Planning and Zoning Department
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Subdivision and Land Development Cover Page for SLD #09-18

Project Name:
601 Washington Street Partners, LLC

Address:
601Washington Street, Conshohocken, PA

Date: March 4, 2022

Status: Under Review

Updates:
Zoning Hearing Board #2019-21 Decision
Preliminary/Final Land Development Plans - Revised March 16, 2022
Fire Marshal Review Memo (and Emergency Action Plan Checklist) - March 25, 2022
Slope Disturbance - Memo and Photos-March 25, 2022
Zoning Ordinance Compliance Review-April 20, 2022
Montgomery County Planning Commission Review - April 20,2022
Township Engineer Review - April 21, 2022
Waiver Requests (Updated) - April 22, 2022
Site History and Clean Up Plan - Received June 20,2022
Letter Comparing Traffic Studies - June 2, 2022
Documents - Received June 6, 2022
Plans - Received June 6, 2022
Reports - Received June 6, 2022
Life Safety and Overall Plans - Received June 20, 2022
Emergency Action Plan Exhibit - Received June 20, 2022
Emergency Management Plan - Draft - Received June 20, 2022
Zoning Ordinance Compliance Review Letter - June 23, 2022
Fire Marshal Memo - June 24, 2022
Township Engineer Review 2 - July 21, 2022
Shade Tree Commission Memo - September 21, 2022

MINUTES
PLANNING COMMISSION
APRIL 26, 2022

Attendees/Participants: Dave Shula, Bob Dambman, Patrick Doran, Elizabeth Shaw-Fink, Scott Quitel, Charlie Guttenplan, AICP, Director of Planning & Zoning, Krista Heinrich (Township Engineer), Vince Manuele (BOS Liaison), Dave Sander (Township Solicitor's office)

1. **CALL TO ORDER:** 7:00 PM by Vice-chair Doran

2. **ANNOUNCEMENTS & CORRESPONDENCE:**

- Montgomery Awards 2022 — Call for Entries: Mr. Guttenplan commented this year's award nomination is open. There was a backlog of several nominations that the County kept on their list; they have either been rewarded or eliminated. Mr. Guttenplan has no suggestions for this year; if anyone has suggestions, a nomination will need to be submitted by May 6, 2022.

- 901 Washington Street/RIVERplace Sewer Module Response Letter—Township Consideration of Planning Commission Comments. Mr. Guttenplan: This correspondence is because when the P.C. responded to Component 4A, there were comments made about the fact that 901 Washington Street was in the Riparian Corridor and there might be some implications because of that. DEP in their review of the module asked for the Township to respond and confirm that they considered the P.C.'s comments in their processing of the module and that is what that letter is.

- It was requested that people talk directly into the microphone so that we can easily hear the recording.

3. **APPROVAL OF MINUTES:** None

4. **ZONING HEARING BOARD APPEALS:** None

5. **CONDITIONAL USE APPLICATIONS:** None

6. **SUBDIVISION &/OR LAND DEVELOPMENT APPLICATIONS:**

- Review SLD #05-22 Keith Catania, Catania Construction, LLC/246 & 248 Hillcrest Avenue, Conshohocken; Preliminary/Final Minor 2-Lot Subdivision

  Attendees: George S. Maalouf, P.E.; Keith Catania, the applicant

  Mr. Guttenplan gave a brief introduction: This is a minor subdivision of two lots; there are currently three tax parcels. The proposal is to combine them and re-divide the area equally to create two lots. The applicant went to the Zoning Hearing Board and was granted several dimensional variances to allow the creation of the two proposed lots and to allow the construction of a single-family home on each. The plan that was the basis for the Zoning Hearing Board decision is the same as the one currently proposed. The applicant is here to get a review of the subdivision; there are several waivers that had to be addressed.

  Mr. Maalouf: they have three lots that they are trying to combine into two lots. They received variances for the area and width of the lots. Review letters were received from the County, Fire Marshal, Township Engineer and the Township Planner. They are mostly "will comply" except for the twenty-one waivers they are requesting.

The following waivers are being requested by the applicant:

1. Applicant is requesting a waiver from section 105-21.B.(1)(n) showing existing features within 500 feet of site. The plans do show improvements 50' beyond the property. **The plans also have an aerial photo (sheet 5 of 5) to show improvements further from the site.**

2. Applicant is requesting a waiver from section 105-23.B.(1)(0)[7] requiring new sidewalks along the property frontage. **There is no sidewalk on that side of the street.**

3. Applicant is requesting a waiver from section 105-21.1.(K).(2) requiring the applicant is to pay a traffic impact fee. **They are taking two houses and adding two houses so the traffic impact will not change.**

4. Applicant is requesting a waiver from section 105-30 requiring a 36' wide cartway, curbs, sidewalks & a tree zone along the property frontage. **Hillcrest Avenue will remain as it exists with the exception of new street trees along property frontage.**

5. Applicant is requesting a waiver from section 105-47(a) requiring new sidewalks along the property frontage.

6. Applicant is requesting a waiver from section 105-52 requiring buffer yards and it will allow the applicant to comply with the shade tree commission recommendations.

7. Applicant is requesting a waiver from section 105-53(d) requiring the applicant to dedicate 10% of the total site area or a fee-in-lieu of dedication. **There is no dedication of land or a fee-in-lieu proposed by the applicant. The applicant installed a water main when the houses across the street were built so they will be bring the water in to the water main they put in so they are hoping this offsets the fee.**

8. Applicant is requesting a waiver from section 105-73 requiring new sidewalks along the property frontage. **There is no existing walks along the frontage and it would not conform to the neighborhood.**

9. Applicant is requesting a waiver from section 105-12(d) from the requirements of this section to allow preliminary & final plan submission to occur contemporaneously.

10. Applicant is requesting a waiver from section 105-23(a)(1) to allow the drawings to be drawn at 1" = 20' where it is required to be 1" = 50' or 1" = 100'.

11. Applicant is requesting a waiver from section 105-41 & 105-75 requiring a stormwater management plan. **There is no stormwater management proposed with the exception of rain barrels at the downspouts. The rain barrels are the only bmp's for this site due to unsuitable soils that will not allow an underground stone seepage bed system.**

12. Applicant is requesting a waiver from section 105-46 requiring new curb along the property frontage. **There is no curb down that side of Hillcrest and it will not conform to the existing roadway.** Mr. Dambman thinks curbing will help define the property. Mr. Catania commented the neighborhood is built out; no other houses can be built. He talked to neighbors, and they do not want curbs.

13. Applicant is requesting a waiver from section105-52(b)(2) requiring a buffer. **No buffer is necessary due to the small-scale nature of the project. The property is surrounded by all residential uses and the alley in the rear is not improved & just grass.** Mr. Catania: buffer side yards are 7 feet, too small for buffers.

14. Applicant is requesting a waiver from section 105-69 requiring full width paving restoration. **The property already has existing water & sewer connections from the homes to be demolished. Only two small connections will be made for re-routing the existing water laterals to the new water main in Hillcrest. This new water main running up Hillcrest was just installed by the applicant and the paving was just resurfaced.** The Township Engineer is ok with this waiver with the condition that it is only 1 trench.

15. Applicant is requesting a waiver from section 105-74 requiring new curb along the property frontage. **Again, there is no curb down that side of Hillcrest and it will not conform to the existing roadway.**

16. Applicant is requesting a waiver from section 105-81 requiring all new utility connections be placed underground. **Again, the two existing houses have all the utility ties and they are all above ground and the applicant is going to utilize these existing connections.**

17. Applicant is requesting a waiver from section l(b)(4)(k) requiring any proposed grading be at least 5' from property line or right-of-way. **The applicant needs to utilize the side yards and they are only 7' wide as per the granted variance. Diversion swales are proposed on the side yards and need the full width of the side yards to achieve. The proposed regrading will still remain completely on the property and not extend onto the neighboring properties.**

18. Applicant is requesting a waiver from section 11(8)(8) requiring a stormwater management report. **There is no stormwater management proposed with the exception of rain barrels at the downspouts. Again, the rain barrels are the only bmp's for this site due to unsuitable soils that will not allow an underground stone seepage bed system.**

19. Applicant is requesting a waiver from section ll (c)(1) that require limiting stormwater runoff. **Again, there is no stormwater management proposed with the exception of rain barrels at the downspouts.**

20. Applicant is requesting a waiver from section ll(c)(3) that require determining the stormwater peak discharge. **Again, there is no stormwater management proposed with the exception of rain barrels at the downspouts.**

21. Applicant is requesting a waiver from section ll(f)(3)(d)(4)(d) that require a detailed soils evaluation to determine suitability of a seepage bed for runoff. **Again, there is no stormwater management proposed with the exception of rain barrels at the downspouts.**

Ms. Heinrich stated that numbers #11, 18, 19, 20, 21 should not be granted; calculations must be provided.

Planning Commission Comments

Mr. Quitel: they keep talking about clay soils, but they are going to be putting in trees, so something is going to be getting into the soil (for the topsoil, you will be fine, but when you get deeper, it will not infiltrate fast enough).

Mr. Dambman: the total impervious on existing lots is 51.23%, what is the proposed (Lot 1: 36.5%, Lot: 33.6%). Mr. Quitel: didn't they already get zoning relief for impervious (yes). Mr. Shula: are you proposing a net increase or decrease in impervious (increasing the building footprint but decreasing the total impervious coverage). Mr. Catania: thinks they are proposing less impervious. They removed a garage and the driveways that existed. Mr. Doran: asked if the overall impervious coverage when said and done will decrease 2% (Yes).

Mr. Doran: commented his concern with waiver #7 is that he understands the substantial contribution the applicant made in installing a water main but is hesitant to waive this since it will take away from the weight of the code section. Mr. Quitel: commented he agrees with the logic. Even though they are getting a tiny reduction in impervious it is still a hard to drain site so he would rather see them convert to trees and plants rather than turf grass because it doesn't really absorb much. He agrees with not granting waiver #7, maybe they can plant more, he doesn't see the hardship to justify. Mr. Catania: were not converting 2 properties into 3, were converting 3 into 2. We're reducing the number of houses. Mr. Quitel: part of it is if you look at the Township before, right now to us developments whether they're small or big they all matter in just taking into account whether it's impervious vs pervious or whether it's stuff going on with climate. every tree we can get makes a difference. Every development we want to be environmentally sensitive, we're trying to push things in a more ecologically sensitive direction. Mr. Maalouf: in Skippack, in lieu of the fee, they allowed us to plant extra trees (yes, that's something the P.C. would consider). Mr. Manuele commented they should recommend that waiver (#7) be granted conditioned on planting of other trees elsewhere other than on the property.

Mr. Maalouf described the existing and proposed conditions. Mr. Doran asked is they have been to the Shade Tree Commission (no, no trees are coming down, they are keeping 2 and adding 4 trees); is there any other landscaping besides the turf grass (there will be landscaping beds in front of the property); Ms. Shaw-Fink asked if the houses are similar to what was built across the street (they will be identical to 250 & 252 Hillcrest Avenue); Mr. Dambman commented the street trees are under wires, they would need to be appropriate for growth height (they can push them back if need be to avoid the wiring); Mr. Quitel suggested planting smaller trees, for example: Eastern Redbuds.

Motions

Mr. Dambman made a motion to recommend not approving waivers #11, 18, 19, 20, 21; seconded by Ms. Shaw-Fink 2nd, Vote: 5-0.

Mr. Quitel made a motion to recommend not granting waiver #7 with the comment and recommendation to the Board of Supervisors that they consider an off-site planting solution of other trees elsewhere other than on the property; seconded by Mr. Shula. Vote 5-0.

Mr. Shula made a motion to recommend that the remaining waivers (#'s 1,2,3,4,5,6,8,9,10,12,13,14, 15, 16 &17) be granted, with the condition that for waiver #14 that it is limited to only 1 trench; seconded by Ms. Shaw-Fink. Vote 5-0

Mr. Shula made a motion to recommend approval of the preliminary/final plan; seconded by Mr. Dambman. Vote 5-0.

In a brief intermission, Mr. Quitel asked if the packets could be organized more efficiently so the more important documents that are likely to be discussed are up front. Mr. Doran commented he would like to see the MCPC letter, Zoning letter, Township Engineer's letter and the waiver list first in the packets.

- Review SLD #09-18 / 601 Washington Street Associates, LP/601 Washington Street, Conshohocken; Preliminary Land Development Plan; Construction of 270-Unit Multi-Family Building and related improvements

Mr. Shula asked to recuse himself from the next application; the applicant is a client of his on another project elsewhere.

Attendees: Ed Campbell, Esquire, the Applicant's Attorney; Rick Roseberry, P.E., Project Engineer at Colliers Engineering & Design; Kevin Kyle, Senior Project Manager at MLB Ventures; Mike Buckley, AIA, Architect

at JKRP Architects; Jerry Roller, AIA, LEED AP, Lead Architect at JKRP Architects; Chris Garrity, RLA, LEED AP, Landscape Architect at Glackin Thomas Panzak; Sandy Koza, P.E., PTOE, Traffic Engineer at McMahon Associates, Inc.

Mr. Guttenplan gave a brief introduction: The Planning Commission previously saw a different version of this project as a sketch plan at their March 12, 2019 meeting and then as a Zoning Hearing Board application (ZHB #2019-21) at their June 25, 2019 meeting. The Zoning Hearing Board denied all of the relief; the 2019 ZHB decision was appealed; Common Pleas Court reversed the denial of two items of relief which has the effect of allowing development to proceed within the floodplain. The remaining items of relief were further appealed; the case is currently in Commonwealth Court awaiting a possible mediation resolution. As an alternative, the applicant has submitted the current plan which the applicant believes needs no additional zoning relief. They are still proposing 270 multi-family units with parking underneath and some outside and a different arrangement of the building and parking to eliminate the need for the other variances that were not granted before. If the plan is approved, it would resolve the appeal.

Mr. Campbell explained the difference between the current plan and the prior plan. The proposed plan shows the structures of the buildings relatively close to Washington Street with the parking behind the building; before the buildings were set further back with parking between Washington Street and the buildings which required variances. The plan has been re-engineered and redesigned so that there is no longer a request from the steep slope ordinance. The only things that haven't been fixed are the things they can't fix; the property is in the floodplain. This plan shows significant parking at 1.75 spaces per dwelling unit; it was pointed out that 1.5 spaces per dwelling unit is required; the plans will be revised to eliminate parking and eliminate impervious coverage. A rendered plan was shown indicating how they are proposing the landscape and amenities; there is a red shale macadam trail that runs along the river, significant landscaping, there is a single primary entrance off Washington Street and two secondary access points, there is significant parking on the ground floor of the buildings, there is a walkway that traverses from Washington Street down to the river. The elevation from parking to livable space is 13.6 feet. A significant portion of the parking to the southeast of the buildings is being removed with the parking reduction; they are still in the process of showing how that will be landscaped and how the plan will be redesigned to accommodate that. There is also a change to the center courtyard based on comments in a review letter pointing out a requirement for having parking not within 10 feet of the building so adjustments had to be made to the courtyard to meet that requirement. They are proposing to have a clubhouse and the clubhouse space will exceed 2% of the square footage of the building, and therefore it qualifies under the criteria for a nonresidential component.

Planning Commission Comments:

Mr. Quitel asked to see an aerial of what the site looks like now; he can not tell where the property boundary lines are.

Mr. Dambman asked what the proposed height of the buildings are (just under 65 feet which is what the code permits).

Mr. Doran commented now that there has been a reduction in parking on the river side is there an opportunity now, with fewer parking spaces and more physical area available, for landscaping to meet that requirement (they believe they will be able to reduce the scope of that waiver by planting additional trees in that area).

Mr. Quitel asked for them to discuss what landscaping is existing, what are they taking down and what will replace what they are taking down (Mr. Garrity: There are approx. 200+/- trees now. About ½ are invasive/nonnative type trees. They are removing about 50 trees. Due to revisions in the layout and less parking, there will be far fewer trees removed. Mr. Quitel: if you don't have to take a mature healthy tree down (even if it's nonnative) is not desirable. Mr. Campbell commented the site is subject to an Act 2 remediation

process. There may be additional trees that DEP's remediation program will be required to be removed to comply with remediation plan which will include capping. The purpose of the cap is to prevent human contact with contaminated soils. Mr. Quitel: What was former use: (the groundwater is contaminated and there is soil contamination). The capping in place, he is not generally comfortable, just because you cap doesn't make them go away. Ms. Heinrich: there is a list of different contaminants and what amounts humans can be in contact with without harm. It is dependent on the contaminant and proposed use. Mr. Campbell: will come back next time with more information related to contaminants, capping & remediation. Mr. Quitel: knowing specifically what the site history was, would be helpful to the Planning Commission and the public.

To follow up, Mr. Manuele commented that Ms. Heinrich indicated that the Act 2 remediation requirements were dictated by use, is it possible that by removing parking and converting that space to open space that is now going to be accessible to the residents, is it possible that somehow changes the Act 2 remediation requirements in any way (no, the cap can be designed for the different uses).

Mr. Doran: the evacuation plan? A lot has changed since 2019. Particularly for this site, Ida. Building on the river has become more terrifying by the storm. They have seen firsthand evacuations and strained emergency response teams who must go to extraordinary lengths to save lives because of the increasing flood events. He is glad to see there is a sophisticated evacuation plan. (Mr. Campbell commented they submitted it to the Township, they expect to get input from EMS, and adjust as necessary. He believes that what they submitted, other applicants along the River have used nearly verbatim of their plan). Mr. Doran asked if they have any information on how high flood waters came on this property; in terms of height (average ground surface elevation is 51; base flood elevation is 59. The finished floor 62.5 feet). It seems like we don't have all the information, like this is part 1 of 2? We are talking about evacuation plans that haven't been reviewed (Mr. Guttenplan: there is an evacuation plan that has been reviewed by the Fire Marshal with recommendations and changes).

Mr. Quitel: If we forget about zoning for a second, and there wasn't a height limit, would you consider going higher with a smaller footprint, would you see a market for that (there are zoning requirements, # of parking spaces, cost of construction. You'd probably need far more units than you could park to make it feasible. One it wouldn't comply with zoning, and two it would be significantly more units to make that work).

Mr. Dambman suggested they could do two-tiered parking underneath. It looks like there is more coverage in parking than there is building, and they can keep their buffers at 50 feet.

Mr. Quitel: In one year we had Isaias and Ida, the river has already told us it's going to flood. All we are talking about now is how good the evacuation plan is. When we see a river that does what it does it is speaking loudly to us, and it does call for creativity. How can we be creative, so the applicant gets the number of units to work for the market, but the Township also gets what it wants; like going higher (they looked at other designs. He couldn't advise his client that the relief they got would carry over since it would be too much of a change).

Mr. Doran: asked if they can talk about traffic? Ms. Koza gave a broad overview of what they looked at in the study. They looked at 9 intersections in the area. They looked at the study in two ways, without the connection to Lee Street which could potentially happen if 901 Washington Street is approved and developed, and the other was without that condition. They also looked at trip count generations for this site; they tried to be conservative on the estimates of the trip generation. They used the Institute of Transportation Engineers Manuel. They used the land use code that is based on multifamily housing, and the proximity to rail transit. They are looking at between 107 (morning)-106(afternoon) in peak hours. All Whitemarsh intersections are meeting level of service results C or better. They will also be paying their Act 209 fee for the site which will cover any off-site improvements that would potentially need to be made. Without Lee Street, the trip distribution changes to about 25% more traffic heading towards Cherry/Elm Streets.

Mr. Kyle spoke about the evacuation plan. He has had multiple experiences with multiple properties along the river. With this evacuation plan, they will have contact numbers for all staff members, floor captains, and contact information of all residents for the advanced notice. If the evacuation calls for the need for residents to remove their car, and if they don't, they will tow their car to a safe site for them. There is also information in the evacuation plans not just for flooding, but a fire or other natural disaster. Mr. Doran asked is the expectation that other than vehicles that people would shelter in place during an event (Yes). Mr. Doran asked where the cars go in advance of the evacuations and will shuttles be provided to bring the residents back to their homes to shelter in place (that is one section of the emergency plan that has to be worked out as they go through the approval process, and they hire staff where they can populate the plan with this information). Mr. Dambman asked what's the number of residential units in other facilities in Conshohocken: Riverwalk has 310 dwelling units, Londonberry: 258 dwelling units.

Mr. Doran had a follow up question on the traffic study. It was said cameras were installed and observed in February 2022, so the activity was recently conducted, but when this project was presented in 2019, was there a study done previously (Yes, a study was done then as well, but because of the lapse time, the code required the study to be done again). Mr. Doran commented he suspects the post pandemic numbers will be different than the February 2022 numbers; he would like to see a comparison with the old numbers and what the results will be.

The following waivers are being requested by the applicant:

A. WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-30.A – STREET STANDARDS. The following chart indicates the required dimensional standards for the various classifications of streets as defined in §105-5. Local streets, basic dimension cartway: 36 feet, Tree Zone: Yes.
   This waiver is requested to allow a cartway width of less than 36 feet. The northern proposed curb line cannot be moved further due to existing transmission power lines. We also request a waiver from providing a tree zone along Washington Street. Our intent is to match existing installed improvements along Washington Street.
B. WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-39A – TREE PRESERVATION, PROTECTION AND REPLACEMENT. All parking areas shall have at least one, three-inch-caliper tree for every two parking spaces provided.
   This waiver is requested as the majority of parking spaces are proposed to be located underneath the proposed building, so there isn't sufficient area to place proposed trees at this density. The applicant's proposal does provide significant landscaping for the building.
C. WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-47.K.1 –SIDEWALKS AND PEDESTRIAN PATHS. A right-of-way of at least 25 feet in width shall be offered for dedication to the Township. If the area is not accepted for dedication, an easement for public use must be provided along with maintenance agreements acceptable to the Township.
   This waiver is requested to allow the required 25' wide right-of-way to be 5' wide due to site constraints.
D. WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-47.K.2 –SIDEWALKS AND PEDESTRIAN PATHS. There must be at least one access to the river. Access points must be located no more than 500 feet apart.
   This waiver is requested to allow access points to be more than 500 feet apart.
E. WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-47.K.3 –SIDEWALKS AND PEDESTRIAN PATHS. A red shale macadam pathway a minimum of 10 feet in width shall be provided and separated from vehicular traffic.

This waiver is requested to allow access from Washington Street to the river trail to be 5 feet in width and be concrete.

F. WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-48.E – STREET TREES. Unless otherwise approved by the Board of Supervisors, street trees shall be planted within a tree planting zone of lawn area or other material approved by the Shade Tree Commission, situated between the sidewalk and curb and measuring a minimum of five feet in width from the planting edge of the curb to the planting edge of the sidewalk.
This waiver is requested to not provide a tree planting zone between the curb and sidewalk along Washington Street. Our intent is to match the existing frontages along Washington Street.

G. WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-50.C.1 – ACCESS AND CIRCULATION. Access to the dwellings and circulation between buildings and other important project facilities for vehicular and pedestrian traffic shall be comfortable and convenient for the occupants.
This waiver is requested from providing access circulation to the dwellings and between the building. Due to maximum impervious requirements, the amount of access paths provided was to the minimum extent. We will provide as many access paths throughout the site while maintaining the maximum impervious cover requirement.

H. WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-52 – BUFFER YARDS Buffer yards are required between subdivisions and land developments and along existing streets to soften visual impact, to screen glare, and to create a visual barrier between conflicting land uses. The extent of buffering required shall be determined by the type of use proposed and the adjacent uses or streets surrounding the proposed development. The impact of the proposed use on adjoining properties is the basis for establishing buffer yard standards. The applicant is encouraged to engage a landscape architect in order to promote the proper use and arrangement of plant materials.
This waiver is requested to allow perimeter buffer yards to be less than 50' in width. Buffer landscaping is provided at the intensity that meets the intent of the buffer yard requirements and address the unique characteristics of the site and intent of the riverfront development district.

I. WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §55-4.B.(6)(f)[1][2]&[3] –TREE PRESERVATION, PROTECTION AND REPLACEMENT. Replacement tree requirement. Subject to the prior approval of the Shade Tree Commission: A maximum of 30 % of the replacement trees may be replaced with ornamental/flowering trees or evergreen trees at a ratio of two flowering or two evergreen trees per required three-inch-caliper shade tree. A maximum of 20% of the replacement trees may be replaced as shrubs with a minimum size of 24 inches in height at a ratio of six shrubs per required three-inch-caliper shade tree. A maximum of 10% of the replacement trees may be replaced as groundcover at a ratio of 40 plants to one three-inch-caliper shade tree. The minimum size of the groundcover will be a one-gallon container.
This waiver is requested to permit the applicant to meet the requirements of this section in accordance with the notations on the landscape plan as well as comments provided by the Shade Tree Commission.

J. WAIVER OF RESOLUTION 2004-8 I.B.4.K. Edges of slopes shall be a minimum of five feet from the property lines.
This waiver is requested to permit grading within five feet of the property lines. The proposed river trail will connect to the adjacent properties. The site will be designed to promote no stormwater impacts to adjacent properties.

Public Comment:

Sydelle Zove: Harts Ridge Road. She is deeply disturbed about references to what was approved elsewhere. She knows every property is unique and doesn't think what happens elsewhere should serve as a precedent. She is hoping they are looking at this as a project on its own merits and considering the waivers they are requesting without regard to what happened elsewhere. One of the waivers was confusing; Waiver F. She urges that waiver request is reworded for clarity. She is a bit confused about where the parking was

eliminated. She was hoping the spaces eliminated were those adjacent to the boat club. She is very committed to Township's code to have the 10' wide red shale macadam trail; and Waiver E should not be granted, and the parking should be reconfigured to allow the widening of that path that leads from Washington Street to the River Walk. She wonders whether the two recently approved projects were considered when the traffic analysis was done. Regarding the remediation approach, how many square feet will be capped. Is it possible to plant in that area? what is the material of the cap? In Ms. Heinrich's letter, there was concern about wetlands and fill, what will be Army Core of Engineer's role, will there be a Jurisdictional Determination. She would like to see a reduction in the number of parking spaces and an increase in the number of trees; she would like to see trees planted on site. The trees planted in the floodway should be required to have a longer warranty period. The Fire Marshal raised a question about remote parking spaces, where are they relocating to? Maybe we can't go higher, but maybe we could request the number of units be reduced and thereby reduce the amount of parking.

In response to the public's comments and concerns: Mr. Roseberry: DEP came out and said these are not wetlands, he suspects the surveyors came out and flagged at the outfall of the existing 48-inch drainage pipe and picked them up and assumed them as wetlands. They were not wetlands; they just delineated the waters edge through there; they are getting that clarified.

Mr. Doran: he knows there is a continuation here, but he knows there are some waivers that can be acted on. Mr. Quitel prefers to wait and thinks that everyone benefits if they take a fresh look at the site. He would rather make an independent judgement, rather than just trust DEP. It's a real tragedy that this Board and the BOS approved that plan as it is (901 Washington Street). There is a push in our township to be more mindful of environmental concerns. Mr. Dambman agrees with Mr. Quitel and commented that 901 Washington Street is 1/5 the units of what this site is going to be.

Mr. Doran commented the Planning Commission would like them to come back and thinks Waiver A might be something they can move quickly on; Waiver B needs a lot more thought; Waiver C - parking reduction along the boat club should be reconsidered; Waiver D is not controversial; Waiver E will be part of the discussion regarding parking on that side; Waiver F should be rephrased for their consideration; Waiver G – withdrawing; Waiver H, the buffer yards might work itself out; Waiver I is trees as well. It has more to do with tree equivalents; and Waiver J is probably not controversial. Mr. Doran stated the applicant heard their comments and they will come back with a comparison traffic study to the 2019 data; and their pleas to reduce hardscape. Mr. Quitel commented, regardless of what DEP says, please give them detailed site history.

Mr. Campbell clarified what the Planning Commission would like to hear at the next meeting: the Emergency Evac Plan; environmentally they want to know more about site history and what is the actual Act 2 remediation plan; preservation and replacement of trees as it relates to environmental issues; additional testimony about traffic impact comparing the 2019 study to 2022; and to the extent they are taking input from the professionals and modifying the plan.

Mr. Guttenplan asked when they come back with revised plans, does the Planning Commission want staff reviews before the meeting (Yes, they would want opportunity for staff reviews).

7. OLD BUSINESS:

Mr. Dambman – gave an update on the Ridge Pike widening project. The project is underway. There was a public presentation last night, every seat was filled. It is going to be over 2 years of construction and there will be some detours. Ms. Heinrich commented they are having weekly meetings now.

8. NEW BUSINESS:

Mr. Doran: he will be communicating with Mr. Guttenplan about some sort of summary about how to find documents easier in the packets, maybe a table of contents.

Mr. Doran asked if he could have a copy of the court of common pleas decision on the earlier presentation of 601 Washington Street. Mr. Guttenplan will provide that.

9. PLANNING COMMISSION MEMBERS COMMENTS: None

10. PUBLIC COMMENT FOR NON-AGENDA ITEMS:

Ms. Zove: just wanted to add she stayed the extra time (at the Ridge Pike meeting) because she wanted to speak with 1 person who could answer her questions, but he was surrounded by people who were not wearing masks. She would characterize that meeting as a zoo. She would have preferred a presentation describing what was happening, where it was happening and when it was happening rather than a free for all. There wasn't much of an opportunity to ask a question clearly and coherently nor was it possible to hear the answer. The photographs displayed just showed the staging of the project and nothing else. The next time around it has to be done differently.

11. ADJOURNMENT

- On a motion made by Mr. Dambman; seconded by Ms. Shaw-Fink, the meeting was adjourned at 10:12 PM.

Respectfully submitted,

_____

Charles L. Guttenplan, AICP, Director of Planning & Zoning

The Planning Commission is appointed as an advisory group to the Board of Supervisors and the Zoning Hearing Board with respect to comprehensive land use planning, existing land use, and various land use and zoning applications in Whitemarsh Township. No formal decisions are rendered by the Planning Commission. Formal decisions are rendered by the Board of Supervisors or Zoning Hearing Board, as prescribed by law, based on the type of application.

MCPC NO. _____

PROCESSED and REVIEWED. A report has been prepared by the Montgomery County Planning Commission in accordance with the Municipalities Planning Code.

Certified this date _____

_____
For The Director

MONTGOMERY COUNTY PLANNING COMMISSION

OWNER'S CERTIFICATION

By: _____
Name:
Title:

Commonwealth of Pennsylvania
: ss
County of Montgomery **AND NOW**, this _____ day of _____ 20__, before me, the undersigned Notary, personally appeared _____ who acknowledged himself to be the _____ of 601 Washington Street Assoc LP, the sole general partner of 601 Washington Street Assoc LP a Pennsylvania limited partnership and he, as such _____, being authorized to do so, executed the foregoing instrument for the purposes therein contained.**IN WITNESS WHEREOF,** I hereunder set my hand and official seal.

_____ _____ Notary Public My commission expires:

OWNER'S CERTIFICATION

By: _____
Name:
Title:

Commonwealth of Pennsylvania
: ss
WE, THE OWNERS OF THE LAND INVOLVING THE ACCOMPANYING PLANS, BEING DULY SWORN ACCORDING TO LAW, DEPOSE AND SAY THAT WE ARE THE SOLE OWNERS OR ARE THE AUTHORIZED OFFICERS OF THE CORPORATION THAT IS THE SOLE OWNERS OF THIS PROPERTY IN PEACEFUL POSSESSION OF IT, AND THAT THERE ARE NO SUITS PENDING AFFECTING THE TITLE OF THE SAME, AND THAT WE ACKNOWLEDGE AND ENDORSE THE ACCOMPANYING PLANS AND THAT WE PROPOSE THE ATTACHED RECORD PLAN FOR RECORDING (AS APPLICABLE), AFTER RECEIVING ALL REQUIRED MUNICIPAL APPROVALS. **IN WITNESS WHEREOF,** I hereunder set my hand and official seal.

_____ _____ Notary Public My commission expires:

PLAN PREPARER'S STATEMENTS

I, _____, A REGISTERED SURVEYOR OF THE COMMONWEALTH OF PENNSYLVANIA, DO HEREBY CERTIFY
THAT THE PLAN, PREPARED FROM A FIELD SURVEY ON _____, 20____ CORRECTLY REPRESENTS THE PROPERTY BOUNDARY OF THE PROPOSED SUBDIVISION OR LAND DEVELOPMENT.

_____ _____
DATE REGISTERED SURVEYOR'S SIGNATURE

I, _____, A LICENSED PROFESSIONAL ENGINEER OF THE COMMONWEALTH OF PENNSYLVANIA, DO HEREBY CERTIFY THAT THE ACCOMPANYING APPLICATION, PLANS, AND SUPPORTING DOCUMENTATION ARE TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE.

_____ _____
DATE LICENSED ENGINEER'S SIGNATURE

MUNICIPAL APPROVAL / REVIEW BLOCK
REVIEWED BY THE WHITEMARSH TOWNSHIP ENGINEER THIS _____ DAY OF_____, 20____.

_____ _____
WHITEMARSH TOWNSHIP ENGINEER SIGNATURE

APPROVED BY THE TOWNSHIP OF WHITEMARSH THIS _____ DAY OF _____, 20____.

_____ _____
WHITEMARSH TOWNSHIP MANAGER SIGNATURE

RECORDER OF DEEDS

RECORDED IN THE OFFICE FOR THE RECORDING OF DEEDS IN AND FOR COUNTY OF MONTGOMERY, AT NORRISTOWN, PA,
IN PLAN BOOK _____, PAGE NO. _____ ON _____, 20____.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS

FOR

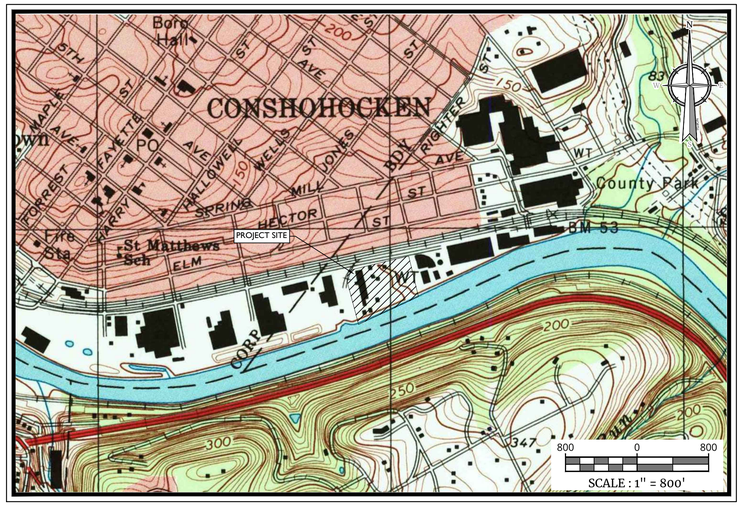
601 WASHINGTON STREET ASSOCIATES LP

601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

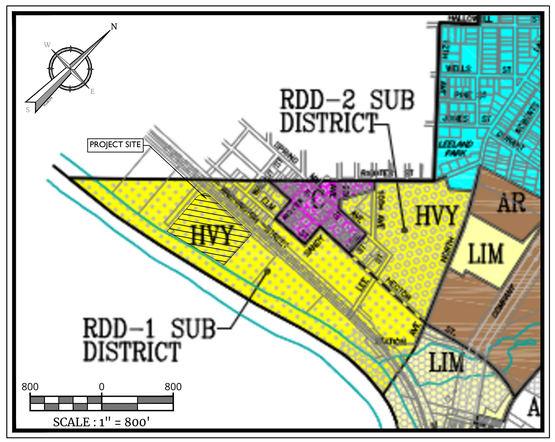
WHITEMARSH TOWNSHIP

MONTGOMERY COUNTY, PENNSYLVANIA



LOCATION MAP

SOURCE: PA USGS NORRISTOWN QUAD



ZONING MAP

SOURCE: WHITEMARSH ZONING MAP

- A - RESIDENTIAL DISTRICT (15,000 SQ. FT.)
- B - RESIDENTIAL DISTRICT (10,000 SQ. FT.)
- C - RESIDENTIAL DISTRICT (6,000 SQ. FT.)
- AR - ADMINISTRATION AND RESEARCH DISTRICT
- LIM - LIMITED INDUSTRIAL DISTRICT
- HVY - HEAVY INDUSTRIAL DISTRICT

INDEX OF SHEETS

SHT. No.	DESCRIPTION	LATEST REVISION
1*	COVER SHEET	
2*	GENERAL NOTES	
3	EXISTING TREE SURVEY PLAN	
4	EXISTING CONDITIONALS AND DEMOLITION PLAN	
5*	DIMENSION PLAN	
6	GRADING PLAN	
7	UTILITY PLAN	
8-9	PROFILES	
10	TRUCK TURNING PLAN	
11-17	CONSTRUCTION DETAILS	
18	ADA GRADING PLAN	
19-22	EROSION AND SEDIMENT POLLUTION CONTROL PLANS	
23-27	POST-CONSTRUCTION STORMWATER MANAGEMENT PLANS	
	ADDITIONAL SETS	
LP-1 - LD-3	LANDSCAPING & LIGHTING PLANS (BY OTHERS)	
A1-A10	ARCHITECTURAL SHEET SET (BY OTHERS)	
	* SHEETS TO BE RECORDED	

APPLICANT/OWNER:
601 WASHINGTON STREET ASSOC LP
201 KING OF PRUSSIA RD, SUITE 501
RADNOR, PA 19087

WAIVERS & VARIANCES

WAIVERS REQUESTED WITHIN WHITEMARSH TOWNSHIP:

SECTION 105-39.A -	A WAIVER FOR THE REQUIREMENT THAT ALL PARKING AREAS SHALL HAVE AT LEAST ONE TREE OR TWO-AND-ONE-HALF-INCHES MINIMUM CALIPER FOR EVERY TWO PARKING SPACES PROVIDED.
SECTION 105-47.K -	A WAIVER IS REQUESTED TO ALLOW THE REQUIRED 25' WIDE RIGHT-OF-WAY TO BE 5' WIDE DUE TO SITE CONSTRAINTS.
SECTION 105-52-	A WAIVER IS REQUESTED TO ALLOW PERIMETER BUFFER YARDS TO BE LESS THAN 50' IN WIDTH. BUFFER LANDSCAPING IS PROVIDED AT THE INTENSITY THAT MEETS THE INTENT OF THE BUFFER YARD REQUIREMENTS AND ADDRESS THE UNIQUE CHARACTERISTICS OF THE SITE AND INTENT OF THE RIVERFRONT DEVELOPMENT DISTRICT.
SECTION 55-4.B.(6)(f)[1][2]&[3] -	A WAIVER FROM THE REQUIREMENT THAT REPLACEMENT TREES INSTALLED BY APPLICANT BE SUBJECT TO CERTAIN MAXIMUM PERMISSIBLE PERCENTAGES FOR FLOWERING TREES, EVERGREEN TREES, SHRUBS AND GROUND COVERS.

VARIANCES & SPECIAL EXCEPTIONS GRANTED BY WHITEMARSH TOWNSHIP ZHB: RESOLUTION #2019-26895: AUGUST 6, 2020

SECTION 116-165 -	VARIANCE TO PERMIT NON-RESIDENTIAL STRUCTURES IN THE FLOODPLAIN CONSERVATION DISTRICT.
SECTION 116-166.A(3) -	SPECIAL EXCEPTION TO PERMIT A STORMWATER RETENTION BASIN WITHIN FLOODWAY.

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REV	DATE	DRAWN BY	DESCRIPTION

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER:	DRAWING NAME:
16001030B	C-CVER

SHEET TITLE: COVER SHEET

SHEET NUMBER: 1 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\Site Plans\C-CVER.dwg(C-01 COVER By: CHRIS.MESZLER

1. PROPERTY IDENTIFICATION - BEING KNOWN AS TAX PARID:

   601 WASHINGTON: 650012679009 DEED BOOK: 5260 PG: 00684

   AS SHOWN IN THE CURRENT OFFICIAL TAX MAPS OF WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA. ADDRESS FOR THE SITE IS 601 WASHINGTON STREET.
2. THE SUBJECT PROPERTY IS LOCATED IN THE HEAVY INDUSTRIAL (HVY)/RIVERFRONT DEVELOPMENT (RDD-1) SUB DISTRICT/FLOODPLAIN CONSERVATION OVERLAY DISTRICT/RIPARIAN CORRIDOR CONSERVATION OVERLAY DISTRICT. THE PROPOSED USE OF THE SUBJECT PROPERTY IS MULTI-FAMILY RESIDENTIAL APARTMENTS AND IS PERMITTED BY RIGHT IN THE RIVERFRONT DEVELOPMENT DISTRICT (RDD-1).
3. APPLICANT/OWNER:

   601 WASHINGTON STREET ASSOC LP

   201 KING OF PRUSSIA RD, SUITE 501

   RADNOR, PA 19087
4. STATEMENT OF INTENT - THE PROPOSED USE IS MULTI-FAMILY RESIDENTIAL. THE PROPOSED APARTMENT BUILDING IS FOUR FLOORS OVER AT-GRADE PARKING.
5. BOUNDARY AND TOPOGRAPHIC INFORMATION SHOWN HEREON WAS OBTAINED FROM FIELD SURVEY PERFORMED ON JANUARY 26, 2018 AND PREPARED BY VALLEY LAND SERVICES, LLC., PLAN DATED FEBRUARY 5, 2018 AND LAST REVISED JULY 25, 2019.
6. DEED REFERENCE - DEED BOOK 5260 PAGE 00684
7. MAP REFERENCES -

   A MAP ENTITLED: "ALTA/NSPS LAND TITLE SURVEY" PREPARED BY VALLEY LAND SERVICES, LLC, DATED FEBRUARY 5, 2018, LAST REVISED JULY 25, 2019.
8. THIS PLAN WAS PREPARED WITH THE BENEFIT OF A TITLE REPORT ISSUED BY FIRST AMERICAN TITLE INSURANCE COMPANY, COMMITMENT NO. PAFA17-5635 DJC., THIS PROPERTY MAY BE SUBJECT TO RESTRICTIONS, COVENANTS AND/OR EASEMENTS, WRITTEN OR IMPLIED AS THEY APPEAR WITHIN THE TITLE REPORT AS FOLLOWS
   A. DEED DEDICATION BETWEEN PHILADELPHIA STEEL AND IRON COMPANY AND WHITEMARSH TOWNSHIP DATED 10/05/1937 AND RECORDED 10/06/1937 AS IN DEED BOOK 1247 PAGE 291. -LOCATION COULD NOT BE DETERMINED FROM RECORD DOCUMENT.
   B. RIGHT OF WAY GRANTED TO THE BELL TELEPHONE COMPANY OF PENNSYLVANIA IN DEED BOOK 1293 PAGE 528. LOCATION COULD NOT BE DETERMINED FROM RECORD DOCUMENT.
   C. RIGHT OF WAY BETWEEN JOHN J. REGAN AND WILMER C. SWARTLEY CO-PARTNERS TRADING AS PHILADELPHIA STEEL AND IRON COMPANY AND PHILADELPHIA SUBURBAN WATER COMPANY, DATED 8/23/1948 AND RECORDED 10/27/1948 AS IN DEED BOOK 1957 PAGE 560. LOCATION COULD NOT BE DETERMINED FROM RECORD DOCUMENT. NOT PLOTTED ON SURVEY.
   D. RIGHT OF WAY BETWEEN JOHN J. REGAN AND WILMER C. SWARTLEY CO-PARTNERS TRADING AS PHILADELPHIA STEEL AND IRON COMPANY AND PHILADELPHIA SUBURBAN WATER COMPANY, DATED 8/23/1948 AND RECORDED 10/27/1948 AS IN DEED BOOK 1957 PAGE 560. LOCATION COULD NOT BE DETERMINED FROM RECORD DOCUMENT.
   E. DEED OF DEDICATION BETWEEN WILMER C. SWARTLEY AND JOHN J. REGAN CO-PARTNERS TRADING AS PHILADELPHIA STEEL AND IRON COMPANY AND TOWNSHIP OF WHITEMARSH, DATED 8/23/1948 AND RECORDED 1/31/1949 AS IN DEED BOOK 1978 PAGE 1. LOCATION COULD NOT BE DETERMINED FROM RECORD DOCUMENT.
   F. RIGHT OF WAY GRANTED TO PHILADELPHIA ELECTRIC COMPANY IN DEED BOOK 3632 PAGE 77. BLANKET IN NATURE. NOT PLOTTED.
   G. RIGHT OF WAY GRANTED TO PHILADELPHIA ELECTRIC COMPANY IN DEED BOOK 5025 PAGE 2495. BLANKET IN NATURE. NOT PLOTTED.
   H. RIGHT OF WAY GRANTED TO PECO ENERGY CO. AS IN DEED BOOK 5205 PAGE 13. BLANKET IN NATURE. NOT PLOTTED.
   I. MATTERS SHOWN ON THAT CERTAIN ALTA/ACSM LAND TITLE SURVEY DATED MAY 14, 1998 AS FILE NO. 05303 BY MOMENEE SURVEY GROUP, INC., AS FOLLOWS:
      a. 48" STORM MAIN RUNS THROUGH EASTERN AND NORTHERN PORTION OF PREMISES NOT SUBJECT TO AN EASEMENT - APPROXIMATE LOCATION SHOWN.
      b. RIGHTS OF OTHER FOR INGRESS AND EGRESS PURPOSES TO THE TOWPATH EXTENDED THROUGH PREMISES - NO TOWPATH OBSERVED AT THE TIME OF THE SURVEY.
      c. ENCROACHMENT OF ADJOINING PARCEL ON THE SOUTHWESTERN SIDE OF PREMISES - SHOWN.
      d. GAS UTILITY LINE EXTENDS ALONG NORTHERN SIDE OF PREMISES AND INTO NORTHWESTERN SIDE OF PREMISE WITHOUT THE BENEFIT OF AN EASEMENT - APPROXIMATE LOCATION SHOWN.
10. THE EXISTENCE OF ANY UNDERGROUND STORAGE TANKS, IF ANY, WAS NOT KNOWN AT THE TIME OF THE SURVEY.
11. TOPOGRAPHIC INFORMATION SHOWN HEREON WAS TAKEN FROM GROUND SURVEY PERFORMED BY VALLEY LAND SERVICES, LLC. THE LOCATION OF ALL UNDERGROUND UTILITIES AS SHOWN HEREON ARE APPROXIMATE AND ARE BASED ON VISIBLE SURFACE STRUCTURES AND ANY UTILITY MAPS PROVIDED BY UTILITY COMPANIES REFERENCED HEREON.
12. EXISTING SITE TOPOGRAPHIC INFORMATION AS SHOWN HEREON IS BASED UPON NAVD 88.
13. BENCHMARKS: MAG NAIL, ELEV. 57.31
14. CONCRETE MONUMENTS, PK NAILS, AND IRON PINS SHALL BE SET UPON APPROVAL OF THIS PLAN PRIOR TO RECORDING, AS NEEDED.
15. ZONE DATA:

HEAVY INDUSTRIAL (HVY) WITH RDD-1 SUB ZONING DISTRICT			
	REQUIRED	EXISTING	PROPOSED
USE		APARTMENTS	
MINIMUM LOT SIZE	130,680 SF	393,027 SF	393,027 SF
		9.02 AC	9.02 AC
RIVER FRONT OPEN SPACE AREA	100' WIDE BUFFER	N/A	86,752 SF
LOT SIZE (MINUS RIVER FRONT OPEN SPACE)	130,680 SF	N/A	306,275
MINIMUM LOT WIDTH	200 FT	695.68 FT	695.68 FT
PRINCIPAL BUILDING			
MINIMUM FRONT YARD	20 FT	19.40 FT	20 FT
MINIMUM REAR YARD	20 FT	55.06 FT	204.91 FT
MINIMUM SIDE YARDS	20 FT	40.38 FT	37.83 FT
PARKING SETBACK	15 FT	12.17 FT	16.00 FT
MAXIMUM BUILDING HEIGHT	4 STORIES	2 STORIES	4 STORIES
MAXIMUM DENSITY	30 UNITS/ACRE	N/A	29.93 UNITS/ACRE
MAXIMUM BUILDING COVER	40%	11.48%	32.02%
		45,122 SF	98,057 SF
MAXIMUM IMPERVIOUS COVER	75%	45.26%	74.94%
		177,902 SF	229,532 SF
OPEN / GREEN SPACE AREA	40%	54.74%	41.60%
		215,125 SF	163,495 SF
REAR YARD AREA, FROM PRIMARY BUILDING PLANE		55,173 SF	134,818 SF
PARKING			
1.75 SPACES/ DWELLING*	473	0	486
ADA (VAN SPACES)**	9 (2)	0	10 (2)

* BASED ON 270 UNITS

** ADA REQUIREMENTS BASED ON THE 401-500 PARKING SPACES RANGE.

16. POTABLE WATER SERVICE WILL BE BY EXISTING PUBLIC WATER SUPPLY AND SANITARY SEWER SERVICE WILL BE BY PUBLIC SEWAGE.
17. WETLANDS ARE SHOWN ON PLAN.
18. BY GRAPHICAL REPRESENTATION ONLY THIS PROPERTY IS LOCATED IN FLOOD HAZARD ZONE AE AS SHOWN ON FLOOD INSURANCE RATE MAP, MAP NO. 42091C0358G WHICH HAS AN EFFECTIVE DATE OF MARCH 2, 2016 AND IS IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE. THE FEMA CALCULATED 100-YEAR FLOOD ELEVATION FOR THIS PROJECT IS 60.5 FEET (NAVD 88).
19. ALL SOILS ON SITE WERE TAKEN FROM THE NRCS WEB SOIL SURVEY.
20. THE SITE IS UNDERLAIN BY THE OLIGOCLASEMICA SCHIST OF THE WISSAHICKON FORMATION AND THE IMPURE LIMESTONE AND DOLOMITE OF THE CONESTOGA FORMATION.
21. THE PROPOSED DEVELOPMENT IS WITHIN THE LOWER SCHUYLKILL RIVER WATERSHED, WHICH DOES NOT HAVE AN APPROVED ACT 167 PLAN.
22. NO TOPSOIL SHALL BE REMOVED FROM THE SITE UNLESS AUTHORIZED BY WHITEMARSH TOWNSHIP OR MONTGOMERY COUNTY CONSERVATION DISTRICT. PERMANENT REMOVAL OF TOPSOIL FROM LAND WITHIN WHITEMARSH TOWNSHIP IS PROHIBITED. NO TOPSOIL SHALL BE USED AS SPOIL.
23. EXCESS CONSTRUCTION WASTE AND DEBRIS SHALL BE REMOVED FROM THE SITE AT THE COMPLETION OF THE PROJECT. UNDER NO CIRCUMSTANCES SHALL SUCH MATERIAL BE ALLOWED TO BE BURIED OR USED AS BACKFILL MATERIAL.
24. MATERIALS, WORKMANSHIP, AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREON SHALL BE IN ACCORDANCE WITH:
   A. PENNSYLVANIA DEPARTMENT OF TRANSPORTATION "SPECIFICATIONS PUBLICATION 408/2020"; AS SUPPLEMENTED.
   B. CURRENT PREVAILING MUNICIPAL, COUNTY, AND/OR STATE AGENCY SPECIFICATIONS, STANDARDS, CONDITIONS, AND REQUIREMENTS.
   C. CURRENT PREVAILING UTILITY COMPANY/AUTHORITY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
   D. CURRENT MANUFACTURER SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
26. APPROVAL OF THIS PLAN DOES NOT GUARANTEE PERMIT ISSUANCE FOR SEWAGE DISPOSAL.
27. UTILITY RELOCATIONS SHOWN HEREON, IF ANY, ARE FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT REPRESENT ALL REQUIRED UTILITY RELOCATIONS. THE CONTRACTOR IS RESPONSIBLE FOR PERFORMING AND/OR COORDINATING ALL REQUIRED UTILITY RELOCATIONS IN COOPERATION WITH THE RESPECTIVE UTILITY COMPANY/ AUTHORITIES.
28. PROPER PIPE COVERAGE SHALL BE MAINTAINED DURING ALL PHASES OF CONSTRUCTION. PIPE LENGTHS SHOWN HEREON ARE FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE.
29. TRAFFIC SIGNAGE AND STRIPING SHALL CORRESPOND TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
30. THIS IS A SITE DEVELOPMENT PLAN AND UNLESS SPECIFICALLY NOTED ELSEWHERE HEREON, IS NOT A SURVEY.
31. ALL STRUCTURES SHALL CONFORM TO THE APPROVED BULK ZONING REQUIREMENTS.
32. DO NOT SCALE DRAWINGS AS THEY PERTAIN TO ADJACENT AND SURROUNDING PHYSICAL CONDITIONS, BUILDINGS, STRUCTURES, ETC. THEY ARE SCHEMATIC ONLY, EXCEPT WHERE DIMENSIONS ARE SHOWN THERETO.
33. THIS SET OF PLANS HAS BEEN PREPARED FOR THE PURPOSES OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL APPROVALS REQUIRED HAVE BEEN OBTAINED, ALL CONDITIONS OF APPROVAL HAVE BEEN SATISFIED AND THE DRAWINGS HAVE BEEN STAMPED "ISSUED FOR CONSTRUCTION". THIS SHALL INCLUDE APPROVAL OF ALL CATALOG CUTS, SHOP DRAWINGS AND/OR DESIGN CALCULATIONS AS REQUIRED BY THE PROJECT OWNER AND/OR MUNICIPAL ENGINEER.
34. EXISTING UTILITY INFORMATION SHOWN HEREON HAS BEEN COLLECTED FROM VARIOUS SOURCES AND IS NOT GUARANTEED AS TO ACCURACY OR COMPLETENESS. THE CONTRACTOR SHALL VERIFY ALL INFORMATION TO HIS SATISFACTION PRIOR TO EXCAVATION. WHERE EXISTING UTILITIES ARE TO BE CROSSED BY PROPOSED CONSTRUCTIONS, TEST PITS SHALL BE DUG BY THE CONTRACTOR PRIOR TO CONSTRUCTION TO ASCERTAIN EXISTING INVERTS, MATERIALS, AND SIZES. TEST PIT INFORMATION SHALL BE GIVEN TO THE ENGINEER PRIOR TO CONSTRUCTION TO PERMIT ADJUSTMENTS AS REQUIRED TO AVOID CONFLICTS. THE CONTRACTOR SHALL NOTIFY THE UNDERSIGNED PROFESSIONAL IMMEDIATELY IF ANY FIELD CONDITIONS ENCOUNTERED DIFFER MATERIALLY FROM THOSE REPRESENTED HEREON. SUCH CONDITIONS COULD RENDER THE DESIGNS HEREON INAPPROPRIATE OR INEFFECTIVE.
35. THE CONTRACTOR IS RESPONSIBLE FOR PROJECT SAFETY, INCLUDING PROVISION OF ALL APPROPRIATE SAFETY DEVICES AND TRAINING REQUIRED.
36. STORMWATER FACILITIES SHALL BE OWNED AND MAINTAINED BY THE PROPERTY OWNER IN PERPETUITY. THE PROPERTY OWNER SHALL PROVIDE A BLANKET STORMWATER ACCESS EASEMENT TO THE TOWNSHIP FOR THE PURPOSE OF ACCESS TO THE STORMWATER FACILITIES. IF, IN THE JUDGEMENT OF THE TOWNSHIP ENGINEER, THE OWNER HAS FAILED TO MAINTAIN THE STORMWATER FACILITIES IN SUCH A MANNER AS TO ENSURE THEIR PROPER FUNCTIONING, THE TOWNSHIP AFTER PROVIDING A WRITTEN NOTICE SHALL HAVE THE RIGHT TO ENTER UPON THE LANDS OF THE OWNER AND TO MAKE ANY REPAIRS AS MAY BE NECESSARY TO THE STORMWATER FACILITIES TO ENSURE THAT SUCH FACILITIES FUNCTION AND PERFORM IN ACCORDANCE WITH THE DESIGN SPECIFICATIONS. ANY AND ALL COSTS INCURRED BY THE TOWNSHIP FOR SUCH REPAIRS AND/OR MAINTENANCE SHALL BE PAID IN FULL BY THE OWNER. A LIEN OR LIENS MAY BE PLACED AGAINST THE PROPERTY IF THE OWNER FAILS TO REMIT PAYMENT WITHIN SIXTY (60) DAYS.
37. DRAINAGE EASEMENTS, IF ANY, MAY NOT BE ALTERED WITHOUT THE WRITTEN PERMISSION OF THE TOWNSHIP ENGINEER. NO OBSTRUCTIONS SUCH AS PLANTED BERMS OR FENCES MAY BE INSTALLED IN THE DRAINAGE EASEMENT AREAS WITHOUT SUFFICIENT PROVISION FOR THE PASSAGE OF STORMWATER, AND ANY SUCH PROPOSED PROVISION SHALL BE APPROVED IN WRITING BY THE TOWNSHIP ENGINEER.
38. STORMWATER BMPS ARE FIXTURES THAT CAN BE ALTERED OR REMOVED ONLY AFTER APPROVAL BY WHITEMARSH TOWNSHIP.

_____ DATE _____ OWNER/APPLICANT

39. ALL ROADWAYS, CURBS, PARKING LOTS, SANITARY SEWERS, STORM SEWERS, STORMWATER MANAGEMENT DEVICES, AND APPURTENANCES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS AND TO THE STANDARDS AND SPECIFICATIONS OF WHITEMARSH TOWNSHIP AND THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION.
40. THE DEVELOPER SHALL BE RESPONSIBLE FOR PROVIDING ALL PAVEMENT MARKINGS, STREET SIGNS, TRAFFIC DIRECTIONAL AND CONTROL SIGNS SHOWN ON THIS PLAN IN ACCORDANCE WITH THE WHITEMARSH TOWNSHIP STANDARDS. ALL SIGNAGE SHALL BE CONSISTENT WITH EXISTING SIGNAGE WITHIN WHITEMARSH TOWNSHIP.
41. CONTRACTOR(S) SHALL RECEIVE A COPY OF THE APPROVED EROSION & SEDIMENTATION CONTROL PLANS.
42. WHITEMARSH TOWNSHIP SHALL NOT BE RESPONSIBLE FOR THE MAINTENANCE OF ANY AREA NOT DEDICATED TO THE TOWNSHIP.
43. THERE SHALL BE NO CHANGES OR DEVIATION FROM THESE PLANS UNLESS APPROVED BY THE ENGINEER. SUCH PLAN CHANGES, SHOULD THEY BECOME NECESSARY, ARE SUBJECT TO THE WHITEMARSH TOWNSHIP ORDINANCES.
44. THE CONTRACTOR SHALL NOTIFY ALL APPROPRIATE UTILITIES AT LEAST SEVENTY-TWO (72) HOURS PRIOR TO THE START OF ANY CONSTRUCTION. ALL UTILITIES HAVE BEEN IDENTIFIED BASED ON THE BEST AVAILABLE INFORMATION AND LISTED ON THESE PLANS IN ACCORDANCE WITH ACT 287 REQUIREMENTS. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF EXISTING UTILITIES AND ALL EFFORTS SHALL BE UNDERTAKEN TO PROTECT EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE TO UTILITIES BY THE CONTRACTOR SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE. RESTORATION OF ALL EXISTING SURFACE IMPROVEMENTS DAMAGED OR ALTERED DURING CONSTRUCTION, INCLUDING LANDSCAPING, SHALL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR.
45. THE CONTRACTOR SHALL MAKE PROVISIONS FOR MAINTAINING THE SAFE FLOW OF TRAFFIC DURING CONSTRUCTION WITHIN THE EXISTING ROAD RIGHTS-OF-WAY WHILE ENTERING AND LEAVING THE SITE.
46. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY PERMITS RELATIVE TO THE CONSTRUCTION PROPOSED ON THE PLANS.
47. ENGINEERING PERMITS: PRIOR TO ANY WORK WITHIN THE RIGHT OF WAY, PERMITS MUST BE OBTAINED FROM THE TOWNSHIP.
48. BY SUBMISSION OF THESE PLANS, THE ENGINEER ON RECORD CERTIFIES THAT THESE PLANS ARE IN COMPLETE COMPLIANCE WITH THE WHITEMARSH TOWNSHIP STORMWATER MANAGEMENT ORDINANCE.
49. THIS LAND DEVELOPMENT PLAN WAS PREPARED IN ACCORDANCE WITH REQUIREMENTS ESTABLISHED IN THE WHITEMARSH TOWNSHIP SUBDIVISION AND LAND DEVELOPMENT ORDINANCE AND THE ZONING ORDINANCE OF WHITEMARSH TOWNSHIP.
50. ALL CROSSWALKS, STOP BARS, ARROWS, AND "ONLY'S" WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE HOT THERMOPLASTIC.
51. ALL SHEETS INCLUDED IN THIS LAND DEVELOPMENT PLAN SET ARE TO BE CONSIDERED AS IF RECORDED WITH THE RECORD PLAN.
52. THERE SHALL BE A PRE CONSTRUCTION CONFERENCE AND INSPECTION WITH THE WHITEMARSH TOWNSHIP SHADE TREE COMMISSION PRIOR TO START OF CONSTRUCTION. AFTER THE INSPECTION IS COMPLETE, THE SHADE TREE COMMISSION SHALL NOTIFY WHITEMARSH TOWNSHIP IN WRITING. UPON WHITEMARSH TOWNSHIP APPROVAL, DEMOLITION, GRADING AND CONSTRUCTION MAY PROCEED.
53. POOLS SHALL BE ENTIRELY ENCLOSED WITH A FENCE NOT LESS THAN FOUR FEET IN HEIGHT.
54. ALL ELECTRIC, TELEPHONE, AND COMMUNICATION SERVICE FACILITIES, BOTH MAIN AND SERVICE LINES, SHALL BE PROVIDED BY UNDERGROUND CABLES, INSTALLED IN ACCORDANCE WITH THE PREVAILING STANDARDS AND PRACTICES OF THE UTILITY AND OTHER COMPANIES PROVIDING SUCH SERVICE.
55. ALL PARKING SPACE SIZES ARE SHOWN ON THE OVERALL SITE PLAN. HALF OF THE EV PARKING SPACES ARE HANDICAP ACCESSIBLE (ADA) SPACES.
56. PROPOSED CURB ALONG WASHINGTON STREET SHALL BE 6" HIGH BELGIAN BLOCK CURB. PROPOSED CURB INTERIOR TO SITE SHALL BE VERTICAL CONCRETE CURB, UNLESS OTHERWISE NOTED.
57. UNDER NO CIRCUMSTANCES SHALL CHLORINATED SWIMMING POOL DISCHARGE BE DIRECTED TO THE RIVER OR TO ANY PIPING SYSTEM THAT DISCHARGES TO THE RIVER.
58. ALL CONSTRUCTION AND MATERIALS TO BE IN ACCORDANCE WITH PENNDOT PUBLICATION 408 AND WHITEMARSH CONSTRUCTION STANDARDS.
59. THESE PLANS CONFORM WITH THE WHITEMARSH FLOODPLAIN MANAGEMENT ORDINANCE.
60. THE PROPOSED BRICK SIDEWALK ALONG WASHINGTON STREET SHALL BE CONSISTENT IN APPEARANCE WITH ADJACENT WASHINGTON STREET DEVELOPMENT
61. ALL PROPOSED OPEN SPACE WILL BE DEED RESTRICTED FROM FUTURE DEVELOPMENT.
62. OPEN SPACE IS PROHIBITED FROM FURTHER DEVELOPMENT BASED ON THIS PLAN.
63. THE RIGHT-OF-WAY FOR THE PROPOSED PUBLIC ACCESS SHALL BE OFFERED FOR DEDICATION TO THE TOWNSHIP. IF THE AREA IS NOT ACCEPTED FOR DEDICATION, AN EASEMENT FOR PUBLIC USE MUST BE PROVIDED ALONG WITH MAINTENANCE AGREEMENTS ACCEPTABLE TO THE TOWNSHIP. IF THE AREA IS ACCEPTED FOR DEDICATION, MAINTENANCE RESPONSIBILITIES FOR STORMWATER COLLECTION AND CONVEYANCE FACILITIES SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER.
64. AN AS-BUILT SURVEY SHALL BE COMPLETED AND SUBMITTED TO WHITEMARSH TOWNSHIP IN BOTH PAPER AND DIGITAL CADD FORMATS.
65. THIS SET OF PLANS IS NOT DEPICTING ENVIRONMENTAL CONDITIONS OR A CERTIFICATION/ WARRANTY REGARDING THE PRESENCE OR ABSENCE OF ENVIRONMENTALLY IMPACTED SITE CONDITIONS. COLLIERS ENGINEER & DESIGN HAS PERFORMED NO EXPLORATORY OR TESTING SERVICES, INTERPRETATIONS, CONCLUSIONS, OR OTHER SITE ENVIRONMENTAL SERVICES RELATED TO THE DETERMINATION OF THE POTENTIAL FOR CHEMICAL, TOXIC, RADIOACTIVE, OR OTHER TYPE OF CONTAMINANTS AFFECTING THE PROPERTY AND THE UNDERSIGNED PROFESSIONAL IS NOT QUALIFIED TO DETERMINE THE EXISTENCE OF THE SAME. SHOULD ENVIRONMENTAL CONTAMINATION OR WASTE BE DISCOVERED, THE OWNER AND CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LAWS AND REGULATIONS.
66. THESE GENERAL NOTES APPLY TO ALL SHEETS IN THE SET.

IMPERVIOUS COVERAGE TABLE

PROPERTY	FEATURE	AREA (SF)	% OF LOT AREA (a)	TOTAL IMPERVIOUS % OF LOT AREA (a)
601	ASPHALT	105,295	34.38%	74.94
	BUILDING	98,057	32.02%	
	CURBING	3,178	1.04%	
	SIDEWALK	15,265	4.98%	
	TRAIL	7,735	2.53%	

100-YEAR FLOODPLAIN ENCROACHMENT TABLE

VOLUME OF IMPACT (AREA X DEPTH OF FLOODPLAIN)

FEATURE	AREA (SF)	VOLUME CHANGE IN FLOODWAY (CY)
SITE OUTSIDE OF FLOODWAY	362,045	- 4216.15 (CUT)
FLOODWAY AREA	30,982	- 1845.65 (CUT)
TOTAL	393,027	- 6061.80 (CUT)

STEEP SLOPE DISTURBANCE

TOTAL SITE

STEEP SLOPE	AREA	DISTURBED AREA	PERCENT DISTURBED
15 -25 %	16,751 SF	5,274 SF	31.5%
25% +	20,534 SF	7,011 SF	34.1%

BUILDING USE DATA

PROPOSED USE: APARTMENTS 270

TOTAL UNITS

APARTMENT LIVING - UNIT COUNT		
APARTMENT TYPE	PERCENTAGE	UNITS
EFFICIENCY	9%	24
1 BEDROOM	56%	150
2 BEDROOM	30%	82
3 BEDROOM	4%	12
4 BEDROOM	1%	2
TOTAL	100%	270

PUBLIC AMENITIES

WHITEMARSH TOWNSHIP 116-283.B.(10)

RECREATION AREA	79,017 SF
RIVER TRAIL	7,735 SF
TOTAL	86,752 SF

AREA OF AMENITIES	86,752 SF
PERCENT OF LOT AREA	22.07%

THE LOT AREA OF 601 WASHINGTON IS 393,027 SF.

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REV	DATE	DRAWN BY	DESCRIPTION

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL C. RICHARD ROSEBERRY ENGINEER No. 46162

C. Richard Roseberry

PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER

LICENSE NUMBER: PE046162R

COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS

FOR

601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design

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941 Marcon Boulevard, Suite 801
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AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER: 16001030B

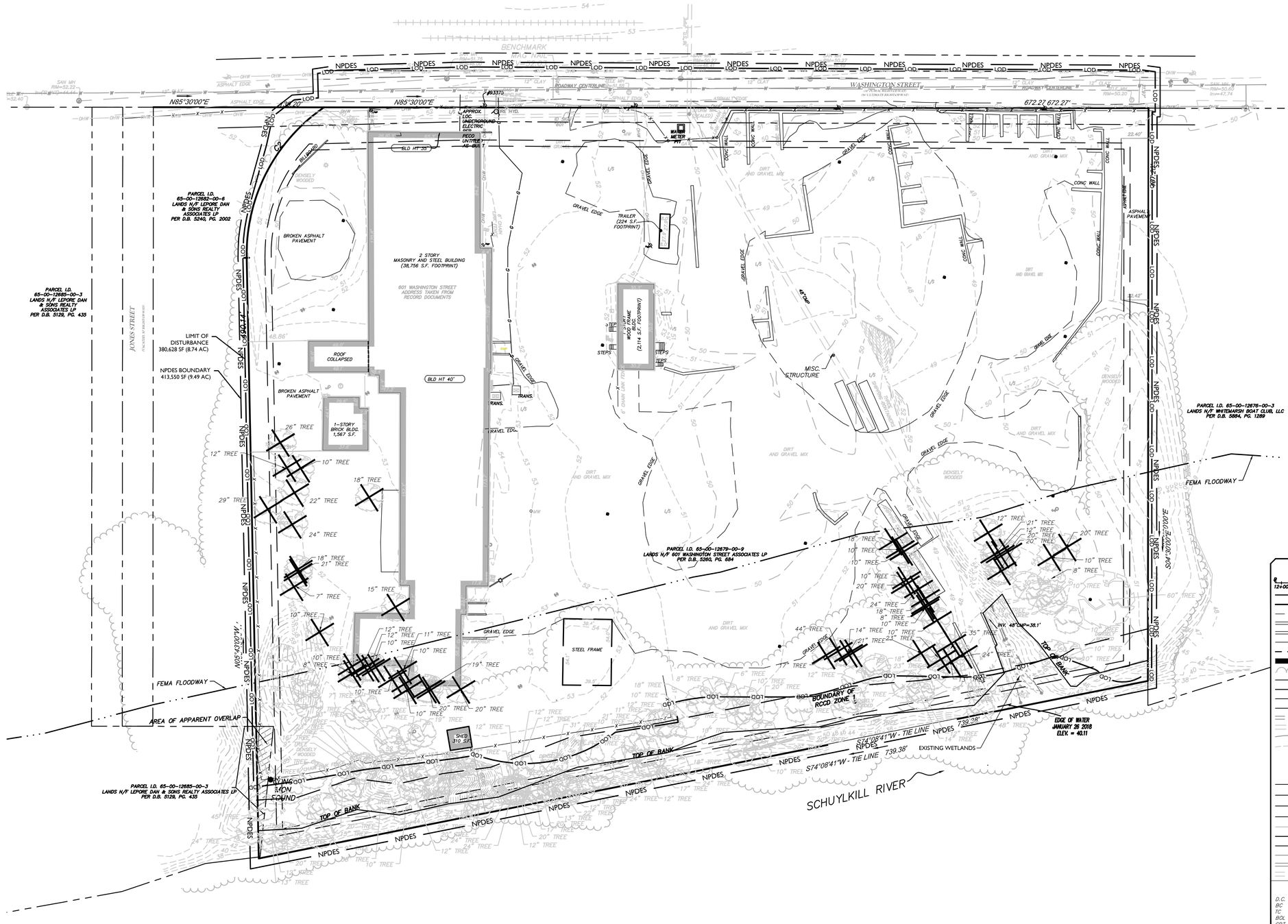
DRAWING NAME: C-CVER

SHEET TITLE: NOTES

SHEET NUMBER: 2 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

20160160103081Engineering\Site Plans\C_CVER.dwg\C-02 NOTES By: CHRIS.MEZLER



TREE SURVEY LEGEND

SYMBOL/HATCH	DESCRIPTION
	EXISTING TREE TO BE REMOVED
	EXISTING TREE REMAIN
NPDES	NPDES BOUNDARY
LOD	LIMIT OF DISTURBANCE

LEGEND

TRAVERSE LINE, CENTER LINE OR BASELINE	WETLAND MARKER
RIGHT OF WAY LINE	TREE
PROPERTY LINE	ROADWAY SIGNS
EDGE OF PAVEMENT	TRAFFIC FLOW
CURB LINE	MAILBOX
DEPRESSED CURB	TRAFFIC SIGNAL POLE
CHAIN FENCE	POLE MOUNTED LIGHT
WETLAND LINE	UTILITY POLE
MUNICIPAL BOUNDARY	GUY WIRE
TREELINE	TRANSFORMER
ELECTRICAL MANHOLE	FIRE DEPT. CONNECTION
WATER MANHOLE	FIRE HYDRANT
TELEPHONE MANHOLE	WATER VALVE
UNMARKED MANHOLE	GAS VALVE
SANITARY MANHOLE	SANITARY CLEANOUT
DRAINAGE MANHOLE	CONCRETE MONUMENT
MAJOR CONTOUR	CAPPED REBAR/IRON PIPE
MINOR CONTOUR	STORM INLET TYPE 'C'
SPOT ELEVATION	STORM INLET TYPE 'M'
TOP OF CURB ELEV.	FLARED END SECTION
BOTTOM OF CURB ELEV.	HEADWALL
U/G CABLE TV LINE	
U/G FIBER OPTIC LINE	
U/G TELEPHONE LINE	
U/G ELECTRIC LINE	
OVERHEAD WIRE	
WATER MAIN	
GAS MAIN	
SAN. SEWER LATERAL	
SAN. SEWER MAIN	
STORM PIPE	

ABBREVIATIONS

D.C. = DEPRESSED CURB	FF = FINISH FLOOR	MHWL = MEAN HIGH WATERLINE
BC = BOTTOM OF CURB	UV = UNKNOWN VALVE	MLWL = MEAN LOW WATERLINE
TC = TOP OF CURB	MH = MANHOLE	TW = TOP OF WALL
BOL = BOLLARD	DEP. = DEPRESSED	BW = BOTTOM WALL
GRT = GRATE	CL = CENTERLINE	
MB = MAILBOX	PM = PARKING METER	

40 0 40 80

SCALE : 1" = 40'

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REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
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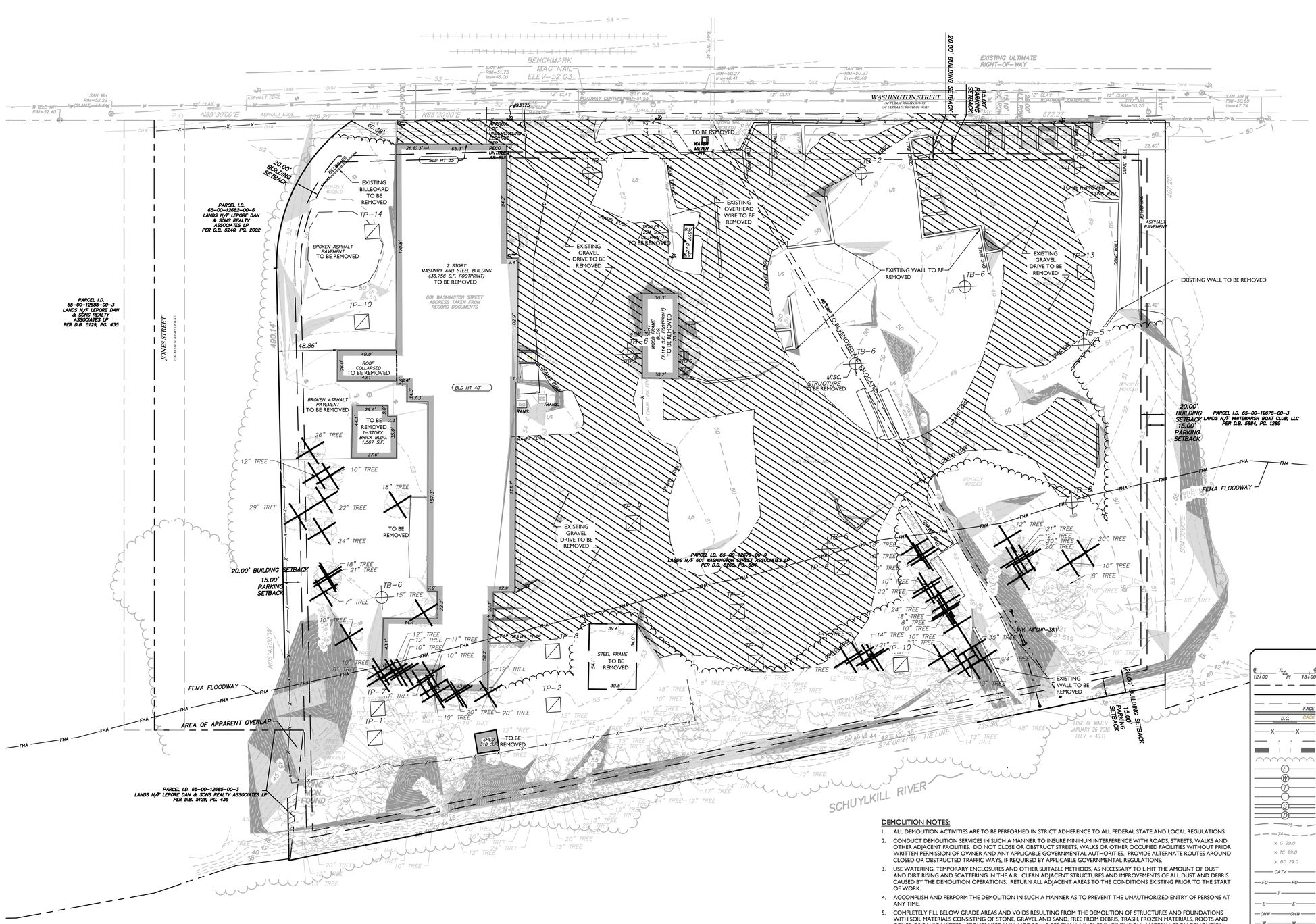
PROJECT NUMBER:	DRAWING NAME:
16001030B	C-TREE

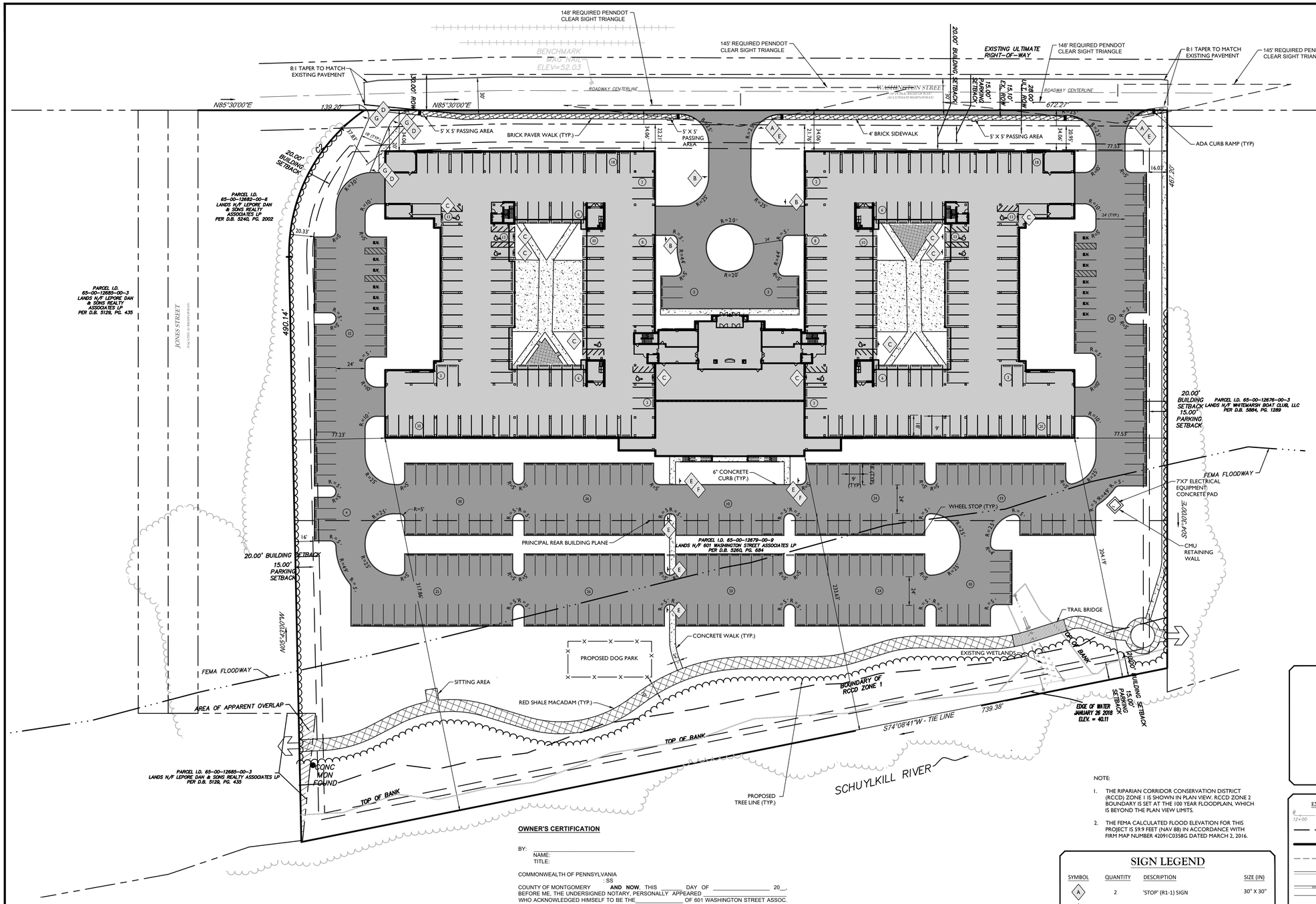
SHEET TITLE:
EXISTING TREE SURVEY PLAN

SHEET NUMBER:
3 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\Site Plans\C-TREE.dwg\XV-XI-XW\RY By: CHRIS.MECELER


BENCHMARK
MAG NAIL
ELEV=52.03
WASHINGTON STREET
(60' R/W BASED ON RECORDED WIDTH)
(80' ULTIMATE RIGHT-OF-WAY)
EXISTING ULTIMATE RIGHT-OF-WAY
20.00' BUILDING SETBACK
15.00' PARKING SETBACK
JONES STREET
(PUBLIC ACCESS ROAD)
PARCEL I.D. 65-00-12682-00-6
LANDS N/F LEPORE DAN & SONS REALTY ASSOCIATES LP
PER D.B. 5240, PG. 2002
PARCEL I.D. 65-00-12685-00-3
LANDS N/F LEPORE DAN & SONS REALTY ASSOCIATES LP
PER D.B. 5129, PG. 435
PARCEL I.D. 65-00-12676-00-3
LANDS N/F WHITEMARSH BOAT CLUB, LLC
PER D.B. 5884, PG. 1269
PARCEL I.D. 65-00-10873-00-8
LANDS N/F 601 WASHINGTON STREET ASSOCIATES LP
PER D.B. 4288, PG. 684
EXISTING BILLBOARD TO BE REMOVED
2 STORY MASONRY AND STEEL BUILDING (38,756 S.F. FOOTPRINT) TO BE REMOVED
601 WASHINGTON STREET ADDRESS TAKEN FROM RECORD DOCUMENTS
BROKEN ASPHALT PAVEMENT TO BE REMOVED
ROOF COLLAPSED TO BE REMOVED
TO BE REMOVED 1-STORY BRICK BLDG. 1,567 S.F.
BLD HT 40'
BLD HT 35'
EXISTING GRAVEL DRIVE TO BE REMOVED
EXISTING OVERHEAD WIRE TO BE REMOVED
EXISTING WALL TO BE REMOVED
TO BE REMOVED
STEEL FRAME TO BE REMOVED
SHED 310 S.F. TO BE REMOVED
MISC. STRUCTURE TO BE REMOVED
TO BE REMOVED
TO BE REMOVED



PARKING TABULATION:

REQUIRED:
- 1.75 SPACES PER DWELLING UNIT = 473 SPACES
- 19 ADA SPACES)
- 13 ELECTRIC VEHICLE SPACES

TOTAL REQUIRED = 486 SPACES

PROVIDED
- COVERED PARKING:
  - 194 SPACES
  - 10 ADA SPACES
- OUTSIDE PARKING:
  - 269 SPACES
  - 13 ELECTRIC VEHICLE SPACES

TOTAL PROVIDED = 486 SPACES

HEAVY INDUSTRIAL (HVY) WITH RDD-1 SUB ZONING DISTRICT			
	REQUIRED	EXISTING	PROPOSED
USE		APARTMENTS	
MINIMUM LOT SIZE	130,680 SF	393,027 SF	393,027 SF
		9.02 AC	9.02 AC
RIVER FRONT OPEN SPACE AREA	100' WIDE BUFFER	N/A	86,752 SF
LOT SIZE (MINUS RIVER FRONT OPEN SPACE)	N/A	N/A	306,275
MINIMUM LOT WIDTH	200 FT	695.68 FT	695.68 FT
PRINCIPAL BUILDING			
MINIMUM FRONT YARD	20 FT	19.40 FT	20 FT
MINIMUM REAR YARD	20 FT	55.06 FT	204.19 FT
MINIMUM SIDE YARDS	20 FT	40.38 FT	37.83 FT
PARKING SETBACK	15 FT	12.17 FT	16.00 FT
MAXIMUM BUILDING HEIGHT	4 STORIES	2 STORIES	4 STORIES
MAXIMUM DENSITY	30 UNITS/ACRE	N/A	29.93 UNITS/ACRE
MAXIMUM BUILDING COVER	40%	11.48%	32.02%
		45,122 SF	98,057 SF
MAXIMUM IMPERVIOUS COVER	75%	45.26%	74.94%
		177,902 SF	229,532 SF
OPEN / GREEN SPACE AREA	40%	54.74%	41.60%
		215,125 SF	163,495 SF
REAR YARD AREA, FROM PRIMARY BUILDING PLANE		55,173 SF	134,818 SF

HATCH LEGEND

HATCH	DESCRIPTION
	APARTMENT BUILDING
	LIGHT DUTY PAVEMENT
	CONCRETE
	BRICK PAVERS
	RED SHALE MACADAM

LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	STALL COUNT	10
	ADA ACCESSIBLE STALL	P HC P V
	DEPRESSED CURB AND ADA RAMP	HC
	DIRECTION OF TRAFFIC FLOW	

SIGN LEGEND

SYMBOL	QUANTITY	DESCRIPTION	SIZE (IN)
A	2	'STOP' (R1-1) SIGN	30" X 30"
B	3	'TRAFFIC CIRCLE' (W16-12P) SIGN AND 'AHEAD' (W16-9P) SIGN	24" X18" 24" X 12"
C	9	'RESERVED PARKING' (R7-8) AND 'VAN ACCESSIBLE' (R7-8P) SIGNS	12" X 18" 12" X 6"
D	3	'DO NOT ENTER' (R5-1) SIGN	30" X 30"
E	7	'STOP FOR PEDESTRIANS' (R1-6A) SIGN	12" x 36"
F	2	'NO PARKING - FIRE LANE' SIGN	12" x 18"
G	3	'FIRE APPARATUS ACCESS ROAD ENTRANCE' SIGN	12" x 18"

NOTE:

1. THE RIPARIAN CORRIDOR CONSERVATION DISTRICT (RCCD) ZONE 1 IS SHOWN IN PLAN VIEW. RCCD ZONE 2 BOUNDARY IS SET AT THE 100 YEAR FLOODPLAIN, WHICH IS BEYOND THE PLAN VIEW LIMITS.
2. THE FEMA CALCULATED FLOOD ELEVATION FOR THIS PROJECT IS 59.9 FEET (NAV 88) IN ACCORDANCE WITH FIRM MAP NUMBER 42091C0358G DATED MARCH 2, 2016.

40 0 40 80

SCALE : 1" = 40'

OWNER'S CERTIFICATION

BY: _____
NAME:
TITLE:

COMMONWEALTH OF PENNSYLVANIA
: SS
COUNTY OF MONTGOMERY

AND NOW, THIS _____ DAY OF _____ 20__, BEFORE ME, THE UNDERSIGNED NOTARY, PERSONALLY APPEARED _____ WHO ACKNOWLEDGED HIMSELF TO BE THE _____ OF 601 WASHINGTON STREET ASSOC. LP, THE SOLE GENERAL PARTNER OF 601 WASHINGTON STREET ASSOC. LP A PENNSYLVANIA LIMITED PARTNERSHIP AND HE, AS SUCH _____, BEING AUTHORIZED TO DO SO, EXECUTED THE FOREGOING INSTRUMENT FOR THE PURPOSES THEREIN CONTAINED.**IN WITNESS WHEREOF,** I HEREUNDER SET MY HAND AND OFFICIAL SEAL.

_____ NOTARY PUBLIC MY COMMISSION EXPIRES:

PLAN PREPARER'S STATEMENTS

I, _____, A REGISTERED SURVEYOR OF THE COMMONWEALTH OF PENNSYLVANIA, DO HEREBY CERTIFY
THAT THE PLAN, PREPARED FROM A FIELD SURVEY ON _____, 20____ CORRECTLY REPRESENTS THE PROPERTY BOUNDARY OF THE PROPOSED SUBDIVISION OR LAND DEVELOPMENT.

_____ _____
DATE REGISTERED SURVEYOR'S SIGNATURE

I, _____, A LICENSED PROFESSIONAL ENGINEER OF THE COMMONWEALTH OF PENNSYLVANIA, DO HEREBY CERTIFY THAT THE ACCOMPANYING APPLICATION, PLANS, AND SUPPORTING DOCUMENTATION ARE TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE.

_____ _____
DATE LICENSED ENGINEER'S SIGNATURE

MCPC NO. _____

PROCESSED and REVIEWED. A report has been prepared by the Montgomery County Planning Commission in accordance with the Municipalities Planning Code.

Certified this date _____

_____
For The Director

MONTGOMERY COUNTY PLANNING COMMISSION

MUNICIPAL APPROVAL / REVIEW BLOCK

REVIEWED BY THE WHITEMARSH TOWNSHIP ENGINEER THIS _____ DAY OF_____, 20___.

_____ _____
WHITEMARSH TOWNSHIP ENGINEER SIGNATURE

APPROVED BY THE TOWNSHIP OF WHITEMARSH THIS _____ DAY OF _____, 20___.

_____ _____
WHITEMARSH TOWNSHIP MANAGER SIGNATURE

RECORDER OF DEEDS

RECORDED IN THE OFFICE FOR THE RECORDING OF DEEDS IN AND FOR COUNTY OF MONTGOMERY, AT NORRISTOWN, PA,
IN PLAN BOOK _____, PAGE NO. _____ ON _____, 20___.

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COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL C. RICHARD ROSEBERRY ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

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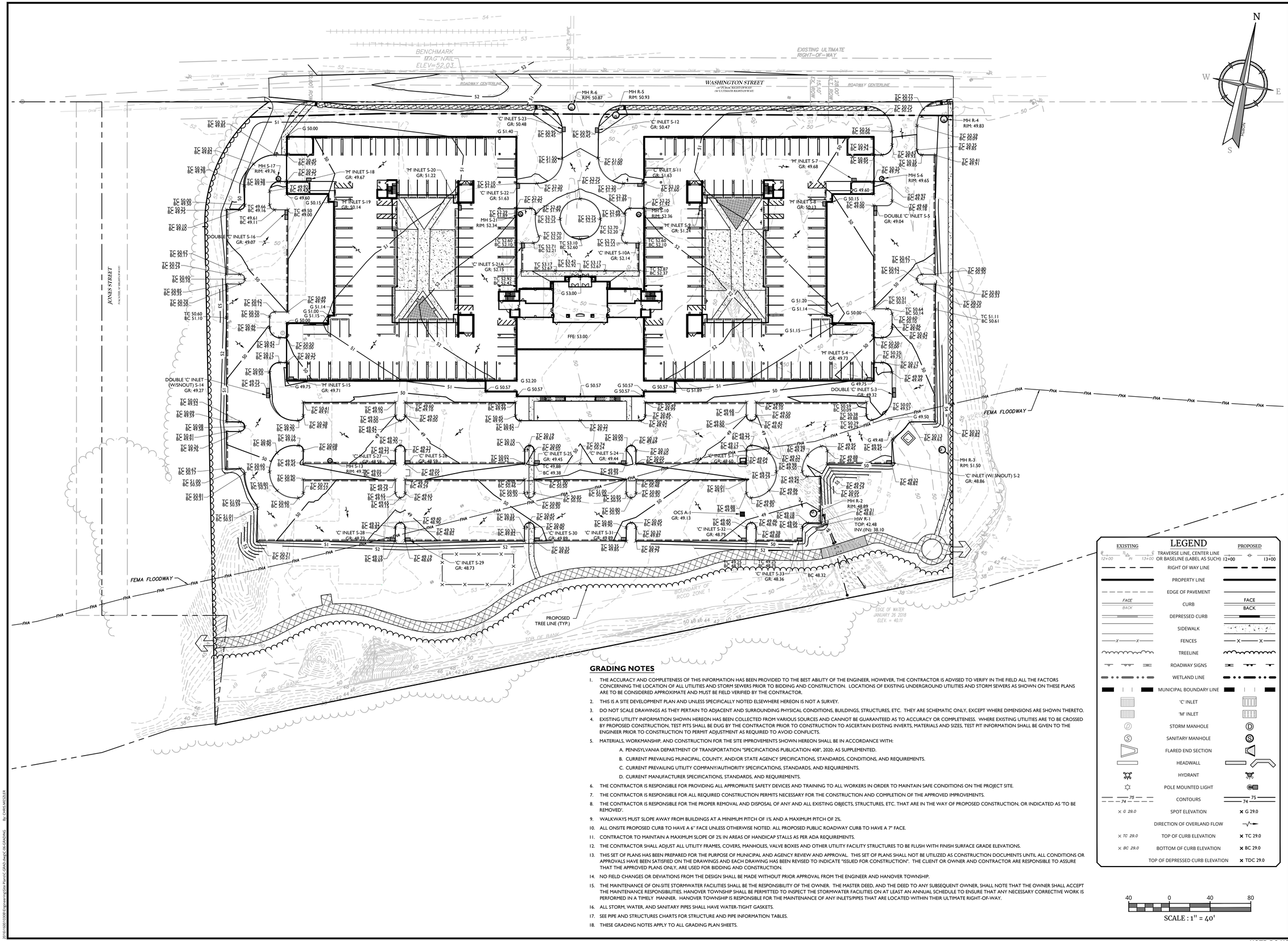
SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA
PROJECT NUMBER: 160010308		DRAWING NAME: C-LAYT	

SHEET TITLE:
DIMENSION PLAN

SHEET NUMBER:
5 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

20151\60103308\Engineering\Site Plans\C-LAYT.dwg;C-05 LAYT By: CHRIS MEISLER



GRADING NOTES

1. THE ACCURACY AND COMPLETENESS OF THIS INFORMATION HAS BEEN PROVIDED TO THE BEST ABILITY OF THE ENGINEER, HOWEVER, THE CONTRACTOR IS ADVISED TO VERIFY IN THE FIELD ALL THE FACTORS CONCERNING THE LOCATION OF ALL UTILITIES AND STORM SEWERS PRIOR TO BIDDING AND CONSTRUCTION. LOCATIONS OF EXISTING UNDERGROUND UTILITIES AND STORM SEWERS AS SHOWN ON THESE PLANS ARE TO BE CONSIDERED APPROXIMATE AND MUST BE FIELD VERIFIED BY THE CONTRACTOR.
2. THIS IS A SITE DEVELOPMENT PLAN AND UNLESS SPECIFICALLY NOTED ELSEWHERE HEREON IS NOT A SURVEY.
3. DO NOT SCALE DRAWINGS AS THEY PERTAIN TO ADJACENT AND SURROUNDING PHYSICAL CONDITIONS, BUILDINGS, STRUCTURES, ETC. THEY ARE SCHEMATIC ONLY, EXCEPT WHERE DIMENSIONS ARE SHOWN THERETO.
4. EXISTING UTILITY INFORMATION SHOWN HEREON HAS BEEN COLLECTED FROM VARIOUS SOURCES AND CANNOT BE GUARANTEED AS TO ACCURACY OR COMPLETENESS. WHERE EXISTING UTILITIES ARE TO BE CROSSED BY PROPOSED CONSTRUCTION, TEST PITS SHALL BE DUG BY THE CONTRACTOR PRIOR TO CONSTRUCTION TO ASCERTAIN EXISTING INVERTS, MATERIALS AND SIZES, TEST PIT INFORMATION SHALL BE GIVEN TO THE ENGINEER PRIOR TO CONSTRUCTION TO PERMIT ADJUSTMENT AS REQUIRED TO AVOID CONFLICTS.
5. MATERIALS, WORKMANSHIP, AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREON SHALL BE IN ACCORDANCE WITH:
   A. PENNSYLVANIA DEPARTMENT OF TRANSPORTATION "SPECIFICATIONS PUBLICATION 408", 2020; AS SUPPLEMENTED.
   B. CURRENT PREVAILING MUNICIPAL, COUNTY, AND/OR STATE AGENCY SPECIFICATIONS, STANDARDS, CONDITIONS, AND REQUIREMENTS.
   C. CURRENT PREVAILING UTILITY COMPANY/AUTHORITY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
   D. CURRENT MANUFACTURER SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
6. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL APPROPRIATE SAFETY DEVICES AND TRAINING TO ALL WORKERS IN ORDER TO MAINTAIN SAFE CONDITIONS ON THE PROJECT SITE.
7. THE CONTRACTOR IS RESPONSIBLE FOR ALL REQUIRED CONSTRUCTION PERMITS NECESSARY FOR THE CONSTRUCTION AND COMPLETION OF THE APPROVED IMPROVEMENTS.
8. THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER REMOVAL AND DISPOSAL OF ANY AND ALL EXISTING OBJECTS, STRUCTURES, ETC. THAT ARE IN THE WAY OF PROPOSED CONSTRUCTION, OR INDICATED AS 'TO BE REMOVED'.
9. WALKWAYS MUST SLOPE AWAY FROM BUILDINGS AT A MINIMUM PITCH OF 1% AND A MAXIMUM PITCH OF 2%.
10. ALL ONSITE PROPOSED CURB TO HAVE A 6" FACE UNLESS OTHERWISE NOTED. ALL PROPOSED PUBLIC ROADWAY CURB TO HAVE A 7" FACE.
11. CONTRACTOR TO MAINTAIN A MAXIMUM SLOPE OF 2% IN AREAS OF HANDICAP STALLS AS PER ADA REQUIREMENTS.
12. THE CONTRACTOR SHALL ADJUST ALL UTILITY FRAMES, COVERS, MANHOLES, VALVE BOXES AND OTHER UTILITY FACILITY STRUCTURES TO BE FLUSH WITH FINISH SURFACE GRADE ELEVATIONS.
13. THIS SET OF PLANS HAS BEEN PREPARED FOR THE PURPOSE OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL CONDITIONS OR APPROVALS HAVE BEEN SATISFIED ON THE DRAWINGS AND EACH DRAWING HAS BEEN REVISED TO INDICATE "ISSUED FOR CONSTRUCTION". THE CLIENT OR OWNER AND CONTRACTOR ARE RESPONSIBLE TO ASSURE THAT THE APPROVED PLANS ONLY, ARE USED FOR BIDDING AND CONSTRUCTION.
14. NO FIELD CHANGES OR DEVIATIONS FROM THE DESIGN SHALL BE MADE WITHOUT PRIOR APPROVAL FROM THE ENGINEER AND HANOVER TOWNSHIP.
15. THE MAINTENANCE OF ON-SITE STORMWATER FACILITIES SHALL BE THE RESPONSIBILITY OF THE OWNER. THE MASTER DEED, AND THE DEED TO ANY SUBSEQUENT OWNER, SHALL NOTE THAT THE OWNER SHALL ACCEPT THE MAINTENANCE RESPONSIBILITIES. HANOVER TOWNSHIP SHALL BE PERMITTED TO INSPECT THE STORMWATER FACILITIES ON AT LEAST AN ANNUAL SCHEDULE TO ENSURE THAT ANY NECESSARY CORRECTIVE WORK IS PERFORMED IN A TIMELY MANNER. HANOVER TOWNSHIP IS RESPONSIBLE FOR THE MAINTENANCE OF ANY INLETS/PIPES THAT ARE LOCATED WITHIN THEIR ULTIMATE RIGHT-OF-WAY.
16. ALL STORM, WATER, AND SANITARY PIPES SHALL HAVE WATER-TIGHT GASKETS.
17. SEE PIPE AND STRUCTURES CHARTS FOR STRUCTURE AND PIPE INFORMATION TABLES.
18. THESE GRADING NOTES APPLY TO ALL GRADING PLAN SHEETS.

LEGEND

EXISTING		PROPOSED
12+00 TL PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'C' INLET	
	'M' INLET	
D	STORM MANHOLE	D
S	SANITARY MANHOLE	S
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
75 / 74	CONTOURS	75 / 74
× G 29.0	SPOT ELEVATION	× G 29.0
	DIRECTION OF OVERLAND FLOW	
× TC 29.0	TOP OF CURB ELEVATION	× TC 29.0
× BC 29.0	BOTTOM OF CURB ELEVATION	× BC 29.0
	TOP OF DEPRESSED CURB ELEVATION	× TDC 29.0

40 0 40 80

SCALE : 1" = 40'

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2019\16001030B\Engineering\Site Plans\C-GRAD.dwg\C-06-GRADING By: CHRIS.MESTLER

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COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
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PENNSYLVANIA

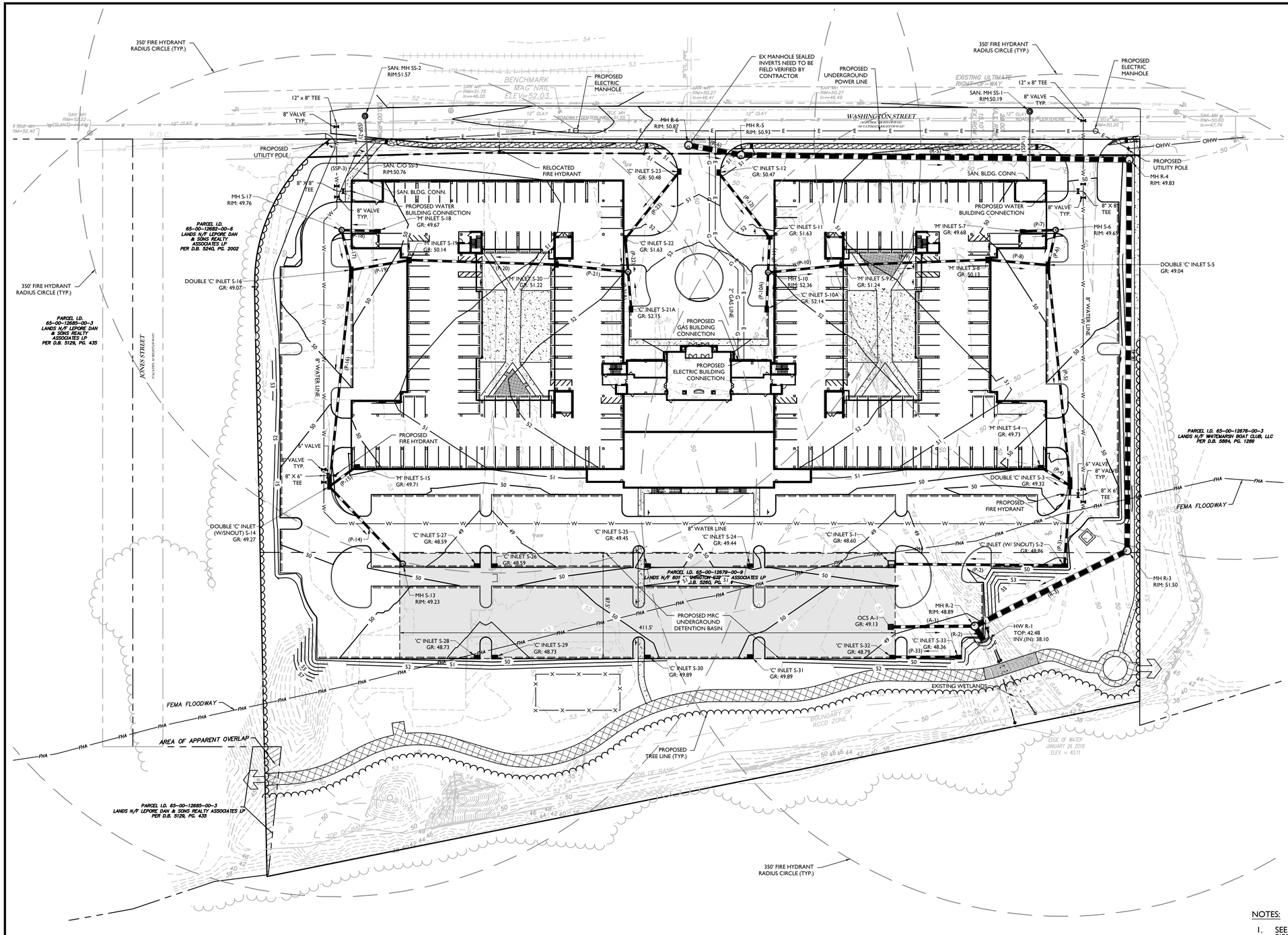
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PROJECT NUMBER:	DRAWING NAME:
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SHEET TITLE:
GRADING PLAN

SHEET NUMBER:
6 of 27



LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'C' INLET	
	'M' INLET	
	STORM MANHOLE	
	SANITARY MANHOLE	
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
CATV	CABLE TV CONDUIT	CATV
W	WATER MAIN	W
G	GAS MAIN	G
T	TELEPHONE CONDUIT	T
E	ELECTRIC CONDUIT	E
	SANITARY PIPE	
	STORM PIPE	

NOTES:

1. SEE CONSTRUCTION DETAILS SHEET 11 FOR STRUCTURE AND PIPE INFORMATION TABLES.
2. BY GRAPHICAL REPRESENTATION ONLY THIS PROPERTY IS LOCATED IN FLOOD HAZARD ZONE AE AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 42091C0358G WHICH HAS AN EFFECTIVE DATE OF MARCH 02, 2016 AND IS IN A SPECIAL FLOOD HAZARD AREA. FIELD SURVEYING WAS NOT PERFORMED TO DETERMINE THIS ZONE. AN ELEVATIONS CERTIFICATE MAY BE NEEDED TO VERIFY THIS DETERMINATION OR APPLY FOR AN AMENDMENT FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
3. FOR EXACT BUILDING UTILITY TIE-IN LOCATIONS, SEE THE ARCHITECTURAL PLANS.

40 0 40 80

SCALE : 1" = 40'

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C. Richard Roseberry
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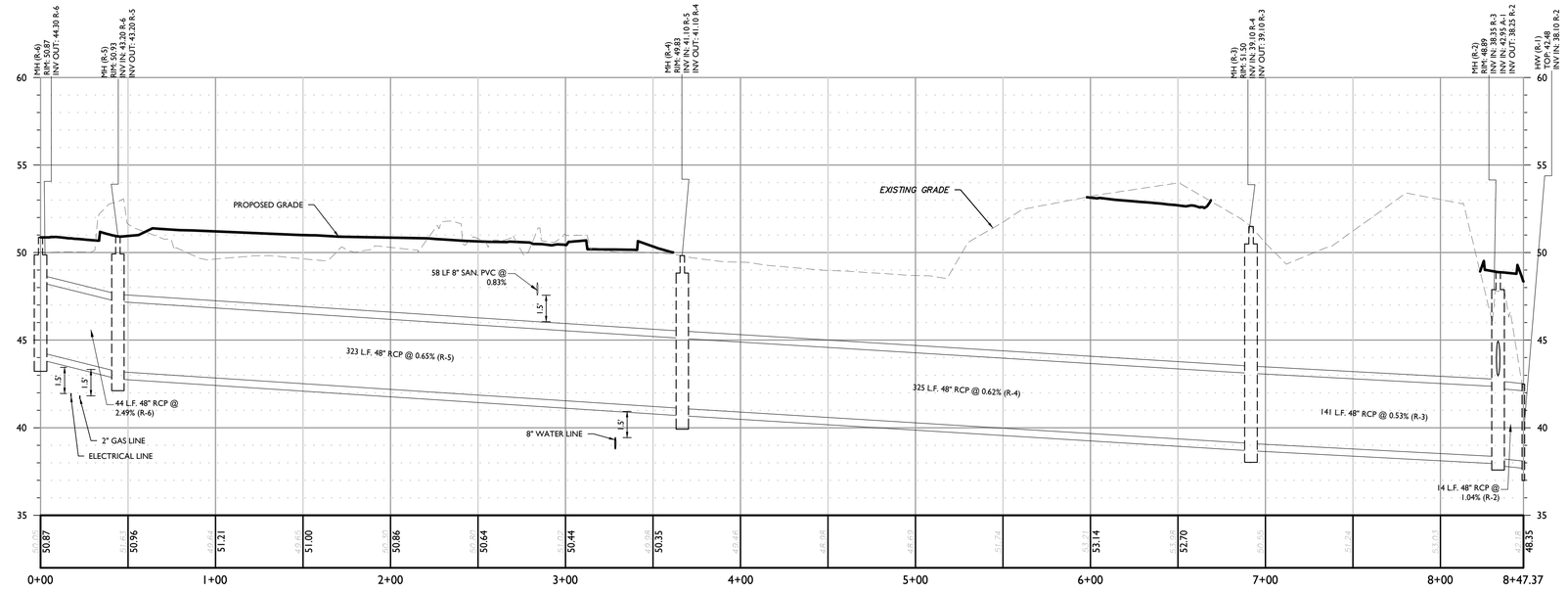
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16001030B	C-UTIL

SHEET TITLE:
UTILITIES PLAN

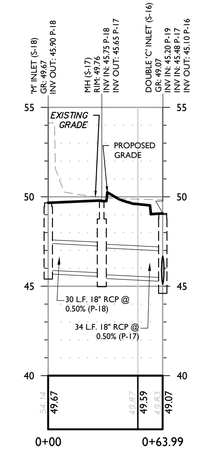
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2016\16001030B\Engineering\Site Plans\C-UTIL.dwg|C-07 UTIL By: CHRIS MECKLER

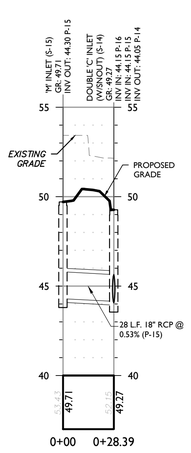
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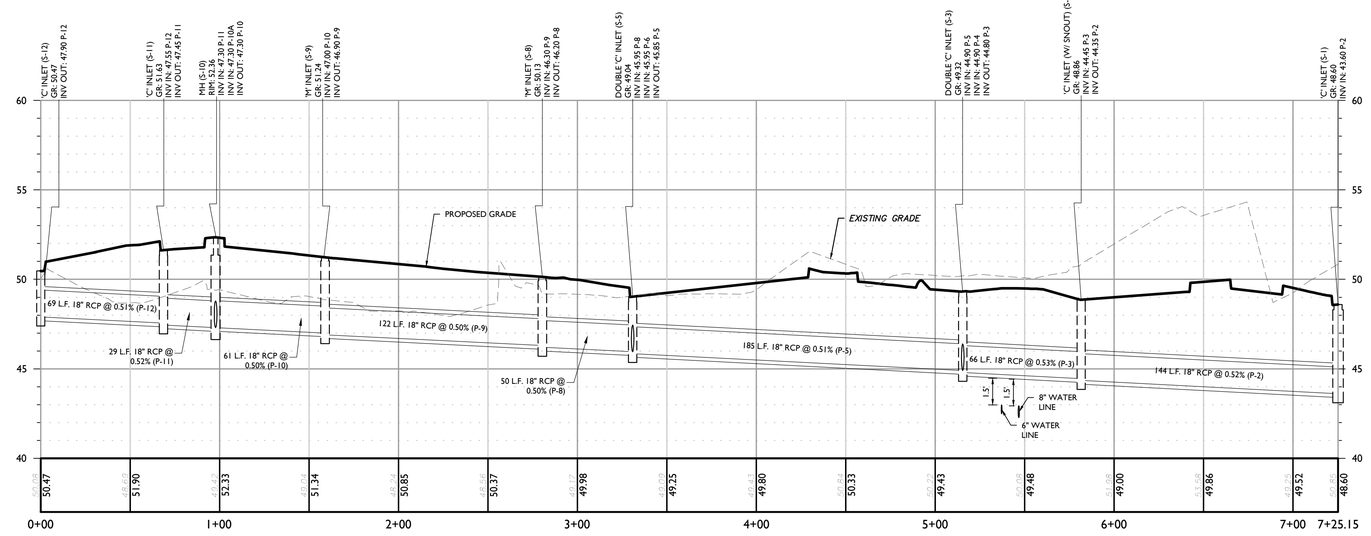
PROFILE OF MH R-6 TO HW R-1
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



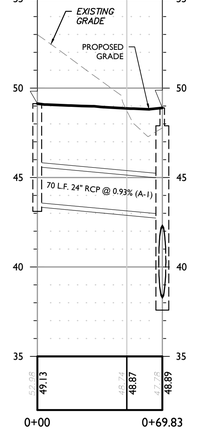
PROFILE OF INLET S-18 TO INLET S-16
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



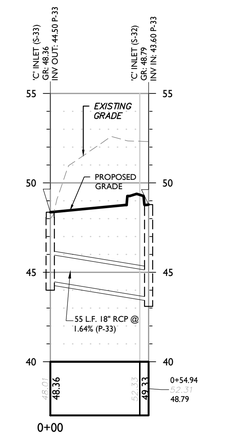
PROFILE OF INLET S-15 TO INLET S-14
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



PROFILE OF INLET S-12 TO INLET S-1
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



PROFILE OF OCS A-1 TO MH R-2
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



PROFILE OF INLET S-33 TO INLET S-32
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'

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ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
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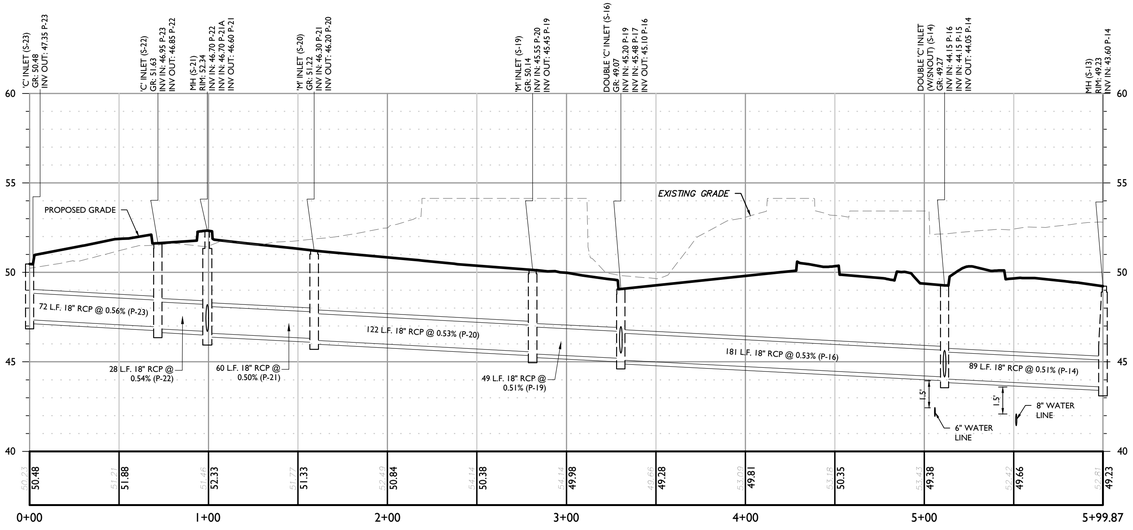
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SHEET TITLE:
PROFILES

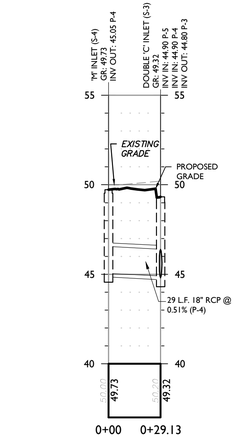
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2016\16001030B\Engineering\Site Plans\C-PROF.dwg|C-08-PROFILES By: CHRIS.METZLER

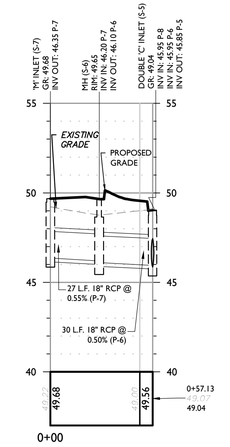
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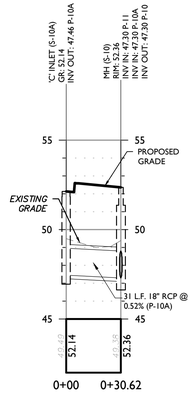
PROFILE OF INLET S-23 TO MH S-13
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



PROFILE OF INLET S-4 TO INLET S-3
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



PROFILE OF INLET S-7 TO INLET S-5
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'

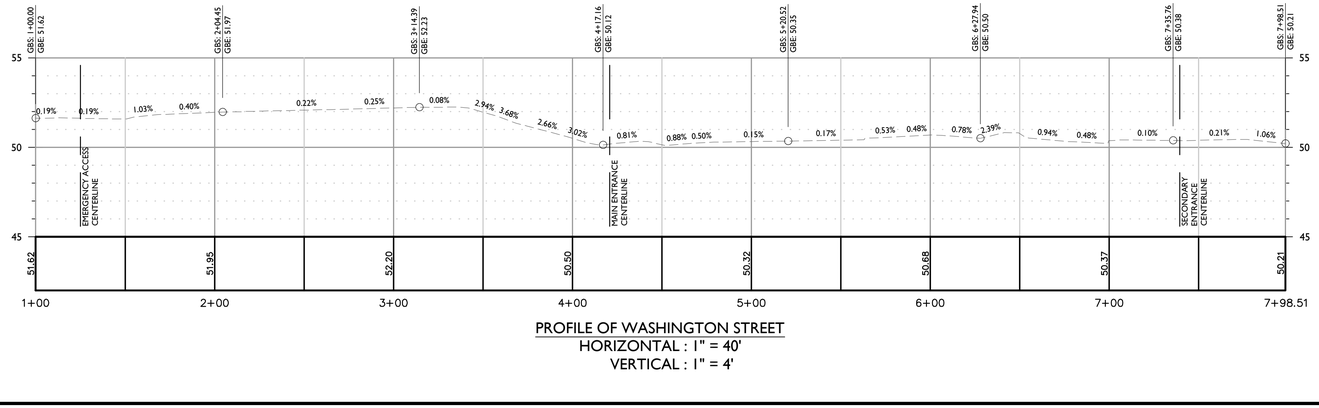


PROFILE OF INLET S-10A TO MH S-10
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'

PROFILE OF INLET S-21A TO MH S-21
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'

PROFILE OF BUILDING TO SS-1
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'

PROFILE OF BUILDING TO MH SS-2
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



PROFILE OF WASHINGTON STREET
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'

4 0 4 8
SCALE : 1" = 4'
VERTICAL

40 0 40 80
SCALE : 1" = 40'
HORIZONTAL

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REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162GR
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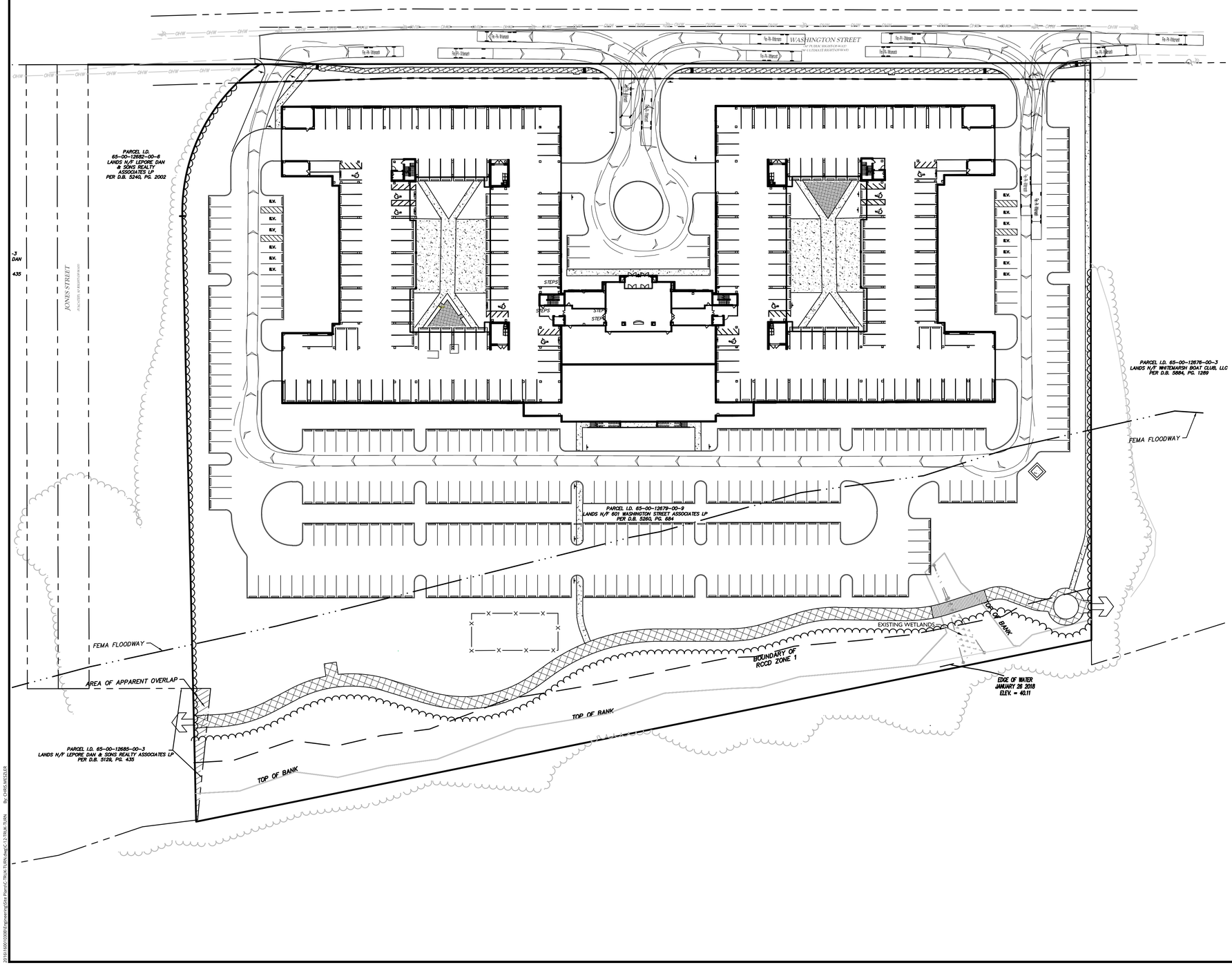
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160010308	C-PROF		

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PROFILES

SHEET NUMBER:
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WASHINGTON STREET
JONES STREET
PARCEL I.D. 65-00-12685-00-6
LANDS N/F LEPORE DAN & SONS REALTY ASSOCIATES LP
PER D.B. 5240, PG. 2002
PARCEL I.D. 65-00-12676-00-3
LANDS N/F WHITEMARSH BOAT CLUB, LLC
PER D.B. 5884, PG. 1289
PARCEL I.D. 65-00-12679-00-9
LANDS N/F 601 WASHINGTON STREET ASSOCIATES LP
PER D.B. 5260, PG. 624
PARCEL I.D. 65-00-12685-00-3
LANDS N/F LEPORE DAN & SONS REALTY ASSOCIATES LP
PER D.B. 5126, PG. 435
FEMA FLOODWAY
FEMA FLOODWAY
AREA OF APPARENT OVERLAP
EXISTING WETLANDS
BOUNDARY OF RCOD ZONE 1
TOP OF BANK
TOP OF BANK
TOP OF BANK
EDGE OF WATER JANUARY 28 2018 ELEV. = 40.11
STEPS
STEPS
STEPS
R.V.
R.V.
R.V.

Proposed Storm Network Structure Table

Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
A-1	48 in. x 48 in. OCS	49.13			24" RCP	43.60
R-1	144 in. x 18 in. x 60 in. CONC. HW	42.48	48" RCP	38.10		
R-2	72 in. dia. CYLINDER MH	48.89	48" RCP 24" RCP	38.35 42.95	48" RCP	38.25
R-3	72 in. dia. CYLINDER MH	51.50	48" RCP	39.10	48" RCP	39.10
R-4	72 in. dia. CYLINDER MH	49.83	48" RCP	41.10	48" RCP	41.10
R-5	72 in. dia. CYLINDER MH	50.93	48" RCP	43.20	48" RCP	43.20
R-6	72 in. dia. CYLINDER MH	50.87			48" RCP	44.30
S-1	60 in. x 60 in. 'C' INLET	48.60	18" RCP	43.60		
S-2	24 in. x 45 in. 'C' INLET	48.86	18" RCP	44.45	18" RCP	44.35
S-3	24 in. x 45 in. 'C' INLET	49.32	18" RCP 18" RCP	44.90 44.90	18" RCP	44.80
S-4	24 in. x 45 in. 'M' INLET	49.73			18" RCP	45.05
S-5	24 in. x 45 in. 'C' INLET	49.04	18" RCP 18" RCP	45.95 45.95	18" RCP	45.85
S-6	48 in. dia. CYLINDER MH	49.65	18" RCP	46.20	18" RCP	46.10
S-7	24 in. x 45 in. 'M' INLET	49.68			18" RCP	46.35
S-8	24 in. x 45 in. 'M' INLET	50.13	18" RCP	46.30	18" RCP	46.20
S-9	24 in. x 45 in. 'M' INLET	51.24	18" RCP	47.00	18" RCP	46.90
S-10	48 in. dia. CYLINDER MH	52.36	18" RCP 18" RCP	47.30 47.30	18" RCP	47.30
S-10A	24 in. x 45 in. 'C' INLET	52.14			18" RCP	47.46
S-11	24 in. x 45 in. 'C' INLET	51.63	18" RCP	47.55	18" RCP	47.45
S-12	24 in. x 45 in. 'C' INLET	50.47			18" RCP	47.90

Proposed Storm Network Structure Table

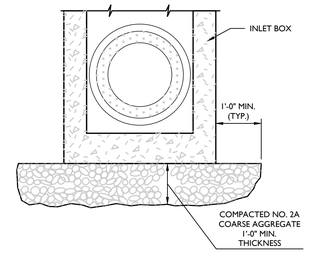
Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
S-13	48 in. dia. CONED MH	49.23	18" RCP	43.60		
S-14	24 in. x 45 in. 'C' INLET	49.27	18" RCP 18" RCP	44.15 44.15	18" RCP	44.05
S-15	24 in. x 45 in. 'M' INLET	49.71			18" RCP	44.30
S-16	24 in. x 45 in. 'C' INLET	49.07	18" RCP 18" RCP	45.20 45.48	18" RCP	45.10
S-17	48 in. dia. CYLINDER MH	49.76	18" RCP	45.75	18" RCP	45.65
S-18	24 in. x 45 in. 'M' INLET	49.67			18" RCP	45.90
S-19	24 in. x 45 in. 'M' INLET	50.14	18" RCP	45.55	18" RCP	45.45
S-20	24 in. x 45 in. 'M' INLET	51.22	18" RCP	46.30	18" RCP	46.20
S-21	48 in. dia. CYLINDER MH	52.34	18" RCP 18" RCP	46.70 46.70	18" RCP	46.60
S-21A	24 in. x 45 in. 'C' INLET	52.15			18" RCP	46.87
S-22	24 in. x 45 in. 'C' INLET	51.63	18" RCP	46.95	18" RCP	46.85
S-23	24 in. x 45 in. 'C' INLET	50.48			18" RCP	47.35
S-24	24 in. x 45 in. 'C' INLET	49.44				
S-25	24 in. x 45 in. 'C' INLET	49.45				
S-26	24 in. x 45 in. 'C' INLET	48.59				
S-27	24 in. x 45 in. 'C' INLET	48.59				
S-28	24 in. x 45 in. 'C' INLET	48.73				
S-29	24 in. x 45 in. 'C' INLET	48.73				
S-30	24 in. x 45 in. 'C' INLET	49.89				
S-31	24 in. x 45 in. 'C' INLET	49.89				

Sanitary Sewer Structure Table

Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
BLDG. CONN.	???	48.48			8" SAN. PVC	47.75
BLDG. CONN.	???	49.77			8" SAN. PVC	47.75
SS-1	48 in. dia. CONED MH	50.19	8" SAN. PVC	47.27		
SS-2	48 in. dia. CONED MH	51.57	8" SAN. PVC	45.88		
SS-3	8 in. Clean Out	50.76	8" SAN. PVC	47.50	8" SAN. PVC	46.95

Sanitary Sewer Pipe Table

Pipe I.D.	Description	Length	Invert Up	Invert Dn	Slope
SSP-1	8"SAN. PVC	58'	47.75	47.27	0.83%
SSP-2	8"SAN. PVC	44'	46.95	45.88	2.43%
SSP-3	8"SAN. PVC	10'	47.75	47.50	2.50%



NOTES:

STANDARD INLET BOXES SHOWN, PROVIDE TOP SLABS FOR OTHER INLET BOX TYPES.

PROVIDE GRADE ADJUSTMENT RINGS WHEN REQUIRED.

COST OF NO. 2A COARSE AGGREGATE IS INCIDENTAL TO THE INLET BOX.

INLET BOX SUB-BASE PREPARATION DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1100 05/01/18

Proposed Storm Network Structure Table

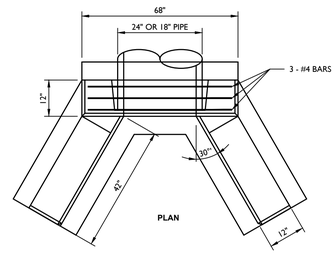
Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
S-32	24 in. x 45 in. 'C' INLET	48.79	18" RCP	43.60		
S-33	24 in. x 45 in. 'C' INLET	48.36			18" RCP	44.50

Proposed Storm Network Pipe Table

Pipe I.D.	Description	Length	Invert Up	Invert Dn	Slope
P-21	18"RCP	60'	46.60	46.30	0.50%
P-21A	18"RCP	31'	46.87	46.70	0.55%
P-22	18"RCP	28'	46.85	46.70	0.54%
P-23	18"RCP	72'	47.35	46.95	0.56%
P-33	18"RCP	55'	44.50	43.60	1.64%
R-2	48"RCP	14'	38.25	38.10	1.04%
R-3	48"RCP	141'	39.10	38.35	0.53%
R-4	48"RCP	325'	41.10	39.10	0.62%
R-5	48"RCP	323'	43.20	41.10	0.65%
R-6	48"RCP	44'	44.30	43.20	2.49%

Proposed Storm Network Pipe Table

Pipe I.D.	Description	Length	Invert Up	Invert Dn	Slope
A-1	24"RCP	70'	43.60	42.95	0.93%
P-2	18"RCP	144'	44.35	43.60	0.52%
P-3	18"RCP	66'	44.80	44.45	0.53%
P-4	18"RCP	29'	45.05	44.90	0.51%
P-5	18"RCP	185'	45.85	44.90	0.51%
P-6	18"RCP	30'	46.10	45.95	0.50%
P-7	18"RCP	27'	46.35	46.20	0.55%
P-8	18"RCP	50'	46.20	45.95	0.50%
P-9	18"RCP	122'	46.90	46.30	0.50%
P-10	18"RCP	61'	47.30	47.00	0.50%
P-10A	18"RCP	31'	47.46	47.30	0.52%
P-11	18"RCP	29'	47.45	47.30	0.52%
P-12	18"RCP	69'	47.90	47.55	0.51%
P-14	18"RCP	89'	44.05	43.60	0.51%
P-15	18"RCP	28'	44.30	44.15	0.53%
P-16	18"RCP	181'	45.10	44.15	0.53%
P-17	18"RCP	34'	45.65	45.48	0.50%
P-18	18"RCP	30'	45.90	45.75	0.50%
P-19	18"RCP	49'	45.45	45.20	0.51%
P-20	18"RCP	122'	46.20	45.55	0.53%



NOTE:

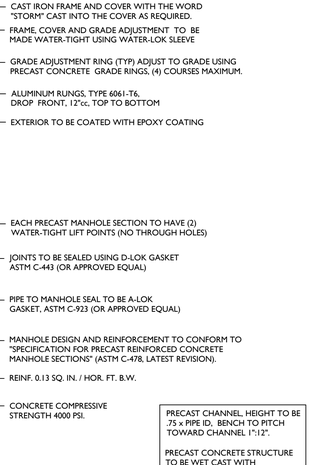
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATIONS AS OUTLINED IN PENNDOT PUBLICATION 408, SECTION 605.
2. PROVIDE REINFORCEMENT IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 709.
3. USE CLASS A CONCRETE OR BETTER.

2 : 1 EMBANKMENT SLOPES

PIPE DIAMETER	SKEW ∢ = 90° TO 60° - 0 = 30°			SKEW ∢ = 55° - 0 = 35°			SKEW ∢ = 50° - 0 = 40°			SKEW ∢ = 45° - 0 = 45°			SKEW ∢ = 40° - 0 = 50°			SKEW ∢ = 30° - 0 = 60°			SKEW ∢ = 20° - 0 = 70°			SKEW ∢ = 10° - 0 = 80°				
D O.W	L O.W	ℓ	W1	L O.W	ℓ	W1	L O.W	ℓ	W1	L O.W	ℓ	W1	L O.W	ℓ	W1	L O.W	ℓ	W1	L O.W	ℓ	W1	L O.W	ℓ	W1	W2	A O.W
(IN)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(IN.)
36	5.8	0	4.6	6.0	0.33	4.9	6.2	0.5	5.2	6.5	0.67	5.7	7.0	0.75	6.2	8.3	1.33	8.0	11.1	1.75	11.7	19.6	5.0	23.0	4.6	12
42	6.3	0	5.8	6.6	0.33	6.1	6.9	0.5	6.5	7.3	0.67	7.1	7.8	0.75	7.8	9.3	1.33	10.0	12.5	1.75	14.6	22.5	5.0	28.8	5.8	12
48	6.9	0	6.9	7.2	0.33	7.3	7.5	0.5	7.8	8.0	0.67	8.5	8.5	0.75	9.4	10.3	1.33	12.0	14.0	1.75	17.5	25.3	5.0	34.6	6.9	12
54	7.5	0	8.0	7.8	0.33	8.5	8.2	0.5	9.1	8.7	0.67	9.9	9.3	0.75	10.9	11.3	1.33	14.0	15.5	1.75	20.5	28.2	5.0	40.3	8.0	12
60	8.1	0	9.2	8.4	0.33	9.8	8.8	0.5	10.4	9.4	0.67	11.3	10.1	0.75	12.5	12.3	1.33	16.0	16.9	1.75	23.4	31.1	5.0	46.0	9.2	15
72	9.2	0	11.5	9.6	0.33	12.2	10.1	0.5	13.0	10.8	0.67	14.1	11.7	0.75	15.6	14.3	1.33	20.0	19.8	1.75	29.2	36.9	5.0	57.6	11.5	15

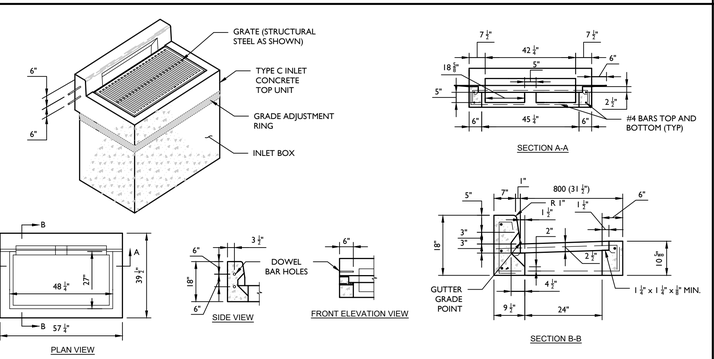
TYPE D-W END WALL DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1700 05/01/18



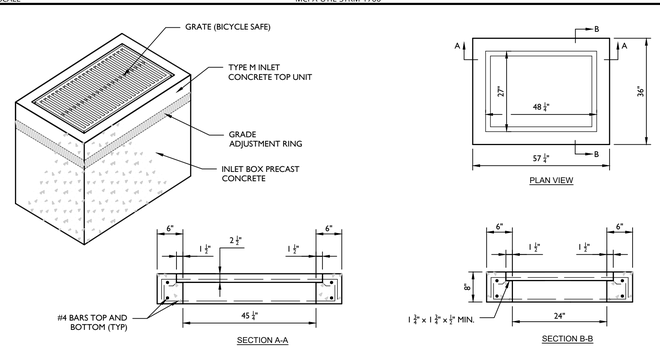
48" DIAMETER STORM MANHOLE DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1600 06/01/19



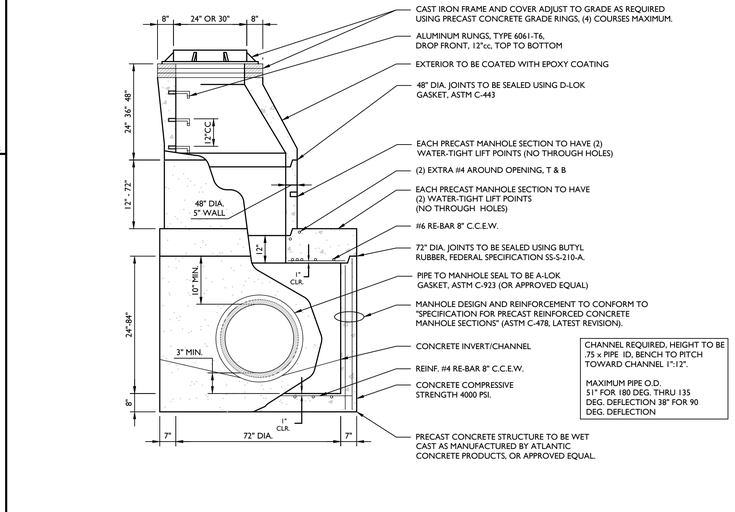
TYPE "C" INLET DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1200 05/01/18



TYPE "M" INLET DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1300 05/01/18



72" DIAMETER STORM MANHOLE DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1601 06/01/19

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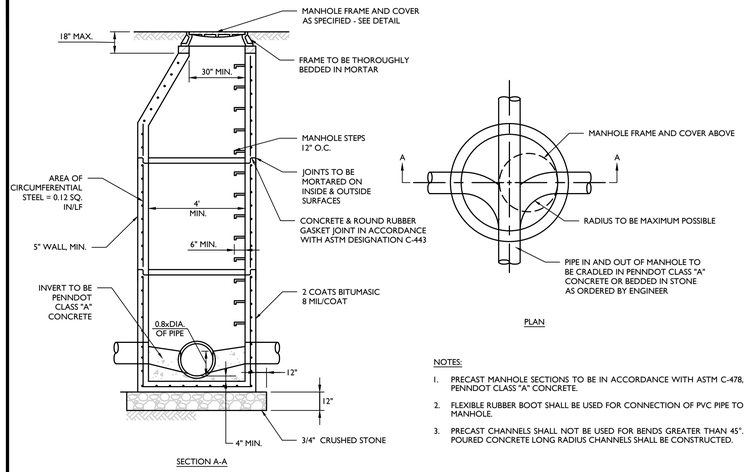
PROJECT NUMBER: 16001030B
DRAWING NAME: C-DTLS

SHEET TITLE: CONSTRUCTION DETAILS

SHEET NUMBER: 11 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\Site Plans\C-DTLS.dwg/C-11 DETAILS By: CHRIS MESZLER

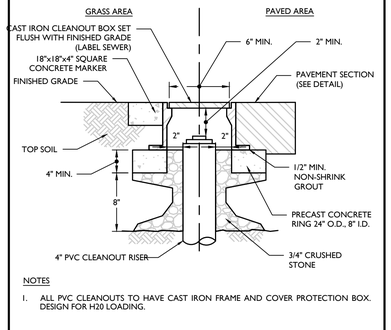


NOTES:

1. PRECAST MANHOLE SECTIONS TO BE IN ACCORDANCE WITH ASTM C-478, PENNDOT CLASS "A" CONCRETE.
2. FLEXIBLE RUBBER BOOT SHALL BE USED FOR CONNECTION OF PVC PIPE TO MANHOLE.
3. PRECAST CHANNELS SHALL NOT BE USED FOR BENDS GREATER THAN 45°. POURED CONCRETE LONG RADIUS CHANNELS SHALL BE CONSTRUCTED.

SANITARY PRECAST MANHOLE DETAIL

NOT TO SCALE | MCPA-UTIL-SSWR-1000 | 05/01/18



NOTES

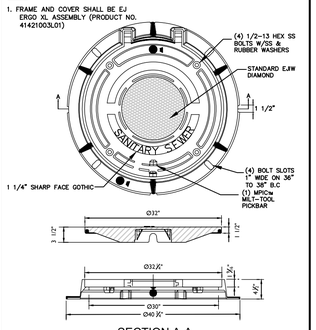
1. ALL PVC CLEANOUTS TO HAVE CAST IRON FRAME AND COVER PROTECTION BOX. DESIGN FOR H20 LOADING.

CLEANOUT PROTECTION BOX DETAIL

NOT TO SCALE | MCPA-UTIL-SSWR-1600 | 05/01/18

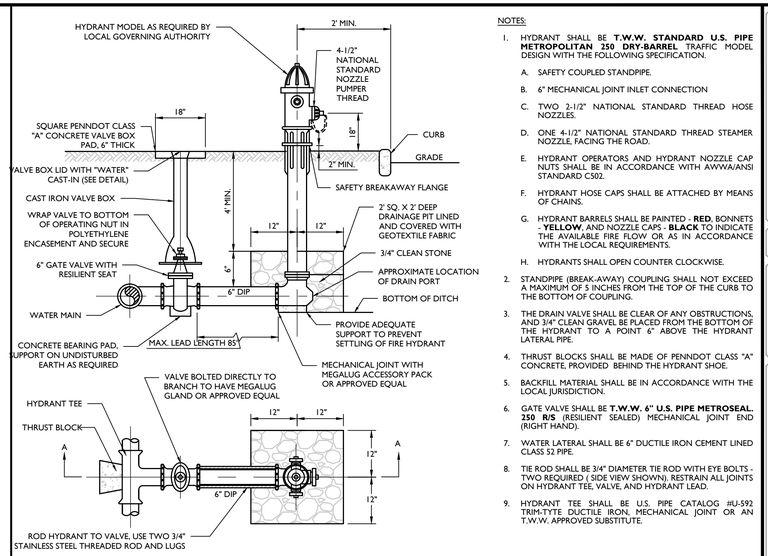
NOTE:

1. FRAME AND COVER SHALL BE EJ ERGO 10, ASSEMBLY (PRODUCT NO. 41421003L01)



SECTION A-A
SANITARY WATERTIGHT MANHOLE FRAME COVER DETAIL

NOT TO SCALE | MCPA-UTIL-SSWR-1700 | 05/01/18

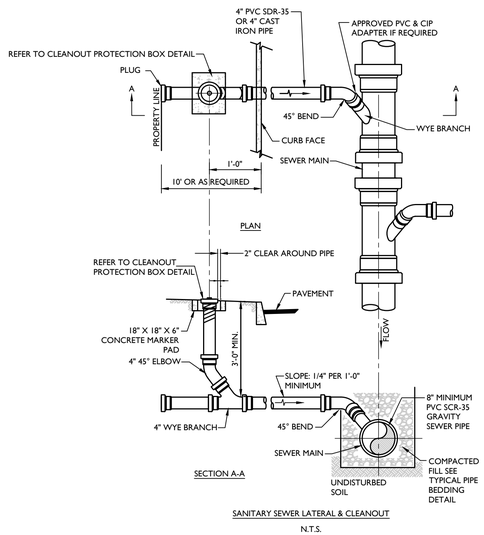


NOTES:

1. HYDRANT SHALL BE **T.W.W. STANDARD U.S. PIPE METROPOLITAN 250 DRY-BARREL** TRAFFIC MODEL DESIGN WITH THE FOLLOWING SPECIFICATION.
   - A. SAFETY COUPLED STANDPIPE.
   - B. 6" MECHANICAL JOINT INLET CONNECTION
   - C. TWO 2-1/2" NATIONAL STANDARD THREAD HOSE NOZZLES.
   - D. ONE 4-1/2" NATIONAL STANDARD THREAD STEAMER NOZZLE, FACING THE ROAD.
   - E. HYDRANT OPERATORS AND HYDRANT NOZZLE CAP NUTS SHALL BE IN ACCORDANCE WITH AWWA/ANSI STANDARD C502.
   - F. HYDRANT HOSE CAPS SHALL BE ATTACHED BY MEANS OF CHAINS.
   - G. HYDRANT BARRELS SHALL BE PAINTED - **RED**, BONNETS - **YELLOW**, AND NOZZLE CAPS - **BLACK** TO INDICATE THE AVAILABLE FIRE FLOW OR AS IN ACCORDANCE WITH THE LOCAL REQUIREMENTS.
   - H. HYDRANTS SHALL OPEN COUNTER CLOCKWISE.
2. STANDPIPE (BREAK-AWAY) COUPLING SHALL NOT EXCEED A MAXIMUM OF 5 INCHES FROM THE TOP OF THE CURB TO THE BOTTOM OF COUPLING.
3. THE DRAIN VALVE SHALL BE CLEAR OF ANY OBSTRUCTIONS, AND 3/4" CLEAN GRAVEL BE PLACED FROM THE BOTTOM OF THE HYDRANT TO A POINT 6" ABOVE THE HYDRANT LATERAL PIPE.
4. THRUST BLOCKS SHALL BE MADE OF PENNDOT CLASS "A" CONCRETE, PROVIDED BEHIND THE HYDRANT SHOE.
5. BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH THE LOCAL JURISDICTION.
6. GATE VALVE SHALL BE **T.W.W. 6" U.S. PIPE METROSEAL. 250 R/S** (RESILIENT SEALED) MECHANICAL JOINT END (RIGHT HAND).
7. WATER LATERAL SHALL BE 6" DUCTILE IRON CEMENT LINED CLASS 52 PIPE.
8. TIE ROD SHALL BE 3/4" DIAMETER TIE ROD WITH EYE BOLTS - TWO REQUIRED (SIDE VIEW SHOWN). RESTRAIN ALL JOINTS ON HYDRANT TEE, VALVE, AND HYDRANT LEAD.
9. HYDRANT TEE SHALL BE U.S. PIPE CATALOG #U-592 TRIM-TYTE DUCTILE IRON, MECHANICAL JOINT OR AN T.W.W. APPROVED SUBSTITUTE.

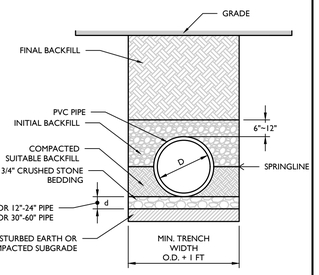
FIRE HYDRANT (VALVE IN GRASS) DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1000 | 05/01/18



SANITARY SEWER LATERAL & CLEANOUT DETAIL

NOT TO SCALE | MCPA-UTIL-SSWR-1700 | 05/01/18

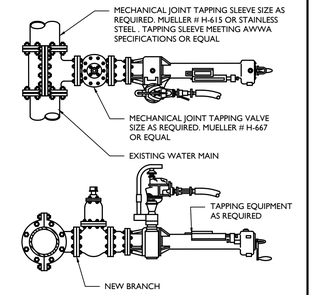


NOTES:

1. ALL PVC GRAVITY PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321.
2. GRAVITY SANITARY PIPE SHALL BE PVC SDR 35 PER ASTM D3034 OR AS REQUIRED BY THE GOVERNING AUTHORITY.

PVC SANITARY PIPE BEDDING (GRAVITY) DETAIL

NOT TO SCALE | MCPA-UTIL-SSWR-2602 | 05/01/18

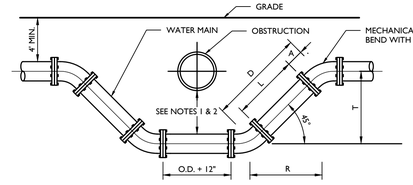


NOTES:

1. WET TAP VALVE CAN BE INSTALLED IN EITHER VERTICAL OR HORIZONTAL POSITION.
2. CONTRACTOR SHALL VERIFY DEPTH OF BURY, MATERIAL, DIAMETER (O.D.) AND OPERATING PRESSURE OF EXISTING WATER MAIN PRIOR TO ORDERING OF WET TAP UNIT.

WET TAP DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1200 | 05/01/18



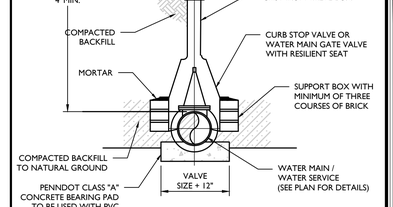
MECHANICAL JOINTS			
ANGLE	D =	R =	L =
45°	T x 1.414	T x 1.000	D-2A
22.5°	T x 2.613	T x 2.414	D-2A
11.25°	T x 5.126	T x 5.027	D-2A

NOTES:

1. WATER MAIN MAY CROSS ABOVE OBSTRUCTION IF **4'** MINIMUM COVER IS MAINTAINED ABOVE THE WATER MAIN AND FINISH GRADE.
2. MINIMUM VERTICAL SEPARATION BETWEEN SANITARY OR STORM SEWER TO WATER MAIN SHALL BE 18" IF THE HORIZONTAL SEPARATION IS LESS THAN 10'. BETWEEN WATER MAIN AND OTHER UTILITIES, THE MINIMUM VERTICAL SEPARATION SHALL BE 12".
3. WATER MAIN SHALL BE SIZE AND MATERIAL SPECIFIED ON THE PLAN, WITH MECHANICAL JOINT OR PUSH-ON AND ALL FITTINGS BE CAST IRON MECHANICALLY JOINT.
4. OFFSETS MAY BE SUBSTITUTED FOR A "T" OF UP TO 24" IF APPROVED BY THE ENGINEER.
5. CONCRETE THRUST BLOCKS SHALL BE PROVIDED AT ALL BENDS OR OTHER POINTS OF PIPE DIRECTION CHANGE.
6. TIE RODS SHALL BE UTILIZED TO RESTRAIN PIPE JOINTS IF THRUST BLOCK IS NOT USED. DETAILS OF THE TIE ROD ASSEMBLY SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL. TIE RODS SHALL BE SUFFICIENT TO RESTRAIN THE THRUST DEVELOPED AT 100 PSI WORKING PRESSURE. MEGALUG RESTRAINT ALSO ACCEPTABLE IN PLACE OF TIE RODS.

WATER CROSSING UNDER UTILITY DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1300 | 05/01/18

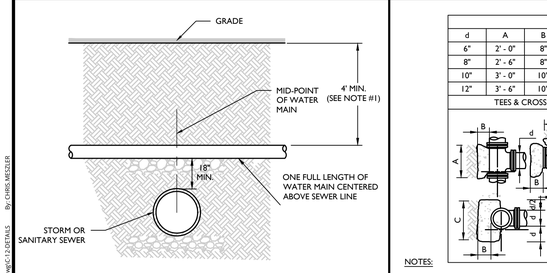


NOTES:

1. VALVE BOX SHOULD HAVE EXTENSION IF WATER MAIN OR SERVICE IS PLACED DEEPER THAN 5 FEET.
2. CURB STOP VALVE BOX SHALL BE MUELLER EXTENSION TYPE WITH ARCH PATTERN BASE, OR APPROVED EQUAL.
3. WATER MAIN VALVE BOX SHALL BE SCREW TYPE ADJUSTABLE MODE. **FIGURE # 4905-22 AS MANUFACTURED BY BINGHAM & TAYLOR OR APPROVED EQUAL.**

WATER VALVE BOX DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1600 | 05/01/18



NOTES:

1. WATER MAIN MAY CROSS ABOVE OBSTRUCTION IF 4' MINIMUM COVER IS MAINTAINED ABOVE THE WATER MAIN TO FINISH GRADE AND 18" MINIMUM VERTICAL SEPARATION IS OBTAINED.

WATER CROSSING OVER SEWER DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1301 | 05/01/18

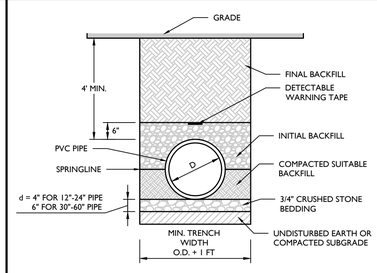
MINIMUM SIZE OF CONCRETE THRUST BLOCKS																	
d	A	B	C	d	A	B	C	d	A	B	C	A	B	C	d x e	A	B
6"	2' - 0"	8"	1' - 3"	6"	2' - 6"	8"	1' - 3"	6"	1' - 6"	6"	1' - 3"	1' - 6"	8"	1' - 3"	6" x 4"	1' - 6"	1' - 0"
8"	2' - 6"	8"	1' - 6"	8"	3' - 0"	8"	1' - 6"	8"	1' - 6"	8"	1' - 9"	1' - 6"	8"	1' - 9"	8" x 4"	2' - 0"	1' - 0"
10"	3' - 0"	10"	2' - 0"	10"	3' - 6"	10"	2' - 0"	10"	2' - 3"	10"	2' - 0"	1' - 6"	10"	2' - 0"	10" x 6"	2' - 4"	1' - 3"
12"	3' - 6"	10"	2' - 6"	12"	3' - 9"	10"	2' - 9"	12"	2' - 6"	10"	2' - 6"	1' - 6"	10"	2' - 6"	10" x 8"	2' - 6"	1' - 6"
TEES & CROSSES				90° BENDS				45° BENDS				22½° & 11¼° BENDS			REDUCERS		

NOTES:

1. ALL HORIZONTAL BENDS SHALL HAVE CONCRETE THRUST BLOCKS WITH MINIMUM BEARING AREAS AGAINST UNDISTURBED SOIL AND NO JOINT SHALL BE COVERED WITH CONCRETE.
2. BEARING AREAS ARE BASED UPON UNDISTURBED SOIL WITH A MINIMUM BEARING CAPACITY OF 0.5 TONS PER SQUARE FOOT. FOR A LESSER SOIL BEARING CAPACITY THESE AREAS SHALL BE INCREASED ACCORDINGLY.
3. THRUST BLOCKS SHALL BE POURED DIRECTLY AGAINST TRENCH WALLS AND SHALL BE PENNDOT CLASS "A" CONCRETE.
4. DETAILS FOR SUPPORTS AND BRACING FOR VERTICAL BENDS FOR 12" DIAMETER OR LARGER SHALL BE APPROVED BY THE AUTHORITY PRIOR TO CONSTRUCTION.

THRUST BLOCKS DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1400 | 05/01/18

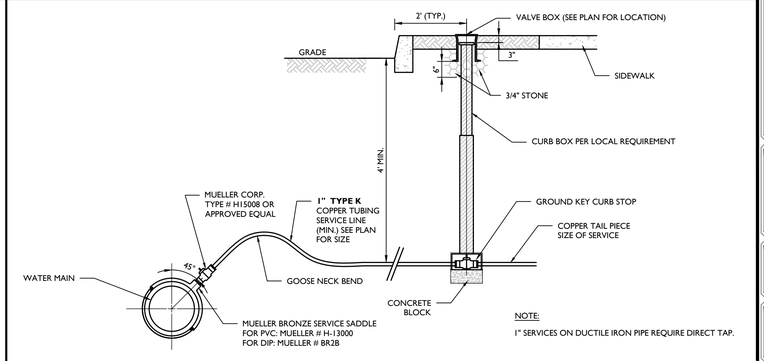


NOTES:

1. ALL PVC WATER PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ANSI/AWWA C605.
2. WATER MAIN SHALL BE PRESSURE **CLASS 165 DR 25** PVC PIPE PER AWWA C900-16 OR AS REQUIRED BY THE GOVERNING AUTHORITIES.

PVC WATER PIPE BEDDING DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1910 | 04/01/20



NOTE:

1" SERVICES ON DUCTILE IRON PIPE REQUIRE DIRECT TAP.

HOUSE WATER SERVICE CONNECTION DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1100 | 05/01/18

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\Site Plans\C-DTLS.dwg|C-1 DETAILS By: CHRIS MESCHLER

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FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER C. RICHARD ROSEBERRY No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

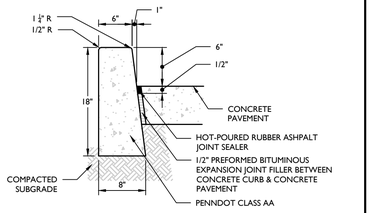
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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA
PROJECT NUMBER: 16001030B		DRAWING NAME: C-DTLS	

SHEET TITLE: CONSTRUCTION DETAILS

SHEET NUMBER: 12 of 27

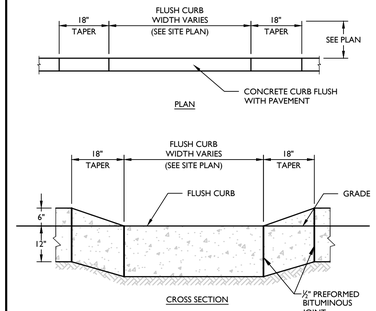


NOTES:

1. DEPTH OF JOINT FILLER STRIP EQUAL TO THE THICKNESS OF THE PAVEMENT LESS 1/2".
2. PREFORMED BITUMINOUS FIBER TRAVERSE JOINTS, 1/2" THICK AT 20' MAX. INTERVALS ALONG THE CURB.
3. PROVIDE CONTRACTION JOINTS (2" DEEP X ⅛" WIDE) 4'-0" MIN TO 10'-0" MAX INTERVALS.

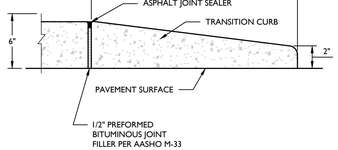
CONCRETE CURB (CONCRETE PAVEMENT) DETAIL

NOT TO SCALE MCPA-SITE-CURB-1001 05/01/18



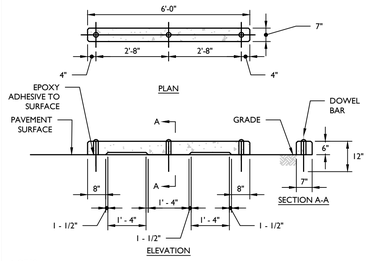
CONCRETE FLUSH CURB DETAIL

NOT TO SCALE MCPA-SITE-CURB-1500 05/01/18



CURB TAPER DETAIL

NOT TO SCALE MCPA-SITE-CURB-2100 05/01/18

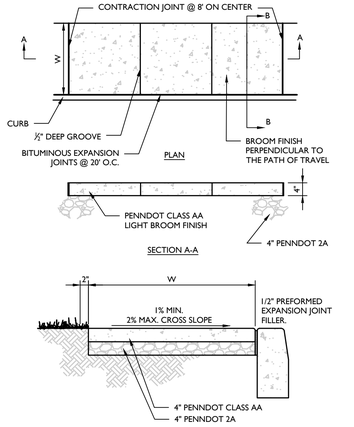


NOTES:

1. CONCRETE SHALL BE PENNDOT CLASS AA.
2. UNIT TO BE PINNED TO SURFACE WITH (3) 5/8" DIA. GALVANIZED STEEL RODS, 12" MINIMUM LENGTH.
3. ALL BEVELS TO BE 1/2", ALL ANGLES TO BE 45°

PRECAST CONCRETE BUMPER CURB WHEEL STOP (FOR CARS) DETAIL

NOT TO SCALE MCPA-SITE-CURB-2301 05/01/18

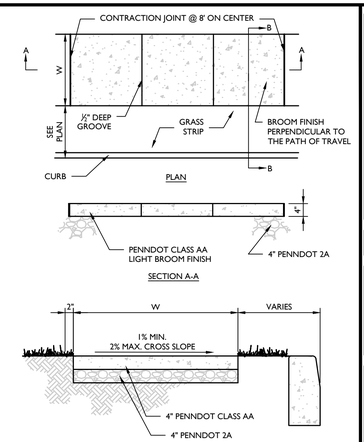


NOTES:

1. ½" EXPANSION JOINT FILLER INSTALLED BETWEEN THE CURB AND CONCRETE SIDEWALK AT 10' MAXIMUM SPACING, RECESS TO ¼" FROM THE TOP OF SIDEWALK.
2. ½" CONTRACTION JOINTS INSTALLED AT AN INTERVAL 24 TO 30 TIMES THE THICKNESS OF THE SLAB, TO A DEPTH OF ¼ OF THE THICKNESS OF THE SLAB, RECESS TO ½" FROM THE TOP OF SIDEWALK, FOR THE FULL WIDTH OF THE SIDEWALK. SCORE A ¼" GROOVED JOINT HALF WAY BETWEEN THE CONTRACTION JOINTS.
3. JOINT FILLER SHALL CONFORM TO AASHTO M-33. SURFACE OF CONCRETE SHALL BE BROOM FINISH. ROUND EDGES USING AN EDGING TOOL WITH A ½" RADIUS.
4. CONCRETE SIDEWALK SHALL BE CONSTRUCTED PER THE LATEST ADA REQUIREMENTS.

CONCRETE SIDEWALK (NEXT TO CURB) DETAIL

NOT TO SCALE MCPA-SITE-PVMT-1900 12/01/20

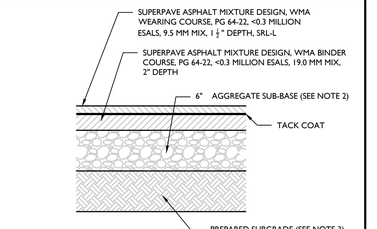


NOTES:

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2. JOINT FILLER SHALL CONFORM TO AASHTO M-33. SURFACE OF CONCRETE SHALL BE BROOM FINISH. ROUND EDGES USING AN EDGING TOOL WITH A ½" RADIUS.
3. CONCRETE SIDEWALK SHALL BE CONSTRUCTED PER THE LATEST ADA REQUIREMENTS.

CONCRETE SIDEWALK (NEXT TO GRASS) DETAIL

NOT TO SCALE MCPA-SITE-PVMT-1901 12/01/20

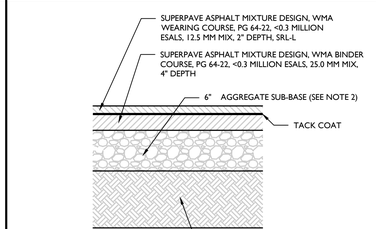


NOTES:

1. PENNDOT APPROVED ASPHALT MIX DESIGN
2. AGGREGATE BASE TO BE PENNDOT TYPE 2A CONFORMING TO PENNDOT PUBLICATIONS 408
3. SUBGRADE TO BE COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY, AS DETERMINED BY THE MODIFIED PROCTOR TEST, ASTM D 1557, AND SHALL CONSIST OF LOAD-BEARING FILL OR EXISTING STRATUM A MATERIALS CAPABLE OF ACHIEVING A CBR VALUE OF 5. THE MOISTURE CONTENT OF THE MATERIAL SHOULD ALSO BE MAINTAINED WITHIN +/- 2 PERCENT OF THE OPTIMUM MOISTURE CONTENT.

LIGHT-DUTY PAVEMENT DETAIL

NOT TO SCALE MCPA-SITE-PVMT-1000 05/01/18

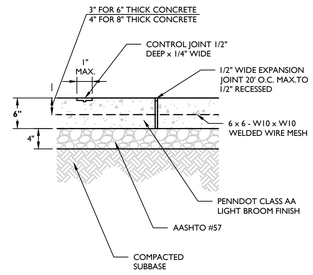


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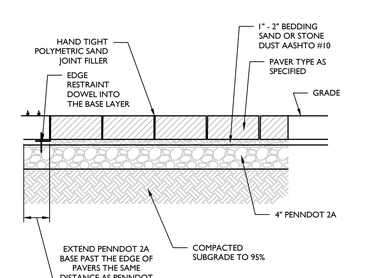
HEAVY-DUTY PAVEMENT DETAIL

NOT TO SCALE MCPA-SITE-PVMT-1100 05/01/18



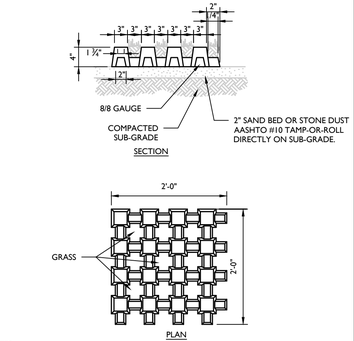
CONCRETE PAVEMENT DETAIL

NOT TO SCALE MCPA-SITE-PVMT-1600 05/01/18



TYPICAL STANDARD PAVER SECTION DETAIL

NOT TO SCALE MCPA-SITE-PVMT-2500 05/01/18

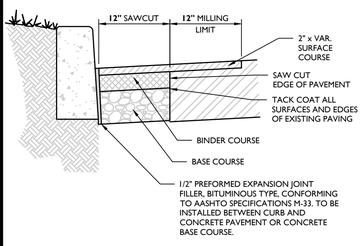


NOTES:

1. PAVERS SHALL BE MANUFACTURED BY **HASTINGS PAVEMENT CO.**, INC., FABRICATED WITH 6"x6" X 8/8 GAUGE STEEL MESH, AND 5,000 PSI CONCRETE OR APPROVED EQUAL.
2. SETTING BED FOR PAVERS SHALL BE EITHER UNDISTURBED EARTH OR FILL COMPACTED TO 95% MAXIMUM DRY DENSITY AS DETERMINED BY THE MODIFIED PROCTOR TEST ASTM D-1557-64 + (PLUS 4% OR MINUS 2% OPTIMUM MOISTURE). REMOVE FROM THE SETTING BED, ROCK OR OTHER MATERIALS WHICH WOULD CREATE UNEVEN BEARING. PLACE TOPSOIL, SAND, OR STONE DUST IN A 2" COMPACTED LAYER TO PRESENT A TRUE AND EVEN GRADE OVER ENTIRE AREA TO RECEIVE PAVER. SET PAVERS AND LINE UP TO ABUT.
3. THOROUGHLY MIX LIME, FERTILIZER AND OTHER ADDITIVES PER LOCAL SOIL CONSERVATION REQUIREMENTS WITH THE TOPSOIL AND SPREAD LOOSELY TO FILL VOIDS IN PAVERS. WATER WITH A MIST SPRAY TO SETTLE. ADD ADDITIONAL TOPSOIL MIX TO BRING THE TOPSOIL FLUSH WITH TOP OF THE PAVER.
4. ADD SEED MIX AS PER LOCAL SOIL CONSERVATION DISTRICT AND PROJECT LANDSCAPING REQUIREMENTS AND APPLY SEED AT SLIGHTLY LESS THAN NORMAL RATE, AND MULCH. WHEN GRASS IS 2 1/2" HIGH, CUT TO 1 3/4".

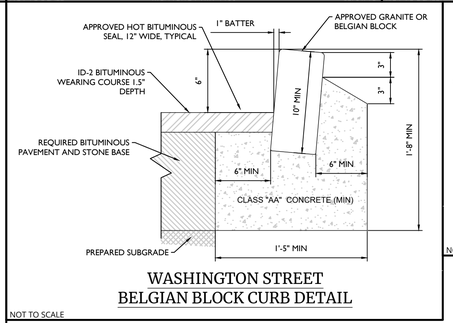
GRASS PAVERS (FOR EMERGENCY ACCESS DRIVE) DETAIL

NOT TO SCALE MCPA-SITE-PVMT-2400 05/01/18



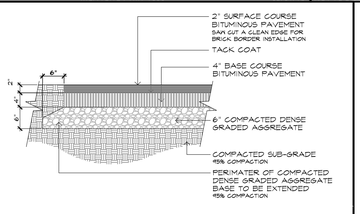
SAWCUT AND PAVEMENT RESTORATION DETAIL

NOT TO SCALE MCPA-SITE-PVMT-2600 05/01/18



WASHINGTON STREET BELGIAN BLOCK CURB DETAIL

NOT TO SCALE



WATERFRONT ASPHALT WALKWAY

NOT TO SCALE

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C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

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PROJECT NUMBER: 16001030B
DRAWING NAME: C-DTLS

SHEET TITLE: CONSTRUCTION DETAILS

SHEET NUMBER: 13 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\Site Plans\C-DTLS.dwg|C-13-DETAILS By: CHRIS MEZLER



30" x 30"

COLORS:
LEGEND = WHITE (RETROREFLECTIVE)
BACKGROUND = RED (RETROREFLECTIVE)

R1-1 SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R1-1 | 12/01/20



12" x 36"

COLORS:
LEGEND = BLACK
BACKGROUND = YELLOW (RETROREFLECTIVE)
STOP SYMBOL = RED (RETROREFLECTIVE)

R1-6A SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R1-6A | 07/01/21



30" x 30"

COLORS:
LEGEND = WHITE (RETROREFLECTIVE)
CIRCLE BACKGROUND = RED (RETROREFLECTIVE)

R5-1 SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R5-1 | 12/01/20



24" x 18"

COLORS:
LEGEND = BLACK
BACKGROUND = YELLOW (RETROREFLECTIVE)

W16-12P SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-WARN-W16-12P | 12/01/20



12" x 18"

COLORS:
LEGEND = GREEN (RETROREFLECTIVE)
HANDICAP SYMBOL= BLUE (RETROREFLECTIVE)
BACKGROUND = WHITE (RETROREFLECTIVE)

R7-8X SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R7-8 | 07/01/21



18" x 9"

COLORS:
LEGEND = GREEN (RETROREFLECTIVE)
BACKGROUND = WHITE (RETROREFLECTIVE)

R7-8P SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R7-8P | 07/01/21



12" x 18"

COLORS:
LEGEND = RED (RETROREFLECTIVE)
BACKGROUND = WHITE (RETROREFLECTIVE)

R7-1X SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R7-1 | 07/01/21

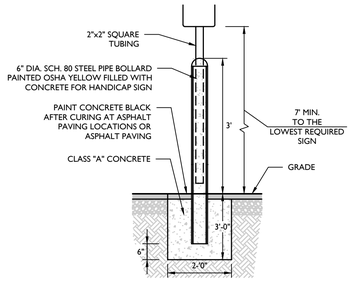


24" x 12"

COLORS:
LEGEND = BLACK
BACKGROUND = YELLOW (RETROREFLECTIVE)

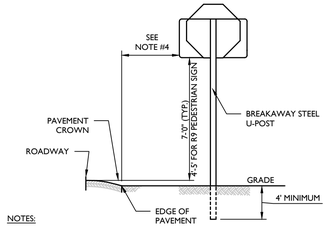
W16-9P SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-WARN-W16-9P | 07/01/21



BOLLARD MOUNTED SIGN DETAIL

NOT TO SCALE | MCPA-SITE-MRKG-2000 | 05/01/18

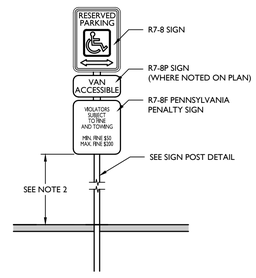


NOTES:

1. ALL POSTS SHALL BE OF ADEQUATE LENGTH TO MEET THE REQUIREMENTS FOR ERECTION, AS STATED IN THE CURRENT MANUAL ON "UNIFORM TRAFFIC CONTROL DEVICES" FOR STREETS AND HIGHWAYS.
2. ALL POSTS SHALL BE EMBEDDED 4' MINIMUM.
3. ALL POSTS TO BE BREAKAWAY STEEL U-POSTS IN CONFORMANCE WITH CURRENT ASTM SPECIFICATION A123 AND PADOT STANDARDS.
4. IN AREAS WITHOUT CURBING, THE OUTER EDGE OF SIGN TO BE 2'-0" MINIMUM TO 12'-0" MAXIMUM FROM EDGE OF CURB, AS DIRECTED.

SINGLE POST SIGN MOUNTING DETAIL

NOT TO SCALE | MCPA-SITE-MRKG-2001 | 05/01/18



NOTES:

1. INSTALL SIGN WHERE NOTED ON PLAN.
2. THE BOTTOM OF THE LOWEST SIGN SHALL BE MOUNTED 60" ABOVE THE PARKING LOT OR SIDEWALK SURFACE WHEN THE SIGN IS PARALLEL TO THE SIDEWALK AND 72" ABOVE THE PARKING LOT OR SIDEWALK WHEN THE SIGN IS PERPENDICULAR TO THE SIDEWALK.

ACCESSIBLE PARKING SIGN DETAIL

NOT TO SCALE | MCPA-SITE-MRKG-1900 | 05/01/18



"NO PARKING - FIRE LANE" SIGN (NTS)



FIRE APPARATUS ENTRANCE SIGN (NTS)

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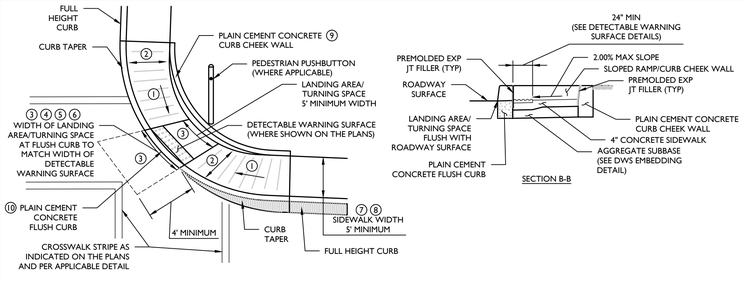
SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

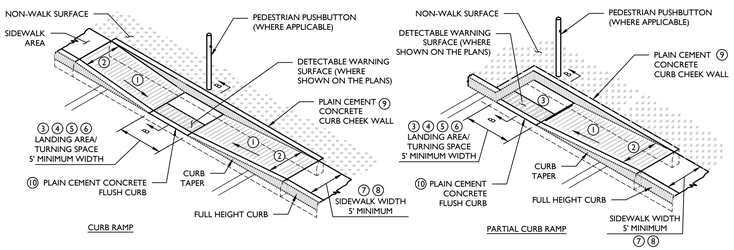
PROJECT NUMBER: 16001030B
DRAWING NAME: C-DTLS

SHEET TITLE: CONSTRUCTION DETAILS

SHEET NUMBER: 14 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.



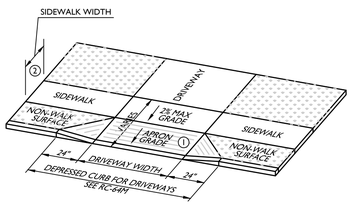


NOTES:

1. 8.33% MAX RAMP SLOPE, TO AVOID CHASING GRADE INDEFINITELY WHEN TRAVERSING THE HEIGHT OF CURB, RAMP LENGTH NOT TO EXCEED 15'-0". ADJUST RAMP SLOPE AS NEEDED TO PROVIDE ACCESS TO THE MAXIMUM EXTENT FEASIBLE.
2. SLOPE: ZERO ± 2.00%
3. CURB RAMPS REQUIRE A 4' x 4' MINIMUM LANDING AREA/TURNING SPACE WITH A MAXIMUM CROSS SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SEE DETAILS FOR LOCATIONS AND DIMENSIONS.
4. LANDING AREA AT THE TOP AND BOTTOM OF THE CURB RAMP (AKA. CLEAR OR TURNING SPACE) MUST BE KEPT CLEAR OF OBSTRUCTIONS. THE LANDING AREA IS TO BE 4' X 4' MINIMUM AND MATCH THE WIDTH OF THE CURB RAMP, INCREASED THE DEPTH OF MINIMUM LANDING AREA TO 5 FEET IF CONSTRAINED AT THE BACK OF THE SIDEWALK.
5. THE LANDING AREA MUST HAVE AN ABSOLUTE MINIMUM SLOPE OF 0.5% AND A MAXIMUM SLOPE OF 2%, WHEREAS 1.0% TO 1.5% IS THE DESIRED DESIGN SLOPE IN THE DIRECTION OF TRAVEL AND FOR THE CROSS SLOPE.
6. ASSISTANT DISTRICT EXECUTIVE APPROVAL REQUIRED IF TURNING SPACE IS NOT ENTIRELY ON SIDEWALK.
7. SIDEWALK CROSS SLOPE MUST BE A MINIMUM OF 1% AND MAXIMUM 2%, WHEREAS 1.5% IS THE DESIRED DESIGN CROSS SLOPE. SIDEWALK BEYOND LANDING AREA MUST HAVE A MINIMUM 1% TO MAXIMUM 5% OF LONGITUDINAL SLOPE IN THE DIRECTION OF TRAVEL, AND A 1% TO 2% MAX. CROSS SLOPE.
8. SIDEWALK WIDTH MAY BE REDUCED TO 4'-0", WHEN PASSING AREAS 5'-0" X 5'-0" ARE PROVIDED EVERY 200'.
9. CHEEK WALLS ARE PERMITTED WHEN ADJACENT TO NON-WALK AREAS OR ELEVATION DIFFERENCES CANNOT BE ACCOMMODATED BY FLARES OR GRADING. GRADE GRASS AREAS OR OTHER NON-WALK AREAS AT 3:1 OR FLATTER. DO NOT INSTALL CHEEK WALLS THAT INTERSECT THE PEDESTRIAN PATH.
10. GUTTER SLOPE THE ALONG CURB RAMP MUST MAINTAIN POSITIVE DRAINAGE WITH A 1.0 % TO 1.5% GUTTER SLOPE PREFERRED, WHEREAS 0.5% AS THE ABSOLUTE MINIMUM AND 2.0% IS MAXIMUM ALONG THE LENGTH OF THE FLUSH CURB.

TYPE 2 CURB RAMP DETAIL

NOT TO SCALE MCPA-SITE-HADA-1100 12/01/20

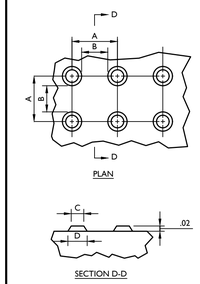


NOTES:

1. 8.00% MAX CHANGE IN GRADE BETWEEN ROAD SURFACE AND DRIVEWAY.
2. MINIMUM SIDEWALK WIDTH 5'-0". SIDEWALK WIDTH MAY BE REDUCED TO 4'-0", WHEN PASSING AREAS 5'-0" X 5'-0" ARE PROVIDED EVERY 200'.

TYPE 1 DRIVEWAY APRON DETAIL

NOT TO SCALE MCPA-SITE-HADA-1002 05/01/18



TRUNCATED DOME DIMENSIONS		
DIM	MIN mm (inch)	MAX mm (inch)
A	1.6"	2.4"
B	0.65"	1.5"
C	NOTE 1	NOTE 1
D	0.9"	1.4"

NOTES:

1. THE "C" DIMENSION IS 50% TO 65% OF THE "D" DIMENSION.

DETECTABLE WARNING SURFACE (DWS) TRUNCATED DOME DETAIL

NOT TO SCALE MCPA-SITE-HADA-1601 05/01/18

ADA GENERAL NOTES

MCPA-SITE-HADA-1700 12/01/20

1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTIONS 350, 409, 630, 676, 694, AND 695.
2. PROVIDE EXPANSION JOINT MATERIAL1/2" THICK WHERE CURB RAMP ADJOINS ANY RIGID PAVEMENT, SIDEWALK OR STRUCTURE WITH THE TOP OF JOINT FILLER FLUSH WITH ADJACENT CONCRETE SURFACE.
3. CONSTRUCT CURB RAMPS WITH A MINIMUM 4'-0" X 4'-0" CLEAR SPACE BEYOND THE CURB FACE, WITHIN THE WIDTH OF THE CROSSWALK AND WHOLLY OUTSIDE THE PARALLEL VEHICLE TRAVEL LANE. SEE SHEET 7 FOR CROSSWALK DETAILS.
4. SEAL JOINTS WITH AN APPROVED SEALING MATERIAL.
5. PROVIDE SLIP RESISTANT TEXTURE ON CURB RAMP BY COARSE BROOMING TRANSVERSE TO THE SLOPE OF THE RAMP. EXTEND TEXTURE THE FULL WIDTH AND LENGTH OF THE CURB RAMP INCLUDING SIDE FLARES.
6. MODIFY CONSTRUCTION DETAILS TO ADAPT DIMENSIONS TO EXISTING CURB HEIGHTS WHERE THE CURB IS LESS THAN THE STANDARD 8" HEIGHT.
7. CURB RAMP AND SIDE FLARE LENGTHS ARE VARIABLE AND BASED ON CURB HEIGHT AND THE SIDEWALK SLOPE.
8. TO AVOID CHASING GRADE INDEFINITELY WHEN TRAVERSING THE HEIGHT OF CURB, RAMP LENGTH NOT TO EXCEED 15'-0", ADJUST RAMP SLOPE AS NEEDED TO PROVIDE ACCESS TO THE MAXIMUM EXTENT FEASIBLE.
9. NON-WALK AREA IS AN OBSTRUCTED OR GRASS/NON-PAVED AREA ADJACENT TO THE PEDESTRIAN ACCESS ROUTE THAT IS NOT USED BY THE PEDESTRIAN FOR ACCESS.
10. THE DETAILS DEPICT PEDESTRIAN PUSHBUTTON POLES TO ILLUSTRATE THE RECOMMENDED PLACEMENT OF PEDESTRIAN PUSHBUTTONS. FOR ALTERATION PROJECTS, PROVIDE ACCESS TO EXISTING PEDESTRIAN PUSHBUTTONS TO THE MAXIMUM EXTENT FEASIBLE. INSTALL PEDESTRIAN PUSHBUTTON STUB POLES, WHERE APPLICABLE, SO AS NOT TO CREATE PEDESTRIAN OBSTRUCTIONS.
11. SEE TC-8803 FOR ADDITIONAL PEDESTRIAN PUSHBUTTON DETAILS NOT SHOWN.
12. ALIGN DETECTABLE WARNING SURFACE TRUNCATED DOMES ON A SQUARE GRID IN THE PREDOMINANT DIRECTION OF THE RAMP AND PERPENDICULAR TO CURB. SEE "DETECTABLE WARNING SURFACE (DWS) ON CURVED SURFACE" DETAIL FOR INSTALLATIONS ALONG CURVED SURFACES, IF APPLICABLE.
13. PROVIDE DETECTABLE WARNING SURFACES (DWS) 24" MINIMUM (IN THE DIRECTION OF PEDESTRIAN TRAVEL) ACROSS FULL WIDTH OF RAMP AT THE GRADE BREAK NEAR STREET EDGE. PROVIDES THAT CONTRAST VISUALLY WITH ADJACENT WALKWAY SURFACES, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT FOR THE FULL WIDTH OF RAMP IN ACCORDANCE WITH LOCAL REQUIREMENTS.
14. FOR NEW CONSTRUCTION, DO NOT EXCEED 2.00% CROSS SLOPE ON THE CURB RAMP OR PEDESTRIAN ACCESS ROUTE.
15. FOR NEW CONSTRUCTION AND ALTERATIONS, CONSTRUCT CURB RAMP AND FLARE SLOPES WITH THE FLATTEST SLOPE POSSIBLE. THE SLOPES INDICATED IN THE DETAILS SHOW THE MAX SLOPE ALLOWABLE. SLOPES THAT EXCEED THOSE INDICATED IN THE DETAILS, OR CONTRACT DOCUMENTS AS APPLICABLE, WILL NOT BE ACCEPTED AND WILL BE RECONSTRUCTED.
16. CONSTRUCT SIDEWALKS AT A LONGITUDINAL SLOPE NOT TO EXCEED 5.00%. FOR ROADWAY PROFILE SLOPES THAT EXCEED 5.00%, CONSTRUCT PARALLEL SIDEWALKS ADJACENT TO ROADWAY AT A LONGITUDINAL SLOPE NOT TO EXCEED ROADWAY PROFILE SLOPE.
17. THE CHANGE IN GRADE AT THE BOTTOM OF THE CURB RAMP AND ADJOINING ROAD SURFACE IS NOT TO EXCEED AN ALGEBRAIC DIFFERENCE OF 13.33%. THE COUNTER SLOPE OF THE GUTTER ROAD AT THE FOOT OF A CURB RAMP, TURNING SPACE OR BLENDED TRANSITION IS NOT TO EXCEED 5.00%. SEE "CHANGE OF GRADE LIMITATIONS" DETAIL, IF APPLICABLE.
18. THE CONSTRUCTION STANDARDS DEPICTED ARE MOST APPROPRIATE FOR NEW CONSTRUCTION. ALL CONSTRUCTION MUST MEET THE STANDARDS CONTAINED HEREIN UNLESS OTHERWISE NOTED OR DIRECTED.
19. ALL SLOPES ARE MEASURED WITH RESPECT TO A LEVEL PLANE. THEREFORE, THE LENGTH OF RAMP IS NOT SOLELY DEPENDANT ON THE HEIGHT OF CURB. (FOR EXAMPLE, A 6" CURB DOES NOT NECESSARILY MEAN A RAMP LENGTH OF 6'-0" FOR A 12:1 SLOPE.
20. SIDEWALK WIDTH MAY BE REDUCED TO 4'-0", WHEN PASSING AREAS 5'-0" X 5'-0" ARE PROVIDED EVERY 200'.
21. THE TRAVEL LANE IS DEFINED BY THE OUTSIDE EDGE OF THE WHITE PAVEMENT MARKING LINE. IF A WHITE PAVEMENT MARKING LINE DOES NOT EXIST, THE TRAVEL LANE IS DEFINED BY THE CONTRACT DOCUMENTS.
22. CONSTRUCT FLUSH CURB FOR CURB RAMPS FLUSH TO ADJACENT ROADWAY. GRADE EDGE OF ROAD ELEVATIONS AT THE FLOW LINE TO ENSURE POSITIVE DRAINAGE AND PREVENT PONDING. FOR LEVEL TURNING SPACES BEHIND FLUSH CURB, ADJUST SLOPES TO PROVIDE POSITIVE DRAINAGE. AT THE JOINT BETWEEN FLUSH CURB AND ROADWAYS, REMOVE EXCESS JOINT SEALER AND COVER THE SEALED AREA WITH A LIGHT APPLICATION OF DRY SAND.
23. CHEEK WALLS ARE PERMITTED WHEN ADJACENT TO NON-WALK AREAS OR ELEVATION DIFFERENCES CANNOT BE ACCOMMODATED BY FLARES OR GRADING. GRADE GRASS AREAS OR OTHER NON-WALK AREAS AT 3:1 OR FLATTER. DO NOT INSTALL CHEEK WALLS THAT INTERSECT THE PEDESTRIAN PATH.
24. CONSTRUCT TOP OF PLAIN CEMENT CONCRETE FLUSH CURB TO BE FLUSH WITH ADJACENT SURFACES (RAMPS, SIDEWALKS, FLARES).
25. FOR CURB RAMPS THAT LEAD TO A SINGLE CROSSWALK, THE RAMP (EXCLUDING FLARES) TO BE FULLY INSIDE OF MARKED CROSSWALK LINES.
26. A 4'-0" MAXIMUM DIGITAL DISPLAY LEVEL WILL BE USED TO VERIFY THE SLOPES OF CURB RAMPS AND SIDEWALKS.
27. INSTALL DUMMY JOINTS WHERE RAMPS, TURNING SPACES, FLARES, AND SIDEWALKS ABUT.
28. CONSTRUCT FLUSH CURB SLOPE TO MATCH ROADWAY PROFILE AND HAVE A FLUSH CONNECTION. TRANSITION CURB RAMP CROSS SLOPE TO MATCH ROADWAY PROFILE AS GRADUALLY AS POSSIBLE. DO NOT EXCEED 3.00% PER 1'-0" CROSS SLOPE RATE OF CHANGE WHEN TRANSITIONING TO ROADWAY PROFILE.
29. DO NOT SCORE OR MAKE GROOVES ON SLOPED SURFACES. LINES SHOWN ON DETAILS ARE FOR ILLUSTRATION ONLY. SEE NOTE 5.
30. CONTRACTOR MUST PREPARE SHOP DRAWINGS OF EACH CURB RAMP FOR SUBMISSION AND APPROVAL OF THE UNDERSIGNED PROFESSIONAL AND THE MUNICIPAL, COUNTY, STATE OR OTHER AGENCY'S ENGINEER HAVING JURISDICTION. DEVIATIONS FROM THE CURB RAMP DETAILS REQUIRE WRITTEN APPROVAL OF THE UNDERSIGNED PROFESSIONAL AND THE MUNICIPAL, COUNTY, STATE OR OTHER AGENCY'S ENGINEER HAVING JURISDICTION.
31. ACCESSIBLE RAMPS:
    A. ON-SITE RAMP OR CURB RAMPS MUST BE INSTALLED IN CONFORMANCE WITH THE CURRENT ADA STANDARDS FOR ACCESSIBLE DESIGN AS PUBLISHED BY THE UNITED STATES DEPARTMENT OF JUSTICE AND MUST ALSO MEET OTHER APPLICABLE LOCAL AND STATE REQUIREMENTS IN EFFECT AT THE DATE OF CONSTRUCTION.
    B. PUBLIC RIGHT OF WAY ACCESSIBLE OR CURB RAMPS MUST BE INSTALLED PURSUANT WITH THE CURRENT UNITED STATES ACCESS BOARD "ACCESSIBILITY GUIDELINES FOR PEDESTRIAN FACILITIES IN THE PUBLIC RIGHT-OF-WAY" (PROWAG).
32. CURB RAMP SLOPE AS CONSTRUCTED IN THE DIRECTION OF TRAVEL CANNOT EXCEED 12H:1V. RAMP SLOPES OF 14H:1V ARE THE PREFERRED SLOPE TO MAINTAIN A LEVEL OF CONSTRUCTION TOLERANCE MINIMUM CURB RAMP CROSS-SLOPE IS TO BE 0.50%, MAXIMUM CANNOT EXCEED 2.00%.
33. CURB RAMP SIDE FLARE SLOPES ARE TO BE 14H:1V DESIRABLE, 12H:1V MAXIMUM, BUT MAY BE 10H:1V UPON APPROVAL OF THE ENGINEER. WHERE SIDE FLARES ARE NOT REQUIRED, PROVIDE AN 18" CURB TAPER TO THE FLUSH CURB PER THE DETAIL.
34. LANDING AREA AT THE TOP AND BOTTOM OF THE CURB RAMP (AKA. CLEAR OR TURNING SPACE) MUST BE KEPT CLEAR OF OBSTRUCTIONS. THE LANDING AREA IS TO BE 4' X 4' MINIMUM AND MATCH THE WIDTH OF THE CURB RAMP, INCREASED THE DEPTH OF MINIMUM LANDING AREA TO 5 FEET IF CONSTRAINED AT THE BACK OF THE SIDEWALK.
35. THE LANDING AREA MUST HAVE AN ABSOLUTE MINIMUM SLOPE OF 0.5% AND A MAXIMUM SLOPE OF 2%, WHEREAS 1.0% TO 1.5% IS THE DESIRED DESIGN SLOPE IN THE DIRECTION OF TRAVEL AND FOR THE CROSS SLOPE.
36. SIDEWALK CROSS SLOPE MUST BE A MINIMUM OF 1% AND MAXIMUM 2%, WHEREAS 1.5% IS THE DESIRED DESIGN CROSS SLOPE. SIDEWALK BEYOND LANDING AREA MUST HAVE A MINIMUM 1% TO MAXIMUM 5% OF LONGITUDINAL SLOPE IN THE DIRECTION OF TRAVEL, AND A 1% TO 2% MAX. CROSS SLOPE.
37. FLUSH CURB AT CURB RAMP MUST BE MINIMUM 4' WIDE AND FLUSH WITH PAVEMENT. THE SEGMENT OF FLUSH CURB MUST BE MADE WITH CONCRETE CURB REGARDLESS OF THE CURB MATERIAL USED THROUGHOUT THE SITE.
38. GUTTER SLOPE THE ALONG CURB RAMP MUST MAINTAIN POSITIVE DRAINAGE WITH A 1.0 % TO 1.5% GUTTER SLOPE PREFERRED, WHEREAS 0.5% AS THE ABSOLUTE MINIMUM AND 2.0% IS MAXIMUM ALONG THE LENGTH OF THE FLUSH CURB.
39. CROSSWALKS AND PAVEMENT MARKINGS MUST BE INSTALLED AS DENOTED ON SITE PLAN. CURB RAMP MUST BE WHOLLY CONTAINED WITHIN THE CROSSWALK CROSSING.
40. THE RAMP SURFACE MUST HAVE A SLIP RESISTANT, BROOM FINISH PERPENDICULAR TO THE PATH OF TRAVEL.
41. CONCRETE EXPANSION JOINTS MUST HAVE A FIRM SURFACE WITH ¼" BEVELED CONCRETE EDGES. THE JOINT SURFACE SHALL NOT BE MORE THAN ¼" BELOW THE ADJOINING CONCRETE SURFACE.
42. DETECTABLE WARNING SURFACES ARE TO BE PROVIDED AT CURB RAMPS, BLENDED TRANSITION AT PEDESTRIAN STREET CROSSINGS AND PEDESTRIAN REFUGE ISLANDS WHEN THOSE ARE WITHIN THE PUBLIC RIGHT-OF-WAY, AND WHERE AS SHOWN ON THE PLANS.

DETECTABLE WARNING SURFACE (DWS) NOTES

MCPA-SITE-HADA-1602 12/01/20

1. THE DETECTABLE WARNING SURFACE IS TO BE MANUFACTURED MATS THAT ARE EMBEDDED AND CAST-IN-PLACE IN THE CONCRETE.
2. IN LIEU OF A CAST IN PLACE DETECTABLE WARNING SURFACE, THE CONTRACTOR MAY UTILIZE A SURFACE APPLIED DETECTABLE WARNING SURFACE WITH PRIOR APPROVAL OF THE UNDERSIGNED ENGINEER AND PRIOR TO POURING OF THE CONCRETE RAMP.
3. THE CONTRACTOR MUST SUBMIT TO THE ENGINEER FOR APPROVAL A SHOP DRAWING OF THE DETECTABLE WARNING SURFACE PRIOR TO CONSTRUCTION.
4. THE CONTRACTOR MUST PROVIDE A MANUFACTURER CERTIFICATION THAT THE DETECTABLE WARNING SURFACE COMPLIES WITH THE CURRENT ADA STANDARDS FOR ACCESSIBLE DESIGN AS PUBLISHED BY THE DEPARTMENT OF JUSTICE AND THE ADA STANDARDS AS SUPPORTED BY THE UNITED STATES ACCESS BOARD, AND THE STATE AND/OR LOCAL ADA STANDARDS.
5. COLOR MUST BE AS APPROVED BY THE LOCAL JURISDICTION PRIOR TO INSTALLATION. DETECTABLE WARNING SURFACES MUST CONTRAST VISUALLY WITH ADJACENT WALKING SURFACES EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT. ALTERNATIVE COLOR MAY BE USED PROVIDED SUCH COLOR COMPLIES WITH CURRENT ADA STANDARDS.
6. DETECTABLE WARNINGS ARE TO CONSIST OF A SURFACE OF TRUNCATED DOMES.
7. TRUNCATED DOMES IN A DETECTABLE WARNING SURFACE MUST HAVE A BASE DIAMETER OF 0.9 INCH (23 mm) MINIMUM AND 1.4 INCHES (36 mm) MAXIMUM, A TOP DIAMETER OF 50 PERCENT OF THE BASE DIAMETER MINIMUM TO 65 PERCENT OF THE BASE DIAMETER MAXIMUM, AND A HEIGHT OF 0.2 INCH (5.1 mm).
8. TRUNCATED DOMES IN DETECTABLE WARNING SURFACE MUST HAVE A CENTER-TO-CENTER SPACING OF 1.6 INCHES (41 mm) MINIMUM AND 2.4 INCHES (61 mm) MAXIMUM, AND A BASE-TO-BASE SPACING OF 0.65 INCH (17 mm) MINIMUM, MEASURED BETWEEN THE MOST ADJACENT DOMES ON A SQUARE GRID.
9. SOME DETECTABLE WARNING PRODUCTS REQUIRE A CONCRETE BORDER FOR PROPER INSTALLATION. WHERE REQUIRED BY THE MANUFACTURER, THE CONCRETE BORDER MUST NOT EXCEED 2 INCHES (51 mm).
10. DETECTABLE WARNING SURFACES ARE NOT BE PLACED ON PAVING OR EXPANSION JOINTS AT CURB RAMPS. THE ROWS OF TRUNCATED DOMES IN DETECTABLE WARNING SURFACES ARE TO BE ALIGNED PERPENDICULAR TO THE GRADE BREAK BETWEEN THE RAMP RUN AND THE STREET SO PEDESTRIANS WHO USE WHEELCHAIRS CAN "TRACK" BETWEEN THE DOMES.
11. ON PERPENDICULAR CURB RAMPS, DETECTABLE WARNING SURFACES ARE TO BE PLACED AS FOLLOWS:
    a. WHERE THE ENDS OF THE BOTTOM GRADE BREAK ARE IN FRONT OF THE BACK OF CURB, DETECTABLE WARNING SURFACES ARE TO BE PLACED AT THE BACK OF CURB.
    b. WHERE THE ENDS OF THE BOTTOM GRADE BREAK ARE BEHIND THE BACK OF CURB AND THE DISTANCE FROM EITHER END OF THE BOTTOM GRADE BREAK TO THE BACK OF CURB IS 5.0 FT OR LESS, DETECTABLE WARNING SURFACES ARE TO BE PLACED ON THE RAMP RUN WITHIN ONE DOME SPACING OF THE BOTTOM GRADE BREAK.
    c. WHERE THE ENDS OF THE BOTTOM GRADE BREAK ARE BEHIND THE BACK OF CURB AND THE DISTANCE FROM EITHER END OF THE BOTTOM GRADE BREAK TO THE BACK OF CURB IS MORE THAN 5.0 FT, DETECTABLE WARNING SURFACES ARE TO BE PLACED ON THE LOWER LANDING AT THE BACK OF CURB.
12. ON PARALLEL CURB RAMPS, DETECTABLE WARNING SURFACES ARE TO BE PLACED ON THE TURNING SPACE AT THE FLUSH TRANSITION BETWEEN THE STREET AND SIDEWALKS.
13. ON BLENDED TRANSITIONS, DETECTABLE WARNING SURFACES ARE TO BE PLACED AT THE BACK OF CURB, WHERE RAISED PEDESTRIAN STREET CROSSINGS, DEPRESSED CORNERS OR OTHER LEVEL PEDESTRIAN STREET CROSSINGS ARE PROVIDED, DETECTABLE WARNING SURFACES ARE TO BE PLACED AT THE FLUSH TRANSITION BETWEEN THE STREET AND THE SIDEWALK.

ADA INSTRUCTIONS TO CONTRACTOR

MCPA-SITE-HADA-1800 12/01/20

1. CONTRACTOR MUST EXERCISE APPROPRIATE CARE AND PRECISION IN CONSTRUCTION OF ADA (HANDICAPPED) ACCESSIBLE COMPONENTS FOR THE SITE/PROJECT. THESE COMPONENTS, AS CONSTRUCTED, MUST COMPLY WITH THE LATEST FEDERAL ADA STANDARDS FOR ACCESSIBLE DESIGN, AND CONSTRUCTION WITHIN THE PUBLIC RIGHT-OF-WAY MUST COMPLY WITH THE LATEST FEDERAL PROPOSED "ASSESSIBILITY GUIDELINES FOR PEDESTRIAN FACILITIES IN THE PUBLIC RIGHT-OF-WAY" (PROWAG).
2. FINISHED SURFACES ALONG THE ACCESSIBLE ROUTE OF TRAVEL FROM PARKING SPACE, PUBLIC TRANSPORTATION, PEDESTRIAN ACCESS, INTER-BUILDING ACCESS, TO POINTS OF ACCESSIBLE BUILDING ENTRANCE/EGRESS, MUST COMPLY WITH THESE ADA CODE REQUIREMENTS AND ANY SUPPLEMENTAL STATE REQUIREMENTS. THESE INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:

   (NOTE: THIS LIST IS NOT INTENDED TO CAPTURE EVERY APPLICABLE FEDERAL, STATE AND LOCAL RULE AND REGULATION. THE CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH THE LAW, WHETHER OR NOT STATED SPECIFICALLY HEREIN):

   A. PARKING SPACES AND PARKING AISLES - SLOPE MUST NOT EXCEED 1:48 (1/4" PER FOOT OR NORMALLY 2.0%) IN ANY DIRECTION.
   B. CURB RAMPS- SLOPES MUST NOT EXCEED 1:12 (8.3%).
   C. LANDINGS
      i. LANDINGS AT CURB RAMPS - MUST BE 4 FT. MIN., X 4 FT. MIN. AND ARE TO BE INCREASED TO 5 FEET WHERE THE LANDING SPACE (TURNING SPACE) IS CONSTRAINED AT THE BACK OF THE SIDEWALK.
      ii. LANDINGS AT RAMPS - MUST BE 5 FT MIN. IN THE DIRECTION OF TRAVEL AND BE PROVIDED AT EACH END OF THE RAMP, MUST PROVIDE POSITIVE DRAINAGE (1 % MIN.), AND MUST NOT EXCEED 1:48 (1/4" PER FOOT OR NORMALLY 2.0%) IN ANY DIRECTION. WHEN LANDING IS ALSO A TURNING SPACE, IT MUST BE A MINIMUM 5 FT X 5 FT.
      iii. LANDINGS AT DOORWAYS - SEE NOTE F BELOW.
   D. PATH OF TRAVEL ALONG ON-SITE ACCESSIBLE ROUTE - MUST PROVIDE A 36 INCH (EXCLUDING THE CURB) OR GREATER UNOBSTRUCTED WIDTH OF TRAVEL, (CAR OVERHANGS MUST NOT REDUCE THIS MINIMUM WIDTH), IN A PUBLIC RIGHT-OF-WAY, THE MINIMUM WIDTH EXCLUDING THE CURB IS 4 FT. THE SLOPE MUST BE NO GREATER THAN 1:20 (5.0%) IN THE DIRECTION OF TRAVEL AND MUST NOT EXCEED 1:48 (1/4" PER FOOT OR NORMALLY 2.0%) IN CROSS SLOPE.
   E. WHERE PATH OF TRAVEL WILL BE GREATER THAN 1:20 (5.0%), AN ADA RAMP, WITH A MAXIMUM SLOPE OF 1:12 (8.3%), FOR A MAXIMUM RISE OF 30 INCHES, MUST BE PROVIDED. THE RAMP MUST HAVE A MINIMUM CLEAR WIDTH OF 36 INCHES, HAVE ADA HAND RAILS AND LANDINGS (MIN. 5 FT. LONG IN THE DIRECTION OF TRAVEL) ON EACH END THAT ARE SLOPED A MIN. 1 % AND NO MORE THAN 1:48 (1/4" PER FOOT OR NOMINALLY 2.0%) FOR POSITIVE DRAINAGE.
   F. EXTERIOR DOORWAYS - MUST HAVE A "LEVEL" LANDING AREA ON THE EXTERIOR SIDE OF THE DOOR THAT IS SLOPED NO MORE THAN 1:48 (1/4" PER FOOT OR NORMALLY 2.0%) FOR POSITIVE DRAINAGE. THIS LANDING AREA IS GENERALLY 5 FT X 5 FT, EXCEPT WHERE OTHERWISE PERMITTED BY ADA STANDARDS. (SEE APPLICABLE CODE SECTIONS).
3. IT IS RECOMMENDED THAT THE CONTRACTOR REVIEW THE INTENDED CONSTRUCTION WITH THE LOCAL BUILDING CODE OFFICIAL, INCLUDING WHETHER OR NOT FALL PROTECTION IS REQUIRED.
4. IT IS RECOMMENDED THAT THE CONTRACTOR CHECK THE SLOPE OF FORMWORK FOR COMPLIANCE WITH ADA STANDARDS PRIOR TO POURING CONCRETE.

REV	DATE	DRAWN BY	DESCRIPTION

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COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
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COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER: 16001030B
DRAWING NAME: C-DTLS

SHEET TITLE: CONSTRUCTION DETAILS

SHEET NUMBER: 15 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

CULTEC RECHARGER® 360HD PRODUCT SPECIFICATIONS

GENERAL
CULTEC RECHARGER® 360HD CHAMBERS ARE DESIGNED FOR UNDERGROUND STORMWATER MANAGEMENT. THE CHAMBERS MAY BE USED FOR RETENTION, RECHARGING, DETENTION OR CONTROLLING THE FLOW OF ON-SITE STORMWATER RUNOFF.

CHAMBER PARAMETERS
1. THE CHAMBERS SHALL BE MANUFACTURED IN THE U.S.A. OR CANADA BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE CHAMBERS SHALL BE DESIGNED AND TESTED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". THE LOAD CONFIGURATION SHALL INCLUDE:
   A. INSTANTANEOUS AASHTO DESIGN TRUCK LIVE LOAD AT MINIMUM COVER
   B. MAXIMUM PERMANENT (50-YEAR) COVER LOAD
   C. 1-WEEK PARKED AASHTO DESIGN TRUCK LOAD
3. THE CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F3430-20 "STANDARD SPECIFICATION FOR CELLULAR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12, WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS. THE STRUCTURAL DESIGN OF THE CHAMBERS SHALL INCLUDE THE FOLLOWING:
   A. THE CREEP MODULUS SHALL BE 50-YEAR AS SPECIFIED IN ASTM F3430
   B. THE MINIMUM SAFETY FACTOR FOR LIVE LOADS SHALL BE 1.75
   C. THE MINIMUM SAFETY FACTOR FOR DEAD LOADS SHALL BE 1.95
5. THE CHAMBER SHALL BE STRUCTURAL FOAM INJECTION MOLDED OF BLUE VIRGIN HIGH MOLECULAR WEIGHT IMPACT-MODIFIED POLYPROPYLENE.
6. THE CHAMBER SHALL BE ARCHED IN SHAPE.
7. THE CHAMBER SHALL BE OPEN-BOTTOMED.
8. THE CHAMBER SHALL BE JOINED USING AN INTERLOCKING OVERLAPPING RIB METHOD. CONNECTIONS MUST BE FULLY SHOULDERED OVERLAPPING RIBS, HAVING NO SEPARATE COUPLINGS.
9. THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC RECHARGER® 360HD SHALL BE 36 INCHES (915 mm) TALL, 60 INCHES (1525 mm) WIDE AND 50 INCHES (1275 mm) LONG. THE INSTALLED LENGTH OF A JOINED RECHARGER® 360HD SHALL BE 3.67 FEET (1.12 m).
10. MULTIPLE CHAMBERS MAY BE CONNECTED TO FORM DIFFERENT LENGTH ROWS. EACH ROW SHALL BEGIN AND END WITH A SEPARATELY FORMED CULTEC RECHARGER® 360HD END CAP. MAXIMUM INLET OPENING ON THE END CAP IS 24 INCH (600 mm) HDPE OR 30 INCH (750mm) PVC.
11. THE CHAMBER SHALL HAVE TWO SIDE PORTALS TO ACCEPT CULTEC HVLV™ FC-48 FEED CONNECTORS TO CREATE AN INTERNAL MANIFOLD. MAXIMUM ALLOWABLE PIPE SIZE IN THE SIDE PORTAL IS 10 INCH (250mm) HDPE OR 12 INCH (300mm) PVC.
12. THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC HVLV™ FC-48 FEED CONNECTOR SHALL BE 12 INCHES (305 mm) TALL, 16 INCHES (406 mm) WIDE AND 49 INCHES (1245 mm) LONG.
13. THE NOMINAL STORAGE VOLUME OF THE RECHARGER® 360HD CHAMBER SHALL BE 10.0 FT³ / FT (.928 m³ / m) - WITHOUT STONE. THE NOMINAL STORAGE VOLUME OF A JOINED RECHARGER® 360HD SHALL BE 36.66 FT³ / UNIT (1.038 m³ / UNIT) - WITHOUT STONE.
14. THE NOMINAL STORAGE VOLUME OF THE HVLV™ FC-48 FEED CONNECTOR SHALL BE 0.913 FT³ / FT (0.085 m³ / m) - WITHOUT STONE.
15. THE RECHARGER® 360HD CHAMBER SHALL HAVE 7 CORRUGATIONS.
16. THE CHAMBER SHALL BE MANUFACTURED IN A FACILITY EMPLOYING CULTEC'S QUALITY CONTROL AND ASSURANCE PROCEDURES.
17. MAXIMUM ALLOWABLE COVER OVER THE TOP OF THE CHAMBER SHALL BE 12.0 FEET (3.66 m).

END CAP PARAMETERS
1. THE CULTEC RECHARGER® 360HD END CAP (REFERRED TO AS 'END CAP') SHALL BE MANUFACTURED IN THE U.S.A. OR CANADA BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE END CAP SHALL BE STRUCTURAL FOAM INJECTION MOLDED OF BLUE VIRGIN HIGH MOLECULAR WEIGHT IMPACT-MODIFIED POLYPROPYLENE.
3. THE END CAP SHALL BE ARCHED IN SHAPE.
4. THE END CAP SHALL BE OPEN-BOTTOMED.
5. THE END CAP SHALL BE JOINED AT THE BEGINNING AND END OF EACH ROW OF CHAMBERS USING AN INTERLOCKING OVERLAPPING RIB METHOD. CONNECTIONS MUST BE FULLY SHOULDERED OVERLAPPING RIBS, HAVING NO SEPARATE COUPLINGS.
6. THE END CAP SHALL HAVE 5 CORRUGATIONS.
7. THE NOMINAL DIMENSIONS OF THE END CAP SHALL BE 36.5 INCHES (927 mm) TALL, 60 INCHES (1525 mm) WIDE AND 18 INCHES (458 mm) LONG. WHEN JOINED WITH A RECHARGER 360HD CHAMBER, THE INSTALLED LENGTH OF THE END CAP SHALL BE 15 INCHES (381 mm).
8. THE NOMINAL STORAGE VOLUME OF THE END CAP SHALL BE 5.17 FT³ / FT (0.48 m³ / m) - WITHOUT STONE. THE NOMINAL STORAGE VOLUME OF AN INTERLOCKED END CAP SHALL BE 6.46 FT³ / UNIT (0.183 m³ / UNIT) - WITHOUT STONE.
9. MAXIMUM INLET OPENING ON THE END CAP IS 24 INCH (600 mm) HDPE OR 30 INCH (750mm) PVC.
10. THE CHAMBER SHALL BE MANUFACTURED IN A FACILITY EMPLOYING CULTEC'S QUALITY CONTROL AND ASSURANCE PROCEDURES
11. THE END CAP SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12.

CULTEC HVLV FC-48 FEED CONNECTOR PRODUCT SPECIFICATIONS

GENERAL
CULTEC HVLV FC-48 FEED CONNECTORS ARE DESIGNED TO CREATE AN INTERNAL MANIFOLD FOR CULTEC RECHARGER MODEL 360HD STORMWATER CHAMBERS.

FEED CONNECTOR PARAMETERS
1. THE FEED CONNECTOR SHALL BE MANUFACTURED BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE FEED CONNECTOR SHALL BE VACUUM THERMOFORMED OF BLACK HIGH MOLECULAR WEIGHT HIGH DENSITY POLYETHYLENE (HMWHDPE).
3. THE FEED CONNECTOR SHALL BE ARCHED IN SHAPE.
4. THE FEED CONNECTOR SHALL BE OPEN-BOTTOMED.
5. THE NOMINAL DIMENSIONS OF THE CULTEC HVLV FC-48 FEED CONNECTOR SHALL BE 12 INCHES (305 mm) TALL, 16 INCHES (406 mm) WIDE AND 49 INCHES (1245 mm) LONG.
6. THE NOMINAL STORAGE VOLUME OF THE HVLV FC-48 FEED CONNECTOR SHALL BE 0.913 FT³ / FT (0.085 m³ / m) - WITHOUT STONE.
7. THE HVLV FC-48 FEED CONNECTOR SHALL HAVE 4 CORRUGATIONS.
8. THE HVLV FC-48 FEED CONNECTOR MUST BE FORMED AS A WHOLE UNIT HAVING TWO OPEN END WALLS AND HAVING NO SEPARATE END PLATES OR SEPARATE END WALLS. THE UNIT SHALL FIT INTO THE SIDE PORTALS OF THE CULTEC RECHARGER STORMWATER CHAMBER AND ACT AS CROSS FEED CONNECTIONS CREATING AN INTERNAL MANIFOLD.
9. THE FEED CONNECTOR SHALL BE DESIGNED TO WITHSTAND AASHTO HS-25 DEFINED LOADS WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS.
10. THE FEED CONNECTOR SHALL BE MANUFACTURED IN AN ISO 9001:2008 CERTIFIED FACILITY.

CULTEC NO. 410™ NON-WOVEN GEOTEXTILE

CULTEC NO. 410™ NON-WOVEN GEOTEXTILE MAY BE USED WITH CULTEC CONTACTOR® AND RECHARGER® STORMWATER INSTALLATIONS TO PROVIDE A BARRIER THAT PREVENTS SOIL INTRUSION INTO THE STONE.

GEOTEXTILE PARAMETERS
1. THE GEOTEXTILE SHALL BE PROVIDED BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE GEOTEXTILE SHALL BE BLACK IN APPEARANCE.
3. THE GEOTEXTILE SHALL HAVE A TYPICAL WEIGHT OF 4.5 OZ/SY (142 G/M).
4. THE GEOTEXTILE SHALL HAVE A TENSILE STRENGTH VALUE OF 120 LBS (533 N) PER ASTM D4632 TESTING METHOD.
5. THE GEOTEXTILE SHALL HAVE AN ELONGATION @ BREAK VALUE OF 50% PER ASTM D4632 TESTING METHOD.
6. THE GEOTEXTILE SHALL HAVE A MULLEN BURST VALUE OF 225 PSI (1551 KPA) PER ASTM D3786 TESTING METHOD.
7. THE GEOTEXTILE SHALL HAVE A PUNCTURE STRENGTH VALUE OF 65 LBS (289 N) PER ASTM D4833 TESTING METHOD.
8. THE GEOTEXTILE SHALL HAVE A CBR PUNCTURE VALUE OF 340 LBS (1513 N) PER ASTM D6241 TESTING METHOD.
9. THE GEOTEXTILE SHALL HAVE A TRAPEZOID TEAR VALUE OF 50 LBS (222 N) PER ASTM D4533 TESTING METHOD.
10. THE GEOTEXTILE SHALL HAVE A AOS VALUE OF 70 U.S. SIEVE (0.212 MM) PER ASTM D4751 TESTING METHOD.
11. THE GEOTEXTILE SHALL HAVE A PERMITTIVITY VALUE OF 1.7 SEC-1 PER ASTM D4491 TESTING METHOD.
12. THE GEOTEXTILE SHALL HAVE A WATER FLOW RATE VALUE OF 135 GAL/MIN/SF (5500 L/MIN/SM) PER ASTM D4491 TESTING METHOD.
13. THE GEOTEXTILE SHALL HAVE A UV STABILITY @ 500 HOURS VALUE OF 70% PER ASTM D4355 TESTING METHOD.

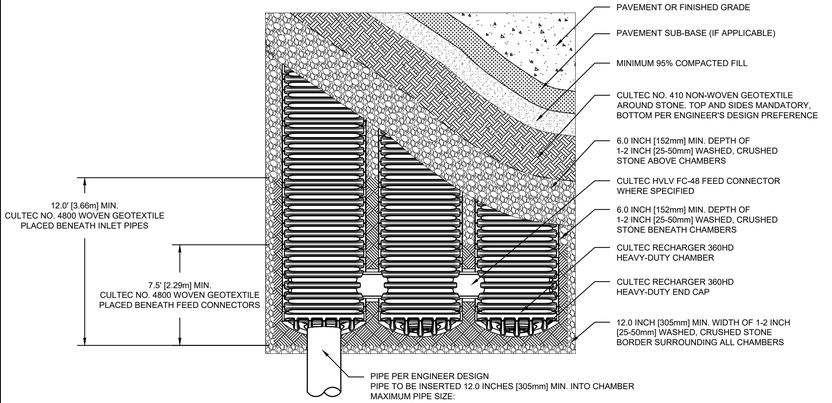
CULTEC NO. 4800™ WOVEN GEOTEXTILE

CULTEC NO. 4800 WOVEN GEOTEXTILE IS DESIGNED AS A UNDERLAYMENT TO PREVENT SCOURING CAUSED BY WATER MOVEMENT WITHIN THE CULTEC CHAMBERS AND FEED CONNECTORS UTILIZING THE CULTEC MANIFOLD FEATURE. IT MAY ALSO BE USED AS A COMPONENT OF THE CULTEC SEPARATOR ROW TO ACT AS A BARRIER TO PREVENT SOIL/CONTAMINANT INTRUSION INTO THE STONE WHILE ALLOWING FOR MAINTENANCE.

GEOTEXTILE PARAMETERS
1. THE GEOTEXTILE SHALL BE PROVIDED BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE GEOTEXTILE SHALL BE BLACK IN APPEARANCE.
3. THE GEOTEXTILE SHALL HAVE A TENSILE STRENGTH OF 550 X 550 LBS (2,448 X 2,448 N) PER ASTM D4632 TESTING METHOD.
4. THE GEOTEXTILE SHALL HAVE A ELONGATION @ BREAK RESISTANCE OF 20 X 20% PER ASTM D4632 TESTING METHOD.
5. THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE OF 5,070 X 5,070 LBS/FT (74 X 74 KN/M) PER ASTM D4595 TESTING METHOD.
6. THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE @ 2% STRAIN OF 960 X 1,096 LBS/FT (14 X 16 KN/M) PER ASTM D4595 TESTING METHOD.
7. THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE @ 5% STRAIN OF 2,740 X 2, 740 LBS/FT (40 X 40 KN/M) PER ASTM D4595 TESTING METHOD.
8. THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE @ 10% STRAIN OF 4,800 X 4,800 LBS/FT (70 X 70 KN/M) PER ASTM D4595 TESTING METHOD.
9. THE GEOTEXTILE SHALL HAVE A CBR PUNCTURE RESISTANCE OF 1,700 LBS (7,560 N) PER ASTM D6241 TESTING METHOD.
10. THE GEOTEXTILE SHALL HAVE A TRAPEZOIDAL TEAR RESISTANCE OF 180 X 180 LBS (801 X 801 N) PER ASTM D4533 TESTING METHOD.
11. THE GEOTEXTILE SHALL HAVE AN APPARENT OPENING SIZE OF 40 US STD. SIEVE (0.425 MM) PER ASTM D4751 TESTING METHOD.
12. THE GEOTEXTILE SHALL HAVE A PERMITTIVITY RATING OF 0.15 SEC-1 PER ASTM D4491 TESTING METHOD.
13. THE GEOTEXTILE SHALL HAVE A WATER FLOW RATING OF 11.5 GPM/FT2 (470 LPM/M2) PER ASTM D4491 TESTING METHOD.
14. THE GEOTEXTILE SHALL HAVE A UV RESISTANCE OF 80% @ 500 HRS. PER ASTM D4355 TESTING METHOD.

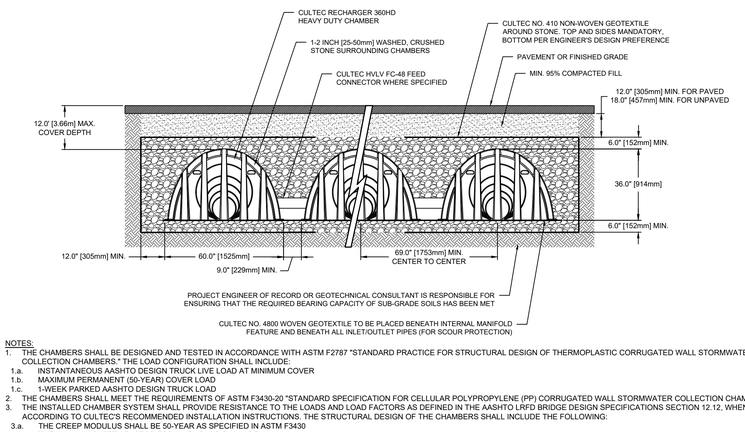
360HD 1.0

GENERAL NOTES



360HD 2.0

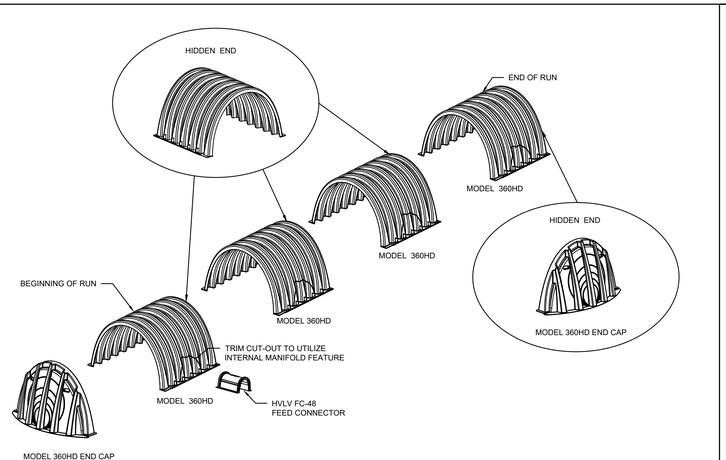
CULTEC RECHARGER 360HD HEAVY DUTY PLAN VIEW



NOTES:
1. THE CHAMBERS SHALL BE DESIGNED AND TESTED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS." THE LOAD CONFIGURATION SHALL INCLUDE:
   1.a. INSTANTANEOUS AASHTO DESIGN TRUCK LIVE LOAD AT MINIMUM COVER
   1.b. MAXIMUM PERMANENT (50-YEAR) COVER LOAD
   1.c. 1-WEEK PARKED AASHTO DESIGN TRUCK LOAD
2. THE CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F3430-20 "STANDARD SPECIFICATION FOR CELLULAR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS"
3. THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12, WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS. THE STRUCTURAL DESIGN OF THE CHAMBERS SHALL INCLUDE THE FOLLOWING:
   3.a. THE CREEP MODULUS SHALL BE 50-YEAR AS SPECIFIED IN ASTM F3430
   3.b. THE MINIMUM SAFETY FACTOR FOR LIVE LOADS SHALL BE 1.75
   3.c. THE MINIMUM SAFETY FACTOR FOR DEAD LOADS SHALL BE 1.95

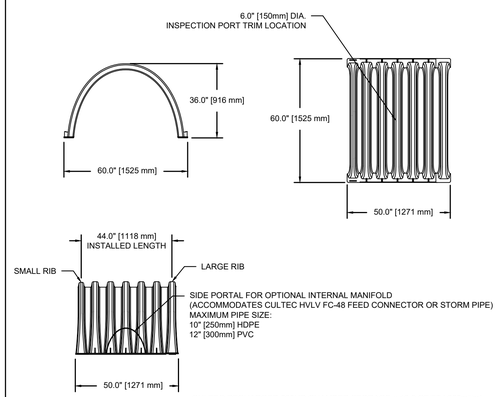
360HD 5.0

CULTEC RECHARGER 360HD HEAVY DUTY CROSS SECTION



360HD 6.0

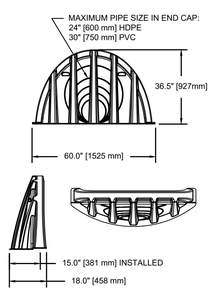
CULTEC RECHARGER 360HD HEAVY DUTY TYPICAL INTERLOCK



CULTEC RECHARGER 360HD CHAMBER STORAGE = 10.0 CF/FT [.928m³/m]
CHAMBER STORAGE VOLUME = 36.66 CF [1.038m³]
INSTALLED LENGTH ADJUSTMENT = 0.50' [0.15m]
SIDE PORTAL ACCEPTS CULTEC HVLV FC-48 FEED CONNECTOR

360HD 3.0

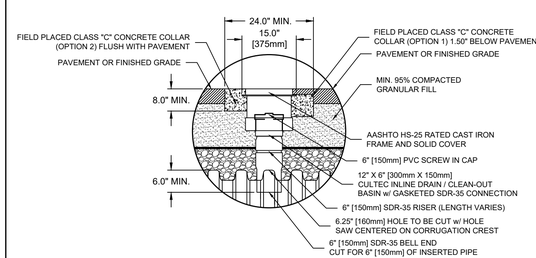
CULTEC RECHARGER 360HD HEAVY DUTY THREE VIEW



CULTEC RECHARGER 360HD END CAP
STORAGE = 5.17 CF/FT [0.48 m³/m]
END CAP STORAGE VOLUME = 6.46 CF [0.183 m3]
INSTALLED LENGTH ADJUSTMENT = 0.25' [0.08 m]

360HD 4.0

CULTEC RECHARGER 360HD HEAVY DUTY END CAP THREE VIEW



360HD 9.0

CULTEC INSPECTION PORT - ZOOM DETAIL

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C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

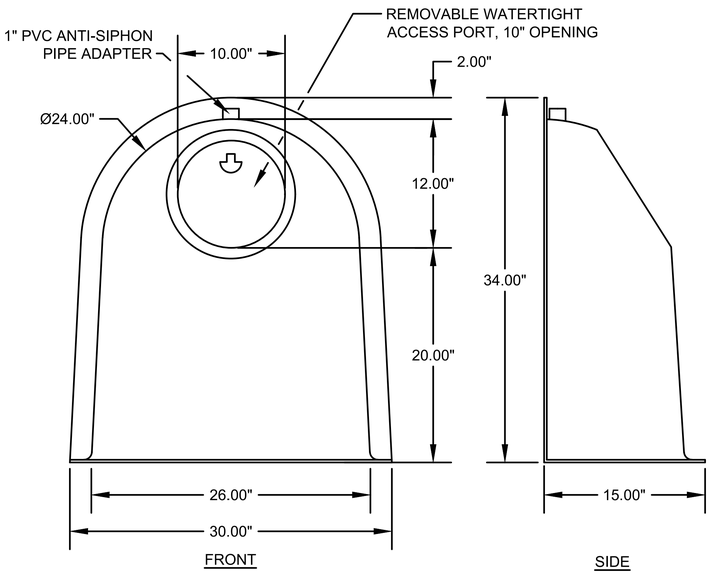
PROJECT NUMBER:	DRAWING NAME:
160010308	C-DTLS

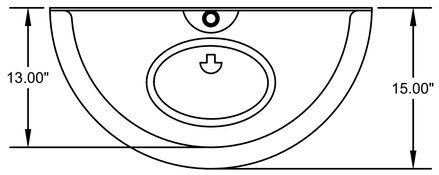
SHEET TITLE:
CONSTRUCTION DETAILS

SHEET NUMBER:
16 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\160010308\Engineering\Site Plans\C-DTLS.dwg|C-1.6-DETAILS By: CHRIS.MESZLER





PLAN

U.S.PATENT #6126817 ADDITIONAL PATENTS PENDING

BMP, INC.
53 MT. ARCHER ROAD, LYME, CT. 06371
(800) 504-8008 FAX: (860)434-3195

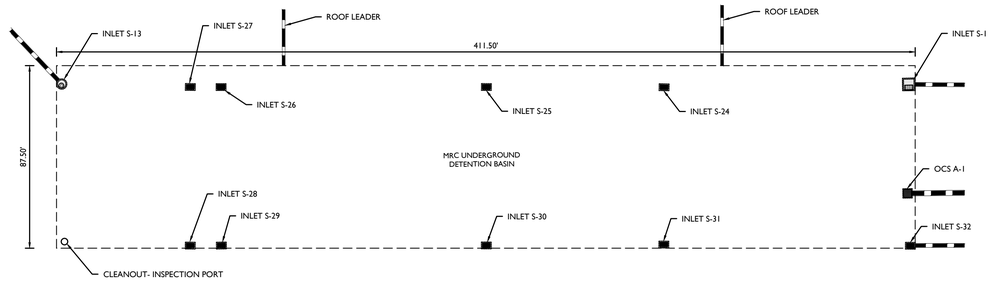
DESCRIPTION	DATE	SCALE
24F SNOUT OIL & DEBRIS STOP	09/20/99	NONE
	DRAWING NUMBER	
	24F	

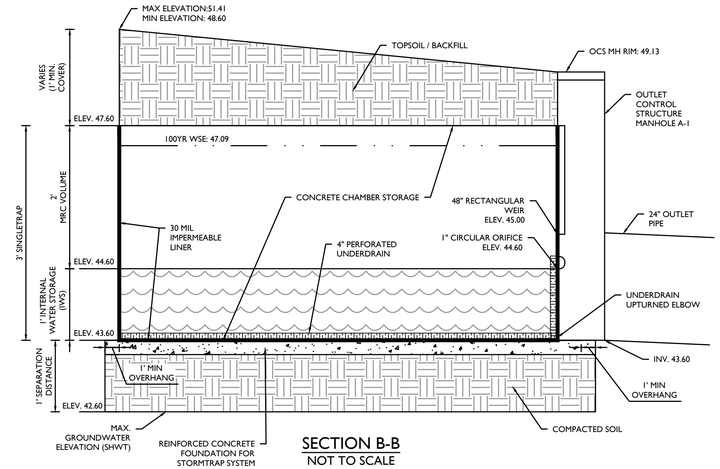
SNOUT BMP CONSTRUCTION SEQUENCE:

1. STABILIZE ALL CONTRIBUTING AREAS BEFORE INSTALLING AND CONNECTING PIPES TO THESE INLETS.
2. FOLLOW MANUFACTURER'S GUIDELINES FOR INSTALLATION. DO NOT USE SNOUTS DURING CONSTRUCTION UNLESS PRODUCT IS DESIGNED PRIMARILY FOR SEDIMENT REMOVAL.

SNOUT BMP MANUFACTURER'S INSTALLATION INSTRUCTIONS:

1. CENTER THE SNOUT® DIRECTLY OVER THE EXIT PIPE SO THAT THE ENTIRE PIPE IS COVERED AND SO THAT THE LOWER EDGE OF THE HOOD IS AT LEAST 1/2 THE PIPE DIAMETER BELOW THE LOWEST INSIDE POINT OF THE PIPE (DEEPER IS EVEN BETTER.)
2. DRILL * EQUALLY SPACED 7/16" HOLES THROUGH THE SNOUT® FLANGE. (*NUMBER OF HOLES VARY DEPENDING ON SIZE OF SNOUT®.)
3. MARK AND DRILL CATCH BASIN AND INSTALL THE TAMP-IN LEAD ANCHORS.
   - 3.1. DRILL A 3/4"HOLE INTO THE BASE MATERIAL TO THE REQUIRED DEPTH (APPROXIMATELY 1-1/4" DEEP.)
   - 3.2. BLOW THE HOLE CLEAN OF DUST AND OTHER MATERIAL.
   - 3.3. INSERT THE ANCHOR INTO THE HOLE. NARROW END OF CONE MUST POINT OUT. LEAD SHIELD SLIDES OVER CONE.
   - 3.4. POSITION THE SETTING TOOL OR A 9/16 SOCKET AGAINST THE ANCHOR OUTER CONE. (THE OUTER RIM OF THE TOOL OR SOCKET SHOULD SEAT ONTO THE LEAD SHIELD RIM.) SET THE ANCHOR BY DRIVING THE LEAD SLEEVE OVER THE CONE USING SEVERAL SHARP HAMMER BLOWS. BE SURE THE ANCHOR IS AT THE REQUIRED EMBEDMENT DEPTH (FLUSH OR SLIGHTLY BELOW FACE OF CONCRETE)
4. ATTACH THE VENT PIPE ADAPTER IN THE PRE-DRILLED HOLE IN THE TOP OF THE SNOUT® USING THE 2 FLAT O RING GASKETS AND PVC LOCK-NUT SUPPLIED IN THE KIT. INSTALL WITH FEMALE SLIP ADAPTER UP AND A WASHER ON EACH SIDE OF THE SNOUT® SHELL. TIGHTEN LOCK-NUT HAND TIGHT.
5. REMOVE PSA BACKING AND WITH FIRM PRESSURE, ATTACH GASKET STRIP(S) TO BACK OF FLANGE AND TRIM EXCESS.
6. ATTACH THE SNOUT® TO THE CATCH BASIN WALL WITH 3/8" DIAMETER STAINLESS STEEL BOLTS IN LEAD EXPANSION ANCHORS. DO NOT OVER TIGHTEN: 10-15 FOOT-POUNDS SHOULD BE SUFFICIENT.
7. CUT THE ANTI-SIPHON VENT STACK TO LENGTH AND ATTACH TO HOOD AT SLIP ADAPTER WITH PVC CEMENT.
8. ATTACH 90 DEGREE FITTING TO VENT STACK WITH PVC CEMENT. ENSURE THAT FITTING OPENING IS ACCESSIBLE FOR MAINTENANCE AND INSPECTION.

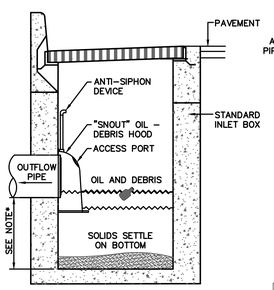




SECTION B-B
NOT TO SCALE

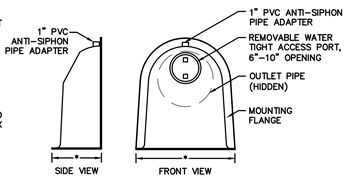
MRC UNDERGROUND DETENTION BASIN DETAIL

NOT TO SCALE 05/01/18



SECTION

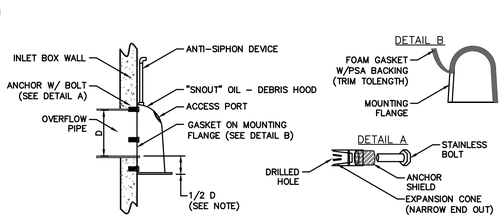
* NOTE- SUMP DEPTH OF 36" MIN. FOR < OR= 12" DIAM. OUTLET. FOR OUTLETS >OR= 15", DEPTH = 2.5-3X DIAM.



* OUTFLOW AREA AT HOOD EQUAL TO OUTFLOW PIPE AREA.

OIL - DEBRIS HOOD

"SNOUT" IS MANUFACTURED BY AND AVAILABLE THROUGH:
BEST MANAGEMENT PRODUCTS, INC.
53 MT. ARCHER RD.
LYME, CT 06371
PHONE (860) 434-0277 * FAX (860) 434-8195
E-MAIL: duran@bestmp.com * WEBSITE: www.bestmp.com

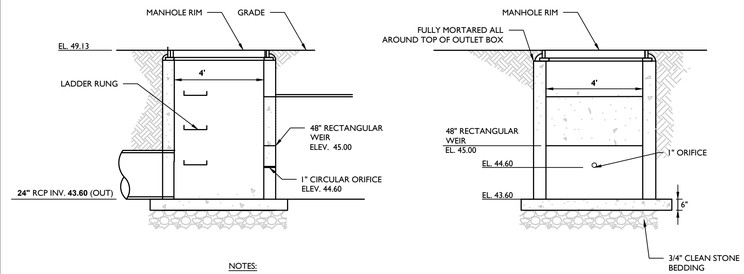


SNOUT INLET - OPERATION AND MAINTENANCE PROCEDURES

A. INSPECTION:
1. INSPECT INLET MONTHLY FOR THE FIRST YEAR AFTER THE SITE HAS BEEN STABILIZED.
2. AFTER EACH MAJOR STORM EVENT, INSPECT INLET IMMEDIATELY, IF SEDIMENT HAS ACCUMULATED TO AND WITHIN ONE (1) FOOT BELOW THE OUTFALL ELEVATION, PERFORM CLEANING AS NECESSARY.
3. ANNUALLY INSPECT THE "SNOUT" HOOD, THE ANTI-SIPHON DEVISE AND THE ACCESS HATCH FOR ANY CRACKED OR DAMAGED PARTS, REPLACE ALL DAMAGED COMPONENTS IMMEDIATELY.

B. CLEANING:
1. REMOVE ALL SOLID DEBRIS FROM THE INLET, A MINIMUM OF EVERY SIX (6) MONTH OR WHEN THE SEDIMENT IS TO AND WITHIN ONE (1) FOOT BELOW THE OUTFALL ELEVATION.
2. WHEN THERE HAS BEEN A SPILL OR INCIDENT THAT CAUSES A LARGER THAN NORMAL ACCUMULATION OF POLLUTANTS, REMOVE ALL SOLID DEBRIS FROM THE INLET.
3. USE A VACUUM TRUCK TO REMOVE ALL SOLIDS IN THE BOTTOM OF THE STRUCTURE.
4. DISPOSE OF ALL COLLECTED WASTES PER THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION REQUIREMENTS.
5. FLUSH THE ANTI-SIPHON DEVISE ON THE "SNOUT" HOOD OR GENTLY CLEAR WITH A FLEXIBLE WIRE ONCE A YEAR.
6. OPEN AND CLOSE THE ACCESS PORT ON THE "SNOUT" HOOD ONCE A YEAR AND CLEAR ANY OBSTRUCTIONS.

"SNOUT" INLET
NOT TO SCALE



NOTES:

1. CONTRACTOR TO SUBMIT SHOP DRAWING FOR REVIEW AND APPROVAL.
2. ALL CONCRETE TO BE CLASS "A".

OUTLET CONTROL STRUCTURE A-1 MRC BASIN DETAIL (SINGLE CHAMBER)

NOT TO SCALE MCPA-UTIL-STMW-1600 05/01/18

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COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL C. RICHARD ROSEBERRY ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC.
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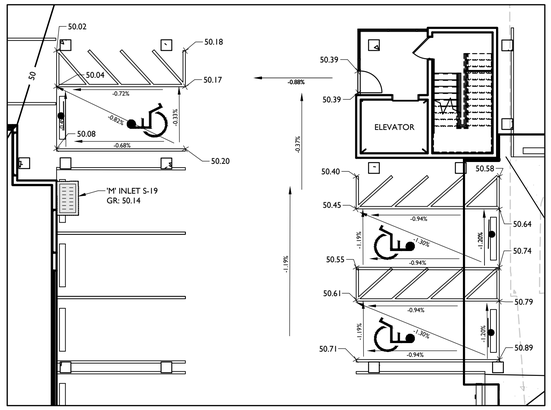
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AS SHOWN	03/01/2022	SF/CMM	RMA
PROJECT NUMBER: 16001030B	DRAWING NAME: C-DTLS		

SHEET TITLE: CONSTRUCTION DETAILS

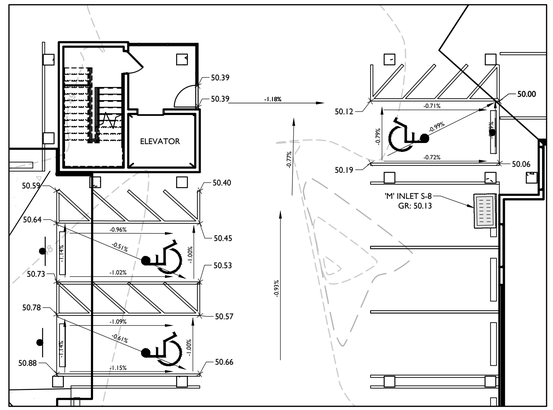
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By: CHRIS.METZLER
2016\16001030\08 Engineering\Site Plans\C-DTLS.dwg\C-17-DETAILS

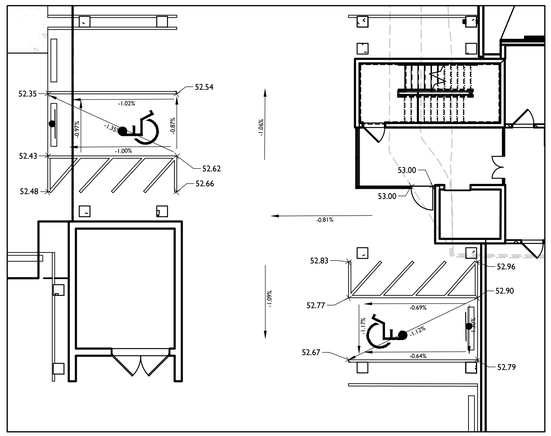
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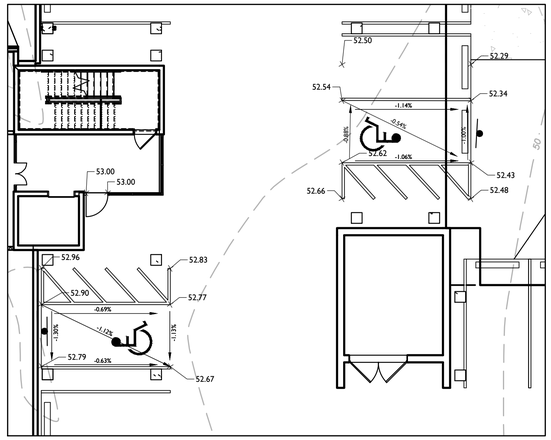
ADA PARKING (WEST)



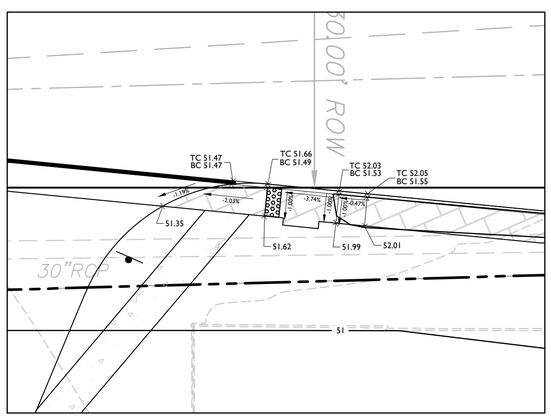
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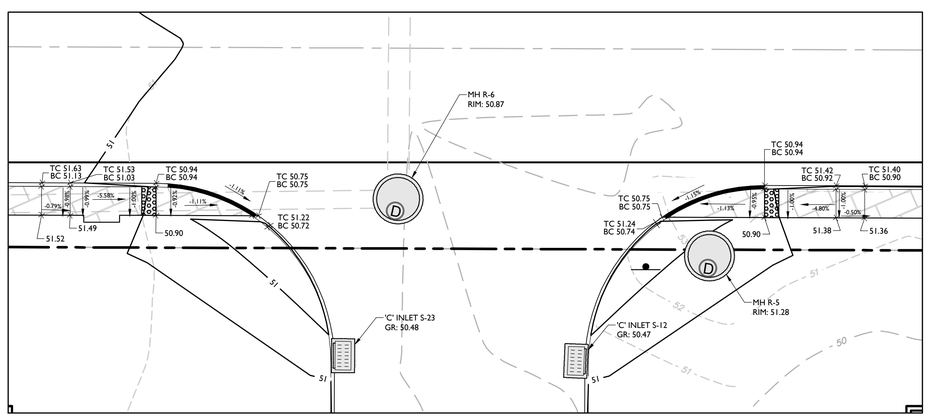
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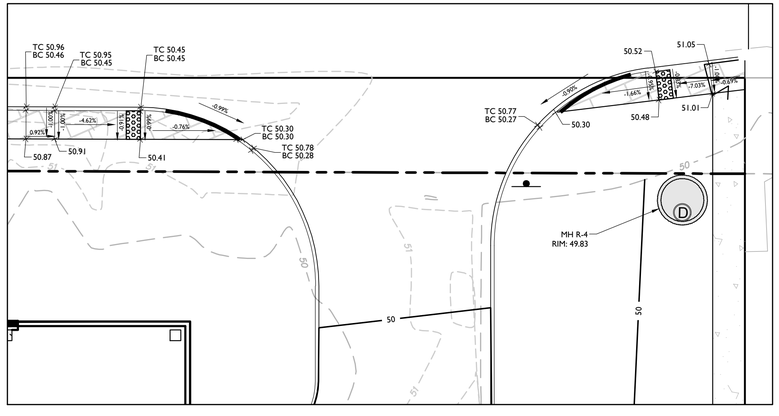
ADA PARKING (SOUTHEAST)



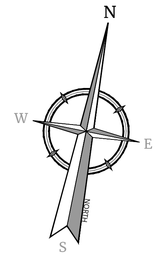
PEDESTRIAN WALKWAY (WEST)



PEDESTRIAN WALKWAY (CENTER))



PEDESTRIAN WALKWAY (EAST)



LEGEND

EXISTING		PROPOSED
12+00 TL PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'C' INLET	
	'M' INLET	
D	STORM MANHOLE	D
S	SANITARY MANHOLE	S
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
75 / 74	CONTOURS	75 / 74
× G 29.0	SPOT ELEVATION	× G 29.0
	DIRECTION OF OVERLAND FLOW	
× TC 29.0	TOP OF CURB ELEVATION	× TC 29.0
× BC 29.0	BOTTOM OF CURB ELEVATION	× BC 29.0
	TOP OF DEPRESSED CURB ELEVATION	× TDC 29.0

10 0 10 20

SCALE : 1" = 10'

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

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REV	DATE	DRAWN BY	DESCRIPTION

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REGISTERED PROFESSIONAL
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PROJECT NUMBER:	DRAWING NAME:
16001030B	C-GRAD-HADA

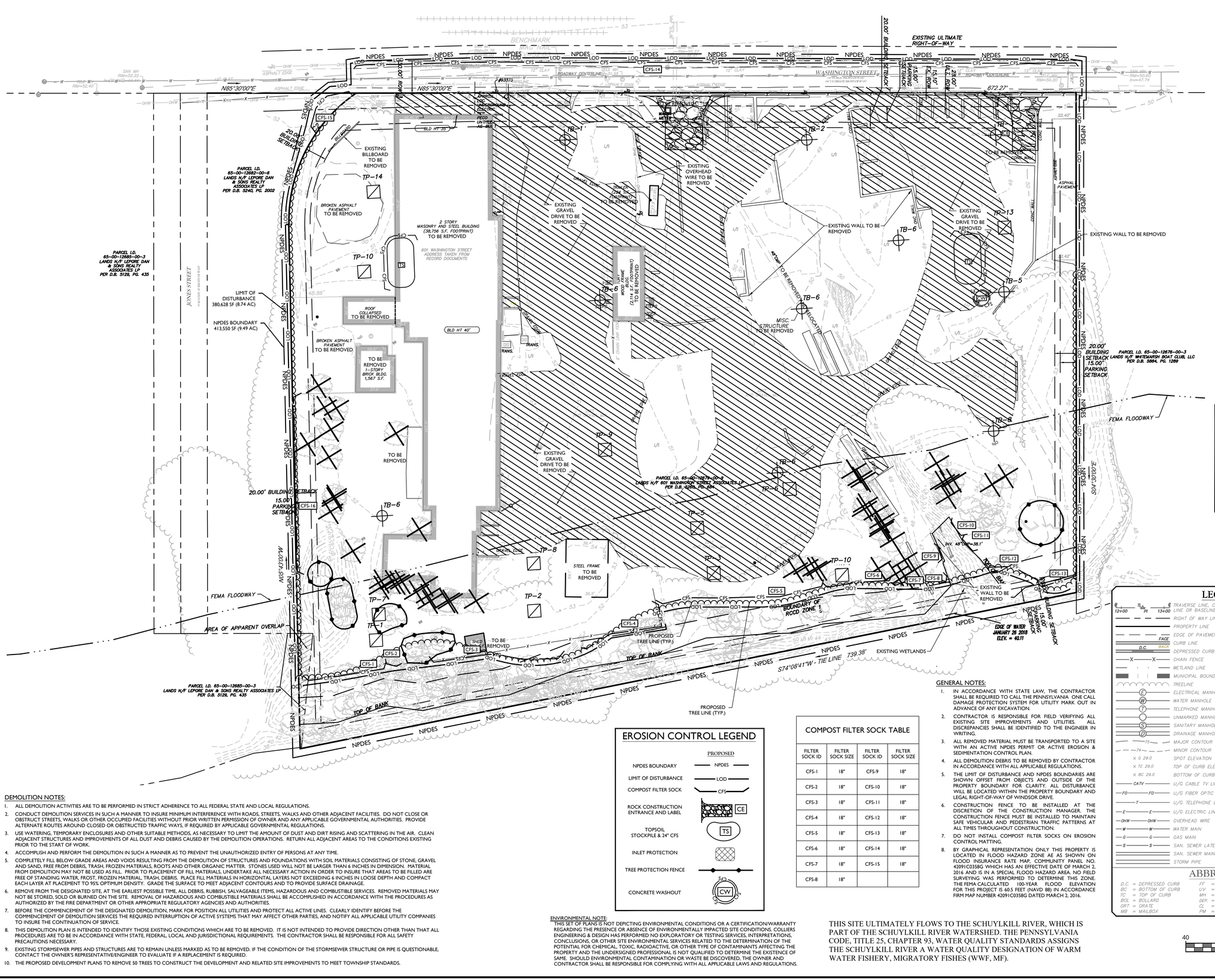
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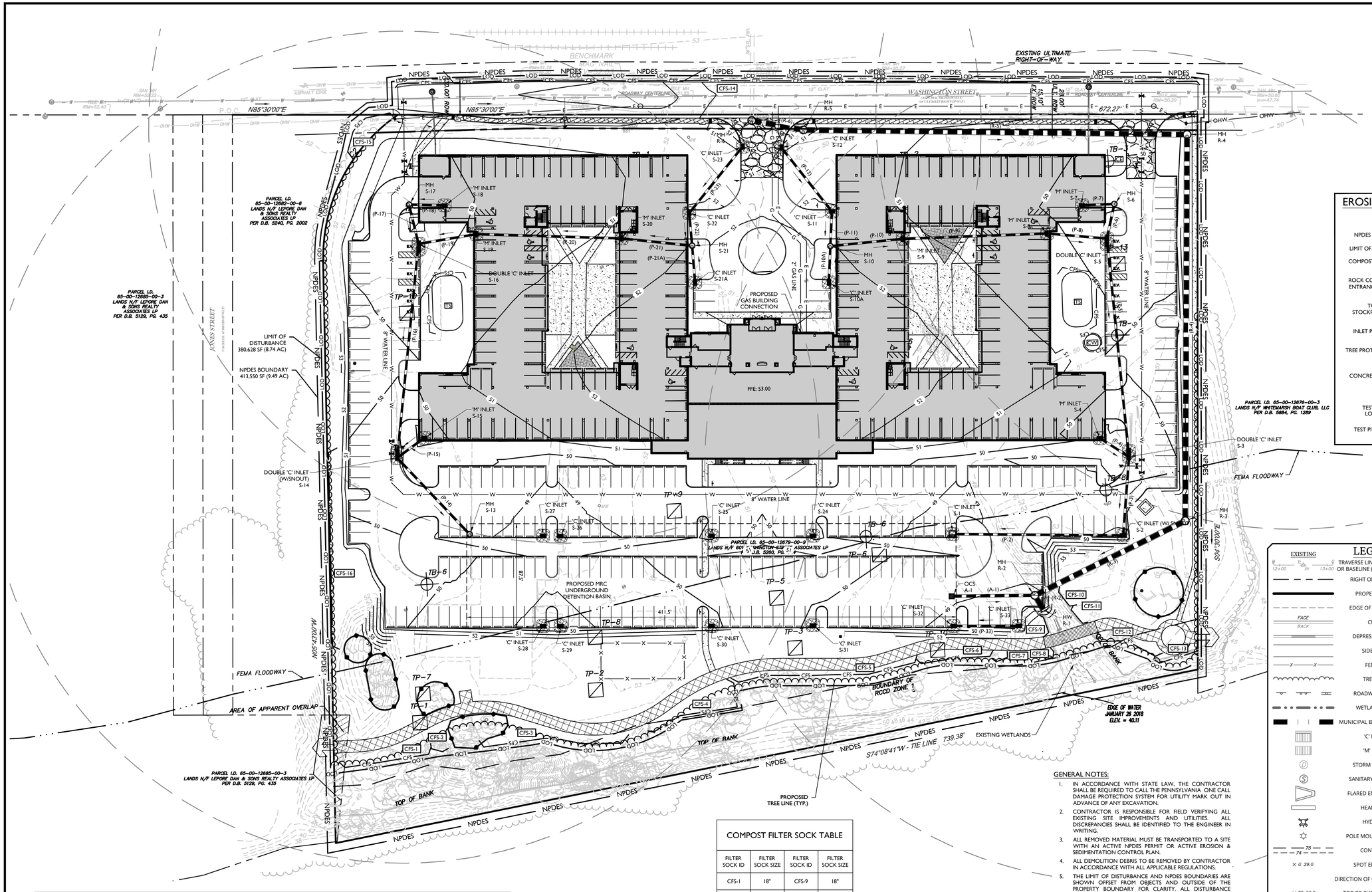
ADA GRADING PLAN

SHEET NUMBER:

18 of 27

2016\16001030B\Engineering\Site Plans\C-GRAD-HADA.dwg|C-06 GRADING By: CHRIS METZLER


BENCHMARK
EXISTING ULTIMATE RIGHT-OF-WAY
20.00' BUILDING SETBACK
WASHINGTON STREET
ROADWAY CENTERLINE
N85°30'00"E
672.27'
S04°30'00"E
N05°43'20"W
S74°08'41"W - TIE LINE 739.38'
JONES STREET
FEMA FLOODWAY
AREA OF APPARENT OVERLAP
TOP OF BANK
EXISTING WETLANDS
EDGE OF WATER JANUARY 28 2018 ELEV. = 40.11
BOUNDARY OF RCCD ZONE 1
PROPOSED TREE LINE (TYP.)
EXISTING WALL TO BE REMOVED
EXISTING OVERHEAD WIRE TO BE REMOVED
EXISTING GRAVEL DRIVE TO BE REMOVED
LIMIT OF DISTURBANCE 380,628 SF (8.74 AC)
NPDES BOUNDARY 413,550 SF (9.49 AC)
PARCEL I.D. 65-00-12682-00-6 LANDS N/F LEPORE DAN & SONS REALTY ASSOCIATES LP PER D.B. 5240, PG. 2002
PARCEL I.D. 65-00-12685-00-3 LANDS N/F LEPORE DAN & SONS REALTY ASSOCIATES LP PER D.B. 5129, PG. 435
PARCEL I.D. 65-00-12676-00-3 LANDS N/F WHITEMARSH BOAT CLUB, LLC PER D.B. 5864, PG. 1299
PARCEL I.D. 65-00-12675-00-8 LANDS N/F 601 WASHINGTON STREET ASSOCIATES LP PER D.B. 4280, PG. 884
2 STORY MASONRY AND STEEL BUILDING (36,756 S.F. FOOTPRINT) TO BE REMOVED
601 WASHINGTON STREET ADDRESS TAKEN FROM RECORD DOCUMENTS
1-STORY WOOD FRAME BLDG. (2,114 S.F. FOOTPRINT) TO BE REMOVED
ROOF COLLAPSED TO BE REMOVED
BROKEN ASPHALT PAVEMENT TO BE REMOVED
TO BE REMOVED 1-STORY BRICK BLDG. 1,567 S.F.
STEEL FRAME TO BE REMOVED
EXISTING BILLBOARD TO BE REMOVED
MISC. STRUCTURE TO BE REMOVED
TO BE REMOVED
TO BE REMOVED



EROSION CONTROL LEGEND

	PROPOSED
NPDES BOUNDARY	NPDES
LIMIT OF DISTURBANCE	LOD
COMPOST FILTER SOCK	CFS
ROCK CONSTRUCTION ENTRANCE AND LABEL	CE
TOPSOIL STOCKPILE & 24" CFS	TS
INLET PROTECTION	
TREE PROTECTION FENCE	
CONCRETE WASHOUT	CW
TEST BORING LOCATION	TB–6
TEST PIT LOCATION	TP–6

LEGEND

EXISTING		PROPOSED
12+00 TL PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 PI 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'C' INLET	
	'M' INLET	
D	STORM MANHOLE	D
S	SANITARY MANHOLE	S
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
75 / 74	CONTOURS	75 / 74
× G 29.0	SPOT ELEVATION	× G 29.0
	DIRECTION OF OVERLAND FLOW	
× TC 29.0	TOP OF CURB ELEVATION	× TC 29.0
× BC 29.0	BOTTOM OF CURB ELEVATION	× BC 29.0
	TOP OF DEPRESSED CURB ELEVATION	× TDC 29.0
CATV	CABLE TV CONDUIT	CATV
W	WATER MAIN	W
G	GAS MAIN	G
T	TELEPHONE CONDUIT	T
E	ELECTRIC CONDUIT	E
	SANITARY PIPE	
	STORM PIPE	

40 0 40 80

SCALE : 1" = 40'

INLET PROTECTION TABLE

INLET ID	MAXIMUM DRAINAGE AREA (ACRES)	INLET PROTECTION TYPE	INLET ID	MAXIMUM DRAINAGE AREA (ACRES)	INLET PROTECTION TYPE	INLET ID	MAXIMUM DRAINAGE AREA (ACRES)	INLET PROTECTION TYPE	INLET ID	MAXIMUM DRAINAGE AREA (ACRES)	INLET PROTECTION TYPE
S-1	0.46	FILTER BAG	S-10A	0.04	FILTER BAG	S-20	0.11	FILTER BAG	S-28	0.28	FILTER BAG
S-2	0.08	FILTER BAG	S-11	0.09	FILTER BAG	S-21A	0.04	FILTER BAG	S-29	0.26	FILTER BAG
S-3	0.21	FILTER BAG	S-12	0.07	FILTER BAG	S-22	0.09	FILTER BAG	S-30	0.09	FILTER BAG
S-4	0.33	FILTER BAG	S-14	0.30	FILTER BAG	S-23	0.20	FILTER BAG	S-31	0.11	FILTER BAG
S-5	0.76	STONE AND BLOCK	S-15	0.33	FILTER BAG	S-24	0.10	FILTER BAG	S-32	0.20	FILTER BAG
S-7	0.49	FILTER BAG	S-16	0.64	FILTER BAG	S-25	0.10	FILTER BAG	S-33	0.11	FILTER BAG
S-8	0.18	FILTER BAG	S-18	0.52	FILTER BAG	S-26	0.28	FILTER BAG			
S-9	0.11	FILTER BAG	S-19	0.15	FILTER BAG	S-27	0.24	FILTER BAG			

COMPOST FILTER SOCK TABLE

FILTER SOCK ID	FILTER SOCK SIZE	FILTER SOCK ID	FILTER SOCK SIZE
CFS-1	18"	CFS-9	18"
CFS-2	18"	CFS-10	18"
CFS-3	18"	CFS-11	18"
CFS-4	18"	CFS-12	18"
CFS-5	18"	CFS-13	18"
CFS-6	18"	CFS-14	18"
CFS-7	18"	CFS-15	18"
CFS-8	18"		

ENVIRONMENTAL NOTE:
THIS SET OF PLANS IS NOT DEPICTING ENVIRONMENTAL CONDITIONS OR A CERTIFICATION/WARRANTY REGARDING THE PRESENCE OR ABSENCE OF ENVIRONMENTALLY IMPACTED SITE CONDITIONS. COLLIERS ENGINEERING & DESIGN HAS PERFORMED NO EXPLORATORY OR TESTING SERVICES, INTERPRETATIONS, CONCLUSIONS, OR OTHER SITE ENVIRONMENTAL SERVICES RELATED TO THE DETERMINATION OF THE POTENTIAL FOR CHEMICAL, TOXIC, RADIOACTIVE, OR OTHER TYPE OF CONTAMINANTS AFFECTING THE PROPERTY AND THE UNDERSIGNED PROFESSIONAL IS NOT QUALIFIED TO DETERMINE THE EXISTENCE OF SAME. SHOULD ENVIRONMENTAL CONTAMINATION OR WASTE BE DISCOVERED, THE OWNER AND CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LAWS AND REGULATIONS.

GENERAL NOTES:

1. IN ACCORDANCE WITH STATE LAW, THE CONTRACTOR SHALL BE REQUIRED TO CALL THE PENNSYLVANIA ONE CALL DAMAGE PROTECTION SYSTEM FOR UTILITY MARK OUT IN ADVANCE OF ANY EXCAVATION.
2. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING SITE IMPROVEMENTS AND UTILITIES. ALL DISCREPANCIES SHALL BE IDENTIFIED TO THE ENGINEER IN WRITING.
3. ALL REMOVED MATERIAL MUST BE TRANSPORTED TO A SITE WITH AN ACTIVE NPDES PERMIT OR ACTIVE EROSION & SEDIMENTATION CONTROL PLAN.
4. ALL DEMOLITION DEBRIS TO BE REMOVED BY CONTRACTOR IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.
5. THE LIMIT OF DISTURBANCE AND NPDES BOUNDARIES ARE SHOWN OFFSET FROM OBJECTS AND OUTSIDE OF THE PROPERTY BOUNDARY FOR CLARITY. ALL DISTURBANCE WILL BE LOCATED WITHIN THE PROPERTY BOUNDARY AND LEGAL RIGHT-OF-WAY OF WINDSOR DRIVE.
6. CONSTRUCTION FENCE TO BE INSTALLED AT THE DISCRETION OF THE CONSTRUCTION MANAGER. THE CONSTRUCTION FENCE MUST BE INSTALLED TO MAINTAIN SAFE VEHICULAR AND PEDESTRIAN TRAFFIC PATTERNS AT ALL TIMES THROUGHOUT CONSTRUCTION.
7. DO NOT INSTALL COMPOST FILTER SOCKS ON EROSION CONTROL MATTING.
8. BY GRAPHICAL REPRESENTATION ONLY THIS PROPERTY IS LOCATED IN FLOOD HAZARD ZONE AE AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 42091C0358G WHICH HAS AN EFFECTIVE DATE OF MARCH 2, 2016 AND IS IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE. THE FEMA CALCULATED 100-YEAR FLOOD ELEVATION FOR THIS PROJECT IS 60.5 FEET (NAVD 88) IN ACCORDANCE FIRM MAP NUMBER 42091C0358G DATED MARCH 2, 2016.

THIS SITE ULTIMATELY FLOWS TO THE SCHUYLKILL RIVER, WHICH IS PART OF THE SCHUYLKILL RIVER WATERSHED. THE PENNSYLVANIA CODE, TITLE 25, CHAPTER 93, WATER QUALITY STANDARDS ASSIGNS THE SCHUYLKILL RIVER A WATER QUALITY DESIGNATION OF WARM WATER FISHERY, MIGRATORY FISHES (WWF, MF).

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FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

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PROJECT NUMBER: 16001030B
DRAWING NAME: C-SESC-PLAN

SHEET TITLE: E&SPC PLAN

SHEET NUMBER: 20 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\E&S Plans\C-SESC-PLAN.dwg\E-03-PLAN By: CHRIS.METZLER

STANDARD EROSION AND SEDIMENT CONTROL NOTES

1) ALL EARTH DISTURBANCES, INCLUDING CLEARING AND GRUBBING AS WELL AS CUTS AND FILLS SHALL BE DONE IN ACCORDANCE WITH THE APPROVED E&S PLAN. A COPY OF THE APPROVED DRAWINGS (STAMPED, SIGNED AND DATED BY THE REVIEWING AGENCY) MUST BE AVAILABLE AT THE PROJECT SITE AT ALL TIMES. THE REVIEWING AGENCY SHALL BE NOTIFIED OF ANY CHANGES TO THE APPROVED PLAN PRIOR TO IMPLEMENTATION OF THOSE CHANGES. THE REVIEWING AGENCY MAY REQUIRE A WRITTEN SUBMITTAL OF THOSE CHANGES FOR REVIEW AND APPROVAL AT ITS DISCRETION.

2) AT LEAST 7 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, INCLUDING CLEARING AND GRUBBING, THE OWNER AND/OR OPERATOR SHALL INVITE ALL CONTRACTORS, THE LANDOWNER, APPROPRIATE MUNICIPAL OFFICIALS, THE E&S PLAN PREPARER, THE PCSM PLAN PREPARER, THE LICENSED PROFESSIONAL RESPONSIBLE FOR OVERSIGHT OF CRITICAL STAGES OF IMPLEMENTATION OF THE PCSM PLAN, AND A REPRESENTATIVE FROM THE LOCAL CONSERVATION DISTRICT TO AN ON-SITE PRE-CONSTRUCTION MEETING.

3) AT LEAST 3 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, OR EXPANDING INTO AN AREA PREVIOUSLY UNMARKED, THE PENNSYLVANIA ONE CALL SYSTEM INC. SHALL BE NOTIFIED AT 1-800-242-1776 FOR THE LOCATION OF EXISTING UNDERGROUND UTILITIES.

4) ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE PROVIDED ON THE PLAN DRAWINGS. DEVIATION FROM THAT SEQUENCE MUST BE APPROVED IN WRITING FROM THE LOCAL CONSERVATION DISTRICT OR BY THE DEPARTMENT PRIOR TO IMPLEMENTATION.

5) AREAS TO BE FILLED ARE TO BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL.

6) CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE. GENERAL SITE CLEARING, GRUBBING AND TOPSOIL STRIPPING MAY NOT COMMENCE IN ANY STAGE OR PHASE OF THE PROJECT UNTIL THE E&S BMPS SPECIFIED BY THE BMP SEQUENCE FOR THAT STAGE OR PHASE HAVE BEEN INSTALLED AND ARE FUNCTIONING AS DESCRIBED IN THIS E&S PLAN.

7) AT NO TIME SHALL CONSTRUCTION VEHICLES BE ALLOWED TO ENTER AREAS OUTSIDE THE LIMIT OF DISTURBANCE BOUNDARIES SHOWN ON THE PLAN MAPS. THESE AREAS MUST BE CLEARLY MARKED AND FENCED OFF BEFORE CLEARING AND GRUBBING OPERATIONS BEGIN.

8) TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED AT THE LOCATION(S) SHOWN ON THE PLAN MAP(S) IN THE AMOUNT NECESSARY TO COMPLETE THE FINISH GRADING OF ALL EXPOSED AREAS THAT ARE TO BE STABILIZED BY VEGETATION. EACH STOCKPILE SHALL BE PROTECTED IN THE MANNER SHOWN ON THE PLAN DRAWINGS. STOCKPILE HEIGHTS SHALL NOT EXCEED 35 FEET. STOCKPILE SLOPES SHALL BE 2H:1V OR FLATTER.

9) IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE OPERATOR SHALL IMPLEMENT APPROPRIATE BEST MANAGEMENT PRACTICES TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION AND NOTIFY THE LOCAL CONSERVATION DISTRICT AND/OR THE REGIONAL OFFICE OF THE DEPARTMENT.

10) ALL BUILDING MATERIALS AND WASTES SHALL BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET SEQ., 271.1, AND 287.1 ET. SEQ. NO BUILDING MATERIALS OR WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THIS SITE.

11) RECYCLING AND DISPOSAL OF MATERIALS: OPERATOR/PERMITTEE SHALL INSURE THAT PROPER MECHANISMS ARE IN PLACE TO CONTROL WASTE MATERIALS. CONSTRUCTION WASTES INCLUDE, BUT ARE NOT LIMITED TO, EXCESS SOIL MATERIALS, BUILDING MATERIALS, CONCRETE WASH WATER, SANITARY WASTES, ETC. THAT COULD ADVERSELY IMPACT WATER QUALITY. MEASURES SHOULD BE PLANNED AND IMPLEMENTED FOR HOUSEKEEPING, MATERIALS MANAGEMENT, AND LITTER CONTROL. WHEREVER POSSIBLE, RECYCLING OF EXCESS MATERIALS IS PREFERRED RATHER THAN DISPOSAL. OFF-SITE TRANSPORT OF MATERIALS REQUIRES THAT THE RECEIVING FACILITY HAVE ITS OWN APPROVED, ACTIVE PERMIT TO RECEIVE SUCH MATERIALS.

12) ALL OFF-SITE WASTE AND BORROW AREAS MUST HAVE AN E&S PLAN APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT FULLY IMPLEMENTED PRIOR TO BEING ACTIVATED.

13) THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ANY MATERIAL BROUGHT ON SITE IS CLEAN FILL FORM FP-001 MUST BE RETAINED BY THE PROPERTY OWNER FOR ANY FILL MATERIAL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE BUT QUALIFYING AS CLEAN FILL DUE TO ANALYTICAL TESTING.

14) ALL PUMPING OF WATER FROM ANY WORK AREA SHALL BE DONE ACCORDING TO THE PROCEDURE DESCRIBED IN THIS PLAN, OVER UNDISTURBED VEGETATED AREAS. ALL PUMPING OF SEDIMENT LADEN WATER SHALL BE THROUGH A SEDIMENT CONTROL BMP, SUCH AS A PUMPED WATER FILTER BAG DISCHARGING OVER NON-DISTURBED AREAS.

15) VEHICLES AND EQUIPMENT MAY NEITHER ENTER DIRECTLY NOR EXIT DIRECTLY FROM THE SITE ONTO WINDSOR DRIVE. VEHICLES AND EQUIPMENT MAY ONLY ENTER AND EXIT THE CONSTRUCTION SITE VIA A STABILIZED ROCK CONSTRUCTION ENTRANCE.

16) UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENT BMPS SHALL BE MAINTAINED PROPERLY. MAINTENANCE SHALL INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT BMPS AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. THE OPERATOR WILL MAINTAIN AND MAKE AVAILABLE TO THE COUNTY CONSERVATION DISTRICT COMPLETE, WRITTEN INSPECTION LOGS OF ALL THOSE INSPECTIONS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING AND RENETTING MUST BE PERFORMED IMMEDIATELY. IF THE E&S BMPS FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPS, OR MODIFICATIONS OF THOSE INSTALLED WILL BE REQUIRED.

17) A LOG SHOWING DATES THAT E&S BMPS WERE INSPECTED AS WELL AS ANY DEFICIENCIES FOUND AND THE DATE THEY WERE CORRECTED SHALL BE MAINTAINED ON THE SITE AND BE MADE AVAILABLE TO REGULATORY AGENCY OFFICIALS AT THE TIME OF INSPECTION.

18) SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED, OR SWEPT INTO ANY ROADSIDE DITCH, STORM SEWER, OR SURFACE WATER.

19) ALL SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS. SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN LANDSCAPED AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS OR DRAINAGE SWALES AND IMMEDIATELY STABILIZED, OR PLACED IN TOPSOIL STOCKPILES.

20) AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 3 TO 5 INCHES - 6 TO 12 INCHES ON COMPACTED SOILS - PRIOR TO PLACEMENT OF TOPSOIL. AREAS TO BE VEGETATED SHALL HAVE A MINIMUM 4 INCHES OF TOPSOIL IN PLACE PRIOR TO SEEDING AND MULCHING. FILL OUTSLOPES SHALL HAVE A MINIMUM OF 2 INCHES OF TOPSOIL.

21) ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.

22) ALL EARTHEN FILLS SHALL BE PLACED IN COMPACTED LAYERS NOT TO EXCEED 9 INCHES IN THICKNESS.

23) FILL MATERIALS SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD, OR OTHER FOREIGN OR OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.

24) FROZEN MATERIALS OR SOFT, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED INTO FILLS.

25) FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES.

26) SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.

27) ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY UPON REACHING FINISHED GRADE. CUT SLOPES IN COMPETENT BEDROCK AND ROCK FILLS NEED NOT BE VEGETATED. SEEDED AREAS WITHIN 50 FEET OF A SURFACE WATER, OR AS OTHERWISE SHOWN ON THE PLAN DRAWINGS, SHALL BE BLANKETED ACCORDING TO THE STANDARDS OF THIS PLAN.

28) IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE IN ANY AREA OR SUBAREA OF THE PROJECT, THE OPERATOR SHALL STABILIZE ALL DISTURBED AREAS. DURING NON-GERMINATING MONTHS, MULCH OR OTHER PROTECTIVE BLANKETING SHALL BE APPLIED AS DESCRIBED IN THE PLAN. AREAS NOT AT FINISHED GRADE WHICH WILL BE REACTIVATED WITHIN 1 YEAR, MAY BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION SPECIFICATIONS. THOSE AREAS WHICH WILL NOT BE REACTIVATED WITHIN 1 YEAR SHALL BE STABILIZED IN ACCORDANCE WITH THE PERMANENT STABILIZATION SPECIFICATIONS.

29) PERMANENT STABILIZATION IS DEFINED AS A MINIMUM UNIFORM, PERENNIAL 70% VEGETATIVE COVER OR OTHER PERMANENT NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED EROSION. CUT AND FILL SLOPES SHALL BE CAPABLE OF RESISTING FAILURE DUE TO SLUMPING, SLIDING, OR MOTHER MOVEMENTS.

30) EROSION AND SEDIMENT BMPS MUST BE CONSTRUCTED, STABILIZED, AND FUNCTIONAL BEFORE SITE DISTURBANCE BEGINS WITHIN THE TRIBUTARY AREAS OF THOSE BMPS. E&S BMPS SHALL REMAIN FUNCTIONAL AS SUCH UNTIL ALL AREAS TRIBUTARY TO THEM ARE PERMANENTLY STABILIZED OR UNTIL THEY ARE REPLACED BY ANOTHER BMP APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT.

31) UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT FOR AN INSPECTION PRIOR TO REMOVAL/CONVERSION OF THE E&S BMPS.

32) AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY EROSION AND SEDIMENT BMPS MUST BE REMOVED OR CONVERTED TO PERMANENT POST CONSTRUCTION STORMWATER MANAGEMENT BMPS. AREAS DISTURBED DURING REMOVAL OR CONVERSION OF THE BMPS SHALL BE STABILIZED IMMEDIATELY. IN ORDER TO ENSURE RAPID REVEGETATION OF DISTURBED AREAS, SUCH REMOVAL/CONVERSIONS ARE TO BE DONE ONLY DURING THE GERMINATING SEASON.

33) UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT TO SCHEDULE A FINAL INSPECTION.

34) FAILURE TO CORRECTLY INSTALL E&S BMPS, FAILURE TO PREVENT SEDIMENT-LADEN RUNOFF FROM LEAVING THE CONSTRUCTION SITE OR FAILURE TO TAKE IMMEDIATE CORRECTIVE ACTION TO RESOLVE FAILURE OF E&S BMPS MAY RESULT IN ADMINISTRATIVE, CIVIL, AND/OR CRIMINAL PENALTIES BEING INSTITUTED BY THE DEPARTMENT AS DEFINED IN SECTION 602 OF THE CLEAN STREAMS LAW. THEE LEAN STREAMS LAW PROVIDES FOR UP TO $10,000 PER DAY IN CIVIL PENALTIES, UP TO $10,000 IN SUMMARY CRIMINAL PENALTIES, AND UP TO $25,000 IN MISDEMEANOR CRIMINAL PENALTIES FOR EACH VIOLATION.

35) IN THE EVENT OF SINKHOLE DISCOVERY A PROFESSIONAL GEOLOGIST OR ENGINEER WILL BE CONTACTED CONCERNING MITIGATION. ADDITIONALLY, THE COUNTY CONSERVATION DISTRICT WILL BE MADE AWARE OF THE SINKHOLE DISCOVERY IMMEDIATELY.

36) THE OPERATOR SHALL ASSURE THAT THE APPROVED EROSION AND SEDIMENT CONTROL PLAN IS PROPERLY AND COMPLETELY IMPLEMENTED.

37) THE CONTRACTOR IS ADVISED TO BECOME THOROUGHLY FAMILIAR WITH THE PROVISIONS OF THE APPENDIX 64, EROSION CONTROL RULES AND REGULATIONS, TITLE 25, PART I, DEPARTMENT OF ENVIRONMENTAL PROTECTION, SUBPART C, PROTECTION OF NATURAL RESOURCES, ARTICLE III, WATER RESOURCES, CHAPTER 102, EROSION CONTROL.

38) STRAW MULCH SHALL BE APPLIED IN LONG STRANDS, NOT CHOPPED OR FINELY BROKEN.

39) CONCRETE WASH WATER SHALL BE HANDLED IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS. IN NO CASE SHALL IT BE ALLOWED TO ENTER ANY SURFACE WATERS OR GROUNDWATER SYSTEMS.

40) EROSION CONTROL MATTING SHALL BE INSTALLED ON ALL SLOPES 3H:1V OR STEEPER, WITHIN 50 FEET OF A SURFACE WATER AND ON ALL OTHER DISTURBED AREAS SPECIFIED ON THE PLAN MAPS AND/OR DETAIL SHEETS.

CONSTRUCTION SEQUENCE NOTES:

1. ALL WORK IS TO OCCUR WITHIN THE LIMIT OF DISTURBANCE BOUNDARIES AS INDICATED ON THE PLAN. AT NO TIME SHALL CONSTRUCTION VEHICLES BE ALLOWED TO ENTER AREAS OUTSIDE THE LIMIT OF DISTURBANCE BOUNDARIES SHOWN ON THE PLAN MAPS. THESE AREAS MUST BE CLEARLY MARKED AND FENCED OFF BEFORE CLEARING AND GRUBBING OPERATIONS BEGIN.
2. CONSTRUCT ALL DRAINAGE APPURTENANCES FROM DOWNSTREAM TO UPSTREAM UNLESS OTHERWISE NOTED.
3. LIMIT TREE REMOVAL TO ONLY WHAT IS REQUIRED FOR CONSTRUCTION.
4. UPON REACHING FINAL GRADE, AREAS TO BE STABILIZED BY VEGETATION MUST NOT EXCEED 15,000 SQUARE FEET WITHOUT BEING STABILIZED.
5. THE SITE MUST BE IMMEDIATELY SEEDED, MULCHED, OR OTHERWISE PROTECTED FROM ACCELERATED EROSION AND SEDIMENTATION WHEN A TEMPORARY CESSATION OF EARTH DISTURBANCE ACTIVITIES EXCEEDS 4 DAYS. DURING NON-GERMINATING MONTHS, MULCH OR PROTECTIVE BLANKETING SHALL BE APPLIED AS DESCRIBED IN THE PLAN. AREAS NOT AT FINISHED GRADE WHICH WILL BE REACTIVATED WITHIN ONE YEAR, MAY BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION SPECIFICATIONS. THOSE AREAS WHICH WILL NOT BE REACTIVATED WITHIN ONE YEAR SHALL BE STABILIZED IN ACCORDANCE WITH THE PERMANENT STABILIZATION SPECIFICATIONS.
6. STABILIZE SLOPES, CHANNELS, DITCHES, AND OTHER DISTURBED AREAS AS THEY REACH FINAL GRADE. ROUND CUT AND FILL SLOPES SUCH THAT RUNOFF IS DIRECTED AWAY FROM THE INTERSECTION OF THE CONSTRUCTED SLOPE AND THE EXISTING GRADE.
7. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE. GENERAL SITE CLEARING, GRUBBING, AND TOPSOIL STRIPPING MAY NOT COMMENCE IN ANY STAGE OR PHASE OF THE PROJECT UNTIL THE E&S BMPS SPECIFIED BY THE CONSTRUCTION SEQUENCE FOR THAT STAGE OR PHASE HAVE BEEN INSTALLED AND ARE FUNCTIONING AS DESCRIBED IN THIS E&S PLAN.

CONSTRUCTION SEQUENCE:

ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE FOLLOWING SEQUENCE. DEVIATION FROM THIS SEQUENCE MUST BE APPROVED IN WRITING FROM THE LOCAL CONSERVATION DISTRICT OR BY THE DEPARTMENT PRIOR TO IMPLEMENTATION.

1. AT LEAST 7 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, INCLUDING CLEARING AND GRUBBING, THE OWNER AND/OR OPERATOR SHALL INVITE ALL CONTRACTORS, THE LANDOWNER, APPROPRIATE MUNICIPAL OFFICIALS, THE E&S PLAN PREPARER, THE PCSM PLAN PREPARER, THE LICENSED PROFESSIONAL RESPONSIBLE FOR OVERSIGHT OF CRITICAL STAGES OF IMPLEMENTATION OF THE PCSM PLAN, AND A REPRESENTATIVE FROM THE LOCAL COUNTY CONSERVATION DISTRICT TO AN ONSITE PRE-CONSTRUCTION MEETING.
2. ALL EXISTING UTILITIES SHOWN ON THE PLAN ARE SHOWN AT APPROXIMATE LOCATIONS. THE ENGINEER DOES NOT GUARANTEE ALL EXISTING UTILITIES ON SITE ARE SHOWN ON THE PLAN. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE OF ALL UTILITIES AND TO CALL THE PENNSYLVANIA ONE CALL SYSTEM (1-800-242-1776) AT LEAST 3 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES OR EXPANDING INTO A PREVIOUSLY UNMARKED AREA.

SITE WORK:

1. INSTALL ROCK CONSTRUCTION ENTRANCES, CLEAR AND GRUB AS NEEDED.
2. INSTALL COMPOST FILTER SOCKS. COMPOST FILTER SOCKS SHALL BE INSTALLED PARALLEL TO EXISTING CONTOURS OR CONSTRUCTED LEVEL ALIGNMENTS. CLEAR AND GRUB AS NEEDED FOR THE INSTALLATION OF THE COMPOST FILTER SOCKS. NOTE: ADDITIONAL COMPOST FILTER SOCKS SHALL BE INSTALLED DOWNGRADE OF ANY DISTURBANCE AREAS AS NEEDED. ALL EROSION AND SEDIMENT CONTROL DEVICES MUST BE INSTALLED IN ACCORDANCE WITH THEIR RESPECTIVE DETAIL AND IN WORKING ORDER PRIOR TO DISTURBING AN AREA.
3. REMOVE EXISTING BUILDING, ASPHALT AREAS, WOODED AREAS, DEBRIS PILES, UTILITIES, AND ALL ITEMS LISTED AS TO BE REMOVED WITHIN THE SITE, AS SHOWN ON THE DEMOLITION PLAN, EXCEPT FOR THE EXISTING UTILITY POLES ALONG THE SOUTHERN SIDE OF WASHINGTON STREET WHICH WILL BE REMOVED PRIOR TO THE INSTALLATION OF THE PROPOSED ELECTRIC LINES IN STEP 7. ELECTRIC SERVICE MUST BE MAINTAINED FOR PROPERTIES THAT ARE CURRENTLY SERVICED THROUGH THESE LINES, OVERHEAD WIRES MAY NEED TO BE RELOCATED IN ORDER TO ACCOMMODATE CONSTRUCTION VEHICLES.
4. INSTALL PROPOSED PIPE NETWORK FROM HEADWALL R-1 TO MANHOLE R-6, WORKING UPSLOPE. REMOVE EXISTING 48" CMP PIPE AS SHOWN ON THE DEMOLITION PLANS. LIMIT DAILY TRENCH EXCAVATION TO THE LENGTH OF PIPE PLACEMENT AND BACKFILLING THAT CAN BE COMPLETED THE SAME DAY. ALL OPEN TRENCHES MUST BE PROTECTED. WATER WHICH ACCUMULATES IN THE OPEN TRENCH SHALL BE COMPLETELY REMOVED BY FILTER BAG PUMPING, BEFORE PIPE OR CONDUIT PLACEMENT AND/OR BACKFILLING BEGINS.
5. ESTABLISH STOCKPILES, STAGING AREA, AND CONCRETE WASHOUT LOCATION AND PLACE DOWNSLOPE COMPOST FILTER SOCKS. ENSURE THAT COMPOST FILTER SOCKS ARE LOCATED DOWNSLOPE OF THE TOPSOIL STOCKPILES AT ALL TIMES.
6. ROUGH GRADE SITE AND BUILDING PADS. ROUGH GRADE DRIVEWAYS, AISLES, CONCRETE PATIOS, PARKING LOTS, AS WELL AS WASHINGTON STREET WIDENING. IMMEDIATELY STABILIZE ANY STEEP SLOPES WITH EROSION CONTROL MATTING. DO NOT PLACE EROSION CONTROL MATTING ON OR UNDER COMPOST FILTER SOCKS. ADJUST COMPOST FILTER SOCKS AS NEEDED TO FIT PROPOSED IMPROVEMENTS. NOTE: ADDITIONAL COMPOST FILTER SOCKS SHALL BE INSTALLED DOWNGRADE OF ANY DISTURBANCE AREAS AS NEEDED.
7. CONSTRUCT MRC UNDERGROUND DETENTION BASIN AND OUTLET CONTROL STRUCTURE. INSTALL OUTFALL STORMSEWER SYSTEM, STARTING AT MH R-2 AND WORKING UPSLOPE TO OUTLET CONTROL STRUCTURE A-1. INSTALL INLETS S-24, S-25, S-26, S-27, S-28, S-29, S-30, S-31. INTALL PROPOSED STORMSEWER SYSTEM, WORKING DOWNSTREAM TO UPSTREAM, FROM INLET S-1 TO INLET S-12. INLET S-3 TO INLET S-4, INLET S-5 TO INLET S-7, MANHOLE S-10 TO INLET S-10A. ALSO, FROM INLET S-13 TO INLET S-23, INLET S-14 TO INLET S-15, INLET S-16 TO INLET S-18, AND MANHOLE S-21 TO INLET S-21A. LIMIT DAILY TRENCH EXCAVATION TO THE LENGTH OF PIPE PLACEMENT AND BACKFILLING THAT CAN BE COMPLETED THE SAME DAY. ALL OPEN TRENCHES MUST BE PROTECTED. WATER WHICH ACCUMULATES IN THE OPEN TRENCH SHALL BE COMPLETELY REMOVED BY FILTER BAG PUMPING, BEFORE PIPE PLACEMENT AND/OR BACKFILLING BEGINS. IMMEDIATELY AFTER INSTALLING EACH INLET, INLET MUST BE PLACED AS APPLICABLE.
8. CONSTRUCT THE BUILDING PAD INCLUDING THE INSTALLATION AND/OR REPLACEMENT OF UTILITY SERVICE CONNECTIONS FOR ELECTRIC, GAS, WATER, AND SANITARY, AS SHOWN ON THE PLANS. REMOVE EXISTING UTILITY POLES AND ASSOCIATED OVERHEAD WIRES PRIOR TO INSTILLATION OF UNDERGROUND ELECTRIC LINES ALONG WASHINGTON STREET. INSTALL WATER LINES AND HYDRANTS. INSTALL SANITARY SEWER SYSTEM FROM DOWNSTREAM TO UPSTREAM, STARTING FROM THE TIE-IN TO THE EXISTING SANITARY MAIN AT MANHOLE SS-100 TO MANHOLE SS-104. LIMIT DAILY TRENCH EXCAVATION TO THE LENGTH OF PIPE PLACEMENT AND BACKFILLING THAT CAN BE COMPLETED THE SAME DAY. ALL OPEN TRENCHES MUST BE PROTECTED. WATER WHICH ACCUMULATES IN THE OPEN TRENCH SHALL BE COMPLETELY REMOVED BY FILTER BAG PUMPING, BEFORE PIPE OR CONDUIT PLACEMENT AND/OR BACKFILLING BEGINS.
9. PLACE SUBGRADE FOR THE DRIVEWAYS, AISLES, PARKING LOTS, AND ROAD WIDENING IN ACCORDANCE WITH THE PLAN DETAILS. INSTALL CURBING, DIRECTING STORMWATER TO THE PROPOSED INLETS. REMOVE COMPOST FILTER SOCKS AS NEEDED TO FIT PROPOSED IMPROVEMENTS.
10. FINALIZE GRADING IN ALL LAWN AREAS.
11. INSTALL PROPOSED SIDEWALKS AND ADA RAMPS.
12. INSTALL PROPOSED TREES AND OTHER PLANTINGS.
13. COMPLETE PAVING OF SITE IN ACCORDANCE WITH THE PLAN DETAILS. ONCE PAVING IS COMPLETED, ADD PAVEMENT MARKINGS.

FINAL SITE PREPARATION:

1. UNTIL THE SITE IS STABILIZED ALL EROSION AND SEDIMENTATION CONTROLS MUST BE MAINTAINED PROPERLY. MAINTENANCE MUST INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENTATION CONTROLS AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK; INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, RE-GRADING, RESEEDING, RE-MULCHING, AND RE-NETTING, MUST BE PERFORMED IMMEDIATELY. CONTACT THE COUNTY CONSERVATION DISTRICT PRIOR TO REMOVING TEMPORARY E&S BMPS.
2. UPON ACHIEVING A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER OVER THE ENTIRE VEGETATED TRIBUTARY AREA, ANY OF THE REMAINING TEMPORARY E&S CONTROLS SHOULD BE REMOVED, INCLUDING COMPOST FILTER SOCKS AND INLET PROTECTION. ALL AREAS DISTURBED DURING THE REMOVAL PROCESS SHOULD BE IMMEDIATELY STABILIZED WITH PERMANENT SEEDING, AS INDICATED ON THE PLANS.
3. THE PERMITTEE SHALL SUBMIT A NOTICE OF TERMINATION TO THE COUNTY CONSERVATION DISTRICT ONCE SITE WORK IS COMPLETED.

PREPARATION OF AREAS TO BE TOPSOILED

GRADE THE AREAS TO BE COVERED BY TOPSOIL USING ACCEPTABLE METHODS, LOOSEN SOIL TO A MINIMUM DEPTH OF 2 INCHES, BEFORE PLACING THE TOPSOIL. REMOVE STONES AND OTHER FOREIGN MATERIAL 2 INCHES OR LARGER IN DIMENSION. REMOVE AND SATISFACTORILY DISPOSE OF UNSUITABLE AND SURPLUS MATERIAL

E&S PLAN - PLANNING AND DESIGN - SECTION 102.4(B)(4)

1. E&S PLAN MINIMIZES THE EXTENT AND DURATION OF THE EARTH DISTURBANCE ACTIVITY.
2. E&S PLAN MAXIMIZES PROTECTION OF EXISTING DRAINAGE FEATURES AND VEGETATION.
3. E&S PLAN MINIMIZES SOIL COMPACTION.
4. E&S PLAN UTILIZES OTHER MEASURES OR CONTROLS THAT PREVENT OR MINIMIZE GENERATION OF INCREASED STORMWATER RUNOFF.

MEASURES PROVIDED TO MINIMIZE THERMAL IMPACTS

RUNOFF WILL BE CAPTURED AND DIRECTED TO SUBSURFACE UNDERDRAINS. RUNOFF FROM PAVED AREAS OF THE PROJECT DISCHARGE THROUGH BURIED PIPE, THEREBY CREATING AMPLE OPPORTUNITY FOR COOLING PRIOR TO REACHING THE SURFACE WATERS. THE MAJORITY OF THE DISTURBED SITE WILL DISCHARGE INTO THE UNDERGROUND DETENTION FACILITIES. AS SUCH, THE PROJECT WILL NOT HAVE AN ADVERSE IMPACT ON THE NATURAL TEMPERATURES OF THE RECEIVING WATERS.

CRITICAL STAGES OF CONSTRUCTION - LICENSED PROFESSIONAL TO BE PRESENT ON SITE	
1	PRE-CONSTRUCTION MEETING TO BE HELD PRIOR TO THE START OF CONSTRUCTION ACTIVITIES.
2	INSTALLATION OF MRC UNDERGROUND DETENTION FACILITY, IMPERMEABLE LINER, AND OUTLET CONTROL STRUCTURES.
3	INSPECTION PRIOR TO REMOVAL OF E&S CONTROLS.
4	FINAL INSPECTION AT PROJECT COMPLETION.

SEEDING AND SOIL SUPPLEMENTS

THE FOLLOWING SPECIFICATIONS ARE IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 804.

TEMPORARY SEED MIXTURES

SEED TYPE	% BY WEIGHT	PURITY	MAX. WEED SEED
(PENNDOT FORMULA E)			
ANNUAL RYEGRASS	100	95%	0.10%

APPLY SEED AT A RATE OF 10 LBS. PER 1,000 SY.
APPLY STRAW MULCH (SEE MULCH APPLICATION RATES TABLE)
SEEDING SEASON DATES: MARCH 15 TO OCTOBER 15

PERMANENT SEED MIXTURES

SEED TYPE	% BY WEIGHT	PURITY	MAX. WEED SEED
(PENNDOT FORMULA B)			
PERENNIAL RYEGRASS MIXTURE *	20	97%	0.10%
(LOLIUM PERENNE)			
CREEPING RED FESCUE	30	97%	0.10%
KENTUCKY BLUEGRASS MIXTURE **	50	97%	0.15%
(POA PRATENSIS)			

APPLY SEED AT A RATE OF 42 LBS. PER 1,000 SY.
APPLY STRAW OR HAY MULCH (SEE MULCH APPLICATION RATES TABLE).
APPLY PULVERIZED AGRICULTURAL LIMESTONE AT A RATE OF 2 TONS/ACRE UNLESS TESTING HAS BEEN PERFORMED.
APPLY 10-20-20 ANALYSIS COMMERCIAL FERTILIZER AT A RATE OF 678 LBS/ACRE UNLESS TESTING HAS BEEN PERFORMED.
SEEDING SEASON DATES: MARCH 15 TO JUNE 1; AUGUST 1 TO OCTOBER 15
APPLY FLEXTERRA FGM (OR EQUAL) ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

* A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL RYEGRASS COMPONENT.
** A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL BLUEGRASS COMPONENT.

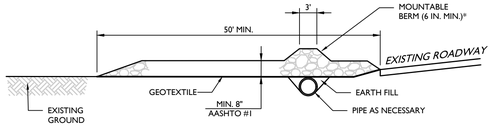
PERMANENT SEED MIXTURES ON STEEP SLOPES (SLOPES EXCEEDING 3:1)

(PENNDOT FORMULA L) SEED TYPE	% BY WEIGHT	PURITY	MAX. WEED SEED
HARD FESCUE	55	97%	0.10%
(FESTUCA LONGIFOLIA***)			
CREEPING RED FESCUE	35	97%	0.10%
(FESTUCA RUBRA)			
ANNUAL RYEGRASS			
(LOLIUM MULTIFLORUM)	10	95%	0.10%

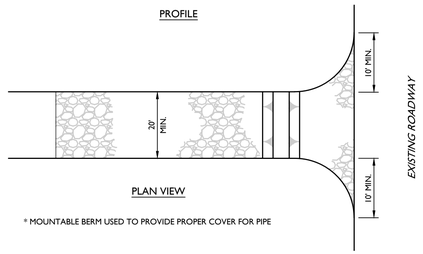
APPLY SEED AT A RATE OF 48 LBS / 1,000 SY.
MULCH WITH MULCH CONTROL NETTING OR EROSION CONTROL BLANKETS MUST BE INSTALLED.
APPLY PULVERIZED AGRICULTURAL LIMESTONE AT A RATE OF 2 TONS/ACRE UNLESS TESTING HAS BEEN PERFORMED.
APPLY 10-20-20 ANALYSIS COMMERCIAL FERTILIZER AT A RATE OF 678 LBS/ACRE UNLESS TESTING HAS BEEN PERFORMED.
SEEDING SEASON DATES: MARCH 15 TO JUNE 1; AUGUST 1 TO OCTOBER 15

*** A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL HARD FESCUE COMPONENT.

| MULCH APPLICATION RATE | | | | |
|---|---|---|---



PROFILE



PLAN VIEW

* MOUNTABLE BERM USED TO PROVIDE PROPER COVER FOR PIPE

NOTES:

1. REMOVE TOPSOIL PRIOR TO INSTALLATION OF ROCK CONSTRUCTION ENTRANCE. EXTEND ROCK OVER FULL WIDTH OF ENTRANCE.
2. RUNOFF SHALL BE DIVERTED FROM ROADWAY TO A SUITABLE SEDIMENT REMOVAL BMP PRIOR TO ENTERING ROCK CONSTRUCTION ENTRANCE.
3. MOUNTABLE BERM SHALL BE INSTALLED WHEREVER OPTIONAL CULVERT PIPE IS USED AND PROPER PIPE COVER AS SPECIFIED BY MANUFACTURER IS NOT OTHERWISE PROVIDED, PIPE SHALL BE SIZED APPROPRIATELY FOR SIZE OF DITCH BEING CROSSED.
4. MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. IF EXCESSIVE AMOUNTS OF SEDIMENT ARE BEING DEPOSITED ON ROADWAY, EXTEND LENGTH OF ROCK CONSTRUCTION ENTRANCE BY 50 FOOT INCREMENTS UNTIL CONDITION IS ALLEVIATED OR INSTALL WASH RACK. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

STANDARD CONSTRUCTION DETAIL # 3-1
ROCK CONSTRUCTION ENTRANCE

NOT TO SCALE | MCPA-SOIL-EROS-1000 | 05/01/18

TABLE 4.1 COMPOST SOCK FABRIC MINIMUM SPECIFICATIONS

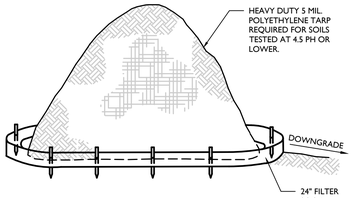
Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photo-degradable	Photo-degradable	Bio- degradable	Photo-degradable	Photo-degradable
Sock Diameters	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"
Mesh Opening	3/8"	3/8"	3/8"	3/8"	1/8"
Tensile Strength		26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years
Two-ply Systems					
Inner Containment Netting	HDPE biaxial net				
	Continuously wound				
	Fusion-welded junctures				
	3/4" x 3/4" Max. aperture size				
Outer Filtration Mesh	Composite Polypropylene Fabric (Woven layer and non-woven fleece mechanically fused via needle punch)				
	3/16" Max. aperture size				
Sock fabrics composed of burlap may be used on projects lasting 6 months or less.					

TABLE 4.2 COMPOST STANDARDS

Organic Matter Content	25% - 100% (dry weight basis)
Organic Portion	Fibrous and elongated
pH	5.5-8.5
Moisture Content	30%-60%
Particle Size	30% - 50% pass through ⅞" sieve
Soluble Salt Concentration	5.0 dS/m (mmhos/cm) Maximum

STANDARD CONSTRUCTION TABLE # 4 -1 & 4 -2

NOT TO SCALE | MCPA-SOIL-EROS-1700 | 05/01/18

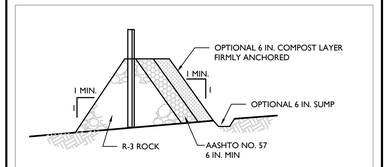


NOTES:

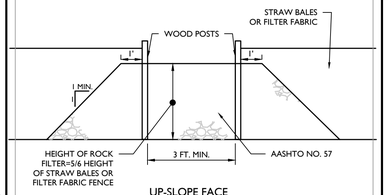
1. ALL STOCKPILES SHALL NOT TO BE LOCATED WITHIN 50 FEET OF A FLOODPLAIN, SLOPE, ROADWAY OR DRAINAGE FACILITY.

TOPSOIL STOCKPILE WITH FILTER SOCK DETAIL

NOT TO SCALE | MCPA-SOIL-EROS-2201 | 05/01/18



OUTLET CROSS-SECTION



UP-SLOPE FACE

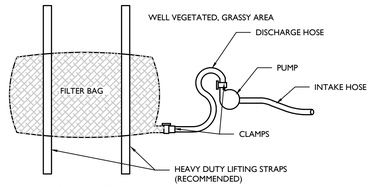
NOTES:

1. A ROCK FILTER OUTLET SHALL BE INSTALLED WHERE FAILURE OF A SILT FENCE OR STRAW BALE BARRIER HAS OCCURRED DUE TO CONCENTRATED FLOW. ANCHORED COMPOST LAYER SHALL BE USED ON UPSLOPE FACE IN HQ AND EV WATERSHEDS.
2. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF THE OUTLET.

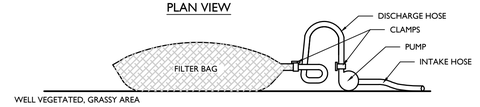
   INSPECTION: ROCK FILTER OUTLET SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT.
   MAINTENANCE:SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH ⅓ THE HEIGHT OF THE OUTLET.
   REPAIR: DAMAGED OR CLOGGED ROCK FILTER OUTLET SHALL BE REPLACED IMMEDIATELY.

STANDARD CONSTRUCTION DETAIL # 4-6
ROCK FILTER OUTLET

NOT TO SCALE | MCPA-SOIL-EROS-1900 | 05/01/18



PLAN VIEW



ELEVATION VIEW

NOTES:

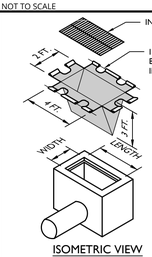
1. LOW VOLUME FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS. HIGH VOLUME FILTER BAGS SHALL BE MADE FROM WOVEN GEOTEXTILES THAT MEET THE FOLLOWING STANDARDS:

PROPERTY	TEST METHOD	MINIMUM STANDARD
AVG. WIDE WIDTH STRENGTH	ASTM D-4884	60 LB/IN
GRAB TENSILE	ASTM D-4632	205 LB
PUNCTURE	ASTM D-4833	110 LB
MULLEN BURST	ASTM D-3786	350 PSI
UV RESISTANCE	ASTM D-4355	70%
AOS % RETAINED	ASTM D-4751	80 SIEVE

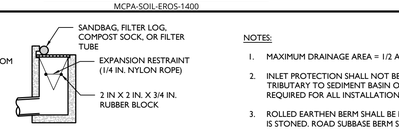
2. A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES SHALL BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL OF SEDIMENT. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED. BAGS SHALL BE PLACED ON STRAPS TO FACILITATE REMOVAL UNLESS BAGS COME WITH LIFTING STRAPS ALREADY ATTACHED.
3. BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE UNDERLAYMENT AND FLOW PATH SHALL BE PROVIDED. BAGS MAY BE PLACED ON FILTER STONE TO INCREASE DISCHARGE CAPACITY. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%. FOR SLOPES EXCEEDING 5%, CLEAN ROCK OR OTHER NON-ERODIBLE AND NON-POLLUTING MATERIAL MAY BE PLACED UNDER THE BAG TO REDUCE SLOPE STEEPNESS.
4. NO DOWNSLOPE SEDIMENT BARRIER IS REQUIRED FOR MOST INSTALLATIONS. COMPOST BERM OR COMPOST FILTER SOCK SHALL BE INSTALLED BELOW BAGS LOCATED IN HQ OR EV WATERSHEDS, WITHIN 50 FEET OF ANY RECEIVING SURFACE WATER OR WHERE GRASSY AREA IS NOT AVAILABLE.
5. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED. A PIECE OF PVC PIPE IS RECOMMENDED FOR THIS PURPOSE.
6. THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHALL BE FLOATING AND SCREENED.
7. FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED.

STANDARD CONSTRUCTION DETAIL # 3-16
PUMPED WATER FILTER BAG

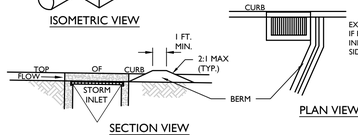
NOT TO SCALE | MCPA-SOIL-EROS-1400 | 05/01/18



ISOMETRIC VIEW



INSTALLATION DETAIL



SECTION VIEW | PLAN VIEW

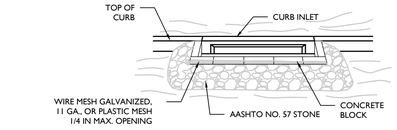
INSPECTION: INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT.
MAINTENANCE: BAGS SHALL BE EMPTIED AND RINSED OR REPLACED WHEN HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET.
REPAIR: DAMAGED OR CLOGGED BAGS SHALL BE REPLACED.

NOTES:

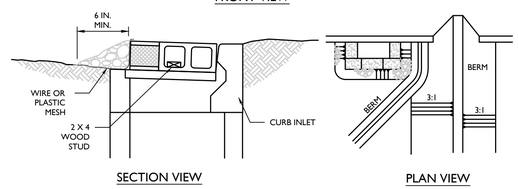
1. MAXIMUM DRAINAGE AREA = 1/2 ACRE.
2. INLET PROTECTION SHALL NOT BE REQUIRED FOR INLET TRIBUTARY TO SEDIMENT BASIN OR TRAP. BERMS SHALL BE REQUIRED FOR ALL INSTALLATIONS.
3. ROLLED EARTHEN BERM SHALL BE MAINTAINED UNTIL ROADWAY IS STONED. ROAD SUBBASE BERM SHALL BE MAINTAINED UNTIL ROADWAY IS PAVED. SIX INCH MINIMUM HEIGHT ASPHALT BERM SHALL BE MAINTAINED UNTIL ROADWAY SURFACE RECEIVES FINAL COAT.
4. AT A MINIMUM, THE FABRIC SHALL HAVE A MINIMUM GRAB TENSILE STRENGTH OF 120 LBS, A MINIMUM BURST STRENGTH OF 200 PSI, AND A MINIMUM TRAPEZOIDAL TEAR STRENGTH OF 50 LBS. FILTER BAGS SHALL BE CAPABLE OF TRAPPING ALL PARTICLES NOT PASSING A NO. 40 SIEVE.
5. INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. BAGS SHALL BE EMPTIED AND RINSED OR REPLACED WHEN HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET. DAMAGED OR CLOGGED BAGS SHALL BE REPLACED. A SUPPLY SHALL BE MAINTAINED ON SITE FOR REPLACEMENT OF BAGS. ALL NEEDED REPAIRS SHALL BE INITIATED IMMEDIATELY AFTER THE INSPECTION. DISPOSE OF ACCUMULATED SEDIMENT AS WELL AS ALL USED BAGS ACCORDING TO THE PLAN NOTES.
6. DO NOT USE ON MAJOR PAVED ROADWAYS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

STANDARD CONSTRUCTION DETAIL # 4-15
FILTER BAG INLET PROTECTION - TYPE C INLET

NOT TO SCALE | MCPA-SOIL-EROS-2400 | 05/01/18



FRONT VIEW



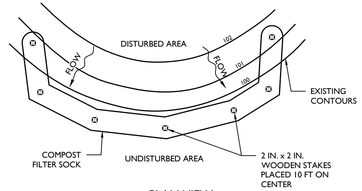
SECTION VIEW | PLAN VIEW

NOTES:

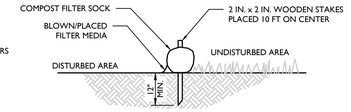
1. MAXIMUM DRAINAGE AREA = 1 ACRE.
2. INLET PROTECTION SHALL NOT BE REQUIRED FOR INLET TRIBUTARY TO SEDIMENT BASIN OR TRAP. BERMS SHALL BE REQUIRED FOR ALL INSTALLATIONS.
3. ROLLED EARTHEN BERM SHALL BE PROVIDED AND MAINTAINED IMMEDIATELY DOWN GRADIENT OF THE PROTECTED INLET UNTIL ROADWAY IS STONED. ROAD SUBBASE BERM SHALL BE MAINTAINED UNTIL ROADWAY IS PAVED. SIX INCH MINIMUM HEIGHT ASPHALT BERM SHALL BE MAINTAINED UNTIL ROADWAY SURFACE RECEIVES FINAL COAT.
4. SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE HEIGHT OF THE STONE. DAMAGED OR CLOGGED INSTALLATIONS SHALL BE REPAIRED OR REPLACED IMMEDIATELY.
5. FOR SYSTEMS DISCHARGING TO HQ OR EV SURFACE WATER, A 6 INCH THICK COMPOST LAYER SHALL BE SECURELY ANCHORED ON OUTSIDE AND OVER TOP OF STONE.
6. DO NOT USE ON MAJOR PAVED ROADWAYS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

STANDARD CONSTRUCTION DETAIL # 4-17
STONE AND CONCRETE BLOCK INLET PROTECTION - TYPE C INLET

NOT TO SCALE | MCPA-SOIL-EROS-2402 | 05/01/18



PLAN VIEW



SECTION

NOTES:

1. SOCK FABRIC SHALL MEET STANDARDS OF TABLE 4.1 OF THE PA DEP EROSION CONTROL MANUAL. COMPOST SHALL MEET THE STANDARDS OF TABLE 4.2 OF THE PA DEP EROSION CONTROL MANUAL.
2. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY BARRIER SHALL NOT EXCEED THAT SPECIFIED FOR THE SIZE OF THE SOCK AND THE SLOPE OF ITS TRIBUTARY AREA.
3. TRAFFIC SHALL NOT BE PERMITTED TO CROSS COMPOST FILTER SOCKS.
4. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE BARRIER AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
5. COMPOST FILTER SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
6. BIODEGRADABLE COMPOST FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
7. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

INSPECTION: COMPOST FILTER SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT.
MAINTENANCE:ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE ABOVEGROUND HEIGHT OF THE SOCK AND DISPOSED OF IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
REPAIR: DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.

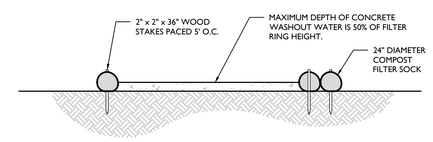
STANDARD CONSTRUCTION DETAIL # 4-1
COMPOST FILTER SOCK

NOT TO SCALE | MCPA-SOIL-EROS-1600 | 05/01/18

NOTES:

1. CONCRETE WASHOUTS ARE REQUIRED ON ALL CONSTRUCTION SITES INVOLVING CONCRETE AND STUCCO USE:
2. THE CONTRACTOR SHALL REQUIRE ALL CONCRETE DRIVERS TO UTILIZE THE CONCRETE WASHOUTS ONSITE.
3. WASHOUT FACILITIES SHALL BE LOCATED AT LEAST 50 FEET AWAY FROM STORM SEWER DRAIN INLETS, GUTTERS, OPEN DITCHES, AND WATER COURSES.
4. APPROPRIATE STONE SHOULD COVER PATHS TO CONCRETE WASHOUT.
5. THE NUMBER OF CONCRETE WASHOUTS DEPENDS ON THE EXPECTED DEMAND FOR STORAGE CAPACITY. LARGE SITES WITH EXTENSIVE CONCRETE WORK SHALL BE PLACED AT MULTIPLE LOCATIONS FOR USE BY CONCRETE TRUCK DRIVERS.
6. CONCRETE WASHOUT AREAS SHALL BE IDENTIFIED BY POSTING SIGNS ONSITE.
7. CONCRETE WASHOUTS ARE TO BE INSPECTED DAILY BY THE CONTRACTOR FOR LEAKS OR TEARS IN PLASTIC LINER.
8. REMOVE AND DISPOSE OF ALL MATERIAL WHEN THE WASHOUT HAS BEEN FILLED TO 75% CAPACITY.
9. PRIOR TO ANY RAINFALL, ALL CONCRETE WASHOUTS ARE TO BE CLEANED OUT OR COVERED.
10. ONCE THE MATERIAL HAS BEEN CLEANED OUT OF THE CONCRETE WASHOUT FACILITY, THE FACILITY MUST BE INSPECTED FOR REPAIR, RECONSTRUCTION OR REPLACEMENT. ALL PLASTIC LINING SHALL BE REMOVED AND REPLACED.
11. PRE-FABRICATED OR ONSITE FABRICATED CONCRETE WASHOUTS MAY BE USED.
12. OPTIONS FOR ONSITE CONCRETE WASHOUTS:
    A. DIG A PIT AND LINE WITH 10 MIL PLASTIC SHEETING.
    B. CREATE AN ABOVE-GROUND STRUCTURE FROM STRAW BALES OR SANDBAGS, WITH 10 MIL PLASTIC LINING.

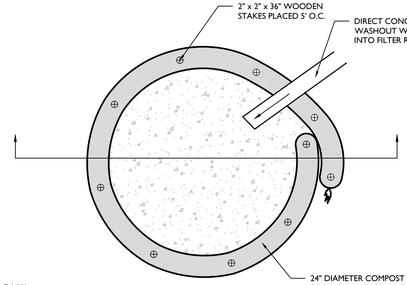
INSPECTION: ALL CONCRETE WASHOUT FACILITIES SHOULD BE INSPECTED DAILY.
MAINTENANCE: ACCUMULATED MATERIALS SHOULD BE REMOVED WHEN THEY REACH 75% CAPACITY.
REPAIR: DAMAGED OR LEAKING WASHOUTS SHOULD BE DEACTIVATED AND REPAIRED OR REPLACED IMMEDIATELY.



SECTION

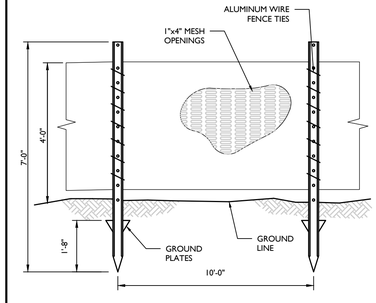
NOTES:

1. INSTALL ON FLAT GRADE FOR OPTIMUM PERFORMANCE.
2. 18" DIAMETER FILTER SOCK MAY BE STACKED ONTO DOUBLE 24" DIAMETER SOCKS IN PYRAMIDAL CONFIGURATION FOR ADDED HEIGHT.



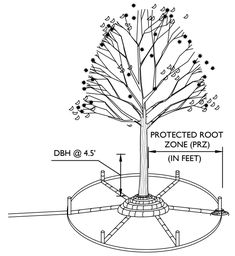
CONCRETE WASHOUT DETAIL

NOT TO SCALE | MCPA-SOIL-EROS-1800 | 12/01/20



ORANGE CONSTRUCTION FENCE DETAIL

NOT TO SCALE | MCPA-SOIL-EROS-2100 | 05/01/18



NOTES:

1. MEASURE THE DBH (DIAMETER OF TREE AT BREAST HEIGHT, 4.5' ABOVE GROUND ON THE UPHILL SIDE) IN INCHES.
2. PROTECTED ROOT ZONE (PRZ) = CRITICAL ROOT ZONE IN FEET = DBH (INCHES) X 1.5' (FOR OLD/SENSITIVE TREES) OR DBH X 1.0 (FOR YOUNG/TOLERANT TREES)

TREE PROTECTION IN CUT AREAS DETAIL

NOT TO SCALE | MCPA-SOIL-EROS-2502 | 05/01/18

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PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

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MONTGOMERY COUNTY
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LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER:	DRAWING NAME:
160010308	C-SESC-DTLS

SHEET TITLE:
EROSION AND SEDIMENT POLLUTION CONTROL DETAILS

SHEET NUMBER:
22 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2001601003\08\Engineering\ESS\Plans\C-SESC-DTLS.dwg\C-SESC-DTLS By: JOHNS.MEYER



PCSM LEGEND

	PROPOSED
EXISTING STORM PIPE	
LIMIT OF DISTURBANCE	LOD
NPDES BOUNDARY	NPDES
POST-PROJECT IMPERVIOUS SURFACES	
TEST BORING LOCATION	TB-6
TEST PIT LOCATION	TP-6

LEGEND

TRAVERSE LINE, CENTER LINE OR BASELINE	WETLAND MARKER
RIGHT OF WAY LINE	TREE
PROPERTY LINE	ROADWAY SIGNS
EDGE OF PAVEMENT	TRAFFIC FLOW
CURB LINE	MAILBOX
DEPRESSED CURB	TRAFFIC SIGNAL POLE
CHAIN FENCE	POLE MOUNTED LIGHT
WETLAND LINE	UTILITY POLE
MUNICIPAL BOUNDARY	GUY WIRE
TREELINE	TRANSFORMER
ELECTRICAL MANHOLE	FIRE DEPT. CONNECTION
WATER MANHOLE	FIRE HYDRANT
TELEPHONE MANHOLE	WATER VALVE
UNMARKED MANHOLE	GAS VALVE
SANITARY MANHOLE	SANITARY CLEANOUT
DRAINAGE MANHOLE	CONCRETE MONUMENT
MAJOR CONTOUR	CAPPED REBAR/IRON PIPE
MINOR CONTOUR	STORM INLET TYPE "C"
SPOT ELEVATION	STM. DBL. INLET TYPE "C"
TOP OF CURB ELEV.	STORM INLET TYPE "M"
BOTTOM OF CURB ELEV.	STM. DBL. INLET TYPE "M"
U/G CABLE TV LINE	FLARED END SECTION
U/G FIBER OPTIC LINE	HEADWALL
U/G TELEPHONE LINE	SOIL BOUNDARY
U/G ELECTRIC LINE	
OVERHEAD WIRE	
WATER MAIN	
GAS MAIN	
SAN. SEWER LATERAL	
SAN. SEWER MAIN	
STORM PIPE	

ABBREVIATIONS

D.C. = DEPRESSED CURB	FF. = FINISH FLOOR	MHWL = MEAN HIGH WATERLINE
BC = BOTTOM OF CURB	UV = UNKNOWN VALVE	MLWL = MEAN LOW WATERLINE
TC = TOP OF CURB	MH = MANHOLE	TW = TOP OF WALL
BOL = BOLLARD	DEP. = DEPRESSED	BW = BOTTOM WALL
GRT = GRATE	CL = CENTERLINE	
MB = MAILBOX	PM = PARKING METER	

GENERAL NOTES:

1. IN ACCORDANCE WITH STATE LAW, THE CONTRACTOR SHALL BE REQUIRED TO CALL THE PENNSYLVANIA ONE CALL DAMAGE PROTECTION SYSTEM FOR UTILITY MARK OUT IN ADVANCE OF ANY EXCAVATION.
2. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING SITE IMPROVEMENTS AND UTILITIES. ALL DISCREPANCIES SHALL BE IDENTIFIED TO THE ENGINEER IN WRITING.
3. ALL REMOVED MATERIAL MUST BE TRANSPORTED TO A SITE WITH AN ACTIVE NPDES PERMIT OR ACTIVE EROSION & SEDIMENTATION CONTROL PLAN.
4. ALL DEMOLITION DEBRIS TO BE REMOVED BY CONTRACTOR IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.
5. THE LIMIT OF DISTURBANCE AND NPDES BOUNDARIES ARE SHOWN OFFSET FROM OBJECTS AND OUTSIDE OF THE PROPERTY BOUNDARY FOR CLARITY. ALL DISTURBANCE WILL BE LOCATED WITHIN THE PROPERTY BOUNDARY AND LEGAL RIGHT-OF-WAY OF WINDSOR DRIVE.
6. BY GRAPHICAL REPRESENTATION ONLY THIS PROPERTY IS LOCATED IN FLOOD HAZARD ZONE AE AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 42091C0358G WHICH HAS AN EFFECTIVE DATE OF MARCH 2, 2016 AND IS IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE. THE FEMA CALCULATED 100-YEAR FLOOD ELEVATION FOR THIS PROJECT IS 60.5 FEET (NAVD 88) IN ACCORDANCE FIRM MAP NUMBER 42091C0358G DATED MARCH 2, 2016.

ENVIRONMENTAL NOTE:

THIS SET OF PLANS IS NOT DEPICTING ENVIRONMENTAL CONDITIONS OR A CERTIFICATION/WARRANTY REGARDING THE PRESENCE OR ABSENCE OF ENVIRONMENTALLY IMPACTED SITE CONDITIONS. COLLIERS ENGINEERING & DESIGN HAS PERFORMED NO EXPLORATORY OR TESTING SERVICES, INTERPRETATIONS, CONCLUSIONS, OR OTHER SITE ENVIRONMENTAL SERVICES RELATED TO THE DETERMINATION OF THE POTENTIAL FOR CHEMICAL, TOXIC, RADIOACTIVE, OR OTHER TYPE OF CONTAMINANTS AFFECTING THE PROPERTY AND THE UNDERSIGNED PROFESSIONAL IS NOT QUALIFIED TO DETERMINE THE EXISTENCE OF SAME. SHOULD ENVIRONMENTAL CONTAMINATION OR WASTE BE DISCOVERED, THE OWNER AND CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LAWS AND REGULATIONS.

THIS SITE ULTIMATELY FLOWS TO THE SCHUYLKILL RIVER, WHICH IS PART OF THE SCHUYLKILL RIVER WATERSHED. THE PENNSYLVANIA CODE, TITLE 25, CHAPTER 93, WATER QUALITY STANDARDS ASSIGNS THE SCHUYLKILL RIVER A WATER QUALITY DESIGNATION OF WARM WATER FISHERY, MIGRATORY FISHES (WWF, MF).

40 0 40 80

SCALE : 1" = 40'

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REV	DATE	DRAWN BY	DESCRIPTION

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

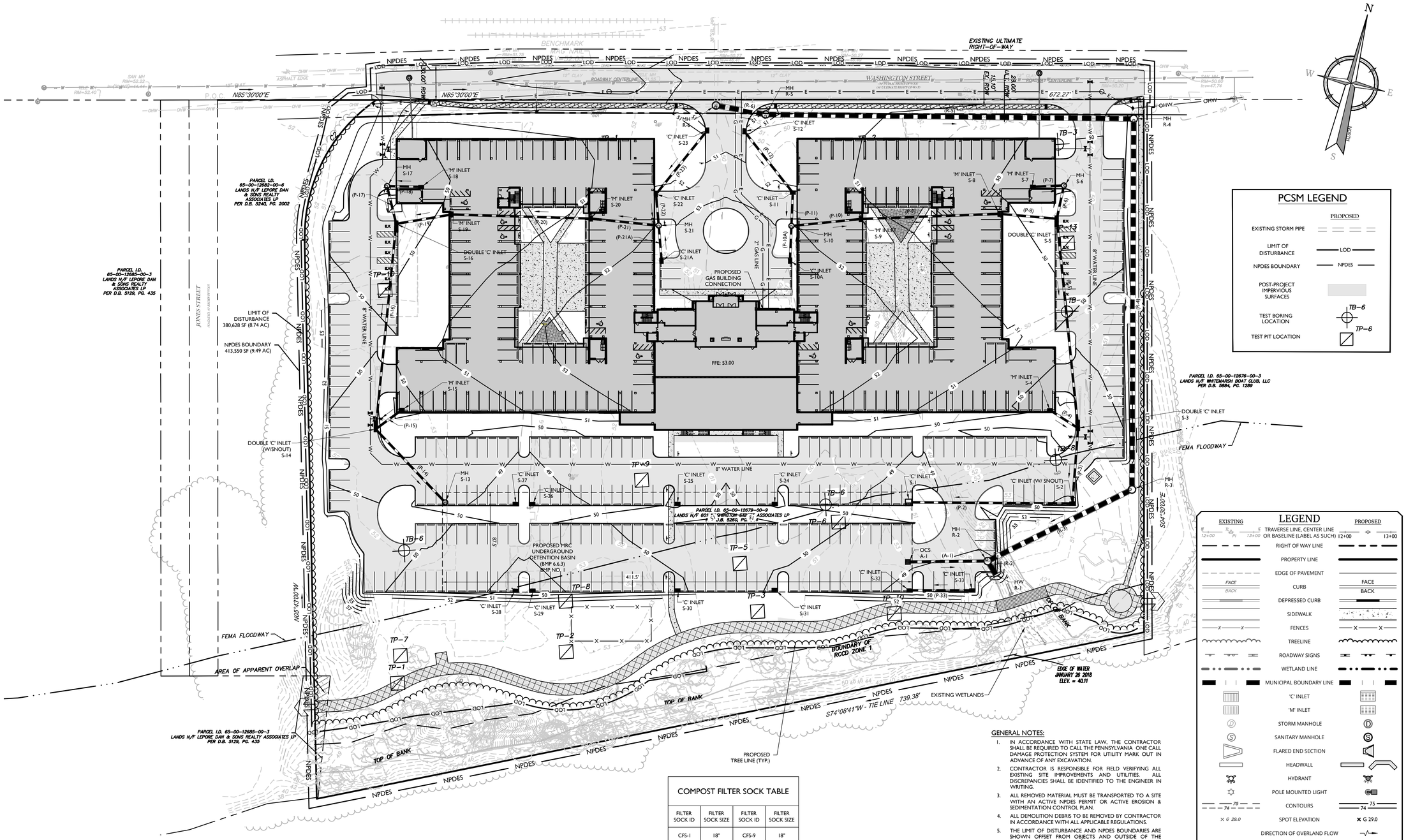
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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA
PROJECT NUMBER:	DRAWING NAME:		
16001030B	C-PCSM-PLAN		

SHEET TITLE:
PCSM EXISTING CONDITIONS

SHEET NUMBER:
23 of 27



PCSM LEGEND

	PROPOSED
EXISTING STORM PIPE	
LIMIT OF DISTURBANCE	LOD
NPDES BOUNDARY	NPDES
POST-PROJECT IMPERVIOUS SURFACES	
TEST BORING LOCATION	TB-6
TEST PIT LOCATION	TP-6

LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'C' INLET	
	'M' INLET	
D	STORM MANHOLE	D
S	SANITARY MANHOLE	S
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
75 / 74	CONTOURS	75 / 74
× G 29.0	SPOT ELEVATION	× G 29.0
	DIRECTION OF OVERLAND FLOW	
× TC 29.0	TOP OF CURB ELEVATION	× TC 29.0
× BC 29.0	BOTTOM OF CURB ELEVATION	× BC 29.0
	TOP OF DEPRESSED CURB ELEVATION	× TDC 29.0
CATV	CABLE TV CONDUIT	CATV
W	WATER MAIN	W
G	GAS MAIN	G
T	TELEPHONE CONDUIT	T
E	ELECTRIC CONDUIT	E
	SANITARY PIPE	
	STORM PIPE	

COMPOST FILTER SOCK TABLE

FILTER SOCK ID	FILTER SOCK SIZE	FILTER SOCK ID	FILTER SOCK SIZE
CFS-1	18"	CFS-9	18"
CFS-2	18"	CFS-10	18"
CFS-3	18"	CFS-11	18"
CFS-4	18"	CFS-12	18"
CFS-5	18"	CFS-13	18"
CFS-6	18"	CFS-14	18"
CFS-7	18"	CFS-15	18"
CFS-8	18"		

GENERAL NOTES:

1. IN ACCORDANCE WITH STATE LAW, THE CONTRACTOR SHALL BE REQUIRED TO CALL THE PENNSYLVANIA ONE CALL DAMAGE PROTECTION SYSTEM FOR UTILITY MARK OUT IN ADVANCE OF ANY EXCAVATION.
2. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING SITE IMPROVEMENTS AND UTILITIES. ALL DISCREPANCIES SHALL BE IDENTIFIED TO THE ENGINEER IN WRITING.
3. ALL REMOVED MATERIAL MUST BE TRANSPORTED TO A SITE WITH AN ACTIVE NPDES PERMIT OR ACTIVE EROSION & SEDIMENTATION CONTROL PLAN.
4. ALL DEMOLITION DEBRIS TO BE REMOVED BY CONTRACTOR IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.
5. THE LIMIT OF DISTURBANCE AND NPDES BOUNDARIES ARE SHOWN OFFSET FROM OBJECTS AND OUTSIDE OF THE PROPERTY BOUNDARY FOR CLARITY. ALL DISTURBANCE WILL BE LOCATED WITHIN THE PROPERTY BOUNDARY AND LEGAL RIGHT-OF-WAY OF WINDSOR DRIVE.
6. CONSTRUCTION FENCE TO BE INSTALLED AT THE DISCRETION OF THE CONSTRUCTION MANAGER. THE CONSTRUCTION FENCE MUST BE INSTALLED TO MAINTAIN SAFE VEHICULAR AND PEDESTRIAN TRAFFIC PATTERNS AT ALL TIMES THROUGHOUT CONSTRUCTION.
7. DO NOT INSTALL COMPOST FILTER SOCKS ON EROSION CONTROL MATTING.
8. BY GRAPHICAL REPRESENTATION ONLY THIS PROPERTY IS LOCATED IN FLOOD HAZARD ZONE AE AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 42091C0358G WHICH HAS AN EFFECTIVE DATE OF MARCH 2, 2016 AND IS IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE. THE FEMA CALCULATED 100-YEAR FLOOD ELEVATION FOR THIS PROJECT IS 60.5 FEET (NAVD 88) IN ACCORDANCE FIRM MAP NUMBER 42091C0358G DATED MARCH 2, 2016.

ENVIRONMENTAL NOTE:
THIS SET OF PLANS IS NOT DEPICTING ENVIRONMENTAL CONDITIONS OR A CERTIFICATION/WARRANTY REGARDING THE PRESENCE OR ABSENCE OF ENVIRONMENTALLY IMPACTED SITE CONDITIONS. COLLIERS ENGINEERING & DESIGN HAS PERFORMED NO EXPLORATORY OR TESTING SERVICES, INTERPRETATIONS, CONCLUSIONS, OR OTHER SITE ENVIRONMENTAL SERVICES RELATED TO THE DETERMINATION OF THE POTENTIAL FOR CHEMICAL, TOXIC, RADIOACTIVE, OR OTHER TYPE OF CONTAMINANTS AFFECTING THE PROPERTY AND THE UNDERSIGNED PROFESSIONAL IS NOT QUALIFIED TO DETERMINE THE EXISTENCE OF SAME. SHOULD ENVIRONMENTAL CONTAMINATION OR WASTE BE DISCOVERED, THE OWNER AND CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LAWS AND REGULATIONS.

THIS SITE ULTIMATELY FLOWS TO THE SCHUYLKILL RIVER, WHICH IS PART OF THE SCHUYLKILL RIVER WATERSHED. THE PENNSYLVANIA CODE, TITLE 25, CHAPTER 93, WATER QUALITY STANDARDS ASSIGNS THE SCHUYLKILL RIVER A WATER QUALITY DESIGNATION OF WARM WATER FISHERY, MIGRATORY FISHES (WWF, MF).

40 0 40 80
SCALE : 1" = 40'

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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER: 16001030B
DRAWING NAME: C-PCSM-PLAN

SHEET TITLE: PCSM PLAN

SHEET NUMBER: 24 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\PCSM\C-PCSM-PLAN.dwg\P-03 PLAN By: CHRIS MEZGLER

POST-CONSTRUCTION STORMWATER MANAGEMENT GENERAL NOTES

1. FOR THE PURPOSES OF THIS PLAN, "BMP" REFERS TO A PROPOSED PCSM BEST MANAGEMENT PRACTICE.
2. DO NOT STOCKPILE EQUIPMENT, SOIL, OR MACHINERY WITHIN THE AREA OF AN INFILTRATION BMP.
3. DO NOT COMPACT INFILTRATION BMP SOIL BEDS DURING CONSTRUCTION. PROHIBIT ALL HEAVY EQUIPMENT FROM THE FLOOR AREA AND MINIMIZE ALL OTHER TRAFFIC. WHERE POSSIBLE, PERFORM WORK FROM THE PERIMETER OF THE BMP TO AVOID EXCESSIVE SOIL COMPACTION WITHIN THE LEVEL EARTH AREAS OF THE BMP.
4. A COMPLETE AND SITE SPECIFIC CONSTRUCTION SEQUENCE INCLUDING THE CONSTRUCTION OF ALL BMPS CAN BE FOUND ON THE EROSION AND SEDIMENT POLLUTION CONTROL PLANS.
5. THE PERMITTEE MUST PROVIDE ENGINEERING CONSTRUCTION OVERSIGHT FOR THE PROPOSED STORMWATER BMPS.
6. BEFORE INITIATING ANY REVISIONS TO THE APPROVED PCSM PLANS OR REVISIONS TO OTHER PLANS WHICH MAY AFFECT THE EFFECTIVENESS OF THE APPROVED PCSM PLAN, THE CONTRACTOR MUST RECEIVE APPROVAL OF THE REVISIONS FROM THE MONTGOMERY COUNTY CONSERVATION DISTRICT AND/OR PADEP.
7. ALL BUILDING MATERIALS AND WASTES SHALL BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET SEQ., 271.1, AND 287.1 ET. SEQ. NO BUILDING MATERIALS OR WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THIS SITE.
8. IN THE EVENT OF SINKHOLE DISCOVERY A PROFESSIONAL GEOLOGIST OR ENGINEER MUST BE CONTACTED CONCERNING MITIGATION. ADDITIONALLY, THE MONTGOMERY COUNTY CONSERVATION DISTRICT MUST BE MADE AWARE OF THE SINKHOLE DISCOVERY IMMEDIATELY.
9. THE CONTRACTOR SHALL ASSURE THAT THE APPROVED POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN IS PROPERLY AND COMPLETELY IMPLEMENTED.
10. PCSM PLAN HAS BEEN DESIGNED TO MINIMIZE IMPERVIOUS AREAS. IMPERVIOUS AREAS WILL BE LIMITED TO ROADWAY MAINTENANCE AND IMPROVEMENT AREAS, AND PERVIOUS AREAS WILL BE RESTORED IN OTHER AREAS WITHIN THE LIMIT OF DISTURBANCE.
11. PCSM PLAN HAS BEEN DESIGNED TO MAXIMIZE THE PROTECTION OF EXISTING DRAINAGE FEATURES AND EXISTING VEGETATION. THE PROPOSED DEVELOPMENT MAINTAINS THE GENERAL DRAINAGE PATTERN, VOLUME, AND RATE OF RUNOFF TO THE SURFACE WATER DISCHARGE. EXISTING VEGETATION IS PROTECTED BY RESTRICTING DISTURBED AREA.
12. PCSM PLAN HAS BEEN DESIGNED TO MINIMIZE LAND CLEARING AND GRADING. EARTH DISTURBANCE IS LIMITED ONLY TO AREAS OF PROPOSED IMPROVEMENTS. DISTURBED AREAS ARE TO BE STABILIZED IMMEDIATELY AFTER GRADING AND/OR IMPROVEMENTS ARE COMPLETED.
13. THE PCSM PLAN MINIMIZES SOIL COMPACTION. USE OF EXISTING ROADWAYS AND STABILIZED AREAS AND CONTROL OF DISTURBED AREAS FOR THE PLANNED IMPROVEMENTS LIMIT THE IMPACT OF SOIL COMPACTION.
14. PCSM PLAN UTILIZES STRUCTURAL AND NON-STRUCTURAL BMPS THAT PREVENT OR MINIMIZE CHANGES IN STORMWATER RUNOFF. SITE BMPS PREVENT OR MINIMIZE CHANGES IN STORMWATER RUNOFF BY CONTROLLING VOLUME AND PEAK RATE RUNOFF FROM THE SITE.
15. THE PCSM PLANS ARE SEPARATE FROM THE EROSION AND SEDIMENT POLLUTION CONTROL (E&SPC) PLANS, ARE CONSISTENT WITH THE E&SPC PLANS, AND ARE THE FINAL PLANS FOR CONSTRUCTION.
16. A SEALER WILL BE USED IN ALL INLETS LOCATED WTIHIN GRASSED AREAS AND WITHIN AREAS OF PCSM BMPS.

PCSM REQUIREMENTS

PCSM REPORTING AND RECORDKEEPING. THE PCSM PLAN, INSPECTION REPORTS AND MONITORING RECORDS MUST BE AVAILABLE FOR REVIEW AND INSPECTION BY PADEP OR THE CONSERVATION DISTRICT.

RESPONSIBLE PARTY & OWNER:

THE STORMWATER BMPS IN THE PROJECT SITE WILL BE OWNED, OPERATED, AND MAINTAINED BY:

601 WASHINGTON STREET ASSOCIATES, L.P.
201 KING OF PRUSSIA ROAD, SUITE 501
RADNOR, PA 19087
P: (610) 337-5582

LICENSED PROFESSIONAL OVERSIGHT OF CRITICAL STAGES. A LICENSED PROFESSIONAL OR A DESIGNEE MUST BE PRESENT ONSITE AND BE RESPONSIBLE DURING CRITICAL STAGES OF PCSM BMP IMPLEMENTATION OF THE APPROVED PCSM PLAN. FOR THE PURPOSES OF THIS PCSM PLAN, THE CRITICAL STAGES ARE CONSIDERED TO BE:

CRITICAL STAGES OF CONSTRUCTION - LICENSED PROFESSIONAL TO BE PRESENT ON SITE	
1	PRE-CONSTRUCTION MEETING TO BE HELD PRIOR TO THE START OF CONSTRUCTION ACTIVITIES.
2	INSTALLATION OF MRC UNDERGROUND DETENTION FACILITY, IMPERMEABLE LINER, AND OUTLET CONTROL STRUCTURES
3	INSPECTION PRIOR TO REMOVAL OF E&S CONTROLS.
4	FINAL INSPECTION AT PROJECT COMPLETION.

FINAL CERTIFICATION. THE PERMITTEE MUST INCLUDE WITH THE NOTICE OF TERMINATION "RECORD DRAWINGS" WITH A FINAL CERTIFICATION STATEMENT FROM A LICENSED PROFESSIONAL, WHICH READS AS FOLLOWS, OR AS THE CURRENT STANDARD READS:

"I (NAME) DO HEREBY CERTIFY PURSUANT TO THE PENALTIES OF 18 PA.C.S.A. CHAPTER 4904 TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF, THAT THE ACCOMPANYING RECORD DRAWINGS ACCURATELY REFLECT THE AS-BUILT CONDITIONS, ARE TRUE AND CORRECT, AND ARE IN CONFORMANCE WITH CHAPTER 102 OF THE RULES AND REGULATIONS OF PADEP OF ENVIRONMENTAL PROTECTION AND THAT THE PROJECT SITE WAS CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PCSM PLAN. ALL APPROVED PLAN CHANGES AND ACCEPTED CONSTRUCTION PRACTICES."

(1) THE PERMITTEE MUST RETAIN A COPY OF THE RECORD DRAWINGS AS A PART OF THE APPROVED PCSM PLAN.

(2) THE PERMITTEE MUST PROVIDE A COPY OF THE RECORD DRAWINGS AS A PART OF THE APPROVED PCSM PLAN TO THE PERSONS OR ENTITIES IDENTIFIED IN THIS SECTION AS BEING RESPONSIBLE FOR THE LONG-TERM OPERATION AND MAINTENANCE OF THE PCSM BMPS.

PCSM LONG TERM OPERATIONS AND MAINTENANCE REQUIREMENTS

UNTIL THE PERMITTEE OR CO-PERMITTEE HAS RECEIVED WRITTEN APPROVAL OF A NOTICE OF TERMINATION, THE PERMITTEE OR CO-PERMITTEE WILL REMAIN RESPONSIBLE FOR COMPLIANCE WITH THE PERMIT TERMS AND CONDITIONS INCLUDING LONG-TERM OPERATION AND MAINTENANCE OF ALL PCSM BMPS ON THE PROJECT SITE AND IS RESPONSIBLE FOR VIOLATIONS OCCURRING ON THE PROJECT SITE. PADEP AND/OR THE CONSERVATION DISTRICT WILL CONDUCT A FINAL INSPECTION AND APPROVE OR DENY THE NOTICE OF TERMINATION WITHIN 30 DAYS.

THE PERMITTEE OR CO-PERMITTEE IS RESPONSIBLE FOR LONG-TERM OPERATION AND MAINTENANCE OF PCSM BMPS UNLESS A DIFFERENT PERSON OR ENTITY IS IDENTIFIED IN THE NOTICE OF TERMINATION AND HAS AGREED TO LONG-TERM OPERATION AND MAINTENANCE OF PCSM BMPS.

FOR ANY PROPERTY CONTAINING A PCSM BMP, THE PERMITTEE OR CO-PERMITTEE SHALL RECORD AN INSTRUMENT WITH THE RECORDER OF DEEDS WHICH WILL ASSURE DISCLOSURE OF THE PCSM BMP AND THE RELATED OBLIGATIONS IN THE ORDINARY COURSE OF A TITLE SEARCH OF THE SUBJECT PROPERTY. THE RECORDED INSTRUMENT MUST IDENTIFY THE PCSM BMP, PROVIDE FOR NECESSARY ACCESS RELATED TO LONG-TERM OPERATION AND MAINTENANCE FOR PCSM BMPS AND PROVIDE NOTICE THAT THE RESPONSIBILITY FOR LONG-TERM OPERATION AND MAINTENANCE OF THE PCSM BMP IS A COVENANT THAT RUNS WITH THE LAND THAT IS BINDING UPON AND ENFORCEABLE BY SUBSEQUENT GRANTEES, AND PROVIDE PROOF OF FILING WITH THE NOTICE OF TERMINATION UNDER § 102.7(B)(5) (RELATING TO PERMIT TERMINATION).

THE PERSON RESPONSIBLE FOR PERFORMING LONG-TERM OPERATION AND MAINTENANCE MAY ENTER INTO AN AGREEMENT WITH ANOTHER PERSON INCLUDING A CONSERVATION DISTRICT, NONPROFIT ORGANIZATION, MUNICIPALITY, AUTHORITY, PRIVATE CORPORATION OR OTHER PERSON, TO TRANSFER THE RESPONSIBILITY FOR PCSM BMPS OR TO PERFORM LONG-TERM OPERATION AND MAINTENANCE AND PROVIDE NOTICE THEREOF TO THE DEPARTMENT.

A PERMITTEE OR CO-PERMITTEE THAT FAILS TO TRANSFER LONG-TERM OPERATION AND MAINTENANCE OF THE PCSM BMP OR OTHERWISE FAILS TO COMPLY WITH THIS REQUIREMENT SHALL REMAIN JOINTLY AND SEVERALLY RESPONSIBLE WITH THE LANDOWNER FOR LONG-TERM OPERATION AND MAINTENANCE OF THE PCSM BMPS LOCATED ON THE PROPERTY.

OPERATION AND MAINTENANCE FOR PCSM BMPS

OWNERSHIP OF THE PERMANENT BMPS INDICATED ON THE PCSM PLANS RESIDES WITHIN THE PROPERTY BOUNDARY FOR THE SUBJECT LOTS. THE OPERATIONS AND MAINTENANCE OF THESE BMPS WILL BECOME THE RESPONSIBILITY OF THE PROPERTY OWNER OR THEIR DESIGNEE. THIS OPERATION AND MAINTENANCE PLAN IS BASED ON CHAPTER 6 OF THE *PENNSYLVANIA STORMWATER BEST MANAGEMENT PRACTICES MANUAL AND SECTIONS 7 AND 8 OF THE PENNSYLVANIA HANDBOOK OF BEST MANAGEMENT PRACTICES FOR DEVELOPING AREAS.*

FOLLOWING THIS OPERATION AND MAINTENANCE PLAN WILL ALLOW THE BMPS TO FUNCTION PROPERLY. EACH BMP MUST BE INSPECTED ANNUALLY (UNLESS OTHERWISE NOTED) AND AFTER ANY MAJOR RUNOFF EVENTS, AS INDICATED.

LIMIT VEHICULAR OPERATION OVER THE BMPS TO AVOID COMPACTION OF THE SOILS OR AGGREGATE MATERIAL. TAKE CARE TO AVOID EXCESSIVE COMPACTION WHEN ACCESS IS REQUIRED. WHEN PERFORMING MAINTENANCE ACTIVITIES IN BMPS, OPERATE EQUIPMENT WITHOUT ENTERING THE FLOOR AREA, OR USE LIGHTWEIGHT, LOW GROUND PRESSURE, TRACK MOUNTED EQUIPMENT.

BMP MINIMUM INSPECTION CHECKLIST

- EXCESSIVE EROSION OR SEDIMENTATION
- UNSTABLE SIDE SLOPES AND EMBANKMENTS
- SEEPAGE THROUGH OUTSIDE FACE OF EMBANKMENTS
- CRACKING OR SETTLING
- SINKHOLES
- ANIMAL BURROWING
- DETERIORATION OF VEGETATION
- INVASIVE PLANT GROWTH
- SLUGGISH DRAINING
- ALGAE, STAGNANT POOLS, OR NOXIOUS ODORS
- RUTS, WASHOUTS, BULGES, SLIDES, SLOUGHS, SCARPS, OR SLUMPS
- RIP-RAP DISPLACEMENT OR FAILURE
- CRACKS OR RUST ON PIPING
- OBSTRUCTIONS BY TRASH AND DEBRIS
- SIGNS OF VANDALISM

IF DURING OPERATION, A SIGN OF FAILURE IS NOTED DURING INSPECTION, CORRECTIVE ACTION MUST BE COMPLETED BASED ON THE TYPE OF PROBLEM OBSERVED.

SEDIMENT REMOVAL

SEDIMENT MAY ACCUMULATE OVER TIME WITHIN BMPS AND STORM SEWER INLETS. THE DISTURBED AREAS OF THE BMPS MUST BE STABILIZED IMMEDIATELY. SEDIMENT ACCUMULATION IN STORM SEWER INLETS AND MANHOLES MUST BE REMOVED AND PROPERLY DISPOSED OF IN ACCORDANCE WITH PADEP REGULATIONS. SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN LANDSCAPED AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS OR DRAINAGE SWALES. THE SEDIMENT DISPOSAL AREA MUST BE STABILIZED IMMEDIATELY. ANY POTENTIALLY HAZARDOUS ACCUMULATIONS REMOVED FROM SUCH STRUCTURES MUST BE PROPERLY DISPOSED OF IN ACCORDANCE WITH PADEP REGULATIONS.

TERRESTRIAL VEGETATION MAINTENANCE

VEGETATIVE COVER MUST BE MOWED AT LEAST TWICE ANNUALLY, ALLOWING THE DEVELOPMENT OF THICK STANDS OF TALL GRASS AND OTHER PLANT VEGETATION.

INSPECT THE SEEDED AREAS AFTER ONE (1) YEAR. IF AN AREA HAS LESS THAN A UNIFORM 70 PERCENT VEGETATIVE PERENNIAL COVER, REEVALUATE THE CHOICE OF PLANT MATERIALS AND THE QUANTITIES OF SOILS SUPPLEMENTS USED. PREPARE THE SEEDBED AND REESTABLISH SEEDING. IF THE SEASON PREVENTS RE-SOWING, APPLY MULCH OR EROSION CONTROL MATTING FOR TEMPORARY STABILIZATION AND SEED THE AREA AS SOON AS PRACTICAL.

SPILLS

IN THE EVENT OF A SPILL, IMMEDIATELY INSPECT THE DOWNGRADIENT BMP(S) FOR CONTAMINATION. REMOVE AND PROPERLY DISPOSE OF SPILLED SUBSTANCES AND CONTAMINATED SOIL/MATERIALS. RESTORE THE AFFECTED BMP(S).

ALL RESTORATION AND REMEDIATION PROCEDURES FOR A SPILL FROM MATERIALS STORED ONSITE MUST COMPLY WITH THE MEASURES LISTED IN PENNSYLVANIA'S CLEAN STREAMS LAW.

UNDERGROUND DETENTION BASINS (PADEP BMP 6.6.3)

INSPECT THE UNDERGROUND DETENTION BASIN FOUR TIMES PER YEAR OR AS OFTEN AS FUTURE POLICIES ON STORMWATER BMP INSPECTIONS DICTATE.:

1. ALL BASIN STRUCTURES (INCLUDING PIPES, STONE, TRASH RACKS, OUTLETS STRUCTURES, AND INLETS) EXPECTED TO RECEIVE AND/OR TRAP DEBRIS AND SEDIMENT SHOULD BE INSPECTED FOR CLOGGING AND EXCESSIVE DEBRIS AND SEDIMENT ACCUMULATION.
2. SEDIMENT REMOVAL SHOULD BE CONDUCTED WHEN THE BASIN IS COMPLETELY DRY. SEDIMENT SHOULD BE DISPOSED OF PROPERLY AND ONCE SEDIMENT IS REMOVED, DISTURBED AREAS NEED TO BE IMMEDIATELY STABILIZED AND REVEGETATED.
3. VACUUMING OF THE SYSTEM MAY BE REQUIRED.
4. PAVED AREAS AT EACH INLET DISCHARGING INTO THE UNDERGROUND DETENTION SYSTEM SHOULD BE INSPECTED FOR SEDIMENT, CLOGGIN, AND PONDED WATER.
5. WATER SHOULD NOT BE PRESENT WITHIN THE UNDERGROUND DETENTION BASINS 7 DAYS AFTER A RAINFALL EVENT. IF WATER IS PRESENT AFTER THIS TIME, A DESIGN PROFESSIONAL SHOULD BE CONSULTED TO EVALUATE THE UNDERGROUND DETENTION BASIN.

ROCK APRONS

ADD ROCK AS NECESSARY TO RESTORE THE ROCK APRON TO THE APPROVED DESIGN SPECIFICATIONS.

SEEDING AND SOIL SUPPLEMENTS
THE FOLLOWING SPECIFICATIONS ARE IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 804.

TEMPORARY SEED MIXTURES

SEED TYPE (PENNDOT FORMULA E)	% BY WEIGHT	PURITY	MAX. WEED SEED
ANNUAL RYEGRASS	100	95%	0.10%

APPLY SEED AT A RATE OF 10 LBS. PER 1,000 SY.
APPLY STRAW MULCH (SEE MULCH APPLICATION RATES TABLE)
SEEDING SEASON DATES: MARCH 15 TO OCTOBER 15

PERMANENT SEED MIXTURES

SEED TYPE (PENNDOT FORMULA B)	% BY WEIGHT	PURITY	MAX. WEED SEED
PERENNIAL RYEGRASS MIXTURE * (LOLIUM PERENNE)	20	97%	0.10%
CREEPING RED FESCUE	30	97%	0.10%
KENTUCKY BLUEGRASS MIXTURE ** (POA PRATENSIS)	50	97%	0.15%

APPLY SEED AT A RATE OF 42 LBS. PER 1,000 SY.
APPLY STRAW OR HAY MULCH (SEE MULCH APPLICATION RATES TABLE).
APPLY PULVERIZED AGRICULTURAL LIMESTONE AT A RATE OF 2 TONS/ACRE UNLESS TESTING HAS BEEN PERFORMED.
APPLY 10-20-20 ANALYSIS COMMERCIAL FERTILIZER AT A RATE OF 678 LBS./ACRE UNLESS TESTING HAS BEEN PERFORMED.
SEEDING SEASON DATES: MARCH 15 TO JUNE 1; AUGUST 1 TO OCTOBER 15
APPLY FLEXTERRA FGM (OR EQUAL) ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

* A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL RYEGRASS COMPONENT.
** A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL BLUEGRASS COMPONENT.

PERMANENT SEED MIXTURES ON STEEP SLOPES (SLOPES EXCEEDING 3:1)

SEED TYPE (PENNDOT FORMULA L)	% BY WEIGHT	PURITY	MAX. WEED SEED
HARD FESCUE (FESTUCA LONGIFOLIA***)	55	97%	0.10%
CREEPING RED FESCUE (FESTUCA RUBRA)	35	97%	0.10%
ANNUAL RYEGRASS (LOLIUM MULTIFLORUM)	10	95%	0.10%

APPLY SEED AT A RATE OF 48 LBS / 1,000 SY.
MULCH WITH MULCH CONTROL NETTING OR EROSION CONTROL BLANKETS MUST BE INSTALLED.
APPLY PULVERIZED AGRICULTURAL LIMESTONE AT A RATE OF 2 TONS/ACRE UNLESS TESTING HAS BEEN PERFORMED.
APPLY 10-20-20 ANALYSIS COMMERCIAL FERTILIZER AT A RATE OF 678 LBS./ACRE UNLESS TESTING HAS BEEN PERFORMED.
SEEDING SEASON DATES: MARCH 15 TO JUNE 1; AUGUST 1 TO OCTOBER 15

*** A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL HARD FESCUE COMPONENT.

MULCH APPLICATION RATE				
MULCH TYPE	APPLICATION RATE (MIN)			NOTES
	PER ACRE	PER 1,000 SF	PER 1,000 SY	
STRAW	3 TONS	18 LB	160 LB	EITHER WHEAT OR OAT STRAW, FREE OF WEEDS, NOT CHOPPED OR FINELY BROKEN
HAY	3 TONS	18 LB	160 LB	TIMOTHY, MIXED CLOVER AND TIMOTHY OR OTHER NATIVE FORAGE GRASSES

PREPARATION OF AREAS TO BE TOPSOILED

GRADE THE AREAS TO BE COVERED BY TOPSOIL USING ACCEPTABLE METHODS, LOOSEN SOIL TO A MINIMUM DEPTH OF 2 INCHES, BEFORE PLACING THE TOPSOIL. REMOVE STONES AND OTHER FOREIGN MATERIAL 2 INCHES OR LARGER IN DIMENSION. REMOVE AND SATISFACTORILY DISPOSE OF UNSUITABLE AND SURPLUS MATERIAL

MEASURES PROVIDED TO MINIMIZE THERMAL IMPACTS

ALL RUNOFF FROM THE ROOF AREAS WILL BE CAPTURED AND DIRECTED TO SUBSURFACE UNDERDRAINS. RUNOFF FROM PAVED AREAS OF THE PROJECT DISCHARGE THROUGH BURIED PIPE, THEREBY CREATING AMPLE OPPORTUNITY FOR COOLING PRIOR TO REACHING THE SURFACE WATERS, THE MAJORITY OF THE SITES WILL BE DIRECTED TO UNDERGROUND DETENTION FACILITIES WHICH WILL PROVIDE ADDITIONAL TIME FOR WATER TO COOL. AS SUCH, THE PROJECT WILL NOT HAVE AN ADVERSE IMPACT ON THE NATURAL TEMPERATURES OF THE RECEIVING WATERS.

RECYCLING OR DISPOSAL OF MATERIALS

THE CONTRACTOR SHALL REMOVE FROM THE SITE, RECYCLE, OR DISPOSE OF ALL BUILDING MATERIALS AND WASTES IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA CODE 260.1 ET SEQ., 271.1 ET SEQ., AND 287.1 ET SEQ. THE CONTRACTOR SHALL NOT LEGALLY BURY, DUMP OR DISCHARGE ANY BUILDING MATERIAL OR WASTES AT THE SITE.

PROCEDURE FOR MANAGING SOIL, GROUNDWATER, AND OTHER POTENTIALLY CONTAMINATED MATERIALS GENERATED OR EXPOSED DURING CONSTRUCTION AND FOR THE REUSE AND/OR OFF-SITE DISPOSAL OF GENERATED MATERIALS

1. ANY EXCAVATED SOIL WHICH IS CONFIRMED TO BE CONTAMINATED AT CONCENTRATIONS WHICH EXCEED THE PADEP CLEAN FILL STANDARDS FOR RESIDENCES SHOULD BE DISPOSED OFF-SITE AT A PERMITTED FACILITY. DISPOSAL MANIFESTS SHOULD BE MAINTAINED. EXCAVATED SOILS SHOULD BE PLACED IMMEDIATELY INTO TRUCKS FOR OFF-SITE DISPOSAL. SOIL AWAITING OFF-SITE DISPOSAL SHALL BE PLACED ON AND COVERED BY POLYETHYLENE SHEETING.
2. IF THE SITE WILL NEED TO IMPORT OR EXPORT MATERIAL FROM THE SITE, THE RESPONSIBILITY FOR PERFORMING ENVIRONMENTAL DUE DILIGENCE AND DETERMINATION OF CLEAN FILL WILL REST WITH THE CONTRACTOR.
3. IF THE FILL MAY HAVE BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE, IT MUST BE TESTED TO DETERMINE IF IT QUALIFIES AS CLEAN FILL. TESTING SHOULD BE PERFORMED IN ACCORDANCE WITH APPENDIX A OF THE DEPARTMENT'S POLICY "MANAGEMENT OF FILL".
4. FILL MATERIAL THAT DOES NOT QUALIFY AS CLEAN FILL IS REGULATED FILL. REGULATED FILL IS WASTE AND MUST BE MANAGED IN ACCORDANCE WITH THE DEPARTMENT'S MUNICIPAL OR RESIDUAL WASTE REGULATIONS BASED ON 25 PA CODE CHAPTERS 287 RESIDUAL WASTE MANAGEMENT OR 271 MUNICIPAL WASTE MANAGEMENT, WHICHEVER IS APPLICABLE. THIS REGULATIONS ARE AVAILABLE ON-LINE AT WWW.PACODE.COM .

STORMSEWER PIPE TRENCH EXCAVATION NOTES

1. LIMIT ADVANCED CLEARING AND GRUBBING OPERATIONS TO A DISTANCE EQUAL TO TWO TIMES THE LENGTH OF PIPE INSTALLATION THAT CAN BE COMPLETED IN ONE DAY.
2. WORK CREWS AND EQUIPMENT FOR TRENCHING, PLACEMENT OF PIPE, PLUG CONSTRUCTION AND BACKFILLING WILL BE SELF CONTAINED AND SEPARATE FROM CLEARING AND GRUBBING AND SITE RESTORATION AND STABILIZATION OPERATIONS.
3. ALL SOIL EXCAVATED FROM THE TRENCH WILL BE PLACED ON THE UPHILL SIDE OF THE TRENCH.
4. LIMIT DAILY TRENCH EXCAVATION TO THE LENGTH OF PIPE PLACEMENT, PLUG INSTALLATION AND BACKFILLING THAT CAN BE COMPLETED THE SAME DAY.
5. WATER WHICH ACCUMULATES IN THE OPEN TRENCH WILL BE COMPLETELY REMOVED BY PUMPING BEFORE PIPE PLACEMENT AND / OR BACKFILLING BEGINS. WATER REMOVED FROM THE TRENCH SHALL BE PUMPED THROUGH A FILTRATION DEVICE.
6. ON THE DAY FOLLOWING PIPE PLACEMENT AND TRENCH BACKFILLING, THE DISTURBED AREA WILL BE GRADED TO FINAL CONTOURS AND IMMEDIATELY STABILIZED.

Proposed Storm Network Structure Table

Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
A-1	48 in. x 48 in. OCS	49.13			24" RCP	43.60
R-1	144 in. x 18 in. x 60 in. CONC. HW	42.48	48" RCP	38.10		
R-2	72 in. dia. CYLINDER MH	48.89	48" RCP 24" RCP	38.35 42.95	48" RCP	38.25
R-3	72 in. dia. CYLINDER MH	51.50	48" RCP	39.10	48" RCP	39.10
R-4	72 in. dia. CYLINDER MH	49.83	48" RCP	41.10	48" RCP	41.10
R-5	72 in. dia. CYLINDER MH	51.28	48" RCP	43.20	48" RCP	43.20
R-6	72 in. dia. CYLINDER MH	50.87			48" RCP	44.30
S-1	60 in. x 60 in. "C" INLET	48.60	18" RCP	43.60		
S-2	24 in. x 45 in. "C" INLET	48.86	18" RCP	44.45	18" RCP	44.35
S-3	24 in. x 45 in. "C" INLET	49.32	18" RCP 18" RCP	44.90 44.90	18" RCP	44.80
S-4	24 in. x 45 in. "M" INLET	49.73			18" RCP	45.05
S-5	24 in. x 45 in. "C" INLET	49.04	18" RCP 18" RCP	45.95 45.95	18" RCP	45.85
S-6	48 in. dia. CYLINDER MH	49.65	18" RCP	46.20	18" RCP	46.10
S-7	24 in. x 45 in. "M" INLET	49.68			18" RCP	46.35
S-8	24 in. x 45 in. "M" INLET	50.13	18" RCP	46.30	18" RCP	46.20
S-9	24 in. x 45 in. "M" INLET	51.24	18" RCP	47.00	18" RCP	46.90
S-10	48 in. dia. CYLINDER MH	52.36	18" RCP 18" RCP	47.30 47.30	18" RCP	47.30
S-10A	24 in. x 45 in. "C" INLET	52.12			18" RCP	47.45
S-11	24 in. x 45 in. "C" INLET	51.63	18" RCP	47.55	18" RCP	47.45
S-12	24 in. x 45 in. "C" INLET	50.47			18" RCP	47.90

Proposed Storm Network Structure Table

Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
S-13	48 in. dia. CONED MH	49.23	18" RCP	43.60		
S-14	24 in. x 45 in. "C' INLET	49.27	18" RCP 18" RCP	44.15 44.15	18" RCP	44.05
S-15	24 in. x 45 in. "M' INLET	49.71			18" RCP	44.30
S-16	24 in. x 45 in. "C' INLET	49.04	18" RCP 18" RCP	45.20 45.50	18" RCP	45.10
S-17	48 in. dia. CYLINDER MH	49.76	18" RCP	45.75	18" RCP	45.65
S-18	24 in. x 45 in. "M' INLET	49.67			18" RCP	45.90
S-19	24 in. x 45 in. "M' INLET	50.14	18" RCP	45.55	18" RCP	45.45
S-20	24 in. x 45 in. "M' INLET	51.22	18" RCP	46.30	18" RCP	46.20
S-21	48 in. dia. CYLINDER MH	52.34	18" RCP 18" RCP	46.70 46.70	18" RCP	46.60
S-21A	24 in. x 45 in. "C' INLET	52.12			18" RCP	46.85
S-22	24 in. x 45 in. "C' INLET	51.63	18" RCP	46.95	18" RCP	46.85
S-23	24 in. x 45 in. "C' INLET	50.48			18" RCP	47.35
S-24	24 in. x 45 in. "C' INLET	49.44				
S-25	24 in. x 45 in. "C' INLET	49.45				
S-26	24 in. x 45 in. "C' INLET	48.59				
S-27	24 in. x 45 in. "C' INLET	48.59				
S-28	24 in. x 45 in. "C' INLET	48.73				
S-29	24 in. x 45 in. "C' INLET	48.73				
S-30	24 in. x 45 in. "C' INLET	49.89				
S-31	24 in. x 45 in. "C' INLET	49.89				

Proposed Storm Network Pipe Table

Pipe I.D.	Description	Length	Invert Up	Invert Dn	Slope
P-21	18"RCP	60'	46.60	46.30	0.50%
P-21A	18"RCP	29'	46.85	46.70	0.52%
P-22	18"RCP	28'	46.85	46.70	0.54%
P-23	18"RCP	72'	47.35	46.95	0.56%
P-33	18"RCP	55'	44.50	43.60	1.64%
R-2	48"RCP	14'	38.25	38.10	1.04%
R-3	48"RCP	141'	39.10	38.35	0.53%
R-4	48"RCP	325'	41.10	39.10	0.62%
R-5	48"RCP	323'	43.20	41.10	0.65%
R-6	48"RCP	44'	44.30	43.20	2.49%

Proposed Storm Network Pipe Table

Pipe I.D.	Description	Length	Invert Up	Invert Dn	Slope
A-1	24"RCP	70'	43.60	42.95	0.93%
P-2	18"RCP	144'	44.35	43.60	0.52%
P-3	18"RCP	66'	44.80	44.45	0.53%
P-4	18"RCP	29'	45.05	44.90	0.51%
P-5	18"RCP	185'	45.85	44.90	0.51%
P-6	18"RCP	30'	46.10	45.95	0.50%
P-7	18"RCP	27'	46.35	46.20	0.55%
P-8	18"RCP	50'	46.20	45.95	0.50%
P-9	18"RCP	122'	46.90	46.30	0.50%
P-10	18"RCP	61'	47.30	47.00	0.50%
P-10A	18"RCP	29'	47.45	47.30	0.52%
P-11	18"RCP	29'	47.45	47.30	0.52%
P-12	18"RCP	69'	47.90	47.55	0.51%
P-14	18"RCP	89'	44.05	43.60	0.51%
P-15	18"RCP	28'	44.30	44.15	0.53%
P-16	18"RCP	185'	45.10	44.15	0.51%
P-17	18"RCP	30'	45.65	45.50	0.50%
P-18	18"RCP	30'	45.90	45.75	0.50%
P-19	18"RCP	49'	45.45	45.20	0.51%
P-20	18"RCP	122'	46.20	45.55	0.53%

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REV	DATE	DRAWN BY	DESCRIPTION

CULTEC RECHARGER® 360HD PRODUCT SPECIFICATIONS

GENERAL
CULTEC RECHARGER® 360HD CHAMBERS ARE DESIGNED FOR UNDERGROUND STORMWATER MANAGEMENT. THE CHAMBERS MAY BE USED FOR RETENTION, RECHARGING, DETENTION OR CONTROLLING THE FLOW OF ON-SITE STORMWATER RUNOFF.

CHAMBER PARAMETERS
1. THE CHAMBERS SHALL BE MANUFACTURED IN THE U.S.A. OR CANADA BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE CHAMBERS SHALL BE DESIGNED AND TESTED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". THE LOAD CONFIGURATION SHALL INCLUDE:
   A. INSTANTANEOUS AASHTO DESIGN TRUCK LIVE LOAD AT MINIMUM COVER
   B. MAXIMUM PERMANENT (50-YEAR) COVER LOAD
   C. 1-WEEK PARKED AASHTO DESIGN TRUCK LOAD
3. THE CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F3430-20 "STANDARD SPECIFICATION FOR CELLULAR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12, WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS. THE STRUCTURAL DESIGN OF THE CHAMBERS SHALL INCLUDE THE FOLLOWING:
   A. THE CREEP MODULUS SHALL BE 50-YEAR AS SPECIFIED IN ASTM F3430
   B. THE MINIMUM SAFETY FACTOR FOR LIVE LOADS SHALL BE 1.75
   C. THE MINIMUM SAFETY FACTOR FOR DEAD LOADS SHALL BE 1.95
5. THE CHAMBER SHALL BE STRUCTURAL FOAM INJECTION MOLDED OF BLUE VIRGIN HIGH MOLECULAR WEIGHT IMPACT-MODIFIED POLYPROPYLENE.
6. THE CHAMBER SHALL BE ARCHED IN SHAPE.
7. THE CHAMBER SHALL BE OPEN-BOTTOMED.
8. THE CHAMBER SHALL BE JOINED USING AN INTERLOCKING OVERLAPPING RIB METHOD. CONNECTIONS MUST BE FULLY SHOULDERED OVERLAPPING RIBS, HAVING NO SEPARATE COUPLINGS.
9. THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC RECHARGER® 360HD SHALL BE 36 INCHES (915 mm) TALL, 60 INCHES (1525 mm) WIDE AND 50 INCHES (1275 mm) LONG. THE INSTALLED LENGTH OF A JOINED RECHARGER® 360HD SHALL BE 3.67 FEET (1.12 m).
10. MULTIPLE CHAMBERS MAY BE CONNECTED TO FORM DIFFERENT LENGTH ROWS. EACH ROW SHALL BEGIN AND END WITH A SEPARATELY FORMED CULTEC RECHARGER® 360HD END CAP. MAXIMUM INLET OPENING ON THE END CAP IS 24 INCH (600 mm) HDPE OR 30 INCH (750mm) PVC.
11. THE CHAMBER SHALL HAVE TWO SIDE PORTALS TO ACCEPT CULTEC HVLV™ FC-48 FEED CONNECTORS TO CREATE AN INTERNAL MANIFOLD. MAXIMUM ALLOWABLE PIPE SIZE IN THE SIDE PORTAL IS 10 INCH (250mm) HDPE OR 12 INCH (300mm) PVC.
12. THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC HVLV™ FC-48 FEED CONNECTOR SHALL BE 12 INCHES (305 mm) TALL, 16 INCHES (406 mm) WIDE AND 49 INCHES (1245 mm) LONG.
13. THE NOMINAL STORAGE VOLUME OF THE RECHARGER® 360HD CHAMBER SHALL BE 10.0 FT³ / FT (.928 m³ / m) - WITHOUT STONE. THE NOMINAL STORAGE VOLUME OF A JOINED RECHARGER® 360HD SHALL BE 36.66 FT³ / UNIT (1.038 m³ / UNIT) - WITHOUT STONE.
14. THE NOMINAL STORAGE VOLUME OF THE HVLV™ FC-48 FEED CONNECTOR SHALL BE 0.913 FT³ / FT (0.085 m³ / m) - WITHOUT STONE.
15. THE RECHARGER® 360HD CHAMBER SHALL HAVE 7 CORRUGATIONS.
16. THE CHAMBER SHALL BE MANUFACTURED IN A FACILITY EMPLOYING CULTEC'S QUALITY CONTROL AND ASSURANCE PROCEDURES.
17. MAXIMUM ALLOWABLE COVER OVER THE TOP OF THE CHAMBER SHALL BE 12.0 FEET (3.66 m).

END CAP PARAMETERS
1. THE CULTEC RECHARGER® 360HD END CAP (REFERRED TO AS 'END CAP') SHALL BE MANUFACTURED IN THE U.S.A. OR CANADA BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE END CAP SHALL BE STRUCTURAL FOAM INJECTION MOLDED OF BLUE VIRGIN HIGH MOLECULAR WEIGHT IMPACT-MODIFIED POLYPROPYLENE.
3. THE END CAP SHALL BE ARCHED IN SHAPE.
4. THE END CAP SHALL BE OPEN-BOTTOMED.
5. THE END CAP SHALL BE JOINED AT THE BEGINNING AND END OF EACH ROW OF CHAMBERS USING AN INTERLOCKING OVERLAPPING RIB METHOD. CONNECTIONS MUST BE FULLY SHOULDERED OVERLAPPING RIBS, HAVING NO SEPARATE COUPLINGS.
6. THE END CAP SHALL HAVE 5 CORRUGATIONS.
7. THE NOMINAL DIMENSIONS OF THE END CAP SHALL BE 36.5 INCHES (927 mm) TALL, 60 INCHES (1525 mm) WIDE AND 18 INCHES (458 mm) LONG. WHEN JOINED WITH A RECHARGER 360HD CHAMBER, THE INSTALLED LENGTH OF THE END CAP SHALL BE 15 INCHES (381 mm).
8. THE NOMINAL STORAGE VOLUME OF THE END CAP SHALL BE 5.17 FT³ / FT (0.48 m³ / m) - WITHOUT STONE. THE NOMINAL STORAGE VOLUME OF AN INTERLOCKED END CAP SHALL BE 6.46 FT³ / UNIT (0.183 m³ / UNIT) - WITHOUT STONE.
9. MAXIMUM INLET OPENING ON THE END CAP IS 24 INCH (600 mm) HDPE OR 30 INCH (750mm) PVC.
10. THE CHAMBER SHALL BE MANUFACTURED IN A FACILITY EMPLOYING CULTEC'S QUALITY CONTROL AND ASSURANCE PROCEDURES
11. THE END CAP SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12.

CULTEC HVLV FC-48 FEED CONNECTOR PRODUCT SPECIFICATIONS

GENERAL
CULTEC HVLV FC-48 FEED CONNECTORS ARE DESIGNED TO CREATE AN INTERNAL MANIFOLD FOR CULTEC RECHARGER MODEL 360HD STORMWATER CHAMBERS.

FEED CONNECTOR PARAMETERS
1. THE FEED CONNECTOR SHALL BE MANUFACTURED BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE FEED CONNECTOR SHALL BE VACUUM THERMOFORMED OF BLACK HIGH MOLECULAR WEIGHT HIGH DENSITY POLYETHYLENE (HMWHDPE).
3. THE FEED CONNECTOR SHALL BE ARCHED IN SHAPE.
4. THE FEED CONNECTOR SHALL BE OPEN-BOTTOMED.
5. THE NOMINAL DIMENSIONS OF THE CULTEC HVLV FC-48 FEED CONNECTOR SHALL BE 12 INCHES (305 mm) TALL, 16 INCHES (406 mm) WIDE AND 49 INCHES (1245 mm) LONG.
6. THE NOMINAL STORAGE VOLUME OF THE HVLV FC-48 FEED CONNECTOR SHALL BE 0.913 FT³ / FT (0.085 m³ / m) - WITHOUT STONE.
7. THE HVLV FC-48 FEED CONNECTOR SHALL HAVE 4 CORRUGATIONS.
8. THE HVLV FC-48 FEED CONNECTOR MUST BE FORMED AS A WHOLE UNIT HAVING TWO OPEN END WALLS AND HAVING NO SEPARATE END PLATES OR SEPARATE END WALLS. THE UNIT SHALL FIT INTO THE SIDE PORTALS OF THE CULTEC RECHARGER STORMWATER CHAMBER AND ACT AS CROSS FEED CONNECTIONS CREATING AN INTERNAL MANIFOLD.
9. THE FEED CONNECTOR SHALL BE DESIGNED TO WITHSTAND AASHTO HS-25 DEFINED LOADS WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS.
10. THE FEED CONNECTOR SHALL BE MANUFACTURED IN AN ISO 9001:2008 CERTIFIED FACILITY.

CULTEC NO. 410™ NON-WOVEN GEOTEXTILE
CULTEC NO. 410™ NON-WOVEN GEOTEXTILE MAY BE USED WITH CULTEC CONTACTOR® AND RECHARGER® STORMWATER INSTALLATIONS TO PROVIDE A BARRIER THAT PREVENTS SOIL INTRUSION INTO THE STONE.

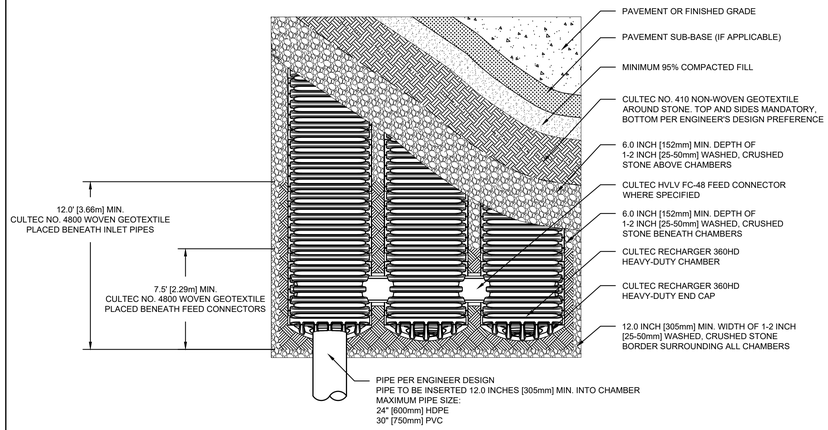
GEOTEXTILE PARAMETERS
1. THE GEOTEXTILE SHALL BE PROVIDED BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE GEOTEXTILE SHALL BE BLACK IN APPEARANCE.
3. THE GEOTEXTILE SHALL HAVE A TYPICAL WEIGHT OF 4.5 OZ/SY (142 G/M).
4. THE GEOTEXTILE SHALL HAVE A TENSILE STRENGTH VALUE OF 120 LBS (533 N) PER ASTM D4632 TESTING METHOD.
5. THE GEOTEXTILE SHALL HAVE AN ELONGATION @ BREAK VALUE OF 50% PER ASTM D4632 TESTING METHOD.
6. THE GEOTEXTILE SHALL HAVE A MULLEN BURST VALUE OF 225 PSI (1551 KPA) PER ASTM D3786 TESTING METHOD.
7. THE GEOTEXTILE SHALL HAVE A PUNCTURE STRENGTH VALUE OF 65 LBS (289 N) PER ASTM D4833 TESTING METHOD.
8. THE GEOTEXTILE SHALL HAVE A CBR PUNCTURE VALUE OF 340 LBS (1513 N) PER ASTM D6241 TESTING METHOD.
9. THE GEOTEXTILE SHALL HAVE A TRAPEZOID TEAR VALUE OF 50 LBS (222 N) PER ASTM D4533 TESTING METHOD.
10. THE GEOTEXTILE SHALL HAVE A AOS VALUE OF 70 U.S. SIEVE (0.212 MM) PER ASTM D4751 TESTING METHOD.
11. THE GEOTEXTILE SHALL HAVE A PERMITTIVITY VALUE OF 1.7 SEC-1 PER ASTM D4491 TESTING METHOD.
12. THE GEOTEXTILE SHALL HAVE A WATER FLOW RATE VALUE OF 135 GAL/MIN/SF (5500 L/MIN/SM) PER ASTM D4491 TESTING METHOD.
13. THE GEOTEXTILE SHALL HAVE A UV STABILITY @ 500 HOURS VALUE OF 70% PER ASTM D4355 TESTING METHOD.

CULTEC NO. 4800™ WOVEN GEOTEXTILE
CULTEC NO. 4800 WOVEN GEOTEXTILE IS DESIGNED AS A UNDERLAYMENT TO PREVENT SCOURING CAUSED BY WATER MOVEMENT WITHIN THE CULTEC CHAMBERS AND FEED CONNECTORS UTILIZING THE CULTEC MANIFOLD FEATURE. IT MAY ALSO BE USED AS A COMPONENT OF THE CULTEC SEPARATOR ROW TO ACT AS A BARRIER TO PREVENT SOIL/CONTAMINANT INTRUSION INTO THE STONE WHILE ALLOWING FOR MAINTENANCE.

GEOTEXTILE PARAMETERS
1. THE GEOTEXTILE SHALL BE PROVIDED BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE GEOTEXTILE SHALL BE BLACK IN APPEARANCE.
3. THE GEOTEXTILE SHALL HAVE A TENSILE STRENGTH OF 550 X 550 LBS (2,448 X 2,448 N) PER ASTM D4632 TESTING METHOD.
4. THE GEOTEXTILE SHALL HAVE A ELONGATION @ BREAK RESISTANCE OF 20 X 20% PER ASTM D4632 TESTING METHOD.
5. THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE OF 5,070 X 5,070 LBS/FT (74 X 74 KN/M) PER ASTM D4595 TESTING METHOD.
6. THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE @ 2% STRAIN OF 960 X 1,096 LBS/FT (14 X 16 KN/M) PER ASTM D4595 TESTING METHOD.
7. THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE @ 5% STRAIN OF 2,740 X 2, 740 LBS/FT (40 X 40 KN/M) PER ASTM D4595 TESTING METHOD.
8. THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE @ 10% STRAIN OF 4,800 X 4,800 LBS/FT (70 X 70 KN/M) PER ASTM D4595 TESTING METHOD.
9. THE GEOTEXTILE SHALL HAVE A CBR PUNCTURE RESISTANCE OF 1,700 LBS (7,560 N) PER ASTM D6241 TESTING METHOD.
10. THE GEOTEXTILE SHALL HAVE A TRAPEZOIDAL TEAR RESISTANCE OF 180 X 180 LBS (801 X 801 N) PER ASTM D4533 TESTING METHOD.
11. THE GEOTEXTILE SHALL HAVE AN APPARENT OPENING SIZE OF 40 US STD. SIEVE (0.425 MM) PER ASTM D4751 TESTING METHOD.
12. THE GEOTEXTILE SHALL HAVE A PERMITTIVITY RATING OF 0.15 SEC-1 PER ASTM D4491 TESTING METHOD.
13. THE GEOTEXTILE SHALL HAVE A WATER FLOW RATING OF 11.5 GPM/FT2 (470 LPM/M2) PER ASTM D4491 TESTING METHOD.
14. THE GEOTEXTILE SHALL HAVE A UV RESISTANCE OF 80% @ 500 HRS. PER ASTM D4355 TESTING METHOD.

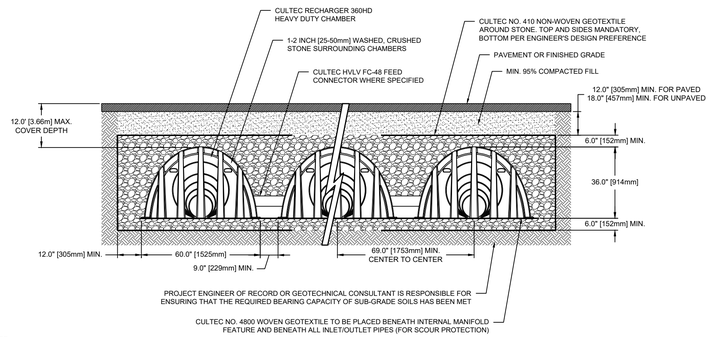
360HD 1.0

GENERAL NOTES



360HD 2.0

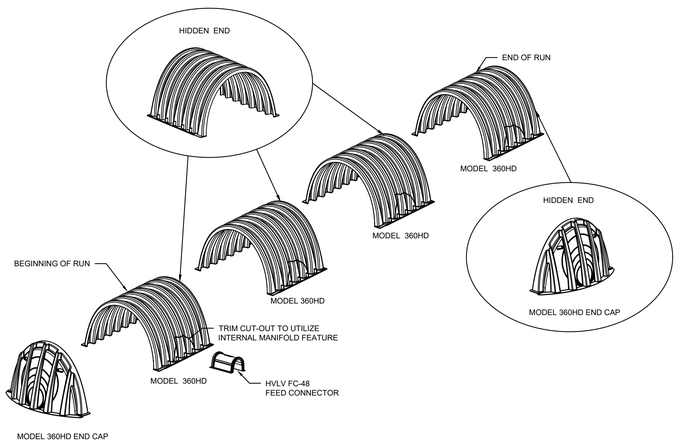
CULTEC RECHARGER 360HD HEAVY DUTY PLAN VIEW



NOTES:
1. THE CHAMBERS SHALL BE DESIGNED AND TESTED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS." THE LOAD CONFIGURATION SHALL INCLUDE:
   1.a. INSTANTANEOUS AASHTO DESIGN TRUCK LIVE LOAD AT MINIMUM COVER
   1.b. MAXIMUM PERMANENT (50-YEAR) COVER LOAD
   1.c. 1-WEEK PARKED AASHTO DESIGN TRUCK LOAD
2. THE CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F3430-20 "STANDARD SPECIFICATION FOR CELLULAR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS"
3. THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12, WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS. THE STRUCTURAL DESIGN OF THE CHAMBERS SHALL INCLUDE THE FOLLOWING:
   3.a. THE CREEP MODULUS SHALL BE 50-YEAR AS SPECIFIED IN ASTM F3430
   3.b. THE MINIMUM SAFETY FACTOR FOR LIVE LOADS SHALL BE 1.75
   3.c. THE MINIMUM SAFETY FACTOR FOR DEAD LOADS SHALL BE 1.95

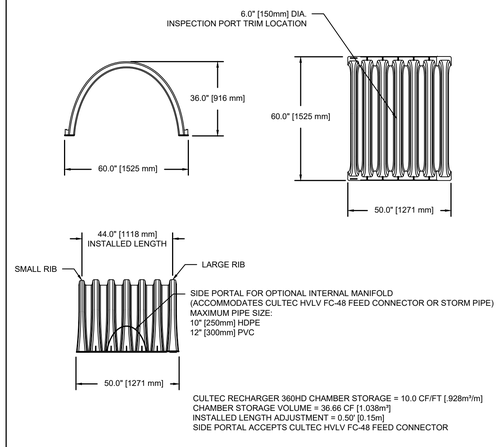
360HD 5.0

CULTEC RECHARGER 360HD HEAVY DUTY CROSS SECTION



360HD 6.0

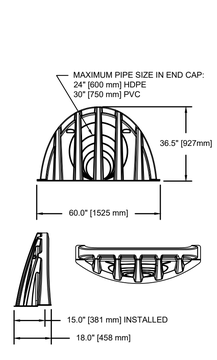
CULTEC RECHARGER 360HD HEAVY DUTY TYPICAL INTERLOCK



CULTEC RECHARGER 360HD CHAMBER STORAGE = 10.0 CF/FT [.928m³/m]
CHAMBER STORAGE VOLUME = 36.66 CF [1.038m³]
INSTALLED LENGTH ADJUSTMENT = 0.50' [0.15m]
SIDE PORTAL ACCEPTS CULTEC HVLV FC-48 FEED CONNECTOR

360HD 3.0

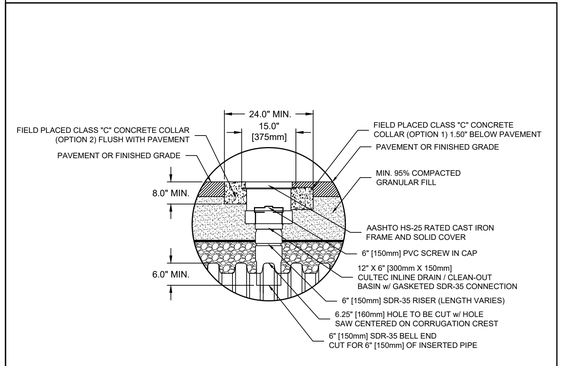
CULTEC RECHARGER 360HD HEAVY DUTY THREE VIEW



CULTEC RECHARGER 360HD END CAP
STORAGE = 5.17 CF/FT [0.48 m³/m]
END CAP STORAGE VOLUME = 6.46 CF [0.183 m3]
INSTALLED LENGTH ADJUSTMENT = 0.25' [0.08 m]

360HD 4.0

CULTEC RECHARGER 360HD HEAVY DUTY END CAP THREE VIEW



360HD 9.0

CULTEC INSPECTION PORT - ZOOM DETAIL

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REV	DATE	DRAWN BY	DESCRIPTION

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — C. RICHARD ROSEBERRY — ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

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AS SHOWN	03/01/2022	SF/CMM	RMA

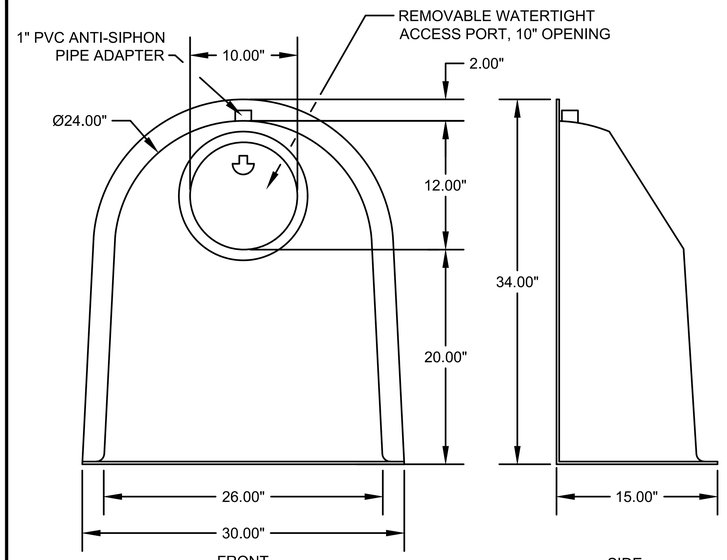
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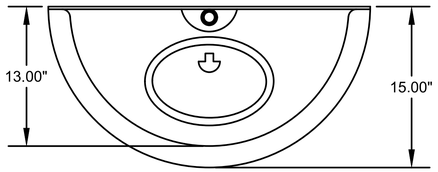
SHEET TITLE: PCSM DETAILS

SHEET NUMBER: 26 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\160010308\Engineering\PCSM\C-PCSM-DTLS.dwg,C-SS-DETAILS, By:CMM,3/4/2022,8:





PLAN

U.S.PATENT #6126817 ADDITIONAL PATENTS PENDING

BMP, INC.
53 MT. ARCHER ROAD, LYME, CT. 06371
(800) 504-8008 FAX: (860)434-3195

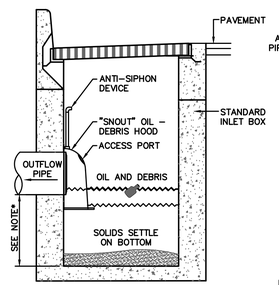
DESCRIPTION	DATE	SCALE
24F SNOUT OIL & DEBRIS STOP	09/20/99	NONE
	DRAWING NUMBER	
	24F	

SNOUT BMP CONSTRUCTION SEQUENCE:

1. STABILIZE ALL CONTRIBUTING AREAS BEFORE INSTALLING AND CONNECTING PIPES TO THESE INLETS.
2. FOLLOW MANUFACTURER'S GUIDELINES FOR INSTALLATION. DO NOT USE SNOUTS DURING CONSTRUCTION UNLESS PRODUCT IS DESIGNED PRIMARILY FOR SEDIMENT REMOVAL.

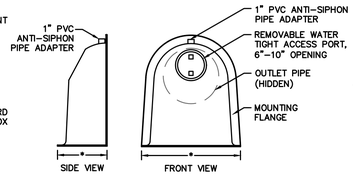
SNOUT BMP MANUFACTURER'S INSTALLATION INSTRUCTIONS:

1. CENTER THE SNOUT® DIRECTLY OVER THE EXIT PIPE SO THAT THE ENTIRE PIPE IS COVERED AND SO THAT THE LOWER EDGE OF THE HOOD IS AT LEAST 1/2 THE PIPE DIAMETER BELOW THE LOWEST INSIDE POINT OF THE PIPE (DEEPER IS EVEN BETTER.)
2. DRILL * EQUALLY SPACED 7/16" HOLES THROUGH THE SNOUT® FLANGE. (*NUMBER OF HOLES VARY DEPENDING ON SIZE OF SNOUT®.)
3. MARK AND DRILL CATCH BASIN AND INSTALL THE TAMP-IN LEAD ANCHORS.
   - 3.1. DRILL A 3/4"HOLE INTO THE BASE MATERIAL TO THE REQUIRED DEPTH (APPROXIMATELY 1-1/4" DEEP.)
   - 3.2. BLOW THE HOLE CLEAN OF DUST AND OTHER MATERIAL.
   - 3.3. INSERT THE ANCHOR INTO THE HOLE. NARROW END OF CONE MUST POINT OUT, LEAD SHIELD SLIDES OVER CONE.
   - 3.4. POSITION THE SETTING TOOL OR A 9/16 SOCKET AGAINST THE ANCHOR OUTER CONE. (THE OUTER RIM OF THE TOOL OR SOCKET SHOULD SEAT ONTO THE LEAD SHIELD RIM.) SET THE ANCHOR BY DRIVING THE LEAD SLEEVE OVER THE CONE USING SEVERAL SHARP HAMMER BLOWS. BE SURE THE ANCHOR IS AT THE REQUIRED EMBEDMENT DEPTH (FLUSH OR SLIGHTLY BELOW FACE OF CONCRETE)
4. ATTACH THE VENT PIPE ADAPTER IN THE PRE-DRILLED HOLE IN THE TOP OF THE SNOUT® USING THE 2 FLAT O RING GASKETS AND PVC LOCK-NUT SUPPLIED IN THE KIT. INSTALL WITH FEMALE SLIP ADAPTER UP AND A WASHER ON EACH SIDE OF THE SNOUT® SHELL. TIGHTEN LOCK-NUT HAND TIGHT.
5. REMOVE PSA BACKING AND WITH FIRM PRESSURE, ATTACH GASKET STRIP(S) TO BACK OF FLANGE AND TRIM EXCESS.
6. ATTACH THE SNOUT® TO THE CATCH BASIN WALL WITH 3/8" DIAMETER STAINLESS STEEL BOLTS IN LEAD EXPANSION ANCHORS. DO NOT OVER TIGHTEN; 10-15 FOOT-POUNDS SHOULD BE SUFFICIENT.
7. CUT THE ANTI-SIPHON VENT STACK TO LENGTH AND ATTACH TO HOOD AT SLIP ADAPTER WITH PVC CEMENT.
8. ATTACH 90 DEGREE FITTING TO VENT STACK WITH PVC CEMENT. ENSURE THAT FITTING OPENING IS ACCESSIBLE FOR MAINTENANCE AND INSPECTION.



SECTION

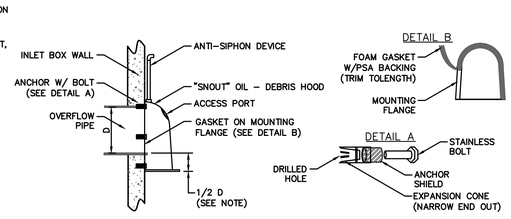
* NOTE- SUMP DEPTH OF 36" MIN. FOR < OR= 12" DIAM. OUTLET. FOR OUTLETS >OR= 15", DEPTH = 2.5-3X DIAM.



* OUTFLOW AREA AT HOOD EQUAL TO OUTFLOW PIPE AREA.

OIL - DEBRIS HOOD

"SNOUT" IS MANUFACTURED BY AND AVAILABLE THROUGH:
BEST MANAGEMENT PRODUCTS, INC.
53 MT. ARCHER RD.
LYME, CT 06371
PHONE (860) 434-0277 * FAX (860) 434-8195
E-MAIL: duron@bestmp.com * WEBSITE: www.bestmp.com

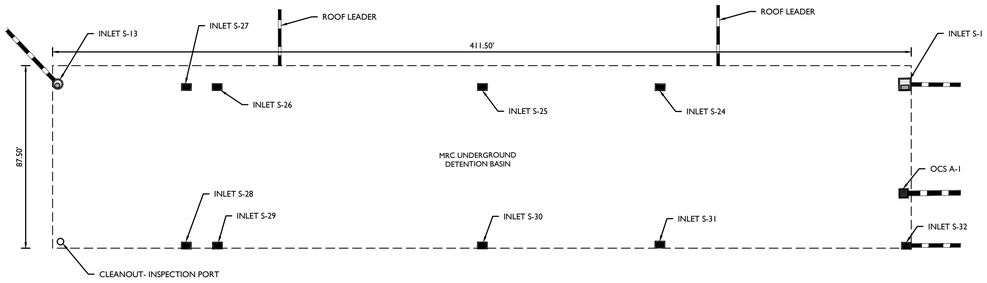


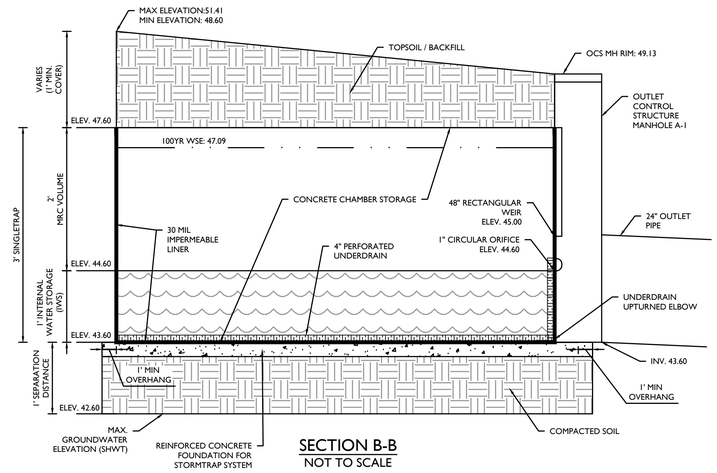
SNOUT INLET - OPERATION AND MAINTENANCE PROCEDURES

A. INSPECTION:
1. INSPECT INLET MONTHLY FOR THE FIRST YEAR AFTER THE SITE HAS BEEN STABILIZED.
2. AFTER EACH MAJOR STORM EVENT, INSPECT INLET IMMEDIATELY, IF SEDIMENT HAS ACCUMULATED TO AND WITHIN ONE (1) FOOT BELOW THE OUTFALL ELEVATION, PERFORM CLEANING AS NECESSARY.
3. ANNUALLY INSPECT THE "SNOUT" HOOD, THE ANTI-SIPHON DEVISE AND THE ACCESS HATCH FOR ANY CRACKED OR DAMAGED PARTS, REPLACE ALL DAMAGED COMPONENTS IMMEDIATELY.

B. CLEANING:
1. REMOVE ALL SOLID DEBRIS FROM THE INLET, A MINIMUM OF EVERY SIX (6) MONTH OR WHEN THE SEDIMENT IS TO AND WITHIN ONE (1) FOOT BELOW THE OUTFALL ELEVATION.
2. WHEN THERE HAS BEEN A SPILL OR INCIDENT THAT CAUSES A LARGER THAN NORMAL ACCUMULATION OF POLLUTANTS, REMOVE ALL SOLID DEBRIS FROM THE INLET.
3. USE A VACUUM TRUCK TO REMOVE ALL SOLIDS IN THE BOTTOM OF THE STRUCTURE.
4. DISPOSE OF ALL COLLECTED WASTES PER THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION REQUIREMENTS.
5. FLUSH THE ANTI-SIPHON DEVISE ON THE "SNOUT" HOOD OR GENTLY CLEAR WITH A FLEXIBLE WIRE ONCE A YEAR.
6. OPEN AND CLOSE THE ACCESS PORT ON THE "SNOUT" HOOD ONCE A YEAR AND CLEAR ANY OBSTRUCTIONS.

"SNOUT" INLET
NOT TO SCALE

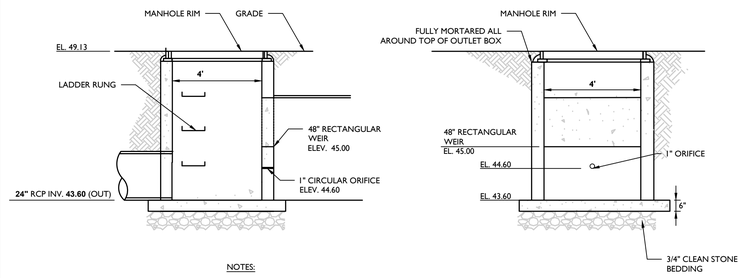




SECTION B-B
NOT TO SCALE

MRC UNDERGROUND DETENTION BASIN DETAIL

NOT TO SCALE 05/01/18



NOTES:
1. CONTRACTOR TO SUBMIT SHOP DRAWING FOR REVIEW AND APPROVAL.
2. ALL CONCRETE TO BE CLASS "A".

OUTLET CONTROL STRUCTURE A-1 MRC BASIN DETAIL (SINGLE CHAMBER)

NOT TO SCALE MCPA-UTIL-STMW-1600 05/01/18

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REV	DATE	DRAWN BY	DESCRIPTION

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA
PROJECT NUMBER: 16001030B	DRAWING NAME: C-PCSM-DTLS		

SHEET TITLE: PCSM DETAILS

SHEET NUMBER: 27 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2001\16001030B\Engineering\PCSM\C-PCSM-DTLS.dwg 05-05-2022 15:45 By: CMM

SECTION 55-4.B.6 - TREE REPLACEMENT:

(a) Every tree determined to be living and healthy, with a DBH of six inches or greater and which is designated to be removed or which is destroyed, shall be replaced with one or more new shade trees of a type approved by the Township with a trunk diameter of not less than three inches in caliper. The total caliper of replacement trees, measured at six inches above the ground line, shall equal or exceed the DBH of the tree removed.
(d) If the Shade Tree Commission determines that there is not sufficient area on the development site for the placement of all replacement trees, a percentage of the replacement trees can be planted on the development site will be increased in caliper size from the three inch minimum in accordance with the following schedule. (Shown Below).
(f) Subject to the prior approval of the Shade Tree Commission:

1. A maximum of 30% of the replacement trees may be replaced with ornamental/flowering or evergreen trees at a ratio of two flowering or two evergreen trees per required three-inch-caliper shade tree.
2. A maximum of 20% of the replacement trees may be replaced as shrubs with a minimum size of 24" height at a ratio of six shrubs per required three-inch-caliper shade tree.
3. A maximum of 10% of the replacement trees may be replaced as groundcover at a ratio of 40 plants to one three-inch-caliper shade tree. The minimum size of the groundcover will be a one-gallon container.
5. A maximum of 5% of the replacement trees may be replaced with plugs at a rate of 240 plugs at a minimum of 1.25 inches x 1.25 inches x 2.5 inch deep root zone for every three-inch-caliper shade tree.

Trees to be Removed (In Inches)	Replacement Trees Required	Replacement Trees Provided**
826" total removed*	276	97 - 3" cal. shade trees*** 83 - 8'-10' ht. ornamental / flowering trees = 42 replacement trees 83 - 8'-10' ht. evergreen trees = 42 replacement trees 331 - 24" -30" ht. shrubs = 55 replacement trees 1,104 - 1 gal. groundcovers = 27 replacement trees 3,312 - (1.25" x 1.25" x 2.5") plugs = 13 replacement trees

*826 total inches removed includes (1) 44" cal. heritage tree.

** 82 ornamental / flowering trees provided at a ratio of two (2) 8'-10' ornamental / flowering trees per one (1) 3" cal. shade tree.
** 82 evergreen trees provided at a ratio of two (2) 8'-10' evergreen trees per one (1) 3" cal. shade tree.
** 331 shrubs provided at a ratio of six (6) 24"-30" ht. shrub per one (1) 3" cal. shade tree.
** 1,104 groundcover provided at a ratio of forty (40) plants per one (1) 3" cal. shade tree.
** 3,312 plugs provided at a ratio of two-hundred-fifty (250) plants per one (1) 3" cal.shade tree.

*** See chart below for breakdown of trees provided per code section 55-4.B.6 (d)

Total Number of 3" cal. Trees Required	Total Number of Trees Provided
97 or 291"	(26) 3" cal. = 78" (29) 4" cal. = 116" (19) 5" cal. = 97" (74) Trees = 291"

SECTION 105-39 - LANDSCAPING OF PARKING FACILITIES:

(A) All parking areas shall have at least one, three-inch-caliper tree for every two parking spaces provided.

Proposed Parking Spaces	Trees Required	Trees Provided
282*	141	73**

* Includes surface parking only.
** See waiver request # 1.

(C) A minimum of 10% of any parking lot facility over 2,000 square feet in gross area shall be devoted to landscaping, inclusive of required trees.

Parking Facility	Area	Required Landscape Areas
A	7,688 SF	768.8 SF
B	10,886 SF	1,088.6 SF
C	17,080 SF	1,708 SF
D	4,592 SF	459.2 SF
E	8,753 SF	875.3 SF
TOTAL:	**48,999 SF**	**4,899.9 SF = 10%**

WAIVER REQUESTS:

(1) Section 105-39 A waiver is requested to partially meet the required (1) 3" caliper shade tree for (2) parking spaces provided.

(2) Section 105-47.K A waiver is requested to allow the required 25' wide right-of-way to be 5' wide due to site constraints.

(3) Section 105-52 A waiver is requested to allow perimeter buffer yards to be less than 50' in width. Buffer landscaping is provided at the intensity that meets the intent of the buffer yard requirements and address the unique characteristics of the site and intent of the Riverfront Development District.

(4) Section 116-284-Riverfront Access and Open Space A waiver is requested to allow existing trees along the proposed trail to be credited toward required trees.

SECTION 105-48 - STREET TREES:

(B) Shade street trees shall be planted at intervals of not more than 45 feet, and flowering street trees at intervals of not more than 30 feet along both sides of new streets and along one or both sides of an existing street within the proposed subdivision or land development. An equivalent number may be planted in an informal arrangement, subject to the approval of the Board of Supervisors

WASHINGTON STREET = 612.2 LF* / 45 = 14 shade street trees required; 14 trees are provided.

* Total linear feet does not include site ingress / egress drive isles.

SECTION 105-52 - BUFFER YARDS**:

AREA	DECIDUOUS			EVERGREEN	
	Shade Trees	Flowering Trees	Shrubs	Trees	Shrubs
North Property Line (Washington Street 612.2 LF) (Street trees as required by Section 105.48)	14	-	-	-	-
East Property Line (467.20 LF) (Buffer Yard Class B - Option 3)	-	-	-	32	59
West Property Line (633.67 LF) (Buffer Yard Class B - Option 4)	-	-	159	64	-
TOTAL REQUIRED:	14	0	159	96	59
TOTAL PROVIDED:	14	0	159	96	59

** See Waiver Request 3

SECTION 116-284 - RIVERFRONT ACCESS AND OPEN SPACE:

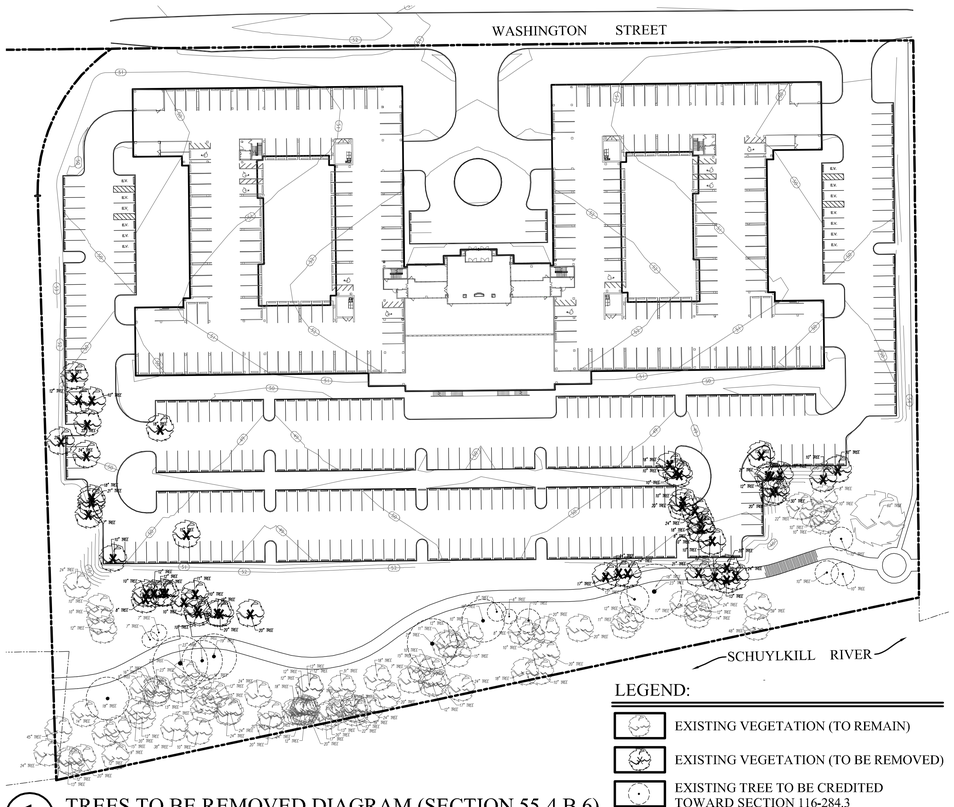
(3) Landscaping to enhance the trail, which at a minimum shall include trees in a naturalized setting at the rate of one tree per every 50 feet of trail. Other landscape treatments may be utilized if approved by the Township.

Proposed Trail Length	Trees Required	Trees Provided
756 LF	16	16*

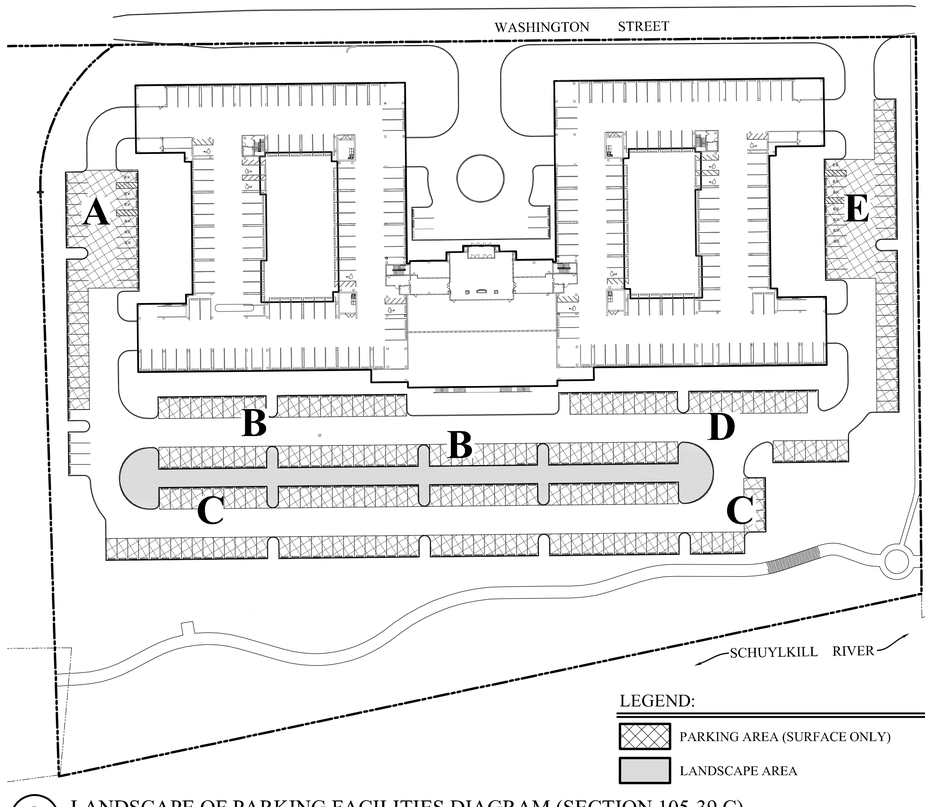
* See Waiver Request # 4.

GENERAL NOTES:

1. Base information including topography, grading, utilities, building and existing vegetation location prepared by Colliers Engineering and Design.
2. This plan is for landscaping purposes only.
3. The Landscape Architect's seal applies only to the landscape portion of this plan.
4. See Sheet LD-1 for Planting Details and Notes.
5. All plant material is to be field adjusted as necessary to address existing site conditions, proposed unit landscaping, and to ensure that clear sight triangles and clear sight lines are maintained.
6. Proposed shade trees shall not be planted over the top of any sewer or water laterals, mains or services. Sewer and water laterals, mains and services are shown on Landscape Plans for reference only. See engineers plans for location of all utilities.
7. Shade and evergreen trees shall be planted fifteen (15) feet from overhead utility lines or light standards. Utilities are shown on Landscape Plans for reference only. See engineers plans for location of all utilities.



1 TREES TO BE REMOVED DIAGRAM (SECTION 55-4.B.6)
SCALE: 1" = 60'-0"



2 LANDSCAPE OF PARKING FACILITIES DIAGRAM (SECTION 105-39 C)
SCALE: 1" = 60'-0"

NORTH

0 30 60 120 180 FEET
SCALE: 1" = 60'

Serial Number:

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GLACKIN THOMAS PANZAK
LAND PLANNING
LANDSCAPE ARCHITECTURE

Glackin Thomas Panzak, Inc.
Paoli Executive Green 1
Suite 300
41 Leopard Road
Paoli, Pennsylvania 19301
610.408.9011
Fax: 610.408.9477
E-mail: plans@glackinplan.com

PENNSYLVANIA REGISTERED LANDSCAPE ARCHITECT LISA L. THOMAS 775-E
Lisa L. Thomas LA000775 E

PRELIMINARY / FINAL LANDSCAPE PLAN

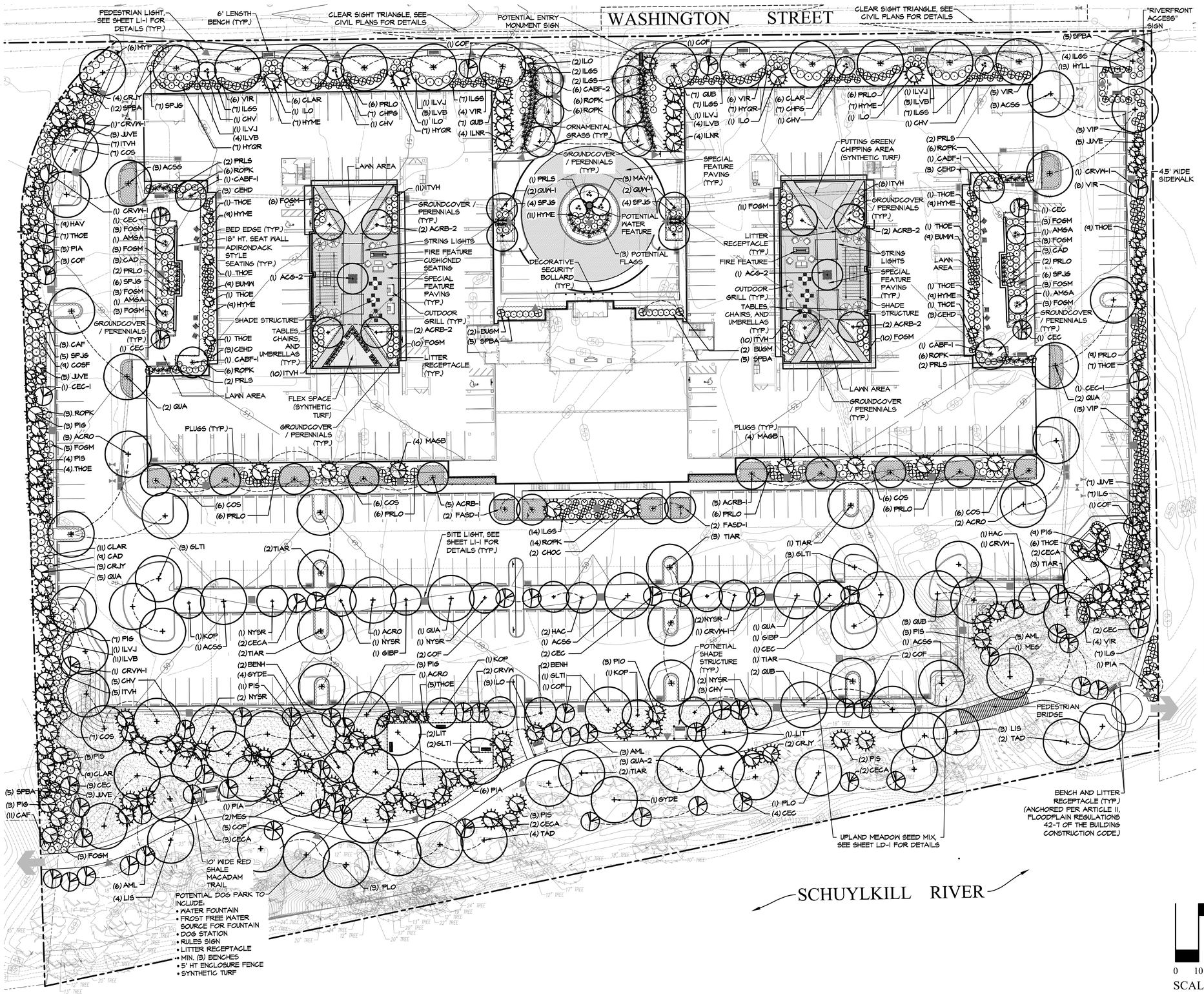
601 Washington Street

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

PROJECT #: 2022H22-002
DATE: 03/01/22 (gs)
REV.:

SHEET:
LANDSCAPE COMPLIANCE PLAN
LP-1
1 OF 6

P:\2022\2022H22-002\CADD\Preliminary\2022H22-002_601 Washington Street_LP_02-15-21.dwg, LP-1, 3/2/2022 10:30:22 AM



GENERAL NOTES:

1. Base information including topography, grading, utilities, building and existing vegetation location prepared by Colliers Engineering and Design.
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LEGEND:

- PROPOSED DECIDUOUS TREE
- PROPOSED ORNAMENTAL TREE
- PROPOSED EVERGREEN TREE
- PROPOSED EVERGREEN SHRUBS
- PROPOSED DECIDUOUS SHRUBS
- PROPOSED ORNAMENTAL GRASS
- PROPOSED GROUNDCOVER / PERENNIALS
- PROPOSED PLUGS
- UPLAND MEADOW SEED MIX

NOTES:
1. See Architect / Engineer plans for EV charging station details.

2. Ornamental Grasses, Groundcovers/Perennials, and Plug quantities purposely not labeled on this plan. Quantities and species to be provided at a future date.

3. See Sheet LD-1 for Landscape Plant List.

Serial Number:

CALL BEFORE YOU DIG!
PENNSYLVANIA LAW REQUIRES 3 WORKING DAYS NOTICE FOR CONSTRUCTION PHASE AND 10 WORKING DAYS IN DESIGN STAGE–STOP CALL
Pennsylvania One Call System, Inc.
1-800-242-1776

GLACKIN THOMAS PANZAK
LAND PLANNING
LANDSCAPE ARCHITECTURE

Glackin Thomas Panzak, Inc.

Paoli Executive Green 1
Suite 300
41 Leopard Road
Paoli, Pennsylvania 19301
610.408.9011
Fax: 610.408.9477
E-mail: plans@glackinplan.com

Lisa L. Thomas LA000775 E

PRELIMINARY / FINAL LANDSCAPE PLAN

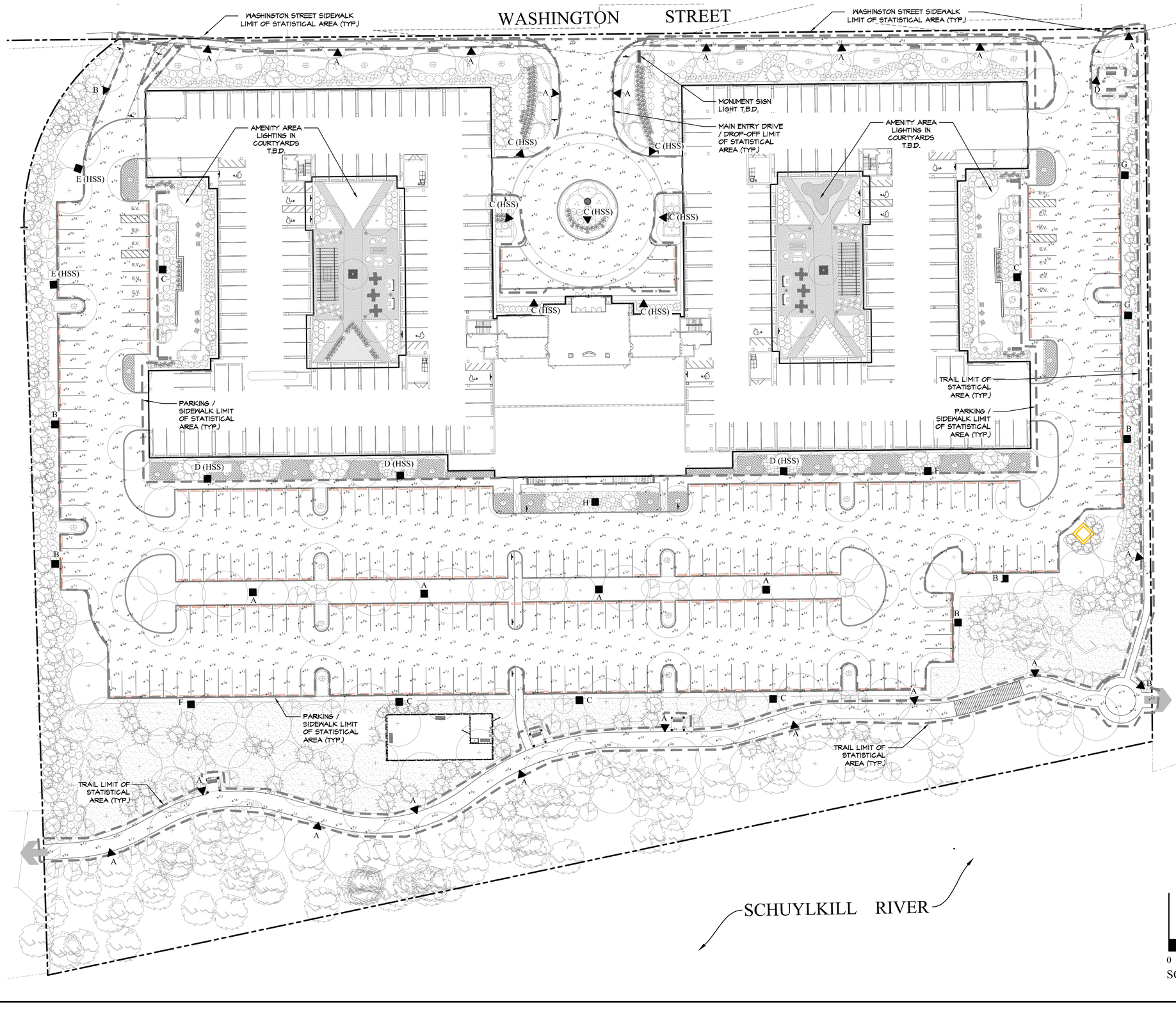
601 Washington Street

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

PROJECT #: 2022H22-002
DATE: 03/01/22 (gs)
REV.:

SHEET:
LANDSCAPE PLAN
LP-2
2 OF 6

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GENERAL NOTES:

1. Base information including topography, grading, utilities, building and existing vegetation location prepared by Colliers Engineering and Design .
2. This plan is for lighting purposes only.
3. The Landscape Architect's seal applies only to the lighting portion of this plan.
4. See Sheet LD-3 for light fixture schedule, site light foot candle calculations, lighting notes and details.
5. All trees shall be pruned as necessary to maintain required light levels.

LIGHTING NOTES:

1. Lighting to be installed to meet all appropriate national and local codes.
2. All light fixtures to be approved by Owner or Owner's representative.
3. Fixtures shall be located a min. of 36" behind back of curb or paved surface.
4. All circuits to be installed by a licensed electrician.
5. All cable to be run in conduit unless approved in writing by the owner.
6. Contractor to provide sufficient nighttime adjustment to all lighting to satisfy Township requirements and Owner or Owner's representative. Fixture on/off control by circuit.
7. All lighting to be installed according to manufactures recommendations.
8. All electrical conduits shall be sch 40 pvc and all bends shall be "sweep" type for pulling wire. Conduit to extend beyond edge of hardscape element by 12" min. Conduit to be temporarily capped and location staked prior to backfilling.
9. While extending conduits under existing structures the contractor shall be responsible for damage to existing structures such as, but not limited to, paving, irrigation, pool piping, masonry piers and underground drainage pipe etc.
10. All switching control device type and locations to be approved by Owner or Owner's representative.
11. All lighting fixtures to be controlled by automatic switches (i.e.- time clocks, photo-cells, etc.) to permit extinguishing light per owner and local authority requirements. All-night safety or security lighting shall not have lighting intensity levels which exceed 25% of the levels normally permitted by the Township but in no case shall intensity levels be less than the minimum levels for safety and security as invoked by the IESNA.
12. All final light locations to be approved by Owner or Owner's representative.
13. All final light locations to be field adjusted, "aimed" as necessary so as to avoid shining of light into windows and doors.
14. Contractor to arrange a pre-construction meeting with the owner and owners representatives including masons, and other individuals familiar with any underground facilities. As-built drawing should be requested of all such facilities.
15. Contractor shall spray paint trench layout prior to commencement. Owner or Owner's representative shall approve layout.
16. Electrical contractor to prepare a plan of all as-built underground electric runs.
17. Project electrical engineer to provide power plan.
18. In the event that the contractor proposes light fixture substitutions, requests must be received by the Landscape Architect for review (14) fourteen days prior to bid date. Failure to submit within that deadline renders all substitution requests void, and originally specified fixture(s) will be supplied. The contractor shall submit the following:
    - A. Township required copies of all mandatory submittals for both the originally specified fixture(s) and the proposed substitution(s).
    - B. Contractor's written certification that the proposed substitution(s) conforms to all requirements of the contract documents in every respect and is appropriate for the applications indicated in the documents.
    - C. Contractor's written statement indicating the effect of the substitution(s) on the construction schedule compared to the schedule with the originally specified fixture(s).
    - D. Contractor-net unit price for the originally specified fixture(s) and for the proposed substitute fixture(s).
    - E. One sample of the proposed substitution fixture(s) with specified lamps and cord and plug connection for 277 volt operation.
    - F. Contractor's written certification that any alterations that may result from the proposed lighting fixture substitution(s) will be designed and constructed at the contractor's expense.
    - G. Reimbursement to the landscape Architect for all time associated with review of fixture substitutions(s). Payment shall be made in advance of the review, based on the Landscape Architect's hourly rates for the personal involved in the review.
    - H. Contractor's written waiver of rights to additional payment and/or time that may become necessary should the proposed substitution(s) fail to perform in a manner that is equivalent to the originally specified fixture(s).
19. The Township reserves the right to conduct one or more post-installation nighttime inspections to verify compliance with Township requirements, if appropriate, to require remedial action at no expense to the Township.
20. Post-approval alterations to lighting plans or intended substitutions for approved lighting equipment shall be submitted to the Township for review and approval.
21. Lighting fixtures and equipment shall be maintained so as to continuously meet Township requirements.

Serial Number:

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0 10 20 40 60 FEET
SCALE: 1" = 20'

NORTH

GLACKIN THOMAS PANZAK
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Lisa L. Thomas LA000775 E

PRELIMINARY / FINAL LIGHTING PLAN

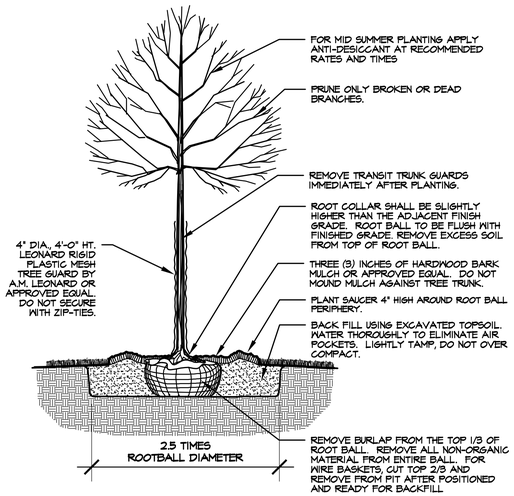
601 Washington Street

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

PROJECT #: 2022H22-002
DATE: 03/01/22 (gs)
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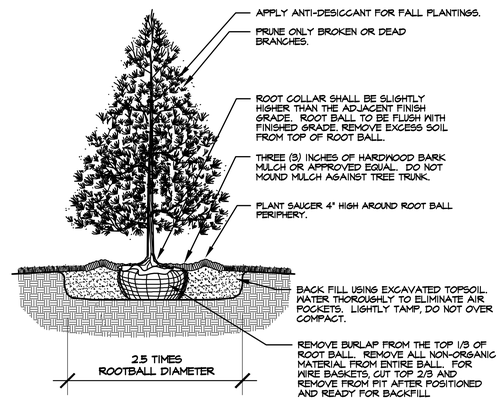
SHEET:
LIGHTING PLAN
LI-1

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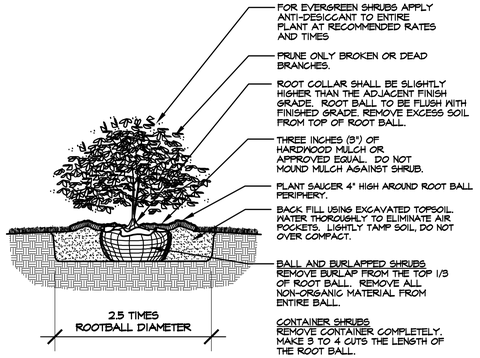
NOTES:
1. Trees with poor quality root balls or root balls that have been cracked or damaged shall be rejected.
2. Trees with central leader broken or dead shall be rejected.
3. Trees that do not display the typical characteristics for their species shall be rejected.
4. Flood planting pit with water twice within 24 hours of planting.
5. Trees shall not be staked. Landscape contractor shall be responsible for inspecting and righting trees for a period of 12 months. If it is determined that staking is needed, it shall be provided in accordance with industry standards, periodically inspected, and removed prior to the end of the guarantee.

1 DECIDUOUS TREE DETAIL
NTS



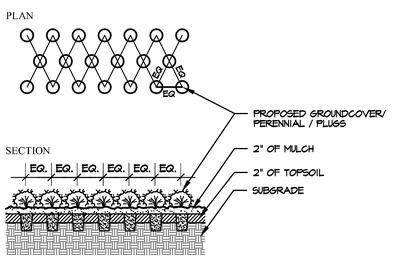
NOTES:
1. Trees with poor quality root balls or root balls that have been cracked or damaged shall be rejected.
2. Trees with central leader broken or dead shall be rejected
3. Trees that do not display the typical characteristics for their species shall be rejected.
4. The owner shall be responsible for contacting the contractor, who shall right and secure any tree that leans out of plumb.
5. Flood planting pit with water twice within 24 hours of planting.

2 EVERGREEN TREE DETAIL
NTS



NOTE: FLOOD PLANTING PIT WITH WATER TWICE WITHIN 24 HOURS OF PLANTING.

3 SHRUB DETAIL
NTS



NOTES:
1. Plants must be planted in bedding mix or topsoil not mulch.
2. See planting list for groundcover species, size, and spacing dimension.

4 PERENNIAL / GROUNDCOVER / PLUG PLANTING DETAIL
NTS

UPLAND SEED MIX:

For Uplands and Meadows (Grassland Mix):

Ernst Conservation Seeds
Uplands and Meadows Seeding-
Eastern Native Habitat & CREP Mix (ERNMX-173)

Seed Rate: 11 lbs./acre

Ernst Conservation Seeds
9006 Mercer Pike
Meadville, PA 16335
800-873-3321

Note:
1. Annual rye grass seed shall be added to all seed mixes at a rate of 5 lbs. / acre, to serve as a nurse crop.

PLANTING NOTES:

1. The contractor shall furnish and plant all plants shown on the drawings, as specified, and in quantities indicated on the plant list.
2. All plants shall be nursery grown and freshly dug.
3. All plants shall be in accordance with The American Standard for Nursery Stock, latest edition.
4. All plants shall be hardy under climatic conditions similar to those in the locality of the project.
5. Fall Digging Hazard: Any species listed below, if included on the plant list, must not be dug in the fall (October through December) because of risk to the tree's survival. Special exceptions may be granted if the owner is notified in writing and an extended warranty on these plants is agreed upon prior to digging. The following varieties should not be dug in fall: Betula, Carpinus, Celtis, Cercidiphyllum, Crataegus, Cryptomeria, Fagus, Halesia, Ilex (tree form varieties), Liquidambar, Liriodendron, Nyssa, Ostrya, Prunus, Pyrus, Quercus (except Quercus palustris), Salix weeping varieties, and Tilia tomentosa. Digging for Malus and Zelkova varieties should be avoided in fall only when in leaf.
6. All plants shall be typical of their species or variety and shall have a normal habit or growth. They shall be sound, healthy and vigorous, well branched and densely foliated when in leaf. They shall be certified by appropriate State and Federal authorities to be free of disease and insect pests, eggs or larvae. They shall have healthy, well-developed root systems.
7. Trees with central leader broken or dead shall be rejected
8. Plants that do not display typical characteristics for their species shall be rejected.
9. Substitutions: When plants of a specified kind or size are not available within a reasonable distance, substitutions may be made upon written request by the contractor, if approved by the owner and/or municipal authority.
10. Measurement: Dimensions of trees and shrubs shall conform to The American Standard for Nursery Stock, latest edition.
11. Size: All plants shall conform to the measurement specified on the plant list, unless authorized in writing by the Township Arborist and the owner.
12. Balled and burlapped plants shall be dug with firm natural balls of earth, of diameter and depth to include most of the fibrous roots. Container grown stock shall have been grown in a container long enough for the root system to have developed sufficiently to hold its soil together firm and whole. No plants shall be loose in the container.
13. Plants with poor quality root balls or root balls that have been cracked or damaged shall be rejected.
14. Root balls of all plants shall be adequately protected at all times from sun and drying winds or frost.
15. Conditions detrimental to plants: The contractor shall notify the project representative in writing of all soil or drainage conditions which the contractor considers detrimental to the growth of plants. The contractor shall state the conditions and submit a proposal for correcting the conditions, including any change in cost, for review and acceptance by the project representative.
16. The owner or the owner's representative shall be notified prior to beginning planting operations.
17. All planting shall be at the locations indicated on the drawings. The contractor shall be responsible for planting at the correct grades, alignment, and to the indicated layout of the planting beds.
18. Layout of planting: The contractor shall lay out with identifiable stakes the location of all planting beds as indicated on drawing. The layout of planting shall be approved by the project representative prior to any excavation of plant pits or plant beds.
19. Minor adjustments to plant locations may be necessary due to field conditions and final grading. The contractor shall notify the owner if major adjustments are required.
20. Do not install plants when ambient temperatures may drop below 35°F or above 90°F.
21. Do not install plants when wind velocity exceeds 30 mph.
22. Planting operations to commence only when preceding work within the area has been completed. Proceed with and complete planting as rapidly as portions of the site become available, working within seasonal limitations.
23. Planting soil shall be excavated native soil and topsoil from the planting pit. The planting soil shall be thoroughly mixed, with all rocks, clods and roots removed.
24. All trees shall be staked and guyed only in cases of steep slopes or high wind areas, and as noted on the planting details.
25. Each tree and shrub shall be pruned in accordance with The American Nursery and Landscape Association Standards to preserve the natural character of the plant. All dead wood or suckers and all broken or badly bruised branches shall be removed.
26. Mulch: Immediately after planting operations are completed, all trees and shrub planting pits shall be covered with a 3" (three inch) layer of double shredded hardwood bark mulch, or other material approved by the owner or the owner's representative. A granular pre-emergent weed control shall be spread prior to mulching. The limit of this mulch for deciduous trees and single evergreen trees shall be the area of the pit. For shrub and perennial beds and for evergreen tree clusters, a continuous, mulched bed shall be created.
27. All shrub groupings will be planted in one continuous bed and not individually.
28. Trees in leaf, including evergreens, when planted shall be treated with anti-desiccant such as Wilt-Pruf® if planted during the months of June through September, November, and December.
29. Weed control: All planting areas shall be free from weeds prior to the beginning of planting operation. Contact herbicide sprays should only be used as required and all manufacturer's specifications followed.
30. Guarantee: All plant material shall be guaranteed by the contractor for eighteen (18) months from the date of installation. The owner shall be responsible for maintenance unless otherwise agreed with contractor. It shall be the contractor's responsibility to monitor the project during the guarantee and notify the owner if problems develop with the plant material. Any material that is 25 % dead or more shall be considered dead and must be replaced at no charge. A tree shall be considered dead when the main leader has died back, or there is 25% of the crown dead.
31. All debris resulting from landscape contracting operations shall be cleaned up and removed from the site on a weekly basis.
32. Watering: The use of tree watering bags ("Treegator") is recommended for trees. It is the responsibility of the landscape contractor for watering sufficiently at the time of planting and until the job is completed, accepted and turned over to the owner.

TOPSOIL, PLANTING SOIL AND BED PREPARATION NOTES:

1. Soil Analysis: Submit soil test analysis and a written report for each sample of topsoil and planting mix from an approved testing laboratory. If necessary, several samples shall be taken or soil taken from several areas combined for analysis.
2. Testing shall be performed in accordance with the most current edition of Methods of Soil Analysis published by the Soil Science Society of America, Inc.
3. All soil mixes shall be tested for particle size and organic content after passing through a 1/4-inch sieve rather than the standard 2-mm sieve to include larger pieces of organic material.
4. Provide a particle size analysis, including gradient of mineral content.
5. Provide a chemical analysis, including the following:
   a. Percent organic content by oven-dried weight, pH, chemical levels by parts per million, soluble salt by electrical conductivity of a 1:2 soil water sample measured in milliohms per centimeter, cation exchange capacity (CEC).
      1) Nutrient tests shall include the testing laboratory recommendations for supplemental additions to the soil mix for the plants specified and notice of when chemical levels are excessive.
      2) Report presence of problem salts, minerals or heavy metals, if present.
6. Provide a physical analysis of each planting mix to include the following test results:
   a. Provide a water permeability analysis of each sample of soil mix ASTM F 1815-97 with sample compacted to 80 and 85 percent of maximum dry density using the standard Proctor method, ASTM D698. Each test shall include the calculation of the bulk density, measured in units of Mg/m3, for each sample when compacted to 80 and 85 percent maximum Proctor density.
7. All testing will be at the expense of the contractor. The landscape architect may request additional planting mix test on different mix component ratios to attain results that more closely meet the mix requirements.
8. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; conforming to ASTM D 5268, pH range of 5.5 to 7.0; containing minimum 4 percent organic matter and sand, silt, and clay particles; friable, pervious; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1-inch in diameter; and free of weeds, roots, and toxic and other non-soil materials. Provide topsoil from one of the following sources, in this order of preference:
9. Reuse surface soil stockpiled on the site. Verify suitability of surface soil to produce viable topsoil meeting requirements, and amend when necessary. Supplement with imported topsoil when quantities are insufficient. Remove from the soil all roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
10. Import topsoil from off-site sources. Obtain topsoil from naturally well-drained sites where topsoil occurs at least 4-inches deep; do not obtain from bogs or marshes.
11. Amend existing surface soil to produce topsoil. Supplement with imported topsoil when required.
12. Soil amendments shall only be used when indicated by soil analysis. The minimum amounts necessary to correct soil deficiencies shall be used. Organic materials are preferred over inorganic materials.
13. Compost, Leaf: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
   a. Yard debris or organic waste material composted for a minimum of 3 months.
14. Compost, Wood (High-Lignin): Decomposed, nitrogen-treated ground bark or wood waste; of uniform texture and free of chips, stones, sticks soil, or toxic materials.
15. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.
16. Spent Mushroom Substrate: Commercial, weathered, free from weed seeds; moisture content 30 to 50 percent; organic content 40 percent minimum; carbon to nitrogen ratio 30:1 maximum; nitrogen content 1.5 to 3.0 percent; phosphorus content 0.5 to 2.0 percent; potassium content 1.0 to 3.0 percent; pH range 6.0 - 8.0.
17. Lime: ASTM C 602, ground agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows
   a. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.
   b. Conforming to standards of the Association of Official Agricultural Chemists and comply with applicable State and Federal regulations.
18. Aluminum Sulfate: Commercial grade, unadulterated.
19. Sand: Clean, washed, natural or manufactured, and free of toxic materials.
20. Perlite: Horticultural perlite, soil amendment grade.
21. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.
22. Rough grading and topsoil placement is to be completed prior to commencement of landscape operations.
23. If site specific conditions require, planting beds are to be amended with 4" of mushroom soil prior to planting. Mushroom soil to be roto-tilled into topsoil to a depth of 6"-8".
24. If conditions detrimental to plants exist, contractor to submit a proposal for correcting condition.
25. Planting Soil, Standard Planting Pits: Planting soil shall consist of existing, native surface topsoil formed under natural conditions with the duff layer retained during excavation process and existing, in-place surface soil. Where existing soil quantities are insufficient, imported or manufactured topsoil shall be used to supplement. Clean soil of roots, plants, sod, stones, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix planting soil thoroughly before placing.
26. Planting Soil, Hardscape Areas: Existing soils shall be removed and replaced to a minimum depth of 30-inches below finish grade with non-compacted topsoil and subsoil, amended with decomposed wood (high-lignin) compost at a rate of 15 percent by volume for the lower 24-inches of backfill. Soil shall be mixed thoroughly and cleaned of roots, plants, sod, stones, clods, clay lumps, pockets of coarse sand, toxic and other non-soil materials larger than 2-inches in diameter before placing. The upper 6-inches of planting soil shall be native or manufactured topsoil.
27. Planting Soil, Planting Beds: Amend surface soil and topsoil with a 4-inch layer of spent mushroom substrate tilled into the soil to a depth of 6 to 8 inches. Planting Soil in annual beds shall be amended with 2-inches of sand in addition to spent mushroom substrate. Till amendments thoroughly into planting beds.
28. Soil Compaction: Planting soils for all planting areas, including landscape berms shall have a proctor density of 75% - 83%. DO NOT OVER-COMPACT PLANTING SOILS.

PLANT LIST:

KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
DECIDUOUS TREES					
ACG-2	2	Acer griseum	Paperbark Maple	5"-5.5" cal.	B&B
ACRB-1	10	Acer rubrum 'Bowhall'	Bowhall Red Maple	4"-4.5" cal.	B&B
ACRB-2	8	Acer rubrum 'Bowhall'	Bowhall Red Maple	5"-5.5" cal.	B&B
ACRO	7	Acer rubrum 'October Glory'	October Glory Red Maple	3"-3.5" cal.	B&B
ACSG	3	Acer saccharum 'Green Mountain'	Green Mountain Sugar Maple	3"-3.5" cal.	B&B
ACSG	6	Acer saccharum 'Green Mountain'	Green Mountain Sugar Maple	4"-4.5" cal.	B&B
AML	14	Amelanchier laevis	Allegheny Serviceberry	3"-3.5" cal.	B&B
AMGA	4	Amelanchier x grandiflora 'Autumn Brilliance'	Autumn Brilliance Serviceberry	8'-10' ht.	B&B, Multistem
BENH	4	Betula nigra 'Heritage'	Heritage River Birch	3"-3.5" cal.	B&B, Single Stem
CABF-1	4	Carpinus betulus 'Frans Fontaine'	Frans Fontaine European Hornbeam	4"-4.5" cal.	B&B
CABF-2	6	Carpinus betulus 'Frans Fontaine'	Frans Fontaine European Hornbeam	5"-5.5" cal.	B&B
CECA	11	Cercis canadensis 'Alba'	White Redbud	3"-3.5" cal.	B&B
CEC-1	2	Cercis canadensis	Redbud	4"-4.5" cal.	B&B
CEC	16	Cercis canadensis	Redbud	3"-3.5" cal.	B&B
CHV	8	Chionanthus virginicus	Fringetree	3"-3.5" cal.	B&B, Single Stem
CHV	4	Chionanthus virginicus	Fringetree	8'-10' ht.	B&B, Multistem
COF	16	Cornus florida	Flowering Dogwood	3"-3.5" cal.	B&B
CRVW-1	5	Crataegus viridis 'Winter King'	Winter King Hawthorn	4"-4.5" cal.	B&B
CRVW	3	Crataegus viridis 'Winter King'	Winter King Hawthorn	3"-3.5" cal.	B&B
FASD-1	4	Fagus sylvatica 'Dawyck'	Dawyck European Beech	4"-4.5" cal.	B&B
GIBP	2	Ginkgo biloba 'Princeton Sentry'	Princeton Sentry Ginkgo	3"-3.5" cal.	B&B
GLTI	9	Gleditsia triacanthos v. inermis 'Shademaster'	Shademaster Honeylocust	3"-3.5" cal.	B&B
GYDE	4	Gymnocladus dioicus 'Espresso'	Espresso Kentucky Coffeetree	3"-3.5" cal.	B&B, fruitless cultivar
GYDE	1	Gymnocladus dioicus 'Espresso'	Espresso Kentucky Coffeetree	4"-4.5" cal.	B&B, fruitless cultivar
HAC	3	Halesia carolina	Carolina Silverbell	3"-3.5" cal.	B&B
KOP	3	Koelreuteria paniculata	Goldenraintree	3"-3.5" cal.	B&B
LIS	7	Liquidambar styraciflua	Sweetgum	3"-3.5" cal.	B&B
LIT	3	Liriodendron tulipifera	Tulip Poplar	3"-3.5" cal.	B&B
MAVH	3	Magnolia virginiana 'Henry Hicks'	Henry Hicks Sweet Bay Magnolia	8'-10' ht.	B&B, Multistem
MEG	3	Metasequoia glyptostroboides	Dawn Redwood	3"-3.5" cal.	B&B
NYSR	9	Nyssa sylvatica 'Red Rage'	Red Rage Black Gum	3"-3.5" cal.	B&B
PLO	4	Platanus occidentalis	American Sycamore	3"-3.5" cal.	B&B
QUA-2	3	Quercus alba	White Oak	5"-5.5" cal.	B&B
QUA	11	Quercus alba	White Oak	3"-3.5" cal.	B&B
QUB	19	Quercus bicolor	Swamp White Oak	3"-3.5" cal.	B&B
QUW-1	4	Quercus x warei 'Long' Regal Prince	Regal Prince Oak	4"-4.5" cal.	B&B
TAD	6	Taxodium distichum	Bald Cypress	3"-3.5" cal.	B&B
TIAR	14	Tilia americana 'Redmond'	Redmond American Linden	3"-3.5" cal.	B&B
EVERGREEN TREES					
CHOC	2	Chamaecyparis obtusa 'Crippsii'	Golden Hinoki Cypress	8'-10' ht.	B&B
CRJY	9	Cryptomeria japonica 'Yoshino'	Yoshino Cryptomeria	8'-10' ht.	B&B
ILO	9	Ilex opaca	American Holly	8'-10' ht.	B&B
ILNR	8	Ilex x 'Nellie R. Stevens'	Nellie R. Stevens Holly	8'-10' ht.	B&B
JUVE	23	Juniperus virginiana 'Emerald Sentinel'	Emerald Sentinel 'Redcedar'	8'-10' ht.	B&B
MAGB	8	Magnolia grandiflora 'Bracken's Brown Beauty"	Bracken's Brown Beauty Southern Magnolia	8'-10' ht.	B&B
PIA	13	Picea abies	Norway Spruce	8'-10' ht.	B&B
PIG	25	Picea glauca	White Spruce	8'-10' ht.	B&B
PIO	3	Picea orientalis	Oriental Spruce	8'-10' ht.	B&B
PIS	28	Pinus strobus	White Pine	8'-10' ht.	B&B
THOE	46	Thuja occidentalis 'Emerald Green'	Emerald Green Arborvitae	8'-10' ht.	B&B
SHRUBS					
BUMW	18	Buxus microphylla 'Wintergreen'	Wintergreen Boxwood	24"-30" ht.	Cont.
BUGM	4	Buxus x 'Green Mountain'	Green Mountain Boxwood	24"-30" ht.	Cont.
CAD	15	Callicarpa dichotoma	Beautyberry	24"-30" ht.	Cont.
CAF	14	Calycanthus floridus	Sweetshrub	24"-30" ht.	Cont.
CEHD	12	Cephalotaxus harringtonia 'Duke Gardens'	Duke Gardens Japanese Plum Yew	24"-30" ht.	Cont.
CHPG	14	Chamaecyparis pisifera 'Golden Mop'	Golden Mop Japanese Falsecypress	24"-30" ht.	Cont.
CLAR	32	Clethra alnifolia 'Ruby Spice'	Ruby Spice Summersweet	24"-30" ht.	Cont.
COSF	9	Cornus sericea 'Flaviramea'	Yellow Twig Dogwood	24"-30" ht.	Cont.
COS	38	Cornus sericea	Red Twig Dogwood	24"-30" ht.	Cont.
FOGM	71	Fothergilla gardenii 'Mt. Airy'	Mt. Airy Fothergilla	24"-30" ht.	Cont.
HAV	9	Hamamelis vernalis	Vernal Witchhazel	24"-30" ht.	Cont.
HYME	61	Hydrangea macrophylla 'Endless Summer'	Endless Summer Hydrangea	24"-30" ht.	Cont.
HYLL	13	Hydrangea paniculata 'Little Lime'	Little Lime Panicle Hydrangea	24"-30" ht.	Cont.
HYQR	21	Hydrangea quercifolia 'Ruby Slippers'	Ruby Slippers Oakleaf Hydrangea	24"-30" ht.	Cont.
ILGS	50	Ilex glabra 'Shamrock'	Shamrock Inkberry Holly	24"-30" ht.	Cont.
ILG	14	Ilex glabra	Inkberry Holly	24"-30" ht.	Cont.
ILVB	29	Ilex verticillata 'Berry Heavy'	Berry Heavy Winterberry Holly	24"-30" ht.	Cont.
ILVJ	5	Ilex verticillata 'Jim Dandy'	Jim Dandy Winterberry Holly	24"-30" ht.	Cont.
ITVH	51	Itea virginica 'Henry's Garnet'	Henry's Garnet Sweetspire	24"-30" ht.	Cont.
MYP	6	Myrica pensylvanica	Bayberry	24"-30" ht.	Cont.
PRLO	49	Prunus laurocerasus 'Otto Luyken'	Otto Luyken Cherry Laurel	24"-30" ht.	Cont.
PRLS	9	Prunus laurocerasus 'Schipkaensis'	Skip Laurel	24"-30" ht.	Cont.
ROPK	53	Rosa 'Pink Knockout'	Pink Knockout Shrub Rose	3 gal.	Cont.
SPJG	32	Spiraea japonica 'Goldmound'	Goldmound Spirea	24"-30" ht.	Cont.
SPBA	32	Spiraea x bumalda 'Anthony Waterer'	Anthony Waterer Spiraea	24"-30" ht.	Cont.
VIR	33	Viburnum rhytidophyllum	Leatherleaf Viburnum	24"-30" ht.	Cont.
VIP	20	Viburnum x pragense	Prague Viburnum	24"-30" ht.	Cont.

NOTE:
1. Where there is a discrepancy between the plant list and plan, the plan shall prevail.
2. Dash one (-1) indicates a replacement tree provided at 4"-4.5" cal.
3. Dash two (-2) indicated a replacement tree provided at 5"-5.5" cal.
4. Ornamental Grasses, Groundcovers Perennials, and Plug quantities purposely not shown on this plant list. Quantities and species to be provided at a future date.

Serial Number:

CALL BEFORE YOU DIG!
PENNSYLVANIA LAW REQUIRES 3 WORKING DAYS NOTICE FOR CONSTRUCTION PHASE AND 10 WORKING DAYS IN DESIGN STAGE-STOP CALL
Pennsylvania One Call System, Inc.
1-800-242-1776

GLACKIN THOMAS PANZAK
LAND PLANNING
LANDSCAPE ARCHITECTURE

Glackin Thomas Panzak, Inc.

Paoli Executive Green 1
Suite 300
41 Leopard Road
Paoli, Pennsylvania 19301
610.408.9011
Fax: 610.408.9477
E-mail: plans@glackinplan.com

Lisa L. Thomas LA000775 E

PRELIMINARY / FINAL LANDSCAPE PLAN

601 Washington Street

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

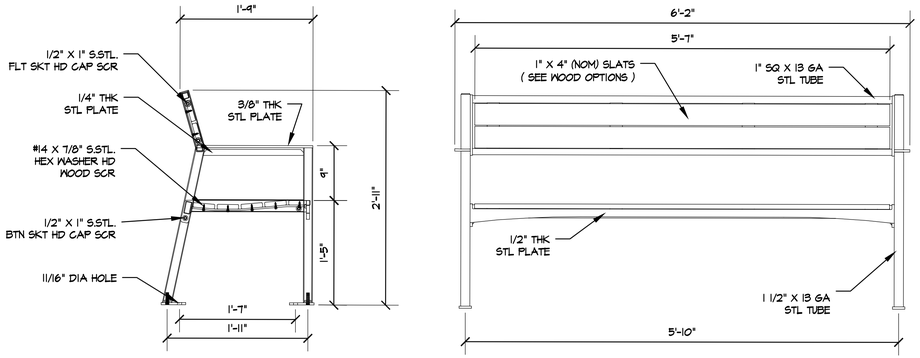
PROJECT #: 2022H22-002
DATE: 03/01/22 (gs)
REV.:

SHEET:
LANDSCAPE DETAILS AND NOTES

LD-1

4 OF 6

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☒ S-2 SURFACE

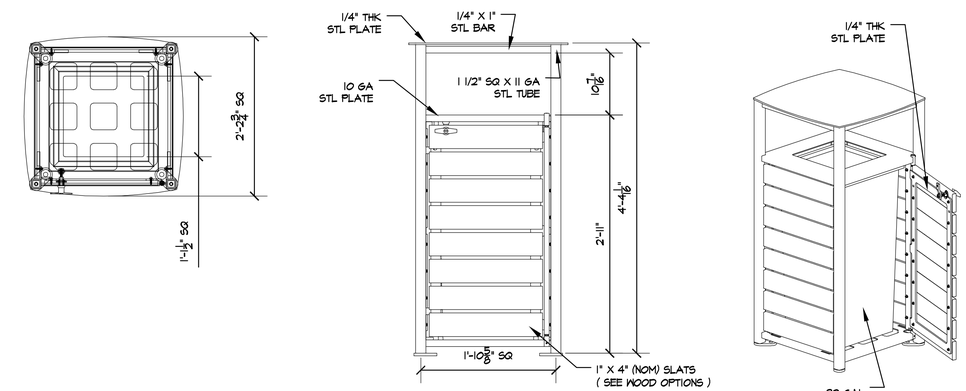
COLOR / FINISH: TBD

NOTES:
1.) ALL STL. MEMBERS COATED W/ ZINC RICH EPOXY THEN FINISHED W/ POLYESTER POWDER COATING.
2.) 1/2" X 3 3/4" EXPANSION ANCHOR BOLTS PROVIDED FOR S-2.

WOOD OPTIONS
☐ 'C' & BTR. DOUGLAS FIR KD S4S EE
☒ IPE S4S EE
☐ OTHER _____

DuMor, inc.	BENCH	DATE DRAWN : 10/29/15 DRAWN BY : JSB DATE REV. : REV. BY :	REV. A	DRAWING NUMBER 500-60

1 TYPICAL BENCH DETAIL
SCALE: 1" = 1'-0"



☒ S-2 SURFACE

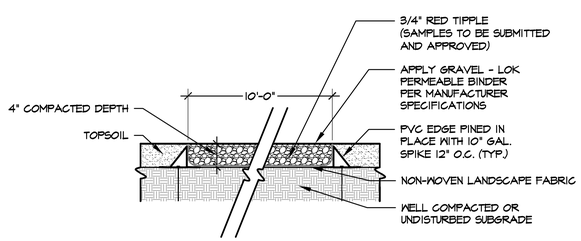
COLOR / FINISH: TBD

NOTES:
1.) ALL STL. MEMBERS COATED W/ ZINC RICH EPOXY THEN FINISHED W/ POLYESTER POWDER COATING.
2.) 1/2" X 3 3/4" EXPANSION ANCHOR BOLTS PROVIDED FOR S-2.

WOOD OPTIONS
☐ 'C' & BTR. DOUGLAS FIR KD S4S EE
☒ IPE S4S EE
☐ OTHER _____

DuMor, inc.	RECEPTACLE	DATE DRAWN : 10/27/15 DRAWN BY : JSB DATE REV. : 00/00/00 REV. BY : XXX	REV. A	DRAWING NUMBER 502-32-BT

2 TYPICAL LITTER RECEPTACLE DETAIL
SCALE: 1" = 1'-0"



3 RED SHALE MACADAM TRAIL DETAIL
SCALE: 1" = 1'-0"

Serial Number:

CALL BEFORE YOU DIG!
PENNSYLVANIA LAW REQUIRES 3 WORKING DAYS NOTICE FOR CONSTRUCTION PHASE AND 10 WORKING DAYS IN DESIGN STAGE–STOP CALL
Pennsylvania One Call System, Inc.
1-800-242-1776

GLACKIN THOMAS PANZAK
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LANDSCAPE ARCHITECTURE

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Fax: 610.408.9477
E-mail: plans@glackinptan.com

Lisa L. Thomas LA000775E

PRELIMINARY / FINAL LANDSCAPE PLAN

601 Washington Street

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

PROJECT #: 2022H22-002
DATE: 03/01/22 (gs)
REV.:

SHEET:
SITE FURNISHING DETAILS
LD-2
5 OF 6

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LIGHTING LEGEND:

SYM.	LIGHT TYPE	QTY.	MFR.	MODEL #	REMARKS
A	PARKING AREA LIGHT 'A'	4	Lithonia Lighting	DSX1-LED-P1-30K-TFTM-MVOLT-SPA-DMG-DBLXD	Pole mounted, 20' mounting ht., 108 watt LED, 30K Color Temperature, two fixtures mounted @ 180°, type TFTM distribution with 0-10V dimming, photocell control by individual circuit. Finish: Black **POLE:** Lithonia SSA-20-5E-DM28AS-DBLXD, 20' ht., 5" diameter aluminum pole. Finish: To match light fixture.
B	PARKING AREA LIGHT 'B'	5	Lithonia Lighting	DSX1-LED-P1-30K-TFTM-MVOLT-SPA-DMG-DBLXD	Pole mounted, 20' mounting ht., 54 watt LED, 30K Color Temperature, type TFTM distribution with 0-10V dimming, photocell control by individual circuit. Finish: Black **POLE:** Lithonia SSA-20-5E-DM19AS-DBLXD, 20' ht., 5" diameter aluminum pole. Finish: To match light fixture.
C	PARKING AREA LIGHT 'C'	5	Lithonia Lighting	DSX1-LED-P1-30K-T2M-MVOLT-SPA-DMG-DBLXD	Pole mounted, 20' mounting ht., 54 watt LED, 30K Color Temperature, type T2M distribution with 0-10V dimming, photocell control by individual circuit. Finish: Black **POLE:** Lithonia SSA-20-5E-DM19AS-DBLXD, 20' ht., 5" diameter aluminum pole. Finish: To match light fixture.
D	PARKING AREA LIGHT 'D'	3	Lithonia Lighting	DSX1-LED-P1-30K-T2M-MVOLT-SPA-DMG-DBLXD	Pole mounted, 20' mounting ht., 54 watt LED, 30K Color Temperature, type T2M distribution with house side shield, 0-10V dimming, photocell control by individual circuit. Finish: Black **POLE:** Lithonia SSA-20-5E-DM19AS-DBLXD, 20' ht., 5" diameter aluminum pole. Finish: To match light fixture.
E	PARKING AREA LIGHT 'E'	2	Lithonia Lighting	DSX1-LED-P1-30K-TFTM-MVOLT-SPA-DMG-DBLXD	Pole mounted, 20' mounting ht., 54 watt LED, 30K Color Temperature, type TFTM distribution with house side shield, 0-10V dimming, photocell control by individual circuit. Finish: Black **POLE:** Lithonia SSA-20-5E-DM19AS-DBLXD, 20' ht., 5" diameter aluminum pole. Finish: To match light fixture.
F	PARKING AREA LIGHT 'F'	2	Lithonia Lighting	DSX1-LED-P1-30K-T3M-MVOLT-SPA-DMG-DBLXD	Pole mounted, 20' mounting ht., 54 watt LED, 30K Color Temperature, type T3M distribution with 0-10V dimming, photocell control by individual circuit. Finish: Black **POLE:** Lithonia SSA-20-5E-DM19AS-DBLXD, 20' ht., 5" diameter aluminum pole. Finish: To match light fixture.
G	PARKING AREA LIGHT 'G'	2	Lithonia Lighting	DSX1-LED-P1-30K-T5M-MVOLT-SPA-DMG-DBLXD	Pole mounted, 20' mounting ht., 54 watt LED, 30K Color Temperature, type T5M distribution with 0-10V dimming, photocell control by individual circuit. Finish: Black **POLE:** Lithonia SSA-20-5E-DM19AS-DBLXD, 20' ht., 5" diameter aluminum pole. Finish: To match light fixture.
H	PARKING AREA LIGHT 'G'	1	Lithonia Lighting	DSX1-LED-P1-30K-T5M-MVOLT-SPA-DMG-DBLXD	Pole mounted, 20' mounting ht., 108 watt LED, 30K Color Temperature, two fixtures mounted @ 180°, type T2M distribution with 0-10V dimming, photocell control by individual circuit. Finish: Black **POLE:** Lithonia SSA-20-5E-DM28AS-DBLXD, 20' ht., 5" diameter aluminum pole. Finish: To match light fixture.
A	PEDESTRIAN AREA LIGHT 'A'	19	Lumenpulse	PUR100T-120/277-CSL-S60-30K-CRI 70-2-BK-DIM	Pole mounted, 16' mounting ht., 55 watt LED, 30K Color Temperature, type II distribution with 0-10V dimming, photocell control by individual circuit. Finish: Black Sandtex. **POLE:** Lumenpulse Straight Pole PLS-4-AL-S-14-M-BK-P, 14' ht., 4" diameter aluminum pole. Finish: To match light fixture.
B	PEDESTRIAN AREA LIGHT 'B'	2	Lumenpulse	PUR100T-120/277-CSL-S60-30K-CRI 70-4-BK-DIM	Pole mounted, 16' mounting ht., 55 watt LED, 30K Color Temperature, type IV distribution with 0-10V dimming, photocell control by individual circuit. Finish: Black Sandtex. **POLE:** Lumenpulse Straight Pole PLS-4-AL-S-14-M-BK-P, 14' ht., 4" diameter aluminum pole. Finish: To match light fixture.
C	PEDESTRIAN AREA LIGHT 'C'	7	Lumenpulse	PUR100T-120/277-CSL-S60-30K-CRI 70-4BLS-BK-DIM	Pole mounted, 16' mounting ht., 55 watt LED, 30K Color Temperature, type IV distribution with house side shield, 0-10V dimming, photocell control by individual circuit. Finish: Black Sandtex. **POLE:** Lumenpulse Straight Pole PLS-4-AL-S-14-M-BK-P, 14' ht., 4" diameter aluminum pole. Finish: To match light fixture.
D	PEDESTRIAN AREA LIGHT 'D'	1	Lumenpulse	PUR100T-120/277-CSL-S60-30K-CRI 70-5S-BK-DIM	Pole mounted, 16' mounting ht., 55 watt LED, 30K Color Temperature, type V, 0-10V dimming, photocell control by individual circuit. Finish: Black Sandtex. **POLE:** Lumenpulse Straight Pole PLS-4-AL-S-14-M-BK-P, 14' ht., 4" diameter aluminum pole. Finish: To match light fixture.
HSS	HOUSE SIDE SHIELD	--	--	--	See Lighting Plan for fixtures specified with House Side Shield. See light fixture manufacturer specifications for details.

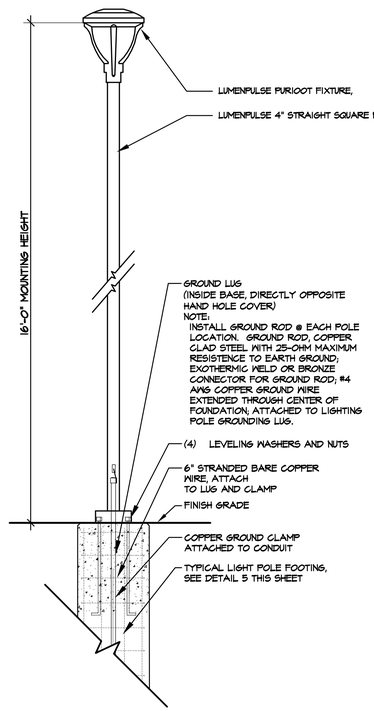
Notes:

1. Final footing design is to be based on manufacturer's wind loading requirements and local soil conditions at time of installation.
2. Contractor to verify line voltage prior to ordering fixture.
3. Contractor to verify pole drilling pattern prior to ordering pole.
4. Final footing design shall be developed and approved by a licensed engineer.

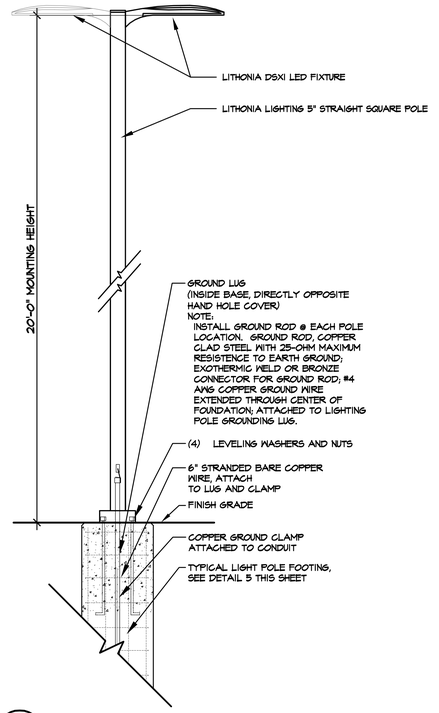
STATISTICAL AREA SUMMARY -

Calculation Area	Avg	Max	Min	Max/Min	Avg/Min
Main Entry Drive / Drop Off	1.2	2.6	0.6	4.3:1	2.0:1
Surface Parking and Sidewalks	0.9	2.3	0.4	5.7:1	2.6:1
Sidewalk - Along Washington Street	1.2	2.7	0.5	5.4:1	2.41
Trail - Along Schuylkill River	1.5	3.3	0.4	8.3:1	3.8:1

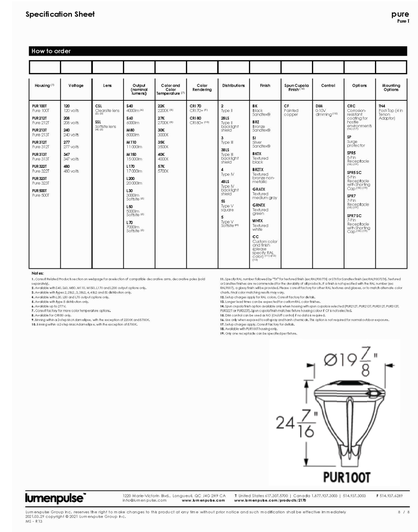
1. Light levels are expressed in footcandles (fc).
2. The point by point illuminance calculation was prepared using Visual Professional Edition, 2020 Acuity Brands Lighting Inc.
3. A light loss factor of 0.90 was used for all LED Parking Area lights to simulate a 3000k color temperature. A light loss factor of 0.9 was used for all LED Pedestrian Lights.
4. The point by point illuminance calculation was prepared using the following ies files:
   - PUR100T_V_Y-120_277-CSL-S60-30K-CRI 70-2.IES
   - PUR100T_V_Y-120_277-CSL-S60-30K-CRI 70-5S.IES
   - PUR100T_V_Y-120_277-CSL-S60-30K-CRI 70-4.IES
   - PUR100T_V_Y-120_277-CSL-S60-30K-CRI 70-4 BLS.IES
   - DSX2-LED-P1-30K-TFTM-MVOLT.IES
   - DSX1-LED-P1-30K-T5M-MVOLT.ies
   - DSX2-LED-P1-30K-T3M-MVOLT.IES
   - DSX2-LED-P1-30K-T2M-MVOLT.IES
   - DSX1-LED-P1-30K-T2M-MVOLT-HS.IES
   - DSX1-LED-P1-30K-T3M-MVOLT-HS.IES
5. The statistical area summary is based on light levels within the paved parking lot areas, cartways, walkways, and trails.
6. The township reserves the right to conduct one or more post-installation nighttime inspections to verify compliance with Township lighting requirements and, if appropriate, to require remedial action at no expense to the Township.
7. Post-approval alterations to lighting plans or intended substitutions for approved lighting equipment shall be submitted to the Township for review and approval.



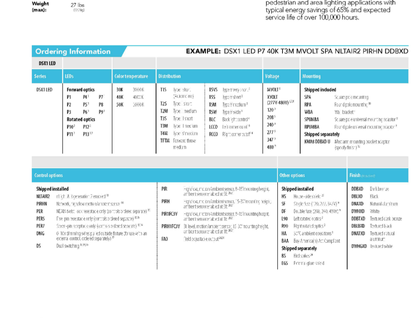
1 PEDESTRIAN AREA LIGHT DETAIL
SCALE: NTS



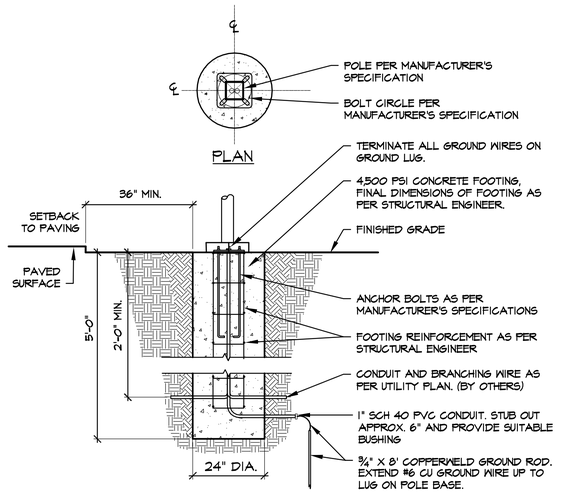
2 PARKING AREA LIGHT DETAIL
SCALE: NTS



3 PEDESTRIAN AREA LIGHT CUTSHEET
SCALE: NTS



4 PARKING AREA LIGHT CUTSHEET
SCALE: NTS



NOTES:
1. THIS DETAIL IS FOR BID AND BUDGETARY PURPOSES ONLY.
2. ALL NEW FREESTANDING LIGHT FIXTURES SHALL BE FLUSH MOUNTED WITH GRADE.
3. CONTRACTOR SHALL ENSURE DESIGN IS PREPARED BY A QUALIFIED STRUCTURAL ENGINEER CONSIDERING LIGHTING MANUFACTURER REQUIREMENTS, LOCAL WIND LOADS, AN SITE SPECIFIC SOIL PARAMETERS.
   A. THE STRUCTURAL ENGINEER SHALL BE NOTIFIED OF THE INTENT TO MOUNT ANYTHING ASIDE FROM THE LIGHT FIXTURE INCLUDING (BUT NOT LIMITED TO) CAMERAS, BANNERS, FLAGS, SIGNAGE, ETC. AS IT WILL IMPACT THE POLE AND FOUNDATION DESIGN.
   B. SOME SITE LOCATIONS AND/OR CONDITIONS MAY REQUIRE VIBRATION DAMPENING MEASURE AS DETERMINED BY A STRUCTURAL ENGINEER.
   C. ACTUAL DIAMETER AND DEPTH OF FOOTING SHALL BE DETERMINED BY THE STRUCTURAL ENGINEER.
4. ALL REBAR SHALL BE MAINTAINED AT A 3" MIN. CLEARANCE FROM SURFACES.
5. FIXTURE MUST BE GROUNDED IN ACCORDANCE WITH LOCAL CODES AND/OR THE NATIONAL ELECTRICAL CODE. FAILURE TO DO SO MAY RESULT IN SERIOUS PERSONAL INJURY.
6. POLES SHOULD NEVER BE ERECTED WITHOUT THE LUMINAIRE INSTALLED. WARRANTY IS VOIDED IF THE POLE IS ERECTED WITHOUT THE LUMINAIRE. THE WARRANTY IS VOIDED IF THE POLE IS NOT GROUTED UNDER THE ENTIRE BASE AFTER INSTALLATION.

5 TYPICAL LIGHT POLE FOUNDATION DETAIL
SCALE: 1/2" = 1'-0"

GLACKIN THOMAS PANZAK
LAND PLANNING
LANDSCAPE ARCHITECTURE

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Paoli, Pennsylvania 19301
610.408.9011
Fax: 610.408.9477
E-mail: plans@glackinplan.com

Lisa L. Thomas LA000775 E

PRELIMINARY / FINAL LIGHTING PLAN

601 Washington Street

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

PROJECT #: 2022H22-002
DATE: 03/01/22 (gs)
REV.:

SHEET:
LIGHTING DETAILS AND NOTES

LD-3

6 OF 6

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WHITEMARSH TOWNSHIP
SUBDIVISION and/or LAND DEVELOPMENT APPLICATION

The applicant, or applicant's authorized agent, for the Township to accept submission of the application, must complete each Application item and each Application Submission Checklist item.

Application Type: (check one)
☐ Minor Subdivision ☐ Minor Land Development
☐ Major Subdivision ☒ Major Land Development
☐ Land Development Waiver

Plan Type:
☐ Sketch ☒ Preliminary ☐ Final

INSERT "N/A" FOR NOT APPLICABLE WHERE APPROPRIATE

Name of Subdivision/Land Development: 601 Washington Street Apartments

Location of Subdivision/Land Development: Washington Street
(~~Primary Access Roadway Name~~)

Between: Cherry Street (Roadway Name) and Lee Street (Roadway Name)

Number of Parcels: 1 **Block Number(s):** _____ **Unit Number(s):** _____

Parcel Number(s): 65-00-12679-00-9

Acreage: 9.8 **Total Lots Proposed:** 1 **Zoning District:** I-Industrial

Water Service Proposed: ☒ Public ☐ Private Sewer Service Proposed: ☒ Public ☐ Private

Applicant Name: 601 Washington Street Assoc LP **Contact Name:** Kevin Kyle

Phone #: 610-337-5582 Fax #: N/A Email: kkyle@mlpventures.com

Address: 201 King of Prussia Road, Suite 501, Radnor, PA 19087

Owner of Record Name (If Different): Same as Applicant

Phone #: _____ Fax #: _____ Email: _____

Address: _____

Engineer Name: C. Richard Roseberry **Firm Name:** Colliers Engineering & Design, Inc.

Phone #: 908-581-8658 Fax #: N/A Email: richard.roseberry@colliersengineering.com

Address: 941 Marcon Blvd, Suite 801, Allentown, PA 18109

Fees and plans showing all public improvements are submitted with this application. Any additional plan information required by the Township Engineer will be submitted to the Director of Planning and Zoning for distribution. The undersigned applicant agrees to comply with all the provisions of Chapter 105 of the Code of the Township of Whitemarsh, as amended, and agrees to obtain all necessary permits in connection with the proposed subdivision and/or land development.

Whitemarsh Township employees, or township-authorized agents, are hereby granted permission to enter upon the land, if necessary, for site inspections.

Original preliminary and/or original final subdivision and/or land development applications submitted by 4:00pm on the last business day of the month will be reviewed by the Whitemarsh Township Planning Commission at a regular meeting two (2) months following the date of submission or other appropriate meeting date depending upon the results of Township reviews.

I hereby certify, as the undersigned applicant, that I am familiar with the provisions of: [1] Chapter 105, "Subdivision and Land Development", [2] Chapter 58, "Grading, Erosion Control, Stormwater Management and Best Management Practices", and [3] Chapter 55, "Tree Protection Standards" of the Code of the Township of Whitemarsh, as amended, and, to the best of my knowledge and belief, this application and the submitted plans conform to those provisions.

Date of Submission: 3/3/22

Signature: _____

(Original Signature must be submitted)

Printed Name: Kevin S. Kyle

I, (name) Kevin Kyle **(title)** V.P. / Sr. Project Manager of

(entity submitting application) MLP Ventures do hereby affirm

that I am authorized by the applicant to affix my signature to this application.

Date: 3/3/22 Signature: _____

(Original Signature must be submitted)

WHITEMARSH TOWNSHIP
SUBDIVISION and/or LAND DEVELOPMENT
TIME WAIVER FORM

Date: 3/3/22

Granted to: Whitemarsh Township Board of Supervisors

Name of Subdivision and/or Land Development: 601 Washington Street Apartments

On or about _____, I/we submitted for official filing the above-reference application.

Notwithstanding any contrary provision of the Pennsylvania Municipalities Planning Code or the Code of the Township of Whitemarsh, this letter will serve as notice to Whitemarsh Township that the requirement that action be taken on this application within ninety (90) days is hereby waived, without limitation as to time. This waiver is granted to permit us to make revisions to the application during the application review process.

Further, with the understanding that this waiver is voluntarily given and will be relied upon by Whitemarsh Township, I/we will give Whitemarsh Township written notice (by certified mail or recognized overnight carrier) should we determine that limiting the time of the review process becomes necessary. Whitemarsh Township shall then have ninety (90) days from receipt of such written notice in which to act upon the application.

This waver is not transferable or assignable by the Applicants and shall apply to any and all revised submissions made in relation to the above-referenced application.

I/we represent that I/we have been duly authorized to execute this waiver on behalf of the Applicant.

Date: 3/3/22

Signature: _____
(Original Signature must be submitted)

Printed Name: Kevin Kyle

Firm Name: MLP Ventures on behalf of: 601 Washington Street Associates, L.P.
(if applicable)

Title: Sr. Project Manager
(if applicable)

WHITEMARSH TOWNSHIP
REQUEST FOR MODIFICATION (WAIVER) OF
SUBDIVISION and/or LAND DEVELOPMENT ORDINANCE REQUIREMENTS

Pursuant to § 512.1.(b) of the Pennsylvania Municipalities Planning Code, all requests for a modification shall be in writing and shall accompany and be a part of the application for development. The request shall state in full the grounds and facts of unreasonableness or hardship on which the request is based, the provision or provisions of the ordinance involved and the minimum modification necessary.

Check the appropriate line:

☐ No modification (or waiver) of the Whitemarsh Township Subdivision and Land Development Ordinance is requested

☑ I/we hereby request the following modification[s] (or waiver[s]) of the Whitemarsh Township Subdivision and Land Development Ordinance. (The request must identify the applicable Section[s] of the Ordinance, modification[s] requested, and facts of unreasonableness or hardship upon which the request is made; attach additional sheets if necessary).

Please see attached waiver request letter.

Name of Subdivision and/or Land Development: 601 Washington Street Apartments

Date: 3/3/22 Signature: _____

(Original Signature must be submitted)

410 Eagleview Boulevard
Suite 104
Exton Pennsylvania 19341
Main: 877 627 3772
colliersengineering.com

Colliers
Engineering & Design

601 Washington Street Apartments

WAIVERS & VARIANCES

WAIVERS REQUESTED WITHIN WHITEMARSH TOWNSHIP:

SECTION 105-39.A -	A WAIVER FOR THE REQUIREMENT THAT ALL PARKING AREAS SHALL HAVE AT LEAST ONE TREE OR TWO-AND-ONE-HALF-INCHES MINIMUM CALIPER FOR EVERY TWO PARKING SPACES PROVIDED.
SECTION 105-47.K -	A WAIVER IS REQUESTED TO ALLOW THE REQUIRED 25' WIDE RIGHT-OF-WAY TO BE 5' WIDE DUE TO SITE CONSTRAINTS.
SECTION 105-52-	A WAIVER IS REQUESTED TO ALLOW PERIMETER BUFFER YARDS TO BE LESS THAN 50' IN WIDTH. BUFFER LANDSCAPING IS PROVIDED AT THE INTENSITY THAT MEETS THE INTENT OF THE BUFFER YARD REQUIREMENTS AND ADDRESS THE UNIQUE CHARACTERISTICS OF THE SITE AND INTENT OF THE RIVERFRONT DEVELOPMENT DISTRICT.
SECTION 55-4.B.(6) (f)[1][2]&[3] -	A WAIVER FROM THE REQUIREMENT THAT REPLACEMENT TREES INSTALLED BY APPLICANT BE SUBJECT TO CERTAIN MAXIMUM PERMISSIBLE PERCENTAGES FOR FLOWERING TREES, EVERGREEN TREES, SHRUBS AND GROUND COVERS.

VARIANCES & SPECIAL EXCEPTIONS GRANTED BY WHITEMARSH TOWNSHIP ZHB: RESOLUTION #2019-26895: AUGUST 6, 2020

SECTION 116-165 -	VARIANCE TO PERMIT NON-RESIDENTIAL STRUCTURES IN THE FLOODPLAIN CONSERVATION DISTRICT.
SECTION 116-166.A(3) -	SPECIAL EXCEPTION TO PERMIT A STORMWATER RETENTION BASIN WITHIN FLOODWAY.

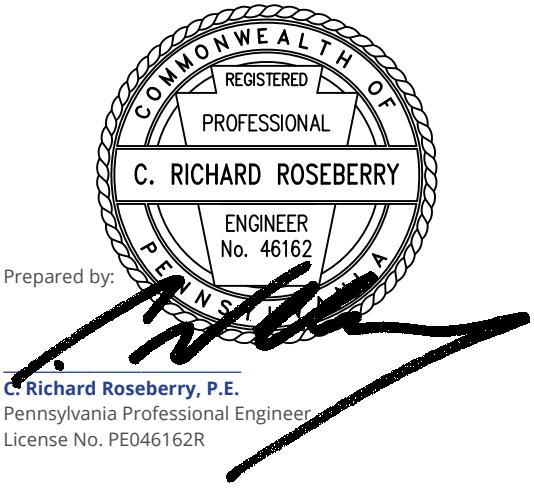
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Post-Construction Stormwater Management Report

March 1, 2022

601 Washington Street Apartments

601 Washington Street
Whitemarsh Township
Montgomery County, Pennsylvania



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Executive Summary

This report was prepared to demonstrate the competency of the proposed Post-Construction Stormwater Management (PCSM) design for the 601 Washington Street Apartments project located in the Township of Whitemarsh, Montgomery County, Pennsylvania.

As part of the National Pollution Discharge Elimination System (NPDES) permit, the project is required to provide a PCSM plan and report. The Pennsylvania Department of Environmental Protection issued the Pennsylvania Stormwater Best Management Practices Manual as guidance for the completion of the PCSM design. Through the use of recommended Best Management Practices (BMPs), the environmental effects from this project were reduced. The project PCSM goal is to adequately and safely recreate, as closely as possible, the pre-project conditions in the post-project condition. This PCSM Plan was designed to eliminate (wherever possible) or minimize point source discharge to surface waters, preserve the integrity of stream channels, and protect the physical, biological, and chemical qualities of the receiving surface water.

The calculations presented in this report demonstrate that the designed facilities meet the project PCSM goals and sufficiently address the state's, county's and municipalities' regulatory requirements.

1.0 Introduction

As part of the NPDES permit, the project is required to provide a PCSM Plan and Report. The Pennsylvania Department of Environmental Protection (PADEP) issued the Pennsylvania Stormwater Best Management Practices Manual (BMP Manual) as guidance for the completion of the PCSM design. The proposed plans incorporate guidelines and calculation methodologies from the BMP Manual. The purpose of the BMP Manual is "to ensure effective stormwater management, to minimize the adverse impacts of stormwater on ground water and surface water resources, and to support and sustain the social, economic, and environmental quality of the Commonwealth." The three primary interests involved include:

- Stream channel erosion and flooding resulting from increases in flow rate and volume;
- Water quality impacts to streams and groundwater aquifers from particulates, floatables, and hydrocarbons; and
- Thermal impact on streams caused by heat transfer from pavement to runoff and loss of riparian buffer vegetation.

Through the use of recommended BMPs, the environmental effects are reduced. The above concerns can be addressed through the implementation of BMPs that decrease runoff volume, extend detention times, and reduce release rates. The project PCSM goal is to adequately and safely recreate, as closely as possible, the pre-project condition in the post-project condition. This PCSM Plan was designed to eliminate (wherever possible) or minimize point source discharges to surface waters, preserve the integrity of stream channels, and protect the physical, biological, and chemical qualities of the receiving surface water.

1.1 Project Information

601 Washington Street Associates LP proposes improvements to the site, including a residential apartment building complex with ground-level parking, a subsurface stormwater management facility, and other typical site appurtenances. Two (2) driveways are proposed along Washington Street. The entire site is located within the 100-year FEMA delineated floodplain of the Schuylkill River and a portion of the site lies within the delineated floodway.

The past land use includes:

Past 5 Years Land Use

The property is currently vacant. The property contains a building as well as gravel and pavement areas of former industrial uses. The property also contains associated utilities and trees.

Past 50 Years Land Use

The property functioned as industrial use since the 1800s.

Due to the former industrial uses, the site is part of the PADEP Act 2 program for onsite soil contaminants.

Approximately 8.74± acres will be disturbed as part of the project. The project is located within the Heavy Industrial District (HVY) with the Riverfront Development District One (RDD-1) Overlay, Riparian Corridor Conservation District (RCCD), Steep Slopes (SS) Overlay District and the Floodplain Conservation Overlay District (FLPL) in Whitemarsh Township. The proposed use is permitted by right. The site will be served by public water and sewer.

The site is bound by Washington Street to the north, the Schuylkill River to the south, and industrial properties to the east and west, see Appendix A for the project location maps.

1.2 Pre-Project Conditions

This site is located in the Schuylkill River Watershed. The site is generally sloped towards the south, with the majority of stormwater flowing directly to the Schuylkill River. The Pennsylvania Code, Title 25, Chapter 93, Water Quality Standards assigns the Schuylkill River a water quality designation of Warm Water Fishery, Migratory Fishes (WWF, MF).

Pre-project cover areas and drainage boundaries were based on topographical survey, site visits, aerial photographs, and USGS mapping. The site is flat with a portion of the storm runoff being collected by roof drains and storm inlets, which are generally conveyed from north to south. There is a small section of the site that drains to the north towards Washington Street. The remainder of the site's runoff is discharged to the Schuylkill River via overland flow.

An existing 48" pipe carries offsite water through the site and discharges to the Schuylkill River. The existing 48" pipe will be removed and will be replaced by a proposed 48" pipe network which will convey the offsite water to the Schuylkill River as in the existing condition.

Due to the past industrial uses, the site in the pre-project condition is considered partially impervious, with the exception of overgrown areas behind the existing buildings and parking area.

This analysis will evaluate the pre-project and post-project flow from the proposed development areas of the site to a study point. Two study points have been established for analysis: the first (SP-1) is a point within the Schuylkill River where the majority of the site's runoff discharges at; the second (SP-2) is a point within the roadside drainage ditch on the south side of Washington Street.

1.3 Post-Project Conditions

The site was analyzed at two (2) study points to examine the effects of development with cover type changes, detention, and low-impact development features. The study points are located at the same locations of the existing study points, as described above.

The proposed construction will be reducing impervious cover to the greatest extent possible through placement of lawn areas. The proposed BMPs include but are not limited to: re-vegetate disturbed areas, snouts, and a Managed Released Concept (MRC) underground basin. The basin discharges to the proposed stormsewer which discharges to the Schuylkill River at the currently existing discharge point. Post-project flow paths will follow pre-project flow paths and no additional discharge points will be added as part of this development.

The proposed impervious cover includes the proposed multi-unit residential building, sidewalks, and necessary roadway improvements. The post-project pervious cover is assumed in the calculations to be lawn, except in areas where the existing trees are to remain.

2.0 Soils

Soil mapping and properties including depths, slopes, and limitations for the calculations presented in this report, were obtained from the NRCS Web Soil Survey. Project soil locations is shown on the plan drawings, and a summary of the soils as well as a copy of the NRCS Web Soil Survey map are included in Appendix B. The NRCS Web Soil Survey soils found within the site area are listed below in Table 3.1:

Table 3.1 NRCS Web Soil Survey Results

Soil Code	Soil Description	Hydrologic Soil Group
UgB	Urban land, 0 to 8 percent slopes	B

The site is located within an urban industrial center for over 150 years and as such, the site soils are comprised of mixed fill material with no definite homogenous characteristics. The site is also part of the PADEP Act 2 program for onsite soil contaminants, therefore the installation of a soil (minimum of 1' depth) or impervious cap will be included as part of the site construction.

2.1 Karst Geology

A specific karst hazard assessment was not developed for this site. There are no known sinkholes onsite or within 1,500 feet of the site. Copies of the karst features and sinkhole maps are included in Appendix J.

2.2 Infiltration and Geotechnical Testing

Due to various factors including shallow bedrock, Act 2 contamination, existing buildings on the site, and lack of suitable area for infiltration, the use of the Manage Release Concept was selected to mitigate volume increases instead of infiltration. The onsite subsurface findings including various test pits and boring holes are located in Appendix K.

3.0 Regulations

The PCSM plan has been prepared utilizing the following standards:

- Municipal Ordinances – Whitemarsh Township, various dates
- PADEP Erosion and Sediment Pollution Control Program Manual, Pennsylvania Department of Environmental Protection, March 2012
- Pennsylvania Stormwater Best Management Practices Manual, Final Draft, Pennsylvania Department of Environmental Protection, December 2006

Several of the above regulations address similar tasks but have different criteria that conflict with one another. In such cases, all of the criteria were evaluated to determine how to achieve the best overall compliance with all of the regulatory documents. The project criteria used included the following:

- Tributary Cover is based on actual field conditions, topographic survey data, and aerial mapping.

- Land Use Coefficients and Curve Numbers are consistent with the normal practices of the Whitemarsh Township Stormwater Management Ordinance, and Urban Hydrology for Small Watersheds, Technical Release 55 (TR-55), and were merged into a project specific list, which is included in **Appendix C**.

- Rainfall Depths and Intensities follow the process outlined in PENNDOT Publication 584, Chapter 7, Appendix A, Figures 7A.1 through 7A.6, shown in **Appendix D**. Rainfall intensity curves consistent with the normal practices of the Whitemarsh Township Stormwater Management Ordinance, were utilized in the rainfall runoff analysis.

- Channel Design uses criteria from the Erosion and Sediment Pollution Control Program Manual.

- Storm Sewer and Inlet Design adhere to criteria found in the Hanover Township Municipal Code. The Rational Method was used for the analysis of stormwater systems and stormwater runoff rates. Pipes were analyzed using the Hydraflow Storm Sewers Extension for AutoCAD Civil 3D computer analysis program.

- Detention Basin Routings use the SCS Segmental approach for the time of concentration. Routings were performed using the Modified Puls Routing methodology with the SCS TR-20 method used for the development of inflow hydrographs in the program HydroCAD Version 10.

3.1 Act 167

Montgomery County completed Act 167 Stormwater Management Plans for 10 of its 17 watersheds and is considering completing one county wide plan to complete the remaining watershed plans and update the existing ones. The project is located within the Schuylkill Watershed for which a plan has not been completed; therefore, more stringent management is not required above the Pennsylvania Stormwater Management Act 167 and all post-project design storms were reduced to rates below the pre-project condition.

3.2 Erosion and Sediment Pollution Control

This project will be submitted to the Montgomery County Conservation District (MCCD) for the required Erosion and Sediment Pollution Controls (E&SPC) approval as required by the Pennsylvania Clean Stream Law and regulations from Chapter 102. Applicable E&SPC design calculations for permanent features are included in Appendix H. The E&SPC construction sequence, on the E&SPC plans, includes the construction sequence for PCSM BMP installations for the project.

3.3 Pennsylvania Department of Environmental Protection

PADEP's PCSM plan goal is to control rate, volume, and water quality of runoff from a project by maximizing volume reduction technologies, minimizing point source discharges to surface waters, preserving stream channel integrity, and protecting the physical, biological, and chemical qualities of the receiving surface water. PADEP created several worksheets to help the designer assess the effectiveness of the design, shown in Appendix E. The PADEP PCSM Worksheets will be discussed in more detail later in this report.

4.0 Proposed PCSM BMPs

The proposed structural BMPs for this project include:

1. Managed Release Concept Basin - Underground MRC Basin was designed to assist in peak rate reduction and volume management through the outlet design with Management Release Concept (MRC) approach. Upstream snouts will function as pre-treatment for this basin. This facility will be constructed as a Cultec R-360HD system. The project is located on a site with known contaminated soils, therefore this facility was not designed for infiltration and is wrapped with a 30 mil liner to prevent it from occurring. This permanent BMP enhances not only ground water recharge, but removes large and small particulates, providing excellent water quality (BMP 6.6.3).

The stormwater runoff conveyed into the MRC subsurface detention facility will be collected from the proposed building roof drains and various Type 'C' and 'M' inlets within the parking areas. This runoff will receive water quality treatment prior to discharge into the detention facilities and will be considered as clean water.

Manage Release Concept Design Standards:

- Runoff Capture – All runoff entering the underground basins will be pre-treated by water quality snout inlets to remove large and small particulates prior to entering the basins.
- Release Rate for the 1.2-inch/2-hour Storm – The MRC facility will have the release rate of 0.00 cfs for the 1.2-inch/2-hour storm event. Refer to MRC worksheet in Appendix E.
- Internal Water Storage – 12" of IWS has been provided. As stated above, all runoff convey into the underground basins are deemed as clean water from the roof drains.
- Peak Flow Attenuation for the 2-year/24-hour Event – The project drainage area release rate of 2-year/24-hour storm event in post development condition is lower than the project drainage area release of 1-year/24-hour storm event in pre-development condition. Refer to Appendix F – Release Rate Calculations.
- Stormwater BMP Manual – MRC is being incorporated into the proposed subsurface detention facility.
- MRC BMP Selection – Non-vegetated MRC (Subsurface Detention Structure) is being proposed for the project.
- Pre-Development Site Characterization and Assessment of Soil and Geology – As described above, infiltration testing was elected not to be performed due to proximity of underground

basins to the buildings and their parking structures. Various test pits were completed around the proposed BMP. Closed systems are proposed.

- Separation Distance – A 1 foot separation from seasonal high water table has been provided. The water table was determined through various test pits, as included in the Geotechnical Report in Appendix J.
- Ponding Depth and Drawdown Time – Design criteria has been incorporated. Refer to MRC worksheets.
- Soil Media – Soil media has not been provided as the proposed MRC is a subsurface detention structure.
- Underdrain Design – A perforated underdrain is provided at the MRC invert with an upturned elbow to provide 12" of internal water storage.
- Discharge Flow Path – Runoff discharges from the subsurface detention facility will be conveyed through the proposed storm sewer network prior to discharge into the Schuylkill River.
- Antidegradation Requirements – Runoff discharges from the subsurface detention facility will be conveyed through the proposed storm sewer network prior to discharge into the Schuylkill River. The underground detention time will allow time for the water to cool prior to discharging to the surface water.
- The PADEP Managed Release Concept (MRC) Design Summary sheets are included in Appendix E.

3. Mechanical Water Quality Filter – The discharge pipes into the underground detention facilities will drain through snouts to treat the stormwater prior to being discharged into the facilities. This structure is not recognized as a DEP BMP, but it can be used in combination with other facilities.

The aforementioned BMPs were designed in accordance with PADEP policies. Specific BMP locations are on the included plans.

5.0 Peak Rate Analysis

This project was designed to fulfill the PADEP Peak Rate Control Guidelines, which limit the post-project peak flow rates to the pre-project peak flow rates for applicable storm events.

The project site is located within the Schuylkill River Watershed which does not have an approved Act 167 plan, therefore no additional release rate restrictions are required. For both analysis points, post-project flow rates shall not exceed the pre-project flow rates for 2-, 10-, 50-, and 100-year design frequency storms.

Since the TR-55 methodology is used, the SCS Segmental methodology is used to calculate the time of concentration. A time of concentration was calculated for each subarea. Minimum time of concentration of 6 minutes was used for areas that would have a Tc less than 6 minutes. The Pre-project time of concentration calculation did not account for the shallow low spots present on the site due to the site being within the floodplain. Time of concentration calculations can be found as part of the release rate calculations completed using HydroCAD, see Appendix F for the pre-project

calculations and post-project calculations. The post-project flow rate is reduced to less than the pre-project flow rate in all design storms.

6.0 Volume Management

This project as a whole was designed to fulfill the PADEP Volume Control Guideline 1, which limits the post-project runoff volume to the pre-project runoff volume for the 2-year, 24-hour storm event. The two ways to mitigate the project runoff volume are through the use of non-structural and structural BMPs. The proposed structural BMPs and their PADEP BMP IDs were listed previously in the Proposed PCSM BMPs section of this report.

6.1 Non-Structural BMP Credits

PADEP PCSM Volume Worksheet calculates the volume credits that can be taken for utilizing non-structural BMPs in the planning process for any project. At this time, credits were not taken for non-structural BMPs. All of the PADEP PCSM Worksheets can be found in Appendix E.

6.2 Required Infiltration Volume

The 'Volume Management' DEP PCSM Spreadsheet calculations were completed to determine the change in runoff volume for the 2-year, 24-hour design storm event from the pre-project condition to the post-project condition.

6.3 Provided Infiltration Volume

The 'Volume Management' DEP PCSM Spreadsheet tabulates the tributary area to the proposed structural BMPs and the storage volume of the proposed BMPs. Since infiltration is not possible, this project includes the use of a managed release concept (MRC) underground detention basin to account for the difference between the 2-year pre-project volume and the 2-year post-project volume. This MRC basin will mitigate for all the additional impervious surfaces while also assisting in rate reduction. The PADEP Managed Release Concept (MRC) Design Summary sheets are included in Appendix E.

7.0 Water Quality Calculations

This project as a whole was designed to adequately address the PADEP Water Quality Control Guideline, which requires that post-project releases of total suspended solids (TSS) and total phosphorous (TP), and nitrates (NO3) do not exceed the pre-project releases. Through the use of structural BMPs, the post-project pollutant loading can be reduced. The proposed Structural BMPs were listed previously in the Proposed PCSM BMPs section of this report.

7.1 Required Water Quality Reductions

In order to reduce the pollutant loading in the post-project condition, permanent BMPs were purposefully placed to intercept disturbed runoff. These proposed BMPs were listed previously in the report. The project was designed to use proposed BMPs in series. As such, the drainage areas to each

BMP may overlap, but the actual footprint of the BMPs do not overlap and volumes to each BMP are only counted once.

The PADEP PCSM Quality Worksheet calculates the total pollutants reaching each individual BMP and the total pollutant reductions based on the BMP removal efficiencies. After each BMP is calculated, a sum of the total pollutant reductions achieved by all BMPs was determined. Although there are multiple proposed BMPs, the water quality BMPs used for calculation purposes include: MRC underground basin. Snouts are used for pre-treatment of stormwater prior to discharging to the underground detention basins, but the snouts do not provide additional water quality credit.

The project post development water quality pollutants loads are less than the pre-development water quality pollutants loads for all three required pollutants. As such, the proposed project meets all three of the PADEP PCSM Quality Worksheet required pollutant load reductions.

All of the PADEP PCSM Worksheets can be found in Appendix E. Water quality calculations for each water quality BMP are also shown in Appendix E.

8.0 Operations and Maintenance for PCSM BMPs

The operation and maintenance of the permanent PCSM BMPs located onsite will become the responsibility of the owner by way of the recorded plans. The owner must sign an Operation and Maintenance Agreement based on the Operation and Maintenance Plan as described in detail on the PCSM plans.

9.0 Anti-Degradation Analysis

This project included measures to mitigate the thermal impacts to the receiving surface waters, even though the project is not required to provide an analysis. An anti-degradation analysis is only required when the project is within a special protection watershed.

All runoff from the roof areas will be captured and directed to subsurface underdrains. Runoff from paved areas of the project discharge through buried pipe, thereby creating ample opportunity for cooling prior to reaching the surface waters. Most of the site will be directed to the underground detention facility which will provide additional time for water to cool. As such, the project will not have an adverse impact on the natural temperatures of the receiving surface waters.

10.0 PCSM Plan Set

Post-Construction Stormwater Management Plan drawings have been submitted concurrently with this report.

11.0 Conclusion

The project meets PCSM requirements by addressing three key measures used by PADEP to gauge the potential impacts from a proposed project including:

1. Peak Rate Mitigation – Peak Rate Mitigation reduces the post-project release rates to levels less than the pre-project release rates, thus reducing the potential for accelerated erosion to areas located downstream of the project and reducing the potential for downstream flooding.
2. Volume Reduction – Volume Reduction lessens the effects of construction by reducing the post-project runoff volume through the use of an MRC BMP. Since this site located in a known contaminated soils area, infiltration is not proposed on the site.
3. Water Quality Control – Water Quality Controls are used to achieve pollutant loading reductions, in order to protect the existing surface waters and preserve natural habitats.

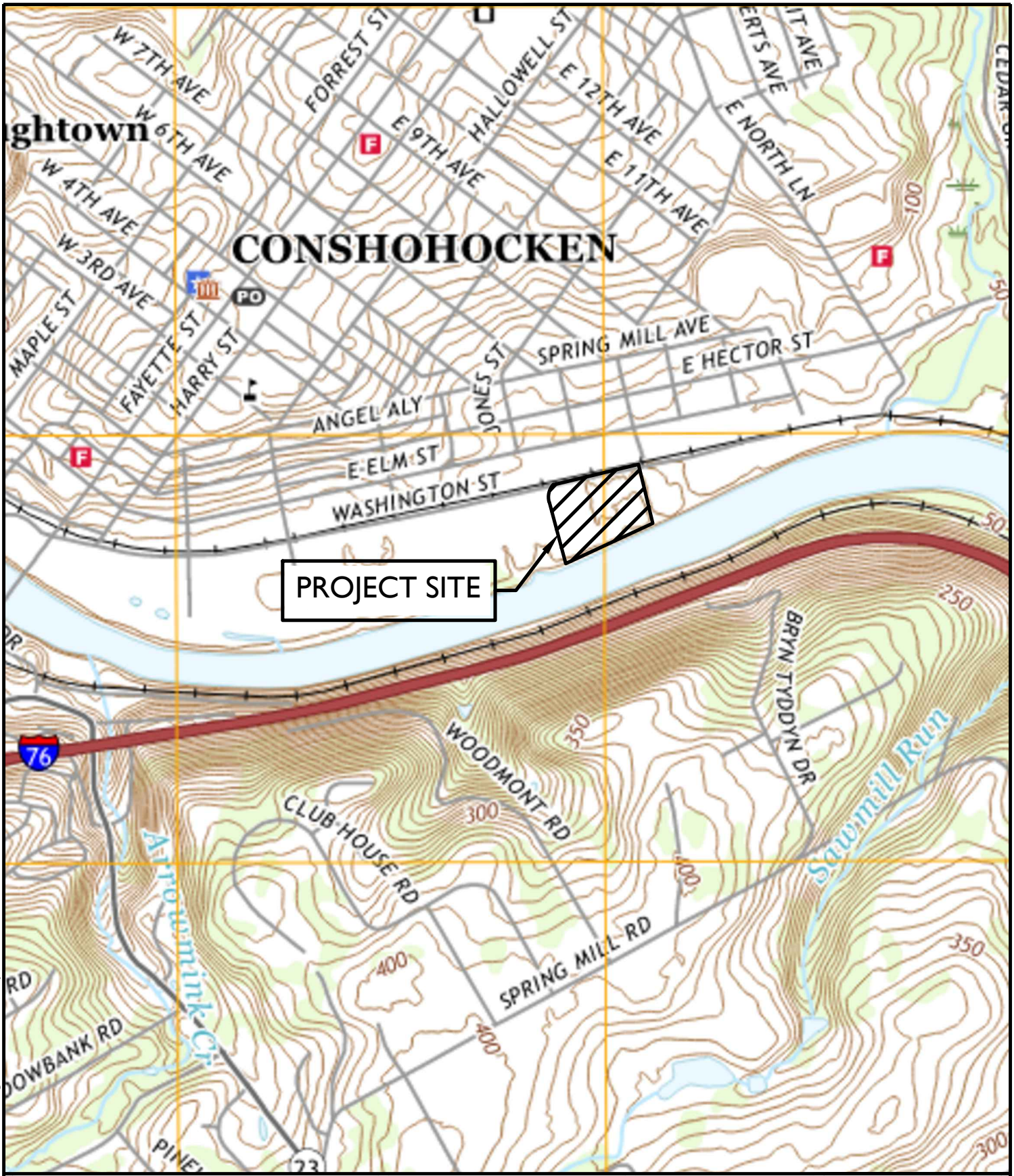
Through the use of recommended BMPs that improve water quality and reduce release rates, the environmental effects from this project were reduced. This PCSM Plan was designed to eliminate (wherever possible) or minimize point source discharges to surface waters, preserve the integrity of existing stream channels, and protect the physical, biological, and chemical qualities of the receiving surface water. The calculations presented in this report demonstrate that the designed facilities sufficiently balance the multiple regulatory requirements.

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References

- Subdivision and Land Development Ordinances (SALDO), Whitemarsh Township, various dates.
- Zoning Ordinances, Whitemarsh Township, various dates.
- Stormwater Management Ordinances, Whitemarsh Township, various dates.
- PADEP Erosion and Sediment Pollution Control Program Manual (E&S Manual), Pennsylvania Department of Environmental Protection, March 2012.
- Pennsylvania Stormwater Best Management Practices Manual, Final Draft, Pennsylvania Department of Environmental Protection, December 2006.
- NRCS Web Soil Survey, United States Department of Agriculture, November 2021.
- PA Code, Title 25, Environmental Protection, Commonwealth of Pennsylvania
- PENNDOT Publication 13M, Design Manual, Part 2, Highway Design (DM-2), Pennsylvania Department of Transportation, August 2009
- PENNDOT Publication 584, PENNDOT Drainage Manual (PDM), Pennsylvania Department of Transportation, December 2010
- PENNDOT Publication 72M, Roadway Construction Standards, Pennsylvania Department of Transportation, June 10, 2013
- Urban Hydrology for Small Watersheds, Technical Release 55 (TR-55), United States Department of Agriculture, June 1986
- PA Code, Title 25, Environmental Protection, Commonwealth of Pennsylvania

Appendix A | Project Location Maps



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PRELIMINARY/FINAL
LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

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PROJECT NUMBER:	DRAWING NAME:
16001030C	C-EXBT-USGS

SHEET TITLE: USGS MAP

SHEET NUMBER: A - 3 of 6

1 of 1

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601 Washington
Aerial Map
Legend
E Hector St
E Elm St
Apple St
Schuylkill River Trail
Washington St
SITE
Schuylkill River
Schuylkill Expy
76
N
700 ft
Google Earth

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 18. **Horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
National Geodetic Survey, NOAA
Silver Spring Metro Center 3
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov/.

BASE MAP SOURCE: Road centerlines were obtained in digital spatial data format from the Delaware Valley Regional Planning Commission. County and township/borough boundaries were downloaded from the Pennsylvania Spatial Data Access website. 2002 and 2005 digital orthophotographs were provided by the Delaware Valley Regional Planning Commission. Streamlines were digitized based on the orthophotos. Adjustments were made to specific base map features to align them to 1"=200' scale orthophotos.

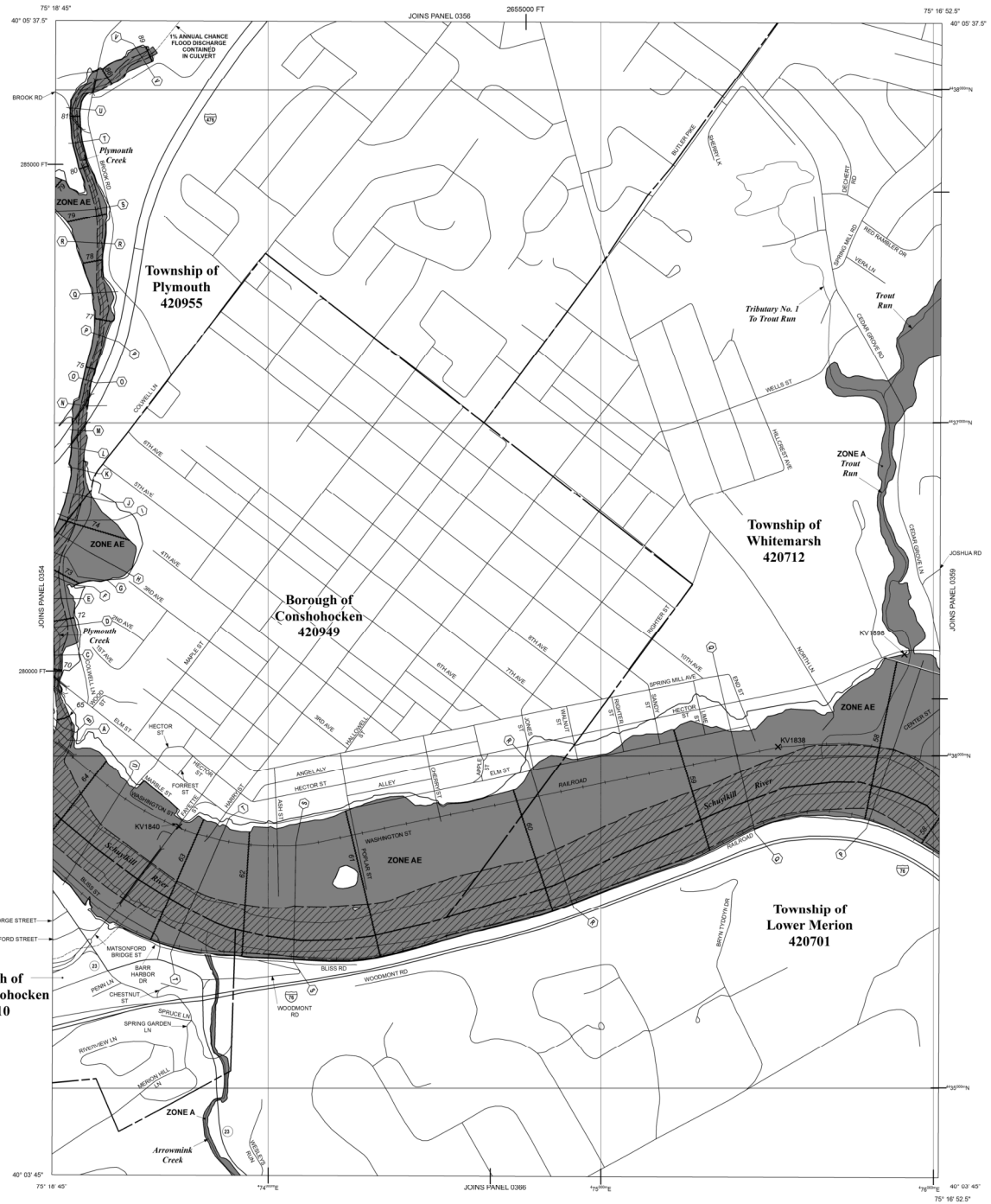
Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map**, how to order products or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAS)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- Bridge
- Culvert
- A — A — Cross section line
- 23 — 23 — Transect line
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4276 000 M — 1000-meter Universal Transverse Mercator grid values, zone 18
- 600000 FT — 5000-foot grid ticks: Pennsylvania State Plane (South) coordinate system (FIPSZONE 3702), Lambert Conformal Conic projection
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- ● M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

DECEMBER 19, 1996

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
MARCH 2, 1998 APRIL 21, 1999 AUGUST 9, 1999 OCTOBER 19, 2001
MARCH 2, 2016 - to add, change and delete Special Flood Hazard Areas; to reflect updated topographic information; to change, add Base Flood Elevations; and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0358G

FIRM
FLOOD INSURANCE RATE MAP

MONTGOMERY COUNTY, PENNSYLVANIA
(ALL JURISDICTIONS)

PANEL 358 OF 451

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CONSHOHOCKEN, BOR OF	420949	0358	G
LOWER MERION, TWP OF	420701	0358	G
PLYMOUTH, TWP OF	420900	0358	G
WHITEMARSH, TWP OF	420712	0358	G
WEST CONSHOHOCKEN, BOR OF	420710	0358	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
42091C0358G

MAP REVISED
MARCH 2, 2016

Federal Emergency Management Agency

Appendix B | Soil Maps and Data

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Montgomery County, Pennsylvania

601 Washington Street



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map



Map Scale: 1:1,940 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 25 50 100 150

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Montgomery County, Pennsylvania
Survey Area Data: Version 16, Sep 1, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 21, 2020—Oct 6, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
UgB	Urban land, 0 to 8 percent slopes	11.1	91.5%
W	Water	1.0	8.5%
Totals for Area of Interest		**12.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Montgomery County, Pennsylvania

UgB—Urban land, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2dtyq
Elevation: 800 to 1,500 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 41 to 62 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Pavement, buildings and other artifically covered areas human transported material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Udorthents, unstable fill

Percent of map unit: 10 percent
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: 1nnv3
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 120 to 214 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Setting

Parent material: Rivers streams ponds

Properties and qualities

Runoff class: Negligible
Frequency of ponding: Frequent

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Appendix C | Runoff Coefficients and Curve Numbers

Runoff Curve Numbers and Percent Imperviousness Values*

Cover Description	Average Percent Impervious Area	Curve Numbers for Hydrologic Soil Group			
Open space (lawns, parks, golf courses, cemeteries, etc.):					
Good condition (grass cover greater than 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads: paved, curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved, open ditches (including right-of-way)		83	89	92	93
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential district by average lot size:					
1/8 acre or less (townhouses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
½ acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Woods		30	55	70	77
Agriculture		Refer to Table 2-2b in source document (TR55) by crop type and treatment.			

*Source Soil Conservation Service Technical Release No. 55, Second Edition, June 1986.

Table 2-2c Runoff curve numbers for other agricultural lands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2/]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3/]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4/]	48	65	73
Woods—grass combination (orchard or tree farm). [5/]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6/]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4/]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.

2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

3 *Poor*: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

4 Actual curve number is less than 30; use CN = 30 for runoff computations.

5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

2. The coefficient of roughness, "n", shall be as follows unless otherwise approved by the Township Engineer.

Material/Ground Cover	**Roughness Coefficient "D"**
Concrete pipe	.012
Corrugated steel pipe	see table below
Vitrified clay pipe	.012
Cast iron pipe	.013
Brick sewer	.015
Asphalt pavement	.015
Concrete pavement	.014
Grass swales	.040
Earth	.020
Gravel	.020
Rock	.035
Cultivated areas	.030 to .050
Dense Brush	.070 to .140
Dense woods with little undergrowth	.100 to .150
Streams	
Some grass and weeds, little brush	.030 to .035
Dense growth of weeds	.035 to .050
Some weeds, heavy brush on banks	.050 to .070

Values of Coefficient of Roughness (n)
for Standard Corrugated Steel Pipe
(Manning's Formula)

Corrugations	Helical						
	1 ½" x 1/4"				2 2/3" x 1 2/3"		
	8"	10"	12"	18"	24"	36"	48"
Unpaved	.012	.014	.011	.014	.016	.019	.020
25% paved					.015	.017	.020
Fully paved					.012	.012	.012

Corrugations	Helical					
	3" x 1"					
	36"	48"	54"	60"	66"	72"
Unpaved	.021	.023	.023	.024	.025	.026
25% paved	.019	.020	.020	.021	.022	.022
Fully paved	.012	.012	.012	.012	.011	.012

Appendix D | Rainfall Depths and Intensities

NOAA Atlas 14, Volume 2, Version 3
Location name: Conshohocken, Pennsylvania, USA*
Latitude: 40.072°, Longitude: -75.2987°
Elevation: 53.9 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.347** (0.318-0.378)	**0.412** (0.379-0.450)	**0.485** (0.444-0.528)	**0.535** (0.489-0.583)	**0.596** (0.542-0.649)	**0.637** (0.576-0.695)	**0.678** (0.611-0.741)	**0.714** (0.639-0.782)	**0.755** (0.670-0.831)	**0.786** (0.692-0.869)
10-min	**0.554** (0.509-0.604)	**0.660** (0.606-0.720)	**0.776** (0.710-0.845)	**0.856** (0.783-0.933)	**0.950** (0.864-1.03)	**1.01** (0.918-1.11)	**1.08** (0.971-1.18)	**1.13** (1.01-1.24)	**1.19** (1.06-1.31)	**1.24** (1.09-1.37)
15-min	**0.692** (0.636-0.755)	**0.829** (0.762-0.905)	**0.982** (0.899-1.07)	**1.08** (0.990-1.18)	**1.20** (1.10-1.31)	**1.29** (1.16-1.40)	**1.36** (1.23-1.49)	**1.43** (1.28-1.56)	**1.50** (1.33-1.65)	**1.55** (1.37-1.72)
30-min	**0.949** (0.872-1.03)	**1.15** (1.05-1.25)	**1.40** (1.28-1.52)	**1.57** (1.44-1.71)	**1.78** (1.62-1.94)	**1.94** (1.75-2.11)	**2.09** (1.88-2.28)	**2.22** (1.99-2.43)	**2.39** (2.12-2.63)	**2.52** (2.21-2.78)
60-min	**1.18** (1.09-1.29)	**1.44** (1.32-1.57)	**1.79** (1.64-1.95)	**2.04** (1.87-2.23)	**2.37** (2.16-2.59)	**2.62** (2.37-2.86)	**2.87** (2.59-3.14)	**3.12** (2.79-3.41)	**3.43** (3.05-3.78)	**3.67** (3.23-4.06)
2-hr	**1.42** (1.29-1.55)	**1.72** (1.57-1.89)	**2.15** (1.96-2.35)	**2.48** (2.25-2.71)	**2.91** (2.63-3.18)	**3.25** (2.92-3.56)	**3.60** (3.21-3.94)	**3.94** (3.49-4.32)	**4.41** (3.86-4.85)	**4.76** (4.13-5.26)
3-hr	**1.55** (1.42-1.70)	**1.88** (1.72-2.07)	**2.36** (2.15-2.59)	**2.72** (2.47-2.98)	**3.21** (2.90-3.52)	**3.59** (3.22-3.94)	**3.99** (3.55-4.37)	**4.39** (3.87-4.82)	**4.92** (4.29-5.44)	**5.35** (4.61-5.92)
6-hr	**1.94** (1.78-2.13)	**2.35** (2.15-2.58)	**2.93** (2.67-3.22)	**3.40** (3.09-3.72)	**4.05** (3.66-4.44)	**4.59** (4.10-5.03)	**5.15** (4.57-5.65)	**5.74** (5.03-6.31)	**6.57** (5.66-7.26)	**7.25** (6.15-8.04)
12-hr	**2.36** (2.16-2.61)	**2.85** (2.61-3.15)	**3.58** (3.27-3.95)	**4.18** (3.80-4.61)	**5.07** (4.55-5.57)	**5.81** (5.17-6.38)	**6.62** (5.82-7.28)	**7.49** (6.49-8.27)	**8.77** (7.44-9.73)	**9.84** (8.20-11.0)
24-hr	**2.73** (2.51-2.97)	**3.28** (3.02-3.59)	**4.12** (3.79-4.50)	**4.82** (4.42-5.26)	**5.83** (5.31-6.34)	**6.68** (6.06-7.26)	**7.60** (6.85-8.25)	**8.60** (7.69-9.32)	**10.0** (8.89-10.9)	**11.2** (9.85-12.2)
2-day	**3.15** (2.88-3.44)	**3.80** (3.48-4.15)	**4.78** (4.38-5.22)	**5.57** (5.09-6.08)	**6.71** (6.10-7.30)	**7.64** (6.93-8.32)	**8.64** (7.78-9.40)	**9.71** (8.69-10.6)	**11.2** (9.96-12.2)	**12.5** (11.0-13.6)
3-day	**3.32** (3.05-3.63)	**4.00** (3.68-4.37)	**5.02** (4.60-5.48)	**5.84** (5.35-6.37)	**7.01** (6.39-7.63)	**7.98** (7.25-8.68)	**9.00** (8.13-9.80)	**10.1** (9.06-11.0)	**11.7** (10.4-12.7)	**12.9** (11.4-14.1)
4-day	**3.49** (3.22-3.82)	**4.21** (3.87-4.60)	**5.26** (4.83-5.74)	**6.11** (5.61-6.66)	**7.31** (6.68-7.96)	**8.31** (7.56-9.04)	**9.36** (8.48-10.2)	**10.5** (9.44-11.4)	**12.1** (10.8-13.2)	**13.4** (11.8-14.6)
7-day	**4.08** (3.79-4.44)	**4.90** (4.54-5.33)	**6.05** (5.60-6.59)	**7.00** (6.47-7.61)	**8.36** (7.69-9.08)	**9.48** (8.68-10.3)	**10.7** (9.71-11.6)	**11.9** (10.8-12.9)	**13.7** (12.3-14.9)	**15.2** (13.5-16.5)
10-day	**4.65** (4.33-5.02)	**5.55** (5.17-6.00)	**6.77** (6.29-7.31)	**7.75** (7.19-8.37)	**9.11** (8.42-9.83)	**10.2** (9.41-11.0)	**11.3** (10.4-12.2)	**12.5** (11.4-13.5)	**14.2** (12.9-15.3)	**15.5** (14.0-16.8)
20-day	**6.29** (5.90-6.72)	**7.46** (7.00-7.97)	**8.90** (8.35-9.51)	**10.0** (9.40-10.7)	**11.6** (10.8-12.3)	**12.7** (11.9-13.6)	**13.9** (13.0-14.9)	**15.2** (14.0-16.2)	**16.8** (15.5-18.0)	**18.0** (16.5-19.3)
30-day	**7.84** (7.41-8.28)	**9.23** (8.73-9.76)	**10.8** (10.2-11.4)	**12.0** (11.3-12.6)	**13.5** (12.7-14.3)	**14.7** (13.8-15.5)	**15.8** (14.9-16.8)	**17.0** (15.9-18.0)	**18.5** (17.2-19.6)	**19.6** (18.2-20.8)
45-day	**9.96** (9.47-10.5)	**11.7** (11.1-12.3)	**13.5** (12.8-14.2)	**14.8** (14.0-15.5)	**16.4** (15.6-17.3)	**17.7** (16.7-18.6)	**18.9** (17.8-19.8)	**20.0** (18.8-21.0)	**21.3** (20.1-22.5)	**22.3** (20.9-23.6)
60-day	**11.9** (11.4-12.5)	**14.0** (13.3-14.7)	**16.0** (15.2-16.8)	**17.4** (16.6-18.3)	**19.3** (18.3-20.2)	**20.6** (19.6-21.6)	**21.8** (20.7-22.9)	**23.0** (21.8-24.2)	**24.4** (23.1-25.7)	**25.4** (24.0-26.8)

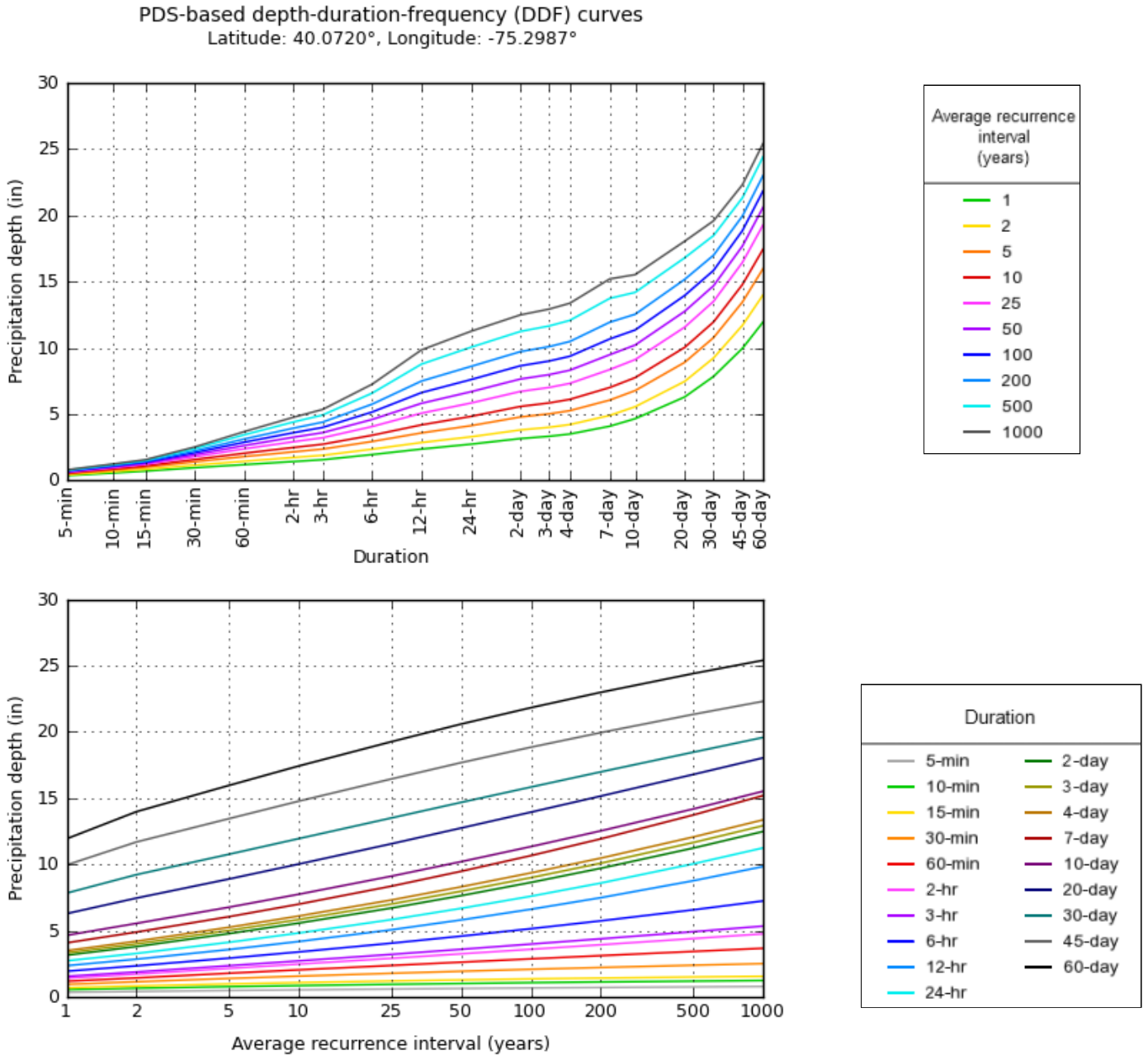
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical



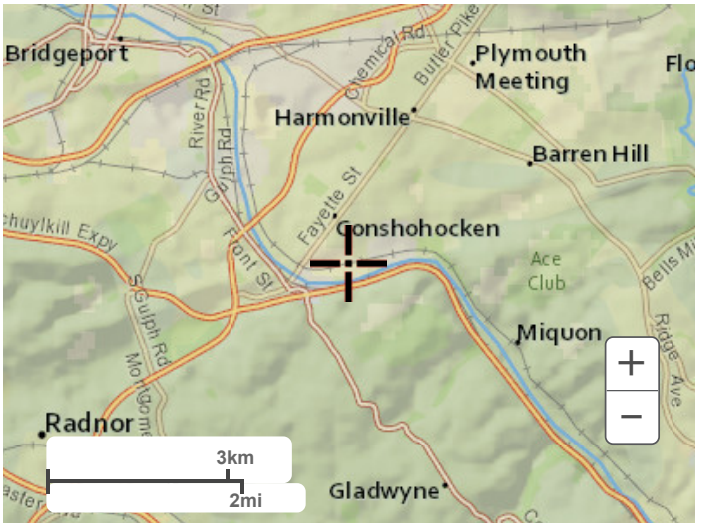
NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Fri Nov 19 14:38:51 2021

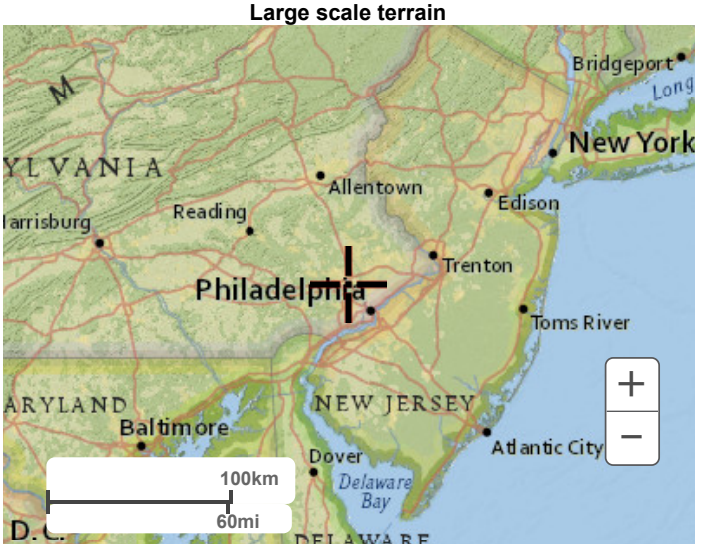
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Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
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Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 1

Return Event: 1 years
Storm Event: 1-YR

Time-Depth Curve: 1-YR	
Label	1-YR
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	1 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.00	0.01	0.01	0.01
0.500	0.01	0.02	0.02	0.02	0.03
1.000	0.03	0.03	0.04	0.04	0.04
1.500	0.05	0.05	0.05	0.06	0.06
2.000	0.06	0.07	0.07	0.07	0.08
2.500	0.08	0.08	0.09	0.09	0.09
3.000	0.10	0.10	0.10	0.11	0.11
3.500	0.11	0.12	0.12	0.13	0.13
4.000	0.13	0.14	0.14	0.15	0.15
4.500	0.15	0.16	0.16	0.17	0.17
5.000	0.17	0.18	0.18	0.19	0.19
5.500	0.19	0.20	0.20	0.21	0.21
6.000	0.22	0.22	0.23	0.23	0.24
6.500	0.24	0.25	0.25	0.26	0.26
7.000	0.27	0.27	0.28	0.28	0.29
7.500	0.30	0.30	0.31	0.31	0.32
8.000	0.33	0.33	0.34	0.35	0.35
8.500	0.36	0.37	0.38	0.38	0.39
9.000	0.40	0.41	0.42	0.42	0.43
9.500	0.44	0.45	0.46	0.47	0.49
10.000	0.50	0.51	0.52	0.54	0.55
10.500	0.56	0.58	0.59	0.61	0.63
11.000	0.66	0.68	0.71	0.74	0.77
11.500	0.81	0.86	0.92	1.00	1.11
12.000	1.30	1.62	1.73	1.81	1.87
12.500	1.92	1.96	1.99	2.02	2.05
13.000	2.07	2.10	2.12	2.14	2.15
13.500	2.17	2.18	2.19	2.21	2.22
14.000	2.23	2.24	2.26	2.27	2.28
14.500	2.29	2.30	2.31	2.31	2.32
15.000	2.33	2.34	2.35	2.35	2.36
15.500	2.37	2.38	2.38	2.39	2.40
16.000	2.40	2.41	2.42	2.42	2.43
16.500	2.43	2.44	2.45	2.45	2.46
17.000	2.46	2.47	2.47	2.48	2.48
17.500	2.49	2.49	2.50	2.50	2.51
18.000	2.51	2.52	2.52	2.53	2.53
18.500	2.54	2.54	2.54	2.55	2.55
19.000	2.56	2.56	2.56	2.57	2.57
19.500	2.58	2.58	2.58	2.59	2.59

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 1

Return Event: 1 years
Storm Event: 1-YR

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
20.000	2.60	2.60	2.60	2.61	2.61
20.500	2.62	2.62	2.62	2.63	2.63
21.000	2.63	2.64	2.64	2.64	2.65
21.500	2.65	2.65	2.66	2.66	2.66
22.000	2.67	2.67	2.67	2.68	2.68
22.500	2.68	2.69	2.69	2.69	2.70
23.000	2.70	2.70	2.71	2.71	2.71
23.500	2.72	2.72	2.72	2.72	2.73
24.000	2.73	(N/A)	(N/A)	(N/A)	(N/A)

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 2

Return Event: 2 years
Storm Event: 2-YR

Time-Depth Curve: 2-YR	
Label	2-YR
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	2 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.00	0.01	0.01	0.01
0.500	0.02	0.02	0.03	0.03	0.03
1.000	0.04	0.04	0.04	0.05	0.05
1.500	0.05	0.06	0.06	0.07	0.07
2.000	0.07	0.08	0.08	0.09	0.09
2.500	0.09	0.10	0.10	0.11	0.11
3.000	0.12	0.12	0.12	0.13	0.13
3.500	0.14	0.14	0.15	0.15	0.16
4.000	0.16	0.17	0.17	0.17	0.18
4.500	0.18	0.19	0.19	0.20	0.20
5.000	0.21	0.21	0.22	0.22	0.23
5.500	0.23	0.24	0.24	0.25	0.25
6.000	0.26	0.27	0.27	0.28	0.28
6.500	0.29	0.29	0.30	0.31	0.31
7.000	0.32	0.33	0.33	0.34	0.35
7.500	0.35	0.36	0.37	0.38	0.39
8.000	0.39	0.40	0.41	0.42	0.43
8.500	0.43	0.44	0.45	0.46	0.47
9.000	0.48	0.49	0.50	0.51	0.52
9.500	0.53	0.54	0.56	0.57	0.58
10.000	0.60	0.61	0.63	0.64	0.66
10.500	0.68	0.69	0.71	0.74	0.76
11.000	0.79	0.82	0.85	0.89	0.93
11.500	0.97	1.04	1.11	1.20	1.33
12.000	1.56	1.95	2.08	2.17	2.24
12.500	2.31	2.35	2.39	2.43	2.46
13.000	2.49	2.52	2.54	2.57	2.59
13.500	2.60	2.62	2.64	2.65	2.67
14.000	2.68	2.70	2.71	2.72	2.74
14.500	2.75	2.76	2.77	2.78	2.79
15.000	2.80	2.81	2.82	2.83	2.84
15.500	2.85	2.85	2.86	2.87	2.88
16.000	2.89	2.89	2.90	2.91	2.92
16.500	2.93	2.93	2.94	2.95	2.95
17.000	2.96	2.97	2.97	2.98	2.99
17.500	2.99	3.00	3.00	3.01	3.01
18.000	3.02	3.03	3.03	3.04	3.04
18.500	3.05	3.05	3.06	3.06	3.07
19.000	3.07	3.08	3.08	3.09	3.09
19.500	3.10	3.10	3.11	3.11	3.11

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 2

Return Event: 2 years
Storm Event: 2-YR

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
20.000	3.12	3.12	3.13	3.13	3.14
20.500	3.14	3.15	3.15	3.16	3.16
21.000	3.16	3.17	3.17	3.18	3.18
21.500	3.19	3.19	3.19	3.20	3.20
22.000	3.21	3.21	3.21	3.22	3.22
22.500	3.23	3.23	3.23	3.24	3.24
23.000	3.24	3.25	3.25	3.25	3.26
23.500	3.26	3.27	3.27	3.27	3.28
24.000	3.28	(N/A)	(N/A)	(N/A)	(N/A)

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 5

Return Event: 5 years
Storm Event: 5-YR

Time-Depth Curve: 5-YR	
Label	5-YR
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	5 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.01	0.01	0.01	0.02
0.500	0.02	0.03	0.03	0.04	0.04
1.000	0.05	0.05	0.05	0.06	0.06
1.500	0.07	0.07	0.08	0.08	0.09
2.000	0.09	0.10	0.10	0.11	0.11
2.500	0.12	0.12	0.13	0.13	0.14
3.000	0.15	0.15	0.16	0.16	0.17
3.500	0.17	0.18	0.18	0.19	0.20
4.000	0.20	0.21	0.21	0.22	0.23
4.500	0.23	0.24	0.24	0.25	0.26
5.000	0.26	0.27	0.27	0.28	0.29
5.500	0.29	0.30	0.31	0.31	0.32
6.000	0.33	0.33	0.34	0.35	0.35
6.500	0.36	0.37	0.38	0.39	0.39
7.000	0.40	0.41	0.42	0.43	0.44
7.500	0.45	0.46	0.46	0.47	0.48
8.000	0.49	0.50	0.51	0.52	0.54
8.500	0.55	0.56	0.57	0.58	0.59
9.000	0.60	0.61	0.63	0.64	0.65
9.500	0.67	0.68	0.70	0.72	0.73
10.000	0.75	0.77	0.79	0.81	0.83
10.500	0.85	0.87	0.90	0.93	0.96
11.000	0.99	1.03	1.07	1.11	1.16
11.500	1.22	1.30	1.39	1.51	1.68
12.000	1.96	2.45	2.61	2.73	2.82
12.500	2.90	2.96	3.01	3.05	3.10
13.000	3.13	3.17	3.20	3.22	3.25
13.500	3.27	3.29	3.31	3.33	3.35
14.000	3.37	3.39	3.41	3.42	3.44
14.500	3.45	3.47	3.48	3.50	3.51
15.000	3.52	3.53	3.54	3.55	3.57
15.500	3.58	3.59	3.60	3.61	3.62
16.000	3.63	3.64	3.65	3.66	3.67
16.500	3.68	3.69	3.69	3.70	3.71
17.000	3.72	3.73	3.74	3.74	3.75
17.500	3.76	3.77	3.77	3.78	3.79
18.000	3.80	3.80	3.81	3.82	3.82
18.500	3.83	3.83	3.84	3.85	3.85
19.000	3.86	3.87	3.87	3.88	3.88
19.500	3.89	3.90	3.90	3.91	3.91

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 5

Return Event: 5 years
Storm Event: 5-YR

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
20.000	3.92	3.93	3.93	3.94	3.94
20.500	3.95	3.95	3.96	3.97	3.97
21.000	3.98	3.98	3.99	3.99	4.00
21.500	4.00	4.01	4.01	4.02	4.02
22.000	4.03	4.03	4.04	4.04	4.05
22.500	4.05	4.06	4.06	4.07	4.07
23.000	4.08	4.08	4.09	4.09	4.10
23.500	4.10	4.10	4.11	4.11	4.12
24.000	4.12	(N/A)	(N/A)	(N/A)	(N/A)

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 10

Return Event: 10 years
Storm Event: 10-YR

Time-Depth Curve: 10-YR	
Label	10-YR
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	10 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.01	0.01	0.02	0.02
0.500	0.03	0.03	0.04	0.04	0.05
1.000	0.05	0.06	0.06	0.07	0.07
1.500	0.08	0.09	0.09	0.10	0.10
2.000	0.11	0.11	0.12	0.13	0.13
2.500	0.14	0.15	0.15	0.16	0.16
3.000	0.17	0.18	0.18	0.19	0.20
3.500	0.20	0.21	0.22	0.22	0.23
4.000	0.24	0.24	0.25	0.26	0.26
4.500	0.27	0.28	0.28	0.29	0.30
5.000	0.31	0.31	0.32	0.33	0.34
5.500	0.34	0.35	0.36	0.37	0.37
6.000	0.38	0.39	0.40	0.41	0.41
6.500	0.42	0.43	0.44	0.45	0.46
7.000	0.47	0.48	0.49	0.50	0.51
7.500	0.52	0.53	0.54	0.55	0.57
8.000	0.58	0.59	0.60	0.61	0.63
8.500	0.64	0.65	0.66	0.68	0.69
9.000	0.70	0.72	0.73	0.75	0.77
9.500	0.78	0.80	0.82	0.84	0.86
10.000	0.88	0.90	0.92	0.95	0.97
10.500	0.99	1.02	1.05	1.08	1.12
11.000	1.16	1.20	1.25	1.30	1.36
11.500	1.42	1.52	1.62	1.76	1.96
12.000	2.30	2.86	3.06	3.20	3.30
12.500	3.40	3.46	3.52	3.57	3.62
13.000	3.66	3.70	3.74	3.77	3.80
13.500	3.83	3.85	3.87	3.90	3.92
14.000	3.94	3.96	3.98	4.00	4.02
14.500	4.04	4.05	4.07	4.09	4.10
15.000	4.12	4.13	4.14	4.16	4.17
15.500	4.18	4.19	4.21	4.22	4.23
16.000	4.24	4.25	4.27	4.28	4.29
16.500	4.30	4.31	4.32	4.33	4.34
17.000	4.35	4.36	4.37	4.38	4.39
17.500	4.40	4.41	4.41	4.42	4.43
18.000	4.44	4.45	4.45	4.46	4.47
18.500	4.48	4.48	4.49	4.50	4.51
19.000	4.51	4.52	4.53	4.54	4.54
19.500	4.55	4.56	4.56	4.57	4.58

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 10

Return Event: 10 years
Storm Event: 10-YR

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
20.000	4.58	4.59	4.60	4.60	4.61
20.500	4.62	4.62	4.63	4.64	4.64
21.000	4.65	4.66	4.66	4.67	4.67
21.500	4.68	4.69	4.69	4.70	4.71
22.000	4.71	4.72	4.72	4.73	4.73
22.500	4.74	4.75	4.75	4.76	4.76
23.000	4.77	4.77	4.78	4.78	4.79
23.500	4.79	4.80	4.80	4.81	4.81
24.000	4.82	(N/A)	(N/A)	(N/A)	(N/A)

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 25

Return Event: 25 years
Storm Event: 25-YR

Time-Depth Curve: 25-YR	
Label	25-YR
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	25 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.01	0.01	0.02	0.03
0.500	0.03	0.04	0.04	0.05	0.06
1.000	0.06	0.07	0.08	0.08	0.09
1.500	0.10	0.10	0.11	0.12	0.12
2.000	0.13	0.14	0.15	0.15	0.16
2.500	0.17	0.18	0.18	0.19	0.20
3.000	0.21	0.21	0.22	0.23	0.24
3.500	0.24	0.25	0.26	0.27	0.28
4.000	0.29	0.29	0.30	0.31	0.32
4.500	0.33	0.34	0.34	0.35	0.36
5.000	0.37	0.38	0.39	0.40	0.41
5.500	0.42	0.42	0.43	0.44	0.45
6.000	0.46	0.47	0.48	0.49	0.50
6.500	0.51	0.52	0.53	0.55	0.56
7.000	0.57	0.58	0.59	0.61	0.62
7.500	0.63	0.64	0.66	0.67	0.68
8.000	0.70	0.71	0.73	0.74	0.76
8.500	0.77	0.79	0.80	0.82	0.84
9.000	0.85	0.87	0.89	0.91	0.93
9.500	0.95	0.97	0.99	1.01	1.04
10.000	1.06	1.09	1.12	1.14	1.17
10.500	1.20	1.23	1.27	1.31	1.35
11.000	1.40	1.45	1.51	1.58	1.65
11.500	1.72	1.84	1.96	2.13	2.37
12.000	2.78	3.46	3.70	3.87	3.99
12.500	4.11	4.18	4.25	4.32	4.38
13.000	4.43	4.48	4.52	4.56	4.60
13.500	4.63	4.66	4.69	4.71	4.74
14.000	4.77	4.79	4.82	4.84	4.86
14.500	4.88	4.90	4.92	4.94	4.96
15.000	4.98	4.99	5.01	5.03	5.04
15.500	5.06	5.07	5.09	5.10	5.12
16.000	5.13	5.15	5.16	5.17	5.19
16.500	5.20	5.21	5.22	5.24	5.25
17.000	5.26	5.27	5.28	5.30	5.31
17.500	5.32	5.33	5.34	5.35	5.36
18.000	5.37	5.38	5.39	5.40	5.41
18.500	5.41	5.42	5.43	5.44	5.45
19.000	5.46	5.47	5.48	5.49	5.49
19.500	5.50	5.51	5.52	5.53	5.54

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 25

Return Event: 25 years
Storm Event: 25-YR

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
20.000	5.54	5.55	5.56	5.57	5.58
20.500	5.59	5.59	5.60	5.61	5.62
21.000	5.62	5.63	5.64	5.65	5.65
21.500	5.66	5.67	5.68	5.68	5.69
22.000	5.70	5.71	5.71	5.72	5.73
22.500	5.73	5.74	5.75	5.75	5.76
23.000	5.77	5.77	5.78	5.79	5.79
23.500	5.80	5.80	5.81	5.82	5.82
24.000	5.83	(N/A)	(N/A)	(N/A)	(N/A)

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 50

Return Event: 50 years
Storm Event: 50-YR

Time-Depth Curve: 50-YR	
Label	50-YR
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	50 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.01	0.02	0.02	0.03
0.500	0.04	0.04	0.05	0.06	0.07
1.000	0.07	0.08	0.09	0.10	0.10
1.500	0.11	0.12	0.13	0.13	0.14
2.000	0.15	0.16	0.17	0.18	0.18
2.500	0.19	0.20	0.21	0.22	0.23
3.000	0.24	0.24	0.25	0.26	0.27
3.500	0.28	0.29	0.30	0.31	0.32
4.000	0.33	0.34	0.35	0.36	0.37
4.500	0.38	0.38	0.39	0.40	0.41
5.000	0.42	0.44	0.45	0.46	0.47
5.500	0.48	0.49	0.50	0.51	0.52
6.000	0.53	0.54	0.55	0.56	0.58
6.500	0.59	0.60	0.61	0.62	0.64
7.000	0.65	0.67	0.68	0.69	0.71
7.500	0.72	0.74	0.75	0.77	0.78
8.000	0.80	0.82	0.83	0.85	0.87
8.500	0.88	0.90	0.92	0.94	0.96
9.000	0.98	1.00	1.02	1.04	1.06
9.500	1.08	1.11	1.13	1.16	1.19
10.000	1.22	1.25	1.28	1.31	1.34
10.500	1.38	1.41	1.46	1.50	1.55
11.000	1.60	1.66	1.73	1.81	1.89
11.500	1.97	2.11	2.25	2.45	2.72
12.000	3.18	3.96	4.23	4.43	4.57
12.500	4.71	4.79	4.87	4.95	5.02
13.000	5.08	5.13	5.18	5.22	5.27
13.500	5.30	5.34	5.37	5.40	5.43
14.000	5.46	5.49	5.52	5.55	5.57
14.500	5.60	5.62	5.64	5.66	5.68
15.000	5.70	5.72	5.74	5.76	5.78
15.500	5.80	5.81	5.83	5.85	5.86
16.000	5.88	5.90	5.91	5.93	5.94
16.500	5.96	5.97	5.99	6.00	6.01
17.000	6.03	6.04	6.06	6.07	6.08
17.500	6.09	6.10	6.12	6.13	6.14
18.000	6.15	6.16	6.17	6.18	6.19
18.500	6.20	6.21	6.22	6.23	6.24
19.000	6.26	6.27	6.28	6.29	6.30
19.500	6.30	6.31	6.32	6.33	6.34

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 50

Return Event: 50 years
Storm Event: 50-YR

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
20.000	6.35	6.36	6.37	6.38	6.39
20.500	6.40	6.41	6.42	6.43	6.44
21.000	6.44	6.45	6.46	6.47	6.48
21.500	6.49	6.50	6.50	6.51	6.52
22.000	6.53	6.54	6.55	6.55	6.56
22.500	6.57	6.58	6.58	6.59	6.60
23.000	6.61	6.61	6.62	6.63	6.64
23.500	6.64	6.65	6.66	6.66	6.67
24.000	6.68	(N/A)	(N/A)	(N/A)	(N/A)

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 100

Return Event: 100 years
Storm Event: 100-YR

Time-Depth Curve: 100-YR	
Label	100-YR
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.01	0.02	0.03	0.03
0.500	0.04	0.05	0.06	0.07	0.07
1.000	0.08	0.09	0.10	0.11	0.12
1.500	0.13	0.14	0.14	0.15	0.16
2.000	0.17	0.18	0.19	0.20	0.21
2.500	0.22	0.23	0.24	0.25	0.26
3.000	0.27	0.28	0.29	0.30	0.31
3.500	0.32	0.33	0.34	0.35	0.36
4.000	0.37	0.38	0.39	0.40	0.42
4.500	0.43	0.44	0.45	0.46	0.47
5.000	0.48	0.49	0.51	0.52	0.53
5.500	0.54	0.55	0.57	0.58	0.59
6.000	0.60	0.61	0.63	0.64	0.65
6.500	0.67	0.68	0.70	0.71	0.73
7.000	0.74	0.76	0.77	0.79	0.81
7.500	0.82	0.84	0.86	0.87	0.89
8.000	0.91	0.93	0.95	0.97	0.99
8.500	1.01	1.03	1.05	1.07	1.09
9.000	1.11	1.13	1.16	1.18	1.21
9.500	1.23	1.26	1.29	1.32	1.35
10.000	1.39	1.42	1.45	1.49	1.53
10.500	1.57	1.61	1.66	1.71	1.76
11.000	1.82	1.89	1.97	2.05	2.15
11.500	2.25	2.40	2.56	2.78	3.09
12.000	3.62	4.51	4.82	5.04	5.20
12.500	5.35	5.45	5.55	5.63	5.71
13.000	5.78	5.84	5.89	5.94	5.99
13.500	6.03	6.07	6.11	6.15	6.18
14.000	6.21	6.25	6.28	6.31	6.34
14.500	6.37	6.39	6.42	6.44	6.47
15.000	6.49	6.51	6.53	6.55	6.57
15.500	6.59	6.61	6.63	6.65	6.67
16.000	6.69	6.71	6.73	6.74	6.76
16.500	6.78	6.79	6.81	6.83	6.84
17.000	6.86	6.87	6.89	6.90	6.92
17.500	6.93	6.95	6.96	6.97	6.99
18.000	7.00	7.01	7.02	7.03	7.05
18.500	7.06	7.07	7.08	7.09	7.11
19.000	7.12	7.13	7.14	7.15	7.16
19.500	7.17	7.18	7.20	7.21	7.22

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 100

Return Event: 100 years
Storm Event: 100-YR

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
20.000	7.23	7.24	7.25	7.26	7.27
20.500	7.28	7.29	7.30	7.31	7.32
21.000	7.33	7.34	7.35	7.36	7.37
21.500	7.38	7.39	7.40	7.41	7.42
22.000	7.43	7.44	7.45	7.46	7.46
22.500	7.47	7.48	7.49	7.50	7.51
23.000	7.52	7.53	7.53	7.54	7.55
23.500	7.56	7.57	7.57	7.58	7.59
24.000	7.60	(N/A)	(N/A)	(N/A)	(N/A)

Appendix E | PADEP Spreadsheets

General Information

Instructions | *General* | Volume | Rate | Quality

Project Name: **601 Washington Street Apartments, SP 1**

Application Type: **PAG-02 NOI**

County: **Montgomery**

Municipality: **Whitemarsh Township**

Project Type: **Multi-Family Housing**

(●) New Project ( ) Minor / Major Amendment

Area: **9.20** acres *(In Watershed)*

Total Earth Disturbance: **8.45** acres *(In Watershed)*

No. of Post-Construction Discharge Points: **1**

Start DP Numbering at: **001**

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
001	9.20	8.45	4.18	5.71	Schuylkill River	WWF, MF	Yes
Undetained Areas							
Totals:	**9.20**	**8.45**	**4.18**	**5.71**			

Volume Management

Project: 601 Washington Street Apartments, SP 1

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **3.28** inches

Alternative 2-Year / 24-Hour Storm Event [ ] inches

Alternative Source: [ ]

Pre-Construction Conditions: *No. Rows:* **4**

☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Pervious as Meadow	1.63	B	58	1.448	0.37	2,188
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	3.34	B	98	0.041	3.05	36,945
Impervious as Meadow	0.84	B	58	1.448	0.37	1,128
Forested (Good Condition)	2.20	B	55	1.636	0.27	2,196
TOTAL (ACRES):	**8.01**				**TOTAL (CF):**	**42,456**

Post-Construction Conditions: *No. Rows:* **3**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	2.68	B	61	1.279	0.48	4,642
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	5.71	B	98	0.041	3.05	63,160
Woods (Good Condition)	0.06	B	55	1.636	0.27	60
TOTAL (ACRES):	**8.45**				**TOTAL (CF):**	**67,862**

NET CHANGE IN VOLUME TO MANAGE (CF):	25,405

Non-Structural BMP Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural BMP Volume Credits: *No. Structural BMPs:* **1** *Start BMP Numbering at:* **1**

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegeta-ted?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
001	1	Dry Extended Detention Basin	Y	Off-Site	7.27	63,782				No		63,782		
											Totals:			

INFILTRATION & ET CREDITS (CF):	
MANAGED RELEASE CREDIT (CF):	**63,782**
NET CHANGE IN VOLUME TO MANAGE (CF):	**25,405**
TOTAL CREDITS (CF):	**63,782**

VOLUME REQUIREMENT SATISFIED

Water Quality

Project: 601 Washington Street Apartments, SP 1

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Pervious as Meadow	Grassland/Herbaceous	1.63	B	2,188	48.8	0.22	2.30	6.67	0.03	0.31
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	3.34	B	36,945	65.0	0.29	2.05	149.95	0.67	4.73
Impervious as Meadow	Grassland/Herbaceous	0.84	B	1,128	48.8	0.22	2.30	3.44	0.02	0.16
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	2.20	B	2,196	45.0	0.13	1.05	6.17	0.02	0.14
	TOTAL (ACRES):	**8.01**					**TOTALS:**	**166.22**	**0.73**	**5.35**

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	2.68	B	4,642	78.0	0.25	1.25	22.61	0.07	0.36

Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	5.71	B	63,160	65.0	0.29	2.05	256.35	1.14	8.08
Woods (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.06	B	60	45.0	0.13	1.05	0.17	0.00	0.00
	TOTAL (ACRES):	**8.45**				**TOTALS:**		**279.13**	**1.22**	**8.45**

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):	**112.90**	**0.48**	**3.10**

☑ **Characterize Undetained Areas (for Untreated Stormwater)** *No. Rows:* **3**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	**0.23**	**B**	**61**	**1.279**	**0.48**	**398**
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	**0.89**	**B**	**98**	**0.041**	**3.05**	**9,845**
Woods (Good Condition)	**0.06**	**B**	**55**	**1.636**	**0.27**	**60**

Non-Structural BMP Water Quality Credits:

☐ Pervious Undetained Area Credit

☐ Other (attach calculations)

Structural BMP Water Quality Credits:

☑ *Use default BMP Outflows and Median BMP Outflow Concentrations*

DP No.	BMP No.	BMP Name	MRC?	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN
001	1	Dry Extended Detention Basin	Y	7.27	63,782			63,782	-	-	-	-	-	-

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):	0.00	0.00	0.00
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	42.07	0.18	1.30
NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):			
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	42.07	0.18	1.30
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	166.22	0.73	5.35

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

C. Richard Roseberry	
Spreadsheet User Name	Date

General Information

Instructions | *General* | Volume | Rate | Quality

Project Name: **601 Washington Street Apartments, SP 2**

Application Type: **PAG-02 NOI**

County: **Montgomery**

Municipality: **Whitemarsh Township**

Project Type: **Multi-Family Housing**

(●) New Project ( ) Minor / Major Amendment

Area: **0.29** acres
(In Watershed)

Total Earth Disturbance: **0.29** acres
(In Watershed)

No. of Post-Construction Discharge Points: **1**

Start DP Numbering at: **002**

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
002	0.29	0.29	0.29	0.29	Schuylkill River	WWF, MF	No
Undetained Areas							
Totals:	**0.29**	**0.29**	**0.29**	**0.29**			

PROJECT SITE MEETS SMALL SITE EXCEPTION - RATE WORKSHEET NOT REQUIRED

Volume Management

Project: 601 Washington Street Apartments, SP 2

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **3.28** inches

Alternative 2-Year / 24-Hour Storm Event [ ] inches

Alternative Source: [ ]

Pre-Construction Conditions: *No. Rows:* **4** ☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Pervious as Meadow	0.05	B	58	1.448	0.37	67
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.32	B	98	0.041	3.05	3,540
Impervious as Meadow	0.08	B	58	1.448	0.37	107
Forested (Good Condition)	0.29	B	55	1.636	0.27	289
TOTAL (ACRES):	**0.74**				**TOTAL (CF):**	**4,004**

Post-Construction Conditions: *No. Rows:* **1**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.29	B	98	0.041	3.05	3,208
TOTAL (ACRES):	**0.29**				**TOTAL (CF):**	**3,208**

NET CHANGE IN VOLUME TO MANAGE (CF): **-796**

Non-Structural BMP Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural BMP Volume Credits: *No. Structural BMPs:* *Start BMP Numbering at:*

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegeta-ted?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
												Totals:		

INFILTRATION & ET CREDITS (CF):

NET CHANGE IN VOLUME TO MANAGE (CF): **-796**

TOTAL CREDITS (CF):

Water Quality

Project: 601 Washington Street Apartments, SP 2

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Pervious as Meadow	Grassland/Herbaceous	0.05	B	67	48.8	0.22	2.30	0.20	0.00	0.01
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.32	B	3,540	65.0	0.29	2.05	14.37	0.06	0.45
Impervious as Meadow	Grassland/Herbaceous	0.08	B	107	48.8	0.22	2.30	0.33	0.00	0.02
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.29	B	289	45.0	0.13	1.05	0.81	0.00	0.02
	TOTAL (ACRES):	**0.74**					**TOTALS:**	**15.71**	**0.07**	**0.50**

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.29	B	3,208	65.0	0.29	2.05	13.02	0.06	0.41
	TOTAL (ACRES):	**0.29**					**TOTALS:**	**13.02**	**0.06**	**0.41**

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):	0.00	0.00	0.00

☐ **Characterize Undetained Areas (for Untreated Stormwater)**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)

Non-Structural BMP Water Quality Credits:

☐ Pervious Undetained Area Credit

☐ Other (attach calculations)

Structural BMP Water Quality Credits:

☑ *Use default BMP Outflows and Median BMP Outflow Concentrations*

DP No.	BMP No.	BMP Name	MRC?	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):	0.00	0.00	0.00
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	13.02	0.06	0.41
NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):			
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	13.02	0.06	0.41
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	15.71	0.07	0.50

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

C. Richard Roseberry	
Spreadsheet User Name	Date

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

MANAGED RELEASE CONCEPT (MRC) DESIGN SUMMARY

Complete One Design Summary Sheet for Each BMP Designed for MRC

GENERAL INFORMATION

Applicant Name:	**601 Washington Street Assoc LP**	Project Name:	**601 Washington Street Apartments**
Applicant Address:	**201 King of Prussia RD, Suite 501**	Municipality:	**Whitemarsh Township**
City, State, Zip:	Radnor, PA 19087	County:	**Montgomery County**

Permit Type: ☒ NPDES PAG-02 ☐ NPDES IP ☐ ESCGP ☐ ESP

	Pre-Development	Post-Development	Change
Impervious Area (acres):	4.36	5.78	+ 1.42

MRC BMP INFORMATION

MRC BMP Type: **Underground Detention Facility** Stormwater BMP Manual Section: **BMP 6.6.3**

Will the BMP Include Vegetation? ☐ Yes ☒ No

If Yes, Identify Proposed Vegetation:

For Non-Vegetated BMPs Will There Be Pre- or Post-Treatment? ☒ Yes (Pre-) ☐ Yes (Post-) ☐ No

If Yes, Identify Proposed Pre- or Post-Treatment: **Water Quality Filter**

Name of Surface Water to Receive MRC BMP Discharges: **Schuylkill River**

Designated Use of Surface Water: **WWF, MF** Existing Use of Surface Water (if different): **Not listed**

Is the Surface Water Impaired? ☒ Yes ☐ No

If Yes, Identify Cause(s): **Source Unknown - Polychlorinated Biphenyls (PCBS). Agriculture - cause unknown; Urban runoff/storm sewers - cause unknown; Municipal point source discharges - cause unknown.**

Will the BMP have an impermeable liner? ☒ Yes ☐ No

If Yes, explain why a liner is proposed: **Within Floodway**

BMP Media Description: **Topsoil:compost (2:1 Mixture)**

Are Any Deviations from MRC Design Standards Proposed? ☐ Yes ☒ No

If Yes, Identify Deviations:

MRC BMP DESIGN VALUES AND STANDARDS

Parameter	Design Value	Design Standard
Actual Contributing Impervious Area to BMP (acres)	**5.48**	
Equivalent Contributing Impervious Area to BMP (acres)	**5.43**	
Total Drainage Area to BMP (acres)	**7.28**	
MRC BMP Release Rate (cfs)	**0.05**	*No greater than 0.01 cfs / acre of equivalent contributing impervious*
Underdrain Outflow Rate During 1.2-Inch/2-Hour Storm (cfs)	**0.00**	*<= MRC BMP Release Rate (cfs)*
Maximum Storm Event Routed to MRC BMP	**100yr**	

MRC BMP Design Summary
Revised, August 25, 2020

Parameter	Design Value	Design Standard
BMP Footprint Area (ft^2)	**40,656**	
Bottom BMP Elevation (Native Soils) (ft)	**43.60**	
2-Yr/24-Hr Storm Ponding Depth (ft)	**1.64**	*1 ft (recommended) (2 ft max)*
Maximum Ponding Depth (ft)	**3.49**	*4 ft (max)*
Overflow Bypass Elevation (ft)	**N/A**	
Media Depth (ft)	**N/A**	*2 ft (min) – 4 ft (max)*
Media Void Space (%)	**N/A**	
Internal Water Storage (IWS) Depth (ft)	**1**	*1 ft recommended*
Top of IWS Elevation (ft)	**44.60**	
Underdrain Pipe Diameter (in)	**4**	
Underdrain Orifice Diameter (in)	**1**	
Underdrain Outlet Elevation (ft)	**44.60**	
IWS Available for Routing (%)	**50**	*50% max*
Separation Distance (Groundwater) (ft)	**1**	*1 ft (min) (2 ft recommended)*
Infiltration Rate (in/hr)	**N/A**	
Volume of Overflow During 1.2-Inch/2-Hour Storm (cf)	**0**	*0 (No overflow allowed)*
1-Yr/24-Hr **Pre**-Development Peak Rate (cfs)	**11.00**	
2-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**1.67**	*1-Yr/24-Hr Pre-Development Peak Rate (or per approved Act 167 Plan)*
10-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**10.87**	*10-Yr/24-Hr Pre-Development Peak Rate*
50-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**27.66**	*50-Yr/24-Hr Pre-Development Peak Rate*
100-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**32.68**	*100-Yr/24-Hr Pre-Development Peak Rate*
Total 2-Yr/24-Hr Runoff Volume Managed by BMP (cf)	**63,782**	
Ponding Time @ 2-Yr/24-Hr Storm (hrs)	**55 hrs**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 10-Yr/24-Hr Storm (hrs)	**55 hrs**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 50-Yr/24-Hr Storm (hrs)	**55 hrs**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 100-Yr/24-Hr Storm (hrs)	**55 hrs**	*72 hrs (surface), 7 days (underground)*

C. Richard Roseberry, P.E.
Licensed P.E. Name

Licensed P.E. Signature

PE046162R
License No.

Date

Licensed Professional's Seal

Modified Worksheet 4. Runoff Volume for 2-YR Storm Event to MRC Basin

PROJECT: **601 WASHINGTON STREET APARTMENTS**
Drainage Area:
2-Year Rainfall: **3.28** **in**

Total Site Area: 7.28 **acres**
Protected Site Area: 0.01 **acres**
Managed Area 7.27 **acres**

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Impervious	B	238,660	5.48	98	0.20	0.04	3.05	60,659
Lawn	B	78,074	1.79	61	6.39	1.28	0.48	3,123
TOTAL:		**316,734**	**7.27**					**63,782**

2-Year Volume (ft3): **63,782**

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P - 0.2S)^2 / (P + 0.8S)$ where
   P = 2-Year Rainfall (in)
   S = (1000/ CN)-10

2. Runoff Volume (CF) = Q x Area x 1/12
   Q = Runoff (in)
   Area = Land use area (sq. ft)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI.
The use of a weighted CN value for volume calculations is not acceptable.

Runoff volume calculation only accounts for drainage areas within the limit of disturbance.

Modified Worksheet 4. Runoff Volume for 1.2/2-HR Storm Event to MRC Basin

PROJECT: **601 WASHINGTON STREET APARTMENTS**
Drainage Area:
2-Year Rainfall: **1.20** **in**

Total Site Area: 7.28 **acres**
Protected Site Area: 0.01 **acres**
Managed Area 7.27 **acres**

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Impervious	B	238,660	5.48	98	0.20	0.04	0.99	19,689
Lawn	B	78,536	1.80	61	6.39	1.28	0.00	0
TOTAL:		317,196	7.28					19,689

2-Year Volume (ft3):	**19,689**

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P - 0.2S)^2 / (P + 0.8S)$ where
   P = 2-Year Rainfall (in)
   S = (1000/ CN)-10

2. Runoff Volume (CF) = Q x Area x 1/12
   Q = Runoff (in)
   Area = Land use area (sq. ft)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI.
The use of a weighted CN value for volume calculations is not acceptable.

Colliers Engineering & Design

Appendix F | Release Rate Calculations

STUDY POINT 1 (DP 001)

SUB-WATERSHED AREA INFORMATION:

	CN	AREA (AC)	Tc
PRE-PROJECT AREA SP 1:	77	8.76	11 MIN

(Tc PATH SHOWN ON PLANS)

PRE-PROJECT FLOW RATES:

DETERMINE THE PRE-PROJECT ALLOWABLE RELEASE RATES. CALCULATE FLOW RATES USING SUB-WATERSHED AREA CN, TC, AND A IN HYDROCAD. ALLOWABLE RELEASE RATES ARE FROM THE WHITEMARSH TOWNSHIP STORMWATER MANAGEMENT ORDINANCE AND PADEP MRC REQUIREMENTS. RAINFALL DEPTHS ARE FROM NOAA ATLAS 14.

		PRE FLOW RATE	RELEASE RATE	ALLOWABLE FLOW
Q_1	=	11.00 CFS	100%	11.00 CFS
Q_2	=	16.00 CFS	--	11.00 CFS
Q_{10}	=	31.44 CFS	100%	31.44 CFS
Q_{50}	=	51.28 CFS	100%	51.28 CFS
Q_{100}	=	61.25 CFS	100%	61.25 CFS

** POST-PROJECT 2-YR STORM PEAK FLOW SHALL NOT EXCEED THE PRE-PROJECT 1-YR STORM PEAK FLOW.

CALCULATION NOTES:

1) THE STUDY POINT IS IN THE SCHUYLKILL RIVER.

2) ALL SOILS ARE 'B' SOILS.

STUDY POINT 1 (DP 001)

SUB-WATERSHED AREA INFORMATION:

	CN	AREA (AC)	Tc	
POST TO MRC BASIN AREA:	89	7.28	6 MIN	(MINIMUM Tc)
BASIN BYPASS AREA:	63	1.93	6 MIN	(MINIMUM Tc)
TOTAL SUB-WATERSHED AREA:		9.21		

POST-PROJECT WITHOUT DETENTION FLOW RATE:

DETERMINE THE POST DEVELOPMENT FLOW RATES WITHOUT DETENTION. CALCULATE FLOW RATES USING SUB-WATERSHED AREA CN, Tc, AND A IN HYDROCAD. RAINFALL DEPTHS ARE FROM NOAA ATLAS 14.

		POST TO MRC UGD BASIN POST FLOW RATES	BASIN BYPASS POST FLOW RATES
Q_1	=	20.48 CFS	0.79 CFS
Q_2	=	26.33 CFS	1.62 CFS
Q_{10}	=	42.79 CFS	4.60 CFS
Q_{50}	=	62.42 CFS	8.93 CFS
Q_{100}	=	72.00 CFS	11.23 CFS

POST-PROJECT WITH DETENTION FLOW RATE:

DETERMINE THE POST-PROJECT FLOW RATES WITH DETENTION. CALCULATE FLOW RATES USING SUB-WATERSHED AREA CN, Tc, AND A IN HYDROCAD. RAINFALL DEPTHS ARE FROM NOAA ATLAS 14.

		MRC BASIN OUTFLOW		BASIN BYPASS POST FLOW RATES		TOTAL RELEASED	TOTAL POST ALLOWABLE
Q_1	=	0.54 CFS	+	0.79 CFS	=	0.80 CFS	11.00 CFS
Q_2	=	1.52 CFS	+	1.62 CFS	=	1.67 CFS	11.00 CFS
Q_{10}	=	9.08 CFS	+	4.60 CFS	=	10.87 CFS	31.44 CFS
Q_{50}	=	21.23 CFS	+	8.93 CFS	=	27.66 CFS	51.28 CFS
Q_{100}	=	23.86 CFS	+	11.23 CFS	=	32.68 CFS	61.25 CFS

THE TOTAL RELEASED IS BASED ON THE ADDITION OF BASIN OUTFLOW & BASIN BYPASS FLOW HYDROGRAPHS AND NOT AN ADDITION OF THE PEAK FLOW RATES. THE TOTAL RELEASED FOR THE 2-YEAR THROUGH 100-YEAR STORMS IS LESS THAN THE TOTAL POST ALLOWABLE. THE POST-PROJECT 2-YEAR FLOW IS LESS THAN THE PRE-PROJECT 1-YEAR FLOW.

CALCULATION NOTES:

1) THE STUDY POINT IS IN THE SCHUYLKILL RIVER.

2) ALL SOILS ARE 'B' SOILS.

STUDY POINT 2 (DP 003)

SUB-WATERSHED AREA INFORMATION:

	CN	AREA (AC)	Tc	
PRE-PROJECT AREA SP 2:	79	0.74	6 MIN	(MINIMUM Tc)
POST-PROJECT AREA SP 2:	98	0.29	6 MIN	(MINIMUM Tc)

* Tc PATHS SHOWN ON PLANS

PRE-PROJECT WITHOUT DETENTION FLOW RATE:

DETERMINE THE PRE-PROJECT ALLOWABLE RELEASE RATES. CALCULATE FLOW RATES USING SUB-WATERSHED AREA CN, TC, AND A IN HYDROCAD. ALLOWABLE RELEASE RATES ARE FROM THE WHITEMARSH TOWNSHIP STORMWATER MANAGEMENT ORDINANCE AND PADEP MRC REQUIREMENTS. RAINFALL DEPTHS ARE FROM NOAA ATLAS 14.

		PRE FLOW RATES	RELEASE RATE	ALLOWABLE FLOW
Q_2	=	1.80 CFS	100%	1.80 CFS
Q_{10}	=	3.36 CFS	100%	3.36 CFS
Q_{50}	=	5.34 CFS	100%	5.34 CFS
Q_{100}	=	6.33 CFS	100%	6.33 CFS

POST-PROJECT WITHOUT DETENTION FLOW RATE:

DETERMINE THE POST DEVELOPMENT FLOW RATES. CALCULATE FLOW RATES USING SUB-WATERSHED AREA CN, Tc, AND A IN HYDROCAD. RAINFALL DEPTHS ARE FROM NOAA ATLAS 14.

		POST FLOW RATES	ALLOWABLE FLOW
Q_2	=	1.31 CFS	1.80 CFS
Q_{10}	=	1.93 CFS	3.36 CFS
Q_{50}	=	2.68 CFS	5.34 CFS
Q_{100}	=	3.05 CFS	6.33 CFS

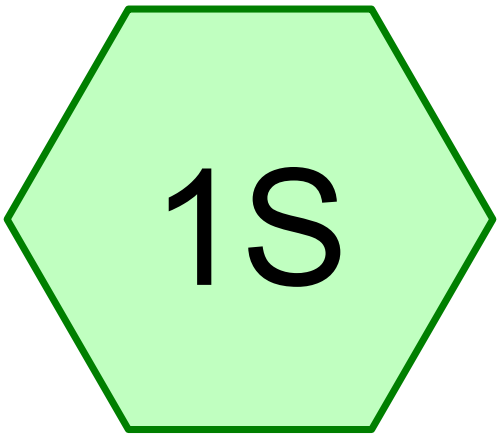
THE TOTAL RELEASED FOR THE 2-YEAR THROUGH 100-YEAR STORMS IS LESS THAN THE TOTAL POST ALLOWABLE.

CALCULATION NOTES:

1) THE STUDY POINT IS IN THE ROADSIDE DITCH ON THE NORTH SIDE OF WASHINGTON STREET.

2) ALL SOILS ARE 'B' SOILS.

Study Point 1: Pre-Project Release Rate Calculations



SP1 Pre-Project

Subcat Reach Pond Link

Routing Diagram for Pre Project SP1 South
Prepared by Colliers Engineering & Design, Printed 2/24/2022
HydroCAD® 10.10-6a s/n 08841 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.63	61	>75% Grass cover, Good, HSG B (1S)
4.18	98	Paved parking, HSG B (1S)
2.95	55	Woods, Good, HSG B (1S)
8.76	**77**	**TOTAL AREA**

Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP1 Pre-Project Runoff Area=8.76 ac 47.72% Impervious Runoff Depth=0.89"
Flow Length=830' Slope=0.0100 '/' Tc=11.3 min CN=77 Runoff=11.00 cfs 0.648 af

Total Runoff Area = 8.76 ac Runoff Volume = 0.648 af Average Runoff Depth = 0.89"
52.28% Pervious = 4.58 ac 47.72% Impervious = 4.18 ac

Summary for Subcatchment 1S: SP1 Pre-Project

[47] Hint: Peak is 331% of capacity of segment #7

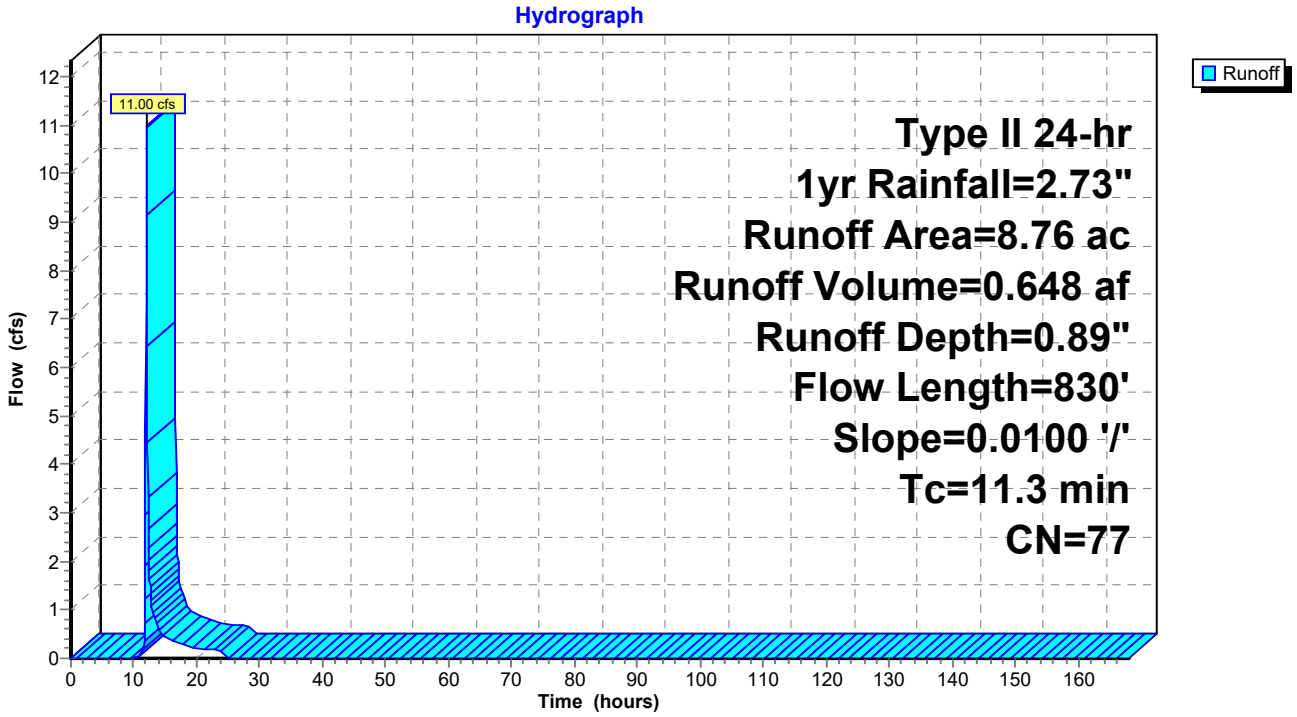
Runoff = 11.00 cfs @ 12.04 hrs, Volume= 0.648 af, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.73"

Area (ac)	CN	Description
4.18	98	Paved parking, HSG B
1.63	61	>75% Grass cover, Good, HSG B
2.95	55	Woods, Good, HSG B
8.76	77	Weighted Average
4.58		52.28% Pervious Area
4.18		47.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.28"
0.3	30	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	120	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.2	120	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	70	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	100	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.8	290	0.0100	0.83	3.33	**Channel Flow,** Area= 4.0 sf Perim= 16.3' r= 0.25' n= 0.070 Medium-dense brush, winter
11.3	830	Total			

Subcatchment 1S: SP1 Pre-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP1 Pre-Project Runoff Area=8.76 ac 47.72% Impervious Runoff Depth=1.27"
Flow Length=830' Slope=0.0100 '/' Tc=11.3 min CN=77 Runoff=16.00 cfs 0.927 af

Total Runoff Area = 8.76 ac Runoff Volume = 0.927 af Average Runoff Depth = 1.27"
52.28% Pervious = 4.58 ac 47.72% Impervious = 4.18 ac

Summary for Subcatchment 1S: SP1 Pre-Project

[47] Hint: Peak is 481% of capacity of segment #7

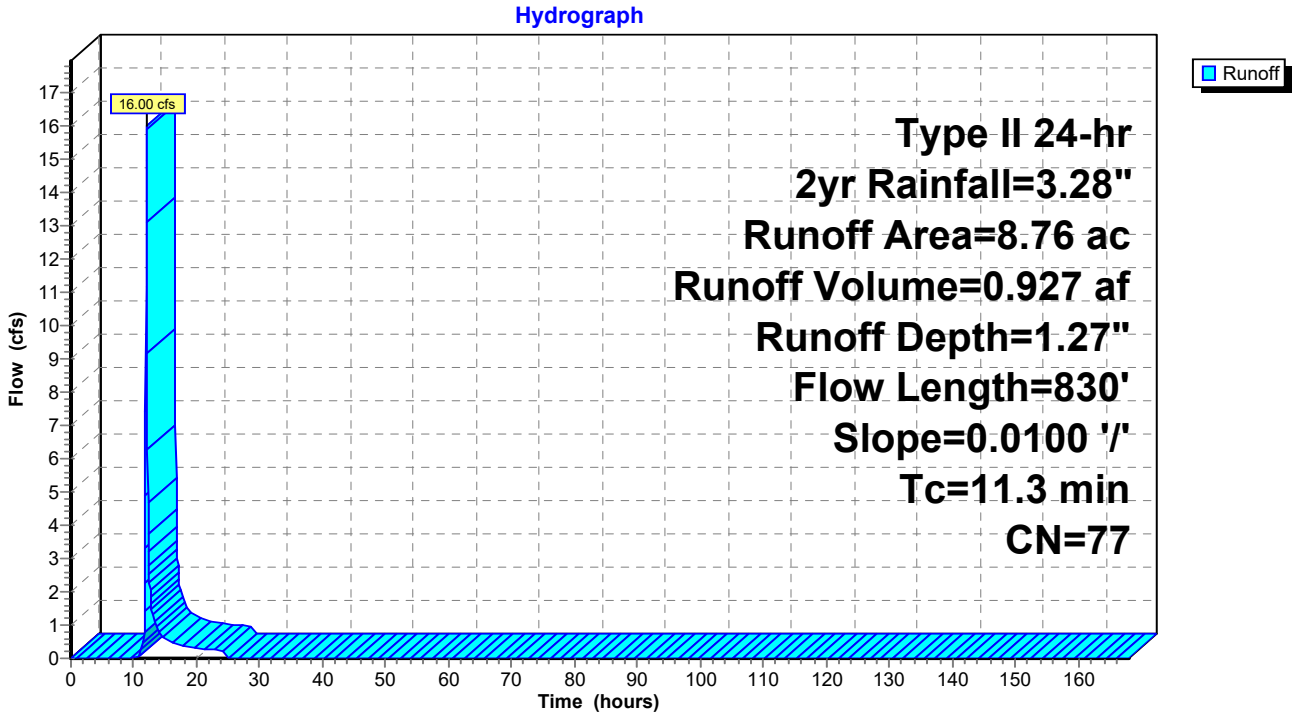
Runoff = 16.00 cfs @ 12.04 hrs, Volume= 0.927 af, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=3.28"

Area (ac)	CN	Description
4.18	98	Paved parking, HSG B
1.63	61	>75% Grass cover, Good, HSG B
2.95	55	Woods, Good, HSG B
8.76	77	Weighted Average
4.58		52.28% Pervious Area
4.18		47.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.28"
0.3	30	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	120	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.2	120	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	70	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	100	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.8	290	0.0100	0.83	3.33	**Channel Flow,** Area= 4.0 sf Perim= 16.3' r= 0.25' n= 0.070 Medium-dense brush, winter
11.3	830	Total			

Subcatchment 1S: SP1 Pre-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP1 Pre-Project Runoff Area=8.76 ac 47.72% Impervious Runoff Depth=2.47"
Flow Length=830' Slope=0.0100 '/' Tc=11.3 min CN=77 Runoff=31.44 cfs 1.805 af

Total Runoff Area = 8.76 ac Runoff Volume = 1.805 af Average Runoff Depth = 2.47"
52.28% Pervious = 4.58 ac 47.72% Impervious = 4.18 ac

Summary for Subcatchment 1S: SP1 Pre-Project

[47] Hint: Peak is 945% of capacity of segment #7

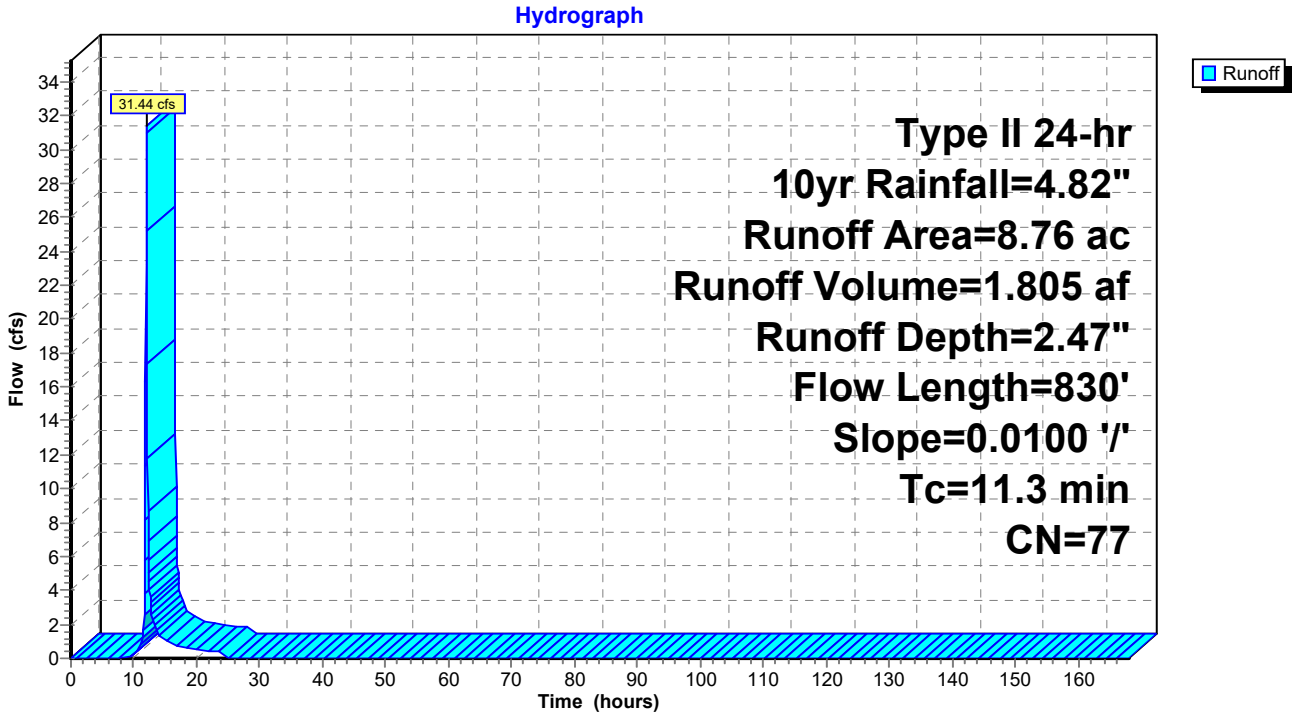
Runoff = 31.44 cfs @ 12.03 hrs, Volume= 1.805 af, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=4.82"

Area (ac)	CN	Description
4.18	98	Paved parking, HSG B
1.63	61	>75% Grass cover, Good, HSG B
2.95	55	Woods, Good, HSG B
8.76	77	Weighted Average
4.58		52.28% Pervious Area
4.18		47.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.28"
0.3	30	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	120	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.2	120	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	70	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	100	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.8	290	0.0100	0.83	3.33	**Channel Flow,** Area= 4.0 sf Perim= 16.3' r= 0.25' n= 0.070 Medium-dense brush, winter
11.3	830	Total			

Subcatchment 1S: SP1 Pre-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP1 Pre-Project Runoff Area=8.76 ac 47.72% Impervious Runoff Depth=4.07"
Flow Length=830' Slope=0.0100 '/' Tc=11.3 min CN=77 Runoff=51.28 cfs 2.971 af

Total Runoff Area = 8.76 ac Runoff Volume = 2.971 af Average Runoff Depth = 4.07"
52.28% Pervious = 4.58 ac 47.72% Impervious = 4.18 ac

Summary for Subcatchment 1S: SP1 Pre-Project

[47] Hint: Peak is 1541% of capacity of segment #7

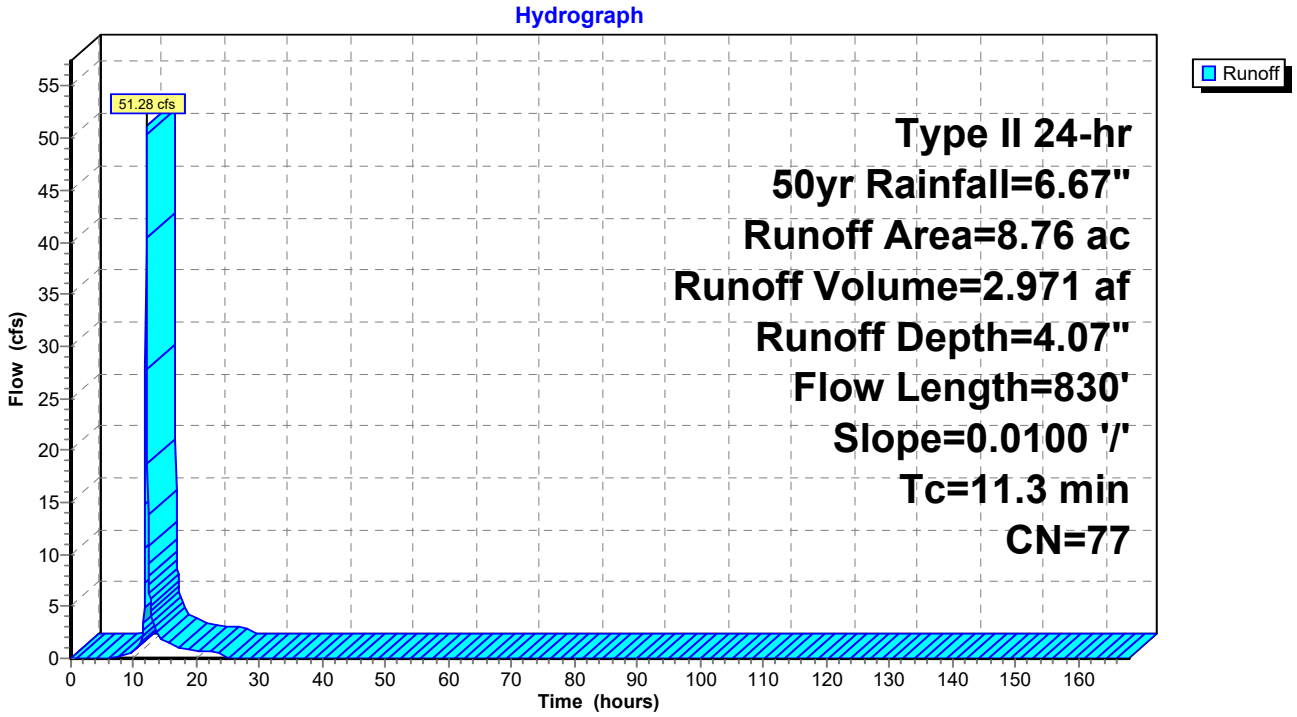
Runoff = 51.28 cfs @ 12.03 hrs, Volume= 2.971 af, Depth= 4.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=6.67"

Area (ac)	CN	Description
4.18	98	Paved parking, HSG B
1.63	61	>75% Grass cover, Good, HSG B
2.95	55	Woods, Good, HSG B
8.76	77	Weighted Average
4.58		52.28% Pervious Area
4.18		47.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.28"
0.3	30	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	120	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.2	120	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	70	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	100	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.8	290	0.0100	0.83	3.33	**Channel Flow,** Area= 4.0 sf Perim= 16.3' r= 0.25' n= 0.070 Medium-dense brush, winter
11.3	830	Total			

Subcatchment 1S: SP1 Pre-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP1 Pre-Project Runoff Area=8.76 ac 47.72% Impervious Runoff Depth=4.89"
Flow Length=830' Slope=0.0100 '/' Tc=11.3 min CN=77 Runoff=61.25 cfs 3.570 af

Total Runoff Area = 8.76 ac Runoff Volume = 3.570 af Average Runoff Depth = 4.89"
52.28% Pervious = 4.58 ac 47.72% Impervious = 4.18 ac

Summary for Subcatchment 1S: SP1 Pre-Project

[47] Hint: Peak is 1840% of capacity of segment #7

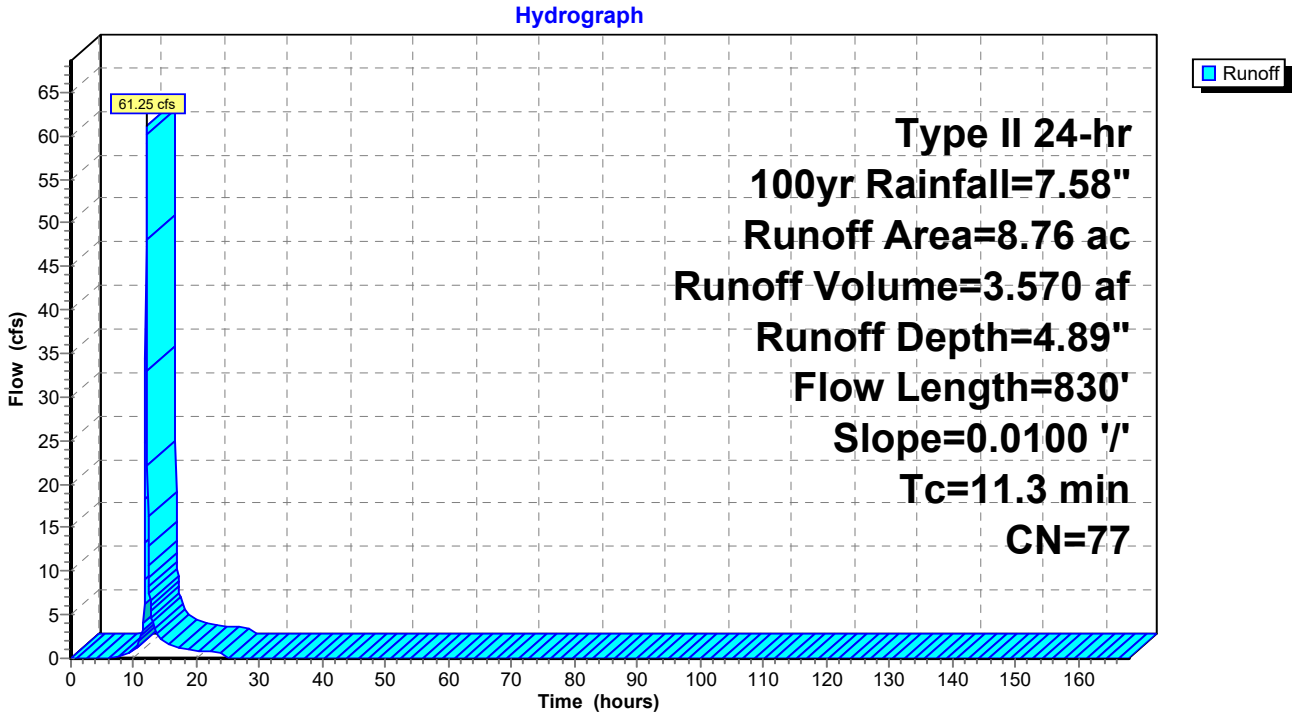
Runoff = 61.25 cfs @ 12.03 hrs, Volume= 3.570 af, Depth= 4.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=7.58"

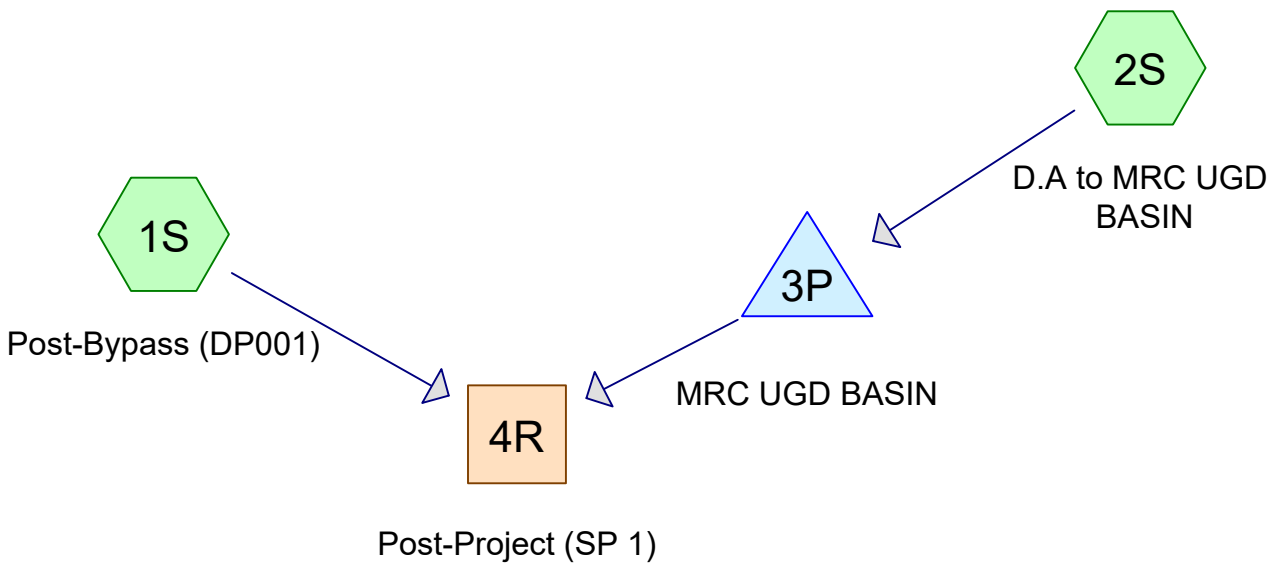
Area (ac)	CN	Description
4.18	98	Paved parking, HSG B
1.63	61	>75% Grass cover, Good, HSG B
2.95	55	Woods, Good, HSG B
8.76	77	Weighted Average
4.58		52.28% Pervious Area
4.18		47.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.28"
0.3	30	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	120	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.2	120	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	70	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	100	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.8	290	0.0100	0.83	3.33	**Channel Flow,** Area= 4.0 sf Perim= 16.3' r= 0.25' n= 0.070 Medium-dense brush, winter
11.3	830	Total			

Subcatchment 1S: SP1 Pre-Project



Study Point 1: Post-Project Release Rate Calculations



Subcat Reach Pond Link

Routing Diagram for Post Project SP1
Prepared by Colliers Engineering & Design, Printed 2/24/2022
HydroCAD® 10.10-6a s/n 08841 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.69	61	>75% Grass cover, Good, HSG B (1S, 2S)
0.23	98	Paved parking, HSG A (1S)
5.48	98	Paved parking, HSG B (2S)
0.81	55	Woods, Good, HSG B (1S)
9.21	**83**	**TOTAL AREA**

Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Post-Bypass(DP001) Runoff Area=1.93 ac 11.92% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=63 Runoff=0.00 cfs 0.000 af

Subcatchment2S: D.A to MRC UGD BASIN Runoff Area=7.28 ac 75.27% Impervious Runoff Depth=0.41"
Tc=6.0 min CN=89 Runoff=10.29 cfs 0.252 af

Pond 3P: MRC UGD BASIN Peak Elev=44.45' Storage=18,162 cf Inflow=10.29 cfs 0.252 af
Outflow=0.00 cfs 0.000 af

Reach 4R: Post-Project(SP 1) Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 9.21 ac Runoff Volume = 0.252 af Average Runoff Depth = 0.33"
38.00% Pervious = 3.50 ac 62.00% Impervious = 5.71 ac

Summary for Subcatchment 1S: Post-Bypass (DP001)

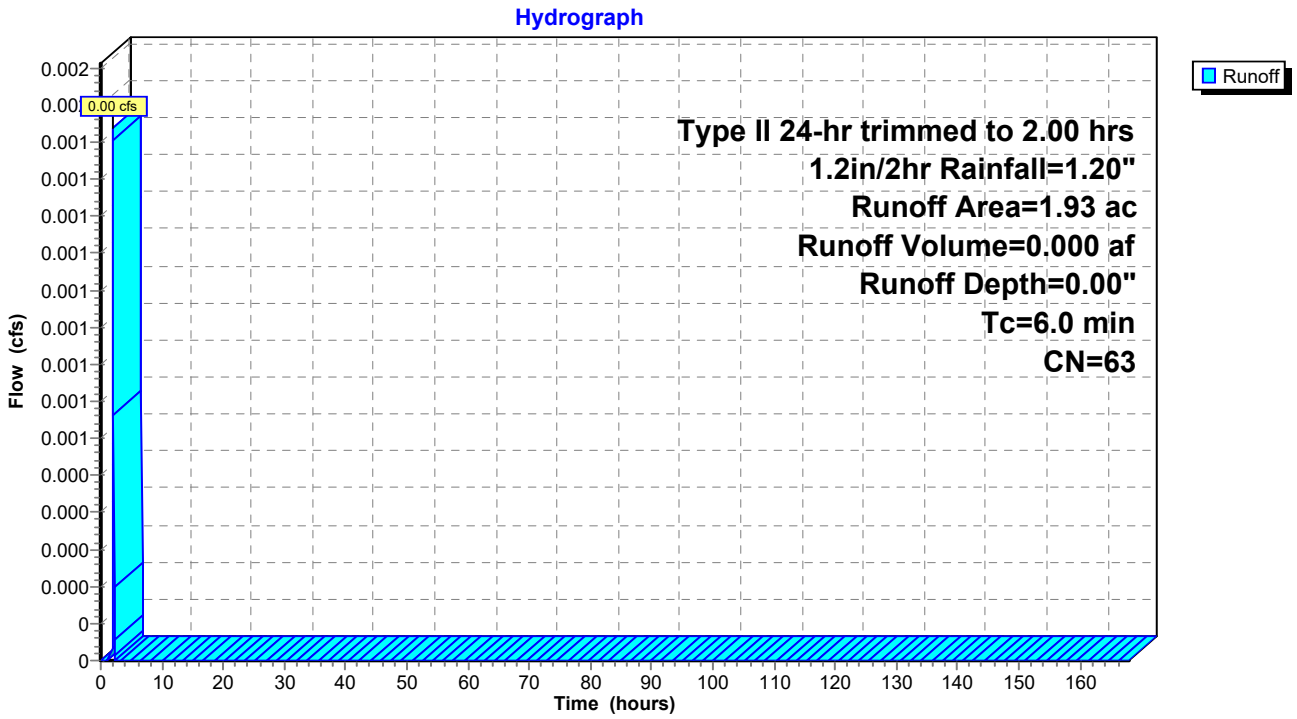
Runoff = 0.00 cfs @ 2.04 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Reach 4R : Post-Project (SP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr trimmed to 2.00 hrs 1.2in/2hr Rainfall=1.20"

Area (ac)	CN	Description
0.23	98	Paved parking, HSG A
0.89	61	>75% Grass cover, Good, HSG B
0.81	55	Woods, Good, HSG B
1.93	63	Weighted Average
1.70		88.08% Pervious Area
0.23		11.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: Post-Bypass (DP001)



Summary for Subcatchment 2S: D.A to MRC UGD BASIN

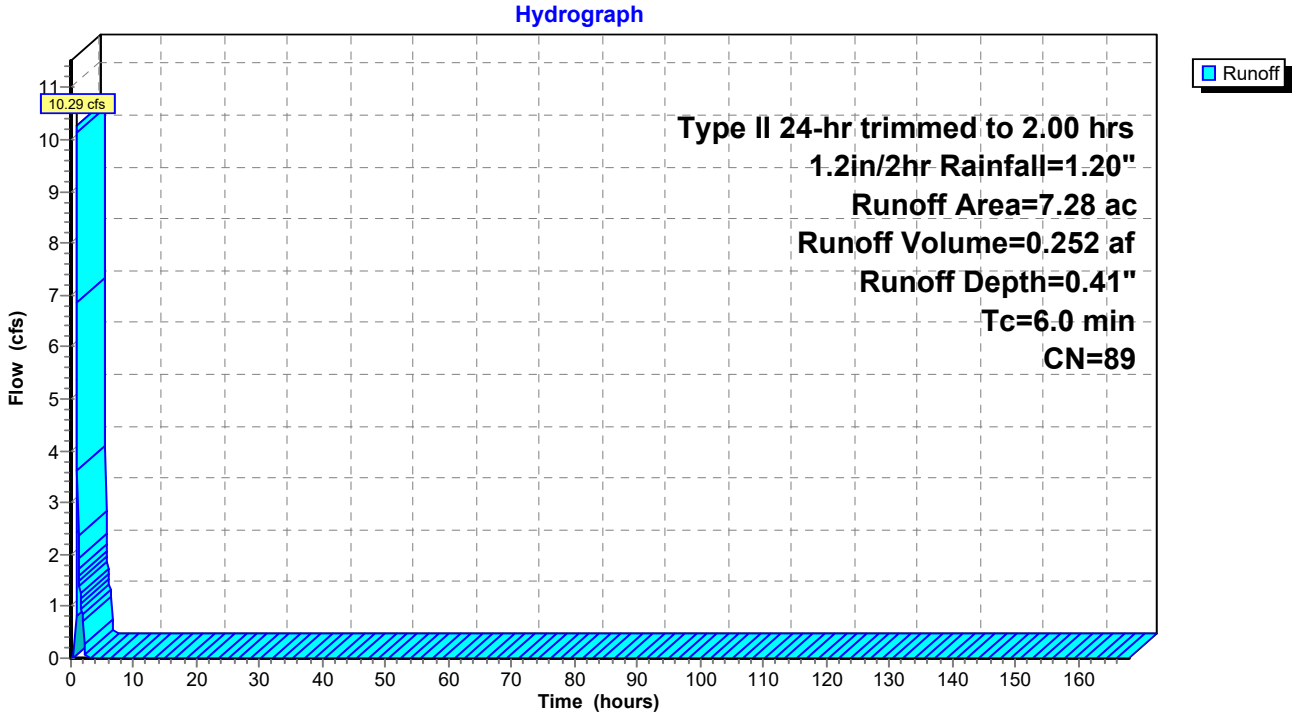
Runoff = 10.29 cfs @ 0.99 hrs, Volume= 0.252 af, Depth= 0.41"
Routed to Pond 3P : MRC UGD BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr trimmed to 2.00 hrs 1.2in/2hr Rainfall=1.20"

Area (ac)	CN	Description
5.48	98	Paved parking, HSG B
1.80	61	>75% Grass cover, Good, HSG B
7.28	89	Weighted Average
1.80		24.73% Pervious Area
5.48		75.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: D.A to MRC UGD BASIN



Summary for Pond 3P: MRC UGD BASIN

Inflow Area = 7.28 ac, 75.27% Impervious, Inflow Depth = 0.41" for 1.2in/2hr event
Inflow = 10.29 cfs @ 0.99 hrs, Volume= 0.252 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 4R : Post-Project (SP 1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Starting Elev= 44.10' Surf.Area= 36,006 sf Storage= 7,201 cf
Peak Elev= 44.45' @ 2.40 hrs Surf.Area= 36,006 sf Storage= 18,162 cf (10,961 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	43.60'	33,127 cf	**87.50'W x 411.50'L x 4.00'H Field A** 144,025 cf Overall - 61,207 cf Embedded = 82,818 cf x 40.0% Voids
#2A	44.10'	61,207 cf	**Cultec R-360HD** x 1665 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 1665 Chambers in 15 Rows Cap Storage= 6.5 cf x 2 x 15 rows = 193.8 cf
		94,334 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	43.60'	**24.0" Round Culvert** L= 70.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.60' / 42.95' S= 0.0093 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	44.60'	**1.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	45.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=44.10' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.00 cfs of 1.48 cfs potential flow)
  ├─**2=Orifice** (Controls 0.00 cfs)
  └─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: MRC UGD BASIN - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)
Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf
Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap
Cap Storage= 6.5 cf x 2 x 15 rows = 193.8 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

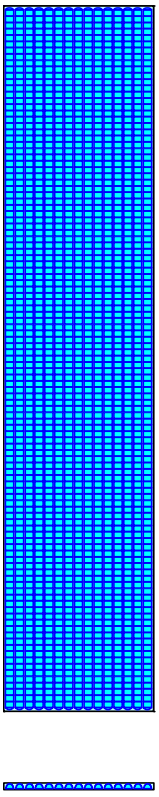
111 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 409.50' Row Length +12.0" End Stone x 2 = 411.50' Base Length
15 Rows x 60.0" Wide + 9.0" Spacing x 14 + 12.0" Side Stone x 2 = 87.50' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

1,665 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 15 Rows = 61,207.2 cf Chamber Storage

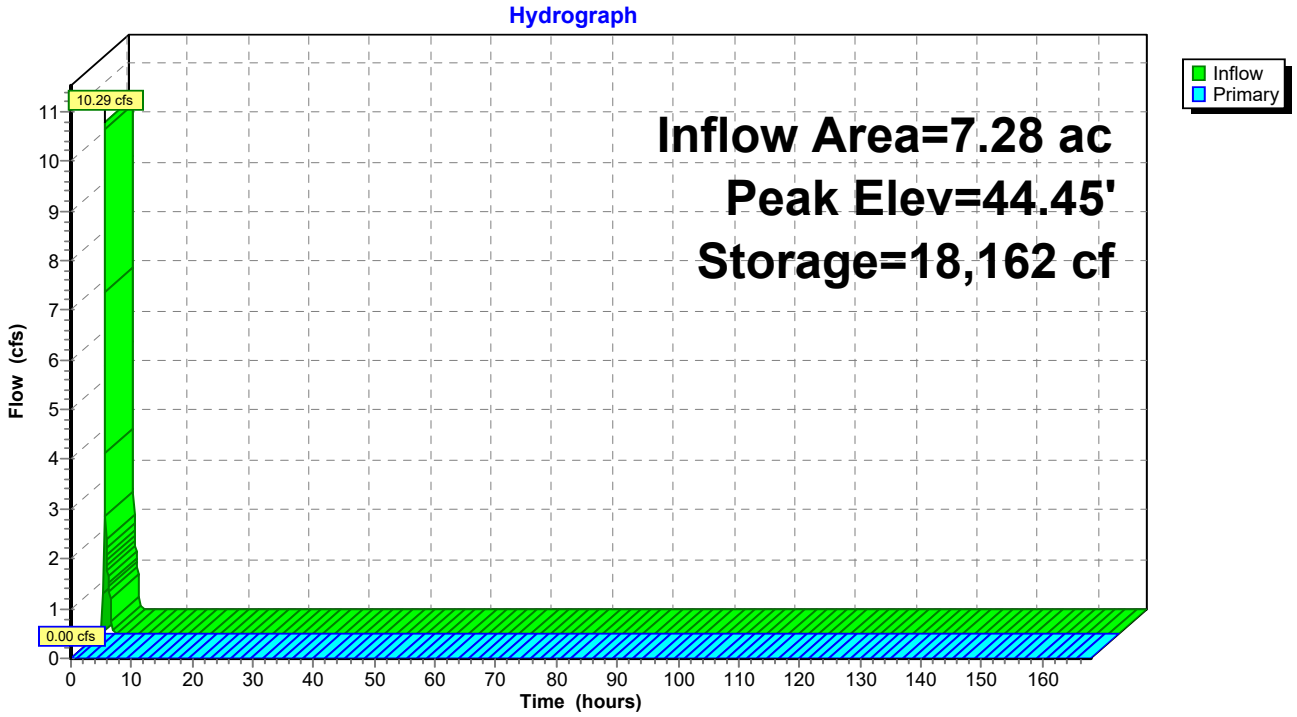
144,025.0 cf Field - 61,207.2 cf Chambers = 82,817.8 cf Stone x 40.0% Voids = 33,127.1 cf Stone Storage

Chamber Storage + Stone Storage = 94,334.3 cf = 2.166 af
Overall Storage Efficiency = 65.5%
Overall System Size = 411.50' x 87.50' x 4.00'

1,665 Chambers
5,334.3 cy Field
3,067.3 cy Stone



Pond 3P: MRC UGD BASIN



Stage-Discharge for Pond 3P: MRC UGD BASIN

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
43.60	0.00	44.64	0.00	45.68	7.11	46.72	22.02
43.62	0.00	44.66	0.00	45.70	7.42	46.74	22.13
43.64	0.00	44.68	0.01	45.72	7.73	46.76	22.23
43.66	0.00	44.70	0.01	45.74	8.05	46.78	22.33
43.68	0.00	44.72	0.01	45.76	8.36	46.80	22.44
43.70	0.00	44.74	0.01	45.78	8.69	46.82	22.54
43.72	0.00	44.76	0.01	45.80	9.01	46.84	22.64
43.74	0.00	44.78	0.01	45.82	9.34	46.86	22.74
43.76	0.00	44.80	0.01	45.84	9.68	46.88	22.84
43.78	0.00	44.82	0.01	45.86	10.01	46.90	22.94
43.80	0.00	44.84	0.01	45.88	10.35	46.92	23.04
43.82	0.00	44.86	0.01	45.90	10.69	46.94	23.14
43.84	0.00	44.88	0.01	45.92	11.04	46.96	23.24
43.86	0.00	44.90	0.01	45.94	11.39	46.98	23.34
43.88	0.00	44.92	0.01	45.96	11.74	47.00	23.43
43.90	0.00	44.94	0.01	45.98	12.10	47.02	23.53
43.92	0.00	44.96	0.01	46.00	12.46	47.04	23.63
43.94	0.00	44.98	0.02	46.02	12.82	47.06	23.73
43.96	0.00	45.00	0.02	46.04	13.18	47.08	23.82
43.98	0.00	45.02	0.05	46.06	13.55	47.10	23.92
44.00	0.00	45.04	0.12	46.08	13.92	47.12	24.01
44.02	0.00	45.06	0.21	46.10	14.29	47.14	24.11
44.04	0.00	45.08	0.31	46.12	14.67	47.16	24.20
44.06	0.00	45.10	0.43	46.14	15.05	47.18	24.30
44.08	0.00	45.12	0.56	46.16	15.43	47.20	24.39
44.10	0.00	45.14	0.70	46.18	15.81	47.22	24.48
44.12	0.00	45.16	0.85	46.20	16.20	47.24	24.58
44.14	0.00	45.18	1.01	46.22	16.58	47.26	24.67
44.16	0.00	45.20	1.18	46.24	16.97	47.28	24.76
44.18	0.00	45.22	1.35	46.26	17.37	47.30	24.86
44.20	0.00	45.24	1.54	46.28	17.76	47.32	24.95
44.22	0.00	45.26	1.73	46.30	18.16	47.34	25.04
44.24	0.00	45.28	1.93	46.32	18.56	47.36	25.13
44.26	0.00	45.30	2.14	46.34	18.96	47.38	25.22
44.28	0.00	45.32	2.35	46.36	19.37	47.40	25.31
44.30	0.00	45.34	2.57	46.38	19.78	47.42	25.40
44.32	0.00	45.36	2.80	46.40	20.19	47.44	25.49
44.34	0.00	45.38	3.03	46.42	20.41	47.46	25.58
44.36	0.00	45.40	3.27	46.44	20.52	47.48	25.67
44.38	0.00	45.42	3.51	46.46	20.63	47.50	25.76
44.40	0.00	45.44	3.76	46.48	20.74	47.52	25.85
44.42	0.00	45.46	4.01	46.50	20.85	47.54	25.94
44.44	0.00	45.48	4.27	46.52	20.96	47.56	26.02
44.46	0.00	45.50	4.53	46.54	21.07	47.58	26.11
44.48	0.00	45.52	4.80	46.56	21.18	47.60	**26.20**
44.50	0.00	45.54	5.08	46.58	21.29		
44.52	0.00	45.56	5.35	46.60	21.39		
44.54	0.00	45.58	5.64	46.62	21.50		
44.56	0.00	45.60	5.92	46.64	21.61		
44.58	0.00	45.62	6.21	46.66	21.71		
44.60	0.00	45.64	6.51	46.68	21.82		
44.62	0.00	45.66	6.81	46.70	21.92		

Stage-Area-Storage for Pond 3P: MRC UGD BASIN

Elevation (feet)	Storage (cubic-feet)
43.60	0
43.65	720
43.70	1,440
43.75	2,160
43.80	2,881
43.85	3,601
43.90	4,321
43.95	5,041
44.00	5,761
44.05	6,481
44.10	7,201
44.15	8,761
44.20	10,319
44.25	11,874
44.30	13,426
44.35	14,974
44.40	16,520
44.45	18,062
44.50	19,600
44.55	21,134
44.60	22,664
44.65	24,190
44.70	25,711
44.75	27,228
44.80	28,740
44.85	30,247
44.90	31,749
44.95	33,246
45.00	34,738
45.05	36,223
45.10	37,702
45.15	39,176
45.20	40,643
45.25	42,104
45.30	43,558
45.35	45,005
45.40	46,444
45.45	47,876
45.50	49,299
45.55	50,715
45.60	52,122
45.65	53,522
45.70	54,912
45.75	56,293
45.80	57,664
45.85	59,025
45.90	60,374
45.95	61,714
46.00	63,042
46.05	64,358
46.10	65,662
46.15	66,953
46.20	68,230
46.25	69,492
46.30	70,738
46.35	71,968
46.40	73,181
46.45	74,375
46.50	75,549
46.55	76,701
46.60	77,831
46.65	78,935
46.70	80,011
46.75	81,053
46.80	82,056
46.85	83,007
46.90	83,909
46.95	84,764
47.00	85,585
47.05	86,375
47.10	87,133
47.15	87,853
47.20	88,573
47.25	89,293
47.30	90,014
47.35	90,734
47.40	91,454
47.45	92,174
47.50	92,894
47.55	93,614
47.60	**94,334**

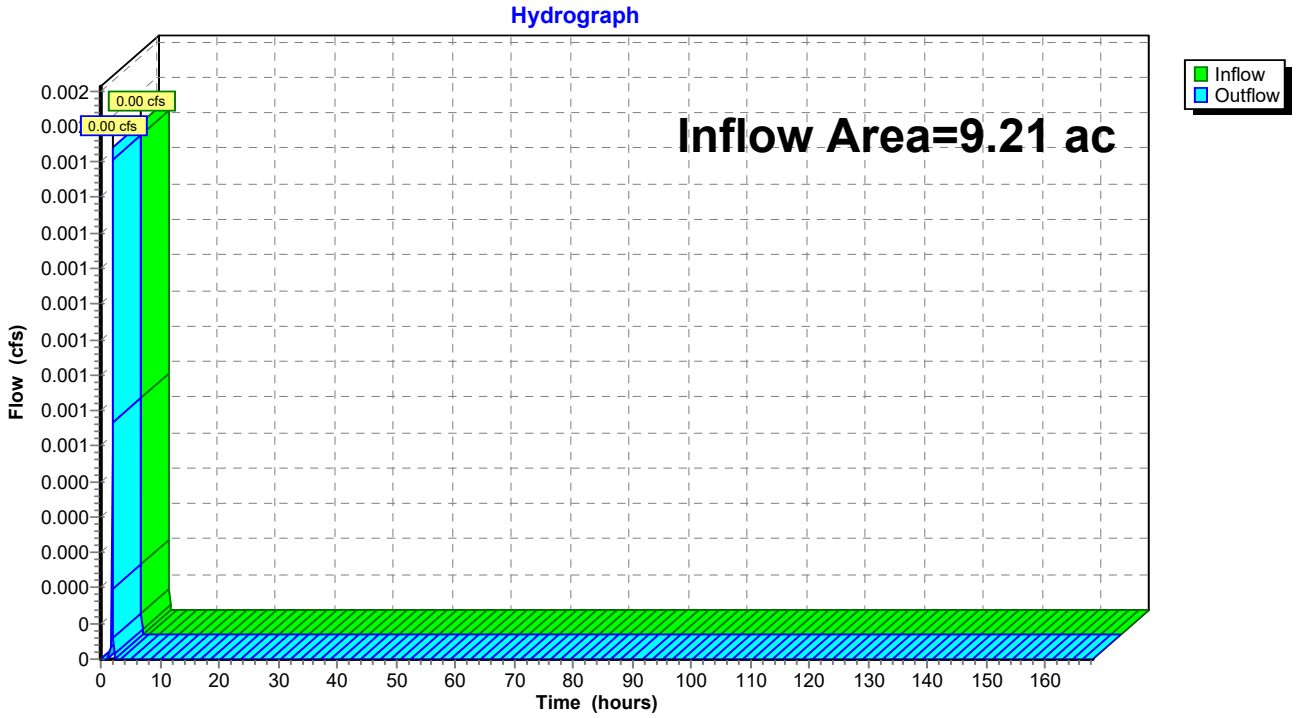
Summary for Reach 4R: Post-Project (SP 1)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.21 ac, 62.00% Impervious, Inflow Depth = 0.00" for 1.2in/2hr event
Inflow = 0.00 cfs @ 2.04 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 2.04 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs

Reach 4R: Post-Project (SP 1)



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Post-Bypass(DP001) Runoff Area=1.93 ac 11.92% Impervious Runoff Depth=0.33"
Tc=6.0 min CN=63 Runoff=0.79 cfs 0.052 af

Subcatchment2S: D.A to MRC UGD BASIN Runoff Area=7.28 ac 75.27% Impervious Runoff Depth=1.66"
Tc=6.0 min CN=89 Runoff=20.48 cfs 1.006 af

Pond 3P: MRC UGD BASIN Peak Elev=45.12' Storage=38,220 cf Inflow=20.48 cfs 1.006 af
Outflow=0.54 cfs 0.517 af

Reach 4R: Post-Project(SP 1) Inflow=0.80 cfs 0.570 af
Outflow=0.80 cfs 0.570 af

Total Runoff Area = 9.21 ac Runoff Volume = 1.058 af Average Runoff Depth = 1.38"
38.00% Pervious = 3.50 ac 62.00% Impervious = 5.71 ac

Summary for Subcatchment 1S: Post-Bypass (DP001)

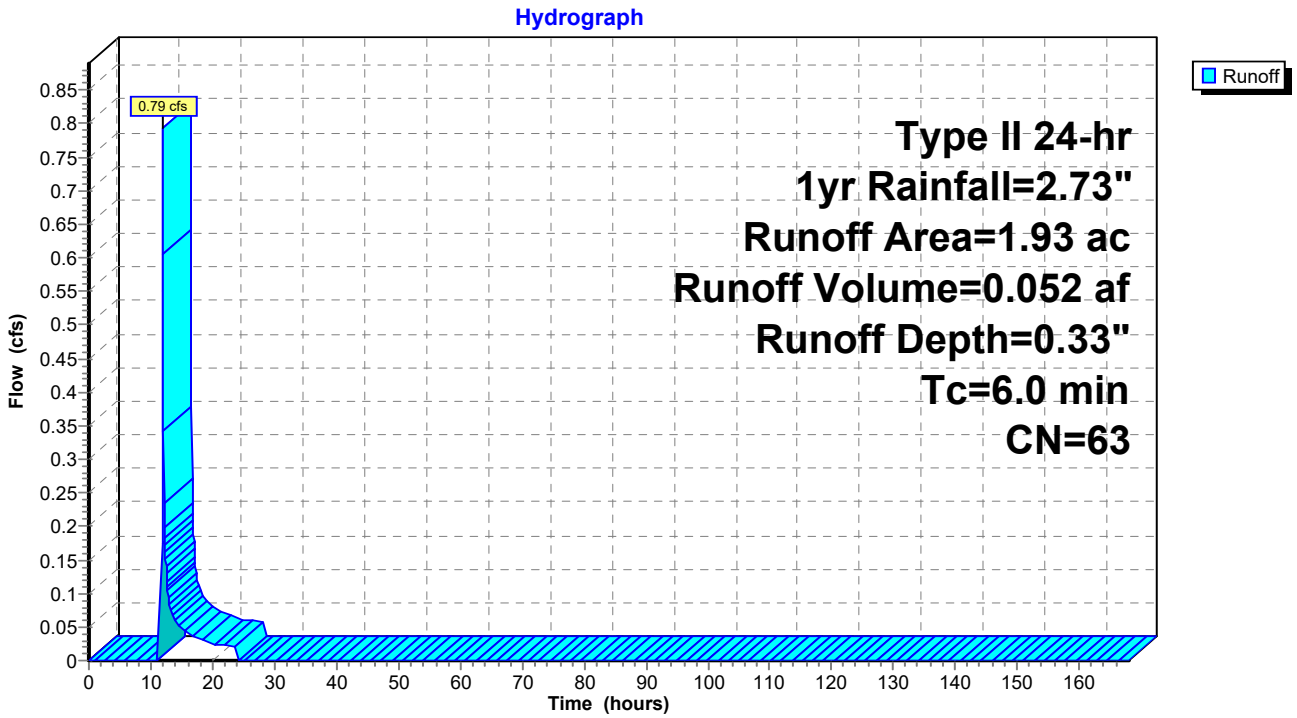
Runoff = 0.79 cfs @ 12.00 hrs, Volume= 0.052 af, Depth= 0.33"
Routed to Reach 4R : Post-Project (SP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.73"

Area (ac)	CN	Description
0.23	98	Paved parking, HSG A
0.89	61	>75% Grass cover, Good, HSG B
0.81	55	Woods, Good, HSG B
1.93	63	Weighted Average
1.70		88.08% Pervious Area
0.23		11.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: Post-Bypass (DP001)



Summary for Subcatchment 2S: D.A to MRC UGD BASIN

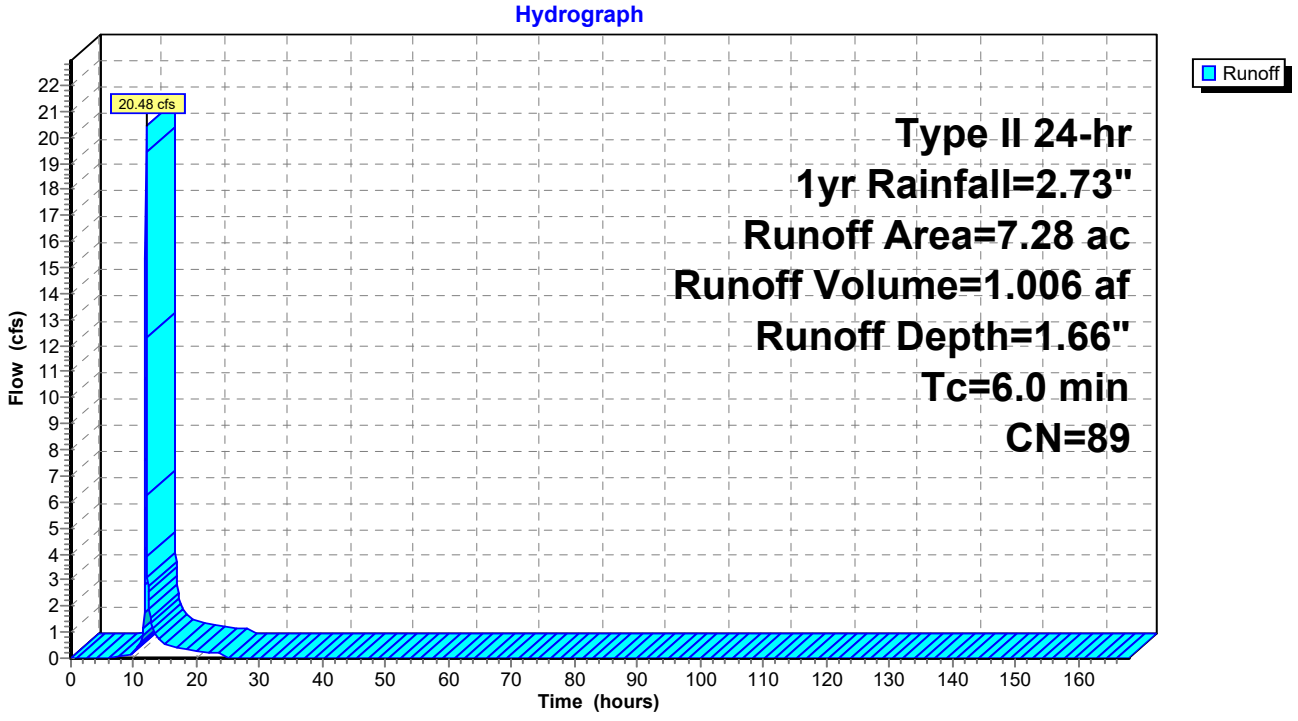
Runoff = 20.48 cfs @ 11.97 hrs, Volume= 1.006 af, Depth= 1.66"
Routed to Pond 3P : MRC UGD BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.73"

Area (ac)	CN	Description
5.48	98	Paved parking, HSG B
1.80	61	>75% Grass cover, Good, HSG B
7.28	89	Weighted Average
1.80		24.73% Pervious Area
5.48		75.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: D.A to MRC UGD BASIN



Summary for Pond 3P: MRC UGD BASIN

Inflow Area = 7.28 ac, 75.27% Impervious, Inflow Depth = 1.66" for 1yr event
Inflow = 20.48 cfs @ 11.97 hrs, Volume= 1.006 af
Outflow = 0.54 cfs @ 14.88 hrs, Volume= 0.517 af, Atten= 97%, Lag= 174.5 min
Primary = 0.54 cfs @ 14.88 hrs, Volume= 0.517 af
Routed to Reach 4R : Post-Project (SP 1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Starting Elev= 44.10' Surf.Area= 36,006 sf Storage= 7,201 cf
Peak Elev= 45.12' @ 14.88 hrs Surf.Area= 36,006 sf Storage= 38,220 cf (31,019 cf above start)

Plug-Flow detention time= 2,423.2 min calculated for 0.352 af (35% of inflow)
Center-of-Mass det. time= 1,594.8 min (2,409.3 - 814.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	43.60'	33,127 cf	**87.50'W x 411.50'L x 4.00'H Field A** 144,025 cf Overall - 61,207 cf Embedded = 82,818 cf x 40.0% Voids
#2A	44.10'	61,207 cf	**Cultec R-360HD** x 1665 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 1665 Chambers in 15 Rows Cap Storage= 6.5 cf x 2 x 15 rows = 193.8 cf
		94,334 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	43.60'	**24.0" Round Culvert** L= 70.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.60' / 42.95' S= 0.0093 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	44.60'	**1.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	45.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.54 cfs @ 14.88 hrs HW=45.12' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.54 cfs of 10.20 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.02 cfs @ 3.32 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.52 cfs @ 1.12 fps)

Pond 3P: MRC UGD BASIN - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)
Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf
Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap
Cap Storage= 6.5 cf x 2 x 15 rows = 193.8 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

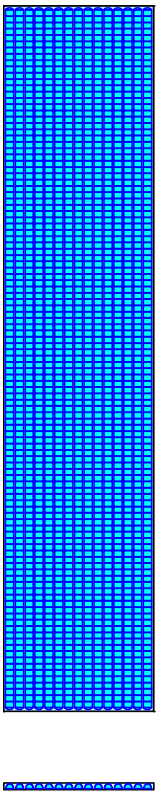
111 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 409.50' Row Length +12.0" End Stone x 2 = 411.50' Base Length
15 Rows x 60.0" Wide + 9.0" Spacing x 14 + 12.0" Side Stone x 2 = 87.50' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

1,665 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 15 Rows = 61,207.2 cf Chamber Storage

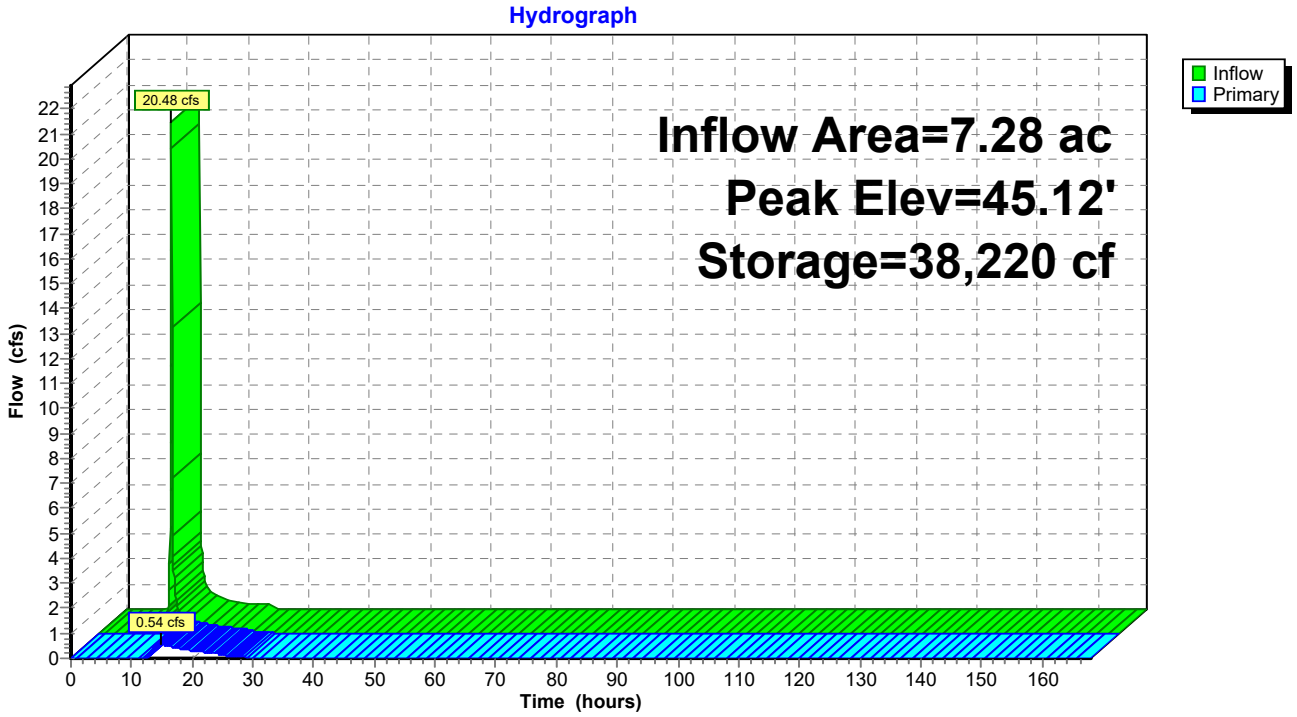
144,025.0 cf Field - 61,207.2 cf Chambers = 82,817.8 cf Stone x 40.0% Voids = 33,127.1 cf Stone Storage

Chamber Storage + Stone Storage = 94,334.3 cf = 2.166 af
Overall Storage Efficiency = 65.5%
Overall System Size = 411.50' x 87.50' x 4.00'

1,665 Chambers
5,334.3 cy Field
3,067.3 cy Stone



Pond 3P: MRC UGD BASIN



Stage-Discharge for Pond 3P: MRC UGD BASIN

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
43.60	0.00	44.64	0.00	45.68	7.11	46.72	22.02
43.62	0.00	44.66	0.00	45.70	7.42	46.74	22.13
43.64	0.00	44.68	0.01	45.72	7.73	46.76	22.23
43.66	0.00	44.70	0.01	45.74	8.05	46.78	22.33
43.68	0.00	44.72	0.01	45.76	8.36	46.80	22.44
43.70	0.00	44.74	0.01	45.78	8.69	46.82	22.54
43.72	0.00	44.76	0.01	45.80	9.01	46.84	22.64
43.74	0.00	44.78	0.01	45.82	9.34	46.86	22.74
43.76	0.00	44.80	0.01	45.84	9.68	46.88	22.84
43.78	0.00	44.82	0.01	45.86	10.01	46.90	22.94
43.80	0.00	44.84	0.01	45.88	10.35	46.92	23.04
43.82	0.00	44.86	0.01	45.90	10.69	46.94	23.14
43.84	0.00	44.88	0.01	45.92	11.04	46.96	23.24
43.86	0.00	44.90	0.01	45.94	11.39	46.98	23.34
43.88	0.00	44.92	0.01	45.96	11.74	47.00	23.43
43.90	0.00	44.94	0.01	45.98	12.10	47.02	23.53
43.92	0.00	44.96	0.01	46.00	12.46	47.04	23.63
43.94	0.00	44.98	0.02	46.02	12.82	47.06	23.73
43.96	0.00	45.00	0.02	46.04	13.18	47.08	23.82
43.98	0.00	45.02	0.05	46.06	13.55	47.10	23.92
44.00	0.00	45.04	0.12	46.08	13.92	47.12	24.01
44.02	0.00	45.06	0.21	46.10	14.29	47.14	24.11
44.04	0.00	45.08	0.31	46.12	14.67	47.16	24.20
44.06	0.00	45.10	0.43	46.14	15.05	47.18	24.30
44.08	0.00	45.12	0.56	46.16	15.43	47.20	24.39
44.10	0.00	45.14	0.70	46.18	15.81	47.22	24.48
44.12	0.00	45.16	0.85	46.20	16.20	47.24	24.58
44.14	0.00	45.18	1.01	46.22	16.58	47.26	24.67
44.16	0.00	45.20	1.18	46.24	16.97	47.28	24.76
44.18	0.00	45.22	1.35	46.26	17.37	47.30	24.86
44.20	0.00	45.24	1.54	46.28	17.76	47.32	24.95
44.22	0.00	45.26	1.73	46.30	18.16	47.34	25.04
44.24	0.00	45.28	1.93	46.32	18.56	47.36	25.13
44.26	0.00	45.30	2.14	46.34	18.96	47.38	25.22
44.28	0.00	45.32	2.35	46.36	19.37	47.40	25.31
44.30	0.00	45.34	2.57	46.38	19.78	47.42	25.40
44.32	0.00	45.36	2.80	46.40	20.19	47.44	25.49
44.34	0.00	45.38	3.03	46.42	20.41	47.46	25.58
44.36	0.00	45.40	3.27	46.44	20.52	47.48	25.67
44.38	0.00	45.42	3.51	46.46	20.63	47.50	25.76
44.40	0.00	45.44	3.76	46.48	20.74	47.52	25.85
44.42	0.00	45.46	4.01	46.50	20.85	47.54	25.94
44.44	0.00	45.48	4.27	46.52	20.96	47.56	26.02
44.46	0.00	45.50	4.53	46.54	21.07	47.58	26.11
44.48	0.00	45.52	4.80	46.56	21.18	47.60	**26.20**
44.50	0.00	45.54	5.08	46.58	21.29		
44.52	0.00	45.56	5.35	46.60	21.39		
44.54	0.00	45.58	5.64	46.62	21.50		
44.56	0.00	45.60	5.92	46.64	21.61		
44.58	0.00	45.62	6.21	46.66	21.71		
44.60	0.00	45.64	6.51	46.68	21.82		
44.62	0.00	45.66	6.81	46.70	21.92		

Stage-Area-Storage for Pond 3P: MRC UGD BASIN

Elevation (feet)	Storage (cubic-feet)
43.60	0
43.65	720
43.70	1,440
43.75	2,160
43.80	2,881
43.85	3,601
43.90	4,321
43.95	5,041
44.00	5,761
44.05	6,481
44.10	7,201
44.15	8,761
44.20	10,319
44.25	11,874
44.30	13,426
44.35	14,974
44.40	16,520
44.45	18,062
44.50	19,600
44.55	21,134
44.60	22,664
44.65	24,190
44.70	25,711
44.75	27,228
44.80	28,740
44.85	30,247
44.90	31,749
44.95	33,246
45.00	34,738
45.05	36,223
45.10	37,702
45.15	39,176
45.20	40,643
45.25	42,104
45.30	43,558
45.35	45,005
45.40	46,444
45.45	47,876
45.50	49,299
45.55	50,715
45.60	52,122
45.65	53,522
45.70	54,912
45.75	56,293
45.80	57,664
45.85	59,025
45.90	60,374
45.95	61,714
46.00	63,042
46.05	64,358
46.10	65,662
46.15	66,953
46.20	68,230
46.25	69,492
46.30	70,738
46.35	71,968
46.40	73,181
46.45	74,375
46.50	75,549
46.55	76,701
46.60	77,831
46.65	78,935
46.70	80,011
46.75	81,053
46.80	82,056
46.85	83,007
46.90	83,909
46.95	84,764
47.00	85,585
47.05	86,375
47.10	87,133
47.15	87,853
47.20	88,573
47.25	89,293
47.30	90,014
47.35	90,734
47.40	91,454
47.45	92,174
47.50	92,894
47.55	93,614
47.60	**94,334**

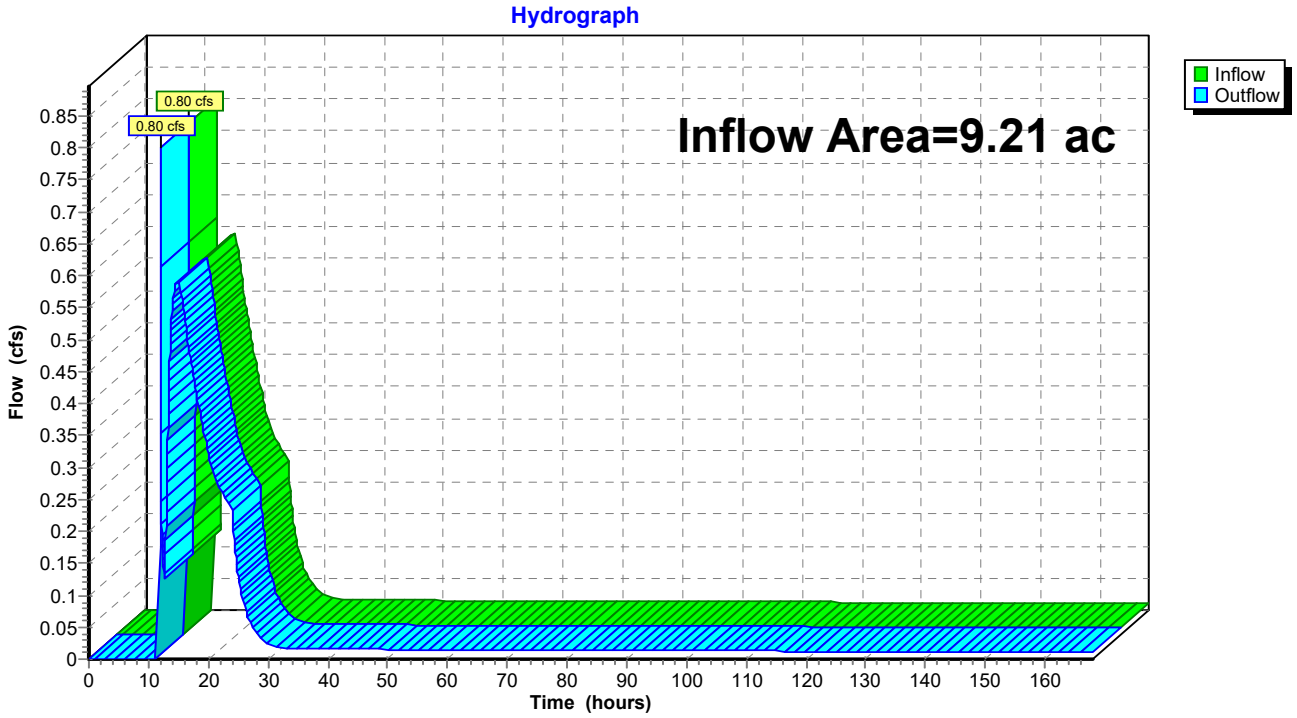
Summary for Reach 4R: Post-Project (SP 1)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.21 ac, 62.00% Impervious, Inflow Depth > 0.74" for 1yr event
Inflow = 0.80 cfs @ 12.00 hrs, Volume= 0.570 af
Outflow = 0.80 cfs @ 12.00 hrs, Volume= 0.570 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs

Reach 4R: Post-Project (SP 1)



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Post-Bypass(DP001) Runoff Area=1.93 ac 11.92% Impervious Runoff Depth=0.56"
Tc=6.0 min CN=63 Runoff=1.62 cfs 0.089 af

Subcatchment2S: D.A to MRC UGD BASIN Runoff Area=7.28 ac 75.27% Impervious Runoff Depth=2.15"
Tc=6.0 min CN=89 Runoff=26.33 cfs 1.307 af

Pond 3P: MRC UGD BASIN Peak Elev=45.24' Storage=41,747 cf Inflow=26.33 cfs 1.307 af
Outflow=1.52 cfs 0.819 af

Reach 4R: Post-Project(SP 1) Inflow=1.67 cfs 0.908 af
Outflow=1.67 cfs 0.908 af

Total Runoff Area = 9.21 ac Runoff Volume = 1.397 af Average Runoff Depth = 1.82"
38.00% Pervious = 3.50 ac 62.00% Impervious = 5.71 ac

Summary for Subcatchment 1S: Post-Bypass (DP001)

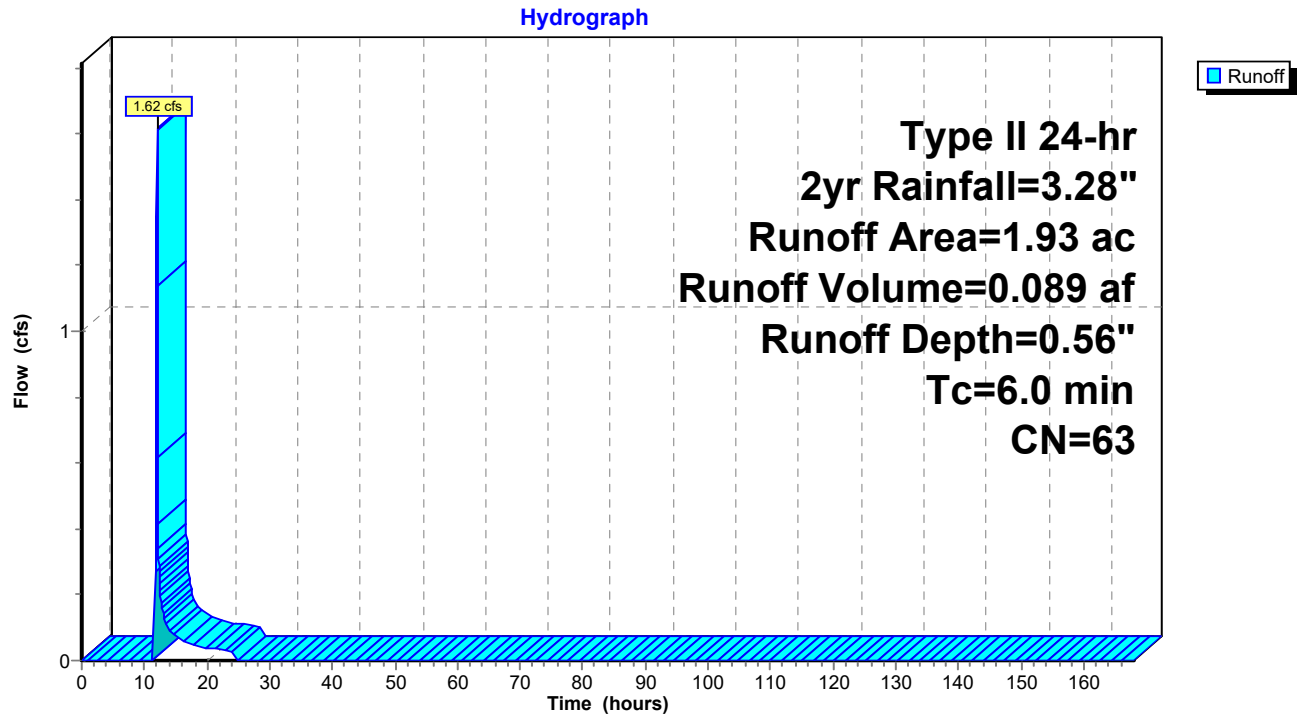
Runoff = 1.62 cfs @ 11.99 hrs, Volume= 0.089 af, Depth= 0.56"
Routed to Reach 4R : Post-Project (SP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=3.28"

Area (ac)	CN	Description
0.23	98	Paved parking, HSG A
0.89	61	>75% Grass cover, Good, HSG B
0.81	55	Woods, Good, HSG B
1.93	63	Weighted Average
1.70		88.08% Pervious Area
0.23		11.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: Post-Bypass (DP001)



Summary for Subcatchment 2S: D.A to MRC UGD BASIN

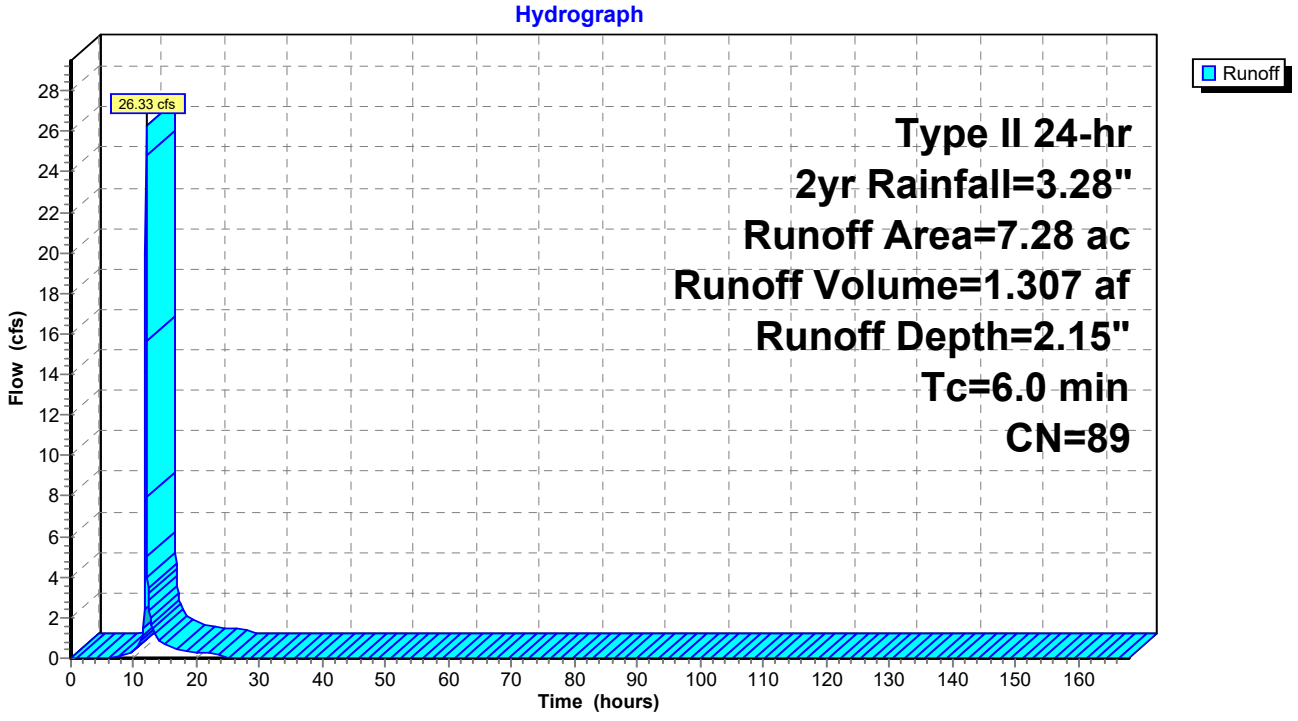
Runoff = 26.33 cfs @ 11.97 hrs, Volume= 1.307 af, Depth= 2.15"
Routed to Pond 3P : MRC UGD BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=3.28"

Area (ac)	CN	Description
5.48	98	Paved parking, HSG B
1.80	61	>75% Grass cover, Good, HSG B
7.28	89	Weighted Average
1.80		24.73% Pervious Area
5.48		75.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: D.A to MRC UGD BASIN



Summary for Pond 3P: MRC UGD BASIN

Inflow Area = 7.28 ac, 75.27% Impervious, Inflow Depth = 2.15" for 2yr event
Inflow = 26.33 cfs @ 11.97 hrs, Volume= 1.307 af
Outflow = 1.52 cfs @ 12.88 hrs, Volume= 0.819 af, Atten= 94%, Lag= 54.6 min
Primary = 1.52 cfs @ 12.88 hrs, Volume= 0.819 af
Routed to Reach 4R : Post-Project (SP 1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Starting Elev= 44.10' Surf.Area= 36,006 sf Storage= 7,201 cf
Peak Elev= 45.24' @ 12.88 hrs Surf.Area= 36,006 sf Storage= 41,747 cf (34,546 cf above start)

Plug-Flow detention time= 1,429.3 min calculated for 0.653 af (50% of inflow)
Center-of-Mass det. time= 1,042.7 min (1,849.7 - 807.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	43.60'	33,127 cf	**87.50'W x 411.50'L x 4.00'H Field A** 144,025 cf Overall - 61,207 cf Embedded = 82,818 cf x 40.0% Voids
#2A	44.10'	61,207 cf	**Cultec R-360HD** x 1665 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 1665 Chambers in 15 Rows Cap Storage= 6.5 cf x 2 x 15 rows = 193.8 cf
		94,334 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	43.60'	**24.0" Round Culvert** L= 70.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.60' / 42.95' S= 0.0093 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	44.60'	**1.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	45.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=1.52 cfs @ 12.88 hrs HW=45.24' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.52 cfs of 11.43 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.02 cfs @ 3.72 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Weir Controls 1.50 cfs @ 1.59 fps)

Pond 3P: MRC UGD BASIN - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)
Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf
Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap
Cap Storage= 6.5 cf x 2 x 15 rows = 193.8 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

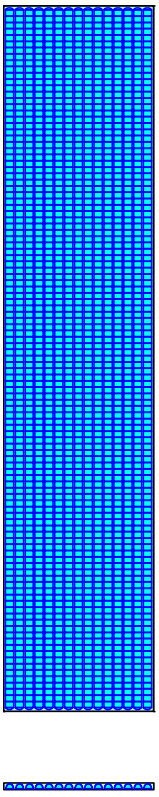
111 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 409.50' Row Length +12.0" End Stone x 2 = 411.50' Base Length
15 Rows x 60.0" Wide + 9.0" Spacing x 14 + 12.0" Side Stone x 2 = 87.50' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

1,665 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 15 Rows = 61,207.2 cf Chamber Storage

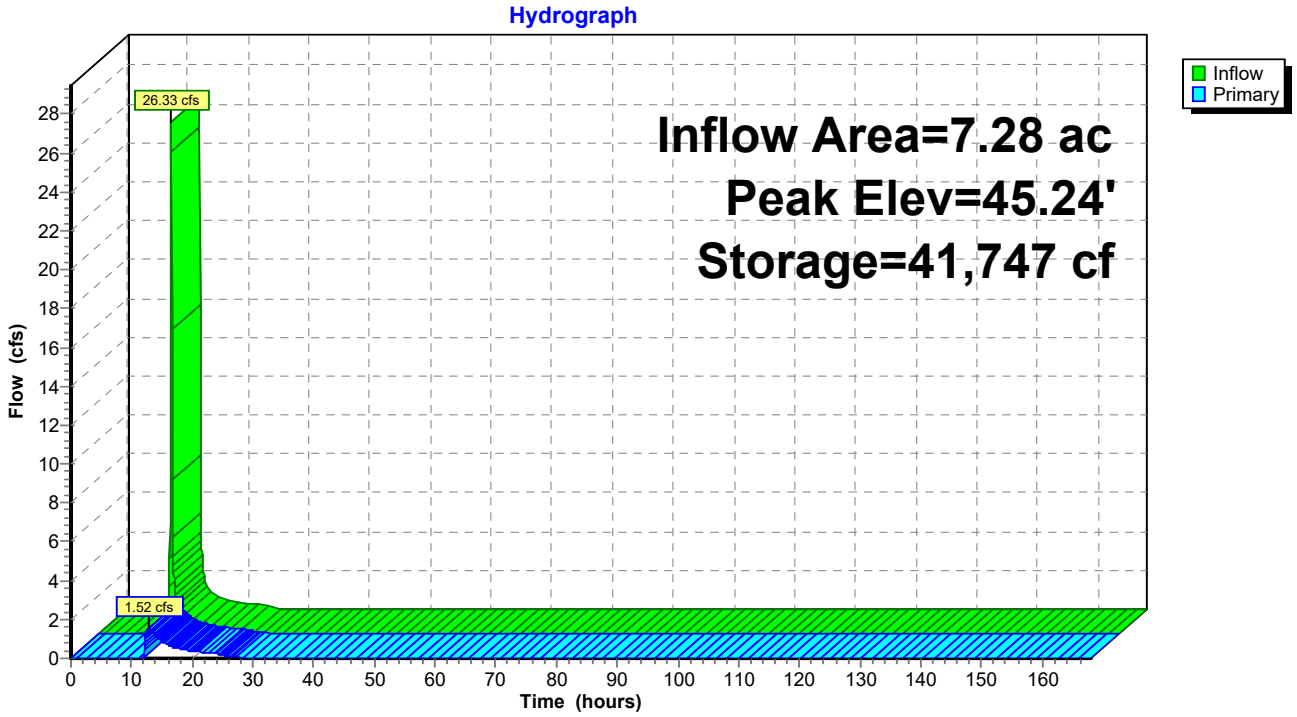
144,025.0 cf Field - 61,207.2 cf Chambers = 82,817.8 cf Stone x 40.0% Voids = 33,127.1 cf Stone Storage

Chamber Storage + Stone Storage = 94,334.3 cf = 2.166 af
Overall Storage Efficiency = 65.5%
Overall System Size = 411.50' x 87.50' x 4.00'

1,665 Chambers
5,334.3 cy Field
3,067.3 cy Stone



Pond 3P: MRC UGD BASIN



Stage-Discharge for Pond 3P: MRC UGD BASIN

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
43.60	0.00	44.64	0.00	45.68	7.11	46.72	22.02
43.62	0.00	44.66	0.00	45.70	7.42	46.74	22.13
43.64	0.00	44.68	0.01	45.72	7.73	46.76	22.23
43.66	0.00	44.70	0.01	45.74	8.05	46.78	22.33
43.68	0.00	44.72	0.01	45.76	8.36	46.80	22.44
43.70	0.00	44.74	0.01	45.78	8.69	46.82	22.54
43.72	0.00	44.76	0.01	45.80	9.01	46.84	22.64
43.74	0.00	44.78	0.01	45.82	9.34	46.86	22.74
43.76	0.00	44.80	0.01	45.84	9.68	46.88	22.84
43.78	0.00	44.82	0.01	45.86	10.01	46.90	22.94
43.80	0.00	44.84	0.01	45.88	10.35	46.92	23.04
43.82	0.00	44.86	0.01	45.90	10.69	46.94	23.14
43.84	0.00	44.88	0.01	45.92	11.04	46.96	23.24
43.86	0.00	44.90	0.01	45.94	11.39	46.98	23.34
43.88	0.00	44.92	0.01	45.96	11.74	47.00	23.43
43.90	0.00	44.94	0.01	45.98	12.10	47.02	23.53
43.92	0.00	44.96	0.01	46.00	12.46	47.04	23.63
43.94	0.00	44.98	0.02	46.02	12.82	47.06	23.73
43.96	0.00	45.00	0.02	46.04	13.18	47.08	23.82
43.98	0.00	45.02	0.05	46.06	13.55	47.10	23.92
44.00	0.00	45.04	0.12	46.08	13.92	47.12	24.01
44.02	0.00	45.06	0.21	46.10	14.29	47.14	24.11
44.04	0.00	45.08	0.31	46.12	14.67	47.16	24.20
44.06	0.00	45.10	0.43	46.14	15.05	47.18	24.30
44.08	0.00	45.12	0.56	46.16	15.43	47.20	24.39
44.10	0.00	45.14	0.70	46.18	15.81	47.22	24.48
44.12	0.00	45.16	0.85	46.20	16.20	47.24	24.58
44.14	0.00	45.18	1.01	46.22	16.58	47.26	24.67
44.16	0.00	45.20	1.18	46.24	16.97	47.28	24.76
44.18	0.00	45.22	1.35	46.26	17.37	47.30	24.86
44.20	0.00	45.24	1.54	46.28	17.76	47.32	24.95
44.22	0.00	45.26	1.73	46.30	18.16	47.34	25.04
44.24	0.00	45.28	1.93	46.32	18.56	47.36	25.13
44.26	0.00	45.30	2.14	46.34	18.96	47.38	25.22
44.28	0.00	45.32	2.35	46.36	19.37	47.40	25.31
44.30	0.00	45.34	2.57	46.38	19.78	47.42	25.40
44.32	0.00	45.36	2.80	46.40	20.19	47.44	25.49
44.34	0.00	45.38	3.03	46.42	20.41	47.46	25.58
44.36	0.00	45.40	3.27	46.44	20.52	47.48	25.67
44.38	0.00	45.42	3.51	46.46	20.63	47.50	25.76
44.40	0.00	45.44	3.76	46.48	20.74	47.52	25.85
44.42	0.00	45.46	4.01	46.50	20.85	47.54	25.94
44.44	0.00	45.48	4.27	46.52	20.96	47.56	26.02
44.46	0.00	45.50	4.53	46.54	21.07	47.58	26.11
44.48	0.00	45.52	4.80	46.56	21.18	47.60	**26.20**
44.50	0.00	45.54	5.08	46.58	21.29		
44.52	0.00	45.56	5.35	46.60	21.39		
44.54	0.00	45.58	5.64	46.62	21.50		
44.56	0.00	45.60	5.92	46.64	21.61		
44.58	0.00	45.62	6.21	46.66	21.71		
44.60	0.00	45.64	6.51	46.68	21.82		
44.62	0.00	45.66	6.81	46.70	21.92		

Stage-Area-Storage for Pond 3P: MRC UGD BASIN

Elevation (feet)	Storage (cubic-feet)
43.60	0
43.65	720
43.70	1,440
43.75	2,160
43.80	2,881
43.85	3,601
43.90	4,321
43.95	5,041
44.00	5,761
44.05	6,481
44.10	7,201
44.15	8,761
44.20	10,319
44.25	11,874
44.30	13,426
44.35	14,974
44.40	16,520
44.45	18,062
44.50	19,600
44.55	21,134
44.60	22,664
44.65	24,190
44.70	25,711
44.75	27,228
44.80	28,740
44.85	30,247
44.90	31,749
44.95	33,246
45.00	34,738
45.05	36,223
45.10	37,702
45.15	39,176
45.20	40,643
45.25	42,104
45.30	43,558
45.35	45,005
45.40	46,444
45.45	47,876
45.50	49,299
45.55	50,715
45.60	52,122
45.65	53,522
45.70	54,912
45.75	56,293
45.80	57,664
45.85	59,025
45.90	60,374
45.95	61,714
46.00	63,042
46.05	64,358
46.10	65,662
46.15	66,953
46.20	68,230
46.25	69,492
46.30	70,738
46.35	71,968
46.40	73,181
46.45	74,375
46.50	75,549
46.55	76,701
46.60	77,831
46.65	78,935
46.70	80,011
46.75	81,053
46.80	82,056
46.85	83,007
46.90	83,909
46.95	84,764
47.00	85,585
47.05	86,375
47.10	87,133
47.15	87,853
47.20	88,573
47.25	89,293
47.30	90,014
47.35	90,734
47.40	91,454
47.45	92,174
47.50	92,894
47.55	93,614
47.60	**94,334**

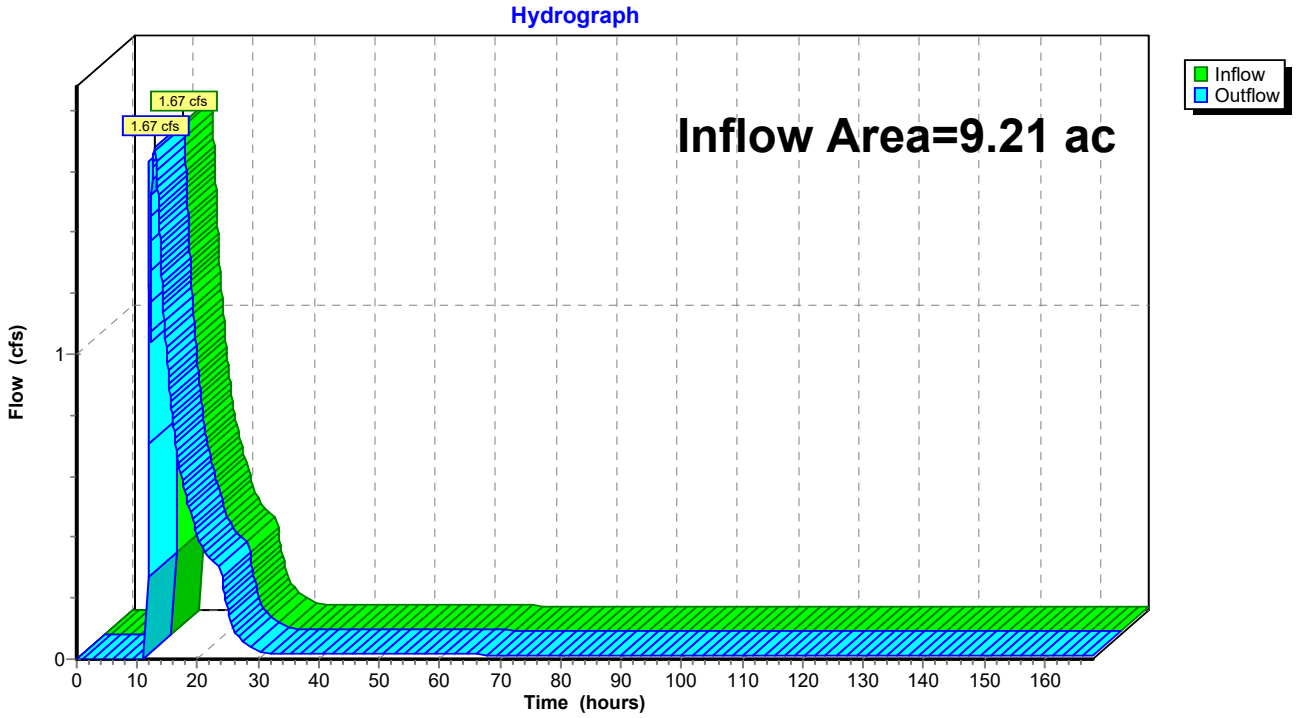
Summary for Reach 4R: Post-Project (SP 1)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.21 ac, 62.00% Impervious, Inflow Depth > 1.18" for 2yr event
Inflow = 1.67 cfs @ 12.81 hrs, Volume= 0.908 af
Outflow = 1.67 cfs @ 12.81 hrs, Volume= 0.908 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs

Reach 4R: Post-Project (SP 1)



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Post-Bypass(DP001) Runoff Area=1.93 ac 11.92% Impervious Runoff Depth=1.40"
Tc=6.0 min CN=63 Runoff=4.60 cfs 0.225 af

Subcatchment2S: D.A to MRC UGD BASIN Runoff Area=7.28 ac 75.27% Impervious Runoff Depth=3.60"
Tc=6.0 min CN=89 Runoff=42.79 cfs 2.184 af

Pond 3P: MRC UGD BASIN Peak Elev=45.80' Storage=57,774 cf Inflow=42.79 cfs 2.184 af
Outflow=9.08 cfs 1.695 af

Reach 4R: Post-Project(SP 1) Inflow=10.87 cfs 1.919 af
Outflow=10.87 cfs 1.919 af

Total Runoff Area = 9.21 ac Runoff Volume = 2.408 af Average Runoff Depth = 3.14"
38.00% Pervious = 3.50 ac 62.00% Impervious = 5.71 ac

Summary for Subcatchment 1S: Post-Bypass (DP001)

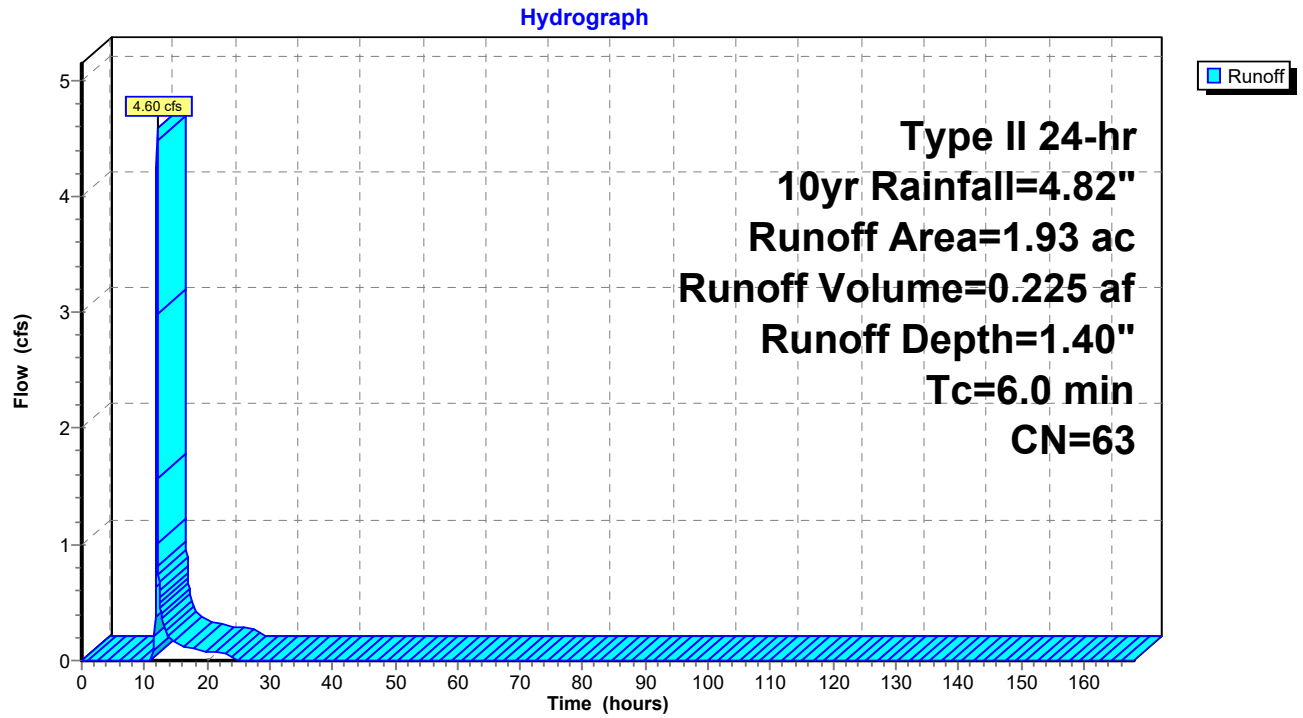
Runoff = 4.60 cfs @ 11.98 hrs, Volume= 0.225 af, Depth= 1.40"
Routed to Reach 4R : Post-Project (SP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=4.82"

Area (ac)	CN	Description
0.23	98	Paved parking, HSG A
0.89	61	>75% Grass cover, Good, HSG B
0.81	55	Woods, Good, HSG B
1.93	63	Weighted Average
1.70		88.08% Pervious Area
0.23		11.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: Post-Bypass (DP001)



Summary for Subcatchment 2S: D.A to MRC UGD BASIN

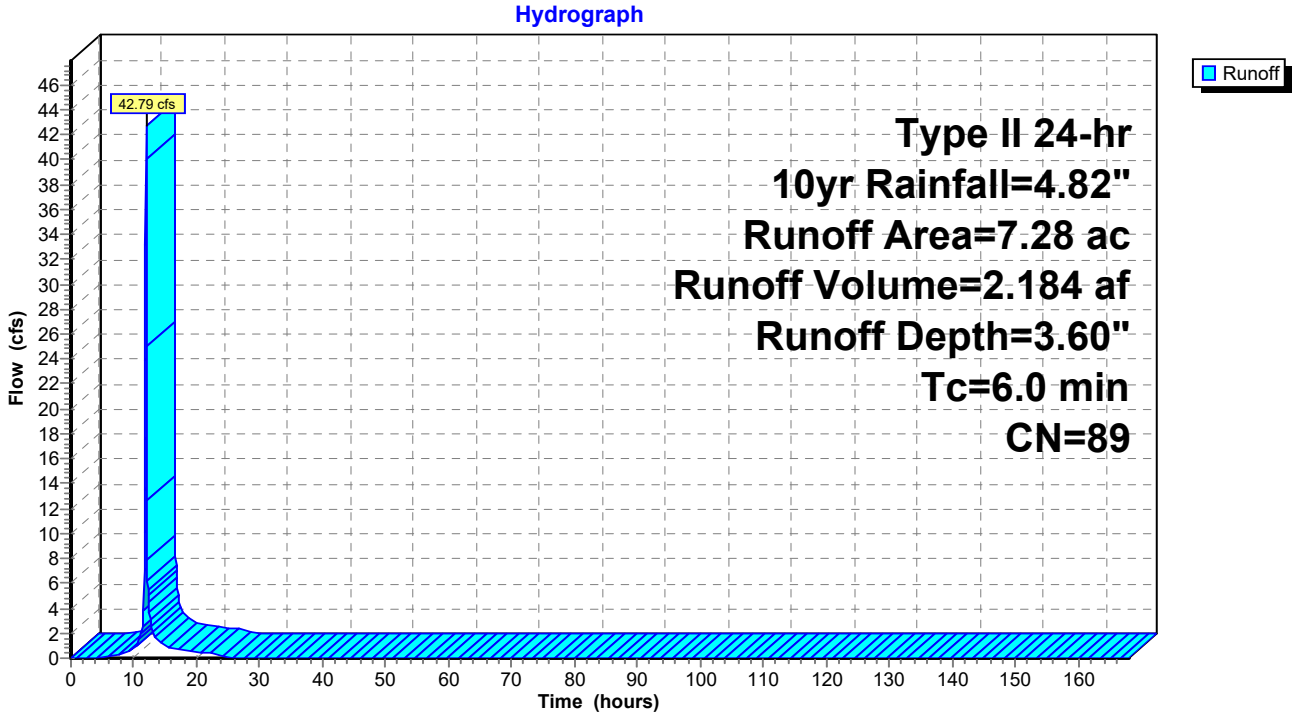
Runoff = 42.79 cfs @ 11.97 hrs, Volume= 2.184 af, Depth= 3.60"
Routed to Pond 3P : MRC UGD BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=4.82"

Area (ac)	CN	Description
5.48	98	Paved parking, HSG B
1.80	61	>75% Grass cover, Good, HSG B
7.28	89	Weighted Average
1.80		24.73% Pervious Area
5.48		75.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: D.A to MRC UGD BASIN



Summary for Pond 3P: MRC UGD BASIN

Inflow Area = 7.28 ac, 75.27% Impervious, Inflow Depth = 3.60" for 10yr event
Inflow = 42.79 cfs @ 11.97 hrs, Volume= 2.184 af
Outflow = 9.08 cfs @ 12.14 hrs, Volume= 1.695 af, Atten= 79%, Lag= 10.8 min
Primary = 9.08 cfs @ 12.14 hrs, Volume= 1.695 af
Routed to Reach 4R : Post-Project (SP 1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Starting Elev= 44.10' Surf.Area= 36,006 sf Storage= 7,201 cf
Peak Elev= 45.80' @ 12.14 hrs Surf.Area= 36,006 sf Storage= 57,774 cf (50,573 cf above start)

Plug-Flow detention time= 702.5 min calculated for 1.530 af (70% of inflow)
Center-of-Mass det. time= 540.3 min (1,332.9 - 792.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	43.60'	33,127 cf	**87.50'W x 411.50'L x 4.00'H Field A** 144,025 cf Overall - 61,207 cf Embedded = 82,818 cf x 40.0% Voids
#2A	44.10'	61,207 cf	**Cultec R-360HD** x 1665 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 1665 Chambers in 15 Rows Cap Storage= 6.5 cf x 2 x 15 rows = 193.8 cf
		94,334 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	43.60'	**24.0" Round Culvert** L= 70.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.60' / 42.95' S= 0.0093 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	44.60'	**1.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	45.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=9.06 cfs @ 12.14 hrs HW=45.80' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 9.06 cfs of 16.59 cfs potential flow)
├**2=Orifice** (Orifice Controls 0.03 cfs @ 5.19 fps)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 9.03 cfs @ 2.93 fps)

Pond 3P: MRC UGD BASIN - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)
Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf
Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap
Cap Storage= 6.5 cf x 2 x 15 rows = 193.8 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

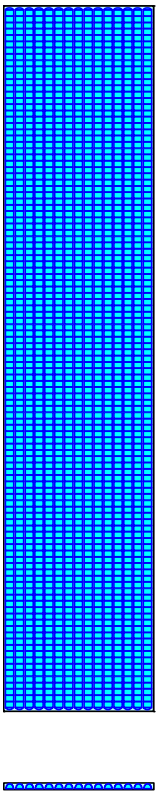
111 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 409.50' Row Length +12.0" End Stone x 2 = 411.50' Base Length
15 Rows x 60.0" Wide + 9.0" Spacing x 14 + 12.0" Side Stone x 2 = 87.50' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

1,665 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 15 Rows = 61,207.2 cf Chamber Storage

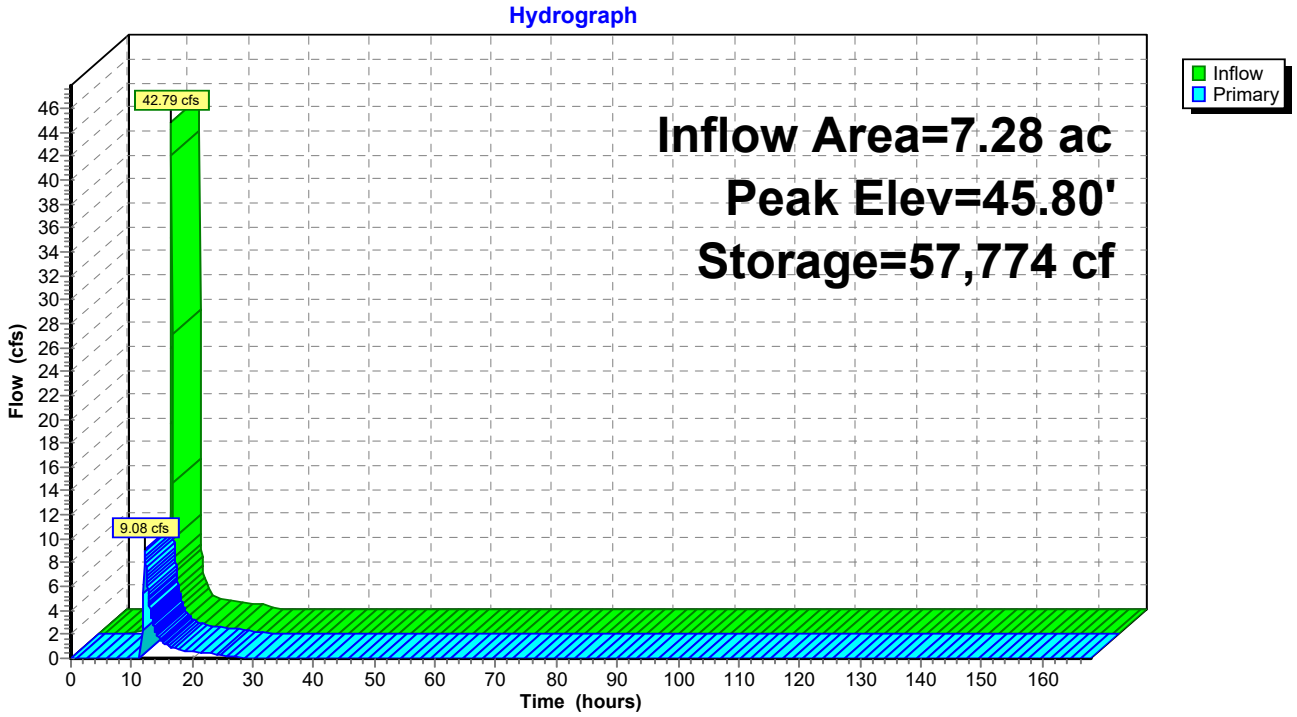
144,025.0 cf Field - 61,207.2 cf Chambers = 82,817.8 cf Stone x 40.0% Voids = 33,127.1 cf Stone Storage

Chamber Storage + Stone Storage = 94,334.3 cf = 2.166 af
Overall Storage Efficiency = 65.5%
Overall System Size = 411.50' x 87.50' x 4.00'

1,665 Chambers
5,334.3 cy Field
3,067.3 cy Stone



Pond 3P: MRC UGD BASIN



Stage-Discharge for Pond 3P: MRC UGD BASIN

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
43.60	0.00	44.64	0.00	45.68	7.11	46.72	22.02
43.62	0.00	44.66	0.00	45.70	7.42	46.74	22.13
43.64	0.00	44.68	0.01	45.72	7.73	46.76	22.23
43.66	0.00	44.70	0.01	45.74	8.05	46.78	22.33
43.68	0.00	44.72	0.01	45.76	8.36	46.80	22.44
43.70	0.00	44.74	0.01	45.78	8.69	46.82	22.54
43.72	0.00	44.76	0.01	45.80	9.01	46.84	22.64
43.74	0.00	44.78	0.01	45.82	9.34	46.86	22.74
43.76	0.00	44.80	0.01	45.84	9.68	46.88	22.84
43.78	0.00	44.82	0.01	45.86	10.01	46.90	22.94
43.80	0.00	44.84	0.01	45.88	10.35	46.92	23.04
43.82	0.00	44.86	0.01	45.90	10.69	46.94	23.14
43.84	0.00	44.88	0.01	45.92	11.04	46.96	23.24
43.86	0.00	44.90	0.01	45.94	11.39	46.98	23.34
43.88	0.00	44.92	0.01	45.96	11.74	47.00	23.43
43.90	0.00	44.94	0.01	45.98	12.10	47.02	23.53
43.92	0.00	44.96	0.01	46.00	12.46	47.04	23.63
43.94	0.00	44.98	0.02	46.02	12.82	47.06	23.73
43.96	0.00	45.00	0.02	46.04	13.18	47.08	23.82
43.98	0.00	45.02	0.05	46.06	13.55	47.10	23.92
44.00	0.00	45.04	0.12	46.08	13.92	47.12	24.01
44.02	0.00	45.06	0.21	46.10	14.29	47.14	24.11
44.04	0.00	45.08	0.31	46.12	14.67	47.16	24.20
44.06	0.00	45.10	0.43	46.14	15.05	47.18	24.30
44.08	0.00	45.12	0.56	46.16	15.43	47.20	24.39
44.10	0.00	45.14	0.70	46.18	15.81	47.22	24.48
44.12	0.00	45.16	0.85	46.20	16.20	47.24	24.58
44.14	0.00	45.18	1.01	46.22	16.58	47.26	24.67
44.16	0.00	45.20	1.18	46.24	16.97	47.28	24.76
44.18	0.00	45.22	1.35	46.26	17.37	47.30	24.86
44.20	0.00	45.24	1.54	46.28	17.76	47.32	24.95
44.22	0.00	45.26	1.73	46.30	18.16	47.34	25.04
44.24	0.00	45.28	1.93	46.32	18.56	47.36	25.13
44.26	0.00	45.30	2.14	46.34	18.96	47.38	25.22
44.28	0.00	45.32	2.35	46.36	19.37	47.40	25.31
44.30	0.00	45.34	2.57	46.38	19.78	47.42	25.40
44.32	0.00	45.36	2.80	46.40	20.19	47.44	25.49
44.34	0.00	45.38	3.03	46.42	20.41	47.46	25.58
44.36	0.00	45.40	3.27	46.44	20.52	47.48	25.67
44.38	0.00	45.42	3.51	46.46	20.63	47.50	25.76
44.40	0.00	45.44	3.76	46.48	20.74	47.52	25.85
44.42	0.00	45.46	4.01	46.50	20.85	47.54	25.94
44.44	0.00	45.48	4.27	46.52	20.96	47.56	26.02
44.46	0.00	45.50	4.53	46.54	21.07	47.58	26.11
44.48	0.00	45.52	4.80	46.56	21.18	47.60	**26.20**
44.50	0.00	45.54	5.08	46.58	21.29		
44.52	0.00	45.56	5.35	46.60	21.39		
44.54	0.00	45.58	5.64	46.62	21.50		
44.56	0.00	45.60	5.92	46.64	21.61		
44.58	0.00	45.62	6.21	46.66	21.71		
44.60	0.00	45.64	6.51	46.68	21.82		
44.62	0.00	45.66	6.81	46.70	21.92		

Stage-Area-Storage for Pond 3P: MRC UGD BASIN

Elevation (feet)	Storage (cubic-feet)
43.60	0
43.65	720
43.70	1,440
43.75	2,160
43.80	2,881
43.85	3,601
43.90	4,321
43.95	5,041
44.00	5,761
44.05	6,481
44.10	7,201
44.15	8,761
44.20	10,319
44.25	11,874
44.30	13,426
44.35	14,974
44.40	16,520
44.45	18,062
44.50	19,600
44.55	21,134
44.60	22,664
44.65	24,190
44.70	25,711
44.75	27,228
44.80	28,740
44.85	30,247
44.90	31,749
44.95	33,246
45.00	34,738
45.05	36,223
45.10	37,702
45.15	39,176
45.20	40,643
45.25	42,104
45.30	43,558
45.35	45,005
45.40	46,444
45.45	47,876
45.50	49,299
45.55	50,715
45.60	52,122
45.65	53,522
45.70	54,912
45.75	56,293
45.80	57,664
45.85	59,025
45.90	60,374
45.95	61,714
46.00	63,042
46.05	64,358
46.10	65,662
46.15	66,953
46.20	68,230
46.25	69,492
46.30	70,738
46.35	71,968
46.40	73,181
46.45	74,375
46.50	75,549
46.55	76,701
46.60	77,831
46.65	78,935
46.70	80,011
46.75	81,053
46.80	82,056
46.85	83,007
46.90	83,909
46.95	84,764
47.00	85,585
47.05	86,375
47.10	87,133
47.15	87,853
47.20	88,573
47.25	89,293
47.30	90,014
47.35	90,734
47.40	91,454
47.45	92,174
47.50	92,894
47.55	93,614
47.60	**94,334**

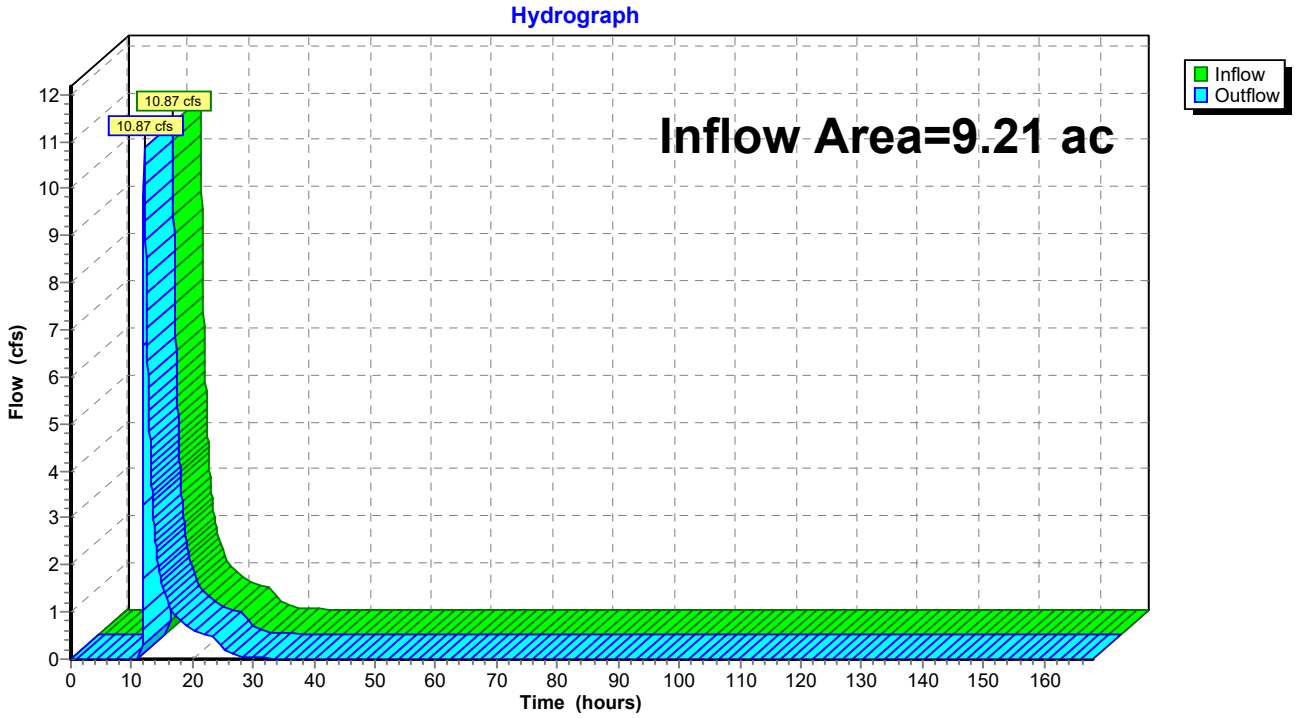
Summary for Reach 4R: Post-Project (SP 1)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.21 ac, 62.00% Impervious, Inflow Depth > 2.50" for 10yr event
Inflow = 10.87 cfs @ 12.06 hrs, Volume= 1.919 af
Outflow = 10.87 cfs @ 12.06 hrs, Volume= 1.919 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs

Reach 4R: Post-Project (SP 1)



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Post-Bypass(DP001) Runoff Area=1.93 ac 11.92% Impervious Runoff Depth=2.66"
Tc=6.0 min CN=63 Runoff=8.93 cfs 0.427 af

Subcatchment2S: D.A to MRC UGD BASIN Runoff Area=7.28 ac 75.27% Impervious Runoff Depth=5.39"
Tc=6.0 min CN=89 Runoff=62.42 cfs 3.268 af

Pond 3P: MRC UGD BASIN Peak Elev=46.57' Storage=77,166 cf Inflow=62.42 cfs 3.268 af
Outflow=21.23 cfs 2.778 af

Reach 4R: Post-Project(SP 1) Inflow=27.66 cfs 3.205 af
Outflow=27.66 cfs 3.205 af

Total Runoff Area = 9.21 ac Runoff Volume = 3.695 af Average Runoff Depth = 4.81"
38.00% Pervious = 3.50 ac 62.00% Impervious = 5.71 ac

Summary for Subcatchment 1S: Post-Bypass (DP001)

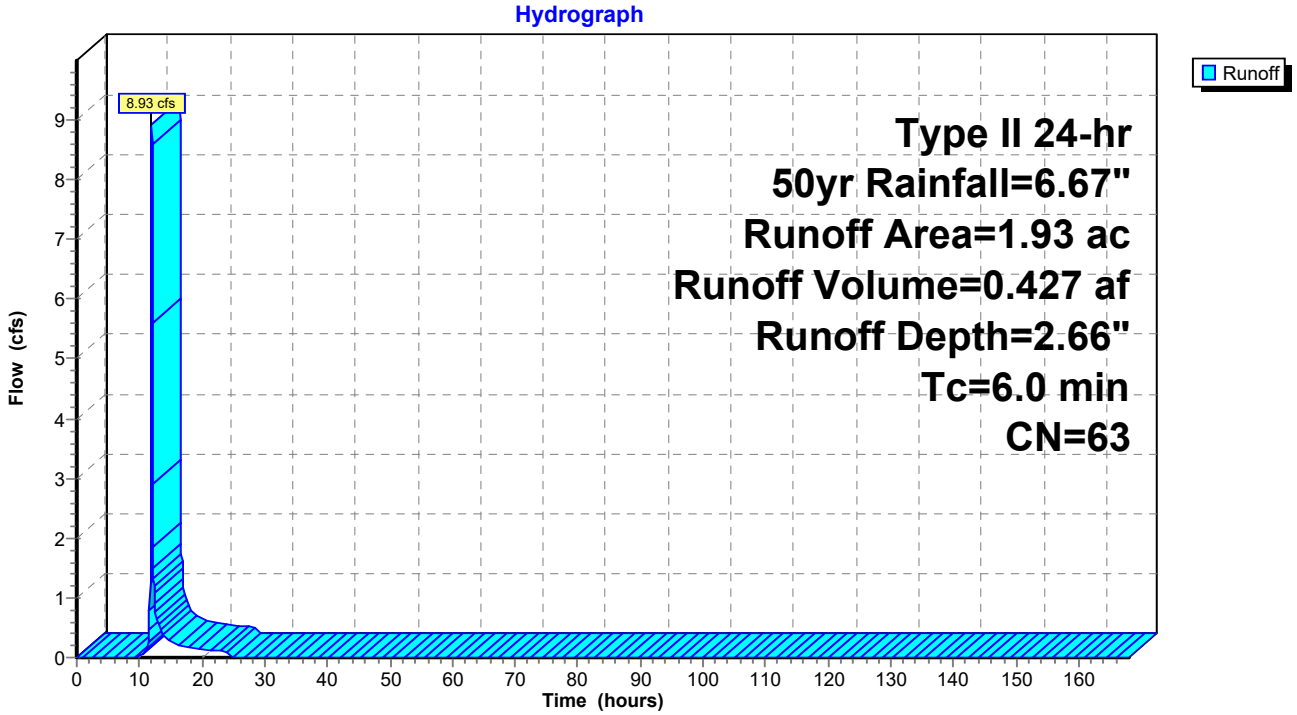
Runoff = 8.93 cfs @ 11.98 hrs, Volume= 0.427 af, Depth= 2.66"
Routed to Reach 4R : Post-Project (SP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=6.67"

Area (ac)	CN	Description
0.23	98	Paved parking, HSG A
0.89	61	>75% Grass cover, Good, HSG B
0.81	55	Woods, Good, HSG B
1.93	63	Weighted Average
1.70		88.08% Pervious Area
0.23		11.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: Post-Bypass (DP001)



Summary for Subcatchment 2S: D.A to MRC UGD BASIN

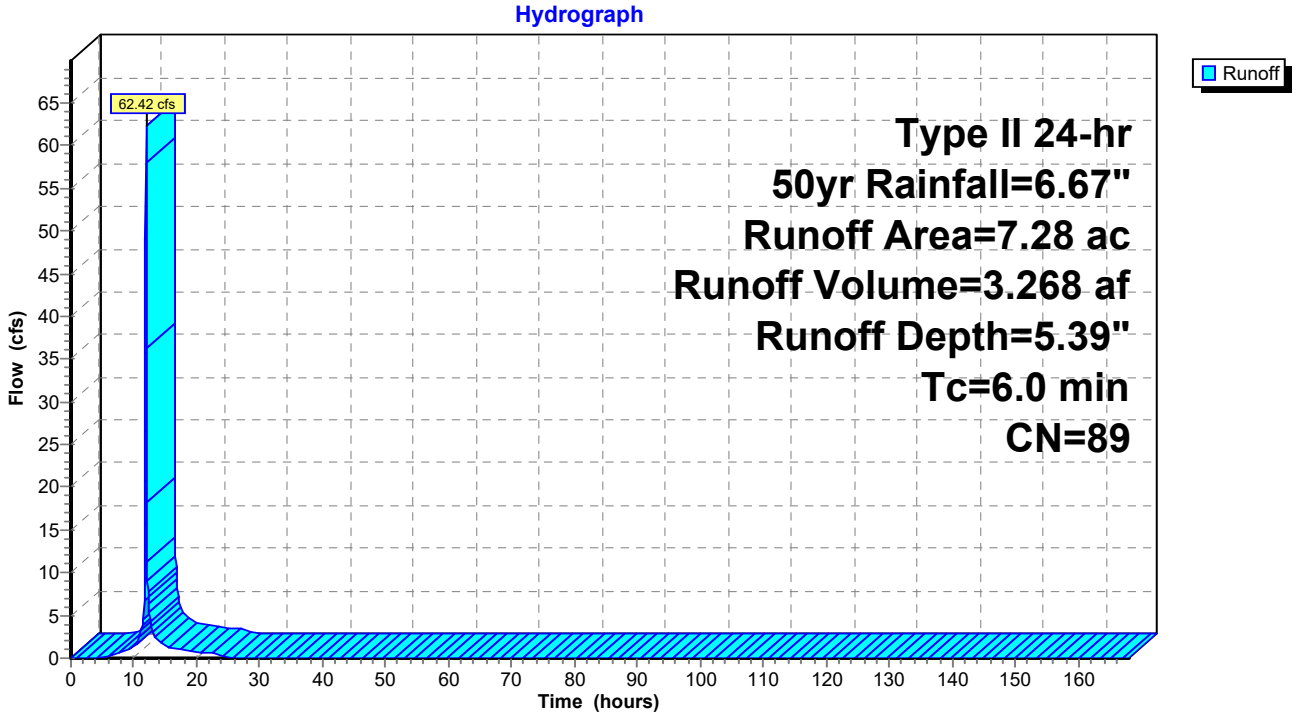
Runoff = 62.42 cfs @ 11.96 hrs, Volume= 3.268 af, Depth= 5.39"
Routed to Pond 3P : MRC UGD BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=6.67"

Area (ac)	CN	Description
5.48	98	Paved parking, HSG B
1.80	61	>75% Grass cover, Good, HSG B
7.28	89	Weighted Average
1.80		24.73% Pervious Area
5.48		75.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: D.A to MRC UGD BASIN



Summary for Pond 3P: MRC UGD BASIN

Inflow Area = 7.28 ac, 75.27% Impervious, Inflow Depth = 5.39" for 50yr event
Inflow = 62.42 cfs @ 11.96 hrs, Volume= 3.268 af
Outflow = 21.23 cfs @ 12.10 hrs, Volume= 2.778 af, Atten= 66%, Lag= 8.2 min
Primary = 21.23 cfs @ 12.10 hrs, Volume= 2.778 af
Routed to Reach 4R : Post-Project (SP 1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Starting Elev= 44.10' Surf.Area= 36,006 sf Storage= 7,201 cf
Peak Elev= 46.57' @ 12.10 hrs Surf.Area= 36,006 sf Storage= 77,166 cf (69,965 cf above start)

Plug-Flow detention time= 459.9 min calculated for 2.612 af (80% of inflow)
Center-of-Mass det. time= 355.8 min (1,137.2 - 781.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	43.60'	33,127 cf	**87.50'W x 411.50'L x 4.00'H Field A** 144,025 cf Overall - 61,207 cf Embedded = 82,818 cf x 40.0% Voids
#2A	44.10'	61,207 cf	**Cultec R-360HD** x 1665 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 1665 Chambers in 15 Rows Cap Storage= 6.5 cf x 2 x 15 rows = 193.8 cf
		94,334 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	43.60'	**24.0" Round Culvert** L= 70.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.60' / 42.95' S= 0.0093 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	44.60'	**1.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	45.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=21.23 cfs @ 12.10 hrs HW=46.57' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 21.23 cfs @ 6.76 fps)
├**2=Orifice** (Passes < 0.04 cfs potential flow)
└**3=Sharp-Crested Rectangular Weir** (Passes < 23.71 cfs potential flow)

Pond 3P: MRC UGD BASIN - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)
Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf
Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap
Cap Storage= 6.5 cf x 2 x 15 rows = 193.8 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

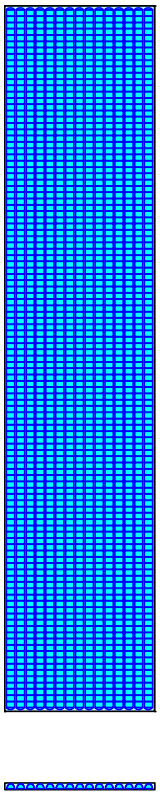
111 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 409.50' Row Length +12.0" End Stone x 2 = 411.50' Base Length
15 Rows x 60.0" Wide + 9.0" Spacing x 14 + 12.0" Side Stone x 2 = 87.50' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

1,665 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 15 Rows = 61,207.2 cf Chamber Storage

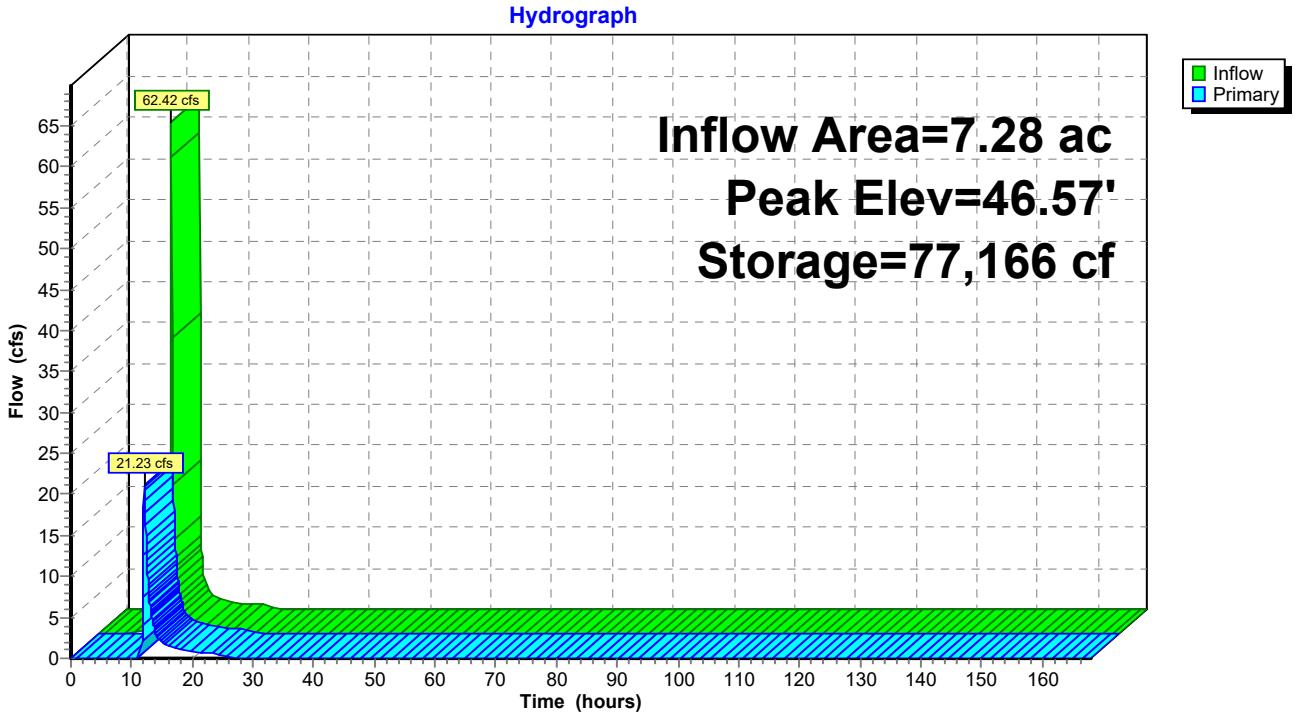
144,025.0 cf Field - 61,207.2 cf Chambers = 82,817.8 cf Stone x 40.0% Voids = 33,127.1 cf Stone Storage

Chamber Storage + Stone Storage = 94,334.3 cf = 2.166 af
Overall Storage Efficiency = 65.5%
Overall System Size = 411.50' x 87.50' x 4.00'

1,665 Chambers
5,334.3 cy Field
3,067.3 cy Stone



Pond 3P: MRC UGD BASIN



Stage-Discharge for Pond 3P: MRC UGD BASIN

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
43.60	0.00	44.64	0.00	45.68	7.11	46.72	22.02
43.62	0.00	44.66	0.00	45.70	7.42	46.74	22.13
43.64	0.00	44.68	0.01	45.72	7.73	46.76	22.23
43.66	0.00	44.70	0.01	45.74	8.05	46.78	22.33
43.68	0.00	44.72	0.01	45.76	8.36	46.80	22.44
43.70	0.00	44.74	0.01	45.78	8.69	46.82	22.54
43.72	0.00	44.76	0.01	45.80	9.01	46.84	22.64
43.74	0.00	44.78	0.01	45.82	9.34	46.86	22.74
43.76	0.00	44.80	0.01	45.84	9.68	46.88	22.84
43.78	0.00	44.82	0.01	45.86	10.01	46.90	22.94
43.80	0.00	44.84	0.01	45.88	10.35	46.92	23.04
43.82	0.00	44.86	0.01	45.90	10.69	46.94	23.14
43.84	0.00	44.88	0.01	45.92	11.04	46.96	23.24
43.86	0.00	44.90	0.01	45.94	11.39	46.98	23.34
43.88	0.00	44.92	0.01	45.96	11.74	47.00	23.43
43.90	0.00	44.94	0.01	45.98	12.10	47.02	23.53
43.92	0.00	44.96	0.01	46.00	12.46	47.04	23.63
43.94	0.00	44.98	0.02	46.02	12.82	47.06	23.73
43.96	0.00	45.00	0.02	46.04	13.18	47.08	23.82
43.98	0.00	45.02	0.05	46.06	13.55	47.10	23.92
44.00	0.00	45.04	0.12	46.08	13.92	47.12	24.01
44.02	0.00	45.06	0.21	46.10	14.29	47.14	24.11
44.04	0.00	45.08	0.31	46.12	14.67	47.16	24.20
44.06	0.00	45.10	0.43	46.14	15.05	47.18	24.30
44.08	0.00	45.12	0.56	46.16	15.43	47.20	24.39
44.10	0.00	45.14	0.70	46.18	15.81	47.22	24.48
44.12	0.00	45.16	0.85	46.20	16.20	47.24	24.58
44.14	0.00	45.18	1.01	46.22	16.58	47.26	24.67
44.16	0.00	45.20	1.18	46.24	16.97	47.28	24.76
44.18	0.00	45.22	1.35	46.26	17.37	47.30	24.86
44.20	0.00	45.24	1.54	46.28	17.76	47.32	24.95
44.22	0.00	45.26	1.73	46.30	18.16	47.34	25.04
44.24	0.00	45.28	1.93	46.32	18.56	47.36	25.13
44.26	0.00	45.30	2.14	46.34	18.96	47.38	25.22
44.28	0.00	45.32	2.35	46.36	19.37	47.40	25.31
44.30	0.00	45.34	2.57	46.38	19.78	47.42	25.40
44.32	0.00	45.36	2.80	46.40	20.19	47.44	25.49
44.34	0.00	45.38	3.03	46.42	20.41	47.46	25.58
44.36	0.00	45.40	3.27	46.44	20.52	47.48	25.67
44.38	0.00	45.42	3.51	46.46	20.63	47.50	25.76
44.40	0.00	45.44	3.76	46.48	20.74	47.52	25.85
44.42	0.00	45.46	4.01	46.50	20.85	47.54	25.94
44.44	0.00	45.48	4.27	46.52	20.96	47.56	26.02
44.46	0.00	45.50	4.53	46.54	21.07	47.58	26.11
44.48	0.00	45.52	4.80	46.56	21.18	47.60	**26.20**
44.50	0.00	45.54	5.08	46.58	21.29		
44.52	0.00	45.56	5.35	46.60	21.39		
44.54	0.00	45.58	5.64	46.62	21.50		
44.56	0.00	45.60	5.92	46.64	21.61		
44.58	0.00	45.62	6.21	46.66	21.71		
44.60	0.00	45.64	6.51	46.68	21.82		
44.62	0.00	45.66	6.81	46.70	21.92		

Stage-Area-Storage for Pond 3P: MRC UGD BASIN

Elevation (feet)	Storage (cubic-feet)
43.60	0
43.65	720
43.70	1,440
43.75	2,160
43.80	2,881
43.85	3,601
43.90	4,321
43.95	5,041
44.00	5,761
44.05	6,481
44.10	7,201
44.15	8,761
44.20	10,319
44.25	11,874
44.30	13,426
44.35	14,974
44.40	16,520
44.45	18,062
44.50	19,600
44.55	21,134
44.60	22,664
44.65	24,190
44.70	25,711
44.75	27,228
44.80	28,740
44.85	30,247
44.90	31,749
44.95	33,246
45.00	34,738
45.05	36,223
45.10	37,702
45.15	39,176
45.20	40,643
45.25	42,104
45.30	43,558
45.35	45,005
45.40	46,444
45.45	47,876
45.50	49,299
45.55	50,715
45.60	52,122
45.65	53,522
45.70	54,912
45.75	56,293
45.80	57,664
45.85	59,025
45.90	60,374
45.95	61,714
46.00	63,042
46.05	64,358
46.10	65,662
46.15	66,953
46.20	68,230
46.25	69,492
46.30	70,738
46.35	71,968
46.40	73,181
46.45	74,375
46.50	75,549
46.55	76,701
46.60	77,831
46.65	78,935
46.70	80,011
46.75	81,053
46.80	82,056
46.85	83,007
46.90	83,909
46.95	84,764
47.00	85,585
47.05	86,375
47.10	87,133
47.15	87,853
47.20	88,573
47.25	89,293
47.30	90,014
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47.50	92,894
47.55	93,614
47.60	**94,334**

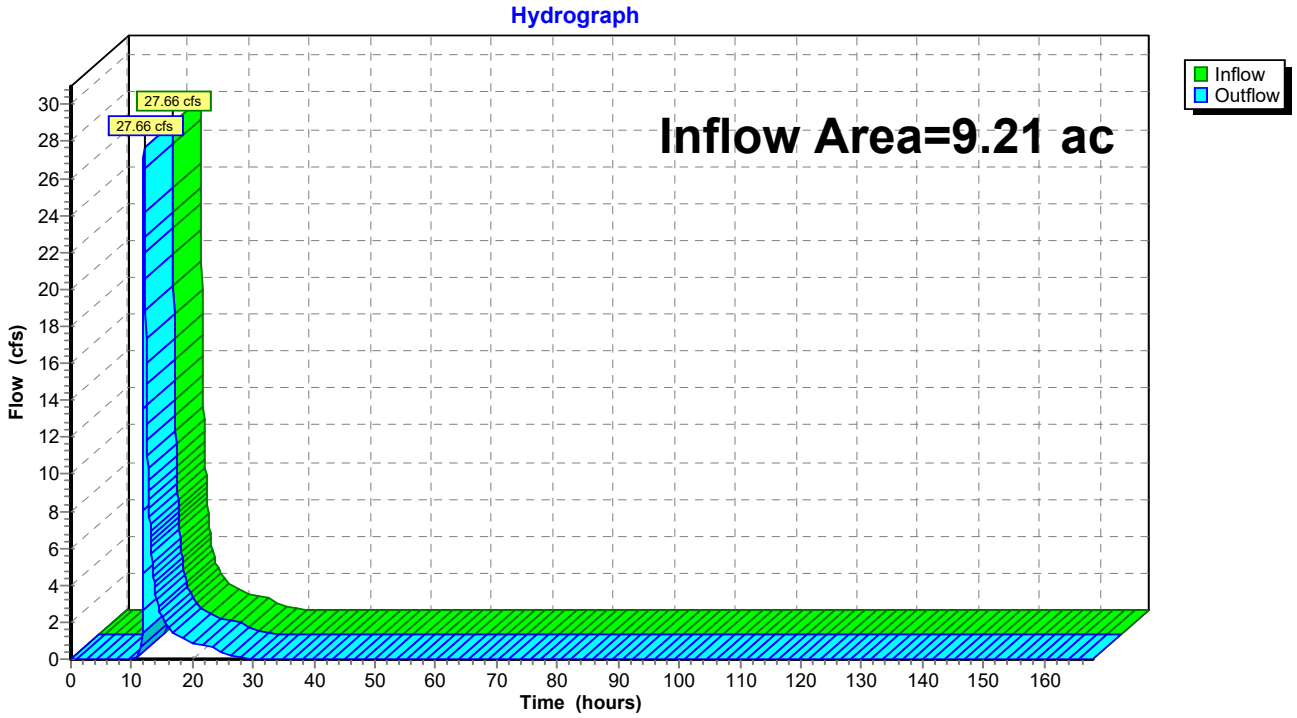
Summary for Reach 4R: Post-Project (SP 1)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.21 ac, 62.00% Impervious, Inflow Depth > 4.18" for 50yr event
Inflow = 27.66 cfs @ 12.02 hrs, Volume= 3.205 af
Outflow = 27.66 cfs @ 12.02 hrs, Volume= 3.205 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs

Reach 4R: Post-Project (SP 1)



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Post-Bypass(DP001) Runoff Area=1.93 ac 11.92% Impervious Runoff Depth=3.34"
Tc=6.0 min CN=63 Runoff=11.23 cfs 0.537 af

Subcatchment2S: D.A to MRC UGD BASIN Runoff Area=7.28 ac 75.27% Impervious Runoff Depth=6.28"
Tc=6.0 min CN=89 Runoff=72.00 cfs 3.807 af

Pond 3P: MRC UGD BASIN Peak Elev=47.09' Storage=86,942 cf Inflow=72.00 cfs 3.807 af
Outflow=23.86 cfs 3.317 af

Reach 4R: Post-Project(SP 1) Inflow=32.68 cfs 3.855 af
Outflow=32.68 cfs 3.855 af

Total Runoff Area = 9.21 ac Runoff Volume = 4.344 af Average Runoff Depth = 5.66"
38.00% Pervious = 3.50 ac 62.00% Impervious = 5.71 ac

Summary for Subcatchment 1S: Post-Bypass (DP001)

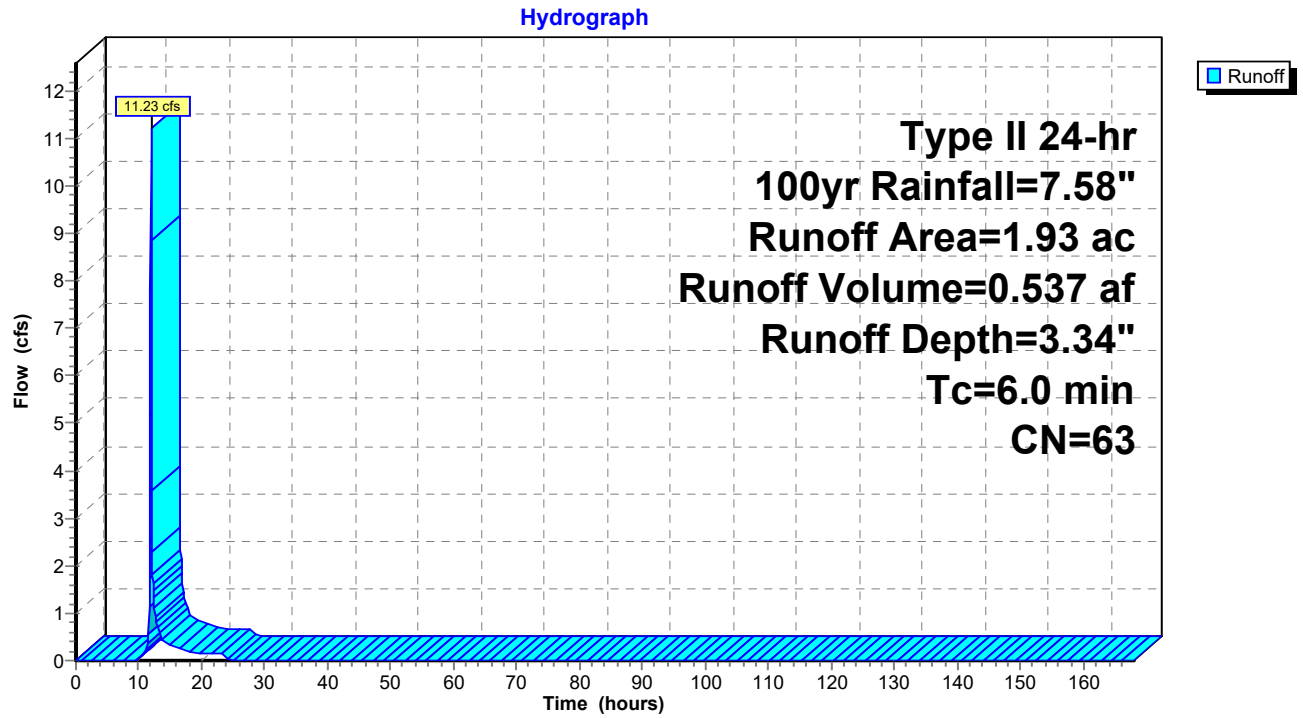
Runoff = 11.23 cfs @ 11.98 hrs, Volume= 0.537 af, Depth= 3.34"
Routed to Reach 4R : Post-Project (SP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=7.58"

Area (ac)	CN	Description
0.23	98	Paved parking, HSG A
0.89	61	>75% Grass cover, Good, HSG B
0.81	55	Woods, Good, HSG B
1.93	63	Weighted Average
1.70		88.08% Pervious Area
0.23		11.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: Post-Bypass (DP001)



Summary for Subcatchment 2S: D.A to MRC UGD BASIN

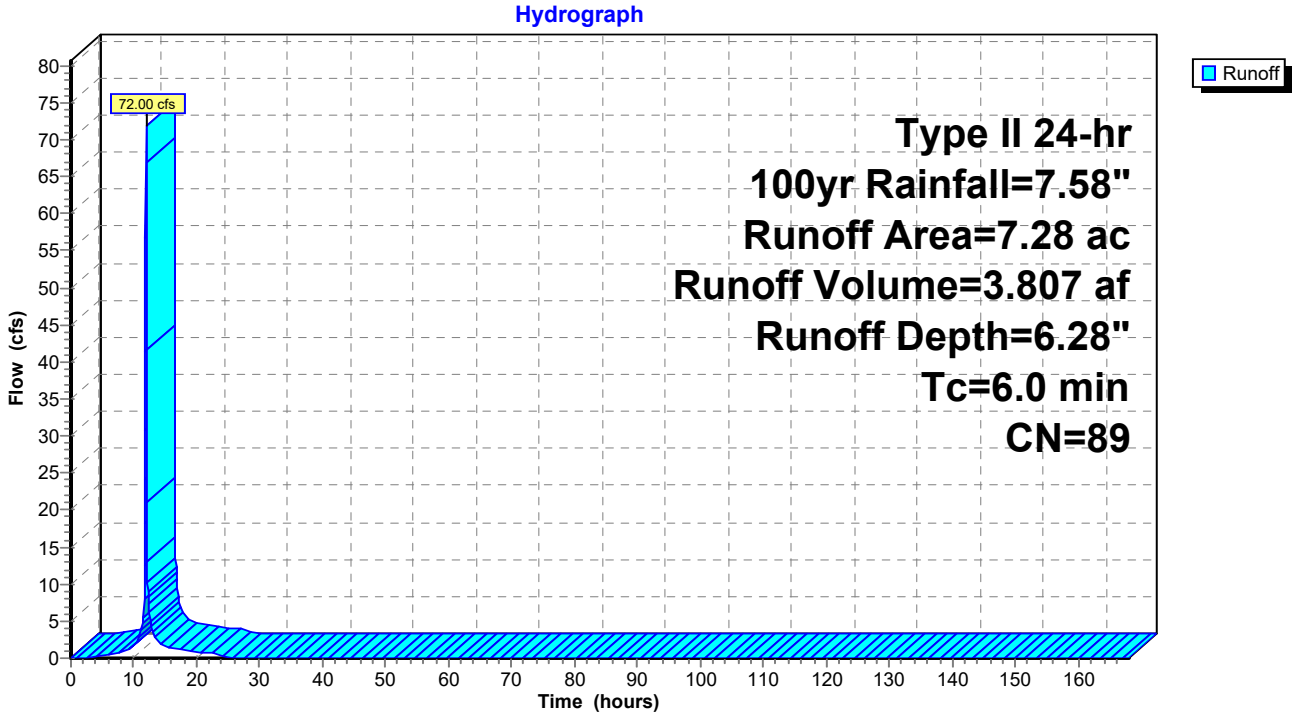
Runoff = 72.00 cfs @ 11.96 hrs, Volume= 3.807 af, Depth= 6.28"
Routed to Pond 3P : MRC UGD BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=7.58"

Area (ac)	CN	Description
5.48	98	Paved parking, HSG B
1.80	61	>75% Grass cover, Good, HSG B
7.28	89	Weighted Average
1.80		24.73% Pervious Area
5.48		75.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: D.A to MRC UGD BASIN



Summary for Pond 3P: MRC UGD BASIN

Inflow Area = 7.28 ac, 75.27% Impervious, Inflow Depth = 6.28" for 100yr event
Inflow = 72.00 cfs @ 11.96 hrs, Volume= 3.807 af
Outflow = 23.86 cfs @ 12.10 hrs, Volume= 3.317 af, Atten= 67%, Lag= 8.3 min
Primary = 23.86 cfs @ 12.10 hrs, Volume= 3.317 af
Routed to Reach 4R : Post-Project (SP 1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Starting Elev= 44.10' Surf.Area= 36,006 sf Storage= 7,201 cf
Peak Elev= 47.09' @ 12.10 hrs Surf.Area= 36,006 sf Storage= 86,942 cf (79,741 cf above start)

Plug-Flow detention time= 403.0 min calculated for 3.152 af (83% of inflow)
Center-of-Mass det. time= 309.7 min (1,087.0 - 777.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	43.60'	33,127 cf	**87.50'W x 411.50'L x 4.00'H Field A** 144,025 cf Overall - 61,207 cf Embedded = 82,818 cf x 40.0% Voids
#2A	44.10'	61,207 cf	**Cultec R-360HD** x 1665 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 1665 Chambers in 15 Rows Cap Storage= 6.5 cf x 2 x 15 rows = 193.8 cf
		94,334 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	43.60'	**24.0" Round Culvert** L= 70.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.60' / 42.95' S= 0.0093 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	44.60'	**1.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	45.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=23.84 cfs @ 12.10 hrs HW=47.08' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 23.84 cfs @ 7.59 fps)
├**2=Orifice** (Passes < 0.04 cfs potential flow)
└**3=Sharp-Crested Rectangular Weir** (Passes < 35.26 cfs potential flow)

Pond 3P: MRC UGD BASIN - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)
Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf
Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap
Cap Storage= 6.5 cf x 2 x 15 rows = 193.8 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

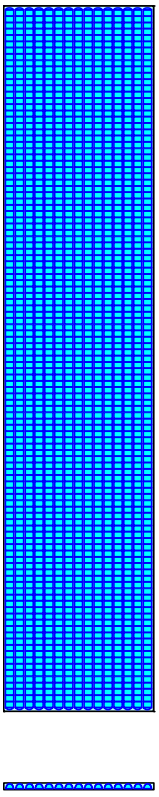
111 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 409.50' Row Length +12.0" End Stone x 2 = 411.50' Base Length
15 Rows x 60.0" Wide + 9.0" Spacing x 14 + 12.0" Side Stone x 2 = 87.50' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

1,665 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 15 Rows = 61,207.2 cf Chamber Storage

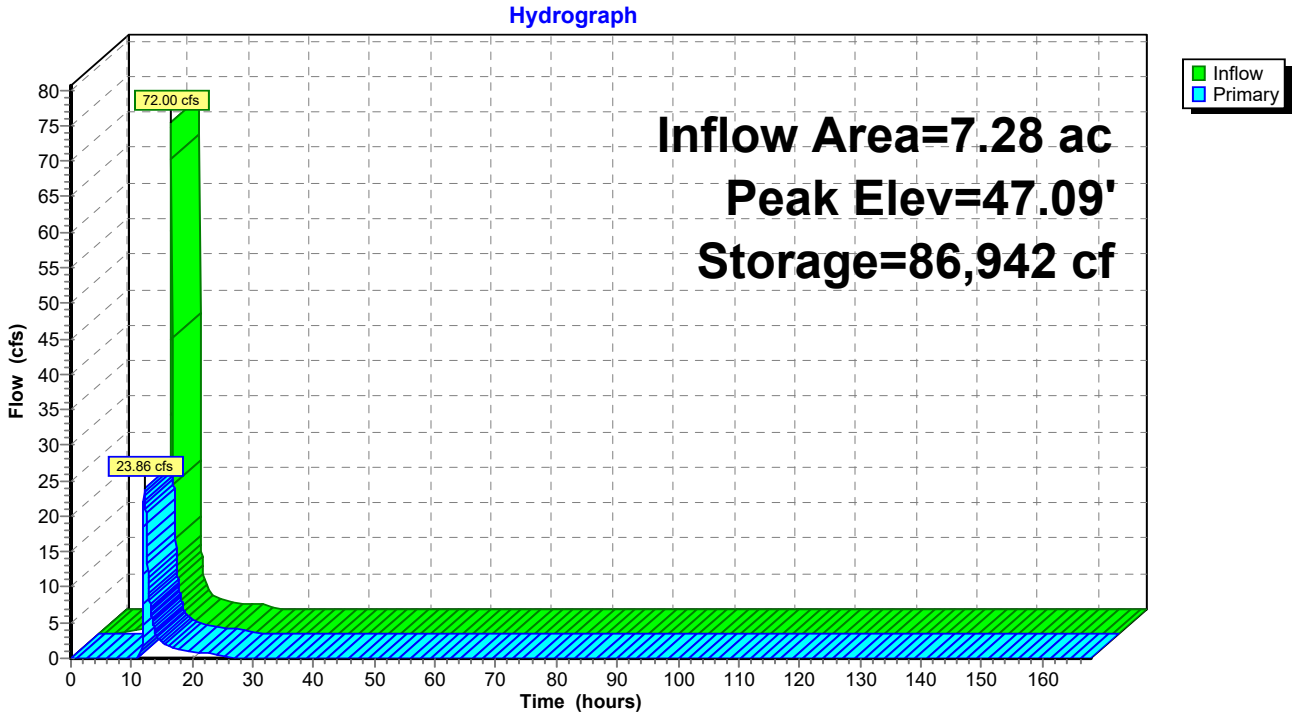
144,025.0 cf Field - 61,207.2 cf Chambers = 82,817.8 cf Stone x 40.0% Voids = 33,127.1 cf Stone Storage

Chamber Storage + Stone Storage = 94,334.3 cf = 2.166 af
Overall Storage Efficiency = 65.5%
Overall System Size = 411.50' x 87.50' x 4.00'

1,665 Chambers
5,334.3 cy Field
3,067.3 cy Stone



Pond 3P: MRC UGD BASIN



Stage-Discharge for Pond 3P: MRC UGD BASIN

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
43.60	0.00	44.64	0.00	45.68	7.11	46.72	22.02
43.62	0.00	44.66	0.00	45.70	7.42	46.74	22.13
43.64	0.00	44.68	0.01	45.72	7.73	46.76	22.23
43.66	0.00	44.70	0.01	45.74	8.05	46.78	22.33
43.68	0.00	44.72	0.01	45.76	8.36	46.80	22.44
43.70	0.00	44.74	0.01	45.78	8.69	46.82	22.54
43.72	0.00	44.76	0.01	45.80	9.01	46.84	22.64
43.74	0.00	44.78	0.01	45.82	9.34	46.86	22.74
43.76	0.00	44.80	0.01	45.84	9.68	46.88	22.84
43.78	0.00	44.82	0.01	45.86	10.01	46.90	22.94
43.80	0.00	44.84	0.01	45.88	10.35	46.92	23.04
43.82	0.00	44.86	0.01	45.90	10.69	46.94	23.14
43.84	0.00	44.88	0.01	45.92	11.04	46.96	23.24
43.86	0.00	44.90	0.01	45.94	11.39	46.98	23.34
43.88	0.00	44.92	0.01	45.96	11.74	47.00	23.43
43.90	0.00	44.94	0.01	45.98	12.10	47.02	23.53
43.92	0.00	44.96	0.01	46.00	12.46	47.04	23.63
43.94	0.00	44.98	0.02	46.02	12.82	47.06	23.73
43.96	0.00	45.00	0.02	46.04	13.18	47.08	23.82
43.98	0.00	45.02	0.05	46.06	13.55	47.10	23.92
44.00	0.00	45.04	0.12	46.08	13.92	47.12	24.01
44.02	0.00	45.06	0.21	46.10	14.29	47.14	24.11
44.04	0.00	45.08	0.31	46.12	14.67	47.16	24.20
44.06	0.00	45.10	0.43	46.14	15.05	47.18	24.30
44.08	0.00	45.12	0.56	46.16	15.43	47.20	24.39
44.10	0.00	45.14	0.70	46.18	15.81	47.22	24.48
44.12	0.00	45.16	0.85	46.20	16.20	47.24	24.58
44.14	0.00	45.18	1.01	46.22	16.58	47.26	24.67
44.16	0.00	45.20	1.18	46.24	16.97	47.28	24.76
44.18	0.00	45.22	1.35	46.26	17.37	47.30	24.86
44.20	0.00	45.24	1.54	46.28	17.76	47.32	24.95
44.22	0.00	45.26	1.73	46.30	18.16	47.34	25.04
44.24	0.00	45.28	1.93	46.32	18.56	47.36	25.13
44.26	0.00	45.30	2.14	46.34	18.96	47.38	25.22
44.28	0.00	45.32	2.35	46.36	19.37	47.40	25.31
44.30	0.00	45.34	2.57	46.38	19.78	47.42	25.40
44.32	0.00	45.36	2.80	46.40	20.19	47.44	25.49
44.34	0.00	45.38	3.03	46.42	20.41	47.46	25.58
44.36	0.00	45.40	3.27	46.44	20.52	47.48	25.67
44.38	0.00	45.42	3.51	46.46	20.63	47.50	25.76
44.40	0.00	45.44	3.76	46.48	20.74	47.52	25.85
44.42	0.00	45.46	4.01	46.50	20.85	47.54	25.94
44.44	0.00	45.48	4.27	46.52	20.96	47.56	26.02
44.46	0.00	45.50	4.53	46.54	21.07	47.58	26.11
44.48	0.00	45.52	4.80	46.56	21.18	47.60	**26.20**
44.50	0.00	45.54	5.08	46.58	21.29		
44.52	0.00	45.56	5.35	46.60	21.39		
44.54	0.00	45.58	5.64	46.62	21.50		
44.56	0.00	45.60	5.92	46.64	21.61		
44.58	0.00	45.62	6.21	46.66	21.71		
44.60	0.00	45.64	6.51	46.68	21.82		
44.62	0.00	45.66	6.81	46.70	21.92		

Stage-Area-Storage for Pond 3P: MRC UGD BASIN

Elevation (feet)	Storage (cubic-feet)
43.60	0
43.65	720
43.70	1,440
43.75	2,160
43.80	2,881
43.85	3,601
43.90	4,321
43.95	5,041
44.00	5,761
44.05	6,481
44.10	7,201
44.15	8,761
44.20	10,319
44.25	11,874
44.30	13,426
44.35	14,974
44.40	16,520
44.45	18,062
44.50	19,600
44.55	21,134
44.60	22,664
44.65	24,190
44.70	25,711
44.75	27,228
44.80	28,740
44.85	30,247
44.90	31,749
44.95	33,246
45.00	34,738
45.05	36,223
45.10	37,702
45.15	39,176
45.20	40,643
45.25	42,104
45.30	43,558
45.35	45,005
45.40	46,444
45.45	47,876
45.50	49,299
45.55	50,715
45.60	52,122
45.65	53,522
45.70	54,912
45.75	56,293
45.80	57,664
45.85	59,025
45.90	60,374
45.95	61,714
46.00	63,042
46.05	64,358
46.10	65,662
46.15	66,953
46.20	68,230
46.25	69,492
46.30	70,738
46.35	71,968
46.40	73,181
46.45	74,375
46.50	75,549
46.55	76,701
46.60	77,831
46.65	78,935
46.70	80,011
46.75	81,053
46.80	82,056
46.85	83,007
46.90	83,909
46.95	84,764
47.00	85,585
47.05	86,375
47.10	87,133
47.15	87,853
47.20	88,573
47.25	89,293
47.30	90,014
47.35	90,734
47.40	91,454
47.45	92,174
47.50	92,894
47.55	93,614
47.60	**94,334**

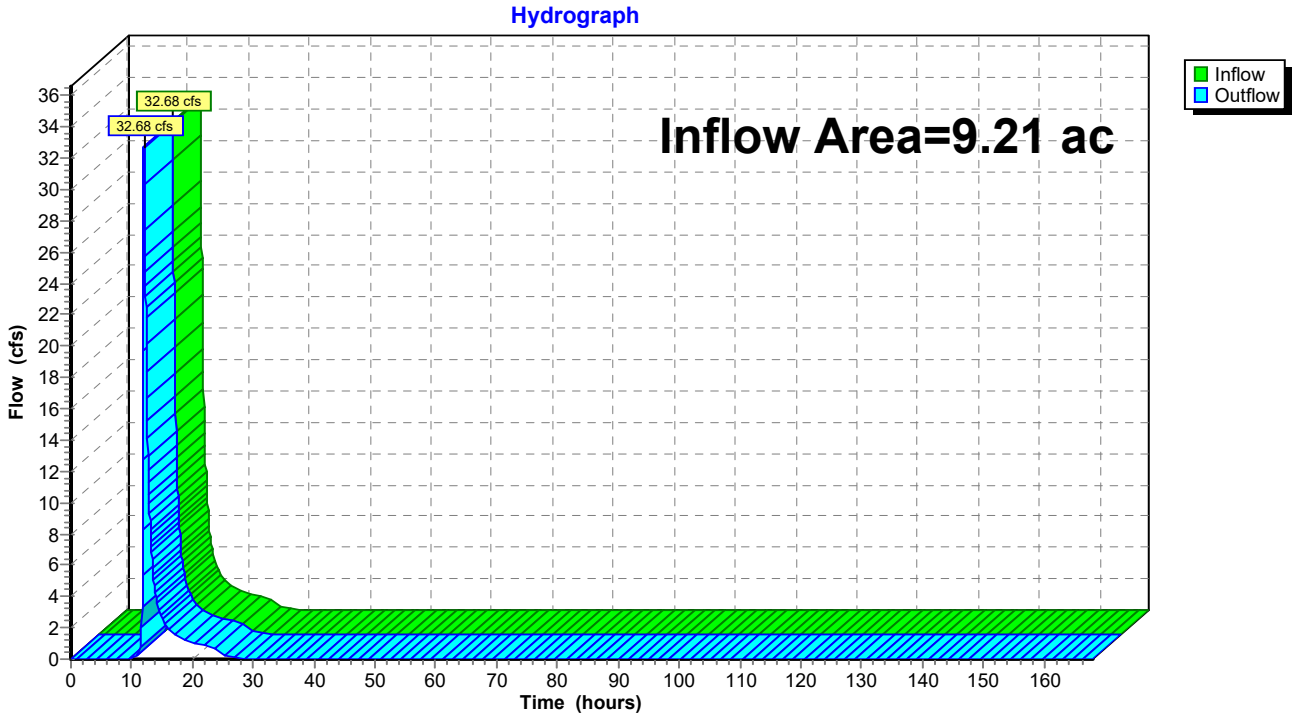
Summary for Reach 4R: Post-Project (SP 1)

[40] Hint: Not Described (Outflow=Inflow)

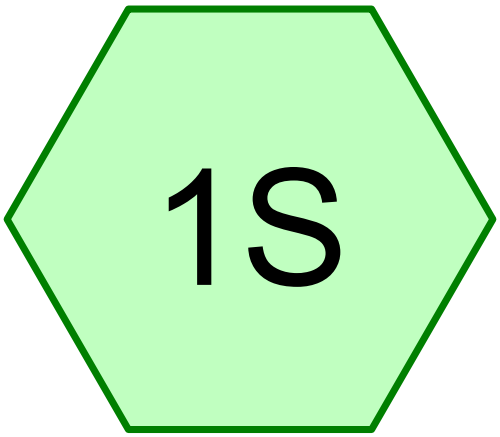
Inflow Area = 9.21 ac, 62.00% Impervious, Inflow Depth > 5.02" for 100yr event
Inflow = 32.68 cfs @ 12.01 hrs, Volume= 3.855 af
Outflow = 32.68 cfs @ 12.01 hrs, Volume= 3.855 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs

Reach 4R: Post-Project (SP 1)



Study Point 2: Pre-Project Release Rate Calculations



SP2 Pre-Project

Subcat Reach Pond Link

Routing Diagram for Pre Project SP2 North
Prepared by Colliers Engineering & Design, Printed 2/28/2022
HydroCAD® 10.10-6a s/n 08841 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.05	61	>75% Grass cover, Good, HSG B (1S)
0.40	98	Paved parking, HSG B (1S)
0.29	55	Woods, Good, HSG B (1S)
0.74	**79**	**TOTAL AREA**

Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP2 Pre-Project Runoff Area=0.74 ac 54.05% Impervious Runoff Depth=1.40"
Tc=6.0 min CN=79 Runoff=1.80 cfs 0.086 af

Total Runoff Area = 0.74 ac Runoff Volume = 0.086 af Average Runoff Depth = 1.40"
45.95% Pervious = 0.34 ac 54.05% Impervious = 0.40 ac

Summary for Subcatchment 1S: SP2 Pre-Project

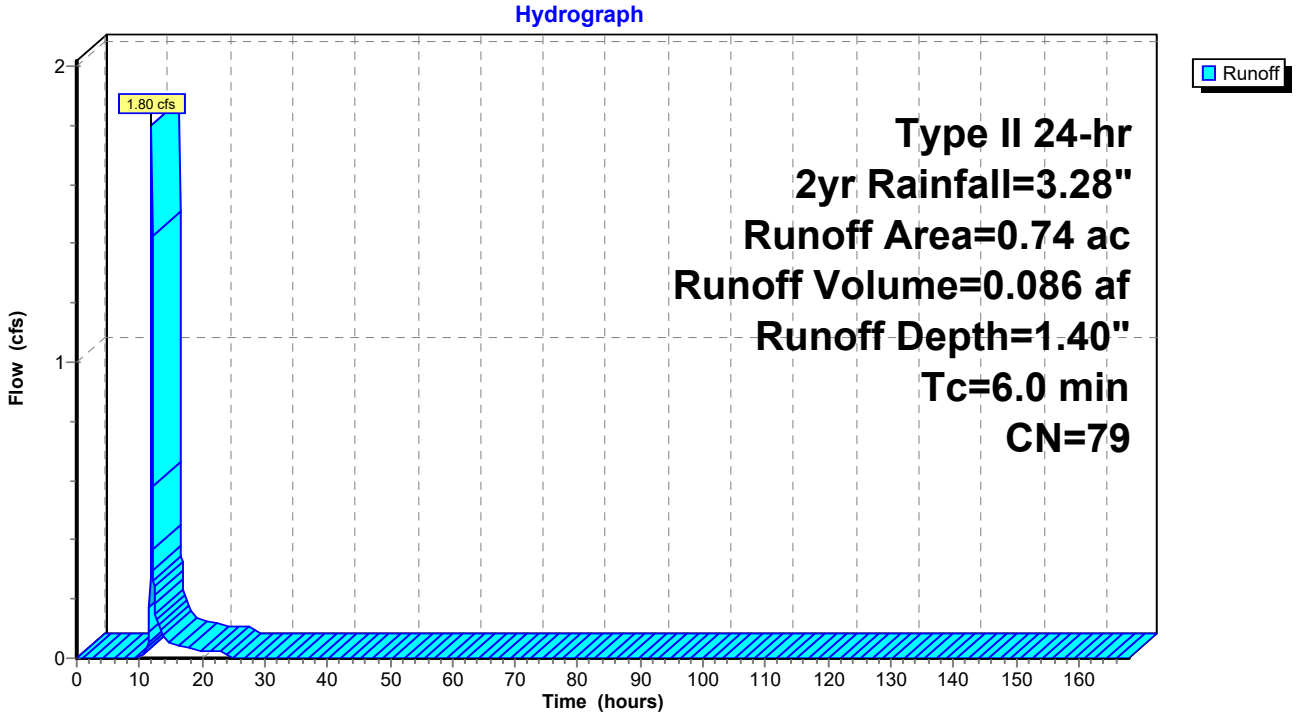
Runoff = 1.80 cfs @ 11.98 hrs, Volume= 0.086 af, Depth= 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=3.28"

Area (ac)	CN	Description
0.40	98	Paved parking, HSG B
0.05	61	>75% Grass cover, Good, HSG B
0.29	55	Woods, Good, HSG B
0.74	79	Weighted Average
0.34		45.95% Pervious Area
0.40		54.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Tc**

Subcatchment 1S: SP2 Pre-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP2 Pre-Project Runoff Area=0.74 ac 54.05% Impervious Runoff Depth=2.65"
Tc=6.0 min CN=79 Runoff=3.36 cfs 0.163 af

Total Runoff Area = 0.74 ac Runoff Volume = 0.163 af Average Runoff Depth = 2.65"
45.95% Pervious = 0.34 ac 54.05% Impervious = 0.40 ac

Summary for Subcatchment 1S: SP2 Pre-Project

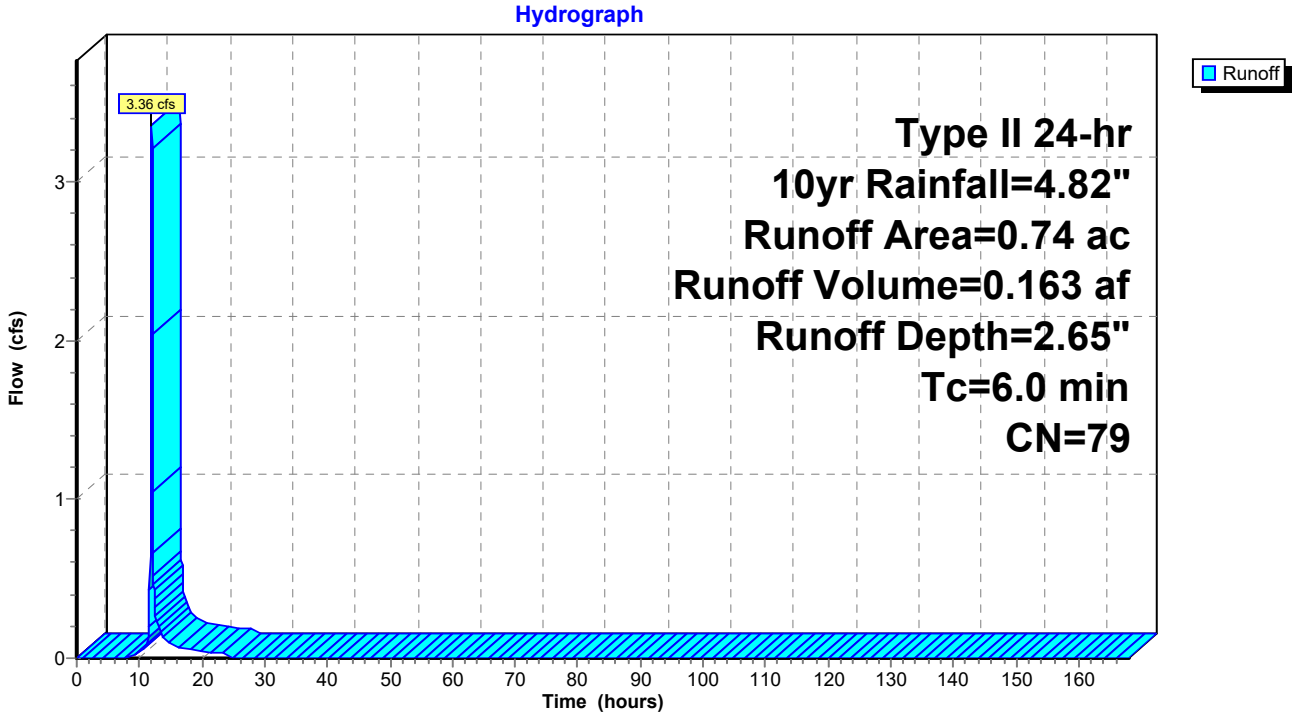
Runoff = 3.36 cfs @ 11.97 hrs, Volume= 0.163 af, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=4.82"

Area (ac)	CN	Description
0.40	98	Paved parking, HSG B
0.05	61	>75% Grass cover, Good, HSG B
0.29	55	Woods, Good, HSG B
0.74	79	Weighted Average
0.34		45.95% Pervious Area
0.40		54.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Tc**

Subcatchment 1S: SP2 Pre-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP2 Pre-Project Runoff Area=0.74 ac 54.05% Impervious Runoff Depth=4.28"
Tc=6.0 min CN=79 Runoff=5.34 cfs 0.264 af

Total Runoff Area = 0.74 ac Runoff Volume = 0.264 af Average Runoff Depth = 4.28"
45.95% Pervious = 0.34 ac 54.05% Impervious = 0.40 ac

Summary for Subcatchment 1S: SP2 Pre-Project

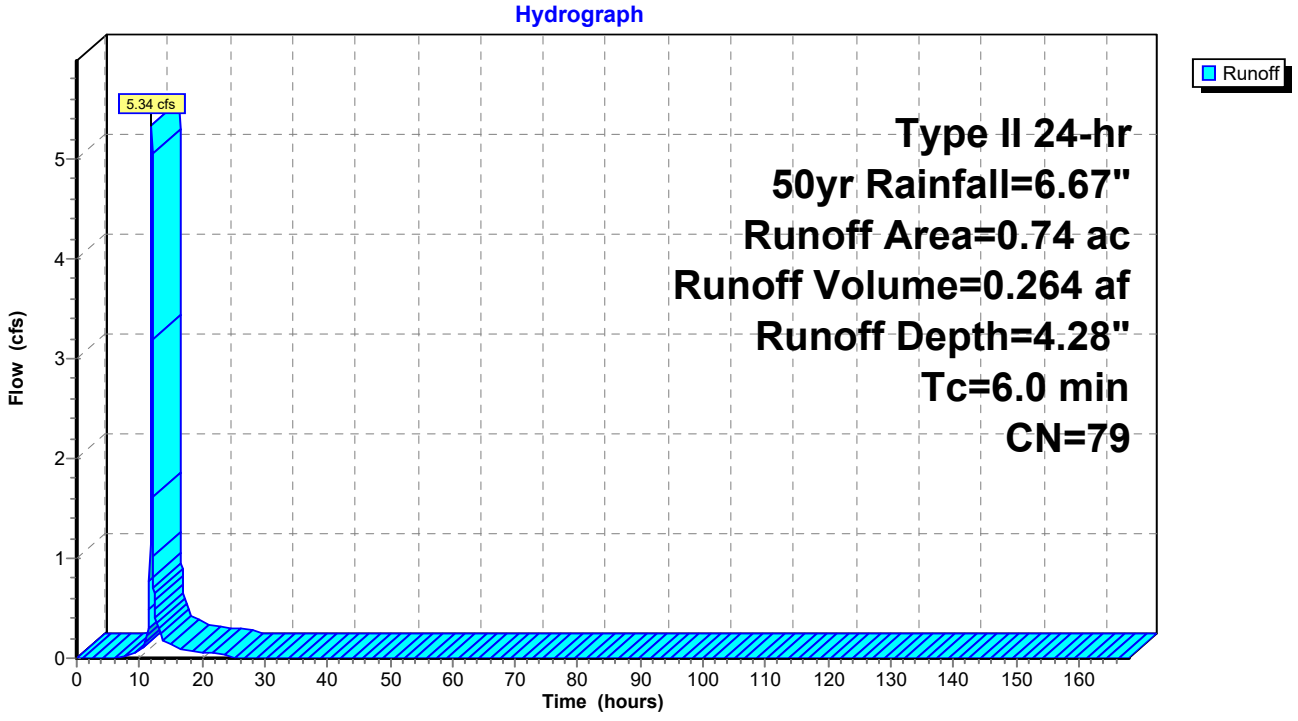
Runoff = 5.34 cfs @ 11.97 hrs, Volume= 0.264 af, Depth= 4.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=6.67"

Area (ac)	CN	Description
0.40	98	Paved parking, HSG B
0.05	61	>75% Grass cover, Good, HSG B
0.29	55	Woods, Good, HSG B
0.74	79	Weighted Average
0.34		45.95% Pervious Area
0.40		54.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Tc**

Subcatchment 1S: SP2 Pre-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP2 Pre-Project Runoff Area=0.74 ac 54.05% Impervious Runoff Depth=5.12"
Tc=6.0 min CN=79 Runoff=6.33 cfs 0.316 af

Total Runoff Area = 0.74 ac Runoff Volume = 0.316 af Average Runoff Depth = 5.12"
45.95% Pervious = 0.34 ac 54.05% Impervious = 0.40 ac

Summary for Subcatchment 1S: SP2 Pre-Project

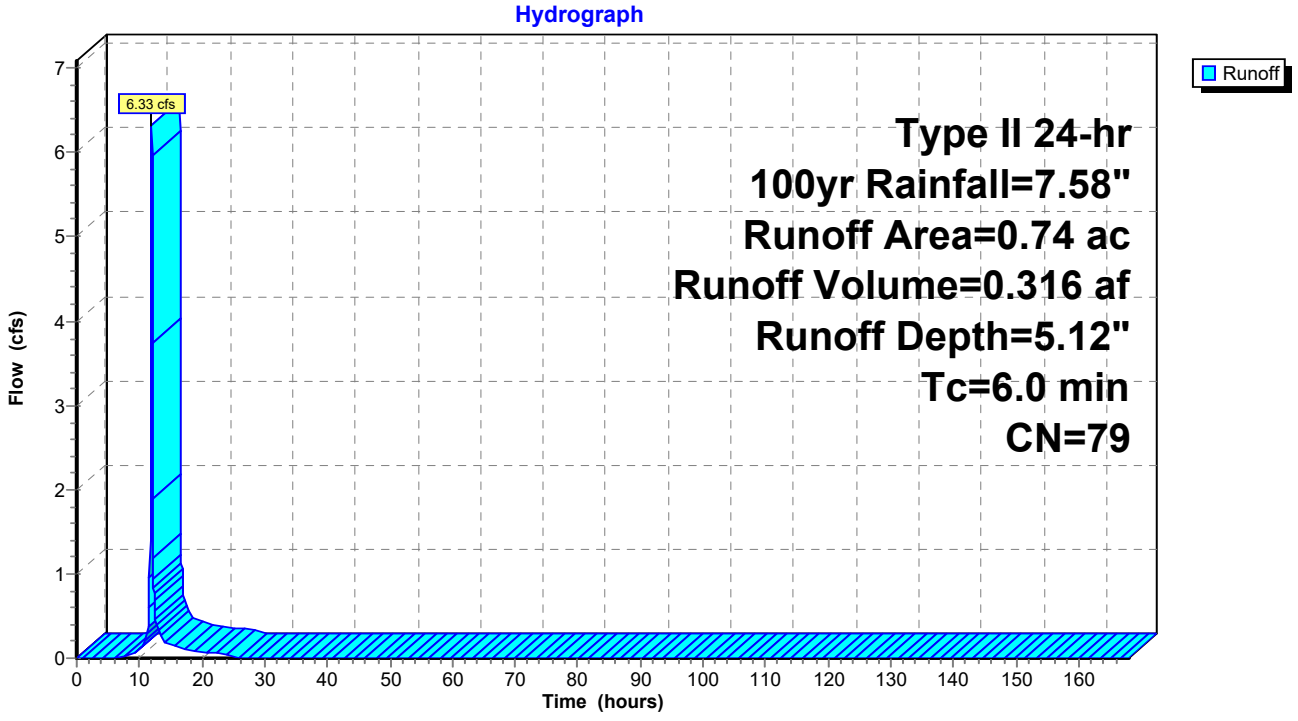
Runoff = 6.33 cfs @ 11.97 hrs, Volume= 0.316 af, Depth= 5.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=7.58"

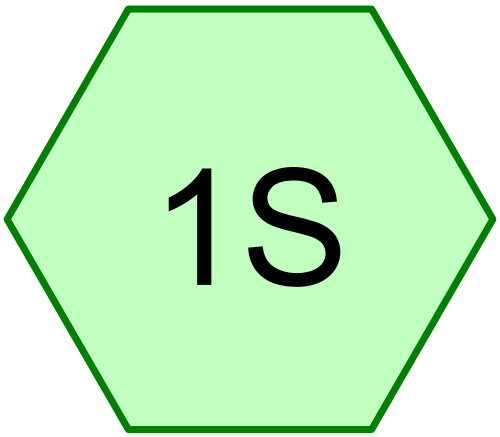
Area (ac)	CN	Description
0.40	98	Paved parking, HSG B
0.05	61	>75% Grass cover, Good, HSG B
0.29	55	Woods, Good, HSG B
0.74	79	Weighted Average
0.34		45.95% Pervious Area
0.40		54.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Tc**

Subcatchment 1S: SP2 Pre-Project



Study Point 2: Post-Project Release Rate Calculations



SP2 Post-Project

Subcat Reach Pond Link

Routing Diagram for Post Project SP2 North
Prepared by Colliers Engineering & Design, Printed 2/28/2022
HydroCAD® 10.10-6a s/n 08841 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.29	98	Paved parking, HSG B (1S)
0.29	**98**	**TOTAL AREA**

Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP2 Post-Project Runoff Area=0.29 ac 100.00% Impervious Runoff Depth=3.05"
Tc=6.0 min CN=98 Runoff=1.31 cfs 0.074 af

Total Runoff Area = 0.29 ac Runoff Volume = 0.074 af Average Runoff Depth = 3.05"
0.00% Pervious = 0.00 ac 100.00% Impervious = 0.29 ac

Summary for Subcatchment 1S: SP2 Post-Project

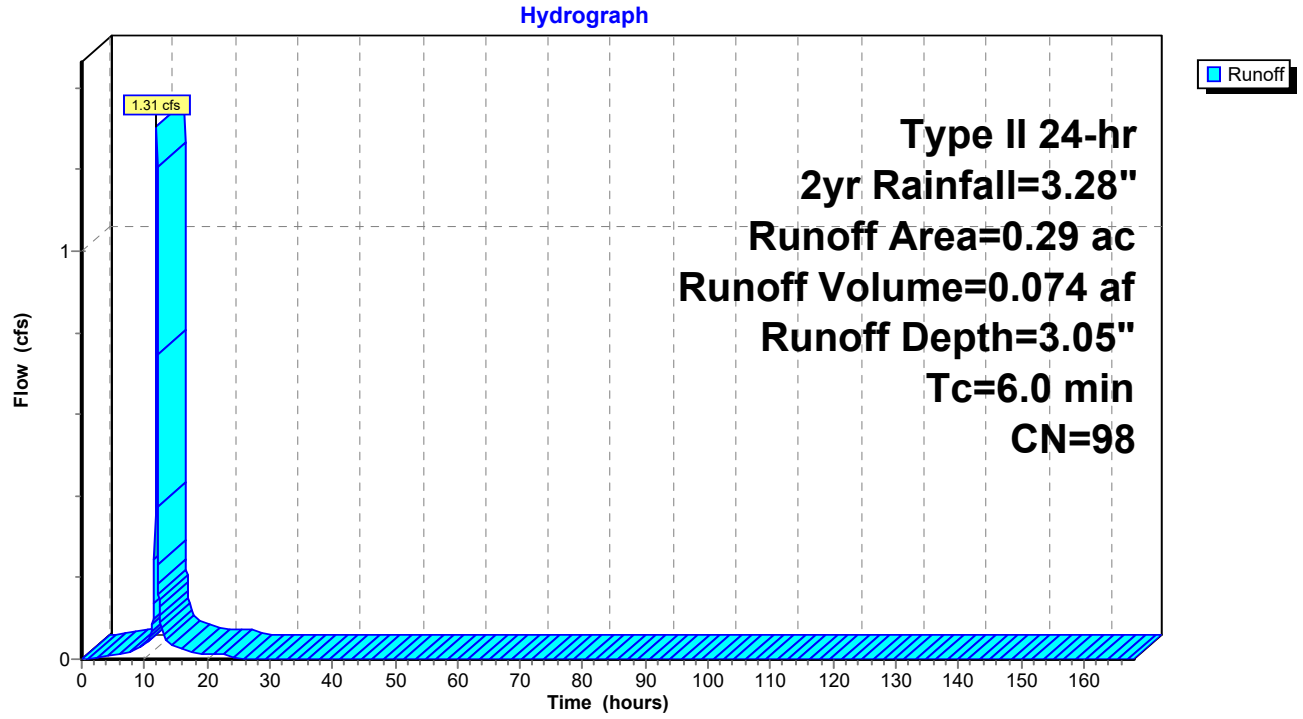
Runoff = 1.31 cfs @ 11.96 hrs, Volume= 0.074 af, Depth= 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=3.28"

Area (ac)	CN	Description
0.29	98	Paved parking, HSG B
0.29		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Tc**

Subcatchment 1S: SP2 Post-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP2 Post-Project Runoff Area=0.29 ac 100.00% Impervious Runoff Depth=4.58"
Tc=6.0 min CN=98 Runoff=1.93 cfs 0.111 af

Total Runoff Area = 0.29 ac Runoff Volume = 0.111 af Average Runoff Depth = 4.58"
0.00% Pervious = 0.00 ac 100.00% Impervious = 0.29 ac

Summary for Subcatchment 1S: SP2 Post-Project

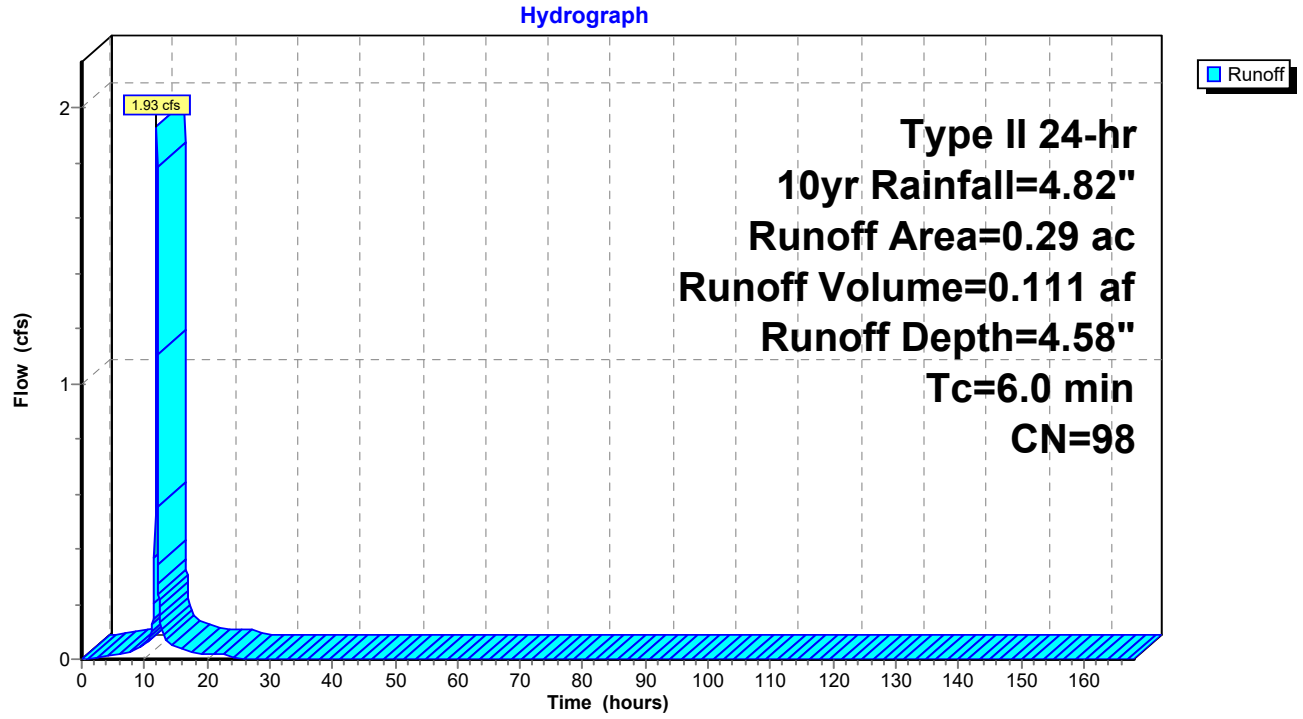
Runoff = 1.93 cfs @ 11.96 hrs, Volume= 0.111 af, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=4.82"

Area (ac)	CN	Description
0.29	98	Paved parking, HSG B
0.29		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Tc**

Subcatchment 1S: SP2 Post-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP2 Post-Project Runoff Area=0.29 ac 100.00% Impervious Runoff Depth=6.43"
Tc=6.0 min CN=98 Runoff=2.68 cfs 0.155 af

Total Runoff Area = 0.29 ac Runoff Volume = 0.155 af Average Runoff Depth = 6.43"
0.00% Pervious = 0.00 ac 100.00% Impervious = 0.29 ac

Summary for Subcatchment 1S: SP2 Post-Project

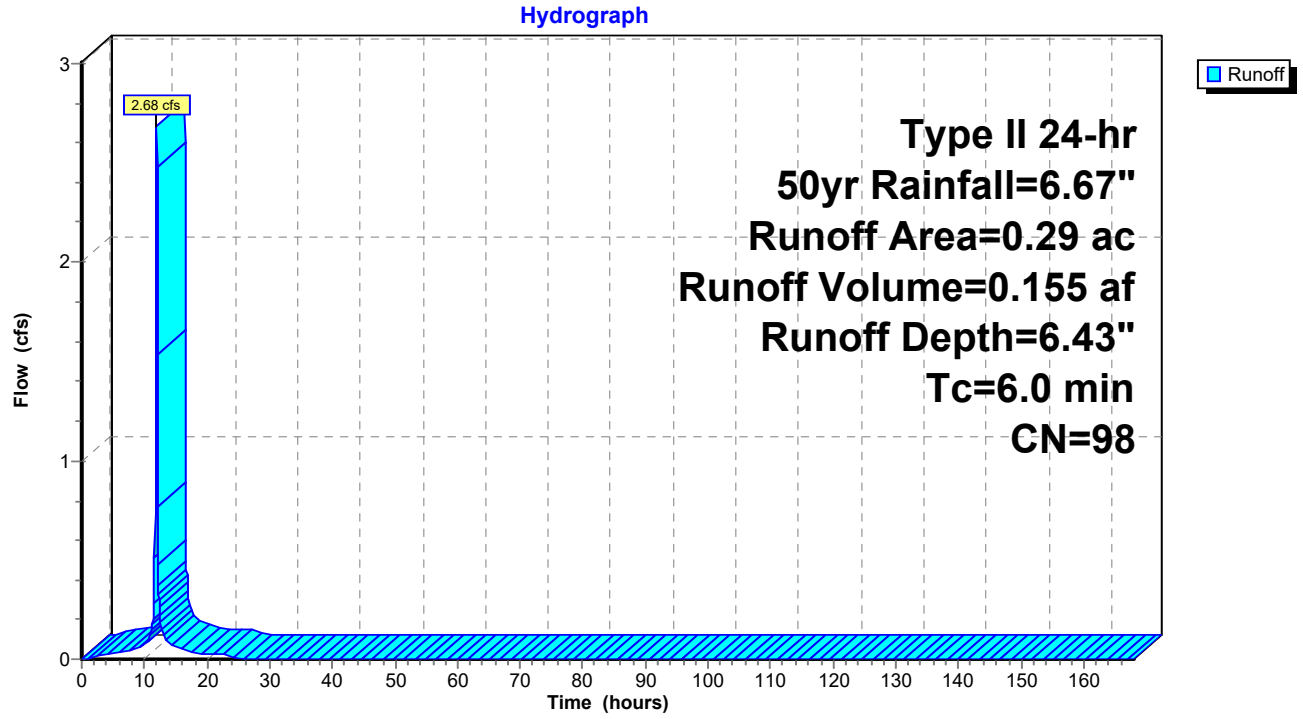
Runoff = 2.68 cfs @ 11.96 hrs, Volume= 0.155 af, Depth= 6.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=6.67"

Area (ac)	CN	Description
0.29	98	Paved parking, HSG B
0.29		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Tc**

Subcatchment 1S: SP2 Post-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP2 Post-Project Runoff Area=0.29 ac 100.00% Impervious Runoff Depth=7.34"
Tc=6.0 min CN=98 Runoff=3.05 cfs 0.177 af

Total Runoff Area = 0.29 ac Runoff Volume = 0.177 af Average Runoff Depth = 7.34"
0.00% Pervious = 0.00 ac 100.00% Impervious = 0.29 ac

Summary for Subcatchment 1S: SP2 Post-Project

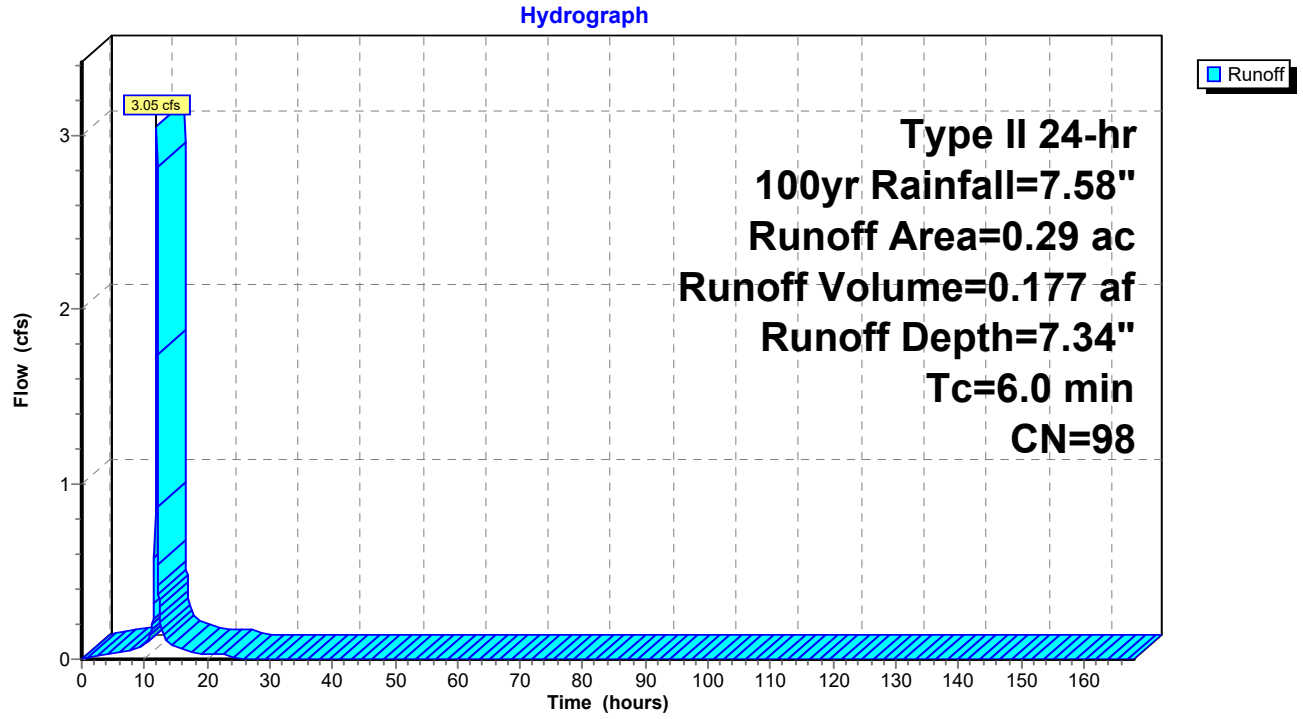
Runoff = 3.05 cfs @ 11.96 hrs, Volume= 0.177 af, Depth= 7.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=7.58"

Area (ac)	CN	Description
0.29	98	Paved parking, HSG B
0.29		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Tc**

Subcatchment 1S: SP2 Post-Project



Appendix G | Stormsewer Design

Colliers Engineering & Design

Project Name:	601 WASHINGTON STREET APARTMENTS		
Project No.:	16001030B	Date:	2/23/2022
Prepared By:	MD	Checked By:	CM

STORMWATER MANAGEMENT CALCULATIONS

Proposed Inlets - Post-Project

S-1

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.30	x	0.85	0.95	=	0.26	0.29
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.12	x	0.20	0.25	=	0.02	0.03
B	+6%	=	0.04	x	0.24	0.30	=	0.01	0.01
	TOTAL	=	**0.46**					**0.29**	**0.33**
					CW		=	**0.63**	**0.71**

S-2

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.06	x	0.85	0.95	=	0.05	0.06
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.02	x	0.24	0.30	=	0.00	0.01
	TOTAL	=	**0.08**					**0.06**	**0.06**
					CW		=	**0.70**	**0.79**

S-3

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.14	x	0.85	0.95	=	0.12	0.13
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.07	x	0.15	0.19	=	0.01	0.01
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.21**					**0.13**	**0.15**
					CW		=	**0.62**	**0.70**

S-4 (Under Building)*

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.00	x	0.85	0.95	=	0.00	0.00
B	2-6%	=	0.33	x	0.86	0.96	=	0.28	0.32
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.33**					**0.28**	**0.32**
					CW		=	**0.86**	**0.96**

S-5

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.43	x	0.85	0.95	=	0.37	0.41
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.33	x	0.15	0.19	=	0.05	0.06
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.76**					**0.42**	**0.47**
					CW		=	**0.55**	**0.62**

S-7 (Under Building)*

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.49	x	0.85	0.95	=	0.42	0.47
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.49**					**0.42**	**0.47**
					CW		=	**0.85**	**0.95**

S-8 (Under Building)*

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.18	x	0.85	0.95	=	0.15	0.17
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.18**					**0.15**	**0.17**
					CW		=	**0.85**	**0.95**

S-9 (Under Building)*

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.11	x	0.85	0.95	=	0.09	0.10
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.11**					**0.09**	**0.10**
					CW		=	**0.85**	**0.95**

S-10A

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.03	x	0.85	0.95	=	0.03	0.03
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.01	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.04**					**0.03**	**0.03**
					CW		=	**0.68**	**0.76**

S-11

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.07	x	0.85	0.95	=	0.06	0.07
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.02	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.09**					**0.06**	**0.07**
					CW		=	**0.69**	**0.78**

S-12

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.04	x	0.85	0.95	=	0.03	0.04
B	2-6%	=	0.03	x	0.86	0.96	=	0.03	0.03
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.07**					**0.06**	**0.07**
					CW		=	**0.85**	**0.95**

S-14

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.20	x	0.85	0.95	=	0.17	0.19
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.03	x	0.15	0.19	=	0.00	0.01
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.07	x	0.24	0.30	=	0.02	0.02
	TOTAL	=	**0.30**					**0.19**	**0.22**
					CW		=	**0.64**	**0.72**

S-15 (Under Building)*

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.33	x	0.85	0.95	=	0.28	0.31
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.33**					**0.28**	**0.31**
					CW		=	**0.85**	**0.95**

S-16

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.22	x	0.85	0.95	=	0.19	0.21
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.32	x	0.15	0.19	=	0.05	0.06
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.10	x	0.24	0.30	=	0.02	0.03
	TOTAL	=	**0.64**					**0.26**	**0.30**
					CW		=	**0.40**	**0.47**

S-18 (Under Building)*

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.52	x	0.85	0.95	=	0.44	0.49
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.52**					**0.44**	**0.49**
					CW		=	**0.85**	**0.95**

S-19 (Under Building)*

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.15	x	0.85	0.95	=	0.13	0.14
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.15**					**0.13**	**0.14**
					CW		=	**0.85**	**0.95**

S-20 (Under Building)*

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.11	x	0.85	0.95	=	0.09	0.10
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.11**					**0.09**	**0.10**
					CW		=	**0.85**	**0.95**

S-21A

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.03	x	0.85	0.95	=	0.03	0.03
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.01	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.04**					**0.03**	**0.03**
					CW		=	**0.68**	**0.76**

S-22

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.07	x	0.85	0.95	=	0.06	0.07
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.02	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.09**					**0.06**	**0.07**
					CW		=	**0.69**	**0.78**

S-23

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.11	x	0.85	0.95	=	0.09	0.10
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.09	x	0.15	0.19	=	0.01	0.02
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.20**					**0.11**	**0.12**
					CW		=	**0.54**	**0.61**

S-24

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.06	x	0.85	0.95	=	0.05	0.06
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.04	x	0.15	0.19	=	0.01	0.01
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.10**					**0.06**	**0.06**
					CW		=	**0.57**	**0.65**

S-25

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.06	x	0.85	0.95	=	0.05	0.06
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.04	x	0.15	0.19	=	0.01	0.01
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.10**					**0.06**	**0.06**
					CW		=	**0.57**	**0.65**

S-26

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.19	x	0.85	0.95	=	0.16	0.18
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.06	x	0.15	0.19	=	0.01	0.01
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.03	x	0.24	0.30	=	0.01	0.01
	TOTAL	=	**0.28**					**0.18**	**0.20**
					CW		=	**0.63**	**0.72**

S-27

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.14	x	0.85	0.95	=	0.12	0.13
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.10	x	0.15	0.19	=	0.02	0.02
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.24**					**0.13**	**0.15**
					CW		=	**0.56**	**0.63**

S-28

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.18	x	0.85	0.95	=	0.15	0.17
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.04	x	0.20	0.25	=	0.01	0.01
B	+6%	=	0.06	x	0.24	0.30	=	0.01	0.02
	TOTAL	=	**0.28**					**0.18**	**0.20**
					CW		=	**0.63**	**0.71**

S-29

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.17	x	0.85	0.95	=	0.14	0.16
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.05	x	0.15	0.19	=	0.01	0.01
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.04	x	0.24	0.30	=	0.01	0.01
	TOTAL	=	**0.26**					**0.16**	**0.18**
					CW		=	**0.62**	**0.70**

S-30

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.07	x	0.85	0.95	=	0.06	0.07
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.02	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.09**					**0.06**	**0.07**
					CW		=	**0.69**	**0.78**

S-31

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.07	x	0.85	0.95	=	0.06	0.07
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.04	x	0.15	0.19	=	0.01	0.01
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.11**					**0.07**	**0.07**
					CW		=	**0.60**	**0.67**

S-32

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.16	x	0.85	0.95	=	0.14	0.15
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.04	x	0.24	0.30	=	0.01	0.01
	TOTAL	=	**0.20**					**0.15**	**0.16**
					CW		=	**0.73**	**0.82**

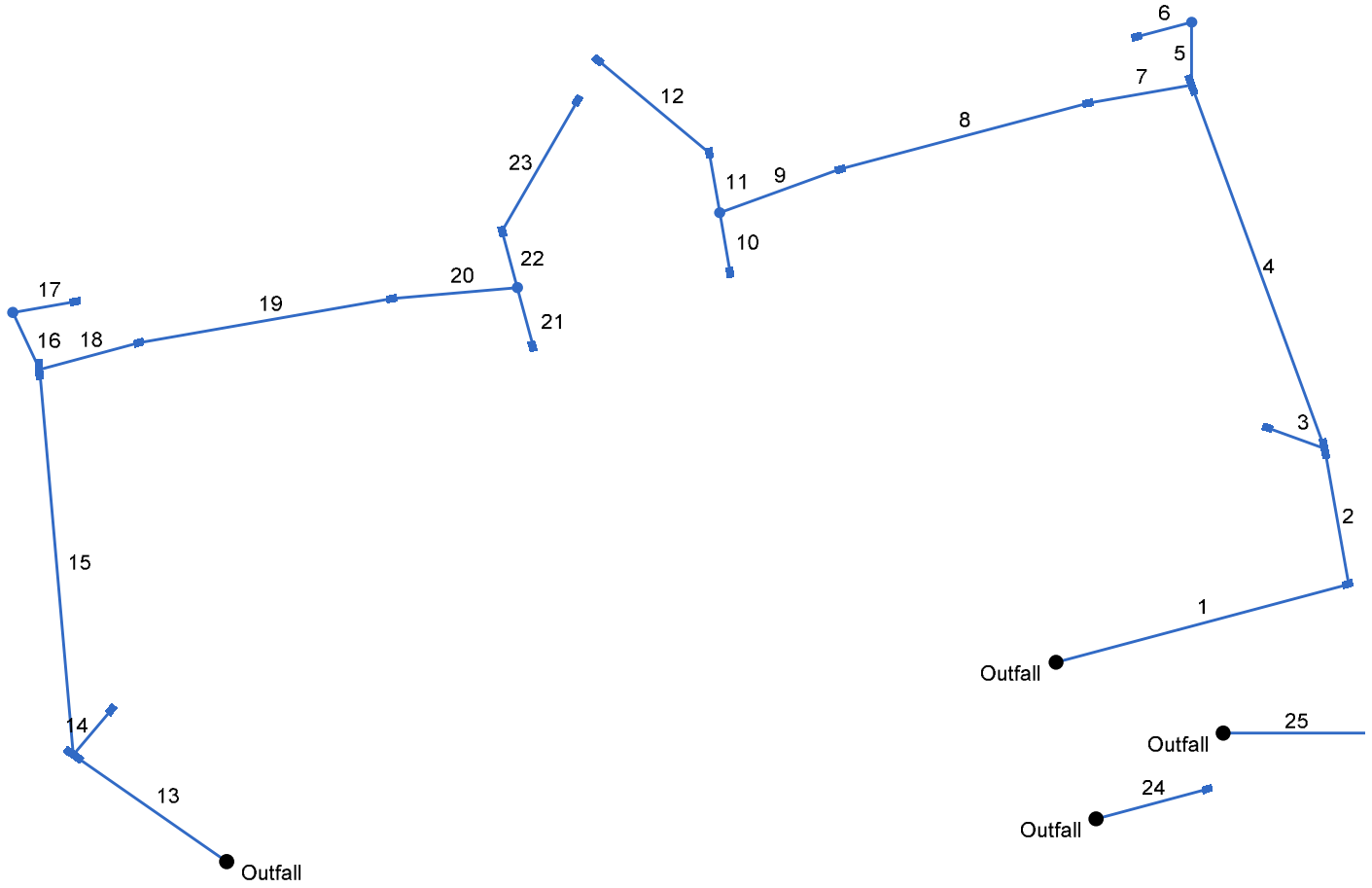
S-33

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.09	x	0.85	0.95	=	0.08	0.09
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.02	x	0.24	0.30	=	0.00	0.01
	TOTAL	=	**0.11**					**0.08**	**0.09**
					CW		=	**0.74**	**0.83**

* DENOTED INLETS ARE UNDER THE PROPOSED ROOFS. STORMWATER WILL BE INTERCEPTED BY THE ROOFS AND MINIMAL FLOW WILL REACH THE INLETS. AS SUCH, THE HYDROFLOW CALCULATIONS DO NOT ACCOUNT FOR THE FLOW TO THESE INLETS, SINCE THE FLOWS WILL BE MANAGED THROUGH THE ROOF DRAIN SYSTEM.

10-YEAR CALCULATIONS
PROPOSED NETWORK

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: 10yr.stm	Number of lines: 25	Date: 2/24/2022

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	144	-15	Comb	0.00	0.08	0.70	5.0	43.60	0.52	44.35	18	Cir	0.012	1.50	48.86	P-2
2	1	66	-85	Comb	0.00	0.21	0.62	5.0	44.45	0.53	44.80	18	Cir	0.012	1.59	49.32	P-3
3	2	29	-60	Grate	0.01	0.00	0.00	5.0	44.90	0.52	45.05	18	Cir	0.012	1.00	49.73	P-4
4	2	185	-10	Comb	0.00	0.76	0.55	5.0	44.90	0.51	45.85	18	Cir	0.012	1.48	49.04	P-5
5	4	30	20	MH	0.00	0.00	0.00	5.0	45.95	0.50	46.10	18	Cir	0.012	1.00	49.65	P-6
6	5	27	-105	Grate	0.01	0.00	0.00	5.0	46.20	0.56	46.35	18	Cir	0.012	1.00	49.68	P-7
7	4	50	-80	Grate	0.01	0.00	0.00	5.0	45.95	0.50	46.20	18	Cir	0.012	0.50	50.13	P-8
8	7	122	-5	Grate	0.01	0.00	0.00	5.0	46.30	0.49	46.90	18	Cir	0.012	0.50	51.24	P-9
9	8	61	-5	MH	0.00	0.00	0.00	5.0	47.00	0.49	47.30	18	Cir	0.012	1.00	52.35	P-10
10	9	29	-80	Comb	0.00	0.04	0.68	5.0	47.30	0.52	47.45	18	Cir	0.012	1.00	52.12	P-10A
11	9	29	100	Comb	0.00	0.09	0.69	5.0	47.30	0.52	47.45	18	Cir	0.012	1.04	51.63	P-11
12	11	69	-40	Comb	0.00	0.07	0.85	5.0	47.55	0.51	47.90	18	Cir	0.012	1.00	50.47	P-12
13	End	89	-145	Comb	0.00	0.30	0.64	5.0	43.60	0.51	44.05	18	Cir	0.012	1.81	49.27	P-14
14	13	28	95	Grate	0.01	0.00	0.00	5.0	44.15	0.54	44.30	18	Cir	0.012	1.00	49.71	P-15
15	13	185	50	Comb	0.00	0.64	0.40	5.0	44.15	0.51	45.10	18	Cir	0.012	1.48	49.04	P-16
16	15	30	-20	MH	0.00	0.00	0.00	5.0	45.50	0.50	45.65	18	Cir	0.012	1.00	49.76	P-17
17	16	30	105	Grate	0.01	0.00	0.00	5.0	45.75	0.50	45.90	18	Cir	0.012	1.00	49.67	P-18
18	15	49	80	Grate	0.01	0.00	0.00	5.0	45.20	0.51	45.45	18	Cir	0.012	0.50	50.14	P-19
19	18	122	5	Grate	0.01	0.00	0.00	5.0	45.55	0.53	46.20	18	Cir	0.012	0.50	51.22	P-20
20	19	60	5	MH	0.00	0.00	0.00	5.0	46.30	0.50	46.60	18	Cir	0.012	1.00	52.34	P-21
21	20	29	80	Comb	0.00	0.04	0.68	5.0	46.70	0.52	46.85	18	Cir	0.012	1.00	52.12	P-21A
22	20	28	-100	Comb	0.00	0.09	0.69	5.0	46.70	0.54	46.85	18	Cir	0.012	1.13	51.63	P-22
23	22	72	45	Comb	0.00	0.20	0.54	5.0	46.95	0.56	47.35	18	Cir	0.012	1.00	50.48	P-23

Project File: 10yr.stm | Number of lines: 25 | Date: 2/24/2022

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	End	55	-15	Comb	0.00	0.11	0.74	5.0	43.60	1.64	44.50	18	Cir	0.012	1.00	48.36	P-33
25	End	70	0	MH	9.08	0.00	0.00	5.0	42.95	0.93	43.60	24	Cir	0.012	1.00	49.13	A-1

Project File: 10yr.stm | Number of lines: 25 | Date: 2/24/2022

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	S-2	Combination	48.86	Rect	4.77	3.27	18	Cir	44.35	18	Cir	44.45
2	S-3	Combination	49.32	Rect	9.54	3.27	18	Cir	44.80	18 18	Cir Cir	44.90 44.90
3	S-4	Grate	49.73	Rect	4.77	3.27	18	Cir	45.05			
4	S-5	Combination	49.04	Rect	9.54	3.27	18	Cir	45.85	18 18	Cir Cir	45.95 45.95
5	S-6	Manhole	49.65	Cir	4.00	4.00	18	Cir	46.10	18	Cir	46.20
6	S-7	Grate	49.68	Rect	4.77	3.27	18	Cir	46.35			
7	S-8	Grate	50.13	Rect	4.77	3.27	18	Cir	46.20	18	Cir	46.30
8	S-9	Grate	51.24	Rect	4.77	3.27	18	Cir	46.90	18	Cir	47.00
9	S-10	Manhole	52.35	Cir	4.00	4.00	18	Cir	47.30	18 18	Cir Cir	47.30 47.30
10	S-10A	Combination	52.12	Rect	4.77	3.27	18	Cir	47.45			
11	S-11	Combination	51.63	Rect	4.77	3.27	18	Cir	47.45	18	Cir	47.55
12	S-12	Combination	50.47	Rect	4.77	3.27	18	Cir	47.90			
13	S-14	Combination	49.27	Rect	9.54	3.27	18	Cir	44.05	18 18	Cir Cir	44.15 44.15
14	S-15	Grate	49.71	Rect	4.77	3.27	18	Cir	44.30			
15	S-16	Combination	49.04	Rect	9.54	3.27	18	Cir	45.10	18 18	Cir Cir	45.50 45.20
16	S-17	Manhole	49.76	Cir	4.00	4.00	18	Cir	45.65	18	Cir	45.75
17	S-18	Grate	49.67	Rect	4.77	3.27	18	Cir	45.90			
18	S-19	Grate	50.14	Rect	4.77	3.27	18	Cir	45.45	18	Cir	45.55
19	S-20	Grate	51.22	Rect	4.77	3.27	18	Cir	46.20	18	Cir	46.30
20	S-21	Manhole	52.34	Cir	4.00	4.00	18	Cir	46.60	18 18	Cir Cir	46.70 46.70

Project File: 10yr.stm | Number of Structures: 25 | Run Date: 2/24/2022

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
21	S-21A	Combination	52.12	Rect	4.77	3.27	18	Cir	46.85			
22	S-22	Combination	51.63	Rect	4.77	3.27	18	Cir	46.85	18	Cir	46.95
23	S-23	Combination	50.48	Rect	4.77	3.27	18	Cir	47.35			
24	S-33	Combination	48.36	Rect	4.77	3.27	18	Cir	44.50			
25	A-1	Manhole	49.13	Rect	4.00	4.00	24	Cir	43.60			

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	P-2	0.90	18	Cir	144	43.60	44.35	0.521	44.60	44.70	n/a	44.70 j	End	Combination
2	P-3	0.84	18	Cir	66	44.45	44.80	0.530	44.77	45.14	n/a	45.14	1	Combination
3	P-4	0.01	18	Cir	29	44.90	45.05	0.517	45.14	45.14	0.00	45.14	2	Grate
4	P-5	0.68	18	Cir	185	44.90	45.85	0.514	45.19	46.16	n/a	46.16	2	Combination
5	P-6	0.01	18	Cir	30	45.95	46.10	0.500	46.16	46.16	0.00	46.17	4	Manhole
6	P-7	0.01	18	Cir	27	46.20	46.35	0.556	46.24	46.39	0.01	46.40	5	Grate
7	P-8	0.78	18	Cir	50	45.95	46.20	0.500	46.27	46.53	n/a	46.53	4	Grate
8	P-9	0.84	18	Cir	122	46.30	46.90	0.492	46.63	47.24	n/a	47.24	7	Grate
9	P-10	0.88	18	Cir	61	47.00	47.30	0.492	47.34	47.65	0.12	47.65	8	Manhole
10	P-10A	0.20	18	Cir	29	47.30	47.45	0.517	47.65	47.61	n/a	47.61	9	Combination
11	P-11	0.74	18	Cir	29	47.30	47.45	0.517	47.65	47.77	n/a	47.77	9	Combination
12	P-12	0.43	18	Cir	69	47.55	47.90	0.507	47.79	48.14	n/a	48.14	11	Combination
13	P-14	0.75	18	Cir	89	43.60	44.05	0.506	44.60	44.37	0.21	44.37	End	Combination
14	P-15	0.01	18	Cir	28	44.15	44.30	0.536	44.37	44.38	0.00	44.38	13	Grate
15	P-16	0.53	18	Cir	185	44.15	45.10	0.514	44.41	45.37	0.14	45.37	13	Combination
16	P-17	0.01	18	Cir	30	45.50	45.65	0.500	45.54	45.69	0.01	45.70	15	Manhole
17	P-18	0.01	18	Cir	30	45.75	45.90	0.500	45.79	45.94	0.01	45.95	16	Grate
18	P-19	1.10	18	Cir	49	45.20	45.45	0.510	45.57	45.84	n/a	45.84	15	Grate
19	P-20	1.18	18	Cir	122	45.55	46.20	0.533	45.93	46.61	n/a	46.61	18	Grate
20	P-21	1.22	18	Cir	60	46.30	46.60	0.500	46.69	47.01	0.15	47.01	19	Manhole
21	P-21A	0.20	18	Cir	29	46.70	46.85	0.517	47.01	47.01	n/a	47.01	20	Combination
22	P-22	1.11	18	Cir	28	46.70	46.85	0.536	47.07	47.24	n/a	47.24	20	Combination
23	P-23	0.78	18	Cir	72	46.95	47.35	0.556	47.26	47.68	n/a	47.68	22	Combination
24	P-33	0.59	18	Cir	55	43.60	44.50	1.636	44.60	44.78	n/a	44.78 j	End	Combination

Project File: 10yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	A-1	9.08	24	Cir	70	42.95	43.60	0.929	43.81	44.68	n/a	44.68	End	Manhole

Project File: 10yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	144	0.08	1.25	0.70	0.06	0.75	5.0	174.7	1.1	0.90	8.21	1.78	18	0.52	43.60	44.35	44.60	44.70	48.60	48.86	P-2
2	1	66	0.21	1.17	0.62	0.13	0.70	5.0	174.3	1.1	0.84	8.28	2.89	18	0.53	44.45	44.80	44.77	45.14	48.86	49.32	P-3
3	2	29	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.18	0.14	18	0.52	44.90	45.05	45.14	45.14	49.32	49.73	P-4
4	2	185	0.76	0.96	0.55	0.42	0.57	5.0	172.9	1.2	0.68	8.15	2.72	18	0.51	44.90	45.85	45.19	46.16	49.32	49.04	P-5
5	4	30	0.00	0.00	0.00	0.00	0.00	5.0	84.5	0.0	0.01	8.04	0.22	18	0.50	45.95	46.10	46.16	46.16	49.04	49.65	P-6
6	5	27	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.48	0.80	18	0.56	46.20	46.35	46.24	46.39	49.65	49.68	P-7
7	4	50	0.00	0.20	0.00	0.00	0.15	5.0	15.8	5.1	0.78	8.04	2.80	18	0.50	45.95	46.20	46.27	46.53	49.04	50.13	P-8
8	7	122	0.00	0.20	0.00	0.00	0.15	5.0	12.4	5.6	0.84	7.98	2.86	18	0.49	46.30	46.90	46.63	47.24	50.13	51.24	P-9
9	8	61	0.00	0.20	0.00	0.00	0.15	5.0	10.7	5.9	0.88	7.98	2.89	18	0.49	47.00	47.30	47.34	47.65	51.24	52.35	P-10
10	9	29	0.04	0.04	0.68	0.03	0.03	5.0	5.0	7.2	0.20	8.18	1.26	18	0.52	47.30	47.45	47.65	47.61	52.35	52.12	P-10A
11	9	29	0.09	0.16	0.69	0.06	0.12	5.0	9.7	6.1	0.74	8.18	2.53	18	0.52	47.30	47.45	47.65	47.77	52.35	51.63	P-11
12	11	69	0.07	0.07	0.85	0.06	0.06	5.0	5.0	7.2	0.43	8.10	2.38	18	0.51	47.55	47.90	47.79	48.14	51.63	50.47	P-12
13	End	89	0.30	1.27	0.64	0.19	0.65	5.0	183.5	1.1	0.75	8.09	1.65	18	0.51	43.60	44.05	44.60	44.37	49.23	49.27	P-14
14	13	28	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.33	0.18	18	0.54	44.15	44.30	44.37	44.38	49.27	49.71	P-15
15	13	185	0.64	0.97	0.40	0.26	0.45	5.0	181.7	1.1	0.53	8.15	2.53	18	0.51	44.15	45.10	44.41	45.37	49.27	49.04	P-16
16	15	30	0.00	0.00	0.00	0.00	0.00	5.0	93.4	0.0	0.01	8.04	0.77	18	0.50	45.50	45.65	45.54	45.69	49.04	49.76	P-17
17	16	30	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.04	0.77	18	0.50	45.75	45.90	45.79	45.94	49.76	49.67	P-18
18	15	49	0.00	0.33	0.00	0.00	0.20	5.0	13.2	5.5	1.10	8.13	3.10	18	0.51	45.20	45.45	45.57	45.84	49.04	50.14	P-19
19	18	122	0.00	0.33	0.00	0.00	0.20	5.0	10.6	5.9	1.18	8.30	3.19	18	0.53	45.55	46.20	45.93	46.61	50.14	51.22	P-20
20	19	60	0.00	0.33	0.00	0.00	0.20	5.0	9.3	6.2	1.22	8.04	3.18	18	0.50	46.30	46.60	46.69	47.01	51.22	52.34	P-21
21	20	29	0.04	0.04	0.68	0.03	0.03	5.0	5.0	7.2	0.20	8.18	1.32	18	0.52	46.70	46.85	47.01	47.01	52.34	52.12	P-21A
22	20	28	0.09	0.29	0.69	0.06	0.17	5.0	7.7	6.5	1.11	8.33	3.14	18	0.54	46.70	46.85	47.07	47.24	52.34	51.63	P-22

Project File: 10yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES:Intensity = 88.24 / (Inlet time + 15.50) ^ 0.83; Return period =Yrs. 10 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	22	72	0.20	0.20	0.54	0.11	0.11	5.0	5.0	7.2	0.78	8.48	2.86	18	0.56	46.95	47.35	47.26	47.68	51.63	50.48	P-23
24	End	55	0.11	0.11	0.74	0.08	0.08	5.0	5.0	7.2	0.59	14.55	1.50	18	1.64	43.60	44.50	44.60	44.78	48.79	48.36	P-33
25	End	70	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	9.08	23.61	6.15	24	0.93	42.95	43.60	43.81	44.68	48.89	49.13	A-1

Project File: 10yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES:Intensity = 88.24 / (Inlet time + 15.50) ^ 0.83; Return period =Yrs. 10 ; c = cir e = ellip b = box

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	S-2	0.41	0.00	0.41	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.07	7.32	0.07	7.32	0.0	Off
2	S-3	0.94	0.00	0.94	0.00	Comb	6.0	8.04	15.08	8.04	2.25	Sag	2.00	0.015	0.015	0.000	0.10	6.71	0.10	6.71	0.0	Off
3	S-4	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
4	S-5	3.03	0.00	3.03	0.00	Comb	6.0	8.04	15.08	8.04	2.25	Sag	2.00	0.020	0.020	0.000	0.21	10.32	0.21	10.32	0.0	Off
5	S-6	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
6	S-7	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
7	S-8	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
8	S-9	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
9	S-10	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
10	S-10A	0.20	0.00	0.20	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.05	4.91	0.05	4.91	0.0	Off
11	S-11	0.45	0.00	0.45	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.08	7.77	0.08	7.77	0.0	Off
12	S-12	0.43	0.00	0.43	0.00	Comb	6.0	8.04	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.06	4.05	0.06	4.05	0.0	Off
13	S-14	1.39	0.00	1.39	0.00	Comb	6.0	8.04	15.08	8.04	2.25	Sag	2.00	0.015	0.015	0.000	0.13	8.40	0.13	8.40	0.0	Off
14	S-15	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
15	S-16	1.85	0.00	1.85	0.00	Comb	6.0	8.04	15.08	8.04	2.25	Sag	2.00	0.015	0.015	0.000	0.15	9.96	0.15	9.96	0.0	Off
16	S-17	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
17	S-18	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
18	S-19	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
19	S-20	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
20	S-21	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
21	S-21A	0.20	0.00	0.20	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.05	4.91	0.05	4.91	0.0	Off
22	S-22	0.45	0.00	0.45	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.08	7.77	0.08	7.77	0.0	Off
23	S-23	0.78	0.00	0.78	0.00	Comb	6.0	8.04	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.09	5.71	0.09	5.71	0.0	Off

Project File: 10yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES: Inlet N-Values = 0.016; Intensity = 88.24 / (Inlet time + 15.50) ^ 0.83; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
24	S-33	0.59	0.00	0.59	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.09	9.10	0.09	9.10	0.0	Off
25	A-1	9.08*	0.00	0.00	9.08	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off

Project File: 10yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES: Inlet N-Values = 0.016; Intensity = 88.24 / (Inlet time + 15.50) ^ 0.83; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	18	0.90	43.60	44.60	1.00	0.32	0.72	0.13	44.73	0.000	144	44.35	44.70 j	0.35**	0.32	2.84	0.13	44.83	0.000	0.000	n/a	1.50	n/a
2	18	0.84	44.45	44.77	0.32*	0.28	3.01	0.12	44.89	0.000	66	44.80	45.14	0.34**	0.30	2.78	0.12	45.26	0.000	0.000	n/a	1.59	n/a
3	18	0.01	44.90	45.14	0.24	0.18	0.05	0.00	45.14	0.000	29	45.05	45.14	0.09	0.05	0.22	0.00	45.14	0.013	0.007	0.002	1.00	0.00
4	18	0.68	44.90	45.19	0.29*	0.24	2.80	0.11	45.30	0.000	185	45.85	46.16	0.31**	0.26	2.63	0.11	46.26	0.000	0.000	n/a	1.48	n/a
5	18	0.01	45.95	46.16	0.21	0.15	0.07	0.00	46.16	0.000	30	46.10	46.16	0.06	0.03	0.38	0.00	46.17	0.064	0.032	0.010	1.00	0.00
6	18	0.01	46.20	46.24	0.04*	0.01	0.80	0.01	46.25	0.553	27	46.35	46.39	0.04**	0.01	0.81	0.01	46.40	0.567	0.560	0.151	1.00	0.01
7	18	0.78	45.95	46.27	0.32*	0.27	2.88	0.12	46.38	0.000	50	46.20	46.53	0.33**	0.29	2.72	0.12	46.64	0.000	0.000	n/a	0.50	n/a
8	18	0.84	46.30	46.63	0.33*	0.29	2.93	0.12	46.75	0.000	122	46.90	47.24	0.34**	0.30	2.79	0.12	47.36	0.000	0.000	n/a	0.50	n/a
9	18	0.88	47.00	47.34	0.34*	0.30	2.97	0.12	47.46	0.000	61	47.30	47.65	0.35**	0.31	2.82	0.12	47.77	0.000	0.000	n/a	1.00	0.12
10	18	0.20	47.30	47.65	0.35	0.10	0.63	0.06	47.70	0.000	29	47.45	47.61	0.16**	0.10	1.89	0.06	47.67	0.000	0.000	n/a	1.00	n/a
11	18	0.74	47.30	47.65	0.35	0.28	2.38	0.11	47.76	0.000	29	47.45	47.77	0.32**	0.28	2.69	0.11	47.88	0.000	0.000	n/a	1.04	n/a
12	18	0.43	47.55	47.79	0.24*	0.18	2.43	0.08	47.87	0.000	69	47.90	48.14	0.24**	0.19	2.33	0.08	48.23	0.000	0.000	n/a	1.00	n/a
13	18	0.75	43.60	44.60	1.00	0.28	0.60	0.11	44.71	0.000	89	44.05	44.37	0.32**	0.28	2.70	0.11	44.49	0.000	0.000	n/a	1.81	0.21
14	18	0.01	44.15	44.37	0.22	0.16	0.06	0.00	44.37	0.000	28	44.30	44.38	0.08	0.03	0.30	0.00	44.38	0.032	0.016	0.005	1.00	0.00
15	18	0.53	44.15	44.41	0.26*	0.20	2.60	0.09	44.50	0.000	185	45.10	45.37	0.27**	0.22	2.46	0.09	45.46	0.000	0.000	n/a	1.48	0.14
16	18	0.01	45.50	45.54	0.04*	0.01	0.77	0.01	45.55	0.498	30	45.65	45.69	0.04**	0.01	0.77	0.01	45.70	0.498	0.498	0.149	1.00	0.01
17	18	0.01	45.75	45.79	0.04*	0.01	0.77	0.01	45.80	0.498	30	45.90	45.94	0.04**	0.01	0.77	0.01	45.95	0.498	0.498	0.149	1.00	0.01
18	18	1.10	45.20	45.57	0.37*	0.34	3.21	0.14	45.71	0.000	49	45.45	45.84	0.39**	0.37	3.00	0.14	45.98	0.000	0.000	n/a	0.50	n/a
19	18	1.18	45.55	45.93	0.38*	0.35	3.32	0.15	46.08	0.000	122	46.20	46.61	0.41**	0.39	3.06	0.15	46.75	0.000	0.000	n/a	0.50	n/a
20	18	1.22	46.30	46.69	0.39*	0.37	3.28	0.15	46.84	0.000	60	46.60	47.01	0.41**	0.39	3.08	0.15	47.16	0.000	0.000	n/a	1.00	0.15
21	18	0.20	46.70	47.01	0.31	0.10	0.74	0.06	47.07	0.000	29	46.85	47.01	0.16**	0.10	1.89	0.06	47.07	0.000	0.000	n/a	1.00	n/a
22	18	1.11	46.70	47.07	0.37*	0.34	3.27	0.14	47.21	0.000	28	46.85	47.24	0.39**	0.37	3.01	0.14	47.38	0.000	0.000	n/a	1.13	n/a

Project File: 10yr.stm | Number of lines: 25 | Run Date: 2/24/2022

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

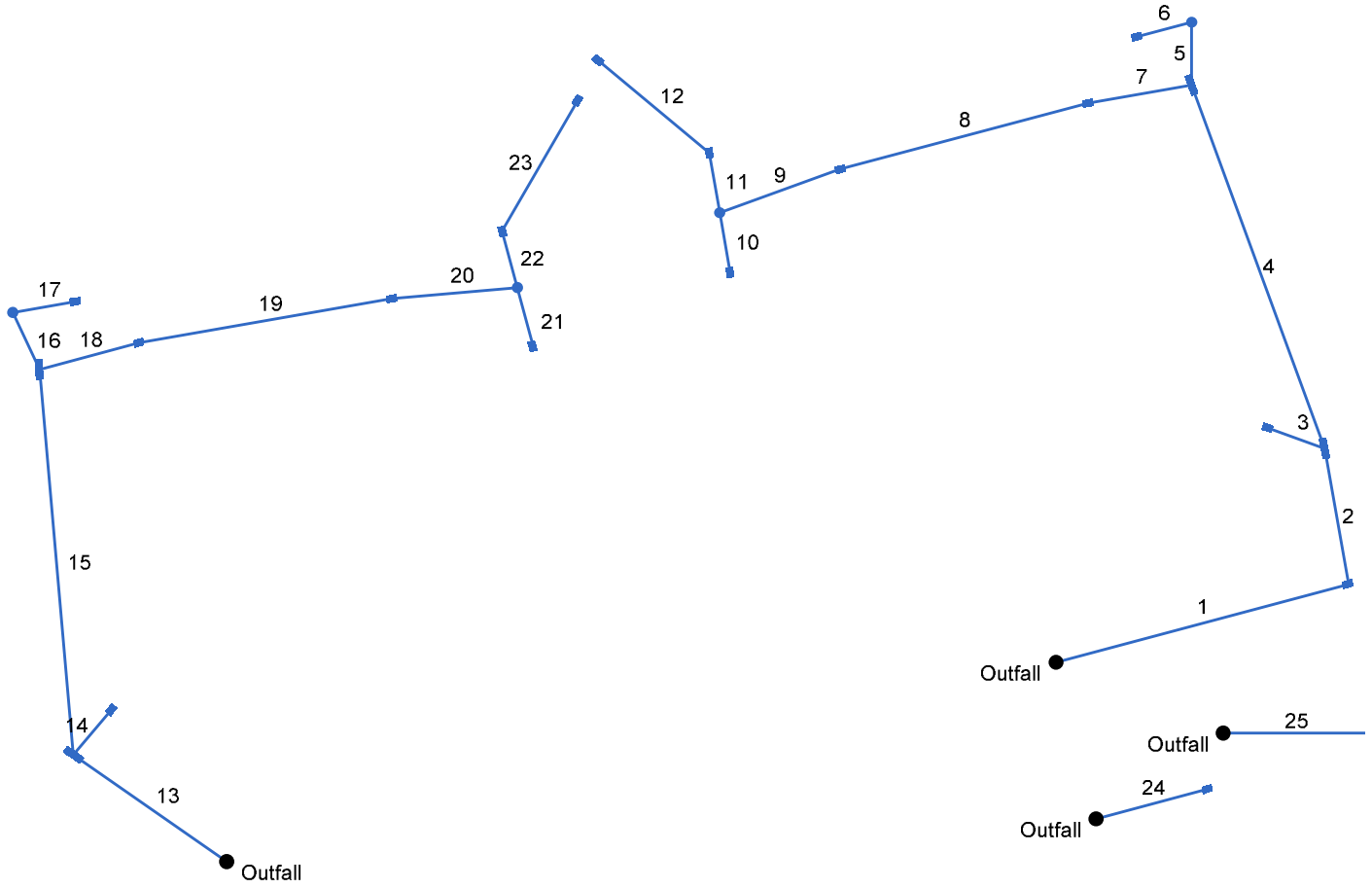
Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
23	18	0.78	46.95	47.26	0.31*	0.26	2.99	0.12	47.37	0.000	72	47.35	47.68	0.33**	0.29	2.73	0.12	47.79	0.000	0.000	n/a	1.00	n/a
24	18	0.59	43.60	44.60	1.00	0.23	0.47	0.10	44.70	0.000	55	44.50	44.78 j	0.28**	0.23	2.53	0.10	44.88	0.000	0.000	n/a	1.00	0.10
25	24	9.08	42.95	43.81	0.86*	1.29	7.02	0.43	44.24	0.000	70	43.60	44.68	1.08**	1.72	5.28	0.43	45.11	0.000	0.000	n/a	1.00	n/a

Project File: 10yr.stm | Number of lines: 25 | Run Date: 2/24/2022

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

25 - YEAR CALCULATIONS
PROPOSED NETWORK

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: 25yr.stm	Number of lines: 25	Date: 2/24/2022

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	144	-15	Comb	0.00	0.08	0.79	5.0	43.60	0.52	44.35	18	Cir	0.012	1.50	48.86	P-2
2	1	66	-85	Comb	0.00	0.21	0.70	5.0	44.45	0.53	44.80	18	Cir	0.012	1.59	49.32	P-3
3	2	29	-60	Grate	0.01	0.00	0.00	5.0	44.90	0.52	45.05	18	Cir	0.012	1.00	49.73	P-4
4	2	185	-10	Comb	0.00	0.76	0.62	5.0	44.90	0.51	45.85	18	Cir	0.012	1.48	49.04	P-5
5	4	30	20	MH	0.00	0.00	0.00	5.0	45.95	0.50	46.10	18	Cir	0.012	1.00	49.65	P-6
6	5	27	-105	Grate	0.01	0.00	0.00	5.0	46.20	0.56	46.35	18	Cir	0.012	1.00	49.68	P-7
7	4	50	-80	Grate	0.01	0.00	0.00	5.0	45.95	0.50	46.20	18	Cir	0.012	0.50	50.13	P-8
8	7	122	-5	Grate	0.01	0.00	0.00	5.0	46.30	0.49	46.90	18	Cir	0.012	0.50	51.24	P-9
9	8	61	-5	MH	0.00	0.00	0.00	5.0	47.00	0.49	47.30	18	Cir	0.012	1.00	52.35	P-10
10	9	29	-80	Comb	0.00	0.04	0.76	5.0	47.30	0.52	47.45	18	Cir	0.012	1.00	52.12	P-10A
11	9	29	100	Comb	0.00	0.09	0.78	5.0	47.30	0.52	47.45	18	Cir	0.012	1.04	51.63	P-11
12	11	69	-40	Comb	0.00	0.07	0.95	5.0	47.55	0.51	47.90	18	Cir	0.012	1.00	50.47	P-12
13	End	89	-145	Comb	0.00	0.30	0.72	5.0	43.60	0.51	44.05	18	Cir	0.012	1.81	49.27	P-14
14	13	28	95	Grate	0.01	0.00	0.00	5.0	44.15	0.54	44.30	18	Cir	0.012	1.00	49.71	P-15
15	13	185	50	Comb	0.00	0.64	0.47	5.0	44.15	0.51	45.10	18	Cir	0.012	1.48	49.04	P-16
16	15	30	-20	MH	0.00	0.00	0.00	5.0	45.50	0.50	45.65	18	Cir	0.012	1.00	49.76	P-17
17	16	30	105	Grate	0.01	0.00	0.00	5.0	45.75	0.50	45.90	18	Cir	0.012	1.00	49.67	P-18
18	15	49	80	Grate	0.01	0.00	0.00	5.0	45.20	0.51	45.45	18	Cir	0.012	0.50	50.14	P-19
19	18	122	5	Grate	0.01	0.00	0.00	5.0	45.55	0.53	46.20	18	Cir	0.012	0.50	51.22	P-20
20	19	60	5	MH	0.00	0.00	0.00	5.0	46.30	0.50	46.60	18	Cir	0.012	1.00	52.34	P-21
21	20	29	80	Comb	0.00	0.04	0.76	5.0	46.70	0.52	46.85	18	Cir	0.012	1.00	52.12	P-21A
22	20	28	-100	Comb	0.00	0.09	0.78	5.0	46.70	0.54	46.85	18	Cir	0.012	1.13	51.63	P-22
23	22	72	45	Comb	0.00	0.20	0.61	5.0	46.95	0.56	47.35	18	Cir	0.012	1.00	50.48	P-23

Project File: 25yr.stm | Number of lines: 25 | Date: 2/24/2022

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	End	55	-15	Comb	0.00	0.11	0.83	5.0	43.60	1.64	44.50	18	Cir	0.012	1.00	48.36	P-33
25	End	70	0	MH	16.52	0.00	0.00	5.0	42.95	0.93	43.60	24	Cir	0.012	1.00	49.13	A-1

Project File: 25yr.stm | Number of lines: 25 | Date: 2/24/2022

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	S-2	Combination	48.86	Rect	4.77	3.27	18	Cir	44.35	18	Cir	44.45
2	S-3	Combination	49.32	Rect	9.54	3.27	18	Cir	44.80	18 18	Cir Cir	44.90 44.90
3	S-4	Grate	49.73	Rect	4.77	3.27	18	Cir	45.05			
4	S-5	Combination	49.04	Rect	9.54	3.27	18	Cir	45.85	18 18	Cir Cir	45.95 45.95
5	S-6	Manhole	49.65	Cir	4.00	4.00	18	Cir	46.10	18	Cir	46.20
6	S-7	Grate	49.68	Rect	4.77	3.27	18	Cir	46.35			
7	S-8	Grate	50.13	Rect	4.77	3.27	18	Cir	46.20	18	Cir	46.30
8	S-9	Grate	51.24	Rect	4.77	3.27	18	Cir	46.90	18	Cir	47.00
9	S-10	Manhole	52.35	Cir	4.00	4.00	18	Cir	47.30	18 18	Cir Cir	47.30 47.30
10	S-10A	Combination	52.12	Rect	4.77	3.27	18	Cir	47.45			
11	S-11	Combination	51.63	Rect	4.77	3.27	18	Cir	47.45	18	Cir	47.55
12	S-12	Combination	50.47	Rect	4.77	3.27	18	Cir	47.90			
13	S-14	Combination	49.27	Rect	9.54	3.27	18	Cir	44.05	18 18	Cir Cir	44.15 44.15
14	S-15	Grate	49.71	Rect	4.77	3.27	18	Cir	44.30			
15	S-16	Combination	49.04	Rect	9.54	3.27	18	Cir	45.10	18 18	Cir Cir	45.50 45.20
16	S-17	Manhole	49.76	Cir	4.00	4.00	18	Cir	45.65	18	Cir	45.75
17	S-18	Grate	49.67	Rect	4.77	3.27	18	Cir	45.90			
18	S-19	Grate	50.14	Rect	4.77	3.27	18	Cir	45.45	18	Cir	45.55
19	S-20	Grate	51.22	Rect	4.77	3.27	18	Cir	46.20	18	Cir	46.30
20	S-21	Manhole	52.34	Cir	4.00	4.00	18	Cir	46.60	18 18	Cir Cir	46.70 46.70

Project File: 25yr.stm | Number of Structures: 25 | Run Date: 2/24/2022

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
21	S-21A	Combination	52.12	Rect	4.77	3.27	18	Cir	46.85			
22	S-22	Combination	51.63	Rect	4.77	3.27	18	Cir	46.85	18	Cir	46.95
23	S-23	Combination	50.48	Rect	4.77	3.27	18	Cir	47.35			
24	S-33	Combination	48.36	Rect	4.77	3.27	18	Cir	44.50			
25	A-1	Manhole	49.13	Rect	4.00	4.00	24	Cir	43.60			

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	P-2	1.20	18	Cir	144	43.60	44.35	0.521	44.60	44.76	n/a	44.76 j	End	Combination
2	P-3	1.12	18	Cir	66	44.45	44.80	0.530	44.82	45.19	n/a	45.19	1	Combination
3	P-4	0.01	18	Cir	29	44.90	45.05	0.517	45.19	45.20	0.00	45.20	2	Grate
4	P-5	0.91	18	Cir	185	44.90	45.85	0.514	45.24	46.21	n/a	46.21	2	Combination
5	P-6	0.01	18	Cir	30	45.95	46.10	0.500	46.21	46.21	0.00	46.21	4	Manhole
6	P-7	0.01	18	Cir	27	46.20	46.35	0.556	46.24	46.39	0.01	46.40	5	Grate
7	P-8	1.07	18	Cir	50	45.95	46.20	0.500	46.32	46.59	n/a	46.59	4	Grate
8	P-9	1.14	18	Cir	122	46.30	46.90	0.492	46.68	47.30	0.07	47.30	7	Grate
9	P-10	1.18	18	Cir	61	47.00	47.30	0.492	47.39	47.71	0.15	47.71	8	Manhole
10	P-10A	0.25	18	Cir	29	47.30	47.45	0.517	47.71	47.63	n/a	47.63	9	Combination
11	P-11	0.99	18	Cir	29	47.30	47.45	0.517	47.71	47.82	n/a	47.82 j	9	Combination
12	P-12	0.55	18	Cir	69	47.55	47.90	0.507	47.82	48.17	n/a	48.17	11	Combination
13	P-14	1.02	18	Cir	89	43.60	44.05	0.506	44.60	44.43	0.24	44.43	End	Combination
14	P-15	0.01	18	Cir	28	44.15	44.30	0.536	44.43	44.43	0.00	44.43	13	Grate
15	P-16	0.73	18	Cir	185	44.15	45.10	0.514	44.45	45.42	0.16	45.42	13	Combination
16	P-17	0.01	18	Cir	30	45.50	45.65	0.500	45.54	45.69	0.01	45.70	15	Manhole
17	P-18	0.01	18	Cir	30	45.75	45.90	0.500	45.79	45.94	0.01	45.95	16	Grate
18	P-19	1.50	18	Cir	49	45.20	45.45	0.510	45.64	45.91	0.08	45.91	15	Grate
19	P-20	1.59	18	Cir	122	45.55	46.20	0.533	45.99	46.67	0.09	46.67	18	Grate
20	P-21	1.63	18	Cir	60	46.30	46.60	0.500	46.76	47.08	0.17	47.08	19	Manhole
21	P-21A	0.25	18	Cir	29	46.70	46.85	0.517	47.08	47.03	n/a	47.03	20	Combination
22	P-22	1.47	18	Cir	28	46.70	46.85	0.536	47.13	47.30	n/a	47.30	20	Combination
23	P-23	1.01	18	Cir	72	46.95	47.35	0.556	47.30	47.72	0.13	47.72	22	Combination
24	P-33	0.75	18	Cir	55	43.60	44.50	1.636	44.60	44.82	n/a	44.82 j	End	Combination

Project File: 25yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	A-1	16.52	24	Cir	70	42.95	43.60	0.929	44.18	45.06	n/a	45.06	End	Manhole

Project File: 25yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	144	0.08	1.25	0.79	0.06	0.85	5.0	174.3	1.4	1.20	8.21	2.02	18	0.52	43.60	44.35	44.60	44.76	48.60	48.86	P-2
2	1	66	0.21	1.17	0.70	0.15	0.79	5.0	174.0	1.4	1.12	8.28	3.14	18	0.53	44.45	44.80	44.82	45.19	48.86	49.32	P-3
3	2	29	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.18	0.08	18	0.52	44.90	45.05	45.19	45.20	49.32	49.73	P-4
4	2	185	0.76	0.96	0.62	0.47	0.64	5.0	172.9	1.4	0.91	8.15	2.94	18	0.51	44.90	45.85	45.24	46.21	49.32	49.04	P-5
5	4	30	0.00	0.00	0.00	0.00	0.00	5.0	84.5	0.0	0.01	8.04	0.12	18	0.50	45.95	46.10	46.21	46.21	49.04	49.65	P-6
6	5	27	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.48	0.80	18	0.56	46.20	46.35	46.24	46.39	49.65	49.68	P-7
7	4	50	0.00	0.20	0.00	0.00	0.17	5.0	13.5	6.3	1.07	8.04	3.07	18	0.50	45.95	46.20	46.32	46.59	49.04	50.13	P-8
8	7	122	0.00	0.20	0.00	0.00	0.17	5.0	10.8	6.8	1.14	7.98	3.12	18	0.49	46.30	46.90	46.68	47.30	50.13	51.24	P-9
9	8	61	0.00	0.20	0.00	0.00	0.17	5.0	9.5	7.1	1.18	7.98	3.14	18	0.49	47.00	47.30	47.39	47.71	51.24	52.35	P-10
10	9	29	0.04	0.04	0.76	0.03	0.03	5.0	5.0	8.2	0.25	8.18	1.33	18	0.52	47.30	47.45	47.71	47.63	52.35	52.12	P-10A
11	9	29	0.09	0.16	0.78	0.07	0.14	5.0	8.7	7.2	0.99	8.18	2.74	18	0.52	47.30	47.45	47.71	47.82	52.35	51.63	P-11
12	11	69	0.07	0.07	0.95	0.07	0.07	5.0	5.0	8.2	0.55	8.10	2.50	18	0.51	47.55	47.90	47.82	48.17	51.63	50.47	P-12
13	End	89	0.30	1.27	0.72	0.22	0.74	5.0	183.1	1.3	1.02	8.09	1.87	18	0.51	43.60	44.05	44.60	44.43	49.23	49.27	P-14
14	13	28	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.33	0.09	18	0.54	44.15	44.30	44.43	44.43	49.27	49.71	P-15
15	13	185	0.64	0.97	0.47	0.30	0.52	5.0	181.7	1.3	0.73	8.15	2.76	18	0.51	44.15	45.10	44.45	45.42	49.27	49.04	P-16
16	15	30	0.00	0.00	0.00	0.00	0.00	5.0	93.4	0.0	0.01	8.04	0.77	18	0.50	45.50	45.65	45.54	45.69	49.04	49.76	P-17
17	16	30	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.04	0.77	18	0.50	45.75	45.90	45.79	45.94	49.76	49.67	P-18
18	15	49	0.00	0.33	0.00	0.00	0.22	5.0	11.4	6.7	1.50	8.13	3.39	18	0.51	45.20	45.45	45.64	45.91	49.04	50.14	P-19
19	18	122	0.00	0.33	0.00	0.00	0.22	5.0	9.4	7.1	1.59	8.30	3.47	18	0.53	45.55	46.20	45.99	46.67	50.14	51.22	P-20
20	19	60	0.00	0.33	0.00	0.00	0.22	5.0	8.4	7.3	1.63	8.04	3.46	18	0.50	46.30	46.60	46.76	47.08	51.22	52.34	P-21
21	20	29	0.04	0.04	0.76	0.03	0.03	5.0	5.0	8.2	0.25	8.18	1.37	18	0.52	46.70	46.85	47.08	47.03	52.34	52.12	P-21A
22	20	28	0.09	0.29	0.78	0.07	0.19	5.0	7.1	7.6	1.47	8.33	3.40	18	0.54	46.70	46.85	47.13	47.30	52.34	51.63	P-22

Project File: 25yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	22	72	0.20	0.20	0.61	0.12	0.12	5.0	5.0	8.2	1.01	8.48	3.04	18	0.56	46.95	47.35	47.30	47.72	51.63	50.48	P-23
24	End	55	0.11	0.11	0.83	0.09	0.09	5.0	5.0	8.2	0.75	14.55	1.65	18	1.64	43.60	44.50	44.60	44.82	48.79	48.36	P-33
25	End	70	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	16.52	23.61	7.42	24	0.93	42.95	43.60	44.18	45.06	48.89	49.13	A-1

Project File: 25yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	S-2	0.52	0.00	0.52	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.08	8.47	0.08	8.47	0.0	Off
2	S-3	1.21	0.00	1.21	0.00	Comb	6.0	8.04	15.08	8.04	2.25	Sag	2.00	0.015	0.015	0.000	0.12	7.75	0.12	7.75	0.0	Off
3	S-4	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
4	S-5	3.89	0.00	3.89	0.00	Comb	6.0	8.04	15.08	8.04	2.25	Sag	2.00	0.020	0.020	0.000	0.24	12.01	0.24	12.01	0.0	Off
5	S-6	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
6	S-7	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
7	S-8	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
8	S-9	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
9	S-10	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
10	S-10A	0.25	0.00	0.25	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.06	5.59	0.06	5.59	0.0	Off
11	S-11	0.58	0.00	0.58	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.09	9.01	0.09	9.01	0.0	Off
12	S-12	0.55	0.00	0.55	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.09	6.15	0.09	6.15	0.0	Off
13	S-14	1.78	0.00	1.78	0.00	Comb	6.0	8.04	15.08	8.04	2.25	Sag	2.00	0.015	0.015	0.000	0.15	9.73	0.15	9.73	0.0	Off
14	S-15	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
15	S-16	2.48	0.00	2.48	0.00	Comb	6.0	8.04	15.08	8.04	2.25	Sag	2.00	0.015	0.015	0.000	0.18	11.89	0.18	11.89	0.0	Off
16	S-17	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
17	S-18	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
18	S-19	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
19	S-20	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
20	S-21	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
21	S-21A	0.25	0.00	0.25	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.06	5.59	0.06	5.59	0.0	Off
22	S-22	0.58	0.00	0.58	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.09	9.01	0.09	9.01	0.0	Off
23	S-23	1.01	0.00	1.01	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.13	8.72	0.13	8.72	0.0	Off

Project File: 25yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES: Inlet N-Values = 0.016; Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
24	S-33	0.75	0.00	0.75	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.11	10.54	0.11	10.54	0.0	Off
25	A-1	16.52*	0.00	0.00	16.52	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off

Project File: 25yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES: Inlet N-Values = 0.016; Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	18	1.20	43.60	44.60	1.00	0.39	0.96	0.15	44.75	0.000	144	44.35	44.76 j	0.41**	0.39	3.08	0.15	44.91	0.000	0.000	n/a	1.50	n/a
2	18	1.12	44.45	44.82	0.37*	0.34	3.27	0.14	44.96	0.000	66	44.80	45.19	0.39**	0.37	3.01	0.14	45.34	0.000	0.000	n/a	1.59	n/a
3	18	0.01	44.90	45.19	0.29	0.25	0.04	0.00	45.19	0.000	29	45.05	45.20	0.15	0.09	0.11	0.00	45.20	0.002	0.001	0.000	1.00	0.00
4	18	0.91	44.90	45.24	0.34*	0.30	3.04	0.13	45.36	0.000	185	45.85	46.21	0.36**	0.32	2.85	0.13	46.33	0.000	0.000	n/a	1.48	n/a
5	18	0.01	45.95	46.21	0.26	0.20	0.05	0.00	46.21	0.000	30	46.10	46.21	0.11	0.06	0.18	0.00	46.21	0.008	0.004	0.001	1.00	0.00
6	18	0.01	46.20	46.24	0.04*	0.01	0.80	0.01	46.25	0.553	27	46.35	46.39	0.04**	0.01	0.81	0.01	46.40	0.567	0.560	0.151	1.00	0.01
7	18	1.07	45.95	46.32	0.37*	0.34	3.16	0.14	46.46	0.000	50	46.20	46.59	0.39**	0.36	2.97	0.14	46.72	0.000	0.000	n/a	0.50	n/a
8	18	1.14	46.30	46.68	0.38*	0.36	3.20	0.14	46.83	0.000	122	46.90	47.30	0.40**	0.38	3.03	0.14	47.44	0.000	0.000	n/a	0.50	0.07
9	18	1.18	47.00	47.39	0.39*	0.36	3.23	0.15	47.54	0.000	61	47.30	47.71	0.41**	0.39	3.06	0.15	47.85	0.000	0.000	n/a	1.00	0.15
10	18	0.25	47.30	47.71	0.41	0.12	0.65	0.06	47.77	0.000	29	47.45	47.63	0.18**	0.12	2.02	0.06	47.70	0.000	0.000	n/a	1.00	n/a
11	18	0.99	47.30	47.71	0.41	0.34	2.56	0.13	47.84	0.000	29	47.45	47.82 j	0.37**	0.34	2.91	0.13	47.95	0.000	0.000	n/a	1.04	n/a
12	18	0.55	47.55	47.82	0.27	0.22	2.53	0.10	47.92	0.000	69	47.90	48.17	0.27**	0.22	2.48	0.10	48.27	0.000	0.000	n/a	1.00	n/a
13	18	1.02	43.60	44.60	1.00	0.35	0.81	0.13	44.73	0.000	89	44.05	44.43	0.38**	0.35	2.93	0.13	44.56	0.000	0.000	n/a	1.81	0.24
14	18	0.01	44.15	44.43	0.28	0.22	0.04	0.00	44.43	0.000	28	44.30	44.43	0.13	0.07	0.14	0.00	44.43	0.004	0.002	0.001	1.00	0.00
15	18	0.73	44.15	44.45	0.30*	0.25	2.85	0.11	44.56	0.000	185	45.10	45.42	0.32**	0.27	2.68	0.11	45.53	0.000	0.000	n/a	1.48	0.16
16	18	0.01	45.50	45.54	0.04*	0.01	0.77	0.01	45.55	0.498	30	45.65	45.69	0.04**	0.01	0.77	0.01	45.70	0.498	0.498	0.149	1.00	0.01
17	18	0.01	45.75	45.79	0.04*	0.01	0.77	0.01	45.80	0.498	30	45.90	45.94	0.04**	0.01	0.77	0.01	45.95	0.498	0.498	0.149	1.00	0.01
18	18	1.50	45.20	45.64	0.44*	0.43	3.51	0.17	45.80	0.000	49	45.45	45.91	0.46**	0.46	3.27	0.17	46.08	0.000	0.000	n/a	0.50	0.08
19	18	1.59	45.55	45.99	0.44*	0.44	3.62	0.17	46.17	0.000	122	46.20	46.67	0.47**	0.48	3.32	0.17	46.84	0.000	0.000	n/a	0.50	0.09
20	18	1.63	46.30	46.76	0.46*	0.46	3.56	0.17	46.93	0.000	60	46.60	47.08	0.48**	0.49	3.35	0.17	47.25	0.000	0.000	n/a	1.00	0.17
21	18	0.25	46.70	47.08	0.38	0.12	0.72	0.06	47.14	0.000	29	46.85	47.03	0.18**	0.12	2.02	0.06	47.10	0.000	0.000	n/a	1.00	n/a
22	18	1.47	46.70	47.13	0.43*	0.41	3.55	0.16	47.29	0.000	28	46.85	47.30	0.45**	0.45	3.25	0.16	47.47	0.000	0.000	n/a	1.13	n/a

Project File: 25yr.stm | Number of lines: 25 | Run Date: 2/24/2022

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

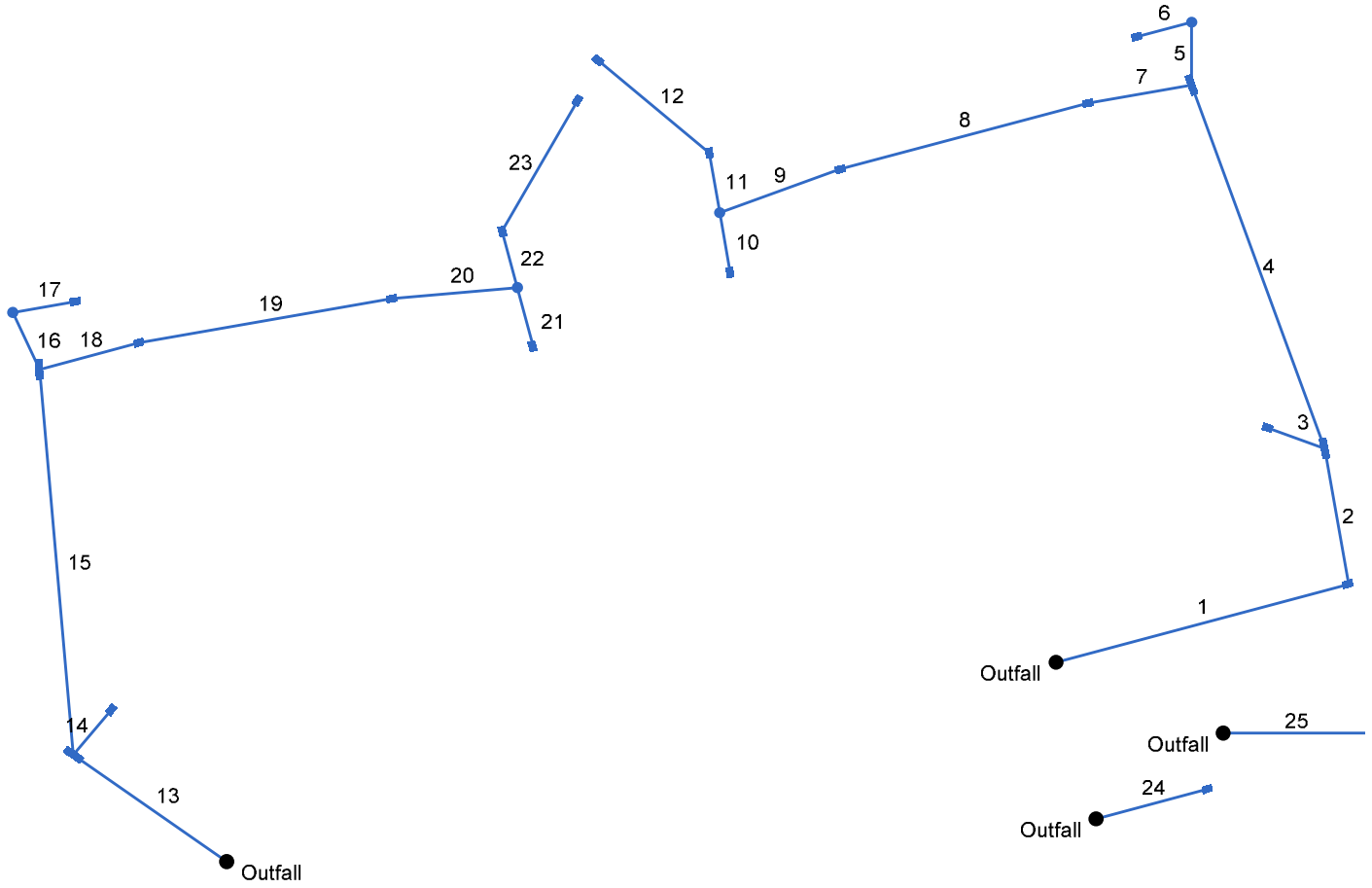
Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
23	18	1.01	46.95	47.30	0.35	0.32	3.16	0.13	47.44	0.000	72	47.35	47.72	0.37**	0.34	2.92	0.13	47.86	0.000	0.000	n/a	1.00	0.13
24	18	0.75	43.60	44.60	1.00	0.28	0.60	0.11	44.71	0.000	55	44.50	44.82 j	0.32**	0.28	2.70	0.11	44.94	0.000	0.000	n/a	1.00	n/a
25	24	16.52	42.95	44.18	1.23*	2.03	8.13	0.70	44.88	0.000	70	43.60	45.06	1.46**	2.46	6.70	0.70	45.76	0.000	0.000	n/a	1.00	n/a

Project File: 25yr.stm | Number of lines: 25 | Run Date: 2/24/2022

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

100-YEAR CALCULATIONS
PROPOSED NETWORK

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: 100yr.stm	Number of lines: 25	Date: 2/24/2022

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	144	-15	Comb	0.00	0.08	0.79	5.0	43.60	0.52	44.35	18	Cir	0.012	1.50	48.86	P-2
2	1	66	-85	Comb	0.00	0.21	0.70	5.0	44.45	0.53	44.80	18	Cir	0.012	1.59	49.32	P-3
3	2	29	-60	Grate	0.01	0.00	0.00	5.0	44.90	0.52	45.05	18	Cir	0.012	1.00	49.73	P-4
4	2	185	-10	Comb	0.00	0.76	0.62	5.0	44.90	0.51	45.85	18	Cir	0.012	1.48	49.04	P-5
5	4	30	20	MH	0.00	0.00	0.00	5.0	45.95	0.50	46.10	18	Cir	0.012	1.00	49.65	P-6
6	5	27	-105	Grate	0.01	0.00	0.00	5.0	46.20	0.56	46.35	18	Cir	0.012	1.00	49.68	P-7
7	4	50	-80	Grate	0.01	0.00	0.00	5.0	45.95	0.50	46.20	18	Cir	0.012	0.50	50.13	P-8
8	7	122	-5	Grate	0.01	0.00	0.00	5.0	46.30	0.49	46.90	18	Cir	0.012	0.50	51.24	P-9
9	8	61	-5	MH	0.00	0.00	0.00	5.0	47.00	0.49	47.30	18	Cir	0.012	1.00	52.35	P-10
10	9	29	-80	Comb	0.00	0.04	0.76	5.0	47.30	0.52	47.45	18	Cir	0.012	1.00	52.12	P-10A
11	9	29	100	Comb	0.00	0.09	0.78	5.0	47.30	0.52	47.45	18	Cir	0.012	1.04	51.63	P-11
12	11	69	-40	Comb	0.00	0.07	0.95	5.0	47.55	0.51	47.90	18	Cir	0.012	1.00	50.47	P-12
13	End	89	-145	Comb	0.00	0.30	0.72	5.0	43.60	0.51	44.05	18	Cir	0.012	1.81	49.27	P-14
14	13	28	95	Grate	0.01	0.00	0.00	5.0	44.15	0.54	44.30	18	Cir	0.012	1.00	49.71	P-15
15	13	185	50	Comb	0.00	0.64	0.47	5.0	44.15	0.51	45.10	18	Cir	0.012	1.48	49.04	P-16
16	15	30	-20	MH	0.00	0.00	0.00	5.0	45.50	0.50	45.65	18	Cir	0.012	1.00	49.76	P-17
17	16	30	105	Grate	0.01	0.00	0.00	5.0	45.75	0.50	45.90	18	Cir	0.012	1.00	49.67	P-18
18	15	49	80	Grate	0.01	0.00	0.00	5.0	45.20	0.51	45.45	18	Cir	0.012	0.50	50.14	P-19
19	18	122	5	Grate	0.01	0.00	0.00	5.0	45.55	0.53	46.20	18	Cir	0.012	0.50	51.22	P-20
20	19	60	5	MH	0.00	0.00	0.00	5.0	46.30	0.50	46.60	18	Cir	0.012	1.00	52.34	P-21
21	20	29	80	Comb	0.00	0.04	0.76	5.0	46.70	0.52	46.85	18	Cir	0.012	1.00	52.12	P-21A
22	20	28	-100	Comb	0.00	0.09	0.78	5.0	46.70	0.54	46.85	18	Cir	0.012	1.13	51.63	P-22
23	22	72	45	Comb	0.00	0.20	0.61	5.0	46.95	0.56	47.35	18	Cir	0.012	1.00	50.48	P-23

Project File: 100yr.stm | Number of lines: 25 | Date: 2/24/2022

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	End	55	-15	Comb	0.00	0.11	0.83	5.0	43.60	1.64	44.50	18	Cir	0.012	1.00	48.36	P-33
25	End	70	0	MH	23.86	0.00	0.00	5.0	42.95	0.93	43.60	24	Cir	0.012	1.00	49.13	A-1

Project File: 100yr.stm | Number of lines: 25 | Date: 2/24/2022

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	S-2	Combination	48.86	Rect	4.77	3.27	18	Cir	44.35	18	Cir	44.45
2	S-3	Combination	49.32	Rect	9.54	3.27	18	Cir	44.80	18 18	Cir Cir	44.90 44.90
3	S-4	Grate	49.73	Rect	4.77	3.27	18	Cir	45.05			
4	S-5	Combination	49.04	Rect	9.54	3.27	18	Cir	45.85	18 18	Cir Cir	45.95 45.95
5	S-6	Manhole	49.65	Cir	4.00	4.00	18	Cir	46.10	18	Cir	46.20
6	S-7	Grate	49.68	Rect	4.77	3.27	18	Cir	46.35			
7	S-8	Grate	50.13	Rect	4.77	3.27	18	Cir	46.20	18	Cir	46.30
8	S-9	Grate	51.24	Rect	4.77	3.27	18	Cir	46.90	18	Cir	47.00
9	S-10	Manhole	52.35	Cir	4.00	4.00	18	Cir	47.30	18 18	Cir Cir	47.30 47.30
10	S-10A	Combination	52.12	Rect	4.77	3.27	18	Cir	47.45			
11	S-11	Combination	51.63	Rect	4.77	3.27	18	Cir	47.45	18	Cir	47.55
12	S-12	Combination	50.47	Rect	4.77	3.27	18	Cir	47.90			
13	S-14	Combination	49.27	Rect	9.54	3.27	18	Cir	44.05	18 18	Cir Cir	44.15 44.15
14	S-15	Grate	49.71	Rect	4.77	3.27	18	Cir	44.30			
15	S-16	Combination	49.04	Rect	9.54	3.27	18	Cir	45.10	18 18	Cir Cir	45.50 45.20
16	S-17	Manhole	49.76	Cir	4.00	4.00	18	Cir	45.65	18	Cir	45.75
17	S-18	Grate	49.67	Rect	4.77	3.27	18	Cir	45.90			
18	S-19	Grate	50.14	Rect	4.77	3.27	18	Cir	45.45	18	Cir	45.55
19	S-20	Grate	51.22	Rect	4.77	3.27	18	Cir	46.20	18	Cir	46.30
20	S-21	Manhole	52.34	Cir	4.00	4.00	18	Cir	46.60	18 18	Cir Cir	46.70 46.70

Project File: 100yr.stm | Number of Structures: 25 | Run Date: 2/24/2022

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
21	S-21A	Combination	52.12	Rect	4.77	3.27	18	Cir	46.85			
22	S-22	Combination	51.63	Rect	4.77	3.27	18	Cir	46.85	18	Cir	46.95
23	S-23	Combination	50.48	Rect	4.77	3.27	18	Cir	47.35			
24	S-33	Combination	48.36	Rect	4.77	3.27	18	Cir	44.50			
25	A-1	Manhole	49.13	Rect	4.00	4.00	24	Cir	43.60			

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	P-2	1.50	18	Cir	144	43.60	44.35	0.521	44.60	44.81	n/a	44.81 j	End	Combination
2	P-3	1.39	18	Cir	66	44.45	44.80	0.530	44.87	45.24	n/a	45.24	1	Combination
3	P-4	0.01	18	Cir	29	44.90	45.05	0.517	45.24	45.24	0.00	45.24	2	Grate
4	P-5	1.13	18	Cir	185	44.90	45.85	0.514	45.28	46.25	n/a	46.25	2	Combination
5	P-6	0.01	18	Cir	30	45.95	46.10	0.500	46.25	46.25	0.00	46.25	4	Manhole
6	P-7	0.01	18	Cir	27	46.20	46.35	0.556	46.25	46.39	0.01	46.40	5	Grate
7	P-8	1.34	18	Cir	50	45.95	46.20	0.500	46.36	46.63	0.08	46.63	4	Grate
8	P-9	1.41	18	Cir	122	46.30	46.90	0.492	46.73	47.35	0.08	47.35	7	Grate
9	P-10	1.45	18	Cir	61	47.00	47.30	0.492	47.43	47.75	n/a	47.75	8	Manhole
10	P-10A	0.30	18	Cir	29	47.30	47.45	0.517	47.75	47.65	n/a	47.65	9	Combination
11	P-11	1.21	18	Cir	29	47.30	47.45	0.517	47.75	47.86	0.15	47.86	9	Combination
12	P-12	0.65	18	Cir	69	47.55	47.90	0.507	47.86	48.20	n/a	48.20 j	11	Combination
13	P-14	1.27	18	Cir	89	43.60	44.05	0.506	44.60	44.47	0.27	44.47	End	Combination
14	P-15	0.01	18	Cir	28	44.15	44.30	0.536	44.47	44.47	0.00	44.47	13	Grate
15	P-16	0.90	18	Cir	185	44.15	45.10	0.514	44.49	45.45	n/a	45.45	13	Combination
16	P-17	0.01	18	Cir	30	45.50	45.65	0.500	45.54	45.69	0.01	45.70	15	Manhole
17	P-18	0.01	18	Cir	30	45.75	45.90	0.500	45.79	45.94	0.01	45.95	16	Grate
18	P-19	1.86	18	Cir	49	45.20	45.45	0.510	45.69	45.96	0.09	45.96	15	Grate
19	P-20	1.95	18	Cir	122	45.55	46.20	0.533	46.04	46.73	0.10	46.73	18	Grate
20	P-21	1.99	18	Cir	60	46.30	46.60	0.500	46.81	47.13	n/a	47.13	19	Manhole
21	P-21A	0.30	18	Cir	29	46.70	46.85	0.517	47.13	47.05	n/a	47.05	20	Combination
22	P-22	1.78	18	Cir	28	46.70	46.85	0.536	47.17	47.35	0.21	47.35	20	Combination
23	P-23	1.20	18	Cir	72	46.95	47.35	0.556	47.35	47.76	n/a	47.76	22	Combination
24	P-33	0.90	18	Cir	55	43.60	44.50	1.636	44.60	44.85	n/a	44.85 j	End	Combination

Project File: 100yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES: Return period = 100 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	A-1	23.86	24	Cir	70	42.95	43.60	0.929	44.61	45.33	n/a	45.33	End	Manhole

Project File: 100yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES: Return period = 100 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	144	0.08	1.25	0.79	0.06	0.85	5.0	174.1	1.7	1.50	8.21	2.23	18	0.52	43.60	44.35	44.60	44.81	48.60	48.86	P-2
2	1	66	0.21	1.17	0.70	0.15	0.79	5.0	173.8	1.7	1.39	8.28	3.34	18	0.53	44.45	44.80	44.87	45.24	48.86	49.32	P-3
3	2	29	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.18	0.05	18	0.52	44.90	45.05	45.24	45.24	49.32	49.73	P-4
4	2	185	0.76	0.96	0.62	0.47	0.64	5.0	172.9	1.7	1.13	8.15	3.13	18	0.51	44.90	45.85	45.28	46.25	49.32	49.04	P-5
5	4	30	0.00	0.00	0.00	0.00	0.00	5.0	84.5	0.0	0.01	8.04	0.08	18	0.50	45.95	46.10	46.25	46.25	49.04	49.65	P-6
6	5	27	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.48	0.72	18	0.56	46.20	46.35	46.25	46.39	49.65	49.68	P-7
7	4	50	0.00	0.20	0.00	0.00	0.17	5.0	12.1	7.9	1.34	8.04	3.27	18	0.50	45.95	46.20	46.36	46.63	49.04	50.13	P-8
8	7	122	0.00	0.20	0.00	0.00	0.17	5.0	9.9	8.4	1.41	7.98	3.31	18	0.49	46.30	46.90	46.73	47.35	50.13	51.24	P-9
9	8	61	0.00	0.20	0.00	0.00	0.17	5.0	8.8	8.7	1.45	7.98	3.33	18	0.49	47.00	47.30	47.43	47.75	51.24	52.35	P-10
10	9	29	0.04	0.04	0.76	0.03	0.03	5.0	5.0	9.8	0.30	8.18	1.39	18	0.52	47.30	47.45	47.75	47.65	52.35	52.12	P-10A
11	9	29	0.09	0.16	0.78	0.07	0.14	5.0	8.1	8.9	1.21	8.18	2.89	18	0.52	47.30	47.45	47.75	47.86	52.35	51.63	P-11
12	11	69	0.07	0.07	0.95	0.07	0.07	5.0	5.0	9.8	0.65	8.10	2.53	18	0.51	47.55	47.90	47.86	48.20	51.63	50.47	P-12
13	End	89	0.30	1.27	0.72	0.22	0.74	5.0	182.8	1.7	1.27	8.09	2.07	18	0.51	43.60	44.05	44.60	44.47	49.23	49.27	P-14
14	13	28	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.33	0.06	18	0.54	44.15	44.30	44.47	44.47	49.27	49.71	P-15
15	13	185	0.64	0.97	0.47	0.30	0.52	5.0	181.7	1.7	0.90	8.15	2.94	18	0.51	44.15	45.10	44.49	45.45	49.27	49.04	P-16
16	15	30	0.00	0.00	0.00	0.00	0.00	5.0	93.4	0.0	0.01	8.04	0.77	18	0.50	45.50	45.65	45.54	45.69	49.04	49.76	P-17
17	16	30	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.04	0.77	18	0.50	45.75	45.90	45.79	45.94	49.76	49.67	P-18
18	15	49	0.00	0.33	0.00	0.00	0.22	5.0	10.4	8.3	1.86	8.13	3.61	18	0.51	45.20	45.45	45.69	45.96	49.04	50.14	P-19
19	18	122	0.00	0.33	0.00	0.00	0.22	5.0	8.7	8.7	1.95	8.30	3.68	18	0.53	45.55	46.20	46.04	46.73	50.14	51.22	P-20
20	19	60	0.00	0.33	0.00	0.00	0.22	5.0	7.9	8.9	1.99	8.04	3.66	18	0.50	46.30	46.60	46.81	47.13	51.22	52.34	P-21
21	20	29	0.04	0.04	0.76	0.03	0.03	5.0	5.0	9.8	0.30	8.18	1.41	18	0.52	46.70	46.85	47.13	47.05	52.34	52.12	P-21A
22	20	28	0.09	0.29	0.78	0.07	0.19	5.0	6.8	9.2	1.78	8.33	3.59	18	0.54	46.70	46.85	47.17	47.35	52.34	51.63	P-22

Project File: 100yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES:Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	22	72	0.20	0.20	0.61	0.12	0.12	5.0	5.0	9.8	1.20	8.48	3.11	18	0.56	46.95	47.35	47.35	47.76	51.63	50.48	P-23
24	End	55	0.11	0.11	0.83	0.09	0.09	5.0	5.0	9.8	0.90	14.55	1.78	18	1.64	43.60	44.50	44.60	44.85	48.79	48.36	P-33
25	End	70	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	23.86	23.61	8.41	24	0.93	42.95	43.60	44.61	45.33	48.89	49.13	A-1

Project File: 100yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES:Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	S-2	0.62	0.00	0.62	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.09	9.40	0.09	9.40	0.0	Off
2	S-3	1.45	0.00	1.45	0.00	Comb	6.0	8.04	15.08	8.04	2.25	Sag	2.00	0.015	0.015	0.000	0.13	8.59	0.13	8.59	0.0	Off
3	S-4	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
4	S-5	4.63	0.00	4.63	0.00	Comb	6.0	8.04	15.08	8.04	2.25	Sag	2.00	0.020	0.020	0.000	0.27	13.38	0.27	13.38	0.0	Off
5	S-6	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
6	S-7	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
7	S-8	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
8	S-9	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
9	S-10	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
10	S-10A	0.30	0.00	0.30	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.06	6.16	0.06	6.16	0.0	Off
11	S-11	0.69	0.00	0.69	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.10	10.01	0.10	10.01	0.0	Off
12	S-12	0.65	0.00	0.65	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.10	6.79	0.10	6.79	0.0	Off
13	S-14	2.12	0.00	2.12	0.00	Comb	6.0	8.04	15.08	8.04	2.25	Sag	2.00	0.015	0.015	0.000	0.16	10.81	0.16	10.81	0.0	Off
14	S-15	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
15	S-16	2.96	0.00	2.96	0.00	Comb	6.0	8.04	15.08	8.04	2.25	Sag	2.00	0.015	0.015	0.000	0.20	13.24	0.20	13.24	0.0	Off
16	S-17	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
17	S-18	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
18	S-19	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
19	S-20	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.01	1.07	0.01	1.07	0.0	Off
20	S-21	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
21	S-21A	0.30	0.00	0.30	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.06	6.16	0.06	6.16	0.0	Off
22	S-22	0.69	0.00	0.69	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.10	10.01	0.10	10.01	0.0	Off
23	S-23	1.20	0.00	1.20	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.15	9.68	0.15	9.68	0.0	Off

Project File: 100yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES: Inlet N-Values = 0.016; Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
24	S-33	0.90	0.00	0.90	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.010	0.010	0.000	0.12	11.73	0.12	11.73	0.0	Off
25	A-1	23.86*	0.00	0.00	23.86	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off

Project File: 100yr.stm | Number of lines: 25 | Run Date: 2/24/2022

NOTES: Inlet N-Values = 0.016; Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	18	1.50	43.60	44.60	1.00	0.46	1.20	0.17	44.77	0.000	144	44.35	44.81 j	0.46**	0.46	3.27	0.17	44.98	0.000	0.000	n/a	1.50	0.25
2	18	1.39	44.45	44.87	0.42*	0.40	3.48	0.16	45.03	0.000	66	44.80	45.24	0.44**	0.43	3.20	0.16	45.40	0.000	0.000	n/a	1.59	n/a
3	18	0.01	44.90	45.24	0.34	0.30	0.03	0.00	45.24	0.000	29	45.05	45.24	0.19	0.13	0.08	0.00	45.24	0.001	0.000	0.000	1.00	0.00
4	18	1.13	44.90	45.28	0.38*	0.35	3.25	0.14	45.42	0.000	185	45.85	46.25	0.40**	0.37	3.02	0.14	46.39	0.000	0.000	n/a	1.48	n/a
5	18	0.01	45.95	46.25	0.30	0.25	0.04	0.00	46.25	0.000	30	46.10	46.25	0.15	0.09	0.11	0.00	46.25	0.002	0.001	0.000	1.00	0.00
6	18	0.01	46.20	46.25	0.05	0.01	0.59	0.01	46.25	0.233	27	46.35	46.39	0.04**	0.01	0.85	0.01	46.40	0.648	0.440	0.119	1.00	0.01
7	18	1.34	45.95	46.36	0.41*	0.40	3.37	0.16	46.52	0.000	50	46.20	46.63	0.43**	0.42	3.17	0.16	46.79	0.000	0.000	n/a	0.50	0.08
8	18	1.41	46.30	46.73	0.43*	0.41	3.40	0.16	46.89	0.000	122	46.90	47.35	0.45**	0.44	3.22	0.16	47.51	0.000	0.000	n/a	0.50	0.08
9	18	1.45	47.00	47.43	0.43*	0.42	3.43	0.16	47.60	0.000	61	47.30	47.75	0.45**	0.45	3.24	0.16	47.91	0.000	0.000	n/a	1.00	n/a
10	18	0.30	47.30	47.75	0.45	0.14	0.67	0.07	47.82	0.000	29	47.45	47.65	0.20**	0.14	2.11	0.07	47.72	0.000	0.000	n/a	1.00	n/a
11	18	1.21	47.30	47.75	0.45	0.39	2.71	0.15	47.90	0.000	29	47.45	47.86	0.41**	0.39	3.08	0.15	48.01	0.000	0.000	n/a	1.04	0.15
12	18	0.65	47.55	47.86	0.31	0.25	2.47	0.11	47.97	0.000	69	47.90	48.20 j	0.30**	0.25	2.60	0.11	48.31	0.000	0.000	n/a	1.00	n/a
13	18	1.27	43.60	44.60	1.00	0.41	1.01	0.15	44.75	0.000	89	44.05	44.47	0.42**	0.41	3.12	0.15	44.62	0.000	0.000	n/a	1.81	0.27
14	18	0.01	44.15	44.47	0.32	0.28	0.04	0.00	44.47	0.000	28	44.30	44.47	0.17	0.11	0.09	0.00	44.47	0.001	0.001	0.000	1.00	0.00
15	18	0.90	44.15	44.49	0.34*	0.30	3.04	0.13	44.61	0.000	185	45.10	45.45	0.35**	0.32	2.84	0.13	45.58	0.000	0.000	n/a	1.48	n/a
16	18	0.01	45.50	45.54	0.04*	0.01	0.77	0.01	45.55	0.498	30	45.65	45.69	0.04**	0.01	0.77	0.01	45.70	0.498	0.498	0.149	1.00	0.01
17	18	0.01	45.75	45.79	0.04*	0.01	0.77	0.01	45.80	0.498	30	45.90	45.94	0.04**	0.01	0.77	0.01	45.95	0.498	0.498	0.149	1.00	0.01
18	18	1.86	45.20	45.69	0.49*	0.50	3.73	0.19	45.88	0.000	49	45.45	45.96	0.51**	0.53	3.48	0.19	46.15	0.000	0.000	n/a	0.50	0.09
19	18	1.95	45.55	46.04	0.49*	0.51	3.83	0.19	46.24	0.000	122	46.20	46.73	0.53**	0.55	3.53	0.19	46.92	0.000	0.000	n/a	0.50	0.10
20	18	1.99	46.30	46.81	0.51*	0.53	3.77	0.20	47.00	0.000	60	46.60	47.13	0.53**	0.56	3.55	0.20	47.33	0.000	0.000	n/a	1.00	n/a
21	18	0.30	46.70	47.13	0.43	0.14	0.71	0.07	47.20	0.000	29	46.85	47.05	0.20**	0.14	2.11	0.07	47.12	0.000	0.000	n/a	1.00	n/a
22	18	1.78	46.70	47.17	0.47*	0.47	3.74	0.18	47.35	0.000	28	46.85	47.35	0.50**	0.52	3.43	0.18	47.53	0.000	0.000	n/a	1.13	0.21

Project File: 100yr.stm | Number of lines: 25 | Run Date: 2/24/2022

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
23	18	1.20	46.95	47.35	0.40	0.38	3.16	0.15	47.50	0.000	72	47.35	47.76	0.41**	0.39	3.07	0.15	47.91	0.000	0.000	n/a	1.00	n/a
24	18	0.90	43.60	44.60	1.00	0.32	0.72	0.12	44.72	0.000	55	44.50	44.85 j	0.35**	0.32	2.83	0.12	44.98	0.000	0.000	n/a	1.00	n/a
25	24	23.86	42.95	44.61	1.66	2.79	8.56	1.06	45.67	0.000	70	43.60	45.33	1.73**	2.89	8.26	1.06	46.39	0.000	0.000	n/a	1.00	n/a

Project File: 100yr.stm | Number of lines: 25 | Run Date: 2/24/2022

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

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Appendix H | Permanent Erosion and Sediment Control BMPs

STANDARD E&S WORKSHEET #21
Temporary and Permanent Vegetative Stabilization Specifications

PROJECT NAME: 601 WASHINGTON STREET APARTMENTS
LOCATION: MONTGOMERY COUNTY, PA
PREPARED BY: MD DATE: 2/24/2022
CHECKED BY: DATE:

SPECIFICATIONS: The Department recommends the use of the Penn State publication, "Erosion Control and Conservation Plantings on Noncropland," as the standard to use for the selection of species, seed specifications, mixtures, liming and fertilizing, time of seeding, and seeding methods. Specifications for these items may also be obtained from PennDOT's Publication # 408, Section 804 or by contacting the applicable county conservation district. Upon selection of a reference, that reference should be used to provide all specifications for seeding, mulching, and soil amendments. The following specification will be used for this project:

(TEMPORARY)	*SPECIES:	PENNDOT FORMULA E	
	% PURE LIVE SEED:	95	%
	APPLICATION RATE:	10	LB./1000 SQ. YD
	FERTILIZER TYPE:	N/A	(10-10-10)
	FERTILIZER APPL. RATE:	N/A	LB./ACRE
	LIMING RATE:	N/A	T./ACRE
	MULCH TYPE:	HAY	
	MULCHING RATE:	3	T./ACRE
	SEEDING SEASON DATES:	MARCH 15 - OCTOBER 15	
(PERMANENT)	TOPSOIL PLACEMENT DEPTH:	4	IN.
	*SPECIES:	PENNDOT FORMULA B	
	% PURE LIVE SEED:	97	%
	APPLICATION RATE:	44	LB./1000 SQ. YD
	FERTILIZER TYPE:	COMMERCIAL	(10-20-20)
	FERTILIZER APPL. RATE:	678	LB./ACRE
	LIMING RATE:	2	T./ACRE
	MULCH TYPE:	STRAW	
	MULCHING RATE:	3	T./ACRE
	ANCHOR MATERIAL:	WOOD FIBER	
	ANCHORING METHOD:	MULCH BINDER	
	RATE OF ANCHOR MATERIAL APPL.:	775	LB./ACRE
	SEEDING SEASON DATES:	MARCH 15 - JUNE 1 & AUGUST 1 - OCTOBER 15	
(PERMANENT-STEEP SLOPES)			
	TOPSOIL PLACEMENT DEPTH:	4	IN.
	*SPECIES:	PENNDOT FORMULA L	
	% PURE LIVE SEED:	97	%
	APPLICATION RATE:	48	LB./1000 SQ. YD
	FERTILIZER TYPE:	COMMERCIAL	(10-20-20)
	FERTILIZER APPL. RATE:	678	LB./ACRE
	LIMING RATE:	2	T./ACRE
	MULCH TYPE:	STRAW	
	MULCHING RATE:	3	T./ACRE
	ANCHOR MATERIAL:	WOOD FIBER	
	ANCHORING METHOD:	MULCH BINDER	
	RATE OF ANCHOR MATERIAL APPL.:	775	LB./ACRE
	SEEDING SEASON DATES:	MARCH 15 - JUNE 1 & AUGUST 1 - OCTOBER 15	

***If more than one species is used, indicate application rate for each species.**
Note: This worksheet should be added to the plan drawings.

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Appendix I | Karst Features & Sinkhole Maps

DENSITY OF MAPPED KARST FEATURES IN SOUTH-CENTRAL AND SOUTHEASTERN PENNSYLVANIA

BY
WILLIAM E. KOCHANOV AND STUART O. REESE
2003

KARST DENSITY MAP—AN INNOVATIVE APPROACH TO VISUALIZING KARST FEATURES

INTRODUCTION

Approximately 7 percent of Pennsylvania is underlain by carbonate bedrock in the form of limestone and dolomite. Most of the carbonate bedrock occurs in the valleys and lowlands of south-central and southeastern Pennsylvania, where over 2 million people live.

Carbonate rocks are unique in that they weather more readily than other types of rocks. The dissolution or dissolving away of the carbonate bedrock by water over long periods of time results in a landscape called karst topography. It is characterized by features such as sinkholes, surface depressions, and caves. The dissolution of the carbonate rock also develops the subsurface drainage network for water along widened cracks or fractures within the bedrock layers. The majority of water in karst areas does not occur as surface streams but is primarily in the subsurface as groundwater.

Sinkholes and surface depressions are subsidence features. The surface expression of these features is a result of water transporting residual material and soil through subsurface pathways established by the dissolution process. Both features are typically circular in shape and can vary in size. Sinkholes exhibit an actual break or hole on the land surface, whereas surface depressions are generally bowl-shaped hollows that do not show this land-surface break. Caves are formed as fractures widen by dissolution, creating large openings in the rocks.

Karst features often impact public safety and health. Subsidence and water-quality problems have been associated with karst topography for many years. Gradual subsidence or the sudden collapse of the land surface can cause serious damage to urban structures, utilities, and roadways. In addition, karst features serve as direct recharge zones to local and regional aquifers, making these areas highly vulnerable to groundwater contamination.

In 1985, the Pennsylvania Geological Survey began investigations to map karst features throughout the commonwealth. Results of these investigations were released as a series of county-based open-file reports (see "References"). For each county, karst surface features were located through an extensive review of aerial photographs (taken in the 1940s–70s) and a subsequent field survey. Identified features were then transferred to scale-stable, 7.5-minute topographic base maps. Additional karst features were compiled from municipal questionnaires and published and unpublished data sources. Although not karst features, small surface mines may be similar in appearance to karst subsidence features. This is most apparent where such a mine has been abandoned for a long period of time. For this reason, surface mines were identified and added to the open-file maps.

After completion of the open-file reports, karst features and surface mines were digitized as point data from the topographic base maps using GSMAP software from the U.S. Geological Survey. Points were positioned in the best-determined center of surface depressions, sinkholes, and surface mines, and at the entrance points of caves. Coordinates and feature types were saved in ASCII files, which were later converted to Microsoft Excel 2000 spreadsheet files. Shapefiles were created from the inventoried data, and point locations and feature attributes were spot-checked against the corresponding features on the original maps. Corrections to the data were made where applicable. The resultant data file served as the basis for the density layer calculations.

As a result of the inventory, 111,715 individual points were compiled for 14 counties (107 7.5-minute quadrangles). Karst features make up approximately 98.4 percent of the points in the database: 96 percent, surface depressions; 2.3 percent, sinkholes; and 0.1 percent, cave entrances. Approximately 1.6 percent of the data points were surface mines, which were not included in the density layer calculation.

DENSITY LAYER CALCULATION

To create the digital density surface, ESRI ArcView 3.2 software was used to divide the study area into 25- by 25-meter (82- by 82-foot) grid cells and to count the karst data points that fell within the area of a 250-meter (820-foot) search radius from the center of each cell. The number of points divided by the search area (approximately 0.2 square kilometer [0.08 square mile or 49 acres]) represents the karst density value of a cell. After the density value was calculated for the first cell, the search area was shifted to the next 25-square-meter grid cell, and the floating process was repeated until all of the cells were assigned a density value. This process smoothed the density data over the study area. Grid cells were then assigned a color using an ESRI ArcMap 8.3 "quantile" gradation of density values. On the map, red represents more than 150 karst features per square kilometer (nearly 400 per square mile). The darkest green color indicates that at least one karst feature falls within the 250-meter search radius of the cell.

DISCLAIMER

While this map is useful for planning and preliminary site studies, it is not a substitute for site-specific subsurface investigations.

The occurrence of a sinkhole or surface depression depends on numerous factors, including rock type, geologic structure (e.g., fractures, joints, and faults), surface and subsurface hydrology, surficial materials (particularly in the glaciated areas of Northampton and Lehigh Counties), and land use. On the map, color shows the density of karst features over a given area. Although orange and red indicate areas where karst features are interpreted to be more abundant, it does not guarantee that new sinkholes will occur in these areas. Conversely, sinkholes can occur in areas where no karst features have been observed. The occurrence of sinkholes, therefore, is not restricted to the high-density areas delineated on the map.

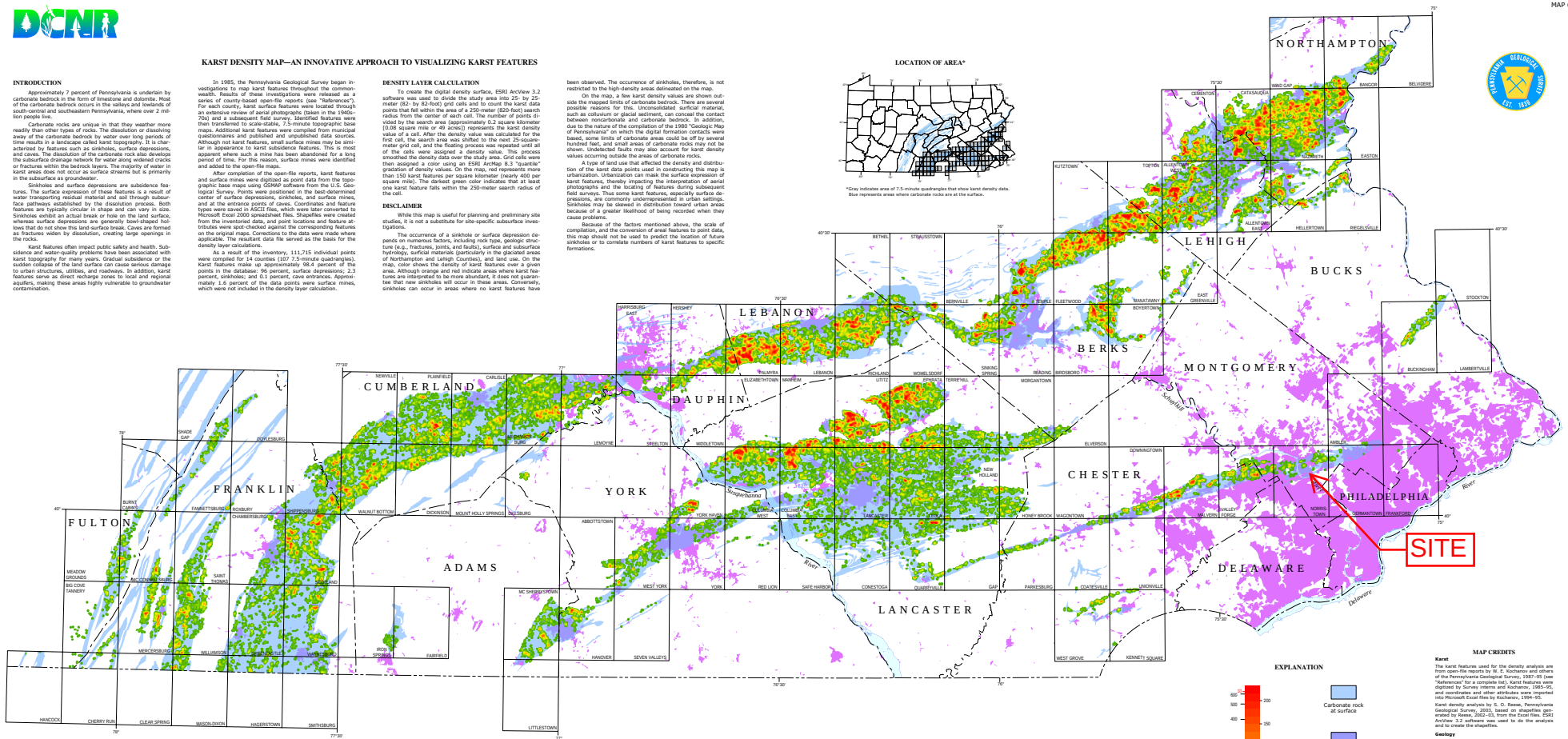
On the map, a few karst density values are shown outside the mapped limits of carbonate bedrock. There are several possible reasons for this. Unconsolidated surficial material, such as colluvium or glacial sediment, can conceal the contact between noncarbonate and carbonate bedrock. In addition, due to the nature of the compilation of the 1980 "Geologic Map of Pennsylvania" on which the digital formation contacts were based, some limits of carbonate areas could be off by several hundred feet, and small areas of carbonate rocks may not be shown. Undetected faults may also account for karst density values occurring outside the areas of carbonate rocks.

A type of land use that affected the density and distribution of the karst data points used in constructing this map is urbanization. Urbanization can mask the surface expression of karst features, thereby impacting the interpretation of aerial photographs and the locating of features during subsequent field surveys. Thus some karst features, especially surface depressions, are commonly underrepresented in urban settings. Sinkholes may be skewed in distribution toward urban areas because of a greater likelihood of being recorded when they cause problems.

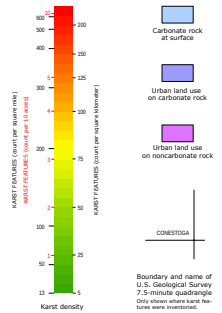
Because of the factors mentioned above, the scale of compilation, and the conversion of areal features to point data, this map should not be used to predict the location of future sinkholes or to correlate numbers of karst features to specific formations.

LOCATION OF AREA*

*Gray indicates area of 7.5-minute quadrangles that show karst density data. Blue represents areas where carbonate rocks are at the surface.



EXPLANATION



SCALE 1:300,000

5 0 5 10 15 20 25 30 KILOMETERS

5 0 5 10 15 MILES

Albers equal area conic projection
Standard parallels 40°N and 42°N, center 78°W

MAP CREDITS

Karst

The karst features used for the density analysis are from open-file reports by W. E. Kochanov and others of the Pennsylvania Geological Survey, 1987–95 (see "References"). Locations of karst features were digitized by Survey interns and Kochanov, 1985–95, and coordinates and other attributes were imported into Microsoft Excel files by Kochanov, 1994–95.

Karst density analysis by S. O. Reese, Pennsylvania Geological Survey, 2003, based on shapefiles generated by Reese, 2002–03, from the Excel files. ESRI ArcView 3.2 software was used to do the analysis and to create the shapefiles.

Geology

Locations of carbonate rocks are slightly modified from *Geologic Map of Pennsylvania*, compiled by T. M. Berg and others (1980, Pennsylvania Geological Survey, 4th ser., Map 1, 2nd ed., scale 1:250,000, 3 sheets). The latter map was prepared as a data set by C. E. Miles, T. G. Whitfield, J. G. Kuchinski, and others (*Bedrock Geology of Pennsylvania*, 2001, Pennsylvania Geological Survey, 4th ser., scale 1:250,000).

Base Map

Urban areas are from the data set *Urban areas of Pennsylvania—PA Explorer CD-ROM edition* by Joe Bishop (1998, University Park, Gap Analysis Program, Environmental Resources Research Institute, Pennsylvania State University).

State and county lines are slightly modified from an unpublished municipality data set (Pennsylvania Department of Environmental Protection, 1998, 1:24,000-scale accuracy).

Quadrangle lines are from shapefiles created by M. E. Moore of the Pennsylvania Geological Survey (1990, unpublished), using ESRI Atlas GIS software.

River shorelines are from the data set *Major Rivers in Pennsylvania* by Environmental Resources Research Institute, Pennsylvania State University, in *Pennsylvania GIS Compendium* (1996, Pennsylvania Department of Environmental Protection, 1:24,000-scale accuracy). Data set derived from Pennsylvania Department of Transportation data.

Other

Map layout and design by S. O. Reese and C. E. O'Neil of the Pennsylvania Geological Survey, 2003. Cartography by S. O. Reese, 2002–03. Map editing by C. E. O'Neil, 2003.

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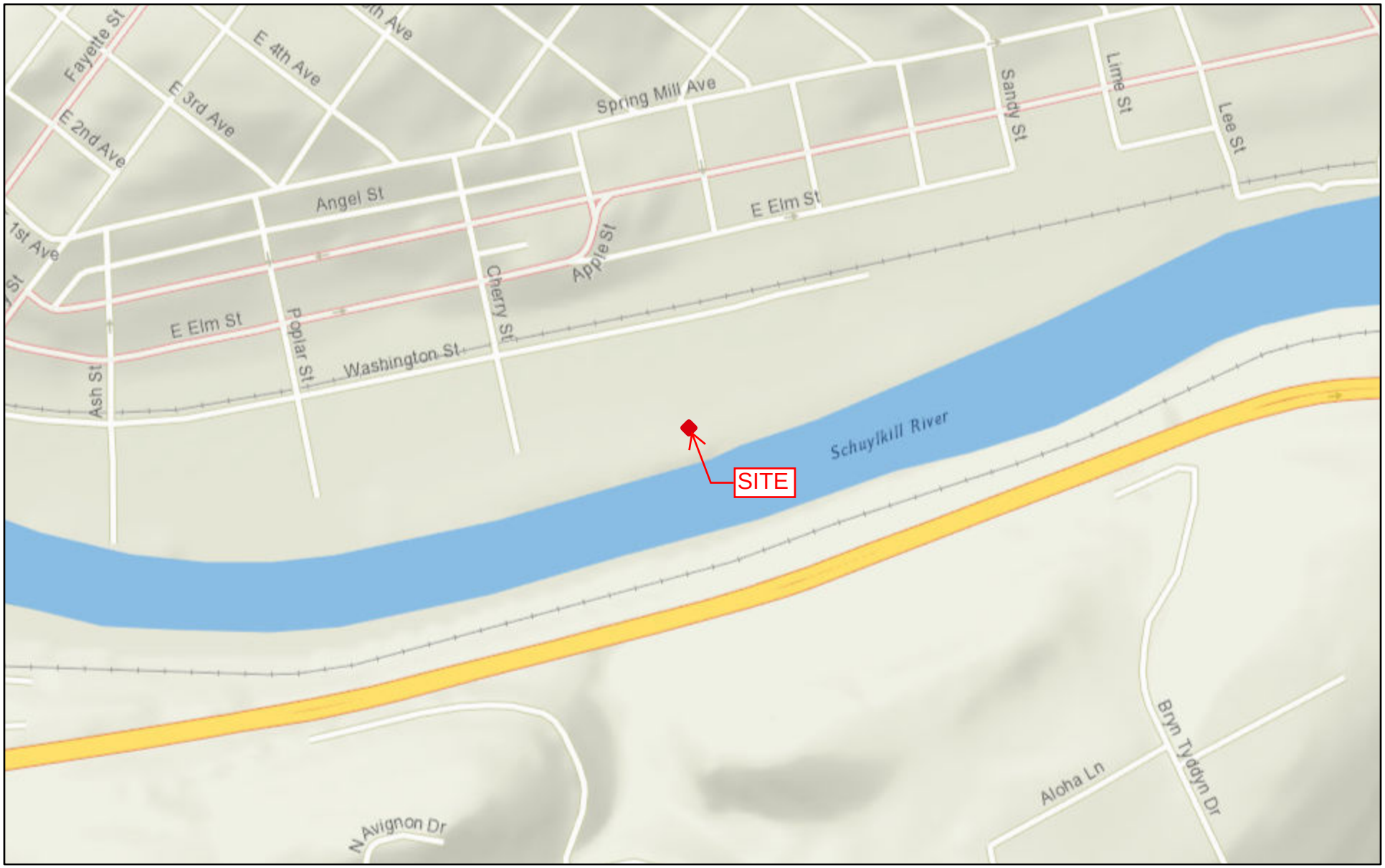
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_____ 1995b, Sinkholes and karst-related features of York County, Pennsylvania: Pennsylvania Geological Survey, 4th ser., Open-File Report 95–06, scale 1:24,000, 10 maps plus 9-page text.

601 Washington Street



2/1/2022

1:9,028

0 0.05 0.1 0.2 mi

0 0.07 0.15 0.3 km

National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA,

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Appendix J | Geotechnical Report

REPORT OF
GEOTECHNICAL EXPLORATION

601 Washington Street
Whitemarsh, Pennsylvania
Maser Consulting Project No. 16001030A

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APPENDICES

APPENDIX A .....Test Boring Logs
APPENDIX B .....Laboratory Test Data

1.0 INTRODUCTION

We are pleased to present this report regarding the geotechnical exploration performed for the proposed residential apartment building located at 601 Washington Street in Whitemarsh, Montgomery County, Pennsylvania, as shown on the Site Location Map, Figure 1. The overall site redevelopment concept consists of an elevated apartment complex, as well as supporting features (utilities, parking, etc.). The purpose of this exploration is to provide geotechnical-related design and construction recommendations for the proposed residential apartment structure and related improvements.

Our scope of services for this geotechnical exploration included the completion of eight test borings and fourteen test pits throughout the site, laboratory testing of representative soil samples, engineering analyses of the subsurface data obtained from this field exploration, and the preparation of this report. Oil, hazardous waste, radioactivity, irritants, pollutants, radon, or other dangerous substances and conditions were not the subject of this exploration.

A supplemental geotechnical exploration will be performed at a later date to provide geotechnical recommendations for the proposed boathouse structure the along the Schuylkill River.

2.0 SITE DESCRIPTION

The site for the proposed improvements is located at 601 Washington Street. The overall site is bordered by Washington Street to the north, developed lots to the east and west, and the Schuylkill River to the south, as shown on the Exploration Location Plan, Figure 2.

At the time of our geotechnical exploration, the site was being used as a landscaping yard containing various stockpiles (mulch, wood, stone, etc.) and existing fill piles, as well as gravel surfaced and vegetated areas. The southern and western boundaries of the property were wooded, and isolated trees were observed throughout the site. Multiple structures were observed throughout the property, including a two-story masonry structure on the west side of the site, as well as smaller wood-framed and steel-framed structures, and metal shipping containers. Evidence of structural cracking and settlement was observed on the exterior of the masonry structure.

Site grades generally slope downward from west to east, from elevation 52 to 49. We understand the site is located within the 100-year flood plain. Existing fill piles on the order of 5 to 10 feet high were observed within the southern portion of the site, along the Schuylkill River.

Below-grade utilities including stormwater, septic, electric, and storage tanks were observed on site. A 48-inch corrugated metal pipe (CMP) traverses the site on a southeasterly alignment, discharging into the Schuylkill River. Groundwater monitoring wells were also observed throughout the site. Other unmarked below-grade utilities may exist at the site. Overhead wires were also observed along the northern perimeter of the site.

Historic Aerial Review

Historic aerials indicate the western portion of the site (two-story masonry structure) was completed prior to 1948. Imagery from 1948 depicts a drainage swale or stream traversing the eastern portion of the site. This historic stream appears to be in the general location of the existing 48-inch CMP. Minor improvements (i.e. earthworks, etc.) were noted within the eastern portion of the site from 1958 to 2002.

3.0 PROPOSED DEVELOPMENT

The proposed development includes the construction of an elevated four-story apartment building with on-grade parking, as well as related infrastructure (utilities, etc.). Column loading is assumed to be less than 250 kips. Site grading is anticipated to result in fills on the order of 2 feet.

4.0 FIELD EXPLORATION AND LABORATORY TESTING

Subsurface conditions for this geotechnical exploration were explored through the completion of eight test borings and fourteen test pits at the locations shown on the Exploration Location Plan, Figure 2. Test borings were drilled by Allied Well Drilling, Inc. of Reading, Pennsylvania. Hollow stem auger drilling techniques were used to advance the test borings. Test pits were excavated by James Castaldi Contractors of Bensalem, Pennsylvania. Ground surface elevations at each test location were estimated using the available plans.

The test borings and test pits were field located by and performed under the full-time technical supervision of Maser Consulting. Upon completion, the test borings and test pits were backfilled with the excavated materials. The test borings and test pits were logged, and the logs are presented in Appendix A with descriptions of the soil strata encountered.

The laboratory investigation was programmed to explore the physical properties of the subsoils, as well as to augment the field exploration. The stratigraphic continuity and physical characteristics of the subsoils were investigated by the determinations of water content, Atterberg limits, loss-on-ignition (organic content), well as grain size distribution by mechanical sieve methods. The laboratory test results are presented in Appendix B.

Soil samples obtained during this exploration will be retained by Maser Consulting for a period of six months. At the end of this time they will be discarded unless we receive other instructions from 601 Washington Street Associates, L.P.

5.0 SUBSURFACE CONDITIONS

5.1 Regional Geology

The overall site is located within the Piedmont Low Land Section of the Piedmont Physiographic Province. Locally, the site is mapped to be underlain by three different geologic formations, consisting of the Precambrian felsic gneiss and the Glenarm Wissahickon Formation (oligolclase-

mica schist) along the river front, as well as the Conestoga Formation (light-gray, thin-bedded limestone having shale partings) which is separated by a fault and underlies the majority of the inland portion of the site.

Fill materials underlain by organic and alluvial deposits, decomposed rock, and limestone was encountered during our field exploration. The presence of gneiss or mica schist could not be confirmed along the river front, as test borings were not advanced within this portion of the site.

5.2 Fill

Fill material was encountered within each test boring and test pit, ranging from 2 to 8 feet, averaging about 4.5 feet. Fill material generally consists of a mixture of sand and varying amounts of gravel, silt, slag, and cinders. Petroleum odor was encountered within TB-7 from 2 to 4 feet below grade. Municipal waste (i.e. tires, metal, wood, plastic, etc.) was also encountered near the riverbank in TP-4 from 3 to 5.5 feet below grade.

Standard Penetration Test (SPT) values within the fill materials typically ranged from 5 to 33 blows per foot (bpf), averaging about 16 bpf. Higher SPT values were typically encountered within the upper 2 feet within the fill materials, indicating a denser surficial crust overlies the lower fill materials and underlying alluvial deposits.

5.3 Stratum A – Buried Topsoil / Marshland Deposit

Stratum A was encountered within each test pit (except TP-1) and periodically within test borings, extending to depths ranging from 2.5 to 6.5 feet, averaging about 4.75 feet below grade. Stratum A represents historic topsoil or marsh deposits that were buried during the original site development/earthworks. Stratum A generally consists of a 4 to 12-inch thick very soft to soft, moist to wet, fine-grained, clay & silt with little sand and trace organics. Loss-on-ignition testing indicates Stratum A materials contain about 10 percent organics.

While only observed periodically within the test borings, Stratum A is anticipated to underlie the majority of the site. Poor split spoon recoveries within this zone of the subsurface profile are likely due to the very soft nature of the Stratum A deposits. Stratum A SPT values are estimated to range from weight of hammer (WOH) to 2 bpf. Pocket penetrometer (PP) tests indicate the unconfined compressive strength of this soil generally is less than 0.5 tons per square foot (tsf).

5.4 Stratum B – Fine-Grained Alluvium (Very Soft to Soft)

Stratum B was encountered below the fill or Stratum A deposits within each test pit and test boring (except TB-8, TP-1 and TP-14), extending to depths ranging from 5 to 11 feet, averaging about 7.25 feet. Stratum B is representative of alluvial materials which were deposited by waterways (rivers, streams, etc.). Stratum B consists of a red brown moist to wet, soft to very soft clay and silt with varying amounts of sand and gravel.

Stratum B SPT values generally range from 0 to 2 bpf. Pocket penetrometer testing indicates the material has unconfined compressive strengths less than 0.5 tsf.

5.5 Stratum C – Fine-Grained Alluvium (Soft to Medium)

Stratum C was encountered below the Stratum B at each test pit and test boring (except TB-6 & 7, TP-1, TP-12, and TP-13), extending to depths ranging from 6.5 to 17 feet, averaging about 9.5 feet. Stratum C represents another fine-grained alluvial deposit comprised of soft to medium clay & silt with varying amounts of sand and gravel. Isolated zones of stiff to very stiff Stratum C materials were encountered intermittently throughout the site.

Stratum C SPT values generally range from 2 to 11 bpf, averaging 6 bpf. SPT values ranging from 11 to 29 were recorded where stiff to very stiff zones were encountered. An isolated very soft zone was encountered in TB-1 from 12 to 17 feet.

5.6 Stratum D – Coarse-Grained Alluvium

Stratum D was encountered below or interbedded within Stratum C at each test pit and test boring (except TP-1, TP-12, and TP-13), extending to depths ranging from 9 to 21.5 feet, averaging about 14.25 feet. Stratum D consists of coarse grained alluvial materials comprised of medium compact to compact gravel, some sand, with varying amounts clay and silt. Occasional cobbles and small boulders were also encountered intermittently throughout the stratum D.

Stratum D SPT values generally range from 16 to 58 bpf, averaging about 34 bpf.

5.7 Stratum E – Decomposed Rock

Stratum E was encountered below Stratum D at each test boring extending to auger refusal or test boring completion at depths ranging from 21 to more than 50 feet below grade. Due to the limited depth of test pits, Stratum E was not encountered at any of the test pits. Decomposed rock is a soil material that represents the partial weathering of the parent bedrock, in that it retains some of its relic structure. Stratum E generally consists of a moist to wet sand and silt with varying amounts of gravel (rock fragments). However, isolated zones of fine-grained Stratum E were encountered in TB-5, TB-6, and TB-7. Occasional decomposed boulders were also encountered within the Stratum E material.

Stratum E SPT values generally range from 5 to 67 bpf, averaging about 32 bpf. However, an isolated very loose zone was encountered within TB-7 from about 16 to 22 feet and 27 to 30 feet below grade, which may be an indicator of potential karst solutioning activity.

5.8 Fractured Rock

Typically represented by auger refusal, shallow fractured rock was encountered in TB-1, TB-2, and TB-8, at depths ranging from 21 to 23 feet. Based on the shallow auger refusal depths and the adjoining deep weathered zones extending to depths beyond 40 to 50 feet, the underlying limestone bedrock appears to be highly pinnacled.

One rock core was obtained within TB-2 from 23 feet to 27 feet below grade. The core sample obtained was photographed and logged for the rock Recovery Ratio (RR) and the Rock Quality Designation (RQD). The rock core data is summarized in Table 1 and the rock core is shown in Photograph 1.

Table 1
ROCK CORE SUMMARY
601 Washington Street
Whitemarsh, Pennsylvania

Test Boring	Run #	Depth (ft.) *Length (in)*	Recovery Ratio (%)	RQD (%)	Comments
TB-2	1	23 – 27 *48*	100	23	Slightly weathered, hard, slightly to moderately fractured, thin bedded Limestone



Photograph 1 – TB-2: Run #1: 23' – 27'

5.9 Groundwater / Perched Water

Groundwater was encountered within each test boring and test pit (except TP-12 and TP-13) at depths ranging from 6 to 13 feet below grade, corresponding to elevations ranging from 38 to 46 feet. Groundwater was generally encountered near the interface between the Strata C and D deposits. Shallower perched water was encountered on top of the Stratum A deposits (at the Fill and Stratum A interface), or within the fine-grained alluvium at depths ranging from 2 to 7 feet, corresponding to elevations ranging from 45 to 48 feet. Water level readings were also obtained within the test borings 24 hours after their completion, and generally ranged from 3 to 5.5 feet, corresponding to elevations ranging from 44.5 to 47.5 feet. Groundwater and perched water conditions should be anticipated to fluctuate due to seasonal influences, as well as fluctuations (normal, flood, etc.) within the adjoining Schuylkill River.

Historic Water Level Monitoring – Roux Associates, Inc.

Periodic water level readings were obtained by Roux Associates, Inc. on eight separate events (seven from August 19, 2005 to October 31, 2006, and one on April 4, 2018). The water readings were obtained at ten monitoring wells located throughout the site during varying seasons. The water level readings and well locations are summarized on the "Draft Groundwater Elevation Summary Table" and "Groundwater Elevation Contour Map, October 31, 2005" by Roux Associates, Inc. Historic water level readings obtained from monitoring wells located, indicate high water elevation levels ranging from 44.6 to 47.5 feet, with seasonal fluctuations on the order of 1 to 5.5 feet (lower than the high-water level readings).

Based on our review of the monitoring well construction, as well as our observations during our recent field exploration, we believe these water level readings are indicative of the perched water conditions which were encountered intermittently throughout the site.

6.0 DEVELOPMENT CONSIDERATIONS

Based on our geotechnical exploration, we have identified the following issues to be addressed during the design and construction of the proposed development:

6.1 Instability of Shallow Overburden (Fill, Strata A, B, and C)

Near surface fill, as well as compressible organic and fine grained alluvial deposits, were encountered throughout the site. Development considerations for foundation, pavements, slabs-on-grade, below grade utility support are outlined below:

Foundation Support

We do not believe the shallow fill, organic, or fine-grained alluvial deposits are capable of supporting a shallow-based foundation system in their current state, while maintaining total post-construction settlements of less than 1 inch. Therefore, we recommend that one of the following options be implemented to permit the proposed structure to be supported by shallow foundations:

> Ground Improvement: Stabilize the remaining fill materials below wall and column spread footings via aggregate piers, creating composite bearing surfaces. This approach would have minimal impact on the site operations, generate less spoils than removal and replacement option, and should eliminate the need for additional over-excavations while yielding increased bearing capacities. Refer to Section 7.3.1 for more information.
>
> Removal and Replacement: Remove and replace the existing fill, Strata A, B, and soft to medium Stratum C deposits below the proposed wall and column spread footings. Over-excavations would generally range from 6 feet to more than 10 feet deep and generate significantly more spoils than the ground improvement option noted above. If disposed of off-site, spoil disposal shall be performed in accordance with clean fill disposal criteria. Refer to Section 7.3.2 for more information.

Alternatively, “short” drilled piers (i.e. round footings) may also be considered in lieu of ground improvement, removal and replacement, or deep foundation elements. Drilled piers should be advanced to bear within the medium compact to compact Stratum D alluvial deposits, generally encountered between 7 to 16 feet. Piers may be designed to directly support column elements, and grade beams spanning piers would be required to support the walls. Refer to Section 7.3.4 for more information.

Pavements and Floor Slab/Pad Support

Similarly, the exposed fill materials should be improved and proof-tested prior to permitting asphalt pavement and floor slabs/pads to be supported on grade. Therefore, we recommend stabilizing the exposed fill materials using geosynthetics and dense graded aggregate fill to enable long term support for these elements. The intent of this program is to provide a stable working platform and to mitigate the effects of long term differential settlement while reducing the need to perform significant removal and replacement activities and potential soil disposal. Refer to Section 7.5 for more information.

Below-Grade Utility Support

Below-grade utilities bearing within the very loose existing fill materials, or Strata A and B deposits, may experience differential settlement. Therefore, we recommend a limited stabilization program (over-excavation and replacement) be performed beneath utilities bearing within these materials. Refer to Section 7.8 for more information.

6.2 Shallow Water Conditions

At the time of our field study, shallow perched water conditions were encountered throughout the majority of the site at depths ranging between 2 and 7 feet below grade, corresponding to elevations ranging from 45 to 48 feet. Groundwater was generally encountered throughout the site at depths ranging from 4 to 11 feet within Stratum D, corresponding to elevations ranging from 38 to 46 feet. Groundwater levels are likely to fluctuate based on precipitation events, Schuylkill River water level, flooding, and other seasonal influences.

We anticipate utility trench excavations or foundation stabilization excavations to intersect perched water and/or groundwater. We believe that dewatering of shallow excavations can be managed by routine methods (sumps and pumps), particularly where perched conditions are encountered. Excavations penetrating the coarse-grained Stratum D will likely require larger pumps to maintain dry conditions.

6.3 Existing 48-inch Corrugated Metal Pipe (CMP)

The existing 48-inch CMP will traverse beneath the eastern portion of the proposed structure. Due to the diameter, age, and impact the proposed structure may have on the pipe (and vice versa), we recommend relocating the pipe outside the structure limits. Any abandoned pipe segments should be removed and replaced with load-bearing fill. If this is not feasible, we recommend better assessing the condition of the pipe via video recording, straddling, and designing the structure’s foundations such that no additional load is transmitted to the pipe.

6.4 Karst Geology – Sinkhole Formation

A recognizable risk of cavity (sinkhole) development and loss-of-support for the proposed development features is inherent with construction in this geologic area. However, the degree of risk specific to this site cannot be determined by conventional geotechnical exploration techniques and practices. Therefore, the conclusions and recommendations in this report assume acceptance by the Owner of a risk of exposure to solution activity during the life of the development. However, sinkhole mitigation techniques can be employed during the design and construction of the proposed structure to reduce the risk of sinkhole development, as outlined in Section 7.10.

7.0 SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations pertaining to the design and construction of the proposed development are summarized in the following paragraphs.

7.1 Site Preparation

The purpose of these site preparation procedures is to provide stable and uniform bearing conditions for the proposed building foundations, slab-on-grade, and pavements. The following procedures should be performed under the technical supervision of the Geotechnical Engineer.

- Install soil erosion and sedimentation control devices, as well as temporary stormwater management facilities, as specified by Site/Civil Engineer.

- Maintain positive drainage conditions throughout construction, avoiding unnecessary ponding of stormwater in excavations or low areas of the site. Seal-roll exposed soil or subgrade surfaces prior to rain or snow events, and promptly remove any standing water immediately afterwards.

- Abandon existing monitoring wells in accordance with PADEP regulations.

- Any existing underground or above-ground utility locations should be verified in the field and relocated or abandoned as necessary, prior to construction. If the option to abandon utilities in-place is chosen, we recommend that a lean cement grout (1,000 psi) be used to fill the utility lines.

- Remove debris piles, wood piles, and vegetation from the site.

- If encountered, topsoil shall be stripped and stockpiled for re-use.

- Demolish or abandon the existing features in accordance with the demolition plan and the following site-specific guidelines:

- Demolish existing structures in accordance with the demolition plan, including the removal of the floor slab, foundations, and other below-grade remnants in their entirety. If feasible, implement a recycling program consisting of the processing of inert building materials (concrete, block, brick, stone, etc.) for use as load-bearing fill (refer to Section 7.2 for requirements). Alternatively, remove demolition debris from the site in accordance with local and state regulations.

- Backfill resulting excavations, etc. with suitable load-bearing fill in accordance with Section 7.2.

- Install below-grade utilities. Trench excavations shall be performed in accordance with the recommendations presented in Section 7.7 of this report.

- Where encountered within site excavations and at/nearby TP-4, municipal waste should be removed from the site and replaced with suitable load-bearing fill in accordance with Section 7.2.

- Implement ground improvement program for foundation support, if selected. Refer to Section 7.3.

- Stabilize the remaining near surface fill materials as outlined below:

    - Prior to load-bearing fill placement (e.g. aggregate base course placement), level and compact the exposed subgrade with a minimum 10-ton smooth-drum roller, and proofroll the exposed subgrade with fully loaded tri-axle dump truck. The vibratory or static modes shall be used, as appropriate, depending on the moisture content of the subgrade material, as determined by the resident Geotechnical Engineer. Undercut remaining loose zones which cannot be stabilized in place via compaction or moisture conditioning and backfill with load-bearing fill. Surficial remedial work should be anticipated prior to load-bearing fill placement, particularly along the 48-inch CMP where the historic drainage swale/creek was located.

    - To mitigate effects of differential settlement, deploy TX-160 Tri-Axial geogrid over the prepared subgrade where asphalt pavements, slabs-on-grade, or other surface improvements that may be affected by differential settlement are proposed, plus a minimum 5-foot perimeter. Geogrid should not be placed under the proposed foundations, as to not interfere with the proposed rammed aggregate pier ground improvement program.

    - Place and compact imported dense graded aggregate in accordance with Section 7.2 to achieve the final subgrade elevation. We understand approximately 2 feet of load-bearing fill will be required to achieve the proposed subgrade elevation. Dense graded aggregate should conform to a gradation similar to PennDOT 2A.

7.2 Load-Bearing Fill

All fill/backfill proposed to support building and site features that would be adversely affected by settlement is considered load-bearing fill. Materials used as load-bearing fill should consist of granular, inorganic, readily compactable materials, which are free of trash, organic inclusions, cinders, ash, frozen material, or excess moisture. Particles larger than 6 inches should be broken down or excluded from the fill.

The existing Strata A, B, C deposits should be excluded from re-use as load-bearing fill due to organic content (Stratum A) and in-situ moisture content (Strata A, B, and C).

Asphalt millings, if any, may be utilized as load-bearing fill outside the building footprint, plus a 10-foot perimeter zone, provided they are blended to conform to a dense-graded aggregate (DGA) similar to PADOT 2A. In addition, asphalt millings should be restricted to less than 12 inches in total thickness throughout the fill profile.

We understand that imported load-bearing fill materials will be required to achieve the proposed grading scheme. Due to the underlying subsurface profile, we recommend that the imported load-bearing fill materials to be placed within the structure and pavement footprints plus a 10-foot perimeter consist of PennDOT 2A stone or similar dense graded aggregate. Imported load-bearing fill materials consisting of SM or coarser material, based on the Unified Soil Classification System (USCS), may be used outside of the proposed structure and pavement footprint. Additionally, the portion passing the #200 sieve should not exceed 30 percent and the plasticity index (PI) should not exceed 10.

The load-bearing fill, consisting of off-site granular borrow material, should be placed in essentially horizontal lifts with a maximum loose thickness of 12 inches. Compaction should be achieved using as large a vibratory compactor as practical.

Table 2 provides compaction requirements for the site.

Table 2
COMPACTION RECOMMENDATIONS
601 Washington Street
Whitemarsh, Pennsylvania

Type of Support	Density Requirement
Beneath Building Foundations/Floor Slabs	95% of Modified Proctor (ASTM D 1557)
Behind Site Walls, Beneath Pavements	92% of Modified Proctor (ASTM D 1557)

7.3 Building Foundations

We believe the existing fill and Strata A, B, and C deposits are incapable of supporting shallow foundations in their current state, without risking total and differential settlements that would exceed the structures' allowable tolerances.

Therefore, we recommend implementing one of the following stabilization options that would permit the structures to be supported by shallow foundations. Alternatively, "short" drilled piers (i.e. round footings) may also be utilized to support the proposed structure as discussed in Section 7.3.4. Other drilled or driven deep foundation alternatives were also considered. However, due to the anticipated moderate structure loading, we do not believe these systems are warranted.

7.3.1 Aggregate Pier Ground Improvement Option

Stabilize fill materials and Strata A, B, and C deposits below the column spread and wall footings via aggregate piers. This approach would have a nominal impact on the site operations and would generate little spoils when compared to other alternatives such as over-excavation and replacement. If performed throughout the building footprint, we believe this technique would permit the use of conventional spread footings on a composite bearing surface capable of achieving an allowable bearing capacity of 5,000 pounds per square foot (psf), while maintaining acceptable total and differential settlements.

Aggregate piers (a.k.a. GeoPiers, Rammed Aggregate Piers (RAP), Stone Columns, Vibro-Columns, etc.) are a ground improvement technique used to stabilize relatively loose, granular soils. Typically, they consist of compacted, often vibrated aggregate material installed vertically through the loose soil profile in 12 to 30-inch diameter columns. Due to the underlying karst geology, we recommend that a portion of the stone column be cement treated to limit the potential for stormwater infiltration. The installation method would also compact the surrounding soil materials, creating an improved soil-aggregate mass. When installed in a grid pattern beneath proposed foundations or other elements, the composite soil-aggregate bearing surface will have improved bearing capacity and settlement control properties.

Each type of aggregate pier is a proprietary design-build method unique to the specialty contractor or vendor. Therefore, the successful vendor will design and install their aggregate pier system to meet a set of performance specifications. For this project, we recommend that the following performance specifications be utilized:

- Minimum allowable composite bearing capacity = 5,000 PSF
- Maximum post-construction total settlement = 1.0 inches
- Maximum post-construction differential settlement = 0.5 inches

Load testing of a minimum of three aggregate piers shall be performed to verify the soil modulus assumed during design. One modulus test should be performed nearby TB-7.

7.3.2 Removal and Replacement Option

Remove the existing fill materials, Strata A and B deposits, as well as soft to medium Stratum C deposits below the proposed building foundations, and replace with load-bearing fill as outlined below. Over-excavations shall be extended to the stiff to very stiff Stratum C, or to the medium compact to compact Stratum D, under the direction of the onsite Geotechnical Engineer. While this option does not require specialty contractors to execute, it will generate a significant amount of spoils as compared to the aggregate pier option. If off-site disposal of these spoils is required, they should be performed in accordance with current environmental regulations.

Guidelines for removal and replacement program are outlined below:

- Over-Excavation Aerial Extent: Limit over-excavations to the size of the footing plus a minimum horizontal distance (12 inches+/-) in each direction.
- Backfill bottom of excavation with 2 feet of ballast stone. Afterwards, where dry conditions are encountered, backfill the remaining excavation with compacted DGA. Alternatively, if where groundwater is encountered, backfill the excavation using AASHTO 57 stone until a minimum of 2 feet of free-board is achieved, at which point the AASHTO 57 stone should be consolidated and the remaining excavation should be backfilled with compacted DGA. DGA should conform to a gradation similar to PennDOT 2A stone. All backfill materials (ballast and DGA) shall be compacted in lifts in accordance with Section 7.2.
- All over-excavations should be backfilled at the end of each working day, up to the proposed foundation bearing elevation.

All excavations should be performed in accordance with the OSHA requirements and criteria outlined in Section 7.7 of this report. Begin constructing shallow foundations as soon as practical, not allowing remaining excavations to be open for extended periods of time. Accumulated stormwater should be removed from excavations as soon as possible.

We recommend that the foundations bearing in these areas be proportioned using an allowable net bearing capacity of 4,000 pounds per square foot (psf). Similarly, we believe that these foundations will be capable of supporting the structure loads with the potential for total post construction settlement of less than 1 inch, and 0.5 inch differential settlement between adjacent columns.

7.3.3 General Shallow Foundation Recommendations

Just prior to foundation construction, all footing excavations should be evaluated by a qualified geotechnical engineer to determine if the supporting capabilities of the bearing materials are compatible with the design criteria. In addition, any remaining loose fill materials (not remediated as outlined above) should be compacted in place using a jumping jack or vibratory roller, or undercut and replaced with load-bearing fill.

The minimum width of all wall footings should be 24 inches, and the minimum horizontal dimension of all spread footings should be 36 inches, regardless of the bearing pressure developed.

All exterior footings subject to frost action should be based at least 36 inches below the adjacent exterior grade. Interior footings should be based at least 24 inches below the finished floor elevation.

In addition, we recommend that the shallow foundations bear below a zone bounded by a plane that extends outward and upward on a 1:1 slope from any proposed underground utility excavation, or other proposed or existing underground features.

7.3.4 Drilled Pier Option

As an alternative to the ground improvement and removal and replacement options discussed above, the building columns can be supported by "short" drilled piers bearing on compact Stratum D deposits, or medium compact to compact Stratum E deposits. In this simple construction technique, the piers would serve as round footings for the columns. Grade beams spanning between the drilled piers should be used to support wall and façade elements.

We recommend the following parameters be used for design of the drilled pier foundations:

- Allowable end bearing capacity: 4,000 psf
- Minimum embedment into bearing layer: 1 foot for seating purposes
- Ignore skin friction contributions.
- Drilled shafts shall be sufficiently reinforced to resist the applied shear and bending forces, and to accommodate the anchor bolt embedment depths. Reinforcing should typically extend the length of the shaft, and be designed in accordance with ACI standards.
- Based on the anticipated loading, we understand the drilled piers would range on the order of 6 to 9 feet in diameter. Following proper drilled pier installation techniques, we believe that the foundations will be capable of supporting the proposed loads with the potential for total settlement (including elastic shortening) of less than 1 inch.

7.3.4.1 Drilled Pier Construction

If drilled piers are elected, we recommend that the following items be incorporated into the drilled pier specifications:

1. Drilled piers shall be advanced to compact Stratum D deposits, or medium compact to compact Stratum E deposits, and be seated a minimum of 1 foot within the respective bearing layer. The bearing surface shall be verified by the onsite Geotechnical Engineer.

2. The Contractor shall be prepared to use temporary steel casings as necessary to protect the integrity of the pier, particularly where perched water or groundwater is encountered. Steel casings shall be withdrawn during the placement of concrete, maintaining a sufficient head of concrete above the bottom of the casing (typically 5 feet).

3. Installation tolerances shall include a maximum of 2.0 percent horizontal (each direction) from the center location, as well as a maximum of 2.0 percent vertical plumbness.

4. Drilled pier bearing surfaces shall be level and cleaned of loose debris using appropriate tools to the satisfaction of the Geotechnical Engineer.

5. Reinforcing steel cages shall be properly centered in the drilled pier (using spacers or

centralizers) and raised off the bottom of the pier using boots), as needed. Anchor bolts and/or reinforcing steel protruding from the top of the drilled pier shall be properly set prior to concrete placement and restrained from movement during the placement operation.

6. If water is present in the pier, concrete shall be placed by the tremie method. Otherwise, concrete may be placed by the free-fall method in accordance with American Concrete Institute (ACI) guidance (concrete shall not strike the reinforcing steel). Displaced water or concrete laitance shall be removed from the top of the pier, and the top of the finished pier shall be leveled at the specified elevation.

7. For drilled piers extending above the ground surface, temporary sonotube or metal forms shall be used to maintain the specified pier diameter and top surface elevation until the concrete has set.

8. Excess spoils shall be disposed of in accordance with local and state environmental regulations.

7.4 Seismic Site Class

In accordance with the 2009 International Building Code, this site may be designed assuming a Site Class "D". This classification was determined by utilizing the Standard Penetration Test (SPT) blow count data through the upper 100 feet of the subsurface profile. SPT values of 100 bpf were used for bedrock, assumed to be at an average depth of 50 feet below grade.

7.5 Floor Slabs / Equipment Pads

Assuming the stabilization program is performed (subgrade compaction, proofrolling, geogrid, and minimum 12 inches of DGA fill) under the observation of a Geotechnical Engineer as described in the Site Preparation Section 7.1, miscellaneous floor slabs or floating equipment pads may be supported on-grade in accordance with the following criteria. The edges of slabs/pads susceptible to frost (which are supporting elements that would impacted by frost heave) should be turned down to frost depth (36 inches).

The subgrade should be compacted with a smooth-drum roller just prior to installation of the aggregate base to re-compact any materials disturbed by previous construction activities or adverse weather conditions. Any unstable zones detected that cannot be stabilized by additional compaction should be removed, and the excavated area backfilled with load-bearing fill.

Immediately prior to slab construction, we recommend that a minimum 4-inch layer of PennDOT 2A crushed stone be placed and compacted over the prepared subgrade. For interior portions of the building to receive floor coatings such as carpeting, floor tile, or epoxy-based finishes, we also recommend that a 10-mil vapor retarder also be placed over the subgrade, followed by the 4-inch layer of dense-graded aggregate. The aggregate surface should also be dampened just prior to concrete placement. These procedures are intended to provide uniform concrete curing conditions.

We anticipate that, following proper site preparation, the subgrade soils can achieve a Modulus of Subgrade Reaction on the order of 150 pounds per cubic inch (pci). A coefficient of sliding friction

of 0.20 may be used for design of a floor slab with a polyethylene vapor retarder over soil. A coefficient of sliding friction of 0.40 may be used for design of a floor slab without a vapor retarder.

Reinforced concrete floor slabs should be simply supported at wall and column junctures to allow unrestricted rotation of the slab edges. Alternatively, the slabs should be free to undergo vertical deflections at the edges.

7.6 Site Walls

If site walls become part of the design scheme, they should be designed using the soil parameters outlined in Table 3. Note that these parameters are ultimate values that do not incorporate a factor of safety. Appropriate, industry-standard factors of safety should be applied to the overall design of these systems.

Table 3
LATERAL EARTH COEFFICIENTS
601 Washington Street
Whitemarsh Township, Pennsylvania

Subsurface Material	Total Unit Weight (pcf)	Internal Friction Angle	Wall Condition	Earth Pressure Coefficient	Equivalent Fluid Pressure (psf)
Imported PennDOT 2A Stone	135	36°	At Rest, K_o	0.41	56
			Active, K_a	0.26	35
			Passive, K_p	3.85	520
Homogenized Fill / Strata A& B	110	26°	At Rest, K_o	0.56	62
			Active, K_a	0.39	43
			Passive, K_p	2.56	282
Stratum C	120	28°	At Rest, K_o	0.53	64
			Active, K_a	0.36	43
			Passive, K_p	2.77	330
Stratum D	130	34°	At Rest, K_o	0.44	58
			Active, K_a	0.28	37
			Passive, K_p	3.54	460

Cantilevered retaining walls, or walls that are tied back which are free to rotate, should be designed for the active earth pressure condition. Walls that are braced or otherwise restricted from rotation should be designed for the at-rest earth pressure condition. Passive earth pressure is used to estimate the resisting force when a wall structure is being forced against the soil material.

Surcharge loading caused by additional surface loads on the retained soil should be added to the lateral pressure on the wall as a uniform stress equal to one-half the surcharge load. These loads may include vehicle or pedestrian traffic, temporary construction loads (stockpiles, material storage, equipment, etc.), floor slab or pavement loads, or other structures.

The earth pressure values are based on the assumption that no hydrostatic pressure from groundwater and/or surface infiltration will be applied to the walls. Therefore, an appropriate drainage system shall be incorporated into the design to maintain drained conditions.

Due to the site's location within the 100-year flood plain, and its proximity to the Schuylkill River, retaining walls should also be designed for flood and sudden drawdown conditions.

7.7 Excavation Safety

Temporary excavation stability is a function of many factors including the presence and abundance of groundwater, the type and density of the various soil strata, the depth of excavation, surcharge loadings adjacent to the excavation, and the length of time and weather conditions while the excavation remains open. It is the responsibility of the Contractor to maintain safe excavations in conformance with all applicable federal, state, and local regulations such as OSHA. All excavations should conform to applicable sloping or shoring standards for worker access.

Portable trench boxes, sliding trench shields, or interlocking sheeting should be used where there is inadequate space to allow proper side slopes for trenches. In all cases, OSHA requirements must be followed and adequate protection provided for workers.

Construction traffic and excavated material stockpiles should be kept away from excavations by a minimum horizontal distance equal to the full depth of the excavation, unless the resulting surcharge loads are accounted for in the design of the lateral bracing system. The Contractor's proposed excavation plan, support systems, and sequence of construction should be designed, signed, and sealed designed by a Professional Engineer registered in the Commonwealth of Pennsylvania, and reviewed by the Geotechnical Engineer prior to allowing the Contractor to commence work.

7.8 Below-Grade Utilities

We offer the following additional recommendations specific to utility construction:

- Any excavated utility trenches located beneath the proposed finished floor or pavement subgrades should be backfilled with compacted load-bearing fill in accordance with the recommendations outlined in the Load-Bearing Fill Section 7.2 of this report.

- Prior to installation, the bearing surfaces for utility structures (manholes, vaults, etc.) and piping should be evaluated by the Geotechnical Engineer or technician. Utilities (piping and structures) bearing within Strata A and B will likely require stabilization prior to utility installation. For preliminary planning purposes, we recommend over-excavating a minimum of 18 inches below the proposed subgrade elevation and backfilling with ballast stone seated into the underlying soil material. The extent of the over-excavation will be determined by the onsite Geotechnical Engineer and will be dependent on the conditions encountered. The ballast should be surfaced with a minimum 6-inch PennDOT 2A stone bedding.

- Perched water should be anticipated within utility trench excavations approaching 3 to 5 feet below grade. We believe this condition can be managed using conventional sumps and pumps. Groundwater should be anticipated within excavations approaching 6 to 8 feet below grade, generally within the Stratum D Alluvial deposits. We believe excavations penetrating 1 to 2 feet within Stratum D may be managed with pumps and sumps. Deeper excavations may require more extensive dewatering and shoring programs.

7.9 Pavements

The asphalt pavement sections described in Table 4 are proposed for construction. The recommended designs are predicated on completing subgrade stabilization as outlined in Section 7.1. In addition, they are based on our experience with similar facilities, utilizing a light-duty pavement section for areas where traffic is limited to passenger vehicles (no trucks), and a heavy-duty section for the main drive isles which may be subject to a combination of truck and automobile traffic.

Table 4
RECOMMENDED MINIMUM PAVEMENT SECTIONS
601 Washington Street
Whitemarsh Township, Pennsylvania

LIGHT-DUTY ASPHALT PAVEMENT (Automobile Traffic Only)	
Asphalt Pavement Element	Thickness (inches)
9.5MM PG64-22 HMA Wearing Course	1.5
25MM PG64-22 HMA Base Course	3.0
PennDOT 2A Stone (1)	6.0
Dense Graded Aggregate Fill (2)	12.0 (min.)
TX-160 Tri-Axial Geogrid	NA
Improved Soil Subgrade (3)	
HEAVY-DUTY ASPHALT PAVEMENT (Automobile and Truck Traffic)	
Asphalt Pavement Element	Thickness (inches)
9.5MM PG64-22 HMA Wearing Course	1.5
25MM PG64-22 HMA Base Course	4.0
PennDOT 2A Stone (1)	6.0
Dense Graded Aggregate Fill (2)	12.0 (min.)
TX-160 Tri-Axial Geogrid	NA
Improved Soil Subgrade (3)	

1. Aggregate base course to be dense-graded aggregate conforming to PennDOT 2A stone, with less than 10 percent finer than the No. 200 sieve and all fines to be non-plastic (PI=0). Aggregate base course to be compacted to a minimum of 92 percent of the maximum dry density, as determined by the Modified Proctor test, ASTM D 1557.
2. Dense Graded Aggregate (DGA) fill with non-plastic fines, per Section 7.1. DGA fill to be compacted to a minimum of 92 percent of the maximum dry density, as determined by the Modified Proctor test, ASTM D 1557.
3. Subgrade soil to be compacted to a minimum of 92 percent of the maximum dry density, as determined by the Modified Proctor test, ASTM D 1557 and shall consist of load-bearing fill and/or existing materials capable of achieving a CBR value of 4. The moisture content of the material should also be maintained within +/- 2 percent of its optimum moisture content.

The pavement soil subgrade should be compacted with a smooth-drum roller in the vibratory mode under the observation of the resident Geotechnical Engineer immediately prior to placement of the DGA fill to compact any materials disturbed by previous construction activities or adverse weather conditions. Any soft/unstable zones detected by this procedure should be removed and the excavated area backfilled with load-bearing fill as described in a previous section of this report. Alternatively, other stabilization methods (geotextiles, geogrids, lime stabilization, etc.) may be considered.

The pavement sections provided are based on the assumption that drained conditions will be maintained. Adequate drainage of the pavement base course should be provided to relieve the effects of any perched water, seepage, or surface water infiltration. Components of a pavement base course drainage system should include appropriately pitched subgrade and pavement surfaces (minimum 1.0 percent slope) and inlet weep holes and stub-drains. Stub-drains may also be considered to provide additional drainage relief. If installed, stub-drains should be protected with a geotextile fabric, wrapped around the coarse aggregate (AASHTO 57 Stone), in an effort to limit the migration of soil fines into the drains.

We recommend that the asphalt pavement sections shown in Table 4 be viewed as minimum guidelines. If anticipated traffic levels differ from those assumed, the pavement section should be re-evaluated to the proposed service levels. Routine maintenance of the pavement should provide the specified 20-year life expectancy. The durability and longevity of the pavement sections are directly based on the quality of the Contractor's installation procedures. Subgrade preparation, aggregate base installation, asphalt compaction, and concrete placement should be monitored by the resident Geotechnical Engineer to verify adherence to the recommendations and specifications.

7.9.1 Concrete Pads

The pavement for loading/unloading zones (i.e. trash dumpster pick-up areas) will be subjected to heavy concentrated wheel or point loads. This frequently results in rutting of asphalt pavements and ultimately in failure. Therefore, we recommend an increased, reinforced concrete section be utilized in such areas, consisting of 9 inches of 4,000 psi concrete, over 6 inches of aggregate base course. The final concrete pavement design (by others) should address the need for steel reinforcing, and provide adequate joint spacing plans and details.

7.10 Sinkhole Risk Mitigation

We recommend that a proactive approach be taken in regulating the risks for sinkhole formation during and after construction by performing some or all of the risk mitigation provisions recommended as follows:

- All underground utilities transporting fluids should be installed with water-tight gasketed joints, as well as the longest practical pipe section lengths to reduce the number of joints.

- Roof drains, downspouts, and area drains should be piped away from the proposed buildings to limit the uncontrolled infiltration of water to the underlying soils. Grades around the proposed structures should be designed to drain stormwater away as quickly as possible.

- Underground utilities should be bedded on and encased with dense-graded aggregate (not open-graded aggregate) to reduce the potential for leaking water to accumulate in the trenches. The use of PADOT 2A crushed stone or recycled concrete is recommended for this purpose.

- Earthwork should be sequenced to limit the ponding of surface water in uncontrolled locations. Ponding water should be removed from exposed subgrades as soon as possible.

- Concrete placement for foundations, as well as the backfill of utility lines, should be completed in the same day as the excavation. Excavations should not be left open when rainfall is expected. Alternatively, a mud-mat should be utilized to protect exposed excavations if concrete placement will not occur on the same day.

7.11 Construction Observation and Testing

Regardless of the thoroughness of a geotechnical engineering exploration, there is always a possibility that subsurface conditions between test locations may be different from those encountered, that conditions are not as anticipated by the designers, or that the construction process has altered the subsurface conditions. Therefore, geotechnical engineering construction observation should be performed under the supervision of a Geotechnical Engineer who is familiar with the intent of the recommendations presented in this report. Such observation services are recommended to evaluate whether the conditions anticipated in the design actually exist, or whether the recommendations presented in the report should be modified where necessary. Our firm can provide these services on your behalf. Therefore, we recommend that Maser Consulting be retained to perform quality assurance observation and testing services on a full-time basis during (at a minimum) earthwork operations, foundation installation, and pavement construction.

8.0 CLARIFICATION

Conclusions and recommendations presented in this report are based solely on the on the findings of our geotechnical exploration. The number, location, and depth of the explorations were completed within the constraints of the exploration’s budget.

We emphasize that this exploration should be made available to prospective bidders for informational purposes. We would recommend that the project specifications contain the following statement:

> "A geotechnical engineering report has been prepared for this project by Maser Consulting P.A. This report is for informational purposes only and should not be considered part of the contract documents. The opinions expressed in this report are those of the Geotechnical Engineer and represent their interpretation of the subsurface conditions, field and laboratory testing, and the results of analyses which they have conducted. Should the data contained in this report not be adequate for the Contractor's purposes, the Contractor may make, prior to bidding, his own investigation, tests, and analyses.”

9.0 LIMITATIONS

This report has been prepared in accordance with generally accepted geotechnical design practice for the exclusive use of 601 Washington Street Associates, L.P., and their agents for specific application to this project. This report has not been prepared to serve as the plans and specifications for actual construction without the appropriate interpretation by the project Architect, Structural Engineer, and/or Civil Engineer. This report has been based on assumed conditions and characteristics of the proposed development where specific information was not available. The conclusions, projections, and recommendations presented in this report cannot be applied to other building configurations or loads.

We recommend that the Architect, Civil Engineer, and Structural Engineer, along with any other design professionals involved in this project, carefully review the assumptions noted in this report regarding the proposed development so that they are consistent with the actual planned development. When discrepancies exist, they should be brought to our attention so that they do not affect the conclusions and recommendations provided in the report. The project plans and specifications should be submitted to us for review so that the geotechnical-related conclusions and recommendations provided herein have been correctly interpreted and are incorporated into the design.

The conclusions and recommendations contained in this report are based upon the subsurface data obtained during this exploration and on details stated in this report. The validity of the projections, conclusions, and recommendations contained in this report is necessarily limited by the scope of field exploration and by the number of test borings and test pits that were made. It is understood that the number of explorations made are consistent with good engineering practice but, given the nature of subsurface conditions, there is a possibility that actual conditions encountered may differ from those projected in this report. Should conditions arise which differ from those described in this report, Maser Consulting should be notified immediately and provided with all information, when available, regarding subsurface conditions.

Our recommendations are based upon the assumption that the services of a qualified Geotechnical Engineer will be retained for the observation of excavation operations, proofrolling, load-bearing fill placement, foundation installation, and all critical earthwork operations. Maser Consulting has the capability of providing these services, and can provide a proposal to perform the on-site quality assurance observation and materials testing.

The scope of this exploration was limited to the evaluation of the load-carrying capabilities and load stability of the soils and bedrock. Oil, hazardous waste, radioactivity, irritants, pollutants, radon or other dangerous substances and conditions were not the subject of this exploration.

FIGURE 1
SITE LOCATION MAP



NOTES:

1.) SITE MAP OBTAINED FROM PENNSYLVANIA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES.

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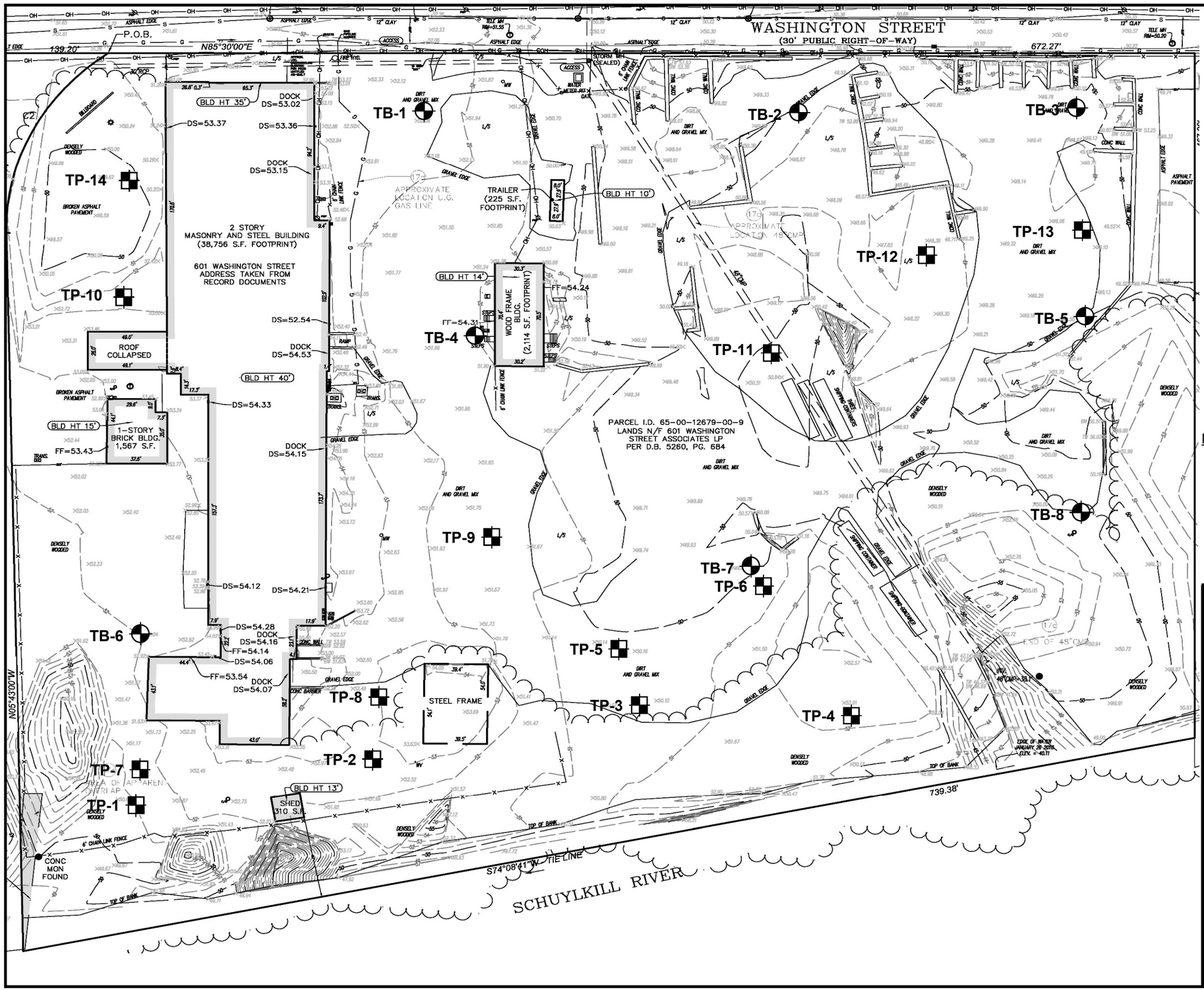
Title: SITE LOCATION MAP

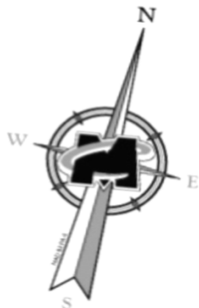
Project: **601 WASHINGTON STREET**

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY, PENNSYLVANIA

Drawn By:	AAY	Checked By:	RTW	Project No.:	16001030A
Scale:	N.T.S.	Date:	6/8/2018	Figure No.:	1

FIGURE 2
EXPLORATION LOCATION PLAN





LEGEND:

TB-1 TEST BORING LOCATION (APPROX.)

TP-1 TEST PIT LOCATION (APPROX.)

NOTES:

1.) *BASE PLAN OBTAINED FROM BOUNDARY AND TOPOGRAPHIC SURVEY PLAN, BY FIRST ORDER, LLC.. REVISED FEBRUARY 05, 2018.

2.) THIS DRAWING IS PART OF MASER'S GEOTECHNICAL REPORT (PROJECT NO. 16001030A) DATED JULY 2018 AND SHOULD ONLY BE USED IN CONJUNCTION WITH THE REPORT.

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TITLE:

EXPLORATION LOCATION PLAN

PROJECT:

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY, PENNSYLVANIA

DRAWN BY:	CHECKED BY:	PROJECT NO.:
AAY	RTW	16001030A
SCALE:	DATE:	FIGURE NO.:
N.T.S.	06/25/2018	2

APPENDIX A
TEST BORING LOGS
TEST PIT LOGS

TEST BORING LOG TB-1

Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Subsurface Profile: Profile Stratum	Subsurface Profile: Visual Description / Comments	Elev. (ft)
0	S - 1	23	21	11	5	**32**	Fill	S-1: Black mf SAND, some f Gravel, some Silt; frequent cinder and slag fragments (Moist) (Fill)	52
	0' - 2'	Sample Recovery =			12				
	S - 2	5	3	2	3	**5**		S-2: Same as S-1 (Moist) (Fill)	
	2' - 4'	Sample Recovery =			10		4ft		
	S - 3	2	2	WOH	WOH	**2**	Stratum A/B	S-3: No Recovery	
	4' - 6'	Sample Recovery =			2				
	S - 4	WOH	1	3	3	**4**	7 ft	S-4: Reddish Brown CLAY & SILT, some (-) f Sand (Moist)	
	6' - 8'	Sample Recovery =			4				
	S - 5	4	3	4	5	**7**		S-5: Reddish Brown CLAY & SILT and mf Sand (Moist to Wet)	
	8' - 10'	Sample Recovery =			10				
10							Stratum C		42
	S - 6	WOH	WOH	WOH	1	**0**		S-6: No Recovery	
	13' - 15'	Sample Recovery =			0				
							17 ft	S-7: Top 4": Reddish Brown mf GRAVEL, some (+) cmf Sand, trace Clayey Silt (Wet)	
							Stratum D 19ft	Bottom 4": Yellowish Brown mf Sand and Silt, little mf Gravel (Wet)	
	S - 7	4	4	16	31	**20**			
20	18' - 20'	Sample Recovery =			8		Stratum E 21ft		32
							AR	Auger Refusal	
								Notes: 1). Auger Refusal at 21 feet.	
30									22
40									12

Location Information

Elevation (ft): 52

Groundwater Data (ft)

Encountered (ft):	13
Elevation, Encount. (ft):	39
At Completion (ft):	5.5
Time = 24 hrs (ft):	5.5

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 30, 2018
Date Completed:	May 30, 2018

Comments:

TEST BORING LOG TB-2

Project Information

Project Name: 601 Washington
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Subsurface Profile: Profile Stratum	Subsurface Profile: Visual Description / Comments	Elev. (ft)
0									49.5
	S - 1	3	5	2	4	**7**	Fill	S-1: Black Clayey SILT, some (-) mf Gravel, little (+) cmf Sand; occasional brick fragments (Moist) (Fill)	
	0' - 2'	Sample Recovery =			10				
	S - 2	3	2	3	2	**5**		S-2: Black mf GRAVEL and cmf Sand, trace Silt; frequent cinders and slag (Moist) (Fill)	
	2' - 4'	Sample Recovery =			8		4 ft		
	S - 3	2	1	WOH	WOH	**1**	Stratum A/B	S-3: Black Clay & Silt, some (-) f Sand, little c Gravel, trace organics (Moist)	
	4' - 6'	Sample Recovery =			4				
	S - 4	WOH	1	2	3	**3**	7ft	S-4: Brown CLAY & SILT, some (-) mf Sand (Wet)	
	6' - 8'	Sample Recovery =			3				
	S - 5	1	3	3	5	**6**		S-5: Reddish Brown CLAY & SILT, some (-) f Sand; frequent redox (Wet)	
10	8' - 10'	Sample Recovery =			18		Stratum C		39.5
							11.5ft		
	S - 6	10	15	22	30	**37**	Stratum D	S-6: Reddish Brown mf GRAVEL, some cmf Sand, little Silt & Clay (Wet)	
	13' - 15'	Sample Recovery =			8				
							16.5ft		
	S - 7	7	12	17	10	**29**		S-7: Brown Silty CLAY, some (+) cmf Gravel, little cmf Sand (Wet)	
20	18' - 20'	Sample Recovery =			6		Stratum C		29.5
							23ft	Auger Refusal	
							RC-1	Notes: 1). RC # 1 : Slightly Weathered, Hard, Slightly to Moderately Fractured, Thin Bedded Limestone	
	Rock Core # 1	RR= 100%							
	23' - 27'	RQD=23%					27ft		
							EOTB		
30									19.5
40									9.5

Location Information

Elevation (ft): 49.5

Groundwater Data (ft)

Encountered (ft):	6
Elevation, Encount. (ft):	43.5
At Completion (ft):	5
Time = 0 hrs (ft):	5

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 31, 2018
Date Completed:	May 31, 2018

Comments:

TEST BORING LOG TB-3

Project Information

Project Name: 601 Washington
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Subsurface Profile: Profile Stratum	Subsurface Profile: Visual Description / Comments	Elev. (ft)
0									49.5
	S - 1	5	8	14	9	**22**	Fill	S-1: Top 8": Gray mf GRAVEL, some (+) cmf Sand, trace Silt (Moist to Wet) (Fill) Bottom 8": Black SILT and cmf Sand, little (+) f Gravel (Fill) (Moist)	
	0' - 2'	Sample Recovery =			16				
	S - 2	3	3	3	3	**6**			
	2' - 4'	Sample Recovery =			1		4 ft		
	S - 3	1	WOH	WOH	WOH	**0**	Stratum A/ B	S-2: Black cmf Sand, little (+) Gravel, trace Silt (Moist) (Fill)	
	4' - 6'	Sample Recovery =			0		6ft	S-3: No Recovery	
	S - 4	2	2	3	13	**5**		S-4: Top 4": Reddish Brown CLAY & SILT, little (-) f Sand (Wet) Bottom 8": Reddish Brown CLAY & SILT and f Sand (Moist to Wet)	
	6' - 8'	Sample Recovery =			12				
	S - 5	18	11	10	15	**21**			
	8' - 10'	Sample Recovery =			8				
10							Stratum C	S-5: Reddish Brown cmf SAND, some (-) f Gravel, little Silt (Moist to Wet)	39.5
	S - 6	4	13	13	8	**26**		S-6: Reddish Brown CLAY & SILT, some mf Gravel, little cmf Sand (Wet)	
	13' - 15'	Sample Recovery =			4				
							16.5ft		
	S - 7	15	22	35	17	**57**	Stratum D	S-7: Reddish Brown SAND, some cmf Gravel, trace Silt (Wet)	
20	18' - 20'	Sample Recovery =			12				29.5
							21.5 ft		
	S - 8	3	5	6	9	**11**	Stratum C	S-8: Reddish Brown CLAY & SILT, some mf Gravel, little cmf Sand (Wet)	
	23' - 25'	Sample Recovery =			5				
							26.5ft		
	S - 9	4	4	7	10	**11**		S-9: Yellowish Brown Clayey SILT, some mf (+) Sand, trace f Gravel (Wet)	
30	28' - 30'	Sample Recovery =			20				19.5
	S - 10	5	6	7	10	**13**	Stratum E	S-10:Yellowish Brown Clayey SILT and mf(+) Sand, some (-) mf Gravel (Wet)	
	33' - 35'	Sample Recovery =			5				
	S - 11	7	6	3	5	**9**		S-11:Yellowish Brown cmf(+) SAND, some mf(+) Gravel, little (-) Silt & Clay (Wet)	
40	38' - 40'	Sample Recovery =			6				9.5

Location Information

Elevation (ft): 49.5

Groundwater Data (ft)

Encountered (ft):	6
Elevation, Encount. (ft):	43.5
At Completion (ft):	NA
Time = 24 hrs (ft):	3

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 29, 2018
Date Completed:	May 29, 2018

Comments:

TEST BORING LOG TB-3

Project Information

Project Name: 601 Washington
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Subsurface Profile: Profile Stratum	Visual Description / Comments	Elev. (ft)
40							Stratum E	S-12:Yellowish Brown cmf SAND, some Silt, little mf mf Gravel (Wet)	9.5
	S - 12	6	34	45	50/3	**79**	44.8ft	End of Test Boring	
	43' - 44.8'	Sample Recovery =			6		EOTB		
50									-0.5
60									-10.5
70									-20.5
80									-30.5

Location Information

Elevation (ft):	49.5

Groundwater Data (ft)

Encountered (ft):	6
Elevation, Encount. (ft):	43.5
At Completion (ft):	NA
Time = 24 hrs (ft):	3

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 29, 2018
Date Completed:	May 29, 2018

Comments:

TEST BORING LOG TB-4

Project Information

Project Name: 601 Washington
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Subsurface Profile: Profile Stratum	Visual Description / Comments	Elev. (ft)
0	S - 1	11	16	12	11	**28**		S-1: Black mf GRAVEL anf cmf Sand, little (+) Silt; frequent cinder and slag fragments (Moist) (Fill)	52
	0' - 2'	Sample Recovery =			12				
	S - 2	5	5	4	4	**9**	Fill	S-2: Same as S-1 (Moist) (Fill)	
	2' - 4'	Sample Recovery =			13		4 ft		
	S - 3	WOH	WOH	WOH	WOH	**0**	Stratum A/ B	S-3: Reddish Brown CLAY & SILT, little (-) f Sand (Moist)	
	4' - 6'	Sample Recovery =			6		7 ft		
	S - 4	WOH	WOH	2	4	**2**	Stratum C	S-4: Reddish Brown CLAY & SILT, some (-) mf(+) Sand, little f Gravel (Moist to Wet)	
	6' - 8'	Sample Recovery =			18		8ft		
	S - 5	12	15	14	22	**29**		S-5: Reddish Brown cmf SAND, some (+) mf Gravel, trace Clayey Silt (Wet)	
10	8' - 10'	Sample Recovery =			15				42
	S - 6	3	8	12	13	**20**	Stratum D	S-6: Reddish Brown cmf GRAVEL, some cmf Sand, trace Silt; occasional Cobbles (Wet)	
	13' - 15'	Sample Recovery =			5				
	S - 7	6	10	11	14	**21**		S-7: No Recovery	
20	18' - 20'	Sample Recovery =			0				32
							21.5ft		
	S - 8	16	25	40	33	**65**		S-8: Yellowish Brown cmf SAND, little Silt, little (-) mf Gravel (Moist)	
	23' - 25'	Sample Recovery =			12				
	S - 9	8	9	45	50/4	**54**	Stratum E	S-9: Same as S-8 (Moist)	
30	28' - 29.8'	Sample Recovery =			10				22
	S - 10	11	13	17	26	**30**		S-10:Yellowish Brown cmf SAND and Silt, trace f Gravel (Moist)	
	33' - 35'	Sample Recovery =			12				
	S - 11	10	20	41	50/4	**61**		S-11:Yellowish Brown cmf Sand and Silt, little f Gravel (Moist to Wet)	
40	38' - 39.8'	Sample Recovery =			12		39.8ft		12
							EOTB	End of Test Boring	

Location Information

Elevation (ft):	52

Groundwater Data (ft)

Encountered (ft):	8
Elevation, Encount. (ft):	44
At Completion (ft):	5
Time = 24 hrs (ft):	5

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 30, 2018
Date Completed:	May 30, 2018

Comments:

TEST BORING LOG TB-5

Project Information

Project Name: 601 Washington
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Subsurface Profile: Profile Stratum	Subsurface Profile: Visual Description / Comments	Elev. (ft)
0	S - 1	3	5	2	6	**7**	Fill	S-1: Black/Brown Clayey SILT, some cmf GRavel, little (+) cmf Sand (Moist) (Fill)	50.5
	0' - 2'	Sample Recovery =			6				
	S - 2	3	4	4	3	**8**		S-2: Dark Brown SILT & CLAY, some cmf Gravel, little cmf Sand; occasional brick fragments (Moist) (Fill)	
	2' - 4'	Sample Recovery =			8		4 ft		
	S - 3	2	WOH	WOH	WOH	**0**	Stratum A/B	S-3: No Recovery	
	4' - 6'	Sample Recovery =			0		5.25 ft		
	S - 4	2	8	12	21	**20**	Stratum C 7 ft	S-4: Top 8": Reddish Brown CLAY & SILT, some mf(+) Sand, little mf Gravel (Moist to Wet) Bottom 8": Reddish Brown cmf SAND, some cmf Gravel, little (-) Clayey Silt (Moist to Wet)	
	6' - 8'	Sample Recovery =			16				
	S - 5	17	20	18	23	**38**		S-5: Brown mf GRAVEL, some cmf Sand, trace Silt (Wet)	
10	8' - 10'	Sample Recovery =			18				40.5
							Stratum D		
	S - 6	12	8	8	11	**16**		S-6: Same as S-5 (Wet)	
	13' - 15'	Sample Recovery =			13				
							16.5ft		
	S - 7	WOH	7	8	6	**15**		S-7: Yellowish Brown SILT, some cmf Sand, little (-) f Gravel (Moist)	
20	18' - 20'	Sample Recovery =			12				30.5
	S - 8	5	22	30	31	**52**	Stratum E	S-8: Same as S-7 (Moist)	
	23' - 25'	Sample Recovery =			12				
	S - 9	8	23	38	50/4	**61**		S-9: Same as S-7 (Moist)	
	28' - 29.8'	Sample Recovery =			12		29.8ft		
30							EOTB	End of Test Boring	20.5
40									10.5

Location Information

Elevation (ft):	50.5

Groundwater Data (ft)

Encountered (ft):	8
Elevation, Encount. (ft):	42.5
At Completion (ft):	4
Time = 24 hrs (ft):	3

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 29, 2018
Date Completed:	May 29, 2018

Comments:

TEST BORING LOG TB-6

Project Information

Project Name: 601 Washington
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Subsurface Profile: Profile Stratum	Subsurface Profile: Visual Description / Comments	Elev. (ft)
0	S - 1	10	6	3	2	**9**	Fill	S-1: Black cmf(+) GRAVEL, some (+) cmf Sand, little (+) Silt; frequent slag and cinders; occasional Cobbles (Moist) (Fill)	52
	0' - 2'	Sample Recovery =			15				
	S - 2	2	5	4	3	**9**		S-2: Same as S-1 (Moist)	
	2' - 4'	Sample Recovery =			12				
	S - 3	5	5	2	3	**7**		S-3: No Recovery	
	4' - 6'	Sample Recovery =			0				
	S - 4	5	9	37	12	**46**		S-4: Red mf GRAVEL, little (+) cmf Sand, trace Silt (Brick Fragments) (Wet) (Fill)	
	6' - 8'	Sample Recovery =			2		8ft		
	S - 5	4	WOH	2	4	**2**	Stratum B	S-5: Reddish Brown CLAY & SILT, trace (+) f Sand; occasional Cobbles (Wet)	
10	8' - 10'	Sample Recovery =			12				42
							11.5ft		
	S - 6	7	17	17	17	**34**	Stratum D	S-6: Reddish Brown cmf GRAVEL, some cmf Sand, trace Clayey Silt; occasional Cobbles (Wet)	
	13' - 15'	Sample Recovery =			20				
							16.5ft		
	S - 7	5	5	3	5	**8**		S-7: Yellowish Brown SILT, some mf(+) Sand, little friable rock fragments (Moist)	
20	18' - 20'	Sample Recovery =			10				32
	S - 8	15	36	23	40	**59**	Stratum E	S-8: Yellowish Brown cmf SAND, some Silt, little mf Gravel (Wet)	
	23' - 25'	Sample Recovery =			6				
							28.2ft	S-9: Same as S-8 (Wet)	
	S - 9	50/3				**50/3**	EOTB		
30	28' - 28.2'	Sample Recovery =			3			End of Test Boring	22
								Notes: 1). Auger grinding from 0-13 feet	
40									12

Location Information

Elevation (ft): 52

Groundwater Data (ft)

Encountered (ft): 6
Elevation, Encount. (ft): 46
At Completion (ft): 5.5
Time = 24 hrs (ft): NA

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 31, 2018
Date Completed:	May 31, 2018

Comments:

TEST BORING LOG TB-7

Project Information

Project Name: 601 Washington
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Subsurface Profile: Profile Stratum	Subsurface Profile: Visual Description / Comments	Elev. (ft)
0									49.7
	S - 1	4	7	9	10	**16**		S-1: Black cmf SAND, some mf Gravel, little Silt; frequent cinder and slag fragments (Moist) (Fill)	
	0' - 2'	Sample Recovery =			16				
	S - 2	6	16	17	13	**33**	Fill	S-2: Same as S-1; Petro Odor (Moist)	
	2' - 4'	Sample Recovery =			18		4 ft		
	S - 3	2	WOH	WOH	WOH	**0**	Stratum A	S-3: Same as S-1; occasional Cobbles (Wet)	
	4' - 6'	Sample Recovery =			8		6ft		
	S - 4	1	1	WOH	WOH	**1**		S-4: Black CLAY & SILT, trace (+) organics, trace f Sand; occasional Cobbles (Wet)	
	6' - 8'	Sample Recovery =			12				
	S - 5	WOH	WOH	WOH	2	**0**	Stratum B	S-5: No Recovery	
	8' - 10'	Sample Recovery =			0				
10									39.7
							11.5ft		
	S - 6	8	35	23	26	**58**		S-6: Reddish Brown cmf GRAVEL, some (+) cmf Sand, trace (-) Clayey SILT; occasional Cobbles (Wet)	
	13' - 15'	Sample Recovery =			12		Stratum D		
							16.5 ft		
	S - 7	1	2	3	4	**5**		S-7: Light Reddish Brown SILT & CLAY, trace f Sand (Moist to Wet)	
	18' - 20'	Sample Recovery =			3				
20									29.7
	S - 8	4	3	7	5	**10**		S-8: Yellowish Brown SILT and cmf SAND, trace (+) mf Gravel (Wet)	
	23' - 25'	Sample Recovery =			8				
	S - 9	WOH	WOH	WOH	WOH	**0**	Stratum E	S-9: No Recovery	
	28' - 30'	Sample Recovery =			0				
30	S - 10	50/1				**50/1**		S-10:Gray mf GRAVEL Rock Fragments	19.7
	30' - 30.1'	Sample Recovery =			1				
	S - 11	5	7	5	7	**12**		S-11:Yellowish Brown SILT, little mf(+) Sand, trace f Gravel (Moist to Wet)	
	33' - 35'	Sample Recovery =			8			S-12: Same as S-11 (Moist to Wet)	
	S - 12	4	15	13	10	**28**		End of Test Boring	
	38' - 40'	Sample Recovery =			12		40ft	Notes: 1). Augered to 50 feet; no sampling	
40							EOTB		9.7

Location Information

Elevation (ft): 49.7

Groundwater Data (ft)

Encountered (ft):	4
Elevation, Encount. (ft):	45.7
At Completion (ft):	5
Time = 24 hrs (ft):	5

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 29, 2018
Date Completed:	May 29, 2018

Comments:

TEST BORING LOG TB-8

Project Information

Project Name: 601 Washington
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Profile Stratum	Visual Description / Comments	Elev. (ft)
0	S - 1	5	15	5	7	**20**	Fill	S-1: Black/Gray Clayey SILT, some mf Sand, little mf Gravel (Moist) (Fill)	50.5
	0' - 2'	Sample Recovery =			20				
	S - 2	7	7	6	5	**13**		S-2: Black cmf SAND, little (-) f Gravel, trace Silt (Moist) (Fill)	
	2' - 4'	Sample Recovery =			2		4ft		
	S - 3	4	3	3	5	**6**		S-3: Dark Reddish Brown CLAY & SILT, trace (+) f Sand (Moist)	
	4' - 6'	Sample Recovery =			8			S-4: Reddish Brown CLAY & SILT, little mf Sand (Moist)	
	S - 4	2	2	2	2	**4**			
	6' - 8'	Sample Recovery =			16		Stratum C		
	S - 5	3	4	5	14	**9**		S-5: Same as S-4 (Moist)	
	8' - 10'	Sample Recovery =			14				
10									40.5
							11.5ft		
	S - 6	35	32	35	21	**67**		S-6: Brown cmf GRAVEL, some cmf Sand, little Silt; frequent Cobbles (Wet)	
	13' - 15'	Sample Recovery =			12				
							Stratum D	S-7: Top 8": Same as S-6 (Wet) Bottom 3": Gray cmf GRAVEL, little cmf Sand, trace (-) Silt (Moist)	
	S - 7	5	13	41	50/4	**54**			
	18' - 19.8'	Sample Recovery =			11				
20									30.5
							22ft		
							AR	Auger Refusal	
								Notes: 1). Auger Refusal at 22 feet.	
30									20.5
40									10.5

Location Information

Elevation (ft):	50.5

Groundwater Data (ft)

Encountered (ft):	13
Elevation, Encount. (ft):	37.5
At Completion (ft):	11
Time = 24 hrs (ft):	5

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 29, 2018
Date Completed:	May 29, 2018

Comments:

TEST PIT LOG TP-1

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Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0						51
					Dark Reddish Brown SILT & CLAY, some (+) cmf Gravel, little (+) cmf Sand; frequent plastic, metal, brick fragments and biodegradable waste; occasional cobbles and boulders (Moist)	
					(5YR 3/3 Loam to Silty Clay Loam, Single Grain to Weak Medium Subangular Blocky, Loose to Firm)	
					(Fill)	
5						46
					6.0ft	
					End of Test Pit	
					Note: Infiltration testing not performed due to the composition of the existing fill materials.	
10						41
15						36
20						31

Location Information

Elevation (ft.):	51

Groundwater Data (ft)

Depth Encountered(ft):	NE
Elevation(ft):	NA
Perched Water Depth:	NE
Perched Water Elevation:	NA

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 5, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-2

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Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Black/Gray cmf SAND, some cmf Gravel, little (+) Silt; frequent brick, slag and coal fragments, occasional cobbles (Moist) (5YR 3/3 Gravelly Loam to Gravelly Silty Clay Loam, Single Grain to Weak Medium Subangular Blocky, Loose to Firm, Clear/Wavey Boudary) (Fill)	53
					3.0ft	
	3.3	0.25	12+	1	3.3ft Black CLAY & SILT, trace organics, trace f Sand (Moist to Wet) (Stratum A)	
5					Reddish Brown CLAY & SILT, little (-) f Sand (Very Moist to Wet) (5YR 4/3 Silt Loam, Massive, Very Friable, Clear/Wavey Boundary) (Stratum B)	48
					5.0ft	
					Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist) (5YR 4/4 Silty Clay Loam, Moderate Medium Subangular Blocky, Firm, Clear/Boundary) (Stratum C)	
					7.5ft	
10					Reddish Brown cmf GRAVEL and cmf Sand, trace (+) Silt (Wet) (5YR 4/4 Extremely Cobbley Loamy Sand, Single Grain) (Stratum D)	43
					10.0ft	
					End of Test Pit Note: Infiltration testing not performed due to perched water (seepage) at 5 feet below grade.	
15						38
20						33

Location Information

Elevation (ft.):	52.5

Groundwater Data (ft)

Depth Encountered (ft.):	7.5
Elevation (ft.):	45
Perched Water Depth:	5 (Seepage)
Perched Water Elevation:	47.5

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 5, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP/IT-3

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Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					0.2ft — Black Clayey SILT, some cmf Sand, little (+) cmf Gravel (Moist) (10YR 2/1 Gravelly Silt Loam, Moderate Medium Granular, Very Friable, Abrupt/Smooth Boundary) (Fill)	50
					3.0ft	
	3	0.25	12+	1	3.5ft — Dark Grayish Brown cmf SAND, some (+) cmf Gravel, trace Silt; frequent brick, metal, coal, slag fragments (Moist) (10YR 4/2 Very Gravelly Loamy Sand, Single Grain, Very Friable, Clear/Boundary) (Fill)	
	4.25	0	12+	WOH		
5					6.0ft — Black CLAY & SILT, trace organics, trace f Sand (Moist to Wet) (Stratum A)	45
					8.0ft — Reddish Brown CLAY & SILT, little f Sand (Very Moist) (5YR 4/3 Silty Clay Loam, Massive, Very Friable, Clear/Wavey Boundary) (Stratum B)	
					9.0ft — Reddish Brown CLAY & SILT, little (+) f Sand (Moist) (5YR 4/4 Silty Clay, Moderate Medium Subangular Blocky, Firm, Clear/Wavey Boundary) (Stratum C)	
10					Reddish Brown cmf GRAVEL and cmf Sand, trace (+) Silt (Wet) (5YR 4/4 Extremely Cobbley Loamy Sand, Single Grain) (Stratum D)	40
					End of Test Pit Note: Infiltration testing peformed at 4.25 feet	
15						35
20						30

Location Information

Elevation (ft.):	50.1

Groundwater Data (ft)

Depth Encountered (ft.):	7.5
Elevation (ft.):	42.6
Perched Water Depth:	NE
Perched Water Elevation:	NA

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 5, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP/IT-4

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Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Brown Clayey SILT, some cmf Gravel, some cmf Sand; frequent brick fragments (Moist) (10YR 4/3 Very Gravelly Loam Weak Medium Subangular Blocky, Firm,Clear/Wavey Boudary) (Fill)	52
					3.0ft	
					Black cmf SAND, some (+) cmf Gravel, trace (+) Silt; frequent brick, coal, metal fragments and biodegradable waste; occasional cobbles and boulders (Moist) (10YR 2/1 Very Gravelly Sandy Loam, Single Grain, Loose, Clear/Wavey Boundary) (Fill)	
5					5.5ft	47
					6.5ft	
	6.5	.5	12+	1	Black CLAY & SILT, trace organics, trace f Sand (Very Moist) (Stratum A)	
					8.0ft	
					Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist) (5YR 4/4 Silty Clay Loam, Moderate Medium Subangular Blocky, Firm, Clear/Boundary) (Stratum B)	
10					10.0ft	42
					11.5ft	
					Reddish Brown SILT & CLAY, little (-) f Sand (Very Moist) (5YR 4/3 Silt Loam, Massive, Very Friable, Clear/Wavey Boundary) (Stratum C)	
15					Reddish Brown cmf GRAVEL and cmf Sand, trace (+) Silt (Wet) (5YR 4/4 Extremely Cobbley Loamy Sand, Single Grain) (Stratum D)	37
					End of Test Pit Note: Infiltration testing performed at 6.5 feet	
20						32

Location Information

Elevation (ft.):	52.3

Groundwater Data (ft)

Depth Encountered (ft.):	10
Elevation (ft.):	42.3
Perched Water Depth:	NE
Perched Water Elevation:	NA

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 5, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP/IT-5

Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Black cmf SAND, some mf Gravel, little Silt; frequent brick, coal, slag, metal fragments (Moist)	50
					(10YR 2/1 Very Gravelly Sandy Loam to Loam, Single Grain to Weak Medium Subangular Blocky, Loose to Friable, Clear/Wavey Boudary) (Fill)	
					3.5ft	
					4.0ft Black CLAY & SILT, trace organics, trace f Sand (Moist to Wet) (Stratum A)	
5						45
					Reddish Brown CLAY & SILT, little (-) f Sand (Very Moist) (5YR 4/3 Silt Loam, Massive, Very Friable, Clear/Wavey Boundary) (Stratum B)	
	6.5	0.5	12+	1	7.0ft	
					Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist) (5YR 4/4 Silty Clay Loam, Moderate Medium Subangular Blocky, Firm, Clear/Boundary) (Stratum C)	
					9.0ft	
10						40
					Reddish Brown cmf GRAVEL, some cmf Sand, trace (+) Silt (Wet) (5YR 4/4 Extremely Cobbley Loamy Sand, Single Grain) (Stratum D)	
					11.0ft	
					End of Test Pit Note: Infiltration testing performed at 4.3 feet	
15						35
20						30

Location Information

Elevation (ft.):	50.1

Groundwater Data (ft)

Depth Encountered (ft.):	8.7
Elevation (ft.):	41.4
Perched Water Depth:	NE
Perched Water Elevation:	NA

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-6

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Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

Depth (ft)	Sample Number (depth, ft)	Test Results PP (tsf)	HP (in.)	DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Black cmf SAND, some mf Gravel, little (+) Silt; frequent brick, coal, slag, metal fragments (Moist) (10YR 2/1 Very Gravelly Sandy Loam to Loam, Single Grain to Weak Medium Subangular Blocky, Loose to Friable, Clear/Wavey Boundary) (Fill)	51
5					5.5ft	46
	6	0.25	12+	1	6.0ft Black CLAY & SILT, trace organics, trace f Sand (Moist to Wet) (Stratum A)	
					7.5ft Reddish Brown CLAY & SILT, little (-) f Sand (Very Moist) (5YR 4/3 Silt Loam, Massive, Very Friable, Clear/Wavey Boundary) (Stratum B)	
10					10.0ft Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist) (5YR 4/4 Silty Clay Loam, Moderate Medium Subangular Blocky, Firm, Clear/Boundary) (Stratum C)	41
					12.0ft Reddish Brown cmf GRAVEL and cmf Sand, trace (+) Silt (Wet) (5YR 4/4 Extremely Cobbley Loamy Sand, Single Grain) (Stratum D)	
15					End of Test Pit Note: Infiltration testing not performed due to perched water (rapid seepage) encountered at 5.5 feet.	36
20						31

Location Information

Elevation (ft.):	50.5

Groundwater Data (ft)

Depth Encountered (ft.):	10
Elevation (ft.):	40.5
Perched Water Depth:	5.5 (Rapid Seepage)
Perched Water Elevation:	45

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-7

Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Black/Gray cmf SAND, some cmf Gravel, little (-) Silt; frequent brick, slag, coal fragments, occasional cobbles (Moist) (Fill)	52
					4.0ft	
	4	0.25	12+	1	4.4ft Black CLAY & SILT, trace organics, trace f Sand (Moist to Wet) (Stratum A)	
5						47
					Reddish Brown SILT & CLAY, little (-) f Sand (Very Moist to Wet) (Stratum B)	
					7.5ft	
					Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist) (Stratum C)	
					9.0ft	
10						42
					10.5ft Reddish Brown cmf GRAVEL, some cmf Sand, trace (+) Clayey Silt (Wet) (Stratum D)	
					End of Test Pit	
15						37
20						32

Location Information

Elevation (ft.):	51.5

Groundwater Data (ft)

Depth Encountered (ft.):	9
Elevation (ft.):	42.5
Perched Water Depth:	7 (Seepage)
Perched Water Elevation:	44.5

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-8

Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0						53
					Black/Gray cmf SAND, some cmf Gravel, little (-) Silt; frequent brick, slag, coal fragments, occasional cobbles (Moist)	
					(Fill)	
5						48
					6.0ft	
					6.5ft Black CLAY & SILT, trace organics, trace f Sand (Moist to Wet) (Stratum A)	
					8.0ft Reddish Brown SILT & CLAY, little (-) f Sand (Very Moist to Wet) (Stratum B)	
10						43
					Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist)	
					11.0ft (Stratum C)	
					12.0ft	
					Reddish Brown cmf GRAVEL, some cmf Sand, trace (+) Clayey Silt (Wet)	
					(Stratum D)	
15					End of Test Pit	38
20						33

Location Information

Elevation (ft.):	53

Groundwater Data (ft)

Depth Encountered (ft.):	11
Elevation (ft.):	42
Perched Water Depth:	NE
Perched Water Elevation:	NA

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-9

Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number (depth, ft)	Test Results PP (tsf)	Test Results HP (in.)	Test Results DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Black cmf SAND, some cmf Gravel, little (-) Silt; frequent brick, slag, coal fragments, occasional cobbles (Moist) (Fill)	52
5					6.0ft Black CLAY & SILT, trace (+) organics, trace f Sand (Moist to Wet) (Stratum A) 6.5ft 7.0ft Reddish Brown CLAY & SILT, little (-) f Sand (Very Moist to Wet) (Stratum B)	47
10					9.0ft Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist) (Stratum C)	42
15					Reddish Brown cmf GRAVEL, some cmf Sand, trace (+) Clayey Silt (Wet) 12.0ft (Stratum D) End of Test Pit	37
20						32

Location Information

Elevation (ft.):	51.5

Groundwater Data (ft)

Depth Encountered (ft.):	10
Elevation (ft.):	41.5
Perched Water Depth:	6
Perched Water Elevation:	45.5

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-10

Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number (depth, ft)	Test Results PP (tsf)	Test Results HP (in.)	Test Results DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Brown Clayey SILT , little (+) cmf GRAVEL, little (-) cmf Sand:, occasional cobbles (Moist) (Fill)	53
					1.8ft — Black/Gray cmf SAND, some cmf Gravel, little (-) Silt; frequent brick, slag, coal fragments, occasional cobbles (Moist) (Fill)	
					3.8ft — 4.6ft — Black CLAY & SILT, trace(+) organics, trace f Sand (Moist to Wet) (Stratum A)	
5	5.5	0.5	12+	1		48
					Reddish Brown CLAY & SILT, some (-) f Sand (Very Moist to Wet) (Stratum B)	
					7.5ft — 8.5ft — Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist) (Stratum C)	
10						43
					Reddish Brown cmf GRAVEL, some cmf Sand, trace (+) Clayey Silt (Wet) (Stratum D)	
					12.0ft — End of Test Pit	
15						38
20						33

Location Information

Elevation (ft.):	52.5

Groundwater Data (ft)

Depth Encountered (ft.):	8.5
Elevation (ft.):	44
Perched Water Depth:	NE
Perched Water Elevation:	NA

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-11

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Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

Depth (ft)	Sample Number (depth, ft)	Test Results PP (tsf)	HP (in.)	DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0						50
					Black/Gray cmf SAND, some cmf Gravel, little (-) Silt; frequent brick, slag, coal fragments, occasional cobbles (Moist) (Fill)	
					5.0ft	
5						45
	5.7	2	12+	1	5.7ft Black CLAY & SILT, trace (+) organics, trace f Sand (Moist to Wet) (Stratum A)	
					Reddish Brown CLAY & SILT, little (-) f Sand (Very Moist to Wet) (Stratum B)	
	7.5	2.5	2	9	7.5ft	
					Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel with layers of Gray Silty CLAY, some cmf Sand (Moist) (Stratum C)	
10					9.0ft	40
					Reddish Brown cmf GRAVEL, some cmf Sand, trace (+) Clayey Silt (Wet) (Stratum D)	
					12.5ft	
					End of Test Pit	
15						35
20						30

Location Information

Elevation (ft.):	50

Groundwater Data (ft)

Depth Encountered (ft.):	9
Elevation (ft.):	41
Perched Water Depth:	7.5
Perched Water Elevation:	42.5

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-12

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Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Black/Gray cmf SAND, some cmf Gravel, little (-) Silt; frequent brick, slag, coal fragments, occasional cobbles (Moist) (Fill)	49
					4.0ft	
5					4.5ft Black CLAY & SILT, trace (+) organics, trace f Sand (Moist to Wet) (Stratum A)	44
					5.5ft Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist) (Stratum B)	
10					End of Test Pit	39
15						34
20						29

Location Information

Elevation (ft.):	48.5

Groundwater Data (ft)

Depth Encountered (ft.):	NE
Elevation (ft.):	NA
Perched Water Depth:	4
Perched Water Elevation:	44.5

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-13

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Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0						49
					0.6ft — Yellow Brown SILT & CLAY, some cmf Gravel, little (+) cmf Sand: occasional cobbles (Moist) (Fill)	
					2.0ft — Black/Gray cmf SAND, some cmf Gravel, little (-) Silt; frequent brick, slag, coal fragments, occasional cobbles (Moist) (Fill)	
					2.5ft — Black CLAY & SILT, trace (+) organics, trace f Sand (Moist to Wet) (Stratum A)	
5					5ft — Reddish Brown CLAY & SILT, little (-) f Sand (Very Moist) (Stratum B)	44
					End of Test Pit	
10						39
15						34
20						29

Location Information

Elevation (ft.):	49

Groundwater Data (ft)

Depth Encountered (ft.):	NE
Elevation (ft.):	NA
Perched Water Depth:	5.5
Perched Water Elevation:	43.5

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-14

Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number (depth, ft)	Test Results PP (tsf)	Test Results HP (in.)	Test Results DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Black/Gray cmf SAND, some cmf Gravel, little (-) Silt; frequent brick, slag, coal fragments, occasional cobbles (Moist) (Fill)	50
					2.0ft	
					2.5ft Black CLAY & SILT, trace (+) organics, trace f Sand (Moist to Wet) (Stratum A)	
	2.5	2	3	6		
5					Reddish Brown SILT & CLAY, little (-) f Sand (Very Moist) (Stratum C)	45
					6.5ft	
					Reddish Brown cmf GRAVEL, some cmf Sand, trace (+) Clayey Silt (Wet) (Stratum D)	
10					10.5ft	40
					End of Test Pit	
15						35
20						30

Location Information

Elevation (ft.):	50

Groundwater Data (ft)

Depth Encountered (ft.):	6.5
Elevation (ft.):	43.5
Perched Water Depth:	2
Perched Water Elevation:	48

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

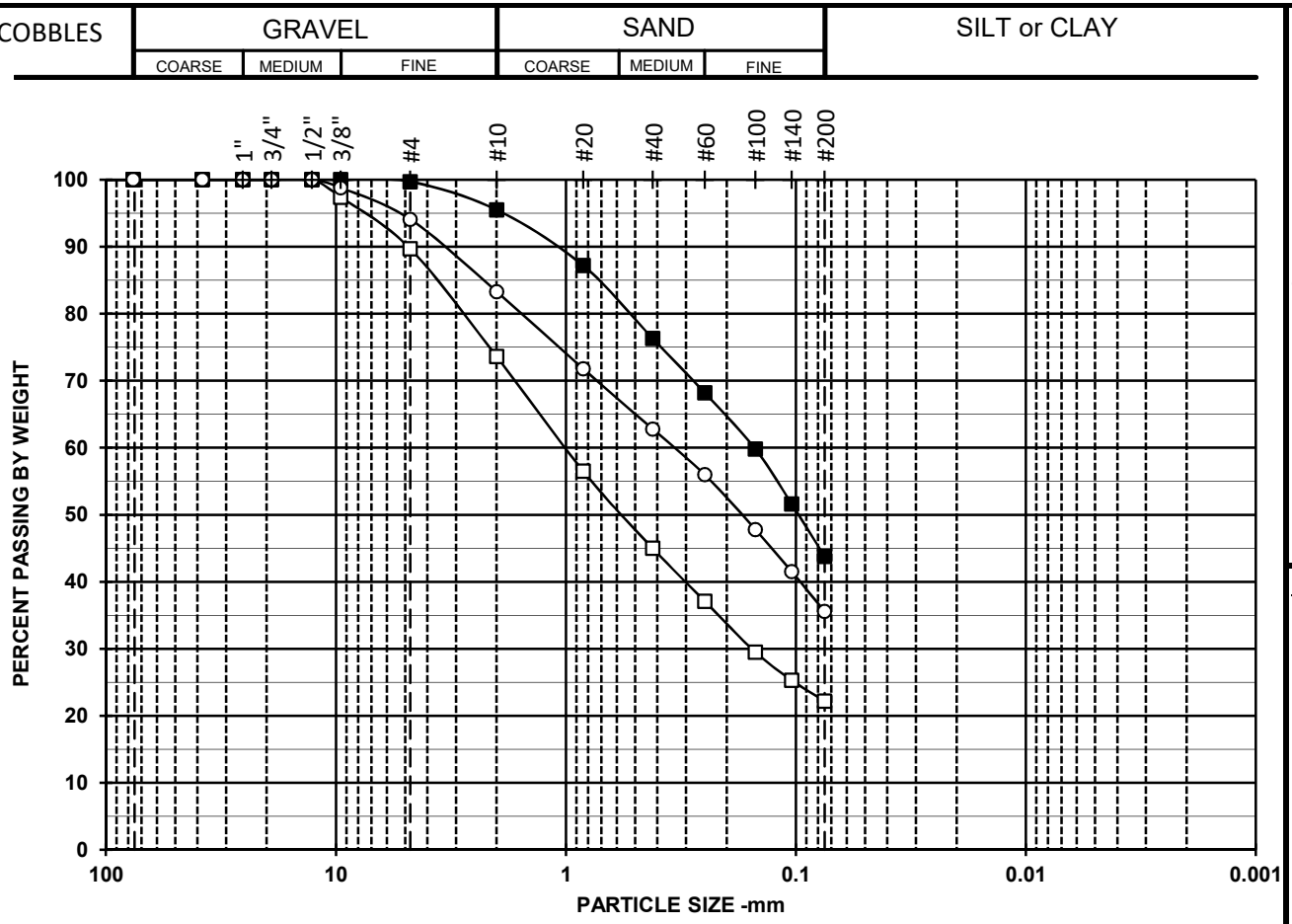
Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

APPENDIX B
LABORATORY TEST DATA

Maser Consulting, P.A. #16001030A
601 Washington Street
LABORATORY TESTING DATA SUMMARY

BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS							REMARKS
			WATER CONTENT (%)	LIQUID LIMIT (-)	PLASTIC LIMIT (-)	PLAS. INDEX (-)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	ORGANIC CONTENT (burnoff) (%)	
TB-1	S-1	0-2	8.9				SM	22.2		
TB-4	S-10	33-35	18.8				SM	43.8		
TB-4	S-11	38-40	16.8				SM	35.6		
TB-5	S-6	11-13	7.7				GP-GM	6.5		
TB-7	S-4	6-8	53.5						10.0	
TB-8	S-4	6-8	23.9	32	18	14	CL	84.2		
TB-8	S-6	13-15	7.4				GP-GM	10.3		
TP-3	S-1	7	18.1							
TP-10	S-1	6	31.8	38	20	18	CL	75.2		
TP-14	S-1	4	25.9							

Note: (1) USCS symbol based on visual observation and Sieve and Atterberg limits reported.



Symbol	□	■	○
Boring	TB-1	TB-4	TB-4
Sample	S-1	S-10	S-11
Depth	0-2	33-35	38-40
% +3"	0.0	0.0	0.0
% Gravel	26.4	4.5	16.7
% SAND	51.4	51.7	47.7
%C SAND	22.5	13.1	15.6
%M SAND	14.0	14.2	11.7
%F SAND	14.9	24.4	20.4
% FINES	22.2	43.8	35.6
D_{100} (mm)	12.700	9.530	12.700
D_{60} (mm)	1.004	0.152	0.338
D_{30} (mm)	0.155		
D_{10} (mm)			
Cc			
Cu			

Size/ID #	Percent Finer Data		
6"	100.0	100.0	100.0
4"	100.0	100.0	100.0
3"	100.0	100.0	100.0
1 1/2"	100.0	100.0	100.0
1"	100.0	100.0	100.0
3/4"	100.0	100.0	100.0
1/2"	100.0	100.0	100.0
3/8"	97.4	100.0	98.8
#4	89.7	99.7	94.1
#10	73.6	95.5	83.3
#20	56.5	87.2	71.8
#40	45.0	76.3	62.8
#60	37.1	68.2	56.0
#100	29.5	59.8	47.8
#140	25.3	51.6	41.5
#200	22.2	43.8	35.6
5μ m			
2μ m			
1μ m			

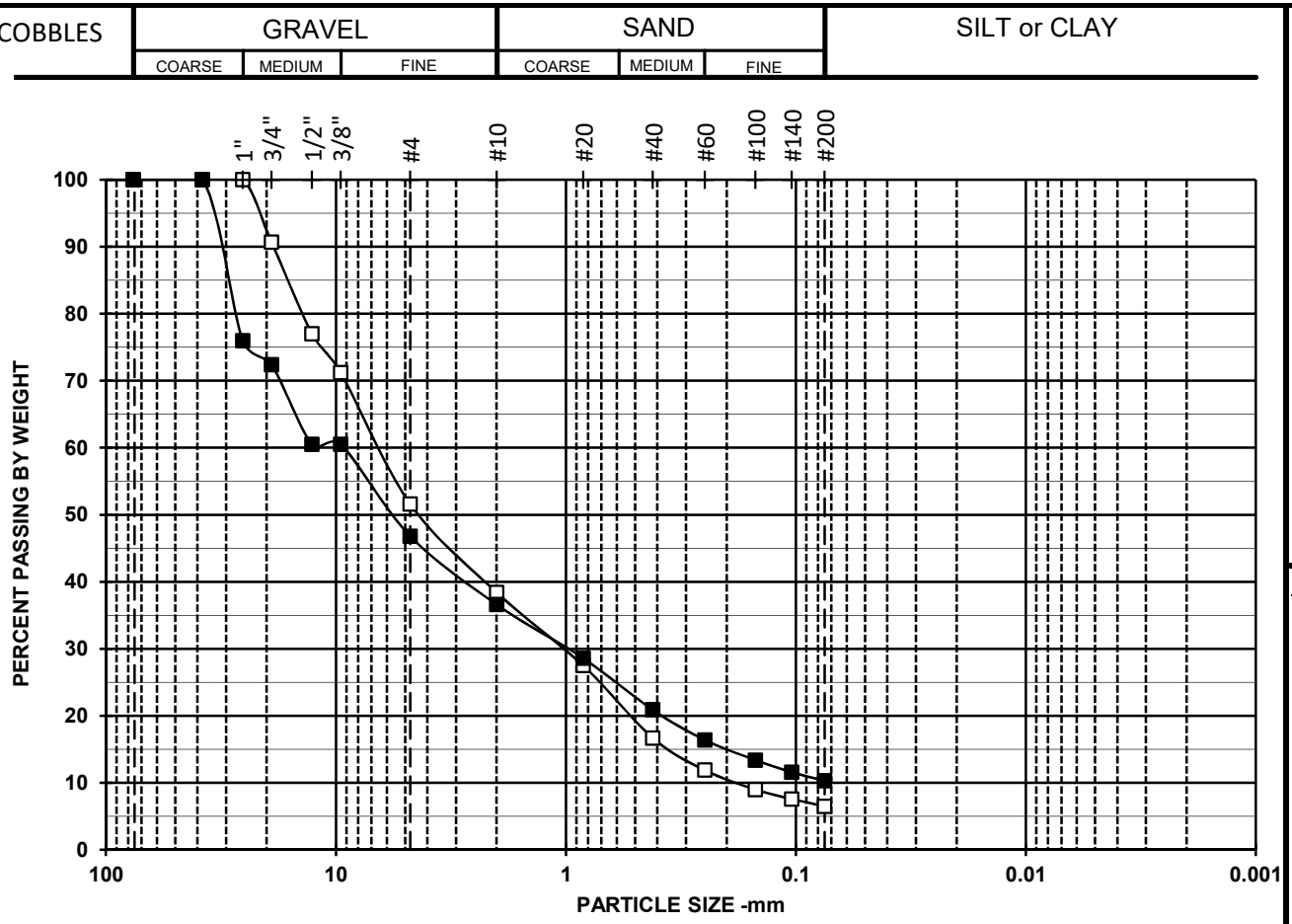
SYMBOL	w (%)	LL	PL	PI	USCS	AASHTO	BURMISTER DESCRIPTION AND REMARKS	DATE
□	8.9				SM		Black coarse medium to fine SAND, some fine Gravel, some Silt shale noted	06/15/18
■	18.8				SM		Yellow coarse medium to fine SAND, and Silt, trace fine Gravel	06/15/18
○	16.8				SM		Yellowish gray coarse medium to fine Sand, and Silt, little fine Gravel	06/15/18

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TerraSense, LLC #7902-18019

601 Washington Street

PARTICLE SIZE DISTRIBUTION



Symbol	□	■	○
Boring	TB-5	TB-8	
Sample	S-6	S-6	
Depth	11-13	13-15	
% +3"	0.0	0.0	
% Gravel	61.6	63.4	
% SAND	31.9	26.3	
%C SAND	16.7	11.8	
%M SAND	9.8	8.4	
%F SAND	5.4	6.1	
% FINES	6.5	10.3	
D_{100} (mm)	25.400	38.100	
D_{60} (mm)	6.400	9.286	
D_{30} (mm)	1.025	0.978	
D_{10} (mm)	0.179		
Cc	0.900		
Cu	35.9		

Size/ID #	Percent Finer Data		
6"	100.0	100.0	
4"	100.0	100.0	
3"	100.0	100.0	
1 1/2"	100.0	100.0	
1"	100.0	76.0	
3/4"	90.7	72.4	
1/2"	77.0	60.5	
3/8"	71.2	60.5	
#4	51.6	46.8	
#10	38.4	36.6	
#20	27.5	28.6	
#40	16.7	20.9	
#60	11.9	16.4	
#100	9.0	13.4	
#140	7.6	11.6	
#200	6.5	10.3	
5μ m			
2μ m			
1μ m			

SYMBOL	w (%)	LL	PL	PI	USCS	AASHTO	BURMISTER DESCRIPTION AND REMARKS	DATE
□	7.7				GP-GM		Brown medium to fine GRAVEL and, coarse medium to fine Sand, trace Silt	06/15/18
■	7.4				GP-GM		Brown coarse medium to fine GRAVEL and, coarse medium to fine Sand, little Silt	06/15/18
○								

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601 Washington Street

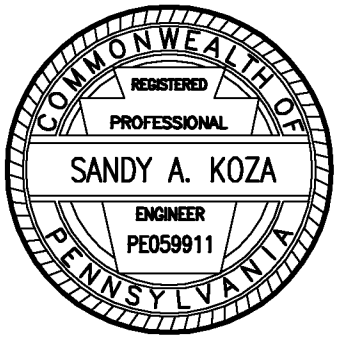
PARTICLE SIZE DISTRIBUTION

Transportation Impact Study for
601 Washington Street

Whitemarsh Township,
Montgomery County, PA







Sandy A. Koza, P.E., PTOE
PA PE License Number PE059911

Prepared by
McMahon Associates, Inc.
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Fort Washington, PA 19034
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Prepared for
601 Washington Street Associates, L.P.

March 2, 2022

McMahon Project Number 818064.12

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Executive Summary

601 Washington Street Associates, L.P. proposes to construct a multi-family residential community at 601 Washington Street in Whitemarsh Township, Montgomery County, PA (see **Figure 1**). The parcel is proposed to be developed to provide up to 270 multi-family apartments in a four-story building, where parking will be provided on the first floor of the building, as well as in a surface lot to the rear of the building. Access to the site is proposed to be provided via two unsignalized, full-movement driveways along Washington Street to the east of Cherry Street. A schematic of the latest site plan, prepared by Maser Consulting, P.A., is shown in **Figure 2**.

The scope of this transportation impact study is based on the Township guidelines in *Section 105-21.B.(9) of the Subdivision and Land Development Ordinance.* The purpose of this transportation impact study is to evaluate the traffic impacts of the proposed development. The scope of this study includes an evaluation of the existing weekday morning and weekday afternoon peak hours, as well as the future 2024 build-out year, both without and with the development at the following study intersections, which are in Conshohocken Borough and Whitemarsh Township as noted below:

- Elm Street (S.R. 3058) and Harry Street *(Conshohocken Borough);*
- Elm Street (S.R. 3058) and Ash Street *(Conshohocken Borough);*
- Elm Street and Cherry Street *(Conshohocken Borough);*
- Washington Street and Ash Street *(Conshohocken Borough);*
- Washington Street and Poplar Street *(Conshohocken Borough);*
- Washington Street and Cherry Street *(Conshohocken Borough);*
- Washington Street and Proposed Site Accesses (*Whitemarsh Township);*
- Hector Street (S.R. 3058) and Spring Mill Avenue / Lee Street (*Whitemarsh Township); and*
- Hector Street and (S.R. 3058) Station Avenue / North Lane (S.R. 3015) (*Whitemarsh Township).*

The evaluation of traffic conditions associated with the proposed development reveals the following findings and conclusions:

- **Trip Generation** – The trip generation characteristics for the development is based on data from the Institute of Transportation Engineers' publication entitled *Trip Generation, 11th Edition*, for similar uses. The proposed apartment complex is anticipated 1,241 total trips (inbound and outbound) on a typical weekday, of which approximately 107 and 106 total trips (inbound and outbound) are expected to be generated during the weekday morning and weekday afternoon peak hours, respectively. The trip generation should be considered conservative as it does not account for residents who would utilize the nearby public transit facilities for commuting.

- **Site Access Recommendation**s – The following recommendations have been made regarding the design of the two site access driveways:
  - Provide one ingress lane and one egress lane for the accesses with a minimum curbed cartway width of 24 feet;
  - Provide stop-control on the egress access,
  - Provide a minimum intersection radius of 25 feet, which should be designed based upon the largest vehicle anticipated to utilize the site, and
  - Ensure ADA compliance for any sidewalk connection across the access driveways.

- **Washington Street** – In conjunction with the development of the site, the Washington Street frontage will be widened to provide a consistent 30-foot wide cartway with a single travel lane in each direction along with sidewalk. A multiuse trail will then be provided along the Riverfront linking the site to the adjacent trail system to the east.

- **Capacity/Level-of-Service Results for Off-Site Intersections** – The study intersections were evaluated to determine the operational characteristics under existing and future build-out year (2024) without- and with-development conditions. The study intersections all operate at LOS D or better conditions overall and based upon PennDOT's mitigation criteria for intersections with state highways or in Conshohocken Borough, as well as those located within Whitemarsh Township, mitigation measures are not required.

Existing Transportation Settings and Conditions

The proposed development is at 601 Washington Street in Whitemarsh Township, Montgomery County, Pennsylvania (see **Figure 1**). The existing roadways and intersections in the vicinity of the site, which comprise the study area roadway network, are described in this section.

Roadway Characteristics

The study area roadway network and characteristics are summarized below in **Table 1**.

Table 1. Existing Roadway Characteristics

Roadway Name	Average Daily Traffic Volumes (vehicles per day)	Roadway Classification		Travel Lanes (per direction)	Posted Speed Limit (mph)
		Roadway Typology (1)	PennDOT/ Township (2)		
Elm Street (S.R. 3058)	4,793 (3)	Neighborhood Collector	Urban – Minor Collector	1 to 2	25
Ash Street	n/a	Local	Local	1	25
Cherry Street	1,242 (3)	Local	Local	1	25
Washington Street	n/a	Local	Local	1	25
Poplar Street	382 (3)	Local	Local	1	25
Hector Street (S.R. 3058)	9,115 (3)	Community Collector	Urban – Major Collector	1	25
North Lane (S.R. 3015)	4,097 (4)	Neighborhood Collector	Urban – Minor Collector	1	25
Station Avenue	n/a	Local	Local	1	25

(1) Based on Table 1.2 – Roadway Typologies in the PennDOT *Publication 13M, Design Manual Part 2*.
(2) Based on the roadway classifications provided on PennDOT's Traffic Information Repository (TIRe) website.
(3) Based on automatic traffic recorder counts conducted on February 3, 2022.
(4) Based on traffic data from PennDOT's Traffic Information Repository (TIRe) website.

The following key intersections in the vicinity of the site comprise the study area:

- Elm Street (S.R. 3058) and Harry Street *(Conshohocken Borough);*
- Elm Street (S.R. 3058) and Ash Street *(Conshohocken Borough);*
- Elm Street and Cherry Street *(Conshohocken Borough);*
- Washington Street and Ash Street *(Conshohocken Borough);*
- Washington Street and Poplar Street *(Conshohocken Borough);*
- Washington Street and Cherry Street *(Conshohocken Borough);*
- Washington Street and Proposed Site Accesses (*Whitemarsh Township);*
- Hector Street (S.R. 3058) and Spring Mill Avenue / Lee Street (*Whitemarsh Township); and*
- Hector Street and (S.R. 3058) Station Avenue / North Lane (S.R. 3015) (*Whitemarsh Township).*

The study intersections were reviewed and agreed upon by Whitemarsh Township. The existing characteristics of the study intersections, including photographs, field sketches, and signal permit plans are provided in **Appendix A**.

Area Transit Services

The site is located approximately one mile to the east of the Conshohocken Regional Rail Station and one-half mile to the west of the Spring Mill Regional Rail Station, which area both along SEPTA's Manayunk/Norristown Regional Rail Line. SEPTA Bus Route 97 also provides service along Elm Street and Hector Street with stops provided at the intersections of Cherry Street with both Elm Street and Hector Street. Both bus stops are also within one-half mile of the site.

Pedestrian-Bicycle Facilities

Sidewalk is provided on both sides of Hector Street, Elm Street, Harry Street, Ash Street, and North Lane (S.R. 3015) through the study area. Sidewalk is provided on the east side of Lee Street and the west side of Spring Mill Avenue. Sidewalk is also provided on the south side of Washington Street to the west of Cherry Street. The site is also within walking distance to the Schuylkill River Trail, which is located between Washington Street and Elm Street. The Washington Street sidewalk connects the site to the Conshohocken Regional Rail Station to the east, while the Schuylkill River Trail connects the site to the Spring Mill Regional Rail Station to the west.

With the development of the site, a sidewalk will be provided along the south side of Washington Street along the site frontage. Additionally, a multiuse trail will also be provided along the Schuylkill River frontage on the south side of the building that will connect to the other parcels being developed to the west.

Traffic Count Data

Daily traffic counts for North Lane (S.R. 3015) were obtained from PennDOT's Traffic Information Repository (TIRe) website, which are provided in **Appendix B** and referenced in Table 1. Daily traffic counts were conducted in February 2022 during a typical weekday (i.e., Tuesday, Wednesday, or Thursday) along Cherry Street, Poplar Street, and Hector Street (S.R. 3058) to collect traffic volumes, vehicle classifications, and travel speeds. The automatic traffic count worksheets are provided in Appendix B.

Manual turning movement traffic counts, were conducted in February 2022 during the weekday morning (7:00 AM to 9:00 AM) and weekday afternoon (4:00 PM to 6:00 PM) peak periods. The results of these traffic counts are tabulated by 15-minute intervals in **Appendix C**. The four highest consecutive 15-minute peak intervals during these traffic count periods constitute the peak hours that are the basis of this traffic analysis.

The resultant peak hour traffic volumes are depicted in **Figure 3A** for the weekday morning and weekday afternoon peak hours. The traffic volumes in Figure 3A were then analyzed to determine the existing operating conditions, and the results of this analysis are shown in **Figure 3B.** Specific details regarding the analysis results and traffic operations are provided later in this report.

Site Characteristics

This section presents the details regarding the proposed site, including the incremental increase in traffic volumes generated by the development during the peak hours and the distribution of site traffic to the study area roadways, as well as the proposed site access configuration, traffic control, and sight distance requirements.

Trip Generation

Traffic volumes generated by the proposed development were prepared based on trip generation data compiled from numerous studies contained in the Institute of Transportation Engineers (ITE) publication, *Trip Generation, 11th Edition*. **Table 2 and 3** presents the anticipated vehicular trip generation characteristics and trips associated with the proposed 270-unit multifamily apartment complex, which is based on the equations for Land Use Code 221: Multifamily Housing (Mid-Rise). The option for not close to transit was utilized to be conservative in the estimate of the total trips for the analysis of the study intersections and since the distribution of the entering and exiting traffic seemed to be more inline with the expected pattern of traffic. Table 3 shows the corresponding number of peak hour trips that would be generated based upon using the option for being close to transit.

Table 2. Trip Generation Methodology for Land Use Code 221: Multifamily Housing (Mid-Rise)

Description	Daily	Weekday Morning Adjacent Street Peak Hour		Weekday Afternoon Adjacent Street Peak Hour	
		Method	Enter/Exit	Method	Enter / Exit
Not Close to Rail Transit	T = 4.77(X) - 46.46	T = 0.44(X) - 11.61	23% / 77%	T = 0.39(X) + 0.34	61% / 39%
Close to Rail Transit	T = 4.75(X)	T = 0.31(X) + 1.06	50% / 44%	T = 0.29(X) - 0.09	43% / 57%

Where X = Independent Variable (units) and T = Trips

Table 3. Vehicular Trip Generation Characteristics

Description	Size	Daily	Weekday Morning Adjacent Street Peak Hour			Weekday Afternoon Adjacent Street Peak Hour		
			In	Out	Total	In	Out	Total
Not Close to Rail Transit	270 d.u.	1,241	24	83	107	64	42	106
Close to Rail Transit		1,283 (2)	47	38	85	33	45	78

(1) Based on the equations for ITE Land Use Code 221 for Multifamily Housing (Mid-Rise) from the *Trip Generation Manual, 11th Edition* for sites that are Close to and Not Close to Rail Transit.
(2) Based on two studies.

Based on American Community Survey (2015-2019) data, approximately 9 percent of commuters along the east side of Conshohocken Borough and the Schuylkill River waterfront in both Conshohocken Borough and Whitemarsh Township utilize public transit. These areas represent residents who live near the two SEPTA Regional Rail stations.

Transportation Impact Fee

The site is in the Southern Transportation Service Area of Whitemarsh Township and would then be subject to the Whitemarsh Township Traffic Impact Fee, which is $2,529 per new weekday afternoon peak hour trip. As the site is expected to generate 106 new weekday afternoon peak hour trips, it would be subject to an impact fee of $268,074.

Trip Distribution and Assignment

Site-generated traffic will approach and depart the site via different routes depending on factors such as the existing traffic patterns, location of major roadways, and the location of the development's site access. The overall trip distribution pattern was based on the existing turning movement pattern associated with vehicles turning into and out of Ash Street, Poplar Street, and Cherry Street to access the residential developments located along Washington Street between Poplar Street and Cherry Street.

The distribution percentages for the anticipated directions of approach and departure and traffic assignment percentages are illustrated in **Figures 4A and 4B** for two scenarios, without a connection to Lee Street to the east and with a connection to Lee Street, which should be provided with the completion of the 901 Washington Street development project. Application of the percentages illustrated in Figures 4A and 4B to the peak hour trips contained in Table 3 for the not close to transit scenario then provides an estimate of site traffic to be added to the study area. The site-generated traffic is then illustrated in **Figure 4C and 4D** for the weekday morning and weekday afternoon peak hours for the two scenarios, respectively.

Site Access Configuration and Traffic Control

Access to the site is proposed via two new, full movement unsignalized driveways located along Washington Street, which will be widened along the site frontage to provide a consistent 30-foot cartway. Although a third access is illustrated on the site plan schematic (see Figure 2), only the central and eastern access have been included in the analysis, since the western access is not fully located on the site parcel. The recommendations for the proposed access designs, including auxiliary turn lanes, traffic control, and geometric design, were based on industry accepted criteria and guidelines.

The need for separate left- and/or right-turn lanes along Washington Street was based on the current PennDOT guidelines in accordance with *Publication 46, Chapter 11 – Traffic Studies* for the with-development volumes with the completion of the Washington Street extension to Lee Street. **Table 4** summarizes the results of the auxiliary turn lane warrants for the two site access intersections along Washington Street, while copies of the worksheets are provided in **Appendix D.**

Table 4 – Turn Lane Warrant Summary

Washington Street Access	Auxiliary Lane Warrant	Warrant Satisfied? (1)	Required Lane Length (1)	Proposed Lane Length
Central Site Access	Eastbound Right	No	n/a	n/a
	Westbound Left	No	n/a	n/a
Eastern Site Access	Eastbound Right	No	n/a	n/a
	Westbound Left	No	n/a	n/a

(1) Based on PennDOT Publication 46, *Traffic Engineering Manual*, Chapter 11.16

Additionally, the geometric design of the proposed site accesses was preliminarily evaluated based on guidelines contained in the *Pennsylvania Code, Chapter 441, Access to and Occupancy of Highways by Driveways and Local Roads*, as well as local PennDOT District policies. Based on the results of this evaluation, the following access configurations and traffic controls are recommended, subject to the detailed engineering of the site accesses along Washington Street:

- Provide one ingress lane and one egress lane for the accesses with a minimum curbed cartway width of 24 feet;
- Provide stop-control on the egress access,
- Provide a minimum intersection radius of 25 feet, which should be designed based upon the largest vehicle anticipated to utilize the site, and
- Ensure ADA compliance for any sidewalk connection across the access driveways.

Sight Distance

Sight distance field measurements and an evaluation were performed at the proposed access intersection along Washington Street. Generally, the travel speed, roadway grades and profiles, and the number of travel lanes play a role in determining if safe sight distances are available for egress and ingress at the proposed accesses. The existing sight distances at the proposed access intersection were measured and compared to PennDOT's sight distance requirements. These sight distance requirements are contained in *Pennsylvania Code, Chapter 441, Access to and Occupancy of Highways by Driveways and Local Roads*. **Table 5** summarizes the available sight distance measurements, as well as PennDOT's sight distance requirements at the proposed access locations. As can be seen, the existing available sight distances at the site access intersections are anticipated to meet PennDOT's desirable sight distance criteria, as well as the Township's intersection sight distance criteria with completion of the widening of Washington Street and maintenance of the vegetation proposed to be installed along the widened street. The actual available sight distances should be verified during detailed engineering of the site accesses.

Table 5. Sight Distance Evaluation
Central Site Access and Washington Street

Movement	Direction	Posted Speed (mph)	Approximate Grade	Township (1) (feet)	PennDOT Requirements (feet)		Available Sight Distance (feet)
					Desirable (1)	Minimum (2)	
Exiting	Looking Left	25	-1.0%	400	250	164	500+
	Looking Right	25	+1.0%	400	195	160	500+
Left turn Entering	Looking Ahead	25	-1.0%	400	190	164	500+
	From the Rear	25	+1.0%	400	n/a	160	500+

Eastern Site Access and Washington Street

Movement	Direction	Posted Speed (mph)	Approximate Grade	Township (1) (feet)	PennDOT Requirements (feet)		Available Sight Distance (feet)
					Desirable (1)	Minimum (2)	
Exiting	Looking Left	25	-1.0%	400	250	164	500+
	Looking Right	25	+1.0%	400	195	160	500+
Left turn Entering	Looking Ahead	25	-1.0%	400	190	164	500+
	From the Rear	25	+1.0%	400	n/a	160	500+

(1) Based on § 105-37 (B) of the Whitemarsh Township ordinance.
(2) Based on the desirable sight distance requirements contained in the *Pennsylvania Code, Chapter 441, Access to and Occupancy of Highways by Driveways and Local Roads* and the posted speed limit, unless otherwise noted.
(3) Based on the safe stopping sight distance requirements contained in the *PennDOT Publication 13M, Chapter 2.17(F).*

Future Traffic Conditions

This section presents the future build-out year 2024, both without and with the proposed development, which is anticipated to be completed and occupied by 2024. The future 2024 build-out year without-development traffic volumes were estimated by increasing the existing 2022 traffic volumes to account for regional growth, as described below. The incremental increase due to the anticipated trip generation for the site was then added, resulting in the future 2024 build-out year with-development traffic volumes.

Regional Traffic Growth

To account for regional traffic growth, the existing traffic volumes were increased by an annual traffic growth rate of 0.33 percent per year compounded for two years to 2024, or 0.66 percent total to 2024. This growth rate is consistent with the traffic growth rate recommended by the PennDOT Bureau of Planning and Research *Growth Factors for August 2021 and July 2022* for similar, Urban Non-Interstate roadways in Montgomery County.

Local Traffic Growth

To account for local traffic growth, other land development projects were identified in surrounding municipalities. The existing traffic volumes were also increased to include the traffic to be generated by nearby approved developments in the vicinity of 601 Washington Street. Specifically, the following projects within Whitemarsh Township and Conshohocken Borough were included:

- *901 Washington Street:* Development of 75 townhomes with access via the extension of Washington Street and Lee Street through the David Bridal parcel to the east.

- *401-433 Washington Street:* Development of 598 apartments to the west of the site, which will result in the extension of Washington Street to the east of Cherry Street.

- *Millennium Apartments:* Development of 305 apartments located along the south side of Washington Street between Ash Street and Harry Street.

Information regarding these nearby developments is provided in **Appendix E.** It is noted that the trip generation for 901 and 401-433 Washington Street are also based on the Multifamily Housing (Mid-Rise) with the Not Close to Transit Option. As with 601 Washington Street, the trip generation for these two uses is then conservative since no transit reduction has been applied. The trip generation for the Millennium Apartments is based on the study that was approved by Conshohocken Township and does include a transit reduction.

Planned Roadway Improvements

As part of the 901 and 401-433 Washington Street residential developments, Washington Street will also be widened along their frontage to provide a continuous 30-foot wide cartway width with a single lane of travel in each direction. As part of the 901 Washington Street project, an extension of Washington Street to Lee Street is also planned. For the purposes of this traffic study, future conditions were analyzed both without and with this extension of Washington Street to Lee Street.

Future Traffic Volumes

The total background growth and nearby development traffic volumes were then added to the existing 2022 traffic volumes, resulting in the future 2024 without-development traffic volumes. Next, the site generated traffic volumes, as shown in Figures 4C and 4D, were added to the future 2024 without-development traffic volumes, resulting in the future 2024 with-development traffic volumes for the without and with completion of the Lee Street connection. Detailed traffic volume projections are provided in **Appendix F.**

The resultant future 2024 peak hour traffic volumes without development are illustrated in **Figure 5A and 5B** with and without the completion to Lee Street, respectively. The future 2024 with-development peak hour traffic volumes are illustrated in **Figures 5C and 5D** without and with completion of the Lee Street connection, respectively. These traffic volumes were then analyzed to determine the future 2024 without and with development traffic operating conditions, and the results of this analysis are shown in **Figures 5E through 5H.**

Capacity/Level-of-Service Results

The peak hour traffic volumes were analyzed to determine the existing and future traffic operating conditions, both without and with the proposed development, in accordance with the standard techniques contained in the current *Highway Capacity Manual (6th Edition)* for both signalized and unsignalized intersections. The HCM 6th Edition Methodology within Synchro 10.3 (build 151, rev. 0) traffic analysis software was utilized in the traffic analyses. These standard capacity/level-of-service analysis techniques, which calculate total control delay, are described in **Appendix G** for both signalized and unsignalized intersections, as well as the correlation between average total control delay and the respective level-of-service (LOS) criteria for each intersection type.

The following procedures and assumptions were utilized for the analysis, which includes those from PennDOT's *Policies and Procedures for Transportation Impact Studies Related to Highway Occupancy Permit Plans:*

- For signalized intersections, the Pennsylvania base saturation flow rate (Exhibit 10-9) and Pennsylvania traffic signal control calibration parameters (Exhibit 10-10) outlined in PennDOT's *Publication 46, Traffic Engineering Manual*, were used.

- For unsignalized intersections, the base critical headways at TWSC intersections (Exhibit 10-11) and base follow-up headways at TWSC intersections (Exhibit 10-12) outlined in PennDOT's *Publication 46, Traffic Engineering Manual*, were used.

- The four-legged, unsignalized intersections of Washington Street with Ash Street, Poplar Street, and Cherry Street were analyzed using SimTraffic as these intersections have stop-controlled along three of the four approaches. The southbound approaches operate at free-flow conditions to prevent vehicles from stopping on the regional rail tracks, since there is not adequate sight distance for vehicles on the approach to view vehicles on the other three approaches from the north side of the tracks. The stop bar provided on the southbound approaches is only utilized when a train is crossing the tracks. This type of stop-control is not supported by the HCM methodology.

The existing, future build-out year 2024 traffic conditions, both without and with the proposed development, are summarized in Figures 3B and 5E through 5H, respectively while the detailed capacity/level-of-service analysis worksheets are provided in **Appendices I, J, and K.** As illustrated in Figures 3B, 5E, 5F, 5G, and 5H, with the development of the proposed site, the study intersections will satisfy PennDOT's level-of-service criteria, which would not require any mitigation measures. **Table 6** below summarizes the overall levels of service for the study intersections. The detailed results of the level-of-service analysis and the 95th percentile queues are contained in the matrices provided in **Tables 7 and 8**, respectively, for the study area intersections

Per *§105-21.B.(9)(d)[3](b)* of the Whitemarsh Township ordinance, roadways and/or intersections experiencing LOS E or F conditions are considered congested locations and *§105-21.B(9)(d)[6](a)* requires mitigation measures be implemented for streets and/or intersections operating at LOS D or worse conditions. All the study area intersections operate at LOS C or better overall during both peak hours and for both development scenarios, except for the weekday afternoon peak hour for the intersection of Elm Street and Ash Street. Since this is a stop-controlled intersection that is not located in Whitemarsh Township that involves a state highway, PennDOT's mitigation criteria would apply, and therefore, no mitigation measures are required. It is also noted that the site traffic could divert to Elm Street and Harry Street to access Washington Street instead. Therefore, no mitigation measures are recommended. It is also noted that the Township has a transportation impact fee that would apply to any off-site mitigation measures within Whitemarsh Township, if required.

Table 6. Mitigation Summary by Intersection
Weekday Morning Peak Hour

Intersection	Without Washington Street Extension			With Washington Street Extension			Requires Mitigation (1)
	Overall Level-of-Service (Delay in Seconds)		Delay Increase	Overall Level-of-Service (Delay in Seconds)		Delay Increase	
	Without Development	With Development		Without Development	With Development		
Elm Street and Harry Street	B (11.0)	B (11.0)	n/a	B (11.0)	B (11.0)	n/a	No
Elm Street and Ash Street	C (15.8)	C (19.5)	3.7	C (15.8)	C (19.5)	3.7	No
Elm Street and Cherry Street	B (10.4)	B (10.6)	0.2	A (10.0)	A (10.0)	n/a	No
Washington Street and Ash Street	A (5.1)	A (5.6)	0.4	A (5.2)	A (5.5)	0.3	No
Washington Street and Poplar Street	A (5.9)	A (6.2)	0.3	A (5.8)	A (6.1)	0.3	No
Washington Street and Cherry Street	A (5.7)	A (6.7)	1.0	A (6.2)	A (6.7)	0.5	No
Hector Street and Spring Mill Avenue/Lee Street	A (1.1)	A (1.2)	0.1	A (2.1)	A (2.4)	0.3	No
Hector Street and Station Avenue/ North Lane	C (24.8)	C (25.5)	0.7	C (26.0)	C (25.5)	n/a	No

Weekday Afternoon Peak Hour

Intersection	Without Washington Street Extension			With Washington Street Extension			Requires Mitigation (1)
	Overall Level-of-Service (Delay in Seconds)		Delay Increase	Overall Level-of-Service (Delay in Seconds)		Delay Increase	
	Without Development	With Development		Without Development	With Development		
Elm Street and Harry Street	B (12.7)	B (12.7)	n/a	B (12.7)	B (12.7)	n/a	No
Elm Street and Ash Street	C (23.9)	D (30.6)	n/a	C (23.9)	D (30.6)	n/a	Yes
Elm Street and Cherry Street	B (14.2)	B (15.1)	0.9	B (13.4)	B (13.9)	0.5	No
Washington Street and Ash Street	A (4.0)	A (4.1)	0.1	A (4.0)	A (4.0)	n/a	No
Washington Street and Poplar Street	A (5.3)	A (5.5)	0.2	A (5.3)	A (5.5)	0.2	No
Washington Street and Cherry Street	A (4.3)	A (4.8)	0.5	A (4.8)	A (4.9)	0.1	No
Hector Street and Spring Mill Avenue/Lee Street	A (1.5)	A (1.5)	n/a	A (2.6)	A (2.9)	0.3	No
Hector Street and Station Avenue/ North Lane	C (27.6)	C (27.8)	0.2	C (27.6)	C (27.8)	0.2	No

(1) Based on Whitemarsh Township criteria for intersections located within the Township and PennDOT criteria for intersections in Conshohocken Borough or that involve state highways.

Conclusions and Recommendations

The evaluation of traffic conditions associated with the proposed development reveals the following findings and conclusions:

- **Trip Generation** – The trip generation characteristics for the development is based on data from the Institute of Transportation Engineers' publication entitled *Trip Generation, 11th Edition*, for similar uses. The proposed apartment complex is anticipated 1,241 total trips (inbound and outbound) on a typical weekday, of which approximately 107 and 106 total trips (inbound and outbound) are expected to be generated during the weekday morning and weekday afternoon peak hours, respectively. The trip generation should be considered conservative as it does not account for residents who would utilize the nearby public transit facilities for commuting.

- **Site Access Recommendation**s – The following recommendations have been made regarding the design of the two site access driveways:
  - Provide one ingress lane and one egress lane for the accesses with a minimum curbed cartway width of 24 feet;
  - Provide stop-control on the egress access,
  - Provide a minimum intersection radius of 25 feet, which should be designed based upon the largest vehicle anticipated to utilize the site, and
  - Ensure ADA compliance for any sidewalk connection across the access driveways.

- **Washington Street** – In conjunction with the development of the site, the Washington Street frontage will be widened to provide a consistent 30-foot wide cartway with a single travel lane in each direction along with sidewalk. A multiuse trail will then be provided along the Riverfront linking the site to the adjacent trail system to the east.

- **Capacity/Level-of-Service Results for Off-Site Intersections** – All the study area intersections operate at LOS C or better overall during both peak hours and for both development scenarios, except for the weekday afternoon peak hour for the intersection of Elm Street and Ash Street. Since this is a stop-controlled intersection that is not located in Whitemarsh Township that involves a state highway, PennDOT's mitigation criteria would apply, and therefore, no mitigation measures are required. It is also noted that the site traffic could divert to Elm Street and Harry Street to access Washington Street instead. Therefore, no mitigation measures are recommended. It is also noted that the Township has a transportation impact fee that would apply to any off-site mitigation measures within Whitemarsh Township, if required.

The traffic analyses contained herein reveals that safe and efficient access to and from the proposed development can be provided and that site-generated traffic can be accommodated at the off-site study area intersections.

Table 6 - Level of Service Matrices

1. Elm Street and Harry Street

Time Period			Weekday Morning Peak Hour					Weekday Afternoon Peak Hour				
Design Year			2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension	
Development Condition			Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev
Elm Street	EB	Thru	A 6.2	A 7.3	A 7.4	A 7.3	A 7.4	A 8.9	B 10.2	B 10.4	B 10.2	B 10.4
		Thru/ Right	A 6.3	A 7.5	A 7.5	A 7.5	A 7.5	A 9.0	B 10.2	B 10.4	B 10.2	B 10.4
	WB	Left	A	A	A	A	A	A	A	A	A	A
		Thru	5.3	7.5	8.1	7.5	8.1	7.8	8.9	9.2	8.9	9.2
Harry Street	NB	Left	C	C	C	C	C	C	C	C	C	C
		Right	26.3	25.7	25.7	25.7	25.7	23.3	23.1	23.1	23.1	23.1
	SB	Left	B 18.2	B 17.1	B 17.1	B 17.1	B 17.1	B 14.2	B 13.9	B 13.9	B 13.9	B 13.9
		Thru	C	C	C	C	C	B	B	B	B	B
		Right	22.6	20.8	20.8	20.8	20.8	17.1	16.5	16.5	16.5	16.5
Overall			B 10.9	B 11.0	B 11.0	B 11.0	B 11.0	B 12.7	B 12.7	B 12.7	B 12.7	B 12.7

Table 6 - Level of Service Matrices

2. Elm Street and Ash Street

Time Period			Weekday Morning Peak Hour					Weekday Afternoon Peak Hour				
Design Year			2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension	
Development Condition			Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev
Elm Street	EB	Left	B	C	C	C	C	C	D	E	D	E
		Thru	13.0	18.0	21.4	18.0	21.4	17.8	32.9	44.6	32.9	44.4
		Right	A 7.2	A 8.3	A 8.7	A 8.3	A 8.7	A 7.4	A 8.5	A 8.9	A 8.5	A 8.9
Ash Street	NB	Left	A	B	C	B	C	A	B	B	B	B
		Thru	9.6	15.0	19.8	15.0	19.8	10.0	12.8	14.2	12.8	14.1
		Right										
Overall			B 11.6	C 15.8	C 19.5	C 15.8	C 19.5	C 15.1	C 23.9	D 30.6	C 23.9	D 30.6

Table 6 - Level of Service Matrices

3. Elm Street and Cherry Street

Time Period		Weekday Morning Peak Hour					Weekday Afternoon Peak Hour				
Design Year		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension	
Development Condition		Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev
Elm Street EB	Thru	B	B	B	B	B	B	B	B	B	B
	Right	10.3	11.3	11.6	10.5	10.5	13.3	16.2	17.5	14.5	15.1
Cherry Street NB	Right	A	A	A	A	A	A	A	A	A	A
		7.5	8.0	8.2	7.5	7.5	8.0	8.5	8.7	8.1	8.1
Cherry Street SB	Left	A	A	A	A	A	A	A	A	A	A
	Thru	8.8	9.2	9.3	8.7	8.7	9.0	9.6	9.9	9.0	9.0
Overall		A	B	B	A	A	B	B	B	B	B
		9.8	10.4	10.6	10.0	10.0	12.2	14.2	15.1	13.4	13.9

Table 6 - Level of Service Matrices

4. Washington Street and Ash Street

Time Period			Weekday Morning Peak Hour					Weekday Afternoon Peak Hour				
Design Year			2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension	
Development Condition			Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev
Washington Street	EB	Left	A	A	A	A	A	A	A	A	A	A
		Thru										
		Right	4.1	4.5	4.2	4.4	4.2	5.3	5.6	5.8	6.3	5.8
	WB	Left	A	A	A	A	A	A	A	A	A	A
			4.9	5.1	4.9	5.1	4.5	5.2	5.9	7.0	6.7	6.3
		Thru	A	A	A	A	A	A	A	A	A	A
		Right	5.0	6.2	6.6	6.2	6.7	4.8	5.4	5.7	5.7	5.6
Ash Street	NB	Left	A	A	A	A	A	A	A	A	A	A
		Thru										
		Right	4.8	5.2	5.4	5.2	5.0	5.0	5.6	6.4	6.1	5.8
	SB	Left	A	A	A	A	A	A	A	A	A	A
		Thru										
		Right	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
Overall			A	A	A	A	A	A	A	A	A	A
			4.1	5.1	5.6	5.2	5.5	3.7	4.0	4.1	4.0	4.0

Table 6 - Level of Service Matrices

5. Washington Street and Poplar Street

Time Period			Weekday Morning Peak Hour					Weekday Afternoon Peak Hour				
Design Year			2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension	
Development Condition			Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev
Washington Street	EB	Left	A	A	A	A	A	A	A	A	A	A
		Thru										
		Right	4.5	4.8	4.8	5.0	4.8	5.4	5.9	5.9	5.5	6.0
	WB	Left	A	A	A	A	A	A	A	A	A	A
		Thru										
		Right	5.4	6.7	7.0	6.5	6.9	5.3	7.1	7.3	7.2	7.4
Poplar Street	NB	Left	A	A	A	A	A	A	A	A	A	A
		Thru										
		Right	4.6	5.9	5.7	5.6	5.6	4.5	5.0	5.4	4.9	5.1
	SB	Left	A	A	A	A	A	A	A	A	A	A
		Thru										
		Right	0.1	0.2	0.2	0.2	0.3	0.1	0.2	0.2	0.2	0.2
Overall			A	A	A	A	A	A	A	A	A	A
			4.6	5.9	6.2	5.8	6.1	4.9	5.3	5.5	5.3	5.5

Table 6 - Level of Service Matrices

6. Washington Street and Cherry Street

Time Period		Weekday Morning Peak Hour					Weekday Afternoon Peak Hour				
Design Year		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension	
Development Condition		Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev
Washington Street	EB Left	A	A	A	A	A	A	A	A	A	A
	EB Thru	4.8	5.8	6.1	5.9	6.0	3.7	5.0	5.7	5.1	5.6
	EB Right										
	WB Left	A	A	A	A	A	A	A	A	A	A
	WB Thru	1.2	7.7	9.0	8.3	8.7	4.1	6.2	6.5	7.3	6.6
	WB Right										
Poplar Street	NB Left	A	A	A	A	A	A	A	A	A	A
	NB Thru	5.3	6.2	6.4	5.9	6.2	5.7	6.3	6.8	6.3	6.5
	NB Right										
	SB Left	A	A	A	A	A	A	A	A	A	A
	SB Thru	1.7	1.7	1.7	1.5	1.5	1.6	1.5	1.5	1.1	1.0
	SB Right										
Overall		A	A	A	A	A	A	A	A	A	A
		2.9	5.7	6.7	6.2	6.7	3.3	4.3	4.8	4.8	4.9

Table 6 - Level of Service Matrices

7. Washington Street and West Site Access

Time Period		Weekday Morning Peak Hour		Weekday Afternoon Peak Hour	
Design Year		2024 Build-Out Year without Washington Street Extension	2024 Build-Out Year With Washington Street Extension	2024 Build-Out Year without Washington Street Extension	2024 Build-Out Year With Washington Street Extension
Development Condition		w/Dev	w/Dev	w/Dev	w/Dev
Washington Street	EB Thru	(1)	(1)	(1)	(1)
	EB Right				
	WB Left	A	A	A	A
	WB Thru	0.0	8.2	0.0	8.3
West Site Access	NB Left	A	A	A	A
	NB Right	9.4	8.9	8.9	8.9
Overall		A	A	A	A
		2.5	2.0	0.9	1.2

(1) Movement operates at free-flow conditions.

Table 6 - Level of Service Matrices

8. Washington Street and East Site Access

Time Period		Weekday Morning Peak Hour		Weekday Afternoon Peak Hour	
Design Year		2024 Build-Out Year without Washington Street Extension	2024 Build-Out Year With Washington Street Extension	2024 Build-Out Year without Washington Street Extension	2024 Build-Out Year With Washington Street Extension
Development Condition		w/Dev	w/Dev	w/Dev	w/Dev
Washington Street	EB Thru	(1)	(1)	(1)	(1)
	EB Right				
	WB Left	A	A	A	A
	WB Thru	0.0	8.2	0.0	8.2
East Site Access	NB Left	A	A	A	A
	NB Right	9.0	8.8	8.6	8.8
Overall		A	A	A	A
		3.6	2.3	1.2	1.4

(1) Movement operates at free-flow conditions.

Table 6 - Level of Service Matrices

10. Hector Street and Spring Mill Avenue/Lee Street

Time Period			Weekday Morning Peak Hour					Weekday Afternoon Peak Hour				
Design Year			2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension	
Development Condition			Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev
Hector Street	EB	Left	A	A	A	A	A	A	A	A	A	A
		Thru										
		Right	0.0	0.0	0.0	0.0	0.0	9.1	9.3	9.4	9.1	9.1
	WB	Left	A	A	A	A	A	A	A	A	B	B
		Thru										
		Right	9.3	9.5	8.5	9.5	9.5	9.8	10.0	10.0	10.1	10.2
Lee Street	NB	Left	C	C	C	B	B	C	C	C	C	C
		Thru										
		Right	16.9	20.4	22.9	14.6	14.6	17.1	18.8	19.3	16.1	16.2
Spring Mill Avenue	SB	Left	C	C	C	C	C	C	C	C	C	D
		Thru										
		Right	20.7	18.7	20.7	20.9	22.3	18.8	21.0	21.6	24.7	27.0
Overall			A	A	A	A	A	A	A	A	A	A
			1.2	1.1	1.2	2.1	2.4	1.5	1.5	1.5	2.6	2.9

Table 6 - Level of Service Matrices

11. Hector Street and North Lane/Station Avenue

Time Period			Weekday Morning Peak Hour					Weekday Afternoon Peak Hour				
Design Year			2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension	
Development Condition			Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev
Hector Street	EB	Left	B 11.7	B 12.1	B 12.3	B 12.1	B 12.3	B 12.4	B 12.7	B 12.8	B 12.7	B 12.8
		Thru	B	B	B	B	B	B	B	B	B	B
		Right	13.2	14.1	14.4	14.1	14.4	18.6	19.6	19.8	19.6	19.8
	WB	Left	B 16.9	B 16.9	B 16.9	B 16.9	B 16.9	B 19.3	B 19.6	B 19.7	B 19.6	B 19.7
		Thru	C	C	C	C	C	C	C	C	C	C
		Right	25.4	26.3	28.0	26.2	27.9	23.3	24.9	25.4	24.9	25.4
Station Avenue	NB	Left	D	D	D	D	D	C	C	C	C	C
		Thru										
		Right	43.0	43.0	43.0	43.0	43.0	34.3	34.2	34.2	34.2	34.2
North Lane	SB	Left	E	E	E	E	E	E	E	E	E	E
		Thru										
		Right	57.1	57.0	57.0	57.0	57.3	62.4	63.1	63.3	63.1	63.3
Overall			C 24.6	C 24.8	C 25.5	C 26.0	C 25.5	C 26.7	C 27.6	C 27.8	C 27.6	C 27.8

Table 7 - 95th Percentile Queue Matrices

1. Elm Street and Harry Street

Time Period		Current Storage [1]	Weekday Morning Peak Hour					Weekday Afternoon Peak Hour				
Design Year			2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension	
Development Condition			Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev
Elm Street	EB Thru	*250'*	73	95	98	95	98	88	125	135	125	135
	EB Thru/ Right	*250'*	73	95	98	95	98	93	130	140	130	140
	WB Left	*500'*	30	98	123	98	123	38	70	83	70	83
	WB Thru											
Harry Street	NB Left	*200'*	40	60	60	60	60	100	108	108	108	108
	NB Right											
	SB Left	*200'*	25	25	25	25	25	25	25	25	25	25
	SB Thru	200'	128	120	120	120	120	100	98	98	98	98
	SB Right											

(1) Distance to adjacent signalized or stop controlled intersections shown in italics.

Table 7 - 95th Percentile Queue Matrices

2. Elm Street and Ash Street

Time Period			Current Storage [1]	Weekday Morning Peak Hour					Weekday Afternoon Peak Hour				
Design Year				2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension	
Development Condition				Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev
Elm Street	EB	Left	*500'*	75	115	140	115	140	138	258	325	258	323
		Thru											
		Right	*500'*	25	25	25	25	25	25	25	25	25	25
Ash Street	NB	Left	*290'*	25	85	135	85	135	25	50	65	50	63
		Thru											
		Right											

(1) Distance to adjacent signalized or stop controlled intersections shown in italics.

Table 7 - 95th Percentile Queue Matrices

3. Elm Street and Cherry Street

Time Period			Current Storage [1]	Weekday Morning Peak Hour					Weekday Afternoon Peak Hour				
Design Year				2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension	
Development Condition				Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev
Elm Street	EB	Thru	*800'*	53	65	68	58	60	100	135	150	120	130
		Right											
Cherry Street	NB	Right	*325'*	25	25	25	25	25	25	25	25	25	25
	SB	Left	*250'*	25	25	25	25	25	25	25	25	25	25
		Thru											

(1) Distance to adjacent signalized or stop controlled intersections shown in italics.

Table 7 - 95th Percentile Queue Matrices

4. Washington Street and Ash Street

Time Period			Current Storage [1]	Weekday Morning Peak Hour					Weekday Afternoon Peak Hour				
Design Year				2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension	
Development Condition				Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev
Washington Street	EB	Left / Thru / Right	*650'*	30	32	29	32	32	40	41	42	43	39
	WB	Left	*800'*	25	28	30	28	25	25	25	26	28	26
		Thru / Right	*800'*	57	80	88	79	89	53	65	72	74	71
Ash Street	NB	Left / Thru / Right	600'	25	47	49	47	48	46	48	50	49	48
	SB	Left / Thru / Right	*290'*	25	0	25	25	25	0	25	25	25	0

(1) Distance to adjacent signalized or stop controlled intersections shown in italics.

Table 7 - 95th Percentile Queue Matrices

5. Washington Street and Poplar Street

Time Period			Current Storage [1]	Weekday Morning Peak Hour					Weekday Afternoon Peak Hour				
Design Year				2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension	
Development Condition				Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev
Washington Street	EB	Left / Thru / Right	*810'*	38	48	47	50	42	57	64	67	60	65
	WB	Left / Thru / Right	*854'*	55	93	110	88	109	49	68	73	72	74
Poplar Street	NB	Left / Thru / Right	270'	39	52	50	51	53	35	40	43	40	41
	SB	Left / Thru / Right	*260'*	25	25	25	25	25	0	25	25	25	25

(1) Distance to adjacent signalized or stop controlled intersections shown in italics.

Table 7 - 95th Percentile Queue Matrices

6. Washington Street and Cherry Street

Time Period			Current Storage [1]	Weekday Morning Peak Hour					Weekday Afternoon Peak Hour				
Design Year				2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension	
Development Condition				Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev
Washington Street	EB	Left / Thru / Right	*850'*	43	46	50	48	49	50	71	80	71	87
	WB	Left / Thru / Right	*1000' +*	42	142	193	150	170	45	73	81	73	77
Cherry Street	NB	Left / Thru / Right	530'	45	43	45	44	47	39	38	40	39	39
	SB	Left / Thru / Right	*330'*	25	25	25	25	25	0	0	25	25	25

(1) Distance to adjacent signalized or stop controlled intersections shown in italics.

Table 7 - 95th Percentile Queue Matrices

7. Washington Street and West Site Access

Time Period		Current Storage [1]	Future Storage [2]	Weekday Morning Peak Hour		Weekday Afternoon Peak Hour	
Design Year				2024 Build-Out Year without Washington Street Extension	2024 Build-Out Year With Washington Street Extension	2024 Build-Out Year without Washington Street Extension	2024 Build-Out Year With Washington Street Extension
Development Condition				w/Dev	w/Dev	w/Dev	w/Dev
Washington Street	EB Thru	*1000'+*		(3)	(3)	(3)	(3)
	EB Right						
	WB Left	*1000' +*		0	0	0	0
	WB Thru						
West Site Access	NB Left		300'	25	25	25	25
	NB Right						

(1) Distance to adjacent signalized or stop controlled intersections shown in italics.

(2) Future storage/distance to adjacent intersections shown if different/improved from existing conditions.

(3) Movement operates at free-flow conditions.

Table 7 - 95th Percentile Queue Matrices

8. Washington Street and East Site Access

Time Period			Current Storage [1]	Future Storage [2]	Weekday Morning Peak Hour		Weekday Afternoon Peak Hour	
Design Year					2024 Build-Out Year without Washington Street Extension	2024 Build-Out Year With Washington Street Extension	2024 Build-Out Year without Washington Street Extension	2024 Build-Out Year With Washington Street Extension
Development Condition					w/Dev	w/Dev	w/Dev	w/Dev
Washington Street	EB	Thru	*1000' +*		(3)	(3)	(3)	(3)
		Right						
	WB	Left	*1000' +*		0	0	0	0
		Thru						
East Site Access	NB	Left		300'	25	25	25	25
		Right						

(1) Distance to adjacent signalized or stop controlled intersections shown in italics.

Table 7 - 95th Percentile Queue Matrices

10. Hector Street and Spring Mill Avenue/Lee Street

Time Period			Current Storage [1]	Weekday Morning Peak Hour					Weekday Afternoon Peak Hour				
Design Year				2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension	
Development Condition				Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev
Hector Street	EB	Left	*1000' +*	0	0	0	0	0	0	0	0	0	0
		Thru											
		Right											
	WB	Left	*780'*	25	25	25	25	25	0	0	0	25	25
		Thru											
		Right											
Lee Street	NB	Left	*1000' +*	25	25	25	25	25	25	25	25	25	25
		Thru											
		Right											
Spring Mill Avenue	SB	Left	*250'*	25	25	25	25	25	25	25	25	25	28
		Thru											
		Right											

(1) Distance to adjacent signalized or stop controlled intersections shown in italics.

Table 7 - 95th Percentile Queue Matrices

11. Hector Street and North Lane/Station Avenue

Time Period			Current Storage [1]	Weekday Morning Peak Hour					Weekday Afternoon Peak Hour				
Design Year				2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension		2022	2024 Build-Out Year without Washington Street Extension		2024 Build-Out Year With Washington Street Extension	
Development Condition				Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev
Hector Street	EB	Left	150'	46	52	53	52	53	39	42	42	42	43
		Thru Right	*780'*	216	257	270	257	270	407	440	448	440	448
	WB	Left	90'	25	25	25	25	25	25	25	25	25	25
		Thru Right	*1000' +*	443	470	478	468	475	308	354	368	354	368
Station Avenue	NB	Left Thru Right	*560'*	45	45	45	45	45	47	47	47	47	47
North Lane	SB	Left Thru Right	*1000' +*	154	157	157	157	157	211	219	221	219	221

(1) Distance to adjacent signalized or stop controlled intersections shown in italics.

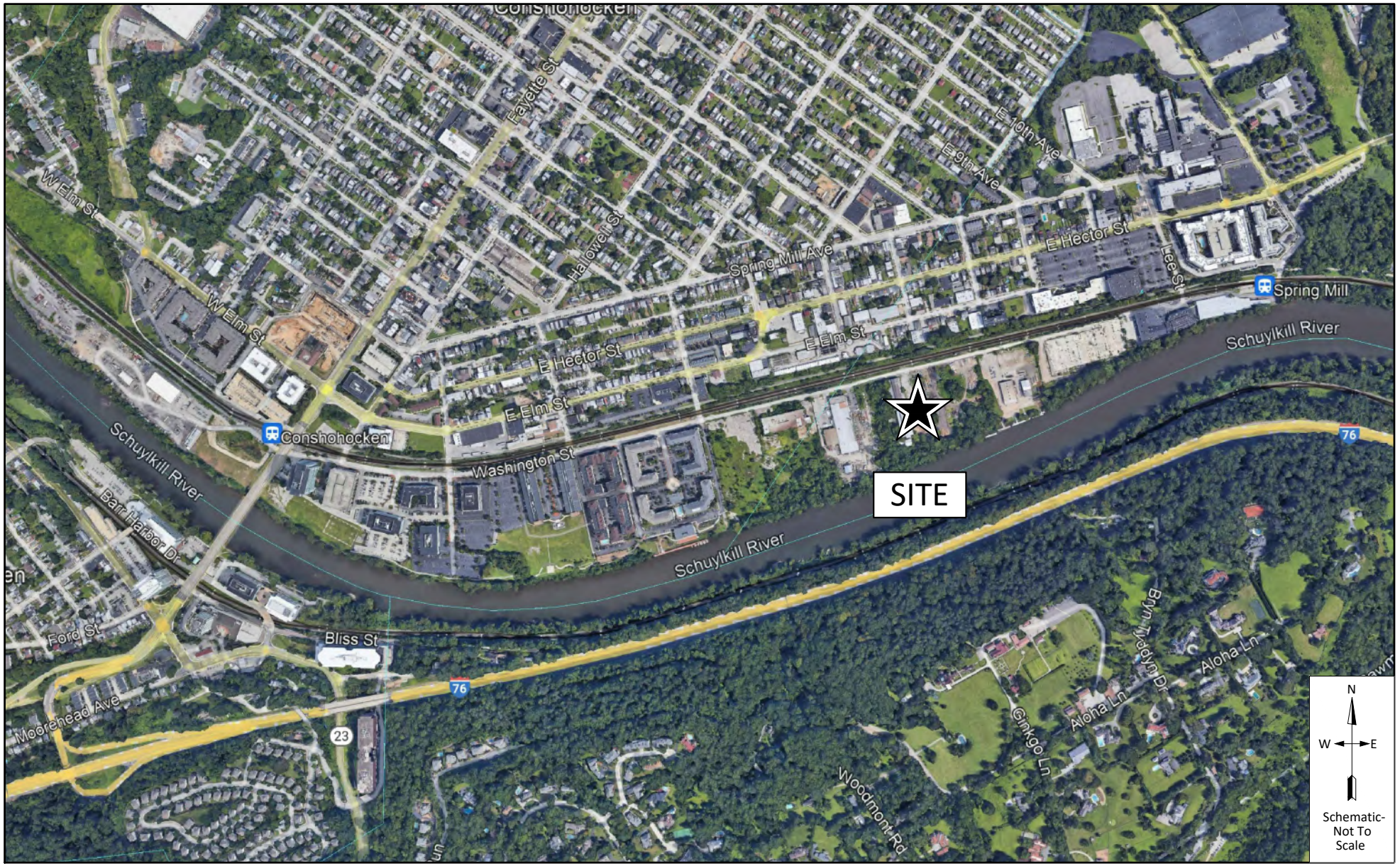


FIGURE 1

Site Location Map

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Graphics\Figure 1.dwg

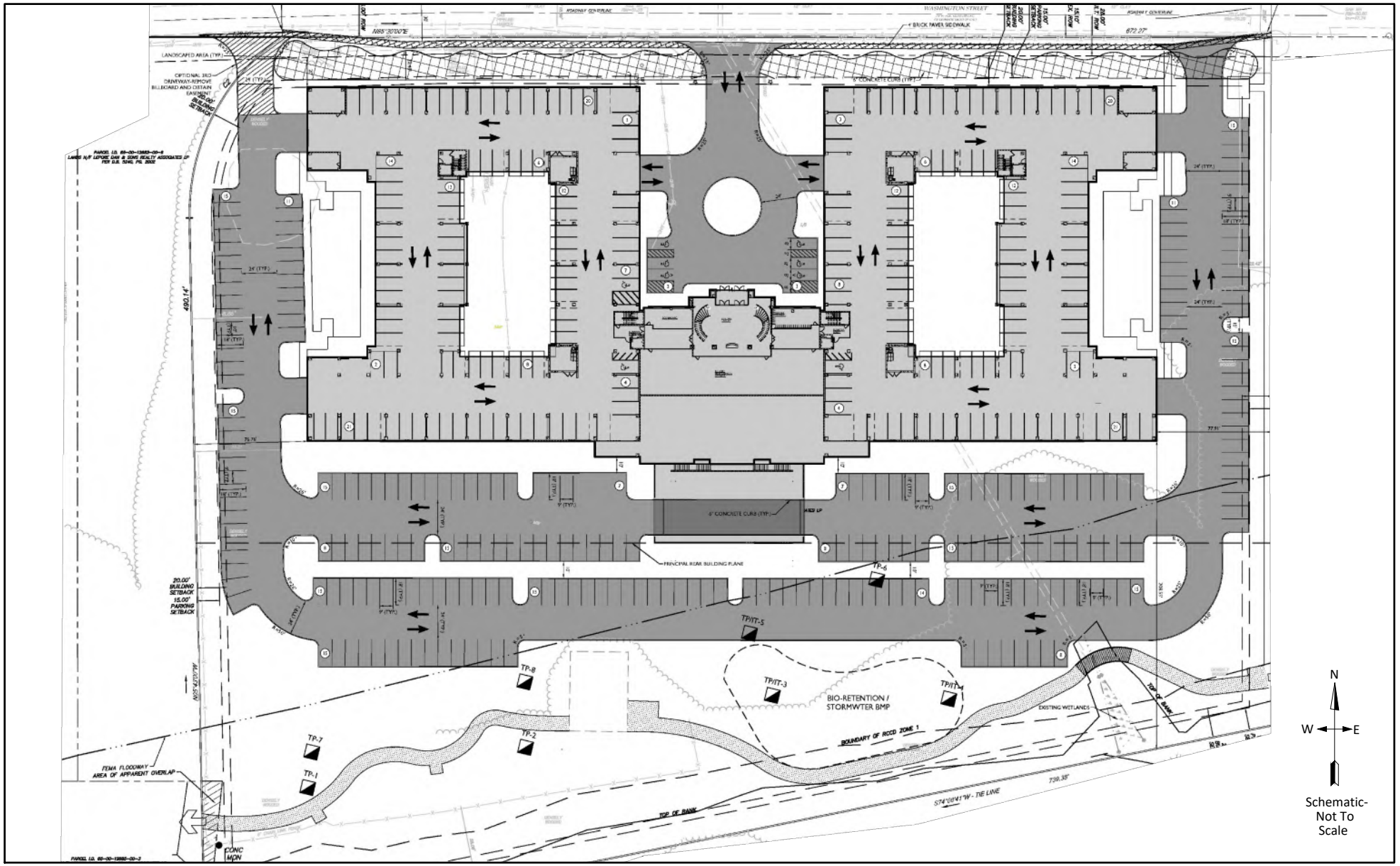


FIGURE 2

Site Plan (Prepared by Maser Consulting, P.A.)

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON

\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Graphics\Figure 2.dwg

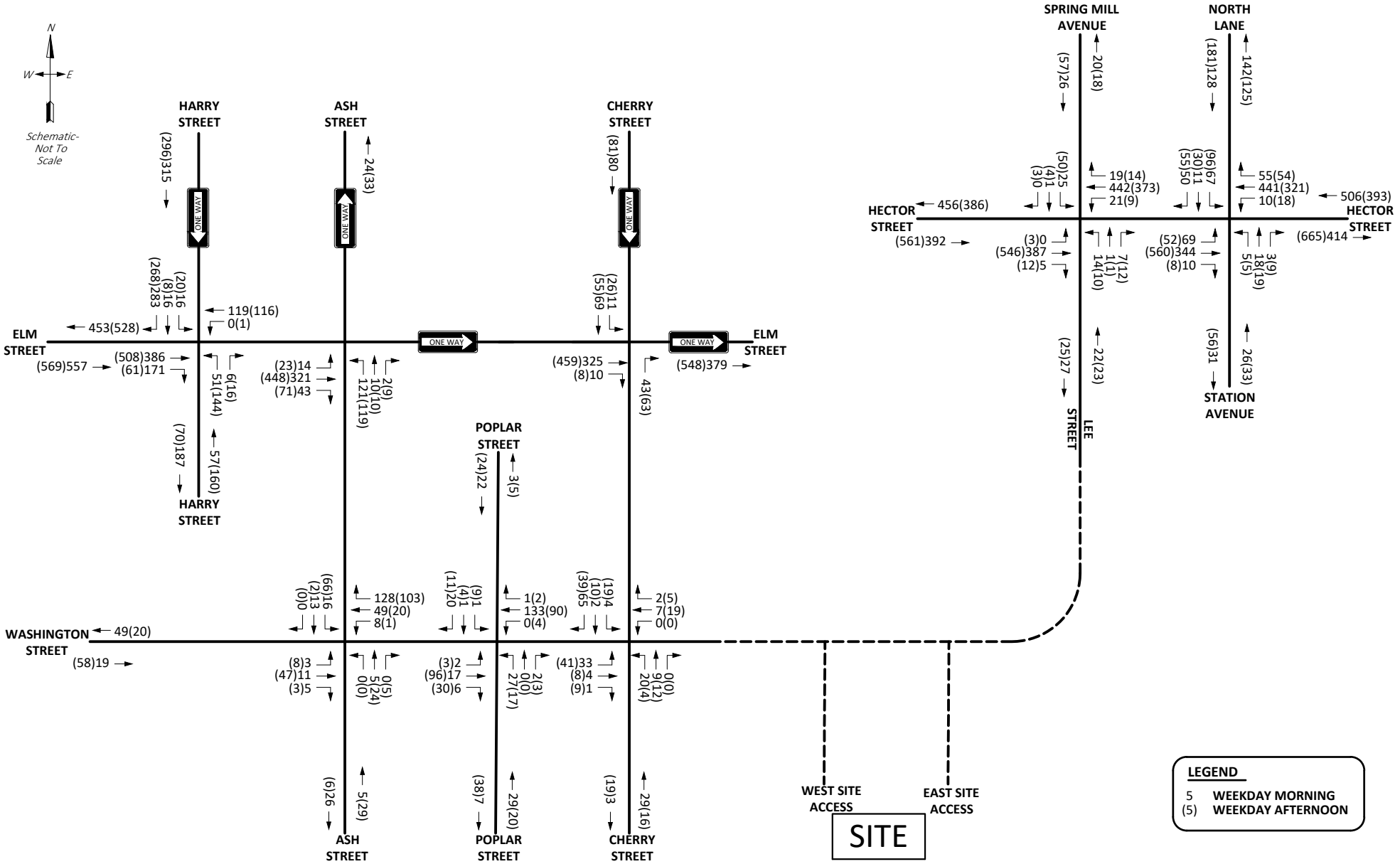


FIGURE 3A

2022 Existing Weekday Peak Hour Traffic Volumes

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON

Y:\eng\818064\Traffic\4-TIS #1 (2022)\Graphics\Figure 3A.dwg

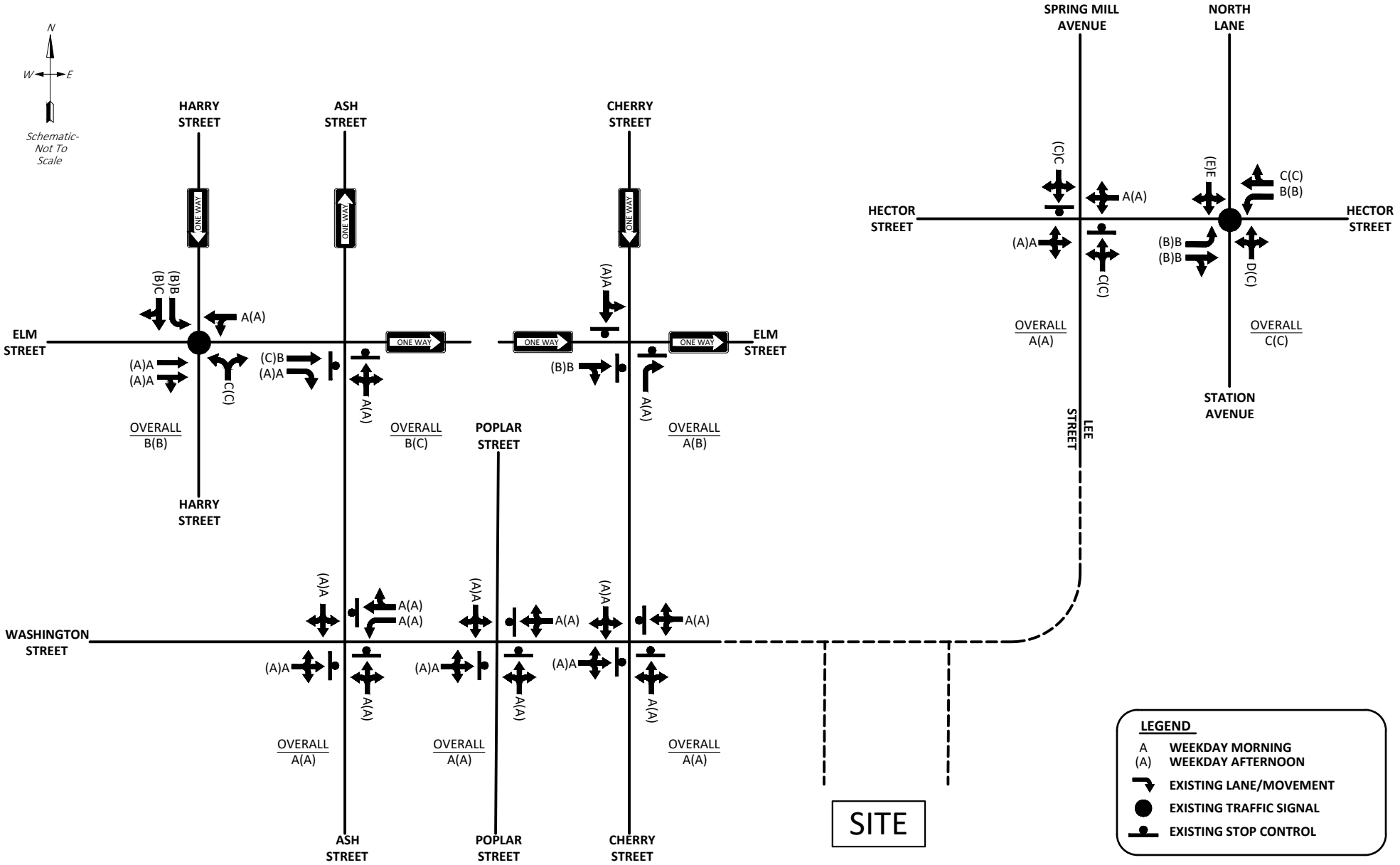


FIGURE 3B

2022 Existing Peak Hour Levels of Service

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON

Y:\eng\818064\Traffic\4-TIS #1 (2022)\Graphics\Figure 3B.dwg

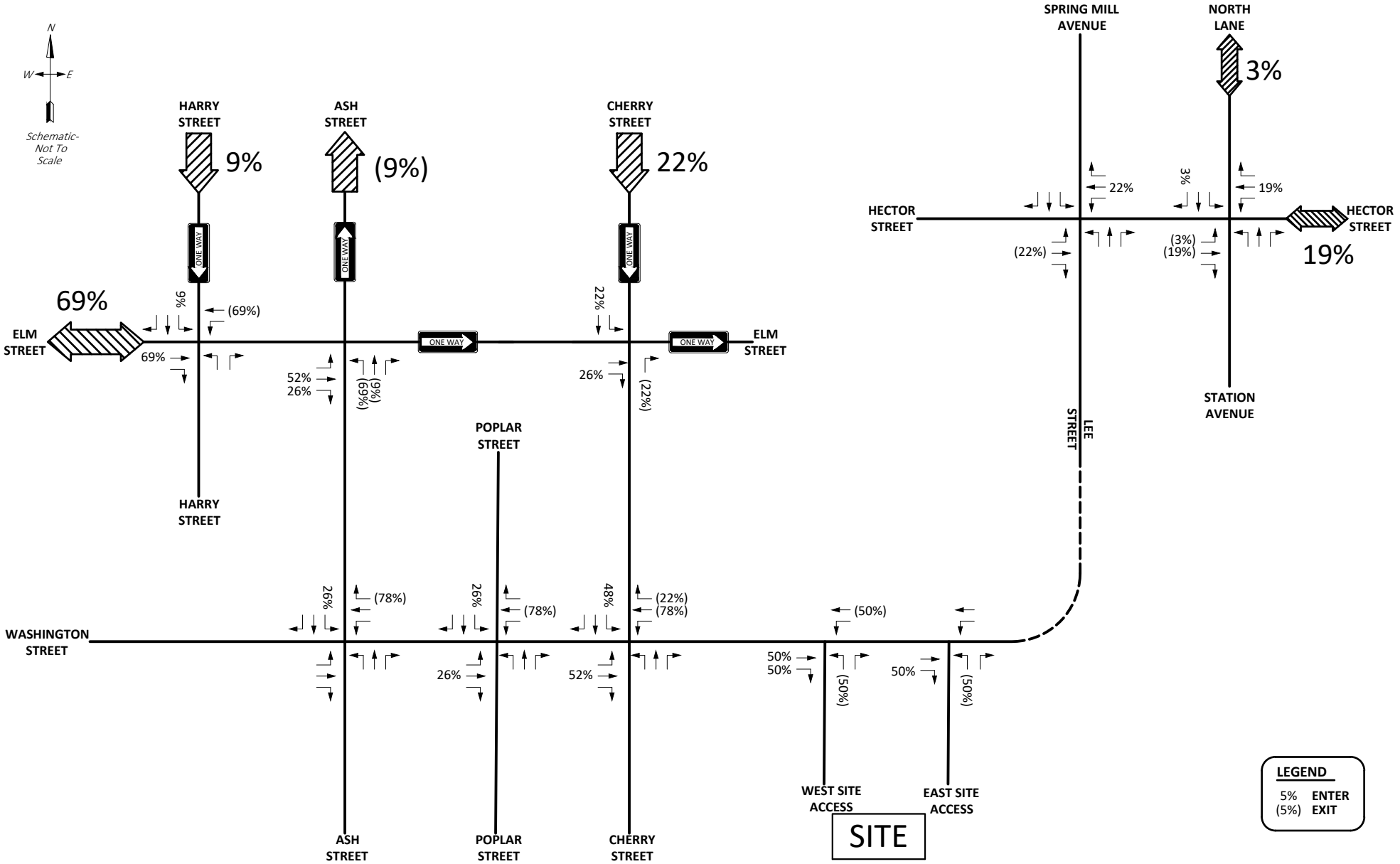


FIGURE 4A

Site Trip Distribution - without Washington Street Extension

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON

Y:\eng\818064\Traffic\4-TIS #1 (2022)\Graphics\Figure 4A.dwg

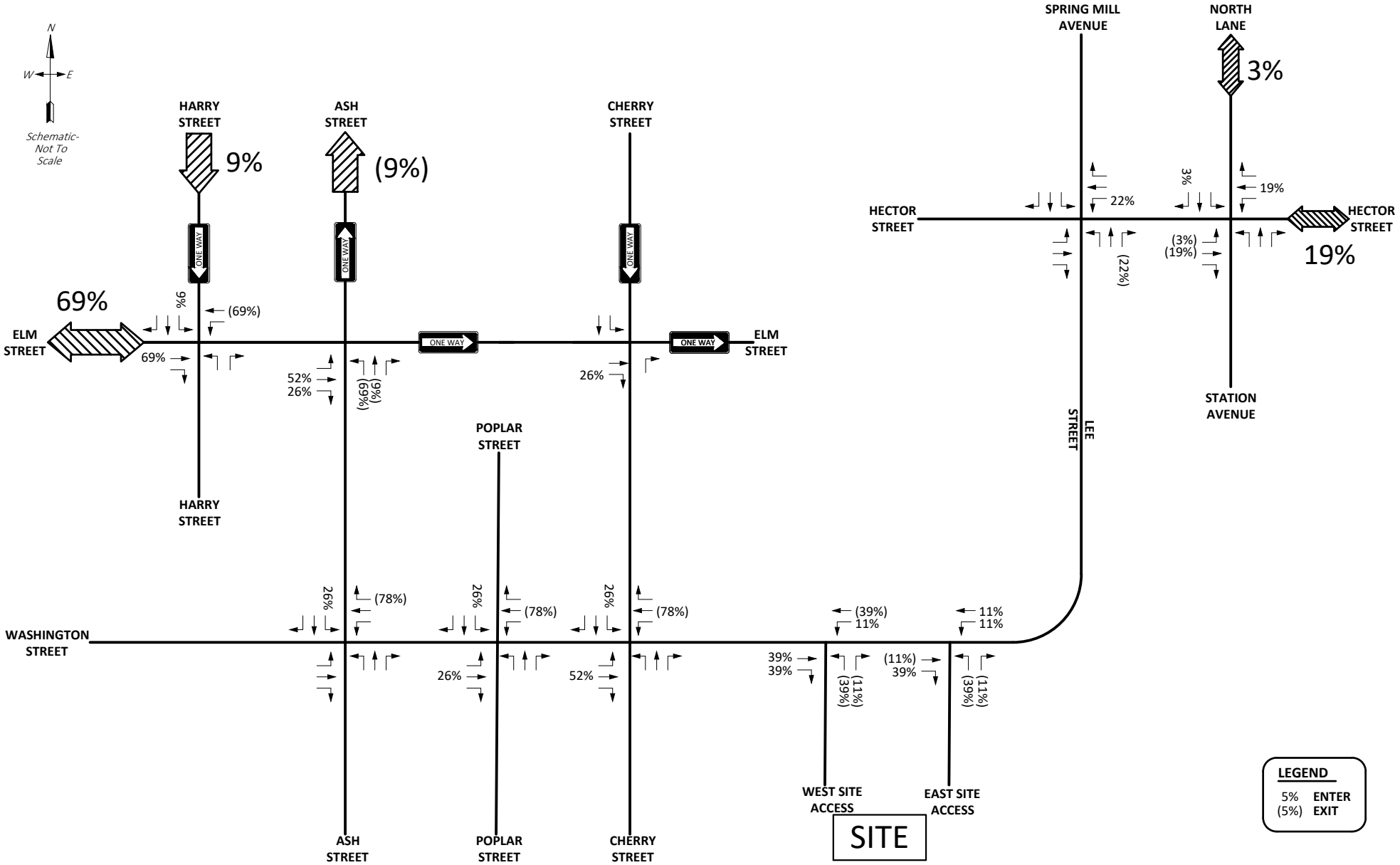


FIGURE 4B

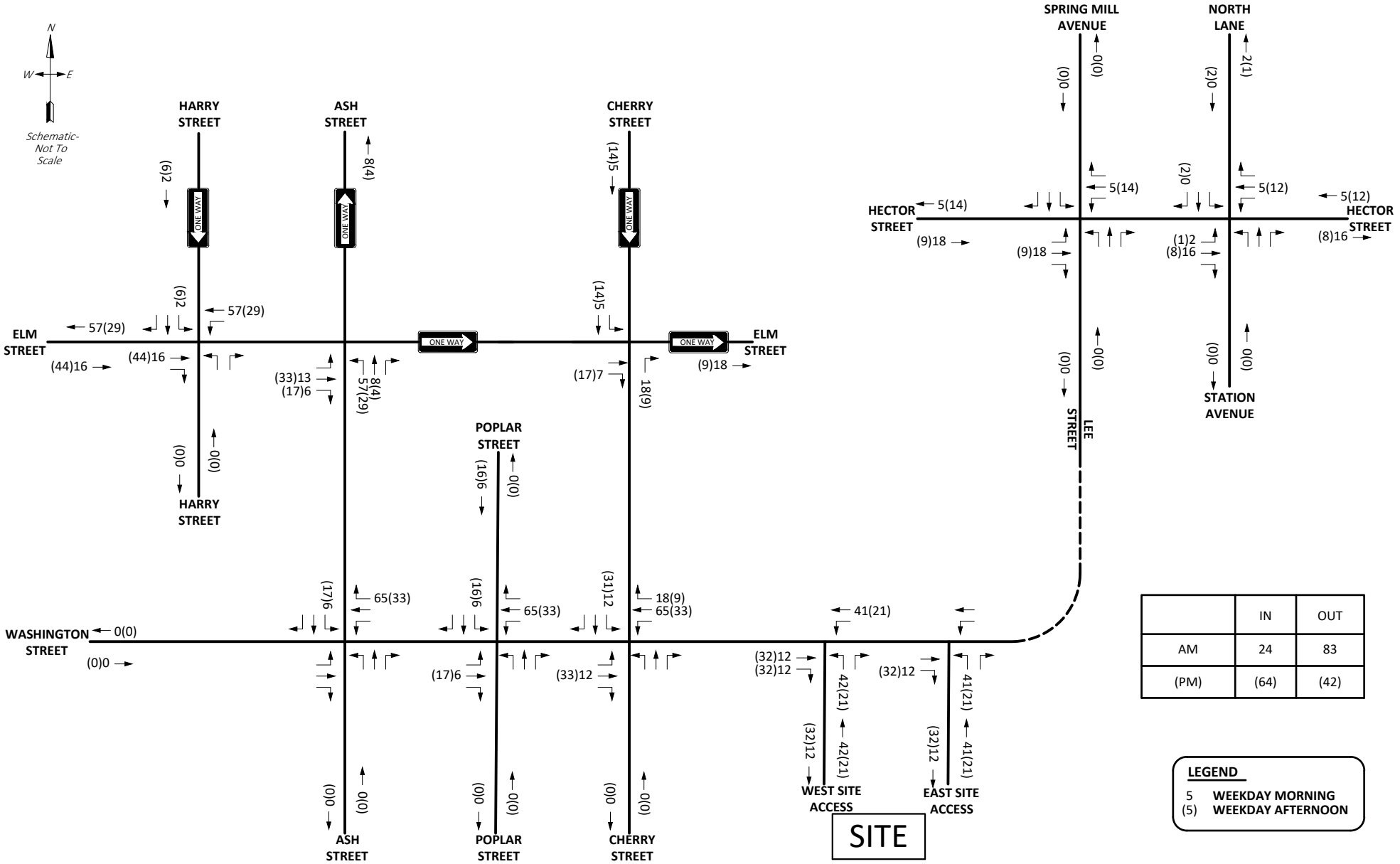
Site Trip Distribution - with Washington Street Extension

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON

Y:\eng\818064\Traffic\4-TIS #1 (2022)\Graphics\Figure 4B.dwg



	IN	OUT
AM	24	83
(PM)	(64)	(42)

LEGEND

5 WEEKDAY MORNING
(5) WEEKDAY AFTERNOON

FIGURE 4C

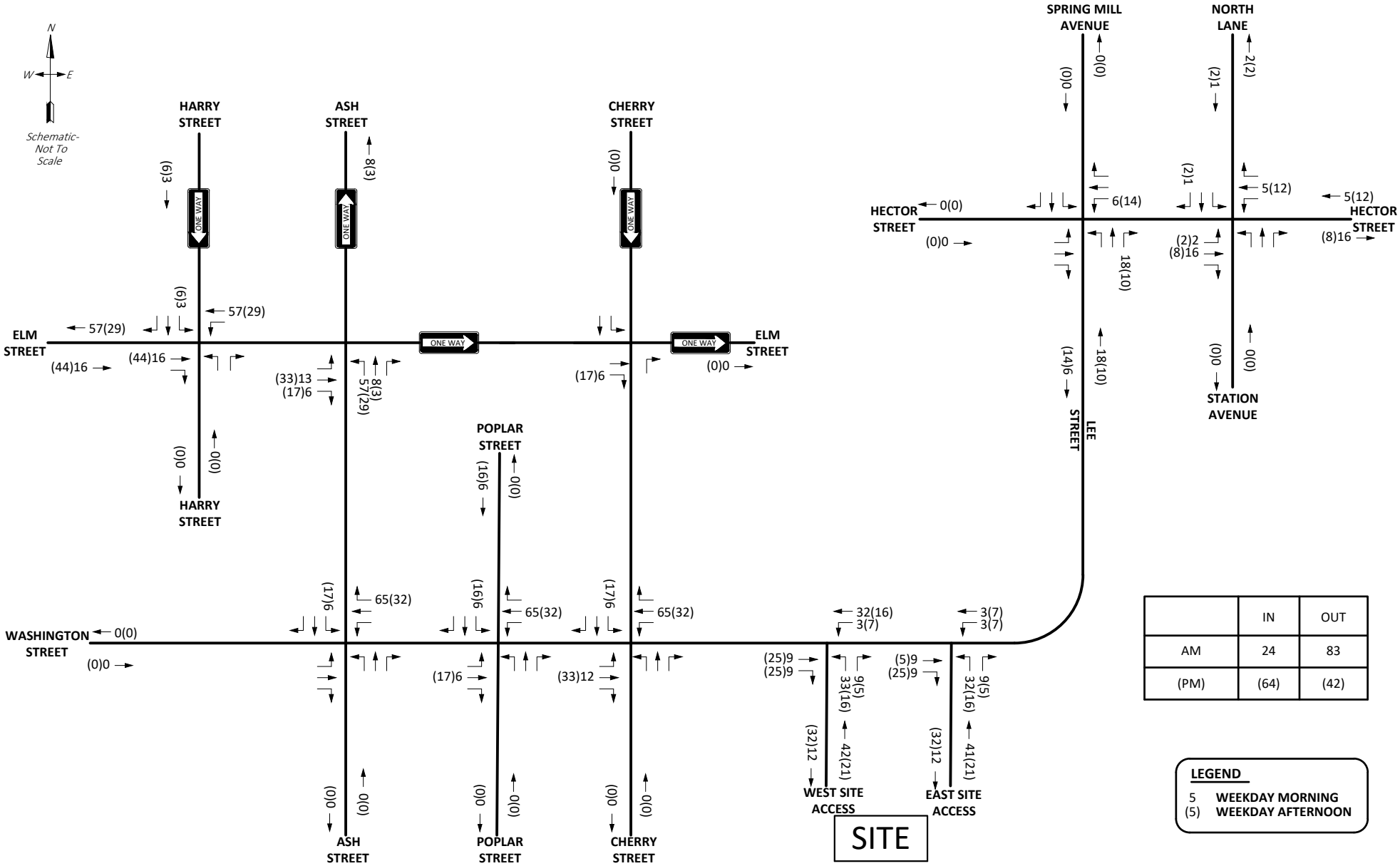
Site Trip Assignment - without Washington Street Extension

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON

Y:\eng\818064\Traffic\4-TIS #1 (2022)\Graphics\Figure 4C.dwg



	IN	OUT
AM	24	83
(PM)	(64)	(42)

LEGEND

5 WEEKDAY MORNING
(5) WEEKDAY AFTERNOON

FIGURE 4D

Site Trip Assignment - with Washington Street Extension

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON

\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Graphics\Figure 4D.dwg

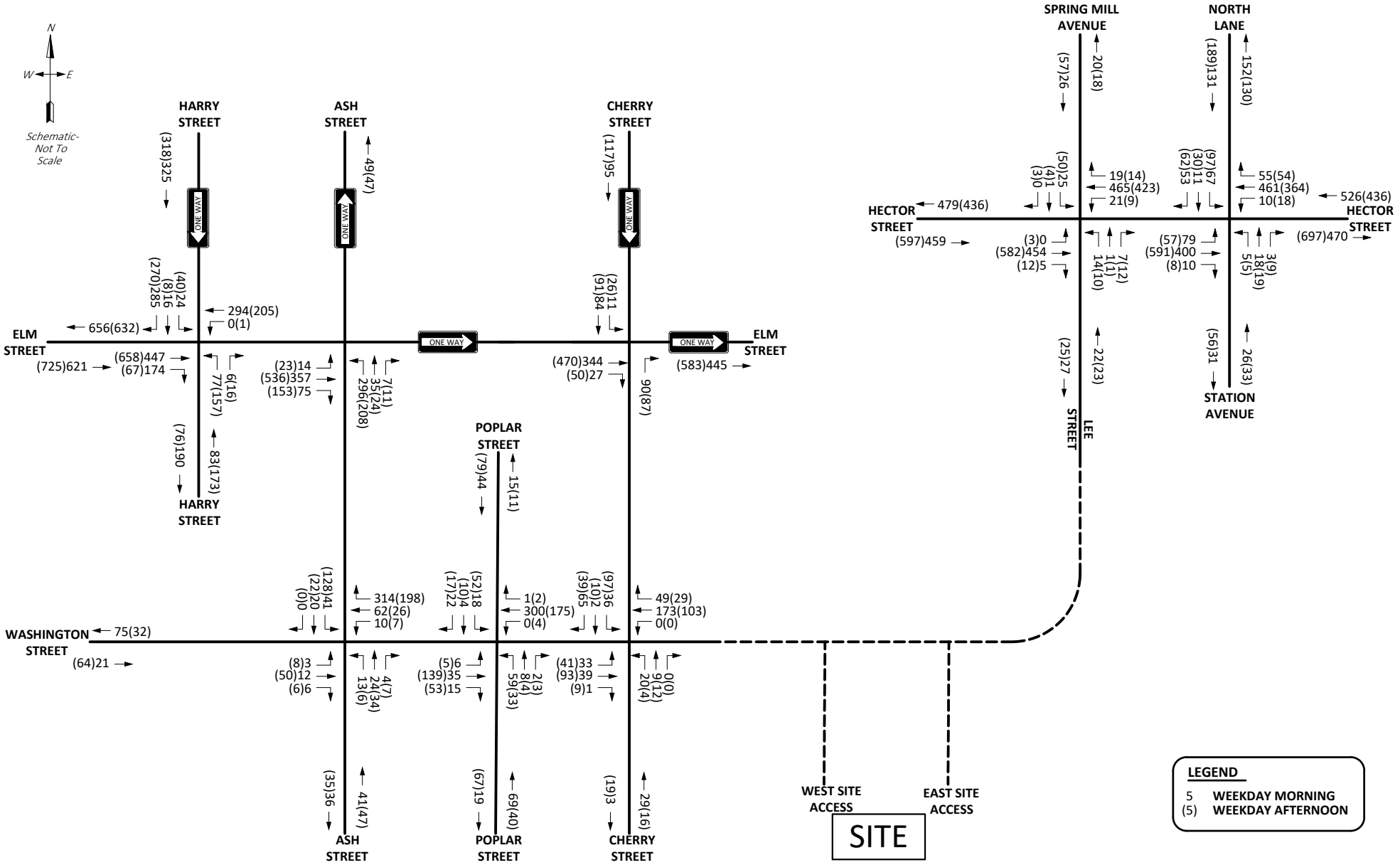


FIGURE 5A

2024 Future without Development Weekday Peak Hour Traffic Volumes - without Washington Street Extension

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON

Y:\eng\818064\Traffic\4-TIS #1 (2022)\Graphics\Figure 5A.dwg

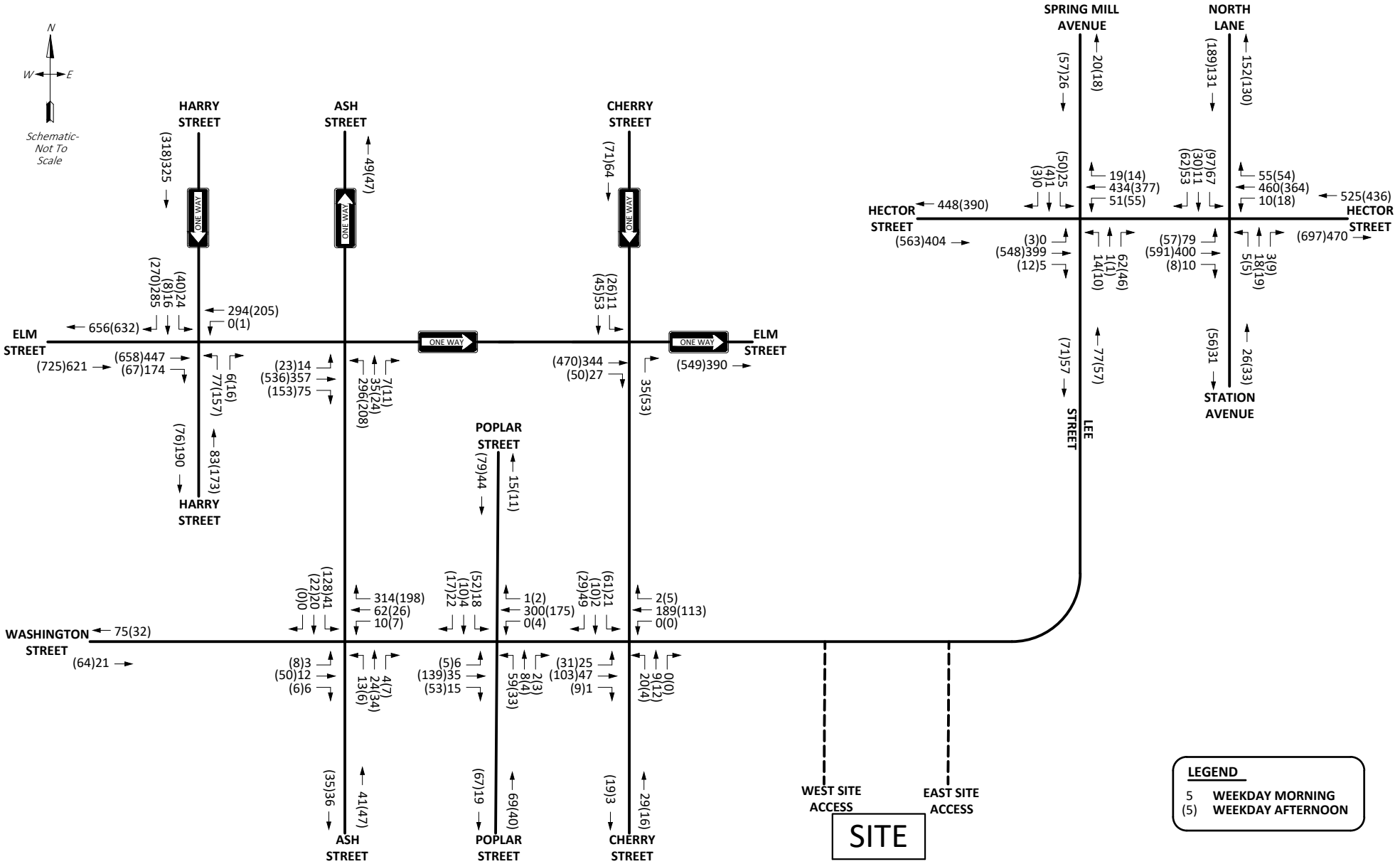


FIGURE 5B

2024 Future without Development Weekday Peak Hour Traffic Volumes - with Washington Street Extension

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON

Y:\eng\818064\Traffic\4-TIS #1 (2022)\Graphics\Figure 5B.dwg

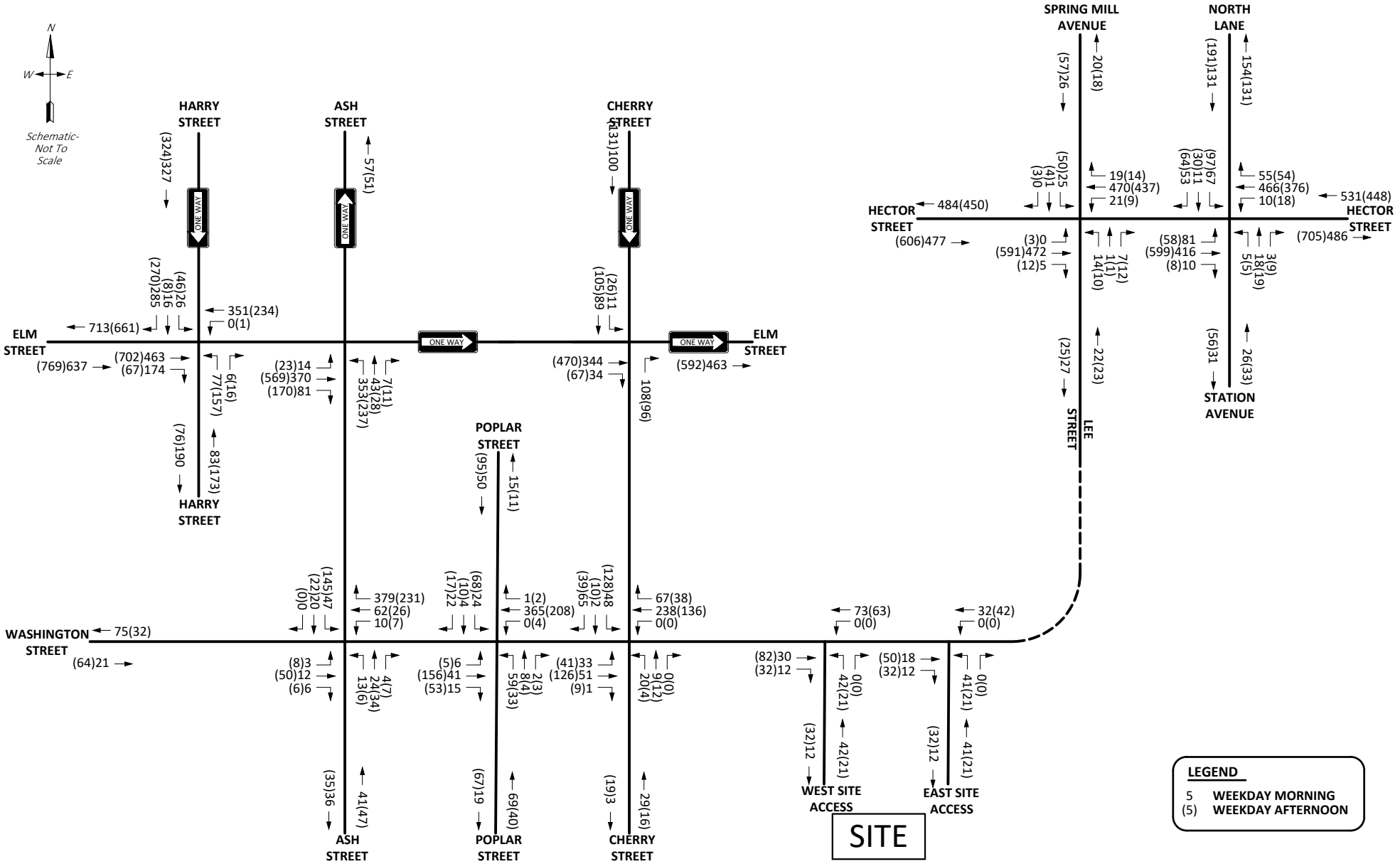


FIGURE 5C

2024 Future with Development Weekday Peak Hour Traffic Volumes - without Washington Street Extension

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON

Y:\eng\818064\Traffic\4-TIS #1 (2022)\Graphics\Figure 5C.dwg

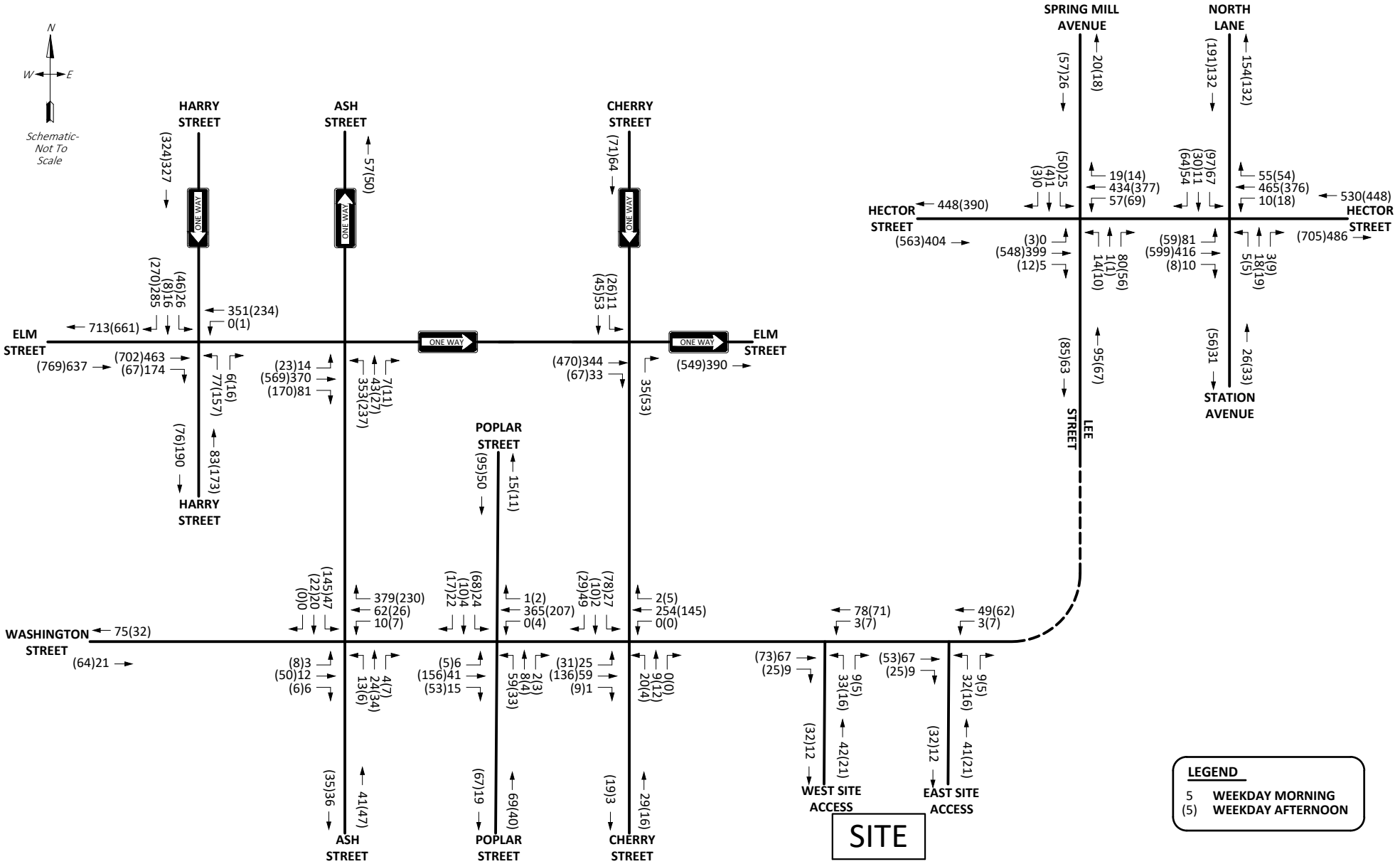


FIGURE 5D

2024 Future with Development Weekday Peak Hour Traffic Volumes - with Washington Street Extension

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON

Y:\eng\818064\Traffic\4-TIS #1 (2022)\Graphics\Figure 5D.dwg

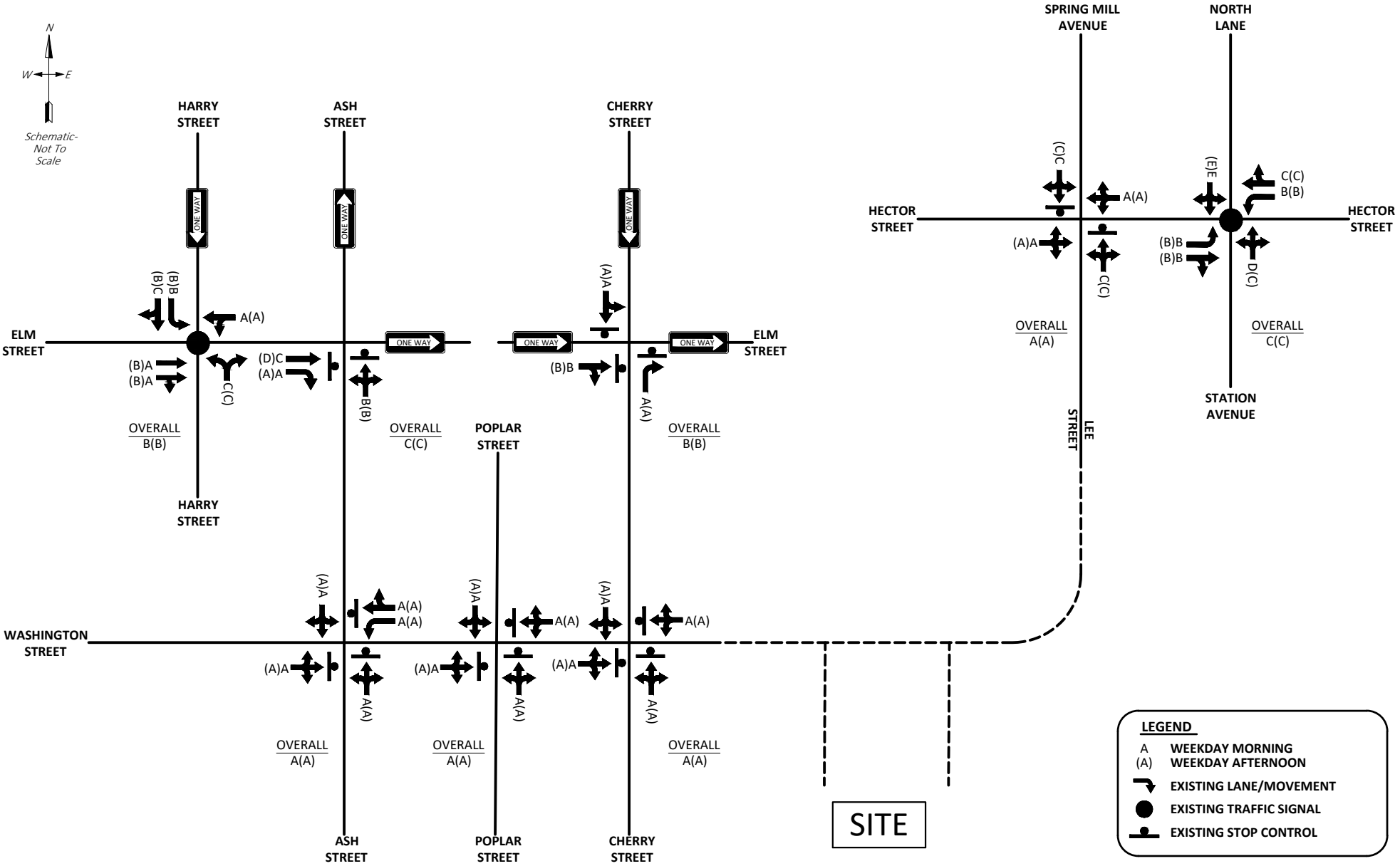


FIGURE 5E

2024 Future without Development Weekday Peak Hour Levels-of-Service - without Washington Street Extension

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON

Y:\eng\818064\Traffic\4-TIS #1 (2022)\Graphics\Figure 5E.dwg

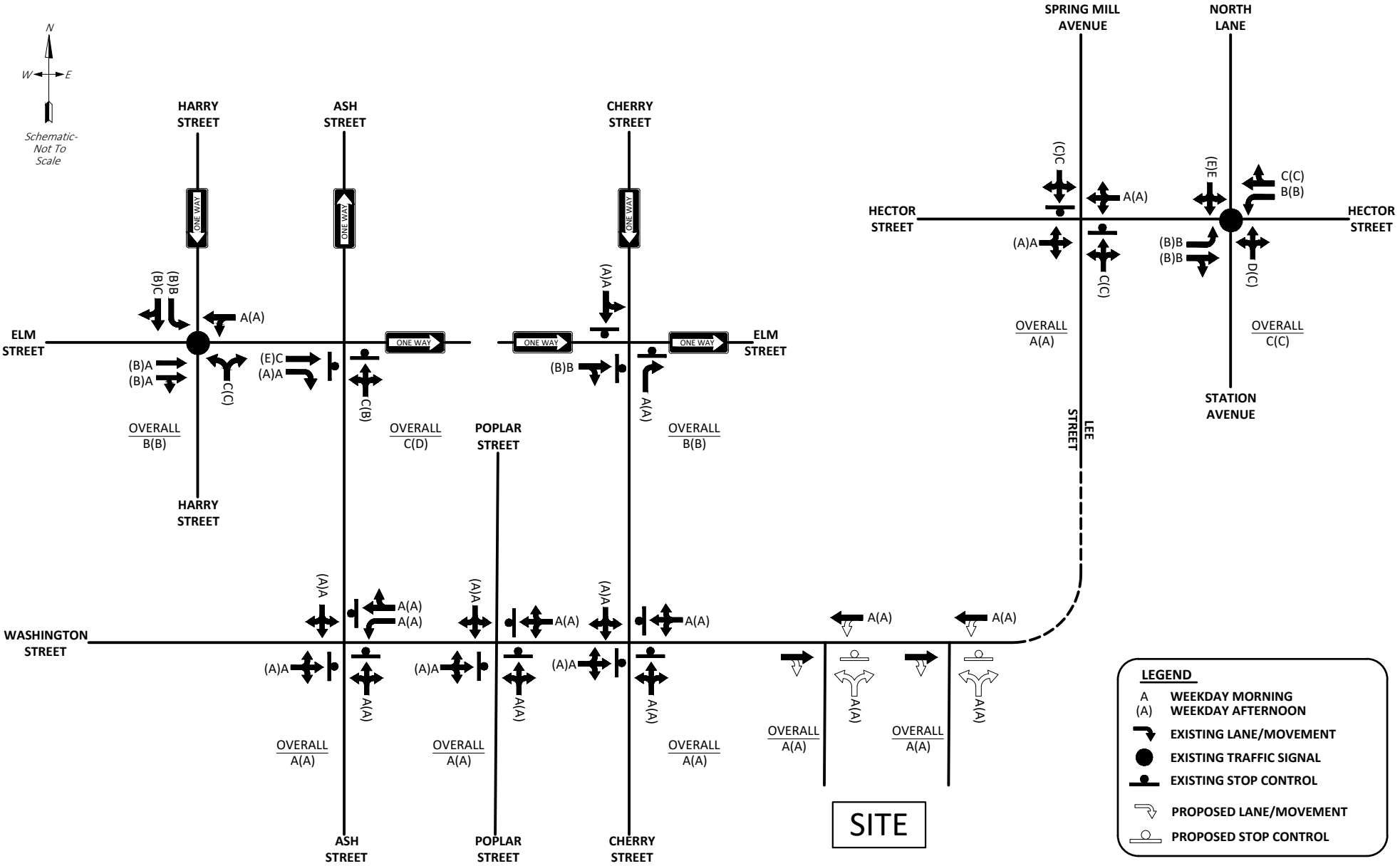


FIGURE 5F

2024 Future with Development Weekday Peak Hour Levels of Service - without Washington Street Extension

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON

Y:\eng\818064\Traffic\4-TIS #1 (2022)\Graphics\Figure 5F.dwg

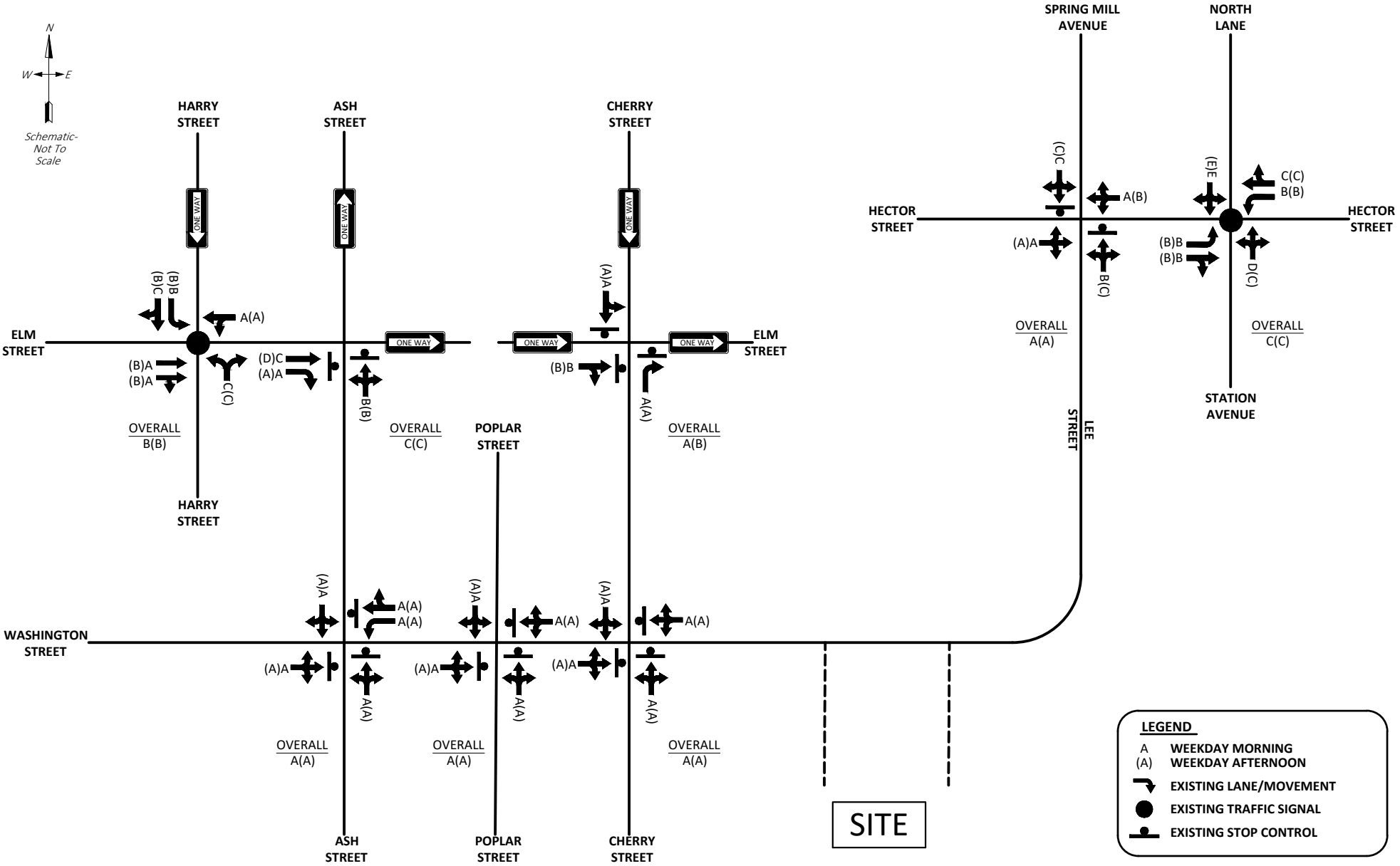


FIGURE 5G

2024 Future without Development Weekday Peak Hour Levels-of-Service - with Washington Street Extension

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON

Y:\eng\818064\Traffic\4-TIS #1 (2022)\Graphics\Figure 5G.dwg

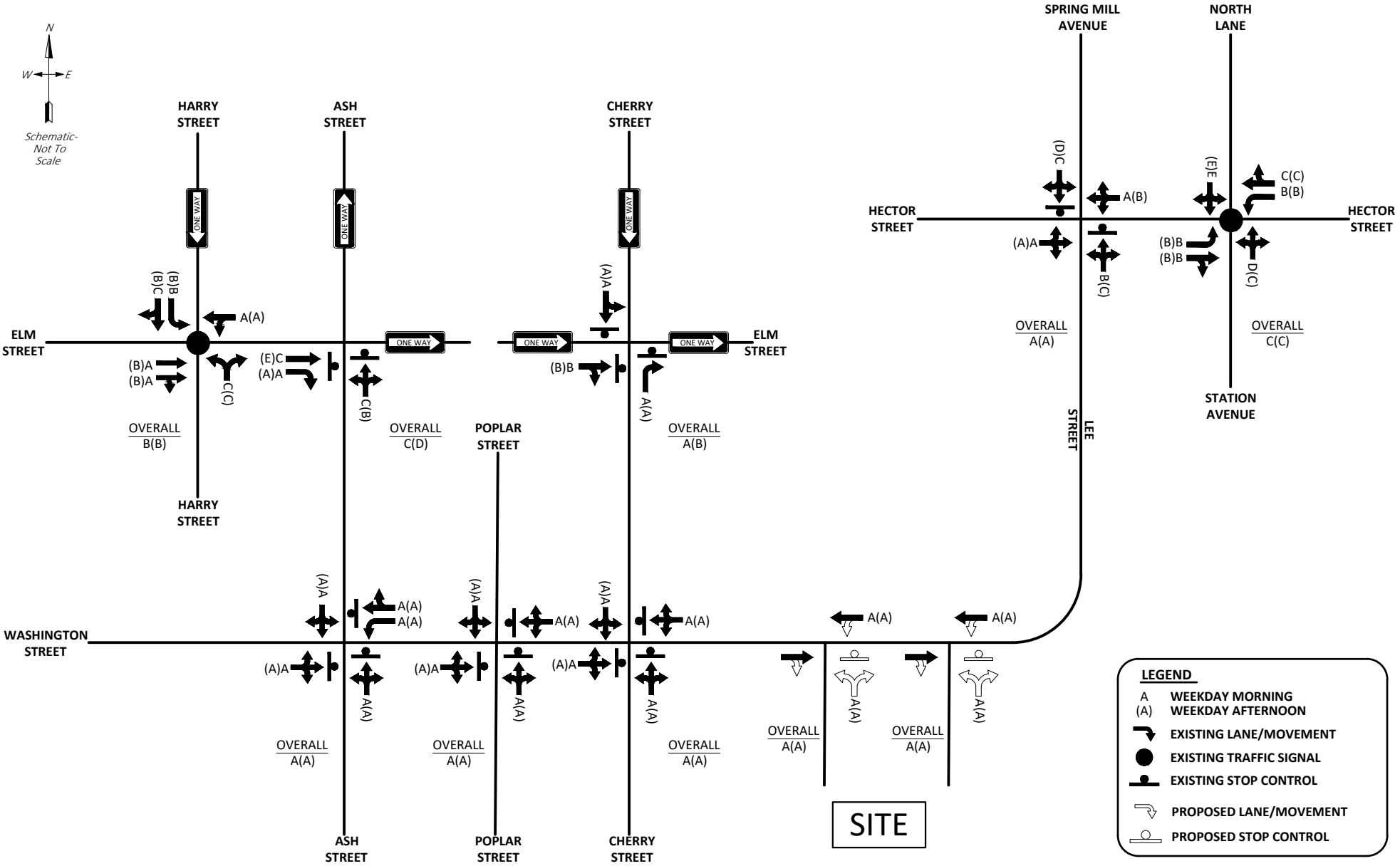


FIGURE 5H

2024 Future with Development Weekday Peak Hour Levels-of-Service - with Washington Street Extension

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

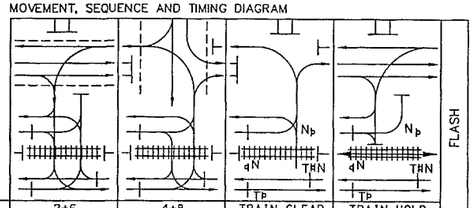
McMAHON

Y:\eng\818064\Traffic\4-TIS #1 (2022)\Graphics\Figure 5H.dwg

Appendix A

Intersection Inventory

MOVEMENT, SEQUENCE AND TIMING DIAGRAM



PHASE	2+6				4+8				TRAIN CLEAR			TRAIN HOLD			FLASH
INTERVAL / SIGNALS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1,2,3	G	G	Y	R	R	R	R	R	R	R	R	G	Y	R	R
4,5	G	G	Y	R	R	R	R	R	R	R	R	G	Y	Y	R
6	R	R	R	R	G	G	Y	R	G	Y	R	R	R	R	R
7	R	R	R	R	G	G	Y	R	G	Y	R	R	R	R	R
8,9	R	R	R	R	G	G	Y	R	R	R	R	R	R	R	R
10,11	M	FH	H	H	H	H	H	H	H	H	H	H	H	H	OUT
12,13	M	FH	H	H	H	H	H	H	H	H	H	H	H	H	OUT
14,15	H	H	H	H	M	FH	H	H	H	H	H	H	H	H	OUT
16,17	H	H	H	H	M	FH	H	H	H	H	H	H	H	H	OUT
SIGNS N,T	②	②	②	②	②	②	②	②	ON	ON	ON	ON	ON	ON	
SIGN G	③	③	③	③	③	③	③	③	ON	ON	ON	ON	ON	ON	

SELECTIVE CLEAR

FIXED			4	2		4	2	6	40①	3	2	**	4	2	
MINIMUM	15				3										
PASSAGE	≠				≠										
MAX. 1	25				20										
PEDESTRIAN*	7	13			7	20									
MEMORY	SVR				NL										

REFER TO SYSTEM PERMIT #1-0085 FOR ADAPTIVE OPERATION

- UPON PEDESTRIAN ACTUATION ONLY, OTHERWISE "H" SYMBOL AT ALL TIMES
- ** FOR DURATION OF TRAIN PRE-EMPTION
- PEDESTRIAN COUNTDOWN TIMER TO COUNTDOWN DURING FLASHING HAND INTERVAL

- SIGNAL SHALL BE EQUIPPED WITH ACCESSIBLE PEDESTRIAN SIGNALS (APS) WITH THE FOLLOWING FEATURES:
  - ADA COMPLIANT PUSHBUTTON WITH LATCHING LED INDICATOR AND TONE.
  - A TACTILE DIRECTIONAL ARROW ALIGNED PARALLEL TO THE CROSSING AND WHICH VIBRATES DURING THE WALK INDICATION.
  - DURATION OF 0.15 SECONDS AND REPEAT AT 1 SECOND INTERVALS, SHALL BE INTENSITY REPONSIVE TO AMBIENT SOUND, AND AUDIBLE FROM 6 TO 12 FEET FROM THE PUSHBUTTON.
  - ACTUATION OF THE PEDESTRIAN PUSHBUTTON SHALL BE ACCOMPANIED BY THE SPEECH MESSAGE "WAIT" WHEN THE WALK INTERVAL IS NOT TIMING.
  - THE WALK INDICATION SHALL BE THE SPEECH WALK MESSAGE: "[STREET NAME]. WALK SIGN IS ON TO CROSS [STREET NAME]."
  - UPON TRAIN PRE-EMPTION, THE FOLLOWING VERBAL MESSAGE IS TO BE ANNOUNCED VIA THE PUSHBUTTON SPEAKERS: "TRAIN APPROACHING NEARBY."

≠ PHASE PASSAGE CALCULATED BY TRAFFIC ADAPTIVE PROCESSOR

• PHASE SEQUENCE SELECTED BY TRAFFIC ADAPTIVE PROCESSOR

• TRAFFIC ADAPTIVE SYSTEM TO OPERATE WITH PEDESTRIAN MODULE

OPERATION NOTES

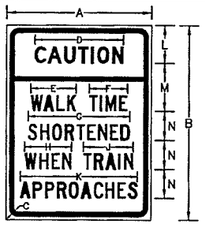
① TRAIN CLEAR PHASE TO HOLD GREEN FOR 5 SECONDS AFTER GATE DOWN RAILROAD INTERCONNECT CIRCUIT CLOSES TO REDUCE THE LIKELIHOOD OF QUEUE STOPPING ON TRACKS.

② LED BLANK OUT TURN PROHIBITION SIGNS N & T TO OPERATE WITH LOOP DETECTORS 11, 12, 13 & 14 ON 2 SECOND DELAY TO REDUCE THE LIKELIHOOD OF QUEUE STOPPING ON TRACKS. "TRAIN" MESSAGE PORTION OF SIGNS N & T TO ILLUMINATE ONLY WHEN TRAIN IS APPROACHING.

③ LED BLANK OUT TRAIN SIGN G TO ILLUMINATE ONLY WHEN TRAIN IS APPROACHING.

SIGN TABULATION

SYMBOL	SERIES	SIZE	DESCRIPTION
A	R10-3E(L)	9"x15"	EDUCATIONAL PUSH BUTTON FOR WALK SIGNAL WITH COUNTDOWN TIMER SIGN
B	D3-4	84"x24"	SINGLE-LINE OVERHEAD STREET NAME SIGN - "E Elm St"
C	D3-4	90"x24"	SINGLE-LINE OVERHEAD STREET NAME SIGN - "Harry St"
D	R3-5R	30"x36"	RIGHT TURN SIGN
E	R3-6LS	30"x36"	OPTIONAL LEFT TURN SIGN
F	R5-1	30"x30"	DO NOT ENTER SIGN
G	W10-7	30"x30"	LIGHT RAIL TRANSIT APPROACHING SIGN - BLANK OUT
J	R3-2	30"x30"	NO LEFT TURN SIGN
K	R6-7	24"x30"	END ONE WAY SIGN
L	W4-4BP	30"x15"	ONCOMING TRAFFIC DOES NOT STOP
M	R1-1	30"x30"	STOP SIGN
N	R3-1	29"x39"	NO RIGHT TURN (TRAIN) SIGN - BLANK OUT
P	R8-8	24"x30"	DO NOT STOP ON TRACKS SIGN
R	R15-1	48"x9"	RAILROAD CROSSING SIGN
S	R15-2	48"x9"	TRACK SIGN "2 TRACKS"
T	R3-2	29"x39"	NO LEFT TURN (TRAIN) SIGN - BLANK OUT
U	R3-1	30"x30"	NO RIGHT TURN SIGN
V	W6-3	30"x30"	TWO WAY TRAFFIC SIGN
W	SPECIAL	9"x12"	CAUTION-WALK TIME SHORTENED WHEN TRAIN APPROACHES
X	R10-3E(L)	9"x15"	EDUCATIONAL PUSH BUTTON FOR WALK SIGNAL WITH COUNTDOWN TIMER SIGN
Y	R7-3-1	12"x18"	NO PARKING HERE TO CORNER
Z	R3-8A(L-SR)	30"x30"	LANE USE CONTROL (TWO LANES) SIGN
AA	R10-11	24"x30"	NO TURN ON RED
BB	R10-20AP	24"x24"	MON. - FRI.; 7-9 AM; 4-7 PM
CC	R6-1L	36"x12"	HORIZONTAL LEFT ONE-WAY SIGN
DD	R6-1R	36"x12"	HORIZONTAL RIGHT ONE-WAY SIGN
EE	W16-9P	24"x12"	AHEAD PLAQUE



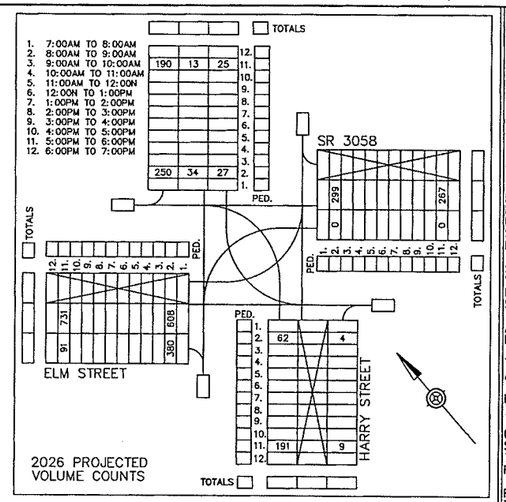
LEGEND AND BORDER	BLACK	NON-REFLECTORIZED
BACKGROUND (TOP)	YELLOW	REFLECTORIZED
BACKGROUND (BOTTOM)	WHITE	REFLECTORIZED

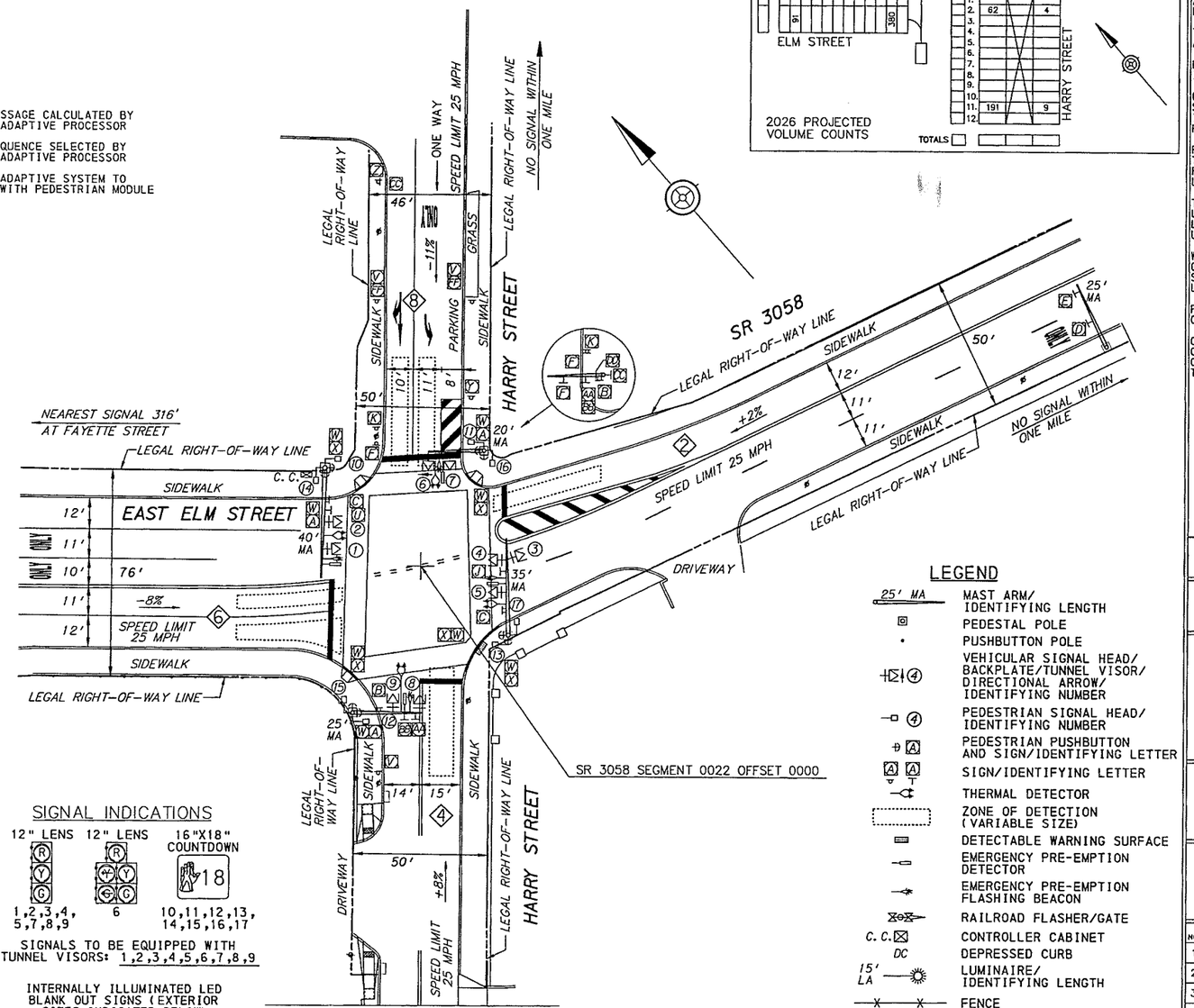
SIGN SIZE	DIMENSIONS												
	A	B	C	D	E	F	G	H	J	K	L	M	N
9X12	9.00	12.00	0.75	5.50	2.80	2.40	6.30	2.90	3.10	7.30	2.30	3.05	1.75

SIGN SIZE	SERIES BY LINE					MARGIN	BORDER
	1	2	3	4	5		
9X12	D	C	C	C	C	0.1875	0.3125

ALL DIMENSIONS IN INCHES SIGN NOT TO SCALE

SIGN W SPECIAL 9"X12"





SIGNAL INDICATIONS

12" LENS 12" LENS 16"X18" COUNTDOWN

1,2,3,4, 5,7,8,9 — 6 — 10,11,12,13, 14,15,16,17

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS: 1,2,3,4,5,6,7,8,9

INTERNALLY ILLUMINATED LED BLANK OUT SIGNS (EXTERIOR SIZES INDICATED BELOW)

30"X30" G — TRAIN 29"X39" W — TRAIN 29"X39" J

LEGEND

- 25' MA — MAST ARM/ IDENTIFYING LENGTH
- PEDESTAL POLE
- PUSHBUTTON POLE
- VEHICULAR SIGNAL HEAD/ BACKPLATE/TUNNEL VISOR/ DIRECTIONAL ARROW/ IDENTIFYING NUMBER
- PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON AND SIGN/IDENTIFYING LETTER
- SIGN/IDENTIFYING LETTER
- THERMAL DETECTOR
- ZONE OF DETECTION (VARIABLE SIZE)
- DETECTABLE WARNING SURFACE
- EMERGENCY PRE-EMPTION DETECTOR
- EMERGENCY PRE-EMPTION FLASHING BEACON
- RAILROAD FLASHER/GATE
- C.C. — CONTROLLER CABINET
- DC — DEPRESSED CURB
- 15' LA — LUMINAIRE/ IDENTIFYING LENGTH
- FENCE
- GUIDE RAIL
- UTILITY POLE
- PHASE NUMBER

0 25 50 FEET

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT FOR REVIEW PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

SYSTEM PERMIT # 1-0085

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY

MUNICIPALITY: CONSHOHOCKEN BOROUGH

INTERSECTION: E ELM STREET (SR 3058) AND HARRY STREET

REVIEWED:

MUNICIPAL OFFICIAL — DATE 10/1/19

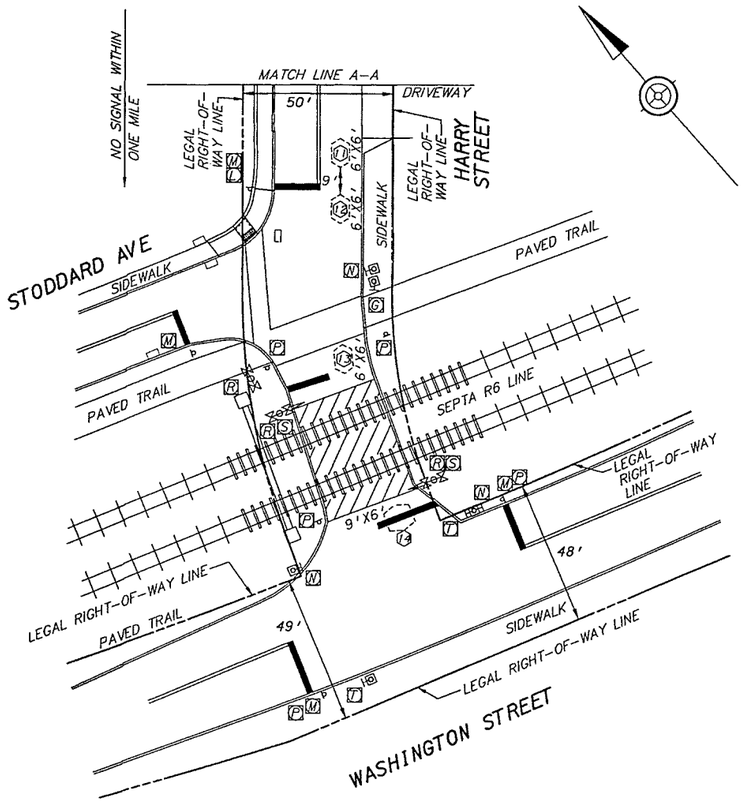
RECOMMENDED:

MARK L KRAY — 5-5-04

LOUIS R BELMONTE, DISTRICT TRAFFIC ENGINEER — 5-17-04

NO.	REVISION	DES./ REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	RELOCATE SE MAST ARM/ TIMING CHANGES	MCM / BJD	11/1/07	LUTZ	11/2/07	ABP	11/3/07
2	ADDITION OF TURNING LANE FOR SOUTHBOUND HARRY STREET, MAX 1 DURING NIGHT, ADD INTCR, PED TIMES	PWH / TFB	7/21/10	DLA	8/26/10	ABP	9/7/10
3	ECMS-96218 ADD ADAPTIVE, ETHERNET COMMUNICATIONS & COUNTDOWNS	PA / KPL	06/27/18	DLA	06/28/18	ABP	06/28/18
4	NEW ATC CABINET, LED RR SIGNS, QUEUE LOOPS, ADD UPS, RR TEST SWITCH, APS	TPD	09/12/19	KPL	10/6/19	DLA	10/9/19
5							
6							
7							
8							

SHEET 2 OF 3 | PERMIT # 64-3238 | FILE # 3238



TRAIN PRE-EMPTION NOTES

WARNING!

HIGHWAY-RAIL GRADE CROSSING WARNING SYSTEM AND HIGHWAY TRAFFIC SIGNALS ARE INTERCONNECTED.

BEFORE MODIFICATION IS MADE TO ANY OPERATION WHICH CONNECTS TO OR CONTROLS THE TIMING OF AN ACTIVE RAILROAD WARNING SYTEM AND/OR TIMING AND PHASING OF TRAFFIC SIGNAL THE APPROPROIATE PARTY(IES) SHALL BE NOTIFIED, AND, IF NECESSARY, A JOINT INSPECTION CONDUCTED.

U.S. DOT/AAR CROSSING NUMBER: 592688K

1. HIGHWAY AGENCY: PENNDOT
   PHONE NUMBER: 610-205-6700
2. RAILROAD: SEPTA
   PHONE NUMBER: 215-580-8668
3. OTHER: CONSHOHOCKEN BOROUGH
   PHONE NUMBER: 610-828-1092

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL TRANSIT ADMINISTRATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

PRE-EMPTION PRIORITY LOGIC

PRE-EMPT 1 → TRAIN PRE-EMPTION

PRE-EMPT 2 → EMERGENCY VEHICLE PRE-EMPTION

INTERCONNECTION CIRCUITS

AVP OR AP - DUAL SINGLE BREAK, SUPERVISION
XR - DUAL SINGLE BREAK, NO SUPERVISION
GD - DUAL SINGLE BREAK
(DUAL-TWO INDEPENDANT TRAFFIC SIGNALS ARE INTERCONNECTED TO THE RAILROAD WARNING SYSTEM)

SPECIAL NOTE FOR INTERCONNECTION CIRCUITS

THIS WARNING SYSTEM IS INTERCONNECTED TO TWO INDEPENDENT HIGHWAY TRAFFIC SIGNALS. ONE TRAFFIC SIGNAL IS LOCATED AT THE INTERSECTION OF ELM STREET AND HARRY STREET AND ONE TRAFFIC SIGNAL IS LOCATED AT FAYETTE STREET AND ELM STREET. MAXIMUM TRAIN TIMETABLE SPEED IS 40 MPH.

THIS REQUIRES TWO ELECTRICALLY INDEPENDENT AND ISOLATED INTERCONNECTION CIRCUITS. IT DOES NOT REQUIRE INDEPENDENT RELAYS, JUST INDEPENDENT CONTACT SETS. BECAUSE BOTH SIGNALIZED INTERSECTIONS WITH FULL RAILROAD PRE-EMPTION ARE LOCATED NORTH OF THE GRADE CROSSING, ONLY ONE GATE DOWN RELAY IS REQUIRED (FOR THE NORTHBOUND GATE). GATE DOWN CIRCUIT TO CLOSE WHEN GATE IS LOWERED TO WITHIN FIVE DEGREES OF HORIZONTAL OR TRAIN OCCUPIES ISLAND.

THE FOLLOWING TERMINALS SHALL BE PROVIDED IN THE INTERCONNECTION JUNCTION BOX ON THE SIDE OF THE INSTRUMENT HOUSE (PREFERRED) OR AS PROVIDED BY THE RAILROAD STANDARDS FOR THE TERMINATION OF THE TRAFFIC SIGNAL INTERCONNECTION CABLES:

ELM & HARRY	FAYETTE & ELM
AP-FRONT	AP-FRONT
AP-BACK	AP-BACK
AP-HEEL	AP-HEEL
XR-FRONT	XR-FRONT
XR-HEEL	XR-HEEL
GD-FRONT	GD-FRONT
GD-HEEL	GD-HEEL

RAILROAD PRE-EMPTION PARAMETERS (SECONDS)

	DESCRIPTION	VALUE
MWT	MINIMUM WARNING TIME	30
APT	ADVANCE PRE-EMPTION TIME	32
MAXIMUM PRE-EMPTION TIME		62

TRAFFIC SIGNAL NOTES FOR TRAIN PRE-EMPTION:

- THE TRAFFIC SIGNAL CONTROLLER IS TO BE INTERCONNECTED WITH THE RAILROAD CROSSING DEVICES. UPON ACTIVATION OF TRAIN PREEMPTION, THE TRAFFIC SIGNAL CONTROLLER IS TO PROVIDE THE TRAIN CLEAR AND TRAIN HOLD PHASES AS SHOWN. THE TRAFFIC SIGNAL CONTROLLER IS TO BE EQUIPPED WITH RAILROAD TEST SWITCH PANEL CONNECTED TO RAILROAD CIRCUITS AS IDENTIFIED ABOVE.
- THE SIGNALS, WHEN ACTIVATED BY A TRAIN, SHALL TRUNCATE ALL GREEN INDICATIONS TO A VALUE OF 5 SECONDS, FOLLOWED BY SELECTIVE CLEARANCES DEPENDENT UPON THE PHASE IN WHICH THE PRE-EMPTION OCCURS, FOLLOWED BY TRAIN CLEAR.
- THE SIGNALS, WHEN ACTIVATED BY A TRAIN, SHALL TIMEOUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY TRAIN CLEAR.
- IF SIGNALS HAVE BEEN ACTUATED BY EMERGENCY PRE-EMPTION AND THE SIGNAL IS PRE-EMPTED BY A TRAIN, THE EMERGENCY PRE-EMPTION PHASE SHALL TERMINATE IMMEDIATELY, FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES, BEFORE GOING INTO TRAIN PRE-EMPTION.
- IF THE SIGNALS, WHEN ACTIVATED BY TRAIN PRE-EMPTION, ARE FLASHING, ALL SIGNALS SHALL REMAIN FLASHING AND SIGNS "G", "N" & "T" SHALL BE ILLUMINATED.
- IF SIGNALS HAVE BEEN ACTUATED BY PEDESTRIAN PUSH BUTTONS, AND THE SIGNAL IS PRE-EMPTED BY A TRAIN, THE "WAN" INTERVAL SHALL TERMINATE IMMEDIATELY, FOLLOWED BY THE "FLASHING HAND" INDICATION, FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCE BEFORE GOING INTO TRAIN PRE-EMPTION. THE "FLASHING HAND" TIME FOR ALL PHASES IS TO BE TRUNCATED TO A VALUE OF 11 SECONDS AND BE ENTIRELY CONTAINED WITHIN THE VEHICULAR GREEN INTERVAL ONLY.
- UPON COMPLETION OF TRAIN HOLD, IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 1 SHALL FOLLOW.
- SIGNS "G", "N" & "T" TO ILLUMINATE IMMEDIATELY UPON ENTERING TRAIN CLEAR SELECTIVE CLEARANCE AND TRAIN PRE-EMPTION PHASES WHEN ACTIVATED BY TRAIN PRE-EMPTION (START OF APT) AND SHOW DARK UPON DEACTIVATION OF RAILROAD LIGHTS/GATES (XR CIRCUIT CLOSED). SIGNS "N" & "T" ALSO OPERATE UPON ACTUATION OF LOOP 11, 12 & 13 ON 2 SECOND DELAY. "TRAIN" MESSAGE PORTION OF SIGNS "N" & "T" TO ILLUMINATE ONLY UPON ACTIVATION OF RAILROAD LIGHTS/GATES (XR CIRCUIT OPEN) AND SHOW DARK UPON DEACTIVATION OF RAILROAD LIGHTS/GATES (XR CIRCUIT CLOSED).
- MAXIMUM PRE-EMPTION TIMER PROVIDED. SIGNAL TO TRANSITION TO SOFT ALL-RED FLASH AFTER 10 MINUTES OF RAILROAD PRE-EMPTION. UPON RETURNING TO NORMAL OPERATION, HOLD ALL-RED FLASH FOR 6 SECONDS.
- GATE DOWN TRAIN CIRCUIT TO BE PROVIDED THAT EXTENDS TRAIN CLEAR (TRACK CLEARANCE) PHASE UNTIL GATES ARE DOWN. ABSENCE OF GATE DOWN AFTER TWO MINUTES SHALL INITIATE LATCHING ALL-RED FLASH.
- SUPERVISION FAILURE TO INITIATE NORMAL RAILROAD PRE-EMPTION OPERATION FOLLOWED BY LATCHING ALL-RED FLASH.
- SECOND TRAIN LOGIC PROVIDED.
- RAILROAD PRE-EMPTION ALSO CONNECTED TO FAYETTE STREET AND ELM STREET PERMIT FILE #0913.

EMERGENCY PRE-EMPTION PHASING

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	2			4			6			8		
SIGNALS \ INTERVAL	15	16	17	18	19	20	21	22	23	24	25	26
1,2,3	G	Y ⑥	R ⑥	R	R	R	R	R	R	R	R	R
4,5	R	R	R	R	R	R	G	Y ⑥	R ⑥	R	R	R
6	R	R	R	6 ⑥	Y	R	R	R	R	R	R	R
7	R	R	R	G	Y	R	R	R	R	R	R	R
8,9	R	R	R	R	R	R	R	R	R	G	Y	R
10,11	H	H	H	H	H	H	H	H	H	H	H	H
12,13	H	H	H	H	H	H	H	H	H	H	H	H
14,15	H	H	H	H	H	H	H	H	H	H	H	H
16,17	H	H	H	H	H	H	H	H	H	H	H	H
SIGNS N,T	②	②	②	ON	ON	ON	②	②	②	②	②	②
SIGN G	③	③	③	③	③	③	③	③	③	③	③	③
FIXED	**	4	2	**	3	2	**	4	2	**	4	2

** FOR DURATION OF PRE-EMPTION

NOTE:
IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON, TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

⑥ G WHEN RETURNING TO NORMAL OPERATION.

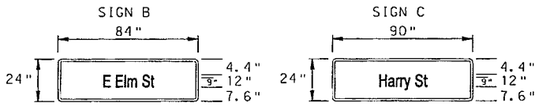
② LED BLANK OUT TURN PROHIBITION SIGNS N & T TO OPERATE WITH LOOP DETECTORS 11, 12, 13 & 14 ON 2 SECOND DELAY TO PREVENT QUEUE FROM BLOCKING TRACKS. "TRAIN" MESSAGE PORTION OF SIGNS N & T TO ILLUMINATE ONLY WHEN TRAIN IS APPROACHING.

③ LED BLANK OUT TRAIN SIGN G TO ILLUMINATE ONLY WHEN TRAIN IS APPROACHING.

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE NORTHBOUND AND SOUTHBOUND APPROACHES OF HARRY STREET AND THE EASTBOUND AND WESTBOUND APPROACHES OF EAST ELM STREET (SR 3058) WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION. THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY. THEN THE GREEN INTERVAL FOR THE PRE-EMPTION PHASE SHALL FOLLOW. ONLY THOSE PHASES NOT POSING A YELLOW TRAP CONDITION MAY REMAIN GREEN (2) WHEN GOVERNED BY APPROACHING EMERGENCY VEHICLE.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE SHALL TIME OUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF THE SIGNAL HAS BEEN ACTUATED BY A PEDESTRIAN PUSH BUTTON AND THE SIGNAL IS PRE-EMPTED, THE PED "WALK" (WAN) INTERVAL SHALL TERMINATE IMMEDIATELY AND THE PED "CLEAR" (FLASHING HAND AND COUNTDOWN TIMER) INTERVAL SHALL TIME OUT, FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE GOING INTO EMERGENCY PREEMPTION.
- IF THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, ARE FLASHING ALL SIGNALS SHALL REMAIN FLASHING.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- UPON COMPLETION OF PRE-EMPTION PHASE 2,4,6 OR 8 IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 1 SHALL FOLLOW.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.
- LOCATION OF EMERGENCY VEHICLE DETECTORS ARE TO BE FIELD ADJUSTED TO ACHIEVE MAXIMUM OPERATION.

CLEARVIEW 3W
12" UPPER CASE
9" LOWER CASE LETTERS



0 25 50 FEET

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ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT FOR REVIEW PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

SYSTEM PERMIT # I-0085

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY
MUNICIPALITY: CONSHOHOCKEN BOROUGH
INTERSECTION: E ELM STREET (SR 3058)
AND HARRY STREET

REVIEWED:

MUNICIPAL OFFICIAL — DATE 10/1/19

RECOMMENDED:

MARK L KRAY — 5-5-04

LOUIS R BELMONTE — 5-17-04
DISTRICT TRAFFIC ENGINEER — DATE

NO.	REVISION	DES./REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	RELOCATE SE MAST ARM/ TIMING CHANGES	MCM / BJB	11/1/07	LUTZ	11/2/07	ABP	11/3/07
2	ADDITION OF TURNING LANE FOR SOUTHBOUND HARRY STREET, MAX 1 DURING NIGHT, ADD NTOR, PED TIMES	PWH / TFB	7/21/10	DLA	8/26/10	ABP	9/7/10
3	ECMS-96218 ADD ADAPTIVE, ETHERNET COMMUNICATIONS & COUNTDOWNS	PA / KPL	06/21/18	DLA	06/28/18	ABP	06/28/18
4	NEW ATC CABINET, LED RR SIGNS, QUEUE LOOPS, ADD UPS, RR TEST SWITCH, APS	TPD	09/12/19	K.PL	10/8/19	DLA	10/9/19
5							
6							
7							
8							

SHEET 3 OF 3 | PERMIT 64-3238 | FILE # 3238

MOVEMENT, SEQUENCE, AND TIMING DIAGRAM

PHASE	2+5			2+6			4+8			PED			FLASH
INTERVAL / SIGNAL	1	2	3	4	5	6	7	8	9	10	11	12	
1,2	R	R	R	G	Y	R	R	R	R	R	R	R	Y
3	G①	Y②	R②	G	Y	R	R	R	R	R	R	R	Y
4	G	Y②	R②	G	Y	R	R	R	R	R	R	R	Y
5,6	R	R	R	R	R	R	G	Y	R	R	R	R	R
7,8	R	R	R	R	R	R	G	Y	R	R	R	R	R
9,10	H	H	H	H	H	H	H	H	H	M	FH	H	OFF
11,12	H	H	H	H	H	H	H	H	H	M	FH	H	OFF
13,14,15,16	H	H	H	H	H	H	H	H	H	M	FH	H	OFF

FIXED		4	2		4	2		4	2			
MINIMUM	3			15			3					
PASSAGE	3			**			3					
MAX 1	7			34			12					
PEDESTRIAN ✱										7	12	3
MEMORY	NL			MN			NL			L		

REFER TO SYSTEM PERMIT #I-0225 FOR PROGRAM TIMINGS AND WEEKLY PROGRAM CHART

OPERATION NOTES

① G⁄A IF FOLLOWED BY 2+6 ② G IF FOLLOWED BY 2+6

✱ UPON PEDESTRIAN ACTUATION, OTHERWISE HAND SYMBOL AT ALL TIMES

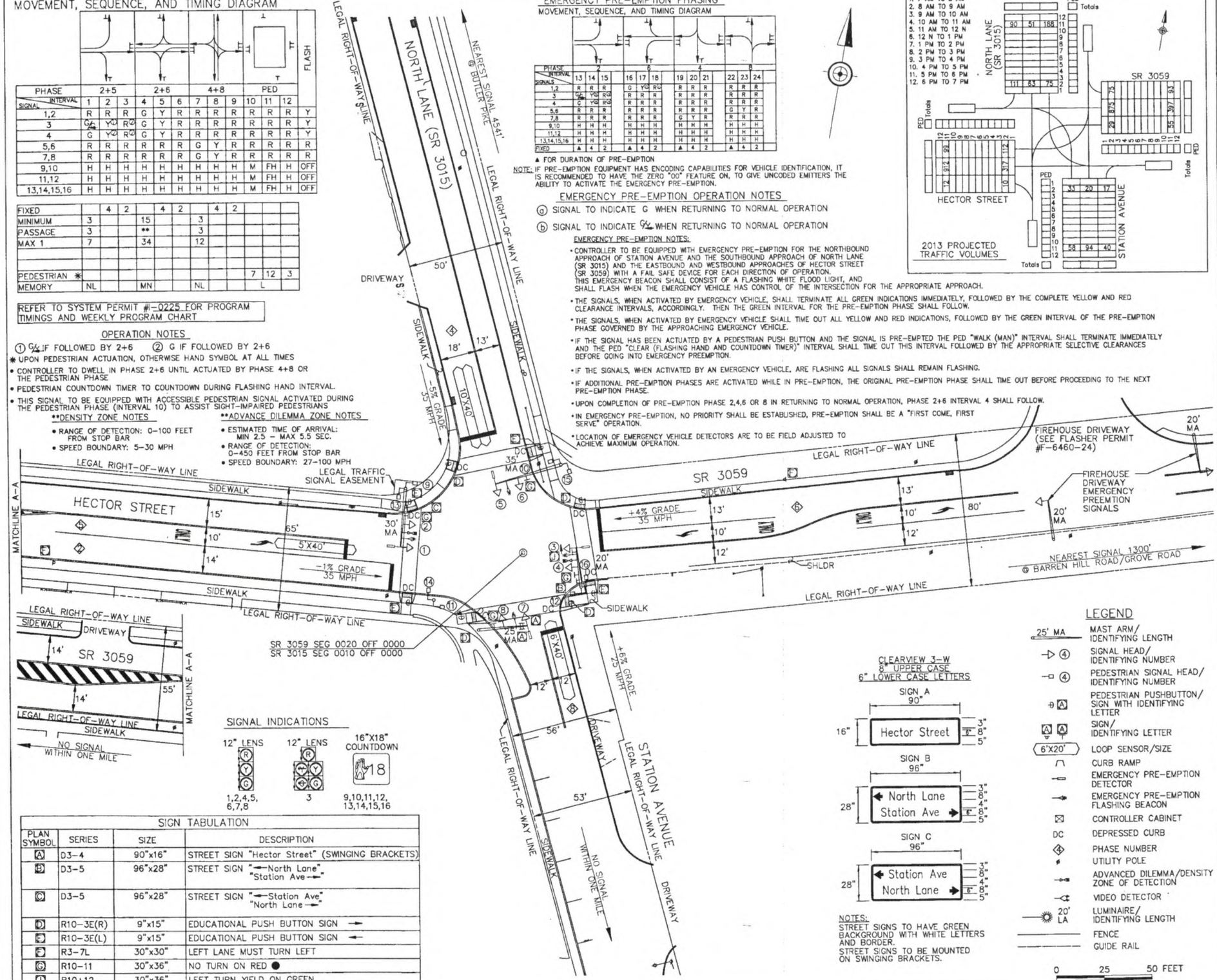
- CONTROLLER TO DWELL IN PHASE 2+6 UNTIL ACTUATED BY PHASE 4+8 OR THE PEDESTRIAN PHASE
- PEDESTRIAN COUNTDOWN TIMER TO COUNTDOWN DURING FLASHING HAND INTERVAL.
- THIS SIGNAL TO BE EQUIPPED WITH ACCESSIBLE PEDESTRIAN SIGNAL ACTIVATED DURING THE PEDESTRIAN PHASE (INTERVAL 10) TO ASSIST SIGHT-IMPAIRED PEDESTRIANS

**DENSITY ZONE NOTES

- RANGE OF DETECTION: 0-100 FEET FROM STOP BAR
- SPEED BOUNDARY: 5-30 MPH

**ADVANCE DILEMMA ZONE NOTES

- ESTIMATED TIME OF ARRIVAL: MIN 2.5 - MAX 5.5 SEC.
- RANGE OF DETECTION: 0-450 FEET FROM STOP BAR
- SPEED BOUNDARY: 27-100 MPH



SIGNAL INDICATIONS

12" LENS	12" LENS	16"X18" COUNTDOWN
1,2,4,5, 6,7,8	3	9,10,11,12, 13,14,15,16

SIGN TABULATION

PLAN SYMBOL	SERIES	SIZE	DESCRIPTION
A	D3-4	90"x16"	STREET SIGN "Hector Street" (SWINGING BRACKETS)
B	D3-5	96"x28"	STREET SIGN "←North Lane" "Station Ave→"
C	D3-5	96"x28"	STREET SIGN "←Station Ave" "North Lane→"
D	R10-3E(R)	9"x15"	EDUCATIONAL PUSH BUTTON SIGN →
E	R10-3E(L)	9"x15"	EDUCATIONAL PUSH BUTTON SIGN ←
F	R3-7L	30"x30"	LEFT LANE MUST TURN LEFT
G	R10-11	30"x36"	NO TURN ON RED ●
H	R10+12	30"x36"	LEFT TURN YIELD ON GREEN

EMERGENCY PRE-EMPTION PHASING

MOVEMENT, SEQUENCE, AND TIMING DIAGRAM

PHASE	2			5			4			6		
INTERVAL / SIGNALS	13	14	15	16	17	18	19	20	21	22	23	24
1,2	R	R	R	G	Y	R	R	R	R	R	R	R
3	G⁄A	Y	R	R	R	R	R	R	R	R	R	R
4	C	Y	R	R	R	R	R	R	R	R	R	R
5,6	R	R	R	R	R	R	R	R	R	G	Y	R
7,8	R	R	R	R	R	R	G	Y	R	R	R	R
9,10	H	H	H	H	H	H	H	H	H	H	H	H
11,12	H	H	H	H	H	H	H	H	H	H	H	H
13,14,15,16	H	H	H	H	H	H	H	H	H	H	H	H
FIXED	▲	4	2	▲	4	2	▲	4	2	▲	4	2

▲ FOR DURATION OF PRE-EMPTION

NOTE: IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON, TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

EMERGENCY PRE-EMPTION OPERATION NOTES

ⓐ SIGNAL TO INDICATE G WHEN RETURNING TO NORMAL OPERATION

ⓑ SIGNAL TO INDICATE G⁄A WHEN RETURNING TO NORMAL OPERATION

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE NORTHBOUND APPROACH OF STATION AVENUE AND THE SOUTHBOUND APPROACH OF NORTH LANE (SR 3015) AND THE EASTBOUND AND WESTBOUND APPROACHES OF HECTOR STREET (SR 3059) WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION. THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY. THEN THE GREEN INTERVAL FOR THE PRE-EMPTION PHASE SHALL FOLLOW.
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- IF THE SIGNAL HAS BEEN ACTUATED BY A PEDESTRIAN PUSH BUTTON AND THE SIGNAL IS PRE-EMPTED THE PED "WALK (MAN)" INTERVAL SHALL TERMINATE IMMEDIATELY AND THE PED "CLEAR (FLASHING HAND AND COUNTDOWN TIMER)" INTERVAL SHALL TIME OUT THIS INTERVAL FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE GOING INTO EMERGENCY PREEMPTION.
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- LOCATION OF EMERGENCY VEHICLE DETECTORS ARE TO BE FIELD ADJUSTED TO ACHIEVE MAXIMUM OPERATION.

2013 PROJECTED TRAFFIC VOLUMES

NOTES:
STREET SIGNS TO HAVE GREEN BACKGROUND WITH WHITE LETTERS AND BORDER.
STREET SIGNS TO BE MOUNTED ON SWINGING BRACKETS.

LEGEND

- 25' MA — MAST ARM/ IDENTIFYING LENGTH
- ④ — SIGNAL HEAD/ IDENTIFYING NUMBER
- ④ — PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER
- A — PEDESTRIAN PUSHBUTTON/ SIGN WITH IDENTIFYING LETTER
- A A — SIGN/ IDENTIFYING LETTER
- 6'X20' — LOOP SENSOR/SIZE
- CURB RAMP
- EMERGENCY PRE-EMPTION DETECTOR
- EMERGENCY PRE-EMPTION FLASHING BEACON
- CONTROLLER CABINET
- DC — DEPRESSED CURB
- PHASE NUMBER
- UTILITY POLE
- ADVANCED DILEMMA/DENSITY ZONE OF DETECTION
- VIDEO DETECTOR
- 20' LA — LUMINAIRE/ IDENTIFYING LENGTH
- FENCE
- GUIDE RAIL

0 25 50 FEET

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CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

SYSTEM PERMIT # I-0225

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY
MUNICIPALITY: WHITEMARSH TOWNSHIP
INTERSECTION: HECTOR STREET (SR 3059) & NORTH LANE (SR 3015)/STATION AVE

REVIEWED:

DATE

MUNICIPAL OFFICIAL DATE

RECOMMENDED:
MARK L KRAY 05-28-91

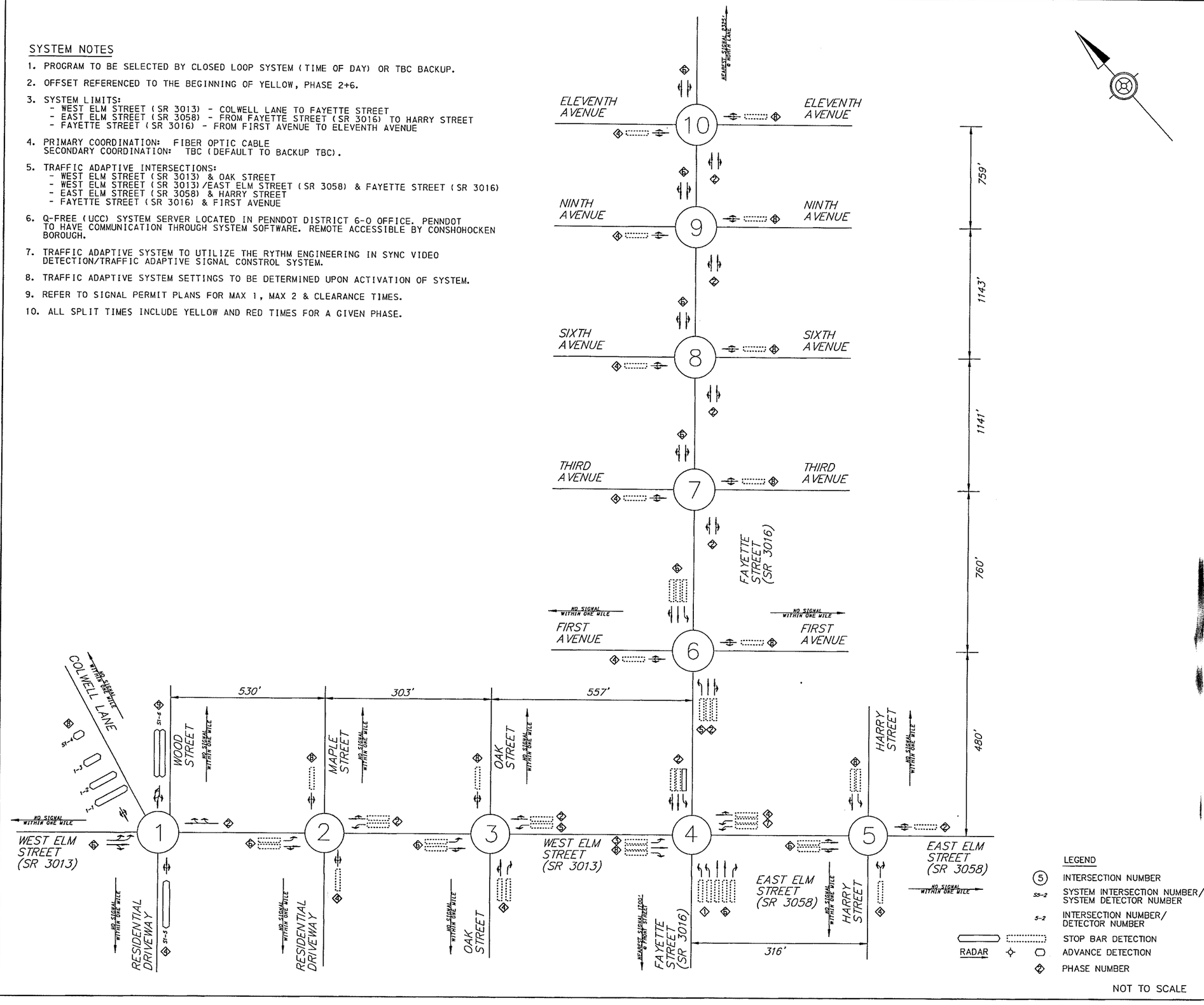
DOUGLAS MAY 05-30-91
DISTRICT TRAFFIC ENGINEER DATE

NO	REVISION	DES/ REVW	DATE	REVW	DATE	RECOM	DATE
1	ADDED NO TURN ON RED 7 AM-7 PM	PAI	09-23-93	MLK	10-01-93	DWM	10-01-93
2	NEW DWG - ADDED PREEMPT	PAI/ CB	10-29-01	MLK	11-02-01	LRB	11-06-01
3	REVISE NW & SW CORNERS; ADD CURB RAMPS, WAVETRONIX, & OSNS; REVISE PRE-EMPTION NOTES; ADD ⓐ & ⓑ	TPD		DLA	11/28/11	ABP	11/28/11
4	AS-BUILT	KPL	02/13/15	DLA	3/4/15	dfield	3/5/15
5							
6							
7							
8							

SHEET 2 OF 2 | PERMIT # 64-2732 | FILE # 2732

SYSTEM NOTES

1. PROGRAM TO BE SELECTED BY CLOSED LOOP SYSTEM (TIME OF DAY) OR TBC BACKUP.
2. OFFSET REFERENCED TO THE BEGINNING OF YELLOW, PHASE 2+6.
3. SYSTEM LIMITS:
   - WEST ELM STREET (SR 3013) - COLWELL LANE TO FAYETTE STREET
   - EAST ELM STREET (SR 3058) - FROM FAYETTE STREET (SR 3016) TO HARRY STREET
   - FAYETTE STREET (SR 3016) - FROM FIRST AVENUE TO ELEVENTH AVENUE
4. PRIMARY COORDINATION: FIBER OPTIC CABLE
   SECONDARY COORDINATION: TBC (DEFAULT TO BACKUP TBC).
5. TRAFFIC ADAPTIVE INTERSECTIONS:
   - WEST ELM STREET (SR 3013) & OAK STREET
   - WEST ELM STREET (SR 3013)/EAST ELM STREET (SR 3058) & FAYETTE STREET (SR 3016)
   - EAST ELM STREET (SR 3058) & HARRY STREET
   - FAYETTE STREET (SR 3016) & FIRST AVENUE
6. Q-FREE (UCC) SYSTEM SERVER LOCATED IN PENNDOT DISTRICT 6-O OFFICE. PENNDOT TO HAVE COMMUNICATION THROUGH SYSTEM SOFTWARE. REMOTE ACCESSIBLE BY CONSHOHOCKEN BOROUGH.
7. TRAFFIC ADAPTIVE SYSTEM TO UTILIZE THE RYTHM ENGINEERING IN SYNC VIDEO DETECTION/TRAFFIC ADAPTIVE SIGNAL CONSTROL SYSTEM.
8. TRAFFIC ADAPTIVE SYSTEM SETTINGS TO BE DETERMINED UPON ACTIVATION OF SYSTEM.
9. REFER TO SIGNAL PERMIT PLANS FOR MAX 1, MAX 2 & CLEARANCE TIMES.
10. ALL SPLIT TIMES INCLUDE YELLOW AND RED TIMES FOR A GIVEN PHASE.



GENERAL NOTES

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REFER TO TRAFFIC SIGNAL PERMIT DRAWING FOR INDIVIDUAL INTERSECTION OPERATION, GEOMETRY, PHASING AND CRITICAL TIMES.

FOR CONSTRUCTION AND INSPECTION THE SYSTEM PERMIT SHOULD ALWAYS BE ACCOMPANIED WITH TRAFFIC SIGNAL PERMIT DRAWING.

TEST THE SYSTEM AT LOCAL INTERSECTION LEVEL, SUBSYSTEM LEVEL MASTER CONTROLLER LEVEL AND PERSONAL COMPUTER REMOTE DIAL UP LEVEL.

GATHER THE SYSTEM FAILURE CRITICAL ALARMS REPORT AND ARCHIVE THEM WHERE APPLICABLE.

SET UP PENNDOT DISTRICT 6-O COMPUTER WITH THE SYSTEM DATABASE AND GRAPHICS. MODIFY THE DATABASE AND GRAPHICS FOR SYSTEMS REVISIONS.

ASSIGN LOOP DETECTORS AND PROGRAM THE CONTROLLERS TO GATHER TRAFFIC VOLUMES IN 15 MINUTE INTERVAL, WHERE APPLICABLE.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

OBTAIN POLE ATTACHMENT PERMIT FOR AERIAL FIBER OPTIC INSTALLATION.

MAINTAIN MASTER CONTROLLER COMMUNICATION SUCH AS PHONE DROPS.

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PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-O

COUNTY: MONTGOMERY

MUNICIPALITY: BOROUGH OF CONSHOHOCKEN

INTERSECTION: ELM ST FROM COLWELL LANE TO HARRY ST
& FAYETTE ST FROM ELM ST TO ELEVENTH AVE

REVIEWED:

MUNICIPAL OFFICIAL — DATE 10/1/19

RECOMMENDED:

ASHWIN B PATEL — 03/09/05

LOUIS R BELMONTE — 03/15/05
DISTRICT TRAFFIC ENGINEER — DATE

NO.	REVISION	DES./ REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	INTERSECTION #1 TEMPORARY RETIMING	PWH / TFB		DLA	1/4/10	ABP	1/5/10
2	ECMS-96218 ADD ADAPTIVE & ETHERNET COMMUNICATIONS	PA / KPL	06/27/18	DLA	06/28/18	ABP	06/28/18
3	REVISE PHASING AT #4 & 6, RETIME ALL	TPD	09/12/19	KPL	10/8/19	DLA	10/9/19
4							

SHEET 1 OF 3 — SYSTEM PERMIT # I-0085

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9/11/2019 11:53:14 PM rkearney Traffic Planning and Design, Inc.

WEEKLY TIMING PROGRAMS

CYCLE/SPLIT/OFFSET

PROGRAM 1 = AM PEAK

	INTERSECTIONS	File #	Phase 1	2	3	4	5	6	7	8	9	Cycle (s)	*Offset (s)
1	W. ELM STREET & COLWELL LANE/DRIVEWAY	3014		23		23		23		23	14	60	33
2	W. ELM STREET & MAPLE STREET	0914		34		26		34		26		60	9
7	FAYETTE STREET & THIRD AVENUE	0911		33		27		33		27		60	49
8	FAYETTE STREET & SIXTH AVENUE	0909		34		26		34		26		60	15
9	FAYETTE STREET & NINTH AVENUE	0875		31		29		31		29		60	44
10	FAYETTE STREET & ELEVENTH AVENUE	0876		31		29		31		29		60	44

PROGRAM 2 = LATE AM

	INTERSECTIONS	File #	Phase 1	2	3	4	5	6	7	8	9	Cycle (s)	*Offset (s)
1	W. ELM STREET & COLWELL LANE/DRIVEWAY	3014		–		–		–		–	–	FREE	–
2	W. ELM STREET & MAPLE STREET	0914		34		26		34		26		60	25
7	FAYETTE STREET & THIRD AVENUE	0911		33		27		33		27		60	42
8	FAYETTE STREET & SIXTH AVENUE	0909		34		26		34		26		60	10
9	FAYETTE STREET & NINTH STREET	0875		31		29		31		29		60	48
10	FAYETTE STREET & ELEVENTH STREET	0876		30		30		30		30		60	40

PROGRAM 3 = OFF PEAK

	INTERSECTIONS	File #	Phase 1	2	3	4	5	6	7	8	9	Cycle (s)	*Offset (s)
1	W. ELM STREET & COLWELL LANE/DRIVEWAY	3014		–		–		–		–	–	FREE	–
2	W. ELM STREET & MAPLE STREET	0914		35		25		35		25		60	6
7	FAYETTE STREET & THIRD AVENUE	0911		33		27		33		27		60	51
8	FAYETTE STREET & SIXTH AVENUE	0909		34		26		34		26		60	20
9	FAYETTE STREET & NINTH STREET	0875		31		29		31		29		60	51
10	FAYETTE STREET & ELEVENTH STREET	0876		31		29		31		29		60	20

PROGRAM 4 = EARLY PM

	INTERSECTIONS	File #	Phase 1	2	3	4	5	6	7	8	9	Cycle (s)	*Offset (s)
1	W. ELM STREET & COLWELL LANE/DRIVEWAY	3014		–		–		–		–	–	FREE	–
2	W. ELM STREET & MAPLE STREET	0914		34		26		34		26		60	13
7	FAYETTE STREET & THIRD AVENUE	0911		33		27		33		27		60	47
8	FAYETTE STREET & SIXTH AVENUE	0909		34		26		34		26		60	16
9	FAYETTE STREET & NINTH STREET	0875		31		29		31		29		60	45
10	FAYETTE STREET & ELEVENTH STREET	0876		31		29		31		29		60	48

PROGRAM 5 = PM PEAK

	INTERSECTIONS	File #	Phase 1	2	3	4	5	6	7	8	9	Cycle (s)	*Offset (s)
1	W. ELM STREET & COLWELL LANE/DRIVEWAY	3014		26		20		26		20	14	60	13
2	W. ELM STREET & MAPLE STREET	0914		36		24		36		24		60	4
7	FAYETTE STREET & THIRD AVENUE	0911		33		27		33		27		60	56
8	FAYETTE STREET & SIXTH AVENUE	0909		34		26		34		26		60	20
9	FAYETTE STREET & NINTH STREET	0875		31		29		31		29		60	57
10	FAYETTE STREET & ELEVENTH STREET	0876		31		29		31		29		60	12

*OFFSET REFERENCED TO BEGINNING OF MAIN STREET (2+6) YELLOW INTERVAL

WEEKLY PROGRAM CHART				
EVENT	DAY	TIME	PROGRAM	REMARKS
1	1–7	0000	MAX 1	FREE
2	1–5	0600	1	AM PEAK
3	1–5	0945	2	LATE AM
4	1–5	1130	3	OFF PEAK
5	1–5	1315	4	EARLY PM
6	1–5	1530	5	PM PEAK
7	1–5	2000	3	OFF PEAK
8	1–5	2200	MAX 1	FREE
9	6,7	1000	3	OFF PEAK
10	6,7	2100	MAX 1	FREE

MONDAY = DAY 1
MAX 1/FREE WHERE NOTED IN CYCLE/SPLIT/OFFSET MATRIX

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PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY

MUNICIPALITY: BOROUGH OF CONSHOHOCKEN

INTERSECTION: ELM ST FROM COLWELL LANE TO HARRY ST
& FAYETTE ST FROM ELM ST TO ELEVENTH AVE

REVIEWED:

MUNICIPAL OFFICIAL — DATE 10/1/19

RECOMMENDED:
ASHWIN B PATEL 03/09/05

LOUIS R BELMONTE 03/15/05
DISTRICT TRAFFIC ENGINEER — DATE

NO.	REVISION	DES./REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	INTERSECTION #1 TEMPORARY RETIMING	PWH / TFB		DLA	1/4/10	ABP	1/5/10
2	ECMS-96218 ADD ADAPTIVE & ETHERNET COMMUNICATIONS	PA / KPL	06/27/18	DLA	06/28/18	ABP	06/28/18
3	REVISE PHASING AT #4 & 6, RETIME ALL	TPD	09/12/19	KPL	10/8/19	DLA	10/9/19
4							

SHEET 2 OF 3

SYSTEM PERMIT # I-0085

PW$$WORKING$:[pa.kpl.dgn]TEMP0858$VERSION$.DGN;1 $Revision: V8i (08.11.09.443) $ $DateTime: 2019/09/11 15:53:01 PM $ $Author: rkearney $ Traffic Planning and Design, Inc.
9/11/2019 15:53:01 PM rkearney Traffic Planning and Design, Inc.

WEEKLY TRAFFIC ADAPTIVE SETTINGS

CYCLE/SPLIT/OFFSET

CONFIGURATION					TUNNEL DURATION								PERIOD	GLOBAL OFFSET (AT FACILITATOR)		LOCAL OFFSET		TRAVEL TIME TO NEXT INTERSECTION	
		INTERSECTIONS	File #	Facilitator	1	2	3	4	5	6	7	8							
3	I-0085	W. ELM STREET & OAK STREET	1455																
4	I-0085	W. ELM STREET/E. ELM STREET & FAYETTE STREET	0913																
5	I-0085	E. ELM STREET & HARRY STREET	3238																
6	I-0085	FAYETTE STREET & FIRST AVENUE	0912																

CONFIGURATION					TUNNEL DURATION								PERIOD	GLOBAL OFFSET (AT FACILITATOR)		LOCAL OFFSET		TRAVEL TIME TO NEXT INTERSECTION	
		INTERSECTIONS	File #	Facilitator	1	2	3	4	5	6	7	8							
3	I-0085	W. ELM STREET & OAK STREET	1455																
4	I-0085	W. ELM STREET/E. ELM STREET & FAYETTE STREET	0913																
5	I-0085	E. ELM STREET & HARRY STREET	3238																
6	I-0085	FAYETTE STREET & FIRST AVENUE	0912																

CONFIGURATION					TUNNEL DURATION								PERIOD	GLOBAL OFFSET (AT FACILITATOR)		LOCAL OFFSET		TRAVEL TIME TO NEXT INTERSECTION	
		INTERSECTIONS	File #	Facilitator	1	2	3	4	5	6	7	8							
3	I-0085	W. ELM STREET & OAK STREET	1455																
4	I-0085	W. ELM STREET/E. ELM STREET & FAYETTE STREET	0913																
5	I-0085	E. ELM STREET & HARRY STREET	3238																
6	I-0085	FAYETTE STREET & FIRST AVENUE	0912																

ADAPTIVE WEEKLY PROGRAM CHART					
EVENT	DAY	TIME	PERIOD	PROGRAM	REMARKS

MONDAY = DAY 1
TUNNELLESS: UNCOORDINATED ADAPTIVE OPERATION

ADAPTIVE NOTES

1. ALL SPLIT TIMES INCLUDE YELLOW AND RED TIMES FOR A GIVEN PHASE.
2. REFER TO SIGNAL PERMIT PLAN FOR MAXIMUM, CLEARANCE AND PED TIMES.
3. GLOBAL OFFSET (AT FACILITATOR): VALUE IN SECONDS THAT OFFSETS A TUNNEL GLOBALLY AT THE FACILITATOR INTERSECTION AS ENTERED IN CentralSync.
4. LOCAL OFFSET: TUNNEL OFFSET AT INTERSECTION AS ENTERED IN CentralSync.
5. TRAVEL TIME TO NEXT INTERSECTION: VALUE FOR TRAVEL TIME OF THE CHOSEN TUNNEL TO THE CORRESPONDING TUNNEL AT THE NEXT INTERSECTION AS ENTERED IN CentralSync MAP VIEW.

BACKUP WEEKLY PROGRAM CHART				
EVENT	DAY	TIME	PROGRAM	REMARKS
1	1-7	0000	MAX 1	FREE
2	1-5	0600	1	AM PEAK
3	1-5	0945	2	LATE AM
4	1-5	1130	3	OFF PEAK
5	1-5	1315	4	EARLY PM
6	1-5	1530	5	PM PEAK
7	1-5	2000	3	OFF PEAK
8	1-5	2200	MAX 1	FREE
9	6,7	1000	3	OFF PEAK
10	6,7	2100	MAX 1	FREE

MONDAY = DAY 1

NOTES

1. ALL SPLIT TIMES INCLUDE YELLOW AND RED TIMES FOR A GIVEN PHASE.
2. REFER TO SIGNAL PERMIT PLAN FOR MAXIMUM, CLEARANCE AND PED TIMES.

BACKUP TIMINGS NOTES

1. ALL INTERSECTIONS TO UTILIZE FLOATING FORCE OFF EXCEPT AS NOTED BELOW.
2. INTERSECTION 4 TO UTILIZE FIXED FORCE OFF AND PHASE 3 ON OMITS PHASE 7 AND PHASE 7 ON OMITS PHASE 3.

T.B.C. BACKUP TIMINGS

CYCLE/SPLIT/OFFSET

PROGRAM 1 = AM PEAK			Phase									Cycle (s)	*Offset (s)
	INTERSECTIONS	File #	1	2	3	4	5	6	7	8	9		
3	W. ELM STREET & OAK STREET	1455		37		23	13 (LEAD)	24		23		60	19
4	W. ELM STREET/E. ELM STREET & FAYETTE STREET	0913	25 (LEAD)	45	14 (SPLIT)	36		70	24 (LAG)	12		120	52
5	E. ELM STREET & HARRY STREET	3238		27		33		27		33		60	28
6	FAYETTE STREET & FIRST AVENUE	0912		69		51	17 (LEAD)	52		51		120	57
PROGRAM 2 = LATE AM			Phase									Cycle (s)	*Offset (s)
	INTERSECTIONS	File #	1	2	3	4	5	6	7	8	9		
3	W. ELM STREET & OAK STREET	1455		37		23	14 (LEAD)	23		23		60	0
4	W. ELM STREET/E. ELM STREET & FAYETTE STREET	0913	29 (LEAD)	37	14 (SPLIT)	40		66	28 (LAG)	12		120	0
5	E. ELM STREET & HARRY STREET	3238		26		34		26		34		60	56
6	FAYETTE STREET & FIRST AVENUE	0912		73		47	17 (LEAD)	56		47		120	31
PROGRAM 3 = OFF PEAK			Phase									Cycle (s)	*Offset (s)
	INTERSECTIONS	File #	1	2	3	4	5	6	7	8	9		
3	W. ELM STREET & OAK STREET	1455		37		23	14 (LEAD)	23		23		60	57
4	W. ELM STREET/E. ELM STREET & FAYETTE STREET	0913	26 (LEAD)	41	16 (SPLIT)	37		67	25 (LAG)	12		120	1
5	E. ELM STREET & HARRY STREET	3238		26		34		26		34		60	59
6	FAYETTE STREET & FIRST AVENUE	0912		73		47	15 (LEAD)	58		47		120	13
PROGRAM 4 = EARLY PM			Phase									Cycle (s)	*Offset (s)
	INTERSECTIONS	File #	1	2	3	4	5	6	7	8	9		
3	W. ELM STREET & OAK STREET	1455		41		19	15 (LEAD)	26		19		60	52
4	W. ELM STREET/E. ELM STREET & FAYETTE STREET	0913	30 (LEAD)	37	15 (SPLIT)	38		67	26 (LAG)	12		120	0
5	E. ELM STREET & HARRY STREET	3238		26		34		26		34		60	24
6	FAYETTE STREET & FIRST AVENUE	0912		68		52	17 (LEAD)	51		52		120	13
PROGRAM 5 = PM PEAK			Phase									Cycle (s)	*Offset (s)
	INTERSECTIONS	File #	1	2	3	4	5	6	7	8	9		
3	W. ELM STREET & OAK STREET	1455		37		23	14 (LEAD)	23		23		60	55
4	W. ELM STREET/E. ELM STREET & FAYETTE STREET	0913	27 (LEAD)	38	20 (SPLIT)	35		65	23 (LAG)	12		120	112
5	E. ELM STREET & HARRY STREET	3238		27		33		27		33		60	48
6	FAYETTE STREET & FIRST AVENUE	0912		59		61	13 (LEAD)	46		61		120	1

*OFFSET REFERENCED TO BEGINNING OF MAIN STREET (2+6) YELLOW INTERVAL

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PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH WAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT FOR REVIEW PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY
MUNICIPALITY: BOROUGH OF CONSHOHOCKEN
INTERSECTION: ELM ST FROM COLWELL LANE TO HARRY ST
& FAYETTE ST FROM ELM ST TO ELEVENTH AVE

REVIEWED:

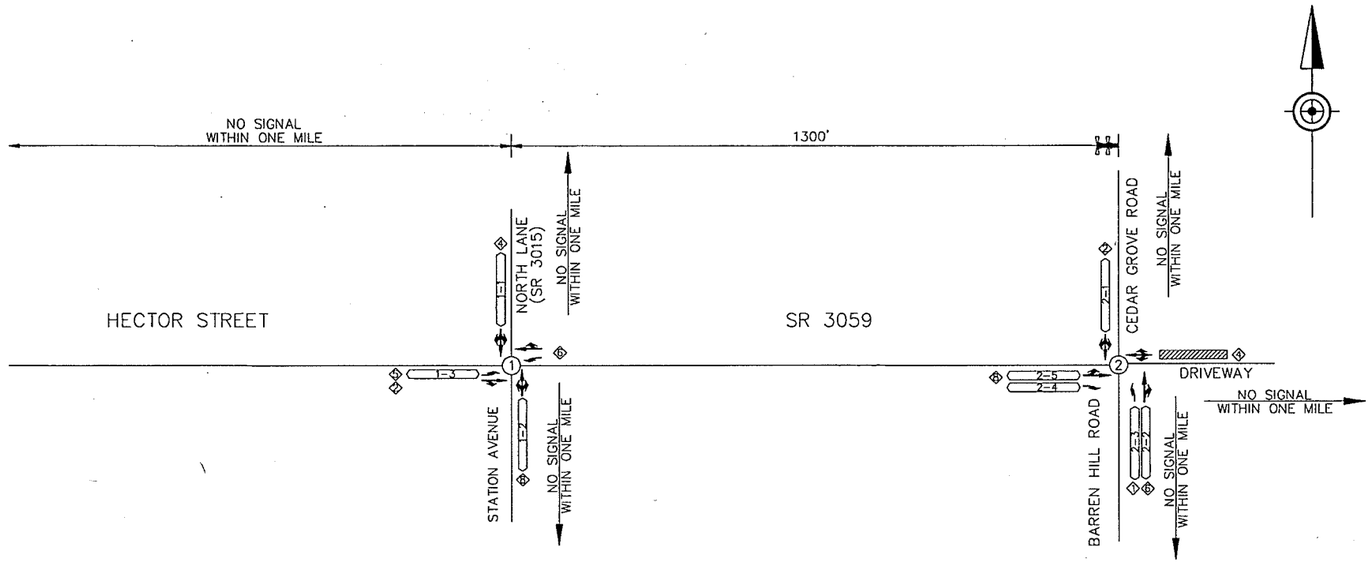
MUNICIPAL OFFICIAL — DATE 10/1/19

RECOMMENDED:
ASHWIN B PATEL — 03/09/05
LOUIS R BELMONTE — 03/15/05
DISTRICT TRAFFIC ENGINEER — DATE

NO.	REVISION	DES./REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	INTERSECTION #1 TEMPORARY RETIMING	PWH / TFB		DLA	1/4/10	ABP	1/5/10
2	ECMS-96218 ADD ADAPTIVE & ETHERNET COMMUNICATIONS	PA / KPL	06/27/18	DLA	06/28/18	ABP	06/28/18
3	REVISE PHASING AT #4 & 6, RETIME ALL	TPD	09/12/19	KPL	10/8/19	DLA	10/9/19
4							

SHEET 3 OF 3 — SYSTEM PERMIT # I-0085

pwh\\06BUHRIG\Projects\Penndot\TEDP\08588\03\Design\PLANS\Signals\0003 Conshohocken T03\CADD\Signals\007.System #I-0085.dgn
9/11/2019 11:52:50 PM rkearney Traffic Planning and Design, Inc.



GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

REFER TO TRAFFIC SIGNAL PERMIT DRAWING FOR INDIVIDUAL INTERSECTION OPERATION, GEOMETRY, PHASING AND CRITICAL TIMES.

FOR CONSTRUCTION AND INSPECTION THE SYSTEM PERMIT SHOULD ALWAYS BE ACCOMPANIED WITH TRAFFIC SIGNAL PERMIT DRAWING.

TEST THE SYSTEM AT LOCAL INTERSECTION LEVEL, SUBSYSTEM LEVEL MASTER CONTROLLER LEVEL AND PERSONAL COMPUTER REMOTE DIAL UP LEVEL.

GATHER THE SYSTEM FAILURE CRITICAL ALARMS REPORT AND ARCHIVE THEM WHERE APPLICABLE.

SET UP PENNDOT DISTRICT 6-0 COMPUTER WITH THE SYSTEM DATABASE AND GRAPHICS. MODIFY THE DATABASE AND GRAPHICS FOR SYSTEMS REVISIONS.

ASSIGN LOOP DETECTORS AND PROGRAM THE CONTROLLERS TO GATHER TRAFFIC VOLUMES IN 15 MINUTE INTERVAL, WHERE APPLICABLE.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

OBTAIN POLE ATTACHMENT PERMIT FOR AERIAL FIBER OPTIC INSTALLATION.

MAINTAIN MASTER CONTROLLER COMMUNICATION SUCH AS PHONE DROPS.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT FOR REVIEW PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

CYCLE / SPLIT / OFFSET

	PROGRAM 1= INTERSECTIONS	FILE #	PHASE 1	2	3	4	5	6	7	8	PED	CYCLE	OFFSET#1	OFFSET#2	OFFSET#3
11															
10															
9															
8															
7															
6															
5															
4															
3															
2	HECTOR ST & CEDAR GROVE RD/BARREN HILL RD	2351		49 (SPLIT)		15		56 (SPLIT)		15		120	0		
1	HECTOR ST & NORTH LN/STATION AVE	2732		75		23	13 (LEAD)	62		23	22	120	26		

	PROGRAM 2= INTERSECTIONS	FILE #	PHASE 1	2	3	4	5	6	7	8	PED	CYCLE	OFFSET#1	OFFSET#2	OFFSET#3
11															
10															
9															
8															
7															
6															
5															
4															
3															
2	HECTOR ST & CEDAR GROVE RD/BARREN HILL RD	2351		50 (SPLIT)		40		30 (SPLIT)		40		120	0		
1	HECTOR ST & NORTH LN/STATION AVE	2732		72		26	13 (LEAD)	59		26	22	120	76		

	PROGRAM 3= INTERSECTIONS	FILE #	PHASE 1	2	3	4	5	6	7	8	PED	CYCLE	OFFSET#1	OFFSET#2	OFFSET#3
11															
10															
9															
8															
7															
6															
5															
4															
3															
2															
1															

	PROGRAM 4= INTERSECTIONS	FILE #	PHASE 1	2	3	4	5	6	7	8	PED	CYCLE	OFFSET#1	OFFSET#2	OFFSET#3
11															
10															
9															
8															
7															
6															
5															
4															
3															
2															
1															

Notes:
- ALL SPLIT TIMES INCLUDE YELLOW AND RED TIMES FOR A GIVEN PHASE

SYSTEM NOTES

1. THE SIGNALS ALONG HECTOR STREET AVENUE FROM NORTH LANE/STATION AVENUE TO CEDAR GROVE ROAD/BARREN HILL ROAD ARE TO BE COORDINATED.
2. PROGRAMS TO BE SELECTED BY CLOSED LOOP SYSTEM OR TBC BACKUP.
3. OFFSETS REFERENCED TO THE BEGINNING OF YELLOW (PHASE 2).
4. SYSTEM LIMITS:
   HECTOR STREET (SR 3059) – FROM NORTH LANE/STATION AVENUE TO CEDAR GROVE ROAD/BARREN HILL ROAD
5. PRIMARY COORDINATION: GPS TIMECLOCK
   SECONDARY COORDINATION: TIME BASED COORDINATION (DEFAULT TO BACKUP TBC PROGRAM CHART)
6. CYCLES, SPLITS & OFFSETS ARE IN SECONDS.

WEEKLY/BACKUP PROGRAM CHART

EVENT	▲DAY	TIME	PROGRAM*	REMARKS
1	1-7	0000	MAXIMUM 1	FREE
2	1-5	0500	1	AM PEAK
3	1-5	1000	MAXIMUM 1	FREE
4	1-5	1500	2	PM PEAK
5	1-7	1900	MAXIMUM 1	FREE
6	6,7	1000	MAXIMUM 1	FREE

▲DAY 1 = MONDAY
* MAX / FREE WHERE NOTED IN

LEGEND

- ④ INTERSECTION ADDRESS
- (S#) SYSTEM LOOP/ IDENTIFYING NUMBER
- LOOP SENSOR / INTERSECTION X – LOOP NUMBER Y
- VIDEO DETECTION AREA
- ◇ PHASE NUMBER

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY

MUNICIPALITY: WHITEMARSH TOWNSHIP

INTERSECTION: HECTOR STREET (SR 3059) FROM CEDAR GROVE ROAD/BARREN HILL ROAD TO NORTH LANE (SR 3015)/STATION AVENUE

REVIEWED:

MUNICIPAL OFFICIAL — DATE 11/7/17

RECOMMENDED:
DAVID ADAMS — 11/28/2011

ASHWIN PATEL — 11/28/2011
DISTRICT TRAFFIC ENGINEER — DATE

NO	REVISION	DES/ REVW	DATE	REVW	DATE	RECOM	DATE
1	TIMING ADJ	BURNS	6/29/15	KPL	1/24/18	PLM	1/24/18
2							
3							
4							
5							
6							
7							
8							

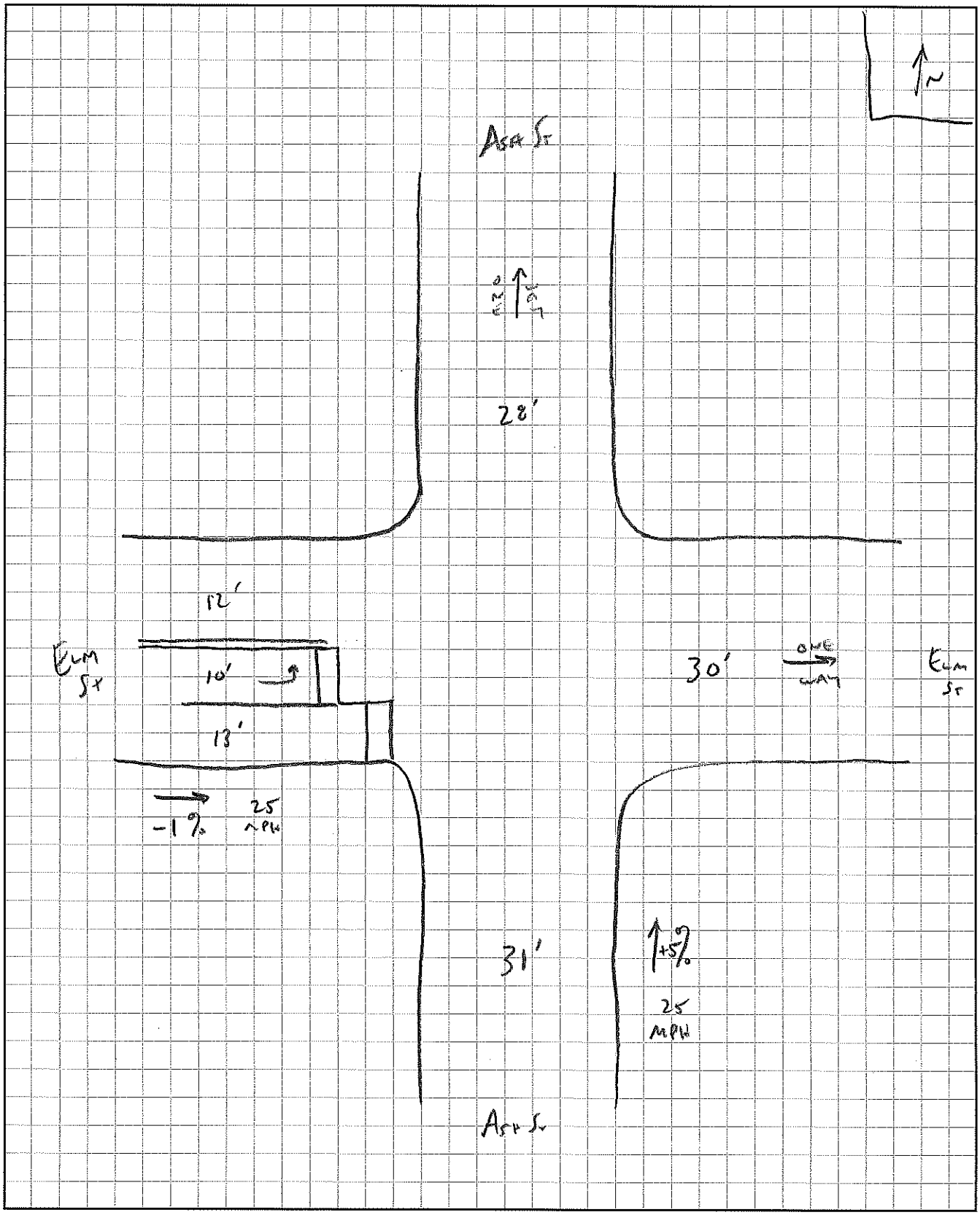
SYSTEM PERMIT # 1-0225

McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

Job _____ McMahon Project No. _____ Sheet _____ of _____

Description 45th St & Elm St Designed By _____ Date _____

Checked By _____ Date _____

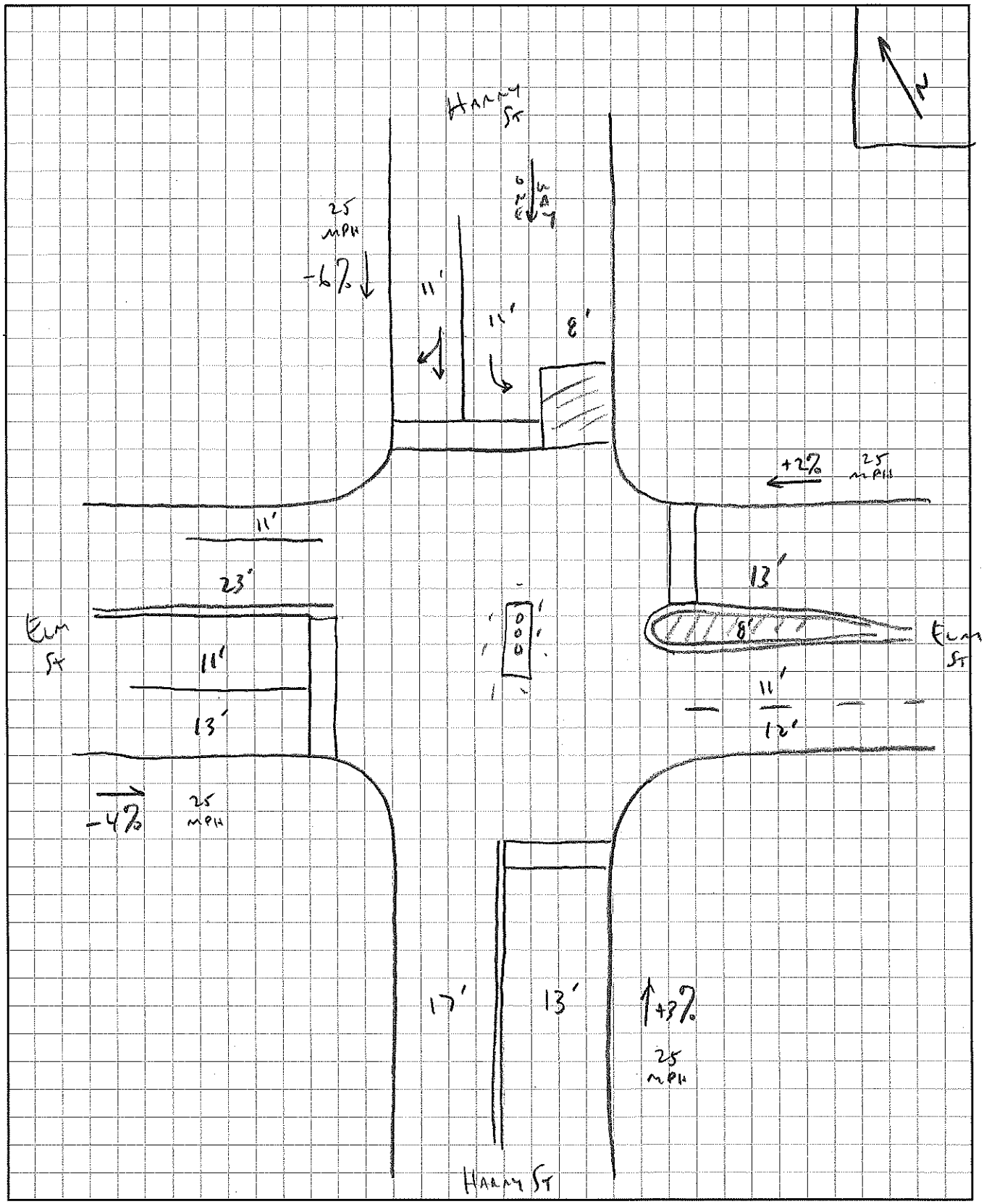


McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

Job _____ McMahon Project No. _____ Sheet _____ of _____

Description HARMY ST & ELM ST Designed By _____ Date _____

Checked By _____ Date _____

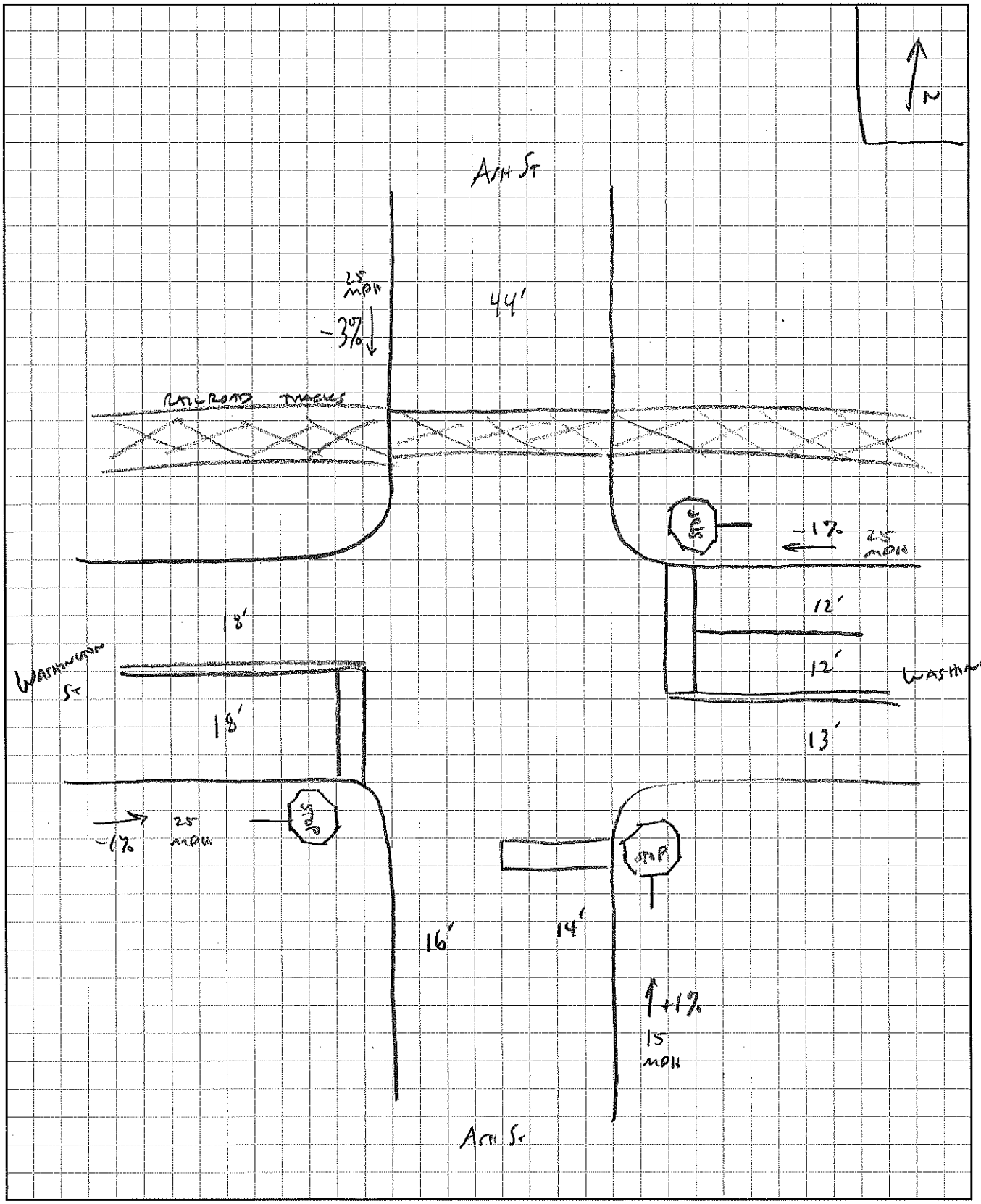


McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

Job _____ McMahon Project No. _____ Sheet _____ of _____

Description WASHINGTON ST + Designed By _____ Date _____

ASH ST Checked By _____ Date _____

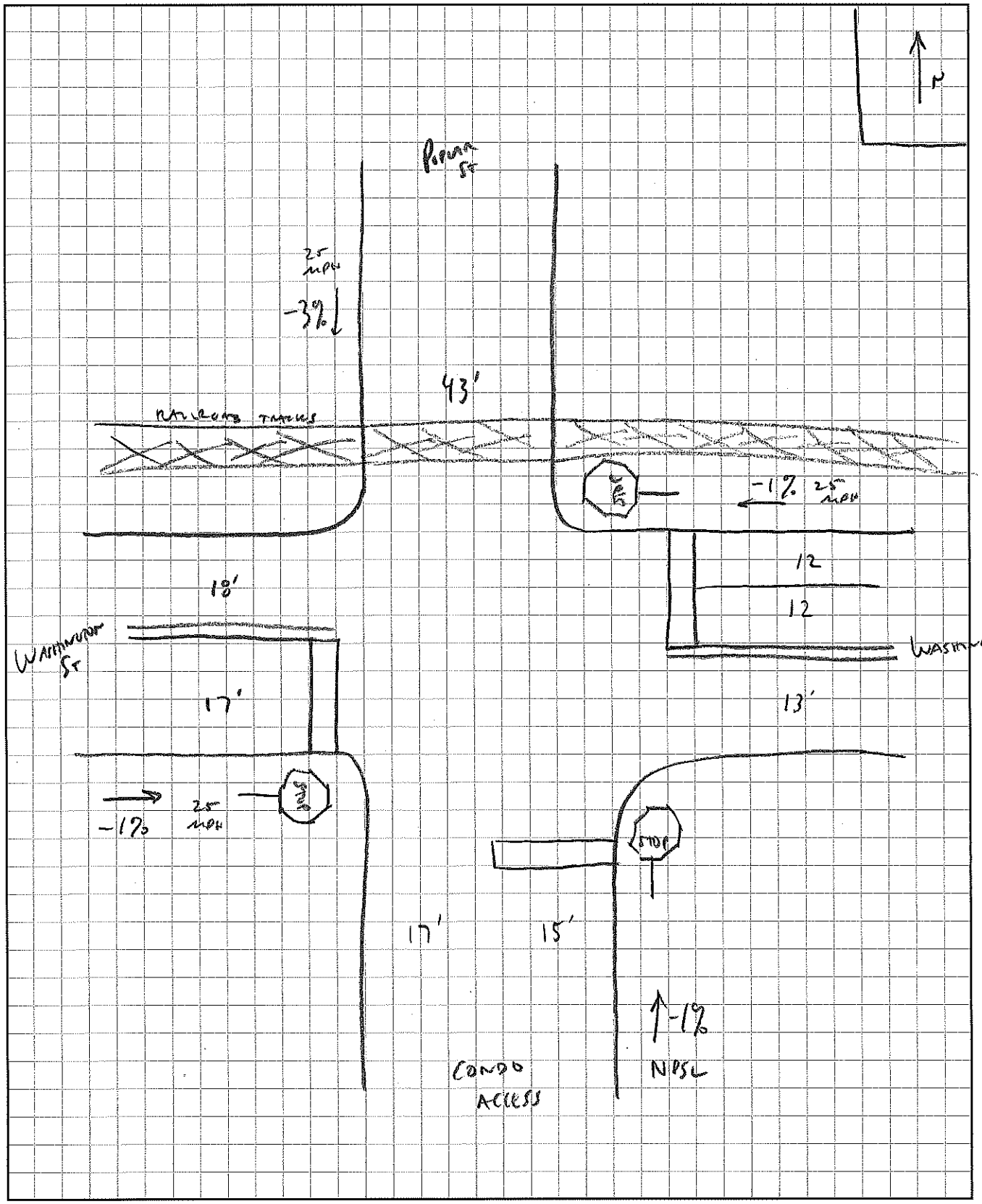


McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

Job _____ McMahon Project No. _____ Sheet _____ of _____

Description WASHINGTON ST + POPLAR ST Designed By _____ Date _____

Checked By _____ Date _____

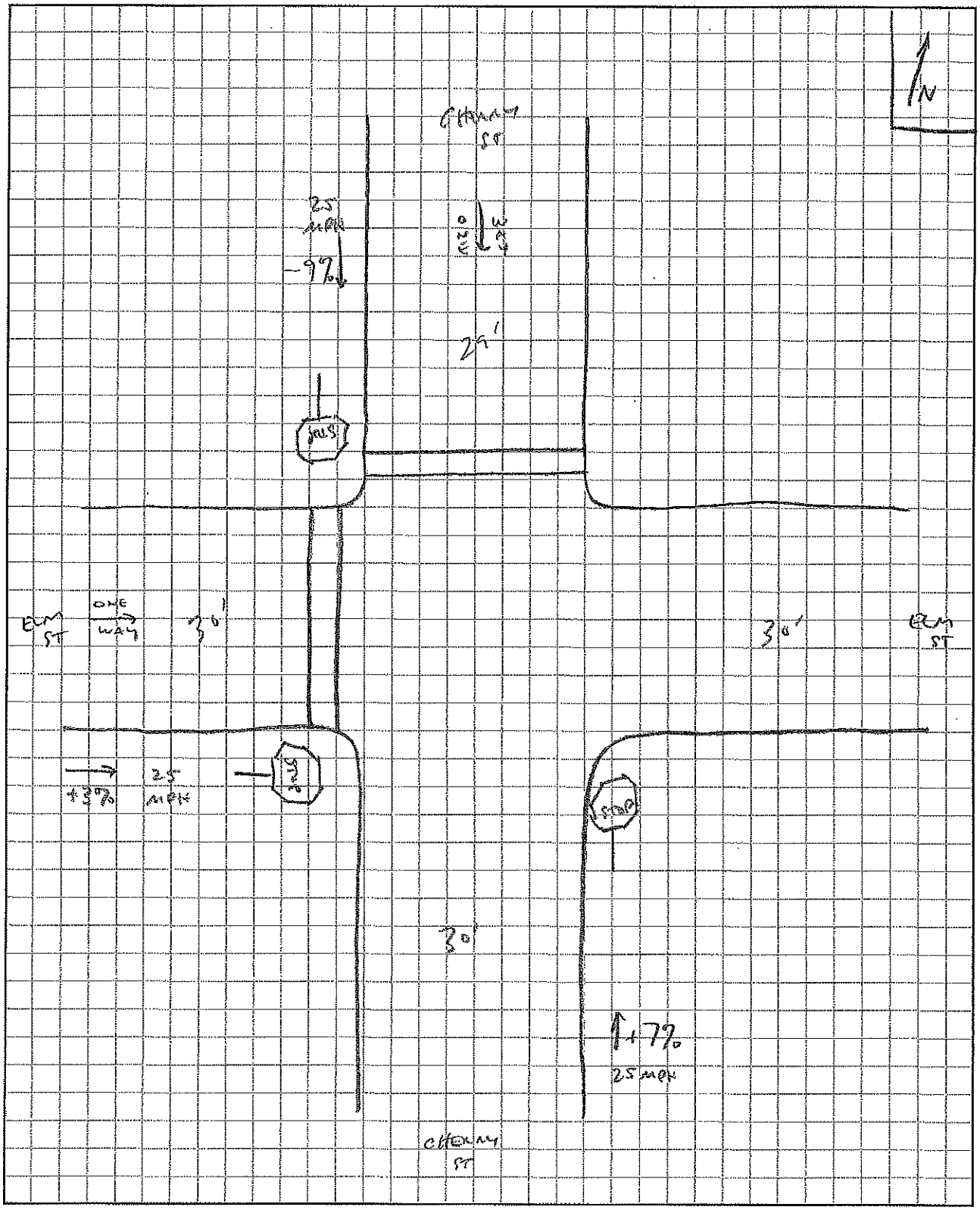


McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

Job _____ McMahon Project No. _____ Sheet 03 of ____

Description ELM STREET + CHERRY STREET Designed By NDB Date _____

Checked By _____ Date _____

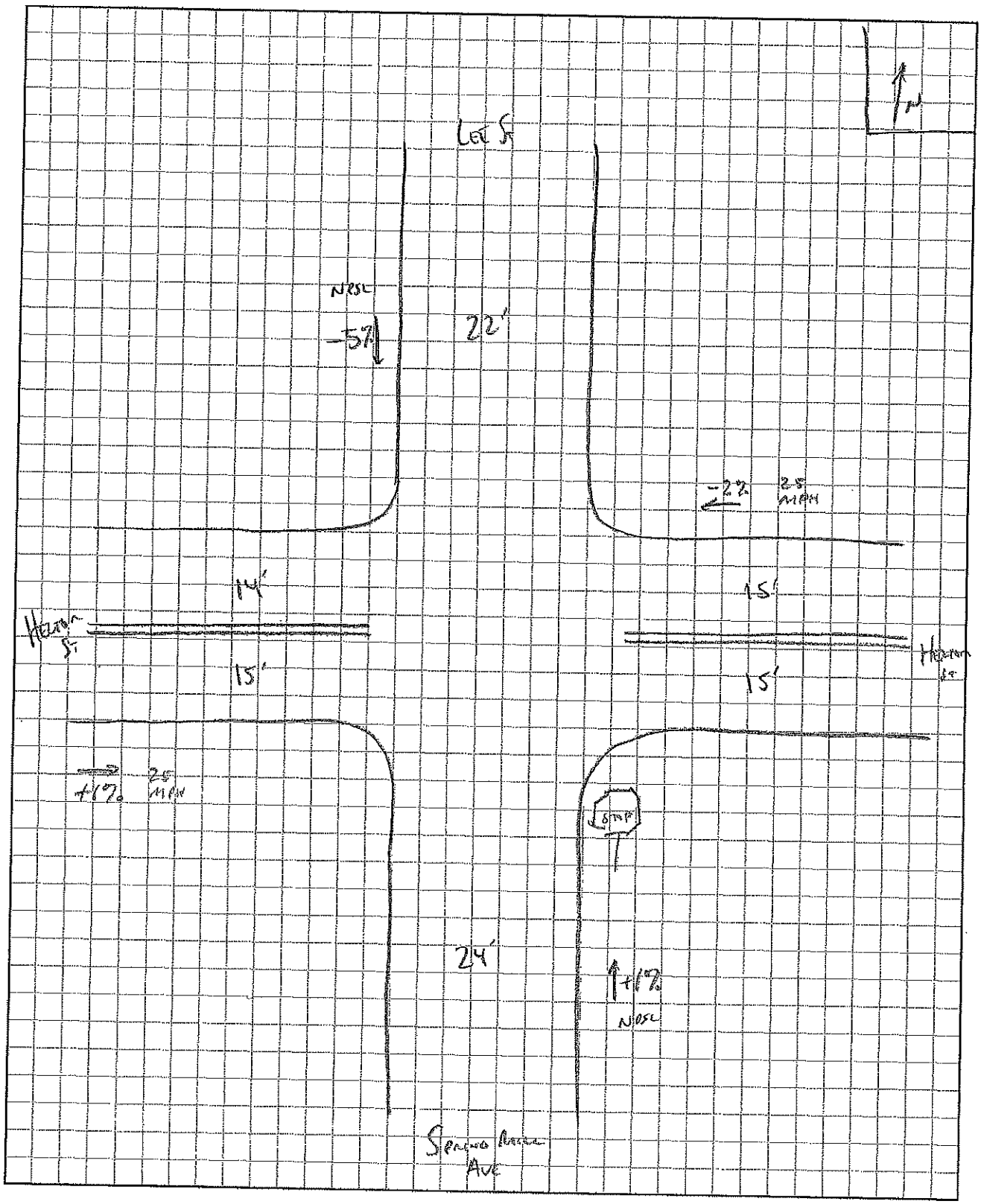


McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

Job _____ McMahon Project No. _____ Sheet 04 of ____

Description Herron St + Spring Mill Ave / Lee St Designed By NOB Date _____

Checked By _____ Date _____

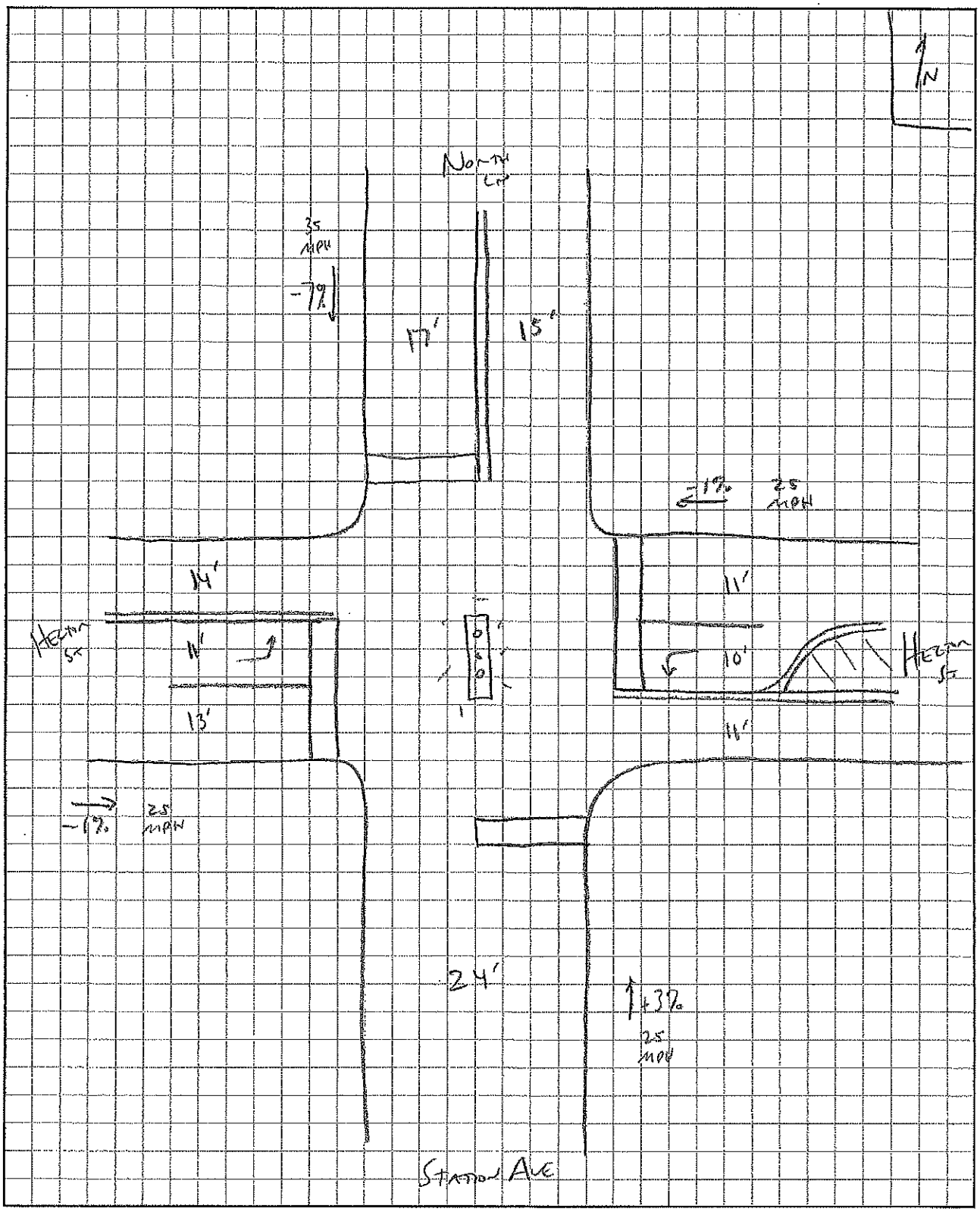


McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

Job _____ McMahon Project No. _____ Sheet 05 of _____

Description Hebron St + Designed By NDS Date _____

North Cir / Station Ave Checked By _____ Date _____

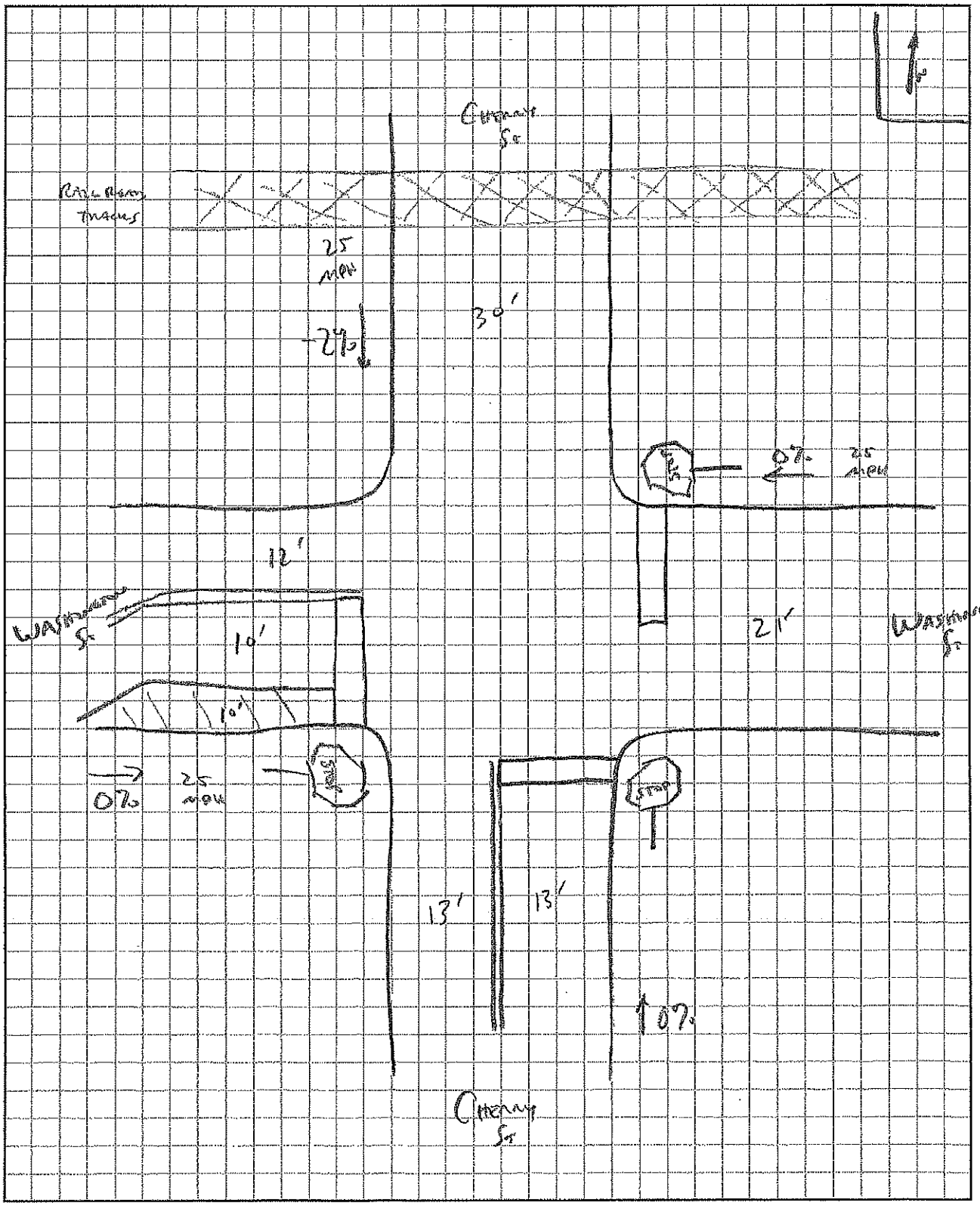


McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

Job _____ McMahon Project No. _____ Sheet 06 of ____

Description WASHINGTON ST + CHERRY ST Designed By MDB Date _____

Checked By _____ Date _____

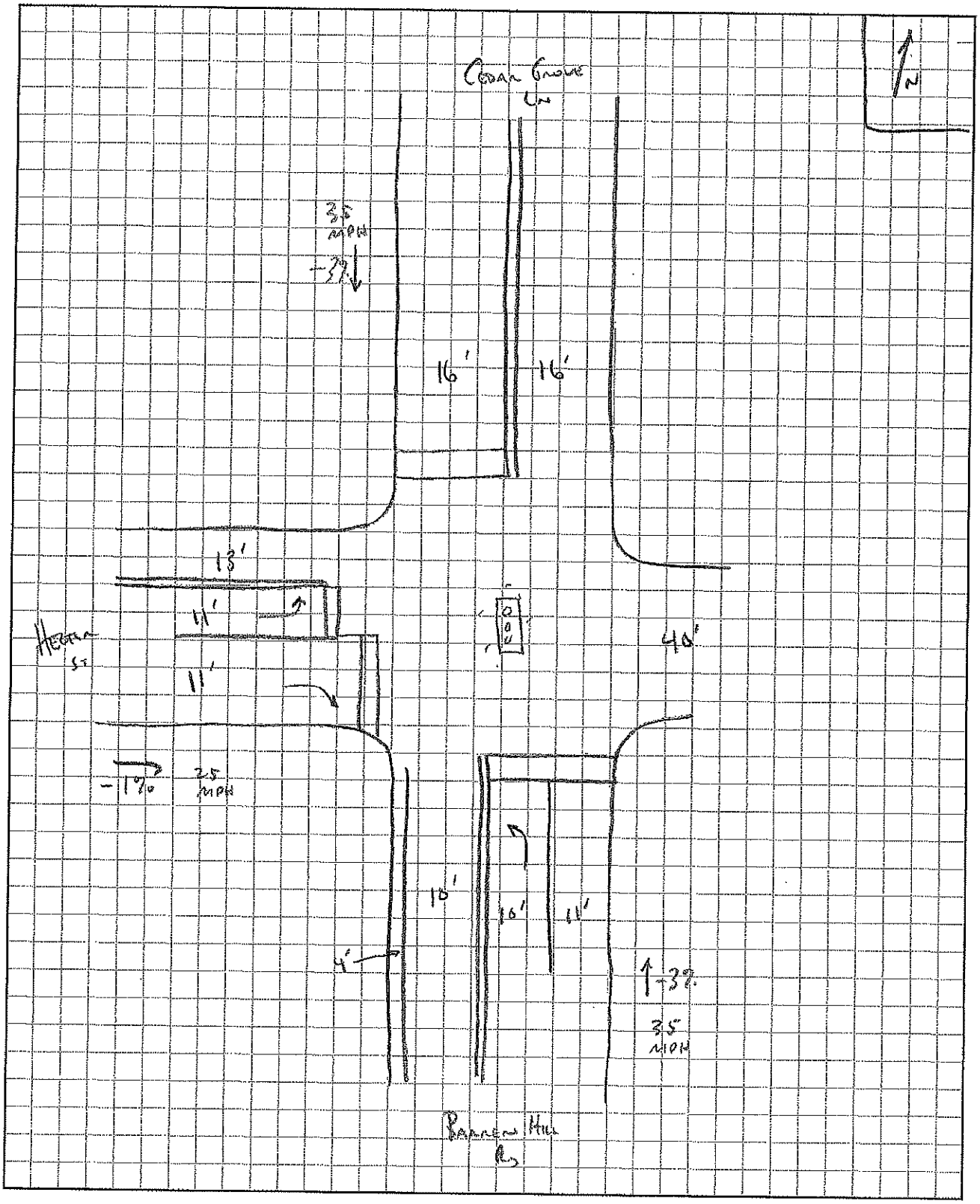


McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

Job _____ McMahon Project No. _____ Sheet _____ of _____

Description Heron St at Cedar Grove Rd + Barren Hill Rd Designed By NDB Date _____

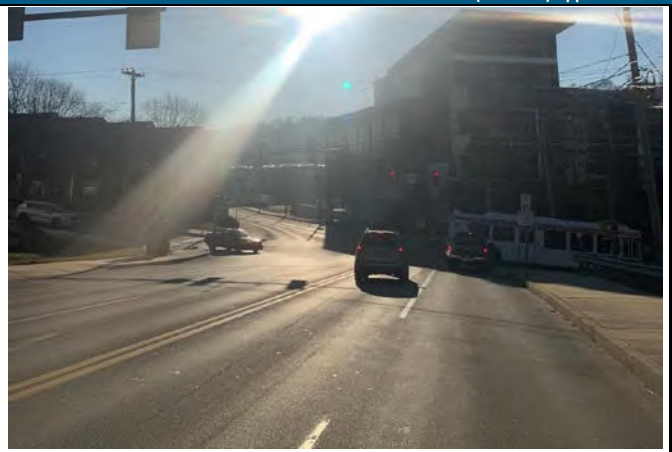
Checked By _____ Date _____



INTERSECTION INVENTORY SUMMARY

Elm Street (S.R. 3058) and Harry Street

Eastbound Elm Street (S.R. 3058) Approach



Lane Geometry

Through
Shared Through/Right

Roadway Classification
Urban – Minor Arterial

Roadway Ownership
State

Posted Speed Limit
25 MPH

Traffic Control
Signalized

Notes

Westbound Elm Street (S.R. 3058) Approach



Lane Geometry

Shared Left/Through

Roadway Classification
Urban – Minor Arterial

Roadway Ownership
State

Posted Speed Limit
25 MPH

Traffic Control
Signalized

Notes

Northbound Harry Street Approach



Lane Geometry

Shared Left/Right

Roadway Classification
Local

Roadway Ownership
Local

Posted Speed Limit
25 MPH

Traffic Control
Signalized

Notes

Southbound Harry Street Approach



Lane Geometry

Left
Through/Right

Roadway Classification
Local

Roadway Ownership
Local

Posted Speed Limit
25 MPH

Traffic Control
Signalized

Notes

INTERSECTION INVENTORY SUMMARY

Elm Street (S.R. 3058) and Ash Street

Eastbound Elm Street (S.R. 3058) Approach	
	**Lane Geometry** Left Shared Through/Right **Roadway Classification** Urban – Minor Arterial **Roadway Ownership** State **Posted Speed Limit** 25 MPH **Traffic Control** Unsignalized **Notes**

Northbound Ash Street Approach	
	**Lane Geometry** Shared Left/Through/Right **Roadway Classification** Local **Roadway Ownership** Local **Posted Speed Limit** 25 MPH **Traffic Control** Unsignalized **Notes**

INTERSECTION INVENTORY SUMMARY

Elm Street (S.R. 3058) and Cherry Street

Eastbound Elm Street (S.R. 3058) Approach



Lane Geometry

Shared Through/Right

Roadway Classification

Urban – Minor Arterial

Roadway Ownership

State

Posted Speed Limit

25 MPH

Traffic Control

Unsignalized

Notes

Northbound Cherry Street Approach



Lane Geometry

Right

Roadway Classification

Local

Roadway Ownership

Local

Posted Speed Limit

25 MPH

Traffic Control

Unsignalized

Notes

Southbound Cherry Street Approach



Lane Geometry

Shared Left/Through

Roadway Classification

Local

Roadway Ownership

Local

Posted Speed Limit

25 MPH

Traffic Control

Unsignalized

Notes

INTERSECTION INVENTORY SUMMARY

Washington Street and Ash Street

Eastbound Washington Street Approach



Lane Geometry

Shared Left/Through/Right

Roadway Classification

Local

Roadway Ownership

Local

Posted Speed Limit

25 MPH

Traffic Control

Unsignalized

Notes

Westbound Washington Street Approach



Lane Geometry

Left
Shared Through/Right

Roadway Classification

Local

Roadway Ownership

Local

Posted Speed Limit

25 MPH

Traffic Control

Unsignalized

Notes

Northbound Ash Street Approach



Lane Geometry

Shared Left/Through/Right

Roadway Classification

Local

Roadway Ownership

Local

Posted Speed Limit

25 MPH

Traffic Control

Unsignalized

Notes

Southbound Ash Street Approach



Lane Geometry

Shared Left/Through/Right

Roadway Classification

Local

Roadway Ownership

Local

Posted Speed Limit

25 MPH

Traffic Control

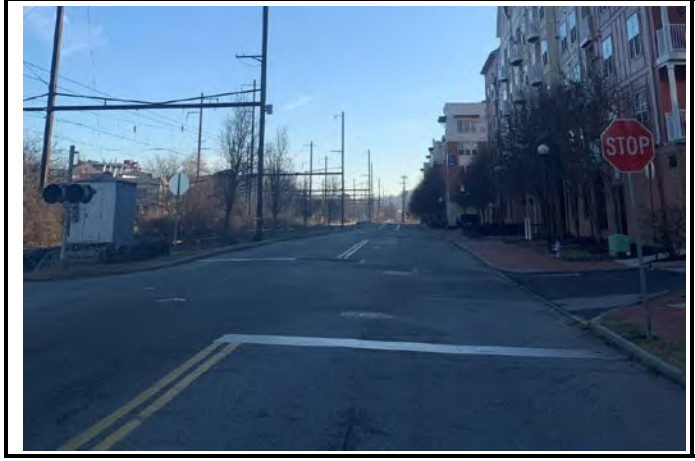
Unsignalized

Notes

INTERSECTION INVENTORY SUMMARY

Washington Street and Poplar Street

Eastbound Washington Street Approach



Lane Geometry

Shared Left/Through/Right

Roadway Classification

Local

Roadway Ownership

Local

Posted Speed Limit

25 MPH

Traffic Control

Unsignalized

Notes

Westbound Washington Street Approach



Lane Geometry

Shared Left/Through/Right

Roadway Classification

Local

Roadway Ownership

Local

Posted Speed Limit

25 MPH

Traffic Control

Unsignalized

Notes

Northbound Poplar Street Approach



Lane Geometry

Shared Left/Through/Right

Roadway Classification

Local

Roadway Ownership

Local

Posted Speed Limit

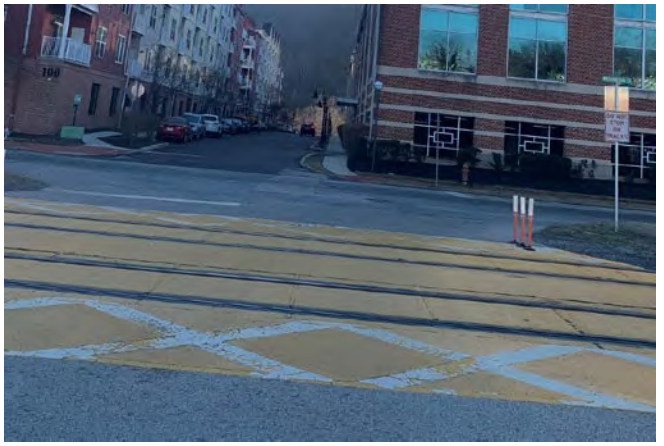
25 MPH

Traffic Control

Unsignalized

Notes

Southbound Poplar Street Approach



Lane Geometry

Shared Left/Through/Right

Roadway Classification

Local

Roadway Ownership

Local

Posted Speed Limit

25 MPH

Traffic Control

Unsignalized

Notes

INTERSECTION INVENTORY SUMMARY

Washington Street and Cherry Street

Eastbound Washington Street Approach



Lane Geometry

Shared Left/Through/Right

Roadway Classification

Local

Roadway Ownership

Local

Posted Speed Limit

25 MPH

Traffic Control

Unsignalized

Notes

Westbound Washington Street Approach



Lane Geometry

Shared Left/Through/Right

Roadway Classification

Local

Roadway Ownership

Local

Posted Speed Limit

25 MPH

Traffic Control

Unsignalized

Notes

Northbound Cherry Street Approach



Lane Geometry

Shared Left/Through/Right

Roadway Classification

Local

Roadway Ownership

Local

Posted Speed Limit

25 MPH

Traffic Control

Unsignalized

Notes

Southbound Cherry Street Approach



Lane Geometry

Shared Left/Through/Right

Roadway Classification

Local

Roadway Ownership

Local

Posted Speed Limit

25 MPH

Traffic Control

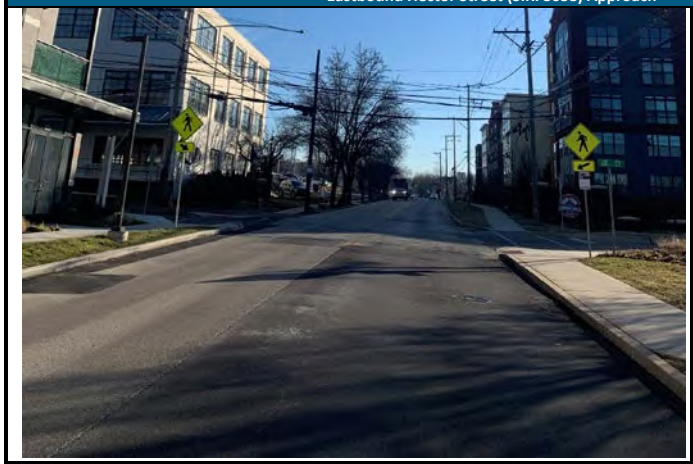
Unsignalized

Notes

INTERSECTION INVENTORY SUMMARY

Hector Street (S.R. 3058) and Spring Mill Avenue/Lee Street

Eastbound Hector Street (S.R. 3058) Approach



Lane Geometry

Shared Left/Through/Right

Roadway Classification

Urban – Minor Arterial

Roadway Ownership

State

Posted Speed Limit

25 MPH

Traffic Control

Unsignalized

Notes

Westbound Hector Street (S.R. 3058) Approach



Lane Geometry

Shared Left/Through/Right

Roadway Classification

Urban – Minor Arterial

Roadway Ownership

State

Posted Speed Limit

25 MPH

Traffic Control

Unsignalized

Notes

Northbound Lee Street Approach



Lane Geometry

Shared Left/Through/Right

Roadway Classification

Local

Roadway Ownership

Local

Posted Speed Limit

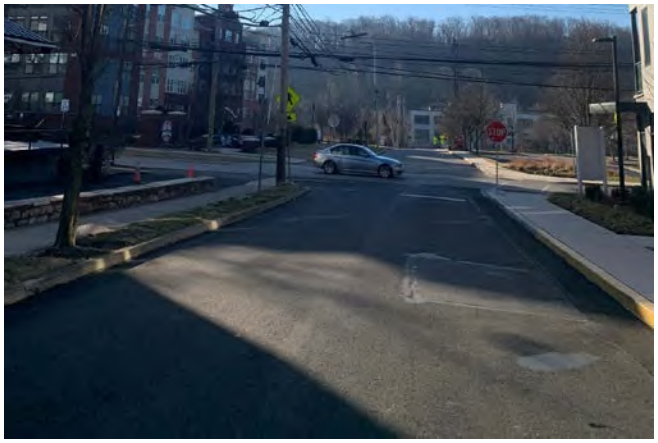
25 MPH

Traffic Control

Unsignalized

Notes

Southbound Lee Street Approach



Lane Geometry

Shared Left/Through/Right

Roadway Classification

Local

Roadway Ownership

Local

Posted Speed Limit

25 MPH

Traffic Control

Unsignalized

Notes

INTERSECTION INVENTORY SUMMARY

Hector Street (S.R. 3058) and Spring Mill Avenue/Lee Street

Eastbound Hector Street (S.R. 3058) Approach



Lane Geometry

Left
SharedThrough/Right

Roadway Classification
Urban – Minor Arterial

Roadway Ownership
State

Posted Speed Limit
25 MPH

Traffic Control
Signalized

Notes

Westbound Hector Street (S.R. 3058) Approach



Lane Geometry

Left
SharedThrough/Right

Roadway Classification
Urban – Minor Arterial

Roadway Ownership
State

Posted Speed Limit
25 MPH

Traffic Control
Signalized

Notes

Northbound Station Avenue Approach



Lane Geometry

Shared Left/Through/Right

Roadway Classification
Local

Roadway Ownership
Local

Posted Speed Limit
25 MPH

Traffic Control
Signalized

Notes

Southbound North Lane (S.R. 3015) Approach



Lane Geometry

Shared Left/Through/Right

Roadway Classification
Urban - Major Collector

Roadway Ownership
State

Posted Speed Limit
25 MPH

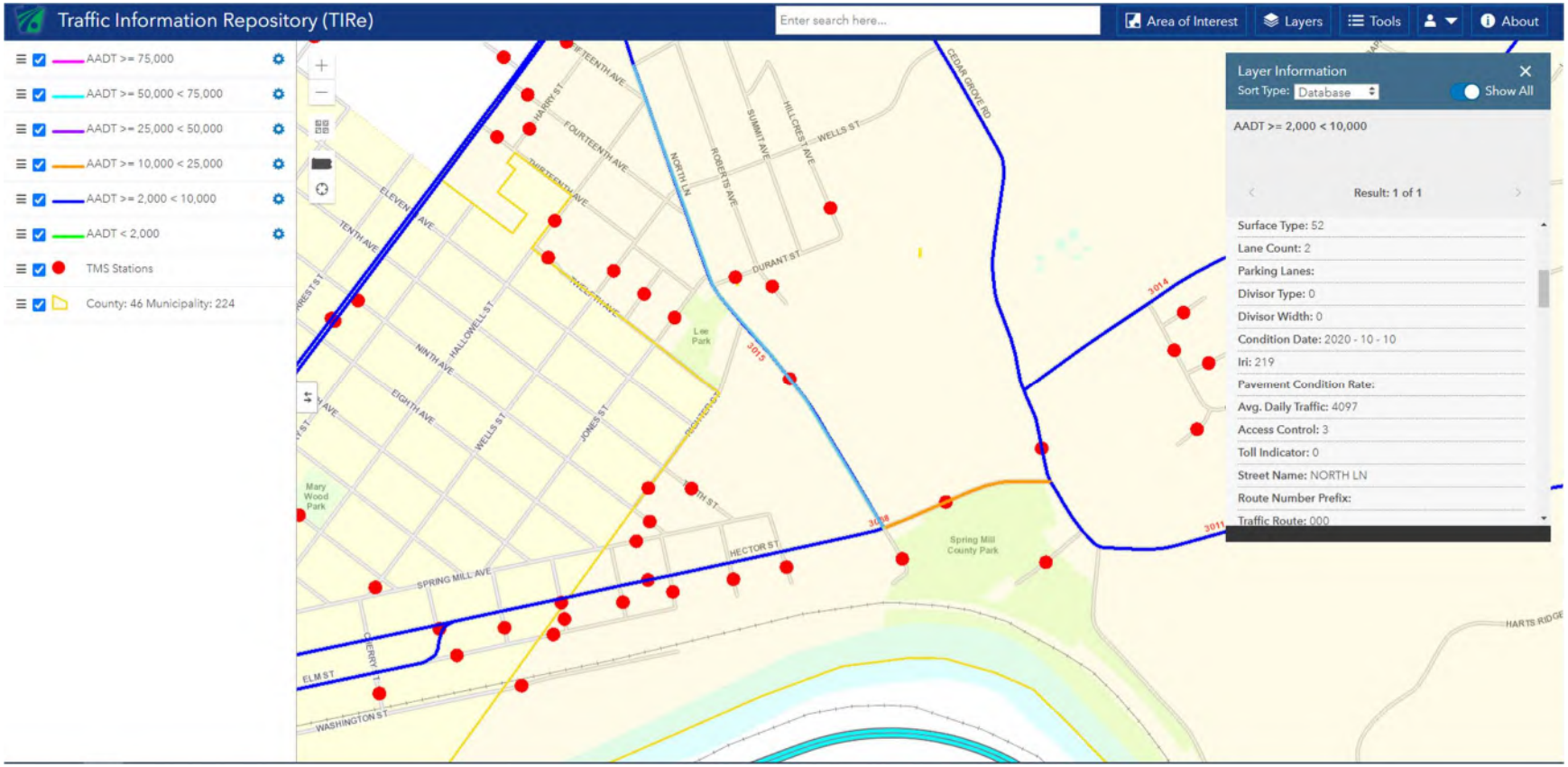
Traffic Control
Signalized

Notes

Appendix B

Daily Traffic Data

NORTH LANE (S.R. 3015)



Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Cherry St
Location: 100 ft S of Elm St
Counter: 35342

Site Code: 3
Station ID: 3
A to B NB
Latitude: 40' 7262.0000 North
Longitude: 75' 29898.0000 West

NB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/02/22	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	0	21	4	1	3	0	0	0	0	0	0	0	0	29
13:00	0	16	1	1	3	0	0	0	0	0	0	0	0	21
14:00	2	32	**7**	1	2	0	0	0	0	0	0	0	0	44
15:00	1	25	6	1	2	0	0	0	0	0	0	0	0	35
16:00	1	51	7	**5**	**4**	0	0	0	0	0	0	0	0	68
17:00	**3**	**74**	2	1	4	0	0	0	0	0	0	0	0	**84**
18:00	0	45	3	0	1	0	0	0	0	0	0	0	0	49
19:00	0	39	6	0	2	0	0	0	0	0	0	0	0	47
20:00	0	9	3	0	0	0	0	0	0	0	0	0	0	12
21:00	1	10	0	0	0	0	0	0	0	0	0	0	0	11
22:00	0	10	1	0	0	0	0	0	0	0	0	0	0	11
23:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
Total	8	336	40	10	21	0	0	0	0	0	0	0	0	415
Percent	1.9%	81.0%	9.6%	2.4%	5.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak Vol.														
PM Peak Vol.	17:00 3	17:00 74	14:00 7	16:00 5	16:00 4									17:00 84

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Cherry St
Location: 100 ft S of Elm St
Counter: 35342

Site Code: 3
Station ID: 3
A to B NB
Latitude: 40' 7262.0000 North
Longitude: 75' 29898.0000 West

NB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/03/22	0	1	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
04:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
05:00	0	6	0	0	0	0	0	0	0	0	0	0	0	6
06:00	0	19	0	0	0	0	0	0	0	0	0	0	0	19
07:00	0	**39**	**4**	0	2	0	0	0	0	0	0	0	0	**45**
08:00	0	32	4	0	**3**	0	0	0	0	0	0	0	0	39
09:00	**2**	22	4	0	1	0	0	0	0	0	0	0	0	29
10:00	0	14	2	0	1	0	0	0	0	0	0	0	0	17
11:00	1	19	2	0	3	0	0	0	0	0	0	0	0	25
12 PM	1	40	4	0	1	0	0	0	0	0	0	0	0	46
13:00	2	23	1	0	9	0	0	0	0	0	0	0	0	35
14:00	0	14	5	0	2	0	0	0	0	0	0	0	0	21
15:00	0	30	**8**	0	2	0	0	0	0	0	0	0	0	40
16:00	2	46	3	**2**	**10**	0	0	0	0	0	0	0	0	63
17:00	**3**	**56**	3	0	0	0	0	0	0	0	0	0	0	62
18:00	0	36	2	1	4	0	0	0	0	0	0	0	0	43
19:00	1	56	7	0	0	0	**1**	0	0	0	0	0	0	**65**
20:00	0	8	0	0	3	0	0	0	0	0	0	0	0	11
21:00	0	8	0	0	0	0	0	0	0	0	0	0	0	8
22:00	1	9	2	0	0	0	0	0	0	0	0	0	0	12
23:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Total	13	485	51	3	41	0	1	0	0	0	0	0	0	594
Percent	2.2%	81.6%	8.6%	0.5%	6.9%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	09:00	07:00	07:00		08:00									07:00
Vol.	2	39	4		3									45
PM Peak	17:00	17:00	15:00	16:00	16:00		19:00							19:00
Vol.	3	56	8	2	10		1							65

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Cherry St
Location: 100 ft S of Elm St
Counter: 35342

Site Code: 3
Station ID: 3
A to B NB
Latitude: 40' 7262.0000 North
Longitude: 75' 29898.0000 West

NB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/04/22	0	1	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
05:00	0	6	0	0	0	0	0	0	0	0	0	0	0	6
06:00	0	15	1	0	0	0	0	0	0	0	0	0	0	16
07:00	0	**37**	**5**	0	**2**	0	0	0	0	0	0	0	0	**44**
08:00	0	36	0	0	1	0	0	0	0	0	0	0	0	37
09:00	0	23	5	0	0	**1**	0	0	0	0	0	0	0	29
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	0	119	11	0	3	1	0	0	0	0	0	0	0	134
Percent	0.0%	88.8%	8.2%	0.0%	2.2%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak		07:00	07:00		07:00	09:00								07:00
Vol.		37	5		2	1								44
PM Peak														
Vol.														
Grand Total	21	940	102	13	65	1	1	0	0	0	0	0	0	1143
Percent	1.8%	82.2%	8.9%	1.1%	5.7%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Cherry St
Location: 100 ft S of Elm St
Counter: 35342

Site Code: 3
Station ID: 3
A to B NB
Latitude: 40' 7262.0000 North
Longitude: 75' 29898.0000 West

SB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/02/22	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	0	30	4	0	2	**1**	0	0	0	0	0	0	0	37
13:00	0	27	7	0	**4**	1	0	0	0	0	0	0	0	39
14:00	0	20	5	**1**	3	0	0	**2**	0	0	0	0	0	31
15:00	**1**	36	2	1	4	0	0	0	0	0	0	0	0	44
16:00	1	44	10	1	0	0	0	0	0	0	0	0	0	56
17:00	0	55	**12**	1	4	0	0	0	0	0	0	0	0	**72**
18:00	0	**57**	9	1	2	0	0	0	0	0	0	0	0	69
19:00	1	29	4	1	1	0	0	0	0	0	0	0	0	36
20:00	0	24	4	0	0	0	0	0	0	0	0	0	0	28
21:00	0	13	2	1	2	0	0	0	0	0	0	0	0	18
22:00	0	4	4	0	0	0	0	0	0	0	0	0	0	8
23:00	0	4	1	0	0	0	0	0	0	0	0	0	0	5
Total	3	343	64	7	22	2	0	2	0	0	0	0	0	443
Percent	0.7%	77.4%	14.4%	1.6%	5.0%	0.5%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak Vol.														
PM Peak	15:00	18:00	17:00	14:00	13:00	12:00		14:00						17:00
Vol.	1	57	12	1	4	1		2						72

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Cherry St
Location: 100 ft S of Elm St
Counter: 35342

Site Code: 3
Station ID: 3
A to B NB
Latitude: 40' 7262.0000 North
Longitude: 75' 29898.0000 West

SB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/03/22	0	2	0	0	0	0	0	0	0	0	0	0	0	2
01:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	5	0	0	0	0	0	0	0	0	0	0	0	5
06:00	0	13	2	0	3	0	0	0	0	0	0	0	0	18
07:00	**1**	38	6	1	3	0	0	0	0	0	0	0	0	49
08:00	0	**45**	8	1	5	1	0	0	0	0	0	0	0	**60**
09:00	1	30	**15**	**2**	4	0	0	0	0	0	0	0	0	52
10:00	0	14	9	1	**6**	0	0	0	0	0	0	0	0	30
11:00	0	15	8	0	2	**2**	0	0	0	0	0	0	0	27
12 PM	0	37	6	1	**5**	0	0	0	0	0	0	0	0	49
13:00	**1**	20	8	0	3	0	0	0	0	0	0	0	0	32
14:00	0	11	3	1	3	**1**	0	0	0	0	0	0	0	19
15:00	1	21	4	0	0	0	0	**1**	0	0	0	0	0	27
16:00	1	44	**10**	**2**	2	0	0	0	0	0	0	0	0	59
17:00	0	41	5	0	4	0	0	0	0	0	0	0	0	50
18:00	0	**54**	10	0	2	0	0	0	0	0	0	0	0	**66**
19:00	0	31	6	0	0	0	0	0	0	0	0	0	0	37
20:00	0	21	2	0	0	0	0	0	0	0	0	0	0	23
21:00	0	14	2	0	0	0	0	0	0	0	0	0	0	16
22:00	0	13	4	0	0	0	0	0	0	0	0	0	0	17
23:00	0	4	1	0	0	0	0	0	0	0	0	0	0	5
Total	5	477	110	9	42	4	0	1	0	0	0	0	0	648
Percent	0.8%	73.6%	17.0%	1.4%	6.5%	0.6%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	08:00	09:00	09:00	10:00	11:00								08:00
Vol.	1	45	15	2	6	2								60
PM Peak	13:00	18:00	16:00	16:00	12:00	14:00		15:00						18:00
Vol.	1	54	10	2	5	1		1						66

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Cherry St
Location: 100 ft S of Elm St
Counter: 35342

Site Code: 3
Station ID: 3
A to B NB
Latitude: 40' 7262.0000 North
Longitude: 75' 29898.0000 West

SB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/04/22	0	3	0	0	0	0	0	0	0	0	0	0	0	3
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	**1**	0	0	0	0	0	0	0	1
05:00	0	3	2	1	0	1	0	0	0	0	0	0	0	7
06:00	0	5	1	0	0	0	0	0	0	0	0	0	0	6
07:00	**2**	22	4	**2**	3	0	0	0	0	0	0	0	0	33
08:00	0	**25**	6	1	**4**	0	0	0	0	0	0	0	0	36
09:00	0	25	**11**	1	2	1	0	0	0	0	0	0	0	**40**
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	2	85	24	5	9	3	0	0	0	0	0	0	0	128
Percent	1.6%	66.4%	18.8%	3.9%	7.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	08:00	09:00	07:00	08:00	04:00								09:00
Vol.	2	25	11	2	4	1								40
PM Peak														
Vol.														
Grand Total	10	905	198	21	73	9	0	3	0	0	0	0	0	1219
Percent	0.8%	74.2%	16.2%	1.7%	6.0%	0.7%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Elm St EB
Location: 155 ft E of Harry St
Counter: 35344

Site Code: 1
Station ID: 1
A to B EB Travel Lane
Latitude: 40' 7215.0000 North
Longitude: 75' 30590.0000 West

EB Travel Lane

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/02/22	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	**2**	82	**36**	**4**	**26**	0	0	0	0	0	0	0	0	**150**
11:00	0	**96**	27	3	21	**1**	0	0	**1**	0	0	0	0	149
12 PM	0	111	29	1	13	**1**	**1**	0	0	0	0	0	0	156
13:00	0	91	34	**5**	**22**	0	0	0	0	0	0	0	0	152
14:00	0	177	48	4	21	0	0	0	0	0	0	0	0	250
15:00	4	176	**57**	5	19	0	1	**3**	0	0	0	0	0	265
16:00	**8**	198	55	4	14	1	0	1	0	0	0	0	0	281
17:00	2	**235**	43	4	12	0	0	0	0	0	0	0	0	**296**
18:00	2	183	43	5	16	0	0	0	0	0	0	0	0	249
19:00	0	104	28	1	8	1	0	0	0	0	0	0	0	142
20:00	0	53	15	0	4	0	0	0	0	0	0	0	0	72
21:00	0	53	14	2	7	0	0	0	0	0	0	0	0	76
22:00	0	3	0	0	4	0	0	0	0	0	0	0	0	7
23:00	0	3	0	0	1	0	0	0	0	0	0	0	0	4
Total	18	1565	429	38	188	4	2	4	1	0	0	0	0	2249
Percent	0.8%	69.6%	19.1%	1.7%	8.4%	0.2%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	10:00	11:00	10:00	10:00	10:00	11:00			11:00					10:00
Vol.	2	96	36	4	26	1			1					150
PM Peak	16:00	17:00	15:00	13:00	13:00	12:00	12:00	15:00						17:00
Vol.	8	235	57	5	22	1	1	3						296

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Elm St EB
Location: 155 ft E of Harry St
Counter: 35344

Site Code: 1
Station ID: 1
A to B EB Travel Lane
Latitude: 40' 7215.0000 North
Longitude: 75' 30590.0000 West

EB Travel Lane

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/03/22	0	1	1	0	0	0	0	0	0	0	0	0	0	2
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	19	10	0	3	0	0	0	0	0	0	0	0	32
06:00	0	29	14	1	7	0	0	0	0	0	0	0	0	51
07:00	0	**133**	**35**	1	16	**1**	0	**1**	0	0	**1**	0	0	**188**
08:00	0	87	28	5	16	1	0	0	0	0	0	0	0	137
09:00	0	114	33	2	18	0	0	1	0	0	0	0	0	168
10:00	0	79	24	**7**	**21**	0	0	1	0	0	0	0	0	132
11:00	**1**	32	11	7	4	0	0	0	0	0	0	0	0	55
12 PM	1	25	8	5	3	0	0	0	0	0	0	0	0	42
13:00	0	84	37	5	19	0	0	0	0	0	0	0	0	145
14:00	2	142	33	5	14	0	0	**1**	0	0	0	0	0	197
15:00	2	169	45	**6**	**21**	0	0	0	0	0	0	0	0	243
16:00	**3**	**207**	**65**	5	15	0	0	1	0	0	0	0	0	**296**
17:00	1	191	57	4	16	0	0	1	0	0	0	0	0	270
18:00	2	124	23	6	7	**1**	0	0	0	0	0	0	0	163
19:00	0	104	28	3	7	0	0	0	0	0	0	0	0	142
20:00	1	64	19	6	5	0	0	0	0	0	0	0	0	95
21:00	0	35	10	3	1	0	0	0	0	0	0	0	0	49
22:00	0	37	5	1	2	0	0	0	0	0	0	0	0	45
23:00	0	24	5	1	0	0	0	0	0	0	0	0	0	30
Total	13	1701	491	73	195	3	0	6	0	0	1	0	0	2483
Percent	0.5%	68.5%	19.8%	2.9%	7.9%	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	11:00	07:00	07:00	10:00	10:00	07:00		07:00			07:00			07:00
Vol.	1	133	35	7	21	1		1			1			188
PM Peak	16:00	16:00	16:00	15:00	15:00	18:00		14:00						16:00
Vol.	3	207	65	6	21	1		1						296

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Elm St EB
Location: 155 ft E of Harry St
Counter: 35344

Site Code: 1
Station ID: 1
A to B EB Travel Lane
Latitude: 40' 7215.0000 North
Longitude: 75' 30590.0000 West

EB Travel Lane

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/04/22	**1**	11	4	0	1	0	0	0	0	0	0	0	0	17
01:00	0	5	1	0	2	0	0	0	0	0	0	0	0	8
02:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
03:00	0	3	2	1	1	0	0	0	0	0	0	0	0	7
04:00	0	8	4	0	3	0	0	0	0	0	0	0	0	15
05:00	0	29	11	1	6	0	0	0	0	0	0	0	0	47
06:00	0	28	15	0	9	**1**	0	0	0	0	0	0	0	53
07:00	1	**166**	37	8	17	0	0	**1**	0	0	0	0	0	**230**
08:00	1	142	**45**	**11**	**25**	0	**1**	0	0	0	0	0	0	225
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	3	394	120	21	64	1	1	1	0	0	0	0	0	605
Percent	0.5%	65.1%	19.8%	3.5%	10.6%	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	00:00	07:00	08:00	08:00	08:00	06:00	08:00	07:00						07:00
Vol.	1	166	45	11	25	1	1	1						230
PM Peak														
Vol.														
Grand Total	34	3660	1040	132	447	8	3	11	1	0	1	0	0	5337
Percent	0.6%	68.6%	19.5%	2.5%	8.4%	0.1%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Elm St EB
Location: 155 ft E of Harry St
Counter: 35344

Site Code: 1
Station ID: 1
A to B EB Travel Lane
Latitude: 40' 7215.0000 North
Longitude: 75' 30590.0000 West

EB Passing Lane

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/02/22	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	2	**26**	**14**	**3**	2	**2**	0	**2**	0	0	0	0	0	**51**
11:00	**3**	23	14	3	**4**	1	0	1	0	0	0	0	0	49
12 PM	0	35	12	2	3	0	**2**	0	0	0	0	0	0	54
13:00	3	40	12	4	6	0	0	0	**1**	0	0	0	0	66
14:00	3	46	10	**9**	**10**	0	1	0	0	0	0	0	0	79
15:00	2	47	13	1	6	0	0	0	0	0	0	0	0	69
16:00	4	61	14	1	9	0	0	0	0	0	0	0	0	89
17:00	4	64	12	1	3	**1**	0	**1**	0	0	0	0	0	86
18:00	**5**	**84**	**16**	2	7	0	0	0	0	0	0	0	0	**114**
19:00	0	57	5	1	10	0	0	0	0	0	0	0	0	73
20:00	0	39	10	2	4	0	0	0	0	0	0	0	0	55
21:00	1	30	9	2	7	0	0	0	0	0	0	0	0	49
22:00	0	21	2	1	1	0	0	0	0	0	0	0	0	25
23:00	0	7	3	0	1	0	0	0	0	0	0	0	0	11
Total	27	580	146	32	73	4	3	4	1	0	0	0	0	870
Percent	3.1%	66.7%	16.8%	3.7%	8.4%	0.5%	0.3%	0.5%	0.1%	0.0%	0.0%	0.0%	0.0%	
AM Peak	11:00	10:00	10:00	10:00	11:00	10:00		10:00						10:00
Vol.	3	26	14	3	4	2		2						51
PM Peak	18:00	18:00	18:00	14:00	14:00	17:00	12:00	17:00	13:00					18:00
Vol.	5	84	16	9	10	1	2	1	1					114

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Elm St EB
Location: 155 ft E of Harry St
Counter: 35344

Site Code: 1
Station ID: 1
A to B EB Travel Lane
Latitude: 40' 7215.0000 North
Longitude: 75' 30590.0000 West

EB Passing Lane

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/03/22	0	7	1	0	1	0	0	0	0	0	0	0	0	9
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	1	0	0	2	0	0	0	0	0	0	0	0	3
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	5	0	1	0	0	0	0	0	0	0	0	0	6
05:00	1	17	2	0	2	0	0	0	0	0	0	0	0	22
06:00	2	27	8	1	5	0	0	0	0	0	0	0	0	43
07:00	0	**41**	**14**	1	8	**1**	0	0	0	0	0	0	0	**65**
08:00	0	37	11	0	8	0	**1**	0	**1**	0	0	0	0	58
09:00	2	27	6	**5**	6	0	0	0	0	0	0	0	0	46
10:00	2	23	4	1	3	0	0	0	0	0	0	0	0	33
11:00	**4**	36	11	0	**10**	1	0	**2**	0	0	0	0	0	64
12 PM	1	41	11	1	6	0	0	0	0	0	0	0	0	60
13:00	1	37	12	1	8	0	0	0	0	0	0	0	0	59
14:00	3	36	13	1	**12**	**1**	0	0	0	0	0	0	0	66
15:00	2	43	**15**	1	4	1	0	0	0	0	0	0	0	66
16:00	2	50	9	**4**	3	1	0	0	0	0	0	0	0	69
17:00	3	64	14	1	4	0	0	0	0	0	0	0	0	86
18:00	**4**	68	14	1	4	0	0	0	0	0	0	0	0	91
19:00	2	**72**	15	1	5	0	0	0	0	0	0	0	0	**95**
20:00	4	54	13	2	3	0	0	0	0	0	0	0	0	76
21:00	1	32	9	1	5	0	0	0	0	0	0	0	0	48
22:00	1	34	6	1	1	0	0	0	0	0	0	0	0	43
23:00	0	7	3	0	0	0	0	0	0	0	0	0	0	10
Total	35	761	191	24	100	5	1	2	1	0	0	0	0	1120
Percent	3.1%	67.9%	17.1%	2.1%	8.9%	0.4%	0.1%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	
AM Peak	11:00	07:00	07:00	09:00	11:00	07:00	08:00	11:00	08:00					07:00
Vol.	4	41	14	5	10	1	1	2	1					65
PM Peak	18:00	19:00	15:00	16:00	14:00	14:00								19:00
Vol.	4	72	15	4	12	1								95

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Elm St EB
Location: 155 ft E of Harry St
Counter: 35344

Site Code: 1
Station ID: 1
A to B EB Travel Lane
Latitude: 40' 7215.0000 North
Longitude: 75' 30590.0000 West

EB Passing Lane

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/04/22	1	14	1	0	0	0	0	0	0	0	0	0	0	16
01:00	0	3	2	0	0	0	0	0	0	0	0	0	0	5
02:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
05:00	0	12	1	0	0	0	0	0	0	0	0	0	0	13
06:00	0	17	9	1	4	0	0	0	0	0	0	0	0	31
07:00	**4**	46	**15**	**3**	5	0	**1**	0	0	0	0	0	0	**74**
08:00	2	**48**	8	0	**9**	0	0	0	0	0	0	0	0	67
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	7	147	36	4	18	0	1	0	0	0	0	0	0	213
Percent	3.3%	69.0%	16.9%	1.9%	8.5%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	08:00	07:00	07:00	08:00		07:00							07:00
Vol.	4	48	15	3	9		1							74
PM Peak														
Vol.														
Grand Total	69	1488	373	60	191	9	5	6	2	0	0	0	0	2203
Percent	3.1%	67.5%	16.9%	2.7%	8.7%	0.4%	0.2%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Elm St EB
Location: 155 ft E of Harry St
Counter: 35344

Site Code: 1
Station ID: 1
A to B EB Travel Lane
Latitude: 40' 7215.0000 North
Longitude: 75' 30590.0000 West

EB Travel Lane, EB Passing Lane

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/02/22	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	**4**	108	**50**	**7**	**28**	**2**	0	**2**	0	0	0	0	0	**201**
11:00	3	**119**	41	6	25	2	0	1	**1**	0	0	0	0	198
12 PM	0	146	41	3	16	**1**	**3**	0	0	0	0	0	0	210
13:00	3	131	46	9	28	0	0	0	**1**	0	0	0	0	218
14:00	3	223	58	**13**	**31**	0	1	0	0	0	0	0	0	329
15:00	6	223	**70**	6	25	0	1	**3**	0	0	0	0	0	334
16:00	**12**	259	69	5	23	1	0	1	0	0	0	0	0	370
17:00	6	**299**	55	5	15	1	0	1	0	0	0	0	0	**382**
18:00	7	267	59	7	23	0	0	0	0	0	0	0	0	363
19:00	0	161	33	2	18	1	0	0	0	0	0	0	0	215
20:00	0	92	25	2	8	0	0	0	0	0	0	0	0	127
21:00	1	83	23	4	14	0	0	0	0	0	0	0	0	125
22:00	0	24	2	1	5	0	0	0	0	0	0	0	0	32
23:00	0	10	3	0	2	0	0	0	0	0	0	0	0	15
Total	45	2145	575	70	261	8	5	8	2	0	0	0	0	3119
Percent	1.4%	68.8%	18.4%	2.2%	8.4%	0.3%	0.2%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	
AM Peak	10:00	11:00	10:00	10:00	10:00	10:00		10:00	11:00					10:00
Vol.	4	119	50	7	28	2		2	1					201
PM Peak	16:00	17:00	15:00	14:00	14:00	12:00	12:00	15:00	13:00					17:00
Vol.	12	299	70	13	31	1	3	3	1					382

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Elm St EB
Location: 155 ft E of Harry St
Counter: 35344

Site Code: 1
Station ID: 1
A to B EB Travel Lane
Latitude: 40' 7215.0000 North
Longitude: 75' 30590.0000 West

EB Travel Lane, EB Passing Lane

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/03/22	0	8	2	0	1	0	0	0	0	0	0	0	0	11
01:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
02:00	0	1	0	0	2	0	0	0	0	0	0	0	0	3
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	5	0	1	0	0	0	0	0	0	0	0	0	6
05:00	1	36	12	0	5	0	0	0	0	0	0	0	0	54
06:00	2	56	22	2	12	0	0	0	0	0	0	0	0	94
07:00	0	**174**	**49**	2	**24**	**2**	0	1	0	0	**1**	0	0	**253**
08:00	0	124	39	5	24	1	**1**	0	**1**	0	0	0	0	195
09:00	2	141	39	7	24	0	0	1	0	0	0	0	0	214
10:00	2	102	28	**8**	24	0	0	1	0	0	0	0	0	165
11:00	**5**	68	22	7	14	1	0	**2**	0	0	0	0	0	119
12 PM	2	66	19	6	9	0	0	0	0	0	0	0	0	102
13:00	1	121	49	6	**27**	0	0	0	0	0	0	0	0	204
14:00	5	178	46	6	26	**1**	0	**1**	0	0	0	0	0	263
15:00	4	212	60	7	25	1	0	0	0	0	0	0	0	309
16:00	5	**257**	**74**	**9**	18	1	0	1	0	0	0	0	0	**365**
17:00	4	255	71	5	20	0	0	1	0	0	0	0	0	356
18:00	**6**	192	37	7	11	1	0	0	0	0	0	0	0	254
19:00	2	176	43	4	12	0	0	0	0	0	0	0	0	237
20:00	5	118	32	8	8	0	0	0	0	0	0	0	0	171
21:00	1	67	19	4	6	0	0	0	0	0	0	0	0	97
22:00	1	71	11	2	3	0	0	0	0	0	0	0	0	88
23:00	0	31	8	1	0	0	0	0	0	0	0	0	0	40
Total	48	2462	682	97	295	8	1	8	1	0	1	0	0	3603
Percent	1.3%	68.3%	18.9%	2.7%	8.2%	0.2%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	11:00	07:00	07:00	10:00	07:00	07:00	08:00	11:00	08:00		07:00			07:00
Vol.	5	174	49	8	24	2	1	2	1		1			253
PM Peak	18:00	16:00	16:00	16:00	13:00	14:00		14:00						16:00
Vol.	6	257	74	9	27	1		1						365

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Elm St EB
Location: 155 ft E of Harry St
Counter: 35344

Site Code: 1
Station ID: 1
A to B EB Travel Lane
Latitude: 40' 7215.0000 North
Longitude: 75' 30590.0000 West

EB Travel Lane, EB Passing Lane

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/04/22	2	25	5	0	1	0	0	0	0	0	0	0	0	33
01:00	0	8	3	0	2	0	0	0	0	0	0	0	0	13
02:00	0	5	1	0	0	0	0	0	0	0	0	0	0	6
03:00	0	4	2	1	1	0	0	0	0	0	0	0	0	8
04:00	0	11	4	0	3	0	0	0	0	0	0	0	0	18
05:00	0	41	12	1	6	0	0	0	0	0	0	0	0	60
06:00	0	45	24	1	13	**1**	0	0	0	0	0	0	0	84
07:00	**5**	**212**	52	**11**	22	0	**1**	**1**	0	0	0	0	0	**304**
08:00	3	190	**53**	11	**34**	0	1	0	0	0	0	0	0	292
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	10	541	156	25	82	1	2	1	0	0	0	0	0	818
Percent	1.2%	66.1%	19.1%	3.1%	10.0%	0.1%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	07:00	08:00	07:00	08:00	06:00	07:00	07:00						07:00
Vol.	5	212	53	11	34	1	1	1						304
PM Peak Vol.														
Grand Total	103	5148	1413	192	638	17	8	17	3	0	1	0	0	7540
Percent	1.4%	68.3%	18.7%	2.5%	8.5%	0.2%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	

Tri-State Traffic Data, Inc.

610-466-1469
TSTData.com

Road: Elm St WB
Location: 155 ft E of Harry St
Counter: 35306

Site Code: 1
Station ID: 1
WB
Latitude: 40' 7215.0000 North
Longitude: 75' 30590.0000 West

WB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/02/22	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	0	**46**	**8**	**4**	5	0	0	**1**	**1**	0	0	0	0	**65**
11:00	0	45	7	2	**7**	0	0	1	1	0	0	0	0	63
12 PM	0	41	8	**3**	1	0	0	0	0	0	0	0	0	53
13:00	0	46	3	0	3	0	0	**1**	**1**	0	0	0	0	54
14:00	0	50	**14**	0	3	0	0	1	0	0	0	0	0	68
15:00	0	64	9	0	**5**	**1**	0	1	1	0	0	0	0	81
16:00	0	99	9	0	5	0	0	0	0	0	0	0	0	113
17:00	0	**109**	12	0	4	0	0	0	0	0	0	0	0	**125**
18:00	0	80	10	0	3	0	0	0	0	0	0	0	0	93
19:00	0	48	4	0	2	0	0	0	0	0	0	0	0	54
20:00	0	22	4	0	1	0	0	0	0	0	0	0	0	27
21:00	0	17	4	0	1	0	0	0	0	0	0	0	0	22
22:00	0	18	3	0	0	0	0	0	0	0	0	0	0	21
23:00	0	8	1	0	0	0	0	0	0	0	0	0	0	9
Total	0	693	96	9	40	1	0	5	4	0	0	0	0	848
Percent	0.0%	81.7%	11.3%	1.1%	4.7%	0.1%	0.0%	0.6%	0.5%	0.0%	0.0%	0.0%	0.0%	
AM Peak		10:00	10:00	10:00	11:00			10:00	10:00					10:00
Vol.		46	8	4	7			1	1					65
PM Peak		17:00	14:00	12:00	15:00	15:00		13:00	13:00					17:00
Vol.		109	14	3	5	1		1	1					125

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Elm St WB
Location: 155 ft E of Harry St
Counter: 35306

Site Code: 1
Station ID: 1
WB
Latitude: 40' 7215.0000 North
Longitude: 75' 30590.0000 West

WB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/03/22	0	2	1	0	0	0	0	0	0	0	0	0	0	3
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
04:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
05:00	0	18	2	0	3	0	0	0	0	0	0	0	0	23
06:00	0	65	6	0	3	0	0	0	0	0	0	0	0	74
07:00	0	**117**	14	0	**4**	0	0	0	0	0	0	0	0	**135**
08:00	0	73	9	0	3	1	0	0	0	0	0	0	0	86
09:00	0	67	11	0	4	0	0	0	**1**	0	0	0	0	83
10:00	0	43	6	0	2	**2**	0	0	1	0	0	0	0	54
11:00	0	45	**15**	0	2	0	0	**1**	0	0	0	0	0	63
12 PM	0	55	9	0	2	0	0	1	0	0	0	0	0	67
13:00	0	40	11	0	1	0	0	**2**	0	0	0	0	0	54
14:00	**3**	39	13	1	**6**	0	0	1	0	0	0	0	0	63
15:00	0	54	**15**	0	3	0	0	0	0	0	0	0	0	72
16:00	0	66	7	**2**	3	0	0	0	0	0	0	0	0	78
17:00	0	**99**	9	0	4	0	0	0	0	0	0	0	0	**112**
18:00	0	72	12	0	3	0	0	0	0	0	0	0	0	87
19:00	0	58	5	0	1	0	0	0	0	0	0	0	0	64
20:00	0	16	2	0	1	0	0	0	0	0	0	0	0	19
21:00	0	24	2	1	0	0	0	0	0	0	0	0	0	27
22:00	0	15	1	0	0	0	0	0	0	0	0	0	0	16
23:00	0	5	0	0	0	0	0	0	0	0	0	0	0	5
Total	3	978	150	4	45	3	0	5	2	0	0	0	0	1190
Percent	0.3%	82.2%	12.6%	0.3%	3.8%	0.3%	0.0%	0.4%	0.2%	0.0%	0.0%	0.0%	0.0%	
AM Peak		07:00	11:00		07:00	10:00		11:00	09:00					07:00
Vol.		117	15		4	2		1	1					135
PM Peak	14:00	17:00	15:00	16:00	14:00			13:00						17:00
Vol.	3	99	15	2	6			2						112

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Elm St WB
Location: 155 ft E of Harry St
Counter: 35306

Site Code: 1
Station ID: 1
WB
Latitude: 40' 7215.0000 North
Longitude: 75' 30590.0000 West

WB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/04/22	0	6	0	0	0	0	0	0	0	0	0	0	0	6
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
04:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
05:00	0	20	4	0	0	0	0	0	0	0	0	0	0	24
06:00	0	68	5	0	1	0	0	**1**	0	0	0	0	0	75
07:00	0	**99**	8	**1**	**2**	0	0	0	0	0	0	0	0	**110**
08:00	0	71	**11**	0	1	0	0	0	**2**	0	0	0	0	85
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	0	270	28	1	4	0	0	1	2	0	0	0	0	306
Percent	0.0%	88.2%	9.2%	0.3%	1.3%	0.0%	0.0%	0.3%	0.7%	0.0%	0.0%	0.0%	0.0%	
AM Peak		07:00	08:00	07:00	07:00			06:00	08:00					07:00
Vol.		99	11	1	2			1	2					110
PM Peak														
Vol.														
Grand Total	3	1941	274	14	89	4	0	11	8	0	0	0	0	2344
Percent	0.1%	82.8%	11.7%	0.6%	3.8%	0.2%	0.0%	0.5%	0.3%	0.0%	0.0%	0.0%	0.0%	

Tri-State Traffic Data, Inc.

610-466-1469
TSTData.com

Road: Hector St
Location: 80 ft E of Lee St
Counter: 35339

Site Code: 4
Station ID: 4
A to B EB
Latitude: 40' 75394.0000 North
Longitude: 75' 28803.0000 West

EB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/02/22	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	2	193	52	2	26	2	**1**	0	**1**	0	0	0	0	279
14:00	0	306	68	**3**	**36**	**4**	1	**3**	0	0	0	0	0	421
15:00	4	374	92	3	36	2	1	0	1	0	0	0	0	513
16:00	**6**	**504**	**104**	1	29	2	1	0	0	0	0	0	0	**647**
17:00	1	492	77	1	26	3	0	1	0	0	0	0	0	601
18:00	2	298	56	1	16	0	0	0	0	0	0	0	0	373
19:00	2	181	42	1	13	0	0	1	0	0	0	0	0	240
20:00	0	134	18	1	3	0	0	0	0	0	0	0	0	156
21:00	0	120	20	0	10	0	0	0	0	0	0	0	0	150
22:00	0	70	10	1	1	0	0	0	0	0	0	0	0	82
23:00	0	35	4	1	0	1	0	0	0	0	0	0	0	41
Total	17	2707	543	15	196	14	4	5	2	0	0	0	0	3503
Percent	0.5%	77.3%	15.5%	0.4%	5.6%	0.4%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	
AM Peak Vol.														
PM Peak	16:00	16:00	16:00	14:00	14:00	14:00	13:00	14:00	13:00					16:00
Vol.	6	504	104	3	36	4	1	3	1					647

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Hector St
Location: 80 ft E of Lee St
Counter: 35339

Site Code: 4
Station ID: 4
A to B EB
Latitude: 40' 75394.0000 North
Longitude: 75' 28803.0000 West

EB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/03/22	0	12	4	0	0	0	0	0	0	0	0	0	0	16
01:00	0	6	2	0	0	0	0	0	0	0	0	0	0	8
02:00	0	2	1	0	1	0	0	0	0	0	0	0	0	4
03:00	0	2	5	0	2	0	0	0	0	0	0	0	0	9
04:00	0	8	2	0	0	1	0	0	0	0	0	0	0	11
05:00	0	30	10	0	2	0	0	0	0	0	0	0	0	42
06:00	0	84	23	2	13	0	0	0	0	0	0	0	0	122
07:00	**7**	**273**	48	3	22	2	0	1	0	0	0	0	0	**356**
08:00	5	246	**52**	5	27	**3**	**1**	**3**	0	0	0	0	0	342
09:00	0	180	43	4	23	1	0	1	1	0	0	0	0	253
10:00	2	127	34	**7**	24	0	0	0	0	0	0	0	0	194
11:00	2	191	42	4	**30**	2	0	0	**2**	0	0	0	0	273
12 PM	0	209	42	2	13	1	0	**3**	0	0	0	0	0	270
13:00	0	180	41	**5**	28	1	0	1	0	0	0	0	0	256
14:00	1	239	63	4	**33**	**3**	0	1	0	0	0	0	0	344
15:00	**6**	325	63	2	28	3	0	2	0	0	0	0	0	429
16:00	5	**449**	**95**	2	17	3	0	0	0	0	0	0	0	**571**
17:00	2	449	66	1	21	2	0	1	0	0	0	0	0	542
18:00	4	297	42	0	15	0	**1**	0	0	0	0	0	0	359
19:00	2	210	34	1	2	0	0	0	0	0	0	0	0	249
20:00	0	144	29	1	7	0	0	0	0	0	0	0	0	181
21:00	0	115	19	0	4	0	0	0	0	0	0	0	0	138
22:00	0	64	9	1	4	0	0	0	0	0	0	0	0	78
23:00	0	21	3	1	1	0	0	0	0	0	0	0	0	26
Total	36	3863	772	45	317	22	2	13	3	0	0	0	0	5073
Percent	0.7%	76.1%	15.2%	0.9%	6.2%	0.4%	0.0%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	07:00	08:00	10:00	11:00	08:00	08:00	08:00	11:00					07:00
Vol.	7	273	52	7	30	3	1	3	2					356
PM Peak	15:00	16:00	16:00	13:00	14:00	14:00	18:00	12:00						16:00
Vol.	6	449	95	5	33	3	1	3						571

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Hector St
Location: 80 ft E of Lee St
Counter: 35339

Site Code: 4
Station ID: 4
A to B EB
Latitude: 40' 75394.0000 North
Longitude: 75' 28803.0000 West

EB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/04/22	0	14	2	0	0	0	0	0	0	0	0	0	0	16
01:00	0	7	3	0	0	0	0	0	0	0	0	0	0	10
02:00	0	6	2	0	0	0	0	0	0	0	0	0	0	8
03:00	0	4	3	0	1	0	0	0	0	0	0	0	0	8
04:00	0	9	1	1	1	0	0	0	0	0	0	0	0	12
05:00	0	24	10	1	3	0	0	0	0	0	0	0	0	38
06:00	2	86	22	2	14	**3**	0	0	0	0	0	0	0	129
07:00	**4**	**268**	44	2	17	1	0	**2**	0	0	0	0	0	338
08:00	2	261	**54**	**5**	**32**	2	0	0	0	0	0	0	0	**356**
09:00	3	174	36	4	21	2	0	2	0	0	0	0	0	242
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	11	853	177	15	89	8	0	4	0	0	0	0	0	1157
Percent	1.0%	73.7%	15.3%	1.3%	7.7%	0.7%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	07:00	08:00	08:00	08:00	06:00		07:00						08:00
Vol.	4	268	54	5	32	3		2						356
PM Peak														
Vol.														
Grand Total	64	7423	1492	75	602	44	6	22	5	0	0	0	0	9733
Percent	0.7%	76.3%	15.3%	0.8%	6.2%	0.5%	0.1%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Hector St
Location: 80 ft E of Lee St
Counter: 35339

Site Code: 4
Station ID: 4
A to B EB
Latitude: 40' 75394.0000 North
Longitude: 75' 28803.0000 West

WB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/02/22	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	2	177	39	3	10	1	0	0	0	0	0	0	0	232
14:00	3	192	28	4	8	0	1	1	0	0	0	0	0	237
15:00	5	242	**46**	**6**	**25**	**4**	0	1	0	0	0	0	0	329
16:00	**7**	**323**	29	2	12	4	**2**	0	0	0	0	0	0	**379**
17:00	6	260	37	2	8	0	0	**2**	0	0	0	0	0	315
18:00	3	224	36	1	8	1	0	0	0	0	0	0	0	273
19:00	4	128	12	1	2	0	0	1	0	0	0	0	0	148
20:00	2	81	13	1	0	0	0	0	0	0	0	0	0	97
21:00	0	75	5	1	3	0	0	0	0	0	0	0	0	84
22:00	0	40	8	1	0	0	0	0	0	0	0	0	0	49
23:00	0	20	3	1	1	0	0	0	0	0	0	0	0	25
Total	32	1762	256	23	77	10	3	5	0	0	0	0	0	2168
Percent	1.5%	81.3%	11.8%	1.1%	3.6%	0.5%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak Vol.														
PM Peak	16:00	16:00	15:00	15:00	15:00	15:00	16:00	17:00						16:00
Vol.	7	323	46	6	25	4	2	2						379

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Hector St
Location: 80 ft E of Lee St
Counter: 35339

Site Code: 4
Station ID: 4
A to B EB
Latitude: 40' 75394.0000 North
Longitude: 75' 28803.0000 West

WB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/03/22	0	6	1	0	0	0	0	0	0	0	0	0	0	7
01:00	0	6	1	0	1	0	0	0	0	0	0	0	0	8
02:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
03:00	0	9	4	0	0	0	0	0	0	0	0	0	0	13
04:00	0	14	5	0	0	1	0	0	0	0	0	0	0	20
05:00	0	55	13	2	2	0	0	0	0	0	0	0	0	72
06:00	0	130	18	1	8	0	0	0	0	0	0	0	0	157
07:00	**5**	255	46	2	12	**3**	0	0	0	0	0	0	0	323
08:00	5	**358**	**65**	**7**	11	3	0	0	0	0	0	0	0	**449**
09:00	0	206	36	3	10	0	0	0	0	0	0	0	0	255
10:00	2	140	24	3	**19**	0	0	0	0	0	0	0	0	188
11:00	0	150	41	1	6	1	**1**	**1**	0	0	0	0	0	201
12 PM	2	192	30	**3**	14	2	0	**1**	0	0	0	0	0	244
13:00	1	174	35	1	13	0	0	0	0	0	0	0	0	224
14:00	3	181	43	3	11	2	0	1	0	0	0	0	0	244
15:00	6	248	**48**	2	**24**	1	**1**	0	0	0	0	0	0	330
16:00	**7**	**286**	37	3	8	1	1	0	0	0	0	0	0	**343**
17:00	3	283	36	1	7	**4**	1	0	0	0	0	0	0	335
18:00	4	214	26	1	3	2	1	0	0	0	0	0	0	251
19:00	3	126	15	1	3	0	0	0	0	0	0	0	0	148
20:00	1	90	7	1	2	0	0	0	0	0	0	0	0	101
21:00	0	65	4	1	1	0	0	0	0	0	0	0	0	71
22:00	0	33	4	1	0	0	0	0	0	0	0	0	0	38
23:00	0	12	2	1	1	0	0	0	0	0	0	0	0	16
Total	42	3237	541	38	156	20	5	3	0	0	0	0	0	4042
Percent	1.0%	80.1%	13.4%	0.9%	3.9%	0.5%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	08:00	08:00	08:00	10:00	07:00	11:00	11:00						08:00
Vol.	5	358	65	7	19	3	1	1						449
PM Peak	16:00	16:00	15:00	12:00	15:00	17:00	15:00	12:00						16:00
Vol.	7	286	48	3	24	4	1	1						343

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Hector St
Location: 80 ft E of Lee St
Counter: 35339

Site Code: 4
Station ID: 4
A to B EB
Latitude: 40' 75394.0000 North
Longitude: 75' 28803.0000 West

WB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/04/22	0	12	0	0	0	0	0	0	0	0	0	0	0	12
01:00	0	3	1	0	0	0	0	0	0	0	0	0	0	4
02:00	0	3	4	0	1	0	0	0	0	0	0	0	0	8
03:00	0	7	0	0	0	0	0	0	0	0	0	0	0	7
04:00	0	7	4	0	0	**2**	0	0	0	0	0	0	0	13
05:00	0	53	8	2	2	1	0	0	0	0	0	0	0	66
06:00	1	105	18	0	5	1	0	0	0	0	0	0	0	130
07:00	2	236	39	**4**	4	2	0	0	0	0	0	0	0	287
08:00	**3**	**271**	**45**	3	**9**	0	0	0	0	0	0	0	0	**331**
09:00	2	222	40	2	6	0	0	**1**	0	0	0	0	0	273
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	8	919	159	11	27	6	0	1	0	0	0	0	0	1131
Percent	0.7%	81.3%	14.1%	1.0%	2.4%	0.5%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	08:00	08:00	07:00	08:00	04:00		09:00						08:00
Vol.	3	271	45	4	9	2		1						331
PM Peak Vol.														
Grand Total	82	5918	956	72	260	36	8	9	0	0	0	0	0	7341
Percent	1.1%	80.6%	13.0%	1.0%	3.5%	0.5%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	

Tri-State Traffic Data, Inc.

610-466-1469
TSTData.com

Road: Poplar St
Location: 80 ft S of Elm St
Counter: 37030

Site Code: 2
Station ID: 2
A to B NB
Latitude: 40' 7219.0000 North
Longitude: 75' 30198.0000 West

NB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/02/22	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 PM	0	4	**1**	0	0	0	0	0	0	0	0	0	0	5
13:00	1	**6**	0	0	0	0	0	0	0	0	0	0	0	7
14:00	0	5	0	0	0	0	0	0	0	0	0	0	0	5
15:00	0	5	1	0	0	0	0	0	0	0	0	0	0	6
16:00	1	6	1	0	0	**1**	0	0	0	0	0	0	0	**9**
17:00	**2**	3	1	0	0	0	0	0	0	0	0	0	0	6
18:00	1	2	1	0	0	0	0	0	0	0	0	0	0	4
19:00	0	5	0	0	0	0	0	0	0	0	0	0	0	5
20:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
21:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
22:00	0	4	1	0	**1**	0	0	0	0	0	0	0	0	6
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	5	43	6	0	1	1	0	0	0	0	0	0	0	56
Percent	8.9%	76.8%	10.7%	0.0%	1.8%	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak Vol.														
PM Peak Vol.	17:00 2	13:00 6	12:00 1		22:00 1	16:00 1								16:00 9

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Poplar St
Location: 80 ft S of Elm St
Counter: 37030

Site Code: 2
Station ID: 2
A to B NB
Latitude: 40' 7219.0000 North
Longitude: 75' 30198.0000 West

NB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/03/22	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
08:00	0	0	0	0	0	**1**	0	0	0	0	0	0	0	1
09:00	0	**3**	0	0	0	0	0	0	0	0	0	0	0	3
10:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
11:00	0	1	**3**	0	**1**	0	0	0	0	0	0	0	0	**5**
12 PM	0	5	1	0	0	0	0	0	0	0	0	0	0	6
13:00	0	1	**2**	0	**1**	0	0	0	0	0	0	0	0	4
14:00	0	0	1	0	1	**1**	0	0	0	0	0	0	0	3
15:00	0	4	2	0	0	0	0	0	0	0	0	0	0	6
16:00	0	**6**	0	0	1	0	0	0	0	0	0	0	0	**7**
17:00	0	5	0	0	0	0	0	0	0	0	0	0	0	5
18:00	0	6	1	0	0	0	0	0	0	0	0	0	0	7
19:00	0	3	0	0	1	0	0	0	0	0	0	0	0	4
20:00	0	1	0	0	1	0	0	0	0	0	0	0	0	2
21:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
22:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	43	12	0	6	2	0	0	0	0	0	0	0	63
Percent	0.0%	68.3%	19.0%	0.0%	9.5%	3.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak		09:00	11:00		11:00	08:00								11:00
Vol.		3	3		1	1								5
PM Peak		16:00	13:00		13:00	14:00								16:00
Vol.		6	2		1	1								7

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Poplar St
Location: 80 ft S of Elm St
Counter: 37030

Site Code: 2
Station ID: 2
A to B NB
Latitude: 40' 7219.0000 North
Longitude: 75' 30198.0000 West

NB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/04/22	**1**	1	0	0	0	0	0	0	0	0	0	0	0	2
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	**2**	0	0	0	0	0	0	0	0	0	0	0	2
06:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
07:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
08:00	0	0	**2**	**1**	0	0	0	0	0	0	0	0	0	**3**
09:00	0	1	1	0	**1**	0	0	0	0	0	0	0	0	3
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	1	7	3	1	1	0	0	0	0	0	0	0	0	13
Percent	7.7%	53.8%	23.1%	7.7%	7.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	00:00	05:00	08:00	08:00	09:00									08:00
Vol.	1	2	2	1	1									3
PM Peak														
Vol.														
Grand Total	6	93	21	1	8	3	0	0	0	0	0	0	0	132
Percent	4.5%	70.5%	15.9%	0.8%	6.1%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Poplar St
Location: 80 ft S of Elm St
Counter: 37030

Site Code: 2
Station ID: 2
A to B NB
Latitude: 40' 7219.0000 North
Longitude: 75' 30198.0000 West

SB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/02/22	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	0	**1**	0	0	**1**	0	0	0	0	0	0	0	0	**2**
12 PM	**1**	16	0	0	3	0	0	**1**	0	0	0	0	0	21
13:00	1	16	1	0	4	0	0	0	0	0	0	0	0	22
14:00	0	19	2	0	**8**	0	0	0	0	0	0	0	0	**29**
15:00	0	10	1	0	1	0	0	0	0	0	0	0	0	12
16:00	0	**22**	0	0	3	0	0	0	0	0	0	0	0	25
17:00	1	13	**3**	0	4	0	0	0	0	0	0	0	0	21
18:00	1	20	2	0	2	0	0	0	0	0	0	0	0	25
19:00	0	13	2	0	1	0	0	0	0	0	0	0	0	16
20:00	0	12	1	0	0	0	0	0	0	0	0	0	0	13
21:00	0	5	3	0	1	0	0	0	0	0	0	0	0	9
22:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
23:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
Total	4	153	16	0	28	0	0	1	0	0	0	0	0	202
Percent	2.0%	75.7%	7.9%	0.0%	13.9%	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak		11:00			11:00									11:00
Vol.		1			1									2
PM Peak	12:00	16:00	17:00		14:00			12:00						14:00
Vol.	1	22	3		8			1						29

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Poplar St
Location: 80 ft S of Elm St
Counter: 37030

Site Code: 2
Station ID: 2
A to B NB
Latitude: 40' 7219.0000 North
Longitude: 75' 30198.0000 West

SB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/03/22	0	0	2	0	0	0	0	0	0	0	0	0	0	2
01:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
05:00	0	4	0	0	1	0	0	0	0	0	0	0	0	5
06:00	**1**	7	3	0	0	0	0	0	0	0	0	0	0	11
07:00	0	19	3	0	1	0	0	0	0	0	0	0	0	23
08:00	0	7	1	0	1	0	0	0	0	0	0	0	0	9
09:00	0	**25**	2	**2**	1	0	0	0	0	0	0	0	0	**30**
10:00	0	12	2	0	**5**	0	0	0	0	0	0	0	0	19
11:00	0	11	**4**	0	4	0	0	0	0	0	0	0	0	19
12 PM	0	16	**4**	**1**	3	0	0	0	0	0	0	0	0	24
13:00	0	9	2	0	4	0	0	0	0	0	0	0	0	15
14:00	0	9	2	0	1	0	0	0	0	0	0	0	0	12
15:00	0	9	0	0	**5**	0	0	0	0	0	0	0	0	14
16:00	0	19	2	1	1	0	0	0	0	0	0	0	0	23
17:00	0	18	3	0	2	0	0	0	0	0	0	0	0	23
18:00	0	**28**	2	1	0	0	0	0	0	0	0	0	0	**31**
19:00	0	23	1	0	2	0	0	0	0	0	0	0	0	26
20:00	0	14	2	0	0	0	0	0	0	0	0	0	0	16
21:00	0	3	1	0	0	0	0	0	0	0	0	0	0	4
22:00	0	4	3	0	0	0	0	0	0	0	0	0	0	7
23:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
Total	1	242	40	5	31	0	0	0	0	0	0	0	0	319
Percent	0.3%	75.9%	12.5%	1.6%	9.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	06:00	09:00	11:00	09:00	10:00									09:00
Vol.	1	25	4	2	5									30
PM Peak		18:00	12:00	12:00	15:00									18:00
Vol.		28	4	1	5									31

Tri-State Traffic Data, Inc.
610-466-1469
TSTData.com

Road: Poplar St
Location: 80 ft S of Elm St
Counter: 37030

Site Code: 2
Station ID: 2
A to B NB
Latitude: 40' 7219.0000 North
Longitude: 75' 30198.0000 West

SB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
02/04/22	0	2	1	**1**	1	0	0	0	0	0	0	0	0	5
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
06:00	0	6	0	0	0	0	0	0	0	0	0	0	0	6
07:00	0	**20**	**4**	0	**3**	0	0	0	0	0	0	0	0	**27**
08:00	1	11	3	0	0	0	0	0	0	0	0	0	0	15
09:00	**2**	13	3	0	1	0	0	0	0	0	0	0	0	19
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	3	57	11	1	5	0	0	0	0	0	0	0	0	77
Percent	3.9%	74.0%	14.3%	1.3%	6.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	09:00	07:00	07:00	00:00	07:00									07:00
Vol.	2	20	4	1	3									27
PM Peak Vol.														
Grand Total	8	452	67	6	64	0	0	1	0	0	0	0	0	598
Percent	1.3%	75.6%	11.2%	1.0%	10.7%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	

Appendix C

Turning Movement Counts

www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Conshohocken, PA
Ash St & Washington St
Thursday, February 3, 2022
Location: 40.071275, -75.304611

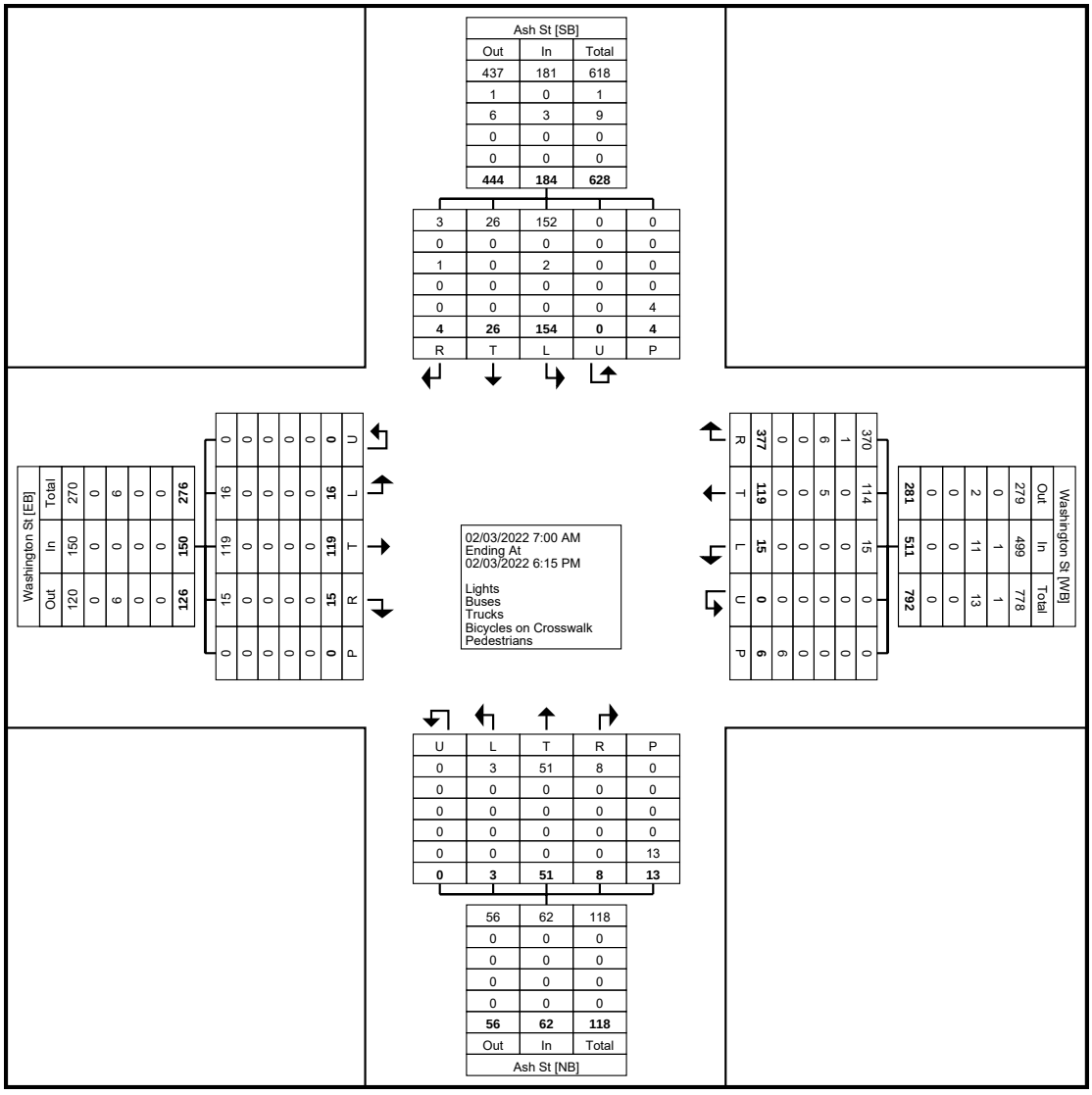
Count Name: Ash St & Washington St
Site Code:
Start Date: 02/03/2022

Turning Movement Data

Start Time	Washington St Eastbound						Washington St Westbound						Ash St Northbound						Ash St Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	0	0	2	0	0	2	2	5	34	0	0	41	0	1	0	0	1	1	5	2	0	0	1	7	51
7:15 AM	1	4	0	0	0	5	4	8	38	0	1	50	0	1	0	0	2	1	4	2	0	0	2	6	62
7:30 AM	1	1	2	0	0	4	1	11	37	0	1	49	0	0	0	0	1	0	5	5	0	0	0	10	63
7:45 AM	1	3	2	0	0	6	2	10	19	0	0	31	0	3	0	0	3	3	3	3	0	0	0	6	46
Hourly Total	3	8	6	0	0	17	9	34	128	0	2	171	0	5	0	0	7	5	17	12	0	0	3	29	222
8:00 AM	0	3	1	0	0	4	1	20	34	0	0	55	0	1	0	0	4	1	4	3	0	0	0	7	67
8:15 AM	1	4	2	0	0	7	2	8	30	0	0	40	1	0	0	0	0	1	8	4	0	0	0	12	60
8:30 AM	0	1	3	0	0	4	1	12	16	0	0	29	0	0	0	0	0	0	2	0	2	0	0	4	37
8:45 AM	1	3	0	0	0	4	0	13	15	0	1	28	0	2	0	0	0	2	4	3	0	0	0	7	41
Hourly Total	2	11	6	0	0	19	4	53	95	0	1	152	1	3	0	0	4	4	18	10	2	0	0	30	205
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	1	9	0	0	0	10	1	4	16	0	0	21	1	8	1	0	0	10	10	1	0	0	0	11	52
4:15 PM	1	17	0	0	0	18	0	1	13	0	1	14	1	4	1	0	0	6	13	0	1	0	1	14	52
4:30 PM	1	11	0	0	0	12	0	3	11	0	0	14	0	5	0	0	0	5	15	1	0	0	0	16	47
4:45 PM	3	8	1	0	0	12	0	5	19	0	0	24	0	4	0	0	0	4	15	1	0	0	0	16	56
Hourly Total	6	45	1	0	0	52	1	13	59	0	1	73	2	21	2	0	0	25	53	3	1	0	1	57	207
5:00 PM	2	18	2	0	0	22	0	5	26	0	0	31	0	11	3	0	0	14	17	0	0	0	0	17	84
5:15 PM	3	10	0	0	0	13	0	5	31	0	0	36	0	5	1	0	1	6	18	1	0	0	0	19	74
5:30 PM	0	11	0	0	0	11	1	5	27	0	0	33	0	4	1	0	1	5	16	0	0	0	0	16	65
5:45 PM	0	16	0	0	0	16	0	4	11	0	2	15	0	2	1	0	0	3	15	0	1	0	0	16	50
Hourly Total	5	55	2	0	0	62	1	19	95	0	2	115	0	22	6	0	2	28	66	1	1	0	0	68	273
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	16	119	15	0	0	150	15	119	377	0	6	511	3	51	8	0	13	62	154	26	4	0	4	184	907
Approach %	10.7	79.3	10.0	0.0	-	-	2.9	23.3	73.8	0.0	-	-	4.8	82.3	12.9	0.0	-	-	83.7	14.1	2.2	0.0	-	-	-
Total %	1.8	13.1	1.7	0.0	-	16.5	1.7	13.1	41.6	0.0	-	56.3	0.3	5.6	0.9	0.0	-	6.8	17.0	2.9	0.4	0.0	-	20.3	-
Lights	16	119	15	0	-	150	15	114	370	0	-	499	3	51	8	0	-	62	152	26	3	0	-	181	892
% Lights	100.0	100.0	100.0	-	-	100.0	100.0	95.8	98.1	-	-	97.7	100.0	100.0	100.0	-	-	100.0	98.7	100.0	75.0	-	-	98.4	98.3
Buses	0	0	0	0	-	0	0	0	1	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.3	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Trucks	0	0	0	0	-	0	0	5	6	0	-	11	0	0	0	0	-	0	2	0	1	0	-	3	14
% Trucks	0.0	0.0	0.0	-	-	0.0	0.0	4.2	1.6	-	-	2.2	0.0	0.0	0.0	-	-	0.0	1.3	0.0	25.0	-	-	1.6	1.5
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	6	-	-	-	-	-	13	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Conshohocken, PA
Ash St & Washington St
Thursday, February 3, 2022
Location: 40.071275, -75.304611

Count Name: Ash St & Washington St
Site Code:
Start Date: 02/03/2022



Turning Movement Data Plot

www.TSTData.com
184 Baker Rd

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Conshohocken, PA
Ash St & Washington St
Thursday, February 3, 2022
Location: 40.071275, -75.304611

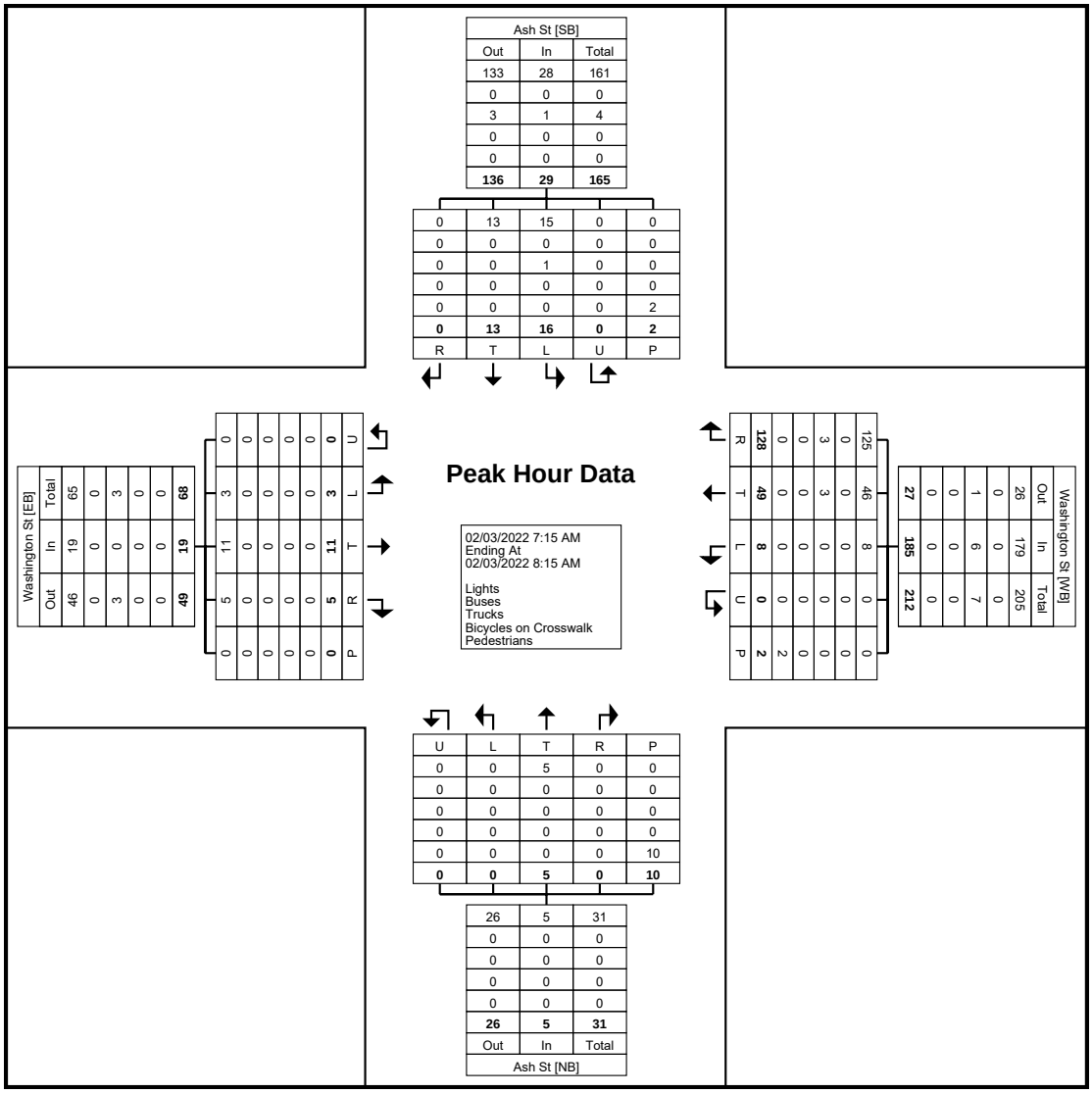
Count Name: Ash St & Washington St
Site Code:
Start Date: 02/03/2022

Turning Movement Peak Hour Data (7:15 AM)

Start Time	Washington St Eastbound						Washington St Westbound						Ash St Northbound						Ash St Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:15 AM	1	4	0	0	0	5	4	8	38	0	1	50	0	1	0	0	2	1	4	2	0	0	2	6	62
7:30 AM	1	1	2	0	0	4	1	11	37	0	1	49	0	0	0	0	1	0	5	5	0	0	0	10	63
7:45 AM	1	3	2	0	0	6	2	10	19	0	0	31	0	3	0	0	3	3	3	3	0	0	0	6	46
8:00 AM	0	3	1	0	0	4	1	20	34	0	0	55	0	1	0	0	4	1	4	3	0	0	0	7	67
Total	3	11	5	0	0	19	8	49	128	0	2	185	0	5	0	0	10	5	16	13	0	0	2	29	238
Approach %	15.8	57.9	26.3	0.0	-	-	4.3	26.5	69.2	0.0	-	-	0.0	100.0	0.0	0.0	-	-	55.2	44.8	0.0	0.0	-	-	-
Total %	1.3	4.6	2.1	0.0	-	8.0	3.4	20.6	53.8	0.0	-	77.7	0.0	2.1	0.0	0.0	-	2.1	6.7	5.5	0.0	0.0	-	12.2	-
PHF	0.750	0.688	0.625	0.000	-	0.792	0.500	0.613	0.842	0.000	-	0.841	0.000	0.417	0.000	0.000	-	0.417	0.800	0.650	0.000	0.000	-	0.725	0.888
Lights	3	11	5	0	-	19	8	46	125	0	-	179	0	5	0	0	-	5	15	13	0	0	-	28	231
% Lights	100.0	100.0	100.0	-	-	100.0	100.0	93.9	97.7	-	-	96.8	-	100.0	-	-	-	100.0	93.8	100.0	-	-	-	96.6	97.1
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	0.0	-	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0
Trucks	0	0	0	0	-	0	0	3	3	0	-	6	0	0	0	0	-	0	1	0	0	0	-	1	7
% Trucks	0.0	0.0	0.0	-	-	0.0	0.0	6.1	2.3	-	-	3.2	-	0.0	-	-	-	0.0	6.3	0.0	-	-	-	3.4	2.9
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	10	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Conshohocken, PA
Ash St & Washington St
Thursday, February 3, 2022
Location: 40.071275, -75.304611

Count Name: Ash St & Washington St
Site Code:
Start Date: 02/03/2022



Turning Movement Peak Hour Data Plot (7:15 AM)

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610-466-1469
Serving Transportation Professionals Since 1995

Conshohocken, PA
Ash St & Washington St
Thursday, February 3, 2022
Location: 40.071275, -75.304611

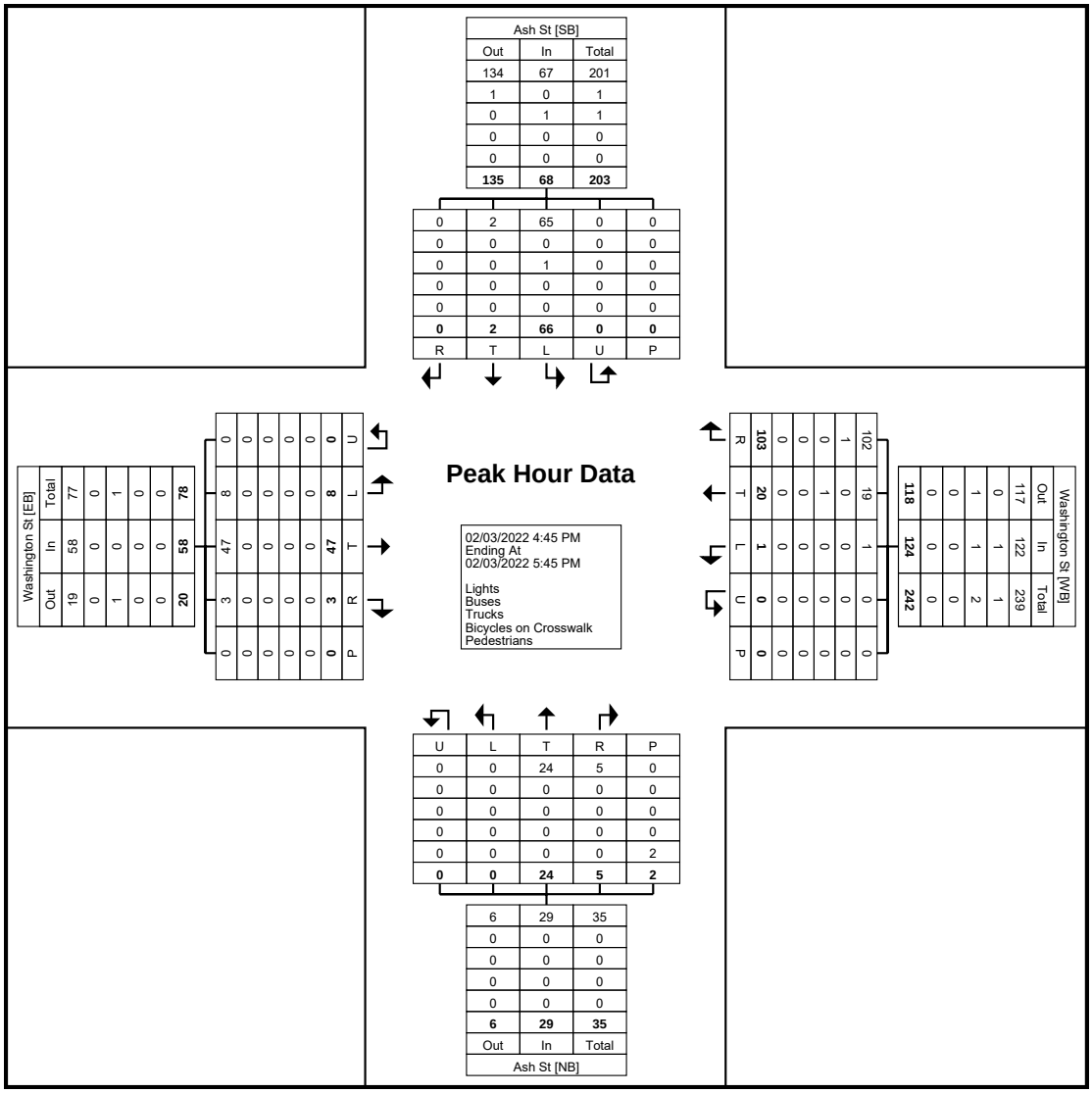
Count Name: Ash St & Washington St
Site Code:
Start Date: 02/03/2022

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Washington St Eastbound						Washington St Westbound						Ash St Northbound						Ash St Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:45 PM	3	8	1	0	0	12	0	5	19	0	0	24	0	4	0	0	0	4	15	1	0	0	0	16	56
5:00 PM	2	18	2	0	0	22	0	5	26	0	0	31	0	11	3	0	0	14	17	0	0	0	0	17	84
5:15 PM	3	10	0	0	0	13	0	5	31	0	0	36	0	5	1	0	1	6	18	1	0	0	0	19	74
5:30 PM	0	11	0	0	0	11	1	5	27	0	0	33	0	4	1	0	1	5	16	0	0	0	0	16	65
Total	8	47	3	0	0	58	1	20	103	0	0	124	0	24	5	0	2	29	66	2	0	0	0	68	279
Approach %	13.8	81.0	5.2	0.0	-	-	0.8	16.1	83.1	0.0	-	-	0.0	82.8	17.2	0.0	-	-	97.1	2.9	0.0	0.0	-	-	-
Total %	2.9	16.8	1.1	0.0	-	20.8	0.4	7.2	36.9	0.0	-	44.4	0.0	8.6	1.8	0.0	-	10.4	23.7	0.7	0.0	0.0	-	24.4	-
PHF	0.667	0.653	0.375	0.000	-	0.659	0.250	1.000	0.831	0.000	-	0.861	0.000	0.545	0.417	0.000	-	0.518	0.917	0.500	0.000	0.000	-	0.895	0.830
Lights	8	47	3	0	-	58	1	19	102	0	-	122	0	24	5	0	-	29	65	2	0	0	-	67	276
% Lights	100.0	100.0	100.0	-	-	100.0	100.0	95.0	99.0	-	-	98.4	-	100.0	100.0	-	-	100.0	98.5	100.0	-	-	-	98.5	98.9
Buses	0	0	0	0	-	0	0	0	1	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	1.0	-	-	0.8	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.4
Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1	0	0	0	-	1	2
% Trucks	0.0	0.0	0.0	-	-	0.0	0.0	5.0	0.0	-	-	0.8	-	0.0	0.0	-	-	0.0	1.5	0.0	-	-	-	1.5	0.7
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

Conshohocken, PA
Ash St & Washington St
Thursday, February 3, 2022
Location: 40.071275, -75.304611

Count Name: Ash St & Washington St
Site Code:
Start Date: 02/03/2022



Turning Movement Peak Hour Data Plot (4:45 PM)

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Conshohocken, PA
E Hecktor Ave & Station St
Thursday, February 3, 2022
Location: 40.075814, -75.285625

Count Name: E Hector St & Station Ave
Site Code:
Start Date: 02/03/2022
Page No: 1

Turning Movement Data

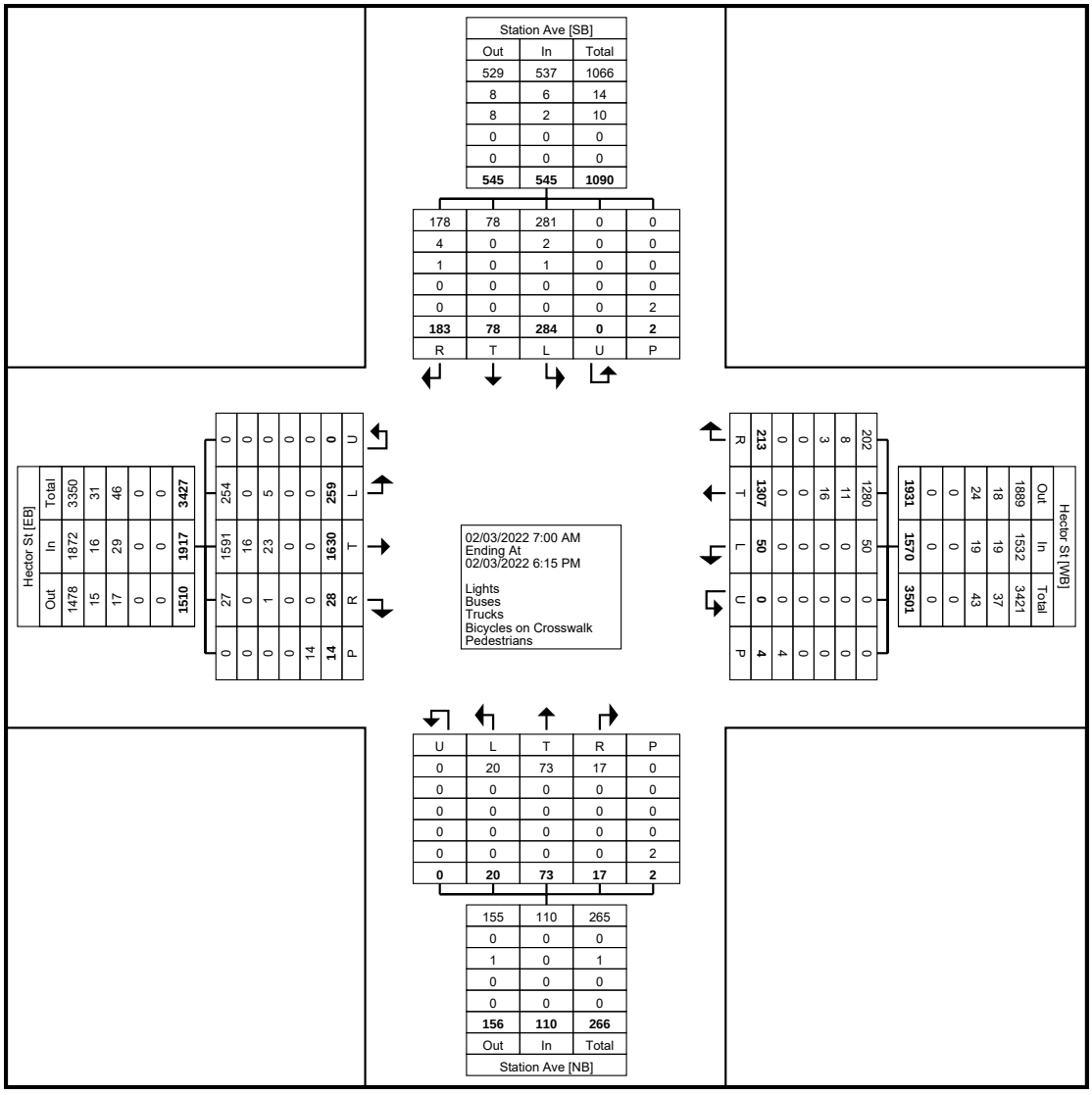
Start Time	Hector St Eastbound							Hector St Westbound							Station Ave Northbound							Station Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:00 AM	12	59	1	0	0	0	72	0	52	6	0	0	0	58	0	1	1	0	0	0	2	0	1	1	0	0	0	2	134
7:15 AM	13	56	2	0	0	3	71	3	67	14	0	0	0	84	1	8	0	0	0	0	9	15	9	6	1	0	0	31	195
7:30 AM	17	95	0	0	0	0	112	1	94	9	0	0	0	104	0	4	0	0	0	0	4	21	1	9	0	0	0	31	251
7:45 AM	13	91	5	0	0	0	109	1	94	16	0	0	0	111	3	2	1	0	0	0	6	20	5	15	2	0	0	42	268
Hourly Total	55	301	8	0	0	3	364	5	307	45	0	0	0	357	4	15	2	0	0	0	21	56	16	31	3	0	0	106	848
8:00 AM	17	78	4	0	0	0	99	7	132	11	0	0	1	150	1	5	0	0	0	0	6	8	0	8	0	0	0	16	271
8:15 AM	22	80	1	0	0	5	103	1	121	19	0	0	1	141	1	7	2	0	0	0	10	18	5	16	0	0	0	39	293
8:30 AM	26	70	1	0	0	1	97	2	77	13	0	0	0	92	1	1	0	0	0	0	2	13	3	11	0	0	1	27	218
8:45 AM	21	57	0	0	0	0	78	1	101	21	0	0	0	123	2	5	1	0	0	0	8	9	2	15	2	0	1	28	237
Hourly Total	86	285	6	0	0	6	377	11	431	64	0	0	2	506	5	18	3	0	0	0	26	48	10	50	2	0	2	110	1019
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	26	127	1	0	0	0	154	3	58	20	1	0	0	82	0	7	0	0	0	0	7	22	2	10	0	0	0	34	277
4:15 PM	12	139	0	0	0	1	151	2	66	10	0	0	2	78	0	1	0	0	0	2	1	24	3	6	0	0	0	33	263
4:30 PM	10	137	1	0	0	0	148	6	107	16	1	0	0	130	1	8	2	0	0	0	11	16	3	15	1	0	0	35	324
4:45 PM	10	145	2	0	0	0	157	4	70	11	0	0	0	85	0	5	0	0	0	0	5	27	6	17	0	0	0	50	297
Hourly Total	58	548	4	0	0	1	610	15	301	57	2	0	2	375	1	21	2	0	0	2	24	89	14	48	1	0	0	152	1161
5:00 PM	16	147	3	0	0	2	166	5	81	20	0	0	0	106	2	3	4	0	0	0	9	27	8	10	0	0	0	45	326
5:15 PM	16	131	2	0	0	2	149	3	63	6	0	0	0	72	2	3	2	1	0	0	8	26	13	12	0	0	0	51	280
5:30 PM	14	118	1	1	0	0	134	5	61	11	0	0	0	77	3	7	0	1	0	0	11	22	5	18	0	0	0	45	267
5:45 PM	14	100	3	0	0	0	117	6	63	8	0	0	0	77	3	6	2	0	0	0	11	15	12	7	1	0	0	35	240
Hourly Total	60	496	9	1	0	4	566	19	268	45	0	0	0	332	10	19	8	2	0	0	39	90	38	47	1	0	0	176	1113
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1
Grand Total	259	1630	27	1	0	14	1917	50	1307	211	2	0	4	1570	20	73	15	2	0	2	110	284	78	176	7	0	2	545	4142
Approach %	13.5	85.0	1.4	0.1	0.0	-	-	3.2	83.2	13.4	0.1	0.0	-	-	18.2	66.4	13.6	1.8	0.0	-	-	52.1	14.3	32.3	1.3	0.0	-	-	-
Total %	6.3	39.4	0.7	0.0	0.0	-	46.3	1.2	31.6	5.1	0.0	0.0	-	37.9	0.5	1.8	0.4	0.0	0.0	-	2.7	6.9	1.9	4.2	0.2	0.0	-	13.2	-
Lights	254	1591	26	1	0	-	1872	50	1280	200	2	0	-	1532	20	73	15	2	0	-	110	281	78	171	7	0	-	537	4051
% Lights	98.1	97.6	96.3	100.0	-	-	97.7	100.0	97.9	94.8	100.0	-	-	97.6	100.0	100.0	100.0	100.0	-	-	100.0	98.9	100.0	97.2	100.0	-	-	98.5	97.8
Buses	0	16	0	0	0	-	16	0	11	8	0	0	-	19	0	0	0	0	0	-	0	2	0	4	0	0	-	6	41
% Buses	0.0	1.0	0.0	0.0	-	-	0.8	0.0	0.8	3.8	0.0	-	-	1.2	0.0	0.0	0.0	0.0	-	-	0.0	0.7	0.0	2.3	0.0	-	-	1.1	1.0
Trucks	5	23	1	0	0	-	29	0	16	3	0	0	-	19	0	0	0	0	0	-	0	1	0	1	0	0	-	2	50
% Trucks	1.9	1.4	3.7	0.0	-	-	1.5	0.0	1.2	1.4	0.0	-	-	1.2	0.0	0.0	0.0	0.0	-	-	0.0	0.4	0.0	0.6	0.0	-	-	0.4	1.2
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	14	-	-	-	-	-	-	4	-	-	-	-	-	-	2	-	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-

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Conshohocken, PA
E Hecktor Ave & Station St
Thursday, February 3, 2022
Location: 40.075814, -75.285625

Count Name: E Hactor St & Station Ave
Site Code:
Start Date: 02/03/2022



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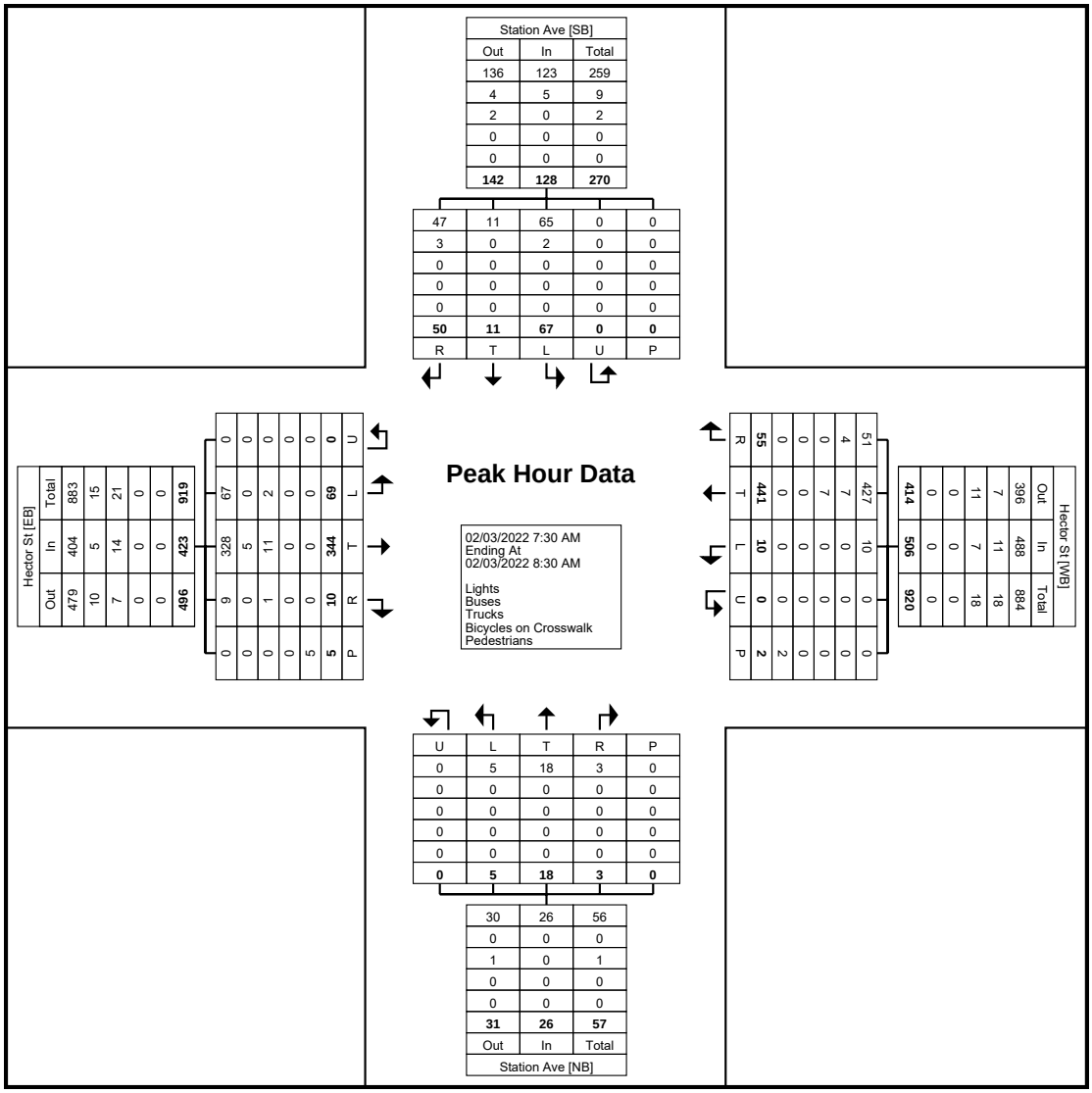
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Conshohocken, PA
E Hecktor Ave & Station St
Thursday, February 3, 2022
Location: 40.075814, -75.285625

Count Name: E Hactor St & Station Ave
Site Code:
Start Date: 02/03/2022

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Hector St Eastbound							Hector St Westbound							Station Ave Northbound							Station Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:30 AM	17	95	0	0	0	0	112	1	94	9	0	0	0	104	0	4	0	0	0	0	4	21	1	9	0	0	0	31	251
7:45 AM	13	91	5	0	0	0	109	1	94	16	0	0	0	111	3	2	1	0	0	0	6	20	5	15	2	0	0	42	268
8:00 AM	17	78	4	0	0	0	99	7	132	11	0	0	1	150	1	5	0	0	0	0	6	8	0	8	0	0	0	16	271
8:15 AM	22	80	1	0	0	5	103	1	121	19	0	0	1	141	1	7	2	0	0	0	10	18	5	16	0	0	0	39	293
Total	69	344	10	0	0	5	423	10	441	55	0	0	2	506	5	18	3	0	0	0	26	67	11	48	2	0	0	128	1083
Approach %	16.3	81.3	2.4	0.0	0.0	-	-	2.0	87.2	10.9	0.0	0.0	-	-	19.2	69.2	11.5	0.0	0.0	-	-	52.3	8.6	37.5	1.6	0.0	-	-	-
Total %	6.4	31.8	0.9	0.0	0.0	-	39.1	0.9	40.7	5.1	0.0	0.0	-	46.7	0.5	1.7	0.3	0.0	0.0	-	2.4	6.2	1.0	4.4	0.2	0.0	-	11.8	-
PHF	0.784	0.905	0.500	0.000	0.000	-	0.944	0.357	0.835	0.724	0.000	0.000	-	0.843	0.417	0.643	0.375	0.000	0.000	-	0.650	0.798	0.550	0.750	0.250	0.000	-	0.762	0.924
Lights	67	328	9	0	0	-	404	10	427	51	0	0	-	488	5	18	3	0	0	-	26	65	11	45	2	0	-	123	1041
% Lights	97.1	95.3	90.0	-	-	-	95.5	100.0	96.8	92.7	-	-	-	96.4	100.0	100.0	100.0	-	-	-	100.0	97.0	100.0	93.8	100.0	-	-	96.1	96.1
Buses	0	5	0	0	0	-	5	0	7	4	0	0	-	11	0	0	0	0	0	-	0	2	0	3	0	0	-	5	21
% Buses	0.0	1.5	0.0	-	-	-	1.2	0.0	1.6	7.3	-	-	-	2.2	0.0	0.0	0.0	-	-	-	0.0	3.0	0.0	6.3	0.0	-	-	3.9	1.9
Trucks	2	11	1	0	0	-	14	0	7	0	0	0	-	7	0	0	0	0	0	-	0	0	0	0	0	0	-	0	21
% Trucks	2.9	3.2	10.0	-	-	-	3.3	0.0	1.6	0.0	-	-	-	1.4	0.0	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	0.0	-	-	0.0	1.9
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	5	-	-	-	-	-	-	2	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Turning Movement Peak Hour Data Plot (7:30 AM)

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Conshohocken, PA
E Hecktor Ave & Station St
Thursday, February 3, 2022
Location: 40.075814, -75.285625

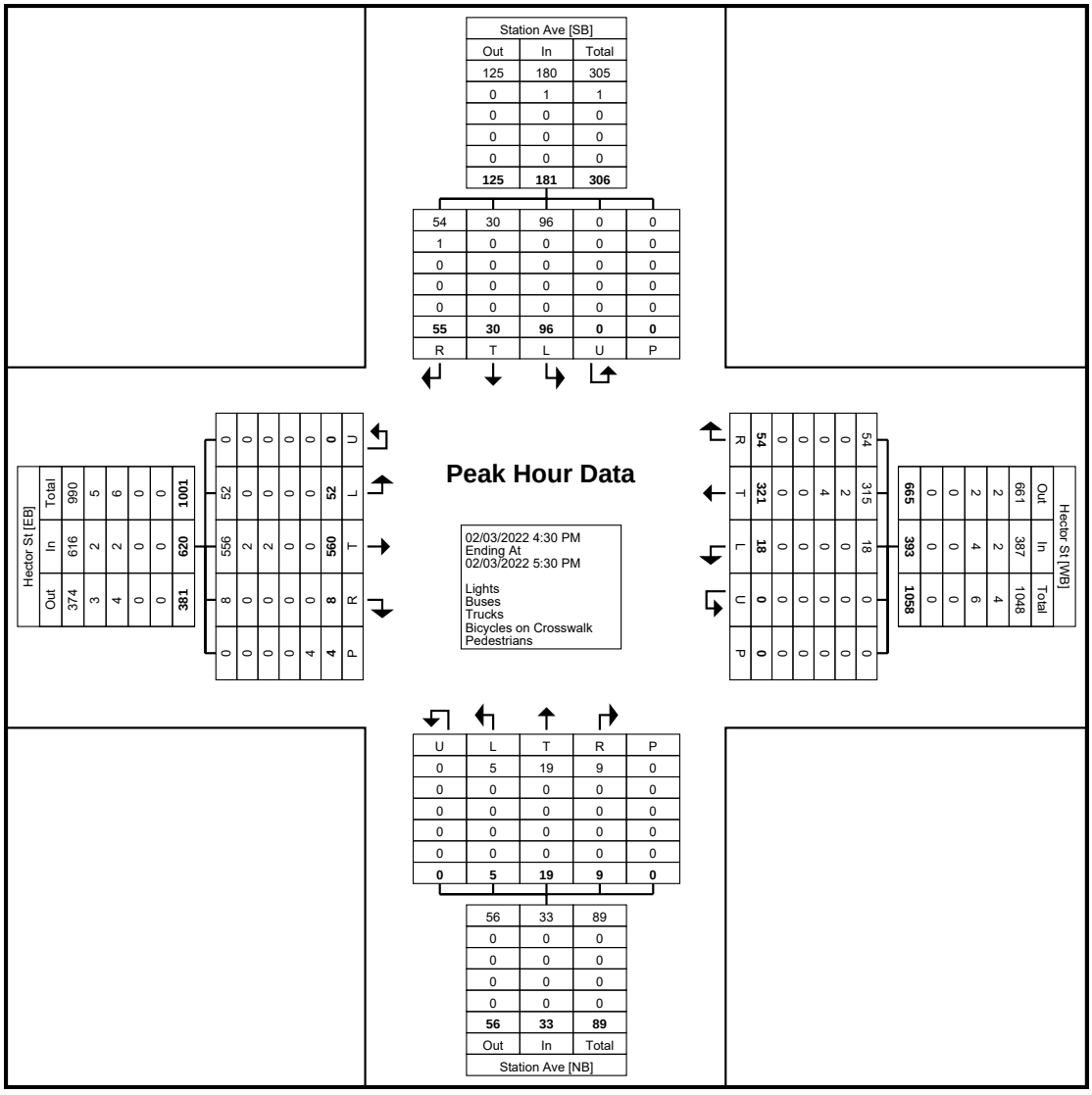
Count Name: E Hactor St & Station Ave
Site Code:
Start Date: 02/03/2022

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Hector St Eastbound							Hector St Westbound							Station Ave Northbound							Station Ave Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
4:30 PM	10	137	1	0	0	0	148	6	107	16	1	0	0	130	1	8	2	0	0	0	11	16	3	15	1	0	0	35	324
4:45 PM	10	145	2	0	0	0	157	4	70	11	0	0	0	85	0	5	0	0	0	0	5	27	6	17	0	0	0	50	297
5:00 PM	16	147	3	0	0	2	166	5	81	20	0	0	0	106	2	3	4	0	0	0	9	27	8	10	0	0	0	45	326
5:15 PM	16	131	2	0	0	2	149	3	63	6	0	0	0	72	2	3	2	1	0	0	8	26	13	12	0	0	0	51	280
Total	52	560	8	0	0	4	620	18	321	53	1	0	0	393	5	19	8	1	0	0	33	96	30	54	1	0	0	181	1227
Approach %	8.4	90.3	1.3	0.0	0.0	-	-	4.6	81.7	13.5	0.3	0.0	-	-	15.2	57.6	24.2	3.0	0.0	-	-	53.0	16.6	29.8	0.6	0.0	-	-	-
Total %	4.2	45.6	0.7	0.0	0.0	-	50.5	1.5	26.2	4.3	0.1	0.0	-	32.0	0.4	1.5	0.7	0.1	0.0	-	2.7	7.8	2.4	4.4	0.1	0.0	-	14.8	-
PHF	0.813	0.952	0.667	0.000	0.000	-	0.934	0.750	0.750	0.663	0.250	0.000	-	0.756	0.625	0.594	0.500	0.250	0.000	-	0.750	0.889	0.577	0.794	0.250	0.000	-	0.887	0.941
Lights	52	556	8	0	0	-	616	18	315	53	1	0	-	387	5	19	8	1	0	-	33	96	30	53	1	0	-	180	1216
% Lights	100.0	99.3	100.0	-	-	-	99.4	100.0	98.1	100.0	100.0	-	-	98.5	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	98.1	100.0	-	-	99.4	99.1
Buses	0	2	0	0	0	-	2	0	2	0	0	0	-	2	0	0	0	0	0	-	0	0	0	1	0	0	-	1	5
% Buses	0.0	0.4	0.0	-	-	-	0.3	0.0	0.6	0.0	0.0	-	-	0.5	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	1.9	0.0	-	-	0.6	0.4
Trucks	0	2	0	0	0	-	2	0	4	0	0	0	-	4	0	0	0	0	0	-	0	0	0	0	0	0	-	0	6
% Trucks	0.0	0.4	0.0	-	-	-	0.3	0.0	1.2	0.0	0.0	-	-	1.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.5
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	4	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Conshohocken, PA
E Hecktor Ave & Station St
Thursday, February 3, 2022
Location: 40.075814, -75.285625

Count Name: E Hactor St & Station Ave
Site Code:
Start Date: 02/03/2022



Turning Movement Peak Hour Data Plot (4:30 PM)

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Conshohocken, PA
E Hector St & Lee St
Thursday, February 3, 2022
Location: 40.075352, -75.288345

Count Name: E Hector St & Lee St
Site Code:
Start Date: 02/03/2022

Turning Movement Data

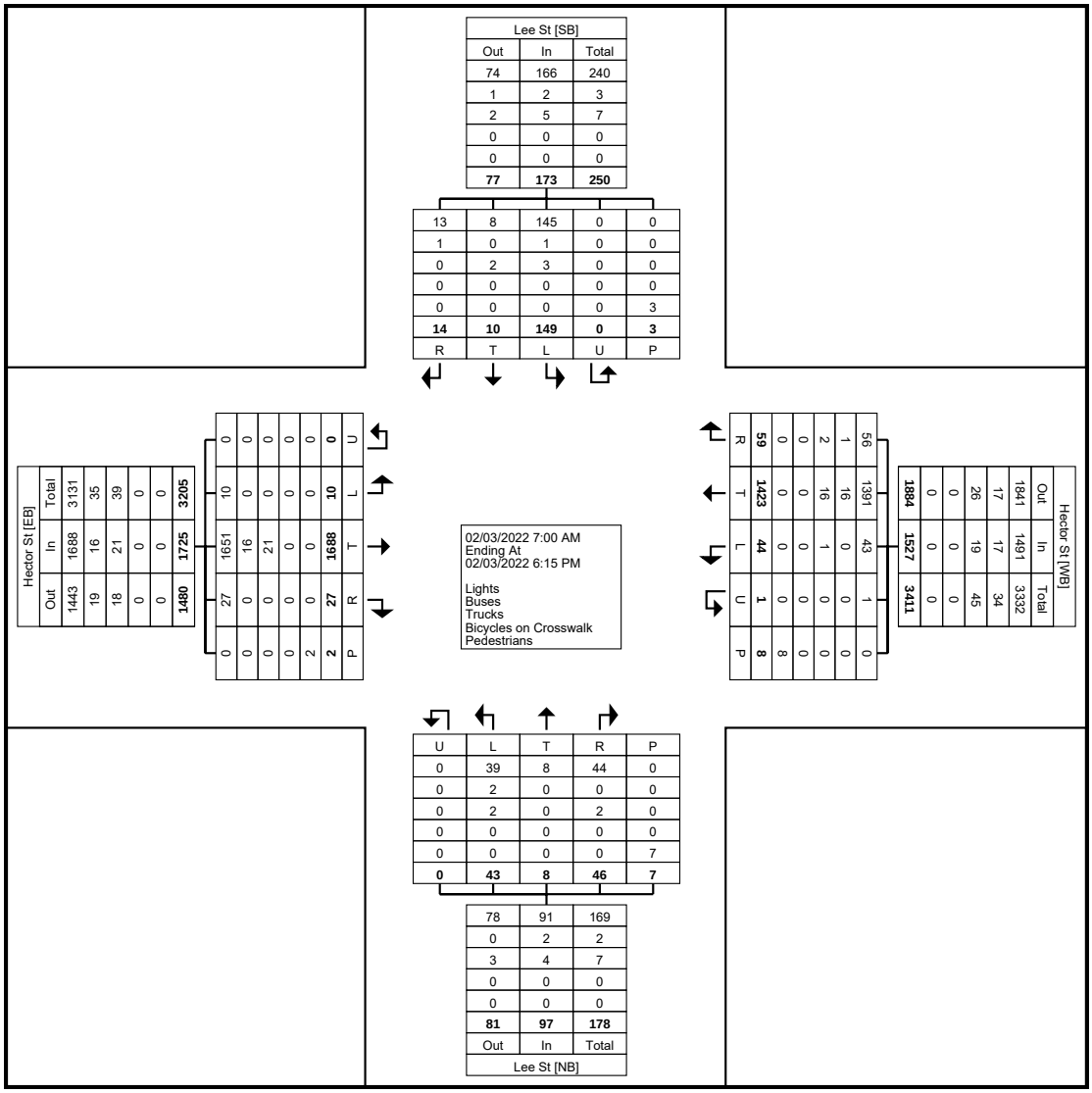
Start Time	Hector St Eastbound						Hector St Westbound						Lee St Northbound						Lee St Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	0	51	1	0	0	52	0	59	0	0	0	59	2	0	4	0	1	6	9	0	2	0	0	11	128
7:15 AM	0	54	1	0	0	55	0	66	1	0	0	67	1	1	3	0	0	5	12	2	0	0	0	14	141
7:30 AM	0	103	3	0	0	106	0	101	5	0	2	106	3	1	1	0	0	5	4	0	0	0	0	4	221
7:45 AM	0	101	0	0	0	101	6	106	3	0	0	115	4	0	2	0	0	6	6	0	0	0	0	6	228
Hourly Total	0	309	5	0	0	314	6	332	9	0	2	347	10	2	10	0	1	22	31	2	2	0	0	35	718
8:00 AM	0	89	0	0	0	89	5	135	4	0	0	144	4	0	3	0	0	7	6	0	0	0	0	6	246
8:15 AM	0	94	2	0	0	96	10	100	7	0	0	117	3	0	1	0	1	4	9	1	0	0	0	10	227
8:30 AM	3	78	3	0	1	84	7	88	4	0	1	99	2	0	5	0	1	7	8	0	0	0	1	8	198
8:45 AM	0	71	2	0	0	73	2	108	4	0	1	114	4	2	2	0	0	8	9	0	2	0	1	11	206
Hourly Total	3	332	7	0	1	342	24	431	19	0	2	474	13	2	11	0	2	26	32	1	2	0	2	35	877
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	1	131	2	0	0	134	1	66	5	0	1	72	2	0	5	0	1	7	9	1	3	0	0	13	226
4:15 PM	1	143	1	0	0	145	2	70	5	0	0	77	1	2	3	0	0	6	10	0	1	0	0	11	239
4:30 PM	1	124	0	0	1	125	1	112	6	0	0	119	2	0	2	0	0	4	12	2	0	0	1	14	262
4:45 PM	2	150	5	0	0	157	2	93	1	1	3	97	2	0	0	0	0	2	10	0	1	0	0	11	267
Hourly Total	5	548	8	0	1	561	6	341	17	1	4	365	7	2	10	0	1	19	41	3	5	0	1	49	994
5:00 PM	0	141	3	0	0	144	1	92	4	0	0	97	2	1	6	0	1	9	16	0	2	0	0	18	268
5:15 PM	0	131	4	0	0	135	4	76	3	0	0	83	4	0	4	0	1	8	12	2	0	0	0	14	240
5:30 PM	2	122	0	0	0	124	1	81	4	0	0	86	4	1	3	0	1	8	10	1	1	0	0	12	230
5:45 PM	0	105	0	0	0	105	2	70	3	0	0	75	3	0	2	0	0	5	7	1	2	0	0	10	195
Hourly Total	2	499	7	0	0	508	8	319	14	0	0	341	13	2	15	0	3	30	45	4	5	0	0	54	933
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	10	1688	27	0	2	1725	44	1423	59	1	8	1527	43	8	46	0	7	97	149	10	14	0	3	173	3522
Approach %	0.6	97.9	1.6	0.0	-	-	2.9	93.2	3.9	0.1	-	-	44.3	8.2	47.4	0.0	-	-	86.1	5.8	8.1	0.0	-	-	-
Total %	0.3	47.9	0.8	0.0	-	49.0	1.2	40.4	1.7	0.0	-	43.4	1.2	0.2	1.3	0.0	-	2.8	4.2	0.3	0.4	0.0	-	4.9	-
Lights	10	1651	27	0	-	1688	43	1391	56	1	-	1491	39	8	44	0	-	91	145	8	13	0	-	166	3436
% Lights	100.0	97.8	100.0	-	-	97.9	97.7	97.8	94.9	100.0	-	97.6	90.7	100.0	95.7	-	-	93.8	97.3	80.0	92.9	-	-	96.0	97.6
Buses	0	16	0	0	-	16	0	16	1	0	-	17	2	0	0	0	-	2	1	0	1	0	-	2	37
% Buses	0.0	0.9	0.0	-	-	0.9	0.0	1.1	1.7	0.0	-	1.1	4.7	0.0	0.0	-	-	2.1	0.7	0.0	7.1	-	-	1.2	1.1
Trucks	0	21	0	0	-	21	1	16	2	0	-	19	2	0	2	0	-	4	3	2	0	0	-	5	49
% Trucks	0.0	1.2	0.0	-	-	1.2	2.3	1.1	3.4	0.0	-	1.2	4.7	0.0	4.3	-	-	4.1	2.0	20.0	0.0	-	-	2.9	1.4
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	8	-	-	-	-	-	7	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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Conshohocken, PA
E Hector St & Lee St
Thursday, February 3, 2022
Location: 40.075352, -75.288345

Count Name: E Hector St & Lee St
Site Code:
Start Date: 02/03/2022
Page No: 2



Turning Movement Data Plot

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Conshohocken, PA
E Hector St & Lee St
Thursday, February 3, 2022
Location: 40.075352, -75.288345

Count Name: E Hector St & Lee St
Site Code:
Start Date: 02/03/2022

Turning Movement Peak Hour Data (7:30 AM)

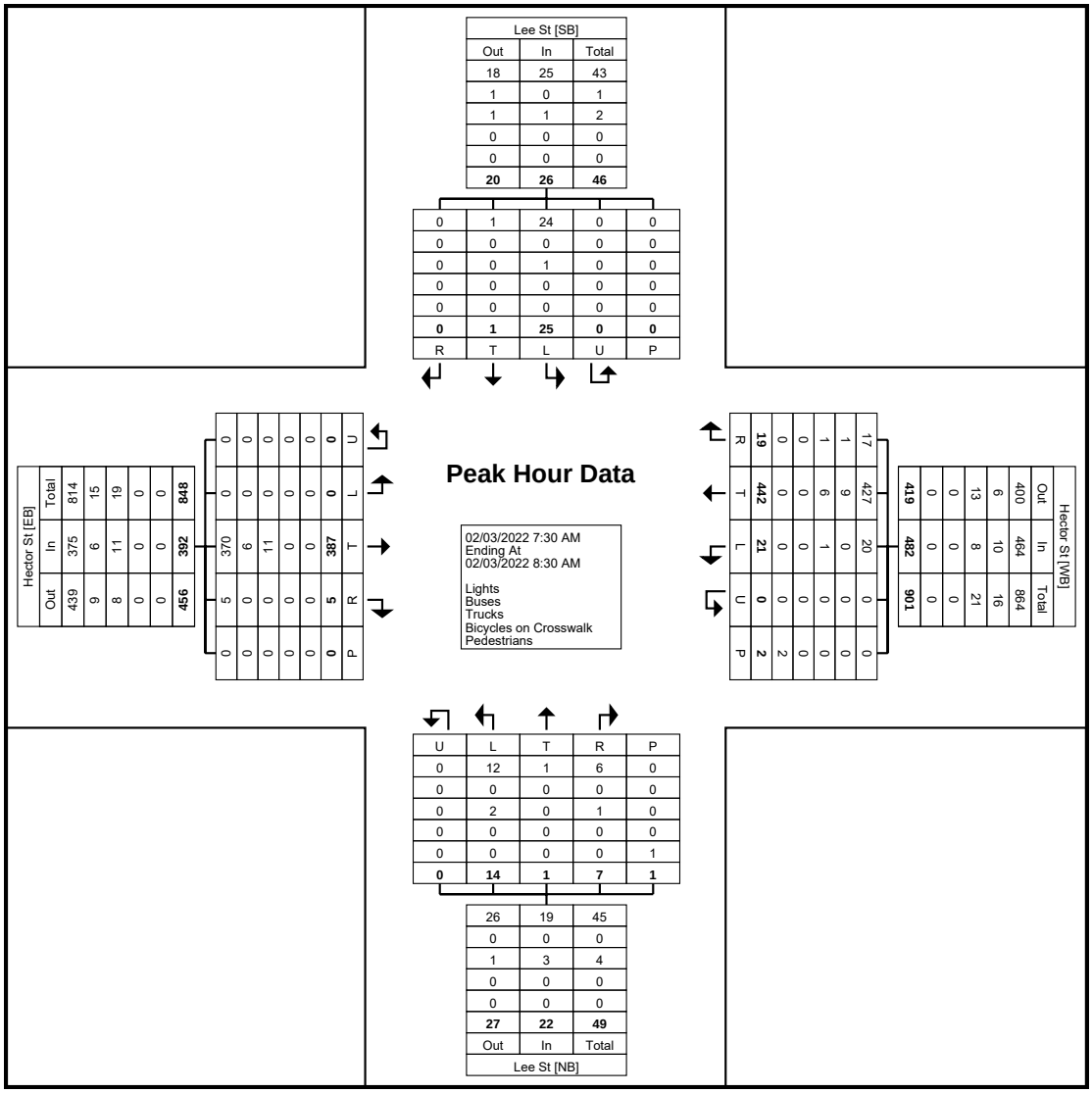
Start Time	Hector St Eastbound						Hector St Westbound						Lee St Northbound						Lee St Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	0	103	3	0	0	106	0	101	5	0	2	106	3	1	1	0	0	5	4	0	0	0	0	4	221
7:45 AM	0	101	0	0	0	101	6	106	3	0	0	115	4	0	2	0	0	6	6	0	0	0	0	6	228
8:00 AM	0	89	0	0	0	89	5	135	4	0	0	144	4	0	3	0	0	7	6	0	0	0	0	6	246
8:15 AM	0	94	2	0	0	96	10	100	7	0	0	117	3	0	1	0	1	4	9	1	0	0	0	10	227
Total	0	387	5	0	0	392	21	442	19	0	2	482	14	1	7	0	1	22	25	1	0	0	0	26	922
Approach %	0.0	98.7	1.3	0.0	-	-	4.4	91.7	3.9	0.0	-	-	63.6	4.5	31.8	0.0	-	-	96.2	3.8	0.0	0.0	-	-	-
Total %	0.0	42.0	0.5	0.0	-	42.5	2.3	47.9	2.1	0.0	-	52.3	1.5	0.1	0.8	0.0	-	2.4	2.7	0.1	0.0	0.0	-	2.8	-
PHF	0.000	0.939	0.417	0.000	-	0.925	0.525	0.819	0.679	0.000	-	0.837	0.875	0.250	0.583	0.000	-	0.786	0.694	0.250	0.000	0.000	-	0.650	0.937
Lights	0	370	5	0	-	375	20	427	17	0	-	464	12	1	6	0	-	19	24	1	0	0	-	25	883
% Lights	-	95.6	100.0	-	-	95.7	95.2	96.6	89.5	-	-	96.3	85.7	100.0	85.7	-	-	86.4	96.0	100.0	-	-	-	96.2	95.8
Buses	0	6	0	0	-	6	0	9	1	0	-	10	0	0	0	0	-	0	0	0	0	0	-	0	16
% Buses	-	1.6	0.0	-	-	1.5	0.0	2.0	5.3	-	-	2.1	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	1.7
Trucks	0	11	0	0	-	11	1	6	1	0	-	8	2	0	1	0	-	3	1	0	0	0	-	1	23
% Trucks	-	2.8	0.0	-	-	2.8	4.8	1.4	5.3	-	-	1.7	14.3	0.0	14.3	-	-	13.6	4.0	0.0	-	-	-	3.8	2.5
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

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E Hector St & Lee St
Thursday, February 3, 2022
Location: 40.075352, -75.288345

Count Name: E Hector St & Lee St
Site Code:
Start Date: 02/03/2022
Page No: 4



Turning Movement Peak Hour Data Plot (7:30 AM)

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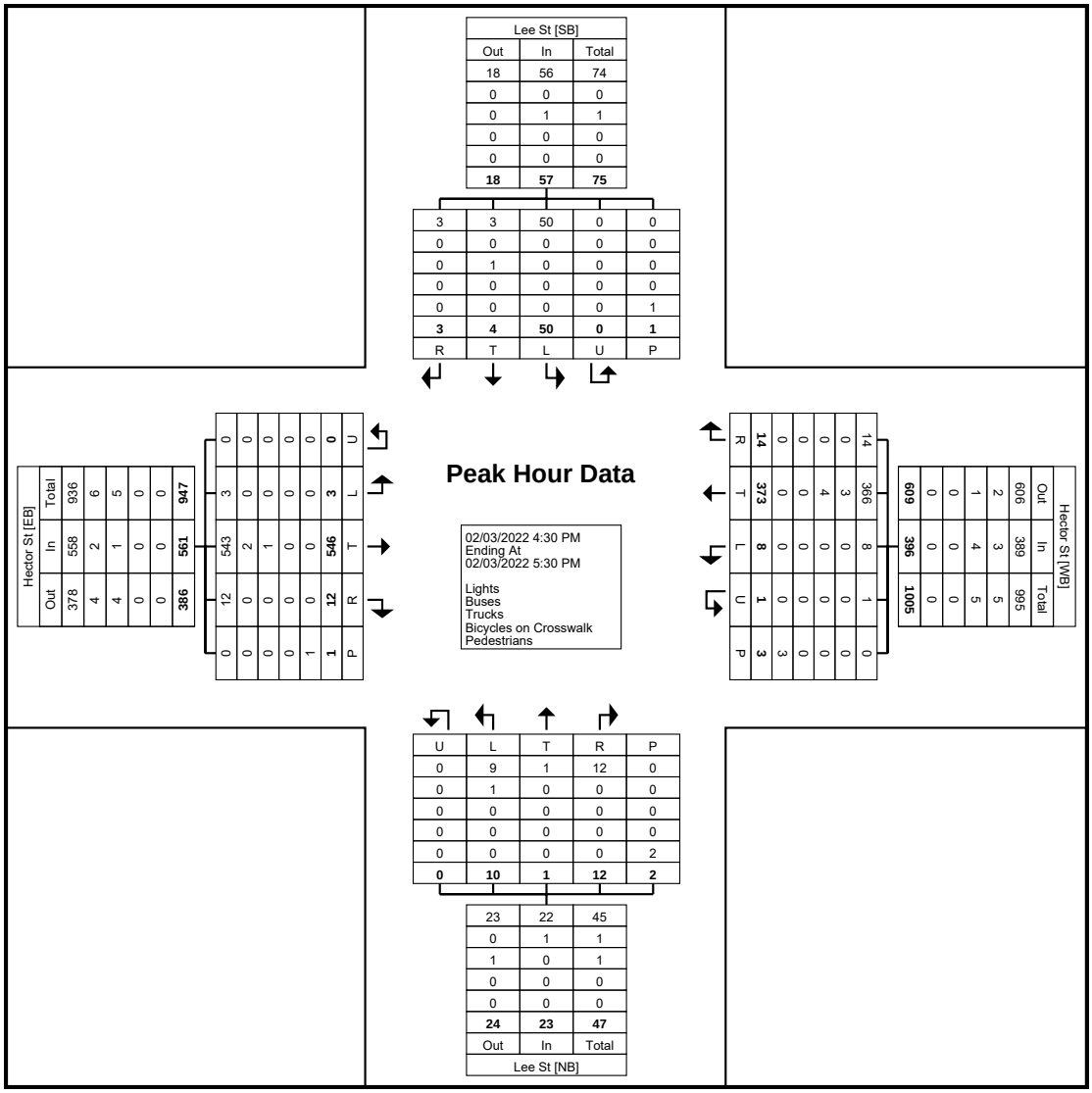
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Conshohocken, PA
E Hector St & Lee St
Thursday, February 3, 2022
Location: 40.075352, -75.288345

Count Name: E Hector St & Lee St
Site Code:
Start Date: 02/03/2022

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Hector St Eastbound						Hector St Westbound						Lee St Northbound						Lee St Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	1	124	0	0	1	125	1	112	6	0	0	119	2	0	2	0	0	4	12	2	0	0	1	14	262
4:45 PM	2	150	5	0	0	157	2	93	1	1	3	97	2	0	0	0	0	2	10	0	1	0	0	11	267
5:00 PM	0	141	3	0	0	144	1	92	4	0	0	97	2	1	6	0	1	9	16	0	2	0	0	18	268
5:15 PM	0	131	4	0	0	135	4	76	3	0	0	83	4	0	4	0	1	8	12	2	0	0	0	14	240
Total	3	546	12	0	1	561	8	373	14	1	3	396	10	1	12	0	2	23	50	4	3	0	1	57	1037
Approach %	0.5	97.3	2.1	0.0	-	-	2.0	94.2	3.5	0.3	-	-	43.5	4.3	52.2	0.0	-	-	87.7	7.0	5.3	0.0	-	-	-
Total %	0.3	52.7	1.2	0.0	-	54.1	0.8	36.0	1.4	0.1	-	38.2	1.0	0.1	1.2	0.0	-	2.2	4.8	0.4	0.3	0.0	-	5.5	-
PHF	0.375	0.910	0.600	0.000	-	0.893	0.500	0.833	0.583	0.250	-	0.832	0.625	0.250	0.500	0.000	-	0.639	0.781	0.500	0.375	0.000	-	0.792	0.967
Lights	3	543	12	0	-	558	8	366	14	1	-	389	9	1	12	0	-	22	50	3	3	0	-	56	1025
% Lights	100.0	99.5	100.0	-	-	99.5	100.0	98.1	100.0	100.0	-	98.2	90.0	100.0	100.0	-	-	95.7	100.0	75.0	100.0	-	-	98.2	98.8
Buses	0	2	0	0	-	2	0	3	0	0	-	3	1	0	0	0	-	1	0	0	0	0	-	0	6
% Buses	0.0	0.4	0.0	-	-	0.4	0.0	0.8	0.0	0.0	-	0.8	10.0	0.0	0.0	-	-	4.3	0.0	0.0	0.0	-	-	0.0	0.6
Trucks	0	1	0	0	-	1	0	4	0	0	-	4	0	0	0	0	-	0	0	1	0	0	-	1	6
% Trucks	0.0	0.2	0.0	-	-	0.2	0.0	1.1	0.0	0.0	-	1.0	0.0	0.0	0.0	-	-	0.0	0.0	25.0	0.0	-	-	1.8	0.6
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (4:30 PM)

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Elm St & Ash St
Thursday, February 3, 2022
Location: 40.072018, -75.304629

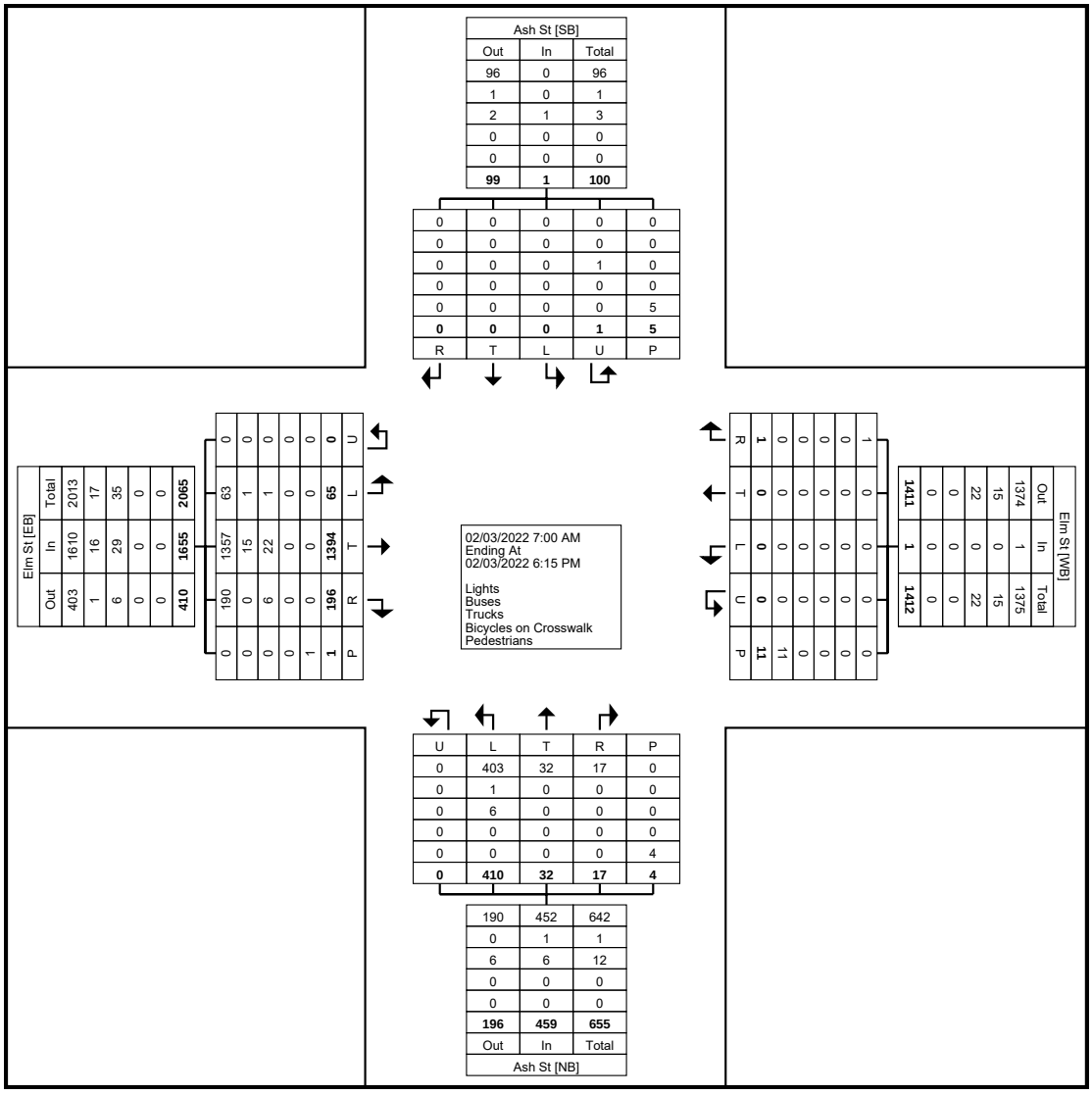
Count Name: Elm St & Ash St
Site Code:
Start Date: 02/03/2022

Turning Movement Data

Start Time	Elm St Eastbound						Elm St Westbound						Ash St Northbound						Ash St Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	2	48	7	0	0	57	0	0	1	0	2	1	34	1	0	0	0	35	0	0	0	1	0	1	94
7:15 AM	4	61	7	0	0	72	0	0	0	0	0	0	36	2	1	0	0	39	0	0	0	0	1	0	111
7:30 AM	3	72	13	0	0	88	0	0	0	0	0	0	38	2	0	0	0	40	0	0	0	0	0	0	128
7:45 AM	3	103	10	0	0	116	0	0	0	0	0	0	19	3	2	0	0	24	0	0	0	0	1	0	140
Hourly Total	12	284	37	0	0	333	0	0	1	0	2	1	127	8	3	0	0	138	0	0	0	1	2	1	473
8:00 AM	3	80	6	0	1	89	0	0	0	0	1	0	37	2	0	0	1	39	0	0	0	0	0	0	128
8:15 AM	5	66	14	0	0	85	0	0	0	0	0	0	27	3	0	0	1	30	0	0	0	0	1	0	115
8:30 AM	4	52	4	0	0	60	0	0	0	0	0	0	15	1	0	0	1	16	0	0	0	0	0	0	76
8:45 AM	1	60	8	0	0	69	0	0	0	0	0	0	16	1	1	0	0	18	0	0	0	0	0	0	87
Hourly Total	13	258	32	0	1	303	0	0	0	0	1	0	95	7	1	0	3	103	0	0	0	0	1	0	406
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	6	105	12	0	0	123	0	0	0	0	0	0	21	3	1	0	0	25	0	0	0	0	0	0	148
4:15 PM	3	123	13	0	0	139	0	0	0	0	2	0	18	0	2	0	1	20	0	0	0	0	0	0	159
4:30 PM	1	99	16	0	0	116	0	0	0	0	0	0	16	2	1	0	0	19	0	0	0	0	0	0	135
4:45 PM	4	132	17	0	0	153	0	0	0	0	0	0	21	3	2	0	0	26	0	0	0	0	0	0	179
Hourly Total	14	459	58	0	0	531	0	0	0	0	2	0	76	8	6	0	1	90	0	0	0	0	0	0	621
5:00 PM	2	111	17	0	0	130	0	0	0	0	2	0	32	5	2	0	0	39	0	0	0	0	0	0	169
5:15 PM	11	109	20	0	0	140	0	0	0	0	0	0	36	2	2	0	0	40	0	0	0	0	1	0	180
5:30 PM	6	96	17	0	0	119	0	0	0	0	2	0	30	0	3	0	0	33	0	0	0	0	1	0	152
5:45 PM	7	77	15	0	0	99	0	0	0	0	2	0	14	2	0	0	0	16	0	0	0	0	0	0	115
Hourly Total	26	393	69	0	0	488	0	0	0	0	6	0	112	9	7	0	0	128	0	0	0	0	2	0	616
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	65	1394	196	0	1	1655	0	0	1	0	11	1	410	32	17	0	4	459	0	0	0	1	5	1	2116
Approach %	3.9	84.2	11.8	0.0	-	-	0.0	0.0	100.0	0.0	-	-	89.3	7.0	3.7	0.0	-	-	0.0	0.0	0.0	100.0	-	-	-
Total %	3.1	65.9	9.3	0.0	-	78.2	0.0	0.0	0.0	0.0	-	0.0	19.4	1.5	0.8	0.0	-	21.7	0.0	0.0	0.0	0.0	-	0.0	-
Lights	63	1357	190	0	-	1610	0	0	1	0	-	1	403	32	17	0	-	452	0	0	0	0	-	0	2063
% Lights	96.9	97.3	96.9	-	-	97.3	-	-	100.0	-	-	100.0	98.3	100.0	100.0	-	-	98.5	-	-	-	0.0	-	0.0	97.5
Buses	1	15	0	0	-	16	0	0	0	0	-	0	1	0	0	0	-	1	0	0	0	0	-	0	17
% Buses	1.5	1.1	0.0	-	-	1.0	-	-	0.0	-	-	0.0	0.2	0.0	0.0	-	-	0.2	-	-	-	0.0	-	0.0	0.8
Trucks	1	22	6	0	-	29	0	0	0	0	-	0	6	0	0	0	-	6	0	0	0	1	-	1	36
% Trucks	1.5	1.6	3.1	-	-	1.8	-	-	0.0	-	-	0.0	1.5	0.0	0.0	-	-	1.3	-	-	-	100.0	-	100.0	1.7
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	11	-	-	-	-	-	4	-	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Conshohocken, PA
Elm St & Ash St
Thursday, February 3, 2022
Location: 40.072018, -75.304629

Count Name: Elm St & Ash St
Site Code:
Start Date: 02/03/2022



Turning Movement Data Plot

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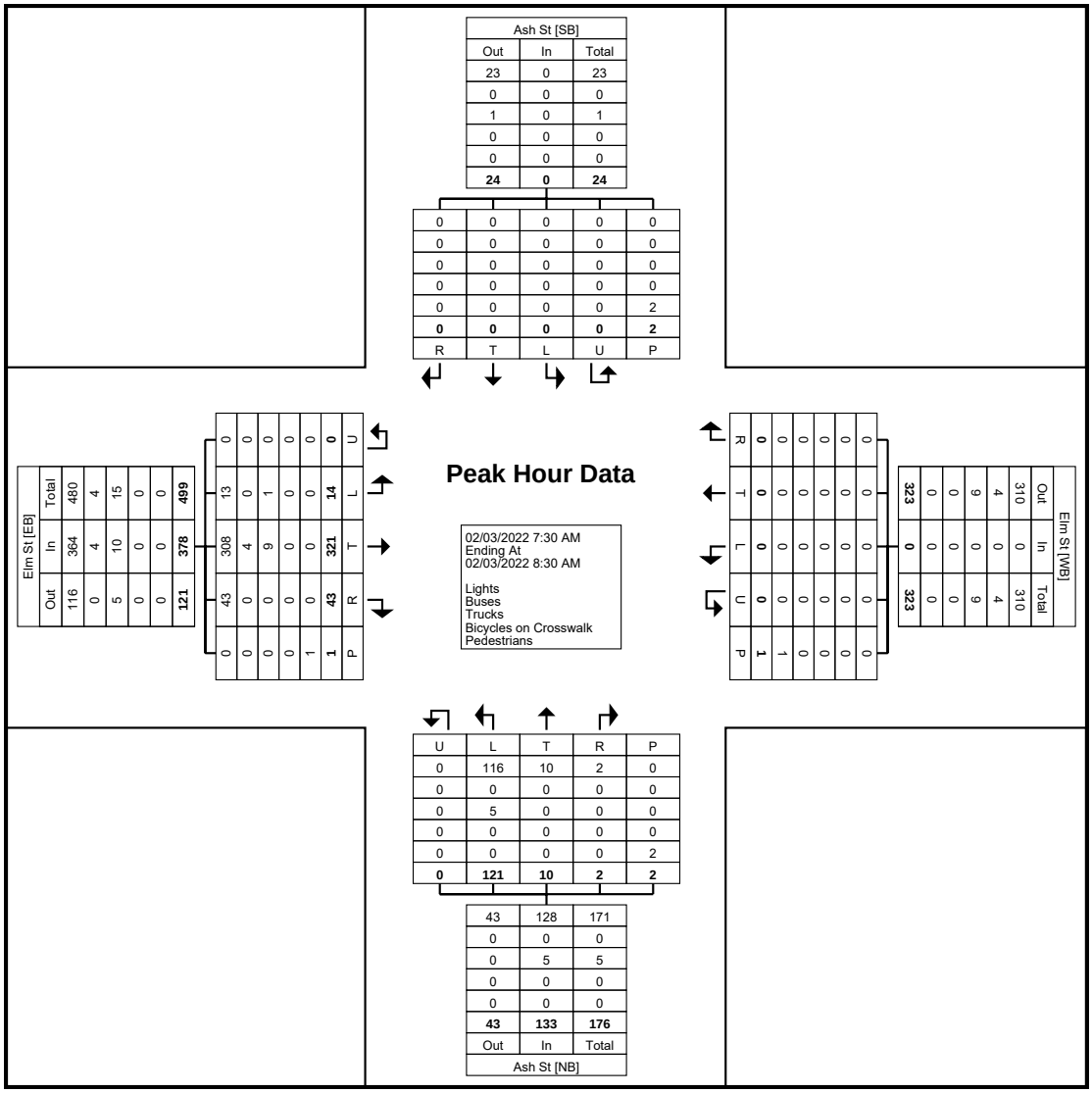
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Conshohocken, PA
Elm St & Ash St
Thursday, February 3, 2022
Location: 40.072018, -75.304629

Count Name: Elm St & Ash St
Site Code:
Start Date: 02/03/2022

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Elm St Eastbound						Elm St Westbound						Ash St Northbound						Ash St Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	3	72	13	0	0	88	0	0	0	0	0	0	38	2	0	0	0	40	0	0	0	0	0	0	128
7:45 AM	3	103	10	0	0	116	0	0	0	0	0	0	19	3	2	0	0	24	0	0	0	0	1	0	140
8:00 AM	3	80	6	0	1	89	0	0	0	0	1	0	37	2	0	0	1	39	0	0	0	0	0	0	128
8:15 AM	5	66	14	0	0	85	0	0	0	0	0	0	27	3	0	0	1	30	0	0	0	0	1	0	115
Total	14	321	43	0	1	378	0	0	0	0	1	0	121	10	2	0	2	133	0	0	0	0	2	0	511
Approach %	3.7	84.9	11.4	0.0	-	-	0.0	0.0	0.0	0.0	-	-	91.0	7.5	1.5	0.0	-	-	0.0	0.0	0.0	0.0	-	-	-
Total %	2.7	62.8	8.4	0.0	-	74.0	0.0	0.0	0.0	0.0	-	0.0	23.7	2.0	0.4	0.0	-	26.0	0.0	0.0	0.0	0.0	-	0.0	-
PHF	0.700	0.779	0.768	0.000	-	0.815	0.000	0.000	0.000	0.000	-	0.000	0.796	0.833	0.250	0.000	-	0.831	0.000	0.000	0.000	0.000	-	0.000	0.913
Lights	13	308	43	0	-	364	0	0	0	0	-	0	116	10	2	0	-	128	0	0	0	0	-	0	492
% Lights	92.9	96.0	100.0	-	-	96.3	-	-	-	-	-	-	95.9	100.0	100.0	-	-	96.2	-	-	-	-	-	-	96.3
Buses	0	4	0	0	-	4	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	4
% Buses	0.0	1.2	0.0	-	-	1.1	-	-	-	-	-	-	0.0	0.0	0.0	-	-	0.0	-	-	-	-	-	-	0.8
Trucks	1	9	0	0	-	10	0	0	0	0	-	0	5	0	0	0	-	5	0	0	0	0	-	0	15
% Trucks	7.1	2.8	0.0	-	-	2.6	-	-	-	-	-	-	4.1	0.0	0.0	-	-	3.8	-	-	-	-	-	-	2.9
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (7:30 AM)

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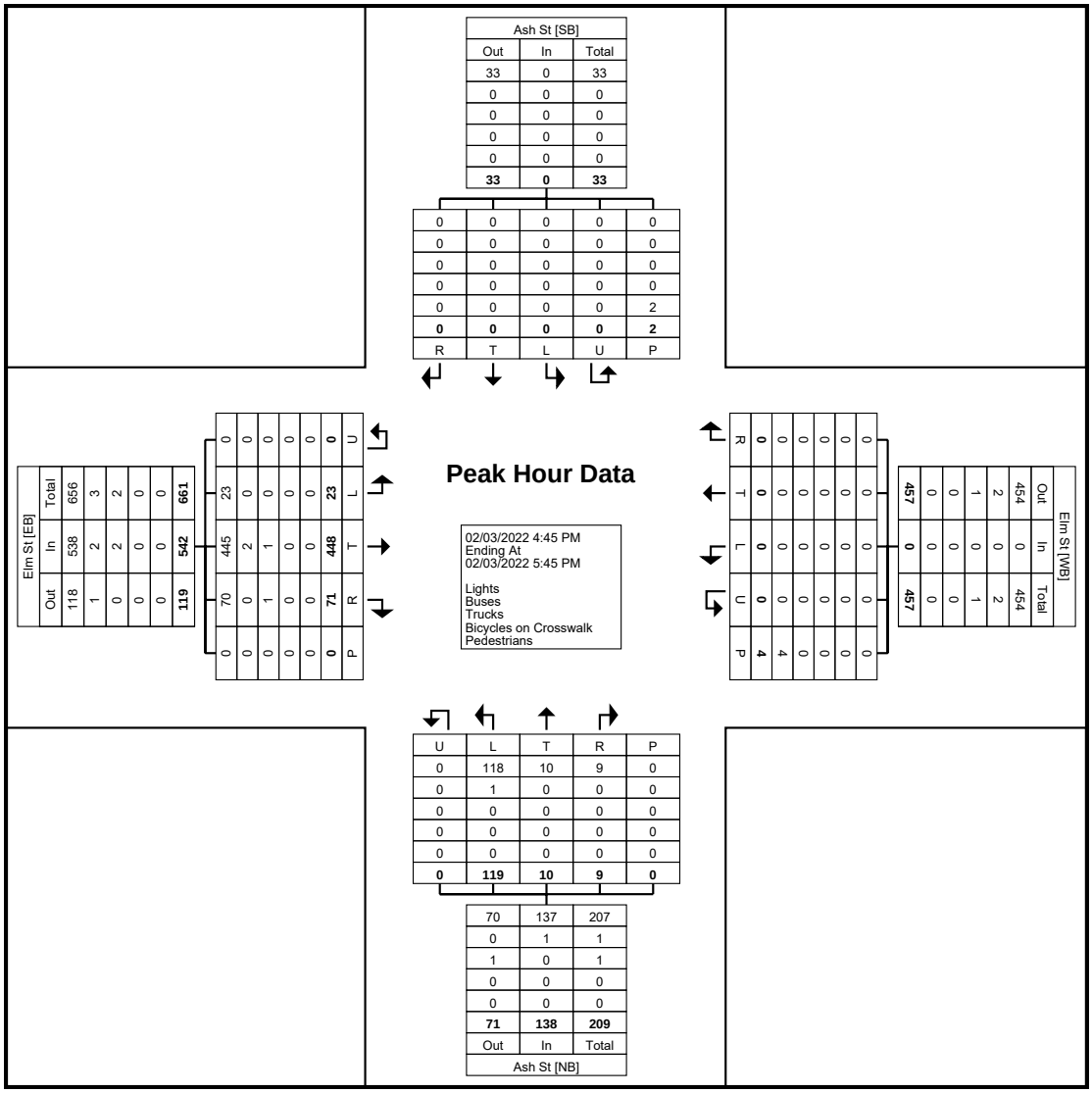
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Conshohocken, PA
Elm St & Ash St
Thursday, February 3, 2022
Location: 40.072018, -75.304629

Count Name: Elm St & Ash St
Site Code:
Start Date: 02/03/2022

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Elm St Eastbound						Elm St Westbound						Ash St Northbound						Ash St Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:45 PM	4	132	17	0	0	153	0	0	0	0	0	0	21	3	2	0	0	26	0	0	0	0	0	0	179
5:00 PM	2	111	17	0	0	130	0	0	0	0	2	0	32	5	2	0	0	39	0	0	0	0	0	0	169
5:15 PM	11	109	20	0	0	140	0	0	0	0	0	0	36	2	2	0	0	40	0	0	0	0	1	0	180
5:30 PM	6	96	17	0	0	119	0	0	0	0	2	0	30	0	3	0	0	33	0	0	0	0	1	0	152
Total	23	448	71	0	0	542	0	0	0	0	4	0	119	10	9	0	0	138	0	0	0	0	2	0	680
Approach %	4.2	82.7	13.1	0.0	-	-	0.0	0.0	0.0	0.0	-	-	86.2	7.2	6.5	0.0	-	-	0.0	0.0	0.0	0.0	-	-	-
Total %	3.4	65.9	10.4	0.0	-	79.7	0.0	0.0	0.0	0.0	-	0.0	17.5	1.5	1.3	0.0	-	20.3	0.0	0.0	0.0	0.0	-	0.0	-
PHF	0.523	0.848	0.888	0.000	-	0.886	0.000	0.000	0.000	0.000	-	0.000	0.826	0.500	0.750	0.000	-	0.863	0.000	0.000	0.000	0.000	-	0.000	0.944
Lights	23	445	70	0	-	538	0	0	0	0	-	0	118	10	9	0	-	137	0	0	0	0	-	0	675
% Lights	100.0	99.3	98.6	-	-	99.3	-	-	-	-	-	-	99.2	100.0	100.0	-	-	99.3	-	-	-	-	-	-	99.3
Buses	0	2	0	0	-	2	0	0	0	0	-	0	1	0	0	0	-	1	0	0	0	0	-	0	3
% Buses	0.0	0.4	0.0	-	-	0.4	-	-	-	-	-	-	0.8	0.0	0.0	-	-	0.7	-	-	-	-	-	-	0.4
Trucks	0	1	1	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	2
% Trucks	0.0	0.2	1.4	-	-	0.4	-	-	-	-	-	-	0.0	0.0	0.0	-	-	0.0	-	-	-	-	-	-	0.3
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (4:45 PM)

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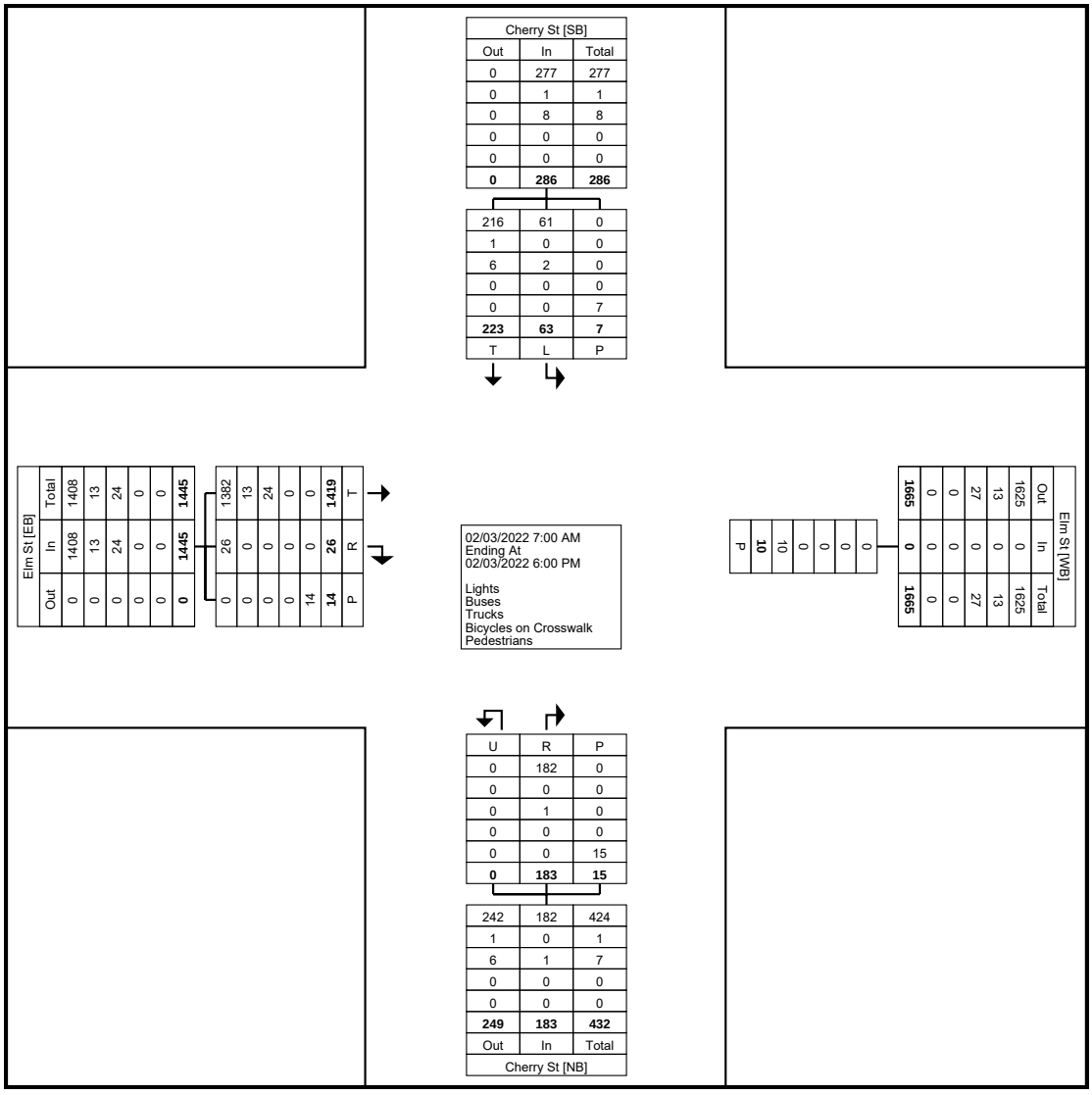
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Conshohocken, PA
Elm St & Cherry St
Thursday, February 3, 2022
Location: 40.072904, -75.299049

Count Name: Elm St & Cherry St
Site Code:
Start Date: 02/03/2022

Turning Movement Data

Start Time	Elm St Eastbound				Elm St Westbound		Cherry St Northbound				Cherry St Southbound				
	Thru	Right	Peds	App. Total	Peds	App. Total	Right	U-Turn	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
7:00 AM	53	4	0	57	0	0	7	0	0	7	2	6	0	8	72
7:15 AM	53	1	0	54	0	0	10	0	0	10	1	9	0	10	74
7:30 AM	79	4	1	83	2	0	16	0	1	16	2	13	1	15	114
7:45 AM	96	1	0	97	0	0	7	0	0	7	1	15	0	16	120
Hourly Total	281	10	1	291	2	0	40	0	1	40	6	43	1	49	380
8:00 AM	79	2	2	81	1	0	8	0	0	8	5	21	1	26	115
8:15 AM	71	3	2	74	2	0	12	0	2	12	3	20	1	23	109
8:30 AM	53	1	1	54	2	0	6	0	2	6	5	11	0	16	76
8:45 AM	68	0	0	68	1	0	5	0	0	5	6	20	0	26	99
Hourly Total	271	6	5	277	6	0	31	0	4	31	19	72	2	91	399
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	111	1	0	112	0	0	11	0	0	11	2	12	0	14	137
4:15 PM	115	0	0	115	0	0	8	0	0	8	4	9	0	13	136
4:30 PM	101	1	1	102	0	0	19	0	1	19	3	23	1	26	147
4:45 PM	128	2	1	130	0	0	12	0	0	12	6	15	0	21	163
Hourly Total	455	4	2	459	0	0	50	0	1	50	15	59	1	74	583
5:00 PM	111	2	0	113	0	0	24	0	2	24	7	12	0	19	156
5:15 PM	112	0	2	112	0	0	10	0	2	10	2	12	2	14	136
5:30 PM	108	4	2	112	1	0	17	0	3	17	11	16	0	27	156
5:45 PM	81	0	2	81	1	0	11	0	2	11	3	9	1	12	104
Hourly Total	412	6	6	418	2	0	62	0	9	62	23	49	3	72	552
Grand Total	1419	26	14	1445	10	0	183	0	15	183	63	223	7	286	1914
Approach %	98.2	1.8	-	-	-	-	100.0	0.0	-	-	22.0	78.0	-	-	-
Total %	74.1	1.4	-	75.5	-	0.0	9.6	0.0	-	9.6	3.3	11.7	-	14.9	-
Lights	1382	26	-	1408	-	0	182	0	-	182	61	216	-	277	1867
% Lights	97.4	100.0	-	97.4	-	-	99.5	-	-	99.5	96.8	96.9	-	96.9	97.5
Buses	13	0	-	13	-	0	0	0	-	0	0	1	-	1	14
% Buses	0.9	0.0	-	0.9	-	-	0.0	-	-	0.0	0.0	0.4	-	0.3	0.7
Trucks	24	0	-	24	-	0	1	0	-	1	2	6	-	8	33
% Trucks	1.7	0.0	-	1.7	-	-	0.5	-	-	0.5	3.2	2.7	-	2.8	1.7
Bicycles on Crosswalk	-	-	0	-	0	-	-	-	0	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	0.0	-	0.0	-	-	-	0.0	-	-	-	0.0	-	-
Pedestrians	-	-	14	-	10	-	-	-	15	-	-	-	7	-	-
% Pedestrians	-	-	100.0	-	100.0	-	-	-	100.0	-	-	-	100.0	-	-



Turning Movement Data Plot

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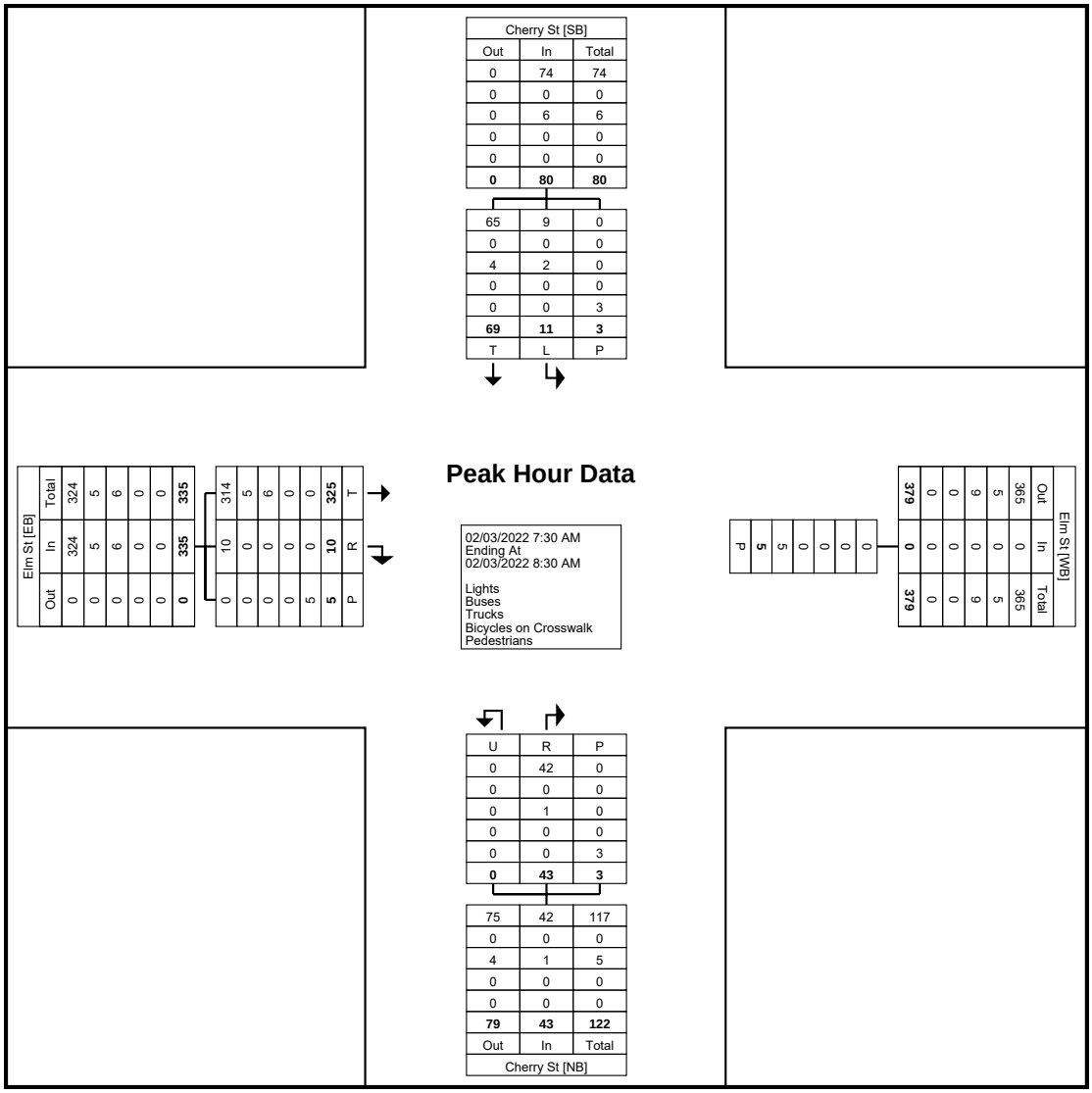
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Conshohocken, PA
Elm St & Cherry St
Thursday, February 3, 2022
Location: 40.072904, -75.299049

Count Name: Elm St & Cherry St
Site Code:
Start Date: 02/03/2022

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Elm St Eastbound				Elm St Westbound		Cherry St Northbound				Cherry St Southbound				
	Thru	Right	Peds	App. Total	Peds	App. Total	Right	U-Turn	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
7:30 AM	79	4	1	83	2	0	16	0	1	16	2	13	1	15	114
7:45 AM	96	1	0	97	0	0	7	0	0	7	1	15	0	16	120
8:00 AM	79	2	2	81	1	0	8	0	0	8	5	21	1	26	115
8:15 AM	71	3	2	74	2	0	12	0	2	12	3	20	1	23	109
Total	325	10	5	335	5	0	43	0	3	43	11	69	3	80	458
Approach %	97.0	3.0	-	-	-	-	100.0	0.0	-	-	13.8	86.3	-	-	-
Total %	71.0	2.2	-	73.1	-	0.0	9.4	0.0	-	9.4	2.4	15.1	-	17.5	-
PHF	0.846	0.625	-	0.863	-	0.000	0.672	0.000	-	0.672	0.550	0.821	-	0.769	0.954
Lights	314	10	-	324	-	0	42	0	-	42	9	65	-	74	440
% Lights	96.6	100.0	-	96.7	-	-	97.7	-	-	97.7	81.8	94.2	-	92.5	96.1
Buses	5	0	-	5	-	0	0	0	-	0	0	0	-	0	5
% Buses	1.5	0.0	-	1.5	-	-	0.0	-	-	0.0	0.0	0.0	-	0.0	1.1
Trucks	6	0	-	6	-	0	1	0	-	1	2	4	-	6	13
% Trucks	1.8	0.0	-	1.8	-	-	2.3	-	-	2.3	18.2	5.8	-	7.5	2.8
Bicycles on Crosswalk	-	-	0	-	0	-	-	-	0	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	0.0	-	0.0	-	-	-	0.0	-	-	-	0.0	-	-
Pedestrians	-	-	5	-	5	-	-	-	3	-	-	-	3	-	-
% Pedestrians	-	-	100.0	-	100.0	-	-	-	100.0	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (7:30 AM)

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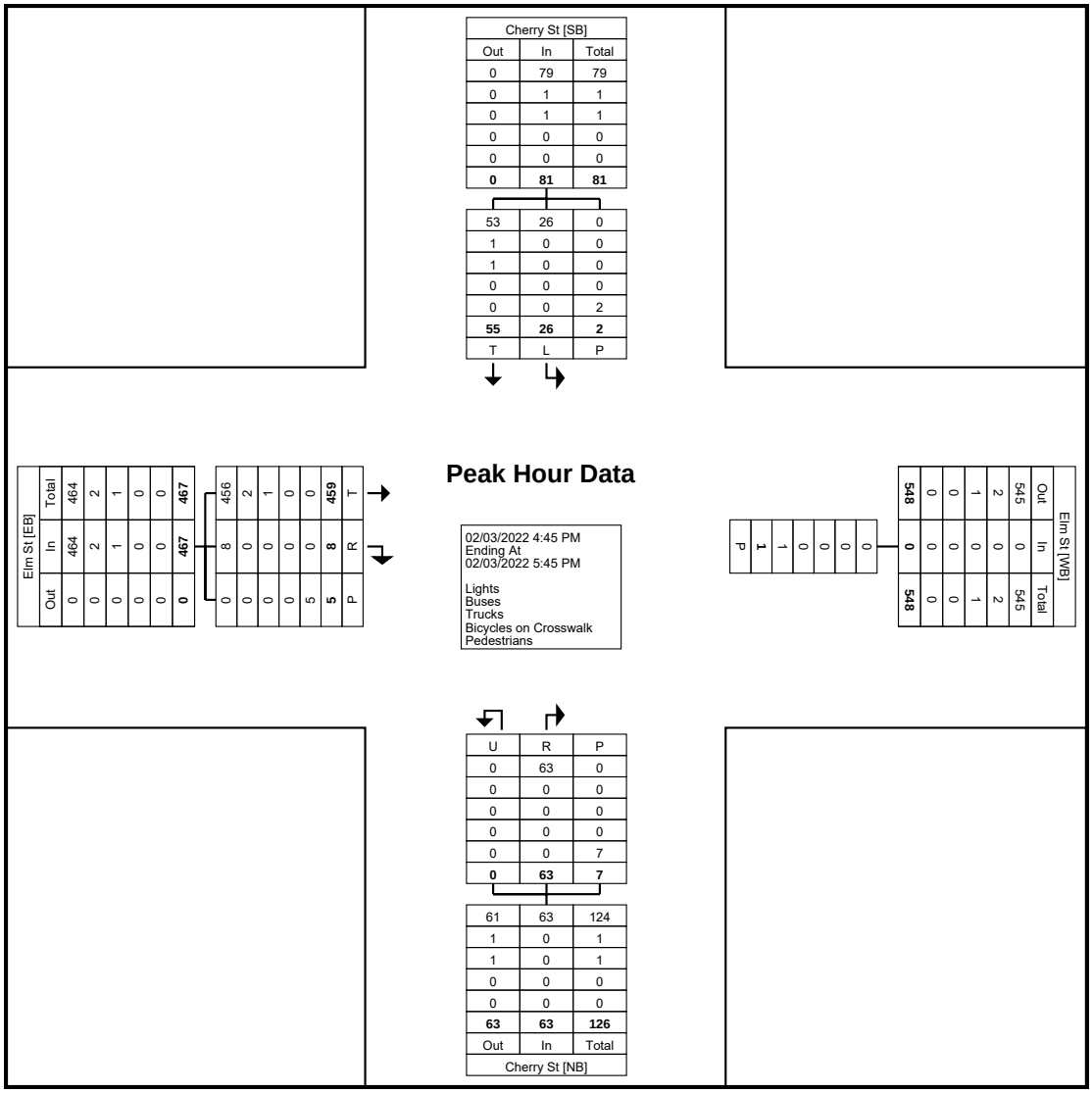
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Conshohocken, PA
Elm St & Cherry St
Thursday, February 3, 2022
Location: 40.072904, -75.299049

Count Name: Elm St & Cherry St
Site Code:
Start Date: 02/03/2022

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Elm St Eastbound				Elm St Westbound		Cherry St Northbound				Cherry St Southbound				
	Thru	Right	Peds	App. Total	Peds	App. Total	Right	U-Turn	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
4:45 PM	128	2	1	130	0	0	12	0	0	12	6	15	0	21	163
5:00 PM	111	2	0	113	0	0	24	0	2	24	7	12	0	19	156
5:15 PM	112	0	2	112	0	0	10	0	2	10	2	12	2	14	136
5:30 PM	108	4	2	112	1	0	17	0	3	17	11	16	0	27	156
Total	459	8	5	467	1	0	63	0	7	63	26	55	2	81	611
Approach %	98.3	1.7	-	-	-	-	100.0	0.0	-	-	32.1	67.9	-	-	-
Total %	75.1	1.3	-	76.4	-	0.0	10.3	0.0	-	10.3	4.3	9.0	-	13.3	-
PHF	0.896	0.500	-	0.898	-	0.000	0.656	0.000	-	0.656	0.591	0.859	-	0.750	0.937
Lights	456	8	-	464	-	0	63	0	-	63	26	53	-	79	606
% Lights	99.3	100.0	-	99.4	-	-	100.0	-	-	100.0	100.0	96.4	-	97.5	99.2
Buses	2	0	-	2	-	0	0	0	-	0	0	1	-	1	3
% Buses	0.4	0.0	-	0.4	-	-	0.0	-	-	0.0	0.0	1.8	-	1.2	0.5
Trucks	1	0	-	1	-	0	0	0	-	0	0	1	-	1	2
% Trucks	0.2	0.0	-	0.2	-	-	0.0	-	-	0.0	0.0	1.8	-	1.2	0.3
Bicycles on Crosswalk	-	-	0	-	0	-	-	-	0	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	0.0	-	0.0	-	-	-	0.0	-	-	-	0.0	-	-
Pedestrians	-	-	5	-	1	-	-	-	7	-	-	-	2	-	-
% Pedestrians	-	-	100.0	-	100.0	-	-	-	100.0	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (4:45 PM)

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Conshohocken, PA
Elm St & Harry St
Thursday, February 3, 2022
Location: 40.072296, -75.306344

Count Name: Elm St & Harry St
Site Code:
Start Date: 02/03/2022

Turning Movement Data

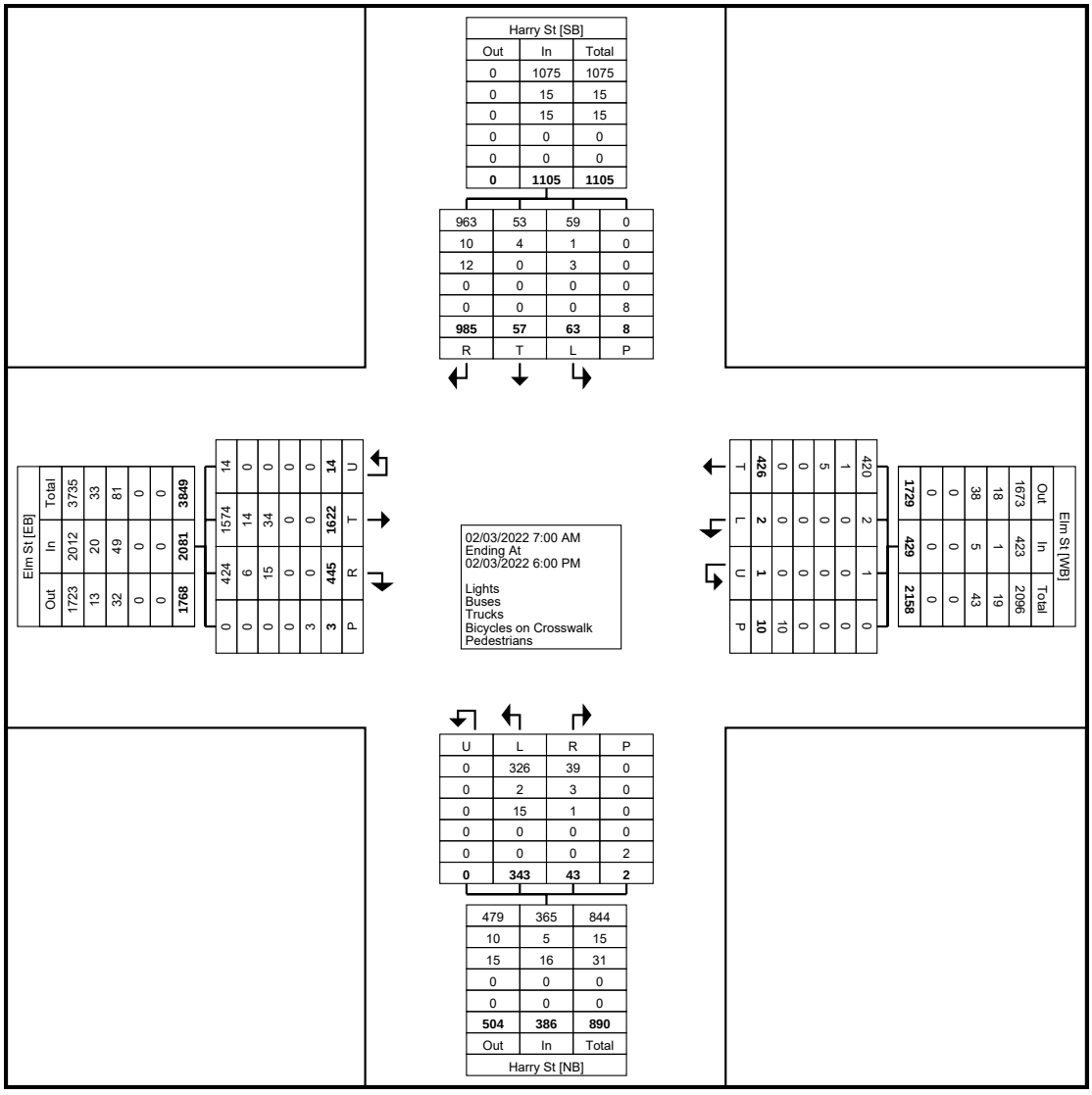
Start Time	Elm St Eastbound						Elm St Westbound					Harry St Northbound						Harry St Southbound						Int. Total
	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
7:00 AM	58	41	3	2	1	104	0	34	0	0	34	7	2	1	0	0	10	1	4	24	29	0	58	206
7:15 AM	73	26	5	0	0	104	0	37	0	1	37	10	0	1	0	0	11	1	3	44	21	1	69	221
7:30 AM	93	30	5	1	0	129	0	36	0	0	36	10	0	3	0	0	13	0	2	33	29	0	64	242
7:45 AM	112	22	9	1	0	144	0	23	0	0	23	12	2	1	0	0	15	5	5	25	36	2	71	253
Hourly Total	336	119	22	4	1	481	0	130	0	1	130	39	4	6	0	0	49	7	14	126	115	3	262	922
8:00 AM	96	42	19	1	0	158	0	34	0	0	34	17	0	0	0	0	17	4	3	66	34	1	107	316
8:15 AM	85	28	16	1	1	130	0	26	0	1	26	12	0	0	0	1	12	7	6	44	16	2	73	241
8:30 AM	58	29	8	0	1	95	0	14	0	0	14	11	3	0	0	0	14	3	8	35	32	0	78	201
8:45 AM	81	46	7	0	0	134	0	15	0	0	15	4	0	0	0	0	4	1	4	25	35	0	65	218
Hourly Total	320	145	50	2	2	517	0	89	0	1	89	44	3	0	0	1	47	15	21	170	117	3	323	976
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	123	7	3	0	0	133	0	25	0	0	25	30	0	0	0	0	30	1	5	22	16	1	44	232
4:15 PM	127	12	5	0	0	144	1	18	0	2	19	23	3	0	0	1	26	5	2	32	24	0	63	252
4:30 PM	113	6	9	1	0	129	0	19	0	0	19	35	5	1	0	0	41	2	1	42	27	0	72	261
4:45 PM	140	11	5	1	0	157	0	22	0	1	22	38	6	0	0	0	44	4	2	45	26	0	77	300
Hourly Total	503	36	22	2	0	563	1	84	0	3	85	126	14	1	0	1	141	12	10	141	93	1	256	1045
5:00 PM	126	13	7	2	0	148	0	39	0	5	39	37	1	1	0	0	39	6	2	49	16	1	73	299
5:15 PM	129	7	3	0	0	139	1	36	0	0	37	34	1	1	0	0	36	8	3	54	9	0	74	286
5:30 PM	97	8	1	2	0	108	0	34	0	0	34	42	8	0	0	0	50	6	1	35	13	0	55	247
5:45 PM	111	7	5	2	0	125	0	14	1	0	15	21	2	1	0	0	24	9	6	26	21	0	62	226
Hourly Total	463	35	16	6	0	520	1	123	1	5	125	134	12	3	0	0	149	29	12	164	59	1	264	1058
Grand Total	1622	335	110	14	3	2081	2	426	1	10	429	343	33	10	0	2	386	63	57	601	384	8	1105	4001
Approach %	77.9	16.1	5.3	0.7	-	-	0.5	99.3	0.2	-	-	88.9	8.5	2.6	0.0	-	-	5.7	5.2	54.4	34.8	-	-	-
Total %	40.5	8.4	2.7	0.3	-	52.0	0.0	10.6	0.0	-	10.7	8.6	0.8	0.2	0.0	-	9.6	1.6	1.4	15.0	9.6	-	27.6	-
Lights	1574	316	108	14	-	2012	2	420	1	-	423	326	30	9	0	-	365	59	53	588	375	-	1075	3875
% Lights	97.0	94.3	98.2	100.0	-	96.7	100.0	98.6	100.0	-	98.6	95.0	90.9	90.0	-	-	94.6	93.7	93.0	97.8	97.7	-	97.3	96.9
Buses	14	5	1	0	-	20	0	1	0	-	1	2	3	0	0	-	5	1	4	7	3	-	15	41
% Buses	0.9	1.5	0.9	0.0	-	1.0	0.0	0.2	0.0	-	0.2	0.6	9.1	0.0	-	-	1.3	1.6	7.0	1.2	0.8	-	1.4	1.0
Trucks	34	14	1	0	-	49	0	5	0	-	5	15	0	1	0	-	16	3	0	6	6	-	15	85
% Trucks	2.1	4.2	0.9	0.0	-	2.4	0.0	1.2	0.0	-	1.2	4.4	0.0	10.0	-	-	4.1	4.8	0.0	1.0	1.6	-	1.4	2.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	10	-	-	-	-	-	2	-	-	-	-	-	8	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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Conshohocken, PA
Elm St & Harry St
Thursday, February 3, 2022
Location: 40.072296, -75.306344

Count Name: Elm St & Harry St
Site Code:
Start Date: 02/03/2022



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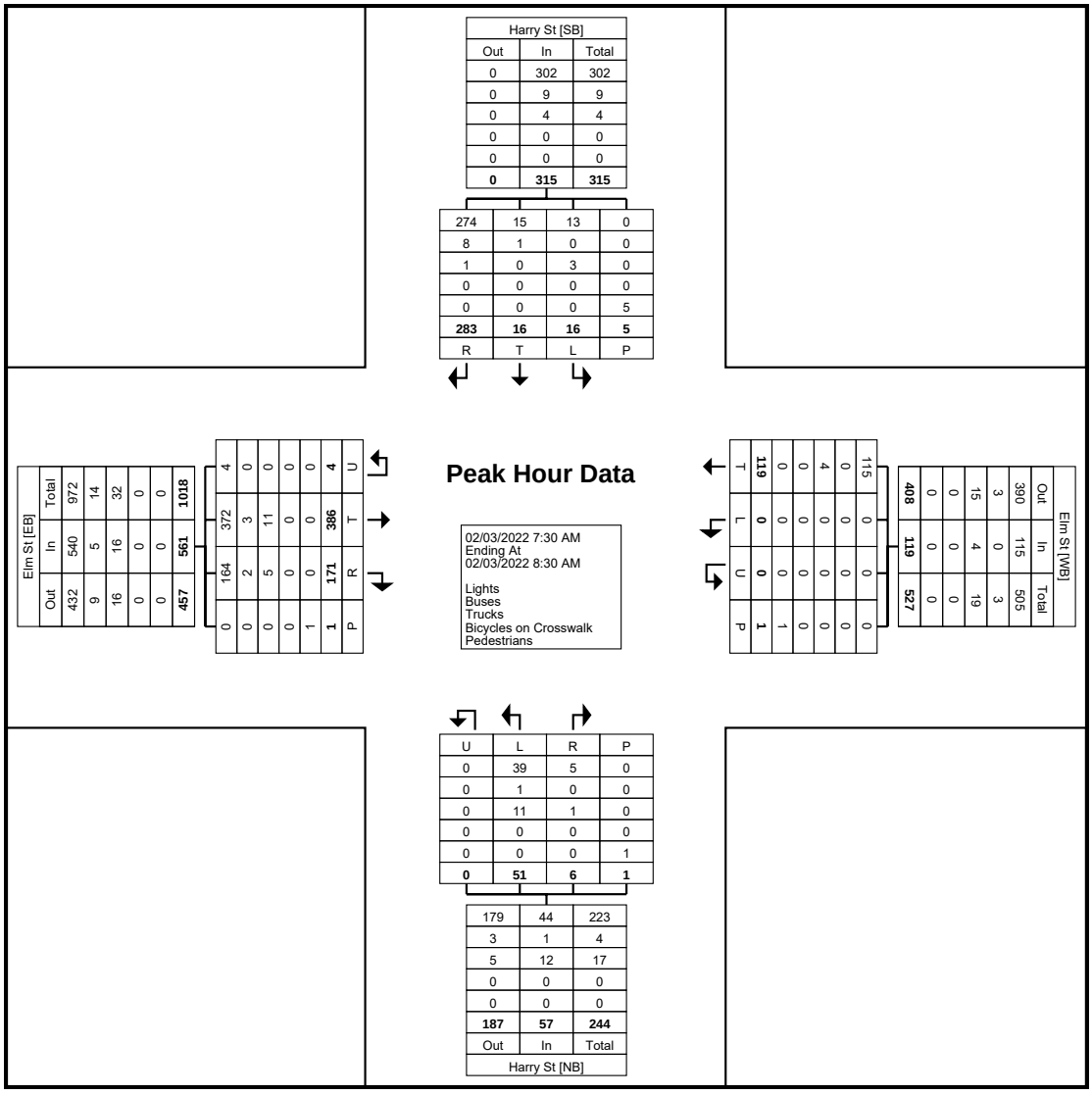
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Conshohocken, PA
Elm St & Harry St
Thursday, February 3, 2022
Location: 40.072296, -75.306344

Count Name: Elm St & Harry St
Site Code:
Start Date: 02/03/2022

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Elm St Eastbound						Elm St Westbound					Harry St Northbound						Harry St Southbound						Int. Total
	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
7:30 AM	93	30	5	1	0	129	0	36	0	0	36	10	0	3	0	0	13	0	2	33	29	0	64	242
7:45 AM	112	22	9	1	0	144	0	23	0	0	23	12	2	1	0	0	15	5	5	25	36	2	71	253
8:00 AM	96	42	19	1	0	158	0	34	0	0	34	17	0	0	0	0	17	4	3	66	34	1	107	316
8:15 AM	85	28	16	1	1	130	0	26	0	1	26	12	0	0	0	1	12	7	6	44	16	2	73	241
Total	386	122	49	4	1	561	0	119	0	1	119	51	2	4	0	1	57	16	16	168	115	5	315	1052
Approach %	68.8	21.7	8.7	0.7	-	-	0.0	100.0	0.0	-	-	89.5	3.5	7.0	0.0	-	-	5.1	5.1	53.3	36.5	-	-	-
Total %	36.7	11.6	4.7	0.4	-	53.3	0.0	11.3	0.0	-	11.3	4.8	0.2	0.4	0.0	-	5.4	1.5	1.5	16.0	10.9	-	29.9	-
PHF	0.862	0.726	0.645	1.000	-	0.888	0.000	0.826	0.000	-	0.826	0.750	0.250	0.333	0.000	-	0.838	0.571	0.667	0.636	0.799	-	0.736	0.832
Lights	372	116	48	4	-	540	0	115	0	-	115	39	2	3	0	-	44	13	15	162	112	-	302	1001
% Lights	96.4	95.1	98.0	100.0	-	96.3	-	96.6	-	-	96.6	76.5	100.0	75.0	-	-	77.2	81.3	93.8	96.4	97.4	-	95.9	95.2
Buses	3	2	0	0	-	5	0	0	0	-	0	1	0	0	0	-	1	0	1	5	3	-	9	15
% Buses	0.8	1.6	0.0	0.0	-	0.9	-	0.0	-	-	0.0	2.0	0.0	0.0	-	-	1.8	0.0	6.3	3.0	2.6	-	2.9	1.4
Trucks	11	4	1	0	-	16	0	4	0	-	4	11	0	1	0	-	12	3	0	1	0	-	4	36
% Trucks	2.8	3.3	2.0	0.0	-	2.9	-	3.4	-	-	3.4	21.6	0.0	25.0	-	-	21.1	18.8	0.0	0.6	0.0	-	1.3	3.4
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (7:30 AM)

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Conshohocken, PA
Elm St & Harry St
Thursday, February 3, 2022
Location: 40.072296, -75.306344

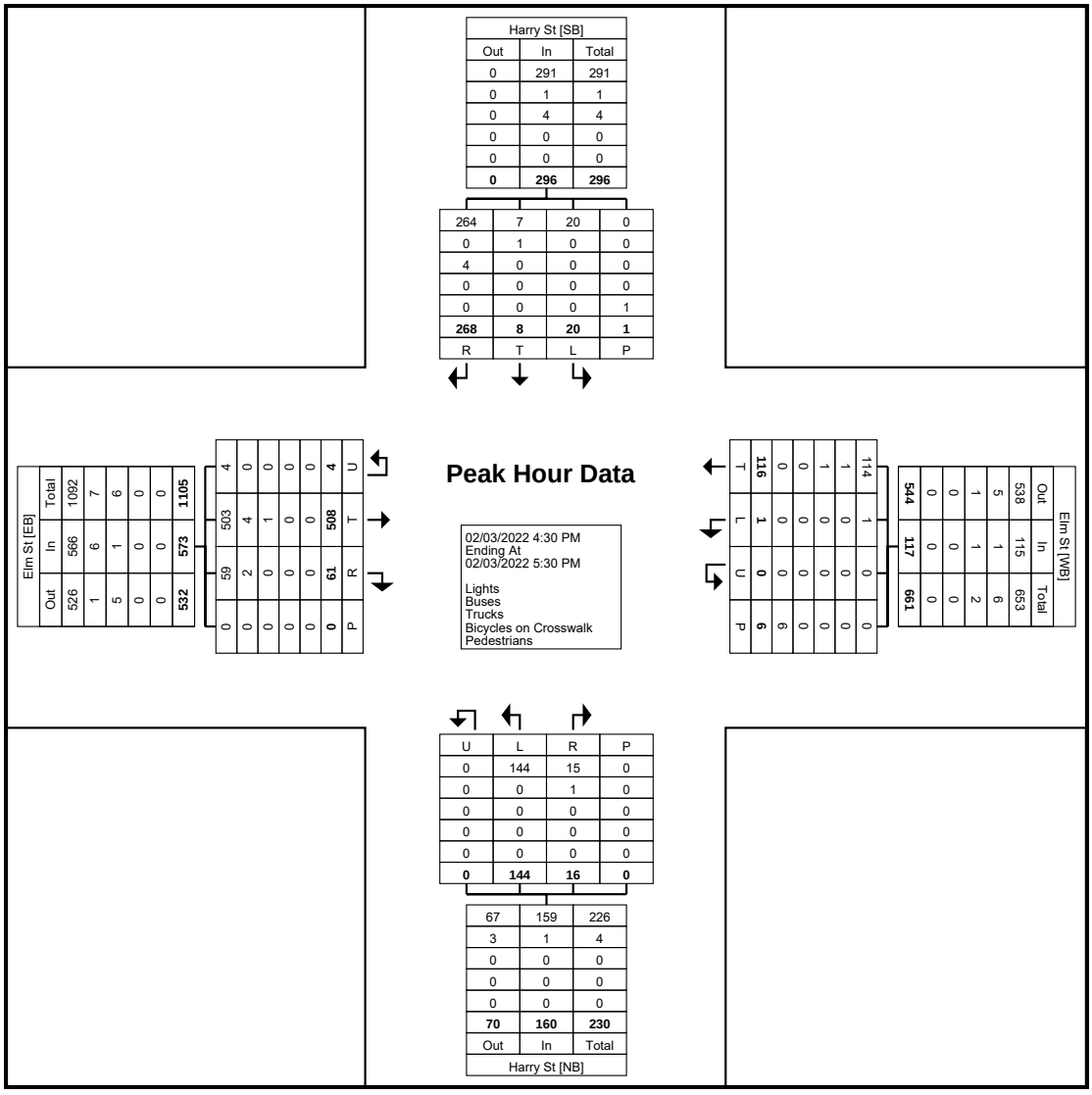
Count Name: Elm St & Harry St
Site Code:
Start Date: 02/03/2022

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Elm St Eastbound						Elm St Westbound					Harry St Northbound						Harry St Southbound						Int. Total
	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
4:30 PM	113	6	9	1	0	129	0	19	0	0	19	35	5	1	0	0	41	2	1	42	27	0	72	261
4:45 PM	140	11	5	1	0	157	0	22	0	1	22	38	6	0	0	0	44	4	2	45	26	0	77	300
5:00 PM	126	13	7	2	0	148	0	39	0	5	39	37	1	1	0	0	39	6	2	49	16	1	73	299
5:15 PM	129	7	3	0	0	139	1	36	0	0	37	34	1	1	0	0	36	8	3	54	9	0	74	286
Total	508	37	24	4	0	573	1	116	0	6	117	144	13	3	0	0	160	20	8	190	78	1	296	1146
Approach %	88.7	6.5	4.2	0.7	-	-	0.9	99.1	0.0	-	-	90.0	8.1	1.9	0.0	-	-	6.8	2.7	64.2	26.4	-	-	-
Total %	44.3	3.2	2.1	0.3	-	50.0	0.1	10.1	0.0	-	10.2	12.6	1.1	0.3	0.0	-	14.0	1.7	0.7	16.6	6.8	-	25.8	-
PHF	0.907	0.712	0.667	0.500	-	0.912	0.250	0.744	0.000	-	0.750	0.947	0.542	0.750	0.000	-	0.909	0.625	0.667	0.880	0.722	-	0.961	0.955
Lights	503	36	23	4	-	566	1	114	0	-	115	144	12	3	0	-	159	20	7	187	77	-	291	1131
% Lights	99.0	97.3	95.8	100.0	-	98.8	100.0	98.3	-	-	98.3	100.0	92.3	100.0	-	-	99.4	100.0	87.5	98.4	98.7	-	98.3	98.7
Buses	4	1	1	0	-	6	0	1	0	-	1	0	1	0	0	-	1	0	1	0	0	-	1	9
% Buses	0.8	2.7	4.2	0.0	-	1.0	0.0	0.9	-	-	0.9	0.0	7.7	0.0	-	-	0.6	0.0	12.5	0.0	0.0	-	0.3	0.8
Trucks	1	0	0	0	-	1	0	1	0	-	1	0	0	0	0	-	0	0	0	3	1	-	4	6
% Trucks	0.2	0.0	0.0	0.0	-	0.2	0.0	0.9	-	-	0.9	0.0	0.0	0.0	-	-	0.0	0.0	0.0	1.6	1.3	-	1.4	0.5
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	6	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Conshohocken, PA
Elm St & Harry St
Thursday, February 3, 2022
Location: 40.072296, -75.306344

Count Name: Elm St & Harry St
Site Code:
Start Date: 02/03/2022



Turning Movement Peak Hour Data Plot (4:30 PM)

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Conshohocken, PA
Washington St & Cherry St
Thursday, February 3, 2022
Location: 40.072106, -75.298835

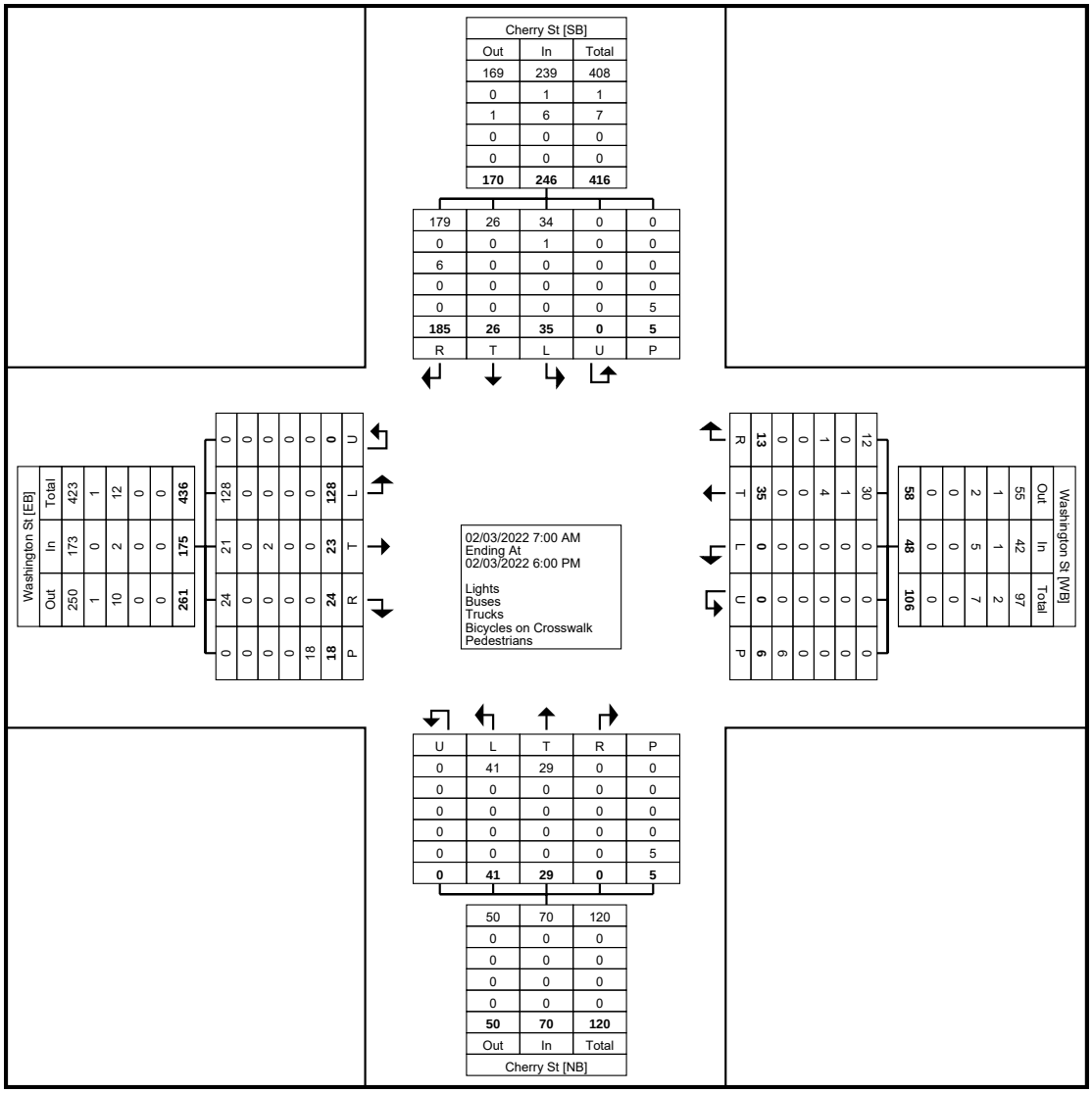
Count Name: Washington St & Cherry St
Site Code:
Start Date: 02/03/2022

Turning Movement Data

Start Time	Washington St Eastbound						Washington St Westbound						Cherry St Northbound						Cherry St Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	7	1	0	0	0	8	0	0	0	0	1	0	2	0	0	0	1	2	1	1	7	0	0	9	19
7:15 AM	8	2	0	0	0	10	0	0	0	0	0	0	5	2	0	0	1	7	2	0	10	0	1	12	29
7:30 AM	14	1	0	0	2	15	0	3	0	0	0	3	7	2	0	0	0	9	2	1	13	0	1	16	43
7:45 AM	6	1	0	0	3	7	0	2	1	0	0	3	3	1	0	0	0	4	1	0	15	0	1	16	30
Hourly Total	35	5	0	0	5	40	0	5	1	0	1	6	17	5	0	0	2	22	6	2	45	0	3	53	121
8:00 AM	4	0	0	0	0	4	0	1	0	0	0	1	5	3	0	0	0	8	0	0	16	0	0	16	29
8:15 AM	9	2	1	0	3	12	0	1	1	0	0	2	5	3	0	0	0	8	1	1	21	0	1	23	45
8:30 AM	5	0	2	0	3	7	0	0	1	0	1	1	5	1	0	0	1	6	0	0	9	0	0	9	23
8:45 AM	4	1	1	0	0	6	0	0	0	0	0	0	2	0	0	0	0	2	2	2	16	0	0	20	28
Hourly Total	22	3	4	0	6	29	0	2	2	0	1	4	17	7	0	0	1	24	3	3	62	0	1	68	125
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	8	1	0	0	0	9	0	4	2	0	0	6	0	0	0	0	0	0	3	1	9	0	0	13	28
4:15 PM	5	0	4	0	0	9	0	1	1	0	0	2	0	0	0	0	0	0	2	3	6	0	0	11	22
4:30 PM	10	2	4	0	2	16	0	1	4	0	1	5	0	3	0	0	0	3	15	1	8	0	0	24	48
4:45 PM	8	2	0	0	2	10	0	2	0	0	0	2	0	3	0	0	0	3	4	3	11	0	0	18	33
Hourly Total	31	5	8	0	4	44	0	8	7	0	1	15	0	6	0	0	0	6	24	8	34	0	0	66	131
5:00 PM	13	3	3	0	1	19	0	6	1	0	1	7	2	4	0	0	0	6	0	2	11	0	0	13	45
5:15 PM	10	1	2	0	1	13	0	10	0	0	1	10	2	2	0	0	1	4	0	4	9	0	0	13	40
5:30 PM	8	1	4	0	0	13	0	3	2	0	1	5	1	5	0	0	1	6	0	5	16	0	0	21	45
5:45 PM	9	5	3	0	1	17	0	1	0	0	0	1	2	0	0	0	0	2	2	2	8	0	1	12	32
Hourly Total	40	10	12	0	3	62	0	20	3	0	3	23	7	11	0	0	2	18	2	13	44	0	1	59	162
Grand Total	128	23	24	0	18	175	0	35	13	0	6	48	41	29	0	0	5	70	35	26	185	0	5	246	539
Approach %	73.1	13.1	13.7	0.0	-	-	0.0	72.9	27.1	0.0	-	-	58.6	41.4	0.0	0.0	-	-	14.2	10.6	75.2	0.0	-	-	-
Total %	23.7	4.3	4.5	0.0	-	32.5	0.0	6.5	2.4	0.0	-	8.9	7.6	5.4	0.0	0.0	-	13.0	6.5	4.8	34.3	0.0	-	45.6	-
Lights	128	21	24	0	-	173	0	30	12	0	-	42	41	29	0	0	-	70	34	26	179	0	-	239	524
% Lights	100.0	91.3	100.0	-	-	98.9	-	85.7	92.3	-	-	87.5	100.0	100.0	-	-	-	100.0	97.1	100.0	96.8	-	-	97.2	97.2
Buses	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1	0	0	0	-	1	2
% Buses	0.0	0.0	0.0	-	-	0.0	-	2.9	0.0	-	-	2.1	0.0	0.0	-	-	-	0.0	2.9	0.0	0.0	-	-	0.4	0.4
Trucks	0	2	0	0	-	2	0	4	1	0	-	5	0	0	0	0	-	0	0	0	6	0	-	6	13
% Trucks	0.0	8.7	0.0	-	-	1.1	-	11.4	7.7	-	-	10.4	0.0	0.0	-	-	-	0.0	0.0	0.0	3.2	-	-	2.4	2.4
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	18	-	-	-	-	-	6	-	-	-	-	-	5	-	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Conshohocken, PA
Washington St & Cherry St
Thursday, February 3, 2022
Location: 40.072106, -75.298835

Count Name: Washington St & Cherry St
Site Code:
Start Date: 02/03/2022



Turning Movement Data Plot

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Washington St & Cherry St
Thursday, February 3, 2022
Location: 40.072106, -75.298835

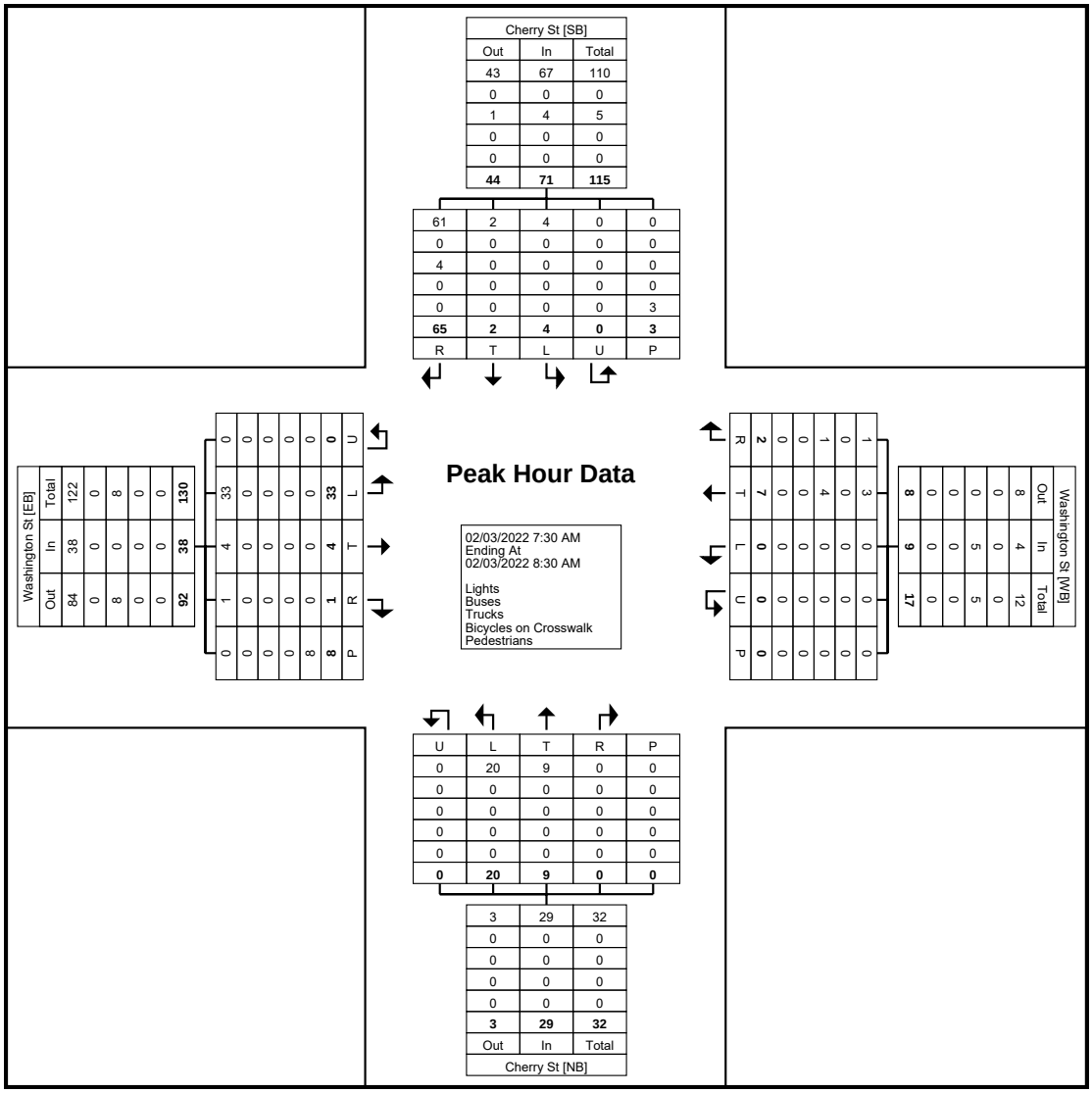
Count Name: Washington St & Cherry St
Site Code:
Start Date: 02/03/2022

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Washington St Eastbound						Washington St Westbound						Cherry St Northbound						Cherry St Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	14	1	0	0	2	15	0	3	0	0	0	3	7	2	0	0	0	9	2	1	13	0	1	16	43
7:45 AM	6	1	0	0	3	7	0	2	1	0	0	3	3	1	0	0	0	4	1	0	15	0	1	16	30
8:00 AM	4	0	0	0	0	4	0	1	0	0	0	1	5	3	0	0	0	8	0	0	16	0	0	16	29
8:15 AM	9	2	1	0	3	12	0	1	1	0	0	2	5	3	0	0	0	8	1	1	21	0	1	23	45
Total	33	4	1	0	8	38	0	7	2	0	0	9	20	9	0	0	0	29	4	2	65	0	3	71	147
Approach %	86.8	10.5	2.6	0.0	-	-	0.0	77.8	22.2	0.0	-	-	69.0	31.0	0.0	0.0	-	-	5.6	2.8	91.5	0.0	-	-	-
Total %	22.4	2.7	0.7	0.0	-	25.9	0.0	4.8	1.4	0.0	-	6.1	13.6	6.1	0.0	0.0	-	19.7	2.7	1.4	44.2	0.0	-	48.3	-
PHF	0.589	0.500	0.250	0.000	-	0.633	0.000	0.583	0.500	0.000	-	0.750	0.714	0.750	0.000	0.000	-	0.806	0.500	0.500	0.774	0.000	-	0.772	0.817
Lights	33	4	1	0	-	38	0	3	1	0	-	4	20	9	0	0	-	29	4	2	61	0	-	67	138
% Lights	100.0	100.0	100.0	-	-	100.0	-	42.9	50.0	-	-	44.4	100.0	100.0	-	-	-	100.0	100.0	100.0	93.8	-	-	94.4	93.9
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Trucks	0	0	0	0	-	0	0	4	1	0	-	5	0	0	0	0	-	0	0	0	4	0	-	4	9
% Trucks	0.0	0.0	0.0	-	-	0.0	-	57.1	50.0	-	-	55.6	0.0	0.0	-	-	-	0.0	0.0	0.0	6.2	-	-	5.6	6.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Conshohocken, PA
Washington St & Cherry St
Thursday, February 3, 2022
Location: 40.072106, -75.298835

Count Name: Washington St & Cherry St
Site Code:
Start Date: 02/03/2022



Turning Movement Peak Hour Data Plot (7:30 AM)

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Conshohocken, PA
Washington St & Cherry St
Thursday, February 3, 2022
Location: 40.072106, -75.298835

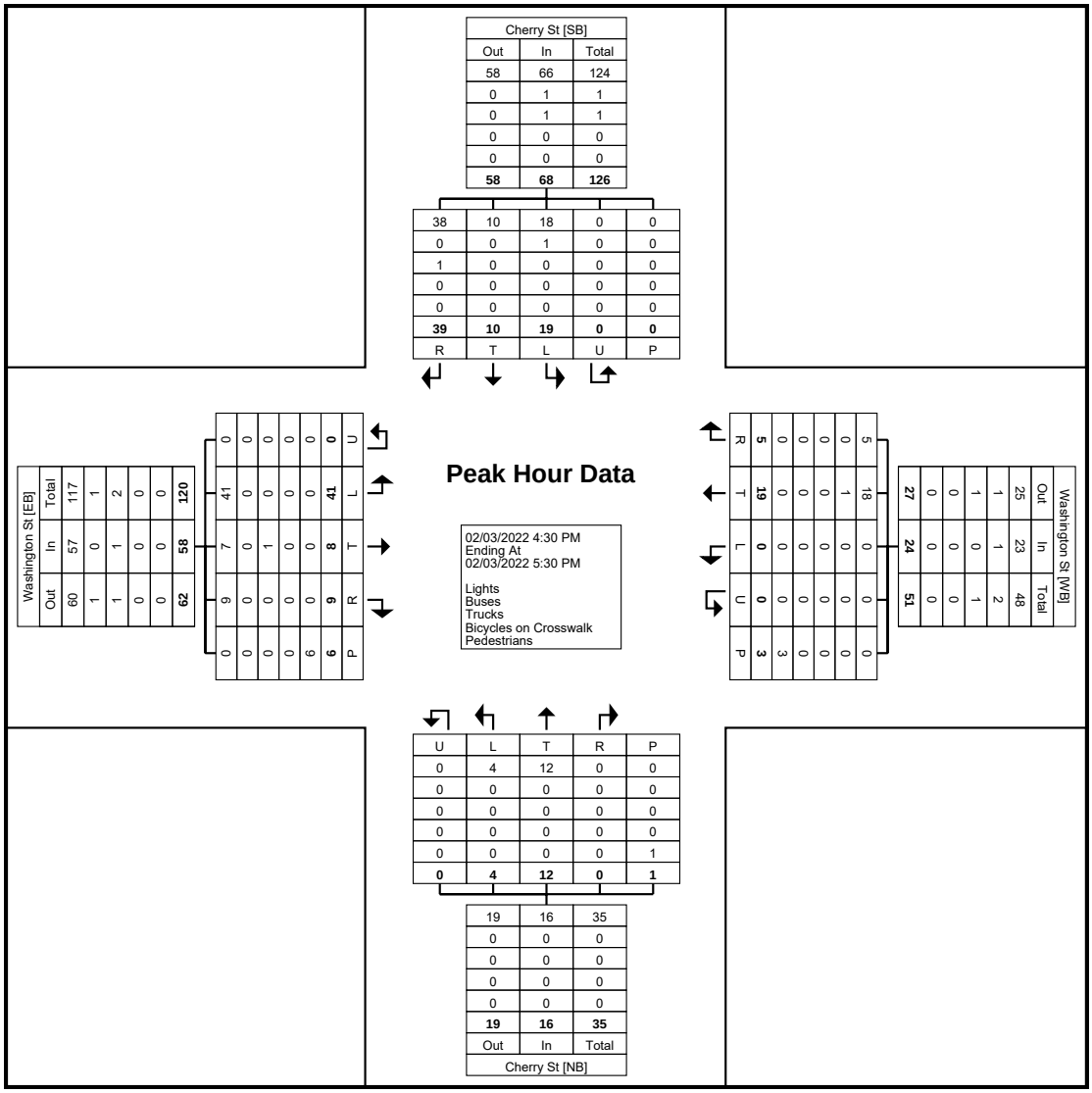
Count Name: Washington St & Cherry St
Site Code:
Start Date: 02/03/2022

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Washington St Eastbound						Washington St Westbound						Cherry St Northbound						Cherry St Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	10	2	4	0	2	16	0	1	4	0	1	5	0	3	0	0	0	3	15	1	8	0	0	24	48
4:45 PM	8	2	0	0	2	10	0	2	0	0	0	2	0	3	0	0	0	3	4	3	11	0	0	18	33
5:00 PM	13	3	3	0	1	19	0	6	1	0	1	7	2	4	0	0	0	6	0	2	11	0	0	13	45
5:15 PM	10	1	2	0	1	13	0	10	0	0	1	10	2	2	0	0	1	4	0	4	9	0	0	13	40
Total	41	8	9	0	6	58	0	19	5	0	3	24	4	12	0	0	1	16	19	10	39	0	0	68	166
Approach %	70.7	13.8	15.5	0.0	-	-	0.0	79.2	20.8	0.0	-	-	25.0	75.0	0.0	0.0	-	-	27.9	14.7	57.4	0.0	-	-	-
Total %	24.7	4.8	5.4	0.0	-	34.9	0.0	11.4	3.0	0.0	-	14.5	2.4	7.2	0.0	0.0	-	9.6	11.4	6.0	23.5	0.0	-	41.0	-
PHF	0.788	0.667	0.563	0.000	-	0.763	0.000	0.475	0.313	0.000	-	0.600	0.500	0.750	0.000	0.000	-	0.667	0.317	0.625	0.886	0.000	-	0.708	0.865
Lights	41	7	9	0	-	57	0	18	5	0	-	23	4	12	0	0	-	16	18	10	38	0	-	66	162
% Lights	100.0	87.5	100.0	-	-	98.3	-	94.7	100.0	-	-	95.8	100.0	100.0	-	-	-	100.0	94.7	100.0	97.4	-	-	97.1	97.6
Buses	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1	0	0	0	-	1	2
% Buses	0.0	0.0	0.0	-	-	0.0	-	5.3	0.0	-	-	4.2	0.0	0.0	-	-	-	0.0	5.3	0.0	0.0	-	-	1.5	1.2
Trucks	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	1	0	-	1	2
% Trucks	0.0	12.5	0.0	-	-	1.7	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	0.0	2.6	-	-	1.5	1.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	6	-	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

Conshohocken, PA
Washington St & Cherry St
Thursday, February 3, 2022
Location: 40.072106, -75.298835

Count Name: Washington St & Cherry St
Site Code:
Start Date: 02/03/2022



Turning Movement Peak Hour Data Plot (4:30 PM)

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Conshohocken, PA
Washington St & Poplar St
Thursday, February 3, 2022
Location: 40.071619, -75.301804

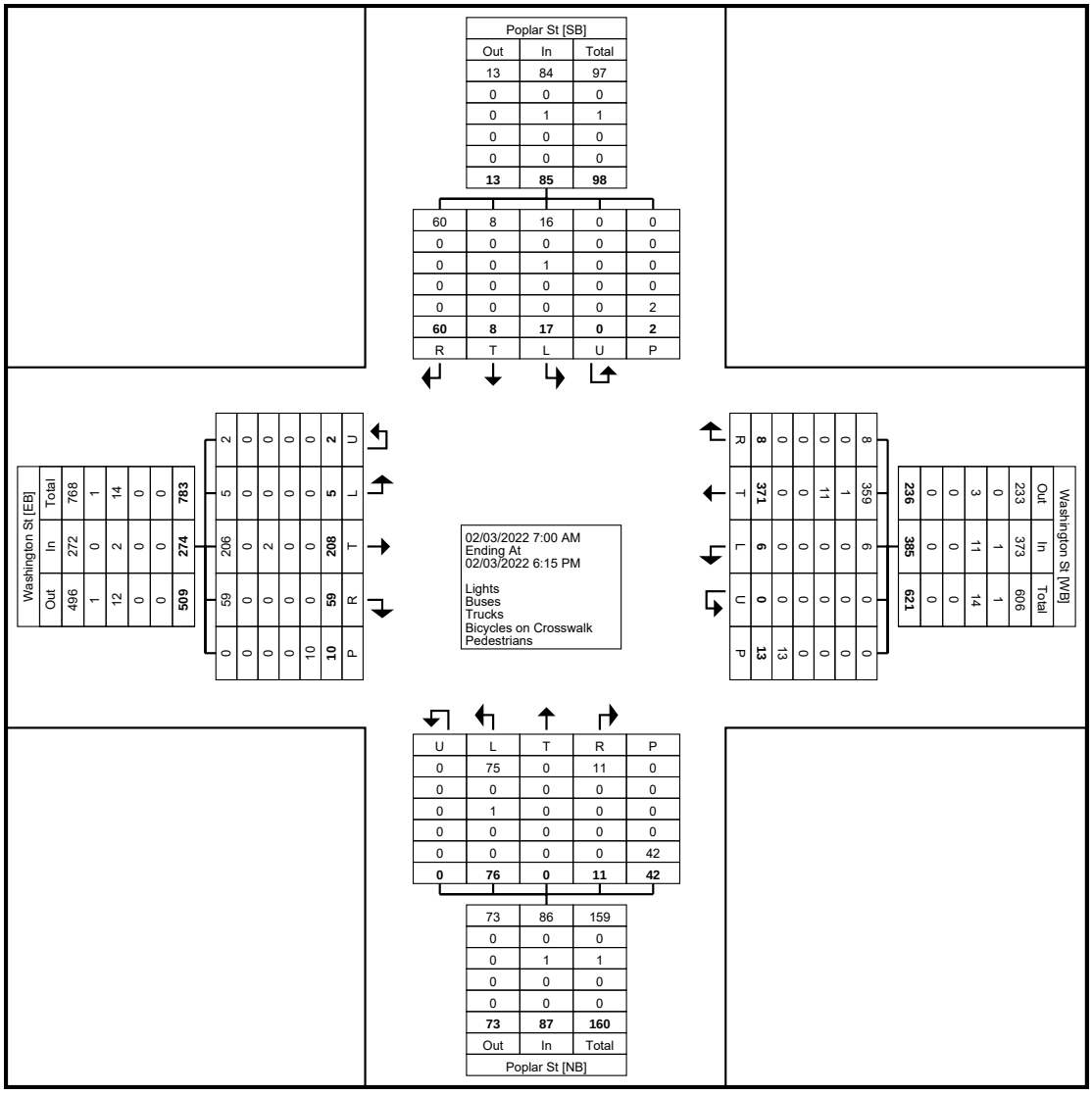
Count Name: Washington St & Poplar St
Site Code:
Start Date: 02/03/2022

Turning Movement Data

Start Time	Washington St Eastbound						Washington St Westbound						Poplar St Northbound						Poplar St Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	0	2	0	0	0	2	0	27	0	0	3	27	8	0	2	0	4	10	1	0	8	0	1	9	48
7:15 AM	0	7	0	2	0	9	0	32	0	0	0	32	10	0	0	0	2	10	0	0	3	0	1	3	54
7:30 AM	0	3	2	0	0	5	0	35	1	0	1	36	5	0	2	0	3	7	1	0	9	0	0	10	58
7:45 AM	0	4	1	0	0	5	0	24	0	0	3	24	4	0	0	0	2	4	0	0	4	0	0	4	37
Hourly Total	0	16	3	2	0	21	0	118	1	0	7	119	27	0	4	0	11	31	2	0	24	0	2	26	197
8:00 AM	0	3	3	0	4	6	0	42	0	0	0	42	8	0	0	0	5	8	0	1	4	0	0	5	61
8:15 AM	0	8	1	0	0	9	0	31	1	0	1	32	6	0	3	0	1	9	1	0	2	0	0	3	53
8:30 AM	0	4	1	0	0	5	0	22	0	0	0	22	3	0	0	0	1	3	1	0	2	0	0	3	33
8:45 AM	0	5	1	0	0	6	0	24	0	0	1	24	6	0	0	0	0	6	0	0	1	0	0	1	37
Hourly Total	0	20	6	0	4	26	0	119	1	0	2	120	23	0	3	0	7	26	2	1	9	0	0	12	184
9:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	1	14	4	0	2	19	1	14	0	0	1	15	3	0	0	0	5	3	1	0	4	0	0	5	42
4:15 PM	0	25	4	0	2	29	0	7	1	0	0	8	2	0	0	0	4	2	0	1	4	0	0	5	44
4:30 PM	1	20	7	0	0	28	0	8	1	0	1	9	0	0	1	0	2	1	1	0	4	0	0	5	43
4:45 PM	0	17	5	0	0	22	1	15	2	0	0	18	4	0	0	0	3	4	2	2	4	0	0	8	52
Hourly Total	2	76	20	0	4	98	2	44	4	0	2	50	9	0	1	0	14	10	4	3	16	0	0	23	181
5:00 PM	1	26	11	0	0	38	3	20	0	0	0	23	6	0	0	0	1	6	1	0	4	0	0	5	72
5:15 PM	1	20	6	0	1	27	1	32	0	0	0	33	5	0	0	0	3	5	2	0	0	0	0	2	67
5:30 PM	0	22	7	0	0	29	0	28	2	0	0	30	0	0	2	0	1	2	4	1	7	0	0	12	73
5:45 PM	1	28	6	0	1	35	0	10	0	0	0	10	6	0	1	0	5	7	2	3	0	0	0	5	57
Hourly Total	3	96	30	0	2	129	4	90	2	0	0	96	17	0	3	0	10	20	9	4	11	0	0	24	269
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	5	208	59	2	10	274	6	371	8	0	13	385	76	0	11	0	42	87	17	8	60	0	2	85	831
Approach %	1.8	75.9	21.5	0.7	-	-	1.6	96.4	2.1	0.0	-	-	87.4	0.0	12.6	0.0	-	-	20.0	9.4	70.6	0.0	-	-	-
Total %	0.6	25.0	7.1	0.2	-	33.0	0.7	44.6	1.0	0.0	-	46.3	9.1	0.0	1.3	0.0	-	10.5	2.0	1.0	7.2	0.0	-	10.2	-
Lights	5	206	59	2	-	272	6	359	8	0	-	373	75	0	11	0	-	86	16	8	60	0	-	84	815
% Lights	100.0	99.0	100.0	100.0	-	99.3	100.0	96.8	100.0	-	-	96.9	98.7	-	100.0	-	-	98.9	94.1	100.0	100.0	-	-	98.8	98.1
Buses	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Buses	0.0	0.0	0.0	0.0	-	0.0	0.0	0.3	0.0	-	-	0.3	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Trucks	0	2	0	0	-	2	0	11	0	0	-	11	1	0	0	0	-	1	1	0	0	0	-	1	15
% Trucks	0.0	1.0	0.0	0.0	-	0.7	0.0	3.0	0.0	-	-	2.9	1.3	-	0.0	-	-	1.1	5.9	0.0	0.0	-	-	1.2	1.8
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	10	-	-	-	-	-	13	-	-	-	-	-	42	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Conshohocken, PA
Washington St & Poplar St
Thursday, February 3, 2022
Location: 40.071619, -75.301804

Count Name: Washington St & Poplar St
Site Code:
Start Date: 02/03/2022



Turning Movement Data Plot

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Conshohocken, PA
Washington St & Poplar St
Thursday, February 3, 2022
Location: 40.071619, -75.301804

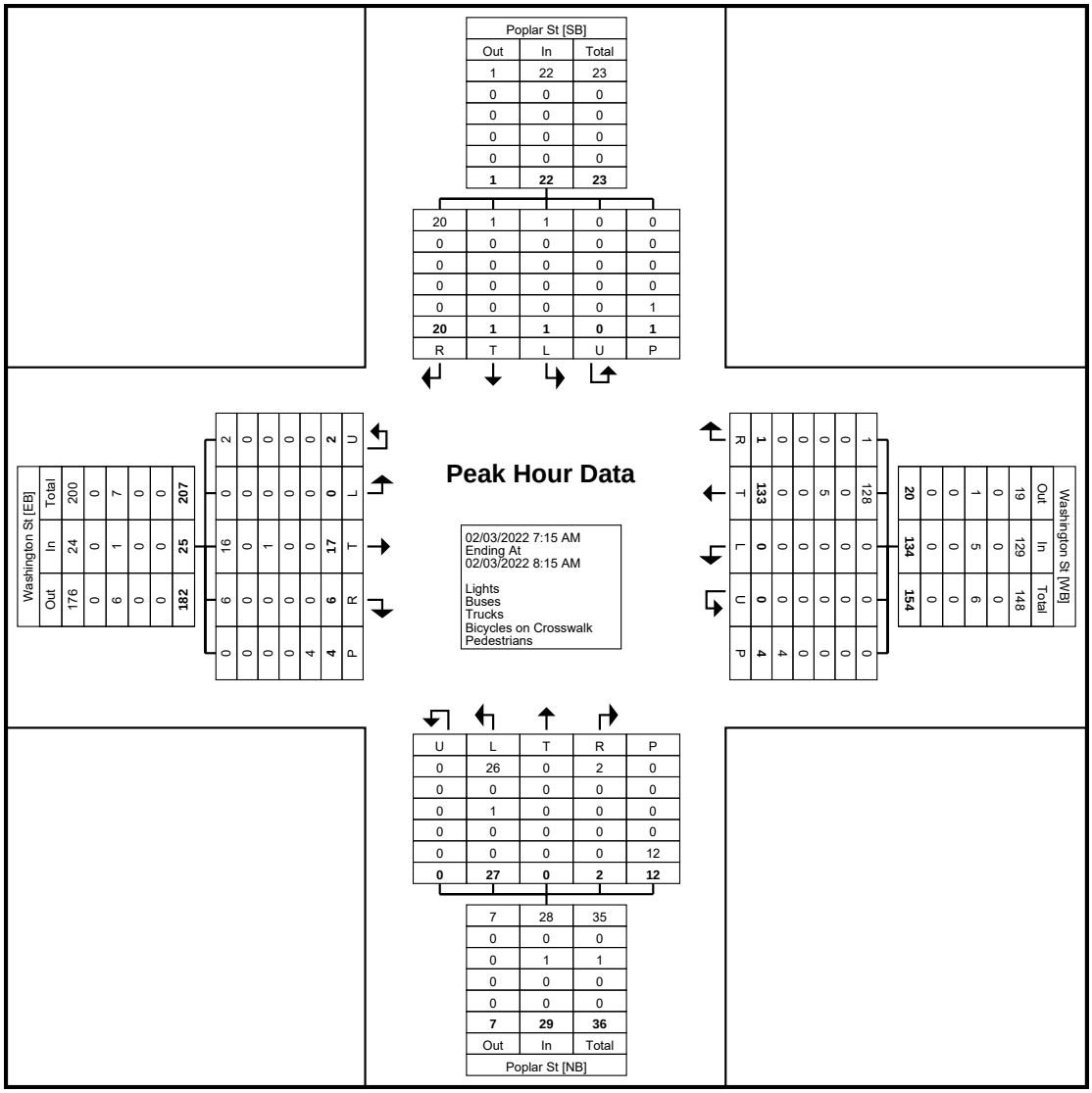
Count Name: Washington St & Poplar St
Site Code:
Start Date: 02/03/2022

Turning Movement Peak Hour Data (7:15 AM)

Start Time	Washington St Eastbound						Washington St Westbound						Poplar St Northbound						Poplar St Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:15 AM	0	7	0	2	0	9	0	32	0	0	0	32	10	0	0	0	2	10	0	0	3	0	1	3	54
7:30 AM	0	3	2	0	0	5	0	35	1	0	1	36	5	0	2	0	3	7	1	0	9	0	0	10	58
7:45 AM	0	4	1	0	0	5	0	24	0	0	3	24	4	0	0	0	2	4	0	0	4	0	0	4	37
8:00 AM	0	3	3	0	4	6	0	42	0	0	0	42	8	0	0	0	5	8	0	1	4	0	0	5	61
Total	0	17	6	2	4	25	0	133	1	0	4	134	27	0	2	0	12	29	1	1	20	0	1	22	210
Approach %	0.0	68.0	24.0	8.0	-	-	0.0	99.3	0.7	0.0	-	-	93.1	0.0	6.9	0.0	-	-	4.5	4.5	90.9	0.0	-	-	-
Total %	0.0	8.1	2.9	1.0	-	11.9	0.0	63.3	0.5	0.0	-	63.8	12.9	0.0	1.0	0.0	-	13.8	0.5	0.5	9.5	0.0	-	10.5	-
PHF	0.000	0.607	0.500	0.250	-	0.694	0.000	0.792	0.250	0.000	-	0.798	0.675	0.000	0.250	0.000	-	0.725	0.250	0.250	0.556	0.000	-	0.550	0.861
Lights	0	16	6	2	-	24	0	128	1	0	-	129	26	0	2	0	-	28	1	1	20	0	-	22	203
% Lights	-	94.1	100.0	100.0	-	96.0	-	96.2	100.0	-	-	96.3	96.3	-	100.0	-	-	96.6	100.0	100.0	100.0	-	-	100.0	96.7
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Trucks	0	1	0	0	-	1	0	5	0	0	-	5	1	0	0	0	-	1	0	0	0	0	-	0	7
% Trucks	-	5.9	0.0	0.0	-	4.0	-	3.8	0.0	-	-	3.7	3.7	-	0.0	-	-	3.4	0.0	0.0	0.0	-	-	0.0	3.3
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	4	-	-	-	-	-	12	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Conshohocken, PA
Washington St & Poplar St
Thursday, February 3, 2022
Location: 40.071619, -75.301804

Count Name: Washington St & Poplar St
Site Code:
Start Date: 02/03/2022



Turning Movement Peak Hour Data Plot (7:15 AM)

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Conshohocken, PA
Washington St & Poplar St
Thursday, February 3, 2022
Location: 40.071619, -75.301804

Count Name: Washington St & Poplar St
Site Code:
Start Date: 02/03/2022

Turning Movement Peak Hour Data (5:00 PM)

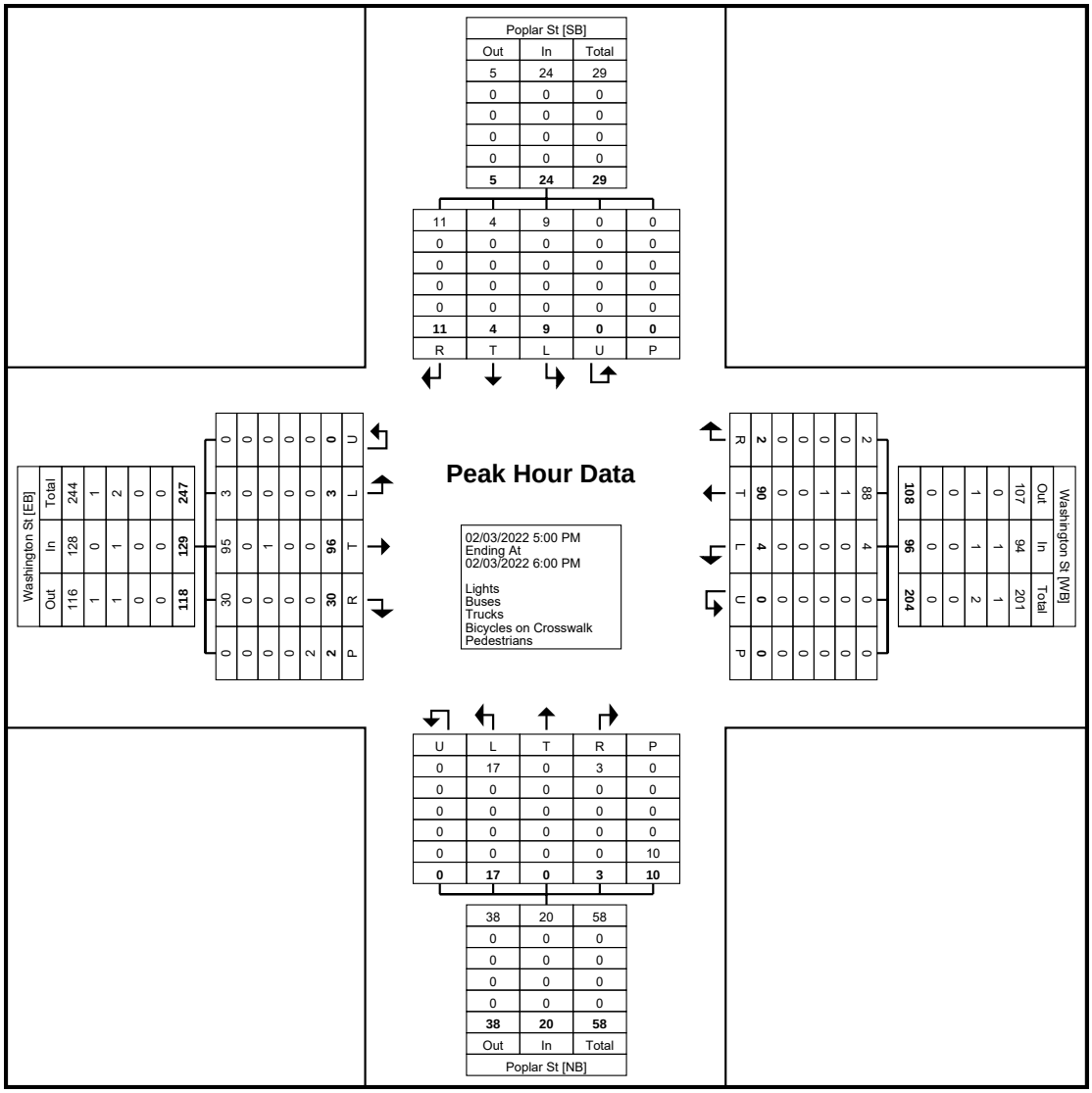
Start Time	Washington St Eastbound						Washington St Westbound						Poplar St Northbound						Poplar St Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
5:00 PM	1	26	11	0	0	38	3	20	0	0	0	23	6	0	0	0	1	6	1	0	4	0	0	5	72
5:15 PM	1	20	6	0	1	27	1	32	0	0	0	33	5	0	0	0	3	5	2	0	0	0	0	2	67
5:30 PM	0	22	7	0	0	29	0	28	2	0	0	30	0	0	2	0	1	2	4	1	7	0	0	12	73
5:45 PM	1	28	6	0	1	35	0	10	0	0	0	10	6	0	1	0	5	7	2	3	0	0	0	5	57
Total	3	96	30	0	2	129	4	90	2	0	0	96	17	0	3	0	10	20	9	4	11	0	0	24	269
Approach %	2.3	74.4	23.3	0.0	-	-	4.2	93.8	2.1	0.0	-	-	85.0	0.0	15.0	0.0	-	-	37.5	16.7	45.8	0.0	-	-	-
Total %	1.1	35.7	11.2	0.0	-	48.0	1.5	33.5	0.7	0.0	-	35.7	6.3	0.0	1.1	0.0	-	7.4	3.3	1.5	4.1	0.0	-	8.9	-
PHF	0.750	0.857	0.682	0.000	-	0.849	0.333	0.703	0.250	0.000	-	0.727	0.708	0.000	0.375	0.000	-	0.714	0.563	0.333	0.393	0.000	-	0.500	0.921
Lights	3	95	30	0	-	128	4	88	2	0	-	94	17	0	3	0	-	20	9	4	11	0	-	24	266
% Lights	100.0	99.0	100.0	-	-	99.2	100.0	97.8	100.0	-	-	97.9	100.0	-	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	98.9
Buses	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	1.1	0.0	-	-	1.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.4
Trucks	0	1	0	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	2
% Trucks	0.0	1.0	0.0	-	-	0.8	0.0	1.1	0.0	-	-	1.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.7
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	10	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

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Conshohocken, PA
Washington St & Poplar St
Thursday, February 3, 2022
Location: 40.071619, -75.301804

Count Name: Washington St & Poplar St
Site Code:
Start Date: 02/03/2022



Turning Movement Peak Hour Data Plot (5:00 PM)

Appendix D

Lane Warrant Worksheets

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Whitemarsh Township	**Analysis Date:**	2/22/2022
County:	Montgomery County	**Conducted By:**	BGG
PennDOT Engineering District:	6	**Checked By:**	JDG
		Agency/Company Name:	McMahon Associates, Inc.

Intersection & Approach Description: Washington Street and East Site Access

Analysis Period:	2024 Build with Wash St Ext	**Number of Approach Lanes:**	1
Design Hour:	AM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		**Type of Analysis**
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	3	2.0%	4
	Through	-	49	2.0%	50
	Right				0
Opposing	Left				0
	Through	-	67	2.0%	68
	Right	Yes	9	2.0%	10

Advancing Volume:	54
Opposing Volume:	78
Left Turn Volume:	4
% Left Turns in Advancing Volume:	7.41%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left				N/A
	Through	-	67	2.0%	N/A
	Right	-	9	2.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **No**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	4
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A:	**N/A**	**Feet**
Condition B:	**N/A**	**Feet**
Condition C:	**N/A**	**Feet**
Required Left Turn Lane Storage Length:	**N/A**	**Feet**

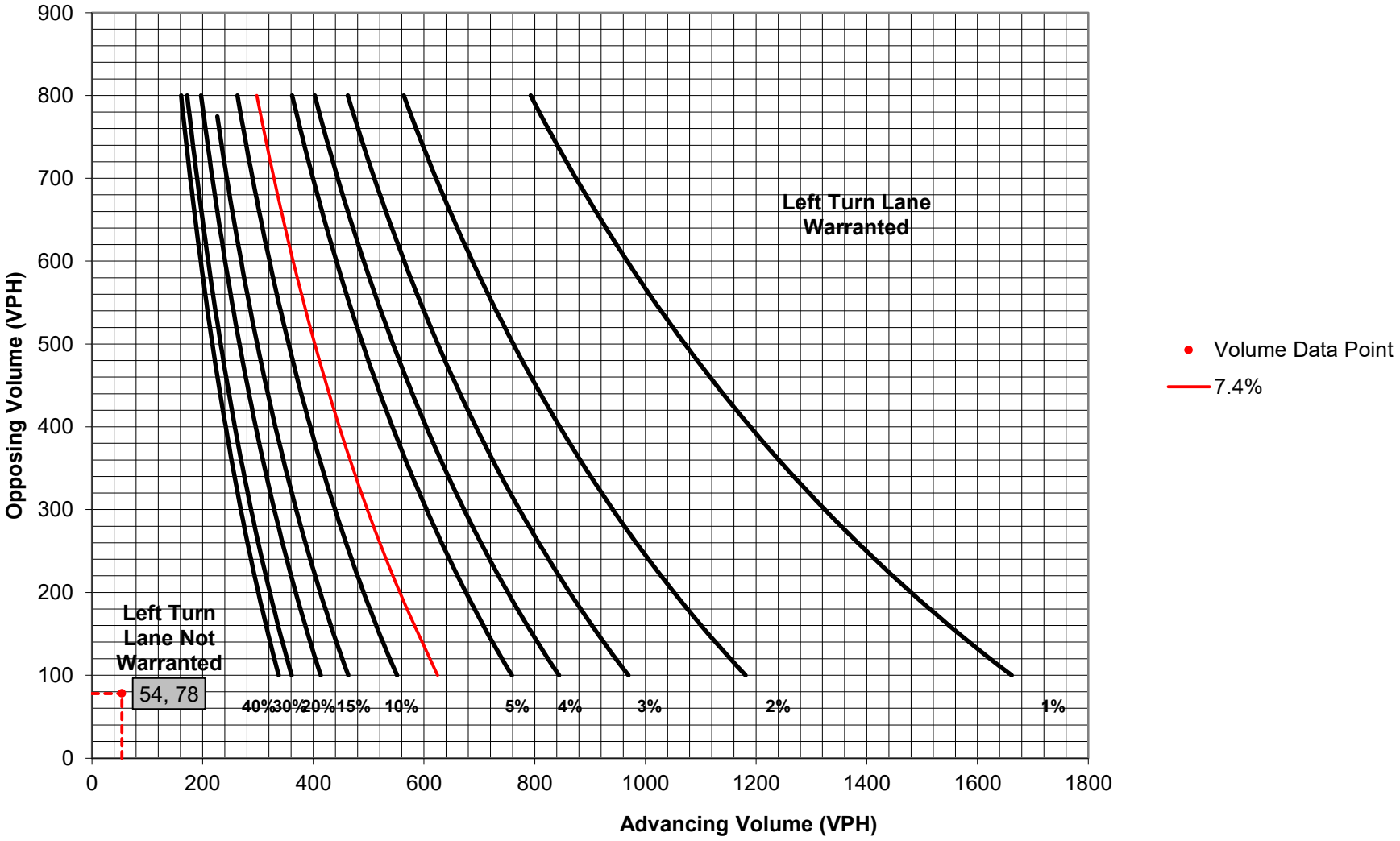
Additional Findings:

N/A

Additional Comments / Justifications:

Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)

(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Whitemarsh Township	**Analysis Date:**	2/22/2022
County:	Montgomery County	**Conducted By:**	BGG
PennDOT Engineering District:	6	**Checked By:**	JDG
		Agency/Company Name:	McMahon Associates, Inc.

Intersection & Approach Description: Washington Street and East Site Access

Analysis Period:	2024 Build with Wash St Ext	**Number of Approach Lanes:**	1
Design Hour:	AM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		**Type of Analysis**
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	3	2.0%	N/A
	Through	-	49	2.0%	N/A
	Right				N/A
Opposing	Left				N/A
	Through	-	67	2.0%	N/A
	Right	Yes	9	2.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left				0
	Through	-	67	2.0%	68
	Right	-	9	2.0%	10

Advancing Volume:	78
Right Turn Volume:	10

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: N/A

Warrant Met?: N/A

Right Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 9

Warrant Met?: No

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	10
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

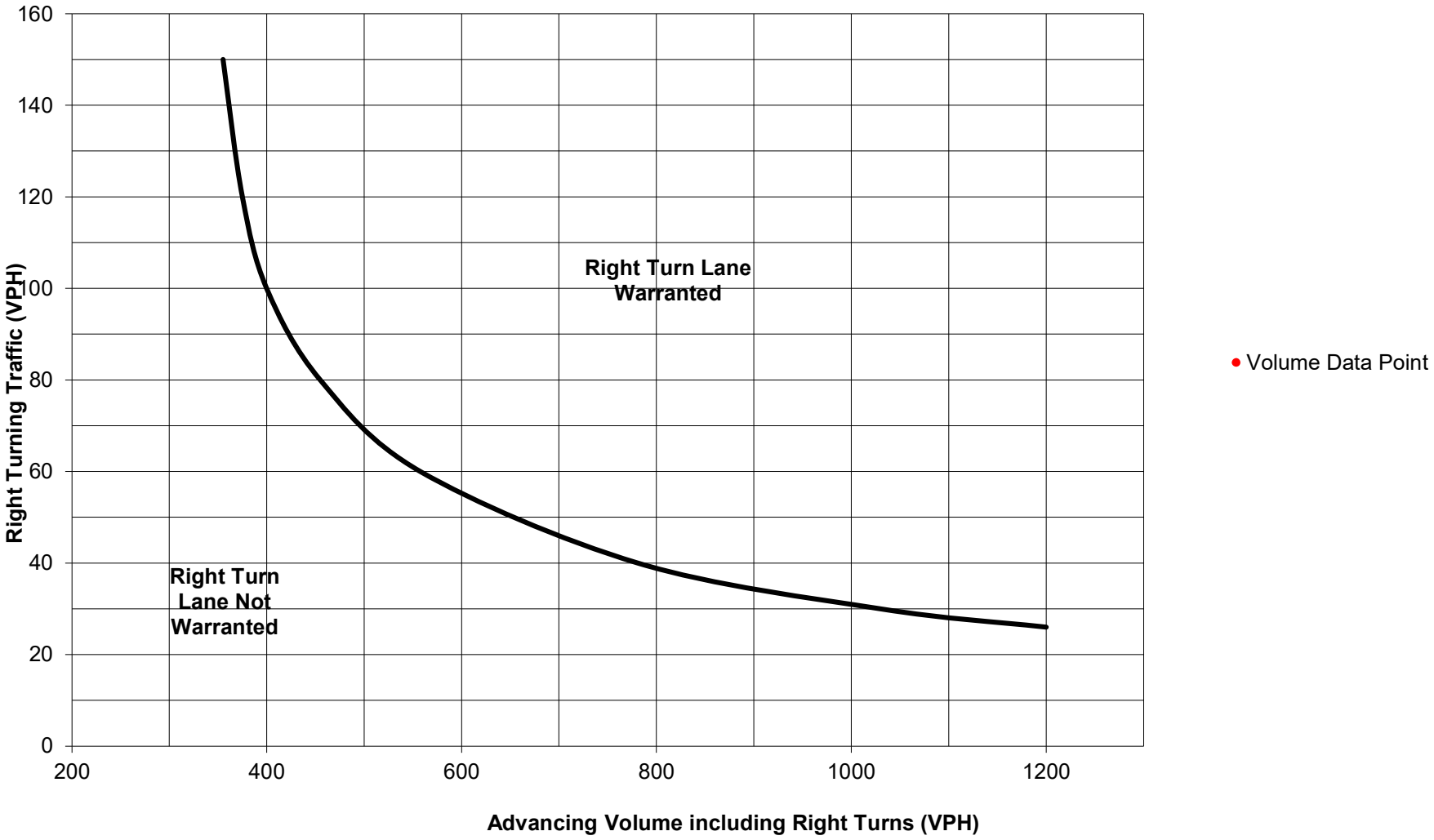
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)



Turn Lane Warrant and Length Analysis Workbook

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Municipality:	Whitemarsh Township	**Analysis Date:**	2/22/2022
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Intersection & Approach Description: Washington Street and East Site Access

Analysis Period:	2024 Build with Wash St Ext	**Number of Approach Lanes:**	1
Design Hour:	PM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		**Type of Analysis**
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	7	2.0%	8
	Through	-	62	2.0%	63
	Right				0
Opposing	Left				0
	Through	-	53	2.0%	54
	Right	Yes	25	2.0%	26

Advancing Volume:	71
Opposing Volume:	80
Left Turn Volume:	8
% Left Turns in Advancing Volume:	11.27%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left				N/A
	Through	-	53	2.0%	N/A
	Right	-	25	2.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 1

Warrant Met?: No

Right Turn Lane Warrant Findings

Applicable Warrant Figure: N/A

Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	8
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Left Turn Lane Storage Length:	N/A	Feet

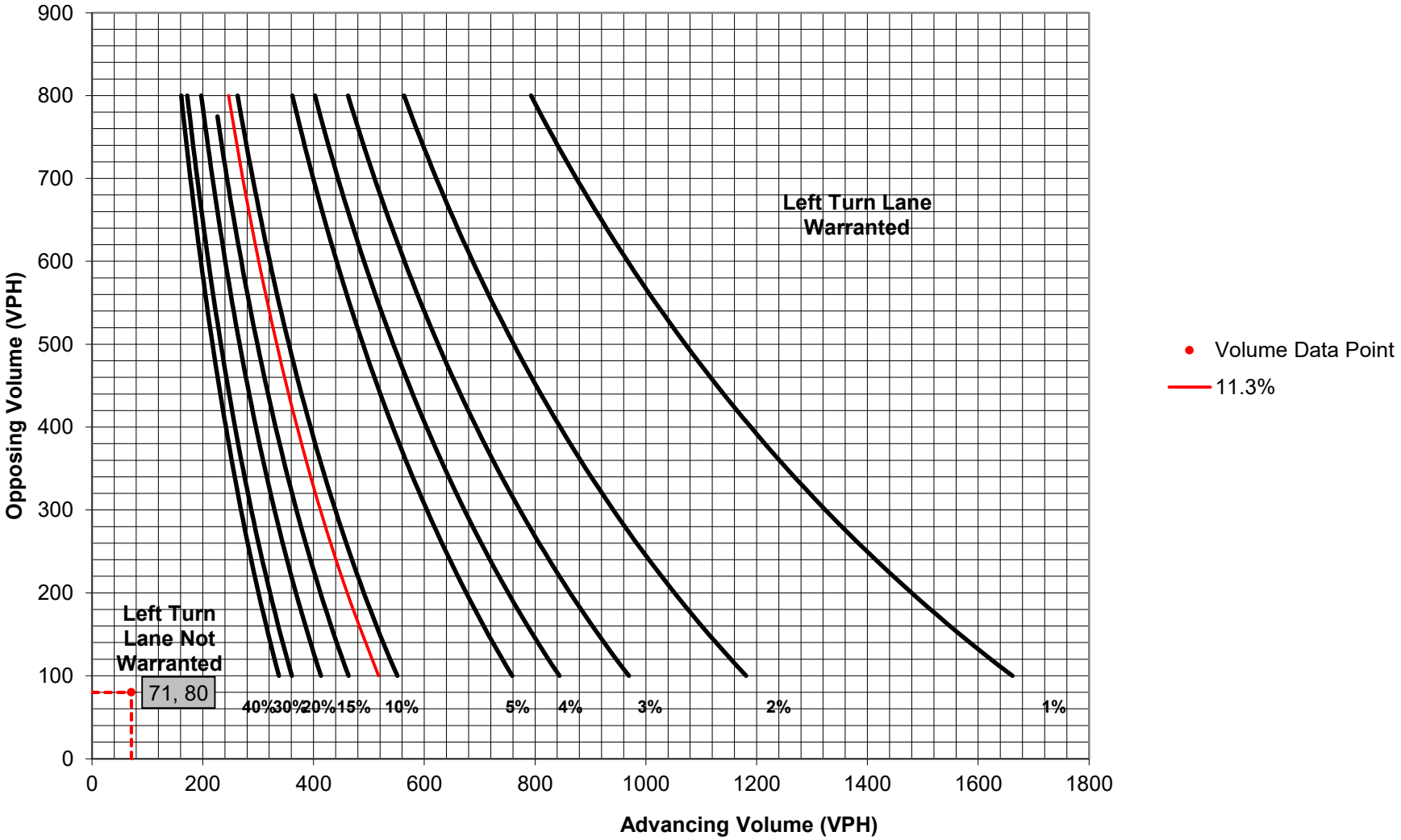
Additional Findings:

N/A

Additional Comments / Justifications:

Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)

(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Whitemarsh Township	**Analysis Date:**	2/22/2022
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PennDOT Engineering District:	6	**Checked By:**	JDG
		Agency/Company Name:	McMahon Associates, Inc.

Intersection & Approach Description: Washington Street and East Site Access

Analysis Period:	2024 Build with Wash St Ext	**Number of Approach Lanes:**	1
Design Hour:	PM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		**Type of Analysis**
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	7	2.0%	N/A
	Through	-	62	2.0%	N/A
	Right				N/A
Opposing	Left				N/A
	Through	-	53	2.0%	N/A
	Right	Yes	25	2.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left				0
	Through	-	53	2.0%	54
	Right	-	25	2.0%	26

Advancing Volume:	80
Right Turn Volume:	26

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: N/A

Warrant Met?: N/A

Right Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 9

Warrant Met?: No

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	26
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

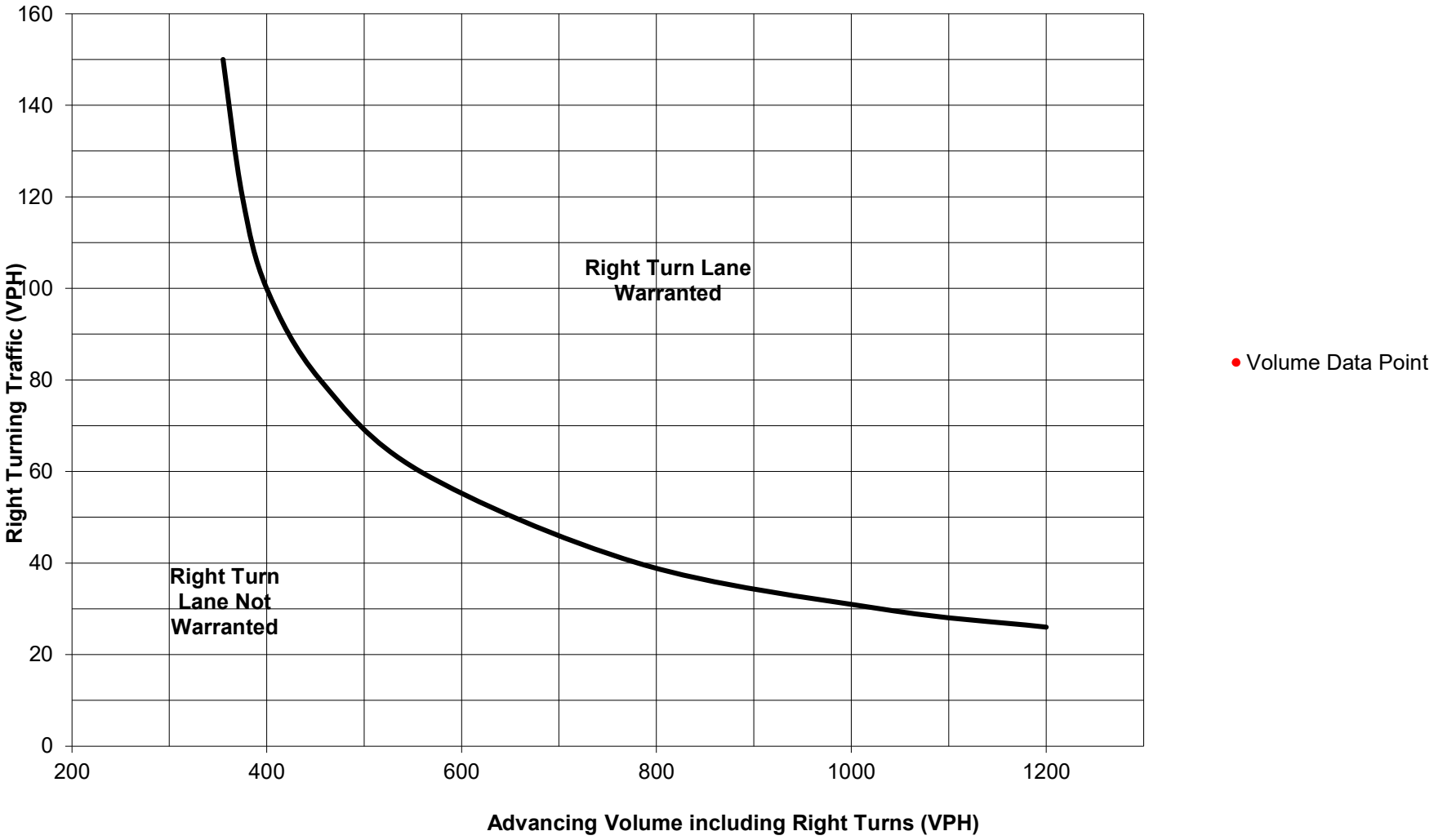
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

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PennDOT Engineering District:	6	**Checked By:**	JDG
		Agency/Company Name:	McMahon Associates, Inc.

Intersection & Approach Description: Washington Street and West Site Access

Analysis Period:	2024 Build with Wash St Ext	**Number of Approach Lanes:**	1
Design Hour:	AM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		**Type of Analysis**
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	3	2.0%	N/A
	Through	-	49	2.0%	N/A
	Right				N/A
Opposing	Left				N/A
	Through	-	67	2.0%	N/A
	Right	Yes	9	2.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left				0
	Through	-	67	2.0%	68
	Right	-	9	2.0%	10

Advancing Volume:	78
Right Turn Volume:	10

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: N/A

Warrant Met?: N/A

Right Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 9

Warrant Met?: No

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	10
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

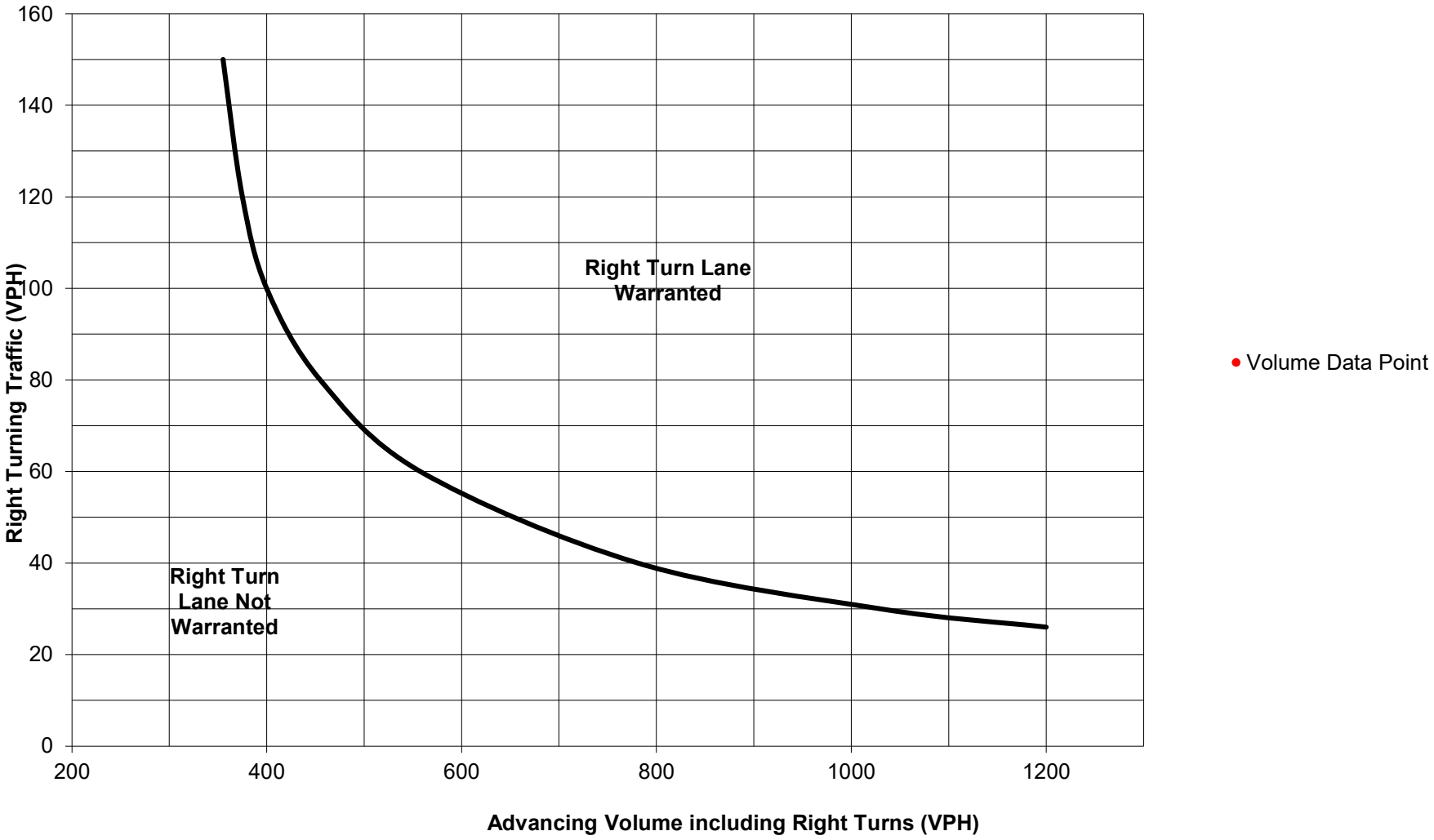
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Whitemarsh Township	**Analysis Date:**	2/22/2022
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Intersection & Approach Description: Washington Street and West Site Access

Analysis Period:	2024 Build with Wash St Ext	**Number of Approach Lanes:**	1
Design Hour:	AM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		**Type of Analysis**
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	3	2.0%	4
	Through	-	49	2.0%	50
	Right				0
Opposing	Left				0
	Through	-	67	2.0%	68
	Right	Yes	9	2.0%	10

Advancing Volume:	54
Opposing Volume:	78
Left Turn Volume:	4
% Left Turns in Advancing Volume:	7.41%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left				N/A
	Through	-	67	2.0%	N/A
	Right	-	9	2.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **No**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	4
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A:	**N/A**	**Feet**
Condition B:	**N/A**	**Feet**
Condition C:	**N/A**	**Feet**
Required Left Turn Lane Storage Length:	**N/A**	**Feet**

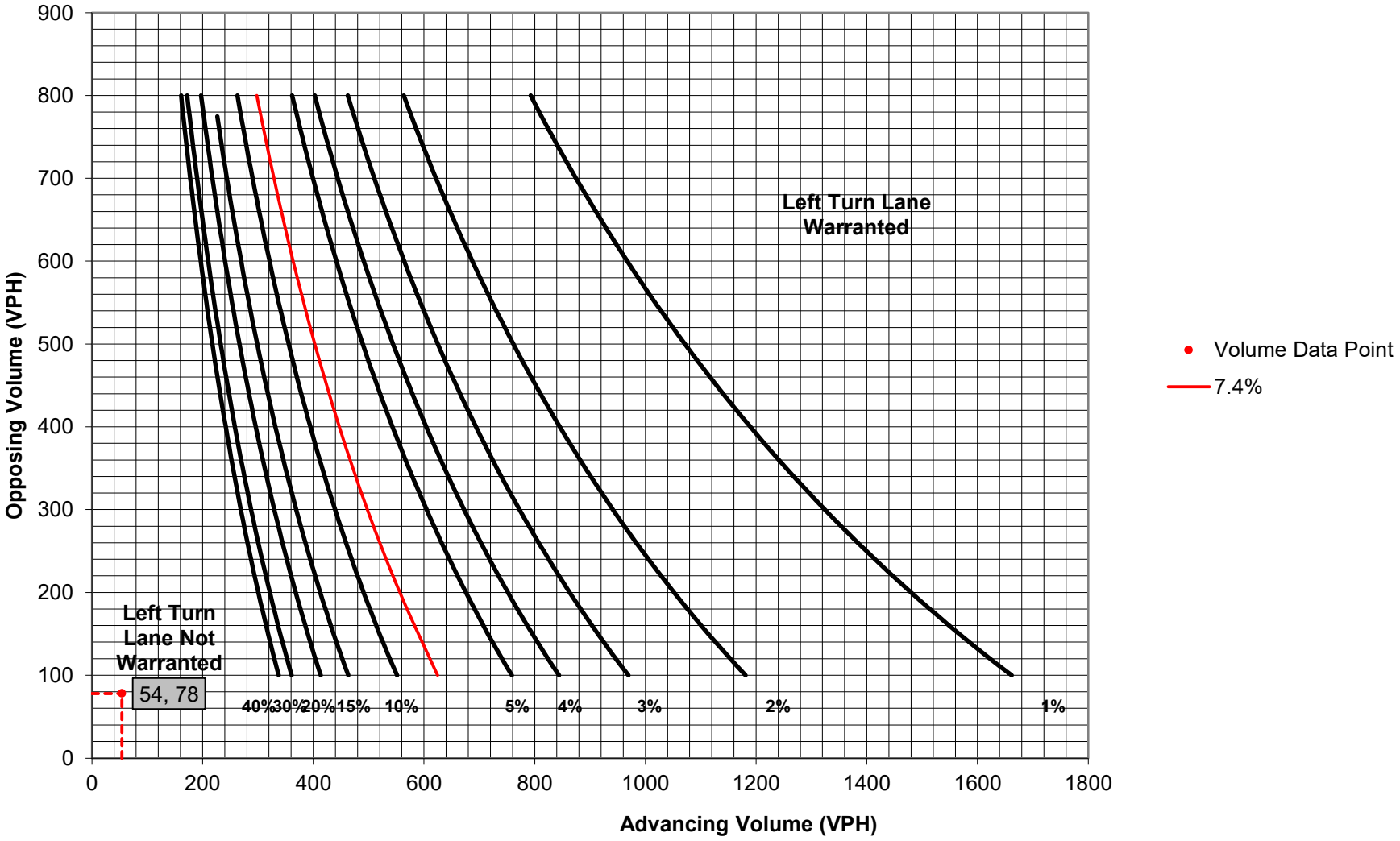
Additional Findings:

N/A

Additional Comments / Justifications:

Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)

(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

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Intersection & Approach Description: Washington Street and West Site Access

Analysis Period:	2024 Build with Wash St Ext	**Number of Approach Lanes:**	1
Design Hour:	PM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		**Type of Analysis**
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	7	2.0%	8
	Through	-	71	2.0%	72
	Right				0
Opposing	Left				0
	Through	-	73	2.0%	74
	Right	Yes	25	2.0%	26

Advancing Volume:	80
Opposing Volume:	100
Left Turn Volume:	8
% Left Turns in Advancing Volume:	10.00%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left				N/A
	Through	-	73	2.0%	N/A
	Right	-	25	2.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **No**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	8
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A:	**N/A**	**Feet**
Condition B:	**N/A**	**Feet**
Condition C:	**N/A**	**Feet**
Required Left Turn Lane Storage Length:	**N/A**	**Feet**

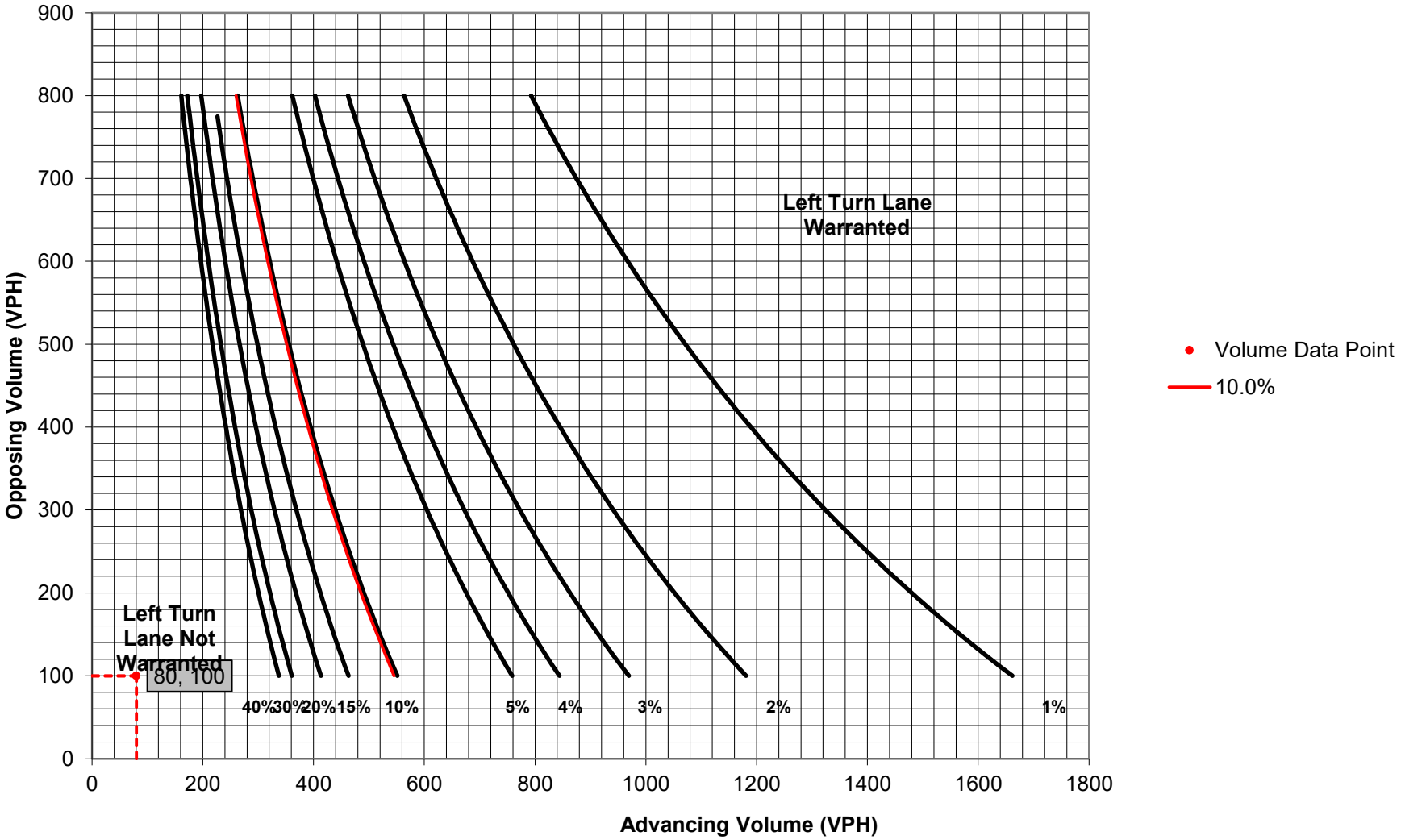
Additional Findings:

N/A

Additional Comments / Justifications:

Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)

(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

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Design Hour:	PM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		**Type of Analysis**
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	7	2.0%	N/A
	Through	-	71	2.0%	N/A
	Right				N/A
Opposing	Left				N/A
	Through	-	73	2.0%	N/A
	Right	Yes	25	2.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left				0
	Through	-	73	2.0%	74
	Right	-	25	2.0%	26

Advancing Volume:	100
Right Turn Volume:	26

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: N/A

Warrant Met?: N/A

Right Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 9

Warrant Met?: No

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	26
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

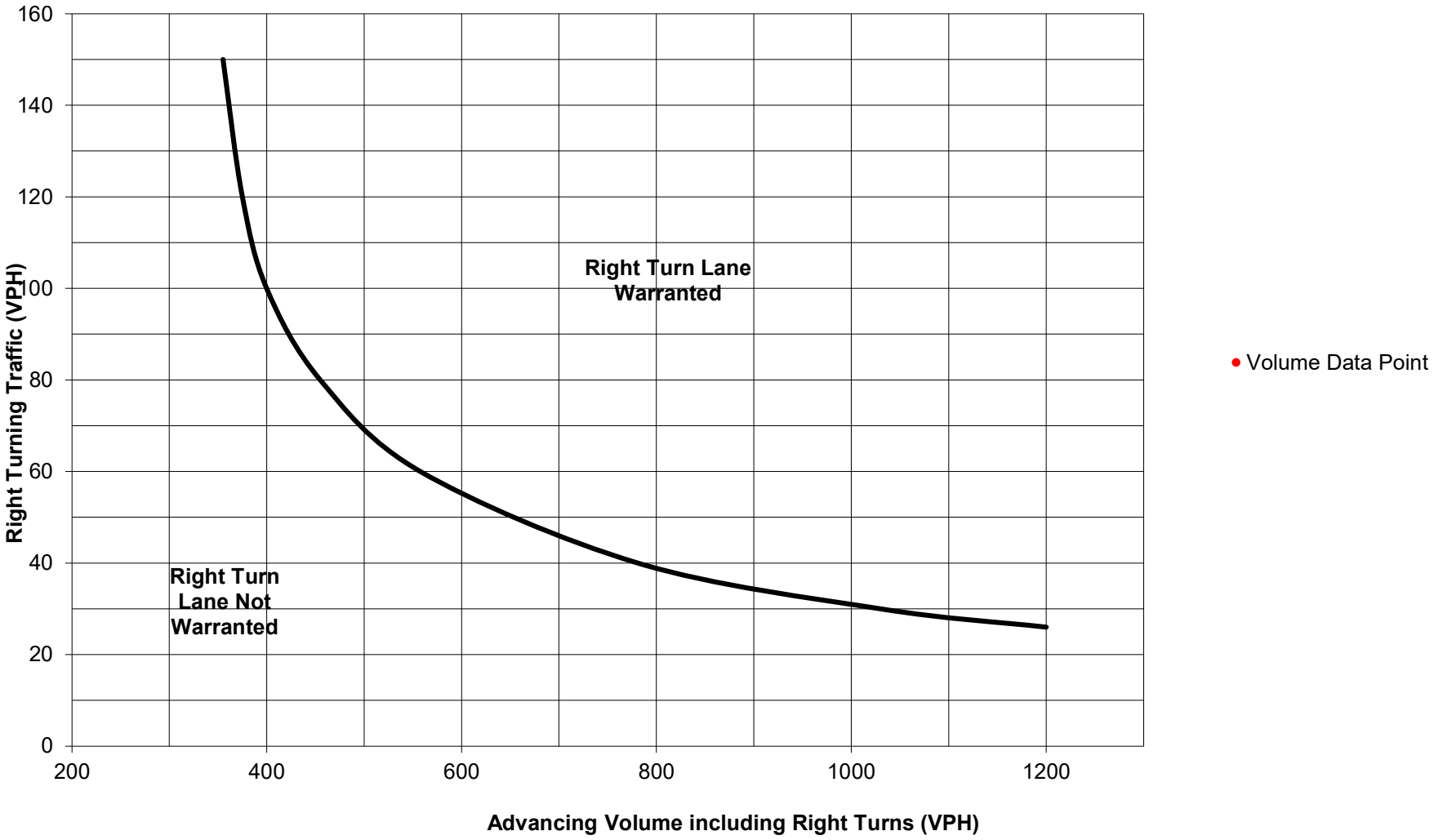
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)



Appendix E

Other Development Information

OTHER DEVELOPMENT TRIP GENERATION

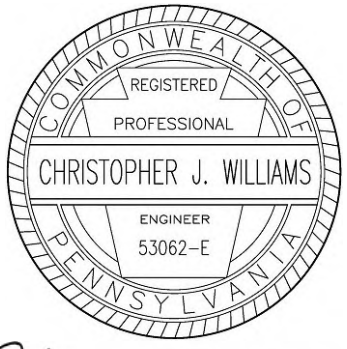
ITE LAND USE CODE	LAND USE NAME				SIZE	TRIP TYPE	DAILY TOTAL	WEEKDAY AM IN	WEEKDAY AM OUT	WEEKDAY AM TOTAL	WEEKDAY PM IN	WEEKDAY PM OUT	WEEKDAY PM TOTAL	INCLUDE PASS-BY?
215	901 Washington Street				75	Total	521	10	23	33	23	18	41	
	Daily	AM	PM	SAT	units	Pass-by	0	0	0	0	0	0	0	NO
Pass-by %	0%	0%	0%	0%		New	521	10	23	33	23	18	41	
221	401 / 433 Washington Street				588	Total	2806	58	194	252	142	92	234	
	Daily	AM	PM	SAT	units	Pass-by	0	0	0	0	0	0	0	NO
Pass-by %	0%	0%	0%	0%		New	2806	58	194	252	142	92	234	
221	Millenium Riverfront				305	Total	1408	28	95	123	72	47	119	
	Daily	AM	PM	SAT	units	Pass-by	282	6	19	25	14	9	23	NO
Modal Reduction %	20%	20%	20%	0%		New	1126	22	76	98	58	38	96	

Transportation Impact Study for the Millennium Apartments

Conshohocken Borough, Montgomery County, PA







Christopher J. Williams, P.E.
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Prepared for
Buccini Pollin Group

March 15, 2021
McMahon Project Number: 821078.11

Site Characteristics

This section presents the details regarding the proposed site, including the incremental increase in traffic volumes generated by the development during the peak hours, and the distribution of site traffic to the study area roadways.

Trip Generation

Traffic volumes generated by the proposed apartment development were prepared based on trip generation data compiled from numerous studies contained in the Institute of Transportation Engineers (ITE) publication, *Trip Generation, 10th Edition*. **Tables 2A and 2B** presents the anticipated vehicular trip generation for the proposed development.

Table 2A. Trip Generation Methodology

Land Use	Land Use Code	Daily	Weekday Morning Peak Hour		Weekday Afternoon Peak Hour	
			Method	Enter	Method	Enter
Multifamily Housing (Mid-Rise)	221	T = 5.45(X) - 1.75	Ln(T) = 0.98 Ln(X) - 0.98	26%	Ln(T) = 0.96 Ln(X) - 0.63	61%

X = Independent Variable (units) | Y = Independent Variable (units) | T = Trips

Table 2B. Vehicular Trip Generation

Land Use	Size	Daily	Weekday Morning Peak Hour			Weekday Afternoon Peak Hour		
			In	Out	Total	In	Out	Total
Apartments [1]	305 units	1,661	26	76	102	79	50	129
- Modal Split Reduction [2]		-332	-5	-15	-20	-16	-10	-26
External Vehicle Trips		1,329	21	61	82	63	40	103

(1) ITE Land Use Code 221 for Multifamily Housing (Mid-Rise).

(2) The modal split reduction assumes a fifteen percent reduction for transit and a five percent reduction for pedestrian and bicycle accommodations.

Furthermore, we understand this subject property previously received preliminary approval for 420,000 square feet of office space. As such, **Table 2C** below provides a comparison between the trips generated by the now proposed apartments and the previously approved office use on this site during the weekday daily and weekday commuter peak hours.

Appendix F

Traffic Volume Projections

WITHOUT WASHINGTON STREET EXTENSION

Harry Street & Elm Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND Elm Street			WESTBOUND Elm Street			NORTHBOUND Harry Street			SOUTHBOUND Harry Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	386	171	0	119	0	51	0	6	16	16	283
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**386**	**171**	**0**	**119**	**0**	**51**	**0**	**6**	**16**	**16**	**283**
Background Growth to 2024	0.66%	0	3	1	0	1	0	0	0	0	0	0	2
901 Washington Street	DIST IN		69%								9%		
	DIST OUT					(69%)							
	ASSIGN	0	7	0	0	16	0	0	0	0	1	0	0
401 / 433 Washington Street	DIST IN		69%								9%		
	DIST OUT					(69%)							
	ASSIGN	0	39	0	0	131	0	0	0	0	5	0	0
Millenium Riverfront	DIST IN		59%	10%							9%		
	DIST OUT					(35%)		(34%)					
	ASSIGN	0	12	2	0	27	0	26	0	0	2	0	0
Total Other Development New Trip Assignments		*0*	*58*	*2*	*0*	*174*	*0*	*26*	*0*	*0*	*8*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**447**	**174**	**0**	**294**	**0**	**77**	**0**	**6**	**24**	**16**	**285**
601 Washington Street	DIST IN		69%								9%		
	DIST OUT					(69%)							
	ASSIGN	0	16	0	0	57	0	0	0	0	2	0	0
Total New Site Trip Assignment		*0*	*16*	*0*	*0*	*57*	*0*	*0*	*0*	*0*	*2*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**463**	**174**	**0**	**351**	**0**	**77**	**0**	**6**	**26**	**16**	**285**

Harry Street & Elm Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Elm Street			WESTBOUND Elm Street			NORTHBOUND Harry Street			SOUTHBOUND Harry Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	508	61	1	116	0	144	0	16	20	8	268
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**508**	**61**	**1**	**116**	**0**	**144**	**0**	**16**	**20**	**8**	**268**
Background Growth to 2024	0.66%	0	3	0	0	1	0	1	0	0	0	0	2
901 Washington Street	DIST IN		69%								9%		
	DIST OUT					(69%)							
	ASSIGN	0	16	0	0	12	0	0	0	0	2	0	0
401 / 433 Washington Street	DIST IN		69%								9%		
	DIST OUT					(69%)							
	ASSIGN	0	97	0	0	62	0	0	0	0	12	0	0
Millenium Riverfront	DIST IN		59%	10%							9%		
	DIST OUT					(35%)		(34%)					
	ASSIGN	0	34	6	0	14	0	12	0	0	6	0	0
Total Other Development New Trip Assignments		*0*	*147*	*6*	*0*	*88*	*0*	*12*	*0*	*0*	*20*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**658**	**67**	**1**	**205**	**0**	**157**	**0**	**16**	**40**	**8**	**270**
601 Washington Street	DIST IN		69%								9%		
	DIST OUT					(69%)							
	ASSIGN	0	44	0	0	29	0	0	0	0	6	0	0
Total New Site Trip Assignment		*0*	*44*	*0*	*0*	*29*	*0*	*0*	*0*	*0*	*6*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**702**	**67**	**1**	**234**	**0**	**157**	**0**	**16**	**46**	**8**	**270**

Ash Street & Elm Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND Elm Street			WESTBOUND Elm Street			NORTHBOUND Ash Street			SOUTHBOUND Ash Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		14	321	43	0	0	0	121	10	2	0	0	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**14**	**321**	**43**	**0**	**0**	**0**	**121**	**10**	**2**	**0**	**0**	**0**
Background Growth to 2024	0.66%	0	2	0	0	0	0	1	0	0	0	0	0
901 Washington Street	DIST IN		52%	26%									
	DIST OUT							(69%)	(9%)				
	ASSIGN	0	5	3	0	0	0	16	2	0	0	0	0
401 / 433 Washington Street	DIST IN		52%	26%									
	DIST OUT							(69%)	(9%)				
	ASSIGN	0	29	15	0	0	0	131	17	0	0	0	0
Millenium Riverfront	DIST IN			68%									
	DIST OUT							(35%)	(9%)	(6%)			
	ASSIGN	0	0	14	0	0	0	27	6	5	0	0	0
Total Other Development New Trip Assignments		*0*	*34*	*32*	*0*	*0*	*0*	*174*	*25*	*5*	*0*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**14**	**357**	**75**	**0**	**0**	**0**	**296**	**35**	**7**	**0**	**0**	**0**
601 Washington Street	DIST IN		52%	26%									
	DIST OUT							(69%)	(9%)				
	ASSIGN	0	13	6	0	0	0	57	8	0	0	0	0
Total New Site Trip Assignment		*0*	*13*	*6*	*0*	*0*	*0*	*57*	*8*	*0*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**14**	**370**	**81**	**0**	**0**	**0**	**353**	**43**	**7**	**0**	**0**	**0**

Ash Street & Elm Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Elm Street			WESTBOUND Elm Street			NORTHBOUND Ash Street			SOUTHBOUND Ash Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		23	448	71	0	0	0	119	10	9	0	0	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**23**	**448**	**71**	**0**	**0**	**0**	**119**	**10**	**9**	**0**	**0**	**0**
Background Growth to 2024	0.66%	0	3	0	0	0	0	1	0	0	0	0	0
901 Washington Street	DIST IN		52%	26%									
	DIST OUT							(69%)	(9%)				
	ASSIGN	0	12	6	0	0	0	12	2	0	0	0	0
401 / 433 Washington Street	DIST IN		52%	26%									
	DIST OUT							(69%)	(9%)				
	ASSIGN	0	73	36	0	0	0	62	8	0	0	0	0
Millenium Riverfront	DIST IN			68%									
	DIST OUT							(35%)	(9%)	(6%)			
	ASSIGN	0	0	40	0	0	0	14	4	2	0	0	0
Total Other Development New Trip Assignments		*0*	*85*	*82*	*0*	*0*	*0*	*88*	*14*	*2*	*0*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**23**	**536**	**153**	**0**	**0**	**0**	**208**	**24**	**11**	**0**	**0**	**0**
601 Washington Street	DIST IN		52%	26%									
	DIST OUT							(69%)	(9%)				
	ASSIGN	0	33	17	0	0	0	29	4	0	0	0	0
Total New Site Trip Assignment		*0*	*33*	*17*	*0*	*0*	*0*	*29*	*4*	*0*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**23**	**569**	**170**	**0**	**0**	**0**	**237**	**28**	**11**	**0**	**0**	**0**

Cherry Street & Elm Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND Elm Street			WESTBOUND Elm Street			NORTHBOUND Cherry Street			SOUTHBOUND Cherry Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	325	10	0	0	0	0	0	43	11	69	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**325**	**10**	**0**	**0**	**0**	**0**	**0**	**43**	**11**	**69**	**0**
Background Growth to 2024	0.66%	0	2	0	0	0	0	0	0	0	0	0	0
901 Washington Street	DIST IN			26%								22%	
	DIST OUT									(22%)			
	ASSIGN	0	0	3	0	0	0	0	0	5	0	2	0
401 / 433 Washington Street	DIST IN			26%								22%	
	DIST OUT									(22%)			
	ASSIGN	0	0	14	0	0	0	0	0	42	0	13	0
Millenium Riverfront	DIST IN												
	DIST OUT		(22%)										
	ASSIGN	0	17	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*17*	*17*	*0*	*0*	*0*	*0*	*0*	*47*	*0*	*15*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**344**	**27**	**0**	**0**	**0**	**0**	**0**	**90**	**11**	**84**	**0**
601 Washington Street	DIST IN			26%								22%	
	DIST OUT									(22%)			
	ASSIGN	0	0	7	0	0	0	0	0	18	0	5	0
Total New Site Trip Assignment		*0*	*0*	*7*	*0*	*0*	*0*	*0*	*0*	*18*	*0*	*5*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**344**	**34**	**0**	**0**	**0**	**0**	**0**	**108**	**11**	**89**	**0**

Cherry Street & Elm Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Elm Street			WESTBOUND Elm Street			NORTHBOUND Cherry Street			SOUTHBOUND Cherry Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	459	8	0	0	0	0	0	63	26	55	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**459**	**8**	**0**	**0**	**0**	**0**	**0**	**63**	**26**	**55**	**0**
Background Growth to 2024	0.66%	0	3	0	0	0	0	0	0	0	0	0	0
901 Washington Street	DIST IN			26%								22%	
	DIST OUT									(22%)			
	ASSIGN	0	0	6	0	0	0	0	0	4	0	5	0
401 / 433 Washington Street	DIST IN			26%								22%	
	DIST OUT									(22%)			
	ASSIGN	0	0	36	0	0	0	0	0	20	0	31	0
Millenium Riverfront	DIST IN												
	DIST OUT		(22%)										
	ASSIGN	0	8	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*8*	*42*	*0*	*0*	*0*	*0*	*0*	*24*	*0*	*36*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**470**	**50**	**0**	**0**	**0**	**0**	**0**	**87**	**26**	**91**	**0**
601 Washington Street	DIST IN			26%								22%	
	DIST OUT									(22%)			
	ASSIGN	0	0	17	0	0	0	0	0	9	0	14	0
Total New Site Trip Assignment		*0*	*0*	*17*	*0*	*0*	*0*	*0*	*0*	*9*	*0*	*14*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**470**	**67**	**0**	**0**	**0**	**0**	**0**	**96**	**26**	**105**	**0**

Ash Street & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND Washington Street			WESTBOUND Washington Street			NORTHBOUND Ash Street			SOUTHBOUND Ash Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		3	11	5	8	49	128	0	5	0	16	13	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**3**	**11**	**5**	**8**	**49**	**128**	**0**	**5**	**0**	**16**	**13**	**0**
Background Growth to 2024	0.66%	0	0	0	0	0	1	0	0	0	0	0	0
901 Washington Street	DIST IN										26%		
	DIST OUT						(78%)						
	ASSIGN	0	0	0	0	0	18	0	0	0	3	0	0
401 / 433 Washington Street	DIST IN										26%		
	DIST OUT						(78%)						
	ASSIGN	0	0	0	0	0	148	0	0	0	15	0	0
Millenium Riverfront	DIST IN		5%	5%	11%						34%	34%	
	DIST OUT					(17%)	(25%)	(17%)	(25%)	(5%)			
	ASSIGN	0	1	1	2	13	19	13	19	4	7	7	0
Total Other Development New Trip Assignments		*0*	*1*	*1*	*2*	*13*	*185*	*13*	*19*	*4*	*25*	*7*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**3**	**12**	**6**	**10**	**62**	**314**	**13**	**24**	**4**	**41**	**20**	**0**
601 Washington Street	DIST IN										26%		
	DIST OUT						(78%)						
	ASSIGN	0	0	0	0	0	65	0	0	0	6	0	0
Total New Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*65*	*0*	*0*	*0*	*6*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**3**	**12**	**6**	**10**	**62**	**379**	**13**	**24**	**4**	**47**	**20**	**0**

Ash Street & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Washington Street			WESTBOUND Washington Street			NORTHBOUND Ash Street			SOUTHBOUND Ash Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		8	47	3	1	20	103	0	24	5	66	2	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**8**	**47**	**3**	**1**	**20**	**103**	**0**	**24**	**5**	**66**	**2**	**0**
Background Growth to 2024	0.66%	0	0	0	0	0	1	0	0	0	0	0	0
901 Washington Street	DIST IN										26%		
	DIST OUT						(78%)						
	ASSIGN	0	0	0	0	0	14	0	0	0	6	0	0
401 / 433 Washington Street	DIST IN										26%		
	DIST OUT						(78%)						
	ASSIGN	0	0	0	0	0	70	0	0	0	36	0	0
Millenium Riverfront	DIST IN		5%	5%	11%						34%	34%	
	DIST OUT					(17%)	(25%)	(17%)	(25%)	(5%)			
	ASSIGN	0	3	3	6	6	10	6	10	2	20	20	0
Total Other Development New Trip Assignments		*0*	*3*	*3*	*6*	*6*	*94*	*6*	*10*	*2*	*62*	*20*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**8**	**50**	**6**	**7**	**26**	**198**	**6**	**34**	**7**	**128**	**22**	**0**
601 Washington Street	DIST IN										26%		
	DIST OUT						(78%)						
	ASSIGN	0	0	0	0	0	33	0	0	0	17	0	0
Total New Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*33*	*0*	*0*	*0*	*17*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**8**	**50**	**6**	**7**	**26**	**231**	**6**	**34**	**7**	**145**	**22**	**0**

Poplar Street & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND Washington Street			WESTBOUND Washington Street			NORTHBOUND Poplar Street			SOUTHBOUND Poplar Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		2	17	6	0	133	1	27	0	2	1	1	20
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**2**	**17**	**6**	**0**	**133**	**1**	**27**	**0**	**2**	**1**	**1**	**20**
Background Growth to 2024	0.66%	0	0	0	0	1	0	0	0	0	0	0	0
901 Washington Street	DIST IN		26%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	3	0	0	18	0	0	0	0	2	0	0
401 / 433 Washington Street	DIST IN		26%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	15	0	0	148	0	0	0	0	15	0	0
Millenium Riverfront	DIST IN			39%								11%	11%
	DIST OUT	(5%)						(42%)	(11%)				
	ASSIGN	4	0	9	0	0	0	32	8	0	0	3	2
Total Other Development New Trip Assignments		*4*	*18*	*9*	*0*	*166*	*0*	*32*	*8*	*0*	*17*	*3*	*2*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**6**	**35**	**15**	**0**	**300**	**1**	**59**	**8**	**2**	**18**	**4**	**22**
601 Washington Street	DIST IN		26%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	6	0	0	65	0	0	0	0	6	0	0
Total New Site Trip Assignment		*0*	*6*	*0*	*0*	*65*	*0*	*0*	*0*	*0*	*6*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**6**	**41**	**15**	**0**	**365**	**1**	**59**	**8**	**2**	**24**	**4**	**22**

Poplar Street & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Washington Street			WESTBOUND Washington Street			NORTHBOUND Poplar Street			SOUTHBOUND Poplar Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		3	96	30	4	90	2	17	0	3	9	4	11
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**3**	**96**	**30**	**4**	**90**	**2**	**17**	**0**	**3**	**9**	**4**	**11**
Background Growth to 2024	0.66%	0	1	0	0	1	0	0	0	0	0	0	0
901 Washington Street	DIST IN		26%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	6	0	0	14	0	0	0	0	6	0	0
401 / 433 Washington Street	DIST IN		26%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	36	0	0	70	0	0	0	0	37	0	0
Millenium Riverfront	DIST IN			39%								11%	11%
	DIST OUT	(5%)						(42%)	(11%)				
	ASSIGN	2	0	23	0	0	0	16	4	0	0	6	6
Total Other Development New Trip Assignments		*2*	*42*	*23*	*0*	*84*	*0*	*16*	*4*	*0*	*43*	*6*	*6*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**5**	**139**	**53**	**4**	**175**	**2**	**33**	**4**	**3**	**52**	**10**	**17**
601 Washington Street	DIST IN		26%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	17	0	0	33	0	0	0	0	16	0	0
Total New Site Trip Assignment		*0*	*17*	*0*	*0*	*33*	*0*	*0*	*0*	*0*	*16*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**5**	**156**	**53**	**4**	**208**	**2**	**33**	**4**	**3**	**68**	**10**	**17**

Cherry Street & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND Washington Street			WESTBOUND Washington Street			NORTHBOUND Cherry Street			SOUTHBOUND Cherry Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		33	4	1	0	7	2	20	9	0	4	2	65
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**33**	**4**	**1**	**0**	**7**	**2**	**20**	**9**	**0**	**4**	**2**	**65**
Background Growth to 2024	0.66%	0	0	0	0	0	0	0	0	0	0	0	0
901 Washington Street	DIST IN		52%								48%		
	DIST OUT					(78%)	(22%)						
	ASSIGN	0	5	0	0	18	5	0	0	0	5	0	0
401 / 433 Washington Street	DIST IN		52%								48%		
	DIST OUT					(78%)	(22%)						
	ASSIGN	0	30	0	0	148	42	0	0	0	27	0	0
Millenium Riverfront	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*35*	*0*	*0*	*166*	*47*	*0*	*0*	*0*	*32*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**33**	**39**	**1**	**0**	**173**	**49**	**20**	**9**	**0**	**36**	**2**	**65**
601 Washington Street	DIST IN		52%								48%		
	DIST OUT					(78%)	(22%)						
	ASSIGN	0	12	0	0	65	18	0	0	0	12	0	0
Total New Site Trip Assignment		*0*	*12*	*0*	*0*	*65*	*18*	*0*	*0*	*0*	*12*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**33**	**51**	**1**	**0**	**238**	**67**	**20**	**9**	**0**	**48**	**2**	**65**

Cherry Street & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Washington Street			WESTBOUND Washington Street			NORTHBOUND Cherry Street			SOUTHBOUND Cherry Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		41	8	9	0	19	5	4	12	0	19	10	39
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**41**	**8**	**9**	**0**	**19**	**5**	**4**	**12**	**0**	**19**	**10**	**39**
Background Growth to 2024	0.66%	0	0	0	0	0	0	0	0	0	0	0	0
901 Washington Street	DIST IN		52%								48%		
	DIST OUT					(78%)	(22%)						
	ASSIGN	0	12	0	0	14	4	0	0	0	11	0	0
401 / 433 Washington Street	DIST IN		52%								48%		
	DIST OUT					(78%)	(22%)						
	ASSIGN	0	73	0	0	70	20	0	0	0	67	0	0
Millenium Riverfront	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*85*	*0*	*0*	*84*	*24*	*0*	*0*	*0*	*78*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**41**	**93**	**9**	**0**	**103**	**29**	**4**	**12**	**0**	**97**	**10**	**39**
601 Washington Street	DIST IN		52%								48%		
	DIST OUT					(78%)	(22%)						
	ASSIGN	0	33	0	0	33	9	0	0	0	31	0	0
Total New Site Trip Assignment		*0*	*33*	*0*	*0*	*33*	*9*	*0*	*0*	*0*	*31*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**41**	**126**	**9**	**0**	**136**	**38**	**4**	**12**	**0**	**128**	**10**	**39**

West Site Access & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND Washington Street			WESTBOUND Washington Street			NORTHBOUND West Site Access			SOUTHBOUND West Site Access		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	8	0	0	9	0	0	0	0	0	0	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**8**	**0**	**0**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Background Growth to 2024	0.66%	0	0	0	0	0	0	0	0	0	0	0	0
901 Washington Street	DIST IN		100%										
	DIST OUT					(100%)							
	ASSIGN	0	10	0	0	23	0	0	0	0	0	0	0
401 / 433 Washington Street	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Millenium Riverfront	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*10*	*0*	*0*	*23*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**18**	**0**	**0**	**32**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
601 Washington Street	DIST IN		50%	50%									
	DIST OUT					(50%)		(50%)					
	ASSIGN	0	12	12	0	41	0	42	0	0	0	0	0
Total New Site Trip Assignment		*0*	*12*	*12*	*0*	*41*	*0*	*42*	*0*	*0*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**30**	**12**	**0**	**73**	**0**	**42**	**0**	**0**	**0**	**0**	**0**

West Site Access & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Washington Street			WESTBOUND Washington Street			NORTHBOUND West Site Access			SOUTHBOUND West Site Access		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	27	0	0	24	0	0	0	0	0	0	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**27**	**0**	**0**	**24**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Background Growth to 2024	0.66%	0	0	0	0	0	0	0	0	0	0	0	0
901 Washington Street	DIST IN		100%										
	DIST OUT					(100%)							
	ASSIGN	0	23	0	0	18	0	0	0	0	0	0	0
401 / 433 Washington Street	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Millenium Riverfront	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*23*	*0*	*0*	*18*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**50**	**0**	**0**	**42**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
601 Washington Street	DIST IN		50%	50%									
	DIST OUT					(50%)		(50%)					
	ASSIGN	0	32	32	0	21	0	21	0	0	0	0	0
Total New Site Trip Assignment		*0*	*32*	*32*	*0*	*21*	*0*	*21*	*0*	*0*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**82**	**32**	**0**	**63**	**0**	**21**	**0**	**0**	**0**	**0**	**0**

East Site Access & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND Washington Street			WESTBOUND Washington Street			NORTHBOUND East Site Access			SOUTHBOUND East Site Access		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	8	0	0	9	0	0	0	0	0	0	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**8**	**0**	**0**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Background Growth to 2024	0.66%	0	0	0	0	0	0	0	0	0	0	0	0
901 Washington Street	DIST IN		100%										
	DIST OUT					(100%)							
	ASSIGN	0	10	0	0	23	0	0	0	0	0	0	0
401 / 433 Washington Street	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Millenium Riverfront	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*10*	*0*	*0*	*23*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**18**	**0**	**0**	**32**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
601 Washington Street	DIST IN			50%									
	DIST OUT							(50%)					
	ASSIGN	0	0	12	0	0	0	41	0	0	0	0	0
Total New Site Trip Assignment		*0*	*0*	*12*	*0*	*0*	*0*	*41*	*0*	*0*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**18**	**12**	**0**	**32**	**0**	**41**	**0**	**0**	**0**	**0**	**0**

East Site Access & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Washington Street			WESTBOUND Washington Street			NORTHBOUND East Site Access			SOUTHBOUND East Site Access		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	27	0	0	24	0	0	0	0	0	0	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**27**	**0**	**0**	**24**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Background Growth to 2024	0.66%	0	0	0	0	0	0	0	0	0	0	0	0
901 Washington Street	DIST IN		100%										
	DIST OUT					(100%)							
	ASSIGN	0	23	0	0	18	0	0	0	0	0	0	0
401 / 433 Washington Street	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Millenium Riverfront	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*23*	*0*	*0*	*18*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**50**	**0**	**0**	**42**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
601 Washington Street	DIST IN			50%									
	DIST OUT							(50%)					
	ASSIGN	0	0	32	0	0	0	21	0	0	0	0	0
Total New Site Trip Assignment		*0*	*0*	*32*	*0*	*0*	*0*	*21*	*0*	*0*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**50**	**32**	**0**	**42**	**0**	**21**	**0**	**0**	**0**	**0**	**0**

Lee Street / Spring Mill Avenue & Hector Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND		
		Hector Street			Hector Street			Lee Street			Spring Mill Avenue		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	387	5	21	442	19	14	1	7	25	1	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**387**	**5**	**21**	**442**	**19**	**14**	**1**	**7**	**25**	**1**	**0**
Background Growth to 2024	0.66%	0	3	0	0	3	0	0	0	0	0	0	0
901 Washington Street	DIST IN					22%							
	DIST OUT		(22%)										
	ASSIGN	0	5	0	0	2	0	0	0	0	0	0	0
401 / 433 Washington Street	DIST IN					22%							
	DIST OUT		(22%)										
	ASSIGN	0	42	0	0	13	0	0	0	0	0	0	0
Millenium Riverfront	DIST IN					22%							
	DIST OUT		(22%)										
	ASSIGN	0	17	0	0	5	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*64*	*0*	*0*	*20*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**454**	**5**	**21**	**465**	**19**	**14**	**1**	**7**	**25**	**1**	**0**
601 Washington Street	DIST IN					22%							
	DIST OUT		(22%)										
	ASSIGN	0	18	0	0	5	0	0	0	0	0	0	0
Total New Site Trip Assignment		*0*	*18*	*0*	*0*	*5*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**472**	**5**	**21**	**470**	**19**	**14**	**1**	**7**	**25**	**1**	**0**

Lee Street / Spring Mill Avenue & Hector Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Hector Street			WESTBOUND Hector Street			NORTHBOUND Lee Street			SOUTHBOUND Spring Mill Avenue		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		3	546	12	9	373	14	10	1	12	50	4	3
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**3**	**546**	**12**	**9**	**373**	**14**	**10**	**1**	**12**	**50**	**4**	**3**
Background Growth to 2024	0.66%	0	4	0	0	2	0	0	0	0	0	0	0
901 Washington Street	DIST IN					22%							
	DIST OUT		(22%)										
	ASSIGN	0	4	0	0	5	0	0	0	0	0	0	0
401 / 433 Washington Street	DIST IN					22%							
	DIST OUT		(22%)										
	ASSIGN	0	20	0	0	31	0	0	0	0	0	0	0
Millenium Riverfront	DIST IN					22%							
	DIST OUT		(22%)										
	ASSIGN	0	8	0	0	12	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*32*	*0*	*0*	*48*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**3**	**582**	**12**	**9**	**423**	**14**	**10**	**1**	**12**	**50**	**4**	**3**
601 Washington Street	DIST IN					22%							
	DIST OUT		(22%)										
	ASSIGN	0	9	0	0	14	0	0	0	0	0	0	0
Total New Site Trip Assignment		*0*	*9*	*0*	*0*	*14*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**3**	**591**	**12**	**9**	**437**	**14**	**10**	**1**	**12**	**50**	**4**	**3**

Station Avenue / North Lane & Hector Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND Hector Street			WESTBOUND Hector Street			NORTHBOUND Station Avenue			SOUTHBOUND North Lane		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		69	344	10	10	441	55	5	18	3	67	11	50
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**69**	**344**	**10**	**10**	**441**	**55**	**5**	**18**	**3**	**67**	**11**	**50**
Background Growth to 2024	0.66%	0	2	0	0	3	0	0	0	0	0	0	0
901 Washington Street	DIST IN					19%							3%
	DIST OUT	(3%)	(19%)										
	ASSIGN	1	4	0	0	2	0	0	0	0	0	0	0
401 / 433 Washington Street	DIST IN					19%							3%
	DIST OUT	(3%)	(19%)										
	ASSIGN	6	36	0	0	11	0	0	0	0	0	0	2
Millenium Riverfront	DIST IN					19%							3%
	DIST OUT	(3%)	(19%)										
	ASSIGN	3	14	0	0	4	0	0	0	0	0	0	1
Total Other Development New Trip Assignments		*10*	*54*	*0*	*0*	*17*	*0*	*0*	*0*	*0*	*0*	*0*	*3*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**79**	**400**	**10**	**10**	**461**	**55**	**5**	**18**	**3**	**67**	**11**	**53**
601 Washington Street	DIST IN					19%							3%
	DIST OUT	(3%)	(19%)										
	ASSIGN	2	16	0	0	5	0	0	0	0	0	0	0
Total New Site Trip Assignment		*2*	*16*	*0*	*0*	*5*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**81**	**416**	**10**	**10**	**466**	**55**	**5**	**18**	**3**	**67**	**11**	**53**

Station Avenue / North Lane & Hector Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Hector Street			WESTBOUND Hector Street			NORTHBOUND Station Avenue			SOUTHBOUND North Lane		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		52	560	8	18	321	54	5	19	9	96	30	55
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**52**	**560**	**8**	**18**	**321**	**54**	**5**	**19**	**9**	**96**	**30**	**55**
Background Growth to 2024	0.66%	0	4	0	0	2	0	0	0	0	1	0	0
901 Washington Street	DIST IN					19%							3%
	DIST OUT	(3%)	(19%)										
	ASSIGN	1	3	0	0	4	0	0	0	0	0	0	1
401 / 433 Washington Street	DIST IN					19%							3%
	DIST OUT	(3%)	(19%)										
	ASSIGN	3	17	0	0	27	0	0	0	0	0	0	4
Millenium Riverfront	DIST IN					19%							3%
	DIST OUT	(3%)	(19%)										
	ASSIGN	1	7	0	0	10	0	0	0	0	0	0	2
Total Other Development New Trip Assignments		*5*	*27*	*0*	*0*	*41*	*0*	*0*	*0*	*0*	*0*	*0*	*7*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**57**	**591**	**8**	**18**	**364**	**54**	**5**	**19**	**9**	**97**	**30**	**62**
601 Washington Street	DIST IN					19%							3%
	DIST OUT	(3%)	(19%)										
	ASSIGN	1	8	0	0	12	0	0	0	0	0	0	2
Total New Site Trip Assignment		*1*	*8*	*0*	*0*	*12*	*0*	*0*	*0*	*0*	*0*	*0*	*2*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**58**	**599**	**8**	**18**	**376**	**54**	**5**	**19**	**9**	**97**	**30**	**64**

WITH WASHINGTON STREET EXTENSION

Harry Street & Elm Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND Elm Street			WESTBOUND Elm Street			NORTHBOUND Harry Street			SOUTHBOUND Harry Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	386	171	0	119	0	51	0	6	16	16	283
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**386**	**171**	**0**	**119**	**0**	**51**	**0**	**6**	**16**	**16**	**283**
Background Growth to 2024	0.66%	0	3	1	0	1	0	0	0	0	0	0	2
901 Washington Street	DIST IN		69%								9%		
	DIST OUT					(69%)							
	ASSIGN	0	7	0	0	16	0	0	0	0	1	0	0
401 / 433 Washington Street	DIST IN		69%								9%		
	DIST OUT					(69%)							
	ASSIGN	0	39	0	0	131	0	0	0	0	5	0	0
Millenium Riverfront	DIST IN		59%	10%							9%		
	DIST OUT					(35%)		(34%)					
	ASSIGN	0	12	2	0	27	0	26	0	0	2	0	0
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*58*	*2*	*0*	*174*	*0*	*26*	*0*	*0*	*8*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**447**	**174**	**0**	**294**	**0**	**77**	**0**	**6**	**24**	**16**	**285**
601 Washington Street	DIST IN		69%								9%		
	DIST OUT					(69%)							
	ASSIGN	0	16	0	0	57	0	0	0	0	3	0	0
Total New Site Trip Assignment		*0*	*16*	*0*	*0*	*57*	*0*	*0*	*0*	*0*	*3*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**463**	**174**	**0**	**351**	**0**	**77**	**0**	**6**	**27**	**16**	**285**

Harry Street & Elm Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Elm Street			WESTBOUND Elm Street			NORTHBOUND Harry Street			SOUTHBOUND Harry Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	508	61	1	116	0	144	0	16	20	8	268
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**508**	**61**	**1**	**116**	**0**	**144**	**0**	**16**	**20**	**8**	**268**
Background Growth to 2024	0.66%	0	3	0	0	1	0	1	0	0	0	0	2
901 Washington Street	DIST IN		69%								9%		
	DIST OUT					(69%)							
	ASSIGN	0	16	0	0	12	0	0	0	0	2	0	0
401 / 433 Washington Street	DIST IN		69%								9%		
	DIST OUT					(69%)							
	ASSIGN	0	97	0	0	62	0	0	0	0	12	0	0
Millenium Riverfront	DIST IN		59%	10%							9%		
	DIST OUT					(35%)		(34%)					
	ASSIGN	0	34	6	0	14	0	12	0	0	6	0	0
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*147*	*6*	*0*	*88*	*0*	*12*	*0*	*0*	*20*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**658**	**67**	**1**	**205**	**0**	**157**	**0**	**16**	**40**	**8**	**270**
601 Washington Street	DIST IN		69%								9%		
	DIST OUT					(69%)							
	ASSIGN	0	44	0	0	29	0	0	0	0	6	0	0
Total New Site Trip Assignment		*0*	*44*	*0*	*0*	*29*	*0*	*0*	*0*	*0*	*6*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**702**	**67**	**1**	**234**	**0**	**157**	**0**	**16**	**46**	**8**	**270**

Ash Street & Elm Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND Elm Street			WESTBOUND Elm Street			NORTHBOUND Ash Street			SOUTHBOUND Ash Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		14	321	43	0	0	0	121	10	2	0	0	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**14**	**321**	**43**	**0**	**0**	**0**	**121**	**10**	**2**	**0**	**0**	**0**
Background Growth to 2024	0.66%	0	2	0	0	0	0	1	0	0	0	0	0
901 Washington Street	DIST IN		52%	26%									
	DIST OUT							(69%)	(9%)				
	ASSIGN	0	5	3	0	0	0	16	2	0	0	0	0
401 / 433 Washington Street	DIST IN		52%	26%									
	DIST OUT							(69%)	(9%)				
	ASSIGN	0	29	15	0	0	0	131	17	0	0	0	0
Millenium Riverfront	DIST IN			68%									
	DIST OUT							(35%)	(9%)	(6%)			
	ASSIGN	0	0	14	0	0	0	27	6	5	0	0	0
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*34*	*32*	*0*	*0*	*0*	*174*	*25*	*5*	*0*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**14**	**357**	**75**	**0**	**0**	**0**	**296**	**35**	**7**	**0**	**0**	**0**
601 Washington Street	DIST IN		52%	26%									
	DIST OUT							(69%)	(9%)				
	ASSIGN	0	13	6	0	0	0	57	8	0	0	0	0
Total New Site Trip Assignment		*0*	*13*	*6*	*0*	*0*	*0*	*57*	*8*	*0*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**14**	**370**	**81**	**0**	**0**	**0**	**353**	**43**	**7**	**0**	**0**	**0**

Ash Street & Elm Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Elm Street			WESTBOUND Elm Street			NORTHBOUND Ash Street			SOUTHBOUND Ash Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		23	448	71	0	0	0	119	10	9	0	0	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**23**	**448**	**71**	**0**	**0**	**0**	**119**	**10**	**9**	**0**	**0**	**0**
Background Growth to 2024	0.66%	0	3	0	0	0	0	1	0	0	0	0	0
901 Washington Street	DIST IN		52%	26%									
	DIST OUT							(69%)	(9%)				
	ASSIGN	0	12	6	0	0	0	12	2	0	0	0	0
401 / 433 Washington Street	DIST IN		52%	26%									
	DIST OUT							(69%)	(9%)				
	ASSIGN	0	73	36	0	0	0	62	8	0	0	0	0
Millenium Riverfront	DIST IN			68%									
	DIST OUT							(35%)	(9%)	(6%)			
	ASSIGN	0	0	40	0	0	0	14	4	2	0	0	0
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*85*	*82*	*0*	*0*	*0*	*88*	*14*	*2*	*0*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**23**	**536**	**153**	**0**	**0**	**0**	**208**	**24**	**11**	**0**	**0**	**0**
601 Washington Street	DIST IN		52%	26%									
	DIST OUT							(69%)	(9%)				
	ASSIGN	0	33	17	0	0	0	29	3	0	0	0	0
Total New Site Trip Assignment		*0*	*33*	*17*	*0*	*0*	*0*	*29*	*3*	*0*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**23**	**569**	**170**	**0**	**0**	**0**	**237**	**27**	**11**	**0**	**0**	**0**

Cherry Street & Elm Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND Elm Street			WESTBOUND Elm Street			NORTHBOUND Cherry Street			SOUTHBOUND Cherry Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	325	10	0	0	0	0	0	43	11	69	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**325**	**10**	**0**	**0**	**0**	**0**	**0**	**43**	**11**	**69**	**0**
Background Growth to 2024	0.66%	0	2	0	0	0	0	0	0	0	0	0	0
901 Washington Street	DIST IN			26%									
	DIST OUT												
	ASSIGN	0	0	3	0	0	0	0	0	0	0	0	0
401 / 433 Washington Street	DIST IN			26%									
	DIST OUT												
	ASSIGN	0	0	14	0	0	0	0	0	0	0	0	0
Millenium Riverfront	DIST IN												
	DIST OUT		(22%)										
	ASSIGN	0	17	0	0	0	0	0	0	0	0	0	0
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	-8	0	-16	0
Total Other Development New Trip Assignments		*0*	*17*	*17*	*0*	*0*	*0*	*0*	*0*	*-8*	*0*	*-16*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**344**	**27**	**0**	**0**	**0**	**0**	**0**	**35**	**11**	**53**	**0**
601 Washington Street	DIST IN			26%									
	DIST OUT												
	ASSIGN	0	0	6	0	0	0	0	0	0	0	0	0
Total New Site Trip Assignment		*0*	*0*	*6*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**344**	**33**	**0**	**0**	**0**	**0**	**0**	**35**	**11**	**53**	**0**

Cherry Street & Elm Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Elm Street			WESTBOUND Elm Street			NORTHBOUND Cherry Street			SOUTHBOUND Cherry Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	459	8	0	0	0	0	0	63	26	55	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**459**	**8**	**0**	**0**	**0**	**0**	**0**	**63**	**26**	**55**	**0**
Background Growth to 2024	0.66%	0	3	0	0	0	0	0	0	0	0	0	0
901 Washington Street	DIST IN			26%									
	DIST OUT												
	ASSIGN	0	0	6	0	0	0	0	0	0	0	0	0
401 / 433 Washington Street	DIST IN			26%									
	DIST OUT												
	ASSIGN	0	0	36	0	0	0	0	0	0	0	0	0
Millenium Riverfront	DIST IN												
	DIST OUT		(22%)										
	ASSIGN	0	8	0	0	0	0	0	0	0	0	0	0
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	-10	0	-10	0
Total Other Development New Trip Assignments		*0*	*8*	*42*	*0*	*0*	*0*	*0*	*0*	*-10*	*0*	*-10*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**470**	**50**	**0**	**0**	**0**	**0**	**0**	**53**	**26**	**45**	**0**
601 Washington Street	DIST IN			26%									
	DIST OUT												
	ASSIGN	0	0	17	0	0	0	0	0	0	0	0	0
Total New Site Trip Assignment		*0*	*0*	*17*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**470**	**67**	**0**	**0**	**0**	**0**	**0**	**53**	**26**	**45**	**0**

Ash Street & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND Washington Street			WESTBOUND Washington Street			NORTHBOUND Ash Street			SOUTHBOUND Ash Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		3	11	5	8	49	128	0	5	0	16	13	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**3**	**11**	**5**	**8**	**49**	**128**	**0**	**5**	**0**	**16**	**13**	**0**
Background Growth to 2024	0.66%	0	0	0	0	0	1	0	0	0	0	0	0
901 Washington Street	DIST IN										26%		
	DIST OUT						(78%)						
	ASSIGN	0	0	0	0	0	18	0	0	0	3	0	0
401 / 433 Washington Street	DIST IN										26%		
	DIST OUT						(78%)						
	ASSIGN	0	0	0	0	0	148	0	0	0	15	0	0
Millenium Riverfront	DIST IN		5%	5%	11%						34%	34%	
	DIST OUT					(17%)	(25%)	(17%)	(25%)	(5%)			
	ASSIGN	0	1	1	2	13	19	13	19	4	7	7	0
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*1*	*1*	*2*	*13*	*185*	*13*	*19*	*4*	*25*	*7*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**3**	**12**	**6**	**10**	**62**	**314**	**13**	**24**	**4**	**41**	**20**	**0**
601 Washington Street	DIST IN										26%		
	DIST OUT						(78%)						
	ASSIGN	0	0	0	0	0	65	0	0	0	6	0	0
Total New Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*65*	*0*	*0*	*0*	*6*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**3**	**12**	**6**	**10**	**62**	**379**	**13**	**24**	**4**	**47**	**20**	**0**

Ash Street & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Washington Street			WESTBOUND Washington Street			NORTHBOUND Ash Street			SOUTHBOUND Ash Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		8	47	3	1	20	103	0	24	5	66	2	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**8**	**47**	**3**	**1**	**20**	**103**	**0**	**24**	**5**	**66**	**2**	**0**
Background Growth to 2024	0.66%	0	0	0	0	0	1	0	0	0	0	0	0
901 Washington Street	DIST IN										26%		
	DIST OUT						(78%)						
	ASSIGN	0	0	0	0	0	14	0	0	0	6	0	0
401 / 433 Washington Street	DIST IN										26%		
	DIST OUT						(78%)						
	ASSIGN	0	0	0	0	0	70	0	0	0	36	0	0
Millenium Riverfront	DIST IN		5%	5%	11%						34%	34%	
	DIST OUT					(17%)	(25%)	(17%)	(25%)	(5%)			
	ASSIGN	0	3	3	6	6	10	6	10	2	20	20	0
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*3*	*3*	*6*	*6*	*94*	*6*	*10*	*2*	*62*	*20*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**8**	**50**	**6**	**7**	**26**	**198**	**6**	**34**	**7**	**128**	**22**	**0**
601 Washington Street	DIST IN										26%		
	DIST OUT						(78%)						
	ASSIGN	0	0	0	0	0	32	0	0	0	17	0	0
Total New Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*32*	*0*	*0*	*0*	*17*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**8**	**50**	**6**	**7**	**26**	**230**	**6**	**34**	**7**	**145**	**22**	**0**

Poplar Street & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND Washington Street			WESTBOUND Washington Street			NORTHBOUND Poplar Street			SOUTHBOUND Poplar Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		2	17	6	0	133	1	27	0	2	1	1	20
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**2**	**17**	**6**	**0**	**133**	**1**	**27**	**0**	**2**	**1**	**1**	**20**
Background Growth to 2024	0.66%	0	0	0	0	1	0	0	0	0	0	0	0
901 Washington Street	DIST IN		26%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	3	0	0	18	0	0	0	0	2	0	0
401 / 433 Washington Street	DIST IN		26%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	15	0	0	148	0	0	0	0	15	0	0
Millenium Riverfront	DIST IN			39%								11%	11%
	DIST OUT	(5%)						(42%)	(11%)				
	ASSIGN	4	0	9	0	0	0	32	8	0	0	3	2
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*4*	*18*	*9*	*0*	*166*	*0*	*32*	*8*	*0*	*17*	*3*	*2*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**6**	**35**	**15**	**0**	**300**	**1**	**59**	**8**	**2**	**18**	**4**	**22**
601 Washington Street	DIST IN		26%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	6	0	0	65	0	0	0	0	6	0	0
Total New Site Trip Assignment		*0*	*6*	*0*	*0*	*65*	*0*	*0*	*0*	*0*	*6*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**6**	**41**	**15**	**0**	**365**	**1**	**59**	**8**	**2**	**24**	**4**	**22**

Poplar Street & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Washington Street			WESTBOUND Washington Street			NORTHBOUND Poplar Street			SOUTHBOUND Poplar Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		3	96	30	4	90	2	17	0	3	9	4	11
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**3**	**96**	**30**	**4**	**90**	**2**	**17**	**0**	**3**	**9**	**4**	**11**
Background Growth to 2024	0.66%	0	1	0	0	1	0	0	0	0	0	0	0
901 Washington Street	DIST IN		26%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	6	0	0	14	0	0	0	0	6	0	0
401 / 433 Washington Street	DIST IN		26%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	36	0	0	70	0	0	0	0	37	0	0
Millenium Riverfront	DIST IN			39%								11%	11%
	DIST OUT	(5%)						(42%)	(11%)				
	ASSIGN	2	0	23	0	0	0	16	4	0	0	6	6
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*2*	*42*	*23*	*0*	*84*	*0*	*16*	*4*	*0*	*43*	*6*	*6*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**5**	**139**	**53**	**4**	**175**	**2**	**33**	**4**	**3**	**52**	**10**	**17**
601 Washington Street	DIST IN		26%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	17	0	0	32	0	0	0	0	16	0	0
Total New Site Trip Assignment		*0*	*17*	*0*	*0*	*32*	*0*	*0*	*0*	*0*	*16*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**5**	**156**	**53**	**4**	**207**	**2**	**33**	**4**	**3**	**68**	**10**	**17**

Cherry Street & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND Washington Street			WESTBOUND Washington Street			NORTHBOUND Cherry Street			SOUTHBOUND Cherry Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		33	4	1	0	7	2	20	9	0	4	2	65
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**33**	**4**	**1**	**0**	**7**	**2**	**20**	**9**	**0**	**4**	**2**	**65**
Background Growth to 2024	0.66%	0	0	0	0	0	0	0	0	0	0	0	0
901 Washington Street	DIST IN		52%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	5	0	0	18	0	0	0	0	3	0	0
401 / 433 Washington Street	DIST IN		52%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	30	0	0	148	0	0	0	0	14	0	0
Millenium Riverfront	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	-8	8	0	0	16	0	0	0	0	0	0	-16
Total Other Development New Trip Assignments		*-8*	*43*	*0*	*0*	*182*	*0*	*0*	*0*	*0*	*17*	*0*	*-16*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**25**	**47**	**1**	**0**	**189**	**2**	**20**	**9**	**0**	**21**	**2**	**49**
601 Washington Street	DIST IN		52%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	12	0	0	65	0	0	0	0	6	0	0
Total New Site Trip Assignment		*0*	*12*	*0*	*0*	*65*	*0*	*0*	*0*	*0*	*6*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**25**	**59**	**1**	**0**	**254**	**2**	**20**	**9**	**0**	**27**	**2**	**49**

Cherry Street & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Washington Street			WESTBOUND Washington Street			NORTHBOUND Cherry Street			SOUTHBOUND Cherry Street		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		41	8	9	0	19	5	4	12	0	19	10	39
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**41**	**8**	**9**	**0**	**19**	**5**	**4**	**12**	**0**	**19**	**10**	**39**
Background Growth to 2024	0.66%	0	0	0	0	0	0	0	0	0	0	0	0
901 Washington Street	DIST IN		52%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	12	0	0	14	0	0	0	0	6	0	0
401 / 433 Washington Street	DIST IN		52%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	73	0	0	70	0	0	0	0	36	0	0
Millenium Riverfront	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	-10	10	0	0	10	0	0	0	0	0	0	-10
Total Other Development New Trip Assignments		*-10*	*95*	*0*	*0*	*94*	*0*	*0*	*0*	*0*	*42*	*0*	*-10*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**31**	**103**	**9**	**0**	**113**	**5**	**4**	**12**	**0**	**61**	**10**	**29**
601 Washington Street	DIST IN		52%								26%		
	DIST OUT					(78%)							
	ASSIGN	0	33	0	0	32	0	0	0	0	17	0	0
Total New Site Trip Assignment		*0*	*33*	*0*	*0*	*32*	*0*	*0*	*0*	*0*	*17*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**31**	**136**	**9**	**0**	**145**	**5**	**4**	**12**	**0**	**78**	**10**	**29**

West Site Access & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND		
		Washington Street			Washington Street			West Site Access			West Site Access		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	0	0	0	0	0	0	0	0	0	0	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Background Growth to 2024	0.66%	0	0	0	0	0	0	0	0	0	0	0	0
901 Washington Street	DIST IN		78%										
	DIST OUT					(78%)							
	ASSIGN	0	8	0	0	18	0	0	0	0	0	0	0
401 / 433 Washington Street	DIST IN					22%							
	DIST OUT		(22%)										
	ASSIGN	0	42	0	0	12	0	0	0	0	0	0	0
Millenium Riverfront	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	8	0	0	16	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*58*	*0*	*0*	*46*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**58**	**0**	**0**	**46**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
601 Washington Street	DIST IN		39%	39%	11%								
	DIST OUT					(39%)		(39%)		(11%)			
	ASSIGN	0	9	9	3	32	0	33	0	9	0	0	0
Total New Site Trip Assignment		*0*	*9*	*9*	*3*	*32*	*0*	*33*	*0*	*9*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**67**	**9**	**3**	**78**	**0**	**33**	**0**	**9**	**0**	**0**	**0**

West Site Access & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Washington Street			WESTBOUND Washington Street			NORTHBOUND West Site Access			SOUTHBOUND West Site Access		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	0	0	0	0	0	0	0	0	0	0	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Background Growth to 2024	0.66%	0	0	0	0	0	0	0	0	0	0	0	0
901 Washington Street	DIST IN		78%										
	DIST OUT					(78%)							
	ASSIGN	0	18	0	0	14	0	0	0	0	0	0	0
401 / 433 Washington Street	DIST IN					22%							
	DIST OUT		(22%)										
	ASSIGN	0	20	0	0	31	0	0	0	0	0	0	0
Millenium Riverfront	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	10	0	0	10	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*48*	*0*	*0*	*55*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**48**	**0**	**0**	**55**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
601 Washington Street	DIST IN		39%	39%	11%								
	DIST OUT					(39%)		(39%)		(11%)			
	ASSIGN	0	25	25	7	16	0	16	0	5	0	0	0
Total New Site Trip Assignment		*0*	*25*	*25*	*7*	*16*	*0*	*16*	*0*	*5*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**73**	**25**	**7**	**71**	**0**	**16**	**0**	**5**	**0**	**0**	**0**

East Site Access & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND		
		Washington Street			Washington Street			East Site Access			East Site Access		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	0	0	0	0	0	0	0	0	0	0	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Background Growth to 2024	0.66%	0	0	0	0	0	0	0	0	0	0	0	0
901 Washington Street	DIST IN		78%										
	DIST OUT					(78%)							
	ASSIGN	0	8	0	0	18	0	0	0	0	0	0	0
401 / 433 Washington Street	DIST IN					22%							
	DIST OUT		(22%)										
	ASSIGN	0	42	0	0	12	0	0	0	0	0	0	0
Millenium Riverfront	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	8	0	0	16	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*58*	*0*	*0*	*46*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**58**	**0**	**0**	**46**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
601 Washington Street	DIST IN			39%	11%	11%							
	DIST OUT		(11%)					(39%)		(11%)			
	ASSIGN	0	9	9	3	3	0	32	0	9	0	0	0
Total New Site Trip Assignment		*0*	*9*	*9*	*3*	*3*	*0*	*32*	*0*	*9*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**67**	**9**	**3**	**49**	**0**	**32**	**0**	**9**	**0**	**0**	**0**

East Site Access & Washington Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND		
		Washington Street			Washington Street			East Site Access			East Site Access		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	0	0	0	0	0	0	0	0	0	0	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Background Growth to 2024	0.66%	0	0	0	0	0	0	0	0	0	0	0	0
901 Washington Street	DIST IN		78%										
	DIST OUT					(78%)							
	ASSIGN	0	18	0	0	14	0	0	0	0	0	0	0
401 / 433 Washington Street	DIST IN					22%							
	DIST OUT		(22%)										
	ASSIGN	0	20	0	0	31	0	0	0	0	0	0	0
Millenium Riverfront	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	10	0	0	10	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*0*	*48*	*0*	*0*	*55*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**48**	**0**	**0**	**55**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
601 Washington Street	DIST IN			39%	11%	11%							
	DIST OUT		(11%)					(39%)		(11%)			
	ASSIGN	0	5	25	7	7	0	16	0	5	0	0	0
Total New Site Trip Assignment		*0*	*5*	*25*	*7*	*7*	*0*	*16*	*0*	*5*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**53**	**25**	**7**	**62**	**0**	**16**	**0**	**5**	**0**	**0**	**0**

Lee Street / Spring Mill Avenue & Hector Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND		
		Hector Street			Hector Street			Lee Street			Spring Mill Avenue		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		0	387	5	21	442	19	14	1	7	25	1	0
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**0**	**387**	**5**	**21**	**442**	**19**	**14**	**1**	**7**	**25**	**1**	**0**
Background Growth to 2024	0.66%	0	3	0	0	3	0	0	0	0	0	0	0
901 Washington Street	DIST IN				22%								
	DIST OUT									(22%)			
	ASSIGN	0	0	0	2	0	0	0	0	5	0	0	0
401 / 433 Washington Street	DIST IN				22%								
	DIST OUT									(22%)			
	ASSIGN	0	0	0	12	0	0	0	0	42	0	0	0
Millenium Riverfront	DIST IN					22%							
	DIST OUT		(22%)										
	ASSIGN	0	17	0	0	5	0	0	0	0	0	0	0
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	-8	0	16	-16	0	0	0	8	0	0	0
Total Other Development New Trip Assignments		*0*	*9*	*0*	*30*	*-11*	*0*	*0*	*0*	*55*	*0*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**0**	**399**	**5**	**51**	**434**	**19**	**14**	**1**	**62**	**25**	**1**	**0**
601 Washington Street	DIST IN				22%								
	DIST OUT									(22%)			
	ASSIGN	0	0	0	6	0	0	0	0	18	0	0	0
Total New Site Trip Assignment		*0*	*0*	*0*	*6*	*0*	*0*	*0*	*0*	*18*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**0**	**399**	**5**	**57**	**434**	**19**	**14**	**1**	**80**	**25**	**1**	**0**

Lee Street / Spring Mill Avenue & Hector Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND		
		Hector Street			Hector Street			Lee Street			Spring Mill Avenue		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		3	546	12	9	373	14	10	1	12	50	4	3
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**3**	**546**	**12**	**9**	**373**	**14**	**10**	**1**	**12**	**50**	**4**	**3**
Background Growth to 2024	0.66%	0	4	0	0	2	0	0	0	0	0	0	0
901 Washington Street	DIST IN				22%								
	DIST OUT									(22%)			
	ASSIGN	0	0	0	5	0	0	0	0	4	0	0	0
401 / 433 Washington Street	DIST IN				22%								
	DIST OUT									(22%)			
	ASSIGN	0	0	0	31	0	0	0	0	20	0	0	0
Millenium Riverfront	DIST IN					22%							
	DIST OUT		(22%)										
	ASSIGN	0	8	0	0	12	0	0	0	0	0	0	0
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	-10	0	10	-10	0	0	0	10	0	0	0
Total Other Development New Trip Assignments		*0*	*-2*	*0*	*46*	*2*	*0*	*0*	*0*	*34*	*0*	*0*	*0*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**3**	**548**	**12**	**55**	**377**	**14**	**10**	**1**	**46**	**50**	**4**	**3**
601 Washington Street	DIST IN				22%								
	DIST OUT									(22%)			
	ASSIGN	0	0	0	14	0	0	0	0	10	0	0	0
Total New Site Trip Assignment		*0*	*0*	*0*	*14*	*0*	*0*	*0*	*0*	*10*	*0*	*0*	*0*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**3**	**548**	**12**	**69**	**377**	**14**	**10**	**1**	**56**	**50**	**4**	**3**

Station Avenue / North Lane & Hector Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 7 AM - 9 AM

		EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND		
		Hector Street			Hector Street			Station Avenue			North Lane		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		69	344	10	10	441	55	5	18	3	67	11	50
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**69**	**344**	**10**	**10**	**441**	**55**	**5**	**18**	**3**	**67**	**11**	**50**
Background Growth to 2024	0.66%	0	2	0	0	3	0	0	0	0	0	0	0
901 Washington Street	DIST IN					19%							3%
	DIST OUT	(3%)	(19%)										
	ASSIGN	1	4	0	0	2	0	0	0	0	0	0	0
401 / 433 Washington Street	DIST IN					19%							3%
	DIST OUT	(3%)	(19%)										
	ASSIGN	6	36	0	0	10	0	0	0	0	0	0	2
Millenium Riverfront	DIST IN					19%							3%
	DIST OUT	(3%)	(19%)										
	ASSIGN	3	14	0	0	4	0	0	0	0	0	0	1
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*10*	*54*	*0*	*0*	*16*	*0*	*0*	*0*	*0*	*0*	*0*	*3*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**79**	**400**	**10**	**10**	**460**	**55**	**5**	**18**	**3**	**67**	**11**	**53**
601 Washington Street	DIST IN					19%							3%
	DIST OUT	(3%)	(19%)										
	ASSIGN	2	16	0	0	5	0	0	0	0	0	0	1
Total New Site Trip Assignment		*2*	*16*	*0*	*0*	*5*	*0*	*0*	*0*	*0*	*0*	*0*	*1*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**81**	**416**	**10**	**10**	**465**	**55**	**5**	**18**	**3**	**67**	**11**	**54**

Station Avenue / North Lane & Hector Street
INTERSECTION VOLUME PROJECTION SUMMARY
Weekday 4 PM - 6 PM

		EASTBOUND Hector Street			WESTBOUND Hector Street			NORTHBOUND Station Avenue			SOUTHBOUND North Lane		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
EXISTING VOLUMES		52	560	8	18	321	54	5	19	9	96	30	55
Seasonal Adjustment Factor	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Balancing Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
Additional Adjustment		0	0	0	0	0	0	0	0	0	0	0	0
ADJUSTED EXISTING VOLUMES		**52**	**560**	**8**	**18**	**321**	**54**	**5**	**19**	**9**	**96**	**30**	**55**
Background Growth to 2024	0.66%	0	4	0	0	2	0	0	0	0	1	0	0
901 Washington Street	DIST IN					19%							3%
	DIST OUT	(3%)	(19%)										
	ASSIGN	1	3	0	0	4	0	0	0	0	0	0	1
401 / 433 Washington Street	DIST IN					19%							3%
	DIST OUT	(3%)	(19%)										
	ASSIGN	3	17	0	0	27	0	0	0	0	0	0	4
Millenium Riverfront	DIST IN					19%							3%
	DIST OUT	(3%)	(19%)										
	ASSIGN	1	7	0	0	10	0	0	0	0	0	0	2
Washington Street Extension Diversions	DIST IN												
	DIST OUT												
	ASSIGN	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Development New Trip Assignments		*5*	*27*	*0*	*0*	*41*	*0*	*0*	*0*	*0*	*0*	*0*	*7*
Total Other Development Pass-by Trip Assignments		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITHOUT DEVELOPMENT VOLUMES		**57**	**591**	**8**	**18**	**364**	**54**	**5**	**19**	**9**	**97**	**30**	**62**
601 Washington Street	DIST IN					19%							3%
	DIST OUT	(3%)	(19%)										
	ASSIGN	2	8	0	0	12	0	0	0	0	0	0	2
Total New Site Trip Assignment		*2*	*8*	*0*	*0*	*12*	*0*	*0*	*0*	*0*	*0*	*0*	*2*
Total Pass-by Site Trip Assignment		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2024 WITH DEVELOPMENT VOLUMES		**59**	**599**	**8**	**18**	**376**	**54**	**5**	**19**	**9**	**97**	**30**	**64**

Appendix G

Capacity / Level-of-Service Methodology

CAPACITY/LEVEL-OF-SERVICE ANALYSIS METHODOLOGY

The detailed capacity/level-of-service analysis contained in this transportation impact study was performed in accordance with the standard techniques contained in the *Highway Capacity Manual 6th Edition.* By definition, capacity represents "the maximum sustainable hourly flow rate at which persons or vehicles reasonably can be expected to traverse a point or a uniform section of a lane or roadway during a given time period under prevailing roadway, environmental, traffic, and control conditions." The level at which an intersection or a uniform section of a lane or roadway function can be expressed in terms of a level of service. Level of service (LOS) is defined as "a quantitative stratification of a performance measure or measures that represent quality of service, measured on an A-F scale, with LOS A representing the best operating conditions from the traveler's perspective and LOS F the worst."

Stop-Controlled Intersections

At unsignalized stop-controlled intersections, such as two-way stop-controlled (TWSC) or all-way stop-controlled (AWSC), a methodology for evaluating the relative functioning of these intersections is based upon the control delay. For these types of unsignalized intersections, the analysis of the control delay is based upon the following data:

- Number and configuration of lanes on each approach;
- Percentage of heavy vehicles on each approach;
- Demand flow rate for each entering vehicular movement and pedestrian crossing movement;
- Unique geometric factors such as, channelization aspects; two-way left-turn lanes, raised or striped median storage; approach grades, flared approaches on the minor street; and upstream signals within 0.25 miles.

At TWSC intersections, only drivers on the minor street approaches are required to stop before proceeding into the intersection and left-turning drivers from the major street may have to yield to on-coming major street through or right-turning traffic, but are not required to stop in the absence of on-coming traffic. The capacity at stop-controlled legs is based primarily on three factors: the distribution of gaps in the major stream, driver judgment in selecting the gaps, and the follow-up headways required by each driver in a queue.

At AWSC intersections, every vehicle is required to stop at the intersection before proceeding, and as a result, the decision to proceed is a function of the traffic conditions on the other approaches. Each driver proceeds only after determining that no vehicles are currently in the intersection and that it is the driver's turn to proceed. Capacity at an AWSC intersection is described by the saturation headway or time between departures of successive vehicles on a given approach for a particular case assuming a continuous queue; departure headway or the average time between departures of successive vehicles on a given approach accounting for the probability of each possible case; and service time or the average time sent by a vehicle in first position waiting to depart.

At both TWSC and AWSC intersections, the level of service is based upon the control delay, as well as the corresponding volume-to-capacity ratio for each movement/lane group. For TWSC intersections, the level of service is not calculated for major-street approaches or for the intersection as a whole; however, the intersection-wide level of service is calculated for AWSC intersections. The following table provides a summary of the relationship between the level of service, control delay, and volume-to-capacity ratio for TWSC and AWSC intersections.

Control Delay (Sec/Veh)	LOS by Volume-to-Capacity Ratio	
	v/c ≤ 1.0	v/c > 1.0
≤ 10	A	F
> 10 – 15	B	F
> 15 – 25	C	F
> 25 – 35	D	F
> 35 – 50	E	F
> 50	F	F

Signalized Intersections

At three or four-legged signalized intersections, a methodology for evaluating the capacity and quality of service provided to road users traveling through the signalized intersection. For signalized intersections, the level of service can be characterized for the entire intersection, each approach, and each lane group. The level of service is based upon the control delay and volume-to-capacity ratio. The delay quantifies the increase in travel time due to the traffic signal control and is a surrogate measure of driver discomfort and fuel consumption, while the volume-to-capacity ratio quantifies the degree to which a phase's capacity is utilized by a lane group. Input data in determining the delay and volume-to-capacity ratio include:

- Demand flow rate for each entering vehicular movement and pedestrian crossing movement, including right-turn on red volumes and percent of heavy vehicles;
- Initial queue for each lane group;
- Number and configuration of lanes on each approach;
- Type of signal control and phase sequence;
- Allocation of minimum/maximum green times and clearance intervals (Yellow plus All Red phases); and
- Phase recall.

At signalized intersections, the level of service is based upon the control delay, as well as the corresponding volume-to-capacity ratio for each movement/lane group. The following table provides a summary of the relationship between the level of service, control delay, and volume-to-capacity ratio for signalized intersections.

Control Delay (Sec/Veh)	LOS by Volume-to-Capacity Ratio	
	v/c ≤ 1.0	v/c > 1.0
≤ 10	A	F
> 10 – 20	B	F
> 20 – 35	C	F
> 35 – 55	D	F
> 55 – 80	E	F
> 80	F	F

Appendix I

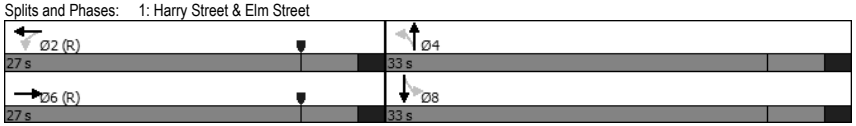
Existing Capacity/Level-of-Service Analysis Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	386	171	0	119	0	51	0	6	16	16	283
Future Volume (vph)	0	386	171	0	119	0	51	0	6	16	16	283
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	13	13	13	13	13	13	11	11	11
Grade (%)		-4%			2%			3%			-6%	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99						1.00		1.00	0.98	
Frt		0.954						0.986			0.858	
Flt Protected								0.957		0.950		
Satd. Flow (prot)	0	3285	0	0	1788	0	0	1391	0	1431	1461	0
Flt Permitted								0.372		0.713		
Satd. Flow (perm)	0	3285	0	0	1788	0	0	540	0	1073	1461	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		133						55			341	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		281			505			298			915	
Travel Time (s)		7.7			13.8			8.1			25.0	
Confl. Peds. (#/hr)	5		1	1		5	1		1	1		1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	4%	4%	0%	3%	0%	24%	0%	25%	19%	6%	3%
Adj. Flow (vph)	0	465	206	0	143	0	61	0	7	19	19	341
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	671	0	0	143	0	0	68	0	19	360	0
Number of Detectors		1		1	1		1	1		1	1	
Detector Template				Left			Left			Left		
Leading Detector (ft)		37		20	37		20	37		37	37	
Trailing Detector (ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Position(ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Size(ft)		40		20	40		20	40		40	40	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type		NA			NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4			8		
Detector Phase		6		2	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)		15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)		21.0		26.0	26.0		9.0	9.0		9.0	9.0	
Total Split (s)		27.0		27.0	27.0		33.0	33.0		33.0	33.0	
Total Split (%)		45.0%		45.0%	45.0%		55.0%	55.0%		55.0%	55.0%	
Maximum Green (s)		21.0		21.0	21.0		27.0	27.0		27.0	27.0	
Yellow Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0			-1.0		-1.0	-1.0	
Total Lost Time (s)		5.0			5.0			5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		13.0		13.0	13.0		20.0	20.0		20.0	20.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 28 (47%), Referenced to phase 2:WBTL and 6:EBT, Start of Yellow	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Harry Street & Elm Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	386	171	0	119	0	51	0	6	16	16	283
Future Volume (veh/h)	0	386	171	0	119	0	51	0	6	16	16	283
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1968	1968	1849	1805	0	1469	1820	1455	1753	1938	1981
Adj Flow Rate, veh/h	0	465	147	0	143	0	61	0	2	19	19	202
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	4	4	0	3	0	24	0	25	19	6	3
Cap, veh/h	0	1699	533	0	1095	0	225	2	4	476	32	344
Arrive On Green	0.00	0.61	0.59	0.00	0.61	0.00	0.21	0.00	0.21	0.23	0.23	0.21
Sat Flow, veh/h	0	2898	879	0	1805	0	472	9	16	1325	143	1518
Grp Volume(v), veh/h	0	309	303	0	143	0	63	0	0	19	0	221
Grp Sat Flow(s),veh/h/ln	0	1869	1809	0	1805	0	497	0	0	1325	0	1661
Q Serve(g_s), s	0.0	4.7	4.8	0.0	2.0	0.0	3.1	0.0	0.0	0.0	0.0	7.2
Cycle Q Clear(g_c), s	0.0	4.7	4.8	0.0	2.0	0.0	10.3	0.0	0.0	0.5	0.0	7.2
Prop In Lane	0.00		0.49	0.00		0.00	0.97		0.03	1.00		0.91
Lane Grp Cap(c), veh/h	0	1134	1098	0	1095	0	222	0	0	476	0	376
V/C Ratio(X)	0.00	0.27	0.28	0.00	0.13	0.00	0.28	0.00	0.00	0.04	0.00	0.59
Avail Cap(c_a), veh/h	0	1134	1098	0	1095	0	495	0	0	794	0	775
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	5.6	5.7	0.0	5.0	0.0	25.6	0.0	0.0	18.2	0.0	21.1
Incr Delay (d2), s/veh	0.0	0.6	0.6	0.0	0.2	0.0	0.7	0.0	0.0	0.0	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	2.9	2.9	0.0	1.2	0.0	1.6	0.0	0.0	0.4	0.0	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	6.2	6.3	0.0	5.3	0.0	26.3	0.0	0.0	18.2	0.0	22.6
LnGrp LOS	A	A	A	A	A	A	C	A	A	B	A	C
Approach Vol, veh/h		612			143			63			240	
Approach Delay, s/veh		6.2			5.3			26.3			22.2	
Approach LOS		A			A			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		41.4		18.6		41.4		18.6				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		21.0		27.0		21.0		27.0				
Max Q Clear Time (g_c+I1), s		4.5		12.3		7.2		9.2				
Green Ext Time (p_c), s		0.4		0.1		2.1		0.9				
Intersection Summary												
HCM 6th Ctrl Delay			10.9									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	321	43	0	0	0	121	10	2	0	0	0
Future Volume (vph)	14	321	43	0	0	0	121	10	2	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	16	16	16	16	16	16	16	16	16
Grade (%)		-1%			0%			5%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850					0.998				
Flt Protected		0.998						0.956				
Satd. Flow (prot)	0	1891	1677	0	0	0	0	1933	0	0	0	0
Flt Permitted		0.998						0.956				
Satd. Flow (perm)	0	1891	1677	0	0	0	0	1933	0	0	0	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		505			1606			289			377	
Travel Time (s)		13.8			43.8			7.9			10.3	
Confl. Peds. (#/hr)	2		2	2		2	1		1	1		1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	4%	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%
Adj. Flow (vph)	15	353	47	0	0	0	133	11	2	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	368	47	0	0	0	0	146	0	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	11.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	321	43	0	0	0	121	10	2	0	0	0
Future Vol, veh/h	14	321	43	0	0	0	121	10	2	0	0	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	7	4	0	0	0	0	4	0	0	0	0	0
Mvmt Flow	15	353	47	0	0	0	133	11	2	0	0	0
Number of Lanes	0	1	1	0	0	0	0	1	0	0	0	0

Approach	EB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		EB
Conflicting Lanes Left	0	2
Conflicting Approach Right	NB	
Conflicting Lanes Right	1	0
HCM Control Delay	12.3	9.6
HCM LOS	B	A

Lane	NBLn1	EBLn1	EBLn2
Vol Left, %	91%	4%	0%
Vol Thru, %	8%	96%	0%
Vol Right, %	2%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	133	335	43
LT Vol	121	14	0
Through Vol	10	321	0
RT Vol	2	0	43
Lane Flow Rate	146	368	47
Geometry Grp	2	7	7
Degree of Util (X)	0.21	0.514	0.056
Departure Headway (Hd)	5.167	5.028	4.253
Convergence, Y/N	Yes	Yes	Yes
Cap	696	718	842
Service Time	3.193	2.755	1.981
HCM Lane V/C Ratio	0.21	0.513	0.056
HCM Control Delay	9.6	13	7.2
HCM Lane LOS	A	B	A
HCM 95th-tile Q	0.8	3	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	325	10	0	0	0	0	0	43	11	69	0
Future Volume (vph)	0	325	10	0	0	0	0	0	43	11	69	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	16	16	16	16	16
Grade (%)		3%			0%			7%			-9%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996							0.865			
Flt Protected											0.993	
Satd. Flow (prot)	0	2053	0	0	0	0	0	0	1762	0	2075	0
Flt Permitted											0.993	
Satd. Flow (perm)	0	2053	0	0	0	0	0	0	1762	0	2075	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1606			1351			328			394	
Travel Time (s)		43.8			36.8			8.9			10.7	
Confl. Peds. (#/hr)	3		2	2		3	5		5	5		5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	3%	0%	0%	0%	0%	0%	0%	2%	18%	6%	0%
Adj. Flow (vph)	0	342	11	0	0	0	0	0	45	12	73	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	353	0	0	0	0	0	0	45	0	85	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	325	10	0	0	0	0	0	43	11	69	0
Future Vol, veh/h	0	325	10	0	0	0	0	0	43	11	69	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	0	3	0	0	0	0	0	0	2	18	6	0
Mvmt Flow	0	342	11	0	0	0	0	0	45	12	73	0
Number of Lanes	0	1	0	0	0	0	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	10.3	7.5	8.8
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	0%	0%	14%
Vol Thru, %	0%	97%	86%
Vol Right, %	100%	3%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	43	335	80
LT Vol	0	0	11
Through Vol	0	325	69
RT Vol	43	10	0
Lane Flow Rate	45	353	84
Geometry Grp	1	1	1
Degree of Util (X)	0.053	0.418	0.119
Departure Headway (Hd)	4.246	4.265	5.09
Convergence, Y/N	Yes	Yes	Yes
Cap	843	850	705
Service Time	2.273	2.265	3.114
HCM Lane V/C Ratio	0.053	0.415	0.119
HCM Control Delay	7.5	10.3	8.8
HCM Lane LOS	A	B	A
HCM 95th-tile Q	0.2	2.1	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	387	5	21	442	19	14	1	7	25	1	0
Future Volume (vph)	0	387	5	21	442	19	14	1	7	25	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	15	15	15	12	12	12	11	11	11
Grade (%)		1%			-2%			1%			-5%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.995			0.959				
Flt Protected					0.998			0.968			0.954	
Satd. Flow (prot)	0	1996	0	0	2028	0	0	1548	0	0	1729	0
Flt Permitted					0.998			0.968			0.954	
Satd. Flow (perm)	0	1996	0	0	2028	0	0	1548	0	0	1729	0
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		736			781			539			303	
Travel Time (s)		20.1			21.3			12.3			6.9	
Confl. Peds. (#/hr)			1	1					2	2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	4%	0%	5%	3%	10%	14%	0%	14%	4%	0%	0%
Adj. Flow (vph)	0	412	5	22	470	20	15	1	7	27	1	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	417	0	0	512	0	0	23	0	0	28	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

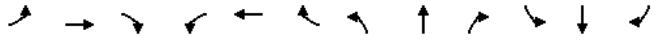
Intersection												
Int Delay, s/veh	1.2											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	387	5	21	442	19	14	1	7	25	1	0
Future Vol, veh/h	0	387	5	21	442	19	14	1	7	25	1	0
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	-2	-	-	1	-	-	-5	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	4	0	5	3	10	14	0	14	4	0	0
Mvmt Flow	0	412	5	22	470	20	15	1	7	27	1	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	490	0	0	418	0	0	941	950	418	945	942	480
Stage 1	-	-	-	-	-	-	416	416	-	524	524	-
Stage 2	-	-	-	-	-	-	525	534	-	421	418	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.44	5.7	-	5.14	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.44	5.7	-	5.14	4.5	-
Follow-up Hdwy	3	-	-	3	-	-	3	4	3.1	3	4	3.1
Pot Cap-1 Maneuver	814	-	-	863	-	-	271	262	673	269	265	620
Stage 1	-	-	-	-	-	-	675	582	-	701	617	-
Stage 2	-	-	-	-	-	-	579	512	-	780	667	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	814	-	-	862	-	-	263	253	671	257	255	620
Mov Cap-2 Maneuver	-	-	-	-	-	-	263	253	-	257	255	-
Stage 1	-	-	-	-	-	-	674	581	-	701	595	-
Stage 2	-	-	-	-	-	-	558	494	-	768	666	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	16.9	20.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	325	814	-	-	862	-	-	257
HCM Lane V/C Ratio	0.072	-	-	-	0.026	-	-	0.108
HCM Control Delay (s)	16.9	0	-	-	9.3	0	-	20.7
HCM Lane LOS	C	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	344	10	10	441	55	5	18	3	67	11	50
Future Volume (vph)	69	344	10	10	441	55	5	18	3	67	11	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	10	11	11	12	12	12	16	16	16
Grade (%)		-1%			-1%			3%			-7%	
Storage Length (ft)	150		0	90		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	70			40			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00			0.98	
Frt		0.996			0.983			0.986			0.948	
Flt Protected	0.950			0.950				0.991			0.974	
Satd. Flow (prot)	1613	1771	0	1604	1662	0	0	1728	0	0	1850	0
Flt Permitted	0.290			0.534				0.947			0.820	
Satd. Flow (perm)	492	1771	0	902	1662	0	0	1648	0	0	1552	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			7			3			22	
Link Speed (mph)		25			25			25			35	
Link Distance (ft)		781			600			343			548	
Travel Time (s)		21.3			16.4			9.4			10.7	
Confl. Peds. (#/hr)							5		2	2		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	5%	10%	0%	3%	7%	0%	0%	0%	3%	0%	6%
Adj. Flow (vph)	75	374	11	11	479	60	5	20	3	73	12	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	75	385	0	11	539	0	0	28	0	0	139	0
Number of Detectors	1	0		0	0		1	1		1	1	
Detector Template							Left			Left		
Leading Detector (ft)	37	0		0	0		20	37		20	37	
Trailing Detector (ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Position(ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Size(ft)	40	6		20	6		20	40		20	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	3.0	15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	9.0	21.0		21.0	21.0		9.0	9.0		9.0	9.0	
Total Split (s)	13.0	75.0		62.0	62.0		23.0	23.0		23.0	23.0	
Total Split (%)	10.8%	62.5%		51.7%	51.7%		19.2%	19.2%		19.2%	19.2%	
Maximum Green (s)	7.0	69.0		56.0	56.0		17.0	17.0		17.0	17.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	

McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street Existing Weekday AM

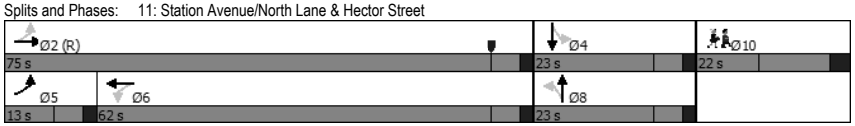
Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	36.0
Total Split (s)	22.0
Total Split (%)	18%
Maximum Green (s)	9.0
Yellow Time (s)	10.0

Lanes, Volumes, Timings Existing Weekday AM
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\01 - EX AM.syn Synchro 10

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		Max	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	73.3	73.3		62.9	62.9			14.7			14.7	
Actuated g/C Ratio	0.61	0.61		0.52	0.52			0.12			0.12	
v/c Ratio	0.20	0.36		0.02	0.62			0.14			0.67	
Control Delay	11.7	13.2		16.9	25.4			43.0			57.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	11.7	13.2		16.9	25.4			43.0			57.1	
LOS	B	B		B	C			D			E	
Approach Delay		13.0			25.2			43.0			57.1	
Approach LOS		B			C			D			E	
Queue Length 50th (ft)	23	141		4	297			17			87	
Queue Length 95th (ft)	46	216		15	443			45			154	
Internal Link Dist (ft)		701			520			263			468	
Turn Bay Length (ft)	150			90								
Base Capacity (vph)	374	1082		472	874			249			251	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.20	0.36		0.02	0.62			0.11			0.55	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 26 (22%), Referenced to phase 2:EBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 24.6		Intersection LOS: C	
Intersection Capacity Utilization 59.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 11: Station Avenue/North Lane & Hector Street



McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street Existing Weekday AM

Lane Group	Ø10
All-Red Time (s)	3.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	7
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lanes, Volumes, Timings Existing Weekday AM
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\01 - EX AM.syn Synchro 10

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:45	6:45	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2349	2243	2292	2281	2326	2298
Vehs Exited	2340	2252	2270	2289	2327	2296
Starting Vehs	41	55	46	53	47	42
Ending Vehs	50	46	68	45	46	49
Travel Distance (mi)	889	864	863	871	883	874
Travel Time (hr)	50.4	48.3	48.7	50.3	49.5	49.4
Total Delay (hr)	14.7	13.7	14.0	15.1	14.2	14.3
Total Stops	2699	2615	2634	2802	2713	2692
Fuel Used (gal)	35.9	34.6	34.6	35.9	35.8	35.4

Interval #0 Information Seeding

Start Time	6:45
End Time	7:00
Total Time (min)	15

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2349	2243	2292	2281	2326	2298
Vehs Exited	2340	2252	2270	2289	2327	2296
Starting Vehs	41	55	46	53	47	42
Ending Vehs	50	46	68	45	46	49
Travel Distance (mi)	889	864	863	871	883	874
Travel Time (hr)	50.4	48.3	48.7	50.3	49.5	49.4
Total Delay (hr)	14.7	13.7	14.0	15.1	14.2	14.3
Total Stops	2699	2615	2634	2802	2713	2692
Fuel Used (gal)	35.9	34.6	34.6	35.9	35.8	35.4

4: Ash Street & Washington Street Performance by lane

Lane	EB	WB	WB	NB	SB	All
Movements Served	LTR	L	TR	LTR	LTR	
Denied Del/Veh (s)						0.0
Total Del/Veh (s)	4.1	4.9	5.0	4.8	0.3	4.1

5: Poplar Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	4.5	5.4	4.6	0.1	4.6

6: Cherry Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.0
Total Del/Veh (s)	4.8	1.2	5.3	1.7	2.9

Total Zone Performance

Denied Del/Veh (s)	0.1
Total Del/Veh (s)	42.8

Intersection: 4: Ash Street & Washington Street

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (ft)	28	28	67	31	6
Average Queue (ft)	11	6	38	5	0
95th Queue (ft)	30	25	57	25	5
Link Distance (ft)	542	740	740	597	211
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Poplar Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	47	58	35	4
Average Queue (ft)	14	36	17	0
95th Queue (ft)	38	55	39	3
Link Distance (ft)	740	791	667	147
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Cherry Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	39	61	44	6
Average Queue (ft)	22	10	19	0
95th Queue (ft)	43	42	45	4
Link Distance (ft)	791	3111	640	268
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0

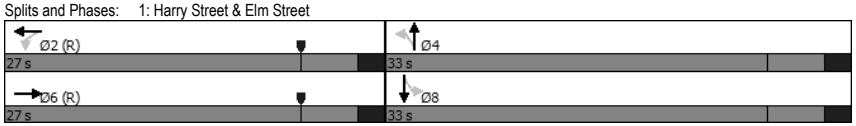
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	508	61	1	116	0	144	0	16	20	8	268
Future Volume (vph)	0	508	61	1	116	0	144	0	16	20	8	268
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	13	13	13	13	13	13	11	11	11
Grade (%)		-4%			2%			3%			-6%	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00		1.00		
Frt		0.984						0.986			0.854	
Flt Protected								0.957		0.950		
Satd. Flow (prot)	0	3504	0	0	1806	0	0	1726	0	1703	1496	0
Flt Permitted					0.997			0.407		0.715		
Satd. Flow (perm)	0	3504	0	0	1800	0	0	734	0	1277	1496	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24						55			279	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		281			505			298			915	
Travel Time (s)		7.7			13.8			8.1			25.0	
Confl. Peds. (#/hr)	1					1			6	6		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	1%	3%	0%	2%	0%	0%	8%	0%	0%	13%	2%
Adj. Flow (vph)	0	529	64	1	121	0	150	0	17	21	8	279
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	593	0	0	122	0	0	167	0	21	287	0
Number of Detectors		1		1	1		1	1		1	1	
Detector Template				Left			Left			Left		
Leading Detector (ft)		37		20	37		20	37		37	37	
Trailing Detector (ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Position(ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Size(ft)		40		20	40		20	40		40	40	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4			8		
Detector Phase		6		2	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)		15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)		21.0		26.0	26.0		9.0	9.0		9.0	9.0	
Total Split (s)		27.0		27.0	27.0		33.0	33.0		33.0	33.0	
Total Split (%)		45.0%		45.0%	45.0%		55.0%	55.0%		55.0%	55.0%	
Maximum Green (s)		21.0		21.0	21.0		27.0	27.0		27.0	27.0	
Yellow Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0			-1.0		-1.0	-1.0	
Total Lost Time (s)		5.0			5.0			5.0		5.0	5.0	

McMahon Associates, Inc. 601 Washington Street
1: Harry Street & Elm Street Existing Weekday PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		13.0		13.0	13.0		20.0	20.0		20.0	20.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 48 (80%), Referenced to phase 2:WBTL and 6:EBT, Start of Yellow	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Harry Street & Elm Street



Lanes, Volumes, Timings Existing Weekday PM
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\01 - EX PM.syn Synchro 10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	508	61	1	116	0	144	0	16	20	8	268
Future Volume (veh/h)	0	508	61	1	116	0	144	0	16	20	8	268
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	2012	1983	1849	1820	0	1820	1703	1820	2024	1839	1995
Adj Flow Rate, veh/h	0	529	39	1	121	0	150	0	14	21	8	198
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	1	3	0	2	0	0	8	0	0	13	2
Cap, veh/h	0	1865	137	61	938	0	318	5	19	677	19	472
Arrive On Green	0.00	0.52	0.50	0.50	0.52	0.00	0.30	0.00	0.30	0.32	0.32	0.30
Sat Flow, veh/h	0	3711	266	2	1815	0	643	16	61	1509	60	1492
Grp Volume(v), veh/h	0	280	288	122	0	0	164	0	0	21	0	206
Grp Sat Flow(s),veh/h/ln	0	1912	1964	1817	0	0	720	0	0	1509	0	1552
Q Serve(g_s), s	0.0	5.0	5.0	0.0	0.0	0.0	8.2	0.0	0.0	0.0	0.0	6.4
Cycle Q Clear(g_c), s	0.0	5.0	5.0	2.1	0.0	0.0	14.6	0.0	0.0	0.5	0.0	6.4
Prop In Lane	0.00		0.14	0.01		0.00	0.91		0.09	1.00		0.96
Lane Grp Cap(c), veh/h	0	988	1015	969	0	0	331	0	0	677	0	492
V/C Ratio(X)	0.00	0.28	0.28	0.13	0.00	0.00	0.50	0.00	0.00	0.03	0.00	0.42
Avail Cap(c_a), veh/h	0	988	1015	969	0	0	494	0	0	903	0	724
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	8.2	8.3	7.5	0.0	0.0	22.1	0.0	0.0	14.2	0.0	16.6
Incr Delay (d2), s/veh	0.0	0.7	0.7	0.3	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	3.5	3.7	1.5	0.0	0.0	4.0	0.0	0.0	0.3	0.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	8.9	9.0	7.8	0.0	0.0	23.3	0.0	0.0	14.2	0.0	17.1
LnGrp LOS	A	A	A	A	A	A	C	A	A	B	A	B
Approach Vol, veh/h		568			122			164			227	
Approach Delay, s/veh		8.9			7.8			23.3			16.9	
Approach LOS		A			A			C			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		36.0		24.0		36.0		24.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		21.0		27.0		21.0		27.0				
Max Q Clear Time (g_c+I1), s		4.1		16.6		7.5		8.4				
Green Ext Time (p_c), s		0.3		0.4		1.8		0.8				
Intersection Summary												
HCM 6th Ctrl Delay			12.7									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	448	71	0	0	0	119	10	9	0	0	0
Future Volume (vph)	23	448	71	0	0	0	119	10	9	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	16	16	16	16	16	16	16	16	16
Grade (%)		-1%			0%			5%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850					0.991				
Flt Protected		0.998						0.959				
Satd. Flow (prot)	0	1951	1661	0	0	0	0	1978	0	0	0	0
Flt Permitted		0.998						0.959				
Satd. Flow (perm)	0	1951	1661	0	0	0	0	1978	0	0	0	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		505			1606			289			377	
Travel Time (s)		13.8			43.8			7.9			10.3	
Confl. Peds. (#/hr)	2					2			4	4		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%	1%	0%	0%	0%	0%	0%
Adj. Flow (vph)	24	477	76	0	0	0	127	11	10	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	501	76	0	0	0	0	148	0	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	15.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	448	71	0	0	0	119	10	9	0	0	0
Future Vol, veh/h	23	448	71	0	0	0	119	10	9	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	0	1	1	0	0	0	1	0	0	0	0	0
Mvmt Flow	24	477	76	0	0	0	127	11	10	0	0	0
Number of Lanes	0	1	1	0	0	0	0	1	0	0	0	0

Approach	EB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		EB
Conflicting Lanes Left	0	2
Conflicting Approach Right	NB	
Conflicting Lanes Right	1	0
HCM Control Delay	16.4	10
HCM LOS	C	A

Lane	NBLn1	EBLn1	EBLn2
Vol Left, %	86%	5%	0%
Vol Thru, %	7%	95%	0%
Vol Right, %	7%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	138	471	71
LT Vol	119	23	0
Through Vol	10	448	0
RT Vol	9	0	71
Lane Flow Rate	147	501	76
Geometry Grp	2	7	7
Degree of Util (X)	0.22	0.686	0.088
Departure Headway (Hd)	5.398	4.926	4.216
Convergence, Y/N	Yes	Yes	Yes
Cap	665	732	848
Service Time	3.437	2.659	1.949
HCM Lane V/C Ratio	0.221	0.684	0.09
HCM Control Delay	10	17.8	7.4
HCM Lane LOS	A	C	A
HCM 95th-tile Q	0.8	5.5	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	459	8	0	0	0	0	0	63	26	55	0
Future Volume (vph)	0	459	8	0	0	0	0	0	63	26	55	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	16	16	16	16	16
Grade (%)		3%			0%			7%			-9%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998							0.865			
Flt Protected											0.984	
Satd. Flow (prot)	0	2096	0	0	0	0	0	0	1797	0	2156	0
Flt Permitted											0.984	
Satd. Flow (perm)	0	2096	0	0	0	0	0	0	1797	0	2156	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1606			1351			328			394	
Travel Time (s)		43.8			36.8			8.9			10.7	
Confl. Peds. (#/hr)	2		7	7		2	5		1	1		5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%
Adj. Flow (vph)	0	488	9	0	0	0	0	0	67	28	59	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	497	0	0	0	0	0	0	67	0	87	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	459	8	0	0	0	0	0	63	26	55	0
Future Vol, veh/h	0	459	8	0	0	0	0	0	63	26	55	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	4	0
Mvmt Flow	0	488	9	0	0	0	0	0	67	28	59	0
Number of Lanes	0	1	0	0	0	0	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	13.3	8	9
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	0%	0%	32%
Vol Thru, %	0%	98%	68%
Vol Right, %	100%	2%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	63	467	81
LT Vol	0	0	26
Through Vol	0	459	55
RT Vol	63	8	0
Lane Flow Rate	67	497	86
Geometry Grp	1	1	1
Degree of Util (X)	0.085	0.591	0.124
Departure Headway (Hd)	4.555	4.283	5.186
Convergence, Y/N	Yes	Yes	Yes
Cap	785	845	690
Service Time	2.592	2.308	3.223
HCM Lane V/C Ratio	0.085	0.588	0.125
HCM Control Delay	8	13.3	9
HCM Lane LOS	A	B	A
HCM 95th-tile Q	0.3	4	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	546	12	9	373	14	10	1	12	50	4	3
Future Volume (vph)	3	546	12	9	373	14	10	1	12	50	4	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	15	15	15	12	12	12	11	11	11
Grade (%)		1%			-2%			1%			-5%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.995			0.930			0.993	
Flt Protected					0.999			0.979			0.958	
Satd. Flow (prot)	0	2053	0	0	2059	0	0	1650	0	0	1761	0
Flt Permitted					0.999			0.979			0.958	
Satd. Flow (perm)	0	2053	0	0	2059	0	0	1650	0	0	1761	0
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		736			781			539			303	
Travel Time (s)		20.1			21.3			12.3			6.9	
Confl. Peds. (#/hr)	1		2	2		1	1		3	3		1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	10%	0%	0%	0%	25%	0%
Adj. Flow (vph)	3	563	12	9	385	14	10	1	12	52	4	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	578	0	0	408	0	0	23	0	0	59	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	546	12	9	373	14	10	1	12	50	4	3
Future Vol, veh/h	3	546	12	9	373	14	10	1	12	50	4	3
Conflicting Peds, #/hr	1	0	2	2	0	1	1	0	3	3	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	-2	-	-	1	-	-	-5	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	1	0	0	2	0	10	0	0	0	25	0
Mvmt Flow	3	563	12	9	385	14	10	1	12	52	4	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	400	0	0	577	0	0	992	995	574	996	994	394
Stage 1	-	-	-	-	-	-	577	577	-	411	411	-
Stage 2	-	-	-	-	-	-	415	418	-	585	583	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.4	6.7	6.3	6.1	5.75	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.4	5.7	-	5.1	4.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.4	5.7	-	5.1	4.75	-
Follow-up Hdwy	3	-	-	3	-	-	3	4	3.1	3	4.225	3.1
Pot Cap-1 Maneuver	875	-	-	759	-	-	230	233	539	327	295	734
Stage 1	-	-	-	-	-	-	542	489	-	792	624	-
Stage 2	-	-	-	-	-	-	679	580	-	662	545	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	874	-	-	758	-	-	222	228	536	312	288	732
Mov Cap-2 Maneuver	-	-	-	-	-	-	222	228	-	312	288	-
Stage 1	-	-	-	-	-	-	538	486	-	787	614	-
Stage 2	-	-	-	-	-	-	661	571	-	640	541	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	17.1	18.8
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	320	874	-	-	758	-	-	320
HCM Lane V/C Ratio	0.074	0.004	-	-	0.012	-	-	0.184
HCM Control Delay (s)	17.1	9.1	0	-	9.8	0	-	18.8
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	560	8	18	321	54	5	19	9	96	30	55
Future Volume (vph)	52	560	8	18	321	54	5	19	9	96	30	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	10	11	11	12	12	12	16	16	16
Grade (%)		-1%			-1%			3%			-7%	
Storage Length (ft)	150		0	90		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	70			40			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00			0.99	
Frt		0.998			0.979			0.961			0.959	
Flt Protected	0.950			0.950				0.993			0.974	
Satd. Flow (prot)	1661	1847	0	1604	1683	0	0	1692	0	0	1942	0
Flt Permitted	0.382			0.370				0.955			0.816	
Satd. Flow (perm)	668	1847	0	625	1683	0	0	1626	0	0	1627	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			9			10			16	
Link Speed (mph)		25			25			25			35	
Link Distance (ft)		781			600			343			548	
Travel Time (s)		21.3			16.4			9.4			10.7	
Confl. Peds. (#/hr)							4					4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	55	596	9	19	341	57	5	20	10	102	32	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	605	0	19	398	0	0	35	0	0	193	0
Number of Detectors	1	0		0	0		1	1		1	1	
Detector Template							Left			Left		
Leading Detector (ft)	37	0		0	0		20	37		20	37	
Trailing Detector (ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Position(ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Size(ft)	40	6		20	6		20	40		20	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	3.0	15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	9.0	21.0		21.0	21.0		9.0	9.0		9.0	9.0	
Total Split (s)	13.0	72.0		59.0	59.0		26.0	26.0		26.0	26.0	
Total Split (%)	10.8%	60.0%		49.2%	49.2%		21.7%	21.7%		21.7%	21.7%	
Maximum Green (s)	7.0	66.0		53.0	53.0		20.0	20.0		20.0	20.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	

McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street Existing Weekday PM

Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	36.0
Total Split (s)	22.0
Total Split (%)	18%
Maximum Green (s)	9.0
Yellow Time (s)	10.0

Lanes, Volumes, Timings Existing Weekday PM
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\01 - EX PM.syn Synchro 10

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		Max	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	70.0	70.0		59.6	59.6			18.0			18.0	
Actuated g/C Ratio	0.58	0.58		0.50	0.50			0.15			0.15	
v/c Ratio	0.12	0.56		0.06	0.47			0.14			0.75	
Control Delay	12.4	18.6		19.3	23.3			34.3			62.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	12.4	18.6		19.3	23.3			34.3			62.4	
LOS	B	B		B	C			C			E	
Approach Delay		18.1			23.1			34.3			62.4	
Approach LOS		B			C			C			E	
Queue Length 50th (ft)	18	283		8	206			17			131	
Queue Length 95th (ft)	39	407		24	308			47			211	
Internal Link Dist (ft)		701			520			263			468	
Turn Bay Length (ft)	150			90								
Base Capacity (vph)	455	1077		310	841			292			297	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.12	0.56		0.06	0.47			0.12			0.65	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 76 (63%), Referenced to phase 2:EBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 26.7		Intersection LOS: C	
Intersection Capacity Utilization 71.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 11: Station Avenue/North Lane & Hector Street



McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street Existing Weekday PM

Lane Group	Ø10
All-Red Time (s)	3.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	4
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lanes, Volumes, Timings Existing Weekday PM
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\01 - EX PM.syn Synchro 10

SimTraffic Simulation Summary
Existing Weekday PM 03/02/2022

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:45	4:45	4:45	4:45	4:45	4:45
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2608	2557	2673	2608	2570	2604
Vehs Exited	2619	2538	2680	2603	2571	2602
Starting Vehs	63	48	60	44	63	48
Ending Vehs	52	67	53	49	62	55
Travel Distance (mi)	1060	1040	1093	1076	1049	1064
Travel Time (hr)	61.7	60.3	64.1	61.8	60.2	61.6
Total Delay (hr)	19.4	18.9	20.7	19.1	18.2	19.3
Total Stops	3419	3312	3531	3478	3379	3422
Fuel Used (gal)	43.2	42.2	44.4	43.7	42.3	43.2

Interval #0 Information Seeding

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2608	2557	2673	2608	2570	2604
Vehs Exited	2619	2538	2680	2603	2571	2602
Starting Vehs	63	48	60	44	63	48
Ending Vehs	52	67	53	49	62	55
Travel Distance (mi)	1060	1040	1093	1076	1049	1064
Travel Time (hr)	61.7	60.3	64.1	61.8	60.2	61.6
Total Delay (hr)	19.4	18.9	20.7	19.1	18.2	19.3
Total Stops	3419	3312	3531	3478	3379	3422
Fuel Used (gal)	43.2	42.2	44.4	43.7	42.3	43.2

SimTraffic Performance Report
Existing Weekday PM 03/02/2022

4: Ash Street & Washington Street Performance by lane

Lane	EB	WB	WB	NB	SB	All
Movements Served	LTR	L	TR	LTR	LTR	
Denied Del/Veh (s)						0.0
Total Del/Veh (s)	5.3	5.2	4.8	5.0	0.3	3.7

5: Poplar Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.0
Total Del/Veh (s)	5.4	5.3	4.5	0.1	4.9

6: Cherry Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.0
Total Del/Veh (s)	3.7	4.1	5.7	1.6	3.3

Total Zone Performance

Denied Del/Veh (s)	0.1
Total Del/Veh (s)	50.7

Intersection: 4: Ash Street & Washington Street

Movement	EB	WB	WB	NB
Directions Served	LTR	L	TR	LTR
Maximum Queue (ft)	47	17	65	40
Average Queue (ft)	22	1	34	21
95th Queue (ft)	40	8	53	46
Link Distance (ft)	542	740	740	597
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Poplar Street & Washington Street

Movement	EB	WB	NB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	68	58	32
Average Queue (ft)	34	31	13
95th Queue (ft)	57	49	35
Link Distance (ft)	740	791	667
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Cherry Street & Washington Street

Movement	EB	WB	NB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	61	48	36
Average Queue (ft)	30	17	13
95th Queue (ft)	50	45	39
Link Distance (ft)	791	3111	640
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 0

Appendix I

2024 Future without Development Capacity/Level-of-Service Analysis Worksheets

WITHOUT WASHINGTON STREET EXTENSION

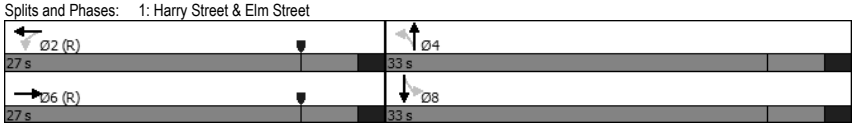
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	447	174	0	294	0	77	0	6	24	16	285
Future Volume (vph)	0	447	174	0	294	0	77	0	6	24	16	285
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	13	13	13	13	13	13	11	11	11
Grade (%)		-4%			2%			3%			-6%	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99						1.00		1.00	0.98	
Frt		0.958						0.991			0.858	
Flt Protected								0.956		0.950		
Satd. Flow (prot)	0	3300	0	0	1788	0	0	1398	0	1431	1461	0
Flt Permitted								0.339		0.743		
Satd. Flow (perm)	0	3300	0	0	1788	0	0	495	0	1118	1461	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		108						55			300	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		281			505			298			915	
Travel Time (s)		7.7			13.8			8.1			25.0	
Confl. Peds. (#/hr)	5		1	1		5	1		1	1		1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	4%	4%	0%	3%	0%	24%	0%	25%	19%	6%	3%
Adj. Flow (vph)	0	539	210	0	354	0	93	0	7	29	19	343
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	749	0	0	354	0	0	100	0	29	362	0
Number of Detectors		1		1	1		1	1		1	1	
Detector Template				Left			Left			Left		
Leading Detector (ft)		37		20	37		20	37		37	37	
Trailing Detector (ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Position(ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Size(ft)		40		20	40		20	40		40	40	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type		NA			NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4			8		
Detector Phase		6		2	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)		15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)		21.0		26.0	26.0		9.0	9.0		9.0	9.0	
Total Split (s)		27.0		27.0	27.0		33.0	33.0		33.0	33.0	
Total Split (%)		45.0%		45.0%	45.0%		55.0%	55.0%		55.0%	55.0%	
Maximum Green (s)		21.0		21.0	21.0		27.0	27.0		27.0	27.0	
Yellow Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0			-1.0		-1.0	-1.0	
Total Lost Time (s)		5.0			5.0			5.0		5.0	5.0	

McMahon Associates, Inc. 601 Washington Street
1: Harry Street & Elm Street 2024 without Dev Weekday AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		13.0		13.0	13.0		20.0	20.0		20.0	20.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 28 (47%), Referenced to phase 2:WBTL and 6:EBT, Start of Yellow	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Harry Street & Elm Street



Lanes, Volumes, Timings 2024 without Dev Weekday AM
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\02 - 24 WO AM.syn Synchro 10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	447	174	0	294	0	77	0	6	24	16	285
Future Volume (veh/h)	0	447	174	0	294	0	77	0	6	24	16	285
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1968	1968	1849	1805	0	1469	1820	1455	1753	1938	1981
Adj Flow Rate, veh/h	0	539	151	0	354	0	93	0	2	29	19	204
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	4	4	0	3	0	24	0	25	19	6	3
Cap, veh/h	0	1674	467	0	1047	0	261	1	3	521	36	385
Arrive On Green	0.00	0.58	0.56	0.00	0.58	0.00	0.24	0.00	0.24	0.25	0.25	0.24
Sat Flow, veh/h	0	2985	805	0	1805	0	560	5	12	1325	142	1519
Grp Volume(v), veh/h	0	348	342	0	354	0	95	0	0	29	0	223
Grp Sat Flow(s),veh/h/ln	0	1869	1822	0	1805	0	578	0	0	1325	0	1661
Q Serve(g_s), s	0.0	5.8	5.9	0.0	6.2	0.0	4.8	0.0	0.0	0.0	0.0	7.0
Cycle Q Clear(g_c), s	0.0	5.8	5.9	0.0	6.2	0.0	11.8	0.0	0.0	0.8	0.0	7.0
Prop In Lane	0.00		0.44	0.00		0.00	0.98		0.02	1.00		0.91
Lane Grp Cap(c), veh/h	0	1084	1057	0	1047	0	256	0	0	521	0	421
V/C Ratio(X)	0.00	0.32	0.32	0.00	0.34	0.00	0.37	0.00	0.00	0.06	0.00	0.53
Avail Cap(c_a), veh/h	0	1084	1057	0	1047	0	497	0	0	803	0	775
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	6.5	6.6	0.0	6.6	0.0	24.8	0.0	0.0	17.0	0.0	19.7
Incr Delay (d2), s/veh	0.0	0.8	0.8	0.0	0.9	0.0	0.9	0.0	0.0	0.0	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	3.8	3.8	0.0	3.9	0.0	2.4	0.0	0.0	0.5	0.0	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	7.3	7.5	0.0	7.5	0.0	25.7	0.0	0.0	17.1	0.0	20.8
LnGrp LOS	A	A	A	A	A	A	C	A	A	B	A	C
Approach Vol, veh/h		690			354			95			252	
Approach Delay, s/veh		7.4			7.5			25.7			20.3	
Approach LOS		A			A			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		39.8		20.2		39.8		20.2				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		21.0		27.0		21.0		27.0				
Max Q Clear Time (g_c+I1), s		8.7		13.8		8.3		9.0				
Green Ext Time (p_c), s		1.0		0.2		2.3		0.9				
Intersection Summary												
HCM 6th Ctrl Delay			11.0									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	357	75	0	0	0	296	35	7	0	0	0
Future Volume (vph)	14	357	75	0	0	0	296	35	7	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	16	16	16	16	16	16	16	16	16
Grade (%)		-1%			0%			5%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850					0.997				
Flt Protected		0.998						0.958				
Satd. Flow (prot)	0	1891	1677	0	0	0	0	1937	0	0	0	0
Flt Permitted		0.998						0.958				
Satd. Flow (perm)	0	1891	1677	0	0	0	0	1937	0	0	0	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		505			1606			289			377	
Travel Time (s)		13.8			43.8			7.9			10.3	
Confl. Peds. (#/hr)	2		2	2		2	1		1	1		1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	4%	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%
Adj. Flow (vph)	15	392	82	0	0	0	325	38	8	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	407	82	0	0	0	0	371	0	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	15.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	357	75	0	0	0	296	35	7	0	0	0
Future Vol, veh/h	14	357	75	0	0	0	296	35	7	0	0	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	7	4	0	0	0	0	4	0	0	0	0	0
Mvmt Flow	15	392	82	0	0	0	325	38	8	0	0	0
Number of Lanes	0	1	1	0	0	0	0	1	0	0	0	0

Approach	EB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		EB
Conflicting Lanes Left	0	2
Conflicting Approach Right	NB	
Conflicting Lanes Right	1	0
HCM Control Delay	16.4	15
HCM LOS	C	B

Lane	NBLn1	EBLn1	EBLn2
Vol Left, %	88%	4%	0%
Vol Thru, %	10%	96%	0%
Vol Right, %	2%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	338	371	75
LT Vol	296	14	0
Through Vol	35	357	0
RT Vol	7	0	75
Lane Flow Rate	371	408	82
Geometry Grp	2	7	7
Degree of Util (X)	0.555	0.639	0.111
Departure Headway (Hd)	5.375	5.643	4.866
Convergence, Y/N	Yes	Yes	Yes
Cap	665	632	727
Service Time	3.451	3.436	2.659
HCM Lane V/C Ratio	0.558	0.646	0.113
HCM Control Delay	15	18	8.3
HCM Lane LOS	B	C	A
HCM 95th-tile Q	3.4	4.6	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	344	27	0	0	0	0	0	90	11	84	0
Future Volume (vph)	0	344	27	0	0	0	0	0	90	11	84	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	16	16	16	16	16
Grade (%)		3%			0%			7%			-9%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.990							0.865			
Flt Protected											0.994	
Satd. Flow (prot)	0	2043	0	0	0	0	0	0	1762	0	2082	0
Flt Permitted											0.994	
Satd. Flow (perm)	0	2043	0	0	0	0	0	0	1762	0	2082	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1606			1351			328			394	
Travel Time (s)		43.8			36.8			8.9			10.7	
Confl. Peds. (#/hr)	3		2	2		3	5		5	5		5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	3%	0%	0%	0%	0%	0%	0%	2%	18%	6%	0%
Adj. Flow (vph)	0	362	28	0	0	0	0	0	95	12	88	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	390	0	0	0	0	0	0	95	0	100	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	344	27	0	0	0	0	0	90	11	84	0
Future Vol, veh/h	0	344	27	0	0	0	0	0	90	11	84	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	0	3	0	0	0	0	0	0	2	18	6	0
Mvmt Flow	0	362	28	0	0	0	0	0	95	12	88	0
Number of Lanes	0	1	0	0	0	0	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	11.3	8	9.2
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	0%	0%	12%
Vol Thru, %	0%	93%	88%
Vol Right, %	100%	7%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	90	371	95
LT Vol	0	0	11
Through Vol	0	344	84
RT Vol	90	27	0
Lane Flow Rate	95	391	100
Geometry Grp	1	1	1
Degree of Util (X)	0.115	0.475	0.146
Departure Headway (Hd)	4.378	4.38	5.251
Convergence, Y/N	Yes	Yes	Yes
Cap	817	824	682
Service Time	2.416	2.406	3.288
HCM Lane V/C Ratio	0.116	0.475	0.147
HCM Control Delay	8	11.3	9.2
HCM Lane LOS	A	B	A
HCM 95th-tile Q	0.4	2.6	0.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	454	5	21	465	19	14	1	7	25	1	0
Future Volume (vph)	0	454	5	21	465	19	14	1	7	25	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	15	15	15	12	12	12	11	11	11
Grade (%)		1%			-2%			1%			-5%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.995			0.959				
Flt Protected					0.998			0.968			0.954	
Satd. Flow (prot)	0	1998	0	0	2028	0	0	1548	0	0	1729	0
Flt Permitted					0.998			0.968			0.954	
Satd. Flow (perm)	0	1998	0	0	2028	0	0	1548	0	0	1729	0
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		736			781			539			303	
Travel Time (s)		20.1			21.3			12.3			6.9	
Confl. Peds. (#/hr)			1	1					2	2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	4%	0%	5%	3%	10%	14%	0%	14%	4%	0%	0%
Adj. Flow (vph)	0	483	5	22	495	20	15	1	7	27	1	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	488	0	0	537	0	0	23	0	0	28	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection												
Int Delay, s/veh	1.1											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	0	454	5	21	465	19	14	1	7	25	1	0
Future Vol, veh/h	0	454	5	21	465	19	14	1	7	25	1	0
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	-2	-	-	1	-	-	-5	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	4	0	5	3	10	14	0	14	4	0	0
Mvmt Flow	0	483	5	22	495	20	15	1	7	27	1	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	515	0	0	489	0	0	1037	1046	489	1041	1038	505
Stage 1	-	-	-	-	-	-	487	487	-	549	549	-
Stage 2	-	-	-	-	-	-	550	559	-	492	489	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.44	6.7	6.44	6.14	5.5	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.44	5.7	-	5.14	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.44	5.7	-	5.14	4.5	-
Follow-up Hdwy	3	-	-	3	-	-	3	4	3.1	3	4	3.1
Pot Cap-1 Maneuver	798	-	-	815	-	-	210	217	593	304	311	644
Stage 1	-	-	-	-	-	-	611	539	-	683	605	-
Stage 2	-	-	-	-	-	-	559	499	-	725	633	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	798	-	-	814	-	-	203	209	591	290	299	644
Mov Cap-2 Maneuver	-	-	-	-	-	-	203	209	-	290	299	-
Stage 1	-	-	-	-	-	-	610	538	-	683	582	-
Stage 2	-	-	-	-	-	-	537	480	-	713	632	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	20.4	18.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	257	798	-	-	814	-	-	290
HCM Lane V/C Ratio	0.091	-	-	-	0.027	-	-	0.095
HCM Control Delay (s)	20.4	0	-	-	9.5	0	-	18.7
HCM Lane LOS	C	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	400	10	10	461	55	5	18	3	67	11	53
Future Volume (vph)	79	400	10	10	461	55	5	18	3	67	11	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	10	11	11	12	12	12	16	16	16
Grade (%)		-1%			-1%			3%			-7%	
Storage Length (ft)	150		0	90		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	70			40			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00			0.98	
Frt		0.996			0.984			0.986			0.945	
Flt Protected	0.950			0.950				0.991			0.975	
Satd. Flow (prot)	1613	1771	0	1604	1664	0	0	1728	0	0	1844	0
Flt Permitted	0.274			0.505				0.945			0.824	
Satd. Flow (perm)	465	1771	0	853	1664	0	0	1644	0	0	1553	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			7			3			24	
Link Speed (mph)		25			25			25			35	
Link Distance (ft)		781			600			343			548	
Travel Time (s)		21.3			16.4			9.4			10.7	
Confl. Peds. (#/hr)							5		2	2		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	5%	10%	0%	3%	7%	0%	0%	0%	3%	0%	6%
Adj. Flow (vph)	86	435	11	11	501	60	5	20	3	73	12	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	446	0	11	561	0	0	28	0	0	143	0
Number of Detectors	1	0		0	0		1	1		1	1	
Detector Template							Left			Left		
Leading Detector (ft)	37	0		0	0		20	37		20	37	
Trailing Detector (ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Position(ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Size(ft)	40	6		20	6		20	40		20	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	3.0	15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	9.0	21.0		21.0	21.0		9.0	9.0		9.0	9.0	
Total Split (s)	13.0	75.0		62.0	62.0		23.0	23.0		23.0	23.0	
Total Split (%)	10.8%	62.5%		51.7%	51.7%		19.2%	19.2%		19.2%	19.2%	
Maximum Green (s)	7.0	69.0		56.0	56.0		17.0	17.0		17.0	17.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	

McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street 2024 without Dev Weekday AM

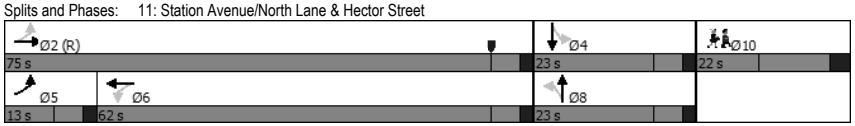
Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	36.0
Total Split (s)	22.0
Total Split (%)	18%
Maximum Green (s)	9.0
Yellow Time (s)	10.0

Lanes, Volumes, Timings 2024 without Dev Weekday AM
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\02 - 24 WO AM.syn Synchro 10

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		Max	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	73.2	73.2		62.8	62.8			14.8			14.8	
Actuated g/C Ratio	0.61	0.61		0.52	0.52			0.12			0.12	
v/c Ratio	0.24	0.41		0.02	0.64			0.14			0.67	
Control Delay	12.1	14.1		16.9	26.3			43.0			57.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	12.1	14.1		16.9	26.3			43.0			57.0	
LOS	B	B		B	C			D			E	
Approach Delay		13.8			26.1			43.0			57.0	
Approach LOS		B			C			D			E	
Queue Length 50th (ft)	26	172		4	317			17			88	
Queue Length 95th (ft)	52	257		15	470			45			157	
Internal Link Dist (ft)		701			520			263			468	
Turn Bay Length (ft)	150			90								
Base Capacity (vph)	359	1080		446	874			249			253	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.24	0.41		0.02	0.64			0.11			0.57	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 26 (22%), Referenced to phase 2:EBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 24.8		Intersection LOS: C	
Intersection Capacity Utilization 62.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 11: Station Avenue/North Lane & Hector Street



McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street 2024 without Dev Weekday AM

Lane Group	Ø10
All-Red Time (s)	3.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	7
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lanes, Volumes, Timings 2024 without Dev Weekday AM
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\02 - 24 WO AM.syn Synchro 10

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:45	6:45	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2836	2803	2926	2881	2891	2868
Vehs Exited	2803	2784	2930	2868	2920	2860
Starting Vehs	51	69	66	58	87	60
Ending Vehs	84	88	62	71	58	69
Travel Distance (mi)	1146	1147	1205	1182	1221	1180
Travel Time (hr)	65.2	64.7	68.1	67.3	68.7	66.8
Total Delay (hr)	18.8	18.4	19.5	19.6	19.6	19.2
Total Stops	3918	3939	4064	4010	4164	4017
Fuel Used (gal)	46.8	46.6	48.6	48.0	49.3	47.9

Interval #0 Information Seeding

Start Time	6:45
End Time	7:00
Total Time (min)	15

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2836	2803	2926	2881	2891	2868
Vehs Exited	2803	2784	2930	2868	2920	2860
Starting Vehs	51	69	66	58	87	60
Ending Vehs	84	88	62	71	58	69
Travel Distance (mi)	1146	1147	1205	1182	1221	1180
Travel Time (hr)	65.2	64.7	68.1	67.3	68.7	66.8
Total Delay (hr)	18.8	18.4	19.5	19.6	19.6	19.2
Total Stops	3918	3939	4064	4010	4164	4017
Fuel Used (gal)	46.8	46.6	48.6	48.0	49.3	47.9

4: Ash Street & Washington Street Performance by lane

Lane	EB	WB	WB	NB	SB	All
Movements Served	LTR	L	TR	LTR	LTR	
Denied Del/Veh (s)						0.0
Total Del/Veh (s)	4.5	5.1	6.2	5.2	0.3	5.1

5: Poplar Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	4.8	6.7	5.9	0.2	5.9

6: Cherry Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	5.8	7.7	6.2	1.7	5.7

Total Zone Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	69.3

Intersection: 4: Ash Street & Washington Street

Movement	EB	WB	WB	NB
Directions Served	LTR	L	TR	LTR
Maximum Queue (ft)	32	28	98	46
Average Queue (ft)	12	8	55	24
95th Queue (ft)	32	28	80	47
Link Distance (ft)	542	740	740	597
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Poplar Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	56	120	70	14
Average Queue (ft)	26	58	27	0
95th Queue (ft)	48	93	52	6
Link Distance (ft)	740	791	667	147
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Cherry Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	48	168	35	24
Average Queue (ft)	28	89	18	2
95th Queue (ft)	46	142	43	11
Link Distance (ft)	791	3111	640	268
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0

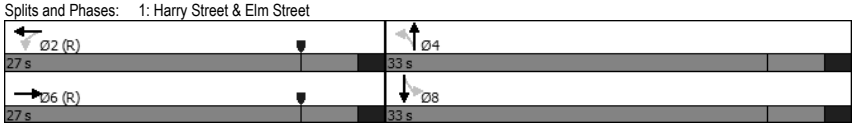
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	658	67	1	205	0	157	0	16	40	8	270
Future Volume (vph)	0	658	67	1	205	0	157	0	16	40	8	270
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	13	13	13	13	13	13	11	11	11
Grade (%)		-4%			2%			3%			-6%	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00		1.00		
Frt		0.986						0.987			0.854	
Flt Protected								0.957		0.950		
Satd. Flow (prot)	0	3513	0	0	1805	0	0	1728	0	1703	1496	0
Flt Permitted					0.998			0.422		0.709		
Satd. Flow (perm)	0	3513	0	0	1802	0	0	762	0	1267	1496	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20						55			281	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		281			505			298			915	
Travel Time (s)		7.7			13.8			8.1			25.0	
Confl. Peds. (#/hr)	1					1			6	6		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	1%	3%	0%	2%	0%	0%	8%	0%	0%	13%	2%
Adj. Flow (vph)	0	685	70	1	214	0	164	0	17	42	8	281
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	755	0	0	215	0	0	181	0	42	289	0
Number of Detectors		1		1	1		1	1		1	1	
Detector Template				Left			Left			Left		
Leading Detector (ft)		37		20	37		20	37		37	37	
Trailing Detector (ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Position(ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Size(ft)		40		20	40		20	40		40	40	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4			8		
Detector Phase		6		2	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)		15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)		21.0		26.0	26.0		9.0	9.0		9.0	9.0	
Total Split (s)		27.0		27.0	27.0		33.0	33.0		33.0	33.0	
Total Split (%)		45.0%		45.0%	45.0%		55.0%	55.0%		55.0%	55.0%	
Maximum Green (s)		21.0		21.0	21.0		27.0	27.0		27.0	27.0	
Yellow Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0			-1.0		-1.0	-1.0	
Total Lost Time (s)		5.0			5.0			5.0		5.0	5.0	

McMahon Associates, Inc. 601 Washington Street
1: Harry Street & Elm Street 2024 without Dev Weekday PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		13.0		13.0	13.0		20.0	20.0		20.0	20.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 48 (80%), Referenced to phase 2:WBTL and 6:EBT, Start of Yellow	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Harry Street & Elm Street



Lanes, Volumes, Timings 2024 without Dev Weekday PM
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\02 - 24 WO PM.syn Synchro 10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	658	67	1	205	0	157	0	16	40	8	270
Future Volume (veh/h)	0	658	67	1	205	0	157	0	16	40	8	270
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	2012	1983	1849	1820	0	1820	1703	1820	2024	1839	1995
Adj Flow Rate, veh/h	0	685	45	1	214	0	164	0	14	42	8	200
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	1	3	0	2	0	0	8	0	0	13	2
Cap, veh/h	0	1838	121	61	917	0	333	5	19	702	20	491
Arrive On Green	0.00	0.50	0.49	0.49	0.50	0.00	0.31	0.00	0.31	0.33	0.33	0.31
Sat Flow, veh/h	0	3742	239	1	1817	0	661	14	58	1509	60	1493
Grp Volume(v), veh/h	0	359	371	215	0	0	178	0	0	42	0	208
Grp Sat Flow(s),veh/h/ln	0	1912	1969	1818	0	0	733	0	0	1509	0	1553
Q Serve(g_s), s	0.0	6.9	6.9	0.0	0.0	0.0	9.0	0.0	0.0	0.0	0.0	6.3
Cycle Q Clear(g_c), s	0.0	6.9	6.9	4.0	0.0	0.0	15.4	0.0	0.0	0.9	0.0	6.3
Prop In Lane	0.00		0.12	0.00		0.00	0.92		0.08	1.00		0.96
Lane Grp Cap(c), veh/h	0	965	994	948	0	0	344	0	0	702	0	510
V/C Ratio(X)	0.00	0.37	0.37	0.23	0.00	0.00	0.52	0.00	0.00	0.06	0.00	0.41
Avail Cap(c_a), veh/h	0	965	994	948	0	0	494	0	0	911	0	725
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.1	9.1	8.3	0.0	0.0	21.8	0.0	0.0	13.8	0.0	16.0
Incr Delay (d2), s/veh	0.0	1.1	1.1	0.6	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	5.0	5.2	2.8	0.0	0.0	4.3	0.0	0.0	0.7	0.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.2	10.2	8.9	0.0	0.0	23.1	0.0	0.0	13.9	0.0	16.5
LnGrp LOS	A	B	B	A	A	A	C	A	A	B	A	B
Approach Vol, veh/h		730			215			178			250	
Approach Delay, s/veh		10.2			8.9			23.1			16.1	
Approach LOS		B			A			C			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		35.3		24.7		35.3		24.7				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		21.0		27.0		21.0		27.0				
Max Q Clear Time (g_c+I1), s		6.0		17.4		9.4		8.3				
Green Ext Time (p_c), s		0.6		0.5		2.3		0.9				
Intersection Summary												
HCM 6th Ctrl Delay			12.7									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	536	153	0	0	0	208	24	11	0	0	0
Future Volume (vph)	23	536	153	0	0	0	208	24	11	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	16	16	16	16	16	16	16	16	16
Grade (%)		-1%			0%			5%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850					0.994				
Flt Protected		0.998						0.959				
Satd. Flow (prot)	0	1950	1661	0	0	0	0	1984	0	0	0	0
Flt Permitted		0.998						0.959				
Satd. Flow (perm)	0	1950	1661	0	0	0	0	1984	0	0	0	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		505			1606			289			377	
Travel Time (s)		13.8			43.8			7.9			10.3	
Confl. Peds. (#/hr)	2					2			4	4		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%	1%	0%	0%	0%	0%	0%
Adj. Flow (vph)	24	570	163	0	0	0	221	26	12	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	594	163	0	0	0	0	259	0	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	23.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	536	153	0	0	0	208	24	11	0	0	0
Future Vol, veh/h	23	536	153	0	0	0	208	24	11	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	0	1	1	0	0	0	1	0	0	0	0	0
Mvmt Flow	24	570	163	0	0	0	221	26	12	0	0	0
Number of Lanes	0	1	1	0	0	0	0	1	0	0	0	0

Approach	EB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		EB
Conflicting Lanes Left	0	2
Conflicting Approach Right	NB	
Conflicting Lanes Right	1	0
HCM Control Delay	27.7	12.8
HCM LOS	D	B

Lane	NBLn1	EBLn1	EBLn2
Vol Left, %	86%	4%	0%
Vol Thru, %	10%	96%	0%
Vol Right, %	5%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	243	559	153
LT Vol	208	23	0
Through Vol	24	536	0
RT Vol	11	0	153
Lane Flow Rate	259	595	163
Geometry Grp	2	7	7
Degree of Util (X)	0.411	0.869	0.206
Departure Headway (Hd)	5.725	5.262	4.554
Convergence, Y/N	Yes	Yes	Yes
Cap	626	684	781
Service Time	3.802	3.033	2.324
HCM Lane V/C Ratio	0.414	0.87	0.209
HCM Control Delay	12.8	32.9	8.5
HCM Lane LOS	B	D	A
HCM 95th-tile Q	2	10.3	0.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	470	50	0	0	0	0	0	87	26	91	0
Future Volume (vph)	0	470	50	0	0	0	0	0	87	26	91	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	16	16	16	16	16
Grade (%)		3%			0%			7%			-9%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.987							0.865			
Flt Protected											0.989	
Satd. Flow (prot)	0	2075	0	0	0	0	0	0	1797	0	2158	0
Flt Permitted											0.989	
Satd. Flow (perm)	0	2075	0	0	0	0	0	0	1797	0	2158	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1606			1351			328			394	
Travel Time (s)		43.8			36.8			8.9			10.7	
Confl. Peds. (#/hr)	2		7	7		2	5		1	1		5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%
Adj. Flow (vph)	0	500	53	0	0	0	0	0	93	28	97	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	553	0	0	0	0	0	0	93	0	125	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	14.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	470	50	0	0	0	0	0	87	26	91	0
Future Vol, veh/h	0	470	50	0	0	0	0	0	87	26	91	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	4	0
Mvmt Flow	0	500	53	0	0	0	0	0	93	28	97	0
Number of Lanes	0	1	0	0	0	0	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	16.2	8.5	9.6
HCM LOS	C	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	0%	0%	22%
Vol Thru, %	0%	90%	78%
Vol Right, %	100%	10%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	87	520	117
LT Vol	0	0	26
Through Vol	0	470	91
RT Vol	87	50	0
Lane Flow Rate	93	553	124
Geometry Grp	1	1	1
Degree of Util (X)	0.123	0.677	0.185
Departure Headway (Hd)	4.765	4.404	5.352
Convergence, Y/N	Yes	Yes	Yes
Cap	746	819	666
Service Time	2.834	2.445	3.418
HCM Lane V/C Ratio	0.125	0.675	0.186
HCM Control Delay	8.5	16.2	9.6
HCM Lane LOS	A	C	A
HCM 95th-tile Q	0.4	5.4	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	582	12	9	423	14	10	1	12	50	4	3
Future Volume (vph)	3	582	12	9	423	14	10	1	12	50	4	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	15	15	15	12	12	12	11	11	11
Grade (%)		1%			-2%			1%			-5%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.996			0.930			0.993	
Flt Protected					0.999			0.979			0.958	
Satd. Flow (prot)	0	2053	0	0	2061	0	0	1650	0	0	1761	0
Flt Permitted					0.999			0.979			0.958	
Satd. Flow (perm)	0	2053	0	0	2061	0	0	1650	0	0	1761	0
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		736			781			539			303	
Travel Time (s)		20.1			21.3			12.3			6.9	
Confl. Peds. (#/hr)	1		2	2		1	1		3	3		1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	10%	0%	0%	0%	25%	0%
Adj. Flow (vph)	3	600	12	9	436	14	10	1	12	52	4	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	615	0	0	459	0	0	23	0	0	59	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection												
Int Delay, s/veh	1.5											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	582	12	9	423	14	10	1	12	50	4	3
Future Vol, veh/h	3	582	12	9	423	14	10	1	12	50	4	3
Conflicting Peds, #/hr	1	0	2	2	0	1	1	0	3	3	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	-2	-	-	1	-	-	-5	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	1	0	0	2	0	10	0	0	0	25	0
Mvmt Flow	3	600	12	9	436	14	10	1	12	52	4	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	451	0	0	614	0	0	1080	1083	611	1084	1082	445
Stage 1	-	-	-	-	-	-	614	614	-	462	462	-
Stage 2	-	-	-	-	-	-	466	469	-	622	620	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.4	6.7	6.3	6.1	5.75	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.4	5.7	-	5.1	4.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.4	5.7	-	5.1	4.75	-
Follow-up Hdwy	3	-	-	3	-	-	3	4	3.1	3	4.225	3.1
Pot Cap-1 Maneuver	840	-	-	736	-	-	198	206	513	290	267	691
Stage 1	-	-	-	-	-	-	515	470	-	751	600	-
Stage 2	-	-	-	-	-	-	632	550	-	637	529	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	839	-	-	735	-	-	191	201	510	276	261	690
Mov Cap-2 Maneuver	-	-	-	-	-	-	191	201	-	276	261	-
Stage 1	-	-	-	-	-	-	511	467	-	746	590	-
Stage 2	-	-	-	-	-	-	614	541	-	615	525	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	18.8	21
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	284	839	-	-	735	-	-	284
HCM Lane V/C Ratio	0.083	0.004	-	-	0.013	-	-	0.207
HCM Control Delay (s)	18.8	9.3	0	-	10	0	-	21
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	591	8	18	364	54	5	19	9	97	30	62
Future Volume (vph)	57	591	8	18	364	54	5	19	9	97	30	62
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	10	11	11	12	12	12	16	16	16
Grade (%)		-1%			-1%			3%			-7%	
Storage Length (ft)	150		0	90		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	70			40			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00			0.99	
Frt		0.998			0.981			0.961			0.956	
Flt Protected	0.950			0.950				0.993			0.975	
Satd. Flow (prot)	1661	1847	0	1604	1686	0	0	1692	0	0	1935	0
Flt Permitted	0.344			0.342				0.953			0.820	
Satd. Flow (perm)	602	1847	0	577	1686	0	0	1622	0	0	1628	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			8			10			18	
Link Speed (mph)		25			25			25			35	
Link Distance (ft)		781			600			343			548	
Travel Time (s)		21.3			16.4			9.4			10.7	
Confl. Peds. (#/hr)							4					4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	61	629	9	19	387	57	5	20	10	103	32	66
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	638	0	19	444	0	0	35	0	0	201	0
Number of Detectors	1	0		0	0		1	1		1	1	
Detector Template							Left			Left		
Leading Detector (ft)	37	0		0	0		20	37		20	37	
Trailing Detector (ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Position(ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Size(ft)	40	6		20	6		20	40		20	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	3.0	15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	9.0	21.0		21.0	21.0		9.0	9.0		9.0	9.0	
Total Split (s)	13.0	72.0		59.0	59.0		26.0	26.0		26.0	26.0	
Total Split (%)	10.8%	60.0%		49.2%	49.2%		21.7%	21.7%		21.7%	21.7%	
Maximum Green (s)	7.0	66.0		53.0	53.0		20.0	20.0		20.0	20.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	

McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street 2024 without Dev Weekday PM

Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	36.0
Total Split (s)	22.0
Total Split (%)	18%
Maximum Green (s)	9.0
Yellow Time (s)	10.0

Lanes, Volumes, Timings 2024 without Dev Weekday PM
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\02 - 24 WO PM.syn Synchro 10

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		Max	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	69.7	69.7		59.4	59.4			18.3			18.3	
Actuated g/C Ratio	0.58	0.58		0.50	0.50			0.15			0.15	
v/c Ratio	0.15	0.59		0.07	0.53			0.14			0.76	
Control Delay	12.7	19.6		19.6	24.9			34.2			63.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	12.7	19.6		19.6	24.9			34.2			63.1	
LOS	B	B		B	C			C			E	
Approach Delay		19.0			24.7			34.2			63.1	
Approach LOS		B			C			C			E	
Queue Length 50th (ft)	20	310		8	242			17			136	
Queue Length 95th (ft)	42	440		24	354			47			219	
Internal Link Dist (ft)		701			520			263			468	
Turn Bay Length (ft)	150			90								
Base Capacity (vph)	420	1073		285	838			292			299	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.15	0.59		0.07	0.53			0.12			0.67	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 76 (63%), Referenced to phase 2:EBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 27.6		Intersection LOS: C	
Intersection Capacity Utilization 76.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 11: Station Avenue/North Lane & Hector Street



McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street 2024 without Dev Weekday PM

Lane Group	Ø10
All-Red Time (s)	3.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	4
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lanes, Volumes, Timings 2024 without Dev Weekday PM
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\02 - 24 WO PM.syn Synchro 10

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:45	4:45	4:45	4:45	4:45	4:45
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	3052	3011	3102	3024	3075	3048
Vehs Exited	3048	2993	3098	3011	3073	3044
Starting Vehs	81	67	83	77	78	70
Ending Vehs	85	85	87	90	80	79
Travel Distance (mi)	1351	1338	1400	1357	1408	1371
Travel Time (hr)	77.1	75.2	79.0	76.3	81.0	77.7
Total Delay (hr)	23.4	22.0	23.3	22.2	24.9	23.2
Total Stops	4395	4327	4516	4305	4624	4431
Fuel Used (gal)	54.7	53.5	55.5	53.8	56.8	54.9

Interval #0 Information Seeding

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3052	3011	3102	3024	3075	3048
Vehs Exited	3048	2993	3098	3011	3073	3044
Starting Vehs	81	67	83	77	78	70
Ending Vehs	85	85	87	90	80	79
Travel Distance (mi)	1351	1338	1400	1357	1408	1371
Travel Time (hr)	77.1	75.2	79.0	76.3	81.0	77.7
Total Delay (hr)	23.4	22.0	23.3	22.2	24.9	23.2
Total Stops	4395	4327	4516	4305	4624	4431
Fuel Used (gal)	54.7	53.5	55.5	53.8	56.8	54.9

4: Ash Street & Washington Street Performance by lane

Lane	EB	WB	WB	NB	SB	All
Movements Served	LTR	L	TR	LTR	LTR	
Denied Del/Veh (s)						0.0
Total Del/Veh (s)	5.6	5.9	5.4	5.6	0.4	4.0

5: Poplar Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	5.9	7.1	5.0	0.2	5.3

6: Cherry Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.0
Total Del/Veh (s)	5.0	6.2	6.3	1.5	4.3

Total Zone Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	79.8

Intersection: 4: Ash Street & Washington Street

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (ft)	47	28	70	50	4
Average Queue (ft)	23	4	43	27	0
95th Queue (ft)	41	20	65	48	3
Link Distance (ft)	542	740	740	597	211
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Poplar Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	74	79	32	7
Average Queue (ft)	40	42	20	0
95th Queue (ft)	64	68	40	3
Link Distance (ft)	740	791	667	147
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Cherry Street & Washington Street

Movement	EB	WB	NB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	86	85	36
Average Queue (ft)	42	45	13
95th Queue (ft)	71	73	38
Link Distance (ft)	791	3111	640
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 0

WITH WASHINGTON STREET EXTENSION

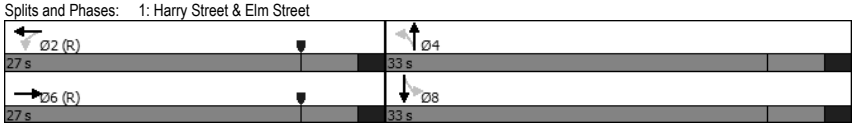
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	447	174	0	294	0	77	0	6	24	16	285
Future Volume (vph)	0	447	174	0	294	0	77	0	6	24	16	285
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	13	13	13	13	13	13	11	11	11
Grade (%)		-4%			2%			3%			-6%	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99						1.00		1.00	0.98	
Frt		0.958						0.991			0.858	
Flt Protected								0.956		0.950		
Satd. Flow (prot)	0	3300	0	0	1788	0	0	1398	0	1431	1461	0
Flt Permitted								0.339		0.743		
Satd. Flow (perm)	0	3300	0	0	1788	0	0	495	0	1118	1461	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		108						55			300	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		281			505			298			915	
Travel Time (s)		7.7			13.8			8.1			25.0	
Confl. Peds. (#/hr)	5		1	1		5	1		1	1		1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	4%	4%	0%	3%	0%	24%	0%	25%	19%	6%	3%
Adj. Flow (vph)	0	539	210	0	354	0	93	0	7	29	19	343
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	749	0	0	354	0	0	100	0	29	362	0
Number of Detectors		1		1	1		1	1		1	1	
Detector Template				Left			Left			Left		
Leading Detector (ft)		37		20	37		20	37		37	37	
Trailing Detector (ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Position(ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Size(ft)		40		20	40		20	40		40	40	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type		NA			NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4			8		
Detector Phase		6		2	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)		15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)		21.0		26.0	26.0		9.0	9.0		9.0	9.0	
Total Split (s)		27.0		27.0	27.0		33.0	33.0		33.0	33.0	
Total Split (%)		45.0%		45.0%	45.0%		55.0%	55.0%		55.0%	55.0%	
Maximum Green (s)		21.0		21.0	21.0		27.0	27.0		27.0	27.0	
Yellow Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0			-1.0		-1.0	-1.0	
Total Lost Time (s)		5.0			5.0			5.0		5.0	5.0	

McMahon Associates, Inc. 601 Washington Street
1: Harry Street & Elm Street 2024 without Dev Weekday AM with Wash Ext

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		13.0		13.0	13.0		20.0	20.0		20.0	20.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 28 (47%), Referenced to phase 2:WBTL and 6:EBT, Start of Yellow	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Harry Street & Elm Street



Lanes, Volumes, Timings 2024 without Dev Weekday AM with Wash Ext
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\04 - 24 WO AM EXT.syn Synchro 10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	447	174	0	294	0	77	0	6	24	16	285
Future Volume (veh/h)	0	447	174	0	294	0	77	0	6	24	16	285
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1968	1968	1849	1805	0	1469	1820	1455	1753	1938	1981
Adj Flow Rate, veh/h	0	539	151	0	354	0	93	0	2	29	19	204
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	4	4	0	3	0	24	0	25	19	6	3
Cap, veh/h	0	1674	467	0	1047	0	261	1	3	521	36	385
Arrive On Green	0.00	0.58	0.56	0.00	0.58	0.00	0.24	0.00	0.24	0.25	0.25	0.24
Sat Flow, veh/h	0	2985	805	0	1805	0	560	5	12	1325	142	1519
Grp Volume(v), veh/h	0	348	342	0	354	0	95	0	0	29	0	223
Grp Sat Flow(s),veh/h/ln	0	1869	1822	0	1805	0	578	0	0	1325	0	1661
Q Serve(g_s), s	0.0	5.8	5.9	0.0	6.2	0.0	4.8	0.0	0.0	0.0	0.0	7.0
Cycle Q Clear(g_c), s	0.0	5.8	5.9	0.0	6.2	0.0	11.8	0.0	0.0	0.8	0.0	7.0
Prop In Lane	0.00		0.44	0.00		0.00	0.98		0.02	1.00		0.91
Lane Grp Cap(c), veh/h	0	1084	1057	0	1047	0	256	0	0	521	0	421
V/C Ratio(X)	0.00	0.32	0.32	0.00	0.34	0.00	0.37	0.00	0.00	0.06	0.00	0.53
Avail Cap(c_a), veh/h	0	1084	1057	0	1047	0	497	0	0	803	0	775
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	6.5	6.6	0.0	6.6	0.0	24.8	0.0	0.0	17.0	0.0	19.7
Incr Delay (d2), s/veh	0.0	0.8	0.8	0.0	0.9	0.0	0.9	0.0	0.0	0.0	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	3.8	3.8	0.0	3.9	0.0	2.4	0.0	0.0	0.5	0.0	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	7.3	7.5	0.0	7.5	0.0	25.7	0.0	0.0	17.1	0.0	20.8
LnGrp LOS	A	A	A	A	A	A	C	A	A	B	A	C
Approach Vol, veh/h		690			354			95			252	
Approach Delay, s/veh		7.4			7.5			25.7			20.3	
Approach LOS		A			A			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		39.8		20.2		39.8		20.2				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		21.0		27.0		21.0		27.0				
Max Q Clear Time (g_c+I1), s		8.7		13.8		8.3		9.0				
Green Ext Time (p_c), s		1.0		0.2		2.3		0.9				
Intersection Summary												
HCM 6th Ctrl Delay			11.0									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	357	75	0	0	0	296	35	7	0	0	0
Future Volume (vph)	14	357	75	0	0	0	296	35	7	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	16	16	16	16	16	16	16	16	16
Grade (%)		-1%			0%			5%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850					0.997				
Flt Protected		0.998						0.958				
Satd. Flow (prot)	0	1891	1677	0	0	0	0	1937	0	0	0	0
Flt Permitted		0.998						0.958				
Satd. Flow (perm)	0	1891	1677	0	0	0	0	1937	0	0	0	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		505			1606			289			377	
Travel Time (s)		13.8			43.8			7.9			10.3	
Confl. Peds. (#/hr)	2		2	2		2	1		1	1		1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	4%	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%
Adj. Flow (vph)	15	392	82	0	0	0	325	38	8	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	407	82	0	0	0	0	371	0	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	15.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	357	75	0	0	0	296	35	7	0	0	0
Future Vol, veh/h	14	357	75	0	0	0	296	35	7	0	0	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	7	4	0	0	0	0	4	0	0	0	0	0
Mvmt Flow	15	392	82	0	0	0	325	38	8	0	0	0
Number of Lanes	0	1	1	0	0	0	0	1	0	0	0	0

Approach	EB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		EB
Conflicting Lanes Left	0	2
Conflicting Approach Right	NB	
Conflicting Lanes Right	1	0
HCM Control Delay	16.4	15
HCM LOS	C	B

Lane	NBLn1	EBLn1	EBLn2
Vol Left, %	88%	4%	0%
Vol Thru, %	10%	96%	0%
Vol Right, %	2%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	338	371	75
LT Vol	296	14	0
Through Vol	35	357	0
RT Vol	7	0	75
Lane Flow Rate	371	408	82
Geometry Grp	2	7	7
Degree of Util (X)	0.555	0.639	0.111
Departure Headway (Hd)	5.375	5.643	4.866
Convergence, Y/N	Yes	Yes	Yes
Cap	665	632	727
Service Time	3.451	3.436	2.659
HCM Lane V/C Ratio	0.558	0.646	0.113
HCM Control Delay	15	18	8.3
HCM Lane LOS	B	C	A
HCM 95th-tile Q	3.4	4.6	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	344	27	0	0	0	0	0	35	11	53	0
Future Volume (vph)	0	344	27	0	0	0	0	0	35	11	53	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	16	16	16	16	16
Grade (%)		3%			0%			7%			-9%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.990							0.865			
Flt Protected											0.991	
Satd. Flow (prot)	0	2043	0	0	0	0	0	0	1762	0	2063	0
Flt Permitted											0.991	
Satd. Flow (perm)	0	2043	0	0	0	0	0	0	1762	0	2063	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1606			1351			328			394	
Travel Time (s)		43.8			36.8			8.9			10.7	
Confl. Peds. (#/hr)	3		2	2		3	5		5	5		5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	3%	0%	0%	0%	0%	0%	0%	2%	18%	6%	0%
Adj. Flow (vph)	0	362	28	0	0	0	0	0	37	12	56	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	390	0	0	0	0	0	0	37	0	68	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	10
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	344	27	0	0	0	0	0	35	11	53	0
Future Vol, veh/h	0	344	27	0	0	0	0	0	35	11	53	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	0	3	0	0	0	0	0	0	2	18	6	0
Mvmt Flow	0	362	28	0	0	0	0	0	37	12	56	0
Number of Lanes	0	1	0	0	0	0	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	10.5	7.5	8.7
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	0%	0%	17%
Vol Thru, %	0%	93%	83%
Vol Right, %	100%	7%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	35	371	64
LT Vol	0	0	11
Through Vol	0	344	53
RT Vol	35	27	0
Lane Flow Rate	37	391	67
Geometry Grp	1	1	1
Degree of Util (X)	0.044	0.443	0.097
Departure Headway (Hd)	4.297	4.088	5.16
Convergence, Y/N	Yes	Yes	Yes
Cap	837	867	699
Service Time	2.301	2.18	3.162
HCM Lane V/C Ratio	0.044	0.451	0.096
HCM Control Delay	7.5	10.5	8.7
HCM Lane LOS	A	B	A
HCM 95th-tile Q	0.1	2.3	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	399	5	51	434	19	14	1	62	25	1	0
Future Volume (vph)	0	399	5	51	434	19	14	1	62	25	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	15	15	15	12	12	12	11	11	11
Grade (%)		1%			-2%			1%			-5%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.995			0.891				
Flt Protected					0.995			0.991			0.954	
Satd. Flow (prot)	0	1996	0	0	2020	0	0	1466	0	0	1729	0
Flt Permitted					0.995			0.991			0.954	
Satd. Flow (perm)	0	1996	0	0	2020	0	0	1466	0	0	1729	0
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		736			781			539			303	
Travel Time (s)		20.1			21.3			12.3			6.9	
Confl. Peds. (#/hr)			1	1					2	2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	4%	0%	5%	3%	10%	14%	0%	14%	4%	0%	0%
Adj. Flow (vph)	0	424	5	54	462	20	15	1	66	27	1	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	429	0	0	536	0	0	82	0	0	28	0
Sign Control		Free			Free			Stop			Stop	

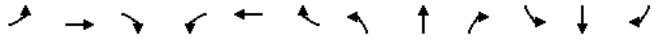
Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	399	5	51	434	19	14	1	62	25	1	0
Future Vol, veh/h	0	399	5	51	434	19	14	1	62	25	1	0
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	-2	-	-	1	-	-	-5	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	4	0	5	3	10	14	0	14	4	0	0
Mvmt Flow	0	424	5	54	462	20	15	1	66	27	1	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	482	0	0	430	0	0	1009	1018	430	1042	1010	472
Stage 1	-	-	-	-	-	-	428	428	-	580	580	-
Stage 2	-	-	-	-	-	-	581	590	-	462	430	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.44	6.7	6.44	6.14	5.5	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.44	5.7	-	5.14	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.44	5.7	-	5.14	4.5	-
Follow-up Hdwy	3	-	-	3	-	-	3	4	3.1	3	4	3.1
Pot Cap-1 Maneuver	819	-	-	854	-	-	221	226	644	304	320	669
Stage 1	-	-	-	-	-	-	663	574	-	661	591	-
Stage 2	-	-	-	-	-	-	535	482	-	748	661	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	819	-	-	853	-	-	206	206	642	253	292	669
Mov Cap-2 Maneuver	-	-	-	-	-	-	206	206	-	253	292	-
Stage 1	-	-	-	-	-	-	662	573	-	661	540	-
Stage 2	-	-	-	-	-	-	487	440	-	668	660	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1	14.6	20.9
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	455	819	-	-	853	-	-	254
HCM Lane V/C Ratio	0.18	-	-	-	0.064	-	-	0.109
HCM Control Delay (s)	14.6	0	-	-	9.5	0	-	20.9
HCM Lane LOS	B	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.7	0	-	-	0.2	-	-	0.4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	400	10	10	460	55	5	18	3	67	11	53
Future Volume (vph)	79	400	10	10	460	55	5	18	3	67	11	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	10	11	11	12	12	12	16	16	16
Grade (%)		-1%			-1%			3%			-7%	
Storage Length (ft)	150		0	90		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	70			40			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00			0.98	
Frt		0.996			0.984			0.986			0.945	
Flt Protected	0.950			0.950				0.991			0.975	
Satd. Flow (prot)	1613	1771	0	1604	1664	0	0	1728	0	0	1844	0
Flt Permitted	0.274			0.505				0.945			0.824	
Satd. Flow (perm)	465	1771	0	853	1664	0	0	1644	0	0	1553	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			7			3			24	
Link Speed (mph)		25			25			25			35	
Link Distance (ft)		781			600			343			548	
Travel Time (s)		21.3			16.4			9.4			10.7	
Confl. Peds. (#/hr)							5		2	2		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	5%	10%	0%	3%	7%	0%	0%	0%	3%	0%	6%
Adj. Flow (vph)	86	435	11	11	500	60	5	20	3	73	12	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	446	0	11	560	0	0	28	0	0	143	0
Number of Detectors	1	0		0	0		1	1		1	1	
Detector Template							Left			Left		
Leading Detector (ft)	37	0		0	0		20	37		20	37	
Trailing Detector (ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Position(ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Size(ft)	40	6		20	6		20	40		20	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	3.0	15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	9.0	21.0		21.0	21.0		9.0	9.0		9.0	9.0	
Total Split (s)	13.0	75.0		62.0	62.0		23.0	23.0		23.0	23.0	
Total Split (%)	10.8%	62.5%		51.7%	51.7%		19.2%	19.2%		19.2%	19.2%	
Maximum Green (s)	7.0	69.0		56.0	56.0		17.0	17.0		17.0	17.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	

McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street 2024 without Dev Weekday AM with Wash Ext

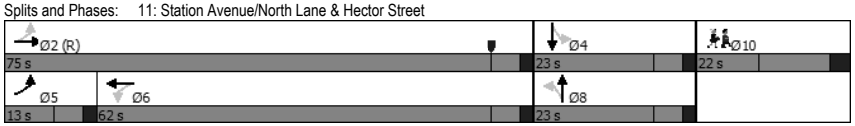
Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	36.0
Total Split (s)	22.0
Total Split (%)	18%
Maximum Green (s)	9.0
Yellow Time (s)	10.0

Lanes, Volumes, Timings 2024 without Dev Weekday AM with Wash Ext
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\04 - 24 WO AM EXT.syn Synchro 10

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		Max	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	73.2	73.2		62.8	62.8			14.8			14.8	
Actuated g/C Ratio	0.61	0.61		0.52	0.52			0.12			0.12	
v/c Ratio	0.24	0.41		0.02	0.64			0.14			0.67	
Control Delay	12.1	14.1		16.9	26.2			43.0			57.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	12.1	14.1		16.9	26.2			43.0			57.0	
LOS	B	B		B	C			D			E	
Approach Delay		13.8			26.0			43.0			57.0	
Approach LOS		B			C			D			E	
Queue Length 50th (ft)	26	172		4	317			17			88	
Queue Length 95th (ft)	52	257		15	468			45			157	
Internal Link Dist (ft)		701			520			263			468	
Turn Bay Length (ft)	150			90								
Base Capacity (vph)	359	1080		446	874			249			253	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.24	0.41		0.02	0.64			0.11			0.57	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 26 (22%), Referenced to phase 2:EBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 24.8		Intersection LOS: C	
Intersection Capacity Utilization 62.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 11: Station Avenue/North Lane & Hector Street



McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street 2024 without Dev Weekday AM with Wash Ext

Lane Group	Ø10
All-Red Time (s)	3.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	7
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lanes, Volumes, Timings 2024 without Dev Weekday AM with Wash Ext
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\04 - 24 WO AM EXT.syn Synchro 10

SimTraffic Simulation Summary
2024 without Dev Weekday AM with Wash Ext 03/02/2022

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:45	6:45	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2673	2766	2847	2707	2733	2743
Vehs Exited	2649	2784	2836	2697	2738	2740
Starting Vehs	50	74	57	66	69	59
Ending Vehs	74	56	68	76	64	64
Travel Distance (mi)	1118	1178	1175	1121	1164	1151
Travel Time (hr)	63.5	66.4	67.1	63.1	67.8	65.6
Total Delay (hr)	18.4	18.8	19.6	17.9	20.9	19.1
Total Stops	3848	4017	4045	3852	4068	3964
Fuel Used (gal)	45.4	47.7	47.6	45.4	47.9	46.8

Interval #0 Information Seeding

Start Time	6:45
End Time	7:00
Total Time (min)	15

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2673	2766	2847	2707	2733	2743
Vehs Exited	2649	2784	2836	2697	2738	2740
Starting Vehs	50	74	57	66	69	59
Ending Vehs	74	56	68	76	64	64
Travel Distance (mi)	1118	1178	1175	1121	1164	1151
Travel Time (hr)	63.5	66.4	67.1	63.1	67.8	65.6
Total Delay (hr)	18.4	18.8	19.6	17.9	20.9	19.1
Total Stops	3848	4017	4045	3852	4068	3964
Fuel Used (gal)	45.4	47.7	47.6	45.4	47.9	46.8

SimTraffic Performance Report
2024 without Dev Weekday AM with Wash Ext 03/02/2022

4: Ash Street & Washington Street Performance by lane

Lane	EB	WB	WB	NB	SB	All
Movements Served	LTR	L	TR	LTR	LTR	
Denied Del/Veh (s)						0.0
Total Del/Veh (s)	4.4	5.1	6.2	5.2	0.3	5.2

5: Poplar Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	5.0	6.5	5.6	0.2	5.8

6: Cherry Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	5.9	8.3	5.9	1.5	6.2

Total Zone Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	60.2

Intersection: 4: Ash Street & Washington Street

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (ft)	28	33	94	41	12
Average Queue (ft)	13	8	55	25	0
95th Queue (ft)	32	28	79	47	6
Link Distance (ft)	542	740	740	597	211
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Poplar Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	59	111	59	7
Average Queue (ft)	25	57	28	0
95th Queue (ft)	50	88	51	3
Link Distance (ft)	740	791	667	147
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Cherry Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	51	205	44	17
Average Queue (ft)	29	86	18	1
95th Queue (ft)	48	150	44	10
Link Distance (ft)	791	3111	640	268
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0

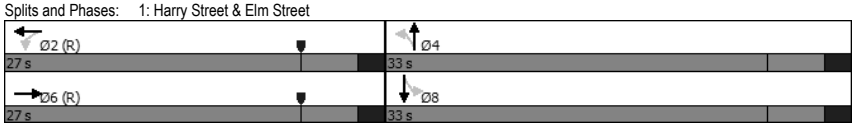
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	658	67	1	205	0	157	0	16	40	8	270
Future Volume (vph)	0	658	67	1	205	0	157	0	16	40	8	270
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	13	13	13	13	13	13	11	11	11
Grade (%)		-4%			2%			3%			-6%	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00		1.00		
Frt		0.986						0.987			0.854	
Flt Protected								0.957		0.950		
Satd. Flow (prot)	0	3513	0	0	1805	0	0	1728	0	1703	1496	0
Flt Permitted					0.998			0.422		0.709		
Satd. Flow (perm)	0	3513	0	0	1802	0	0	762	0	1267	1496	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20						55			281	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		281			505			298			915	
Travel Time (s)		7.7			13.8			8.1			25.0	
Confl. Peds. (#/hr)	1					1			6	6		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	1%	3%	0%	2%	0%	0%	8%	0%	0%	13%	2%
Adj. Flow (vph)	0	685	70	1	214	0	164	0	17	42	8	281
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	755	0	0	215	0	0	181	0	42	289	0
Number of Detectors		1		1	1		1	1		1	1	
Detector Template				Left			Left			Left		
Leading Detector (ft)		37		20	37		20	37		37	37	
Trailing Detector (ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Position(ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Size(ft)		40		20	40		20	40		40	40	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4			8		
Detector Phase		6		2	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)		15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)		21.0		26.0	26.0		9.0	9.0		9.0	9.0	
Total Split (s)		27.0		27.0	27.0		33.0	33.0		33.0	33.0	
Total Split (%)		45.0%		45.0%	45.0%		55.0%	55.0%		55.0%	55.0%	
Maximum Green (s)		21.0		21.0	21.0		27.0	27.0		27.0	27.0	
Yellow Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0			-1.0		-1.0	-1.0	
Total Lost Time (s)		5.0			5.0			5.0		5.0	5.0	

McMahon Associates, Inc. 601 Washington Street
1: Harry Street & Elm Street 2024 without Dev Weekday PM with Wash Ext

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		13.0		13.0	13.0		20.0	20.0		20.0	20.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 48 (80%), Referenced to phase 2:WBTL and 6:EBT, Start of Yellow	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Harry Street & Elm Street



Lanes, Volumes, Timings 2024 without Dev Weekday PM with Wash Ext
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\04 - 24 WO PM EXT.syn Synchro 10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	658	67	1	205	0	157	0	16	40	8	270
Future Volume (veh/h)	0	658	67	1	205	0	157	0	16	40	8	270
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	2012	1983	1849	1820	0	1820	1703	1820	2024	1839	1995
Adj Flow Rate, veh/h	0	685	45	1	214	0	164	0	14	42	8	200
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	1	3	0	2	0	0	8	0	0	13	2
Cap, veh/h	0	1838	121	61	917	0	333	5	19	702	20	491
Arrive On Green	0.00	0.50	0.49	0.49	0.50	0.00	0.31	0.00	0.31	0.33	0.33	0.31
Sat Flow, veh/h	0	3742	239	1	1817	0	661	14	58	1509	60	1493
Grp Volume(v), veh/h	0	359	371	215	0	0	178	0	0	42	0	208
Grp Sat Flow(s),veh/h/ln	0	1912	1969	1818	0	0	733	0	0	1509	0	1553
Q Serve(g_s), s	0.0	6.9	6.9	0.0	0.0	0.0	9.0	0.0	0.0	0.0	0.0	6.3
Cycle Q Clear(g_c), s	0.0	6.9	6.9	4.0	0.0	0.0	15.4	0.0	0.0	0.9	0.0	6.3
Prop In Lane	0.00		0.12	0.00		0.00	0.92		0.08	1.00		0.96
Lane Grp Cap(c), veh/h	0	965	994	948	0	0	344	0	0	702	0	510
V/C Ratio(X)	0.00	0.37	0.37	0.23	0.00	0.00	0.52	0.00	0.00	0.06	0.00	0.41
Avail Cap(c_a), veh/h	0	965	994	948	0	0	494	0	0	911	0	725
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.1	9.1	8.3	0.0	0.0	21.8	0.0	0.0	13.8	0.0	16.0
Incr Delay (d2), s/veh	0.0	1.1	1.1	0.6	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	5.0	5.2	2.8	0.0	0.0	4.3	0.0	0.0	0.7	0.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.2	10.2	8.9	0.0	0.0	23.1	0.0	0.0	13.9	0.0	16.5
LnGrp LOS	A	B	B	A	A	A	C	A	A	B	A	B
Approach Vol, veh/h		730			215			178			250	
Approach Delay, s/veh		10.2			8.9			23.1			16.1	
Approach LOS		B			A			C			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		35.3		24.7		35.3		24.7				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		21.0		27.0		21.0		27.0				
Max Q Clear Time (g_c+I1), s		6.0		17.4		9.4		8.3				
Green Ext Time (p_c), s		0.6		0.5		2.3		0.9				
Intersection Summary												
HCM 6th Ctrl Delay			12.7									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	536	153	0	0	0	208	24	11	0	0	0
Future Volume (vph)	23	536	153	0	0	0	208	24	11	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	16	16	16	16	16	16	16	16	16
Grade (%)		-1%			0%			5%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850					0.994				
Flt Protected		0.998						0.959				
Satd. Flow (prot)	0	1950	1661	0	0	0	0	1984	0	0	0	0
Flt Permitted		0.998						0.959				
Satd. Flow (perm)	0	1950	1661	0	0	0	0	1984	0	0	0	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		505			1606			289			377	
Travel Time (s)		13.8			43.8			7.9			10.3	
Confl. Peds. (#/hr)	2					2			4	4		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%	1%	0%	0%	0%	0%	0%
Adj. Flow (vph)	24	570	163	0	0	0	221	26	12	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	594	163	0	0	0	0	259	0	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	23.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	536	153	0	0	0	208	24	11	0	0	0
Future Vol, veh/h	23	536	153	0	0	0	208	24	11	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	0	1	1	0	0	0	1	0	0	0	0	0
Mvmt Flow	24	570	163	0	0	0	221	26	12	0	0	0
Number of Lanes	0	1	1	0	0	0	0	1	0	0	0	0

Approach	EB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		EB
Conflicting Lanes Left	0	2
Conflicting Approach Right	NB	
Conflicting Lanes Right	1	0
HCM Control Delay	27.7	12.8
HCM LOS	D	B

Lane	NBLn1	EBLn1	EBLn2
Vol Left, %	86%	4%	0%
Vol Thru, %	10%	96%	0%
Vol Right, %	5%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	243	559	153
LT Vol	208	23	0
Through Vol	24	536	0
RT Vol	11	0	153
Lane Flow Rate	259	595	163
Geometry Grp	2	7	7
Degree of Util (X)	0.411	0.869	0.206
Departure Headway (Hd)	5.725	5.262	4.554
Convergence, Y/N	Yes	Yes	Yes
Cap	626	684	781
Service Time	3.802	3.033	2.324
HCM Lane V/C Ratio	0.414	0.87	0.209
HCM Control Delay	12.8	32.9	8.5
HCM Lane LOS	B	D	A
HCM 95th-tile Q	2	10.3	0.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	470	50	0	0	0	0	0	53	26	45	0
Future Volume (vph)	0	470	50	0	0	0	0	0	53	26	45	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	16	16	16	16	16
Grade (%)		3%			0%			7%			-9%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.987							0.865			
Flt Protected											0.982	
Satd. Flow (prot)	0	2075	0	0	0	0	0	0	1797	0	2155	0
Flt Permitted											0.982	
Satd. Flow (perm)	0	2075	0	0	0	0	0	0	1797	0	2155	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1606			1351			328			394	
Travel Time (s)		43.8			36.8			8.9			10.7	
Confl. Peds. (#/hr)	2		7	7		2	5		1	1		5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%
Adj. Flow (vph)	0	500	53	0	0	0	0	0	56	28	48	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	553	0	0	0	0	0	0	56	0	76	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	13.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	470	50	0	0	0	0	0	53	26	45	0
Future Vol, veh/h	0	470	50	0	0	0	0	0	53	26	45	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	4	0
Mvmt Flow	0	500	53	0	0	0	0	0	56	28	48	0
Number of Lanes	0	1	0	0	0	0	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	14.5	8.1	9
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	0%	0%	37%
Vol Thru, %	0%	90%	63%
Vol Right, %	100%	10%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	53	520	71
LT Vol	0	0	26
Through Vol	0	470	45
RT Vol	53	50	0
Lane Flow Rate	56	553	76
Geometry Grp	1	1	1
Degree of Util (X)	0.073	0.644	0.111
Departure Headway (Hd)	4.646	4.192	5.288
Convergence, Y/N	Yes	Yes	Yes
Cap	769	863	678
Service Time	2.685	2.213	3.325
HCM Lane V/C Ratio	0.073	0.641	0.112
HCM Control Delay	8.1	14.5	9
HCM Lane LOS	A	B	A
HCM 95th-tile Q	0.2	4.8	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	548	12	55	377	14	10	1	46	50	4	3
Future Volume (vph)	3	548	12	55	377	14	10	1	46	50	4	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	15	15	15	12	12	12	11	11	11
Grade (%)		1%			-2%			1%			-5%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.996			0.891			0.993	
Flt Protected					0.994			0.991			0.958	
Satd. Flow (prot)	0	2053	0	0	2055	0	0	1641	0	0	1761	0
Flt Permitted					0.994			0.991			0.958	
Satd. Flow (perm)	0	2053	0	0	2055	0	0	1641	0	0	1761	0
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		736			781			539			303	
Travel Time (s)		20.1			21.3			12.3			6.9	
Confl. Peds. (#/hr)	1		2	2		1	1		3	3		1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	10%	0%	0%	0%	25%	0%
Adj. Flow (vph)	3	565	12	57	389	14	10	1	47	52	4	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	580	0	0	460	0	0	58	0	0	59	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	3	548	12	55	377	14	10	1	46	50	4	3
Future Vol, veh/h	3	548	12	55	377	14	10	1	46	50	4	3
Conflicting Peds, #/hr	1	0	2	2	0	1	1	0	3	3	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	-2	-	-	1	-	-	-5	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	1	0	0	2	0	10	0	0	0	25	0
Mvmt Flow	3	565	12	57	389	14	10	1	47	52	4	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	404	0	0	579	0	0	1094	1097	576	1115	1096	398
Stage 1	-	-	-	-	-	-	579	579	-	511	511	-
Stage 2	-	-	-	-	-	-	515	518	-	604	585	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.4	6.7	6.3	6.1	5.75	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.4	5.7	-	5.1	4.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.4	5.7	-	5.1	4.75	-
Follow-up Hdwy	3	-	-	3	-	-	3	4	3.1	3	4.225	3.1
Pot Cap-1 Maneuver	872	-	-	758	-	-	193	202	538	279	263	730
Stage 1	-	-	-	-	-	-	540	488	-	714	577	-
Stage 2	-	-	-	-	-	-	591	521	-	649	544	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	871	-	-	757	-	-	174	181	535	232	236	728
Mov Cap-2 Maneuver	-	-	-	-	-	-	174	181	-	232	236	-
Stage 1	-	-	-	-	-	-	536	485	-	710	520	-
Stage 2	-	-	-	-	-	-	527	470	-	585	540	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.3	16.1	24.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	383	871	-	-	757	-	-	241
HCM Lane V/C Ratio	0.153	0.004	-	-	0.075	-	-	0.244
HCM Control Delay (s)	16.1	9.1	0	-	10.1	0	-	24.7
HCM Lane LOS	C	A	A	-	B	A	-	C
HCM 95th %tile Q(veh)	0.5	0	-	-	0.2	-	-	0.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	591	8	18	364	54	5	19	9	97	30	62
Future Volume (vph)	57	591	8	18	364	54	5	19	9	97	30	62
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	10	11	11	12	12	12	16	16	16
Grade (%)		-1%			-1%			3%			-7%	
Storage Length (ft)	150		0	90		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	70			40			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00			0.99	
Frt		0.998			0.981			0.961			0.956	
Flt Protected	0.950			0.950				0.993			0.975	
Satd. Flow (prot)	1661	1847	0	1604	1686	0	0	1692	0	0	1935	0
Flt Permitted	0.344			0.342				0.953			0.820	
Satd. Flow (perm)	602	1847	0	577	1686	0	0	1622	0	0	1628	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			8			10			18	
Link Speed (mph)		25			25			25			35	
Link Distance (ft)		781			600			343			548	
Travel Time (s)		21.3			16.4			9.4			10.7	
Confl. Peds. (#/hr)							4					4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	61	629	9	19	387	57	5	20	10	103	32	66
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	638	0	19	444	0	0	35	0	0	201	0
Number of Detectors	1	0		0	0		1	1		1	1	
Detector Template							Left			Left		
Leading Detector (ft)	37	0		0	0		20	37		20	37	
Trailing Detector (ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Position(ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Size(ft)	40	6		20	6		20	40		20	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	3.0	15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	9.0	21.0		21.0	21.0		9.0	9.0		9.0	9.0	
Total Split (s)	13.0	72.0		59.0	59.0		26.0	26.0		26.0	26.0	
Total Split (%)	10.8%	60.0%		49.2%	49.2%		21.7%	21.7%		21.7%	21.7%	
Maximum Green (s)	7.0	66.0		53.0	53.0		20.0	20.0		20.0	20.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	

McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street 2024 without Dev Weekday PM with Wash Ext

Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	36.0
Total Split (s)	22.0
Total Split (%)	18%
Maximum Green (s)	9.0
Yellow Time (s)	10.0

Lanes, Volumes, Timings 2024 without Dev Weekday PM with Wash Ext
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\04 - 24 WO PM EXT.syn Synchro 10

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		Max	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	69.7	69.7		59.4	59.4			18.3			18.3	
Actuated g/C Ratio	0.58	0.58		0.50	0.50			0.15			0.15	
v/c Ratio	0.15	0.59		0.07	0.53			0.14			0.76	
Control Delay	12.7	19.6		19.6	24.9			34.2			63.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	12.7	19.6		19.6	24.9			34.2			63.1	
LOS	B	B		B	C			C			E	
Approach Delay		19.0			24.7			34.2			63.1	
Approach LOS		B			C			C			E	
Queue Length 50th (ft)	20	310		8	242			17			136	
Queue Length 95th (ft)	42	440		24	354			47			219	
Internal Link Dist (ft)		701			520			263			468	
Turn Bay Length (ft)	150			90								
Base Capacity (vph)	420	1073		285	838			292			299	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.15	0.59		0.07	0.53			0.12			0.67	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 76 (63%), Referenced to phase 2:EBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 27.6		Intersection LOS: C	
Intersection Capacity Utilization 76.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 11: Station Avenue/North Lane & Hector Street



McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street 2024 without Dev Weekday PM with Wash Ext

Lane Group	Ø10
All-Red Time (s)	3.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	4
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lanes, Volumes, Timings 2024 without Dev Weekday PM with Wash Ext
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\04 - 24 WO PM EXT.syn Synchro 10

SimTraffic Simulation Summary
2024 without Dev Weekday PM with Wash Ext 03/02/2022

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:45	4:45	4:45	4:45	4:45	4:45
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2960	2915	2938	3089	2897	2960
Vehs Exited	2965	2925	2918	3070	2893	2955
Starting Vehs	78	89	85	76	78	75
Ending Vehs	73	79	105	95	82	81
Travel Distance (mi)	1385	1330	1317	1446	1335	1363
Travel Time (hr)	80.6	76.7	75.5	84.2	77.5	78.9
Total Delay (hr)	25.6	23.7	23.1	26.6	24.2	24.6
Total Stops	4625	4355	4285	4863	4375	4501
Fuel Used (gal)	55.8	53.5	52.6	58.6	53.6	54.8

Interval #0 Information Seeding

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2960	2915	2938	3089	2897	2960
Vehs Exited	2965	2925	2918	3070	2893	2955
Starting Vehs	78	89	85	76	78	75
Ending Vehs	73	79	105	95	82	81
Travel Distance (mi)	1385	1330	1317	1446	1335	1363
Travel Time (hr)	80.6	76.7	75.5	84.2	77.5	78.9
Total Delay (hr)	25.6	23.7	23.1	26.6	24.2	24.6
Total Stops	4625	4355	4285	4863	4375	4501
Fuel Used (gal)	55.8	53.5	52.6	58.6	53.6	54.8

SimTraffic Performance Report
2024 without Dev Weekday PM with Wash Ext 03/02/2022

4: Ash Street & Washington Street Performance by lane

Lane	EB	WB	WB	NB	SB	All
Movements Served	LTR	L	TR	LTR	LTR	
Denied Del/Veh (s)						0.0
Total Del/Veh (s)	6.3	6.7	5.7	6.1	0.4	4.0

5: Poplar Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	5.5	7.2	4.9	0.2	5.3

6: Cherry Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.0
Total Del/Veh (s)	5.1	7.3	6.3	1.1	4.8

Total Zone Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	80.5

Intersection: 4: Ash Street & Washington Street

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (ft)	55	33	83	54	4
Average Queue (ft)	23	7	47	24	0
95th Queue (ft)	43	28	74	49	3
Link Distance (ft)	542	740	740	597	211
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Poplar Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	69	91	36	7
Average Queue (ft)	38	44	19	0
95th Queue (ft)	60	72	40	4
Link Distance (ft)	740	791	667	147
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Cherry Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	78	81	31	15
Average Queue (ft)	43	44	14	0
95th Queue (ft)	71	73	39	6
Link Distance (ft)	791	3111	640	268
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0

Appendix J

2024 Future with Development Capacity/Level-of-Service Analysis Worksheets

WITHOUT WASHINGTON STREET EXTENSION

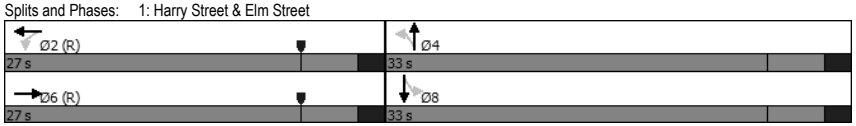
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	463	174	0	351	0	77	0	6	26	16	285
Future Volume (vph)	0	463	174	0	351	0	77	0	6	26	16	285
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	13	13	13	13	13	13	11	11	11
Grade (%)		-4%			2%			3%			-6%	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99						1.00		1.00	0.98	
Frt		0.959						0.991			0.858	
Flt Protected								0.956		0.950		
Satd. Flow (prot)	0	3304	0	0	1788	0	0	1398	0	1431	1461	0
Flt Permitted								0.286		0.737		
Satd. Flow (perm)	0	3304	0	0	1788	0	0	418	0	1109	1461	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		103						55			233	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		281			505			298			915	
Travel Time (s)		7.7			13.8			8.1			25.0	
Confl. Peds. (#/hr)	5		1	1		5	1		1	1		1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	4%	4%	0%	3%	0%	24%	0%	25%	19%	6%	3%
Adj. Flow (vph)	0	558	210	0	423	0	93	0	7	31	19	343
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	768	0	0	423	0	0	100	0	31	362	0
Number of Detectors		1		1	1		1	1		1	1	
Detector Template				Left			Left			Left		
Leading Detector (ft)		37		20	37		20	37		37	37	
Trailing Detector (ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Position(ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Size(ft)		40		20	40		20	40		40	40	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type		NA			NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4			8		
Detector Phase		6		2	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)		15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)		21.0		26.0	26.0		9.0	9.0		9.0	9.0	
Total Split (s)		27.0		27.0	27.0		33.0	33.0		33.0	33.0	
Total Split (%)		45.0%		45.0%	45.0%		55.0%	55.0%		55.0%	55.0%	
Maximum Green (s)		21.0		21.0	21.0		27.0	27.0		27.0	27.0	
Yellow Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0			-1.0		-1.0	-1.0	
Total Lost Time (s)		5.0			5.0			5.0		5.0	5.0	

McMahon Associates, Inc. 601 Washington Street
1: Harry Street & Elm Street 2024 with Dev Weekday AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		13.0		13.0	13.0		20.0	20.0		20.0	20.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 28 (47%), Referenced to phase 2:WBTL and 6:EBT, Start of Yellow	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Harry Street & Elm Street



Lanes, Volumes, Timings 2024 with Dev Weekday AM
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\03 - 24 W AM.syn Synchro 10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	463	174	0	351	0	77	0	6	26	16	285
Future Volume (veh/h)	0	463	174	0	351	0	77	0	6	26	16	285
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1968	1968	1849	1805	0	1469	1820	1455	1753	1938	1981
Adj Flow Rate, veh/h	0	558	151	0	423	0	93	0	2	31	19	204
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	4	4	0	3	0	24	0	25	19	6	3
Cap, veh/h	0	1688	455	0	1047	0	261	1	3	521	36	385
Arrive On Green	0.00	0.58	0.56	0.00	0.58	0.00	0.24	0.00	0.24	0.25	0.25	0.24
Sat Flow, veh/h	0	3009	785	0	1805	0	560	5	12	1325	142	1519
Grp Volume(v), veh/h	0	358	351	0	423	0	95	0	0	31	0	223
Grp Sat Flow(s),veh/h/ln	0	1869	1826	0	1805	0	578	0	0	1325	0	1661
Q Serve(g_s), s	0.0	6.0	6.1	0.0	7.7	0.0	4.8	0.0	0.0	0.0	0.0	7.0
Cycle Q Clear(g_c), s	0.0	6.0	6.1	0.0	7.7	0.0	11.8	0.0	0.0	0.8	0.0	7.0
Prop In Lane	0.00		0.43	0.00		0.00	0.98		0.02	1.00		0.91
Lane Grp Cap(c), veh/h	0	1084	1059	0	1047	0	256	0	0	521	0	421
V/C Ratio(X)	0.00	0.33	0.33	0.00	0.40	0.00	0.37	0.00	0.00	0.06	0.00	0.53
Avail Cap(c_a), veh/h	0	1084	1059	0	1047	0	497	0	0	803	0	775
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	6.5	6.7	0.0	6.9	0.0	24.8	0.0	0.0	17.0	0.0	19.7
Incr Delay (d2), s/veh	0.0	0.8	0.8	0.0	1.2	0.0	0.9	0.0	0.0	0.0	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	3.9	3.9	0.0	4.9	0.0	2.4	0.0	0.0	0.6	0.0	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	7.4	7.5	0.0	8.1	0.0	25.7	0.0	0.0	17.1	0.0	20.8
LnGrp LOS	A	A	A	A	A	A	C	A	A	B	A	C
Approach Vol, veh/h		709			423			95			254	
Approach Delay, s/veh		7.4			8.1			25.7			20.3	
Approach LOS		A			A			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		39.8		20.2		39.8		20.2				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		21.0		27.0		21.0		27.0				
Max Q Clear Time (g_c+I1), s		10.2		13.8		8.5		9.0				
Green Ext Time (p_c), s		1.2		0.2		2.3		0.9				
Intersection Summary												
HCM 6th Ctrl Delay			11.0									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	370	81	0	0	0	353	43	7	0	0	0
Future Volume (vph)	14	370	81	0	0	0	353	43	7	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	16	16	16	16	16	16	16	16	16
Grade (%)		-1%			0%			5%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850					0.998				
Flt Protected		0.998						0.958				
Satd. Flow (prot)	0	1892	1677	0	0	0	0	1939	0	0	0	0
Flt Permitted		0.998						0.958				
Satd. Flow (perm)	0	1892	1677	0	0	0	0	1939	0	0	0	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		505			1606			289			377	
Travel Time (s)		13.8			43.8			7.9			10.3	
Confl. Peds. (#/hr)	2		2	2		2	1		1	1		1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	4%	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%
Adj. Flow (vph)	15	407	89	0	0	0	388	47	8	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	422	89	0	0	0	0	443	0	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	19.5
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	370	81	0	0	0	353	43	7	0	0	0
Future Vol, veh/h	14	370	81	0	0	0	353	43	7	0	0	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	7	4	0	0	0	0	4	0	0	0	0	0
Mvmt Flow	15	407	89	0	0	0	388	47	8	0	0	0
Number of Lanes	0	1	1	0	0	0	0	1	0	0	0	0

Approach	EB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		EB
Conflicting Lanes Left	0	2
Conflicting Approach Right	NB	
Conflicting Lanes Right	1	0
HCM Control Delay	19.2	19.8
HCM LOS	C	C

Lane	NBLn1	EBLn1	EBLn2
Vol Left, %	88%	4%	0%
Vol Thru, %	11%	96%	0%
Vol Right, %	2%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	403	384	81
LT Vol	353	14	0
Through Vol	43	370	0
RT Vol	7	0	81
Lane Flow Rate	443	422	89
Geometry Grp	2	7	7
Degree of Util (X)	0.685	0.699	0.128
Departure Headway (Hd)	5.566	5.963	5.185
Convergence, Y/N	Yes	Yes	Yes
Cap	655	608	692
Service Time	3.566	3.693	2.914
HCM Lane V/C Ratio	0.676	0.694	0.129
HCM Control Delay	19.8	21.4	8.7
HCM Lane LOS	C	C	A
HCM 95th-tile Q	5.4	5.6	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	344	34	0	0	0	0	0	108	11	89	0
Future Volume (vph)	0	344	34	0	0	0	0	0	108	11	89	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	16	16	16	16	16
Grade (%)		3%			0%			7%			-9%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.988							0.865			
Flt Protected											0.994	
Satd. Flow (prot)	0	2040	0	0	0	0	0	0	1762	0	2083	0
Flt Permitted											0.994	
Satd. Flow (perm)	0	2040	0	0	0	0	0	0	1762	0	2083	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1606			1351			328			394	
Travel Time (s)		43.8			36.8			8.9			10.7	
Confl. Peds. (#/hr)	3		2	2		3	5		5	5		5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	3%	0%	0%	0%	0%	0%	0%	2%	18%	6%	0%
Adj. Flow (vph)	0	362	36	0	0	0	0	0	114	12	94	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	398	0	0	0	0	0	0	114	0	106	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	344	34	0	0	0	0	0	108	11	89	0
Future Vol, veh/h	0	344	34	0	0	0	0	0	108	11	89	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	0	3	0	0	0	0	0	0	2	18	6	0
Mvmt Flow	0	362	36	0	0	0	0	0	114	12	94	0
Number of Lanes	0	1	0	0	0	0	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	11.6	8.2	9.3
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	0%	0%	11%
Vol Thru, %	0%	91%	89%
Vol Right, %	100%	9%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	108	378	100
LT Vol	0	0	11
Through Vol	0	344	89
RT Vol	108	34	0
Lane Flow Rate	114	398	105
Geometry Grp	1	1	1
Degree of Util (X)	0.139	0.489	0.155
Departure Headway (Hd)	4.411	4.425	5.297
Convergence, Y/N	Yes	Yes	Yes
Cap	809	812	676
Service Time	2.454	2.457	3.341
HCM Lane V/C Ratio	0.141	0.49	0.155
HCM Control Delay	8.2	11.6	9.3
HCM Lane LOS	A	B	A
HCM 95th-tile Q	0.5	2.7	0.5

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	30	12	0	73	42	0
Future Volume (vph)	30	12	0	73	42	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.962					
Flt Protected					0.950	
Satd. Flow (prot)	1792	0	0	1863	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1792	0	0	1863	1770	0
Link Speed (mph)	25			25	30	
Link Distance (ft)	1274			316	305	
Travel Time (s)	34.7			8.6	6.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	13	0	81	47	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	46	0	0	81	47	0
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	2.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	30	12	0	73	42	0
Future Vol, veh/h	30	12	0	73	42	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	13	0	81	47	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	46	0	121	40
Stage 1	-	-	-	-	40	-
Stage 2	-	-	-	-	81	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1562	-	874	1031
Stage 1	-	-	-	-	982	-
Stage 2	-	-	-	-	942	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1562	-	874	1031
Mov Cap-2 Maneuver	-	-	-	-	874	-
Stage 1	-	-	-	-	982	-
Stage 2	-	-	-	-	942	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	874	-	-	1562	-
HCM Lane V/C Ratio	0.053	-	-	-	-
HCM Control Delay (s)	9.4	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	18	12	0	32	41	0
Future Volume (vph)	18	12	0	32	41	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.947					
Flt Protected					0.950	
Satd. Flow (prot)	1764	0	0	1863	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1764	0	0	1863	1770	0
Link Speed (mph)	25			25	30	
Link Distance (ft)	316			1585	353	
Travel Time (s)	8.6			43.2	8.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	20	13	0	36	46	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	33	0	0	36	46	0
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	3.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	18	12	0	32	41	0
Future Vol, veh/h	18	12	0	32	41	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	13	0	36	46	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	33	0	63	27
Stage 1	-	-	-	-	27	-
Stage 2	-	-	-	-	36	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1579	-	943	1048
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	986	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1579	-	943	1048
Mov Cap-2 Maneuver	-	-	-	-	943	-
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	986	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	943	-	-	1579	-
HCM Lane V/C Ratio	0.048	-	-	-	-
HCM Control Delay (s)	9	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	472	5	21	470	19	14	1	7	25	1	0
Future Volume (vph)	0	472	5	21	470	19	14	1	7	25	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	15	15	15	12	12	12	11	11	11
Grade (%)		1%			-2%			1%			-5%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.995			0.959				
Flt Protected					0.998			0.968			0.954	
Satd. Flow (prot)	0	1998	0	0	2028	0	0	1548	0	0	1729	0
Flt Permitted					0.998			0.968			0.954	
Satd. Flow (perm)	0	1998	0	0	2028	0	0	1548	0	0	1729	0
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		736			781			539			303	
Travel Time (s)		20.1			21.3			12.3			6.9	
Confl. Peds. (#/hr)			1	1					2	2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	4%	0%	5%	3%	10%	14%	0%	14%	4%	0%	0%
Adj. Flow (vph)	0	502	5	22	500	20	15	1	7	27	1	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	507	0	0	542	0	0	23	0	0	28	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection												
Int Delay, s/veh	1.2											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	472	5	21	470	19	14	1	7	25	1	0
Future Vol, veh/h	0	472	5	21	470	19	14	1	7	25	1	0
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	-2	-	-	1	-	-	-5	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	4	0	5	3	10	14	0	14	4	0	0
Mvmt Flow	0	502	5	22	500	20	15	1	7	27	1	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	520	0	0	508	0	0	1061	1070	508	1065	1062	510
Stage 1	-	-	-	-	-	-	506	506	-	554	554	-
Stage 2	-	-	-	-	-	-	555	564	-	511	508	-
Critical Hdwy	4.1	-	-	4.15	-	-	7.44	6.7	6.44	6.14	5.5	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.44	5.7	-	5.14	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.44	5.7	-	5.14	4.5	-
Follow-up Hdwy	2.2	-	-	2.245	-	-	3.626	4	3.426	3.536	4	3.3
Pot Cap-1 Maneuver	1056	-	-	1042	-	-	180	210	534	267	303	609
Stage 1	-	-	-	-	-	-	513	528	-	599	603	-
Stage 2	-	-	-	-	-	-	480	496	-	624	624	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1056	-	-	1041	-	-	175	203	532	256	294	609
Mov Cap-2 Maneuver	-	-	-	-	-	-	175	203	-	256	294	-
Stage 1	-	-	-	-	-	-	512	527	-	599	585	-
Stage 2	-	-	-	-	-	-	465	481	-	613	623	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	22.9	20.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	224	1056	-	-	1041	-	-	257
HCM Lane V/C Ratio	0.104	-	-	-	0.021	-	-	0.108
HCM Control Delay (s)	22.9	0	-	-	8.5	0	-	20.7
HCM Lane LOS	C	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	416	10	10	466	55	5	18	3	67	11	53
Future Volume (vph)	81	416	10	10	466	55	5	18	3	67	11	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	10	11	11	12	12	12	16	16	16
Grade (%)		-1%			-1%			3%			-7%	
Storage Length (ft)	150		0	90		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	70			40			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00			0.98	
Frt		0.996			0.984			0.986			0.945	
Flt Protected	0.950			0.950				0.991			0.975	
Satd. Flow (prot)	1613	1771	0	1604	1664	0	0	1728	0	0	1844	0
Flt Permitted	0.262			0.497				0.945			0.824	
Satd. Flow (perm)	445	1771	0	839	1664	0	0	1644	0	0	1553	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			7			3			24	
Link Speed (mph)		25			25			25			35	
Link Distance (ft)		781			600			343			548	
Travel Time (s)		21.3			16.4			9.4			10.7	
Confl. Peds. (#/hr)							5		2	2		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	5%	10%	0%	3%	7%	0%	0%	0%	3%	0%	6%
Adj. Flow (vph)	88	452	11	11	507	60	5	20	3	73	12	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	463	0	11	567	0	0	28	0	0	143	0
Number of Detectors	1	0		0	0		1	1		1	1	
Detector Template							Left			Left		
Leading Detector (ft)	37	0		0	0		20	37		20	37	
Trailing Detector (ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Position(ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Size(ft)	40	6		20	6		20	40		20	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	3.0	15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	9.0	21.0		21.0	21.0		9.0	9.0		9.0	9.0	
Total Split (s)	13.0	75.0		62.0	62.0		23.0	23.0		23.0	23.0	
Total Split (%)	10.8%	62.5%		51.7%	51.7%		19.2%	19.2%		19.2%	19.2%	
Maximum Green (s)	7.0	69.0		56.0	56.0		17.0	17.0		17.0	17.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	

McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street 2024 with Dev Weekday AM

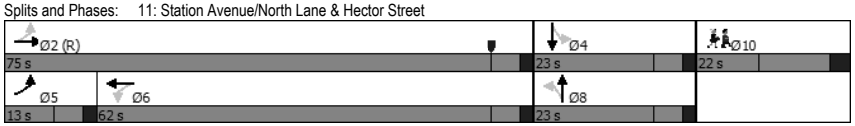
Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	36.0
Total Split (s)	22.0
Total Split (%)	18%
Maximum Green (s)	9.0
Yellow Time (s)	10.0

Lanes, Volumes, Timings 2024 with Dev Weekday AM
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\03 - 24 W AM.syn Synchro 10

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		Max	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	73.2	73.2		60.4	60.4			14.8			14.8	
Actuated g/C Ratio	0.61	0.61		0.50	0.50			0.12			0.12	
v/c Ratio	0.25	0.43		0.03	0.68			0.14			0.67	
Control Delay	12.3	14.4		16.9	28.0			43.0			57.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	12.3	14.4		16.9	28.0			43.0			57.0	
LOS	B	B		B	C			D			E	
Approach Delay		14.0			27.7			43.0			57.0	
Approach LOS		B			C			D			E	
Queue Length 50th (ft)	27	181		4	322			17			88	
Queue Length 95th (ft)	53	270		15	478			45			157	
Internal Link Dist (ft)		701			520			263			468	
Turn Bay Length (ft)	150			90								
Base Capacity (vph)	349	1080		422	840			249			253	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.25	0.43		0.03	0.68			0.11			0.57	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 26 (22%), Referenced to phase 2:EBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 25.5		Intersection LOS: C	
Intersection Capacity Utilization 63.6%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 11: Station Avenue/North Lane & Hector Street



McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street 2024 with Dev Weekday AM

Lane Group	Ø10
All-Red Time (s)	3.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	7
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lanes, Volumes, Timings 2024 with Dev Weekday AM
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\03 - 24 W AM.syn Synchro 10

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:45	6:45	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	3029	2989	2958	3083	3026	3015
Vehs Exited	3048	2980	2952	3074	3052	3021
Starting Vehs	79	67	65	74	81	66
Ending Vehs	60	76	71	83	55	61
Travel Distance (mi)	1201	1171	1165	1218	1220	1195
Travel Time (hr)	69.2	67.5	66.8	70.3	70.8	68.9
Total Delay (hr)	20.0	19.9	19.2	20.5	20.9	20.1
Total Stops	4493	4372	4219	4504	4463	4411
Fuel Used (gal)	49.5	48.4	47.6	50.0	50.1	49.1

Interval #0 Information Seeding

Start Time	6:45
End Time	7:00
Total Time (min)	15

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3029	2989	2958	3083	3026	3015
Vehs Exited	3048	2980	2952	3074	3052	3021
Starting Vehs	79	67	65	74	81	66
Ending Vehs	60	76	71	83	55	61
Travel Distance (mi)	1201	1171	1165	1218	1220	1195
Travel Time (hr)	69.2	67.5	66.8	70.3	70.8	68.9
Total Delay (hr)	20.0	19.9	19.2	20.5	20.9	20.1
Total Stops	4493	4372	4219	4504	4463	4411
Fuel Used (gal)	49.5	48.4	47.6	50.0	50.1	49.1

4: Ash Street & Washington Street Performance by lane

Lane	EB	WB	WB	NB	SB	All
Movements Served	LTR	L	TR	LTR	LTR	
Denied Del/Veh (s)						0.0
Total Del/Veh (s)	4.2	4.9	6.6	5.4	0.3	5.6

5: Poplar Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	4.8	7.0	5.7	0.2	6.2

6: Cherry Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.2
Total Del/Veh (s)	6.1	9.0	6.4	1.7	6.7

Total Zone Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	65.7

Intersection: 4: Ash Street & Washington Street

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (ft)	24	28	102	53	4
Average Queue (ft)	10	9	60	26	0
95th Queue (ft)	29	30	88	49	3
Link Distance (ft)	542	740	740	597	211
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Poplar Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	64	160	61	12
Average Queue (ft)	24	65	26	1
95th Queue (ft)	47	110	50	6
Link Distance (ft)	740	791	667	147
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Cherry Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	60	255	40	22
Average Queue (ft)	30	111	20	3
95th Queue (ft)	50	193	45	15
Link Distance (ft)	791	1209	640	268
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	702	67	1	234	0	157	0	16	46	8	270
Future Volume (vph)	0	702	67	1	234	0	157	0	16	46	8	270
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	13	13	13	13	13	13	11	11	11
Grade (%)		-4%			2%			3%			-6%	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00		1.00		
Frt		0.987						0.987			0.854	
Flt Protected								0.957		0.950		
Satd. Flow (prot)	0	3517	0	0	1805	0	0	1728	0	1703	1496	0
Flt Permitted					0.998			0.422		0.709		
Satd. Flow (perm)	0	3517	0	0	1802	0	0	762	0	1267	1496	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19						55			281	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		281			505			298			915	
Travel Time (s)		7.7			13.8			8.1			25.0	
Confl. Peds. (#/hr)	1					1			6	6		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	1%	3%	0%	2%	0%	0%	8%	0%	0%	13%	2%
Adj. Flow (vph)	0	731	70	1	244	0	164	0	17	48	8	281
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	801	0	0	245	0	0	181	0	48	289	0
Number of Detectors		1		1	1		1	1		1	1	
Detector Template				Left			Left			Left		
Leading Detector (ft)		37		20	37		20	37		37	37	
Trailing Detector (ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Position(ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Size(ft)		40		20	40		20	40		40	40	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4			8		
Detector Phase		6		2	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)		15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)		21.0		26.0	26.0		9.0	9.0		9.0	9.0	
Total Split (s)		27.0		27.0	27.0		33.0	33.0		33.0	33.0	
Total Split (%)		45.0%		45.0%	45.0%		55.0%	55.0%		55.0%	55.0%	
Maximum Green (s)		21.0		21.0	21.0		27.0	27.0		27.0	27.0	
Yellow Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0			-1.0		-1.0	-1.0	
Total Lost Time (s)		5.0			5.0			5.0		5.0	5.0	

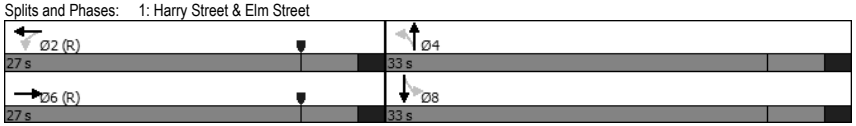
McMahon Associates, Inc.
1: Harry Street & Elm Street

601 Washington Street
2024 with Dev Weekday PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		13.0		13.0	13.0		20.0	20.0		20.0	20.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 48 (80%), Referenced to phase 2:WBTL and 6:EBT, Start of Yellow	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Harry Street & Elm Street



Lanes, Volumes, Timings
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2024 with Dev Weekday PM
Synchro 10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	702	67	1	234	0	157	0	16	46	8	270
Future Volume (veh/h)	0	702	67	1	234	0	157	0	16	46	8	270
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	2012	1983	1849	1820	0	1820	1703	1820	2024	1839	1995
Adj Flow Rate, veh/h	0	731	45	1	244	0	164	0	14	48	8	200
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	1	3	0	2	0	0	8	0	0	13	2
Cap, veh/h	0	1846	114	61	917	0	333	5	19	702	20	491
Arrive On Green	0.00	0.50	0.49	0.49	0.50	0.00	0.31	0.00	0.31	0.33	0.33	0.31
Sat Flow, veh/h	0	3759	225	1	1817	0	661	14	58	1509	60	1493
Grp Volume(v), veh/h	0	382	394	245	0	0	178	0	0	48	0	208
Grp Sat Flow(s),veh/h/ln	0	1912	1972	1818	0	0	733	0	0	1509	0	1553
Q Serve(g_s), s	0.0	7.4	7.4	0.0	0.0	0.0	9.0	0.0	0.0	0.0	0.0	6.3
Cycle Q Clear(g_c), s	0.0	7.4	7.4	4.6	0.0	0.0	15.4	0.0	0.0	1.1	0.0	6.3
Prop In Lane	0.00		0.11	0.00		0.00	0.92		0.08	1.00		0.96
Lane Grp Cap(c), veh/h	0	965	995	948	0	0	344	0	0	702	0	510
V/C Ratio(X)	0.00	0.40	0.40	0.26	0.00	0.00	0.52	0.00	0.00	0.07	0.00	0.41
Avail Cap(c_a), veh/h	0	965	995	948	0	0	494	0	0	911	0	725
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.2	9.2	8.5	0.0	0.0	21.8	0.0	0.0	13.9	0.0	16.0
Incr Delay (d2), s/veh	0.0	1.2	1.2	0.7	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	5.4	5.6	3.3	0.0	0.0	4.3	0.0	0.0	0.8	0.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.4	10.4	9.2	0.0	0.0	23.1	0.0	0.0	13.9	0.0	16.5
LnGrp LOS	A	B	B	A	A	A	C	A	A	B	A	B
Approach Vol, veh/h		776			245			178			256	
Approach Delay, s/veh		10.4			9.2			23.1			16.1	
Approach LOS		B			A			C			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		35.3		24.7		35.3		24.7				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		21.0		27.0		21.0		27.0				
Max Q Clear Time (g_c+I1), s		6.6		17.4		9.9		8.3				
Green Ext Time (p_c), s		0.7		0.5		2.4		0.9				
Intersection Summary												
HCM 6th Ctrl Delay			12.7									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	569	170	0	0	0	237	28	11	0	0	0
Future Volume (vph)	23	569	170	0	0	0	237	28	11	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	16	16	16	16	16	16	16	16	16
Grade (%)		-1%			0%			5%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850					0.994				
Flt Protected		0.998						0.959				
Satd. Flow (prot)	0	1950	1661	0	0	0	0	1984	0	0	0	0
Flt Permitted		0.998						0.959				
Satd. Flow (perm)	0	1950	1661	0	0	0	0	1984	0	0	0	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		505			1606			289			377	
Travel Time (s)		13.8			43.8			7.9			10.3	
Confl. Peds. (#/hr)	2					2			4	4		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%	1%	0%	0%	0%	0%	0%
Adj. Flow (vph)	24	605	181	0	0	0	252	30	12	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	629	181	0	0	0	0	294	0	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	30.6
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	569	170	0	0	0	237	28	11	0	0	0
Future Vol, veh/h	23	569	170	0	0	0	237	28	11	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	0	1	1	0	0	0	1	0	0	0	0	0
Mvmt Flow	24	605	181	0	0	0	252	30	12	0	0	0
Number of Lanes	0	1	1	0	0	0	0	1	0	0	0	0

Approach	EB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		EB
Conflicting Lanes Left	0	2
Conflicting Approach Right	NB	
Conflicting Lanes Right	1	0
HCM Control Delay	36.6	14.2
HCM LOS	E	B

Lane	NBLn1	EBLn1	EBLn2
Vol Left, %	86%	4%	0%
Vol Thru, %	10%	96%	0%
Vol Right, %	4%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	276	592	170
LT Vol	237	23	0
Through Vol	28	569	0
RT Vol	11	0	170
Lane Flow Rate	294	630	181
Geometry Grp	2	7	7
Degree of Util (X)	0.475	0.94	0.234
Departure Headway (Hd)	5.827	5.373	4.665
Convergence, Y/N	Yes	Yes	Yes
Cap	614	668	761
Service Time	3.918	3.158	2.45
HCM Lane V/C Ratio	0.479	0.943	0.238
HCM Control Delay	14.2	44.6	8.9
HCM Lane LOS	B	E	A
HCM 95th-tile Q	2.6	13	0.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	470	67	0	0	0	0	0	96	26	105	0
Future Volume (vph)	0	470	67	0	0	0	0	0	96	26	105	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	16	16	16	16	16
Grade (%)		3%			0%			7%			-9%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.983							0.865			
Flt Protected											0.990	
Satd. Flow (prot)	0	2067	0	0	0	0	0	0	1797	0	2159	0
Flt Permitted											0.990	
Satd. Flow (perm)	0	2067	0	0	0	0	0	0	1797	0	2159	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1606			1351			328			394	
Travel Time (s)		43.8			36.8			8.9			10.7	
Confl. Peds. (#/hr)	2		7	7		2	5		1	1		5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%
Adj. Flow (vph)	0	500	71	0	0	0	0	0	102	28	112	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	571	0	0	0	0	0	0	102	0	140	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	15.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	470	67	0	0	0	0	0	96	26	105	0
Future Vol, veh/h	0	470	67	0	0	0	0	0	96	26	105	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	4	0
Mvmt Flow	0	500	71	0	0	0	0	0	102	28	112	0
Number of Lanes	0	1	0	0	0	0	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	17.5	8.7	9.9
HCM LOS	C	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	0%	0%	20%
Vol Thru, %	0%	88%	80%
Vol Right, %	100%	12%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	96	537	131
LT Vol	0	0	26
Through Vol	0	470	105
RT Vol	96	67	0
Lane Flow Rate	102	571	139
Geometry Grp	1	1	1
Degree of Util (X)	0.137	0.706	0.21
Departure Headway (Hd)	4.841	4.452	5.413
Convergence, Y/N	Yes	Yes	Yes
Cap	733	811	658
Service Time	2.921	2.5	3.488
HCM Lane V/C Ratio	0.139	0.704	0.211
HCM Control Delay	8.7	17.5	9.9
HCM Lane LOS	A	C	A
HCM 95th-tile Q	0.5	6	0.8

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	82	32	0	63	21	0
Future Volume (vph)	82	32	0	63	21	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.962					
Flt Protected					0.950	
Satd. Flow (prot)	1792	0	0	1863	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1792	0	0	1863	1770	0
Link Speed (mph)	25			25	30	
Link Distance (ft)	1313			265	334	
Travel Time (s)	35.8			7.2	7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	91	36	0	70	23	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	127	0	0	70	23	0
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	82	32	0	63	21	0
Future Vol, veh/h	82	32	0	63	21	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	91	36	0	70	23	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	127	0	179	109
Stage 1	-	-	-	-	109	-
Stage 2	-	-	-	-	70	-
Critical Hdwy	-	-	4.3	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	3	-	3	3.1
Pot Cap-1 Maneuver	-	-	1087	-	939	1008
Stage 1	-	-	-	-	1065	-
Stage 2	-	-	-	-	1112	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1087	-	939	1008
Mov Cap-2 Maneuver	-	-	-	-	939	-
Stage 1	-	-	-	-	1065	-
Stage 2	-	-	-	-	1112	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	939	-	-	1087	-
HCM Lane V/C Ratio	0.025	-	-	-	-
HCM Control Delay (s)	8.9	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	50	32	0	42	21	0
Future Volume (vph)	50	32	0	42	21	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.947					
Flt Protected					0.950	
Satd. Flow (prot)	1764	0	0	1863	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1764	0	0	1863	1770	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	265			1597	305	
Travel Time (s)	7.2			43.6	8.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	36	0	47	23	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	92	0	0	47	23	0
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	50	32	0	42	21	0
Future Vol, veh/h	50	32	0	42	21	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	56	36	0	47	23	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	92	0	121	74
Stage 1	-	-	-	-	74	-
Stage 2	-	-	-	-	47	-
Critical Hdwy	-	-	4.3	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	3	-	3	3.1
Pot Cap-1 Maneuver	-	-	1117	-	1017	1055
Stage 1	-	-	-	-	1107	-
Stage 2	-	-	-	-	1140	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1117	-	1017	1055
Mov Cap-2 Maneuver	-	-	-	-	1017	-
Stage 1	-	-	-	-	1107	-
Stage 2	-	-	-	-	1140	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1017	-	-	1117	-
HCM Lane V/C Ratio	0.023	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	591	12	9	437	14	10	1	12	50	4	3
Future Volume (vph)	3	591	12	9	437	14	10	1	12	50	4	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	15	15	15	12	12	12	11	11	11
Grade (%)		1%			-2%			1%			-5%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.996			0.930			0.993	
Flt Protected					0.999			0.979			0.958	
Satd. Flow (prot)	0	2053	0	0	2061	0	0	1650	0	0	1761	0
Flt Permitted					0.999			0.979			0.958	
Satd. Flow (perm)	0	2053	0	0	2061	0	0	1650	0	0	1761	0
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		736			781			539			303	
Travel Time (s)		20.1			21.3			12.3			6.9	
Confl. Peds. (#/hr)	1		2	2		1	1		3	3		1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	10%	0%	0%	0%	25%	0%
Adj. Flow (vph)	3	609	12	9	451	14	10	1	12	52	4	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	624	0	0	474	0	0	23	0	0	59	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection												
Int Delay, s/veh	1.5											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	591	12	9	437	14	10	1	12	50	4	3
Future Vol, veh/h	3	591	12	9	437	14	10	1	12	50	4	3
Conflicting Peds, #/hr	1	0	2	2	0	1	1	0	3	3	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	-2	-	-	1	-	-	-5	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	1	0	0	2	0	10	0	0	0	25	0
Mvmt Flow	3	609	12	9	451	14	10	1	12	52	4	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	466	0	0	623	0	0	1104	1107	620	1108	1106	460
Stage 1	-	-	-	-	-	-	623	623	-	477	477	-
Stage 2	-	-	-	-	-	-	481	484	-	631	629	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.4	6.7	6.3	6.1	5.75	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.4	5.7	-	5.1	4.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.4	5.7	-	5.1	4.75	-
Follow-up Hdwy	3	-	-	3	-	-	3	4	3.1	3	4.225	3.1
Pot Cap-1 Maneuver	830	-	-	731	-	-	190	199	506	281	260	679
Stage 1	-	-	-	-	-	-	508	465	-	740	593	-
Stage 2	-	-	-	-	-	-	619	541	-	631	525	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	829	-	-	730	-	-	183	194	503	267	253	678
Mov Cap-2 Maneuver	-	-	-	-	-	-	183	194	-	267	253	-
Stage 1	-	-	-	-	-	-	504	461	-	735	582	-
Stage 2	-	-	-	-	-	-	601	531	-	608	521	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	19.3	21.6
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	275	829	-	-	730	-	-	275
HCM Lane V/C Ratio	0.086	0.004	-	-	0.013	-	-	0.214
HCM Control Delay (s)	19.3	9.4	0	-	10	0	-	21.6
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	599	8	18	376	54	5	19	9	97	30	64
Future Volume (vph)	58	599	8	18	376	54	5	19	9	97	30	64
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	10	11	11	12	12	12	16	16	16
Grade (%)		-1%			-1%			3%			-7%	
Storage Length (ft)	150		0	90		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	70			40			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00			0.99	
Frt		0.998			0.981			0.961			0.955	
Flt Protected	0.950			0.950				0.993			0.975	
Satd. Flow (prot)	1661	1847	0	1604	1686	0	0	1692	0	0	1932	0
Flt Permitted	0.333			0.335				0.953			0.822	
Satd. Flow (perm)	582	1847	0	566	1686	0	0	1622	0	0	1629	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			8			10			18	
Link Speed (mph)		25			25			25			35	
Link Distance (ft)		781			600			343			548	
Travel Time (s)		21.3			16.4			9.4			10.7	
Confl. Peds. (#/hr)							4					4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	62	637	9	19	400	57	5	20	10	103	32	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	646	0	19	457	0	0	35	0	0	203	0
Number of Detectors	1	0		0	0		1	1		1	1	
Detector Template							Left			Left		
Leading Detector (ft)	37	0		0	0		20	37		20	37	
Trailing Detector (ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Position(ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Size(ft)	40	6		20	6		20	40		20	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	3.0	15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	9.0	21.0		21.0	21.0		9.0	9.0		9.0	9.0	
Total Split (s)	13.0	72.0		59.0	59.0		26.0	26.0		26.0	26.0	
Total Split (%)	10.8%	60.0%		49.2%	49.2%		21.7%	21.7%		21.7%	21.7%	
Maximum Green (s)	7.0	66.0		53.0	53.0		20.0	20.0		20.0	20.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	

McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street 2024 with Dev Weekday PM

Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	36.0
Total Split (s)	22.0
Total Split (%)	18%
Maximum Green (s)	9.0
Yellow Time (s)	10.0

Lanes, Volumes, Timings 2024 with Dev Weekday PM
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\03 - 24 W PM.syn Synchro 10

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		Max	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	69.6	69.6		59.3	59.3			18.4			18.4	
Actuated g/C Ratio	0.58	0.58		0.49	0.49			0.15			0.15	
v/c Ratio	0.15	0.60		0.07	0.55			0.14			0.77	
Control Delay	12.8	19.8		19.7	25.4			34.2			63.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	12.8	19.8		19.7	25.4			34.2			63.3	
LOS	B	B		B	C			C			E	
Approach Delay		19.2			25.1			34.2			63.3	
Approach LOS		B			C			C			E	
Queue Length 50th (ft)	21	317		8	252			17			137	
Queue Length 95th (ft)	42	448		24	368			47			221	
Internal Link Dist (ft)		701			520			263			468	
Turn Bay Length (ft)	150			90								
Base Capacity (vph)	409	1071		279	836			292			299	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.15	0.60		0.07	0.55			0.12			0.68	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 76 (63%), Referenced to phase 2:EBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 27.8		Intersection LOS: C	
Intersection Capacity Utilization 77.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 11: Station Avenue/North Lane & Hector Street



McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street 2024 with Dev Weekday PM

Lane Group	Ø10
All-Red Time (s)	3.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	4
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lanes, Volumes, Timings 2024 with Dev Weekday PM
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\03 - 24 W PM.syn Synchro 10

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:45	4:45	4:45	4:45	4:45	4:45
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	3163	3286	3253	3254	3175	3226
Vehs Exited	3158	3309	3274	3248	3185	3235
Starting Vehs	69	90	96	76	83	78
Ending Vehs	74	67	75	82	73	67
Travel Distance (mi)	1331	1427	1396	1388	1341	1377
Travel Time (hr)	78.7	84.4	85.0	82.9	79.1	82.0
Total Delay (hr)	25.1	26.5	28.5	26.8	24.9	26.4
Total Stops	4676	5023	4979	4896	4613	4837
Fuel Used (gal)	54.4	58.6	58.1	57.0	54.8	56.6

Interval #0 Information Seeding

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3163	3286	3253	3254	3175	3226
Vehs Exited	3158	3309	3274	3248	3185	3235
Starting Vehs	69	90	96	76	83	78
Ending Vehs	74	67	75	82	73	67
Travel Distance (mi)	1331	1427	1396	1388	1341	1377
Travel Time (hr)	78.7	84.4	85.0	82.9	79.1	82.0
Total Delay (hr)	25.1	26.5	28.5	26.8	24.9	26.4
Total Stops	4676	5023	4979	4896	4613	4837
Fuel Used (gal)	54.4	58.6	58.1	57.0	54.8	56.6

4: Ash Street & Washington Street Performance by lane

Lane	EB	WB	WB	NB	SB	All
Movements Served	LTR	L	TR	LTR	LTR	
Denied Del/Veh (s)						0.0
Total Del/Veh (s)	5.8	7.0	5.7	6.4	0.4	4.1

5: Poplar Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.0
Total Del/Veh (s)	5.9	7.3	5.4	0.2	5.5

6: Cherry Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.0
Total Del/Veh (s)	5.7	6.5	6.8	1.5	4.8

Total Zone Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	97.4

Intersection: 4: Ash Street & Washington Street

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (ft)	56	29	85	55	4
Average Queue (ft)	24	6	48	27	0
95th Queue (ft)	42	26	72	50	4
Link Distance (ft)	542	740	740	597	211
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Poplar Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	80	83	49	3
Average Queue (ft)	42	46	20	0
95th Queue (ft)	67	73	43	2
Link Distance (ft)	740	791	667	147
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Cherry Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	104	107	35	24
Average Queue (ft)	49	49	14	1
95th Queue (ft)	80	81	40	10
Link Distance (ft)	791	1248	640	268
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0

WITH WASHINGTON STREET EXTENSION

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	463	174	0	351	0	77	0	6	27	16	285
Future Volume (vph)	0	463	174	0	351	0	77	0	6	27	16	285
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	13	13	13	13	13	13	11	11	11
Grade (%)		-4%			2%			3%			-6%	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99						1.00		1.00	0.98	
Frt		0.959						0.991			0.858	
Flt Protected								0.956		0.950		
Satd. Flow (prot)	0	3304	0	0	1788	0	0	1398	0	1431	1461	0
Flt Permitted								0.286		0.737		
Satd. Flow (perm)	0	3304	0	0	1788	0	0	418	0	1109	1461	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		103						55			233	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		281			505			298			915	
Travel Time (s)		7.7			13.8			8.1			25.0	
Confl. Peds. (#/hr)	5		1	1		5	1		1	1		1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	4%	4%	0%	3%	0%	24%	0%	25%	19%	6%	3%
Adj. Flow (vph)	0	558	210	0	423	0	93	0	7	33	19	343
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	768	0	0	423	0	0	100	0	33	362	0
Number of Detectors		1		1	1		1	1		1	1	
Detector Template				Left			Left			Left		
Leading Detector (ft)		37		20	37		20	37		37	37	
Trailing Detector (ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Position(ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Size(ft)		40		20	40		20	40		40	40	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type		NA			NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4			8		
Detector Phase		6		2	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)		15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)		21.0		26.0	26.0		9.0	9.0		9.0	9.0	
Total Split (s)		27.0		27.0	27.0		33.0	33.0		33.0	33.0	
Total Split (%)		45.0%		45.0%	45.0%		55.0%	55.0%		55.0%	55.0%	
Maximum Green (s)		21.0		21.0	21.0		27.0	27.0		27.0	27.0	
Yellow Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0			-1.0		-1.0	-1.0	
Total Lost Time (s)		5.0			5.0			5.0		5.0	5.0	

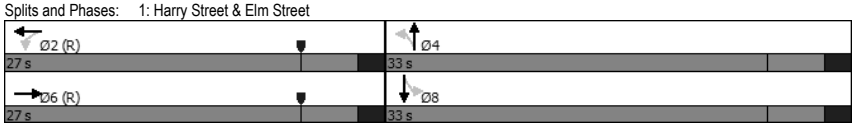
McMahon Associates, Inc.
1: Harry Street & Elm Street

601 Washington Street
2024 with Dev Weekday AM with Wash Ext

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		13.0		13.0	13.0		20.0	20.0		20.0	20.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 28 (47%), Referenced to phase 2:WBTL and 6:EBT, Start of Yellow	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Harry Street & Elm Street



Lanes, Volumes, Timings
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\05 - 24 W AM EXT.syn

2024 with Dev Weekday AM with Wash Ext
Synchro 10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	463	174	0	351	0	77	0	6	27	16	285
Future Volume (veh/h)	0	463	174	0	351	0	77	0	6	27	16	285
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1968	1968	1849	1805	0	1469	1820	1455	1753	1938	1981
Adj Flow Rate, veh/h	0	558	151	0	423	0	93	0	2	33	19	204
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	4	4	0	3	0	24	0	25	19	6	3
Cap, veh/h	0	1688	455	0	1047	0	261	1	3	521	36	385
Arrive On Green	0.00	0.58	0.56	0.00	0.58	0.00	0.24	0.00	0.24	0.25	0.25	0.24
Sat Flow, veh/h	0	3009	785	0	1805	0	560	5	12	1325	142	1519
Grp Volume(v), veh/h	0	358	351	0	423	0	95	0	0	33	0	223
Grp Sat Flow(s),veh/h/ln	0	1869	1826	0	1805	0	578	0	0	1325	0	1661
Q Serve(g_s), s	0.0	6.0	6.1	0.0	7.7	0.0	4.8	0.0	0.0	0.0	0.0	7.0
Cycle Q Clear(g_c), s	0.0	6.0	6.1	0.0	7.7	0.0	11.8	0.0	0.0	0.9	0.0	7.0
Prop In Lane	0.00		0.43	0.00		0.00	0.98		0.02	1.00		0.91
Lane Grp Cap(c), veh/h	0	1084	1059	0	1047	0	256	0	0	521	0	421
V/C Ratio(X)	0.00	0.33	0.33	0.00	0.40	0.00	0.37	0.00	0.00	0.06	0.00	0.53
Avail Cap(c_a), veh/h	0	1084	1059	0	1047	0	497	0	0	803	0	775
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	6.5	6.7	0.0	6.9	0.0	24.8	0.0	0.0	17.1	0.0	19.7
Incr Delay (d2), s/veh	0.0	0.8	0.8	0.0	1.2	0.0	0.9	0.0	0.0	0.1	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	3.9	3.9	0.0	4.9	0.0	2.4	0.0	0.0	0.6	0.0	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	7.4	7.5	0.0	8.1	0.0	25.7	0.0	0.0	17.1	0.0	20.8
LnGrp LOS	A	A	A	A	A	A	C	A	A	B	A	C
Approach Vol, veh/h		709			423			95			256	
Approach Delay, s/veh		7.4			8.1			25.7			20.3	
Approach LOS		A			A			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		39.8		20.2		39.8		20.2				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		21.0		27.0		21.0		27.0				
Max Q Clear Time (g_c+I1), s		10.2		13.8		8.5		9.0				
Green Ext Time (p_c), s		1.2		0.2		2.3		0.9				
Intersection Summary												
HCM 6th Ctrl Delay			11.0									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	370	81	0	0	0	353	43	7	0	0	0
Future Volume (vph)	14	370	81	0	0	0	353	43	7	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	16	16	16	16	16	16	16	16	16
Grade (%)		-1%			0%			5%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850					0.998				
Flt Protected		0.998						0.958				
Satd. Flow (prot)	0	1892	1677	0	0	0	0	1939	0	0	0	0
Flt Permitted		0.998						0.958				
Satd. Flow (perm)	0	1892	1677	0	0	0	0	1939	0	0	0	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		505			1606			289			377	
Travel Time (s)		13.8			43.8			7.9			10.3	
Confl. Peds. (#/hr)	2		2	2		2	1		1	1		1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	4%	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%
Adj. Flow (vph)	15	407	89	0	0	0	388	47	8	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	422	89	0	0	0	0	443	0	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	19.5
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	370	81	0	0	0	353	43	7	0	0	0
Future Vol, veh/h	14	370	81	0	0	0	353	43	7	0	0	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	7	4	0	0	0	0	4	0	0	0	0	0
Mvmt Flow	15	407	89	0	0	0	388	47	8	0	0	0
Number of Lanes	0	1	1	0	0	0	0	1	0	0	0	0

Approach	EB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		EB
Conflicting Lanes Left	0	2
Conflicting Approach Right	NB	
Conflicting Lanes Right	1	0
HCM Control Delay	19.2	19.8
HCM LOS	C	C

Lane	NBLn1	EBLn1	EBLn2
Vol Left, %	88%	4%	0%
Vol Thru, %	11%	96%	0%
Vol Right, %	2%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	403	384	81
LT Vol	353	14	0
Through Vol	43	370	0
RT Vol	7	0	81
Lane Flow Rate	443	422	89
Geometry Grp	2	7	7
Degree of Util (X)	0.685	0.699	0.128
Departure Headway (Hd)	5.566	5.963	5.185
Convergence, Y/N	Yes	Yes	Yes
Cap	655	608	692
Service Time	3.566	3.693	2.914
HCM Lane V/C Ratio	0.676	0.694	0.129
HCM Control Delay	19.8	21.4	8.7
HCM Lane LOS	C	C	A
HCM 95th-tile Q	5.4	5.6	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	344	33	0	0	0	0	0	35	11	53	0
Future Volume (vph)	0	344	33	0	0	0	0	0	35	11	53	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	16	16	16	16	16
Grade (%)		3%			0%			7%			-9%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.988							0.865			
Flt Protected											0.991	
Satd. Flow (prot)	0	2040	0	0	0	0	0	0	1762	0	2063	0
Flt Permitted											0.991	
Satd. Flow (perm)	0	2040	0	0	0	0	0	0	1762	0	2063	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1606			1351			328			394	
Travel Time (s)		43.8			36.8			8.9			10.7	
Confl. Peds. (#/hr)	3		2	2		3	5		5	5		5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	3%	0%	0%	0%	0%	0%	0%	2%	18%	6%	0%
Adj. Flow (vph)	0	362	35	0	0	0	0	0	37	12	56	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	397	0	0	0	0	0	0	37	0	68	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	10
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	344	33	0	0	0	0	0	35	11	53	0
Future Vol, veh/h	0	344	33	0	0	0	0	0	35	11	53	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	0	3	0	0	0	0	0	0	2	18	6	0
Mvmt Flow	0	362	35	0	0	0	0	0	37	12	56	0
Number of Lanes	0	1	0	0	0	0	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	10.5	7.5	8.7
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	0%	0%	17%
Vol Thru, %	0%	91%	83%
Vol Right, %	100%	9%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	35	377	64
LT Vol	0	0	11
Through Vol	0	344	53
RT Vol	35	33	0
Lane Flow Rate	37	397	67
Geometry Grp	1	1	1
Degree of Util (X)	0.044	0.45	0.097
Departure Headway (Hd)	4.311	4.079	5.174
Convergence, Y/N	Yes	Yes	Yes
Cap	835	869	697
Service Time	2.315	2.171	3.176
HCM Lane V/C Ratio	0.044	0.457	0.096
HCM Control Delay	7.5	10.5	8.7
HCM Lane LOS	A	B	A
HCM 95th-tile Q	0.1	2.4	0.3

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	67	9	3	78	33	9
Future Volume (vph)	67	9	3	78	33	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.984				0.971	
Flt Protected				0.998	0.962	
Satd. Flow (prot)	1833	0	0	1859	1740	0
Flt Permitted				0.998	0.962	
Satd. Flow (perm)	1833	0	0	1859	1740	0
Link Speed (mph)	25			25	30	
Link Distance (ft)	1274			316	305	
Travel Time (s)	34.7			8.6	6.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	74	10	3	87	37	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	84	0	0	90	47	0
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	67	9	3	78	33	9
Future Vol, veh/h	67	9	3	78	33	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	10	3	87	37	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	84	0	172	79
Stage 1	-	-	-	-	79	-
Stage 2	-	-	-	-	93	-
Critical Hdwy	-	-	4.3	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	3	-	3	3.1
Pot Cap-1 Maneuver	-	-	1124	-	948	1048
Stage 1	-	-	-	-	1101	-
Stage 2	-	-	-	-	1084	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1124	-	945	1048
Mov Cap-2 Maneuver	-	-	-	-	945	-
Stage 1	-	-	-	-	1101	-
Stage 2	-	-	-	-	1081	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	8.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	965	-	-	1124	-
HCM Lane V/C Ratio	0.048	-	-	0.003	-
HCM Control Delay (s)	8.9	-	-	8.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	67	9	3	49	32	9
Future Volume (vph)	67	9	3	49	32	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.984				0.971	
Flt Protected				0.997	0.962	
Satd. Flow (prot)	1833	0	0	1857	1740	0
Flt Permitted				0.997	0.962	
Satd. Flow (perm)	1833	0	0	1857	1740	0
Link Speed (mph)	25			25	30	
Link Distance (ft)	316			1585	353	
Travel Time (s)	8.6			43.2	8.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	74	10	3	54	36	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	84	0	0	57	46	0
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	67	9	3	49	32	9
Future Vol, veh/h	67	9	3	49	32	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	10	3	54	36	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	84	0	139	79
Stage 1	-	-	-	-	79	-
Stage 2	-	-	-	-	60	-
Critical Hdwy	-	-	4.3	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	3	-	3	3.1
Pot Cap-1 Maneuver	-	-	1124	-	992	1048
Stage 1	-	-	-	-	1101	-
Stage 2	-	-	-	-	1124	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1124	-	989	1048
Mov Cap-2 Maneuver	-	-	-	-	989	-
Stage 1	-	-	-	-	1101	-
Stage 2	-	-	-	-	1121	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1001	-	-	1124	-
HCM Lane V/C Ratio	0.046	-	-	0.003	-
HCM Control Delay (s)	8.8	-	-	8.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	399	5	57	434	19	14	1	80	25	1	0
Future Volume (vph)	0	399	5	57	434	19	14	1	80	25	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	15	15	15	12	12	12	11	11	11
Grade (%)		1%			-2%			1%			-5%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.995			0.886				
Flt Protected					0.994			0.993			0.954	
Satd. Flow (prot)	0	1996	0	0	2017	0	0	1461	0	0	1729	0
Flt Permitted					0.994			0.993			0.954	
Satd. Flow (perm)	0	1996	0	0	2017	0	0	1461	0	0	1729	0
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		736			781			539			303	
Travel Time (s)		20.1			21.3			12.3			6.9	
Confl. Peds. (#/hr)			1	1					2	2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	4%	0%	5%	3%	10%	14%	0%	14%	4%	0%	0%
Adj. Flow (vph)	0	424	5	61	462	20	15	1	85	27	1	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	429	0	0	543	0	0	101	0	0	28	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	0	399	5	57	434	19	14	1	80	25	1	0
Future Vol, veh/h	0	399	5	57	434	19	14	1	80	25	1	0
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	-2	-	-	1	-	-	-5	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	4	0	5	3	10	14	0	14	4	0	0
Mvmt Flow	0	424	5	61	462	20	15	1	85	27	1	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	482	0	0	430	0	0	1023	1032	430	1066	1024	472
Stage 1	-	-	-	-	-	-	428	428	-	594	594	-
Stage 2	-	-	-	-	-	-	595	604	-	472	430	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.44	6.7	6.44	6.14	5.5	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.44	5.7	-	5.14	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.44	5.7	-	5.14	4.5	-
Follow-up Hdwy	3	-	-	3	-	-	3	4	3.1	3	4	3.1
Pot Cap-1 Maneuver	819	-	-	854	-	-	215	222	644	294	315	669
Stage 1	-	-	-	-	-	-	663	574	-	652	585	-
Stage 2	-	-	-	-	-	-	525	475	-	740	661	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	819	-	-	853	-	-	198	200	642	234	284	669
Mov Cap-2 Maneuver	-	-	-	-	-	-	198	200	-	234	284	-
Stage 1	-	-	-	-	-	-	662	573	-	652	528	-
Stage 2	-	-	-	-	-	-	473	428	-	639	660	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.1	14.6	22.3
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	474	819	-	-	853	-	-	236
HCM Lane V/C Ratio	0.213	-	-	-	0.071	-	-	0.117
HCM Control Delay (s)	14.6	0	-	-	9.5	0	-	22.3
HCM Lane LOS	B	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.8	0	-	-	0.2	-	-	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	416	10	10	465	55	5	18	3	67	11	54
Future Volume (vph)	81	416	10	10	465	55	5	18	3	67	11	54
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	10	11	11	12	12	12	16	16	16
Grade (%)		-1%			-1%			3%			-7%	
Storage Length (ft)	150		0	90		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	70			40			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00			0.98	
Frt		0.996			0.984			0.986			0.945	
Flt Protected	0.950			0.950				0.991			0.975	
Satd. Flow (prot)	1613	1771	0	1604	1664	0	0	1728	0	0	1843	0
Flt Permitted	0.264			0.497				0.944			0.825	
Satd. Flow (perm)	448	1771	0	839	1664	0	0	1643	0	0	1554	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			7			3			24	
Link Speed (mph)		25			25			25			35	
Link Distance (ft)		781			600			343			548	
Travel Time (s)		21.3			16.4			9.4			10.7	
Confl. Peds. (#/hr)							5		2	2		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	5%	10%	0%	3%	7%	0%	0%	0%	3%	0%	6%
Adj. Flow (vph)	88	452	11	11	505	60	5	20	3	73	12	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	463	0	11	565	0	0	28	0	0	144	0
Number of Detectors	1	0		0	0		1	1		1	1	
Detector Template							Left			Left		
Leading Detector (ft)	37	0		0	0		20	37		20	37	
Trailing Detector (ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Position(ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Size(ft)	40	6		20	6		20	40		20	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	3.0	15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	9.0	21.0		21.0	21.0		9.0	9.0		9.0	9.0	
Total Split (s)	13.0	75.0		62.0	62.0		23.0	23.0		23.0	23.0	
Total Split (%)	10.8%	62.5%		51.7%	51.7%		19.2%	19.2%		19.2%	19.2%	
Maximum Green (s)	7.0	69.0		56.0	56.0		17.0	17.0		17.0	17.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	

McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street 2024 with Dev Weekday AM with Wash Ext

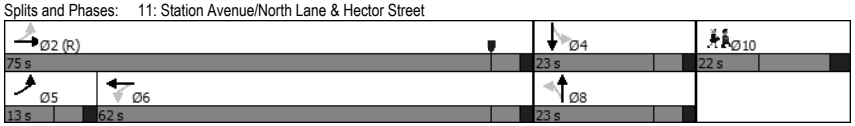
Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	36.0
Total Split (s)	22.0
Total Split (%)	18%
Maximum Green (s)	9.0
Yellow Time (s)	10.0

Lanes, Volumes, Timings 2024 with Dev Weekday AM with Wash Ext
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\05 - 24 W AM EXT.syn Synchro 10

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		Max	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	73.2	73.2		60.4	60.4			14.8			14.8	
Actuated g/C Ratio	0.61	0.61		0.50	0.50			0.12			0.12	
v/c Ratio	0.25	0.43		0.03	0.67			0.14			0.68	
Control Delay	12.3	14.4		16.9	27.9			43.0			57.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	12.3	14.4		16.9	27.9			43.0			57.3	
LOS	B	B		B	C			D			E	
Approach Delay		14.0			27.7			43.0			57.3	
Approach LOS		B			C			D			E	
Queue Length 50th (ft)	27	181		4	321			17			89	
Queue Length 95th (ft)	53	270		15	475			45			157	
Internal Link Dist (ft)		701			520			263			468	
Turn Bay Length (ft)	150			90								
Base Capacity (vph)	351	1080		421	840			249			253	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.25	0.43		0.03	0.67			0.11			0.57	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 26 (22%), Referenced to phase 2:EBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 25.5		Intersection LOS: C	
Intersection Capacity Utilization 63.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 11: Station Avenue/North Lane & Hector Street



McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street 2024 with Dev Weekday AM with Wash Ext

Lane Group	Ø10
All-Red Time (s)	3.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	7
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lanes, Volumes, Timings 2024 with Dev Weekday AM with Wash Ext
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\05 - 24 W AM EXT.syn Synchro 10

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:45	6:45	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2959	2922	2898	2810	2957	2912
Vehs Exited	2923	2927	2911	2805	2948	2904
Starting Vehs	46	71	75	56	67	60
Ending Vehs	82	66	62	61	76	63
Travel Distance (mi)	1198	1217	1211	1173	1205	1201
Travel Time (hr)	70.5	69.4	70.2	67.4	71.4	69.8
Total Delay (hr)	21.8	20.1	20.9	19.5	22.3	20.9
Total Stops	4316	4427	4446	4253	4408	4369
Fuel Used (gal)	49.5	49.7	49.7	47.9	49.9	49.4

Interval #0 Information Seeding

Start Time	6:45
End Time	7:00
Total Time (min)	15

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2959	2922	2898	2810	2957	2912
Vehs Exited	2923	2927	2911	2805	2948	2904
Starting Vehs	46	71	75	56	67	60
Ending Vehs	82	66	62	61	76	63
Travel Distance (mi)	1198	1217	1211	1173	1205	1201
Travel Time (hr)	70.5	69.4	70.2	67.4	71.4	69.8
Total Delay (hr)	21.8	20.1	20.9	19.5	22.3	20.9
Total Stops	4316	4427	4446	4253	4408	4369
Fuel Used (gal)	49.5	49.7	49.7	47.9	49.9	49.4

4: Ash Street & Washington Street Performance by lane

Lane	EB	WB	WB	NB	SB	All
Movements Served	LTR	L	TR	LTR	LTR	
Denied Del/Veh (s)						0.0
Total Del/Veh (s)	4.2	4.5	6.7	5.0	0.3	5.5

5: Poplar Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	4.8	6.9	5.6	0.3	6.1

6: Cherry Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.2
Total Del/Veh (s)	6.0	8.7	6.2	1.5	6.7

Total Zone Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	57.4

Intersection: 4: Ash Street & Washington Street

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (ft)	29	28	113	50	12
Average Queue (ft)	13	6	61	24	1
95th Queue (ft)	32	24	89	48	7
Link Distance (ft)	542	740	740	597	211
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Poplar Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	50	138	68	18
Average Queue (ft)	24	67	27	1
95th Queue (ft)	42	109	53	10
Link Distance (ft)	740	791	667	147
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Cherry Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	65	217	53	16
Average Queue (ft)	31	99	20	1
95th Queue (ft)	49	170	47	12
Link Distance (ft)	791	1209	640	268
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	702	67	1	234	0	157	0	16	46	8	270
Future Volume (vph)	0	702	67	1	234	0	157	0	16	46	8	270
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	13	13	13	13	13	13	11	11	11
Grade (%)		-4%			2%			3%			-6%	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00		1.00		
Frt		0.987						0.987			0.854	
Flt Protected								0.957		0.950		
Satd. Flow (prot)	0	3517	0	0	1805	0	0	1728	0	1703	1496	0
Flt Permitted					0.998			0.422		0.709		
Satd. Flow (perm)	0	3517	0	0	1802	0	0	762	0	1267	1496	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19						55			281	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		281			505			298			915	
Travel Time (s)		7.7			13.8			8.1			25.0	
Confl. Peds. (#/hr)	1					1			6	6		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	1%	3%	0%	2%	0%	0%	8%	0%	0%	13%	2%
Adj. Flow (vph)	0	731	70	1	244	0	164	0	17	48	8	281
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	801	0	0	245	0	0	181	0	48	289	0
Number of Detectors		1		1	1		1	1		1	1	
Detector Template				Left			Left			Left		
Leading Detector (ft)		37		20	37		20	37		37	37	
Trailing Detector (ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Position(ft)		-3		0	-3		0	-3		-3	-3	
Detector 1 Size(ft)		40		20	40		20	40		40	40	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4			8		
Detector Phase		6		2	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)		15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)		21.0		26.0	26.0		9.0	9.0		9.0	9.0	
Total Split (s)		27.0		27.0	27.0		33.0	33.0		33.0	33.0	
Total Split (%)		45.0%		45.0%	45.0%		55.0%	55.0%		55.0%	55.0%	
Maximum Green (s)		21.0		21.0	21.0		27.0	27.0		27.0	27.0	
Yellow Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)		2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0			-1.0		-1.0	-1.0	
Total Lost Time (s)		5.0			5.0			5.0		5.0	5.0	

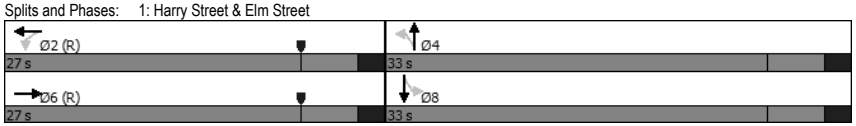
McMahon Associates, Inc.
1: Harry Street & Elm Street

601 Washington Street
2024 with Dev Weekday PM with Wash Ext

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		13.0		13.0	13.0		20.0	20.0		20.0	20.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 48 (80%), Referenced to phase 2:WBTL and 6:EBT, Start of Yellow	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Harry Street & Elm Street



Lanes, Volumes, Timings
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2024 with Dev Weekday PM with Wash Ext
Synchro 10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	702	67	1	234	0	157	0	16	46	8	270
Future Volume (veh/h)	0	702	67	1	234	0	157	0	16	46	8	270
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	2012	1983	1849	1820	0	1820	1703	1820	2024	1839	1995
Adj Flow Rate, veh/h	0	731	45	1	244	0	164	0	14	48	8	200
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	1	3	0	2	0	0	8	0	0	13	2
Cap, veh/h	0	1846	114	61	917	0	333	5	19	702	20	491
Arrive On Green	0.00	0.50	0.49	0.49	0.50	0.00	0.31	0.00	0.31	0.33	0.33	0.31
Sat Flow, veh/h	0	3759	225	1	1817	0	661	14	58	1509	60	1493
Grp Volume(v), veh/h	0	382	394	245	0	0	178	0	0	48	0	208
Grp Sat Flow(s),veh/h/ln	0	1912	1972	1818	0	0	733	0	0	1509	0	1553
Q Serve(g_s), s	0.0	7.4	7.4	0.0	0.0	0.0	9.0	0.0	0.0	0.0	0.0	6.3
Cycle Q Clear(g_c), s	0.0	7.4	7.4	4.6	0.0	0.0	15.4	0.0	0.0	1.1	0.0	6.3
Prop In Lane	0.00		0.11	0.00		0.00	0.92		0.08	1.00		0.96
Lane Grp Cap(c), veh/h	0	965	995	948	0	0	344	0	0	702	0	510
V/C Ratio(X)	0.00	0.40	0.40	0.26	0.00	0.00	0.52	0.00	0.00	0.07	0.00	0.41
Avail Cap(c_a), veh/h	0	965	995	948	0	0	494	0	0	911	0	725
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.2	9.2	8.5	0.0	0.0	21.8	0.0	0.0	13.9	0.0	16.0
Incr Delay (d2), s/veh	0.0	1.2	1.2	0.7	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	5.4	5.6	3.3	0.0	0.0	4.3	0.0	0.0	0.8	0.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.4	10.4	9.2	0.0	0.0	23.1	0.0	0.0	13.9	0.0	16.5
LnGrp LOS	A	B	B	A	A	A	C	A	A	B	A	B
Approach Vol, veh/h		776			245			178			256	
Approach Delay, s/veh		10.4			9.2			23.1			16.1	
Approach LOS		B			A			C			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	35.3	24.7	35.3	24.7
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	21.0	27.0	21.0	27.0
Max Q Clear Time (g_c+I1), s	6.6	17.4	9.9	8.3
Green Ext Time (p_c), s	0.7	0.5	2.4	0.9

Intersection Summary	
HCM 6th Ctrl Delay	12.7
HCM 6th LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	569	170	0	0	0	237	27	11	0	0	0
Future Volume (vph)	23	569	170	0	0	0	237	27	11	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	16	16	16	16	16	16	16	16	16
Grade (%)		-1%			0%			5%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850					0.994				
Flt Protected		0.998						0.959				
Satd. Flow (prot)	0	1950	1661	0	0	0	0	1984	0	0	0	0
Flt Permitted		0.998						0.959				
Satd. Flow (perm)	0	1950	1661	0	0	0	0	1984	0	0	0	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		505			1606			289			377	
Travel Time (s)		13.8			43.8			7.9			10.3	
Confl. Peds. (#/hr)	2					2			4	4		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%	1%	0%	0%	0%	0%	0%
Adj. Flow (vph)	24	605	181	0	0	0	252	29	12	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	629	181	0	0	0	0	293	0	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	30.6
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	569	170	0	0	0	237	27	11	0	0	0
Future Vol, veh/h	23	569	170	0	0	0	237	27	11	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	0	1	1	0	0	0	1	0	0	0	0	0
Mvmt Flow	24	605	181	0	0	0	252	29	12	0	0	0
Number of Lanes	0	1	1	0	0	0	0	1	0	0	0	0

Approach	EB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		EB
Conflicting Lanes Left	0	2
Conflicting Approach Right	NB	
Conflicting Lanes Right	1	0
HCM Control Delay	36.5	14.1
HCM LOS	E	B

Lane	NBLn1	EBLn1	EBLn2
Vol Left, %	86%	4%	0%
Vol Thru, %	10%	96%	0%
Vol Right, %	4%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	275	592	170
LT Vol	237	23	0
Through Vol	27	569	0
RT Vol	11	0	170
Lane Flow Rate	293	630	181
Geometry Grp	2	7	7
Degree of Util (X)	0.473	0.939	0.234
Departure Headway (Hd)	5.826	5.369	4.662
Convergence, Y/N	Yes	Yes	Yes
Cap	611	668	761
Service Time	3.918	3.154	2.446
HCM Lane V/C Ratio	0.48	0.943	0.238
HCM Control Delay	14.1	44.4	8.9
HCM Lane LOS	B	E	A
HCM 95th-tile Q	2.5	12.9	0.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	470	67	0	0	0	0	0	53	26	45	0
Future Volume (vph)	0	470	67	0	0	0	0	0	53	26	45	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	16	16	16	16	16
Grade (%)		3%			0%			7%			-9%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.983							0.865			
Flt Protected											0.982	
Satd. Flow (prot)	0	2067	0	0	0	0	0	0	1797	0	2155	0
Flt Permitted											0.982	
Satd. Flow (perm)	0	2067	0	0	0	0	0	0	1797	0	2155	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1606			1351			328			394	
Travel Time (s)		43.8			36.8			8.9			10.7	
Confl. Peds. (#/hr)	2		7	7		2	5		1	1		5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%
Adj. Flow (vph)	0	500	71	0	0	0	0	0	56	28	48	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	571	0	0	0	0	0	0	56	0	76	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	13.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	470	67	0	0	0	0	0	53	26	45	0
Future Vol, veh/h	0	470	67	0	0	0	0	0	53	26	45	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	4	0
Mvmt Flow	0	500	71	0	0	0	0	0	56	28	48	0
Number of Lanes	0	1	0	0	0	0	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	15.1	8.1	9
HCM LOS	C	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	0%	0%	37%
Vol Thru, %	0%	88%	63%
Vol Right, %	100%	12%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	53	537	71
LT Vol	0	0	26
Through Vol	0	470	45
RT Vol	53	67	0
Lane Flow Rate	56	571	76
Geometry Grp	1	1	1
Degree of Util (X)	0.073	0.663	0.112
Departure Headway (Hd)	4.682	4.175	5.324
Convergence, Y/N	Yes	Yes	Yes
Cap	763	868	672
Service Time	2.724	2.198	3.363
HCM Lane V/C Ratio	0.073	0.658	0.113
HCM Control Delay	8.1	15.1	9
HCM Lane LOS	A	C	A
HCM 95th-tile Q	0.2	5.2	0.4

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	73	25	7	71	16	5
Future Volume (vph)	73	25	7	71	16	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.965				0.966	
Flt Protected				0.995	0.964	
Satd. Flow (prot)	1798	0	0	1853	1735	0
Flt Permitted				0.995	0.964	
Satd. Flow (perm)	1798	0	0	1853	1735	0
Link Speed (mph)	25			25	30	
Link Distance (ft)	1313			265	334	
Travel Time (s)	35.8			7.2	7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	81	28	8	79	18	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	109	0	0	87	24	0
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	73	25	7	71	16	5
Future Vol, veh/h	73	25	7	71	16	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	81	28	8	79	18	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	109	0	190	95
Stage 1	-	-	-	-	95	-
Stage 2	-	-	-	-	95	-
Critical Hdwy	-	-	4.3	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	3	-	3	3.1
Pot Cap-1 Maneuver	-	-	1102	-	925	1026
Stage 1	-	-	-	-	1082	-
Stage 2	-	-	-	-	1082	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1102	-	918	1026
Mov Cap-2 Maneuver	-	-	-	-	918	-
Stage 1	-	-	-	-	1082	-
Stage 2	-	-	-	-	1073	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	8.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	942	-	-	1102	-
HCM Lane V/C Ratio	0.025	-	-	0.007	-
HCM Control Delay (s)	8.9	-	-	8.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	53	25	7	62	16	5
Future Volume (vph)	53	25	7	62	16	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.957				0.966	
Flt Protected				0.995	0.964	
Satd. Flow (prot)	1783	0	0	1853	1735	0
Flt Permitted				0.995	0.964	
Satd. Flow (perm)	1783	0	0	1853	1735	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	265			1597	305	
Travel Time (s)	7.2			43.6	8.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	59	28	8	69	18	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	0	0	77	24	0
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	53	25	7	62	16	5
Future Vol, veh/h	53	25	7	62	16	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	59	28	8	69	18	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	87	0	158	73
Stage 1	-	-	-	-	73	-
Stage 2	-	-	-	-	85	-
Critical Hdwy	-	-	4.3	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	3	-	3	3.1
Pot Cap-1 Maneuver	-	-	1121	-	966	1056
Stage 1	-	-	-	-	1108	-
Stage 2	-	-	-	-	1094	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1121	-	959	1056
Mov Cap-2 Maneuver	-	-	-	-	959	-
Stage 1	-	-	-	-	1108	-
Stage 2	-	-	-	-	1086	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	980	-	-	1121	-
HCM Lane V/C Ratio	0.024	-	-	0.007	-
HCM Control Delay (s)	8.8	-	-	8.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	548	12	69	377	14	10	1	56	50	4	3
Future Volume (vph)	3	548	12	69	377	14	10	1	56	50	4	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	15	15	15	12	12	12	11	11	11
Grade (%)		1%			-2%			1%			-5%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.996			0.887			0.993	
Flt Protected					0.993			0.993			0.958	
Satd. Flow (prot)	0	2053	0	0	2054	0	0	1641	0	0	1761	0
Flt Permitted					0.993			0.993			0.958	
Satd. Flow (perm)	0	2053	0	0	2054	0	0	1641	0	0	1761	0
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		736			781			539			303	
Travel Time (s)		20.1			21.3			12.3			6.9	
Confl. Peds. (#/hr)	1		2	2		1	1		3	3		1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	10%	0%	0%	0%	25%	0%
Adj. Flow (vph)	3	565	12	71	389	14	10	1	58	52	4	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	580	0	0	474	0	0	69	0	0	59	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	3	548	12	69	377	14	10	1	56	50	4	3
Future Vol, veh/h	3	548	12	69	377	14	10	1	56	50	4	3
Conflicting Peds, #/hr	1	0	2	2	0	1	1	0	3	3	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	-2	-	-	1	-	-	-5	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	1	0	0	2	0	10	0	0	0	25	0
Mvmt Flow	3	565	12	71	389	14	10	1	58	52	4	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	404	0	0	579	0	0	1122	1125	576	1149	1124	398
Stage 1	-	-	-	-	-	-	579	579	-	539	539	-
Stage 2	-	-	-	-	-	-	543	546	-	610	585	-
Critical Hdwy	4.3	-	-	4.3	-	-	7.4	6.7	6.3	6.1	5.75	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.4	5.7	-	5.1	4.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.4	5.7	-	5.1	4.75	-
Follow-up Hdwy	3	-	-	3	-	-	3	4	3.1	3	4.225	3.1
Pot Cap-1 Maneuver	872	-	-	758	-	-	184	194	538	266	255	730
Stage 1	-	-	-	-	-	-	540	488	-	694	565	-
Stage 2	-	-	-	-	-	-	568	506	-	645	544	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	871	-	-	757	-	-	163	169	535	213	222	728
Mov Cap-2 Maneuver	-	-	-	-	-	-	163	169	-	213	222	-
Stage 1	-	-	-	-	-	-	536	485	-	690	496	-
Stage 2	-	-	-	-	-	-	492	444	-	569	540	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.5	16.2	27
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	390	871	-	-	757	-	-	222
HCM Lane V/C Ratio	0.177	0.004	-	-	0.094	-	-	0.265
HCM Control Delay (s)	16.2	9.1	0	-	10.2	0	-	27
HCM Lane LOS	C	A	A	-	B	A	-	D
HCM 95th %tile Q(veh)	0.6	0	-	-	0.3	-	-	1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	599	8	18	376	54	5	19	9	97	30	64
Future Volume (vph)	59	599	8	18	376	54	5	19	9	97	30	64
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	13	13	10	11	11	12	12	12	16	16	16
Grade (%)		-1%			-1%			3%			-7%	
Storage Length (ft)	150		0	90		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	70			40			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00			0.99	
Frt		0.998			0.981			0.961			0.955	
Flt Protected	0.950			0.950				0.993			0.975	
Satd. Flow (prot)	1661	1847	0	1604	1686	0	0	1692	0	0	1932	0
Flt Permitted	0.332			0.335				0.953			0.822	
Satd. Flow (perm)	581	1847	0	566	1686	0	0	1622	0	0	1629	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			8			10			18	
Link Speed (mph)		25			25			25			35	
Link Distance (ft)		781			600			343			548	
Travel Time (s)		21.3			16.4			9.4			10.7	
Confl. Peds. (#/hr)							4					4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	63	637	9	19	400	57	5	20	10	103	32	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	646	0	19	457	0	0	35	0	0	203	0
Number of Detectors	1	0		0	0		1	1		1	1	
Detector Template							Left			Left		
Leading Detector (ft)	37	0		0	0		20	37		20	37	
Trailing Detector (ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Position(ft)	-3	0		0	0		0	-3		0	-3	
Detector 1 Size(ft)	40	6		20	6		20	40		20	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	3.0	15.0		15.0	15.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	9.0	21.0		21.0	21.0		9.0	9.0		9.0	9.0	
Total Split (s)	13.0	72.0		59.0	59.0		26.0	26.0		26.0	26.0	
Total Split (%)	10.8%	60.0%		49.2%	49.2%		21.7%	21.7%		21.7%	21.7%	
Maximum Green (s)	7.0	66.0		53.0	53.0		20.0	20.0		20.0	20.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	

McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street 2024 with Dev Weekday PM with Wash Ext

Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	36.0
Total Split (s)	22.0
Total Split (%)	18%
Maximum Green (s)	9.0
Yellow Time (s)	10.0

Lanes, Volumes, Timings 2024 with Dev Weekday PM with Wash Ext
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\05 - 24 W PM EXT.syn Synchro 10

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		Max	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	69.6	69.6		59.2	59.2			18.4			18.4	
Actuated g/C Ratio	0.58	0.58		0.49	0.49			0.15			0.15	
v/c Ratio	0.16	0.60		0.07	0.55			0.14			0.77	
Control Delay	12.8	19.8		19.7	25.4			34.2			63.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	12.8	19.8		19.7	25.4			34.2			63.3	
LOS	B	B		B	C			C			E	
Approach Delay		19.2			25.1			34.2			63.3	
Approach LOS		B			C			C			E	
Queue Length 50th (ft)	21	317		8	252			17			137	
Queue Length 95th (ft)	43	448		24	368			47			221	
Internal Link Dist (ft)		701			520			263			468	
Turn Bay Length (ft)	150			90								
Base Capacity (vph)	409	1071		279	836			292			299	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.15	0.60		0.07	0.55			0.12			0.68	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 76 (63%), Referenced to phase 2:EBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 27.8		Intersection LOS: C	
Intersection Capacity Utilization 77.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 11: Station Avenue/North Lane & Hector Street



McMahon Associates, Inc. 601 Washington Street
11: Station Avenue/North Lane & Hector Street 2024 with Dev Weekday PM with Wash Ext

Lane Group	Ø10
All-Red Time (s)	3.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	Ped
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	4
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lanes, Volumes, Timings 2024 with Dev Weekday PM with Wash Ext
\\ftwfs\mcm\eng\818064\Traffic\4-TIS #1 (2022)\Analysis\Synchro\05 - 24 W PM EXT.syn Synchro 10

SimTraffic Simulation Summary
2024 with Dev Weekday PM with Wash Ext 03/03/2022

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:45	4:45	4:45	4:45	4:45	4:45
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	3132	3003	3123	3131	3071	3088
Vehs Exited	3141	2992	3151	3137	3050	3093
Starting Vehs	83	71	100	92	71	73
Ending Vehs	74	82	72	86	92	72
Travel Distance (mi)	1373	1317	1395	1370	1326	1356
Travel Time (hr)	80.9	76.7	82.7	81.7	78.7	80.1
Total Delay (hr)	25.6	23.5	26.4	26.3	24.9	25.4
Total Stops	4817	4594	4910	4894	4656	4773
Fuel Used (gal)	56.5	53.8	56.9	56.6	54.4	55.6

Interval #0 Information Seeding

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3132	3003	3123	3131	3071	3088
Vehs Exited	3141	2992	3151	3137	3050	3093
Starting Vehs	83	71	100	92	71	73
Ending Vehs	74	82	72	86	92	72
Travel Distance (mi)	1373	1317	1395	1370	1326	1356
Travel Time (hr)	80.9	76.7	82.7	81.7	78.7	80.1
Total Delay (hr)	25.6	23.5	26.4	26.3	24.9	25.4
Total Stops	4817	4594	4910	4894	4656	4773
Fuel Used (gal)	56.5	53.8	56.9	56.6	54.4	55.6

SimTraffic Performance Report
2024 with Dev Weekday PM with Wash Ext 03/03/2022

4: Ash Street & Washington Street Performance by lane

Lane	EB	WB	WB	NB	SB	All
Movements Served	LTR	L	TR	LTR	LTR	
Denied Del/Veh (s)						0.0
Total Del/Veh (s)	5.8	6.3	5.6	5.8	0.4	4.0

5: Poplar Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	6.0	7.4	5.1	0.2	5.5

6: Cherry Street & Washington Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.0
Total Del/Veh (s)	5.6	6.6	6.5	1.0	4.9

Total Zone Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	93.5

Intersection: 4: Ash Street & Washington Street

Movement	EB	WB	WB	NB
Directions Served	LTR	L	TR	LTR
Maximum Queue (ft)	47	28	85	50
Average Queue (ft)	24	7	47	26
95th Queue (ft)	39	26	71	48
Link Distance (ft)	542	740	740	597
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Poplar Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	70	91	45	7
Average Queue (ft)	42	46	19	0
95th Queue (ft)	65	74	41	3
Link Distance (ft)	740	791	667	147
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Cherry Street & Washington Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	121	102	40	8
Average Queue (ft)	50	47	13	0
95th Queue (ft)	87	77	39	4
Link Distance (ft)	791	1248	640	268
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0

EMERGENCY ACTION PLAN

Washington Street Apartments

601 Washington Street

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Prepared for 601 Washington Street Associates, LP

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OVERVIEW

This Emergency Action Plan was designed specifically for the 601 Washington Street apartment complex located at 601 Washington Street, Whitemarsh Township, PA. The purpose of the plan is to provide management and occupants with guidelines and actions to respond to many different types of emergencies. The plan is designed to be administered by a building Emergency Coordinator and Crisis Management Team. The plan should be reviewed and modified as needed and practiced at least once a year.

BUILDING LOCATION

The apartment complex consists of one (1) 4-story buildings containing 270 riverfront apartment units plus a Club House/Amenity Center. The building is adjacent to the Schuylkill River, on the former Oreland Sheet Metal site. The United States Postal address is 601 Washington Street, Conshohocken, PA 19428. The property phone number is **XXX-XXX-XXXX.** The property's web site is: **www.ToBeDetermined.com.**

HAZARD ANALYSIS

From an operational standpoint, building occupants are subject to the typical interior and external hazards common to this type of structure and building use.

Based upon a review of available information, meetings with municipal and county Emergency Management officials and a review of the site, the following hazards/risks have been determined.

SARA Title III Sites-

Title III of the U.S. Environmental Protection Agency's Superfund Amendments and Reauthorization Act (SARA) and is usually referred to as "SARA Title III". The act provides for the collection of and access to information about the use, storage, production and release of hazardous chemicals, to help inform emergency planners/responders and the public. Appendix 1 indicates facilities that pose a hazard to the 601 Washington. The red highlighted facilities would be of most concern.

Flood

The provided FIRM (Appendix 2 and Appendix 3) for 601 Washington shows the property falling within the Special Flood Hazard Area. The elevation of the property is approximately 50' – North American Vertical Datum 1988 (determined by pictometry imagery). The flood height listed on the FIRM for that area is between 60' and 59' for Base Flood Elevation from ground surface for a 1% annual flood chance.

The closest flood gauge to this property is upriver in Norristown. The height of this gauge is listed at 51' – North American Vertical Datum 1988. The highest crest listed at this gauge was in 1972 (Hurricane Agnes) at 25.10' which would compare to 76.10 feet in relation to the listed gauge height. The National Weather Service Advanced Hydrologic Prediction Service webpage for the Norristown gauge (https://water.weather.gov/ahps2/hydrograph.php?wfo=phi&gage=nrsp1&hydro_type=2 [water.weather.gov]) lists the following for Flood Impacts:

> At 17' - *A couple industries along the river begin to have flood problems. Water begins to cover rails in Conshohocken. Septa tracks at Mogees in Plymouth Township begin to flood. Ross Street in Plymouth Township at the Sewer Authority Plant floods under the railroad bridge and bike trail. Flooding also occurs along Diamond Run at Station Road (in Plymouth Township off of Conshohocken Road) due to high and backwater effects.*

Pipeline

The map image provided (Appendix 4) through the National Pipeline Mapping System Public Viewer shows a LNG gas transmission pipeline starting from the PECO LNG plant to Colwell Lane. The PECO LNG plant is approximately 1.3 miles from 601 Washington Street. No other pipelines were identified on the map in that area.

The building's location, however does present the need to emphasize two specific areas.

- Flooding

  Being adjacent to the Schuylkill River, portions of the site are considered in the Federal Emergency Management Agency's 100 –year flood plane. Therefore, the Flooding section of the plan should be expanded accordingly.

- Transportation Incidents

  The site is positioned along the SEPTA Manayunk/Norristown Regional rail line and the Norfolk Southern main freight rail line. Commuter rail passengers and hazardous materials pass by the site day and night and both management and tenants need to be aware of actions in the event of a regional rail train derailment and hazardous materials incident in the vicinity. Therefore, the Hazardous Materials section of this plan should be expanded accordingly.

CONCEPT OF OPERATIONS:

Management shall appoint a ***Crisis Management Team*** for the complex. The Team should consist of management and maintenance personnel, and a tenant representative. Management should designate an ***Emergency Coordinator***, and an ***Alternate.*** The Coordinator and /or Alternate should be available by phone contact 24 hours a day, and within a 15 minute response time.

Upon observation or notification of an emergency condition, ***Emergency Coordinator or Alternate,*** or, if unavailable, ***Senior Management Official*** on duty, will activate the Emergency Action Plan. The ***Emergency Coordinator*** will interface with Emergency Responders until a representative of Building Management is on the scene.

The ***Crisis Management Team*** will report to the building Command Center area, making notifications, and implement the Plan to the extent required.

ORGANIZATION:

Emergency Coordinator and Alternate:

The persons trained as the Emergency Coordinator or Alternate should be available by phone contact at all times. The coordinator and alternate shall be familiar with all sections of this and other emergency plans used by the facility. The coordinators make decisions regarding evacuation and/or shelter in place strategy that will, in their best estimation, promote the safety of residents and employees. The complex manager will be responsible to see that all employees who may function as the Emergency Coordinator maintain a high state of readiness and are familiar with the Emergency Action Guide.

Emergency Coordinator: **To Be Determined.**
Alternate Coordinator: **To Be Determined.**

Crisis Management Team:

A tenant representative and alternate from should be appointed as liaison to the Crisis Management Team. The Team is responsible for implementing the Emergency Action Plan. The Team shall appoint and assign Building Captains, and Exit Guards to assist in Evacuations and Sheltering in Place. Persons familiar with the building's mechanical systems should also be represented on the Team.

Building Captains:
The Building should have at least one Building Captain appointed to assist with Evacuation or Shelter-In-Place. The Building Captain should be familiar with occupancies in that building.

Building Captain: **To Be Determined**.

Exit Guards:
Exit Guards should be appointed at each exit to assist in evacuation and prevent any persons from re-entering the building.

Exit Guard: **To Be Determined**

EMERGENCY ACCESS:

A Knox Box or similar approved product shall be made available to provide for emergency access by law enforcement, emergency medical or fire department services if deemed necessary. The size, location and ultimate items to be contained within the repository shall be governed by the Township Emergency Management and Police Department.

COMMAND CENTER:

A Command Center location shall be identified. An alternate location should also be identified. The Command Center shall provide the focal point for receiving reports, requests for assistance, liaison with Township Emergency Responders, disseminating information, directing employees, and facilitating the decision making process. Plans, phone numbers, status displays, communications and equipment should be available to help the Emergency Coordinator deal with a developing emergency. Equipment should include flashlights, radios, batteries, identification vests, etc.

COMMUNICATIONS:

Reliable and effective communications are a critical part of every Emergency Action Plan. Generally, communications between the facility Command Center and the Township will be via telephone.

The facility must maintain a state of vigilance, especially when heavy sustained rains or severe weather are predicted. A NOAA radio monitor with alert device and the Weather Channel shall be obtained, maintained and monitored at all times.

Internal communications should be via portable radios or cell phones for all key employees. Other means of communications include public address system, messenger, fax machine, dial-up modems, and signs. In the event the public address system is not available the facility should also maintain a portable, handheld bullhorn.

DIRECTION AND CONTROL:

The Emergency Coordinator shall:

- Assess the situation, sound the proper alarm if not already activated, and make appropriate notifications.
- Assemble the Crisis Management Team and Notify Management
- Greet and confer with responding Township Fire, Police, and Emergency Management officials.
- The Emergency Coordinator shall assist first responders with any information needed until a building management representative is on the scene.

Note: The facility manager will maintain a current chain of command list (usually the Crisis Management Team listing) so that there will be a clear understanding of who is in charge in the coordinator's absence.

ADMINISTRATION:

A current copy of this Emergency Action Plan should be maintained in the facility manager's office, or readily available to the Emergency Coordinator and Alternate.

A current copy must also be on file with the Township Emergency Management Coordinator. The Facility Manager will insure that all tenants review and are familiar with the plan annually and that all phone numbers are verified at least every 6 months. A record of changes shall be maintained as an element of this Emergency Action Plan.

EDUCATION / OUTREACH:

It is essential that elements of this plan be provided to ALL TENANTS prior to the occurrence of an emergency. Site maps should be posted at all means of egress. New employee training should include a review of this plan.

Arrange with the Fire Department to provide fire extinguisher training for all employees. Employees who have been properly trained may fight incipient fires with portable fire extinguishers

DRILLS:

Emergency evacuation drills shall be conducted in the occupancy annually, or when required by the fire code official. Drills shall be designed in cooperation with the local authorities. Fire Alarm systems shall be inspected and tested in accordance with applicable Township codes.

Responsibility for the planning and conducting of drills shall be assigned to competent persons designated to exercise leadership. Drills will be held at unexpected times and under varying conditions to simulate the unusual conditions that occur in cases of fire. Prior notification should be given to the fire code official. Records must be maintained of required emergency evacuation drills and should include the following information:

1. Person conducting the drill
2. Date and time of drill
3. Notification method used
4. Staff members on duty and participating
5. Number of occupants evacuated
6. Special conditions simulated
7. Problems encountered
8. Weather conditions during evacuation
9. Time required to accomplish complete evacuation

ACTIVATION

The plan shall be activated upon confirmation of one or more of the following conditions:

- Activation of the fire alarm or sprinkler system
- Severe weather watch
- Notification from an official or recognized source that an external emergency is threatening the facility or the geographic area.
- Internal or external gas leak
- Internal or external bomb, security, or safety threat
- A utility failure that is seriously affecting the facility
- Discretion of Facility Manager or the Emergency Management Coordinator, Police, Fire or EMS Chief or their designee.

NOTIFICATION AND IMPORTANT PHONE NUMBERS

- POLICE, FIRE or MEDICAL EMERGENCY 9-1-1

- Property Management 24 hr. Number

    - 601 Washington Street: **(XXX) XXX-XXXX**
    - **TBD**, Property Manager: **(XXX) XXX-XXXX**
    - **TBD**, Maintenance Supervisor: **(XXX) XXX-XXXX**

- Phone numbers for all critical system vendors/contactors:
    - Mike Spaeder Landscaping, (610) 544-1075
    - Budget Maintenance Emergency Services, (610) 269-5417
    - Electrical Contractor, **TBD**
    - Elevator, **TBD**
    - Fire Alarm/Security, Mill Stat: (610) 687-1018
    - HVAC, **TBD**
    - Plumbing, **TBD**
    - Sprinkler System, **TBD**

- Whitemarsh Township Emergency Services: (610) 825-3535
    - Scott Lynch, EMS Administrator, Fire Marshall (610) 825-3535, ext. 2614

- PECO - Gas or electric emergency call: 1-800-841-4141

- Poison Information Center: 1-800-222-1222

EMERGENCY COORDINATOR CHECKLIST

Upon activation or the Guide, the Emergency Coordinator will:

- Refer to the Emergency Action Guide for the particular emergency
- Establish a Command Center Location
- Start a log of all activities (See attachment)
- Address safety of staff and patrons
- Initiate evacuation form the facility for fires, gas leaks, and/or immediate internal threats to the safety of patrons and employees
- For ALL emergencies, confer with Township police, fire and Emergency Management officials
- Assemble the Crisis Team
- Consult with Whitemarsh Township Emergency services for the need to evacuate or shelter in place
- Estimate the duration of the emergency and address logistical needs for extended operations if they are anticipated.
- Provide information to guests via signs, PA announcements, etc.
- Provide for safety of all patrons and staff
- Be prepared to conduct damage assessment
- Scale down operations and return to normal as soon as possible

NOTIFY-ME

All residents shall be required to register for Notify-Me emergency alerting system. This shall occur as a function of signing their lease agreement to register for emergency notification necessitating shelter in place or evacuation. The purpose of **Notify Me** is an emergency **notification** system used by Montgomery County and participating municipalities to issue **notifications** to the public. This will assist in orderly and timely evacuations of the 601 Washington Street site in the event of an emergency warranting such action.

Further information can be obtained from:

Montgomery County Department of Public Safety
50 Eagleville Road
Eagleville, PA 19403
Office: (610) 631-6500
Fax: (610) 631-6536
http://dps.montcopa.org

To register, go to:

https://www.montcopa.org/List.aspx

and register, selecting “Alert Center” and then “emergency”.

EMERGENCY ACTION GUIDES

- Evacuation
- Shelter-in-Place
- Fire/Explosion/Building Collapse
- Flooding and Severe Weather
- Bomb Threats/Suspicious Mail/Packages
- Hazardous Materials Release
- Utility Emergencies
- Security Incident/Lockdown
- Emergency Maps
- Checklists
    - Employee Responsibilities
        - Coordinator Responsibilities
        - Building Captains
        - Exit Guards
        - Logs

EVACUATION

In the event of an internal emergency that poses an immediate threat to the safety of the facility patrons and staff, an immediate evacuation will be initiated. The individual observing or being made aware of the threat should activate the building's manual fire alarm system as the primary means to quickly evacuate the building. Employees should assist patrons from the building, paying particular attention to those who may need additional assistance, such as the elderly and those with physical disabilities.

When the threat is external to the building, such as a toxic vapor cloud or a severe storm that is developing, the Township Police, Fire or Emergency Management Organization will advise the Emergency Coordinator regarding evacuation. **IT IS CRITICAL THAT ACCURATE CONTACT PHONE NUMBERS BE MAINTAINED.** However, in a rapidly developing crisis, such as a flash flood, the Emergency Coordinator may have to make a decision regarding evacuation or shelter in place.

EVACUATION DOs AND DON'Ts

EVACUATION DO's

- REMAIN CALM
- SHUT DOWN ALL WORK ON EQUIPMENT
- EXIT THE BUILDING AND REPORT TO THE ASSEMBLY AREA
- ADVISE SUPERVISOR OR ANY MISSING CO-WORKERS
- ASSIST INJURED OR DISORIENTED PERSONS TO SAFETY
- FOLLOW INSTRUCTIONS OF SAFETY MONITORS AND EMERGENCY RESPONDERS

EVACUATION DO NOT's

- DON'T PANIC OR RUN
- DON'T RUN
- DON'T USE ELEVATORS
- DON'T RETURN FOR ANYTHING UNTIL "ALL CLEAR" IS GIVEN
- DON'T LEAVE ASSEMBLY AREA UNTIL "ALL CLEAR" IS GIVEN

SHELTER-IN-PLACE

In some instances you will be asked to Shelter-in-Place. Sheltering is an option that helps protect people from outside exposures such as chemicals, radiation, police activity, or weather.

- Have a predetermined safe room
- Know where your ventilation system controls are and how to turn them off
- Have a Shelter–in-Place kit available
- Follow instructions of authorities regarding actions to be taken (i.e. sealing vents, windows, or staying away from windows and doors,)

Shelter-in-Place Kit

- Plastic Sheeting
- Duct Tape
- Scissors
- Towels and rags for blocking vents and under doors
- Drinking water
- Battery powered radio with emergency alert station taped to side
- Working Flashlight
- Extra Batteries
- Snacks

FIRE/EXPLOSION/BUILDING COLLAPSE

In the event of a fire or smoke condition, employees will take immediate action, following the R-A-C-E procedure as outlined below:

R – Remove those in immediate danger

A – Activate the fire alarm system and call 9-1-1

C – Confine the fire by closing doors

E – Evacuate patrons and staff via nearest safe emergency exit

- The individual who first encounters a fire or smoke condition will immediately remove those in danger and sound the building's fire alarm if it has not already activated
- Employees have the responsibility of calling 9-1-1 to advise the 9-1-1 operator of the activation of the fire alarm and the location of the fire and/or smoke condition, if known
- After exiting the building, patrons should be directed away from exit doors and the driveway
- The Emergency Coordinator will assemble the Crisis Management Team at a safe location and account for residents and employees
- Residents and employees WILL NOT re-enter the building until authorized by the Fire Marshal

FLOODING AND SEVERE WEATHER

The Apartment Complex is located adjacent to the Schuylkill River and thus may be subject to flooding. Portions of the property are within the FEMA 100-year flood line. While there is no recollection in current history of the river flooding above the retaining walls, this plan will discuss actions to be taken in the event of such flooding.

DEFINITIONS:

Flash Flood or Flood ***Watch*****:**
Flash flooding or flooding is possible in the watch area.

Flash Flood or Flood ***Warning*****:**
Flash flooding or flooding has been reported or is imminent

Urban and Small Stream Advisory:
Flooding of small streams, streets, and low-lying areas is occurring.

Flash Flood or Flood Statement:
Follow-up information regarding a flash flood event.

PROCEDURE:

Monitoring Conditions: The National Weather Service (NWS) in collaboration with the U.S. Geological Survey constantly monitor water levels in the Schuylkill River. These measurements are available real-time on line at the NWS web site. When weather conditions warrant, the NWS will issue weather ALERTS which are monitored by County and Local Emergency Management offices. Montgomery County will then issue ALERTS to communities which may be affected by the weather event.

Management officials should register with the county ALERT system to receive these ALERTS by way of e-mail and/or cell phone text messages. As a back up, Management should obtain a NOAA Weather Radio for the management office that will activate anytime a weather alert is issued for the area. During Flood Advisories, Management Should monitor the USGS river gauge web sites noted in this plan.

Restricted Parking in Flood Zones: Some vehicle parking areas may be located within the FEMA 100-year flood line. These areas of the parking lots will be designated by a marked color line on the paved areas and residents advised that parking in this area during a flood emergency will be prohibited, and if not moved within a certain time period after notification, Management will have them towed to a safe area.

Actions: Management will take the following actions according to the National Weather Service preparation levels:

FLOOD WATCH:

1. Charge all walkie-talkies, cell phones and golf cart batteries.

2. Check supply of barricades, orange cones, and yellow caution tape.

3. Alert all Staff to be available to work during the storm. If necessary have the staff stay overnight at the property. Also, obtain additional cleaning staff. In total, we should have about 10 people.

4. Review Emergency Action Plan will all employees.

FLOOD WARNING:

1. Monitor throughout the storm this website, which provides flooding information:
    a. http://water.weather.gov/ahps2/hydrograph.php?wfo=phi&gage=nrsp1&view=1,1,1,1,1,1,1,1&toggles=10,7,8,2,9,15,6&type=0

2. Place flyers throughout the property, in the elevators, in the building lobbies, consistent with "Exhibit A". Send out a blast e-mail with the same message.

3. Contact 2-3 local towing services to have them available before and during the storm to tow vehicles.
    a. Pat's Towing: 610-279-9018
    b. EVB Towing: 610-828-6522
    c. Janeway Towing: 610-828-1613
    d. Jamison Towing: 610-270-9999

4. Contact Budget Maintenance Emergency Services and Mike Spaeder to place on standby their clean up crews.
    a. Budget Maintenance: (610) 544-1075
    b. Mike Spaeder Landscaping: (610) 506-2295

5. Shut down irrigation system and pool pumps.

6. Instruct maintenance to activate the flood preparedness actions listed on the Maintenance Flood Checklist, such as securing outdoor furniture or objects subject to floating or blowing away.

7. Remove all pool umbrellas.

8. Remove the walk off mats in buildings lobbies.

9. Contact local hotels to determine their best rate if we have to do an evacuation.

FLOOD ACTION STAGE: (River Gauge at 10')

1. Establish facility Command Post and advise local officials of the same.

2. One person should be designated the "Facility Commander". This position is responsible for coordinating all staff, maintaining contact with emergency officials, speaking with Corporate, recommending the evacuation, directing towing, etc.

3. Re-send e-mail blast. Include in this e-mail blast any deals we made with local hotels.

4. Advise Residents that they should consider the possibility that flooding may be severe enough to prohibit their ability to safely leave the property.

5. Advise residents that they may become stranded and prohibited by authorities from leaving if the water level rises to an unsafe level.

6. Have any remaining vehicles in flood zone way towed.

7. Constantly monitor ingress and egress to the site and the loop road and keep clear of any obstructions

8. Coordinate any decision to evacuate the site with Whitemarsh Township Office of Emergency Management officials.

9. Staff should be assigned as follows:
    a. Two people in the leasing office to take calls, send e-mail blasts, and comfort residents.
    b. Three maintenance personnel to handle any maintenance issues, direct towing efforts and handle a possible resident evacuation.
    c. Five cleaning personnel to be ready to immediately clean up after the storm. In addition, these people can handle refreshments during the storm and miscellaneous duties.

AFTER THE STORM:

1. Perform damage assessment of the complex and advise Township officials.

2. When determined safe, send out e-mail blast telling all residents the storm is over and they can return.

3. Contact Budget Maintenance & Spaeder Landscape to begin clean up efforts.

4. Clean all building lobbies.

5. Place walk off mats back in the lobbies.

6. Clean, sweep and power wash garages.
7. Clean and sweep parking lots and roadways.
8. Look for missing irrigation lids which could create tripping hazards. Cover with wood until new lids are installed.

REMEMBER…

Even 6 inches of fast-moving water will knock you off your feet and 2 feet will float your car!
NEVER try to walk or drive through swift moving water. If such conditions exist, do not allow guests to drive through the water. Utilize the emergency exit or return to the building until the water recedes.

BOMB THREATS/SUSPICIOUS MAIL/PACKAGES

Bomb threats made against the facility could be received by either telephone or mail. Persons normally answering telephone and/or opening mail should be trained in the proper handling of these incidents.

PROCEDURE:

- Telephone Threats
  - Remain calm
  - Keep the caller on the line as long as possible to obtain as much information as possible
  - Immediately report the threat to the on-duty manager and the Whitemarsh Township Police Department

- Mail Threats
  - Remain calm
  - Save the envelope and its contents
  - Avoid unnecessary handling of the item
  - Immediately report the threat to the on-duty manager and the Whitemarsh Township Police Department

MANAGEMENT RESPONSIBILITIES:

- Upon receipt of a bomb threat, immediate evacuation is warranted

- Deploy staff to assure the complete evacuation is carried out in a calm and orderly manner

- Assemble the Crisis Team

- Designate employees who will assist police with sweep of the building for suspicious packages, include exterior of building in search

- Do not use portable radios

- If a suspicious device is found:
  - Evacuate immediately
  - DO NOT touch the device
  - Residents and staff will remain outside until re-entry is authorized by the Whitemarsh Township Police Department

HAZARDOUS MATERIALS RELEASE

The release of toxic or hazardous materials from a transportation accident may require the activation of the Guide for possible evacuation or shelter in place procedures. Unlike flooding, which will be self-evident, determining the need to evacuate patrons will be determined by Township or State officials based on their assessment of conditions.

If ordered to shelter in place, initiate the following procedures:

- Assemble the Crisis Management Team
- Follow instructions from authorities
- Deploy staff to search exterior for those who may be unaware of danger
- Shut down the HVAC system
- Post shelter-in-place signs and make public address announcements
- Place towels under all exterior doors
- Monitor all communications links
- Notify Township Emergency Management officials of the number of residents and employees sheltered
- Maintain a several hour inventory of essential items for extended operations
- Keep tenants advised of the status of the emergency

UTILITY EMERGENCIES

Every tenant should be aware of what utilities are connected to the facility, where the utility shut offs are located, and what companies supply the utilities. Natural gas and electricity will pose the greatest danger to the facility.

Gas Odor/Leak

- Open the windows.
- Do not turn any electric devises on or off including light switches.
- Follow on-site Evacuation Plan.
- Call 9-1-1 to report the odor/leak.
- Call the gas supplier to report the gas odor/leak.

Electrical Emergency

- Call the electric supplier.
- If there is a power outage to your facility and a transformer is on fire or trees are causing wires to arc call 9-1-1 .
- When evacuating the facility be cautious of downed wires – consider any wires on the ground live.

Telephone/Water/Cable

- Be sure to keep current contact numbers on the emergency contact list in case these utilities ever need to be contacted.

SECURITY INCIDENT/LOCKDOWN

Tenants of the building must be aware of the possibility for an unknown person or intruder entering the property/facility. In a situation like this it is important to keep everyone safe and not to put anyone in jeopardy of becoming injured.

The building manager should create a code system that all tenants are aware of to announce an intruder in the facility.

If you are the person that makes the initial contact with an intruder:

- Approach with caution and do not be confrontational.
- Do not make any sudden movements.
- You should ask them normal questions as to what and why they are there.

If you are NOT the person making contact follow these procedures:

- Remain calm
- Call 9-1-1 and report the intruder, give a detailed description of intruder – stay on the line to give any updated information.
- Make an announcement of the code word or phrase.
- Do NOT take heroic actions, it may cause the incident to escalate and injuries to occur especially if a weapon is involved.

EMERGENCY MAPS

Emergency Maps should be posted throughout the facility and include:

- EXIT LOCATIONS.
- FIRE ALARM PULL STATIONS.
- FIRE EXTINGUISHERS.
- MAIN AISLES AND EVACUATION ROUTES.
- ASSEMBLY AREAS.
- EMERGENCY PHONE NUMBERS.
- NAMES OF EVACUATION COORDINATOR & BUILDING CAPTAINS.

EMPLOYEE /TENANT RESPONSIBILITIES

- REGISTER WITH MONTGOMERY COUNTY READY NOTIFY FOR ALERTS
- BE FAMILIAR WITH ALARMS FOR EVACUATION AND SHELTERING.
- KNOW CLOSEST TWO EVACUATION AND ESCAPE ROUTES OR SHELTER AREAS.
- KNOW WHO TO CONTACT IN AN EMERGENCY.
- KNOW LOCATION OF ASSEMBLY AREA.
- KNOW EVACUATION COORDINATOR AND FLOOR CAPTAIN.
- STAY CALM AND EXIT QUICKLY.
- REPORT TO DESIGNATED ASSEMBLY AREA.
- FOLLOW INSTRUCTIONS.
- REPORT ANY EXIT OR ESCAPE OBSTRUCTIONS TO SUPERVISOR.
- IF TRAPPED, GO TO A ROOM WITH A WINDOW AND TELEPHONE FOR HELP IF POSSIBLE.

EVACUATION COORDINATOR:

Make sure all Emergency Plans are current and drilled frequently.

Assign appropriate number of Building Captains and Exit Guards to provide coverage at all times the facility is occupied.

Make sure Captains and Monitors know their responsibilities and assignments

Account for all evacuees. Identify the name and last know location of any missing or unaccounted person and pass information on to the Incident Commander.

BUILDING CAPTAINS:

Ensure the evacuation of your assigned area. Perform a sweep of the area, including restrooms, etc. to ensure all persons have been evacuated. Report the status of the evacuation to the Evacuation Coordinator.

EXIT GUARDS:

Make sure all exits are free from obstructions and provide a direct access to the exterior. Remain outside the exit door and prevent any persons from re-entering the building until the "All Clear" is given.

EMERGENCY ACTION LOG

TIME	EVENT/ACTION TAKEN	BY

APPENDIX 1

EVACUATION ROUTE MAP



FIGURE 1

Site Access Map

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON TRANSPORTATION ENGINEERS & PLANNERS

APPENDIX 2

EVACUATION ROUTE AERIAL MAP



FIGURE 2

Site Access Map

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON TRANSPORTATION ENGINEERS & PLANNERS

UPDATES

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December 23, 2019

601 Washington Street Associates, LP
201 King of Prussia Road, Suite 501
Radnor, PA 19087

RE: Whitemarsh Township Zoning Hearing Board
Application of 601 Washington Street Associates, LP No. 2019-21

Dear Applicant:

Enclosed herewith please find a true and correct copy of the Findings of Fact, Conclusions of Law, Decision and Order of the Whitemarsh Township Zoning Hearing Board in this matter. All parties shall have thirty (30) days from the issuance of this Decision and Order to file an appeal with the Court of Common Pleas of Montgomery County.

Sincerely,

MICHAEL E. FUREY
Solicitor to the Zoning Hearing Board
Whitemarsh Township

MEF/js
Enclosure

cc: Charles Guttenplan, Zoning Officer (w/enclosure)
Sean Kilkenny, Esquire (w/enclosure)
Edmund J. Campbell, Esquire (w/enclosure)

BEFORE THE WHITEMARSH TOWNSHIP ZONING HEARING BOARD
MONTGOMERY COUNTY, PENNSYLVANIA
DECISION AND ORDER

APPLICATION OF 601 WASHINGTON STREET ASSOCIATES, LP NO: 2019-21

I. BACKGROUND

The Applicant, 601 Washington Street Associates, LP, filed an application with the Zoning Hearing Board regarding the property located at 601 Washington Street, Whitemarsh Township, Montgomery County, Pennsylvania. The Applicant proposed to construct a two hundred seventy (270) unit multi-family residential complex, parking areas and associated facilities. Public hearings were conducted on July 10, 2019, September 11, 2019, November 6, 2019, and November 13, 2019.

The Applicant requested the following relief:

1. A variance from Section 116-24.D.(3), so as to permit in excess of 30% coverage of accessory uses and structures in the rear yard or between the rear lot line and the rear principal building plane.

2. A variance from Section 116-24.E.(3)(a), so as to permit off-street parking within the front yard.

3. A variance from Section 116-165, so as to permit structures within the Floodplain Conservation District that are not permitted under this Section.

4. A variance from Section 116-169.B.(1), so as to permit the regrading of 49% of the total portion of 15-25% slopes on the site, rather than the 30% permitted.

5. A variance from Section 116.169.B.(2), so as to permit the regrading of 29.4% of the total portion of 25% or greater slopes on the site, rather than the 15% permitted.

6. A variance from Section 116-281.A.(3)(a), from the 10 foot minimum setback from the ultimate right-of-way of abutting streets with an average of 20 feet, so as to permit the setback from the ultimate right-of-way of Washington Street at 66.41 feet.

7. A special exception under Section 116-166.A.(3). so as to permit a stormwater facility (BMP) in the floodway.

The following requests for relief were withdrawn (N.T. 07/10/19, pp. 17-18):

1. The request for a variance from Section 116-164.C, so as to permit development within the Floodplain Conservation District.

2. The request for a variance from Section 116-184.F, so as to permit parking within 10 feet of structures, and allow handicapped parking in the entry court four (4) feet from the building.

3. The request for a variance from Section 116-280.H, so as to permit an exclusively residential development, rather than the minimum of two percent (2%) of the footprint area of nonresidential use required.

The Zoning Hearing Board members participating in the hearings were Stanley A. Casacio, who served as Chair, Robert A. Bacine, James Behr, William E. Kramer and Marc Weinstein. The Applicant was represented by Edmund Campbell, Esquire. No parties entered appearance in opposition to the application, although some residents posed questions and offered public comment.

The witnesses were duly sworn or affirmed and Notes of Testimony for the hearings were transcribed and are hereby made a part of this record. After the hearings and public discussion, the Board voted on November 13, 2019 to deny the application by a vote of 4:1. The Board issues Findings of Fact and Conclusions of Law in support of the Decision and Order.

II. FINDINGS OF FACT

1. The Applicant is 601 Washington Street Associates, LP, legal owner of the Property located at 601 Washington Street, Whitemarsh Township, Montgomery County, Pennsylvania. (Application, Exhibit T-3)

2. The following Exhibits were marked and duly admitted into evidence:

TOWNSHIP EXHIBITS:

T-1A	Proof of Publication
T-1B	Meeting Notification
T-1C	Posting of Notice
T-2	Zoning Map
T-3	Tax Map
T-4	Zoning Officer's Zoning Ordinance Compliance Review Letter Dated March 7, 2019
T-5	Township Engineer's Memo Dated June 26, 2019
T-6	Township Engineer's Review Letter Dated March 7, 2019
T-7	Fire Marshal's Memo Dated June 25, 2019
T-8	Planning Commission Report Dated June 27, 2019
T-9	Prior Decisions: ZHB #2002-22 ZHB #2000-52 ZHB #2000-27 ZHB #1996-04 ZHB #1989-15 ZHB #1986-29
T-10	Memo Dated September 10, 2019 Approving Emergency Action Plan
T-11	DEP Letter Dated September 3, 2019

APPLICANT EXHIBITS:

A-1	Power Point
A-2	Rosenberry Resume
A-3	Thomas Resume
A-4	Kyle Resume
A-5	Act 2 Report
A-6	Traffic Engineering Chart/Plan
A-7	Emergency Action Plan
A-8	Vesey email
A-9	Koza Resume
A-10	PowerPoint
A-11	Vesey Email
A-12	Traffic Report
A-13	Supplemental Traffic Report

3. The Applicant presented the testimony of Kevin Kyle, Project Manager ("Project Manager"). (N.T. 07/10/19, pp. 23-25)

4. The Applicant proposes a 270 unit multi-family residential development. (N.T. 07/10/19, p. 24)

5. The subject property is bordered by the Schuylkill River to the south, Whitemarsh Boat Club to the east (801 Washington Street), a SEPTA line to the north along Washington Street, and a construction supply company to the west (501 Washington Street). (N.T. 07/10/19, pp. 25-27, Exhibit A-1)

6. The subject property is mostly vacant with industrial-type buildings; a landscaper is currently operating out of one of the buildings. (N.T. 07/10/19, pp. 27-36, Exhibit A-1)

7. The Applicant presented an Emergency Action Plan for flooding and rail line disasters. (N.T. 07/10/19, pp. 46-49, Exhibit A-7)

8. The Project Manager maintained that there is sufficient lead time (3-5 days) to organize an evacuation for a normal flooding event due to gauges upstream on the Schuylkill River. (N.T. 07/10/19, pp. 46-48, 60-73)

9. Unlike other properties being developed along the river, at least one which has an increased elevation (901 Washington Street), this property at 601 Washington Street is more susceptible to flash flooding, with much less warning and lead time. (N.T. 07/10/19, pp. 46-48, 60-73)

10. The entire property is located in the Floodplain Conservation District, with the southern portion actually located in the floodway. (N.T. 07/10/19, pp. 51-52, 172-173, Exhibit A-1)

11. The residential apartment buildings were proposed to be four-stories with parking underneath the structures, measuring approximately 60 feet in height. (N.T. 07/10/19, pp. 57-59)

12. The Applicant plans improvements to Washington Street by widening same along its development. (N.T. 07/10/19, pp. 78-79)

13. There are significant concerns regarding the condition and width of Washington Street with respect to whether the proposed development will be detrimental to the public welfare. (N.T. 07/10/19, pp. 76-90)

14. The Applicant proposed the maximum density of units permitted by right. (N.T. 07/10/19, pp. 113-116)

15. The Township Planning Commission recommended denial of the application due to access and emergency evacuation concerns directly related to the condition of Washington Street. (N.T. 07/10/19, pp. 116-120, Exhibit T-8)

16. The Applicant presented the testimony of Lisa Thomas as an expert in landscape architecture and land planning ("Land Planner"). (N.T. 07/10/19, pp. 121-124, Exhibit A-3)

17. The Applicant proposed to use 35% (6,741 square feet more than allowed) for structures in the rear yard for "flexibility", even though the plans show less than the 30% allowed under Section 116-24.D.(3); therefore, the lack of hardship in that respect is evident. (N.T. 07/10/19, pp. 131-134, 161, Exhibit A-1)

18. The justifications for the variance related to the location of off-street parking (Section 116-24.E.(3)(a)) were "ambiance" and that complying with the ordinance was "counterproductive," rather than identifying any hardship. (N.T. 07/10/19, pp. 134-136, 160-162, 179-180)

19. The variance request with respect to the location of the building as related to the street (Section 116-281.A.(3)(a)) was also not based on any hardship analysis, but rather the Applicant deemed it to be a more attractive alignment. (N.T. 07/10/19, pp. 136-137, 160-162, 171-172)

20. In response to questioning, it became evident that if the buildings were not as large, less variance relief would be required, even to achieve the aesthetic goals of the Applicant. (N.T. 07/10/19, pp. 144-148)

21. The Applicant presented the testimony of Richard Rosenberry as an expert in civil engineering ("Civil Engineer"). (N.T. 07/10/19, pp. 156-159, Exhibit A-2)

22. The Applicant argued that a variance from Section 116-165 to allow structures associated with development would be required for any development of this piece of land, however the Applicant offered no justification for the extent to which relief from this provision is required from a hardship standpoint. (N.T. 07/10/19, pp. 162-164)

23. The Applicant argued that any development of this lot would require variances from Sections 116-169.B.(1) and 116-169.B.(2) to disturb the steep slopes, and further maintained that since some of the slopes appear to be manmade, the slopes need not be protected. (N.T. 07/10/19, pp. 39-42, 164-168, Exhibit A-1)

24. This argument ignores the fact that the Applicant has owned the property for twenty (20) years, and has either caused, permitted, or failed to abate, the activities on the property which created such steep slope conditions.

25. The reason why the Ordinance does not differentiate between naturally occurring steep slopes and man-made steep slopes is that disturbance of such steep slopes, regardless how

the slopes were made, has an effect on storm water and erosion control; hence, disturbance of such steep slopes require relief.

26. The argument that the slopes are man-made actually makes the grant of the variance more difficult because one of the mandatory elements of variance relief is that the hardship has not been created by the Applicant.

27. The record developed by the Applicant is completely devoid of evidence that the hardship created by the man-made steep slopes is not self-inflicted.

28. In addition, there was clearly insufficient evidence of hardship to disturb the natural steep slopes, which the Civil Engineer admitted increases the likelihood of erosion. (N.T. 07/10/19, pp. 166-171)

29. Regardless, it is clear that less steep slopes would be impacted if the Applicant's design did not completely maximize the residential density.

30. A stormwater facility (BMP) is proposed to be placed in the floodway, without sufficient expert testimony as to why it could not be located in the less environmentally sensitive floodway fringe; it is evident that the Civil Engineer just assumed this intense build-out of the site, and then concluded that the floodway had to be disturbed. (N.T. 07/10/19, pp. 172-177)

31. While the Board recognizes that a fully engineered stormwater plan is generally presented for land development purposes, when an applicant requests development in a floodplain, the stormwater management plan speaks directly to whether the proposal is detrimental to the public welfare, and the Applicant chose to not incur the cost of performing such a study at this point so as to present this evidence to the Board. (N.T. 07/10/19, pp. 182-184)

32. Due to the scope of the project, even a portion of one of the buildings will be located

in the floodway without any showing of hardship to justify the placement. (N.T. 07/10/19, pp. 185-192, Exhibit A-1)

33. The Civil Engineer also testified that, unlike another property being developed in the immediate vicinity (901 Washington Street), this developer has chosen not to perform the necessary studies to determine whether a FEMA map amendment may be appropriate, simply stating: "We don't want to do that." (N.T. 07/10/19, pp. 203-204)

34. It appears that the Applicant believes it is easier and more economical to request relief from this Board, without sufficient analysis on the impact on surrounding properties, including the river, and especially properties downstream.

35. Upon questioning, the Civil Engineer first stated that he did not calculate existing impervious coverage versus proposed impervious coverage, and only calculated proposed impervious coverage to evaluate storm water concerns, which testimony was contrary to the site plan specifically showing over a 9% increase in impervious coverage. (N.T. 07/10/19, pp. 222-223)

36. The Civil Engineer corrected his testimony, but this exchange raises significant questions as to the accuracy of the testimony regarding impact on surrounding properties.

37. The Applicant presented the testimony of Michael Gonshor as an expert in environmental science ("Environmental Expert"). (N.T. 09/11/19, pp. 8-10)

38. The Environmental Expert testified that an Act 2 Report had been prepared and submitted for approval, which report concluded that no soil has to be removed from, or capped on, the property. (N.T. 09/11/19, pp. 11-32, Exhibits A-5, T-11)

39. However, the groundwater is contaminated, requiring a vapor barrier system for the

buildings, and perhaps passive or mechanical ventilation systems installed. (N.T. 09/11/19, pp. 11-32, Exhibits A-5, T-11)

40. A final determination has not been made with respect to the approval of the Act 2 Report. (N.T. 09/11/19, pp. 11-32, Exhibits A-5, T-11)

41. The Applicant's Environmental Expert indicated that he believed that a DEP Act 2 letter will be issued so as to permit the residential development, even though the groundwater is contaminated. (N.T. 11/06/19, pp. 36-72, Exhibit T-11)

42. While the Board finds the testimony of the Applicant's Environmental Expert to be credible, unfortunately his opinions were incomplete as the Applicant has not performed the additional testing required by DEP in its September 3, 2019 letter and, therefore, insufficient evidence was presented to permit the Board to conclude the relief, if granted, will not be detrimental to the public welfare from an environmental standpoint. (N.T. 11/06/19, pp. 33-45, 78, Exhibit T-11)

43. The Applicant could have already obtained the Act 2 clearance over the last 20 years of ownership, but has not completed same, so as to be submitted to the Board. (N.T. 11/06/19, pp. 66-67, 71-72; N.T. 11/13/19, pp. 100-101)

44. The Applicant offered, as a condition of approval, that an Act 2 letter be obtained, and, as a result, the Board is not basing its denial on the lack of said clearance letter, but the pattern of issues raised during the hearings are met with the response by the Applicant that such issues would be addressed in the future, without providing the Board definitive information regarding resolution of such issues, makes it very difficult for the Board to conclude the use will not be detrimental to the public welfare. (N.T. 11/06/19, p. 71; N.T. 11/13/19, pp. 100-101)

45. The Applicant presented the testimony of William Jenaway as an expert in emergency management ("Emergency Management Expert"). (N.T. 09/11/19, pp. 64-67)

46. The Emergency Management Expert developed an Emergency Action Plan for the proposed development. (N.T. 09/11/19, p. 67, Exhibit A-7)

47. The Emergency Management Expert testified that, based on information provided to him regarding gauges along the Schuylkill River, gradual increases in flood heights can be predicted sufficiently in advance to provide for evacuations. (N.T. 09/11/19, pp. 71-72, 80-83)

48. The concern, however, is the reduced notice time for a flash flood, which the Emergency Management Expert apparently did not anticipate. (N.T. 09/11/19, pp. 80-83)

49. The Emergency Management Expert met with members of Whitemarsh Township's Emergency Management Team, who approved the plan. (N.T. 09/11/19, pp. 74-75, Exhibit T-10)

50. The Emergency Management Expert acknowledged that if there were a train breakdown, or an accident, at the intersection west of the project, such would cause additional challenges to the evacuation, highlighting the concern that this intense development is being proposed on a dead-end street, which does not even consist of two (2) regulation-sized lanes at critical egress points. (N.T. 09/11/19, pp. 114-115)

51. The Applicant presented the testimony of Sandy Koza as an expert in traffic engineering ("Traffic Engineer"). (N.T. 09/11/19, pp. 40-42)

52. The Traffic Engineer initially presented no written report to the Board, but presented a field view chart. (N.T. 09/11/19, pp. 42-43, Exhibit A-6)

53. The Traffic Engineer testified that Exhibit A-6 provided a plan for egress in

emergencies, but the plan does not account for blockage of the only egress route. (N.T. 09/11/19, pp. 44-46)

54. The Traffic Engineer nevertheless opined that all of the traffic "... should be able to be accommodated" provided sufficient emergency personnel were stationed at the intersections. (N.T. 09/11/19, pp. 44-46)

55. The Traffic Engineer also indicated that improvements to Washington Street and the intersections would improve the situation, admitting that Washington Street is not built to current standards, closed to the east, and provides only one direction for traffic to exit the area. (N.T. 09/11/19, pp. 46-50, 93-101)

56. The Traffic Engineer acknowledged that an emergency evacuation, such as a flash flood, would require up to 473 vehicles to be moved out of the floodplain over Washington Street which, even if improved at the Applicant's property, is quite narrow as a lane of travel to the west leading to one intersection, with train tracks traversing the egress. (N.T. 09/11/19, pp. 50-61; N.T. 11/06/19, pp. 104-105)

57. The Traffic Engineer expressed the general opinion that the evacuation "should" work, but did not opine that it would so within a reasonable degree of scientific or traffic engineering certainty. (N.T. 09/11/19, pp. 57-60)

58. The Traffic Engineer initially was not aware of the number of units of other developments accessing the same egress route in an emergency, nor did the Traffic Engineer review the Emergency Action Plans of other developments. (N.T. 09/11/19, pp. 60-63)

59. The Applicant once again presented the testimony of Kevin Kyle, the Project Manager for the Applicant at the November 6, 2019 meeting. (N.T. 11/06/19, p. 8)

60. Mr. Kyle confirmed that the Applicant is arranging for access to and from 901 Washington Street, and to gain access to an easement across adjoining private property of a business known as David's Bridal, located at the dead end of Washington Street (1001 Washington Street). (N.T. 11/06/19, pp. 8-18, 80-81; N. T. 11/13/19, pp. 60-64, Exhibits A-8, A-11)

61. The arrangement with 901 Washington Street was not finalized, but it is also contingent upon extension of the easement over 1001 Washington Street to access a public road (Lee Street) on the other side of such properties. (N.T. 11/13/19, pp. 4-5, 60-64, Exhibit A-11)

62. Washington Street narrows to one lane and terminates at the dead end where it encounters the 1001 Washington Street property at a "pinch point" or "bottleneck"; the road is blocked by a gate, which only emergency personnel can open in case of an emergency. (N.T. 11/06/19, pp. 14-18; N.T. 11/13/19, pp. 87-88)

63. The ingress/egress condition is clearly contrary to the public welfare, and consequently, the Applicant was in the process, during the hearings, of attempting to arrange an emergency evacuation route to the east, which still raises significant concerns with reference to welfare of the community. (N.T. 07/10/19, pp. 211-212, 223-224)

64. The Applicant's Traffic Report analyzed various intersections in the area and identified levels of service (L.O.S.) ranging from "A" to "E" with a number of intersections currently operating at "D", which the expert defined as "acceptable", and "E" defined as "at capacity." (N.T. 11/13/19, pp. 24-30, Exhibit A-12)

65. Except for the Washington and Cherry intersection, all of the other intersections providing egress in an emergency are to the north across Washington Street and the railroad tracks. (Exhibits A-6, A-12, A-13)

66. The intersections of Hector and Lee/Spring Mill, Hector and North Lane, and Hector and Cedar Grove/Barren Hill are not directly accessible because Washington Street is closed at the east end at 901 Washington Street. (Exhibits A-6, A-12, A-13)

67. Except in an emergency, the 473 cars must all turn left out of the property and head west on Washington Street to the intersection of Cherry and Washington; at that intersection, traffic must either continue to proceed west or turn north onto Cherry towards Elm, because turning left only leads to a dead end at the river and the parking lot of an existing large apartment complex. (N.T. 11/13/19, pp. 43-45)

68. Consequently, there is only one way out of the proposed development with the residents of 601 Washington Street traversing west on poorly improved Washington Street, past the potentially 598 apartments planned at 401-433 Washington Street straddling Whitemarsh Township and Conshohocken Borough, to the intersection at Cherry, the site of another large apartment complex. (N.T. 11/13/19, pp. 78-96, Exhibits A-6, A-12, A-13; Whitemarsh Zoning Hearing Board #2014-34)

69. Attempting to respond to the Board's concerns, the Traffic Engineer then analyzed the traffic situation in an emergency, and concluded that the site can be safely evacuated with assistance of emergency personnel and "...adequate notifications, especially in the case of a flooding event..." (N.T. 11/13/19, pp. 8-15, Exhibit A-13)

70. Even if the owners of 901 Washington Street and 1001 Washington Street allow emergency access to the east, the traffic from 601 Washington, all of the traffic from the proposed townhome development at 901 Washington Street, and traffic from the business at 1001 Washington Street, would all have to traverse through a private drive squeezed between David's

Bridal's building at 1001 Washington Street and railroad tracks to reach Lee Street. (Exhibits A-6, A-12, A-13)

71. The Traffic Engineer's opinions all assume that there would be no accidents and no vehicles become disabled during the emergency evacuation, and that sufficient emergency personnel would be present at these intersections and pinch points to facilitate the evacuation.

72. Upon questioning, the Traffic Engineer admitted that the L.O.S. ratings are averages and that the actual wait times at intersections can be longer. (N.T. 11/13/19, pp. 16-17)

73. The Traffic Engineer also admitted that in a flash flood situation, residents may stay in their apartments for safety and suffer "...damage to their cars, then, that are parked out in the floodplain." (N.T. 11/13/19, pp. 18-21)

74. The Traffic Engineer's conclusion that there would only be "damage" to the residents' cars fails to consider the danger of the cars being carried by the flood waters from their parked locations.

75. The intersection of Washington and Cherry currently operates at a L.O.S. of "A" because there is relatively little development on Washington Street currently (although much planned in the future) and virtually no cars turn left on Cherry which dead ends at the river. (Exhibit A-12)

76. But the next intersection encountered turning north onto Cherry is Cherry and Elm, already at a L.O.S. of "D". (N.T. 11/13/19, pp. 24-56, Exhibit A-12)

77. As confirmed by Figures 3-A through 5-D and Appendix "C" of the Traffic Impact Study, once a motorist turns right (north) onto Cherry from Washington Street and crosses the train tracks, the motorist must turn right (east) on Elm, because Cherry becomes one way southbound

at that intersection and Elm is one way eastbound. (N.T. 11/13/19, pp. 86-87, Exhibit A-12, Figures 3-A through 5-D, Appendix C)

78. Upon leaving the Cherry/Elm intersection, one then travels up to Apple Street to access Hector Street. (N.T. 11/13/19, pp. 86-87, Exhibit A-12, Figures 3-A through 5-D, Appendix C)

79. The Board finds that since the traffic study had a limited horizon, only projecting future buildout to be completed within the next year (2020), and then only extrapolating based on computer modeling, and not what the actual and potential development would be over the next 5 to 10 years, the conclusions of the Traffic Report and the Traffic Engineer are so limited as to be unreliable and not credible. (N.T. 11/13/19, pp. 86-87, Exhibit A-12, Figures 3-A, Appendix C)

80. Even though the Traffic Engineer was qualified as an expert in traffic engineering, the limitations of the report, with respect to the projected future traffic, result in a failure to provide a credible conclusion as to what the traffic impact will be 5 to 10 years from now. (N.T. 11/13/19, pp. 86-87, Exhibit A-12, Figures 3-A, Appendix C)

81. According to the Supplemental Traffic Report, which considered an emergency evacuation, it would require from 79 minutes to 118 minutes just to evacuate what is currently proposed for development on Washington Street. (N.T. 11/13/19, p. 80, Exhibit A-13)

82. The Emergency Management Team of the Township was not afforded the opportunity to review the information provided by the Supplemental Traffic Report with the projected evacuation time of approximately 1 hour 20 minutes to 2 hours.

83. Since the Supplemental Report was not reviewed by the Township's Emergency Management Team, the Board cannot rely upon the Fire Marshal's Report dated September 10,

2019 marked as Exhibit T-10.

84. Since the Supplemental Traffic Report was based on the initial Traffic Report, which projected traffic impacts only one (1) year out, the Board determines that the Supplemental Report is likewise not reliable or credible.

85. The Traffic Engineer admitted that she had not "typically" had occasion to prepare an emergency evacuation study, which again, raises questions regarding the reliability of the conclusions expressed. (N.T. 11/13/19, pp. 107-108)

86. Furthermore, even if the Supplemental Report were deemed accurate, if it takes two hours for the last car to evacuate Washington Street in a flash flood situation, the Board does not find credible the Traffic Engineer's opinion that safe egress can be achieved.

87. The Applicant proposes to place 270 residential apartments and 473 cars in the floodplain, on a property prone to flash floods, accessed on a partially improved road that significantly narrows in spots, and allowing only one way for normal egress to the west, with severely limited emergency egress to the east.

88. The Applicant has failed to present the substantial evidence required for this Board to find that the use will not be detrimental to the public welfare.

89. The Board's conclusions are supported by the substantial evidence submitted by the Traffic Reports, and the fact that even these Traffic Reports, which reveal significant traffic concerns, have an extremely short shelf life.

90. The Applicant maintained that relief from Section 116-24.E(3)(a) was not required as the Code allows "residential parking space" in the front of the buildings, but the Board notes that there are other structures specifically to be placed in that area in addition to the large parking

field, such as sidewalks, curbs, and drive aisles, all of which require relief. (N.T. 11/06/19, p. 134)

91. The only stated reasons for requesting the variance from Section 116-24.E(3)(a) were from the standpoints of "an abundance of caution", "esthetic", "better design" and "consistent" with other developments, none of which provide a basis for the granting of variances. (N.T. 11/06/19, pp. 133-135; N.T. 11/13/19, p. 95)

92. The variance request from the building setback under Section 116-281.A(3)(a) was supported only by the same reasons as noted in the paragraph above, which again, are not the applicable criteria for granting a variance. (N.T. 11/06/19, pp. 134-135)

93. The Applicant maintained that it established that the structures in the floodplain will not cause a net increase the flood heights, considering removal of the current structures on site, with the cut and fill balanced, so that a full offset will be achieved under Section 116-164.C. (N.T. 07/10/19, pp. 183-216)

94. But, Section 116-165.A of the Zoning Ordinance permits dwellings in the floodway fringe, only if proof is presented that there will be no increase in the elevation of the one-hundred year frequency recurrent interval flood by more than one (1) foot at any point.

95. The Applicant maintains that it intends to comply with the above-noted standard, without presenting any proof of such analysis to the Board. (N.T. 07/10/19, pp. 183-216)

96. Other than the residential buildings, the other accessory structures are not permitted by right, and therefore, the Applicant requested use variances for such accessory structures.

97. The Applicant is therefore requesting a use variance to allow part of a dwelling building, parking and drive aisles in the floodway, and structures accessory to such dwellings in the floodway fringe, all without any showing of hardship to justify same.

98. The Applicant argues that any development on this lot would require a variance from Section 116-165, so as to place structures in the floodplain.

99. The Applicant's argument is apparently based on a perceived inconsistency in the ordinance that residential dwelling buildings are permitted in the Floodplain Conservation District, but the accessory structures required are prohibited, so the hardship is evident.

100. The Applicant's argument fails to recognize that Sections 116-166.B(2) and (3) anticipate that structures accessory to permitted uses (dwellings) would be allowed in the floodway fringe by special exception; and therefore the ordinance is not inconsistent, it just adds a layer of scrutiny for approval of related infrastructure to protect the health, safety and welfare of the community.

101. However, because the Applicant elected to pursue variances for such accessory structures, rather than a special exception, the Applicant must establish the hardship required to be entitled to the variances requested.

102. If the option of seeking a special exception were not available, a hardship under Section 116-165 for such accessory structures would be evident, and such hardship would not have been created by the Applicant.

103. However, variance relief must be limited to the minimum required, and if the density were not maximized, there would be less accessory structures required.

104. To place structures in the floodplain, an applicant is not entitled to maximize the use on a site, and argue that it is therefore entitled to the maximum variances requested, but rather only the minimum variances required.

105. The Applicant is requesting the maximum, not the minimum, variances to afford

relief.

106. The Applicant presented no evidence that a development with less units, and therefore, less relief required, is financially infeasible.

107. The Applicant requested a completely unnecessary variance, admittedly not needed with this project, so to exceed the 30% limitation on accessory use and structure cover by 5% for "flexibility", which, again, does not qualify as a basis for granting a variance. (N.T. 11/06/19, pp. 137-138)

108. Of course, "flexibility" would not be required if the Applicant did not design the project to the maximum density of residential units on site.

109. It is also clear that if the Applicant complied with the prohibition of off-street parking in the front yard under Section 116-24.E(3)(a), the variance to place the parking field in the rear yard under Section 116-24.D(3) would be much greater.

110. The Applicant would not want to reduce the size of the parking field, as that would result in less residential units, and therefore in order to develop to the maximum density, the Applicant requested relief from Section 116-24.E(3)(a).

111. With reference to the special exception requested to place the stormwater facility in the floodway, Section 116-218 of the Zoning Ordinance shifts the burden of proof to the Applicant that the proposed use will not be contrary to the health, safety and welfare of the community.

112. In response to sufficient evidence in the record that the proposed use will adversely affect health, safety and welfare, such a provision shifts the burden of persuasion to the Applicant that the use is not contrary to the health, safety and welfare of the community.

113. In a special exception case, Section 116-217.A(2) instructs the Zoning Hearing Board to consider whether the proposed use will injure or detract from the use of neighboring property, and Section 116-227 requires a specific inquiry regarding the impact on the floodplain.

114. The Applicant's expert testified that the stormwater BMP had to be placed in the margin of the floodway, because it had to be at the lowest point of the development, but presented no storm water report supporting his conclusions that there would be no impact on the floodway.

115. In actuality, the reason why the Applicant proposes to locate the bio-retention stormwater BMP in the floodway is that, in an effort to obtain maximum density of residential units, virtually all of the land outside of the floodway on the Property is being developed with buildings and parking lots; otherwise, there is no reason to locate the BMP in the floodway.

116. In addition to the concerns raised by public comment, the Township Engineer's Memo (Exhibit T-5) raised the significant issue as to whether the proposed BMP could accommodate the tailwater conditions of the Schuylkill River, in response to which the Applicant failed to present any evidence, let alone sufficient to carry the burden of persuasion, thus failing to meet the objective criteria of the Ordinance to be entitled to the special exception requested.

117. If there were less buildings and less parking, the stormwater BMP facility could be constructed outside of the floodway, and there would be less impact on steep slopes.

118. The Applicant can develop this piece of land with permitted uses, and substantially less relief, if the density were reduced, but the Applicant simply chose not to do so, instead requesting zoning relief to develop as the Applicant wishes to maximize economic benefits.

119. The Applicant has failed to present evidence that the use is not contrary to the health, safety and welfare, and in fact, it is clear from the record, with the current state of

Washington Street, and even if improved along the frontage of this Property by the Applicant, the increased density and resultant traffic, especially in the event of an emergency, such as a flash flood (which is likely to happen), would injure and detract from the use of neighboring property, would adversely affect the character of the neighborhood, and would be contrary to the health, safety and welfare of the community.

120. With reference to the variances requested, upon consideration of Section 910.2 of the Pennsylvania Municipalities Planning Code, the Board determines the following:

A. There are no unique physical circumstances or conditions peculiar to this property, creating an unnecessary hardship which justifies the granting of the variances requested. The Applicant merely seeks to develop the Property in the most intense fashion, with the most density possible, purely for economic gain. As a result, the Applicant set forth only an economic basis for the relief from most of the provisions as requested. The law does not allow the Board to grant variances for that reason alone.

B. It is clear from the record that the property can be developed in stricter conformity with the provisions of the Zoning Ordinance and that the variances requested are not necessary to enable the reasonable use of the property.

C. Any "hardship" has been created by the Applicant in seeking to overdevelop the Property with a certain density and configuration whereas, a development with less units and a different configuration can be pursued with substantially less relief required.

D. The granting of the variances will alter the essential character of the neighborhood, substantially impair the use of adjacent property, and would be detrimental to the public welfare.

E. The variances requested are clearly not the minimum variances to afford relief or the least modification possible. A less intense multi-family residential development would not require the variances to the extent requested.

121. Under Section 116-217 of the Zoning Ordinance, the Board determines the following:

A. The use will substantially injure or detract from the use of neighboring property and from the character of the neighborhood, and the use of property adjacent to the area of the proposed use would not be adequately safeguarded.

B. The proposed use will have a harmful effect on local vehicular traffic. The vehicular traffic will undoubtedly increase from the proposed use, and there was no credible evidence presented that Washington Street, being narrow and not built to current standards, with one way of ingress and egress, even with the provision of alternate emergency access to the east, will be adequate to handle the increased traffic, especially in an emergency.

C. The proposed use is not consistent with the legislative intent of the applicable zoning districts.

D. The surrounding neighborhood will not necessarily be subjected to objectionable noise, lighting, glare, heat, ventilation, smoke, fumes, dust, dirt, gases or radioactive or electrical disturbances by the proposed use, but this finding alone does not support the granting of relief. Furthermore, there was insufficient evidence as to what measures will be taken so that vapors from the groundwater contamination will not be harmful to the residents.

E. The Applicant did not present any evidence for the Board to conclude whether the use will unduly burden sanitary and school facilities, but it is clear that, in an emergency, the proposed use will unduly burden police and fire protection.

122. Pursuant to Section 116-227 of the Zoning Ordinance governing Variances and Special Exceptions in the Floodplain Conservation District, the Zoning Hearing Board considered the following factors and determined the following:

A. Without presenting sufficient evidence, the Applicant maintained that, compared to what is currently on the Property, (as opposed to vacant land), and considering the balancing of cut and fill as planned, the buildings, improvements and encroachments proposed will not cause increased flood heights or velocities in excess of the Code. Even if so, the Project still poses a danger to life and property in that materials, specifically vehicles, may be swept onto other lands or downstream to the injury of others.

B. The proposed project is susceptible to flood damage with a significant effect on the individual owners and tenants.

C. The services provided by the proposed project can be provided more safely elsewhere in the community, there are alternative locations not subject to flooding for the proposed use, and the project does not require a waterfront location. Having said that, it is recognized that this finding is not determinative, as the Applicant is entitled to develop its Property in accordance with the applicable zoning, but may only obtain relief from such zoning requirements by presenting sufficient evidence of unnecessary hardship, and satisfying the criteria for relief set forth in the Ordinance.

D. There are substantial concerns regarding the safety, availability and means of access to the property for emergency services and vehicles in time of flooding, causing additional threats to public safety.

123. The provisions of the Zoning Ordinance, strictly applied, do not impose an unnecessary hardship on the land or the Applicant and, therefore, the requested variances should be denied.

III. DISCUSSION

In Hertzberg v. Zoning Bd. of Adjustment of the City of Pittsburgh, 554 Pa. 249, 721 A.2d 43 (1998), the Supreme Court of Pennsylvania determined that, in evaluating a hardship for a dimensional variance, the Zoning Hearing Board should consider various factors, including economics, and the characteristics of the surrounding neighborhood, in determining whether a variance would be appropriate. The Court also held that, when considering a dimensional variance, a Zoning Hearing Board should adopt a somewhat more relaxed standard of scrutiny than when the Board is considering a use variance.

In Marshall v. City of Philadelphia and Zoning Board of Adjustment, 626 Pa. 385, 97 A.3d 323 (2014), the Supreme Court recognized that a property does not have to be valueless in order to obtain a use variance. The Court further indicated that economic considerations may be considered in a use variance case, if the property can only be brought into conformance at a prohibitive expense. The Supreme Court reiterated in the Hertzberg and Marshall cases, that an

Applicant need not prove that the property cannot be used for any other permitted use in order to be entitled to a variance. Nevertheless, an applicant seeking a variance must prove that unnecessary hardship will result if the variance is denied, and must also prove that the proposed use is not contrary to the public interest. Valley View Civic Association v. Zoning Board of Adjustment, 501 Pa. 550, 462 A.2d 637 (1983). "The burden on an applicant seeking a variance is a heavy one, and the reasons for granting the variance must be substantial, serious and compelling." Singer v. Zoning Board of Adjustment, 29 A.3d 144, 149 (Pa. Cmwlth. 2011)

The case before the Board involves the request for numerous variances so as to permit the Property to be developed at maximum density for residential units. The Board's decision to deny the variances is fully in accordance with the Supreme Court's rulings. The Board is not holding the Applicant to the high bar of proving that the property cannot be used for any other permitted use. The Board also afforded the Applicant the opportunity to show that a less intense development was simply not feasible. Not only did the Applicant not present such evidence, but on the contrary, presented evidence which can only support the conclusion that the property can easily be developed with less density. There was no evidence of financial infeasibility presented. The evidence presented does not justify the variances, and the hardship presented for most of the relief requested was based purely on economics, which cannot be the only basis for a variance. Even though economic considerations are now appropriate for variance cases under Hertzberg and Marshall, the applicable case law still holds that variances cannot be granted for solely economic reasons. Dunn v. Middletown Township Zoning Hearing Board, 143 A.3d 494 (Pa. Cmwlth. 2016).

In addition, since the Applicant is requesting a use variance to place part of one of the apartment buildings, parking areas and drive aisles in the floodway, and accessory structures in the floodway fringe, the Board must apply a heightened level of scrutiny than when considering just dimensional variances. This is not a question of where these structures may be located on the lot with respect to setbacks. The apartment building, parking areas and drive aisles are not allowed to be located in the floodway, and the accessory structures (parking areas, curbs, sidewalks, drive aisles, pool and sidewalks) are not permitted anywhere on this lot by right because of the Floodplain Conservation District regulations. For such use variances, and even for the dimensional variances requested, the Applicant is not entitled to relief by maximizing the density of the project. Society Hill Civic Association v. Philadelphia Zoning Board of Adjustment, 42 A.3d 1178 (Pa. Cmwlth. 2012)

The Whitemarsh Township Planning Commission surely provides valuable information in informing a decision as to whether a proposal is detrimental to the public welfare. Although not determinative, the Board found instructive that the Planning Commission unanimously recommended denial of the application.

The Board is well aware that decisional case law holds that a special exception, and even variances, should not be denied solely because of general future traffic concerns, unless the Board's conclusions are supported by traffic studies. In re: Appeal of Jones, 29 A.3d 60 (Pa. Cmwlth. 2011)

The traffic concerns in this matter are not just general concerns over additional traffic in the area as a result of the development. What sets this application apart is that the development is entirely in the Floodplain Conservation District. While it is recognized that the objectives of the

Riverfront Development Ordinance are to encourage orderly mixed development along the river, and providing public access to the riverfront area, this Property is still located in an area prone to flooding, implicating concerns for the public welfare at a heightened level. This concern is demonstrated in the Zoning Ordinance which imposes upon the Board an additional level of inquiry in the Floodplain Conservation District under Section 116-227 of the Code. The Applicant simply did not address, to the Board's satisfaction, the issues identified in the Ordinance as crucial determinations to protect the public welfare.

In this case, the Board did receive a Traffic Report and a Supplemental Report, which had not been submitted to the Township Emergency Management team for review. A careful review of the reports, and the empirical data included therein, demonstrates that the data belies the conclusion of the Applicant's Traffic Engineer. A Zoning Hearing Board is the sole determiner of the credibility of witnesses. Taliaferro v. Darby Township Zoning Hearing Board, 873 A.2d 807 (Pa. Cmwlth. 2005), Tri-County Landfill, Inc. v. Pike Township Zoning Hearing Board, 83 A.3d 488 (Pa. Cmwlth. 2014).

On the basis of the Traffic Reports presented, the expressed conclusion that the traffic for this development over a marginally improved road, barely capable of handling the current traffic, let alone the traffic of 473 extra cars resulting from this development, and that emergency egress "... should be able to be accommodated," is just not credible. (N.T. 9/11/19, p. 45) From a practical standpoint, the Traffic Engineer seemed to just assume that, in an emergency situation of a flash flood, all of the residents of the 270 apartment units, will be home, immediately proceed to move the 473 cars from the parking lot at the same time and in an orderly fashion, and no one will attempt to return to the apartments to retrieve their vehicles, belongings, or rescue a family

member. Other than relying on the evacuation plan working perfectly, there was insufficient evidence of what precautions would be taken so as to prevent stranded vehicles from being swept away by the flood waters. With all due respect to the Traffic Engineer's attempts to convince the Board that all will be well, the Traffic Reports provided sufficient reasons for the Board to conclude that the evacuation plan for this densely populated apartment complex fails to adequately address the threat to the public safety caused by a flash flood emergency.

In addition, the evidence in the Traffic Report details a negative traffic impact from this development and fails to anticipate the development planned for the immediate area, already on the books. The report only assumed a growth factor and projected the "acceptable" impacts only one (1) year out. Even if such a limited horizon for the Traffic Report would be acceptable to PennDOT, that is not the issue. The purpose of the Traffic Reports was to satisfy specific criteria in the Zoning Ordinance, which the Board must consider to determine whether the Applicant has sustained its burden of proof. The Supplemental Traffic Report's conclusion that the impact is "acceptable" from an emergency standpoint, is not credible based on the information in the Report itself. Assuming the most orderly textbook evacuation, with emergency personnel on site, if it still takes two hours to evacuate in a flash flood during evening rush hour, property damage and injuries are likely. Unless Washington Street is improved to current standards, even with a textbook evacuation, lives could be lost during a flash flood. If that is not detrimental to the public welfare, the Board is at a loss as to what the definition of that term would be.

However, the Board did not base its decision on traffic alone, although the traffic concerns demonstrate how the proposed use would be detrimental to the public welfare. Such concerns for the public welfare also relate to the fact that the Applicant is not requesting the minimum variances

to afford relief in order to develop floodplain land for residential apartments. That basis was specifically stated on the record by the Board prior to the motion to deny. What the Applicant requested were the variances required for the Applicant to build out the development to its maximum density, thus creating its own hardship.

The Zoning Hearing Board has discretionary power to determine whether a party has met its burden of proof. Broussard v. Zoning Board of Adjustment, 831 A.2d 764 (Pa. Cmwlth. 2003), affirmed on appeal @ 589 Pa. 71, 907 A.2d 494 (2006), Cohen v. Zoning Board of Adjustment of the City of Philadelphia, 3 Pa. Cmwlth. 50, 276 A.2d 352 (1971). The only conclusion that the Board can reach is that the Applicant failed to sustain its burden of proof regarding unnecessary hardship which would justify the granting of the variances requested.

IV. CONCLUSIONS OF LAW

1. The Zoning Hearing Board has jurisdiction over the subject matter of the application.

2. The Applicant is the legal owner of the Property in question.

3. The Applicant and the subject matter are properly before the Board. The Applicant has standing to submit the application.

4. Hearing notices were duly published and posted in accordance with law, by advertisement in the newspaper and posting on the property.

5. With reference to the variances requested, upon consideration of Section 910.2 of the Pennsylvania Municipalities Planning Code, the Board determines the following as a matter of law:

A. There are no unique physical circumstances or conditions peculiar to this property, creating an unnecessary hardship which justifies the granting of the variances requested. The Applicant merely seeks to develop the Property in the most intense fashion, with the most density possible, purely for economic gain. As a result, the Applicant set forth only an economic basis for the relief from most of the provisions as requested. The law does not allow the Board to grant variances for that reason alone.

B. It is clear from the record that the property can be developed in stricter conformity with the provisions of the Zoning Ordinance and that the variances requested are not necessary to enable the reasonable use of the property.

C. Any "hardship" has been created by the Applicant in seeking to overdevelop the Property with a certain density and configuration whereas, a development with less units and a different configuration can be pursued with substantially less relief required.

D. The granting of the variances will alter the essential character of the neighborhood, substantially impair the use of adjacent property, and would be detrimental to the public welfare.

E. The variances requested are clearly not the minimum variances to afford relief or the least modification possible. A less intense multi-family residential development would not require the variances to the extent requested.

6. Under Section 116-217 of the Zoning Ordinance, the Board determines the following as a matter of law:

A. The use will substantially injure or detract from the use of neighboring property and from the character of the neighborhood, and the use of property adjacent to the area of the proposed use would not be adequately safeguarded.

B. The proposed use will have a harmful effect on local vehicular traffic. The vehicular traffic will undoubtedly increase from the proposed use, and there was no credible evidence presented that Washington Street, being narrow and not built to current standards, with one way of ingress and egress, even with the provision of alternate emergency access to the east, will be adequate to handle the increased traffic, especially in an emergency.

C. The proposed use is not consistent with the legislative intent of the applicable zoning districts.

D. The surrounding neighborhood will not necessarily be subjected to objectionable noise, lighting, glare, heat, ventilation, smoke, fumes, dust, dirt, gases or radioactive or electrical disturbances by the proposed use, but this finding alone does not support the granting of relief. Furthermore, there was insufficient evidence as to what measures will be taken so that vapors from the groundwater contamination will not be harmful to the residents.

E. The Applicant did not present any evidence for the Board to conclude whether the use will unduly burden sanitary and school facilities, but it is clear that, in an emergency, the proposed use will unduly burden police and fire protection.

7. Pursuant to Section 116-227 governing Variances and Special Exceptions in the Floodplain Conservation District, the Zoning Hearing Board considered the following factors and determined the following as matter of law:

A. Without presenting sufficient evidence, the Applicant maintained that, compared to what is currently on the Property, (as opposed to vacant land), and considering the balancing of cut and fill as planned, the buildings, improvements and encroachments proposed will not cause increased flood heights or velocities in excess of the Code. Even if so, the Project still poses a danger to life and property in that materials, specifically vehicles, may be swept onto other lands or downstream to the injury of others.

B. The proposed project is susceptible to flood damage with a significant effect on the individual owners and tenants.

C. The services provided by the proposed project can be provided more safely elsewhere in the community, there are alternative locations not subject to flooding for the proposed use, and the project does not require a waterfront location. Having said that, it is recognized that this finding is not determinative, as the Applicant is entitled to develop its Property in accordance with the applicable zoning, but may only obtain relief from such zoning requirements by presenting sufficient evidence of unnecessary hardship, and satisfying the criteria for relief set forth in the Ordinance.

D. There are substantial concerns regarding the safety, availability and means of access to the property for emergency services and vehicles in time of flooding, causing additional threats to public safety.

8. As a matter of law, the Applicant's evidence failed to meet the objective criteria of the Ordinance so as to be entitled to the special exception as requested.

9. As a matter of law, the provisions of the Zoning Ordinance, strictly applied, do not impose an unnecessary hardship on the land or the Applicant and, therefore, the requested variances should be denied.

V. OPINION

Upon consideration of the Findings of Fact and Conclusions of Law, the Board determines that the application should be denied as set forth hereinafter in the Decision and Order.

WHITEMARSH TOWNSHIP ZONING HEARING BOARD

DECISION AND ORDER

APPLICATION NO.: 2019-21
APPLICANT: 601 Washington Street Associates, LP
Block 011, Unit 041
601 Washington Street
Conshohocken, PA 19428
HVY – Heavy Industrial District
RDD-1 – Riverfront Development Overlay District Subdistrict 1
Floodplain Conservation Overlay District
Riparian Corridor Conservation Overlay District

FIRST HEARING DATE: 07/10/19
CONT'D HEARING DATES: 09/11/19, 11/06/19, 11/13/19
VOTE: 11/13/19
WRITTEN DECISION: 12/23/19
COPY MAILED: 12/23/19

1. A variance from Section 116-24.D.(3), so as to permit in excess of 30% coverage of accessory uses and structures in the rear yard or between the rear lot line and the rear principal building plane, is **DENIED**.

2. A variance from Section 116-24.E.(3)(a), so as to permit off-street parking within the front yard, is **DENIED**.

3. A variance from Section 116-165, so as to permit structures within the Floodplain Conservation District that are not permitted under this Section, is **DENIED.**

4. A variance from Section 116-169.B.(1), so as to permit the regrading of 49% of the total portion of 15-25% slopes on the site, rather than the 30% permitted, is **DENIED**.

5. A variance from Section 116.169.B.(2), so as to permit the regrading of 29.4% of the total portion of 25% or greater slopes on the site, rather than the 15% permitted, is **DENIED**.

6. A variance from Section 116-281.A.(3)(a), from the 10 foot minimum setback from the ultimate right-of-way of abutting streets with an average of 20 feet, so as to permit the setback from the ultimate right-of-way of Washington Street at 66.41 feet, is **DENIED**.

7. A special exception under Section 116-166.A.(3), so as to permit a stormwater facility (BMP) in the floodway is **DENIED.**

8. The request for a variance from Section 116-164.C, so as to permit development within the Floodplain Conservation District, was withdrawn.

9. The request for a variance from Section 116-184.F, so as to permit parking within 10 feet of structures, and allow handicapped parking in the entry court four (4) feet from the building, was withdrawn.

10. The request for a variance from Section 116-280.H, so as to permit an exclusively residential development, rather than the minimum of two percent (2%) of the footprint area of nonresidential use required, was withdrawn.

11. The Application is **DENIED** in its entirety.

WHITEMARSH TOWNSHIP ZONING HEARING BOARD:

Stanley A. Casacio, Chair

James Behr, Vice Chair

Robert A. Bacine

Marc Weinstein

Alternate

William E. Kramer DISSENT

Randi Rubin

MCPC NO. _____

PROCESSED and REVIEWED. A report has been prepared by the Montgomery County Planning Commission in accordance with the Municipalities Planning Code.

Certified this date _____

_____
For The Director

MONTGOMERY COUNTY PLANNING COMMISSION

OWNER'S CERTIFICATION

By: _____
Name:
Title:

Commonwealth of Pennsylvania
: ss
County of Montgomery **AND NOW**, this _____ day of _____ 20__, before me, the undersigned Notary, personally appeared _____ who acknowledged himself to be the _____ of 601 Washington Street Assoc LP, the sole general partner of 601 Washington Street Assoc LP a Pennsylvania limited partnership and he, as such _____, being authorized to do so, executed the foregoing instrument for the purposes therein contained.**IN WITNESS WHEREOF,** I hereunder set my hand and official seal.

_____ _____ Notary Public My commission expires:

OWNER'S CERTIFICATION

By: _____
Name:
Title:

Commonwealth of Pennsylvania
: ss
WE, THE OWNERS OF THE LAND INVOLVING THE ACCOMPANYING PLANS, BEING DULY SWORN ACCORDING TO LAW, DEPOSE AND SAY THAT WE ARE THE SOLE OWNERS OR ARE THE AUTHORIZED OFFICERS OF THE CORPORATION THAT IS THE SOLE OWNERS OF THIS PROPERTY IN PEACEFUL POSSESSION OF IT, AND THAT THERE ARE NO SUITS PENDING AFFECTING THE TITLE OF THE SAME, AND THAT WE ACKNOWLEDGE AND ENDORSE THE ACCOMPANYING PLANS AND THAT WE PROPOSE THE ATTACHED RECORD PLAN FOR RECORDING (AS APPLICABLE), AFTER RECEIVING ALL REQUIRED MUNICIPAL APPROVALS. **IN WITNESS WHEREOF,** I hereunder set my hand and official seal.

_____ _____ Notary Public My commission expires:

PLAN PREPARER'S STATEMENTS

I, _____, A REGISTERED SURVEYOR OF THE COMMONWEALTH OF PENNSYLVANIA, DO HEREBY CERTIFY
THAT THE PLAN, PREPARED FROM A FIELD SURVEY ON _____, 20____ CORRECTLY REPRESENTS THE PROPERTY BOUNDARY OF THE PROPOSED SUBDIVISION OR LAND DEVELOPMENT.

_____ _____.
DATE REGISTERED SURVEYOR'S SIGNATURE

I, _____, A LICENSED PROFESSIONAL ENGINEER OF THE COMMONWEALTH OF PENNSYLVANIA, DO HEREBY CERTIFY THAT THE ACCOMPANYING APPLICATION, PLANS, AND SUPPORTING DOCUMENTATION ARE TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE.

_____ _____.
DATE LICENSED ENGINEER'S SIGNATURE

MUNICIPAL APPROVAL / REVIEW BLOCK
REVIEWED BY THE WHITEMARSH TOWNSHIP ENGINEER THIS _____ DAY OF_____, 20____.

_____ _____
WHITEMARSH TOWNSHIP ENGINEER SIGNATURE

APPROVED BY THE TOWNSHIP OF WHITEMARSH THIS _____ DAY OF _____, 20____.

_____ _____
WHITEMARSH TOWNSHIP MANAGER SIGNATURE

RECORDER OF DEEDS

RECORDED IN THE OFFICE FOR THE RECORDING OF DEEDS IN AND FOR COUNTY OF MONTGOMERY, AT NORRISTOWN, PA,
IN PLAN BOOK _____, PAGE NO. _____ ON _____, 20____.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS

FOR

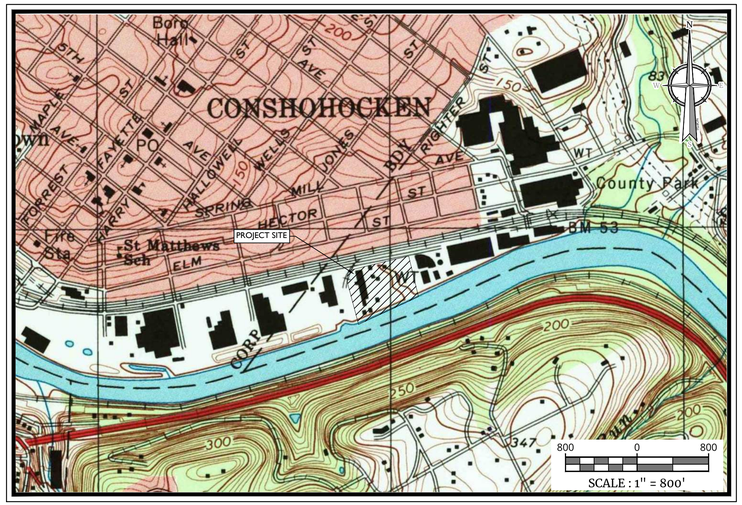
601 WASHINGTON STREET ASSOCIATES LP

601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

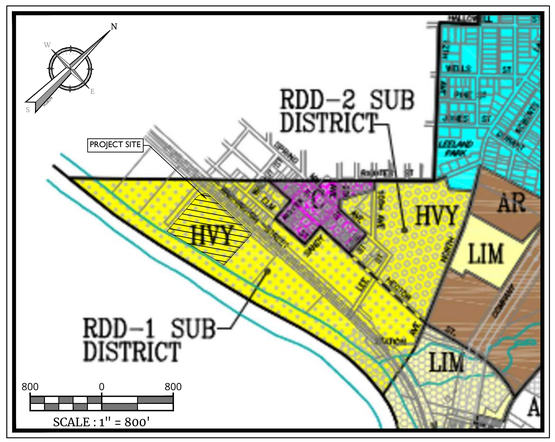
WHITEMARSH TOWNSHIP

MONTGOMERY COUNTY, PENNSYLVANIA



LOCATION MAP

SOURCE: PA USGS NORRISTOWN QUAD



ZONING MAP

SOURCE: WHITEMARSH ZONING MAP

- A - RESIDENTIAL DISTRICT (15,000 SQ. FT.)
- B - RESIDENTIAL DISTRICT (10,000 SQ. FT.)
- C - RESIDENTIAL DISTRICT (8,000 SQ. FT.)
- AR - ADMINISTRATION AND RESEARCH DISTRICT
- LIM - LIMITED INDUSTRIAL DISTRICT
- HVY - HEAVY INDUSTRIAL DISTRICT

INDEX OF SHEETS

SHT. No.	DESCRIPTION	LATEST REVISION
1*	COVER SHEET	
2*	GENERAL NOTES	
3	EXISTING TREE SURVEY PLAN	
4	EXISTING CONDITIONALS AND DEMOLITION PLAN	
5*	DIMENSION PLAN	
6	GRADING PLAN	
7	UTILITY PLAN	
8-9	PROFILES	
10	TRUCK TURNING PLAN	
11-17	CONSTRUCTION DETAILS	
18	ADA GRADING PLAN	
19-22	EROSION AND SEDIMENT POLLUTION CONTROL PLANS	
23-27	POST-CONSTRUCTION STORMWATER MANAGEMENT PLANS	
	ADDITIONAL SETS	
LP-1 - LD-3	LANDSCAPING & LIGHTING PLANS (BY OTHERS)	
A1-A10	ARCHITECTURAL SHEET SET (BY OTHERS)	
	* SHEETS TO BE RECORDED	

APPLICANT/OWNER:
601 WASHINGTON STREET ASSOC LP
201 KING OF PRUSSIA RD, SUITE 501
RADNOR, PA 19087

WAIVERS & VARIANCES

WAIVERS REQUESTED WITHIN WHITEMARSH TOWNSHIP:

SECTION 105-39.A -	A WAIVER FOR THE REQUIREMENT THAT ALL PARKING AREAS SHALL HAVE AT LEAST ONE TREE OR TWO-AND-ONE-HALF-INCHES MINIMUM CALIPER FOR EVERY TWO PARKING SPACES PROVIDED.
SECTION 105-47.K -	A WAIVER IS REQUESTED TO ALLOW THE REQUIRED 25' WIDE RIGHT-OF-WAY TO BE 5' WIDE DUE TO SITE CONSTRAINTS.
SECTION 105-52-	A WAIVER IS REQUESTED TO ALLOW PERIMETER BUFFER YARDS TO BE LESS THAN 50' IN WIDTH. BUFFER LANDSCAPING IS PROVIDED AT THE INTENSITY THAT MEETS THE INTENT OF THE BUFFER YARD REQUIREMENTS AND ADDRESS THE UNIQUE CHARACTERISTICS OF THE SITE AND INTENT OF THE RIVERFRONT DEVELOPMENT DISTRICT.
SECTION 55-4.B.(6)(f)[1][2]&[3] -	A WAIVER FROM THE REQUIREMENT THAT REPLACEMENT TREES INSTALLED BY APPLICANT BE SUBJECT TO CERTAIN MAXIMUM PERMISSIBLE PERCENTAGES FOR FLOWERING TREES, EVERGREEN TREES, SHRUBS AND GROUND COVERS.

VARIANCES & SPECIAL EXCEPTIONS GRANTED BY WHITEMARSH TOWNSHIP ZHB: RESOLUTION #2019-26895: AUGUST 6, 2020

SECTION 116-165 -	VARIANCE TO PERMIT NON-RESIDENTIAL STRUCTURES IN THE FLOODPLAIN CONSERVATION DISTRICT.
SECTION 116-166.A(3) -	SPECIAL EXCEPTION TO PERMIT A STORMWATER RETENTION BASIN WITHIN FLOODWAY.

Colliers Engineering & Design
www.colliersengineering.com

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER:	DRAWING NAME:
16001030B	C-CVER

SHEET TITLE:
COVER SHEET

SHEET NUMBER:
1 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\Site Plans\C-CVER.dwg(C-01 COVER By: CHRIS.MESZLER

1. PROPERTY IDENTIFICATION - BEING KNOWN AS TAX PARID:

   601 WASHINGTON: 650012679009 DEED BOOK: 5260 PG: 00684

   AS SHOWN IN THE CURRENT OFFICIAL TAX MAPS OF WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA. ADDRESS FOR THE SITE IS 601 WASHINGTON STREET.
2. THE SUBJECT PROPERTY IS LOCATED IN THE HEAVY INDUSTRIAL (HVY)/RIVERFRONT DEVELOPMENT (RDD-1) SUB DISTRICT/FLOODPLAIN CONSERVATION OVERLAY DISTRICT/RIPARIAN CORRIDOR CONSERVATION OVERLAY DISTRICT. THE PROPOSED USE OF THE SUBJECT PROPERTY IS MULTI-FAMILY RESIDENTIAL APARTMENTS AND IS PERMITTED BY RIGHT IN THE RIVERFRONT DEVELOPMENT DISTRICT (RDD-1).
3. APPLICANT/OWNER:

   601 WASHINGTON STREET ASSOC LP

   201 KING OF PRUSSIA RD, SUITE 501

   RADNOR, PA 19087
4. STATEMENT OF INTENT - THE PROPOSED USE IS MULTI-FAMILY RESIDENTIAL. THE PROPOSED APARTMENT BUILDING IS FOUR FLOORS OVER AT-GRADE PARKING.
5. BOUNDARY AND TOPOGRAPHIC INFORMATION SHOWN HEREON WAS OBTAINED FROM FIELD SURVEY PERFORMED ON JANUARY 26, 2018 AND PREPARED BY VALLEY LAND SERVICES, LLC., PLAN DATED FEBRUARY 5, 2018 AND LAST REVISED JULY 25, 2019.
6. DEED REFERENCE - DEED BOOK 5260 PAGE 00684
7. MAP REFERENCES -

   A MAP ENTITLED: "ALTA/NSPS LAND TITLE SURVEY" PREPARED BY VALLEY LAND SERVICES, LLC, DATED FEBRUARY 5, 2018, LAST REVISED JULY 25, 2019.
8. THIS PLAN WAS PREPARED WITH THE BENEFIT OF A TITLE REPORT ISSUED BY FIRST AMERICAN TITLE INSURANCE COMPANY, COMMITMENT NO. PAFA17-5635 DJC., THIS PROPERTY MAY BE SUBJECT TO RESTRICTIONS, COVENANTS AND/OR EASEMENTS, WRITTEN OR IMPLIED AS THEY APPEAR WITHIN THE TITLE REPORT AS FOLLOWS
   - A. DEED DEDICATION BETWEEN PHILADELPHIA STEEL AND IRON COMPANY AND WHITEMARSH TOWNSHIP DATED 10/05/1937 AND RECORDED 10/06/1937 AS IN DEED BOOK 1247 PAGE 291. -LOCATION COULD NOT BE DETERMINED FROM RECORD DOCUMENT.
   - B. RIGHT OF WAY GRANTED TO THE BELL TELEPHONE COMPANY OF PENNSYLVANIA IN DEED BOOK 1293 PAGE 528. LOCATION COULD NOT BE DETERMINED FROM RECORD DOCUMENT.
   - C. RIGHT OF WAY BETWEEN JOHN J. REGAN AND WILMER C. SWARTLEY CO-PARTNERS TRADING AS PHILADELPHIA STEEL AND IRON COMPANY AND PHILADELPHIA SUBURBAN WATER COMPANY, DATED 8/23/1948 AND RECORDED 10/27/1948 AS IN DEED BOOK 1957 PAGE 560. LOCATION COULD NOT BE DETERMINED FROM RECORD DOCUMENT. NOT PLOTTED ON SURVEY.
   - D. RIGHT OF WAY BETWEEN JOHN J. REGAN AND WILMER C. SWARTLEY CO-PARTNERS TRADING AS PHILADELPHIA STEEL AND IRON COMPANY AND PHILADELPHIA SUBURBAN WATER COMPANY, DATED 8/23/1948 AND RECORDED 10/27/1948 AS IN DEED BOOK 1957 PAGE 560. LOCATION COULD NOT BE DETERMINED FROM RECORD DOCUMENT.
   - E. DEED OF DEDICATION BETWEEN WILMER C. SWARTLEY AND JOHN J. REGAN CO-PARTNERS TRADING AS PHILADELPHIA STEEL AND IRON COMPANY AND TOWNSHIP OF WHITEMARSH, DATED 8/23/1948 AND RECORDED 1/31/1949 AS IN DEED BOOK 1978 PAGE 1. LOCATION COULD NOT BE DETERMINED FROM RECORD DOCUMENT.
   - F. RIGHT OF WAY GRANTED TO PHILADELPHIA ELECTRIC COMPANY IN DEED BOOK 3632 PAGE 77. BLANKET IN NATURE. NOT PLOTTED.
   - G. RIGHT OF WAY GRANTED TO PHILADELPHIA ELECTRIC COMPANY IN DEED BOOK 5025 PAGE 2495. BLANKET IN NATURE. NOT PLOTTED.
   - H. RIGHT OF WAY GRANTED TO PECO ENERGY CO. AS IN DEED BOOK 5205 PAGE 13. BLANKET IN NATURE. NOT PLOTTED.
   - I. MATTERS SHOWN ON THAT CERTAIN ALTA/ACSM LAND TITLE SURVEY DATED MAY 14, 1998 AS FILE NO. 05303 BY MOMENEE SURVEY GROUP, INC., AS FOLLOWS:
     - a. 48" STORM MAIN RUNS THROUGH EASTERN AND NORTHERN PORTION OF PREMISES NOT SUBJECT TO AN EASEMENT - APPROXIMATE LOCATION SHOWN.
     - b. RIGHTS OF OTHER FOR INGRESS AND EGRESS PURPOSES TO THE TOWPATH EXTENDED THROUGH PREMISES - NO TOWPATH OBSERVED AT THE TIME OF THE SURVEY.
     - c. ENCROACHMENT OF ADJOINING PARCEL ON THE SOUTHWESTERN SIDE OF PREMISES - SHOWN.
     - d. GAS UTILITY LINE EXTENDS ALONG NORTHERN SIDE OF PREMISES AND INTO NORTHWESTERN SIDE OF PREMISE WITHOUT THE BENEFIT OF AN EASEMENT - APPROXIMATE LOCATION SHOWN.
10. THE EXISTENCE OF ANY UNDERGROUND STORAGE TANKS, IF ANY, WAS NOT KNOWN AT THE TIME OF THE SURVEY.
11. TOPOGRAPHIC INFORMATION SHOWN HEREON WAS TAKEN FROM GROUND SURVEY PERFORMED BY VALLEY LAND SERVICES, LLC. THE LOCATION OF ALL UNDERGROUND UTILITIES AS SHOWN HEREON ARE APPROXIMATE AND ARE BASED ON VISIBLE SURFACE STRUCTURES AND ANY UTILITY MAPS PROVIDED BY UTILITY COMPANIES REFERENCED HEREON.
12. EXISTING SITE TOPOGRAPHIC INFORMATION AS SHOWN HEREON IS BASED UPON NAVD 88.
13. BENCHMARKS: MAG NAIL, ELEV. 57.31
14. CONCRETE MONUMENTS, PK NAILS, AND IRON PINS SHALL BE SET UPON APPROVAL OF THIS PLAN PRIOR TO RECORDING, AS NEEDED.
15. ZONE DATA:

HEAVY INDUSTRIAL (HVY) WITH RDD-1 SUB ZONING DISTRICT			
	REQUIRED	EXISTING	PROPOSED
USE		APARTMENTS	
MINIMUM LOT SIZE	130,680 SF	393,027 SF	393,027 SF
		9.02 AC	9.02 AC
RIVER FRONT OPEN SPACE AREA	100' WIDE BUFFER	N/A	86,752 SF
LOT SIZE (MINUS RIVER FRONT OPEN SPACE)	130,680 SF	N/A	306,275
MINIMUM LOT WIDTH	200 FT	695.68 FT	695.68 FT
PRINCIPAL BUILDING			
MINIMUM FRONT YARD	20 FT	19.40 FT	20 FT
MINIMUM REAR YARD	20 FT	55.06 FT	204.91 FT
MINIMUM SIDE YARDS	20 FT	40.38 FT	37.83 FT
PARKING SETBACK	15 FT	12.17 FT	16.00 FT
MAXIMUM BUILDING HEIGHT	4 STORIES	2 STORIES	4 STORIES
MAXIMUM DENSITY	30 UNITS/ACRE	N/A	29.93 UNITS/ACRE
MAXIMUM BUILDING COVER	40%	11.48%	32.02%
		45,122 SF	98,057 SF
MAXIMUM IMPERVIOUS COVER	75%	45.26%	74.94%
		177,902 SF	229,532 SF
OPEN / GREEN SPACE AREA	40%	54.74%	41.60%
		215,125 SF	163,495 SF
REAR YARD AREA, FROM PRIMARY BUILDING PLANE		55,173 SF	134,818 SF
PARKING			
1.75 SPACES/ DWELLING*	473	0	486
ADA (VAN SPACES)**	9 (2)	0	10 (2)

* BASED ON 270 UNITS

** ADA REQUIREMENTS BASED ON THE 401-500 PARKING SPACES RANGE.

16. POTABLE WATER SERVICE WILL BE BY EXISTING PUBLIC WATER SUPPLY AND SANITARY SEWER SERVICE WILL BE BY PUBLIC SEWAGE.
17. WETLANDS ARE SHOWN ON PLAN.
18. BY GRAPHICAL REPRESENTATION ONLY THIS PROPERTY IS LOCATED IN FLOOD HAZARD ZONE AE AS SHOWN ON FLOOD INSURANCE RATE MAP, MAP NO. 42091C0358G WHICH HAS AN EFFECTIVE DATE OF MARCH 2, 2016 AND IS IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE. THE FEMA CALCULATED 100-YEAR FLOOD ELEVATION FOR THIS PROJECT IS 60.5 FEET (NAVD 88).
19. ALL SOILS ON SITE WERE TAKEN FROM THE NRCS WEB SOIL SURVEY.
20. THE SITE IS UNDERLAIN BY THE OLIGOCLASEMICA SCHIST OF THE WISSAHICKON FORMATION AND THE IMPURE LIMESTONE AND DOLOMITE OF THE CONESTOGA FORMATION.
21. THE PROPOSED DEVELOPMENT IS WITHIN THE LOWER SCHUYLKILL RIVER WATERSHED, WHICH DOES NOT HAVE AN APPROVED ACT 167 PLAN.
22. NO TOPSOIL SHALL BE REMOVED FROM THE SITE UNLESS AUTHORIZED BY WHITEMARSH TOWNSHIP OR MONTGOMERY COUNTY CONSERVATION DISTRICT. PERMANENT REMOVAL OF TOPSOIL FROM LAND WITHIN WHITEMARSH TOWNSHIP IS PROHIBITED. NO TOPSOIL SHALL BE USED AS SPOIL.
23. EXCESS CONSTRUCTION WASTE AND DEBRIS SHALL BE REMOVED FROM THE SITE AT THE COMPLETION OF THE PROJECT. UNDER NO CIRCUMSTANCES SHALL SUCH MATERIAL BE ALLOWED TO BE BURIED OR USED AS BACKFILL MATERIAL.
24. MATERIALS, WORKMANSHIP, AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREON SHALL BE IN ACCORDANCE WITH:
    - A. PENNSYLVANIA DEPARTMENT OF TRANSPORTATION "SPECIFICATIONS PUBLICATION 408/2020"; AS SUPPLEMENTED.
    - B. CURRENT PREVAILING MUNICIPAL, COUNTY, AND/OR STATE AGENCY SPECIFICATIONS, STANDARDS, CONDITIONS, AND REQUIREMENTS.
    - C. CURRENT PREVAILING UTILITY COMPANY/AUTHORITY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
    - D. CURRENT MANUFACTURER SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
26. APPROVAL OF THIS PLAN DOES NOT GUARANTEE PERMIT ISSUANCE FOR SEWAGE DISPOSAL.
27. UTILITY RELOCATIONS SHOWN HEREON, IF ANY, ARE FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT REPRESENT ALL REQUIRED UTILITY RELOCATIONS. THE CONTRACTOR IS RESPONSIBLE FOR PERFORMING AND/OR COORDINATING ALL REQUIRED UTILITY RELOCATIONS IN COOPERATION WITH THE RESPECTIVE UTILITY COMPANY/ AUTHORITIES.
28. PROPER PIPE COVERAGE SHALL BE MAINTAINED DURING ALL PHASES OF CONSTRUCTION. PIPE LENGTHS SHOWN HEREON ARE FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE.
29. TRAFFIC SIGNAGE AND STRIPING SHALL CORRESPOND TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
30. THIS IS A SITE DEVELOPMENT PLAN AND UNLESS SPECIFICALLY NOTED ELSEWHERE HEREON, IS NOT A SURVEY.
31. ALL STRUCTURES SHALL CONFORM TO THE APPROVED BULK ZONING REQUIREMENTS.
32. DO NOT SCALE DRAWINGS AS THEY PERTAIN TO ADJACENT AND SURROUNDING PHYSICAL CONDITIONS, BUILDINGS, STRUCTURES, ETC. THEY ARE SCHEMATIC ONLY, EXCEPT WHERE DIMENSIONS ARE SHOWN THERETO.
33. THIS SET OF PLANS HAS BEEN PREPARED FOR THE PURPOSES OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL APPROVALS REQUIRED HAVE BEEN OBTAINED, ALL CONDITIONS OF APPROVAL HAVE BEEN SATISFIED AND THE DRAWINGS HAVE BEEN STAMPED "ISSUED FOR CONSTRUCTION". THIS SHALL INCLUDE APPROVAL OF ALL CATALOG CUTS, SHOP DRAWINGS AND/OR DESIGN CALCULATIONS AS REQUIRED BY THE PROJECT OWNER AND/OR MUNICIPAL ENGINEER.
34. EXISTING UTILITY INFORMATION SHOWN HEREON HAS BEEN COLLECTED FROM VARIOUS SOURCES AND IS NOT GUARANTEED AS TO ACCURACY OR COMPLETENESS. THE CONTRACTOR SHALL VERIFY ALL INFORMATION TO HIS SATISFACTION PRIOR TO EXCAVATION. WHERE EXISTING UTILITIES ARE TO BE CROSSED BY PROPOSED CONSTRUCTIONS, TEST PITS SHALL BE DUG BY THE CONTRACTOR PRIOR TO CONSTRUCTION TO ASCERTAIN EXISTING INVERTS, MATERIALS, AND SIZES. TEST PIT INFORMATION SHALL BE GIVEN TO THE ENGINEER PRIOR TO CONSTRUCTION TO PERMIT ADJUSTMENTS AS REQUIRED TO AVOID CONFLICTS. THE CONTRACTOR SHALL NOTIFY THE UNDERSIGNED PROFESSIONAL IMMEDIATELY IF ANY FIELD CONDITIONS ENCOUNTERED DIFFER MATERIALLY FROM THOSE REPRESENTED HEREON. SUCH CONDITIONS COULD RENDER THE DESIGNS HEREON INAPPROPRIATE OR INEFFECTIVE.
35. THE CONTRACTOR IS RESPONSIBLE FOR PROJECT SAFETY, INCLUDING PROVISION OF ALL APPROPRIATE SAFETY DEVICES AND TRAINING REQUIRED.
36. STORMWATER FACILITIES SHALL BE OWNED AND MAINTAINED BY THE PROPERTY OWNER IN PERPETUITY. THE PROPERTY OWNER SHALL PROVIDE A BLANKET STORMWATER ACCESS EASEMENT TO THE TOWNSHIP FOR THE PURPOSE OF ACCESS TO THE STORMWATER FACILITIES. IF, IN THE JUDGEMENT OF THE TOWNSHIP ENGINEER, THE OWNER HAS FAILED TO MAINTAIN THE STORMWATER FACILITIES IN SUCH A MANNER AS TO ENSURE THEIR PROPER FUNCTIONING, THE TOWNSHIP AFTER PROVIDING A WRITTEN NOTICE SHALL HAVE THE RIGHT TO ENTER UPON THE LANDS OF THE OWNER AND TO MAKE ANY REPAIRS AS MAY BE NECESSARY TO THE STORMWATER FACILITIES TO ENSURE THAT SUCH FACILITIES FUNCTION AND PERFORM IN ACCORDANCE WITH THE DESIGN SPECIFICATIONS. ANY AND ALL COSTS INCURRED BY THE TOWNSHIP FOR SUCH REPAIRS AND/OR MAINTENANCE SHALL BE PAID IN FULL BY THE OWNER. A LIEN OR LIENS MAY BE PLACED AGAINST THE PROPERTY IF THE OWNER FAILS TO REMIT PAYMENT WITHIN SIXTY (60) DAYS.
37. DRAINAGE EASEMENTS, IF ANY, MAY NOT BE ALTERED WITHOUT THE WRITTEN PERMISSION OF THE TOWNSHIP ENGINEER. NO OBSTRUCTIONS SUCH AS PLANTED BERMS OR FENCES MAY BE INSTALLED IN THE DRAINAGE EASEMENT AREAS WITHOUT SUFFICIENT PROVISION FOR THE PASSAGE OF STORMWATER, AND ANY SUCH PROPOSED PROVISION SHALL BE APPROVED IN WRITING BY THE TOWNSHIP ENGINEER.
38. STORMWATER BMPS ARE FIXTURES THAT CAN BE ALTERED OR REMOVED ONLY AFTER APPROVAL BY WHITEMARSH TOWNSHIP.

_____ DATE _____ OWNER/APPLICANT

39. ALL ROADWAYS, CURBS, PARKING LOTS, SANITARY SEWERS, STORM SEWERS, STORMWATER MANAGEMENT DEVICES, AND APPURTENANCES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS AND TO THE STANDARDS AND SPECIFICATIONS OF WHITEMARSH TOWNSHIP AND THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION.
40. THE DEVELOPER SHALL BE RESPONSIBLE FOR PROVIDING ALL PAVEMENT MARKINGS, STREET SIGNS, TRAFFIC DIRECTIONAL AND CONTROL SIGNS SHOWN ON THIS PLAN IN ACCORDANCE WITH THE WHITEMARSH TOWNSHIP STANDARDS. ALL SIGNAGE SHALL BE CONSISTENT WITH EXISTING SIGNAGE WITHIN WHITEMARSH TOWNSHIP.
41. CONTRACTOR(S) SHALL RECEIVE A COPY OF THE APPROVED EROSION & SEDIMENTATION CONTROL PLANS.
42. WHITEMARSH TOWNSHIP SHALL NOT BE RESPONSIBLE FOR THE MAINTENANCE OF ANY AREA NOT DEDICATED TO THE TOWNSHIP.
43. THERE SHALL BE NO CHANGES OR DEVIATION FROM THESE PLANS UNLESS APPROVED BY THE ENGINEER. SUCH PLAN CHANGES, SHOULD THEY BECOME NECESSARY, ARE SUBJECT TO THE WHITEMARSH TOWNSHIP ORDINANCES.
44. THE CONTRACTOR SHALL NOTIFY ALL APPROPRIATE UTILITIES AT LEAST SEVENTY-TWO (72) HOURS PRIOR TO THE START OF ANY CONSTRUCTION. ALL UTILITIES HAVE BEEN IDENTIFIED BASED ON THE BEST AVAILABLE INFORMATION AND LISTED ON THESE PLANS IN ACCORDANCE WITH ACT 287 REQUIREMENTS. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF EXISTING UTILITIES AND ALL EFFORTS SHALL BE UNDERTAKEN TO PROTECT EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE TO UTILITIES BY THE CONTRACTOR SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE. RESTORATION OF ALL EXISTING SURFACE IMPROVEMENTS DAMAGED OR ALTERED DURING CONSTRUCTION, INCLUDING LANDSCAPING, SHALL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR.
45. THE CONTRACTOR SHALL MAKE PROVISIONS FOR MAINTAINING THE SAFE FLOW OF TRAFFIC DURING CONSTRUCTION WITHIN THE EXISTING ROAD RIGHTS-OF-WAY WHILE ENTERING AND LEAVING THE SITE.
46. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY PERMITS RELATIVE TO THE CONSTRUCTION PROPOSED ON THE PLANS.
47. ENGINEERING PERMITS: PRIOR TO ANY WORK WITHIN THE RIGHT OF WAY, PERMITS MUST BE OBTAINED FROM THE TOWNSHIP.
48. BY SUBMISSION OF THESE PLANS, THE ENGINEER ON RECORD CERTIFIES THAT THESE PLANS ARE IN COMPLETE COMPLIANCE WITH THE WHITEMARSH TOWNSHIP STORMWATER MANAGEMENT ORDINANCE.
49. THIS LAND DEVELOPMENT PLAN WAS PREPARED IN ACCORDANCE WITH REQUIREMENTS ESTABLISHED IN THE WHITEMARSH TOWNSHIP SUBDIVISION AND LAND DEVELOPMENT ORDINANCE AND THE ZONING ORDINANCE OF WHITEMARSH TOWNSHIP.
50. ALL CROSSWALKS, STOP BARS, ARROWS, AND "ONLY'S" WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE HOT THERMOPLASTIC.
51. ALL SHEETS INCLUDED IN THIS LAND DEVELOPMENT PLAN SET ARE TO BE CONSIDERED AS IF RECORDED WITH THE RECORD PLAN.
52. THERE SHALL BE A PRE CONSTRUCTION CONFERENCE AND INSPECTION WITH THE WHITEMARSH TOWNSHIP SHADE TREE COMMISSION PRIOR TO START OF CONSTRUCTION. AFTER THE INSPECTION IS COMPLETE, THE SHADE TREE COMMISSION SHALL NOTIFY WHITEMARSH TOWNSHIP IN WRITING. UPON WHITEMARSH TOWNSHIP APPROVAL, DEMOLITION, GRADING AND CONSTRUCTION MAY PROCEED.
53. POOLS SHALL BE ENTIRELY ENCLOSED WITH A FENCE NOT LESS THAN FOUR FEET IN HEIGHT.
54. ALL ELECTRIC, TELEPHONE, AND COMMUNICATION SERVICE FACILITIES, BOTH MAIN AND SERVICE LINES, SHALL BE PROVIDED BY UNDERGROUND CABLES, INSTALLED IN ACCORDANCE WITH THE PREVAILING STANDARDS AND PRACTICES OF THE UTILITY AND OTHER COMPANIES PROVIDING SUCH SERVICE.
55. ALL PARKING SPACE SIZES ARE SHOWN ON THE OVERALL SITE PLAN. HALF OF THE EV PARKING SPACES ARE HANDICAP ACCESSIBLE (ADA) SPACES.
56. PROPOSED CURB ALONG WASHINGTON STREET SHALL BE 6" HIGH BELGIAN BLOCK CURB. PROPOSED CURB INTERIOR TO SITE SHALL BE VERTICAL CONCRETE CURB, UNLESS OTHERWISE NOTED.
57. UNDER NO CIRCUMSTANCES SHALL CHLORINATED SWIMMING POOL DISCHARGE BE DIRECTED TO THE RIVER OR TO ANY PIPING SYSTEM THAT DISCHARGES TO THE RIVER.
58. ALL CONSTRUCTION AND MATERIALS TO BE IN ACCORDANCE WITH PENNDOT PUBLICATION 408 AND WHITEMARSH CONSTRUCTION STANDARDS.
59. THESE PLANS CONFORM WITH THE WHITEMARSH FLOODPLAIN MANAGEMENT ORDINANCE.
60. THE PROPOSED BRICK SIDEWALK ALONG WASHINGTON STREET SHALL BE CONSISTENT IN APPEARANCE WITH ADJACENT WASHINGTON STREET DEVELOPMENT
61. ALL PROPOSED OPEN SPACE WILL BE DEED RESTRICTED FROM FUTURE DEVELOPMENT.
62. OPEN SPACE IS PROHIBITED FROM FURTHER DEVELOPMENT BASED ON THIS PLAN.
63. THE RIGHT-OF-WAY FOR THE PROPOSED PUBLIC ACCESS SHALL BE OFFERED FOR DEDICATION TO THE TOWNSHIP. IF THE AREA IS NOT ACCEPTED FOR DEDICATION, AN EASEMENT FOR PUBLIC USE MUST BE PROVIDED ALONG WITH MAINTENANCE AGREEMENTS ACCEPTABLE TO THE TOWNSHIP. IF THE AREA IS ACCEPTED FOR DEDICATION, MAINTENANCE RESPONSIBILITIES FOR STORMWATER COLLECTION AND CONVEYANCE FACILITIES SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER.
64. AN AS-BUILT SURVEY SHALL BE COMPLETED AND SUBMITTED TO WHITEMARSH TOWNSHIP IN BOTH PAPER AND DIGITAL CADD FORMATS.
65. THIS SET OF PLANS IS NOT DEPICTING ENVIRONMENTAL CONDITIONS OR A CERTIFICATION/ WARRANTY REGARDING THE PRESENCE OR ABSENCE OF ENVIRONMENTALLY IMPACTED SITE CONDITIONS. COLLIERS ENGINEER & DESIGN HAS PERFORMED NO EXPLORATORY OR TESTING SERVICES, INTERPRETATIONS, CONCLUSIONS, OR OTHER SITE ENVIRONMENTAL SERVICES RELATED TO THE DETERMINATION OF THE POTENTIAL FOR CHEMICAL, TOXIC, RADIOACTIVE, OR OTHER TYPE OF CONTAMINANTS AFFECTING THE PROPERTY AND THE UNDERSIGNED PROFESSIONAL IS NOT QUALIFIED TO DETERMINE THE EXISTENCE OF THE SAME. SHOULD ENVIRONMENTAL CONTAMINATION OR WASTE BE DISCOVERED, THE OWNER AND CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LAWS AND REGULATIONS.
66. THESE GENERAL NOTES APPLY TO ALL SHEETS IN THE SET.

IMPERVIOUS COVERAGE TABLE

PROPERTY	FEATURE	AREA (SF)	% OF LOT AREA (a)	TOTAL IMPERVIOUS % OF LOT AREA (a)
601	ASPHALT	105,295	34.38%	74.94
	BUILDING	98,057	32.02%	
	CURBING	3,178	1.04%	
	SIDEWALK	15,265	4.98%	
	TRAIL	7,735	2.53%	

100-YEAR FLOODPLAIN ENCROACHMENT TABLE

VOLUME OF IMPACT (AREA X DEPTH OF FLOODPLAIN)

FEATURE	AREA (SF)	VOLUME CHANGE IN FLOODWAY (CY)
SITE OUTSIDE OF FLOODWAY	362,045	- 4216.15 (CUT)
FLOODWAY AREA	30,982	- 1845.65 (CUT)
TOTAL	393,027	- 6061.80 (CUT)

STEEP SLOPE DISTURBANCE

TOTAL SITE

STEEP SLOPE	AREA	DISTURBED AREA	PERCENT DISTURBED
15 -25 %	12,103 SF	3,056 SF	25.25%
25% +	20,545 SF	2,860 SF	13.92%

BUILDING USE DATA

PROPOSED USE: APARTMENTS 270

TOTAL UNITS

APARTMENT LIVING - UNIT COUNT

APARTMENT TYPE	PERCENTAGE	UNITS
EFFICIENCY	9%	24
1 BEDROOM	56%	150
2 BEDROOM	30%	82
3 BEDROOM	4%	12
4 BEDROOM	1%	2
TOTAL	100%	270

PUBLIC AMENITIES

WHITEMARSH TOWNSHIP 116-283.B.(10)

RECREATION AREA	79,017 SF
RIVER TRAIL	7,735 SF
TOTAL	86,752 SF

AREA OF AMENITIES	86,752 SF
PERCENT OF LOT AREA	22.07%

THE LOT AREA OF 601 WASHINGTON IS 393,027 SF.

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL C. RICHARD ROSEBERRY ENGINEER No. 46162

C. Richard Roseberry

PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER

LICENSE NUMBER: PE046162R

COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS

FOR

601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design

LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201

COLLIERS ENGINEERING & DESIGN, INC.
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AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER:	DRAWING NAME:
16001030B	C-CVER

SHEET TITLE:

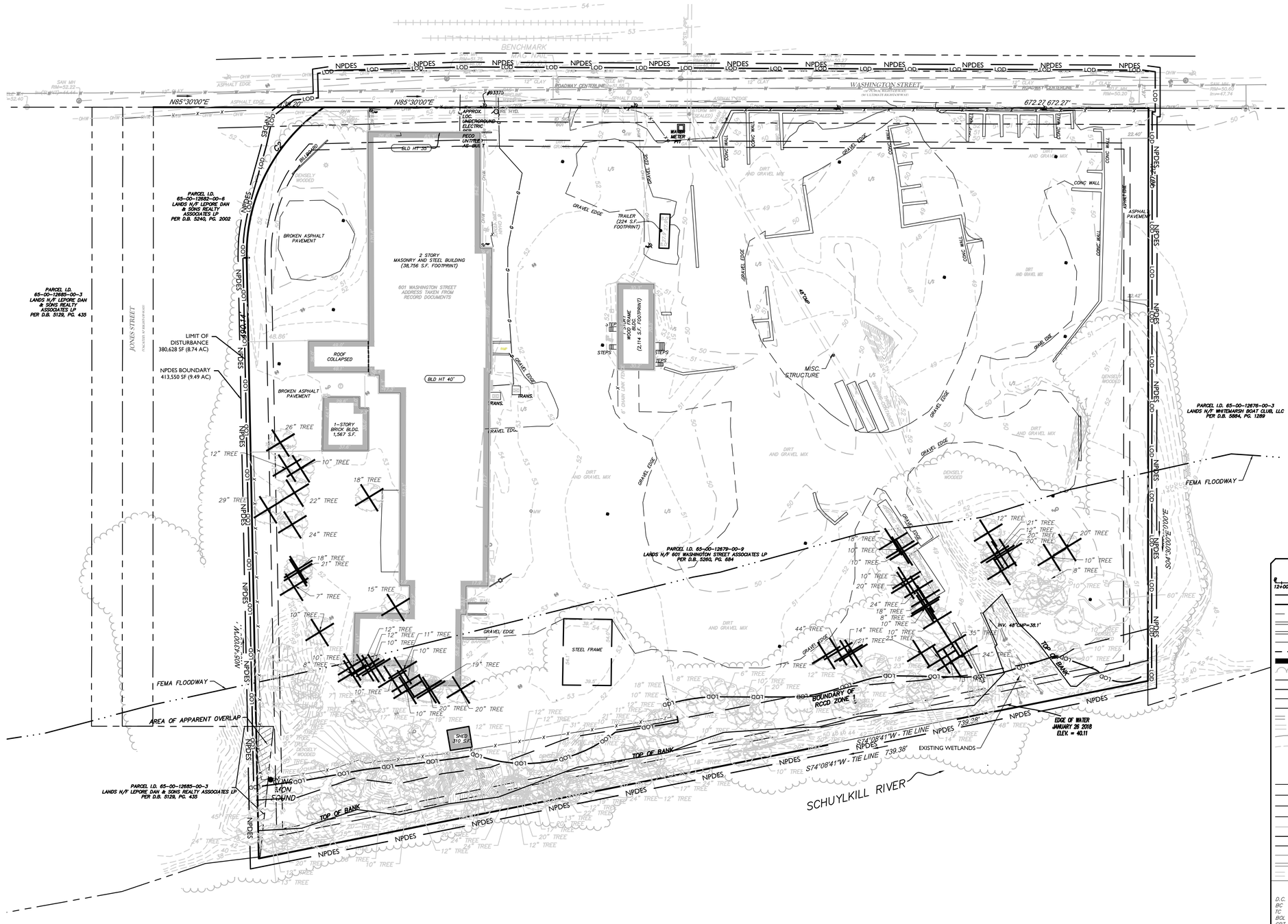
NOTES

SHEET NUMBER:

2 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\Site Plans\C-CVER.dwg\C-02 NOTES By: CHRIS.MEZLER



TREE SURVEY LEGEND

SYMBOL/HATCH	DESCRIPTION
	EXISTING TREE TO BE REMOVED
	EXISTING TREE REMAIN
NPDES	NPDES BOUNDARY
LOD	LIMIT OF DISTURBANCE

LEGEND

- TRAVERSE LINE, CENTER LINE OR BASELINE
- RIGHT OF WAY LINE
- PROPERTY LINE
- EDGE OF PAVEMENT
- CURB LINE
- DEPRESSED CURB
- CHAIN FENCE
- WETLAND LINE
- MUNICIPAL BOUNDARY
- TREELINE
- ELECTRICAL MANHOLE
- WATER MANHOLE
- TELEPHONE MANHOLE
- UNMARKED MANHOLE
- SANITARY MANHOLE
- DRAINAGE MANHOLE
- MAJOR CONTOUR
- MINOR CONTOUR
- SPOT ELEVATION
- TOP OF CURB ELEV.
- BOTTOM OF CURB ELEV.
- U/G CABLE TV LINE
- U/G FIBER OPTIC LINE
- U/G TELEPHONE LINE
- U/G ELECTRIC LINE
- OVERHEAD WIRE
- WATER MAIN
- GAS MAIN
- SAN. SEWER LATERAL
- SAN. SEWER MAIN
- STORM PIPE
- WETLAND MARKER
- TREE
- ROADWAY SIGNS
- TRAFFIC FLOW
- MAILBOX
- TRAFFIC SIGNAL POLE
- POLE MOUNTED LIGHT
- UTILITY POLE
- GUY WIRE
- TRANSFORMER
- FIRE DEPT. CONNECTION
- FIRE HYDRANT
- WATER VALVE
- GAS VALVE
- SANITARY CLEANOUT
- CONCRETE MONUMENT
- CAPPED REBAR/IRON PIPE
- STORM INLET TYPE 'C'
- STORM INLET TYPE 'M'
- FLARED END SECTION
- HEADWALL

ABBREVIATIONS

D.C. = DEPRESSED CURB	FF = FINISH FLOOR	MHWL = MEAN HIGH WATERLINE
BC = BOTTOM OF CURB	UV = UNKNOWN VALVE	MLWL = MEAN LOW WATERLINE
TC = TOP OF CURB	MH = MANHOLE	TW = TOP OF WALL
BOL = BOLLARD	DEP. = DEPRESSED	BW = BOTTOM WALL
GRT = GRATE	CL = CENTERLINE	
MB = MAILBOX	PM = PARKING METER	

40 0 40 80

SCALE : 1" = 40'

REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

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FOR
601 WASHINGTON STREET APARTMENTS

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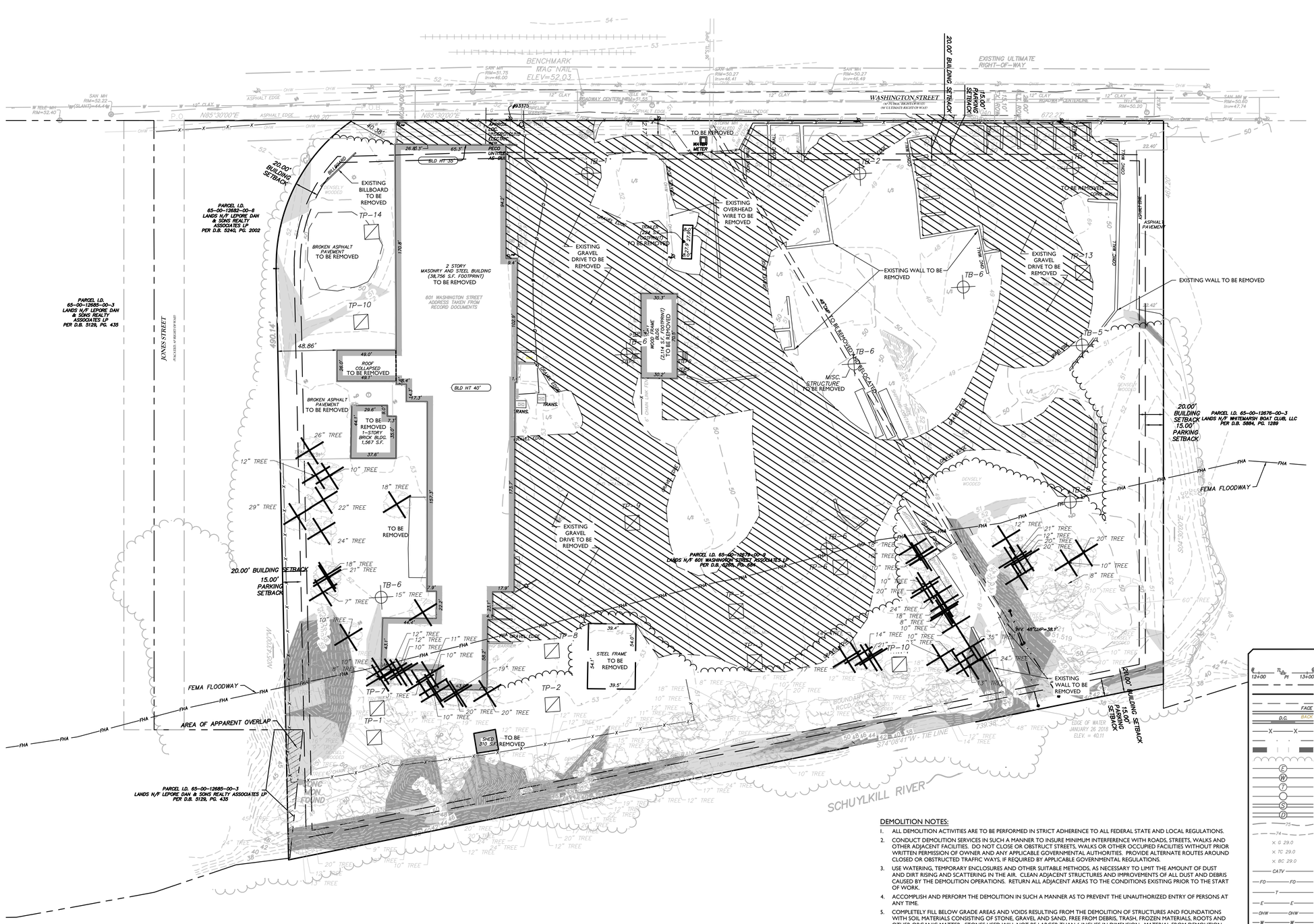
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PROJECT NUMBER:	DRAWING NAME:		
16001030B	C-TREE		

SHEET TITLE:
EXISTING TREE SURVEY PLAN

SHEET NUMBER:
3 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\Site Plans\C-TREE.dwg\XX-XX-XX\REV By: CHRIS.MECELER



DEMO LEGEND

SYMBOL/HATCH	DESCRIPTION
	EXISTING FEATURE TO BE REMOVED
	EXISTING TREE TO BE REMOVED
	STEEP SLOPES 15% - 25%
	STEEP SLOPES 25%+
TB-6 / TP-6	TEST BORING LOCATION / TEST PIT LOCATION

LEGEND

124-00 TLP# P1 131-00	TRAVERSE LINE, CENTER LINE OR BASELINE
	RIGHT OF WAY LINE
	PROPERTY LINE
FACE	EDGE OF PAVEMENT
FACE / BACK	CURB LINE
D.C.	DEPRESSED CURB
X X	CHAIN FENCE
	WETLAND LINE
	MUNICIPAL BOUNDARY
	TREELINE
E	ELECTRICAL MANHOLE
W	WATER MANHOLE
T	TELEPHONE MANHOLE
	UNMARKED MANHOLE
S	SANITARY MANHOLE
D	DRAINAGE MANHOLE
75	MAJOR CONTOUR
74	MINOR CONTOUR
× G 29.0	SPOT ELEVATION
× TC 29.0	TOP OF CURB ELEV.
× BC 29.0	BOTTOM OF CURB ELEV.
CATV	U/G CABLE TV LINE
FO FO	U/G FIBER OPTIC LINE
T	U/G TELEPHONE LINE
E E	U/G ELECTRIC LINE
OHW OHW	OVERHEAD WIRE
W W	WATER MAIN
G G	GAS MAIN
S S	SAN. SEWER LATERAL
	SAN. SEWER MAIN
	STORM PIPE
W-1	WETLAND MARKER
	TREE
	ROADWAY SIGNS
	TRAFFIC FLOW
	MAILBOX
	TRAFFIC SIGNAL POLE
	POLE MOUNTED LIGHT
	UTILITY POLE
	GUY WIRE
	TRANSFORMER
FDC	FIRE DEPT. CONNECTION
	FIRE HYDRANT
WV	WATER VALVE
GV	GAS VALVE
CO	SANITARY CLEANOUT
	CONCRETE MONUMENT
	CAPPED REBAR/IRON PIPE
SI	STORM INLET TYPE "C"
SI SI	STM. DBL. INLET TYPE "C"
SI	STORM INLET TYPE "M"
SI SI	STM. DBL. INLET TYPE "M"
	FLARED END SECTION
	HEADWALL
	SOIL BOUNDARY

ABBREVIATIONS

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BC = BOTTOM OF CURB	UV = UNKNOWN VALVE	
TC = TOP OF CURB	MH = MANHOLE	MLWL= MEAN LOW WATERLINE
BOL = BOLLARD	DEP. = DEPRESSED	
GRT = GRATE	CL = CENTERLINE	TW = TOP OF WALL
MB = MAILBOX	PM = PARKING METER	BW = BOTTOM WALL

SCALE : 1" = 40'

DEMOLITION NOTES:

1. ALL DEMOLITION ACTIVITIES ARE TO BE PERFORMED IN STRICT ADHERENCE TO ALL FEDERAL STATE AND LOCAL REGULATIONS.
2. CONDUCT DEMOLITION SERVICES IN SUCH A MANNER TO INSURE MINIMUM INTERFERENCE WITH ROADS, STREETS, WALKS AND OTHER ADJACENT FACILITIES. DO NOT CLOSE OR OBSTRUCT STREETS, WALKS OR OTHER OCCUPIED FACILITIES WITHOUT PRIOR WRITTEN PERMISSION OF OWNER AND ANY APPLICABLE GOVERNMENTAL AUTHORITIES. PROVIDE ALTERNATE ROUTES AROUND CLOSED OR OBSTRUCTED TRAFFIC WAYS, IF REQUIRED BY APPLICABLE GOVERNMENTAL REGULATIONS.
3. USE WATERING, TEMPORARY ENCLOSURES AND OTHER SUITABLE METHODS, AS NECESSARY TO LIMIT THE AMOUNT OF DUST AND DIRT RISING AND SCATTERING IN THE AIR. CLEAN ADJACENT STRUCTURES AND IMPROVEMENTS OF ALL DUST AND DEBRIS CAUSED BY THE DEMOLITION OPERATIONS. RETURN ALL ADJACENT AREAS TO THE CONDITIONS EXISTING PRIOR TO THE START OF WORK.
4. ACCOMPLISH AND PERFORM THE DEMOLITION IN SUCH A MANNER AS TO PREVENT THE UNAUTHORIZED ENTRY OF PERSONS AT ANY TIME.
5. COMPLETELY FILL BELOW GRADE AREAS AND VOIDS RESULTING FROM THE DEMOLITION OF STRUCTURES AND FOUNDATIONS WITH SOIL MATERIALS CONSISTING OF STONE, GRAVEL AND SAND, FREE FROM DEBRIS, TRASH, FROZEN MATERIALS, ROOTS AND OTHER ORGANIC MATTER. STONES USED WILL NOT BE LARGER THAN 6 INCHES IN DIMENSION. MATERIAL FROM DEMOLITION MAY NOT BE USED AS FILL. PRIOR TO PLACEMENT OF FILL MATERIALS UNDERTAKE ALL NECESSARY ACTION IN ORDER TO INSURE THAT AREAS TO BE FILLED ARE FREE OF STANDING WATER, FROST, FROZEN MATERIAL, TRASH, DEBRIS. PLACE FILL MATERIALS IN HORIZONTAL LAYERS NOT EXCEEDING 6 INCHES IN LOOSE DEPTH AND COMPACT EACH LAYER AT PLACEMENT TO 95% OPTIMUM DENSITY. GRADE THE SURFACE TO MEET ADJACENT CONTOURS AND TO PROVIDE SURFACE DRAINAGE.
6. REMOVE FROM THE DESIGNATED SITE, AT THE EARLIEST POSSIBLE TIME, ALL DEBRIS, RUBBISH, SALVAGEABLE ITEMS, HAZARDOUS AND COMBUSTIBLE SERVICES. REMOVED MATERIALS MAY NOT BE STORED, SOLD OR BURNED ON THE SITE. REMOVAL OF HAZARDOUS AND COMBUSTIBLE MATERIALS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE PROCEDURES AS AUTHORIZED BY THE FIRE DEPARTMENT OR OTHER APPROPRIATE REGULATORY AGENCIES AND AUTHORITIES.
7. BEFORE THE COMMENCEMENT OF THE DESIGNATED DEMOLITION, MARK FOR POSITION ALL UTILITIES AND PROTECT ALL ACTIVE LINES. CLEARLY IDENTIFY BEFORE THE COMMENCEMENT OF DEMOLITION SERVICES THE REQUIRED INTERRUPTION OF ACTIVE SYSTEMS THAT MAY AFFECT OTHER PARTIES, AND NOTIFY ALL APPLICABLE UTILITY COMPANIES TO INSURE THE CONTINUATION OF SERVICE.
8. THIS DEMOLITION PLAN IS INTENDED TO IDENTIFY THOSE EXISTING CONDITIONS WHICH ARE TO BE REMOVED. IT IS NOT INTENDED TO PROVIDE DIRECTION OTHER THAN THAT, ALL PROCEDURES ARE TO BE IN ACCORDANCE WITH STATE, FEDERAL, LOCAL AND JURISDICTIONAL REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAFETY PRECAUTIONS NECESSARY.
9. EXISTING STORMSEWER PIPES AND STRUCTURES ARE TO REMAIN UNLESS MARKED AS TO BE REMOVED. IF THE CONDITION OF THE STORMSEWER STRUCTURE OR PIPE IS QUESTIONABLE, CONTACT THE OWNER'S REPRESENTATIVE/ENGINEER TO EVALUATE IF A REPLACEMENT IS REQUIRED.
10. THE PROPOSED DEVELOPMENT PLANS TO REMOVE 50 TREES TO CONSTRUCT THE DEVELOPMENT AND RELATED SITE IMPROVEMENTS TO MEET TOWNSHIP STANDARDS.

SOILS SCHEDULE

TAKEN FROM USDA NATURAL RESOURCE CONSERVATION SERVICE (WEB SOIL SURVEY)

MAP SYMBOL	SOIL	HYDROLOGIC SOILS GROUP	DEPTH TO BEDROCK (FT. BELOW GRADE)	DEPTH TO SEASONAL WATER TABLE (FT. BELOW GRADE)	FLOOD HAZARD POTENTIAL	HYDRIC/ HYDRIC COMPONENT
UgB	URBAN LAND, 0 TO 8 PERCENT SLOPES	B	≥ 21-23	> 6-13	NONE	NONE

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

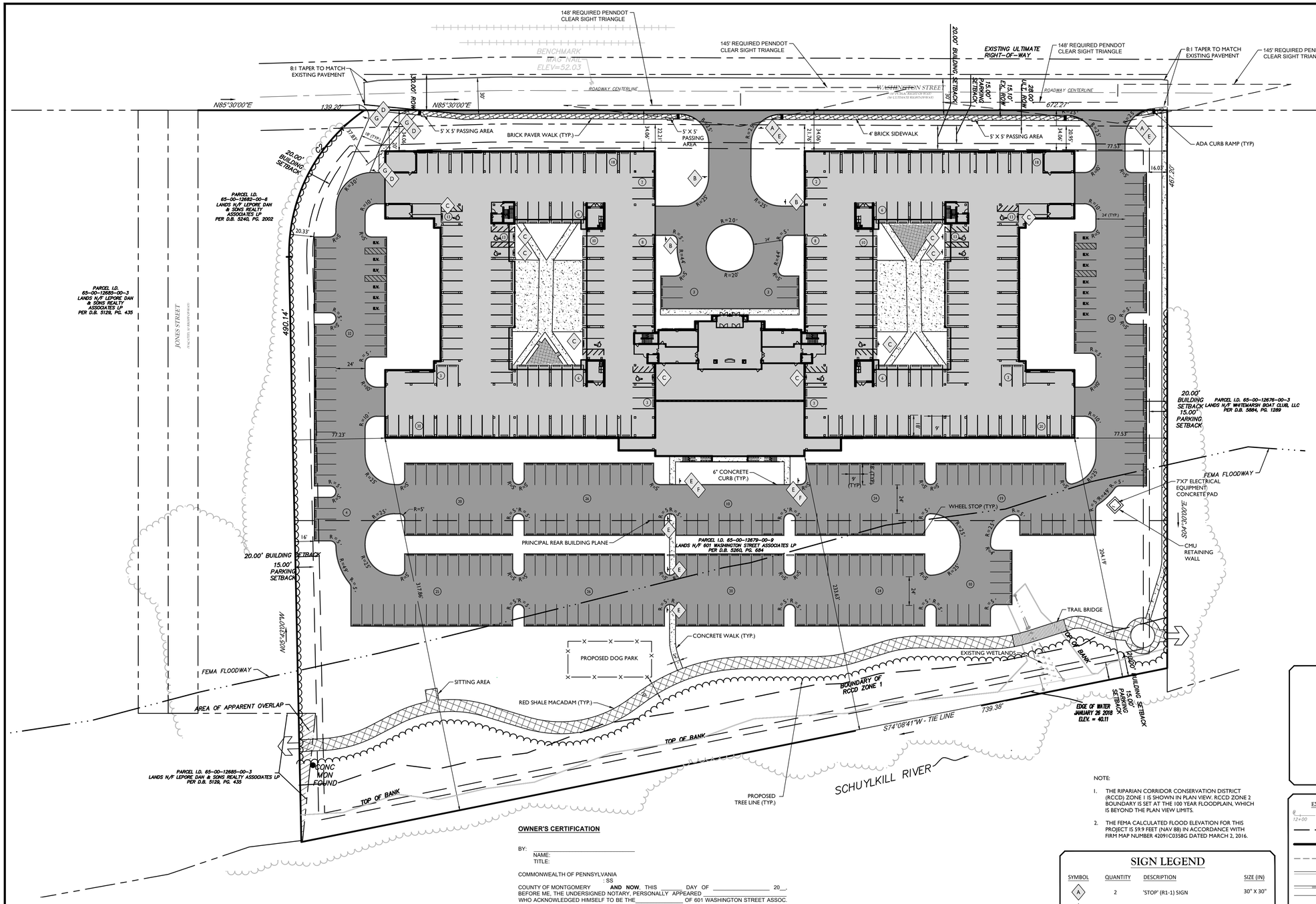
PROJECT NUMBER: 160010030B
DRAWING NAME: C-DEMO

SHEET TITLE:
SITE DEMOLITION PLAN

SHEET NUMBER:
4 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

20161600103098\Engineering\Site Plans\C-DEMO.dwg By: CHRIS.METZLER



PARKING TABULATION:

REQUIRED:
- 1.75 SPACES PER DWELLING UNIT = 473 SPACES
  - 19 ADA SPACES)
- 13 ELECTRIC VEHICLE SPACES

TOTAL REQUIRED = 486 SPACES

PROVIDED
- COVERED PARKING:
  - 194 SPACES
  - 10 ADA SPACES
- OUTSIDE PARKING:
  - 269 SPACES
  - 13 ELECTRIC VEHICLE SPACES

TOTAL PROVIDED = 486 SPACES

HEAVY INDUSTRIAL (HVY) WITH RDD-1 SUB ZONING DISTRICT			
	REQUIRED	EXISTING	PROPOSED
USE		APARTMENTS	
MINIMUM LOT SIZE	130,680 SF	393,027 SF	393,027 SF
		9.02 AC	9.02 AC
RIVER FRONT OPEN SPACE AREA	100' WIDE BUFFER	N/A	86,752 SF
LOT SIZE (MINUS RIVER FRONT OPEN SPACE)	N/A	N/A	306,275
MINIMUM LOT WIDTH	200 FT	695.68 FT	695.68 FT
PRINCIPAL BUILDING			
MINIMUM FRONT YARD	20 FT	19.40 FT	20 FT
MINIMUM REAR YARD	20 FT	55.06 FT	204.19 FT
MINIMUM SIDE YARDS	20 FT	40.38 FT	37.83 FT
PARKING SETBACK	15 FT	12.17 FT	16.00 FT
MAXIMUM BUILDING HEIGHT	4 STORIES	2 STORIES	4 STORIES
MAXIMUM DENSITY	30 UNITS/ACRE	N/A	29.93 UNITS/ACRE
MAXIMUM BUILDING COVER	40%	11.48%	32.02%
		45,122 SF	98,057 SF
MAXIMUM IMPERVIOUS COVER	75%	45.26%	74.94%
		177,902 SF	229,532 SF
OPEN / GREEN SPACE AREA	40%	54.74%	41.60%
		215,125 SF	163,495 SF
REAR YARD AREA, FROM PRIMARY BUILDING PLANE		55,173 SF	143,161 SF
ACCESSORY USE COVER IN REAR YARD	30%	1.36%	16.05%
		750 SF	22,981 SF

HATCH LEGEND

HATCH	DESCRIPTION
	APARTMENT BUILDING
	LIGHT DUTY PAVEMENT
	CONCRETE
	BRICK PAVERS
	RED SHALE MACADAM

LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	STALL COUNT	10
	ADA ACCESSIBLE STALL	P HC P V
	DEPRESSED CURB AND ADA RAMP	HC
	DIRECTION OF TRAFFIC FLOW	

SIGN LEGEND

SYMBOL	QUANTITY	DESCRIPTION	SIZE (IN)
A	2	'STOP' (R1-1) SIGN	30" X 30"
B	3	'TRAFFIC CIRCLE' (W16-12P) SIGN AND 'AHEAD' (W16-9P) SIGN	24" X18" 24" X 12"
C	9	'RESERVED PARKING' (R7-8) AND 'VAN ACCESSIBLE' (R7-8P) SIGNS	12" X 18" 12" X 6"
D	3	'DO NOT ENTER' (R5-1) SIGN	30" X 30"
E	7	'STOP FOR PEDESTRIANS' (R1-6A) SIGN	12" x 36"
F	2	'NO PARKING - FIRE LANE' SIGN	12" x 18"
G	3	'FIRE APPARATUS ACCESS ROAD ENTRANCE' SIGN	12" x 18"

NOTE:

1. THE RIPARIAN CORRIDOR CONSERVATION DISTRICT (RCCD) ZONE 1 IS SHOWN IN PLAN VIEW. RCCD ZONE 2 BOUNDARY IS SET AT THE 100 YEAR FLOODPLAIN, WHICH IS BEYOND THE PLAN VIEW LIMITS.
2. THE FEMA CALCULATED FLOOD ELEVATION FOR THIS PROJECT IS 59.9 FEET (NAV 88) IN ACCORDANCE WITH FIRM MAP NUMBER 42091C0358G DATED MARCH 2, 2016.

40 0 40 80

SCALE : 1" = 40'

MCPC NO. _____

PROCESSED and REVIEWED. A report has been prepared by the Montgomery County Planning Commission in accordance with the Municipalities Planning Code.

Certified this date _____

_____
For The Director

MONTGOMERY COUNTY PLANNING COMMISSION

MUNICIPAL APPROVAL / REVIEW BLOCK

REVIEWED BY THE WHITEMARSH TOWNSHIP ENGINEER THIS _____ DAY OF_____, 20___.

_____ _____
WHITEMARSH TOWNSHIP ENGINEER SIGNATURE

APPROVED BY THE TOWNSHIP OF WHITEMARSH THIS _____ DAY OF _____, 20___.

_____ _____
WHITEMARSH TOWNSHIP MANAGER SIGNATURE

RECORDER OF DEEDS

RECORDED IN THE OFFICE FOR THE RECORDING OF DEEDS IN AND FOR COUNTY OF MONTGOMERY, AT NORRISTOWN, PA.
IN PLAN BOOK _____, PAGE NO. _____ ON _____, 20___.

OWNER'S CERTIFICATION

BY: _____
NAME:
TITLE:

COMMONWEALTH OF PENNSYLVANIA
: SS
COUNTY OF MONTGOMERY

AND NOW, THIS _____ DAY OF _____ 20__, BEFORE ME, THE UNDERSIGNED NOTARY, PERSONALLY APPEARED _____ WHO ACKNOWLEDGED HIMSELF TO BE THE _____ OF 601 WASHINGTON STREET ASSOC. LP, THE SOLE GENERAL PARTNER OF 601 WASHINGTON STREET ASSOC. LP A PENNSYLVANIA LIMITED PARTNERSHIP AND HE, AS SUCH _____, BEING AUTHORIZED TO DO SO, EXECUTED THE FOREGOING INSTRUMENT FOR THE PURPOSES THEREIN CONTAINED.**IN WITNESS WHEREOF,** I HEREUNDER SET MY HAND AND OFFICIAL SEAL.

_____ NOTARY PUBLIC MY COMMISSION EXPIRES:

PLAN PREPARER'S STATEMENTS

I, _____, A REGISTERED SURVEYOR OF THE COMMONWEALTH OF PENNSYLVANIA, DO HEREBY CERTIFY
THAT THE PLAN, PREPARED FROM A FIELD SURVEY ON _____, 20____ CORRECTLY REPRESENTS THE PROPERTY BOUNDARY OF THE PROPOSED SUBDIVISION OR LAND DEVELOPMENT.

_____ _____
DATE REGISTERED SURVEYOR'S SIGNATURE

I, _____, A LICENSED PROFESSIONAL ENGINEER OF THE COMMONWEALTH OF PENNSYLVANIA, DO HEREBY CERTIFY THAT THE ACCOMPANYING APPLICATION, PLANS, AND SUPPORTING DOCUMENTATION ARE TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE.

_____ _____
DATE LICENSED ENGINEER'S SIGNATURE

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C. Richard Roseberry
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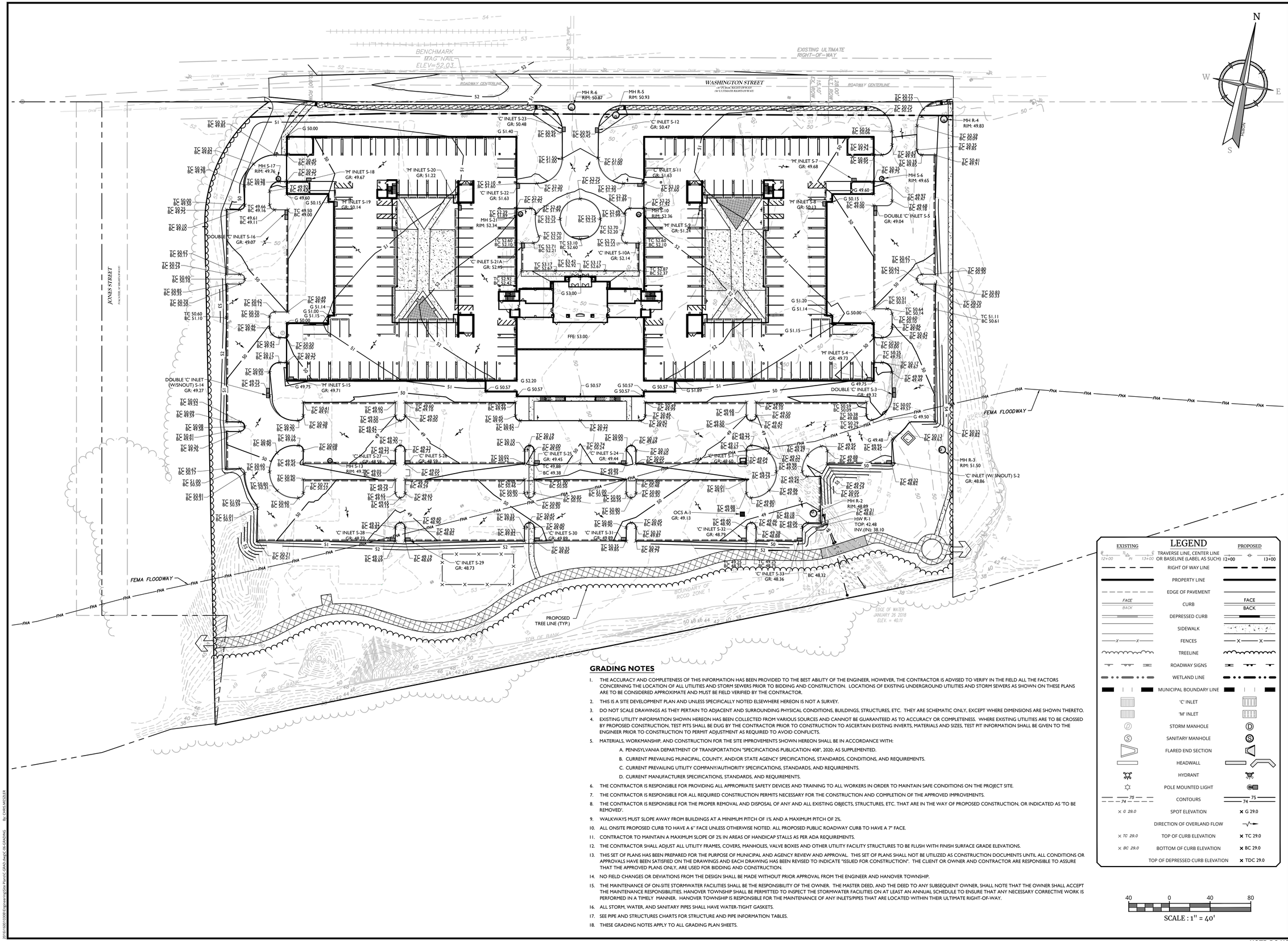
SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA
PROJECT NUMBER: 160010308		DRAWING NAME: C-LAYT	

SHEET TITLE:
DIMENSION PLAN

SHEET NUMBER:
5 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

20151\60151308\Engineering\Site Plans\C-LAYT.dwg C-05-LAYT By: CHRIS MEISLER



GRADING NOTES

1. THE ACCURACY AND COMPLETENESS OF THIS INFORMATION HAS BEEN PROVIDED TO THE BEST ABILITY OF THE ENGINEER, HOWEVER, THE CONTRACTOR IS ADVISED TO VERIFY IN THE FIELD ALL THE FACTORS CONCERNING THE LOCATION OF ALL UTILITIES AND STORM SEWERS PRIOR TO BIDDING AND CONSTRUCTION. LOCATIONS OF EXISTING UNDERGROUND UTILITIES AND STORM SEWERS AS SHOWN ON THESE PLANS ARE TO BE CONSIDERED APPROXIMATE AND MUST BE FIELD VERIFIED BY THE CONTRACTOR.
2. THIS IS A SITE DEVELOPMENT PLAN AND UNLESS SPECIFICALLY NOTED ELSEWHERE HEREON IS NOT A SURVEY.
3. DO NOT SCALE DRAWINGS AS THEY PERTAIN TO ADJACENT AND SURROUNDING PHYSICAL CONDITIONS, BUILDINGS, STRUCTURES, ETC. THEY ARE SCHEMATIC ONLY, EXCEPT WHERE DIMENSIONS ARE SHOWN THERETO.
4. EXISTING UTILITY INFORMATION SHOWN HEREON HAS BEEN COLLECTED FROM VARIOUS SOURCES AND CANNOT BE GUARANTEED AS TO ACCURACY OR COMPLETENESS. WHERE EXISTING UTILITIES ARE TO BE CROSSED BY PROPOSED CONSTRUCTION, TEST PITS SHALL BE DUG BY THE CONTRACTOR PRIOR TO CONSTRUCTION TO ASCERTAIN EXISTING INVERTS, MATERIALS AND SIZES, TEST PIT INFORMATION SHALL BE GIVEN TO THE ENGINEER PRIOR TO CONSTRUCTION TO PERMIT ADJUSTMENT AS REQUIRED TO AVOID CONFLICTS.
5. MATERIALS, WORKMANSHIP, AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREON SHALL BE IN ACCORDANCE WITH:
   A. PENNSYLVANIA DEPARTMENT OF TRANSPORTATION "SPECIFICATIONS PUBLICATION 408", 2020; AS SUPPLEMENTED.
   B. CURRENT PREVAILING MUNICIPAL, COUNTY, AND/OR STATE AGENCY SPECIFICATIONS, STANDARDS, CONDITIONS, AND REQUIREMENTS.
   C. CURRENT PREVAILING UTILITY COMPANY/AUTHORITY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
   D. CURRENT MANUFACTURER SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
6. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL APPROPRIATE SAFETY DEVICES AND TRAINING TO ALL WORKERS IN ORDER TO MAINTAIN SAFE CONDITIONS ON THE PROJECT SITE.
7. THE CONTRACTOR IS RESPONSIBLE FOR ALL REQUIRED CONSTRUCTION PERMITS NECESSARY FOR THE CONSTRUCTION AND COMPLETION OF THE APPROVED IMPROVEMENTS.
8. THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER REMOVAL AND DISPOSAL OF ANY AND ALL EXISTING OBJECTS, STRUCTURES, ETC. THAT ARE IN THE WAY OF PROPOSED CONSTRUCTION, OR INDICATED AS 'TO BE REMOVED'.
9. WALKWAYS MUST SLOPE AWAY FROM BUILDINGS AT A MINIMUM PITCH OF 1% AND A MAXIMUM PITCH OF 2%.
10. ALL ONSITE PROPOSED CURB TO HAVE A 6" FACE UNLESS OTHERWISE NOTED. ALL PROPOSED PUBLIC ROADWAY CURB TO HAVE A 7" FACE.
11. CONTRACTOR TO MAINTAIN A MAXIMUM SLOPE OF 2% IN AREAS OF HANDICAP STALLS AS PER ADA REQUIREMENTS.
12. THE CONTRACTOR SHALL ADJUST ALL UTILITY FRAMES, COVERS, MANHOLES, VALVE BOXES AND OTHER UTILITY FACILITY STRUCTURES TO BE FLUSH WITH FINISH SURFACE GRADE ELEVATIONS.
13. THIS SET OF PLANS HAS BEEN PREPARED FOR THE PURPOSE OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL CONDITIONS OR APPROVALS HAVE BEEN SATISFIED ON THE DRAWINGS AND EACH DRAWING HAS BEEN REVISED TO INDICATE "ISSUED FOR CONSTRUCTION". THE CLIENT OR OWNER AND CONTRACTOR ARE RESPONSIBLE TO ASSURE THAT THE APPROVED PLANS ONLY, ARE USED FOR BIDDING AND CONSTRUCTION.
14. NO FIELD CHANGES OR DEVIATIONS FROM THE DESIGN SHALL BE MADE WITHOUT PRIOR APPROVAL FROM THE ENGINEER AND HANOVER TOWNSHIP.
15. THE MAINTENANCE OF ON-SITE STORMWATER FACILITIES SHALL BE THE RESPONSIBILITY OF THE OWNER. THE MASTER DEED, AND THE DEED TO ANY SUBSEQUENT OWNER, SHALL NOTE THAT THE OWNER SHALL ACCEPT THE MAINTENANCE RESPONSIBILITIES. HANOVER TOWNSHIP SHALL BE PERMITTED TO INSPECT THE STORMWATER FACILITIES ON AT LEAST AN ANNUAL SCHEDULE TO ENSURE THAT ANY NECESSARY CORRECTIVE WORK IS PERFORMED IN A TIMELY MANNER. HANOVER TOWNSHIP IS RESPONSIBLE FOR THE MAINTENANCE OF ANY INLETS/PIPES THAT ARE LOCATED WITHIN THEIR ULTIMATE RIGHT-OF-WAY.
16. ALL STORM, WATER, AND SANITARY PIPES SHALL HAVE WATER-TIGHT GASKETS.
17. SEE PIPE AND STRUCTURES CHARTS FOR STRUCTURE AND PIPE INFORMATION TABLES.
18. THESE GRADING NOTES APPLY TO ALL GRADING PLAN SHEETS.

LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'C' INLET	
	'M' INLET	
D	STORM MANHOLE	D
S	SANITARY MANHOLE	S
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
75 / 74	CONTOURS	75 / 74
× G 29.0	SPOT ELEVATION	× G 29.0
	DIRECTION OF OVERLAND FLOW	
× TC 29.0	TOP OF CURB ELEVATION	× TC 29.0
× BC 29.0	BOTTOM OF CURB ELEVATION	× BC 29.0
	TOP OF DEPRESSED CURB ELEVATION	× TDC 29.0

40 0 40 80

SCALE : 1" = 40'

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2019\16001030B\Engineering\Site Plans\C-GRAD.dwg\C-06-GRADING By: CHRIS.MESTLER

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601 WASHINGTON STREET

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PENNSYLVANIA

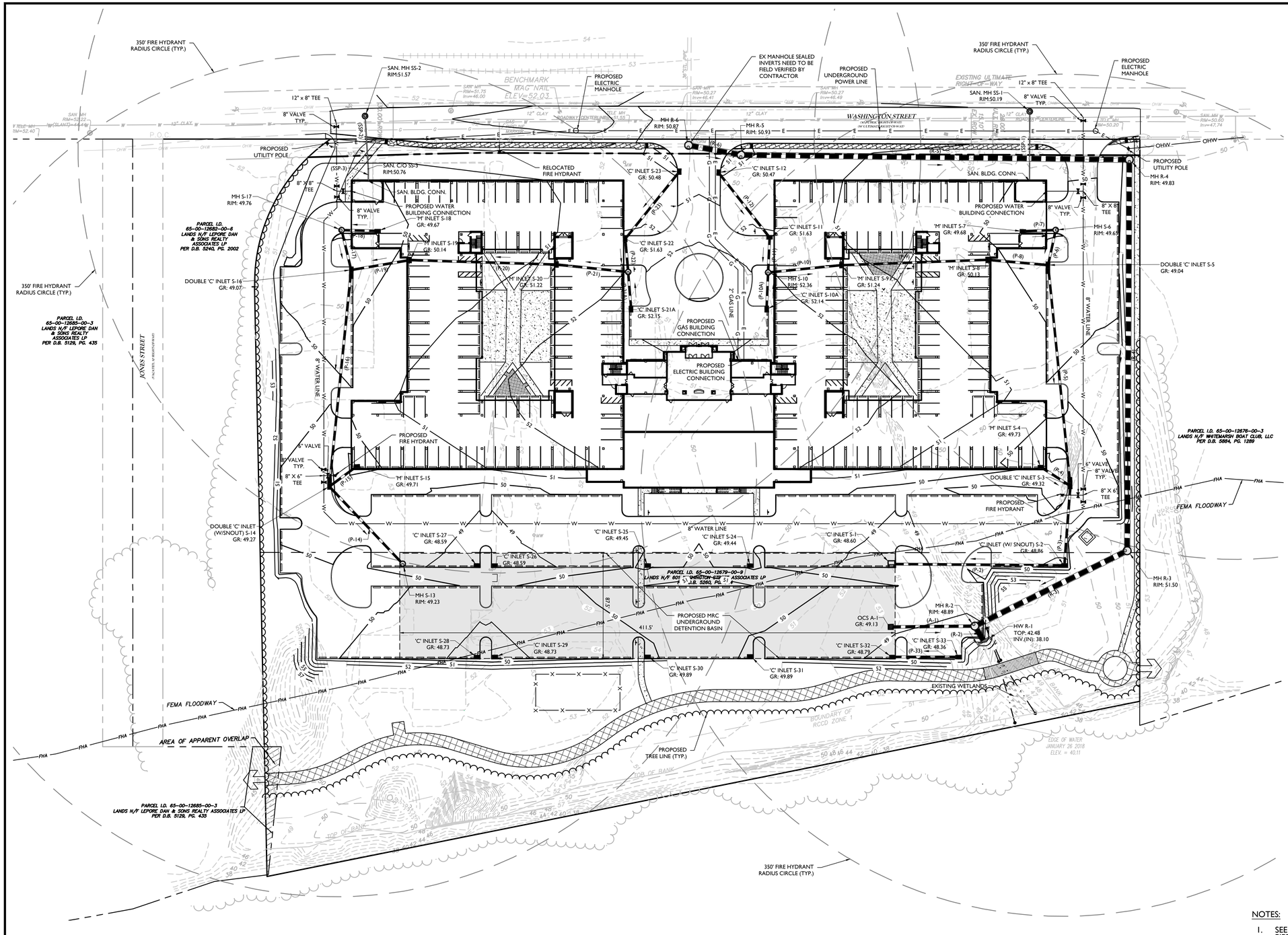
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PROJECT NUMBER:	DRAWING NAME:
16001030B	C-GRAD

SHEET TITLE: GRADING PLAN

SHEET NUMBER: 6 of 27



LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'C' INLET	
	'M' INLET	
	STORM MANHOLE	
	SANITARY MANHOLE	
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
CATV	CABLE TV CONDUIT	CATV
W	WATER MAIN	W
G	GAS MAIN	G
T	TELEPHONE CONDUIT	T
E	ELECTRIC CONDUIT	E
	SANITARY PIPE	
	STORM PIPE	

NOTES:

1. SEE CONSTRUCTION DETAILS SHEET 11 FOR STRUCTURE AND PIPE INFORMATION TABLES.
2. BY GRAPHICAL REPRESENTATION ONLY THIS PROPERTY IS LOCATED IN FLOOD HAZARD ZONE AE AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 42091C0358G WHICH HAS AN EFFECTIVE DATE OF MARCH 02, 2016 AND IS IN A SPECIAL FLOOD HAZARD AREA. FIELD SURVEYING WAS NOT PERFORMED TO DETERMINE THIS ZONE. AN ELEVATIONS CERTIFICATE MAY BE NEEDED TO VERIFY THIS DETERMINATION OR APPLY FOR AN AMENDMENT FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
3. FOR EXACT BUILDING UTILITY TIE-IN LOCATIONS, SEE THE ARCHITECTURAL PLANS.

40 0 40 80

SCALE : 1" = 40'

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C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
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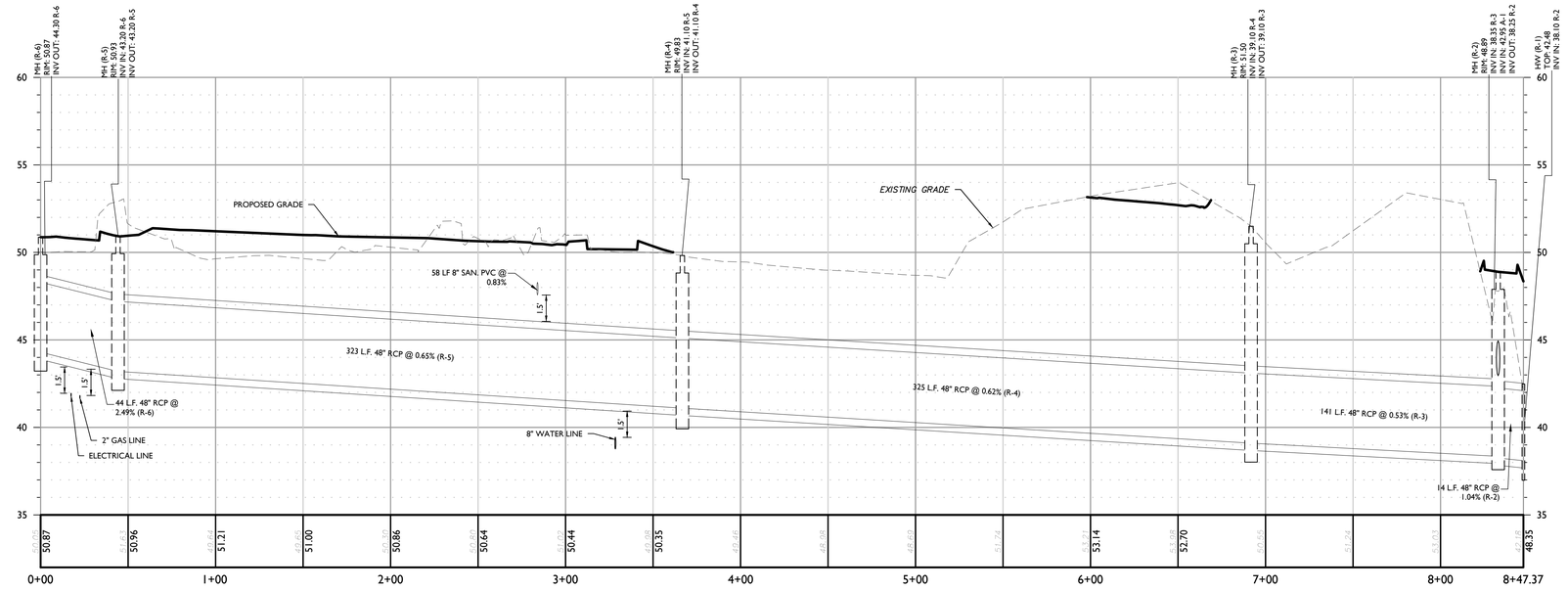
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DRAWING NAME: C-UTIL

SHEET TITLE: UTILITIES PLAN

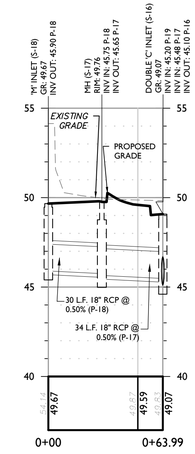
SHEET NUMBER: 7 of 27

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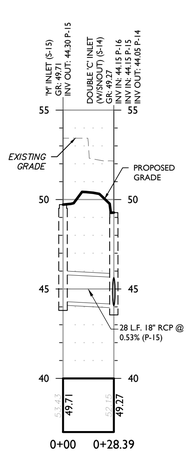
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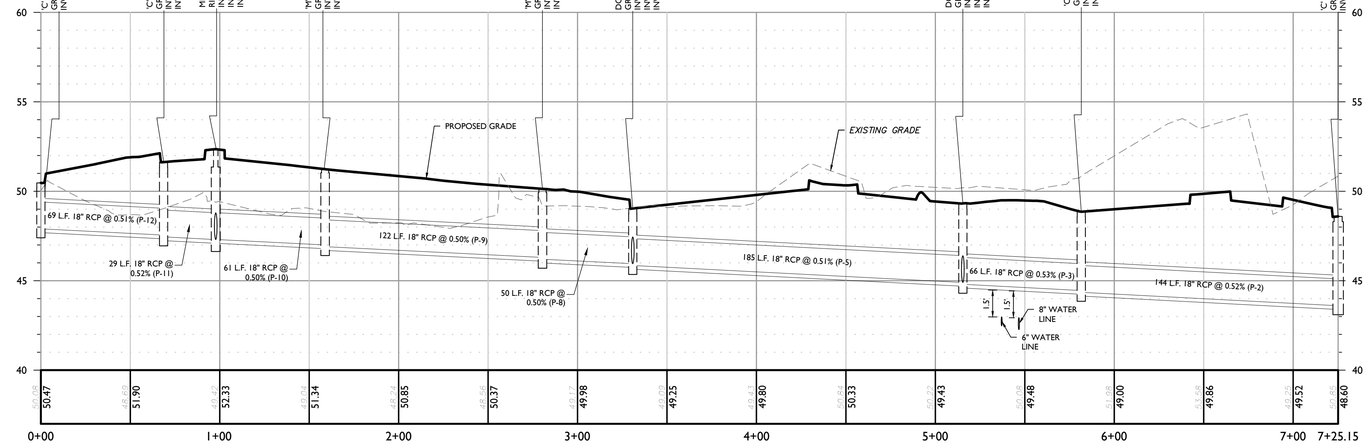
PROFILE OF MH R-6 TO HW R-1
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



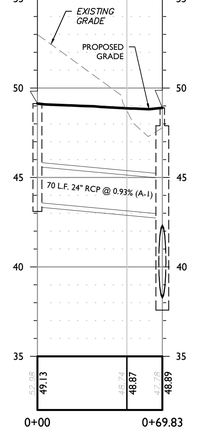
PROFILE OF INLET S-18 TO INLET S-16
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



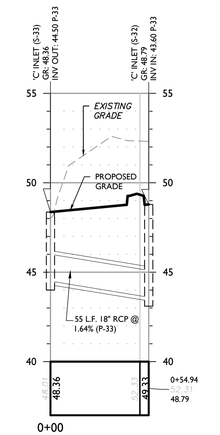
PROFILE OF INLET S-15 TO INLET S-14
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



PROFILE OF INLET S-12 TO INLET S-1
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



PROFILE OF OCS A-1 TO MH R-2
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



PROFILE OF INLET S-33 TO INLET S-32
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046161628
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC.
DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

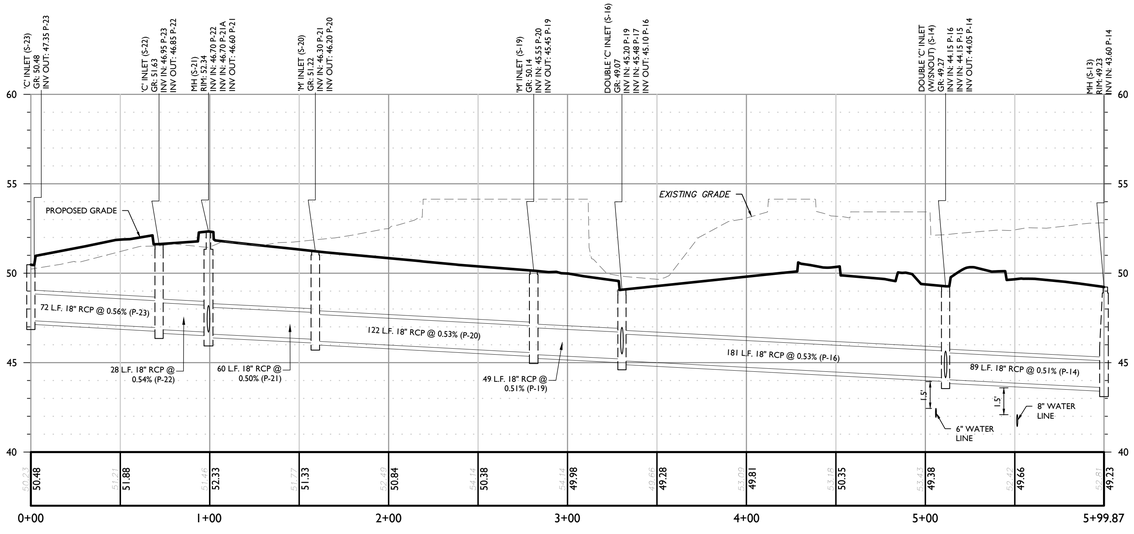
PROJECT NUMBER: 16001030B
DRAWING NAME: C-PROF

SHEET TITLE: PROFILES

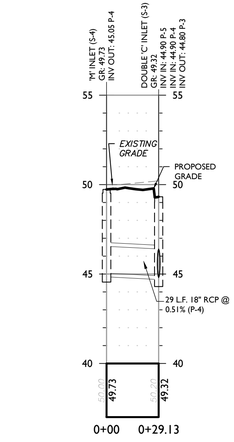
SHEET NUMBER: 8 of 27

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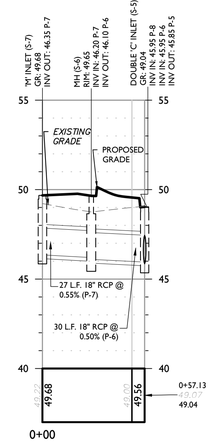
2016\16001030B\Engineering\Cad Files\C-PROF.dwg\C-08-PROFILES By: CHRIS.MEZLER



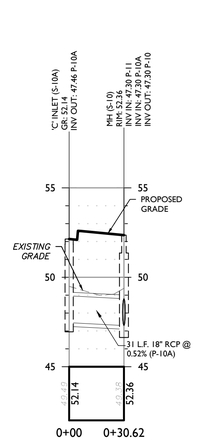
PROFILE OF INLET S-23 TO MH S-13
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



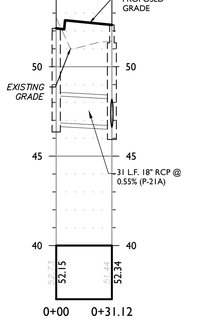
PROFILE OF INLET S-4 TO INLET S-3
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



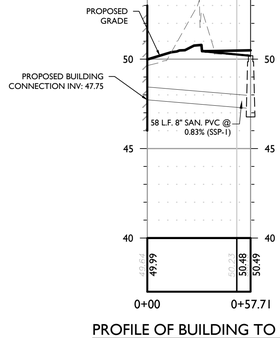
PROFILE OF INLET S-7 TO INLET S-5
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VERTICAL : 1" = 4'



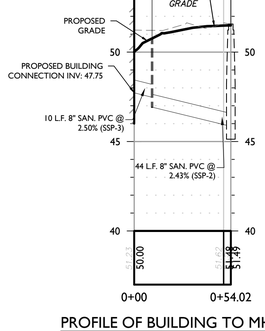
PROFILE OF INLET S-10A TO MH S-10
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



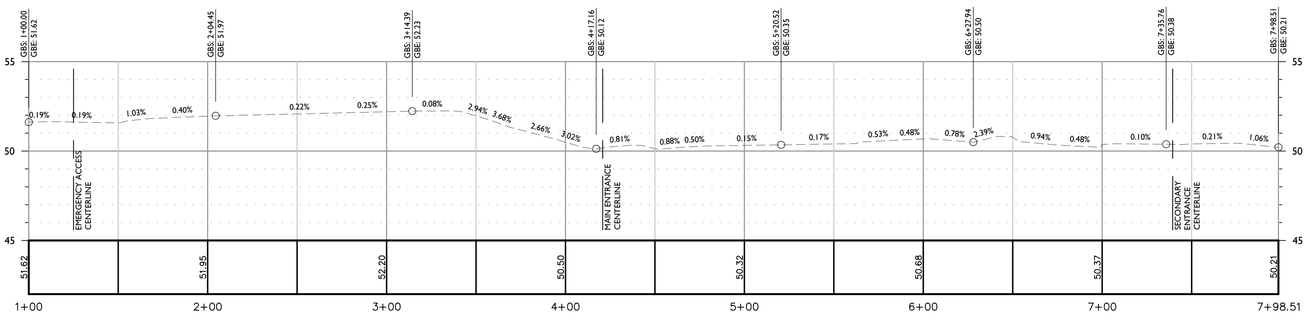
PROFILE OF INLET S-21A TO MH S-21
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



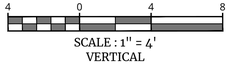
PROFILE OF BUILDING TO SS-1
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



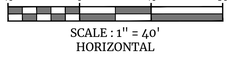
PROFILE OF BUILDING TO MH SS-2
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



PROFILE OF WASHINGTON STREET
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



SCALE : 1" = 4'
VERTICAL



SCALE : 1" = 40'
HORIZONTAL

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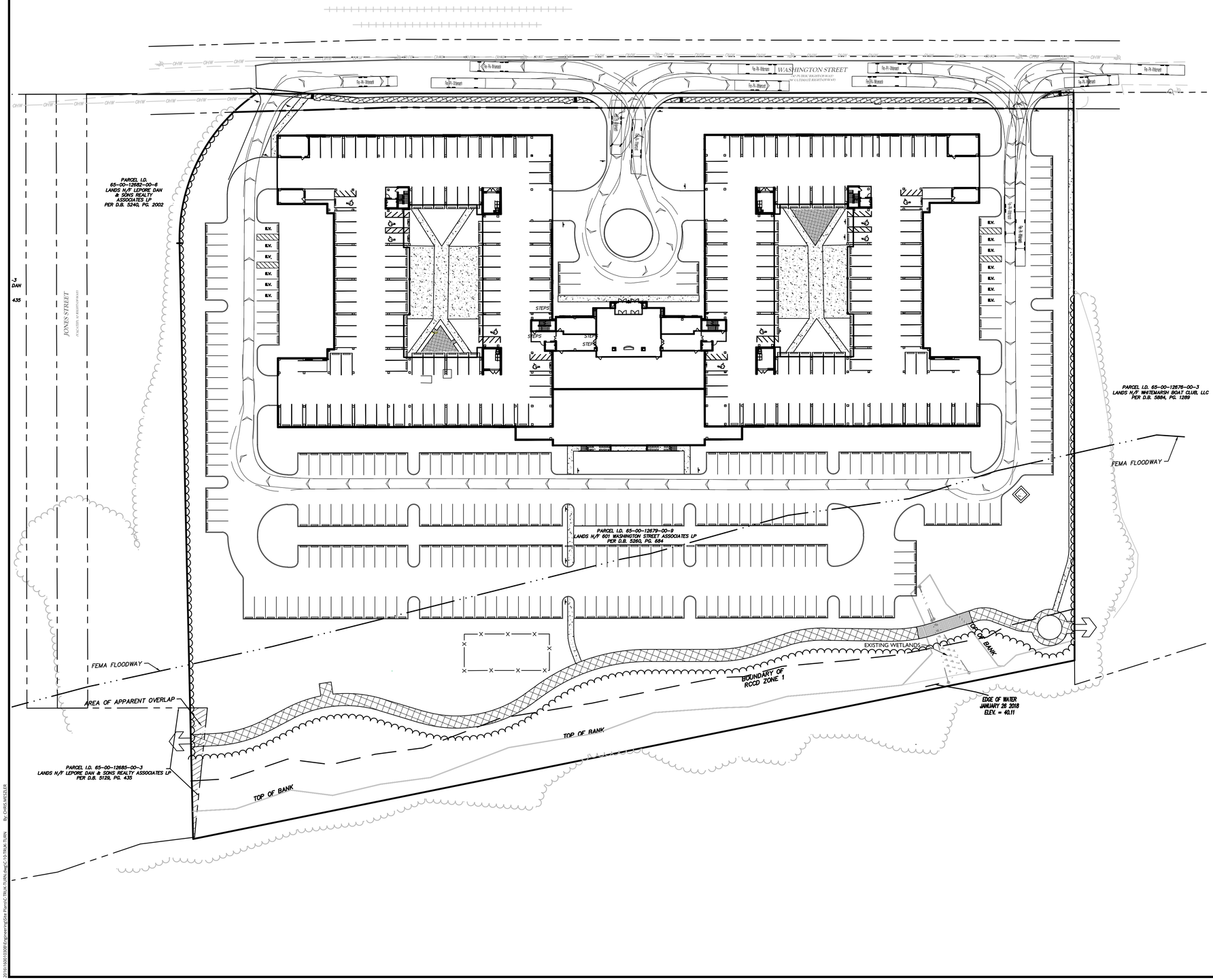
PROJECT NUMBER: 16001030B
DRAWING NAME: C-PROF

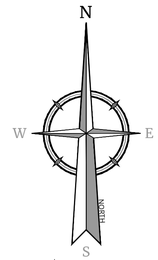
SHEET TITLE: PROFILES

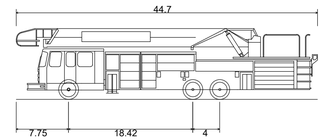
SHEET NUMBER: 9 of 27

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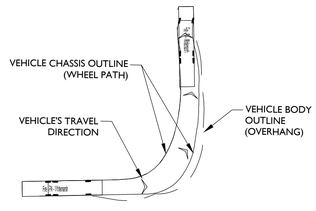
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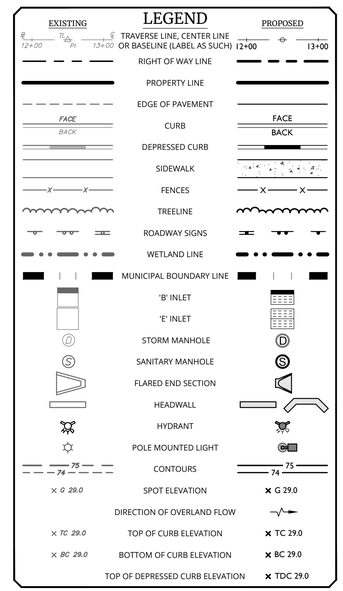


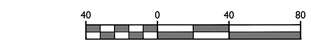


Fire - PA - Whitemarsh	
Overall Length	44.700ft
Overall Width	8.300ft
Overall Body Height	10.484ft
Min Body Ground Clearance	0.915ft
Track Width	8.300ft
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	35.050ft



VEHICLE PATH LEGEND





SCALE : 1" = 40'

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER: 16001030B
DRAWING NAME: C-TRUK-TURN

SHEET TITLE: FIRE TRUCK TURNING PLAN

SHEET NUMBER: 10 of 27

20160\16001030B\Engineering\Site Plans\C-TRUK-TURN.dwg/C-1.0-TRUK-TURN By: CHRIS.MESTLER

Proposed Storm Network Structure Table

Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
A-1	48 in. x 48 in. OCS	49.13			24" RCP	43.60
R-1	144 in. x 18 in. x 60 in. CONC. HW	42.48	48" RCP	38.10		
R-2	72 in. dia. CYLINDER MH	48.89	48" RCP 24" RCP	38.35 42.95	48" RCP	38.25
R-3	72 in. dia. CYLINDER MH	51.50	48" RCP	39.10	48" RCP	39.10
R-4	72 in. dia. CYLINDER MH	49.83	48" RCP	41.10	48" RCP	41.10
R-5	72 in. dia. CYLINDER MH	50.93	48" RCP	43.20	48" RCP	43.20
R-6	72 in. dia. CYLINDER MH	50.87			48" RCP	44.30
S-1	60 in. x 60 in. 'C' INLET	48.60	18" RCP	43.60		
S-2	24 in. x 45 in. 'C' INLET	48.86	18" RCP	44.45	18" RCP	44.35
S-3	24 in. x 45 in. 'C' INLET	49.32	18" RCP 18" RCP	44.90 44.90	18" RCP	44.80
S-4	24 in. x 45 in. 'M' INLET	49.73			18" RCP	45.05
S-5	24 in. x 45 in. 'C' INLET	49.04	18" RCP 18" RCP	45.95 45.95	18" RCP	45.85
S-6	48 in. dia. CYLINDER MH	49.65	18" RCP	46.20	18" RCP	46.10
S-7	24 in. x 45 in. 'M' INLET	49.68			18" RCP	46.35
S-8	24 in. x 45 in. 'M' INLET	50.13	18" RCP	46.30	18" RCP	46.20
S-9	24 in. x 45 in. 'M' INLET	51.24	18" RCP	47.00	18" RCP	46.90
S-10	48 in. dia. CYLINDER MH	52.36	18" RCP 18" RCP	47.30 47.30	18" RCP	47.30
S-10A	24 in. x 45 in. 'C' INLET	52.14			18" RCP	47.46
S-11	24 in. x 45 in. 'C' INLET	51.63	18" RCP	47.55	18" RCP	47.45
S-12	24 in. x 45 in. 'C' INLET	50.47			18" RCP	47.90

Proposed Storm Network Structure Table

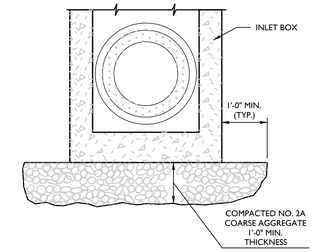
Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
S-13	48 in. dia. CONED MH	49.23	18" RCP	43.60		
S-14	24 in. x 45 in. 'C' INLET	49.27	18" RCP 18" RCP	44.15 44.15	18" RCP	44.05
S-15	24 in. x 45 in. 'M' INLET	49.71			18" RCP	44.30
S-16	24 in. x 45 in. 'C' INLET	49.07	18" RCP 18" RCP	45.20 45.48	18" RCP	45.10
S-17	48 in. dia. CYLINDER MH	49.76	18" RCP	45.75	18" RCP	45.65
S-18	24 in. x 45 in. 'M' INLET	49.67			18" RCP	45.90
S-19	24 in. x 45 in. 'M' INLET	50.14	18" RCP	45.55	18" RCP	45.45
S-20	24 in. x 45 in. 'M' INLET	51.22	18" RCP	46.30	18" RCP	46.20
S-21	48 in. dia. CYLINDER MH	52.34	18" RCP 18" RCP	46.70 46.70	18" RCP	46.60
S-21A	24 in. x 45 in. 'C' INLET	52.15			18" RCP	46.87
S-22	24 in. x 45 in. 'C' INLET	51.63	18" RCP	46.95	18" RCP	46.85
S-23	24 in. x 45 in. 'C' INLET	50.48			18" RCP	47.35
S-24	24 in. x 45 in. 'C' INLET	49.44				
S-25	24 in. x 45 in. 'C' INLET	49.45				
S-26	24 in. x 45 in. 'C' INLET	48.59				
S-27	24 in. x 45 in. 'C' INLET	48.59				
S-28	24 in. x 45 in. 'C' INLET	48.73				
S-29	24 in. x 45 in. 'C' INLET	48.73				
S-30	24 in. x 45 in. 'C' INLET	49.89				
S-31	24 in. x 45 in. 'C' INLET	49.89				

Sanitary Sewer Structure Table

Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
BLDG. CONN.	???	48.48			8" SAN. PVC	47.75
BLDG. CONN.	???	49.77			8" SAN. PVC	47.75
SS-1	48 in. dia. CONED MH	50.19	8" SAN. PVC	47.27		
SS-2	48 in. dia. CONED MH	51.57	8" SAN. PVC	45.88		
SS-3	8 in. Clean Out	50.76	8" SAN. PVC	47.50	8" SAN. PVC	46.95

Sanitary Sewer Pipe Table

Pipe I.D.	Description	Length	Invert Up	Invert Dn	Slope
SSP-1	8"SAN. PVC	58'	47.75	47.27	0.83%
SSP-2	8"SAN. PVC	44'	46.95	45.88	2.43%
SSP-3	8"SAN. PVC	10'	47.75	47.50	2.50%



NOTES:

STANDARD INLET BOXES SHOWN, PROVIDE TOP SLABS FOR OTHER INLET BOX TYPES.

PROVIDE GRADE ADJUSTMENT RINGS WHEN REQUIRED.

COST OF NO. 2A COARSE AGGREGATE IS INCIDENTAL TO THE INLET BOX.

INLET BOX SUB-BASE PREPARATION DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1100 05/01/18

Proposed Storm Network Structure Table

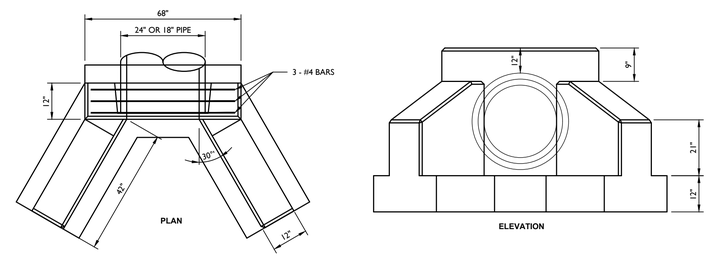
Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
S-32	24 in. x 45 in. 'C' INLET	48.79	18" RCP	43.60		
S-33	24 in. x 45 in. 'C' INLET	48.36			18" RCP	44.50

Proposed Storm Network Pipe Table

Pipe I.D.	Description	Length	Invert Up	Invert Dn	Slope
P-21	18"RCP	60'	46.60	46.30	0.50%
P-21A	18"RCP	31'	46.87	46.70	0.55%
P-22	18"RCP	28'	46.85	46.70	0.54%
P-23	18"RCP	72'	47.35	46.95	0.56%
P-33	18"RCP	55'	44.50	43.60	1.64%
R-2	48"RCP	14'	38.25	38.10	1.04%
R-3	48"RCP	141'	39.10	38.35	0.53%
R-4	48"RCP	325'	41.10	39.10	0.62%
R-5	48"RCP	323'	43.20	41.10	0.65%
R-6	48"RCP	44'	44.30	43.20	2.49%

Proposed Storm Network Pipe Table

Pipe I.D.	Description	Length	Invert Up	Invert Dn	Slope
A-1	24"RCP	70'	43.60	42.95	0.93%
P-2	18"RCP	144'	44.35	43.60	0.52%
P-3	18"RCP	66'	44.80	44.45	0.53%
P-4	18"RCP	29'	45.05	44.90	0.51%
P-5	18"RCP	185'	45.85	44.90	0.51%
P-6	18"RCP	30'	46.10	45.95	0.50%
P-7	18"RCP	27'	46.35	46.20	0.55%
P-8	18"RCP	50'	46.20	45.95	0.50%
P-9	18"RCP	122'	46.90	46.30	0.50%
P-10	18"RCP	61'	47.30	47.00	0.50%
P-10A	18"RCP	31'	47.46	47.30	0.52%
P-11	18"RCP	29'	47.45	47.30	0.52%
P-12	18"RCP	69'	47.90	47.55	0.51%
P-14	18"RCP	89'	44.05	43.60	0.51%
P-15	18"RCP	28'	44.30	44.15	0.53%
P-16	18"RCP	181'	45.10	44.15	0.53%
P-17	18"RCP	34'	45.65	45.48	0.50%
P-18	18"RCP	30'	45.90	45.75	0.50%
P-19	18"RCP	49'	45.45	45.20	0.51%
P-20	18"RCP	122'	46.20	45.55	0.53%



NOTE:

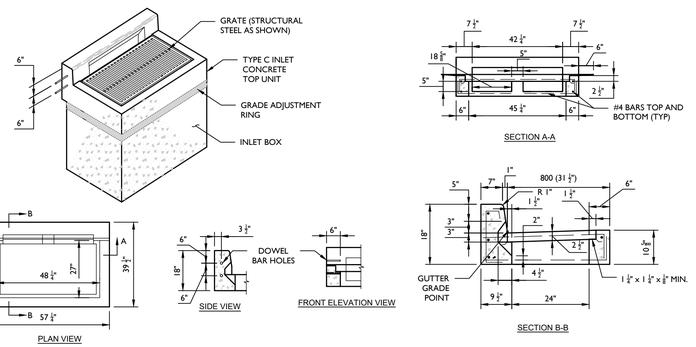
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATIONS AS OUTLINED IN PENNDOT PUBLICATION 408, SECTION 605.
2. PROVIDE REINFORCEMENT IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 709.
3. USE CLASS A CONCRETE OR BETTER.

2 : 1 EMBANKMENT SLOPES

PIPE DIAMETER	SKEW ∠ = 90° TO 60° - 0 = 30°			SKEW ∠ = 55° - 0 = 35°			SKEW ∠ = 50° - 0 = 40°			SKEW ∠ = 45° - 0 = 45°			SKEW ∠ = 40° - 0 = 50°			SKEW ∠ = 30° - 0 = 60°			SKEW ∠ = 20° - 0 = 70°			SKEW ∠ = 10° - 0 = 80°				
D D.W	L D.W	ℓ	W1	L D.W	ℓ	W1	L D.W	ℓ	W1	L D.W	ℓ	W1	L D.W	ℓ	W1	L D.W	ℓ	W1	L D.W	ℓ	W1	L D.W	ℓ	W1	W2	A D.W
(IN)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(FT.)	(IN.)
36	5.8	0	4.6	6.0	0.33	4.9	6.2	0.5	5.2	6.5	0.67	5.7	7.0	0.75	6.2	8.3	1.33	8.0	11.1	1.75	11.7	19.6	5.0	23.0	4.6	12
42	6.3	0	5.8	6.6	0.33	6.1	6.9	0.5	6.5	7.3	0.67	7.1	7.8	0.75	7.8	9.3	1.33	10.0	12.5	1.75	14.6	22.5	5.0	28.8	5.8	12
48	6.9	0	6.9	7.2	0.33	7.3	7.5	0.5	7.8	8.0	0.67	8.5	8.5	0.75	9.4	10.3	1.33	12.0	14.0	1.75	17.5	25.3	5.0	34.6	6.9	12
54	7.5	0	8.0	7.8	0.33	8.5	8.2	0.5	9.1	8.7	0.67	9.9	9.3	0.75	10.9	11.3	1.33	14.0	15.5	1.75	20.5	28.2	5.0	40.3	8.0	12
60	8.1	0	9.2	8.4	0.33	9.8	8.8	0.5	10.4	9.4	0.67	11.3	10.1	0.75	12.5	12.3	1.33	16.0	16.9	1.75	23.4	31.1	5.0	46.0	9.2	15
72	9.2	0	11.5	9.6	0.33	12.2	10.1	0.5	13.0	10.8	0.67	14.1	11.7	0.75	15.6	14.3	1.33	20.0	19.8	1.75	29.2	36.9	5.0	57.6	11.5	15

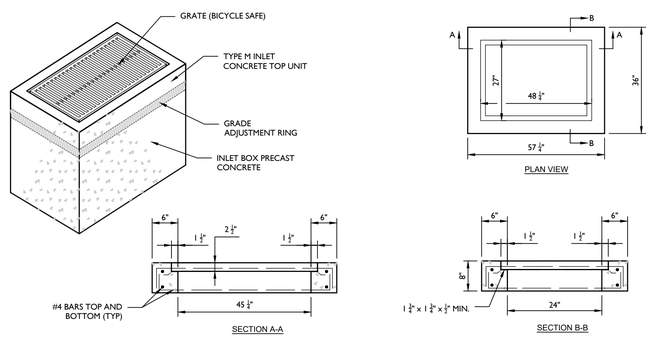
TYPE D-W END WALL DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1700 05/01/18



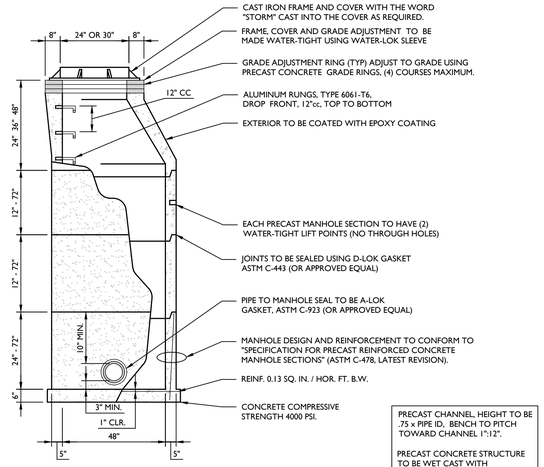
TYPE "C" INLET DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1200 05/01/18



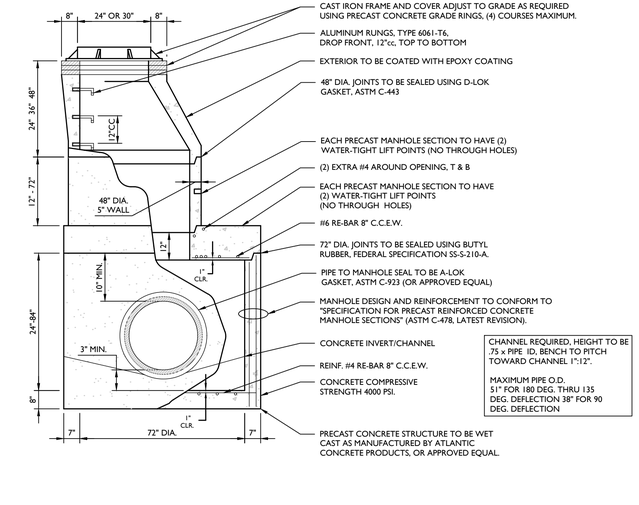
TYPE "M" INLET DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1300 05/01/18



48" DIAMETER STORM MANHOLE DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1600 06/01/19



72" DIAMETER STORM MANHOLE DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1601 06/01/19

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
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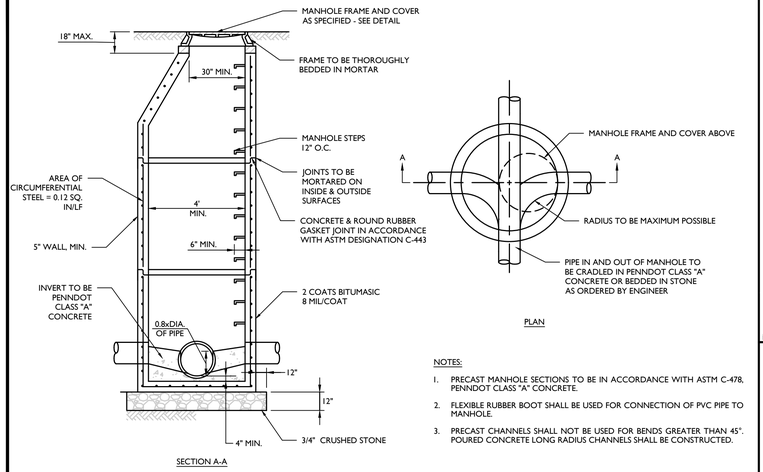
PROJECT NUMBER: 16001030B
DRAWING NAME: C-DTLS

SHEET TITLE: CONSTRUCTION DETAILS

SHEET NUMBER: 11 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\Site Plans\C-DTLS.dwg/C-11 DETAILS By: CHRIS.MESZLER

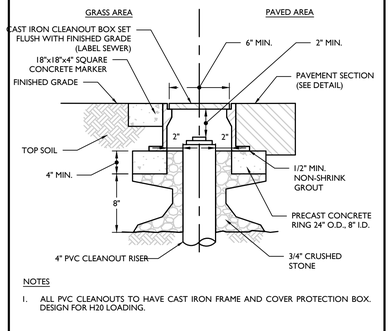


NOTES:

1. PRECAST MANHOLE SECTIONS TO BE IN ACCORDANCE WITH ASTM C-478, PENNDOT CLASS "A" CONCRETE.
2. FLEXIBLE RUBBER BOOT SHALL BE USED FOR CONNECTION OF PVC PIPE TO MANHOLE.
3. PRECAST CHANNELS SHALL NOT BE USED FOR BENDS GREATER THAN 45°. POURED CONCRETE LONG RADIUS CHANNELS SHALL BE CONSTRUCTED.

SANITARY PRECAST MANHOLE DETAIL

NOT TO SCALE | MCPA-UTIL-SSWR-1000 | 05/01/18



NOTES

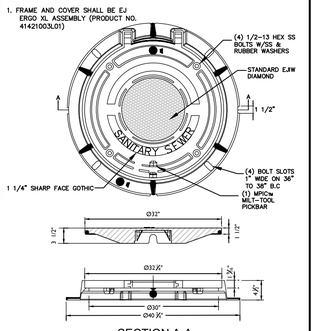
1. ALL PVC CLEANOUTS TO HAVE CAST IRON FRAME AND COVER PROTECTION BOX. DESIGN FOR H20 LOADING.

CLEANOUT PROTECTION BOX DETAIL

NOT TO SCALE | MCPA-UTIL-SSWR-1600 | 05/01/18

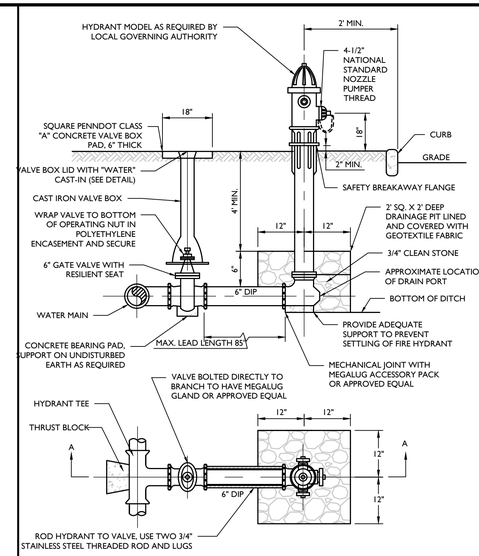
NOTE:

1. FRAME AND COVER SHALL BE EJ ERGO 16, ASSEMBLY (PRODUCT NO. 41421003L01)



SECTION A-A
SANITARY WATERTIGHT MANHOLE FRAME COVER DETAIL

NOT TO SCALE | NOT TO SCALE

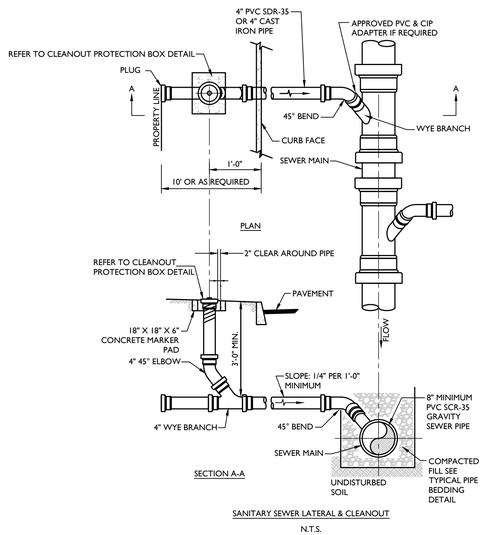


NOTES:

1. HYDRANT SHALL BE **T.W.W. STANDARD U.S. PIPE METROPOLITAN 250 DRY-BARREL** TRAFFIC MODEL DESIGN WITH THE FOLLOWING SPECIFICATION.
   - A. SAFETY COUPLED STANDPIPE.
   - B. 6" MECHANICAL JOINT INLET CONNECTION
   - C. TWO 2-1/2" NATIONAL STANDARD THREAD HOSE NOZZLES.
   - D. ONE 4-1/2" NATIONAL STANDARD THREAD STEAMER NOZZLE, FACING THE ROAD.
   - E. HYDRANT OPERATORS AND HYDRANT NOZZLE CAP NUTS SHALL BE IN ACCORDANCE WITH AWWA/ANSI STANDARD C502.
   - F. HYDRANT HOSE CAPS SHALL BE ATTACHED BY MEANS OF CHAINS.
   - G. HYDRANT BARRELS SHALL BE PAINTED - **RED**, BONNETS - **YELLOW**, AND NOZZLE CAPS - **BLACK** TO INDICATE THE AVAILABLE FIRE FLOW OR AS IN ACCORDANCE WITH THE LOCAL REQUIREMENTS.
   - H. HYDRANTS SHALL OPEN COUNTER CLOCKWISE.
2. STANDPIPE (BREAK-AWAY) COUPLING SHALL NOT EXCEED A MAXIMUM OF 5 INCHES FROM THE TOP OF THE CURB TO THE BOTTOM OF COUPLING.
3. THE DRAIN VALVE SHALL BE CLEAR OF ANY OBSTRUCTIONS, AND 3/4" CLEAN GRAVEL BE PLACED FROM THE BOTTOM OF THE HYDRANT TO A POINT 6" ABOVE THE HYDRANT LATERAL PIPE.
4. THRUST BLOCKS SHALL BE MADE OF PENNDOT CLASS "A" CONCRETE, PROVIDED BEHIND THE HYDRANT SHOE.
5. BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH THE LOCAL JURISDICTION.
6. GATE VALVE SHALL BE **T.W.W. 6" U.S. PIPE METROSEAL. 250 R/S** (RESILIENT SEALED) MECHANICAL JOINT END (RIGHT HAND).
7. WATER LATERAL SHALL BE 6" DUCTILE IRON CEMENT LINED CLASS 52 PIPE.
8. TIE ROD SHALL BE 3/4" DIAMETER TIE ROD WITH EYE BOLTS - TWO REQUIRED (SIDE VIEW SHOWN). RESTRAIN ALL JOINTS ON HYDRANT TEE, VALVE, AND HYDRANT LEAD.
9. HYDRANT TEE SHALL BE U.S. PIPE CATALOG #U-592 TRIM-TYTE DUCTILE IRON, MECHANICAL JOINT OR AN T.W.W. APPROVED SUBSTITUTE.

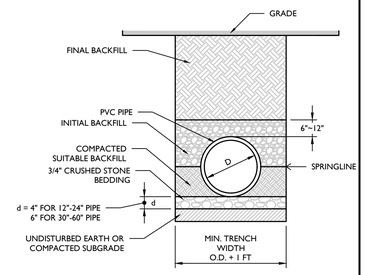
FIRE HYDRANT (VALVE IN GRASS) DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1000 | 05/01/18



SANITARY SEWER LATERAL & CLEANOUT DETAIL

NOT TO SCALE | MCPA-UTIL-SSWR-1700 | 05/01/18

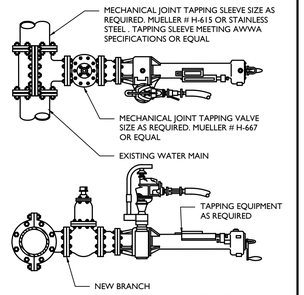


NOTES:

1. ALL PVC GRAVITY PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321.
2. GRAVITY SANITARY PIPE SHALL BE PVC SDR 35 PER ASTM D3034 OR AS REQUIRED BY THE GOVERNING AUTHORITY.

PVC SANITARY PIPE BEDDING (GRAVITY) DETAIL

NOT TO SCALE | MCPA-UTIL-SSWR-2602 | 05/01/18

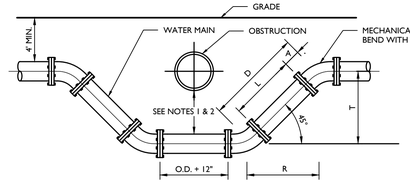


NOTES:

1. WET TAP VALVE CAN BE INSTALLED IN EITHER VERTICAL OR HORIZONTAL POSITION.
2. CONTRACTOR SHALL VERIFY DEPTH OF BURY, MATERIAL, DIAMETER (O.D.) AND OPERATING PRESSURE OF EXISTING WATER MAIN PRIOR TO ORDERING OF WET TAP UNIT.

WET TAP DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1200 | 05/01/18



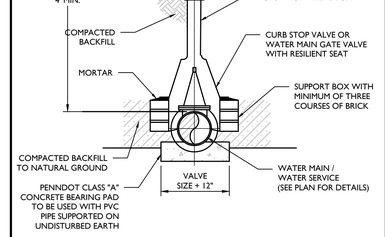
MECHANICAL JOINTS			
ANGLE	D =	R =	L =
45°	T x 1.414	T x 1.000	D-2A
22.5°	T x 2.613	T x 2.414	D-2A
11.25°	T x 5.126	T x 5.027	D-2A

NOTES:

1. WATER MAIN MAY CROSS ABOVE OBSTRUCTION IF **4'** MINIMUM COVER IS MAINTAINED ABOVE THE WATER MAIN AND FINISH GRADE.
2. MINIMUM VERTICAL SEPARATION BETWEEN SANITARY OR STORM SEWER TO WATER MAIN SHALL BE 18" IF THE HORIZONTAL SEPARATION IS LESS THAN 10'. BETWEEN WATER MAIN AND OTHER UTILITIES, THE MINIMUM VERTICAL SEPARATION SHALL BE 12".
3. WATER MAIN SHALL BE SIZE AND MATERIAL SPECIFIED ON THE PLAN, WITH MECHANICAL JOINT OR PUSH-ON AND ALL FITTINGS BE CAST IRON MECHANICALLY JOINT.
4. OFFSETS MAY BE SUBSTITUTED FOR A "T" OF UP TO 24" IF APPROVED BY THE ENGINEER.
5. CONCRETE THRUST BLOCKS SHALL BE PROVIDED AT ALL BENDS OR OTHER POINTS OF PIPE DIRECTION CHANGE.
6. TIE RODS SHALL BE UTILIZED TO RESTRAIN PIPE JOINTS IF THRUST BLOCK IS NOT USED. DETAILS OF THE TIE ROD ASSEMBLY SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL. TIE RODS SHALL BE SUFFICIENT TO RESTRAIN THE THRUST DEVELOPED AT 100 PSI WORKING PRESSURE. MEGALUG RESTRAINT ALSO ACCEPTABLE IN PLACE OF TIE RODS.

WATER CROSSING UNDER UTILITY DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1300 | 05/01/18

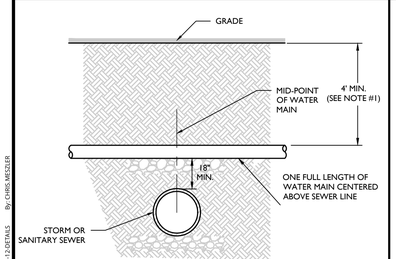


NOTES:

1. VALVE BOX SHOULD HAVE EXTENSION IF WATER MAIN OR SERVICE IS PLACED DEEPER THAN 5 FEET.
2. CURB STOP VALVE BOX SHALL BE MUELLER EXTENSION TYPE WITH ARCH PATTERN BASE, OR APPROVED EQUAL.
3. WATER MAIN VALVE BOX SHALL BE SCREW TYPE ADJUSTABLE MODE. **FIGURE # 4905-22 AS MANUFACTURED BY BINGHAM & TAYLOR OR APPROVED EQUAL.**

WATER VALVE BOX DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1600 | 05/01/18



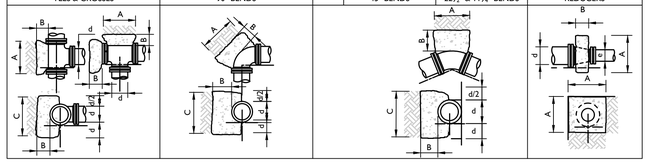
NOTES:

1. WATER MAIN MAY CROSS ABOVE OBSTRUCTION IF 4' MINIMUM COVER IS MAINTAINED ABOVE THE WATER MAIN TO FINISH GRADE AND 18" MINIMUM VERTICAL SEPARATION IS OBTAINED.

WATER CROSSING OVER SEWER DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1301 | 05/01/18

MINIMUM SIZE OF CONCRETE THRUST BLOCKS																	
d	A	B	C	d	A	B	C	d	A	B	C	A	B	C	d x e	A	B
6"	2' - 0"	8"	1' - 3"	6"	2' - 6"	8"	1' - 3"	6"	1' - 6"	6"	1' - 3"	1' - 6"	8"	1' - 3"	6" x 4"	1' - 6"	1' - 0"
8"	2' - 6"	8"	1' - 6"	8"	3' - 0"	8"	1' - 6"	8"	1' - 6"	8"	1' - 9"	1' - 6"	8"	1' - 9"	8" x 4"	2' - 0"	1' - 0"
10"	3' - 0"	10"	2' - 0"	10"	3' - 6"	10"	2' - 0"	10"	2' - 3"	10"	2' - 0"	1' - 6"	10"	2' - 0"	10" x 6"	2' - 4"	1' - 3"
12"	3' - 6"	10"	2' - 6"	12"	3' - 9"	10"	2' - 9"	12"	2' - 6"	10"	2' - 6"	1' - 6"	10"	2' - 6"	10" x 8"	2' - 6"	1' - 6"
TEES & CROSSES				90° BENDS				45° BENDS				22½° & 11¼° BENDS			REDUCERS		

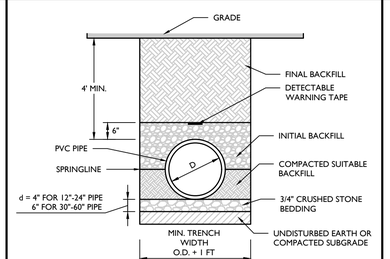


NOTES:

1. ALL HORIZONTAL BENDS SHALL HAVE CONCRETE THRUST BLOCKS WITH MINIMUM BEARING AREAS AGAINST UNDISTURBED SOIL AND NO JOINT SHALL BE COVERED WITH CONCRETE.
2. BEARING AREAS ARE BASED UPON UNDISTURBED SOIL WITH A MINIMUM BEARING CAPACITY OF 0.5 TONS PER SQUARE FOOT. FOR A LESSER SOIL BEARING CAPACITY THESE AREAS SHALL BE INCREASED ACCORDINGLY.
3. THRUST BLOCKS SHALL BE POURED DIRECTLY AGAINST TRENCH WALLS AND SHALL BE PENNDOT CLASS "A" CONCRETE.
4. DETAILS FOR SUPPORTS AND BRACING FOR VERTICAL BENDS FOR 12" DIAMETER OR LARGER SHALL BE APPROVED BY THE AUTHORITY PRIOR TO CONSTRUCTION.

THRUST BLOCKS DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1400 | 05/01/18

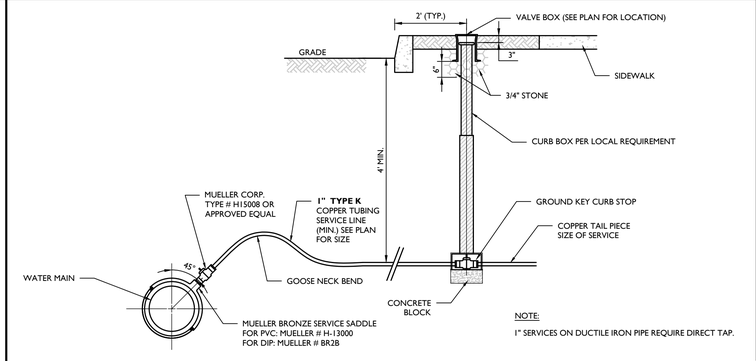


NOTES:

1. ALL PVC WATER PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ANSI/AWWA C605.
2. WATER MAIN SHALL BE PRESSURE **CLASS 165 DR 25** PVC PIPE PER AWWA C900-16 OR AS REQUIRED BY THE GOVERNING AUTHORITIES.

PVC WATER PIPE BEDDING DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1910 | 04/01/20



NOTE:

1" SERVICES ON DUCTILE IRON PIPE REQUIRE DIRECT TAP.

HOUSE WATER SERVICE CONNECTION DETAIL

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1	03/16/22	CMA	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL C. RICHARD ROSEBERRY ENGINEER No. 46162

C. Richard Roseberry
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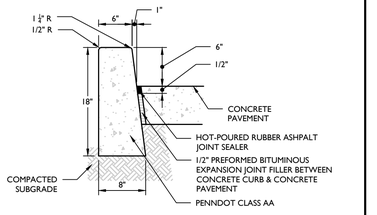
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AS SHOWN	03/01/2022	SF/CMM	RMA
PROJECT NUMBER: 16001030B		DRAWING NAME: C-DTLS	

SHEET TITLE: CONSTRUCTION DETAILS

SHEET NUMBER: 12 of 27

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2016\16001030B\Engineering\Site Plans\C-DTLS.dwg|C-12 DETAILS By: CHRIS MESSLER

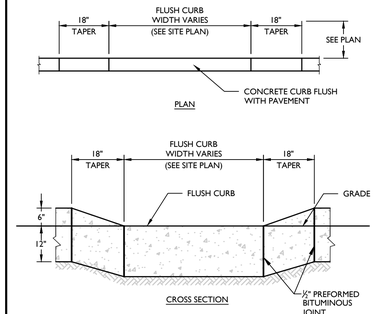


NOTES:

1. DEPTH OF JOINT FILLER STRIP EQUAL TO THE THICKNESS OF THE PAVEMENT LESS 1/2".
2. PREFORMED BITUMINOUS FIBER TRAVERSE JOINTS, 1/2" THICK AT 20' MAX. INTERVALS ALONG THE CURB.
3. PROVIDE CONTRACTION JOINTS (2" DEEP X ⅛" WIDE) 4'-0" MIN TO 10'-0" MAX INTERVALS.

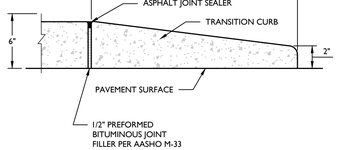
CONCRETE CURB (CONCRETE PAVEMENT) DETAIL

NOT TO SCALE MCPA-SITE-CURB-1001 05/01/18



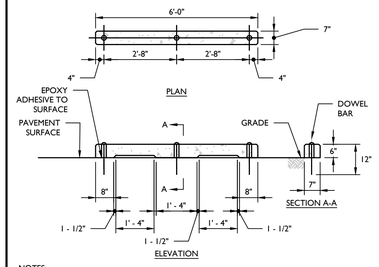
CONCRETE FLUSH CURB DETAIL

NOT TO SCALE MCPA-SITE-CURB-1500 05/01/18



CURB TAPER DETAIL

NOT TO SCALE MCPA-SITE-CURB-2100 05/01/18

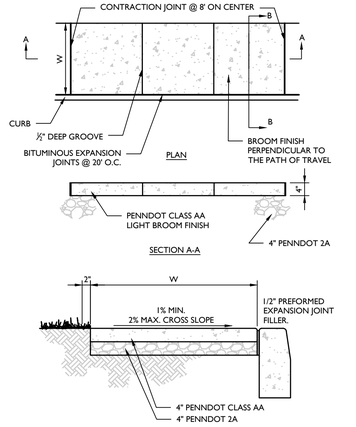


NOTES:

1. CONCRETE SHALL BE PENNDOT CLASS AA.
2. UNIT TO BE PINNED TO SURFACE WITH (3) 5/8" DIA. GALVANIZED STEEL RODS, 12" MINIMUM LENGTH.
3. ALL BEVELS TO BE 1/2", ALL ANGLES TO BE 45°

PRECAST CONCRETE BUMPER CURB WHEEL STOP (FOR CARS) DETAIL

NOT TO SCALE MCPA-SITE-CURB-2301 05/01/18

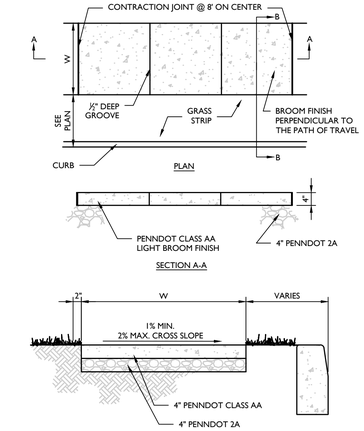


NOTES:

1. ½" EXPANSION JOINT FILLER INSTALLED BETWEEN THE CURB AND CONCRETE SIDEWALK AT 10' MAXIMUM SPACING, RECESS TO ¼" FROM THE TOP OF SIDEWALK.
2. ½" CONTRACTION JOINTS INSTALLED AT AN INTERVAL 24 TO 30 TIMES THE THICKNESS OF THE SLAB, TO A DEPTH OF ¼ OF THE THICKNESS OF THE SLAB, RECESS TO ½" FROM THE TOP OF SIDEWALK, FOR THE FULL WIDTH OF THE SIDEWALK. SCORE A ¼" GROOVED JOINT HALF WAY BETWEEN THE CONTRACTION JOINTS.
3. JOINT FILLER SHALL CONFORM TO AASHTO M-33. SURFACE OF CONCRETE SHALL BE BROOM FINISH. ROUND EDGES USING AN EDGING TOOL WITH A ½" RADIUS.
4. CONCRETE SIDEWALK SHALL BE CONSTRUCTED PER THE LATEST ADA REQUIREMENTS.

CONCRETE SIDEWALK (NEXT TO CURB) DETAIL

NOT TO SCALE MCPA-SITE-PVMT-1900 12/01/20

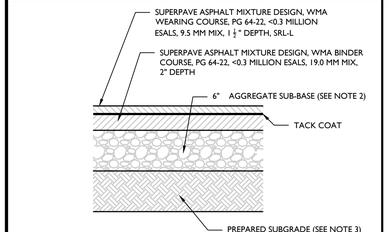


NOTES:

1. ½" CONTRACTION JOINTS INSTALLED AT AN INTERVAL 24 TO 30 TIMES THE THICKNESS OF THE SLAB, TO A DEPTH OF ¼ OF THE THICKNESS OF THE SLAB, RECESS TO ½" FROM THE TOP OF SIDEWALK, FOR THE FULL WIDTH OF THE SIDEWALK. SCORE A ¼" GROOVED JOINT HALF WAY BETWEEN THE CONTRACTION JOINTS.
2. JOINT FILLER SHALL CONFORM TO AASHTO M-33. SURFACE OF CONCRETE SHALL BE BROOM FINISH. ROUND EDGES USING AN EDGING TOOL WITH A ½" RADIUS.
3. CONCRETE SIDEWALK SHALL BE CONSTRUCTED PER THE LATEST ADA REQUIREMENTS.

CONCRETE SIDEWALK (NEXT TO GRASS) DETAIL

NOT TO SCALE MCPA-SITE-PVMT-1901 12/01/20

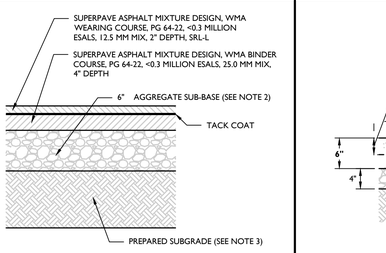


NOTES:

1. PENNDOT APPROVED ASPHALT MIX DESIGN
2. AGGREGATE BASE TO BE PENNDOT TYPE 2A CONFORMING TO PENNDOT PUBLICATIONS 408
3. SUBGRADE TO BE COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY, AS DETERMINED BY THE MODIFIED PROCTOR TEST, ASTM D 1557, AND SHALL CONSIST OF LOAD-BEARING FILL OR EXISTING STRATUM A MATERIALS CAPABLE OF ACHIEVING A CBR VALUE OF 5. THE MOISTURE CONTENT OF THE MATERIAL SHOULD ALSO BE MAINTAINED WITHIN +/- 2 PERCENT OF THE OPTIMUM MOISTURE CONTENT.

LIGHT-DUTY PAVEMENT DETAIL

NOT TO SCALE MCPA-SITE-PVMT-1000 05/01/18

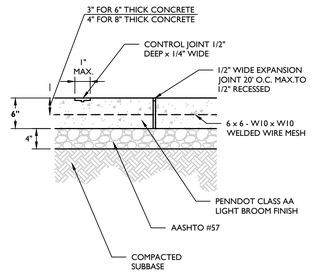


NOTES:

1. PENNDOT APPROVED ASPHALT MIX DESIGN
2. AGGREGATE BASE TO BE PENNDOT TYPE 2A CONFORMING TO PENNDOT PUBLICATIONS 408
3. SUBGRADE TO BE COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY, AS DETERMINED BY THE MODIFIED PROCTOR TEST, ASTM D 1557, AND SHALL CONSIST OF LOAD-BEARING FILL OR EXISTING STRATUM A MATERIALS CAPABLE OF ACHIEVING A CBR VALUE OF 5. THE MOISTURE CONTENT OF THE MATERIAL SHOULD ALSO BE MAINTAINED WITHIN +/- 2 PERCENT OF THE OPTIMUM MOISTURE CONTENT.

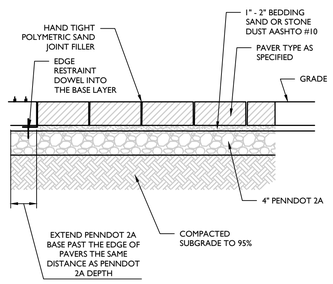
HEAVY-DUTY PAVEMENT DETAIL

NOT TO SCALE MCPA-SITE-PVMT-1100 05/01/18



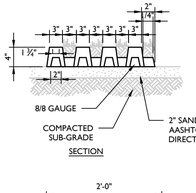
CONCRETE PAVEMENT DETAIL

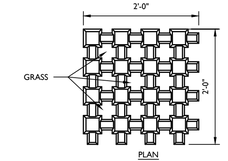
NOT TO SCALE MCPA-SITE-PVMT-1600 05/01/18



TYPICAL STANDARD PAVER SECTION DETAIL

NOT TO SCALE MCPA-SITE-PVMT-2500 05/01/18



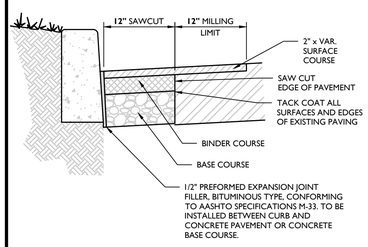


NOTES:

1. PAVERS SHALL BE MANUFACTURED BY **HASTINGS PAVEMENT CO.**, INC., FABRICATED WITH 6"x6" X 8/8 GAUGE STEEL MESH, AND 5,000 PSI CONCRETE OR APPROVED EQUAL.
2. SETTING BED FOR PAVERS SHALL BE EITHER UNDISTURBED EARTH OR FILL COMPACTED TO 95% MAXIMUM DRY DENSITY AS DETERMINED BY THE MODIFIED PROCTOR TEST ASTM D-1557-64 + (PLUS 4% OR MINUS 2% OPTIMUM MOISTURE). REMOVE FROM THE SETTING BED, ROCK OR OTHER MATERIALS WHICH WOULD CREATE UNEVEN BEARING. PLACE TOPSOIL, SAND, OR STONE DUST IN A 2" COMPACTED LAYER TO PRESENT A TRUE AND EVEN GRADE OVER ENTIRE AREA TO RECEIVE PAVER. SET PAVERS AND LINE UP TO ABUT.
3. THOROUGHLY MIX LIME, FERTILIZER AND OTHER ADDITIVES PER LOCAL SOIL CONSERVATION REQUIREMENTS WITH THE TOPSOIL AND SPREAD LOOSELY TO FILL VOIDS IN PAVERS. WATER WITH A MIST SPRAY TO SETTLE. ADD ADDITIONAL TOPSOIL MIX TO BRING THE TOPSOIL FLUSH WITH TOP OF THE PAVER.
4. ADD SEED MIX AS PER LOCAL SOIL CONSERVATION DISTRICT AND PROJECT LANDSCAPING REQUIREMENTS AND APPLY SEED AT SLIGHTLY LESS THAN NORMAL RATE, AND MULCH. WHEN GRASS IS 2 1/2" HIGH, CUT TO 1 3/4".

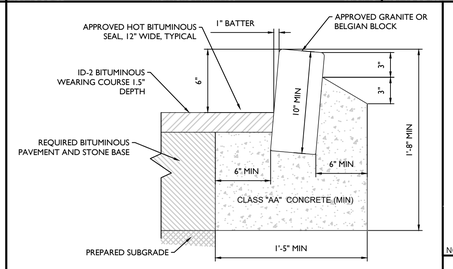
GRASS PAVERS (FOR EMERGENCY ACCESS DRIVE) DETAIL

NOT TO SCALE MCPA-SITE-PVMT-2400 05/01/18



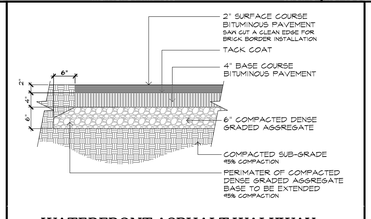
SAWCUT AND PAVEMENT RESTORATION DETAIL

NOT TO SCALE MCPA-SITE-PVMT-2600 05/01/18



WASHINGTON STREET BELGIAN BLOCK CURB DETAIL

NOT TO SCALE



WATERFRONT ASPHALT WALKWAY

NOT TO SCALE

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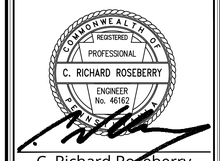
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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS



C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

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941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER: 16001030B
DRAWING NAME: C-DTLS

SHEET TITLE: CONSTRUCTION DETAILS

SHEET NUMBER: 13 of 27

2016\16001030B\Engineering\Site Plans\C-DTLS.dwg|C-13-DETAILS By: CHRIS MEZLER

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.



30" x 30"

COLORS:
LEGEND = WHITE (RETROREFLECTIVE)
BACKGROUND = RED (RETROREFLECTIVE)

R1-1 SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R1-1 | 12/01/20



12" x 36"

COLORS:
LEGEND = BLACK
BACKGROUND = YELLOW (RETROREFLECTIVE)
STOP SYMBOL = RED (RETROREFLECTIVE)

R1-6A SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R1-6A | 07/01/21



30" x 30"

COLORS:
LEGEND = WHITE (RETROREFLECTIVE)
CIRCLE BACKGROUND = RED (RETROREFLECTIVE)

R5-1 SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R5-1 | 12/01/20



24" x 18"

COLORS:
LEGEND = BLACK
BACKGROUND = YELLOW (RETROREFLECTIVE)

W16-12P SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-WARN-W16-12P | 12/01/20



12" x 18"

COLORS:
LEGEND = GREEN (RETROREFLECTIVE)
HANDICAP SYMBOL= BLUE (RETROREFLECTIVE)
BACKGROUND = WHITE (RETROREFLECTIVE)

R7-8X SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R7-8 | 07/01/21



18" x 9"

COLORS:
LEGEND = GREEN (RETROREFLECTIVE)
BACKGROUND = WHITE (RETROREFLECTIVE)

R7-8P SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R7-8P | 07/01/21



12" x 18"

COLORS:
LEGEND = RED (RETROREFLECTIVE)
BACKGROUND = WHITE (RETROREFLECTIVE)

R7-1X SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R7-1 | 07/01/21

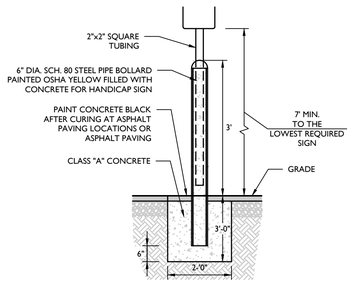


24" x 12"

COLORS:
LEGEND = BLACK
BACKGROUND = YELLOW (RETROREFLECTIVE)

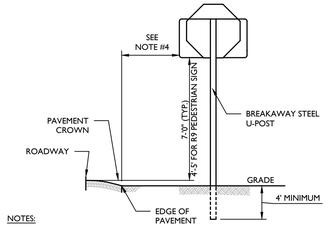
W16-9P SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-WARN-W16-9P | 07/01/21



BOLLARD MOUNTED SIGN DETAIL

NOT TO SCALE | MCPA-SITE-MRKG-2000 | 05/01/18

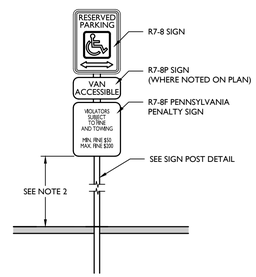


NOTES:

1. ALL POSTS SHALL BE OF ADEQUATE LENGTH TO MEET THE REQUIREMENTS FOR ERECTION, AS STATED IN THE CURRENT MANUAL ON "UNIFORM TRAFFIC CONTROL DEVICES" FOR STREETS AND HIGHWAYS.
2. ALL POSTS SHALL BE EMBEDDED 4' MINIMUM.
3. ALL POSTS TO BE BREAKAWAY STEEL U-POSTS IN CONFORMANCE WITH CURRENT ASTM SPECIFICATION A123 AND PADOT STANDARDS.
4. IN AREAS WITHOUT CURBING, THE OUTER EDGE OF SIGN TO BE 2'-0" MINIMUM TO 12'-0" MAXIMUM FROM EDGE OF CURB, AS DIRECTED.

SINGLE POST SIGN MOUNTING DETAIL

NOT TO SCALE | MCPA-SITE-MRKG-2001 | 05/01/18



NOTES:

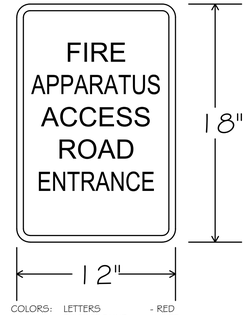
1. INSTALL SIGN WHERE NOTED ON PLAN.
2. THE BOTTOM OF THE LOWEST SIGN SHALL BE MOUNTED 60" ABOVE THE PARKING LOT OR SIDEWALK SURFACE WHEN THE SIGN IS PARALLEL TO THE SIDEWALK AND 72" ABOVE THE PARKING LOT OR SIDEWALK WHEN THE SIGN IS PERPENDICULAR TO THE SIDEWALK.

ACCESSIBLE PARKING SIGN DETAIL

NOT TO SCALE | MCPA-SITE-MRKG-1900 | 05/01/18



"NO PARKING - FIRE LANE" SIGN (NTS)



FIRE APPARATUS ENTRANCE SIGN (NTS)

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1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

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941 Marcon Boulevard, Suite 801
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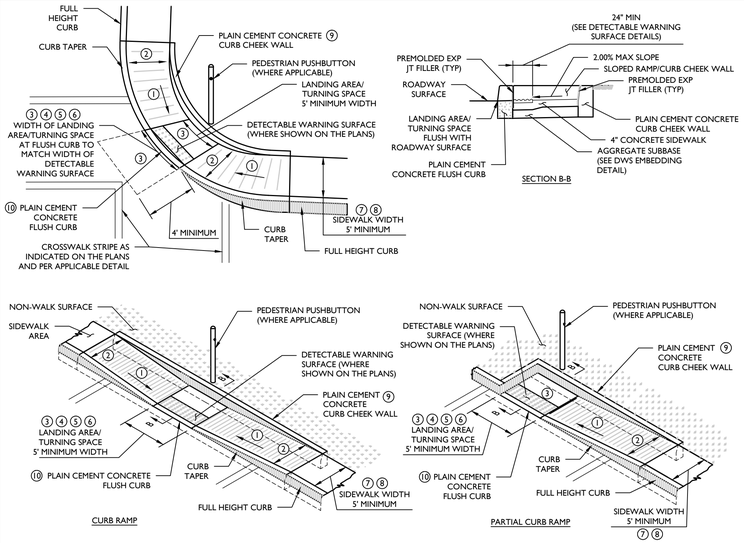
PROJECT NUMBER: 16001030B
DRAWING NAME: C-DTLS

SHEET TITLE: CONSTRUCTION DETAILS

SHEET NUMBER: 14 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\Site Plans\C-DTLS.dwg|C-14 DETAILS By: CHRIS.MESZLER

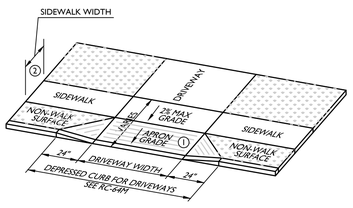


NOTES:

1. 8.33% MAX RAMP SLOPE, TO AVOID CHASING GRADE INDEFINITELY WHEN TRAVERSING THE HEIGHT OF CURB, RAMP LENGTH NOT TO EXCEED 15'-0". ADJUST RAMP SLOPE AS NEEDED TO PROVIDE ACCESS TO THE MAXIMUM EXTENT FEASIBLE.
2. SLOPE: ZERO ± 2.00%
3. CURB RAMPS REQUIRE A 4' x 4' MINIMUM LANDING AREA/TURNING SPACE WITH A MAXIMUM CROSS SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SEE DETAILS FOR LOCATIONS AND DIMENSIONS.
4. LANDING AREA AT THE TOP AND BOTTOM OF THE CURB RAMP (AKA. CLEAR OR TURNING SPACE) MUST BE KEPT CLEAR OF OBSTRUCTIONS. THE LANDING AREA IS TO BE 4' X 4' MINIMUM AND MATCH THE WIDTH OF THE CURB RAMP, INCREASED THE DEPTH OF MINIMUM LANDING AREA TO 5 FEET IF CONSTRAINED AT THE BACK OF THE SIDEWALK.
5. THE LANDING AREA MUST HAVE AN ABSOLUTE MINIMUM SLOPE OF 0.5% AND A MAXIMUM SLOPE OF 2%, WHEREAS 1.0% TO 1.5% IS THE DESIRED DESIGN SLOPE IN THE DIRECTION OF TRAVEL AND FOR THE CROSS SLOPE.
6. ASSISTANT DISTRICT EXECUTIVE APPROVAL REQUIRED IF TURNING SPACE IS NOT ENTIRELY ON SIDEWALK.
7. SIDEWALK CROSS SLOPE MUST BE A MINIMUM OF 1% AND MAXIMUM 2%, WHEREAS 1.5% IS THE DESIRED DESIGN CROSS SLOPE. SIDEWALK BEYOND LANDING AREA MUST HAVE A MINIMUM 1% TO MAXIMUM 5% OF LONGITUDINAL SLOPE IN THE DIRECTION OF TRAVEL, AND A 1% TO 2% MAX. CROSS SLOPE.
8. SIDEWALK WIDTH MAY BE REDUCED TO 4'-0", WHEN PASSING AREAS 5'-0" X 5'-0" ARE PROVIDED EVERY 200'.
9. CHEEK WALLS ARE PERMITTED WHEN ADJACENT TO NON-WALK AREAS OR ELEVATION DIFFERENCES CANNOT BE ACCOMMODATED BY FLARES OR GRADING. GRADE GRASS AREAS OR OTHER NON-WALK AREAS AT 3:1 OR FLATTER, DO NOT INSTALL CHEEK WALLS THAT INTERSECT THE PEDESTRIAN PATH.
10. GUTTER SLOPE THE ALONG CURB RAMP MUST MAINTAIN POSITIVE DRAINAGE WITH A 1.0 % TO 1.5% GUTTER SLOPE PREFERRED, WHEREAS 0.5% AS THE ABSOLUTE MINIMUM AND 2.0% IS MAXIMUM ALONG THE LENGTH OF THE FLUSH CURB.

TYPE 2 CURB RAMP DETAIL

NOT TO SCALE MCPA-SITE-HADA-1100 12/01/20

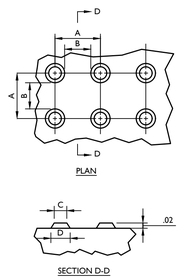


NOTES:

1. 8.00% MAX CHANGE IN GRADE BETWEEN ROAD SURFACE AND DRIVEWAY.
2. MINIMUM SIDEWALK WIDTH 5'-0". SIDEWALK WIDTH MAY BE REDUCED TO 4'-0", WHEN PASSING AREAS 5'-0" X 5'-0" ARE PROVIDED EVERY 200'.

TYPE 1 DRIVEWAY APRON DETAIL

NOT TO SCALE MCPA-SITE-HADA-1002 05/01/18



TRUNCATED DOME DIMENSIONS		
DIM	MIN mm (inch)	MAX mm (inch)
A	1.6"	2.4"
B	0.65"	1.5"
C	NOTE 1	NOTE 1
D	0.9"	1.4"

NOTES:

1. THE "C" DIMENSION IS 50% TO 65% OF THE "D" DIMENSION.

DETECTABLE WARNING SURFACE (DWS) TRUNCATED DOME DETAIL

NOT TO SCALE MCPA-SITE-HADA-1601 05/01/18

ADA GENERAL NOTES

MCPA-SITE-HADA-1700 12/01/20

1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTIONS 350, 409, 630, 676, 694, AND 695.
2. PROVIDE EXPANSION JOINT MATERIAL1/2" THICK WHERE CURB RAMP ADJOINS ANY RIGID PAVEMENT, SIDEWALK OR STRUCTURE WITH THE TOP OF JOINT FILLER FLUSH WITH ADJACENT CONCRETE SURFACE.
3. CONSTRUCT CURB RAMPS WITH A MINIMUM 4'-0" X 4'-0" CLEAR SPACE BEYOND THE CURB FACE, WITHIN THE WIDTH OF THE CROSSWALK AND WHOLLY OUTSIDE THE PARALLEL VEHICLE TRAVEL LANE. SEE SHEET 7 FOR CROSSWALK DETAILS.
4. SEAL JOINTS WITH AN APPROVED SEALING MATERIAL.
5. PROVIDE SLIP RESISTANT TEXTURE ON CURB RAMP BY COARSE BROOMING TRANSVERSE TO THE SLOPE OF THE RAMP. EXTEND TEXTURE THE FULL WIDTH AND LENGTH OF THE CURB RAMP INCLUDING SIDE FLARES.
6. MODIFY CONSTRUCTION DETAILS TO ADAPT DIMENSIONS TO EXISTING CURB HEIGHTS WHERE THE CURB IS LESS THAN THE STANDARD 8" HEIGHT.
7. CURB RAMP AND SIDE FLARE LENGTHS ARE VARIABLE AND BASED ON CURB HEIGHT AND THE SIDEWALK SLOPE.
8. TO AVOID CHASING GRADE INDEFINITELY WHEN TRAVERSING THE HEIGHT OF CURB, RAMP LENGTH NOT TO EXCEED 15'-0", ADJUST RAMP SLOPE AS NEEDED TO PROVIDE ACCESS TO THE MAXIMUM EXTENT FEASIBLE.
9. NON-WALK AREA IS AN OBSTRUCTED OR GRASS/NON-PAVED AREA ADJACENT TO THE PEDESTRIAN ACCESS ROUTE THAT IS NOT USED BY THE PEDESTRIAN FOR ACCESS.
10. THE DETAILS DEPICT PEDESTRIAN PUSHBUTTON POLES TO ILLUSTRATE THE RECOMMENDED PLACEMENT OF PEDESTRIAN PUSHBUTTONS. FOR ALTERATION PROJECTS, PROVIDE ACCESS TO EXISTING PEDESTRIAN PUSHBUTTONS TO THE MAXIMUM EXTENT FEASIBLE. INSTALL PEDESTRIAN PUSHBUTTON STUB POLES, WHERE APPLICABLE, SO AS NOT TO CREATE PEDESTRIAN OBSTRUCTIONS.
11. SEE TC-8803 FOR ADDITIONAL PEDESTRIAN PUSHBUTTON DETAILS NOT SHOWN.
12. ALIGN DETECTABLE WARNING SURFACE TRUNCATED DOMES ON A SQUARE GRID IN THE PREDOMINANT DIRECTION OF THE RAMP AND PERPENDICULAR TO CURB. SEE "DETECTABLE WARNING SURFACE (DWS) ON CURVED SURFACE" DETAIL FOR INSTALLATIONS ALONG CURVED SURFACES, IF APPLICABLE.
13. PROVIDE DETECTABLE WARNING SURFACES (DWS) 24" MINIMUM (IN THE DIRECTION OF PEDESTRIAN TRAVEL) ACROSS FULL WIDTH OF RAMP AT THE GRADE BREAK NEAR STREET EDGE. PROVIDE DWS THAT CONTRAST VISUALLY WITH ADJACENT WALKWAY SURFACES, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT FOR THE FULL WIDTH OF RAMP IN ACCORDANCE WITH LOCAL REQUIREMENTS.
14. FOR NEW CONSTRUCTION, DO NOT EXCEED 2.00% CROSS SLOPE ON THE CURB RAMP OR PEDESTRIAN ACCESS ROUTE.
15. FOR NEW CONSTRUCTION AND ALTERATIONS, CONSTRUCT CURB RAMP AND FLARE SLOPES WITH THE FLATTEST SLOPE POSSIBLE. THE SLOPES INDICATED IN THE DETAILS SHOW THE MAX SLOPE ALLOWABLE. SLOPES THAT EXCEED THOSE INDICATED IN THE DETAILS, OR CONTRACT DOCUMENTS AS APPLICABLE, WILL NOT BE ACCEPTED AND WILL BE RECONSTRUCTED.
16. CONSTRUCT SIDEWALKS AT A LONGITUDINAL SLOPE NOT TO EXCEED 5.00%. FOR ROADWAY PROFILE SLOPES THAT EXCEED 5.00%, CONSTRUCT PARALLEL SIDEWALKS ADJACENT TO ROADWAY AT A LONGITUDINAL SLOPE NOT TO EXCEED ROADWAY PROFILE SLOPE.
17. THE CHANGE IN GRADE AT THE BOTTOM OF THE CURB RAMP AND ADJOINING ROAD SURFACE IS NOT TO EXCEED AN ALGEBRAIC DIFFERENCE OF 13.33%. THE COUNTER SLOPE OF THE GUTTER ROAD AT THE FOOT OF A CURB RAMP, TURNING SPACE OR BLENDED TRANSITION IS NOT TO EXCEED 5.00%. SEE "CHANGE OF GRADE LIMITATIONS" DETAIL, IF APPLICABLE.
18. THE CONSTRUCTION STANDARDS DEPICTED ARE MOST APPROPRIATE FOR NEW CONSTRUCTION. ALL CONSTRUCTION MUST MEET THE STANDARDS CONTAINED HEREIN UNLESS OTHERWISE NOTED OR DIRECTED.
19. ALL SLOPES ARE MEASURED WITH RESPECT TO A LEVEL PLANE. THEREFORE, THE LENGTH OF RAMP IS NOT SOLELY DEPENDANT ON THE HEIGHT OF CURB. (FOR EXAMPLE, A 6" CURB DOES NOT NECESSARILY MEAN A RAMP LENGTH OF 6'-0" FOR A 12:1 SLOPE.
20. SIDEWALK WIDTH MAY BE REDUCED TO 4'-0", WHEN PASSING AREAS 5'-0" X 5'-0" ARE PROVIDED EVERY 200'.
21. THE TRAVEL LANE IS DEFINED BY THE OUTSIDE EDGE OF THE WHITE PAVEMENT MARKING LINE. IF A WHITE PAVEMENT MARKING LINE DOES NOT EXIST, THE TRAVEL LANE IS DEFINED BY THE CONTRACT DOCUMENTS.
22. CONSTRUCT FLUSH CURB FOR CURB RAMPS FLUSH TO ADJACENT ROADWAY. GRADE EDGE OF ROAD ELEVATIONS AT THE FLOW LINE TO ENSURE POSITIVE DRAINAGE AND PREVENT PONDING. FOR LEVEL TURNING SPACES BEHIND FLUSH CURB, ADJUST SLOPES TO PROVIDE POSITIVE DRAINAGE. AT THE JOINT BETWEEN FLUSH CURB AND ROADWAYS, REMOVE EXCESS JOINT SEALER AND COVER THE SEALED AREA WITH A LIGHT APPLICATION OF DRY SAND.
23. CHEEK WALLS ARE PERMITTED WHEN ADJACENT TO NON-WALK AREAS OR ELEVATION DIFFERENCES CANNOT BE ACCOMMODATED BY FLARES OR GRADING. GRADE GRASS AREAS OR OTHER NON-WALK AREAS AT 3:1 OR FLATTER. DO NOT INSTALL CHEEK WALLS THAT INTERSECT THE PEDESTRIAN PATH.
24. CONSTRUCT TOP OF PLAIN CEMENT CONCRETE FLUSH CURB TO BE FLUSH WITH ADJACENT SURFACES (RAMPS, SIDEWALKS, FLARES).
25. FOR CURB RAMPS THAT LEAD TO A SINGLE CROSSWALK, THE RAMP (EXCLUDING FLARES) TO BE FULLY INSIDE OF MARKED CROSSWALK LINES.
26. A 4'-0" MAXIMUM DIGITAL DISPLAY LEVEL WILL BE USED TO VERIFY THE SLOPES OF CURB RAMPS AND SIDEWALKS.
27. INSTALL DUMMY JOINTS WHERE RAMPS, TURNING SPACES, FLARES, AND SIDEWALKS ABUT.
28. CONSTRUCT FLUSH CURB SLOPE TO MATCH ROADWAY PROFILE AND HAVE A FLUSH CONNECTION. TRANSITION CURB RAMP CROSS SLOPE TO MATCH ROADWAY PROFILE AS GRADUALLY AS POSSIBLE. DO NOT EXCEED 3.00% PER 1'-0" CROSS SLOPE RATE OF CHANGE WHEN TRANSITIONING TO ROADWAY PROFILE.
29. DO NOT SCORE OR MAKE GROOVES ON SLOPED SURFACES. LINES SHOWN ON DETAILS ARE FOR ILLUSTRATION ONLY. SEE NOTE 5.
30. CONTRACTOR MUST PREPARE SHOP DRAWINGS OF EACH CURB RAMP FOR SUBMISSION AND APPROVAL OF THE UNDERSIGNED PROFESSIONAL AND THE MUNICIPAL, COUNTY, STATE OR OTHER AGENCY'S ENGINEER HAVING JURISDICTION. DEVIATIONS FROM THE CURB RAMP DETAILS REQUIRE WRITTEN APPROVAL OF THE UNDERSIGNED PROFESSIONAL AND THE MUNICIPAL, COUNTY, STATE OR OTHER AGENCY'S ENGINEER HAVING JURISDICTION.
31. ACCESSIBLE RAMPS:
    A. ON-SITE RAMP OR CURB RAMPS MUST BE INSTALLED IN CONFORMANCE WITH THE CURRENT ADA STANDARDS FOR ACCESSIBLE DESIGN AS PUBLISHED BY THE UNITED STATES DEPARTMENT OF JUSTICE AND MUST ALSO MEET OTHER APPLICABLE LOCAL AND STATE REQUIREMENTS IN EFFECT AT THE DATE OF CONSTRUCTION.
    B. PUBLIC RIGHT OF WAY ACCESSIBLE OR CURB RAMPS MUST BE INSTALLED PURSUANT WITH THE CURRENT UNITED STATES ACCESS BOARD "ACCESSIBILITY GUIDELINES FOR PEDESTRIAN FACILITIES IN THE PUBLIC RIGHT-OF-WAY" (PROWAG).
32. CURB RAMP SLOPE AS CONSTRUCTED IN THE DIRECTION OF TRAVEL CANNOT EXCEED 12H:1V. RAMP SLOPES OF 14H:1V ARE THE PREFERRED SLOPE TO MAINTAIN A LEVEL OF CONSTRUCTION TOLERANCE MINIMUM CURB RAMP CROSS-SLOPE IS TO BE 0.50%, MAXIMUM CANNOT EXCEED 2.00%.
33. CURB RAMP SIDE FLARE SLOPES ARE TO BE 14H:1V DESIRABLE, 12H:1V MAXIMUM, BUT MAY BE 10H:1V UPON APPROVAL OF THE ENGINEER. WHERE SIDE FLARES ARE NOT REQUIRED, PROVIDE AN 18" CURB TAPER TO THE FLUSH CURB PER THE DETAIL.
34. LANDING AREA AT THE TOP AND BOTTOM OF THE CURB RAMP (AKA. CLEAR OR TURNING SPACE) MUST BE KEPT CLEAR OF OBSTRUCTIONS. THE LANDING AREA IS TO BE 4' X 4' MINIMUM AND MATCH THE WIDTH OF THE CURB RAMP, INCREASED THE DEPTH OF MINIMUM LANDING AREA TO 5 FEET IF CONSTRAINED AT THE BACK OF THE SIDEWALK.
35. THE LANDING AREA MUST HAVE AN ABSOLUTE MINIMUM SLOPE OF 0.5% AND A MAXIMUM SLOPE OF 2%, WHEREAS 1.0% TO 1.5% IS THE DESIRED DESIGN SLOPE IN THE DIRECTION OF TRAVEL AND FOR THE CROSS SLOPE.
36. SIDEWALK CROSS SLOPE MUST BE A MINIMUM OF 1% AND MAXIMUM 2%, WHEREAS 1.5% IS THE DESIRED DESIGN CROSS SLOPE. SIDEWALK BEYOND LANDING AREA MUST HAVE A MINIMUM 1% TO MAXIMUM 5% OF LONGITUDINAL SLOPE IN THE DIRECTION OF TRAVEL, AND A 1% TO 2% MAX. CROSS SLOPE.
37. FLUSH CURB AT CURB RAMP MUST BE MINIMUM 4' WIDE AND FLUSH WITH PAVEMENT. THE SEGMENT OF FLUSH CURB MUST BE MADE WITH CONCRETE CURB REGARDLESS OF THE CURB MATERIAL USED THROUGHOUT THE SITE.
38. GUTTER SLOPE THE ALONG CURB RAMP MUST MAINTAIN POSITIVE DRAINAGE WITH A 1.0 % TO 1.5% GUTTER SLOPE PREFERRED, WHEREAS 0.5% AS THE ABSOLUTE MINIMUM AND 2.0% IS MAXIMUM ALONG THE LENGTH OF THE FLUSH CURB.
39. CROSSWALKS AND PAVEMENT MARKINGS MUST BE INSTALLED AS DENOTED ON SITE PLAN. CURB RAMP MUST BE WHOLLY CONTAINED WITHIN THE CROSSWALK CROSSING.
40. THE RAMP SURFACE MUST HAVE A SLIP RESISTANT, BROOM FINISH PERPENDICULAR TO THE PATH OF TRAVEL.
41. CONCRETE EXPANSION JOINTS MUST HAVE A FIRM SURFACE WITH ¼" BEVELED CONCRETE EDGES. THE JOINT SURFACE SHALL NOT BE MORE THAN ¼" BELOW THE ADJOINING CONCRETE SURFACE.
42. DETECTABLE WARNING SURFACES ARE TO BE PROVIDED AT CURB RAMPS, BLENDED TRANSITION AT PEDESTRIAN STREET CROSSINGS AND PEDESTRIAN REFUGE ISLANDS WHEN THOSE ARE WITHIN THE PUBLIC RIGHT-OF-WAY, AND WHERE AS SHOWN ON THE PLANS.

DETECTABLE WARNING SURFACE (DWS) NOTES

MCPA-SITE-HADA-1602 12/01/20

1. THE DETECTABLE WARNING SURFACE IS TO BE MANUFACTURED MATS THAT ARE EMBEDDED AND CAST-IN-PLACE IN THE CONCRETE.
2. IN LIEU OF A CAST IN PLACE DETECTABLE WARNING SURFACE, THE CONTRACTOR MAY UTILIZE A SURFACE APPLIED DETECTABLE WARNING SURFACE WITH PRIOR APPROVAL OF THE UNDERSIGNED ENGINEER AND PRIOR TO POURING OF THE CONCRETE RAMP.
3. THE CONTRACTOR MUST SUBMIT TO THE ENGINEER FOR APPROVAL A SHOP DRAWING OF THE DETECTABLE WARNING SURFACE PRIOR TO CONSTRUCTION.
4. THE CONTRACTOR MUST PROVIDE A MANUFACTURER CERTIFICATION THAT THE DETECTABLE WARNING SURFACE COMPLIES WITH THE CURRENT ADA STANDARDS FOR ACCESSIBLE DESIGN AS PUBLISHED BY THE DEPARTMENT OF JUSTICE AND THE ADA STANDARDS AS SUPPORTED BY THE UNITED STATES ACCESS BOARD, AND THE STATE AND/OR LOCAL ADA STANDARDS.
5. COLOR MUST BE AS APPROVED BY THE LOCAL JURISDICTION PRIOR TO INSTALLATION. DETECTABLE WARNING SURFACES MUST CONTRAST VISUALLY WITH ADJACENT WALKING SURFACES EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT. ALTERNATIVE COLOR MAY BE USED PROVIDED SUCH COLOR COMPLIES WITH CURRENT ADA STANDARDS.
6. DETECTABLE WARNINGS ARE TO CONSIST OF A SURFACE OF TRUNCATED DOMES.
7. TRUNCATED DOMES IN A DETECTABLE WARNING SURFACE MUST HAVE A BASE DIAMETER OF 0.9 INCH (23 mm) MINIMUM AND 1.4 INCHES (36 mm) MAXIMUM, A TOP DIAMETER OF 50 PERCENT OF THE BASE DIAMETER MINIMUM TO 65 PERCENT OF THE BASE DIAMETER MAXIMUM, AND A HEIGHT OF 0.2 INCH (5.1 mm).
8. TRUNCATED DOMES IN DETECTABLE WARNING SURFACE MUST HAVE A CENTER-TO-CENTER SPACING OF 1.6 INCHES (41 mm) MINIMUM AND 2.4 INCHES (61 mm) MAXIMUM, AND A BASE-TO-BASE SPACING OF 0.65 INCH (17 mm) MINIMUM, MEASURED BETWEEN THE MOST ADJACENT DOMES ON A SQUARE GRID.
9. SOME DETECTABLE WARNING PRODUCTS REQUIRE A CONCRETE BORDER FOR PROPER INSTALLATION. WHERE REQUIRED BY THE MANUFACTURER, THE CONCRETE BORDER MUST NOT EXCEED 2 INCHES (51 mm).
10. DETECTABLE WARNING SURFACES ARE NOT BE PLACED ON PAVING OR EXPANSION JOINTS AT CURB RAMPS. THE ROWS OF TRUNCATED DOMES IN DETECTABLE WARNING SURFACES ARE TO BE ALIGNED PERPENDICULAR TO THE GRADE BREAK BETWEEN THE RAMP RUN AND THE STREET SO PEDESTRIANS WHO USE WHEELCHAIRS CAN "TRACK" BETWEEN THE DOMES.
11. ON PERPENDICULAR CURB RAMPS, DETECTABLE WARNING SURFACES ARE TO BE PLACED AS FOLLOWS:
    a. WHERE THE ENDS OF THE BOTTOM GRADE BREAK ARE IN FRONT OF THE BACK OF CURB, DETECTABLE WARNING SURFACES ARE TO BE PLACED AT THE BACK OF CURB.
    b. WHERE THE ENDS OF THE BOTTOM GRADE BREAK ARE BEHIND THE BACK OF CURB AND THE DISTANCE FROM EITHER END OF THE BOTTOM GRADE BREAK TO THE BACK OF CURB IS 5.0 FT OR LESS, DETECTABLE WARNING SURFACES ARE TO BE PLACED ON THE RAMP RUN WITHIN ONE DOME SPACING OF THE BOTTOM GRADE BREAK.
    c. WHERE THE ENDS OF THE BOTTOM GRADE BREAK ARE BEHIND THE BACK OF CURB AND THE DISTANCE FROM EITHER END OF THE BOTTOM GRADE BREAK TO THE BACK OF CURB IS MORE THAN 5.0 FT, DETECTABLE WARNING SURFACES ARE TO BE PLACED ON THE LOWER LANDING AT THE BACK OF CURB.
12. ON PARALLEL CURB RAMPS, DETECTABLE WARNING SURFACES ARE TO BE PLACED ON THE TURNING SPACE AT THE FLUSH TRANSITION BETWEEN THE STREET AND SIDEWALKS.
13. ON BLENDED TRANSITIONS, DETECTABLE WARNING SURFACES ARE TO BE PLACED AT THE BACK OF CURB, WHERE RAISED PEDESTRIAN STREET CROSSINGS, DEPRESSED CORNERS OR OTHER LEVEL PEDESTRIAN STREET CROSSINGS ARE PROVIDED, DETECTABLE WARNING SURFACES ARE TO BE PLACED AT THE FLUSH TRANSITION BETWEEN THE STREET AND THE SIDEWALK.

ADA INSTRUCTIONS TO CONTRACTOR

MCPA-SITE-HADA-1800 12/01/20

1. CONTRACTOR MUST EXERCISE APPROPRIATE CARE AND PRECISION IN CONSTRUCTION OF ADA (HANDICAPPED) ACCESSIBLE COMPONENTS FOR THE SITE/PROJECT. THESE COMPONENTS, AS CONSTRUCTED, MUST COMPLY WITH THE LATEST FEDERAL ADA STANDARDS FOR ACCESSIBLE DESIGN, AND CONSTRUCTION WITHIN THE PUBLIC RIGHT-OF-WAY MUST COMPLY WITH THE LATEST FEDERAL PROPOSED "ASSESSIBILITY GUIDELINES FOR PEDESTRIAN FACILITIES IN THE PUBLIC RIGHT-OF-WAY" (PROWAG).
2. FINISHED SURFACES ALONG THE ACCESSIBLE ROUTE OF TRAVEL FROM PARKING SPACE, PUBLIC TRANSPORTATION, PEDESTRIAN ACCESS, INTER-BUILDING ACCESS, TO POINTS OF ACCESSIBLE BUILDING ENTRANCE/EGRESS, MUST COMPLY WITH THESE ADA CODE REQUIREMENTS AND ANY SUPPLEMENTAL STATE REQUIREMENTS. THESE INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:

   (NOTE: THIS LIST IS NOT INTENDED TO CAPTURE EVERY APPLICABLE FEDERAL, STATE AND LOCAL RULE AND REGULATION. THE CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH THE LAW, WHETHER OR NOT STATED SPECIFICALLY HEREIN):

   A. PARKING SPACES AND PARKING AISLES - SLOPE MUST NOT EXCEED 1:48 (1/4" PER FOOT OR NORMALLY 2.0%) IN ANY DIRECTION.
   B. CURB RAMPS- SLOPES MUST NOT EXCEED 1:12 (8.3%).
   C. LANDINGS
      i. LANDINGS AT CURB RAMPS - MUST BE 4 FT. MIN., X 4 FT. MIN. AND ARE TO BE INCREASED TO 5 FEET WHERE THE LANDING SPACE (TURNING SPACE) IS CONSTRAINED AT THE BACK OF THE SIDEWALK.
      ii. LANDINGS AT RAMPS - MUST BE 5 FT MIN. IN THE DIRECTION OF TRAVEL AND BE PROVIDED AT EACH END OF THE RAMP, MUST PROVIDE POSITIVE DRAINAGE (1 % MIN.), AND MUST NOT EXCEED 1:48 (1/4" PER FOOT OR NORMALLY 2.0%) IN ANY DIRECTION. WHEN LANDING IS ALSO A TURNING SPACE, IT MUST BE A MINIMUM 5 FT X 5 FT.
      iii. LANDINGS AT DOORWAYS - SEE NOTE F BELOW.
   D. PATH OF TRAVEL ALONG ON-SITE ACCESSIBLE ROUTE - MUST PROVIDE A 36 INCH (EXCLUDING THE CURB) OR GREATER UNOBSTRUCTED WIDTH OF TRAVEL, (CAR OVERHANGS MUST NOT REDUCE THIS MINIMUM WIDTH), IN A PUBLIC RIGHT-OF-WAY, THE MINIMUM WIDTH EXCLUDING THE CURB IS 4 FT. THE SLOPE MUST BE NO GREATER THAN 1:20 (5.0%) IN THE DIRECTION OF TRAVEL AND MUST NOT EXCEED 1:48 (1/4" PER FOOT OR NORMALLY 2.0%) IN CROSS SLOPE.
   E. WHERE PATH OF TRAVEL WILL BE GREATER THAN 1:20 (5.0%), AN ADA RAMP, WITH A MAXIMUM SLOPE OF 1:12 (8.3%), FOR A MAXIMUM RISE OF 30 INCHES, MUST BE PROVIDED. THE RAMP MUST HAVE A MINIMUM CLEAR WIDTH OF 36 INCHES, HAVE ADA HAND RAILS AND LANDINGS (MIN. 5 FT. LONG IN THE DIRECTION OF TRAVEL) ON EACH END THAT ARE SLOPED A MIN. 1 % AND NO MORE THAN 1:48 (1/4" PER FOOT OR NOMINALLY 2.0%) FOR POSITIVE DRAINAGE.
   F. EXTERIOR DOORWAYS - MUST HAVE A "LEVEL" LANDING AREA ON THE EXTERIOR SIDE OF THE DOOR THAT IS SLOPED NO MORE THAN 1:48 (1/4" PER FOOT OR NORMALLY 2.0%) FOR POSITIVE DRAINAGE. THIS LANDING AREA IS GENERALLY 5 FT X 5 FT, EXCEPT WHERE OTHERWISE PERMITTED BY ADA STANDARDS. (SEE APPLICABLE CODE SECTIONS).
3. IT IS RECOMMENDED THAT THE CONTRACTOR REVIEW THE INTENDED CONSTRUCTION WITH THE LOCAL BUILDING CODE OFFICIAL, INCLUDING WHETHER OR NOT FALL PROTECTION IS REQUIRED.
4. IT IS RECOMMENDED THAT THE CONTRACTOR CHECK THE SLOPE OF FORMWORK FOR COMPLIANCE WITH ADA STANDARDS PRIOR TO POURING CONCRETE.

REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

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COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER: 16001030B
DRAWING NAME: C-DTLS

SHEET TITLE: CONSTRUCTION DETAILS

SHEET NUMBER: 15 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\Site Plans\C-DTLS.dwg/C-11-DETAILS By: CHRIS.MESZLER

CULTEC RECHARGER® 360HD PRODUCT SPECIFICATIONS

GENERAL
CULTEC RECHARGER® 360HD CHAMBERS ARE DESIGNED FOR UNDERGROUND STORMWATER MANAGEMENT. THE CHAMBERS MAY BE USED FOR RETENTION, RECHARGING, DETENTION OR CONTROLLING THE FLOW OF ON-SITE STORMWATER RUNOFF.

CHAMBER PARAMETERS
1. THE CHAMBERS SHALL BE MANUFACTURED IN THE U.S.A. OR CANADA BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE CHAMBERS SHALL BE DESIGNED AND TESTED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". THE LOAD CONFIGURATION SHALL INCLUDE:
   A. INSTANTANEOUS AASHTO DESIGN TRUCK LIVE LOAD AT MINIMUM COVER
   B. MAXIMUM PERMANENT (50-YEAR) COVER LOAD
   C. 1-WEEK PARKED AASHTO DESIGN TRUCK LOAD
3. THE CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F3430-20 "STANDARD SPECIFICATION FOR CELLULAR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12, WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS. THE STRUCTURAL DESIGN OF THE CHAMBERS SHALL INCLUDE THE FOLLOWING:
   A. THE CREEP MODULUS SHALL BE 50-YEAR AS SPECIFIED IN ASTM F3430
   B. THE MINIMUM SAFETY FACTOR FOR LIVE LOADS SHALL BE 1.75
   C. THE MINIMUM SAFETY FACTOR FOR DEAD LOADS SHALL BE 1.95
5. THE CHAMBER SHALL BE STRUCTURAL FOAM INJECTION MOLDED OF BLUE VIRGIN HIGH MOLECULAR WEIGHT IMPACT-MODIFIED POLYPROPYLENE.
6. THE CHAMBER SHALL BE ARCHED IN SHAPE.
7. THE CHAMBER SHALL BE OPEN-BOTTOMED.
8. THE CHAMBER SHALL BE JOINED USING AN INTERLOCKING OVERLAPPING RIB METHOD. CONNECTIONS MUST BE FULLY SHOULDERED OVERLAPPING RIBS, HAVING NO SEPARATE COUPLINGS.
9. THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC RECHARGER® 360HD SHALL BE 36 INCHES (915 mm) TALL, 60 INCHES (1525 mm) WIDE AND 50 INCHES (1275 mm) LONG. THE INSTALLED LENGTH OF A JOINED RECHARGER® 360HD SHALL BE 3.67 FEET (1.12 m).
10. MULTIPLE CHAMBERS MAY BE CONNECTED TO FORM DIFFERENT LENGTH ROWS. EACH ROW SHALL BEGIN AND END WITH A SEPARATELY FORMED CULTEC RECHARGER® 360HD END CAP. MAXIMUM INLET OPENING ON THE END CAP IS 24 INCH (600 mm) HDPE OR 30 INCH (750mm) PVC.
11. THE CHAMBER SHALL HAVE TWO SIDE PORTALS TO ACCEPT CULTEC HVLV™ FC-48 FEED CONNECTORS TO CREATE AN INTERNAL MANIFOLD. MAXIMUM ALLOWABLE PIPE SIZE IN THE SIDE PORTAL IS 10 INCH (250mm) HDPE OR 12 INCH (300mm) PVC.
12. THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC HVLV™ FC-48 FEED CONNECTOR SHALL BE 12 INCHES (305 mm) TALL, 16 INCHES (406 mm) WIDE AND 49 INCHES (1245 mm) LONG.
13. THE NOMINAL STORAGE VOLUME OF THE RECHARGER® 360HD CHAMBER SHALL BE 10.0 FT³ / FT (.928 m³ / m) - WITHOUT STONE. THE NOMINAL STORAGE VOLUME OF A JOINED RECHARGER® 360HD SHALL BE 36.66 FT³ / UNIT (1.038 m³ / UNIT) - WITHOUT STONE.
14. THE NOMINAL STORAGE VOLUME OF THE HVLV™ FC-48 FEED CONNECTOR SHALL BE 0.913 FT³ / FT (0.085 m³ / m) - WITHOUT STONE.
15. THE RECHARGER® 360HD CHAMBER SHALL HAVE 7 CORRUGATIONS.
16. THE CHAMBER SHALL BE MANUFACTURED IN A FACILITY EMPLOYING CULTEC'S QUALITY CONTROL AND ASSURANCE PROCEDURES.
17. MAXIMUM ALLOWABLE COVER OVER THE TOP OF THE CHAMBER SHALL BE 12.0 FEET (3.66 m).

END CAP PARAMETERS
1. THE CULTEC RECHARGER® 360HD END CAP (REFERRED TO AS 'END CAP') SHALL BE MANUFACTURED IN THE U.S.A. OR CANADA BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE END CAP SHALL BE STRUCTURAL FOAM INJECTION MOLDED OF BLUE VIRGIN HIGH MOLECULAR WEIGHT IMPACT-MODIFIED POLYPROPYLENE.
3. THE END CAP SHALL BE ARCHED IN SHAPE.
4. THE END CAP SHALL BE OPEN-BOTTOMED.
5. THE END CAP SHALL BE JOINED AT THE BEGINNING AND END OF EACH ROW OF CHAMBERS USING AN INTERLOCKING OVERLAPPING RIB METHOD. CONNECTIONS MUST BE FULLY SHOULDERED OVERLAPPING RIBS, HAVING NO SEPARATE COUPLINGS.
6. THE END CAP SHALL HAVE 5 CORRUGATIONS.
7. THE NOMINAL DIMENSIONS OF THE END CAP SHALL BE 36.5 INCHES (927 mm) TALL, 60 INCHES (1525 mm) WIDE AND 18 INCHES (458 mm) LONG. WHEN JOINED WITH A RECHARGER 360HD CHAMBER, THE INSTALLED LENGTH OF THE END CAP SHALL BE 15 INCHES (381 mm).
8. THE NOMINAL STORAGE VOLUME OF THE END CAP SHALL BE 5.17 FT³ / FT (0.48 m³ / m) - WITHOUT STONE. THE NOMINAL STORAGE VOLUME OF AN INTERLOCKED END CAP SHALL BE 6.46 FT³ / UNIT (0.183 m³ / UNIT) - WITHOUT STONE.
9. MAXIMUM INLET OPENING ON THE END CAP IS 24 INCH (600 mm) HDPE OR 30 INCH (750mm) PVC.
10. THE CHAMBER SHALL BE MANUFACTURED IN A FACILITY EMPLOYING CULTEC'S QUALITY CONTROL AND ASSURANCE PROCEDURES
11. THE END CAP SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12.

CULTEC HVLV FC-48 FEED CONNECTOR PRODUCT SPECIFICATIONS

GENERAL
CULTEC HVLV FC-48 FEED CONNECTORS ARE DESIGNED TO CREATE AN INTERNAL MANIFOLD FOR CULTEC RECHARGER MODEL 360HD STORMWATER CHAMBERS.

FEED CONNECTOR PARAMETERS
1. THE FEED CONNECTOR SHALL BE MANUFACTURED BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE FEED CONNECTOR SHALL BE VACUUM THERMOFORMED OF BLACK HIGH MOLECULAR WEIGHT HIGH DENSITY POLYETHYLENE (HMWHDPE).
3. THE FEED CONNECTOR SHALL BE ARCHED IN SHAPE.
4. THE FEED CONNECTOR SHALL BE OPEN-BOTTOMED.
5. THE NOMINAL DIMENSIONS OF THE CULTEC HVLV FC-48 FEED CONNECTOR SHALL BE 12 INCHES (305 mm) TALL, 16 INCHES (406 mm) WIDE AND 49 INCHES (1245 mm) LONG.
6. THE NOMINAL STORAGE VOLUME OF THE HVLV FC-48 FEED CONNECTOR SHALL BE 0.913 FT³ / FT (0.085 m³ / m) - WITHOUT STONE.
7. THE HVLV FC-48 FEED CONNECTOR SHALL HAVE 4 CORRUGATIONS.
8. THE HVLV FC-48 FEED CONNECTOR MUST BE FORMED AS A WHOLE UNIT HAVING TWO OPEN END WALLS AND HAVING NO SEPARATE END PLATES OR SEPARATE END WALLS. THE UNIT SHALL FIT INTO THE SIDE PORTALS OF THE CULTEC RECHARGER STORMWATER CHAMBER AND ACT AS CROSS FEED CONNECTIONS CREATING AN INTERNAL MANIFOLD.
9. THE FEED CONNECTOR SHALL BE DESIGNED TO WITHSTAND AASHTO HS-25 DEFINED LOADS WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS.
10. THE FEED CONNECTOR SHALL BE MANUFACTURED IN AN ISO 9001:2008 CERTIFIED FACILITY.

CULTEC NO. 410™ NON-WOVEN GEOTEXTILE

CULTEC NO. 410™ NON-WOVEN GEOTEXTILE MAY BE USED WITH CULTEC CONTACTOR® AND RECHARGER® STORMWATER INSTALLATIONS TO PROVIDE A BARRIER THAT PREVENTS SOIL INTRUSION INTO THE STONE.

GEOTEXTILE PARAMETERS
1. THE GEOTEXTILE SHALL BE PROVIDED BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE GEOTEXTILE SHALL BE BLACK IN APPEARANCE.
3. THE GEOTEXTILE SHALL HAVE A TYPICAL WEIGHT OF 4.5 OZ/SY (142 G/M).
4. THE GEOTEXTILE SHALL HAVE A TENSILE STRENGTH VALUE OF 120 LBS (533 N) PER ASTM D4632 TESTING METHOD.
5. THE GEOTEXTILE SHALL HAVE AN ELONGATION @ BREAK VALUE OF 50% PER ASTM D4632 TESTING METHOD.
6. THE GEOTEXTILE SHALL HAVE A MULLEN BURST VALUE OF 225 PSI (1551 KPA) PER ASTM D3786 TESTING METHOD.
7. THE GEOTEXTILE SHALL HAVE A PUNCTURE STRENGTH VALUE OF 65 LBS (289 N) PER ASTM D4833 TESTING METHOD.
8. THE GEOTEXTILE SHALL HAVE A CBR PUNCTURE VALUE OF 340 LBS (1513 N) PER ASTM D6241 TESTING METHOD.
9. THE GEOTEXTILE SHALL HAVE A TRAPEZOID TEAR VALUE OF 50 LBS (222 N) PER ASTM D4533 TESTING METHOD.
10. THE GEOTEXTILE SHALL HAVE A AOS VALUE OF 70 U.S. SIEVE (0.212 MM) PER ASTM D4751 TESTING METHOD.
11. THE GEOTEXTILE SHALL HAVE A PERMITTIVITY VALUE OF 1.7 SEC-1 PER ASTM D4491 TESTING METHOD.
12. THE GEOTEXTILE SHALL HAVE A WATER FLOW RATE VALUE OF 135 GAL/MIN/SF (5500 L/MIN/SM) PER ASTM D4491 TESTING METHOD.
13. THE GEOTEXTILE SHALL HAVE A UV STABILITY @ 500 HOURS VALUE OF 70% PER ASTM D4355 TESTING METHOD.

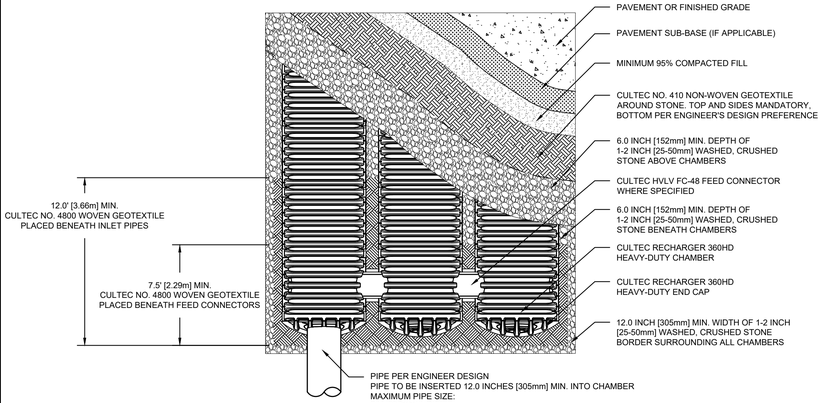
CULTEC NO. 4800™ WOVEN GEOTEXTILE

CULTEC NO. 4800 WOVEN GEOTEXTILE IS DESIGNED AS A UNDERLAYMENT TO PREVENT SCOURING CAUSED BY WATER MOVEMENT WITHIN THE CULTEC CHAMBERS AND FEED CONNECTORS UTILIZING THE CULTEC MANIFOLD FEATURE. IT MAY ALSO BE USED AS A COMPONENT OF THE CULTEC SEPARATOR ROW TO ACT AS A BARRIER TO PREVENT SOIL/CONTAMINANT INTRUSION INTO THE STONE WHILE ALLOWING FOR MAINTENANCE.

GEOTEXTILE PARAMETERS
1. THE GEOTEXTILE SHALL BE PROVIDED BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE GEOTEXTILE SHALL BE BLACK IN APPEARANCE.
3. THE GEOTEXTILE SHALL HAVE A TENSILE STRENGTH OF 550 X 550 LBS (2,448 X 2,448 N) PER ASTM D4632 TESTING METHOD.
4. THE GEOTEXTILE SHALL HAVE A ELONGATION @ BREAK RESISTANCE OF 20 X 20% PER ASTM D4632 TESTING METHOD.
5. THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE OF 5,070 X 5,070 LBS/FT (74 X 74 KN/M) PER ASTM D4595 TESTING METHOD.
6. THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE @ 2% STRAIN OF 960 X 1,096 LBS/FT (14 X 16 KN/M) PER ASTM D4595 TESTING METHOD.
7. THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE @ 5% STRAIN OF 2,740 X 2, 740 LBS/FT (40 X 40 KN/M) PER ASTM D4595 TESTING METHOD.
8. THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE @ 10% STRAIN OF 4,800 X 4,800 LBS/FT (70 X 70 KN/M) PER ASTM D4595 TESTING METHOD.
9. THE GEOTEXTILE SHALL HAVE A CBR PUNCTURE RESISTANCE OF 1,700 LBS (7,560 N) PER ASTM D6241 TESTING METHOD.
10. THE GEOTEXTILE SHALL HAVE A TRAPEZOIDAL TEAR RESISTANCE OF 180 X 180 LBS (801 X 801 N) PER ASTM D4533 TESTING METHOD.
11. THE GEOTEXTILE SHALL HAVE AN APPARENT OPENING SIZE OF 40 US STD. SIEVE (0.425 MM) PER ASTM D4751 TESTING METHOD.
12. THE GEOTEXTILE SHALL HAVE A PERMITTIVITY RATING OF 0.15 SEC-1 PER ASTM D4491 TESTING METHOD.
13. THE GEOTEXTILE SHALL HAVE A WATER FLOW RATING OF 11.5 GPM/FT2 (470 LPM/M2) PER ASTM D4491 TESTING METHOD.
14. THE GEOTEXTILE SHALL HAVE A UV RESISTANCE OF 80% @ 500 HRS. PER ASTM D4355 TESTING METHOD.

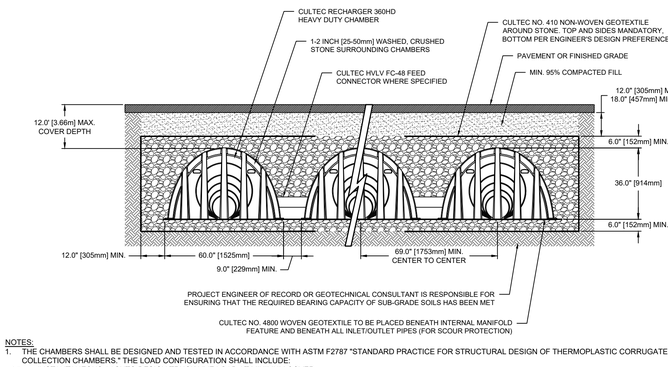
360HD 1.0

GENERAL NOTES



360HD 2.0

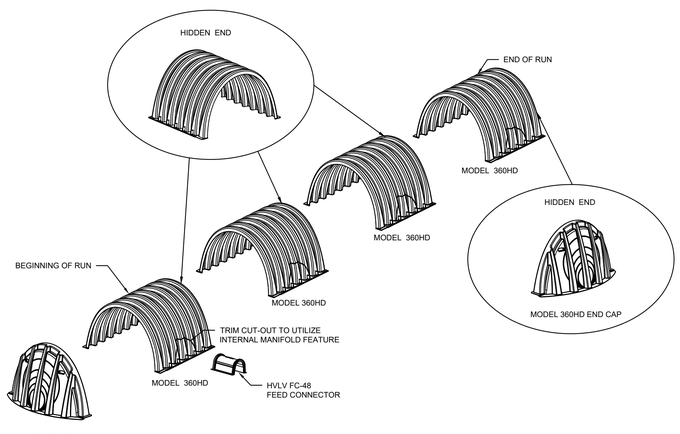
CULTEC RECHARGER 360HD HEAVY DUTY PLAN VIEW



NOTES:
1. THE CHAMBERS SHALL BE DESIGNED AND TESTED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS." THE LOAD CONFIGURATION SHALL INCLUDE:
   1.a. INSTANTANEOUS AASHTO DESIGN TRUCK LIVE LOAD AT MINIMUM COVER
   1.b. MAXIMUM PERMANENT (50-YEAR) COVER LOAD
   1.c. 1-WEEK PARKED AASHTO DESIGN TRUCK LOAD
2. THE CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F3430-20 "STANDARD SPECIFICATION FOR CELLULAR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS"
3. THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12, WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS. THE STRUCTURAL DESIGN OF THE CHAMBERS SHALL INCLUDE THE FOLLOWING:
   3.a. THE CREEP MODULUS SHALL BE 50-YEAR AS SPECIFIED IN ASTM F3430
   3.b. THE MINIMUM SAFETY FACTOR FOR LIVE LOADS SHALL BE 1.75
   3.c. THE MINIMUM SAFETY FACTOR FOR DEAD LOADS SHALL BE 1.95

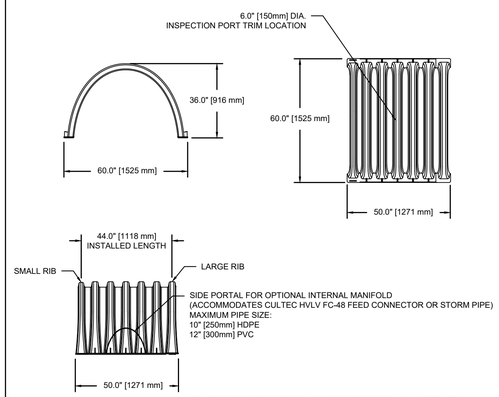
360HD 5.0

CULTEC RECHARGER 360HD HEAVY DUTY CROSS SECTION



360HD 6.0

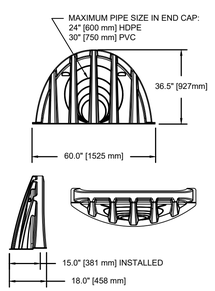
CULTEC RECHARGER 360HD HEAVY DUTY TYPICAL INTERLOCK



CULTEC RECHARGER 360HD CHAMBER STORAGE = 10.0 CF/FT [.928m³/m]
CHAMBER STORAGE VOLUME = 36.66 CF [1.038m³]
INSTALLED LENGTH ADJUSTMENT = 0.50' [0.15m]
SIDE PORTAL ACCEPTS CULTEC HVLV FC-48 FEED CONNECTOR

360HD 3.0

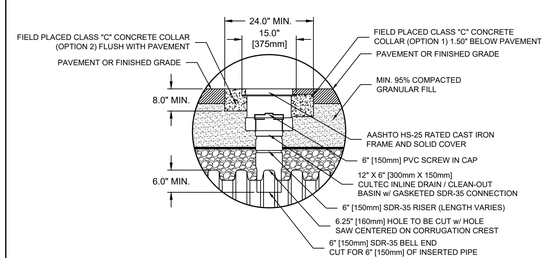
CULTEC RECHARGER 360HD HEAVY DUTY THREE VIEW



CULTEC RECHARGER 360HD END CAP
STORAGE = 5.17 CF/FT [0.48 m³/m]
END CAP STORAGE VOLUME = 6.46 CF [0.183 m3]
INSTALLED LENGTH ADJUSTMENT = 0.25' [0.08 m]

360HD 4.0

CULTEC RECHARGER 360HD HEAVY DUTY END CAP THREE VIEW



360HD 9.0

CULTEC INSPECTION PORT - ZOOM DETAIL

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — C. RICHARD ROSEBERRY — ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

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AS SHOWN	03/01/2022	SF/CMM	RMA

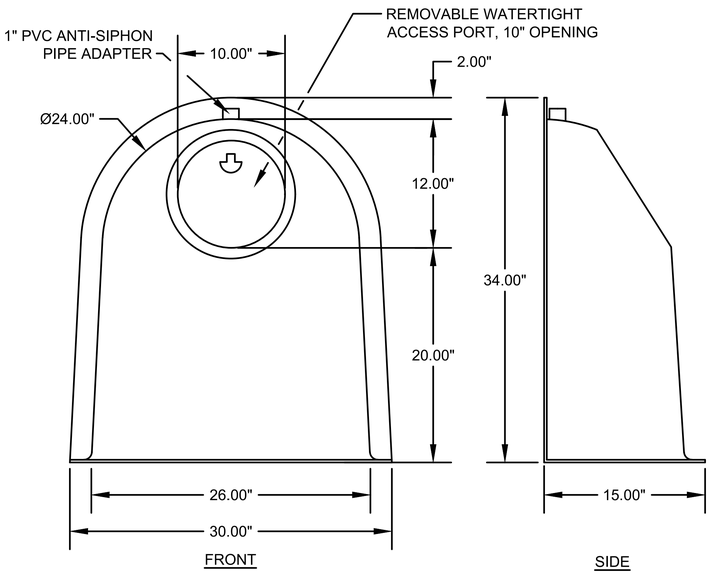
PROJECT NUMBER: 160010308 | DRAWING NAME: C-DTLS

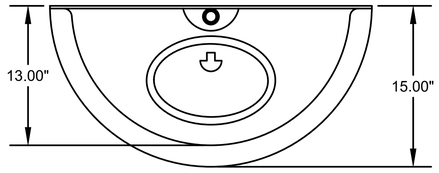
SHEET TITLE: CONSTRUCTION DETAILS

SHEET NUMBER: 16 of 27

2016\160010308\Engineering\Site Plans\C-DTLS.dwg|C-1 ED-ETAILS By: CHRIS.METZLER

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.





PLAN

U.S.PATENT #6126817 ADDITIONAL PATENTS PENDING

BMP, INC.

53 MT. ARCHER ROAD, LYME, CT. 06371
(800) 504-8008 FAX: (860)434-3195

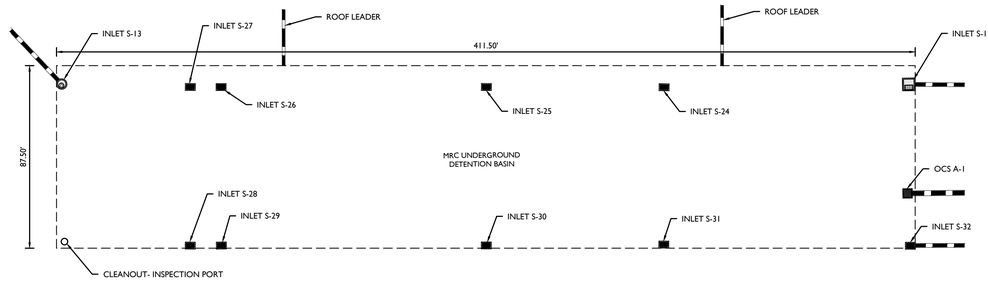
DESCRIPTION	DATE	SCALE
24F SNOUT OIL & DEBRIS STOP	09/20/99	NONE
	DRAWING NUMBER	
	24F	

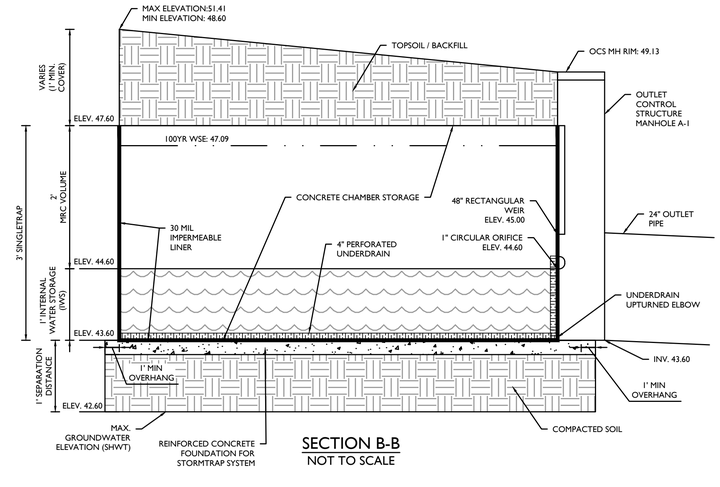
SNOUT BMP CONSTRUCTION SEQUENCE:

1. STABILIZE ALL CONTRIBUTING AREAS BEFORE INSTALLING AND CONNECTING PIPES TO THESE INLETS.
2. FOLLOW MANUFACTURER'S GUIDELINES FOR INSTALLATION. DO NOT USE SNOUTS DURING CONSTRUCTION UNLESS PRODUCT IS DESIGNED PRIMARILY FOR SEDIMENT REMOVAL.

SNOUT BMP MANUFACTURER'S INSTALLATION INSTRUCTIONS:

1. CENTER THE SNOUT® DIRECTLY OVER THE EXIT PIPE SO THAT THE ENTIRE PIPE IS COVERED AND SO THAT THE LOWER EDGE OF THE HOOD IS AT LEAST 1/2 THE PIPE DIAMETER BELOW THE LOWEST INSIDE POINT OF THE PIPE (DEEPER IS EVEN BETTER.)
2. DRILL * EQUALLY SPACED 7/16" HOLES THROUGH THE SNOUT® FLANGE. (*NUMBER OF HOLES VARY DEPENDING ON SIZE OF SNOUT®.)
3. MARK AND DRILL CATCH BASIN AND INSTALL THE TAMP-IN LEAD ANCHORS.
   - 3.1. DRILL A 3/4"HOLE INTO THE BASE MATERIAL TO THE REQUIRED DEPTH (APPROXIMATELY 1-1/4" DEEP.)
   - 3.2. BLOW THE HOLE CLEAN OF DUST AND OTHER MATERIAL.
   - 3.3. INSERT THE ANCHOR INTO THE HOLE. NARROW END OF CONE MUST POINT OUT. LEAD SHIELD SLIDES OVER CONE.
   - 3.4. POSITION THE SETTING TOOL OR A 9/16 SOCKET AGAINST THE ANCHOR OUTER CONE. (THE OUTER RIM OF THE TOOL OR SOCKET SHOULD SEAT ONTO THE LEAD SHIELD RIM.) SET THE ANCHOR BY DRIVING THE LEAD SLEEVE OVER THE CONE USING SEVERAL SHARP HAMMER BLOWS. BE SURE THE ANCHOR IS AT THE REQUIRED EMBEDMENT DEPTH (FLUSH OR SLIGHTLY BELOW FACE OF CONCRETE)
4. ATTACH THE VENT PIPE ADAPTER IN THE PRE-DRILLED HOLE IN THE TOP OF THE SNOUT® USING THE 2 FLAT O RING GASKETS AND PVC LOCK-NUT SUPPLIED IN THE KIT. INSTALL WITH FEMALE SLIP ADAPTER UP AND A WASHER ON EACH SIDE OF THE SNOUT® SHELL. TIGHTEN LOCK-NUT HAND TIGHT.
5. REMOVE PSA BACKING AND WITH FIRM PRESSURE, ATTACH GASKET STRIP(S) TO BACK OF FLANGE AND TRIM EXCESS.
6. ATTACH THE SNOUT® TO THE CATCH BASIN WALL WITH 3/8" DIAMETER STAINLESS STEEL BOLTS IN LEAD EXPANSION ANCHORS. DO NOT OVER TIGHTEN: 10-15 FOOT-POUNDS SHOULD BE SUFFICIENT.
7. CUT THE ANTI-SIPHON VENT STACK TO LENGTH AND ATTACH TO HOOD AT SLIP ADAPTER WITH PVC CEMENT.
8. ATTACH 90 DEGREE FITTING TO VENT STACK WITH PVC CEMENT. ENSURE THAT FITTING OPENING IS ACCESSIBLE FOR MAINTENANCE AND INSPECTION.

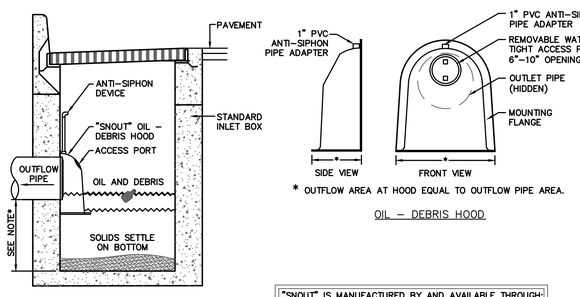




SECTION B-B
NOT TO SCALE

MRC UNDERGROUND DETENTION BASIN DETAIL

NOT TO SCALE 05/01/18



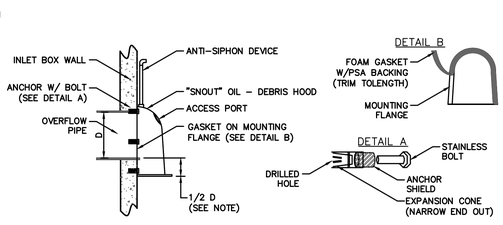
SECTION

* NOTE- SUMP DEPTH OF 36" MIN. FOR < OR= 12" DIAM. OUTLET. FOR OUTLETS >OR= 15", DEPTH = 2.5-3X DIAM.

* OUTFLOW AREA AT HOOD EQUAL TO OUTFLOW PIPE AREA.

OIL - DEBRIS HOOD

"SNOUT" IS MANUFACTURED BY AND AVAILABLE THROUGH:
BEST MANAGEMENT PRODUCTS, INC.
53 MT. ARCHER RD.
LYME, CT 06371
PHONE (860) 434-0277 * FAX (860) 434-8195
E-MAIL: duran@bestmp.com * WEBSITE: www.bestmp.com

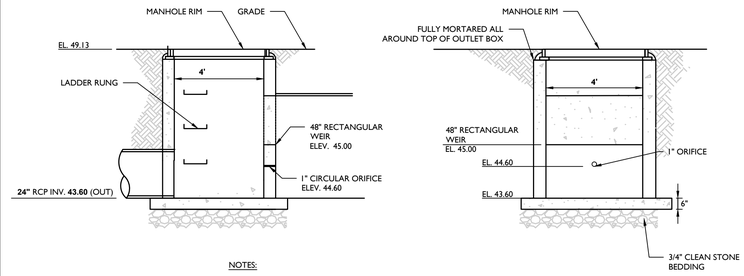


SNOUT INLET - OPERATION AND MAINTENANCE PROCEDURES

A. INSPECTION:
1. INSPECT INLET MONTHLY FOR THE FIRST YEAR AFTER THE SITE HAS BEEN STABILIZED.
2. AFTER EACH MAJOR STORM EVENT, INSPECT INLET IMMEDIATELY, IF SEDIMENT HAS ACCUMULATED TO AND WITHIN ONE (1) FOOT BELOW THE OUTFALL ELEVATION, PERFORM CLEANING AS NECESSARY.
3. ANNUALLY INSPECT THE "SNOUT" HOOD, THE ANTI-SIPHON DEVISE AND THE ACCESS HATCH FOR ANY CRACKED OR DAMAGED PARTS, REPLACE ALL DAMAGED COMPONENTS IMMEDIATELY.

B. CLEANING:
1. REMOVE ALL SOLID DEBRIS FROM THE INLET, A MINIMUM OF EVERY SIX (6) MONTH OR WHEN THE SEDIMENT IS TO AND WITHIN ONE (1) FOOT BELOW THE OUTFALL ELEVATION.
2. WHEN THERE HAS BEEN A SPILL OR INCIDENT THAT CAUSES A LARGER THAN NORMAL ACCUMULATION OF POLLUTANTS, REMOVE ALL SOLID DEBRIS FROM THE INLET.
3. USE A VACUUM TRUCK TO REMOVE ALL SOLIDS IN THE BOTTOM OF THE STRUCTURE.
4. DISPOSE OF ALL COLLECTED WASTES PER THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION REQUIREMENTS.
5. FLUSH THE ANTI-SIPHON DEVISE ON THE "SNOUT" HOOD OR GENTLY CLEAR WITH A FLEXIBLE WIRE ONCE A YEAR.
6. OPEN AND CLOSE THE ACCESS PORT ON THE "SNOUT" HOOD ONCE A YEAR AND CLEAR ANY OBSTRUCTIONS.

"SNOUT" INLET
NOT TO SCALE



NOTES:

1. CONTRACTOR TO SUBMIT SHOP DRAWING FOR REVIEW AND APPROVAL.
2. ALL CONCRETE TO BE CLASS "A".

OUTLET CONTROL STRUCTURE A-1 MRC BASIN DETAIL (SINGLE CHAMBER)

NOT TO SCALE MCPA-UTIL-STMW-1600 05/01/18

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1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
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Colliers Engineering & Design

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941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC.
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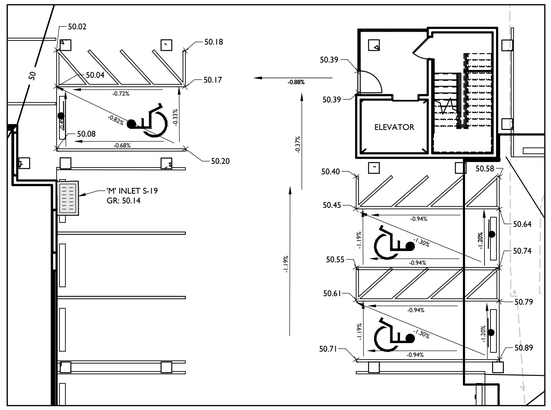
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PROJECT NUMBER: 16001030B	DRAWING NAME: C-DTLS		

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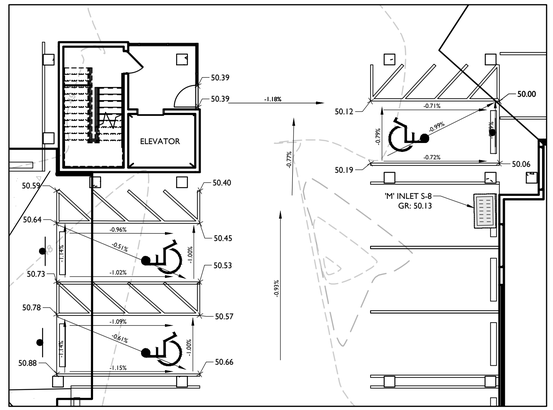
SHEET NUMBER: 17 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

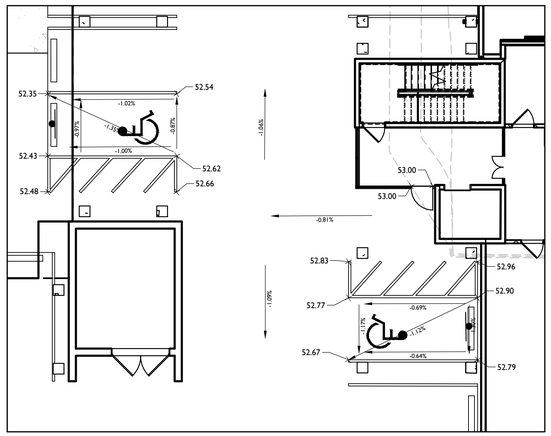
2016\16001030B\Engineering\Site Plans\C-DTLS.dwg|C-17-DETAILS By: CHRIS MESZLER



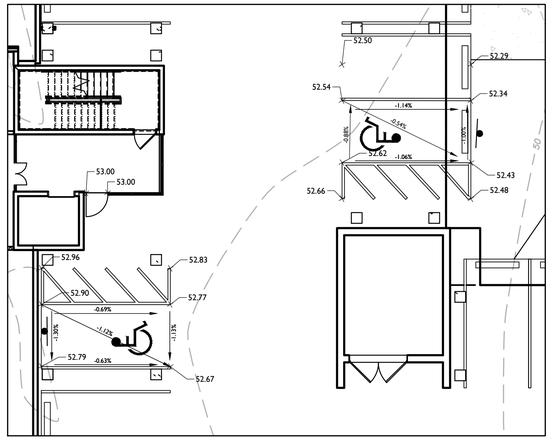
ADA PARKING (WEST)



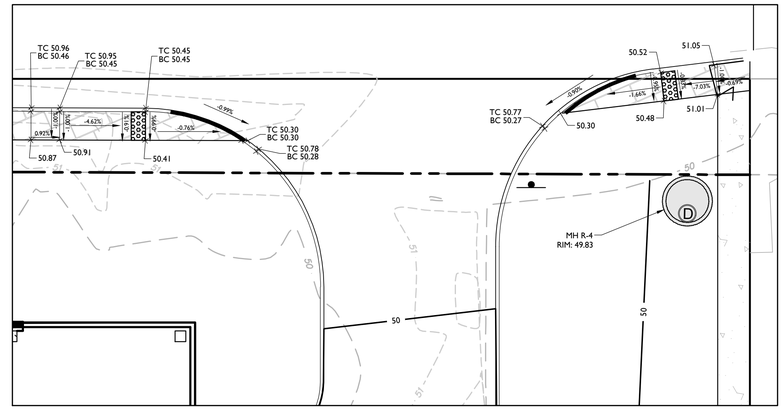
ADA PARKING (EAST)



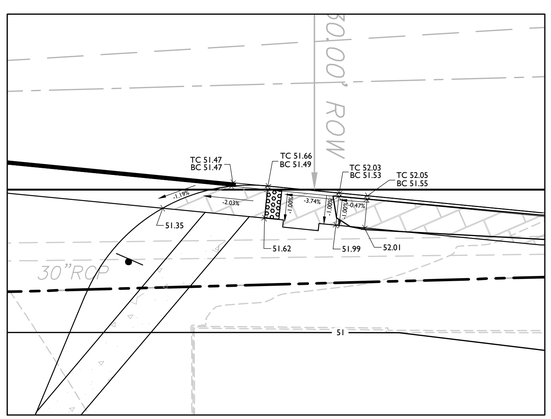
ADA PARKING (SOUTHWEST)



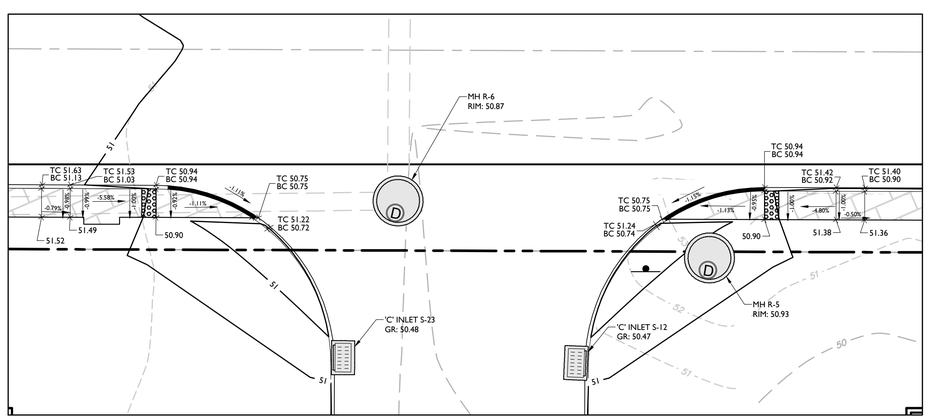
ADA PARKING (SOUTHEAST)



PEDESTRIAN WALKWAY (EAST)



PEDESTRIAN WALKWAY (WEST)



PEDESTRIAN WALKWAY (CENTER))

N
W
E
S

LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'C' INLET	
	'M' INLET	
D	STORM MANHOLE	D
S	SANITARY MANHOLE	S
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
75 / 74	CONTOURS	75 / 74
× G 29.0	SPOT ELEVATION	× G 29.0
	DIRECTION OF OVERLAND FLOW	
× TC 29.0	TOP OF CURB ELEVATION	× TC 29.0
× BC 29.0	BOTTOM OF CURB ELEVATION	× BC 29.0
	TOP OF DEPRESSED CURB ELEVATION	× TDC 29.0

10 0 10 20

SCALE : 1" = 10'

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL C. RICHARD ROSEBERRY ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

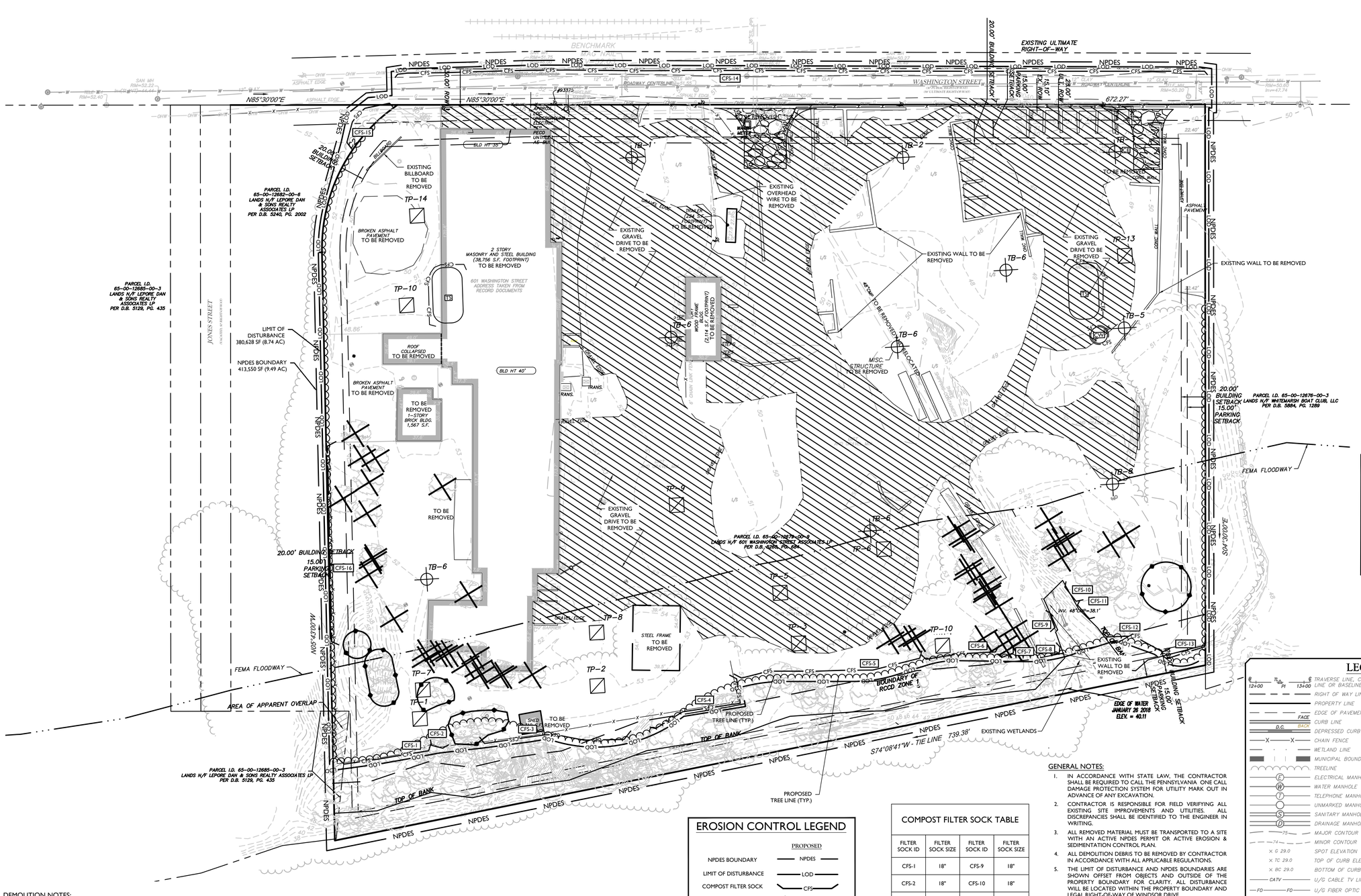
SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

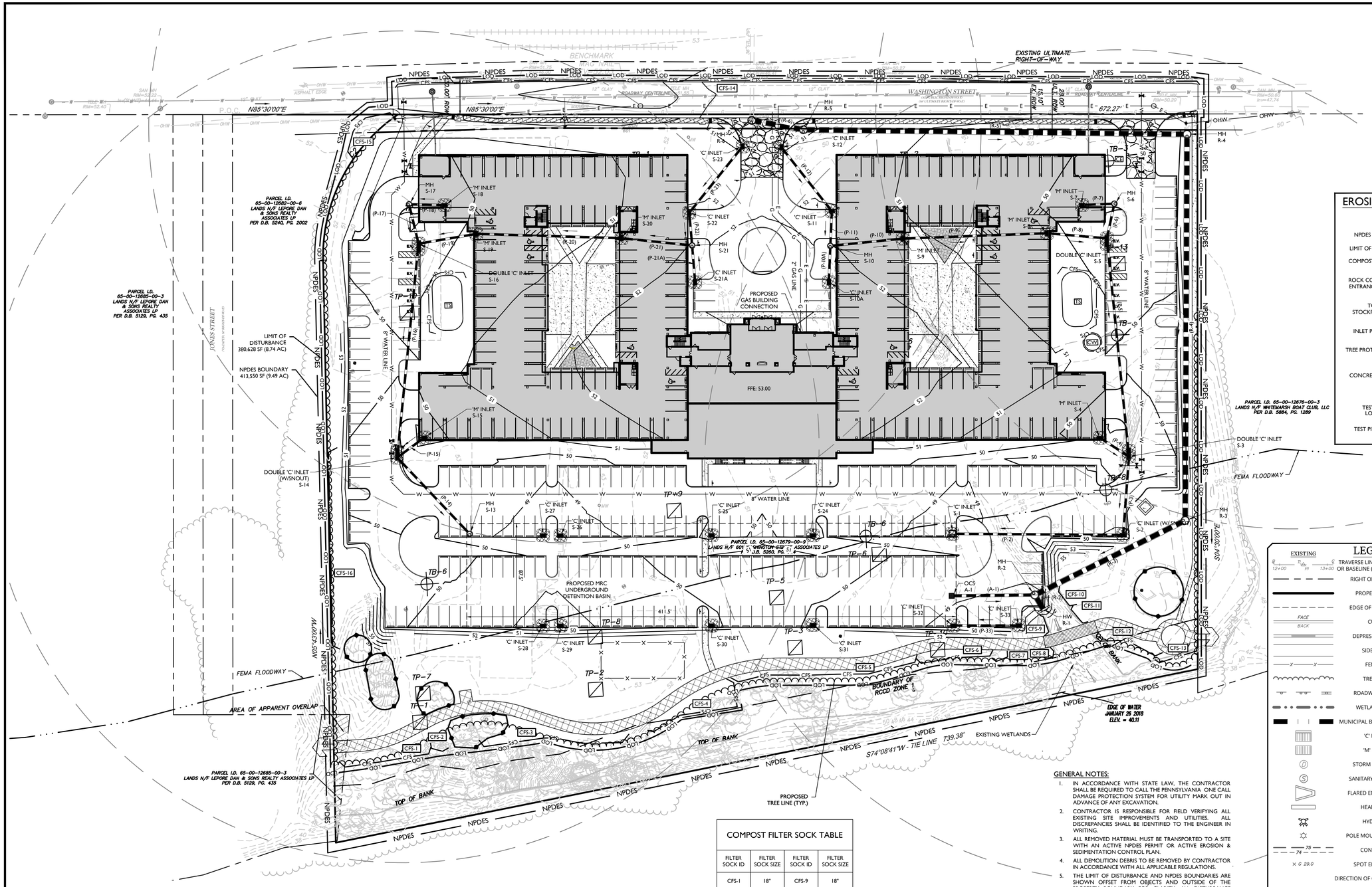
PROJECT NUMBER: 16001030B
DRAWING NAME: C-GRAD-HADA

SHEET TITLE: ADA GRADING PLAN

SHEET NUMBER: 18 of 27

2016\16001030B\Engineering\Site Plans\C-GRAD-HADA.dwg|C-06-GRADING By: CHRIS METZLER


EXISTING ULTIMATE RIGHT-OF-WAY
20.00' BUILDING SETBACK
WASHINGTON STREET
ROADWAY CENTERLINE
BENCHMARK
N85°30'00"E
672.27'
PARCEL I.D. 65-00-12682-00-6
LANDS N/F LEPORE DAN & SONS REALTY ASSOCIATES LP
PER D.B. 5240, PG. 2002
PARCEL I.D. 65-00-12685-00-3
LANDS N/F LEPORE DAN & SONS REALTY ASSOCIATES LP
PER D.B. 5129, PG. 435
JONES STREET
(NOT IMPROVED)
EXISTING BILLBOARD TO BE REMOVED
BROKEN ASPHALT PAVEMENT TO BE REMOVED
2 STORY MASONRY AND STEEL BUILDING (36,756 S.F. FOOTPRINT) TO BE REMOVED
601 WASHINGTON STREET ADDRESS TAKEN FROM RECORD DOCUMENTS
LIMIT OF DISTURBANCE 380,628 SF (8.74 AC)
NPDES BOUNDARY 413,550 SF (9.49 AC)
ROOF COLLAPSED TO BE REMOVED
BROKEN ASPHALT PAVEMENT TO BE REMOVED
TO BE REMOVED 1-STORY BRICK BLDG. 1,567 S.F.
TO BE REMOVED
EXISTING GRAVEL DRIVE TO BE REMOVED
EXISTING OVERHEAD WIRE TO BE REMOVED
TRAILER (CONCRETE FOOTPRINT) TO BE REMOVED
2 STORY WOOD FRAME BLDG. (2,114 S.F. FOOTPRINT) TO BE REMOVED
MISC. STRUCTURE TO BE REMOVED
EXISTING WALL TO BE REMOVED
EXISTING GRAVEL DRIVE TO BE REMOVED
48" CMP TO BE REMOVED & RELOCATED
STEEL FRAME TO BE REMOVED
SHED TO BE REMOVED
EXISTING WALL TO BE REMOVED
PROPOSED TREE LINE (TYP.)
BOUNDARY OF RCOD ZONE 1
EDGE OF WATER JANUARY 28 2018 ELEV. = 40.11'
EXISTING WETLANDS
S74°08'41"W - TIE LINE 739.38'
TOP OF BANK
AREA OF APPARENT OVERLAP
FEMA FLOODWAY
PARCEL I.D. 65-00-12676-00-3
LANDS N/F WHITEMARSH BOAT CLUB, LLC
PER D.B. 5884, PG. 1289
20.00' BUILDING SETBACK
15.00' PARKING SETBACK
PARCEL I.D. 65-00-10879-00-9
LANDS N/F 601 WASHINGTON STREET ASSOCIATES LP
PER D.B. 42098, PG. 684
TB-1
TB-2
TB-3
TB-4
TB-5
TB-6
TB-7
TB-8
TP-1
TP-2
TP-3
TP-4
TP-5
TP-6
TP-7
TP-8
TP-9
TP-10
TP-13
TP-14
CFS-1
CFS-2
CFS-3
CFS-4
CFS-5
CFS-6
CFS-7
CFS-8
CFS-9
CFS-10
CFS-11
CFS-12
CFS-13
CFS-14
CFS-15
CFS-16
INV. 48"CMP=38.1'
INV. 48"CMP=38.1'
INV. 15"RCP=38.1'
INV. 15"RCP=38.1'
INV. 15"RC



EROSION CONTROL LEGEND

	PROPOSED
NPDES BOUNDARY	NPDES
LIMIT OF DISTURBANCE	LOD
COMPOST FILTER SOCK	CFS
ROCK CONSTRUCTION ENTRANCE AND LABEL	CE
TOPSOIL STOCKPILE & 24" CFS	TS
INLET PROTECTION	
TREE PROTECTION FENCE	
CONCRETE WASHOUT	CW
TEST BORING LOCATION	TB-6
TEST PIT LOCATION	TP-6

LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'C' INLET	
	'M' INLET	
D	STORM MANHOLE	D
S	SANITARY MANHOLE	S
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
74 75	CONTOURS	74 75
× G 29.0	SPOT ELEVATION	× G 29.0
	DIRECTION OF OVERLAND FLOW	
× TC 29.0	TOP OF CURB ELEVATION	× TC 29.0
× BC 29.0	BOTTOM OF CURB ELEVATION	× BC 29.0
	TOP OF DEPRESSED CURB ELEVATION	× TDC 29.0
CATV	CABLE TV CONDUIT	CATV
W	WATER MAIN	W
G	GAS MAIN	G
T	TELEPHONE CONDUIT	T
E	ELECTRIC CONDUIT	E
	SANITARY PIPE	
	STORM PIPE	

40 0 40 80

SCALE : 1" = 40'

INLET PROTECTION TABLE

INLET ID	MAXIMUM DRAINAGE AREA (ACRES)	INLET PROTECTION TYPE	INLET ID	MAXIMUM DRAINAGE AREA (ACRES)	INLET PROTECTION TYPE	INLET ID	MAXIMUM DRAINAGE AREA (ACRES)	INLET PROTECTION TYPE	INLET ID	MAXIMUM DRAINAGE AREA (ACRES)	INLET PROTECTION TYPE
S-1	0.46	FILTER BAG	S-10A	0.04	FILTER BAG	S-20	0.11	FILTER BAG	S-28	0.28	FILTER BAG
S-2	0.08	FILTER BAG	S-11	0.09	FILTER BAG	S-21A	0.04	FILTER BAG	S-29	0.26	FILTER BAG
S-3	0.21	FILTER BAG	S-12	0.07	FILTER BAG	S-22	0.09	FILTER BAG	S-30	0.09	FILTER BAG
S-4	0.33	FILTER BAG	S-14	0.30	FILTER BAG	S-23	0.20	FILTER BAG	S-31	0.11	FILTER BAG
S-5	0.76	STONE AND BLOCK	S-15	0.33	FILTER BAG	S-24	0.10	FILTER BAG	S-32	0.20	FILTER BAG
S-7	0.49	FILTER BAG	S-16	0.64	FILTER BAG	S-25	0.10	FILTER BAG	S-33	0.11	FILTER BAG
S-8	0.18	FILTER BAG	S-18	0.52	FILTER BAG	S-26	0.28	FILTER BAG			
S-9	0.11	FILTER BAG	S-19	0.15	FILTER BAG	S-27	0.24	FILTER BAG			

COMPOST FILTER SOCK TABLE

FILTER SOCK ID	FILTER SOCK SIZE	FILTER SOCK ID	FILTER SOCK SIZE
CFS-1	18"	CFS-9	18"
CFS-2	18"	CFS-10	18"
CFS-3	18"	CFS-11	18"
CFS-4	18"	CFS-12	18"
CFS-5	18"	CFS-13	18"
CFS-6	18"	CFS-14	18"
CFS-7	18"	CFS-15	18"
CFS-8	18"		

GENERAL NOTES:

1. IN ACCORDANCE WITH STATE LAW, THE CONTRACTOR SHALL BE REQUIRED TO CALL THE PENNSYLVANIA ONE CALL DAMAGE PROTECTION SYSTEM FOR UTILITY MARK OUT IN ADVANCE OF ANY EXCAVATION.
2. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING SITE IMPROVEMENTS AND UTILITIES. ALL DISCREPANCIES SHALL BE IDENTIFIED TO THE ENGINEER IN WRITING.
3. ALL REMOVED MATERIAL MUST BE TRANSPORTED TO A SITE WITH AN ACTIVE NPDES PERMIT OR ACTIVE EROSION & SEDIMENTATION CONTROL PLAN.
4. ALL DEMOLITION DEBRIS TO BE REMOVED BY CONTRACTOR IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.
5. THE LIMIT OF DISTURBANCE AND NPDES BOUNDARIES ARE SHOWN OFFSET FROM OBJECTS AND OUTSIDE OF THE PROPERTY BOUNDARY FOR CLARITY. ALL DISTURBANCE WILL BE LOCATED WITHIN THE PROPERTY BOUNDARY AND LEGAL RIGHT-OF-WAY OF WINDSOR DRIVE.
6. CONSTRUCTION FENCE TO BE INSTALLED AT THE DISCRETION OF THE CONSTRUCTION MANAGER. THE CONSTRUCTION FENCE MUST BE INSTALLED TO MAINTAIN SAFE VEHICULAR AND PEDESTRIAN TRAFFIC PATTERNS AT ALL TIMES THROUGHOUT CONSTRUCTION.
7. DO NOT INSTALL COMPOST FILTER SOCKS ON EROSION CONTROL MATTING.
8. BY GRAPHICAL REPRESENTATION ONLY THIS PROPERTY IS LOCATED IN FLOOD HAZARD ZONE AE AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 42091C0358G WHICH HAS AN EFFECTIVE DATE OF MARCH 2, 2016 AND IS IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE. THE FEMA CALCULATED 100-YEAR FLOOD ELEVATION FOR THIS PROJECT IS 60.5 FEET (NAVD 88) IN ACCORDANCE FIRM MAP NUMBER 42091C0358G DATED MARCH 2, 2016.

ENVIRONMENTAL NOTE:
THIS SET OF PLANS IS NOT DEPICTING ENVIRONMENTAL CONDITIONS OR A CERTIFICATION/WARRANTY REGARDING THE PRESENCE OR ABSENCE OF ENVIRONMENTALLY IMPACTED SITE CONDITIONS. COLLIERS ENGINEERING & DESIGN HAS PERFORMED NO EXPLORATORY OR TESTING SERVICES, INTERPRETATIONS, CONCLUSIONS, OR OTHER SITE ENVIRONMENTAL SERVICES RELATED TO THE DETERMINATION OF THE POTENTIAL FOR CHEMICAL, TOXIC, RADIOACTIVE, OR OTHER TYPE OF CONTAMINANTS AFFECTING THE PROPERTY AND THE UNDERSIGNED PROFESSIONAL IS NOT QUALIFIED TO DETERMINE THE EXISTENCE OF SAME. SHOULD ENVIRONMENTAL CONTAMINATION OR WASTE BE DISCOVERED, THE OWNER AND CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LAWS AND REGULATIONS.

THIS SITE ULTIMATELY FLOWS TO THE SCHUYLKILL RIVER, WHICH IS PART OF THE SCHUYLKILL RIVER WATERSHED. THE PENNSYLVANIA CODE, TITLE 25, CHAPTER 93, WATER QUALITY STANDARDS ASSIGNS THE SCHUYLKILL RIVER A WATER QUALITY DESIGNATION OF WARM WATER FISHERY, MIGRATORY FISHES (WWF, MF).

2019\16001030B\Engineering\E&S Plans\C-SESC PLAN.dwg 03-PLAN By: CHRIS MESSLER

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
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PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER: 16001030B
DRAWING NAME: C-SESC-PLAN

SHEET TITLE: E&SPC PLAN

SHEET NUMBER: 20 of 27

STANDARD EROSION AND SEDIMENT CONTROL NOTES

1) ALL EARTH DISTURBANCES, INCLUDING CLEARING AND GRUBBING AS WELL AS CUTS AND FILLS SHALL BE DONE IN ACCORDANCE WITH THE APPROVED E&S PLAN. A COPY OF THE APPROVED DRAWINGS (STAMPED, SIGNED AND DATED BY THE REVIEWING AGENCY) MUST BE AVAILABLE AT THE PROJECT SITE AT ALL TIMES. THE REVIEWING AGENCY SHALL BE NOTIFIED OF ANY CHANGES TO THE APPROVED PLAN PRIOR TO IMPLEMENTATION OF THOSE CHANGES. THE REVIEWING AGENCY MAY REQUIRE A WRITTEN SUBMITTAL OF THOSE CHANGES FOR REVIEW AND APPROVAL AT ITS DISCRETION.

2) AT LEAST 7 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, INCLUDING CLEARING AND GRUBBING, THE OWNER AND/OR OPERATOR SHALL INVITE ALL CONTRACTORS, THE LANDOWNER, APPROPRIATE MUNICIPAL OFFICIALS, THE E&S PLAN PREPARER, THE PCSM PLAN PREPARER, THE LICENSED PROFESSIONAL RESPONSIBLE FOR OVERSIGHT OF CRITICAL STAGES OF IMPLEMENTATION OF THE PCSM PLAN, AND A REPRESENTATIVE FROM THE LOCAL CONSERVATION DISTRICT TO AN ON-SITE PRE-CONSTRUCTION MEETING.

3) AT LEAST 3 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, OR EXPANDING INTO AN AREA PREVIOUSLY UNMARKED, THE PENNSYLVANIA ONE CALL SYSTEM INC. SHALL BE NOTIFIED AT 1-800-242-1776 FOR THE LOCATION OF EXISTING UNDERGROUND UTILITIES.

4) ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE PROVIDED ON THE PLAN DRAWINGS. DEVIATION FROM THAT SEQUENCE MUST BE APPROVED IN WRITING FROM THE LOCAL CONSERVATION DISTRICT OR BY THE DEPARTMENT PRIOR TO IMPLEMENTATION.

5) AREAS TO BE FILLED ARE TO BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL.

6) CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE. GENERAL SITE CLEARING, GRUBBING AND TOPSOIL STRIPPING MAY NOT COMMENCE IN ANY STAGE OR PHASE OF THE PROJECT UNTIL THE E&S BMPS SPECIFIED BY THE BMP SEQUENCE FOR THAT STAGE OR PHASE HAVE BEEN INSTALLED AND ARE FUNCTIONING AS DESCRIBED IN THIS E&S PLAN.

7) AT NO TIME SHALL CONSTRUCTION VEHICLES BE ALLOWED TO ENTER AREAS OUTSIDE THE LIMIT OF DISTURBANCE BOUNDARIES SHOWN ON THE PLAN MAPS. THESE AREAS MUST BE CLEARLY MARKED AND FENCED OFF BEFORE CLEARING AND GRUBBING OPERATIONS BEGIN.

8) TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED AT THE LOCATION(S) SHOWN ON THE PLAN MAP(S) IN THE AMOUNT NECESSARY TO COMPLETE THE FINISH GRADING OF ALL EXPOSED AREAS THAT ARE TO BE STABILIZED BY VEGETATION. EACH STOCKPILE SHALL BE PROTECTED IN THE MANNER SHOWN ON THE PLAN DRAWINGS. STOCKPILE HEIGHTS SHALL NOT EXCEED 35 FEET. STOCKPILE SLOPES SHALL BE 2H:1V OR FLATTER.

9) IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE OPERATOR SHALL IMPLEMENT APPROPRIATE BEST MANAGEMENT PRACTICES TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION AND NOTIFY THE LOCAL CONSERVATION DISTRICT AND/OR THE REGIONAL OFFICE OF THE DEPARTMENT.

10) ALL BUILDING MATERIALS AND WASTES SHALL BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET SEQ., 271.1, AND 287.1 ET. SEQ. NO BUILDING MATERIALS OR WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THIS SITE.

11) RECYCLING AND DISPOSAL OF MATERIALS: OPERATOR/PERMITTEE SHALL INSURE THAT PROPER MECHANISMS ARE IN PLACE TO CONTROL WASTE MATERIALS. CONSTRUCTION WASTES INCLUDE, BUT ARE NOT LIMITED TO, EXCESS SOIL MATERIALS, BUILDING MATERIALS, CONCRETE WASH WATER, SANITARY WASTES, ETC. THAT COULD ADVERSELY IMPACT WATER QUALITY. MEASURES SHOULD BE PLANNED AND IMPLEMENTED FOR HOUSEKEEPING, MATERIALS MANAGEMENT, AND LITTER CONTROL. WHEREVER POSSIBLE, RECYCLING OF EXCESS MATERIALS IS PREFERRED RATHER THAN DISPOSAL. OFF-SITE TRANSPORT OF MATERIALS REQUIRES THAT THE RECEIVING FACILITY HAVE ITS OWN APPROVED, ACTIVE PERMIT TO RECEIVE SUCH MATERIALS.

12) ALL OFF-SITE WASTE AND BORROW AREAS MUST HAVE AN E&S PLAN APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT FULLY IMPLEMENTED PRIOR TO BEING ACTIVATED.

13) THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ANY MATERIAL BROUGHT ON SITE IS CLEAN FILL FORM FP-001 MUST BE RETAINED BY THE PROPERTY OWNER FOR ANY FILL MATERIAL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE BUT QUALIFYING AS CLEAN FILL DUE TO ANALYTICAL TESTING.

14) ALL PUMPING OF WATER FROM ANY WORK AREA SHALL BE DONE ACCORDING TO THE PROCEDURE DESCRIBED IN THIS PLAN, OVER UNDISTURBED VEGETATED AREAS. ALL PUMPING OF SEDIMENT LADEN WATER SHALL BE THROUGH A SEDIMENT CONTROL BMP, SUCH AS A PUMPED WATER FILTER BAG DISCHARGING OVER NON-DISTURBED AREAS.

15) VEHICLES AND EQUIPMENT MAY NEITHER ENTER DIRECTLY NOR EXIT DIRECTLY FROM THE SITE ONTO WINDSOR DRIVE. VEHICLES AND EQUIPMENT MAY ONLY ENTER AND EXIT THE CONSTRUCTION SITE VIA A STABILIZED ROCK CONSTRUCTION ENTRANCE.

16) UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENT BMPS SHALL BE MAINTAINED PROPERLY. MAINTENANCE SHALL INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT BMPS AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. THE OPERATOR WILL MAINTAIN AND MAKE AVAILABLE TO THE COUNTY CONSERVATION DISTRICT COMPLETE, WRITTEN INSPECTION LOGS OF ALL THOSE INSPECTIONS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING AND RENETTING MUST BE PERFORMED IMMEDIATELY. IF THE E&S BMPS FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPS, OR MODIFICATIONS OF THOSE INSTALLED WILL BE REQUIRED.

17) A LOG SHOWING DATES THAT E&S BMPS WERE INSPECTED AS WELL AS ANY DEFICIENCIES FOUND AND THE DATE THEY WERE CORRECTED SHALL BE MAINTAINED ON THE SITE AND BE MADE AVAILABLE TO REGULATORY AGENCY OFFICIALS AT THE TIME OF INSPECTION.

18) SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED, OR SWEPT INTO ANY ROADSIDE DITCH, STORM SEWER, OR SURFACE WATER.

19) ALL SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS. SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN LANDSCAPED AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS OR DRAINAGE SWALES AND IMMEDIATELY STABILIZED, OR PLACED IN TOPSOIL STOCKPILES.

20) AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 3 TO 5 INCHES - 6 TO 12 INCHES ON COMPACTED SOILS - PRIOR TO PLACEMENT OF TOPSOIL. AREAS TO BE VEGETATED SHALL HAVE A MINIMUM 4 INCHES OF TOPSOIL IN PLACE PRIOR TO SEEDING AND MULCHING. FILL OUTSLOPES SHALL HAVE A MINIMUM OF 2 INCHES OF TOPSOIL.

21) ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.

22) ALL EARTHEN FILLS SHALL BE PLACED IN COMPACTED LAYERS NOT TO EXCEED 9 INCHES IN THICKNESS.

23) FILL MATERIALS SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD, OR OTHER FOREIGN OR OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.

24) FROZEN MATERIALS OR SOFT, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED INTO FILLS.

25) FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES.

26) SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.

27) ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY UPON REACHING FINISHED GRADE. CUT SLOPES IN COMPETENT BEDROCK AND ROCK FILLS NEED NOT BE VEGETATED. SEEDED AREAS WITHIN 50 FEET OF A SURFACE WATER, OR AS OTHERWISE SHOWN ON THE PLAN DRAWINGS, SHALL BE BLANKETED ACCORDING TO THE STANDARDS OF THIS PLAN.

28) IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE IN ANY AREA OR SUBAREA OF THE PROJECT, THE OPERATOR SHALL STABILIZE ALL DISTURBED AREAS. DURING NON-GERMINATING MONTHS, MULCH OR OTHER PROTECTIVE BLANKETING SHALL BE APPLIED AS DESCRIBED IN THE PLAN. AREAS NOT AT FINISHED GRADE, WHICH WILL BE REACTIVATED WITHIN 1 YEAR, MAY BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION SPECIFICATIONS. THOSE AREAS WHICH WILL NOT BE REACTIVATED WITHIN 1 YEAR SHALL BE STABILIZED IN ACCORDANCE WITH THE PERMANENT STABILIZATION SPECIFICATIONS.

29) PERMANENT STABILIZATION IS DEFINED AS A MINIMUM UNIFORM, PERENNIAL 70% VEGETATIVE COVER OR OTHER PERMANENT NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED EROSION. CUT AND FILL SLOPES SHALL BE CAPABLE OF RESISTING FAILURE DUE TO SLUMPING, SLIDING, OR MOTHER MOVEMENTS.

30) EROSION AND SEDIMENT BMPS MUST BE CONSTRUCTED, STABILIZED, AND FUNCTIONAL BEFORE SITE DISTURBANCE BEGINS WITHIN THE TRIBUTARY AREAS OF THOSE BMPS. E&S BMPS SHALL REMAIN FUNCTIONAL AS SUCH UNTIL ALL AREAS TRIBUTARY TO THEM ARE PERMANENTLY STABILIZED OR UNTIL THEY ARE REPLACED BY ANOTHER BMP APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT.

31) UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT FOR AN INSPECTION PRIOR TO REMOVAL/CONVERSION OF THE E&S BMPS.

32) AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY EROSION AND SEDIMENT BMPS MUST BE REMOVED OR CONVERTED TO PERMANENT POST CONSTRUCTION STORMWATER MANAGEMENT BMPS. AREAS DISTURBED DURING REMOVAL OR CONVERSION OF THE BMPS SHALL BE STABILIZED IMMEDIATELY. IN ORDER TO ENSURE RAPID REVEGETATION OF DISTURBED AREAS, SUCH REMOVAL/CONVERSIONS ARE TO BE DONE ONLY DURING THE GERMINATING SEASON.

33) UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT TO SCHEDULE A FINAL INSPECTION.

34) FAILURE TO CORRECTLY INSTALL E&S BMPS, FAILURE TO PREVENT SEDIMENT-LADEN RUNOFF FROM LEAVING THE CONSTRUCTION SITE OR FAILURE TO TAKE IMMEDIATE CORRECTIVE ACTION TO RESOLVE FAILURE OF E&S BMPS MAY RESULT IN ADMINISTRATIVE, CIVIL, AND/OR CRIMINAL PENALTIES BEING INSTITUTED BY THE DEPARTMENT AS DEFINED IN SECTION 602 OF THE CLEAN STREAMS LAW. THEE LEAN STREAMS LAW PROVIDES FOR UP TO $10,000 PER DAY IN CIVIL PENALTIES, UP TO $10,000 IN SUMMARY CRIMINAL PENALTIES, AND UP TO $25,000 IN MISDEMEANOR CRIMINAL PENALTIES FOR EACH VIOLATION.

35) IN THE EVENT OF SINKHOLE DISCOVERY A PROFESSIONAL GEOLOGIST OR ENGINEER WILL BE CONTACTED CONCERNING MITIGATION. ADDITIONALLY, THE COUNTY CONSERVATION DISTRICT WILL BE MADE AWARE OF THE SINKHOLE DISCOVERY IMMEDIATELY.

36) THE OPERATOR SHALL ASSURE THAT THE APPROVED EROSION AND SEDIMENT CONTROL PLAN IS PROPERLY AND COMPLETELY IMPLEMENTED.

37) THE CONTRACTOR IS ADVISED TO BECOME THOROUGHLY FAMILIAR WITH THE PROVISIONS OF THE APPENDIX 64, EROSION CONTROL RULES AND REGULATIONS, TITLE 25, PART I, DEPARTMENT OF ENVIRONMENTAL PROTECTION, SUBPART C, PROTECTION OF NATURAL RESOURCES, ARTICLE III, WATER RESOURCES, CHAPTER 102, EROSION CONTROL.

38) STRAW MULCH SHALL BE APPLIED IN LONG STRANDS, NOT CHOPPED OR FINELY BROKEN.

39) CONCRETE WASH WATER SHALL BE HANDLED IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS. IN NO CASE SHALL IT BE ALLOWED TO ENTER ANY SURFACE WATERS OR GROUNDWATER SYSTEMS.

40) EROSION CONTROL MATTING SHALL BE INSTALLED ON ALL SLOPES 3H:1V OR STEEPER, WITHIN 50 FEET OF A SURFACE WATER AND ON ALL OTHER DISTURBED AREAS SPECIFIED ON THE PLAN MAPS AND/OR DETAIL SHEETS.

CONSTRUCTION SEQUENCE NOTES:

1. ALL WORK IS TO OCCUR WITHIN THE LIMIT OF DISTURBANCE BOUNDARIES AS INDICATED ON THE PLAN. AT NO TIME SHALL CONSTRUCTION VEHICLES BE ALLOWED TO ENTER AREAS OUTSIDE THE LIMIT OF DISTURBANCE BOUNDARIES SHOWN ON THE PLAN MAPS. THESE AREAS MUST BE CLEARLY MARKED AND FENCED OFF BEFORE CLEARING AND GRUBBING OPERATIONS BEGIN.
2. CONSTRUCT ALL DRAINAGE APPURTENANCES FROM DOWNSTREAM TO UPSTREAM UNLESS OTHERWISE NOTED.
3. LIMIT TREE REMOVAL TO ONLY WHAT IS REQUIRED FOR CONSTRUCTION.
4. UPON REACHING FINAL GRADE, AREAS TO BE STABILIZED BY VEGETATION MUST NOT EXCEED 15,000 SQUARE FEET WITHOUT BEING STABILIZED.
5. THE SITE MUST BE IMMEDIATELY SEEDED, MULCHED, OR OTHERWISE PROTECTED FROM ACCELERATED EROSION AND SEDIMENTATION WHEN A TEMPORARY CESSATION OF EARTH DISTURBANCE ACTIVITIES EXCEEDS 4 DAYS. DURING NON-GERMINATING MONTHS, MULCH OR PROTECTIVE BLANKETING SHALL BE APPLIED AS DESCRIBED IN THE PLAN. AREAS NOT AT FINISHED GRADE WHICH WILL BE REACTIVATED WITHIN ONE YEAR, MAY BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION SPECIFICATIONS. THOSE AREAS WHICH WILL NOT BE REACTIVATED WITHIN ONE YEAR SHALL BE STABILIZED IN ACCORDANCE WITH THE PERMANENT STABILIZATION SPECIFICATIONS.
6. STABILIZE SLOPES, CHANNELS, DITCHES, AND OTHER DISTURBED AREAS AS THEY REACH FINAL GRADE. ROUND CUT AND FILL SLOPES SUCH THAT RUNOFF IS DIRECTED AWAY FROM THE INTERSECTION OF THE CONSTRUCTED SLOPE AND THE EXISTING GRADE.
7. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE. GENERAL SITE CLEARING, GRUBBING, AND TOPSOIL STRIPPING MAY NOT COMMENCE IN ANY STAGE OR PHASE OF THE PROJECT UNTIL THE E&S BMPS SPECIFIED BY THE CONSTRUCTION SEQUENCE FOR THAT STAGE OR PHASE HAVE BEEN INSTALLED AND ARE FUNCTIONING AS DESCRIBED IN THIS E&S PLAN.

CONSTRUCTION SEQUENCE:

ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE FOLLOWING SEQUENCE. DEVIATION FROM THIS SEQUENCE MUST BE APPROVED IN WRITING FROM THE LOCAL CONSERVATION DISTRICT OR BY THE DEPARTMENT PRIOR TO IMPLEMENTATION.

1. AT LEAST 7 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, INCLUDING CLEARING AND GRUBBING, THE OWNER AND/OR OPERATOR SHALL INVITE ALL CONTRACTORS, THE LANDOWNER, APPROPRIATE MUNICIPAL OFFICIALS, THE E&S PLAN PREPARER, THE PCSM PLAN PREPARER, THE LICENSED PROFESSIONAL RESPONSIBLE FOR OVERSIGHT OF CRITICAL STAGES OF IMPLEMENTATION OF THE PCSM PLAN, AND A REPRESENTATIVE FROM THE LOCAL COUNTY CONSERVATION DISTRICT TO AN ONSITE PRE-CONSTRUCTION MEETING.
2. ALL EXISTING UTILITIES SHOWN ON THE PLAN ARE SHOWN AT APPROXIMATE LOCATIONS. THE ENGINEER DOES NOT GUARANTEE ALL EXISTING UTILITIES ON SITE ARE SHOWN ON THE PLAN. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE OF ALL UTILITIES AND TO CALL THE PENNSYLVANIA ONE CALL SYSTEM (1-800-242-1776) AT LEAST 3 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES OR EXPANDING INTO A PREVIOUSLY UNMARKED AREA.

SITE WORK:

1. INSTALL ROCK CONSTRUCTION ENTRANCES, CLEAR AND GRUB AS NEEDED.
2. INSTALL COMPOST FILTER SOCKS. COMPOST FILTER SOCKS SHALL BE INSTALLED PARALLEL TO EXISTING CONTOURS OR CONSTRUCTED LEVEL ALIGNMENTS. CLEAR AND GRUB AS NEEDED FOR THE INSTALLATION OF THE COMPOST FILTER SOCKS. NOTE: ADDITIONAL COMPOST FILTER SOCKS SHALL BE INSTALLED DOWNGRADE OF ANY DISTURBANCE AREAS AS NEEDED. ALL EROSION AND SEDIMENT CONTROL DEVICES MUST BE INSTALLED IN ACCORDANCE WITH THEIR RESPECTIVE DETAIL AND IN WORKING ORDER PRIOR TO DISTURBING AN AREA.
3. REMOVE EXISTING BUILDING, ASPHALT AREAS, WOODED AREAS, DEBRIS PILES, UTILITIES, AND ALL ITEMS LISTED AS TO BE REMOVED WITHIN THE SITE, AS SHOWN ON THE DEMOLITION PLAN, EXCEPT FOR THE EXISTING UTILITY POLES ALONG THE SOUTHERN SIDE OF WASHINGTON STREET WHICH WILL BE REMOVED PRIOR TO THE INSTALLATION OF THE PROPOSED ELECTRIC LINES IN STEP 7. ELECTRIC SERVICE MUST BE MAINTAINED FOR PROPERTIES THAT ARE CURRENTLY SERVICED THROUGH THESE LINES, OVERHEAD WIRES MAY NEED TO BE RELOCATED IN ORDER TO ACCOMMODATE CONSTRUCTION VEHICLES.
4. INSTALL PROPOSED PIPE NETWORK FROM HEADWALL R-1 TO MANHOLE R-6, WORKING UPSLOPE. REMOVE EXISTING 48" CMP PIPE AS SHOWN ON THE DEMOLITION PLANS. LIMIT DAILY TRENCH EXCAVATION TO THE LENGTH OF PIPE PLACEMENT AND BACKFILLING THAT CAN BE COMPLETED THE SAME DAY. ALL OPEN TRENCHES MUST BE PROTECTED. WATER WHICH ACCUMULATES IN THE OPEN TRENCH SHALL BE COMPLETELY REMOVED BY FILTER BAG PUMPING, BEFORE PIPE OR CONDUIT PLACEMENT AND/OR BACKFILLING BEGINS.
5. ESTABLISH STOCKPILES, STAGING AREA, AND CONCRETE WASHOUT LOCATION AND PLACE DOWNSLOPE COMPOST FILTER SOCKS. ENSURE THAT COMPOST FILTER SOCKS ARE LOCATED DOWNSLOPE OF THE TOPSOIL STOCKPILES AT ALL TIMES.
6. ROUGH GRADE SITE AND BUILDING PADS. ROUGH GRADE DRIVEWAYS, AISLES, CONCRETE PATIOS, PARKING LOTS, AS WELL AS WASHINGTON STREET WIDENING. IMMEDIATELY STABILIZE ANY STEEP SLOPES WITH EROSION CONTROL MATTING. DO NOT PLACE EROSION CONTROL MATTING ON OR UNDER COMPOST FILTER SOCKS. ADJUST COMPOST FILTER SOCKS AS NEEDED TO FIT PROPOSED IMPROVEMENTS. NOTE: ADDITIONAL COMPOST FILTER SOCKS SHALL BE INSTALLED DOWNGRADE OF ANY DISTURBANCE AREAS AS NEEDED.
7. CONSTRUCT MRC UNDERGROUND DETENTION BASIN AND OUTLET CONTROL STRUCTURE. INSTALL OUTFALL STORMSEWER SYSTEM, STARTING AT MH R-2 AND WORKING UPSLOPE TO OUTLET CONTROL STRUCTURE A-1. INSTALL INLETS S-24, S-25, S-26, S-27, S-28, S-29, S-30, S-31. INTALL PROPOSED STORMSEWER SYSTEM, WORKING DOWNSTREAM TO UPSTREAM, FROM INLET S-1 TO INLET S-12. INLET S-3 TO INLET S-4, INLET S-5 TO INLET S-7, MANHOLE S-10 TO INLET S-10A. ALSO, FROM INLET S-13 TO INLET S-23, INLET S-14 TO INLET S-15, INLET S-16 TO INLET S-18, AND MANHOLE S-21 TO INLET S-21A. LIMIT DAILY TRENCH EXCAVATION TO THE LENGTH OF PIPE PLACEMENT AND BACKFILLING THAT CAN BE COMPLETED THE SAME DAY. ALL OPEN TRENCHES MUST BE PROTECTED. WATER WHICH ACCUMULATES IN THE OPEN TRENCH SHALL BE COMPLETELY REMOVED BY FILTER BAG PUMPING, BEFORE PIPE PLACEMENT AND/OR BACKFILLING BEGINS. IMMEDIATELY AFTER INSTALLING EACH INLET, INLET MUST BE PLACED AS APPLICABLE.
8. CONSTRUCT THE BUILDING PAD INCLUDING THE INSTALLATION AND/OR REPLACEMENT OF UTILITY SERVICE CONNECTIONS FOR ELECTRIC, GAS, WATER, AND SANITARY, AS SHOWN ON THE PLANS. REMOVE EXISTING UTILITY POLES AND ASSOCIATED OVERHEAD WIRES PRIOR TO INSTILLATION OF UNDERGROUND ELECTRIC LINES ALONG WASHINGTON STREET. INSTALL WATER LINES AND HYDRANTS. INSTALL SANITARY SEWER SYSTEM FROM DOWNSTREAM TO UPSTREAM, STARTING FROM THE TIE-IN TO THE EXISTING SANITARY MAIN AT MANHOLE SS-100 TO MANHOLE SS-104. LIMIT DAILY TRENCH EXCAVATION TO THE LENGTH OF PIPE PLACEMENT AND BACKFILLING THAT CAN BE COMPLETED THE SAME DAY. ALL OPEN TRENCHES MUST BE PROTECTED. WATER WHICH ACCUMULATES IN THE OPEN TRENCH SHALL BE COMPLETELY REMOVED BY FILTER BAG PUMPING, BEFORE PIPE OR CONDUIT PLACEMENT AND/OR BACKFILLING BEGINS.
9. PLACE SUBGRADE FOR THE DRIVEWAYS, AISLES, PARKING LOTS, AND ROAD WIDENING IN ACCORDANCE WITH THE PLAN DETAILS. INSTALL CURBING, DIRECTING STORMWATER TO THE PROPOSED INLETS. REMOVE COMPOST FILTER SOCKS AS NEEDED TO FIT PROPOSED IMPROVEMENTS.
10. FINALIZE GRADING IN ALL LAWN AREAS.
11. INSTALL PROPOSED SIDEWALKS AND ADA RAMPS.
12. INSTALL PROPOSED TREES AND OTHER PLANTINGS.
13. COMPLETE PAVING OF SITE IN ACCORDANCE WITH THE PLAN DETAILS. ONCE PAVING IS COMPLETED, ADD PAVEMENT MARKINGS.

FINAL SITE PREPARATION:

1. UNTIL THE SITE IS STABILIZED ALL EROSION AND SEDIMENTATION CONTROLS MUST BE MAINTAINED PROPERLY. MAINTENANCE MUST INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENTATION CONTROLS AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK; INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, RE-GRADING, RESEEDING, RE-MULCHING, AND RE-NETTING, MUST BE PERFORMED IMMEDIATELY. CONTACT THE COUNTY CONSERVATION DISTRICT PRIOR TO REMOVING TEMPORARY E&S BMPS.
2. UPON ACHIEVING A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER OVER THE ENTIRE VEGETATED TRIBUTARY AREA, ANY OF THE REMAINING TEMPORARY E&S CONTROLS SHOULD BE REMOVED, INCLUDING COMPOST FILTER SOCKS AND INLET PROTECTION. ALL AREAS DISTURBED DURING THE REMOVAL PROCESS SHOULD BE IMMEDIATELY STABILIZED WITH PERMANENT SEEDING, AS INDICATED ON THE PLANS.
3. THE PERMITTEE SHALL SUBMIT A NOTICE OF TERMINATION TO THE COUNTY CONSERVATION DISTRICT ONCE SITE WORK IS COMPLETED.

PREPARATION OF AREAS TO BE TOPSOILED

GRADE THE AREAS TO BE COVERED BY TOPSOIL USING ACCEPTABLE METHODS, LOOSEN SOIL TO A MINIMUM DEPTH OF 2 INCHES, BEFORE PLACING THE TOPSOIL. REMOVE STONES AND OTHER FOREIGN MATERIAL 2 INCHES OR LARGER IN DIMENSION. REMOVE AND SATISFACTORILY DISPOSE OF UNSUITABLE AND SURPLUS MATERIAL

E&S PLAN - PLANNING AND DESIGN - SECTION 102.4(B)(4)

1. E&S PLAN MINIMIZES THE EXTENT AND DURATION OF THE EARTH DISTURBANCE ACTIVITY.
2. E&S PLAN MAXIMIZES PROTECTION OF EXISTING DRAINAGE FEATURES AND VEGETATION.
3. E&S PLAN MINIMIZES SOIL COMPACTION.
4. E&S PLAN UTILIZES OTHER MEASURES OR CONTROLS THAT PREVENT OR MINIMIZE GENERATION OF INCREASED STORMWATER RUNOFF.

MEASURES PROVIDED TO MINIMIZE THERMAL IMPACTS

RUNOFF WILL BE CAPTURED AND DIRECTED TO SUBSURFACE UNDERDRAINS. RUNOFF FROM PAVED AREAS OF THE PROJECT DISCHARGE THROUGH BURIED PIPE, THEREBY CREATING AMPLE OPPORTUNITY FOR COOLING PRIOR TO REACHING THE SURFACE WATERS. THE MAJORITY OF THE DISTURBED SITE WILL DISCHARGE INTO THE UNDERGROUND DETENTION FACILITIES. AS SUCH, THE PROJECT WILL NOT HAVE AN ADVERSE IMPACT ON THE NATURAL TEMPERATURES OF THE RECEIVING WATERS.

CRITICAL STAGES OF CONSTRUCTION - LICENSED PROFESSIONAL TO BE PRESENT ON SITE	
1	PRE-CONSTRUCTION MEETING TO BE HELD PRIOR TO THE START OF CONSTRUCTION ACTIVITIES.
2	INSTALLATION OF MRC UNDERGROUND DETENTION FACILITY, IMPERMEABLE LINER, AND OUTLET CONTROL STRUCTURES.
3	INSPECTION PRIOR TO REMOVAL OF E&S CONTROLS.
4	FINAL INSPECTION AT PROJECT COMPLETION.

SEEDING AND SOIL SUPPLEMENTS

THE FOLLOWING SPECIFICATIONS ARE IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 804.

TEMPORARY SEED MIXTURES

SEED TYPE	% BY WEIGHT	PURITY	MAX. WEED SEED
(PENNDOT FORMULA E)			
ANNUAL RYEGRASS	100	95%	0.10%

APPLY SEED AT A RATE OF 10 LBS. PER 1,000 SY.
APPLY STRAW MULCH (SEE MULCH APPLICATION RATES TABLE)
SEEDING SEASON DATES: MARCH 15 TO OCTOBER 15

PERMANENT SEED MIXTURES

SEED TYPE	% BY WEIGHT	PURITY	MAX. WEED SEED
(PENNDOT FORMULA B)			
PERENNIAL RYEGRASS MIXTURE *	20	97%	0.10%
(LOLIUM PERENNE)			
CREEPING RED FESCUE	30	97%	0.10%
KENTUCKY BLUEGRASS MIXTURE **	50	97%	0.15%
(POA PRATENSIS)			

APPLY SEED AT A RATE OF 42 LBS. PER 1,000 SY.
APPLY STRAW OR HAY MULCH (SEE MULCH APPLICATION RATES TABLE).
APPLY PULVERIZED AGRICULTURAL LIMESTONE AT A RATE OF 2 TONS/ACRE UNLESS TESTING HAS BEEN PERFORMED.
APPLY 10-20-20 ANALYSIS COMMERCIAL FERTILIZER AT A RATE OF 678 LBS/ACRE UNLESS TESTING HAS BEEN PERFORMED.
SEEDING SEASON DATES: MARCH 15 TO JUNE 1; AUGUST 1 TO OCTOBER 15
APPLY FLEXTERRA FGM (OR EQUAL) ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

* A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL RYEGRASS COMPONENT.
** A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL BLUEGRASS COMPONENT.

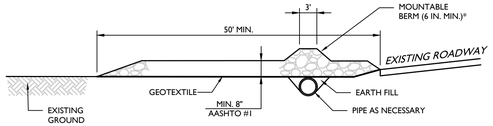
PERMANENT SEED MIXTURES ON STEEP SLOPES (SLOPES EXCEEDING 3:1)

SEED TYPE	% BY WEIGHT	PURITY	MAX. WEED SEED
(PENNDOT FORMULA L)			
HARD FESCUE	55	97%	0.10%
(FESTUCA LONGIFOLIA***)			
CREEPING RED FESCUE	35	97%	0.10%
(FESTUCA RUBRA)			
ANNUAL RYEGRASS			
(LOLIUM MULTIFLORUM)	10	95%	0.10%

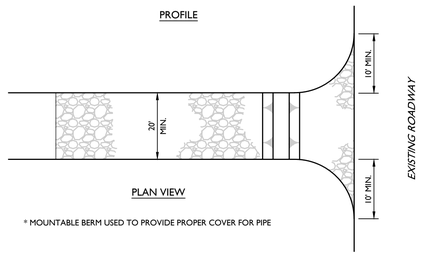
APPLY SEED AT A RATE OF 48 LBS / 1,000 SY.
MULCH WITH MULCH CONTROL NETTING OR EROSION CONTROL BLANKETS MUST BE INSTALLED.
APPLY PULVERIZED AGRICULTURAL LIMESTONE AT A RATE OF 2 TONS/ACRE UNLESS TESTING HAS BEEN PERFORMED.
APPLY 10-20-20 ANALYSIS COMMERCIAL FERTILIZER AT A RATE OF 678 LBS/ACRE UNLESS TESTING HAS BEEN PERFORMED.
SEEDING SEASON DATES: MARCH 15 TO JUNE 1; AUGUST 1 TO OCTOBER 15

*** A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL HARD FESCUE COMPONENT.

| MULCH APPLICATION RATE | | | | |
|



PROFILE



PLAN VIEW

* MOUNTABLE BERM USED TO PROVIDE PROPER COVER FOR PIPE

NOTES:

1. REMOVE TOPSOIL PRIOR TO INSTALLATION OF ROCK CONSTRUCTION ENTRANCE. EXTEND ROCK OVER FULL WIDTH OF ENTRANCE.
2. RUNOFF SHALL BE DIVERTED FROM ROADWAY TO A SUITABLE SEDIMENT REMOVAL BMP PRIOR TO ENTERING ROCK CONSTRUCTION ENTRANCE.
3. MOUNTABLE BERM SHALL BE INSTALLED WHEREVER OPTIONAL CULVERT PIPE IS USED AND PROPER PIPE COVER AS SPECIFIED BY MANUFACTURER IS NOT OTHERWISE PROVIDED, PIPE SHALL BE SIZED APPROPRIATELY FOR SIZE OF DITCH BEING CROSSED.
4. MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. IF EXCESSIVE AMOUNTS OF SEDIMENT ARE BEING DEPOSITED ON ROADWAY, EXTEND LENGTH OF ROCK CONSTRUCTION ENTRANCE BY 50 FOOT INCREMENTS UNTIL CONDITION IS ALLEVIATED OR INSTALL WASH RACK. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

STANDARD CONSTRUCTION DETAIL # 3-1
ROCK CONSTRUCTION ENTRANCE

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TABLE 4.1 COMPOST SOCK FABRIC MINIMUM SPECIFICATIONS

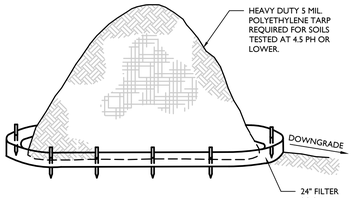
Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photo-degradable	Photo-degradable	Bio- degradable	Photo-degradable	Photo-degradable
Sock Diameters	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"
Mesh Opening	3/8"	3/8"	3/8"	3/8"	1/8"
Tensile Strength		26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years
Two-ply Systems					
Inner Containment Netting	HDPE biaxial net				
	Continuously wound				
	Fusion-welded junctures				
	3/4" x 3/4" Max. aperture size				
Outer Filtration Mesh	Composite Polypropylene Fabric (Woven layer and non-woven fleece mechanically fused via needle punch)				
	3/16" Max. aperture size				
Sock fabrics composed of burlap may be used on projects lasting 6 months or less.					

TABLE 4.2 COMPOST STANDARDS

Organic Matter Content	25% - 100% (dry weight basis)
Organic Portion	Fibrous and elongated
pH	5.5-8.5
Moisture Content	30%-60%
Particle Size	30% - 50% pass through ⅞" sieve
Soluble Salt Concentration	5.0 dS/m (mmhos/cm) Maximum

STANDARD CONSTRUCTION TABLE # 4 -1 & 4 -2

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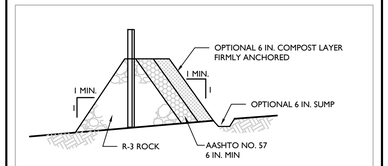


NOTES:

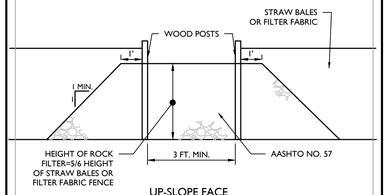
1. ALL STOCKPILES SHALL NOT TO BE LOCATED WITHIN 50 FEET OF A FLOODPLAIN, SLOPE, ROADWAY OR DRAINAGE FACILITY.

TOPSOIL STOCKPILE WITH FILTER SOCK DETAIL

NOT TO SCALE | MCPA-SOIL-EROS-2201 | 05/01/18



OUTLET CROSS-SECTION



UP-SLOPE FACE

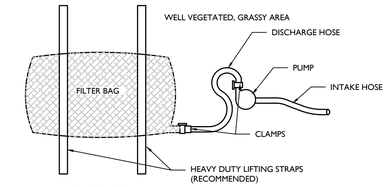
NOTES:

1. A ROCK FILTER OUTLET SHALL BE INSTALLED WHERE FAILURE OF A SILT FENCE OR STRAW BALE BARRIER HAS OCCURRED DUE TO CONCENTRATED FLOW. ANCHORED COMPOST LAYER SHALL BE USED ON UPSLOPE FACE IN HQ AND EV WATERSHEDS.
2. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF THE OUTLET.

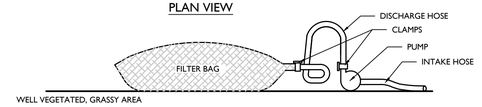
   INSPECTION: ROCK FILTER OUTLET SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT.
   MAINTENANCESEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH ┼ THE HEIGHT OF THE OUTLET.
   REPAIR: DAMAGED OR CLOGGED ROCK FILTER OUTLET SHALL BE REPLACED IMMEDIATELY.

STANDARD CONSTRUCTION DETAIL # 46
ROCK FILTER OUTLET

NOT TO SCALE | MCPA-SOIL-EROS-1900 | 05/01/18



PLAN VIEW



ELEVATION VIEW

NOTES:

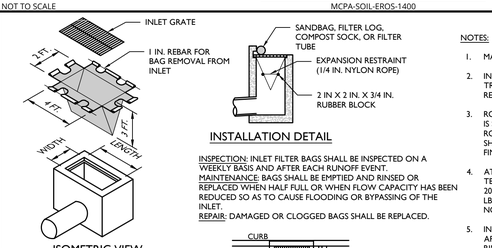
1. LOW VOLUME FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS. HIGH VOLUME FILTER BAGS SHALL BE MADE FROM WOVEN GEOTEXTILES THAT MEET THE FOLLOWING STANDARDS:

PROPERTY	TEST METHOD	MINIMUM STANDARD
AVG. WIDE WIDTH STRENGTH	ASTM D-4884	60 LB/IN
GRAB TENSILE	ASTM D-4632	205 LB
PUNCTURE	ASTM D-4833	110 LB
MULLEN BURST	ASTM D-3786	350 PSI
UV RESISTANCE	ASTM D-4355	70%
AOS % RETAINED	ASTM D-4751	80 SIEVE

2. A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES SHALL BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL OF SEDIMENT. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED. BAGS SHALL BE PLACED ON STRAPS TO FACILITATE REMOVAL UNLESS BAGS COME WITH LIFTING STRAPS ALREADY ATTACHED.
3. BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE UNDERLAYMENT AND FLOW PATH SHALL BE PROVIDED. BAGS MAY BE PLACED ON FILTER STONE TO INCREASE DISCHARGE CAPACITY. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%. FOR SLOPES EXCEEDING 5%, CLEAN ROCK OR OTHER NON-ERODIBLE AND NON-POLLUTING MATERIAL MAY BE PLACED UNDER THE BAG TO REDUCE SLOPE STEEPNESS.
4. NO DOWNSLOPE SEDIMENT BARRIER IS REQUIRED FOR MOST INSTALLATIONS. COMPOST BERM OR COMPOST FILTER SOCK SHALL BE INSTALLED BELOW BAGS LOCATED IN HQ OR EV WATERSHEDS, WITHIN 50 FEET OF ANY RECEIVING SURFACE WATER OR WHERE GRASSY AREA IS NOT AVAILABLE.
5. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED. A PIECE OF PVC PIPE IS RECOMMENDED FOR THIS PURPOSE.
6. THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHALL BE FLOATING AND SCREENED.
7. FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED.

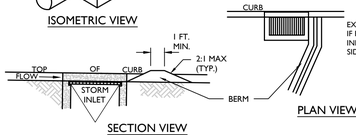
STANDARD CONSTRUCTION DETAIL # 3-16
PUMPED WATER FILTER BAG

NOT TO SCALE | MCPA-SOIL-EROS-1400 | 05/01/18



ISOMETRIC VIEW

INSTALLATION DETAIL



SECTION VIEW

PLAN VIEW

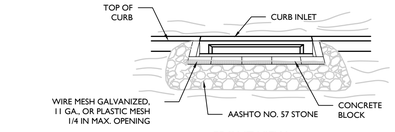
INSPECTION: INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT.
MAINTENANCE: BAGS SHALL BE EMPTIED AND RINSED OR REPLACED WHEN HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET.
REPAIR: DAMAGED OR CLOGGED BAGS SHALL BE REPLACED.

NOTES:

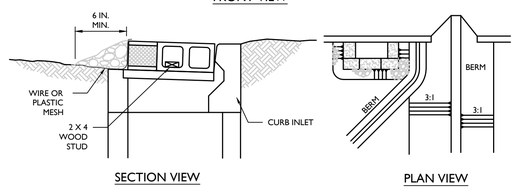
1. MAXIMUM DRAINAGE AREA = 1/2 ACRE.
2. INLET PROTECTION SHALL NOT BE REQUIRED FOR INLET TRIBUTARY TO SEDIMENT BASIN OR TRAP. BERMS SHALL BE REQUIRED FOR ALL INSTALLATIONS.
3. ROLLED EARTHEN BERM SHALL BE MAINTAINED UNTIL ROADWAY IS STONED. ROAD SUBBASE BERM SHALL BE MAINTAINED UNTIL ROADWAY IS PAVED. SIX INCH MINIMUM HEIGHT ASPHALT BERM SHALL BE MAINTAINED UNTIL ROADWAY SURFACE RECEIVES FINAL COAT.
4. AT A MINIMUM, THE FABRIC SHALL HAVE A MINIMUM GRAB TENSILE STRENGTH OF 120 LBS, A MINIMUM BURST STRENGTH OF 200 PSI, AND A MINIMUM TRAPEZOIDAL TEAR STRENGTH OF 50 LBS. FILTER BAGS SHALL BE CAPABLE OF TRAPPING ALL PARTICLES NOT PASSING A NO. 40 SIEVE.
5. INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. BAGS SHALL BE EMPTIED AND RINSED OR REPLACED WHEN HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET. DAMAGED OR CLOGGED BAGS SHALL BE REPLACED. A SUPPLY SHALL BE MAINTAINED ON SITE FOR REPLACEMENT OF BAGS. ALL NEEDED REPAIRS SHALL BE INITIATED IMMEDIATELY AFTER THE INSPECTION. DISPOSE OF ACCUMULATED SEDIMENT AS WELL AS ALL USED BAGS ACCORDING TO THE PLAN NOTES.
6. DO NOT USE ON MAJOR PAVED ROADWAYS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

STANDARD CONSTRUCTION DETAIL # 4-15
FILTER BAG INLET PROTECTION - TYPE C INLET

NOT TO SCALE | MCPA-SOIL-EROS-2400 | 05/01/18



FRONT VIEW



SECTION VIEW

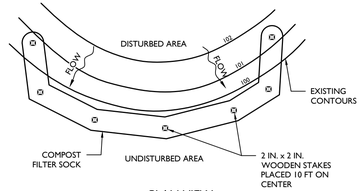
PLAN VIEW

NOTES:

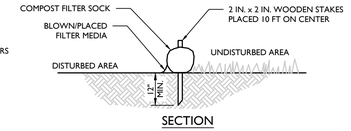
1. MAXIMUM DRAINAGE AREA = 1 ACRE.
2. INLET PROTECTION SHALL NOT BE REQUIRED FOR INLET TRIBUTARY TO SEDIMENT BASIN OR TRAP. BERMS SHALL BE REQUIRED FOR ALL INSTALLATIONS.
3. ROLLED EARTHEN BERM SHALL BE PROVIDED AND MAINTAINED IMMEDIATELY DOWN GRADIENT OF THE PROTECTED INLET UNTIL ROADWAY IS STONED. ROAD SUBBASE BERM SHALL BE MAINTAINED UNTIL ROADWAY IS PAVED. SIX INCH MINIMUM HEIGHT ASPHALT BERM SHALL BE MAINTAINED UNTIL ROADWAY SURFACE RECEIVES FINAL COAT.
4. SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE HEIGHT OF THE STONE. DAMAGED OR CLOGGED INSTALLATIONS SHALL BE REPAIRED OR REPLACED IMMEDIATELY.
5. FOR SYSTEMS DISCHARGING TO HQ OR EV SURFACE WATER, A 6 INCH THICK COMPOST LAYER SHALL BE SECURELY ANCHORED ON OUTSIDE AND OVER TOP OF STONE.
6. DO NOT USE ON MAJOR PAVED ROADWAYS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

STANDARD CONSTRUCTION DETAIL # 4-17
STONE AND CONCRETE BLOCK INLET PROTECTION - TYPE C INLET

NOT TO SCALE | MCPA-SOIL-EROS-2402 | 05/01/18



PLAN VIEW



SECTION

NOTES:

1. SOCK FABRIC SHALL MEET STANDARDS OF TABLE 4.1 OF THE PA DEP EROSION CONTROL MANUAL. COMPOST SHALL MEET THE STANDARDS OF TABLE 4.2 OF THE PA DEP EROSION CONTROL MANUAL.
2. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY BARRIER SHALL NOT EXCEED THAT SPECIFIED FOR THE SIZE OF THE SOCK AND THE SLOPE OF ITS TRIBUTARY AREA.
3. TRAFFIC SHALL NOT BE PERMITTED TO CROSS COMPOST FILTER SOCKS.
4. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE BARRIER AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
5. COMPOST FILTER SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
6. BIODEGRADABLE COMPOST FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
7. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

INSPECTION: COMPOST FILTER SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT.
MAINTENANCE:ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE ABOVEGROUND HEIGHT OF THE SOCK AND DISPOSED OF IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
REPAIR: DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.

STANDARD CONSTRUCTION DETAIL # 4-1
COMPOST FILTER SOCK

NOT TO SCALE | MCPA-SOIL-EROS-1600 | 05/01/18

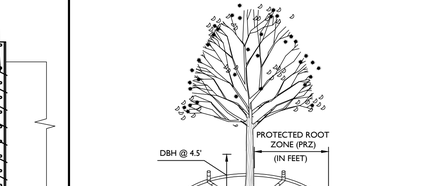
NOTES:

1. CONCRETE WASHOUTS ARE REQUIRED ON ALL CONSTRUCTION SITES INVOLVING CONCRETE AND STUCCO USE:
2. THE CONTRACTOR SHALL REQUIRE ALL CONCRETE DRIVERS TO UTILIZE THE CONCRETE WASHOUTS ONSITE.
3. WASHOUT FACILITIES SHALL BE LOCATED AT LEAST 50 FEET AWAY FROM STORM SEWER DRAIN INLETS, GUTTERS, OPEN DITCHES, AND WATER COURSES.
4. APPROPRIATE STONE SHOULD COVER PATHS TO CONCRETE WASHOUT.
5. THE NUMBER OF CONCRETE WASHOUTS DEPENDS ON THE EXPECTED DEMAND FOR STORAGE CAPACITY. LARGE SITES WITH EXTENSIVE CONCRETE WORK SHALL BE PLACED AT MULTIPLE LOCATIONS FOR USE BY CONCRETE TRUCK DRIVERS.
6. CONCRETE WASHOUT AREAS SHALL BE IDENTIFIED BY POSTING SIGNS ONSITE.
7. CONCRETE WASHOUTS ARE TO BE INSPECTED DAILY BY THE CONTRACTOR FOR LEAKS OR TEARS IN PLASTIC LINER.
8. REMOVE AND DISPOSE OF ALL MATERIAL WHEN THE WASHOUT HAS BEEN FILLED TO 75% CAPACITY.
9. PRIOR TO ANY RAINFALL, ALL CONCRETE WASHOUTS ARE TO BE CLEANED OUT OR COVERED.
10. ONCE THE MATERIAL HAS BEEN CLEANED OUT OF THE CONCRETE WASHOUT FACILITY, THE FACILITY MUST BE INSPECTED FOR REPAIR, RECONSTRUCTION OR REPLACEMENT. ALL PLASTIC LINING SHALL BE REMOVED AND REPLACED.
11. PRE-FABRICATED OR ONSITE FABRICATED CONCRETE WASHOUTS MAY BE USED.
12. OPTIONS FOR ONSITE CONCRETE WASHOUTS:
    A. DIG A PIT AND LINE WITH 10 MIL PLASTIC SHEETING.
    B. CREATE AN ABOVE-GROUND STRUCTURE FROM STRAW BALES OR SANDBAGS, WITH 10 MIL PLASTIC LINING.

INSPECTION: ALL CONCRETE WASHOUT FACILITIES SHOULD BE INSPECTED DAILY.
MAINTENANCE: ACCUMULATED MATERIALS SHOULD BE REMOVED WHEN THEY REACH 75% CAPACITY.
REPAIR: DAMAGED OR LEAKING WASHOUTS SHOULD BE DEACTIVATED AND REPAIRED OR REPLACED IMMEDIATELY.

CONCRETE WASHOUT DETAIL

NOT TO SCALE | MCPA-SOIL-EROS-1800 | 12/01/20



ORANGE CONSTRUCTION FENCE DETAIL

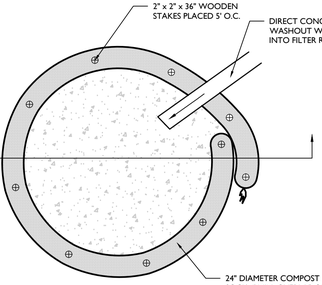
NOT TO SCALE | MCPA-SOIL-EROS-2100 | 05/01/18

NOTES:

1. MEASURE THE DBH (DIAMETER OF TREE AT BREAST HEIGHT, 4.5' ABOVE GROUND ON THE UPHILL SIDE) IN INCHES.
2. PROTECTED ROOT ZONE (PRZ) = CRITICAL ROOT ZONE IN FEET = DBH (INCHES) X 1.5' (FOR OLD/SENSITIVE TREES) OR DBH X 1.0 (FOR YOUNG/TOLERANT TREES)

TREE PROTECTION IN CUT AREAS DETAIL

NOT TO SCALE | MCPA-SOIL-EROS-2502 | 05/01/18



REV	DATE	DESCRIPTION	DRAWN BY
1	03/16/22	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS	CMM

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COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL C. RICHARD ROSEBERRY ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
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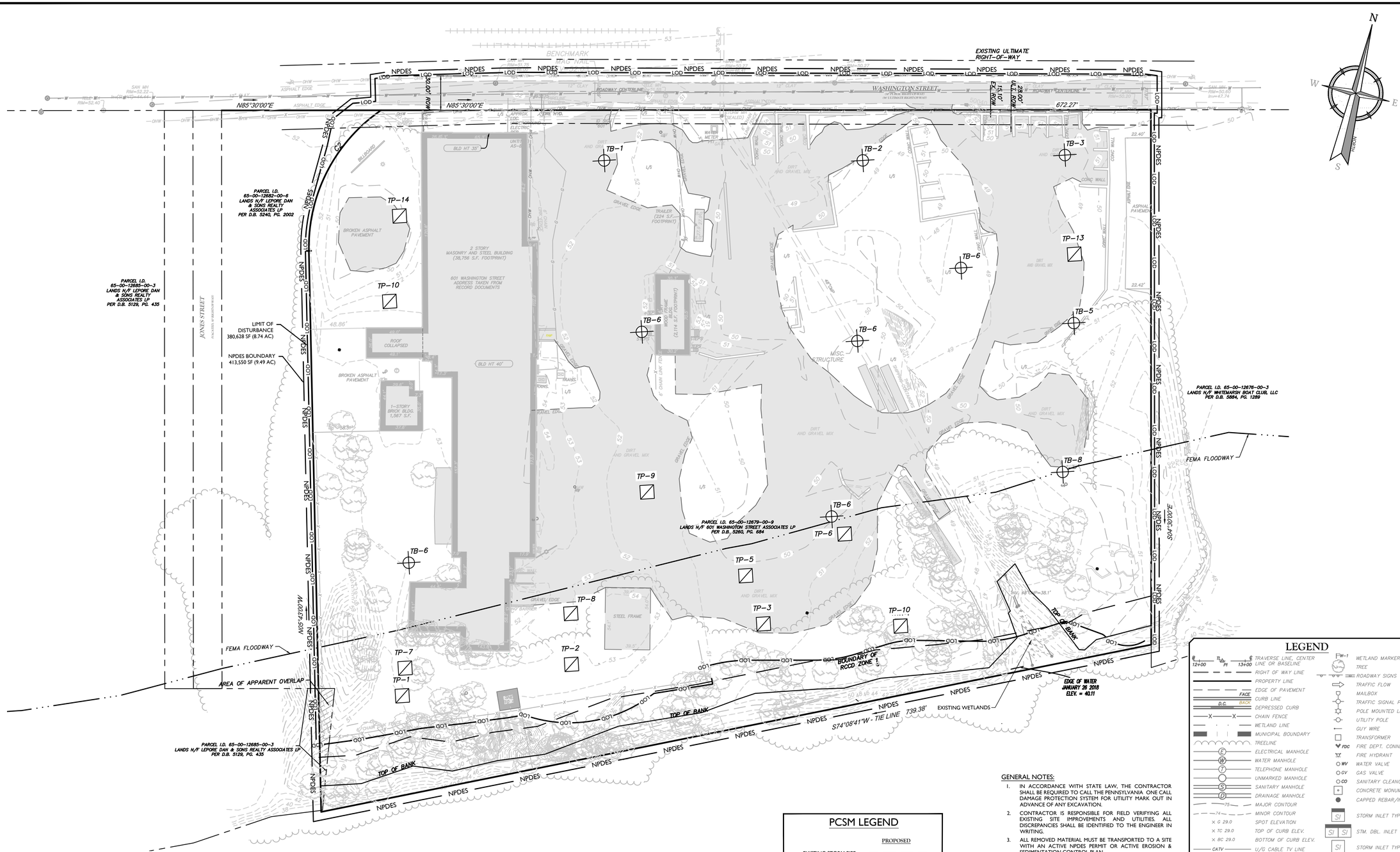
PROJECT NUMBER: 16001030B
DRAWING NAME: C-SESC-DTLS

SHEET TITLE: EROSION AND SEDIMENT POLLUTION CONTROL DETAILS

SHEET NUMBER: 22 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

20016001030B\Engineering\ESS\Plans\C-SESC-DTLS.dwg\C-SESC-DTLS 03/14/22 By: JOHN.MEYER



PCSM LEGEND

	PROPOSED
EXISTING STORM PIPE	
LIMIT OF DISTURBANCE	LOD
NPDES BOUNDARY	NPDES
POST-PROJECT IMPERVIOUS SURFACES	
TEST BORING LOCATION	TB-6
TEST PIT LOCATION	TP-6

GENERAL NOTES:

1. IN ACCORDANCE WITH STATE LAW, THE CONTRACTOR SHALL BE REQUIRED TO CALL THE PENNSYLVANIA ONE CALL DAMAGE PROTECTION SYSTEM FOR UTILITY MARK OUT IN ADVANCE OF ANY EXCAVATION.
2. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING SITE IMPROVEMENTS AND UTILITIES. ALL DISCREPANCIES SHALL BE IDENTIFIED TO THE ENGINEER IN WRITING.
3. ALL REMOVED MATERIAL MUST BE TRANSPORTED TO A SITE WITH AN ACTIVE NPDES PERMIT OR ACTIVE EROSION & SEDIMENTATION CONTROL PLAN.
4. ALL DEMOLITION DEBRIS TO BE REMOVED BY CONTRACTOR IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.
5. THE LIMIT OF DISTURBANCE AND NPDES BOUNDARIES ARE SHOWN OFFSET FROM OBJECTS AND OUTSIDE OF THE PROPERTY BOUNDARY FOR CLARITY. ALL DISTURBANCE WILL BE LOCATED WITHIN THE PROPERTY BOUNDARY AND LEGAL RIGHT-OF-WAY OF WINDSOR DRIVE.
6. BY GRAPHICAL REPRESENTATION ONLY THIS PROPERTY IS LOCATED IN FLOOD HAZARD ZONE AE AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 42091C0358G WHICH HAS AN EFFECTIVE DATE OF MARCH 2, 2016 AND IS IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE. THE FEMA CALCULATED 100-YEAR FLOOD ELEVATION FOR THIS PROJECT IS 60.5 FEET (NAVD 88) IN ACCORDANCE FIRM MAP NUMBER 42091C0358G DATED MARCH 2, 2016.

LEGEND

TRAVERSE LINE, CENTER LINE OR BASELINE	WETLAND MARKER
RIGHT OF WAY LINE	TREE
PROPERTY LINE	ROADWAY SIGNS
EDGE OF PAVEMENT	TRAFFIC FLOW
CURB LINE: FACE / D.C. BACK	MAILBOX
DEPRESSED CURB	TRAFFIC SIGNAL POLE
CHAIN FENCE	POLE MOUNTED LIGHT
WETLAND LINE	UTILITY POLE
MUNICIPAL BOUNDARY	GUY WIRE
TREELINE	TRANSFORMER
ELECTRICAL MANHOLE	FIRE DEPT. CONNECTION
WATER MANHOLE	FIRE HYDRANT
TELEPHONE MANHOLE	WATER VALVE
UNMARKED MANHOLE	GAS VALVE
SANITARY MANHOLE	SANITARY CLEANOUT
DRAINAGE MANHOLE	CONCRETE MONUMENT
MAJOR CONTOUR	CAPPED REBAR/IRON PIPE
MINOR CONTOUR	STORM INLET TYPE 'C'
SPOT ELEVATION	STM. DBL. INLET TYPE 'C'
TOP OF CURB ELEV.	STORM INLET TYPE 'M'
BOTTOM OF CURB ELEV.	STM. DBL. INLET TYPE 'M'
U/G CABLE TV LINE	FLARED END SECTION
U/G FIBER OPTIC LINE	HEADWALL
U/G TELEPHONE LINE	SOIL BOUNDARY
U/G ELECTRIC LINE	
OVERHEAD WIRE	
WATER MAIN	
GAS MAIN	
SAN. SEWER LATERAL	
SAN. SEWER MAIN	
STORM PIPE	

ABBREVIATIONS

D.C. = DEPRESSED CURB	FF = FINISH FLOOR	MHWL = MEAN HIGH WATERLINE
BC = BOTTOM OF CURB	UV = UNKNOWN VALVE	MLWL = MEAN LOW WATERLINE
TC = TOP OF CURB	MH = MANHOLE	TW = TOP OF WALL
BOL = BOLLARD	DEP. = DEPRESSED	BW = BOTTOM WALL
GRT = GRATE	CL = CENTERLINE	
MB = MAILBOX	PM = PARKING METER	

ENVIRONMENTAL NOTE:
THIS SET OF PLANS IS NOT DEPICTING ENVIRONMENTAL CONDITIONS OR A CERTIFICATION/WARRANTY REGARDING THE PRESENCE OR ABSENCE OF ENVIRONMENTALLY IMPACTED SITE CONDITIONS. COLLIERS ENGINEERING & DESIGN HAS PERFORMED NO EXPLORATORY OR TESTING SERVICES, INTERPRETATIONS, CONCLUSIONS, OR OTHER SITE ENVIRONMENTAL SERVICES RELATED TO THE DETERMINATION OF THE POTENTIAL FOR CHEMICAL, TOXIC, RADIOACTIVE, OR OTHER TYPE OF CONTAMINANTS AFFECTING THE PROPERTY AND THE UNDERSIGNED PROFESSIONAL IS NOT QUALIFIED TO DETERMINE THE EXISTENCE OF SAME. SHOULD ENVIRONMENTAL CONTAMINATION OR WASTE BE DISCOVERED, THE OWNER AND CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LAWS AND REGULATIONS.

THIS SITE ULTIMATELY FLOWS TO THE SCHUYLKILL RIVER, WHICH IS PART OF THE SCHUYLKILL RIVER WATERSHED. THE PENNSYLVANIA CODE, TITLE 25, CHAPTER 93, WATER QUALITY STANDARDS ASSIGNS THE SCHUYLKILL RIVER A WATER QUALITY DESIGNATION OF WARM WATER FISHERY, MIGRATORY FISHES (WWF, MF).

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL C. RICHARD ROSEBERRY ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
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PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
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WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
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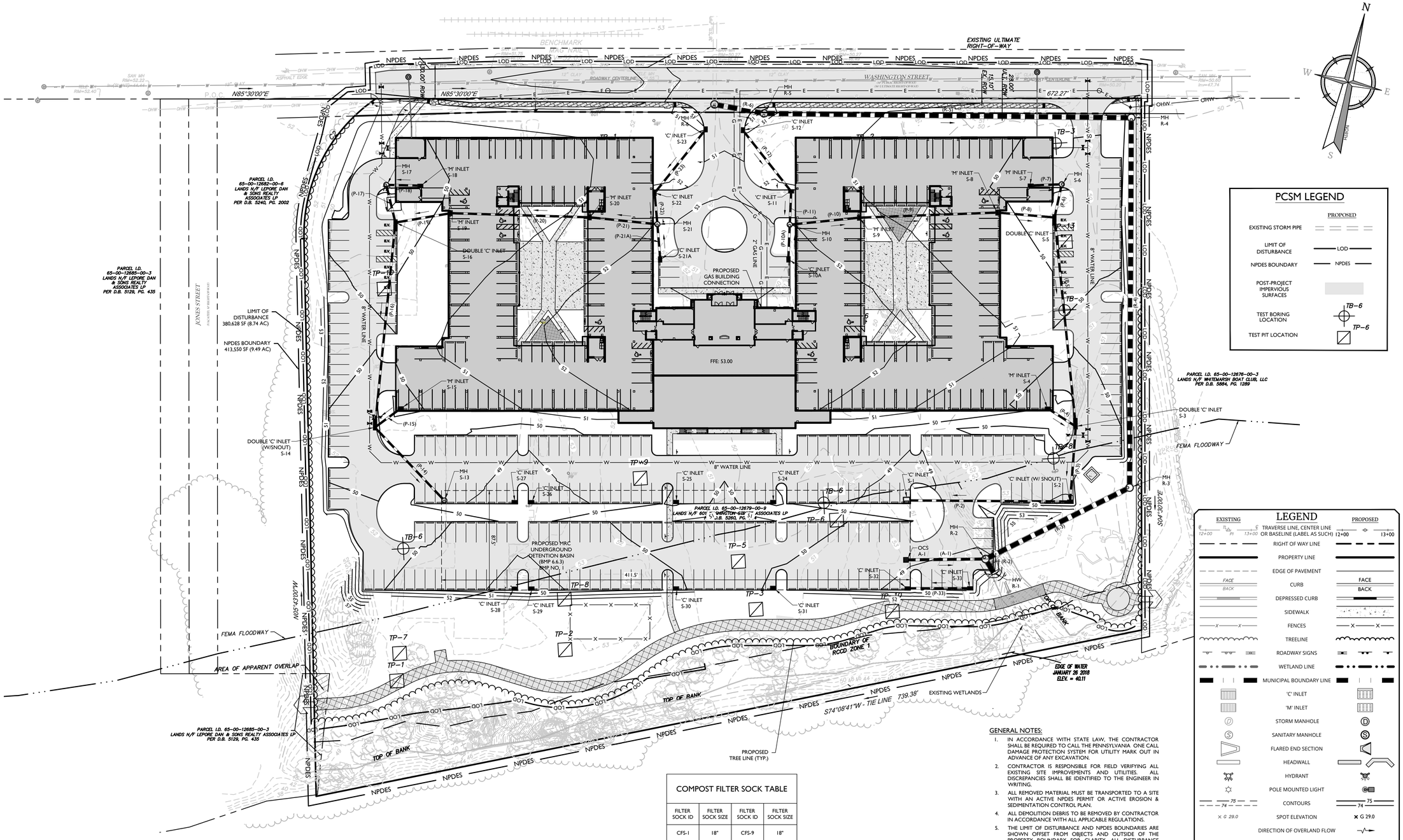
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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
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PROJECT NUMBER: 16001030B	DRAWING NAME: C-PCSM-PLAN		

SHEET TITLE:
PCSM EXISTING CONDITIONS

SHEET NUMBER:
23 of 27

2016\16001030B\Engineering\PCSM\C-PCSM-PLAN.dwg|P-ID_60.MO By: CHRIS.MESZLER



PCSM LEGEND

	PROPOSED
EXISTING STORM PIPE	
LIMIT OF DISTURBANCE	LOD
NPDES BOUNDARY	NPDES
POST-PROJECT IMPERVIOUS SURFACES	
TEST BORING LOCATION	TB-6
TEST PIT LOCATION	TP-6

LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'C' INLET	
	'M' INLET	
D	STORM MANHOLE	D
S	SANITARY MANHOLE	S
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
74 75	CONTOURS	75 74
× G 29.0	SPOT ELEVATION	× G 29.0
	DIRECTION OF OVERLAND FLOW	
× TC 29.0	TOP OF CURB ELEVATION	× TC 29.0
× BC 29.0	BOTTOM OF CURB ELEVATION	× BC 29.0
	TOP OF DEPRESSED CURB ELEVATION	× TDC 29.0
CATV	CABLE TV CONDUIT	CATV
W	WATER MAIN	W
G	GAS MAIN	G
T	TELEPHONE CONDUIT	T
E	ELECTRIC CONDUIT	E
	SANITARY PIPE	
	STORM PIPE	

SCALE : 1" = 40'

GENERAL NOTES:

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6. CONSTRUCTION FENCE TO BE INSTALLED AT THE DISCRETION OF THE CONSTRUCTION MANAGER. THE CONSTRUCTION FENCE MUST BE INSTALLED TO MAINTAIN SAFE VEHICULAR AND PEDESTRIAN TRAFFIC PATTERNS AT ALL TIMES THROUGHOUT CONSTRUCTION.
7. DO NOT INSTALL COMPOST FILTER SOCKS ON EROSION CONTROL MATTING.
8. BY GRAPHICAL REPRESENTATION ONLY THIS PROPERTY IS LOCATED IN FLOOD HAZARD ZONE AE AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 42091C0358G WHICH HAS AN EFFECTIVE DATE OF MARCH 2, 2016 AND IS IN A SPECIAL FLOOD HAZARD AREA, NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE. THE FEMA CALCULATED 100-YEAR FLOOD ELEVATION FOR THIS PROJECT IS 60.5 FEET (NAVD 88) IN ACCORDANCE FIRM MAP NUMBER 42091C0358G DATED MARCH 2, 2016.

COMPOST FILTER SOCK TABLE

FILTER SOCK ID	FILTER SOCK SIZE	FILTER SOCK ID	FILTER SOCK SIZE
CFS-1	18"	CFS-9	18"
CFS-2	18"	CFS-10	18"
CFS-3	18"	CFS-11	18"
CFS-4	18"	CFS-12	18"
CFS-5	18"	CFS-13	18"
CFS-6	18"	CFS-14	18"
CFS-7	18"	CFS-15	18"
CFS-8	18"		

ENVIRONMENTAL NOTE:
THIS SET OF PLANS IS NOT DEPICTING ENVIRONMENTAL CONDITIONS OR A CERTIFICATION/WARRANTY REGARDING THE PRESENCE OR ABSENCE OF ENVIRONMENTALLY IMPACTED SITE CONDITIONS. COLLIERS ENGINEERING & DESIGN HAS PERFORMED NO EXPLORATORY OR TESTING SERVICES, INTERPRETATIONS, CONCLUSIONS, OR OTHER SITE ENVIRONMENTAL SERVICES RELATED TO THE DETERMINATION OF THE POTENTIAL FOR CHEMICAL, TOXIC, RADIOACTIVE, OR OTHER TYPE OF CONTAMINANTS AFFECTING THE PROPERTY AND THE UNDERSIGNED PROFESSIONAL IS NOT QUALIFIED TO DETERMINE THE EXISTENCE OF SAME. SHOULD ENVIRONMENTAL CONTAMINATION OR WASTE BE DISCOVERED, THE OWNER AND CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LAWS AND REGULATIONS.

THIS SITE ULTIMATELY FLOWS TO THE SCHUYLKILL RIVER, WHICH IS PART OF THE SCHUYLKILL RIVER WATERSHED. THE PENNSYLVANIA CODE, TITLE 25, CHAPTER 93, WATER QUALITY STANDARDS ASSIGNS THE SCHUYLKILL RIVER A WATER QUALITY DESIGNATION OF WARM WATER FISHERY, MIGRATORY FISHES (WWF, MF).

40 0 40 80

SCALE : 1" = 40'

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

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C. Richard Roseberry
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LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER: 16001030B
DRAWING NAME: C-PCSM-PLAN

SHEET TITLE: PCSM PLAN

SHEET NUMBER: 24 of 27

2016\16001030B\Engineering\PCSM\C-PCSM PLAN.dwg/P-03 PLAN By: CHRIS MISZLER

POST-CONSTRUCTION STORMWATER MANAGEMENT GENERAL NOTES

1. FOR THE PURPOSES OF THIS PLAN, "BMP" REFERS TO A PROPOSED PCSM BEST MANAGEMENT PRACTICE.
2. DO NOT STOCKPILE EQUIPMENT, SOIL, OR MACHINERY WITHIN THE AREA OF AN INFILTRATION BMP.
3. DO NOT COMPACT INFILTRATION BMP SOIL BEDS DURING CONSTRUCTION. PROHIBIT ALL HEAVY EQUIPMENT FROM THE FLOOR AREA AND MINIMIZE ALL OTHER TRAFFIC. WHERE POSSIBLE, PERFORM WORK FROM THE PERIMETER OF THE BMP TO AVOID EXCESSIVE SOIL COMPACTION WITHIN THE LEVEL EARTH AREAS OF THE BMP.
4. A COMPLETE AND SITE SPECIFIC CONSTRUCTION SEQUENCE INCLUDING THE CONSTRUCTION OF ALL BMPS CAN BE FOUND ON THE EROSION AND SEDIMENT POLLUTION CONTROL PLANS.
5. THE PERMITTEE MUST PROVIDE ENGINEERING CONSTRUCTION OVERSIGHT FOR THE PROPOSED STORMWATER BMPS.
6. BEFORE INITIATING ANY REVISIONS TO THE APPROVED PCSM PLANS OR REVISIONS TO OTHER PLANS WHICH MAY AFFECT THE EFFECTIVENESS OF THE APPROVED PCSM PLAN, THE CONTRACTOR MUST RECEIVE APPROVAL OF THE REVISIONS FROM THE MONTGOMERY COUNTY CONSERVATION DISTRICT AND/OR PADEP.
7. ALL BUILDING MATERIALS AND WASTES SHALL BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET SEQ., 271.1, AND 287.1 ET. SEQ. NO BUILDING MATERIALS OR WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THIS SITE.
8. IN THE EVENT OF SINKHOLE DISCOVERY A PROFESSIONAL GEOLOGIST OR ENGINEER MUST BE CONTACTED CONCERNING MITIGATION. ADDITIONALLY, THE MONTGOMERY COUNTY CONSERVATION DISTRICT MUST BE MADE AWARE OF THE SINKHOLE DISCOVERY IMMEDIATELY.
9. THE CONTRACTOR SHALL ASSURE THAT THE APPROVED POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN IS PROPERLY AND COMPLETELY IMPLEMENTED.
10. PCSM PLAN HAS BEEN DESIGNED TO MINIMIZE IMPERVIOUS AREAS. IMPERVIOUS AREAS WILL BE LIMITED TO ROADWAY MAINTENANCE AND IMPROVEMENT AREAS, AND PERVIOUS AREAS WILL BE RESTORED IN OTHER AREAS WITHIN THE LIMIT OF DISTURBANCE.
11. PCSM PLAN HAS BEEN DESIGNED TO MAXIMIZE THE PROTECTION OF EXISTING DRAINAGE FEATURES AND EXISTING VEGETATION. THE PROPOSED DEVELOPMENT MAINTAINS THE GENERAL DRAINAGE PATTERN, VOLUME, AND RATE OF RUNOFF TO THE SURFACE WATER DISCHARGE. EXISTING VEGETATION IS PROTECTED BY RESTRICTING DISTURBED AREA.
12. PCSM PLAN HAS BEEN DESIGNED TO MINIMIZE LAND CLEARING AND GRADING. EARTH DISTURBANCE IS LIMITED ONLY TO AREAS OF PROPOSED IMPROVEMENTS. DISTURBED AREAS ARE TO BE STABILIZED IMMEDIATELY AFTER GRADING AND/OR IMPROVEMENTS ARE COMPLETED.
13. THE PCSM PLAN MINIMIZES SOIL COMPACTION. USE OF EXISTING ROADWAYS AND STABILIZED AREAS AND CONTROL OF DISTURBED AREAS FOR THE PLANNED IMPROVEMENTS LIMIT THE IMPACT OF SOIL COMPACTION.
14. PCSM PLAN UTILIZES STRUCTURAL AND NON-STRUCTURAL BMPS THAT PREVENT OR MINIMIZE CHANGES IN STORMWATER RUNOFF. SITE BMPS PREVENT OR MINIMIZE CHANGES IN STORMWATER RUNOFF BY CONTROLLING VOLUME AND PEAK RATE RUNOFF FROM THE SITE.
15. THE PCSM PLANS ARE SEPARATE FROM THE EROSION AND SEDIMENT POLLUTION CONTROL (E&SPC) PLANS, ARE CONSISTENT WITH THE E&SPC PLANS, AND ARE THE FINAL PLANS FOR CONSTRUCTION.
16. A SEALER WILL BE USED IN ALL INLETS LOCATED WTIHIN GRASSED AREAS AND WITHIN AREAS OF PCSM BMPS.

PCSM REQUIREMENTS

PCSM REPORTING AND RECORDKEEPING. THE PCSM PLAN, INSPECTION REPORTS AND MONITORING RECORDS MUST BE AVAILABLE FOR REVIEW AND INSPECTION BY PADEP OR THE CONSERVATION DISTRICT.

RESPONSIBLE PARTY & OWNER:

THE STORMWATER BMPS IN THE PROJECT SITE WILL BE OWNED, OPERATED, AND MAINTAINED BY:

601 WASHINGTON STREET ASSOCIATES, L.P.
201 KING OF PRUSSIA ROAD, SUITE 501
RADNOR, PA 19087
P: (610) 337-5582

LICENSED PROFESSIONAL OVERSIGHT OF CRITICAL STAGES. A LICENSED PROFESSIONAL OR A DESIGNEE MUST BE PRESENT ONSITE AND BE RESPONSIBLE DURING CRITICAL STAGES OF PCSM BMP IMPLEMENTATION OF THE APPROVED PCSM PLAN. FOR THE PURPOSES OF THIS PCSM PLAN, THE CRITICAL STAGES ARE CONSIDERED TO BE:

CRITICAL STAGES OF CONSTRUCTION - LICENSED PROFESSIONAL TO BE PRESENT ON SITE	
1	PRE-CONSTRUCTION MEETING TO BE HELD PRIOR TO THE START OF CONSTRUCTION ACTIVITIES.
2	INSTALLATION OF MRC UNDERGROUND DETENTION FACILITY, IMPERMEABLE LINER, AND OUTLET CONTROL STRUCTURES
3	INSPECTION PRIOR TO REMOVAL OF E&S CONTROLS.
4	FINAL INSPECTION AT PROJECT COMPLETION.

FINAL CERTIFICATION. THE PERMITTEE MUST INCLUDE WITH THE NOTICE OF TERMINATION "RECORD DRAWINGS" WITH A FINAL CERTIFICATION STATEMENT FROM A LICENSED PROFESSIONAL, WHICH READS AS FOLLOWS, OR AS THE CURRENT STANDARD READS:

"I (NAME) DO HEREBY CERTIFY PURSUANT TO THE PENALTIES OF 18 PA.C.S.A. CHAPTER 4904 TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF, THAT THE ACCOMPANYING RECORD DRAWINGS ACCURATELY REFLECT THE AS-BUILT CONDITIONS, ARE TRUE AND CORRECT, AND ARE IN CONFORMANCE WITH CHAPTER 102 OF THE RULES AND REGULATIONS OF PADEP OF ENVIRONMENTAL PROTECTION AND THAT THE PROJECT SITE WAS CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PCSM PLAN. ALL APPROVED PLAN CHANGES AND ACCEPTED CONSTRUCTION PRACTICES."

(1) THE PERMITTEE MUST RETAIN A COPY OF THE RECORD DRAWINGS AS A PART OF THE APPROVED PCSM PLAN.

(2) THE PERMITTEE MUST PROVIDE A COPY OF THE RECORD DRAWINGS AS A PART OF THE APPROVED PCSM PLAN TO THE PERSONS OR ENTITIES IDENTIFIED IN THIS SECTION AS BEING RESPONSIBLE FOR THE LONG-TERM OPERATION AND MAINTENANCE OF THE PCSM BMPS.

PCSM LONG TERM OPERATIONS AND MAINTENANCE REQUIREMENTS

UNTIL THE PERMITTEE OR CO-PERMITTEE HAS RECEIVED WRITTEN APPROVAL OF A NOTICE OF TERMINATION, THE PERMITTEE OR CO-PERMITTEE WILL REMAIN RESPONSIBLE FOR COMPLIANCE WITH THE PERMIT TERMS AND CONDITIONS INCLUDING LONG-TERM OPERATION AND MAINTENANCE OF ALL PCSM BMPS ON THE PROJECT SITE AND IS RESPONSIBLE FOR VIOLATIONS OCCURRING ON THE PROJECT SITE. PADEP AND/OR THE CONSERVATION DISTRICT WILL CONDUCT A FINAL INSPECTION AND APPROVE OR DENY THE NOTICE OF TERMINATION WITHIN 30 DAYS.

THE PERMITTEE OR CO-PERMITTEE IS RESPONSIBLE FOR LONG-TERM OPERATION AND MAINTENANCE OF PCSM BMPS UNLESS A DIFFERENT PERSON OR ENTITY IS IDENTIFIED IN THE NOTICE OF TERMINATION AND HAS AGREED TO LONG-TERM OPERATION AND MAINTENANCE OF PCSM BMPS.

FOR ANY PROPERTY CONTAINING A PCSM BMP, THE PERMITTEE OR CO-PERMITTEE SHALL RECORD AN INSTRUMENT WITH THE RECORDER OF DEEDS WHICH WILL ASSURE DISCLOSURE OF THE PCSM BMP AND THE RELATED OBLIGATIONS IN THE ORDINARY COURSE OF A TITLE SEARCH OF THE SUBJECT PROPERTY. THE RECORDED INSTRUMENT MUST IDENTIFY THE PCSM BMP, PROVIDE FOR NECESSARY ACCESS RELATED TO LONG-TERM OPERATION AND MAINTENANCE FOR PCSM BMPS AND PROVIDE NOTICE THAT THE RESPONSIBILITY FOR LONG-TERM OPERATION AND MAINTENANCE OF THE PCSM BMP IS A COVENANT THAT RUNS WITH THE LAND THAT IS BINDING UPON AND ENFORCEABLE BY SUBSEQUENT GRANTEES, AND PROVIDE PROOF OF FILING WITH THE NOTICE OF TERMINATION UNDER § 102.7(B)(5) (RELATING TO PERMIT TERMINATION).

THE PERSON RESPONSIBLE FOR PERFORMING LONG-TERM OPERATION AND MAINTENANCE MAY ENTER INTO AN AGREEMENT WITH ANOTHER PERSON INCLUDING A CONSERVATION DISTRICT, NONPROFIT ORGANIZATION, MUNICIPALITY, AUTHORITY, PRIVATE CORPORATION OR OTHER PERSON, TO TRANSFER THE RESPONSIBILITY FOR PCSM BMPS OR TO PERFORM LONG-TERM OPERATION AND MAINTENANCE AND PROVIDE NOTICE THEREOF TO THE DEPARTMENT.

A PERMITTEE OR CO-PERMITTEE THAT FAILS TO TRANSFER LONG-TERM OPERATION AND MAINTENANCE OF THE PCSM BMP OR OTHERWISE FAILS TO COMPLY WITH THIS REQUIREMENT SHALL REMAIN JOINTLY AND SEVERALLY RESPONSIBLE WITH THE LANDOWNER FOR LONG-TERM OPERATION AND MAINTENANCE OF THE PCSM BMPS LOCATED ON THE PROPERTY.

OPERATION AND MAINTENANCE FOR PCSM BMPS

OWNERSHIP OF THE PERMANENT BMPS INDICATED ON THE PCSM PLANS RESIDES WITHIN THE PROPERTY BOUNDARY FOR THE SUBJECT LOTS. THE OPERATIONS AND MAINTENANCE OF THESE BMPS WILL BECOME THE RESPONSIBILITY OF THE PROPERTY OWNER OR THEIR DESIGNEE. THIS OPERATION AND MAINTENANCE PLAN IS BASED ON CHAPTER 6 OF THE *PENNSYLVANIA STORMWATER BEST MANAGEMENT PRACTICES MANUAL AND SECTIONS 7 AND 8 OF THE PENNSYLVANIA HANDBOOK OF BEST MANAGEMENT PRACTICES FOR DEVELOPING AREAS.*

FOLLOWING THIS OPERATION AND MAINTENANCE PLAN WILL ALLOW THE BMPS TO FUNCTION PROPERLY. EACH BMP MUST BE INSPECTED ANNUALLY (UNLESS OTHERWISE NOTED) AND AFTER ANY MAJOR RUNOFF EVENTS, AS INDICATED.

LIMIT VEHICULAR OPERATION OVER THE BMPS TO AVOID COMPACTION OF THE SOILS OR AGGREGATE MATERIAL. TAKE CARE TO AVOID EXCESSIVE COMPACTION WHEN ACCESS IS REQUIRED. WHEN PERFORMING MAINTENANCE ACTIVITIES IN BMPS, OPERATE EQUIPMENT WITHOUT ENTERING THE FLOOR AREA, OR USE LIGHTWEIGHT, LOW GROUND PRESSURE, TRACK MOUNTED EQUIPMENT.

BMP MINIMUM INSPECTION CHECKLIST

- EXCESSIVE EROSION OR SEDIMENTATION
- UNSTABLE SIDE SLOPES AND EMBANKMENTS
- SEEPAGE THROUGH OUTSIDE FACE OF EMBANKMENTS
- CRACKING OR SETTLING
- SINKHOLES
- ANIMAL BURROWING
- DETERIORATION OF VEGETATION
- INVASIVE PLANT GROWTH
- SLUGGISH DRAINING
- ALGAE, STAGNANT POOLS, OR NOXIOUS ODORS
- RUTS, WASHOUTS, BULGES, SLIDES, SLOUGHS, SCARPS, OR SLUMPS
- RIP-RAP DISPLACEMENT OR FAILURE
- CRACKS OR RUST ON PIPING
- OBSTRUCTIONS BY TRASH AND DEBRIS
- SIGNS OF VANDALISM

IF DURING OPERATION, A SIGN OF FAILURE IS NOTED DURING INSPECTION, CORRECTIVE ACTION MUST BE COMPLETED BASED ON THE TYPE OF PROBLEM OBSERVED.

SEDIMENT REMOVAL

SEDIMENT MAY ACCUMULATE OVER TIME WITHIN BMPS AND STORM SEWER INLETS. THE DISTURBED AREAS OF THE BMPS MUST BE STABILIZED IMMEDIATELY. SEDIMENT ACCUMULATION IN STORM SEWER INLETS AND MANHOLES MUST BE REMOVED AND PROPERLY DISPOSED OF IN ACCORDANCE WITH PADEP REGULATIONS. SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN LANDSCAPED AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS OR DRAINAGE SWALES. THE SEDIMENT DISPOSAL AREA MUST BE STABILIZED IMMEDIATELY. ANY POTENTIALLY HAZARDOUS ACCUMULATIONS REMOVED FROM SUCH STRUCTURES MUST BE PROPERLY DISPOSED OF IN ACCORDANCE WITH PADEP REGULATIONS.

TERRESTRIAL VEGETATION MAINTENANCE

VEGETATIVE COVER MUST BE MOWED AT LEAST TWICE ANNUALLY, ALLOWING THE DEVELOPMENT OF THICK STANDS OF TALL GRASS AND OTHER PLANT VEGETATION.

INSPECT THE SEEDED AREAS AFTER ONE (1) YEAR. IF AN AREA HAS LESS THAN A UNIFORM 70 PERCENT VEGETATIVE PERENNIAL COVER, REEVALUATE THE CHOICE OF PLANT MATERIALS AND THE QUANTITIES OF SOILS SUPPLEMENTS USED. PREPARE THE SEEDBED AND REESTABLISH SEEDING. IF THE SEASON PREVENTS RE-SOWING, APPLY MULCH OR EROSION CONTROL MATTING FOR TEMPORARY STABILIZATION AND SEED THE AREA AS SOON AS PRACTICAL.

SPILLS

IN THE EVENT OF A SPILL, IMMEDIATELY INSPECT THE DOWNGRADIENT BMP(S) FOR CONTAMINATION. REMOVE AND PROPERLY DISPOSE OF SPILLED SUBSTANCES AND CONTAMINATED SOIL/MATERIALS. RESTORE THE AFFECTED BMP(S).

ALL RESTORATION AND REMEDIATION PROCEDURES FOR A SPILL FROM MATERIALS STORED ONSITE MUST COMPLY WITH THE MEASURES LISTED IN PENNSYLVANIA'S CLEAN STREAMS LAW.

UNDERGROUND DETENTION BASINS (PADEP BMP 6.6.3)

INSPECT THE UNDERGROUND DETENTION BASIN FOUR TIMES PER YEAR OR AS OFTEN AS FUTURE POLICIES ON STORMWATER BMP INSPECTIONS DICTATE.:

1. ALL BASIN STRUCTURES (INCLUDING PIPES, STONE, TRASH RACKS, OUTLETS STRUCTURES, AND INLETS) EXPECTED TO RECEIVE AND/OR TRAP DEBRIS AND SEDIMENT SHOULD BE INSPECTED FOR CLOGGING AND EXCESSIVE DEBRIS AND SEDIMENT ACCUMULATION.
2. SEDIMENT REMOVAL SHOULD BE CONDUCTED WHEN THE BASIN IS COMPLETELY DRY. SEDIMENT SHOULD BE DISPOSED OF PROPERLY AND ONCE SEDIMENT IS REMOVED, DISTURBED AREAS NEED TO BE IMMEDIATELY STABILIZED AND REVEGETATED.
3. VACUUMING OF THE SYSTEM MAY BE REQUIRED.
4. PAVED AREAS AT EACH INLET DISCHARGING INTO THE UNDERGROUND DETENTION SYSTEM SHOULD BE INSPECTED FOR SEDIMENT, CLOGGIN, AND PONDED WATER.
5. WATER SHOULD NOT BE PRESENT WITHIN THE UNDERGROUND DETENTION BASINS 7 DAYS AFTER A RAINFALL EVENT. IF WATER IS PRESENT AFTER THIS TIME, A DESIGN PROFESSIONAL SHOULD BE CONSULTED TO EVALUATE THE UNDERGROUND DETENTION BASIN.

ROCK APRONS

ADD ROCK AS NECESSARY TO RESTORE THE ROCK APRON TO THE APPROVED DESIGN SPECIFICATIONS.

SEEDING AND SOIL SUPPLEMENTS
THE FOLLOWING SPECIFICATIONS ARE IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 804.

TEMPORARY SEED MIXTURES

SEED TYPE (PENNDOT FORMULA E)	% BY WEIGHT	PURITY	MAX. WEED SEED
ANNUAL RYEGRASS	100	95%	0.10%

APPLY SEED AT A RATE OF 10 LBS. PER 1,000 SY.
APPLY STRAW MULCH (SEE MULCH APPLICATION RATES TABLE)
SEEDING SEASON DATES: MARCH 15 TO OCTOBER 15

PERMANENT SEED MIXTURES

SEED TYPE (PENNDOT FORMULA B)	% BY WEIGHT	PURITY	MAX. WEED SEED
PERENNIAL RYEGRASS MIXTURE * (LOLIUM PERENNE)	20	97%	0.10%
CREEPING RED FESCUE	30	97%	0.10%
KENTUCKY BLUEGRASS MIXTURE ** (POA PRATENSIS)	50	97%	0.15%

APPLY SEED AT A RATE OF 42 LBS. PER 1,000 SY.
APPLY STRAW OR HAY MULCH (SEE MULCH APPLICATION RATES TABLE).
APPLY PULVERIZED AGRICULTURAL LIMESTONE AT A RATE OF 2 TONS/ACRE UNLESS TESTING HAS BEEN PERFORMED.
APPLY 10-20-20 ANALYSIS COMMERCIAL FERTILIZER AT A RATE OF 678 LBS./ACRE UNLESS TESTING HAS BEEN PERFORMED.
SEEDING SEASON DATES: MARCH 15 TO JUNE 1; AUGUST 1 TO OCTOBER 15
APPLY FLEXTERRA FGM (OR EQUAL) ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

* A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL RYEGRASS COMPONENT.
** A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL BLUEGRASS COMPONENT.

PERMANENT SEED MIXTURES ON STEEP SLOPES (SLOPES EXCEEDING 3:1)

SEED TYPE (PENNDOT FORMULA L)	% BY WEIGHT	PURITY	MAX. WEED SEED
HARD FESCUE (FESTUCA LONGIFOLIA***)	55	97%	0.10%
CREEPING RED FESCUE (FESTUCA RUBRA)	35	97%	0.10%
ANNUAL RYEGRASS (LOLIUM MULTIFLORUM)	10	95%	0.10%

APPLY SEED AT A RATE OF 48 LBS / 1,000 SY.
MULCH WITH MULCH CONTROL NETTING OR EROSION CONTROL BLANKETS MUST BE INSTALLED.
APPLY PULVERIZED AGRICULTURAL LIMESTONE AT A RATE OF 2 TONS/ACRE UNLESS TESTING HAS BEEN PERFORMED.
APPLY 10-20-20 ANALYSIS COMMERCIAL FERTILIZER AT A RATE OF 678 LBS./ACRE UNLESS TESTING HAS BEEN PERFORMED.
SEEDING SEASON DATES: MARCH 15 TO JUNE 1; AUGUST 1 TO OCTOBER 15

*** A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL HARD FESCUE COMPONENT.

MULCH APPLICATION RATE				
MULCH TYPE	APPLICATION RATE (MIN)			NOTES
	PER ACRE	PER 1,000 SF	PER 1,000 SY	
STRAW	3 TONS	18 LB	160 LB	EITHER WHEAT OR OAT STRAW, FREE OF WEEDS, NOT CHOPPED OR FINELY BROKEN
HAY	3 TONS	18 LB	160 LB	TIMOTHY, MIXED CLOVER AND TIMOTHY OR OTHER NATIVE FORAGE GRASSES

PREPARATION OF AREAS TO BE TOPSOILED

GRADE THE AREAS TO BE COVERED BY TOPSOIL USING ACCEPTABLE METHODS, LOOSEN SOIL TO A MINIMUM DEPTH OF 2 INCHES, BEFORE PLACING THE TOPSOIL. REMOVE STONES AND OTHER FOREIGN MATERIAL 2 INCHES OR LARGER IN DIMENSION. REMOVE AND SATISFACTORILY DISPOSE OF UNSUITABLE AND SURPLUS MATERIAL

MEASURES PROVIDED TO MINIMIZE THERMAL IMPACTS

ALL RUNOFF FROM THE ROOF AREAS WILL BE CAPTURED AND DIRECTED TO SUBSURFACE UNDERDRAINS. RUNOFF FROM PAVED AREAS OF THE PROJECT DISCHARGE THROUGH BURIED PIPE, THEREBY CREATING AMPLE OPPORTUNITY FOR COOLING PRIOR TO REACHING THE SURFACE WATERS, THE MAJORITY OF THE SITE WILL BE DIRECTED TO UNDERGROUND DETENTION FACILITIES WHICH WILL PROVIDE ADDITIONAL TIME FOR WATER TO COOL. AS SUCH, THE PROJECT WILL NOT HAVE AN ADVERSE IMPACT ON THE NATURAL TEMPERATURES OF THE RECEIVING WATERS.

RECYCLING OR DISPOSAL OF MATERIALS

THE CONTRACTOR SHALL REMOVE FROM THE SITE, RECYCLE, OR DISPOSE OF ALL BUILDING MATERIALS AND WASTES IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA CODE 260.1 ET SEQ., 271.1 ET SEQ., AND 287.1 ET SEQ. THE CONTRACTOR SHALL NOT LEGALLY BURY, DUMP OR DISCHARGE ANY BUILDING MATERIAL OR WASTES AT THE SITE.

PROCEDURE FOR MANAGING SOIL, GROUNDWATER, AND OTHER POTENTIALLY CONTAMINATED MATERIALS GENERATED OR EXPOSED DURING CONSTRUCTION AND FOR THE REUSE AND/OR OFF-SITE DISPOSAL OF GENERATED MATERIALS

1. ANY EXCAVATED SOIL WHICH IS CONFIRMED TO BE CONTAMINATED AT CONCENTRATIONS WHICH EXCEED THE PADEP CLEAN FILL STANDARDS FOR RESIDENCES SHOULD BE DISPOSED OFF-SITE AT A PERMITTED FACILITY. DISPOSAL MANIFESTS SHOULD BE MAINTAINED. EXCAVATED SOILS SHOULD BE PLACED IMMEDIATELY INTO TRUCKS FOR OFF-SITE DISPOSAL. SOIL AWAITING OFF-SITE DISPOSAL SHALL BE PLACED ON AND COVERED BY POLYETHYLENE SHEETING.
2. IF THE SITE WILL NEED TO IMPORT OR EXPORT MATERIAL FROM THE SITE, THE RESPONSIBILITY FOR PERFORMING ENVIRONMENTAL DUE DILIGENCE AND DETERMINATION OF CLEAN FILL WILL REST WITH THE CONTRACTOR.
3. IF THE FILL MAY HAVE BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE, IT MUST BE TESTED TO DETERMINE IF IT QUALIFIES AS CLEAN FILL. TESTING SHOULD BE PERFORMED IN ACCORDANCE WITH APPENDIX A OF THE DEPARTMENT'S POLICY "MANAGEMENT OF FILL".
4. FILL MATERIAL THAT DOES NOT QUALIFY AS CLEAN FILL IS REGULATED FILL. REGULATED FILL IS WASTE AND MUST BE MANAGED IN ACCORDANCE WITH THE DEPARTMENT'S MUNICIPAL OR RESIDUAL WASTE REGULATIONS BASED ON 25 PA CODE CHAPTERS 287 RESIDUAL WASTE MANAGEMENT OR 271 MUNICIPAL WASTE MANAGEMENT, WHICHEVER IS APPLICABLE. THIS REGULATIONS ARE AVAILABLE ON-LINE AT WWW.PACODE.COM .

STORMSEWER PIPE TRENCH EXCAVATION NOTES

1. LIMIT ADVANCED CLEARING AND GRUBBING OPERATIONS TO A DISTANCE EQUAL TO TWO TIMES THE LENGTH OF PIPE INSTALLATION THAT CAN BE COMPLETED IN ONE DAY.
2. WORK CREWS AND EQUIPMENT FOR TRENCHING, PLACEMENT OF PIPE, PLUG CONSTRUCTION AND BACKFILLING WILL BE SELF CONTAINED AND SEPARATE FROM CLEARING AND GRUBBING AND SITE RESTORATION AND STABILIZATION OPERATIONS.
3. ALL SOIL EXCAVATED FROM THE TRENCH WILL BE PLACED ON THE UPHILL SIDE OF THE TRENCH.
4. LIMIT DAILY TRENCH EXCAVATION TO THE LENGTH OF PIPE PLACEMENT, PLUG INSTALLATION AND BACKFILLING THAT CAN BE COMPLETED THE SAME DAY.
5. WATER WHICH ACCUMULATES IN THE OPEN TRENCH WILL BE COMPLETELY REMOVED BY PUMPING BEFORE PIPE PLACEMENT AND / OR BACKFILLING BEGINS. WATER REMOVED FROM THE TRENCH SHALL BE PUMPED THROUGH A FILTRATION DEVICE.
6. ON THE DAY FOLLOWING PIPE PLACEMENT AND TRENCH BACKFILLING, THE DISTURBED AREA WILL BE GRADED TO FINAL CONTOURS AND IMMEDIATELY STABILIZED.

Proposed Storm Network Structure Table

Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
A-1	48 in. x 48 in. OCS	49.13			24" RCP	43.60
R-1	144 in. x 18 in. x 60 in. CONC. HW	42.48	48" RCP	38.10		
R-2	72 in. dia. CYLINDER MH	48.89	48" RCP 24" RCP	38.35 42.95	48" RCP	38.25
R-3	72 in. dia. CYLINDER MH	51.50	48" RCP	39.10	48" RCP	39.10
R-4	72 in. dia. CYLINDER MH	49.83	48" RCP	41.10	48" RCP	41.10
R-5	72 in. dia. CYLINDER MH	50.93	48" RCP	43.20	48" RCP	43.20
R-6	72 in. dia. CYLINDER MH	50.87			48" RCP	44.30
S-1	60 in. x 60 in. "C" INLET	48.60	18" RCP	43.60		
S-2	24 in. x 45 in. "C" INLET	48.86	18" RCP	44.45	18" RCP	44.35
S-3	24 in. x 45 in. "C" INLET	49.32	18" RCP 18" RCP	44.90 44.90	18" RCP	44.80
S-4	24 in. x 45 in. "M" INLET	49.73			18" RCP	45.05
S-5	24 in. x 45 in. "C" INLET	49.04	18" RCP 18" RCP	45.95 45.95	18" RCP	45.85
S-6	48 in. dia. CYLINDER MH	49.65	18" RCP	46.20	18" RCP	46.10
S-7	24 in. x 45 in. "M" INLET	49.68			18" RCP	46.35
S-8	24 in. x 45 in. "M" INLET	50.13	18" RCP	46.30	18" RCP	46.20
S-9	24 in. x 45 in. "M" INLET	51.24	18" RCP	47.00	18" RCP	46.90
S-10	48 in. dia. CYLINDER MH	52.36	18" RCP 18" RCP	47.30 47.30	18" RCP	47.30
S-10A	24 in. x 45 in. "C" INLET	52.14			18" RCP	47.46
S-11	24 in. x 45 in. "C" INLET	51.63	18" RCP	47.55	18" RCP	47.45
S-12	24 in. x 45 in. "C" INLET	50.47			18" RCP	47.90

Proposed Storm Network Structure Table

Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
S-13	48 in. dia. CONED MH	49.23	18" RCP	43.60		
S-14	24 in. x 45 in. "C' INLET	49.27	18" RCP 18" RCP	44.15 44.15	18" RCP	44.05
S-15	24 in. x 45 in. "M" INLET	49.71			18" RCP	44.30
S-16	24 in. x 45 in. "C' INLET	49.07	18" RCP 18" RCP	45.20 45.48	18" RCP	45.10
S-17	48 in. dia. CYLINDER MH	49.76	18" RCP	45.75	18" RCP	45.65
S-18	24 in. x 45 in. "M" INLET	49.67			18" RCP	45.90
S-19	24 in. x 45 in. "M" INLET	50.14	18" RCP	45.55	18" RCP	45.45
S-20	24 in. x 45 in. "M" INLET	51.22	18" RCP	46.30	18" RCP	46.20
S-21	48 in. dia. CYLINDER MH	52.34	18" RCP 18" RCP	46.70 46.70	18" RCP	46.60
S-21A	24 in. x 45 in. "C' INLET	52.15			18" RCP	46.87
S-22	24 in. x 45 in. "C' INLET	51.63	18" RCP	46.95	18" RCP	46.85
S-23	24 in. x 45 in. "C' INLET	50.48			18" RCP	47.35
S-24	24 in. x 45 in. "C' INLET	49.44				
S-25	24 in. x 45 in. "C' INLET	49.45				
S-26	24 in. x 45 in. "C' INLET	48.59				
S-27	24 in. x 45 in. "C' INLET	48.59				
S-28	24 in. x 45 in. "C' INLET	48.73				
S-29	24 in. x 45 in. "C' INLET	48.73				
S-30	24 in. x 45 in. "C' INLET	49.89				
S-31	24 in. x 45 in. "C' INLET	49.89				

Proposed Storm Network Pipe Table

Pipe I.D.	Description	Length	Invert Up	Invert Dn	Slope
P-21	18"RCP	60'	46.60	46.30	0.50%
P-21A	18"RCP	31'	46.87	46.70	0.55%
P-22	18"RCP	28'	46.85	46.70	0.54%
P-23	18"RCP	72'	47.35	46.95	0.56%
P-33	18"RCP	55'	44.50	43.60	1.64%
R-2	48"RCP	14'	38.25	38.10	1.04%
R-3	48"RCP	141'	39.10	38.35	0.53%
R-4	48"RCP	325'	41.10	39.10	0.62%
R-5	48"RCP	323'	43.20	41.10	0.65%
R-6	48"RCP	44'	44.30	43.20	2.49%

Proposed Storm Network Pipe Table

Pipe I.D.	Description	Length	Invert Up	Invert Dn	Slope
A-1	24"RCP	70'	43.60	42.95	0.93%
P-2	18"RCP	144'	44.35	43.60	0.52%
P-3	18"RCP	66'	44.80	44.45	0.53%
P-4	18"RCP	29'	45.05	44.90	0.51%
P-5	18"RCP	185'	45.85	44.90	0.51%
P-6	18"RCP	30'	46.10	45.95	0.50%
P-7	18"RCP	27'	46.35	46.20	0.55%
P-8	18"RCP	50'	46.20	45.95	0.50%
P-9	18"RCP	122'	46.90	46.30	0.50%
P-10	18"RCP	61'	47.30	47.00	0.50%
P-10A	18"RCP	31'	47.46	47.30	0.52%
P-11	18"RCP	29'	47.45	47.30	0.52%
P-12	18"RCP	69'	47.90	47.55	0.51%
P-14	18"RCP	89'	44.05	43.60	0.51%
P-15	18"RCP	28'	44.30	44.15	0.53%
P-16	18"RCP	181'	45.10	44.15	0.53%
P-17	18"RCP	34'	45.65	45.48	0.50%
P-18	18"RCP	30'	45.90	45.75	0.50%
P-19	18"RCP	49'	45.45	45.20	0.51%
P-20	18"RCP	122'	46.20	45.55	0.53%

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REV	DATE	DRAWN BY	DESCRIPTION

CULTEC RECHARGER® 360HD PRODUCT SPECIFICATIONS

GENERAL

CULTEC RECHARGER® 360HD CHAMBERS ARE DESIGNED FOR UNDERGROUND STORMWATER MANAGEMENT. THE CHAMBERS MAY BE USED FOR RETENTION, RECHARGING, DETENTION OR CONTROLLING THE FLOW OF ON-SITE STORMWATER RUNOFF.

CHAMBER PARAMETERS

1. THE CHAMBERS SHALL BE MANUFACTURED IN THE U.S.A. OR CANADA BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE CHAMBERS SHALL BE DESIGNED AND TESTED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". THE LOAD CONFIGURATION SHALL INCLUDE:
   A. INSTANTANEOUS AASHTO DESIGN TRUCK LIVE LOAD AT MINIMUM COVER
   B. MAXIMUM PERMANENT (50-YEAR) COVER LOAD
   C. 1-WEEK PARKED AASHTO DESIGN TRUCK LOAD
3. THE CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F3430-20 "STANDARD SPECIFICATION FOR CELLULAR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12, WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS. THE STRUCTURAL DESIGN OF THE CHAMBERS SHALL INCLUDE THE FOLLOWING:
   A. THE CREEP MODULUS SHALL BE 50-YEAR AS SPECIFIED IN ASTM F3430
   B. THE MINIMUM SAFETY FACTOR FOR LIVE LOADS SHALL BE 1.75
   C. THE MINIMUM SAFETY FACTOR FOR DEAD LOADS SHALL BE 1.95
5. THE CHAMBER SHALL BE STRUCTURAL FOAM INJECTION MOLDED OF BLUE VIRGIN HIGH MOLECULAR WEIGHT IMPACT-MODIFIED POLYPROPYLENE.
6. THE CHAMBER SHALL BE ARCHED IN SHAPE.
7. THE CHAMBER SHALL BE OPEN-BOTTOMED.
8. THE CHAMBER SHALL BE JOINED USING AN INTERLOCKING OVERLAPPING RIB METHOD. CONNECTIONS MUST BE FULLY SHOULDERED OVERLAPPING RIBS, HAVING NO SEPARATE COUPLINGS.
9. THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC RECHARGER® 360HD SHALL BE 36 INCHES (915 mm) TALL, 60 INCHES (1525 mm) WIDE AND 50 INCHES (1275 mm) LONG. THE INSTALLED LENGTH OF A JOINED RECHARGER® 360HD SHALL BE 3.67 FEET (1.12 m).
10. MULTIPLE CHAMBERS MAY BE CONNECTED TO FORM DIFFERENT LENGTH ROWS. EACH ROW SHALL BEGIN AND END WITH A SEPARATELY FORMED CULTEC RECHARGER® 360HD END CAP. MAXIMUM INLET OPENING ON THE END CAP IS 24 INCH (600 mm) HDPE OR 30 INCH (750mm) PVC.
11. THE CHAMBER SHALL HAVE TWO SIDE PORTALS TO ACCEPT CULTEC HVLV™ FC-48 FEED CONNECTORS TO CREATE AN INTERNAL MANIFOLD. MAXIMUM ALLOWABLE PIPE SIZE IN THE SIDE PORTAL IS 10 INCH (250mm) HDPE OR 12 INCH (300mm) PVC.
12. THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC HVLV™ FC-48 FEED CONNECTOR SHALL BE 12 INCHES (305 mm) TALL, 16 INCHES (406 mm) WIDE AND 49 INCHES (1245 mm) LONG.
13. THE NOMINAL STORAGE VOLUME OF THE RECHARGER® 360HD CHAMBER SHALL BE 10.0 FT³ / FT (.928 m³ / m) - WITHOUT STONE. THE NOMINAL STORAGE VOLUME OF A JOINED RECHARGER® 360HD SHALL BE 36.66 FT³ / UNIT (1.038 m³ / UNIT) - WITHOUT STONE.
14. THE NOMINAL STORAGE VOLUME OF THE HVLV™ FC-48 FEED CONNECTOR SHALL BE 0.913 FT³ / FT (0.085 m³ / m) - WITHOUT STONE.
15. THE RECHARGER® 360HD CHAMBER SHALL HAVE 7 CORRUGATIONS.
16. THE CHAMBER SHALL BE MANUFACTURED IN A FACILITY EMPLOYING CULTEC'S QUALITY CONTROL AND ASSURANCE PROCEDURES.
17. MAXIMUM ALLOWABLE COVER OVER THE TOP OF THE CHAMBER SHALL BE 12.0 FEET (3.66 m).

END CAP PARAMETERS

1. THE CULTEC RECHARGER® 360HD END CAP (REFERRED TO AS 'END CAP') SHALL BE MANUFACTURED IN THE U.S.A. OR CANADA BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE END CAP SHALL BE STRUCTURAL FOAM INJECTION MOLDED OF BLUE VIRGIN HIGH MOLECULAR WEIGHT IMPACT-MODIFIED POLYPROPYLENE.
3. THE END CAP SHALL BE ARCHED IN SHAPE.
4. THE END CAP SHALL BE OPEN-BOTTOMED.
5. THE END CAP SHALL BE JOINED AT THE BEGINNING AND END OF EACH ROW OF CHAMBERS USING AN INTERLOCKING OVERLAPPING RIB METHOD. CONNECTIONS MUST BE FULLY SHOULDERED OVERLAPPING RIBS, HAVING NO SEPARATE COUPLINGS.
6. THE END CAP SHALL HAVE 5 CORRUGATIONS.
7. THE NOMINAL DIMENSIONS OF THE END CAP SHALL BE 36.5 INCHES (927 mm) TALL, 60 INCHES (1525 mm) WIDE AND 18 INCHES (458 mm) LONG. WHEN JOINED WITH A RECHARGER 360HD CHAMBER, THE INSTALLED LENGTH OF THE END CAP SHALL BE 15 INCHES (381 mm).
8. THE NOMINAL STORAGE VOLUME OF THE END CAP SHALL BE 5.17 FT³ / FT (0.48 m³ / m) - WITHOUT STONE. THE NOMINAL STORAGE VOLUME OF AN INTERLOCKED END CAP SHALL BE 6.46 FT³ / UNIT (0.183 m³ / UNIT) - WITHOUT STONE.
9. MAXIMUM INLET OPENING ON THE END CAP IS 24 INCH (600 mm) HDPE OR 30 INCH (750mm) PVC.
10. THE CHAMBER SHALL BE MANUFACTURED IN A FACILITY EMPLOYING CULTEC'S QUALITY CONTROL AND ASSURANCE PROCEDURES
11. THE END CAP SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12.

CULTEC HVLV FC-48 FEED CONNECTOR PRODUCT SPECIFICATIONS

GENERAL

CULTEC HVLV FC-48 FEED CONNECTORS ARE DESIGNED TO CREATE AN INTERNAL MANIFOLD FOR CULTEC RECHARGER MODEL 360HD STORMWATER CHAMBERS.

FEED CONNECTOR PARAMETERS

1. THE FEED CONNECTOR SHALL BE MANUFACTURED BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE FEED CONNECTOR SHALL BE VACUUM THERMOFORMED OF BLACK HIGH MOLECULAR WEIGHT HIGH DENSITY POLYETHYLENE (HMWHDPE).
3. THE FEED CONNECTOR SHALL BE ARCHED IN SHAPE.
4. THE FEED CONNECTOR SHALL BE OPEN-BOTTOMED.
5. THE NOMINAL DIMENSIONS OF THE CULTEC HVLV FC-48 FEED CONNECTOR SHALL BE 12 INCHES (305 mm) TALL, 16 INCHES (406 mm) WIDE AND 49 INCHES (1245 mm) LONG.
6. THE NOMINAL STORAGE VOLUME OF THE HVLV FC-48 FEED CONNECTOR SHALL BE 0.913 FT³ / FT (0.085 m³ / m) - WITHOUT STONE.
7. THE HVLV FC-48 FEED CONNECTOR SHALL HAVE 4 CORRUGATIONS.
8. THE HVLV FC-48 FEED CONNECTOR MUST BE FORMED AS A WHOLE UNIT HAVING TWO OPEN END WALLS AND HAVING NO SEPARATE END PLATES OR SEPARATE END WALLS. THE UNIT SHALL FIT INTO THE SIDE PORTALS OF THE CULTEC RECHARGER STORMWATER CHAMBER AND ACT AS CROSS FEED CONNECTIONS CREATING AN INTERNAL MANIFOLD.
9. THE FEED CONNECTOR SHALL BE DESIGNED TO WITHSTAND AASHTO HS-25 DEFINED LOADS WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS.
10. THE FEED CONNECTOR SHALL BE MANUFACTURED IN AN ISO 9001:2008 CERTIFIED FACILITY.

CULTEC NO. 410™ NON-WOVEN GEOTEXTILE

CULTEC NO. 410™ NON-WOVEN GEOTEXTILE MAY BE USED WITH CULTEC CONTACTOR® AND RECHARGER® STORMWATER INSTALLATIONS TO PROVIDE A BARRIER THAT PREVENTS SOIL INTRUSION INTO THE STONE.

GEOTEXTILE PARAMETERS

1. THE GEOTEXTILE SHALL BE PROVIDED BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE GEOTEXTILE SHALL BE BLACK IN APPEARANCE.
3. THE GEOTEXTILE SHALL HAVE A TYPICAL WEIGHT OF 4.5 OZ/SY (142 G/M).
4. THE GEOTEXTILE SHALL HAVE A TENSILE STRENGTH VALUE OF 120 LBS (533 N) PER ASTM D4632 TESTING METHOD.
5. THE GEOTEXTILE SHALL HAVE AN ELONGATION @ BREAK VALUE OF 50% PER ASTM D4632 TESTING METHOD.
6. THE GEOTEXTILE SHALL HAVE A MULLEN BURST VALUE OF 225 PSI (1551 KPA) PER ASTM D3786 TESTING METHOD.
7. THE GEOTEXTILE SHALL HAVE A PUNCTURE STRENGTH VALUE OF 65 LBS (289 N) PER ASTM D4833 TESTING METHOD.
8. THE GEOTEXTILE SHALL HAVE A CBR PUNCTURE VALUE OF 340 LBS (1513 N) PER ASTM D6241 TESTING METHOD.
9. THE GEOTEXTILE SHALL HAVE A TRAPEZOID TEAR VALUE OF 50 LBS (222 N) PER ASTM D4533 TESTING METHOD.
10. THE GEOTEXTILE SHALL HAVE A AOS VALUE OF 70 U.S. SIEVE (0.212 MM) PER ASTM D4751 TESTING METHOD.
11. THE GEOTEXTILE SHALL HAVE A PERMITTIVITY VALUE OF 1.7 SEC-1 PER ASTM D4491 TESTING METHOD.
12. THE GEOTEXTILE SHALL HAVE A WATER FLOW RATE VALUE OF 135 GAL/MIN/SF (5500 L/MIN/SM) PER ASTM D4491 TESTING METHOD.
13. THE GEOTEXTILE SHALL HAVE A UV STABILITY @ 500 HOURS VALUE OF 70% PER ASTM D4355 TESTING METHOD.

CULTEC NO. 4800™ WOVEN GEOTEXTILE

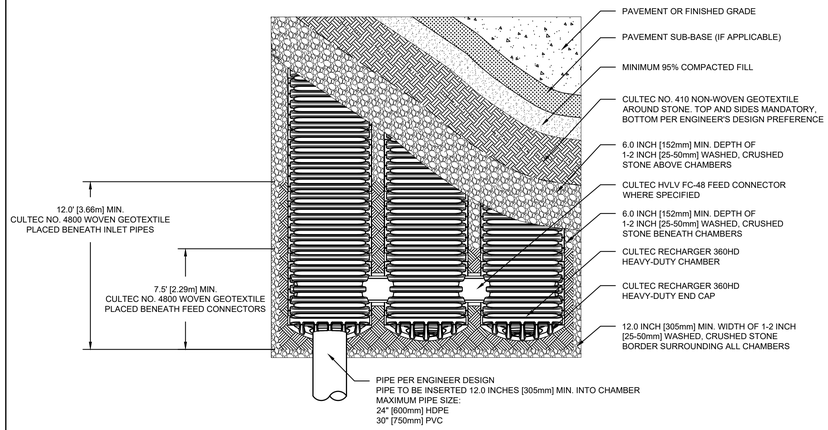
CULTEC NO. 4800 WOVEN GEOTEXTILE IS DESIGNED AS A UNDERLAYMENT TO PREVENT SCOURING CAUSED BY WATER MOVEMENT WITHIN THE CULTEC CHAMBERS AND FEED CONNECTORS UTILIZING THE CULTEC MANIFOLD FEATURE. IT MAY ALSO BE USED AS A COMPONENT OF THE CULTEC SEPARATOR ROW TO ACT AS A BARRIER TO PREVENT SOIL/CONTAMINANT INTRUSION INTO THE STONE WHILE ALLOWING FOR MAINTENANCE.

GEOTEXTILE PARAMETERS

1. THE GEOTEXTILE SHALL BE PROVIDED BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE GEOTEXTILE SHALL BE BLACK IN APPEARANCE.
3. THE GEOTEXTILE SHALL HAVE A TENSILE STRENGTH OF 550 X 550 LBS (2,448 X 2,448 N) PER ASTM D4632 TESTING METHOD.
4. THE GEOTEXTILE SHALL HAVE A ELONGATION @ BREAK RESISTANCE OF 20 X 20% PER ASTM D4632 TESTING METHOD.
5. THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE OF 5,070 X 5,070 LBS/FT (74 X 74 KN/M) PER ASTM D4595 TESTING METHOD.
6. THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE @ 2% STRAIN OF 960 X 1,096 LBS/FT (14 X 16 KN/M) PER ASTM D4595 TESTING METHOD.
7. THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE @ 5% STRAIN OF 2,740 X 2, 740 LBS/FT (40 X 40 KN/M) PER ASTM D4595 TESTING METHOD.
8. THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE @ 10% STRAIN OF 4,800 X 4,800 LBS/FT (70 X 70 KN/M) PER ASTM D4595 TESTING METHOD.
9. THE GEOTEXTILE SHALL HAVE A CBR PUNCTURE RESISTANCE OF 1,700 LBS (7,560 N) PER ASTM D6241 TESTING METHOD.
10. THE GEOTEXTILE SHALL HAVE A TRAPEZOIDAL TEAR RESISTANCE OF 180 X 180 LBS (801 X 801 N) PER ASTM D4533 TESTING METHOD.
11. THE GEOTEXTILE SHALL HAVE AN APPARENT OPENING SIZE OF 40 US STD. SIEVE (0.425 MM) PER ASTM D4751 TESTING METHOD.
12. THE GEOTEXTILE SHALL HAVE A PERMITTIVITY RATING OF 0.15 SEC-1 PER ASTM D4491 TESTING METHOD.
13. THE GEOTEXTILE SHALL HAVE A WATER FLOW RATING OF 11.5 GPM/FT2 (470 LPM/M2) PER ASTM D4491 TESTING METHOD.
14. THE GEOTEXTILE SHALL HAVE A UV RESISTANCE OF 80% @ 500 HRS. PER ASTM D4355 TESTING METHOD.

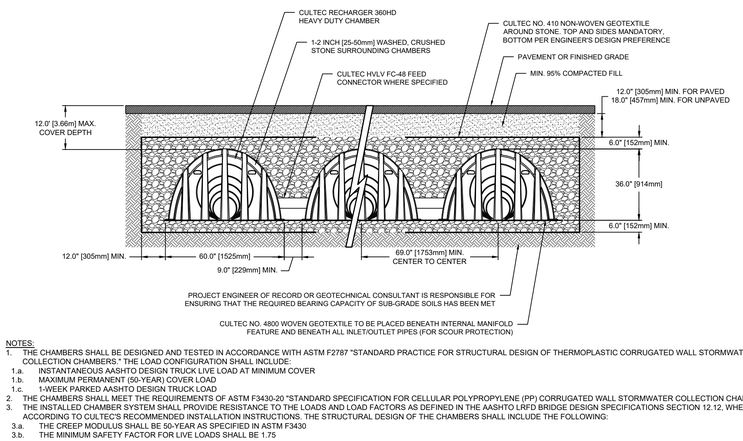
360HD 1.0

GENERAL NOTES



360HD 2.0

CULTEC RECHARGER 360HD HEAVY DUTY PLAN VIEW

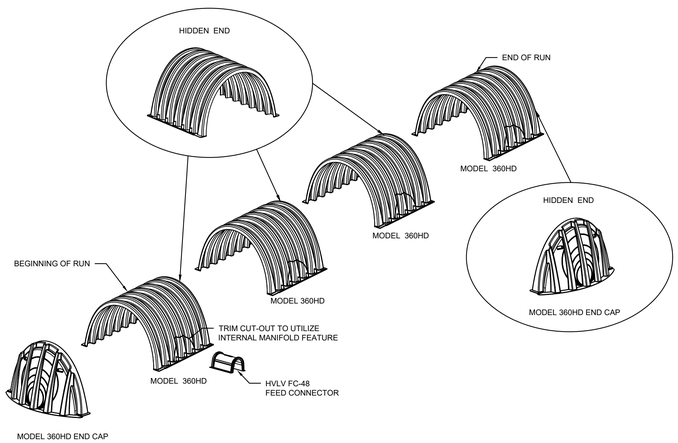


NOTES:

1. THE CHAMBERS SHALL BE DESIGNED AND TESTED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS." THE LOAD CONFIGURATION SHALL INCLUDE:
   1.a. INSTANTANEOUS AASHTO DESIGN TRUCK LIVE LOAD AT MINIMUM COVER
   1.b. MAXIMUM PERMANENT (50-YEAR) COVER LOAD
   1.c. 1-WEEK PARKED AASHTO DESIGN TRUCK LOAD
2. THE CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F3430-20 "STANDARD SPECIFICATION FOR CELLULAR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS"
3. THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12, WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS. THE STRUCTURAL DESIGN OF THE CHAMBERS SHALL INCLUDE THE FOLLOWING:
   3.a. THE CREEP MODULUS SHALL BE 50-YEAR AS SPECIFIED IN ASTM F3430
   3.b. THE MINIMUM SAFETY FACTOR FOR LIVE LOADS SHALL BE 1.75
   3.c. THE MINIMUM SAFETY FACTOR FOR DEAD LOADS SHALL BE 1.95

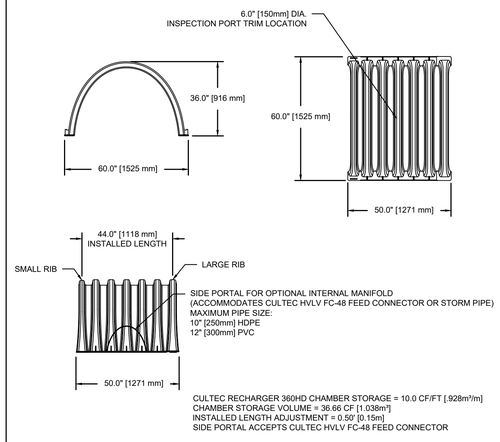
360HD 5.0

CULTEC RECHARGER 360HD HEAVY DUTY CROSS SECTION



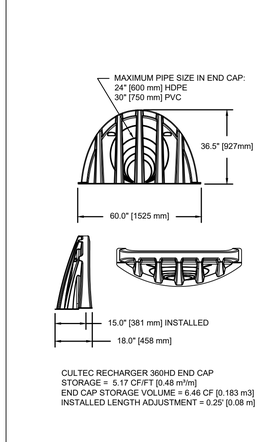
360HD 6.0

CULTEC RECHARGER 360HD HEAVY DUTY TYPICAL INTERLOCK



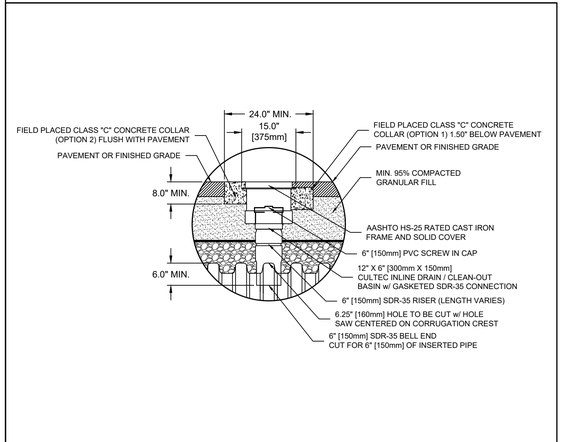
360HD 3.0

CULTEC RECHARGER 360HD HEAVY DUTY THREE VIEW



360HD 4.0

CULTEC RECHARGER 360HD HEAVY DUTY END CAP THREE VIEW



360HD 9.0

CULTEC INSPECTION PORT - ZOOM DETAIL

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1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — C. RICHARD ROSEBERRY — ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

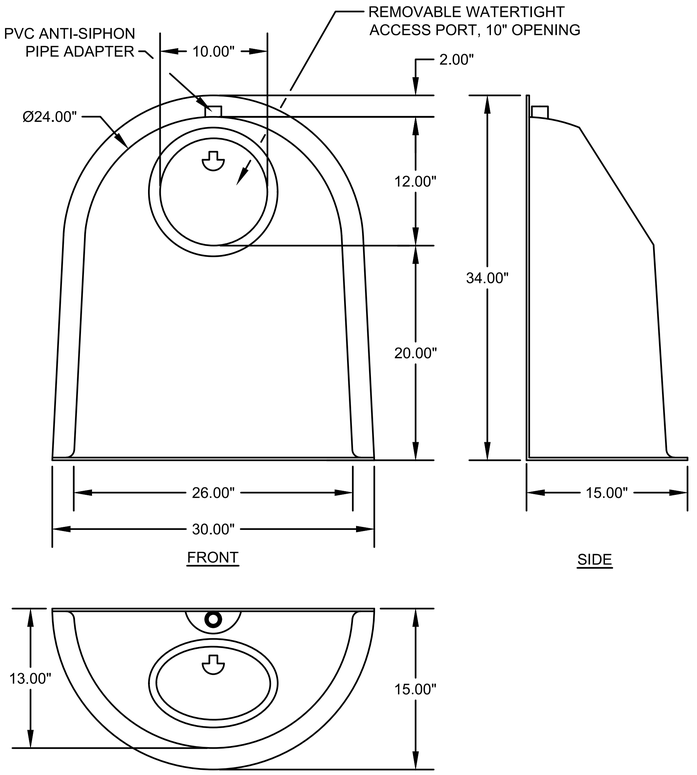
PROJECT NUMBER: 160010308 | DRAWING NAME: C-PCSM-DTLS

SHEET TITLE: PCSM DETAILS

SHEET NUMBER: 26 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\160010308\Engineering\PCSM\C-PCSM-DTLS.dwg, 6/6/2022 8:45:45 AM, By: CMM, MYCELER



U.S.PATENT #6126817 ADDITIONAL PATENTS PENDING

BMP, INC.
53 MT. ARCHER ROAD, LYME, CT. 06371
(800) 504-8008 FAX: (860)434-3195

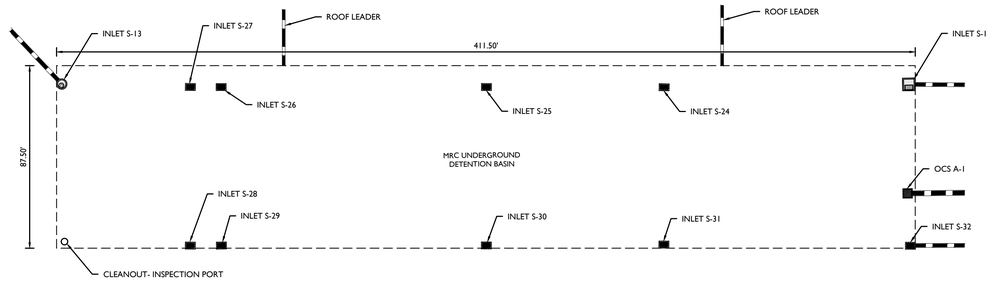
DESCRIPTION	DATE	SCALE
24F SNOUT OIL & DEBRIS STOP	09/20/99	NONE
	DRAWING NUMBER	
	24F	

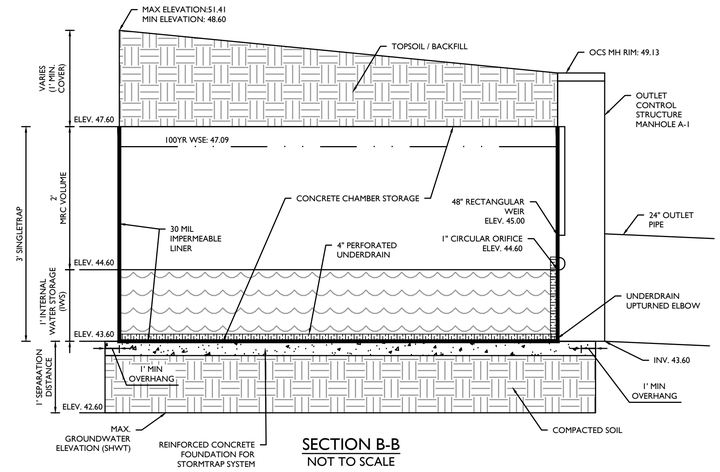
SNOUT BMP CONSTRUCTION SEQUENCE:

1. STABILIZE ALL CONTRIBUTING AREAS BEFORE INSTALLING AND CONNECTING PIPES TO THESE INLETS.
2. FOLLOW MANUFACTURER'S GUIDELINES FOR INSTALLATION. DO NOT USE SNOUTS DURING CONSTRUCTION UNLESS PRODUCT IS DESIGNED PRIMARILY FOR SEDIMENT REMOVAL.

SNOUT BMP MANUFACTURER'S INSTALLATION INSTRUCTIONS:

1. CENTER THE SNOUT® DIRECTLY OVER THE EXIT PIPE SO THAT THE ENTIRE PIPE IS COVERED AND SO THAT THE LOWER EDGE OF THE HOOD IS AT LEAST 1/2 THE PIPE DIAMETER BELOW THE LOWEST INSIDE POINT OF THE PIPE (DEEPER IS EVEN BETTER.)
2. DRILL * EQUALLY SPACED 7/16" HOLES THROUGH THE SNOUT® FLANGE. (*NUMBER OF HOLES VARY DEPENDING ON SIZE OF SNOUT®.)
3. MARK AND DRILL CATCH BASIN AND INSTALL THE TAMP-IN LEAD ANCHORS.
   - 3.1. DRILL A 3/4"HOLE INTO THE BASE MATERIAL TO THE REQUIRED DEPTH (APPROXIMATELY 1-1/4" DEEP.)
   - 3.2. BLOW THE HOLE CLEAN OF DUST AND OTHER MATERIAL.
   - 3.3. INSERT THE ANCHOR INTO THE HOLE. NARROW END OF CONE MUST POINT OUT, LEAD SHIELD SLIDES OVER CONE.
   - 3.4. POSITION THE SETTING TOOL OR A 9/16 SOCKET AGAINST THE ANCHOR OUTER CONE. (THE OUTER RIM OF THE TOOL OR SOCKET SHOULD SEAT ONTO THE LEAD SHIELD RIM.) SET THE ANCHOR BY DRIVING THE LEAD SLEEVE OVER THE CONE USING SEVERAL SHARP HAMMER BLOWS. BE SURE THE ANCHOR IS AT THE REQUIRED EMBEDMENT DEPTH (FLUSH OR SLIGHTLY BELOW FACE OF CONCRETE)
4. ATTACH THE VENT PIPE ADAPTER IN THE PRE-DRILLED HOLE IN THE TOP OF THE SNOUT® USING THE 2 FLAT O RING GASKETS AND PVC LOCK-NUT SUPPLIED IN THE KIT. INSTALL WITH FEMALE SLIP ADAPTER UP AND A WASHER ON EACH SIDE OF THE SNOUT® SHELL. TIGHTEN LOCK-NUT HAND TIGHT.
5. REMOVE PSA BACKING AND WITH FIRM PRESSURE, ATTACH GASKET STRIP(S) TO BACK OF FLANGE AND TRIM EXCESS.
6. ATTACH THE SNOUT® TO THE CATCH BASIN WALL WITH 3/8" DIAMETER STAINLESS STEEL BOLTS IN LEAD EXPANSION ANCHORS. DO NOT OVER TIGHTEN; 10-15 FOOT-POUNDS SHOULD BE SUFFICIENT.
7. CUT THE ANTI-SIPHON VENT STACK TO LENGTH AND ATTACH TO HOOD AT SLIP ADAPTER WITH PVC CEMENT.
8. ATTACH 90 DEGREE FITTING TO VENT STACK WITH PVC CEMENT. ENSURE THAT FITTING OPENING IS ACCESSIBLE FOR MAINTENANCE AND INSPECTION.

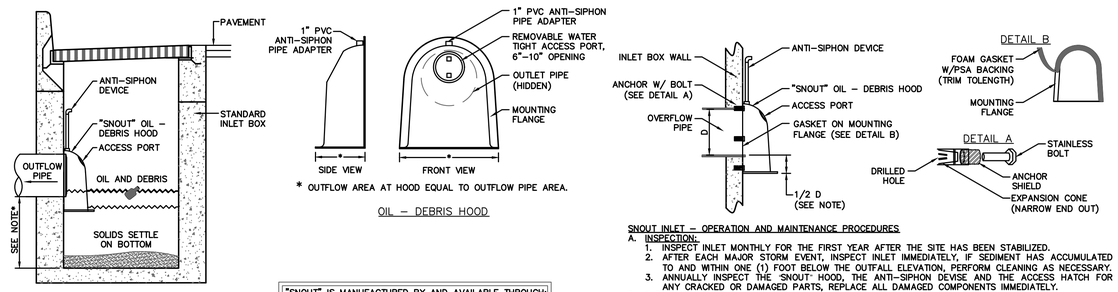




SECTION B-B
NOT TO SCALE

MRC UNDERGROUND DETENTION BASIN DETAIL

NOT TO SCALE 05/01/18



SECTION

* OUTFLOW AREA AT HOOD EQUAL TO OUTFLOW PIPE AREA.

OIL – DEBRIS HOOD

* NOTE– SUMP DEPTH OF 36" MIN. FOR < OR= 12" DIAM. OUTLET. FOR OUTLETS >OR= 15", DEPTH = 2.5–3X DIAM.

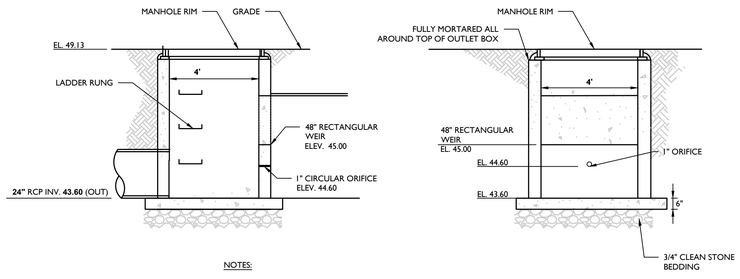
"SNOUT" IS MANUFACTURED BY AND AVAILABLE THROUGH:
BEST MANAGEMENT PRODUCTS, INC.
53 MT. ARCHER RD.
LYME, CT 06371
PHONE (860) 434-0277 * FAX (860) 434-8195
E-MAIL: duron@bestmp.com * WEBSITE: www.bestmp.com

SNOUT INLET – OPERATION AND MAINTENANCE PROCEDURES

A. INSPECTION:
1. INSPECT INLET MONTHLY FOR THE FIRST YEAR AFTER THE SITE HAS BEEN STABILIZED.
2. AFTER EACH MAJOR STORM EVENT, INSPECT INLET IMMEDIATELY, IF SEDIMENT HAS ACCUMULATED TO AND WITHIN ONE (1) FOOT BELOW THE OUTFALL ELEVATION, PERFORM CLEANING AS NECESSARY.
3. ANNUALLY INSPECT THE "SNOUT" HOOD, THE ANTI-SIPHON DEVISE AND THE ACCESS HATCH FOR ANY CRACKED OR DAMAGED PARTS, REPLACE ALL DAMAGED COMPONENTS IMMEDIATELY.

B. CLEANING:
1. REMOVE ALL SOLID DEBRIS FROM THE INLET, A MINIMUM OF EVERY SIX (6) MONTH OR WHEN THE SEDIMENT IS TO AND WITHIN ONE (1) FOOT BELOW THE OUTFALL ELEVATION.
2. WHEN THERE HAS BEEN A SPILL OR INCIDENT THAT CAUSES A LARGER THAN NORMAL ACCUMULATION OF POLLUTANTS, REMOVE ALL SOLID DEBRIS FROM THE INLET.
3. USE A VACUUM TRUCK TO REMOVE ALL SOLIDS IN THE BOTTOM OF THE STRUCTURE.
4. DISPOSE OF ALL COLLECTED WASTES PER THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION REQUIREMENTS.
5. FLUSH THE ANTI-SIPHON DEVISE ON THE "SNOUT" HOOD OR GENTLY CLEAR WITH A FLEXIBLE WIRE ONCE A YEAR.
6. OPEN AND CLOSE THE ACCESS PORT ON THE "SNOUT" HOOD ONCE A YEAR AND CLEAR ANY OBSTRUCTIONS.

"SNOUT" INLET
NOT TO SCALE



NOTES:
1. CONTRACTOR TO SUBMIT SHOP DRAWING FOR REVIEW AND APPROVAL.
2. ALL CONCRETE TO BE CLASS "A".

OUTLET CONTROL STRUCTURE A-1 MRC BASIN DETAIL (SINGLE CHAMBER)

NOT TO SCALE MCPA-UTIL-STMW-1600 05/01/18

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL C. RICHARD ROSEBERRY ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA
PROJECT NUMBER: 16001030B	DRAWING NAME: C-PCSM-DTLS		

SHEET TITLE: PCSM DETAILS

SHEET NUMBER: 27 of 27

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

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WHITEMARSH TOWNSHIP

To: Charlie L. Guttenplan, Director of Planning & Zoning/Zoning Officer

From: NICHOLAS W. WEAVER, FIRE MARSHAL

Subject: **SLD #09-18 601 Washington Street**

Date: March 25, 2022

cc:

This application cannot be approved at this time for the following outstanding items:

1. Fire Apparatus Access and turning plan to be updated. This plan shall meet the requirements as set forth in Chapter 5 of the International Fire Code 2015 edition, Appendix D of the International Fire Code 2015 Edition, and Whitemarsh Township Ordinance #1003.
    a. Fire Apparatus Access Roads shall be 24' wide with 14' vertical clearance and no closer than 5' to a structure.
    b. Highest roof surface height shall be provided. This height shall be measured to the eave of a pitched roof, the intersection of the roof to the exterior wall, or the top of parapet walls. If this height exceeds 30ft, the Fire Apparatus Access Road shall be 26' wide.
    c. Apparatus: Overall length 49' and wheelbase 23' (Tandem axle).
    d. There is no parking allowed on Fire Apparatus Access Roads. Line striping and signage shall be provided in approved locations.

2. Fire Hydrant plan to be updated with distances. This plan shall meet the requirements as set forth in Chapter 5 of the International Fire Code 2015 edition, Appendix B of the International Fire Code 2015 Edition, Appendix C of the International Fire Code 2015 Edition, and Whitemarsh Township Ordinance #1003.
    a. All buildings must have a fire hydrant within 600' of all portions structure by approved route.
        i. If the building is equipped with standpipes a hydrant is required within 100' of the fire department connection
    b. The hydrants must be capable of flowing a minimum of 1500 gallons per minute for one hour.
        i. Hydrants must meet the needed fire flow as required by Appendix B
    c. The average spacing between hydrants shall meet the requirements set forth by Appendix C of the International Fire Code 2015 Edition.

3. Provide an Emergency Responder Radio Coverage Plan. This plan shall meet the requirements as set forth in Chapter 5 of the International Fire Code 2015.

Nicholas W. Weaver
Fire Marshal
616 Germantown Pike
Lafayette Hill, PA 19444
Phone: 610-825-3535 ext. 2614
Email: nweaver@whitemarshtwp.org

a. All new buildings shall have approved radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building.

4. Emergency Action Plan shall be updated
    a. Contacts shall be updated
    b. Change Notify me to ReadyMontCo https://www.montcopa.org/3311/ReadyMontco
    c. Provide Emergency Evacuation Routes/Shelter in place plans
    d. Provide Elevator Procedures
    e. Provide Procedures for accounting for employees and residents after evacuation
    f. Provide Means of notifying occupants during an emergency
    g. Provide Site plans with evacuation points, hydrants, and fire department access
    h. Provide Floor Plans
    i. Locations for residents to move their cars in the event of a potential flood

Whitemarsh TOWNSHIP

616 GERMANTOWN PIKE – LAFAYETTE HILL, PA 19444-1821
TEL: 610-825-3535 FAX: 610-825-9416
www.whitemarshtwp.org

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Richard L. Mellor, Jr.
Township Manager

Emergency Action Plan Checklist

Fire Safety & Evacuation Plan

The following items, if applicable, must be present in the Fire Evacuation Plan:

- ☐ Emergency Evacuation Routes/Shelter in place plans
- ☐ Procedures for employees who must remain to operate critical equipment (if any)
- ☐ Elevator Procedures (if any)
- ☐ Procedures to assist persons unable to exit themselves
- ☐ Identification and assignment of personnel responsible to for rescue and/or medical aid
- ☐ Procedures for accounting for employees and residents after evacuation
- ☐ Means of notifying occupants during an emergency
- ☐ Means to contact emergency response organizations
- ☐ Identification and assignment of personnel who can provide further information for the plan
- ☐ Description of the voice/alarm communication system alert tone and messages (if any)
- ☐ Site plans with evacuation points, hydrants, and fire department access
- ☐ Floor Plans
- ☐ List of fire hazards associated with normal operations, such as maintenance and housekeeping
- ☐ Identification and assignment of personnel responsible for maintaining fire protection systems
- ☐ Identification and assignment of personnel responsible for maintenance, housekeeping, and controlling fuel hazard sources

Facility Name: _____

Facility Address: _____

Reviewed by: _____ Date: _____

941 Marcon Boulevard
Suite 801
Allentown, Pennsylvania 18109
Main: 877 627 3772
http://colliersengineering.com/

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Memorandum

To: Charles Guttenplan, AICP

From: C. Richard Roseberry, P.E., AICP

Date: March 25, 2022

Subject: Site Photographs – Existing Stockpile Slopes

Project No.: 16001030B

The project site at 601 Washington Street has been used as a storage yard for a landscaping company. The existing site has concrete storage areas with stockpiled landscape materials, soil stockpiles, and piles of split firewood. The stockpiled landscape materials, soil stockpiles, and firewood piles were modeled and included in our steep slope calculations. With the revised plans, we updated our steep slope calculations to remove the stockpiled materials.

Please see below for the site photographs that were taken on February 18, 2022. The photographs show the areas of the stockpiled materials and piles of firewood. Attached is an exhibit showing the photograph locations.

Attachment: EXISTING STOCKPILES PHOTO EXHIBIT



N

W E S

40 0 40 80

SCALE : 1" = 40'

LEGEND

- TRAVERSE LINE, CENTER LINE OR BASELINE
- RIGHT OF WAY LINE
- PROPERTY LINE
- EDGE OF PAVEMENT
- CURB LINE
- DEPRESSED CURB
- CHAIN FENCE
- WETLAND LINE
- MUNICIPAL BOUNDARY
- TREELINE
- ELECTRICAL MANHOLE
- WATER MANHOLE
- TELEPHONE MANHOLE
- UNMARKED MANHOLE
- SANITARY MANHOLE
- DRAINAGE MANHOLE
- MAJOR CONTOUR
- MINOR CONTOUR
- SPOT ELEVATION
- TOP OF CURB ELEV.
- BOTTOM OF CURB ELEV.
- U/G CABLE TV LINE
- U/G FIBER OPTIC LINE
- U/G TELEPHONE LINE
- U/G ELECTRIC LINE
- OVERHEAD WIRE
- WATER MAIN
- GAS MAIN
- SAN. SEWER LATERAL
- SAN. SEWER MAIN
- STORM PIPE
- WETLAND MARKER
- TREE
- ROADWAY SIGNS
- TRAFFIC FLOW
- MAILBOX
- TRAFFIC SIGNAL POLE
- POLE MOUNTED LIGHT
- UTILITY POLE
- GUY WIRE
- TRANSFORMER
- FIRE DEPT. CONNECTION
- FIRE HYDRANT
- WATER VALVE
- GAS VALVE
- SANITARY CLEANOUT
- CONCRETE MONUMENT
- CAPPED REBAR/IRON PIPE
- STORM INLET TYPE 'C'
- STORM INLET TYPE 'M'
- FLARED END SECTION
- HEADWALL
- PHOTO LOCATION AND VIEW DIRECTION
- STEEP SLOPES 15% - 25%
- STEEP SLOPES 25%+

ABBREVIATIONS

D.C. = DEPRESSED CURB
BC = BOTTOM OF CURB
TC = TOP OF CURB
BOL = BOLLARD
CRT = CRATE
MB = MAILBOX
FF = FINISH FLOOR
UV = UNKNOWN VALVE
MH = MANHOLE
DEP. = DEPRESSED
CL = CENTERLINE
PM = PARKING METER
MHWL = MEAN HIGH WATERLINE
MLWL = MEAN LOW WATERLINE
TW = TOP OF WALL
BW = BOTTOM WALL

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

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REV	DESCRIPTION	DRAWN BY	DATE

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

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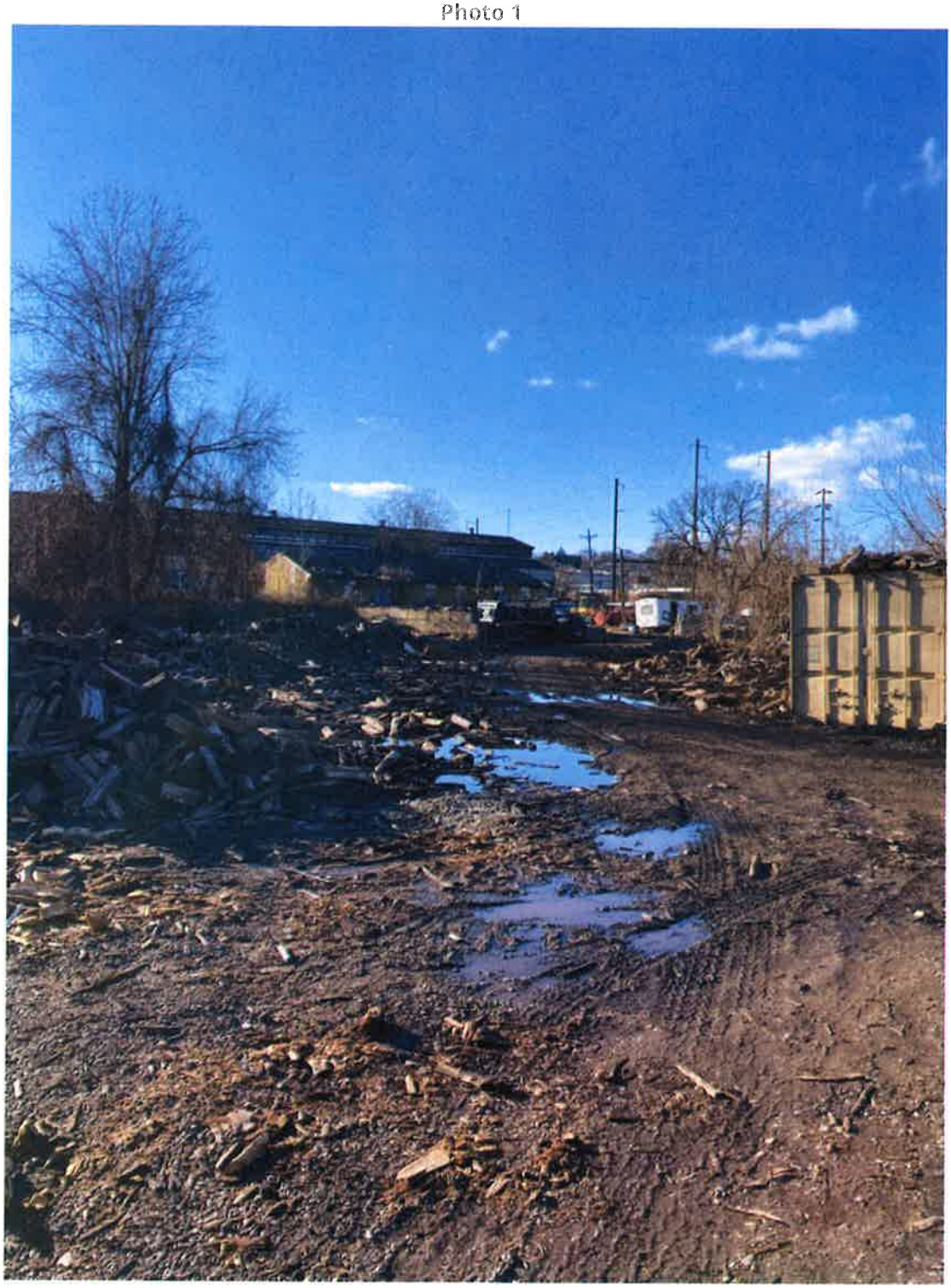
SCALE:	DATE:	DRAWN BY	CHECKED BY
AS SHOWN	03/25/22	CMM	CRR
PROJECT NUMBER	DRAWING NAME		
160010308	C-EXHIBIT-SLOPE		

SHEET TITLE:
EXISTING STOCKPILES PHOTO EXHIBIT

SHEET NUMBER:
1 of 1

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Photo 1



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Photo 2



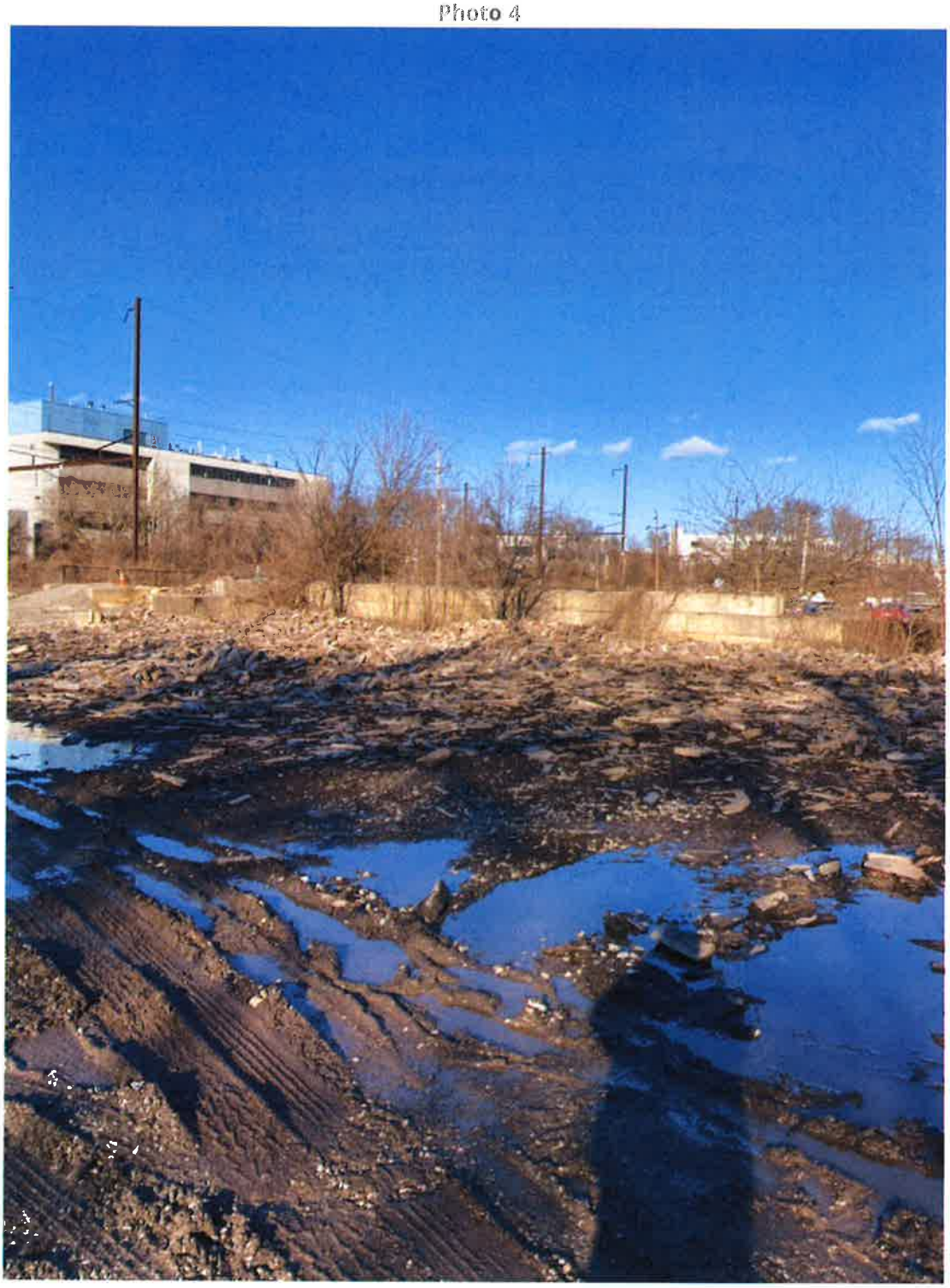
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Photo 3



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Photo 4



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Photo 5



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Photo 6



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Photo 7



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Photo 8



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Photo 9



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Photo 10



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Richard L. Mellor, Jr.
Township Manager

April 20, 2022

601 Washington Associates, LP
c/o Kevin Kyle
201 King of Prussia Road, Suite 501
Radnor, PA 19087

RE: SLD#09-18 / 601 Washington Street Associates, LP, Conshohocken, PA
Proposed 270 Apartments (Preliminary Land Development Plan)
Zoning Ordinance Compliance Review

Dear Mr. Kyle:

Please accept this as a review of the Zoning Ordinance Compliance issues for your above referenced 27-Sheet Preliminary Land Development Plan submission, prepared by Colliers Engineering and Design, dated March 1, 2022, with Sheet 2, 4, and 5 re-submitted March 16, 2022 with modifications. We also received a 6-Sheet landscape plan set by Glackin Thomas Panzak, Inc., dated March 1, 2022.

Please note that the site for this development is zoned HVY Heavy Industrial District with overlays of the Riverfront Development District, Sub-district 1 (RDD-1), the Floodplain Conservation District, and the Riparian Corridor Conservation District.

1.	§116-28.A.(2)	The applicant shall furnish a letter from the appropriate authority indicating the availability and supply of water for the proposed project to the Zoning Officer
2.	§116-29.	The applicant must obtain the approval of the Whitemarsh Township Authority with regard to proposed sanitary sewer facilities.
3.	§116 33.2. §116-279.	In those areas of Whitemarsh Township where an overlay district exists, should the use be that allowed in the underlying district, the underlying requirements shall apply. For the purposes of this review, the requirements of the Riverfront Development Overlay District (RDD-1) are applicable given the use proposed and we note that is what the applicant has utilized.
4.	§116-165 §116-166.A.(3)	Relief from these two sections (variance and special exception, respectively) to allow nonresidential structures in the Floodplain Conservation District, and to allow a stormwater retention facility in the floodway, was granted as the result of an appeal of a Zoning Hearing Board decision (based on a prior plan) to the Montgomery County Court of Common Pleas. While the Court's decision was appealed in part, the granting of the relief of these two sections, was not appealed. The applicant has relied on this relief for the current plan. There may be additional legal action required to confirm the applicability of this relief; the Township Solicitor will need to determine what additional actions, if any, are necessary.

5.	§116-166.C.	Any new construction must be in full compliance with 44 CFR 60.3(a) through (d) of the National Flood Insurance Program regulations. These regulations require that all new construction and substantial improvements of non-residential structures within Zones AE are required to have the lowest floor elevated 1 ½ feet above the base flood level or, together with attendant utility and sanitary facilities, be designed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. A registered professional engineer or architect shall develop and/or review structural design, specifications, and plans for the construction, and shall certify that the design and methods of construction are in accordance with accepted standards of practice.
6.	116-169.B.(1) 116-169.B.(2)	There was a lack of clarity regarding slope disturbance calculations for the site that has been resolved. On March 25, 2022 Mr. Roseberry submitted a series of photographs and a site plan indicating the locations where the photos were taken. These photographs show that mounds of material originally believed to be sloped ground are in fact piles of firewood, gravel, and loose soil and thus the slopes of these piles need not be included in steep slope disturbance calculations. The slope disturbance limitations have been adequately addressed.
7.	116-184.A 116-282.E	The required number of parking spaces for this plan is based upon Section 116-282.E, in which the RDD overlay requires a minimum of 1.75 spaces per unit. However, there has been a recent amendment to Section 116-184.A. which allows 1.5 spaces per unit to be used for multi-family housing. This lower requirement may be used if desired.
8.	§116-184.F.	This section does not allow parking within 10 feet of structures; handicapped parking in the entry court is approximately 4 feet from the building. This must be corrected or a variance must be obtained.
9.	§116-184.G.	All parking shall conform to the requirements of the Whitemarsh Township Fire Prevention Code as enacted and amended. The applicant must obtain approval from the Whitemarsh Township Fire Marshal. He has issued a review memo dated March, 25 2022 (enclosed).
10.	§116-279.B.(3)	If a structure is otherwise permitted by virtue of the requirements of the RDD, relief from the Zoning Hearing Board from the provisions of Article XXXV - Riparian Corridor Conservation District shall not be required, provided approval is recommended to the Board of Supervisors by the Township Engineer. There is no objectionto the location of the structures within the Riparian Corridor Conservation District by the Township Engineer.
11.	§116-280.H.	In the RDD-1 Sub-district, a minimum of 2% of the footprint area of a residential development must contain a permitted nonresidential use(s), provided, however, that such area shall not be less than 2,000 square feet. We do not see any indication of how this requirement has been met; if it is

not, a variance must be obtained.

12. §116-282.A. Parking structures, whether freestanding or integral with other uses in the same building, shall have another permitted first floor use on any portion of the structure visible from any streets, required pathways, or riverfront access or suitable architectural treatment shall be provided. Suitable architectural treatment shall be as defined in Sections 116-282.B., C. and D., and Sections 116-283.A.(2) and (4). Per the first sheet of the land development set, there is a separate architectural plan set. This has not been provided to the Township, so we are unable to determine if this requirement has been met.

13. §116-282.F. Parking may be permitted in the floodplain and riparian corridor in the RDD without relief from the Zoning Hearing Board from the provisions of Article XXII, Floodplain Conservation District, and Article XXXV, Riparian Corridor Conservation District, provided that a parking evacuation plan is provided by the applicant and is approved by the Board of Supervisors. Such plan must be reviewed and approved by the Emergency Management Coordinator and Police Chief. (Please see enclosed Fire Marshal memo and Emergency Action Plan Checklist.)

14. §116-283 Up to date architectural renderings are needed to assess compliance with parts of this section. As indicated in Comment #12, the first sheet of the land development set indicates that there is a separate architectural plan set. This has not been provided to the Township.

15. §116-283.C. We note that several waivers have been requested from landscape requirements. These will be evaluated by the Planning Commission and Shade Tree Commission. Prior to this proposal being considered by the Board of Supervisors, the Shade Tree Commission must recommend approval of the landscape plans.

16. §116-283.D.(1) For all developments the following elements shall be included to create a pedestrian oriented development:

(a) Lighting along all street frontages with lighting fixtures to be of a style as approved by the Board of Supervisors.
(b) Benches, trash receptacles, bicycle racks and other street furniture in a style approved by the Board of Supervisors.
(c) Wide sidewalks and other pedestrian amenities, landscaping, shade trees.
(d) A variety of pavement materials for street surfaces and sidewalks.
(e) Planting strips, located between the curb and sidewalk.

We note there are details of a bench and trash receptacle illustrated in the landscape plan set. Additionally, there are specific recommendations and guidance as to what might be appropriate and required along the riverfront in the Township's Riverfront Plan adopted in 2016. We encourage the applicant to work with the Township to develop an appropriate amenity package.

17.	§116-284.A	This section requires a 150' area measured from the mean water elevation of the Rivers of the United States/Pennsylvania to be indicated in the plans to be dedicated to the Township or governed by an easement allowing public access. It appears, however, that the applicant has elected to reduce this to 100' in accordance with §116-284.C. (See Comment #18.) Both the mean water elevation and the boundary of the land to be dedicated/reserved must be shown on site plans. There may be several parking spaces located in this area. If this is the case, they must be relocated.
18.	§116-284.C	This section requires the provision of two public amenities if the riverfront area dedicated to the Township or reserved for public use is reduced to 100', rather than the standard 150'. These do not include the river trail which is indicated on the plans as one of the public amenities. The riverfront trail is separately required for all developments with frontage on the river. A list of potential amenities is indicated in §116-283.B.
19.	§116-284.D.	Public riverfront access is required in accordance with Chapter 105, Subdivision and Land Development, §105-47.K. The plan currently does not provide the dimensional requirements for the riverfront access. A waiver has been requested to reduce the width of the right-of-way to 5' from the required 25'. Additionally, given the site's frontage, it would appear that 2 accesses to the river are required; however, only one is shown.

Should you have any questions, please do not hesitate to contact me.

Very truly yours,

Charles L. Guttenplan, AICP
Director of Planning and Zoning/Zoning Officer

Enclosed: Fire Marshal Memo Dated March 25, 2022 and Emergency Section Plan Checklist

cc: Richard L. Mellor, Jr., Township Manager
Sean Halbom, Township Assistant Manager
Robert A. Sztubinski, B.C.O., Director of Building and Codes
Nick Weaver, Fire Marshal
Sean P. Kilkenny, Esq., Township Solicitor
Krista Heinrich, P.E., Township Engineer
C. Richard Roseberry, P.E., Colliers Engineering & Design, Inc, Applicant Engineer
Edmund J. Campbell, Jr. Esq. Applicant's Attorney

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BOARD OF COMMISSIONERS

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MONTGOMERY COUNTY
PLANNING COMMISSION

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SCOTT FRANCE, AICP
EXECUTIVE DIRECTOR

April 20, 2022

Mr. Charles Guttenplan, AICP, Director of Planning & Zoning
Whitemarsh Township
616 Germantown Pike
Lafayette Hill, Pennsylvania 19444

Re: MCPC # 19-0018-002
Plan Name: 601 Washington Street Apartments
Situate: Washington Street (south), Lee Street (east)
Whitemarsh Township

Dear Mr. Guttenplan:

We have reviewed the above-referenced land development plan in accordance with Section 502 of Act 247, "The Pennsylvania Municipalities Planning Code," as requested on March 15, 2022. We forward this letter as a report of our review and recommendations.

BACKGROUND

Our office has received a set of preliminary/final plans, which depict proposed improvements on a 9.02-acre tract of land (County Parcel ID 65 00 12679 01 09) situated in Whitemarsh Township on Washington Street, east of Lee Street. According to the submitted application, 601 Washington Street Associates, L.P., the applicants, seek permission to construct a four story, multifamily development consisting of 227 units on the subject property.

Concerning zoning, the township classifies the parcel HVY Heavy Industrial District with an attached RDD Riverfront Development Overlay District designation. Municipal regulations outlined in the Zoning Ordinance stipulate that *in those areas of Whitemarsh Township where the RDD applies, the requirements of the RDD shall be additive to the requirements of the underlying zoning district(s) and, in the event of a conflict, take precedence over the underlying zoning district(s)*.

In accordance with off-street parking requirements, the development shall provide 486 parking spaces on-site, including 10 reserved for the physically disabled, and 13 for electric vehicle charging. In addition, we note that 194 spaces will be placed within the proposed structure, while the remaining 269 spaces will be outside.

Information placed on the plan by the Applicant's engineer indicates that public water and sewer shall serve the planned development.

Relief from specified requirements in the Subdivision and Land Development Ordinance will be sought from tree replacement standards (*§55-4.B.(6).(f).[1], [2], [3]),* parking facility landscaping requirements (*§105.39.A)*, sidewalk and pedestrian path standards (*§105.47.K)*, and buffer yard regulations (*§105-52).*

We report that the Zoning Hearing Board granted a variance on August 6, 2020, from requirements governing the placement of non-residential structures in the Floodplain Conservation District. In addition, a special exception was granted to permit the construction of a stormwater retention basin within a floodway.

The MCPC has previously reviewed a sketch plan submission related to this multifamily apartment proposal, remitting a report to the municipality in a letter dated March 4, 2019. Our report stated that "the Montgomery County Planning Commission supports the redevelopment concept proposed by the applicant"; however, concerns were raised on several issues regarding site access, open space amenities, and development within the floodplain.

COMPREHENSIVE PLAN COMPLIANCE

County Comprehensive Plan

This proposed plan is generally consistent with goals and objectives established in *Montco 2040: A Shared Vision, the Comprehensive Plan for Montgomery County.* The comprehensive plan is designed around three interrelated themes- *Connected Communities*, *Sustainable Places* and *Vibrant Economy*. Connected Communities focuses on several issues, including creating pedestrian-oriented developments, providing for more sidewalks, allowing linkages to county and local trails, and adding bike facilities to developments.

We find that the plan, as submitted, may not fully address *Montco 2040*'s objectives concerning sustainable transportation options. While we welcome the Applicant's decision to include electric vehicle parking, we recommend that municipal officials take a comprehensive look at encouraging a variety of transportation options for residential and commercial developments, including walking, cycling and transit.

The transportation sector is the most significant contributor to GHG emissions in the United States and makes up almost a quarter of global GHG emissions. Gas-powered cars are the primary source of carbon emissions from transportation. Along with the urgent risks of climate change, high rates of single-occupant vehicle travel negatively impact local air quality, traffic congestion, and public health.

With respect to the Walk Score®- a public access walkability index- of the applicant’s site, it has been given a rating of 51 (out of 100). We report that the development parcel is considered “somewhat walkable” where some errands can be accomplished on foot. Also, the Bike Score® of the tract, has been given a rating of 63 (out of 100) and is considered “bikeable” with “some bike infrastructure” in the general vicinity.

It is suggested that greater emphasis be made to provide multimodal access to/from the subject tract. Our office notes that the Spring Mill regional rail station, offering access to the greater Philadelphia area, is situated within walking distance (½ mile) to the proposed development. Furthermore, access to the Schuylkill River Trail, which provides access to Valley Forge is within walking and cycling distance to the site.

Township Comprehensive Plan

The submitted plan appears generally consistent with policies established in the Whitemarsh Township Selective Comprehensive Plan Update. It is also generally consistent with objectives outlined in the Draft Spring Mill Multi-Modal and Land Use Study. In the Comprehensive Plan Update policies related to circulation are listed, which the plan addresses adequately. We recommend that minor revisions may be needed to further integrate this development into the fabric of the surrounding area and advance those municipal goals that pertain to linkages and connections to open space amenities.

REVIEW COMMENTS

We have identified the following issues that the Applicant and municipality may wish to consider. Our comments are as follows.

ZONING ORDINANCE COMPLIANCE

A. Electric vehicle charging stations (*§116-188.3)*

Township regulations stipulate that "parking spaces providing electric vehicle (EV) charging stations are to be included in addition to the minimum number of parking spaces required, as provided in Article XXVI, Off-Street Parking and Loading." Furthermore, "a minimum of 50% of all required EV charging stations shall be ADA-accessible". While the plan appears to show the required number of EV spaces, the necessary EVSE is not depicted on the plan. In addition, proposed wheel stops delineated within designated EV spaces maybe inconsistent with barrier free access. It is recommended that the plan be amended accordingly.

B. Design standards/Public amenities (*§116-283.B.(5))*

According to RDD District design standards, "all public gathering spaces shall be designed to safely provide pedestrians with ingress and egress, shall be adequately lit, and shall be ADA compliant." Furthermore, "adequate seating and trash receptacles shall be provided." It is unclear whether the plan fully satisfies this requirement, as no information regarding proposed street furniture is included with this submission. In addition, our office observes that the planned concrete walk which extends through the parking lot may lack necessary curb ramps to make it accessible for the physically disabled. This matter should be addressed.

C. Design standards/Pedestrian-oriented development (*§116-283.D.(1).(a))*

The Zoning Ordinance mandates that for all developments, the project shall include: "lighting along all street frontages with lighting fixtures to be of a style as approved by the Board of Supervisors." We defer to municipal officials to determine whether the plan complies with this requirement.

D. Riverfront access and open space (*§116-284.A.(2))*

RDD District open space standards state that riverfront open space areas shall include "seating areas at intervals of not more than 300 feet." The plan does not appear to meet this requirement.

E. Riverfront access and open space (*§116-284.A.(5))*

Township regulations specify that "street furniture located in the floodway shall be anchored in accordance with the requirements of Article II, Floodplain Regulations, §42-7 of the Building Construction Code." We defer to the Township Engineer to determine if the plans adequately address this issue. Clarification may be needed with respect to any recreational elements sited inside of the proposed dog park area.

DESIGN ISSUES

A. Pedestrian Connectivity/Washington Street

While the MCPC recognizes and is aware of a proposed 4 foot wide sidewalk to be constructed along Washington Avenue; however, we note that it appears that no direct pedestrian connections from this proposed sidewalk to the building or parking areas is proposed. It is unclear how persons may safely access the main entrance without creating conflicts with vehicles entering/exiting parking areas or utilizing the front drop off area. It is suggested that further design study may be needed.

B. Pedestrian Connectivity/South Parking Area

As depicted on the plan, a 5 foot wide sidewalk from the proposed building to the waterfront trail shall traverse through the parking area on the south side of the property. It appears that the walkway is not ADA compliant, for no curb ramps are delineated on the plan. While “Stop for Pedestrians” signs are proposed, we suggest that the Township Engineer be consulted to determine crosswalks or other pavement markings/traffic control devices are necessary. The Township Engineer should also confirm that the placement of these signs behind the sidewalk rather than in front of in one situation is appropriate.

C. Pedestrian Connectivity/Proposed Eastern Boundary Walkway

A proposed 4½ foot wide walkway is proposed along the site's eastern property border. The MCPC cautions that this walkway, which connects the riverfront trail to Washington Street, may serve as the primary pedestrian access link on the planned Riverwalk Trail on the banks of the Schuylkill. As such, its 4½ foot width may be insufficient. Although the plan shows a possible future linkage to the adjacent Hines Rowing Center tract, it is uncertain whether this connection will be constructed in the future. Accordingly, consideration should be given to widening this walk to accommodate more pedestrian traffic. Additionally, we suggest that a continuous buffer the entire length between this walk and the parking area may present safety/security issues. A paved connection from the walk to the parking area may be needed.

D. Bicycle Connectivity

The plan should address issues that pertain to bicycle access from this residential development to the Schuylkill River Trail as well as to the Spring Mill Station on Station Avenue. It appears that the plan, as proposed, does not clearly address this issue. Municipal officials may wish to consider what, if any, revisions should be made to the plan to help foster bicycling in this area.

E. Bicycle Storage

Our office notices that bicycle storage facilities previously shown on the sketch plan submission do not appear to be delineated on the preliminary plan. Clarification may be needed. If bicycle storage will be provided within the proposed building, the applicant should review with the municipal officials the storage capacity of the proposed room and how residents will be able to safely access the street.

F. Bicycle Parking

The MCPC suggests that in order to encourage and facilitate bicycle usage, bike racks should be placed within or near proposed trail or pedestrian areas.

G. Vehicular Entry Area

We defer to the Township Engineer to determine whether the vehicular entry area, as designer and configured, will function efficiently. It is recommended that delivery vehicles should be able to safely access the building entry without causing conflicts with cars accessing this area. In addition, we observe that no reserved ADA stalls are provided in this area for visitors who may be unfamiliar the site. This matter should be addressed.

H. Open Space Amenities

Although a proposed "sitting area" is depicted on the submitted plan, we suggest that a greater effort be made to provide benches, trash receptacles, lighting and other pedestrian amenities within the riverfront pathway area.

I. Proposed Riverfront Area Planting Scheme

The County recommends that the applicant review with township officials how the riverfront planting scheme shown on the submitted Landscape Plan will address concerns regarding planting within an area that may be susceptible to frequent flooding. While the plantings proposed in this area appear appropriate, municipal officials should discuss with the applicant what, if any, plans will be put in place to ensure the restoration of this landscaped area after flooding events.

MISCELLANEOUS

A. Assignment of MCPC Number

When an application is forwarded to the County for review, a member of our staff is required to assign a unique, nine-digit identifier to the plan. This identifier is referred to as a MCPC number. Please note that the number "19-0018-002" has been set aside for this submission. If any subsequent plans are brought to this office for final recording, this MCPC number should appear on the applicable sheets within the plan set in the box reserved for the seal of this agency.

CONCLUSION

We request that the Township consider the comments contained in this report.

Please note that the review comments and recommendations contained in this report are advisory to the municipality, and final disposition for the approval of any proposal will be made by the municipality.

Should the governing body approve a final plat of this proposal, the Applicant must present the plan to our office for seal and signature prior to recording with the Recorder of Deeds office. A paper copy bearing the municipal seal and signature of approval must be supplied for our files.

Sincerely,



Kevin Chavous, ASLA, LEED AP, SITES AP, WELL AP, LFA, CNU-A, AICP CUD
Design Planner
610.278.3731 e mail **kchavous@montcopa.org**

c: Chairman, Planning Commission
601 Washington Street Associates, LP, Applicant
Richard Roseberry, PE, PP, CME, AICP, Colliers Engineering & Design, Applicant's Engineer

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

April 21, 2022

Mr. Richard L. Mellor, Jr. - Township Manager
Whitemarsh Township Municipal Building
616 Germantown Pike
Lafayette Hill, PA 19444

RE: Preliminary Plan Review
601 Washington Street
Whitemarsh Township, Montgomery County, PA
S/LD # 09-18
Our Project Number 2022-04053

Dear Mr. Mellor:

As requested, we have reviewed plans for the above referenced Preliminary Plan Submission consisting of:

- 27-Sheet Plan prepared by Colliers Engineering & Design and dated March 1, 2022 and last revised March 16, 2022
- Post Construction Stormwater Management (PCSM) plan narrative prepared by Colliers Engineering & Design and dated March 1, 2022 with no noted revisions
- Various supporting documents, forms and correspondence enclosed with the application

The following comments are offered for your consideration:

The applicant is requesting waivers and/or relief from the requirements of the following sections of the ordinance:

1. 105-39(A) The applicant is requesting a waiver from the requirements of this section of the ordinance, which requires that all parking areas shall have at least one, three-inch-caliper tree for every two parking spaces provided.

2. 105-47(K) The applicant is requesting a waiver from the requirements of this section of the ordinance, in order to allow a right-of-way of five feet in width for public riverfront access perpendicular to the river. This section requires that a right-of-way of at least 25 feet in width shall be offered for dedication to the Township. If the area is not accepted for dedication, an easement for public use must be provided along with maintenance agreements acceptable to the Township.

3. 105-52 The applicant is requesting a waiver from the requirements of this section of the ordinance, in order to not require buffers to have a minimum width of 50 feet.

	Section	Description
4.	55-4(B)(6)(f)	The applicant is requesting a waiver from the requirements of this section of the ordinance, which states that, subject to the prior approval of the Shade Tree Commission: 1. A maximum of 30% of the replacement trees may be replaced with ornamental/flowering trees or evergreen trees at a ratio of two flowering or two evergreen trees per required three-inch-caliper shade tree. 2. A maximum of 20% of the replacement trees may be replaced as shrubs with a minimum size of 24 inches in height at a ratio of six shrubs per required three-inch-caliper shade tree. 3. A maximum of 10% of the replacement trees may be replaced as groundcover at a ratio of 40 plants to one three-inch-caliper shade tree. The minimum size of the groundcover will be a one-gallon container.

SUBDIVISION AND LAND DEVELOPMENT ORDINANCE

	Section	Description
5.	105-21(A)(3)	Each sheet shall be numbered and shall show its relationship to the total number of sheets. The following plans were submitted separately, and must be incorporated into the plan set, and individually listed on the Index of Sheets: • Landscaping Plans LP-1 & LP-2 • Lighting Plan LI-2 • Details and Notes LD-1, LD-2 & LD-3
6.	105-21(B)(1)(k)	The plans must be revised to show the location of all existing property monumentation.
7.	105-21(B)(1)(l)	The plans indicate an “area of apparent overlap” at the Southwestern Corner of the site. Property Boundaries must be resolved and properly monumented prior to final plan approval.
8.	105-21(B)(1)(n)	This section of the ordinance requires the plans to show existing principal buildings (and their respective uses), and driveways on the adjacent peripheral strip: sewers lines, storm drains, culverts, bridges, utility easements, quarries, railroads, and other significant man-made features within 500 feet of and within the site, including properties across streets.
9.	105-21(B)(1)(o)[1]	The plans must be revised to include dimensions indicating the width of both access driveways on sheet 5.
10.	105-21(B)(1)(o)[2]	Structural Plans or details are to be provided for the proposed pedestrian bridge along the river trail.
11.	105-21(B)(2)(e)	The Record plan must be revised to list the lowest floor elevation and/or the elevation to which the structure would be floodproofed.

	Section	Description
12.	105-21(B)(9)(d)[6]([a]	All streets and/or intersections showing a level of service below C shall be considered deficient, and specific recommendations for the elimination of these problems shall be listed. Deficiencies are noted at the intersection of Ash Street and Elm Street with a delay increase of more than 10 seconds for the eastbound left-turn critical movement. This intersection is located in Conshohocken Borough. Any modifications to the intersection are subject to the review of the Borough or PennDOT.
13.	105-21(B)(9)(d)[6]([a]	Overall the report was conducted in accordance with traffic engineering standards. There are minor technical discrepancies on the Figures, Table 6 and Capacity Analysis Worksheets for the PM LOS for Elm Street and Cherry Street but they do not affect the overall analysis. In our opinion the report conducted is acceptable.
14.	105-21(B)(10)(a)	The applicant shall submit a letter from the appropriate municipal authority indicating the availability of public sanitary sewer facilities.
15.	105-21(B)(10)(b)	The applicant shall submit a letter from the appropriate municipal authority indicating the availability of central water supply.
16.	105-21(B)(12)	A map showing the location of the proposed subdivision within its neighborhood context shall be submitted.
17.	105-21(B)(13)	An Existing Resources and Site Analysis Plan (ERSAP) shall be prepared and shall provide a comprehensive analysis of existing conditions, both on the proposed development tract and within 500 feet of the tract boundaries. Conditions beyond the tract boundaries may be described on the basis of existing published data available from governmental agencies and from aerial photographs.
18.	105-21(B)(13)[10]	There is an existing sign located at the front corner of the site, along Washington Street, for a former historic use of the site. The applicant should consider possible reuse/repurposing of the sign, if feasible.
19.	105-21(B)(15)	A Preliminary Resource Impact and Conservation Plan (the “Preliminary Impact Plan”) shall be prepared for all Major Subdivision and Land Development applications to categorize the impacts of the proposed activities and physical alterations on those resources shown on the ERSAP. All proposed improvements, including but not necessarily limited to grading, fill, streets, buildings, utilities and stormwater management facilities, as proposed in the other Preliminary Plan documents, shall be taken into account in preparing the Preliminary Impact Plan, which shall clearly demonstrate that the applicant has minimized site disturbance to the greatest extent practicable.
20.	105-21(B)(16)(n)	Signature blocks for the Board of Supervisors shall be provided on the preliminary improvements plan.
21.	105-21(B)(17)(e)	The applicant shall submit a Community Association Document consistent with the requirements of this section of the ordinance.

	Section	Description

22. 105-21(B)(18) The applicant shall submit a 'Preliminary Common Open Space Ownership and Management Plan' consistent with the requirements of this section of the ordinance.

23. 105-21(B)(20)(g) The Lighting Plans must be revised to include the plan notes contained in this section of the ordinance.

24. 105-21.1(K)(2) Within the South Transportation Service Area an impact fee in the amount of Two Thousand Five Hundred and Twenty-Nine Dollars ($2,529.00) per anticipated peak hour trip must be provided by the applicant. Based on data documented within the latest edition of the ITE Trip Generation Manual, the proposed development will generate 106 PM peak hour trips. Therefore, the traffic impact fee totals $268,074.00 ($2,529.00 x 106 peak hour trips).

25. 105-26(E) The applicant must provide evidence in sufficient detail to demonstrate that there are no environmental concerns related to previous uses of the site. Additional information related to the site's participation in the PADEP Act 2 Program, related to the former industrial uses.

26. 105-30 As defined by Section 105-29(C) and 105-30(A), streets adjacent to the site are subject to the following requirements:

Street Name	Classification	Required Ultimate R.O.W	Required Cartway Width	Curbs	Sidewalks	Tree Zone
Washington Street	Local Street	56 feet	36 feet	Required	Required	Required

The plans must be revised in order to demonstrate compliance with the requirements of this section of the ordinance. The following, at a minimum, must be addressed:

- A waiver would be required in order to not require a tree zone along Washington Street, as required by Section 105-48. The plans show the proposed sidewalk as being contiguous with the curb, where section 105-48 requires a tree planting zone of lawn area, situated between the sidewalk and curb and measuring a minimum of five feet in width from the planting edge of the curb to the planting edge of the sidewalk. We recommend a minimum 2-foot grass verge between the curb line and sidewalk be provided to minimize pedestrian and vehicular conflicts. This is consistent with the preliminary typical cross sections within the 'Spring Mill Area Study'.
- A waiver would be required in order to not require the cartway of Washington Street to be 36± feet, in order to permit a width of 30 feet.

27. 105-30 The applicant is proposing Belgian block curb along Washington Street. We have no objection to Belgian Block Curb, however we recommend the Planning Commission consider the curb material, since Washington Street is largely unimproved and should be consistent along its length. Future land developments should utilize the same materials.

	Section	Description
28.	105-30(A)	The plans must be revised in accordance with the following: a. Dimension the half-width of the proposed cartway from the centerline on Washington Street. A 36 foot (18-foot half-width) is required along the full site frontage. Shoulder tapers are not recommended at the western and eastern property lines. b. Dimension the Legal and Ultimate Right-of-Way lines for Washington Street on sheets 3 and 4. Label the property owner on the north side of Washington Street across from the subject property. Verify the ultimate right-of-way on the north side of Washington Street has been offered to the Township. If the right-of-way has not been offered, we recommend the line be removed from the plan.
29.	105-34	The Profile of Washington Street on Sheet 9 must be revised to show the proposed street finished grades.
30.	105-37	The plans must be revised to demonstrate compliance with the sight distance requirements of this section of the ordinance and/or the required sight distances contained in the most current revision of Pennsylvania Code Title 67 Chapter 441, whichever is more restrictive. Available sight distance at each proposed driveway opening must be indicated.
31.	105-38(B)	The width of entrance and exit drives shall be: (2) A minimum of 25 feet of two-way use (3) A maximum of 35 feet at the street line Dimensions must be added to the plans which demonstrate compliance with the requirements of this section of the ordinance.
32.	105-38(C)	The applicant must obtain the approval of the Fire Marshal with regard to access for fire protection equipment.
33.	105-38(V)	All artificial lighting used to illuminate any parking space or spaces shall be so arranged that no direct rays from such lighting shall fall upon any neighboring property or streets, nor shall any high brightness surface of the luminaries be visible from neighboring residential property or from a public street. The required Lighting Plan must also demonstrate compliance with the requirements of this section of the ordinance.
34.	105-38(W)	Section 116-282(E) of the Zoning Ordinance states that residential uses shall not be subject to the overflow parking requirements of Chapter 105, Subdivision and Land Development § 105-38W.
35.	105-39(A)	The applicant is requesting a waiver from the requirements of this section of the ordinance, which requires that all parking areas shall have at least one, three-inch-caliper tree for every two parking spaces provided.
36.	105-40, 105-50(C)(2)	The plans must be revised to include adequate space, if required, for off-street loading. The plans must be revised to indicate the proposed method of garbage collection and provisions must be made to provide for deliveries and moving trucks.

	Section	Description
37.	105-47	The plans must be revised to provide ADA Accessible ramps and crosswalks along the concrete walks from the rear of the building to the Reiver Trail.
38.	105-47(B)	The minimum width of all sidewalks and pedestrian paths shall be five feet; in areas of higher pedestrian density, the minimum width of all sidewalks shall be eight feet.
39.	105-47(C)	An easement should be provided for the sidewalk from Washington Street to the river trail.
40.	105-47(H)	The plans must be revised to provide proposed grades for the sidewalk from Washington Street to the trail and along the river trail proposed pathway. Verify the grades will not exceed 7%.
41.	105-47(K)(2)	The plans must be revised in order to demonstrate compliance with the requirements of this section of the ordinance, which states that access points to the River must be located no more than 500 feet apart.
42.	105-47(K)(3)	The perpendicular access to the River must be revised in order to be a red shale macadam pathway with a minimum of 10 feet in width.
43.	105-47(K)(4)	At least one seating area shall be provided along the perpendicular access to the River.
44.	105-47(K)(5)	Lighting fixtures shall be installed along the perpendicular access to the River and shall be of a style as approved by the Board of Supervisors.
45.	105-47(K)(6)	The perpendicular access to the River shall contain appropriate signage to direct pedestrians to the river in accordance with Chapter 116, Zoning, § 116-286B(5).
46.	105-48(E)	A waiver would be required in order to permit the tree zone along Washington Street to not be located between the sidewalk and curb, where this section of the ordinance requires a tree planting zone of lawn area or other material approved by the Shade Tree Commission, situated between the sidewalk and curb and measuring a minimum of five feet in width from the planting edge of the curb to the planting edge of the sidewalk.
47.	105-50(B)	The applicant must submit architectural plans including elevation views for the proposed buildings in order to demonstrate compliance with the requirements of this section of the ordinance.

	Section	Description
48.	105-50(C)(1)	The following must be addressed: a. It is recommended to provide a pedestrian walkway along the perimeter of the building to minimize pedestrian and vehicular conflicts within the parking area. b. A pedestrian walkway should be provided from the front door to Washington Street sidewalk. a. The mini roundabout design should be modified to better guide vehicles exiting the garages. Vehicles exiting the west and east garages should not be able to turn left. Island diverters, signage, pavement marking and/or relocation of the circle slightly to the north should be considered.
49.	105-50(F)(2)	The plans must be revised to indicate the proposed method of garbage collection. Garbage Collection stations, if any, shall be adequately screened and landscaped. Provide turning templates for garbage collection vehicles.
50.	105-52	The plans must be revised to provide a buffer between Washington Street and the SEPTA train tracks. Consideration must be given to restricting pedestrian access to the tracks by means of plantings, fencing, low walls or other safety measures. We recommend coordination with SEPTA with regard to safety along the tracks.
51.	105-52	All landscaping plans are subject to the review and approval of the Shade Tree Commission.
52.	105-53(D)	This section of the ordinance requires the dedication of land in the amount of 10% of the total Site Area for Park and/or Recreational use. The applicant has the option of offering a fee in lieu of dedicating actual land area and can also provide a combination of a fee in lieu and dedication of land. All offers of land and/or fees in lieu of dedication must meet the requirements of this section of the ordinance. If actual land area is offered, the applicant is advised that this section of the ordinance states that no more than 25% of the minimum land area required for park and recreation land may consist of floodplain or riparian corridor buffer areas, wetlands or areas with slopes in excess of 8%.
53.	105-69(C)	The plans must be revised to clearly indicate full depth pavement restoration of Washington Street. The standard pavement restoration cross section for Township roads is 6” Base Course, 5” 25mm Superpave Binder Course, 2” 9.5mm Superpave wearing course. The plans must be revised to indicate the pavement cross section proposed for Washington Street, in accordance with the standards of Whitemarsh Township, at a minimum.
54.	105-72(A)	Monuments must be provided at all property line corners. Monuments shall be placed at each change in direction of a boundary along the street line; two to be placed at each street intersection and one on each side of any street at angle points and at the beginning and end of curves.
55.	105-73	The plans must be revised to indicate proposed grading along the River Trail.

	Section	Description
56.	105-75	The developer shall construct stormwater drainage facilities, including curbs, inlets, storm sewers, road swales, and other structures in order to prevent erosion, flooding and other hazards along Washington Street.
57.	105-76	The applicant must obtain a letter of approval from the Township Fire Marshal in order to ensure that adequate fire protection is provided.
58.	105-78	The applicant must obtain the approval of the Whitemarsh Township Authority with regard to proposed sanitary sewerage facilities.
59.	105-78(C) 105-79	All preliminary plan submissions shall include a completed sewage facilities planning module (the planning module) for land development provided by DEP.
60.	105-83(E)	No Removal of a tree shall be permitted unless the applicant obtains a recommendation from the Shade Tree Commission based on a tree survey and removal plan submitted in accordance with Chapter 55 of the Whitemarsh Township Code.
61.	105-89	The developer shall enter into a written agreement with the Township in the manner and form approved by the Solicitor wherein the developer shall agree, to construct or cause to be constructed at his own expense all proposed improvements shown on the approved land development plan, all in strict accordance with the standards and specifications of the Township and within the time specified in said agreement, and to deposit with the Township financial security in an amount sufficient to cover the cost of all subdivision or land development improvements, including both public and private improvements.

CHAPTER 55 - TREE PROTECTION STANDARDS

	Section	Description
62.	55-4(A)(2)	We defer to the Township Arborist whether there is sufficient cover provided for the trees proposed in the parking islands above the underground basin.
63.	55-4(A)(4)	The tree survey plan shall be reviewed by the Shade Tree Commission in a public meeting.
64.	55-4(B)(2)	The Construction Sequence must be revised to indicate that a pre-construction conference with the Township Shade Tree Commission is required prior to start of construction.
65.	55-4(B)(1)	The plans must be revised to include provisions for tree protection to preserve healthy trees and shrubs on site in accordance with this section of the ordinance. Construction Sequence Site Work note 1 must be revised to require protective fencing to be placed around trees on the property prior to any other construction activities. Protective fencing must be shown on the plans, including the Erosion & Sedimentation Control Plan, in all areas where it will be required.

GRADING, EROSION CONTROL, STORMWATER MANAGEMENT AND BEST MANAGEMENT PRACTICES ORDINANCE:

	Section	Description
66.	58-4(B)	General Note 5 on Sheets 20, 23 and 24 must be revised in order to be consistent with the plan view.
67.	58-4(B)	Since the site is within the floodplain and floodway, erosion control blanket should be installed over all disturbed lawn areas.
68.	58-4(B)	Additional existing topography along and North of Washington Street should be provided.
69.	58-4(B)	Proposed Contour lines along the rear of the parking lot and at HW R-1 must be revised to tie into existing grades and/or be labeled with the correct elevations.
70.	58-4(B)(2)(p)	The plan must be revised to show the size, location and construction details of all existing and proposed storm drainage facilities. The following must be addressed: • The stormwater management calculations must be revised to address tailwater from the River. A flap gate, or similar, should be considered at the outlet structure. • Invert data, pipe slopes and related structure information must be provided for several existing Manholes noted as 'sealed'. • The next upstream or downstream structure and pipe slope for an existing 36" RCP within Washington Street Must be shown.
71.	58-4(B)(2)(q)	Construction Sequence Note 1 on Sheet 21 must be revised to include Note 5 from Sheet 19.
72.	58-4(D)(1)	Since the limit of disturbance is greater than one acre, the applicant must obtain a National Pollutant Discharge Elimination System (NPDES) permit from the Pennsylvania Department of Environmental Protection. Once obtained, a copy must be submitted to the Township.
73.	58-8(H)	All easements must be documented in the form of an easement agreement, approved by the Township Solicitor and recorded at the Recorder of Deeds for Montgomery County.
74.	58-11(G)(1) 58-11(H)(1)	The property owner shall sign an operations and maintenance agreement with the Township addressing stormwater BMPs that are to be privately owned. The plans indicate that the lot owner is responsible for the "Ownership and Maintenance" of the BMPs. The operation and maintenance agreement shall be subject to review and approval of the Township.

RESOLUTION 2004-8:

	Section	Description
75.	I(B)(4)(k)	Edges of slopes shall be a minimum of five feet from property lines. The plans must be revised to address how the proposed perpendicular trail will be constructed without encroaching on the adjacent property.
76.	I(C)(5)	Fills shall not encroach on natural watercourses, floodways, floodway fringes, constructed channels, or on wetlands unless permitted by the Army Corps of Engineers, Pennsylvania Department of Environmental Protection and approved by the Township.
77.	I(C)(6)	Fills placed adjacent to natural watercourses, floodways, floodway fringes, constructed channels, or wetlands shall have suitable protection against erosion during periods of flooding, where approved by the Army Corps of Engineers, the Pennsylvania Department of Environmental Protection, and the Township.
78.	II(A)(8)	If in the course of reviewing the stormwater management plan, the Township Engineer determines that off-site improvements are necessary to satisfactorily control the stormwater from the site, the applicant shall be responsible for such off-site improvements.
79.	II(B)(16)	The applicant must submit legal descriptions for any proposed rights-of-way, easements, or lands to be offered for dedication.
80.	II(C)(1)	All earth disturbance activities shall limit the rate of stormwater runoff so that no greater runoff is permitted from any point on the site than that of the site at its maximum development potential in its natural condition of the same frequency storm, except where deemed necessary by the Township Engineer. Where farm, field, or disturbed earth is the existing condition, meadow shall be used as the starting basis for such calculations, regardless of the actual conditions.
81.	II(C)(8)(d)	The following note shall be attached to all drainage plans and signed and sealed by the applicant's Registered Professional Engineer experienced in geotechnical and soil engineering: *"I certify that the proposed facility is/is not underlain by limestone."*
82.	II(D)(13)	Energy dissipaters and/or level spreaders shall be installed at points where pipes or drainage ways drain to or from basins. Energy dissipaters shall comply with criteria in the Erosion and Sediment Control Manual, published by the Pennsylvania Department of Environmental Protection or the Engineering Field Manual for Conservation Practices, SCS. Energy dissipating device calculations shall be submitted to the Township for review.
83.	II(F)(3)(d)(4)[d]	The Geotechnical investigation showed water for at several borings locations beneath the proposed underground detention basin. The applicant's engineer must address groundwater displacement and buoyancy considerations for the proposed underground detention basin.

Section	Description
84. II(F)(3)(d) (4)[e][7]	The volume below the MRC water storage elevation (44.60) shall not be used in computing the storage volume of the stormwater management facility.

ADDITIONAL COMMENTS

85. The proposed improvements will require the applicant to obtain a Chapter 105 Water Obstruction and Encroachment General Permit, administered by the Pennsylvania Department of Environmental Protection (PADEP) Bureau of Waterways Engineering and Wetlands. Once obtained, the permit must be submitted to the Township.

86. On Sheet 5, revise the quantity of Sign C (10) in the sign legend to reflect the number of signs noted on the plan.

87. On sheet 18, include dimensions at all critical points for all proposed curb ramps and ADA parking spaces to verify accessibility.

88. For the proposed handicap spaces along the building:
    a. Identify the van spaces and the size of the handicap parking space and associated accessible aisle adjacent to the space. Van spaces must have an aisle with of 8 feet in accordance with ADA standards.
    b. Provide a detail indicating the color of the diagonal striping and handicap legend.
    c. Identify the handicapped access ramp from the proposed parking spaces.

89. Provide a curb ramp on the western side of the emergency access driveway.

90. An “Authorized Vehicles Only” sign is recommended be added to the emergency access.

91. Provide signage to indicate the clearance of the garage entrances.

Any future submission of the design plans for this project must be accompanied by a letter, prepared by the applicant’s engineer, which addresses each of the comments contained in this report. Should you have any questions regarding this matter, please do not hesitate to contact me at this office.

Sincerely,

Krista Heinrich, PE
Township Engineer

c: Mr. Sean Halbom – Assistant Township Manager
Mr. Charles L. Guttenplan, AICP – Director of Planning and Zoning
Mr. Sean Kilkenny, Esq.; The Law Offices of Sean Kilkenny, LLC – Township Solicitor
Mr. Allen B. Mason, P.E., Carroll Engineering – Whitemarsh Township Authority Engineer
Mr. Kevin Kyle - 601 Washington Street Associates, LP
C. Richard Roseberry, PE– Colliers, Applicant’s Engineer
Edmund J. Campbell, Jr. Esq., Applicant’s Attorney

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Colliers
Engineering
& Design

April 22, 2022

Charles L. Guttenplan
Director of Planning & Zoning
Whitemarsh Township
616 Germantown Pike
Lafayette Hill, PA 19444

601 Washington Street Apartments
Colliers Engineering & Design Project No. 16001030B

Dear Mr. Guttenplan,

On behalf of our client, 601 Washington Street Assoc LP, we are requesting the following waivers the Subdivision and Land Development Ordinance for the above referenced project:

A. **WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-30.A – STREET STANDARDS.** *The following chart indicates the required dimensional standards for the various classifications of streets as defined in §105-5. Local streets, basic dimension cartway: 36 feet, Tree Zone: Yes.*

   This waiver is requested to allow a cartway width of less than 36 feet. The northern proposed curb line cannot be moved further due to existing transmission power lines. We also request a waiver from providing a tree zone along Washington Street. Our intent is to match existing installed improvements along Washington Street.

B. **WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-39A – TREE PRESERVATION, PROTECTION AND REPLACEMENT.** *All parking areas shall have at least one, three-inch-caliper tree for every two parking spaces provided.*

   This waiver is requested as the majority of parking spaces are proposed to be located underneath the proposed building, so there isn't sufficient area to place proposed trees at this density. The applicant's proposal does provide significant landscaping for the building.

C. **WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-47.K.1 – SIDEWALKS AND PEDESTRIAN PATHS.** *A right-of-way of at least 25 feet in width shall be offered for dedication to the Township. If the area is not accepted for dedication, an easement for public use must be provided along with maintenance agreements acceptable to the Township.*

   This waiver is requested to allow the required 25' wide right-of-way to be 5' wide due to site constraints.

Colliers Engineering & Design

D. **WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-47.K.2 – SIDEWALKS AND PEDESTRIAN PATHS.** *There must be at least one access to the river. Access points must be located no more than 500 feet apart.*

   This waiver is requested to allow access points to be more than 500 feet apart.

E. **WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-47.K.3 – SIDEWALKS AND PEDESTRIAN PATHS.** *A red shale macadam pathway a minimum of 10 feet in width shall be provided and separated from vehicular traffic.*

   This waiver is requested to allow access from Washington Street to the river trail to be 5 feet in width and be concrete.

F. **WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-48.E – STREET TREES.** *Unless otherwise approved by the Board of Supervisors, street trees shall be planted within a tree planting zone of lawn area or other material approved by the Shade Tree Commission, situated between the sidewalk and curb and measuring a minimum of five feet in width from the planting edge of the curb to the planting edge of the sidewalk.*

   This waiver is requested to not provide a tree planting zone between the curb and sidewalk along Washington Street. Our intent is to match the existing frontages along Washington Street.

G. **WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-50.C.1 – ACCESS AND CIRCULATION.** *Access to the dwellings and circulation between buildings and other important project facilities for vehicular and pedestrian traffic shall be comfortable and convenient for the occupants.*

   This waiver is requested from providing access circulation to the dwellings and between the building. Due to maximum impervious requirements the amount of access paths provided was to the minimum extent. We will provide as many access paths throughout the site while maintaining the maximum impervious cover requirement.

H. **WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-52 – BUFFER YARDS** *Buffer yards are required between subdivisions and land developments and along existing streets to soften visual impact, to screen glare, and to create a visual barrier between conflicting land uses. The extent of buffering required shall be determined by the type of use proposed and the adjacent uses or streets surrounding the proposed development. The impact of the proposed use on adjoining properties is the basis for establishing buffer yard standards. The applicant is encouraged to engage a landscape architect in order to promote the proper use and arrangement of plant materials.*

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Engineering & Design

This waiver is requested to allow perimeter buffer yards to be less than 50' in width. Buffer landscaping is provided at the intensity that meets the intent of the buffer yard requirements and address the unique characteristics of the site and intent of the riverfront development district.

I. **WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §55-4.B.(6)(f)[1][2]&[3] – TREE PRESERVATION, PROTECTION AND REPLACEMENT.** *Replacement tree requirement. Subject to the prior approval of the Shade Tree Commission: A maximum of 30 % of the replacement trees may be replaced with ornamental/flowering trees or evergreen trees at a ratio of two flowering or two evergreen trees per required three-inch-caliper shade tree. A maximum of 20% of the replacement trees may be replaced as shrubs with a minimum size of 24 inches in height at a ratio of six shrubs per required three-inch-caliper shade tree. A maximum of 10% of the replacement trees may be replaced as groundcover at a ratio of 40 plants to one three-inch-caliper shade tree. The minimum size of the groundcover will be a one-gallon container.*

This waiver is requested to permit the applicant to meet the requirements of this section in accordance with the notations on the landscape plan as well as comments provided by the Shade Tree Commission.

J. **WAIVER OF RESOLUTION 2004-8 I.B.4.K.** *Edges of slopes shall be a minimum of five feet from the property lines.*

This waiver is requested to permit grading within five feet of the property lines. The proposed river trail will connect to the adjacent properties. The site will be designed to promote no stormwater impacts to adjacent properties.

Sincerely,

Colliers Engineering & Design, Inc.



C. Richard Roseberry, P.E., AICP
Regional Manager

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601 Washington Street

Site History

Site History

- Historical sources, such as Sanborn Maps and aerial photographs, indicate that the Site had already been already developed for industrial purposes by 1928.

- In 1928, Frassoni Iron Works occupied the site. Frassoni Iron Works manufactured pressure and storage tanks for water, oil, and gas. In additional, welding and drilling operations were conducted at this facility.

- Sometime between 1928 and 1950, the subject property came under control of the Philadelphia Steel and Iron Company.

- Philadelphia Steel and Iron Company manufactured steel forgings. Machining operations and forging operations were conducted at the site until at least 1967. It is not known when the Philadelphia Steel and Iron Company ceased operations at the Site.

- In 1981, Oreland Sheet Metal occupied the site. Operations included sheet metal fabrication for industrial/commercial purposes. The metal fabricating included welding, use of hydraulic punches and presses, production of spiral wrapped ducting, and the assembly of custom sheet metal.

- Today, operations currently conducted on the Site include the following:
  - The storage of rowing sculls
  - The sale of landscaping materials, such as mulch, stone, gravel, sand and top soil, and fire wood in the eastern portion of the Site
  - Employee parking
  - A floating dock was also present to allow access to the Schuylkill River for sculling purposes

Environmental Summary

- PADEP approved the ACT 2 Remedial Investigation Report, Pathway Elimination Analysis, Cleanup Plan and Final Report for Soil and Groundwater (Combined Report), and associated Combined Report Addenda, April 6, 2021.

- Soil - Soil investigation results showed no soil remediation was required to meet PADEP's Residential Direct Contact Statewide Health Standards

- Ground Water
  - Groundwater investigation included installation and sampling of shallow and deep wells and analyzing samples collected from those wells for volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), and RCRA metals.

  - The only constituents analyzed detected in Site groundwater at concentrations exceeding the Residential Used Aquifer Statewide Health Medium-Specific Concentrations (RUA MSCs) in samples collected from the monitoring wells were benzene, MTBE, PCE, TCE, and vinyl chloride. MTBE was not detected at concentrations above its RUA MSC during any attainment sampling events.

  - The ACT 2 Combined Report documented demonstration of attainment with RUS Statewide Health MSCs for benzene, MTBE and vinyl chloride and attainment of Site-Specific Standards for TCE and PCE in groundwater.

  - Groundwater is not currently being used or planned to be used for potable or irrigation purposes - a groundwater use restriction is included in the Site's Environmental Covenant.

- LNAPL
  - LNAPL was identified in a very localized area at MW-4.
  - LNAPL was determined to not be causing an adverse impact to dissolved-phase petroleum constituents in groundwater in MW-4

Clean Up Plan

- Site Health and Safety Plan for Construction
  - A site-specific health and safety plan will be developed and implemented by all Site contractors.

- Soil
  - The soil characterization results showed that there were no exceedances of the Residential Direct Contact or RUA SGW MSCs for soil. As such, no further action was required for Site soil.

- Groundwater
  - The Environmental Covenant precludes use of groundwater beneath the site for any purpose (potable, irrigation, etc.)

- Vapor
  - PCE, TCE, vinyl chloride and benzene have been detected in groundwater beneath the Site at concentrations exceeding Residential vapor intrusion screening values. Therefore, the Environmental Covenant requires that future buildings on Site developed on or below grade (e.g., stairwells, elevator shafts, and/or other occupiable structures constructed on or below grade) include the installation of appropriate vapor barriers and/or mitigation systems (e.g., passive and/or active sub-slab depressurization systems) in accordance with PADEP's Vapor Intrusion Guidance.

McMAHON
a Bowman company

June 2, 2022

Charles L. Guttenplan, AICP
Whitemarsh Township
616 Germantown Pike
Lafayette Hill, PA 19444-1821

RE: 601 Washington Street
Information from Prior Traffic Study
McMahon Project Number 818064.12

Dear Charles:

As requested by the Planning Commission at their April 26, 2022 meeting, I am providing you with pages from the *Transportation Impact Study for 601 Washington Street Residential Development,* last revised November 12, 2019. Sections of the report text have been highlighted in yellow to reflect modifications from the current report for the subject parcel, which are also summarized in the table below.

Item	2019 Study	2022 Study
Existing Count Data	Conducted in November 2018	Conducted in February 2022
Site Trip Generation	AM 91 Total Trips PM 115 Total Trips	AM 107 Total Trips PM 106 Total Trips
Trip Generation Manual	10th Edition	11th Edition
Build-Out Year	2020	2024
Regional Growth Rate	0.34% per year	0.33% per year
Other Development Projects	901 Washington Street 401-433 Washington Street	901 Washington Street 401-433 Washington Street Millennium Apartments
Scenario	Without Washington Street connection to Lee Street	Without and With Washington Street Connection to Lee Street

The biggest change to the study is the impacts to the area travel patterns that have occurred because of COVID-19 impacts. Although area restrictions have lifted, commuter travel pattens in the area have been influenced by ongoing telework policies that area offices may have adopted, as well as changes to commercial businesses. These changes can be seen in the table provided on the next page, which lists the decreases in area traffic at four of the study area intersections. There are businesses located on the south side of Washington Street to the east and west of Ash Street, as well as the Spring Mill Corporate Center to the north of Hector Street that are most likely not operating at pre-COVID levels. In addition, area residents may also be working from home as businesses may have also adopted telework protocols.

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Intersection	Movement	Time-Period	2018	2022
Cherry Street and Elm Street	SB Cherry Street Throughs	AM	259	69
	WB Elm Street Throughs	AM	466	325
		PM	546	459
	NB Cherry Street Right	AM	99	43
		PM	217	63
Cherry Street and Washington Street	SB Cherry Street Right	AM	200	65
	EB Washington Street Left	AM	59	33
		PM	139	41
Hector Street and Spring Mill Avenue/ Lee Street	WB Hector Street Throughs	AM	764	442
	EB Hector Street Throughs	PM	760	546
	Enter Spring Mill Avenue	AM	58	20
	Exit Spring Mill Avenue	PM	90	57
	Enter Lee Street	AM	89	27
	Exit Lee Street	PM	79	23
Hector Street and North Lane/Station Avenue	Enter Station Avenue	AM	84	31
	Exit Station Avenue	AM	71	26
		PM	113	33
	Southbound North Lane	AM	192	128
	Depart via North Lane (North)	AM	299	142
		PM	253	125
	Westbound Hector Street	AM	928	506
	Depart via Hector Street East	PM	812	665

While there have been modifications to the area travel patterns, both studies indicated that the area study intersections could accommodate the additional traffic associated with the development of the subject parcel. If there are any questions regarding the two studies, please feel free to contact me.

Sincerely,

Sandy A. Koza, P.E., PTOE
Senior Project Manager

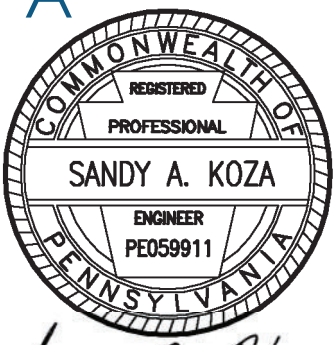
cc: Kevin Kyle, MLP Ventures

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Transportation Impact Study
for
601 Washington Street
Residential Development

Whitemarsh Township,
Montgomery County, PA



Sandy A. Koza, P.E., PTOE
PA PE License Number PE059911

Prepared by
McMahon Associates, Inc.
425 Commerce Drive, Suite 200
Fort Washington, PA 19034
215.283.944

Prepared for
MLP Ventures

May 24, 2019
Last Revised November 12, 2019

818064.11

Existing Traffic Conditions

This section provides a summary of the existing (2018) daily and peak hour traffic conditions on the study area roadways and intersections surrounding the proposed development.

Traffic Count Data

Manual turning movement traffic counts were conducted in November 2018 during the weekday morning peak period (7:00 AM to 9:00 AM) and weekday afternoon peak period (4:00 PM to 6:00 PM) at the study area intersections. The results of these traffic counts are tabulated by 15-minute intervals in **Appendix C**. The four highest consecutive 15-minute peak intervals during these traffic count periods constitute the peak hours that are the basis of this traffic analysis. The resultant 2018 existing weekday morning and weekday afternoon peak hours are depicted in **Figure 3A**.

Capacity/Level of Service Analysis

The peak hour traffic volumes were analyzed to determine the existing conditions, and future conditions, without and with the proposed development, in accordance with the standard techniques contained in the current *Highway Capacity Manual (2010)*. These standard capacity/level-of-service analysis techniques, which calculate total control delay, are more thoroughly described in **Appendix D** for unsignalized and signalized intersections, as well the correlation between average total control delay and the respective level-of-service (LOS) criteria for each intersection type. In the surrounding area, PennDOT District 6-0, as well as many local municipalities, considers LOS A through D acceptable operating conditions, while LOS E represents conditions approaching capacity, and LOS F indicates that traffic volumes have exceeded available capacity.

The results of the capacity/level-of-service analyses are illustrated in **Figure 3B** for the existing conditions, while the detailed capacity/level-of-service analysis worksheets are contained in **Appendix E**. Specific details regarding the analysis and operations of each intersection are contained in the "Capacity/Level-of-Service Results" section of this study.

Site Characteristics

This section presents the details regarding the proposed site, including the incremental increase in traffic volumes generated by the development during the peak hours and the distribution of this site traffic to the study area roadways, as well as the proposed site access configuration, traffic control, and sight distance requirements.

Trip Generation

Traffic volumes generated by the 270 apartment units proposed for 601 Washington Street were prepared based on trip generation data compiled from numerous studies contained in the Institute of Transportation Engineers (ITE) publication, *Trip Generation, Tenth Edition*. Specifically, the equations for Land Use Code 221 – Multifamily Housing (Mid-Rise) were utilized, since the building will provide a total of four-stories with parking on the first story and three levels of apartments. **Table 2** presents the anticipated vehicular trip generation for the proposed development.

Table 2 – Vehicular Trip Generation (1)

Land Use	Size (units)	Daily	Weekday Morning			Weekday Afternoon		
			In	Out	Total	In	Out	Total
Multifamily Housing (Mid-Rise) (2)	270	1,470	24	67	91	70	45	115

(1) Based on ITE's *Trip Generation, Tenth Edition.*
(2) Based upon ITE Land Use Code 221.

It should be noted that given the nature of the area around the site, where pedestrian activity is high, as well as accessibility to mass transit, that other travel modes are also expected. However, no reductions were utilized in the traffic generation projections to reflect this. As a result, the traffic generation projections should be considered conservative.

Trip Distribution and Assignment

Site-generated traffic will approach and depart the site via different routes depending on factors such as the existing traffic patterns, location of major roadways, and the location of the development's site access. The distribution percentages for the new trips for the proposed development are illustrated in **Figure 4A**, while the application of the percentages in Figure 4A to the new trips contained above in Table 2 for the weekday morning and weekday afternoon peak hours are illustrated in **Figure 4B**.

Site Access Configuration and Traffic Control

Access to the proposed development will be provided via one unsignalized full-movement driveway along Washington Street to the east of Cherry Street. Based on the results of this evaluation, the following access configurations and traffic controls are recommended, subject to the detailed engineering of the site accesses:

Future Build-Out Year (2020) Traffic Conditions

This section presents the future build-out year traffic conditions, both without and with the proposed development, which is anticipated to be completed by 2020. The future 2020 build-out year without-development traffic volumes were estimated by increasing the existing 2018 traffic volumes to account for regional growth, as described below. The incremental increase due to the anticipated trip generation for the site was then added, resulting in the future 2020 build-out year with-development traffic volumes.

Future 2020 Without-Development Traffic Volumes

To account for regional traffic growth, the existing traffic volumes were increased by an annual traffic growth rate of 0.34 percent per year for two years. This growth rate is consistent with the traffic growth rate recommended by the PennDOT Bureau of Planning and Research *Growth Factors for August 2018 to July 2019* for similar roadways in Montgomery County. It should be noted that the new recommended growth rate is 0.28 percent per year.

Additionally, traffic from the proposed development of 901 and 401-433 Washington Street have also been included. 901 Washington Street is a 75-unit townhome development located to the east of the proposed site, which has received approvals from Whitemarsh Township. 401-433 Washington Street is a 588-unit apartment complex located to the west of the proposed site in both Conshohocken Borough and Whitemarsh Township. Although 401-433 has been included in the study, only Conshohocken Borough has approved the development project and it is not known when the development of the site will proceed given that approvals from Whitemarsh Township are also necessary. The trip generation details along with the trip distribution and assignment for these sites are provided in **Appendix F.**

The total background growth and traffic associated with the other projects was then added to the existing 2018 traffic volumes along with the traffic associated with the other project noted above, and the resultant future 2020 build-out year peak hour traffic volumes are then illustrated in **Figure 5A** for the weekday morning and weekday afternoon peak hours.

Future 2020 with Development Traffic Volumes

The total site-generated traffic volumes for the proposed development, as illustrated in Figure 4B for the two peak hours, were then added to the future without development traffic volumes (Figure 5A) to result in the total future peak hour traffic volumes with completion of the development during both peak hours. The resultant weekday morning and weekday afternoon peak hour traffic volumes are illustrated in **Figure 5B** for the anticipated build-out year (2020). Detailed spreadsheets summarizing the existing traffic volumes and the trip assignment for each intersection with completion of the proposed development are provided in **Appendix G**.

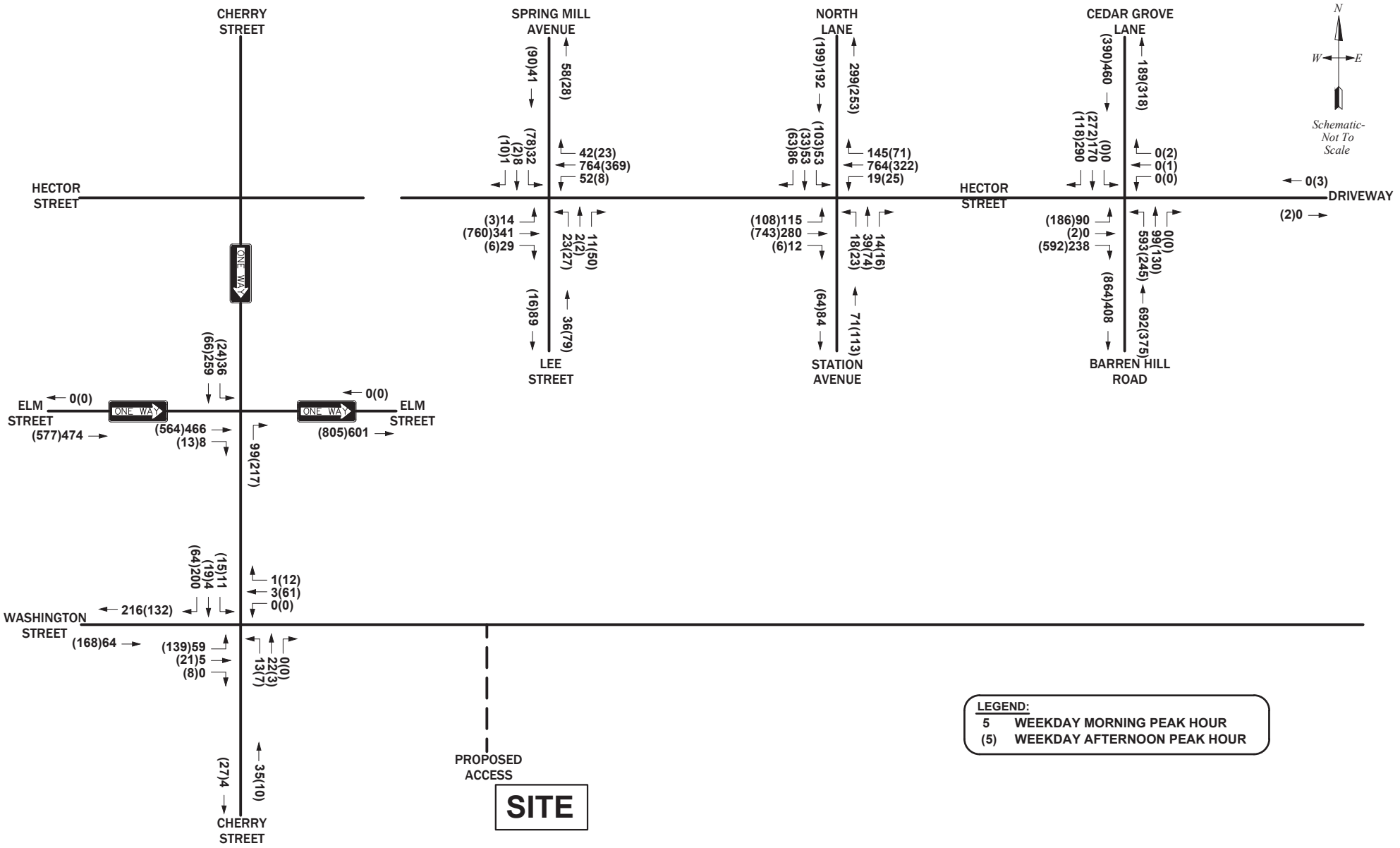


FIGURE 3A

2018 Existing Peak Hour Traffic Volumes

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON TRANSPORTATION ENGINEERS & PLANNERS

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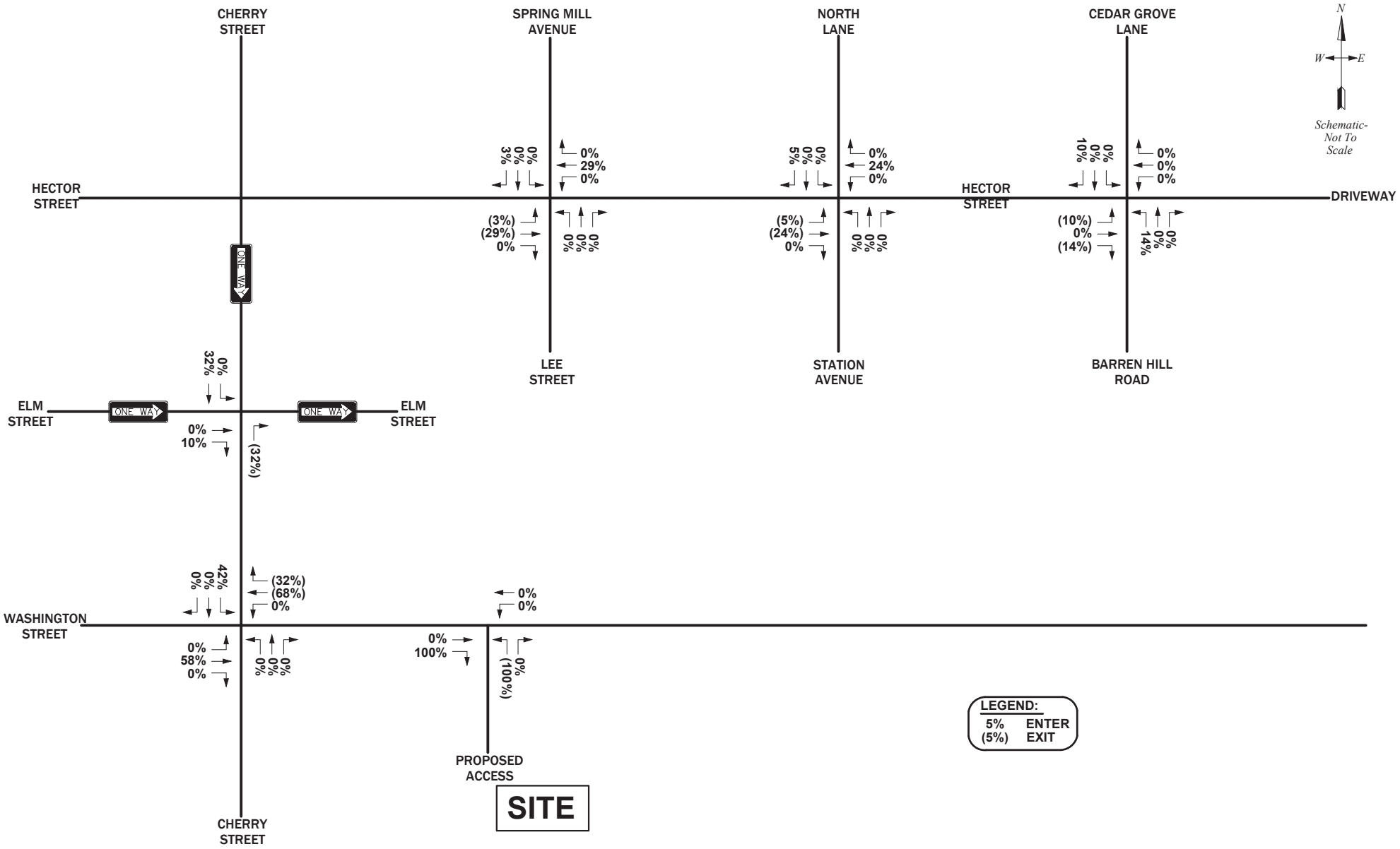


FIGURE 4A

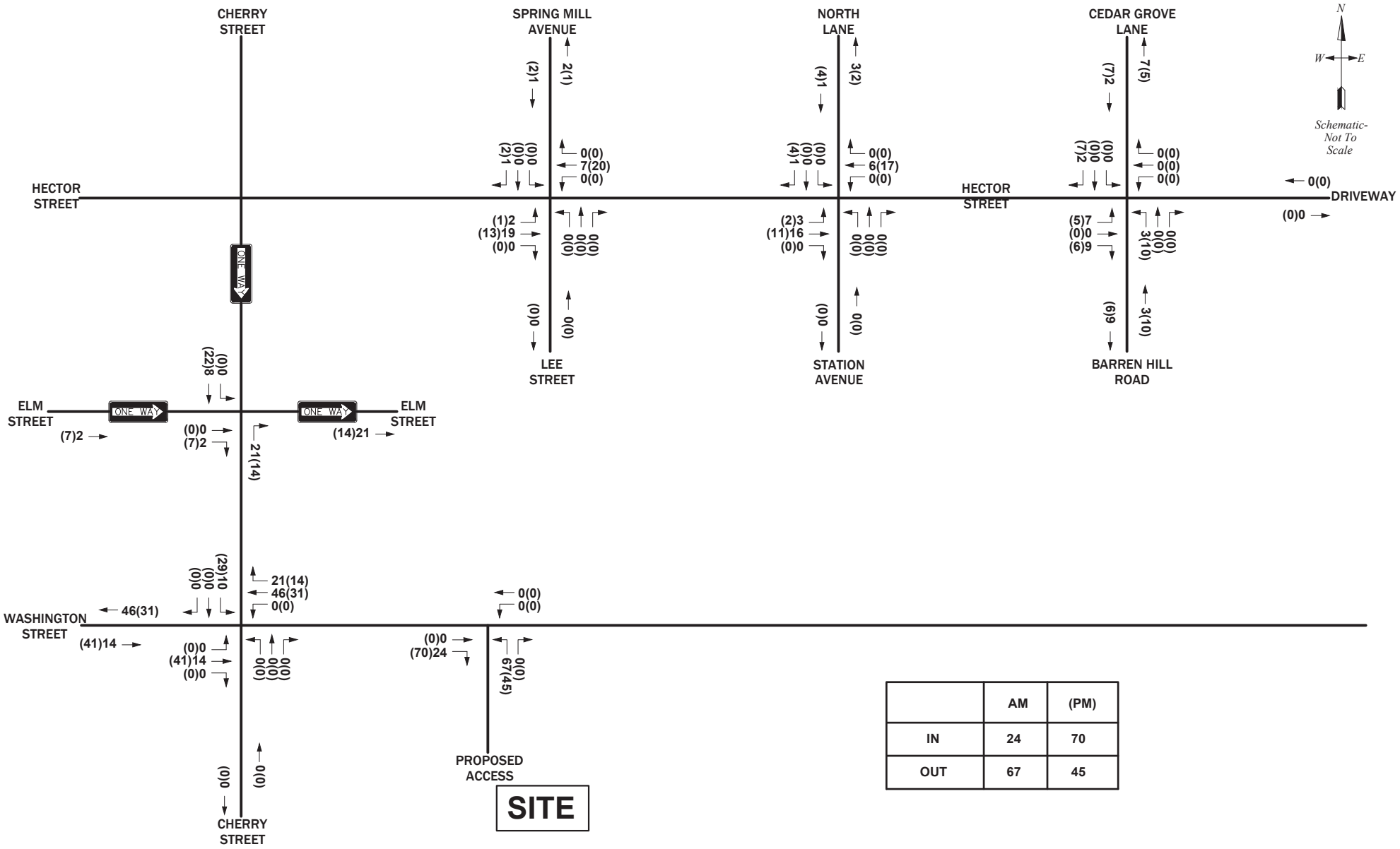
Site Trip Distribution

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

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	AM	(PM)
IN	24	70
OUT	67	45

FIGURE 4B

Site Trip Assignment

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON TRANSPORTATION ENGINEERS & PLANNERS

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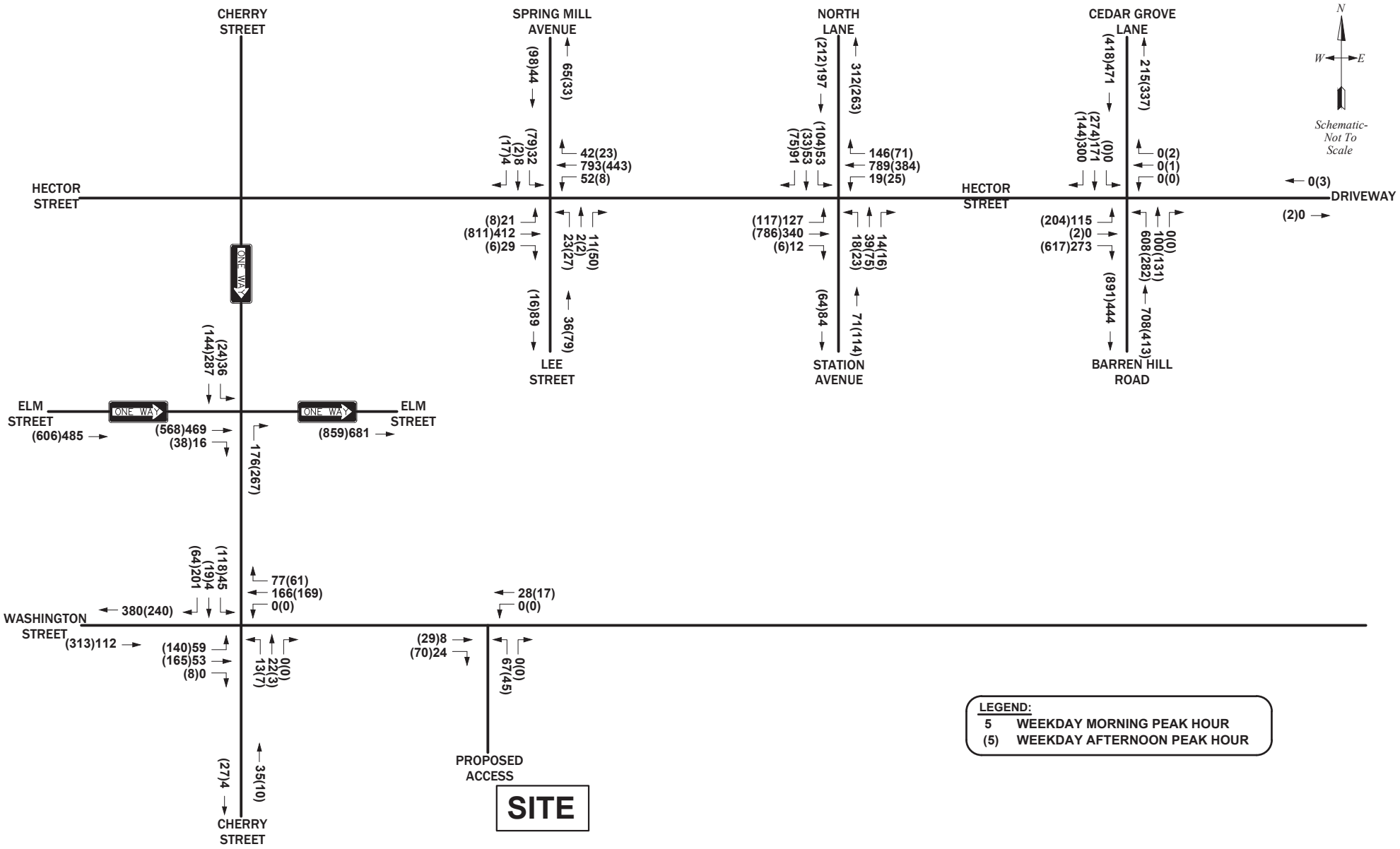


FIGURE 5B

2020 Future Peak Hour Traffic Volumes with Development

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON TRANSPORTATION ENGINEERS & PLANNERS

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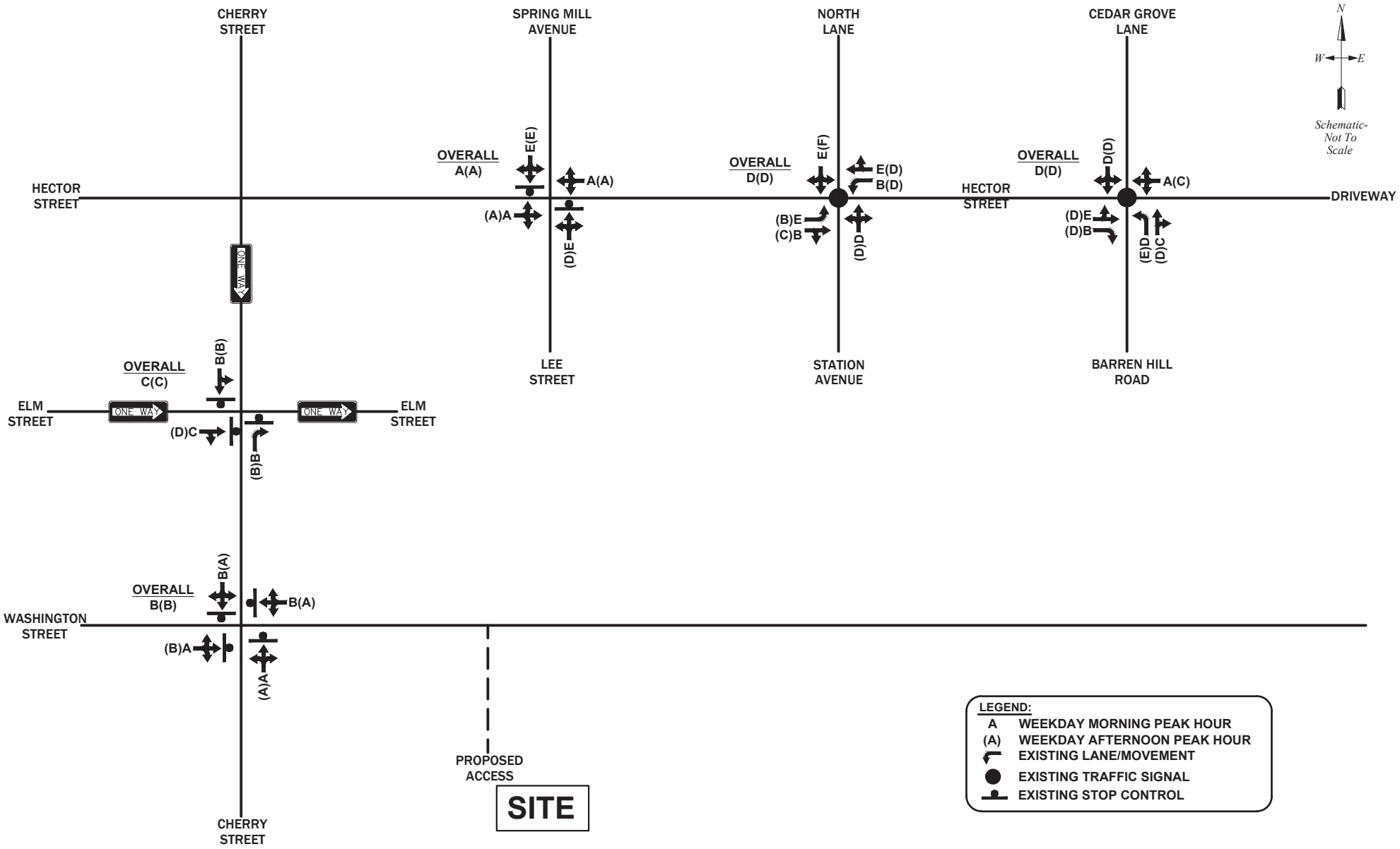


FIGURE 5C

2020 Future Peak Hour Levels of Service Without Development

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PA

McMAHON TRANSPORTATION ENGINEERS & PLANNERS

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March 14, 2022

Derrick Birkinbine
410 Eagelview Blvd
Exton, PA 19341

Re: Water Availability
601 Washington St
Whitemarsh Township, Montgomery County

In response to your request, this letter will serve as confirmation that the above referenced property is situated within Aqua Pennsylvania Inc. service territory.

Domestic and fire water service is available to this property and will be provided in accordance with Aqua Pennsylvania, Inc. Rules and Regulations. For further details, visit www.aquaamerica.com.

With regard to our capacity for domestic and fire service for this area, flow data information can be obtained upon written request to Lisa Thomas of our Control Center at LATHOMAS@AQUAAMERICA.COM. Include the address with town or township and the nearest intersecting street.

Should you have any further questions or need to request an application for service, contact me at (610) 541-4160 or dlciotti@aquaamerica.com.

Regards,

Deanna L. Ciotti
Special Services Coordinator-New Business Applications
Aqua Pennsylvania, Inc
700 W Sproul Rd
Springfield, PA 19064
O: 610.541.4160

AQUA

To:	Derrick Birkinbine, Colliers Engineering Design	**Date:**	April 11, 2022
		Pages:	2, including this cover sheet
From:	Lisa Thomas		
Subject:	Flow Test Information		

COMMENTS:

Attached per your request received April 6, 2022, please find the flow information for 601 Washington St. & Cherry St., Whitmarsh Township.

762 W. Lancaster Avenue, Bryn Mawr, PA 19010 610-525-1400 Fax: 610-645-1162

AQUA PENNSYLVANIA, INC. - FIRE HYDRANT FLOW TEST(S)

TOWN CONSHOHOCKEN BORO/ WHITEMARSH TWP. **DATE** 2/17/2022 **OPERATORS** FORMICHELLI-WISER

PLATE J - 18 **TIME** 10:45 AM **WEATHER CONDITIONS** SUNNY-COOL

FIRE HYD. #	LOCATION	STATIC (PSI)	RESIDUAL (PSI)	NO. OUTLETS	DIAMETER* (INCHES)	PITOT	FLOW ** (GPM)
8-85	Washington St. 795 ft. E/O Cherry St.	110	100				
35-28-0	Washington St.1338 ft. E/O Cherry St.			1	2 1/2	80	1501

COMMENTS

diffuser used on 2 1/2" butt

The average static pressure for fire hydrant #8-85 is 106 PSI.

NAME	COMPANY	DATE

Please be advised that you should confirm the elevations of the above referenced fire hydrants in determining pressure and flow available to your service area.
These figures show conditions at the time of the test. We do not guarantee that these pressures and flows will not vary due to change in system load.
The analysis was not performed for duration, therefore Aqua Pennsylvania, Inc. does not guarantee this rate for any duration of time.
If the static pressure is 85 PSI or above, confirm with Aqua Pennsylvania, Inc. New Business Rep. whether pressure reducing valves will be required.

****Calculation based on accepted AWWA Standard.**

410 Eagleview Boulevard
Suite 104
Exton Pennsylvania 19341
Main: 877 627 3772
colliersengineering.com

Colliers Engineering & Design

June 2, 2022

Nicholas W. Weaver, Fire Marshal
Whitemarsh Township
616 Germantown Pike
Lafayette Hill, PA 19444

601 Washington Street Apartments – Fire Marshal Review Memo
Colliers Engineering & Design Project No. 16001030B

Dear Mr. Weaver,

Colliers Engineering & Design, Inc. is in receipt of your Memo dated March 25, 2022, and offers the following responses:

1. Fire Apparatus Access and turning plan to be updated. This plan shall meet the requirements as set forth in Chapter 5 of the International Fire Code 2015 edition, Appendix D of the International Fire Code 2015 Edition, and Whitemarsh Township Ordinance #1003.

    a. Fire Apparatus Access Roads shall be 24' wide with 14' vertical clearance and no closer than 5' to a structure.

    The plans have been revised to provide 26' wide access roads and to be greater than 5 feet from the building.

    b. Highest roof surface height shall be provided. This height shall be measured to the eave of a pitched roof, the intersection of the roof to the exterior wall, or the top of parapet walls. If this height exceeds 30ft, the Fire Apparatus Access Road shall be 26' wide.

    The plans have been revised to provide 26' wide access roads as the building exceeds 30 ft in height.

    c. Apparatus: Overall length 49' and wheelbase 23' (Tandem axle).

    The plans have been revised to show a fire truck with these parameters. See sheet 12.

    d. There is no parking allowed on Fire Apparatus Access Roads. Line striping and signage shall be provided in approved locations.

    The dimension plan was revised to show no parking signs and red painted curb along the rear building entrance curb line.

Colliers Engineering & Design

2. Fire Hydrant plan to be updated with distances. This plan shall meet the requirements as set forth in Chapter 5 of the International Fire Code 2015 edition, Appendix B of the International Fire Code 2015 Edition, Appendix C of the International Fire Code 2015 Edition, and Whitemarsh Township Ordinance #1003.

    a. All buildings must have a fire hydrant within 600' of all portions structure by approved route.
        i. If the building is equipped with standpipes a hydrant is required within 100' of the fire department connection

    The plans have been revised.

    b. The hydrants must be capable of flowing a minimum of 1500 gallons per minute for one hour.
        i. Hydrants must meet the needed fire flow as required by Appendix B

    See enclosed hydrant flow test from AQUA.

    c. The average spacing between hydrants shall meet the requirements set forth by Appendix C of the International Fire Code 2015 Edition.

    The plans have been revised.

3. Provide an Emergency Responder Radio Coverage Plan. This plan shall meet the requirements set forth in Chapter 5 of the International Fire Code 2015.
    a. All new buildings shall have approved radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building.

    The building will have approved radio coverage for emergency responders that meet the requirements from chapter 5 of the International Fire Code 2015.

4. Emergency Action Plan shall be updated

    a. Contacts shall be updated
    b. Change Notify me to ReadyMontCo https://www.montcopa.org/3311/ReadyMontCo
    c. Provide Emergency Evacuation Routes/Shelter in place plans
    d. Provide Elevator Procedures
    e. Provide Procedures for accounting for employees and residents after evacuation
    f. Provide Means of notifying occupants during an emergency
    g. Provide Site plans with evacuation points, hydrants, and fire department access
    h. Provide Floor Plans
    i. Location for residents to move their cars in the event of a potential flood.

    The emergency action plan will be updated and provided under separate cover.

Should you have any questions or require additional information please do not hesitate to contact this office.

Sincerely,

Colliers Engineering & Design, Inc.
(DBA Maser Consulting)



Ryan Armour, RLA
Project Manager

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410 Eagleview Boulevard
Suite 104
Exton Pennsylvania 19341
Main: 877 627 3772
colliersengineering.com

Colliers
Engineering
& Design

June 2, 2022

Krista Heinrich, PE
Township Engineer
Gilmore & Associates, Inc.
65 East Butler Avenue, Suite 100
New Britain, PA 18901

601 Washington Street Apartments – Gilmore Review #1
Colliers Engineering & Design Project No. 16001030B

Dear Ms. Heinrich,

Colliers Engineering & Design, Inc. is in receipt of your letter dated April 21, 2022, and offers the following responses:

5. 105-21(A)(3) – Each sheet shall be numbered and shall show its relationship to the total number of sheets. The following plans were submitted separately, and must be incorporated into the plan set, and individually listed on the Index of Sheets:
    - Landscaping Plans LP-1 & LP-2
    - Lighting Plan LI-2
    - Detail and Notes LD-1, LD-2 & LD-3

    The plan set has been updated to include the abovementioned sheets. The sheet index has been updated.

6. 105-21(B)(1)(k) – The plans must be revised to show the location of all existing property monumentation.

    No existing monumentation was found at the time of the original survey.

7. 105-21(B)(1)(l) – The plans indicate an "area of apparent overlap" at the Southwestern Corner of the site. Property Boundaries must be resolved and properly monumented prior to plan approval.
    The owner is working on resolving this issue.

8. 105-21(B)(1)(n) – This section of the ordinance requires the plans to show existing principal buildings (and their respective uses), and driveways on the adjacent peripheral strip: sewers lines, storm drains, culverts, bridges, utility easements, quarries, railroads, and other significant man-made features within 500 feet of and within the site, including properties across streets.

Colliers Engineering & Design

An overall aerial was added to the cover sheet and an aerial exhibit is included. The Existing Resources and Site Analysis Plan was added to the sheet set identifying existing features within 500 ft of the site.

9. 105-21(B)(1)(o)[1] – The plans must be revised to include dimensions indicating the width of both access driveways on sheet 5.

   The plans have been revised to provide the requested dimensions.

10. 105-21(B)(1(o)[2] – Structural Plans or details are to be provided for the proposed pedestrian bridge along the river trail.

    The pedestrian bridge has been removed from the plans as it is no longer needed.

11. 105-21(B)(2)(e) – The Record plan must be revised to list the lowest floor elevation and/or the elevation to which the structure would be floodproofed.

    The ground floor elevation is 53.00'. The Base Flood Elevation is 60.50'. The Design Flood Elevation is 62.00'. The building is wet flood proofed to the Designed Flood Elevation. The floodplain note has been added to the General Construction Notes on the Architectural plans.

12. 105-21(BP(9)(d)[6](a) – All streets and/or intersection showing a level of service below C shall be considered deficient, and specific recommendations for the elimination of these problems shall be listed. Deficiencies are noted at the intersection of Ash Street and Elm Street with a delay increase of more than 10 seconds for the eastbound left-turn critical movement. This intersection is located in Conshohocken Borough. Any modifications to the intersection are subject to the review of the Borough and PennDOT.

    The intersection of Ash Street and Elm Street is located within the Borough of Conshohocken and not Whitemarsh Township. The Borough of Conshohocken does not have a LOS C or better requirements in regard to traffic impact studies according to *Section 27-824* of the Borough's *Zoning Ordinance.* Also as noted in the study, the traffic assigned to travel along Elm Street to then turn right onto Poplar Street or Cherry Street to access the site could divert to Harry Street to access Washington Street instead.

13. 105-21(B)(9)(d)[6](a) – Overall the report was conducted in accordance with traffic engineering standards. There are minor technical discrepancies on the Figures, Table 6 and Capacity Analysis Worksheets for the PM LOS for Elm Street and Cherry Street but they do not affect the overall analysis. In our opinion the report conducted is acceptable.

    Comment acknowledged.

Colliers Engineering & Design

14. 105-21(B)(10(a) – The Applicant shall submit a letter from the appropriate municipal authority indicating the availability of public sanitary sewer facilities.

    A letter has been sent to the Borough of Conshohocken Sewer Authority. When a Will Serve letter is received, a copy will be provided to the Township.

15. 105-21(B)(10(b) – The Applicant shall submit a letter from the appropriate municipal authority indicating the availability of central water supply.

    A copy of Aqua America's Will Serve letter is attached.

16. 105-21(B)(12) – A map showing the location of the proposed subdivision within its neighborhood context shall be submitted.

    An aerial map has been provided on the cover sheet to show the project location within the context of the surround neighborhood. An aerial exhibit is also included.

17. 105-21(B)(13) – An Existing Resources and Site Analysis Plan (ERSAP) shall be prepared and shall provide a comprehensive analysis of existing conditions, both on the proposed development tract and within 500 feet of the tract boundaries. Conditions beyond the tract boundaries may be described on the basis of existing published data available from governmental agencies and from aerial photographs.

    An ERSAP plan has been added to the sheet set as requested. An aerial exhibit is included with the submission package.

18. 105-21(B)(13)[10] – There is an existing sign located at the front corner of the site, along Washington Street, for a former historic use of the site. The applicant should consider possible reuse/repurposing of the sign, if feasible.

    The sign is located I within the proposed fire access and will be removed.

19. 105-21(B)(15) – A Preliminary Resource Impact and Conservation Plan (the "Preliminary Impact Plan") shall be prepared for all Major Subdivision and Land Development applications to categorize the impacts of the proposed activities and physical alterations on those resources shown on the ERSAP. All proposed improvements, including but not necessarily limited to grading, fill, streets, buildings, utilities and stormwater management facilities, as proposed in the other Preliminary Plan documents, shall be taken into account in preparing the Preliminary Impact Plan, which shall clearly demonstrate that the applicant has minimized site disturbance to the greatest extent practicable.

    A preliminary resource impact and conservation plan will be provided under separate cover.

Colliers Engineering & Design

20. 105-21(B)(16)(n) – Signature blocks for the Board of Supervisors shall be provide on the preliminary improvements plans.

    The plans have been revised.

21. 105-21(B)(17)(e) – The applicant shall submit a Community Association Document consistent with the requirements of this section of the ordinance.

    A Community Association Document will be provided.

22. 105-21(B)(18) – The applicant shall submit a 'Preliminary Common Open Space Ownership and Management Plan' consistent with the requirements of this section of the ordinance.

    A Preliminary Common Open Space Ownership and Management Plan will be provided.

23. 105-21(B)(20(g) – The Lighting Plans must be revised to include the plan notes contained in this section of the ordinance.

    The Lighting Plans have been revised to include the notes per Section 1025-21(B)(20)(g)

24. 105-21.1(K)(2) – Within the South Transportation Service Area an impact fee in the amount of Two Thousand Five Hundred and Twenty-Nine Dollars ($2,529.00) per anticipated peak hour tip must be provided by the applicant. Based on data documented within the latest edition of the ITE Trip Generation Manual, the proposed development will generate 106 PM peak hour tips. Therefore, the traffic impact fee totals $268,074.00 ($2,52900 x 106peak hour trips).

    The fee will be paid by the owner.

25. 105-26(E) – The applicant must provide evidence in sufficient detail to demonstrate that there are no environmental concerns related to the previous uses of the site. Additional information related to the site's participation in the PADEP Act 2 Program, related to the former industrial uses.

    We will provide a letter under separate cover from our Environmental Consultant with this information.

Colliers Engineering & Design

26. 106-30 – As defined by Section 105-29(C) and 105-30(A), streets adjacent to the site are subject to the following requirements:

Street Name	Classification	Required Ultimate R.O.W.	Required Cartway Width	Curbs	Sidewalks	Tree Zone
Washington Street	Local Street	56 feet	36 feet	Required	Required	Required

The plans must be revised in order to demonstrate compliance with the requirements of this section of the ordinance. The following, at a minimum, must be addressed:

- A waiver would be required in order to not require a tree zone along Washington Street, as required by Section 105-48. The plans show the proposed sidewalk as being contiguous with the curb, where section 105-48 requires a tree planting zone of law area, situated between the sidewalk and curb and measuring a minimum of five feet in width from the planting edge of the curb to the planting edge of the sidewalk. We recommend a minimum 2-foot grass verge between the curb line and sidewalk be provided to minimize pedestrian and vehicular conflicts. This is consistent with the preliminary typical cross sections within the 'Spring Mill Area Study'.

  The brick paver sidewalk is designed to provide no tree zone along Washington Street to be consistent with the other developments.

- A waiver would be required in order to not require the cartway of Washington Street to be 36+/- feet, in order to permit a width of 30 feet.

  We are requesting a waiver from this section of the ordinance.

27. 105-30 – The applicant is proposing Belgian block curb along Washington Street. We have no objection to Belgian Block Curb, however we recommend the Planning commission consider the curb material, since Washington Street is largely unimproved and should be consistent along its length. Future land developments should utilize the same materials.

    In reviewing the existing curbing material along Washington Street, the plans have been updated to detail granite cubing

28. 105-30(A) – The plans must be revised in accordance with the following:
    a) Dimension the half-width of the proposed cartway from the centerline on Washington Street. A 36 foot (18-foot half-width) is required along the full site frontage. Shoulder tapers are not recommended at the western and eastern property lines.

       A waiver is being requested to allow less than a 36' wide cartway width. The tapers are added to tie the curb line back into the existing pavement.

Colliers Engineering & Design

b) Dimension the Legal and Ultimate Right-of-Way lines for Washington Street on sheets 3 and 4. Label the property owner on the north side of Washington Street across from the subject property. Verify the ultimate right-of-way on the north side of Washington Street has been offered to the Township. If the right-of-way has not been offered, we recommend the line be removed from the plan.

The ultimate ROW has been removed from the north side of Washington Street. The Legal and Ultimate ROW have been dimensioned on sheets 4 and 6.

29. 105-34 – The Profile of Washington Street on Sheet 9 must be revised to show the proposed street finished grades.

The profile has been revised to show the proposed street finished grades. See sheet 11.

30. 105-37 – The plans must be revised to demonstrate compliance with the sight distance requirements of this section of the ordinance and/or the required sight distances contained in the most current revision of Pennsylvania Code Title 67 Chapter 441, whichever is more restrictive. Available sight distance at each proposed driveway opening must be indicated.

Sight distances have been provided on the site plan sheet 6.

31. 105-38(B) – The width of entrance and exit drives shall be:

(2) A minimum of 25 feet of two-way use

(3) A maximum of 35 feet at the street line

Dimensions must be added to the plans which demonstrate compliance with the requirements of this section of the ordinance.

The plans have been revised. The main loop road has been increased to 26 feet per the Fire Marshals comments.

32. 105-38(C) – The applicant must obtain the approval of the Fire Marshal with regard to access for fire protection equipment.

The plans will be coordinated with the Fire Marshall.

33. 105-38(V) – All artificial lighting used to illuminate any parking space or spaces shall be so arranged hat no direct rays from such lighting shall fall upon any neighboring property or streets, nor shall any high brightness surface of the luminaries be visible from neighboring residential property or from a public street. The required Lighting Plan must also demonstrate compliance with the requirements of this section of the ordinance.

Colliers Engineering & Design

The Lighting Plan has been revised to show all light fixtures directed in, toward the property. Proposed light fixtures shown close to property boundaries are specified to include house side shield(s).

34. 105-38(W) – Section 116-282(E) of the Zoning Ordinance states that residential uses shall not be subject to the overflow parking requirements of Chapter 105, Subdivision and Land Development §105-38W.

    Comment acknowledged.

35. 105-39(A) – The applicant is requesting a waiver from the requirements of this section of the ordinance, which requires that all parking areas shall have at least one, three-inch-caliper tree for every two parking spaces provided.

    The waiver request has been revised to account for the change in total parking spaces and to allow a portion of the required parking area trees to be provided as shrubs at a rate of 6 shrubs/1 tree.

36. 105-40, 105-50(C)(2) – The plans must be revised to include adequate space, if required, for off-street loading. The plans must be revised to indicate the proposed method of garbage collection and provisions must be made to provide for deliveries and moving trucks.

    The main entrance has been revised to provide an isolated drop off and loading zone at the front door. Garbage collection areas have been added to the Architectural plans.

37. 105-47 – The plans must be revised to provide ADA Accessible ramps and crosswalks along the concrete walks from the rear of the building to the River Trail.

    The plans have been revised accordingly.

38. 105-47(B) – The minimum width of all sidewalks and pedestrian paths shall be five feet; in areas of higher pedestrian density, the minimum width of all sidewalks shall be eight feet.

    The plans have been revised accordingly.

39. 105-47(C) – An easement should be provided for the sidewalk from Washington Street to the river trail.

    An easement has been provided of the site plan, see sheet 6 and 7.

40. 105-47(H) – The plans must be revised to provide proposed grades for the sidewalk from Washington Street to the trail and along the river trail proposed pathway. Verify the grades will not exceed 7%.

    The grading plan has been revised.

Colliers Engineering & Design

41. 105-47(K)(2) – The plans must be revised in order to demonstrate compliance with the requirements of this section of the ordinance, which states that access points to the River must be located no more than 500 feet apart.

    A waiver has been requested as the two (2) proposed river trail access points are greater than 500 feet apart.

42. 105-47(K)(3) – The perpendicular access to the River must be revised in order to be a red shale macadam pathway with a minimum of 10 feet in width.

    The plans have been revised accordingly.

43. 105-47(K)(4) – At least one seating area shall be provided along the perpendicular access to the River.

    The plans have been revised.

44. 105-47(K)(5) – Lighting fixtures shall be installed along the perpendicular access to the River and shall be a style as approved by the Board of Supervisors.

    The Lighting Plans have been revised accordingly.

45. 105-47(K)(6) – The perpendicular access to the River shall contain appropriate signage to direct pedestrians to the river in accordance with Chapter 116, Zoning, §116-286B(5).

    The landscape plans have been revised to indicate location of proposed signage to direct pedestrians from Washington Street to the river.

46. 105-48(E) – A waiver would be required in order to permit the tree zone along Washington Street to not be located between the sidewalk and curb, where this section of the ordinance requires a tree planting zone of lawn area or other material approved by the Shade Tree Commission, situated between the sidewalk and curb and measuring a minimum of five feet in width from the planting edge of the curb to the planting edge of the sidewalk.

    A waiver has been requested as we are currently matching the existing development along Washington Street.

47. 105-50(B) – The applicant must submit architectural plans including elevation views for the proposed buildings in order to demonstrate compliance with the requirements of this section of the ordinance.

    Architectural plans and elevations are included.

Colliers Engineering & Design

48. 105-50(C)(1) – The following must be addressed:
    a) It is recommended to provide a pedestrian walkway along the perimeter of the building to minimize pedestrian and vehicular conflicts within the parking area.
    b) A pedestrian walkway should be provided from the front door to Washing Street sidewalk.
    c) The mini roundabout design should be modified to better guide vehicles exiting the garages. Vehicles exiting the west and east garages should not be able to turn left. Island diverters, signage, pavement marking and/or relocation of the circle slightly to the north should be considered.

    The previous design was limited by the maximum impervious cover requirements. Now that we have reduce the parking, we have added sidewalks throughout the site. The main entrance has been revised to decentralize the circle into an isolated drop off zone. This allows for a better traffic flow to and from the parking garages.

49. 105-50(F)(2) – The plans must be revised to indicate the proposed method of garbage collection. Garbage Collection stations, if any, shall be adequately screened and landscaped. Provide turning templates for garbage collection vehicles.

    Garbage is stored indoors in the trash rooms within the covered garage. Dumpsters will be rolled out for pickup. Garbage collection areas have been added to

50. 105-52 – The plans must be revised to provide a buffer between Washington Street and the SEPTA train tracks. Consideration must be given to restricting pedestrian access to the tracks by means of planting, fencing, low walls or other safety along the tracks.

    Plans will be coordinated with the Township to provide a buffer between Washington Street and the SEPTA train tracks.

51. 105-52 – All landscaping plans are subject to the review and approval of the Shade Tree Commission.

    Comment acknowledged.

52. 105-53(D) – This section of the ordinance requires the dedication of land in the amount of 10% of the total Site Area for Parking and/or Recreational use. The applicant has the option of offering a fee in lieu of dedicating actual land area and can also provide a combination of a fee in lieu and dedication of land. All offers of land and/or fees in lieu of dedication must meet the requirements of this section of the ordinance. If actual land area is offered, the applicant is advised that this section of the ordinance states that no more than 25% of the minimum land area required for park and recreation land may consist of floodplain or riparian corridor buffer areas, wetlands or areas with slopes in excess of 8%.

    The entire site is located within a floodplain so a fee in lieu of will be required.

Colliers Engineering & Design

53. 105-69(C) – The plans must be revised to clearly indicate full depth pavement restoration of Washington Street. The standard pavement restoration cross section for Township roads is 6" Base Course, 5" 25mm Superpave Binder Course, 2" 9.5mm Superpave wearing course. The plans must be revised to indicate the pavement cross section proposed for Washington Street, in accordance with the standards of Whitemarsh Township, at a minimum.

    The plans have been revised to include a typical cross section for Washington Street. See sheet 16.

54. 105-72(A) – Monuments must be provided at all property line corners. Monuments shall be placed at each change in direction of a boundary along the street line; two to be placed at each street intersection and one on each side of any street at angle points and at the beginning and end of curves.

    Property corners will be set once the lot line overlay issue is resolved. The proposed locations have been shown on sheet 6.

55. 105-73 – The plans must be revised to indicate proposed grading along the River Trail.

    The plans have been revised to provide grading along the river trail. See sheet 8.

56. 105-75 – The developer shall construct stormwater drainage facilities, including curbs, inlets, storm sewers, road swales, and other structures in order to prevent erosion, flooding and other hazards along Washington Street.

    Washington Street, along the frontage of our property, has been designed to provided curbing, inlets, and storm sewers to capture runoff and prevent flooding and erosion.

57. 105-76 – The applicant must obtain a letter of approval from the Township Fire Marshal in order to ensure that adequate fire protection is provided.

    A letter will be obtained from the Township Fire Marshall.

58. 105-78 – The applicant must obtain the approval of the Whitemarsh Township Authority with regard to proposed sanitary sewerage facilities.

    Approval will be obtained from the Whitemarsh Township Authority.

59. 105-78(C), 105-79 – All preliminary plan submissions shall include a completed sewage facilities planning module (the planning module) for land development provided by DEP.

    The planning module has been submitted to the Borough of Conshohocken Authority.

60. 105-83(E) – No Removal of a tree shall be permitted unless the applicant obtains a recommendation from the Shade Tree Commission based on a tree survey and removal plan submitted in accordance with Chapter 55 of the Whitemarsh Township Code.

    Comment acknowledged.

Colliers Engineering & Design

61. 105-89 – The developer shall enter into a written agreement with the Township in the manner and form approved by the Solicitor wherein the developer shall agree, to construct or cause to be constructed at his own expense all proposed improvements shown on the approved land development plan, all in strict accordance with the standards and specification of the Township and within the time specified in said agreement, and to deposit with the Township financial security in an amount sufficient to cover the cost of all subdivision or land development improvements, including both public and private improvements.

    Comment acknowledged.

CHAPTER 55 – TREE PROTECTION STANDARDS

62. 55-4(A)(2) – We defer to the Township Arborist whether there is sufficient cover provided for the trees proposed in the parking islands above the underground basin.

    The underground basin has been modified to avoid conflicts with the required plantings to the greatest extent feasible.

63. 55-4(A)(4) – The tree survey plan shall be reviewed by the Shade Tree Commission in a public meeting.

    Comment acknowledged.

64. 55-4(B)(2) – The Construction Sequence must be revised to indicate that a pre-construction conference with the Township Shade Tree Commission is required prior to start of construction.

    The construction sequence has been revised to include the meeting with the Shade Tree Commission prior to construction.

65. 55-4(B)(1) – The plans must be revised to include provisions for tree protection to preserve health trees and shrubs on site in accordance with this section of the ordinance. Construction Sequence Site Work note 1 must be revised to require protective fencing to be placed around trees on the property prior to any other construction activities. Protective fencing must be shown on the plans, including the Erosion & Sedimentation Control Plan, in all areas where it will be required.

    The plans and notes have been revised as requested.

Colliers Engineering & Design

GRADING, EROSION CONTROL, STORMWATER MANAGEMENT AND BEST MANAGEMENT PRACTICES ORDINANCES

66. 58-4(B) – General Note 5 on Sheets 20, 23 and 24 must be revised in order to be consistent with the plan view.

    The notes have been revised as requested.

67. 58-4(B) – Since the site is within the floodplain and floodway, erosion control blanket should be installed over all disturbed lawn areas.

    The plans have been revised as requested, see General Note 8 on sheets 22 and 23.

68. 58-4(B) – Additional existing topography along and North of Washington Street should be provided.

    Additional GIS topography has been provided along Washington Street.

69. 58-4(B) – Proposed Contour lines along the rear of the parking lot and at HW R-1 must be revised to tie into existing grades and/or be labeled with the correct elevations.

    The plans have been revised as requested.

70. 58-4(B)(2)(p) – The plan must be revised to show the size, location and construction details of all existing and proposed storm drainage facilities. The following must be addressed:
    a) The stormwater management calculations must be revised to address tailwater from the River. A flap gate, or similar, should be considered at the outlet structure.
    b) Invert data, pipe slopes and related structure information must be provided for several existing Manholes noted as 'sealed'.
    c) The next upstream or downstream structure and pipe slope for an existing 36" RCP within Washington Street Must be shown.

    The plans have been revised to provide the requested information. We are waiting on additional survey information in order to address comment C. We will provide the additional survey information under separate cover once it is obtained.

71. 58-4(B)(2)9q) – Construction Sequence Note 1 on Sheet 21 must be revised to include Note 5 from Sheet 19.

    The notes have been revised as requested.

72. 58-4(D)(1) – Since the limit of disturbance is greater than one acre, the applicant must obtain a National Pollutant Discharge Elimination System (NPDES) permit from the Pennsylvania Department of Environmental Protection. Once obtained, a copy must be submitted to the Township.

    A copy will be provided when completed.

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73. 58-8(H) – All easements must be documented in the form of an easement agreement, approved by the Township Solicitor and recorded at the Recorder of Deeds for Montgomery County.

    Required easements and agreements will be provided.

74. 58-11(G)(1), 58-11(H)(1) – The property owner shall sign an operations and maintenance agreement with the Township addressing stormwater BMPs that are to be privately owned. The plans indicate that the lot owner is responsible for the "Ownership and Maintenance" of the BMPs. The operation and maintenance agreement shall be subject to review and approval of the Township.

    An operations and maintenance agreement will be coordinated with the Township.

RESOLUTION 2004-8

75. I(B)(4)(k) – Edges of slopes shall be a minimum of five feet from property lines. The plans must be revised to address how the proposed perpendicular trail will be constructed without encroaching on the adjacent property.

    A waiver has been requested to permit grading within five feet of the property lines. The proposed river trail will connect to the adjacent properties.

76. I(C)(5) – Fills shall not encroach on natural watercourses, floodways, floodway fringes, constructed channels, or on wetlands unless permitted by the Arm Corps of Engineers, Pennsylvania Department of Environmental Protection and approved by the Township.

    The development in the floodway results in a net cut condition.

77. I(C)(6) – Fills placed adjacent to natural watercourses, floodways, floodway fringes, constructed channels, or wetlands shall have suitable protection against erosion during periods of flooding, where approved by the Arm Corps of Engineers, the Pennsylvania Department of Environmental Protection, and the Township.

    The development in the floodway results in a net cut condition.

78. II(A)(8) – If in the course of reviewing the stormwater management plan, the Township Engineer determines that off-site improvements are necessary to satisfactorily control the stormwater from the site, the applicant shall be responsible for such off-site improvements.

    Comment acknowledged.

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79. II(BO(16) – The applicant must submit legal descriptions for any proposed rights-of-way, easements, or lands to be offered for dedication.

    Required legal descriptions will be provided.

80. II(C)(1) – All earth disturbance activities shall limit the rate of stormwater runoff so that no greater runoff is permitted from any point on the site than that of the site at its maximum development potential in its natural condition of the same frequency storm, except where deemed necessary by the Township Engineer. Where farm, field, or disturbed earth is the existing condition, meadow shall be used as the starting basis for such calculations, regardless of the actual conditions.

    The stormwater system is designed to meet the Township requirements and reduce the stormwater runoff in the post-project condition.

81. II(C)(8)(d) – The following note shall be attached to all drainage plans and signed and sealed by the applicant's Registered Professional Engineer experienced in geotechnical and soil engineering: *"I certify that the proposed facility is/is not underlain by limestone."*

    The requested certification has been added to the plans on sheet 9, 26 and 27.

82. II(D)(13) – Energy dissipaters and/or level spreaders shall be installed at points where pipes or drainage ways drain to or from basins. Energy dissipaters shall comply with the criteria in the Erosion and Sediment Control Manual, published by the Pennsylvania Department of Environmental Protection or the Engineering Field Manual for Conservation Practices, SCS. Energy dissipating device calculations shall be submitted to the Township for review.

    The storm sewer system was updated to tie into the existing storm water pipe upstream of the outfall. With the storm sewer system reducing the runoff rates in the post-project condition, the existing channel will be in an improved condition.

83. II(FO(3)(d)(4)[d] – The Geotechnical investigation showed water at several borings locations beneath the proposed underground detention basin. The applicant's engineer must address groundwater displacement and buoyancy consideration for the proposed underground detention basin.

    The underground detention system has been revised to be a concrete chamber system to address buoyancy concerns. The basin is designed to have separation from the groundwater surface elevation.

84. II(F)(3)(d)(4)[e][7] – The volume below the MRC water storage elevation (44.60) shall not be used in computing the storage volume of the stormwater management facility.

    The basin routing calculations have taking into account for 50% of the IWS storage per the managed release concept.

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ADDITIONAL COMMENTS

85. The proposed improvements will require the applicant to obtain a Chapter 105 Water Obstruction and Encroachment General Permit, administered by the Pennsylvania Department of Environmental Protection (PADEP) Bureau of Waterway Engineering and Wetlands. Once obtained, the permit must be submitted to the Township.

    Will comply.

86. On Sheet 5, revise the quantity of Sign C (10) in the sign legend to reflect the number of signs noted on the plan.

    The plans have been revised as requested. See sheet 6.

87. On sheet 18, include dimensions at all critical points for all proposed curb ramps and ADA parking spaces to verify accessibility.

    The plans have been revised as requested. See sheets 21 and 22.

88. For the proposed handicap spaces along the building:
    a) Identify the van spaces and the size of the handicap parking spaces and associated accessible aisle adjacent to the space. Van spaces must have an aisle with the 8 feet in accordance with ADA standards.
    b) Provide a detail indicating the color of the diagonal striping and handicap legend.
    c) Identify the handicapped access ramp from the proposed parking spaces.

    The plans have been revised as requested. See sheets 6, 18, 21, and 22.

89. Provide a curb ramp on the western side of the emergency access driveway.

    The plans have been revised as requested. See sheet 6.

90. An “Authorized Vehicles Only” sign is recommended be added to the emergency access.

    The plans have been revised as requested. See sheets 6 and 17.

91. Provide signage to indicate the clearance of the garage entrances.

    Signs have been added to the plans as requested. See sheets 6 and 17.

Should you have any questions or require additional information please do not hesitate to contact this office.

Sincerely,

Colliers Engineering & Design, Inc.
(DBA Maser Consulting)



Ryan Armour, RLA
Project Manager

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June 2, 2022

Kevin Chavous, ASLA, LEED AP, SITES AP, WELL AP, LFA, CNU-A, AICP CUD
Design Planner
Montgomery County Planning Commission
Montgomery County Courthouse
PO Box 311
Norristown, PA 19404-0311

601 Washington Street Apartments – Montgomery County Review
MCCP Number: 19-0018-002
Colliers Engineering & Design Project No: 16001030B

Dear Mr. Chavous,

Colliers Engineering & Design, Inc. is in receipt of your letter dated April 20, 2022, and offers the following responses:

ZONING ORDINANCE COMPLIANCE

A. Electric vehicle charging stations (*§116-188.3)*

Township regulations stipulate that "parking spaces providing electric vehicle (EV) charging stations are to be included in addition to the minimum number of parking spaces required, as provided in Article XXVI, Off-Street Parking and Loading." Furthermore, "a minimum of 50% of all required EV charging stations shall be ADA-accessible". While the plan appears to show the required number of EV spaces, the necessary EVSE is not depicted on the plan. In addition, proposed wheel stops delineated within designated EV spaces maybe inconsistent with barrier free access. It is recommended that the plan be amended accordingly.

The plan has been revised to indicate the proposed Electric Vehicle Supply Equipment (chargers). The wheel stops are a requirement of Whitmarsh Township and will remain on the plans.

B. Design standards/Public amenities (*§116-283.B.(5))*

According to RDD District design standards, "all public gathering spaces shall be designed to safely provide pedestrians with ingress and egress, shall be adequately lit, and shall be ADA compliant." Furthermore, "adequate seating and trash receptacles shall be provided." It is unclear whether the plan fully satisfies this requirement, as no information regarding proposed street furniture is included with this submission. In addition, our office observes that the planned concrete walk which

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extends through the parking lot may lack necessary curb ramps to make it accessible for the physically disabled. This matter should be addressed.

The plans have been revised accordingly and access points updated. Refer to the Landscape and Site Furniture Plans for detailed amenities.

C. Design standards/Pedestrian-oriented development (*§116-283.D.(1).(a)*)

The Zoning Ordinance mandates that for all developments, the project shall include: "lighting along all street frontages with lighting fixtures to be of a style as approved by the Board of Supervisors." We defer to municipal officials to determine whether the plan complies with this requirement.

Ornamental lighting has been provided along Washington Street. We will coordinate the specific style of lighting with the Township.

D. Riverfront access and open space (*§116-284.A.(2)*)

RDD District open space standards state that riverfront open space areas shall include "seating areas at intervals of not more than 300 feet." The plan does not appear to meet this requirement.

The plans have been revised. Refer to Landscape and Site Furniture Plans for details related to seating areas.

E. Riverfront access and open space (*§116-284.A.(5)*)

Township regulations specify that "street furniture located in the floodway shall be anchored in accordance with the requirements of Article II, Floodplain Regulations, §42-7 of the Building Construction Code." We defer to the Township Engineer to determine if the plans adequately address this issue. Clarification may be needed with respect to any recreational elements sited inside of the proposed dog park area.

The plans have been revised to indicate street furniture and structures in the floodway shall be anchored per chapter 42-7 of the building code.

DESIGN ISSUES

A. Pedestrian Connectivity/Washington Street

While the MCPC recognizes and is aware of a proposed 4 foot wide sidewalk to be constructed along Washington Avenue; however, we note that it appears that no direct pedestrian connections from this proposed sidewalk to the building or parking areas is proposed. It is unclear how persons may

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safely access the main entrance without creating conflicts with vehicles entering/exiting parking areas or utilizing the front drop off area. It is suggested that further design study may be needed.

The plans have been revised.

B. Pedestrian Connectivity/South Parking Area

As depicted on the plan, a 5 foot wide sidewalk from the proposed building to the waterfront trail shall traverse through the parking area on the south side of the property. It appears that the walkway is not ADA compliant, for no curb ramps are delineated on the plan. While "Stop for Pedestrians" signs are proposed, we suggest that the Township Engineer be consulted to determine crosswalks or other pavement markings/traffic control devices are necessary. The Township Engineer should also confirm that the placement of these signs behind the sidewalk rather than in front of in one situation is appropriate.

The plans have been revised.

C. Pedestrian Connectivity/Proposed Eastern Boundary Walkway

A proposed 4½ foot wide walkway is proposed along the site's eastern property border. The MCPC cautions that this walkway, which connects the riverfront trail to Washington Street, may serve as the primary pedestrian access link on the planned Riverwalk Trail on the banks of the Schuylkill. As such, its 4½ foot width may be insufficient. Although the plan shows a possible future linkage to the adjacent Hines Rowing Center tract, it is uncertain whether this connection will be constructed in the future. Accordingly, consideration should be given to widening this walk to accommodate more pedestrian traffic. Additionally, we suggest that a continuous buffer the entire length between this walk and the parking area may present safety/security issues. A paved connection from the walk to the parking area may be needed.

The plans have been revised and the path is now wider and adjacent to the parking lot.

D. Bicycle Connectivity

The plan should address issues that pertain to bicycle access from this residential development to the Schuylkill River Trail as well as to the Spring Mill Station on Station Avenue. It appears that the plan, as proposed, does not clearly address this issue. Municipal officials may wish to consider what, if any, revisions should be made to the plan to help foster bicycling in this area.

Plans will be coordinated with Whitemarsh Township.

E. Bicycle Storage

Our office notices that bicycle storage facilities previously shown on the sketch plan submission do not appear to be delineated on the preliminary plan. Clarification may be needed. If bicycle storage will be provided within the proposed building, the applicant should review with the municipal

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officials the storage capacity of the proposed room and how residents will be able to safely access the street.

Plans will be coordinated with Whitemarsh Township.

F. Bicycle Parking

The MCPC suggests that in order to encourage and facilitate bicycle usage, bike racks should be placed within or near proposed trail or pedestrian areas.

The residents of the apartments will have bicycle storage facility within the parking garage. Refer to Landscape and Site Furniture Plans for location of bicycle storage facility.

G. Vehicular Entry Area

We defer to the Township Engineer to determine whether the vehicular entry area, as designer and configured, will function efficiently. It is recommended that delivery vehicles should be able to safely access the building entry without causing conflicts with cars accessing this area. In addition, we observe that no reserved ADA stalls are provided in this area for visitors who may be unfamiliar the site. This matter should be addressed.

The plans have been revised.

H. Open Space Amenities

Although a proposed "sitting area" is depicted on the submitted plan, we suggest that a greater effort be made to provide benches, trash receptacles, lighting and other pedestrian amenities within the riverfront pathway area.

The plans have been revised to include additional sitting areas, benches, trash receptacles, and other amenities. Refer to Landscape and Site Furniture Plans for details.

I. Proposed Riverfront Area Planting Scheme

The County recommends that the applicant review with township officials how the riverfront planting scheme shown on the submitted Landscape Plan will address concerns regarding planting within an area that may be susceptible to frequent flooding. While the plantings proposed in this area appear appropriate, municipal officials should discuss with the applicant what, if any, plans will be put in place to ensure the restoration of this landscaped area after flooding events.

The applicant/owner will work with municipal officials to review and discuss plans related to restoration of plant materials after flooding events.

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MISCELLANEOUS

A. Assignment of MCPC Number

When an application is forwarded to the County for review, a member of our staff is required to assign a unique, nine-digit identifier to the plan. This identifier is referred to as a MCPC number. Please note that the number "19-0018-002" has been set aside for this submission. If any subsequent plans are brought to this office for final recording, this MCPC number should appear on the applicable sheets within the plan set in the box reserved for the seal of this agency.

The plans have been revised to include this number.

Should you have any questions or require additional information please do not hesitate to contact this office.

Sincerely,

Colliers Engineering & Design, Inc.
(DBA Maser Consulting)



Ryan Armour, RLA
Project Manager

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June 2, 2022

Charles L. Guttenplan, AICP
Director of Planning and Zoning/Zoning Officer
Whitemarsh Township
616 Germantown Pike
Lafayette Hill, PA 19444

601 Washington Street Apartments – Zoning Ordinance Compliance Review
Colliers Engineering & Design Project No. 16001030B

Dear Mr. Guttenplan,

Colliers Engineering & Design, Inc. is in receipt of your letter dated April 20, 2022, and offers the following responses:

1. **§116-28.4.A.(2)**

   The applicant shall furnish a letter from the appropriate authority indicating the availability and supply of water for the proposed project to the Zoning Officer.

   A copy of A copy of Aqua America's Will Serve letter is attached.

2. **§116-29**

   The applicant must obtain the approval of the Whitemarsh Township Authority with regard to proposed sanitary sewer facilities.

   We are working with the Borough of Conshohocken Sewer Authority to obtain approval.

3. **§116-33.2**

   In those areas of Whitemarsh Township where an overlay district exists, should the use be that allowed in the underlying district, the underlying requirements shall apply. For the purposes of this review, the requirements of the Riverfront Development Overlay District (RDD-1) are applicable given the use proposed and we note that is what the applicant has utilized.

   Comment acknowledged.

4. **§116-165, §116-66.A.(3)**

   Relief from these two sections (variance and special exception, respectively) to allow nonresidential structures in the Floodplain Conservation District, and to allow a stormwater

retention facility in the floodway, was granted as the result of an appeal of a Zoning Hearing Board decision (based on a prior plan) to the Montgomery County Court of Common Pleas. While the Court's decision was appealed in part, the granting of the relief of these two sections, was not appealed. The applicant has relied on this relief for the current plan. There may be additional legal action required to confirm the applicability of this relief; the Township Solicitor will need to determine what additional actions, if any, are necessary.

Comment acknowledged.

5. **§116-166.C**

   Any new construction must be in full compliance with 44 CFR 60.3(a) through (d) of the National Flood Insurance Program regulations. These regulations require that all new construction and substantial improvements of non-residential structures within Zones AE are required to have the lowest floor elevated 1 ½ feet above the base flood level, or together with attendant utility and sanitary facilities, be designed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. A registered professional engineer or architect shall develop and/or review structural design, specifications, and plans for the construction, and shall certify that the design and methods of construction are in accordance with accepted standards of practice.

   The building will comply with National Flood Insurance Program regulations.

6. **§116-169.B.(1), §116-169.B.(2)**

   There was a lack of clarity regarding slope disturbance calculations for the site that has been resolved. On March 25 ,2022 Mr. Roseberry submitted a series of photographs and a site plan indicating the locations where the photos were taken. These photographs show that mounds of material originally believed to be sloped ground are in fact piles of firewood, gravel, and loose soil and thus the slopes of these piles need not be included in steep slope disturbance calculations. The slope disturbance limitations have been adequately addressed.

   Comment acknowledged.

7. **§116-184.A, §116-282.E**

   The required number of parking spaces for this plan is based upon Section 116-282.E, in which the RDD overlay requires a minimum of 1.75 spaces per unit. However, there has been a recent amendment to Section 116-184.A which allows 1.5 spaces per unit to be used for multi-family housing. This lower requirement may be used if desired.

   The site plans have been revised to utilize the 1.5 parking spaces per unit.

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8. **§116-184.F**

   This section does not allow parking within 10 feet of structures; handicapped parking in the entry court is approximately 4 feet from the building. This must be corrected or a variance must be obtained.

   The plans have been revised so that no parking is located within 10 feet of the building.

9. **§116-184.G**

   All parking shall conform to the requirements of the Whitemarsh Township Fire Prevention Code as enacted and amended. The applicant must obtain approval from the Whitemarsh Township Fire Marshal. He has issued a review memo dated March 25, 2022.

   We will address the Township Fire Marshal comments in a separate response letter.

10. **§116-279.B.(3)**

    If a structure is otherwise permitted by virtue of the requirements of the RDD, relief from the Zoning Hearing Board from the provisions of Article XXXV – Riparian Corridor Conservation District shall not be required, provided approval is recommended to the Board of Supervisors by the Township Engineer. There is no objection to the location of the structures within the Riparian Corridor Conservation District by the Township Engineer.

    Comment acknowledged.

11. **§116-280.H**

    In the RDD-1 Sub-district, a minimum of 2% of the footprint area of a residential development must contain a permitted nonresidential use(s), provided, however, that such area shall not be less than 2,000 square feet. We do not see any indication of how this requirement has been met; if it is not, a variance must be obtained.

    A non-residential area breakdown table has been added to the Architectural plans, see plan G3.20.

12. **§116-282.A**

    Parking structures, whether freestanding or integral with other uses in the same building, shall have another permitted first floor use on any portion of the structure visible from any streets, required pathways, or riverfront access or suitable architectural treatment shall be provided. Suitable architectural treatment shall be as defined in Section 116-222.B., C. and D., and Sections 116-283.A.(2) and (4). Per the first sheet of the land development set, there

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is a separate architectural plan set. This has not been provided to the Township, so we are unable to determine if this requirement has been met.

Architectural elevations plans are attached.

13. **§116-282.F**

    Parking may be permitted in the floodplain and riparian corridor in the RDD without relief from the Zoning Hearing Board from the provisions of Article XXII, Floodplain Conservation District, and Article XXXV, Riparian Corridor Conservation District, provided that a parking evacuation plan is provided by the applicant and is approved by the Board of Supervisors. Such plan must be reviewed and approved by the Emergency Management Coordinator and Police Chief. (Please see enclosed Fire marshal memo and Emergency Action Plan Checklist).

    The owner will coordinate a parking evacuation plan with the Emergency Management Coordinator and Police Chief

14. **§116-283**

    Up to date architectural renderings are needed to assess compliance with parts of this section. As indicated in Comment #12, the first sheet of the land development set indicates that there is a separate architectural plan set. This has not been provided to the Township.

    The current architectural renderings are attached.

15. **§116-283.C**

    We note that several waivers have been requested from landscape requirements. These will be evaluated by the Planning Commission and Shade Tree Commission. Prior to this proposal being considered by the Board of Supervisors, the Shade Tree Commission must recommend approval of the landscape plans.

    The waivers have been updated based on the revised site layout. See Landscape Plan Sheet LP-1 for updated waiver request(s).

16. **§116-283.D.(1)**

    For all developments the following elements shall be included to create a pedestrian oriented development:

    (a) Lighting along all street frontages with lighting fixtures to be of a style as approved by the Board of Supervisors.
    (b) Benches, trash receptacles, bicycle racks and other street furniture in a style approved by the Board of Supervisors.
    (c) Wide sidewalks and other pedestrian amenities, landscaping, shade trees.
    (d) A variety of pavement materials for street surfaces and sidewalks.
    (e) Planting strips, located between the curb and sidewalk.

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We note there are details of a bench and trash receptable illustrated in the landscape plan set. Additionally, there are specific recommendations and guidance as to what might be appropriate and required along the riverfront in the Township's Riverfront Plan adopted in 2016. We encourage the applicant to work with the Township to develop an appropriate amenity package.

Lighting, benches, trash receptacles, gathering areas and a variety of pavement materials are shown on the revised Landscape and Site Furniture Plans. The applicant is willing to work with the Township to refine this amenity package as the project progresses.

17. **§116-284.A**

    This section required a 150' area measured from the mean water elevation of the Rivers of the United States/Pennsylvania to be indicated in the plans to be dedicated to the Township or governed by an easement allowing public access. It appears, however, that the applicant has elected to reduce this to 100' in accordance with §116-284.C. (See Comment #18.) Both the mean water elevation and the boundary of the land to be dedicated/reserved must be shown on site plans. There may be several parking spaces located in this area. If this is the case, they must be relocated.

    The 100' area along the river that is to be dedicated to the Township has been shown on sheet 7. The parking has been revised so that it no longer encroaches into this area.

18. **§116-284.C**

    This section requires the provision of two public amenities if the riverfront area dedicated to the Township or reserved for public use is reduced to 100', rather than the standard 150'. These do not include the river trail which is indicated on the plans as one of the public amenities. The riverfront trail is separately required for all developments with frontage on the river. A list of potential amenities is indicated in §116-283.B.

    A dog park and a gazebo have been proposed as public amenities.

19. **§116-284.D**

    Public riverfront access is required in accordance with Chapter 105, Subdivision and Land Development, §105-47.K. The plan currently does not provide the dimensional requirements for the riverfront access. A waiver has been required to reduce the width of the right-of-way to 5' from the required 25'. Additionally, given the site's frontage, it would appear that 2 accesses to the river are required; however, only one is shown.

    The plan has been revised to provide the required 25' wide access easement and a 10' wide access path along the eastern and western sides of the site.

Should you have any questions or require additional information please do not hesitate to contact this office.

Sincerely,

Colliers Engineering & Design, Inc.
(DBA Maser Consulting)



Ryan Armour, RLA
Project Manager

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Ebert Engineering, Inc.

Water and Wastewater Engineering

June 2, 2022

Brent Wagner
Borough of Conshohocken Authority
601 East Elm Street
Conshohocken, PA 19428

Subject: 601 Washington Street Apartment Complex
Re: Letter of Serviceability
EE, Inc. No.: 070-084

Dear Mr. Wagner:

As requested, on the behalf of the Borough of Conshohocken Authority, Ebert Engineering, Inc. (EE, Inc.) has conducted a review of the sanitary sewer flow estimate for the proposed 601Washington Apartment Complex located at the intersection of Jones Street and Washington Street in Conshohocken, Pennsylvania. It is noted that the developer of the proposed apartment complex is in their due-diligence phase and is requesting if the Borough of Conshohocken Authority's wastewater treatment plant has sufficient capacity to service their proposed project.

The development site is proposed to be located at 601 Washington Street, which is situated entirely within Whitemarsh Township. Project improvements are proposing to construct two (2) multi story buildings containing a total of 270 apartment units.

The applicant's engineer requested a letter of serviceability based upon a concept plan and a letter dated March 10, 2022. The letter estimated the flow to be 70,875 gallons per day based upon a rate of 262.5 gpd/edu. The Borough of Conshohocken Authority Rules and Regulations also defines the flow per apartment unit to be equal to 262.5 gpd/edu. If there are any additional uses in the building then there may be additional capacity that must be purchased for those uses in accordance with the Rules and Regulations of the Authority.

EE, Inc. has reviewed the proposed sewage flows and have determined that the Borough of Conshohocken Authority has both Conveyance and Treatment capacity to serve the proposed project. Conveyance capacity can be provided through a connection to the existing thirty (30) inch sanitary sewer main located on Washington Street and treatment can be provided through available treatment capacity at the Authority's wastewater treatment plant. Whitemarsh Township will also need to provide conveyance capacity for their sanitary sewer main which leads to the connection of the Borough of Conshohocken Authorities thirty (30) inch sanitary sewer interceptor.

The Authority has existing conveyance and treatment capacity at this time to service the proposed apartment project without creating an existing or proposed hydraulic or organic overload for the next five years. Capacity is not guaranteed until it is purchased from the Authority through the payment of tapping fees at the then current amount.

Should you have any questions concerning the above, please feel free to contact me.

Very truly yours,

Jonathan Vito
Project Engineer

Cc: Stephanie Cecco, Borough of Conshohocken
Brittany Rogers, Borough of Conshohocken
Ray Sokolowski, Borough of Conshohocken
Karen MacNair, Borough of Conshohocken Engineer
Lauren Gallagher, Esq., Authority Solicitor
Michael Peters, Esq., Borough of Conshohocken Solicitor
Derrick Birkinbine, Colliers Engineering & Design

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610.584.6701 ♦ **Fax 610.584.6704**

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& Design

March 10, 2022

Conshohocken Sewer Authority
601 E Elm St, Conshohocken, PA 19428

601 Washington Street Apartments
Colliers Engineering & Design Project No. 16001030B

Dear Mr. Mongan,

We are in the process of evaluating the above-referenced site for the development of a 270 Unit Apartment Complex. This will serve letter is an inquiry for sanitary sewer service apvailability at the above-mentioned address. It is anticipated flow that the project will accumulate is approximately 270 EDUs. This would equate to 70,875 gallons per day, per Conshohocken's EDU of 262.5 gallons per day.

Please indicate the availability of your utility service by completing the statements and answering the questions on the Service Availability Questionnaire, which is enclosed. Please enclose a plan showing location, size and/or depth of existing and/or future facilities. Also, please identify any applicable design, connection, usage, or frontage fees related to this service. Please attach such additional documentation as necessary to clearly explain these items.

Please sign and return one copy to my attention. Should you require any additional information, please contact me. Thank you for your cooperation.

Sincerely,

Derrick Birkinbine
Project Engineer

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2016\16001030B\Engineering\Site Plans\C-CVER.dwg\AERIAL EXHIBIT By: CHRIS.MESZLER

Colliers Engineering & Design

www.colliersengineering.com

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PRELIMINARY/FINAL
LAND DEVELOPMENT PLANS
FOR

601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET
WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

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Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SITE AERIAL

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	6/3/22	CMM	RMA

PROJECT NUMBER: 16001030B
DRAWING NAME: C-CVER

SHEET TITLE: AERIAL EXHIBIT

SHEET NUMBER: 1 of 1

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Engineering & Design

June 3, 2022

Charles L. Guttenplan
Director of Planning & Zoning
Whitemarsh Township
616 Germantown Pike
Lafayette Hill, PA 19444

601 Washington Street Apartments
Colliers Engineering & Design Project No. 16001030B

Dear Mr. Guttenplan,

On behalf of our client, 601 Washington Street Assoc LP, we are requesting the following waivers the Subdivision and Land Development Ordinance for the above referenced project:

A. **WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-30.A – STREET STANDARDS.** *The following chart indicates the required dimensional standards for the various classifications of streets as defined in §105-5. Local streets, basic dimension cartway: 36 feet, Tree Zone: Yes.*

   This waiver is requested to allow a cartway width of less than 36 feet. The northern proposed curb line cannot be moved further due to existing transmission power lines. We also request a waiver from providing a tree zone along Washington Street. Our intent is to match existing installed improvements along Washington Street.

B. **WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-39A – TREE PRESERVATION, PROTECTION AND REPLACEMENT.** *All parking areas shall have at least one, three-inch-caliper tree for every two parking spaces provided.*

   This waiver is requested to meet this requirement by providing a portion of the required trees as shrubs with a minimum size of 24" height at a ratio of six shrubs for one required 3" caliper shade tree for every (2) parking spaces.

C. **WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-47.K.2 – SIDEWALKS AND PEDESTRIAN PATHS.** *There must be at least one access to the river. Access points must be located no more than 500 feet apart.*

   This waiver is requested to allow access points to be more than 500 feet apart.

D. **WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-48.E – STREET TREES.** *Unless otherwise approved by the Board of Supervisors, street trees shall be planted within*

Colliers Engineering & Design

a tree planting zone of lawn area or other material approved by the Shade Tree Commission, situated between the sidewalk and curb and measuring a minimum of five feet in width from the planting edge of the curb to the planting edge of the sidewalk.

This waiver is requested to not provide a tree planting zone between the curb and sidewalk along Washington Street. Our intent is to match the existing frontages along Washington Street.

E. **WAIVER OF SUBDIVISION AND LAND DEVELOPMENT ORDINANCE §105-52 – BUFFER YARDS** *Buffer yards are required between subdivisions and land developments and along existing streets to soften visual impact, to screen glare, and to create a visual barrier between conflicting land uses. The extent of buffering required shall be determined by the type of use proposed and the adjacent uses or streets surrounding the proposed development. The impact of the proposed use on adjoining properties is the basis for establishing buffer yard standards. The applicant is encouraged to engage a landscape architect in order to promote the proper use and arrangement of plant materials.*

This waiver is requested to allow perimeter buffer yards to be less than 50' in width. Buffer landscaping is provided at the intensity that meets the intent of the buffer yard requirements and address the unique characteristics of the site and intent of the Riverfront Development District.

F. **WAIVER OF RESOLUTION 2004-8 I.B.4.K.** *Edges of slopes shall be a minimum of five feet from the property lines.*

This waiver is requested to permit grading within five feet of the property lines. The proposed river trail will connect to the adjacent properties. The site will be designed to promote no stormwater impacts to adjacent properties.

Sincerely,

Colliers Engineering & Design, Inc.

C. Richard Roseberry, P.E., AICP
Regional Manager

r:\projects\2016\16001030b\correspondence\out\220603_rma_ waiver letter - revised.docx



ELEVATION: NORTH

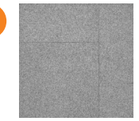
MATERIAL PALETTE

A

GROUND FACE CMU
DARK GRAY

B

LOUVRED WINDOW OPENING
DARK GRAY

C

STONE PANEL
1 - GRAY
2 - BEIGE
3 - DARK GRAY

D

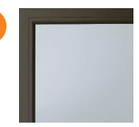
HARDIE PANEL
WHITE
WHITE

E

CORRUGATED METAL PANEL
DARK GRAY

F

CORRUGATED METAL PANEL
MISSION RED

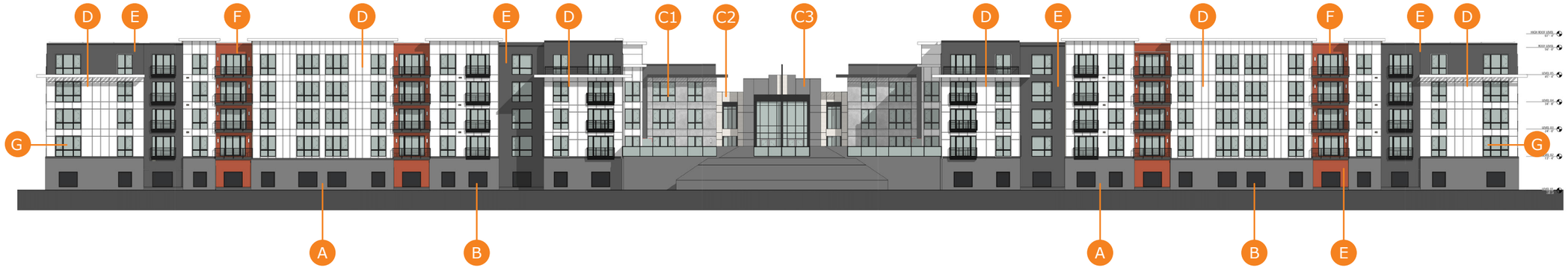
G

TRUSTILE ENTRY DOOR
WOOD CHERRY

JKRP ARCHITECTS

2022.05.25

601 WASHINGTON ST

ELEVATIONS



ELEVATION: SOUTH

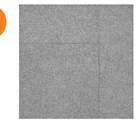
MATERIAL PALETTE

A

GROUND FACE CMU
DARK GRAY

B

LOUVRED WINDOW OPENING
DARK GRAY

C

STONE PANEL
1 - GRAY
2 - BEIGE
3 - DARK GRAY

D

HARDIE PANEL
WHITE
WHITE

E

CORRUGATED METAL PANEL
DARK GRAY

F

CORRUGATED METAL PANEL
MISSION RED

G

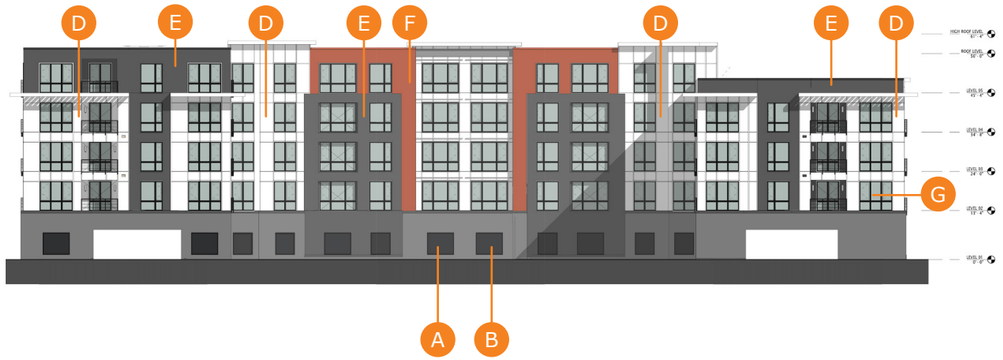
TRUSTILE ENTRY DOOR
WOOD CHERRY

JKRP ARCHITECTS
2022.05.25

601 WASHINGTON ST
ELEVATIONS



ELEVATION: EAST



ELEVATION: EAST

MATERIAL PALETTE

A 

GROUND FACE CMU
DARK GRAY

B 

LOUVRED WINDOW OPENING
DARK GRAY



STONE PANEL
1 - GRAY
2 - BEIGE
3 - DARK GRAY

D 

HARDIE PANEL
WHITE

E 

CORRUGATED METAL PANEL
DARK GRAY

F 

CORRUGATED METAL PANEL
MISSION RED

G 

MARVIN WINDOWS

JKRP ARCHITECTS

2022.05.25

601 WASHINGTON ST
ELEVATIONS

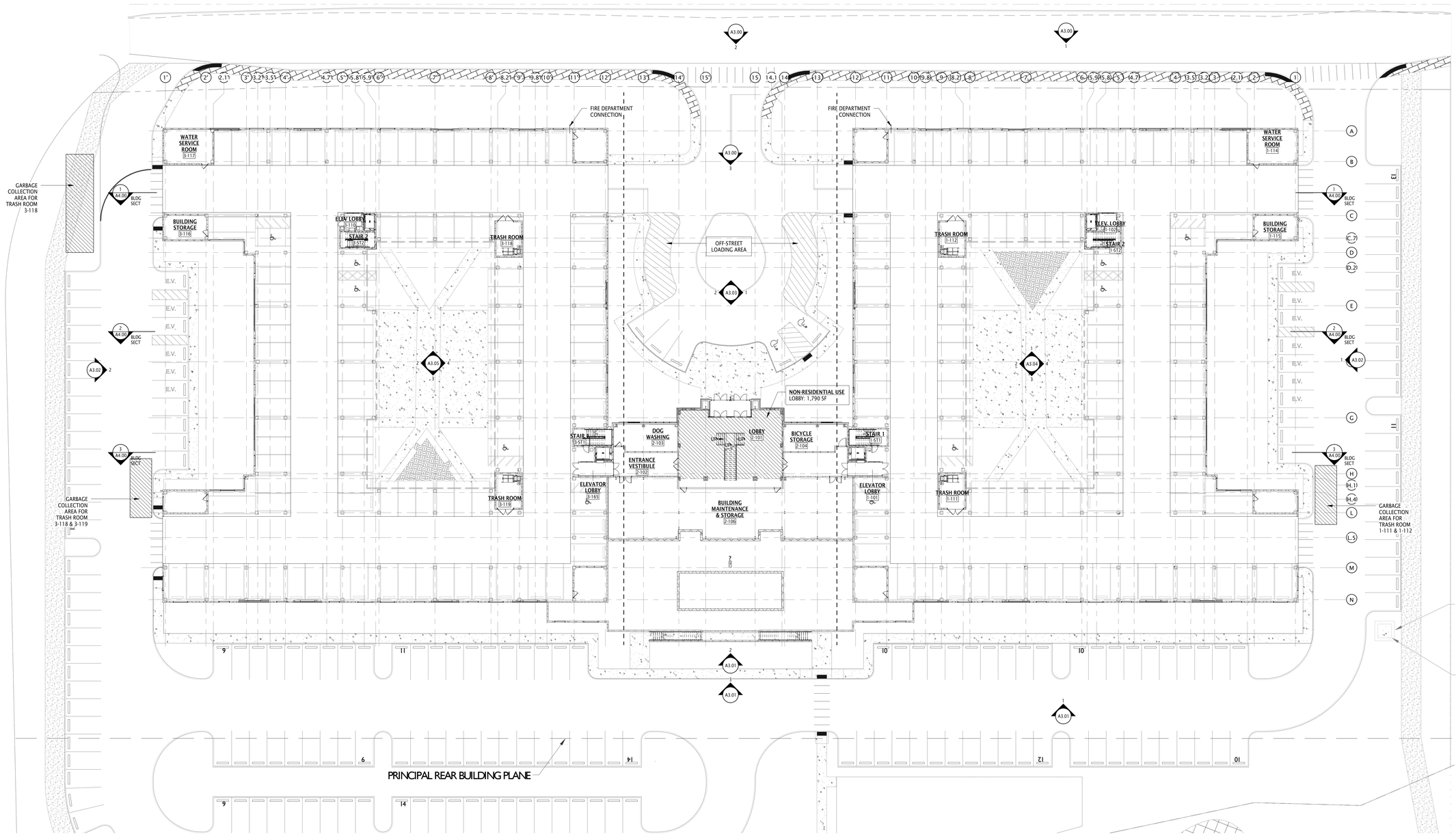
GENERAL CONSTRUCTION NOTES		
FLOOD PLAIN The building is within the floodplain and will comply with National Flood Insurance Program regulations. Ground Floor FFE: 53.00' Base Flood Elevation: 60.50' Design Flood Elevation: 62.00'		
NON-RESIDENTIAL AREA		
2% MINIMUM OR 2,000 SF 2% OF THE 84,484 SF FOOTPRINT = 1,770 SF THEREFORE 2,000 SF IS REQUIRED.		
LEVEL	**ROOM**	**AREA**
GROUND FLOOR	LOBBY	1,790
2ND FLOOR	CLUB ROOM	1,550
TOTAL		**3,340**

JKRP ARCHITECTS
100 EAST PENN SQUARE
SUITE 1080
PHILADELPHIA, PA 19107
215 . 928 . 9331
JKRPARCHITECTS.COM

NOT FOR CONSTRUCTION

OWNER/CLIENT

MLP VENTURES, LLC
201 KING OF PRUSSIA ROAD, #501
RADNOR, PA 19087
215.972.1550



1 G3.10 LEVEL 01 PLAN
3/64" = 1'-0"

601 WASHINGTON

MULTIFAMILY RESIDENTIAL

601 WASHINGTON STREET
WHITEMARSH TOWNSHIP, PA 19428

PROJECT NORTH

FIRST FLOOR PLAN

DATE: 2022.05.11
DRAWN BY: Author
REVISIONS:

0 21'-4" 42'-8"

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G3.10

DESIGN DEVELOPMENT

ORIGINAL SHEET SIZE: 30" X 42" ARCH E1

5/25/2022 7:15:58 PM C:\Users\mlp\Desktop\Revit Local Files\Revit 2020 Local\0-22-001_601 Washington_Site_R20_mlpackham@JKP.rvt

GENERAL CONSTRUCTION NOTES
FLOOD PLAIN The building is within the floodplain and will comply with National Flood Insurance Program regulations. Ground Floor FFE: 53.00' Base Flood Elevation: 60.50' Design Flood Elevation: 62.00'
NON-RESIDENTIAL AREA
2% MINIMUM OR 2,000 SF 2% OF THE 84,484 SF FOOTPRINT = 1,770 SF THEREFORE 2,000 SF IS REQUIRED.

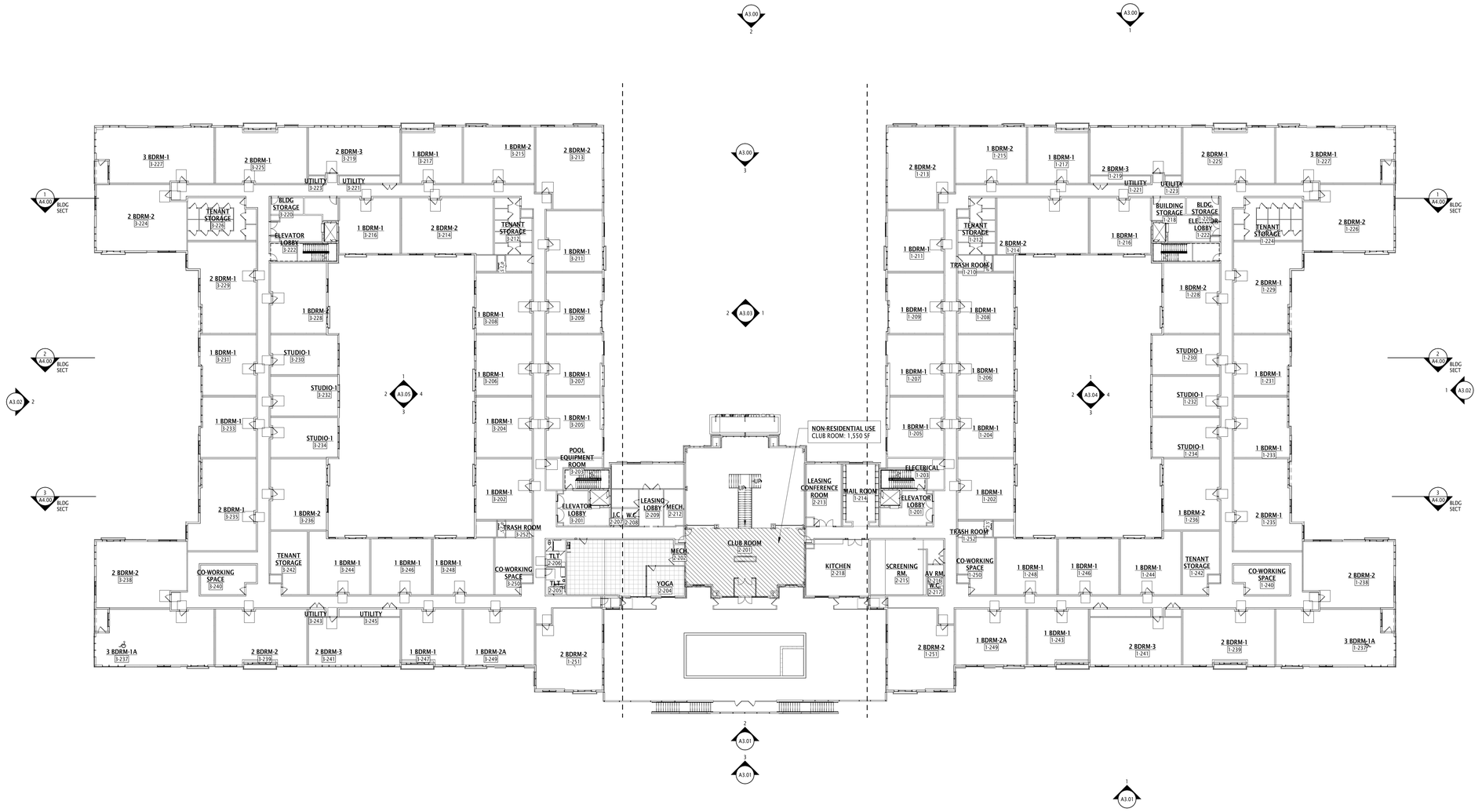
LEVEL	ROOM	AREA
GROUND FLOOR	LOBBY	1,790
2ND FLOOR	CLUB ROOM	1,550
TOTAL		**3,340**

JKRP ARCHITECTS
100 EAST PENN SQUARE
SUITE 1080
PHILADELPHIA, PA 19107
215 . 928 . 9331
JKRPARCHITECTS.COM

NOT FOR CONSTRUCTION

OWNER/CLIENT

MLP VENTURES, LLC
201 KING OF PRUSSIA ROAD, #501
RADNOR, PA 19087
215.972.1550



1 G3.20 LEVEL 02 PLAN
3/64" = 1'-0"

601 WASHINGTON

MULTIFAMILY RESIDENTIAL

601 WASHINGTON STREET
WHITEMARSH TOWNSHIP, PA 19428

PROJECT NORTH

SECOND FLOOR PLAN

DATE: 2022.05.11
DRAWN BY: Author
REVISIONS:

0 21'-4" 42'-8"

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G3.20

DESIGN DEVELOPMENT

ORIGINAL SHEET SIZE: 30" X 42" ARCH E1

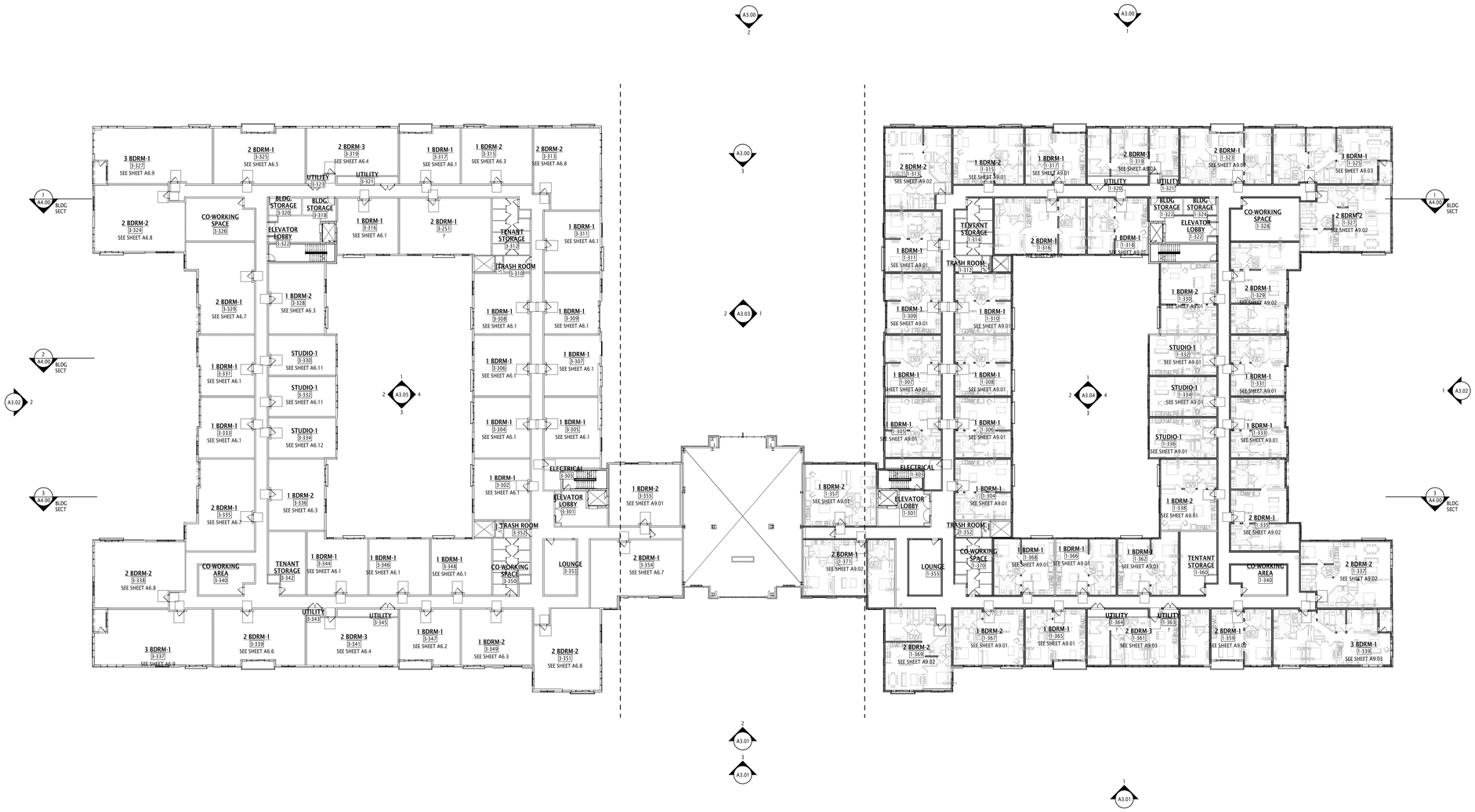
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SUITE 1080
PHILADELPHIA, PA 19107
215 . 928 . 9331
JKRPARCHITECTS.COM

NOT FOR CONSTRUCTION

OWNER/CLIENT

MLP VENTURES, LLC
201 KING OF PRUSSIA ROAD, #501
RADNOR, PA 19087
215.972.1550



1 LEVEL 03 PLAN
G3.30 3/64" = 1'-0"

601 WASHINGTON

MULTIFAMILY RESIDENTIAL

601 WASHINGTON STREET
WHITEMARSH TOWNSHIP, PA 19428

PROJECT NORTH

THIRD FLOOR PLAN

DATE: 2022.05.11
DRAWN BY: Author
REVISIONS:

0 21'-4" 42'-8"

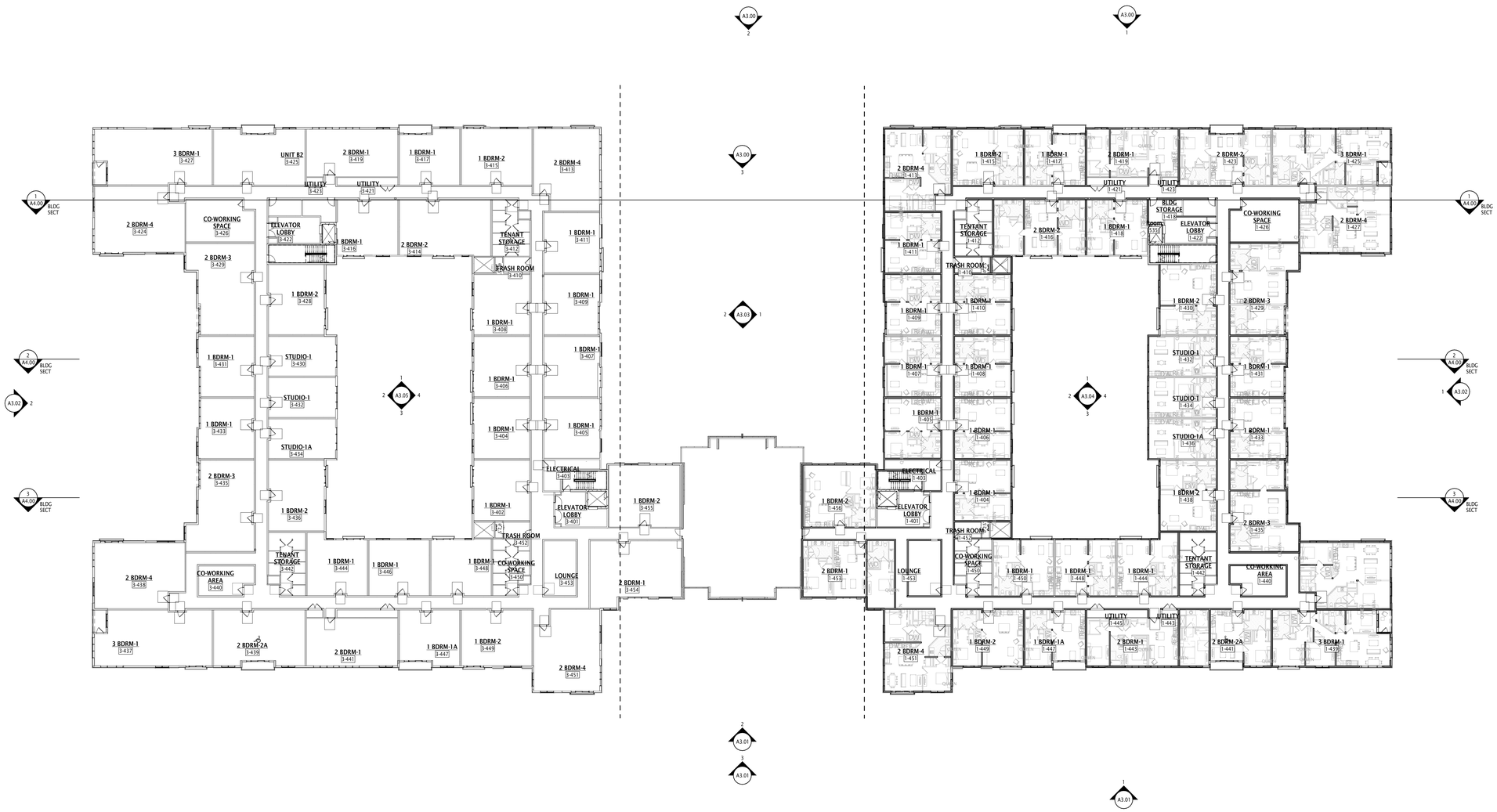
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G3.30

DESIGN DEVELOPMENT

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ORIGINAL SHEET SIZE: 30" X 42" ARCH E1



1 G3.40 LEVEL 04 FLOOR PLAN
3/64" = 1'-0"

JKRP ARCHITECTS
100 EAST PENN SQUARE
SUITE 1080
PHILADELPHIA, PA 19107
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JKRPARCHITECTS.COM

NOT FOR CONSTRUCTION

OWNER/CLIENT

MLP VENTURES, LLC
201 KING OF PRUSSIA ROAD, #501
RADNOR, PA 19087
215.972.1550

601 WASHINGTON

MULTIFAMILY RESIDENTIAL

601 WASHINGTON STREET
WHITEMARSH TOWNSHIP, PA 19428

PROJECT NORTH

FOURTH FLOOR PLAN

DATE: 2022.05.11
DRAWN BY: Author
REVISIONS:

AS INDICATED

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G3.40

DESIGN DEVELOPMENT

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ORIGINAL SHEET SIZE: 30" X 42" ARCH E1



1 G3.50 LEVEL 05 PLAN
3/64" = 1'-0"

JKRP ARCHITECTS
100 EAST PENN SQUARE
SUITE 1080
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JKRPARCHITECTS.COM

NOT FOR CONSTRUCTION

OWNER/CLIENT

MLP VENTURES, LLC
201 KING OF PRUSSIA ROAD, #501
RADNOR, PA 19087
215.972.1550

601 WASHINGTON

MULTIFAMILY RESIDENTIAL

601 WASHINGTON STREET
WHITEMARSH TOWNSHIP, PA 19428

PROJECT NORTH

FIFTH FLOOR PLAN

DATE: 2022.05.11
DRAWN BY: Author
REVISIONS:

0 21'-4" 42'-8"

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G3.50

DESIGN DEVELOPMENT

ORIGINAL SHEET SIZE: 30" X 42" ARCH E1

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JKRP ARCHITECTS

2022.05.25

601 WASHINGTON ST

SOUTH RENDERING

JKRP ARCHITECTS

2022.05.25

601 WASHINGTON ST

SOUTH WEST RENDERING



JKRP ARCHITECTS

2022.05.25

601 WASHINGTON ST

NORTH RENDERING



JKRP ARCHITECTS

2022.05.25

601 WASHINGTON ST

NORTH WEST RENDERING

SECTION 55-4.B.6 - TREE REPLACEMENT:

(a) Every tree determined to be living and healthy, with a DBH of six inches or greater and which is designated to be removed or which is destroyed, shall be replaced with one or more new shade trees of a type approved by the Township with a trunk diameter of not less than three inches in caliper. The total caliper of replacement trees, measured at six inches above the ground line, shall equal or exceed the DBH of the tree removed.
(d) If the Shade Tree Commission determines that there is not sufficient area on the development site for the placement of all replacement trees, a percentage of the replacement trees can be planted on the development site will be increased in caliper size from the three inch minimum in accordance with the following schedule. (Shown Below).
(f) Subject to the prior approval of the Shade Tree Commission:

1. A maximum of 30% of the replacement trees may be replaced with ornamental/flowering or evergreen trees at a ratio of two flowering or two evergreen trees per required three-inch-caliper shade tree.
2. A maximum of 20% of the replacement trees may be replaced as shrubs with a minimum size of 24" height at a ratio of six shrubs per required three-inch-caliper shade tree.
3. A maximum of 10% of the replacement trees may be replaced as groundcover at a ratio of 40 plants to one three-inch-caliper shade tree. The minimum size of the groundcover will be a one-gallon container.
5. A maximum of 5% of the replacement trees may be replaced with plugs at a rate of 240 plugs at a minimum of 1.25 inches x 1.25 inches x 2.5 inch deep root zone for every three-inch-caliper shade tree.

Trees to be Removed (In Inches)	Replacement Trees Required	Replacement Trees Provided**
719" total removed*	240	61 - 3" cal. shade trees*** 83 - 8'-10' ht. ornamental / flowering trees = 42 replacement trees 83 - 8'-10' ht. evergreen trees = 42 replacement trees 331 - 24" -30" ht. shrubs = 55 replacement trees 1,104 - 1 gal. groundcovers = 27 replacement trees 3,312 - (1.25" x 1.25" x 2.5") plugs = 13 replacement trees

*826 total inches removed includes (1) 44" cal. heritage tree.

** 82 ornamental / flowering trees provided at a ratio of two (2) 8'-10' ornamental / flowering trees per one (1) 3" cal. shade tree.
** 82 evergreen trees provided at a ratio of two (2) 8'-10' evergreen trees per one (1) 3" cal. shade tree.
** 331 shrubs provided at a ratio of six (6) 24"-30" ht. shrub per one (1) 3" cal. shade tree.
** 1,104 groundcover provided at a ratio of forty (40) plants per one (1) 3" cal. shade tree.
** 3,312 plugs provided at a ratio of two-hundred-fifty (250) plants per one (1) 3" cal.shade tree.

*** See chart below for breakdown of trees provided per code section 55-4.B.6 (d)

Total Number of 3" cal. Trees Required	Total Number of Trees Provided
61 or 183"	(25) 3" cal. = 69" (17) 4" cal. = 68" (8) 5" cal. = 40" (50) Trees = 183"

SECTION 105-39 - LANDSCAPING OF PARKING FACILITIES:

(A) All parking areas shall have at least one, three-inch-caliper tree for every two parking spaces provided.

Proposed Parking Spaces	Trees Required	Trees Provided	Shrubs Provided
220*	110	65**	270** (45 3" caliper trees)
		65 +	45
		110	

* Includes surface parking only.
** See waiver request # 1.

(C) A minimum of 10% of any parking lot facility over 2,000 square feet in gross area shall be devoted to landscaping, inclusive of required trees.

Parking Facility	Area	Required Landscape Areas
A	9,402 SF	940.2 SF
B	6,988 SF	698.8 SF
C	9,064 SF	906.4 SF
D	6,856 SF	685.6 SF
E	8,325 SF	832.5 SF
TOTAL:	**40,635 SF**	**4,063.5 SF = 10%**

WAIVER REQUESTS:

(1) Section 105-39 A waiver is requested to meet this requirement by providing a portion of the required trees as shrubs with a minimum size of 24" height at a ratio of six shrubs for one required 3" caliper shade tree for every (2) parking spaces.

(2) Section 105-52 A waiver is requested to allow perimeter buffer yards to be less than 50' in width. Buffer landscaping is provided at the intensity that meets the intent of the buffer yard requirements and address the unique characteristics of the site and intent of the Riverfront Development District.

SECTION 105-48 - STREET TREES:

(B) Shade street trees shall be planted at intervals of not more than 45 feet, and flowering street trees at intervals of not more than 30 feet along both sides of new streets and along one or both sides of an existing street within the proposed subdivision or land development. An equivalent number may be planted in an informal arrangement, subject to the approval of the Board of Supervisors

WASHINGTON STREET = 612.2 LF* / 45 = 14 shade street trees required; 14 trees are provided.

* Total linear feet does not include site ingress / egress drive isles.

SECTION 105-52 - BUFFER YARDS**:

AREA	DECIDUOUS			EVERGREEN	
	Shade Trees	Flowering Trees	Shrubs	Trees	Shrubs
North Property Line (Washington Street 612.2 LF) (Street trees as required by Section 105.48)	14	-	-	-	-
East Property Line (467.20 LF) (Buffer Yard Class B - Option 3)	-	-	-	32	59
West Property Line (633.67 LF) (Buffer Yard Class B - Option 4)	-	-	159	64	-
TOTAL REQUIRED:	14	0	159	96	59
TOTAL PROVIDED:	14	0	159	96	59

** See Waiver Request 2

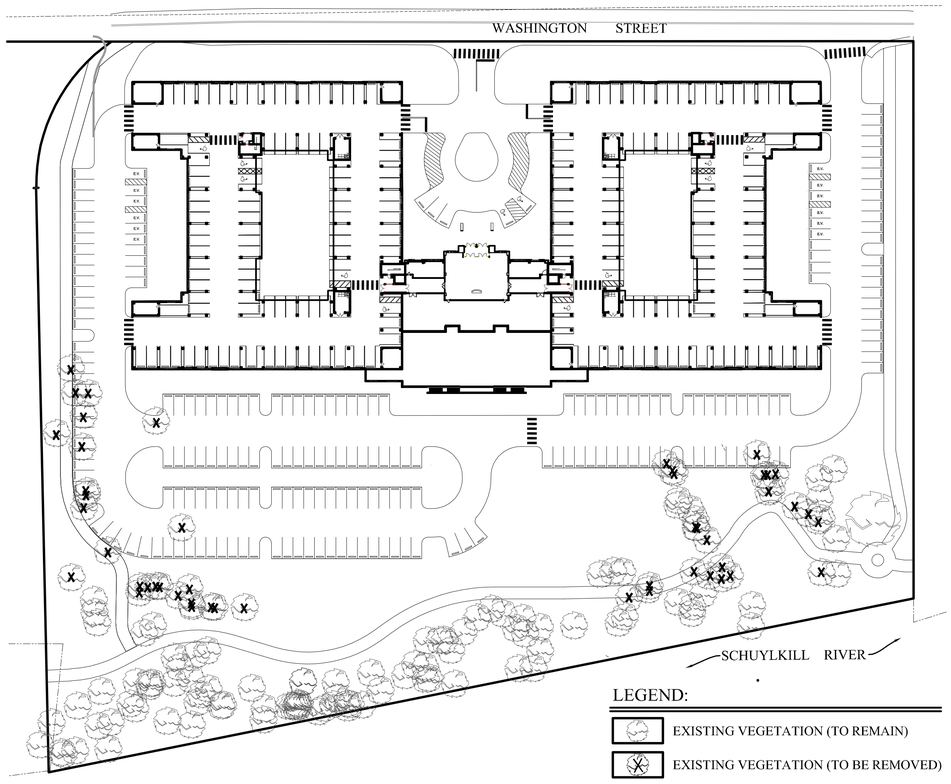
SECTION 116-284 - RIVERFRONT ACCESS AND OPEN SPACE:

(3) Landscaping to enhance the trail, which at a minimum shall include trees in a naturalized setting at the rate of one tree per every 50 feet of trail. Other landscape treatments may be utilized if approved by the Township.

Proposed Trail Length	Trees Required	Trees Provided
756 LF	16	16

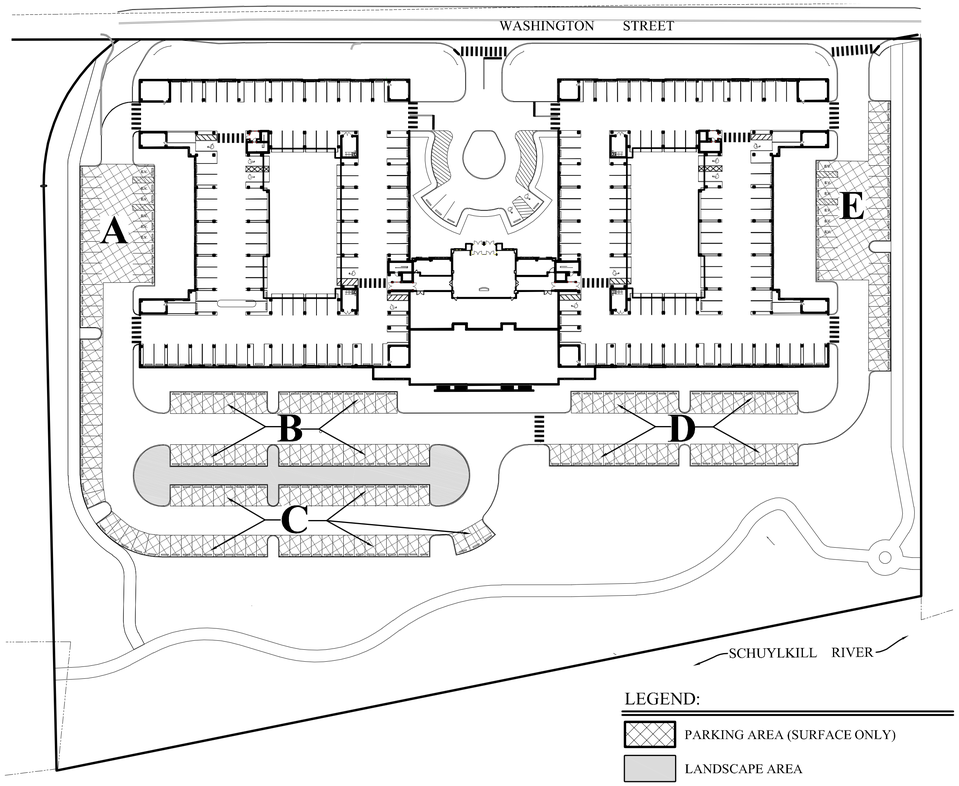
GENERAL NOTES:

1. Base information including topography, grading, utilities, building and existing vegetation location prepared by Colliers Engineering and Design.
2. This plan is for landscaping purposes only.
3. The Landscape Architect's seal applies only to the landscape portion of this plan.
4. See Sheet LD-1 for Planting Details and Notes.
5. All plant material is to be field adjusted as necessary to address existing site conditions, proposed unit landscaping, and to ensure that clear sight triangles and clear sight lines are maintained.
6. Proposed shade trees shall not be planted over the top of any sewer or water laterals, mains or services. Sewer and water laterals, mains and services are shown on Landscape Plans for reference only. See engineers plans for location of all utilities.
7. Utilities are shown on Landscape Plans for reference only. See engineers plans for location of all utilities.



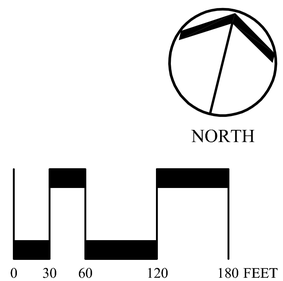
LEGEND:
- EXISTING VEGETATION (TO REMAIN)
- EXISTING VEGETATION (TO BE REMOVED)

1 TREES TO BE REMOVED DIAGRAM (SECTION 55-4.B.6)
SCALE: 1" = 60'-0"



LEGEND:
- PARKING AREA (SURFACE ONLY)
- LANDSCAPE AREA

2 LANDSCAPE OF PARKING FACILITIES DIAGRAM (SECTION 105-39 C)
SCALE: 1" = 60'-0"



SCALE: 1" = 60'

Serial Number:
CALL BEFORE YOU DIG!
PENNSYLVANIA LAW REQUIRES 3 WORKING DAYS NOTICE FOR CONSTRUCTION PHASE AND 10 WORKING DAYS IN DESIGN STAGE–STOP CALL
Pennsylvania One Call System, Inc.
1-800-242-1776

GLACKIN THOMAS PANZAK
LAND PLANNING
LANDSCAPE ARCHITECTURE

Glackin Thomas Panzak, Inc.
Paoli Executive Green 1
Suite 300
41 Leopard Road
Paoli, Pennsylvania 19301
610.408.9011
Fax: 610.408.9477
E-mail: plans@glackinplan.com

COMMONWEALTH OF PENNSYLVANIA
LISA L. THOMAS
REGISTERED LANDSCAPE ARCHITECT
775-E
Lisa L. Thomas LA000775 E

PRELIMINARY / FINAL LANDSCAPE PLAN

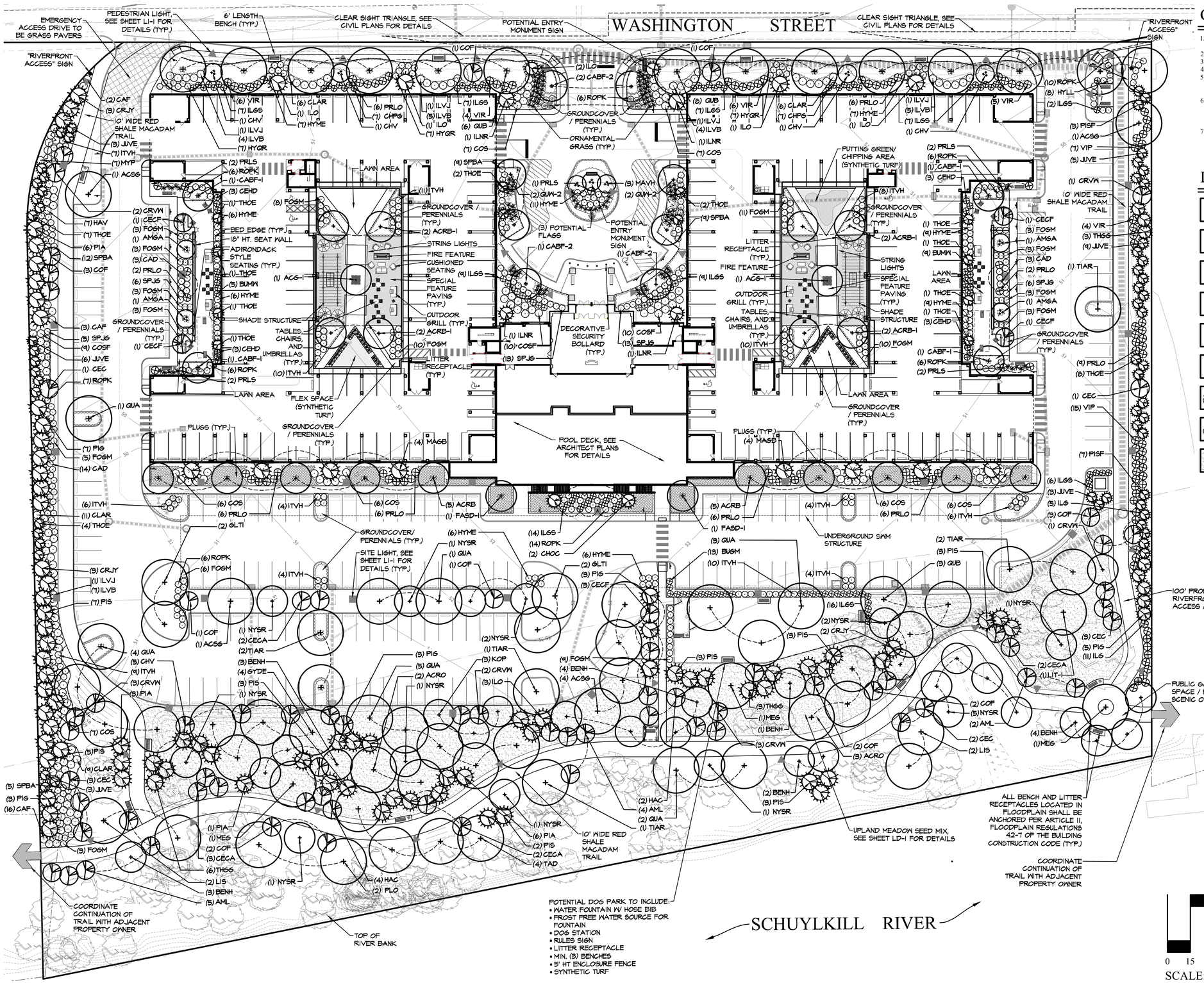
601 Washington Street

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

PROJECT #: 2022H22-002
DATE: 03/01/22 (gs)
REV.: 06/02/22 (gs)

SHEET:
LANDSCAPE COMPLIANCE PLAN
LP-1
30 OF 37

P:\2022\2022H22-002\CAD\Preliminary\2022H22-002_601 Washington Street_LP_06-01-22_cocover.dwg, Lp-1, 6/3/2022 9:35:31 AM, GarySchneider



GENERAL NOTES:

1. Base information including topography, grading, utilities, building and existing vegetation location prepared by Colliers Engineering and Design.
2. This plan is for landscaping purposes only.
3. The Landscape Architect's seal applies only to the landscape portion of this plan.
4. See Sheet LD-1 for Planting Details and Notes.
5. All plant material is to be field adjusted as necessary to address existing site conditions, proposed unit landscaping, and to ensure that clear sight triangles and clear sight lines are maintained.
6. Proposed shade trees shall not be planted over the top of any sewer or water laterals, mains or services. Sewer and water laterals, mains and services are shown on Landscape Plans for reference only. See engineers plans for location of all utilities.
7. Utilities are shown on Landscape Plans for reference only. See engineers plans for location of all utilities.

LEGEND:

- PROPOSED DECIDUOUS TREE
- PROPOSED ORNAMENTAL TREE
- PROPOSED EVERGREEN TREE
- PROPOSED EVERGREEN SHRUBS
- PROPOSED DECIDUOUS SHRUBS
- PROPOSED ORNAMENTAL GRASS
- PROPOSED GROUNDCOVER / PERENNIALS
- PROPOSED PLUGS
- UPLAND MEADOW SEED MIX

NOTES:
1. See Architect / Engineer plans for EV charging station details.

2. Ornamental Grasses, Groundcovers/Perennials, and Plug quantities purposely not labeled on this plan. Quantities and species to be provided.

3. See Sheet LD-1 for Landscape Plant List.

Serial Number:

CALL BEFORE YOU DIG!
PENNSYLVANIA LAW REQUIRES 3 WORKING DAYS NOTICE FOR CONSTRUCTION PHASE AND 10 WORKING DAYS IN DESIGN STAGE–STOP CALL
Pennsylvania One Call System, Inc.
1-800-242-1776

GLACKIN THOMAS PANZAK
LAND PLANNING
LANDSCAPE ARCHITECTURE

Glackin Thomas Panzak, Inc.

Paoli Executive Green 1
Suite 300
41 Leopard Road
Paoli, Pennsylvania 19301
610.408.9011
Fax: 610.408.9477
E-mail: plans@glackinplan.com

PENNSYLVANIA — LISA L. THOMAS — 775-E — REGISTERED LANDSCAPE ARCHITECT
Lisa L. Thomas LA000775 E

PRELIMINARY / FINAL LANDSCAPE PLAN

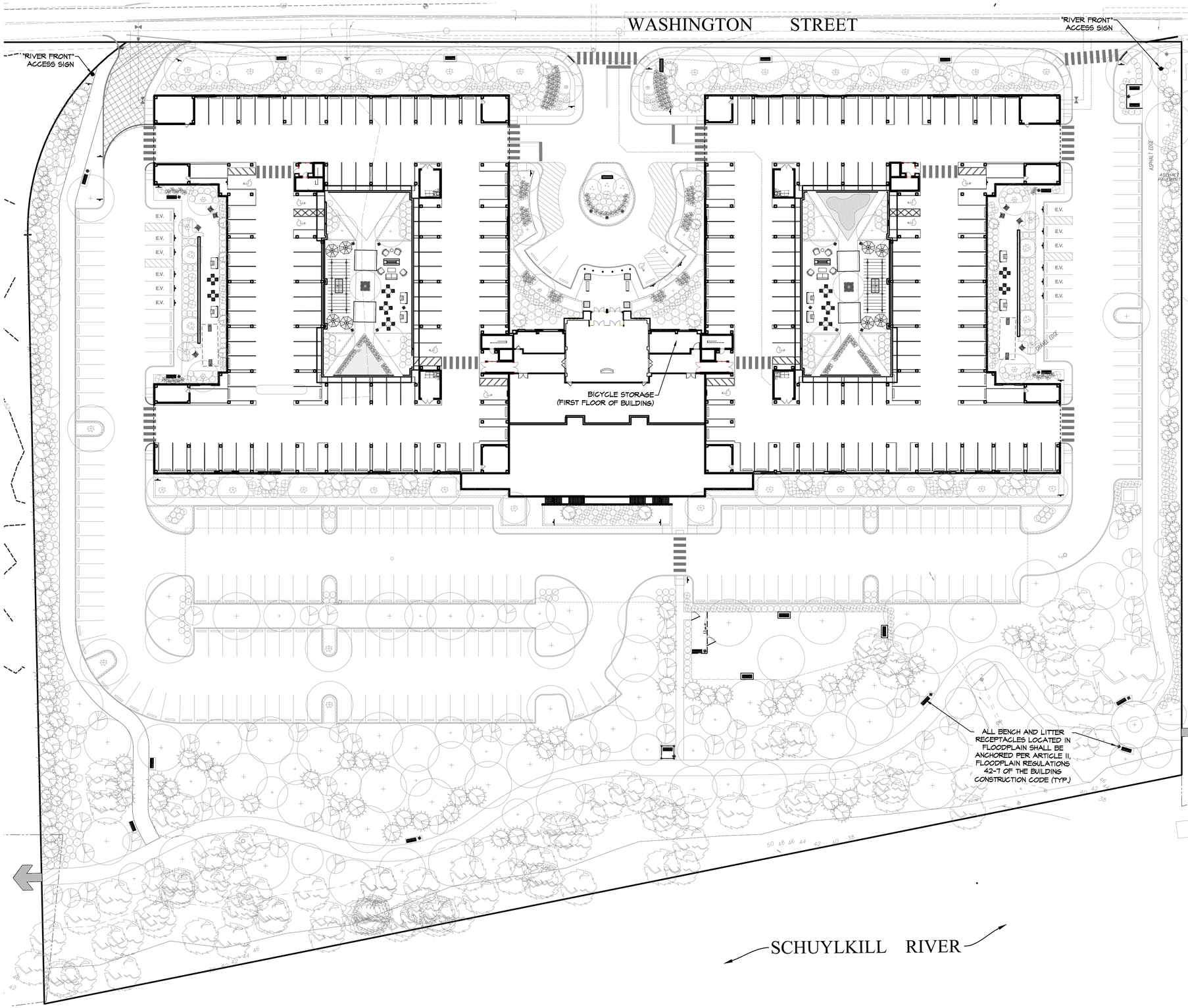
601 Washington Street

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

PROJECT #: 2022H22-002
DATE: 03/01/22 (gs)
REV.: 06/02/22 (gs)

SHEET:
LANDSCAPE PLAN
LP-2
31 OF 37

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GENERAL NOTES:

1. Base information including topography, grading, utilities, building and existing vegetation location prepared by Colliers Engineering and Design.
2. This plan is for landscaping purposes only.
3. The Landscape Architect's seal applies only to the landscape portion of this plan.
4. See Sheet LD-1 for Planting Details and Notes.
5. All plant material is to be field adjusted as necessary to address existing site conditions, proposed unit landscaping, and to ensure that clear sight triangles and clear sight lines are maintained.
6. Proposed shade trees shall not be planted over the top of any sewer or water laterals, mains or services. Sewer and water laterals, mains and services are shown on Landscape Plans for reference only. See engineers plans for location of all utilities.
7. Utilities are shown on Landscape Plans for reference only. See engineers plans for location of all utilities.

FURNITURE LEGEND:

- PROPOSED BENCH (on Concrete Pad)
- PROPOSED LITTER RECEPTACLE
- PROPOSED GRILL
- PROPOSED SHADE STRUCTURE
- PROPOSED TABLE AND CHAIR
- PROPOSED SECURITY BOLLARD
- PROPOSED FIRE FEATURE
- PROPOSED PLANTER
- PROPOSED LAWN GAME
- PROPOSED TABLE GAME
- PROPOSED ADIRONDACK CHAIR
- PROPOSED RIVER FRONT ACCESS SIGN

NOTES:
1. See Architect / Engineer plans for EV charging station details.

2. Ornamental Grasses, Groundcovers/Perennials, and Plug quantities purposely not labeled on this plan. Quantities and species to be provided at a future date.

3. See Sheet LD-1 for Landscape Plant List.

Serial Number:

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Pennsylvania One Call System, Inc.
1-800-242-1776

0 15 30 60 90 FEET
SCALE: 1" = 30'

NORTH

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PENNSYLVANIA REGISTERED LANDSCAPE ARCHITECT LISA L. THOMAS 775-E

Lisa L. Thomas LA000775 E

PRELIMINARY / FINAL LANDSCAPE PLAN

601 Washington Street

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

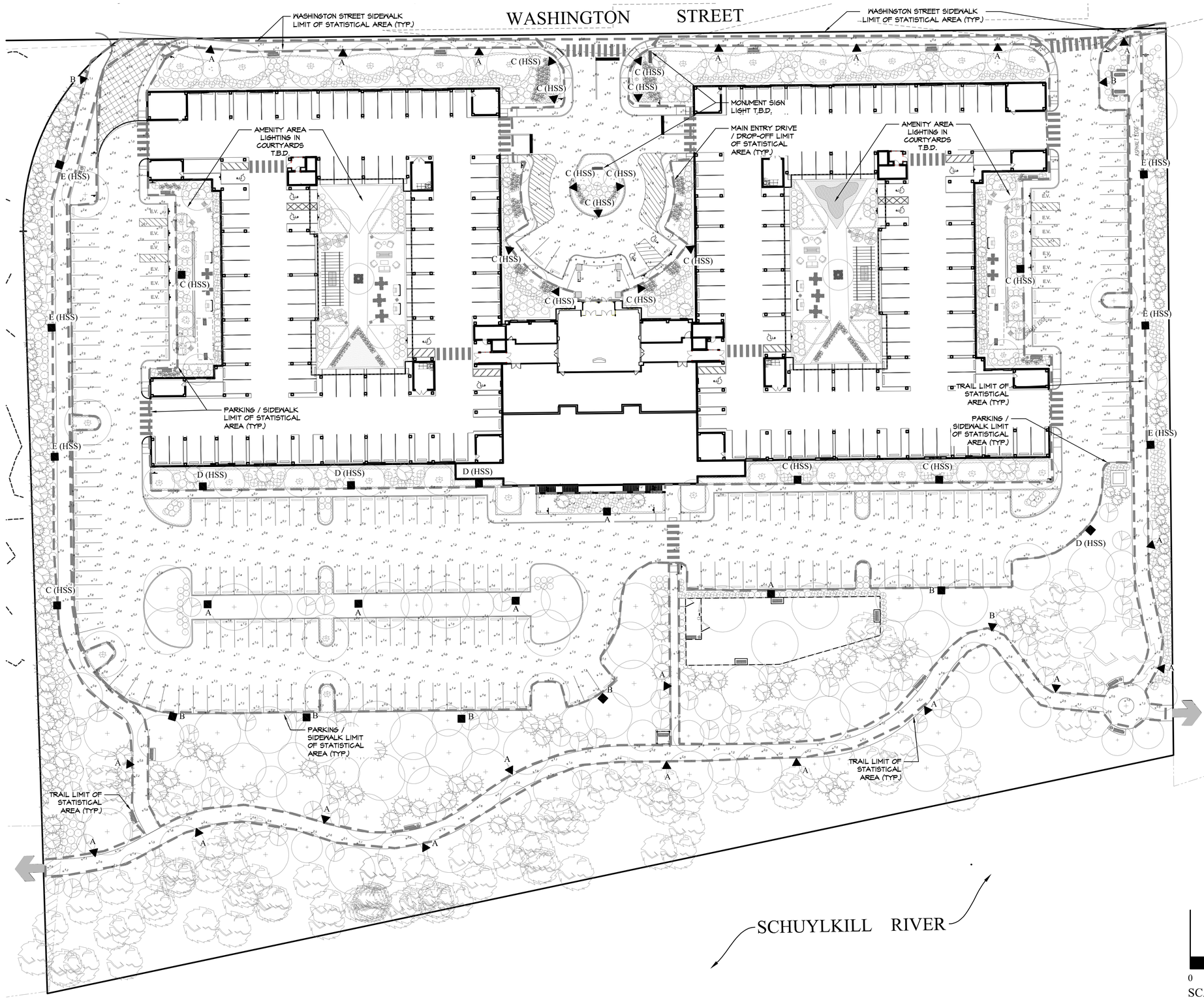
PROJECT #: 2022H22-002
DATE: 03/01/22 (gs)
REV.: 06/02/22 (gs)

SHEET:
SITE FURNISHINGS PLAN

LP-3

32 OF 37

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GENERAL NOTES:

1. Base information including topography, grading, utilities, building and existing vegetation location prepared by Colliers Engineering and Design .
2. This plan is for lighting purposes only.
3. The Landscape Architect's seal applies only to the lighting portion of this plan.
4. See Sheet LD-3 for light fixture schedule, site light foot candle calculations, lighting notes and details.
5. All trees shall be pruned as necessary to maintain required light levels.

LIGHTING NOTES:

1. Lighting to be installed to meet all appropriate national and local codes.
2. All light fixtures to be approved by Owner or Owner's representative.
3. Fixtures shall be located a min. of 36" behind back of curb or paved surface.
4. All circuits to be installed by a licensed electrician.
5. All cable to be run in conduit unless approved in writing by the owner.
6. Contractor to provide sufficient nighttime adjustment to all lighting to satisfy Township requirements and Owner or Owner's representative. Fixture on/off control by circuit.
7. All lighting to be installed according to manufactures recommendations.
8. All electrical conduits shall be sch 40 pvc and all bends shall be "sweep" type for pulling wire. Conduit to extend beyond edge of hardscape element by 12" min. Conduit to be temporarily capped and location staked prior to backfilling.
9. While extending conduits under existing structures the contractor shall be responsible for damage to existing structures such as, but not limited to, paving, irrigation, pool piping, masonry piers and underground drainage pipe etc.
10. All switching control device type and locations to be approved by Owner or Owner's representative.
11. All lighting fixtures to be controlled by automatic switches (i.e.- time clocks, photo-cells, etc.) to permit extinguishing light per owner and local authority requirements. All-night safety or security lighting shall not have lighting intensity levels which exceed 25% of the levels normally permitted by the Township but in no case shall intensity levels be less than the minimum levels for safety and security as invoked by the IESNA.
12. All final light locations to be approved by Owner or Owner's representative.
13. All final light locations to be field adjusted, "aimed" as necessary so as to avoid shining of light into windows and doors.
14. Contractor to arrange a pre-construction meeting with the owner and owners representatives including masons, and other individuals familiar with any underground facilities. As-built drawing should be requested of all such facilities.
15. Contractor shall spray paint trench layout prior to commencement. Owner or Owner's representative shall approve layout.
16. Electrical contractor to prepare a plan of all as-built underground electric runs.
17. Project electrical engineer to provide power plan.
18. Post-approval alterations to lighting plans or intended substitutions for approved lighting equipment shall be submitted to the Township for review and approval.
19. The Township reserves the right to conduct post installation inspections to verify compliance with the requirements of this chapter and approved lighting plan commitments and, if deemed appropriate by the Township, to require action at no expense to the Township.
20. All exterior lighting shall meet IESNA full-cutoff criteria unless otherwise approved by the Township.
21. The installer shall notify the Township to arrange for inspection and approval of all exterior lighting, including building-mounted lighting, prior to its installation.

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0 10 20 40 60 FEET
SCALE: 1" = 20'

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Lisa L. Thomas LA000775 E

PRELIMINARY / FINAL LIGHTING PLAN

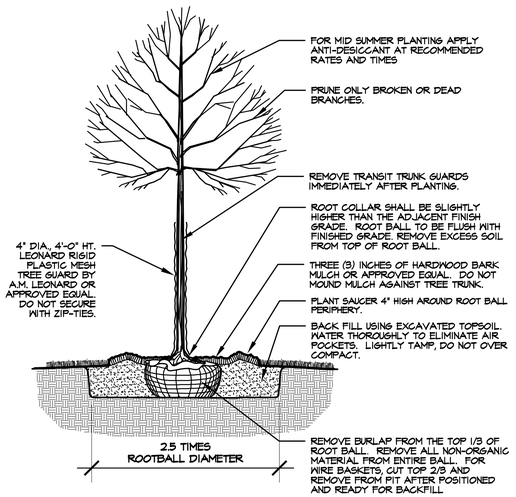
601 Washington Street

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

PROJECT #: 2022H22-002
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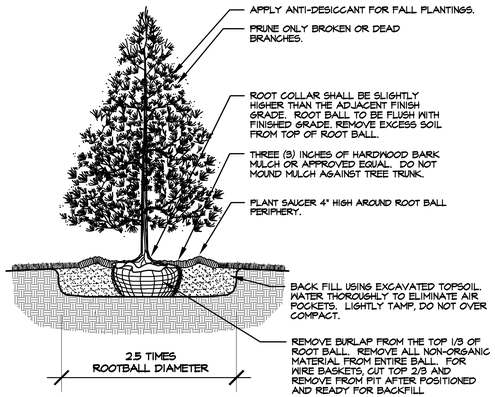
SHEET:
LIGHTING PLAN
LI-1

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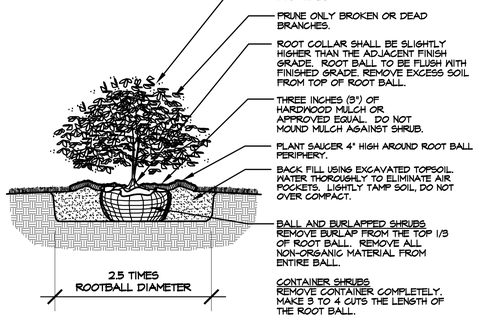
NOTES:
1. Trees with poor quality root balls or root balls that have been cracked or damaged shall be rejected.
2. Trees with central leader broken or dead shall be rejected.
3. Trees that do not display the typical characteristics for their species shall be rejected.
4. Flood planting pit with water twice within 24 hours of planting.
5. Trees shall not be staked. Landscape contractor shall be responsible for inspecting and righting trees for a period of 12 months. If it is determined that staking is needed, it shall be provided in accordance with industry standards, periodically inspected, and removed prior to the end of the guarantee.

1 DECIDUOUS TREE DETAIL
NTS



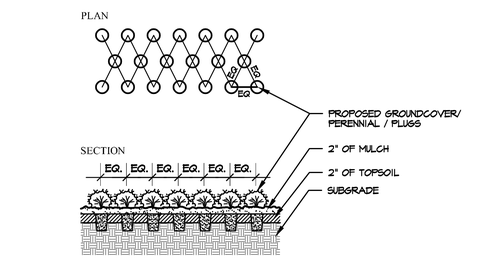
NOTES:
1. Trees with poor quality root balls or root balls that have been cracked or damaged shall be rejected.
2. Trees with central leader broken or dead shall be rejected
3. Trees that do not display the typical characteristics for their species shall be rejected.
4. The owner shall be responsible for contacting the contractor, who shall right and secure any tree that leans out of plumb.
5. Flood planting pit with water twice within 24 hours of planting.

2 EVERGREEN TREE DETAIL
NTS



NOTE: FLOOD PLANTING PIT WITH WATER TWICE WITHIN 24 HOURS OF PLANTING.

3 SHRUB DETAIL
NTS



NOTES:
1. Plants must be planted in bedding mix or topsoil not mulch.
2. See planting list for groundcover species, size, and spacing dimension.

4 PERENNIAL / GROUNDCOVER / PLUG PLANTING DETAIL
NTS

UPLAND SEED MIX:

For Uplands and Meadows (Grassland Mix):

Ernst Conservation Seeds
Uplands and Meadows Seeding-
Eastern Native Habitat & CREP Mix (ERNMX-173)

Seed Rate: 11 lbs./acre

Ernst Conservation Seeds
9006 Mercer Pike
Meadville, PA 16335
800-873-3321

Note:
1. Annual rye grass seed shall be added to all seed mixes at a rate of 5 lbs. / acre, to serve as a nurse crop.

PLANTING NOTES:

1. The contractor shall furnish and plant all plants shown on the drawings, as specified, and in quantities indicated on the plant list.
2. All plants shall be nursery grown and freshly dug.
3. All plants shall be in accordance with The American Standard for Nursery Stock, latest edition.
4. All plants shall be hardy under climatic conditions similar to those in the locality of the project.
5. Fall Digging Hazard: Any species listed below, if included on the plant list, must not be dug in the fall (October through December) because of risk to the tree's survival. Special exceptions may be granted if the owner is notified in writing and an extended warranty on these plants is agreed upon prior to digging. The following varieties should not be dug in fall: Betula, Carpinus, Celtis, Cercidiphyllum, Crataegus, Cryptomeria, Fagus, Halesia, Ilex (tree form varieties), Liquidambar, Liriodendron, Nyssa, Ostrya, Prunus, Pyrus, Quercus (except Quercus palustris), Salix weeping varieties, and Tilia tomentosa. Digging for Malus and Zelkova varieties should be avoided in fall only when in leaf.
6. All plants shall be typical of their species or variety and shall have a normal habit or growth. They shall be sound, healthy and vigorous, well branched and densely foliated when in leaf. They shall be certified by appropriate State and Federal authorities to be free of disease and insect pests, eggs or larvae. They shall have healthy, well-developed root systems.
7. Trees with central leader broken or dead shall be rejected
8. Plants that do not display typical characteristics for their species shall be rejected.
9. Substitutions: When plants of a specified kind or size are not available within a reasonable distance, substitutions may be made upon written request by the contractor, if approved by the owner and/or municipal authority.
10. Measurement: Dimensions of trees and shrubs shall conform to The American Standard for Nursery Stock, latest edition.
11. Size: All plants shall conform to the measurement specified on the plant list, unless authorized in writing by the Township Arborist and the owner.
12. Balled and burlapped plants shall be dug with firm natural balls of earth, of diameter and depth to include most of the fibrous roots. Container grown stock shall have been grown in a container long enough for the root system to have developed sufficiently to hold its soil together firm and whole. No plants shall be loose in the container.
13. Plants with poor quality root balls or root balls that have been cracked or damaged shall be rejected.
14. Root balls of all plants shall be adequately protected at all times from sun and drying winds or frost.
15. Conditions detrimental to plants: The contractor shall notify the project representative in writing of all soil or drainage conditions which the contractor considers detrimental to the growth of plants. The contractor shall state the conditions and submit a proposal for correcting the conditions, including any change in cost, for review and acceptance by the project representative.
16. The owner or the owner's representative shall be notified prior to beginning planting operations.
17. All planting shall be at the locations indicated on the drawings. The contractor shall be responsible for planting at the correct grades, alignment, and to the indicated layout of the planting beds.
18. Layout of planting: The contractor shall lay out with identifiable stakes the location of all planting beds as indicated on drawing. The layout of planting shall be approved by the project representative prior to any excavation of plant pits or plant beds.
19. Minor adjustments to plant locations may be necessary due to field conditions and final grading. The contractor shall notify the owner if major adjustments are required.
20. Do not install plants when ambient temperatures may drop below 35°F or above 90°F.
21. Do not install plants when wind velocity exceeds 30 mph.
22. Planting operations to commence only when preceding work within the area has been completed. Proceed with and complete planting as rapidly as portions of the site become available, working within seasonal limitations.
23. Planting soil shall be excavated native soil and topsoil from the planting pit. The planting soil shall be thoroughly mixed, with all rocks, clods and roots removed.
24. All trees shall be staked and guyed only in cases of steep slopes or high wind areas, and as noted on the planting details.
25. Each tree and shrub shall be pruned in accordance with The American Nursery and Landscape Association Standards to preserve the natural character of the plant. All dead wood or suckers and all broken or badly bruised branches shall be removed.
26. Mulch: Immediately after planting operations are completed, all trees and shrub planting pits shall be covered with a 3" (three inch) layer of double shredded hardwood bark mulch, or other material approved by the owner or the owner's representative. A granular pre-emergent weed control shall be spread prior to mulching. The limit of this mulch for deciduous trees and single evergreen trees shall be the area of the pit. For shrub and perennial beds and for evergreen tree clusters, a continuous, mulched bed shall be created.
27. All shrub groupings will be planted in one continuous bed and not individually.
28. Trees in leaf, including evergreens, when planted shall be treated with anti-desiccant such as Wilt-Pruf® if planted during the months of June through September, November, and December.
29. Weed control: All planting areas shall be free from weeds prior to the beginning of planting operation. Contact herbicide sprays should only be used as required and all manufacturer's specifications followed.
30. Guarantee: All plant material shall be guaranteed by the contractor for eighteen (18) months from the date of installation. The owner shall be responsible for maintenance unless otherwise agreed with contractor. It shall be the contractor's responsibility to monitor the project during the guarantee and notify the owner if problems develop with the plant material. Any material that is 25 % dead or more shall be considered dead and must be replaced at no charge. A tree shall be considered dead when the main leader has died back, or there is 25% of the crown dead.
31. All debris resulting from landscape contracting operations shall be cleaned up and removed from the site on a weekly basis.
32. Watering: The use of tree watering bags ("Treegator") is recommended for trees. It is the responsibility of the landscape contractor for watering sufficiently at the time of planting and until the job is completed, accepted and turned over to the owner.

TOPSOIL, PLANTING SOIL AND BED PREPARATION NOTES:

1. Soil Analysis: Submit soil test analysis and a written report for each sample of topsoil and planting mix from an approved testing laboratory. If necessary, several samples shall be taken or soil taken from several areas combined for analysis.
2. Testing shall be performed in accordance with the most current edition of Methods of Soil Analysis published by the Soil Science Society of America, Inc.
3. All soil mixes shall be tested for particle size and organic content after passing through a 1/4-inch sieve rather than the standard 2-mm sieve to include larger pieces of organic material.
4. Provide a particle size analysis, including gradient of mineral content.
5. Provide a chemical analysis, including the following:
   a. Percent organic content by oven-dried weight, pH, chemical levels by parts per million, soluble salt by electrical conductivity of a 1:2 soil water sample measured in milliohms per centimeter, cation exchange capacity (CEC).
      1) Nutrient tests shall include the testing laboratory recommendations for supplemental additions to the soil mix for the plants specified and notice of when chemical levels are excessive.
      2) Report presence of problem salts, minerals or heavy metals, if present.
6. Provide a physical analysis of each planting mix to include the following test results:
   a. Provide a water permeability analysis of each sample of soil mix ASTM F 1815-97 with sample compacted to 80 and 85 percent of maximum dry density using the standard Proctor method, ASTM D698. Each test shall include the calculation of the bulk density, measured in units of Mg/m3, for each sample when compacted to 80 and 85 percent maximum Proctor density.
7. All testing will be at the expense of the contractor. The landscape architect may request additional planting mix test on different mix component ratios to attain results that more closely meet the mix requirements.
8. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; conforming to ASTM D 5268, pH range of 5.5 to 7.0; containing minimum 4 percent organic matter and sand, silt, and clay particles; friable, pervious; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1-inch in diameter; and free of weeds, roots, and toxic and other non-soil materials. Provide topsoil from one of the following sources, in this order of preference:
9. Reuse surface soil stockpiled on the site. Verify suitability of surface soil to produce viable topsoil meeting requirements, and amend when necessary. Supplement with imported topsoil when quantities are insufficient. Remove from the soil all roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
10. Import topsoil from off-site sources. Obtain topsoil from naturally well-drained sites where topsoil occurs at least 4-inches deep; do not obtain from bogs or marshes.
11. Amend existing surface soil to produce topsoil. Supplement with imported topsoil when required.
12. Soil amendments shall only be used when indicated by soil analysis. The minimum amounts necessary to correct soil deficiencies shall be used. Organic materials are preferred over inorganic materials.
13. Compost, Leaf: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
   a. Yard debris or organic waste material composted for a minimum of 3 months.
14. Compost, Wood (High-Lignin): Decomposed, nitrogen-treated ground bark or wood waste; of uniform texture and free of chips, stones, sticks soil, or toxic materials.
15. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.
16. Spent Mushroom Substrate: Commercial, weathered, free from weed seeds; moisture content 30 to 50 percent; organic content 40 percent minimum; carbon to nitrogen ratio 30:1 maximum; nitrogen content 1.5 to 3.0 percent; phosphorus content 0.5 to 2.0 percent; potassium content 1.0 to 3.0 percent; pH range 6.0 - 8.0.
17. Lime: ASTM C 602, ground agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows
   a. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.
   b. Conforming to standards of the Association of Official Agricultural Chemists and comply with applicable State and Federal regulations.
18. Aluminum Sulfate: Commercial grade, unadulterated.
19. Sand: Clean, washed, natural or manufactured, and free of toxic materials.
20. Perlite: Horticultural perlite, soil amendment grade.
21. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.
22. Rough grading and topsoil placement is to be completed prior to commencement of landscape operations.
23. If site specific conditions require, planting beds are to be amended with 4" of mushroom soil prior to planting. Mushroom soil to be roto-tilled into topsoil to a depth of 6"-8".
24. If conditions detrimental to plants exist, contractor to submit a proposal for correcting condition.
25. Planting Soil, Standard Planting Pits: Planting soil shall consist of existing, native surface topsoil formed under natural conditions with the duff layer retained during excavation process and existing, in-place surface soil. Where existing soil quantities are insufficient, imported or manufactured topsoil shall be used to supplement. Clean soil of roots, plants, sod, stones, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix planting soil thoroughly before placing.
26. Planting Soil, Hardscape Areas: Existing soils shall be removed and replaced to a minimum depth of 30-inches below finish grade with non-compacted topsoil and subsoil, amended with decomposed wood (high-lignin) compost at a rate of 15 percent by volume for the lower 24-inches of backfill. Soil shall be mixed thoroughly and cleaned of roots, plants, sod, stones, clods, clay lumps, pockets of coarse sand, toxic and other non-soil materials larger than 2-inches in diameter before placing. The upper 6-inches of planting soil shall be native or manufactured topsoil.
27. Planting Soil, Planting Beds: Amend surface soil and topsoil with a 4-inch layer of spent mushroom substrate tilled into the soil to a depth of 6 to 8 inches. Planting Soil in annual beds shall be amended with 2-inches of sand in addition to spent mushroom substrate. Till amendments thoroughly into planting beds.
28. Prior to placement of any topsoil, contractor shall rip/till existing subgrade to a depth of 6" minimum in any designated planting area.
29. Soil Compaction: Planting soils for all planting areas, including landscape berms shall have a proctor density of 75% - 83%. DO NOT OVER-COMPACT PLANTING SOILS.

PLANT LIST:

KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
DECIDUOUS TREES					
ACG-1	2	Acer griseum	Paperbark Maple	4"-4.5" cal.	B&B
ACRB-1	8	Acer rubrum 'Bowhall'	Bowhall Red Maple	4"-4.5" cal.	B&B
ACRB	10	Acer rubrum 'Bowhall'	Bowhall Red Maple	3"-3.5" cal.	B&B
ACRO	5	Acer rubrum 'October Glory'	October Glory Red Maple	3"-3.5" cal.	B&B
ACSG	7	Acer saccharum 'Green Mountain'	Green Mountain Sugar Maple	3"-3.5" cal.	B&B
AML	11	Amelanchier laevis	Allegheny Serviceberry	8'-10' ht.	B&B, Single Stem
AMGA	4	Amelanchier x grandiflora 'Autumn Brilliance'	Autumn Brilliance Serviceberry	8'-10' ht.	B&B, Multistem
BENH	17	Betula nigra 'Heritage'	Heritage River Birch	3"-3.5" cal.	B&B, Single Stem
CABF-1	4	Carpinus betulus 'Frans Fontaine'	Frans Fontaine European Hornbeam	4"-4.5" cal.	B&B
CABF-2	4	Carpinus betulus 'Frans Fontaine'	Frans Fontaine European Hornbeam	5"-5.5" cal.	B&B
CECA	9	Cercis canadensis 'Alba'	White Redbud	8'-10' ht.	B&B, Single Stem
CECF	7	Cercis canadensis 'Forest Pansy'	Forest Pansy Redbud	8'-10' ht.	B&B, Single Stem
CEC	10	Cercis canadensis	Redbud	8'-10' ht.	B&B, Single Stem
CHV	5	Chionanthus virginicus	Fringetree	3"-3.5" cal.	B&B, Single Stem
CHV	4	Chionanthus virginicus	Fringetree	8'-10' ht.	B&B, Multistem
COF	16	Cornus florida	Flowering Dogwood	8'-10' ht.	B&B, Single Stem
CRVW	12	Crataegus viridis 'Winter King'	Winter King Hawthorn	8'-10' ht.	B&B, Single Stem
FASD-1	2	Fagus sylvatica 'Dawyck'	Dawyck European Beech	4"-4.5" cal.	B&B
GLTI	4	Gleditsia triacanthos v. inermis 'Shademaster'	Shademaster Honeylocust	3"-3.5" cal.	B&B
GYDE	4	Gymnocladus dioicus 'Espresso'	Espresso Kentucky Coffeetree	3"-3.5" cal.	B&B, fruitless cultivar
HAC	6	Halesia carolina	Carolina Silverbell	8'-10' ht.	B&B, Single Stem
KOP	3	Koelreuteria paniculata	Goldenraintree	3"-3.5" cal.	B&B
LIS	4	Liquidambar styraciflua	Sweetgum	3"-3.5" cal.	B&B
LIT-1	1	Liriodendron tulipifera	Tulip Poplar	4"-4.5" cal.	B&B
MAVH	3	Magnolia virginiana 'Henry Hicks'	Henry Hicks Sweet Bay Magnolia	8'-10' ht.	B&B, Multistem
MEG	3	Metasequoia glyptostroboides	Dawn Redwood	3"-3.5" cal.	B&B
NYSR	17	Nyssa sylvatica 'Red Rage'	Red Rage Black Gum	3"-3.5" cal.	B&B
PLO	2	Platanus occidentalis	American Sycamore	3"-3.5" cal.	B&B
QUA	16	Quercus alba	White Oak	3"-3.5" cal.	B&B
QUB	17	Quercus bicolor	Swamp White Oak	3"-3.5" cal.	B&B
QUW-2	4	Quercus x warei 'Long' Regal Prince	Regal Prince Oak	5"-5.5" cal.	B&B
TAD	4	Taxodium distichum	Bald Cypress	3"-3.5" cal.	B&B
TIAR	7	Tilia americana 'Redmond'	Redmond American Linden	3"-3.5" cal.	B&B

KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
EVERGREEN TREES					
CHOC	2	Chamaecyparis obtusa 'Crippsii'	Golden Hinoki Cypress	8'-10' ht.	B&B
CRY	8	Cryptomeria japonica 'Yoshino'	Yoshino Cryptomeria	8'-10' ht.	B&B
ILO	9	Ilex opaca	American Holly	8'-10' ht.	B&B
ILNR	4	Ilex x 'Nellie R. Stevens'	Nellie R. Stevens Holly	8'-10' ht.	B&B
JUVE	29	Juniperus virginiana 'Emerald Sentinel'	Emerald Sentinel 'Redcedar'	8'-10' ht.	B&B
MAGB	8	Magnolia grandiflora 'Bracken's Brown Beauty''	Bracken's Brown Beauty Southern Magnolia	8'-10' ht.	B&B
PIA	16	Picea abies	Norway Spruce	8'-10' ht.	B&B
PIG	21	Picea glauca	White Spruce	8'-10' ht.	B&B
PISF	10	Pinus strobus 'Fastigiata'	Columnar White Pine	8'-10' ht.	B&B
PIS	29	Pinus strobus	White Pine	8'-10' ht.	B&B
THOE	31	Thuja occidentalis 'Emerald Green'	Emerald Green Arborvitae	8'-10' ht.	B&B
THGG	12	Thuja plicata 'Green Giant'	Green Giant Arborvitae	8'-10' ht.	B&B
SHRUBS					
BUMW	14	Buxus microphylla 'Wintergreen'	Wintergreen Boxwood	24"-30" ht.	Cont.
BUGM	13	Buxus x 'Green Mountain'	Green Mountain Boxwood	24"-30" ht.	Cont.
CAD	20	Callicarpa dichotoma	Beautyberry	24"-30" ht.	Cont.
CAF	21	Calycanthus floridus	Sweetshrub	24"-30" ht.	Cont.
CEHD	12	Cephalotaxus harringtonia 'Duke Gardens'	Duke Gardens Japanese Plum Yew	24"-30" ht.	Cont.
CHPG	14	Chamaecyparis pisifera 'Golden Mop'	Golden Mop Japanese Falsecypress	24"-30" ht.	Cont.
CLAR	32	Clethra alnifolia 'Ruby Spice'	Ruby Spice Summersweet	24"-30" ht.	Cont.
COSF	29	Cornus sericea 'Flaviramea'	Yellow Twig Dogwood	24"-30" ht.	Cont.
COS	45	Cornus sericea	Red Twig Dogwood	24"-30" ht.	Cont.
FOGM	86	Fothergilla gardenii 'Mt. Airy'	Mt. Airy Fothergilla	24"-30" ht.	Cont.
HAV	7	Hamamelis vernalis	Vernal Witchhazel	24"-30" ht.	Cont.
HYME	67	Hydrangea macrophylla 'Endless Summer'	Endless Summer Hydrangea	24"-30" ht.	Cont.
HYLL	8	Hydrangea paniculata 'Little Lime'	Little Lime Panicle Hydrangea	24"-30" ht.	Cont.
HYQR	21	Hydrangea quercifolia 'Ruby Slippers'	Ruby Slippers Oakleaf Hydrangea	24"-30" ht.	Cont.
ILGS	84	Ilex glabra 'Shamrock'	Shamrock Inkberry Holly	24"-30" ht.	Cont.
ILG	16	Ilex glabra	Inkberry Holly	24"-30" ht.	Cont.
ILVB	25	Ilex verticillata 'Berry Heavy'	Berry Heavy Winterberry Holly	24"-30" ht.	Cont.
ILVJ	5	Ilex verticillata 'Jim Dandy'	Jim Dandy Winterberry Holly	24"-30" ht.	Cont.
ITVH	93	Itea virginica 'Henry's Garnet'	Henry's Garnet Sweetspire	24"-30" ht.	Cont.
MYP	7	Myrica pensylvanica	Bayberry	24"-30" ht.	Cont.
PRLO	49	Prunus laurocerasus 'Otto Luyken'	Otto Luyken Cherry Laurel	24"-30" ht.	Cont.
PRLS	9	Prunus laurocerasus 'Schipkaensis'	Skip Laurel	24"-30" ht.	Cont.
ROPK	67	Rosa 'Pink Knockout'	Pink Knockout Shrub Rose	3 gal.	Cont.
SPJG	43	Spiraea japonica 'Goldmound'	Goldmound Spirea	24"-30" ht.	Cont.
SPBA	35	Spiraea x bumalda 'Anthony Waterer'	Anthony Waterer Spiraea	24"-30" ht.	Cont.
VIR	25	Viburnum rhytidophyllum	Leatherleaf Viburnum	24"-30" ht.	Cont.
VIP	22	Viburnum x pragense	Prague Viburnum	24"-30" ht.	Cont.

NOTE:
1. Where there is a discrepancy between the plant list and plan, the plan shall prevail.
2. Dash one (-1) indicates a replacement tree provided at 4"-4.5" cal.
3. Dash two (-2) indicated a replacement tree provided at 5"-5.5" cal.
4. Ornamental Grasses, Groundcovers/Perennials, and Plug quantities purposely not shown on this plant list. Quantities and species to be provided at a future date.

Serial Number:

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PENNSYLVANIA LAW REQUIRES 3 WORKING DAYS NOTICE FOR CONSTRUCTION PHASE AND 10 WORKING DAYS IN DESIGN STAGE–STOP CALL
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1-800-242-1776

GLACKIN THOMAS PANZAK
LAND PLANNING
LANDSCAPE ARCHITECTURE

Glackin Thomas Panzak, Inc.

Paoli Executive Green 1
Suite 300
41 Leopard Road
Paoli, Pennsylvania 19301
610.408.9011
Fax: 610.408.9477
E-mail: plans@glackinplan.com

Lisa L. Thomas LA000775 E

PRELIMINARY / FINAL LANDSCAPE PLAN

601 Washington Street

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

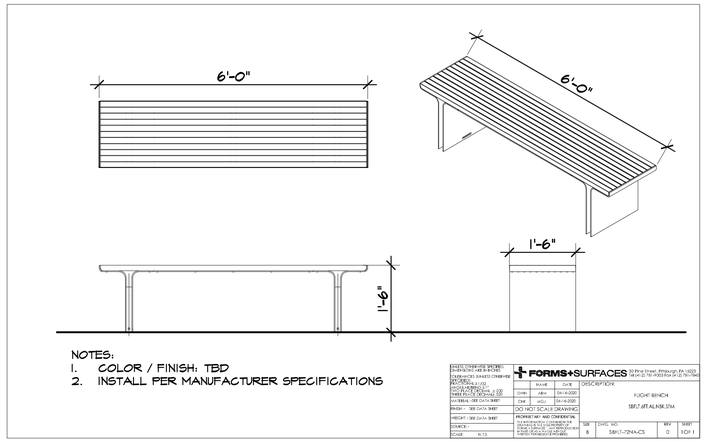
PROJECT #: 20221122-002
DATE: 03/01/22 (gs)
REV.: 06/02/22 (gs)

SHEET:
LANDSCAPE DETAILS AND NOTES

LD-1

34 OF 37

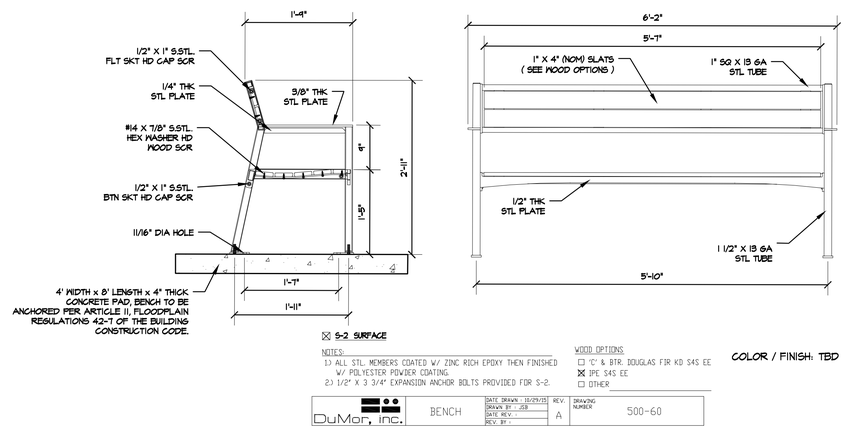
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1 TYPICAL BENCH - BACKLESS

NTS

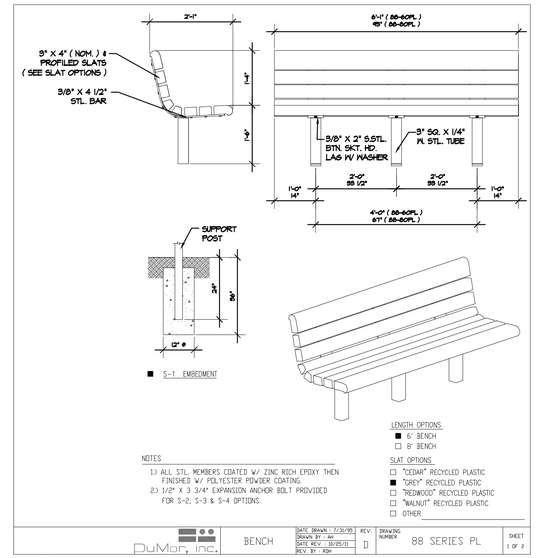
Preliminary detail is subject to change.



2 TYPICAL BENCH WITH BACK (TRAIL)

NTS

Preliminary detail is subject to change.

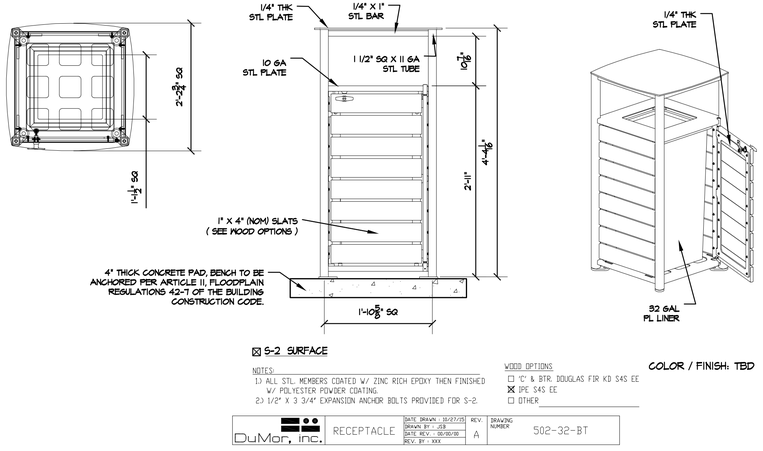


NOTES:
1. COLOR/ FINISH TO BE REVIEWED AND APPROVED BY OWNER.
2. INSTALL PER MANUFACTURER SPECIFICATIONS.

3 TYPICAL BENCH AT DOG PARK

NTS

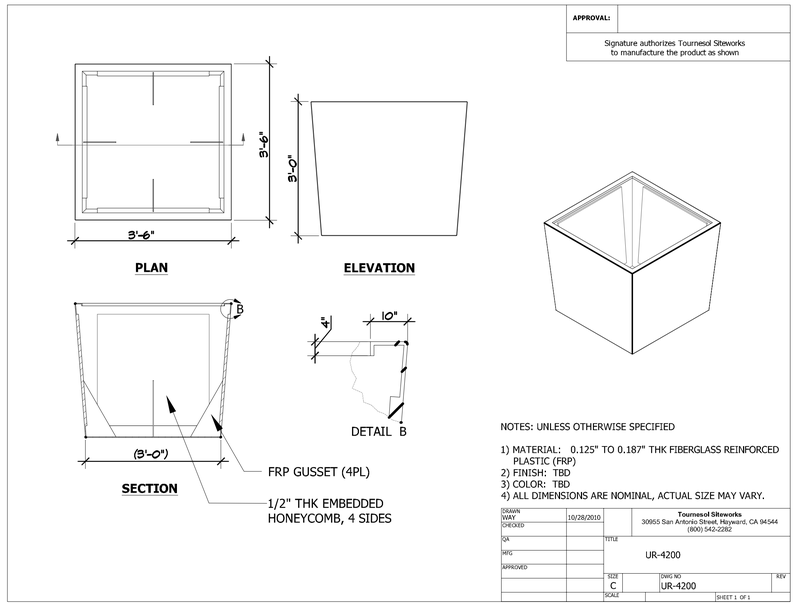
Preliminary detail is subject to change.



4 TYPICAL LITTER RECEPTACLE

NTS

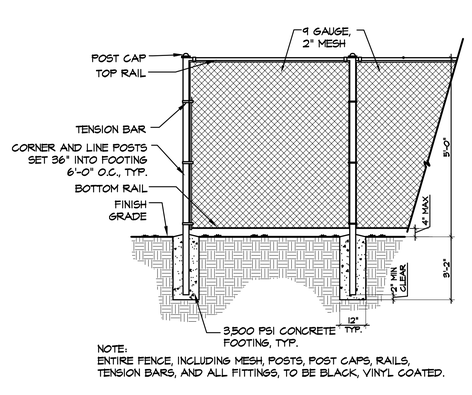
Preliminary detail is subject to change.



5 TYPICAL PLANTER

NTS

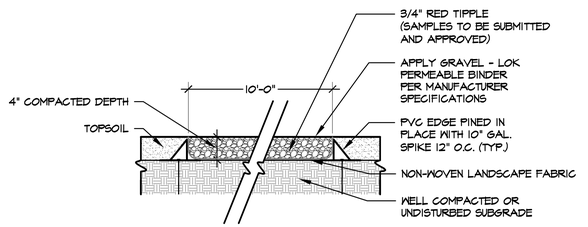
Preliminary detail is subject to change.



6 CHAIN LINK FENCE AT DOG PARK

SCALE: 1/2" = 1'-0"

Preliminary detail is subject to change.



7 RED SHALE MACADAM TRAIL

SCALE: 1" = 1'-0"

Preliminary detail is subject to change.

Serial Number:

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1-800-242-1776

GLACKIN THOMAS PANZAK
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LANDSCAPE ARCHITECTURE

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Paoli Executive Green 1
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41 Leopard Road
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Fax: 610.408.9477
E-mail: plans@glackinptan.com

PENNSYLVANIA LICENSED LANDSCAPE ARCHITECT 775-E
Lisa L. Thomas LA000775E

PRELIMINARY / FINAL LANDSCAPE PLAN

601 Washington Street

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

PROJECT #: 2022H22-002
DATE: 03/01/22 (gs)
REV.: 06/02/22 (gs)

SHEET:
SITE FURNISHING DETAILS
LD-2
35 OF 37

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Review Your Pergola

Pergola Basics
Type: Pergola
Style: Classic Wood
Material: Wood
Size: 10x10

Customized Options
Posts: 5x5
Post Bases: None
Pergola Finish: No Finish
Lattice Roof: No
EZShade Canopy: No

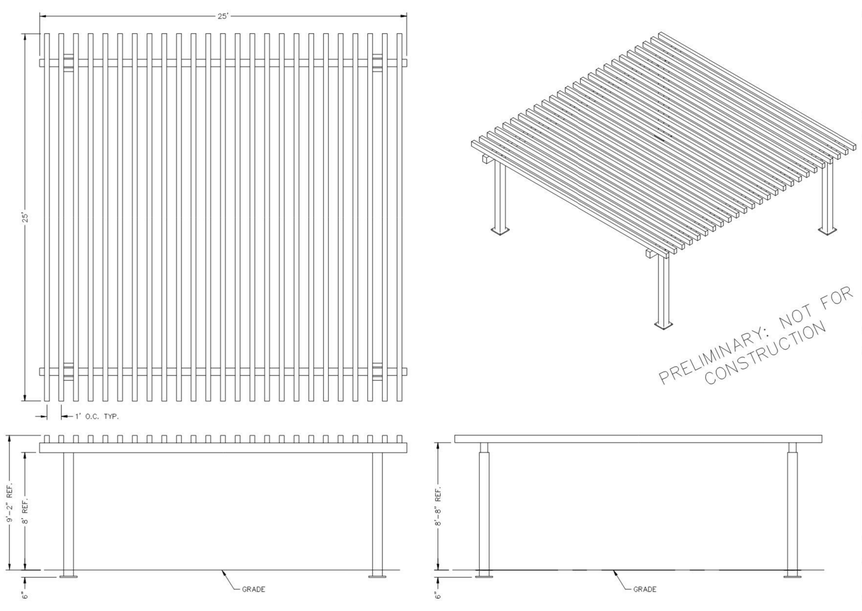
Colors
Color: Natural Wood

Accessories
Electrical Package: 0
Additional Outlets: 0
Ceiling Fan: None
Weathervane: None

NOTE:
1. MANUFACTURER: AMISH COUNTRY GAZEBOS OR APPROVED EQUAL.
2. INSTALL ALL PERGOLA COMPONENTS PER MANUFACTURER SPECIFICATIONS.

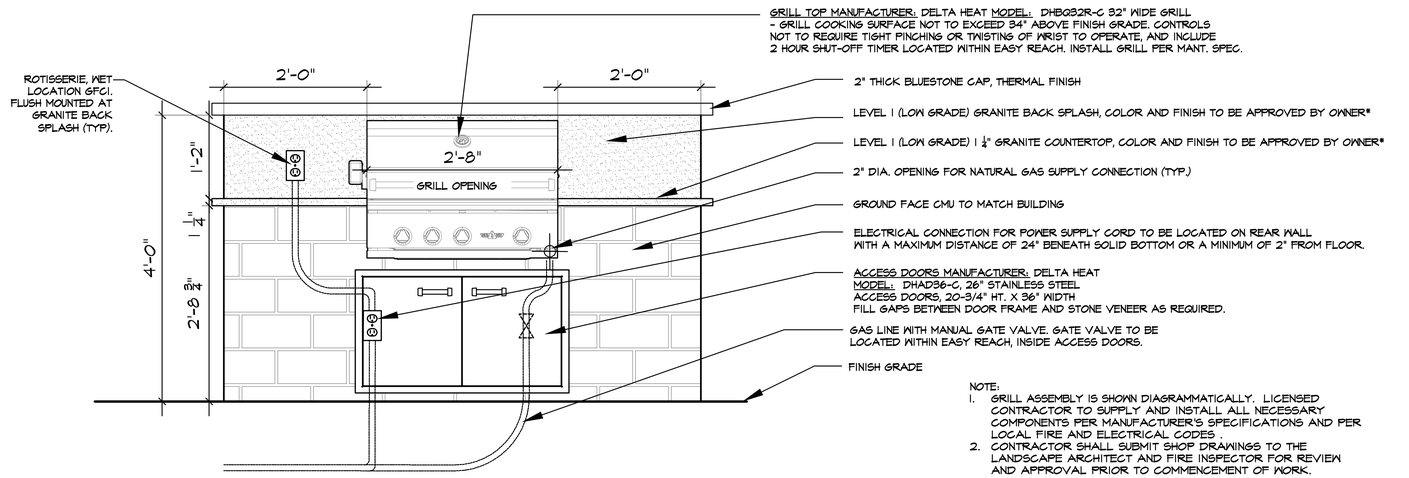
1 WOOD SHADE STRUCTURE
NTS

Preliminary detail is subject to change.



3 STEEL SHADE STRUCTURE DETAIL
NTS

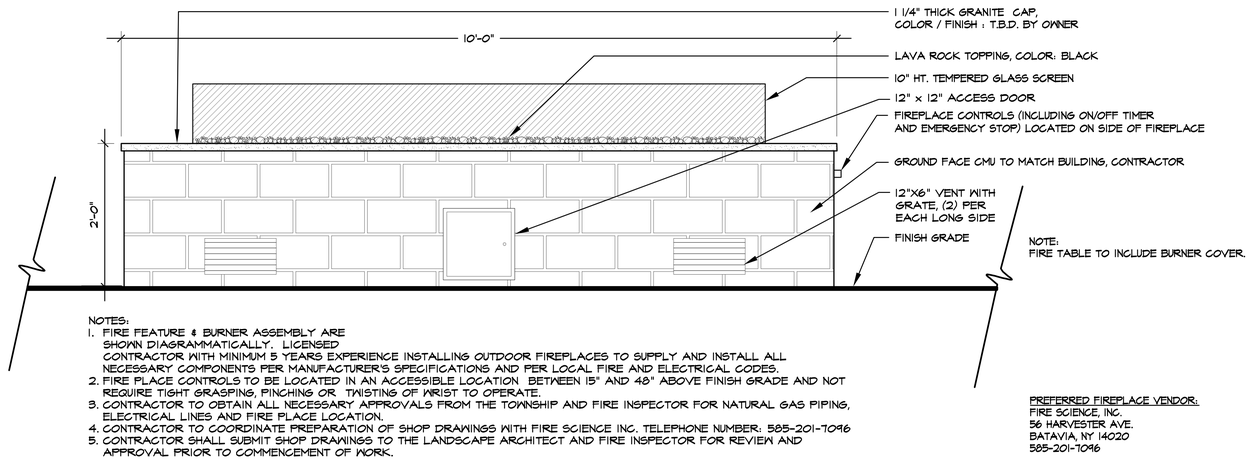
Preliminary detail is subject to change.



NOTE:
1. GRILL ASSEMBLY IS SHOWN DIAGRAMMATICALLY. LICENSED CONTRACTOR TO SUPPLY AND INSTALL ALL NECESSARY COMPONENTS PER MANUFACTURER'S SPECIFICATIONS AND PER LOCAL FIRE AND ELECTRICAL CODES .
2. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE LANDSCAPE ARCHITECT AND FIRE INSPECTOR FOR REVIEW AND APPROVAL PRIOR TO COMMENCEMENT OF WORK.

2 OUTDOOR GRILL DETAIL
NTS

Preliminary detail is subject to change.



NOTE:
FIRE TABLE TO INCLUDE BURNER COVER.

NOTES:
1. FIRE FEATURE & BURNER ASSEMBLY ARE SHOWN DIAGRAMMATICALLY. LICENSED CONTRACTOR WITH MINIMUM 5 YEARS EXPERIENCE INSTALLING OUTDOOR FIREPLACES TO SUPPLY AND INSTALL ALL NECESSARY COMPONENTS PER MANUFACTURER'S SPECIFICATIONS AND PER LOCAL FIRE AND ELECTRICAL CODES.
2. FIRE PLACE CONTROLS TO BE LOCATED IN AN ACCESSIBLE LOCATION BETWEEN 15" AND 48" ABOVE FINISH GRADE AND NOT REQUIRE TIGHT GRASPING, PINCHING OR TWISTING OF WRIST TO OPERATE.
3. CONTRACTOR TO OBTAIN ALL NECESSARY APPROVALS FROM THE TOWNSHIP AND FIRE INSPECTOR FOR NATURAL GAS PIPING, ELECTRICAL LINES AND FIRE PLACE LOCATION.
4. CONTRACTOR TO COORDINATE PREPARATION OF SHOP DRAWINGS WITH FIRE SCIENCE INC. TELEPHONE NUMBER: 585-201-7096
5. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE LANDSCAPE ARCHITECT AND FIRE INSPECTOR FOR REVIEW AND APPROVAL PRIOR TO COMMENCEMENT OF WORK.

PREFERRED FIREPLACE VENDOR:
FIRE SCIENCE, INC.
56 HARVESTER AVE.
BATAVIA, NY 14020
585-201-7096

4 OUTDOOR FIRE FEATURE DETAIL
NTS

Preliminary detail is subject to change.

Serial Number:

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E-mail: plans@glackinplan.com

Lisa L. Thomas LA000775 E

PRELIMINARY / FINAL LANDSCAPE PLAN

601 Washington Street

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

PROJECT #: 2022H22-002
DATE: 03/01/22 (gs)
REV.: 06/02/22 (gs)

SHEET:
SITE FURNISHING DETAILS
LD-3
36 OF 37

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LIGHTING LEGEND:

SYM.	LIGHT TYPE	QTY.	MFR.	MODEL #	REMARKS
A	PARKING AREA LIGHT 'A'	5	Lithonia Lighting	DSX1-LED-P1-30K-T2M-MVOLT-SPA-DMG-DBLXD	Pole mounted, 20' mounting ht., 108 watt LED, 30K Color Temperature, two fixtures mounted @ 180°, type T2M distribution with 0-10V dimming, photocell control by individual circuit. Finish: Black **POLE:** Lithonia SSA-20-5E-DM28AS-DBLXD, 20' ht., 5" diameter aluminum pole. Finish: To match light fixture.
B	PARKING AREA LIGHT 'B'	5	Lithonia Lighting	DSX1-LED-P1-30K-T2M-MVOLT-SPA-DMG-DBLXD	Pole mounted, 20' mounting ht., 54 watt LED, 30K Color Temperature, type T2M distribution with 0-10V dimming, photocell control by individual circuit. Finish: Black **POLE:** Lithonia SSA-20-5E-DM19AS-DBLXD, 20' ht., 5" diameter aluminum pole. Finish: To match light fixture.
C	PARKING AREA LIGHT 'C'	5	Lithonia Lighting	DSX1-LED-P1-30K-T2M-MVOLT-SPA-DMG-DBLXD	Pole mounted, 20' mounting ht., 54 watt LED, 30K Color Temperature, type T2M distribution with house side shield, 0-10V dimming, photocell control by individual circuit. Finish: Black **POLE:** Lithonia SSA-20-5E-DM19AS-DBLXD, 20' ht., 5" diameter aluminum pole. Finish: To match light fixture.
D	PARKING AREA LIGHT 'D'	4	Lithonia Lighting	DSX1-LED-P1-30K-TFTM-MVOLT-SPA-DMG-DBLXD	Pole mounted, 20' mounting ht., 54 watt LED, 30K Color Temperature, type TFTM distribution with house side shield, 0-10V dimming, photocell control by individual circuit. Finish: Black **POLE:** Lithonia SSA-20-5E-DM19AS-DBLXD, 20' ht., 5" diameter aluminum pole. Finish: To match light fixture.
E	PARKING AREA LIGHT 'E'	6	Lithonia Lighting	DSX1-LED-P5-30K-TFTM-MVOLT-SPA-DMG-DBLXD	Pole mounted, 20' mounting ht., 138 watt LED, 30K Color Temperature, type TFTM distribution with house side shield, 0-10V dimming, photocell control by individual circuit. Finish: Black **POLE:** Lithonia SSA-20-5E-DM19AS-DBLXD, 20' ht., 5" diameter aluminum pole. Finish: To match light fixture.
A	PEDESTRIAN AREA LIGHT 'A'	20	Lumenpulse	PUR100T-120/277-CSL-S60-30K-CRI 70-2-BK-DIM	Pole mounted, 16' mounting ht., 55 watt LED, 30K Color Temperature, type II distribution with 0-10V dimming, photocell control by individual circuit. Finish: Black Sandtex. **POLE:** Lumenpulse Straight Pole PLS-4-AL-S-14-M-BK-P, 14' ht., 4" diameter aluminum pole. Finish: To match light fixture.
B	PEDESTRIAN AREA LIGHT 'B'	3	Lumenpulse	PUR100T-120/277-CSL-S60-30K-CRI 70-4-BK-DIM	Pole mounted, 16' mounting ht., 55 watt LED, 30K Color Temperature, type IV distribution with 0-10V dimming, photocell control by individual circuit. Finish: Black Sandtex. **POLE:** Lumenpulse Straight Pole PLS-4-AL-S-14-M-BK-P, 14' ht., 4" diameter aluminum pole. Finish: To match light fixture.
C	PEDESTRIAN AREA LIGHT 'C'	11	Lumenpulse	PUR100T-120/277-CSL-S60-30K-CRI 70-4BLS-BK-DIM	Pole mounted, 16' mounting ht., 55 watt LED, 30K Color Temperature, type IV distribution with house side shield, 0-10V dimming, photocell control by individual circuit. Finish: Black Sandtex. **POLE:** Lumenpulse Straight Pole PLS-4-AL-S-14-M-BK-P, 14' ht., 4" diameter aluminum pole. Finish: To match light fixture.
HSS	HOUSE SIDE SHIELD	--	--	--	See Lighting Plan for fixtures specified with House Side Shield. See light fixture manufacturer specifications for details.

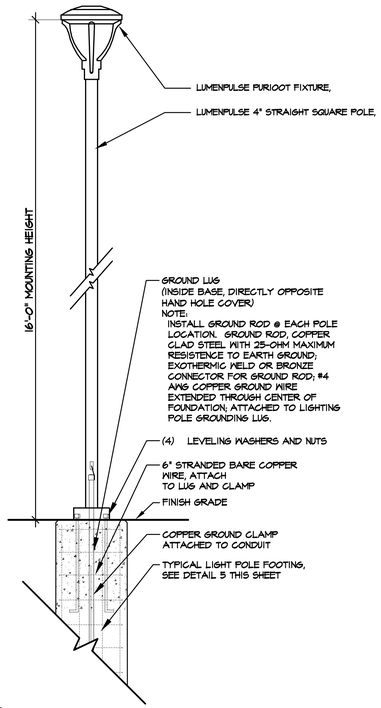
Notes:

1. Final footing design is to be based on manufacturer's wind loading requirements and local soil conditions at time of installation.
2. Contractor to verify line voltage prior to ordering fixture.
3. Contractor to verify pole drilling pattern prior to ordering pole.
4. Final footing design shall be developed and approved by a licensed engineer.

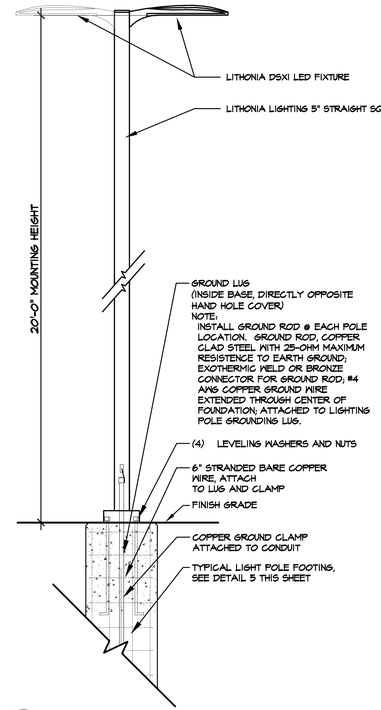
STATISTICAL AREA SUMMARY:

Calculation Area	Avg	Max	Min	Max/Min	Avg/Min
Main Entry Drive / Drop Off	1.3	2.5	0.5	5.0:1	2.6:1
Surface Parking and Sidewalks	1.2	3.0	0.5	6.7:1	2.8:1
Sidewalk - Along Washington Street	1.4	2.6	0.6	4.3:1	2.3:1
Trail - Along Schuylkill River And Perpendicular Access to River	1.7	3.6	0.5	8.0:1	3.7:1

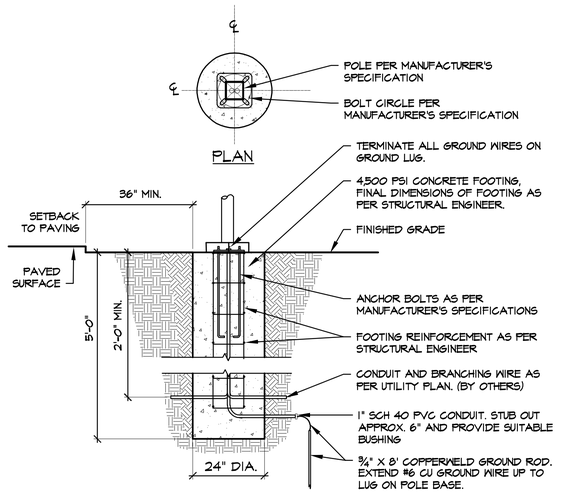
1. Light levels are expressed in footcandles (fc).
2. The point by point illuminance calculation was prepared using Visual Professional Edition, 2020 Acuity Brands Lighting Inc.
3. A light loss factor of 0.90 was used for all LED Parking Area lights to simulate a 3000k color temperature. A light loss factor of 0.9 was used for all LED Pedestrian Lights.
4. The point by point illuminance calculation was prepared using the following ies files:
   - PUR100T_V_Y-120_277-CSL-S60-30K-CRI 70-2.IES
   - PUR100T_V_Y-120_277-CSL-S60-30K-CRI 70-5S.IES
   - PUR100T_V_Y-120_277-CSL-S60-30K-CRI 70-4.IES
   - DSX2-LED-P1-30K-TFTM-MVOLT.IES
   - DSX1-LED-P1-30K-T5M-MVOLT.ies
   - DSX2-LED-P1-30K-T2M-MVOLT.IES
   - DSX1-LED-P1-30K-T2M-MVOLT-HS.IES
   - DSX1-LED-P5-30K-TFTM-MVOLT-HS.IES
5. The statistical area summary is based on light levels within the paved parking lot areas, cartways, walkways, and trails.
6. The township reserves the right to conduct one or more post-installation nighttime inspections to verify compliance with Township lighting requirements and, if appropriate, to require remedial action at no expense to the Township.
7. Post-approval alterations to lighting plans or intended substitutions for approved lighting equipment shall be submitted to the Township for review and approval.



1 PEDESTRIAN AREA LIGHT DETAIL
SCALE: NTS

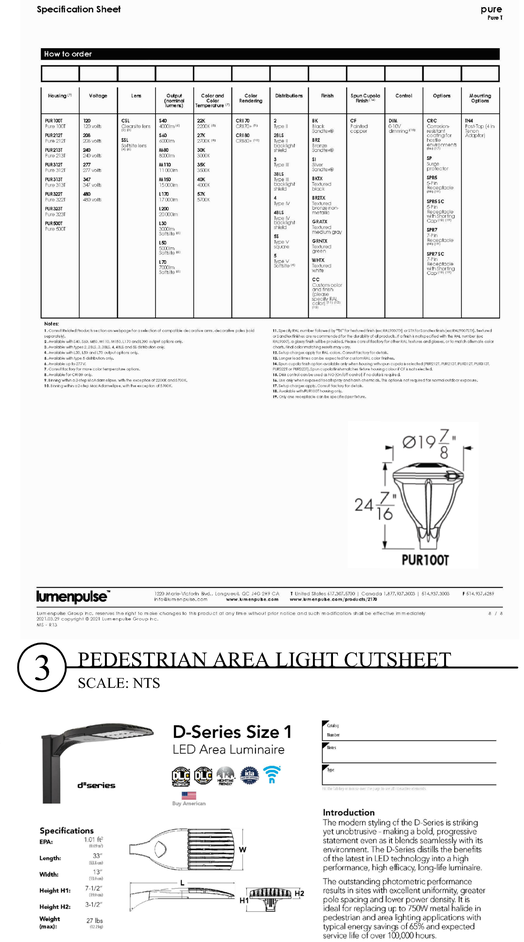


2 PARKING AREA LIGHT DETAIL
SCALE: NTS



NOTES:
1. ALL NEW FREESTANDING LIGHT FIXTURES SHALL BE FLUSH MOUNTED WITH GRADE.
2. CONTRACTOR SHALL ENSURE DESIGN IS PREPARED BY A QUALIFIED STRUCTURAL ENGINEER CONSIDERING LIGHTING MANUFACTURER REQUIREMENTS, LOCAL WIND LOADS, AN SITE SPECIFIC SOIL PARAMETERS.
   A. THE STRUCTURAL ENGINEER SHALL BE NOTIFIED OF THE INTENT TO MOUNT ANYTHING ASIDE FROM THE LIGHT FIXTURE INCLUDING (BUT NOT LIMITED TO) CAMERAS, BANNERS, FLAGS, SIGNAGE, ETC. AS IT WILL IMPACT THE POLE AND FOUNDATION DESIGN.
   B. SOME SITE LOCATIONS AND/OR CONDITIONS MAY REQUIRE VIBRATION DAMPENING MEASURE AS DETERMINED BY A STRUCTURAL ENGINEER.
   C. ACTUAL DIAMETER AND DEPTH OF FOOTING SHALL BE DETERMINED BY THE STRUCTURAL ENGINEER.
3. ALL REBAR SHALL BE MAINTAINED AT A 3" MIN. CLEARANCE FROM SURFACES.
4. FIXTURE MUST BE GROUNDED IN ACCORDANCE WITH LOCAL CODES AND/OR THE NATIONAL ELECTRICAL CODE. FAILURE TO DO SO MAY RESULT IN SERIOUS PERSONAL INJURY.
5. POLES SHOULD NEVER BE ERECTED WITHOUT THE LUMINAIRE INSTALLED. WARRANTY IS VOIDED IF THE POLE IS ERECTED WITHOUT THE LUMINAIRE. THE WARRANTY IS VOIDED IF THE POLE IS NOT GROUTED UNDER THE ENTIRE BASE AFTER INSTALLATION.

5 TYPICAL LIGHT POLE FOUNDATION DETAIL
SCALE: 1/2" = 1'-0"


Specification Sheet
pure
Pure 1
How to order
Housing [1]
Voltage
Lens
Output (delivered lumens)
Color and color temperature [2]
Color Rendering
Distributions
Finish
Euro Cubicle Finish [3]
Control
Options
Mounting Options
PUR 100T
Pure 100T
PUR 200T
Pure 200T
PUR 300T
Pure 300T
PUR 400T
Pure 400T
PUR 500T
Pure 500T
PUR 600T
Pure 600T
120 120 volts
208 208 volts
240 240 volts
277 277 volts
347 347 volts
480 480 volts
CSL Composite lens (no dirt)
SSL Synthetic lens (no dirt)
540 4000lm [4]
640 6000lm
960 9000lm
1410 13120lm
1700 15810lm
2200 20460lm
L30 3000lm to 4K [5]
L50 5000lm to 4K [5]
L70 7000lm to 4K [5]
22K 2200K [4]
27K 2700K [4]
30K 3000K
35K 3500K
40K 4000K
57K 5700K
CRI70 CRI70+ [4]
CRI80 CRI80+ [4]
2 Type 2
2BLS Type 2 Backlight Shield
3 Type 3
3BLS Type 3 Backlight Shield
4 Type 4
4BLS Type 4 Backlight Shield
5 Type 5
5W Type 5 Wide
BK Black
Standard on PUR 100T
BRZ Bronze
Standard on PUR 200T
BL Black
Standard on PUR 300T
DNA Dark Natural Aluminum
Standard on PUR 400T
GRATX Textured Graphite Grey
GRATX Textured Grey
WHTX Textured White
CC Custom colors! Add RAL, Sandtex or Metallic finish to any PUR. Contact factory for details.
CF Painted Cubicle
DIM 0-10V dimming [4] [6]
CFC Commercial Cubicle for flexible mounting [7]
DP Double Pendant Mounting
SPR5 5" Round Pole Adapter
SPR5 5" Square Pole Adapter with Drilling Pattern [8]
SPR7 7" Square Pole Adapter
SPR7 5" Round Pole Adapter
Shipped included
OPA Square pole mount adapter
RPA Round pole mount adapter [9]
WBA Wall bracket [9]
SPUMBA Square pole universal mounting adapter [9]
RPUMBA Round pole universal mounting adapter [9]
Shipped separately
BBW/DCEU-U Black antimicrowave/cellular shield (type "U" only) [4, 9]
Notes:
1. Cover/Heat Shield Product selection wizard page for a selective list of compatible decorative lens, decorative poles (sold separately).
2. Available with L40, L65, L80, HO, SO, WD, LO, and L90 output options only.
3. Available with Type 2, 2BLS, 3, 3BLS, 4, 4BLS, and SL (5W) distribution only.
4. Available with Type 4 and Type 5 distributions only.
5. Available with Type 4 distributions.
6. Available up to 277V.
7. Consult factory for more color temperature options.
8. Available for GRW only.
9. Not available with Type 5W distributions, with the exception of 22K, 30K, 35K, and 40K.
10. Finish is white (WH) for Wall Adapter, with the exception of 57K/CRI70.
11. Spec-Ability number followed by "PS" for horizontal finish (ex: PUR100T-SO-27K-T3-DDB-PS-DDBXD), textured and bronze finishes are recommended for the durability of all products, or if field is not specified with the SKU number (ex: PUR100T-SO-27K-T3-DDB-DDBXD), or glass finish add a (-G) suffix to the SKU number (ex: PUR100T-SO-27K-T3-DDB-G-DDBXD). Contact factory for details, features and options, or to match aluminum color charts, finish color matching assistance.
12. Longer lead times can be expected for factory customizations, color finishes.
13. Spun cupola finish options are available only when housing with spun cupola is selected (PUR100T, PUR200T, PUR300T, PUR400T, or PUR500T) or PUR100S (spun cupola aluminum die-formed housing) colors (CF) are selected.
14. Dark control can be used on HO/SO/WD control (LO not available).
15. Longer lead times can be expected for Euro Cubicle finishes. The optimum, not required for normal outdoor exposures.
16. Available with PUR100T housing only.
17. Only one receptacle can be specified per fixture.
Ordering Information
EXAMPLE: DSX1 LED P7 40K T3M MVOLT SPA NLTAIR2 PIRHN DDBXD
DSX1 LED
Series
LEDs
Color temperature
Distribution
Voltage
Mounting
Control options
Other options
Finish (required)
Shipped included
Shipped separately
lumenpulse
1319 Monte-Victoria Blvd., Lorquinet, QC J4S 0K9 CA
T United States 617.267.0700 | Canada 1.877.957.2600 | 514.937.3000
F 514.937.4259
www.lumenpulse.com
www.lumenpulse.com/products/2170
Lumenpulse Group Inc. reserves the right to make changes to this product at any time without prior notice and such modifications shall be effective immediately
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MS - 813
8 / 4

3 PEDESTRIAN AREA LIGHT CUTSHEET
SCALE: NTS

4 PARKING AREA LIGHT CUTSHEET
SCALE: NTS

Serial Number:

CALL BEFORE YOU DIG!
PENNSYLVANIA LAW REQUIRES 3 WORKING DAYS NOTICE FOR CONSTRUCTION PHASE AND 10 WORKING DAYS IN DESIGN STAGE–STOP CALL
Pennsylvania One Call System, Inc.
1-800-242-1776

GLACKIN THOMAS PANZAK
LAND PLANNING
LANDSCAPE ARCHITECTURE

Glackin Thomas Panzak, Inc.

Paoli Executive Green 1
Suite 300
41 Leopard Road
Paoli, Pennsylvania 19301
610.408.9011
Fax: 610.408.9477
E-mail: plans@glackinptan.com

PENNSYLVANIA LISA L. THOMAS 775-E REGISTERED LANDSCAPE ARCHITECT

Lisa L. Thomas LA000775 E

PRELIMINARY / FINAL LIGHTING PLAN

601 Washington Street

WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

PROJECT #: 2022H22-002
DATE: 03/01/22 (gs)
REV.: 06/02/22 (gs)

SHEET: LIGHTING DETAILS AND NOTES

LD-4

37 OF 37

P:\2022\2022H22-002\CAD\DD\Preliminary\2022H22-002 601 Washington Street_LL_06-01-22.dwg, LD-3, 6/3/2022 7:41:56 AM, GarySchneider

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS

FOR

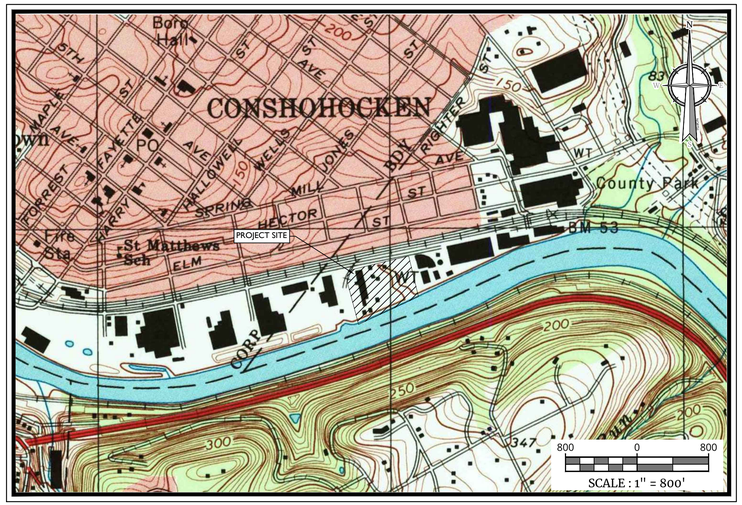
601 WASHINGTON STREET ASSOCIATES LP

601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP

MONTGOMERY COUNTY, PENNSYLVANIA



LOCATION MAP

SOURCE: PA USGS NORRISTOWN QUAD



AERIAL MAP

SOURCE: PASDA

WAIVERS & VARIANCES

WAIVERS REQUESTED WITHIN WHITEMARSH TOWNSHIP:

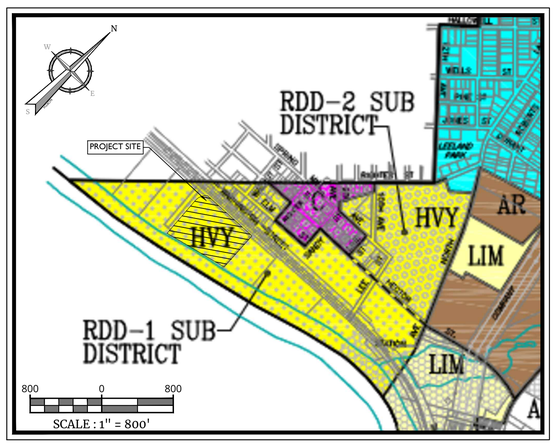
SECTION 105-30.A -	A WAIVER TO ALLOW A CARTWAY WIDTH OF LESS THAN 36 FEET.
SECTION 105-39.A -	A WAIVER FOR THE REQUIREMENT THAT ALL PARKING AREAS SHALL HAVE AT LEAST ONE TREE OR TWO-AND-ONE-HALF-INCHES MINIMUM CALIPER FOR EVERY TWO PARKING SPACES PROVIDED.
SECTION 105-47.K.2 -	A WAIVER IS REQUESTED TO ALLOW ACCESS POINTS TO BE MORE THAN 500 FEET APART.
SECTION 105-48.E -	A WAIVER REQUESTED TO NOT PROVIDE A TREE PLANTING ZONE BETWEEN THE CURB AND SIDEWALK ALONG WASHINGTON STREET.
SECTION 105-52 -	A WAIVER IS REQUESTED TO ALLOW PERIMETER BUFFER YARDS TO BE LESS THAN 50' IN WIDTH. BUFFER LANDSCAPING IS PROVIDED AT THE INTENSITY THAT MEETS THE INTENT OF THE BUFFER YARD REQUIREMENTS AND ADDRESS THE UNIQUE CHARACTERISTICS OF THE SITE AND INTENT OF THE RIVERFRONT DEVELOPMENT DISTRICT.
SECTION 2004-8.1.B.4.K -	A WAIVER IS REQUESTED TO PERMIT GRADING WITHIN FIVE FEET OF THE PROPERTY LINES.

VARIANCES & SPECIAL EXCEPTIONS GRANTED BY WHITEMARSH TOWNSHIP ZHB: RESOLUTION #2019-26895: AUGUST 6, 2020

SECTION 116-165 -	VARIANCE TO PERMIT NON-RESIDENTIAL STRUCTURES IN THE FLOODPLAIN CONSERVATION DISTRICT.
SECTION 116-166.A(3) -	SPECIAL EXCEPTION TO PERMIT A STORMWATER RETENTION BASIN WITHIN FLOODWAY.

INDEX OF SHEETS

SHT. No.	DESCRIPTION	LATEST REVISION
1*	COVER SHEET	6/2/2022
2*	GENERAL NOTES	6/2/2022
3	EXISTING TREE SURVEY PLAN	6/2/2022
4	EXISTING RESOURCE AND SITE ANALYSIS PLAN	6/2/2022
5	EXISTING CONDITIONS AND DEMOLITION PLAN	6/2/2022
6*	DIMENSION PLAN	6/2/2022
7	RIVER FRONT ACCESS AND OPEN SPACE PLAN	6/2/2022
8	GRADING PLAN	6/2/2022
9	UTILITY PLAN	6/2/2022
10-11	PROFILES	6/2/2022
12-13	TRUCK TURNING PLANS	6/2/2022
14-19	CONSTRUCTION DETAILS	6/2/2022
20-21	ADA GRADING PLAN	6/2/2022
22-25	EROSION AND SEDIMENT POLLUTION CONTROL PLANS	6/2/2022
26-29	POST-CONSTRUCTION STORMWATER MANAGEMENT PLANS	6/2/2022
30-37	LANDSCAPING & LIGHTING PLANS (BY OTHERS)	6/2/2022
	ADDITIONAL SETS	
G3.10-G3.50	ARCHITECTURAL FLOOR PLAN SHEET SET (BY OTHERS)	
1M1.10-FP4.00	ARCHITECTURAL MEP SHEET SET (BY OTHERS)	
	* SHEETS TO BE RECORDED	



ZONING MAP

SOURCE: WHITEMARSH ZONING MAP

A - RESIDENTIAL DISTRICT (15,000 SQ. FT.)
B - RESIDENTIAL DISTRICT (10,000 SQ. FT.)
C - RESIDENTIAL DISTRICT (8,000 SQ. FT.)
AR - ADMINISTRATION AND RESEARCH DISTRICT
LIM - LIMITED INDUSTRIAL DISTRICT
HVY - HEAVY INDUSTRIAL DISTRICT

APPLICANT/OWNER:
601 WASHINGTON STREET ASSOC LP
201 KING OF PRUSSIA RD, SUITE 501
RADNOR, PA 19087

OWNER'S CERTIFICATION

By: _____
Name:
Title:

Commonwealth of Pennsylvania : ss

County of Montgomery **AND NOW**, this _____ day of _____ 20__, before me, the undersigned Notary, personally appeared _____ who acknowledged himself to be the _____ of 601 Washington Street Assoc LP, the sole general partner of 601 Washington Street Assoc LP a Pennsylvania limited partnership and he, as such _____, being authorized to do so, executed the foregoing instrument for the purposes therein contained.**IN WITNESS WHEREOF,** I hereunder set my hand and official seal.

_____ _____ Notary Public My commission expires:

OWNER'S CERTIFICATION

By: _____
Name:
Title:

Commonwealth of Pennsylvania : ss

WE, THE OWNERS OF THE LAND INVOLVING THE ACCOMPANYING PLANS. BEING DULY SWORN ACCORDING TO LAW, DEPOSE AND SAY THAT WE ARE THE SOLE OWNERS OR ARE THE AUTHORIZED OFFICERS OF THE CORPORATION THAT IS THE SOLE OWNERS OF THIS PROPERTY IN PEACEFUL POSSESSION OF IT, AND THAT THERE ARE NO SUITS PENDING AFFECTING THE TITLE OF THE SAME, AND THAT WE ACKNOWLEDGE AND ENDORSE THE ACCOMPANYING PLANS AND THAT WE PROPOSE THE ATTACHED RECORD PLAN FOR RECORDING (AS APPLICABLE), AFTER RECEIVING ALL REQUIRED MUNICIPAL APPROVALS. **IN WITNESS WHEREOF,** I hereunder set my hand and official seal.

_____ _____ Notary Public My commission expires:

PLAN PREPARER'S STATEMENTS

I, _____, A REGISTERED SURVEYOR OF THE COMMONWEALTH OF PENNSYLVANIA, DO HEREBY CERTIFY
THAT THE PLAN, PREPARED FROM A FIELD SURVEY ON _____, 20____ CORRECTLY REPRESENTS THE PROPERTY BOUNDARY OF THE PROPOSED SUBDIVISION OR LAND DEVELOPMENT.

_____ _____
DATE REGISTERED SURVEYOR'S SIGNATURE

I, _____, A LICENSED PROFESSIONAL ENGINEER OF THE COMMONWEALTH OF PENNSYLVANIA, DO HEREBY CERTIFY THAT THE ACCOMPANYING APPLICATION, PLANS, AND SUPPORTING DOCUMENTATION ARE TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE.

_____ _____
DATE LICENSED ENGINEER'S SIGNATURE

MUNICIPAL APPROVAL / REVIEW BLOCK
REVIEWED BY THE WHITEMARSH TOWNSHIP ENGINEER THIS _____ DAY OF_____, 20____.

_____ _____
WHITEMARSH TOWNSHIP ENGINEER SIGNATURE

APPROVED BY THE TOWNSHIP OF WHITEMARSH THIS _____ DAY OF _____, 20____.

_____ _____
WHITEMARSH TOWNSHIP MANAGER SIGNATURE

APPROVED BY THE TOWNSHIP OF WHITEMARSH BOARD OF SUPERVISORS THIS _____ DAY OF _____, 20____.

_____ _____
PRESIDENT SIGNATURE

_____ _____
SECRETARY SIGNATURE

RECORDER OF DEEDS

RECORDED IN THE OFFICE FOR THE RECORDING OF DEEDS IN AND FOR COUNTY OF MONTGOMERY, AT NORRISTOWN, PA.
IN PLAN BOOK _____, PAGE NO. _____ ON _____, 20____.

MCPC NO. 19-0018-002

PROCESSED and REVIEWED. A report has been prepared by the Montgomery County Planning Commission in accordance with the Municipalities Planning Code.

Certified this date _____

_____
For The Director

MONTGOMERY COUNTY PLANNING COMMISSION

REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS
2	06/02/22	CMM	REVISED PER PRE MARSHAL, TOWNSHIP AND ZONING REVIEW LETTERS

Colliers Engineering & Design

www.colliersengineering.com

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COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL C. RICHARD ROSEBERRY ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS
601 WASHINGTON STREET
WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER: 16001030B
DRAWING NAME: C-CVER

SHEET TITLE: COVER SHEET

SHEET NUMBER: 1 of 37

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\Site Plans\C-CVER.dwg|C-01-COVER By: MDREYGUS

1. PROPERTY IDENTIFICATION - BEING KNOWN AS TAX PARID:

   601 WASHINGTON: 650012679009 DEED BOOK: 5260 PG: 00684

   AS SHOWN IN THE CURRENT OFFICIAL TAX MAPS OF WHITEMARSH TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA. ADDRESS FOR THE SITE IS 601 WASHINGTON STREET.
2. THE SUBJECT PROPERTY IS LOCATED IN THE HEAVY INDUSTRIAL (HVY)/RIVERFRONT DEVELOPMENT (RDD-1) SUB DISTRICT/FLOODPLAIN CONSERVATION OVERLAY DISTRICT/RIPARIAN CORRIDOR CONSERVATION OVERLAY DISTRICT. THE PROPOSED USE OF THE SUBJECT PROPERTY IS MULTI-FAMILY RESIDENTIAL APARTMENTS AND IS PERMITTED BY RIGHT IN THE RIVERFRONT DEVELOPMENT DISTRICT (RDD-1).
3. APPLICANT/OWNER:

   601 WASHINGTON STREET ASSOC LP

   201 KING OF PRUSSIA RD, SUITE 501

   RADNOR, PA 19087
4. STATEMENT OF INTENT - THE PROPOSED USE IS MULTI-FAMILY RESIDENTIAL. THE PROPOSED APARTMENT BUILDING IS FOUR FLOORS OVER AT-GRADE PARKING.
5. BOUNDARY AND TOPOGRAPHIC INFORMATION SHOWN HEREON WAS OBTAINED FROM FIELD SURVEY PERFORMED ON JANUARY 26, 2018 AND PREPARED BY VALLEY LAND SERVICES, LLC., PLAN DATED FEBRUARY 5, 2018 AND LAST REVISED JULY 25, 2019.
6. DEED REFERENCE - DEED BOOK 5260 PAGE 00684
7. MAP REFERENCES -

   A MAP ENTITLED: "ALTA/NSPS LAND TITLE SURVEY" PREPARED BY VALLEY LAND SERVICES, LLC, DATED FEBRUARY 5, 2018, LAST REVISED JULY 25, 2019.
8. THIS PLAN WAS PREPARED WITH THE BENEFIT OF A TITLE REPORT ISSUED BY FIRST AMERICAN TITLE INSURANCE COMPANY, COMMITMENT NO. PAFA17-5635 DJC,. THIS PROPERTY MAY BE SUBJECT TO RESTRICTIONS, COVENANTS AND/OR EASEMENTS, WRITTEN OR IMPLIED AS THEY APPEAR WITHIN THE TITLE REPORT AS FOLLOWS
   A. DEED DEDICATION BETWEEN PHILADELPHIA STEEL AND IRON COMPANY AND WHITEMARSH TOWNSHIP DATED 10/05/1937 AND RECORDED 10/06/1937 AS IN DEED BOOK 1247 PAGE 291. -LOCATION COULD NOT BE DETERMINED FROM RECORD DOCUMENT.
   B. RIGHT OF WAY GRANTED TO THE BELL TELEPHONE COMPANY OF PENNSYLVANIA IN DEED BOOK 1293 PAGE 528. LOCATION COULD NOT BE DETERMINED FROM RECORD DOCUMENT.
   C. RIGHT OF WAY BETWEEN JOHN J. REGAN AND WILMER C. SWARTLEY CO-PARTNERS TRADING AS PHILADELPHIA STEEL AND IRON COMPANY AND PHILADELPHIA SUBURBAN WATER COMPANY, DATED 8/23/1948 AND RECORDED 10/27/1948 AS IN DEED BOOK 1957 PAGE 560. LOCATION COULD NOT BE DETERMINED FROM RECORD DOCUMENT. NOT PLOTTED ON SURVEY.
   D. RIGHT OF WAY BETWEEN JOHN J. REGAN AND WILMER C. SWARTLEY CO-PARTNERS TRADING AS PHILADELPHIA STEEL AND IRON COMPANY AND PHILADELPHIA SUBURBAN WATER COMPANY, DATED 8/23/1948 AND RECORDED 10/27/1948 AS IN DEED BOOK 1957 PAGE 560. LOCATION COULD NOT BE DETERMINED FROM RECORD DOCUMENT.
   E. DEED OF DEDICATION BETWEEN WILMER C. SWARTLEY AND JOHN J. REGAN CO-PARTNERS TRADING AS PHILADELPHIA STEEL AND IRON COMPANY AND TOWNSHIP OF WHITEMARSH, DATED 8/23/1948 AND RECORDED 1/31/1949 AS IN DEED BOOK 1978 PAGE 1. LOCATION COULD NOT BE DETERMINED FROM RECORD DOCUMENT.
   F. RIGHT OF WAY GRANTED TO PHILADELPHIA ELECTRIC COMPANY IN DEED BOOK 3632 PAGE 77. BLANKET IN NATURE. NOT PLOTTED.
   G. RIGHT OF WAY GRANTED TO PHILADELPHIA ELECTRIC COMPANY IN DEED BOOK 5025 PAGE 2495. BLANKET IN NATURE. NOT PLOTTED.
   H. RIGHT OF WAY GRANTED TO PECO ENERGY CO. AS IN DEED BOOK 5205 PAGE 13. BLANKET IN NATURE. NOT PLOTTED.
   I. MATTERS SHOWN ON THAT CERTAIN ALTA/ACSM LAND TITLE SURVEY DATED MAY 14, 1998 AS FILE NO. 05303 BY MOMENEE SURVEY GROUP, INC., AS FOLLOWS:

      a. 48" STORM MAIN RUNS THROUGH EASTERN AND NORTHERN PORTION OF PREMISES NOT SUBJECT TO AN EASEMENT - APPROXIMATE LOCATION SHOWN.
      b. RIGHTS OF OTHER FOR INGRESS AND EGRESS PURPOSES TO THE TOWPATH EXTENDED THROUGH PREMISES - NO TOWPATH OBSERVED AT THE TIME OF THE SURVEY.
      c. ENCROACHMENT OF ADJOINING PARCEL ON THE SOUTHWESTERN SIDE OF PREMISES - SHOWN.
      d. GAS UTILITY LINE EXTENDS ALONG NORTHERN SIDE OF PREMISES AND INTO NORTHWESTERN SIDE OF PREMISE WITHOUT THE BENEFIT OF AN EASEMENT - APPROXIMATE LOCATION SHOWN.
9. THE EXISTENCE OF ANY UNDERGROUND STORAGE TANKS, IF ANY, WAS NOT KNOWN AT THE TIME OF THE SURVEY.
10. TOPOGRAPHIC INFORMATION SHOWN HEREON WAS TAKEN FROM GROUND SURVEY PERFORMED BY VALLEY LAND SERVICES, LLC. THE LOCATION OF ALL UNDERGROUND UTILITIES AS SHOWN HEREON ARE APPROXIMATE AND ARE BASED ON VISIBLE SURFACE STRUCTURES AND ANY UTILITY MAPS PROVIDED BY UTILITY COMPANIES REFERENCED HEREON.
11. EXISTING SITE TOPOGRAPHIC INFORMATION AS SHOWN HEREON IS BASED UPON NAVD 88.
12. BENCHMARKS: MAG NAIL, ELEV. 57.31
13. CONCRETE MONUMENTS, PK NAILS, AND IRON PINS SHALL BE SET UPON APPROVAL OF THIS PLAN PRIOR TO RECORDING, AS NEEDED.
14. ZONE DATA:

HEAVY INDUSTRIAL (HVY) WITH RDD-1 SUB ZONING DISTRICT			
	REQUIRED	EXISTING	PROPOSED
USE		APARTMENTS	
MINIMUM LOT SIZE	130,680 SF	393,027 SF	393,027 SF
		9.02 AC	9.02 AC
RIVER FRONT OPEN SPACE AREA	100' WIDE BUFFER	N/A	78,068 SF
LOT SIZE (MINUS RIVER FRONT OPEN SPACE)	130,680 SF	N/A	314,959 SF
MINIMUM LOT WIDTH	200 FT	695.68 FT	695.68 FT
PRINCIPAL BUILDING			
MINIMUM FRONT YARD	20 FT	19.40 FT	20 FT
MINIMUM REAR YARD	20 FT	55.06 FT	204.91 FT
MINIMUM SIDE YARDS	20 FT	40.38 FT	37.83 FT
PARKING SETBACK	15 FT	12.17 FT	20.95 FT
MAXIMUM BUILDING HEIGHT	4 STORIES	2 STORIES	4 STORIES
MAXIMUM DENSITY	30 UNITS/ACRE	N/A	29.93 UNITS/ACRE
MAXIMUM BUILDING COVER	40%	11.48%	28.66%
		45,122 SF	90,278 SF
MAXIMUM IMPERVIOUS COVER TOTAL LOT	75%	45.26%	59.28%
		177,902 SF	232,981 SF
MAXIMUM IMPERVIOUS COVER MINUS 100' RIVER FRONT OPEN SPACE	75%	N/A	70.96%
		N/A	223,499 SF
OPEN / GREEN SPACE AREA	40%	54.74%	40.72%
		215,125 SF	160,046 SF
REAR YARD AREA, FROM PRIMARY BUILDING PLANE		55,173 SF	143,161 SF
PARKING			
1.5 SPACES/ DWELLING*	405	0	417
ADA (VAN SPACES)**	9 (2)	0	12 (2)
ELECTRIC VEHICLE SPACES***	12	0	12

* BASED ON 270 UNITS
** ADA REQUIREMENTS BASED ON THE 401-500 PARKING SPACES RANGE.
*** BASED ON THE CALCULATION FOUND IN ZONING ORDINANCE SECTION 116-188.3.D(1)(c)&(d)

16. POTABLE WATER SERVICE WILL BE BY EXISTING PUBLIC WATER SUPPLY AND SANITARY SEWER SERVICE WILL BE BY PUBLIC SEWAGE.
17. WETLANDS ARE SHOWN ON PLAN.
18. BY GRAPHICAL REPRESENTATION ONLY THIS PROPERTY IS LOCATED IN FLOOD HAZARD ZONE AE AS SHOWN ON FLOOD INSURANCE RATE MAP, MAP NO. 42091C0358G WHICH HAS AN EFFECTIVE DATE OF MARCH 2, 2016 AND IS IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE. THE FEMA CALCULATED 100-YEAR BASE FLOOD ELEVATION FOR THIS PROJECT IS 60.50 FEET (NAVD 88).
19. ALL SOILS ON SITE WERE TAKEN FROM THE NRCS WEB SOIL SURVEY.
20. THE SITE IS UNDERLAIN BY THE OLIGOCLASEMICA SCHIST OF THE WISSAHICKON FORMATION AND THE IMPURE LIMESTONE AND DOLOMITE OF THE CONESTOGA FORMATION.
21. THE PROPOSED DEVELOPMENT IS WITHIN THE LOWER SCHUYLKILL RIVER WATERSHED, WHICH DOES NOT HAVE AN APPROVED ACT 167 PLAN.
22. NO TOPSOIL SHALL BE REMOVED FROM THE SITE UNLESS AUTHORIZED BY WHITEMARSH TOWNSHIP OR MONTGOMERY COUNTY CONSERVATION DISTRICT. PERMANENT REMOVAL OF TOPSOIL FROM LAND WITHIN WHITEMARSH TOWNSHIP IS PROHIBITED. NO TOPSOIL SHALL BE USED AS SPOIL.
23. EXCESS CONSTRUCTION WASTE AND DEBRIS SHALL BE REMOVED FROM THE SITE AT THE COMPLETION OF THE PROJECT. UNDER NO CIRCUMSTANCES SHALL SUCH MATERIAL BE ALLOWED TO BE BURIED OR USED AS BACKFILL MATERIAL.
24. MATERIALS, WORKMANSHIP, AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREON SHALL BE IN ACCORDANCE WITH:
   A. PENNSYLVANIA DEPARTMENT OF TRANSPORTATION "SPECIFICATIONS PUBLICATION 408/2020"; AS SUPPLEMENTED.
   B. CURRENT PREVAILING MUNICIPAL, COUNTY, AND/OR STATE AGENCY SPECIFICATIONS, STANDARDS, CONDITIONS, AND REQUIREMENTS.
   C. CURRENT PREVAILING UTILITY COMPANY/AUTHORITY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
   D. CURRENT MANUFACTURER SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
26. APPROVAL OF THIS PLAN DOES NOT GUARANTEE PERMIT ISSUANCE FOR SEWAGE DISPOSAL.
27. UTILITY RELOCATIONS SHOWN HEREON, IF ANY, ARE FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT REPRESENT ALL REQUIRED UTILITY RELOCATIONS. THE CONTRACTOR IS RESPONSIBLE FOR PERFORMING AND/OR COORDINATING ALL REQUIRED UTILITY RELOCATIONS IN COOPERATION WITH THE RESPECTIVE UTILITY COMPANY/ AUTHORITIES.
28. PROPER PIPE COVERAGE SHALL BE MAINTAINED DURING ALL PHASES OF CONSTRUCTION. PIPE LENGTHS SHOWN HEREON ARE FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE.
29. TRAFFIC SIGNAGE AND STRIPING SHALL CORRESPOND TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
30. THIS IS A SITE DEVELOPMENT PLAN AND UNLESS SPECIFICALLY NOTED ELSEWHERE HEREON, IS NOT A SURVEY.
31. ALL STRUCTURES SHALL CONFORM TO THE APPROVED BULK ZONING REQUIREMENTS.
32. DO NOT SCALE DRAWINGS AS THEY PERTAIN TO ADJACENT AND SURROUNDING PHYSICAL CONDITIONS, BUILDINGS, STRUCTURES, ETC. THEY ARE SCHEMATIC ONLY, EXCEPT WHERE DIMENSIONS ARE SHOWN THERETO.
33. THIS SET OF PLANS HAS BEEN PREPARED FOR THE PURPOSES OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL APPROVALS REQUIRED HAVE BEEN OBTAINED, ALL CONDITIONS OF APPROVAL HAVE BEEN SATISFIED AND THE DRAWINGS HAVE BEEN STAMPED "ISSUED FOR CONSTRUCTION". THIS SHALL INCLUDE APPROVAL OF ALL CATALOG CUTS, SHOP DRAWINGS AND/OR DESIGN CALCULATIONS AS REQUIRED BY THE PROJECT OWNER AND/OR MUNICIPAL ENGINEER.
34. EXISTING UTILITY INFORMATION SHOWN HEREON HAS BEEN COLLECTED FROM VARIOUS SOURCES AND IS NOT GUARANTEED AS TO ACCURACY OR COMPLETENESS. THE CONTRACTOR SHALL VERIFY ALL INFORMATION TO HIS SATISFACTION PRIOR TO EXCAVATION. WHERE EXISTING UTILITIES ARE TO BE CROSSED BY PROPOSED CONSTRUCTIONS, TEST PITS SHALL BE DUG BY THE CONTRACTOR PRIOR TO CONSTRUCTION TO ASCERTAIN EXISTING INVERTS, MATERIALS, AND SIZES. TEST PIT INFORMATION SHALL BE GIVEN TO THE ENGINEER PRIOR TO CONSTRUCTION TO PERMIT ADJUSTMENTS AS REQUIRED TO AVOID CONFLICTS. THE CONTRACTOR SHALL NOTIFY THE UNDERSIGNED PROFESSIONAL IMMEDIATELY IF ANY FIELD CONDITIONS ENCOUNTERED DIFFER MATERIALLY FROM THOSE REPRESENTED HEREON. SUCH CONDITIONS COULD RENDER THE DESIGNS HEREON INAPPROPRIATE OR INEFFECTIVE.
35. THE CONTRACTOR IS RESPONSIBLE FOR PROJECT SAFETY, INCLUDING PROVISION OF ALL APPROPRIATE SAFETY DEVICES AND TRAINING REQUIRED.
36. STORMWATER FACILITIES SHALL BE OWNED AND MAINTAINED BY THE PROPERTY OWNER IN PERPETUITY. THE PROPERTY OWNER SHALL PROVIDE A BLANKET STORMWATER ACCESS EASEMENT TO THE TOWNSHIP FOR THE PURPOSE OF ACCESS TO THE STORMWATER FACILITIES. IF, IN THE JUDGEMENT OF THE TOWNSHIP ENGINEER, THE OWNER HAS FAILED TO MAINTAIN THE STORMWATER FACILITIES IN SUCH A MANNER AS TO ENSURE THEIR PROPER FUNCTIONING, THE TOWNSHIP AFTER PROVIDING A WRITTEN NOTICE SHALL HAVE THE RIGHT TO ENTER UPON THE LANDS OF THE OWNER AND TO MAKE ANY REPAIRS AS MAY BE NECESSARY TO THE STORMWATER FACILITIES TO ENSURE THAT SUCH FACILITIES FUNCTION AND PERFORM IN ACCORDANCE WITH THE DESIGN SPECIFICATIONS, ANY AND ALL COSTS INCURRED BY THE TOWNSHIP FOR SUCH REPAIRS AND/OR MAINTENANCE SHALL BE PAID IN FULL BY THE OWNER. A LIEN OR LIENS MAY BE PLACED AGAINST THE PROPERTY IF THE OWNER FAILS TO REMIT PAYMENT WITHIN SIXTY (60) DAYS.
37. DRAINAGE EASEMENTS, IF ANY, MAY NOT BE ALTERED WITHOUT THE WRITTEN PERMISSION OF THE TOWNSHIP ENGINEER. NO OBSTRUCTIONS SUCH AS PLANTED BERMS OR FENCES MAY BE INSTALLED IN THE DRAINAGE EASEMENT AREAS WITHOUT SUFFICIENT PROVISION FOR THE PASSAGE OF STORMWATER, AND ANY SUCH PROPOSED PROVISION SHALL BE APPROVED IN WRITING BY THE TOWNSHIP ENGINEER.
38. STORMWATER BMPS ARE FIXTURES THAT CAN BE ALTERED OR REMOVED ONLY AFTER APPROVAL BY WHITEMARSH TOWNSHIP.

_____ _____
DATE OWNER/APPLICANT

39. ALL ROADWAYS, CURBS, PARKING LOTS, SANITARY SEWERS, STORM SEWERS, STORMWATER MANAGEMENT DEVICES, AND APPURTENANCES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS AND TO THE STANDARDS AND SPECIFICATIONS OF WHITEMARSH TOWNSHIP AND THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION.
40. THE DEVELOPER SHALL BE RESPONSIBLE FOR PROVIDING ALL PAVEMENT MARKINGS, STREET SIGNS, TRAFFIC DIRECTIONAL AND CONTROL SIGNS SHOWN ON THIS PLAN IN ACCORDANCE WITH THE WHITEMARSH TOWNSHIP STANDARDS. ALL SIGNAGE SHALL BE CONSISTENT WITH EXISTING SIGNAGE WITHIN WHITEMARSH TOWNSHIP.
41. CONTRACTOR(S) SHALL RECEIVE A COPY OF THE APPROVED EROSION & SEDIMENTATION CONTROL PLANS.
42. WHITEMARSH TOWNSHIP SHALL NOT BE RESPONSIBLE FOR THE MAINTENANCE OF ANY AREA NOT DEDICATED TO THE TOWNSHIP.
43. THERE SHALL BE NO CHANGES OR DEVIATION FROM THESE PLANS UNLESS APPROVED BY THE ENGINEER. SUCH PLAN CHANGES, SHOULD THEY BECOME NECESSARY, ARE SUBJECT TO THE WHITEMARSH TOWNSHIP ORDINANCES.
44. THE CONTRACTOR SHALL NOTIFY ALL APPROPRIATE UTILITIES AT LEAST SEVENTY-TWO (72) HOURS PRIOR TO THE START OF ANY CONSTRUCTION. ALL UTILITIES HAVE BEEN IDENTIFIED BASED ON THE BEST AVAILABLE INFORMATION AND LISTED ON THESE PLANS IN ACCORDANCE WITH ACT 287 REQUIREMENTS. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF EXISTING UTILITIES AND ALL EFFORTS SHALL BE UNDERTAKEN TO PROTECT EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE TO UTILITIES BY THE CONTRACTOR SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE. RESTORATION OF ALL EXISTING SURFACE IMPROVEMENTS DAMAGED OR ALTERED DURING CONSTRUCTION, INCLUDING LANDSCAPING, SHALL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR.
45. THE CONTRACTOR SHALL MAKE PROVISIONS FOR MAINTAINING THE SAFE FLOW OF TRAFFIC DURING CONSTRUCTION WITHIN THE EXISTING ROAD RIGHTS-OF-WAY WHILE ENTERING AND LEAVING THE SITE.
46. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY PERMITS RELATIVE TO THE CONSTRUCTION PROPOSED ON THE PLANS.
47. ENGINEERING PERMITS: PRIOR TO ANY WORK WITHIN THE RIGHT OF WAY, PERMITS MUST BE OBTAINED FROM THE TOWNSHIP.
48. BY SUBMISSION OF THESE PLANS, THE ENGINEER ON RECORD CERTIFIES THAT THESE PLANS ARE IN COMPLETE COMPLIANCE WITH THE WHITEMARSH TOWNSHIP STORMWATER MANAGEMENT ORDINANCE.
49. THIS LAND DEVELOPMENT PLAN WAS PREPARED IN ACCORDANCE WITH REQUIREMENTS ESTABLISHED IN THE WHITEMARSH TOWNSHIP SUBDIVISION AND LAND DEVELOPMENT ORDINANCE AND THE ZONING ORDINANCE OF WHITEMARSH TOWNSHIP.
50. ALL CROSSWALKS, STOP BARS, ARROWS, AND "ONLY'S" WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE HOT THERMOPLASTIC.
51. ALL SHEETS INCLUDED IN THIS LAND DEVELOPMENT PLAN SET ARE TO BE CONSIDERED AS IF RECORDED WITH THE RECORD PLAN.
52. THERE SHALL BE A PRE CONSTRUCTION CONFERENCE AND INSPECTION WITH THE WHITEMARSH TOWNSHIP SHADE TREE COMMISSION PRIOR TO START OF CONSTRUCTION. AFTER THE INSPECTION IS COMPLETE, THE SHADE TREE COMMISSION SHALL NOTIFY WHITEMARSH TOWNSHIP IN WRITING, UPON WHITEMARSH TOWNSHIP APPROVAL, DEMOLITION, GRADING AND CONSTRUCTION MAY PROCEED.
53. POOLS SHALL BE ENTIRELY ENCLOSED WITH A FENCE NOT LESS THAN FOUR FEET IN HEIGHT.
54. ALL ELECTRIC, TELEPHONE, AND COMMUNICATION SERVICE FACILITIES, BOTH MAIN AND SERVICE LINES, SHALL BE PROVIDED BY UNDERGROUND CABLES, INSTALLED IN ACCORDANCE WITH THE PREVAILING STANDARDS AND PRACTICES OF THE UTILITY AND OTHER COMPANIES PROVIDING SUCH SERVICE.
55. ALL PARKING SPACE SIZES ARE SHOWN ON THE OVERALL SITE PLAN. HALF OF THE EV PARKING SPACES ARE HANDICAP ACCESSIBLE (ADA) SPACES.
56. PROPOSED CURB ALONG WASHINGTON STREET SHALL BE 6" HIGH BELGIAN BLOCK CURB. PROPOSED CURB INTERIOR TO SITE SHALL BE VERTICAL CONCRETE CURB, UNLESS OTHERWISE NOTED.
57. UNDER NO CIRCUMSTANCES SHALL CHLORINATED SWIMMING POOL DISCHARGE BE DIRECTED TO THE RIVER OR TO ANY PIPING SYSTEM THAT DISCHARGES TO THE RIVER.
58. ALL CONSTRUCTION AND MATERIALS TO BE IN ACCORDANCE WITH PENNDOT PUBLICATION 408 AND WHITEMARSH CONSTRUCTION STANDARDS.
59. THESE PLANS CONFORM WITH THE WHITEMARSH FLOODPLAIN MANAGEMENT ORDINANCE.
60. THE PROPOSED BRICK SIDEWALK ALONG WASHINGTON STREET SHALL BE CONSISTENT IN APPEARANCE WITH ADJACENT WASHINGTON STREET DEVELOPMENT
61. ALL PROPOSED OPEN SPACE WILL BE DEED RESTRICTED FROM FUTURE DEVELOPMENT.
62. OPEN SPACE IS PROHIBITED FROM FURTHER DEVELOPMENT BASED ON THIS PLAN.
63. THE RIGHT-OF-WAY FOR THE PROPOSED PUBLIC ACCESS SHALL BE OFFERED FOR DEDICATION TO THE TOWNSHIP. IF THE AREA IS NOT ACCEPTED FOR DEDICATION, AN EASEMENT FOR PUBLIC USE MUST BE PROVIDED ALONG WITH MAINTENANCE AGREEMENTS ACCEPTABLE TO THE TOWNSHIP. IF THE AREA IS ACCEPTED FOR DEDICATION, MAINTENANCE RESPONSIBILITIES FOR STORMWATER COLLECTION AND CONVEYANCE FACILITIES SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER.
64. AN AS-BUILT SURVEY SHALL BE COMPLETED AND SUBMITTED TO WHITEMARSH TOWNSHIP IN BOTH PAPER AND DIGITAL CADD FORMATS.
65. THIS SET OF PLANS IS NOT DEPICTING ENVIRONMENTAL CONDITIONS OR A CERTIFICATION/ WARRANTY REGARDING THE PRESENCE OR ABSENCE OF ENVIRONMENTALLY IMPACTED SITE CONDITIONS. COLLIERS ENGINEER & DESIGN HAS PERFORMED NO EXPLORATORY OR TESTING SERVICES, INTERPRETATIONS, CONCLUSIONS, OR OTHER SITE ENVIRONMENTAL SERVICES RELATED TO THE DETERMINATION OF THE POTENTIAL FOR CHEMICAL, TOXIC, RADIOACTIVE, OR OTHER TYPE OF CONTAMINANTS AFFECTING THE PROPERTY AND THE UNDERSIGNED PROFESSIONAL IS NOT QUALIFIED TO DETERMINE THE EXISTENCE OF THE SAME. SHOULD ENVIRONMENTAL CONTAMINATION OR WASTE BE DISCOVERED, THE OWNER AND CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LAWS AND REGULATIONS.
66. THESE GENERAL NOTES APPLY TO ALL SHEETS IN THE SET.

IMPERVIOUS COVERAGE TABLE

PROPERTY	FEATURE	AREA (SF)	% OF LOT AREA (a)	TOTAL IMPERVIOUS % OF LOT AREA (a)
601	ASPHALT	100,020	25.45%	59.28
	BUILDING	90,278	22.97%	
	CURBING	2,458	0.63%	
	SIDEWALK	22,143	5.63%	
	TRAIL	18,082	4.60%	

100-YEAR FLOODPLAIN ENCROACHMENT TABLE

VOLUME OF IMPACT (AREA X DEPTH OF FLOODPLAIN)

FEATURE	AREA (SF)	VOLUME CHANGE IN FLOODPLAIN (CY)
SITE OUTSIDE OF FLOODWAY	362,045	1,914.96 (FILL)
FLOODWAY AREA	30,982	- 119.40 (CUT)
TOTAL SITE	393,027	1,795.56 (FILL)
EXISTING BUILDINGS OBSTRUCTION	42,437	10,024
PROPOSED BUILDING OBSTRUCTION*	17,047	4,895
BUILDING ENCROACHMENT DIFFERENCE	-25,390	- 5,129
TOTAL FLOODPLAIN ENCROACHMENT**	-	-3,333.44

* INCLUDES PARTS OF THE BUILDING UNDER THE BASE FLOOD ELEVATION. (I.E. PARKING GARAGE WALLS, COLUMNS, MAIN ENTRANCE LOBBY..)

** TOTAL ENCROACHMENT UNDER THE BASE FLOOD ELEVATION.

STEEP SLOPE DISTURBANCE

TOTAL SITE

STEEP SLOPE	AREA	DISTURBED AREA	PERCENT DISTURBED
15 -25 %	12,103 SF	3,185 SF	26.32%
25% +	20,545 SF	2,497 SF	12.15%

BUILDING USE DATA

PROPOSED USE: APARTMENTS 270
TOTAL UNITS

APARTMENT LIVING - UNIT COUNT

APARTMENT TYPE	PERCENTAGE	UNITS
EFFICIENCY	9%	24
1 BEDROOM	56%	150
2 BEDROOM	30%	82
3 BEDROOM	4%	12
4 BEDROOM	1%	2
TOTAL	100%	270

PUBLIC AMENITIES

WHITEMARSH TOWNSHIP 116-283.B.(10)

RECREATION AREA	79,017 SF
RIVER TRAIL	7,735 SF
TOTAL	86,752 SF

AREA OF AMENITIES	86,752 SF
PERCENT OF LOT AREA	22.07%

THE LOT AREA OF 601 WASHINGTON IS 393,027 SF.

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS
2	08/02/22	CMM	REVISED PER FIRE MARSHAL, TOWNSHIP AND ZONING REVIEW LETTERS

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — C. RICHARD ROSEBERRY — ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER: 160010308
DRAWING NAME: C-CVER

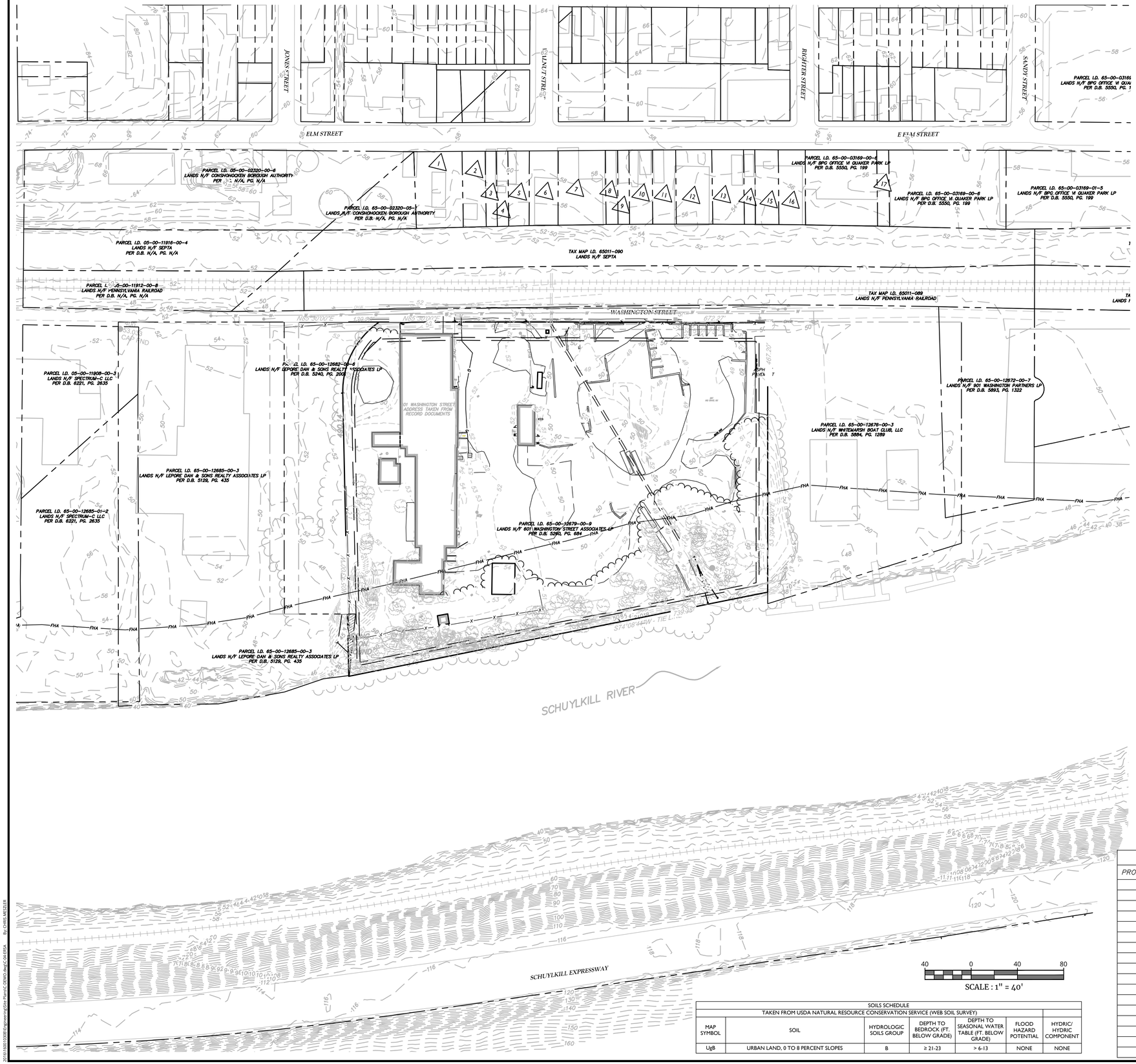
SHEET TITLE: NOTES

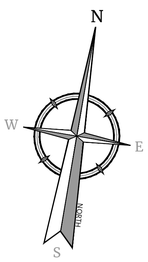
SHEET NUMBER: 2 of 37

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\160010308\Engineering\Site Plans\C-CVER.dwg|C-02 NOTES By: CHRIS.METZLER


TAX MAP I.D. 85011-090
LANDS N/F SEPTA
BENCHMARK
MAG NAIL
WASHINGTON STREET
(ULTIMATE RIGHT-OF-WAY)
ROADWAY CENTERLINE
N85°30'00"E
672.27'
PARCEL I.D. 65-00-12682-00-8
LANDS N/F LEPORE DAN & SONS REALTY ASSOCIATES LP
PER D.B. 5240, PG. 2002
PARCEL I.D. 65-00-12685-00-3
LANDS N/F LEPORE DAN & SONS REALTY ASSOCIATES LP
PER D.B. 5129, PG. 435
JONES STREET
(LOCATION TO BE FIELD VERIFIED)
601 WASHINGTON STREET
ADDRESS TAKEN FROM
RECORD DOCUMENTS
2 STORY
MASONRY AND STEEL BUILDING
(38,756 S.F. FOOTPRINT)
BLD HT 35'
BLD HT 40'
ROOF
COLLAPSED
BROKEN ASPHALT
PAVEMENT
BROKEN ASPHALT
PAVEMENT
1-STORY
BRICK BLDG.
1,567 S.F.
TRAILER
(224 S.F.
FOOTPRINT)
1-STORY
WOOD FRAME
BLDG.
(214 S.F. FOOTPRINT)
STEPS
STEPS
MISC.
STRUCTURE
STEEL FRAME
SHED
310 S.F.
LIMIT OF
DISTURBANCE
380,628 SF (8.74 AC)
NPDES BOUNDARY
413,550 SF (9.49 AC)
GRAVEL EDGE
DRIVE EDGE
CONC WALL
ASPHALT
PAVEMENT
DIRT
AND GRAVEL MIX
DENSELY
WOODED
TRANS.
TRANS.
GRAVEL EDGE
GRAVEL EDGE
GRAVEL EDGE





LEGEND

- TRAVERSE LINE, CENTER LINE OR BASELINE (12+00 TL PI 13+00 ℄)
- RIGHT OF WAY LINE
- PROPERTY LINE
- EDGE OF PAVEMENT
- CURB LINE (FACE)
- DEPRESSED CURB (D.C. BACK)
- CHAIN FENCE
- WETLAND LINE
- MUNICIPAL BOUNDARY
- TREELINE
- ELECTRICAL MANHOLE
- WATER MANHOLE
- TELEPHONE MANHOLE
- UNMARKED MANHOLE
- SANITARY MANHOLE
- DRAINAGE MANHOLE
- MAJOR CONTOUR
- MINOR CONTOUR
- SPOT ELEVATION (× 29.0)
- TOP OF CURB ELEV. (× TC 29.0)
- BOTTOM OF CURB ELEV. (× BC 29.0)
- U/G CABLE TV LINE (CATV)
- U/G FIBER OPTIC LINE (FO)
- U/G TELEPHONE LINE (T)
- U/G ELECTRIC LINE (E)
- OVERHEAD WIRE (OHW)
- WATER MAIN (W)
- GAS MAIN (G)
- SAN. SEWER LATERAL (S)
- SAN. SEWER MAIN
- STORM PIPE
- WETLAND MARKER (W-1)
- TREE
- ROADWAY SIGNS
- TRAFFIC FLOW
- MAILBOX
- TRAFFIC SIGNAL POLE
- POLE MOUNTED LIGHT
- UTILITY POLE
- GUY WIRE
- TRANSFORMER
- FIRE DEPT. CONNECTION (FDC)
- FIRE HYDRANT
- WATER VALVE (WV)
- GAS VALVE (GV)
- SANITARY CLEANOUT (CO)
- CONCRETE MONUMENT
- CAPPED REBAR/IRON PIPE
- STORM INLET TYPE 'C' (S/)
- STM. DBL. INLET TYPE 'C' (S/ S/)
- STORM INLET TYPE 'M' (S/)
- STM. DBL. INLET TYPE 'M' (S/ S/)
- FLARED END SECTION
- HEADWALL
- SOIL BOUNDARY

ABBREVIATIONS

D.C. = DEPRESSED CURB	FF = FINISH FLOOR	MHWL = MEAN HIGH WATERLINE
BC = BOTTOM OF CURB	UV = UNKNOWN VALVE	MLWL = MEAN LOW WATERLINE
TC = TOP OF CURB	MH = MANHOLE	TW = TOP OF WALL
BOL = BOLLARD	DEP = DEPRESSED	BW = BOTTOM WALL
GRT = GRATE	CL = CENTERLINE	
MB = MAILBOX	PM = PARKING METER	

DEMOLITION NOTES:

1. ALL DEMOLITION ACTIVITIES ARE TO BE PERFORMED IN STRICT ADHERENCE TO ALL FEDERAL STATE AND LOCAL REGULATIONS.
2. CONDUCT DEMOLITION SERVICES IN SUCH A MANNER TO INSURE MINIMUM INTERFERENCE WITH ROADS, STREETS, WALKS AND OTHER ADJACENT FACILITIES. DO NOT CLOSE OR OBSTRUCT STREETS, WALKS OR OTHER OCCUPIED FACILITIES WITHOUT PRIOR WRITTEN PERMISSION OF OWNER AND ANY APPLICABLE GOVERNMENTAL AUTHORITIES. PROVIDE ALTERNATE ROUTES AROUND CLOSED OR OBSTRUCTED TRAFFIC WAYS, IF REQUIRED BY APPLICABLE GOVERNMENTAL REGULATIONS.
3. USE WATERING, TEMPORARY ENCLOSURES AND OTHER SUITABLE METHODS, AS NECESSARY TO LIMIT THE AMOUNT OF DUST AND DIRT RISING AND SCATTERING IN THE AIR. CLEAN ADJACENT STRUCTURES AND IMPROVEMENTS OF ALL DUST AND DEBRIS CAUSED BY THE DEMOLITION OPERATIONS. RETURN ALL ADJACENT AREAS TO THE CONDITIONS EXISTING PRIOR TO THE START OF WORK.
4. ACCOMPLISH AND PERFORM THE DEMOLITION IN SUCH A MANNER AS TO PREVENT THE UNAUTHORIZED ENTRY OF PERSONS AT ANY TIME.
5. COMPLETELY FILL BELOW GRADE AREAS AND VOIDS RESULTING FROM THE DEMOLITION OF STRUCTURES AND FOUNDATIONS WITH SOIL MATERIALS CONSISTING OF STONE, GRAVEL AND SAND, FREE FROM DEBRIS, TRASH, FROZEN MATERIALS, ROOTS AND OTHER ORGANIC MATTER. STONES USED WILL NOT BE LARGER THAN 6 INCHES IN DIMENSION. MATERIAL FROM DEMOLITION MAY NOT BE USED AS FILL. PRIOR TO PLACEMENT OF FILL MATERIALS, UNDERTAKE ALL NECESSARY ACTION IN ORDER TO INSURE THAT AREAS TO BE FILLED ARE FREE OF STANDING WATER, FROST, FROZEN MATERIAL, TRASH, DEBRIS. PLACE FILL MATERIALS IN HORIZONTAL LAYERS NOT EXCEEDING 6 INCHES IN LOOSE DEPTH AND COMPACT EACH LAYER AT PLACEMENT TO 95% OPTIMUM DENSITY. GRADE THE SURFACE TO MEET ADJACENT CONTOURS AND TO PROVIDE SURFACE DRAINAGE.
6. REMOVE FROM THE DESIGNATED SITE, AT THE EARLIEST POSSIBLE TIME, ALL DEBRIS, RUBBISH, SALVAGEABLE ITEMS, HAZARDOUS AND COMBUSTIBLE SERVICES. REMOVED MATERIALS MAY NOT BE STORED, SOLD OR BURNED ON THE SITE. REMOVAL OF HAZARDOUS AND COMBUSTIBLE MATERIALS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE PROCEDURES AS AUTHORIZED BY THE FIRE DEPARTMENT OR OTHER APPROPRIATE REGULATORY AGENCIES AND AUTHORITIES.
7. BEFORE THE COMMENCEMENT OF THE DESIGNATED DEMOLITION, MARK FOR POSITION ALL UTILITIES AND PROTECT ALL ACTIVE LINES. CLEARLY IDENTIFY BEFORE THE COMMENCEMENT OF DEMOLITION SERVICES THE REQUIRED INTERRUPTION OF ACTIVE SYSTEMS THAT MAY AFFECT OTHER PARTIES, AND NOTIFY ALL APPLICABLE UTILITY COMPANIES TO INSURE THE CONTINUATION OF SERVICE.
8. THIS DEMOLITION PLAN IS INTENDED TO IDENTIFY THOSE EXISTING CONDITIONS WHICH ARE TO BE REMOVED. IT IS NOT INTENDED TO PROVIDE DIRECTION OTHER THAN THAT, ALL PROCEDURES ARE TO BE IN ACCORDANCE WITH STATE, FEDERAL, LOCAL AND JURISDICTIONAL REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAFETY PRECAUTIONS NECESSARY.
9. EXISTING STORMSEWER PIPES AND STRUCTURES ARE TO REMAIN UNLESS MARKED AS TO BE REMOVED. IF THE CONDITION OF THE STORMSEWER STRUCTURE OR PIPE IS QUESTIONABLE, CONTACT THE OWNER'S REPRESENTATIVE/ENGINEER TO EVALUATE IF A REPLACEMENT IS REQUIRED.
10. THE PROPOSED DEVELOPMENT PLANS TO REMOVE 50 TREES TO CONSTRUCT THE DEVELOPMENT AND RELATED SITE IMPROVEMENTS TO MEET TOWNSHIP STANDARDS.

PROPERTY OWNER TABLE

PROPERTY ID	PARCEL ID	OWNER	DEED BOOK
1	65-00-03280-00-3	CONSHOHOCKEN BOROUGH AUTHORITY	BOOK: 4778 PAGE: 125
2	65-00-03277-00-6	JOSEPH GRASSO	BOOK: 5590 PAGE: 14
3	65-00-03274-00-9	JOSEPH GRASSO	BOOK: 5590 PAGE: 10
4	65-00-03271-00-3	ALLISON & DANE WOZNIAK	BOOK: 6162 PAGE: 698
5	65-00-03268-00-6	JOSE R & ELIZABETH H ORTIZ	BOOK: 5552 PAGE: 1110
6	65-00-03265-01-8	KENNEDY PROPERTIES LP	–
7	65-00-03265-00-9	KENNEDY PROPERTIES LP	BOOK: 5461 PAGE: 1879
8	65-00-03262-00-3	PALMER PROPERTY ACQUISITIONS LLC	BOOK: 5927 PAGE: 2043
9	65-00-03259-00-6	JOSEPH & KAREN T FERRIER	BOOK: 5598 PAGE: 994
10	65-00-03256-00-9	RACHEL C & GABRIELE TSIOURIS	BOOK: 6147 PAGE: 1930
11	65-00-03253-00-3	JOSEPH A & BARBARA L SUGALSKI	–
12	65-00-03250-00-6	CONNAUGHTOWN PARTNERS LLC	BOOK: 6199 PAGE: 1799
13	65-00-03247-00-9	CONNAUGHTOWN PARTNERS LLC	BOOK: 6199 PAGE: 1799
14	65-00-03244-00-3	CONNAUGHTOWN PARTNERS LLC	BOOK: 6199 PAGE: 1799
15	65011-043	–	–
16	65-00-03241-00-6	ELM STREET PARTNERS	BOOK: 5104 PAGE: 1918
17	6-00-03226-00-3	BPG OFFICE VI QUAKER PARK LP	BOOK: 5550 PAGE: 199

SOILS SCHEDULE						
TAKEN FROM USDA NATURAL RESOURCE CONSERVATION SERVICE (WEB SOIL SURVEY)						
MAP SYMBOL	SOIL	HYDROLOGIC SOILS GROUP	DEPTH TO BEDROCK (FT. BELOW GRADE)	DEPTH TO SEASONAL WATER TABLE (FT. BELOW GRADE)	FLOOD HAZARD POTENTIAL	HYDRIC/ HYDRIC COMPONENT
UgB	URBAN LAND, 0 TO 8 PERCENT SLOPES	B	≥ 21-23	> 6-13	NONE	NONE

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMK	REVISED PER PRE-MARSHAL, TOWNSHIP AND ZONING REVIEW LETTERS
2	06/02/22	CMK	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL C. RICHARD ROSEBERRY ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
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PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

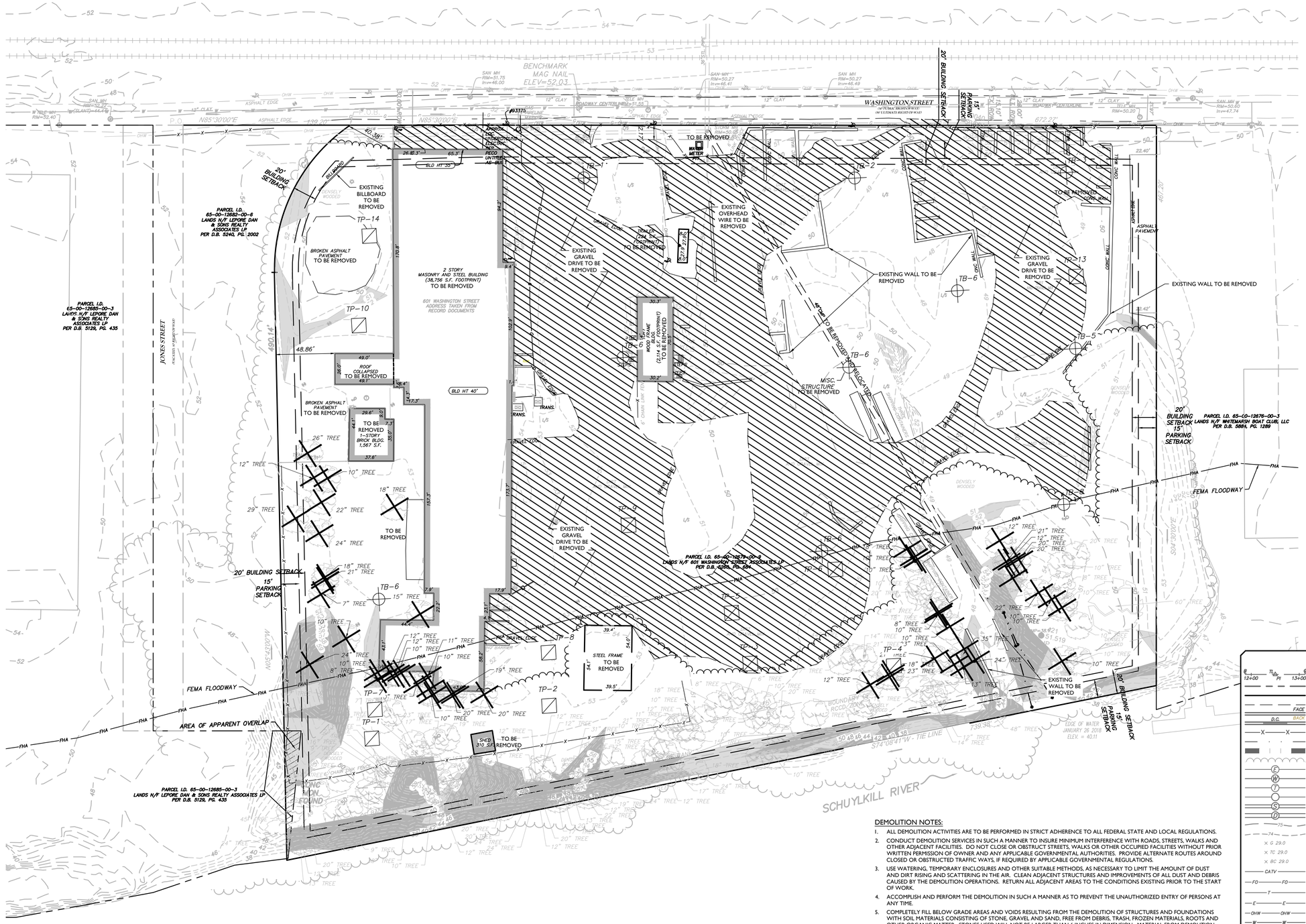
PROJECT NUMBER: 16001030B
DRAWING NAME: C-DEMO

SHEET TITLE:
EXISTING RESOURCE AND SITE ANALYSIS PLAN

SHEET NUMBER: 4 of 37

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

20160160\03\DWG\Engineering\Site Plan\C-DEMO.dwg/C-DEMO By: CHRIS.METZLER



DEMO LEGEND

SYMBOL/HATCH	DESCRIPTION
	EXISTING FEATURE TO BE REMOVED
	EXISTING TREE TO BE REMOVED
	STEEP SLOPES 15% - 25%
	STEEP SLOPES 25%+
TB-6 / TP-6	TEST BORING LOCATION / TEST PIT LOCATION

LEGEND

TRAVERSE LINE, CENTER LINE OR BASELINE	WETLAND MARKER
RIGHT OF WAY LINE	TREE
PROPERTY LINE	ROADWAY SIGNS
EDGE OF PAVEMENT	TRAFFIC FLOW
CURB LINE	MAILBOX
DEPRESSED CURB	TRAFFIC SIGNAL POLE
CHAIN FENCE	POLE MOUNTED LIGHT
WETLAND LINE	UTILITY POLE
MUNICIPAL BOUNDARY	GUY WIRE
TREELINE	TRANSFORMER
ELECTRICAL MANHOLE	FIRE DEPT. CONNECTION
WATER MANHOLE	FIRE HYDRANT
TELEPHONE MANHOLE	WATER VALVE
UNMARKED MANHOLE	GAS VALVE
SANITARY MANHOLE	SANITARY CLEANOUT
DRAINAGE MANHOLE	CONCRETE MONUMENT
MAJOR CONTOUR	CAPPED REBAR/IRON PIPE
MINOR CONTOUR	STORM INLET TYPE "C"
SPOT ELEVATION	STM. DBL. INLET TYPE "C"
TOP OF CURB ELEV.	STORM INLET TYPE "M"
BOTTOM OF CURB ELEV.	STM. DBL. INLET TYPE "M"
U/G CABLE TV LINE	FLARED END SECTION
U/G FIBER OPTIC LINE	HEADWALL
U/G TELEPHONE LINE	SOIL BOUNDARY
U/G ELECTRIC LINE	
OVERHEAD WIRE	
WATER MAIN	
GAS MAIN	
SAN. SEWER LATERAL	
SAN. SEWER MAIN	
STORM PIPE	

ABBREVIATIONS

D.C. = DEPRESSED CURB	FF = FINISH FLOOR	MHWL = MEAN HIGH WATERLINE
BC = BOTTOM OF CURB	UV = UNKNOWN VALVE	
TC = TOP OF CURB	MH = MANHOLE	MLWL= MEAN LOW WATERLINE
BOL = BOLLARD	DEP. = DEPRESSED	
GRT = GRATE	CL = CENTERLINE	TW = TOP OF WALL
MB = MAILBOX	PM = PARKING METER	BW = BOTTOM WALL

SCALE : 1" = 40'

SOILS SCHEDULE						
TAKEN FROM USDA NATURAL RESOURCE CONSERVATION SERVICE (WEB SOIL SURVEY)						
MAP SYMBOL	SOIL	HYDROLOGIC SOILS GROUP	DEPTH TO BEDROCK (FT. BELOW GRADE)	DEPTH TO SEASONAL WATER TABLE (FT. BELOW GRADE)	FLOOD HAZARD POTENTIAL	HYDRIC/ HYDRIC COMPONENT
UgB	URBAN LAND, 0 TO 8 PERCENT SLOPES	B	≥ 21-23	> 6-13	NONE	NONE

DEMOLITION NOTES:

1. ALL DEMOLITION ACTIVITIES ARE TO BE PERFORMED IN STRICT ADHERENCE TO ALL FEDERAL STATE AND LOCAL REGULATIONS.
2. CONDUCT DEMOLITION SERVICES IN SUCH A MANNER TO INSURE MINIMUM INTERFERENCE WITH ROADS, STREETS, WALKS AND OTHER ADJACENT FACILITIES. DO NOT CLOSE OR OBSTRUCT STREETS, WALKS OR OTHER OCCUPIED FACILITIES WITHOUT PRIOR WRITTEN PERMISSION OF OWNER AND ANY APPLICABLE GOVERNMENTAL AUTHORITIES. PROVIDE ALTERNATE ROUTES AROUND CLOSED OR OBSTRUCTED TRAFFIC WAYS, IF REQUIRED BY APPLICABLE GOVERNMENTAL REGULATIONS.
3. USE WATERING, TEMPORARY ENCLOSURES AND OTHER SUITABLE METHODS, AS NECESSARY TO LIMIT THE AMOUNT OF DUST AND DIRT RISING AND SCATTERING IN THE AIR. CLEAN ADJACENT STRUCTURES AND IMPROVEMENTS OF ALL DUST AND DEBRIS CAUSED BY THE DEMOLITION OPERATIONS. RETURN ALL ADJACENT AREAS TO THE CONDITIONS EXISTING PRIOR TO THE START OF WORK.
4. ACCOMPLISH AND PERFORM THE DEMOLITION IN SUCH A MANNER AS TO PREVENT THE UNAUTHORIZED ENTRY OF PERSONS AT ANY TIME.
5. COMPLETELY FILL BELOW GRADE AREAS AND VOIDS RESULTING FROM THE DEMOLITION OF STRUCTURES AND FOUNDATIONS WITH SOIL MATERIALS CONSISTING OF STONE, GRAVEL AND SAND, FREE FROM DEBRIS, TRASH, FROZEN MATERIALS, ROOTS AND OTHER ORGANIC MATTER. STONES USED WILL NOT BE LARGER THAN 6 INCHES IN DIMENSION. MATERIAL FROM DEMOLITION MAY NOT BE USED AS FILL. PRIOR TO PLACEMENT OF FILL MATERIALS UNDERTAKE ALL NECESSARY ACTION IN ORDER TO INSURE THAT AREAS TO BE FILLED ARE FREE OF STANDING WATER, FROST, FROZEN MATERIAL, TRASH, DEBRIS. PLACE FILL MATERIALS IN HORIZONTAL LAYERS NOT EXCEEDING 6 INCHES IN LOOSE DEPTH AND COMPACT EACH LAYER AT PLACEMENT TO 95% OPTIMUM DENSITY. GRADE THE SURFACE TO MEET ADJACENT CONTOURS AND TO PROVIDE SURFACE DRAINAGE.
6. REMOVE FROM THE DESIGNATED SITE, AT THE EARLIEST POSSIBLE TIME, ALL DEBRIS, RUBBISH, SALVAGEABLE ITEMS, HAZARDOUS AND COMBUSTIBLE SERVICES. REMOVED MATERIALS MAY NOT BE STORED, SOLD OR BURNED ON THE SITE. REMOVAL OF HAZARDOUS AND COMBUSTIBLE MATERIALS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE PROCEDURES AS AUTHORIZED BY THE FIRE DEPARTMENT OR OTHER APPROPRIATE REGULATORY AGENCIES AND AUTHORITIES.
7. BEFORE THE COMMENCEMENT OF THE DESIGNATED DEMOLITION, MARK FOR POSITION ALL UTILITIES AND PROTECT ALL ACTIVE LINES. CLEARLY IDENTIFY BEFORE THE COMMENCEMENT OF DEMOLITION SERVICES THE REQUIRED INTERRUPTION OF ACTIVE SYSTEMS THAT MAY AFFECT OTHER PARTIES, AND NOTIFY ALL APPLICABLE UTILITY COMPANIES TO INSURE THE CONTINUATION OF SERVICE.
8. THIS DEMOLITION PLAN IS INTENDED TO IDENTIFY THOSE EXISTING CONDITIONS WHICH ARE TO BE REMOVED. IT IS NOT INTENDED TO PROVIDE DIRECTION OTHER THAN THAT, ALL PROCEDURES ARE TO BE IN ACCORDANCE WITH STATE, FEDERAL, LOCAL AND JURISDICTIONAL REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAFETY PRECAUTIONS NECESSARY.
9. EXISTING STORMSEWER PIPES AND STRUCTURES ARE TO REMAIN UNLESS MARKED AS TO BE REMOVED. IF THE CONDITION OF THE STORMSEWER STRUCTURE OR PIPE IS QUESTIONABLE, CONTACT THE OWNER'S REPRESENTATIVE/ENGINEER TO EVALUATE IF A REPLACEMENT IS REQUIRED.
10. THE PROPOSED DEVELOPMENT PLANS TO REMOVE 50 TREES TO CONSTRUCT THE DEVELOPMENT AND RELATED SITE IMPROVEMENTS TO MEET TOWNSHIP STANDARDS.

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMK	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS
2	06/02/22	CMK	REVISED PER FIRE MARSHAL, TOWNSHIP AND ZONING REVIEW LETTERS

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

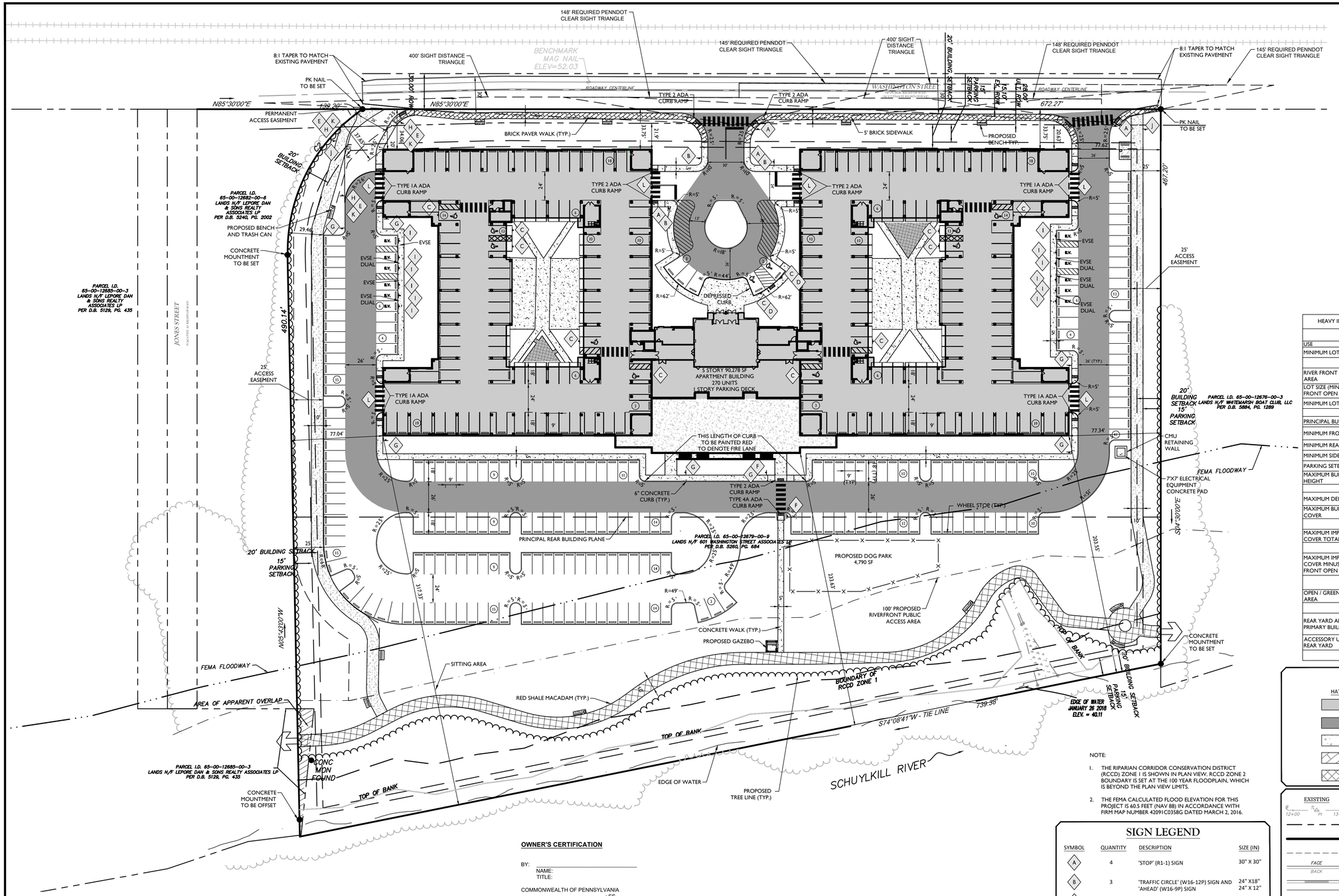
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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA
PROJECT NUMBER: 160010308	DRAWING NAME: C-DEMO		

SHEET TITLE:
SITE DEMOLITION PLAN

SHEET NUMBER:
5 of 37

20160160010308\Engineering\Site Plans\C-DEMO.dwg|C-DEMO By: CHRIS.METZLER



PARKING TABULATION:

REQUIRED:
- 1.5 SPACES PER DWELLING UNIT = 405 SPACES (9 ADA SPACES)
- 12 ELECTRIC VEHICLE SPACES

TOTAL REQUIRED = 417 SPACES

PROVIDED
- COVERED PARKING:
  - 198 SPACES
  - 10 ADA SPACES
- OUTSIDE PARKING:
  - 207 SPACES
  - 2 ADA SPACES (VAN)
  - 12 ELECTRIC VEHICLE SPACES

TOTAL PROVIDED = 417 SPACES

HEAVY INDUSTRIAL (HVY) WITH RDD-1 SUB ZONING DISTRICT			
	REQUIRED	EXISTING	PROPOSED
USE	APARTMENTS		
MINIMUM LOT SIZE	130,680 SF	393,027 SF	393,027 SF
		9.02 AC	9.02 AC
RIVER FRONT OPEN SPACE AREA	100' WIDE BUFFER	N/A	78,068 SF
LOT SIZE (MINUS RIVER FRONT OPEN SPACE)	N/A	N/A	314,959 SF
MINIMUM LOT WIDTH	200 FT	695.68 FT	695.68 FT
PRINCIPAL BUILDING			
MINIMUM FRONT YARD	20 FT	19.40 FT	20 FT
MINIMUM REAR YARD	20 FT	55.06 FT	204.19 FT
MINIMUM SIDE YARDS	20 FT	40.38 FT	37.83 FT
PARKING SETBACK	15 FT	12.17 FT	20.95 FT
MAXIMUM BUILDING HEIGHT	4 STORIES	2 STORIES	4 STORIES
MAXIMUM DENSITY	30 UNITS/ACRE	N/A	29.93 UNITS/ACRE
MAXIMUM BUILDING COVER	40%	11.48%	28.66%
		45,122 SF	90,278 SF
MAXIMUM IMPERVIOUS COVER TOTAL LOT	75%	45.26%	59.28%
		177,902 SF	232,981 SF
MAXIMUM IMPERVIOUS COVER MINUS 100' RIVER FRONT OPEN SPACE	75%	N/A	70.96%
		N/A	223,499 SF
OPEN / GREEN SPACE AREA	40%	54.74%	40.72%
		215,125 SF	160,046 SF
REAR YARD AREA, FROM PRIMARY BUILDING PLANE		55,173 SF	143,161 SF
ACCESSORY USE COVER IN REAR YARD	30%	1.36%	10.97%
		750 SF	15,701 SF

HATCH LEGEND

HATCH	DESCRIPTION
	APARTMENT BUILDING
	HEAVY DUTY PAVEMENT
	CONCRETE
	BRICK PAVERS
	RED SHALE MACADAM

LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	STALL COUNT	(10)
	ADA ACCESSIBLE STALL	P / P V
	DEPRESSED CURB AND ADA RAMP	HC
	DIRECTION OF TRAFFIC FLOW	

SIGN LEGEND

SYMBOL	QUANTITY	DESCRIPTION	SIZE (IN)
A	4	'STOP' (R1-1) SIGN	30" X 30"
B	3	"TRAFFIC CIRCLE' (W16-12P) SIGN AND 'AHEAD' (W16-9P) SIGN	24" X18" 24" X 12"
C	10	'RESERVED PARKING' (R7-8) SIGN	12" X 18"
D	2	'VAN ACCESSIBLE' (R7-8P) SIGN	12" X 6"
E	3	'DO NOT ENTER' (R5-1) SIGN	30" X 30"
F	2	'STOP FOR PEDESTRIANS' (R1-6A) SIGN	12" x 36"
G	7	'NO PARKING - FIRE LANE' SIGN	12" x 18"
H	3	'FIRE APPARATUS ACCESS ROAD ENTRANCE' SIGN	12" x 18"
I	12	'RESERVED PARKING ELECTRIC VEHICLE CHARGING ONLY' SIGN	12" x 18"
J	2	'RIVER FRONT ACCESS PATH' SIGN	12" x 12"
K	3	'AUTHORIZED VEHICLES ONLY' (R5-11) SIGN	30" x 24"
L	6	'CLEARANCE' SIGN (MOUNTED ABOVE GARAGE ENTRANCE)	48" x 6"

NOTE:

1. THE RIPARIAN CORRIDOR CONSERVATION DISTRICT (RCCD) ZONE 1 IS SHOWN IN PLAN VIEW. RCCD ZONE 2 BOUNDARY IS SET AT THE 100 YEAR FLOODPLAIN, WHICH IS BEYOND THE PLAN VIEW LIMITS.
2. THE FEMA CALCULATED FLOOD ELEVATION FOR THIS PROJECT IS 60.5 FEET (NAV 88) IN ACCORDANCE WITH FIRM MAP NUMBER 42091C0358G DATED MARCH 2, 2016.

40 0 40 80

SCALE : 1" = 40'

MCPC NO. 19-0018-002

PROCESSED and REVIEWED. A report has been prepared by the Montgomery County Planning Commission in accordance with the Municipalities Planning Code.

Certified this date _____

_____
For The Director

MONTGOMERY COUNTY PLANNING COMMISSION

MUNICIPAL APPROVAL / REVIEW BLOCK

REVIEWED BY THE WHITEMARSH TOWNSHIP ENGINEER THIS _____ DAY OF_____, 20___.

_____ _____
WHITEMARSH TOWNSHIP ENGINEER SIGNATURE

APPROVED BY THE TOWNSHIP OF WHITEMARSH THIS _____ DAY OF _____, 20___.

_____ _____
WHITEMARSH TOWNSHIP MANAGER SIGNATURE

APPROVED BY THE TOWNSHIP OF WHITEMARSH BOARD OF SUPERVISORS THIS _____ DAY OF _____, 20___.

_____ _____
PRESIDENT SIGNATURE

_____ _____
SECRETARY SIGNATURE

OWNER'S CERTIFICATION

BY: _____
NAME:
TITLE:

COMMONWEALTH OF PENNSYLVANIA
: SS
COUNTY OF MONTGOMERY

AND NOW, THIS _____ DAY OF _____ 20__, BEFORE ME, THE UNDERSIGNED NOTARY, PERSONALLY APPEARED _____ WHO ACKNOWLEDGED HIMSELF TO BE THE _____ OF 601 WASHINGTON STREET ASSOC. LP. THE SOLE GENERAL PARTNER OF 601 WASHINGTON STREET ASSOC. LP A PENNSYLVANIA LIMITED PARTNERSHIP AND HE, AS SUCH _____, BEING AUTHORIZED TO DO SO, EXECUTED THE FOREGOING INSTRUMENT FOR THE PURPOSES THEREIN CONTAINED.**IN WITNESS WHEREOF,** I HEREUNDER SET MY HAND AND OFFICIAL SEAL.

_____, _____ NOTARY PUBLIC MY COMMISSION EXPIRES:

PLAN PREPARER'S STATEMENTS

I, _____, A REGISTERED SURVEYOR OF THE COMMONWEALTH OF PENNSYLVANIA, DO HEREBY CERTIFY
THAT THE PLAN, PREPARED FROM A FIELD SURVEY ON _____ 20____ CORRECTLY REPRESENTS THE PROPERTY BOUNDARY OF THE PROPOSED SUBDIVISION OR LAND DEVELOPMENT.

_____ _____
DATE REGISTERED SURVEYOR'S SIGNATURE

I, _____, A LICENSED PROFESSIONAL ENGINEER OF THE COMMONWEALTH OF PENNSYLVANIA, DO HEREBY CERTIFY THAT THE ACCOMPANYING APPLICATION, PLANS, AND SUPPORTING DOCUMENTATION ARE TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE.

_____ _____
DATE LICENSED ENGINEER'S SIGNATURE

RECORDER OF DEEDS

RECORDED IN THE OFFICE FOR THE RECORDING OF DEEDS IN AND FOR COUNTY OF MONTGOMERY, AT NORRISTOWN, PA.
IN PLAN BOOK _____, PAGE NO. _____ ON _____, 20____.

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REV	DATE	DRAWN BY	DESCRIPTION
--	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS
1	08/02/22	CMM	REVISED PER FIRE MARSHAL, TOWNSHIP AND ZONING REVIEW LETTERS
2			

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL C. RICHARD ROSEBERRY ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

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AS SHOWN	03/01/2022	SF/CMM	RMA

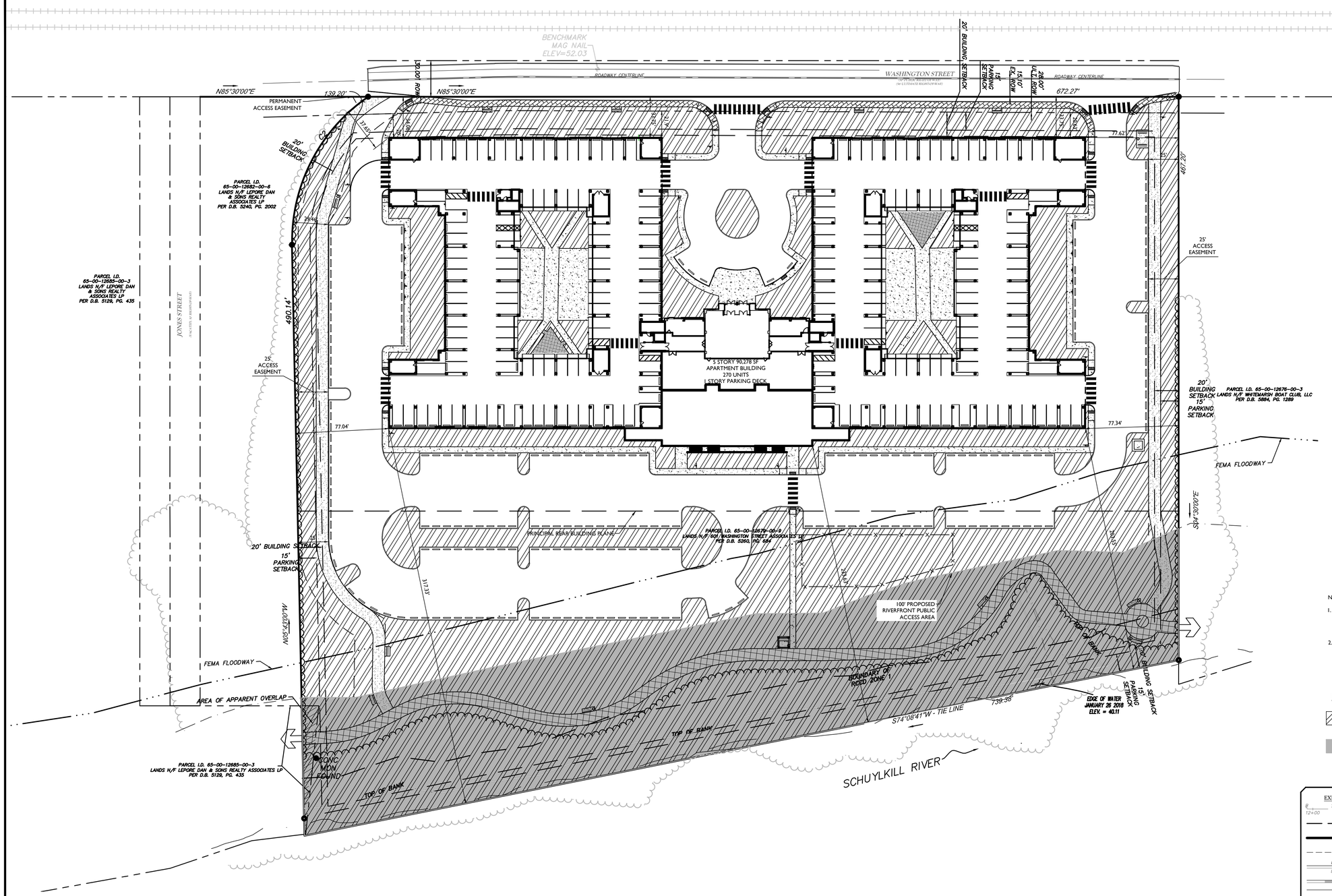
PROJECT NUMBER: 16001030B
DRAWING NAME: C-LAYT

SHEET TITLE:
DIMENSION PLAN

SHEET NUMBER:
6 of 37

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

20161016030B\Engineering\Site Plans\C-LAYT.dwg\C-06-LAYT By: CHRIS.MESZLER



NOTE:

1. THE RIPARIAN CORRIDOR CONSERVATION DISTRICT (RCCD) ZONE 1 IS SHOWN IN PLAN VIEW. RCCD ZONE 2 BOUNDARY IS SET AT THE 100 YEAR FLOODPLAIN, WHICH IS BEYOND THE PLAN VIEW LIMITS.
2. THE FEMA CALCULATED FLOOD ELEVATION FOR THIS PROJECT IS 60.5 FEET (NAV 88) IN ACCORDANCE WITH FIRM MAP NUMBER 42091C0358G DATED MARCH 2, 2016.

LEGEND

WHITEMARSH OPEN SPACE

RIVERFRONT AREA (TO BE DEDICATED TO WHITEMARSH TOWNSHIP)

LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	STALL COUNT	10
	ADA ACCESSIBLE STALL	P HC P V
	DEPRESSED CURB AND ADA RAMP	HC
	DIRECTION OF TRAFFIC FLOW	

40 0 40 80

SCALE : 1" = 40'

MCPC NO. 19-0018-002

PROCESSED and REVIEWED. A report has been prepared by the Montgomery County Planning Commission in accordance with the Municipalities Planning Code.

Certified this date _____

_____
For The Director

MONTGOMERY COUNTY PLANNING COMMISSION

MUNICIPAL APPROVAL / REVIEW BLOCK

REVIEWED BY THE WHITEMARSH TOWNSHIP ENGINEER THIS _____ DAY OF_____, 20____.

_____ _____
WHITEMARSH TOWNSHIP ENGINEER SIGNATURE

APPROVED BY THE TOWNSHIP OF WHITEMARSH THIS _____ DAY OF _____, 20____.

_____ _____
WHITEMARSH TOWNSHIP MANAGER SIGNATURE

APPROVED BY THE TOWNSHIP OF WHITEMARSH BOARD OF SUPERVISORS THIS _____ DAY OF _____, 20____.

_____ _____
PRESIDENT SIGNATURE

_____ _____
SECRETARY SIGNATURE

PLAN PREPARER'S STATEMENTS

I, _____, A REGISTERED SURVEYOR OF THE COMMONWEALTH OF PENNSYLVANIA, DO HEREBY CERTIFY
THAT THE PLAN, PREPARED FROM A FIELD SURVEY ON _____, 20____ CORRECTLY REPRESENTS THE PROPERTY BOUNDARY OF THE PROPOSED SUBDIVISION OR LAND DEVELOPMENT.

_____ _____
DATE REGISTERED SURVEYOR'S SIGNATURE

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_____ _____
DATE LICENSED ENGINEER'S SIGNATURE

OWNER'S CERTIFICATION

BY: _____
NAME:
TITLE:

COMMONWEALTH OF PENNSYLVANIA
: SS
COUNTY OF MONTGOMERY **AND NOW**, THIS _____ DAY OF _____ 20__, BEFORE ME, THE UNDERSIGNED NOTARY, PERSONALLY APPEARED _____ WHO ACKNOWLEDGED HIMSELF TO BE THE_____ OF 601 WASHINGTON STREET ASSOC. LP, THE SOLE GENERAL PARTNER OF 601 WASHINGTON STREET ASSOC. LP A PENNSYLVANIA LIMITED PARTNERSHIP AND HE, AS SUCH _____, BEING AUTHORIZED TO DO SO, EXECUTED THE FOREGOING INSTRUMENT FOR THE PURPOSES THEREIN CONTAINED.**IN WITNESS WHEREOF**, I HEREUNDER SET MY HAND AND OFFICIAL SEAL.
_____ NOTARY PUBLIC MY COMMISSION EXPIRES:

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2	8/10/22	CMK	REVISED PER FIRE MARSHAL, TOWNSHIP AND ZONING REPENT LETTERS

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REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER
No. 46162E

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
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FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

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MONTGOMERY COUNTY
PENNSYLVANIA

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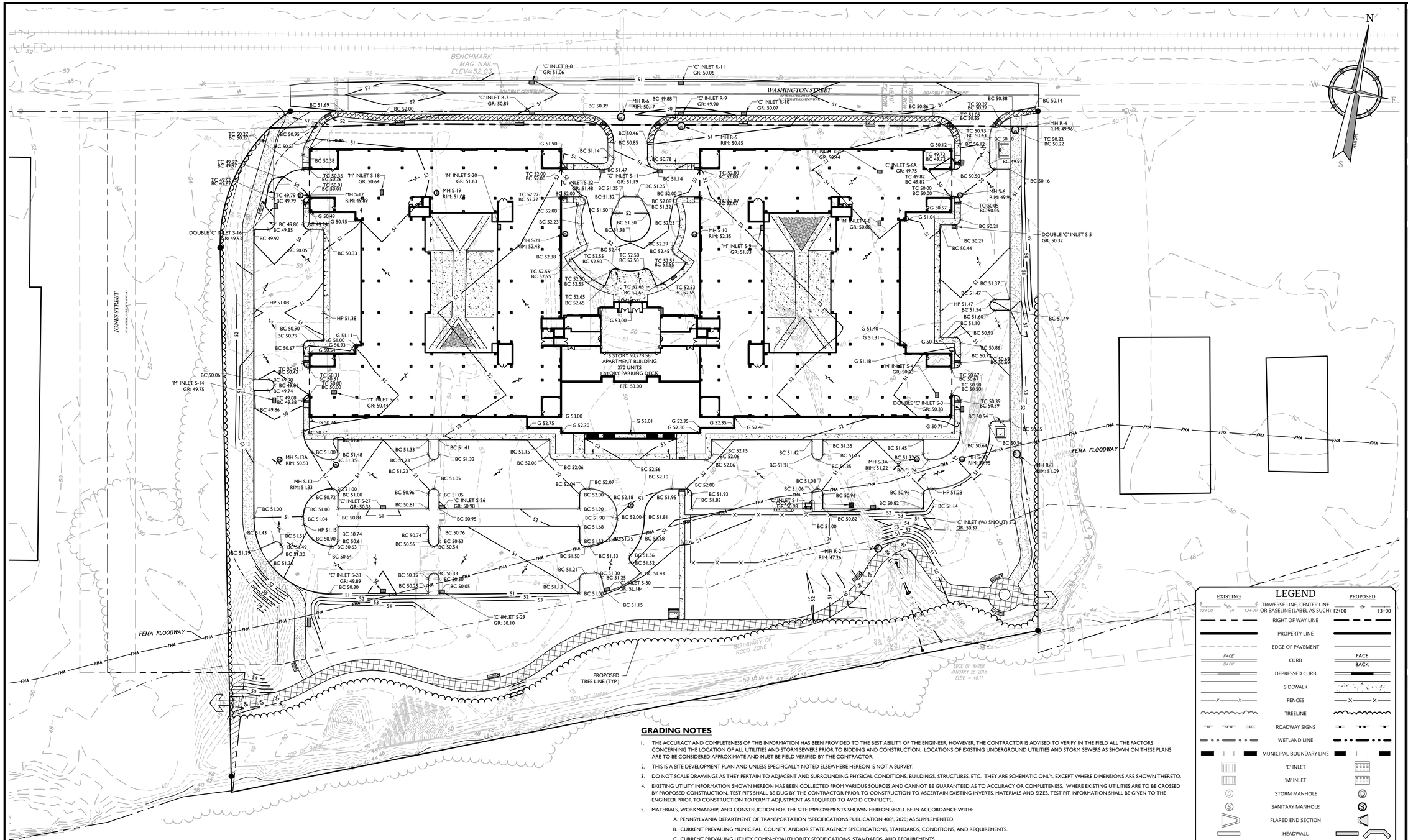
PROJECT NUMBER: 16001030B
DRAWING NAME: C-LAYT

SHEET TITLE:
RIVERFRONT ACCESS & OPEN SPACE

SHEET NUMBER:
7 of 37

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

20161001030B\Engineering\Site Plans\C-LAYT.dwg|C-01 RFADS By: CHRIS.MEZGLER



GRADING NOTES

1. THE ACCURACY AND COMPLETENESS OF THIS INFORMATION HAS BEEN PROVIDED TO THE BEST ABILITY OF THE ENGINEER, HOWEVER, THE CONTRACTOR IS ADVISED TO VERIFY IN THE FIELD ALL THE FACTORS CONCERNING THE LOCATION OF ALL UTILITIES AND STORM SEWERS PRIOR TO BIDDING AND CONSTRUCTION. LOCATIONS OF EXISTING UNDERGROUND UTILITIES AND STORM SEWERS AS SHOWN ON THESE PLANS ARE TO BE CONSIDERED APPROXIMATE AND MUST BE FIELD VERIFIED BY THE CONTRACTOR.
2. THIS IS A SITE DEVELOPMENT PLAN AND UNLESS SPECIFICALLY NOTED ELSEWHERE HEREON IS NOT A SURVEY.
3. DO NOT SCALE DRAWINGS AS THEY PERTAIN TO ADJACENT AND SURROUNDING PHYSICAL CONDITIONS, BUILDINGS, STRUCTURES, ETC. THEY ARE SCHEMATIC ONLY, EXCEPT WHERE DIMENSIONS ARE SHOWN THERETO.
4. EXISTING UTILITY INFORMATION SHOWN HEREON HAS BEEN COLLECTED FROM VARIOUS SOURCES AND CANNOT BE GUARANTEED AS TO ACCURACY OR COMPLETENESS. WHERE EXISTING UTILITIES ARE TO BE CROSSED BY PROPOSED CONSTRUCTION, TEST PITS SHALL BE DUG BY THE CONTRACTOR PRIOR TO CONSTRUCTION TO ASCERTAIN EXISTING INVERTS, MATERIALS AND SIZES, TEST PIT INFORMATION SHALL BE GIVEN TO THE ENGINEER PRIOR TO CONSTRUCTION TO PERMIT ADJUSTMENT AS REQUIRED TO AVOID CONFLICTS.
5. MATERIALS, WORKMANSHIP, AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREON SHALL BE IN ACCORDANCE WITH:
   - A. PENNSYLVANIA DEPARTMENT OF TRANSPORTATION "SPECIFICATIONS PUBLICATION 408", 2020; AS SUPPLEMENTED.
   - B. CURRENT PREVAILING MUNICIPAL, COUNTY, AND/OR STATE AGENCY SPECIFICATIONS, STANDARDS, CONDITIONS, AND REQUIREMENTS.
   - C. CURRENT PREVAILING UTILITY COMPANY/AUTHORITY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
   - D. CURRENT MANUFACTURER SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
6. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL APPROPRIATE SAFETY DEVICES AND TRAINING TO ALL WORKERS IN ORDER TO MAINTAIN SAFE CONDITIONS ON THE PROJECT SITE.
7. THE CONTRACTOR IS RESPONSIBLE FOR ALL REQUIRED CONSTRUCTION PERMITS NECESSARY FOR THE CONSTRUCTION AND COMPLETION OF THE APPROVED IMPROVEMENTS.
8. THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER REMOVAL AND DISPOSAL OF ANY AND ALL EXISTING OBJECTS, STRUCTURES, ETC. THAT ARE IN THE WAY OF PROPOSED CONSTRUCTION, OR INDICATED AS 'TO BE REMOVED'.
9. WALKWAYS MUST SLOPE AWAY FROM BUILDINGS AT A MINIMUM PITCH OF 1% AND A MAXIMUM PITCH OF 2%.
10. ALL ONSITE PROPOSED CURB TO HAVE A 6" FACE UNLESS OTHERWISE NOTED. ALL PROPOSED PUBLIC ROADWAY CURB TO HAVE A 7" FACE.
11. CONTRACTOR TO MAINTAIN A MAXIMUM SLOPE OF 2% IN AREAS OF HANDICAP STALLS AS PER ADA REQUIREMENTS.
12. THE CONTRACTOR SHALL ADJUST ALL UTILITY FRAMES, COVERS, MANHOLES, VALVE BOXES AND OTHER UTILITY FACILITY STRUCTURES TO BE FLUSH WITH FINISH SURFACE GRADE ELEVATIONS.
13. THIS SET OF PLANS HAS BEEN PREPARED FOR THE PURPOSE OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL CONDITIONS OR APPROVALS HAVE BEEN SATISFIED ON THE DRAWINGS AND EACH DRAWING HAS BEEN REVISED TO INDICATE "ISSUED FOR CONSTRUCTION". THE CLIENT OR OWNER AND CONTRACTOR ARE RESPONSIBLE TO ASSURE THAT THE APPROVED PLANS ONLY, ARE USED FOR BIDDING AND CONSTRUCTION.
14. NO FIELD CHANGES OR DEVIATIONS FROM THE DESIGN SHALL BE MADE WITHOUT PRIOR APPROVAL FROM THE ENGINEER AND HANOVER TOWNSHIP.
15. THE MAINTENANCE OF ON-SITE STORMWATER FACILITIES SHALL BE THE RESPONSIBILITY OF THE OWNER. THE MASTER DEED, AND THE DEED TO ANY SUBSEQUENT OWNER, SHALL NOTE THAT THE OWNER SHALL ACCEPT THE MAINTENANCE RESPONSIBILITIES. HANOVER TOWNSHIP SHALL BE PERMITTED TO INSPECT THE STORMWATER FACILITIES ON AT LEAST AN ANNUAL SCHEDULE TO ENSURE THAT ANY NECESSARY CORRECTIVE WORK IS PERFORMED IN A TIMELY MANNER. HANOVER TOWNSHIP IS RESPONSIBLE FOR THE MAINTENANCE OF ANY INLETS/PIPES THAT ARE LOCATED WITHIN THEIR ULTIMATE RIGHT-OF-WAY.
16. ALL STORM, WATER, AND SANITARY PIPES SHALL HAVE WATER-TIGHT GASKETS.
17. SEE PIPE AND STRUCTURES CHARTS FOR STRUCTURE AND PIPE INFORMATION TABLES.
18. THESE GRADING NOTES APPLY TO ALL GRADING PLAN SHEETS.

LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'C' INLET	
	'M' INLET	
D	STORM MANHOLE	D
S	SANITARY MANHOLE	S
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
75 / 74	CONTOURS	75 / 74
× G 29.0	SPOT ELEVATION	× G 29.0
	DIRECTION OF OVERLAND FLOW	
× TC 29.0	TOP OF CURB ELEVATION	× TC 29.0
× BC 29.0	BOTTOM OF CURB ELEVATION	× BC 29.0
	TOP OF DEPRESSED CURB ELEVATION	× TDC 29.0

40 0 40 80

SCALE : 1" = 40'

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

By: CHRIS.MESTLER
2019\160010308\Engineering\Site Plans\C-GRAD.dwg\C-GRADING

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1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS
2	06/02/22	CMM	REVISED PER PRE-MARSHAL, TOWNSHIP AND ZONING REVIEW LETTERS

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REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER
No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

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FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
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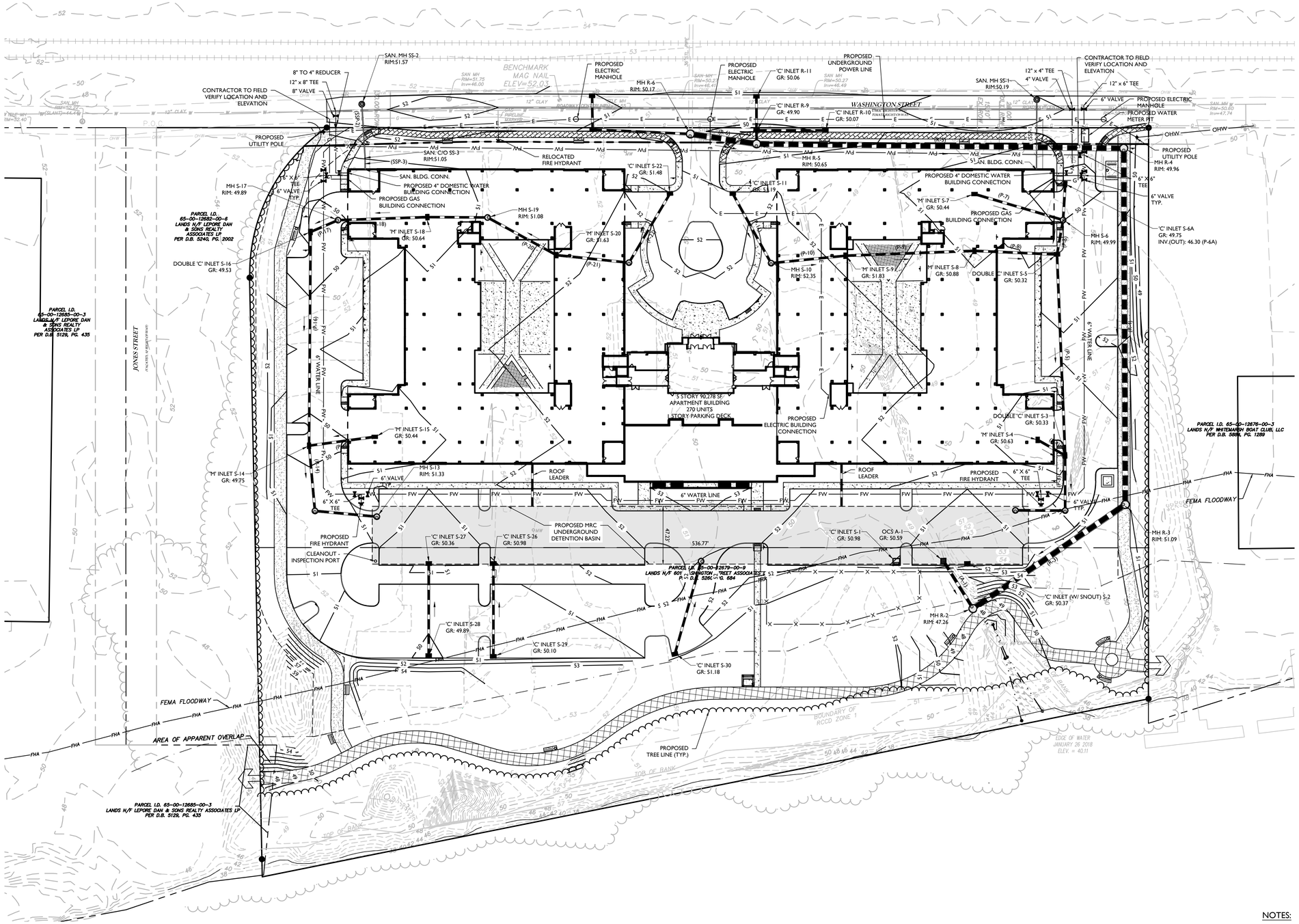
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PROJECT NUMBER: 160010308
DRAWING NAME: C-GRAD

SHEET TITLE: GRADING PLAN

SHEET NUMBER: 8 of 37



LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'C' INLET	
	'M' INLET	
	STORM MANHOLE	
	SANITARY MANHOLE	
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
CATV	CABLE TV CONDUIT	CATV
W	WATER MAIN	W
G	GAS MAIN	G
T	TELEPHONE CONDUIT	T
E	ELECTRIC CONDUIT	E
	SANITARY PIPE	
	STORM PIPE	

NOTES:

1. SEE CONSTRUCTION DETAILS SHEET 11 FOR STRUCTURE AND PIPE INFORMATION TABLES.
2. BY GRAPHICAL REPRESENTATION ONLY THIS PROPERTY IS LOCATED IN FLOOD HAZARD ZONE AE AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 42091C0358G WHICH HAS AN EFFECTIVE DATE OF MARCH 02, 2016 AND IS IN A SPECIAL FLOOD HAZARD AREA. FIELD SURVEYING WAS NOT PERFORMED TO DETERMINE THIS ZONE. AN ELEVATIONS CERTIFICATE MAY BE NEEDED TO VERIFY THIS DETERMINATION OR APPLY FOR AN AMENDMENT FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
3. FOR EXACT BUILDING UTILITY TIE-IN LOCATIONS, SEE THE ARCHITECTURAL PLANS.

ENGINEER CERTIFICATION:

I CERTIFY THAT THE PROPOSED FACILITY IS UNDERLAIN BY LIMESTONE.

PROFESSIONAL ENGINEER _____ DATE _____

40 0 40 80

SCALE : 1" = 40'

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2019\16001030B\Engineering\Site Plans\C-UTIL.dwg|C-09-UTIL By: CHRIS.METZLER

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C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
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601 WASHINGTON STREET

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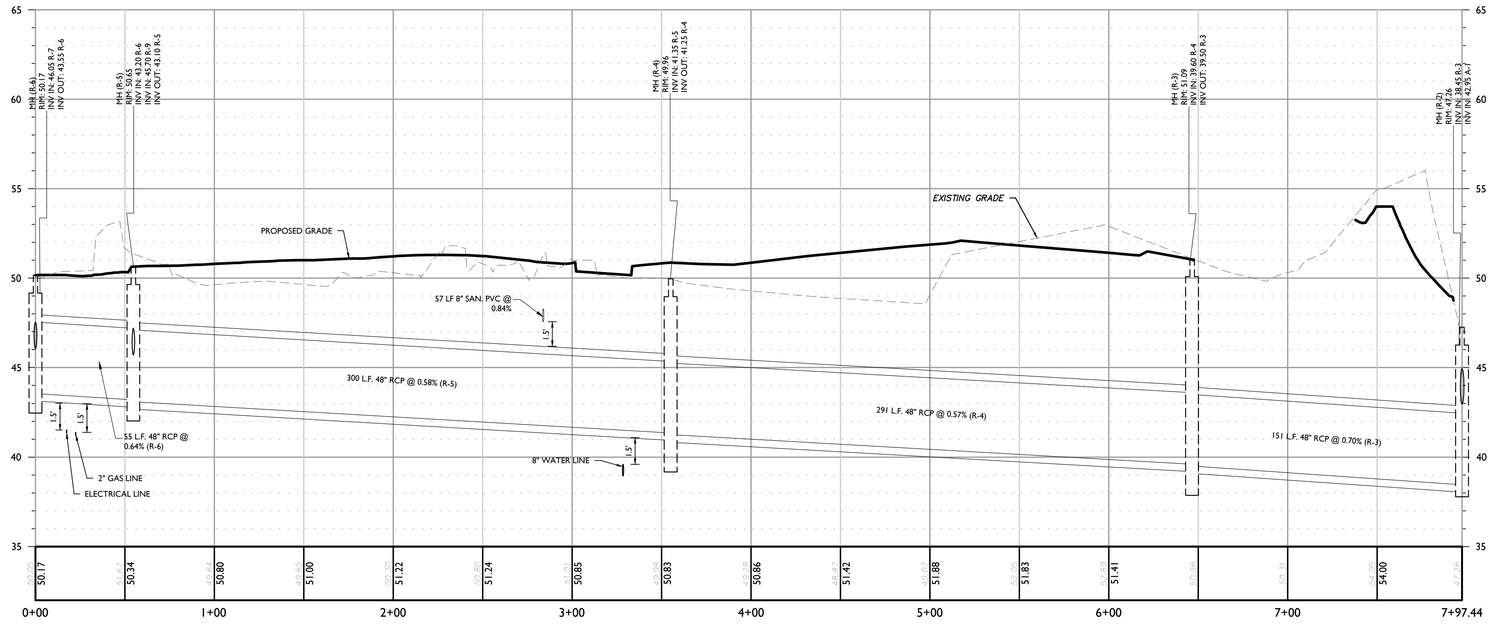
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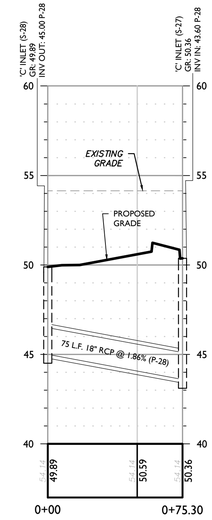
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DRAWING NAME: C-UTIL

SHEET TITLE: UTILITIES PLAN

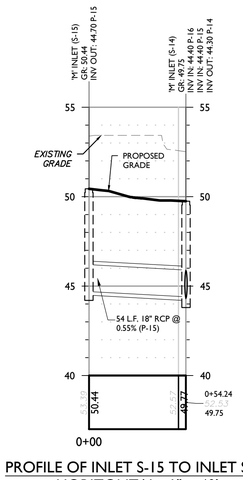
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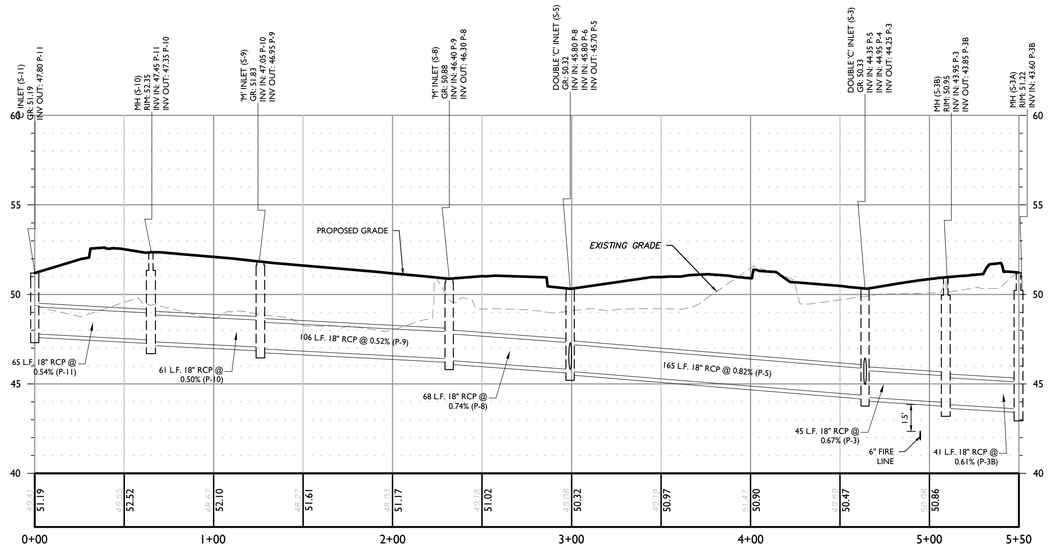
PROFILE OF MH R-6 TO MH R-2
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



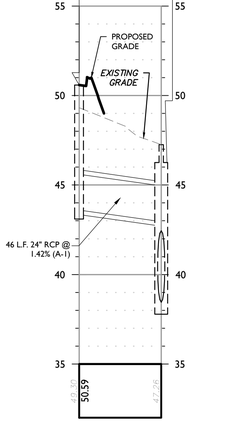
PROFILE OF INLET S-28 TO INLET S-27
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



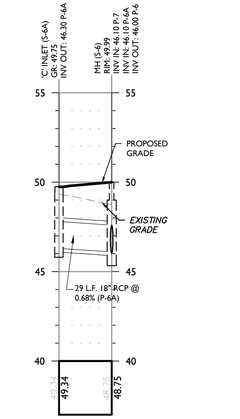
PROFILE OF INLET S-15 TO INLET S-14
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



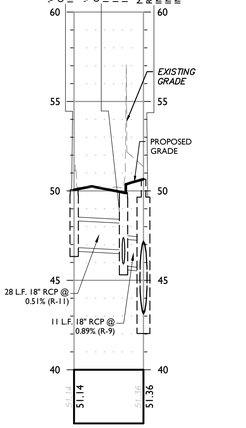
PROFILE OF INLET S-11 TO MH S-3A
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



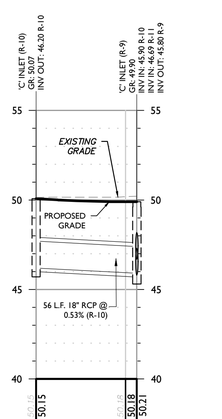
PROFILE OF OCS A-1 TO MH R-2
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



ROFILE OF INLET S-6A TO MH S-6
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



PROFILE OF INLET R-11 TO MH R-5
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



PROFILE OF INLET R-10 TO INLET R-9
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'

4 0 4 8
SCALE : 1" = 4'
VERTICAL

40 0 40 80
SCALE : 1" = 40'
HORIZONTAL

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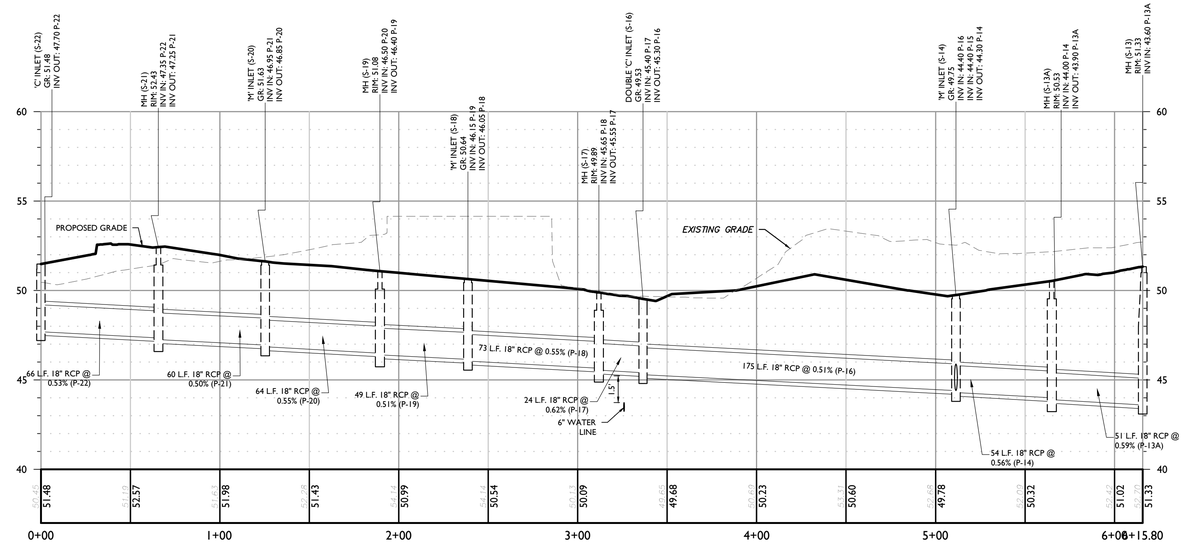
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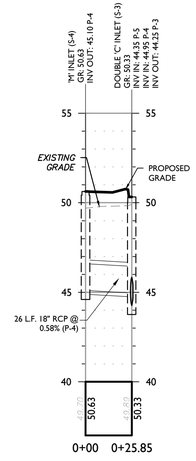
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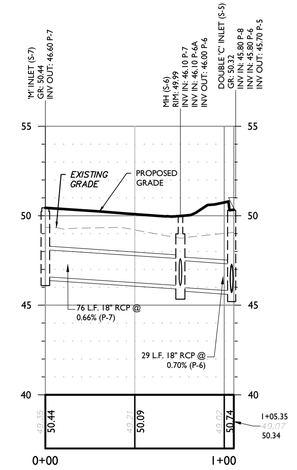
20161600103081Engineering\Site Plans\C-PROF.dwg|C-10 PROFILES By: CHRIS MEZGLER



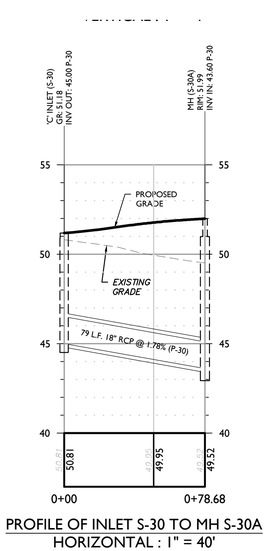
PROFILE OF INLET S-22 TO MH S-13
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



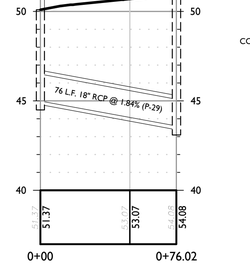
PROFILE OF INLET S-4 TO INLET S-3
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



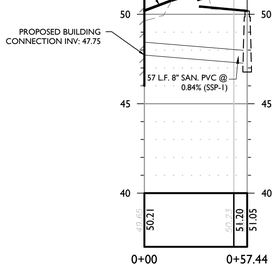
PROFILE OF INLET S-7 TO INLET S-5
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



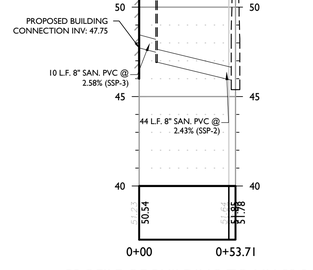
PROFILE OF INLET S-30 TO MH S-30A
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



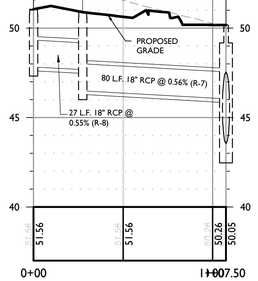
PROFILE OF INLET S-29 TO INLET S-26
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



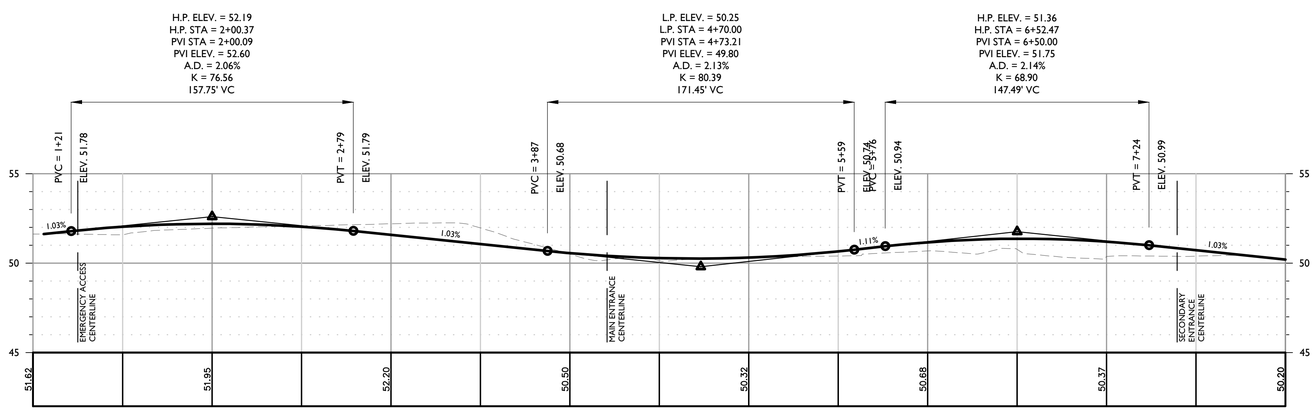
PROFILE OF BUILDING TO SS-1
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



PROFILE OF BUILDING TO MH SS-2
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



PROFILE OF INLET S-8 TO MH R-6
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'



PROFILE OF WASHINGTON STREET
HORIZONTAL : 1" = 40'
VERTICAL : 1" = 4'

4 0 4 8
SCALE : 1" = 4'
VERTICAL

40 0 40 80
SCALE : 1" = 40'
HORIZONTAL

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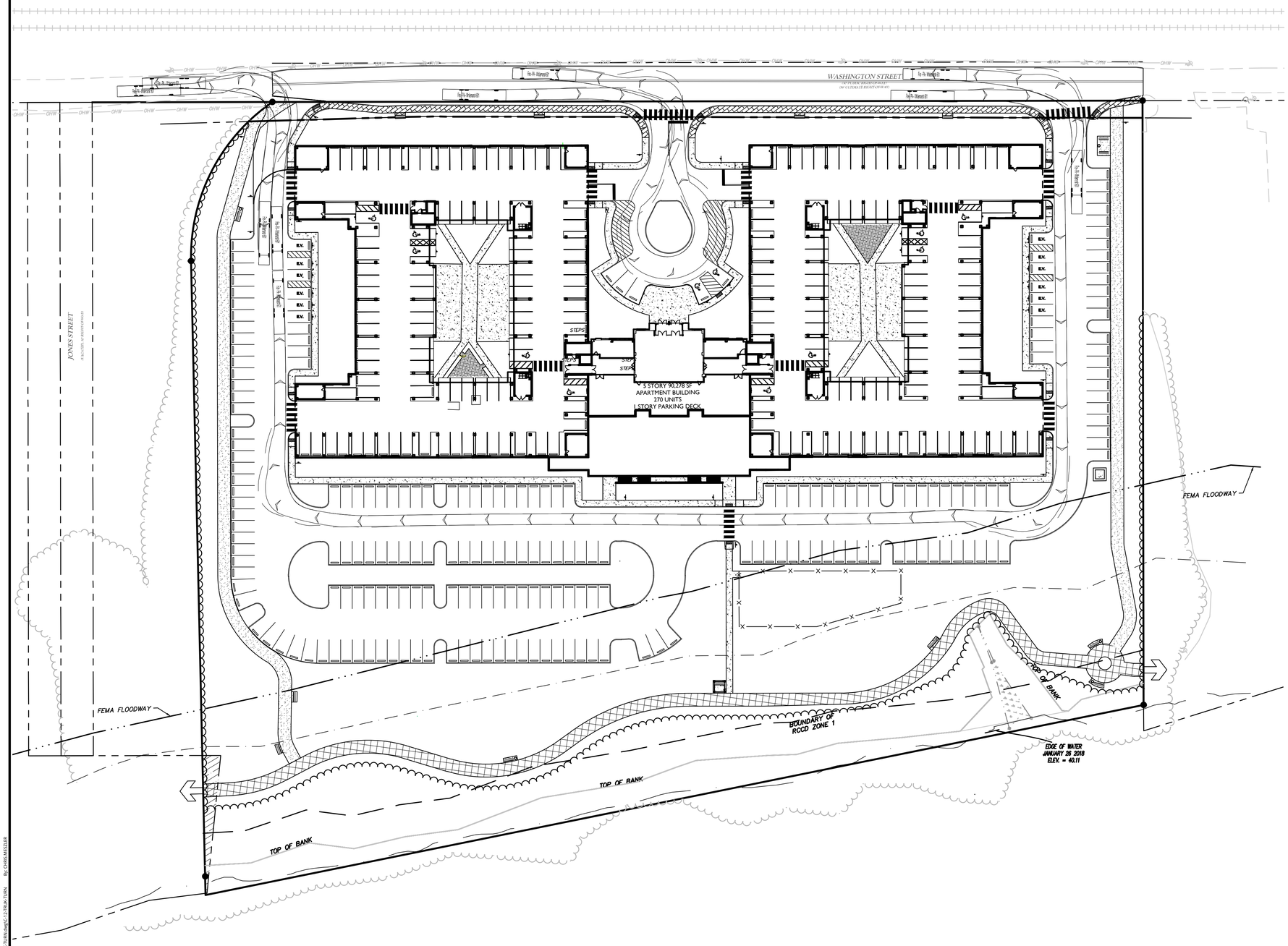
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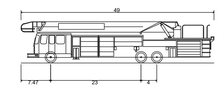
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AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER: 160010308
DRAWING NAME: C-PROF

SHEET TITLE: PROFILES

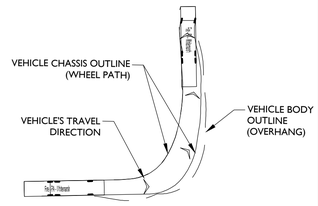
SHEET NUMBER: 11 of 37





Fire - PA - Whitemarsh 601

Overall Length	49.000ft
Overall Width	8.300ft
Overall Body Height	10.484ft
Min Body Ground Clearance	0.915ft
Track Width	8.300ft
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	35.050ft



VEHICLE PATH LEGEND

LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 PI 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'B' INLET	
	'E' INLET	
(D)	STORM MANHOLE	D
(S)	SANITARY MANHOLE	S
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
75 / 74	CONTOURS	75 / 74
× G 29.0	SPOT ELEVATION	× G 29.0
	DIRECTION OF OVERLAND FLOW	
× TC 29.0	TOP OF CURB ELEVATION	× TC 29.0
× BC 29.0	BOTTOM OF CURB ELEVATION	× BC 29.0
	TOP OF DEPRESSED CURB ELEVATION	× TDC 29.0

40 0 40 80

SCALE : 1" = 40'

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FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMK	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS
2	06/02/22	CMK	REVISED PER FIRE MARSHAL, TOWNSHIP AND ZONING REVIEW LETTERS

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER
No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC.
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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

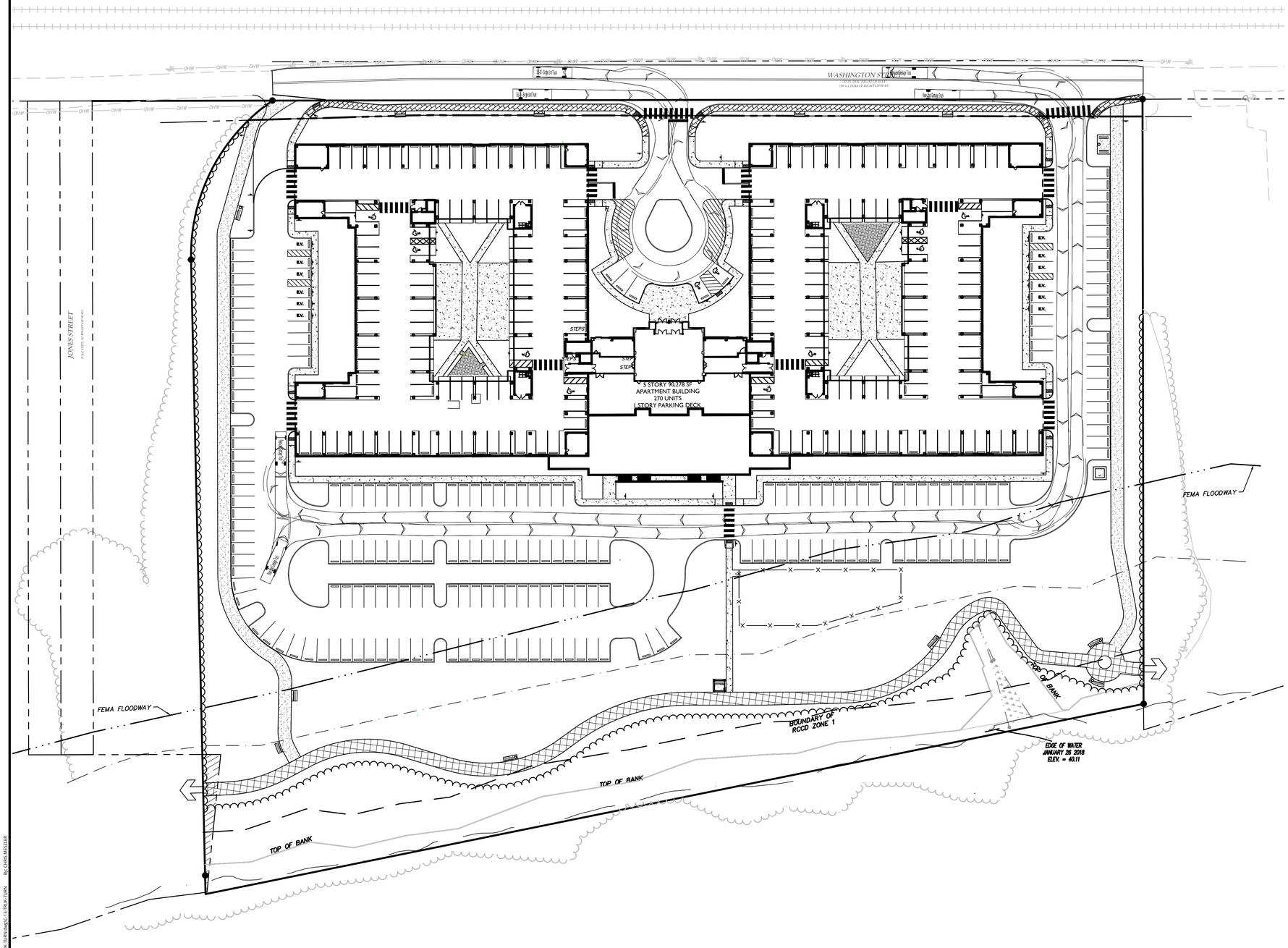
PROJECT NUMBER:	DRAWING NAME:
16001030B	C-TRUK-TURN

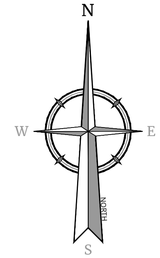
SHEET TITLE:
FIRE TRUCK TURNING PLAN

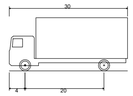
SHEET NUMBER:
12 of 37

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\Site Plans\C-TRUK-TURN.dwg C-12 TRUK-TURN By: CHRIS.MEYZLER

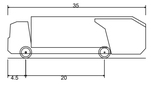






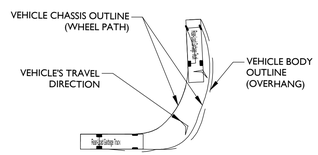
SU-30 - Single Unit Truck

Overall Length	30.000ft
Overall Width	8.000ft
Overall Body Height	13.500ft
Min Body Ground Clearance	1.367ft
Track Width	8.000ft
Lock-to-lock time	5.00s
Max Steering Angle (Virtual)	31.80°



Rear-Load Garbage Truck

Overall Length	35.000ft
Overall Width	8.375ft
Overall Body Height	10.546ft
Min Body Ground Clearance	1.000ft
Track Width	8.375ft
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	29.300ft



VEHICLE PATH LEGEND

LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'B' INLET	
	'E' INLET	
D	STORM MANHOLE	D
S	SANITARY MANHOLE	S
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
75 / 74	CONTOURS	75 / 74
× G 29.0	SPOT ELEVATION	× G 29.0
	DIRECTION OF OVERLAND FLOW	
× TC 29.0	TOP OF CURB ELEVATION	× TC 29.0
× BC 29.0	BOTTOM OF CURB ELEVATION	× BC 29.0
	TOP OF DEPRESSED CURB ELEVATION	× TDC 29.0

40 0 40 80

SCALE : 1" = 40'

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REV	DATE	DRAWN BY	DESCRIPTION
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2	06/02/22	CMM	REVISED PER FIRE MARSHAL, TOWNSHIP AND ZONING REVIEW LETTERS

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL C. RICHARD ROSEBERRY ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
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PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
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601 WASHINGTON STREET APARTMENTS

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WHITEMARSH TOWNSHIP
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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER: 160010308
DRAWING NAME: C-TRUK-TURN

SHEET TITLE:
MOVING AND GARBAGE TRUCK TURNING PLAN

SHEET NUMBER:
13 of 37

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\160\10308\Engineering\Site Plans\C-TRUK-TURN.dwg|C-13 TRUK-TURN By: CHRIS.MEISZLER

Proposed Storm Network Structure Table

Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
A-1	48 in. x 48 in. OCS	50.59			24" RCP	43.60
R-2	72 in. dia. CYLINDER MH	47.26	48" RCP 24" RCP	38.45 42.95		
R-3	72 in. dia. CYLINDER MH	51.09	48" RCP	39.60	48" RCP	39.50
R-4	72 in. dia. CYLINDER MH	49.96	48" RCP	41.35	48" RCP	41.25
R-5	72 in. dia. CYLINDER MH	50.65	48" RCP 18" RCP	43.20 45.70	48" RCP	43.10
R-6	72 in. dia. CYLINDER MH	50.17	18" RCP	46.05	48" RCP	43.55
R-7	24 in. x 45 in. "C" INLET	50.89	18" RCP	47.68	18" RCP	46.50
R-8	24 in. x 45 in. "C" INLET	51.06			18" RCP	47.83
R-9	24 in. x 45 in. "C" INLET	49.90	18" RCP 18" RCP	45.90 46.69	18" RCP	45.80
R-10	24 in. x 45 in. "C" INLET	50.07			18" RCP	46.20
R-11	24 in. x 45 in. "C" INLET	50.06			18" RCP	46.83
S-1	60 in. x 60 in. "C" INLET	50.98				
S-2	24 in. x 45 in. "C" INLET	50.37				
S-3	24 in. x 45 in. "C" INLET	50.33	18" RCP 18" RCP	44.35 44.95	18" RCP	44.25
S-3A	48 in. dia. CYLINDER MH	51.22	18" RCP	43.60		
S-3B	48 in. dia. CYLINDER MH	50.95	18" RCP	43.95	18" RCP	43.85
S-4	24 in. x 45 in. "M" INLET	50.63			18" RCP	45.10
S-5	24 in. x 45 in. "C" INLET	50.32	18" RCP 18" RCP	45.80 45.80	18" RCP	45.70
S-6	48 in. dia. CYLINDER MH	49.99	18" RCP 18" RCP	46.10 46.10	18" RCP	46.00
S-6A	24 in. x 45 in. "C" INLET	49.75			18" RCP	46.30

Proposed Storm Network Structure Table

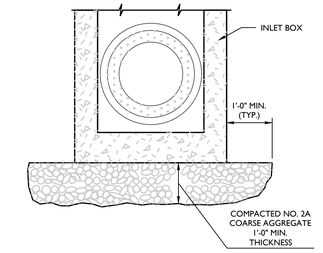
Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
S-7	24 in. x 45 in. "M" INLET	50.44			18" RCP	46.60
S-8	24 in. x 45 in. "M" INLET	50.88	18" RCP	46.40	18" RCP	46.30
S-9	24 in. x 45 in. "M" INLET	51.83	18" RCP	47.05	18" RCP	46.95
S-10	48 in. dia. CYLINDER MH	52.35	18" RCP	47.45	18" RCP	47.35
S-11	24 in. x 45 in. "C" INLET	51.19			18" RCP	47.80
S-13	48 in. dia. CONED MH	51.33	18" RCP	43.60		
S-13A	48 in. dia. CYLINDER MH	50.53	18" RCP	44.00	18" RCP	43.90
S-14	24 in. x 45 in. "M" INLET	49.75	18" RCP 18" RCP	44.40 44.40	18" RCP	44.30
S-15	24 in. x 45 in. "M" INLET	50.44			18" RCP	44.70
S-16	24 in. x 45 in. "C" INLET	49.53	18" RCP	45.40	18" RCP	45.30
S-17	48 in. dia. CYLINDER MH	49.89	18" RCP	45.65	18" RCP	45.55
S-18	24 in. x 45 in. "M" INLET	50.64	18" RCP	46.15	18" RCP	46.05
S-19	48 in. dia. CYLINDER MH	51.08	18" RCP	46.50	18" RCP	46.40
S-20	24 in. x 45 in. "M" INLET	51.63	18" RCP	46.95	18" RCP	46.85
S-21	48 in. dia. CYLINDER MH	52.43	18" RCP	47.35	18" RCP	47.25
S-22	24 in. x 45 in. "C" INLET	51.48			18" RCP	47.70
S-26	24 in. x 45 in. "C" INLET	50.98	18" RCP	43.60		
S-27	24 in. x 45 in. "C" INLET	50.36	18" RCP	43.60		
S-28	24 in. x 45 in. "C" INLET	49.89			18" RCP	45.00
S-29	24 in. x 45 in. "C" INLET	50.10			18" RCP	45.00

Sanitary Sewer Structure Table

Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
BLDG. CONN.	???	48.48			8" SAN. PVC	47.75
BLDG. CONN.	???	48.48			8" SAN. PVC	47.75
SS-1	48 in. dia. CONED MH	50.19	8" SAN. PVC	47.27		
SS-2	48 in. dia. CONED MH	51.57	8" SAN. PVC	45.88		
SS-3	8 in. Clean Out	51.05	8" SAN. PVC	47.50	8" SAN. PVC	46.95

Sanitary Sewer Pipe Table

Pipe I.D.	Description	Length	Invert Up	Invert Dn	Slope
SSP-1	8"SAN. PVC	57'	47.75	47.27	0.84%
SSP-2	8"SAN. PVC	44'	46.95	45.88	2.43%
SSP-3	8"SAN. PVC	10'	47.75	47.50	2.58%



NOTES:

STANDARD INLET BOXES SHOWN, PROVIDE TOP SLABS FOR OTHER INLET BOX TYPES.

PROVIDE GRADE ADJUSTMENT RINGS WHEN REQUIRED.

COST OF NO. 2A COARSE AGGREGATE IS INCIDENTAL TO THE INLET BOX.

INLET BOX SUB-BASE PREPARATION DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1100 05/01/18

Proposed Storm Network Structure Table

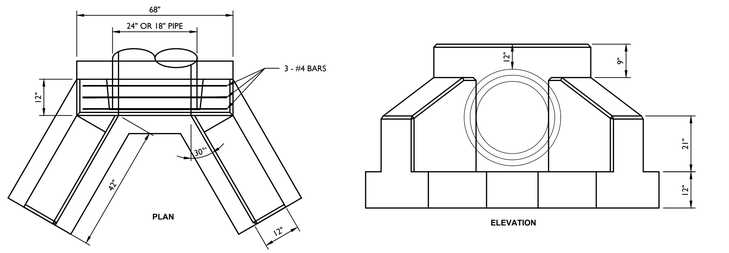
Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
S-30	24 in. x 45 in. "C" INLET	51.18			18" RCP	45.00
S-30A	48 in. dia. CYLINDER MH	51.99	18" RCP	43.60		

Proposed Storm Network Pipe Table

Pipe I.D.	Description	Length	Invert Up	Invert Dn	Slope
P-21	18"RCP	60'	47.25	46.95	0.50%
P-22	18"RCP	66'	47.70	47.35	0.53%
P-28	18"RCP	75'	45.00	43.60	1.86%
P-29	18"RCP	76'	45.00	43.60	1.84%
P-30	18"RCP	79'	45.00	43.60	1.78%
R-3	48"RCP	151'	39.50	38.45	0.70%
R-4	48"RCP	291'	41.25	39.60	0.57%
R-5	48"RCP	300'	43.10	41.35	0.58%
R-6	48"RCP	55'	43.55	43.20	0.64%
R-7	18"RCP	80'	46.50	46.05	0.56%
R-8	18"RCP	27'	47.83	47.68	0.55%
R-9	18"RCP	11'	45.80	45.70	0.89%
R-10	18"RCP	56'	46.20	45.90	0.53%
R-11	18"RCP	28'	46.83	46.69	0.51%

Proposed Storm Network Pipe Table

Pipe I.D.	Description	Length	Invert Up	Invert Dn	Slope
A-1	24"RCP	46'	43.60	42.95	1.42%
P-3	18"RCP	45'	44.25	43.95	0.67%
P-3B	18"RCP	41'	43.85	43.60	0.61%
P-4	18"RCP	26'	45.10	44.95	0.58%
P-5	18"RCP	165'	45.70	44.35	0.82%
P-6	18"RCP	29'	46.00	45.80	0.70%
P-6A	18"RCP	29'	46.30	46.10	0.68%
P-7	18"RCP	76'	46.60	46.10	0.66%
P-8	18"RCP	68'	46.30	45.80	0.74%
P-9	18"RCP	106'	46.95	46.40	0.52%
P-10	18"RCP	61'	47.35	47.05	0.50%
P-11	18"RCP	65'	47.80	47.45	0.54%
P-13A	18"RCP	51'	43.90	43.60	0.59%
P-14	18"RCP	54'	44.30	44.00	0.56%
P-15	18"RCP	54'	44.70	44.40	0.55%
P-16	18"RCP	175'	45.30	44.40	0.51%
P-17	18"RCP	24'	45.55	45.40	0.62%
P-18	18"RCP	73'	46.05	45.65	0.55%
P-19	18"RCP	49'	46.40	46.15	0.51%
P-20	18"RCP	64'	46.85	46.50	0.55%



NOTE:

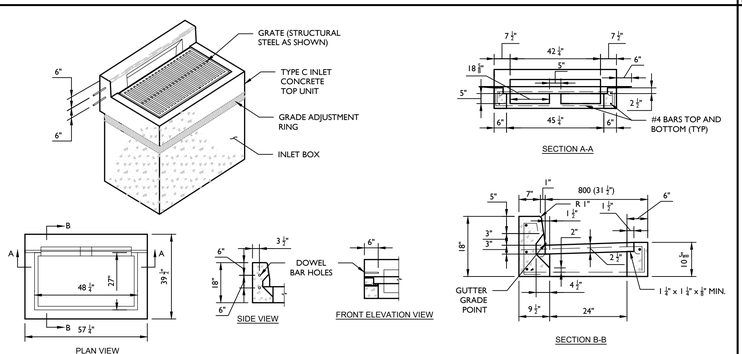
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATIONS AS OUTLINED IN PENNDOT PUBLICATION 408, SECTION 605.
2. PROVIDE REINFORCEMENT IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 709.
3. USE CLASS A CONCRETE OR BETTER.

2 : 1 EMBANKMENT SLOPES

PIPE DIAMETER	SKEW ∠ = 90° TO 60° - 0 = 30°			SKEW ∠ = 55° - 0 = 35°			SKEW ∠ = 50° - 0 = 40°			SKEW ∠ = 45° - 0 = 45°			SKEW ∠ = 40° - 0 = 50°			SKEW ∠ = 30° - 0 = 60°			SKEW ∠ = 20° - 0 = 70°			SKEW ∠ = 10° - 0 = 80°				
D o.w. (IN.)	L o.w. (FT.)	∅ (FT.)	W1 (FT.)	L o.w. (FT.)	∅ (FT.)	W1 (FT.)	L o.w. (FT.)	∅ (FT.)	W1 (FT.)	L o.w. (FT.)	∅ (FT.)	W1 (FT.)	L o.w. (FT.)	∅ (FT.)	W1 (FT.)	L o.w. (FT.)	∅ (FT.)	W1 (FT.)	L o.w. (FT.)	∅ (FT.)	W1 (FT.)	L o.w. (FT.)	∅ (FT.)	W1 (FT.)	W2 (FT.)	A (IN.)
36	5.8	0	4.6	6.0	0.33	4.9	6.2	0.5	5.2	6.5	0.67	5.7	7.0	0.75	6.2	8.3	1.33	8.0	11.1	1.75	11.7	19.6	5.0	23.0	4.6	12
42	6.3	0	5.8	6.6	0.33	6.1	6.9	0.5	6.5	7.3	0.67	7.1	7.8	0.75	7.8	9.3	1.33	10.0	12.5	1.75	14.6	22.5	5.0	28.8	5.8	12
48	6.9	0	6.9	7.2	0.33	7.3	7.5	0.5	7.8	8.0	0.67	8.5	8.5	0.75	9.4	10.3	1.33	12.0	14.0	1.75	17.5	25.3	5.0	34.6	6.9	12
54	7.5	0	8.0	7.8	0.33	8.5	8.2	0.5	9.1	8.7	0.67	9.9	9.3	0.75	10.9	11.3	1.33	14.0	15.5	1.75	20.5	28.2	5.0	40.3	8.0	12
60	8.1	0	9.2	8.4	0.33	9.8	8.8	0.5	10.4	9.4	0.67	11.3	10.1	0.75	12.5	12.3	1.33	16.0	16.9	1.75	23.4	31.1	5.0	46.0	9.2	15
72	9.2	0	11.5	9.6	0.33	12.2	10.1	0.5	13.0	10.8	0.67	14.1	11.7	0.75	15.6	14.3	1.33	20.0	19.8	1.75	29.2	36.9	5.0	57.6	11.5	15

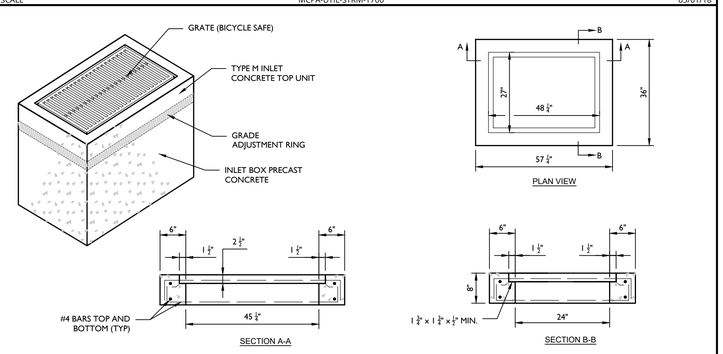
TYPE D-W END WALL DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1700 05/01/18



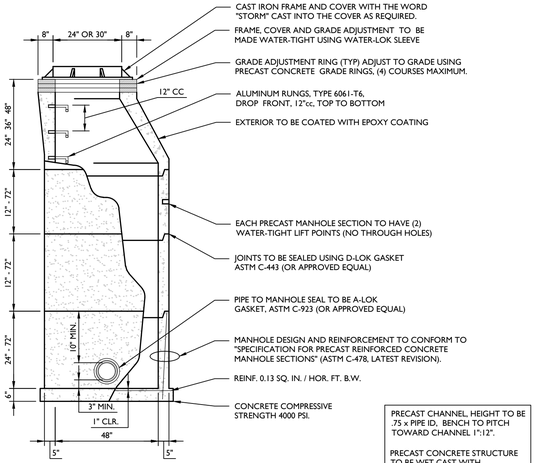
TYPE "C" INLET DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1200 05/01/18



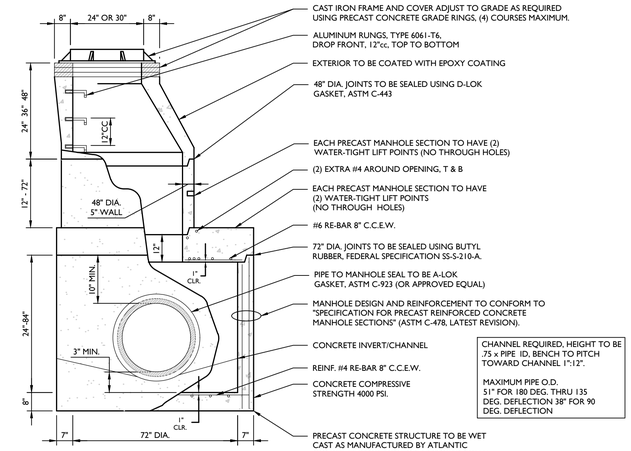
TYPE "M" INLET DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1300 05/01/18



48" DIAMETER STORM MANHOLE DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1600 06/01/19



72" DIAMETER STORM MANHOLE DETAIL

NOT TO SCALE MCPA-UTIL-STRM-1601 06/01/19

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1	03/16/22	CMM	REVISED PER FIRE MARSHAL, TOWNSHIP AND ZONING REVIEW LETTERS
2	06/02/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL C. RICHARD ROSEBERRY ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

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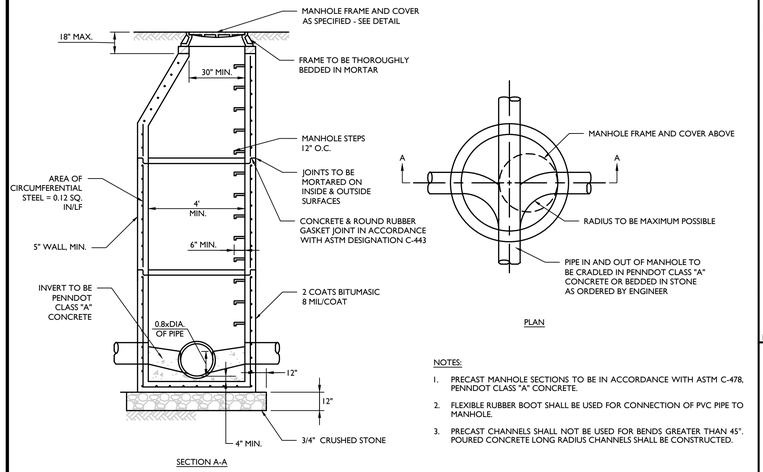
PROJECT NUMBER: 160010308 DRAWING NAME: C-DTLS

SHEET TITLE: CONSTRUCTION DETAILS

SHEET NUMBER: 14 of 37

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\160\10308\Engineering\Site Plans\C-DTLS.dwg|C-14 DETAILS By: CHRIS.MATZKE.ER

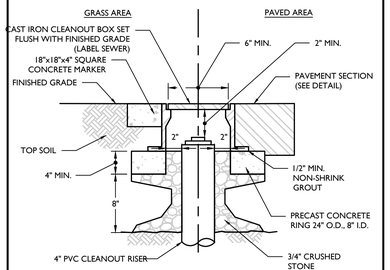


NOTES:

1. PRECAST MANHOLE SECTIONS TO BE IN ACCORDANCE WITH ASTM C-478, PENNDOT CLASS "A" CONCRETE.
2. FLEXIBLE RUBBER BOOT SHALL BE USED FOR CONNECTION OF PVC PIPE TO MANHOLE.
3. PRECAST CHANNELS SHALL NOT BE USED FOR BENDS GREATER THAN 45°. POURED CONCRETE LONG RADIUS CHANNELS SHALL BE CONSTRUCTED.

SANITARY PRECAST MANHOLE DETAIL

NOT TO SCALE | MCPA-UTIL-SSWR-1000 | 05/01/18

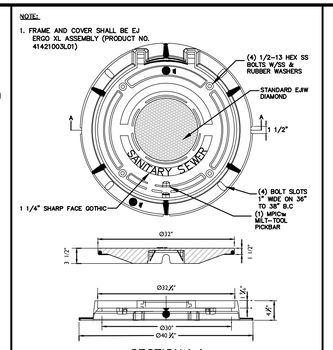


NOTES

1. ALL PVC CLEANOUTS TO HAVE CAST IRON FRAME AND COVER PROTECTION BOX. DESIGN FOR H20 LOADING.

CLEANOUT PROTECTION BOX DETAIL

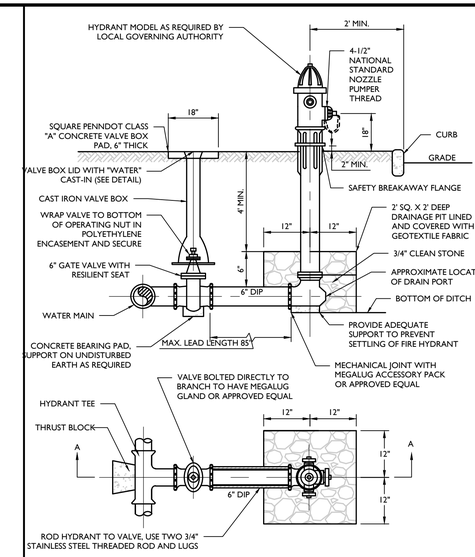
NOT TO SCALE | MCPA-UTIL-SSWR-1600 | 05/01/18



SECTION A-A

SANITARY WATERTIGHT MANHOLE FRAME COVER DETAIL

NOT TO SCALE

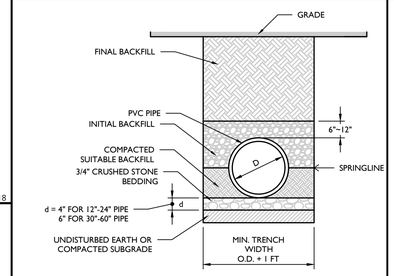


NOTES:

1. HYDRANT SHALL BE **T.W.W. STANDARD U.S. PIPE METROPOLITAN 250 DRY-BARREL** TRAFFIC MODEL DESIGN WITH THE FOLLOWING SPECIFICATION.
   - A. SAFETY COUPLED STANDPIPE.
   - B. 6" MECHANICAL JOINT INLET CONNECTION
   - C. TWO 2-1/2" NATIONAL STANDARD THREAD HOSE NOZZLES.
   - D. ONE 4-1/2" NATIONAL STANDARD THREAD STEAMER NOZZLE, FACING THE ROAD.
   - E. HYDRANT OPERATORS AND HYDRANT NOZZLE CAP NUTS SHALL BE IN ACCORDANCE WITH AWWA/ANSI STANDARD C502.
   - F. HYDRANT HOSE CAPS SHALL BE ATTACHED BY MEANS OF CHAINS.
   - G. HYDRANT BARRELS SHALL BE PAINTED - **RED**, BONNETS - **YELLOW**, AND NOZZLE CAPS - **BLACK** TO INDICATE THE AVAILABLE FIRE FLOW OR AS IN ACCORDANCE WITH THE LOCAL REQUIREMENTS.
   - H. HYDRANTS SHALL OPEN COUNTER CLOCKWISE.
2. STANDPIPE (BREAK-AWAY) COUPLING SHALL NOT EXCEED A MAXIMUM OF 5 INCHES FROM THE TOP OF THE CURB TO THE BOTTOM OF COUPLING.
3. THE DRAIN VALVE SHALL BE CLEAR OF ANY OBSTRUCTIONS, AND 3/4" CLEAN GRAVEL BE PLACED FROM THE BOTTOM OF THE HYDRANT TO A POINT 6" ABOVE THE HYDRANT LATERAL PIPE.
4. THRUST BLOCKS SHALL BE MADE OF PENNDOT CLASS "A" CONCRETE, PROVIDED BEHIND THE HYDRANT SHOE.
5. BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH THE LOCAL JURISDICTION.
6. GATE VALVE SHALL BE **T.W.W. 6" U.S. PIPE METROSEAL 250 R/S** (RESILIENT SEALED) MECHANICAL JOINT END (RIGHT HAND).
7. WATER LATERAL SHALL BE 6" DUCTILE IRON CEMENT LINED CLASS 52 PIPE.
8. TIE ROD SHALL BE 3/4" DIAMETER TIE ROD WITH EYE BOLTS - TWO REQUIRED (SIDE VIEW SHOWN). RESTRAIN ALL JOINTS ON HYDRANT TEE, VALVE, AND HYDRANT LEAD.
9. HYDRANT TEE SHALL BE U.S. PIPE CATALOG #U-592 TRIM-TYTE DUCTILE IRON, MECHANICAL JOINT OR AN T.W.W. APPROVED SUBSTITUTE.

FIRE HYDRANT (VALVE IN GRASS) DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1000 | 05/01/18

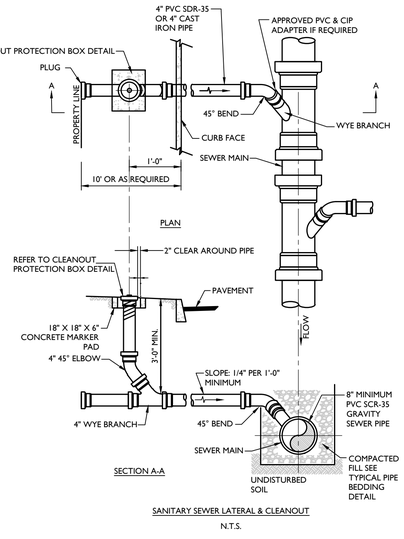


NOTES:

1. ALL PVC GRAVITY PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321.
2. GRAVITY SANITARY PIPE SHALL BE PVC SDR 35 PER ASTM D3034 OR AS REQUIRED BY THE GOVERNING AUTHORITY.

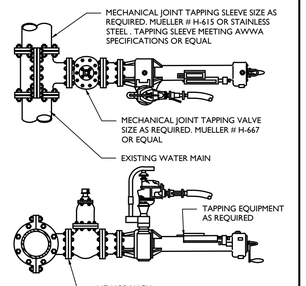
PVC SANITARY PIPE BEDDING (GRAVITY) DETAIL

NOT TO SCALE | MCPA-UTIL-SSWR-2602 | 05/01/18



SANITARY SEWER LATERAL & CLEANOUT DETAIL

NOT TO SCALE | MCPA-UTIL-SSWR-1700 | 05/01/18

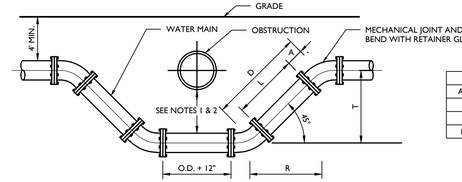


NOTES:

1. WET TAP VALVE CAN BE INSTALLED IN EITHER VERTICAL OR HORIZONTAL POSITION.
2. CONTRACTOR SHALL VERIFY DEPTH OF BURY, MATERIAL, DIAMETER (O.D.) AND OPERATING PRESSURE OF EXISTING WATER MAIN PRIOR TO ORDERING OF WET TAP UNIT.

WET TAP DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1200 | 05/01/18



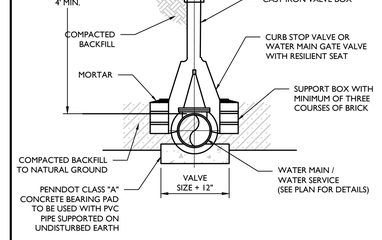
MECHANICAL JOINTS			
ANGLE	D =	R =	L =
45°	T x 1.414	T x 1.000	D-2A
22.5°	T x 2.613	T x 2.414	D-2A
11.25°	T x 5.126	T x 5.027	D-2A

NOTES:

1. WATER MAIN MAY CROSS ABOVE OBSTRUCTION IF 4' MINIMUM COVER IS MAINTAINED ABOVE THE WATER MAIN AND FINISH GRADE.
2. MINIMUM VERTICAL SEPARATION BETWEEN SANITARY OR STORM SEWER TO WATER MAIN SHALL BE 18" IF THE HORIZONTAL SEPARATION IS LESS THAN 10'. BETWEEN WATER MAIN AND OTHER UTILITIES, THE MINIMUM VERTICAL SEPARATION SHALL BE 12".
3. WATER MAIN SHALL BE SIZE AND MATERIAL SPECIFIED ON THE PLAN, WITH MECHANICAL JOINT OR PUSH-ON AND ALL FITTINGS BE CAST IRON MECHANICALLY JOINT.
4. OFFSETS MAY BE SUBSTITUTED FOR A "T" OF UP TO 24" IF APPROVED BY THE ENGINEER.
5. CONCRETE THRUST BLOCKS SHALL BE PROVIDED AT ALL BENDS OR OTHER POINTS OF PIPE DIRECTION CHANGE.
6. TIE RODS SHALL BE UTILIZED TO RESTRAIN PIPE JOINTS IF THRUST BLOCK IS NOT USED. DETAILS OF THE TIE ROD ASSEMBLY SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL. TIE RODS SHALL BE SUFFICIENT TO RESTRAIN THE THRUST DEVELOPED AT 100 PSI WORKING PRESSURE. MEGALUG RESTRAINT ALSO ACCEPTABLE IN PLACE OF TIE RODS.

WATER CROSSING UNDER UTILITY DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1300 | 05/01/18

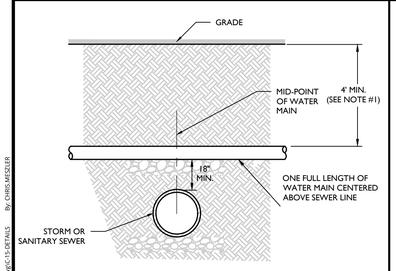


NOTES:

1. VALVE BOX SHOULD HAVE EXTENSION IF WATER MAIN OR SERVICE IS PLACED DEEPER THAN 5 FEET.
2. CURB STOP VALVE BOX SHALL BE MUELLER EXTENSION TYPE WITH ARCH PATTERN BASE, OR APPROVED EQUAL.
3. WATER MAIN VALVE BOX SHALL BE SCREW TYPE ADJUSTABLE MODE. **FIGURE # 4905-22 AS MANUFACTURED BY BINGHAM & TAYLOR OR APPROVED EQUAL.**

WATER VALVE BOX DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1600 | 05/01/18



NOTES:

1. WATER MAIN MAY CROSS ABOVE OBSTRUCTION IF 4' MINIMUM COVER IS MAINTAINED ABOVE THE WATER MAIN TO FINISH GRADE AND 18" MINIMUM VERTICAL SEPARATION IS OBTAINED.

WATER CROSSING OVER SEWER DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1301 | 05/01/18

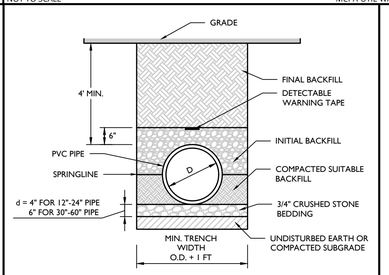
MINIMUM SIZE OF CONCRETE THRUST BLOCKS																	
d	A	B	C	d	A	B	C	d	A	B	C	A	B	C	d x e	A	B
6"	2'-0"	8"	1'-3"	6"	2'-6"	8"	1'-3"	6"	1'-6"	6"	1'-3"	1'-6"	8"	1'-3"	6" x 4"	1'-6"	1'-0"
8"	2'-6"	8"	1'-6"	8"	3'-0"	8"	1'-6"	8"	1'-6"	8"	1'-9"	1'-6"	8"	1'-9"	8" x 4"	2'-0"	1'-0"
10"	3'-0"	10"	2'-0"	10"	3'-6"	10"	2'-0"	10"	2'-3"	10"	2'-0"	1'-6"	10"	2'-0"	10" x 6"	2'-4"	1'-3"
12"	3'-6"	10"	2'-6"	12"	3'-9"	10"	2'-9"	12"	2'-6"	10"	2'-6"	1'-6"	10"	2'-6"	10" x 8"	2'-6"	1'-6"
TEES & CROSSES				90° BENDS				45° BENDS				22½° & 11¼° BENDS			REDUCERS		

NOTES:

1. ALL HORIZONTAL BENDS SHALL HAVE CONCRETE THRUST BLOCKS WITH MINIMUM BEARING AREAS AGAINST UNDISTURBED SOIL AND NO JOINT SHALL BE COVERED WITH CONCRETE.
2. BEARING AREAS ARE BASED UPON UNDISTURBED SOIL WITH A MINIMUM BEARING CAPACITY OF 0.5 TONS PER SQUARE FOOT. FOR A LESSER SOIL BEARING CAPACITY THESE AREAS SHALL BE INCREASED ACCORDINGLY.
3. THRUST BLOCKS SHALL BE POURED DIRECTLY AGAINST TRENCH WALLS AND SHALL BE PENNDOT CLASS "A" CONCRETE.
4. DETAILS FOR SUPPORTS AND BRACING FOR VERTICAL BENDS FOR 12" DIAMETER OR LARGER SHALL BE APPROVED BY THE AUTHORITY PRIOR TO CONSTRUCTION.

THRUST BLOCKS DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1400 | 05/01/18

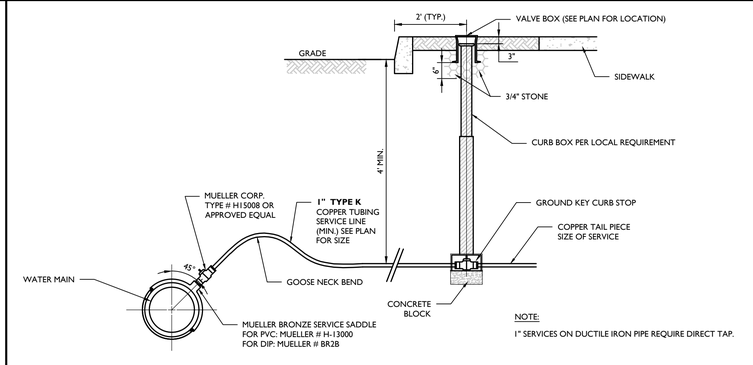


NOTES:

1. ALL PVC WATER PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ANSI/AWWA C605.
2. WATER MAIN SHALL BE PRESSURE **CLASS 165 DR 25** PVC PIPE PER AWWA C900-16 OR AS REQUIRED BY THE GOVERNING AUTHORITIES.

PVC WATER PIPE BEDDING DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1910 | 04/01/20



NOTE:

1" SERVICES ON DUCTILE IRON PIPE REQUIRE DIRECT TAP.

HOUSE WATER SERVICE CONNECTION DETAIL

NOT TO SCALE | MCPA-UTIL-WATR-1100 | 05/01/18

REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	REVISED PER FIRE MARSHAL, TOWNSHIP AND ZONING REVIEW LETTERS
2	08/02/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

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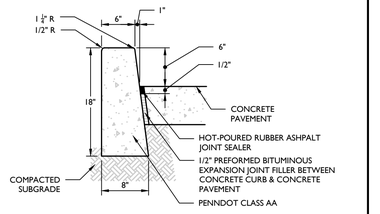
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AS SHOWN	03/01/2022	SF/CMM	RMA
PROJECT NUMBER: 16001030B		DRAWING NAME: C-DTLS	

SHEET TITLE:
CONSTRUCTION DETAILS

SHEET NUMBER:
15 of 37

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

20161600\1030B\Engineering\Site Plan\C-DTLS.dwg|C-15 DETAILS By: CHRIS.MESZLER

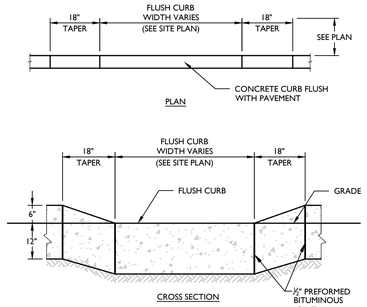


NOTES:

1. DEPTH OF JOINT FILLER STRIP EQUAL TO THE THICKNESS OF THE PAVEMENT LESS 1/2".
2. PREFORMED BITUMINOUS FIBER TRAVERSE JOINTS, 1/2" THICK AT 20' MAX. INTERVALS ALONG THE CURB.
3. PROVIDE CONTRACTION JOINTS (2" DEEP X ⅛" WIDE) 4'-0" MIN TO 10'-0" MAX INTERVALS.

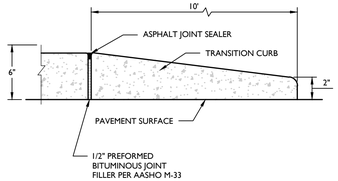
CONCRETE CURB (CONCRETE PAVEMENT) DETAIL

NOT TO SCALE | MCPA-SITE-CURB-1001 | 05/01/18



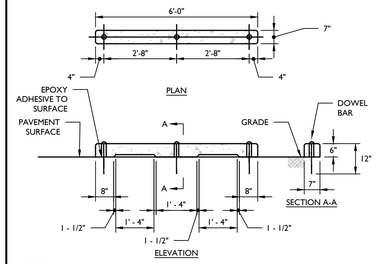
CONCRETE FLUSH CURB DETAIL

NOT TO SCALE | MCPA-SITE-CURB-1500 | 05/01/18



CURB TAPER DETAIL

NOT TO SCALE | MCPA-SITE-CURB-2100 | 05/01/18

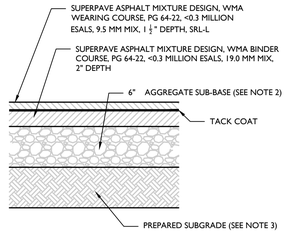


NOTES:

1. CONCRETE SHALL BE PENNDOT CLASS AA.
2. UNIT TO BE PINNED TO SURFACE WITH (3) 5/8" DIA. GALVANIZED STEEL RODS, 12" MINIMUM LENGTH.
3. ALL BEVELS TO BE 1/2". ALL ANGLES TO BE 45°

PRECAST CONCRETE BUMPER CURB WHEEL STOP (FOR CARS) DETAIL

NOT TO SCALE | MCPA-SITE-CURB-2301 | 05/01/18

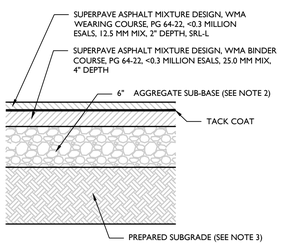


NOTES:

1. PENNDOT APPROVED ASPHALT MIX DESIGN
2. AGGREGATE BASE TO BE PENNDOT TYPE 2A CONFORMING TO PENNDOT PUBLICATIONS 408
3. SUBGRADE TO BE COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY, AS DETERMINED BY THE MODIFIED PROCTOR TEST, ASTM D 1557, AND SHALL CONSIST OF LOAD-BEARING FILL OR EXISTING STRATUM A MATERIALS CAPABLE OF ACHIEVING A CBR VALUE OF 5. THE MOISTURE CONTENT OF THE MATERIAL SHOULD ALSO BE MAINTAINED WITHIN +/- 2 PERCENT OF THE OPTIMUM MOISTURE CONTENT.

LIGHT-DUTY PAVEMENT DETAIL

NOT TO SCALE | MCPA-SITE-PVMT-1000 | 05/01/18

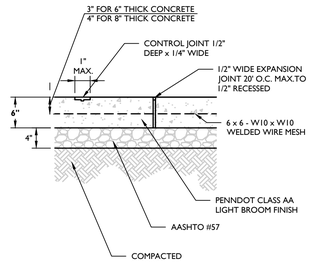


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1. PENNDOT APPROVED ASPHALT MIX DESIGN
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3. SUBGRADE TO BE COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY, AS DETERMINED BY THE MODIFIED PROCTOR TEST, ASTM D 1557, AND SHALL CONSIST OF LOAD-BEARING FILL OR EXISTING STRATUM A MATERIALS CAPABLE OF ACHIEVING A CBR VALUE OF 5. THE MOISTURE CONTENT OF THE MATERIAL SHOULD ALSO BE MAINTAINED WITHIN +/- 2 PERCENT OF THE OPTIMUM MOISTURE CONTENT.

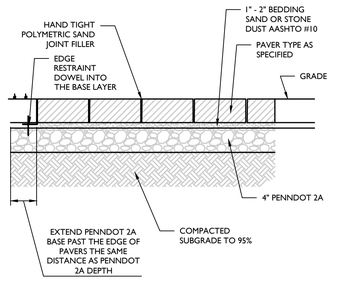
HEAVY-DUTY PAVEMENT DETAIL

NOT TO SCALE | MCPA-SITE-PVMT-1100 | 05/01/18



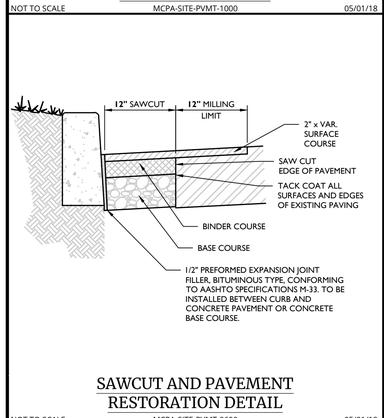
CONCRETE PAVEMENT DETAIL

NOT TO SCALE | MCPA-SITE-PVMT-1600 | 05/01/18



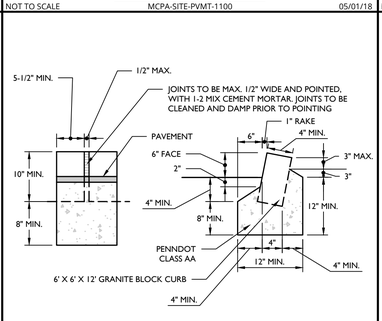
TYPICAL STANDARD PAVER SECTION DETAIL

NOT TO SCALE | MCPA-SITE-PVMT-2500 | 05/01/18



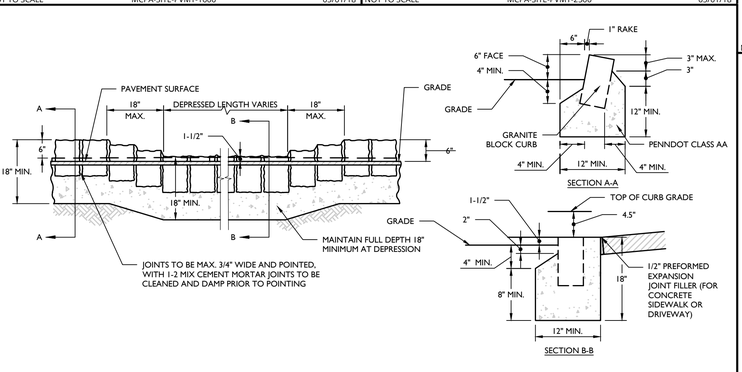
SAWCUT AND PAVEMENT RESTORATION DETAIL

NOT TO SCALE | MCPA-SITE-PVMT-2600 | 05/01/18



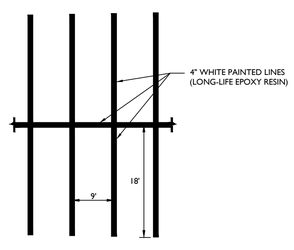
GRANITE BLOCK CURB DETAIL (WASHINGTON STREET)

NOT TO SCALE | MCPA-SITE-CURB-1300 | 05/01/18



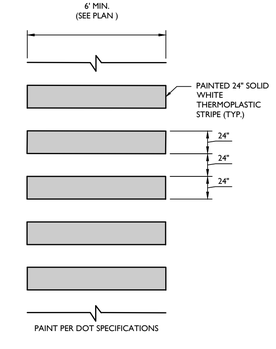
DEPRESSED GRANITE BLOCK CURB DETAIL

NOT TO SCALE | MCPA-SITE-CURB-1901 | 05/01/18



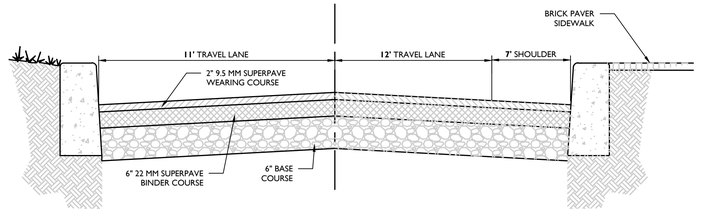
TYPICAL PARKING STALL DETAIL

NOT TO SCALE | MCPA-SITE-MRKG-1000 | 05/01/18



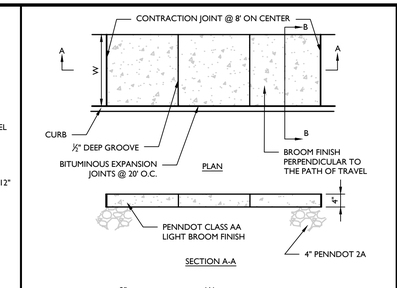
PEDESTRIAN CROSSWALK DETAIL

NOT TO SCALE | MCPA-SITE-MRKG-1400 | 05/01/18



WASHINGTON STREET TYPICAL CROSS SECTION

NOT TO SCALE | MOD: 06/02/22

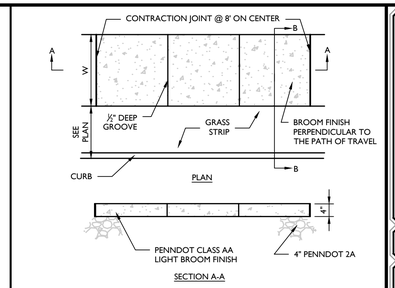


NOTES:

1. ½" EXPANSION JOINT FILLER INSTALLED BETWEEN THE CURB AND CONCRETE SIDEWALK AT 10' MAXIMUM SPACING, RECESS TO ¼" FROM THE TOP OF SIDEWALK.
2. ½" CONTRACTION JOINTS INSTALLED AT AN INTERVAL 24 TO 30 TIMES THE THICKNESS OF THE SLAB, TO A DEPTH OF ¼ OF THE THICKNESS OF THE SLAB, RECESS TO ½" FROM THE TOP OF SIDEWALK, FOR THE FULL WIDTH OF THE SIDEWALK. SCORE A ¼" GROOVED JOINT HALF WAY BETWEEN THE CONTRACTION JOINTS.
3. JOINT FILLER SHALL CONFORM TO AASHTO M-33. SURFACE OF CONCRETE SHALL BE BROOM FINISH. ROUND EDGES USING AN EDGING TOOL WITH A ½" RADIUS.
4. CONCRETE SIDEWALK SHALL BE CONSTRUCTED PER THE LATEST ADA REQUIREMENTS.

CONCRETE SIDEWALK (NEXT TO CURB) DETAIL

NOT TO SCALE | MCPA-SITE-PVMT-1900 | 12/01/20

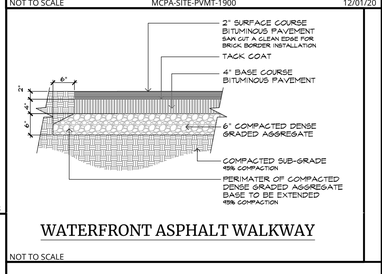


NOTES:

1. ½" CONTRACTION JOINTS INSTALLED AT AN INTERVAL 24 TO 30 TIMES THE THICKNESS OF THE SLAB, TO A DEPTH OF ¼ OF THE THICKNESS OF THE SLAB, RECESS TO ½" FROM THE TOP OF SIDEWALK, FOR THE FULL WIDTH OF THE SIDEWALK. SCORE A ¼" GROOVED JOINT HALF WAY BETWEEN THE CONTRACTION JOINTS.
2. JOINT FILLER SHALL CONFORM TO AASHTO M-33. SURFACE OF CONCRETE SHALL BE BROOM FINISH. ROUND EDGES USING AN EDGING TOOL WITH A ½" RADIUS.
3. CONCRETE SIDEWALK SHALL BE CONSTRUCTED PER THE LATEST ADA REQUIREMENTS.

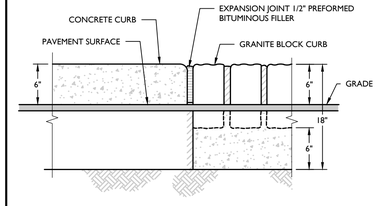
CONCRETE SIDEWALK (NEXT TO GRASS) DETAIL

NOT TO SCALE | MCPA-SITE-PVMT-1901 | 12/01/20



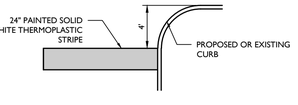
WATERFRONT ASPHALT WALKWAY

NOT TO SCALE



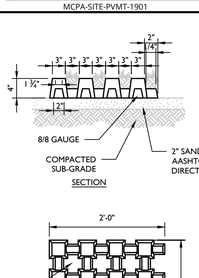
TRANSITION BETWEEN GRANITE BLOCK & CONCRETE CURB DETAIL

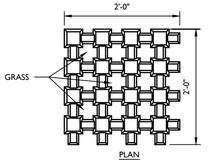
NOT TO SCALE | MCPA-SITE-CURB-2000 | 05/01/18



TYPICAL STOP BAR DETAIL

NOT TO SCALE | MCPA-SITE-MRKG-1100 | 05/01/18





NOTES:

1. PAVERS SHALL BE MANUFACTURED BY **HASTINGS PAVEMENT CO.**, INC., FABRICATED WITH 6"x6" X 8/8 GAUGE STEEL MESH, AND 5,000 PSI CONCRETE OR APPROVED EQUAL.
2. SETTING BED FOR PAVERS SHALL BE EITHER UNDISTURBED EARTH OR FILL COMPACTED TO 95% MAXIMUM DRY DENSITY AS DETERMINED BY THE MODIFIED PROCTOR TEST ASTM D-1557-64 + (PLUS 4% OR MINUS 2% OPTIMUM MOISTURE). REMOVE FROM THE SETTING BED, ROCK OR OTHER MATERIALS WHICH WOULD CREATE UNEVEN BEARING. PLACE TOPSOIL, SAND, OR STONE DUST IN A 2" COMPACTED LAYER TO PRESENT A TRUE AND EVEN GRADE OVER ENTIRE AREA TO RECEIVE PAVER. SET PAVERS AND LINE UP TO ABUT.
3. THOROUGHLY MIX LIME, FERTILIZER AND OTHER ADDITIVES PER LOCAL SOIL CONSERVATION REQUIREMENTS WITH THE TOPSOIL AND SPREAD LOOSELY TO FILL VOIDS IN PAVERS. WATER WITH A MIST SPRAY TO SETTLE. ADD ADDITIONAL TOPSOIL MIX TO BRING THE TOPSOIL FLUSH WITH TOP OF THE PAVER.
4. ADD SEED MIX AS PER LOCAL SOIL CONSERVATION DISTRICT AND PROJECT LANDSCAPING REQUIREMENTS AND APPLY SEED AT SLIGHTLY LESS THAN NORMAL RATE, AND MULCH. WHEN GRASS IS 2 1/2" HIGH, CUT TO 1 3/4".

GRASS PAVERS (FOR EMERGENCY ACCESS DRIVE) DETAIL

NOT TO SCALE | MCPA-SITE-PVMT-2400 | 05/01/18

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS
2	06/02/22	CMM	REVISED PER PRE-MARSHAL, TOWNSHIP AND ZONING REVIEW LETTERS

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design

LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER:	DRAWING NAME:
16001030B	C-DTLS

SHEET TITLE:
CONSTRUCTION DETAILS

SHEET NUMBER:
16 of 37

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\Site Plans\C-DTLS.dwg|C-16-DETAILS By: CHRIS.MESZLER



30" x 30"

COLORS:
LEGEND = WHITE (RETROREFLECTIVE)
BACKGROUND = RED (RETROREFLECTIVE)

R1-1 SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R1-1 | 12/01/20



12" x 36"

COLORS:
LEGEND = BLACK
BACKGROUND = YELLOW (RETROREFLECTIVE)
STOP SYMBOL = RED (RETROREFLECTIVE)

R1-6A SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R1-6A | 07/01/21



30" x 30"

COLORS:
LEGEND = WHITE (RETROREFLECTIVE)
CIRCLE BACKGROUND = RED (RETROREFLECTIVE)

R5-1 SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R5-1 | 12/01/20

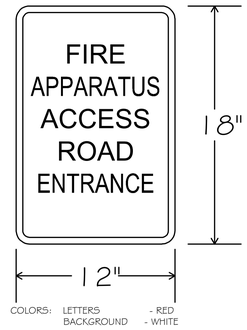


24" x 18"

COLORS:
LEGEND = BLACK
BACKGROUND = YELLOW (RETROREFLECTIVE)

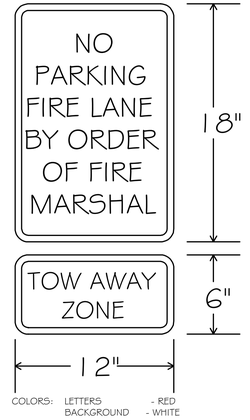
W16-12P SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-WARN-W16-12P | 12/01/20



FIRE APPARATUS ENTRANCE SIGN

NOT TO SCALE | MOD: 05/16/22



NO PARKING - FIRE LANE SIGN

NOT TO SCALE | MOD: 05/16/22



12" x 18"

COLORS:
LEGEND = GREEN (RETROREFLECTIVE)
HANDICAP SYMBOL= BLUE (RETROREFLECTIVE)
BACKGROUND = WHITE (RETROREFLECTIVE)

R7-8X SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R7-8 | 07/01/21



18" x 9"

COLORS:
LEGEND = GREEN (RETROREFLECTIVE)
BACKGROUND = WHITE (RETROREFLECTIVE)

R7-8P SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R7-8P | 07/01/21



12" x 18"

COLORS:
LEGEND = RED (RETROREFLECTIVE)
BACKGROUND = WHITE (RETROREFLECTIVE)

R7-1X SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R7-1 | 07/01/21



24" x 12"

COLORS:
LEGEND = BLACK
BACKGROUND = YELLOW (RETROREFLECTIVE)

W16-9P SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-WARN-W16-9P | 07/01/21



- Schedule 40 Galvanized Steel
- Bosch 240V Hybrid Electric Vehicle Charging Unit
- Adjustable Amperage: 12-32
- Voltage: 96 VAC- 264 VAC
- Input/Output Power: 7.2 kW
- Input Current: 30 Amps
- Breaker Size 40 Amps
- Temperature rating: -40°F to 122°F (-40°C - 50°C)
- 125 lbs
- 1/4" Skyline Decorative Bollard Cover: Granite Color
- Dimensions: 7.2 in. D x 58 in. H
- Base Plate: 5/8"H x 10"W x 10"D w/ (4) 15/16" Holes
- 23 Ft. Flexible Charging Cable
- ETL certified to UL standards
- 3 Year Warranty

Power Xpress™
Dual Bollard Charge Station
(OR APPROVED EQUAL)

ELECTRIC VEHICLE CHARGER - DUAL

NOT TO SCALE | MOD: 05/16/22

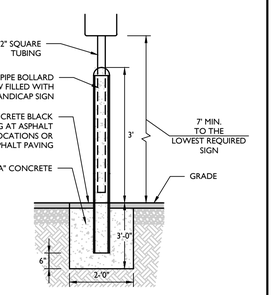


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- Bosch 240V Hybrid Electric Vehicle Charging Unit
- Adjustable Amperage: 12-32
- Voltage: 96 VAC- 264 VAC
- Input/Output Power: 7.2 kW
- Input Current: 30 Amps
- Breaker Size 40 Amps
- Temperature rating: -40°F to 122°F (-40°C - 50°C)
- 125 lbs
- 1/4" Skyline Decorative Bollard Cover: Granite Color
- Dimensions: 7.2 in. D x 58 in. H
- Base Plate: 5/8"H x 10"W x 10"D w/ (4) 15/16" Holes
- 23 Ft. Flexible Charging Cable
- ETL certified to UL standards
- 3 Year Warranty

Power Xpress™ Bollard Charge Station
(OR APPROVED EQUAL)

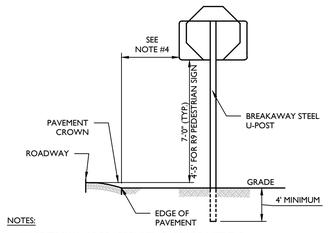
ELECTRIC VEHICLE CHARGER - SINGLE

NOT TO SCALE | MOD: 05/16/22



BOLLARD MOUNTED SIGN DETAIL

NOT TO SCALE | MCPA-SITE-MRKG-2000 | 05/01/18

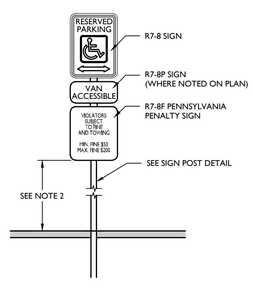


NOTES:

1. ALL POSTS SHALL BE OF ADEQUATE LENGTH TO MEET THE REQUIREMENTS FOR ERECTION, AS STATED IN THE CURRENT MANUAL ON "UNIFORM TRAFFIC CONTROL DEVICES" FOR STREETS AND HIGHWAYS.
2. ALL POSTS SHALL BE EMBEDDED 4' MINIMUM.
3. ALL POSTS TO BE BREAKAWAY STEEL U-POSTS IN CONFORMANCE WITH CURRENT ASTM SPECIFICATION A123 AND PADOT STANDARDS.
4. IN AREAS WITHOUT CURBING, THE OUTER EDGE OF SIGN TO BE 2'-0" MINIMUM TO 12'-0" MAXIMUM FROM EDGE OF CURB, AS DIRECTED.

SINGLE POST SIGN MOUNTING DETAIL

NOT TO SCALE | MCPA-SITE-MRKG-2001 | 05/01/18

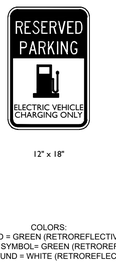


NOTES:

1. INSTALL SIGN WHERE NOTED ON PLAN.
2. THE BOTTOM OF THE LOWEST SIGN SHALL BE MOUNTED 60" ABOVE THE PARKING LOT OR SIDEWALK SURFACE WHEN THE SIGN IS PARALLEL TO THE SIDEWALK AND 72" ABOVE THE PARKING LOT OR SIDEWALK WHEN THE SIGN IS PERPENDICULAR TO THE SIDEWALK.

ACCESSIBLE PARKING SIGN DETAIL

NOT TO SCALE | MCPA-SITE-MRKG-1900 | 05/01/18

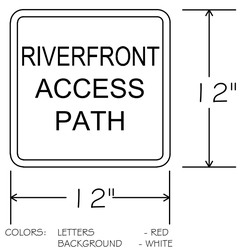


12" x 18"

COLORS:
LEGEND = GREEN (RETROREFLECTIVE)
EV CHARGING SYMBOL= GREEN (RETROREFLECTIVE)
BACKGROUND = WHITE (RETROREFLECTIVE)

RESERVED PARKING ELECTRIC VEHICLE PARKING ONLY SIGN

NOT TO SCALE | MOD: 05/16/22



RIVERFRONT ACCESS PATH SIGN

NOT TO SCALE | MOD: 05/16/22

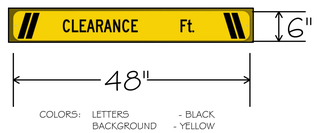


30" x 24"

COLORS:
LEGEND = BLACK
BACKGROUND = WHITE (RETROREFLECTIVE)

R5-11 SIGN DETAIL

NOT TO SCALE | MCCM-SIGN-REGU-R5-11 | 12/01/20



CLEARANCE SIGN

NOT TO SCALE | MOD: 05/16/22

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS
2	06/02/22	CMM	REVISED PER FIRE MARSHAL, TOWNSHIP AND ZONING REVIEW LETTERS



C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
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AS SHOWN	03/01/2022	SF/CMM	RMA

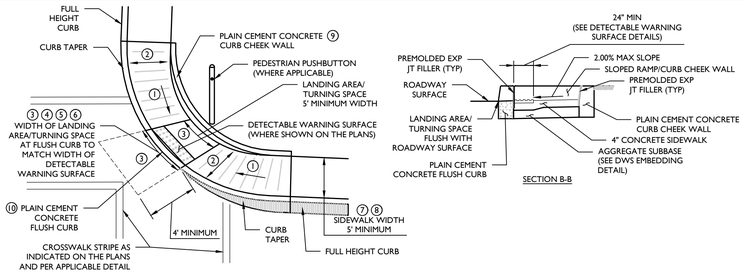
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DRAWING NAME: C-DTLS

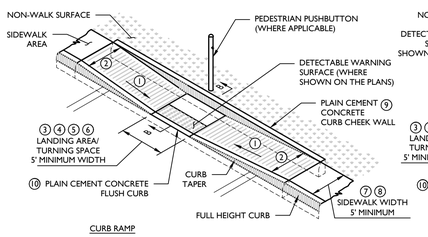
SHEET TITLE:
CONSTRUCTION DETAILS

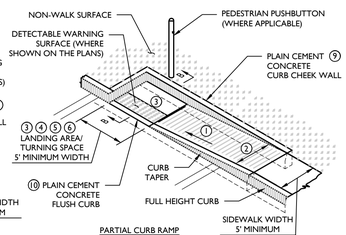
SHEET NUMBER:
17 of 37

By: CHRIS.MEZGER
20160\16001030B\Engineering\Site Plans\C-DTLS.dwg\C-17 DETAILS

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.





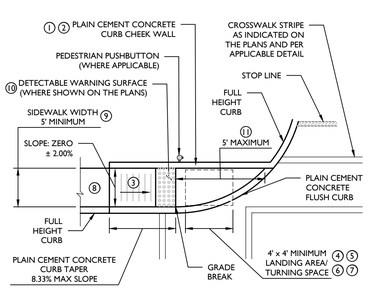


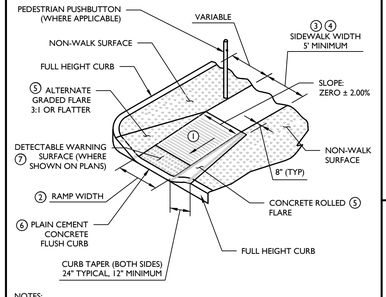
NOTES:

1. 8.33% MAX RAMP SLOPE, TO AVOID CHASING GRADE INDEFINITELY WHEN TRAVERSING THE HEIGHT OF CURB, RAMP LENGTH NOT TO EXCEED 15'-0". ADJUST RAMP SLOPE AS NEEDED TO PROVIDE ACCESS TO THE MAXIMUM EXTENT FEASIBLE.
2. SLOPE: ZERO ± 2.00%
3. CURB RAMPS REQUIRE A 4' x 4' MINIMUM LANDING AREA/TURNING SPACE WITH A MAXIMUM CROSS SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SEE DETAILS FOR LOCATIONS AND DIMENSIONS.
4. LANDING AREA AT THE TOP AND BOTTOM OF THE CURB RAMP (AKA. CLEAR OR TURNING SPACE) MUST BE KEPT CLEAR OF OBSTRUCTIONS. THE LANDING AREA IS TO BE 4' X 4' MINIMUM AND MATCH THE WIDTH OF THE CURB RAMP. INCREASED THE DEPTH OF MINIMUM LANDING AREA TO 5 FEET IF CONSTRAINED AT THE BACK OF THE SIDEWALK.
5. THE LANDING AREA MUST HAVE AN ABSOLUTE MINIMUM SLOPE OF 0.5% AND A MAXIMUM SLOPE OF 2%, WHEREAS 1.0% TO 1.5% IS THE DESIRED DESIGN SLOPE IN THE DIRECTION OF TRAVEL AND FOR THE CROSS SLOPE.
6. ASSISTANT DISTRICT EXECUTIVE APPROVAL REQUIRED IF TURNING SPACE IS NOT ENTIRELY ON SIDEWALK.
7. SIDEWALK CROSS SLOPE MUST BE A MINIMUM OF 1% AND MAXIMUM 2%, WHEREAS 1.5% IS THE DESIRED DESIGN CROSS SLOPE. SIDEWALK BEYOND LANDING AREA MUST HAVE A MINIMUM 1% TO MAXIMUM 5% OF LONGITUDINAL SLOPE IN THE DIRECTION OF TRAVEL, AND A 1% TO 2% MAX. CROSS SLOPE.
8. SIDEWALK WIDTH MAY BE REDUCED TO 4'-0", WHEN PASSING AREAS 5'-0" X 5'-0" ARE PROVIDED EVERY 200'.
9. CHEEK WALLS ARE PERMITTED WHEN ADJACENT TO NON-WALK AREAS OR ELEVATION DIFFERENCES CANNOT BE ACCOMMODATED BY FLARES OR GRADING. GRADE GRASS AREAS OR OTHER NON-WALK AREAS AT 3:1 OR FLATTER. DO NOT INSTALL CHEEK WALLS THAT INTERSECT THE PEDESTRIAN PATH.
10. GUTTER SLOPE THE ALONG CURB RAMP MUST MAINTAIN POSITIVE DRAINAGE WITH A 1.0 % TO 1.5% GUTTER SLOPE PREFERRED, WHEREAS 0.5% AS THE ABSOLUTE MINIMUM AND 2.0% IS MAXIMUM ALONG THE LENGTH OF THE FLUSH CURB.

TYPE 2 CURB RAMP DETAIL

NOT TO SCALE MCPA-SITE-HADA-1100 12/01/20





NOTES:

1. CHEEK WALLS ARE PERMITTED WHEN ADJACENT TO NON-WALK AREAS OR ELEVATION DIFFERENCES CANNOT BE ACCOMMODATED BY FLARES OR GRADING. GRADE GRASS AREAS OR OTHER NON-WALK AREAS AT 3:1 OR FLATTER. DO NOT INSTALL CHEEK WALLS THAT INTERSECT THE PEDESTRIAN PATH.
2. OPTIONAL ROLLED CONCRETE SURFACE OR REGRADE SLOPE CAN BE USED TO MEET THE ADJACENT SURFACES IN LIEU OF A RETURN CURB CHEEK WALL.
3. 8.33% MAX RAMP SLOPE, TO AVOID CHASING GRADE INDEFINITELY WHEN TRAVERSING THE HEIGHT OF CURB, RAMP LENGTH NOT TO EXCEED 15'-0". ADJUST RAMP SLOPE AS NEEDED TO PROVIDE ACCESS TO THE MAXIMUM EXTENT FEASIBLE.
4. CURB RAMPS REQUIRE A 4' x 4' MINIMUM LANDING AREA/TURNING SPACE WITH A MAXIMUM CROSS SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS.
5. LANDING AREA AT THE BOTTOM OF THE CURB RAMP (AKA. CLEAR OR TURNING SPACE) MUST BE KEPT CLEAR OF OBSTRUCTIONS. THE LANDING AREA IS TO BE 4' X 4' MINIMUM AND MATCH THE WIDTH OF THE CURB RAMP.
6. THE LANDING AREA MUST HAVE AN ABSOLUTE MINIMUM SLOPE OF 0.5% AND A MAXIMUM SLOPE OF 2%, WHEREAS 1.0% TO 1.5% IS THE DESIRED DESIGN SLOPE IN THE DIRECTION OF TRAVEL AND FOR THE CROSS SLOPE.
7. ASSISTANT DISTRICT EXECUTIVE APPROVAL REQUIRED IF TURNING SPACE IS NOT ENTIRELY ON SIDEWALK.
8. SIDEWALK CROSS SLOPE MUST BE A MINIMUM OF 1% AND MAXIMUM 2%, WHEREAS 1.5% IS THE DESIRED DESIGN CROSS SLOPE. SIDEWALK BEYOND LANDING AREA MUST HAVE A MINIMUM 1% TO MAXIMUM 5% OF LONGITUDINAL SLOPE IN THE DIRECTION OF TRAVEL, AND A 1% TO 2% MAX. CROSS SLOPE.
9. SIDEWALK WIDTH MAY BE REDUCED TO 4'-0", WHEN PASSING AREAS 5'-0" X 5'-0" ARE PROVIDED EVERY 200'.
10. DETECTABLE WARNING SURFACES ARE TO BE PROVIDED AT CURB RAMPS, BLENDED TRANSITION AT PEDESTRIAN STREET CROSSINGS AND PEDESTRIAN REFUGE ISLANDS WHEN THOSE ARE WITHIN THE PUBLIC RIGHT-OF-WAY, AND WHERE SHOWN ON THE PLANS. SEE SEPARATE DETECTABLE WARNING SURFACE DETAILS.
11. IF THE DISTANCE BETWEEN THE GRADE BREAK AND THE BACK OF CURB IS GREATER THAN 5', THE DETECTABLE WARNING SURFACE MUST BE INSTALLED ALONG THE CURVED FLUSH CURB IN ACCORDANCE WITH THE "DETECTABLE WARNING SURFACE (DWS) ON CURVED SURFACE" DETAIL.

TYPICAL TYPE 1A CURB RAMP DETAIL

NOT TO SCALE MCPA-SITE-HADA-1001 12/01/20

NOTES:

1. 8.33% MAX RAMP SLOPE. TO AVOID CHASING GRADE INDEFINITELY WHEN TRAVERSING THE HEIGHT OF CURB, RAMP LENGTH NOT TO EXCEED 15'-0". ADJUST RAMP SLOPE AS NEEDED TO PROVIDE ACCESS TO THE MAXIMUM EXTENT FEASIBLE.
2. CURB RAMP WIDTH IS EQUAL TO SIDEWALK WIDTH WHEN THE SIDEWALK WIDTH IS GREATER THAN OR EQUAL TO THE MINIMUM 4'-0".
3. SIDEWALK WIDTH MAY BE REDUCED TO 4'-0", WHEN PASSING AREAS 5'-0" X 5'-0" ARE PROVIDED EVERY 200'.
4. SIDEWALK CROSS SLOPE MUST BE A MINIMUM OF 1% AND MAXIMUM 2%, WHEREAS 1.5% IS THE DESIRED DESIGN CROSS SLOPE. SIDEWALK BEYOND LANDING AREA MUST HAVE A MINIMUM 1% TO MAXIMUM 5% OF LONGITUDINAL SLOPE IN THE DIRECTION OF TRAVEL, AND A 1% TO 2% MAX. CROSS SLOPE.
5. CHEEK WALLS ARE PERMITTED WHEN ADJACENT TO NON-WALK AREAS OR ELEVATION DIFFERENCES CANNOT BE ACCOMMODATED BY FLARES OR GRADING. GRADE GRASS AREAS OR OTHER NON-WALK AREAS AT 3:1 OR FLATTER. DO NOT INSTALL CHEEK WALLS THAT INTERSECT THE PEDESTRIAN PATH.
6. GUTTER SLOPE ALONG CURB RAMP MUST MAINTAIN POSITIVE DRAINAGE WITH A 1.0 % TO 1.5% GUTTER SLOPE PREFERRED, WHEREAS 0.5% AS THE ABSOLUTE MINIMUM AND 2.0% IS MAXIMUM ALONG THE LENGTH OF THE FLUSH CURB.
7. DETECTABLE WARNING SURFACES ARE TO BE PROVIDED AT CURB RAMPS, BLENDED TRANSITION AT PEDESTRIAN STREET CROSSINGS AND PEDESTRIAN REFUGE ISLANDS WHEN THOSE ARE WITHIN THE PUBLIC RIGHT-OF-WAY, AND WHERE AS SHOWN ON THE PLANS.

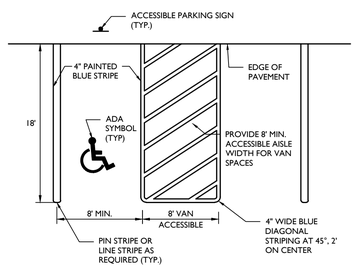
ALTERNATE TYPE 4A CURB PARALLEL RAMP DETAIL

NOT TO SCALE MCPA-SITE-HADA-1302 12/01/20

ADA GENERAL NOTES

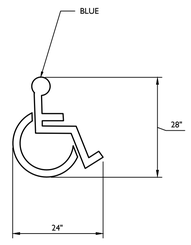
MCPA-SITE-HADA-1700 12/01/20

1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTIONS 350, 409, 630, 676, 694, AND 695.
2. PROVIDE EXPANSION JOINT MATERIAL,1/2" THICK WHERE CURB RAMP ADJOINS ANY RIGID PAVEMENT, SIDEWALK OR STRUCTURE WITH THE TOP OF JOINT FILLER FLUSH WITH ADJACENT CONCRETE SURFACE.
3. CONSTRUCT CURB RAMPS WITH A MINIMUM 4'-0" X 4'-0" CLEAR SPACE BEYOND THE CURB FACE, WITHIN THE WIDTH OF THE CROSSWALK AND WHOLLY OUTSIDE THE PARALLEL VEHICLE TRAVEL LANE. SEE SHEET 7 FOR CROSSWALK DETAILS.
4. SEAL JOINTS WITH AN APPROVED SEALING MATERIAL.
5. PROVIDE SLIP RESISTANT TEXTURE ON CURB RAMP BY COARSE BROOMING TRANSVERSE TO THE SLOPE OF THE RAMP. EXTEND TEXTURE THE FULL WIDTH AND LENGTH OF THE CURB RAMP, INCLUDING SIDE FLARES.
6. MODIFY CONSTRUCTION DETAILS TO ADAPT DIMENSIONS TO EXISTING CURB HEIGHTS WHERE THE CURB IS LESS THAN THE STANDARD 8" HEIGHT.
7. CURB RAMP AND SIDE FLARE LENGTHS ARE VARIABLE AND BASED ON CURB HEIGHT AND THE SIDEWALK SLOPE.
8. TO AVOID CHASING GRADE INDEFINITELY WHEN TRAVERSING THE HEIGHT OF CURB, RAMP LENGTH NOT TO EXCEED 15'-0", ADJUST RAMP SLOPE AS NEEDED TO PROVIDE ACCESS TO THE MAXIMUM EXTENT FEASIBLE.
9. NON-WALK AREA IS AN UNSTRUCTURED OR GRASS/NON-PAVED AREA ADJACENT TO THE PEDESTRIAN ACCESS ROUTE THAT IS NOT USED BY THE PEDESTRIAN FOR ACCESS.
10. THE DETAILS DEPICT PEDESTRIAN PUSHBUTTON POLES TO ILLUSTRATE THE RECOMMENDED PLACEMENT OF PEDESTRIAN PUSHBUTTONS. FOR ALTERATION PROJECTS, PROVIDE ACCESS TO EXISTING PEDESTRIAN PUSHBUTTONS TO THE MAXIMUM EXTENT FEASIBLE. INSTALL PEDESTRIAN PUSHBUTTON STUB POLES, WHERE APPLICABLE, SO AS NOT TO CREATE PEDESTRIAN OBSTRUCTIONS.
11. SEE TC-8803 FOR ADDITIONAL PEDESTRIAN PUSHBUTTON DETAILS NOT SHOWN.
12. ALIGN DETECTABLE WARNING SURFACE TRUNCATED DOMES ON A SQUARE GRID IN THE PREDOMINANT DIRECTION OF THE RAMP AND PERPENDICULAR TO CURB. SEE "DETECTABLE WARNING SURFACE (DWS) ON CURVED SURFACE" DETAIL FOR INSTALLATIONS ALONG CURVED SURFACES, IF APPLICABLE.
13. PROVIDE DETECTABLE WARNING SURFACES (DWS) 24" MINIMUM (IN THE DIRECTION OF PEDESTRIAN TRAVEL) ACROSS FULL WIDTH OF RAMP AT THE GRADE BREAK NEAR STREET EDGE. PROVIDES THAT CONTRAST VISUALLY WITH ADJACENT WALKWAY SURFACES, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT FOR THE FULL WIDTH OF RAMP IN ACCORDANCE WITH LOCAL REQUIREMENTS.
14. FOR NEW CONSTRUCTION, DO NOT EXCEED 2.00% CROSS SLOPE ON THE CURB RAMP OR PEDESTRIAN ACCESS ROUTE.
15. FOR NEW CONSTRUCTION AND ALTERATIONS, CONSTRUCT CURB RAMP AND FLARE SLOPES WITH THE FLATTEST SLOPE POSSIBLE. THE SLOPES INDICATED IN THE DETAILS SHOW THE MAX SLOPE ALLOWABLE. SLOPES THAT EXCEED THOSE INDICATED IN THE DETAILS, OR CONTRACT DOCUMENTS AS APPLICABLE, WILL NOT BE ACCEPTED AND WILL BE RECONSTRUCTED.
16. CONSTRUCT SIDEWALKS AT A LONGITUDINAL SLOPE NOT TO EXCEED 5.00%. FOR ROADWAY PROFILE SLOPES THAT EXCEED 5.00%, CONSTRUCT PARALLEL SIDEWALKS ADJACENT TO ROADWAY AT A LONGITUDINAL SLOPE NOT TO EXCEED ROADWAY PROFILE SLOPE.
17. THE CHANGE IN GRADE AT THE BOTTOM OF THE CURB RAMP AND ADJOINING ROAD SURFACE IS NOT TO EXCEED AN ALGEBRAIC DIFFERENCE OF 13.33%. THE COUNTER SLOPE OF THE GUTTER OR ROAD AT THE FOOT OF A CURB RAMP, TURNING SPACE OR BLENDED TRANSITION IS NOT TO EXCEED 5.00%. SEE "CHANGE OF GRADE LIMITATIONS" DETAIL, IF APPLICABLE.
18. THE CONSTRUCTION STANDARDS DEPICTED ARE MOST APPROPRIATE FOR NEW CONSTRUCTION. ALL CONSTRUCTION MUST MEET THE STANDARDS CONTAINED HEREIN UNLESS OTHERWISE NOTED OR DIRECTED.
19. ALL SLOPES ARE MEASURED WITH RESPECT TO A LEVEL PLANE. THEREFORE, THE LENGTH OF RAMP IS NOT SOLELY DEPENDANT ON THE HEIGHT OF CURB. (FOR EXAMPLE, A 6" CURB DOES NOT NECESSARILY MEAN A RAMP LENGTH OF 6'-0" FOR A 12:1 SLOPE.
20. SIDEWALK WIDTH MAY BE REDUCED TO 4'-0", WHEN PASSING AREAS 5'-0" X 5'-0" ARE PROVIDED EVERY 200'.
21. THE TRAVEL LANE IS DEFINED BY THE OUTSIDE EDGE OF THE WHITE PAVEMENT MARKING LINE. IF A WHITE PAVEMENT MARKING LINE DOES NOT EXIST, THE TRAVEL LANE IS DEFINED BY THE CONTRACT DOCUMENTS.
22. CONSTRUCT FLUSH CURB FOR CURB RAMPS FLUSH TO ADJACENT ROADWAY. GRADE EDGE OF ROAD ELEVATIONS AT THE FLOW LINE TO ENSURE POSITIVE DRAINAGE AND PREVENT PONDING. FOR LEVEL TURNING SPACES BEHIND FLUSH CURB, ADJUST SLOPES TO PROVIDE POSITIVE DRAINAGE. AT THE JOINT BETWEEN FLUSH CURB AND ROADWAYS, REMOVE EXCESS JOINT SEALER AND COVER THE SEALED AREA WITH A LIGHT APPLICATION OF DRY SAND.
23. CHEEK WALLS ARE PERMITTED WHEN ADJACENT TO NON-WALK AREAS OR ELEVATION DIFFERENCES CANNOT BE ACCOMMODATED BY FLARES OR GRADING. GRADE GRASS AREAS OR OTHER NON-WALK AREAS AT 3:1 OR FLATTER. DO NOT INSTALL CHEEK WALLS THAT INTERSECT THE PEDESTRIAN PATH.
24. CONSTRUCT TOP OF PLAIN CEMENT CONCRETE FLUSH CURB TO BE FLUSH WITH ADJACENT SURFACES (RAMPS, SIDEWALKS, FLARES).
25. FOR CURB RAMPS THAT LEAD TO A SINGLE CROSSWALK, THE RAMP (EXCLUDING FLARES) TO BE FULLY INSIDE OF MARKED CROSSWALK LINES.
26. A 4'-0" MAXIMUM DIGITAL DISPLAY LEVEL WILL BE USED TO VERIFY THE SLOPES OF CURB RAMPS AND SIDEWALKS.
27. INSTALL DUMMY JOINTS WHERE RAMPS, TURNING SPACES, FLARES, AND SIDEWALKS ABUT.
28. CONSTRUCT FLUSH CURB SLOPE TO MATCH ROADWAY PROFILE AND HAVE A FLUSH CONNECTION. TRANSITION CURB RAMP CROSS SLOPE TO MATCH ROADWAY PROFILE AS GRADUALLY AS POSSIBLE. DO NOT EXCEED 3.00% PER 1'-0" CROSS SLOPE RATE OF CHANGE WHEN TRANSITIONING TO ROADWAY PROFILE.
29. DO NOT SCORE OR MAKE GROOVES ON SLOPED SURFACES. LINES SHOWN ON DETAILS ARE FOR ILLUSTRATION ONLY. SEE NOTE 5.
30. CONTRACTOR MUST PREPARE SHOP DRAWINGS OF EACH CURB RAMP FOR SUBMISSION AND APPROVAL OF THE UNDERSIGNED PROFESSIONAL AND THE MUNICIPAL, COUNTY, STATE OR OTHER AGENCY'S ENGINEER HAVING JURISDICTION. DEVIATIONS FROM THE CURB RAMP DETAILS REQUIRE WRITTEN APPROVAL OF THE UNDERSIGNED PROFESSIONAL AND THE MUNICIPAL, COUNTY, STATE OR OTHER AGENCY'S ENGINEER HAVING JURISDICTION.
31. ACCESSIBLE RAMPS:
    A. ON-SITE RAMP OR CURB RAMPS MUST BE INSTALLED IN CONFORMANCE WITH THE CURRENT ADA STANDARDS FOR ACCESSIBLE DESIGN AS PUBLISHED BY THE UNITED STATES DEPARTMENT OF JUSTICE AND MUST ALSO MEET OTHER APPLICABLE LOCAL AND STATE REQUIREMENTS IN EFFECT AT THE DATE OF CONSTRUCTION.
    B. PUBLIC RIGHT OF WAY ACCESSIBLE OR CURB RAMPS MUST BE INSTALLED PURSUANT WITH THE CURRENT UNITED STATES ACCESS BOARD "ACCESSIBILITY GUIDELINES FOR PEDESTRIAN FACILITIES IN THE PUBLIC RIGHT-OF-WAY" (PROWAG).
32. CURB RAMP SLOPE AS CONSTRUCTED IN THE DIRECTION OF TRAVEL CANNOT EXCEED 12H:1V. RAMP SLOPES OF 14H:1V ARE THE PREFERRED SLOPE TO MAINTAIN A LEVEL OF CONSTRUCTION TOLERANCE. MINIMUM CURB RAMP CROSS-SLOPE IS TO BE 0.50%, MAXIMUM CANNOT EXCEED 2.00%.
33. CURB RAMP SIDE FLARE SLOPES ARE TO BE 14H:1V DESIRABLE, 12H:1V MAXIMUM, BUT MAY BE 10H:1V UPON APPROVAL OF THE ENGINEER. WHERE SIDE FLARES ARE NOT REQUIRED, PROVIDE AN 18" CURB TAPER TO THE FLUSH CURB PER THE DETAIL.
34. LANDING AREA AT THE TOP AND BOTTOM OF THE CURB RAMP (AKA. CLEAR OR TURNING SPACE) MUST BE KEPT CLEAR OF OBSTRUCTIONS. THE LANDING AREA IS TO BE 4' X 4' MINIMUM AND MATCH THE WIDTH OF THE CURB RAMP. INCREASED THE DEPTH OF MINIMUM LANDING AREA TO 5 FEET IF CONSTRAINED AT THE BACK OF THE SIDEWALK.
35. THE LANDING AREA MUST HAVE AN ABSOLUTE MINIMUM SLOPE OF 0.5% AND A MAXIMUM SLOPE OF 2%, WHEREAS 1.0% TO 1.5% IS THE DESIRED DESIGN SLOPE IN THE DIRECTION OF TRAVEL AND FOR THE CROSS SLOPE.
36. SIDEWALK CROSS SLOPE MUST BE A MINIMUM OF 1% AND MAXIMUM 2%, WHEREAS 1.5% IS THE DESIRED DESIGN CROSS SLOPE. SIDEWALK BEYOND LANDING AREA MUST HAVE A MINIMUM 1% TO MAXIMUM 5% OF LONGITUDINAL SLOPE IN THE DIRECTION OF TRAVEL, AND A 1% TO 2% MAX. CROSS SLOPE.
37. FLUSH CURB AT CURB RAMP MUST BE MINIMUM 4' WIDE AND FLUSH WITH PAVEMENT. THE SEGMENT OF FLUSH CURB MUST BE MADE WITH CONCRETE CURB REGARDLESS OF THE CURB MATERIAL USED THROUGHOUT THE SITE.
38. GUTTER SLOPE THE ALONG CURB RAMP MUST MAINTAIN POSITIVE DRAINAGE WITH A 1.0 % TO 1.5% GUTTER SLOPE PREFERRED, WHEREAS 0.5% AS THE ABSOLUTE MINIMUM AND 2.0% IS MAXIMUM ALONG THE LENGTH OF THE FLUSH CURB.
39. CROSSWALKS AND PAVEMENT MARKINGS MUST BE INSTALLED AS DENOTED ON SITE PLAN. CURB RAMP MUST BE WHOLLY CONTAINED WITHIN THE CROSSWALK CROSSING.
40. THE RAMP SURFACE MUST HAVE A SLIP RESISTANT, BROOM FINISH PERPENDICULAR TO THE PATH OF TRAVEL.
41. CONCRETE EXPANSION JOINTS MUST HAVE A FIRM SURFACE WITH ¼" BEVELED CONCRETE EDGES. THE JOINT SURFACE SHALL NOT BE MORE THAN ¼" BELOW THE ADJOINING CONCRETE SURFACE.
42. DETECTABLE WARNING SURFACES ARE TO BE PROVIDED AT CURB RAMPS, BLENDED TRANSITION AT PEDESTRIAN STREET CROSSINGS AND PEDESTRIAN REFUGE ISLANDS WHEN THOSE ARE WITHIN THE PUBLIC RIGHT-OF-WAY, AND WHERE AS SHOWN ON THE PLANS.



ACCESSIBLE PARKING STALL DETAIL

NOT TO SCALE MCPA-SITE-MRKG-1600 05/01/18



STROKE WIDTH: MINIMUM/STANDARD = 3"

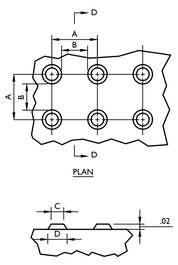
ADA SYMBOL DETAIL

NOT TO SCALE MCPA-SITE-MRKG-1800 05/01/18

DETECTABLE WARNING SURFACE (DWS) NOTES

MCPA-SITE-HADA-1602 12/01/20

1. THE DETECTABLE WARNING SURFACE IS TO BE MANUFACTURED MATS THAT ARE EMBEDDED AND CAST-IN-PLACE IN THE CONCRETE.
2. IN LIEU OF A CAST IN PLACE DETECTABLE WARNING SURFACE, THE CONTRACTOR MAY UTILIZE A SURFACE APPLIED DETECTABLE WARNING SURFACE WITH PRIOR APPROVAL OF THE UNDERSIGNED ENGINEER AND PRIOR TO POURING OF THE CONCRETE RAMP.
3. THE CONTRACTOR MUST SUBMIT TO THE ENGINEER FOR APPROVAL A SHOP DRAWING OF THE DETECTABLE WARNING SURFACE PRIOR TO CONSTRUCTION.
4. THE CONTRACTOR MUST PROVIDE A MANUFACTURER CERTIFICATION THAT THE DETECTABLE WARNING SURFACE COMPLIES WITH THE CURRENT ADA STANDARDS FOR ACCESSIBLE DESIGN AS PUBLISHED BY THE DEPARTMENT OF JUSTICE AND THE ADA STANDARDS AS SUPPORTED BY THE UNITED STATES ACCESS BOARD, AND THE STATE AND/OR LOCAL ADA STANDARDS.
5. COLOR MUST BE AS APPROVED BY THE LOCAL JURISDICTION PRIOR TO INSTALLATION. DETECTABLE WARNING SURFACES MUST CONTRAST VISUALLY WITH ADJACENT WALKING SURFACES EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT. ALTERNATIVE COLOR MAY BE USED PROVIDED SUCH COLOR COMPLIES WITH CURRENT ADA STANDARDS.
6. DETECTABLE WARNINGS ARE TO CONSIST OF A SURFACE OF TRUNCATED DOMES.
7. TRUNCATED DOMES IN A DETECTABLE WARNING SURFACE MUST HAVE A BASE DIAMETER OF 0.9 INCH (23 mm) MINIMUM AND 1.4 INCHES (36 mm) MAXIMUM, A TOP DIAMETER OF 50 PERCENT OF THE BASE DIAMETER MINIMUM TO 65 PERCENT OF THE BASE DIAMETER MAXIMUM, AND A HEIGHT OF 0.2 INCH (5.1 mm).
8. TRUNCATED DOMES IN DETECTABLE WARNING SURFACE MUST HAVE A CENTER-TO-CENTER SPACING OF 1.6 INCHES (41 mm) MINIMUM AND 2.4 INCHES (61 mm) MAXIMUM, AND A BASE-TO-BASE SPACING OF 0.65 INCH (17 mm) MINIMUM, MEASURED BETWEEN THE MOST ADJACENT DOMES ON A SQUARE GRID.
9. SOME DETECTABLE WARNING PRODUCTS REQUIRE A CONCRETE BORDER FOR PROPER INSTALLATION. WHERE REQUIRED BY THE MANUFACTURER, THE CONCRETE BORDER MUST NOT EXCEED 2 INCHES (51 mm).
10. DETECTABLE WARNING SURFACES ARE NOT BE PLACED ON PAVING OR EXPANSION JOINTS AT CURB RAMPS. THE ROWS OF TRUNCATED DOMES IN DETECTABLE WARNING SURFACES ARE TO BE ALIGNED PERPENDICULAR TO THE GRADE BREAK BETWEEN THE RAMP RUN AND THE STREET SO PEDESTRIANS WHO USE WHEELCHAIRS CAN "TRACK" BETWEEN THE DOMES.
11. ON PERPENDICULAR CURB RAMPS, DETECTABLE WARNING SURFACES ARE TO BE PLACED AS FOLLOWS:
    a. WHERE THE ENDS OF THE BOTTOM GRADE BREAK ARE IN FRONT OF THE BACK OF CURB, DETECTABLE WARNING SURFACES ARE TO BE PLACED AT THE BACK OF CURB.
    b. WHERE THE ENDS OF THE BOTTOM GRADE BREAK ARE BEHIND THE BACK OF CURB AND THE DISTANCE FROM EITHER END OF THE BOTTOM GRADE BREAK TO THE BACK OF CURB IS 5.0 FT OR LESS, DETECTABLE WARNING SURFACES ARE TO BE PLACED ON THE RAMP RUN WITHIN ONE DOME SPACING OF THE BOTTOM GRADE BREAK.
    c. WHERE THE ENDS OF THE BOTTOM GRADE BREAK ARE BEHIND THE BACK OF CURB AND THE DISTANCE FROM EITHER END OF THE BOTTOM GRADE BREAK TO THE BACK OF CURB IS MORE THAN 5.0 FT, DETECTABLE WARNING SURFACES ARE TO BE PLACED ON THE LOWER LANDING AT THE BACK OF CURB.
12. ON PARALLEL CURB RAMPS, DETECTABLE WARNING SURFACES ARE TO BE PLACED ON THE TURNING SPACE AT THE FLUSH TRANSITION BETWEEN THE STREET AND SIDEWALKS.
13. ON BLENDED TRANSITIONS, DETECTABLE WARNING SURFACES ARE TO BE PLACED AT THE BACK OF CURB. WHERE RAISED PEDESTRIAN STREET CROSSINGS, DEPRESSED CORNERS OR OTHER LEVEL PEDESTRIAN STREET CROSSINGS ARE PROVIDED, DETECTABLE WARNING SURFACES ARE TO BE PLACED AT THE FLUSH TRANSITION BETWEEN THE STREET AND THE SIDEWALK.



TRUNCATED DOME DIMENSIONS		
DIM	MIN mm (inch)	MAX mm (inch)
A	1.6"	2.4"
B	0.65"	1.5"
C	NOTE 1	NOTE 1
D	0.9"	1.4"

NOTES:

1. THE "C" DIMENSION IS 50% TO 65% OF THE "D" DIMENSION.

DETECTABLE WARNING SURFACE (DWS) TRUNCATED DOME DETAIL

NOT TO SCALE MCPA-SITE-HADA-1601 05/01/18

ADA INSTRUCTIONS TO CONTRACTOR

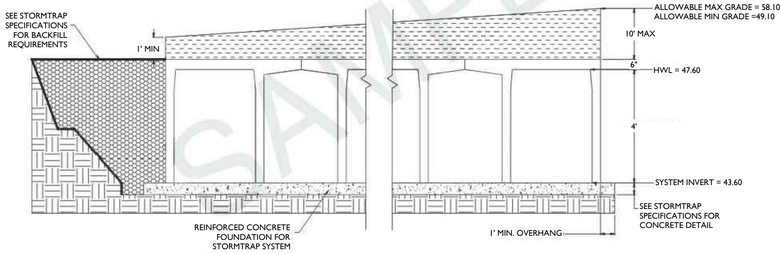
MCPA-SITE-HADA-1800 12/01/20

1. CONTRACTOR MUST EXERCISE APPROPRIATE CARE AND PRECISION IN CONSTRUCTION OF ADA (HANDICAPPED) ACCESSIBLE COMPONENTS FOR THE SITE/PROJECT. THESE COMPONENTS, AS CONSTRUCTED, MUST COMPLY WITH THE LATEST FEDERAL ADA STANDARDS FOR ACCESSIBLE DESIGN, AND CONSTRUCTION WITHIN THE PUBLIC RIGHT-OF-WAY MUST COMPLY WITH THE LATEST FEDERAL PROPOSED "ASSESSIBILITY GUIDELINES FOR PEDESTRIAN FACILITIES IN THE PUBLIC RIGHT-OF-WAY" (PROWAG).
2. FINISHED SURFACES ALONG THE ACCESSIBLE ROUTE OF TRAVEL FROM PARKING SPACE, PUBLIC TRANSPORTATION, PEDESTRIAN ACCESS, INTER-BUILDING ACCESS, TO POINTS OF ACCESSIBLE BUILDING ENTRANCE/EGRESS, MUST COMPLY WITH THESE ADA CODE REQUIREMENTS AND ANY SUPPLEMENTAL STATE REQUIREMENTS. THESE INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:

   (NOTE: THIS LIST IS NOT INTENDED TO CAPTURE EVERY APPLICABLE FEDERAL, STATE AND LOCAL RULE AND REGULATION. THE CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH THE LAW, WHETHER OR NOT STATED SPECIFICALLY HEREIN):

   A. PARKING SPACES AND PARKING AISLES - SLOPE MUST NOT EXCEED 1:48 (1/4" PER FOOT OR NORMALLY 2.0%) IN ANY DIRECTION.
   B. CURB RAMPS- SLOPES MUST NOT EXCEED 1:12 (8.3%).
   C. LANDINGS
      i. LANDINGS AT CURB RAMPS - MUST BE 4 FT. MIN., X 4 FT. MIN. AND ARE TO BE INCREASED TO 5 FEET WHERE THE LANDING SPACE (TURNING SPACE) IS CONSTRAINED AT THE BACK OF THE SIDEWALK.
      ii. LANDINGS AT RAMPS - MUST BE 5 FT MIN. IN THE DIR

SAMPLE



NOTES:
1. STORMTRAP MODULES SHALL BE MANUFACTURED AND INSTALLED ACCORDING TO SHOP DRAWINGS APPROVED BY THE INSTALLING CONTRACTOR AND ENGINEER OF RECORD. THE SHOP DRAWINGS SHALL INDICATE SIZE AND LOCATION OF ROOF OPENINGS AND INLET/OUTLET PIPE TYPES, SIZES, INVERT ELEVATIONS AND SIZE OF OPENINGS.

STORMTRAP SINGLETRAP 4-0 TYPICAL DETAIL

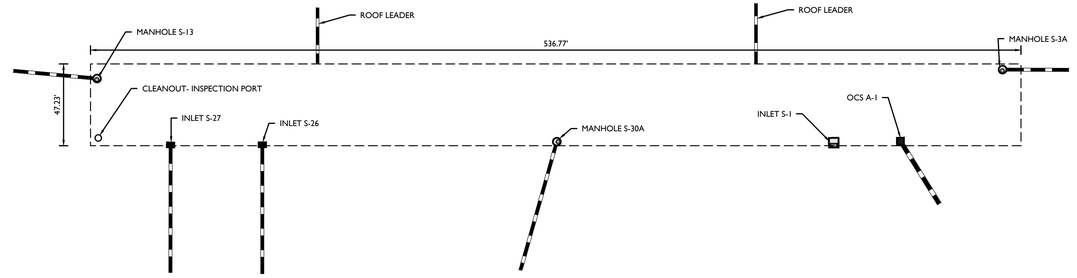
STORMTRAP SYSTEM INFORMATION

WATER STORAGE PROVIDED: 2.071 ACRE-FT

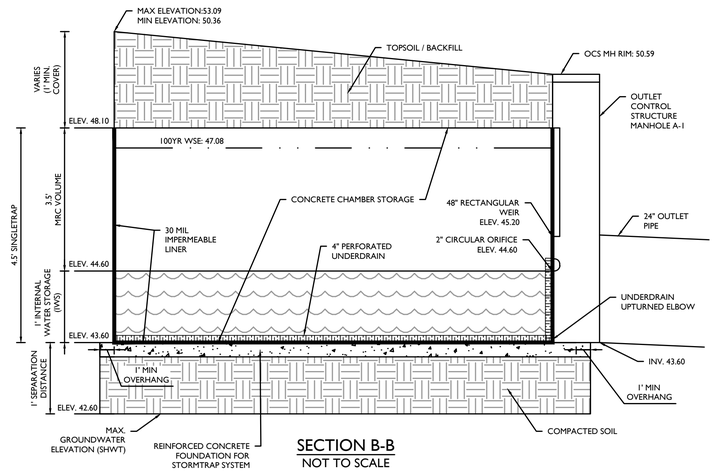
UNIT HEADROOM: 4'-6" SINGLETRAP (ST-4)

UNIT QUANTITY: 136 TOTAL PIECES

UNDERGROUND MRC BASIN STAGE STORAGE	
ELEVATION (FEET)	STORAGE (ACRE-FEET)
43.60	0.000
44.00	0.207
44.50	0.466
45.00	0.725
45.50	0.984
46.00	1.243
46.50	1.502
47.00	1.761
47.50	2.020
48.00	2.071
48.10	2.071



UNDERGROUND SYSTEM NOTES :
1. USE 4'-0" DEEP STORMTRAP SINGLETRAP REINFORCED CONCRETE STRUCTURES OR AN EQUIVALENT FOR THE UNDERGROUND SYSTEM.
2. STORMTRAP STORAGE PROVIDED: 2.071 AF
   UNIT HEADROOM: 4'-6" SINGLETRAP (ST-4)
   UNIT QUANTITY: 136 TOTAL PIECES
3. STORMTRAP MODULES SHALL BE MANUFACTURED AND INSTALLED ACCORDING TO SHOP DRAWINGS APPROVED BY THE INSTALLING CONTRACTOR AND ENGINEER OF RECORD. THE SHOP DRAWINGS SHALL INDICATE SIZE AND LOCATION OF ROOF OPENINGS AND INLET/OUTLET PIPE TYPES, SIZES, INVERT ELEVATIONS, AND SIZES OF OPENINGS.
4. COVER RANGE: MIN. 1.00', MAX. 10.00'
5. ALL DIMENSIONS AND SOIL CONDITIONS, INCLUDING BUT NOT LIMITED TO GROUNDWATER AND SOIL BEARING CAPACITY ARE REQUIRED TO BE VERIFIED IN THE FIELD BY OTHERS PRIOR TO STORMTRAP INSTALLATION.
6. CONTRACTORS RESPONSIBILITY TO ENSURE CONSISTENCY/ACCURACY TO FINAL ENGINEER OF RECORD PLAN SET
7. STORMTRAP SHALL BE INSTALLED IN ACCORDANCE WITH ASTM C891, STANDARD FOR INSTALLATION OF UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES.
8. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT PROPER/ ADEQUATE EQUIPMENT IS USED TO SET/ INSTALL THE MODULES.
9. STORMTRAP MODULES SHALL BE PLACED ON A LEVEL CONCRETE FOUNDATION WITH A 1'-0" OVERHANG ON ALL SIDES THAT SHALL BE POURED IN PLACE BY INSTALLING CONTRACTOR. A QUALIFIED GEOTECHNICAL ENGINEER WILL BE EMPLOYED, BY OWNER, TO PROVIDE ASSISTANCE I N EVALUATING THE EXISTI NG SOIL CONDITIONS. TO ENSURE THAT THE SOIL BEARING PRESSURE MEET OR EXCEED THE STRUCTURAL DESIGN LOADING CRITERIA AS SPECIFIED.
10. THE FILL PLACED AROUND THE STORMTRAP MODULES MUST BE DEPOSITED ON BOTH SIDES AT THE SAME TIME AND TO APPROXIMATELY THE SAME ELEVATION. AT NO TIME SHALL THE FILL BEHIND ONE SIDE WALL BE MORE THAN 2'-0" HIGHER THAN THE FILL ON THE OPPOSITE SIDE. BACKFILL SHALL EITHER BE COMPACTED AND/OR VIBRATED TO ENSURE THAT BACKFILL AGGREGATE/STONE MATERIAL IS WELL SEATED AND PROPERLY INTERLOCKED. CARE SHALL BE TAKEN TO PREVENT ANY WEDGING ACTION AGAINST THE STRUCTURE, AND ALL SLOPES WITHIN THE AREA TO BE BACKFILLED MUST BE STEPPED OR SERRATED TO PREVENT WEDGING ACTION. CARE SHALL ALSO BE TAKEN AS NOT TO DISRUPT THE JOINT WRAP FROM THE JOINT DURING THE BACKFILL PROCESS. BACKFILL MATERIAL SHALL BE CLEAN, CRUSHED, ANGULAR NO. 5 (AASHTO M43) AGGREGATE. IF NATIVE EARTH IS SUSCEPTIBLE TO MIGRATION, CONFIRM WITH GEOTECHNICAL ENGINEER AND PROVIDE PROTECTION AS REQUIRED.
11. DURING PLACEMENT OF MATERIAL OVERTOP THE SYSTEM, AT NO TIME SHALL MACHINERY BE USED OVERTOP THAT EXCEEDS THE DESIGN LIMITATIONS OF THE SYSTEM. WHEN PLACEMENT OF MATERIAL OVERTOP, MATERIAL SHALL BE PLACED SUCH THAT THE DIRECTION OF PLACEMENT IS PARALLEL WITH THE OVERALL LONGITUDINAL DIRECTION OF THE SYSTEM WHENEVER POSSIBLE.
12. THE FILL PLACED OVERTOP THE SYSTEM SHALL BE PLACED AT A MINIMUM OF 6" LIFTS. AT NO TIME SHALL MACHINERY OR VEHICLES GREATER THAN THE DESIGN HS20 LOADING CRITERIA TRAVEL OVERTOP THE SYSTEM WITHOUT THE MINIMUM DESIGN COVERAGE. IF TRAVEL IS NECESSARY OVERTOP THE SYSTEM PRIOR TO ACHIEVING THE MINIMUM DESIGN COVER, IT MAY BE NECESSARY TO REDUCE THE ULTIMATE LOAD/BURDEN OF THE OPERATING MACHINERY SO AS TO NOT EXCEED THE DESIGN CAPACITY OF THE SYSTEM. IN SOME CASES, IN ORDER TO ACHIEVE REQUIRED COMPACTION, HAND COMPACTION MAY BE NECESSARY IN ORDER TO NOT EXCEED THE ALLOTTED DESIGN LOADING.
13. REFER TO PENNDOT PUBLICATION 408 SECTION 610 FOR SPECIFICATIONS OF UNDERDRAINS.

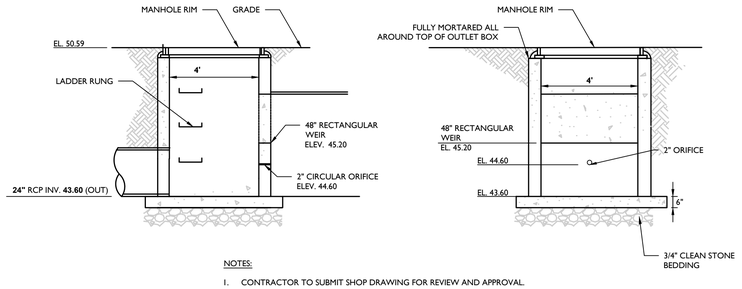


SECTION B-B
NOT TO SCALE

MRC UNDERGROUND DETENTION BASIN DETAIL

NOT TO SCALE

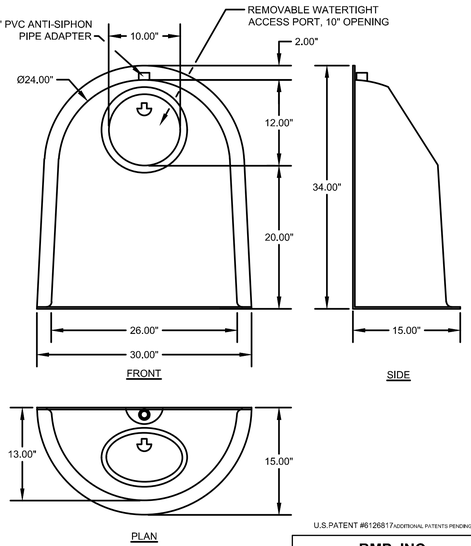
05/01/18



NOTES:
1. CONTRACTOR TO SUBMIT SHOP DRAWING FOR REVIEW AND APPROVAL.
2. ALL CONCRETE TO BE CLASS "A".

OUTLET CONTROL STRUCTURE A-1 MRC BASIN DETAIL (SINGLE CHAMBER)

NOT TO SCALE MCPA-UTIL-STMW-1600 05/01/18



U.S.PATENT #6126817 ADDITIONAL PATENTS PENDING

BMP, INC.
53 MT. ARCHER ROAD, LYME, CT. 06371
(800) 504-8008 FAX: (860)434-3195

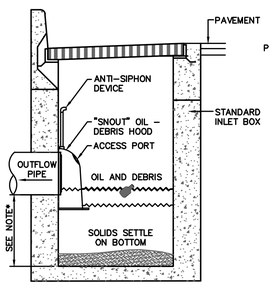
DESCRIPTION	DATE	SCALE
24F SNOUT OIL & DEBRIS STOP	09/20/99	NONE
	DRAWING NUMBER 24F	

SNOUT BMP CONSTRUCTION SEQUENCE:

1. STABILIZE ALL CONTRIBUTING AREAS BEFORE INSTALLING AND CONNECTING PIPES TO THESE INLETS.
2. FOLLOW MANUFACTURER'S GUIDELINES FOR INSTALLATION. DO NOT USE SNOUTS DURING CONSTRUCTION UNLESS PRODUCT IS DESIGNED PRIMARILY FOR SEDIMENT REMOVAL.

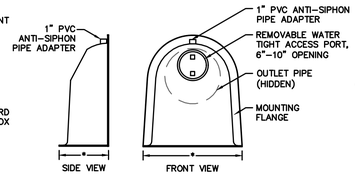
SNOUT BMP MANUFACTURER'S INSTALLATION INSTRUCTIONS:

1. CENTER THE SNOUT® DIRECTLY OVER THE EXIT PIPE SO THAT THE ENTIRE PIPE IS COVERED AND SO THAT THE LOWER EDGE OF THE HOOD IS AT LEAST 1/2 THE PIPE DIAMETER BELOW THE LOWEST INSIDE POINT OF THE PIPE (DEEPER IS EVEN BETTER.)
2. DRILL * EQUALLY SPACED 7/16" HOLES THROUGH THE SNOUT® FLANGE. (*NUMBER OF HOLES VARY DEPENDING ON SIZE OF SNOUT®.)
3. MARK AND DRILL CATCH BASIN AND INSTALL THE TAMP-IN LEAD ANCHORS.
   3.1. DRILL A 3/4"HOLE INTO THE BASE MATERIAL TO THE REQUIRED DEPTH (APPROXIMATELY 1-1/4" DEEP.)
   3.2. BLOW THE HOLE CLEAN OF DUST AND OTHER MATERIAL.
   3.3. INSERT THE ANCHOR INTO THE HOLE. NARROW END OF CONE MUST POINT OUT. LEAD SHIELD SLIDES OVER CONE.
   3.4. POSITION THE SETTING TOOL OR A 9/16 SOCKET AGAINST THE ANCHOR OUTER CONE. (THE OUTER RIM OF THE TOOL OR SOCKET SHOULD SEAT ONTO THE LEAD SHIELD RIM.) SET THE ANCHOR BY DRIVING THE LEAD SLEEVE OVER THE CONE USING SEVERAL SHARP HAMMER BLOWS. BE SURE THE ANCHOR IS AT THE REQUIRED EMBEDMENT DEPTH (FLUSH OR SLIGHTLY BELOW FACE OF CONCRETE)
4. ATTACH THE VENT PIPE ADAPTER IN THE PRE-DRILLED HOLE IN THE TOP OF THE SNOUT® USING THE 2 FLAT O RING GASKETS AND PVC LOCK-NUT SUPPLIED IN THE KIT. INSTALL WITH FEMALE SLIP ADAPTER UP AND A WASHER ON EACH SIDE OF THE SNOUT® SHELL. TIGHTEN LOCK-NUT HAND TIGHT.
5. REMOVE PSA BACKING AND WITH FIRM PRESSURE, ATTACH GASKET STRIP(S) TO BACK OF FLANGE AND TRIM EXCESS.
6. ATTACH THE SNOUT® TO THE CATCH BASIN WALL WITH 3/8" DIAMETER STAINLESS STEEL BOLTS IN LEAD EXPANSION ANCHORS. DO NOT OVER TIGHTEN; 10-15 FOOT-POUNDS SHOULD BE SUFFICIENT.
7. CUT THE ANTI-SIPHON VENT STACK TO LENGTH AND ATTACH TO HOOD AT SLIP ADAPTER WITH PVC CEMENT.
8. ATTACH 90 DEGREE FITTING TO VENT STACK WITH PVC CEMENT. ENSURE THAT FITTING OPENING IS ACCESSIBLE FOR MAINTENANCE AND INSPECTION.



SECTION

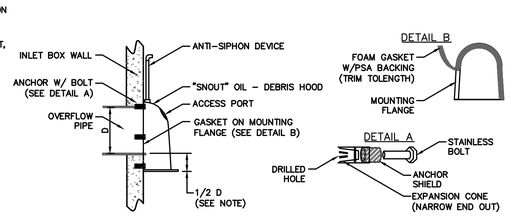
* NOTE- SUMP DEPTH OF 36" MIN. FOR < OR= 12" DIAM. OUTLET. FOR OUTLETS >OR= 15", DEPTH = 2.5-3X DIAM.



* OUTFLOW AREA AT HOOD EQUAL TO OUTFLOW PIPE AREA.

OIL - DEBRIS HOOD

"SNOUT" IS MANUFACTURED BY AND AVAILABLE THROUGH:
BEST MANAGEMENT PRODUCTS, INC.
53 MT. ARCHER RD.
LYME, CT 06371
PHONE (860) 434-0277 * FAX (860) 434-8195
E-MAIL: duran@bestmp.com * WEBSITE: www.bestmp.com



"SNOUT" INLET
NOT TO SCALE

SNOUT INLET - OPERATION AND MAINTENANCE PROCEDURES

A. INSPECTION:
   1. INSPECT INLET MONTHLY FOR THE FIRST YEAR AFTER THE SITE HAS BEEN STABILIZED.
   2. AFTER EACH MAJOR STORM EVENT, INSPECT INLET IMMEDIATELY, IF SEDIMENT HAS ACCUMULATED TO AND WITHIN ONE (1) FOOT BELOW THE OUTFALL ELEVATION, PERFORM CLEANING AS NECESSARY.
   3. ANNUALLY INSPECT THE "SNOUT" HOOD, THE ANTI-SIPHON DEVISE AND THE ACCESS HATCH FOR ANY CRACKED OR DAMAGED PARTS, REPLACE ALL DAMAGED COMPONENTS IMMEDIATELY.

B. CLEANING:
   1. REMOVE ALL SOLID DEBRIS FROM THE INLET, A MINIMUM OF EVERY SIX (6) MONTH OR WHEN THE SEDIMENT IS TO AND WITHIN ONE (1) FOOT BELOW THE OUTFALL ELEVATION.
   2. WHEN THERE HAS BEEN A SPILL OR INCIDENT THAT CAUSES A LARGER THAN NORMAL ACCUMULATION OF POLLUTANTS, REMOVE ALL SOLID DEBRIS FROM THE INLET.
   3. USE A VACUUM TRUCK TO REMOVE ALL SOLIDS IN THE BOTTOM OF THE STRUCTURE.
   4. DISPOSE OF ALL COLLECTED WASTES PER THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION REQUIREMENTS.
   5. FLUSH THE ANTI-SIPHON DEVISE ON THE "SNOUT" HOOD OR GENTLY CLEAR WITH A FLEXIBLE WIRE ONCE A YEAR.
   6. OPEN AND CLOSE THE ACCESS PORT ON THE "SNOUT" HOOD ONCE A YEAR AND CLEAR ANY OBSTRUCTIONS.

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	REVISED PER PRE-MARSHAL, TOWNSHIP AND ZONING REVIEW LETTERS
2	06/02/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
C. RICHARD ROSEBERRY
ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

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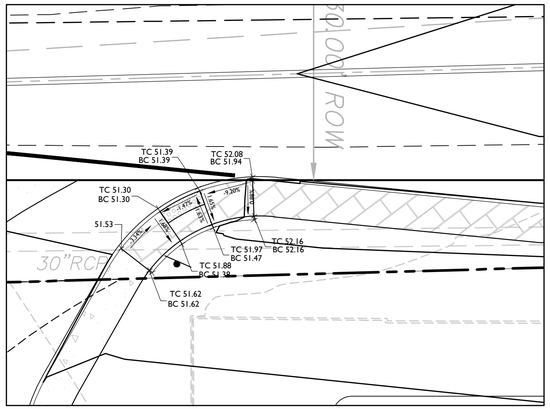
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PROJECT NUMBER: 16001030B	DRAWING NAME: C-DTLS		

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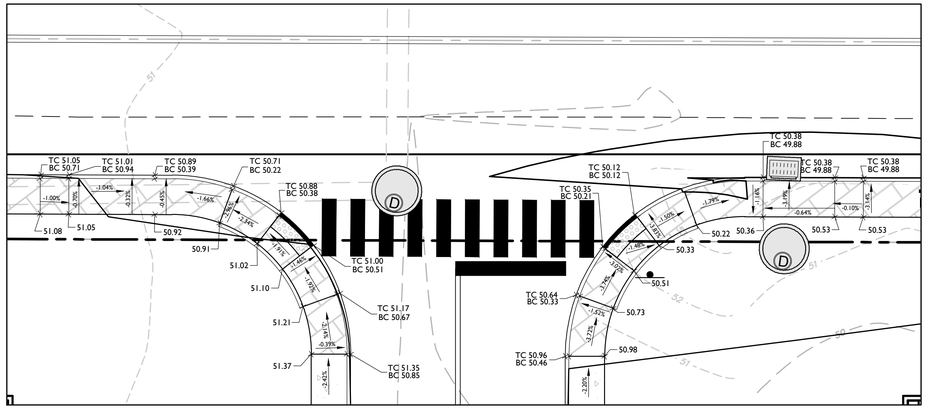
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2016\16001030B\Engineering\Site Plans\C-DTLS.dwg, C-19-DETAILS By: CHRIS.MCGUIRE

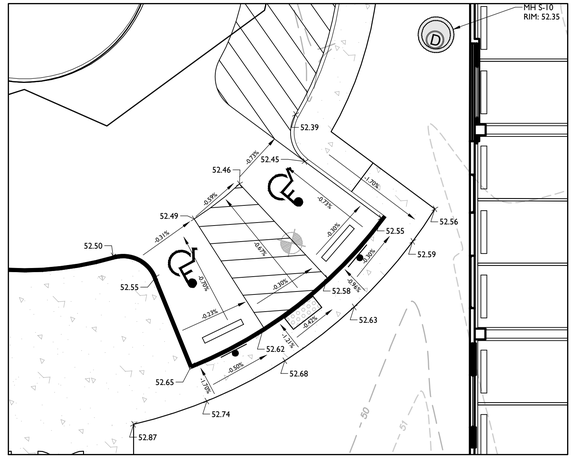
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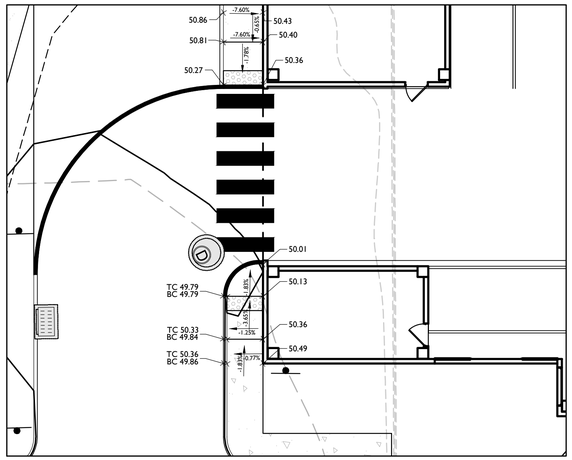
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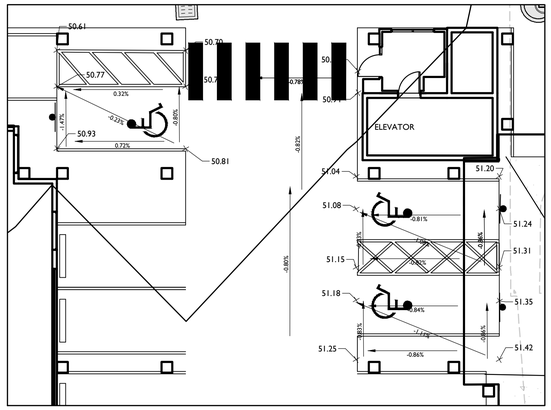
PEDESTRIAN WALKWAY (CENTER))



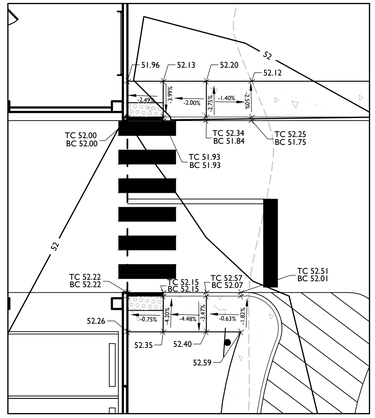
ADA PARKING BUILDING ENTRANCE



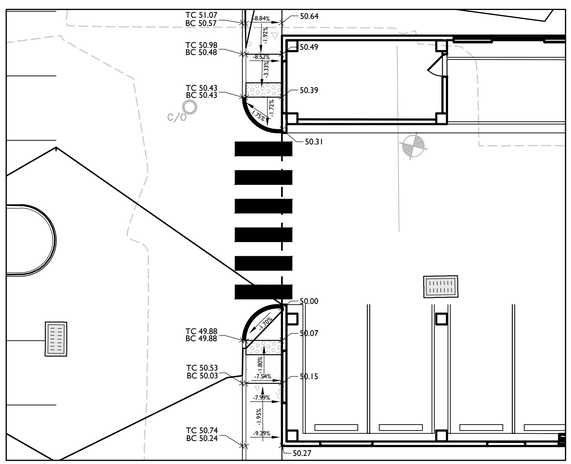
WEST PARKING GARAGE ENTRANCE (NORTHWEST)



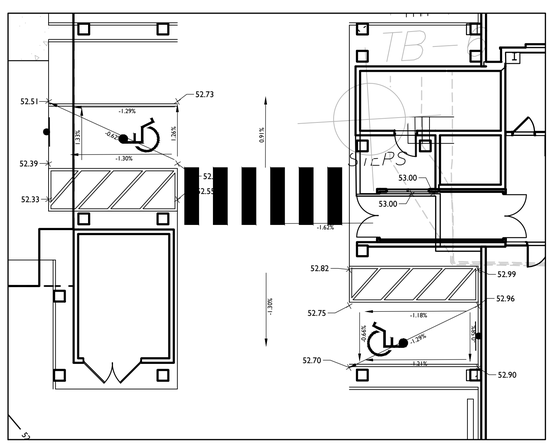
ADA PARKING (WEST)



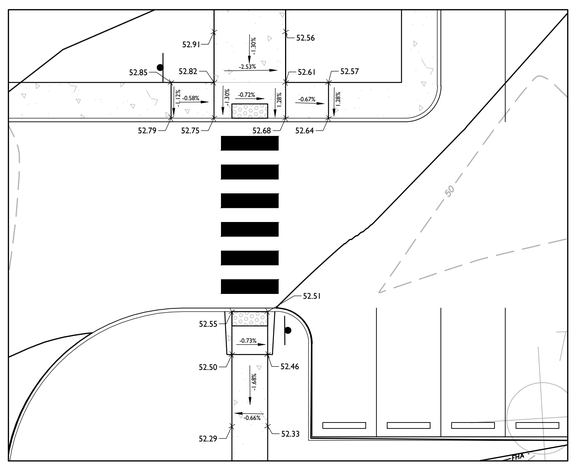
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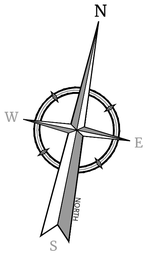
WEST PARKING GARAGE ENTRANCE (SOUTHWEST)



ADA PARKING (SOUTHWEST)



REAR BUILDING PARKING LOT



LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'C' INLET	
	'M' INLET	
D	STORM MANHOLE	D
S	SANITARY MANHOLE	S
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
75 / 74	CONTOURS	75 / 74
× G 29.0	SPOT ELEVATION	× G 29.0
	DIRECTION OF OVERLAND FLOW	
× TC 29.0	TOP OF CURB ELEVATION	× TC 29.0
× BC 29.0	BOTTOM OF CURB ELEVATION	× BC 29.0
	TOP OF DEPRESSED CURB ELEVATION	× TDC 29.0

10 0 10 20

SCALE : 1" = 10'

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

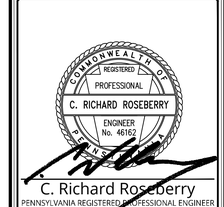
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1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS
2	06/02/22	CMM	REVISED PER PPA MARSHAL, TOWNSHIP AND ZONING REVIEW LETTERS



C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
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MONTGOMERY COUNTY
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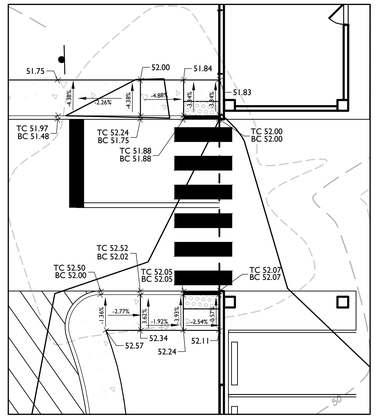
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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA
PROJECT NUMBER: 16001030B	DRAWING NAME: C-GRAD-HADA		

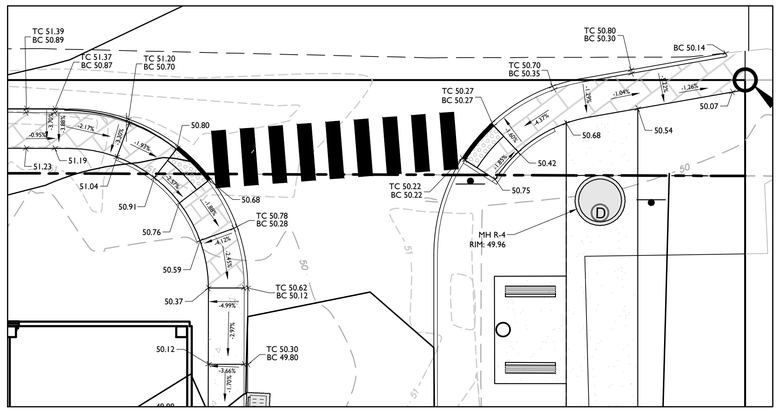
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ADA GRADING PLAN

SHEET NUMBER:
20 of 37

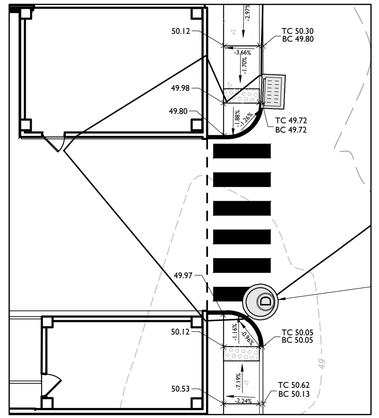
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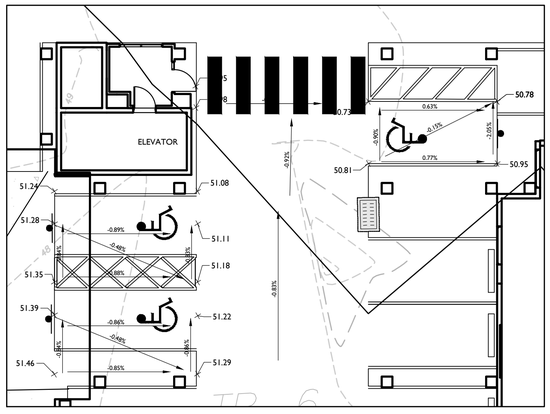
EAST PARKING GARAGE ENTRANCE (NORTHWEST)



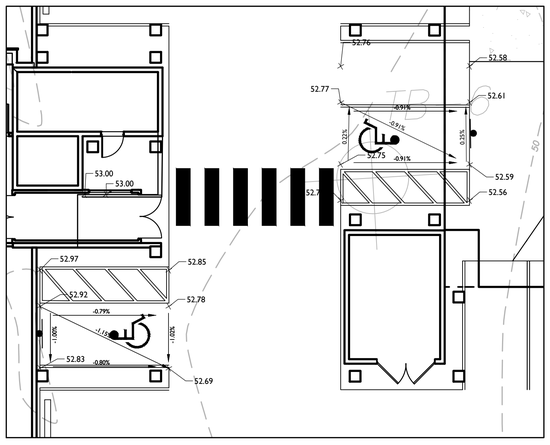
PEDESTRIAN WALKWAY (EAST)



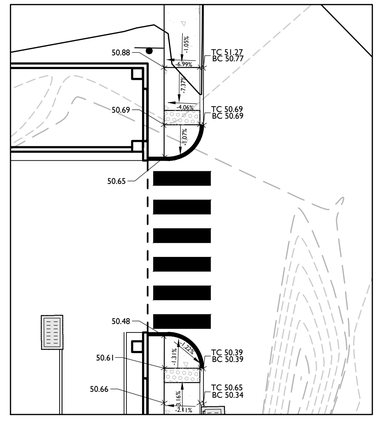
EAST PARKING GARAGE ENTRANCE (NORTHEAST)



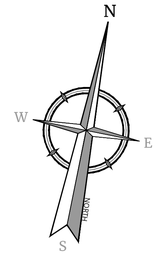
ADA PARKING (EAST)



ADA PARKING (SOUTHEAST)



EAST PARKING GARAGE ENTRANCE (SOUTHEAST)



LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'C' INLET	
	'M' INLET	
	STORM MANHOLE	
	SANITARY MANHOLE	
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
75 / 74	CONTOURS	75 / 74
× G 29.0	SPOT ELEVATION	× G 29.0
	DIRECTION OF OVERLAND FLOW	
× TC 29.0	TOP OF CURB ELEVATION	× TC 29.0
× BC 29.0	BOTTOM OF CURB ELEVATION	× BC 29.0
	TOP OF DEPRESSED CURB ELEVATION	× TDC 29.0

10 0 10 20

SCALE : 1" = 10'

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS
2	06/02/22	CMM	REVISED PER FIRE MARSHAL, TOWNSHIP AND ZONING REVIEW LETTERS

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL C. RICHARD ROSEBERRY ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

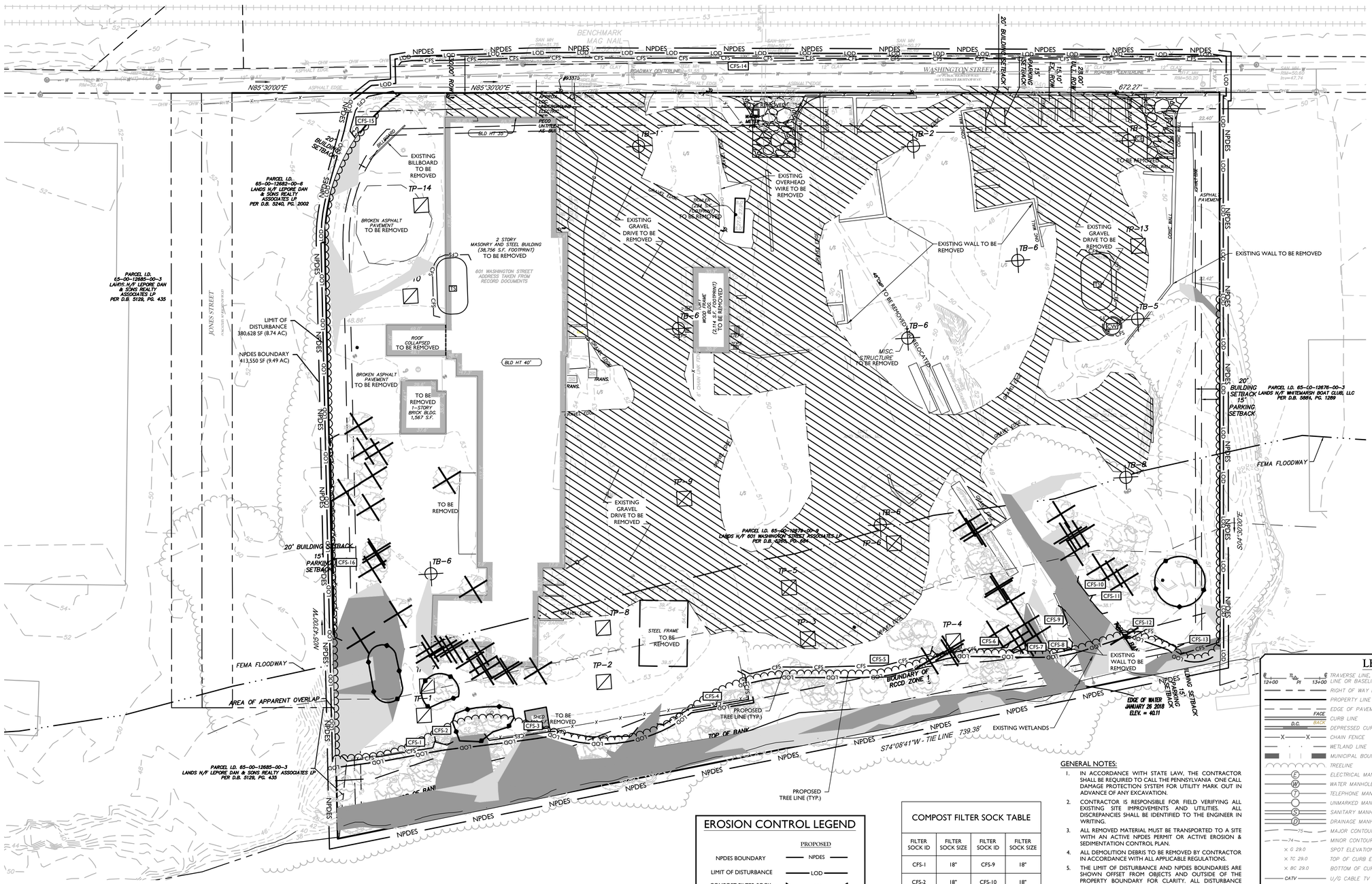
PROJECT NUMBER:	DRAWING NAME:
16001030B	C-GRAD-HADA

SHEET TITLE:
ADA GRADING PLAN

SHEET NUMBER:
21 of 37

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\Site Plans\C-GRAD-HADA.dwg|C-21-ADA GRADE By: MDIEDUS



DEMO LEGEND

SYMBOL/HATCH	DESCRIPTION
	EXISTING FEATURE TO BE REMOVED
	EXISTING TREE TO BE REMOVED
TB-6	TEST BORING LOCATION
TP-6	TEST PIT LOCATION

LEGEND

- TRAVERSE LINE, CENTER LINE OR BASELINE (12+00 PI 13+00)
- RIGHT OF WAY LINE
- PROPERTY LINE
- EDGE OF PAVEMENT
- CURB LINE (FACE, D.C. BACK)
- DEPRESSED CURB
- CHAIN FENCE
- WETLAND LINE
- MUNICIPAL BOUNDARY
- TREELINE
- ELECTRICAL MANHOLE (E)
- WATER MANHOLE (W)
- TELEPHONE MANHOLE (T)
- UNMARKED MANHOLE
- SANITARY MANHOLE (S)
- DRAINAGE MANHOLE (D)
- MAJOR CONTOUR (75)
- MINOR CONTOUR (74)
- SPOT ELEVATION (× G 29.0)
- TOP OF CURB ELEV. (× TC 29.0)
- BOTTOM OF CURB ELEV. (× BC 29.0)
- U/G CABLE TV LINE (CATV)
- U/G FIBER OPTIC LINE (FO)
- U/G TELEPHONE LINE (T)
- U/G ELECTRIC LINE (E)
- OVERHEAD WIRE (OHW)
- WATER MAIN (W)
- GAS MAIN (G)
- SAN. SEWER LATERAL (S)
- SAN. SEWER MAIN
- STORM PIPE
- WETLAND MARKER (W-1)
- TREE
- ROADWAY SIGNS
- TRAFFIC FLOW
- MAILBOX
- TRAFFIC SIGNAL POLE
- POLE MOUNTED LIGHT
- UTILITY POLE
- GUY WIRE
- TRANSFORMER
- FIRE DEPT. CONNECTION (FDC)
- FIRE HYDRANT
- WATER VALVE (WV)
- GAS VALVE (GV)
- SANITARY CLEANOUT (CO)
- CONCRETE MONUMENT
- CAPPED REBAR/IRON PIPE
- STORM INLET TYPE 'C'
- STM. DBL. INLET TYPE 'C'
- STORM INLET TYPE 'M'
- STM. DBL. INLET TYPE 'M'
- FLARED END SECTION
- HEADWALL
- SOIL BOUNDARY

ABBREVIATIONS

D.C. = DEPRESSED CURB	FF = FINISH FLOOR	MHWL = MEAN HIGH WATERLINE	
BC = BOTTOM OF CURB	UV = UNKNOWN VALVE	MLWL = MEAN LOW WATERLINE	
TC = TOP OF CURB	MH = MANHOLE	DEP. = DEPRESSED	TW = TOP OF WALL
BOL = BOLLARD	CL = CENTERLINE	BW = BOTTOM WALL	
GRT = GRATE	PM = PARKING METER		
MB = MAILBOX			

EROSION CONTROL LEGEND

	PROPOSED
NPDES BOUNDARY	NPDES
LIMIT OF DISTURBANCE	LOD
COMPOST FILTER SOCK	CFS
ROCK CONSTRUCTION ENTRANCE AND LABEL	CE
TOPSOIL STOCKPILE & 24" CFS	TS
INLET PROTECTION	
TREE PROTECTION FENCE	
CONCRETE WASHOUT	CW

COMPOST FILTER SOCK TABLE

FILTER SOCK ID	FILTER SOCK SIZE	FILTER SOCK ID	FILTER SOCK SIZE
CFS-1	18"	CFS-9	18"
CFS-2	18"	CFS-10	18"
CFS-3	18"	CFS-11	18"
CFS-4	18"	CFS-12	18"
CFS-5	18"	CFS-13	18"
CFS-6	18"	CFS-14	18"
CFS-7	18"	CFS-15	18"
CFS-8	18"		

DEMOLITION NOTES:

1. ALL DEMOLITION ACTIVITIES ARE TO BE PERFORMED IN STRICT ADHERENCE TO ALL FEDERAL STATE AND LOCAL REGULATIONS.
2. CONDUCT DEMOLITION SERVICES IN SUCH A MANNER TO INSURE MINIMUM INTERFERENCE WITH ROADS, STREETS, WALKS AND OTHER ADJACENT FACILITIES. DO NOT CLOSE OR OBSTRUCT STREETS, WALKS OR OTHER OCCUPIED FACILITIES WITHOUT PRIOR WRITTEN PERMISSION OF OWNER AND ANY APPLICABLE GOVERNMENTAL AUTHORITIES. PROVIDE ALTERNATE ROUTES AROUND CLOSED OR OBSTRUCTED TRAFFIC WAYS, IF REQUIRED BY APPLICABLE GOVERNMENTAL REGULATIONS.
3. USE WATERING, TEMPORARY ENCLOSURES AND OTHER SUITABLE METHODS, AS NECESSARY TO LIMIT THE AMOUNT OF DUST AND DIRT RISING AND SCATTERING IN THE AIR. CLEAN ADJACENT STRUCTURES AND IMPROVEMENTS OF ALL DUST AND DEBRIS CAUSED BY THE DEMOLITION OPERATIONS. RETURN ALL ADJACENT AREAS TO THE CONDITIONS EXISTING PRIOR TO THE START OF WORK.
4. ACCOMPLISH AND PERFORM THE DEMOLITION IN SUCH A MANNER AS TO PREVENT THE UNAUTHORIZED ENTRY OF PERSONS AT ANY TIME.
5. COMPLETELY FILL BELOW GRADE AREAS AND VOIDS RESULTING FROM THE DEMOLITION OF STRUCTURES AND FOUNDATIONS WITH SOIL MATERIALS CONSISTING OF STONE, GRAVEL AND SAND, FREE FROM DEBRIS, TRASH, FROZEN MATERIALS, ROOTS AND OTHER ORGANIC MATTER. STONES USED WILL NOT BE LARGER THAN 6 INCHES IN DIMENSION. MATERIAL FROM DEMOLITION MAY NOT BE USED AS FILL. PRIOR TO PLACEMENT OF FILL MATERIALS, UNDERTAKE ALL NECESSARY ACTION IN ORDER TO INSURE THAT AREAS TO BE FILLED ARE FREE OF STANDING WATER, FROST, FROZEN MATERIAL, TRASH, DEBRIS. PLACE FILL MATERIALS IN HORIZONTAL LAYERS NOT EXCEEDING 6 INCHES IN LOOSE DEPTH AND COMPACT EACH LAYER AT PLACEMENT TO 95% OPTIMUM DENSITY. GRADE THE SURFACE TO MEET ADJACENT CONTOURS AND TO PROVIDE SURFACE DRAINAGE.
6. REMOVE FROM THE DESIGNATED SITE, AT THE EARLIEST POSSIBLE TIME, ALL DEBRIS, RUBBISH, SALVAGEABLE ITEMS, HAZARDOUS AND COMBUSTIBLE SERVICES. REMOVED MATERIALS MAY NOT BE STORED, SOLD OR BURNED ON THE SITE. REMOVAL OF HAZARDOUS AND COMBUSTIBLE MATERIALS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE PROCEDURES AS AUTHORIZED BY THE FIRE DEPARTMENT OR OTHER APPROPRIATE REGULATORY AGENCIES AND AUTHORITIES.
7. BEFORE THE COMMENCEMENT OF THE DESIGNATED DEMOLITION, MARK FOR POSITION ALL UTILITIES AND PROTECT ALL ACTIVE LINES. CLEARLY IDENTIFY BEFORE THE COMMENCEMENT OF DEMOLITION SERVICES THE REQUIRED INTERRUPTION OF ACTIVE SYSTEMS THAT MAY AFFECT OTHER PARTIES, AND NOTIFY ALL APPLICABLE UTILITY COMPANIES TO INSURE THE CONTINUATION OF SERVICE.
8. THIS DEMOLITION PLAN IS INTENDED TO IDENTIFY THOSE EXISTING CONDITIONS WHICH ARE TO BE REMOVED. IT IS NOT INTENDED TO PROVIDE DIRECTION OTHER THAN THAT ALL PROCEDURES ARE TO BE IN ACCORDANCE WITH STATE, FEDERAL, LOCAL AND JURISDICTIONAL REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAFETY PRECAUTIONS NECESSARY.
9. EXISTING STORMSEWER PIPES AND STRUCTURES ARE TO REMAIN UNLESS MARKED AS TO BE REMOVED. IF THE CONDITION OF THE STORMSEWER STRUCTURE OR PIPE IS QUESTIONABLE, CONTACT THE OWNER'S REPRESENTATIVE/ENGINEER TO EVALUATE IF A REPLACEMENT IS REQUIRED.
10. THE PROPOSED DEVELOPMENT PLANS TO REMOVE 50 TREES TO CONSTRUCT THE DEVELOPMENT AND RELATED SITE IMPROVEMENTS TO MEET TOWNSHIP STANDARDS.

GENERAL NOTES:

1. IN ACCORDANCE WITH STATE LAW, THE CONTRACTOR SHALL BE REQUIRED TO CALL THE PENNSYLVANIA ONE CALL DAMAGE PROTECTION SYSTEM FOR UTILITY MARK OUT IN ADVANCE OF ANY EXCAVATION.
2. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING SITE IMPROVEMENTS AND UTILITIES. ALL DISCREPANCIES SHALL BE IDENTIFIED TO THE ENGINEER IN WRITING.
3. ALL REMOVED MATERIAL MUST BE TRANSPORTED TO A SITE WITH AN ACTIVE NPDES PERMIT OR ACTIVE EROSION & SEDIMENTATION CONTROL PLAN.
4. ALL DEMOLITION DEBRIS TO BE REMOVED BY CONTRACTOR IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.
5. THE LIMIT OF DISTURBANCE AND NPDES BOUNDARIES ARE SHOWN OFFSET FROM OBJECTS AND OUTSIDE OF THE PROPERTY BOUNDARY FOR CLARITY. ALL DISTURBANCE WILL BE LOCATED WITHIN THE PROPERTY BOUNDARY.
6. CONSTRUCTION FENCE TO BE INSTALLED AT THE DISCRETION OF THE CONSTRUCTION MANAGER. THE CONSTRUCTION FENCE MUST BE INSTALLED TO MAINTAIN SAFE VEHICULAR AND PEDESTRIAN TRAFFIC PATTERNS AT ALL TIMES THROUGHOUT CONSTRUCTION.
7. DO NOT INSTALL COMPOST FILTER SOCKS ON EROSION CONTROL MATTING.
8. EROSION CONTROL MATTING SHALL BE INSTALLED ON DISTURBED LAWN AREAS WITHIN THE FLOODPLAIN AND FLOODWAY.
9. BY GRAPHICAL REPRESENTATION ONLY THIS PROPERTY IS LOCATED IN FLOOD HAZARD ZONE AE AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 42091C0358G WHICH HAS AN EFFECTIVE DATE OF MARCH 2, 2016 AND IS IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE. THE FEMA CALCULATED 100-YEAR FLOOD ELEVATION FOR THIS PROJECT IS 60.5 FEET (NAVD 88) IN ACCORDANCE FIRM MAP NUMBER 42091C0358G DATED MARCH 2, 2016.

ENVIRONMENTAL NOTE:

THIS SET OF PLANS IS NOT DEPICTING ENVIRONMENTAL CONDITIONS OR A CERTIFICATION/WARRANTY REGARDING THE PRESENCE OR ABSENCE OF ENVIRONMENTALLY IMPACTED SITE CONDITIONS. COLLIERS ENGINEERING & DESIGN HAS PERFORMED NO EXPLORATORY OR TESTING SERVICES, INTERPRETATIONS, CONCLUSIONS, OR OTHER SITE ENVIRONMENTAL SERVICES RELATED TO THE DETERMINATION OF THE POTENTIAL FOR CHEMICAL, TOXIC, RADIOACTIVE, OR OTHER TYPE OF CONTAMINANTS AFFECTING THE PROPERTY AND THE UNDERSIGNED PROFESSIONAL IS NOT QUALIFIED TO DETERMINE THE EXISTENCE OF SAME. SHOULD ENVIRONMENTAL CONTAMINATION OR WASTE BE DISCOVERED, THE OWNER AND CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LAWS AND REGULATIONS.

THIS SITE ULTIMATELY FLOWS TO THE SCHUYLKILL RIVER, WHICH IS PART OF THE SCHUYLKILL RIVER WATERSHED. THE PENNSYLVANIA CODE, TITLE 25, CHAPTER 93, WATER QUALITY STANDARDS ASSIGNS THE SCHUYLKILL RIVER A WATER QUALITY DESIGNATION OF WARM WATER FISHERY, MIGRATORY FISHES (WWF, MF).

40 0 40 80

SCALE : 1" = 40'

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/15/22	CMK	REVISED PER PRE-MARSHAL, TOWNSHIP AND ZONING REVIEW LETTERS
2	6/01/22	CMK	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL C. RICHARD ROSEBERRY ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

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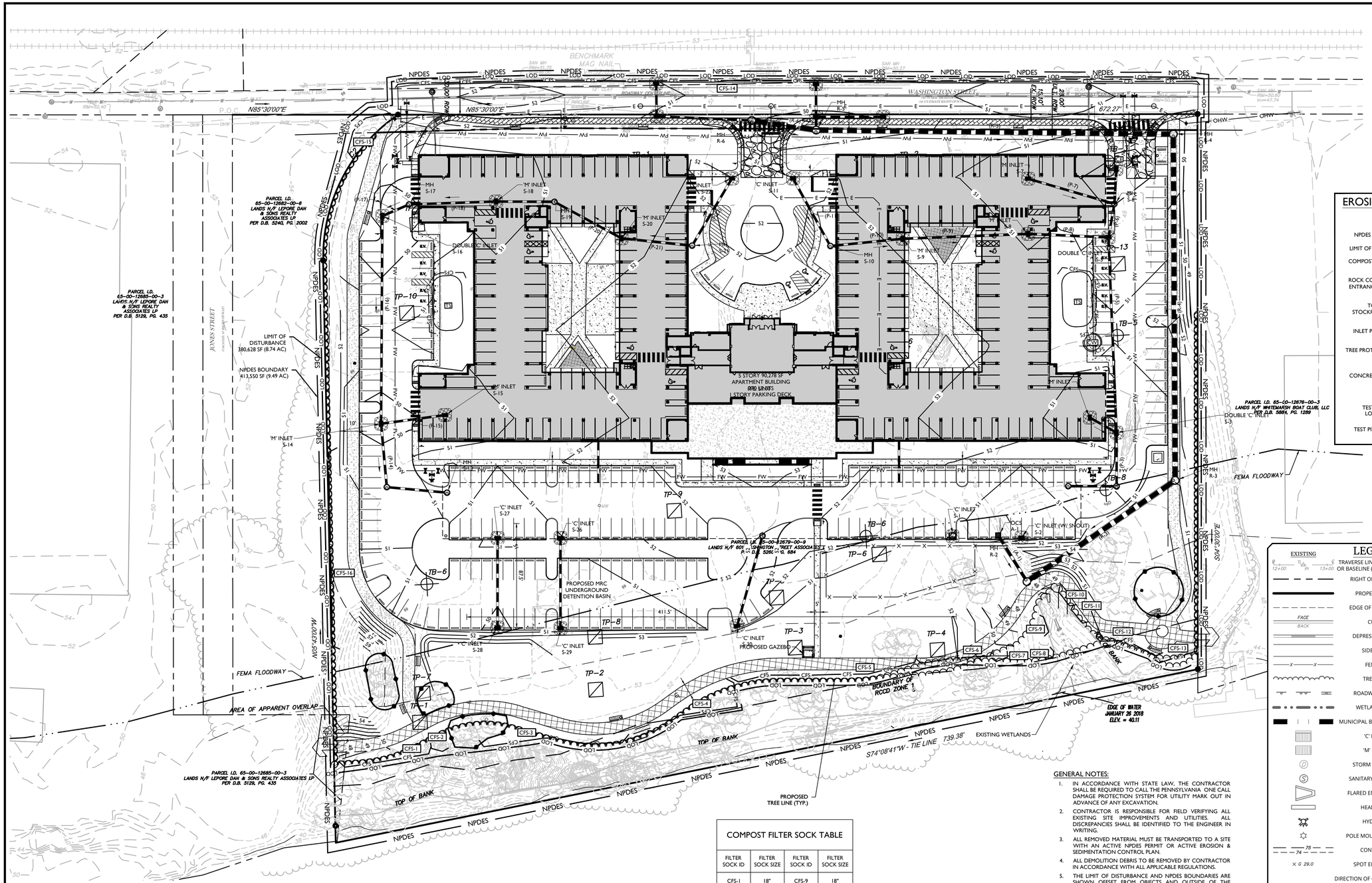
SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER: 160010030B
DRAWING NAME: C-SESC-PLAN

SHEET TITLE:
E&SPC EXISTING CONDITIONS & DEMOLITION PLANS

SHEET NUMBER:
22 of 37

2016\160010308\Engineering\E&S Plans\C-SESC-PLAN.dwg,C-02-DEMO By: CHRIS.MCGUIRE


BENCHMARK
MAG NAIL
WASHINGTON STREET
(50' ULTIMATE RIGHT-OF-WAY)
ROADWAY CENTERLINE
N85°30'00"E
672.27'
S04°30'45"W
400.43'
PARCEL I.D. 65-00-12662-00-6
LANDS N/F LEPORE DAN & SONS REALTY ASSOCIATES LP
PER D.B. 5240, PG. 2002
PARCEL I.D. 65-00-12685-00-3
LANDS N/F LEPORE DAN & SONS REALTY ASSOCIATES LP
PER D.B. 5129, PG. 435
JONES STREET
(SOCIETY HILL DRIVEWAY)
LIMIT OF DISTURBANCE
380,628 SF (8.74 AC)
NPDES BOUNDARY
413,550 SF (9.49 AC)
5 STORY 90,278 SF
APARTMENT BUILDING
OVER 1.5 STORY
PARKING DECK
PROPOSED MRC
UNDERGROUND
DETENTION BASIN
PROPOSED GAZEBO
PARCEL I.D. 65-00-12679-00-9
LANDS N/F 601 WASHINGTON STREET ASSOCIATES L.P.
PER D.B. 5326, PG. 684
PARCEL I.D. 65-00-12676-00-3
LANDS N/F WHITEMARSH BOAT CLUB, LLC
PER D.B. 5864, PG. 1289
FEMA FLOODWAY
AREA OF APPARENT OVERLAP
BOUNDARY OF RCCD ZONE 1
EDGE OF WATER
JANUARY 26 2018
ELEV. = 40.11
TOP OF BANK
EXISTING WETLANDS
PROPOSED
TREE LINE (TYP.)
S74°08'41"W - TIE LINE 739.38'
TB-1
TB-2
TB-3
TB-4
TB-5
TB-6
TB-7
TB-8
TP-1
TP-2
TP-3
TP-4
TP-5
TP-6
TP-7
TP-8
TP-9
TP-10
CFS-1
CFS-2
CFS-3
CFS-4
CFS-5
CFS-6
CFS-7
CFS-8
CFS-9
CFS-10
CFS-11
CFS-12
CFS-13
CFS-14
CFS-15
CFS-16
'C' INLET S-1
'C' INLET S-2
'C' INLET (W/ SNOUT)
'C' INLET S-11
'C' INLET S-26
'C' INLET S-27
'C' INLET S-28
'C' INLET S-29
'M' INLET S-7
'M' INLET S-8
'M' INLET S-9
'M' INLET S-10
'M' INLET S-14
'M' INLET S-15
'M' INLET S-18
'M' INLET S-19
'M' INLET S-20
DOUBLE 'C' INLET S-3
DOUBLE 'C' INLET S-8
DOUBLE 'C' INLET S-16
MH S-12
MH S-17
MH R-1
MH R-2
MH R-3
MH R-4
MH R-6
MH S-10
MH S-11
MH S-13
MH S-21
MH S-22
MH S-23
MH S-24
MH S-25
MH S-26
MH S-27
MH S-28
MH S-29
MH S-30
MH S-31
MH S-32
MH S-33
MH S-34
MH S-35
MH S-36
MH S-37
MH S-38
MH S-39
MH S-40
MH

STANDARD EROSION AND SEDIMENT CONTROL NOTES

1) ALL EARTH DISTURBANCES, INCLUDING CLEARING AND GRUBBING AS WELL AS CUTS AND FILLS SHALL BE DONE IN ACCORDANCE WITH THE APPROVED E&S PLAN. A COPY OF THE APPROVED DRAWINGS (STAMPED, SIGNED AND DATED BY THE REVIEWING AGENCY) MUST BE AVAILABLE AT THE PROJECT SITE AT ALL TIMES. THE REVIEWING AGENCY SHALL BE NOTIFIED OF ANY CHANGES TO THE APPROVED PLAN PRIOR TO IMPLEMENTATION OF THOSE CHANGES. THE REVIEWING AGENCY MAY REQUIRE A WRITTEN SUBMITTAL OF THOSE CHANGES FOR REVIEW AND APPROVAL AT ITS DISCRETION.

2) AT LEAST 7 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, INCLUDING CLEARING AND GRUBBING, THE OWNER AND/OR OPERATOR SHALL INVITE ALL CONTRACTORS, THE LANDOWNER, APPROPRIATE MUNICIPAL OFFICIALS, THE E&S PLAN PREPARER, THE PCSM PLAN PREPARER, THE LICENSED PROFESSIONAL RESPONSIBLE FOR OVERSIGHT OF CRITICAL STAGES OF IMPLEMENTATION OF THE PCSM PLAN, AND A REPRESENTATIVE FROM THE LOCAL CONSERVATION DISTRICT TO AN ON-SITE PRE-CONSTRUCTION MEETING.

3) AT LEAST 3 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, OR EXPANDING INTO AN AREA PREVIOUSLY UNMARKED, THE PENNSYLVANIA ONE CALL SYSTEM INC. SHALL BE NOTIFIED AT 1-800-242-1776 FOR THE LOCATION OF EXISTING UNDERGROUND UTILITIES.

4) ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE PROVIDED ON THE PLAN DRAWINGS. DEVIATION FROM THAT SEQUENCE MUST BE APPROVED IN WRITING FROM THE LOCAL CONSERVATION DISTRICT OR BY THE DEPARTMENT PRIOR TO IMPLEMENTATION.

5) AREAS TO BE FILLED ARE TO BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL.

6) CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE. GENERAL SITE CLEARING, GRUBBING AND TOPSOIL STRIPPING MAY NOT COMMENCE IN ANY STAGE OR PHASE OF THE PROJECT UNTIL THE E&S BMPS SPECIFIED BY THE BMP SEQUENCE FOR THAT STAGE OR PHASE HAVE BEEN INSTALLED AND ARE FUNCTIONING AS DESCRIBED IN THIS E&S PLAN.

7) AT NO TIME SHALL CONSTRUCTION VEHICLES BE ALLOWED TO ENTER AREAS OUTSIDE THE LIMIT OF DISTURBANCE BOUNDARIES SHOWN ON THE PLAN MAPS. THESE AREAS MUST BE CLEARLY MARKED AND FENCED OFF BEFORE CLEARING AND GRUBBING OPERATIONS BEGIN.

8) TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED AT THE LOCATION(S) SHOWN ON THE PLAN MAP(S) IN THE AMOUNT NECESSARY TO COMPLETE THE FINISH GRADING OF ALL EXPOSED AREAS THAT ARE TO BE STABILIZED BY VEGETATION. EACH STOCKPILE SHALL BE PROTECTED IN THE MANNER SHOWN ON THE PLAN DRAWINGS. STOCKPILE HEIGHTS SHALL NOT EXCEED 35 FEET. STOCKPILE SLOPES SHALL BE 2H:1V OR FLATTER.

9) IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE OPERATOR SHALL IMPLEMENT APPROPRIATE BEST MANAGEMENT PRACTICES TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION AND NOTIFY THE LOCAL CONSERVATION DISTRICT AND/OR THE REGIONAL OFFICE OF THE DEPARTMENT.

10) ALL BUILDING MATERIALS AND WASTES SHALL BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET SEQ., 271.1, AND 287.1 ET. SEQ. NO BUILDING MATERIALS OR WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THIS SITE.

11) RECYCLING AND DISPOSAL OF MATERIALS: OPERATOR/PERMITTEE SHALL INSURE THAT PROPER MECHANISMS ARE IN PLACE TO CONTROL WASTE MATERIALS. CONSTRUCTION WASTES INCLUDE, BUT ARE NOT LIMITED TO, EXCESS SOIL MATERIALS, BUILDING MATERIALS, CONCRETE WASH WATER, SANITARY WASTES, ETC. THAT COULD ADVERSELY IMPACT WATER QUALITY. MEASURES SHOULD BE PLANNED AND IMPLEMENTED FOR HOUSEKEEPING, MATERIALS MANAGEMENT, AND LITTER CONTROL. WHEREVER POSSIBLE, RECYCLING OF EXCESS MATERIALS IS PREFERRED RATHER THAN DISPOSAL. OFF-SITE TRANSPORT OF MATERIALS REQUIRES THAT THE RECEIVING FACILITY HAVE ITS OWN APPROVED, ACTIVE PERMIT TO RECEIVE SUCH MATERIALS.

12) ALL OFF-SITE WASTE AND BORROW AREAS MUST HAVE AN E&S PLAN APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT FULLY IMPLEMENTED PRIOR TO BEING ACTIVATED.

13) THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ANY MATERIAL BROUGHT ON SITE IS CLEAN FILL. FORM FP-001 MUST BE RETAINED BY THE PROPERTY OWNER FOR ANY FILL MATERIAL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE BUT QUALIFYING AS CLEAN FILL DUE TO ANALYTICAL TESTING.

14) ALL PUMPING OF WATER FROM ANY WORK AREA SHALL BE DONE ACCORDING TO THE PROCEDURE DESCRIBED IN THIS PLAN, OVER UNDISTURBED VEGETATED AREAS. ALL PUMPING OF SEDIMENT LADEN WATER SHALL BE THROUGH A SEDIMENT CONTROL BMP, SUCH AS A PUMPED WATER FILTER BAG DISCHARGING OVER NON-DISTURBED AREAS.

15) VEHICLES AND EQUIPMENT MAY NEITHER ENTER DIRECTLY NOR EXIT DIRECTLY FROM THE SITE ONTO WINDSOR DRIVE. VEHICLES AND EQUIPMENT MAY ONLY ENTER AND EXIT THE CONSTRUCTION SITE VIA A STABILIZED ROCK CONSTRUCTION ENTRANCE.

16) UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENT BMPS SHALL BE MAINTAINED PROPERLY. MAINTENANCE SHALL INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT BMPS AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. THE OPERATOR WILL MAINTAIN AND MAKE AVAILABLE TO THE COUNTY CONSERVATION DISTRICT COMPLETE, WRITTEN INSPECTION LOGS OF ALL THOSE INSPECTIONS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING AND RENETTING MUST BE PERFORMED IMMEDIATELY. IF THE E&S BMPS FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPS, OR MODIFICATIONS OF THOSE INSTALLED WILL BE REQUIRED.

17) A LOG SHOWING DATES THAT E&S BMPS WERE INSPECTED AS WELL AS ANY DEFICIENCIES FOUND AND THE DATE THEY WERE CORRECTED SHALL BE MAINTAINED ON THE SITE AND BE MADE AVAILABLE TO REGULATORY AGENCY OFFICIALS AT THE TIME OF INSPECTION.

18) SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED, OR SWEPT INTO ANY ROADSIDE DITCH, STORM SEWER, OR SURFACE WATER.

19) ALL SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS. SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN LANDSCAPED AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS OR DRAINAGE SWALES AND IMMEDIATELY STABILIZED, OR PLACED IN TOPSOIL STOCKPILES.

20) AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 3 TO 5 INCHES - 6 TO 12 INCHES ON COMPACTED SOILS - PRIOR TO PLACEMENT OF TOPSOIL. AREAS TO BE VEGETATED SHALL HAVE A MINIMUM 4 INCHES OF TOPSOIL IN PLACE PRIOR TO SEEDING AND MULCHING. FILL OUTSLOPES SHALL HAVE A MINIMUM OF 2 INCHES OF TOPSOIL.

21) ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.

22) ALL EARTHEN FILLS SHALL BE PLACED IN COMPACTED LAYERS NOT TO EXCEED 9 INCHES IN THICKNESS.

23) FILL MATERIALS SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD, OR OTHER FOREIGN OR OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.

24) FROZEN MATERIALS OR SOFT, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED INTO FILLS.

25) FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES.

26) SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.

27) ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY UPON REACHING FINISHED GRADE. CUT SLOPES IN COMPETENT BEDROCK AND ROCK FILLS NEED NOT BE VEGETATED. SEEDED AREAS WITHIN 50 FEET OF A SURFACE WATER, OR AS OTHERWISE SHOWN ON THE PLAN DRAWINGS, SHALL BE BLANKETED ACCORDING TO THE STANDARDS OF THIS PLAN.

28) IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE IN ANY AREA OR SUBAREA OF THE PROJECT, THE OPERATOR SHALL STABILIZE ALL DISTURBED AREAS. DURING NON-GERMINATING MONTHS, MULCH OR OTHER PROTECTIVE BLANKETING SHALL BE APPLIED AS DESCRIBED IN THE PLAN. AREAS NOT AT FINISHED GRADE, WHICH WILL BE REACTIVATED WITHIN 1 YEAR, MAY BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION SPECIFICATIONS. THOSE AREAS WHICH WILL NOT BE REACTIVATED WITHIN 1 YEAR SHALL BE STABILIZED IN ACCORDANCE WITH THE PERMANENT STABILIZATION SPECIFICATIONS.

29) PERMANENT STABILIZATION IS DEFINED AS A MINIMUM UNIFORM, PERENNIAL 70% VEGETATIVE COVER OR OTHER PERMANENT NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED EROSION. CUT AND FILL SLOPES SHALL BE CAPABLE OF RESISTING FAILURE DUE TO SLUMPING, SLIDING, OR MOTHER MOVEMENTS.

30) EROSION AND SEDIMENT BMPS MUST BE CONSTRUCTED, STABILIZED, AND FUNCTIONAL BEFORE SITE DISTURBANCE BEGINS WITHIN THE TRIBUTARY AREAS OF THOSE BMPS. E&S BMPS SHALL REMAIN FUNCTIONAL AS SUCH UNTIL ALL AREAS TRIBUTARY TO THEM ARE PERMANENTLY STABILIZED OR UNTIL THEY ARE REPLACED BY ANOTHER BMP APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT.

31) UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT FOR AN INSPECTION PRIOR TO REMOVAL/CONVERSION OF THE E&S BMPS.

32) AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY EROSION AND SEDIMENT BMPS MUST BE REMOVED OR CONVERTED TO PERMANENT POST CONSTRUCTION STORMWATER MANAGEMENT BMPS. AREAS DISTURBED DURING REMOVAL OR CONVERSION OF THE BMPS SHALL BE STABILIZED IMMEDIATELY. IN ORDER TO ENSURE RAPID REVEGETATION OF DISTURBED AREAS, SUCH REMOVAL/CONVERSIONS ARE TO BE DONE ONLY DURING THE GERMINATING SEASON.

33) UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT TO SCHEDULE A FINAL INSPECTION.

34) FAILURE TO CORRECTLY INSTALL E&S BMPS, FAILURE TO PREVENT SEDIMENT-LADEN RUNOFF FROM LEAVING THE CONSTRUCTION SITE OR FAILURE TO TAKE IMMEDIATE CORRECTIVE ACTION TO RESOLVE FAILURE OF E&S BMPS MAY RESULT IN ADMINISTRATIVE, CIVIL AND/OR CRIMINAL PENALTIES BEING INSTITUTED BY THE DEPARTMENT AS DEFINED IN SECTION 602 OF THE CLEAN STREAMS LAW. THEE LEAN STREAMS LAW PROVIDES FOR UP TO $10,000 PER DAY IN CIVIL PENALTIES, UP TO $10,000 IN SUMMARY CRIMINAL PENALTIES, AND UP TO $25,000 IN MISDEMEANOR CRIMINAL PENALTIES FOR EACH VIOLATION.

35) IN THE EVENT OF SINKHOLE DISCOVERY A PROFESSIONAL GEOLOGIST OR ENGINEER WILL BE CONTACTED CONCERNING MITIGATION. ADDITIONALLY, THE COUNTY CONSERVATION DISTRICT WILL BE MADE AWARE OF THE SINKHOLE DISCOVERY IMMEDIATELY.

36) THE OPERATOR SHALL ASSURE THAT THE APPROVED EROSION AND SEDIMENT CONTROL PLAN IS PROPERLY AND COMPLETELY IMPLEMENTED.

37) THE CONTRACTOR IS ADVISED TO BECOME THOROUGHLY FAMILIAR WITH THE PROVISIONS OF THE APPENDIX 64, EROSION CONTROL RULES AND REGULATIONS, TITLE 25, PART I, DEPARTMENT OF ENVIRONMENTAL PROTECTION, SUBPART C, PROTECTION OF NATURAL RESOURCES, ARTICLE III, WATER RESOURCES, CHAPTER 102, EROSION CONTROL.

38) STRAW MULCH SHALL BE APPLIED IN LONG STRANDS, NOT CHOPPED OR FINELY BROKEN.

39) CONCRETE WASH WATER SHALL BE HANDLED IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS. IN NO CASE SHALL IT BE ALLOWED TO ENTER ANY SURFACE WATERS OR GROUNDWATER SYSTEMS.

40) EROSION CONTROL MATTING SHALL BE INSTALLED ON ALL SLOPES 3H:1V OR STEEPER, WITHIN 50 FEET OF A SURFACE WATER AND ON ALL OTHER DISTURBED AREAS SPECIFIED ON THE PLAN MAPS AND/OR DETAIL SHEETS.

CONSTRUCTION SEQUENCE NOTES:

1. ALL WORK IS TO OCCUR WITHIN THE LIMIT OF DISTURBANCE BOUNDARIES AS INDICATED ON THE PLAN. AT NO TIME SHALL CONSTRUCTION VEHICLES BE ALLOWED TO ENTER AREAS OUTSIDE THE LIMIT OF DISTURBANCE BOUNDARIES SHOWN ON THE PLAN MAPS. THESE AREAS MUST BE CLEARLY MARKED AND FENCED OFF BEFORE CLEARING AND GRUBBING OPERATIONS BEGIN. THE LIMIT OF DISTURBANCE AND NPDES BOUNDARIES ARE SHOWN OFFSET FROM OBJECTS AND OUTSIDE OF THE PROPERTY BOUNDARY FOR CLARITY. ALL DISTURBANCE WILL BE LOCATED WITHIN THE PROPERTY BOUNDARY.
2. CONSTRUCT ALL DRAINAGE APPURTENANCES FROM DOWNSTREAM TO UPSTREAM UNLESS OTHERWISE NOTED.
3. LIMIT TREE REMOVAL TO ONLY WHAT IS REQUIRED FOR CONSTRUCTION.
4. UPON REACHING FINAL GRADE, AREAS TO BE STABILIZED BY VEGETATION MUST NOT EXCEED 15,000 SQUARE FEET WITHOUT BEING STABILIZED.
5. THE SITE MUST BE IMMEDIATELY SEEDED, MULCHED, OR OTHERWISE PROTECTED FROM ACCELERATED EROSION AND SEDIMENTATION WHEN A TEMPORARY CESSATION OF EARTH DISTURBANCE ACTIVITIES EXCEEDS 4 DAYS. DURING NON-GERMINATING MONTHS, MULCH OR PROTECTIVE BLANKETING SHALL BE APPLIED AS DESCRIBED IN THE PLAN. AREAS NOT AT FINISHED GRADE WHICH WILL BE REACTIVATED WITHIN ONE YEAR, MAY BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION SPECIFICATIONS. THOSE AREAS WHICH WILL NOT BE REACTIVATED WITHIN ONE YEAR SHALL BE STABILIZED IN ACCORDANCE WITH THE PERMANENT STABILIZATION SPECIFICATIONS.
6. STABILIZE SLOPES, CHANNELS, DITCHES, AND OTHER DISTURBED AREAS AS THEY REACH FINAL GRADE. ROUND CUT AND FILL SLOPES SUCH THAT RUNOFF IS DIRECTED AWAY FROM THE INTERSECTION OF THE CONSTRUCTED SLOPE AND THE EXISTING GRADE.
7. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE. GENERAL SITE CLEARING, GRUBBING, AND TOPSOIL STRIPPING MAY NOT COMMENCE IN ANY STAGE OR PHASE OF THE PROJECT UNTIL THE E&S BMPS SPECIFIED BY THE CONSTRUCTION SEQUENCE FOR THAT STAGE OR PHASE HAVE BEEN INSTALLED AND ARE FUNCTIONING AS DESCRIBED IN THIS E&S PLAN.

CONSTRUCTION SEQUENCE:

ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE FOLLOWING SEQUENCE. DEVIATION FROM THIS SEQUENCE MUST BE APPROVED IN WRITING FROM THE LOCAL CONSERVATION DISTRICT OR BY THE DEPARTMENT PRIOR TO IMPLEMENTATION.

1. AT LEAST 7 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, INCLUDING CLEARING AND GRUBBING, THE OWNER AND/OR OPERATOR SHALL INVITE ALL CONTRACTORS, THE LANDOWNER, APPROPRIATE MUNICIPAL OFFICIALS, THE E&S PLAN PREPARER, THE PCSM PLAN PREPARER, THE LICENSED PROFESSIONAL RESPONSIBLE FOR OVERSIGHT OF CRITICAL STAGES OF IMPLEMENTATION OF THE PCSM PLAN, AND A REPRESENTATIVE FROM THE LOCAL COUNTY CONSERVATION DISTRICT TO AN ONSITE PRE-CONSTRUCTION MEETING.
2. ALL EXISTING UTILITIES SHOWN ON THE PLAN ARE SHOWN AT APPROXIMATE LOCATIONS. THE ENGINEER DOES NOT GUARANTEE ALL EXISTING UTILITIES ON SITE ARE SHOWN ON THE PLAN. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE OF ALL UTILITIES AND TO CALL THE PENNSYLVANIA ONE CALL SYSTEM (1-800-242-1776) AT LEAST 3 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES OR EXPANDING INTO A PREVIOUSLY UNMARKED AREA.
3. A PRE-CONSTRUCTION MEETING WITH THE TOWNSHIP OF WHITEMARSH'S SHADE TREE COMMISSION MUST BE HELD BEFORE THE START OF CONSTRUCTION.

SITE WORK:

1. INSTALL ROCK CONSTRUCTION ENTRANCES, TREE PROTECTION FENCING, AND CLEAR AND GRUB AS NEEDED.
2. INSTALL COMPOST FILTER SOCKS. COMPOST FILTER SOCKS SHALL BE INSTALLED PARALLEL TO EXISTING CONTOURS OR CONSTRUCTED LEVEL ALIGNMENTS. CLEAR AND GRUB AS NEEDED FOR THE INSTALLATION OF THE COMPOST FILTER SOCKS. NOTE: ADDITIONAL COMPOST FILTER SOCKS SHALL BE INSTALLED DOWNGRADE OF ANY DISTURBANCE AREAS AS NEEDED. ALL EROSION AND SEDIMENT CONTROL DEVICES MUST BE INSTALLED IN ACCORDANCE WITH THEIR RESPECTIVE DETAIL AND IN WORKING ORDER PRIOR TO DISTURBED AN AREA.
3. REMOVE EXISTING BUILDING, ASPHALT AREAS, WOODED AREAS, DEBRIS PILES, UTILITIES, AND ALL ITEMS LISTED AS TO BE REMOVED WITHIN THE SITE, AS SHOWN ON THE DEMOLITION PLAN, EXCEPT FOR THE EXISTING UTILITY POLES ALONG THE SOUTHERN SIDE OF WASHINGTON STREET WHICH WILL BE REMOVED PRIOR TO THE INSTALLATION OF THE PROPOSED ELECTRIC LINES IN STEP 7. ELECTRIC SERVICE MUST BE MAINTAINED FOR PROPERTIES THAT ARE CURRENTLY SERVICED THROUGH THESE LINES, OVERHEAD WIRES MAY NEED TO BE RELOCATED IN ORDER TO ACCOMMODATE CONSTRUCTION VEHICLES.
4. INSTALL PROPOSED PIPE NETWORK FROM HEADWALL R-1 TO MANHOLE R-6, WORKING UPSLOPE. REMOVE EXISTING 48" CMP PIPE AS SHOWN ON THE DEMOLITION PLANS. LIMIT DAILY TRENCH EXCAVATION TO THE LENGTH OF PIPE PLACEMENT AND BACKFILLING THAT CAN BE COMPLETED THE SAME DAY. ALL OPEN TRENCHES MUST BE PROTECTED. WATER WHICH ACCUMULATES IN THE OPEN TRENCH SHALL BE COMPLETELY REMOVED BY FILTER BAG PUMPING, BEFORE PIPE OR CONDUIT PLACEMENT AND/OR BACKFILLING BEGINS.
5. ESTABLISH STOCKPILES, STAGING AREA, AND CONCRETE WASHOUT LOCATION AND PLACE DOWNSLOPE COMPOST FILTER SOCKS. ENSURE THAT COMPOST FILTER SOCKS ARE LOCATED DOWNSLOPE OF THE TOPSOIL STOCKPILES AT ALL TIMES.
6. ROUGH GRADE SITE AND BUILDING PADS. ROUGH GRADE DRIVEWAYS, AISLES, CONCRETE PATIOS, PARKING LOTS, AS WELL AS WASHINGTON STREET WIDENING. IMMEDIATELY STABILIZE ANY STEEP SLOPES WITH EROSION CONTROL MATTING. DO NOT PLACE EROSION CONTROL MATTING ON OR UNDER COMPOST FILTER SOCKS. ADJUST COMPOST FILTER SOCKS AS NEEDED TO FIT PROPOSED IMPROVEMENTS. NOTE: ADDITIONAL COMPOST FILTER SOCKS SHALL BE INSTALLED DOWNGRADE OF ANY DISTURBANCE AREAS AS NEEDED.
7. CONSTRUCT MRC UNDERGROUND DETENTION BASIN AND OUTLET CONTROL STRUCTURE. INSTALL OUTFALL STORMSEWER SYSTEM, STARTING AT MH R-2 AND WORKING UPSLOPE TO OUTLET CONTROL STRUCTURE A-1. INSTALL INLETS S-24, S-25, S-26, S-27, S-28, S-29, S-30, S-31. INTALL PROPOSED STORMSEWER SYSTEM, WORKING DOWNSTREAM TO UPSTREAM, FROM INLET S-1 TO INLET S-12. INLET S-3 TO INLET S-4, INLET S-5 TO INLET S-7, MANHOLE S=10 TO INLET S-10A. ALSO, FROM INLET S-13 TO INLET S-23, INLET S-14 TO INLET S-15, INLET S-16 TO INLET S-18, AND MANHOLE S-21 TO INLET S-21A. LIMIT DAILY TRENCH EXCAVATION TO THE LENGTH OF PIPE PLACEMENT AND BACKFILLING THAT CAN BE COMPLETED THE SAME DAY. ALL OPEN TRENCHES MUST BE PROTECTED. WATER WHICH ACCUMULATES IN THE OPEN TRENCH SHALL BE COMPLETELY REMOVED BY FILTER BAG PUMPING, BEFORE PIPE PLACEMENT AND/OR BACKFILLING BEGINS. IMMEDIATELY AFTER INSTALLING EACH INLET, INLET MUST BE PLACED AS APPLICABLE.
8. CONSTRUCT THE BUILDING PAD INCLUDING THE INSTALLATION AND/OR REPLACEMENT OF UTILITY SERVICE CONNECTIONS FOR ELECTRIC, GAS, WATER, AND SANITARY, AS SHOWN ON THE PLANS. REMOVE EXISTING UTILITY POLES AND ASSOCIATED OVERHEAD WIRES PRIOR TO INSTILLATION OF UNDERGROUND ELECTRIC LINES ALONG WASHINGTON STREET. INSTALL WATER LINES AND HYDRANTS. INSTALL SANITARY SEWER SYSTEM FROM DOWNSTREAM TO UPSTREAM, STARTING FROM THE TIE-IN TO THE EXISTING SANITARY MAIN AT MANHOLE SS-100 TO MANHOLE SS-104. LIMIT DAILY TRENCH EXCAVATION TO THE LENGTH OF PIPE PLACEMENT AND BACKFILLING THAT CAN BE COMPLETED THE SAME DAY. ALL OPEN TRENCHES MUST BE PROTECTED. WATER WHICH ACCUMULATES IN THE OPEN TRENCH SHALL BE COMPLETELY REMOVED BY FILTER BAG PUMPING, BEFORE PIPE OR CONDUIT PLACEMENT AND/OR BACKFILLING BEGINS.
9. PLACE SUBGRADE FOR THE DRIVEWAYS, AISLES, PARKING LOTS, AND ROAD WIDENING IN ACCORDANCE WITH THE PLAN DETAILS. INSTALL CURBING, DIRECTING STORMWATER TO THE PROPOSED INLETS. REMOVE COMPOST FILTER SOCKS AS NEEDED TO FIT PROPOSED IMPROVEMENTS.
10. FINALIZE GRADING IN ALL LAWN AREAS.
11. INSTALL PROPOSED SIDEWALKS AND ADA RAMPS.
12. INSTALL PROPOSED TREES AND OTHER PLANTINGS.
13. COMPLETE PAVING OF SITE IN ACCORDANCE WITH THE PLAN DETAILS. ONCE PAVING IS COMPLETED, ADD PAVEMENT MARKINGS.

FINAL SITE PREPARATION:

1. UNTIL THE SITE IS STABILIZED ALL EROSION AND SEDIMENTATION CONTROLS MUST BE MAINTAINED PROPERLY. MAINTENANCE MUST INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENTATION CONTROLS AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK; INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, RE-GRADING, RESEEDING, RE-MULCHING, AND RE-NETTING, MUST BE PERFORMED IMMEDIATELY. CONTACT THE COUNTY CONSERVATION DISTRICT PRIOR TO REMOVING TEMPORARY E&S BMPS.
2. UPON ACHIEVING A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER OVER THE ENTIRE VEGETATED TRIBUTARY AREA, ANY OF THE REMAINING TEMPORARY E&S CONTROLS SHOULD BE REMOVED, INCLUDING COMPOST FILTER SOCKS AND INLET PROTECTION. ALL AREAS DISTURBED PREPARATION FOR E&S BMP REMOVAL SHALL BE IMMEDIATELY STABILIZED WITH PERMANENT SEEDING, AS INDICATED ON THE PLANS.
3. ANY ITEMS OR AREAS TEMPORARILY STABILIZED WITH TEMPORARY SEEDING OR MULCH THAT ARE TO BE INCORPORATED INTO PERMANENT STABILIZATION AREAS SHALL BE REWORKED AS NECESSARY TO ENSURE PROPER PREPARATION FOR PERMANENT STABILIZATION. REMOVE ALL TEMPORARY E&S BMPS AND ACCUMULATED SEDIMENT AND DISPOSE OF PROPERLY. BEFORE REMOVING TEMPORARY E&S BMPS, ENSURE THAT ALL AREAS TRIBUTARY TO THEM ARE PROPERLY STABILIZED. BEFORE REMOVING SILT FENCE, REMOVE ACCUMULATED SEDIMENT AND GRADE ITEM AREAS TO BLEND WITH SURROUNDING TOPOGRAPHY. CONSERVATION DISTRICT MAY REQUIRE SEEDING AND MULCHING AFTER PLACING THE TOPSOIL. REMOVE STONES AND OTHER FOREIGN MATERIAL 2 INCHES OR LARGER IN DIMENSION. REMOVE AND SATISFACTORILY DISPOSE OF UNSUITABLE AND SURPLUS MATERIAL.

E&S PLAN - PLANNING AND DESIGN - SECTION 102.4(B)(4)

I. E&S PLAN MINIMIZES THE EXTENT AND DURATION OF THE EARTH DISTURBANCE ACTIVITY.
2. E&S PLAN MAXIMIZES PROTECTION OF EXISTING DRAINAGE FEATURES AND VEGETATION.
3. E&S PLAN MINIMIZES SOIL COMPACTION.
4. E&S PLAN UTILIZES OTHER MEASURES OR CONTROLS THAT PREVENT OR MINIMIZE GENERATION OF INCREASED STORMWATER RUNOFF.

MEASURES PROVIDED TO MINIMIZE THERMAL IMPACTS

RUNOFF WILL BE CAPTURED AND DIRECTED TO SUBSURFACE UNDERDRAINS. RUNOFF FROM PAVED AREAS OF THE PROJECT DISCHARGE THROUGH BURIED PIPE, THEREBY CREATING AMPLE OPPORTUNITY FOR COOLING PRIOR TO REACHING THE SURFACE WATERS. THE MAJORITY OF THE DISTURBED SITE WILL DISCHARGE INTO THE UNDERGROUND DETENTION FACILITIES. AS SUCH, THE PROJECT WILL NOT HAVE AN ADVERSE IMPACT ON THE NATURAL TEMPERATURES OF THE RECEIVING WATERS.

CRITICAL STAGES OF CONSTRUCTION - LICENSED PROFESSIONAL TO BE PRESENT ON SITE	
1	PRE-CONSTRUCTION MEETING TO BE HELD PRIOR TO THE START OF CONSTRUCTION ACTIVITIES.
2	INSTALLATION OF MRC UNDERGROUND DETENTION FACILITY, IMPERMEABLE LINER, AND OUTLET CONTROL STRUCTURES.
3	INSPECTION PRIOR TO REMOVAL OF E&S CONTROLS.
4	FINAL INSPECTION AT PROJECT COMPLETION.

SEEDING AND SOIL SUPPLEMENTS

THE FOLLOWING SPECIFICATIONS ARE IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 804.

TEMPORARY SEED MIXTURES

SEED TYPE (PENNDOT FORMULA E)	% BY WEIGHT	PURITY	MAX. WEED SEED
ANNUAL RYEGRASS	100	95%	0.10%

APPLY SEED AT A RATE OF 10 LBS. PER 1,000 SY.
APPLY STRAW MULCH (SEE MULCH APPLICATION RATES TABLE)
SEEDING SEASON DATES: MARCH 15 TO OCTOBER 15

PERMANENT SEED MIXTURES

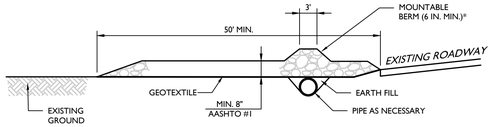
SEED TYPE (PENNDOT FORMULA B)	% BY WEIGHT	PURITY	MAX. WEED SEED
PERENNIAL RYEGRASS MIXTURE * (LOLIUM PERENNE)	20	97%	0.10%
CREEPING RED FESCUE	30	97%	0.10%
KENTUCKY BLUEGRASS MIXTURE ** (POA PRATENSIS)	50	97%	0.15%

APPLY SEED AT A RATE OF 42 LBS. PER 1,000 SY.
APPLY STRAW OR HAY MULCH (SEE MULCH APPLICATION RATES TABLE).
APPLY PULVERIZED AGRICULTURAL LIMESTONE AT A RATE OF 2 TONS/ACRE UNLESS TESTING HAS BEEN PERFORMED.
APPLY 10-20-20 ANALYSIS COMMERCIAL FERTILIZER AT A RATE OF 678 LBS/ACRE UNLESS TESTING HAS BEEN PERFORMED.
SEEDING SEASON DATES: MARCH 15 TO JUNE 1; AUGUST 1 TO OCTOBER 15
APPLY FLEXTERRA FGM (OR EQUAL) ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

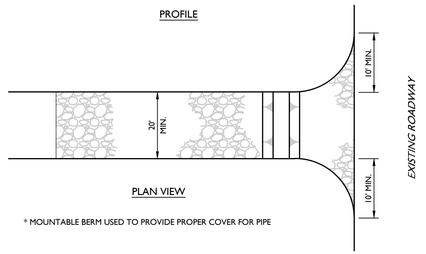
* A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL RYEGRASS COMPONENT.
** A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL BLUEGRASS COMPONENT.

PERMANENT SEED MIXTURES ON STEEP SLOPES (SLOPES EXCEEDING 3:1)

(PENNDOT FORMULA L) SEED TYPE	% BY WEIGHT	PURITY	MAX. WEED SEED
HARD FESCUE (FESTUCA LONGIFOLIA***)	55	97%	0.10%
CREEPING RED FESCUE (FESTUCA RUBRA)	35	97%	0.10%
ANNUAL RYEGRASS (LOLIUM MULTIFLORUM)	10	95%



PROFILE



PLAN VIEW

* MOUNTABLE BERM USED TO PROVIDE PROPER COVER FOR PIPE

NOTES:

1. REMOVE TOPSOIL PRIOR TO INSTALLATION OF ROCK CONSTRUCTION ENTRANCE. EXTEND ROCK OVER FULL WIDTH OF ENTRANCE.
2. RUNOFF SHALL BE DIVERTED FROM ROADWAY TO A SUITABLE SEDIMENT REMOVAL BMP PRIOR TO ENTERING ROCK CONSTRUCTION ENTRANCE.
3. MOUNTABLE BERM SHALL BE INSTALLED WHEREVER OPTIONAL CULVERT PIPE IS USED AND PROPER PIPE COVER AS SPECIFIED BY MANUFACTURER IS NOT OTHERWISE PROVIDED. PIPE SHALL BE SIZED APPROPRIATELY FOR SIZE OF DITCH BEING CROSSED.
4. MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. IF EXCESSIVE AMOUNTS OF SEDIMENT ARE BEING DEPOSITED ON ROADWAY, EXTEND LENGTH OF ROCK CONSTRUCTION ENTRANCE BY 50 FOOT INCREMENTS UNTIL CONDITION IS ALLEVIATED OR INSTALL WASH RACK. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

STANDARD CONSTRUCTION DETAIL # 3-1
ROCK CONSTRUCTION ENTRANCE

NOT TO SCALE | MCPA-SOIL-EROS-1000 | 05/01/18

TABLE 4.1 COMPOST SOCK FABRIC MINIMUM SPECIFICATIONS

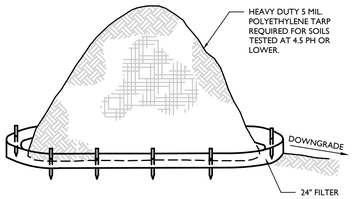
Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photo-degradable	Photo-degradable	Bio- degradable	Photo-degradable	Photo-degradable
Sock Diameters	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"
Mesh Opening	3/8"	3/8"	3/8"	3/8"	1/8"
Tensile Strength		26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years
Two-ply Systems					
Inner Containment Netting	HDPE biaxial net				
	Continuously wound				
	Fusion-welded junctures				
	3/4" x 3/4" Max. aperture size				
Outer Filtration Mesh	Composite Polypropylene Fabric (Woven layer and non-woven fleece mechanically fused via needle punch)				
	3/16" Max. aperture size				
Sock fabrics composed of burlap may be used on projects lasting 6 months or less.					

TABLE 4.2 COMPOST STANDARDS

Organic Matter Content	25% - 100% (dry weight basis)
Organic Portion	Fibrous and elongated
pH	5.5-8.5
Moisture Content	30%-60%
Particle Size	30% - 50% pass through ½" sieve
Soluble Salt Concentration	5.0 dS/m (mmhos/cm) Maximum

STANDARD CONSTRUCTION TABLE # 4 -1 & 4 -2

NOT TO SCALE | MCPA-SOIL-EROS-1700 | 05/01/18

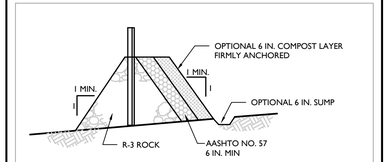


NOTES:

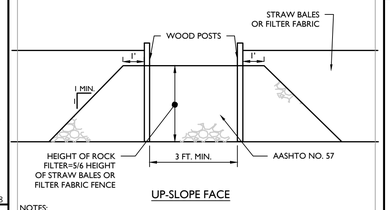
1. ALL STOCKPILES SHALL NOT TO BE LOCATED WITHIN 50 FEET OF A FLOODPLAIN, SLOPE, ROADWAY OR DRAINAGE FACILITY.

TOPSOIL STOCKPILE WITH FILTER SOCK DETAIL

NOT TO SCALE | MCPA-SOIL-EROS-2201 | 05/01/18



OUTLET CROSS-SECTION



UP-SLOPE FACE

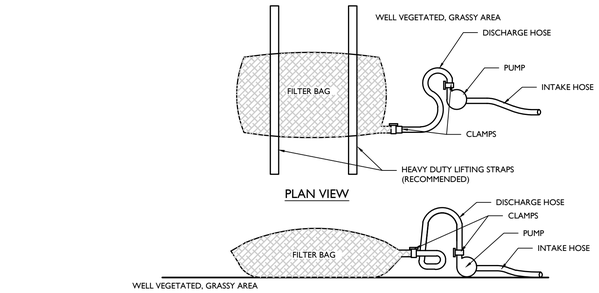
NOTES:

1. A ROCK FILTER OUTLET SHALL BE INSTALLED WHERE FAILURE OF A SILT FENCE OR STRAW BALE BARRIER HAS OCCURRED DUE TO CONCENTRATED FLOW. ANCHORED COMPOST LAYER SHALL BE USED ON UPSLOPE FACE IN HQ AND EV WATERSHEDS.
2. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF THE OUTLET.

   INSPECTION: ROCK FILTER OUTLET SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT.
   MAINTENANCE:SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH ⅓ THE HEIGHT OF THE OUTLET.
   REPAIR: DAMAGED OR CLOGGED ROCK FILTER OUTLET SHALL BE REPLACED IMMEDIATELY.

STANDARD CONSTRUCTION DETAIL # 46
ROCK FILTER OUTLET

NOT TO SCALE | MCPA-SOIL-EROS-1900 | 05/01/18



PLAN VIEW

ELEVATION VIEW

NOTES:

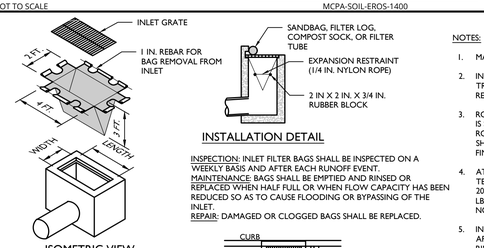
1. LOW VOLUME FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS. HIGH VOLUME FILTER BAGS SHALL BE MADE FROM WOVEN GEOTEXTILES THAT MEET THE FOLLOWING STANDARDS:

PROPERTY	TEST METHOD	MINIMUM STANDARD
AVG. WIDE WIDTH STRENGTH	ASTM D-4884	60 LB/IN
GRAB TENSILE	ASTM D-4632	205 LB
PUNCTURE	ASTM D-4833	110 LB
MULLEN BURST	ASTM D-3786	350 PSI
UV RESISTANCE	ASTM D-4355	70%
AOS % RETAINED	ASTM D-4751	80 SIEVE

2. A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES SHALL BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL OF SEDIMENT. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED. BAGS SHALL BE PLACED ON STRAPS TO FACILITATE REMOVAL UNLESS BAGS COME WITH LIFTING STRAPS ALREADY ATTACHED.
3. BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE UNDERLAYMENT AND FLOW PATH SHALL BE PROVIDED. BAGS MAY BE PLACED ON FILTER STONE TO INCREASE DISCHARGE CAPACITY. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%. FOR SLOPES EXCEEDING 5%, CLEAN ROCK OR OTHER NON-ERODIBLE AND NON-POLLUTING MATERIAL MAY BE PLACED UNDER THE BAG TO REDUCE SLOPE STEEPNESS.
4. NO DOWNSLOPE SEDIMENT BARRIER IS REQUIRED FOR MOST INSTALLATIONS. COMPOST BERM OR COMPOST FILTER SOCK SHALL BE INSTALLED BELOW BAGS LOCATED IN HQ OR EV WATERSHEDS, WITHIN 50 FEET OF ANY RECEIVING SURFACE WATER OR WHERE GRASSY AREA IS NOT AVAILABLE.
5. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED. A PIECE OF PVC PIPE IS RECOMMENDED FOR THIS PURPOSE.
6. THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHALL BE FLOATING AND SCREENED.
7. FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED.

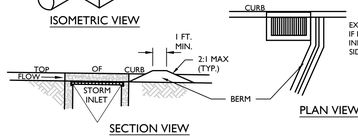
STANDARD CONSTRUCTION DETAIL # 3-16
PUMPED WATER FILTER BAG

NOT TO SCALE | MCPA-SOIL-EROS-1400 | 05/01/18



ISOMETRIC VIEW

INSTALLATION DETAIL



SECTION VIEW

PLAN VIEW

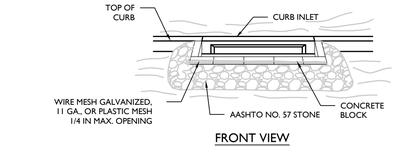
INSPECTION: INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT.
MAINTENANCE: BAGS SHALL BE EMPTIED AND RINSED OR REPLACED WHEN HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET.
REPAIR: DAMAGED OR CLOGGED BAGS SHALL BE REPLACED.

NOTES:

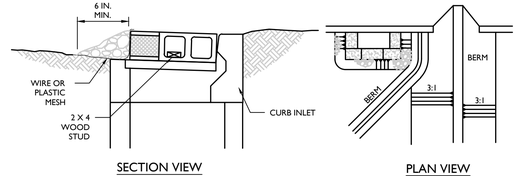
1. MAXIMUM DRAINAGE AREA = 1/2 ACRE.
2. INLET PROTECTION SHALL NOT BE REQUIRED FOR INLET TRIBUTARY TO SEDIMENT BASIN OR TRAP. BERMS SHALL BE REQUIRED FOR ALL INSTALLATIONS.
3. ROLLED EARTHEN BERM SHALL BE MAINTAINED UNTIL ROADWAY IS STONED. ROAD SUBBASE BERM SHALL BE MAINTAINED UNTIL ROADWAY IS PAVED. SIX INCH MINIMUM HEIGHT ASPHALT BERM SHALL BE MAINTAINED UNTIL ROADWAY SURFACE RECEIVES FINAL COAT.
4. AT A MINIMUM, THE FABRIC SHALL HAVE A MINIMUM GRAB TENSILE STRENGTH OF 120 LBS, A MINIMUM BURST STRENGTH OF 200 PSI, AND A MINIMUM TRAPEZOIDAL TEAR STRENGTH OF 50 LBS. FILTER BAGS SHALL BE CAPABLE OF TRAPPING ALL PARTICLES NOT PASSING A NO. 40 SIEVE.
5. INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. BAGS SHALL BE EMPTIED AND RINSED OR REPLACED WHEN HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET. DAMAGED OR CLOGGED BAGS SHALL BE REPLACED. A SUPPLY SHALL BE MAINTAINED ON SITE FOR REPLACEMENT OF BAGS. ALL NEEDED REPAIRS SHALL BE INITIATED IMMEDIATELY AFTER THE INSPECTION. DISPOSE OF ACCUMULATED SEDIMENT AS WELL AS ALL USED BAGS ACCORDING TO THE PLAN NOTES.
6. DO NOT USE ON MAJOR PAVED ROADWAYS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

STANDARD CONSTRUCTION DETAIL # 4-15
FILTER BAG INLET PROTECTION - TYPE C INLET

NOT TO SCALE | MCPA-SOIL-EROS-2400 | 05/01/18



FRONT VIEW



SECTION VIEW

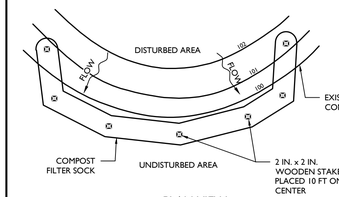
PLAN VIEW

NOTES:

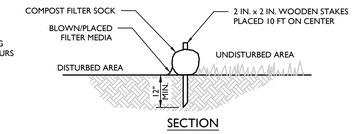
1. MAXIMUM DRAINAGE AREA = 1 ACRE.
2. INLET PROTECTION SHALL NOT BE REQUIRED FOR INLET TRIBUTARY TO SEDIMENT BASIN OR TRAP. BERMS SHALL BE REQUIRED FOR ALL INSTALLATIONS.
3. ROLLED EARTHEN BERM SHALL BE PROVIDED AND MAINTAINED IMMEDIATELY DOWN GRADIENT OF THE PROTECTED INLET UNTIL ROADWAY IS STONED. ROAD SUBBASE BERM SHALL BE MAINTAINED UNTIL ROADWAY IS PAVED. SIX INCH MINIMUM HEIGHT ASPHALT BERM SHALL BE MAINTAINED UNTIL ROADWAY SURFACE RECEIVES FINAL COAT.
4. SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE HEIGHT OF THE STONE. DAMAGED OR CLOGGED INSTALLATIONS SHALL BE REPAIRED OR REPLACED IMMEDIATELY.
5. FOR SYSTEMS DISCHARGING TO HQ OR EV SURFACE WATER, A 6 INCH THICK COMPOST LAYER SHALL BE SECURELY ANCHORED ON OUTSIDE AND OVER TOP OF STONE.
6. DO NOT USE ON MAJOR PAVED ROADWAYS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

STANDARD CONSTRUCTION DETAIL # 4-17
STONE AND CONCRETE BLOCK INLET PROTECTION - TYPE C INLET

NOT TO SCALE | MCPA-SOIL-EROS-2402 | 05/01/18



PLAN VIEW



SECTION

NOTES:

1. SOCK FABRIC SHALL MEET STANDARDS OF TABLE 4.1 OF THE PA DEP EROSION CONTROL MANUAL. COMPOST SHALL MEET THE STANDARDS OF TABLE 4.2 OF THE PA DEP EROSION CONTROL MANUAL.
2. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY BARRIER SHALL NOT EXCEED THAT SPECIFIED FOR THE SIZE OF THE SOCK AND THE SLOPE OF ITS TRIBUTARY AREA.
3. TRAFFIC SHALL NOT BE PERMITTED TO CROSS COMPOST FILTER SOCKS.
4. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE BARRIER AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
5. COMPOST FILTER SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
6. BIODEGRADABLE COMPOST FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
7. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

INSPECTION: COMPOST FILTER SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT.
MAINTENANCE:ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE ABOVEGROUND HEIGHT OF THE SOCK AND DISPOSED OF IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
REPAIR: DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.

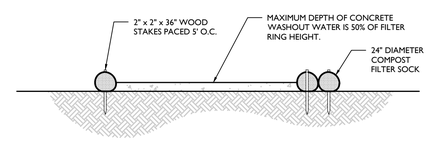
STANDARD CONSTRUCTION DETAIL # 4-1
COMPOST FILTER SOCK

NOT TO SCALE | MCPA-SOIL-EROS-1600 | 05/01/18

NOTES:

1. CONCRETE WASHOUTS ARE REQUIRED ON ALL CONSTRUCTION SITES INVOLVING CONCRETE AND STUCCO USE:
2. THE CONTRACTOR SHALL REQUIRE ALL CONCRETE DRIVERS TO UTILIZE THE CONCRETE WASHOUTS ONSITE.
3. WASHOUT FACILITIES SHALL BE LOCATED AT LEAST 50 FEET AWAY FROM STORM SEWER DRAIN INLETS, GUTTERS, OPEN DITCHES, AND WATER COURSES.
4. APPROPRIATE STONE SHOULD COVER PATHS TO CONCRETE WASHOUT.
5. THE NUMBER OF CONCRETE WASHOUTS DEPENDS ON THE EXPECTED DEMAND FOR STORAGE CAPACITY. LARGE SITES WITH EXTENSIVE CONCRETE WORK SHALL BE PLACED AT MULTIPLE LOCATIONS FOR USE BY CONCRETE TRUCK DRIVERS.
6. CONCRETE WASHOUT AREAS SHALL BE IDENTIFIED BY POSTING SIGNS ONSITE.
7. CONCRETE WASHOUTS ARE TO BE INSPECTED DAILY BY THE CONTRACTOR FOR LEAKS OR TEARS IN PLASTIC LINER.
8. REMOVE AND DISPOSE OF ALL MATERIAL WHEN THE WASHOUT HAS BEEN FILLED TO 75% CAPACITY.
9. PRIOR TO ANY RAINFALL, ALL CONCRETE WASHOUTS ARE TO BE CLEANED OUT OR COVERED.
10. ONCE THE MATERIAL HAS BEEN CLEANED OUT OF THE CONCRETE WASHOUT FACILITY, THE FACILITY MUST BE INSPECTED FOR REPAIR, RECONSTRUCTION OR REPLACEMENT. ALL PLASTIC LINING SHALL BE REMOVED AND REPLACED.
11. PRE-FABRICATED OR ONSITE FABRICATED CONCRETE WASHOUTS MAY BE USED.
12. OPTIONS FOR ONSITE CONCRETE WASHOUTS:
    A. DIG A PIT AND LINE WITH 10 MIL PLASTIC SHEETING.
    B. CREATE AN ABOVE-GROUND STRUCTURE FROM STRAW BALES OR SANDBAGS, WITH 10 MIL PLASTIC LINING.

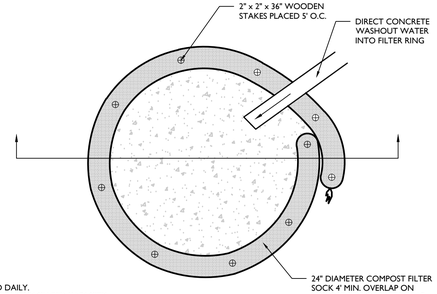
INSPECTION: ALL CONCRETE WASHOUT FACILITIES SHOULD BE INSPECTED DAILY.
MAINTENANCE: ACCUMULATED MATERIALS SHOULD BE REMOVED WHEN THEY REACH 75% CAPACITY.
REPAIR: DAMAGED OR LEAKING WASHOUTS SHOULD BE DEACTIVATED AND REPAIRED OR REPLACED IMMEDIATELY.



SECTION

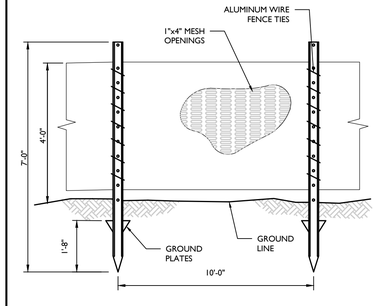
NOTES:

1. INSTALL ON FLAT GRADE FOR OPTIMUM PERFORMANCE.
2. 18" DIAMETER FILTER SOCK MAY BE STACKED ONTO DOUBLE 24" DIAMETER SOCKS IN PYRAMIDAL CONFIGURATION FOR ADDED HEIGHT.



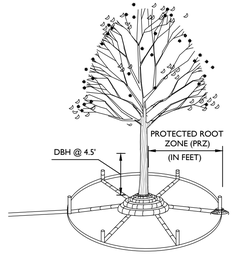
CONCRETE WASHOUT DETAIL

NOT TO SCALE | MCPA-SOIL-EROS-1800 | 12/01/20



ORANGE CONSTRUCTION FENCE DETAIL

NOT TO SCALE | MCPA-SOIL-EROS-2100 | 05/01/18



NOTES:

1. MEASURE THE DBH (DIAMETER OF TREE AT BREAST HEIGHT, 4.5' ABOVE GROUND ON THE UPHILL SIDE) IN INCHES.
2. PROTECTED ROOT ZONE (PRZ) = CRITICAL ROOT ZONE IN FEET = DBH (INCHES) X 1.5' (FOR OLD/SENSITIVE TREES) OR DBH X 1.0 (FOR YOUNG/TOLERANT TREES)

TREE PROTECTION IN CUT AREAS DETAIL

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMM	ACANS UPDATED PER TOWNSHIP ZONING COMMENTS
2	06/02/22	CMM	REVISED PER FIRE MARSHAL, TOWNSHIP, AND ZONING REVIEW LETTERS

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL C. RICHARD ROSEBERRY ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC.
DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER: 160010308
DRAWING NAME: C-SESC-DTLS

SHEET TITLE: EROSION AND SEDIMENT POLLUTION CONTROL DETAILS

SHEET NUMBER: 25 of 37

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2021\160010308\Engineering\ESS\Plans\C-SESC-DTLS.dwg,C-SESC-DTLS,3/4/2022 8:47:14 AM, By: JOHN.MEZGER



PCSM LEGEND

	PROPOSED
EXISTING STORM PIPE	
LIMIT OF DISTURBANCE	LOD
NPDES BOUNDARY	NPDES
POST-PROJECT IMPERVIOUS SURFACES	
TEST BORING LOCATION	TB-6
TEST PIT LOCATION	TP-6

LEGEND

TRAVERSE LINE, CENTER LINE OR BASELINE	WETLAND MARKER
RIGHT OF WAY LINE	TREE
PROPERTY LINE	ROADWAY SIGNS
EDGE OF PAVEMENT	TRAFFIC FLOW
FACE CURB LINE	MAILBOX
D.C. BACK DEPRESSED CURB	TRAFFIC SIGNAL POLE
CHAIN FENCE	POLE MOUNTED LIGHT
WETLAND LINE	UTILITY POLE
MUNICIPAL BOUNDARY	GUY WIRE
TREELINE	TRANSFORMER
ELECTRICAL MANHOLE	FIRE DEPT. CONNECTION
WATER MANHOLE	FIRE HYDRANT
TELEPHONE MANHOLE	WATER VALVE
UNMARKED MANHOLE	GAS VALVE
SANITARY MANHOLE	SANITARY CLEANOUT
DRAINAGE MANHOLE	CONCRETE MONUMENT
MAJOR CONTOUR	CAPPED REBAR/IRON PIPE
MINOR CONTOUR	STORM INLET TYPE "C"
SPOT ELEVATION	STM. DBL. INLET TYPE "C"
TOP OF CURB ELEV.	STORM INLET TYPE "M"
BOTTOM OF CURB ELEV.	STM. DBL. INLET TYPE "M"
U/G CABLE TV LINE	FLARED END SECTION
U/G FIBER OPTIC LINE	HEADWALL
U/G TELEPHONE LINE	SOIL BOUNDARY
U/G ELECTRIC LINE	
OVERHEAD WIRE	
WATER MAIN	
GAS MAIN	
SAN. SEWER LATERAL	
SAN. SEWER MAIN	
STORM PIPE	

ABBREVIATIONS

D.C. = DEPRESSED CURB	FF. = FINISH FLOOR	MHWL = MEAN HIGH WATERLINE	
BC = BOTTOM OF CURB	UV = UNKNOWN VALVE	MLWL = MEAN LOW WATERLINE	
TC = TOP OF CURB	MH = MANHOLE	TW = TOP OF WALL	
BOL = BOLLARD	DEP. = DEPRESSED	BW = BOTTOM WALL	
GRT = GRATE	CL = CENTERLINE		
MB = MAILBOX	PM = PARKING METER		

GENERAL NOTES:

1. IN ACCORDANCE WITH STATE LAW, THE CONTRACTOR SHALL BE REQUIRED TO CALL THE PENNSYLVANIA ONE CALL DAMAGE PROTECTION SYSTEM FOR UTILITY MARK OUT IN ADVANCE OF ANY EXCAVATION.
2. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING SITE IMPROVEMENTS AND UTILITIES. ALL DISCREPANCIES SHALL BE IDENTIFIED TO THE ENGINEER IN WRITING.
3. ALL REMOVED MATERIAL MUST BE TRANSPORTED TO A SITE WITH AN ACTIVE NPDES PERMIT OR ACTIVE EROSION & SEDIMENTATION CONTROL PLAN.
4. ALL DEMOLITION DEBRIS TO BE REMOVED BY CONTRACTOR IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.
5. THE LIMIT OF DISTURBANCE AND NPDES BOUNDARIES ARE SHOWN OFFSET FROM OBJECTS AND OUTSIDE OF THE PROPERTY BOUNDARY FOR CLARITY. ALL DISTURBANCE WILL BE LOCATED WITHIN THE PROPERTY BOUNDARY.
6. BY GRAPHICAL REPRESENTATION ONLY THIS PROPERTY IS LOCATED IN FLOOD HAZARD ZONE AE AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 42091C0358G WHICH HAS AN EFFECTIVE DATE OF MARCH 2, 2016 AND IS IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE. THE FEMA CALCULATED 100-YEAR FLOOD ELEVATION FOR THIS PROJECT IS 60.5 FEET (NAVD 88) IN ACCORDANCE FIRM MAP NUMBER 42091C0358G DATED MARCH 2, 2016.

ENVIRONMENTAL NOTE:

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ENGINEER CERTIFICATION:

I CERTIFY THAT THE PROPOSED FACILITY IS UNDERLAIN BY LIMESTONE.

PROFESSIONAL ENGINEER _____ DATE _____

THIS SITE ULTIMATELY FLOWS TO THE SCHUYLKILL RIVER, WHICH IS PART OF THE SCHUYLKILL RIVER WATERSHED. THE PENNSYLVANIA CODE, TITLE 25, CHAPTER 93, WATER QUALITY STANDARDS ASSIGNS THE SCHUYLKILL RIVER A WATER QUALITY DESIGNATION OF WARM WATER FISHERY, MIGRATORY FISHES (WWF, MF).

40 0 40 80

SCALE : 1" = 40'

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

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REV	DATE	DRAWN BY	DESCRIPTION
1	03/16/22	CMK	REVISED PER PRE-MARSHAL, TOWNSHIP AND ZONING REVIEW LETTERS
2	06/02/22	CMK	PLANS UPDATED PER TOWNSHIP ZONING COMMENTS

C. RICHARD ROSEBERRY
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

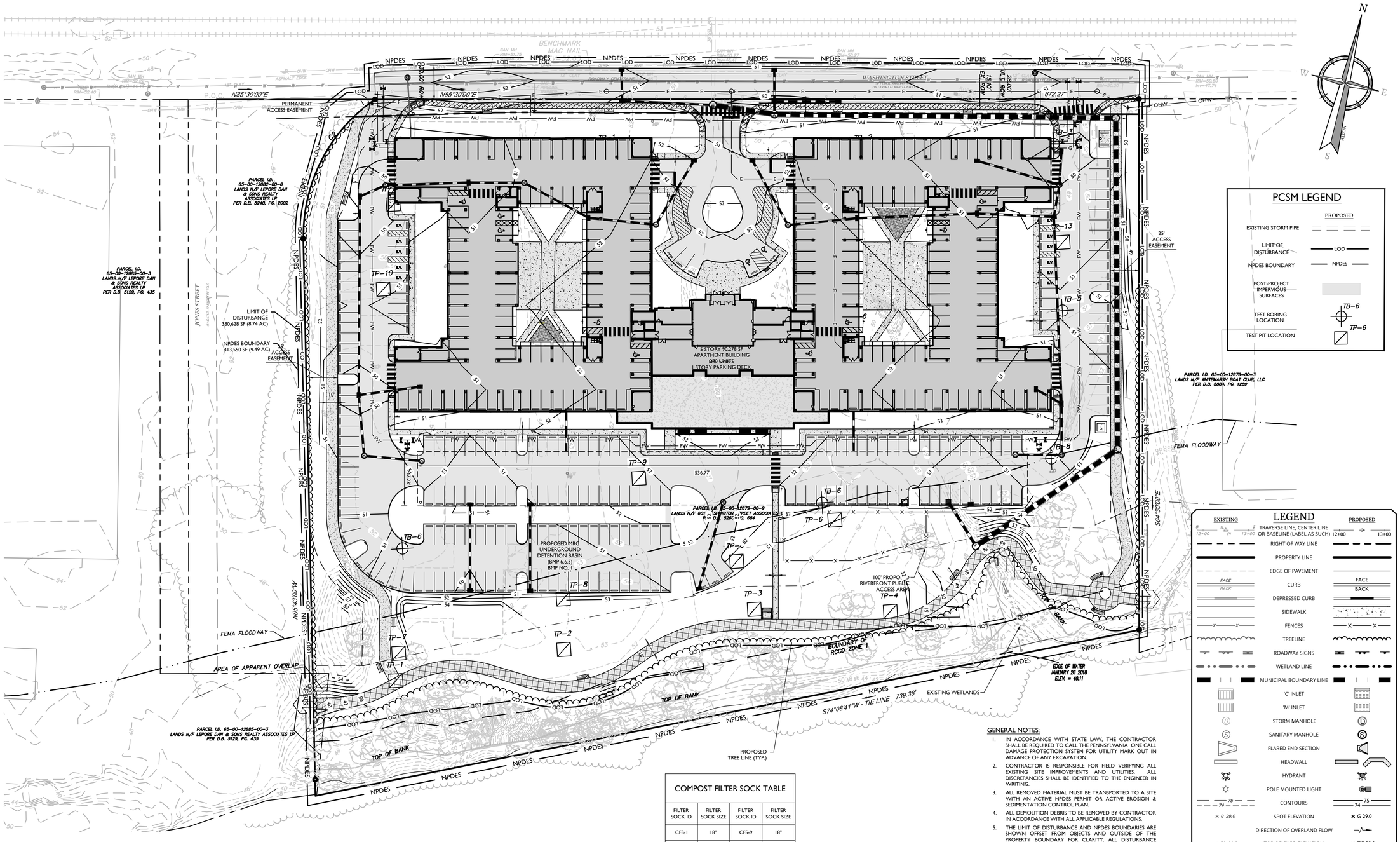
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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA
PROJECT NUMBER:	DRAWING NAME:		
16001030B	C-PCSM-PLAN		

SHEET TITLE:
PCSM EXISTING CONDITIONS

SHEET NUMBER:
26 of 37

20161001030B\Engineering\PCSM\C-PCSM-PLAN.dwg(P-02-LEGND By: CHRIS.MESZLER



PCSM LEGEND

	PROPOSED
EXISTING STORM PIPE	
LIMIT OF DISTURBANCE	LOD
NPDES BOUNDARY	NPDES
POST-PROJECT IMPERVIOUS SURFACES	
TEST BORING LOCATION	TB-6
TEST PIT LOCATION	TP-6

LEGEND

EXISTING		PROPOSED
12+00 PVI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'C' INLET	
	'M' INLET	
D	STORM MANHOLE	D
S	SANITARY MANHOLE	S
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
75 74	CONTOURS	75 74
× G 29.0	SPOT ELEVATION	× G 29.0
	DIRECTION OF OVERLAND FLOW	
× TC 29.0	TOP OF CURB ELEVATION	× TC 29.0
× BC 29.0	BOTTOM OF CURB ELEVATION	× BC 29.0
	TOP OF DEPRESSED CURB ELEVATION	× TDC 29.0
CATV	CABLE TV CONDUIT	CATV
W	WATER MAIN	W
G	GAS MAIN	G
T	TELEPHONE CONDUIT	T
E	ELECTRIC CONDUIT	E
	SANITARY PIPE	
	STORM PIPE	

COMPOST FILTER SOCK TABLE

FILTER SOCK ID	FILTER SOCK SIZE	FILTER SOCK ID	FILTER SOCK SIZE
CFS-1	18"	CFS-9	18"
CFS-2	18"	CFS-10	18"
CFS-3	18"	CFS-11	18"
CFS-4	18"	CFS-12	18"
CFS-5	18"	CFS-13	18"
CFS-6	18"	CFS-14	18"
CFS-7	18"	CFS-15	18"
CFS-8	18"		

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6. CONSTRUCTION FENCE TO BE INSTALLED AT THE DISCRETION OF THE CONSTRUCTION MANAGER. THE CONSTRUCTION FENCE MUST BE INSTALLED TO MAINTAIN SAFE VEHICULAR AND PEDESTRIAN TRAFFIC PATTERNS AT ALL TIMES THROUGHOUT CONSTRUCTION.
7. DO NOT INSTALL COMPOST FILTER SOCKS ON EROSION CONTROL MATTING.
8. BY GRAPHICAL REPRESENTATION ONLY THIS PROPERTY IS LOCATED IN FLOOD HAZARD ZONE AE AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 42091C0358G WHICH HAS AN EFFECTIVE DATE OF MARCH 2, 2016 AND IS IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE. THE FEMA CALCULATED 100-YEAR FLOOD ELEVATION FOR THIS PROJECT IS 60.5 FEET (NAVD 88) IN ACCORDANCE FIRM MAP NUMBER 42091C0358G DATED MARCH 2, 2016.

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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	03/01/2022	SF/CMM	RMA

PROJECT NUMBER: 16001030B
DRAWING NAME: C-PCSM-PLAN

SHEET TITLE: PCSM PLAN

SHEET NUMBER: 27 of 37

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

20161600103\08 Engineering\PCSM\C-PCSM-PLAN.dwg 03-PLAN By: CHRIS.MESZLER

POST-CONSTRUCTION STORMWATER MANAGEMENT GENERAL NOTES

1. FOR THE PURPOSES OF THIS PLAN, "BMP" REFERS TO A PROPOSED PCSM BEST MANAGEMENT PRACTICE.
2. DO NOT STOCKPILE EQUIPMENT, SOIL, OR MACHINERY WITHIN THE AREA OF AN INFILTRATION BMP.
3. DO NOT COMPACT INFILTRATION BMP SOIL BEDS DURING CONSTRUCTION. PROHIBIT ALL HEAVY EQUIPMENT FROM THE FLOOR AREA AND MINIMIZE ALL OTHER TRAFFIC. WHERE POSSIBLE, PERFORM WORK FROM THE PERIMETER OF THE BMP TO AVOID EXCESSIVE SOIL COMPACTION WITHIN THE LEVEL EARTH AREAS OF THE BMP.
4. A COMPLETE AND SITE SPECIFIC CONSTRUCTION SEQUENCE INCLUDING THE CONSTRUCTION OF ALL BMPS CAN BE FOUND ON THE EROSION AND SEDIMENT POLLUTION CONTROL PLANS.
5. THE PERMITTEE MUST PROVIDE ENGINEERING CONSTRUCTION OVERSIGHT FOR THE PROPOSED STORMWATER BMPS.
6. BEFORE INITIATING ANY REVISIONS TO THE APPROVED PCSM PLANS OR REVISIONS TO OTHER PLANS WHICH MAY AFFECT THE EFFECTIVENESS OF THE APPROVED PCSM PLAN, THE CONTRACTOR MUST RECEIVE APPROVAL OF THE REVISIONS FROM THE MONTGOMERY COUNTY CONSERVATION DISTRICT AND/OR PADEP.
7. ALL BUILDING MATERIALS AND WASTES SHALL BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET SEQ., 271.1, AND 287.1 ET. SEQ. NO BUILDING MATERIALS OR WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THIS SITE.
8. IN THE EVENT OF SINKHOLE DISCOVERY A PROFESSIONAL GEOLOGIST OR ENGINEER MUST BE CONTACTED CONCERNING MITIGATION. ADDITIONALLY, THE MONTGOMERY COUNTY CONSERVATION DISTRICT MUST BE MADE AWARE OF THE SINKHOLE DISCOVERY IMMEDIATELY.
9. THE CONTRACTOR SHALL ASSURE THAT THE APPROVED POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN IS PROPERLY AND COMPLETELY IMPLEMENTED.
10. PCSM PLAN HAS BEEN DESIGNED TO MINIMIZE IMPERVIOUS AREAS. IMPERVIOUS AREAS WILL BE LIMITED TO ROADWAY MAINTENANCE AND IMPROVEMENT AREAS, AND PERVIOUS AREAS WILL BE RESTORED IN OTHER AREAS WITHIN THE LIMIT OF DISTURBANCE.
11. PCSM PLAN HAS BEEN DESIGNED TO MAXIMIZE THE PROTECTION OF EXISTING DRAINAGE FEATURES AND EXISTING VEGETATION. THE PROPOSED DEVELOPMENT MAINTAINS THE GENERAL DRAINAGE PATTERN, VOLUME, AND RATE OF RUNOFF TO THE SURFACE WATER DISCHARGE. EXISTING VEGETATION IS PROTECTED BY RESTRICTING DISTURBED AREA.
12. PCSM PLAN HAS BEEN DESIGNED TO MINIMIZE LAND CLEARING AND GRADING. EARTH DISTURBANCE IS LIMITED ONLY TO AREAS OF PROPOSED IMPROVEMENTS. DISTURBED AREAS ARE TO BE STABILIZED IMMEDIATELY AFTER GRADING AND/OR IMPROVEMENTS ARE COMPLETED.
13. THE PCSM PLAN MINIMIZES SOIL COMPACTION. USE OF EXISTING ROADWAYS AND STABILIZED AREAS AND CONTROL OF DISTURBED AREAS FOR THE PLANNED IMPROVEMENTS LIMIT THE IMPACT OF SOIL COMPACTION.
14. PCSM PLAN UTILIZES STRUCTURAL AND NON-STRUCTURAL BMPS THAT PREVENT OR MINIMIZE CHANGES IN STORMWATER RUNOFF. SITE BMPS PREVENT OR MINIMIZE CHANGES IN STORMWATER RUNOFF BY CONTROLLING VOLUME AND PEAK RATE RUNOFF FROM THE SITE.
15. THE PCSM PLANS ARE SEPARATE FROM THE EROSION AND SEDIMENT POLLUTION CONTROL (E&SPC) PLANS, ARE CONSISTENT WITH THE E&SPC PLANS, AND ARE THE FINAL PLANS FOR CONSTRUCTION.
16. A SEALER WILL BE USED IN ALL INLETS LOCATED WTIHIN GRASSED AREAS AND WITHIN AREAS OF PCSM BMPS.

PCSM REQUIREMENTS

PCSM REPORTING AND RECORDKEEPING. THE PCSM PLAN, INSPECTION REPORTS AND MONITORING RECORDS MUST BE AVAILABLE FOR REVIEW AND INSPECTION BY PADEP OR THE CONSERVATION DISTRICT.

RESPONSIBLE PARTY & OWNER:

THE STORMWATER BMPS IN THE PROJECT SITE WILL BE OWNED, OPERATED, AND MAINTAINED BY:

601 WASHINGTON STREET ASSOCIATES, L.P.
201 KING OF PRUSSIA ROAD, SUITE 501
RADNOR, PA 19087
P: (610) 337-5582

LICENSED PROFESSIONAL OVERSIGHT OF CRITICAL STAGES. A LICENSED PROFESSIONAL OR A DESIGNEE MUST BE PRESENT ONSITE AND BE RESPONSIBLE DURING CRITICAL STAGES OF PCSM BMP IMPLEMENTATION OF THE APPROVED PCSM PLAN. FOR THE PURPOSES OF THIS PCSM PLAN, THE CRITICAL STAGES ARE CONSIDERED TO BE:

CRITICAL STAGES OF CONSTRUCTION - LICENSED PROFESSIONAL TO BE PRESENT ON SITE	
1	PRE-CONSTRUCTION MEETING TO BE HELD PRIOR TO THE START OF CONSTRUCTION ACTIVITIES.
2	INSTALLATION OF MRC UNDERGROUND DETENTION FACILITY, IMPERMEABLE LINER, AND OUTLET CONTROL STRUCTURES
3	INSPECTION PRIOR TO REMOVAL OF E&S CONTROLS.
4	FINAL INSPECTION AT PROJECT COMPLETION.

FINAL CERTIFICATION. THE PERMITTEE MUST INCLUDE WITH THE NOTICE OF TERMINATION "RECORD DRAWINGS" WITH A FINAL CERTIFICATION STATEMENT FROM A LICENSED PROFESSIONAL, WHICH READS AS FOLLOWS, OR AS THE CURRENT STANDARD READS:

"I (NAME) DO HEREBY CERTIFY PURSUANT TO THE PENALTIES OF 18 PA.C.S.A. CHAPTER 4904 TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF, THAT THE ACCOMPANYING RECORD DRAWINGS ACCURATELY REFLECT THE AS-BUILT CONDITIONS, ARE TRUE AND CORRECT, AND ARE IN CONFORMANCE WITH CHAPTER 102 OF THE RULES AND REGULATIONS OF PADEP OF ENVIRONMENTAL PROTECTION AND THAT THE PROJECT SITE WAS CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PCSM PLAN, ALL APPROVED PLAN CHANGES AND ACCEPTED CONSTRUCTION PRACTICES."

(1) THE PERMITTEE MUST RETAIN A COPY OF THE RECORD DRAWINGS AS A PART OF THE APPROVED PCSM PLAN.

(2) THE PERMITTEE MUST PROVIDE A COPY OF THE RECORD DRAWINGS AS A PART OF THE APPROVED PCSM PLAN TO THE PERSONS OR ENTITIES IDENTIFIED IN THIS SECTION AS BEING RESPONSIBLE FOR THE LONG-TERM OPERATION AND MAINTENANCE OF THE PCSM BMPS.

PCSM LONG TERM OPERATIONS AND MAINTENANCE REQUIREMENTS

UNTIL THE PERMITTEE OR CO-PERMITTEE HAS RECEIVED WRITTEN APPROVAL OF A NOTICE OF TERMINATION, THE PERMITTEE OR CO-PERMITTEE WILL REMAIN RESPONSIBLE FOR COMPLIANCE WITH THE PERMIT TERMS AND CONDITIONS INCLUDING LONG-TERM OPERATION AND MAINTENANCE OF ALL PCSM BMPS ON THE PROJECT SITE AND IS RESPONSIBLE FOR VIOLATIONS OCCURRING ON THE PROJECT SITE. PADEP AND/OR THE CONSERVATION DISTRICT WILL CONDUCT A FINAL INSPECTION AND APPROVE OR DENY THE NOTICE OF TERMINATION WITHIN 30 DAYS.

THE PERMITTEE OR CO-PERMITTEE IS RESPONSIBLE FOR LONG-TERM OPERATION AND MAINTENANCE OF PCSM BMPS UNLESS A DIFFERENT PERSON OR ENTITY IS IDENTIFIED IN THE NOTICE OF TERMINATION AND HAS AGREED TO LONG-TERM OPERATION AND MAINTENANCE OF PCSM BMPS.

FOR ANY PROPERTY CONTAINING A PCSM BMP, THE PERMITTEE OR CO-PERMITTEE SHALL RECORD AN INSTRUMENT WITH THE RECORDER OF DEEDS WHICH WILL ASSURE DISCLOSURE OF THE PCSM BMP AND THE RELATED OBLIGATIONS IN THE ORDINARY COURSE OF A TITLE SEARCH OF THE SUBJECT PROPERTY. THE RECORDED INSTRUMENT MUST IDENTIFY THE PCSM BMP, PROVIDE FOR NECESSARY ACCESS RELATED TO LONG-TERM OPERATION AND MAINTENANCE FOR PCSM BMPS AND PROVIDE NOTICE THAT THE RESPONSIBILITY FOR LONG-TERM OPERATION AND MAINTENANCE OF THE PCSM BMP IS A COVENANT THAT RUNS WITH THE LAND THAT IS BINDING UPON AND ENFORCEABLE BY SUBSEQUENT GRANTEES, AND PROVIDE PROOF OF FILING WITH THE NOTICE OF TERMINATION UNDER § 102.7(B)(5) (RELATING TO PERMIT TERMINATION).

THE PERSON RESPONSIBLE FOR PERFORMING LONG-TERM OPERATION AND MAINTENANCE MAY ENTER INTO AN AGREEMENT WITH ANOTHER PERSON INCLUDING A CONSERVATION DISTRICT, NONPROFIT ORGANIZATION, MUNICIPALITY, AUTHORITY, PRIVATE CORPORATION OR OTHER PERSON, TO TRANSFER THE RESPONSIBILITY FOR PCSM BMPS OR TO PERFORM LONG-TERM OPERATION AND MAINTENANCE AND PROVIDE NOTICE THEREOF TO THE DEPARTMENT.

A PERMITTEE OR CO-PERMITTEE THAT FAILS TO TRANSFER LONG-TERM OPERATION AND MAINTENANCE OF THE PCSM BMP OR OTHERWISE FAILS TO COMPLY WITH THIS REQUIREMENT SHALL REMAIN JOINTLY AND SEVERALLY RESPONSIBLE WITH THE LANDOWNER FOR LONG-TERM OPERATION AND MAINTENANCE OF THE PCSM BMPS LOCATED ON THE PROPERTY.

OPERATION AND MAINTENANCE FOR PCSM BMPS

OWNERSHIP OF THE PERMANENT BMPS INDICATED ON THE PCSM PLANS RESIDES WITHIN THE PROPERTY BOUNDARY FOR THE SUBJECT LOTS. THE OPERATIONS AND MAINTENANCE OF THESE BMPS WILL BECOME THE RESPONSIBILITY OF THE PROPERTY OWNER OR THEIR DESIGNEE. THIS OPERATION AND MAINTENANCE PLAN IS BASED ON CHAPTER 6 OF THE *PENNSYLVANIA STORMWATER BEST MANAGEMENT PRACTICES MANUAL AND SECTIONS 7 AND 8 OF THE PENNSYLVANIA HANDBOOK OF BEST MANAGEMENT PRACTICES FOR DEVELOPING AREAS.*

FOLLOWING THIS OPERATION AND MAINTENANCE PLAN WILL ALLOW THE BMPS TO FUNCTION PROPERLY. EACH BMP MUST BE INSPECTED ANNUALLY (UNLESS OTHERWISE NOTED) AND AFTER ANY MAJOR RUNOFF EVENTS, AS INDICATED.

LIMIT VEHICULAR OPERATION OVER THE BMPS TO AVOID COMPACTION OF THE SOILS OR AGGREGATE MATERIAL. TAKE CARE TO AVOID EXCESSIVE COMPACTION WHEN ACCESS IS REQUIRED. WHEN PERFORMING MAINTENANCE ACTIVITIES IN BMPS, OPERATE EQUIPMENT WITHOUT ENTERING THE FLOOR AREA, OR USE LIGHTWEIGHT, LOW GROUND PRESSURE, TRACK MOUNTED EQUIPMENT.

BMP MINIMUM INSPECTION CHECKLIST

- EXCESSIVE EROSION OR SEDIMENTATION
- UNSTABLE SIDE SLOPES AND EMBANKMENTS
- SEEPAGE THROUGH OUTSIDE FACE OF EMBANKMENTS
- CRACKING OR SETTLING
- SINKHOLES
- ANIMAL BURROWING
- DETERIORATION OF VEGETATION
- INVASIVE PLANT GROWTH
- SLUGGISH DRAINING
- ALGAE, STAGNANT POOLS, OR NOXIOUS ODORS
- RUTS, WASHOUTS, BULGES, SLIDES, SLOUGHS, SCARPS, OR SLUMPS
- RIP-RAP DISPLACEMENT OR FAILURE
- CRACKS OR RUST ON PIPING
- OBSTRUCTIONS BY TRASH AND DEBRIS
- SIGNS OF VANDALISM

IF DURING OPERATION, A SIGN OF FAILURE IS NOTED DURING INSPECTION, CORRECTIVE ACTION MUST BE COMPLETED BASED ON THE TYPE OF PROBLEM OBSERVED.

SEDIMENT REMOVAL

SEDIMENT MAY ACCUMULATE OVER TIME WITHIN BMPS AND STORM SEWER INLETS. THE DISTURBED AREAS OF THE BMPS MUST BE STABILIZED IMMEDIATELY. SEDIMENT ACCUMULATION IN STORM SEWER INLETS AND MANHOLES MUST BE REMOVED AND PROPERLY DISPOSED OF IN ACCORDANCE WITH PADEP REGULATIONS. SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN LANDSCAPED AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS OR DRAINAGE SWALES. THE SEDIMENT DISPOSAL AREA MUST BE STABILIZED IMMEDIATELY. ANY POTENTIALLY HAZARDOUS ACCUMULATIONS REMOVED FROM SUCH STRUCTURES MUST BE PROPERLY DISPOSED OF IN ACCORDANCE WITH PADEP REGULATIONS.

TERRESTRIAL VEGETATION MAINTENANCE

VEGETATIVE COVER MUST BE MOWED AT LEAST TWICE ANNUALLY, ALLOWING THE DEVELOPMENT OF THICK STANDS OF TALL GRASS AND OTHER PLANT VEGETATION.

INSPECT THE SEEDED AREAS AFTER ONE (1) YEAR. IF AN AREA HAS LESS THAN A UNIFORM 70 PERCENT VEGETATIVE PERENNIAL COVER, REEVALUATE THE CHOICE OF PLANT MATERIALS AND THE QUANTITIES OF SOILS SUPPLEMENTS USED. PREPARE THE SEEDBED AND REESTABLISH SEEDING. IF THE SEASON PREVENTS RE-SOWING, APPLY MULCH OR EROSION CONTROL MATTING FOR TEMPORARY STABILIZATION AND SEED THE AREA AS SOON AS PRACTICAL.

SPILLS

IN THE EVENT OF A SPILL, IMMEDIATELY INSPECT THE DOWNGRADIENT BMP(S) FOR CONTAMINATION. REMOVE AND PROPERLY DISPOSE OF SPILLED SUBSTANCES AND CONTAMINATED SOIL/MATERIALS. RESTORE THE AFFECTED BMP(S).

ALL RESTORATION AND REMEDIATION PROCEDURES FOR A SPILL FROM MATERIALS STORED ONSITE MUST COMPLY WITH THE MEASURES LISTED IN PENNSYLVANIA'S CLEAN STREAMS LAW.

UNDERGROUND DETENTION BASINS (PADEP BMP 6.6.3)

INSPECT THE UNDERGROUND DETENTION BASIN FOUR TIMES PER YEAR OR AS OFTEN AS FUTURE POLICIES ON STORMWATER BMP INSPECTIONS DICTATE.:

1. ALL BASIN STRUCTURES (INCLUDING PIPES, STONE, TRASH RACKS, OUTLETS STRUCTURES, AND INLETS) EXPECTED TO RECEIVE AND/OR TRAP DEBRIS AND SEDIMENT SHOULD BE INSPECTED FOR CLOGGING AND EXCESSIVE DEBRIS AND SEDIMENT ACCUMULATION.
2. SEDIMENT REMOVAL SHOULD BE CONDUCTED WHEN THE BASIN IS COMPLETELY DRY. SEDIMENT SHOULD BE DISPOSED OF PROPERLY AND ONCE SEDIMENT IS REMOVED, DISTURBED AREAS NEED TO BE IMMEDIATELY STABILIZED AND REVEGETATED.
3. VACUUMING OF THE SYSTEM MAY BE REQUIRED.
4. PAVED AREAS AT EACH INLET DISCHARGING INTO THE UNDERGROUND DETENTION SYSTEM SHOULD BE INSPECTED FOR SEDIMENT, CLOGGIN, AND PONDED WATER.
5. WATER SHOULD NOT BE PRESENT WITHIN THE UNDERGROUND DETENTION BASINS 7 DAYS AFTER A RAINFALL EVENT. IF WATER IS PRESENT AFTER THIS TIME, A DESIGN PROFESSIONAL SHOULD BE CONSULTED TO EVALUATE THE UNDERGROUND DETENTION BASIN.

ROCK APRONS

ADD ROCK AS NECESSARY TO RESTORE THE ROCK APRON TO THE APPROVED DESIGN SPECIFICATIONS.

SEEDING AND SOIL SUPPLEMENTS

THE FOLLOWING SPECIFICATIONS ARE IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 804.

TEMPORARY SEED MIXTURES

SEED TYPE (PENNDOT FORMULA E)	% BY WEIGHT	PURITY	MAX. WEED SEED
ANNUAL RYEGRASS	100	95%	0.10%

APPLY SEED AT A RATE OF 10 LBS. PER 1,000 SY.
APPLY STRAW MULCH (SEE MULCH APPLICATION RATES TABLE)
SEEDING SEASON DATES: MARCH 15 TO OCTOBER 15

PERMANENT SEED MIXTURES

SEED TYPE (PENNDOT FORMULA B)	% BY WEIGHT	PURITY	MAX. WEED SEED
PERENNIAL RYEGRASS MIXTURE * (LOLIUM PERENNE)	20	97%	0.10%
CREEPING RED FESCUE	30	97%	0.10%
KENTUCKY BLUEGRASS MIXTURE ** (POA PRATENSIS)	50	97%	0.15%

APPLY SEED AT A RATE OF 42 LBS. PER 1,000 SY.
APPLY STRAW OR HAY MULCH (SEE MULCH APPLICATION RATES TABLE).
APPLY PULVERIZED AGRICULTURAL LIMESTONE AT A RATE OF 2 TONS/ACRE UNLESS TESTING HAS BEEN PERFORMED.
APPLY 10-20-20 ANALYSIS COMMERCIAL FERTILIZER AT A RATE OF 678 LBS./ACRE UNLESS TESTING HAS BEEN PERFORMED.
SEEDING SEASON DATES: MARCH 15 TO JUNE 1; AUGUST 1 TO OCTOBER 15
APPLY FLEXTERRA FGM (OR EQUAL) ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

* A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL RYEGRASS COMPONENT.
** A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL BLUEGRASS COMPONENT.

PERMANENT SEED MIXTURES ON STEEP SLOPES (SLOPES EXCEEDING 3:1)

(PENNDOT FORMULA L) SEED TYPE	% BY WEIGHT	PURITY	MAX. WEED SEED
HARD FESCUE (FESTUCA LONGIFOLIA***)	55	97%	0.10%
CREEPING RED FESCUE (FESTUCA RUBRA)	35	97%	0.10%
ANNUAL RYEGRASS (LOLIUM MULTIFLORUM)	10	95%	0.10%

APPLY SEED AT A RATE OF 48 LBS / 1,000 SY.
MULCH WITH MULCH CONTROL NETTING OR EROSION CONTROL BLANKETS MUST BE INSTALLED.
APPLY PULVERIZED AGRICULTURAL LIMESTONE AT A RATE OF 2 TONS/ACRE UNLESS TESTING HAS BEEN PERFORMED.
APPLY 10-20-20 ANALYSIS COMMERCIAL FERTILIZER AT A RATE OF 678 LBS./ACRE UNLESS TESTING HAS BEEN PERFORMED.
SEEDING SEASON DATES: MARCH 15 TO JUNE 1; AUGUST 1 TO OCTOBER 15

*** A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL HARD FESCUE COMPONENT.

MULCH APPLICATION RATE				
MULCH TYPE	APPLICATION RATE (MIN)			NOTES
	PER ACRE	PER 1,000 SF	PER 1,000 SY	
STRAW	3 TONS	18 LB	160 LB	EITHER WHEAT OR OAT STRAW, FREE OF WEEDS, NOT CHOPPED OR FINELY BROKEN
HAY	3 TONS	18 LB	160 LB	TIMOTHY, MIXED CLOVER AND TIMOTHY OR OTHER NATIVE FORAGE GRASSES

PREPARATION OF AREAS TO BE TOPSOILED

GRADE THE AREAS TO BE COVERED BY TOPSOIL USING ACCEPTABLE METHODS, LOOSEN SOIL TO A MINIMUM DEPTH OF 2 INCHES, BEFORE PLACING THE TOPSOIL. REMOVE STONES AND OTHER FOREIGN MATERIAL 2 INCHES OR LARGER IN DIMENSION. REMOVE AND SATISFACTORILY DISPOSE OF UNSUITABLE AND SURPLUS MATERIAL

MEASURES PROVIDED TO MINIMIZE THERMAL IMPACTS

ALL RUNOFF FROM THE ROOF AREAS WILL BE CAPTURED AND DIRECTED TO SUBSURFACE UNDERDRAINS. RUNOFF FROM PAVED AREAS OF THE PROJECT DISCHARGE THROUGH BURIED PIPE, THEREBY CREATING AMPLE OPPORTUNITY FOR COOLING PRIOR TO REACHING THE SURFACE WATERS, THE MAJORITY OF THE SITE WILL BE DIRECTED TO UNDERGROUND DETENTION FACILITIES WHICH WILL PROVIDE ADDITIONAL TIME FOR WATER TO COOL. AS SUCH, THE PROJECT WILL NOT HAVE AN ADVERSE IMPACT ON THE NATURAL TEMPERATURES OF THE RECEIVING WATERS.

RECYCLING OR DISPOSAL OF MATERIALS

THE CONTRACTOR SHALL REMOVE FROM THE SITE, RECYCLE, OR DISPOSE OF ALL BUILDING MATERIALS AND WASTES IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA CODE 260.1 ET SEQ., 271.1 ET SEQ., AND 287.1 ET SEQ. THE CONTRACTOR SHALL NOT LEGALLY BURY, DUMP OR DISCHARGE ANY BUILDING MATERIAL OR WASTES AT THE SITE.

PROCEDURE FOR MANAGING SOIL, GROUNDWATER, AND OTHER POTENTIALLY CONTAMINATED MATERIALS GENERATED OR EXPOSED DURING CONSTRUCTION AND FOR THE REUSE AND/OR OFF-SITE DISPOSAL OF GENERATED MATERIALS

1. ANY EXCAVATED SOIL WHICH IS CONFIRMED TO BE CONTAMINATED AT CONCENTRATIONS WHICH EXCEED THE PADEP CLEAN FILL STANDARDS FOR RESIDENCES SHOULD BE DISPOSED OFF-SITE AT A PERMITTED FACILITY. DISPOSAL MANIFESTS SHOULD BE MAINTAINED. EXCAVATED SOILS SHOULD BE PLACED IMMEDIATELY INTO TRUCKS FOR OFF-SITE DISPOSAL. SOIL AWAITING OFF-SITE DISPOSAL SHALL BE PLACED ON AND COVERED BY POLYETHYLENE SHEETING.
2. IF THE SITE WILL NEED TO IMPORT OR EXPORT MATERIAL FROM THE SITE, THE RESPONSIBILITY FOR PERFORMING ENVIRONMENTAL DUE DILIGENCE AND DETERMINATION OF CLEAN FILL WILL REST WITH THE CONTRACTOR.
3. IF THE FILL MAY HAVE BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE, IT MUST BE TESTED TO DETERMINE IF IT QUALIFIES AS CLEAN FILL. TESTING SHOULD BE PERFORMED IN ACCORDANCE WITH APPENDIX A OF THE DEPARTMENT'S POLICY "MANAGEMENT OF FILL".
4. FILL MATERIAL THAT DOES NOT QUALIFY AS CLEAN FILL IS REGULATED FILL. REGULATED FILL IS WASTE AND MUST BE MANAGED IN ACCORDANCE WITH THE DEPARTMENT'S MUNICIPAL OR RESIDUAL WASTE REGULATIONS BASED ON 25 PA CODE CHAPTERS 287 RESIDUAL WASTE MANAGEMENT OR 271 MUNICIPAL WASTE MANAGEMENT, WHICHEVER IS APPLICABLE. THIS REGULATIONS ARE AVAILABLE ON-LINE AT WWW.PACODE.COM .

STORMSEWER PIPE TRENCH EXCAVATION NOTES

1. LIMIT ADVANCED CLEARING AND GRUBBING OPERATIONS TO A DISTANCE EQUAL TO TWO TIMES THE LENGTH OF PIPE INSTALLATION THAT CAN BE COMPLETED IN ONE DAY.
2. WORK CREWS AND EQUIPMENT FOR TRENCHING, PLACEMENT OF PIPE, PLUG CONSTRUCTION AND BACKFILLING WILL BE SELF CONTAINED AND SEPARATE FROM CLEARING AND GRUBBING AND SITE RESTORATION AND STABILIZATION OPERATIONS.
3. ALL SOIL EXCAVATED FROM THE TRENCH WILL BE PLACED ON THE UPHILL SIDE OF THE TRENCH.
4. LIMIT DAILY TRENCH EXCAVATION TO THE LENGTH OF PIPE PLACEMENT, PLUG INSTALLATION AND BACKFILLING THAT CAN BE COMPLETED THE SAME DAY.
5. WATER WHICH ACCUMULATES IN THE OPEN TRENCH WILL BE COMPLETELY REMOVED BY PUMPING BEFORE PIPE PLACEMENT AND / OR BACKFILLING BEGINS. WATER REMOVED FROM THE TRENCH SHALL BE PUMPED THROUGH A FILTRATION DEVICE.
6. ON THE DAY FOLLOWING PIPE PLACEMENT AND TRENCH BACKFILLING, THE DISTURBED AREA WILL BE GRADED TO FINAL CONTOURS AND IMMEDIATELY STABILIZED.

Proposed Storm Network Structure Table

Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
A-1	48 in. x 48 in. OCS	50.59			24" RCP	43.60
R-2	72 in. dia. CYLINDER MH	47.26	48" RCP 24" RCP	38.45 42.95		
R-3	72 in. dia. CYLINDER MH	51.09	48" RCP	39.60	48" RCP	39.50
R-4	72 in. dia. CYLINDER MH	49.96	48" RCP	41.35	48" RCP	41.25
R-5	72 in. dia. CYLINDER MH	50.65	48" RCP 18" RCP	43.20 45.70	48" RCP	43.10
R-6	72 in. dia. CYLINDER MH	50.17	18" RCP	46.05	48" RCP	43.55
R-7	24 in. x 45 in. 'C' INLET	50.89	18" RCP	47.68	18" RCP	46.50
R-8	24 in. x 45 in. 'C' INLET	51.06			18" RCP	47.83
R-9	24 in. x 45 in. 'C' INLET	49.90	18" RCP 18" RCP	45.90 46.69	18" RCP	45.80
R-10	24 in. x 45 in. 'C' INLET	50.07			18" RCP	46.20
R-11	24 in. x 45 in. 'C' INLET	50.06			18" RCP	46.83
S-1	60 in. x 60 in. 'C' INLET	50.98				
S-2	24 in. x 45 in. 'C' INLET	50.37				
S-3	24 in. x 45 in. 'C' INLET	50.33	18" RCP 18" RCP	44.35 44.95	18" RCP	44.25
S-3A	48 in. dia. CYLINDER MH	51.22	18" RCP	43.60		
S-3B	48 in. dia. CYLINDER MH	50.95	18" RCP	43.95	18" RCP	43.85
S-4	24 in. x 45 in. 'M' INLET	50.63			18" RCP	45.10
S-5	24 in. x 45 in. 'C' INLET	50.32	18" RCP 18" RCP	45.80 45.80	18" RCP	45.70
S-6	48 in. dia. CYLINDER MH	49.99	18" RCP 18" RCP	46.10 46.10	18" RCP	46.00
S-6A	24 in. x 45 in. 'C' INLET	49.75			18" RCP	46.30

Proposed Storm Network Structure Table

Structure I.D.	Description	Rim/Grate	Pipes (In)	Inverts (In)	Pipes (Out)	Inverts (Out)
S-7	24 in. x 45 in. 'M' INLET	50.44			18" RCP	46.60
S-8	24 in. x 45 in. 'M' INLET	50.88	18" RCP	46.40	18" RCP	46.30
S-9	24 in. x 45 in. 'M' INLET	51.83	18" RCP	47.05	18" RCP	46.95
S-10	48 in. dia. CYLINDER MH	52.35	18" RCP	47.45	18" RCP	47.35
S-11	24 in. x 45 in. 'C' INLET	51.19			18" RCP	47.80
S-13	48 in. dia. CONED MH	51.33	18" RCP	43.60		
S-13A	48 in. dia. CYLINDER MH	50.53	18" RCP	44.00	18" RCP	43.90
S-14	24 in. x 45 in. 'M' INLET	49.75	18" RCP 18" RCP	44.40 44.40	18" RCP	44.30
S-15	24 in. x 45 in. 'M' INLET	50.44			18" RCP	44.70
S-16	24 in. x 45 in. 'C' INLET	49.53	18" RCP	45.40	18" RCP	45.30
S-17	48 in. dia. CYLINDER MH	49.89	18" RCP	45.65	18" RCP	45.55
S-18	24 in. x 45 in. 'M' INLET	50.64	18" RCP	46.15	18" RCP	46.05
S-19	48 in. dia. CYLINDER MH	51.08	18" RCP	46.50	18" RCP	46.40
S-20	24 in. x 45 in. 'M' INLET	51.63	18" RCP	46.95	18" RCP	46.85
S-21	48 in. dia. CYLINDER MH	52.43	18" RCP	47.35	18" RCP	47.25
S-22	24 in. x 45 in. 'C' INLET	51.48			18" RCP	47.70
S-26	24 in. x 45 in. 'C' INLET	50.98	18" RCP	43.60		
S-27	24 in. x 45 in. 'C' INLET	50.36	18" RCP	43.60		
S-28	24 in. x 45 in. 'C' INLET	49.89			18" RCP	45.00
S-29	24 in. x 45 in. 'C' INLET	50.10			18" RCP	45.00

Proposed Storm Network Pipe Table

Pipe I.D.	Description	Length	Invert Up	Invert Dn	Slope
P-21	18"RCP	60'	47.25	46.95	0.50%
P-22	18"RCP	66'	47.70	47.35	0.53%
P-28	18"RCP	75'	45.00	43.60	1.86%
P-29	18"RCP	76'	45.00	43.60	1.84%
P-30	18"RCP	79'	45.00	43.60	1.78%
R-3	48"RCP	151'	39.50	38.45	0.70%
R-4	48"RCP	291'	41.25	39.60	0.57%
R-5	48"RCP	300'	43.10	41.35	0.58%
R-6	48"RCP	55'	43.55	43.20	0.64%
R-7	18"RCP	80'	46.50	46.05	0.56%
R-8	18"RCP	27'	47.83	47.68	0.55%
R-9	18"RCP	11'	45.80	45.70	0.89%
R-10	18"RCP	56'	46.20	45.90	0.53%
R-11	18"RCP	28'	46.83	46.69	0.51%

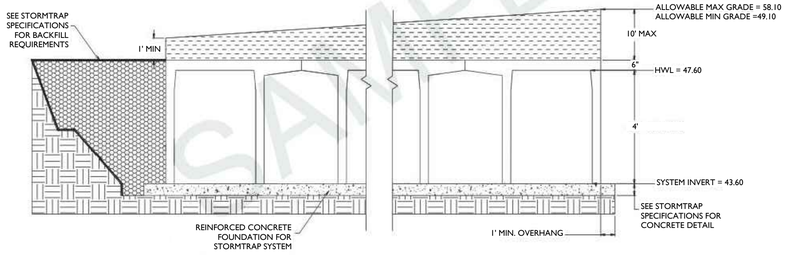
Proposed Storm Network Pipe Table

Pipe I.D.	Description	Length	Invert Up	Invert Dn	Slope
A-1	24"RCP	46'	43.60	42.95	1.42%
P-3	18"RCP	45'	44.25	43.95	0.67%
P-3B	18"RCP	41'	43.85	43.60	0.61%
P-4	18"RCP	26'	45.10	44.95	0.58%
P-5	18"RCP	165'	45.70	44.35	0.82%
P-6	18"RCP	29'	46.00	45.80	0.70%
P-6A	18"RCP	29'	46.30	46.10	0.68%
P-7	18"RCP	76'	46.60	46.10	0.66%
P-8	18"RCP	68'	46.30	45.80	0.74%
P-9	18"RCP	106'	46.95	46.40	0.52%
P-10	18"RCP	61'	47.35	47.05	0.50%
P-11	18"RCP	65'	47.80	47.45	0.54%
P-13A	18"RCP	51'	43.90	43.60	0.59%
P-14	18"RCP	54'	44.30	44.00	0.56%
P-15	18"RCP	54'	44.70	44.40	0.55%
P-16	18"RCP	175'	45.30	44.40	0.51%
P-17	18"RCP	24'	45.55	45.40	0.62%
P-18	18"RCP	73'	46.05	45.65	0.55%
P-19	18"RCP	49'	46.40	46.15	0.51%
P-20	18"RCP	64'	46.85	46.50	0.55%

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SAMPLE



NOTES:
1. STORMTRAP MODULES SHALL BE MANUFACTURED AND INSTALLED ACCORDING TO SHOP DRAWINGS APPROVED BY THE INSTALLING CONTRACTOR AND ENGINEER OF RECORD. THE SHOP DRAWINGS SHALL INDICATE SIZE AND LOCATION OF ROOF OPENINGS AND INLET/OUTLET PIPE TYPES, SIZES, INVERT ELEVATIONS AND SIZE OF OPENINGS.

STORMTRAP SINGLETRAP 4-0 TYPICAL DETAIL

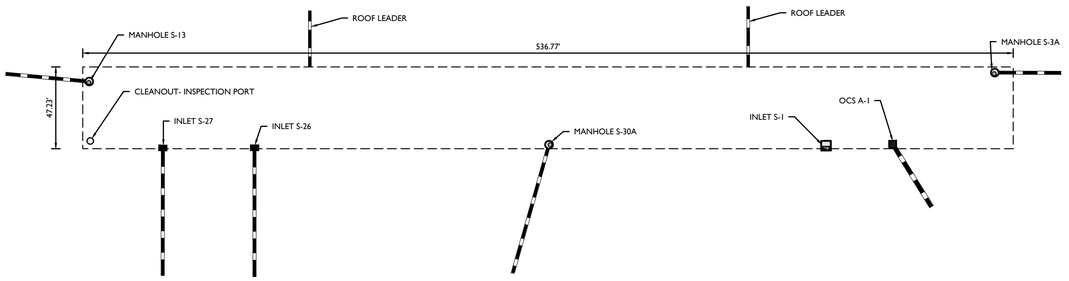
STORMTRAP SYSTEM INFORMATION

WATER STORAGE PROVIDED: 2.071 ACRE-FT

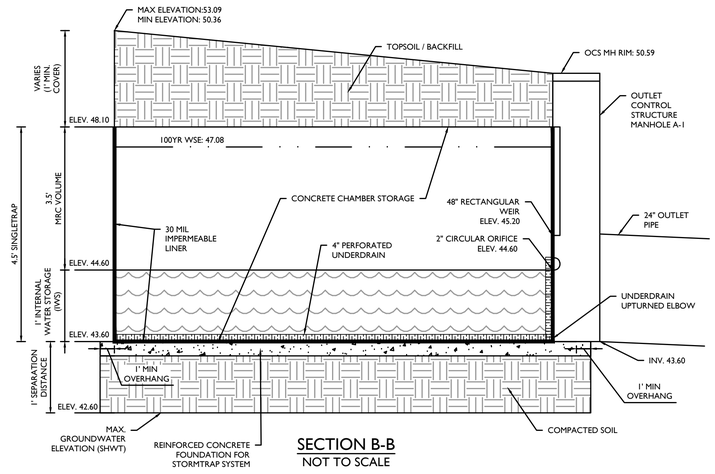
UNIT HEADROOM: 4'-6" SINGLETRAP (ST-4)

UNIT QUANTITY: 136 TOTAL PIECES

UNDERGROUND MRC BASIN STAGE STORAGE	
ELEVATION (FEET)	STORAGE (ACRE-FEET)
43.60	0.000
44.00	0.207
44.50	0.466
45.00	0.725
45.50	0.984
46.00	1.243
46.50	1.502
47.00	1.761
47.50	2.020
48.00	2.071
48.10	2.071



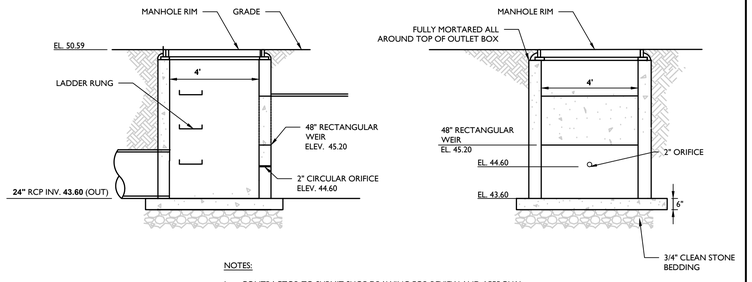
UNDERGROUND SYSTEM NOTES :
1. USE 4'-0" DEEP STORMTRAP SINGLETRAP REINFORCED CONCRETE STRUCTURES OR AN EQUIVALENT FOR THE UNDERGROUND SYSTEM.
2. STORMTRAP STORAGE PROVIDED: 2.071 AF
   UNIT HEADROOM: 4'-6" SINGLETRAP (ST-4)
   UNIT QUANTITY: 136 TOTAL PIECES
3. STORMTRAP MODULES SHALL BE MANUFACTURED AND INSTALLED ACCORDING TO SHOP DRAWINGS APPROVED BY THE INSTALLING CONTRACTOR AND ENGINEER OF RECORD. THE SHOP DRAWINGS SHALL INDICATE SIZE AND LOCATION OF ROOF OPENINGS AND INLET/OUTLET PIPE TYPES, SIZES, INVERT ELEVATIONS, AND SIZES OF OPENINGS.
4. COVER RANGE: MIN. 1.00', MAX. 10.00'
5. ALL DIMENSIONS AND SOIL CONDITIONS, INCLUDING BUT NOT LIMITED TO GROUNDWATER AND SOIL BEARING CAPACITY ARE REQUIRED TO BE VERIFIED IN THE FIELD BY OTHERS PRIOR TO STORMTRAP INSTALLATION.
6. CONTRACTORS RESPONSIBILITY TO ENSURE CONSISTENCY/ACCURACY TO FINAL ENGINEER OF RECORD PLAN SET
7. STORMTRAP SHALL BE INSTALLED IN ACCORDANCE WITH ASTM C891, STANDARD FOR INSTALLATION OF UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES.
8. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT PROPER/ ADEQUATE EQUIPMENT IS USED TO SET/ INSTALL THE MODULES.
9. STORMTRAP MODULES SHALL BE PLACED ON A LEVEL CONCRETE FOUNDATION WITH A 1'-0" OVERHANG ON ALL SIDES THAT SHALL BE POURED IN PLACE BY INSTALLING CONTRACTOR. A QUALIFIED GEOTECHNICAL ENGINEER WILL BE EMPLOYED, BY OWNER, TO PROVIDE ASSISTANCE I N EVALUATING THE EXISTI NG SOIL CONDITIONS. TO ENSURE THAT THE SOIL BEARING PRESSURE MEET OR EXCEED THE STRUCTURAL DESIGN LOADING CRITERIA AS SPECIFIED.
10. THE FILL PLACED AROUND THE STORMTRAP MODULES MUST BE DEPOSITED ON BOTH SIDES AT THE SAME TIME AND TO APPROXIMATELY THE SAME ELEVATION. AT NO TIME SHALL THE FILL BEHIND ONE SIDE WALL BE MORE THAN 2'-0" HIGHER THAN THE FILL ON THE OPPOSITE SIDE. BACKFILL SHALL EITHER BE COMPACTED AND/OR VIBRATED TO ENSURE THAT BACKFILL AGGREGATE/STONE MATERIAL IS WELL SEATED AND PROPERLY INTERLOCKED. CARE SHALL BE TAKEN TO PREVENT ANY WEDGING ACTION AGAINST THE STRUCTURE, AND ALL SLOPES WITHIN THE AREA TO BE BACKFILLED MUST BE STEPPED OR SERRATED TO PREVENT WEDGING ACTION. CARE SHALL ALSO BE TAKEN AS NOT TO DISRUPT THE JOINT WRAP FROM THE JOINT DURING THE BACKFILL PROCESS. BACKFILL MATERIAL SHALL BE CLEAN, CRUSHED, ANGULAR NO. 5 (AASHTO M43) AGGREGATE. IF NATIVE EARTH IS SUSCEPTIBLE TO MIGRATION, CONFIRM WITH GEOTECHNICAL ENGINEER AND PROVIDE PROTECTION AS REQUIRED.
11. DURING PLACEMENT OF MATERIAL OVERTOP THE SYSTEM, AT NO TIME SHALL MACHINERY BE USED OVERTOP THAT EXCEEDS THE DESIGN LIMITATIONS OF THE SYSTEM. WHEN PLACEMENT OF MATERIAL OVERTOP, MATERIAL SHALL BE PLACED SUCH THAT THE DIRECTION OF PLACEMENT IS PARALLEL WITH THE OVERALL LONGITUDINAL DIRECTION OF THE SYSTEM WHENEVER POSSIBLE.
12. THE FILL PLACED OVERTOP THE SYSTEM SHALL BE PLACED AT A MINIMUM OF 6" LIFTS. AT NO TIME SHALL MACHINERY OR VEHICLES GREATER THAN THE DESIGN HS20 LOADING CRITERIA TRAVEL OVERTOP THE SYSTEM WITHOUT THE MINIMUM DESIGN COVERAGE. IF TRAVEL IS NECESSARY OVERTOP THE SYSTEM PRIOR TO ACHIEVING THE MINIMUM DESIGN COVER, IT MAY BE NECESSARY TO REDUCE THE ULTIMATE LOAD/BURDEN OF THE OPERATING MACHINERY SO AS TO NOT EXCEED THE DESIGN CAPACITY OF THE SYSTEM. IN SOME CASES, IN ORDER TO ACHIEVE REQUIRED COMPACTION, HAND COMPACTION MAY BE NECESSARY IN ORDER TO NOT EXCEED THE ALLOTTED DESIGN LOADING.
13. REFER TO PENNDOT PUBLICATION 408 SECTION 610 FOR SPECIFICATIONS OF UNDERDRAINS.



SECTION B-B
NOT TO SCALE

MRC UNDERGROUND DETENTION BASIN DETAIL
NOT TO SCALE

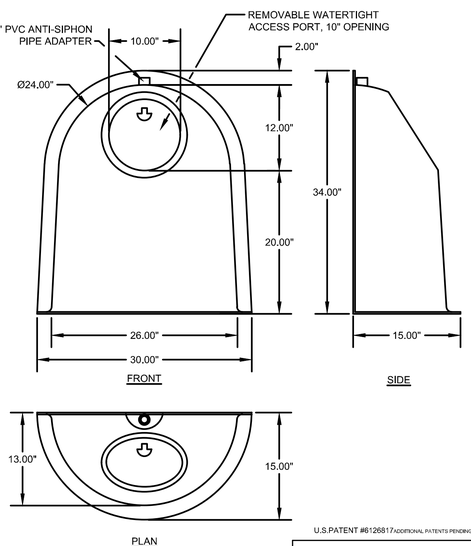
05/01/18



NOTES:
1. CONTRACTOR TO SUBMIT SHOP DRAWING FOR REVIEW AND APPROVAL.
2. ALL CONCRETE TO BE CLASS "A".

OUTLET CONTROL STRUCTURE A-1 MRC BASIN DETAIL (SINGLE CHAMBER)

NOT TO SCALE | MCPA-UTIL-STMW-1600 | 05/01/18



U.S.PATENT #6126817 ADDITIONAL PATENTS PENDING

BMP, INC.
53 MT. ARCHER ROAD, LYME, CT. 06371
(800) 504-8008 FAX: (860)434-3195

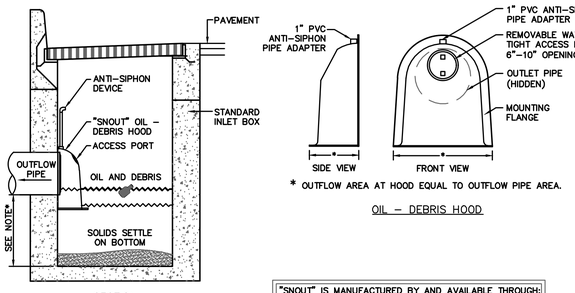
DESCRIPTION	DATE	SCALE
24F SNOUT OIL & DEBRIS STOP	09/20/99	NONE
	DRAWING NUMBER	24F

SNOUT BMP CONSTRUCTION SEQUENCE:

1. STABILIZE ALL CONTRIBUTING AREAS BEFORE INSTALLING AND CONNECTING PIPES TO THESE INLETS.
2. FOLLOW MANUFACTURER'S GUIDELINES FOR INSTALLATION. DO NOT USE SNOUTS DURING CONSTRUCTION UNLESS PRODUCT IS DESIGNED PRIMARILY FOR SEDIMENT REMOVAL.

SNOUT BMP MANUFACTURER'S INSTALLATION INSTRUCTIONS:

1. CENTER THE SNOUT® DIRECTLY OVER THE EXIT PIPE SO THAT THE ENTIRE PIPE IS COVERED AND SO THAT THE LOWER EDGE OF THE HOOD IS AT LEAST 1/2 THE PIPE DIAMETER BELOW THE LOWEST INSIDE POINT OF THE PIPE (DEEPER IS EVEN BETTER.)
2. DRILL * EQUALLY SPACED 7/16" HOLES THROUGH THE SNOUT® FLANGE. (*NUMBER OF HOLES VARY DEPENDING ON SIZE OF SNOUT®.)
3. MARK AND DRILL CATCH BASIN AND INSTALL THE TAMP-IN LEAD ANCHORS.
   3.1. DRILL A 3/4"HOLE INTO THE BASE MATERIAL TO THE REQUIRED DEPTH (APPROXIMATELY 1-1/4" DEEP.)
   3.2. BLOW THE HOLE CLEAN OF DUST AND OTHER MATERIAL.
   3.3. INSERT THE ANCHOR INTO THE HOLE. NARROW END OF CONE MUST POINT OUT. LEAD SHIELD SLIDES OVER CONE.
   3.4. POSITION THE SETTING TOOL OR A 9/16 SOCKET AGAINST THE ANCHOR OUTER CONE. (THE OUTER RIM OF THE TOOL OR SOCKET SHOULD SEAT ONTO THE LEAD SHIELD RIM.) SET THE ANCHOR BY DRIVING THE LEAD SLEEVE OVER THE CONE USING SEVERAL SHARP HAMMER BLOWS. BE SURE THE ANCHOR IS AT THE REQUIRED EMBEDMENT DEPTH (FLUSH OR SLIGHTLY BELOW FACE OF CONCRETE)
4. ATTACH THE VENT PIPE ADAPTER IN THE PRE-DRILLED HOLE IN THE TOP OF THE SNOUT® USING THE 2 FLAT O RING GASKETS AND PVC LOCK-NUT SUPPLIED IN THE KIT. INSTALL WITH FEMALE SLIP ADAPTER UP AND A WASHER ON EACH SIDE OF THE SNOUT® SHELL. TIGHTEN LOCK-NUT HAND TIGHT.
5. REMOVE PSA BACKING AND WITH FIRM PRESSURE, ATTACH GASKET STRIP(S) TO BACK OF FLANGE AND TRIM EXCESS.
6. ATTACH THE SNOUT® TO THE CATCH BASIN WALL WITH 3/8" DIAMETER STAINLESS STEEL BOLTS IN LEAD EXPANSION ANCHORS. DO NOT OVER TIGHTEN; 10-15 FOOT-POUNDS SHOULD BE SUFFICIENT.
7. CUT THE ANTI-SIPHON VENT STACK TO LENGTH AND ATTACH TO HOOD AT SLIP ADAPTER WITH PVC CEMENT.
8. ATTACH 90 DEGREE FITTING TO VENT STACK WITH PVC CEMENT. ENSURE THAT FITTING OPENING IS ACCESSIBLE FOR MAINTENANCE AND INSPECTION.



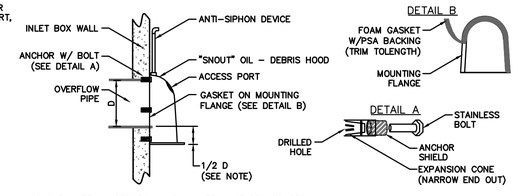
* OUTFLOW AREA AT HOOD EQUAL TO OUTFLOW PIPE AREA.

OIL - DEBRIS HOOD

SECTION

* NOTE- SUMP DEPTH OF 36" MIN. FOR < OR= 12" DIAM. OUTLET. FOR OUTLETS >OR= 15", DEPTH = 2.5-3X DIAM.

"SNOUT" IS MANUFACTURED BY AND AVAILABLE THROUGH:
BEST MANAGEMENT PRODUCTS, INC.
53 MT. ARCHER RD.
LYME, CT 06371
PHONE (860) 434-0277 * FAX (860) 434-8195
E-MAIL: duran@bestmp.com * WEBSITE: www.bestmp.com



SNOUT INLET - OPERATION AND MAINTENANCE PROCEDURES

A. INSPECTION:
   1. INSPECT INLET MONTHLY FOR THE FIRST YEAR AFTER THE SITE HAS BEEN STABILIZED.
   2. AFTER EACH MAJOR STORM EVENT, INSPECT INLET IMMEDIATELY, IF SEDIMENT HAS ACCUMULATED TO AND WITHIN ONE (1) FOOT BELOW THE OUTFALL ELEVATION, PERFORM CLEANING AS NECESSARY.
   3. ANNUALLY INSPECT THE "SNOUT" HOOD, THE ANTI-SIPHON DEVISE AND THE ACCESS HATCH FOR ANY CRACKED OR DAMAGED PARTS, REPLACE ALL DAMAGED COMPONENTS IMMEDIATELY.

B. CLEANING:
   1. REMOVE ALL SOLID DEBRIS FROM THE INLET, A MINIMUM OF EVERY SIX (6) MONTH OR WHEN THE SEDIMENT IS TO AND WITHIN ONE (1) FOOT BELOW THE OUTFALL ELEVATION.
   2. WHEN THERE HAS BEEN A SPILL OR INCIDENT THAT CAUSES A LARGER THAN NORMAL ACCUMULATION OF POLLUTANTS, REMOVE ALL SOLID DEBRIS FROM THE INLET.
   3. USE A VACUUM TRUCK TO REMOVE ALL SOLIDS IN THE BOTTOM OF THE STRUCTURE.
   4. DISPOSE OF ALL COLLECTED WASTES PER THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION REQUIREMENTS.
   5. FLUSH THE ANTI-SIPHON DEVISE ON THE "SNOUT" HOOD OR GENTLY CLEAR WITH A FLEXIBLE WIRE ONCE A YEAR.
   6. OPEN AND CLOSE THE ACCESS PORT ON THE "SNOUT" HOOD ONCE A YEAR AND CLEAR ANY OBSTRUCTIONS.

"SNOUT" INLET
NOT TO SCALE

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2	06/02/22	CMM	REVISED PER FIRE MARSHAL, TOWNSHIP, AND ZONING REVIEW LETTERS

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — C. RICHARD ROSEBERRY — ENGINEER No. 46162

C. Richard Roseberry
PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER
LICENSE NUMBER: PE046162R
COLLIERS ENGINEERING & DESIGN, INC.

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

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SHEET TITLE: PCSM DETAILS

SHEET NUMBER: 29 of 37

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20161030308\Engineering\PCSM\C-PCSM-DTLS.dwg, 6/2/2022 8:47:51 AM, By: CHRIS MESSLER

PARCEL I.D. 65-00-02330-05-1
LANDS N/F CONSHOHOCKEN BOROUGH AUTHORITY
PER D.B. N/A, PG. N/A

TAX MAP I.D. 65011-090
LANDS N/F SEPTA

DISCHARGE POINT 2 (DP 002)

BENCHMARK
MAG NAIL
ELEV=52.03

WASHINGTON STREET
(50' ULTIMATE RIGHT-OF-WAY)

N85°30'00"E 139.39'

N85°30'00"E 672.27'

PARCEL I.D. 65-00-12682-00-6
LANDS N/F LEPORE DAN & SONS REALTY ASSOCIATES LP
PER D.B. 5240, PG. 2002

PARCEL I.D. 65-00-12685-00-3
LANDS N/F LEPORE DAN & SONS REALTY ASSOCIATES LP
PER D.B. 5129, PG. 435

JONES STREET
(VACATED, NO RIGHT-OF-WAY)

PRE DA TO DP002
32270.65 sq. ft.
0.741 acres

PRE DA TO DP 001
381461.72 sq. ft.
8.757 acres

601 WASHINGTON STREET
ADDRESS TAKEN FROM
RECORD DOCUMENTS

2 STORY
MASONRY AND STEEL BUILDING
(38,756 S.F. FOOTPRINT)

BLD HT 35'

BLD HT 40'

ROOF COLLAPSED

1-STORY BRICK BLDG.
1,567 S.F.

TRAILER (224 S.F. FOOTPRINT)

1-STORY WOOD FRAME BLDG.
(2,114 S.F. FOOTPRINT)

STEEL FRAME

SHED
310 S.F.

BROKEN ASPHALT PAVEMENT

GRAVEL EDGE

DIRT AND GRAVEL MIX

MISC. STRUCTURE

CONC WALL

ASPHALT PAVEMENT

SEGMENT 1:
SHEET FLOW, 100 LF

SEGMENT 2:
SHALLOW CONC.
FLOW, 30 LF

SEGMENT 3:
SHALLOW CONC.
FLOW, 120 LF

SEGMENT 4:
SHALLOW CONC.
FLOW, 120 LF

SEGMENT 5:
SHALLOW CONC.
FLOW, 70 LF

SEGMENT 6:
SHALLOW CONC.
FLOW, 100 LF

SEGMENT 7:
CHANNEL FLOW,
290 LF

PRE-PROJECT Tc PATH
TO SPI = 11 MINUTES

PARCEL I.D. 65-00-12679-00-9
LANDS N/F 601 WASHINGTON STREET ASSOCIATES LP
PER D.B. 5260, PG. 684

PARCEL I.D. 65-00-12676-00-3
LANDS N/F WHITEMARSH BOAT CLUB, LLC
PER D.B. 5804, PG. 1289

FEMA FLOODWAY

AREA OF APPARENT OVERLAP

PARCEL I.D. 65-00-12685-00-3
LANDS N/F LEPORE DAN & SONS REALTY ASSOCIATES LP
PER D.B. 5129, PG. 435

CONC MON FOUND

S74°08'41"W - TIE LINE 739.38'

DISCHARGE POINT 1 (DP 001)

SCHUYLKILL RIVER

PRE-PROJECT DRAINAGE AREA BOUNDARY

LEGEND

- TRAVERSE LINE, CENTER LINE OR BASELINE
- RIGHT OF WAY LINE
- PROPERTY LINE
- EDGE OF PAVEMENT
- CURB LINE
- DEPRESSED CURB
- CHAIN FENCE
- WETLAND LINE
- MUNICIPAL BOUNDARY
- TREELINE
- ELECTRICAL MANHOLE
- WATER MANHOLE
- TELEPHONE MANHOLE
- UNMARKED MANHOLE
- SANITARY MANHOLE
- DRAINAGE MANHOLE
- MAJOR CONTOUR
- MINOR CONTOUR
- SPOT ELEVATION
- TOP OF CURB ELEV.
- BOTTOM OF CURB ELEV.
- U/G CABLE TV LINE
- U/G FIBER OPTIC LINE
- U/G TELEPHONE LINE
- U/G ELECTRIC LINE
- OVERHEAD WIRE
- WATER MAIN
- GAS MAIN
- SAN. SEWER LATERAL
- SAN. SEWER MAIN
- STORM PIPE
- WETLAND MARKER
- TREE
- ROADWAY SIGNS
- TRAFFIC FLOW
- MAILBOX
- TRAFFIC SIGNAL POLE
- POLE MOUNTED LIGHT
- UTILITY POLE
- GUY WIRE
- TRANSFORMER
- FIRE DEPT. CONNECTION
- FIRE HYDRANT
- WATER VALVE
- GAS VALVE
- SANITARY CLEANOUT
- CONCRETE MONUMENT
- CAPPED REBAR/IRON PIPE
- STORM INLET TYPE 'A'
- STORM INLET TYPE 'B'
- STM. DBL. INLET TYPE 'B'
- STORM INLET TYPE 'E'
- STM. DBL. INLET TYPE 'E'
- FLARED END SECTION
- HEADWALL

ABBREVIATIONS

D.C. = DEPRESSED CURB
BC = BOTTOM OF CURB
TC = TOP OF CURB
BOL = BOLLARD
GRT = GRATE
MB = MAILBOX
FF = FINISH FLOOR
UV = UNKNOWN VALVE
MH = MANHOLE
DEP. = DEPRESSED
CL = CENTERLINE
PM = PARKING METER
MHWL = MEAN HIGH WATERLINE
MLWL = MEAN LOW WATERLINE
TW = TOP OF WALL
BW = BOTTOM WALL

40 0 40 80
SCALE : 1" = 40'

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REV	DATE	DRAWN BY	DESCRIPTION

DRAINAGE AREA MAPS

FOR

601 WASHINGTON STREET

PID 65-00-12679-00-9

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

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PROJECT NUMBER:	DRAWING NAME:
16001030B	C-DRNG

SHEET TITLE:
EXISTING DRAINAGE MAP

SHEET NUMBER:
1 of 3

2016\16001030B\Engineering\Drainage Maps\C-DRNG.dwg\C-01 EXIST. DRAINAGE MAP By: MDEEJUS

PARCEL I.D. 65-00-02330-05-1
LANDS N/F CONSHOHOCKEN BOROUGH AUTHORITY
PER D.B. N/A, PG. N/A

TAX MAP I.D. 65011-090
LANDS N/F SEPTA

POST BYPASS (DP002)
9,541.43 sq. ft.
0.214 acres

POST BYPASS 3 DA (DP001)
19827.77 sq. ft.
0.455 acres
(TOTAL = 3.00 acres)

DISCHARGE POINT 2 (DP 002)

BENCHMARK
MAG NAIL
ELEV=52.03

WASHINGTON STREET
(50' ULTIMATE RIGHT-OF-WAY)

N85°30'00"E 139.39'

672.27'

PARCEL I.D. 65-00-12682-00-6
LANDS N/F LEPORE DAN & SONS REALTY ASSOCIATES LP
PER D.B. 5240, PG. 2002

PARCEL I.D. 65-00-12685-00-3
LANDS N/F LEPORE DAN & SONS REALTY ASSOCIATES LP
PER D.B. 5129, PG. 435

JONES STREET
(VACATED, NO RIGHT-OF-WAY)

490.14'

N05°42'00"W

POST BYPASS 2 DA (DP001)
6640.49 sq. ft.
0.152 acres
(TOTAL = 3.00 acres)

407.20'

S04°30'00"E

8 STORY 105,396 SF
APARTMENT BUILDING
270 UNITS
1 STORY PARKING DECK

DA TO MRC UGD BASIN (DP001)
273994.80 sq. ft.
6.290 acres

PROPOSED GAZEBO

PARCEL I.D. 65-00-12679-00-9
LANDS N/F 601 WASHINGTON STREET ASSOCIATES LP
P.O. D.B. 5206, PG. 684

PARCEL I.D. 65-00-12676-00-3
LANDS N/F WHITEMARSH BOAT CLUB, LLC
PER D.B. 5804, PG. 1289

FEMA FLOODWAY

AREA OF APPARENT OVERLAP

S74°08'41"W - TIE LINE 739.38'

DISCHARGE POINT 1 (DP 001)

CONC MON FOUND

SCHUYLKILL RIVER

PROPOSED TREE LINE (TYP.)

POST BYPASS 1 DA (DP001)
103877.20 sq. ft.
2.385 acres
(TOTAL = 3.00 acres)

POST-PROJECT DRAINAGE AREA BOUNDARY

LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE	CURB	FACE
BACK	DEPRESSED CURB	BACK
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'C' INLET	
	'M' INLET	
(D)	STORM MANHOLE	(D)
(S)	SANITARY MANHOLE	(S)
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
75 74	CONTOURS	75 74
× G 29.0	SPOT ELEVATION	× G 29.0
	DIRECTION OF OVERLAND FLOW	
× TC 29.0	TOP OF CURB ELEVATION	× TC 29.0
× BC 29.0	BOTTOM OF CURB ELEVATION	× BC 29.0
	TOP OF DEPRESSED CURB ELEVATION	× TDC 29.0
CATV	CABLE TV CONDUIT	CATV
W	WATER MAIN	W
G	GAS MAIN	G
T	TELEPHONE CONDUIT	T
E	ELECTRIC CONDUIT	E
	SANITARY PIPE	
	STORM PIPE	

40 0 40 80
SCALE : 1" = 40'

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DRAINAGE AREA MAPS

FOR

601 WASHINGTON STREET

PID 65-00-12679-00-9

WHITEMARSH TOWNSHIP
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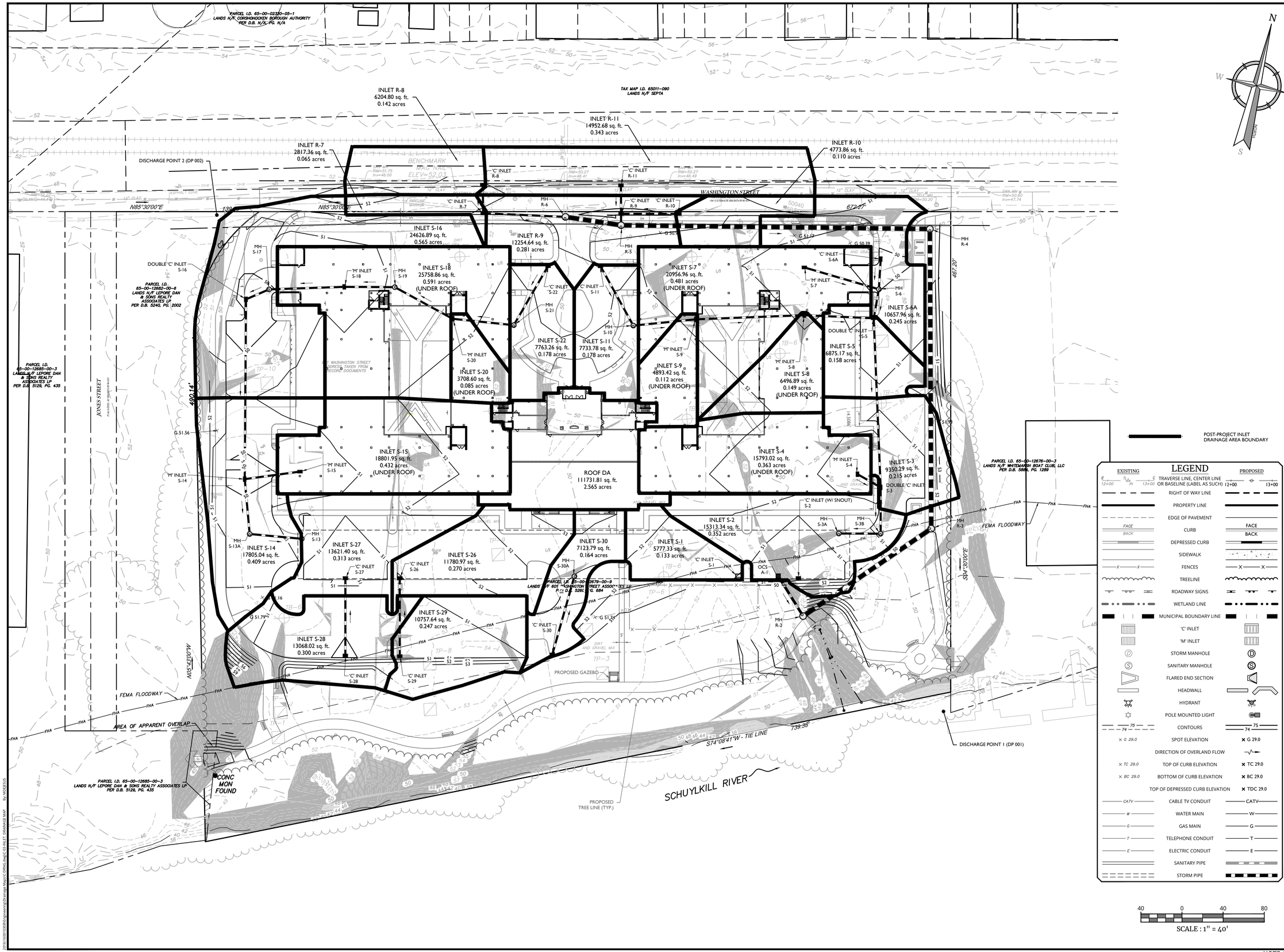
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DRAINAGE AREA MAPS

FOR

601 WASHINGTON STREET

PID 65-00-12679-00-9

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INLET DRAINAGE MAP

SHEET NUMBER:
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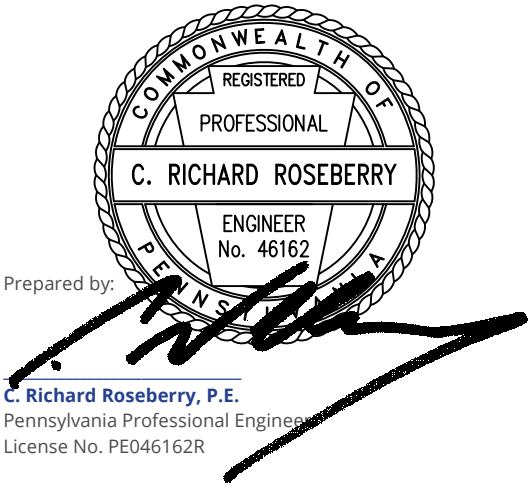
Post-Construction Stormwater Management Report

March 1, 2022

Revised June 2022

601 Washington Street Apartments

601 Washington Street
Whitemarsh Township
Montgomery County, Pennsylvania



Prepared for:

601 Washington Street Assoc. LP
201 King of Prussia Rd
Suite 501
Radnor, PA 19087

Prepared by:

C. Richard Roseberry, P.E.
Pennsylvania Professional Engineer
License No. PE046162R

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Appendix D | Rainfall Depths and Intensities
Appendix E | PADEP Spreadsheets
Appendix F | Release Rate Calculations
Appendix G | Stormsewer Design
Appendix H | Permanent Erosion and Sediment Pollution Control BMPs
Appendix I | Karst Features & Sinkhole Maps
Appendix J | Geotechnical Report

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Executive Summary

This report was prepared to demonstrate the competency of the proposed Post-Construction Stormwater Management (PCSM) design for the 601 Washington Street Apartments project located in the Township of Whitemarsh, Montgomery County, Pennsylvania.

As part of the National Pollution Discharge Elimination System (NPDES) permit, the project is required to provide a PCSM plan and report. The Pennsylvania Department of Environmental Protection issued the Pennsylvania Stormwater Best Management Practices Manual as guidance for the completion of the PCSM design. Through the use of recommended Best Management Practices (BMPs), the environmental effects from this project were reduced. The project PCSM goal is to adequately and safely recreate, as closely as possible, the pre-project conditions in the post-project condition. This PCSM Plan was designed to eliminate (wherever possible) or minimize point source discharge to surface waters, preserve the integrity of stream channels, and protect the physical, biological, and chemical qualities of the receiving surface water.

The calculations presented in this report demonstrate that the designed facilities meet the project PCSM goals and sufficiently address the state's, county's and municipalities' regulatory requirements.

1.0 Introduction

As part of the NPDES permit, the project is required to provide a PCSM Plan and Report. The Pennsylvania Department of Environmental Protection (PADEP) issued the Pennsylvania Stormwater Best Management Practices Manual (BMP Manual) as guidance for the completion of the PCSM design. The proposed plans incorporate guidelines and calculation methodologies from the BMP Manual. The purpose of the BMP Manual is "to ensure effective stormwater management, to minimize the adverse impacts of stormwater on ground water and surface water resources, and to support and sustain the social, economic, and environmental quality of the Commonwealth." The three primary interests involved include:

- Stream channel erosion and flooding resulting from increases in flow rate and volume;
- Water quality impacts to streams and groundwater aquifers from particulates, floatables, and hydrocarbons; and
- Thermal impact on streams caused by heat transfer from pavement to runoff and loss of riparian buffer vegetation.

Through the use of recommended BMPs, the environmental effects are reduced. The above concerns can be addressed through the implementation of BMPs that decrease runoff volume, extend detention times, and reduce release rates. The project PCSM goal is to adequately and safely recreate, as closely as possible, the pre-project condition in the post-project condition. This PCSM Plan was designed to eliminate (wherever possible) or minimize point source discharges to surface waters, preserve the integrity of stream channels, and protect the physical, biological, and chemical qualities of the receiving surface water.

1.1 Project Information

601 Washington Street Associates LP proposes improvements to the site, including a residential apartment building complex with ground-level parking, a subsurface stormwater management facility, and other typical site appurtenances. Two (2) driveways are proposed along Washington Street. The entire site is located within the 100-year FEMA delineated floodplain of the Schuylkill River and a portion of the site lies within the delineated floodway.

The past land use includes:

Past 5 Years Land Use

The property is currently vacant. The property contains a building as well as gravel and pavement areas of former industrial uses. The property also contains associated utilities and trees.

Past 50 Years Land Use

The property functioned as industrial use since the 1800s.

Due to the former industrial uses, the site is part of the PADEP Act 2 program for onsite soil contaminants.

Approximately 8.74± acres will be disturbed as part of the project. The project is located within the Heavy Industrial District (HVY) with the Riverfront Development District One (RDD-1) Overlay, Riparian Corridor Conservation District (RCCD), Steep Slopes (SS) Overlay District and the Floodplain Conservation Overlay District (FLPL) in Whitemarsh Township. The proposed use is permitted by right. The site will be served by public water and sewer.

The site is bound by Washington Street to the north, the Schuylkill River to the south, and industrial properties to the east and west, see Appendix A for the project location maps.

1.2 Pre-Project Conditions

This site is located in the Schuylkill River Watershed. The site is generally sloped towards the south, with the majority of stormwater flowing directly to the Schuylkill River. The Pennsylvania Code, Title 25, Chapter 93, Water Quality Standards assigns the Schuylkill River a water quality designation of Warm Water Fishery, Migratory Fishes (WWF, MF).

Pre-project cover areas and drainage boundaries were based on topographical survey, site visits, aerial photographs, and USGS mapping. The site is flat with a portion of the storm runoff being collected by roof drains and storm inlets, which are generally conveyed from north to south. There is a small section of the site that drains to the north towards Washington Street. The remainder of the site's runoff is discharged to the Schuylkill River via overland flow.

An existing 48" pipe carries offsite water through the site and discharges to the Schuylkill River. The existing 48" pipe will be removed and will be replaced by a proposed 48" pipe network which will convey the offsite water to the Schuylkill River as in the existing condition.

Due to the past industrial uses, the site in the pre-project condition is considered partially impervious, with the exception of overgrown areas behind the existing buildings and parking area.

This analysis will evaluate the pre-project and post-project flow from the proposed development areas of the site to a study point. Two discharge points have been established for analysis: the first (DP 001) is a point within the Schuylkill River where the majority of the site's runoff discharges at; the second (DP 002) is a point within the roadside drainage ditch on the south side of Washington Street.

1.3 Post-Project Conditions

The site was analyzed at two (2) discharge points to examine the effects of development with cover type changes, detention, and low-impact development features. The discharge points are located at the same locations of the existing study points, as described above.

The proposed construction will be reducing impervious cover to the greatest extent possible through placement of lawn areas. The proposed BMPs include but are not limited to: re-vegetate disturbed areas, snouts, and a Managed Released Concept (MRC) underground basin. The basin discharges to the proposed stormsewer which discharges to the Schuylkill River at the currently existing discharge point. Post-project flow paths will follow pre-project flow paths and no additional discharge points will be added as part of this development.

The proposed impervious cover includes the proposed multi-unit residential building, sidewalks, and necessary roadway improvements. The post-project pervious cover is assumed in the calculations to be lawn, except in areas where the existing trees are to remain.

2.0 Soils

Soil mapping and properties including depths, slopes, and limitations for the calculations presented in this report, were obtained from the NRCS Web Soil Survey. Project soil locations is shown on the plan drawings, and a summary of the soils as well as a copy of the NRCS Web Soil Survey map are included in Appendix B. The NRCS Web Soil Survey soils found within the site area are listed below in Table 3.1:

Table 3.1 NRCS Web Soil Survey Results

Soil Code	Soil Description	Hydrologic Soil Group
UgB	Urban land, 0 to 8 percent slopes	B

The site is located within an urban industrial center for over 150 years and as such, the site soils are comprised of mixed fill material with no definite homogenous characteristics. The site is also part of the PADEP Act 2 program for onsite soil contaminants, therefore the installation of a soil (minimum of 1' depth) or impervious cap will be included as part of the site construction.

2.1 Karst Geology

A specific karst hazard assessment was not developed for this site. There are no known sinkholes onsite or within 1,500 feet of the site. Copies of the karst features and sinkhole maps are included in Appendix J.

2.2 Infiltration and Geotechnical Testing

Due to various factors including shallow bedrock, Act 2 contamination, existing buildings on the site, and lack of suitable area for infiltration, the use of the Manage Release Concept was selected to mitigate volume increases instead of infiltration. The onsite subsurface findings including various test pits and boring holes are located in Appendix K.

3.0 Regulations

The PCSM plan has been prepared utilizing the following standards:

- Municipal Ordinances – Whitemarsh Township, various dates
- PADEP Erosion and Sediment Pollution Control Program Manual, Pennsylvania Department of Environmental Protection, March 2012
- Pennsylvania Stormwater Best Management Practices Manual, Final Draft, Pennsylvania Department of Environmental Protection, December 2006

Several of the above regulations address similar tasks but have different criteria that conflict with one another. In such cases, all of the criteria were evaluated to determine how to achieve the best overall compliance with all of the regulatory documents. The project criteria used included the following:

- Tributary Cover is based on actual field conditions, topographic survey data, and aerial mapping.

- Land Use Coefficients and Curve Numbers are consistent with the normal practices of the Whitemarsh Township Stormwater Management Ordinance, and Urban Hydrology for Small Watersheds, Technical Release 55 (TR-55), and were merged into a project specific list, which is included in **Appendix C**.

- Rainfall Depths and Intensities follow the process outlined in PENNDOT Publication 584, Chapter 7, Appendix A, Figures 7A.1 through 7A.6, shown in **Appendix D**. Rainfall intensity curves consistent with the normal practices of the Whitemarsh Township Stormwater Management Ordinance, were utilized in the rainfall runoff analysis.

- Channel Design uses criteria from the Erosion and Sediment Pollution Control Program Manual.

- Storm Sewer and Inlet Design adhere to criteria found in the Hanover Township Municipal Code. The Rational Method was used for the analysis of stormwater systems and stormwater runoff rates. Pipes were analyzed using the Hydraflow Storm Sewers Extension for AutoCAD Civil 3D computer analysis program.

- Detention Basin Routings use the SCS Segmental approach for the time of concentration. Routings were performed using the Modified Puls Routing methodology with the SCS TR-20 method used for the development of inflow hydrographs in the program HydroCAD Version 10.

3.1 Act 167

Montgomery County completed Act 167 Stormwater Management Plans for 10 of its 17 watersheds and is considering completing one county wide plan to complete the remaining watershed plans and update the existing ones. The project is located within the Schuylkill Watershed for which a plan has not been completed; therefore, more stringent management is not required above the Pennsylvania Stormwater Management Act 167 and all post-project design storms were reduced to rates below the pre-project condition.

3.2 Erosion and Sediment Pollution Control

This project will be submitted to the Montgomery County Conservation District (MCCD) for the required Erosion and Sediment Pollution Controls (E&SPC) approval as required by the Pennsylvania Clean Stream Law and regulations from Chapter 102. Applicable E&SPC design calculations for permanent features are included in Appendix H. The E&SPC construction sequence, on the E&SPC plans, includes the construction sequence for PCSM BMP installations for the project.

3.3 Pennsylvania Department of Environmental Protection

PADEP's PCSM plan goal is to control rate, volume, and water quality of runoff from a project by maximizing volume reduction technologies, minimizing point source discharges to surface waters, preserving stream channel integrity, and protecting the physical, biological, and chemical qualities of the receiving surface water. PADEP created several worksheets to help the designer assess the effectiveness of the design, shown in Appendix E. The PADEP PCSM Worksheets will be discussed in more detail later in this report.

4.0 Proposed PCSM BMPs

The proposed structural BMPs for this project include:

1. Managed Release Concept Basin - Underground MRC Basin was designed to assist in peak rate reduction and volume management through the outlet design with Management Release Concept (MRC) approach. Upstream snouts will function as pre-treatment for this basin. This facility will be constructed as an underground concrete chamber. The project is located on a site with known contaminated soils, therefore this facility was not designed for infiltration and is wrapped with a 30 mil liner to prevent it from occurring. This permanent BMP enhances not only ground water recharge, but removes large and small particulates, providing excellent water quality (BMP 6.6.3).

The stormwater runoff conveyed into the MRC subsurface detention facility will be collected from the proposed building roof drains and various Type 'C' and 'M' inlets within the parking areas. This runoff will receive water quality treatment prior to discharge into the detention facilities and will be considered as clean water.

Manage Release Concept Design Standards:

- Runoff Capture – All runoff entering the underground basins will be pre-treated by water quality snout inlets to remove large and small particulates prior to entering the basins.
- Release Rate for the 1.2-inch/2-hour Storm – The MRC facility will have the release rate of 0.05 cfs for the 1.2-inch/2-hour storm event. Refer to MRC worksheet.
- Internal Water Storage – 12" of IWS has been provided. As stated above, all runoff convey into the underground basins are deemed as clean water from the roof drains.
- Peak Flow Attenuation for the 2-year/24-hour Event – The project drainage area release rate of 2-year/24-hour storm event in post development condition is lower than the project drainage area release of 1-year/24-hour storm event in pre-development condition. Refer to Appendix F – Release Rate Calculations.
- Stormwater BMP Manual – MRC is being incorporated into the subsurface detention facility.
- MRC BMP Selection – Non-vegetated MRC (Subsurface Detention Structure) is being proposed for the project.
- Pre-Development Site Characterization and Assessment of Soil and Geology – As described above, infiltration testing was elected not to be performed due to proximity of underground basins to the buildings and their parking structures. Closed systems are proposed.
- Separation Distance – A 1 foot separation from seasonal high water table has been provided.

- Ponding Depth and Drawdown Time – Design criteria has been incorporated. Refer to MRC worksheets.
- Soil Media – Soil media has not been provided as the proposed MRC is a subsurface detention structure.
- Underdrain Design – Perforated underdrains are provided at the MRC invert with an upturned elbow to provide 12" of internal water storage at the OCS.
- Discharge Flow Path – Runoff discharges from the subsurface detention facility will be conveyed through the proposed storm sewer network prior to discharge into the Schuylkill River.
- Antidegradation Requirements – Runoff discharges from the subsurface detention facility will be conveyed through the proposed storm sewer network prior to discharge into the Schuylkill River. The underground detention time will allow time for the water to cool prior to discharging to the surface water.
- The PADEP Managed Release Concept (MRC) Design Summary sheets are included in Appendix F.

3. Mechanical Water Quality Filter – The discharge pipes into the underground detention facilities will drain through snouts to treat the stormwater prior to being discharged into the facilities. This structure is not recognized as a DEP BMP, but it can be used in combination with other facilities.

The aforementioned BMPs were designed in accordance with PADEP policies. Specific BMP locations are on the included plans.

5.0 Peak Rate Analysis

This project was designed to fulfill the PADEP Peak Rate Control Guidelines, which limit the post-project peak flow rates to the pre-project peak flow rates for applicable storm events.

The project site is located within the Schuylkill River Watershed which does not have an approved Act 167 plan, therefore no additional release rate restrictions are required. For both analysis points, post-project flow rates shall not exceed the pre-project flow rates for 2-, 10-, 50-, and 100-year design frequency storms.

Since the TR-55 methodology is used, the SCS Segmental methodology is used to calculate the time of concentration. A time of concentration was calculated for each subarea. Minimum time of concentration of 6 minutes was used for areas that would have a Tc less than 6 minutes. The Pre-project time of concentration calculation did not account for the shallow low spots present on the site due to the site being within the floodplain. Time of concentration calculations can be found as part of the release rate calculations completed using HydroCAD, see Appendix F for the pre-project calculations and post-project calculations. The post-project flow rate is reduced to less than the pre-project flow rate in all design storms.

6.0 Volume Management

This project as a whole was designed to fulfill the PADEP Volume Control Guideline 1, which limits the post-project runoff volume to the pre-project runoff volume for the 2-year, 24-hour storm event. The two ways to mitigate the project runoff volume are through the use of non-structural and structural BMPs. The proposed structural BMPs and their PADEP BMP IDs were listed previously in the Proposed PCSM BMPs section of this report.

6.1 Non-Structural BMP Credits

PADEP PCSM Volume Worksheet calculates the volume credits that can be taken for utilizing non-structural BMPs in the planning process for any project. At this time, credits were not taken for non-structural BMPs. All of the PADEP PCSM Worksheets can be found in Appendix E.

6.2 Required Infiltration Volume

The 'Volume Management' DEP PCSM Spreadsheet calculations were completed to determine the change in runoff volume for the 2-year, 24-hour design storm event from the pre-project condition to the post-project condition.

6.3 Provided Infiltration Volume

The 'Volume Management' DEP PCSM Spreadsheet tabulates the tributary area to the proposed structural BMPs and the storage volume of the proposed BMPs. Since infiltration is not possible, this project includes the use of a managed release concept (MRC) underground detention basin to account for the difference between the 2-year pre-project volume and the 2-year post-project volume. This MRC basin will mitigate for all the additional impervious surfaces while also assisting in rate reduction. The PADEP Managed Release Concept (MRC) Design Summary sheets are included in Appendix E.

7.0 Water Quality Calculations

This project as a whole was designed to adequately address the PADEP Water Quality Control Guideline, which requires that post-project releases of total suspended solids (TSS) and total phosphorous (TP), and nitrates (NO3) do not exceed the pre-project releases. Through the use of structural BMPs, the post-project pollutant loading can be reduced. The proposed Structural BMPs were listed previously in the Proposed PCSM BMPs section of this report.

7.1 Required Water Quality Reductions

In order to reduce the pollutant loading in the post-project condition, permanent BMPs were purposefully placed to intercept disturbed runoff. These proposed BMPs were listed previously in the report. The project was designed to use proposed BMPs in series. As such, the drainage areas to each BMP may overlap, but the actual footprint of the BMPs do not overlap and volumes to each BMP are only counted once.

The PADEP PCSM Quality Worksheet calculates the total pollutants reaching each individual BMP and the total pollutant reductions based on the BMP removal efficiencies. After each BMP is calculated, a sum of the total pollutant reductions achieved by all BMPs was determined. Although there are multiple proposed BMPs, the water quality BMPs used for calculation purposes include: MRC underground basin. Snouts are used for pre-treatment of stormwater prior to discharging to the underground detention basins, but the snouts do not provide additional water quality credit.

The project post development water quality pollutants loads are less than the pre-development water quality pollutants loads for all three required pollutants. As such, the proposed project meets all three of the PADEP PCSM Quality Worksheet required pollutant load reductions.

All of the PADEP PCSM Worksheets can be found in Appendix E. Water quality calculations for each water quality BMP are also shown in Appendix E.

8.0 Operations and Maintenance for PCSM BMPs

The operation and maintenance of the permanent PCSM BMPs located onsite will become the responsibility of the owner by way of the recorded plans. The owner must sign an Operation and Maintenance Agreement based on the Operation and Maintenance Plan as described in detail on the PCSM plans.

9.0 Anti-Degradation Analysis

This project included measures to mitigate the thermal impacts to the receiving surface waters, even though the project is not required to provide an analysis. An anti-degradation analysis is only required when the project is within a special protection watershed.

All runoff from the roof areas will be captured and directed to subsurface underdrains. Runoff from paved areas of the project discharge through buried pipe, thereby creating ample opportunity for cooling prior to reaching the surface waters. Most of the site will be directed to the underground detention facility which will provide additional time for water to cool. As such, the project will not have an adverse impact on the natural temperatures of the receiving surface waters.

10.0 PCSM Plan Set

Post-Construction Stormwater Management Plan drawings have been submitted concurrently with this report.

11.0 Conclusion

The project meets PCSM requirements by addressing three key measures used by PADEP to gauge the potential impacts from a proposed project including:

1. Peak Rate Mitigation – Peak Rate Mitigation reduces the post-project release rates to levels less than the pre-project release rates, thus reducing the potential for accelerated erosion to areas located downstream of the project and reducing the potential for downstream flooding.
2. Volume Reduction – Volume Reduction lessens the effects of construction by reducing the post-project runoff volume through the use of an MRC BMP. Since this site located in a known contaminated soils area, infiltration is not proposed on the site.
3. Water Quality Control – Water Quality Controls are used to achieve pollutant loading reductions, in order to protect the existing surface waters and preserve natural habitats.

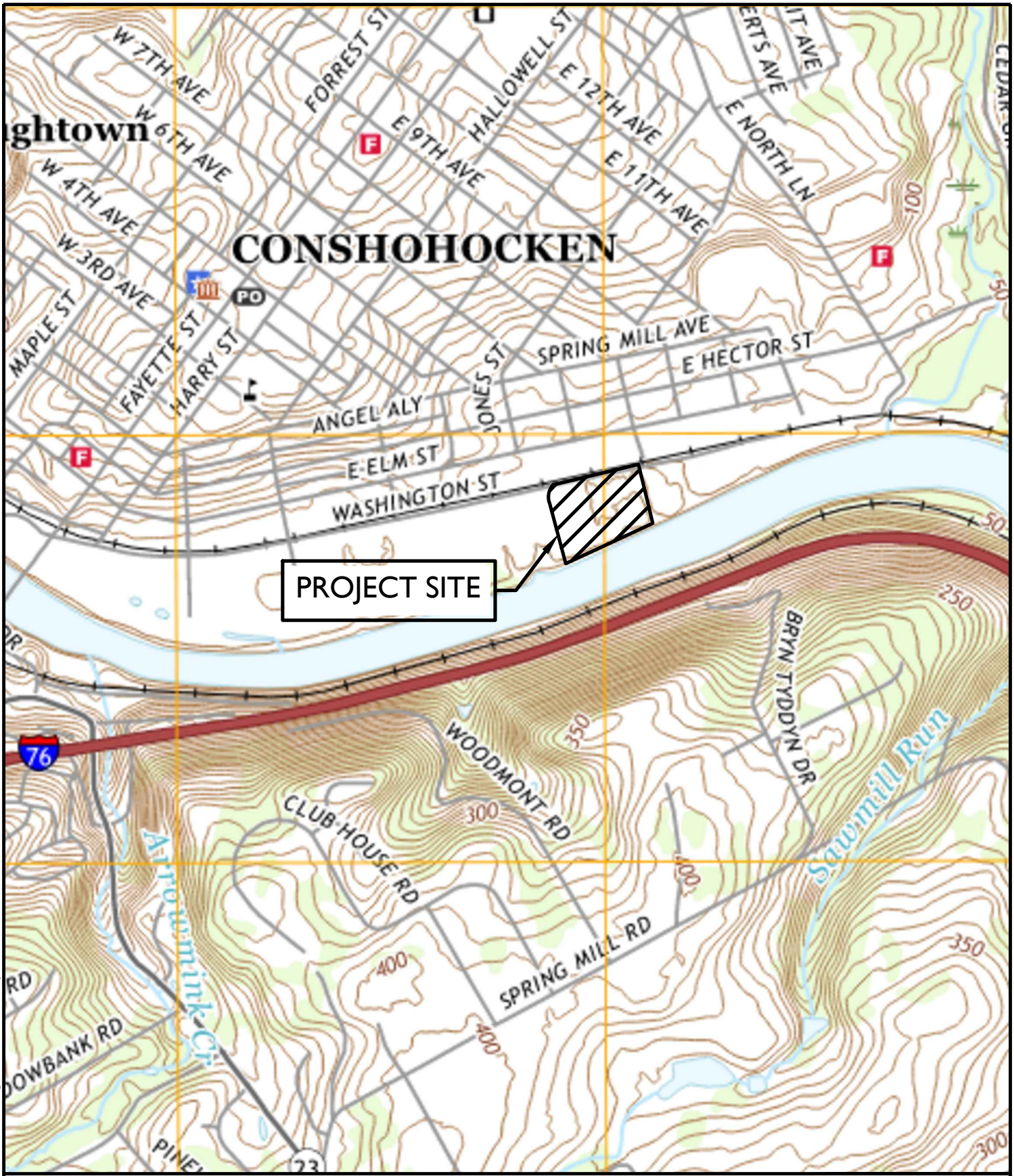
Through the use of recommended BMPs that improve water quality and reduce release rates, the environmental effects from this project were reduced. This PCSM Plan was designed to eliminate (wherever possible) or minimize point source discharges to surface waters, preserve the integrity of existing stream channels, and protect the physical, biological, and chemical qualities of the receiving surface water. The calculations presented in this report demonstrate that the designed facilities sufficiently balance the multiple regulatory requirements.

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References

- Subdivision and Land Development Ordinances (SALDO), Whitemarsh Township, various dates.
- Zoning Ordinances, Whitemarsh Township, various dates.
- Stormwater Management Ordinances, Whitemarsh Township, various dates.
- PADEP Erosion and Sediment Pollution Control Program Manual (E&S Manual), Pennsylvania Department of Environmental Protection, March 2012.
- Pennsylvania Stormwater Best Management Practices Manual, Final Draft, Pennsylvania Department of Environmental Protection, December 2006.
- NRCS Web Soil Survey, United States Department of Agriculture, November 2021.
- PA Code, Title 25, Environmental Protection, Commonwealth of Pennsylvania
- PENNDOT Publication 13M, Design Manual, Part 2, Highway Design (DM-2), Pennsylvania Department of Transportation, August 2009
- PENNDOT Publication 584, PENNDOT Drainage Manual (PDM), Pennsylvania Department of Transportation, December 2010
- PENNDOT Publication 72M, Roadway Construction Standards, Pennsylvania Department of Transportation, June 10, 2013
- Urban Hydrology for Small Watersheds, Technical Release 55 (TR-55), United States Department of Agriculture, June 1986
- PA Code, Title 25, Environmental Protection, Commonwealth of Pennsylvania

Appendix A | Project Location Maps



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PRELIMINARY/FINAL
LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	2/11/2022	MD	CRR

PROJECT NUMBER:	DRAWING NAME:
16001030C	C-EXBT-USGS

SHEET TITLE: USGS MAP

SHEET NUMBER: A - 3 of 6

1 of 1

2016\16001030B\Engineering\Exhibits\C-EXBT-USGS.dwg\C-XX-EXHIBIT By: MDEJESUS


601 Washington
Aerial Map
Legend
E Hector St
E Elm St
Apple St
Schuylkill River Trail
Washington St
SITE
Schuylkill River
Schuylkill Expy
76
N
700 ft
Google Earth

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 18. **Horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
National Geodetic Survey, NOAA
Silver Spring Metro Center 3
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov/.

BASE MAP SOURCE: Road centerlines were obtained in digital spatial data format from the Delaware Valley Regional Planning Commission. County and township/borough boundaries were downloaded from the Pennsylvania Spatial Data Access website. 2002 and 2005 digital orthophotographs were provided by the Delaware Valley Regional Planning Commission. Streamlines were digitized based on the orthophotos. Adjustments were made to specific base map features to align them to 1"=200' scale orthophotos.

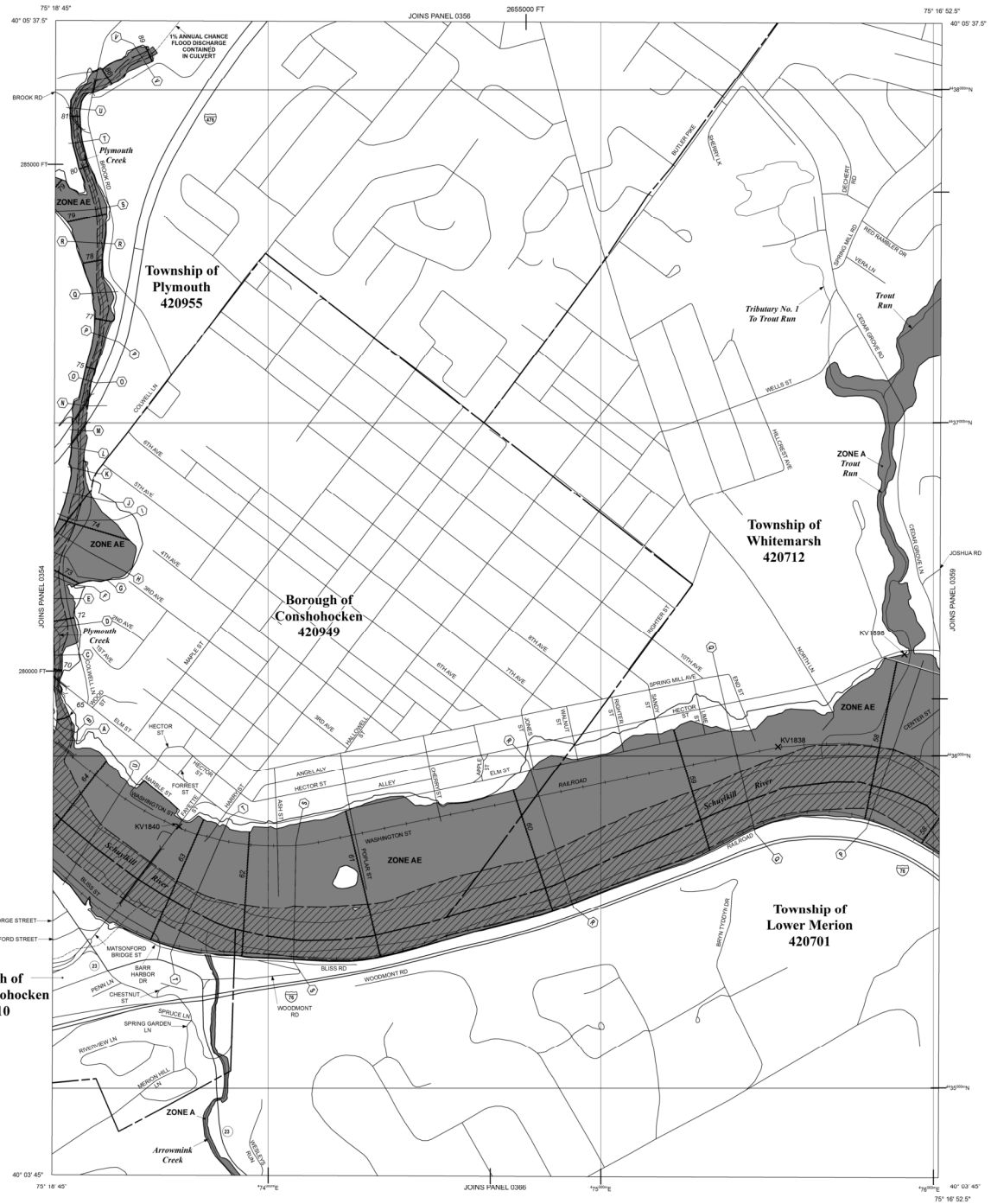
Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map**, how to order products or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAS)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- Bridge
- Culvert
- A — A — Cross section line
- 23 — 23 — Transect line
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4276 000 M — 1000-meter Universal Transverse Mercator grid values, zone 18
- 600000 FT — 5000-foot grid ticks: Pennsylvania State Plane (South) coordinate system (FIPSZONE 3702), Lambert Conformal Conic projection
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- ● M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

DECEMBER 19, 1996

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
MARCH 2, 1998 APRIL 21, 1999 AUGUST 9, 1999 OCTOBER 19, 2001
MARCH 2, 2016 - to add, change and delete Special Flood Hazard Areas; to reflect updated topographic information; to change, add Base Flood Elevations; and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0358G

FIRM
FLOOD INSURANCE RATE MAP

MONTGOMERY COUNTY, PENNSYLVANIA
(ALL JURISDICTIONS)

PANEL 358 OF 451

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CONSHOHOCKEN, BOR OF	420949	0358	G
LOWER MERION, TWP OF	420701	0358	G
PLYMOUTH, TWP OF	420900	0358	G
WHITEMARSH, TWP OF	420712	0358	G
WEST CONSHOHOCKEN, BOR OF	420710	0358	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
42091C0358G

MAP REVISED
MARCH 2, 2016

Federal Emergency Management Agency

Appendix B | Soil Maps and Data

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Montgomery County, Pennsylvania

601 Washington Street



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map



Map Scale: 1:1,940 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 25 50 100 150

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Montgomery County, Pennsylvania
Survey Area Data: Version 16, Sep 1, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 21, 2020—Oct 6, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
UgB	Urban land, 0 to 8 percent slopes	11.1	91.5%
W	Water	1.0	8.5%
Totals for Area of Interest		**12.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Montgomery County, Pennsylvania

UgB—Urban land, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2dtyq
Elevation: 800 to 1,500 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 41 to 62 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Pavement, buildings and other artifically covered areas human transported material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Udorthents, unstable fill

Percent of map unit: 10 percent
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: 1nnv3
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 120 to 214 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Setting

Parent material: Rivers streams ponds

Properties and qualities

Runoff class: Negligible
Frequency of ponding: Frequent

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Appendix C | Runoff Coefficients and Curve Numbers

Runoff Curve Numbers and Percent Imperviousness Values*

Cover Description	Average Percent Impervious Area	Curve Numbers for Hydrologic Soil Group			
Open space (lawns, parks, golf courses, cemeteries, etc.):					
Good condition (grass cover greater than 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads: paved, curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved, open ditches (including right-of-way)		83	89	92	93
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential district by average lot size:					
1/8 acre or less (townhouses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
½ acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Woods		30	55	70	77
Agriculture		Refer to Table 2-2b in source document (TR55) by crop type and treatment.			

*Source Soil Conservation Service Technical Release No. 55, Second Edition, June 1986.

Table 2-2c Runoff curve numbers for other agricultural lands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2/]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3/]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4/]	48	65	73
Woods—grass combination (orchard or tree farm). [5/]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6/]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4/]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.

2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

3 *Poor*: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

4 Actual curve number is less than 30; use CN = 30 for runoff computations.

5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

2. The coefficient of roughness, "n", shall be as follows unless otherwise approved by the Township Engineer.

Material/Ground Cover	**Roughness Coefficient "D"**
Concrete pipe	.012
Corrugated steel pipe	see table below
Vitrified clay pipe	.012
Cast iron pipe	.013
Brick sewer	.015
Asphalt pavement	.015
Concrete pavement	.014
Grass swales	.040
Earth	.020
Gravel	.020
Rock	.035
Cultivated areas	.030 to .050
Dense Brush	.070 to .140
Dense woods with little undergrowth	.100 to .150
Streams	
Some grass and weeds, little brush	.030 to .035
Dense growth of weeds	.035 to .050
Some weeds, heavy brush on banks	.050 to .070

Values of Coefficient of Roughness (n)
for Standard Corrugated Steel Pipe
(Manning's Formula)

Corrugations	Helical						
	1 ½" x 1/4"				2 2/3" x 1 2/3"		
	8"	10"	12"	18"	24"	36"	48"
Unpaved	.012	.014	.011	.014	.016	.019	.020
25% paved					.015	.017	.020
Fully paved					.012	.012	.012

Corrugations	Helical					
	3" x 1"					
	36"	48"	54"	60"	66"	72"
Unpaved	.021	.023	.023	.024	.025	.026
25% paved	.019	.020	.020	.021	.022	.022
Fully paved	.012	.012	.012	.012	.011	.012

Appendix D | Rainfall Depths and Intensities

NOAA Atlas 14, Volume 2, Version 3
Location name: Conshohocken, Pennsylvania, USA*
Latitude: 40.072°, Longitude: -75.2987°
Elevation: 53.9 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.347** (0.318-0.378)	**0.412** (0.379-0.450)	**0.485** (0.444-0.528)	**0.535** (0.489-0.583)	**0.596** (0.542-0.649)	**0.637** (0.576-0.695)	**0.678** (0.611-0.741)	**0.714** (0.639-0.782)	**0.755** (0.670-0.831)	**0.786** (0.692-0.869)
10-min	**0.554** (0.509-0.604)	**0.660** (0.606-0.720)	**0.776** (0.710-0.845)	**0.856** (0.783-0.933)	**0.950** (0.864-1.03)	**1.01** (0.918-1.11)	**1.08** (0.971-1.18)	**1.13** (1.01-1.24)	**1.19** (1.06-1.31)	**1.24** (1.09-1.37)
15-min	**0.692** (0.636-0.755)	**0.829** (0.762-0.905)	**0.982** (0.899-1.07)	**1.08** (0.990-1.18)	**1.20** (1.10-1.31)	**1.29** (1.16-1.40)	**1.36** (1.23-1.49)	**1.43** (1.28-1.56)	**1.50** (1.33-1.65)	**1.55** (1.37-1.72)
30-min	**0.949** (0.872-1.03)	**1.15** (1.05-1.25)	**1.40** (1.28-1.52)	**1.57** (1.44-1.71)	**1.78** (1.62-1.94)	**1.94** (1.75-2.11)	**2.09** (1.88-2.28)	**2.22** (1.99-2.43)	**2.39** (2.12-2.63)	**2.52** (2.21-2.78)
60-min	**1.18** (1.09-1.29)	**1.44** (1.32-1.57)	**1.79** (1.64-1.95)	**2.04** (1.87-2.23)	**2.37** (2.16-2.59)	**2.62** (2.37-2.86)	**2.87** (2.59-3.14)	**3.12** (2.79-3.41)	**3.43** (3.05-3.78)	**3.67** (3.23-4.06)
2-hr	**1.42** (1.29-1.55)	**1.72** (1.57-1.89)	**2.15** (1.96-2.35)	**2.48** (2.25-2.71)	**2.91** (2.63-3.18)	**3.25** (2.92-3.56)	**3.60** (3.21-3.94)	**3.94** (3.49-4.32)	**4.41** (3.86-4.85)	**4.76** (4.13-5.26)
3-hr	**1.55** (1.42-1.70)	**1.88** (1.72-2.07)	**2.36** (2.15-2.59)	**2.72** (2.47-2.98)	**3.21** (2.90-3.52)	**3.59** (3.22-3.94)	**3.99** (3.55-4.37)	**4.39** (3.87-4.82)	**4.92** (4.29-5.44)	**5.35** (4.61-5.92)
6-hr	**1.94** (1.78-2.13)	**2.35** (2.15-2.58)	**2.93** (2.67-3.22)	**3.40** (3.09-3.72)	**4.05** (3.66-4.44)	**4.59** (4.10-5.03)	**5.15** (4.57-5.65)	**5.74** (5.03-6.31)	**6.57** (5.66-7.26)	**7.25** (6.15-8.04)
12-hr	**2.36** (2.16-2.61)	**2.85** (2.61-3.15)	**3.58** (3.27-3.95)	**4.18** (3.80-4.61)	**5.07** (4.55-5.57)	**5.81** (5.17-6.38)	**6.62** (5.82-7.28)	**7.49** (6.49-8.27)	**8.77** (7.44-9.73)	**9.84** (8.20-11.0)
24-hr	**2.73** (2.51-2.97)	**3.28** (3.02-3.59)	**4.12** (3.79-4.50)	**4.82** (4.42-5.26)	**5.83** (5.31-6.34)	**6.68** (6.06-7.26)	**7.60** (6.85-8.25)	**8.60** (7.69-9.32)	**10.0** (8.89-10.9)	**11.2** (9.85-12.2)
2-day	**3.15** (2.88-3.44)	**3.80** (3.48-4.15)	**4.78** (4.38-5.22)	**5.57** (5.09-6.08)	**6.71** (6.10-7.30)	**7.64** (6.93-8.32)	**8.64** (7.78-9.40)	**9.71** (8.69-10.6)	**11.2** (9.96-12.2)	**12.5** (11.0-13.6)
3-day	**3.32** (3.05-3.63)	**4.00** (3.68-4.37)	**5.02** (4.60-5.48)	**5.84** (5.35-6.37)	**7.01** (6.39-7.63)	**7.98** (7.25-8.68)	**9.00** (8.13-9.80)	**10.1** (9.06-11.0)	**11.7** (10.4-12.7)	**12.9** (11.4-14.1)
4-day	**3.49** (3.22-3.82)	**4.21** (3.87-4.60)	**5.26** (4.83-5.74)	**6.11** (5.61-6.66)	**7.31** (6.68-7.96)	**8.31** (7.56-9.04)	**9.36** (8.48-10.2)	**10.5** (9.44-11.4)	**12.1** (10.8-13.2)	**13.4** (11.8-14.6)
7-day	**4.08** (3.79-4.44)	**4.90** (4.54-5.33)	**6.05** (5.60-6.59)	**7.00** (6.47-7.61)	**8.36** (7.69-9.08)	**9.48** (8.68-10.3)	**10.7** (9.71-11.6)	**11.9** (10.8-12.9)	**13.7** (12.3-14.9)	**15.2** (13.5-16.5)
10-day	**4.65** (4.33-5.02)	**5.55** (5.17-6.00)	**6.77** (6.29-7.31)	**7.75** (7.19-8.37)	**9.11** (8.42-9.83)	**10.2** (9.41-11.0)	**11.3** (10.4-12.2)	**12.5** (11.4-13.5)	**14.2** (12.9-15.3)	**15.5** (14.0-16.8)
20-day	**6.29** (5.90-6.72)	**7.46** (7.00-7.97)	**8.90** (8.35-9.51)	**10.0** (9.40-10.7)	**11.6** (10.8-12.3)	**12.7** (11.9-13.6)	**13.9** (13.0-14.9)	**15.2** (14.0-16.2)	**16.8** (15.5-18.0)	**18.0** (16.5-19.3)
30-day	**7.84** (7.41-8.28)	**9.23** (8.73-9.76)	**10.8** (10.2-11.4)	**12.0** (11.3-12.6)	**13.5** (12.7-14.3)	**14.7** (13.8-15.5)	**15.8** (14.9-16.8)	**17.0** (15.9-18.0)	**18.5** (17.2-19.6)	**19.6** (18.2-20.8)
45-day	**9.96** (9.47-10.5)	**11.7** (11.1-12.3)	**13.5** (12.8-14.2)	**14.8** (14.0-15.5)	**16.4** (15.6-17.3)	**17.7** (16.7-18.6)	**18.9** (17.8-19.8)	**20.0** (18.8-21.0)	**21.3** (20.1-22.5)	**22.3** (20.9-23.6)
60-day	**11.9** (11.4-12.5)	**14.0** (13.3-14.7)	**16.0** (15.2-16.8)	**17.4** (16.6-18.3)	**19.3** (18.3-20.2)	**20.6** (19.6-21.6)	**21.8** (20.7-22.9)	**23.0** (21.8-24.2)	**24.4** (23.1-25.7)	**25.4** (24.0-26.8)

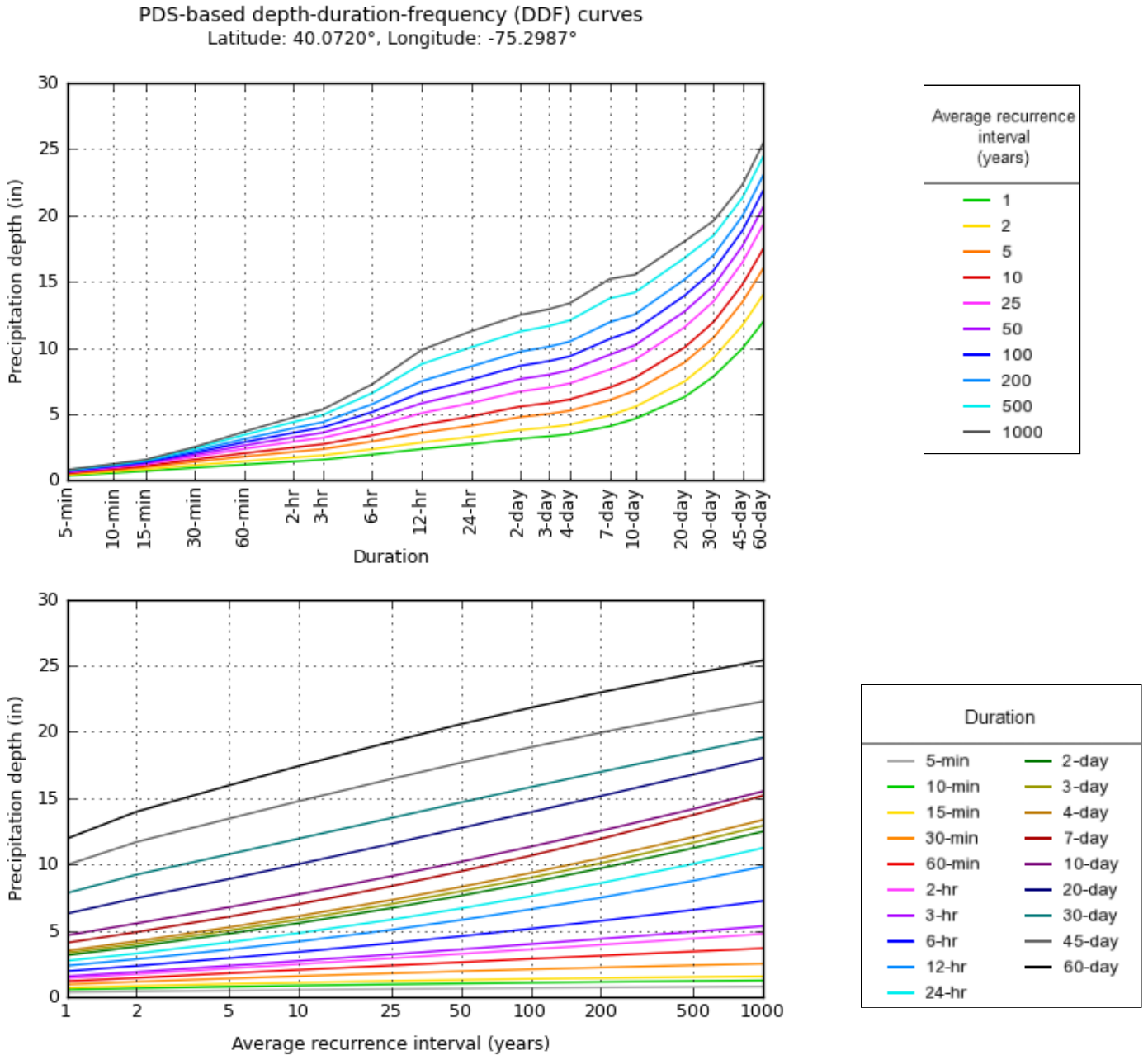
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical



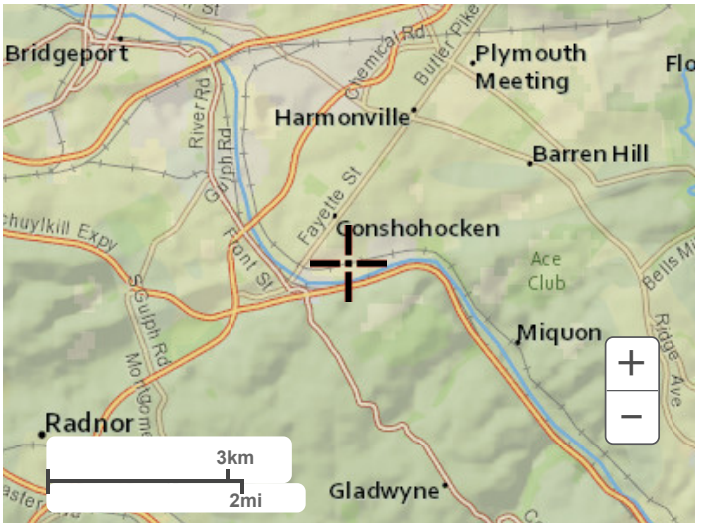
NOAA Atlas 14, Volume 2, Version 3

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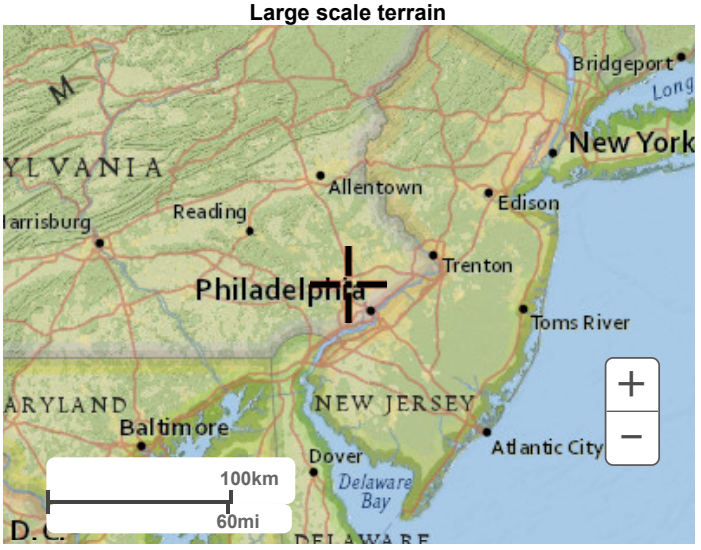
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Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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Disclaimer

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 1

Return Event: 1 years
Storm Event: 1-YR

Time-Depth Curve: 1-YR	
Label	1-YR
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	1 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.00	0.01	0.01	0.01
0.500	0.01	0.02	0.02	0.02	0.03
1.000	0.03	0.03	0.04	0.04	0.04
1.500	0.05	0.05	0.05	0.06	0.06
2.000	0.06	0.07	0.07	0.07	0.08
2.500	0.08	0.08	0.09	0.09	0.09
3.000	0.10	0.10	0.10	0.11	0.11
3.500	0.11	0.12	0.12	0.13	0.13
4.000	0.13	0.14	0.14	0.15	0.15
4.500	0.15	0.16	0.16	0.17	0.17
5.000	0.17	0.18	0.18	0.19	0.19
5.500	0.19	0.20	0.20	0.21	0.21
6.000	0.22	0.22	0.23	0.23	0.24
6.500	0.24	0.25	0.25	0.26	0.26
7.000	0.27	0.27	0.28	0.28	0.29
7.500	0.30	0.30	0.31	0.31	0.32
8.000	0.33	0.33	0.34	0.35	0.35
8.500	0.36	0.37	0.38	0.38	0.39
9.000	0.40	0.41	0.42	0.42	0.43
9.500	0.44	0.45	0.46	0.47	0.49
10.000	0.50	0.51	0.52	0.54	0.55
10.500	0.56	0.58	0.59	0.61	0.63
11.000	0.66	0.68	0.71	0.74	0.77
11.500	0.81	0.86	0.92	1.00	1.11
12.000	1.30	1.62	1.73	1.81	1.87
12.500	1.92	1.96	1.99	2.02	2.05
13.000	2.07	2.10	2.12	2.14	2.15
13.500	2.17	2.18	2.19	2.21	2.22
14.000	2.23	2.24	2.26	2.27	2.28
14.500	2.29	2.30	2.31	2.31	2.32
15.000	2.33	2.34	2.35	2.35	2.36
15.500	2.37	2.38	2.38	2.39	2.40
16.000	2.40	2.41	2.42	2.42	2.43
16.500	2.43	2.44	2.45	2.45	2.46
17.000	2.46	2.47	2.47	2.48	2.48
17.500	2.49	2.49	2.50	2.50	2.51
18.000	2.51	2.52	2.52	2.53	2.53
18.500	2.54	2.54	2.54	2.55	2.55
19.000	2.56	2.56	2.56	2.57	2.57
19.500	2.58	2.58	2.58	2.59	2.59

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 1

Return Event: 1 years
Storm Event: 1-YR

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
20.000	2.60	2.60	2.60	2.61	2.61
20.500	2.62	2.62	2.62	2.63	2.63
21.000	2.63	2.64	2.64	2.64	2.65
21.500	2.65	2.65	2.66	2.66	2.66
22.000	2.67	2.67	2.67	2.68	2.68
22.500	2.68	2.69	2.69	2.69	2.70
23.000	2.70	2.70	2.71	2.71	2.71
23.500	2.72	2.72	2.72	2.72	2.73
24.000	2.73	(N/A)	(N/A)	(N/A)	(N/A)

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 2

Return Event: 2 years
Storm Event: 2-YR

Time-Depth Curve: 2-YR	
Label	2-YR
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	2 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.00	0.01	0.01	0.01
0.500	0.02	0.02	0.03	0.03	0.03
1.000	0.04	0.04	0.04	0.05	0.05
1.500	0.05	0.06	0.06	0.07	0.07
2.000	0.07	0.08	0.08	0.09	0.09
2.500	0.09	0.10	0.10	0.11	0.11
3.000	0.12	0.12	0.12	0.13	0.13
3.500	0.14	0.14	0.15	0.15	0.16
4.000	0.16	0.17	0.17	0.17	0.18
4.500	0.18	0.19	0.19	0.20	0.20
5.000	0.21	0.21	0.22	0.22	0.23
5.500	0.23	0.24	0.24	0.25	0.25
6.000	0.26	0.27	0.27	0.28	0.28
6.500	0.29	0.29	0.30	0.31	0.31
7.000	0.32	0.33	0.33	0.34	0.35
7.500	0.35	0.36	0.37	0.38	0.39
8.000	0.39	0.40	0.41	0.42	0.43
8.500	0.43	0.44	0.45	0.46	0.47
9.000	0.48	0.49	0.50	0.51	0.52
9.500	0.53	0.54	0.56	0.57	0.58
10.000	0.60	0.61	0.63	0.64	0.66
10.500	0.68	0.69	0.71	0.74	0.76
11.000	0.79	0.82	0.85	0.89	0.93
11.500	0.97	1.04	1.11	1.20	1.33
12.000	1.56	1.95	2.08	2.17	2.24
12.500	2.31	2.35	2.39	2.43	2.46
13.000	2.49	2.52	2.54	2.57	2.59
13.500	2.60	2.62	2.64	2.65	2.67
14.000	2.68	2.70	2.71	2.72	2.74
14.500	2.75	2.76	2.77	2.78	2.79
15.000	2.80	2.81	2.82	2.83	2.84
15.500	2.85	2.85	2.86	2.87	2.88
16.000	2.89	2.89	2.90	2.91	2.92
16.500	2.93	2.93	2.94	2.95	2.95
17.000	2.96	2.97	2.97	2.98	2.99
17.500	2.99	3.00	3.00	3.01	3.01
18.000	3.02	3.03	3.03	3.04	3.04
18.500	3.05	3.05	3.06	3.06	3.07
19.000	3.07	3.08	3.08	3.09	3.09
19.500	3.10	3.10	3.11	3.11	3.11

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 2

Return Event: 2 years
Storm Event: 2-YR

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
20.000	3.12	3.12	3.13	3.13	3.14
20.500	3.14	3.15	3.15	3.16	3.16
21.000	3.16	3.17	3.17	3.18	3.18
21.500	3.19	3.19	3.19	3.20	3.20
22.000	3.21	3.21	3.21	3.22	3.22
22.500	3.23	3.23	3.23	3.24	3.24
23.000	3.24	3.25	3.25	3.25	3.26
23.500	3.26	3.27	3.27	3.27	3.28
24.000	3.28	(N/A)	(N/A)	(N/A)	(N/A)

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 5

Return Event: 5 years
Storm Event: 5-YR

Time-Depth Curve: 5-YR	
Label	5-YR
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	5 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.01	0.01	0.01	0.02
0.500	0.02	0.03	0.03	0.04	0.04
1.000	0.05	0.05	0.05	0.06	0.06
1.500	0.07	0.07	0.08	0.08	0.09
2.000	0.09	0.10	0.10	0.11	0.11
2.500	0.12	0.12	0.13	0.13	0.14
3.000	0.15	0.15	0.16	0.16	0.17
3.500	0.17	0.18	0.18	0.19	0.20
4.000	0.20	0.21	0.21	0.22	0.23
4.500	0.23	0.24	0.24	0.25	0.26
5.000	0.26	0.27	0.27	0.28	0.29
5.500	0.29	0.30	0.31	0.31	0.32
6.000	0.33	0.33	0.34	0.35	0.35
6.500	0.36	0.37	0.38	0.39	0.39
7.000	0.40	0.41	0.42	0.43	0.44
7.500	0.45	0.46	0.46	0.47	0.48
8.000	0.49	0.50	0.51	0.52	0.54
8.500	0.55	0.56	0.57	0.58	0.59
9.000	0.60	0.61	0.63	0.64	0.65
9.500	0.67	0.68	0.70	0.72	0.73
10.000	0.75	0.77	0.79	0.81	0.83
10.500	0.85	0.87	0.90	0.93	0.96
11.000	0.99	1.03	1.07	1.11	1.16
11.500	1.22	1.30	1.39	1.51	1.68
12.000	1.96	2.45	2.61	2.73	2.82
12.500	2.90	2.96	3.01	3.05	3.10
13.000	3.13	3.17	3.20	3.22	3.25
13.500	3.27	3.29	3.31	3.33	3.35
14.000	3.37	3.39	3.41	3.42	3.44
14.500	3.45	3.47	3.48	3.50	3.51
15.000	3.52	3.53	3.54	3.55	3.57
15.500	3.58	3.59	3.60	3.61	3.62
16.000	3.63	3.64	3.65	3.66	3.67
16.500	3.68	3.69	3.69	3.70	3.71
17.000	3.72	3.73	3.74	3.74	3.75
17.500	3.76	3.77	3.77	3.78	3.79
18.000	3.80	3.80	3.81	3.82	3.82
18.500	3.83	3.83	3.84	3.85	3.85
19.000	3.86	3.87	3.87	3.88	3.88
19.500	3.89	3.90	3.90	3.91	3.91

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 5

Return Event: 5 years
Storm Event: 5-YR

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
20.000	3.92	3.93	3.93	3.94	3.94
20.500	3.95	3.95	3.96	3.97	3.97
21.000	3.98	3.98	3.99	3.99	4.00
21.500	4.00	4.01	4.01	4.02	4.02
22.000	4.03	4.03	4.04	4.04	4.05
22.500	4.05	4.06	4.06	4.07	4.07
23.000	4.08	4.08	4.09	4.09	4.10
23.500	4.10	4.10	4.11	4.11	4.12
24.000	4.12	(N/A)	(N/A)	(N/A)	(N/A)

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 10

Return Event: 10 years
Storm Event: 10-YR

Time-Depth Curve: 10-YR	
Label	10-YR
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	10 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.01	0.01	0.02	0.02
0.500	0.03	0.03	0.04	0.04	0.05
1.000	0.05	0.06	0.06	0.07	0.07
1.500	0.08	0.09	0.09	0.10	0.10
2.000	0.11	0.11	0.12	0.13	0.13
2.500	0.14	0.15	0.15	0.16	0.16
3.000	0.17	0.18	0.18	0.19	0.20
3.500	0.20	0.21	0.22	0.22	0.23
4.000	0.24	0.24	0.25	0.26	0.26
4.500	0.27	0.28	0.28	0.29	0.30
5.000	0.31	0.31	0.32	0.33	0.34
5.500	0.34	0.35	0.36	0.37	0.37
6.000	0.38	0.39	0.40	0.41	0.41
6.500	0.42	0.43	0.44	0.45	0.46
7.000	0.47	0.48	0.49	0.50	0.51
7.500	0.52	0.53	0.54	0.55	0.57
8.000	0.58	0.59	0.60	0.61	0.63
8.500	0.64	0.65	0.66	0.68	0.69
9.000	0.70	0.72	0.73	0.75	0.77
9.500	0.78	0.80	0.82	0.84	0.86
10.000	0.88	0.90	0.92	0.95	0.97
10.500	0.99	1.02	1.05	1.08	1.12
11.000	1.16	1.20	1.25	1.30	1.36
11.500	1.42	1.52	1.62	1.76	1.96
12.000	2.30	2.86	3.06	3.20	3.30
12.500	3.40	3.46	3.52	3.57	3.62
13.000	3.66	3.70	3.74	3.77	3.80
13.500	3.83	3.85	3.87	3.90	3.92
14.000	3.94	3.96	3.98	4.00	4.02
14.500	4.04	4.05	4.07	4.09	4.10
15.000	4.12	4.13	4.14	4.16	4.17
15.500	4.18	4.19	4.21	4.22	4.23
16.000	4.24	4.25	4.27	4.28	4.29
16.500	4.30	4.31	4.32	4.33	4.34
17.000	4.35	4.36	4.37	4.38	4.39
17.500	4.40	4.41	4.41	4.42	4.43
18.000	4.44	4.45	4.45	4.46	4.47
18.500	4.48	4.48	4.49	4.50	4.51
19.000	4.51	4.52	4.53	4.54	4.54
19.500	4.55	4.56	4.56	4.57	4.58

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 10

Return Event: 10 years
Storm Event: 10-YR

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
20.000	4.58	4.59	4.60	4.60	4.61
20.500	4.62	4.62	4.63	4.64	4.64
21.000	4.65	4.66	4.66	4.67	4.67
21.500	4.68	4.69	4.69	4.70	4.71
22.000	4.71	4.72	4.72	4.73	4.73
22.500	4.74	4.75	4.75	4.76	4.76
23.000	4.77	4.77	4.78	4.78	4.79
23.500	4.79	4.80	4.80	4.81	4.81
24.000	4.82	(N/A)	(N/A)	(N/A)	(N/A)

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 25

Return Event: 25 years
Storm Event: 25-YR

Time-Depth Curve: 25-YR	
Label	25-YR
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	25 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.01	0.01	0.02	0.03
0.500	0.03	0.04	0.04	0.05	0.06
1.000	0.06	0.07	0.08	0.08	0.09
1.500	0.10	0.10	0.11	0.12	0.12
2.000	0.13	0.14	0.15	0.15	0.16
2.500	0.17	0.18	0.18	0.19	0.20
3.000	0.21	0.21	0.22	0.23	0.24
3.500	0.24	0.25	0.26	0.27	0.28
4.000	0.29	0.29	0.30	0.31	0.32
4.500	0.33	0.34	0.34	0.35	0.36
5.000	0.37	0.38	0.39	0.40	0.41
5.500	0.42	0.42	0.43	0.44	0.45
6.000	0.46	0.47	0.48	0.49	0.50
6.500	0.51	0.52	0.53	0.55	0.56
7.000	0.57	0.58	0.59	0.61	0.62
7.500	0.63	0.64	0.66	0.67	0.68
8.000	0.70	0.71	0.73	0.74	0.76
8.500	0.77	0.79	0.80	0.82	0.84
9.000	0.85	0.87	0.89	0.91	0.93
9.500	0.95	0.97	0.99	1.01	1.04
10.000	1.06	1.09	1.12	1.14	1.17
10.500	1.20	1.23	1.27	1.31	1.35
11.000	1.40	1.45	1.51	1.58	1.65
11.500	1.72	1.84	1.96	2.13	2.37
12.000	2.78	3.46	3.70	3.87	3.99
12.500	4.11	4.18	4.25	4.32	4.38
13.000	4.43	4.48	4.52	4.56	4.60
13.500	4.63	4.66	4.69	4.71	4.74
14.000	4.77	4.79	4.82	4.84	4.86
14.500	4.88	4.90	4.92	4.94	4.96
15.000	4.98	4.99	5.01	5.03	5.04
15.500	5.06	5.07	5.09	5.10	5.12
16.000	5.13	5.15	5.16	5.17	5.19
16.500	5.20	5.21	5.22	5.24	5.25
17.000	5.26	5.27	5.28	5.30	5.31
17.500	5.32	5.33	5.34	5.35	5.36
18.000	5.37	5.38	5.39	5.40	5.41
18.500	5.41	5.42	5.43	5.44	5.45
19.000	5.46	5.47	5.48	5.49	5.49
19.500	5.50	5.51	5.52	5.53	5.54

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 25

Return Event: 25 years
Storm Event: 25-YR

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
20.000	5.54	5.55	5.56	5.57	5.58
20.500	5.59	5.59	5.60	5.61	5.62
21.000	5.62	5.63	5.64	5.65	5.65
21.500	5.66	5.67	5.68	5.68	5.69
22.000	5.70	5.71	5.71	5.72	5.73
22.500	5.73	5.74	5.75	5.75	5.76
23.000	5.77	5.77	5.78	5.79	5.79
23.500	5.80	5.80	5.81	5.82	5.82
24.000	5.83	(N/A)	(N/A)	(N/A)	(N/A)

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 50

Return Event: 50 years
Storm Event: 50-YR

Time-Depth Curve: 50-YR	
Label	50-YR
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	50 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.01	0.02	0.02	0.03
0.500	0.04	0.04	0.05	0.06	0.07
1.000	0.07	0.08	0.09	0.10	0.10
1.500	0.11	0.12	0.13	0.13	0.14
2.000	0.15	0.16	0.17	0.18	0.18
2.500	0.19	0.20	0.21	0.22	0.23
3.000	0.24	0.24	0.25	0.26	0.27
3.500	0.28	0.29	0.30	0.31	0.32
4.000	0.33	0.34	0.35	0.36	0.37
4.500	0.38	0.38	0.39	0.40	0.41
5.000	0.42	0.44	0.45	0.46	0.47
5.500	0.48	0.49	0.50	0.51	0.52
6.000	0.53	0.54	0.55	0.56	0.58
6.500	0.59	0.60	0.61	0.62	0.64
7.000	0.65	0.67	0.68	0.69	0.71
7.500	0.72	0.74	0.75	0.77	0.78
8.000	0.80	0.82	0.83	0.85	0.87
8.500	0.88	0.90	0.92	0.94	0.96
9.000	0.98	1.00	1.02	1.04	1.06
9.500	1.08	1.11	1.13	1.16	1.19
10.000	1.22	1.25	1.28	1.31	1.34
10.500	1.38	1.41	1.46	1.50	1.55
11.000	1.60	1.66	1.73	1.81	1.89
11.500	1.97	2.11	2.25	2.45	2.72
12.000	3.18	3.96	4.23	4.43	4.57
12.500	4.71	4.79	4.87	4.95	5.02
13.000	5.08	5.13	5.18	5.22	5.27
13.500	5.30	5.34	5.37	5.40	5.43
14.000	5.46	5.49	5.52	5.55	5.57
14.500	5.60	5.62	5.64	5.66	5.68
15.000	5.70	5.72	5.74	5.76	5.78
15.500	5.80	5.81	5.83	5.85	5.86
16.000	5.88	5.90	5.91	5.93	5.94
16.500	5.96	5.97	5.99	6.00	6.01
17.000	6.03	6.04	6.06	6.07	6.08
17.500	6.09	6.10	6.12	6.13	6.14
18.000	6.15	6.16	6.17	6.18	6.19
18.500	6.20	6.21	6.22	6.23	6.24
19.000	6.26	6.27	6.28	6.29	6.30
19.500	6.30	6.31	6.32	6.33	6.34

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 50

Return Event: 50 years
Storm Event: 50-YR

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
20.000	6.35	6.36	6.37	6.38	6.39
20.500	6.40	6.41	6.42	6.43	6.44
21.000	6.44	6.45	6.46	6.47	6.48
21.500	6.49	6.50	6.50	6.51	6.52
22.000	6.53	6.54	6.55	6.55	6.56
22.500	6.57	6.58	6.58	6.59	6.60
23.000	6.61	6.61	6.62	6.63	6.64
23.500	6.64	6.65	6.66	6.66	6.67
24.000	6.68	(N/A)	(N/A)	(N/A)	(N/A)

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 100

Return Event: 100 years
Storm Event: 100-YR

Time-Depth Curve: 100-YR	
Label	100-YR
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.01	0.02	0.03	0.03
0.500	0.04	0.05	0.06	0.07	0.07
1.000	0.08	0.09	0.10	0.11	0.12
1.500	0.13	0.14	0.14	0.15	0.16
2.000	0.17	0.18	0.19	0.20	0.21
2.500	0.22	0.23	0.24	0.25	0.26
3.000	0.27	0.28	0.29	0.30	0.31
3.500	0.32	0.33	0.34	0.35	0.36
4.000	0.37	0.38	0.39	0.40	0.42
4.500	0.43	0.44	0.45	0.46	0.47
5.000	0.48	0.49	0.51	0.52	0.53
5.500	0.54	0.55	0.57	0.58	0.59
6.000	0.60	0.61	0.63	0.64	0.65
6.500	0.67	0.68	0.70	0.71	0.73
7.000	0.74	0.76	0.77	0.79	0.81
7.500	0.82	0.84	0.86	0.87	0.89
8.000	0.91	0.93	0.95	0.97	0.99
8.500	1.01	1.03	1.05	1.07	1.09
9.000	1.11	1.13	1.16	1.18	1.21
9.500	1.23	1.26	1.29	1.32	1.35
10.000	1.39	1.42	1.45	1.49	1.53
10.500	1.57	1.61	1.66	1.71	1.76
11.000	1.82	1.89	1.97	2.05	2.15
11.500	2.25	2.40	2.56	2.78	3.09
12.000	3.62	4.51	4.82	5.04	5.20
12.500	5.35	5.45	5.55	5.63	5.71
13.000	5.78	5.84	5.89	5.94	5.99
13.500	6.03	6.07	6.11	6.15	6.18
14.000	6.21	6.25	6.28	6.31	6.34
14.500	6.37	6.39	6.42	6.44	6.47
15.000	6.49	6.51	6.53	6.55	6.57
15.500	6.59	6.61	6.63	6.65	6.67
16.000	6.69	6.71	6.73	6.74	6.76
16.500	6.78	6.79	6.81	6.83	6.84
17.000	6.86	6.87	6.89	6.90	6.92
17.500	6.93	6.95	6.96	6.97	6.99
18.000	7.00	7.01	7.02	7.03	7.05
18.500	7.06	7.07	7.08	7.09	7.11
19.000	7.12	7.13	7.14	7.15	7.16
19.500	7.17	7.18	7.20	7.21	7.22

Rainfall Time-Depth Curves

Subsection: Time-Depth Curve
Label: NOAA PP, Conshohocken PA
Scenario: Pre-Development 100

Return Event: 100 years
Storm Event: 100-YR

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
20.000	7.23	7.24	7.25	7.26	7.27
20.500	7.28	7.29	7.30	7.31	7.32
21.000	7.33	7.34	7.35	7.36	7.37
21.500	7.38	7.39	7.40	7.41	7.42
22.000	7.43	7.44	7.45	7.46	7.46
22.500	7.47	7.48	7.49	7.50	7.51
23.000	7.52	7.53	7.53	7.54	7.55
23.500	7.56	7.57	7.57	7.58	7.59
24.000	7.60	(N/A)	(N/A)	(N/A)	(N/A)

Appendix E | PADEP Spreadsheets

General Information

Instructions | *General* | Volume | Rate | Quality

Project Name:	**601 Washington Street Apartments, SP 1**	Application Type:	**PAG-02 NOI**
County:	**Montgomery**	Municipality:	**Whitemarsh Township**
Project Type:	**Multi-Family Housing**	◉ New Project	○ Minor / Major Amendment
Area: *(In Watershed)*	**9.28** acres	Total Earth Disturbance: *(In Watershed)*	**8.53** acres
No. of Post-Construction Discharge Points:	**1**	Start DP Numbering at:	**001**

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
001	6.29	6.29	3.94	4.97	Schuylkill River	WWF, MF	Yes
Undetained Areas	2.99	2.24	0.24	0.61	Schuylkill River	WWF, MF	
Totals:	**9.28**	**8.53**	**4.18**	**5.58**			

Volume Management

Project: 601 Washington Street Apartments, SP 1

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **3.28** inches

Alternative 2-Year / 24-Hour Storm Event _____ inches

Alternative Source: _____

Pre-Construction Conditions: *No. Rows:* **4** ☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Pervious as Meadow	1.63	B	58	1.448	0.37	2,188
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	3.34	B	98	0.041	3.05	36,945
Impervious as Meadow	0.84	B	58	1.448	0.37	1,128
Forested (Good Condition)	2.20	B	55	1.636	0.27	2,196
TOTAL (ACRES):	**8.01**				**TOTAL (CF):**	**42,456**

Post-Construction Conditions: *No. Rows:* **3**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	2.89	B	61	1.279	0.48	5,005
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	5.58	B	98	0.041	3.05	61,722
Woods (Good Condition)	0.06	B	55	1.636	0.27	60
TOTAL (ACRES):	**8.53**				**TOTAL (CF):**	**66,787**

NET CHANGE IN VOLUME TO MANAGE (CF):	24,331

Non-Structural BMP Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural BMP Volume Credits: *No. Structural BMPs:* **1** *Start BMP Numbering at:* **1**

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegeta-ted?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
001	1	Dry Extended Detention Basin	Y	Off-Site	6.29	57,290				No		57,290		
											Totals:			

INFILTRATION & ET CREDITS (CF):	
MANAGED RELEASE CREDIT (CF):	**57,290**
NET CHANGE IN VOLUME TO MANAGE (CF):	**24,331**
TOTAL CREDITS (CF):	**57,290**

VOLUME REQUIREMENT SATISFIED

Water Quality

Project: 601 Washington Street Apartments, SP 1

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Pervious as Meadow	Grassland/Herbaceous	1.63	B	2,188	48.8	0.22	2.30	6.67	0.03	0.31
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	3.34	B	36,945	65.0	0.29	2.05	149.95	0.67	4.73
Impervious as Meadow	Grassland/Herbaceous	0.84	B	1,128	48.8	0.22	2.30	3.44	0.02	0.16
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	2.20	B	2,196	45.0	0.13	1.05	6.17	0.02	0.14
	TOTAL (ACRES):	**8.01**					**TOTALS:**	**166.22**	**0.73**	**5.35**

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	2.89	B	5,005	78.0	0.25	1.25	24.38	0.08	0.39

Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	5.58	B	61,722	65.0	0.29	2.05	250.52	1.12	7.90
Woods (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.06	B	60	45.0	0.13	1.05	0.17	0.00	0.00
	TOTAL (ACRES):	**8.53**					**TOTALS:**	**275.06**	**1.20**	**8.30**

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS): **108.84** **0.46** **2.95**

☑ **Characterize Undetained Areas (for Untreated Stormwater)** *No. Rows:* **3**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	**1.57**	**B**	**61**	**1.279**	**0.48**	**2,719**
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	**0.61**	**B**	**98**	**0.041**	**3.05**	**6,747**
Woods (Good Condition)	**0.06**	**B**	**55**	**1.636**	**0.27**	**60**

Non-Structural BMP Water Quality Credits:

☐ Pervious Undetained Area Credit

☐ Other (attach calculations)

Structural BMP Water Quality Credits:

☑ *Use default BMP Outflows and Median BMP Outflow Concentrations*

DP No.	BMP No.	BMP Name	MRC?	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN
001	1	Dry Extended Detention Basin	Y	6.29	57,290			57,290	-	-	-	-	-	-

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):	0.00	0.00	0.00
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	40.80	0.17	1.08
NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):			
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	40.80	0.17	1.08
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	166.22	0.73	5.35

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

C. Richard Roseberry	
Spreadsheet User Name	Date

General Information

Instructions | *General* | Volume | Rate | Quality

Project Name:	**601 Washington Street Apartments, SP 2**	Application Type:	**PAG-02 NOI**
County:	**Montgomery**	Municipality:	**Whitemarsh Township**
Project Type:	**Multi-Family Housing**	◉ New Project	○ Minor / Major Amendment
Area: *(In Watershed)*	**0.21** acres	Total Earth Disturbance: *(In Watershed)*	**0.21** acres
No. of Post-Construction Discharge Points:	**1**	Start DP Numbering at:	**002**

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
002	0.00	0.00	0.00	0.00	Schuylkill River	WWF, MF	No
Undetained Areas	0.21	0.21	0.18	0.18	Schuylkill River	WWF, MF	
Totals:	**0.21**	**0.21**	**0.18**	**0.18**			

PROJECT SITE MEETS SMALL SITE EXCEPTION - RATE WORKSHEET NOT REQUIRED

Volume Management

Project: 601 Washington Street Apartments, SP 2

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **3.28** inches

Alternative 2-Year / 24-Hour Storm Event _____ inches

Alternative Source: _____

Pre-Construction Conditions: *No. Rows:* **4** ☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Pervious as Meadow	0.05	B	58	1.448	0.37	67
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.32	B	98	0.041	3.05	3,540
Impervious as Meadow	0.08	B	58	1.448	0.37	107
Forested (Good Condition)	0.29	B	55	1.636	0.27	289
TOTAL (ACRES):	**0.74**				**TOTAL (CF):**	**4,004**

Post-Construction Conditions: *No. Rows:* **2**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.18	B	98	0.041	3.05	1,991
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.03	B	61	1.279	0.48	52
TOTAL (ACRES):	**0.21**				**TOTAL (CF):**	**2,043**

NET CHANGE IN VOLUME TO MANAGE (CF): **-1,961**

Non-Structural BMP Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural BMP Volume Credits: *No. Structural BMPs:* *Start BMP Numbering at:*

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegeta-ted?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
												Totals:		

INFILTRATION & ET CREDITS (CF):	
NET CHANGE IN VOLUME TO MANAGE (CF):	**-1,961**
TOTAL CREDITS (CF):	

Water Quality

Project: 601 Washington Street Apartments, SP 2

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Pervious as Meadow	Grassland/Herbaceous	0.05	B	67	48.8	0.22	2.30	0.20	0.00	0.01
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.32	B	3,540	65.0	0.29	2.05	14.37	0.06	0.45
Impervious as Meadow	Grassland/Herbaceous	0.08	B	107	48.8	0.22	2.30	0.33	0.00	0.02
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.29	B	289	45.0	0.13	1.05	0.81	0.00	0.02
	TOTAL (ACRES):	**0.74**					**TOTALS:**	**15.71**	**0.07**	**0.50**

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.18	B	1,991	65.0	0.29	2.05	8.08	0.04	0.25

Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.03	B	52	78.0	0.25	1.25	0.25	0.00	0.00
	TOTAL (ACRES):	**0.21**					**TOTALS:**	**8.33**	**0.04**	**0.26**

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):	**0.00**	**0.00**	**0.00**

☐ **Characterize Undetained Areas (for Untreated Stormwater)**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)

Non-Structural BMP Water Quality Credits:

☐ Pervious Undetained Area Credit

☐ Other (attach calculations)

Structural BMP Water Quality Credits:

☑ *Use default BMP Outflows and Median BMP Outflow Concentrations*

DP No.	BMP No.	BMP Name	MRC?	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):	**0.00**	**0.00**	**0.00**
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	**8.33**	**0.04**	**0.26**
NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):			
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	**8.33**	**0.04**	**0.26**
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	**15.71**	**0.07**	**0.50**

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

C. Richard Roseberry	
Spreadsheet User Name	Date

WITHIN LIMIT OF DISTURBANCE

Modified Worksheet 4. Runoff Volume for 2-YR Storm Event to MRC Basin

PROJECT: **601 WASHINGTON STREET APARTMENTS**
Drainage Area:
2-Year Rainfall: **3.28** **in**

Total Site Area: 6.29 **acres**
Protected Site Area: 0.00 **acres**
Managed Area 6.29 **acres**

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Impervious	B	216,355	4.97	98	0.20	0.04	3.05	54,990
Lawn	B	57,490	1.32	61	6.39	1.28	0.48	2,300
TOTAL:		**273,845**	**6.29**					**57,290**

2-Year Volume (ft3): **57,290**

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P - 0.2S)^2 / (P + 0.8S)$ where
   P = 2-Year Rainfall (in)
   S = (1000/ CN)-10

2. Runoff Volume (CF) = Q x Area x 1/12
   Q = Runoff (in)
   Area = Land use area (sq. ft)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI.
The use of a weighted CN value for volume calculations is not acceptable.

Runoff volume calculation only accounts for drainage areas within the limit of disturbance.

TOTAL DRAINAGE AREA

Modified Worksheet 4. Runoff Volume for 2-YR Storm Event to MRC Basin

PROJECT: **601 WASHINGTON STREET APARTMENTS**
Drainage Area:
2-Year Rainfall: **3.28** **in**

Total Site Area: 6.29 **acres**
Protected Site Area: 0.00 **acres**
Managed Area 6.29 **acres**

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Impervious	B	216,355	4.97	98	0.20	0.04	3.05	54,990
Lawn	B	57,640	1.32	61	6.39	1.28	0.48	2,306
TOTAL:		273,995	6.29					57,296

2-Year Volume (ft3): **57,296**

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P - 0.2S)^2 / (P + 0.8S)$ where
   P = 2-Year Rainfall (in)
   S = (1000/ CN)-10

2. Runoff Volume (CF) = Q x Area x 1/12
   Q = Runoff (in)
   Area = Land use area (sq. ft)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI.
The use of a weighted CN value for volume calculations is not acceptable.

Colliers Engineering & Design

Appendix F | Release Rate Calculations

STUDY POINT 1 (DP 001)

SUB-WATERSHED AREA INFORMATION:

	CN	AREA (AC)	Tc
PRE-PROJECT AREA SP 1:	77	8.76	11 MIN

(Tc PATH SHOWN ON PLANS)

PRE-PROJECT FLOW RATES:

DETERMINE THE PRE-PROJECT ALLOWABLE RELEASE RATES. CALCULATE FLOW RATES USING SUB-WATERSHED AREA CN, TC, AND A IN HYDROCAD. ALLOWABLE RELEASE RATES ARE FROM THE WHITEMARSH TOWNSHIP STORMWATER MANAGEMENT ORDINANCE AND PADEP MRC REQUIREMENTS. RAINFALL DEPTHS ARE FROM NOAA ATLAS 14.

		PRE FLOW RATE	RELEASE RATE	ALLOWABLE FLOW
Q_1	=	11.00 CFS	100%	11.00 CFS
Q_2	=	16.00 CFS	--	11.00 CFS
Q_{10}	=	31.44 CFS	100%	31.44 CFS
Q_{50}	=	51.28 CFS	100%	51.28 CFS
Q_{100}	=	61.25 CFS	100%	61.25 CFS

** POST-PROJECT 2-YR STORM PEAK FLOW SHALL NOT EXCEED THE PRE-PROJECT 1-YR STORM PEAK FLOW.

CALCULATION NOTES:

1) THE STUDY POINT IS IN THE SCHUYLKILL RIVER.

2) ALL SOILS ARE 'B' SOILS.

STUDY POINT 1 (DP 001)

SUB-WATERSHED AREA INFORMATION:

	CN	AREA (AC)	Tc	
POST TO MRC BASIN AREA:	90	6.29	6 MIN	(MINIMUM Tc)
BASIN BYPASS AREA:	67	3.00	6 MIN	(MINIMUM Tc)
TOTAL SUB-WATERSHED AREA:		9.29		

POST-PROJECT WITHOUT DETENTION FLOW RATE:

DETERMINE THE POST DEVELOPMENT FLOW RATES WITHOUT DETENTION. CALCULATE FLOW RATES USING SUB-WATERSHED AREA CN, Tc, AND A IN HYDROCAD. RAINFALL DEPTHS ARE FROM NOAA ATLAS 14.

		POST TO MRC UGD BASIN POST FLOW RATES	BASIN BYPASS POST FLOW RATES
Q_1	=	18.44 CFS	2.06 CFS
Q_2	=	23.51 CFS	3.58 CFS
Q_{10}	=	37.71 CFS	8.72 CFS
Q_{50}	=	54.62 CFS	15.76 CFS
Q_{100}	=	62.86 CFS	19.50 CFS

POST-PROJECT WITH DETENTION FLOW RATE:

DETERMINE THE POST-PROJECT FLOW RATES WITH DETENTION. CALCULATE FLOW RATES USING SUB-WATERSHED AREA CN, Tc, AND A IN HYDROCAD. RAINFALL DEPTHS ARE FROM NOAA ATLAS 14.

		MRC BASIN OUTFLOW		BASIN BYPASS POST FLOW RATES		TOTAL RELEASED	TOTAL POST ALLOWABLE
Q_1	=	0.57 CFS	+	2.06 CFS	=	2.10 CFS	11.00 CFS
Q_2	=	1.71 CFS	+	3.58 CFS	=	3.63 CFS	11.00 CFS
Q_{10}	=	10.15 CFS	+	8.72 CFS	=	15.35 CFS	31.44 CFS
Q_{50}	=	22.14 CFS	+	15.76 CFS	=	34.73 CFS	51.28 CFS
Q_{100}	=	23.83 CFS	+	19.50 CFS	=	41.54 CFS	61.25 CFS

THE TOTAL RELEASED IS BASED ON THE ADDITION OF BASIN OUTFLOW & BASIN BYPASS FLOW HYDROGRAPHS AND NOT AN ADDITION OF THE PEAK FLOW RATES. THE TOTAL RELEASED FOR THE 2-YEAR THROUGH 100-YEAR STORMS IS LESS THAN THE TOTAL POST ALLOWABLE. THE POST-PROJECT 2-YEAR FLOW IS LESS THAN THE PRE-PROJECT 1-YEAR FLOW.

CALCULATION NOTES:

1) THE STUDY POINT IS IN THE SCHUYLKILL RIVER.

2) ALL SOILS ARE 'B' SOILS.

STUDY POINT 2 (DP 003)

SUB-WATERSHED AREA INFORMATION:

	CN	AREA (AC)	Tc	
PRE-PROJECT AREA SP 2:	79	0.74	6 MIN	(MINIMUM Tc)
POST-PROJECT AREA SP 2:	93	0.21	6 MIN	(MINIMUM Tc)

* Tc PATHS SHOWN ON PLANS

PRE-PROJECT WITHOUT DETENTION FLOW RATE:

DETERMINE THE PRE-PROJECT ALLOWABLE RELEASE RATES. CALCULATE FLOW RATES USING SUB-WATERSHED AREA CN, TC, AND A IN HYDROCAD. ALLOWABLE RELEASE RATES ARE FROM THE WHITEMARSH TOWNSHIP STORMWATER MANAGEMENT ORDINANCE AND PADEP MRC REQUIREMENTS. RAINFALL DEPTHS ARE FROM NOAA ATLAS 14.

		PRE FLOW RATES	RELEASE RATE	ALLOWABLE FLOW
Q_2	=	1.80 CFS	100%	1.80 CFS
Q_{10}	=	3.36 CFS	100%	3.36 CFS
Q_{50}	=	5.34 CFS	100%	5.34 CFS
Q_{100}	=	6.33 CFS	100%	6.33 CFS

POST-PROJECT WITHOUT DETENTION FLOW RATE:

DETERMINE THE POST DEVELOPMENT FLOW RATES. CALCULATE FLOW RATES USING SUB-WATERSHED AREA CN, Tc, AND A IN HYDROCAD. RAINFALL DEPTHS ARE FROM NOAA ATLAS 14.

		POST FLOW RATES	ALLOWABLE FLOW
Q_2	=	0.86 CFS	1.80 CFS
Q_{10}	=	1.33 CFS	3.36 CFS
Q_{50}	=	1.88 CFS	5.34 CFS
Q_{100}	=	2.15 CFS	6.33 CFS

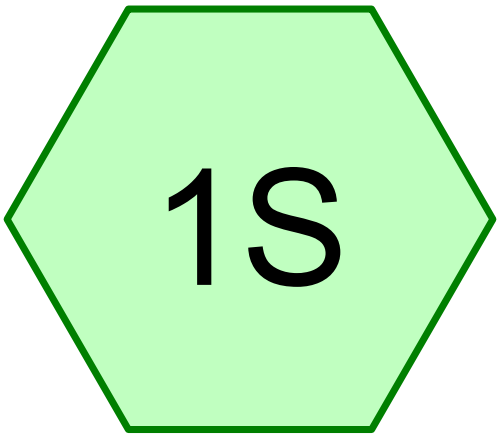
THE TOTAL RELEASED FOR THE 2-YEAR THROUGH 100-YEAR STORMS IS LESS THAN THE TOTAL POST ALLOWABLE.

CALCULATION NOTES:

1) THE STUDY POINT IS IN THE ROADSIDE DITCH ON THE NORTH SIDE OF WASHINGTON STREET.

2) ALL SOILS ARE 'B' SOILS.

Study Point 1: Pre-Project Release Rate Calculations



SP1 Pre-Project

Subcat Reach Pond Link

Routing Diagram for Pre Project SP1 South
Prepared by Colliers Engineering & Design, Printed 2/24/2022
HydroCAD® 10.10-6a s/n 08841 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.63	61	>75% Grass cover, Good, HSG B (1S)
4.18	98	Paved parking, HSG B (1S)
2.95	55	Woods, Good, HSG B (1S)
8.76	**77**	**TOTAL AREA**

Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP1 Pre-Project Runoff Area=8.76 ac 47.72% Impervious Runoff Depth=0.89"
Flow Length=830' Slope=0.0100 '/' Tc=11.3 min CN=77 Runoff=11.00 cfs 0.648 af

Total Runoff Area = 8.76 ac Runoff Volume = 0.648 af Average Runoff Depth = 0.89"
52.28% Pervious = 4.58 ac 47.72% Impervious = 4.18 ac

Summary for Subcatchment 1S: SP1 Pre-Project

[47] Hint: Peak is 331% of capacity of segment #7

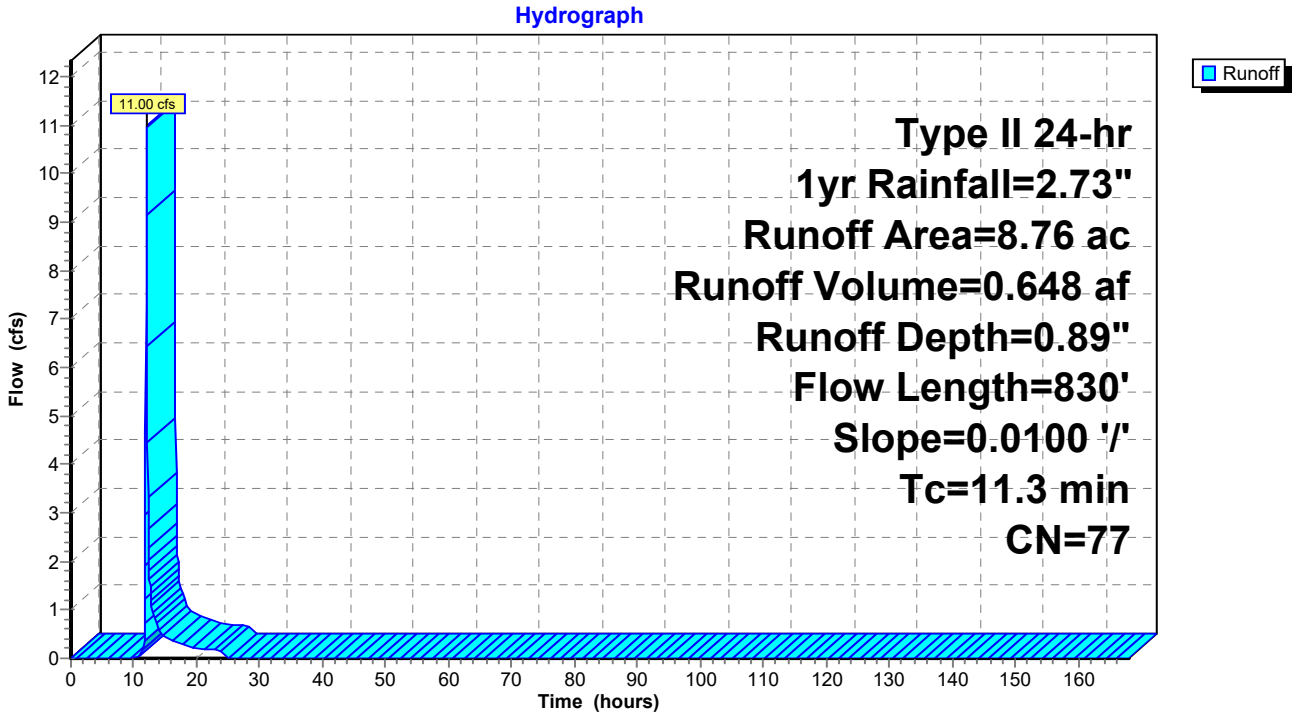
Runoff = 11.00 cfs @ 12.04 hrs, Volume= 0.648 af, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.73"

Area (ac)	CN	Description
4.18	98	Paved parking, HSG B
1.63	61	>75% Grass cover, Good, HSG B
2.95	55	Woods, Good, HSG B
8.76	77	Weighted Average
4.58		52.28% Pervious Area
4.18		47.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.28"
0.3	30	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	120	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.2	120	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	70	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	100	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.8	290	0.0100	0.83	3.33	**Channel Flow,** Area= 4.0 sf Perim= 16.3' r= 0.25' n= 0.070 Medium-dense brush, winter
11.3	830	Total			

Subcatchment 1S: SP1 Pre-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP1 Pre-Project Runoff Area=8.76 ac 47.72% Impervious Runoff Depth=1.27"
Flow Length=830' Slope=0.0100 '/' Tc=11.3 min CN=77 Runoff=16.00 cfs 0.927 af

Total Runoff Area = 8.76 ac Runoff Volume = 0.927 af Average Runoff Depth = 1.27"
52.28% Pervious = 4.58 ac 47.72% Impervious = 4.18 ac

Summary for Subcatchment 1S: SP1 Pre-Project

[47] Hint: Peak is 481% of capacity of segment #7

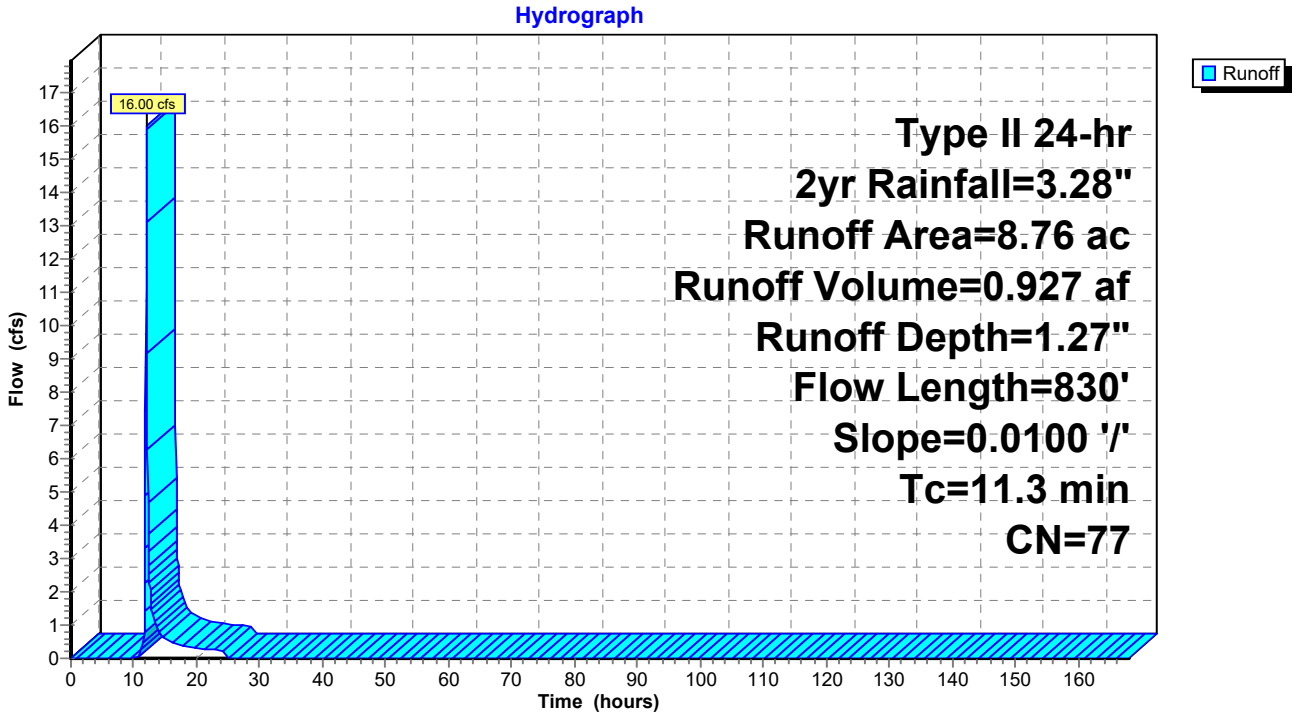
Runoff = 16.00 cfs @ 12.04 hrs, Volume= 0.927 af, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=3.28"

Area (ac)	CN	Description
4.18	98	Paved parking, HSG B
1.63	61	>75% Grass cover, Good, HSG B
2.95	55	Woods, Good, HSG B
8.76	77	Weighted Average
4.58		52.28% Pervious Area
4.18		47.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.28"
0.3	30	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	120	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.2	120	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	70	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	100	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.8	290	0.0100	0.83	3.33	**Channel Flow,** Area= 4.0 sf Perim= 16.3' r= 0.25' n= 0.070 Medium-dense brush, winter
11.3	830	Total			

Subcatchment 1S: SP1 Pre-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP1 Pre-Project Runoff Area=8.76 ac 47.72% Impervious Runoff Depth=2.47"
Flow Length=830' Slope=0.0100 '/' Tc=11.3 min CN=77 Runoff=31.44 cfs 1.805 af

Total Runoff Area = 8.76 ac Runoff Volume = 1.805 af Average Runoff Depth = 2.47"
52.28% Pervious = 4.58 ac 47.72% Impervious = 4.18 ac

Summary for Subcatchment 1S: SP1 Pre-Project

[47] Hint: Peak is 945% of capacity of segment #7

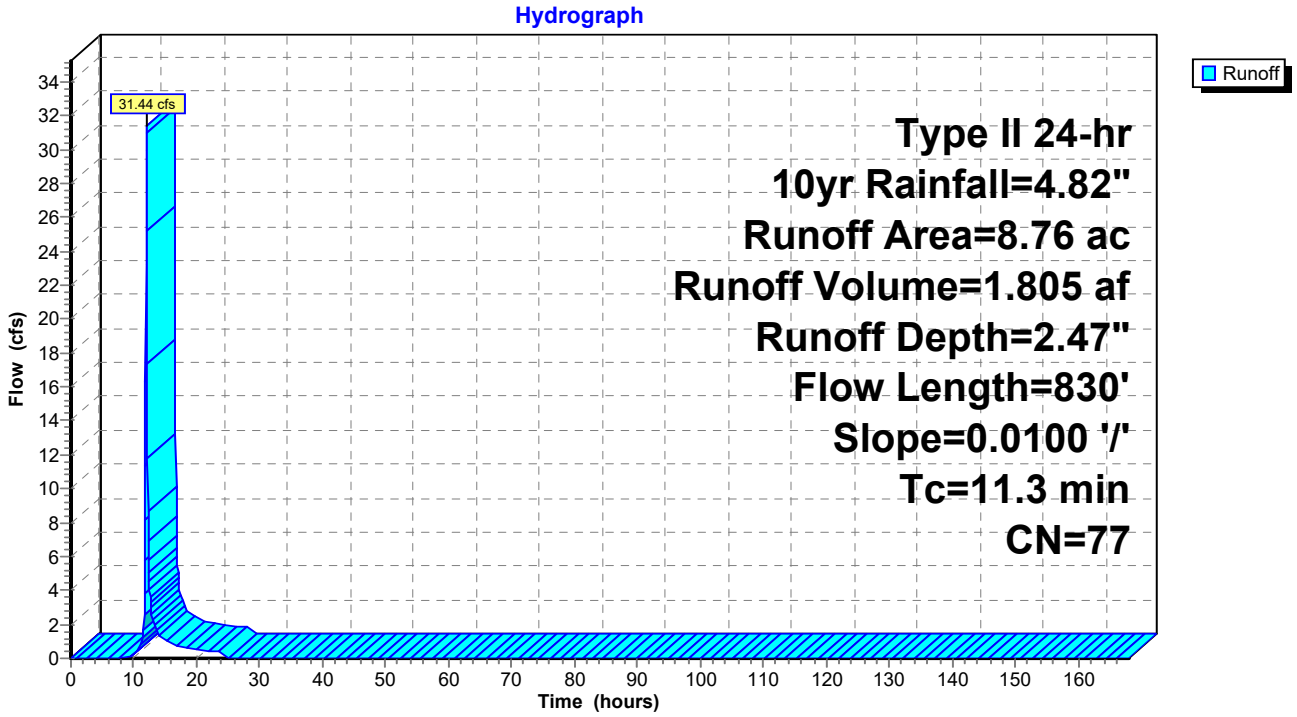
Runoff = 31.44 cfs @ 12.03 hrs, Volume= 1.805 af, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=4.82"

Area (ac)	CN	Description
4.18	98	Paved parking, HSG B
1.63	61	>75% Grass cover, Good, HSG B
2.95	55	Woods, Good, HSG B
8.76	77	Weighted Average
4.58		52.28% Pervious Area
4.18		47.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.28"
0.3	30	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	120	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.2	120	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	70	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	100	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.8	290	0.0100	0.83	3.33	**Channel Flow,** Area= 4.0 sf Perim= 16.3' r= 0.25' n= 0.070 Medium-dense brush, winter
11.3	830	Total			

Subcatchment 1S: SP1 Pre-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP1 Pre-Project Runoff Area=8.76 ac 47.72% Impervious Runoff Depth=4.07"
Flow Length=830' Slope=0.0100 '/' Tc=11.3 min CN=77 Runoff=51.28 cfs 2.971 af

Total Runoff Area = 8.76 ac Runoff Volume = 2.971 af Average Runoff Depth = 4.07"
52.28% Pervious = 4.58 ac 47.72% Impervious = 4.18 ac

Summary for Subcatchment 1S: SP1 Pre-Project

[47] Hint: Peak is 1541% of capacity of segment #7

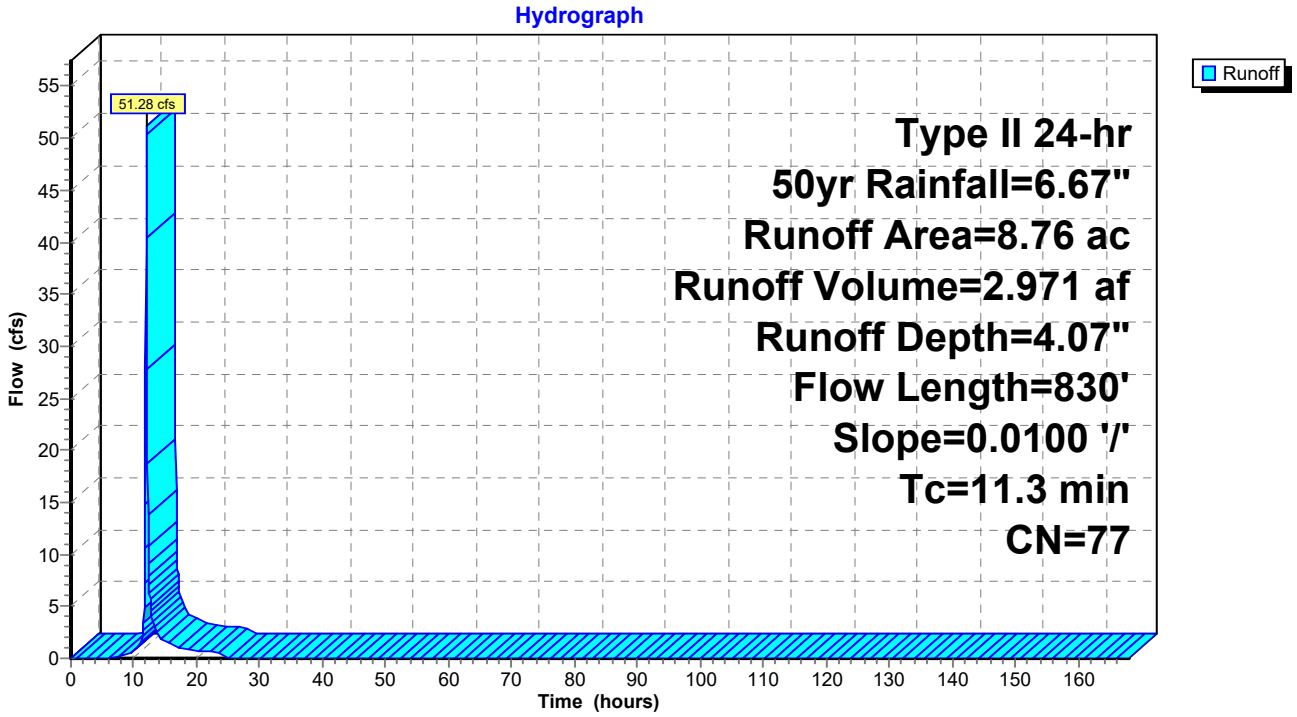
Runoff = 51.28 cfs @ 12.03 hrs, Volume= 2.971 af, Depth= 4.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=6.67"

Area (ac)	CN	Description
4.18	98	Paved parking, HSG B
1.63	61	>75% Grass cover, Good, HSG B
2.95	55	Woods, Good, HSG B
8.76	77	Weighted Average
4.58		52.28% Pervious Area
4.18		47.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.28"
0.3	30	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	120	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.2	120	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	70	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	100	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.8	290	0.0100	0.83	3.33	**Channel Flow,** Area= 4.0 sf Perim= 16.3' r= 0.25' n= 0.070 Medium-dense brush, winter
11.3	830	Total			

Subcatchment 1S: SP1 Pre-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP1 Pre-Project Runoff Area=8.76 ac 47.72% Impervious Runoff Depth=4.89"
Flow Length=830' Slope=0.0100 '/' Tc=11.3 min CN=77 Runoff=61.25 cfs 3.570 af

Total Runoff Area = 8.76 ac Runoff Volume = 3.570 af Average Runoff Depth = 4.89"
52.28% Pervious = 4.58 ac 47.72% Impervious = 4.18 ac

Summary for Subcatchment 1S: SP1 Pre-Project

[47] Hint: Peak is 1840% of capacity of segment #7

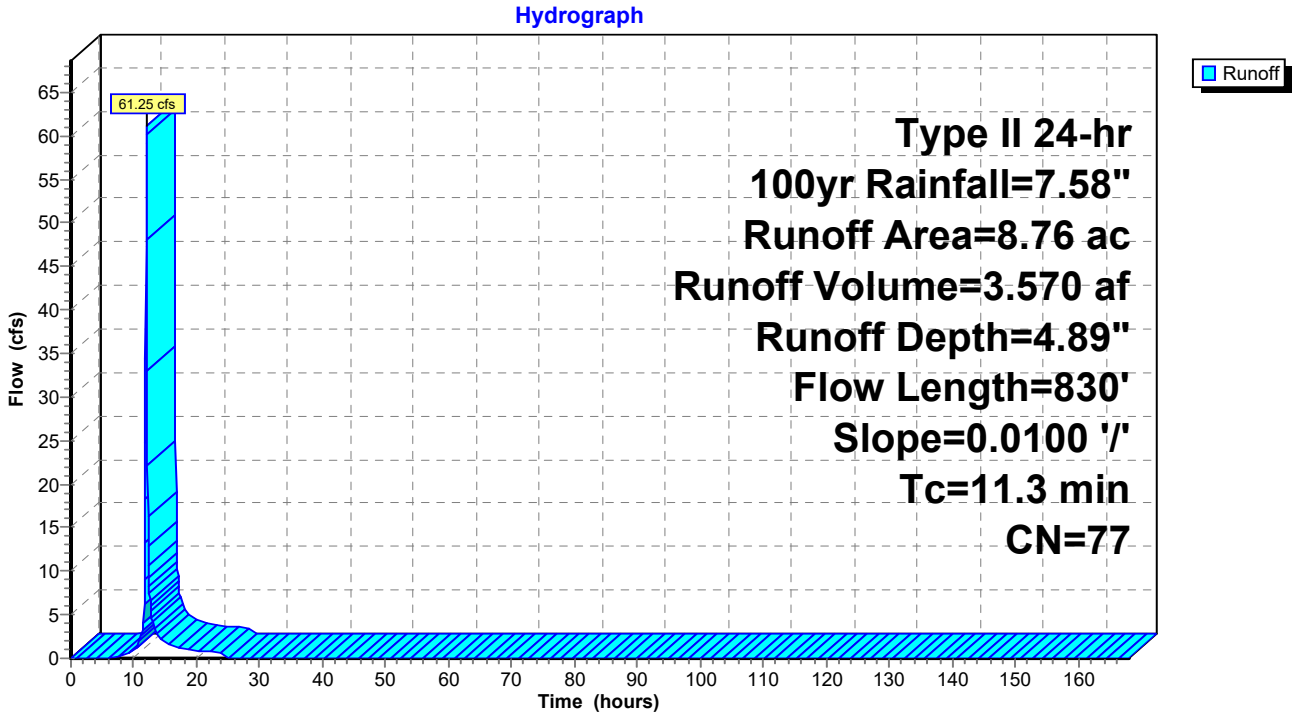
Runoff = 61.25 cfs @ 12.03 hrs, Volume= 3.570 af, Depth= 4.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=7.58"

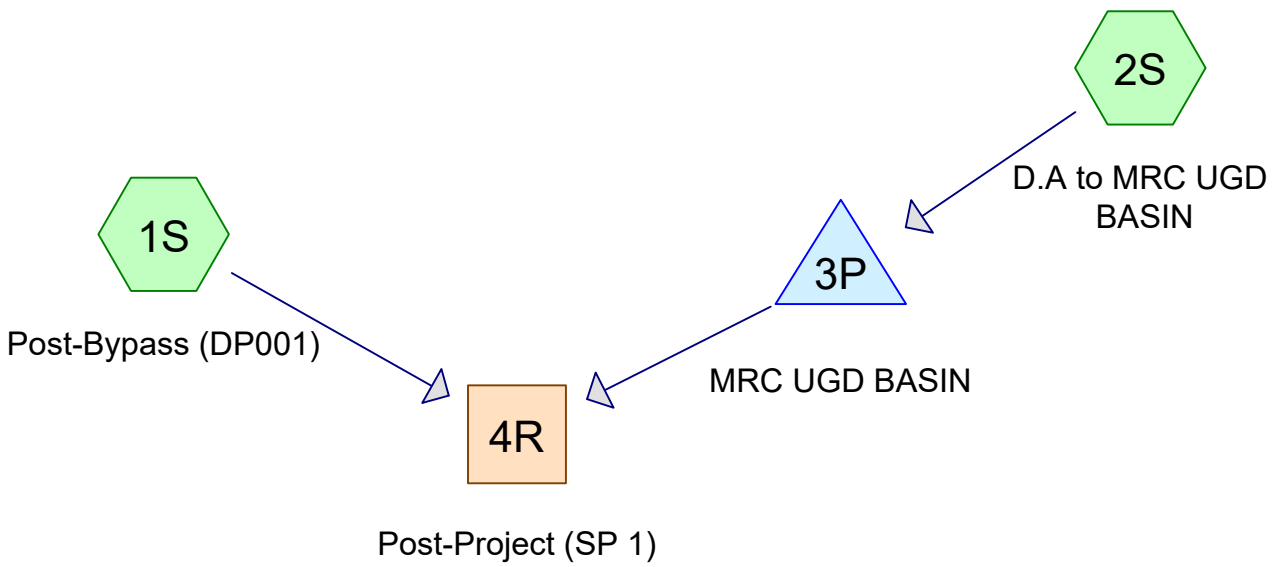
Area (ac)	CN	Description
4.18	98	Paved parking, HSG B
1.63	61	>75% Grass cover, Good, HSG B
2.95	55	Woods, Good, HSG B
8.76	77	Weighted Average
4.58		52.28% Pervious Area
4.18		47.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0100	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.28"
0.3	30	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	120	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.2	120	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	70	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.8	100	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.8	290	0.0100	0.83	3.33	**Channel Flow,** Area= 4.0 sf Perim= 16.3' r= 0.25' n= 0.070 Medium-dense brush, winter
11.3	830	Total			

Subcatchment 1S: SP1 Pre-Project



Study Point 1: Post-Project Release Rate Calculations



Subcat Reach Pond Link

Routing Diagram for Post Project SP1
Prepared by Colliers Engineering & Design, Printed 5/31/2022
HydroCAD® 10.10-6a s/n 08841 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.90	61	>75% Grass cover, Good, HSG B (1S, 2S)
0.61	98	Paved parking, HSG A (1S)
4.97	98	Paved parking, HSG B (2S)
0.81	55	Woods, Good, HSG B (1S)
9.29	**83**	**TOTAL AREA**

Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Post-Bypass(DP001) Runoff Area=3.00 ac 20.33% Impervious Runoff Depth=0.46"
Tc=6.0 min CN=67 Runoff=2.06 cfs 0.114 af

Subcatchment2S: D.A to MRC UGD BASIN Runoff Area=6.29 ac 79.01% Impervious Runoff Depth=1.74"
Tc=6.0 min CN=90 Runoff=18.44 cfs 0.911 af

Pond 3P: MRC UGD BASIN Peak Elev=45.31' Storage=38,605 cf Inflow=18.44 cfs 0.911 af
Outflow=0.57 cfs 0.634 af

Reach 4R: Post-Project(SP 1) Inflow=2.10 cfs 0.748 af
Outflow=2.10 cfs 0.748 af

Total Runoff Area = 9.29 ac Runoff Volume = 1.025 af Average Runoff Depth = 1.32"
39.94% Pervious = 3.71 ac 60.06% Impervious = 5.58 ac

Summary for Subcatchment 1S: Post-Bypass (DP001)

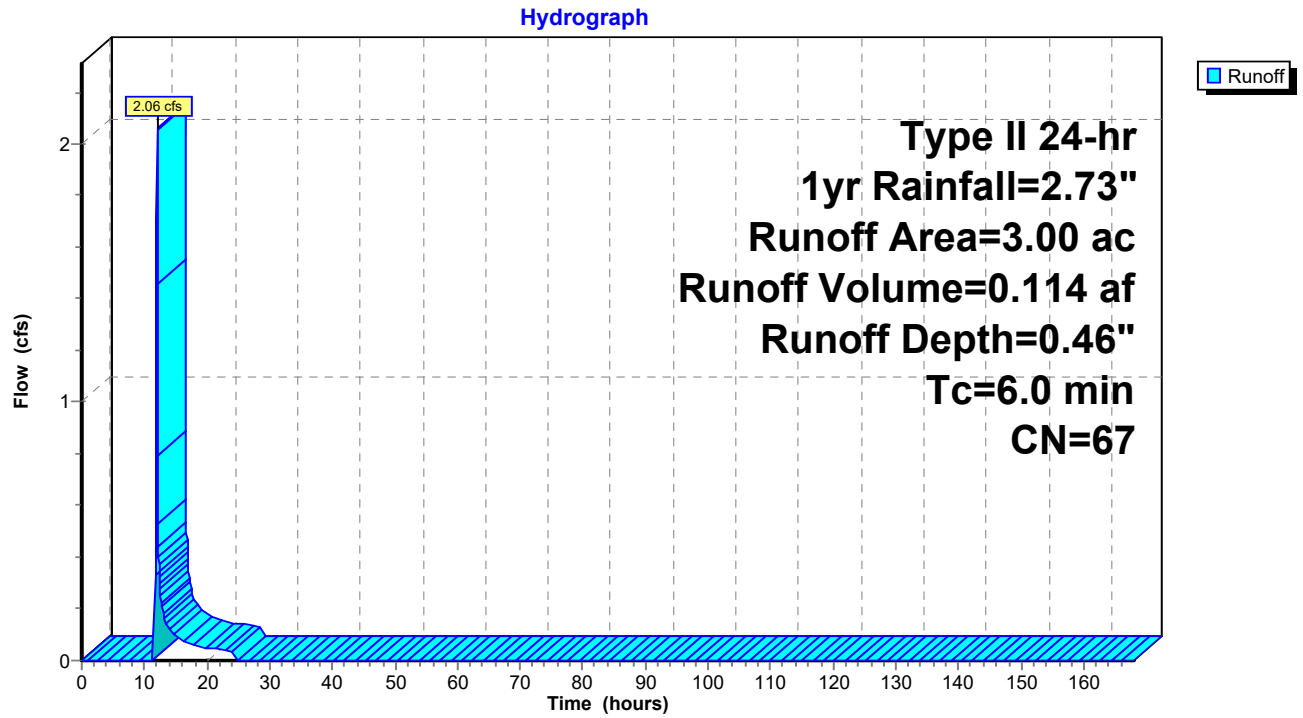
Runoff = 2.06 cfs @ 11.99 hrs, Volume= 0.114 af, Depth= 0.46"
Routed to Reach 4R : Post-Project (SP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.73"

Area (ac)	CN	Description
0.61	98	Paved parking, HSG A
1.58	61	>75% Grass cover, Good, HSG B
0.81	55	Woods, Good, HSG B
3.00	67	Weighted Average
2.39		79.67% Pervious Area
0.61		20.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: Post-Bypass (DP001)



Summary for Subcatchment 2S: D.A to MRC UGD BASIN

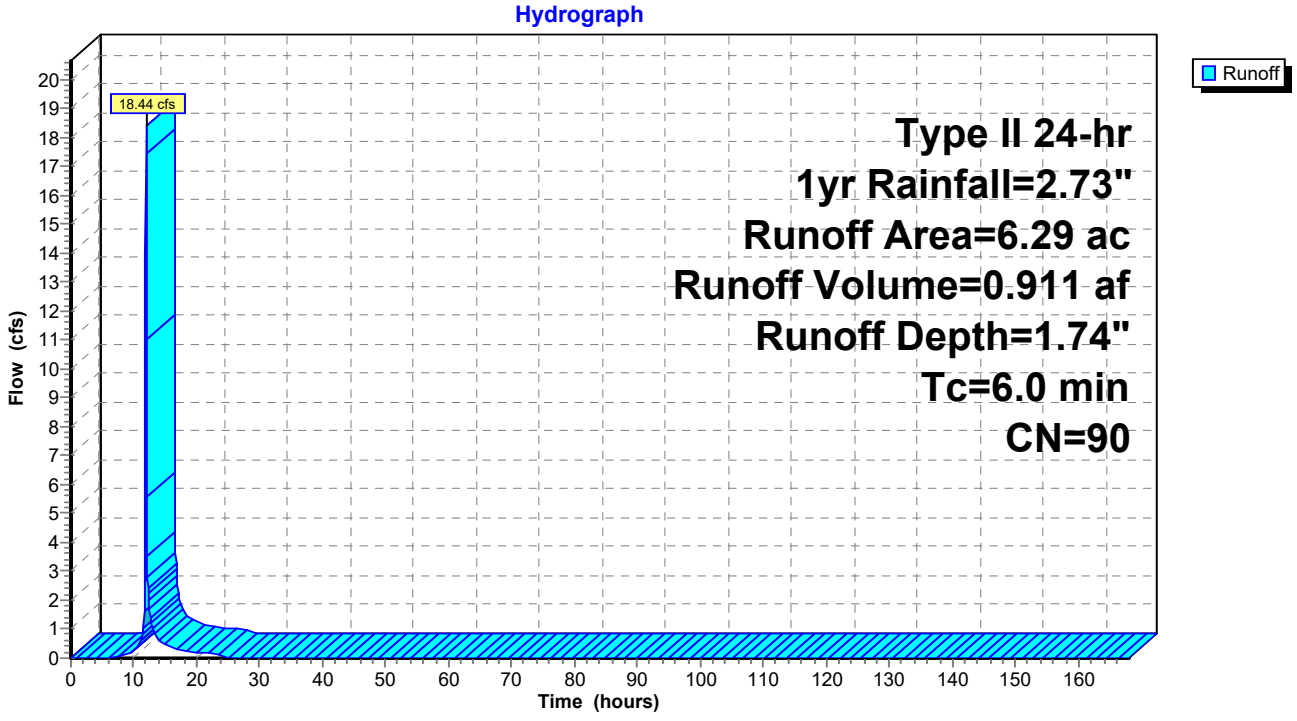
Runoff = 18.44 cfs @ 11.97 hrs, Volume= 0.911 af, Depth= 1.74"
Routed to Pond 3P : MRC UGD BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.73"

Area (ac)	CN	Description
4.97	98	Paved parking, HSG B
1.32	61	>75% Grass cover, Good, HSG B
6.29	90	Weighted Average
1.32		20.99% Pervious Area
4.97		79.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: D.A to MRC UGD BASIN



Summary for Pond 3P: MRC UGD BASIN

Inflow Area = 6.29 ac, 79.01% Impervious, Inflow Depth = 1.74" for 1yr event
Inflow = 18.44 cfs @ 11.97 hrs, Volume= 0.911 af
Outflow = 0.57 cfs @ 14.08 hrs, Volume= 0.634 af, Atten= 97%, Lag= 126.7 min
Primary = 0.57 cfs @ 14.08 hrs, Volume= 0.634 af
Routed to Reach 4R : Post-Project (SP 1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Starting Elev= 44.10' Surf.Area= 25,351 sf Storage= 11,279 cf
Peak Elev= 45.31' @ 14.08 hrs Surf.Area= 25,351 sf Storage= 38,605 cf (27,326 cf above start)

Plug-Flow detention time= 2,479.8 min calculated for 0.375 af (41% of inflow)
Center-of-Mass det. time= 1,459.7 min (2,269.8 - 810.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	43.60'	0 cf	**47.23'W x 536.77'L x 4.50'H Field A** 114,081 cf Overall - 114,081 cf Embedded = 0 cf x 40.0% Voids
#2A	43.60'	90,231 cf	**StormTrap ST2 SingleTrap 4-0** x 136 Inside #1 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 136 Chambers in 4 Rows 33.92' x 523.46' Core + 6.66' Border = 47.23' x 536.77' System
		90,231 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	43.60'	**24.0" Round Culvert** L= 45.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.60' / 42.95' S= 0.0142 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	44.60'	**2.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	45.20'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.57 cfs @ 14.08 hrs HW=45.31' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.57 cfs of 12.75 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.08 cfs @ 3.82 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.48 cfs @ 1.09 fps)

Pond 3P: MRC UGD BASIN - Chamber Wizard Field A

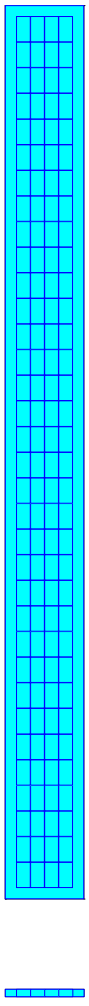
Chamber Model = StormTrap ST2 SingleTrap 4-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf
Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf

34 Chambers/Row x 15.40' Long = 523.46' Row Length +79.9" Border x 2 = 536.77' Base Length
4 Rows x 101.7" Wide + 79.9" Side Border x 2 = 47.23' Base Width
54.0" Chamber Height = 4.50' Field Height

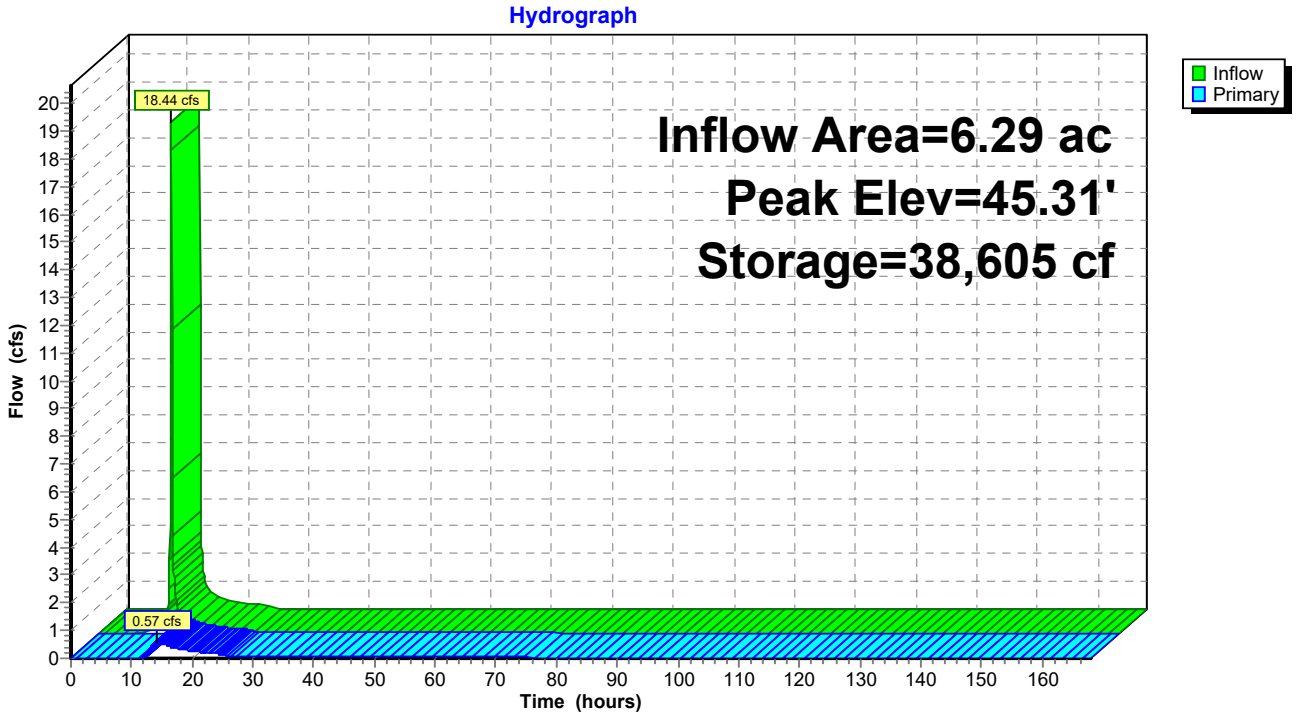
136 Chambers x 470.3 cf + 26,273.7 cf Border = 90,230.6 cf Chamber Storage
136 Chambers x 587.4 cf + 34,187.7 cf Border = 114,080.6 cf Displacement

Chamber Storage = 90,230.6 cf = 2.071 af
Overall Storage Efficiency = 79.1%
Overall System Size = 536.77' x 47.23' x 4.50'

136 Chambers (plus border)
4,225.2 cy Field



Pond 3P: MRC UGD BASIN



Stage-Discharge for Pond 3P: MRC UGD BASIN

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
43.60	0.00	46.20	12.56
43.65	0.00	46.25	13.47
43.70	0.00	46.30	14.39
43.75	0.00	46.35	15.34
43.80	0.00	46.40	16.30
43.85	0.00	46.45	17.28
43.90	0.00	46.50	18.27
43.95	0.00	46.55	19.28
44.00	0.00	46.60	20.30
44.05	0.00	46.65	21.33
44.10	0.00	46.70	21.92
44.15	0.00	46.75	22.18
44.20	0.00	46.80	22.44
44.25	0.00	46.85	22.69
44.30	0.00	46.90	22.94
44.35	0.00	46.95	23.19
44.40	0.00	47.00	23.43
44.45	0.00	47.05	23.68
44.50	0.00	47.10	23.92
44.55	0.00	47.15	24.16
44.60	0.00	47.20	24.39
44.65	0.00	47.25	24.62
44.70	0.01	47.30	24.86
44.75	0.03	47.35	25.08
44.80	0.04	47.40	25.31
44.85	0.04	47.45	25.54
44.90	0.05	47.50	25.76
44.95	0.05	47.55	25.98
45.00	0.06	47.60	26.20
45.05	0.06	47.65	26.42
45.10	0.07	47.70	26.63
45.15	0.07	47.75	26.85
45.20	0.08	47.80	27.06
45.25	0.22	47.85	27.27
45.30	0.49	47.90	27.48
45.35	0.84	47.95	27.69
45.40	1.25	48.00	27.89
45.45	1.71	48.05	28.10
45.50	2.21	48.10	**28.30**
45.55	2.76		
45.60	3.34		
45.65	3.96		
45.70	4.61		
45.75	5.30		
45.80	6.01		
45.85	6.75		
45.90	7.51		
45.95	8.30		
46.00	9.11		
46.05	9.94		
46.10	10.79		
46.15	11.66		

Stage-Area-Storage for Pond 3P: MRC UGD BASIN

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
43.60	0	46.20	58,650
43.65	1,128	46.25	59,778
43.70	2,256	46.30	60,906
43.75	3,384	46.35	62,034
43.80	4,512	46.40	63,161
43.85	5,639	46.45	64,289
43.90	6,767	46.50	65,417
43.95	7,895	46.55	66,545
44.00	9,023	46.60	67,673
44.05	10,151	46.65	68,801
44.10	11,279	46.70	69,929
44.15	12,407	46.75	71,057
44.20	13,535	46.80	72,184
44.25	14,662	46.85	73,312
44.30	15,790	46.90	74,440
44.35	16,918	46.95	75,568
44.40	18,046	47.00	76,696
44.45	19,174	47.05	77,824
44.50	20,302	47.10	78,952
44.55	21,430	47.15	80,080
44.60	22,558	47.20	81,208
44.65	23,686	47.25	82,335
44.70	24,813	47.30	83,463
44.75	25,941	47.35	84,591
44.80	27,069	47.40	85,719
44.85	28,197	47.45	86,847
44.90	29,325	47.50	87,975
44.95	30,453	47.55	89,103
45.00	31,581	47.60	**90,231**
45.05	32,709	47.65	**90,231**
45.10	33,836	47.70	90,231
45.15	34,964	47.75	90,231
45.20	36,092	47.80	90,231
45.25	37,220	47.85	90,231
45.30	38,348	47.90	90,231
45.35	39,476	47.95	90,231
45.40	40,604	48.00	90,231
45.45	41,732	48.05	90,231
45.50	42,860	48.10	90,231
45.55	43,987		
45.60	45,115		
45.65	46,243		
45.70	47,371		
45.75	48,499		
45.80	49,627		
45.85	50,755		
45.90	51,883		
45.95	53,010		
46.00	54,138		
46.05	55,266		
46.10	56,394		
46.15	57,522		

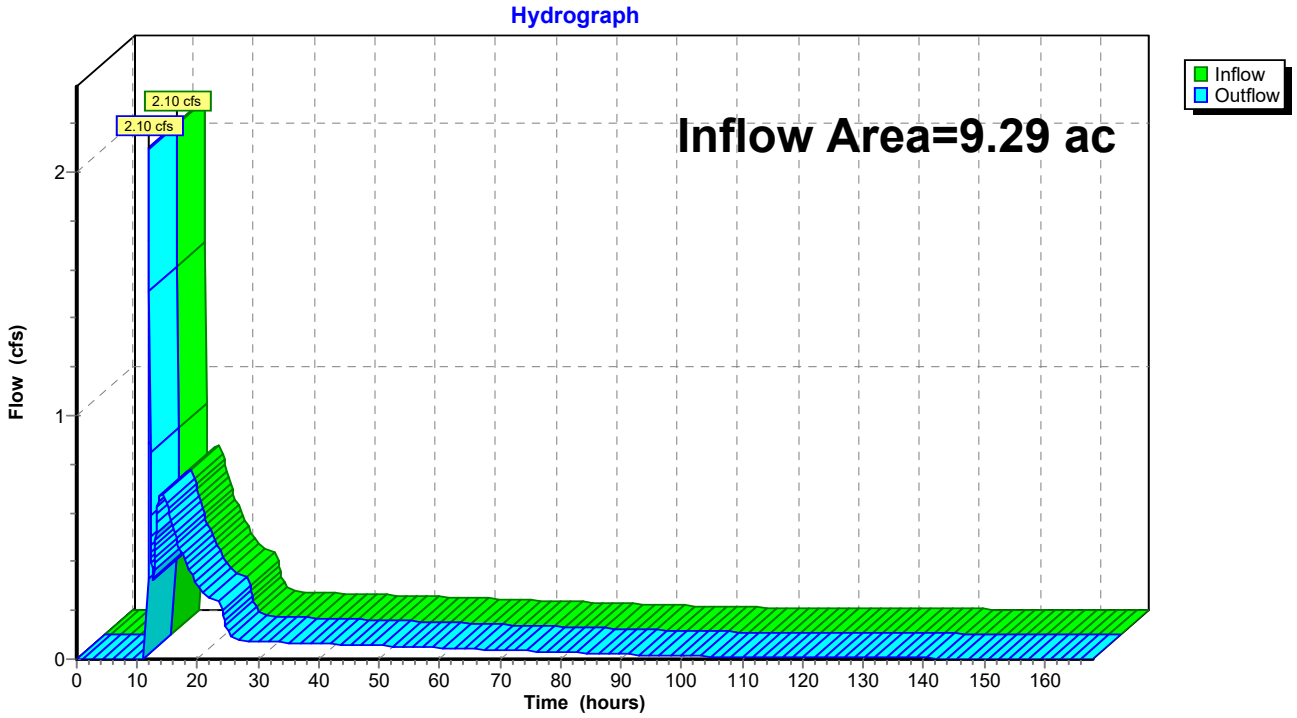
Summary for Reach 4R: Post-Project (SP 1)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.29 ac, 60.06% Impervious, Inflow Depth > 0.97" for 1yr event
Inflow = 2.10 cfs @ 11.99 hrs, Volume= 0.748 af
Outflow = 2.10 cfs @ 11.99 hrs, Volume= 0.748 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs

Reach 4R: Post-Project (SP 1)



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Post-Bypass(DP001) Runoff Area=3.00 ac 20.33% Impervious Runoff Depth=0.73"
Tc=6.0 min CN=67 Runoff=3.58 cfs 0.182 af

Subcatchment2S: D.A to MRC UGD BASIN Runoff Area=6.29 ac 79.01% Impervious Runoff Depth=2.24"
Tc=6.0 min CN=90 Runoff=23.51 cfs 1.176 af

Pond 3P: MRC UGD BASIN Peak Elev=45.45' Storage=41,731 cf Inflow=23.51 cfs 1.176 af
Outflow=1.71 cfs 0.899 af

Reach 4R: Post-Project(SP 1) Inflow=3.63 cfs 1.081 af
Outflow=3.63 cfs 1.081 af

Total Runoff Area = 9.29 ac Runoff Volume = 1.358 af Average Runoff Depth = 1.75"
39.94% Pervious = 3.71 ac 60.06% Impervious = 5.58 ac

Summary for Subcatchment 1S: Post-Bypass (DP001)

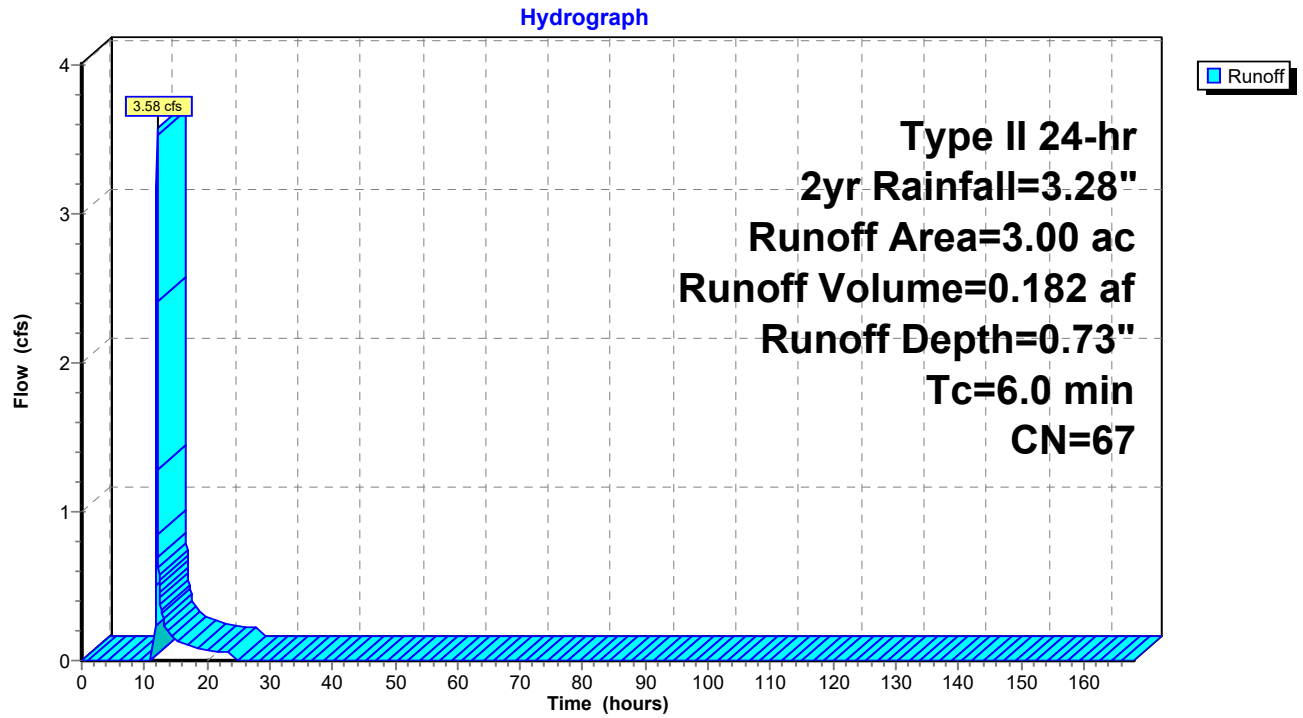
Runoff = 3.58 cfs @ 11.99 hrs, Volume= 0.182 af, Depth= 0.73"
Routed to Reach 4R : Post-Project (SP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=3.28"

Area (ac)	CN	Description
0.61	98	Paved parking, HSG A
1.58	61	>75% Grass cover, Good, HSG B
0.81	55	Woods, Good, HSG B
3.00	67	Weighted Average
2.39		79.67% Pervious Area
0.61		20.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: Post-Bypass (DP001)



Summary for Subcatchment 2S: D.A to MRC UGD BASIN

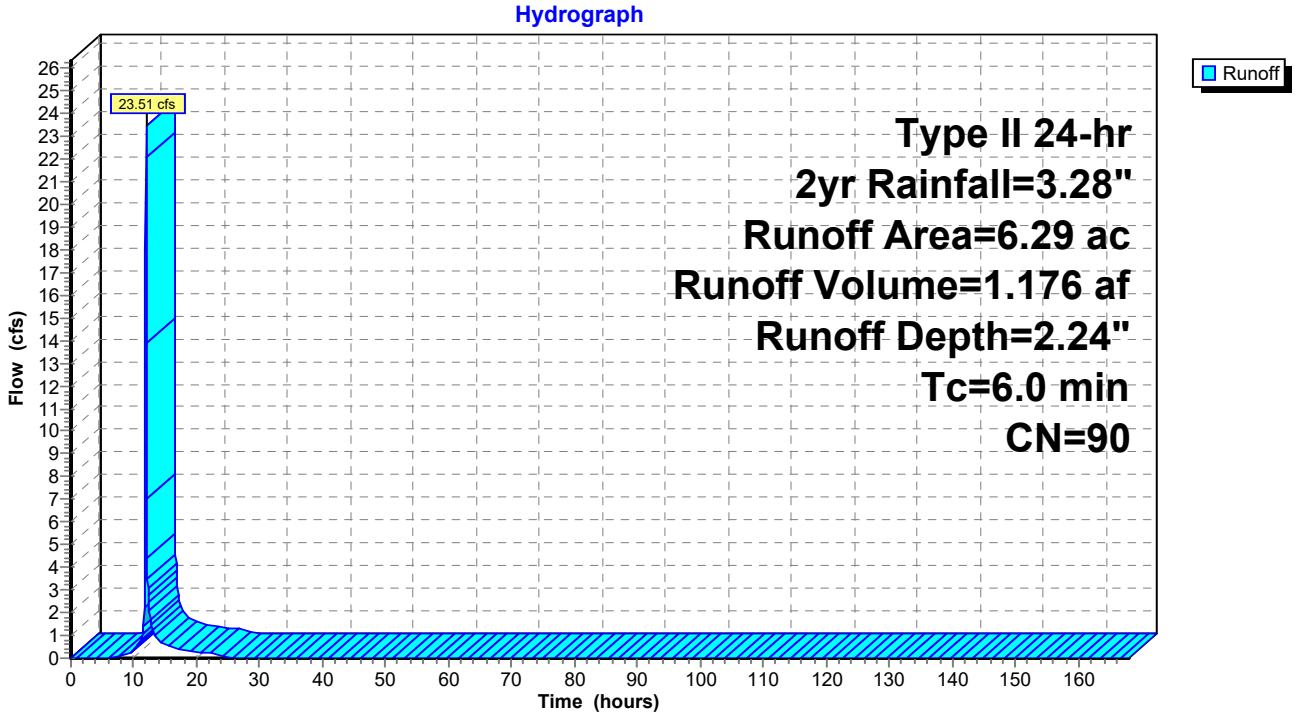
Runoff = 23.51 cfs @ 11.97 hrs, Volume= 1.176 af, Depth= 2.24"
Routed to Pond 3P : MRC UGD BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=3.28"

Area (ac)	CN	Description
4.97	98	Paved parking, HSG B
1.32	61	>75% Grass cover, Good, HSG B
6.29	90	Weighted Average
1.32		20.99% Pervious Area
4.97		79.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: D.A to MRC UGD BASIN



Summary for Pond 3P: MRC UGD BASIN

Inflow Area = 6.29 ac, 79.01% Impervious, Inflow Depth = 2.24" for 2yr event
Inflow = 23.51 cfs @ 11.97 hrs, Volume= 1.176 af
Outflow = 1.71 cfs @ 12.58 hrs, Volume= 0.899 af, Atten= 93%, Lag= 36.9 min
Primary = 1.71 cfs @ 12.58 hrs, Volume= 0.899 af
Routed to Reach 4R : Post-Project (SP 1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Starting Elev= 44.10' Surf.Area= 25,351 sf Storage= 11,279 cf
Peak Elev= 45.45' @ 12.58 hrs Surf.Area= 25,351 sf Storage= 41,731 cf (30,452 cf above start)

Plug-Flow detention time= 1,601.9 min calculated for 0.640 af (54% of inflow)
Center-of-Mass det. time= 1,059.3 min (1,862.1 - 802.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	43.60'	0 cf	**47.23'W x 536.77'L x 4.50'H Field A** 114,081 cf Overall - 114,081 cf Embedded = 0 cf x 40.0% Voids
#2A	43.60'	90,231 cf	**StormTrap ST2 SingleTrap 4-0** x 136 Inside #1 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 136 Chambers in 4 Rows 33.92' x 523.46' Core + 6.66' Border = 47.23' x 536.77' System
		90,231 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	43.60'	**24.0" Round Culvert** L= 45.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.60' / 42.95' S= 0.0142 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	44.60'	**2.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	45.20'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=1.71 cfs @ 12.58 hrs HW=45.45' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.71 cfs of 14.05 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.09 cfs @ 4.22 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Weir Controls 1.61 cfs @ 1.63 fps)

Pond 3P: MRC UGD BASIN - Chamber Wizard Field A

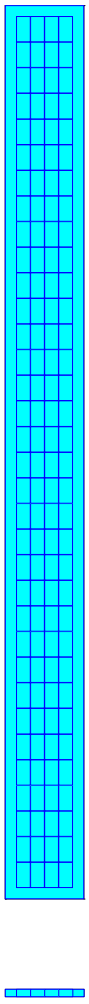
Chamber Model = StormTrap ST2 SingleTrap 4-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf
Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf

34 Chambers/Row x 15.40' Long = 523.46' Row Length +79.9" Border x 2 = 536.77' Base Length
4 Rows x 101.7" Wide + 79.9" Side Border x 2 = 47.23' Base Width
54.0" Chamber Height = 4.50' Field Height

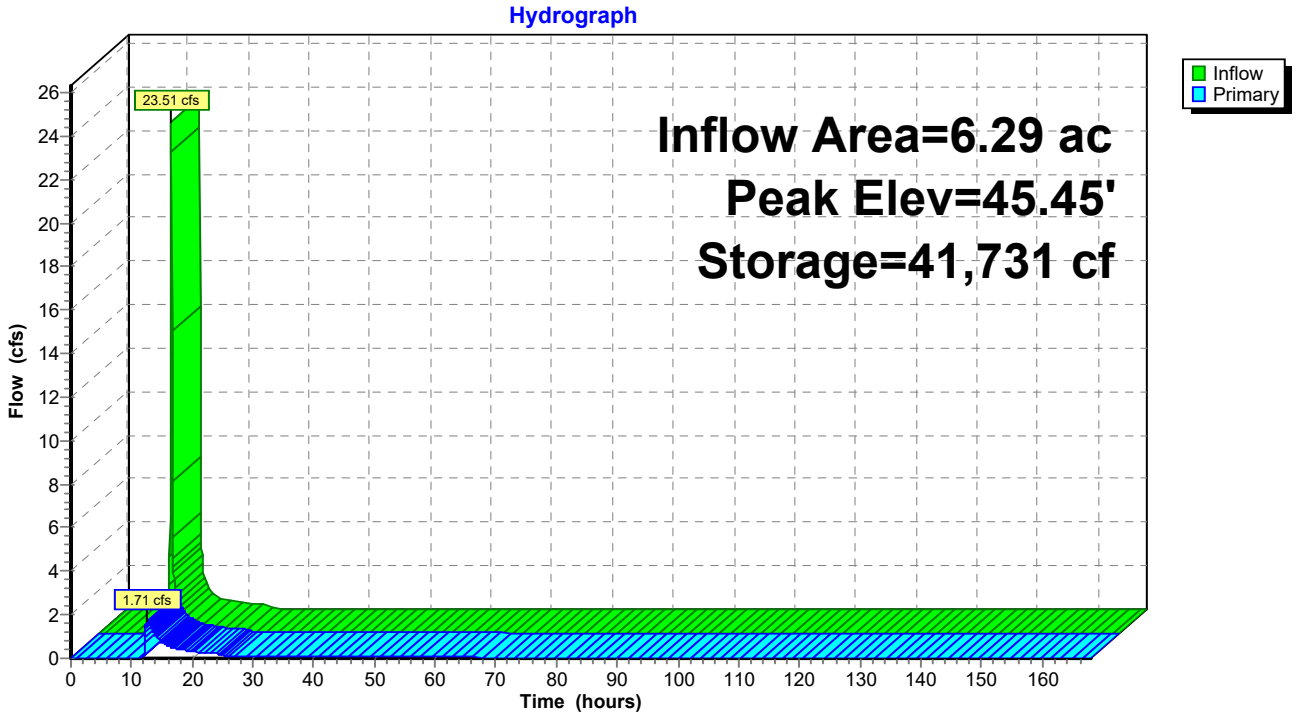
136 Chambers x 470.3 cf + 26,273.7 cf Border = 90,230.6 cf Chamber Storage
136 Chambers x 587.4 cf + 34,187.7 cf Border = 114,080.6 cf Displacement

Chamber Storage = 90,230.6 cf = 2.071 af
Overall Storage Efficiency = 79.1%
Overall System Size = 536.77' x 47.23' x 4.50'

136 Chambers (plus border)
4,225.2 cy Field



Pond 3P: MRC UGD BASIN



Stage-Discharge for Pond 3P: MRC UGD BASIN

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
43.60	0.00	46.20	12.56
43.65	0.00	46.25	13.47
43.70	0.00	46.30	14.39
43.75	0.00	46.35	15.34
43.80	0.00	46.40	16.30
43.85	0.00	46.45	17.28
43.90	0.00	46.50	18.27
43.95	0.00	46.55	19.28
44.00	0.00	46.60	20.30
44.05	0.00	46.65	21.33
44.10	0.00	46.70	21.92
44.15	0.00	46.75	22.18
44.20	0.00	46.80	22.44
44.25	0.00	46.85	22.69
44.30	0.00	46.90	22.94
44.35	0.00	46.95	23.19
44.40	0.00	47.00	23.43
44.45	0.00	47.05	23.68
44.50	0.00	47.10	23.92
44.55	0.00	47.15	24.16
44.60	0.00	47.20	24.39
44.65	0.00	47.25	24.62
44.70	0.01	47.30	24.86
44.75	0.03	47.35	25.08
44.80	0.04	47.40	25.31
44.85	0.04	47.45	25.54
44.90	0.05	47.50	25.76
44.95	0.05	47.55	25.98
45.00	0.06	47.60	26.20
45.05	0.06	47.65	26.42
45.10	0.07	47.70	26.63
45.15	0.07	47.75	26.85
45.20	0.08	47.80	27.06
45.25	0.22	47.85	27.27
45.30	0.49	47.90	27.48
45.35	0.84	47.95	27.69
45.40	1.25	48.00	27.89
45.45	1.71	48.05	28.10
45.50	2.21	48.10	**28.30**
45.55	2.76		
45.60	3.34		
45.65	3.96		
45.70	4.61		
45.75	5.30		
45.80	6.01		
45.85	6.75		
45.90	7.51		
45.95	8.30		
46.00	9.11		
46.05	9.94		
46.10	10.79		
46.15	11.66		

Stage-Area-Storage for Pond 3P: MRC UGD BASIN

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
43.60	0	46.20	58,650
43.65	1,128	46.25	59,778
43.70	2,256	46.30	60,906
43.75	3,384	46.35	62,034
43.80	4,512	46.40	63,161
43.85	5,639	46.45	64,289
43.90	6,767	46.50	65,417
43.95	7,895	46.55	66,545
44.00	9,023	46.60	67,673
44.05	10,151	46.65	68,801
44.10	11,279	46.70	69,929
44.15	12,407	46.75	71,057
44.20	13,535	46.80	72,184
44.25	14,662	46.85	73,312
44.30	15,790	46.90	74,440
44.35	16,918	46.95	75,568
44.40	18,046	47.00	76,696
44.45	19,174	47.05	77,824
44.50	20,302	47.10	78,952
44.55	21,430	47.15	80,080
44.60	22,558	47.20	81,208
44.65	23,686	47.25	82,335
44.70	24,813	47.30	83,463
44.75	25,941	47.35	84,591
44.80	27,069	47.40	85,719
44.85	28,197	47.45	86,847
44.90	29,325	47.50	87,975
44.95	30,453	47.55	89,103
45.00	31,581	47.60	**90,231**
45.05	32,709	47.65	**90,231**
45.10	33,836	47.70	90,231
45.15	34,964	47.75	90,231
45.20	36,092	47.80	90,231
45.25	37,220	47.85	90,231
45.30	38,348	47.90	90,231
45.35	39,476	47.95	90,231
45.40	40,604	48.00	90,231
45.45	41,732	48.05	90,231
45.50	42,860	48.10	90,231
45.55	43,987		
45.60	45,115		
45.65	46,243		
45.70	47,371		
45.75	48,499		
45.80	49,627		
45.85	50,755		
45.90	51,883		
45.95	53,010		
46.00	54,138		
46.05	55,266		
46.10	56,394		
46.15	57,522		

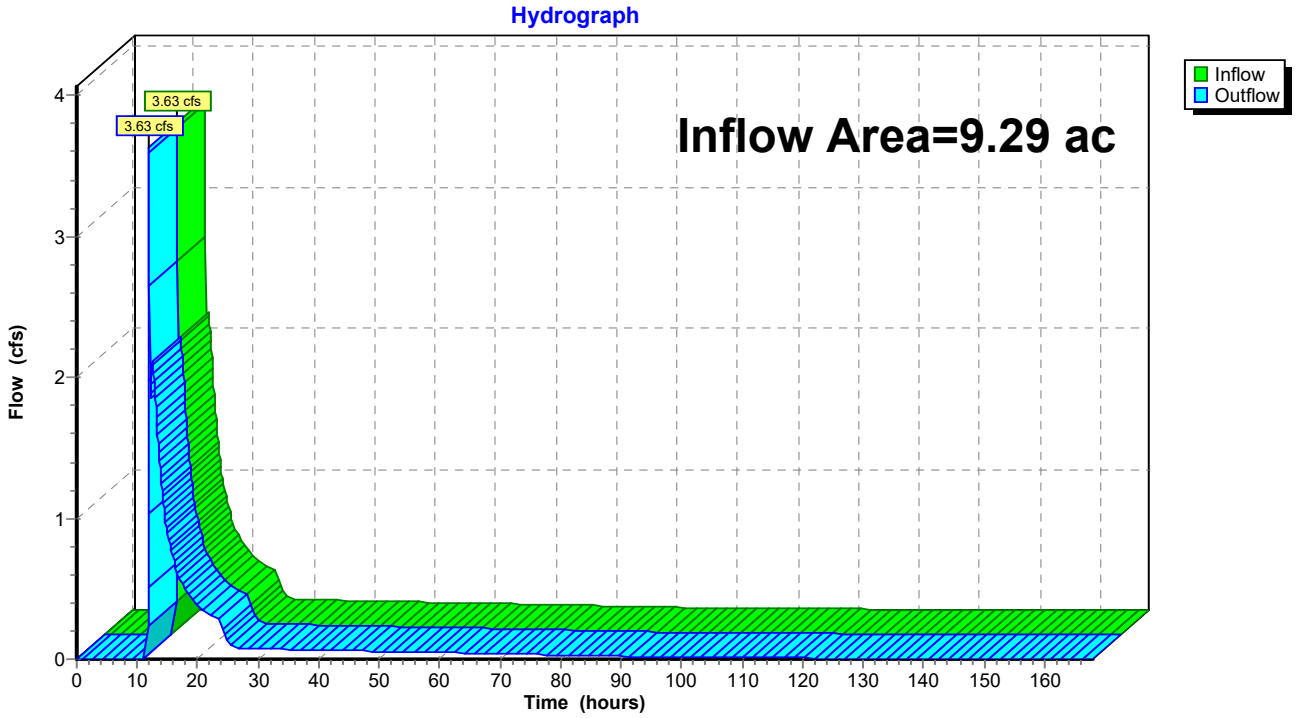
Summary for Reach 4R: Post-Project (SP 1)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.29 ac, 60.06% Impervious, Inflow Depth > 1.40" for 2yr event
Inflow = 3.63 cfs @ 11.99 hrs, Volume= 1.081 af
Outflow = 3.63 cfs @ 11.99 hrs, Volume= 1.081 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs

Reach 4R: Post-Project (SP 1)



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Post-Bypass(DP001) Runoff Area=3.00 ac 20.33% Impervious Runoff Depth=1.68"
Tc=6.0 min CN=67 Runoff=8.72 cfs 0.420 af

Subcatchment2S: D.A to MRC UGD BASIN Runoff Area=6.29 ac 79.01% Impervious Runoff Depth=3.70"
Tc=6.0 min CN=90 Runoff=37.71 cfs 1.941 af

Pond 3P: MRC UGD BASIN Peak Elev=46.06' Storage=55,554 cf Inflow=37.71 cfs 1.941 af
Outflow=10.15 cfs 1.664 af

Reach 4R: Post-Project(SP 1) Inflow=15.35 cfs 2.084 af
Outflow=15.35 cfs 2.084 af

Total Runoff Area = 9.29 ac Runoff Volume = 2.361 af Average Runoff Depth = 3.05"
39.94% Pervious = 3.71 ac 60.06% Impervious = 5.58 ac

Summary for Subcatchment 1S: Post-Bypass (DP001)

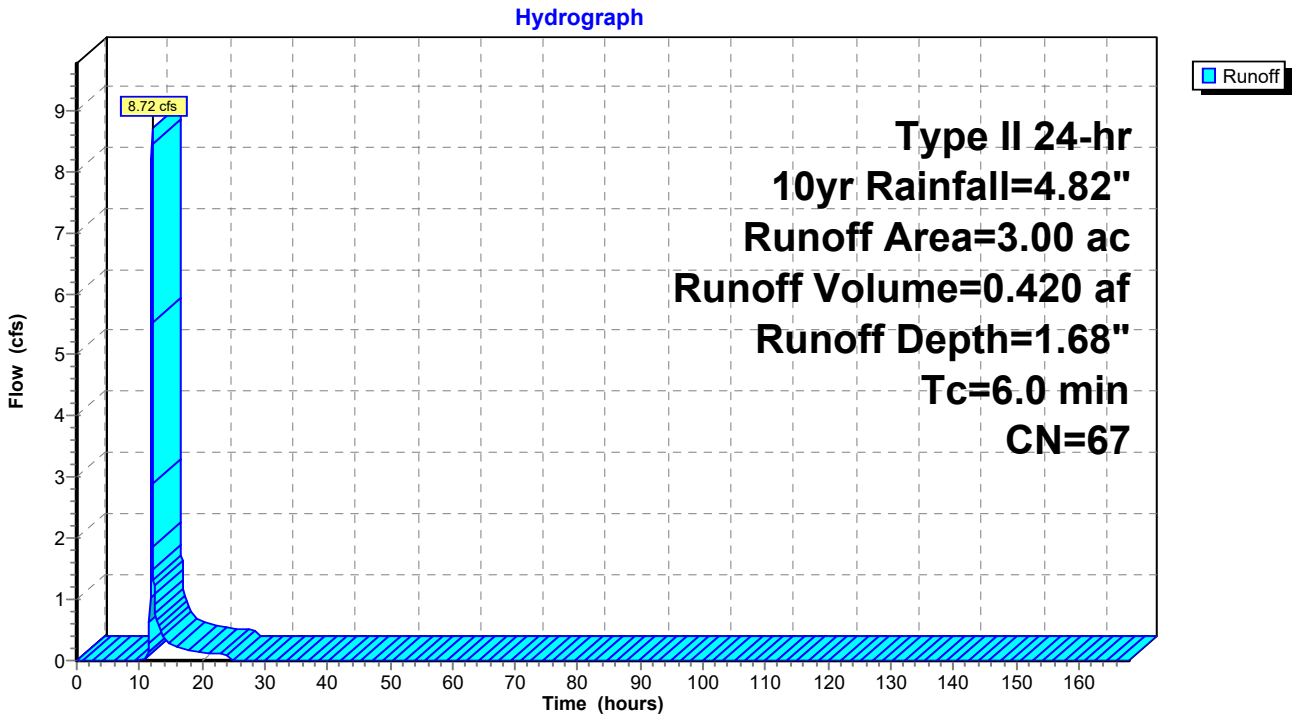
Runoff = 8.72 cfs @ 11.98 hrs, Volume= 0.420 af, Depth= 1.68"
Routed to Reach 4R : Post-Project (SP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=4.82"

Area (ac)	CN	Description
0.61	98	Paved parking, HSG A
1.58	61	>75% Grass cover, Good, HSG B
0.81	55	Woods, Good, HSG B
3.00	67	Weighted Average
2.39		79.67% Pervious Area
0.61		20.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: Post-Bypass (DP001)



Summary for Subcatchment 2S: D.A to MRC UGD BASIN

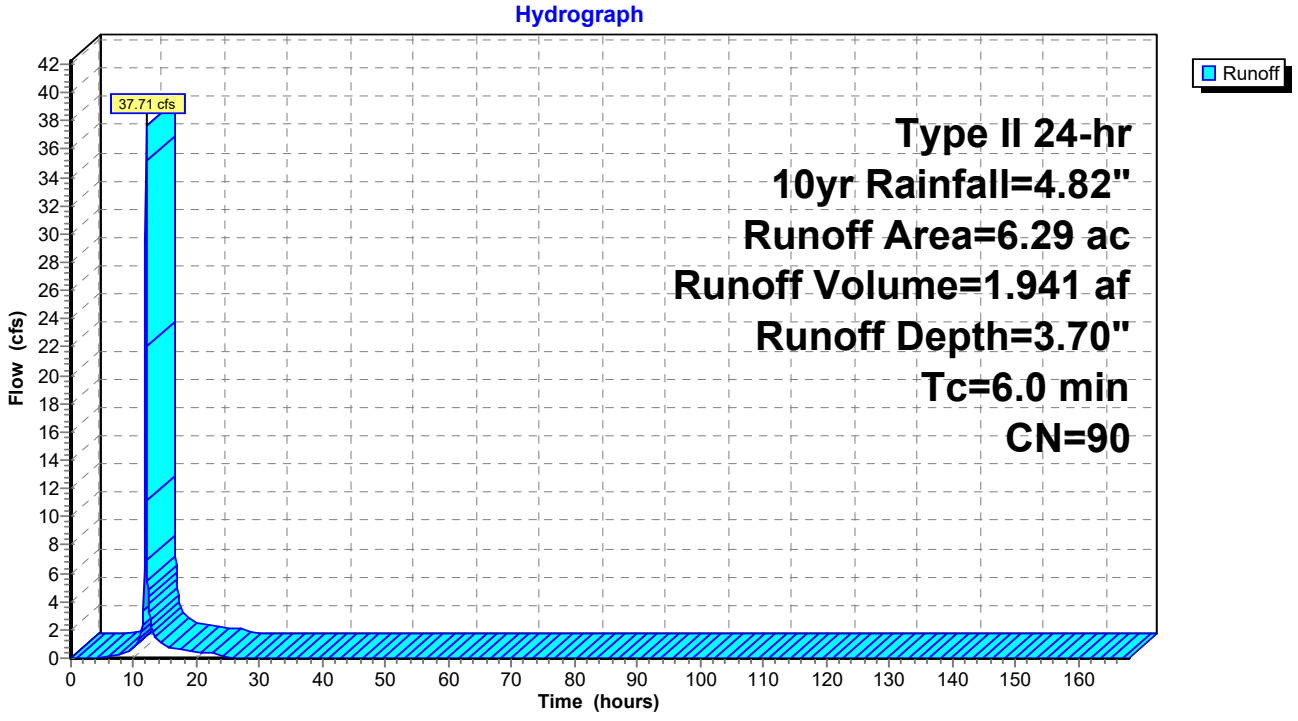
Runoff = 37.71 cfs @ 11.96 hrs, Volume= 1.941 af, Depth= 3.70"
Routed to Pond 3P : MRC UGD BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=4.82"

Area (ac)	CN	Description
4.97	98	Paved parking, HSG B
1.32	61	>75% Grass cover, Good, HSG B
6.29	90	Weighted Average
1.32		20.99% Pervious Area
4.97		79.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: D.A to MRC UGD BASIN



Summary for Pond 3P: MRC UGD BASIN

Inflow Area = 6.29 ac, 79.01% Impervious, Inflow Depth = 3.70" for 10yr event
Inflow = 37.71 cfs @ 11.96 hrs, Volume= 1.941 af
Outflow = 10.15 cfs @ 12.12 hrs, Volume= 1.664 af, Atten= 73%, Lag= 9.2 min
Primary = 10.15 cfs @ 12.12 hrs, Volume= 1.664 af
Routed to Reach 4R : Post-Project (SP 1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Starting Elev= 44.10' Surf.Area= 25,351 sf Storage= 11,279 cf
Peak Elev= 46.06' @ 12.12 hrs Surf.Area= 25,351 sf Storage= 55,554 cf (44,275 cf above start)

Plug-Flow detention time= 820.8 min calculated for 1.405 af (72% of inflow)
Center-of-Mass det. time= 607.0 min (1,395.8 - 788.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	43.60'	0 cf	**47.23'W x 536.77'L x 4.50'H Field A** 114,081 cf Overall - 114,081 cf Embedded = 0 cf x 40.0% Voids
#2A	43.60'	90,231 cf	**StormTrap ST2 SingleTrap 4-0** x 136 Inside #1 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 136 Chambers in 4 Rows 33.92' x 523.46' Core + 6.66' Border = 47.23' x 536.77' System
		90,231 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	43.60'	**24.0" Round Culvert** L= 45.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.60' / 42.95' S= 0.0142 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	44.60'	**2.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	45.20'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=10.03 cfs @ 12.12 hrs HW=46.06' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 10.03 cfs of 18.25 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.12 cfs @ 5.64 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Weir Controls 9.90 cfs @ 3.02 fps)

Pond 3P: MRC UGD BASIN - Chamber Wizard Field A

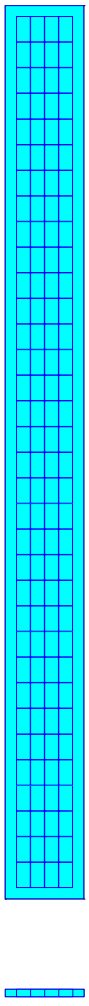
Chamber Model = StormTrap ST2 SingleTrap 4-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf
Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf

34 Chambers/Row x 15.40' Long = 523.46' Row Length +79.9" Border x 2 = 536.77' Base Length
4 Rows x 101.7" Wide + 79.9" Side Border x 2 = 47.23' Base Width
54.0" Chamber Height = 4.50' Field Height

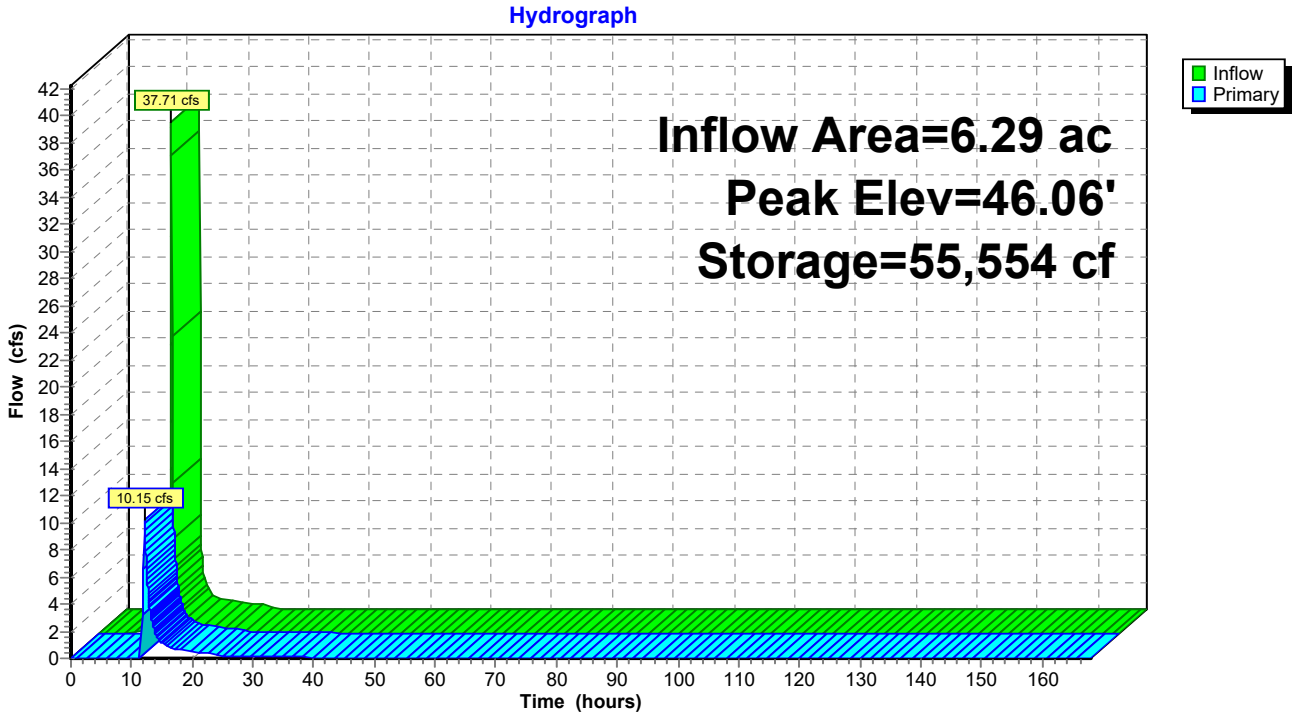
136 Chambers x 470.3 cf + 26,273.7 cf Border = 90,230.6 cf Chamber Storage
136 Chambers x 587.4 cf + 34,187.7 cf Border = 114,080.6 cf Displacement

Chamber Storage = 90,230.6 cf = 2.071 af
Overall Storage Efficiency = 79.1%
Overall System Size = 536.77' x 47.23' x 4.50'

136 Chambers (plus border)
4,225.2 cy Field



Pond 3P: MRC UGD BASIN



Stage-Discharge for Pond 3P: MRC UGD BASIN

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
43.60	0.00	46.20	12.56
43.65	0.00	46.25	13.47
43.70	0.00	46.30	14.39
43.75	0.00	46.35	15.34
43.80	0.00	46.40	16.30
43.85	0.00	46.45	17.28
43.90	0.00	46.50	18.27
43.95	0.00	46.55	19.28
44.00	0.00	46.60	20.30
44.05	0.00	46.65	21.33
44.10	0.00	46.70	21.92
44.15	0.00	46.75	22.18
44.20	0.00	46.80	22.44
44.25	0.00	46.85	22.69
44.30	0.00	46.90	22.94
44.35	0.00	46.95	23.19
44.40	0.00	47.00	23.43
44.45	0.00	47.05	23.68
44.50	0.00	47.10	23.92
44.55	0.00	47.15	24.16
44.60	0.00	47.20	24.39
44.65	0.00	47.25	24.62
44.70	0.01	47.30	24.86
44.75	0.03	47.35	25.08
44.80	0.04	47.40	25.31
44.85	0.04	47.45	25.54
44.90	0.05	47.50	25.76
44.95	0.05	47.55	25.98
45.00	0.06	47.60	26.20
45.05	0.06	47.65	26.42
45.10	0.07	47.70	26.63
45.15	0.07	47.75	26.85
45.20	0.08	47.80	27.06
45.25	0.22	47.85	27.27
45.30	0.49	47.90	27.48
45.35	0.84	47.95	27.69
45.40	1.25	48.00	27.89
45.45	1.71	48.05	28.10
45.50	2.21	48.10	**28.30**
45.55	2.76		
45.60	3.34		
45.65	3.96		
45.70	4.61		
45.75	5.30		
45.80	6.01		
45.85	6.75		
45.90	7.51		
45.95	8.30		
46.00	9.11		
46.05	9.94		
46.10	10.79		
46.15	11.66		

Stage-Area-Storage for Pond 3P: MRC UGD BASIN

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
43.60	0	46.20	58,650
43.65	1,128	46.25	59,778
43.70	2,256	46.30	60,906
43.75	3,384	46.35	62,034
43.80	4,512	46.40	63,161
43.85	5,639	46.45	64,289
43.90	6,767	46.50	65,417
43.95	7,895	46.55	66,545
44.00	9,023	46.60	67,673
44.05	10,151	46.65	68,801
44.10	11,279	46.70	69,929
44.15	12,407	46.75	71,057
44.20	13,535	46.80	72,184
44.25	14,662	46.85	73,312
44.30	15,790	46.90	74,440
44.35	16,918	46.95	75,568
44.40	18,046	47.00	76,696
44.45	19,174	47.05	77,824
44.50	20,302	47.10	78,952
44.55	21,430	47.15	80,080
44.60	22,558	47.20	81,208
44.65	23,686	47.25	82,335
44.70	24,813	47.30	83,463
44.75	25,941	47.35	84,591
44.80	27,069	47.40	85,719
44.85	28,197	47.45	86,847
44.90	29,325	47.50	87,975
44.95	30,453	47.55	89,103
45.00	31,581	47.60	**90,231**
45.05	32,709	47.65	**90,231**
45.10	33,836	47.70	90,231
45.15	34,964	47.75	90,231
45.20	36,092	47.80	90,231
45.25	37,220	47.85	90,231
45.30	38,348	47.90	90,231
45.35	39,476	47.95	90,231
45.40	40,604	48.00	90,231
45.45	41,732	48.05	90,231
45.50	42,860	48.10	90,231
45.55	43,987		
45.60	45,115		
45.65	46,243		
45.70	47,371		
45.75	48,499		
45.80	49,627		
45.85	50,755		
45.90	51,883		
45.95	53,010		
46.00	54,138		
46.05	55,266		
46.10	56,394		
46.15	57,522		

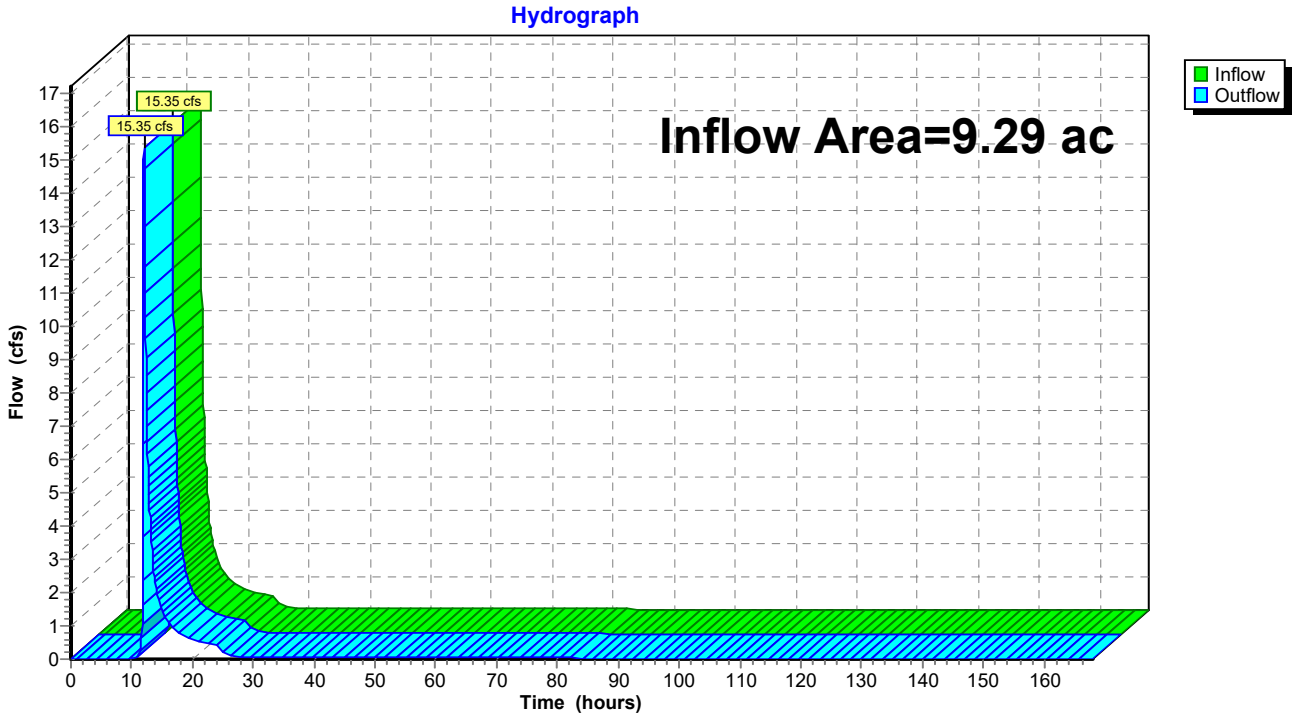
Summary for Reach 4R: Post-Project (SP 1)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.29 ac, 60.06% Impervious, Inflow Depth > 2.69" for 10yr event
Inflow = 15.35 cfs @ 12.02 hrs, Volume= 2.084 af
Outflow = 15.35 cfs @ 12.02 hrs, Volume= 2.084 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs

Reach 4R: Post-Project (SP 1)



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Post-Bypass(DP001) Runoff Area=3.00 ac 20.33% Impervious Runoff Depth=3.05"
Tc=6.0 min CN=67 Runoff=15.76 cfs 0.761 af

Subcatchment2S: D.A to MRC UGD BASIN Runoff Area=6.29 ac 79.01% Impervious Runoff Depth=5.50"
Tc=6.0 min CN=90 Runoff=54.62 cfs 2.883 af

Pond 3P: MRC UGD BASIN Peak Elev=46.74' Storage=70,794 cf Inflow=54.62 cfs 2.883 af
Outflow=22.14 cfs 2.606 af

Reach 4R: Post-Project(SP 1) Inflow=34.73 cfs 3.367 af
Outflow=34.73 cfs 3.367 af

Total Runoff Area = 9.29 ac Runoff Volume = 3.644 af Average Runoff Depth = 4.71"
39.94% Pervious = 3.71 ac 60.06% Impervious = 5.58 ac

Summary for Subcatchment 1S: Post-Bypass (DP001)

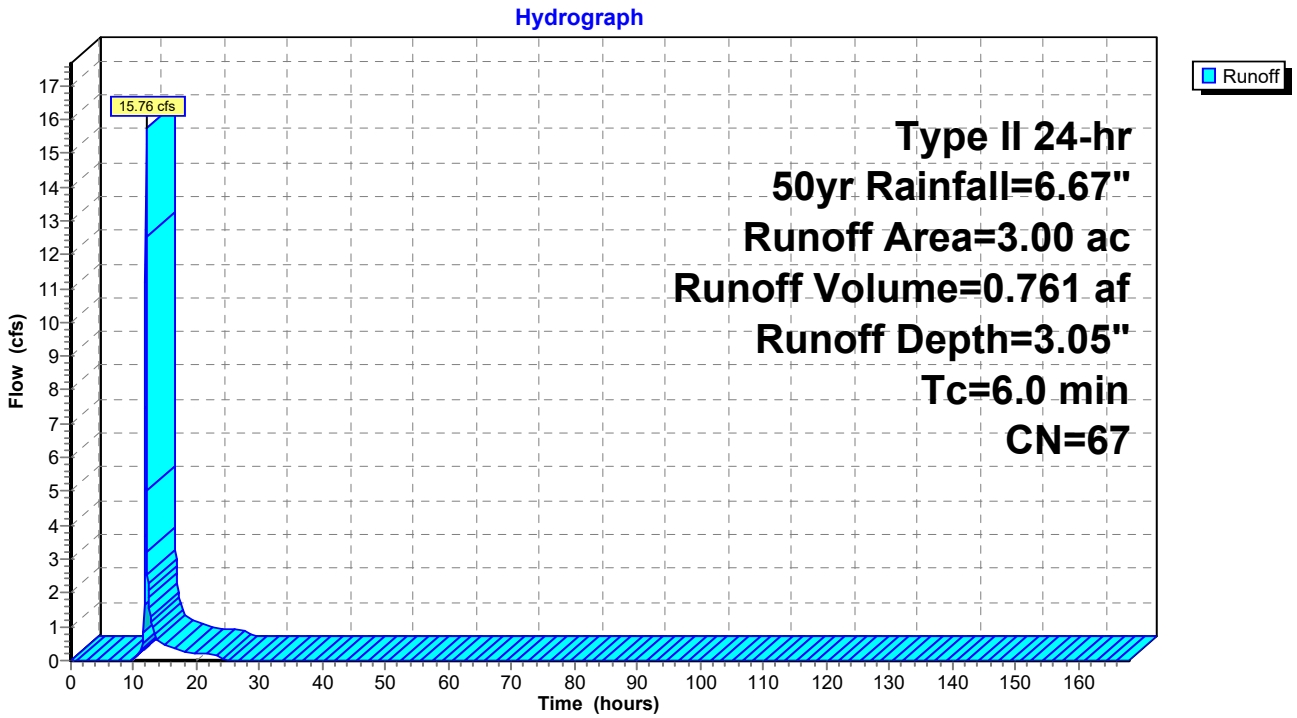
Runoff = 15.76 cfs @ 11.97 hrs, Volume= 0.761 af, Depth= 3.05"
Routed to Reach 4R : Post-Project (SP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=6.67"

Area (ac)	CN	Description
0.61	98	Paved parking, HSG A
1.58	61	>75% Grass cover, Good, HSG B
0.81	55	Woods, Good, HSG B
3.00	67	Weighted Average
2.39		79.67% Pervious Area
0.61		20.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: Post-Bypass (DP001)



Summary for Subcatchment 2S: D.A to MRC UGD BASIN

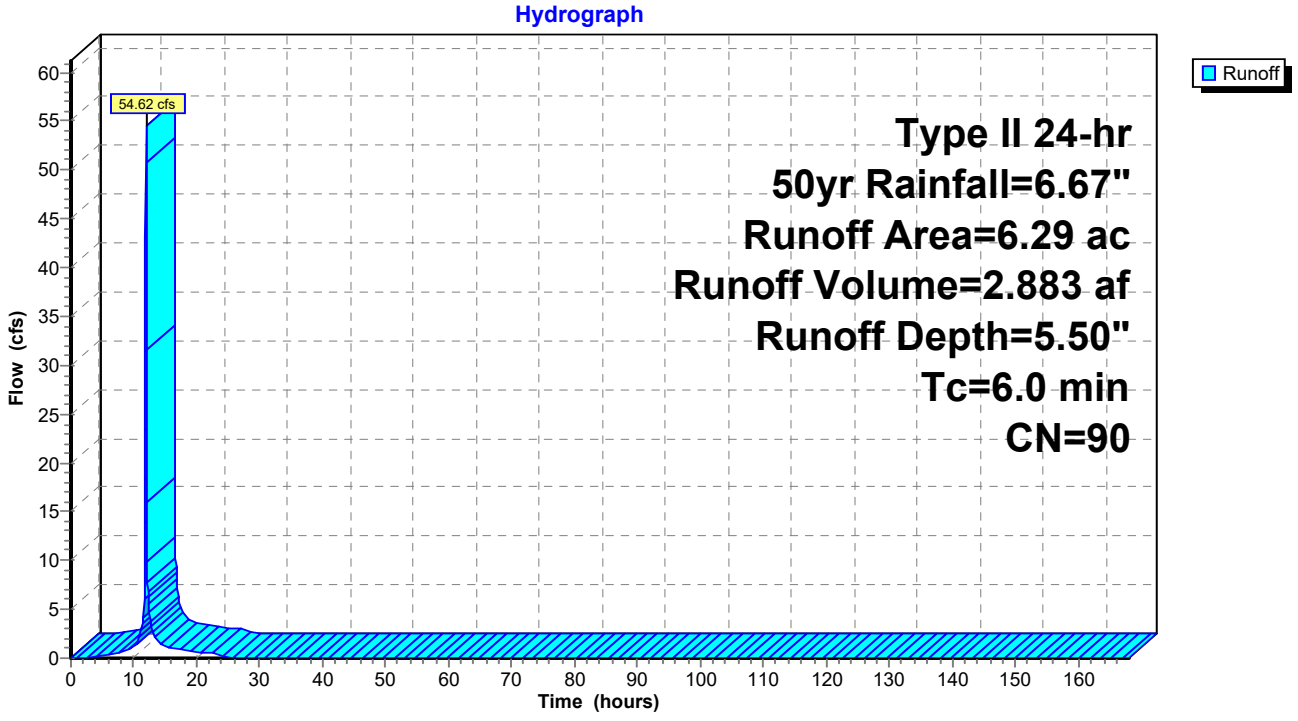
Runoff = 54.62 cfs @ 11.96 hrs, Volume= 2.883 af, Depth= 5.50"
Routed to Pond 3P : MRC UGD BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=6.67"

Area (ac)	CN	Description
4.97	98	Paved parking, HSG B
1.32	61	>75% Grass cover, Good, HSG B
6.29	90	Weighted Average
1.32		20.99% Pervious Area
4.97		79.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: D.A to MRC UGD BASIN



Summary for Pond 3P: MRC UGD BASIN

Inflow Area = 6.29 ac, 79.01% Impervious, Inflow Depth = 5.50" for 50yr event
Inflow = 54.62 cfs @ 11.96 hrs, Volume= 2.883 af
Outflow = 22.14 cfs @ 12.08 hrs, Volume= 2.606 af, Atten= 59%, Lag= 7.1 min
Primary = 22.14 cfs @ 12.08 hrs, Volume= 2.606 af
Routed to Reach 4R : Post-Project (SP 1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Starting Elev= 44.10' Surf.Area= 25,351 sf Storage= 11,279 cf
Peak Elev= 46.74' @ 12.08 hrs Surf.Area= 25,351 sf Storage= 70,794 cf (59,515 cf above start)

Plug-Flow detention time= 539.5 min calculated for 2.346 af (81% of inflow)
Center-of-Mass det. time= 412.8 min (1,190.8 - 778.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	43.60'	0 cf	**47.23'W x 536.77'L x 4.50'H Field A** 114,081 cf Overall - 114,081 cf Embedded = 0 cf x 40.0% Voids
#2A	43.60'	90,231 cf	**StormTrap ST2 SingleTrap 4-0** x 136 Inside #1 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 136 Chambers in 4 Rows 33.92' x 523.46' Core + 6.66' Border = 47.23' x 536.77' System
		90,231 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	43.60'	**24.0" Round Culvert** L= 45.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.60' / 42.95' S= 0.0142 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	44.60'	**2.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	45.20'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=22.07 cfs @ 12.08 hrs HW=46.73' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 22.07 cfs @ 7.02 fps)
├**2=Orifice** (Passes < 0.15 cfs potential flow)
└**3=Sharp-Crested Rectangular Weir** (Passes < 22.82 cfs potential flow)

Pond 3P: MRC UGD BASIN - Chamber Wizard Field A

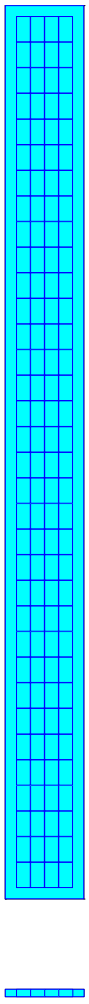
Chamber Model = StormTrap ST2 SingleTrap 4-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf
Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf

34 Chambers/Row x 15.40' Long = 523.46' Row Length +79.9" Border x 2 = 536.77' Base Length
4 Rows x 101.7" Wide + 79.9" Side Border x 2 = 47.23' Base Width
54.0" Chamber Height = 4.50' Field Height

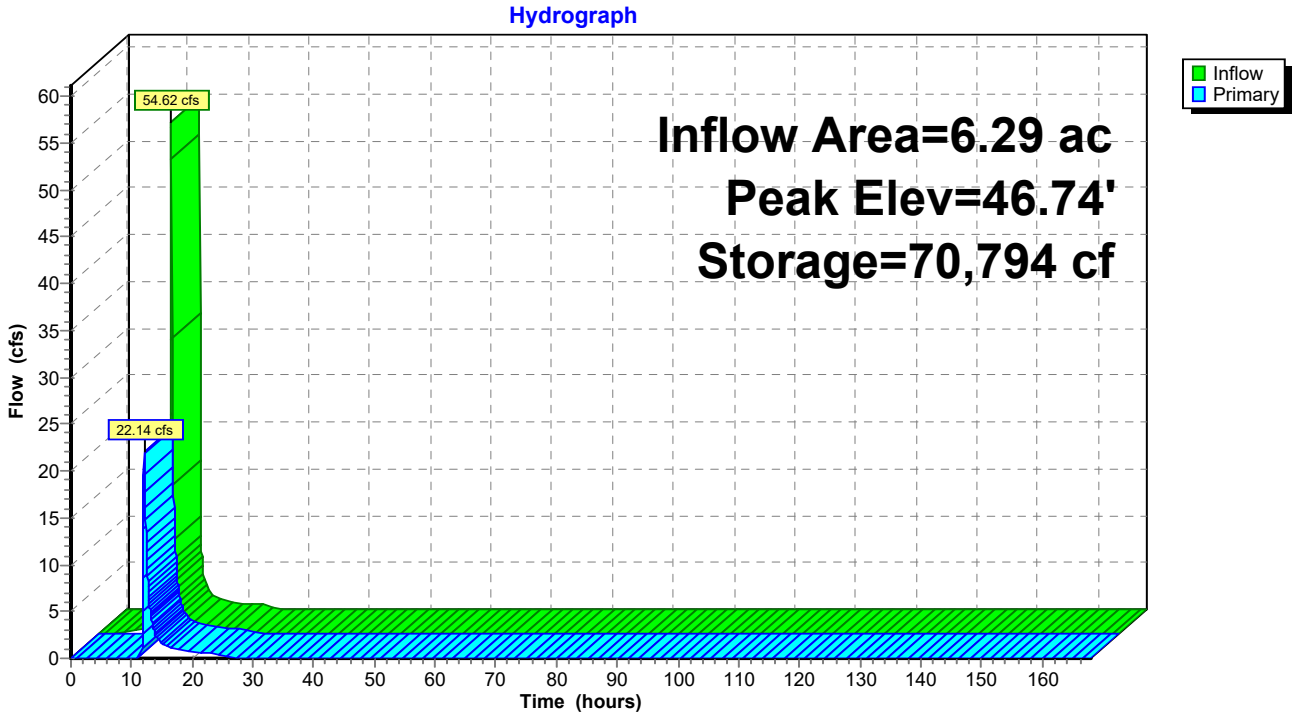
136 Chambers x 470.3 cf + 26,273.7 cf Border = 90,230.6 cf Chamber Storage
136 Chambers x 587.4 cf + 34,187.7 cf Border = 114,080.6 cf Displacement

Chamber Storage = 90,230.6 cf = 2.071 af
Overall Storage Efficiency = 79.1%
Overall System Size = 536.77' x 47.23' x 4.50'

136 Chambers (plus border)
4,225.2 cy Field



Pond 3P: MRC UGD BASIN



Stage-Discharge for Pond 3P: MRC UGD BASIN

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
43.60	0.00	46.20	12.56
43.65	0.00	46.25	13.47
43.70	0.00	46.30	14.39
43.75	0.00	46.35	15.34
43.80	0.00	46.40	16.30
43.85	0.00	46.45	17.28
43.90	0.00	46.50	18.27
43.95	0.00	46.55	19.28
44.00	0.00	46.60	20.30
44.05	0.00	46.65	21.33
44.10	0.00	46.70	21.92
44.15	0.00	46.75	22.18
44.20	0.00	46.80	22.44
44.25	0.00	46.85	22.69
44.30	0.00	46.90	22.94
44.35	0.00	46.95	23.19
44.40	0.00	47.00	23.43
44.45	0.00	47.05	23.68
44.50	0.00	47.10	23.92
44.55	0.00	47.15	24.16
44.60	0.00	47.20	24.39
44.65	0.00	47.25	24.62
44.70	0.01	47.30	24.86
44.75	0.03	47.35	25.08
44.80	0.04	47.40	25.31
44.85	0.04	47.45	25.54
44.90	0.05	47.50	25.76
44.95	0.05	47.55	25.98
45.00	0.06	47.60	26.20
45.05	0.06	47.65	26.42
45.10	0.07	47.70	26.63
45.15	0.07	47.75	26.85
45.20	0.08	47.80	27.06
45.25	0.22	47.85	27.27
45.30	0.49	47.90	27.48
45.35	0.84	47.95	27.69
45.40	1.25	48.00	27.89
45.45	1.71	48.05	28.10
45.50	2.21	48.10	**28.30**
45.55	2.76		
45.60	3.34		
45.65	3.96		
45.70	4.61		
45.75	5.30		
45.80	6.01		
45.85	6.75		
45.90	7.51		
45.95	8.30		
46.00	9.11		
46.05	9.94		
46.10	10.79		
46.15	11.66		

Stage-Area-Storage for Pond 3P: MRC UGD BASIN

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
43.60	0	46.20	58,650
43.65	1,128	46.25	59,778
43.70	2,256	46.30	60,906
43.75	3,384	46.35	62,034
43.80	4,512	46.40	63,161
43.85	5,639	46.45	64,289
43.90	6,767	46.50	65,417
43.95	7,895	46.55	66,545
44.00	9,023	46.60	67,673
44.05	10,151	46.65	68,801
44.10	11,279	46.70	69,929
44.15	12,407	46.75	71,057
44.20	13,535	46.80	72,184
44.25	14,662	46.85	73,312
44.30	15,790	46.90	74,440
44.35	16,918	46.95	75,568
44.40	18,046	47.00	76,696
44.45	19,174	47.05	77,824
44.50	20,302	47.10	78,952
44.55	21,430	47.15	80,080
44.60	22,558	47.20	81,208
44.65	23,686	47.25	82,335
44.70	24,813	47.30	83,463
44.75	25,941	47.35	84,591
44.80	27,069	47.40	85,719
44.85	28,197	47.45	86,847
44.90	29,325	47.50	87,975
44.95	30,453	47.55	89,103
45.00	31,581	47.60	**90,231**
45.05	32,709	47.65	**90,231**
45.10	33,836	47.70	90,231
45.15	34,964	47.75	90,231
45.20	36,092	47.80	90,231
45.25	37,220	47.85	90,231
45.30	38,348	47.90	90,231
45.35	39,476	47.95	90,231
45.40	40,604	48.00	90,231
45.45	41,732	48.05	90,231
45.50	42,860	48.10	90,231
45.55	43,987		
45.60	45,115		
45.65	46,243		
45.70	47,371		
45.75	48,499		
45.80	49,627		
45.85	50,755		
45.90	51,883		
45.95	53,010		
46.00	54,138		
46.05	55,266		
46.10	56,394		
46.15	57,522		

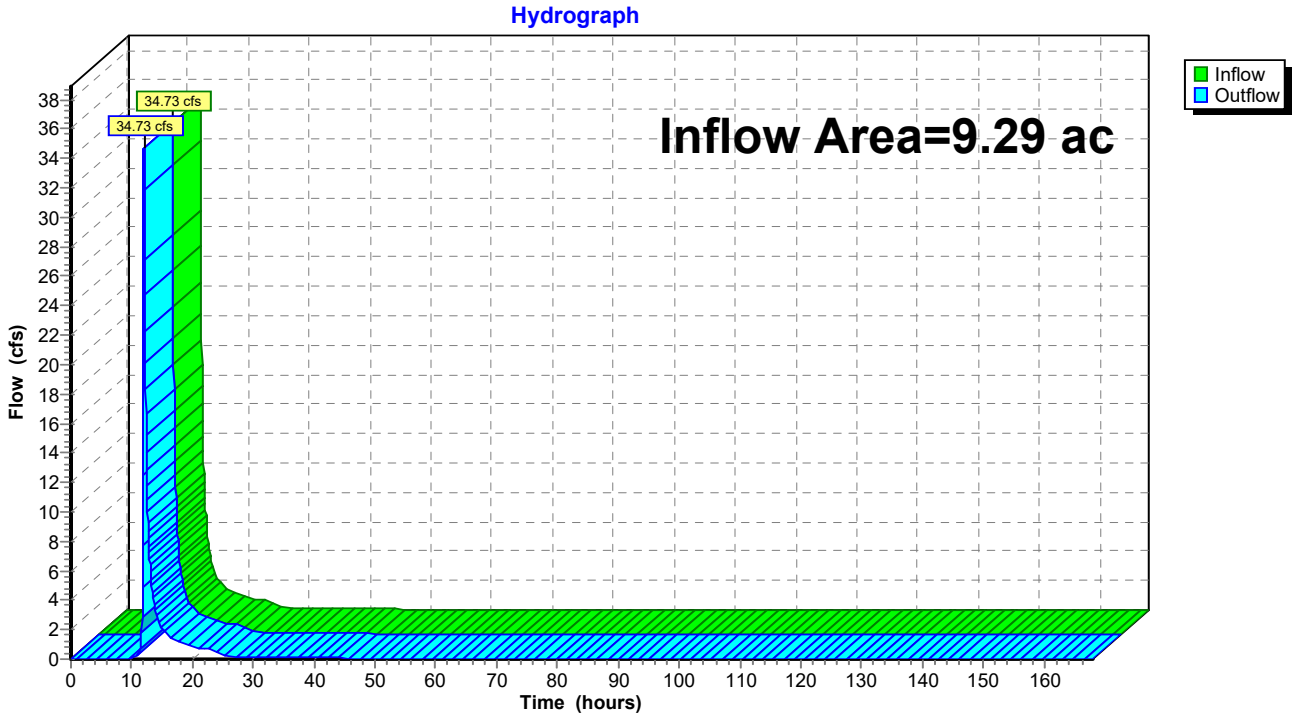
Summary for Reach 4R: Post-Project (SP 1)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.29 ac, 60.06% Impervious, Inflow Depth = 4.35" for 50yr event
Inflow = 34.73 cfs @ 12.01 hrs, Volume= 3.367 af
Outflow = 34.73 cfs @ 12.01 hrs, Volume= 3.367 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs

Reach 4R: Post-Project (SP 1)



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Post-Bypass(DP001) Runoff Area=3.00 ac 20.33% Impervious Runoff Depth=3.78"
Tc=6.0 min CN=67 Runoff=19.50 cfs 0.944 af

Subcatchment2S: D.A to MRC UGD BASIN Runoff Area=6.29 ac 79.01% Impervious Runoff Depth=6.39"
Tc=6.0 min CN=90 Runoff=62.86 cfs 3.351 af

Pond 3P: MRC UGD BASIN Peak Elev=47.08' Storage=78,545 cf Inflow=62.86 cfs 3.351 af
Outflow=23.83 cfs 3.074 af

Reach 4R: Post-Project(SP 1) Inflow=41.54 cfs 4.017 af
Outflow=41.54 cfs 4.017 af

Total Runoff Area = 9.29 ac Runoff Volume = 4.295 af Average Runoff Depth = 5.55"
39.94% Pervious = 3.71 ac 60.06% Impervious = 5.58 ac

Summary for Subcatchment 1S: Post-Bypass (DP001)

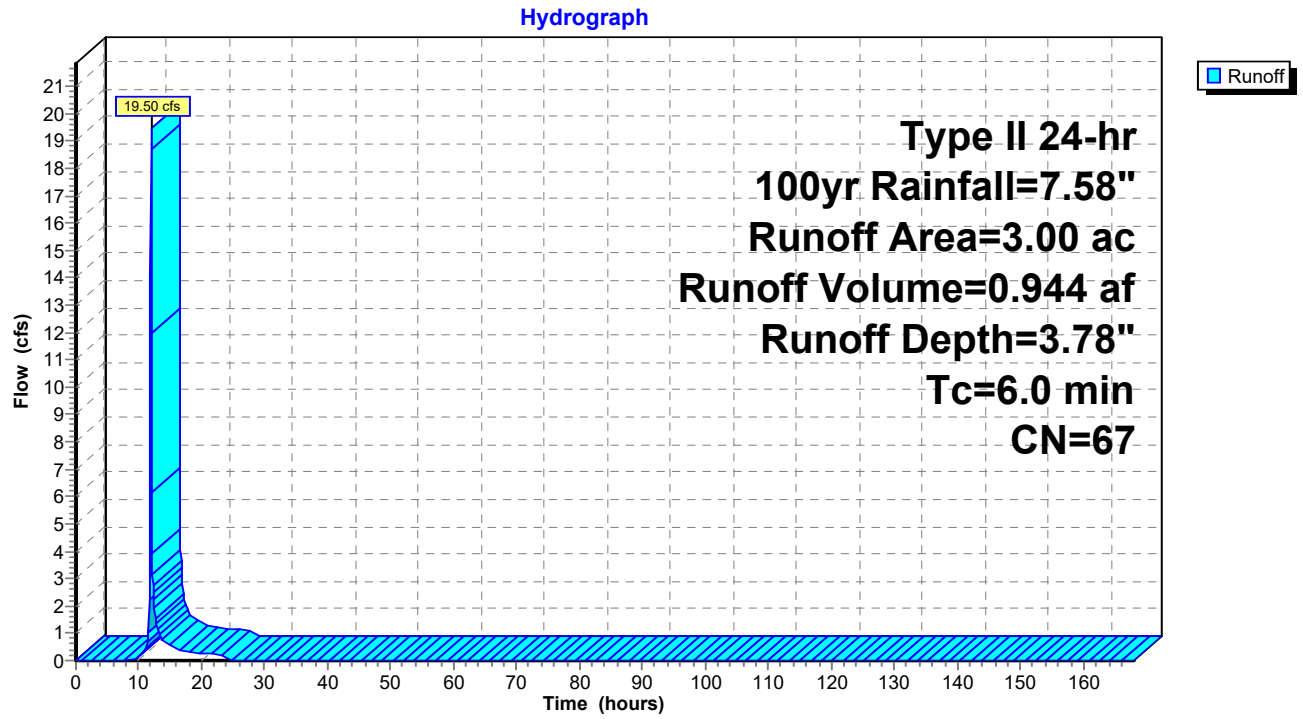
Runoff = 19.50 cfs @ 11.97 hrs, Volume= 0.944 af, Depth= 3.78"
Routed to Reach 4R : Post-Project (SP 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=7.58"

Area (ac)	CN	Description
0.61	98	Paved parking, HSG A
1.58	61	>75% Grass cover, Good, HSG B
0.81	55	Woods, Good, HSG B
3.00	67	Weighted Average
2.39		79.67% Pervious Area
0.61		20.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: Post-Bypass (DP001)



Summary for Subcatchment 2S: D.A to MRC UGD BASIN

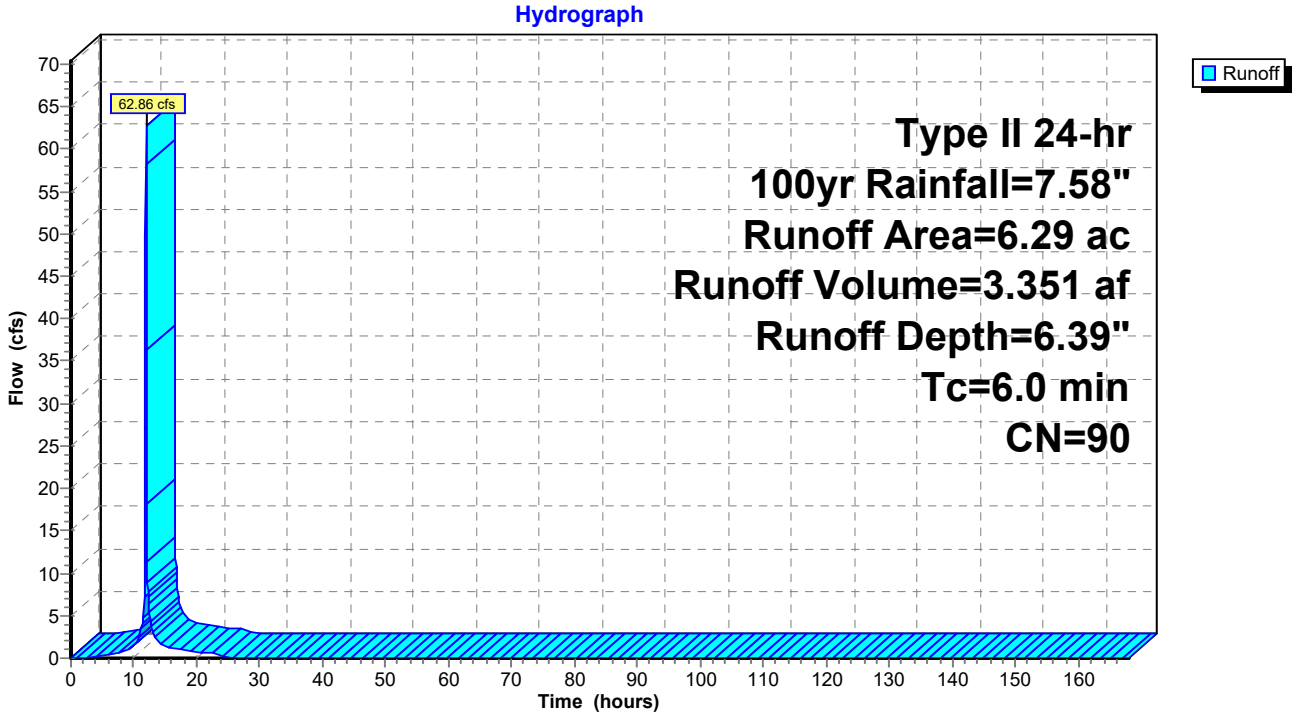
Runoff = 62.86 cfs @ 11.96 hrs, Volume= 3.351 af, Depth= 6.39"
Routed to Pond 3P : MRC UGD BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=7.58"

Area (ac)	CN	Description
4.97	98	Paved parking, HSG B
1.32	61	>75% Grass cover, Good, HSG B
6.29	90	Weighted Average
1.32		20.99% Pervious Area
4.97		79.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: D.A to MRC UGD BASIN



Summary for Pond 3P: MRC UGD BASIN

Inflow Area = 6.29 ac, 79.01% Impervious, Inflow Depth = 6.39" for 100yr event
Inflow = 62.86 cfs @ 11.96 hrs, Volume= 3.351 af
Outflow = 23.83 cfs @ 12.09 hrs, Volume= 3.074 af, Atten= 62%, Lag= 7.6 min
Primary = 23.83 cfs @ 12.09 hrs, Volume= 3.074 af
Routed to Reach 4R : Post-Project (SP 1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Starting Elev= 44.10' Surf.Area= 25,351 sf Storage= 11,279 cf
Peak Elev= 47.08' @ 12.09 hrs Surf.Area= 25,351 sf Storage= 78,545 cf (67,266 cf above start)

Plug-Flow detention time= 468.0 min calculated for 2.814 af (84% of inflow)
Center-of-Mass det. time= 361.0 min (1,135.1 - 774.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	43.60'	0 cf	**47.23'W x 536.77'L x 4.50'H Field A** 114,081 cf Overall - 114,081 cf Embedded = 0 cf x 40.0% Voids
#2A	43.60'	90,231 cf	**StormTrap ST2 SingleTrap 4-0** x 136 Inside #1 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 136 Chambers in 4 Rows 33.92' x 523.46' Core + 6.66' Border = 47.23' x 536.77' System
		90,231 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	43.60'	**24.0" Round Culvert** L= 45.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.60' / 42.95' S= 0.0142 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	44.60'	**2.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	45.20'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=23.79 cfs @ 12.09 hrs HW=47.07' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 23.79 cfs @ 7.57 fps)
├─**2=Orifice** (Passes < 0.16 cfs potential flow)
└─**3=Sharp-Crested Rectangular Weir** (Passes < 30.40 cfs potential flow)

Pond 3P: MRC UGD BASIN - Chamber Wizard Field A

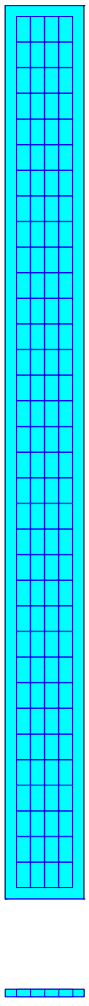
Chamber Model = StormTrap ST2 SingleTrap 4-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf
Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf

34 Chambers/Row x 15.40' Long = 523.46' Row Length +79.9" Border x 2 = 536.77' Base Length
4 Rows x 101.7" Wide + 79.9" Side Border x 2 = 47.23' Base Width
54.0" Chamber Height = 4.50' Field Height

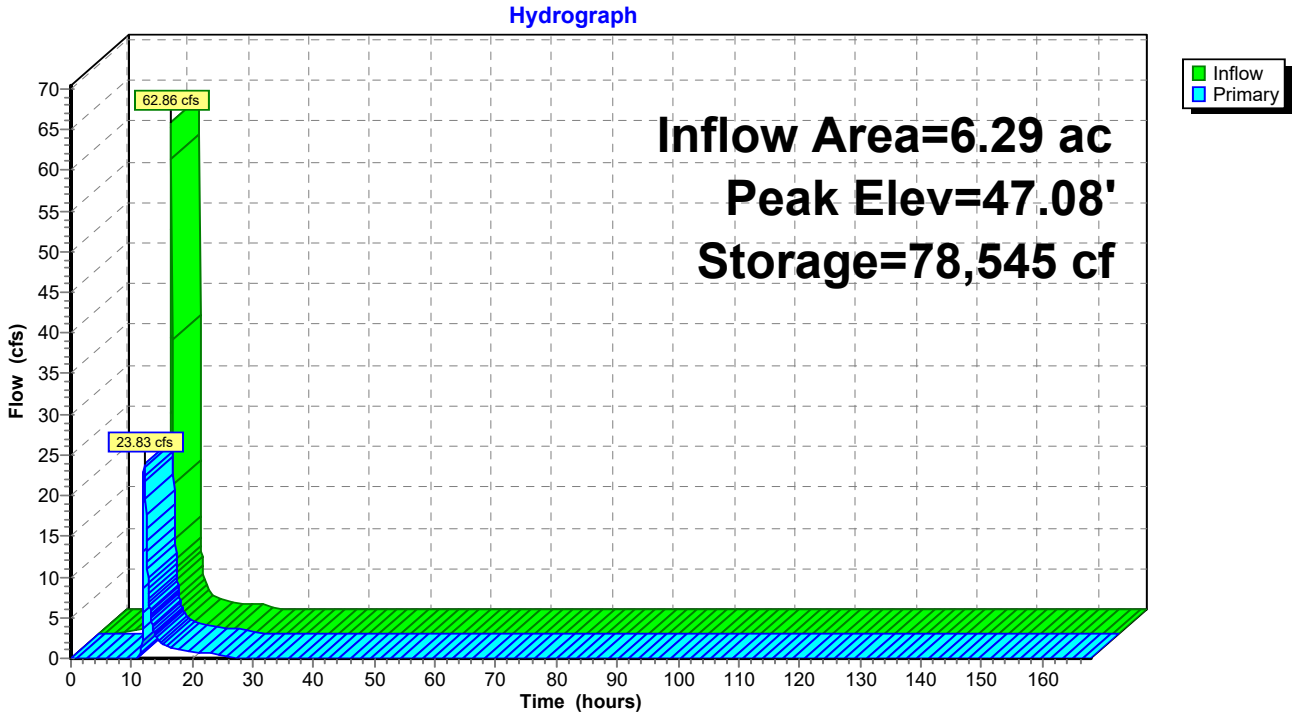
136 Chambers x 470.3 cf + 26,273.7 cf Border = 90,230.6 cf Chamber Storage
136 Chambers x 587.4 cf + 34,187.7 cf Border = 114,080.6 cf Displacement

Chamber Storage = 90,230.6 cf = 2.071 af
Overall Storage Efficiency = 79.1%
Overall System Size = 536.77' x 47.23' x 4.50'

136 Chambers (plus border)
4,225.2 cy Field



Pond 3P: MRC UGD BASIN



Stage-Discharge for Pond 3P: MRC UGD BASIN

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
43.60	0.00	46.20	12.56
43.65	0.00	46.25	13.47
43.70	0.00	46.30	14.39
43.75	0.00	46.35	15.34
43.80	0.00	46.40	16.30
43.85	0.00	46.45	17.28
43.90	0.00	46.50	18.27
43.95	0.00	46.55	19.28
44.00	0.00	46.60	20.30
44.05	0.00	46.65	21.33
44.10	0.00	46.70	21.92
44.15	0.00	46.75	22.18
44.20	0.00	46.80	22.44
44.25	0.00	46.85	22.69
44.30	0.00	46.90	22.94
44.35	0.00	46.95	23.19
44.40	0.00	47.00	23.43
44.45	0.00	47.05	23.68
44.50	0.00	47.10	23.92
44.55	0.00	47.15	24.16
44.60	0.00	47.20	24.39
44.65	0.00	47.25	24.62
44.70	0.01	47.30	24.86
44.75	0.03	47.35	25.08
44.80	0.04	47.40	25.31
44.85	0.04	47.45	25.54
44.90	0.05	47.50	25.76
44.95	0.05	47.55	25.98
45.00	0.06	47.60	26.20
45.05	0.06	47.65	26.42
45.10	0.07	47.70	26.63
45.15	0.07	47.75	26.85
45.20	0.08	47.80	27.06
45.25	0.22	47.85	27.27
45.30	0.49	47.90	27.48
45.35	0.84	47.95	27.69
45.40	1.25	48.00	27.89
45.45	1.71	48.05	28.10
45.50	2.21	48.10	**28.30**
45.55	2.76		
45.60	3.34		
45.65	3.96		
45.70	4.61		
45.75	5.30		
45.80	6.01		
45.85	6.75		
45.90	7.51		
45.95	8.30		
46.00	9.11		
46.05	9.94		
46.10	10.79		
46.15	11.66		

Stage-Area-Storage for Pond 3P: MRC UGD BASIN

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
43.60	0	46.20	58,650
43.65	1,128	46.25	59,778
43.70	2,256	46.30	60,906
43.75	3,384	46.35	62,034
43.80	4,512	46.40	63,161
43.85	5,639	46.45	64,289
43.90	6,767	46.50	65,417
43.95	7,895	46.55	66,545
44.00	9,023	46.60	67,673
44.05	10,151	46.65	68,801
44.10	11,279	46.70	69,929
44.15	12,407	46.75	71,057
44.20	13,535	46.80	72,184
44.25	14,662	46.85	73,312
44.30	15,790	46.90	74,440
44.35	16,918	46.95	75,568
44.40	18,046	47.00	76,696
44.45	19,174	47.05	77,824
44.50	20,302	47.10	78,952
44.55	21,430	47.15	80,080
44.60	22,558	47.20	81,208
44.65	23,686	47.25	82,335
44.70	24,813	47.30	83,463
44.75	25,941	47.35	84,591
44.80	27,069	47.40	85,719
44.85	28,197	47.45	86,847
44.90	29,325	47.50	87,975
44.95	30,453	47.55	89,103
45.00	31,581	47.60	**90,231**
45.05	32,709	47.65	**90,231**
45.10	33,836	47.70	90,231
45.15	34,964	47.75	90,231
45.20	36,092	47.80	90,231
45.25	37,220	47.85	90,231
45.30	38,348	47.90	90,231
45.35	39,476	47.95	90,231
45.40	40,604	48.00	90,231
45.45	41,732	48.05	90,231
45.50	42,860	48.10	90,231
45.55	43,987		
45.60	45,115		
45.65	46,243		
45.70	47,371		
45.75	48,499		
45.80	49,627		
45.85	50,755		
45.90	51,883		
45.95	53,010		
46.00	54,138		
46.05	55,266		
46.10	56,394		
46.15	57,522		

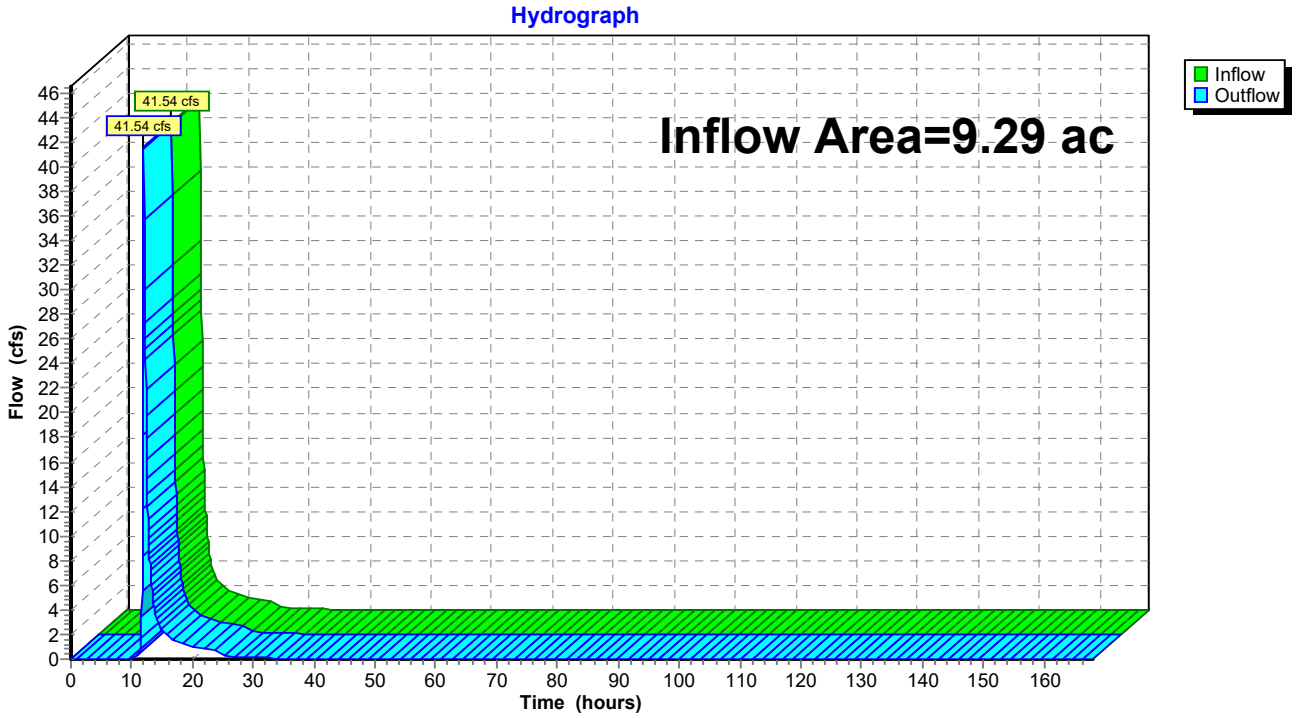
Summary for Reach 4R: Post-Project (SP 1)

[40] Hint: Not Described (Outflow=Inflow)

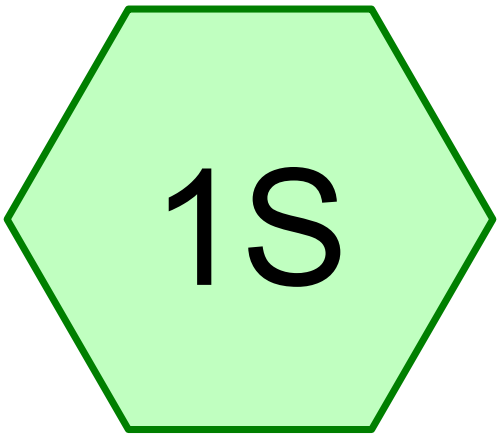
Inflow Area = 9.29 ac, 60.06% Impervious, Inflow Depth = 5.19" for 100yr event
Inflow = 41.54 cfs @ 11.99 hrs, Volume= 4.017 af
Outflow = 41.54 cfs @ 11.99 hrs, Volume= 4.017 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs

Reach 4R: Post-Project (SP 1)



Study Point 2: Pre-Project Release Rate Calculations



SP2 Pre-Project

Subcat Reach Pond Link

Routing Diagram for Pre Project SP2 North
Prepared by Colliers Engineering & Design, Printed 2/28/2022
HydroCAD® 10.10-6a s/n 08841 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.05	61	>75% Grass cover, Good, HSG B (1S)
0.40	98	Paved parking, HSG B (1S)
0.29	55	Woods, Good, HSG B (1S)
0.74	**79**	**TOTAL AREA**

Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP2 Pre-Project Runoff Area=0.74 ac 54.05% Impervious Runoff Depth=1.40"
Tc=6.0 min CN=79 Runoff=1.80 cfs 0.086 af

Total Runoff Area = 0.74 ac Runoff Volume = 0.086 af Average Runoff Depth = 1.40"
45.95% Pervious = 0.34 ac 54.05% Impervious = 0.40 ac

Summary for Subcatchment 1S: SP2 Pre-Project

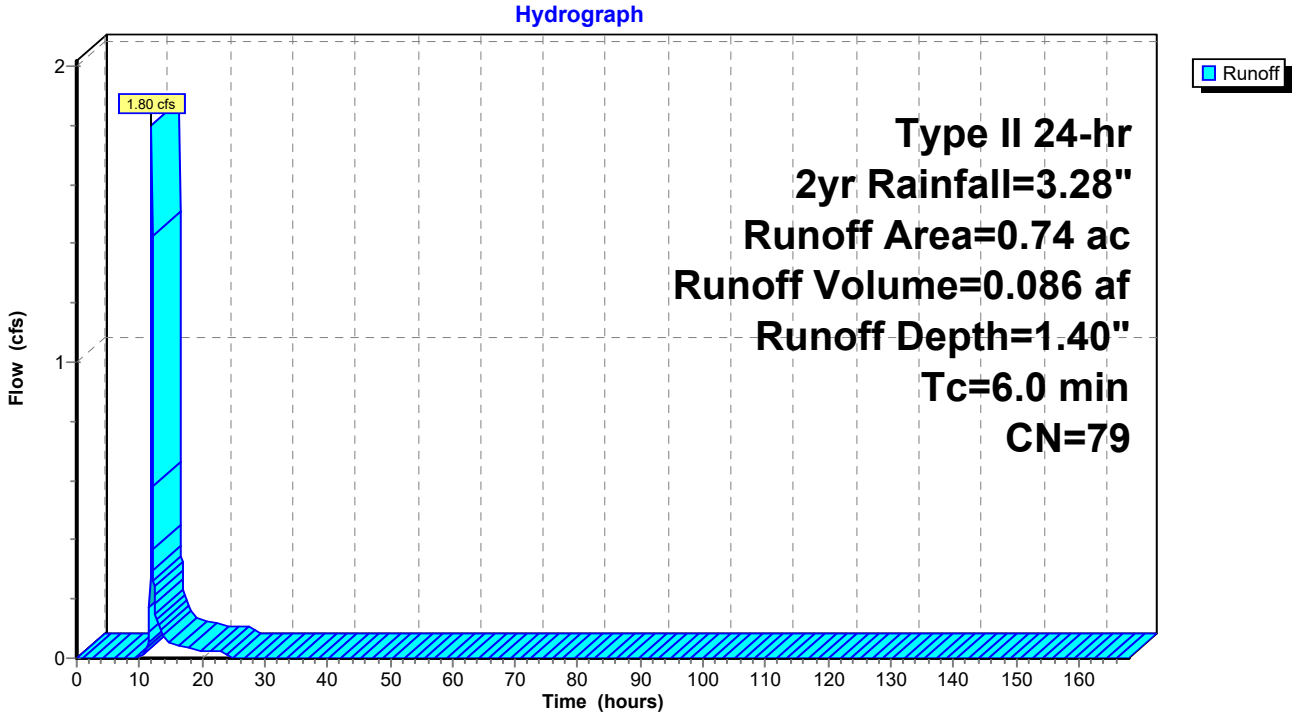
Runoff = 1.80 cfs @ 11.98 hrs, Volume= 0.086 af, Depth= 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=3.28"

Area (ac)	CN	Description
0.40	98	Paved parking, HSG B
0.05	61	>75% Grass cover, Good, HSG B
0.29	55	Woods, Good, HSG B
0.74	79	Weighted Average
0.34		45.95% Pervious Area
0.40		54.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Tc**

Subcatchment 1S: SP2 Pre-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP2 Pre-Project Runoff Area=0.74 ac 54.05% Impervious Runoff Depth=2.65"
Tc=6.0 min CN=79 Runoff=3.36 cfs 0.163 af

Total Runoff Area = 0.74 ac Runoff Volume = 0.163 af Average Runoff Depth = 2.65"
45.95% Pervious = 0.34 ac 54.05% Impervious = 0.40 ac

Summary for Subcatchment 1S: SP2 Pre-Project

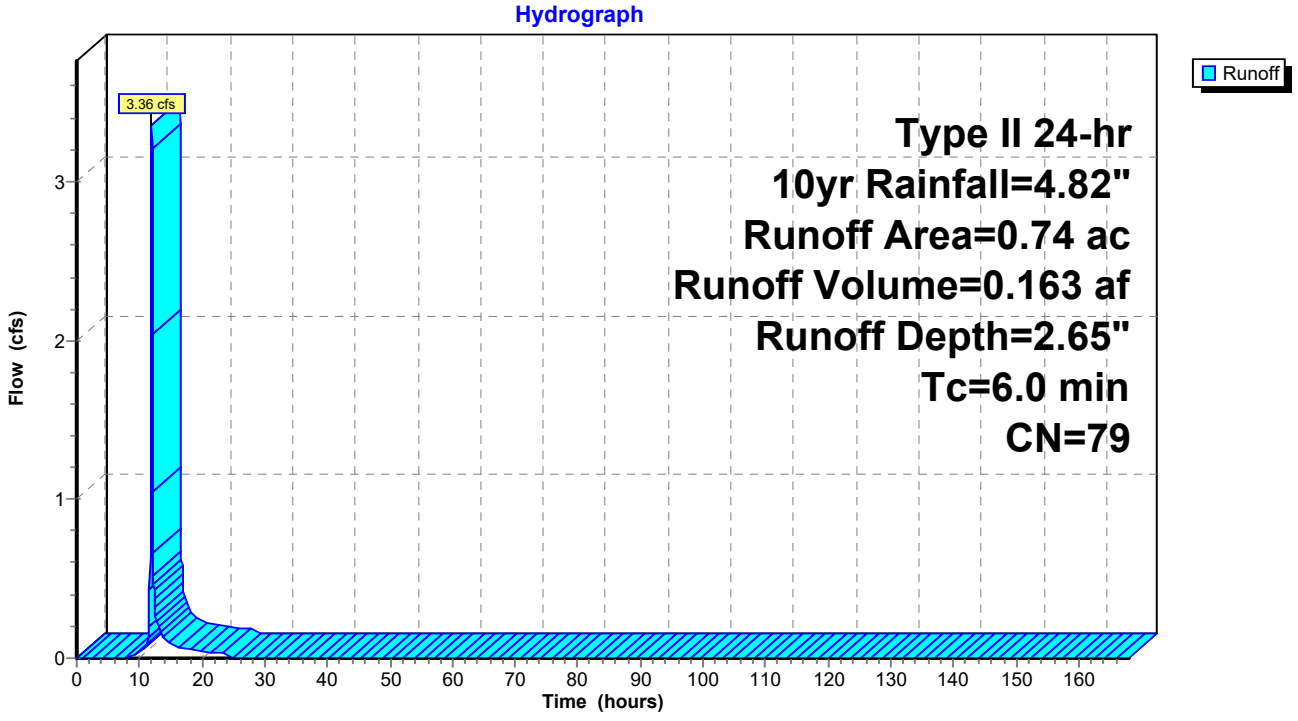
Runoff = 3.36 cfs @ 11.97 hrs, Volume= 0.163 af, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=4.82"

Area (ac)	CN	Description
0.40	98	Paved parking, HSG B
0.05	61	>75% Grass cover, Good, HSG B
0.29	55	Woods, Good, HSG B
0.74	79	Weighted Average
0.34		45.95% Pervious Area
0.40		54.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Tc**

Subcatchment 1S: SP2 Pre-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP2 Pre-Project Runoff Area=0.74 ac 54.05% Impervious Runoff Depth=4.28"
Tc=6.0 min CN=79 Runoff=5.34 cfs 0.264 af

Total Runoff Area = 0.74 ac Runoff Volume = 0.264 af Average Runoff Depth = 4.28"
45.95% Pervious = 0.34 ac 54.05% Impervious = 0.40 ac

Summary for Subcatchment 1S: SP2 Pre-Project

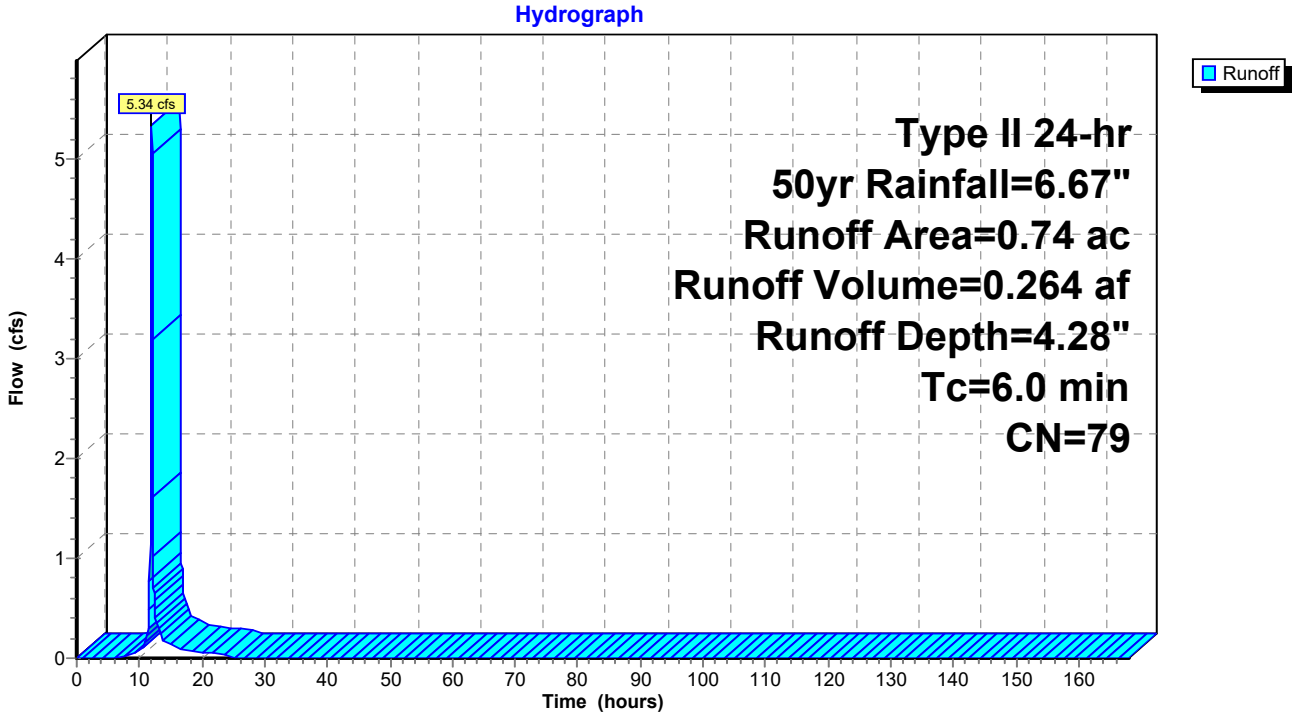
Runoff = 5.34 cfs @ 11.97 hrs, Volume= 0.264 af, Depth= 4.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=6.67"

Area (ac)	CN	Description
0.40	98	Paved parking, HSG B
0.05	61	>75% Grass cover, Good, HSG B
0.29	55	Woods, Good, HSG B
0.74	79	Weighted Average
0.34		45.95% Pervious Area
0.40		54.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Tc**

Subcatchment 1S: SP2 Pre-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP2 Pre-Project Runoff Area=0.74 ac 54.05% Impervious Runoff Depth=5.12"
Tc=6.0 min CN=79 Runoff=6.33 cfs 0.316 af

Total Runoff Area = 0.74 ac Runoff Volume = 0.316 af Average Runoff Depth = 5.12"
45.95% Pervious = 0.34 ac 54.05% Impervious = 0.40 ac

Summary for Subcatchment 1S: SP2 Pre-Project

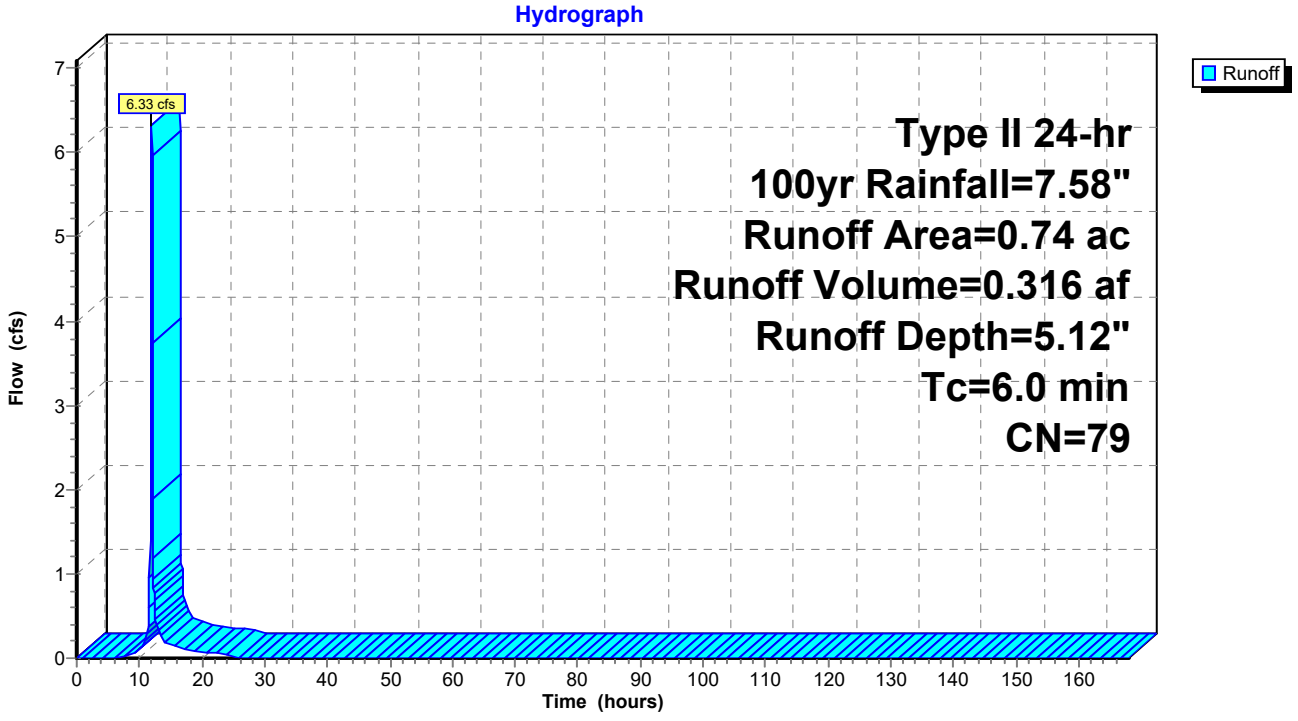
Runoff = 6.33 cfs @ 11.97 hrs, Volume= 0.316 af, Depth= 5.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=7.58"

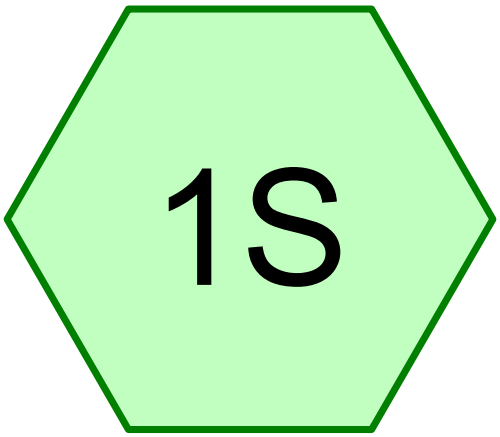
Area (ac)	CN	Description
0.40	98	Paved parking, HSG B
0.05	61	>75% Grass cover, Good, HSG B
0.29	55	Woods, Good, HSG B
0.74	79	Weighted Average
0.34		45.95% Pervious Area
0.40		54.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Tc**

Subcatchment 1S: SP2 Pre-Project



Study Point 2: Post-Project Release Rate Calculations



SP2 Post-Project

Subcat Reach Pond Link

Routing Diagram for Post Project SP2 North
Prepared by Colliers Engineering & Design, Printed 5/31/2022
HydroCAD® 10.10-6a s/n 08841 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.03	61	>75% Grass cover, Good, HSG B (1S)
0.18	98	Paved parking, HSG B (1S)
0.21	**93**	**TOTAL AREA**

Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP2 Post-Project Runoff Area=0.21 ac 85.71% Impervious Runoff Depth=2.52"
Tc=6.0 min CN=93 Runoff=0.86 cfs 0.044 af

Total Runoff Area = 0.21 ac Runoff Volume = 0.044 af Average Runoff Depth = 2.52"
14.29% Pervious = 0.03 ac 85.71% Impervious = 0.18 ac

Summary for Subcatchment 1S: SP2 Post-Project

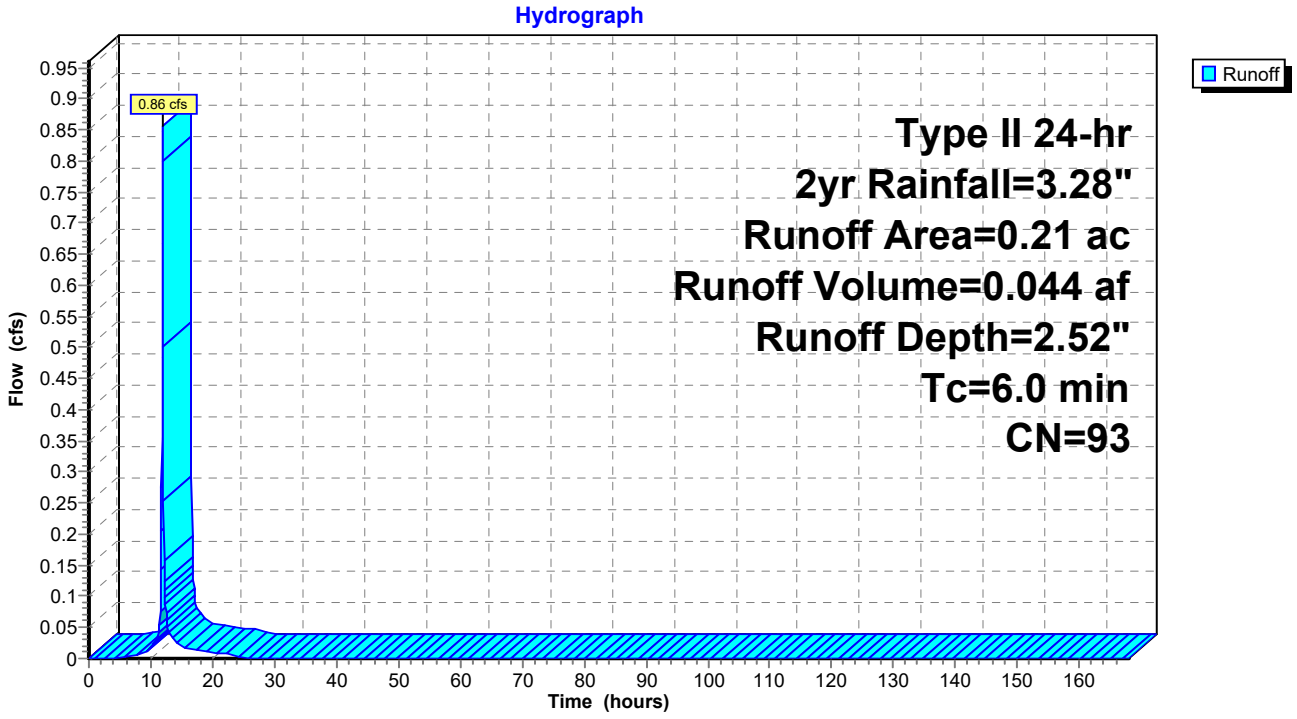
Runoff = 0.86 cfs @ 11.96 hrs, Volume= 0.044 af, Depth= 2.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=3.28"

Area (ac)	CN	Description
0.18	98	Paved parking, HSG B
0.03	61	>75% Grass cover, Good, HSG B
0.21	93	Weighted Average
0.03		14.29% Pervious Area
0.18		85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Tc**

Subcatchment 1S: SP2 Post-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP2 Post-Project Runoff Area=0.21 ac 85.71% Impervious Runoff Depth=4.02"
Tc=6.0 min CN=93 Runoff=1.33 cfs 0.070 af

Total Runoff Area = 0.21 ac Runoff Volume = 0.070 af Average Runoff Depth = 4.02"
14.29% Pervious = 0.03 ac 85.71% Impervious = 0.18 ac

Summary for Subcatchment 1S: SP2 Post-Project

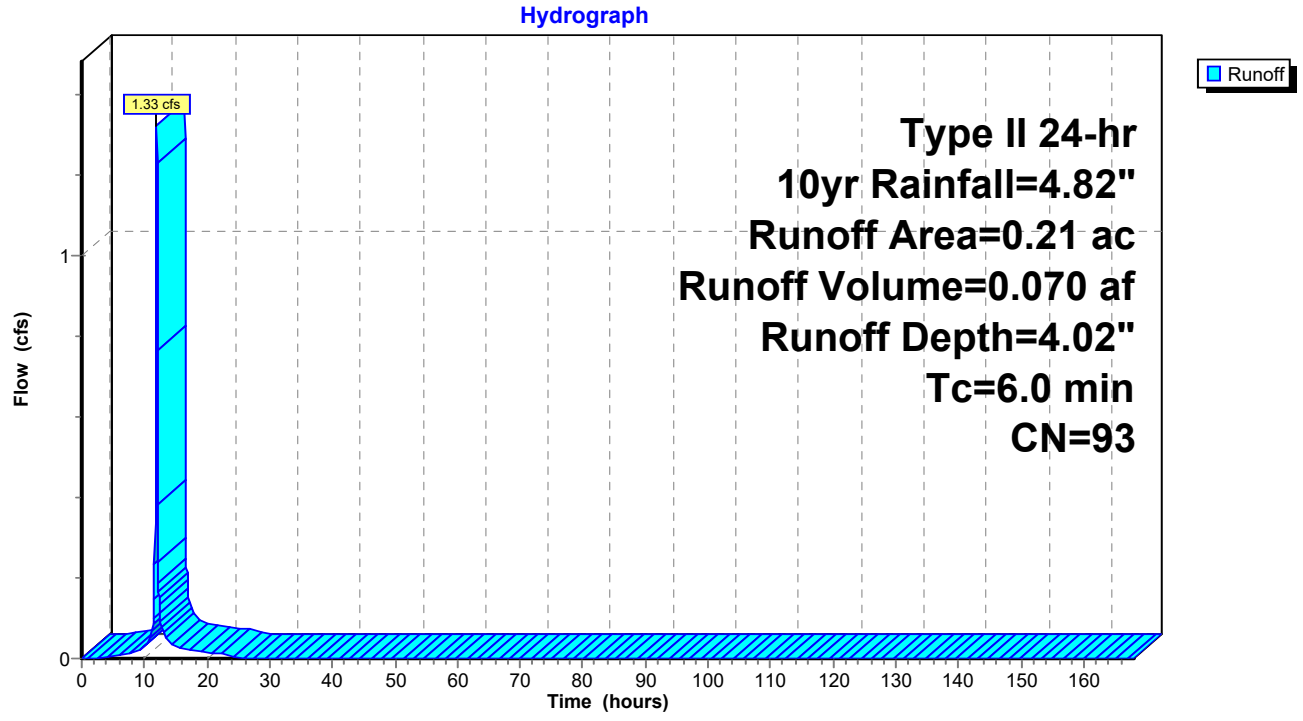
Runoff = 1.33 cfs @ 11.96 hrs, Volume= 0.070 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=4.82"

Area (ac)	CN	Description
0.18	98	Paved parking, HSG B
0.03	61	>75% Grass cover, Good, HSG B
0.21	93	Weighted Average
0.03		14.29% Pervious Area
0.18		85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Tc**

Subcatchment 1S: SP2 Post-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP2 Post-Project Runoff Area=0.21 ac 85.71% Impervious Runoff Depth=5.84"
Tc=6.0 min CN=93 Runoff=1.88 cfs 0.102 af

Total Runoff Area = 0.21 ac Runoff Volume = 0.102 af Average Runoff Depth = 5.84"
14.29% Pervious = 0.03 ac 85.71% Impervious = 0.18 ac

Summary for Subcatchment 1S: SP2 Post-Project

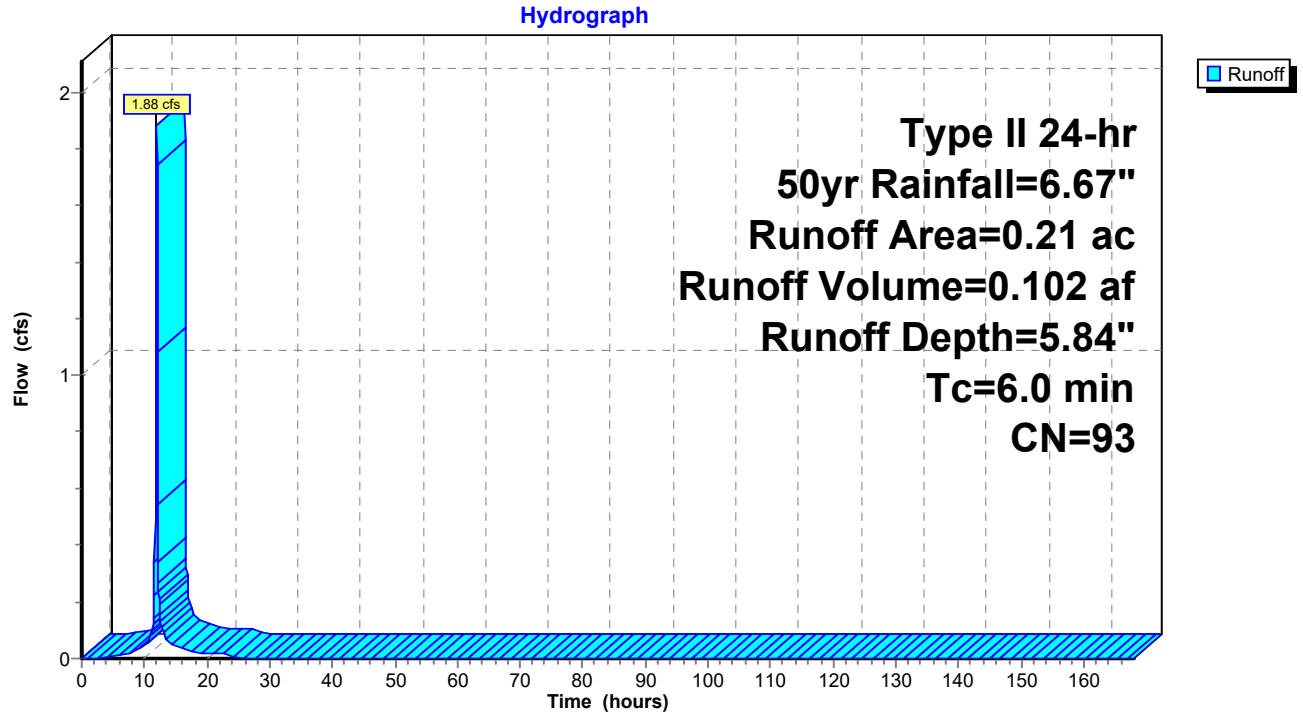
Runoff = 1.88 cfs @ 11.96 hrs, Volume= 0.102 af, Depth= 5.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=6.67"

Area (ac)	CN	Description
0.18	98	Paved parking, HSG B
0.03	61	>75% Grass cover, Good, HSG B
0.21	93	Weighted Average
0.03		14.29% Pervious Area
0.18		85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Tc**

Subcatchment 1S: SP2 Post-Project



Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SP2 Post-Project Runoff Area=0.21 ac 85.71% Impervious Runoff Depth=6.75"
Tc=6.0 min CN=93 Runoff=2.15 cfs 0.118 af

Total Runoff Area = 0.21 ac Runoff Volume = 0.118 af Average Runoff Depth = 6.75"
14.29% Pervious = 0.03 ac 85.71% Impervious = 0.18 ac

Summary for Subcatchment 1S: SP2 Post-Project

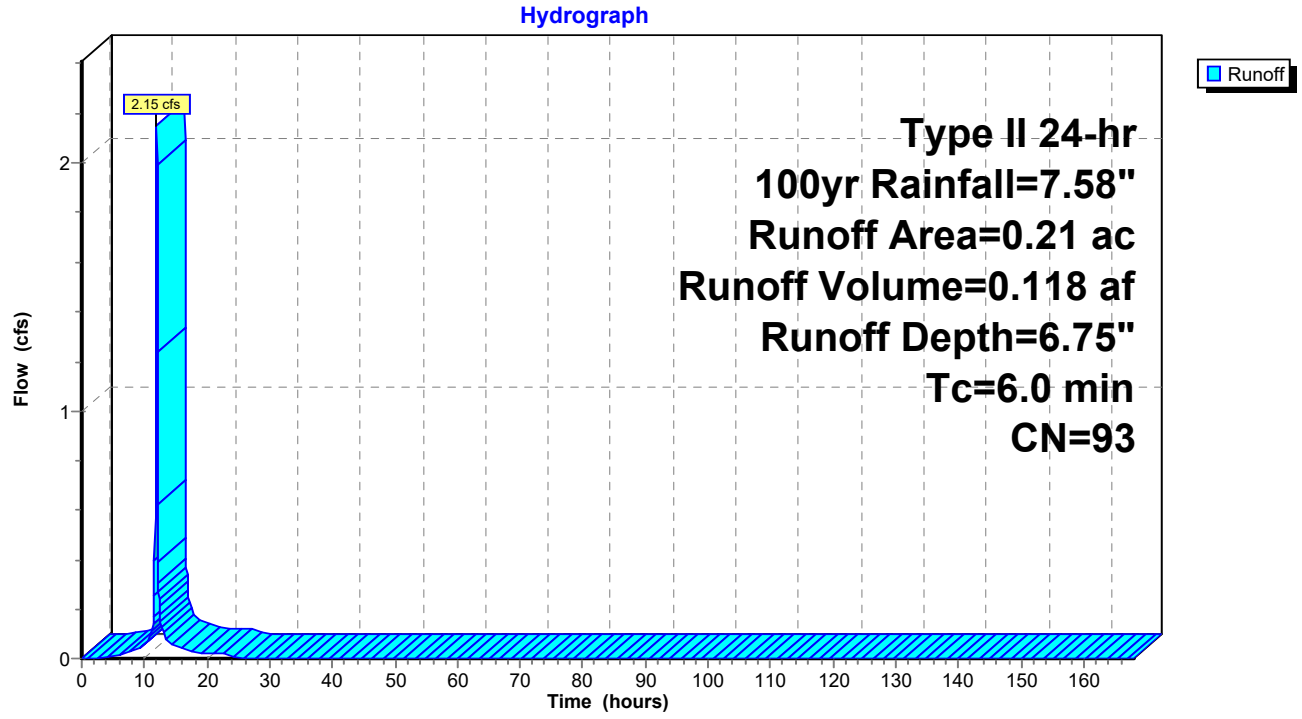
Runoff = 2.15 cfs @ 11.96 hrs, Volume= 0.118 af, Depth= 6.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=7.58"

Area (ac)	CN	Description
0.18	98	Paved parking, HSG B
0.03	61	>75% Grass cover, Good, HSG B
0.21	93	Weighted Average
0.03		14.29% Pervious Area
0.18		85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Tc**

Subcatchment 1S: SP2 Post-Project



MRC BMP DESIGN CALCULATIONS

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

MANAGED RELEASE CONCEPT (MRC) DESIGN SUMMARY

Complete One Design Summary Sheet for Each BMP Designed for MRC

GENERAL INFORMATION

Applicant Name:	**601 Washington Street Assoc LP**	Project Name:	**601 Washington Street Apartments**
Applicant Address:	**201 King of Prussia RD, Suite 501**	Municipality:	**Whitemarsh Township**
City, State, Zip:	Radnor, PA 19087	County:	**Montgomery County**

Permit Type: ☒ NPDES PAG-02 ☐ NPDES IP ☐ ESCGP ☐ ESP

	Pre-Development	Post-Development	Change
Impervious Area (acres):	4.36	5.58	+ 1.22

MRC BMP INFORMATION

MRC BMP Type: **Underground Detention Facility** Stormwater BMP Manual Section: **BMP 6.6.3**

Will the BMP Include Vegetation? ☐ Yes ☒ No

If Yes, Identify Proposed Vegetation:

For Non-Vegetated BMPs Will There Be Pre- or Post-Treatment? ☒ Yes (Pre-) ☐ Yes (Post-) ☐ No

If Yes, Identify Proposed Pre- or Post-Treatment: **Water Quality Filter**

Name of Surface Water to Receive MRC BMP Discharges: **Schuylkill River**

Designated Use of Surface Water: **WWF, MF** Existing Use of Surface Water (if different): **Not listed**

Is the Surface Water Impaired? ☒ Yes ☐ No

If Yes, Identify Cause(s): **Source Unknown - Polychlorinated Biphenyls (PCBS). Agriculture - cause unknown; Urban runoff/storm sewers - cause unknown; Municipal point source discharges - cause unknown.**

Will the BMP have an impermeable liner? ☒ Yes ☐ No

If Yes, explain why a liner is proposed: **Within Floodway**

BMP Media Description: **Topsoil:compost (2:1 Mixture)**

Are Any Deviations from MRC Design Standards Proposed? ☐ Yes ☒ No

If Yes, Identify Deviations:

MRC BMP DESIGN VALUES AND STANDARDS

Parameter	Design Value	Design Standard
Actual Contributing Impervious Area to BMP (acres)	**4.97**	
Equivalent Contributing Impervious Area to BMP (acres)	**4.92**	
Total Drainage Area to BMP (acres)	**6.29**	
MRC BMP Release Rate (cfs)	**0.05**	*No greater than 0.01 cfs / acre of equivalent contributing impervious*
Underdrain Outflow Rate During 1.2-Inch/2-Hour Storm (cfs)	**0.05**	*<= MRC BMP Release Rate (cfs)*
Maximum Storm Event Routed to MRC BMP	**100yr**	

MRC BMP Design Summary
Revised, August 25, 2020

Parameter	Design Value	Design Standard
BMP Footprint Area (ft^2)	**25,352**	
Bottom BMP Elevation (Native Soils) (ft)	**43.60**	
2-Yr/24-Hr Storm Ponding Depth (ft)	**1.85**	*1 ft (recommended) (2 ft max)*
Maximum Ponding Depth (ft)	**3.48**	*4 ft (max)*
Overflow Bypass Elevation (ft)	**N/A**	
Media Depth (ft)	**N/A**	*2 ft (min) – 4 ft (max)*
Media Void Space (%)	**N/A**	
Internal Water Storage (IWS) Depth (ft)	**1**	*1 ft recommended*
Top of IWS Elevation (ft)	**44.60**	
Underdrain Pipe Diameter (in)	**4**	
Underdrain Orifice Diameter (in)	**2**	
Underdrain Outlet Elevation (ft)	**44.60**	
IWS Available for Routing (%)	**50**	*50% max*
Separation Distance (Groundwater) (ft)	**1**	*1 ft (min) (2 ft recommended)*
Infiltration Rate (in/hr)	**N/A**	
Volume of Overflow During 1.2-Inch/2-Hour Storm (cf)	**0**	*0 (No overflow allowed)*
1-Yr/24-Hr **Pre**-Development Peak Rate (cfs)	**11.00**	
2-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**3.63**	*1-Yr/24-Hr Pre-Development Peak Rate (or per approved Act 167 Plan)*
10-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**15.35**	*10-Yr/24-Hr Pre-Development Peak Rate*
50-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**34.73**	*50-Yr/24-Hr Pre-Development Peak Rate*
100-Yr/24-Hr **Post**-Development Peak Rate (cfs)	**41.54**	*100-Yr/24-Hr Pre-Development Peak Rate*
Total 2-Yr/24-Hr Runoff Volume Managed by BMP (cf)	**57,296**	
Ponding Time @ 2-Yr/24-Hr Storm (hrs)	**129.5 hrs**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 10-Yr/24-Hr Storm (hrs)	**130.0 hrs**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 50-Yr/24-Hr Storm (hrs)	**130.5 hrs**	*72 hrs (surface), 7 days (underground)*
Ponding Time @ 100-Yr/24-Hr Storm (hrs)	**130.5 hrs**	*72 hrs (surface), 7 days (underground)*

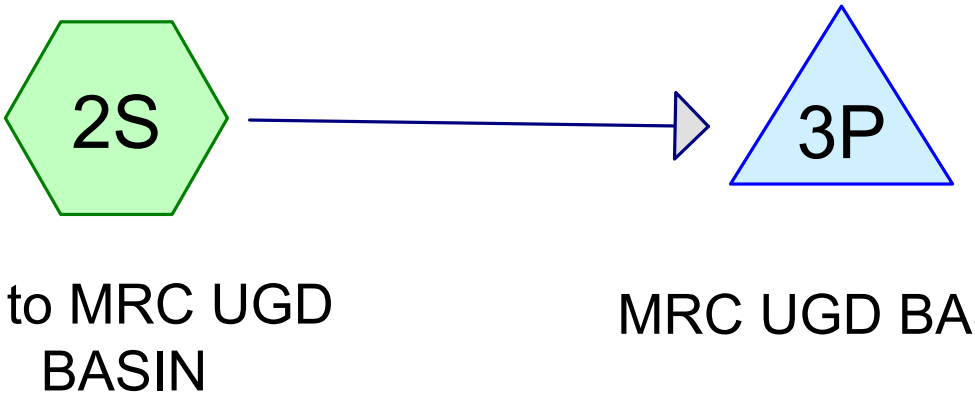
C. Richard Roseberry, P.E.
Licensed P.E. Name

Licensed P.E. Signature

PE046162R
License No.

Date

Licensed Professional's Seal



Subcat Reach Pond Link

Routing Diagram for Post Project SP1 1.2in
Prepared by Colliers Engineering & Design, Printed 5/31/2022
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.32	61	>75% Grass cover, Good, HSG B (2S)
4.97	98	Paved parking, HSG B (2S)
6.29	**90**	**TOTAL AREA**

Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment2S: D.A to MRC UGD BASIN Runoff Area=6.29 ac 79.01% Impervious Runoff Depth=0.78"
Tc=6.0 min CN=WQ Runoff=14.43 cfs 0.408 af

Pond 3P: MRC UGD BASIN Peak Elev=44.88' Storage=28,909 cf Inflow=14.43 cfs 0.408 af
Outflow=0.05 cfs 0.138 af

Total Runoff Area = 6.29 ac Runoff Volume = 0.408 af Average Runoff Depth = 0.78"
20.99% Pervious = 1.32 ac 79.01% Impervious = 4.97 ac

Summary for Subcatchment 2S: D.A to MRC UGD BASIN

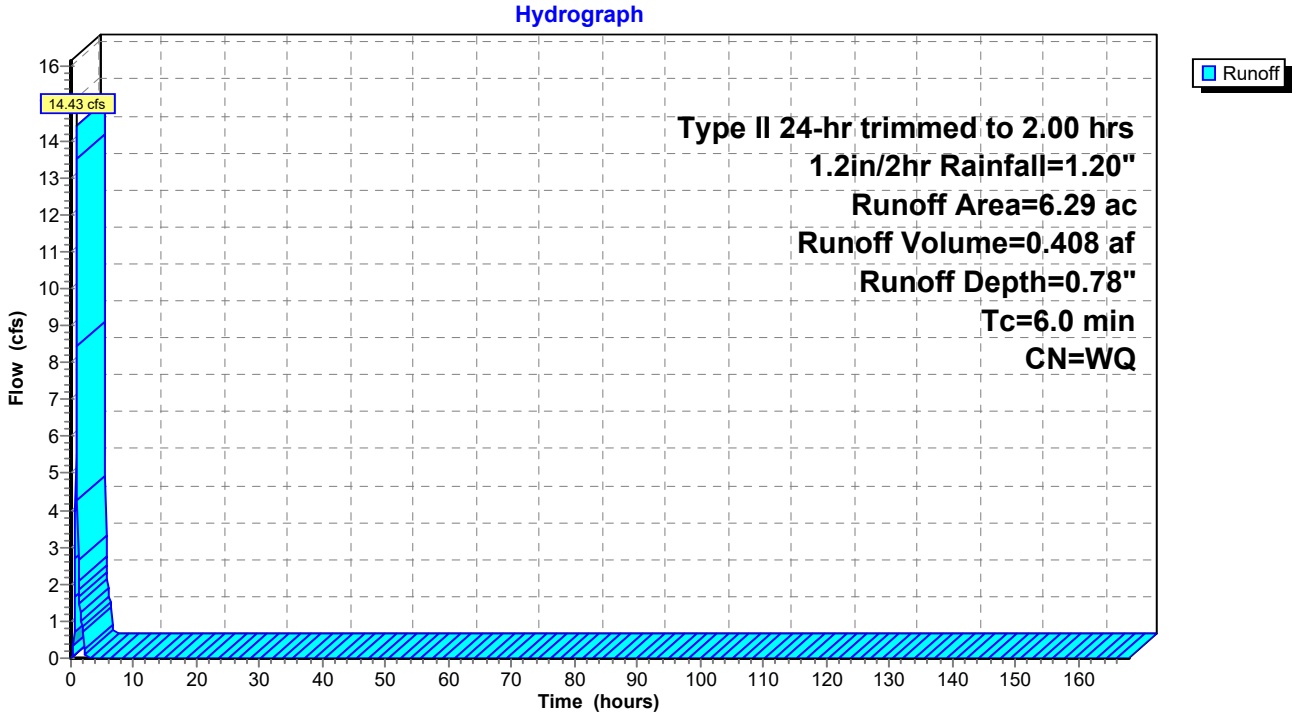
Runoff = 14.43 cfs @ 0.97 hrs, Volume= 0.408 af, Depth= 0.78"
Routed to Pond 3P : MRC UGD BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr trimmed to 2.00 hrs 1.2in/2hr Rainfall=1.20"

Area (ac)	CN	Description
4.97	98	Paved parking, HSG B
1.32	61	>75% Grass cover, Good, HSG B
6.29		Weighted Average
1.32		20.99% Pervious Area
4.97		79.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: D.A to MRC UGD BASIN



Summary for Pond 3P: MRC UGD BASIN

Inflow Area = 6.29 ac, 79.01% Impervious, Inflow Depth = 0.78" for 1.2in/2hr event
Inflow = 14.43 cfs @ 0.97 hrs, Volume= 0.408 af
Outflow = 0.05 cfs @ 2.18 hrs, Volume= 0.138 af, Atten= 100%, Lag= 72.7 min
Primary = 0.05 cfs @ 2.18 hrs, Volume= 0.138 af
Routed to nonexistent node 4R

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Starting Elev= 44.10' Surf.Area= 25,351 sf Storage= 11,279 cf
Peak Elev= 44.88' @ 2.18 hrs Surf.Area= 25,351 sf Storage= 28,909 cf (17,630 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 1,985.9 min (2,048.9 - 62.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	43.60'	0 cf	**47.23'W x 536.77'L x 4.50'H Field A** 114,081 cf Overall - 114,081 cf Embedded = 0 cf x 40.0% Voids
#2A	43.60'	90,231 cf	**StormTrap ST2 SingleTrap 4-0** x 136 Inside #1 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 136 Chambers in 4 Rows 33.92' x 523.46' Core + 6.66' Border = 47.23' x 536.77' System
		90,231 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	43.60'	**24.0" Round Culvert** L= 45.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.60' / 42.95' S= 0.0142 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	44.60'	**2.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	45.20'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.05 cfs @ 2.18 hrs HW=44.88' (Free Discharge)
└**1=Culvert** (Passes 0.05 cfs of 8.20 cfs potential flow)
├**2=Orifice** (Orifice Controls 0.05 cfs @ 2.14 fps)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: MRC UGD BASIN - Chamber Wizard Field A

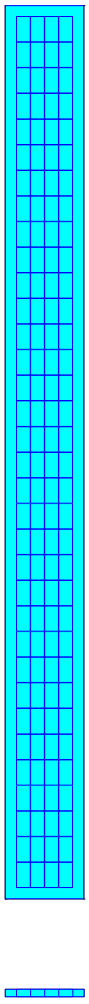
Chamber Model = StormTrap ST2 SingleTrap 4-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf
Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf

34 Chambers/Row x 15.40' Long = 523.46' Row Length +79.9" Border x 2 = 536.77' Base Length
4 Rows x 101.7" Wide + 79.9" Side Border x 2 = 47.23' Base Width
54.0" Chamber Height = 4.50' Field Height

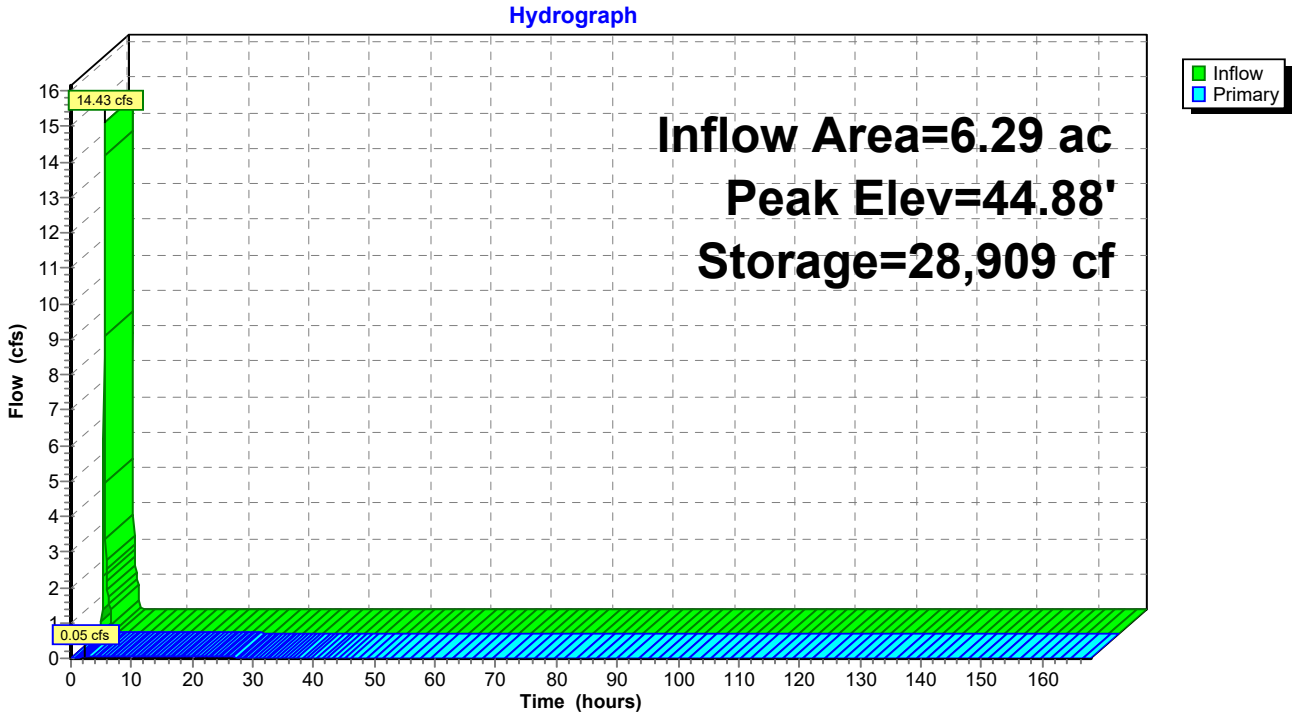
136 Chambers x 470.3 cf + 26,273.7 cf Border = 90,230.6 cf Chamber Storage
136 Chambers x 587.4 cf + 34,187.7 cf Border = 114,080.6 cf Displacement

Chamber Storage = 90,230.6 cf = 2.071 af
Overall Storage Efficiency = 79.1%
Overall System Size = 536.77' x 47.23' x 4.50'

136 Chambers (plus border)
4,225.2 cy Field



Pond 3P: MRC UGD BASIN



Stage-Discharge for Pond 3P: MRC UGD BASIN

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
43.60	0.00	46.20	12.56
43.65	0.00	46.25	13.47
43.70	0.00	46.30	14.39
43.75	0.00	46.35	15.34
43.80	0.00	46.40	16.30
43.85	0.00	46.45	17.28
43.90	0.00	46.50	18.27
43.95	0.00	46.55	19.28
44.00	0.00	46.60	20.30
44.05	0.00	46.65	21.33
44.10	0.00	46.70	21.92
44.15	0.00	46.75	22.18
44.20	0.00	46.80	22.44
44.25	0.00	46.85	22.69
44.30	0.00	46.90	22.94
44.35	0.00	46.95	23.19
44.40	0.00	47.00	23.43
44.45	0.00	47.05	23.68
44.50	0.00	47.10	23.92
44.55	0.00	47.15	24.16
44.60	0.00	47.20	24.39
44.65	0.00	47.25	24.62
44.70	0.01	47.30	24.86
44.75	0.03	47.35	25.08
44.80	0.04	47.40	25.31
44.85	0.04	47.45	25.54
44.90	0.05	47.50	25.76
44.95	0.05	47.55	25.98
45.00	0.06	47.60	26.20
45.05	0.06	47.65	26.42
45.10	0.07	47.70	26.63
45.15	0.07	47.75	26.85
45.20	0.08	47.80	27.06
45.25	0.22	47.85	27.27
45.30	0.49	47.90	27.48
45.35	0.84	47.95	27.69
45.40	1.25	48.00	27.89
45.45	1.71	48.05	28.10
45.50	2.21	48.10	**28.30**
45.55	2.76		
45.60	3.34		
45.65	3.96		
45.70	4.61		
45.75	5.30		
45.80	6.01		
45.85	6.75		
45.90	7.51		
45.95	8.30		
46.00	9.11		
46.05	9.94		
46.10	10.79		
46.15	11.66		

Stage-Area-Storage for Pond 3P: MRC UGD BASIN

Elevation (feet)	Storage (cubic-feet)
43.60	0
43.65	1,128
43.70	2,256
43.75	3,384
43.80	4,512
43.85	5,639
43.90	6,767
43.95	7,895
44.00	9,023
44.05	10,151
44.10	11,279
44.15	12,407
44.20	13,535
44.25	14,662
44.30	15,790
44.35	16,918
44.40	18,046
44.45	19,174
44.50	20,302
44.55	21,430
44.60	22,558
44.65	23,686
44.70	24,813
44.75	25,941
44.80	27,069
44.85	28,197
44.90	29,325
44.95	30,453
45.00	31,581
45.05	32,709
45.10	33,836
45.15	34,964
45.20	36,092
45.25	37,220
45.30	38,348
45.35	39,476
45.40	40,604
45.45	41,732
45.50	42,860
45.55	43,987
45.60	45,115
45.65	46,243
45.70	47,371
45.75	48,499
45.80	49,627
45.85	50,755
45.90	51,883
45.95	53,010
46.00	54,138
46.05	55,266
46.10	56,394
46.15	57,522
46.20	58,650
46.25	59,778
46.30	60,906
46.35	62,034
46.40	63,161
46.45	64,289
46.50	65,417
46.55	66,545
46.60	67,673
46.65	68,801
46.70	69,929
46.75	71,057
46.80	72,184
46.85	73,312
46.90	74,440
46.95	75,568
47.00	76,696
47.05	77,824
47.10	78,952
47.15	80,080
47.20	81,208
47.25	82,335
47.30	83,463
47.35	84,591
47.40	85,719
47.45	86,847
47.50	87,975
47.55	89,103
47.60	90,231
47.65	90,231
47.70	90,231
47.75	90,231
47.80	90,231
47.85	90,231
47.90	90,231
47.95	90,231
48.00	90,231
48.05	**90,231**
48.10	**90,231**

Equivalent Contributing Impervious Area to BMP (acres)

Per Managed Release Concept Design Standards Note 2: To obtain the equivalent impervious area being managed by a MRC BMP, determine the total volume of runoff generated during the 1.2-inch/2-hour event from all pervious and impervious areas contributing to the MRC and divide by 0.0833 feet. See Modified Worksheet 4 for runoff volume calculation to the MRC Basin during the 1.2-inch/2-hour storm event.

$$= \frac{\text{Total Volume of 1.2in/2 hr Storm Inflow (cubic feet)}}{0.0833\ feet * 43560\ square\ feet\ /acre}$$

$$= \frac{17849\ \text{(cubic feet)}}{0.0833\ feet * 43560\ square\ feet\ /acre}$$

= 4.92 acres

Modified Worksheet 4. Runoff Volume for 1.2/2-HR Storm Event to MRC Basin

PROJECT: **601 WASHINGTON STREET APARTMENTS**
Drainage Area:
2-Year Rainfall: **1.20** **in**

Total Site Area: 6.29 **acres**
Protected Site Area: 0.00 **acres**
Managed Area 6.29 **acres**

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Impervious	B	216,355	4.97	98	0.20	0.04	0.99	17,849
Lawn	B	57,640	1.32	61	6.39	1.28	0.00	0
TOTAL:		**273,995**	**6.29**					**17,849**

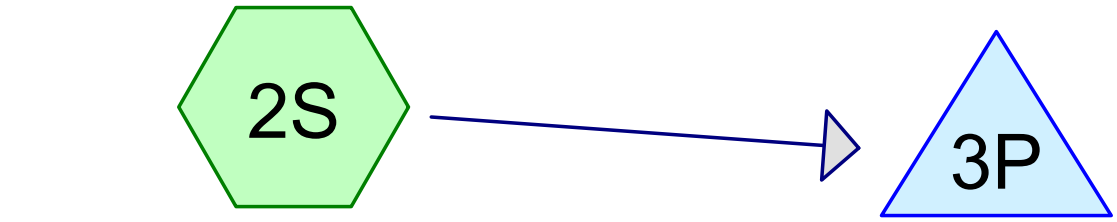
2-Year Volume (ft3):	**17,849**

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P - 0.2S)^2 / (P + 0.8S)$ where
   P = 2-Year Rainfall (in)
   S = (1000/ CN)-10

2. Runoff Volume (CF) = Q x Area x 1/12
   Q = Runoff (in)
   Area = Land use area (sq. ft)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI.
The use of a weighted CN value for volume calculations is not acceptable.



Equivalent Impervious D.A to MRC UGD BASIN

MRC UGD BASIN

Subcat Reach Pond Link

Routing Diagram for Post Project SP1 1.2in EQ IMP
Prepared by Colliers Engineering & Design, Printed 5/31/2022
HydroCAD® 10.10-6a s/n 08841 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.92	98	Paved parking, HSG B (2S)
4.92	**98**	**TOTAL AREA**

Time span=0.00-168.00 hrs, dt=0.05 hrs, 3361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment2S: Equivalent Impervious Runoff Area=4.92 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=98 Runoff=14.28 cfs 0.404 af

Pond 3P: MRC UGD BASIN Peak Elev=44.87' Storage=28,734 cf Inflow=14.28 cfs 0.404 af
Outflow=0.05 cfs 0.134 af

Total Runoff Area = 4.92 ac Runoff Volume = 0.404 af Average Runoff Depth = 0.99"
0.00% Pervious = 0.00 ac 100.00% Impervious = 4.92 ac

Summary for Subcatchment 2S: Equivalent Impervious D.A to MRC UGD BASIN

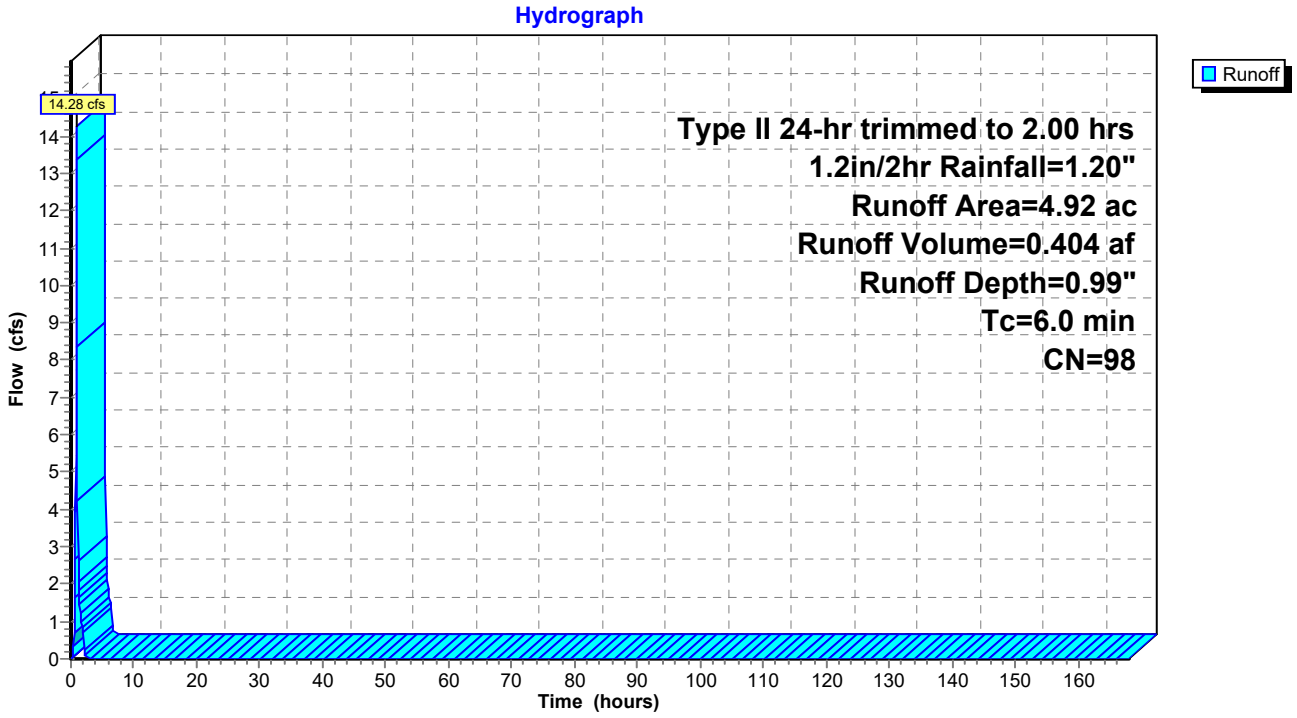
Runoff = 14.28 cfs @ 0.97 hrs, Volume= 0.404 af, Depth= 0.99"
Routed to Pond 3P : MRC UGD BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Type II 24-hr trimmed to 2.00 hrs 1.2in/2hr Rainfall=1.20"

Area (ac)	CN	Description
4.92	98	Paved parking, HSG B
4.92		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: Equivalent Impervious D.A to MRC UGD BASIN



Summary for Pond 3P: MRC UGD BASIN

Inflow Area = 4.92 ac,100.00% Impervious, Inflow Depth = 0.99" for 1.2in/2hr event
Inflow = 14.28 cfs @ 0.97 hrs, Volume= 0.404 af
Outflow = 0.05 cfs @ 2.18 hrs, Volume= 0.134 af, Atten= 100%, Lag= 72.7 min
Primary = 0.05 cfs @ 2.18 hrs, Volume= 0.134 af
Routed to nonexistent node 4R

Routing by Dyn-Stor-Ind method, Time Span= 0.00-168.00 hrs, dt= 0.05 hrs
Starting Elev= 44.10' Surf.Area= 25,351 sf Storage= 11,279 cf
Peak Elev= 44.87' @ 2.18 hrs Surf.Area= 25,351 sf Storage= 28,734 cf (17,456 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 1,987.4 min (2,050.3 - 62.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	43.60'	0 cf	**47.23'W x 536.77'L x 4.50'H Field A** 114,081 cf Overall - 114,081 cf Embedded = 0 cf x 40.0% Voids
#2A	43.60'	90,231 cf	**StormTrap ST2 SingleTrap 4-0** x 136 Inside #1 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 136 Chambers in 4 Rows 33.92' x 523.46' Core + 6.66' Border = 47.23' x 536.77' System
		90,231 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	43.60'	**24.0" Round Culvert** L= 45.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.60' / 42.95' S= 0.0142 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	44.60'	**2.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	45.20'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.05 cfs @ 2.18 hrs HW=44.87' (Free Discharge)
└**1=Culvert** (Passes 0.05 cfs of 8.11 cfs potential flow)
├**2=Orifice** (Orifice Controls 0.05 cfs @ 2.10 fps)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: MRC UGD BASIN - Chamber Wizard Field A

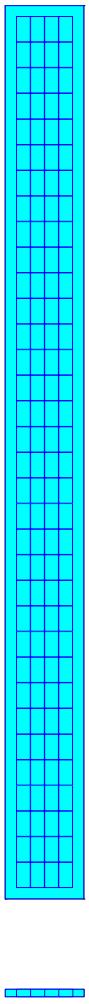
Chamber Model = StormTrap ST2 SingleTrap 4-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf
Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf

34 Chambers/Row x 15.40' Long = 523.46' Row Length +79.9" Border x 2 = 536.77' Base Length
4 Rows x 101.7" Wide + 79.9" Side Border x 2 = 47.23' Base Width
54.0" Chamber Height = 4.50' Field Height

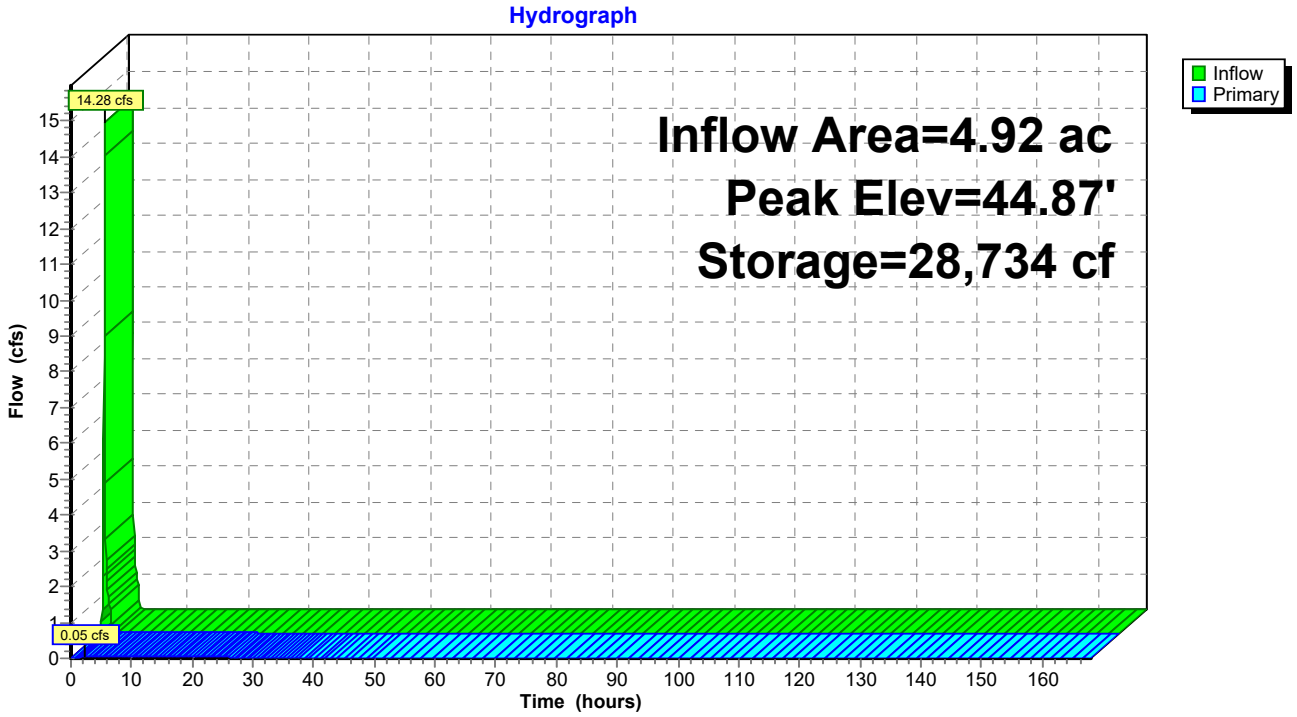
136 Chambers x 470.3 cf + 26,273.7 cf Border = 90,230.6 cf Chamber Storage
136 Chambers x 587.4 cf + 34,187.7 cf Border = 114,080.6 cf Displacement

Chamber Storage = 90,230.6 cf = 2.071 af
Overall Storage Efficiency = 79.1%
Overall System Size = 536.77' x 47.23' x 4.50'

136 Chambers (plus border)
4,225.2 cy Field



Pond 3P: MRC UGD BASIN



Stage-Discharge for Pond 3P: MRC UGD BASIN

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
43.60	0.00	46.20	12.56
43.65	0.00	46.25	13.47
43.70	0.00	46.30	14.39
43.75	0.00	46.35	15.34
43.80	0.00	46.40	16.30
43.85	0.00	46.45	17.28
43.90	0.00	46.50	18.27
43.95	0.00	46.55	19.28
44.00	0.00	46.60	20.30
44.05	0.00	46.65	21.33
44.10	0.00	46.70	21.92
44.15	0.00	46.75	22.18
44.20	0.00	46.80	22.44
44.25	0.00	46.85	22.69
44.30	0.00	46.90	22.94
44.35	0.00	46.95	23.19
44.40	0.00	47.00	23.43
44.45	0.00	47.05	23.68
44.50	0.00	47.10	23.92
44.55	0.00	47.15	24.16
44.60	0.00	47.20	24.39
44.65	0.00	47.25	24.62
44.70	0.01	47.30	24.86
44.75	0.03	47.35	25.08
44.80	0.04	47.40	25.31
44.85	0.04	47.45	25.54
44.90	0.05	47.50	25.76
44.95	0.05	47.55	25.98
45.00	0.06	47.60	26.20
45.05	0.06	47.65	26.42
45.10	0.07	47.70	26.63
45.15	0.07	47.75	26.85
45.20	0.08	47.80	27.06
45.25	0.22	47.85	27.27
45.30	0.49	47.90	27.48
45.35	0.84	47.95	27.69
45.40	1.25	48.00	27.89
45.45	1.71	48.05	28.10
45.50	2.21	48.10	**28.30**
45.55	2.76		
45.60	3.34		
45.65	3.96		
45.70	4.61		
45.75	5.30		
45.80	6.01		
45.85	6.75		
45.90	7.51		
45.95	8.30		
46.00	9.11		
46.05	9.94		
46.10	10.79		
46.15	11.66		

Stage-Area-Storage for Pond 3P: MRC UGD BASIN

Elevation (feet)	Storage (cubic-feet)
43.60	0
43.65	1,128
43.70	2,256
43.75	3,384
43.80	4,512
43.85	5,639
43.90	6,767
43.95	7,895
44.00	9,023
44.05	10,151
44.10	11,279
44.15	12,407
44.20	13,535
44.25	14,662
44.30	15,790
44.35	16,918
44.40	18,046
44.45	19,174
44.50	20,302
44.55	21,430
44.60	22,558
44.65	23,686
44.70	24,813
44.75	25,941
44.80	27,069
44.85	28,197
44.90	29,325
44.95	30,453
45.00	31,581
45.05	32,709
45.10	33,836
45.15	34,964
45.20	36,092
45.25	37,220
45.30	38,348
45.35	39,476
45.40	40,604
45.45	41,732
45.50	42,860
45.55	43,987
45.60	45,115
45.65	46,243
45.70	47,371
45.75	48,499
45.80	49,627
45.85	50,755
45.90	51,883
45.95	53,010
46.00	54,138
46.05	55,266
46.10	56,394
46.15	57,522
46.20	58,650
46.25	59,778
46.30	60,906
46.35	62,034
46.40	63,161
46.45	64,289
46.50	65,417
46.55	66,545
46.60	67,673
46.65	68,801
46.70	69,929
46.75	71,057
46.80	72,184
46.85	73,312
46.90	74,440
46.95	75,568
47.00	76,696
47.05	77,824
47.10	78,952
47.15	80,080
47.20	81,208
47.25	82,335
47.30	83,463
47.35	84,591
47.40	85,719
47.45	86,847
47.50	87,975
47.55	89,103
47.60	90,231
47.65	90,231
47.70	90,231
47.75	90,231
47.80	90,231
47.85	90,231
47.90	90,231
47.95	90,231
48.00	90,231
48.05	**90,231**
48.10	**90,231**

MRC BMP DRAWDOWN CALCULATIONS

Hydrograph for Pond 3P: MRC UGD BASIN

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	11,279	44.10	0.00
0.50	0.00	11,279	44.10	0.00
1.00	0.00	11,279	44.10	0.00
1.50	0.00	11,279	44.10	0.00
2.00	0.00	11,279	44.10	0.00
2.50	0.00	11,279	44.10	0.00
3.00	0.00	11,279	44.10	0.00
3.50	0.00	11,279	44.10	0.00
4.00	0.00	11,279	44.10	0.00
4.50	0.00	11,279	44.10	0.00
5.00	0.00	11,279	44.10	0.00
5.50	0.00	11,280	44.10	0.00
6.00	0.02	11,303	44.10	0.00
6.50	0.04	11,360	44.10	0.00
7.00	0.06	11,455	44.11	0.00
7.50	0.09	11,589	44.11	0.00
8.00	0.11	11,765	44.12	0.00
8.50	0.15	11,999	44.13	0.00
9.00	0.22	12,331	44.15	0.00
9.50	0.25	12,759	44.17	0.00
10.00	0.34	13,287	44.19	0.00
10.50	0.50	14,035	44.22	0.00
11.00	0.77	15,156	44.27	0.00
11.50	**1.41**	17,053	44.36	0.00
12.00	**22.12**	34,063	45.11	0.07
12.50	1.99	**41,692**	**45.45**	**1.69**
13.00	1.22	**41,396**	**45.44**	**1.56**
13.50	0.93	40,731	45.41	1.30
14.00	0.73	40,101	45.38	1.06
14.50	0.64	39,590	45.36	0.88
15.00	0.58	39,225	45.34	0.76
15.50	0.51	38,932	45.33	0.66
16.00	0.45	38,675	45.31	0.59
16.50	0.42	38,453	45.30	0.52
17.00	0.40	38,287	45.30	0.48
17.50	0.37	38,152	45.29	0.44
18.00	0.35	38,034	45.29	0.41
18.50	0.33	37,927	45.28	0.38
19.00	0.30	37,824	45.28	0.36
19.50	0.28	37,722	45.27	0.33
20.00	0.25	37,621	45.27	0.31
20.50	0.25	37,530	45.26	0.29
21.00	0.24	37,461	45.26	0.27
21.50	0.24	37,408	45.26	0.26
22.00	0.23	37,364	45.26	0.25
22.50	0.23	37,327	45.25	0.25
23.00	0.22	37,295	45.25	0.24
23.50	0.22	37,265	45.25	0.23
24.00	0.21	37,238	45.25	0.23
24.50	0.00	36,942	45.24	0.17
25.00	0.00	36,671	45.23	0.13
25.50	0.00	36,461	45.22	0.10

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
26.00	0.00	36,290	45.21	0.09
26.50	0.00	36,144	45.20	0.08
27.00	0.00	36,008	45.20	0.08
27.50	0.00	35,873	45.19	0.07
28.00	0.00	35,738	45.18	0.07
28.50	0.00	35,605	45.18	0.07
29.00	0.00	35,472	45.17	0.07
29.50	0.00	35,340	45.17	0.07
30.00	0.00	35,209	45.16	0.07
30.50	0.00	35,079	45.16	0.07
31.00	0.00	34,950	45.15	0.07
31.50	0.00	34,821	45.14	0.07
32.00	0.00	34,693	45.14	0.07
32.50	0.00	34,566	45.13	0.07
33.00	0.00	34,440	45.13	0.07
33.50	0.00	34,314	45.12	0.07
34.00	0.00	34,190	45.12	0.07
34.50	0.00	34,066	45.11	0.07
35.00	0.00	33,943	45.10	0.07
35.50	0.00	33,820	45.10	0.07
36.00	0.00	33,699	45.09	0.07
36.50	0.00	33,578	45.09	0.07
37.00	0.00	33,458	45.08	0.07
37.50	0.00	33,339	45.08	0.07
38.00	0.00	33,221	45.07	0.07
38.50	0.00	33,103	45.07	0.07
39.00	0.00	32,986	45.06	0.06
39.50	0.00	32,870	45.06	0.06
40.00	0.00	32,755	45.05	0.06
40.50	0.00	32,641	45.05	0.06
41.00	0.00	32,527	45.04	0.06
41.50	0.00	32,414	45.04	0.06
42.00	0.00	32,302	45.03	0.06
42.50	0.00	32,191	45.03	0.06
43.00	0.00	32,081	45.02	0.06
43.50	0.00	31,971	45.02	0.06
44.00	0.00	31,862	45.01	0.06
44.50	0.00	31,754	45.01	0.06
45.00	0.00	31,647	45.00	0.06
45.50	0.00	31,541	45.00	0.06
46.00	0.00	31,435	44.99	0.06
46.50	0.00	31,330	44.99	0.06
47.00	0.00	31,226	44.98	0.06
47.50	0.00	31,123	44.98	0.06
48.00	0.00	31,020	44.98	0.06
48.50	0.00	30,918	44.97	0.06
49.00	0.00	30,818	44.97	0.06
49.50	0.00	30,718	44.96	0.06
50.00	0.00	30,618	44.96	0.05
50.50	0.00	30,520	44.95	0.05
51.00	0.00	30,422	44.95	0.05
51.50	0.00	30,325	44.94	0.05

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
52.00	0.00	30,229	44.94	0.05
52.50	0.00	30,133	44.94	0.05
53.00	0.00	30,039	44.93	0.05
53.50	0.00	29,945	44.93	0.05
54.00	0.00	29,852	44.92	0.05
54.50	0.00	29,760	44.92	0.05
55.00	0.00	29,669	44.92	0.05
55.50	0.00	29,578	44.91	0.05
56.00	0.00	29,488	44.91	0.05
56.50	0.00	29,399	44.90	0.05
57.00	0.00	29,311	44.90	0.05
57.50	0.00	29,224	44.90	0.05
58.00	0.00	29,137	44.89	0.05
58.50	0.00	29,051	44.89	0.05
59.00	0.00	28,966	44.88	0.05
59.50	0.00	28,882	44.88	0.05
60.00	0.00	28,798	44.88	0.05
60.50	0.00	28,715	44.87	0.05
61.00	0.00	28,634	44.87	0.05
61.50	0.00	28,552	44.87	0.04
62.00	0.00	28,472	44.86	0.04
62.50	0.00	28,393	44.86	0.04
63.00	0.00	28,314	44.86	0.04
63.50	0.00	28,236	44.85	0.04
64.00	0.00	28,159	44.85	0.04
64.50	0.00	28,082	44.84	0.04
65.00	0.00	28,007	44.84	0.04
65.50	0.00	27,932	44.84	0.04
66.00	0.00	27,858	44.83	0.04
66.50	0.00	27,785	44.83	0.04
67.00	0.00	27,712	44.83	0.04
67.50	0.00	27,641	44.83	0.04
68.00	0.00	27,570	44.82	0.04
68.50	0.00	27,500	44.82	0.04
69.00	0.00	27,431	44.82	0.04
69.50	0.00	27,362	44.81	0.04
70.00	0.00	27,294	44.81	0.04
70.50	0.00	27,228	44.81	0.04
71.00	0.00	27,161	44.80	0.04
71.50	0.00	27,096	44.80	0.04
72.00	0.00	27,032	44.80	0.04
72.50	0.00	26,968	44.80	0.04
73.00	0.00	26,905	44.79	0.03
73.50	0.00	26,843	44.79	0.03
74.00	0.00	26,781	44.79	0.03
74.50	0.00	26,721	44.78	0.03
75.00	0.00	26,661	44.78	0.03
75.50	0.00	26,602	44.78	0.03
76.00	0.00	26,544	44.78	0.03
76.50	0.00	26,487	44.77	0.03
77.00	0.00	26,430	44.77	0.03
77.50	0.00	26,374	44.77	0.03

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
78.00	0.00	26,319	44.77	0.03
78.50	0.00	26,265	44.76	0.03
79.00	0.00	26,211	44.76	0.03
79.50	0.00	26,158	44.76	0.03
80.00	0.00	26,106	44.76	0.03
80.50	0.00	26,055	44.76	0.03
81.00	0.00	26,004	44.75	0.03
81.50	0.00	25,954	44.75	0.03
82.00	0.00	25,905	44.75	0.03
82.50	0.00	25,857	44.75	0.03
83.00	0.00	25,810	44.74	0.03
83.50	0.00	25,764	44.74	0.03
84.00	0.00	25,719	44.74	0.02
84.50	0.00	25,674	44.74	0.02
85.00	0.00	25,630	44.74	0.02
85.50	0.00	25,588	44.73	0.02
86.00	0.00	25,546	44.73	0.02
86.50	0.00	25,505	44.73	0.02
87.00	0.00	25,465	44.73	0.02
87.50	0.00	25,425	44.73	0.02
88.00	0.00	25,387	44.73	0.02
88.50	0.00	25,349	44.72	0.02
89.00	0.00	25,312	44.72	0.02
89.50	0.00	25,275	44.72	0.02
90.00	0.00	25,240	44.72	0.02
90.50	0.00	25,205	44.72	0.02
91.00	0.00	25,171	44.72	0.02
91.50	0.00	25,137	44.71	0.02
92.00	0.00	25,105	44.71	0.02
92.50	0.00	25,073	44.71	0.02
93.00	0.00	25,041	44.71	0.02
93.50	0.00	25,010	44.71	0.02
94.00	0.00	24,980	44.71	0.02
94.50	0.00	24,951	44.71	0.02
95.00	0.00	24,922	44.70	0.02
95.50	0.00	24,893	44.70	0.02
96.00	0.00	24,866	44.70	0.02
96.50	0.00	24,838	44.70	0.01
97.00	0.00	24,812	44.70	0.01
97.50	0.00	24,785	44.70	0.01
98.00	0.00	24,760	44.70	0.01
98.50	0.00	24,734	44.70	0.01
99.00	0.00	24,710	44.70	0.01
99.50	0.00	24,686	44.69	0.01
100.00	0.00	24,662	44.69	0.01
100.50	0.00	24,639	44.69	0.01
101.00	0.00	24,616	44.69	0.01
101.50	0.00	24,593	44.69	0.01
102.00	0.00	24,571	44.69	0.01
102.50	0.00	24,550	44.69	0.01
103.00	0.00	24,529	44.69	0.01
103.50	0.00	24,508	44.69	0.01

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
104.00	0.00	24,487	44.69	0.01
104.50	0.00	24,467	44.68	0.01
105.00	0.00	24,448	44.68	0.01
105.50	0.00	24,428	44.68	0.01
106.00	0.00	24,409	44.68	0.01
106.50	0.00	24,391	44.68	0.01
107.00	0.00	24,372	44.68	0.01
107.50	0.00	24,354	44.68	0.01
108.00	0.00	24,337	44.68	0.01
108.50	0.00	24,319	44.68	0.01
109.00	0.00	24,302	44.68	0.01
109.50	0.00	24,286	44.68	0.01
110.00	0.00	24,269	44.68	0.01
110.50	0.00	24,253	44.68	0.01
111.00	0.00	24,237	44.67	0.01
111.50	0.00	24,221	44.67	0.01
112.00	0.00	24,206	44.67	0.01
112.50	0.00	24,191	44.67	0.01
113.00	0.00	24,176	44.67	0.01
113.50	0.00	24,161	44.67	0.01
114.00	0.00	24,147	44.67	0.01
114.50	0.00	24,133	44.67	0.01
115.00	0.00	24,119	44.67	0.01
115.50	0.00	24,105	44.67	0.01
116.00	0.00	24,092	44.67	0.01
116.50	0.00	24,078	44.67	0.01
117.00	0.00	24,065	44.67	0.01
117.50	0.00	24,053	44.67	0.01
118.00	0.00	24,040	44.67	0.01
118.50	0.00	24,027	44.67	0.01
119.00	0.00	24,015	44.66	0.01
119.50	0.00	24,003	44.66	0.01
120.00	0.00	23,991	44.66	0.01
120.50	0.00	23,979	44.66	0.01
121.00	0.00	23,968	44.66	0.01
121.50	0.00	23,957	44.66	0.01
122.00	0.00	23,945	44.66	0.01
122.50	0.00	23,934	44.66	0.01
123.00	0.00	23,923	44.66	0.01
123.50	0.00	23,913	44.66	0.01
124.00	0.00	23,902	44.66	0.01
124.50	0.00	23,892	44.66	0.01
125.00	0.00	23,882	44.66	0.01
125.50	0.00	23,871	44.66	0.01
126.00	0.00	23,861	44.66	0.01
126.50	0.00	23,852	44.66	0.01
127.00	0.00	23,842	44.66	0.01
127.50	0.00	23,832	44.66	0.01
128.00	0.00	23,823	44.66	0.01
128.50	0.00	23,814	44.66	0.01
129.00	0.00	23,804	44.66	0.01
129.50	0.00	23,795	44.65	0.00

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
130.00	0.00	23,786	44.65	0.00
130.50	0.00	23,778	44.65	0.00
131.00	0.00	23,769	44.65	0.00
131.50	0.00	23,760	44.65	0.00
132.00	0.00	23,752	44.65	0.00
132.50	0.00	23,744	44.65	0.00
133.00	0.00	23,735	44.65	0.00
133.50	0.00	23,727	44.65	0.00
134.00	0.00	23,719	44.65	0.00
134.50	0.00	23,711	44.65	0.00
135.00	0.00	23,703	44.65	0.00
135.50	0.00	23,696	44.65	0.00
136.00	0.00	23,688	44.65	0.00
136.50	0.00	23,681	44.65	0.00
137.00	0.00	23,673	44.65	0.00
137.50	0.00	23,666	44.65	0.00
138.00	0.00	23,659	44.65	0.00
138.50	0.00	23,651	44.65	0.00
139.00	0.00	23,644	44.65	0.00
139.50	0.00	23,637	44.65	0.00
140.00	0.00	23,630	44.65	0.00
140.50	0.00	23,624	44.65	0.00
141.00	0.00	23,617	44.65	0.00
141.50	0.00	23,610	44.65	0.00
142.00	0.00	23,604	44.65	0.00
142.50	0.00	23,597	44.65	0.00
143.00	0.00	23,591	44.65	0.00
143.50	0.00	23,584	44.65	0.00
144.00	0.00	23,578	44.65	0.00
144.50	0.00	23,572	44.64	0.00
145.00	0.00	23,566	44.64	0.00
145.50	0.00	23,560	44.64	0.00
146.00	0.00	23,554	44.64	0.00
146.50	0.00	23,548	44.64	0.00
147.00	0.00	23,542	44.64	0.00
147.50	0.00	23,536	44.64	0.00
148.00	0.00	23,530	44.64	0.00
148.50	0.00	23,525	44.64	0.00
149.00	0.00	23,519	44.64	0.00
149.50	0.00	23,514	44.64	0.00
150.00	0.00	23,508	44.64	0.00
150.50	0.00	23,503	44.64	0.00
151.00	0.00	23,497	44.64	0.00
151.50	0.00	23,492	44.64	0.00
152.00	0.00	23,487	44.64	0.00
152.50	0.00	23,482	44.64	0.00
153.00	0.00	23,476	44.64	0.00
153.50	0.00	23,471	44.64	0.00
154.00	0.00	23,466	44.64	0.00
154.50	0.00	23,461	44.64	0.00
155.00	0.00	23,456	44.64	0.00
155.50	0.00	23,452	44.64	0.00

Hydrograph for Pond 3P: MRC UGD BASIN

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	11,279	44.10	0.00
0.50	0.00	11,279	44.10	0.00
1.00	0.00	11,279	44.10	0.00
1.50	0.00	11,279	44.10	0.00
2.00	0.00	11,279	44.10	0.00
2.50	0.00	11,279	44.10	0.00
3.00	0.00	11,279	44.10	0.00
3.50	0.00	11,279	44.10	0.00
4.00	0.00	11,279	44.10	0.00
4.50	0.03	11,307	44.10	0.00
5.00	0.06	11,386	44.10	0.00
5.50	0.09	11,520	44.11	0.00
6.00	0.13	11,714	44.12	0.00
6.50	0.16	11,973	44.13	0.00
7.00	0.20	12,298	44.15	0.00
7.50	0.24	12,692	44.16	0.00
8.00	0.28	13,159	44.18	0.00
8.50	0.37	13,733	44.21	0.00
9.00	0.48	14,496	44.24	0.00
9.50	0.54	15,426	44.28	0.00
10.00	0.70	16,521	44.33	0.00
10.50	0.97	18,011	44.40	0.00
11.00	1.44	20,150	44.49	0.00
11.50	**2.53**	23,618	44.65	0.00
12.00	**35.20**	**50,474**	**45.84**	**6.56**
12.50	3.09	**50,494**	**45.84**	**6.57**
13.00	1.89	45,786	45.63	3.71
13.50	1.43	43,341	45.52	2.44
14.00	1.12	41,889	45.46	1.77
14.50	0.99	40,959	45.42	1.39
15.00	0.89	40,375	45.39	1.16
15.50	0.79	39,947	45.37	1.00
16.00	0.69	39,588	45.35	0.88
16.50	0.64	39,291	45.34	0.78
17.00	0.61	39,076	45.33	0.71
17.50	0.57	38,905	45.32	0.66
18.00	0.53	38,757	45.32	0.61
18.50	0.50	38,620	45.31	0.57
19.00	0.46	38,488	45.31	0.53
19.50	0.42	38,357	45.30	0.50
20.00	0.39	38,227	45.29	0.46
20.50	0.38	38,109	45.29	0.43
21.00	0.37	38,025	45.29	0.41
21.50	0.36	37,962	45.28	0.39
22.00	0.35	37,911	45.28	0.38
22.50	0.35	37,868	45.28	0.37
23.00	0.34	37,830	45.28	0.36
23.50	0.33	37,795	45.28	0.35
24.00	0.32	37,761	45.27	0.34
24.50	0.00	37,330	45.25	0.25
25.00	0.00	36,955	45.24	0.18
25.50	0.00	36,681	45.23	0.13

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
26.00	0.00	36,469	45.22	0.10
26.50	0.00	36,297	45.21	0.09
27.00	0.00	36,149	45.20	0.08
27.50	0.00	36,013	45.20	0.08
28.00	0.00	35,878	45.19	0.07
28.50	0.00	35,744	45.18	0.07
29.00	0.00	35,610	45.18	0.07
29.50	0.00	35,478	45.17	0.07
30.00	0.00	35,346	45.17	0.07
30.50	0.00	35,215	45.16	0.07
31.00	0.00	35,084	45.16	0.07
31.50	0.00	34,955	45.15	0.07
32.00	0.00	34,826	45.14	0.07
32.50	0.00	34,698	45.14	0.07
33.00	0.00	34,571	45.13	0.07
33.50	0.00	34,445	45.13	0.07
34.00	0.00	34,319	45.12	0.07
34.50	0.00	34,195	45.12	0.07
35.00	0.00	34,071	45.11	0.07
35.50	0.00	33,948	45.10	0.07
36.00	0.00	33,825	45.10	0.07
36.50	0.00	33,704	45.09	0.07
37.00	0.00	33,583	45.09	0.07
37.50	0.00	33,463	45.08	0.07
38.00	0.00	33,344	45.08	0.07
38.50	0.00	33,225	45.07	0.07
39.00	0.00	33,108	45.07	0.07
39.50	0.00	32,991	45.06	0.06
40.00	0.00	32,875	45.06	0.06
40.50	0.00	32,760	45.05	0.06
41.00	0.00	32,646	45.05	0.06
41.50	0.00	32,532	45.04	0.06
42.00	0.00	32,419	45.04	0.06
42.50	0.00	32,307	45.03	0.06
43.00	0.00	32,196	45.03	0.06
43.50	0.00	32,085	45.02	0.06
44.00	0.00	31,976	45.02	0.06
44.50	0.00	31,867	45.01	0.06
45.00	0.00	31,759	45.01	0.06
45.50	0.00	31,651	45.00	0.06
46.00	0.00	31,545	45.00	0.06
46.50	0.00	31,439	44.99	0.06
47.00	0.00	31,334	44.99	0.06
47.50	0.00	31,230	44.98	0.06
48.00	0.00	31,127	44.98	0.06
48.50	0.00	31,024	44.98	0.06
49.00	0.00	30,923	44.97	0.06
49.50	0.00	30,822	44.97	0.06
50.00	0.00	30,722	44.96	0.06
50.50	0.00	30,622	44.96	0.05
51.00	0.00	30,524	44.95	0.05
51.50	0.00	30,426	44.95	0.05

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
52.00	0.00	30,329	44.94	0.05
52.50	0.00	30,233	44.94	0.05
53.00	0.00	30,137	44.94	0.05
53.50	0.00	30,043	44.93	0.05
54.00	0.00	29,949	44.93	0.05
54.50	0.00	29,856	44.92	0.05
55.00	0.00	29,764	44.92	0.05
55.50	0.00	29,672	44.92	0.05
56.00	0.00	29,582	44.91	0.05
56.50	0.00	29,492	44.91	0.05
57.00	0.00	29,403	44.90	0.05
57.50	0.00	29,315	44.90	0.05
58.00	0.00	29,227	44.90	0.05
58.50	0.00	29,140	44.89	0.05
59.00	0.00	29,055	44.89	0.05
59.50	0.00	28,969	44.88	0.05
60.00	0.00	28,885	44.88	0.05
60.50	0.00	28,802	44.88	0.05
61.00	0.00	28,719	44.87	0.05
61.50	0.00	28,637	44.87	0.05
62.00	0.00	28,556	44.87	0.04
62.50	0.00	28,475	44.86	0.04
63.00	0.00	28,396	44.86	0.04
63.50	0.00	28,317	44.86	0.04
64.00	0.00	28,239	44.85	0.04
64.50	0.00	28,162	44.85	0.04
65.00	0.00	28,085	44.85	0.04
65.50	0.00	28,010	44.84	0.04
66.00	0.00	27,935	44.84	0.04
66.50	0.00	27,861	44.84	0.04
67.00	0.00	27,788	44.83	0.04
67.50	0.00	27,715	44.83	0.04
68.00	0.00	27,644	44.83	0.04
68.50	0.00	27,573	44.82	0.04
69.00	0.00	27,503	44.82	0.04
69.50	0.00	27,433	44.82	0.04
70.00	0.00	27,365	44.81	0.04
70.50	0.00	27,297	44.81	0.04
71.00	0.00	27,230	44.81	0.04
71.50	0.00	27,164	44.80	0.04
72.00	0.00	27,099	44.80	0.04
72.50	0.00	27,034	44.80	0.04
73.00	0.00	26,970	44.80	0.04
73.50	0.00	26,908	44.79	0.03
74.00	0.00	26,845	44.79	0.03
74.50	0.00	26,784	44.79	0.03
75.00	0.00	26,723	44.78	0.03
75.50	0.00	26,664	44.78	0.03
76.00	0.00	26,605	44.78	0.03
76.50	0.00	26,546	44.78	0.03
77.00	0.00	26,489	44.77	0.03
77.50	0.00	26,432	44.77	0.03

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
78.00	0.00	26,377	44.77	0.03
78.50	0.00	26,322	44.77	0.03
79.00	0.00	26,267	44.76	0.03
79.50	0.00	26,213	44.76	0.03
80.00	0.00	26,160	44.76	0.03
80.50	0.00	26,108	44.76	0.03
81.00	0.00	26,057	44.76	0.03
81.50	0.00	26,006	44.75	0.03
82.00	0.00	25,956	44.75	0.03
82.50	0.00	25,907	44.75	0.03
83.00	0.00	25,859	44.75	0.03
83.50	0.00	25,812	44.74	0.03
84.00	0.00	25,766	44.74	0.03
84.50	0.00	25,720	44.74	0.02
85.00	0.00	25,676	44.74	0.02
85.50	0.00	25,632	44.74	0.02
86.00	0.00	25,590	44.73	0.02
86.50	0.00	25,548	44.73	0.02
87.00	0.00	25,506	44.73	0.02
87.50	0.00	25,466	44.73	0.02
88.00	0.00	25,427	44.73	0.02
88.50	0.00	25,388	44.73	0.02
89.00	0.00	25,350	44.72	0.02
89.50	0.00	25,313	44.72	0.02
90.00	0.00	25,277	44.72	0.02
90.50	0.00	25,241	44.72	0.02
91.00	0.00	25,206	44.72	0.02
91.50	0.00	25,172	44.72	0.02
92.00	0.00	25,139	44.71	0.02
92.50	0.00	25,106	44.71	0.02
93.00	0.00	25,074	44.71	0.02
93.50	0.00	25,042	44.71	0.02
94.00	0.00	25,012	44.71	0.02
94.50	0.00	24,981	44.71	0.02
95.00	0.00	24,952	44.71	0.02
95.50	0.00	24,923	44.70	0.02
96.00	0.00	24,894	44.70	0.02
96.50	0.00	24,867	44.70	0.02
97.00	0.00	24,839	44.70	0.02
97.50	0.00	24,813	44.70	0.01
98.00	0.00	24,786	44.70	0.01
98.50	0.00	24,761	44.70	0.01
99.00	0.00	24,736	44.70	0.01
99.50	0.00	24,711	44.70	0.01
100.00	0.00	24,687	44.69	0.01
100.50	0.00	24,663	44.69	0.01
101.00	0.00	24,640	44.69	0.01
101.50	0.00	24,617	44.69	0.01
102.00	0.00	24,594	44.69	0.01
102.50	0.00	24,572	44.69	0.01
103.00	0.00	24,551	44.69	0.01
103.50	0.00	24,529	44.69	0.01

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
104.00	0.00	24,509	44.69	0.01
104.50	0.00	24,488	44.69	0.01
105.00	0.00	24,468	44.68	0.01
105.50	0.00	24,448	44.68	0.01
106.00	0.00	24,429	44.68	0.01
106.50	0.00	24,410	44.68	0.01
107.00	0.00	24,391	44.68	0.01
107.50	0.00	24,373	44.68	0.01
108.00	0.00	24,355	44.68	0.01
108.50	0.00	24,337	44.68	0.01
109.00	0.00	24,320	44.68	0.01
109.50	0.00	24,303	44.68	0.01
110.00	0.00	24,286	44.68	0.01
110.50	0.00	24,270	44.68	0.01
111.00	0.00	24,254	44.68	0.01
111.50	0.00	24,238	44.67	0.01
112.00	0.00	24,222	44.67	0.01
112.50	0.00	24,207	44.67	0.01
113.00	0.00	24,192	44.67	0.01
113.50	0.00	24,177	44.67	0.01
114.00	0.00	24,162	44.67	0.01
114.50	0.00	24,148	44.67	0.01
115.00	0.00	24,133	44.67	0.01
115.50	0.00	24,120	44.67	0.01
116.00	0.00	24,106	44.67	0.01
116.50	0.00	24,092	44.67	0.01
117.00	0.00	24,079	44.67	0.01
117.50	0.00	24,066	44.67	0.01
118.00	0.00	24,053	44.67	0.01
118.50	0.00	24,040	44.67	0.01
119.00	0.00	24,028	44.67	0.01
119.50	0.00	24,016	44.66	0.01
120.00	0.00	24,004	44.66	0.01
120.50	0.00	23,992	44.66	0.01
121.00	0.00	23,980	44.66	0.01
121.50	0.00	23,968	44.66	0.01
122.00	0.00	23,957	44.66	0.01
122.50	0.00	23,946	44.66	0.01
123.00	0.00	23,935	44.66	0.01
123.50	0.00	23,924	44.66	0.01
124.00	0.00	23,913	44.66	0.01
124.50	0.00	23,903	44.66	0.01
125.00	0.00	23,892	44.66	0.01
125.50	0.00	23,882	44.66	0.01
126.00	0.00	23,872	44.66	0.01
126.50	0.00	23,862	44.66	0.01
127.00	0.00	23,852	44.66	0.01
127.50	0.00	23,842	44.66	0.01
128.00	0.00	23,833	44.66	0.01
128.50	0.00	23,823	44.66	0.01
129.00	0.00	23,814	44.66	0.01
129.50	0.00	23,805	44.66	0.01

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
130.00	0.00	23,796	44.65	0.00
130.50	0.00	23,787	44.65	0.00
131.00	0.00	23,778	44.65	0.00
131.50	0.00	23,769	44.65	0.00
132.00	0.00	23,761	44.65	0.00
132.50	0.00	23,752	44.65	0.00
133.00	0.00	23,744	44.65	0.00
133.50	0.00	23,736	44.65	0.00
134.00	0.00	23,728	44.65	0.00
134.50	0.00	23,720	44.65	0.00
135.00	0.00	23,712	44.65	0.00
135.50	0.00	23,704	44.65	0.00
136.00	0.00	23,696	44.65	0.00
136.50	0.00	23,688	44.65	0.00
137.00	0.00	23,681	44.65	0.00
137.50	0.00	23,673	44.65	0.00
138.00	0.00	23,666	44.65	0.00
138.50	0.00	23,659	44.65	0.00
139.00	0.00	23,652	44.65	0.00
139.50	0.00	23,645	44.65	0.00
140.00	0.00	23,638	44.65	0.00
140.50	0.00	23,631	44.65	0.00
141.00	0.00	23,624	44.65	0.00
141.50	0.00	23,617	44.65	0.00
142.00	0.00	23,610	44.65	0.00
142.50	0.00	23,604	44.65	0.00
143.00	0.00	23,597	44.65	0.00
143.50	0.00	23,591	44.65	0.00
144.00	0.00	23,585	44.65	0.00
144.50	0.00	23,578	44.65	0.00
145.00	0.00	23,572	44.64	0.00
145.50	0.00	23,566	44.64	0.00
146.00	0.00	23,560	44.64	0.00
146.50	0.00	23,554	44.64	0.00
147.00	0.00	23,548	44.64	0.00
147.50	0.00	23,542	44.64	0.00
148.00	0.00	23,536	44.64	0.00
148.50	0.00	23,531	44.64	0.00
149.00	0.00	23,525	44.64	0.00
149.50	0.00	23,519	44.64	0.00
150.00	0.00	23,514	44.64	0.00
150.50	0.00	23,508	44.64	0.00
151.00	0.00	23,503	44.64	0.00
151.50	0.00	23,498	44.64	0.00
152.00	0.00	23,492	44.64	0.00
152.50	0.00	23,487	44.64	0.00
153.00	0.00	23,482	44.64	0.00
153.50	0.00	23,477	44.64	0.00
154.00	0.00	23,472	44.64	0.00
154.50	0.00	23,467	44.64	0.00
155.00	0.00	23,462	44.64	0.00
155.50	0.00	23,457	44.64	0.00

Hydrograph for Pond 3P: MRC UGD BASIN

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	11,279	44.10	0.00
0.50	0.00	11,279	44.10	0.00
1.00	0.00	11,279	44.10	0.00
1.50	0.00	11,279	44.10	0.00
2.00	0.00	11,279	44.10	0.00
2.50	0.00	11,279	44.10	0.00
3.00	0.00	11,279	44.10	0.00
3.50	0.04	11,317	44.10	0.00
4.00	0.08	11,431	44.11	0.00
4.50	0.13	11,623	44.12	0.00
5.00	0.18	11,901	44.13	0.00
5.50	0.23	12,272	44.14	0.00
6.00	0.29	12,738	44.16	0.00
6.50	0.34	13,304	44.19	0.00
7.00	0.40	13,973	44.22	0.00
7.50	0.46	14,745	44.25	0.00
8.00	0.52	15,623	44.29	0.00
8.50	0.66	16,669	44.34	0.00
9.00	0.84	18,017	44.40	0.00
9.50	0.92	19,617	44.47	0.00
10.00	1.16	21,454	44.55	0.00
10.50	1.58	23,895	44.66	0.01
11.00	2.28	27,282	44.81	0.04
11.50	**3.91**	32,610	45.05	0.06
12.00	**50.75**	**66,697**	**46.56**	**19.41**
12.50	4.40	**57,081**	**46.13**	**11.32**
13.00	2.69	48,843	45.77	5.51
13.50	2.03	45,260	45.61	3.42
14.00	1.59	43,324	45.52	2.43
14.50	1.40	42,150	45.47	1.89
15.00	1.26	41,441	45.44	1.58
15.50	1.12	40,927	45.41	1.37
16.00	0.97	40,491	45.40	1.20
16.50	0.91	40,132	45.38	1.07
17.00	0.85	39,876	45.37	0.98
17.50	0.80	39,673	45.36	0.91
18.00	0.75	39,496	45.35	0.85
18.50	0.70	39,329	45.34	0.79
19.00	0.65	39,168	45.34	0.74
19.50	0.60	39,006	45.33	0.69
20.00	0.55	38,844	45.32	0.64
20.50	0.53	38,699	45.32	0.59
21.00	0.52	38,600	45.31	0.57
21.50	0.51	38,526	45.31	0.54
22.00	0.50	38,468	45.31	0.53
22.50	0.49	38,419	45.30	0.51
23.00	0.48	38,374	45.30	0.50
23.50	0.47	38,333	45.30	0.49
24.00	0.46	38,293	45.30	0.48
24.50	0.00	37,706	45.27	0.33
25.00	0.00	37,216	45.25	0.22
25.50	0.00	36,873	45.23	0.16

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
26.00	0.00	36,618	45.22	0.12
26.50	0.00	36,419	45.21	0.10
27.00	0.00	36,255	45.21	0.08
27.50	0.00	36,112	45.20	0.08
28.00	0.00	35,977	45.19	0.08
28.50	0.00	35,842	45.19	0.07
29.00	0.00	35,708	45.18	0.07
29.50	0.00	35,574	45.18	0.07
30.00	0.00	35,442	45.17	0.07
30.50	0.00	35,310	45.17	0.07
31.00	0.00	35,179	45.16	0.07
31.50	0.00	35,049	45.15	0.07
32.00	0.00	34,920	45.15	0.07
32.50	0.00	34,792	45.14	0.07
33.00	0.00	34,664	45.14	0.07
33.50	0.00	34,537	45.13	0.07
34.00	0.00	34,411	45.13	0.07
34.50	0.00	34,286	45.12	0.07
35.00	0.00	34,161	45.11	0.07
35.50	0.00	34,037	45.11	0.07
36.00	0.00	33,915	45.10	0.07
36.50	0.00	33,792	45.10	0.07
37.00	0.00	33,671	45.09	0.07
37.50	0.00	33,551	45.09	0.07
38.00	0.00	33,431	45.08	0.07
38.50	0.00	33,312	45.08	0.07
39.00	0.00	33,194	45.07	0.07
39.50	0.00	33,076	45.07	0.06
40.00	0.00	32,960	45.06	0.06
40.50	0.00	32,844	45.06	0.06
41.00	0.00	32,729	45.05	0.06
41.50	0.00	32,615	45.05	0.06
42.00	0.00	32,501	45.04	0.06
42.50	0.00	32,389	45.04	0.06
43.00	0.00	32,277	45.03	0.06
43.50	0.00	32,166	45.03	0.06
44.00	0.00	32,056	45.02	0.06
44.50	0.00	31,946	45.02	0.06
45.00	0.00	31,837	45.01	0.06
45.50	0.00	31,730	45.01	0.06
46.00	0.00	31,623	45.00	0.06
46.50	0.00	31,516	45.00	0.06
47.00	0.00	31,411	44.99	0.06
47.50	0.00	31,306	44.99	0.06
48.00	0.00	31,202	44.98	0.06
48.50	0.00	31,099	44.98	0.06
49.00	0.00	30,997	44.97	0.06
49.50	0.00	30,895	44.97	0.06
50.00	0.00	30,795	44.97	0.06
50.50	0.00	30,695	44.96	0.06
51.00	0.00	30,596	44.96	0.05
51.50	0.00	30,497	44.95	0.05

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
52.00	0.00	30,400	44.95	0.05
52.50	0.00	30,303	44.94	0.05
53.00	0.00	30,207	44.94	0.05
53.50	0.00	30,112	44.93	0.05
54.00	0.00	30,017	44.93	0.05
54.50	0.00	29,924	44.93	0.05
55.00	0.00	29,831	44.92	0.05
55.50	0.00	29,739	44.92	0.05
56.00	0.00	29,648	44.91	0.05
56.50	0.00	29,557	44.91	0.05
57.00	0.00	29,468	44.91	0.05
57.50	0.00	29,379	44.90	0.05
58.00	0.00	29,291	44.90	0.05
58.50	0.00	29,204	44.89	0.05
59.00	0.00	29,117	44.89	0.05
59.50	0.00	29,031	44.89	0.05
60.00	0.00	28,947	44.88	0.05
60.50	0.00	28,862	44.88	0.05
61.00	0.00	28,779	44.88	0.05
61.50	0.00	28,697	44.87	0.05
62.00	0.00	28,615	44.87	0.05
62.50	0.00	28,534	44.86	0.04
63.00	0.00	28,454	44.86	0.04
63.50	0.00	28,374	44.86	0.04
64.00	0.00	28,296	44.85	0.04
64.50	0.00	28,218	44.85	0.04
65.00	0.00	28,141	44.85	0.04
65.50	0.00	28,065	44.84	0.04
66.00	0.00	27,990	44.84	0.04
66.50	0.00	27,915	44.84	0.04
67.00	0.00	27,841	44.83	0.04
67.50	0.00	27,768	44.83	0.04
68.00	0.00	27,696	44.83	0.04
68.50	0.00	27,624	44.82	0.04
69.00	0.00	27,554	44.82	0.04
69.50	0.00	27,484	44.82	0.04
70.00	0.00	27,415	44.82	0.04
70.50	0.00	27,346	44.81	0.04
71.00	0.00	27,279	44.81	0.04
71.50	0.00	27,212	44.81	0.04
72.00	0.00	27,146	44.80	0.04
72.50	0.00	27,081	44.80	0.04
73.00	0.00	27,017	44.80	0.04
73.50	0.00	26,953	44.79	0.04
74.00	0.00	26,891	44.79	0.03
74.50	0.00	26,829	44.79	0.03
75.00	0.00	26,768	44.79	0.03
75.50	0.00	26,707	44.78	0.03
76.00	0.00	26,648	44.78	0.03
76.50	0.00	26,589	44.78	0.03
77.00	0.00	26,531	44.78	0.03
77.50	0.00	26,474	44.77	0.03

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
78.00	0.00	26,417	44.77	0.03
78.50	0.00	26,362	44.77	0.03
79.00	0.00	26,307	44.77	0.03
79.50	0.00	26,253	44.76	0.03
80.00	0.00	26,199	44.76	0.03
80.50	0.00	26,146	44.76	0.03
81.00	0.00	26,094	44.76	0.03
81.50	0.00	26,043	44.75	0.03
82.00	0.00	25,992	44.75	0.03
82.50	0.00	25,943	44.75	0.03
83.00	0.00	25,894	44.75	0.03
83.50	0.00	25,846	44.75	0.03
84.00	0.00	25,800	44.74	0.03
84.50	0.00	25,753	44.74	0.03
85.00	0.00	25,708	44.74	0.02
85.50	0.00	25,664	44.74	0.02
86.00	0.00	25,621	44.74	0.02
86.50	0.00	25,578	44.73	0.02
87.00	0.00	25,536	44.73	0.02
87.50	0.00	25,496	44.73	0.02
88.00	0.00	25,455	44.73	0.02
88.50	0.00	25,416	44.73	0.02
89.00	0.00	25,378	44.73	0.02
89.50	0.00	25,340	44.72	0.02
90.00	0.00	25,303	44.72	0.02
90.50	0.00	25,267	44.72	0.02
91.00	0.00	25,232	44.72	0.02
91.50	0.00	25,197	44.72	0.02
92.00	0.00	25,163	44.72	0.02
92.50	0.00	25,130	44.71	0.02
93.00	0.00	25,097	44.71	0.02
93.50	0.00	25,065	44.71	0.02
94.00	0.00	25,034	44.71	0.02
94.50	0.00	25,003	44.71	0.02
95.00	0.00	24,973	44.71	0.02
95.50	0.00	24,944	44.71	0.02
96.00	0.00	24,915	44.70	0.02
96.50	0.00	24,887	44.70	0.02
97.00	0.00	24,859	44.70	0.02
97.50	0.00	24,832	44.70	0.01
98.00	0.00	24,805	44.70	0.01
98.50	0.00	24,779	44.70	0.01
99.00	0.00	24,754	44.70	0.01
99.50	0.00	24,729	44.70	0.01
100.00	0.00	24,704	44.70	0.01
100.50	0.00	24,680	44.69	0.01
101.00	0.00	24,656	44.69	0.01
101.50	0.00	24,633	44.69	0.01
102.00	0.00	24,611	44.69	0.01
102.50	0.00	24,588	44.69	0.01
103.00	0.00	24,566	44.69	0.01
103.50	0.00	24,545	44.69	0.01

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
104.00	0.00	24,524	44.69	0.01
104.50	0.00	24,503	44.69	0.01
105.00	0.00	24,483	44.69	0.01
105.50	0.00	24,463	44.68	0.01
106.00	0.00	24,443	44.68	0.01
106.50	0.00	24,424	44.68	0.01
107.00	0.00	24,405	44.68	0.01
107.50	0.00	24,386	44.68	0.01
108.00	0.00	24,368	44.68	0.01
108.50	0.00	24,350	44.68	0.01
109.00	0.00	24,333	44.68	0.01
109.50	0.00	24,315	44.68	0.01
110.00	0.00	24,298	44.68	0.01
110.50	0.00	24,282	44.68	0.01
111.00	0.00	24,265	44.68	0.01
111.50	0.00	24,249	44.67	0.01
112.00	0.00	24,233	44.67	0.01
112.50	0.00	24,218	44.67	0.01
113.00	0.00	24,203	44.67	0.01
113.50	0.00	24,187	44.67	0.01
114.00	0.00	24,173	44.67	0.01
114.50	0.00	24,158	44.67	0.01
115.00	0.00	24,144	44.67	0.01
115.50	0.00	24,130	44.67	0.01
116.00	0.00	24,116	44.67	0.01
116.50	0.00	24,102	44.67	0.01
117.00	0.00	24,089	44.67	0.01
117.50	0.00	24,075	44.67	0.01
118.00	0.00	24,062	44.67	0.01
118.50	0.00	24,050	44.67	0.01
119.00	0.00	24,037	44.67	0.01
119.50	0.00	24,025	44.67	0.01
120.00	0.00	24,012	44.66	0.01
120.50	0.00	24,000	44.66	0.01
121.00	0.00	23,989	44.66	0.01
121.50	0.00	23,977	44.66	0.01
122.00	0.00	23,965	44.66	0.01
122.50	0.00	23,954	44.66	0.01
123.00	0.00	23,943	44.66	0.01
123.50	0.00	23,932	44.66	0.01
124.00	0.00	23,921	44.66	0.01
124.50	0.00	23,910	44.66	0.01
125.00	0.00	23,900	44.66	0.01
125.50	0.00	23,889	44.66	0.01
126.00	0.00	23,879	44.66	0.01
126.50	0.00	23,869	44.66	0.01
127.00	0.00	23,859	44.66	0.01
127.50	0.00	23,849	44.66	0.01
128.00	0.00	23,840	44.66	0.01
128.50	0.00	23,830	44.66	0.01
129.00	0.00	23,821	44.66	0.01
129.50	0.00	23,812	44.66	0.01

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
130.00	0.00	23,802	44.66	0.01
130.50	0.00	23,793	44.65	0.00
131.00	0.00	23,784	44.65	0.00
131.50	0.00	23,776	44.65	0.00
132.00	0.00	23,767	44.65	0.00
132.50	0.00	23,758	44.65	0.00
133.00	0.00	23,750	44.65	0.00
133.50	0.00	23,742	44.65	0.00
134.00	0.00	23,733	44.65	0.00
134.50	0.00	23,725	44.65	0.00
135.00	0.00	23,717	44.65	0.00
135.50	0.00	23,709	44.65	0.00
136.00	0.00	23,702	44.65	0.00
136.50	0.00	23,694	44.65	0.00
137.00	0.00	23,686	44.65	0.00
137.50	0.00	23,679	44.65	0.00
138.00	0.00	23,671	44.65	0.00
138.50	0.00	23,664	44.65	0.00
139.00	0.00	23,657	44.65	0.00
139.50	0.00	23,650	44.65	0.00
140.00	0.00	23,643	44.65	0.00
140.50	0.00	23,636	44.65	0.00
141.00	0.00	23,629	44.65	0.00
141.50	0.00	23,622	44.65	0.00
142.00	0.00	23,615	44.65	0.00
142.50	0.00	23,609	44.65	0.00
143.00	0.00	23,602	44.65	0.00
143.50	0.00	23,596	44.65	0.00
144.00	0.00	23,589	44.65	0.00
144.50	0.00	23,583	44.65	0.00
145.00	0.00	23,577	44.65	0.00
145.50	0.00	23,570	44.64	0.00
146.00	0.00	23,564	44.64	0.00
146.50	0.00	23,558	44.64	0.00
147.00	0.00	23,552	44.64	0.00
147.50	0.00	23,546	44.64	0.00
148.00	0.00	23,541	44.64	0.00
148.50	0.00	23,535	44.64	0.00
149.00	0.00	23,529	44.64	0.00
149.50	0.00	23,523	44.64	0.00
150.00	0.00	23,518	44.64	0.00
150.50	0.00	23,512	44.64	0.00
151.00	0.00	23,507	44.64	0.00
151.50	0.00	23,501	44.64	0.00
152.00	0.00	23,496	44.64	0.00
152.50	0.00	23,491	44.64	0.00
153.00	0.00	23,486	44.64	0.00
153.50	0.00	23,480	44.64	0.00
154.00	0.00	23,475	44.64	0.00
154.50	0.00	23,470	44.64	0.00
155.00	0.00	23,465	44.64	0.00
155.50	0.00	23,460	44.64	0.00

Hydrograph for Pond 3P: MRC UGD BASIN

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	11,279	44.10	0.00
0.50	0.00	11,279	44.10	0.00
1.00	0.00	11,279	44.10	0.00
1.50	0.00	11,279	44.10	0.00
2.00	0.00	11,279	44.10	0.00
2.50	0.00	11,279	44.10	0.00
3.00	0.03	11,298	44.10	0.00
3.50	0.08	11,402	44.11	0.00
4.00	0.13	11,598	44.11	0.00
4.50	0.19	11,889	44.13	0.00
5.00	0.25	12,284	44.14	0.00
5.50	0.31	12,788	44.17	0.00
6.00	0.38	13,406	44.19	0.00
6.50	0.44	14,140	44.23	0.00
7.00	0.51	14,994	44.26	0.00
7.50	0.57	15,967	44.31	0.00
8.00	0.64	17,062	44.36	0.00
8.50	0.81	18,352	44.41	0.00
9.00	1.02	20,002	44.49	0.00
9.50	1.11	21,944	44.57	0.00
10.00	1.39	24,153	44.67	0.01
10.50	1.88	27,035	44.80	0.04
11.00	2.69	31,019	44.98	0.06
11.50	**4.59**	37,260	45.25	0.23
12.00	**58.33**	**73,525**	**46.86**	**22.74**
12.50	5.04	**60,928**	**46.30**	**14.41**
13.00	3.08	50,376	45.83	6.49
13.50	2.32	46,155	45.65	3.91
14.00	1.82	43,976	45.55	2.75
14.50	1.60	42,686	45.49	2.13
15.00	1.44	41,921	45.46	1.79
15.50	1.28	41,368	45.43	1.55
16.00	1.11	40,898	45.41	1.36
16.50	1.03	40,510	45.40	1.21
17.00	0.98	40,236	45.38	1.11
17.50	0.92	40,019	45.37	1.03
18.00	0.86	39,828	45.37	0.96
18.50	0.80	39,648	45.36	0.90
19.00	0.74	39,473	45.35	0.84
19.50	0.68	39,297	45.34	0.78
20.00	0.62	39,120	45.33	0.72
20.50	0.60	38,964	45.33	0.67
21.00	0.59	38,857	45.32	0.64
21.50	0.58	38,779	45.32	0.62
22.00	0.57	38,718	45.32	0.60
22.50	0.56	38,665	45.31	0.58
23.00	0.55	38,618	45.31	0.57
23.50	0.53	38,574	45.31	0.56
24.00	0.52	38,531	45.31	0.55
24.50	0.00	37,868	45.28	0.37
25.00	0.00	37,325	45.25	0.25
25.50	0.00	36,951	45.24	0.18

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
26.00	0.00	36,678	45.23	0.13
26.50	0.00	36,467	45.22	0.10
27.00	0.00	36,295	45.21	0.09
27.50	0.00	36,148	45.20	0.08
28.00	0.00	36,012	45.20	0.08
28.50	0.00	35,877	45.19	0.07
29.00	0.00	35,742	45.18	0.07
29.50	0.00	35,609	45.18	0.07
30.00	0.00	35,476	45.17	0.07
30.50	0.00	35,344	45.17	0.07
31.00	0.00	35,213	45.16	0.07
31.50	0.00	35,083	45.16	0.07
32.00	0.00	34,954	45.15	0.07
32.50	0.00	34,825	45.14	0.07
33.00	0.00	34,697	45.14	0.07
33.50	0.00	34,570	45.13	0.07
34.00	0.00	34,444	45.13	0.07
34.50	0.00	34,318	45.12	0.07
35.00	0.00	34,193	45.12	0.07
35.50	0.00	34,069	45.11	0.07
36.00	0.00	33,946	45.10	0.07
36.50	0.00	33,824	45.10	0.07
37.00	0.00	33,702	45.09	0.07
37.50	0.00	33,582	45.09	0.07
38.00	0.00	33,462	45.08	0.07
38.50	0.00	33,342	45.08	0.07
39.00	0.00	33,224	45.07	0.07
39.50	0.00	33,107	45.07	0.07
40.00	0.00	32,990	45.06	0.06
40.50	0.00	32,874	45.06	0.06
41.00	0.00	32,759	45.05	0.06
41.50	0.00	32,644	45.05	0.06
42.00	0.00	32,531	45.04	0.06
42.50	0.00	32,418	45.04	0.06
43.00	0.00	32,306	45.03	0.06
43.50	0.00	32,194	45.03	0.06
44.00	0.00	32,084	45.02	0.06
44.50	0.00	31,974	45.02	0.06
45.00	0.00	31,866	45.01	0.06
45.50	0.00	31,757	45.01	0.06
46.00	0.00	31,650	45.00	0.06
46.50	0.00	31,544	45.00	0.06
47.00	0.00	31,438	44.99	0.06
47.50	0.00	31,333	44.99	0.06
48.00	0.00	31,229	44.98	0.06
48.50	0.00	31,126	44.98	0.06
49.00	0.00	31,023	44.98	0.06
49.50	0.00	30,921	44.97	0.06
50.00	0.00	30,821	44.97	0.06
50.50	0.00	30,720	44.96	0.06
51.00	0.00	30,621	44.96	0.05
51.50	0.00	30,523	44.95	0.05

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
52.00	0.00	30,425	44.95	0.05
52.50	0.00	30,328	44.94	0.05
53.00	0.00	30,232	44.94	0.05
53.50	0.00	30,136	44.94	0.05
54.00	0.00	30,042	44.93	0.05
54.50	0.00	29,948	44.93	0.05
55.00	0.00	29,855	44.92	0.05
55.50	0.00	29,763	44.92	0.05
56.00	0.00	29,671	44.92	0.05
56.50	0.00	29,581	44.91	0.05
57.00	0.00	29,491	44.91	0.05
57.50	0.00	29,402	44.90	0.05
58.00	0.00	29,314	44.90	0.05
58.50	0.00	29,226	44.90	0.05
59.00	0.00	29,139	44.89	0.05
59.50	0.00	29,054	44.89	0.05
60.00	0.00	28,968	44.88	0.05
60.50	0.00	28,884	44.88	0.05
61.00	0.00	28,801	44.88	0.05
61.50	0.00	28,718	44.87	0.05
62.00	0.00	28,636	44.87	0.05
62.50	0.00	28,555	44.87	0.04
63.00	0.00	28,474	44.86	0.04
63.50	0.00	28,395	44.86	0.04
64.00	0.00	28,316	44.86	0.04
64.50	0.00	28,238	44.85	0.04
65.00	0.00	28,161	44.85	0.04
65.50	0.00	28,085	44.85	0.04
66.00	0.00	28,009	44.84	0.04
66.50	0.00	27,934	44.84	0.04
67.00	0.00	27,860	44.84	0.04
67.50	0.00	27,787	44.83	0.04
68.00	0.00	27,714	44.83	0.04
68.50	0.00	27,643	44.83	0.04
69.00	0.00	27,572	44.82	0.04
69.50	0.00	27,502	44.82	0.04
70.00	0.00	27,433	44.82	0.04
70.50	0.00	27,364	44.81	0.04
71.00	0.00	27,296	44.81	0.04
71.50	0.00	27,229	44.81	0.04
72.00	0.00	27,163	44.80	0.04
72.50	0.00	27,098	44.80	0.04
73.00	0.00	27,033	44.80	0.04
73.50	0.00	26,970	44.80	0.04
74.00	0.00	26,907	44.79	0.03
74.50	0.00	26,845	44.79	0.03
75.00	0.00	26,783	44.79	0.03
75.50	0.00	26,723	44.78	0.03
76.00	0.00	26,663	44.78	0.03
76.50	0.00	26,604	44.78	0.03
77.00	0.00	26,546	44.78	0.03
77.50	0.00	26,488	44.77	0.03

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
78.00	0.00	26,432	44.77	0.03
78.50	0.00	26,376	44.77	0.03
79.00	0.00	26,321	44.77	0.03
79.50	0.00	26,267	44.76	0.03
80.00	0.00	26,213	44.76	0.03
80.50	0.00	26,160	44.76	0.03
81.00	0.00	26,108	44.76	0.03
81.50	0.00	26,056	44.76	0.03
82.00	0.00	26,005	44.75	0.03
82.50	0.00	25,956	44.75	0.03
83.00	0.00	25,907	44.75	0.03
83.50	0.00	25,859	44.75	0.03
84.00	0.00	25,812	44.74	0.03
84.50	0.00	25,765	44.74	0.03
85.00	0.00	25,720	44.74	0.02
85.50	0.00	25,675	44.74	0.02
86.00	0.00	25,632	44.74	0.02
86.50	0.00	25,589	44.73	0.02
87.00	0.00	25,547	44.73	0.02
87.50	0.00	25,506	44.73	0.02
88.00	0.00	25,466	44.73	0.02
88.50	0.00	25,426	44.73	0.02
89.00	0.00	25,388	44.73	0.02
89.50	0.00	25,350	44.72	0.02
90.00	0.00	25,313	44.72	0.02
90.50	0.00	25,276	44.72	0.02
91.00	0.00	25,241	44.72	0.02
91.50	0.00	25,206	44.72	0.02
92.00	0.00	25,172	44.72	0.02
92.50	0.00	25,138	44.71	0.02
93.00	0.00	25,106	44.71	0.02
93.50	0.00	25,073	44.71	0.02
94.00	0.00	25,042	44.71	0.02
94.50	0.00	25,011	44.71	0.02
95.00	0.00	24,981	44.71	0.02
95.50	0.00	24,952	44.71	0.02
96.00	0.00	24,923	44.70	0.02
96.50	0.00	24,894	44.70	0.02
97.00	0.00	24,866	44.70	0.02
97.50	0.00	24,839	44.70	0.01
98.00	0.00	24,812	44.70	0.01
98.50	0.00	24,786	44.70	0.01
99.00	0.00	24,760	44.70	0.01
99.50	0.00	24,735	44.70	0.01
100.00	0.00	24,711	44.70	0.01
100.50	0.00	24,686	44.69	0.01
101.00	0.00	24,663	44.69	0.01
101.50	0.00	24,639	44.69	0.01
102.00	0.00	24,616	44.69	0.01
102.50	0.00	24,594	44.69	0.01
103.00	0.00	24,572	44.69	0.01
103.50	0.00	24,550	44.69	0.01

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
104.00	0.00	24,529	44.69	0.01
104.50	0.00	24,508	44.69	0.01
105.00	0.00	24,488	44.69	0.01
105.50	0.00	24,468	44.68	0.01
106.00	0.00	24,448	44.68	0.01
106.50	0.00	24,429	44.68	0.01
107.00	0.00	24,410	44.68	0.01
107.50	0.00	24,391	44.68	0.01
108.00	0.00	24,373	44.68	0.01
108.50	0.00	24,355	44.68	0.01
109.00	0.00	24,337	44.68	0.01
109.50	0.00	24,320	44.68	0.01
110.00	0.00	24,303	44.68	0.01
110.50	0.00	24,286	44.68	0.01
111.00	0.00	24,270	44.68	0.01
111.50	0.00	24,253	44.68	0.01
112.00	0.00	24,237	44.67	0.01
112.50	0.00	24,222	44.67	0.01
113.00	0.00	24,206	44.67	0.01
113.50	0.00	24,191	44.67	0.01
114.00	0.00	24,176	44.67	0.01
114.50	0.00	24,162	44.67	0.01
115.00	0.00	24,147	44.67	0.01
115.50	0.00	24,133	44.67	0.01
116.00	0.00	24,119	44.67	0.01
116.50	0.00	24,106	44.67	0.01
117.00	0.00	24,092	44.67	0.01
117.50	0.00	24,079	44.67	0.01
118.00	0.00	24,066	44.67	0.01
118.50	0.00	24,053	44.67	0.01
119.00	0.00	24,040	44.67	0.01
119.50	0.00	24,028	44.67	0.01
120.00	0.00	24,016	44.66	0.01
120.50	0.00	24,003	44.66	0.01
121.00	0.00	23,992	44.66	0.01
121.50	0.00	23,980	44.66	0.01
122.00	0.00	23,968	44.66	0.01
122.50	0.00	23,957	44.66	0.01
123.00	0.00	23,946	44.66	0.01
123.50	0.00	23,935	44.66	0.01
124.00	0.00	23,924	44.66	0.01
124.50	0.00	23,913	44.66	0.01
125.00	0.00	23,902	44.66	0.01
125.50	0.00	23,892	44.66	0.01
126.00	0.00	23,882	44.66	0.01
126.50	0.00	23,872	44.66	0.01
127.00	0.00	23,862	44.66	0.01
127.50	0.00	23,852	44.66	0.01
128.00	0.00	23,842	44.66	0.01
128.50	0.00	23,833	44.66	0.01
129.00	0.00	23,823	44.66	0.01
129.50	0.00	23,814	44.66	0.01

Hydrograph for Pond 3P: MRC UGD BASIN (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
130.00	0.00	23,805	44.66	0.01
130.50	0.00	23,796	44.65	0.00
131.00	0.00	23,787	44.65	0.00
131.50	0.00	23,778	44.65	0.00
132.00	0.00	23,769	44.65	0.00
132.50	0.00	23,761	44.65	0.00
133.00	0.00	23,752	44.65	0.00
133.50	0.00	23,744	44.65	0.00
134.00	0.00	23,736	44.65	0.00
134.50	0.00	23,727	44.65	0.00
135.00	0.00	23,719	44.65	0.00
135.50	0.00	23,712	44.65	0.00
136.00	0.00	23,704	44.65	0.00
136.50	0.00	23,696	44.65	0.00
137.00	0.00	23,688	44.65	0.00
137.50	0.00	23,681	44.65	0.00
138.00	0.00	23,673	44.65	0.00
138.50	0.00	23,666	44.65	0.00
139.00	0.00	23,659	44.65	0.00
139.50	0.00	23,652	44.65	0.00
140.00	0.00	23,645	44.65	0.00
140.50	0.00	23,638	44.65	0.00
141.00	0.00	23,631	44.65	0.00
141.50	0.00	23,624	44.65	0.00
142.00	0.00	23,617	44.65	0.00
142.50	0.00	23,610	44.65	0.00
143.00	0.00	23,604	44.65	0.00
143.50	0.00	23,597	44.65	0.00
144.00	0.00	23,591	44.65	0.00
144.50	0.00	23,585	44.65	0.00
145.00	0.00	23,578	44.65	0.00
145.50	0.00	23,572	44.64	0.00
146.00	0.00	23,566	44.64	0.00
146.50	0.00	23,560	44.64	0.00
147.00	0.00	23,554	44.64	0.00
147.50	0.00	23,548	44.64	0.00
148.00	0.00	23,542	44.64	0.00
148.50	0.00	23,536	44.64	0.00
149.00	0.00	23,531	44.64	0.00
149.50	0.00	23,525	44.64	0.00
150.00	0.00	23,519	44.64	0.00
150.50	0.00	23,514	44.64	0.00
151.00	0.00	23,508	44.64	0.00
151.50	0.00	23,503	44.64	0.00
152.00	0.00	23,497	44.64	0.00
152.50	0.00	23,492	44.64	0.00
153.00	0.00	23,487	44.64	0.00
153.50	0.00	23,482	44.64	0.00
154.00	0.00	23,477	44.64	0.00
154.50	0.00	23,471	44.64	0.00
155.00	0.00	23,466	44.64	0.00
155.50	0.00	23,461	44.64	0.00

Appendix G | Stormsewer Design

Colliers Engineering & Design

Project Name:	601 WASHINGTON STREET APARTMENTS		
Project No.:	16001030B	Date:	6/1/2022
Prepared By:	MD	Checked By:	CM

STORMWATER MANAGEMENT CALCULATIONS

Proposed Inlets - Post-Project

S-1

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.12	x	0.85	0.95	=	0.10	0.11
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.01	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.13**					**0.10**	**0.12**
					CW		=	**0.80**	**0.89**

S-2

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.24	x	0.85	0.95	=	0.20	0.23
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.11	x	0.15	0.19	=	0.02	0.02
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.35**					**0.22**	**0.25**
					CW		=	**0.63**	**0.71**

S-3

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.16	x	0.85	0.95	=	0.14	0.15
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.03	x	0.15	0.19	=	0.00	0.01
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.03	x	0.24	0.30	=	0.01	0.01
	TOTAL	=	**0.22**					**0.15**	**0.17**
					CW		=	**0.67**	**0.76**

S-4 (Under Building)*

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.34	x	0.85	0.95	=	0.29	0.32
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.02	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.36**					**0.29**	**0.33**
					CW		=	**0.81**	**0.91**

S-5

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.10	x	0.85	0.95	=	0.09	0.10
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.06	x	0.15	0.19	=	0.01	0.01
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.16**					**0.09**	**0.11**
					CW		=	**0.59**	**0.67**

S-7 (Under Building)*

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.46	x	0.85	0.95	=	0.39	0.44
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.02	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.48**					**0.39**	**0.44**
					CW		=	**0.82**	**0.92**

S-8 (Under Building)*

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.14	x	0.85	0.95	=	0.12	0.13
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.01	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.15**					**0.12**	**0.13**
					CW		=	**0.80**	**0.90**

S-9 (Under Building)*

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.11	x	0.85	0.95	=	0.09	0.10
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.11**					**0.09**	**0.10**
					CW		=	**0.85**	**0.95**

S-6A

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.19	x	0.85	0.95	=	0.16	0.18
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.06	x	0.15	0.19	=	0.01	0.01
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.25**					**0.17**	**0.19**
					CW		=	**0.68**	**0.77**

S-11

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.12	x	0.85	0.95	=	0.10	0.11
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.06	x	0.15	0.19	=	0.01	0.01
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.18**					**0.11**	**0.13**
					CW		=	**0.62**	**0.70**

S-14

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.32	x	0.85	0.95	=	0.27	0.30
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.09	x	0.15	0.19	=	0.01	0.02
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.41**					**0.29**	**0.32**
					CW		=	**0.70**	**0.78**

S-15 (Under Building)*

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.41	x	0.85	0.95	=	0.35	0.39
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.02	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.43**					**0.35**	**0.39**
					CW		=	**0.82**	**0.91**

S-16

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.29	x	0.85	0.95	=	0.25	0.28
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.19	x	0.15	0.19	=	0.03	0.04
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.09	x	0.24	0.30	=	0.02	0.03
	TOTAL	=	**0.57**					**0.30**	**0.34**
					CW		=	**0.52**	**0.59**

S-18 (Under Building)*

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.56	x	0.85	0.95	=	0.48	0.53
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.03	x	0.15	0.19	=	0.00	0.01
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.59**					**0.48**	**0.54**
					CW		=	**0.81**	**0.91**

S-20 (Under Building)*

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.09	x	0.85	0.95	=	0.08	0.09
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.09**					**0.08**	**0.09**
					CW		=	**0.85**	**0.95**

S-22

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.12	x	0.85	0.95	=	0.10	0.11
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.06	x	0.15	0.19	=	0.01	0.01
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.18**					**0.11**	**0.13**
					CW		=	**0.62**	**0.70**

S-26

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.18	x	0.85	0.95	=	0.15	0.17
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.09	x	0.15	0.19	=	0.01	0.02
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.27**					**0.17**	**0.19**
					CW		=	**0.62**	**0.70**

S-27

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.19	x	0.85	0.95	=	0.16	0.18
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.12	x	0.15	0.19	=	0.02	0.02
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.31**					**0.18**	**0.20**
					CW		=	**0.58**	**0.66**

S-28

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.20	x	0.85	0.95	=	0.17	0.19
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.10	x	0.15	0.19	=	0.02	0.02
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.30**					**0.19**	**0.21**
					CW		=	**0.62**	**0.70**

S-29

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.17	x	0.85	0.95	=	0.14	0.16
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.08	x	0.15	0.19	=	0.01	0.02
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.25**					**0.16**	**0.18**
					CW		=	**0.63**	**0.71**

S-30

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.12	x	0.85	0.95	=	0.10	0.11
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.04	x	0.15	0.19	=	0.01	0.01
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.16**					**0.11**	**0.12**
					CW		=	**0.68**	**0.76**

R-7

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.06	x	0.85	0.95	=	0.05	0.06
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.01	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.07**					**0.05**	**0.06**
					CW		=	**0.75**	**0.84**

R-8

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.03	x	0.85	0.95	=	0.03	0.03
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.11	x	0.20	0.25	=	0.02	0.03
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.14**					**0.05**	**0.06**
					CW		=	**0.34**	**0.40**

R-9

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.17	x	0.85	0.95	=	0.14	0.16
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.11	x	0.15	0.19	=	0.02	0.02
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.28**					**0.16**	**0.18**
					CW		=	**0.58**	**0.65**

R-10

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.06	x	0.85	0.95	=	0.05	0.06
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.05	x	0.15	0.19	=	0.01	0.01
B	2-6%	=	0.00	x	0.20	0.25	=	0.00	0.00
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.11**					**0.06**	**0.07**
					CW		=	**0.53**	**0.60**

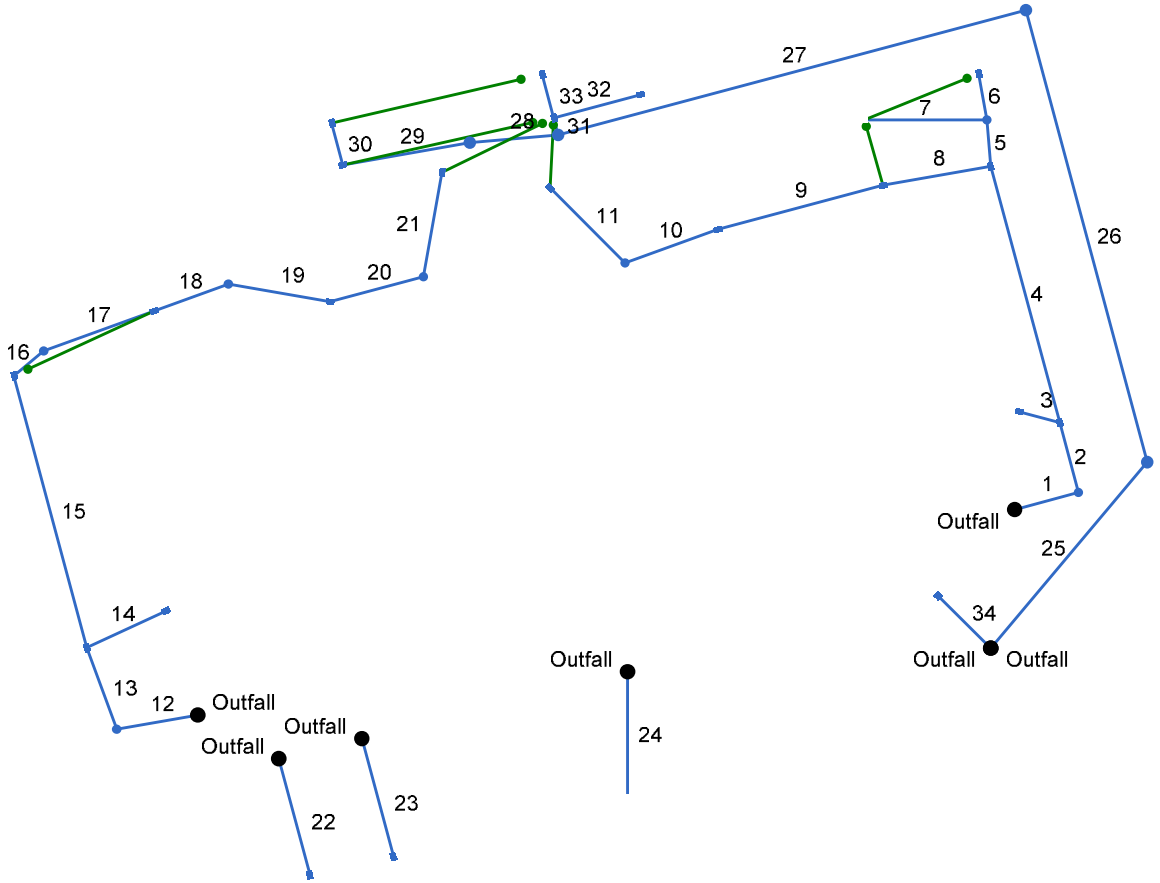
R-11

SOIL	SLOPE		AREA		C (<=10)	c (25+)		C x A (<= 10YR)	C x A (25 YR+)
IMPERVIOUS									
B	0-2%	=	0.08	x	0.85	0.95	=	0.07	0.08
B	2-6%	=	0.00	x	0.86	0.96	=	0.00	0.00
B	+6%	=	0.00	x	0.87	0.97	=	0.00	0.00
MEADOW/LAWN									
B	0-2%	=	0.00	x	0.15	0.19	=	0.00	0.00
B	2-6%	=	0.26	x	0.20	0.25	=	0.05	0.07
B	+6%	=	0.00	x	0.24	0.30	=	0.00	0.00
	TOTAL	=	**0.34**					**0.12**	**0.14**
					CW		=	**0.35**	**0.41**

* DENOTED INLETS ARE UNDER THE PROPOSED ROOFS. STORMWATER WILL BE INTERCEPTED BY THE ROOFS AND MINIMAL FLOW WILL REACH THE INLETS. AS SUCH, THE HYDROFLOW CALCULATIONS DO NOT ACCOUNT FOR THE FLOW TO THESE INLETS, SINCE THE FLOWS WILL BE MANAGED THROUGH THE ROOF DRAIN SYSTEM.

10-YEAR CALCULATIONS
PROPOSED NETWORK

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: 10yr Revised.stm	Number of lines: 34	Date: 6/1/2022

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	41	-15	MH	0.00	0.00	0.00	5.0	43.60	0.61	43.85	18	Cir	0.012	1.00	50.95	P-3B
2	1	45	-90	Comb	0.00	0.22	0.67	5.0	43.95	0.67	44.25	18	Cir	0.012	1.33	50.33	P-3
3	2	26	-60	Grate	0.01	0.00	0.00	5.0	44.95	0.58	45.10	18	Cir	0.012	1.00	50.63	P-4
4	2	165	0	Comb	0.00	0.16	0.59	5.0	44.35	0.82	45.70	18	Cir	0.012	1.50	50.32	P-5
5	4	29	10	MH	0.00	0.00	0.00	5.0	45.80	0.69	46.00	18	Cir	0.012	1.00	49.98	P-6
6	5	29	-5	Comb	0.00	0.25	0.68	5.0	46.10	0.69	46.30	18	Cir	0.012	1.00	49.75	P-6A
7	5	76	-85	Grate	0.01	0.00	0.00	5.0	46.10	0.66	46.60	18	Cir	0.012	1.00	50.44	P-7
8	4	68	-85	Grate	0.01	0.00	0.00	5.0	45.80	0.74	46.30	18	Cir	0.012	0.50	50.88	P-8
9	8	106	-5	Grate	0.01	0.00	0.00	5.0	46.40	0.52	46.95	18	Cir	0.012	0.50	51.83	P-9
10	9	61	-5	MH	0.00	0.00	0.00	5.0	47.05	0.49	47.35	18	Cir	0.012	0.92	52.60	P-10
11	10	66	65	Comb	0.00	0.18	0.62	5.0	47.45	0.53	47.80	18	Cir	0.012	1.00	51.18	P-11
12	End	51	170	MH	0.00	0.00	0.00	5.0	43.60	0.59	43.90	18	Cir	0.012	0.99	50.53	P-13A
13	12	54	80	Grate	0.00	0.41	0.70	5.0	44.00	0.56	44.30	18	Cir	0.012	1.85	49.75	P-14
14	13	54	85	Grate	0.01	0.00	0.00	5.0	44.40	0.56	44.70	18	Cir	0.012	1.00	50.44	P-15
15	13	175	5	Comb	0.00	0.57	0.52	5.0	44.40	0.51	45.30	18	Cir	0.012	1.38	49.54	P-16
16	15	24	65	MH	0.00	0.00	0.00	5.0	45.40	0.62	45.55	18	Cir	0.012	0.40	49.92	P-17
17	16	73	20	Grate	0.01	0.00	0.00	5.0	45.65	0.55	46.05	18	Cir	0.012	0.50	50.64	P-18
18	17	49	0	MH	0.00	0.00	0.00	5.0	46.15	0.51	46.40	18	Cir	0.012	0.56	51.08	P-19
19	18	64	30	Grate	0.01	0.00	0.00	5.0	46.50	0.55	46.85	18	Cir	0.012	0.72	51.63	P-20
20	19	60	-25	MH	0.00	0.00	0.00	5.0	46.95	0.50	47.25	18	Cir	0.012	0.92	52.69	P-21
21	20	66	-65	Comb	0.00	0.18	0.62	5.0	47.35	0.53	47.70	18	Cir	0.012	1.00	51.49	P-22
22	End	75	75	Comb	0.00	0.30	0.62	5.0	43.60	1.87	45.00	18	Cir	0.012	1.00	49.89	P-28
23	End	76	75	Comb	0.00	0.25	0.63	5.0	43.60	1.84	45.00	18	Cir	0.012	1.00	50.10	P-29

Project File: 10yr Revised.stm | Number of lines: 34 | Date: 6/1/2022

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	End	79	90	Comb	0.00	0.16	0.68	5.0	43.60	1.77	45.00	18	Cir	0.012	1.00	51.18	P-30
25	End	151	-50	MH	0.00	0.00	0.00	5.0	38.45	0.70	39.50	48	Cir	0.012	0.85	51.09	R-3
26	25	291	-55	MH	0.00	0.00	0.00	5.0	39.60	0.57	41.25	48	Cir	0.012	1.00	49.96	R-4
27	26	300	-90	MH	0.00	0.00	0.00	5.0	41.35	0.58	43.10	48	Cir	0.012	1.00	50.65	R-5
28	27	55	10	MH	0.00	0.00	0.00	5.0	43.20	0.64	43.55	48	Cir	0.012	0.15	50.17	R-6
29	28	80	-5	Comb	0.00	0.07	0.75	5.0	46.05	0.56	46.50	18	Cir	0.012	1.50	50.89	R-7
30	29	27	85	Comb	0.00	0.14	0.34	5.0	47.68	0.56	47.83	18	Cir	0.012	1.00	51.06	R-8
31	27	11	90	Comb	0.00	0.28	0.58	5.0	45.70	0.91	45.80	18	Cir	0.012	1.50	49.90	R-9
32	31	56	90	Comb	0.00	0.11	0.53	5.0	45.90	0.54	46.20	18	Cir	0.012	1.00	50.07	R-10
33	31	28	0	Comb	0.00	0.34	0.35	5.0	46.69	0.50	46.83	18	Cir	0.012	1.00	50.06	R-11
34	End	46	-135	MH	10.15	0.00	0.00	5.0	42.95	1.41	43.60	24	Cir	0.012	1.00	50.59	A-1

Project File: 10yr Revised.stm | Number of lines: 34 | Date: 6/1/2022

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	S-3B	Manhole	50.95	Cir	4.00	4.00	18	Cir	43.85	18	Cir	43.95
2	S-3	Combination	50.33	Rect	4.77	3.27	18	Cir	44.25	18 18	Cir Cir	44.95 44.35
3	S-4	Grate	50.63	Rect	4.77	3.27	18	Cir	45.10			
4	S-5	Combination	50.32	Rect	4.77	3.27	18	Cir	45.70	18 18	Cir Cir	45.80 45.80
5	S-6	Manhole	49.98	Cir	4.00	4.00	18	Cir	46.00	18 18	Cir Cir	46.10 46.10
6	S-6A	Combination	49.75	Rect	4.77	3.27	18	Cir	46.30			
7	S-7	Grate	50.44	Rect	4.77	3.27	18	Cir	46.60			
8	S-8	Grate	50.88	Rect	4.77	3.27	18	Cir	46.30	18	Cir	46.40
9	S-9	Grate	51.83	Rect	4.77	3.27	18	Cir	46.95	18	Cir	47.05
10	S-10	Manhole	52.60	Cir	4.00	4.00	18	Cir	47.35	18	Cir	47.45
11	S-11	Combination	51.18	Rect	4.77	3.27	18	Cir	47.80			
12	S-13A	Manhole	50.53	Cir	4.00	4.00	18	Cir	43.90	18	Cir	44.00
13	S-14	Grate	49.75	Rect	4.77	3.27	18	Cir	44.30	18 18	Cir Cir	44.40 44.40
14	S-15	Grate	50.44	Rect	4.77	3.27	18	Cir	44.70			
15	S-16	Combination	49.54	Rect	4.77	3.27	18	Cir	45.30	18	Cir	45.40
16	S-17	Manhole	49.92	Cir	4.00	4.00	18	Cir	45.55	18	Cir	45.65
17	S-18	Grate	50.64	Rect	4.77	3.27	18	Cir	46.05	18	Cir	46.15
18	S-19	Manhole	51.08	Cir	4.00	4.00	18	Cir	46.40	18	Cir	46.50
19	S-20	Grate	51.63	Rect	4.77	3.27	18	Cir	46.85	18	Cir	46.95
20	S-21	Manhole	52.69	Cir	4.00	4.00	18	Cir	47.25	18	Cir	47.35
21	S-22	Combination	51.49	Rect	4.77	3.27	18	Cir	47.70			

Project File: 10yr Revised.stm | Number of Structures: 34 | Run Date: 6/1/2022

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
22	S-28	Combination	49.89	Rect	4.77	3.27	18	Cir	45.00			
23	S-29	Combination	50.10	Rect	4.77	3.27	18	Cir	45.00			
24	S-30	Combination	51.18	Rect	4.77	3.27	18	Cir	45.00			
25	R-3	Manhole	51.09	Cir	6.00	6.00	48	Cir	39.50	48	Cir	39.60
26	R-4	Manhole	49.96	Cir	6.00	6.00	48	Cir	41.25	48	Cir	41.35
27	R-5	Manhole	50.65	Cir	6.00	6.00	48	Cir	43.10	48 18	Cir Cir	43.20 45.70
28	R-6	Manhole	50.17	Cir	6.00	6.00	48	Cir	43.55	18	Cir	46.05
29	R-7	Combination	50.89	Rect	4.77	3.27	18	Cir	46.50	18	Cir	47.68
30	R-8	Combination	51.06	Rect	4.77	3.27	18	Cir	47.83			
31	R-9	Combination	49.90	Rect	4.77	3.27	18	Cir	45.80	18 18	Cir Cir	45.90 46.69
32	R-10	Combination	50.07	Rect	4.77	3.27	18	Cir	46.20			
33	R-11	Combination	50.06	Rect	4.77	3.27	18	Cir	46.83			
34	A-1	Manhole	50.59	Rect	4.00	4.00	24	Cir	43.60			

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	P-3B	0.52	18	Cir	41	43.60	43.85	0.610	44.60	44.12	n/a	44.12	End	Manhole
2	P-3	0.52	18	Cir	45	43.95	44.25	0.667	44.19	44.52	0.12	44.52	1	Combination
3	P-4	0.01	18	Cir	26	44.95	45.10	0.577	44.99	45.14	0.01	45.15	2	Grate
4	P-5	0.38	18	Cir	165	44.35	45.70	0.818	44.55	45.93	0.12	45.93	2	Combination
5	P-6	0.17	18	Cir	29	45.80	46.00	0.690	45.94	46.15	0.05	46.15	4	Manhole
6	P-6A	1.23	18	Cir	29	46.10	46.30	0.690	46.47	46.71	0.15	46.71	5	Combination
7	P-7	0.01	18	Cir	76	46.10	46.60	0.658	46.15	46.64	n/a	46.64	5	Grate
8	P-8	0.62	18	Cir	68	45.80	46.30	0.735	46.06	46.59	n/a	46.59	4	Grate
9	P-9	0.69	18	Cir	106	46.40	46.95	0.519	46.69	47.26	0.05	47.26	8	Grate
10	P-10	0.74	18	Cir	61	47.05	47.35	0.492	47.36	47.67	n/a	47.67	9	Manhole
11	P-11	0.81	18	Cir	66	47.45	47.80	0.530	47.77	48.13	n/a	48.13	10	Combination
12	P-13A	0.86	18	Cir	51	43.60	43.90	0.588	44.60	44.25	0.12	44.25	End	Manhole
13	P-14	0.86	18	Cir	54	44.00	44.30	0.556	44.32	44.65	0.23	44.65	12	Grate
14	P-15	0.01	18	Cir	54	44.40	44.70	0.556	44.65	44.74	0.01	44.75	13	Grate
15	P-16	2.01	18	Cir	175	44.40	45.30	0.514	44.91	45.83	0.27	45.83	13	Combination
16	P-17	0.58	18	Cir	24	45.40	45.55	0.625	45.83	45.83	n/a	45.83 j	15	Manhole
17	P-18	0.62	18	Cir	73	45.65	46.05	0.548	45.93	46.34	0.05	46.34	16	Grate
18	P-19	0.64	18	Cir	49	46.15	46.40	0.510	46.44	46.70	n/a	46.70	17	Manhole
19	P-20	0.69	18	Cir	64	46.50	46.85	0.547	46.79	47.16	n/a	47.16	18	Grate
20	P-21	0.74	18	Cir	60	46.95	47.25	0.500	47.26	47.57	n/a	47.57	19	Manhole
21	P-22	0.81	18	Cir	66	47.35	47.70	0.530	47.67	48.03	n/a	48.03	20	Combination
22	P-28	1.35	18	Cir	75	43.60	45.00	1.867	44.60	45.43	n/a	45.43 j	End	Combination
23	P-29	1.14	18	Cir	76	43.60	45.00	1.842	44.60	45.40	n/a	45.40 j	End	Combination
24	P-30	0.79	18	Cir	79	43.60	45.00	1.772	44.60	45.33	n/a	45.33 j	End	Combination

Project File: 10yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	R-3	0.99	48	Cir	151	38.45	39.50	0.695	38.70	39.79	0.08	39.79	End	Manhole
26	R-4	1.26	48	Cir	291	39.60	41.25	0.567	39.89	41.57	n/a	41.57	25	Manhole
27	R-5	1.75	48	Cir	300	41.35	43.10	0.583	41.69	43.48	n/a	43.48	26	Manhole
28	R-6	0.59	48	Cir	55	43.20	43.55	0.636	43.48	43.77	0.01	43.77	27	Manhole
29	R-7	0.66	18	Cir	80	46.05	46.50	0.563	46.33	46.80	n/a	46.80	28	Combination
30	R-8	0.34	18	Cir	27	47.68	47.83	0.556	47.89	48.05	0.07	48.05	29	Combination
31	R-9	2.13	18	Cir	11	45.70	45.80	0.909	46.15	46.35	n/a	46.35	27	Combination
32	R-10	0.42	18	Cir	56	45.90	46.20	0.536	46.35	46.44	n/a	46.44 j	31	Combination
33	R-11	0.86	18	Cir	28	46.69	46.83	0.500	47.02	47.18	n/a	47.18	31	Combination
34	A-1	10.15	24	Cir	46	42.95	43.60	1.413	43.77	44.74	0.47	44.74	End	Manhole

Project File: 10yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	41	0.00	0.81	0.00	0.00	0.52	5.0	231.8	0.9	0.52	8.88	1.43	18	0.61	43.60	43.85	44.60	44.12	51.22	50.95	P-3B
2	1	45	0.22	0.81	0.67	0.15	0.52	5.0	231.4	0.9	0.52	9.29	2.64	18	0.67	43.95	44.25	44.19	44.52	50.95	50.33	P-3
3	2	26	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.64	0.81	18	0.58	44.95	45.10	44.99	45.14	50.33	50.63	P-4
4	2	165	0.16	0.59	0.59	0.09	0.38	5.0	229.5	0.9	0.38	10.29	2.51	18	0.82	44.35	45.70	44.55	45.93	50.33	50.32	P-5
5	4	29	0.00	0.25	0.00	0.00	0.17	5.0	228.8	0.9	0.17	9.45	1.93	18	0.69	45.80	46.00	45.94	46.15	50.32	49.98	P-6
6	5	29	0.25	0.25	0.68	0.17	0.17	5.0	5.0	7.2	1.23	9.45	3.39	18	0.69	46.10	46.30	46.47	46.71	49.98	49.75	P-6A
7	5	76	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	9.23	0.71	18	0.66	46.10	46.60	46.15	46.64	49.98	50.44	P-7
8	4	68	0.00	0.18	0.00	0.00	0.11	5.0	13.6	5.4	0.62	9.76	2.83	18	0.74	45.80	46.30	46.06	46.59	50.32	50.88	P-8
9	8	106	0.00	0.18	0.00	0.00	0.11	5.0	9.7	6.1	0.69	8.19	2.73	18	0.52	46.40	46.95	46.69	47.26	50.88	51.83	P-9
10	9	61	0.00	0.18	0.00	0.00	0.11	5.0	7.4	6.6	0.74	7.98	2.75	18	0.49	47.05	47.35	47.36	47.67	51.83	52.60	P-10
11	10	66	0.18	0.18	0.62	0.11	0.11	5.0	5.0	7.2	0.81	8.28	2.86	18	0.53	47.45	47.80	47.77	48.13	52.60	51.18	P-11
12	End	51	0.00	1.16	0.00	0.00	0.70	5.0	164.4	1.2	0.86	8.73	1.75	18	0.59	43.60	43.90	44.60	44.25	51.33	50.53	P-13A
13	12	54	0.41	1.16	0.70	0.29	0.70	5.0	164.0	1.2	0.86	8.48	2.95	18	0.56	44.00	44.30	44.32	44.65	50.53	49.75	P-14
14	13	54	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.48	0.38	18	0.56	44.40	44.70	44.65	44.74	49.75	50.44	P-15
15	13	175	0.57	0.75	0.52	0.30	0.41	5.0	17.5	4.9	2.01	8.16	3.69	18	0.51	44.40	45.30	44.91	45.83	49.75	49.54	P-16
16	15	24	0.00	0.18	0.00	0.00	0.11	5.0	16.6	5.0	0.58	8.99	1.94	18	0.62	45.40	45.55	45.83	45.83	49.54	49.92	P-17
17	16	73	0.00	0.18	0.00	0.00	0.11	5.0	13.8	5.4	0.62	8.42	2.67	18	0.55	45.65	46.05	45.93	46.34	49.92	50.64	P-18
18	17	49	0.00	0.18	0.00	0.00	0.11	5.0	12.0	5.7	0.64	8.13	2.67	18	0.51	46.15	46.40	46.44	46.70	50.64	51.08	P-19
19	18	64	0.00	0.18	0.00	0.00	0.11	5.0	9.6	6.1	0.69	8.41	2.76	18	0.55	46.50	46.85	46.79	47.16	51.08	51.63	P-20
20	19	60	0.00	0.18	0.00	0.00	0.11	5.0	7.4	6.6	0.74	8.04	2.76	18	0.50	46.95	47.25	47.26	47.57	51.63	52.69	P-21
21	20	66	0.18	0.18	0.62	0.11	0.11	5.0	5.0	7.2	0.81	8.28	2.86	18	0.53	47.35	47.70	47.67	48.03	52.69	51.49	P-22
22	End	75	0.30	0.30	0.62	0.19	0.19	5.0	5.0	7.2	1.35	15.54	2.12	18	1.87	43.60	45.00	44.60	45.43	50.36	49.89	P-28

Project File: 10yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES:Intensity = 88.24 / (Inlet time + 15.50) ^ 0.83; Return period =Yrs. 10 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	End	76	0.25	0.25	0.63	0.16	0.16	5.0	5.0	7.2	1.14	15.44	1.97	18	1.84	43.60	45.00	44.60	45.40	50.98	50.10	P-29
24	End	79	0.16	0.16	0.68	0.11	0.11	5.0	5.0	7.2	0.79	15.14	1.68	18	1.77	43.60	45.00	44.60	45.33	51.99	51.18	P-30
25	End	151	0.00	0.94	0.00	0.00	0.44	5.0	68.4	2.3	0.99	129.8	2.76	48	0.70	38.45	39.50	38.70	39.79	47.26	51.09	R-3
26	25	291	0.00	0.94	0.00	0.00	0.44	5.0	47.3	2.9	1.26	117.2	2.86	48	0.57	39.60	41.25	39.89	41.57	51.09	49.96	R-4
27	26	300	0.00	0.94	0.00	0.00	0.44	5.0	26.9	4.0	1.75	118.9	3.15	48	0.58	41.35	43.10	41.69	43.48	49.96	50.65	R-5
28	27	55	0.00	0.21	0.00	0.00	0.10	5.0	10.6	5.9	0.59	124.1	1.86	48	0.64	43.20	43.55	43.48	43.77	50.65	50.17	R-6
29	28	80	0.07	0.21	0.75	0.05	0.10	5.0	7.3	6.6	0.66	8.53	2.74	18	0.56	46.05	46.50	46.33	46.80	50.17	50.89	R-7
30	29	27	0.14	0.14	0.34	0.05	0.05	5.0	5.0	7.2	0.34	8.48	2.27	18	0.56	47.68	47.83	47.89	48.05	50.89	51.06	R-8
31	27	11	0.28	0.73	0.58	0.16	0.34	5.0	8.9	6.3	2.13	10.85	4.19	18	0.91	45.70	45.80	46.15	46.35	50.65	49.90	R-9
32	31	56	0.11	0.11	0.53	0.06	0.06	5.0	5.0	7.2	0.42	8.33	1.63	18	0.54	45.90	46.20	46.35	46.44	49.90	50.07	R-10
33	31	28	0.34	0.34	0.35	0.12	0.12	5.0	5.0	7.2	0.86	8.04	2.89	18	0.50	46.69	46.83	47.02	47.18	49.90	50.06	R-11
34	End	46	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	10.15	29.13	6.93	24	1.41	42.95	43.60	43.77	44.74	47.26	50.59	A-1

Project File: 10yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES:Intensity = 88.24 / (Inlet time + 15.50) ^ 0.83; Return period =Yrs. 10 ; c = cir e = ellip b = box

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	S-3B	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	S-3	1.07	0.00	1.07	0.00	Comb	6.0	4.02	15.08	4.02	4.50	Sag	2.00	0.015	0.015	0.000	0.11	7.05	0.11	7.05	0.0	Off
3	S-4	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.01	0.71	0.01	0.71	0.0	Off
4	S-5	0.68	0.00	0.68	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.10	6.97	0.10	6.97	0.0	Off
5	S-6	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
6	S-6A	1.23	0.00	1.23	0.00	Comb	6.0	4.02	15.08	4.02	4.50	Sag	2.00	0.015	0.015	0.000	0.11	7.65	0.11	7.65	0.0	Off
7	S-7	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	0.00	4.02	2.25	0.015	2.00	0.015	0.015	0.013	0.02	1.32	0.00	0.01	0.0	6
8	S-8	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	0.00	4.02	2.25	0.015	2.00	0.015	0.015	0.013	0.02	1.32	0.00	0.01	0.0	7
9	S-9	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.01	0.71	0.01	0.71	0.0	Off
10	S-10	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
11	S-11	0.81	0.00	0.65	0.15	Comb	6.0	4.02	0.00	4.02	2.25	0.020	2.00	0.020	0.020	0.013	0.11	5.41	0.06	2.91	0.0	31
12	S-13A	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
13	S-14	2.08	0.00	2.08	0.00	Grate	0.0	0.00	15.08	4.02	4.50	Sag	2.00	0.020	0.020	0.000	0.19	9.31	0.19	9.31	0.0	Off
14	S-15	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.01	0.71	0.01	0.71	0.0	Off
15	S-16	2.15	0.00	2.15	0.00	Comb	6.0	4.02	15.08	4.02	4.50	Sag	2.00	0.020	0.020	0.000	0.16	8.23	0.16	8.23	0.0	Off
16	S-17	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
17	S-18	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	0.00	4.02	2.25	0.015	2.00	0.015	0.015	0.013	0.02	1.32	0.00	0.01	0.0	15
18	S-19	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
19	S-20	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.01	0.71	0.01	0.71	0.0	Off
20	S-21	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
21	S-22	0.81	0.00	0.65	0.15	Comb	6.0	4.02	0.00	4.02	2.25	0.020	2.00	0.020	0.020	0.013	0.11	5.41	0.06	2.91	0.0	31
22	S-28	1.35	0.00	1.35	0.00	Comb	6.0	4.02	15.08	4.02	4.50	Sag	2.00	0.015	0.015	0.000	0.12	8.07	0.12	8.07	0.0	Off
23	S-29	1.14	0.00	1.14	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.14	9.39	0.14	9.39	0.0	Off

Project File: 10yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES: Inlet N-Values = 0.016; Intensity = 88.24 / (Inlet time + 15.50) ^ 0.83; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
24	S-30	0.79	0.00	0.79	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.11	7.55	0.11	7.55	0.0	Off
25	R-3	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
26	R-4	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
27	R-5	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
28	R-6	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
29	R-7	0.38	0.00	0.34	0.04	Comb	6.0	4.02	0.00	4.02	2.25	0.015	2.00	0.020	0.020	0.013	0.09	4.30	0.04	1.81	0.0	31
30	R-8	0.34	0.00	0.31	0.03	Comb	6.0	4.02	0.00	4.02	2.25	0.015	2.00	0.020	0.020	0.013	0.08	4.15	0.03	1.68	0.0	33
31	R-9	1.18	0.39	1.57	0.00	Comb	6.0	4.02	15.08	4.02	4.50	Sag	2.00	0.020	0.020	0.000	0.14	6.86	0.14	6.86	0.0	Off
32	R-10	0.42	0.00	0.38	0.05	Comb	6.0	4.02	0.00	4.02	2.25	0.015	2.00	0.020	0.020	0.013	0.09	4.48	0.04	1.96	0.0	31
33	R-11	0.86	0.03	0.89	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.020	0.020	0.000	0.13	6.34	0.13	6.34	0.0	Off
34	A-1	10.15*	0.00	0.00	10.15	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off

Project File: 10yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES: Inlet N-Values = 0.016; Intensity = 88.24 / (Inlet time + 15.50) ^ 0.83; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	18	0.52	43.60	44.60	1.00	0.21	0.42	0.09	44.69	0.000	41	43.85	44.12	0.27**	0.21	2.45	0.09	44.21	0.000	0.000	n/a	1.00	n/a
2	18	0.52	43.95	44.19	0.24*	0.18	2.84	0.09	44.28	0.000	45	44.25	44.52	0.27**	0.21	2.45	0.09	44.61	0.000	0.000	n/a	1.33	0.12
3	18	0.01	44.95	44.99	0.04*	0.01	0.81	0.01	45.00	0.575	26	45.10	45.14	0.04**	0.01	0.81	0.01	45.15	0.567	0.571	0.149	1.00	0.01
4	18	0.38	44.35	44.55	0.20*	0.14	2.77	0.08	44.63	0.000	165	45.70	45.93	0.23**	0.17	2.25	0.08	46.01	0.000	0.000	n/a	1.50	0.12
5	18	0.17	45.80	45.94	0.14*	0.08	2.04	0.05	45.99	0.000	29	46.00	46.15	0.15**	0.09	1.82	0.05	46.20	0.000	0.000	n/a	1.00	0.05
6	18	1.23	46.10	46.47	0.37*	0.33	3.69	0.15	46.61	0.000	29	46.30	46.71	0.41**	0.40	3.09	0.15	46.86	0.000	0.000	n/a	1.00	0.15
7	18	0.01	46.10	46.15	0.05	0.01	0.54	0.00	46.16	0.180	76	46.60	46.64	0.04**	0.01	0.89	0.01	46.65	0.742	0.461	n/a	1.00	n/a
8	18	0.62	45.80	46.06	0.26*	0.20	3.09	0.10	46.16	0.000	68	46.30	46.59	0.29**	0.24	2.57	0.10	46.70	0.000	0.000	n/a	0.50	n/a
9	18	0.69	46.40	46.69	0.29*	0.25	2.82	0.11	46.80	0.000	106	46.95	47.26	0.31**	0.26	2.64	0.11	47.37	0.000	0.000	n/a	0.50	0.05
10	18	0.74	47.05	47.36	0.31*	0.26	2.82	0.11	47.47	0.000	61	47.35	47.67	0.32**	0.27	2.69	0.11	47.78	0.000	0.000	n/a	0.92	n/a
11	18	0.81	47.45	47.77	0.32*	0.27	2.97	0.12	47.88	0.000	66	47.80	48.13	0.33**	0.29	2.75	0.12	48.25	0.000	0.000	n/a	1.00	n/a
12	18	0.86	43.60	44.60	1.00	0.31	0.69	0.12	44.72	0.000	51	43.90	44.25	0.35**	0.31	2.80	0.12	44.37	0.000	0.000	n/a	0.99	0.12
13	18	0.86	44.00	44.32	0.32*	0.28	3.08	0.12	44.45	0.000	54	44.30	44.65	0.35**	0.31	2.81	0.12	44.77	0.000	0.000	n/a	1.85	0.23
14	18	0.01	44.40	44.65	0.25	0.01	0.05	0.00	44.65	0.000	54	44.70	44.74	0.04**	0.01	0.71	0.01	44.75	0.385	0.193	0.104	1.00	0.01
15	18	2.01	44.40	44.91	0.51*	0.53	3.82	0.20	45.11	0.000	175	45.30	45.83	0.53**	0.56	3.56	0.20	46.03	0.000	0.000	n/a	1.38	0.27
16	18	0.58	45.40	45.83	0.43	0.23	1.36	0.10	45.93	0.000	24	45.55	45.83 j	0.28**	0.23	2.52	0.10	45.93	0.000	0.000	n/a	0.40	0.04
17	18	0.62	45.65	45.93	0.28*	0.22	2.78	0.10	46.03	0.000	73	46.05	46.34	0.29**	0.24	2.56	0.10	46.44	0.000	0.000	n/a	0.50	0.05
18	18	0.64	46.15	46.44	0.29*	0.23	2.74	0.10	46.54	0.000	49	46.40	46.70	0.30**	0.25	2.59	0.10	46.80	0.000	0.000	n/a	0.56	n/a
19	18	0.69	46.50	46.79	0.29*	0.24	2.87	0.11	46.90	0.000	64	46.85	47.16	0.31**	0.26	2.64	0.11	47.27	0.000	0.000	n/a	0.72	n/a
20	18	0.74	46.95	47.26	0.31*	0.26	2.83	0.11	47.37	0.000	60	47.25	47.57	0.32**	0.27	2.69	0.11	47.68	0.000	0.000	n/a	0.92	n/a
21	18	0.81	47.35	47.67	0.32*	0.27	2.97	0.12	47.78	0.000	66	47.70	48.03	0.33**	0.29	2.75	0.12	48.15	0.000	0.000	n/a	1.00	n/a
22	18	1.35	43.60	44.60	1.00	0.42	1.08	0.16	44.76	0.000	75	45.00	45.43 j	0.43**	0.42	3.17	0.16	45.59	0.000	0.000	n/a	1.00	n/a

Project File: 10yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

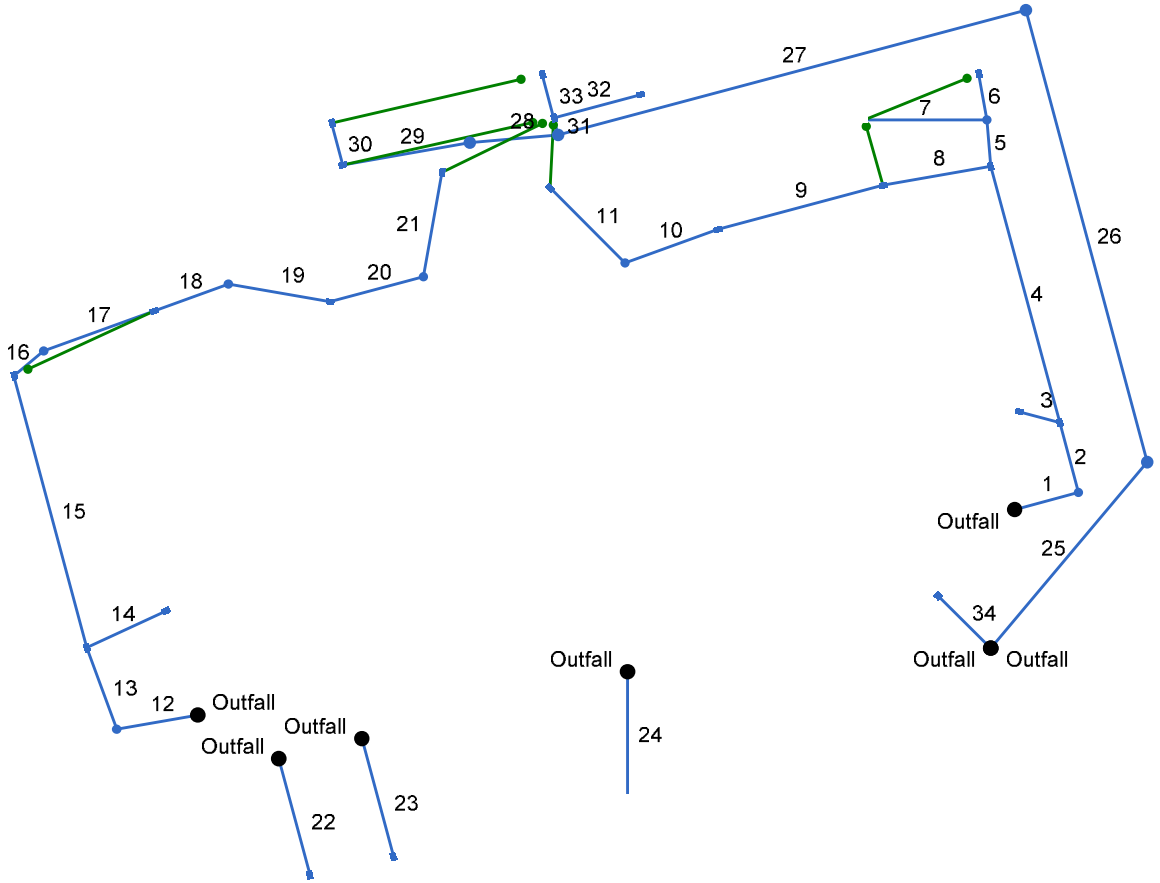
Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
23	18	1.14	43.60	44.60	1.00	0.38	0.91	0.14	44.74	0.000	76	45.00	45.40 j	0.40**	0.38	3.03	0.14	45.54	0.000	0.000	n/a	1.00	0.14
24	18	0.79	43.60	44.60	1.00	0.29	0.63	0.12	44.72	0.000	79	45.00	45.33 j	0.33**	0.29	2.73	0.12	45.45	0.000	0.000	n/a	1.00	n/a
25	48	0.99	38.45	38.70	0.25	0.33	3.03	0.10	38.80	0.000	151	39.50	39.79	0.29**	0.40	2.50	0.10	39.88	0.000	0.000	n/a	0.85	0.08
26	48	1.26	39.60	39.89	0.29*	0.41	3.06	0.11	40.00	0.000	291	41.25	41.57	0.32**	0.47	2.66	0.11	41.68	0.000	0.000	n/a	1.00	n/a
27	48	1.75	41.35	41.69	0.34*	0.51	3.41	0.13	41.82	0.000	300	43.10	43.48	0.38**	0.60	2.89	0.13	43.61	0.000	0.000	n/a	1.00	n/a
28	48	0.59	43.20	43.48	0.28	0.27	1.54	0.07	43.55	0.000	55	43.55	43.77	0.22**	0.27	2.19	0.07	43.84	0.000	0.000	n/a	0.15	0.01
29	18	0.66	46.05	46.33	0.28*	0.23	2.86	0.11	46.44	0.000	80	46.50	46.80	0.30**	0.25	2.61	0.11	46.91	0.000	0.000	n/a	1.50	n/a
30	18	0.34	47.68	47.89	0.21*	0.15	2.35	0.07	47.96	0.000	27	47.83	48.05	0.22**	0.16	2.19	0.07	48.12	0.000	0.000	n/a	1.00	0.07
31	18	2.13	45.70	46.15	0.45*	0.45	4.77	0.20	46.35	0.000	11	45.80	46.35	0.55**	0.59	3.62	0.20	46.55	0.000	0.000	n/a	1.50	n/a
32	18	0.42	45.90	46.35	0.45	0.18	0.95	0.08	46.43	0.000	56	46.20	46.44 j	0.24**	0.18	2.31	0.08	46.52	0.000	0.000	n/a	1.00	n/a
33	18	0.86	46.69	47.02	0.33*	0.29	2.97	0.12	47.14	0.000	28	46.83	47.18	0.35**	0.31	2.80	0.12	47.30	0.000	0.000	n/a	1.00	n/a
34	24	10.15	42.95	43.77	0.82	1.21	8.37	0.47	44.24	0.000	46	43.60	44.74	1.14**	1.85	5.49	0.47	45.21	0.000	0.000	n/a	1.00	0.47

Project File: 10yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

25 - YEAR CALCULATIONS
PROPOSED NETWORK

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: 25yr Revised.stm	Number of lines: 34	Date: 6/1/2022

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	41	-15	MH	0.00	0.00	0.00	5.0	43.60	0.61	43.85	18	Cir	0.012	1.00	50.95	P-3B
2	1	45	-90	Comb	0.00	0.22	0.76	5.0	43.95	0.67	44.25	18	Cir	0.012	1.33	50.33	P-3
3	2	26	-60	Grate	0.01	0.00	0.00	5.0	44.95	0.58	45.10	18	Cir	0.012	1.00	50.63	P-4
4	2	165	0	Comb	0.00	0.16	0.67	5.0	44.35	0.82	45.70	18	Cir	0.012	1.50	50.32	P-5
5	4	29	10	MH	0.00	0.00	0.00	5.0	45.80	0.69	46.00	18	Cir	0.012	1.00	49.98	P-6
6	5	29	-5	Comb	0.00	0.25	0.77	5.0	46.10	0.69	46.30	18	Cir	0.012	1.00	49.75	P-6A
7	5	76	-85	Grate	0.01	0.00	0.00	5.0	46.10	0.66	46.60	18	Cir	0.012	1.00	50.44	P-7
8	4	68	-85	Grate	0.01	0.00	0.00	5.0	45.80	0.74	46.30	18	Cir	0.012	0.50	50.88	P-8
9	8	106	-5	Grate	0.01	0.00	0.00	5.0	46.40	0.52	46.95	18	Cir	0.012	0.50	51.83	P-9
10	9	61	-5	MH	0.00	0.00	0.00	5.0	47.05	0.49	47.35	18	Cir	0.012	0.92	52.60	P-10
11	10	66	65	Comb	0.00	0.18	0.70	5.0	47.45	0.53	47.80	18	Cir	0.012	1.00	51.18	P-11
12	End	51	170	MH	0.00	0.00	0.00	5.0	43.60	0.59	43.90	18	Cir	0.012	0.99	50.53	P-13A
13	12	54	80	Grate	0.00	0.41	0.78	5.0	44.00	0.56	44.30	18	Cir	0.012	1.85	49.75	P-14
14	13	54	85	Grate	0.01	0.00	0.00	5.0	44.40	0.56	44.70	18	Cir	0.012	1.00	50.44	P-15
15	13	175	5	Comb	0.00	0.57	0.59	5.0	44.40	0.51	45.30	18	Cir	0.012	1.38	49.54	P-16
16	15	24	65	MH	0.00	0.00	0.00	5.0	45.40	0.62	45.55	18	Cir	0.012	0.40	49.92	P-17
17	16	73	20	Grate	0.01	0.00	0.00	5.0	45.65	0.55	46.05	18	Cir	0.012	0.50	50.64	P-18
18	17	49	0	MH	0.00	0.00	0.00	5.0	46.15	0.51	46.40	18	Cir	0.012	0.56	51.08	P-19
19	18	64	30	Grate	0.01	0.00	0.00	5.0	46.50	0.55	46.85	18	Cir	0.012	0.72	51.63	P-20
20	19	60	-25	MH	0.00	0.00	0.00	5.0	46.95	0.50	47.25	18	Cir	0.012	0.92	52.69	P-21
21	20	66	-65	Comb	0.00	0.18	0.70	5.0	47.35	0.53	47.70	18	Cir	0.012	1.00	51.49	P-22
22	End	75	75	Comb	0.00	0.30	0.70	5.0	43.60	1.87	45.00	18	Cir	0.012	1.00	49.89	P-28
23	End	76	75	Comb	0.00	0.25	0.71	5.0	43.60	1.84	45.00	18	Cir	0.012	1.00	50.10	P-29

Project File: 25yr Revised.stm | Number of lines: 34 | Date: 6/1/2022

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	End	79	90	Comb	0.00	0.16	0.76	5.0	43.60	1.77	45.00	18	Cir	0.012	1.00	51.18	P-30
25	End	151	-50	MH	0.00	0.00	0.00	5.0	38.45	0.70	39.50	48	Cir	0.012	0.85	51.09	R-3
26	25	291	-55	MH	0.00	0.00	0.00	5.0	39.60	0.57	41.25	48	Cir	0.012	1.00	49.96	R-4
27	26	300	-90	MH	0.00	0.00	0.00	5.0	41.35	0.58	43.10	48	Cir	0.012	1.00	50.65	R-5
28	27	55	10	MH	0.00	0.00	0.00	5.0	43.20	0.64	43.55	48	Cir	0.012	0.15	50.17	R-6
29	28	80	-5	Comb	0.00	0.07	0.84	5.0	46.05	0.56	46.50	18	Cir	0.012	1.50	50.89	R-7
30	29	27	85	Comb	0.00	0.14	0.40	5.0	47.68	0.56	47.83	18	Cir	0.012	1.00	51.06	R-8
31	27	11	90	Comb	0.00	0.28	0.65	5.0	45.70	0.91	45.80	18	Cir	0.012	1.50	49.90	R-9
32	31	56	90	Comb	0.00	0.11	0.60	5.0	45.90	0.54	46.20	18	Cir	0.012	1.00	50.07	R-10
33	31	28	0	Comb	0.00	0.34	0.41	5.0	46.69	0.50	46.83	18	Cir	0.012	1.00	50.06	R-11
34	End	46	-135	MH	22.14	0.00	0.00	5.0	42.95	1.41	43.60	24	Cir	0.012	1.00	50.59	A-1

Project File: 25yr Revised.stm | Number of lines: 34 | Date: 6/1/2022

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	S-3B	Manhole	50.95	Cir	4.00	4.00	18	Cir	43.85	18	Cir	43.95
2	S-3	Combination	50.33	Rect	4.77	3.27	18	Cir	44.25	18 18	Cir Cir	44.95 44.35
3	S-4	Grate	50.63	Rect	4.77	3.27	18	Cir	45.10			
4	S-5	Combination	50.32	Rect	4.77	3.27	18	Cir	45.70	18 18	Cir Cir	45.80 45.80
5	S-6	Manhole	49.98	Cir	4.00	4.00	18	Cir	46.00	18 18	Cir Cir	46.10 46.10
6	S-6A	Combination	49.75	Rect	4.77	3.27	18	Cir	46.30			
7	S-7	Grate	50.44	Rect	4.77	3.27	18	Cir	46.60			
8	S-8	Grate	50.88	Rect	4.77	3.27	18	Cir	46.30	18	Cir	46.40
9	S-9	Grate	51.83	Rect	4.77	3.27	18	Cir	46.95	18	Cir	47.05
10	S-10	Manhole	52.60	Cir	4.00	4.00	18	Cir	47.35	18	Cir	47.45
11	S-11	Combination	51.18	Rect	4.77	3.27	18	Cir	47.80			
12	S-13A	Manhole	50.53	Cir	4.00	4.00	18	Cir	43.90	18	Cir	44.00
13	S-14	Grate	49.75	Rect	4.77	3.27	18	Cir	44.30	18 18	Cir Cir	44.40 44.40
14	S-15	Grate	50.44	Rect	4.77	3.27	18	Cir	44.70			
15	S-16	Combination	49.54	Rect	4.77	3.27	18	Cir	45.30	18	Cir	45.40
16	S-17	Manhole	49.92	Cir	4.00	4.00	18	Cir	45.55	18	Cir	45.65
17	S-18	Grate	50.64	Rect	4.77	3.27	18	Cir	46.05	18	Cir	46.15
18	S-19	Manhole	51.08	Cir	4.00	4.00	18	Cir	46.40	18	Cir	46.50
19	S-20	Grate	51.63	Rect	4.77	3.27	18	Cir	46.85	18	Cir	46.95
20	S-21	Manhole	52.69	Cir	4.00	4.00	18	Cir	47.25	18	Cir	47.35
21	S-22	Combination	51.49	Rect	4.77	3.27	18	Cir	47.70			

Project File: 25yr Revised.stm | Number of Structures: 34 | Run Date: 6/1/2022

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
22	S-28	Combination	49.89	Rect	4.77	3.27	18	Cir	45.00			
23	S-29	Combination	50.10	Rect	4.77	3.27	18	Cir	45.00			
24	S-30	Combination	51.18	Rect	4.77	3.27	18	Cir	45.00			
25	R-3	Manhole	51.09	Cir	6.00	6.00	48	Cir	39.50	48	Cir	39.60
26	R-4	Manhole	49.96	Cir	6.00	6.00	48	Cir	41.25	48	Cir	41.35
27	R-5	Manhole	50.65	Cir	6.00	6.00	48	Cir	43.10	48 18	Cir Cir	43.20 45.70
28	R-6	Manhole	50.17	Cir	6.00	6.00	48	Cir	43.55	18	Cir	46.05
29	R-7	Combination	50.89	Rect	4.77	3.27	18	Cir	46.50	18	Cir	47.68
30	R-8	Combination	51.06	Rect	4.77	3.27	18	Cir	47.83			
31	R-9	Combination	49.90	Rect	4.77	3.27	18	Cir	45.80	18 18	Cir Cir	45.90 46.69
32	R-10	Combination	50.07	Rect	4.77	3.27	18	Cir	46.20			
33	R-11	Combination	50.06	Rect	4.77	3.27	18	Cir	46.83			
34	A-1	Manhole	50.59	Rect	4.00	4.00	24	Cir	43.60			

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	P-3B	0.70	18	Cir	41	43.60	43.85	0.610	44.60	44.16	0.11	44.16	End	Manhole
2	P-3	0.70	18	Cir	45	43.95	44.25	0.667	44.23	44.56	0.14	44.56	1	Combination
3	P-4	0.01	18	Cir	26	44.95	45.10	0.577	44.99	45.14	0.01	45.15	2	Grate
4	P-5	0.50	18	Cir	165	44.35	45.70	0.818	44.58	45.96	0.14	45.96	2	Combination
5	P-6	0.22	18	Cir	29	45.80	46.00	0.690	45.96	46.17	n/a	46.17	4	Manhole
6	P-6A	1.59	18	Cir	29	46.10	46.30	0.690	46.52	46.77	0.17	46.77	5	Combination
7	P-7	0.01	18	Cir	76	46.10	46.60	0.658	46.17	46.64	n/a	46.64	5	Grate
8	P-8	0.85	18	Cir	68	45.80	46.30	0.735	46.10	46.64	n/a	46.64	4	Grate
9	P-9	0.92	18	Cir	106	46.40	46.95	0.519	46.74	47.31	0.06	47.31	8	Grate
10	P-10	0.97	18	Cir	61	47.05	47.35	0.492	47.40	47.72	n/a	47.72	9	Manhole
11	P-11	1.04	18	Cir	66	47.45	47.80	0.530	47.81	48.18	0.14	48.18	10	Combination
12	P-13A	1.15	18	Cir	51	43.60	43.90	0.588	44.60	44.30	n/a	44.30	End	Manhole
13	P-14	1.15	18	Cir	54	44.00	44.30	0.556	44.37	44.70	n/a	44.70	12	Grate
14	P-15	0.01	18	Cir	54	44.40	44.70	0.556	44.70	44.75	0.00	44.75	13	Grate
15	P-16	2.83	18	Cir	175	44.40	45.30	0.514	45.01	45.94	0.33	45.94	13	Combination
16	P-17	0.80	18	Cir	24	45.40	45.55	0.625	45.94	45.88	0.05	45.88	15	Manhole
17	P-18	0.85	18	Cir	73	45.65	46.05	0.548	45.97	46.39	n/a	46.39	16	Grate
18	P-19	0.87	18	Cir	49	46.15	46.40	0.510	46.48	46.75	0.07	46.75	17	Manhole
19	P-20	0.93	18	Cir	64	46.50	46.85	0.547	46.84	47.21	n/a	47.21	18	Grate
20	P-21	0.97	18	Cir	60	46.95	47.25	0.500	47.30	47.62	n/a	47.62	19	Manhole
21	P-22	1.04	18	Cir	66	47.35	47.70	0.530	47.71	48.08	0.14	48.08	20	Combination
22	P-28	1.73	18	Cir	75	43.60	45.00	1.867	44.60	45.49	n/a	45.49 j	End	Combination
23	P-29	1.46	18	Cir	76	43.60	45.00	1.842	44.60	45.45	n/a	45.45 j	End	Combination
24	P-30	1.00	18	Cir	79	43.60	45.00	1.772	44.60	45.37	n/a	45.37 j	End	Combination

Project File: 25yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	R-3	1.57	48	Cir	151	38.45	39.50	0.695	38.76	39.86	n/a	39.86	End	Manhole
26	R-4	1.95	48	Cir	291	39.60	41.25	0.567	39.96	41.65	0.14	41.65	25	Manhole
27	R-5	2.58	48	Cir	300	41.35	43.10	0.583	41.76	43.56	0.16	43.56	26	Manhole
28	R-6	0.82	48	Cir	55	43.20	43.55	0.636	43.56	43.81	n/a	43.81 j	27	Manhole
29	R-7	0.89	18	Cir	80	46.05	46.50	0.563	46.38	46.85	0.19	46.85	28	Combination
30	R-8	0.46	18	Cir	27	47.68	47.83	0.556	47.92	48.08	0.09	48.08	29	Combination
31	R-9	2.87	18	Cir	11	45.70	45.80	0.909	46.23	46.44	n/a	46.44	27	Combination
32	R-10	0.54	18	Cir	56	45.90	46.20	0.536	46.44	46.47	n/a	46.47 j	31	Combination
33	R-11	1.15	18	Cir	28	46.69	46.83	0.500	47.07	47.23	n/a	47.23	31	Combination
34	A-1	22.14	24	Cir	46	42.95	43.60	1.413	44.25	45.28	n/a	45.28	End	Manhole

Project File: 25yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	41	0.00	0.81	0.00	0.00	0.59	5.0	231.1	1.1	0.70	8.88	1.60	18	0.61	43.60	43.85	44.60	44.16	51.22	50.95	P-3B
2	1	45	0.22	0.81	0.76	0.17	0.59	5.0	230.8	1.1	0.70	9.29	2.87	18	0.67	43.95	44.25	44.23	44.56	50.95	50.33	P-3
3	2	26	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.64	0.81	18	0.58	44.95	45.10	44.99	45.14	50.33	50.63	P-4
4	2	165	0.16	0.59	0.67	0.11	0.43	5.0	229.4	1.1	0.50	10.29	2.72	18	0.82	44.35	45.70	44.58	45.96	50.33	50.32	P-5
5	4	29	0.00	0.25	0.00	0.00	0.19	5.0	228.8	1.1	0.22	9.45	2.06	18	0.69	45.80	46.00	45.96	46.17	50.32	49.98	P-6
6	5	29	0.25	0.25	0.77	0.19	0.19	5.0	5.0	8.2	1.59	9.45	3.65	18	0.69	46.10	46.30	46.52	46.77	49.98	49.75	P-6A
7	5	76	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	9.23	0.60	18	0.66	46.10	46.60	46.17	46.64	49.98	50.44	P-7
8	4	68	0.00	0.18	0.00	0.00	0.13	5.0	11.7	6.6	0.85	9.76	3.09	18	0.74	45.80	46.30	46.10	46.64	50.32	50.88	P-8
9	8	106	0.00	0.18	0.00	0.00	0.13	5.0	8.6	7.3	0.92	8.19	2.96	18	0.52	46.40	46.95	46.74	47.31	50.88	51.83	P-9
10	9	61	0.00	0.18	0.00	0.00	0.13	5.0	6.9	7.7	0.97	7.98	2.97	18	0.49	47.05	47.35	47.40	47.72	51.83	52.60	P-10
11	10	66	0.18	0.18	0.70	0.13	0.13	5.0	5.0	8.2	1.04	8.28	3.07	18	0.53	47.45	47.80	47.81	48.18	52.60	51.18	P-11
12	End	51	0.00	1.16	0.00	0.00	0.78	5.0	164.3	1.4	1.15	8.73	1.98	18	0.59	43.60	43.90	44.60	44.30	51.33	50.53	P-13A
13	12	54	0.41	1.16	0.78	0.32	0.78	5.0	164.0	1.4	1.15	8.48	3.20	18	0.56	44.00	44.30	44.37	44.70	50.53	49.75	P-14
14	13	54	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.48	0.29	18	0.56	44.40	44.70	44.70	44.75	49.75	50.44	P-15
15	13	175	0.57	0.75	0.59	0.34	0.46	5.0	14.7	6.1	2.83	8.16	4.07	18	0.51	44.40	45.30	45.01	45.94	49.75	49.54	P-16
16	15	24	0.00	0.18	0.00	0.00	0.13	5.0	14.0	6.2	0.80	8.99	2.08	18	0.62	45.40	45.55	45.94	45.88	49.54	49.92	P-17
17	16	73	0.00	0.18	0.00	0.00	0.13	5.0	11.9	6.6	0.85	8.42	2.92	18	0.55	45.65	46.05	45.97	46.39	49.92	50.64	P-18
18	17	49	0.00	0.18	0.00	0.00	0.13	5.0	10.4	6.9	0.87	8.13	2.91	18	0.51	46.15	46.40	46.48	46.75	50.64	51.08	P-19
19	18	64	0.00	0.18	0.00	0.00	0.13	5.0	8.6	7.3	0.93	8.41	2.99	18	0.55	46.50	46.85	46.84	47.21	51.08	51.63	P-20
20	19	60	0.00	0.18	0.00	0.00	0.13	5.0	6.9	7.7	0.97	8.04	2.98	18	0.50	46.95	47.25	47.30	47.62	51.63	52.69	P-21
21	20	66	0.18	0.18	0.70	0.13	0.13	5.0	5.0	8.2	1.04	8.28	3.07	18	0.53	47.35	47.70	47.71	48.08	52.69	51.49	P-22
22	End	75	0.30	0.30	0.70	0.21	0.21	5.0	5.0	8.2	1.73	15.54	2.40	18	1.87	43.60	45.00	44.60	45.49	50.36	49.89	P-28

Project File: 25yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	End	76	0.25	0.25	0.71	0.18	0.18	5.0	5.0	8.2	1.46	15.44	2.21	18	1.84	43.60	45.00	44.60	45.45	50.98	50.10	P-29
24	End	79	0.16	0.16	0.76	0.12	0.12	5.0	5.0	8.2	1.00	15.14	1.86	18	1.77	43.60	45.00	44.60	45.37	51.99	51.18	P-30
25	End	151	0.00	0.94	0.00	0.00	0.50	5.0	53.5	3.1	1.57	129.8	3.15	48	0.70	38.45	39.50	38.76	39.86	47.26	51.09	R-3
26	25	291	0.00	0.94	0.00	0.00	0.50	5.0	37.4	3.9	1.95	117.2	3.22	48	0.57	39.60	41.25	39.96	41.65	51.09	49.96	R-4
27	26	300	0.00	0.94	0.00	0.00	0.50	5.0	21.7	5.1	2.58	118.9	3.51	48	0.58	41.35	43.10	41.76	43.56	49.96	50.65	R-5
28	27	55	0.00	0.21	0.00	0.00	0.11	5.0	9.2	7.1	0.82	124.1	1.91	48	0.64	43.20	43.55	43.56	43.81	50.65	50.17	R-6
29	28	80	0.07	0.21	0.84	0.06	0.11	5.0	6.7	7.7	0.89	8.53	2.97	18	0.56	46.05	46.50	46.38	46.85	50.17	50.89	R-7
30	29	27	0.14	0.14	0.40	0.06	0.06	5.0	5.0	8.2	0.46	8.48	2.47	18	0.56	47.68	47.83	47.92	48.08	50.89	51.06	R-8
31	27	11	0.28	0.73	0.65	0.18	0.39	5.0	8.0	7.4	2.87	10.85	4.57	18	0.91	45.70	45.80	46.23	46.44	50.65	49.90	R-9
32	31	56	0.11	0.11	0.60	0.07	0.07	5.0	5.0	8.2	0.54	8.33	1.71	18	0.54	45.90	46.20	46.44	46.47	49.90	50.07	R-10
33	31	28	0.34	0.34	0.41	0.14	0.14	5.0	5.0	8.2	1.15	8.04	3.13	18	0.50	46.69	46.83	47.07	47.23	49.90	50.06	R-11
34	End	46	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	22.14	29.13	9.03	24	1.41	42.95	43.60	44.25	45.28	47.26	50.59	A-1

Project File: 25yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	S-3B	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	S-3	1.38	0.00	1.38	0.00	Comb	6.0	4.02	15.08	4.02	4.50	Sag	2.00	0.015	0.015	0.000	0.12	8.18	0.12	8.18	0.0	Off
3	S-4	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.01	0.71	0.01	0.71	0.0	Off
4	S-5	0.88	0.00	0.88	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.12	8.08	0.12	8.08	0.0	Off
5	S-6	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
6	S-6A	1.59	0.00	1.59	0.00	Comb	6.0	4.02	15.08	4.02	4.50	Sag	2.00	0.015	0.015	0.000	0.13	8.89	0.13	8.89	0.0	Off
7	S-7	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	0.00	4.02	2.25	0.015	2.00	0.015	0.015	0.013	0.02	1.32	0.00	0.01	0.0	6
8	S-8	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	0.00	4.02	2.25	0.015	2.00	0.015	0.015	0.013	0.02	1.32	0.00	0.01	0.0	7
9	S-9	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.01	0.71	0.01	0.71	0.0	Off
10	S-10	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
11	S-11	1.04	0.00	0.80	0.24	Comb	6.0	4.02	0.00	4.02	2.25	0.020	2.00	0.020	0.020	0.013	0.12	5.95	0.07	3.41	0.0	31
12	S-13A	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
13	S-14	2.64	0.00	2.64	0.00	Grate	0.0	0.00	15.08	4.02	4.50	Sag	2.00	0.020	0.020	0.000	0.21	10.53	0.21	10.53	0.0	Off
14	S-15	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.01	0.71	0.01	0.71	0.0	Off
15	S-16	2.77	0.00	2.77	0.00	Comb	6.0	4.02	15.08	4.02	4.50	Sag	2.00	0.020	0.020	0.000	0.19	9.58	0.19	9.58	0.0	Off
16	S-17	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
17	S-18	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	0.00	4.02	2.25	0.015	2.00	0.015	0.015	0.013	0.02	1.32	0.00	0.01	0.0	15
18	S-19	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
19	S-20	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.01	0.71	0.01	0.71	0.0	Off
20	S-21	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
21	S-22	1.04	0.00	0.80	0.24	Comb	6.0	4.02	0.00	4.02	2.25	0.020	2.00	0.020	0.020	0.013	0.12	5.95	0.07	3.41	0.0	31
22	S-28	1.73	0.00	1.73	0.00	Comb	6.0	4.02	15.08	4.02	4.50	Sag	2.00	0.015	0.015	0.000	0.14	9.35	0.14	9.35	0.0	Off
23	S-29	1.46	0.00	1.46	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.16	10.91	0.16	10.91	0.0	Off

Project File: 25yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES: Inlet N-Values = 0.016; Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
24	S-30	1.00	0.00	1.00	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.13	8.70	0.13	8.70	0.0	Off
25	R-3	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
26	R-4	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
27	R-5	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
28	R-6	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
29	R-7	0.48	0.00	0.42	0.06	Comb	6.0	4.02	0.00	4.02	2.25	0.015	2.00	0.020	0.020	0.013	0.09	4.72	0.04	2.17	0.0	31
30	R-8	0.46	0.00	0.41	0.06	Comb	6.0	4.02	0.00	4.02	2.25	0.015	2.00	0.020	0.020	0.013	0.09	4.63	0.04	2.10	0.0	33
31	R-9	1.50	0.61	2.11	0.00	Comb	6.0	4.02	15.08	4.02	4.50	Sag	2.00	0.020	0.020	0.000	0.16	8.15	0.16	8.15	0.0	Off
32	R-10	0.54	0.00	0.47	0.08	Comb	6.0	4.02	0.00	4.02	2.25	0.015	2.00	0.020	0.020	0.013	0.10	4.92	0.05	2.37	0.0	31
33	R-11	1.15	0.06	1.21	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.020	0.020	0.000	0.15	7.53	0.15	7.53	0.0	Off
34	A-1	22.14*	0.00	0.00	22.14	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off

Project File: 25yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES: Inlet N-Values = 0.016; Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	18	0.70	43.60	44.60	1.00	0.26	0.56	0.11	44.71	0.000	41	43.85	44.16	0.31**	0.26	2.64	0.11	44.27	0.000	0.000	n/a	1.00	0.11
2	18	0.70	43.95	44.23	0.28*	0.23	3.09	0.11	44.34	0.000	45	44.25	44.56	0.31**	0.26	2.65	0.11	44.67	0.000	0.000	n/a	1.33	0.14
3	18	0.01	44.95	44.99	0.04*	0.01	0.81	0.01	45.00	0.575	26	45.10	45.14	0.04**	0.01	0.81	0.01	45.15	0.567	0.571	0.149	1.00	0.01
4	18	0.50	44.35	44.58	0.23*	0.17	3.01	0.09	44.67	0.000	165	45.70	45.96	0.26**	0.21	2.42	0.09	46.05	0.000	0.000	n/a	1.50	0.14
5	18	0.22	45.80	45.96	0.16	0.10	2.17	0.06	46.02	0.000	29	46.00	46.17	0.17**	0.11	1.96	0.06	46.23	0.000	0.000	n/a	1.00	n/a
6	18	1.59	46.10	46.52	0.42*	0.40	3.97	0.17	46.69	0.000	29	46.30	46.77	0.47**	0.48	3.33	0.17	46.94	0.000	0.000	n/a	1.00	0.17
7	18	0.01	46.10	46.17	0.07	0.01	0.31	0.00	46.18	0.035	76	46.60	46.64	0.04**	0.01	0.89	0.01	46.65	0.742	0.388	n/a	1.00	n/a
8	18	0.85	45.80	46.10	0.30*	0.25	3.39	0.12	46.22	0.000	68	46.30	46.64	0.34**	0.30	2.80	0.12	46.76	0.000	0.000	n/a	0.50	n/a
9	18	0.92	46.40	46.74	0.34*	0.30	3.07	0.13	46.87	0.000	106	46.95	47.31	0.36**	0.32	2.86	0.13	47.43	0.000	0.000	n/a	0.50	0.06
10	18	0.97	47.05	47.40	0.35*	0.32	3.05	0.13	47.53	0.000	61	47.35	47.72	0.37**	0.34	2.89	0.13	47.85	0.000	0.000	n/a	0.92	n/a
11	18	1.04	47.45	47.81	0.36*	0.32	3.20	0.14	47.94	0.000	66	47.80	48.18	0.38**	0.35	2.95	0.14	48.32	0.000	0.000	n/a	1.00	0.14
12	18	1.15	43.60	44.60	1.00	0.38	0.92	0.14	44.74	0.000	51	43.90	44.30	0.40**	0.38	3.04	0.14	44.44	0.000	0.000	n/a	0.99	n/a
13	18	1.15	44.00	44.37	0.37*	0.34	3.35	0.14	44.52	0.000	54	44.30	44.70	0.40**	0.38	3.04	0.14	44.84	0.000	0.000	n/a	1.85	n/a
14	18	0.01	44.40	44.70	0.30	0.25	0.04	0.00	44.70	0.000	54	44.70	44.75	0.05	0.02	0.55	0.00	44.75	0.187	0.094	0.051	1.00	0.00
15	18	2.83	44.40	45.01	0.61*	0.67	4.19	0.24	45.25	0.000	175	45.30	45.94	0.64**	0.72	3.95	0.24	46.18	0.000	0.000	n/a	1.38	0.33
16	18	0.80	45.40	45.94	0.54	0.29	1.40	0.12	46.06	0.000	24	45.55	45.88	0.33**	0.29	2.75	0.12	46.00	0.000	0.000	n/a	0.40	0.05
17	18	0.85	45.65	45.97	0.32*	0.28	3.05	0.12	46.09	0.000	73	46.05	46.39	0.34**	0.30	2.79	0.12	46.51	0.000	0.000	n/a	0.50	n/a
18	18	0.87	46.15	46.48	0.33*	0.29	3.00	0.12	46.61	0.000	49	46.40	46.75	0.35**	0.31	2.81	0.12	46.87	0.000	0.000	n/a	0.56	0.07
19	18	0.93	46.50	46.84	0.34*	0.30	3.13	0.13	46.96	0.000	64	46.85	47.21	0.36**	0.32	2.86	0.13	47.34	0.000	0.000	n/a	0.72	n/a
20	18	0.97	46.95	47.30	0.35*	0.32	3.07	0.13	47.43	0.000	60	47.25	47.62	0.37**	0.34	2.89	0.13	47.75	0.000	0.000	n/a	0.92	n/a
21	18	1.04	47.35	47.71	0.36*	0.32	3.20	0.14	47.84	0.000	66	47.70	48.08	0.38**	0.35	2.95	0.14	48.22	0.000	0.000	n/a	1.00	0.14
22	18	1.73	43.60	44.60	1.00	0.51	1.38	0.18	44.78	0.000	75	45.00	45.49 j	0.49**	0.51	3.41	0.18	45.68	0.000	0.000	n/a	1.00	0.18

Project File: 25yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

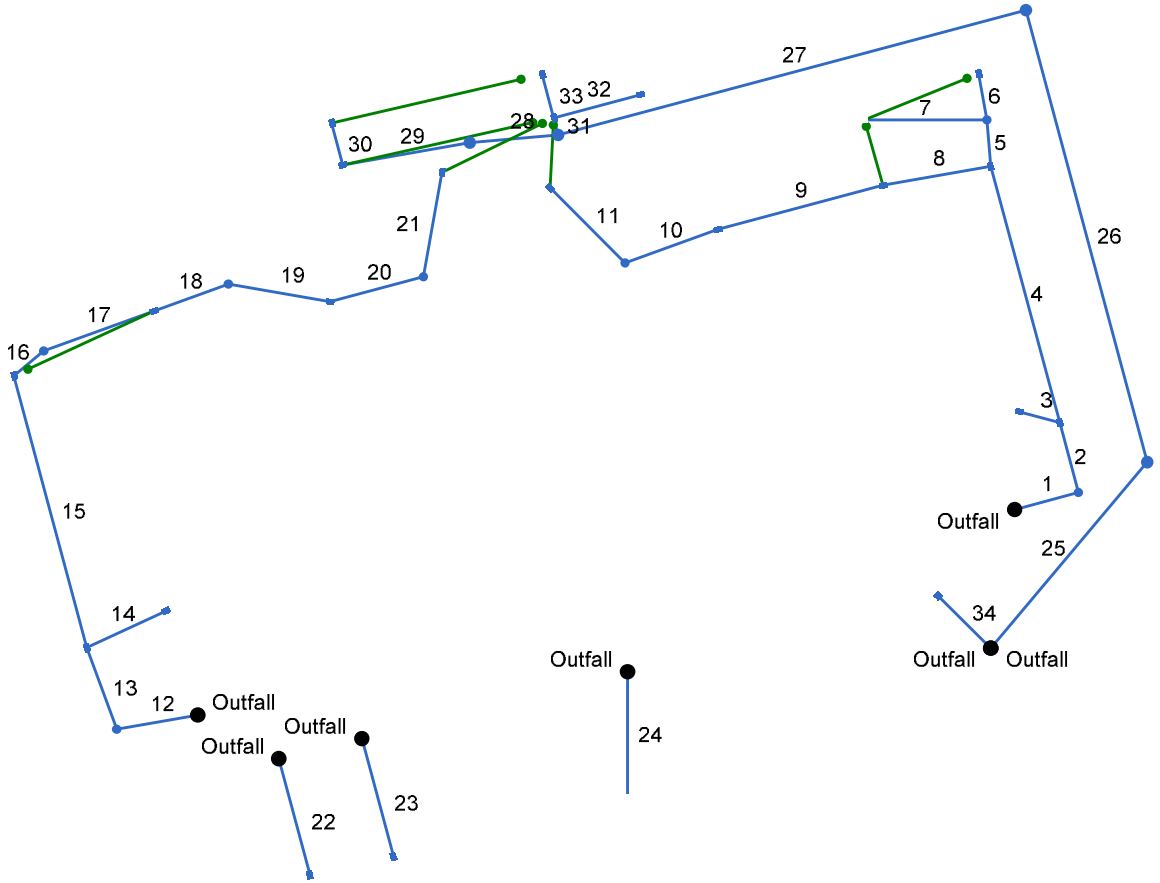
Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
23	18	1.46	43.60	44.60	1.00	0.45	1.17	0.16	44.76	0.000	76	45.00	45.45 j	0.45**	0.45	3.25	0.16	45.62	0.000	0.000	n/a	1.00	n/a
24	18	1.00	43.60	44.60	1.00	0.34	0.80	0.13	44.73	0.000	79	45.00	45.37 j	0.37**	0.34	2.92	0.13	45.51	0.000	0.000	n/a	1.00	0.13
25	48	1.57	38.45	38.76	0.31	0.45	3.49	0.12	38.88	0.000	151	39.50	39.86	0.36**	0.56	2.81	0.12	39.98	0.000	0.000	n/a	0.85	n/a
26	48	1.95	39.60	39.96	0.36*	0.56	3.48	0.14	40.10	0.000	291	41.25	41.65	0.40**	0.66	2.96	0.14	41.79	0.000	0.000	n/a	1.00	0.14
27	48	2.58	41.35	41.76	0.41*	0.67	3.83	0.16	41.92	0.000	300	43.10	43.56	0.46**	0.81	3.19	0.16	43.72	0.000	0.000	n/a	1.00	0.16
28	48	0.82	43.20	43.56	0.36	0.34	1.44	0.09	43.65	0.000	55	43.55	43.81 j	0.26**	0.34	2.37	0.09	43.90	0.000	0.000	n/a	0.15	0.01
29	18	0.89	46.05	46.38	0.33*	0.28	3.12	0.12	46.50	0.000	80	46.50	46.85	0.35**	0.31	2.83	0.12	46.98	0.000	0.000	n/a	1.50	0.19
30	18	0.46	47.68	47.92	0.24*	0.18	2.56	0.09	48.01	0.000	27	47.83	48.08	0.25**	0.19	2.37	0.09	48.17	0.000	0.000	n/a	1.00	0.09
31	18	2.87	45.70	46.23	0.53*	0.55	5.18	0.24	46.47	0.000	11	45.80	46.44	0.64**	0.72	3.97	0.24	46.69	0.000	0.000	n/a	1.50	n/a
32	18	0.54	45.90	46.44	0.54	0.22	0.94	0.10	46.54	0.000	56	46.20	46.47 j	0.27**	0.22	2.48	0.10	46.57	0.000	0.000	n/a	1.00	n/a
33	18	1.15	46.69	47.07	0.38*	0.36	3.23	0.14	47.22	0.000	28	46.83	47.23	0.40**	0.38	3.03	0.14	47.37	0.000	0.000	n/a	1.00	n/a
34	24	22.14	42.95	44.25	1.30*	2.17	10.20	0.96	45.22	0.000	46	43.60	45.28	1.68**	2.81	7.87	0.96	46.24	0.000	0.000	n/a	1.00	n/a

Project File: 25yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

100-YEAR CALCULATIONS
PROPOSED NETWORK

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: 100yr Revised.stm	Number of lines: 34	Date: 6/1/2022

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	41	-15	MH	0.00	0.00	0.00	5.0	43.60	0.61	43.85	18	Cir	0.012	1.00	50.95	P-3B
2	1	45	-90	Comb	0.00	0.22	0.76	5.0	43.95	0.67	44.25	18	Cir	0.012	1.33	50.33	P-3
3	2	26	-60	Grate	0.01	0.00	0.00	5.0	44.95	0.58	45.10	18	Cir	0.012	1.00	50.63	P-4
4	2	165	0	Comb	0.00	0.16	0.67	5.0	44.35	0.82	45.70	18	Cir	0.012	1.50	50.32	P-5
5	4	29	10	MH	0.00	0.00	0.00	5.0	45.80	0.69	46.00	18	Cir	0.012	1.00	49.98	P-6
6	5	29	-5	Comb	0.00	0.25	0.77	5.0	46.10	0.69	46.30	18	Cir	0.012	1.00	49.75	P-6A
7	5	76	-85	Grate	0.01	0.00	0.00	5.0	46.10	0.66	46.60	18	Cir	0.012	1.00	50.44	P-7
8	4	68	-85	Grate	0.01	0.00	0.00	5.0	45.80	0.74	46.30	18	Cir	0.012	0.50	50.88	P-8
9	8	106	-5	Grate	0.01	0.00	0.00	5.0	46.40	0.52	46.95	18	Cir	0.012	0.50	51.83	P-9
10	9	61	-5	MH	0.00	0.00	0.00	5.0	47.05	0.49	47.35	18	Cir	0.012	0.92	52.60	P-10
11	10	66	65	Comb	0.00	0.18	0.70	5.0	47.45	0.53	47.80	18	Cir	0.012	1.00	51.18	P-11
12	End	51	170	MH	0.00	0.00	0.00	5.0	43.60	0.59	43.90	18	Cir	0.012	0.99	50.53	P-13A
13	12	54	80	Grate	0.00	0.41	0.78	5.0	44.00	0.56	44.30	18	Cir	0.012	1.85	49.75	P-14
14	13	54	85	Grate	0.01	0.00	0.00	5.0	44.40	0.56	44.70	18	Cir	0.012	1.00	50.44	P-15
15	13	175	5	Comb	0.00	0.57	0.59	5.0	44.40	0.51	45.30	18	Cir	0.012	1.38	49.54	P-16
16	15	24	65	MH	0.00	0.00	0.00	5.0	45.40	0.62	45.55	18	Cir	0.012	0.40	49.92	P-17
17	16	73	20	Grate	0.01	0.00	0.00	5.0	45.65	0.55	46.05	18	Cir	0.012	0.50	50.64	P-18
18	17	49	0	MH	0.00	0.00	0.00	5.0	46.15	0.51	46.40	18	Cir	0.012	0.56	51.08	P-19
19	18	64	30	Grate	0.01	0.00	0.00	5.0	46.50	0.55	46.85	18	Cir	0.012	0.72	51.63	P-20
20	19	60	-25	MH	0.00	0.00	0.00	5.0	46.95	0.50	47.25	18	Cir	0.012	0.92	52.69	P-21
21	20	66	-65	Comb	0.00	0.18	0.70	5.0	47.35	0.53	47.70	18	Cir	0.012	1.00	51.49	P-22
22	End	75	75	Comb	0.00	0.30	0.70	5.0	43.60	1.87	45.00	18	Cir	0.012	1.00	49.89	P-28
23	End	76	75	Comb	0.00	0.25	0.71	5.0	43.60	1.84	45.00	18	Cir	0.012	1.00	50.10	P-29

Project File: 100yr Revised.stm | Number of lines: 34 | Date: 6/1/2022

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	End	79	90	Comb	0.00	0.16	0.76	5.0	43.60	1.77	45.00	18	Cir	0.012	1.00	51.18	P-30
25	End	151	-50	MH	0.00	0.00	0.00	5.0	38.45	0.70	39.50	48	Cir	0.012	0.85	51.09	R-3
26	25	291	-55	MH	0.00	0.00	0.00	5.0	39.60	0.57	41.25	48	Cir	0.012	1.00	49.96	R-4
27	26	300	-90	MH	0.00	0.00	0.00	5.0	41.35	0.58	43.10	48	Cir	0.012	1.00	50.65	R-5
28	27	55	10	MH	0.00	0.00	0.00	5.0	43.20	0.64	43.55	48	Cir	0.012	0.15	50.17	R-6
29	28	80	-5	Comb	0.00	0.07	0.84	5.0	46.05	0.56	46.50	18	Cir	0.012	1.50	50.89	R-7
30	29	27	85	Comb	0.00	0.14	0.40	5.0	47.68	0.56	47.83	18	Cir	0.012	1.00	51.06	R-8
31	27	11	90	Comb	0.00	0.28	0.65	5.0	45.70	0.91	45.80	18	Cir	0.012	1.50	49.90	R-9
32	31	56	90	Comb	0.00	0.11	0.60	5.0	45.90	0.54	46.20	18	Cir	0.012	1.00	50.07	R-10
33	31	28	0	Comb	0.00	0.34	0.41	5.0	46.69	0.50	46.83	18	Cir	0.012	1.00	50.06	R-11
34	End	46	-135	MH	23.83	0.00	0.00	5.0	42.95	1.41	43.60	24	Cir	0.012	1.00	50.59	A-1

Project File: 100yr Revised.stm | Number of lines: 34 | Date: 6/1/2022

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	S-3B	Manhole	50.95	Cir	4.00	4.00	18	Cir	43.85	18	Cir	43.95
2	S-3	Combination	50.33	Rect	4.77	3.27	18	Cir	44.25	18 18	Cir Cir	44.95 44.35
3	S-4	Grate	50.63	Rect	4.77	3.27	18	Cir	45.10			
4	S-5	Combination	50.32	Rect	4.77	3.27	18	Cir	45.70	18 18	Cir Cir	45.80 45.80
5	S-6	Manhole	49.98	Cir	4.00	4.00	18	Cir	46.00	18 18	Cir Cir	46.10 46.10
6	S-6A	Combination	49.75	Rect	4.77	3.27	18	Cir	46.30			
7	S-7	Grate	50.44	Rect	4.77	3.27	18	Cir	46.60			
8	S-8	Grate	50.88	Rect	4.77	3.27	18	Cir	46.30	18	Cir	46.40
9	S-9	Grate	51.83	Rect	4.77	3.27	18	Cir	46.95	18	Cir	47.05
10	S-10	Manhole	52.60	Cir	4.00	4.00	18	Cir	47.35	18	Cir	47.45
11	S-11	Combination	51.18	Rect	4.77	3.27	18	Cir	47.80			
12	S-13A	Manhole	50.53	Cir	4.00	4.00	18	Cir	43.90	18	Cir	44.00
13	S-14	Grate	49.75	Rect	4.77	3.27	18	Cir	44.30	18 18	Cir Cir	44.40 44.40
14	S-15	Grate	50.44	Rect	4.77	3.27	18	Cir	44.70			
15	S-16	Combination	49.54	Rect	4.77	3.27	18	Cir	45.30	18	Cir	45.40
16	S-17	Manhole	49.92	Cir	4.00	4.00	18	Cir	45.55	18	Cir	45.65
17	S-18	Grate	50.64	Rect	4.77	3.27	18	Cir	46.05	18	Cir	46.15
18	S-19	Manhole	51.08	Cir	4.00	4.00	18	Cir	46.40	18	Cir	46.50
19	S-20	Grate	51.63	Rect	4.77	3.27	18	Cir	46.85	18	Cir	46.95
20	S-21	Manhole	52.69	Cir	4.00	4.00	18	Cir	47.25	18	Cir	47.35
21	S-22	Combination	51.49	Rect	4.77	3.27	18	Cir	47.70			

Project File: 100yr Revised.stm | Number of Structures: 34 | Run Date: 6/1/2022

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
22	S-28	Combination	49.89	Rect	4.77	3.27	18	Cir	45.00			
23	S-29	Combination	50.10	Rect	4.77	3.27	18	Cir	45.00			
24	S-30	Combination	51.18	Rect	4.77	3.27	18	Cir	45.00			
25	R-3	Manhole	51.09	Cir	6.00	6.00	48	Cir	39.50	48	Cir	39.60
26	R-4	Manhole	49.96	Cir	6.00	6.00	48	Cir	41.25	48	Cir	41.35
27	R-5	Manhole	50.65	Cir	6.00	6.00	48	Cir	43.10	48 18	Cir Cir	43.20 45.70
28	R-6	Manhole	50.17	Cir	6.00	6.00	48	Cir	43.55	18	Cir	46.05
29	R-7	Combination	50.89	Rect	4.77	3.27	18	Cir	46.50	18	Cir	47.68
30	R-8	Combination	51.06	Rect	4.77	3.27	18	Cir	47.83			
31	R-9	Combination	49.90	Rect	4.77	3.27	18	Cir	45.80	18 18	Cir Cir	45.90 46.69
32	R-10	Combination	50.07	Rect	4.77	3.27	18	Cir	46.20			
33	R-11	Combination	50.06	Rect	4.77	3.27	18	Cir	46.83			
34	A-1	Manhole	50.59	Rect	4.00	4.00	24	Cir	43.60			

Project File: 100yr Revised.stm | Number of Structures: 34 | Run Date: 6/1/2022

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	P-3B	0.86	18	Cir	41	43.60	43.85	0.610	44.60	44.20	n/a	44.20	End	Manhole
2	P-3	0.87	18	Cir	45	43.95	44.25	0.667	44.26	44.60	n/a	44.60	1	Combination
3	P-4	0.01	18	Cir	26	44.95	45.10	0.577	44.99	45.14	0.01	45.15	2	Grate
4	P-5	0.63	18	Cir	165	44.35	45.70	0.818	44.60	45.99	n/a	45.99	2	Combination
5	P-6	0.28	18	Cir	29	45.80	46.00	0.690	45.99	46.19	0.07	46.19	4	Manhole
6	P-6A	1.89	18	Cir	29	46.10	46.30	0.690	46.56	46.82	0.19	46.82	5	Combination
7	P-7	0.01	18	Cir	76	46.10	46.60	0.658	46.19	46.64	n/a	46.64	5	Grate
8	P-8	1.06	18	Cir	68	45.80	46.30	0.735	46.13	46.68	0.07	46.68	4	Grate
9	P-9	1.13	18	Cir	106	46.40	46.95	0.519	46.78	47.35	n/a	47.35	8	Grate
10	P-10	1.17	18	Cir	61	47.05	47.35	0.492	47.44	47.75	0.13	47.75	9	Manhole
11	P-11	1.24	18	Cir	66	47.45	47.80	0.530	47.84	48.22	0.15	48.22	10	Combination
12	P-13A	1.43	18	Cir	51	43.60	43.90	0.588	44.60	44.35	0.16	44.35	End	Manhole
13	P-14	1.44	18	Cir	54	44.00	44.30	0.556	44.42	44.75	0.30	44.75	12	Grate
14	P-15	0.01	18	Cir	54	44.40	44.70	0.556	44.75	44.76	0.00	44.77	13	Grate
15	P-16	3.56	18	Cir	175	44.40	45.30	0.514	45.09	46.02	n/a	46.02	13	Combination
16	P-17	1.00	18	Cir	24	45.40	45.55	0.625	46.02	45.92	0.05	45.92	15	Manhole
17	P-18	1.05	18	Cir	73	45.65	46.05	0.548	46.01	46.43	n/a	46.43	16	Grate
18	P-19	1.08	18	Cir	49	46.15	46.40	0.510	46.52	46.79	0.08	46.79	17	Manhole
19	P-20	1.13	18	Cir	64	46.50	46.85	0.547	46.87	47.25	0.10	47.25	18	Grate
20	P-21	1.17	18	Cir	60	46.95	47.25	0.500	47.34	47.65	0.13	47.65	19	Manhole
21	P-22	1.24	18	Cir	66	47.35	47.70	0.530	47.74	48.12	0.15	48.12	20	Combination
22	P-28	2.06	18	Cir	75	43.60	45.00	1.867	44.60	45.54	n/a	45.54 j	End	Combination
23	P-29	1.75	18	Cir	76	43.60	45.00	1.842	44.60	45.50	n/a	45.50 j	End	Combination
24	P-30	1.20	18	Cir	79	43.60	45.00	1.772	44.60	45.41	n/a	45.41 j	End	Combination

Project File: 100yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES: Return period = 100 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	R-3	2.14	48	Cir	151	38.45	39.50	0.695	38.81	39.92	n/a	39.92	End	Manhole
26	R-4	2.60	48	Cir	291	39.60	41.25	0.567	40.01	41.71	n/a	41.71	25	Manhole
27	R-5	3.34	48	Cir	300	41.35	43.10	0.583	41.81	43.63	n/a	43.63	26	Manhole
28	R-6	1.00	48	Cir	55	43.20	43.55	0.636	43.63	43.84	n/a	43.84 j	27	Manhole
29	R-7	1.07	18	Cir	80	46.05	46.50	0.563	46.41	46.89	0.21	46.89	28	Combination
30	R-8	0.55	18	Cir	27	47.68	47.83	0.556	47.94	48.10	n/a	48.10	29	Combination
31	R-9	3.49	18	Cir	11	45.70	45.80	0.909	46.29	46.51	0.42	46.51	27	Combination
32	R-10	0.65	18	Cir	56	45.90	46.20	0.536	46.51	46.50	n/a	46.50 j	31	Combination
33	R-11	1.37	18	Cir	28	46.69	46.83	0.500	47.11	47.27	n/a	47.27	31	Combination
34	A-1	23.83	24	Cir	46	42.95	43.60	1.413	44.33	45.33	1.06	45.33	End	Manhole

Project File: 100yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES: Return period = 100 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	41	0.00	0.81	0.00	0.00	0.59	5.0	230.8	1.4	0.86	8.88	1.75	18	0.61	43.60	43.85	44.60	44.20	51.22	50.95	P-3B
2	1	45	0.22	0.81	0.76	0.17	0.59	5.0	230.5	1.4	0.87	9.29	3.05	18	0.67	43.95	44.25	44.26	44.60	50.95	50.33	P-3
3	2	26	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.64	0.81	18	0.58	44.95	45.10	44.99	45.14	50.33	50.63	P-4
4	2	165	0.16	0.59	0.67	0.11	0.43	5.0	229.3	1.4	0.63	10.29	2.89	18	0.82	44.35	45.70	44.60	45.99	50.33	50.32	P-5
5	4	29	0.00	0.25	0.00	0.00	0.19	5.0	228.8	1.4	0.28	9.45	2.09	18	0.69	45.80	46.00	45.99	46.19	50.32	49.98	P-6
6	5	29	0.25	0.25	0.77	0.19	0.19	5.0	5.0	9.8	1.89	9.45	3.84	18	0.69	46.10	46.30	46.56	46.82	49.98	49.75	P-6A
7	5	76	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	9.23	0.55	18	0.66	46.10	46.60	46.19	46.64	49.98	50.44	P-7
8	4	68	0.00	0.18	0.00	0.00	0.13	5.0	10.6	8.2	1.06	9.76	3.29	18	0.74	45.80	46.30	46.13	46.68	50.32	50.88	P-8
9	8	106	0.00	0.18	0.00	0.00	0.13	5.0	8.0	8.9	1.13	8.19	3.14	18	0.52	46.40	46.95	46.78	47.35	50.88	51.83	P-9
10	9	61	0.00	0.18	0.00	0.00	0.13	5.0	6.6	9.3	1.17	7.98	3.14	18	0.49	47.05	47.35	47.44	47.75	51.83	52.60	P-10
11	10	66	0.18	0.18	0.70	0.13	0.13	5.0	5.0	9.8	1.24	8.28	3.23	18	0.53	47.45	47.80	47.84	48.22	52.60	51.18	P-11
12	End	51	0.00	1.16	0.00	0.00	0.78	5.0	164.3	1.8	1.43	8.73	2.19	18	0.59	43.60	43.90	44.60	44.35	51.33	50.53	P-13A
13	12	54	0.41	1.16	0.78	0.32	0.78	5.0	164.0	1.8	1.44	8.48	3.40	18	0.56	44.00	44.30	44.42	44.75	50.53	49.75	P-14
14	13	54	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	0.01	8.48	0.21	18	0.56	44.40	44.70	44.75	44.76	49.75	50.44	P-15
15	13	175	0.57	0.75	0.59	0.34	0.46	5.0	13.1	7.7	3.56	8.16	4.35	18	0.51	44.40	45.30	45.09	46.02	49.75	49.54	P-16
16	15	24	0.00	0.18	0.00	0.00	0.13	5.0	12.5	7.8	1.00	8.99	2.19	18	0.62	45.40	45.55	46.02	45.92	49.54	49.92	P-17
17	16	73	0.00	0.18	0.00	0.00	0.13	5.0	10.8	8.2	1.05	8.42	3.10	18	0.55	45.65	46.05	46.01	46.43	49.92	50.64	P-18
18	17	49	0.00	0.18	0.00	0.00	0.13	5.0	9.6	8.5	1.08	8.13	3.08	18	0.51	46.15	46.40	46.52	46.79	50.64	51.08	P-19
19	18	64	0.00	0.18	0.00	0.00	0.13	5.0	8.0	8.9	1.13	8.41	3.17	18	0.55	46.50	46.85	46.87	47.25	51.08	51.63	P-20
20	19	60	0.00	0.18	0.00	0.00	0.13	5.0	6.6	9.3	1.17	8.04	3.15	18	0.50	46.95	47.25	47.34	47.65	51.63	52.69	P-21
21	20	66	0.18	0.18	0.70	0.13	0.13	5.0	5.0	9.8	1.24	8.28	3.23	18	0.53	47.35	47.70	47.74	48.12	52.69	51.49	P-22
22	End	75	0.30	0.30	0.70	0.21	0.21	5.0	5.0	9.8	2.06	15.54	2.62	18	1.87	43.60	45.00	44.60	45.54	50.36	49.89	P-28

Project File: 100yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES:Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	End	76	0.25	0.25	0.71	0.18	0.18	5.0	5.0	9.8	1.75	15.44	2.41	18	1.84	43.60	45.00	44.60	45.50	50.98	50.10	P-29
24	End	79	0.16	0.16	0.76	0.12	0.12	5.0	5.0	9.8	1.20	15.14	2.01	18	1.77	43.60	45.00	44.60	45.41	51.99	51.18	P-30
25	End	151	0.00	0.94	0.00	0.00	0.50	5.0	45.6	4.3	2.14	129.8	3.43	48	0.70	38.45	39.50	38.81	39.92	47.26	51.09	R-3
26	25	291	0.00	0.94	0.00	0.00	0.50	5.0	32.1	5.2	2.60	117.2	3.50	48	0.57	39.60	41.25	40.01	41.71	51.09	49.96	R-4
27	26	300	0.00	0.94	0.00	0.00	0.50	5.0	19.0	6.6	3.34	118.9	3.78	48	0.58	41.35	43.10	41.81	43.63	49.96	50.65	R-5
28	27	55	0.00	0.21	0.00	0.00	0.11	5.0	8.5	8.7	1.00	124.1	1.95	48	0.64	43.20	43.55	43.63	43.84	50.65	50.17	R-6
29	28	80	0.07	0.21	0.84	0.06	0.11	5.0	6.4	9.4	1.07	8.53	3.14	18	0.56	46.05	46.50	46.41	46.89	50.17	50.89	R-7
30	29	27	0.14	0.14	0.40	0.06	0.06	5.0	5.0	9.8	0.55	8.48	2.59	18	0.56	47.68	47.83	47.94	48.10	50.89	51.06	R-8
31	27	11	0.28	0.73	0.65	0.18	0.39	5.0	7.5	9.0	3.49	10.85	4.84	18	0.91	45.70	45.80	46.29	46.51	50.65	49.90	R-9
32	31	56	0.11	0.11	0.60	0.07	0.07	5.0	5.0	9.8	0.65	8.33	1.78	18	0.54	45.90	46.20	46.51	46.50	49.90	50.07	R-10
33	31	28	0.34	0.34	0.41	0.14	0.14	5.0	5.0	9.8	1.37	8.04	3.29	18	0.50	46.69	46.83	47.11	47.27	49.90	50.06	R-11
34	End	46	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	23.83	29.13	9.28	24	1.41	42.95	43.60	44.33	45.33	47.26	50.59	A-1

Project File: 100yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES:Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	S-3B	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	S-3	1.64	0.00	1.64	0.00	Comb	6.0	4.02	15.08	4.02	4.50	Sag	2.00	0.015	0.015	0.000	0.14	9.07	0.14	9.07	0.0	Off
3	S-4	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.01	0.71	0.01	0.71	0.0	Off
4	S-5	1.05	0.00	1.05	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.13	8.96	0.13	8.96	0.0	Off
5	S-6	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
6	S-6A	1.89	0.00	1.89	0.00	Comb	6.0	4.02	15.08	4.02	4.50	Sag	2.00	0.015	0.015	0.000	0.15	9.87	0.15	9.87	0.0	Off
7	S-7	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	0.00	4.02	2.25	0.015	2.00	0.015	0.015	0.013	0.02	1.32	0.00	0.01	0.0	6
8	S-8	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	0.00	4.02	2.25	0.015	2.00	0.015	0.015	0.013	0.02	1.32	0.00	0.01	0.0	7
9	S-9	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.01	0.71	0.01	0.71	0.0	Off
10	S-10	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
11	S-11	1.24	0.00	0.92	0.31	Comb	6.0	4.02	0.00	4.02	2.25	0.020	2.00	0.020	0.020	0.013	0.13	6.35	0.08	3.80	0.0	31
12	S-13A	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
13	S-14	3.14	0.00	3.14	0.00	Grate	0.0	0.00	15.08	4.02	4.50	Sag	2.00	0.020	0.020	0.000	0.23	11.56	0.23	11.56	0.0	Off
14	S-15	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.01	0.71	0.01	0.71	0.0	Off
15	S-16	3.31	0.00	3.31	0.00	Comb	6.0	4.02	15.08	4.02	4.50	Sag	2.00	0.020	0.020	0.000	0.21	10.65	0.21	10.65	0.0	Off
16	S-17	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
17	S-18	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	0.00	4.02	2.25	0.015	2.00	0.015	0.015	0.013	0.02	1.32	0.00	0.01	0.0	15
18	S-19	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
19	S-20	0.01*	0.00	0.01	0.00	Grate	0.0	0.00	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.01	0.71	0.01	0.71	0.0	Off
20	S-21	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
21	S-22	1.24	0.00	0.92	0.31	Comb	6.0	4.02	0.00	4.02	2.25	0.020	2.00	0.020	0.020	0.013	0.13	6.35	0.08	3.80	0.0	31
22	S-28	2.06	0.00	2.06	0.00	Comb	6.0	4.02	15.08	4.02	4.50	Sag	2.00	0.015	0.015	0.000	0.16	10.39	0.16	10.39	0.0	Off
23	S-29	1.75	0.00	1.75	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.18	12.14	0.18	12.14	0.0	Off

Project File: 100yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES: Inlet N-Values = 0.016; Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
24	S-30	1.20	0.00	1.20	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.015	0.015	0.000	0.14	9.66	0.14	9.66	0.0	Off
25	R-3	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
26	R-4	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
27	R-5	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
28	R-6	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
29	R-7	0.58	0.00	0.49	0.09	Comb	6.0	4.02	0.00	4.02	2.25	0.015	2.00	0.020	0.020	0.013	0.10	5.04	0.05	2.46	0.0	31
30	R-8	0.55	0.00	0.47	0.08	Comb	6.0	4.02	0.00	4.02	2.25	0.015	2.00	0.020	0.020	0.013	0.10	4.95	0.05	2.38	0.0	33
31	R-9	1.79	0.82	2.61	0.00	Comb	6.0	4.02	15.08	4.02	4.50	Sag	2.00	0.020	0.020	0.000	0.18	9.24	0.18	9.24	0.0	Off
32	R-10	0.65	0.00	0.54	0.11	Comb	6.0	4.02	0.00	4.02	2.25	0.015	2.00	0.020	0.020	0.013	0.11	5.26	0.05	2.66	0.0	31
33	R-11	1.37	0.08	1.45	0.00	Comb	6.0	4.02	7.54	4.02	2.25	Sag	2.00	0.020	0.020	0.000	0.17	8.38	0.17	8.38	0.0	Off
34	A-1	23.83*	0.00	0.00	23.83	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off

Project File: 100yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

NOTES: Inlet N-Values = 0.016; Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	18	0.86	43.60	44.60	1.00	0.31	0.69	0.12	44.72	0.000	41	43.85	44.20	0.35**	0.31	2.80	0.12	44.32	0.000	0.000	n/a	1.00	n/a
2	18	0.87	43.95	44.26	0.31*	0.26	3.29	0.12	44.38	0.000	45	44.25	44.60	0.35**	0.31	2.81	0.12	44.72	0.000	0.000	n/a	1.33	n/a
3	18	0.01	44.95	44.99	0.04*	0.01	0.81	0.01	45.00	0.575	26	45.10	45.14	0.04**	0.01	0.81	0.01	45.15	0.567	0.571	0.149	1.00	0.01
4	18	0.63	44.35	44.60	0.25*	0.19	3.21	0.10	44.70	0.000	165	45.70	45.99	0.29**	0.24	2.57	0.10	46.10	0.000	0.000	n/a	1.50	n/a
5	18	0.28	45.80	45.99	0.19	0.13	2.10	0.07	46.06	0.000	29	46.00	46.19	0.19**	0.13	2.08	0.07	46.26	0.000	0.000	n/a	1.00	0.07
6	18	1.89	46.10	46.56	0.46*	0.45	4.17	0.19	46.75	0.000	29	46.30	46.82	0.52**	0.54	3.50	0.19	47.01	0.000	0.000	n/a	1.00	0.19
7	18	0.01	46.10	46.19	0.09	0.01	0.21	0.00	46.20	0.012	76	46.60	46.64	0.04**	0.01	0.89	0.01	46.65	0.742	0.377	n/a	1.00	n/a
8	18	1.06	45.80	46.13	0.33*	0.29	3.61	0.14	46.27	0.000	68	46.30	46.68	0.38**	0.36	2.96	0.14	46.82	0.000	0.000	n/a	0.50	0.07
9	18	1.13	46.40	46.78	0.38*	0.35	3.25	0.14	46.92	0.000	106	46.95	47.35	0.40**	0.37	3.02	0.14	47.49	0.000	0.000	n/a	0.50	n/a
10	18	1.17	47.05	47.44	0.39*	0.36	3.23	0.14	47.58	0.000	61	47.35	47.75	0.40**	0.38	3.05	0.14	47.90	0.000	0.000	n/a	0.92	0.13
11	18	1.24	47.45	47.84	0.39*	0.37	3.37	0.15	47.99	0.000	66	47.80	48.22	0.42**	0.40	3.10	0.15	48.37	0.000	0.000	n/a	1.00	0.15
12	18	1.43	43.60	44.60	1.00	0.44	1.15	0.16	44.76	0.000	51	43.90	44.35	0.45**	0.44	3.23	0.16	44.51	0.000	0.000	n/a	0.99	0.16
13	18	1.44	44.00	44.42	0.42*	0.40	3.57	0.16	44.58	0.000	54	44.30	44.75	0.45**	0.44	3.23	0.16	44.91	0.000	0.000	n/a	1.85	0.30
14	18	0.01	44.40	44.75	0.35	0.31	0.03	0.00	44.75	0.000	54	44.70	44.76	0.06	0.03	0.38	0.00	44.77	0.064	0.032	0.017	1.00	0.00
15	18	3.56	44.40	45.09	0.69*	0.80	4.46	0.28	45.37	0.000	175	45.30	46.02	0.72**	0.84	4.25	0.28	46.30	0.000	0.000	n/a	1.38	n/a
16	18	1.00	45.40	46.02	0.62	0.34	1.45	0.13	46.15	0.000	24	45.55	45.92	0.37**	0.34	2.92	0.13	46.06	0.000	0.000	n/a	0.40	0.05
17	18	1.05	45.65	46.01	0.36*	0.32	3.25	0.14	46.14	0.000	73	46.05	46.43	0.38**	0.36	2.96	0.14	46.57	0.000	0.000	n/a	0.50	n/a
18	18	1.08	46.15	46.52	0.37*	0.34	3.19	0.14	46.66	0.000	49	46.40	46.79	0.39**	0.36	2.98	0.14	46.93	0.000	0.000	n/a	0.56	0.08
19	18	1.13	46.50	46.87	0.37*	0.34	3.31	0.14	47.01	0.000	64	46.85	47.25	0.40**	0.37	3.02	0.14	47.39	0.000	0.000	n/a	0.72	0.10
20	18	1.17	46.95	47.34	0.39*	0.36	3.25	0.14	47.48	0.000	60	47.25	47.65	0.40**	0.38	3.05	0.14	47.80	0.000	0.000	n/a	0.92	0.13
21	18	1.24	47.35	47.74	0.39*	0.37	3.37	0.15	47.89	0.000	66	47.70	48.12	0.42**	0.40	3.10	0.15	48.27	0.000	0.000	n/a	1.00	0.15
22	18	2.06	43.60	44.60	1.00	0.58	1.65	0.20	44.80	0.000	75	45.00	45.54 j	0.54**	0.58	3.59	0.20	45.74	0.000	0.000	n/a	1.00	0.20

Project File: 100yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
23	18	1.75	43.60	44.60	1.00	0.51	1.39	0.18	44.78	0.000	76	45.00	45.50 j	0.50**	0.51	3.42	0.18	45.68	0.000	0.000	n/a	1.00	0.18
24	18	1.20	43.60	44.60	1.00	0.39	0.96	0.15	44.75	0.000	79	45.00	45.41 j	0.41**	0.39	3.07	0.15	45.55	0.000	0.000	n/a	1.00	n/a
25	48	2.14	38.45	38.81	0.36	0.56	3.82	0.14	38.95	0.000	151	39.50	39.92	0.42**	0.70	3.04	0.14	40.06	0.000	0.000	n/a	0.85	n/a
26	48	2.60	39.60	40.01	0.41*	0.68	3.81	0.16	40.17	0.000	291	41.25	41.71	0.46**	0.81	3.20	0.16	41.87	0.000	0.000	n/a	1.00	n/a
27	48	3.34	41.35	41.81	0.46*	0.81	4.14	0.18	41.99	0.000	300	43.10	43.63	0.53**	0.98	3.42	0.18	43.81	0.000	0.000	n/a	1.00	n/a
28	48	1.00	43.20	43.63	0.43	0.40	1.40	0.10	43.72	0.000	55	43.55	43.84 j	0.29**	0.40	2.50	0.10	43.93	0.000	0.000	n/a	0.15	n/a
29	18	1.07	46.05	46.41	0.36*	0.33	3.30	0.14	46.55	0.000	80	46.50	46.89	0.39**	0.36	2.98	0.14	47.02	0.000	0.000	n/a	1.50	0.21
30	18	0.55	47.68	47.94	0.26*	0.20	2.70	0.10	48.04	0.000	27	47.83	48.10	0.27**	0.22	2.48	0.10	48.20	0.000	0.000	n/a	1.00	n/a
31	18	3.49	45.70	46.29	0.59*	0.64	5.47	0.28	46.56	0.000	11	45.80	46.51	0.71**	0.83	4.22	0.28	46.79	0.000	0.000	n/a	1.50	0.42
32	18	0.65	45.90	46.51	0.61	0.25	0.96	0.10	46.62	0.000	56	46.20	46.50 j	0.30**	0.25	2.60	0.10	46.60	0.000	0.000	n/a	1.00	0.10
33	18	1.37	46.69	47.11	0.42*	0.40	3.39	0.16	47.27	0.000	28	46.83	47.27	0.44**	0.43	3.19	0.16	47.43	0.000	0.000	n/a	1.00	n/a
34	24	23.83	42.95	44.33	1.38	2.31	10.31	1.06	45.39	0.000	46	43.60	45.33	1.73**	2.89	8.25	1.06	46.39	0.000	0.000	n/a	1.00	1.06

Project File: 100yr Revised.stm | Number of lines: 34 | Run Date: 6/1/2022

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

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Appendix H | Permanent Erosion and Sediment Control BMPs

STANDARD E&S WORKSHEET #21
Temporary and Permanent Vegetative Stabilization Specifications

PROJECT NAME: 601 WASHINGTON STREET APARTMENTS
LOCATION: MONTGOMERY COUNTY, PA
PREPARED BY: MD DATE: 2/24/2022
CHECKED BY: DATE:

SPECIFICATIONS: The Department recommends the use of the Penn State publication, "Erosion Control and Conservation Plantings on Noncropland," as the standard to use for the selection of species, seed specifications, mixtures, liming and fertilizing, time of seeding, and seeding methods. Specifications for these items may also be obtained from PennDOT's Publication # 408, Section 804 or by contacting the applicable county conservation district. Upon selection of a reference, that reference should be used to provide all specifications for seeding, mulching, and soil amendments. The following specification will be used for this project:

(TEMPORARY)	*SPECIES:	PENNDOT FORMULA E	
	% PURE LIVE SEED:	95	%
	APPLICATION RATE:	10	LB./1000 SQ. YD
	FERTILIZER TYPE:	N/A	(10-10-10)
	FERTILIZER APPL. RATE:	N/A	LB./ACRE
	LIMING RATE:	N/A	T./ACRE
	MULCH TYPE:	HAY	
	MULCHING RATE:	3	T./ACRE
	SEEDING SEASON DATES:	MARCH 15 - OCTOBER 15	
(PERMANENT)	TOPSOIL PLACEMENT DEPTH:	4	IN.
	*SPECIES:	PENNDOT FORMULA B	
	% PURE LIVE SEED:	97	%
	APPLICATION RATE:	44	LB./1000 SQ. YD
	FERTILIZER TYPE:	COMMERCIAL	(10-20-20)
	FERTILIZER APPL. RATE:	678	LB./ACRE
	LIMING RATE:	2	T./ACRE
	MULCH TYPE:	STRAW	
	MULCHING RATE:	3	T./ACRE
	ANCHOR MATERIAL:	WOOD FIBER	
	ANCHORING METHOD:	MULCH BINDER	
	RATE OF ANCHOR MATERIAL APPL.:	775	LB./ACRE
	SEEDING SEASON DATES:	MARCH 15 - JUNE 1 & AUGUST 1 - OCTOBER 15	
(PERMANENT-STEEP SLOPES)			
	TOPSOIL PLACEMENT DEPTH:	4	IN.
	*SPECIES:	PENNDOT FORMULA L	
	% PURE LIVE SEED:	97	%
	APPLICATION RATE:	48	LB./1000 SQ. YD
	FERTILIZER TYPE:	COMMERCIAL	(10-20-20)
	FERTILIZER APPL. RATE:	678	LB./ACRE
	LIMING RATE:	2	T./ACRE
	MULCH TYPE:	STRAW	
	MULCHING RATE:	3	T./ACRE
	ANCHOR MATERIAL:	WOOD FIBER	
	ANCHORING METHOD:	MULCH BINDER	
	RATE OF ANCHOR MATERIAL APPL.:	775	LB./ACRE
	SEEDING SEASON DATES:	MARCH 15 - JUNE 1 & AUGUST 1 - OCTOBER 15	

***If more than one species is used, indicate application rate for each species.**
Note: This worksheet should be added to the plan drawings.

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Appendix I | Karst Features & Sinkhole Maps

DENSITY OF MAPPED KARST FEATURES IN SOUTH-CENTRAL AND SOUTHEASTERN PENNSYLVANIA

BY
WILLIAM E. KOCHANOV AND STUART O. REESE
2003

KARST DENSITY MAP—AN INNOVATIVE APPROACH TO VISUALIZING KARST FEATURES

INTRODUCTION

Approximately 7 percent of Pennsylvania is underlain by carbonate bedrock in the form of limestone and dolomite. Most of the carbonate bedrock occurs in the valleys and lowlands of south-central and southeastern Pennsylvania, where over 2 million people live.

Carbonate rocks are unique in that they weather more readily than other types of rocks. The dissolution or dissolving away of the carbonate bedrock by water over long periods of time results in a landscape called karst topography. It is characterized by features such as sinkholes, surface depressions, and caves. The dissolution of the carbonate rock also develops the subsurface drainage network for water along widened cracks or fractures within the bedrock layers. The majority of water in karst areas does not occur as surface streams but is primarily in the subsurface as groundwater.

Sinkholes and surface depressions are subsidence features. The surface expression of these features is a result of water transporting residual material and soil through subsurface pathways established by the dissolution process. Both features are typically circular in shape and can vary in size. Sinkholes exhibit an actual break or hole on the land surface, whereas surface depressions are generally bowl-shaped hollows that do not show this land-surface break. Caves are formed as fractures widen by dissolution, creating large openings in the rocks.

Karst features often impact public safety and health. Subsidence and water-quality problems have been associated with karst topography for many years. Gradual subsidence or the sudden collapse of the land surface can cause serious damage to urban structures, utilities, and roadways. In addition, karst features serve as direct recharge zones to local and regional aquifers, making these areas highly vulnerable to groundwater contamination.

In 1985, the Pennsylvania Geological Survey began investigations to map karst features throughout the commonwealth. Results of these investigations were released as a series of county-based open-file reports (see "References"). For each county, karst surface features were located through an extensive review of aerial photographs (taken in the 1940s–70s) and a subsequent field survey. Identified features were then transferred to scale-stable, 7.5-minute topographic base maps. Additional karst features were compiled from municipal questionnaires and published and unpublished data sources. Although not karst features, small surface mines may be similar in appearance to karst subsidence features. This is most apparent where such a mine has been abandoned for a long period of time. For this reason, surface mines were identified and added to the open-file maps.

After completion of the open-file reports, karst features and surface mines were digitized as point data from the topographic base maps using GSMAP software from the U.S. Geological Survey. Points were positioned in the best-determined center of surface depressions, sinkholes, and surface mines, and at the entrance points of caves. Coordinates and feature types were saved in ASCII files, which were later converted to Microsoft Excel 2000 spreadsheet files. Shapefiles were created from the inventoried data, and point locations and feature attributes were spot-checked against the corresponding features on the original maps. Corrections to the data were made where applicable. The resultant data file served as the basis for the density layer calculations.

As a result of the inventory, 111,715 individual points were compiled for 14 counties (107 7.5-minute quadrangles). Karst features make up approximately 98.4 percent of the points in the database: 96 percent, surface depressions; 2.3 percent, sinkholes; and 0.1 percent, cave entrances. Approximately 1.6 percent of the data points were surface mines, which were not included in the density layer calculation.

DENSITY LAYER CALCULATION

To create the digital density surface, ESRI ArcView 3.2 software was used to divide the study area into 25- by 25-meter (82- by 82-foot) grid cells and to count the karst data points that fell within the area of a 250-meter (820-foot) search radius from the center of each cell. The number of points divided by the search area (approximately 0.2 square kilometer [0.08 square mile or 49 acres]) represents the karst density value of a cell. After the density value was calculated for the first cell, the search area was shifted to the next 25-square-meter grid cell, and the floating process was repeated until all of the cells were assigned a density value. This process smoothed the density data over the study area. Grid cells were then assigned a color using an ESRI ArcMap 8.3 "quantile" gradation of density values. On the map, red represents more than 150 karst features per square kilometer (nearly 400 per square mile). The darkest green color indicates that at least one karst feature falls within the 250-meter search radius of the cell.

DISCLAIMER

While this map is useful for planning and preliminary site studies, it is not a substitute for site-specific subsurface investigations.

The occurrence of a sinkhole or surface depression depends on numerous factors, including rock type, geologic structure (e.g., fractures, joints, and faults), surface and subsurface hydrology, surficial materials (particularly in the glaciated areas of Northampton and Lehigh Counties), and land use. On the map, color shows the density of karst features over a given area. Although orange and red indicate areas where karst features are interpreted to be more abundant, it does not guarantee that new sinkholes will occur in these areas. Conversely, sinkholes can occur in areas where no karst features have been observed. The occurrence of sinkholes, therefore, is not restricted to the high-density areas delineated on the map.

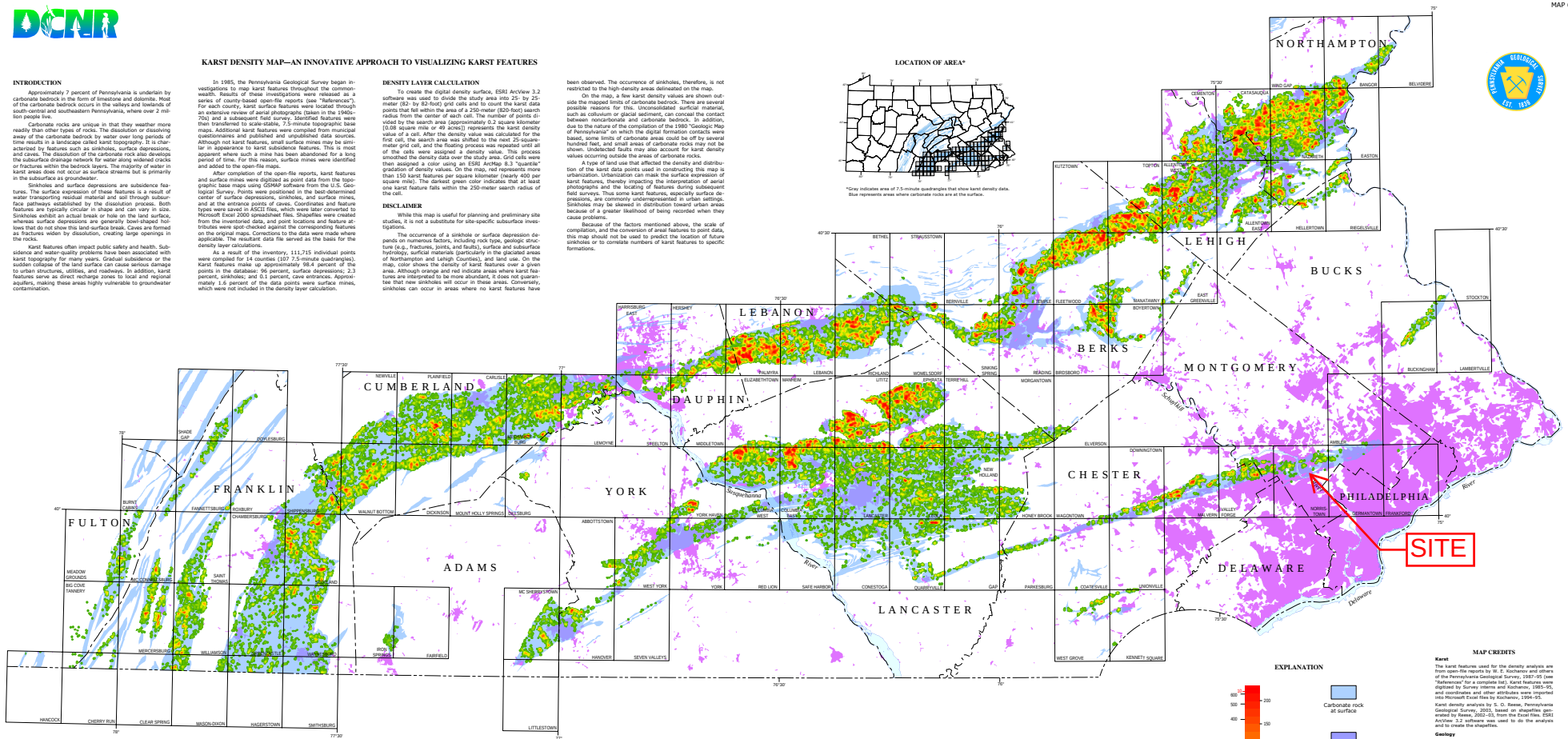
On the map, a few karst density values are shown outside the mapped limits of carbonate bedrock. There are several possible reasons for this. Unconsolidated surficial material, such as colluvium or glacial sediment, can conceal the contact between noncarbonate and carbonate bedrock. In addition, due to the nature of the compilation of the 1980 "Geologic Map of Pennsylvania" on which the digital formation contacts were based, some limits of carbonate areas could be off by several hundred feet, and small areas of carbonate rocks may not be shown. Undetected faults may also account for karst density values occurring outside the areas of carbonate rocks.

A type of land use that affected the density and distribution of the karst data points used in constructing this map is urbanization. Urbanization can mask the surface expression of karst features, thereby impacting the interpretation of aerial photographs and the locating of features during subsequent field surveys. Thus some karst features, especially surface depressions, are commonly underrepresented in urban settings. Sinkholes may be skewed in distribution toward urban areas because of a greater likelihood of being recorded when they cause problems.

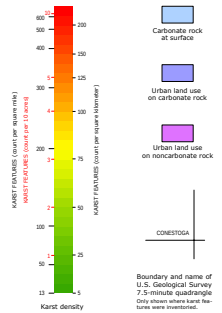
Because of the factors mentioned above, the scale of compilation, and the conversion of areal features to point data, this map should not be used to predict the location of future sinkholes or to correlate numbers of karst features to specific formations.

LOCATION OF AREA*

*Gray indicates area of 7.5-minute quadrangles that show karst density data. Blue represents areas where carbonate rocks are at the surface.



EXPLANATION



SCALE 1:300,000

5 0 5 10 15 20 25 30 KILOMETERS

5 0 5 10 15 MILES

Albers equal area conic projection
Standard parallels 40°N and 42°N, center 78°W

MAP CREDITS

Karst

The karst features used for the density analysis are from open-file reports by W. E. Kochanov and others of the Pennsylvania Geological Survey, 1987–95 (see "References"). Locations of karst features were digitized by Survey interns and Kochanov, 1985–95, and coordinates and other attributes were imported into Microsoft Excel files by Kochanov, 1994–95.

Karst density analysis by S. O. Reese, Pennsylvania Geological Survey, 2003, based on shapefiles generated by Reese, 2002–03, from the Excel files. ESRI ArcView 3.2 software was used to do the analysis and to create the shapefiles.

Geology

Locations of carbonate rocks are slightly modified from *Geologic Map of Pennsylvania*, compiled by T. M. Berg and others (1980, Pennsylvania Geological Survey, 4th ser., Map 1, 2nd ed., scale 1:250,000, 3 sheets). The latter map was prepared as a data set by C. E. Miles, T. G. Whitfield, J. G. Kuchinski, and others (*Bedrock Geology of Pennsylvania*, 2001, Pennsylvania Geological Survey, 4th ser., scale 1:250,000).

Base Map

Urban areas are from the data set *Urban areas of Pennsylvania—PA Explorer CD-ROM edition* by Joe Bishop (1998, University Park, Gap Analysis Program, Environmental Resources Research Institute, Pennsylvania State University).

State and county lines are slightly modified from an unpublished municipality data set (Pennsylvania Department of Environmental Protection, 1998, 1:24,000-scale accuracy).

Quadrangle lines are from shapefiles created by M. E. Moore of the Pennsylvania Geological Survey (1990, unpublished), using ESRI Atlas GIS software.

River shorelines are from the data set *Major Rivers in Pennsylvania* by Environmental Resources Research Institute, Pennsylvania State University, in *Pennsylvania GIS Compendium* (1996, Pennsylvania Department of Environmental Protection, 1:24,000-scale accuracy). Data set derived from Pennsylvania Department of Transportation data.

Other

Map layout and design by S. O. Reese and C. E. O'Neil of the Pennsylvania Geological Survey, 2003. Cartography by S. O. Reese, 2002–03. Map editing by C. E. O'Neil, 2003.

REFERENCES

Kochanov, W. E., 1987a, Sinkholes and karst-related features of Lehigh County, Pennsylvania: Pennsylvania Geological Survey, 4th ser., Open-File Report 87–01, scale 1:24,000, 6 maps plus 19-page text.

_____ 1987b, Sinkholes and karst-related features of Northampton County, Pennsylvania: Pennsylvania Geological Survey, 4th ser., Open-File Report 87–02, scale 1:24,000, 10 maps plus 24-page text.

_____ 1988a, Sinkholes and karst-related features of Berks County, Pennsylvania: Pennsylvania Geological Survey, 4th ser., Open-File Report 88–01, scale 1:24,000, 16 maps plus 13-page text.

_____ 1988b, Sinkholes and karst-related features of Lebanon County, Pennsylvania: Pennsylvania Geological Survey, 4th ser., Open-File Report 88–02, scale 1:24,000, 4 maps plus 11-page text.

_____ 1989a, Sinkholes and karst-related features of Cumberland County, Pennsylvania: Pennsylvania Geological Survey, 4th ser., Open-File Report 89–02, scale 1:24,000, 9 maps plus 16-page text.

_____ 1989b, Sinkholes and karst-related features of Dauphin County, Pennsylvania: Pennsylvania Geological Survey, 4th ser., Open-File Report 89–01, scale 1:24,000, 5 maps plus 8-page text.

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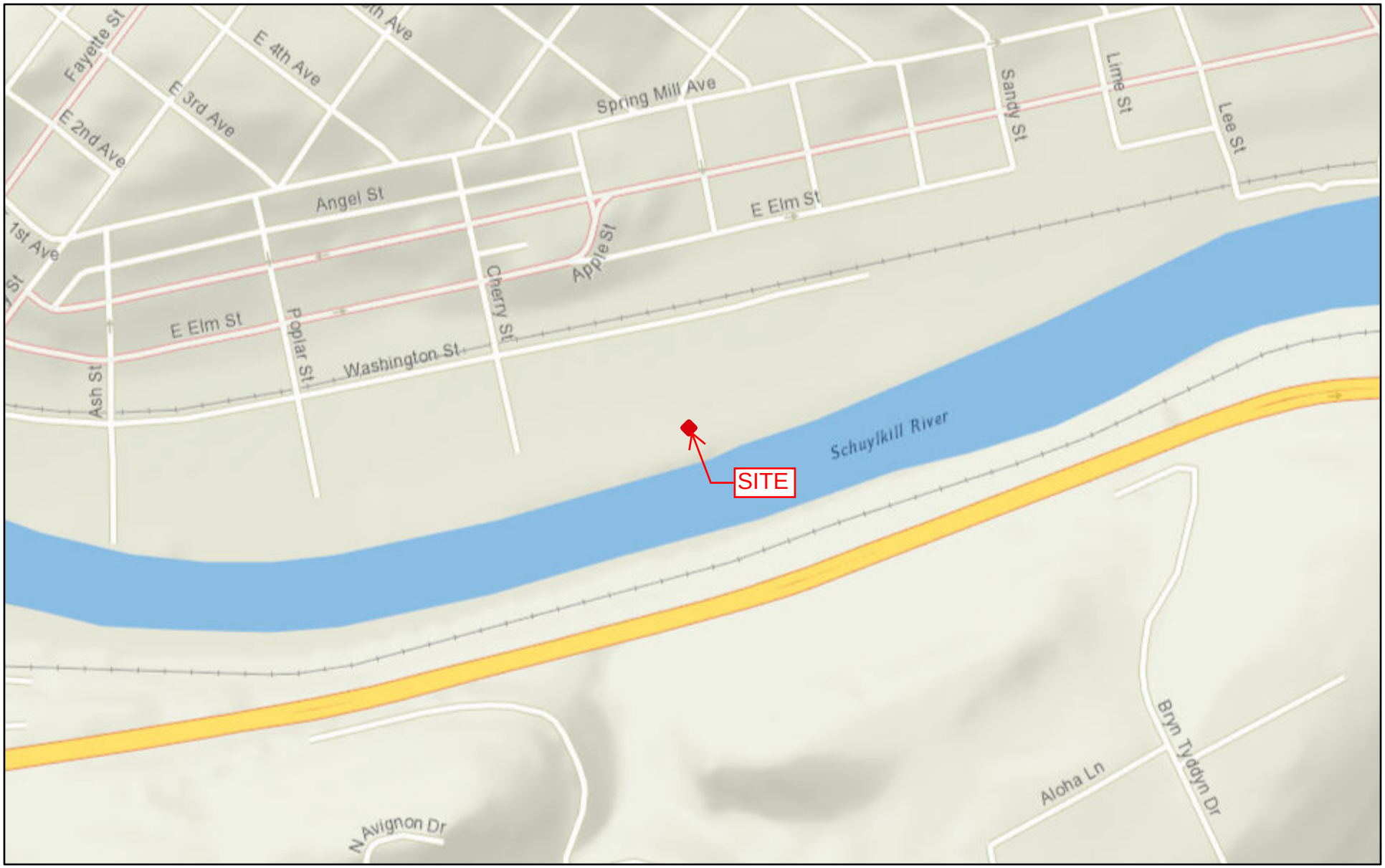
_____ 1993b, Sinkholes and karst-related features of Chester County, Pennsylvania: Pennsylvania Geological Survey, 4th ser., Open-File Report 93–01, scale 1:24,000, 10 maps plus 9-page text.

_____ 1993c, Sinkholes and karst-related features of Montgomery County, Pennsylvania: Pennsylvania Geological Survey, 4th ser., Open-File Report 93–02, scale 1:24,000, 5 maps plus 7-page text.

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601 Washington Street



2/1/2022

1:9,028

0 0.05 0.1 0.2 mi

0 0.07 0.15 0.3 km

National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA,

Colliers Engineering & Design

Appendix J | Geotechnical Report

REPORT OF
GEOTECHNICAL EXPLORATION

601 Washington Street
Whitemarsh, Pennsylvania
Maser Consulting Project No. 16001030A

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1.0 INTRODUCTION

We are pleased to present this report regarding the geotechnical exploration performed for the proposed residential apartment building located at 601 Washington Street in Whitemarsh, Montgomery County, Pennsylvania, as shown on the Site Location Map, Figure 1. The overall site redevelopment concept consists of an elevated apartment complex, as well as supporting features (utilities, parking, etc.). The purpose of this exploration is to provide geotechnical-related design and construction recommendations for the proposed residential apartment structure and related improvements.

Our scope of services for this geotechnical exploration included the completion of eight test borings and fourteen test pits throughout the site, laboratory testing of representative soil samples, engineering analyses of the subsurface data obtained from this field exploration, and the preparation of this report. Oil, hazardous waste, radioactivity, irritants, pollutants, radon, or other dangerous substances and conditions were not the subject of this exploration.

A supplemental geotechnical exploration will be performed at a later date to provide geotechnical recommendations for the proposed boathouse structure the along the Schuylkill River.

2.0 SITE DESCRIPTION

The site for the proposed improvements is located at 601 Washington Street. The overall site is bordered by Washington Street to the north, developed lots to the east and west, and the Schuylkill River to the south, as shown on the Exploration Location Plan, Figure 2.

At the time of our geotechnical exploration, the site was being used as a landscaping yard containing various stockpiles (mulch, wood, stone, etc.) and existing fill piles, as well as gravel surfaced and vegetated areas. The southern and western boundaries of the property were wooded, and isolated trees were observed throughout the site. Multiple structures were observed throughout the property, including a two-story masonry structure on the west side of the site, as well as smaller wood-framed and steel-framed structures, and metal shipping containers. Evidence of structural cracking and settlement was observed on the exterior of the masonry structure.

Site grades generally slope downward from west to east, from elevation 52 to 49. We understand the site is located within the 100-year flood plain. Existing fill piles on the order of 5 to 10 feet high were observed within the southern portion of the site, along the Schuylkill River.

Below-grade utilities including stormwater, septic, electric, and storage tanks were observed on site. A 48-inch corrugated metal pipe (CMP) traverses the site on a southeasterly alignment, discharging into the Schuylkill River. Groundwater monitoring wells were also observed throughout the site. Other unmarked below-grade utilities may exist at the site. Overhead wires were also observed along the northern perimeter of the site.

Historic Aerial Review

Historic aerials indicate the western portion of the site (two-story masonry structure) was completed prior to 1948. Imagery from 1948 depicts a drainage swale or stream traversing the eastern portion of the site. This historic stream appears to be in the general location of the existing 48-inch CMP. Minor improvements (i.e. earthworks, etc.) were noted within the eastern portion of the site from 1958 to 2002.

3.0 PROPOSED DEVELOPMENT

The proposed development includes the construction of an elevated four-story apartment building with on-grade parking, as well as related infrastructure (utilities, etc.). Column loading is assumed to be less than 250 kips. Site grading is anticipated to result in fills on the order of 2 feet.

4.0 FIELD EXPLORATION AND LABORATORY TESTING

Subsurface conditions for this geotechnical exploration were explored through the completion of eight test borings and fourteen test pits at the locations shown on the Exploration Location Plan, Figure 2. Test borings were drilled by Allied Well Drilling, Inc. of Reading, Pennsylvania. Hollow stem auger drilling techniques were used to advance the test borings. Test pits were excavated by James Castaldi Contractors of Bensalem, Pennsylvania. Ground surface elevations at each test location were estimated using the available plans.

The test borings and test pits were field located by and performed under the full-time technical supervision of Maser Consulting. Upon completion, the test borings and test pits were backfilled with the excavated materials. The test borings and test pits were logged, and the logs are presented in Appendix A with descriptions of the soil strata encountered.

The laboratory investigation was programmed to explore the physical properties of the subsoils, as well as to augment the field exploration. The stratigraphic continuity and physical characteristics of the subsoils were investigated by the determinations of water content, Atterberg limits, loss-on-ignition (organic content), well as grain size distribution by mechanical sieve methods. The laboratory test results are presented in Appendix B.

Soil samples obtained during this exploration will be retained by Maser Consulting for a period of six months. At the end of this time they will be discarded unless we receive other instructions from 601 Washington Street Associates, L.P.

5.0 SUBSURFACE CONDITIONS

5.1 Regional Geology

The overall site is located within the Piedmont Low Land Section of the Piedmont Physiographic Province. Locally, the site is mapped to be underlain by three different geologic formations, consisting of the Precambrian felsic gneiss and the Glenarm Wissahickon Formation (oligolclase-

mica schist) along the river front, as well as the Conestoga Formation (light-gray, thin-bedded limestone having shale partings) which is separated by a fault and underlies the majority of the inland portion of the site.

Fill materials underlain by organic and alluvial deposits, decomposed rock, and limestone was encountered during our field exploration. The presence of gneiss or mica schist could not be confirmed along the river front, as test borings were not advanced within this portion of the site.

5.2 Fill

Fill material was encountered within each test boring and test pit, ranging from 2 to 8 feet, averaging about 4.5 feet. Fill material generally consists of a mixture of sand and varying amounts of gravel, silt, slag, and cinders. Petroleum odor was encountered within TB-7 from 2 to 4 feet below grade. Municipal waste (i.e. tires, metal, wood, plastic, etc.) was also encountered near the riverbank in TP-4 from 3 to 5.5 feet below grade.

Standard Penetration Test (SPT) values within the fill materials typically ranged from 5 to 33 blows per foot (bpf), averaging about 16 bpf. Higher SPT values were typically encountered within the upper 2 feet within the fill materials, indicating a denser surficial crust overlies the lower fill materials and underlying alluvial deposits.

5.3 Stratum A – Buried Topsoil / Marshland Deposit

Stratum A was encountered within each test pit (except TP-1) and periodically within test borings, extending to depths ranging from 2.5 to 6.5 feet, averaging about 4.75 feet below grade. Stratum A represents historic topsoil or marsh deposits that were buried during the original site development/earthworks. Stratum A generally consists of a 4 to 12-inch thick very soft to soft, moist to wet, fine-grained, clay & silt with little sand and trace organics. Loss-on-ignition testing indicates Stratum A materials contain about 10 percent organics.

While only observed periodically within the test borings, Stratum A is anticipated to underlie the majority of the site. Poor split spoon recoveries within this zone of the subsurface profile are likely due to the very soft nature of the Stratum A deposits. Stratum A SPT values are estimated to range from weight of hammer (WOH) to 2 bpf. Pocket penetrometer (PP) tests indicate the unconfined compressive strength of this soil generally is less than 0.5 tons per square foot (tsf).

5.4 Stratum B – Fine-Grained Alluvium (Very Soft to Soft)

Stratum B was encountered below the fill or Stratum A deposits within each test pit and test boring (except TB-8, TP-1 and TP-14), extending to depths ranging from 5 to 11 feet, averaging about 7.25 feet. Stratum B is representative of alluvial materials which were deposited by waterways (rivers, streams, etc.). Stratum B consists of a red brown moist to wet, soft to very soft clay and silt with varying amounts of sand and gravel.

Stratum B SPT values generally range from 0 to 2 bpf. Pocket penetrometer testing indicates the material has unconfined compressive strengths less than 0.5 tsf.

5.5 Stratum C – Fine-Grained Alluvium (Soft to Medium)

Stratum C was encountered below the Stratum B at each test pit and test boring (except TB-6 & 7, TP-1, TP-12, and TP-13), extending to depths ranging from 6.5 to 17 feet, averaging about 9.5 feet. Stratum C represents another fine-grained alluvial deposit comprised of soft to medium clay & silt with varying amounts of sand and gravel. Isolated zones of stiff to very stiff Stratum C materials were encountered intermittently throughout the site.

Stratum C SPT values generally range from 2 to 11 bpf, averaging 6 bpf. SPT values ranging from 11 to 29 were recorded where stiff to very stiff zones were encountered. An isolated very soft zone was encountered in TB-1 from 12 to 17 feet.

5.6 Stratum D – Coarse-Grained Alluvium

Stratum D was encountered below or interbedded within Stratum C at each test pit and test boring (except TP-1, TP-12, and TP-13), extending to depths ranging from 9 to 21.5 feet, averaging about 14.25 feet. Stratum D consists of coarse grained alluvial materials comprised of medium compact to compact gravel, some sand, with varying amounts clay and silt. Occasional cobbles and small boulders were also encountered intermittently throughout the stratum D.

Stratum D SPT values generally range from 16 to 58 bpf, averaging about 34 bpf.

5.7 Stratum E – Decomposed Rock

Stratum E was encountered below Stratum D at each test boring extending to auger refusal or test boring completion at depths ranging from 21 to more than 50 feet below grade. Due to the limited depth of test pits, Stratum E was not encountered at any of the test pits. Decomposed rock is a soil material that represents the partial weathering of the parent bedrock, in that it retains some of its relic structure. Stratum E generally consists of a moist to wet sand and silt with varying amounts of gravel (rock fragments). However, isolated zones of fine-grained Stratum E were encountered in TB-5, TB-6, and TB-7. Occasional decomposed boulders were also encountered within the Stratum E material.

Stratum E SPT values generally range from 5 to 67 bpf, averaging about 32 bpf. However, an isolated very loose zone was encountered within TB-7 from about 16 to 22 feet and 27 to 30 feet below grade, which may be an indicator of potential karst solutioning activity.

5.8 Fractured Rock

Typically represented by auger refusal, shallow fractured rock was encountered in TB-1, TB-2, and TB-8, at depths ranging from 21 to 23 feet. Based on the shallow auger refusal depths and the adjoining deep weathered zones extending to depths beyond 40 to 50 feet, the underlying limestone bedrock appears to be highly pinnacled.

One rock core was obtained within TB-2 from 23 feet to 27 feet below grade. The core sample obtained was photographed and logged for the rock Recovery Ratio (RR) and the Rock Quality Designation (RQD). The rock core data is summarized in Table 1 and the rock core is shown in Photograph 1.

Table 1
ROCK CORE SUMMARY
601 Washington Street
Whitemarsh, Pennsylvania

Test Boring	Run #	Depth (ft.) *Length (in)*	Recovery Ratio (%)	RQD (%)	Comments
TB-2	1	23 – 27 *48*	100	23	Slightly weathered, hard, slightly to moderately fractured, thin bedded Limestone



Photograph 1 – TB-2: Run #1: 23' – 27'

5.9 Groundwater / Perched Water

Groundwater was encountered within each test boring and test pit (except TP-12 and TP-13) at depths ranging from 6 to 13 feet below grade, corresponding to elevations ranging from 38 to 46 feet. Groundwater was generally encountered near the interface between the Strata C and D deposits. Shallower perched water was encountered on top of the Stratum A deposits (at the Fill and Stratum A interface), or within the fine-grained alluvium at depths ranging from 2 to 7 feet, corresponding to elevations ranging from 45 to 48 feet. Water level readings were also obtained within the test borings 24 hours after their completion, and generally ranged from 3 to 5.5 feet, corresponding to elevations ranging from 44.5 to 47.5 feet. Groundwater and perched water conditions should be anticipated to fluctuate due to seasonal influences, as well as fluctuations (normal, flood, etc.) within the adjoining Schuylkill River.

Historic Water Level Monitoring – Roux Associates, Inc.

Periodic water level readings were obtained by Roux Associates, Inc. on eight separate events (seven from August 19, 2005 to October 31, 2006, and one on April 4, 2018). The water readings were obtained at ten monitoring wells located throughout the site during varying seasons. The water level readings and well locations are summarized on the "Draft Groundwater Elevation Summary Table" and "Groundwater Elevation Contour Map, October 31, 2005" by Roux Associates, Inc. Historic water level readings obtained from monitoring wells located, indicate high water elevation levels ranging from 44.6 to 47.5 feet, with seasonal fluctuations on the order of 1 to 5.5 feet (lower than the high-water level readings).

Based on our review of the monitoring well construction, as well as our observations during our recent field exploration, we believe these water level readings are indicative of the perched water conditions which were encountered intermittently throughout the site.

6.0 DEVELOPMENT CONSIDERATIONS

Based on our geotechnical exploration, we have identified the following issues to be addressed during the design and construction of the proposed development:

6.1 Instability of Shallow Overburden (Fill, Strata A, B, and C)

Near surface fill, as well as compressible organic and fine grained alluvial deposits, were encountered throughout the site. Development considerations for foundation, pavements, slabs-on-grade, below grade utility support are outlined below:

Foundation Support

We do not believe the shallow fill, organic, or fine-grained alluvial deposits are capable of supporting a shallow-based foundation system in their current state, while maintaining total post-construction settlements of less than 1 inch. Therefore, we recommend that one of the following options be implemented to permit the proposed structure to be supported by shallow foundations:

> Ground Improvement: Stabilize the remaining fill materials below wall and column spread footings via aggregate piers, creating composite bearing surfaces. This approach would have minimal impact on the site operations, generate less spoils than removal and replacement option, and should eliminate the need for additional over-excavations while yielding increased bearing capacities. Refer to Section 7.3.1 for more information.
>
> Removal and Replacement: Remove and replace the existing fill, Strata A, B, and soft to medium Stratum C deposits below the proposed wall and column spread footings. Over-excavations would generally range from 6 feet to more than 10 feet deep and generate significantly more spoils than the ground improvement option noted above. If disposed of off-site, spoil disposal shall be performed in accordance with clean fill disposal criteria. Refer to Section 7.3.2 for more information.

Alternatively, “short” drilled piers (i.e. round footings) may also be considered in lieu of ground improvement, removal and replacement, or deep foundation elements. Drilled piers should be advanced to bear within the medium compact to compact Stratum D alluvial deposits, generally encountered between 7 to 16 feet. Piers may be designed to directly support column elements, and grade beams spanning piers would be required to support the walls. Refer to Section 7.3.4 for more information.

Pavements and Floor Slab/Pad Support

Similarly, the exposed fill materials should be improved and proof-tested prior to permitting asphalt pavement and floor slabs/pads to be supported on grade. Therefore, we recommend stabilizing the exposed fill materials using geosynthetics and dense graded aggregate fill to enable long term support for these elements. The intent of this program is to provide a stable working platform and to mitigate the effects of long term differential settlement while reducing the need to perform significant removal and replacement activities and potential soil disposal. Refer to Section 7.5 for more information.

Below-Grade Utility Support

Below-grade utilities bearing within the very loose existing fill materials, or Strata A and B deposits, may experience differential settlement. Therefore, we recommend a limited stabilization program (over-excavation and replacement) be performed beneath utilities bearing within these materials. Refer to Section 7.8 for more information.

6.2 Shallow Water Conditions

At the time of our field study, shallow perched water conditions were encountered throughout the majority of the site at depths ranging between 2 and 7 feet below grade, corresponding to elevations ranging from 45 to 48 feet. Groundwater was generally encountered throughout the site at depths ranging from 4 to 11 feet within Stratum D, corresponding to elevations ranging from 38 to 46 feet. Groundwater levels are likely to fluctuate based on precipitation events, Schuylkill River water level, flooding, and other seasonal influences.

We anticipate utility trench excavations or foundation stabilization excavations to intersect perched water and/or groundwater. We believe that dewatering of shallow excavations can be managed by routine methods (sumps and pumps), particularly where perched conditions are encountered. Excavations penetrating the coarse-grained Stratum D will likely require larger pumps to maintain dry conditions.

6.3 Existing 48-inch Corrugated Metal Pipe (CMP)

The existing 48-inch CMP will traverse beneath the eastern portion of the proposed structure. Due to the diameter, age, and impact the proposed structure may have on the pipe (and vice versa), we recommend relocating the pipe outside the structure limits. Any abandoned pipe segments should be removed and replaced with load-bearing fill. If this is not feasible, we recommend better assessing the condition of the pipe via video recording, straddling, and designing the structure’s foundations such that no additional load is transmitted to the pipe.

6.4 Karst Geology – Sinkhole Formation

A recognizable risk of cavity (sinkhole) development and loss-of-support for the proposed development features is inherent with construction in this geologic area. However, the degree of risk specific to this site cannot be determined by conventional geotechnical exploration techniques and practices. Therefore, the conclusions and recommendations in this report assume acceptance by the Owner of a risk of exposure to solution activity during the life of the development. However, sinkhole mitigation techniques can be employed during the design and construction of the proposed structure to reduce the risk of sinkhole development, as outlined in Section 7.10.

7.0 SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations pertaining to the design and construction of the proposed development are summarized in the following paragraphs.

7.1 Site Preparation

The purpose of these site preparation procedures is to provide stable and uniform bearing conditions for the proposed building foundations, slab-on-grade, and pavements. The following procedures should be performed under the technical supervision of the Geotechnical Engineer.

- Install soil erosion and sedimentation control devices, as well as temporary stormwater management facilities, as specified by Site/Civil Engineer.

- Maintain positive drainage conditions throughout construction, avoiding unnecessary ponding of stormwater in excavations or low areas of the site. Seal-roll exposed soil or subgrade surfaces prior to rain or snow events, and promptly remove any standing water immediately afterwards.

- Abandon existing monitoring wells in accordance with PADEP regulations.

- Any existing underground or above-ground utility locations should be verified in the field and relocated or abandoned as necessary, prior to construction. If the option to abandon utilities in-place is chosen, we recommend that a lean cement grout (1,000 psi) be used to fill the utility lines.

- Remove debris piles, wood piles, and vegetation from the site.

- If encountered, topsoil shall be stripped and stockpiled for re-use.

- Demolish or abandon the existing features in accordance with the demolition plan and the following site-specific guidelines:

- Demolish existing structures in accordance with the demolition plan, including the removal of the floor slab, foundations, and other below-grade remnants in their entirety. If feasible, implement a recycling program consisting of the processing of inert building materials (concrete, block, brick, stone, etc.) for use as load-bearing fill (refer to Section 7.2 for requirements). Alternatively, remove demolition debris from the site in accordance with local and state regulations.

- Backfill resulting excavations, etc. with suitable load-bearing fill in accordance with Section 7.2.

- Install below-grade utilities. Trench excavations shall be performed in accordance with the recommendations presented in Section 7.7 of this report.

- Where encountered within site excavations and at/nearby TP-4, municipal waste should be removed from the site and replaced with suitable load-bearing fill in accordance with Section 7.2.

- Implement ground improvement program for foundation support, if selected. Refer to Section 7.3.

- Stabilize the remaining near surface fill materials as outlined below:

    - Prior to load-bearing fill placement (e.g. aggregate base course placement), level and compact the exposed subgrade with a minimum 10-ton smooth-drum roller, and proofroll the exposed subgrade with fully loaded tri-axle dump truck. The vibratory or static modes shall be used, as appropriate, depending on the moisture content of the subgrade material, as determined by the resident Geotechnical Engineer. Undercut remaining loose zones which cannot be stabilized in place via compaction or moisture conditioning and backfill with load-bearing fill. Surficial remedial work should be anticipated prior to load-bearing fill placement, particularly along the 48-inch CMP where the historic drainage swale/creek was located.

    - To mitigate effects of differential settlement, deploy TX-160 Tri-Axial geogrid over the prepared subgrade where asphalt pavements, slabs-on-grade, or other surface improvements that may be affected by differential settlement are proposed, plus a minimum 5-foot perimeter. Geogrid should not be placed under the proposed foundations, as to not interfere with the proposed rammed aggregate pier ground improvement program.

    - Place and compact imported dense graded aggregate in accordance with Section 7.2 to achieve the final subgrade elevation. We understand approximately 2 feet of load-bearing fill will be required to achieve the proposed subgrade elevation. Dense graded aggregate should conform to a gradation similar to PennDOT 2A.

7.2 Load-Bearing Fill

All fill/backfill proposed to support building and site features that would be adversely affected by settlement is considered load-bearing fill. Materials used as load-bearing fill should consist of granular, inorganic, readily compactable materials, which are free of trash, organic inclusions, cinders, ash, frozen material, or excess moisture. Particles larger than 6 inches should be broken down or excluded from the fill.

The existing Strata A, B, C deposits should be excluded from re-use as load-bearing fill due to organic content (Stratum A) and in-situ moisture content (Strata A, B, and C).

Asphalt millings, if any, may be utilized as load-bearing fill outside the building footprint, plus a 10-foot perimeter zone, provided they are blended to conform to a dense-graded aggregate (DGA) similar to PADOT 2A. In addition, asphalt millings should be restricted to less than 12 inches in total thickness throughout the fill profile.

We understand that imported load-bearing fill materials will be required to achieve the proposed grading scheme. Due to the underlying subsurface profile, we recommend that the imported load-bearing fill materials to be placed within the structure and pavement footprints plus a 10-foot perimeter consist of PennDOT 2A stone or similar dense graded aggregate. Imported load-bearing fill materials consisting of SM or coarser material, based on the Unified Soil Classification System (USCS), may be used outside of the proposed structure and pavement footprint. Additionally, the portion passing the #200 sieve should not exceed 30 percent and the plasticity index (PI) should not exceed 10.

The load-bearing fill, consisting of off-site granular borrow material, should be placed in essentially horizontal lifts with a maximum loose thickness of 12 inches. Compaction should be achieved using as large a vibratory compactor as practical.

Table 2 provides compaction requirements for the site.

Table 2
COMPACTION RECOMMENDATIONS
601 Washington Street
Whitemarsh, Pennsylvania

Type of Support	Density Requirement
Beneath Building Foundations/Floor Slabs	95% of Modified Proctor (ASTM D 1557)
Behind Site Walls, Beneath Pavements	92% of Modified Proctor (ASTM D 1557)

7.3 Building Foundations

We believe the existing fill and Strata A, B, and C deposits are incapable of supporting shallow foundations in their current state, without risking total and differential settlements that would exceed the structures' allowable tolerances.

Therefore, we recommend implementing one of the following stabilization options that would permit the structures to be supported by shallow foundations. Alternatively, "short" drilled piers (i.e. round footings) may also be utilized to support the proposed structure as discussed in Section 7.3.4. Other drilled or driven deep foundation alternatives were also considered. However, due to the anticipated moderate structure loading, we do not believe these systems are warranted.

7.3.1 Aggregate Pier Ground Improvement Option

Stabilize fill materials and Strata A, B, and C deposits below the column spread and wall footings via aggregate piers. This approach would have a nominal impact on the site operations and would generate little spoils when compared to other alternatives such as over-excavation and replacement. If performed throughout the building footprint, we believe this technique would permit the use of conventional spread footings on a composite bearing surface capable of achieving an allowable bearing capacity of 5,000 pounds per square foot (psf), while maintaining acceptable total and differential settlements.

Aggregate piers (a.k.a. GeoPiers, Rammed Aggregate Piers (RAP), Stone Columns, Vibro-Columns, etc.) are a ground improvement technique used to stabilize relatively loose, granular soils. Typically, they consist of compacted, often vibrated aggregate material installed vertically through the loose soil profile in 12 to 30-inch diameter columns. Due to the underlying karst geology, we recommend that a portion of the stone column be cement treated to limit the potential for stormwater infiltration. The installation method would also compact the surrounding soil materials, creating an improved soil-aggregate mass. When installed in a grid pattern beneath proposed foundations or other elements, the composite soil-aggregate bearing surface will have improved bearing capacity and settlement control properties.

Each type of aggregate pier is a proprietary design-build method unique to the specialty contractor or vendor. Therefore, the successful vendor will design and install their aggregate pier system to meet a set of performance specifications. For this project, we recommend that the following performance specifications be utilized:

- Minimum allowable composite bearing capacity = 5,000 PSF
- Maximum post-construction total settlement = 1.0 inches
- Maximum post-construction differential settlement = 0.5 inches

Load testing of a minimum of three aggregate piers shall be performed to verify the soil modulus assumed during design. One modulus test should be performed nearby TB-7.

7.3.2 Removal and Replacement Option

Remove the existing fill materials, Strata A and B deposits, as well as soft to medium Stratum C deposits below the proposed building foundations, and replace with load-bearing fill as outlined below. Over-excavations shall be extended to the stiff to very stiff Stratum C, or to the medium compact to compact Stratum D, under the direction of the onsite Geotechnical Engineer. While this option does not require specialty contractors to execute, it will generate a significant amount of spoils as compared to the aggregate pier option. If off-site disposal of these spoils is required, they should be performed in accordance with current environmental regulations.

Guidelines for removal and replacement program are outlined below:

- Over-Excavation Aerial Extent: Limit over-excavations to the size of the footing plus a minimum horizontal distance (12 inches+/-) in each direction.
- Backfill bottom of excavation with 2 feet of ballast stone. Afterwards, where dry conditions are encountered, backfill the remaining excavation with compacted DGA. Alternatively, if where groundwater is encountered, backfill the excavation using AASHTO 57 stone until a minimum of 2 feet of free-board is achieved, at which point the AASHTO 57 stone should be consolidated and the remaining excavation should be backfilled with compacted DGA. DGA should conform to a gradation similar to PennDOT 2A stone. All backfill materials (ballast and DGA) shall be compacted in lifts in accordance with Section 7.2.
- All over-excavations should be backfilled at the end of each working day, up to the proposed foundation bearing elevation.

All excavations should be performed in accordance with the OSHA requirements and criteria outlined in Section 7.7 of this report. Begin constructing shallow foundations as soon as practical, not allowing remaining excavations to be open for extended periods of time. Accumulated stormwater should be removed from excavations as soon as possible.

We recommend that the foundations bearing in these areas be proportioned using an allowable net bearing capacity of 4,000 pounds per square foot (psf). Similarly, we believe that these foundations will be capable of supporting the structure loads with the potential for total post construction settlement of less than 1 inch, and 0.5 inch differential settlement between adjacent columns.

7.3.3 General Shallow Foundation Recommendations

Just prior to foundation construction, all footing excavations should be evaluated by a qualified geotechnical engineer to determine if the supporting capabilities of the bearing materials are compatible with the design criteria. In addition, any remaining loose fill materials (not remediated as outlined above) should be compacted in place using a jumping jack or vibratory roller, or undercut and replaced with load-bearing fill.

The minimum width of all wall footings should be 24 inches, and the minimum horizontal dimension of all spread footings should be 36 inches, regardless of the bearing pressure developed.

All exterior footings subject to frost action should be based at least 36 inches below the adjacent exterior grade. Interior footings should be based at least 24 inches below the finished floor elevation.

In addition, we recommend that the shallow foundations bear below a zone bounded by a plane that extends outward and upward on a 1:1 slope from any proposed underground utility excavation, or other proposed or existing underground features.

7.3.4 Drilled Pier Option

As an alternative to the ground improvement and removal and replacement options discussed above, the building columns can be supported by "short" drilled piers bearing on compact Stratum D deposits, or medium compact to compact Stratum E deposits. In this simple construction technique, the piers would serve as round footings for the columns. Grade beams spanning between the drilled piers should be used to support wall and façade elements.

We recommend the following parameters be used for design of the drilled pier foundations:

- Allowable end bearing capacity: 4,000 psf
- Minimum embedment into bearing layer: 1 foot for seating purposes
- Ignore skin friction contributions.
- Drilled shafts shall be sufficiently reinforced to resist the applied shear and bending forces, and to accommodate the anchor bolt embedment depths. Reinforcing should typically extend the length of the shaft, and be designed in accordance with ACI standards.
- Based on the anticipated loading, we understand the drilled piers would range on the order of 6 to 9 feet in diameter. Following proper drilled pier installation techniques, we believe that the foundations will be capable of supporting the proposed loads with the potential for total settlement (including elastic shortening) of less than 1 inch.

7.3.4.1 Drilled Pier Construction

If drilled piers are elected, we recommend that the following items be incorporated into the drilled pier specifications:

1. Drilled piers shall be advanced to compact Stratum D deposits, or medium compact to compact Stratum E deposits, and be seated a minimum of 1 foot within the respective bearing layer. The bearing surface shall be verified by the onsite Geotechnical Engineer.

2. The Contractor shall be prepared to use temporary steel casings as necessary to protect the integrity of the pier, particularly where perched water or groundwater is encountered. Steel casings shall be withdrawn during the placement of concrete, maintaining a sufficient head of concrete above the bottom of the casing (typically 5 feet).

3. Installation tolerances shall include a maximum of 2.0 percent horizontal (each direction) from the center location, as well as a maximum of 2.0 percent vertical plumbness.

4. Drilled pier bearing surfaces shall be level and cleaned of loose debris using appropriate tools to the satisfaction of the Geotechnical Engineer.

5. Reinforcing steel cages shall be properly centered in the drilled pier (using spacers or

centralizers) and raised off the bottom of the pier using boots), as needed. Anchor bolts and/or reinforcing steel protruding from the top of the drilled pier shall be properly set prior to concrete placement and restrained from movement during the placement operation.

6. If water is present in the pier, concrete shall be placed by the tremie method. Otherwise, concrete may be placed by the free-fall method in accordance with American Concrete Institute (ACI) guidance (concrete shall not strike the reinforcing steel). Displaced water or concrete laitance shall be removed from the top of the pier, and the top of the finished pier shall be leveled at the specified elevation.

7. For drilled piers extending above the ground surface, temporary sonotube or metal forms shall be used to maintain the specified pier diameter and top surface elevation until the concrete has set.

8. Excess spoils shall be disposed of in accordance with local and state environmental regulations.

7.4 Seismic Site Class

In accordance with the 2009 International Building Code, this site may be designed assuming a Site Class "D". This classification was determined by utilizing the Standard Penetration Test (SPT) blow count data through the upper 100 feet of the subsurface profile. SPT values of 100 bpf were used for bedrock, assumed to be at an average depth of 50 feet below grade.

7.5 Floor Slabs / Equipment Pads

Assuming the stabilization program is performed (subgrade compaction, proofrolling, geogrid, and minimum 12 inches of DGA fill) under the observation of a Geotechnical Engineer as described in the Site Preparation Section 7.1, miscellaneous floor slabs or floating equipment pads may be supported on-grade in accordance with the following criteria. The edges of slabs/pads susceptible to frost (which are supporting elements that would impacted by frost heave) should be turned down to frost depth (36 inches).

The subgrade should be compacted with a smooth-drum roller just prior to installation of the aggregate base to re-compact any materials disturbed by previous construction activities or adverse weather conditions. Any unstable zones detected that cannot be stabilized by additional compaction should be removed, and the excavated area backfilled with load-bearing fill.

Immediately prior to slab construction, we recommend that a minimum 4-inch layer of PennDOT 2A crushed stone be placed and compacted over the prepared subgrade. For interior portions of the building to receive floor coatings such as carpeting, floor tile, or epoxy-based finishes, we also recommend that a 10-mil vapor retarder also be placed over the subgrade, followed by the 4-inch layer of dense-graded aggregate. The aggregate surface should also be dampened just prior to concrete placement. These procedures are intended to provide uniform concrete curing conditions.

We anticipate that, following proper site preparation, the subgrade soils can achieve a Modulus of Subgrade Reaction on the order of 150 pounds per cubic inch (pci). A coefficient of sliding friction

of 0.20 may be used for design of a floor slab with a polyethylene vapor retarder over soil. A coefficient of sliding friction of 0.40 may be used for design of a floor slab without a vapor retarder.

Reinforced concrete floor slabs should be simply supported at wall and column junctures to allow unrestricted rotation of the slab edges. Alternatively, the slabs should be free to undergo vertical deflections at the edges.

7.6 Site Walls

If site walls become part of the design scheme, they should be designed using the soil parameters outlined in Table 3. Note that these parameters are ultimate values that do not incorporate a factor of safety. Appropriate, industry-standard factors of safety should be applied to the overall design of these systems.

Table 3
LATERAL EARTH COEFFICIENTS
601 Washington Street
Whitemarsh Township, Pennsylvania

Subsurface Material	Total Unit Weight (pcf)	Internal Friction Angle	Wall Condition	Earth Pressure Coefficient	Equivalent Fluid Pressure (psf)
Imported PennDOT 2A Stone	135	36°	At Rest, K_o	0.41	56
			Active, K_a	0.26	35
			Passive, K_p	3.85	520
Homogenized Fill / Strata A& B	110	26°	At Rest, K_o	0.56	62
			Active, K_a	0.39	43
			Passive, K_p	2.56	282
Stratum C	120	28°	At Rest, K_o	0.53	64
			Active, K_a	0.36	43
			Passive, K_p	2.77	330
Stratum D	130	34°	At Rest, K_o	0.44	58
			Active, K_a	0.28	37
			Passive, K_p	3.54	460

Cantilevered retaining walls, or walls that are tied back which are free to rotate, should be designed for the active earth pressure condition. Walls that are braced or otherwise restricted from rotation should be designed for the at-rest earth pressure condition. Passive earth pressure is used to estimate the resisting force when a wall structure is being forced against the soil material.

Surcharge loading caused by additional surface loads on the retained soil should be added to the lateral pressure on the wall as a uniform stress equal to one-half the surcharge load. These loads may include vehicle or pedestrian traffic, temporary construction loads (stockpiles, material storage, equipment, etc.), floor slab or pavement loads, or other structures.

The earth pressure values are based on the assumption that no hydrostatic pressure from groundwater and/or surface infiltration will be applied to the walls. Therefore, an appropriate drainage system shall be incorporated into the design to maintain drained conditions.

Due to the site's location within the 100-year flood plain, and its proximity to the Schuylkill River, retaining walls should also be designed for flood and sudden drawdown conditions.

7.7 Excavation Safety

Temporary excavation stability is a function of many factors including the presence and abundance of groundwater, the type and density of the various soil strata, the depth of excavation, surcharge loadings adjacent to the excavation, and the length of time and weather conditions while the excavation remains open. It is the responsibility of the Contractor to maintain safe excavations in conformance with all applicable federal, state, and local regulations such as OSHA. All excavations should conform to applicable sloping or shoring standards for worker access.

Portable trench boxes, sliding trench shields, or interlocking sheeting should be used where there is inadequate space to allow proper side slopes for trenches. In all cases, OSHA requirements must be followed and adequate protection provided for workers.

Construction traffic and excavated material stockpiles should be kept away from excavations by a minimum horizontal distance equal to the full depth of the excavation, unless the resulting surcharge loads are accounted for in the design of the lateral bracing system. The Contractor's proposed excavation plan, support systems, and sequence of construction should be designed, signed, and sealed designed by a Professional Engineer registered in the Commonwealth of Pennsylvania, and reviewed by the Geotechnical Engineer prior to allowing the Contractor to commence work.

7.8 Below-Grade Utilities

We offer the following additional recommendations specific to utility construction:

- Any excavated utility trenches located beneath the proposed finished floor or pavement subgrades should be backfilled with compacted load-bearing fill in accordance with the recommendations outlined in the Load-Bearing Fill Section 7.2 of this report.

- Prior to installation, the bearing surfaces for utility structures (manholes, vaults, etc.) and piping should be evaluated by the Geotechnical Engineer or technician. Utilities (piping and structures) bearing within Strata A and B will likely require stabilization prior to utility installation. For preliminary planning purposes, we recommend over-excavating a minimum of 18 inches below the proposed subgrade elevation and backfilling with ballast stone seated into the underlying soil material. The extent of the over-excavation will be determined by the onsite Geotechnical Engineer and will be dependent on the conditions encountered. The ballast should be surfaced with a minimum 6-inch PennDOT 2A stone bedding.

- Perched water should be anticipated within utility trench excavations approaching 3 to 5 feet below grade. We believe this condition can be managed using conventional sumps and pumps. Groundwater should be anticipated within excavations approaching 6 to 8 feet below grade, generally within the Stratum D Alluvial deposits. We believe excavations penetrating 1 to 2 feet within Stratum D may be managed with pumps and sumps. Deeper excavations may require more extensive dewatering and shoring programs.

7.9 Pavements

The asphalt pavement sections described in Table 4 are proposed for construction. The recommended designs are predicated on completing subgrade stabilization as outlined in Section 7.1. In addition, they are based on our experience with similar facilities, utilizing a light-duty pavement section for areas where traffic is limited to passenger vehicles (no trucks), and a heavy-duty section for the main drive isles which may be subject to a combination of truck and automobile traffic.

Table 4
RECOMMENDED MINIMUM PAVEMENT SECTIONS
601 Washington Street
Whitemarsh Township, Pennsylvania

LIGHT-DUTY ASPHALT PAVEMENT (Automobile Traffic Only)	
Asphalt Pavement Element	Thickness (inches)
9.5MM PG64-22 HMA Wearing Course	1.5
25MM PG64-22 HMA Base Course	3.0
PennDOT 2A Stone (1)	6.0
Dense Graded Aggregate Fill (2)	12.0 (min.)
TX-160 Tri-Axial Geogrid	NA
Improved Soil Subgrade (3)	
HEAVY-DUTY ASPHALT PAVEMENT (Automobile and Truck Traffic)	
Asphalt Pavement Element	Thickness (inches)
9.5MM PG64-22 HMA Wearing Course	1.5
25MM PG64-22 HMA Base Course	4.0
PennDOT 2A Stone (1)	6.0
Dense Graded Aggregate Fill (2)	12.0 (min.)
TX-160 Tri-Axial Geogrid	NA
Improved Soil Subgrade (3)	

1. Aggregate base course to be dense-graded aggregate conforming to PennDOT 2A stone, with less than 10 percent finer than the No. 200 sieve and all fines to be non-plastic (PI=0). Aggregate base course to be compacted to a minimum of 92 percent of the maximum dry density, as determined by the Modified Proctor test, ASTM D 1557.
2. Dense Graded Aggregate (DGA) fill with non-plastic fines, per Section 7.1. DGA fill to be compacted to a minimum of 92 percent of the maximum dry density, as determined by the Modified Proctor test, ASTM D 1557.
3. Subgrade soil to be compacted to a minimum of 92 percent of the maximum dry density, as determined by the Modified Proctor test, ASTM D 1557 and shall consist of load-bearing fill and/or existing materials capable of achieving a CBR value of 4. The moisture content of the material should also be maintained within +/- 2 percent of its optimum moisture content.

The pavement soil subgrade should be compacted with a smooth-drum roller in the vibratory mode under the observation of the resident Geotechnical Engineer immediately prior to placement of the DGA fill to compact any materials disturbed by previous construction activities or adverse weather conditions. Any soft/unstable zones detected by this procedure should be removed and the excavated area backfilled with load-bearing fill as described in a previous section of this report. Alternatively, other stabilization methods (geotextiles, geogrids, lime stabilization, etc.) may be considered.

The pavement sections provided are based on the assumption that drained conditions will be maintained. Adequate drainage of the pavement base course should be provided to relieve the effects of any perched water, seepage, or surface water infiltration. Components of a pavement base course drainage system should include appropriately pitched subgrade and pavement surfaces (minimum 1.0 percent slope) and inlet weep holes and stub-drains. Stub-drains may also be considered to provide additional drainage relief. If installed, stub-drains should be protected with a geotextile fabric, wrapped around the coarse aggregate (AASHTO 57 Stone), in an effort to limit the migration of soil fines into the drains.

We recommend that the asphalt pavement sections shown in Table 4 be viewed as minimum guidelines. If anticipated traffic levels differ from those assumed, the pavement section should be re-evaluated to the proposed service levels. Routine maintenance of the pavement should provide the specified 20-year life expectancy. The durability and longevity of the pavement sections are directly based on the quality of the Contractor's installation procedures. Subgrade preparation, aggregate base installation, asphalt compaction, and concrete placement should be monitored by the resident Geotechnical Engineer to verify adherence to the recommendations and specifications.

7.9.1 Concrete Pads

The pavement for loading/unloading zones (i.e. trash dumpster pick-up areas) will be subjected to heavy concentrated wheel or point loads. This frequently results in rutting of asphalt pavements and ultimately in failure. Therefore, we recommend an increased, reinforced concrete section be utilized in such areas, consisting of 9 inches of 4,000 psi concrete, over 6 inches of aggregate base course. The final concrete pavement design (by others) should address the need for steel reinforcing, and provide adequate joint spacing plans and details.

7.10 Sinkhole Risk Mitigation

We recommend that a proactive approach be taken in regulating the risks for sinkhole formation during and after construction by performing some or all of the risk mitigation provisions recommended as follows:

- All underground utilities transporting fluids should be installed with water-tight gasketed joints, as well as the longest practical pipe section lengths to reduce the number of joints.

- Roof drains, downspouts, and area drains should be piped away from the proposed buildings to limit the uncontrolled infiltration of water to the underlying soils. Grades around the proposed structures should be designed to drain stormwater away as quickly as possible.

- Underground utilities should be bedded on and encased with dense-graded aggregate (not open-graded aggregate) to reduce the potential for leaking water to accumulate in the trenches. The use of PADOT 2A crushed stone or recycled concrete is recommended for this purpose.

- Earthwork should be sequenced to limit the ponding of surface water in uncontrolled locations. Ponding water should be removed from exposed subgrades as soon as possible.

- Concrete placement for foundations, as well as the backfill of utility lines, should be completed in the same day as the excavation. Excavations should not be left open when rainfall is expected. Alternatively, a mud-mat should be utilized to protect exposed excavations if concrete placement will not occur on the same day.

7.11 Construction Observation and Testing

Regardless of the thoroughness of a geotechnical engineering exploration, there is always a possibility that subsurface conditions between test locations may be different from those encountered, that conditions are not as anticipated by the designers, or that the construction process has altered the subsurface conditions. Therefore, geotechnical engineering construction observation should be performed under the supervision of a Geotechnical Engineer who is familiar with the intent of the recommendations presented in this report. Such observation services are recommended to evaluate whether the conditions anticipated in the design actually exist, or whether the recommendations presented in the report should be modified where necessary. Our firm can provide these services on your behalf. Therefore, we recommend that Maser Consulting be retained to perform quality assurance observation and testing services on a full-time basis during (at a minimum) earthwork operations, foundation installation, and pavement construction.

8.0 CLARIFICATION

Conclusions and recommendations presented in this report are based solely on the on the findings of our geotechnical exploration. The number, location, and depth of the explorations were completed within the constraints of the exploration’s budget.

We emphasize that this exploration should be made available to prospective bidders for informational purposes. We would recommend that the project specifications contain the following statement:

> "A geotechnical engineering report has been prepared for this project by Maser Consulting P.A. This report is for informational purposes only and should not be considered part of the contract documents. The opinions expressed in this report are those of the Geotechnical Engineer and represent their interpretation of the subsurface conditions, field and laboratory testing, and the results of analyses which they have conducted. Should the data contained in this report not be adequate for the Contractor's purposes, the Contractor may make, prior to bidding, his own investigation, tests, and analyses.”

9.0 LIMITATIONS

This report has been prepared in accordance with generally accepted geotechnical design practice for the exclusive use of 601 Washington Street Associates, L.P., and their agents for specific application to this project. This report has not been prepared to serve as the plans and specifications for actual construction without the appropriate interpretation by the project Architect, Structural Engineer, and/or Civil Engineer. This report has been based on assumed conditions and characteristics of the proposed development where specific information was not available. The conclusions, projections, and recommendations presented in this report cannot be applied to other building configurations or loads.

We recommend that the Architect, Civil Engineer, and Structural Engineer, along with any other design professionals involved in this project, carefully review the assumptions noted in this report regarding the proposed development so that they are consistent with the actual planned development. When discrepancies exist, they should be brought to our attention so that they do not affect the conclusions and recommendations provided in the report. The project plans and specifications should be submitted to us for review so that the geotechnical-related conclusions and recommendations provided herein have been correctly interpreted and are incorporated into the design.

The conclusions and recommendations contained in this report are based upon the subsurface data obtained during this exploration and on details stated in this report. The validity of the projections, conclusions, and recommendations contained in this report is necessarily limited by the scope of field exploration and by the number of test borings and test pits that were made. It is understood that the number of explorations made are consistent with good engineering practice but, given the nature of subsurface conditions, there is a possibility that actual conditions encountered may differ from those projected in this report. Should conditions arise which differ from those described in this report, Maser Consulting should be notified immediately and provided with all information, when available, regarding subsurface conditions.

Our recommendations are based upon the assumption that the services of a qualified Geotechnical Engineer will be retained for the observation of excavation operations, proofrolling, load-bearing fill placement, foundation installation, and all critical earthwork operations. Maser Consulting has the capability of providing these services, and can provide a proposal to perform the on-site quality assurance observation and materials testing.

The scope of this exploration was limited to the evaluation of the load-carrying capabilities and load stability of the soils and bedrock. Oil, hazardous waste, radioactivity, irritants, pollutants, radon or other dangerous substances and conditions were not the subject of this exploration.

FIGURE 1
SITE LOCATION MAP



NOTES:

1.) SITE MAP OBTAINED FROM PENNSYLVANIA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES.

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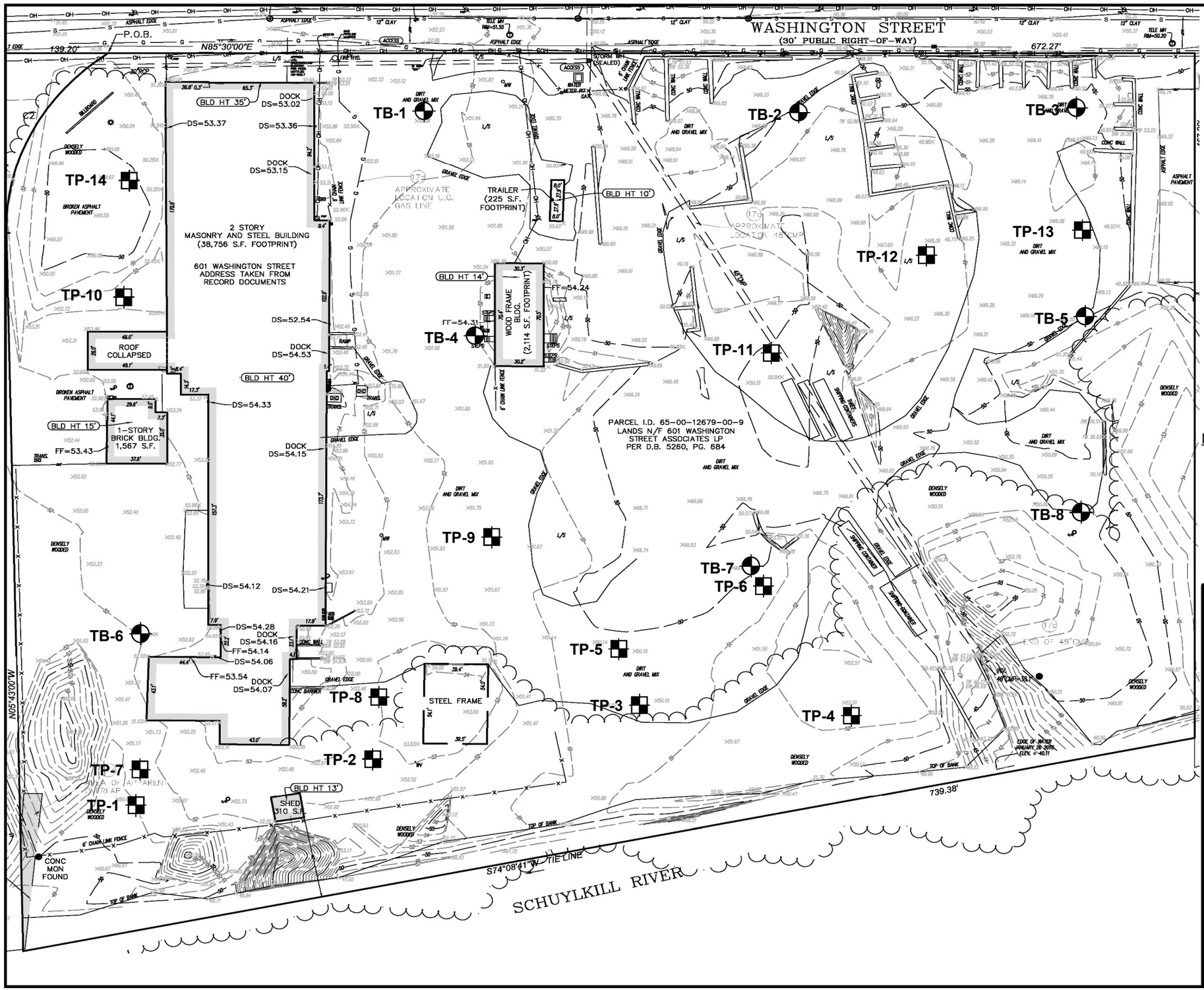
Title: SITE LOCATION MAP

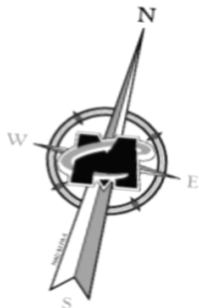
Project: **601 WASHINGTON STREET**

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY, PENNSYLVANIA

Drawn By:	AAY	Checked By:	RTW	Project No.:	16001030A
Scale:	N.T.S.	Date:	6/8/2018	Figure No.:	1

FIGURE 2
EXPLORATION LOCATION PLAN





LEGEND:

TB-1 TEST BORING LOCATION (APPROX.)

TP-1 TEST PIT LOCATION (APPROX.)

NOTES:

1.) *BASE PLAN OBTAINED FROM BOUNDARY AND TOPOGRAPHIC SURVEY PLAN, BY FIRST ORDER, LLC.. REVISED FEBRUARY 05, 2018.

2.) THIS DRAWING IS PART OF MASER'S GEOTECHNICAL REPORT (PROJECT NO. 16001030A) DATED JULY 2018 AND SHOULD ONLY BE USED IN CONJUNCTION WITH THE REPORT.

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TITLE:

EXPLORATION LOCATION PLAN

PROJECT:

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY, PENNSYLVANIA

DRAWN BY:	CHECKED BY:	PROJECT NO.:
AAY	RTW	16001030A
SCALE:	DATE:	FIGURE NO.:
N.T.S.	06/25/2018	2

APPENDIX A
TEST BORING LOGS
TEST PIT LOGS

TEST BORING LOG TB-1

Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Subsurface Profile: Profile Stratum	Subsurface Profile: Visual Description / Comments	Elev. (ft)
0	S - 1	23	21	11	5	**32**	Fill	S-1: Black mf SAND, some f Gravel, some Silt; frequent cinder and slag fragments (Moist) (Fill)	52
	0' - 2'	Sample Recovery =			12				
	S - 2	5	3	2	3	**5**		S-2: Same as S-1 (Moist) (Fill)	
	2' - 4'	Sample Recovery =			10		4ft		
	S - 3	2	2	WOH	WOH	**2**	Stratum A/B	S-3: No Recovery	
	4' - 6'	Sample Recovery =			2				
	S - 4	WOH	1	3	3	**4**	7 ft	S-4: Reddish Brown CLAY & SILT, some (-) f Sand (Moist)	
	6' - 8'	Sample Recovery =			4				
	S - 5	4	3	4	5	**7**		S-5: Reddish Brown CLAY & SILT and mf Sand (Moist to Wet)	
	8' - 10'	Sample Recovery =			10				
10							Stratum C		42
	S - 6	WOH	WOH	WOH	1	**0**		S-6: No Recovery	
	13' - 15'	Sample Recovery =			0				
							17 ft	S-7: Top 4": Reddish Brown mf GRAVEL, some (+) cmf Sand, trace Clayey Silt (Wet)	
							Stratum D 19ft	Bottom 4": Yellowish Brown mf Sand and Silt, little mf Gravel (Wet)	
	S - 7	4	4	16	31	**20**			
20	18' - 20'	Sample Recovery =			8		Stratum E 21ft		32
							AR	Auger Refusal	
								Notes: 1). Auger Refusal at 21 feet.	
30									22
40									12

Location Information

Elevation (ft): 52

Groundwater Data (ft)

Encountered (ft):	13
Elevation, Encount. (ft):	39
At Completion (ft):	5.5
Time = 24 hrs (ft):	5.5

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 30, 2018
Date Completed:	May 30, 2018

Comments:

TEST BORING LOG TB-2

Project Information

Project Name: 601 Washington
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Subsurface Profile: Profile Stratum	Subsurface Profile: Visual Description / Comments	Elev. (ft)
0									49.5
	S - 1	3	5	2	4	**7**	Fill	S-1: Black Clayey SILT, some (-) mf Gravel, little (+) cmf Sand; occasional brick fragments (Moist) (Fill)	
	0' - 2'	Sample Recovery =			10				
	S - 2	3	2	3	2	**5**		S-2: Black mf GRAVEL and cmf Sand, trace Silt; frequent cinders and slag (Moist) (Fill)	
	2' - 4'	Sample Recovery =			8		4 ft		
	S - 3	2	1	WOH	WOH	**1**	Stratum A/B	S-3: Black Clay & Silt, some (-) f Sand, little c Gravel, trace organics (Moist)	
	4' - 6'	Sample Recovery =			4				
	S - 4	WOH	1	2	3	**3**	7ft	S-4: Brown CLAY & SILT, some (-) mf Sand (Wet)	
	6' - 8'	Sample Recovery =			3				
	S - 5	1	3	3	5	**6**		S-5: Reddish Brown CLAY & SILT, some (-) f Sand; frequent redox (Wet)	
10	8' - 10'	Sample Recovery =			18		Stratum C		39.5
							11.5ft		
	S - 6	10	15	22	30	**37**	Stratum D	S-6: Reddish Brown mf GRAVEL, some cmf Sand, little Silt & Clay (Wet)	
	13' - 15'	Sample Recovery =			8				
							16.5ft		
	S - 7	7	12	17	10	**29**		S-7: Brown Silty CLAY, some (+) cmf Gravel, little cmf Sand (Wet)	
20	18' - 20'	Sample Recovery =			6		Stratum C		29.5
							23ft	Auger Refusal	
							RC-1	Notes: 1). RC # 1 : Slightly Weathered, Hard, Slightly to Moderately Fractured, Thin Bedded Limestone	
	Rock Core # 1	RR= 100%							
	23' - 27'	RQD=23%					27ft		
							EOTB		
30									19.5
40									9.5

Location Information

Elevation (ft): 49.5

Groundwater Data (ft)

Encountered (ft):	6
Elevation, Encount. (ft):	43.5
At Completion (ft):	5
Time = 0 hrs (ft):	5

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 31, 2018
Date Completed:	May 31, 2018

Comments:

TEST BORING LOG TB-3

Project Information

Project Name: 601 Washington
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Subsurface Profile: Profile Stratum	Subsurface Profile: Visual Description / Comments	Elev. (ft)
0									49.5
	S - 1	5	8	14	9	**22**	Fill	S-1: Top 8": Gray mf GRAVEL, some (+) cmf Sand, trace Silt (Moist to Wet) (Fill) Bottom 8": Black SILT and cmf Sand, little (+) f Gravel (Fill) (Moist)	
	0' - 2'	Sample Recovery =			16				
	S - 2	3	3	3	3	**6**			
	2' - 4'	Sample Recovery =			1		4 ft		
	S - 3	1	WOH	WOH	WOH	**0**	Stratum A/ B	S-2: Black cmf Sand, little (+) Gravel, trace Silt (Moist) (Fill)	
	4' - 6'	Sample Recovery =			0		6ft	S-3: No Recovery	
	S - 4	2	2	3	13	**5**		S-4: Top 4": Reddish Brown CLAY & SILT, little (-) f Sand (Wet) Bottom 8": Reddish Brown CLAY & SILT and f Sand (Moist to Wet)	
	6' - 8'	Sample Recovery =			12				
	S - 5	18	11	10	15	**21**			
	8' - 10'	Sample Recovery =			8				
10							Stratum C	S-5: Reddish Brown cmf SAND, some (-) f Gravel, little Silt (Moist to Wet)	39.5
	S - 6	4	13	13	8	**26**		S-6: Reddish Brown CLAY & SILT, some mf Gravel, little cmf Sand (Wet)	
	13' - 15'	Sample Recovery =			4				
							16.5ft		
	S - 7	15	22	35	17	**57**	Stratum D	S-7: Reddish Brown SAND, some cmf Gravel, trace Silt (Wet)	
20	18' - 20'	Sample Recovery =			12				29.5
							21.5 ft		
	S - 8	3	5	6	9	**11**	Stratum C	S-8: Reddish Brown CLAY & SILT, some mf Gravel, little cmf Sand (Wet)	
	23' - 25'	Sample Recovery =			5				
							26.5ft		
	S - 9	4	4	7	10	**11**		S-9: Yellowish Brown Clayey SILT, some mf (+) Sand, trace f Gravel (Wet)	
30	28' - 30'	Sample Recovery =			20				19.5
	S - 10	5	6	7	10	**13**	Stratum E	S-10:Yellowish Brown Clayey SILT and mf(+) Sand, some (-) mf Gravel (Wet)	
	33' - 35'	Sample Recovery =			5				
	S - 11	7	6	3	5	**9**		S-11:Yellowish Brown cmf(+) SAND, some mf(+) Gravel, little (-) Silt & Clay (Wet)	
40	38' - 40'	Sample Recovery =			6				9.5

Location Information

Elevation (ft): 49.5

Groundwater Data (ft)

Encountered (ft):	6
Elevation, Encount. (ft):	43.5
At Completion (ft):	NA
Time = 24 hrs (ft):	3

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 29, 2018
Date Completed:	May 29, 2018

Comments:

TEST BORING LOG TB-3

Project Information

Project Name: 601 Washington
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Subsurface Profile: Profile Stratum	Visual Description / Comments	Elev. (ft)
40							Stratum E	S-12:Yellowish Brown cmf SAND, some Silt, little mf mf Gravel (Wet)	9.5
	S - 12	6	34	45	50/3	**79**	44.8ft	End of Test Boring	
	43' - 44.8'	Sample Recovery =			6		EOTB		
50									-0.5
60									-10.5
70									-20.5
80									-30.5

Location Information

Elevation (ft):	49.5

Groundwater Data (ft)

Encountered (ft):	6
Elevation, Encount. (ft):	43.5
At Completion (ft):	NA
Time = 24 hrs (ft):	3

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 29, 2018
Date Completed:	May 29, 2018

Comments:

TEST BORING LOG TB-4

Project Information

Project Name: 601 Washington
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Subsurface Profile: Profile Stratum	Visual Description / Comments	Elev. (ft)
0	S - 1	11	16	12	11	**28**		S-1: Black mf GRAVEL anf cmf Sand, little (+) Silt; frequent cinder and slag fragments (Moist) (Fill)	52
	0' - 2'	Sample Recovery =			12				
	S - 2	5	5	4	4	**9**	Fill	S-2: Same as S-1 (Moist) (Fill)	
	2' - 4'	Sample Recovery =			13		4 ft		
	S - 3	WOH	WOH	WOH	WOH	**0**	Stratum A/ B	S-3: Reddish Brown CLAY & SILT, little (-) f Sand (Moist)	
	4' - 6'	Sample Recovery =			6		7 ft		
	S - 4	WOH	WOH	2	4	**2**	Stratum C	S-4: Reddish Brown CLAY & SILT, some (-) mf(+) Sand, little f Gravel (Moist to Wet)	
	6' - 8'	Sample Recovery =			18		8ft		
	S - 5	12	15	14	22	**29**		S-5: Reddish Brown cmf SAND, some (+) mf Gravel, trace Clayey Silt (Wet)	
10	8' - 10'	Sample Recovery =			15				42
	S - 6	3	8	12	13	**20**	Stratum D	S-6: Reddish Brown cmf GRAVEL, some cmf Sand, trace Silt; occasional Cobbles (Wet)	
	13' - 15'	Sample Recovery =			5				
	S - 7	6	10	11	14	**21**		S-7: No Recovery	
20	18' - 20'	Sample Recovery =			0				32
							21.5ft		
	S - 8	16	25	40	33	**65**		S-8: Yellowish Brown cmf SAND, little Silt, little (-) mf Gravel (Moist)	
	23' - 25'	Sample Recovery =			12				
	S - 9	8	9	45	50/4	**54**	Stratum E	S-9: Same as S-8 (Moist)	
30	28' - 29.8'	Sample Recovery =			10				22
	S - 10	11	13	17	26	**30**		S-10:Yellowish Brown cmf SAND and Silt, trace f Gravel (Moist)	
	33' - 35'	Sample Recovery =			12				
	S - 11	10	20	41	50/4	**61**		S-11:Yellowish Brown cmf Sand and Silt, little f Gravel (Moist to Wet)	
40	38' - 39.8'	Sample Recovery =			12		39.8ft		12
							EOTB	End of Test Boring	

Location Information

Elevation (ft):	52

Groundwater Data (ft)

Encountered (ft):	8
Elevation, Encount. (ft):	44
At Completion (ft):	5
Time = 24 hrs (ft):	5

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 30, 2018
Date Completed:	May 30, 2018

Comments:

TEST BORING LOG TB-5

Project Information

Project Name: 601 Washington
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Subsurface Profile: Profile Stratum	Visual Description / Comments	Elev. (ft)
0	S - 1	3	5	2	6	**7**	Fill	S-1: Black/Brown Clayey SILT, some cmf GRavel, little (+) cmf Sand (Moist) (Fill)	50.5
	0' - 2'	Sample Recovery =			6				
	S - 2	3	4	4	3	**8**		S-2: Dark Brown SILT & CLAY, some cmf Gravel, little cmf Sand; occasional brick fragments (Moist) (Fill)	
	2' - 4'	Sample Recovery =			8		4 ft		
	S - 3	2	WOH	WOH	WOH	**0**	Stratum A/B	S-3: No Recovery	
	4' - 6'	Sample Recovery =			0		5.25 ft		
	S - 4	2	8	12	21	**20**	Stratum C 7 ft	S-4: Top 8": Reddish Brown CLAY & SILT, some mf(+) Sand, little mf Gravel (Moist to Wet) Bottom 8": Reddish Brown cmf SAND, some cmf Gravel, little (-) Clayey Silt (Moist to Wet)	
	6' - 8'	Sample Recovery =			16				
	S - 5	17	20	18	23	**38**		S-5: Brown mf GRAVEL, some cmf Sand, trace Silt (Wet)	
10	8' - 10'	Sample Recovery =			18				40.5
							Stratum D		
	S - 6	12	8	8	11	**16**		S-6: Same as S-5 (Wet)	
	13' - 15'	Sample Recovery =			13				
							16.5ft		
	S - 7	WOH	7	8	6	**15**		S-7: Yellowish Brown SILT, some cmf Sand, little (-) f Gravel (Moist)	
20	18' - 20'	Sample Recovery =			12				30.5
	S - 8	5	22	30	31	**52**	Stratum E	S-8: Same as S-7 (Moist)	
	23' - 25'	Sample Recovery =			12				
	S - 9	8	23	38	50/4	**61**		S-9: Same as S-7 (Moist)	
	28' - 29.8'	Sample Recovery =			12		29.8ft		
30							EOTB	End of Test Boring	20.5
40									10.5

Location Information

Elevation (ft):	50.5

Groundwater Data (ft)

Encountered (ft):	8
Elevation, Encount. (ft):	42.5
At Completion (ft):	4
Time = 24 hrs (ft):	3

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 29, 2018
Date Completed:	May 29, 2018

Comments:

TEST BORING LOG TB-6

Project Information

Project Name: 601 Washington
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Subsurface Profile: Profile Stratum	Subsurface Profile: Visual Description / Comments	Elev. (ft)
0	S - 1	10	6	3	2	**9**	Fill	S-1: Black cmf(+) GRAVEL, some (+) cmf Sand, little (+) Silt; frequent slag and cinders; occasional Cobbles (Moist) (Fill)	52
	0' - 2'	Sample Recovery =			15				
	S - 2	2	5	4	3	**9**		S-2: Same as S-1 (Moist)	
	2' - 4'	Sample Recovery =			12				
	S - 3	5	5	2	3	**7**		S-3: No Recovery	
	4' - 6'	Sample Recovery =			0				
	S - 4	5	9	37	12	**46**		S-4: Red mf GRAVEL, little (+) cmf Sand, trace Silt (Brick Fragments) (Wet) (Fill)	
	6' - 8'	Sample Recovery =			2		8ft		
	S - 5	4	WOH	2	4	**2**	Stratum B	S-5: Reddish Brown CLAY & SILT, trace (+) f Sand; occasional Cobbles (Wet)	
10	8' - 10'	Sample Recovery =			12				42
							11.5ft		
	S - 6	7	17	17	17	**34**	Stratum D	S-6: Reddish Brown cmf GRAVEL, some cmf Sand, trace Clayey Silt; occasional Cobbles (Wet)	
	13' - 15'	Sample Recovery =			20				
							16.5ft		
	S - 7	5	5	3	5	**8**		S-7: Yellowish Brown SILT, some mf(+) Sand, little friable rock fragments (Moist)	
20	18' - 20'	Sample Recovery =			10				32
	S - 8	15	36	23	40	**59**	Stratum E	S-8: Yellowish Brown cmf SAND, some Silt, little mf Gravel (Wet)	
	23' - 25'	Sample Recovery =			6				
							28.2ft	S-9: Same as S-8 (Wet)	
	S - 9	50/3				**50/3**	EOTB		
30	28' - 28.2'	Sample Recovery =			3			End of Test Boring	22
								Notes: 1). Auger grinding from 0-13 feet	
40									12

Location Information

Elevation (ft): 52

Groundwater Data (ft)

Encountered (ft): 6
Elevation, Encount. (ft): 46
At Completion (ft): 5.5
Time = 24 hrs (ft): NA

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 31, 2018
Date Completed:	May 31, 2018

Comments:

TEST BORING LOG TB-7

Project Information

Project Name: 601 Washington
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Subsurface Profile: Profile Stratum	Subsurface Profile: Visual Description / Comments	Elev. (ft)
0									49.7
	S - 1	4	7	9	10	**16**		S-1: Black cmf SAND, some mf Gravel, little Silt; frequent cinder and slag fragments (Moist) (Fill)	
	0' - 2'	Sample Recovery =			16				
	S - 2	6	16	17	13	**33**	Fill	S-2: Same as S-1; Petro Odor (Moist)	
	2' - 4'	Sample Recovery =			18		4 ft		
	S - 3	2	WOH	WOH	WOH	**0**	Stratum A	S-3: Same as S-1; occasional Cobbles (Wet)	
	4' - 6'	Sample Recovery =			8		6ft		
	S - 4	1	1	WOH	WOH	**1**		S-4: Black CLAY & SILT, trace (+) organics, trace f Sand; occasional Cobbles (Wet)	
	6' - 8'	Sample Recovery =			12				
	S - 5	WOH	WOH	WOH	2	**0**	Stratum B	S-5: No Recovery	
	8' - 10'	Sample Recovery =			0				
10									39.7
							11.5ft		
	S - 6	8	35	23	26	**58**		S-6: Reddish Brown cmf GRAVEL, some (+) cmf Sand, trace (-) Clayey SILT; occasional Cobbles (Wet)	
	13' - 15'	Sample Recovery =			12		Stratum D		
							16.5 ft		
	S - 7	1	2	3	4	**5**		S-7: Light Reddish Brown SILT & CLAY, trace f Sand (Moist to Wet)	
	18' - 20'	Sample Recovery =			3				
20									29.7
	S - 8	4	3	7	5	**10**		S-8: Yellowish Brown SILT and cmf SAND, trace (+) mf Gravel (Wet)	
	23' - 25'	Sample Recovery =			8				
	S - 9	WOH	WOH	WOH	WOH	**0**	Stratum E	S-9: No Recovery	
	28' - 30'	Sample Recovery =			0				
30	S - 10	50/1				**50/1**		S-10:Gray mf GRAVEL Rock Fragments	19.7
	30' - 30.1'	Sample Recovery =			1				
	S - 11	5	7	5	7	**12**		S-11:Yellowish Brown SILT, little mf(+) Sand, trace f Gravel (Moist to Wet)	
	33' - 35'	Sample Recovery =			8			S-12: Same as S-11 (Moist to Wet)	
	S - 12	4	15	13	10	**28**		End of Test Boring	
	38' - 40'	Sample Recovery =			12		40ft	Notes: 1). Augered to 50 feet; no sampling	
40							EOTB		9.7

Location Information

Elevation (ft): 49.7

Groundwater Data (ft)

Encountered (ft):	4
Elevation, Encount. (ft):	45.7
At Completion (ft):	5
Time = 24 hrs (ft):	5

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 29, 2018
Date Completed:	May 29, 2018

Comments:

TEST BORING LOG TB-8

Project Information

Project Name: 601 Washington
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number / Depths Below Surface (ft)	Standard Penetration Test Results 0-6"	6-12"	12-18"	18-24"	"N" Value (bpf)	Profile Stratum	Visual Description / Comments	Elev. (ft)
0	S - 1	5	15	5	7	**20**	Fill	S-1: Black/Gray Clayey SILT, some mf Sand, little mf Gravel (Moist) (Fill)	50.5
	0' - 2'	Sample Recovery =			20				
	S - 2	7	7	6	5	**13**		S-2: Black cmf SAND, little (-) f Gravel, trace Silt (Moist) (Fill)	
	2' - 4'	Sample Recovery =			2		4ft		
	S - 3	4	3	3	5	**6**		S-3: Dark Reddish Brown CLAY & SILT, trace (+) f Sand (Moist)	
	4' - 6'	Sample Recovery =			8			S-4: Reddish Brown CLAY & SILT, little mf Sand (Moist)	
	S - 4	2	2	2	2	**4**			
	6' - 8'	Sample Recovery =			16		Stratum C		
	S - 5	3	4	5	14	**9**		S-5: Same as S-4 (Moist)	
	8' - 10'	Sample Recovery =			14				
10									40.5
							11.5ft		
	S - 6	35	32	35	21	**67**		S-6: Brown cmf GRAVEL, some cmf Sand, little Silt; frequent Cobbles (Wet)	
	13' - 15'	Sample Recovery =			12				
							Stratum D	S-7: Top 8": Same as S-6 (Wet) Bottom 3": Gray cmf GRAVEL, little cmf Sand, trace (-) Silt (Moist)	
	S - 7	5	13	41	50/4	**54**			
	18' - 19.8'	Sample Recovery =			11				
20									30.5
							22ft		
							AR	Auger Refusal	
								Notes: 1). Auger Refusal at 22 feet.	
30									20.5
40									10.5

Location Information

Elevation (ft):	50.5

Groundwater Data (ft)

Encountered (ft):	13
Elevation, Encount. (ft):	37.5
At Completion (ft):	11
Time = 24 hrs (ft):	5

General Information

Maser Representative:	A. Young
Project Manager:	R. Walters
Contractor:	Allied Drilling Inc.
Driller:	R. Miller
Drilling Equipment:	Diedrich B-50
Drilling Method:	Hollow Stem Auger
Sampling Method:	2-inch O.D. Split Spoon
Date Started:	May 29, 2018
Date Completed:	May 29, 2018

Comments:

TEST PIT LOG TP-1

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Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0						51
					Dark Reddish Brown SILT & CLAY, some (+) cmf Gravel, little (+) cmf Sand; frequent plastic, metal, brick fragments and biodegradable waste; occasional cobbles and boulders (Moist)	
					(5YR 3/3 Loam to Silty Clay Loam, Single Grain to Weak Medium Subangular Blocky, Loose to Firm)	
					(Fill)	
5						46
					6.0ft	
					End of Test Pit	
					Note: Infiltration testing not performed due to the composition of the existing fill materials.	
10						41
15						36
20						31

Location Information

Elevation (ft.):	51

Groundwater Data (ft)

Depth Encountered(ft):	NE
Elevation(ft):	NA
Perched Water Depth:	NE
Perched Water Elevation:	NA

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 5, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-2

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Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Black/Gray cmf SAND, some cmf Gravel, little (+) Silt; frequent brick, slag and coal fragments, occasional cobbles (Moist) (5YR 3/3 Gravelly Loam to Gravelly Silty Clay Loam, Single Grain to Weak Medium Subangular Blocky, Loose to Firm, Clear/Wavey Boudary) (Fill)	53
					3.0ft	
	3.3	0.25	12+	1	3.3ft Black CLAY & SILT, trace organics, trace f Sand (Moist to Wet) (Stratum A)	
5					Reddish Brown CLAY & SILT, little (-) f Sand (Very Moist to Wet) (5YR 4/3 Silt Loam, Massive, Very Friable, Clear/Wavey Boundary) (Stratum B)	48
					5.0ft	
					Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist) (5YR 4/4 Silty Clay Loam, Moderate Medium Subangular Blocky, Firm, Clear/Boundary) (Stratum C)	
					7.5ft	
10					Reddish Brown cmf GRAVEL and cmf Sand, trace (+) Silt (Wet) (5YR 4/4 Extremely Cobbley Loamy Sand, Single Grain) (Stratum D)	43
					10.0ft	
					End of Test Pit Note: Infiltration testing not performed due to perched water (seepage) at 5 feet below grade.	
15						38
20						33

Location Information

Elevation (ft.):	52.5

Groundwater Data (ft)

Depth Encountered (ft.):	7.5
Elevation (ft.):	45
Perched Water Depth:	5 (Seepage)
Perched Water Elevation:	47.5

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 5, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP/IT-3

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Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					0.2ft — Black Clayey SILT, some cmf Sand, little (+) cmf Gravel (Moist) (10YR 2/1 Gravelly Silt Loam, Moderate Medium Granular, Very Friable, Abrupt/Smooth Boundary) (Fill)	50
					3.0ft	
	3	0.25	12+	1	3.5ft — Dark Grayish Brown cmf SAND, some (+) cmf Gravel, trace Silt; frequent brick, metal, coal, slag fragments (Moist) (10YR 4/2 Very Gravelly Loamy Sand, Single Grain, Very Friable, Clear/Boundary) (Fill)	
	4.25	0	12+	WOH		
5					6.0ft — Black CLAY & SILT, trace organics, trace f Sand (Moist to Wet) (Stratum A)	45
					8.0ft — Reddish Brown CLAY & SILT, little f Sand (Very Moist) (5YR 4/3 Silty Clay Loam, Massive, Very Friable, Clear/Wavey Boundary) (Stratum B)	
					9.0ft — Reddish Brown CLAY & SILT, little (+) f Sand (Moist) (5YR 4/4 Silty Clay, Moderate Medium Subangular Blocky, Firm, Clear/Wavey Boundary) (Stratum C)	
10					Reddish Brown cmf GRAVEL and cmf Sand, trace (+) Silt (Wet) (5YR 4/4 Extremely Cobbley Loamy Sand, Single Grain) (Stratum D)	40
					End of Test Pit Note: Infiltration testing peformed at 4.25 feet	
15						35
20						30

Location Information

Elevation (ft.):	50.1

Groundwater Data (ft)

Depth Encountered (ft.):	7.5
Elevation (ft.):	42.6
Perched Water Depth:	NE
Perched Water Elevation:	NA

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 5, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP/IT-4

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Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Brown Clayey SILT, some cmf Gravel, some cmf Sand; frequent brick fragments (Moist) (10YR 4/3 Very Gravelly Loam Weak Medium Subangular Blocky, Firm,Clear/Wavey Boudary) (Fill)	52
					3.0ft	
					Black cmf SAND, some (+) cmf Gravel, trace (+) Silt; frequent brick, coal, metal fragments and biodegradable waste; occasional cobbles and boulders (Moist) (10YR 2/1 Very Gravelly Sandy Loam, Single Grain, Loose, Clear/Wavey Boundary) (Fill)	
5					5.5ft	47
					6.5ft	
	6.5	.5	12+	1	Black CLAY & SILT, trace organics, trace f Sand (Very Moist) (Stratum A)	
					8.0ft	
					Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist) (5YR 4/4 Silty Clay Loam, Moderate Medium Subangular Blocky, Firm, Clear/Boundary) (Stratum B)	
10					10.0ft	42
					11.5ft	
					Reddish Brown SILT & CLAY, little (-) f Sand (Very Moist) (5YR 4/3 Silt Loam, Massive, Very Friable, Clear/Wavey Boundary) (Stratum C)	
15					Reddish Brown cmf GRAVEL and cmf Sand, trace (+) Silt (Wet) (5YR 4/4 Extremely Cobbley Loamy Sand, Single Grain) (Stratum D)	37
					End of Test Pit Note: Infiltration testing performed at 6.5 feet	
20						32

Location Information

Elevation (ft.):	52.3

Groundwater Data (ft)

Depth Encountered (ft.):	10
Elevation (ft.):	42.3
Perched Water Depth:	NE
Perched Water Elevation:	NA

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 5, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP/IT-5

Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Black cmf SAND, some mf Gravel, little Silt; frequent brick, coal, slag, metal fragments (Moist)	50
					(10YR 2/1 Very Gravelly Sandy Loam to Loam, Single Grain to Weak Medium Subangular Blocky, Loose to Friable, Clear/Wavey Boudary) (Fill)	
					3.5ft	
					4.0ft Black CLAY & SILT, trace organics, trace f Sand (Moist to Wet) (Stratum A)	
5						45
					Reddish Brown CLAY & SILT, little (-) f Sand (Very Moist) (5YR 4/3 Silt Loam, Massive, Very Friable, Clear/Wavey Boundary) (Stratum B)	
	6.5	0.5	12+	1	7.0ft	
					Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist) (5YR 4/4 Silty Clay Loam, Moderate Medium Subangular Blocky, Firm, Clear/Boundary) (Stratum C)	
					9.0ft	
10						40
					Reddish Brown cmf GRAVEL, some cmf Sand, trace (+) Silt (Wet) (5YR 4/4 Extremely Cobbley Loamy Sand, Single Grain) (Stratum D)	
					11.0ft	
					End of Test Pit Note: Infiltration testing performed at 4.3 feet	
15						35
20						30

Location Information

Elevation (ft.):	50.1

Groundwater Data (ft)

Depth Encountered (ft.):	8.7
Elevation (ft.):	41.4
Perched Water Depth:	NE
Perched Water Elevation:	NA

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-6

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Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

Depth (ft)	Sample Number (depth, ft)	Test Results PP (tsf)	HP (in.)	DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Black cmf SAND, some mf Gravel, little (+) Silt; frequent brick, coal, slag, metal fragments (Moist) (10YR 2/1 Very Gravelly Sandy Loam to Loam, Single Grain to Weak Medium Subangular Blocky, Loose to Friable, Clear/Wavey Boundary) (Fill)	51
5					5.5ft	46
	6	0.25	12+	1	6.0ft Black CLAY & SILT, trace organics, trace f Sand (Moist to Wet) (Stratum A)	
					7.5ft Reddish Brown CLAY & SILT, little (-) f Sand (Very Moist) (5YR 4/3 Silt Loam, Massive, Very Friable, Clear/Wavey Boundary) (Stratum B)	
10					10.0ft Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist) (5YR 4/4 Silty Clay Loam, Moderate Medium Subangular Blocky, Firm, Clear/Boundary) (Stratum C)	41
					12.0ft Reddish Brown cmf GRAVEL and cmf Sand, trace (+) Silt (Wet) (5YR 4/4 Extremely Cobbley Loamy Sand, Single Grain) (Stratum D)	
15					End of Test Pit Note: Infiltration testing not performed due to perched water (rapid seepage) encountered at 5.5 feet.	36
20						31

Location Information

Elevation (ft.):	50.5

Groundwater Data (ft)

Depth Encountered (ft.):	10
Elevation (ft.):	40.5
Perched Water Depth:	5.5 (Rapid Seepage)
Perched Water Elevation:	45

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-7

Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Black/Gray cmf SAND, some cmf Gravel, little (-) Silt; frequent brick, slag, coal fragments, occasional cobbles (Moist) (Fill)	52
					4.0ft	
	4	0.25	12+	1	4.4ft Black CLAY & SILT, trace organics, trace f Sand (Moist to Wet) (Stratum A)	
5						47
					Reddish Brown SILT & CLAY, little (-) f Sand (Very Moist to Wet) (Stratum B)	
					7.5ft	
					Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist) (Stratum C)	
					9.0ft	
10						42
					10.5ft Reddish Brown cmf GRAVEL, some cmf Sand, trace (+) Clayey Silt (Wet) (Stratum D)	
					End of Test Pit	
15						37
20						32

Location Information

Elevation (ft.):	51.5

Groundwater Data (ft)

Depth Encountered (ft.):	9
Elevation (ft.):	42.5
Perched Water Depth:	7 (Seepage)
Perched Water Elevation:	44.5

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-8

Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0						53
					Black/Gray cmf SAND, some cmf Gravel, little (-) Silt; frequent brick, slag, coal fragments, occasional cobbles (Moist)	
					(Fill)	
5						48
					6.0ft	
					6.5ft Black CLAY & SILT, trace organics, trace f Sand (Moist to Wet) (Stratum A)	
					8.0ft Reddish Brown SILT & CLAY, little (-) f Sand (Very Moist to Wet) (Stratum B)	
10						43
					Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist)	
					11.0ft (Stratum C)	
					12.0ft	
					Reddish Brown cmf GRAVEL, some cmf Sand, trace (+) Clayey Silt (Wet)	
					(Stratum D)	
15					End of Test Pit	38
20						33

Location Information

Elevation (ft.):	53

Groundwater Data (ft)

Depth Encountered (ft.):	11
Elevation (ft.):	42
Perched Water Depth:	NE
Perched Water Elevation:	NA

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-9

Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number (depth, ft)	Test Results PP (tsf)	Test Results HP (in.)	Test Results DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Black cmf SAND, some cmf Gravel, little (-) Silt; frequent brick, slag, coal fragments, occasional cobbles (Moist) (Fill)	52
5					6.0ft Black CLAY & SILT, trace (+) organics, trace f Sand (Moist to Wet) (Stratum A) 6.5ft 7.0ft Reddish Brown CLAY & SILT, little (-) f Sand (Very Moist to Wet) (Stratum B)	47
10					9.0ft Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist) (Stratum C)	42
15					Reddish Brown cmf GRAVEL, some cmf Sand, trace (+) Clayey Silt (Wet) 12.0ft (Stratum D) End of Test Pit	37
20						32

Location Information

Elevation (ft.):	51.5

Groundwater Data (ft)

Depth Encountered (ft.):	10
Elevation (ft.):	41.5
Perched Water Depth:	6
Perched Water Elevation:	45.5

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-10

Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number (depth, ft)	Test Results PP (tsf)	Test Results HP (in.)	Test Results DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Brown Clayey SILT , little (+) cmf GRAVEL, little (-) cmf Sand:, occasional cobbles (Moist) (Fill)	53
					1.8ft — Black/Gray cmf SAND, some cmf Gravel, little (-) Silt; frequent brick, slag, coal fragments, occasional cobbles (Moist) (Fill)	
					3.8ft — 4.6ft — Black CLAY & SILT, trace(+) organics, trace f Sand (Moist to Wet) (Stratum A)	
5	5.5	0.5	12+	1		48
					Reddish Brown CLAY & SILT, some (-) f Sand (Very Moist to Wet) (Stratum B)	
					7.5ft — 8.5ft — Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist) (Stratum C)	
10						43
					Reddish Brown cmf GRAVEL, some cmf Sand, trace (+) Clayey Silt (Wet) (Stratum D)	
					12.0ft — End of Test Pit	
15						38
20						33

Location Information

Elevation (ft.):	52.5

Groundwater Data (ft)

Depth Encountered (ft.):	8.5
Elevation (ft.):	44
Perched Water Depth:	NE
Perched Water Elevation:	NA

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-11

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Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

Depth (ft)	Sample Number (depth, ft)	Test Results PP (tsf)	HP (in.)	DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0						50
					Black/Gray cmf SAND, some cmf Gravel, little (-) Silt; frequent brick, slag, coal fragments, occasional cobbles (Moist) (Fill)	
					5.0ft	
5						45
	5.7	2	12+	1	5.7ft Black CLAY & SILT, trace (+) organics, trace f Sand (Moist to Wet) (Stratum A)	
					Reddish Brown CLAY & SILT, little (-) f Sand (Very Moist to Wet) (Stratum B)	
	7.5	2.5	2	9	7.5ft	
					Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel with layers of Gray Silty CLAY, some cmf Sand (Moist) (Stratum C)	
10					9.0ft	40
					Reddish Brown cmf GRAVEL, some cmf Sand, trace (+) Clayey Silt (Wet) (Stratum D)	
					12.5ft	
					End of Test Pit	
15						35
20						30

Location Information

Elevation (ft.):	50

Groundwater Data (ft)

Depth Encountered (ft.):	9
Elevation (ft.):	41
Perched Water Depth:	7.5
Perched Water Elevation:	42.5

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-12

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Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Black/Gray cmf SAND, some cmf Gravel, little (-) Silt; frequent brick, slag, coal fragments, occasional cobbles (Moist) (Fill)	49
					4.0ft	
5					4.5ft Black CLAY & SILT, trace (+) organics, trace f Sand (Moist to Wet) (Stratum A)	44
					5.5ft Reddish Brown CLAY & SILT, some mf Sand, trace mf Gravel (Moist) (Stratum B)	
10					End of Test Pit	39
15						34
20						29

Location Information

Elevation (ft.):	48.5

Groundwater Data (ft)

Depth Encountered (ft.):	NE
Elevation (ft.):	NA
Perched Water Depth:	4
Perched Water Elevation:	44.5

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-13

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Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

Depth (ft)	Sample Number (depth, ft)	Test Results: PP (tsf)	Test Results: HP (in.)	Test Results: DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0						49
					0.6ft — Yellow Brown SILT & CLAY, some cmf Gravel, little (+) cmf Sand: occasional cobbles (Moist) (Fill)	
					2.0ft — Black/Gray cmf SAND, some cmf Gravel, little (-) Silt; frequent brick, slag, coal fragments, occasional cobbles (Moist) (Fill)	
					2.5ft — Black CLAY & SILT, trace (+) organics, trace f Sand (Moist to Wet) (Stratum A)	
5					5ft — Reddish Brown CLAY & SILT, little (-) f Sand (Very Moist) (Stratum B)	44
					End of Test Pit	
10						39
15						34
20						29

Location Information

Elevation (ft.):	49

Groundwater Data (ft)

Depth Encountered (ft.):	NE
Elevation (ft.):	NA
Perched Water Depth:	5.5
Perched Water Elevation:	43.5

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

TEST PIT LOG TP-14

Project Information

Project Name: 601 Washington Street
Project Location: Whitemarsh Township, PA
Project Number: 16001030A

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Depth (ft)	Sample Number (depth, ft)	Test Results PP (tsf)	Test Results HP (in.)	Test Results DCP (bpl.75")	Visual Description / Comments	Elev. (ft)
0					Black/Gray cmf SAND, some cmf Gravel, little (-) Silt; frequent brick, slag, coal fragments, occasional cobbles (Moist) (Fill)	50
					2.0ft	
					2.5ft Black CLAY & SILT, trace (+) organics, trace f Sand (Moist to Wet) (Stratum A)	
	2.5	2	3	6		
5					Reddish Brown SILT & CLAY, little (-) f Sand (Very Moist) (Stratum C)	45
					6.5ft	
					Reddish Brown cmf GRAVEL, some cmf Sand, trace (+) Clayey Silt (Wet) (Stratum D)	
10					10.5ft	40
					End of Test Pit	
15						35
20						30

Location Information

Elevation (ft.):	50

Groundwater Data (ft)

Depth Encountered (ft.):	6.5
Elevation (ft.):	43.5
Perched Water Depth:	2
Perched Water Elevation:	48

General Information

Maser Representative:	Austin Young
Project Manager:	Ryan Walters
Contractor:	James Castaldi Contractors
Excavator:	Jim Castaldi
Equipment:	CASE 580
Date Completed:	June 6, 2018

Comments:

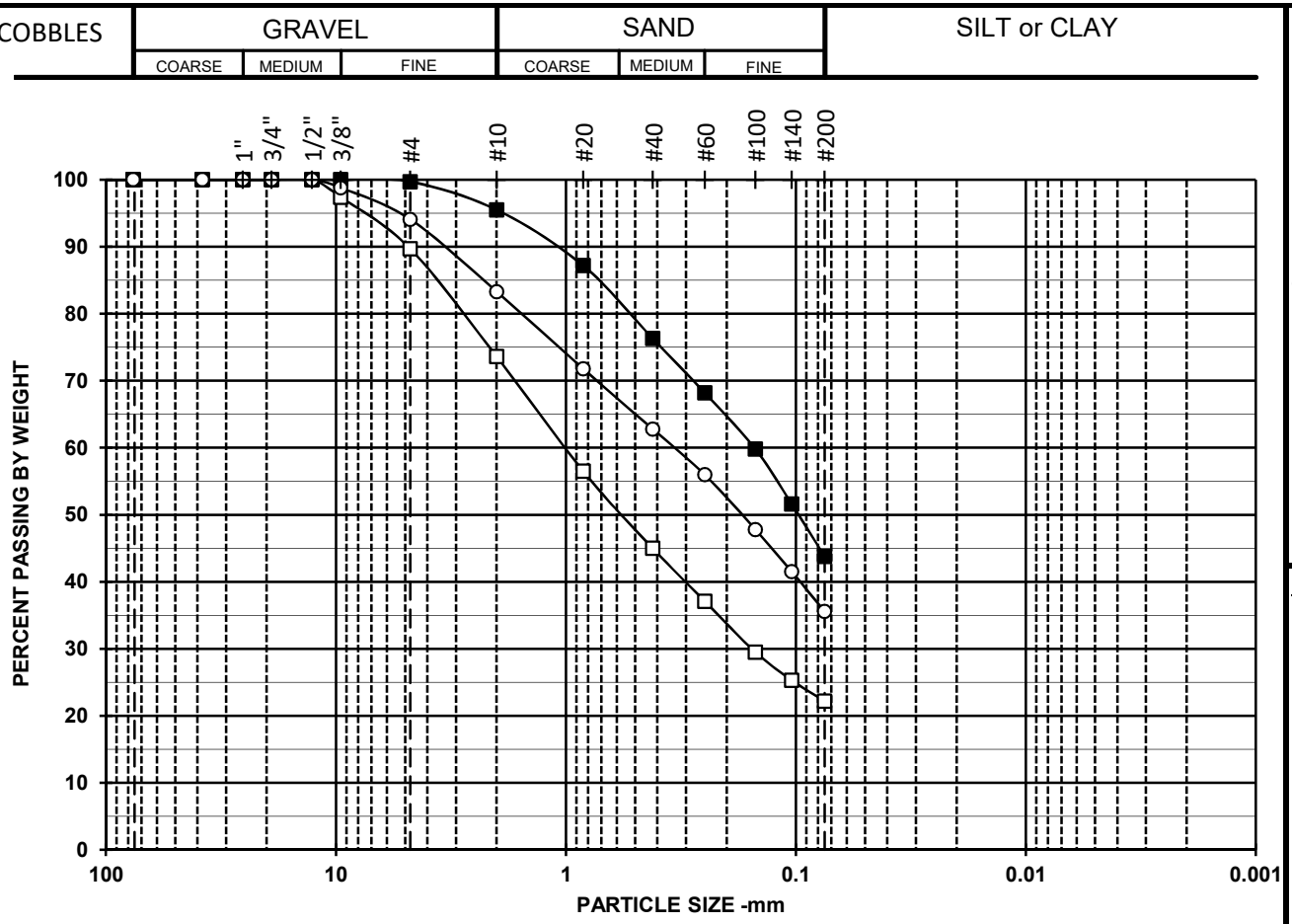
Notes: PP - Pocket Penetrometer
HP - Hand Probe Penetration
DCP-Dynamic Cone Penetrameter (blows/1.75")

APPENDIX B
LABORATORY TEST DATA

Maser Consulting, P.A. #16001030A
601 Washington Street
LABORATORY TESTING DATA SUMMARY

BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS							REMARKS
			WATER CONTENT (%)	LIQUID LIMIT (-)	PLASTIC LIMIT (-)	PLAS. INDEX (-)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	ORGANIC CONTENT (burnoff) (%)	
TB-1	S-1	0-2	8.9				SM	22.2		
TB-4	S-10	33-35	18.8				SM	43.8		
TB-4	S-11	38-40	16.8				SM	35.6		
TB-5	S-6	11-13	7.7				GP-GM	6.5		
TB-7	S-4	6-8	53.5						10.0	
TB-8	S-4	6-8	23.9	32	18	14	CL	84.2		
TB-8	S-6	13-15	7.4				GP-GM	10.3		
TP-3	S-1	7	18.1							
TP-10	S-1	6	31.8	38	20	18	CL	75.2		
TP-14	S-1	4	25.9							

Note: (1) USCS symbol based on visual observation and Sieve and Atterberg limits reported.



Symbol	□	■	○
Boring	TB-1	TB-4	TB-4
Sample	S-1	S-10	S-11
Depth	0-2	33-35	38-40
% +3"	0.0	0.0	0.0
% Gravel	26.4	4.5	16.7
% SAND	51.4	51.7	47.7
%C SAND	22.5	13.1	15.6
%M SAND	14.0	14.2	11.7
%F SAND	14.9	24.4	20.4
% FINES	22.2	43.8	35.6
D_{100} (mm)	12.700	9.530	12.700
D_{60} (mm)	1.004	0.152	0.338
D_{30} (mm)	0.155		
D_{10} (mm)			
Cc			
Cu			

Size/ID #	Percent Finer Data		
6"	100.0	100.0	100.0
4"	100.0	100.0	100.0
3"	100.0	100.0	100.0
1 1/2"	100.0	100.0	100.0
1"	100.0	100.0	100.0
3/4"	100.0	100.0	100.0
1/2"	100.0	100.0	100.0
3/8"	97.4	100.0	98.8
#4	89.7	99.7	94.1
#10	73.6	95.5	83.3
#20	56.5	87.2	71.8
#40	45.0	76.3	62.8
#60	37.1	68.2	56.0
#100	29.5	59.8	47.8
#140	25.3	51.6	41.5
#200	22.2	43.8	35.6
5μ m			
2μ m			
1μ m			

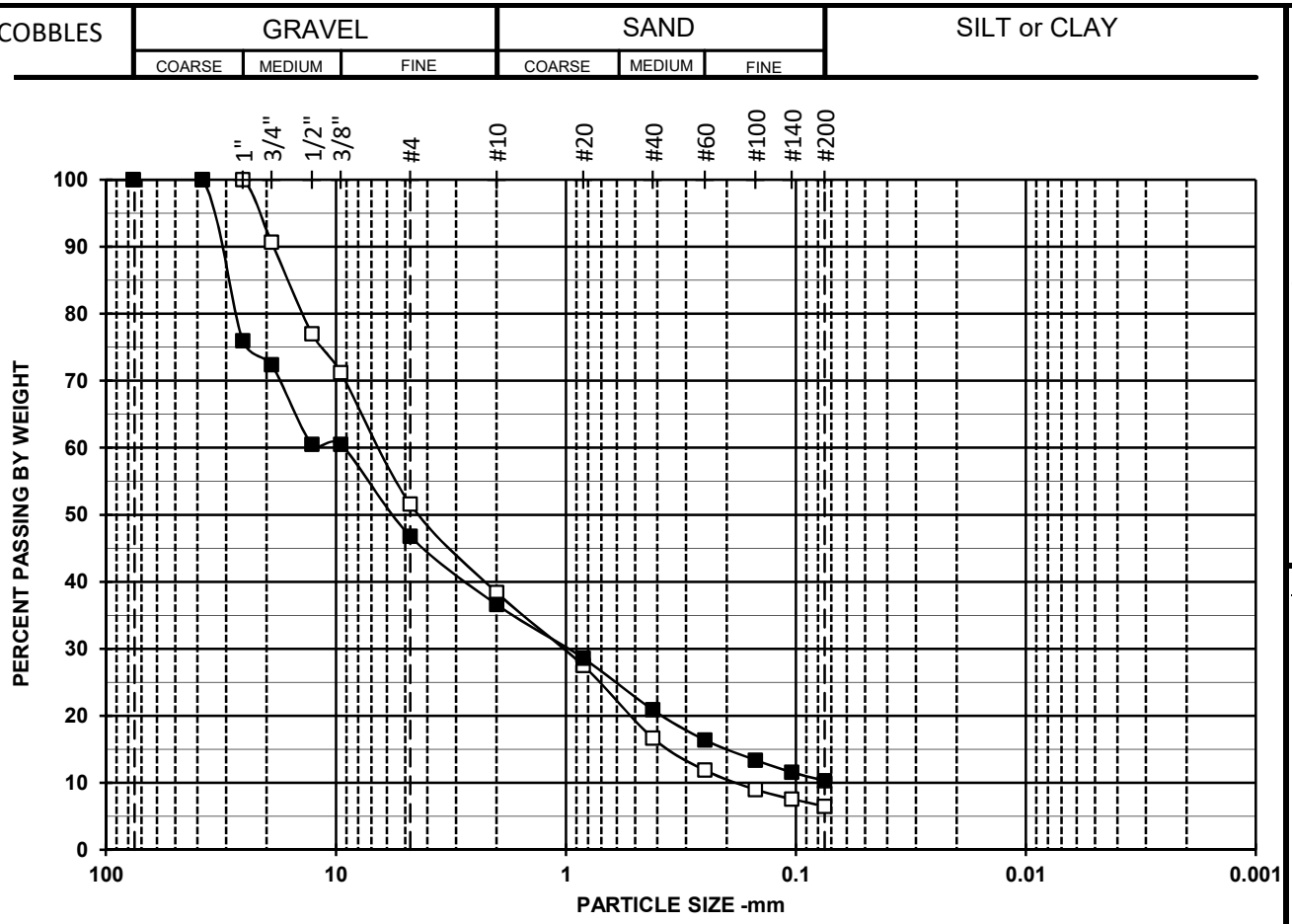
SYMBOL	w (%)	LL	PL	PI	USCS	AASHTO	BURMISTER DESCRIPTION AND REMARKS	DATE
□	8.9				SM		Black coarse medium to fine SAND, some fine Gravel, some Silt shale noted	06/15/18
■	18.8				SM		Yellow coarse medium to fine SAND, and Silt, trace fine Gravel	06/15/18
○	16.8				SM		Yellowish gray coarse medium to fine Sand, and Silt, little fine Gravel	06/15/18

Maser Consulting, P.A. #16001030A

TerraSense, LLC #7902-18019

601 Washington Street

PARTICLE SIZE DISTRIBUTION



Symbol	□	■	○
Boring	TB-5	TB-8	
Sample	S-6	S-6	
Depth	11-13	13-15	
% +3"	0.0	0.0	
% Gravel	61.6	63.4	
% SAND	31.9	26.3	
%C SAND	16.7	11.8	
%M SAND	9.8	8.4	
%F SAND	5.4	6.1	
% FINES	6.5	10.3	
D_{100} (mm)	25.400	38.100	
D_{60} (mm)	6.400	9.286	
D_{30} (mm)	1.025	0.978	
D_{10} (mm)	0.179		
Cc	0.900		
Cu	35.9		

Size/ID #	Percent Finer Data		
6"	100.0	100.0	
4"	100.0	100.0	
3"	100.0	100.0	
1 1/2"	100.0	100.0	
1"	100.0	76.0	
3/4"	90.7	72.4	
1/2"	77.0	60.5	
3/8"	71.2	60.5	
#4	51.6	46.8	
#10	38.4	36.6	
#20	27.5	28.6	
#40	16.7	20.9	
#60	11.9	16.4	
#100	9.0	13.4	
#140	7.6	11.6	
#200	6.5	10.3	
5μ m			
2μ m			
1μ m			

SYMBOL	w (%)	LL	PL	PI	USCS	AASHTO	BURMISTER DESCRIPTION AND REMARKS	DATE
□	7.7				GP-GM		Brown medium to fine GRAVEL and, coarse medium to fine Sand, trace Silt	06/15/18
■	7.4				GP-GM		Brown coarse medium to fine GRAVEL and, coarse medium to fine Sand, little Silt	06/15/18
○								

Maser Consulting, P.A. #16001030A

TerraSense, LLC #7902-18019

601 Washington Street

PARTICLE SIZE DISTRIBUTION

LIFE SAFETY - EGRESS TRAVEL DISTANCE

PATH NAME	EXIT	LENGTH	COMMENTS
A		72' - 5"	COMMON PATH
A1	6	83' - 9"	
A2		22' - 11"	
B	1	61' - 2"	COMMON PATH
B1	1	184' - 10"	TOTAL TRAVEL DISTANCE: 246'-0" (61'-2" COMMON PATH +184'-10")
B2	2	217' - 11"	TOTAL TRAVEL DISTANCE: 279'-1" (61'-2" COMMON PATH+217'-11")
C		44' - 10"	COMMON PATH
C1	1	161' - 6"	TOTAL TRAVEL DISTANCE: 205'-7" (44'-1" COMMON PATH +161'-6")
C2	2	153' - 3"	TOTAL TRAVEL DISTANCE: 197'-4" (44'-1" COMMON PATH +153'-3")
D		44' - 10"	COMMON PATH
D1	3	161' - 4"	TOTAL TRAVEL DISTANCE: 206'-2" (44'-10" COMMON PATH +161'-4")
D2	4	153' - 3"	TOTAL TRAVEL DISTANCE: 198'-1" (44'-10" COMMON PATH +153'-3")
E		60' - 8"	COMMON PATH
E1	3	186' - 1"	TOTAL TRAVEL DISTANCE: 246'-9" (60'-8" COMMON PATH +186'-1")
E2	4	217' - 5"	TOTAL TRAVEL DISTANCE: 279'-1" (60'-8" COMMON PATH +218'-5")
F		59' - 7"	COMMON PATH
F1	1	185' - 1"	TOTAL TRAVEL DISTANCE: 244'-8" (59'-7" COMMON PATH +185'-1")
F2	2	218' - 3"	TOTAL TRAVEL DISTANCE: 277'-10" (59'-7" COMMON PATH +218'-3")
G		42' - 1"	COMMON PATH
G1	1	160' - 2"	TOTAL TRAVEL DISTANCE: 202'-3" (42'-1" COMMON PATH +160'-2")
G2	2	156' - 0"	TOTAL TRAVEL DISTANCE: 198'-1" (42'-1" COMMON PATH +156'-0")
H		42' - 1"	COMMON PATH
H1	3	160' - 2"	TOTAL TRAVEL DISTANCE: 202'-3" (42'-1" COMMON PATH +160'-2")
H2	4	156' - 0"	TOTAL TRAVEL DISTANCE: 198'-1" (42'-1" COMMON PATH +156'-0")
I		59' - 6"	COMMON PATH
I1	3	185' - 7"	TOTAL TRAVEL DISTANCE: 245'-1" (59'-6" COMMON PATH +185'-7")
I2	4	218' - 6"	TOTAL TRAVEL DISTANCE: 278'-0" (59'-6" COMMON PATH 218'-6")
J		59' - 7"	COMMON PATH
J1	1	185' - 0"	TOTAL TRAVEL DISTANCE: 244'-7" (59'-7" COMMON PATH +185'-0")
J2	2	217' - 2"	TOTAL TRAVEL DISTANCE: 278'-0" (59'-7" COMMON PATH +185'-0")
K		42' - 1"	COMMON PATH
K1	1	159' - 11"	TOTAL TRAVEL DISTANCE: 202'-0" (42'-1" COMMON PATH +159'-11")
K2	2	151' - 10"	TOTAL TRAVEL DISTANCE: 198'-1" (42'-1" COMMON PATH +156'-0")
L		47' - 8"	COMMON PATH
L1	3	155' - 3"	TOTAL TRAVEL DISTANCE: 202'-11" (47'-8" COMMON PATH +155'-3")
L2	4	154' - 0"	TOTAL TRAVEL DISTANCE: 203'-8" (47'-8" COMMON PATH +165'-0")
M		59' - 10"	COMMON PATH
M1	3	185' - 9"	TOTAL TRAVEL DISTANCE: 245'-7" (59'-10" COMMON PATH +185'-9")
M2	4	218' - 0"	TOTAL TRAVEL DISTANCE: 277'-10" (59'-10" COMMON PATH +218'-0")
N		40' - 6"	COMMON PATH
N1	2	115' - 1"	TOTAL TRAVEL DISTANCE: 155'-4" (40'-6" COMMON PATH +114'-10")
N2	4	115' - 3"	TOTAL TRAVEL DISTANCE: 155'-4" (40'-6" COMMON PATH +114'-10")
O		68' - 11"	COMMON PATH
O1	1	176' - 0"	TOTAL TRAVEL DISTANCE: 244'-11" (68'-11" COMMON PATH +176'-0")
O2	2	206' - 9"	TOTAL TRAVEL DISTANCE: 275'-2" (68'-11" COMMON PATH +206'-3")
P		49' - 3"	COMMON PATH
P1	1	105' - 2"	TOTAL TRAVEL DISTANCE: 154'-5" (49'-3" COMMON PATH +105'-2")
P2	2	236' - 10"	TOTAL TRAVEL DISTANCE: 286'-1" (49'-3" COMMON PATH +236'-10")
Q		68' - 11"	COMMON PATH
Q1	3	176' - 0"	TOTAL TRAVEL DISTANCE: 244'-11" (68'-11" COMMON PATH +176'-0")
Q2	4	206' - 9"	TOTAL TRAVEL DISTANCE: 275'-2" (68'-11" COMMON PATH +206'-3")
R		38' - 3"	COMMON PATH
R1	3	105' - 2"	TOTAL TRAVEL DISTANCE: 143'-5" (38'-3" COMMON PATH +105'-2")
R2	4	222' - 0"	TOTAL TRAVEL DISTANCE: 260'-3" (38'-3" COMMON PATH +222'-0")
S		31' - 6"	COMMON PATH
S1	2	111' - 6"	
S2	4	110' - 9"	
T1	2	81' - 11"	
T2	4	306' - 5"	
T3	4	8' - 9"	COMMON PATH

IBC 2018 OCCUPANCY SCHEDULE - Level-1

NAME	NUMBER	FUNCTION	LOAD FACTOR	TYPE	AREA	OCCUPANTS	FIXED SEATS	OCCUPANT LOAD
LEVEL 01								
TRASH RM	1-101	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	250 SF	1		1
TRASH RM	1-102	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	250 SF	1		1
WATER RM	1-103	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	459 SF	2		2
BLDG STORAGE	1-104	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	291 SF	1		1
BUILDING ACCESS	2-101	RESIDENTIAL	200	Gross	2,840 SF	15		15
STORAGE	2-102	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	3,552 SF	12		12
STORAGE	2-103	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	432 SF	2		2
STORAGE	2-104	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	427 SF	2		2
TRASH RM	3-101	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	250 SF	1		1
TRASH RM	3-102	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	250 SF	1		1
WATER RM	3-103	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	459 SF	2		2
BLDG STORAGE	3-104	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	291 SF	1		1
TOTAL								41

LIFE SAFETY

FIRE-RATED WALL, SEE TABLE BELOW

START / FINISH — EGRESS TRAVEL DISTANCE, SEE TABLE

W. WIDTH — ACCESSIBLE ROUTE

LENGTH OF MAX OVERALL DIAGONAL: 0' - 0"
SEPARATION REQUIREMENT: 0' - 0" — MAXIMUM OVERALL BUILDING DIAGONAL

EXIT SEPARATION DISTANCE: 0' - 0" — EXIT SEPARATION

EXIT SIGNS (SEE RCPS - A2.XX SERIES)

NOTE: REFERENCE ELECTRICAL DRAWINGS FOR EMERGENCY LIGHTING INFORMATION

EXIT # — EXIT X
OCCUPANTS — XX OCC
REQUIRED WIDTH — XX" R
PROVIDED WIDTH — XX" P

SEE EXIT REQUIREMENTS TABLE FOR MORE INFORMATION

NOTE: FIRE EXTINGUISHER CABINET LOCATIONS CAN BE FOUND ON A1.XX SHEETS - FLOOR PLANS

FEC FIRE EXTINGUISHER CABINET LOCATION

FE FIRE EXTINGUISHER LOCATION

OL OCCUPANT LOAD SIGN. ONCE FOR EACH ROOM AND ONE POSTED AT MAIN ENTRANCE FOR ASSEMBLY AREA TOTAL

TS TACTILE ADA SIGNAGE. REFER TO DETAIL AND ACCESSIBILITY GUIDELINES

AS ACCESSIBILITY SIGNAGE

WALL RATINGS LEGEND

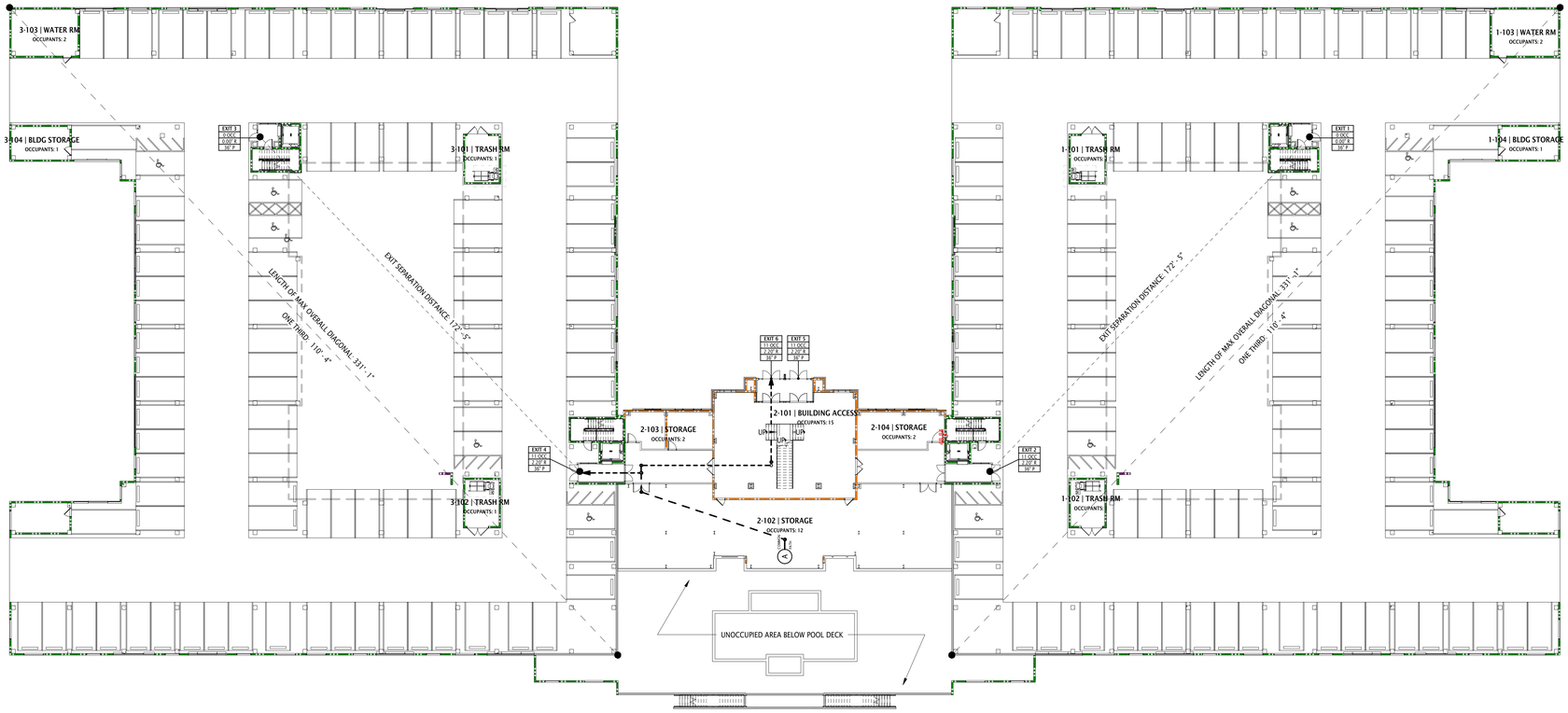
NUMERIC CHARACTER	RATING	HEIGHT	GRAPHIC
4	4-HOUR	TO UNDERSIDE OF STRUCTURE	
3	3-HOUR	TO UNDERSIDE OF STRUCTURE	
2	2-HOUR	TO UNDERSIDE OF STRUCTURE	
1	1-HOUR	TO UNDERSIDE OF STRUCTURE	
-	SMOKE RATED	TO UNDERSIDE OF STRUCTURE	
0	NOT RATED	TO UNDERSIDE OF STRUCTURE	

JKRP ARCHITECTS
100 EAST PENN SQUARE
SUITE 1080
PHILADELPHIA, PA 19107
215 . 928 . 9331
JKRPARCHITECTS.COM

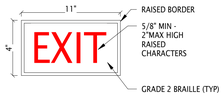
NOT FOR CONSTRUCTION

OWNER/CLIENT

MLP VENTURES, LLC
201 KING OF PRUSSIA ROAD, #501
RADNOR, PA 19087
215.972.1550



1 / G1.00 LIFE SAFETY PLAN - GROUND FLOOR
3/64" = 1'-0"



NOTE:
1. ALL COPY AND GRAPHICS SHALL BE RAISED 1/32"
2. LETTERFORM SHALL BE SANS SERIF

EXIT DOOR IDENTIFICATION DETAILS
N.T.S.

601 WASHINGTON

MULTIFAMILY RESIDENTIAL

601 WASHINGTON STREET
WHITEMARSH TOWNSHIP, PA 19428

PROJECT NORTH

LIFE SAFETY PLANS

DATE: 2022.06.03
DRAWN BY: Author
REVISIONS:

AS INDICATED

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G1.00

50% CONSTRUCTION DOCUMENTS

6/17/2022 12:33:36 PM C:\Users\mbl\Desktop\Revit Local Files\Revit 2020 Local\20-22-001_601 Washington_Site_2020_mblevkvrhkAZ.rvt

ORIGINAL SHEET SIZE: 30" X 42" ARCH E1

LIFE SAFETY - EGRESS TRAVEL DISTANCE

PATH NAME	EXIT	LENGTH	COMMENTS
A		72' - 5"	COMMON PATH
A1	6	83' - 9"	
A2		22' - 11"	
B	1	61' - 2"	COMMON PATH
B1	1	184' - 10"	TOTAL TRAVEL DISTANCE: 246'-0" (61'-2" COMMON PATH +184'-10")
B2	2	217' - 11"	TOTAL TRAVEL DISTANCE: 279'-1" (61'-2" COMMON PATH+217'-11")
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I1	3	185' - 7"	TOTAL TRAVEL DISTANCE: 245'-1" (59'-6" COMMON PATH +185'-7")
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K1	1	159' - 11"	TOTAL TRAVEL DISTANCE: 202'-0" (42'-1" COMMON PATH +159'-11")
K2	2	151' - 10"	TOTAL TRAVEL DISTANCE: 198'-1" (42'-1" COMMON PATH +156'-0")
L		47' - 8"	COMMON PATH
L1	3	155' - 3"	TOTAL TRAVEL DISTANCE: 202'-11" (47'-8" COMMON PATH +155'-3")
L2	4	154' - 0"	TOTAL TRAVEL DISTANCE: 203'-8" (47'-8" COMMON PATH +165'-0")
M		59' - 10"	COMMON PATH
M1	3	185' - 9"	TOTAL TRAVEL DISTANCE: 245'-7" (59'-10" COMMON PATH +185'-9")
M2	4	218' - 0"	TOTAL TRAVEL DISTANCE: 277'-10" (59'-10" COMMON PATH +218'-0")
N		40' - 6"	COMMON PATH
N1	2	115' - 1"	TOTAL TRAVEL DISTANCE: 155-4" (40'-6" COMMON PATH +114'-10")
N2	4	115' - 3"	TOTAL TRAVEL DISTANCE: 155-4" (40'-6" COMMON PATH +114'-10")
O		68' - 11"	COMMON PATH
O1	1	176' - 0"	TOTAL TRAVEL DISTANCE: 244'-11" (68'-11" COMMON PATH +176'-0")
O2	2	206' - 9"	TOTAL TRAVEL DISTANCE: 275'-2" (68'-11" COMMON PATH +206'-3")
P		49' - 3"	COMMON PATH
P1	1	105' - 2"	TOTAL TRAVEL DISTANCE: 154'-5" (49'-3" COMMON PATH +105'-2")
P2	2	236' - 10"	TOTAL TRAVEL DISTANCE: 286'-1" (49'-3" COMMON PATH +236'-10")
Q		68' - 11"	COMMON PATH
Q1	3	176' - 0"	TOTAL TRAVEL DISTANCE: 244'-11" (68'-11" COMMON PATH +176'-0")
Q2	4	206' - 9"	TOTAL TRAVEL DISTANCE: 275'-2" (68'-11" COMMON PATH +206'-3")
R		38' - 3"	COMMON PATH
R1	3	105' - 2"	TOTAL TRAVEL DISTANCE: 143'-5" (38'-3" COMMON PATH +105'-2")
R2	4	222' - 0"	TOTAL TRAVEL DISTANCE: 260'-3" (38'-3" COMMON PATH +222'-0")
S		31' - 6"	COMMON PATH
S1	2	111' - 6"	
S2	4	110' - 9"	
T1	2	81' - 11"	
T2	4	306' - 5"	
T3	4	8' - 9"	COMMON PATH

IBC 2018 OCCUPANCY SCHEDULE - BLDG 1_Level-2

NAME	NUMBER	FUNCTION	LOAD FACTOR	TYPE	AREA	OCCUPANTS	FIXED SEATS	OCCUPANT LOAD
LEVEL 02								
ELECTRICAL	1-203	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	181 SF	1		1
TRASH ROOM	1-210	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	82 SF	1		1
STORAGE	1-212	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	395 SF	2		2
CONF.	1-213	BUSINESS AREAS	150	Gross	395 SF	3		3
MAILROOM	1-214	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	355 SF	2		2
THEATER	1-215	ASSEMBLY - FIXED SEATS			796 SF		24	24
LOUNGE	1-218	BUSINESS AREAS	150	Gross				8
UTILITY	1-221	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	97 SF	1		1
UTILITY	1-223	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	26 SF	1		1
ELECTRICAL	1-224	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	559 SF	2		2
CO-WORKING SPACE	1-240	BUSINESS AREAS	150	Gross	330 SF	3		3
STORAGE	1-242	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	432 SF	2		2
UTILITY	1-245	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	26 SF	1		1
UTILITY	1-247	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	97 SF	1		1
STORAGE	1-250	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	369 SF	2		2
TRASH ROOM	1-251	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	82 SF	1		1
RESIDENTIAL	1-LEVEL 2	RESIDENTIAL	200	Gross				150
TOTAL								205

IBC 2018 OCCUPANCY SCHEDULE - BLDG 2_Level-2

NAME	NUMBER	FUNCTION	LOAD FACTOR	TYPE	AREA	OCCUPANTS	FIXED SEATS	OCCUPANT LOAD
LEVEL 02								
CLUB ROOM	2-201	BUSINESS AREAS	150	Gross	1,489 SF	10		10
POOL DECK	2-202	SKATING RINKS AND SWIMMING POOLS - DECKS	15	Gross	4,279 SF	286		286
POOL	2-203	SKATING RINKS AND SWIMMING POOLS - RINK AND POOL	50	Gross	1,288 SF	26		26
TOTAL								322

IBC 2018 OCCUPANCY SCHEDULE - BLDG 3_Level-2

NAME	NUMBER	FUNCTION	LOAD FACTOR	TYPE	AREA	OCCUPANTS	FIXED SEATS	OCCUPANT LOAD
LEVEL 02								
FITNESS ROOM	3-201	EXERCISE ROOMS	50	Gross	1,297 SF	26		26
MECH.	3-202	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	141 SF	1		1
ELECTRICAL	3-203	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	181 SF	1		1
TRASH ROOM	3-210	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	82 SF	1		1
OFFICE	3-211	BUSINESS AREAS	150	Gross	623 SF	5		5
STORAGE	3-212	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	395 SF	2		2
STORAGE	3-218	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	315 SF	2		2
UTILITY	3-221	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	97 SF	1		1
STORAGE	3-222	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	559 SF	2		2
UTILITY	3-223	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	26 SF	1		1
CO-WORKING SPACE	3-240	BUSINESS AREAS	150	Gross	321 SF	3		3
STORAGE	3-242	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	432 SF	2		2
UTILITY	3-245	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	26 SF	1		1
UTILITY	3-247	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	97 SF	1		1
STORAGE	3-250	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	369 SF	2		2
TRASH ROOM	3-251	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	82 SF	1		1
RESIDENTIAL	3-LEVEL 2	RESIDENTIAL	200	Gross				150
TOTAL								202

LIFE SAFETY

FIRE-RATED WALL, SEE TABLE BELOW

START / FINISH — EGRESS TRAVEL DISTANCE, SEE TABLE

W: WIDTH — ACCESSIBLE ROUTE

LENGTH OF MAX OVERALL DIAGONAL: 0' - 0"
SEPARATION REQUIREMENT: 0' - 0" — MAXIMUM OVERALL BUILDING DIAGONAL

EXIT SEPARATION DISTANCE: 0' - 0" — EXIT SEPARATION

EXIT SIGNS (SEE RCPS - A2.XX SERIES)

NOTE: REFERENCE ELECTRICAL DRAWINGS FOR EMERGENCY LIGHTING INFORMATION

EXIT # — EXIT X
OCCUPANTS — XX OCC
REQUIRED WIDTH — XX" R
PROVIDED WIDTH — XX" P

SEE EXIT REQUIREMENTS TABLE FOR MORE INFORMATION

NOTE: FIRE EXTINGUISHER CABINET LOCATIONS CAN BE FOUND ON A1.XX SHEETS - FLOOR PLANS

FEC FIRE EXTINGUISHER CABINET LOCATION

FE FIRE EXTINGUISHER LOCATION

OL OCCUPANT LOAD SIGN. ONCE FOR EACH ROOM AND ONE POSTED AT MAIN ENTRANCE FOR ASSEMBLY AREA TOTAL

TS TACTILE ADA SIGNAGE. REFER TO DETAIL AND ACCESSIBILITY GUIDELINES

AS ACCESSIBILITY SIGNAGE

WALL RATINGS LEGEND

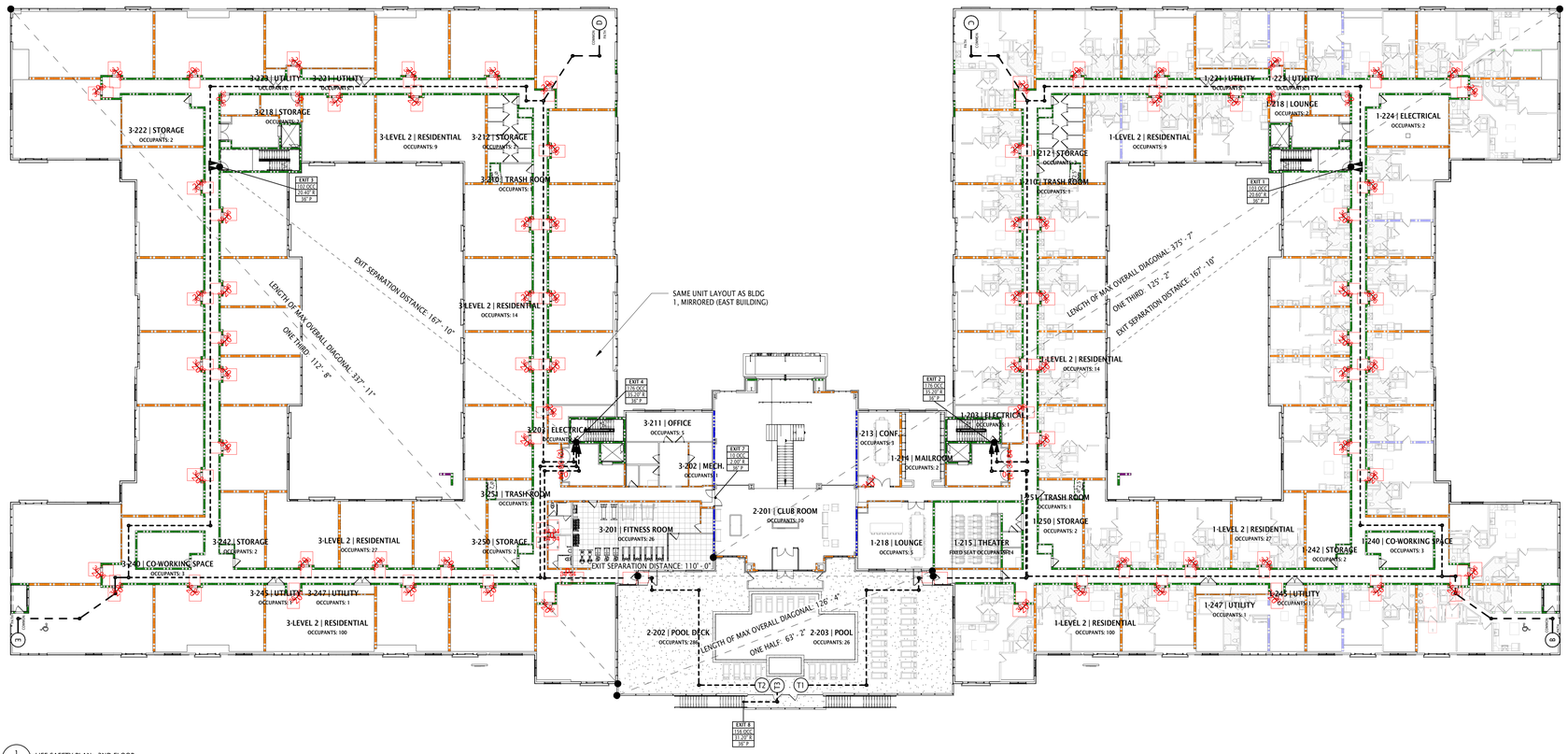
NUMERIC CHARACTER	RATING	HEIGHT	GRAPHIC
4	4-HOUR	TO UNDERSIDE OF STRUCTURE	
3	3-HOUR	TO UNDERSIDE OF STRUCTURE	
2	2-HOUR	TO UNDERSIDE OF STRUCTURE	
1	1-HOUR	TO UNDERSIDE OF STRUCTURE	
-	SMOKE RATED	TO UNDERSIDE OF STRUCTURE	
0	NOT RATED	TO UNDERSIDE OF STRUCTURE	

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100 EAST PENN SQUARE
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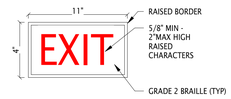
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OWNER/CLIENT

MLP VENTURES, LLC
201 KING OF PRUSSIA ROAD, #501
RADNOR, PA 19087
215.972.1550



1 / G1.01 LIFE SAFETY PLAN - 2ND FLOOR
5/64" = 1'-0"



NOTE:
1. ALL COPY AND GRAPHICS SHALL BE RAISED 1/32"
2. LETTERFORM SHALL BE SANS SERIF

EXIT DOOR IDENTIFICATION DETAILS
N.T.S.

601 WASHINGTON

MULTIFAMILY RESIDENTIAL

601 WASHINGTON STREET
WHITEMARSH TOWNSHIP, PA 19428

PROJECT NORTH

LIFE SAFETY PLANS

DATE: 2022.06.03
DRAWN BY: Author |
REVISIONS:
1 YYYY.MM.DD Revision 1

AS INDICATED

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G1.01

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ORIGINAL SHEET SIZE: 30" X 42" ARCH E1

LIFE SAFETY - EGRESS TRAVEL DISTANCE

PATH NAME	EXIT	LENGTH	COMMENTS
A		72' - 5"	COMMON PATH
A1	6	83' - 9"	
A2		22' - 11"	
B	1	61' - 2"	COMMON PATH
B1	1	184' - 10"	TOTAL TRAVEL DISTANCE: 246'-0" (61'-2" COMMON PATH +184'-10")
B2	2	217' - 11"	TOTAL TRAVEL DISTANCE: 279'-1" (61'-2" COMMON PATH+217'-11")
C		44' - 10"	COMMON PATH
C1	1	161' - 6"	TOTAL TRAVEL DISTANCE: 205'-7" (44'-1" COMMON PATH +161'-6")
C2	2	153' - 3"	TOTAL TRAVEL DISTANCE: 197'-4" (44'-1" COMMON PATH +153'-3")
D		44' - 10"	COMMON PATH
D1	3	161' - 4"	TOTAL TRAVEL DISTANCE: 206'-2" (44'-10" COMMON PATH +161'-4")
D2	4	153' - 3"	TOTAL TRAVEL DISTANCE: 198'-1" (44'-10" COMMON PATH +153'-3")
E		60' - 8"	COMMON PATH
E1	3	186' - 1"	TOTAL TRAVEL DISTANCE: 246'-9" (60'-8" COMMON PATH +186'-1")
E2	4	217' - 5"	TOTAL TRAVEL DISTANCE: 279'-1" (60'-8" COMMON PATH +218'-5")
F		59' - 7"	COMMON PATH
F1	1	185' - 1"	TOTAL TRAVEL DISTANCE: 244'-8" (59'-7" COMMON PATH +185'-1")
F2	2	218' - 3"	TOTAL TRAVEL DISTANCE: 277'-10" (59'-7" COMMON PATH +218'-3")
G		42' - 1"	COMMON PATH
G1	1	160' - 2"	TOTAL TRAVEL DISTANCE: 202'-3" (42'-1" COMMON PATH +160'-2")
G2	2	156' - 0"	TOTAL TRAVEL DISTANCE: 198'-1" (42'-1" COMMON PATH +156'-0")
H		42' - 1"	COMMON PATH
H1	3	160' - 2"	TOTAL TRAVEL DISTANCE: 202'-3" (42'-1" COMMON PATH +160'-2")
H2	4	156' - 0"	TOTAL TRAVEL DISTANCE: 198'-1" (42'-1" COMMON PATH +156'-0")
I		59' - 6"	COMMON PATH
I1	3	185' - 7"	TOTAL TRAVEL DISTANCE: 245'-1" (59'-6" COMMON PATH +185'-7")
I2	4	218' - 6"	TOTAL TRAVEL DISTANCE: 278'-0" (59'-6" COMMON PATH 218'-6")
J		59' - 7"	COMMON PATH
J1	1	185' - 0"	TOTAL TRAVEL DISTANCE: 244'-7" (59'-7" COMMON PATH +185'-0")
J2	2	217' - 2"	TOTAL TRAVEL DISTANCE: 278'-0" (59'-7" COMMON PATH +185'-0")
K		42' - 1"	COMMON PATH
K1	1	159' - 11"	TOTAL TRAVEL DISTANCE: 202'-0" (42'-1" COMMON PATH +159'-11")
K2	2	151' - 10"	TOTAL TRAVEL DISTANCE: 198'-1" (42'-1" COMMON PATH +156'-0")
L		47' - 8"	COMMON PATH
L1	3	155' - 3"	TOTAL TRAVEL DISTANCE: 202'-11" (47'-8" COMMON PATH +155'-3")
L2	4	154' - 0"	TOTAL TRAVEL DISTANCE: 203'-8" (47'-8" COMMON PATH +165'-0")
M		59' - 10"	COMMON PATH
M1	3	185' - 9"	TOTAL TRAVEL DISTANCE: 245'-7" (59'-10" COMMON PATH +185'-9")
M2	4	218' - 0"	TOTAL TRAVEL DISTANCE: 277'-10" (59'-10" COMMON PATH +218'-0")
N		40' - 6"	COMMON PATH
N1	2	115' - 1"	TOTAL TRAVEL DISTANCE: 155-4" (40'-6" COMMON PATH +114'-10")
N2	4	115' - 3"	TOTAL TRAVEL DISTANCE: 155-4" (40'-6" COMMON PATH +114'-10")
O		68' - 11"	COMMON PATH
O1	1	176' - 0"	TOTAL TRAVEL DISTANCE: 244'-11" (68'-11" COMMON PATH +176'-0")
O2	2	206' - 9"	TOTAL TRAVEL DISTANCE: 275'-2" (68'-11" COMMON PATH +206'-3")
P		49' - 3"	COMMON PATH
P1	1	105' - 2"	TOTAL TRAVEL DISTANCE: 154'-5" (49'-3" COMMON PATH +105'-2")
P2	2	236' - 10"	TOTAL TRAVEL DISTANCE: 286'-1" (49'-3" COMMON PATH +236'-10")
Q		68' - 11"	COMMON PATH
Q1	3	176' - 0"	TOTAL TRAVEL DISTANCE: 244'-11" (68'-11" COMMON PATH +176'-0")
Q2	4	206' - 9"	TOTAL TRAVEL DISTANCE: 275'-2" (68'-11" COMMON PATH +206'-3")
R		38' - 3"	COMMON PATH
R1	3	105' - 2"	TOTAL TRAVEL DISTANCE: 143'-5" (38'-3" COMMON PATH +105'-2")
R2	4	222' - 0"	TOTAL TRAVEL DISTANCE: 260'-3" (38'-3" COMMON PATH +222'-0")
S		31' - 6"	COMMON PATH
S1	2	111' - 6"	
S2	4	110' - 9"	
T1	2	81' - 11"	
T2	4	306' - 5"	
T3	4	8' - 9"	COMMON PATH

IBC 2018 OCCUPANCY SCHEDULE - BLDG 1_Level-3

NAME	NUMBER	FUNCTION	LOAD FACTOR	TYPE	AREA	OCCUPANTS	FIXED SEATS	OCCUPANT LOAD
LEVEL 03								
ELECTRICAL	1-303	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	181 SF	1		1
TRASH ROOM	1-310	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	84 SF	1		1
STORAGE	1-312	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	374 SF	2		2
STORAGE	1-318	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	224 SF	1		1
UTILITY	1-321	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	97 SF	1		1
UTILITY	1-323	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	26 SF	1		1
CO-WORKING SPACE	1-326	BUSINESS AREAS	150	Gross	559 SF	4		4
CO-WORKING SPACE	1-340	BUSINESS AREAS	150	Gross	321 SF	3		3
STORAGE	1-342	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	406 SF	2		2
UTILITY	1-343	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	26 SF	1		1
UTILITY	1-345	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	104 SF	1		1
CO-WORKING SPACE	1-350	BUSINESS AREAS	150	Gross	368 SF	3		3
TRASH ROOM	1-352	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	82 SF	1		1
LOUNGE	1-353	BUSINESS AREAS	150	Gross	564 SF	4		4
RESIDENTIAL	1-LEVEL 3	RESIDENTIAL	200	Gross				160
TOTAL								186

IBC 2018 OCCUPANCY SCHEDULE - BLDG 3_Level-3

NAME	NUMBER	FUNCTION	LOAD FACTOR	TYPE	AREA	OCCUPANTS	FIXED SEATS	OCCUPANT LOAD
LEVEL 03								
ELECTRICAL	3-303	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	181 SF	1		1
TRASH ROOM	3-310	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	84 SF	1		1
STORAGE	3-312	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	374 SF	2		2
STORAGE	3-318	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	224 SF	1		1
UTILITY	3-321	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	97 SF	1		1
UTILITY	3-323	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	26 SF	1		1
CO-WORKING SPACE	3-326	BUSINESS AREAS	150	Gross	559 SF	4		4
CO-WORKING SPACE	3-340	BUSINESS AREAS	150	Gross	320 SF	3		3
UTILITY	3-341	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	26 SF	1		1
STORAGE	3-342	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	406 SF	2		2
UTILITY	3-343	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	97 SF	1		1
RESIDENTIAL	3-345	RESIDENTIAL	200	Gross	853 SF	5		5
CO-WORKING SPACE	3-350	BUSINESS AREAS	150	Gross	368 SF	3		3
TRASH ROOM	3-352	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	82 SF	1		1
LOUNGE	3-353	BUSINESS AREAS	150	Gross	564 SF	4		4
RESIDENTIAL	3-LEVEL 3	RESIDENTIAL	200	Gross				155
TOTAL								186

LIFE SAFETY

FIRE-RATED WALL, SEE TABLE BELOW

START — FINISH — EGRESS TRAVEL DISTANCE, SEE TABLE

W. WIDTH — ACCESSIBLE ROUTE

LENGTH OF MAX OVERALL DIAGONAL: 0' - 0"
SEPARATION REQUIREMENT: 0' - 0" — MAXIMUM OVERALL BUILDING DIAGONAL

EXIT SEPARATION DISTANCE: 0' - 0" — EXIT SEPARATION

EXIT SIGNS (SEE RCPS - A2.XX SERIES)

NOTE: REFERENCE ELECTRICAL DRAWINGS FOR EMERGENCY LIGHTING INFORMATION

EXIT # — EXIT X
OCCUPANTS — XX OCC
REQUIRED WIDTH — XX" R
PROVIDED WIDTH — XX" P

SEE EXIT REQUIREMENTS TABLE FOR MORE INFORMATION

NOTE: FIRE EXTINGUISHER CABINET LOCATIONS CAN BE FOUND ON A1.XX SHEETS - FLOOR PLANS

FEC FIRE EXTINGUISHER CABINET LOCATION

FE FIRE EXTINGUISHER LOCATION

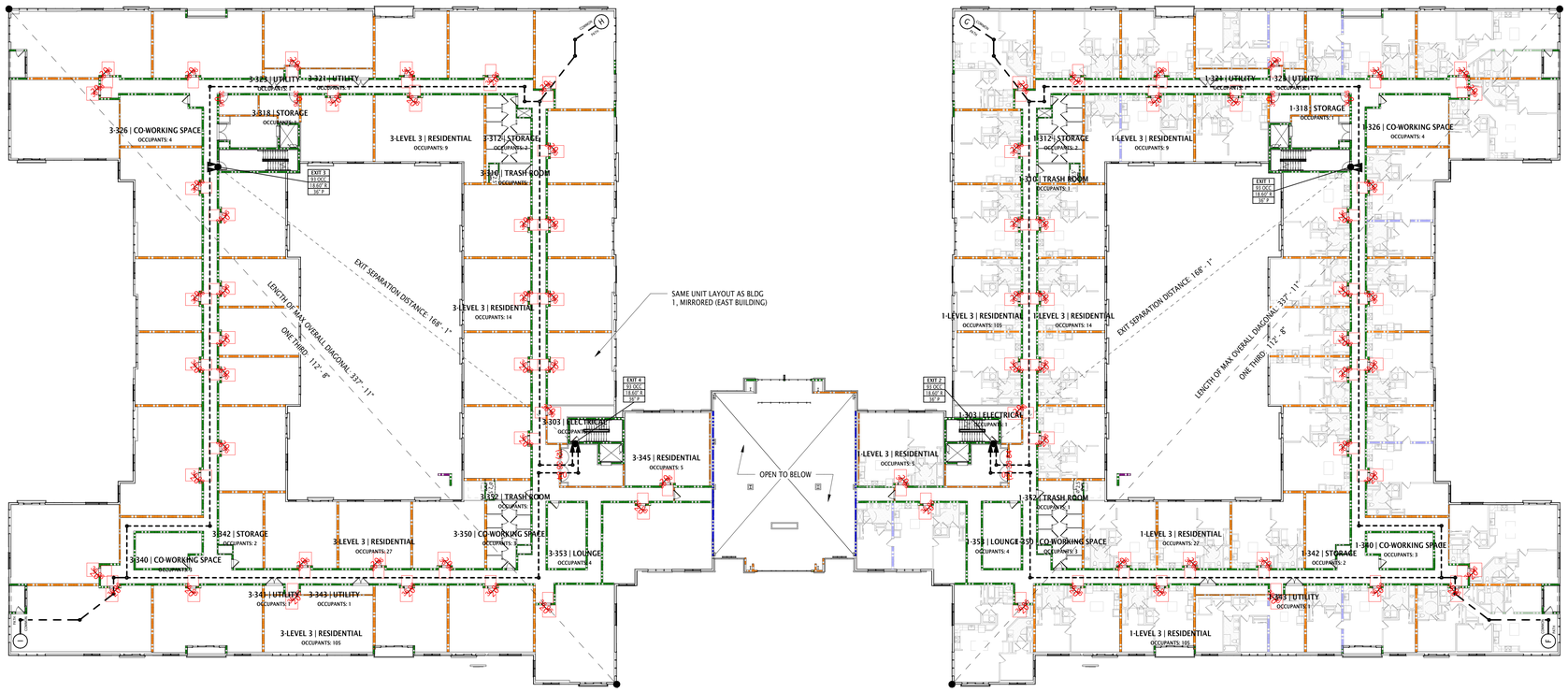
OL OCCUPANT LOAD SIGN. ONCE FOR EACH ROOM AND ONE POSTED AT MAIN ENTRANCE FOR ASSEMBLY AREA TOTAL

TS TACTILE ADA SIGNAGE. REFER TO DETAIL AND ACCESSIBILITY GUIDELINES

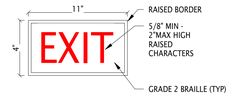
AS ACCESSIBILITY SIGNAGE

WALL RATINGS LEGEND

NUMERIC CHARACTER	RATING	HEIGHT	GRAPHIC
4	4-HOUR	TO UNDERSIDE OF STRUCTURE	
3	3-HOUR	TO UNDERSIDE OF STRUCTURE	
2	2-HOUR	TO UNDERSIDE OF STRUCTURE	
1	1-HOUR	TO UNDERSIDE OF STRUCTURE	
-	SMOKE RATED	TO UNDERSIDE OF STRUCTURE	
0	NOT RATED	TO UNDERSIDE OF STRUCTURE	



1 / G1.02 — LIFE SAFETY PLAN - 3RD FLOOR
3/64" = 1'-0"



NOTE:
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2. LETTERFORM SHALL BE SANS SERIF

EXIT DOOR IDENTIFICATION DETAILS
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100 EAST PENN SQUARE
SUITE 1080
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RADNOR, PA 19087
215.972.1550

601 WASHINGTON

MULTIFAMILY RESIDENTIAL

601 WASHINGTON STREET
WHITEMARSH TOWNSHIP, PA 19428

PROJECT NORTH

LIFE SAFETY PLANS

DATE: 2022.06.03
DRAWN BY: Author
REVISIONS:

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G1.02

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ORIGINAL SHEET SIZE: 30" X 42" ARCH E1

LIFE SAFETY - EGRESS TRAVEL DISTANCE

PATH NAME	EXIT	LENGTH	COMMENTS
A		72' - 5"	COMMON PATH
A1	6	83' - 9"	
A2		22' - 11"	
B	1	61' - 2"	COMMON PATH
B1	1	184' - 10"	TOTAL TRAVEL DISTANCE: 246'-0" (61'-2" COMMON PATH +184'-10")
B2	2	217' - 11"	TOTAL TRAVEL DISTANCE: 279'-1" (61'-2" COMMON PATH+217'-11")
C		44' - 10"	COMMON PATH
C1	1	161' - 6"	TOTAL TRAVEL DISTANCE: 205'-7" (44'-1" COMMON PATH +161'-6")
C2	2	153' - 3"	TOTAL TRAVEL DISTANCE: 197'-4" (44'-1" COMMON PATH +153'-3")
D		44' - 10"	COMMON PATH
D1	3	161' - 4"	TOTAL TRAVEL DISTANCE: 206'-2" (44'-10" COMMON PATH +161'-4")
D2	4	153' - 3"	TOTAL TRAVEL DISTANCE: 198'-1" (44'-10" COMMON PATH +153'-3")
E		60' - 8"	COMMON PATH
E1	3	186' - 1"	TOTAL TRAVEL DISTANCE: 246'-9" (60'-8" COMMON PATH +186'-1")
E2	4	217' - 5"	TOTAL TRAVEL DISTANCE: 279'-1" (60'-8" COMMON PATH +218'-5")
F		59' - 7"	COMMON PATH
F1	1	185' - 1"	TOTAL TRAVEL DISTANCE: 244'-8" (59'-7" COMMON PATH +185'-1")
F2	2	218' - 3"	TOTAL TRAVEL DISTANCE: 277'-10" (59'-7" COMMON PATH +218'-3")
G		42' - 1"	COMMON PATH
G1	1	160' - 2"	TOTAL TRAVEL DISTANCE: 202'-3" (42'-1" COMMON PATH +160'-2")
G2	2	156' - 0"	TOTAL TRAVEL DISTANCE: 198'-1" (42'-1" COMMON PATH +156'-0")
H		42' - 1"	COMMON PATH
H1	3	160' - 2"	TOTAL TRAVEL DISTANCE: 202'-3" (42'-1" COMMON PATH +160'-2")
H2	4	156' - 0"	TOTAL TRAVEL DISTANCE: 198'-1" (42'-1" COMMON PATH +156'-0")
I		59' - 6"	COMMON PATH
I1	3	185' - 7"	TOTAL TRAVEL DISTANCE: 245'-1" (59'-6" COMMON PATH +185'-7")
I2	4	218' - 6"	TOTAL TRAVEL DISTANCE: 278'-0" (59'-6" COMMON PATH 218'-6")
J		59' - 7"	COMMON PATH
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J2	2	217' - 2"	TOTAL TRAVEL DISTANCE: 278'-0" (59'-7" COMMON PATH +185'-0")
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K1	1	159' - 11"	TOTAL TRAVEL DISTANCE: 202'-0" (42'-1" COMMON PATH +159'-11")
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L1	3	155' - 3"	TOTAL TRAVEL DISTANCE: 202'-11" (47'-8" COMMON PATH +155'-3")
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M		59' - 10"	COMMON PATH
M1	3	185' - 9"	TOTAL TRAVEL DISTANCE: 245'-7" (59'-10" COMMON PATH +185'-9")
M2	4	218' - 0"	TOTAL TRAVEL DISTANCE: 277'-10" (59'-10" COMMON PATH +218'-0")
N		40' - 6"	COMMON PATH
N1	2	115' - 1"	TOTAL TRAVEL DISTANCE: 155-4" (40'-6" COMMON PATH +114'-10")
N2	4	115' - 3"	TOTAL TRAVEL DISTANCE: 155-4" (40'-6" COMMON PATH +114'-10")
O		68' - 11"	COMMON PATH
O1	1	176' - 0"	TOTAL TRAVEL DISTANCE: 244'-11" (68'-11" COMMON PATH +176'-0")
O2	2	206' - 9"	TOTAL TRAVEL DISTANCE: 275'-2" (68'-11" COMMON PATH +206'-3")
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Q		68' - 11"	COMMON PATH
Q1	3	176' - 0"	TOTAL TRAVEL DISTANCE: 244'-11" (68'-11" COMMON PATH +176'-0")
Q2	4	206' - 9"	TOTAL TRAVEL DISTANCE: 275'-2" (68'-11" COMMON PATH +206'-3")
R		38' - 3"	COMMON PATH
R1	3	105' - 2"	TOTAL TRAVEL DISTANCE: 143'-5" (38'-3" COMMON PATH +105'-2")
R2	4	222' - 0"	TOTAL TRAVEL DISTANCE: 260'-3" (38'-3" COMMON PATH +222'-0")
S		31' - 6"	COMMON PATH
S1	2	111' - 6"	
S2	4	110' - 9"	
T1	2	81' - 11"	
T2	4	306' - 5"	
T3	4	8' - 9"	COMMON PATH

IBC 2018 OCCUPANCY SCHEDULE - BLDG 1_Level-4

NAME	NUMBER	FUNCTION	LOAD FACTOR	TYPE	AREA	OCCUPANTS	FIXED SEATS	OCCUPANT LOAD
LEVEL 04								
ELECTRICAL	1-403	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	181 SF	1		1
TRASH ROOM	1-410	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	82 SF	1		1
STORAGE	1-412	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	374 SF	2		2
STORAGE	1-418	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	224 SF	1		1
UTILITY	1-421	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	97 SF	1		1
UTILITY	1-423	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	26 SF	1		1
CO-WORKING SPACE	1-426	BUSINESS AREAS	150	Gross	559 SF	4		4
CO-WORKING SPACE	1-440	BUSINESS AREAS	150	Gross	558 SF	4		4
STORAGE	1-442	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	406 SF	2		2
UTILITY	1-443	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	26 SF	1		1
UTILITY	1-445	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	97 SF	1		1
CO-WORKING SPACE	1-450	BUSINESS AREAS	150	Gross	368 SF	3		3
TRASH ROOM	1-452	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	82 SF	1		1
LOUNGE	1-453	BUSINESS AREAS	150	Gross	564 SF	4		4
RESIDENTIAL	1-LEVEL 4	RESIDENTIAL	200	Gross				161
TOTAL								188

IBC 2018 OCCUPANCY SCHEDULE - BLDG 2_Level-4

NAME	NUMBER	FUNCTION	LOAD FACTOR	TYPE	AREA	OCCUPANTS	FIXED SEATS	OCCUPANT LOAD
LEVEL 04								
ROOF DECK	2-LEVEL 4	ASSEMBLY - UNCONCENTRATED TABLE AND CHAIRS	15	Net	3,238 SF	216		216
TOTAL								216

IBC 2018 OCCUPANCY SCHEDULE - BLDG 3_Level-4

NAME	NUMBER	FUNCTION	LOAD FACTOR	TYPE	AREA	OCCUPANTS	FIXED SEATS	OCCUPANT LOAD
LEVEL 04								
ELECTRICAL	3-403	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	181 SF	1		1
TRASH ROOM	3-410	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	82 SF	1		1
STORAGE	3-412	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	374 SF	2		2
STORAGE	3-418	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	222 SF	1		1
UTILITY	3-421	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	97 SF	1		1
UTILITY	3-423	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	26 SF	1		1
CO-WORKING SPACE	3-426	BUSINESS AREAS	150	Gross	559 SF	4		4
CO-WORKING SPACE	3-440	BUSINESS AREAS	150	Gross	558 SF	4		4
STORAGE	3-442	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	406 SF	2		2
UTILITY	3-443	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	26 SF	1		1
UTILITY	3-445	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	97 SF	1		1
CO-WORKING SPACE	3-450	BUSINESS AREAS	150	Gross	368 SF	3		3
TRASH ROOM	3-452	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	82 SF	1		1
LOUNGE	3-453	BUSINESS AREAS	150	Gross	564 SF	4		4
RESIDENTIAL	3-LEVEL 4	RESIDENTIAL	200	Gross				161
TOTAL								188

LIFE SAFETY

FIRE-RATED WALL, SEE TABLE BELOW

START / FINISH — EGRESS TRAVEL DISTANCE, SEE TABLE

W: WIDTH — ACCESSIBLE ROUTE

LENGTH OF MAX OVERALL DIAGONAL: 0' - 0"
SEPARATION REQUIREMENT: 0' - 0" — MAXIMUM OVERALL BUILDING DIAGONAL

EXIT SEPARATION DISTANCE: 0' - 0" — EXIT SEPARATION

EXIT SIGNS (SEE RCPS - A2.XX SERIES)

NOTE: REFERENCE ELECTRICAL DRAWINGS FOR EMERGENCY LIGHTING INFORMATION

EXIT # — EXIT X
OCCUPANTS — XX OCC
REQUIRED WIDTH — XX" R
PROVIDED WIDTH — XX" P

SEE EXIT REQUIREMENTS TABLE FOR MORE INFORMATION

NOTE: FIRE EXTINGUISHER CABINET LOCATIONS CAN BE FOUND ON A1.XX SHEETS - FLOOR PLANS

FEC FIRE EXTINGUISHER CABINET LOCATION

FE FIRE EXTINGUISHER LOCATION

OL OCCUPANT LOAD SIGN. ONCE FOR EACH ROOM AND ONE POSTED AT MAIN ENTRANCE FOR ASSEMBLY AREA TOTAL

TS TACTILE ADA SIGNAGE. REFER TO DETAIL AND ACCESSIBILITY GUIDELINES

AS ACCESSIBILITY SIGNAGE

WALL RATINGS LEGEND

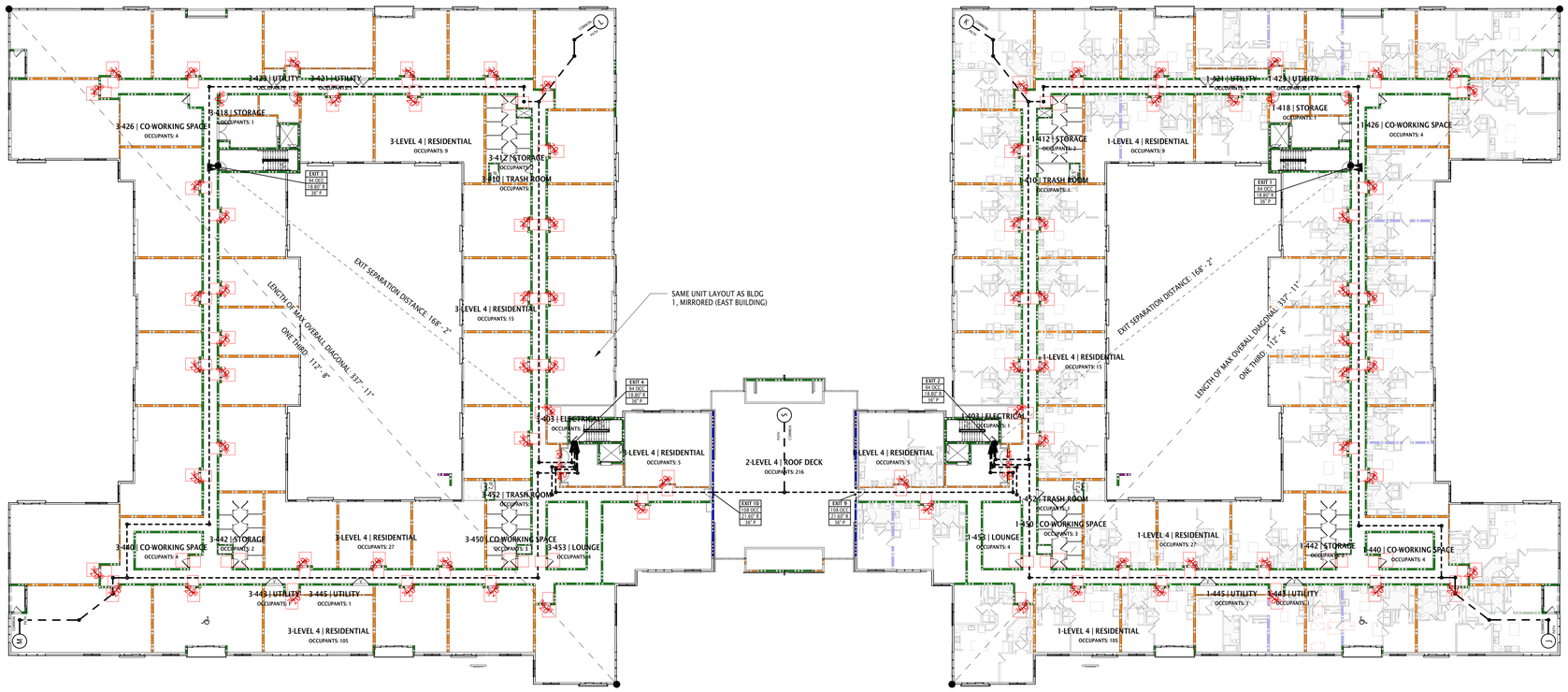
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3	3-HOUR	TO UNDERSIDE OF STRUCTURE	
2	2-HOUR	TO UNDERSIDE OF STRUCTURE	
1	1-HOUR	TO UNDERSIDE OF STRUCTURE	
-	SMOKE RATED	TO UNDERSIDE OF STRUCTURE	
0	NOT RATED	TO UNDERSIDE OF STRUCTURE	

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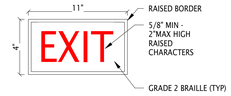
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OWNER/CLIENT

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1 / G1.03 LIFE SAFETY PLAN - 4TH FLOOR
3/64" = 1'-0"



NOTE:
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EXIT DOOR IDENTIFICATION DETAILS
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601 WASHINGTON STREET
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PROJECT NORTH

LIFE SAFETY PLANS

DATE: 2022.06.03
DRAWN BY: Author
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G1.03

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ORIGINAL SHEET SIZE: 30" X 42" ARCH E1

LIFE SAFETY - EGRESS TRAVEL DISTANCE

PATH NAME	EXIT	LENGTH	COMMENTS
A		72' - 5"	COMMON PATH
A1	6	83' - 9"	
A2		22' - 11"	
B	1	61' - 2"	COMMON PATH
B1	1	184' - 10"	TOTAL TRAVEL DISTANCE: 246'-0" (61'-2" COMMON PATH +184'-10")
B2	2	217' - 11"	TOTAL TRAVEL DISTANCE: 279'-1" (61'-2" COMMON PATH+217'-11")
C		44' - 10"	COMMON PATH
C1	1	161' - 6"	TOTAL TRAVEL DISTANCE: 205'-7" (44'-1" COMMON PATH +161'-6")
C2	2	153' - 3"	TOTAL TRAVEL DISTANCE: 197'-4" (44'-1" COMMON PATH +153'-3")
D		44' - 10"	COMMON PATH
D1	3	161' - 4"	TOTAL TRAVEL DISTANCE: 206'-2" (44'-10" COMMON PATH +161'-4")
D2	4	153' - 3"	TOTAL TRAVEL DISTANCE: 198'-1" (44'-10" COMMON PATH +153'-3")
E		60' - 8"	COMMON PATH
E1	3	186' - 1"	TOTAL TRAVEL DISTANCE: 246'-9" (60'-8" COMMON PATH +186'-1")
E2	4	217' - 5"	TOTAL TRAVEL DISTANCE: 279'-1" (60'-8" COMMON PATH +218'-5")
F		59' - 7"	COMMON PATH
F1	1	185' - 1"	TOTAL TRAVEL DISTANCE: 244'-8" (59'-7" COMMON PATH +185'-1")
F2	2	218' - 3"	TOTAL TRAVEL DISTANCE: 277'-10" (59'-7" COMMON PATH +218'-3")
G		42' - 1"	COMMON PATH
G1	1	160' - 2"	TOTAL TRAVEL DISTANCE: 202'-3" (42'-1" COMMON PATH +160'-2")
G2	2	156' - 0"	TOTAL TRAVEL DISTANCE: 198'-1" (42'-1" COMMON PATH +156'-0")
H		42' - 1"	COMMON PATH
H1	3	160' - 2"	TOTAL TRAVEL DISTANCE: 202'-3" (42'-1" COMMON PATH +160'-2")
H2	4	156' - 0"	TOTAL TRAVEL DISTANCE: 198'-1" (42'-1" COMMON PATH +156'-0")
I		59' - 6"	COMMON PATH
I1	3	185' - 7"	TOTAL TRAVEL DISTANCE: 245'-1" (59'-6" COMMON PATH +185'-7")
I2	4	218' - 6"	TOTAL TRAVEL DISTANCE: 278-0" (59'-6" COMMON PATH 218'-6")
J		59' - 7"	COMMON PATH
J1	1	185' - 0"	TOTAL TRAVEL DISTANCE: 244'-7" (59'-7" COMMON PATH +185'-0")
J2	2	217' - 2"	TOTAL TRAVEL DISTANCE: 278'-0" (59'-7" COMMON PATH +185'-0")
K		42' - 1"	COMMON PATH
K1	1	159' - 11"	TOTAL TRAVEL DISTANCE: 202'-0" (42'-1" COMMON PATH +159'-11")
K2	2	151' - 10"	TOTAL TRAVEL DISTANCE: 198'-1" (42'-1" COMMON PATH +156'-0")
L		47' - 8"	COMMON PATH
L1	3	155' - 3"	TOTAL TRAVEL DISTANCE: 202'-11" (47'-8" COMMON PATH +155'-3")
L2	4	154' - 0"	TOTAL TRAVEL DISTANCE: 203'-8" (47'-8" COMMON PATH +165'-0")
M		59' - 10"	COMMON PATH
M1	3	185' - 9"	TOTAL TRAVEL DISTANCE: 245'-7" (59'-10" COMMON PATH +185'-9")
M2	4	218' - 0"	TOTAL TRAVEL DISTANCE: 277'-10" (59'-10" COMMON PATH +218'-0")
N		40' - 6"	COMMON PATH
N1	2	115' - 1"	TOTAL TRAVEL DISTANCE: 155-4" (40'-6" COMMON PATH +114'-10")
N2	4	115' - 3"	TOTAL TRAVEL DISTANCE: 155-4" (40'-6" COMMON PATH +114'-10")
O		68' - 11"	COMMON PATH
O1	1	176' - 0"	TOTAL TRAVEL DISTANCE: 244'-11" (68'-11" COMMON PATH +176'-0")
O2	2	206' - 9"	TOTAL TRAVEL DISTANCE: 275'-2" (68'-11" COMMON PATH +206'-3")
P		49' - 3"	COMMON PATH
P1	1	105' - 2"	TOTAL TRAVEL DISTANCE: 154'-5" (49'-3" COMMON PATH +105'-2")
P2	2	236' - 10"	TOTAL TRAVEL DISTANCE: 286'-1" (49'-3" COMMON PATH +236'-10")
Q		68' - 11"	COMMON PATH
Q1	3	176' - 0"	TOTAL TRAVEL DISTANCE: 244'-11" (68'-11" COMMON PATH +176'-0")
Q2	4	206' - 9"	TOTAL TRAVEL DISTANCE: 275'-2" (68'-11" COMMON PATH +206'-3")
R		38' - 3"	COMMON PATH
R1	3	105' - 2"	TOTAL TRAVEL DISTANCE: 143'-5" (38'-3" COMMON PATH +105'-2")
R2	4	222' - 0"	TOTAL TRAVEL DISTANCE: 260'-3" (38'-3" COMMON PATH +222'-0")
S		31' - 6"	COMMON PATH
S1	2	111' - 6"	
S2	4	110' - 9"	
T1	2	81' - 11"	
T2	4	306' - 5"	
T3	4	8' - 9"	COMMON PATH

IBC 2018 OCCUPANCY SCHEDULE - BLDG 1_Level-5

NAME	NUMBER	FUNCTION	LOAD FACTOR	TYPE	AREA	OCCUPANTS	FIXED SEATS	OCCUPANT LOAD
LEVEL 05								
ELECTRICAL	1-503	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	182 SF	1		1
RESIDENTIAL	1-505	RESIDENTIAL	200	Gross	665 SF	4		4
RESIDENTIAL	1-506	RESIDENTIAL	200	Gross	1,009 SF	6		6
STORAGE	1-507	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	166 SF	1		1
LOUNGE	1-517	BUSINESS AREAS	150	Gross	179 SF	2		2
COWORKING	1-518	BUSINESS AREAS	150	Gross	210 SF	2		2
STORAGE	1-522	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	406 SF	2		2
UTILITY	1-525	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	26 SF	1		1
UTILITY	1-527	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	97 SF	1		1
CO-WORKING SPACE	1-530	BUSINESS AREAS	150	Gross	368 SF	3		3
TRASH ROOM	1-532	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	100 SF	1		1
RESIDENTIAL	1-LEVEL 5	RESIDENTIAL	200	Gross				91
TOTAL								115

IBC 2018 OCCUPANCY SCHEDULE - BLDG 3_Level-5

NAME	NUMBER	FUNCTION	LOAD FACTOR	TYPE	AREA	OCCUPANTS	FIXED SEATS	OCCUPANT LOAD
LEVEL 05								
ELECTRICAL	3-503	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	182 SF	1		1
RESIDENTIAL	3-505	RESIDENTIAL	200	Gross	665 SF	4		4
RESIDENTIAL	3-506	RESIDENTIAL	200	Gross	1,009 SF	6		6
UTILITY	3-507	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	166 SF	1		1
LOUNGE	3-517	BUSINESS AREAS	150	Gross	176 SF	2		2
COWORKING	3-518	BUSINESS AREAS	150	Gross	220 SF	2		2
STORAGE	3-522	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	406 SF	2		2
UTILITY	3-525	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	26 SF	1		1
UTILITY	3-527	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	97 SF	1		1
CO-WORKING SPACE	3-530	BUSINESS AREAS	150	Gross	368 SF	3		3
TRASH ROOM	3-532	ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300	Gross	82 SF	1		1
RESIDENTIAL	3-LEVEL 5	RESIDENTIAL	200	Gross				90
TOTAL								114

LIFE SAFETY

FIRE-RATED WALL, SEE TABLE BELOW

START — FINISH — EGRESS TRAVEL DISTANCE, SEE TABLE

W. WIDTH — ACCESSIBLE ROUTE

LENGTH OF MAX OVERALL DIAGONAL: 0' - 0"
SEPARATION REQUIREMENT: 0' - 0" — MAXIMUM OVERALL BUILDING DIAGONAL

EXIT SEPARATION DISTANCE: 0' - 0" — EXIT SEPARATION

EXIT SIGNS (SEE RCPS - A2.XX SERIES)

NOTE: REFERENCE ELECTRICAL DRAWINGS FOR EMERGENCY LIGHTING INFORMATION

EXIT # — EXIT X
OCCUPANTS — XX OCC
REQUIRED WIDTH — XX" R
PROVIDED WIDTH — XX" P

SEE EXIT REQUIREMENTS TABLE FOR MORE INFORMATION

NOTE: FIRE EXTINGUISHER CABINET LOCATIONS CAN BE FOUND ON A1.XX SHEETS - FLOOR PLANS

FEC FIRE EXTINGUISHER CABINET LOCATION

FE FIRE EXTINGUISHER LOCATION

OL OCCUPANT LOAD SIGN. ONCE FOR EACH ROOM AND ONE POSTED AT MAIN ENTRANCE FOR ASSEMBLY AREA TOTAL

TS TACTILE ADA SIGNAGE. REFER TO DETAIL AND ACCESSIBILITY GUIDELINES

AS ACCESSIBILITY SIGNAGE

WALL RATINGS LEGEND

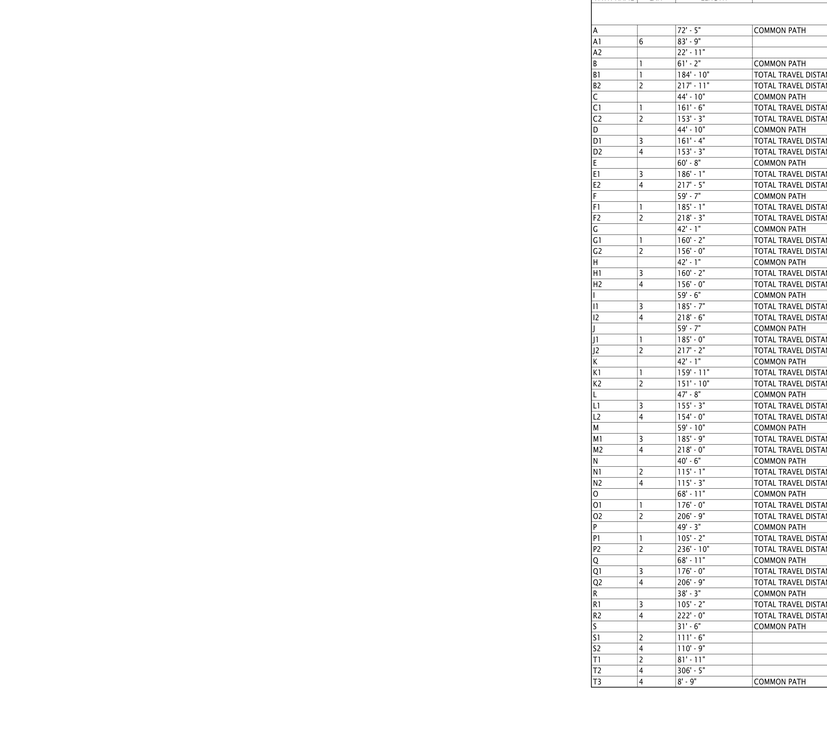
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3	3-HOUR	TO UNDERSIDE OF STRUCTURE	
2	2-HOUR	TO UNDERSIDE OF STRUCTURE	
1	1-HOUR	TO UNDERSIDE OF STRUCTURE	
-	SMOKE RATED	TO UNDERSIDE OF STRUCTURE	
0	NOT RATED	TO UNDERSIDE OF STRUCTURE	

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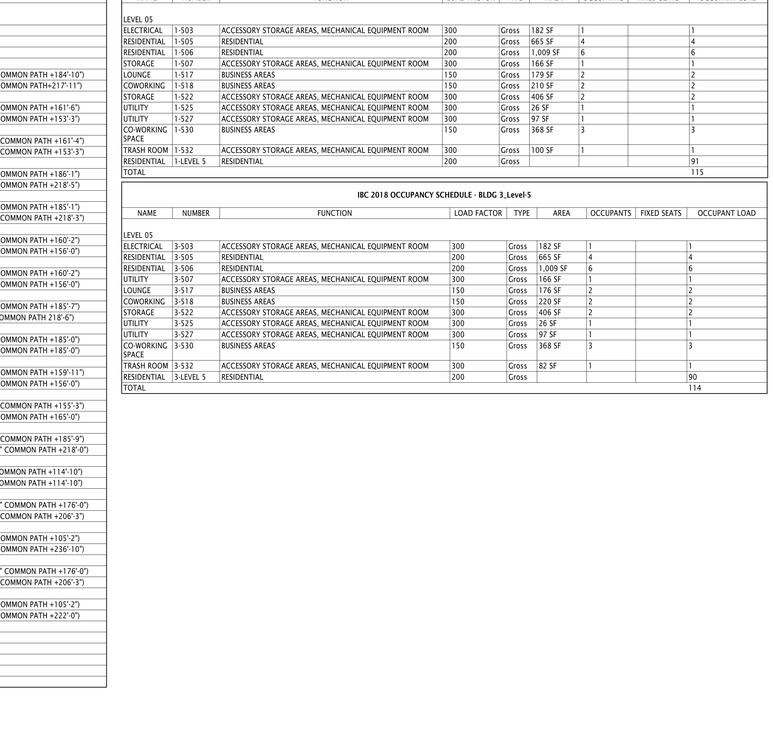
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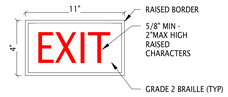
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1 / G1.04 — LIFE SAFETY PLAN - 5TH FLOOR
3/64" = 1'-0"





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PROJECT NORTH

LIFE SAFETY PLANS

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ORIGINAL SHEET SIZE: 30" X 42" ARCH E1

8.1' TAPER TO MATCH EXISTING PAVEMENT

PERMANENT ACCESS EASEMENT

BRICK PAVER WALK (TYP.)

5' BRICK SIDEWALK

TYPE 1A ADA CURB RAMP

TYPE 2 ADA CURB RAMP

FIRE DEPARTMENT CONNECTION

FIRE DEPARTMENT CONNECTION

WATER SERVICE ROOM 3-117

WATER SERVICE ROOM 1-114

BUILDING STORAGE 3-116

ELEV. LOBBY 3-115

STAIR 2 3-57

TRASH ROOM 3-118

TRASH ROOM 3-119

OFF-STREET LOADING AREA

DEPRESSED CURB

NON-RESIDENTIAL USE LOBBY: 1,790 SF

BUILDING STORAGE 2-103

BUILDING ACCESS 2-101

BICYCLE STORAGE 2-104

STAIR 3 3-57

STAIR 1 1-57

ENTRANCE VESTIBULE 2-102

ELEVATOR LOBBY 3-165

ELEVATOR LOBBY 1-101

BUILDING STORAGE 2-106

TRASH ROOM 1-112

ELEV. LOBBY 1-102

STAIR 2 1-57

BUILDING STORAGE 1-115

TRASH ROOM 1-111

GARBAGE COLLECTION AREA FOR TRASH ROOM 3-118 & 3-119

GARBAGE COLLECTION AREA FOR TRASH ROOM 1-111 & 1-112

25' ACCESS EASEMENT

25' ACCESS EASEMENT

CMU RETAINING WALL

7'X7' ELEC EQUIPME CONCRE

6" CONCRETE CURB (TYP.)

TYPE 2 ADA CURB RAMP

TYPE 4 ADA CURB RAMP

WHEEL STOP (TYP.)

PRINCIPAL REAR BUILDING PLANE

PROPOSED DOG PARK 4,790 SF

100' PROPOSED PUBLIC ACCESS AREA

CONCRETE WALK (TYP.)

SITTING AREA

RED SHALE MACADAM (TYP.)

LEVEL 01 REFERENCE PLAN
N.T.S.

ORIGINAL SHEET SIZE: 30" X 42" ARCH E1

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TOWNSHIP NOTES
FLOOD PLAIN
The building is within the floodplain and will comply with National Flood Insurance Program regulations. Ground Floor FFE: 53.00' Base Flood Elevation: 60.50' Design Flood Elevation: 62.00'
NON-RESIDENTIAL AREA
2% MINIMUM OR 2,000 SF
2% OF THE 84,484 SF FOOTPRINT = 1,770 SF
THEREFORE 2,000 SF IS REQUIRED.

LEVEL	ROOM	AREA
GROUND FLOOR	LOBBY	1,790
2ND FLOOR	CLUB ROOM	1,550
TOTAL		3,340

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PROJECT NORTH

FIRST FLOOR REFERENCE PLAN

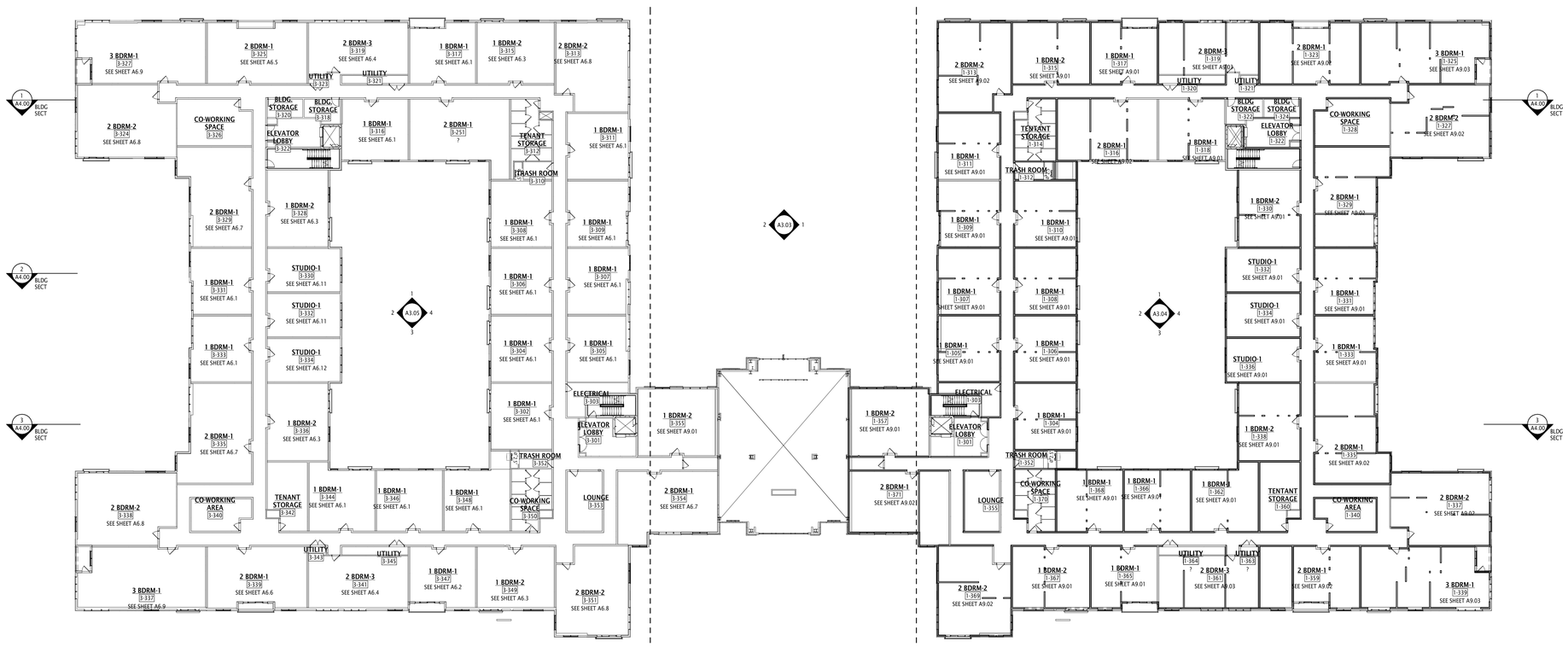
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0 21'-4" 42'-8"

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LEVEL 03 REFERENCE PLAN
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LEVEL 02 REFERENCE PLAN
N.T.S.

TOWNSHIP NOTES
FLOOD PLAIN
The building is within the floodplain and will comply with National Flood Insurance Program regulations.
Ground Floor FFE: 53.00' Base Flood Elevation: 60.50' Design Flood Elevation: 62.00'
NON-RESIDENTIAL AREA
2% MINIMUM OR 2,000 SF
2% OF THE 84,484 SF FOOTPRINT = 1,770 SF
THEREFORE 2,000 SF IS REQUIRED.

LEVEL	ROOM	AREA
GROUND FLOOR	LOBBY	1,790
2ND FLOOR	CLUB ROOM	1,550
TOTAL		**3,340**

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SECOND AND THIRD FLOOR REFERENCE PLAN

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0 21'-4" 42'-8"

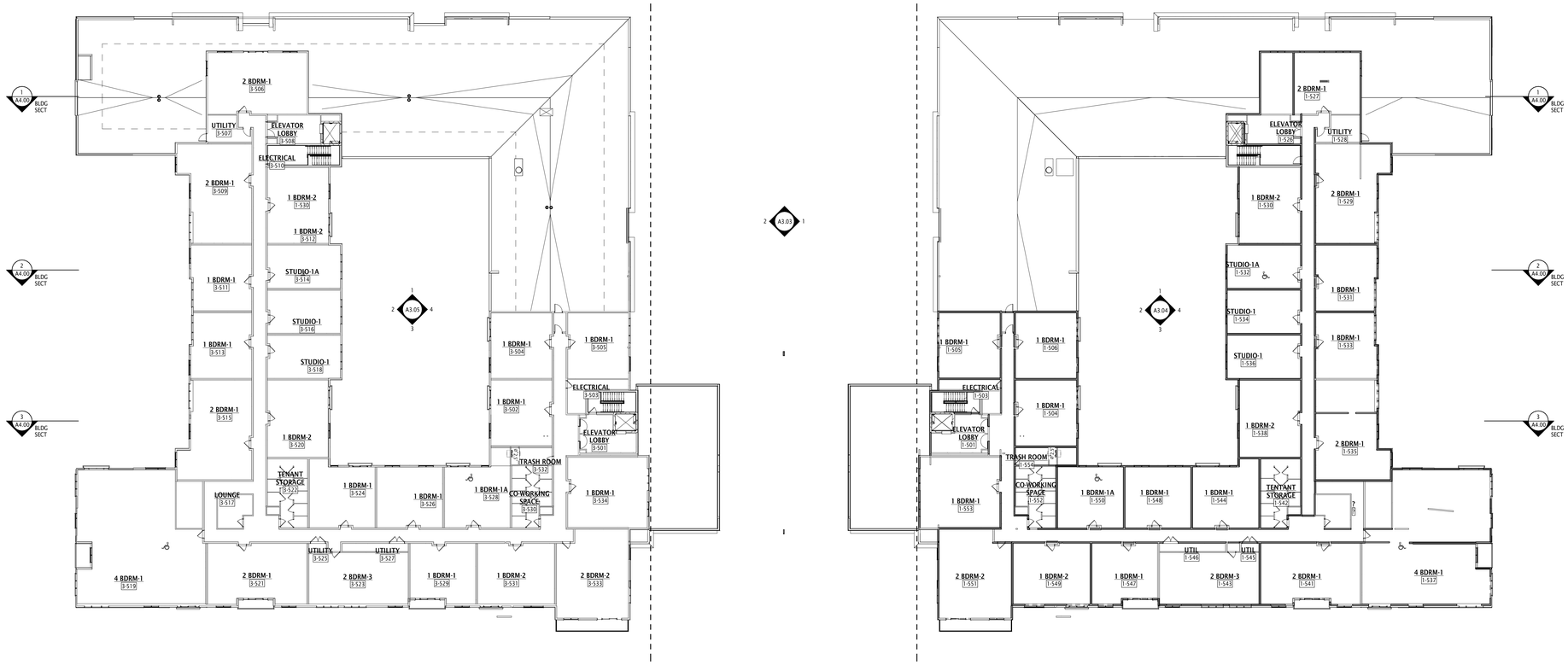
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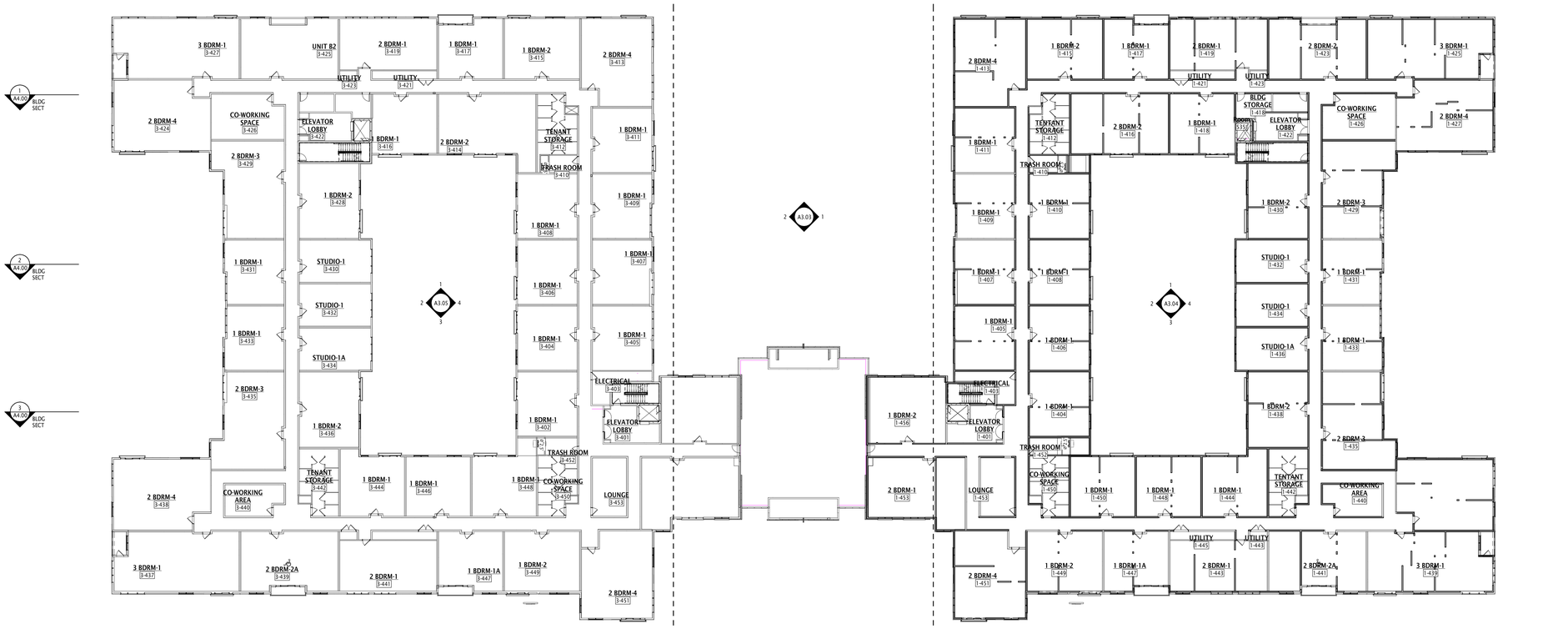
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ORIGINAL SHEET SIZE: 30" X 42" ARCH E1



LEVEL 05 PLAN
N.T.S.

3 A3.01



LEVEL 04 FLOOR PLAN
N.T.S.

3 A3.01

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FOURTH AND FIFTH FLOOR REFERENCE PLAN

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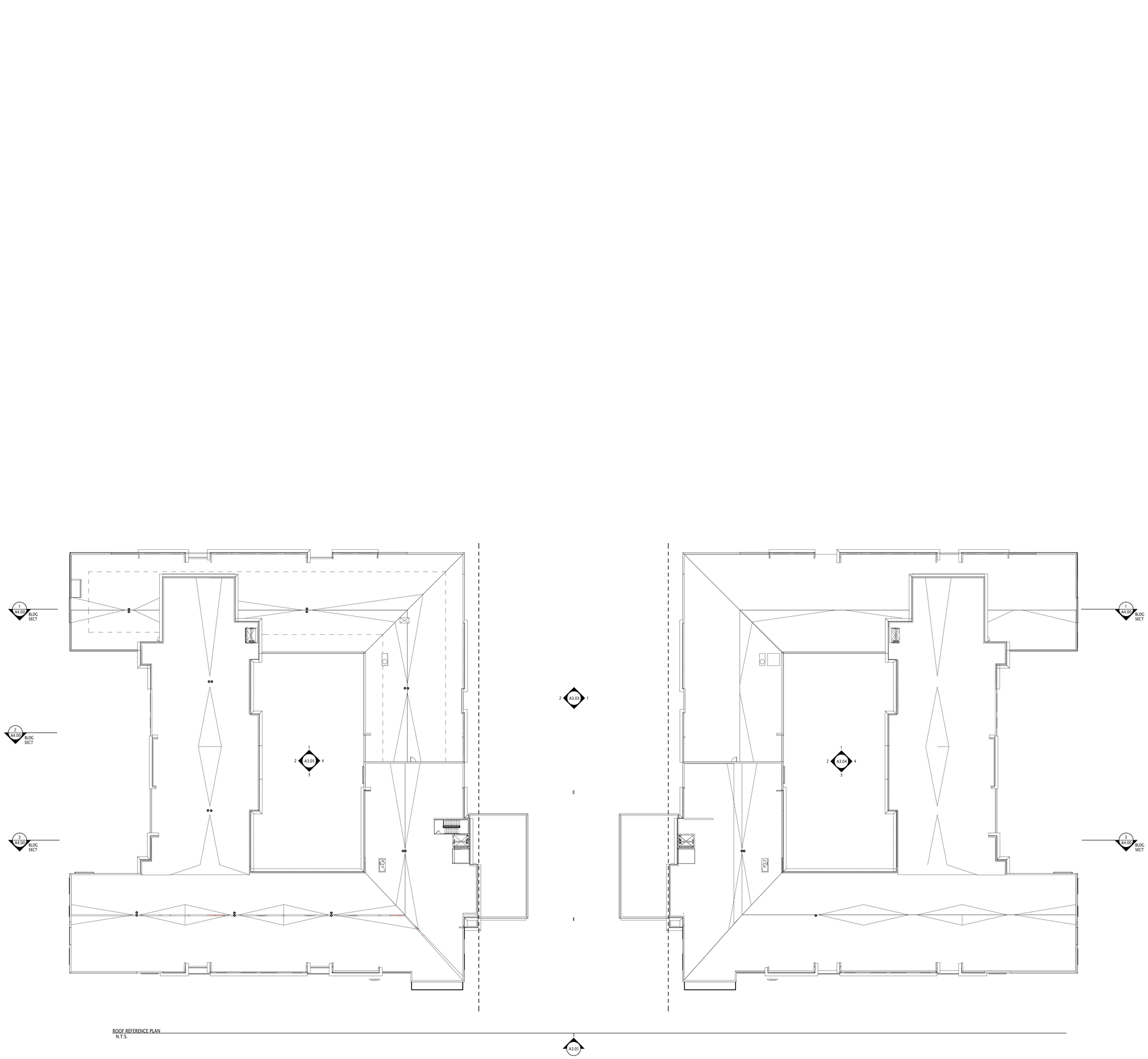
ORIGINAL SHEET SIZE: 30" X 42" ARCH E1

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PHILADELPHIA, PA 19107
215 . 928 . 9331
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NOT FOR CONSTRUCTION

OWNER/CLIENT

MLP VENTURES, LLC
201 KING OF PRUSSIA ROAD, #501
RADNOR, PA 19087
215.972.1550



ROOF REFERENCE PLAN
N.T.S.

601 WASHINGTON

MULTIFAMILY RESIDENTIAL

601 WASHINGTON STREET
WHITEMARSH TOWNSHIP, PA 19428

PROJECT NORTH

ROOF REFERENCE PLAN

DATE: 2022.06.03
DRAWN BY: Author
REVISIONS:

0 21'-4" 42'-8"

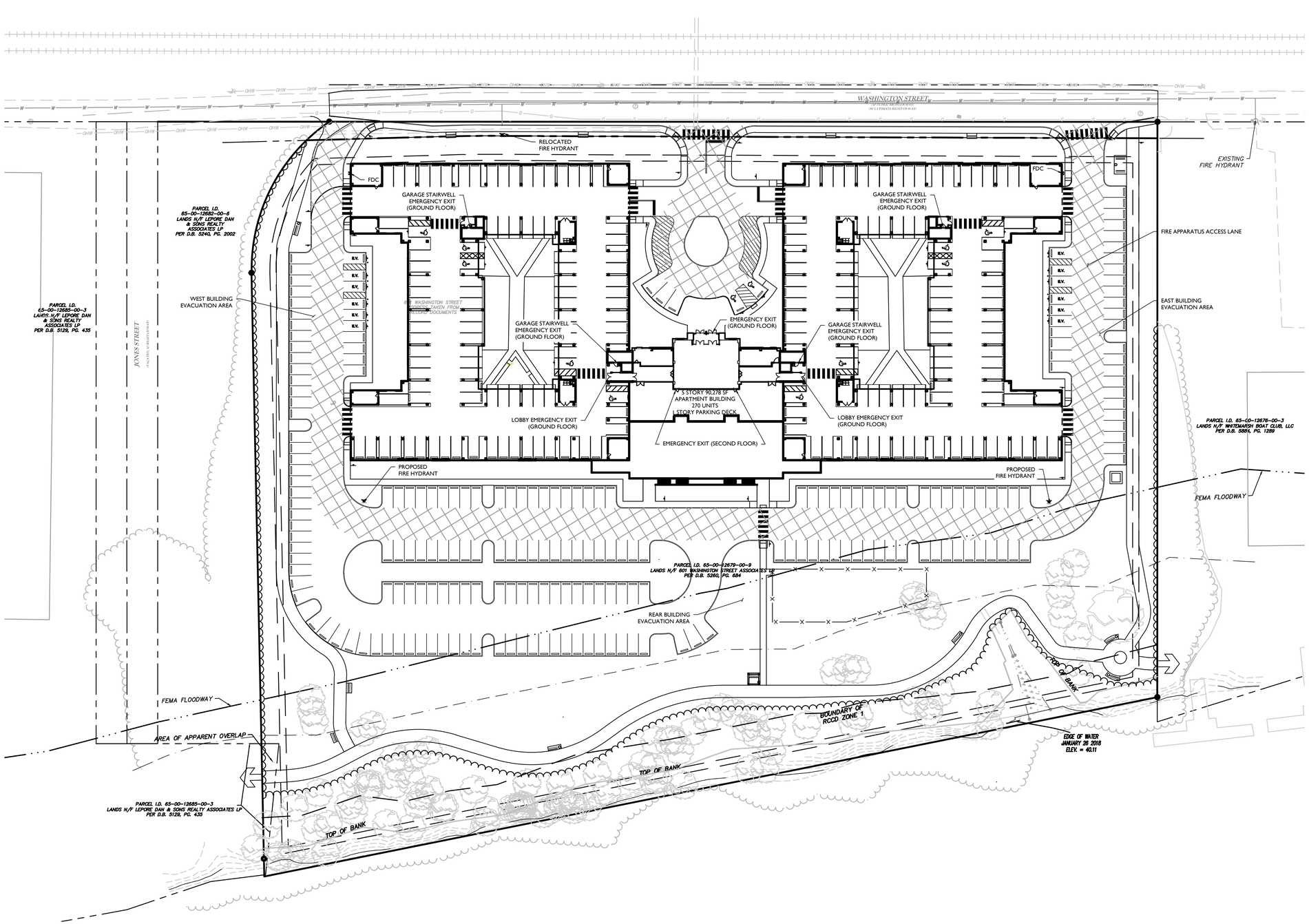
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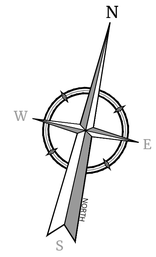
G3.60

50% CONSTRUCTION DOCUMENTS

6/17/2022 12:34:54 PM C:\Users\mbl\Desktop\Revit Local Files\Revit 2020 Local\G0-22-005_601 Washington_Site_2020_mblevit.rvt

ORIGINAL SHEET SIZE: 30" X 42" ARCH E1





LEGEND

EXISTING		PROPOSED
12+00 PI 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE / BACK	CURB	FACE / BACK
	DEPRESSED CURB	
	SIDEWALK	
X X	FENCES	X X
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	STALL COUNT	10
	ADA ACCESSIBLE STALL	P, P V
	DEPRESSED CURB AND ADA RAMP	HC
	DIRECTION OF TRAFFIC FLOW	
	FIRE APPARATUS ACCESS LANE	
	FIRE HYDRANT	

40 0 40 80

SCALE : 1" = 40'

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2016\16001030B\Engineering\Exhibits\C-EXBT-EMAC.dwg|C-EXBT-EMAC By: CHRIS.MECZLER

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REV	DATE	DRAWN BY	DESCRIPTION

PRELIMINARY/FINAL LAND DEVELOPMENT PLANS
FOR
601 WASHINGTON STREET APARTMENTS

601 WASHINGTON STREET

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Colliers Engineering & Design
LEHIGH VALLEY
941 Marcon Boulevard, Suite 801
Allentown, PA 18109
Phone: 610.868.4201
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	06/07/22	CMM	RMA

PROJECT NUMBER:	DRAWING NAME:
16001030B	C-EXBT-EMAC

SHEET TITLE:
EMERGENCY ACTION PLAN EXHIBIT

SHEET NUMBER:
1 of 1

EMERGENCY ACTION PLAN

Washington Street Apartments

601 Washington Street

WHITEMARSH TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

Prepared for 601 Washington Street Associates, LP

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OVERVIEW

This Emergency Action Plan was designed specifically for the 601 Washington Street apartment complex located at 601 Washington Street, Whitemarsh Township, PA. The purpose of the plan is to provide management and occupants with guidelines and actions to respond to many different types of emergencies. The plan is designed to be administered by a building Emergency Coordinator and Crisis Management Team. The plan should be reviewed and modified as needed and practiced at least once a year.

BUILDING LOCATION

The apartment complex consists of one (1) 4-story buildings containing 270 riverfront apartment units plus a Club House/Amenity Center. The building is adjacent to the Schuylkill River, on the former Oreland Sheet Metal site. The United States Postal address is 601 Washington Street, Conshohocken, PA 19428. The property phone number is **XXX-XXX-XXXX**. The property's web site is: www.ToBeDetermined.com.

HAZARD ANALYSIS

Building occupants are subject to the typical interior and external hazards common to this type of structure and building use and the Emergency Action Plan addresses these in an All-Hazard approach. The building's location, however does present the need to emphasize two specific hazards:

- Flooding

Being adjacent to the Schuylkill River, portions of the site are considered in the Federal Emergency Management Agency's 100 –year flood plane. Therefore, the Flooding section of this plan has been expanded accordingly.

- Transportation Incidents

The site is positioned along the SEPTA Manayunk/Norristown Regional rail line and the Norfolk Southern main freight rail line. Commuter rail passengers and hazardous materials pass by the site day and night and both management and tenants need to be aware of actions in the event of a reginal rail train derailment and hazardous materials incident in the vicinity. Therefore, the Hazardous Materials section of this plan has been expanded accordingly.

CONCEPT OF OPERATIONS:

Management shall appoint a ***Crisis Management Team*** for the complex. The Team should consist of management and maintenance personnel, and a tenant representative. Management should designate an ***Emergency Coordinator***, and an ***Alternate.*** The

Coordinator and /or Alternate should be available by phone contact 24 hours a day, and within a 15 minute response time.

Upon observation or notification of an emergency condition, ***Emergency Coordinator or Alternate,*** or, if unavailable, ***Senior Management Official*** on duty, will activate the Emergency Action Plan. The ***Emergency Coordinator*** will interface with Emergency Responders until a representative of Building Management is on the scene.

The ***Crisis Management Team*** will report to the building Command Center area, making notifications, and implement the Plan to the extent required.

ORGANIZATION:

Emergency Coordinator and Alternate:

The persons trained as the Emergency Coordinator or Alternate should be available by phone contact at all times. The coordinator and alternate shall be familiar with all sections of this and other emergency plans used by the facility. The coordinators make decisions regarding evacuation and/or shelter in place strategy that will, in their best estimation, promote the safety of residents and employees. The complex manager will be responsible to see that all employees who may function as the Emergency Coordinator maintain a high state of readiness and are familiar with the Emergency Action Guide.

Emergency Coordinator: **To Be Determined.**
Alternate Coordinator: **To Be Determined.**

Crisis Management Team:

A tenant representative and alternate from should be appointed as liaison to the Crisis Management Team. The Team is responsible for implementing the Emergency Action Plan. The Team shall appoint and assign Building Captains, and Exit Guards to assist in Evacuations and Sheltering in Place. Persons familiar with the building's mechanical systems should also be represented on the Team.

Building Captains:
The Building should have at least one Building Captain appointed to assist with Evacuation or Shelter-In –Place. The Building Captain should be familiar with occupancies in that building.

Building Captain: **To Be Determined**.

Exit Guards:
Exit Guards should be appointed at each exit to assist in evacuation and prevent any persons from re-entering the building.

Exit Guard: **To Be Determined**

COMMAND CENTER:

A Command Center location shall be identified. An alternate location should also be identified. The Command Center shall provide the focal point for receiving reports, requests for assistance, liaison with Township Emergency Responders, disseminating information, directing employees, and facilitating the decision making process. Plans, phone numbers, status displays, communications and equipment should be available to help the Emergency Coordinator deal with a developing emergency. Equipment should include flashlights, radios, batteries, identification vests, etc.

COMMUNICATIONS:

Reliable and effective communications are a critical part of every Emergency Action Plan. Generally, communications between the facility Command Center and the Township will be via telephone.

The facility must maintain a state of vigilance, especially when heavy sustained rains or severe weather are predicted. A NOAA radio monitor with alert device and the Weather Channel shall be obtained, maintained and monitored at all times.

Internal communications should be via portable radios or cell phones for all key employees. Other means of communications include public address system, messenger, fax machine, dial-up modems, and signs. In the event the public address system is not available the facility should also maintain a portable, handheld bullhorn.

DIRECTION AND CONTROL:

The Emergency Coordinator shall:

- Assess the situation, sound the proper alarm if not already activated, and make appropriate notifications.
- Assemble the Crisis Management Team and Notify Management
- Greet and confer with responding Township Fire, Police, and Emergency Management officials.

- The Emergency Coordinator shall assist first responders with any information needed until a building management representative is on the scene.

Note: The facility manager will maintain a current chain of command list (usually the Crisis Management Team listing) so that there will be a clear understanding of who is in charge in the coordinator's absence.

ADMINISTRATION:

A current copy of this Emergency Action Plan should be maintained in the facility manager's office, or readily available to the Emergency Coordinator and Alternate.

A current copy must also be on file with the Township Emergency Management Coordinator. The Facility Manager will insure that all tenants review and are familiar with the plan annually and that all phone numbers are verified at least every 6 months. A record of changes shall be maintained as an element of this Emergency Action Plan.

EDUCATION / OUTREACH:

It is essential that elements of this plan be provided to ALL TENANTS prior to the occurrence of an emergency. Site maps should be posted at all means of egress. New employee training should include a review of this plan.

Arrange with the Fire Department to provide fire extinguisher training for all employees. Employees who have been properly trained may fight incipient fires with portable fire extinguishers

DRILLS:

Emergency evacuation drills shall be conducted in the occupancy annually, or when required by the fire code official. Drills shall be designed in cooperation with the local authorities. Fire Alarm systems shall be inspected and tested in accordance with applicable Township codes.

Responsibility for the planning and conduct of drills shall be assigned to competent persons designated to exercise leadership. Drills will be held at unexpected times and under varying conditions to simulate the unusual conditions that occur in cases of fire. Prior notification should be given to the fire code official. Records must be maintained of required emergency evacuation drills and should include the following information:

1. Person conducting the drill
2. Date and time of drill
3. Notification method used
4. Staff members on duty and participating
5. Number of occupants evacuated
6. Special conditions simulated
7. Problems encountered
8. Weather conditions during evacuation
9. Time required to accomplish complete evacuation

ACTIVATION

The plan shall be activated upon confirmation of one or more of the following conditions:

- Activation of the fire alarm or sprinkler system
- Severe weather watch
- Notification from an official or recognized source that an external emergency is threatening the facility or the geographic area.
- Notification from ReadyMontco, Https://www.montcopa.org/3311/ReadyMontco
- Residents will be notified by Text, Email, and Flyers under door
- Internal or external gas leak
- Internal or external bomb, security, or safety threat
- A utility failure that is seriously affecting the facility
- Discretion of Facility Manager or Emergency Coordinator

NOTIFICATION AND IMPORTANT PHONE NUMBERS

- POLICE, FIRE or MEDICAL EMERGENCY 9-1-1

- Property Management 24 hr. Number

    - 601 Washington Street: **(XXX) XXX-XXXX**
    - **TBD**, Property Manager: **(XXX) XXX-XXXX**
    - **TBD**, Maintenance Supervisor: **(XXX) XXX-XXXX**

- Phone numbers for all critical system vendors/contactors:
    - Mike Spaeder Landscaping, (610) 544-1075
    - Budget Maintenance Emergency Services, (610) 269-5417
    - Electrical Contractor, **TBD**
    - Elevator, **TBD**
    - Fire Alarm/Security, Mill Stat: (610) 687-1018
    - HVAC, **TBD**
    - Plumbing, **TBD**
    - Sprinkler System, **TBD**

- Whitemarsh Township Emergency Services: (610) 825-3535
    - Scott Lynch, EMS Administrator, Fire Marshall (610) 825-3535, ext. 2614

- PECO - Gas or electric emergency call: 1-800-841-4141

- Poison Information Center: 1-800-222-1222

- Residents: ReadyMontco, Https://www.montcopa.org/3311/ReadyMontco

EMERGENCY COORDINATOR CHECKLIST

Upon activation or the Guide, the Emergency Coordinator will:

- Refer to the Emergency Action Guide for the particular emergency
- Establish a Command Center Location
- Start a log of all activities (See attachment)
- Address safety of staff and patrons
- Initiate evacuation form the facility for fires, gas leaks, and/or immediate internal threats to the safety of patrons and employees
- For external emergency, confer with Township police, fire and Emergency Management officials
- Assemble the Crisis Team
- Assess need for evacuation or shelter in place
- Estimate the duration of the emergency and address logistical needs for extended operations if they are anticipated.
- Provide information to guests via signs, PA announcements, etc.
- Provide for safety of all patrons and staff
- Be prepared to conduct damage assessment
- Scale down operations and return to normal as soon as possible

EMERGENCY ACTION GUIDES

- Evacuation
- Shelter-in-Place
- Fire/Explosion/Building Collapse
- Flooding and Severe Weather
- Bomb Threats/Suspicious Mail/Packages
- Hazardous Materials Release
- Utility Emergencies
- Security Incident/Lockdown
- Emergency Maps
- Checklists
    - Employee Responsibilities
        - Coordinator Responsibilities
        - Building Captains
        - Exit Guards
        - Logs

EVACUATION

In the event of an internal emergency that poses an immediate threat to the safety of the facility patrons and staff, an immediate evacuation will be initiated. The individual observing or being made aware of the threat should activate the building's manual fire alarm system as the primary means to quickly evacuate the building. Employees should assist patrons from the building, paying particular attention to those who may need additional assistance, such as the elderly and those with physical disabilities.

When the threat is external to the building, such as a toxic vapor cloud or a severe storm that is developing, the Township Police, Fire or Emergency Management Organization will advise the Emergency Coordinator regarding evacuation. IT IS CRITICAL THAT ACCURATE CONTACT PHONE NUMBERS BE MAINTAINED. However, in a rapidly developing crisis, such as a flash flood, the Emergency Coordinator may have to make a decision regarding evacuation or shelter in place.

Evacuation Routes: Residents should exit towards the emergency exit stairways. After exiting the building residents are to wait behind at one of the three designated emergency exit location with these locations being the west side of the building the east side of the building and behind the building to the south.

Elevator Procedures: In the event of an emergency the elevators will be cleared and residents are encouraged to take the stairs. If elevator is stuck with occupants inside, the first floor elevator display screen will identify what floor the elevator is on. Employees will then start on the first or fifth floor and work their way up or down respectively. The master key will be used to unlock the elevator so that occupants may exit and continue evacuating the building.

Procedures for accounting of employees and residents: residents and employees are directed to go towards the front of the building and then move away from the building. Employees are directed check elevators, check fire panel, etc. One employee will remain in the lobby to direct residents and to greet emergency response teams.

In the event of a flood residents can use the street parking on East Elm street, East Hector Street, Cherry Street, Walnut Street, Jones Street, and other streets in the nearby area. The 601 Washington Street Associates, LP residents will be allowed to park their vehicles during an emergency event at both 2100 and 2201 Renaissance Boulevard in King of Prussia, PA. 601 Washington Street Associates will provide shuttle services to pick up and drop off it's residents. 601 Washington Street is approximately 3.4 miles away.

EVACUATION DOs AND DON'Ts

EVACUATION DO's

- REMAIN CALM
- SHUT DOWN ALL WORK ON EQUIPMENT
- EXIT THE BUILDING AND REPORT TO THE ASSEMBLY AREA
- ADVISE SUPERVISOR OR ANY MISSING CO-WORKERS
- ASSIST INJURED OR DISORIENTED PERSONS TO SAFETY
- FOLLOW INSTRUCTIONS OF SAFETY MONITORS AND EMERGENCY RESPONDERS

EVACUATION DO NOT's

- DON'T PANIC OR RUN
- DON'T RUN
- DON'T USE ELEVATORS
- DON'T RETURN FOR ANYTHING UNTIL "ALL CLEAR" IS GIVEN
- DON'T LEAVE ASSEMBLY AREA UNTIL "ALL CLEAR" IS GIVEN

SHELTER-IN-PLACE

In some instances you will be asked to Shelter-in-Place. Sheltering is an option that helps protect people from outside exposures such as chemicals, radiation, police activity, or weather.

- Have a predetermined safe room
- Know where your ventilation system controls are and how to turn them off
- Have a Shelter–in-Place kit available
- Follow instructions of authorities regarding actions to be taken (i.e. sealing vents, windows, or staying away from windows and doors,)

Shelter-in-Place Kit

- Plastic Sheeting
- Duct Tape
- Scissors
- Towels and rags for blocking vents and under doors
- Drinking water
- Battery powered radio with emergency alert station taped to side
- Working Flashlight
- Extra Batteries
- Snacks

FIRE/EXPLOSION/BUILDING COLLAPSE

In the event of a fire or smoke condition, employees will take immediate action, following the R-A-C-E procedure as outlined below:

R – Remove those in immediate danger

A – Activate the fire alarm system and call 9-1-1

C – Confine the fire by closing doors

E – Evacuate patrons and staff via nearest safe emergency exit

- The individual who first encounters a fire or smoke condition will immediately remove those in danger and sound the building's fire alarm if it has not already activated
- Employees have the responsibility of calling 9-1-1 to advise the 9-1-1 operator of the activation of the fire alarm and the location of the fire and/or smoke condition, if known
- After exiting the building, patrons should be directed away from exit doors and the driveway
- The Emergency Coordinator will assemble the Crisis Management Team at a safe location and account for residents and employees
- Residents and employees WILL NOT re-enter the building until authorized by the Fire Chief

FLOODING AND SEVERE WEATHER

The Apartment Complex is located adjacent to the Schuylkill River and thus may be subject to flooding. Portions of the property are within the FEMA 100-year flood line. While there is no recollection in current history of the river flooding above the retaining walls, this plan will discuss actions to be taken in the event of such flooding.

DEFINITIONS:

*Flash Flood or Flood **Watch*:**
Flash flooding or flooding is possible in the watch area.

*Flash Flood or Flood **Warning*:**
Flash flooding or flooding has been reported or is imminent

Urban and Small Stream Advisory:
Flooding of small streams, streets, and low-lying areas is occurring.

Flash Flood or Flood Statement:
Follow-up information regarding a flash flood event.

PROCEDURE:

Monitoring Conditions: The National Weather Service (NWS) in collaboration with the U.S. Geological Survey constantly monitor water levels in the Schuylkill River. These measurements are available real-time on line at the NWS web site. When weather conditions warrant, the NWS will issue weather ALERTS which are monitored by County and Local Emergency Management offices. Montgomery County will then issue ALERTS to communities which may be affected by the weather event.

Management officials should register with the county ALERT system to receive these ALERTS by way of e-mail and/or cell phone text messages. As a back up, Management should obtain a NOAA Weather Radio for the management office that will activate anytime a weather alert is issued for the area. During Flood Advisories, Management Should monitor the USGS river gauge web sites noted in this plan.

Restricted Parking in Flood Zones: Some vehicle parking areas may be located within the FEMA 100-year flood line. These areas of the parking lots will be designated by a marked color line on the paved areas and residents advised that parking in this area during a flood emergency will be prohibited, and if not moved within a certain time period after notification, Management will have them towed to a safe area.

Actions: Management will take the following actions according to the National Weather Service preparation levels:

FLOOD WATCH:

1. Charge all walkie-talkies, cell phones and golf cart batteries.

2. Check supply of barricades, orange cones, and yellow caution tape.

3. Alert all Staff to be available to work during the storm. If necessary have the staff stay overnight at the property. Also, obtain additional cleaning staff. In total, we should have about 10 people.

4. Review Emergency Action Plan will all employees.

FLOOD WARNING:

1. Monitor throughout the storm this website, which provides flooding information:
    a. http://water.weather.gov/ahps2/hydrograph.php?wfo=phi&gage=nrsp1&view=1,1,1,1,1,1,1,1&toggles=10,7,8,2,9,15,6&type=0

2. Place flyers throughout the property, in the elevators, in the building lobbies, consistent with "Exhibit A". Send out a blast e-mail with the same message.

3. Contact 2-3 local towing services to have them available before and during the storm to tow vehicles.
    a. K&S Towing: 610-649-8697
    b. Jamison Towing: 610-270-9999
    c. Infinity Towing: 484.266.9081

4. Contact Budget Maintenance Emergency Services and Mike Spaeder to place on standby their clean up crews.
    a. Budget Maintenance: (610) 544-1075
    b. Mike Spaeder Landscaping: (610) 506-2295

5. Shut down irrigation system and pool pumps.

6. Instruct maintenance to activate the flood preparedness actions listed on the Maintenance Flood Checklist, such as securing outdoor furniture or objects subject to floating or blowing away.

7. Remove all pool umbrellas.

8. Remove the walk off mats in buildings lobbies.

9. Contact local hotels to determine their best rate if we have to do an evacuation.

FLOOD ACTION STAGE: (River Gauge at 10')

1. Establish facility Command Post and advise local officials of the same.

2. One person should be designated the "Facility Commander". This position is responsible for co-coordinating all staff, maintaining contact with emergency officials, speaking with Corporate, recommending the evacuation, directing towing, etc.

3. Re-send e-mail blast. Include in this e-mail blast any deals we made with local hotels.

4. Advise Residents that they should consider the possibility that flooding may be severe enough to prohibit their ability to safely leave the property.

5. Advise residents that they may become stranded and prohibited by authorities from leaving if the water level rises to an unsafe level.

6. Have any remaining vehicles in flood zone way towed.

7. Constantly monitor ingress and egress to the site and the loop road and keep clear of any obstructions

8. Coordinate any decision to evacuate the site with Whitemarsh Township Office of Emergency Management officials.

9. Staff should be assigned as follows:
    a. Two people in the leasing office to take calls, send e-mail blasts, and comfort residents.
    b. Three maintenance personnel to handle any maintenance issues, direct towing efforts and handle a possible resident evacuation.
    c. Five cleaning personnel to be ready to immediately clean up after the storm. In addition, these people can handle refreshments during the storm and miscellaneous duties.

AFTER THE STORM:

1. Perform damage assessment of the complex and advise Township officials.

2. When determined safe, send out e-mail blast telling all residents the storm is over and they can return.

3. Contact Budget Maintenance & Spaeder Landscape to begin clean up efforts.

4. Clean all building lobbies.

5. Place walk off mats back in the lobbies.

6. Clean, sweep and power wash garages.
7. Clean and sweep parking lots and roadways.
8. Look for missing irrigation lids which could create tripping hazards. Cover with wood until new lids are installed.

REMEMBER…

Even 6 inches of fast-moving water will knock you off your feet and 2 feet will float your car!
NEVER try to walk or drive through swift moving water. If such conditions exist, do not allow guests to drive through the water. Utilize the emergency exit or return to the building until the water recedes.

BOMB THREATS/SUSPICIOUS MAIL/PACKAGES

Bomb threats made against the facility could be received by either telephone or mail. Persons normally answering telephone and/or opening mail should be trained in the proper handling of these incidents.

PROCEDURE:

- Telephone Threats
  - Remain calm
  - Keep the caller on the line as long as possible to obtain as much information as possible
  - Immediately report the threat to the on-duty manager and the Whitemarsh Township Police Department

- Mail Threats
  - Remain calm
  - Save the envelope and its contents
  - Avoid unnecessary handling of the item
  - Immediately report the threat to the on-duty manager and the Whitemarsh Township Police Department

MANAGEMENT RESPONSIBILITIES:

- Upon receipt of a bomb threat, immediate evacuation is warranted

- Deploy staff to assure the complete evacuation is carried out in a calm and orderly manner

- Assemble the Crisis Team

- Designate employees who will assist police with sweep of the building for suspicious packages, include exterior of building in search

- Do not use portable radios

- If a suspicious device is found:
  - Evacuate immediately
  - DO NOT touch the device
  - Residents and staff will remain outside until re-entry is authorized by the Whitemarsh Township Police Department

HAZARDOUS MATERIALS RELEASE

The release of toxic or hazardous materials from a transportation accident may require the activation of the Guide for possible evacuation or shelter in place procedures. Unlike flooding, which will be self-evident, determining the need to evacuate patrons will be determined by Township or State officials based on their assessment of conditions.

If ordered to shelter in place, initiate the following procedures:

- Assemble the Crisis Management Team
- Follow instructions from authorities
- Deploy staff to search exterior for those who may be unaware of danger
- Shut down the HVAC system
- Post shelter in place signs and make public address announcements
- Place towels under all exterior doors
- Monitor all communications links
- Notify Township Emergency Management officials of the number of residents and employees sheltered
- Maintain a several hour inventory of essential items for extended operations
- Keep tenants advised of the status of the emergency

UTILITY EMERGENCIES

Every tenant should be aware of what utilities are connected to the facility, where the utility shut offs are located, and what companies supply the utilities. Natural gas and electricity will pose the greatest danger to the facility.

Gas Odor/Leak

- Open the windows.
- Do not turn any electric devises on or off including light switches.
- Follow on-site Evacuation Plan.
- Call 9-1-1 to report the odor/leak.
- Call the gas supplier to report the gas odor/leak.

Electrical Emergency

- Call the electric supplier.
- If there is a power outage to your facility and a transformer is on fire or trees are causing wires to arc call 9-1-1 .
- When evacuating the facility be cautious of downed wires – consider any wires on the ground live.

Telephone/Water/Cable

- Be sure to keep current contact numbers on the emergency contact list in case these utilities ever need to be contacted.

SECURITY INCIDENT/LOCKDOWN

Tenants of the building must be aware of the possibility for an unknown person or intruder entering the property/facility. In a situation like this it is important to keep everyone safe and not to put anyone in jeopardy of becoming injured.

The building manager should create a code system that all tenants are aware of to announce an intruder in the facility.

If you are the person that makes the initial contact with an intruder:

- Approach with caution and do not be confrontational.
- Do not make any sudden movements.
- You should ask them normal questions as to what and why they are there.

If you are NOT the person making contact follow these procedures:

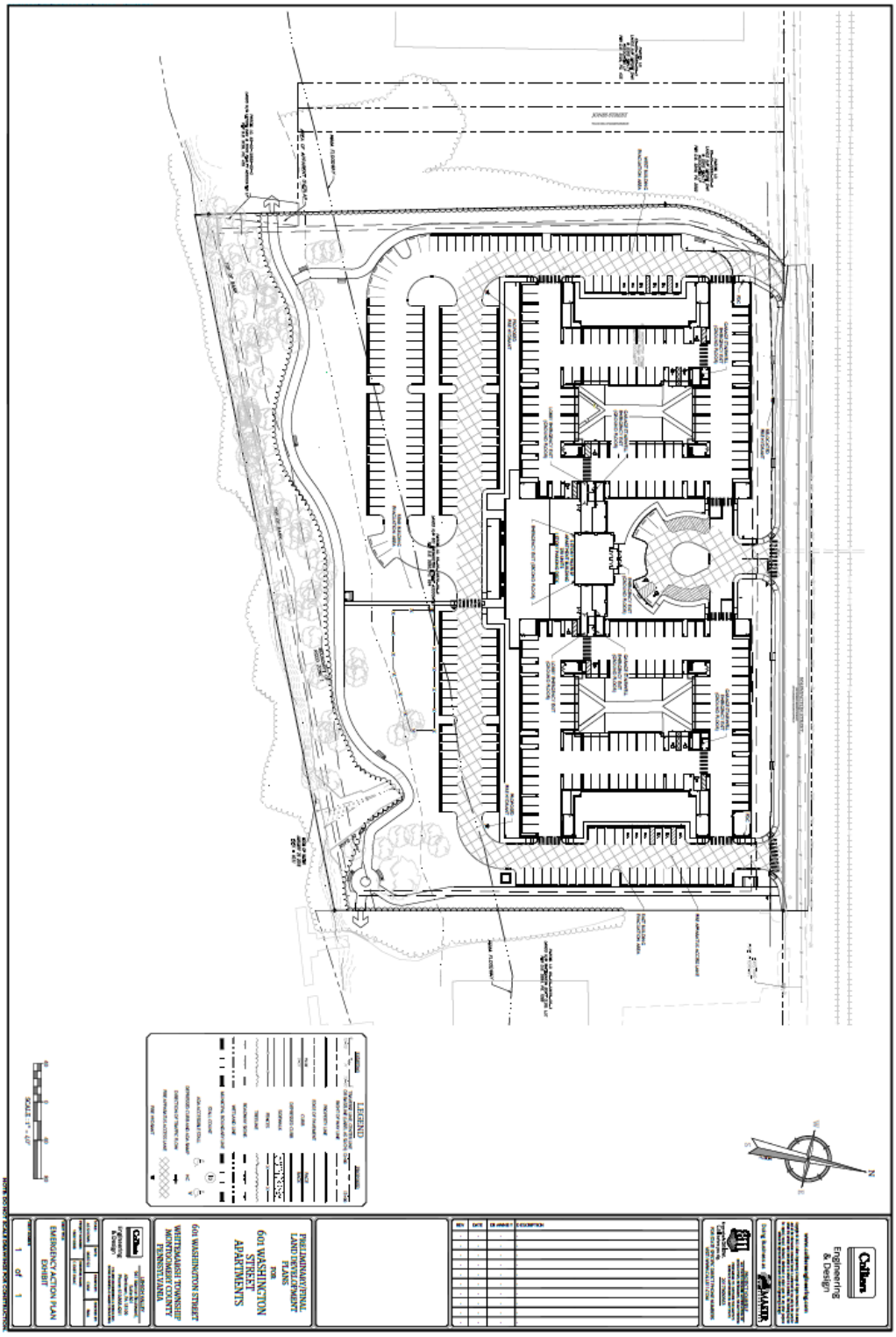
- Remain calm
- Call 9-1-1 and report the intruder, give a detailed description of intruder – stay on the line to give any updated information.
- Make an announcement of the code word or phrase.
- Do NOT take heroic actions, it may cause the incident to escalate and injuries to occur especially if a weapon is involved.

EMERGENCY MAPS

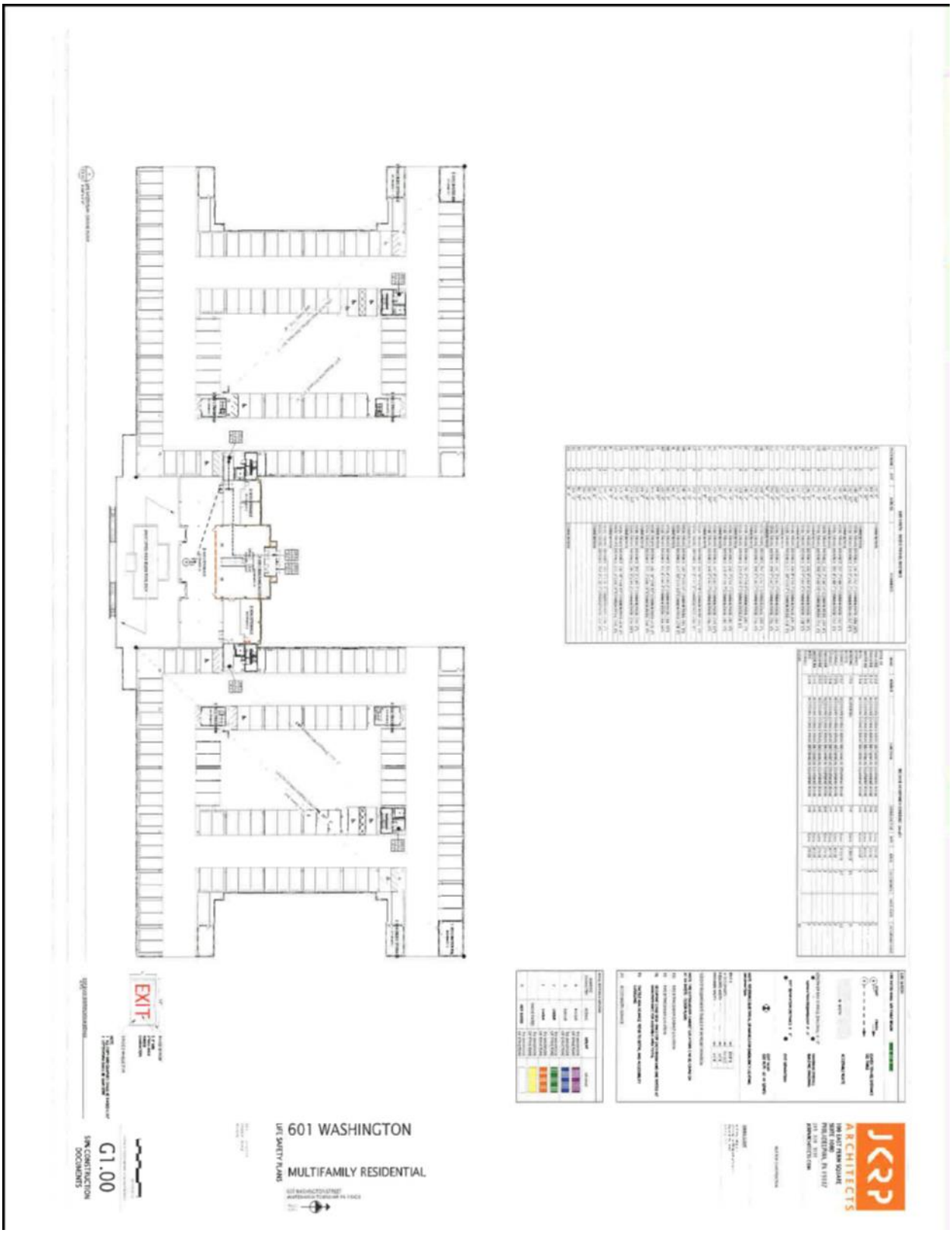
Emergency Maps should be posted throughout the facility and include:

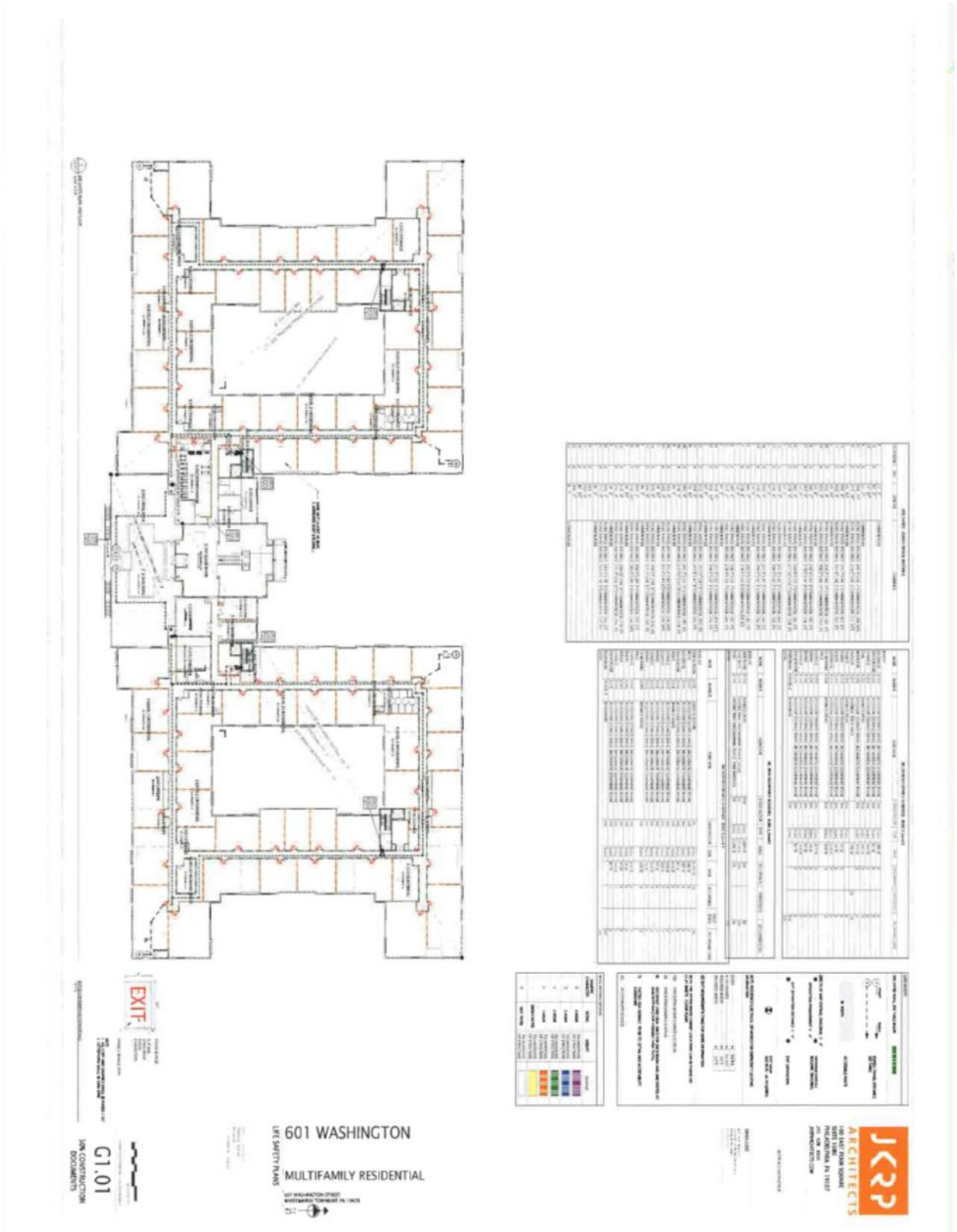
- EXIT LOCATIONS.
- FIRE ALARM PULL STATIONS.
- FIRE EXTINGUISHERS.
- MAIN AISLES AND EVACUATION ROUTES.
- ASSEMBLY AREAS.
- EMERGENCY PHONE NUMBERS.
- NAMES OF EVACUATION COORDINATOR & BUILDING CAPTAINS.

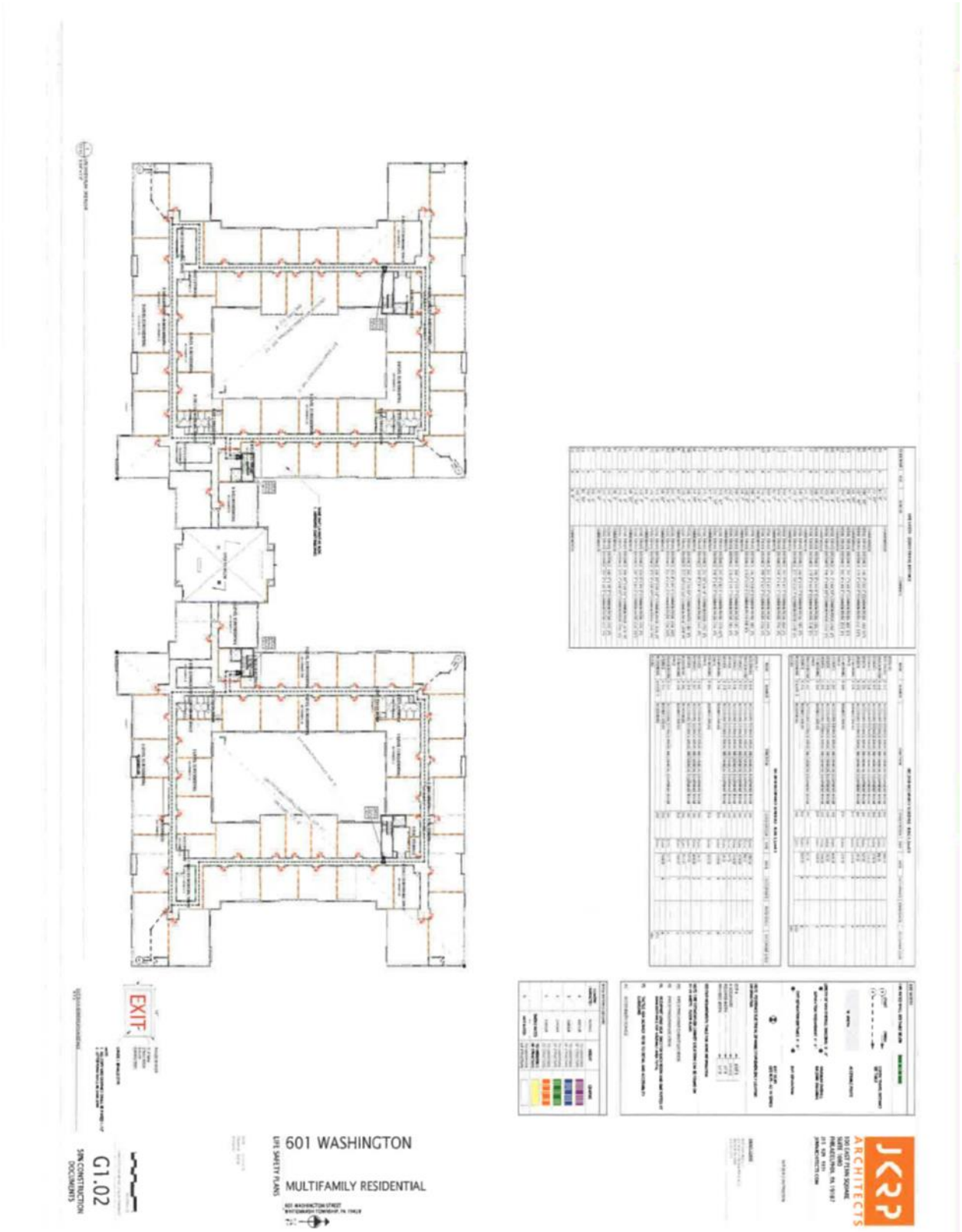
Site Plan Emergency Access Exhibit

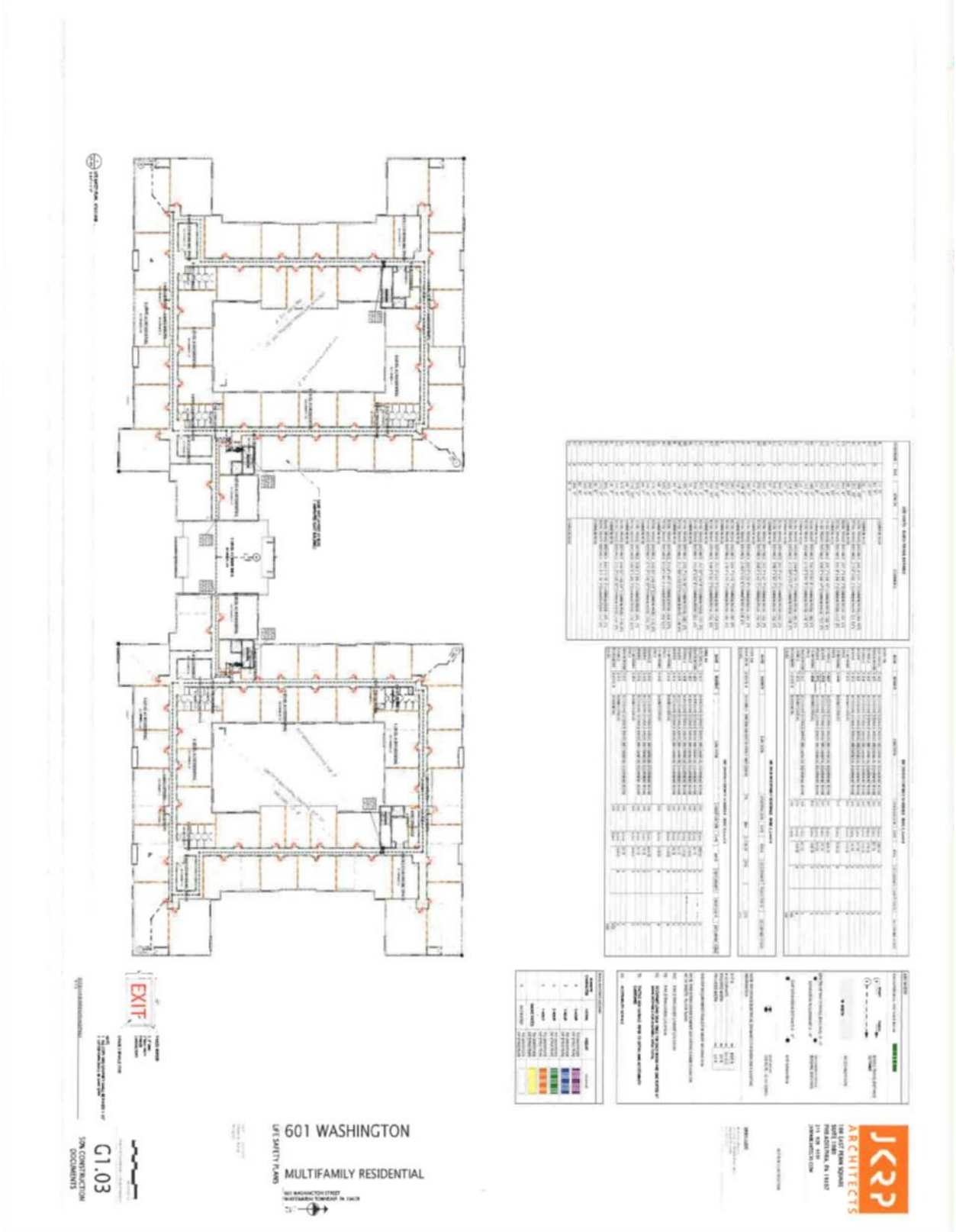


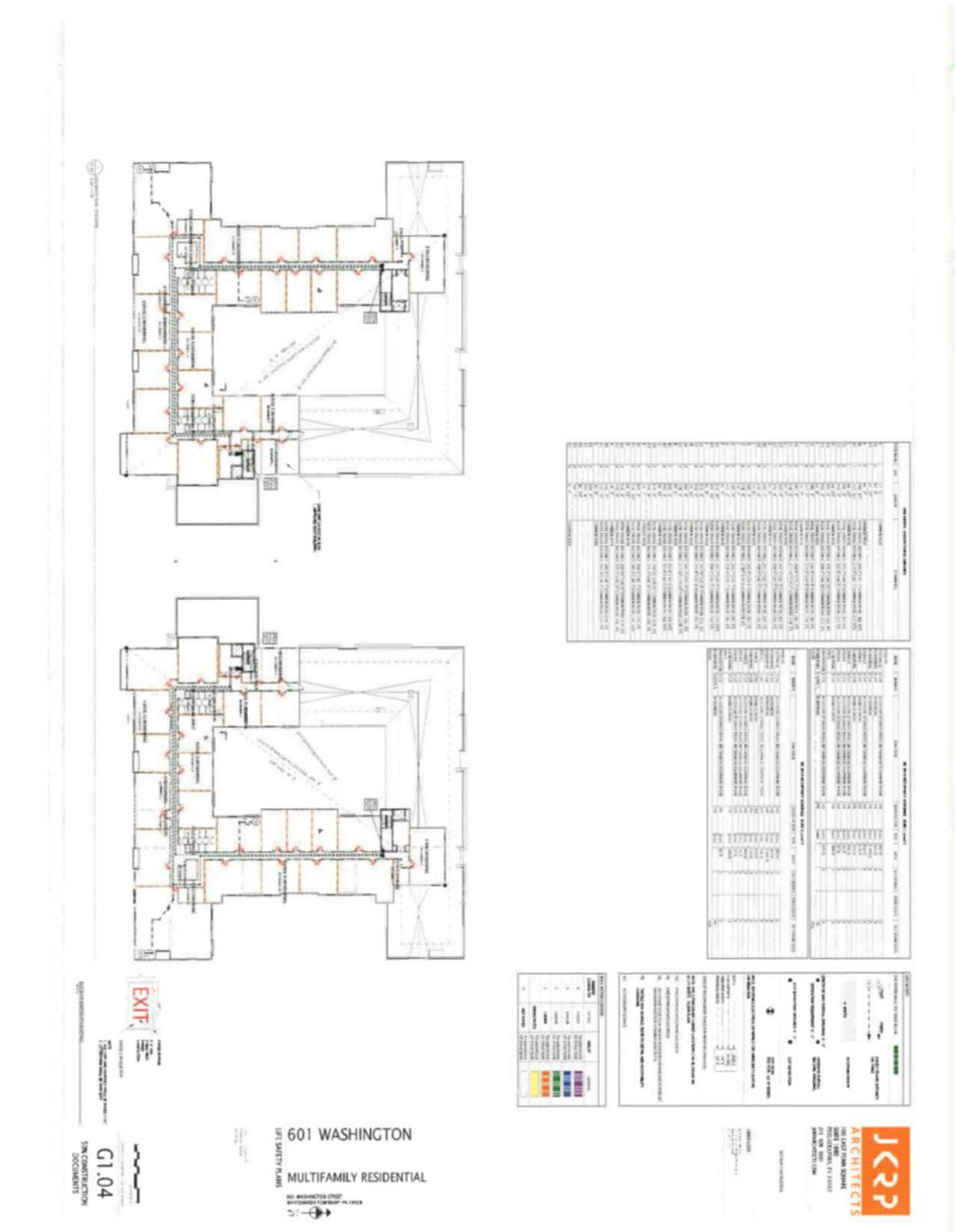
Life Safety and Overall Plan Exhibits

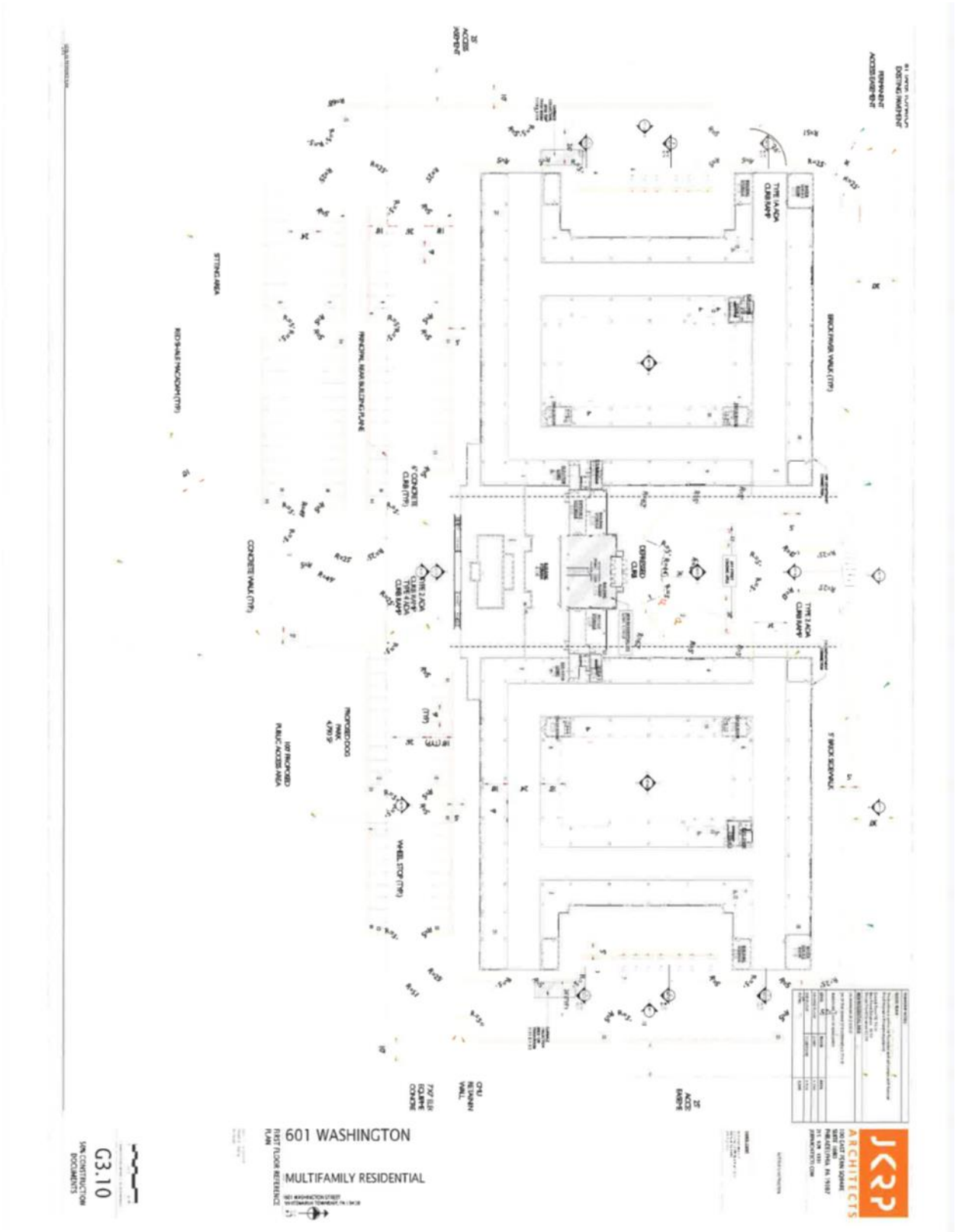


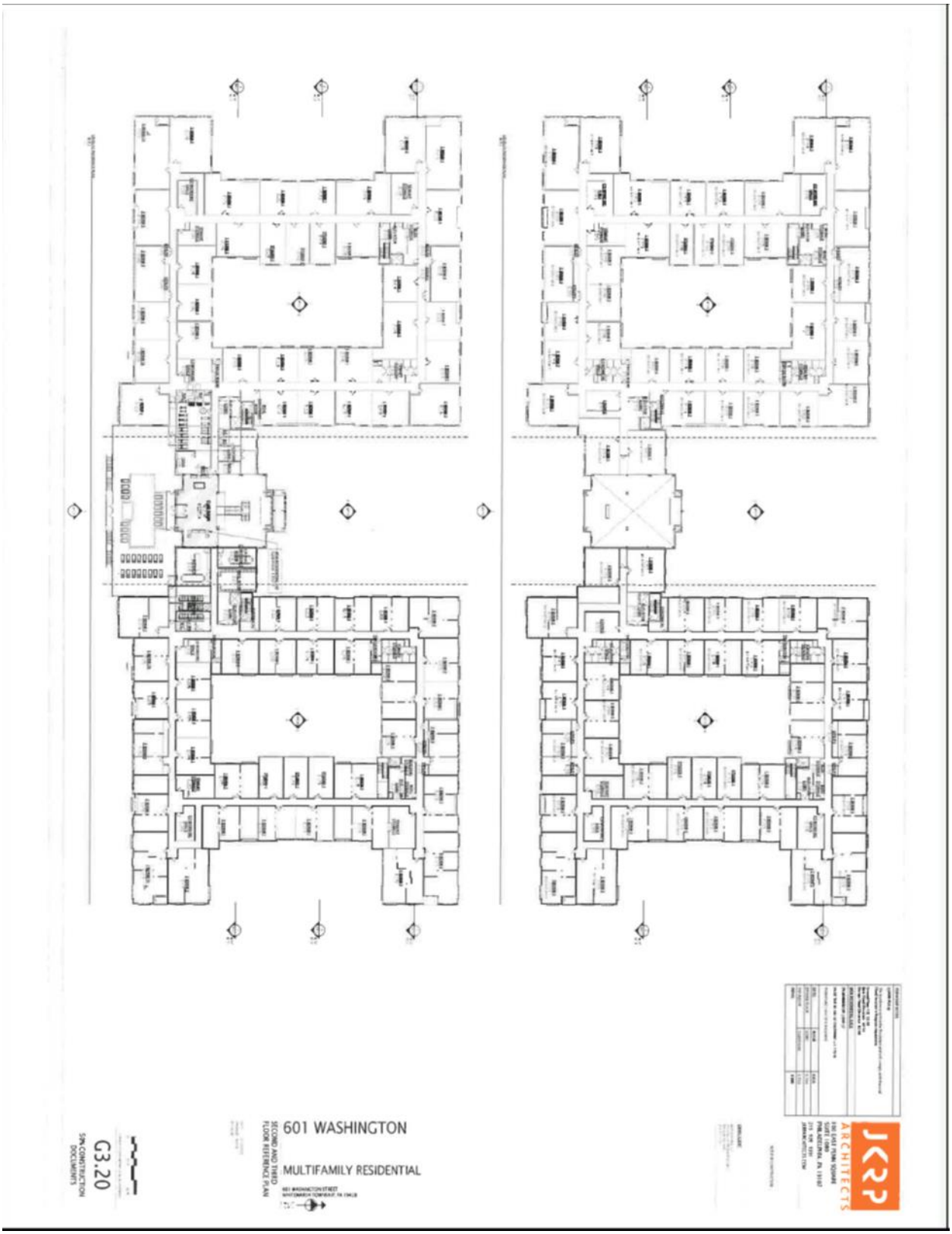

EXIT
601 WASHINGTON
MULTIFAMILY RESIDENTIAL
G1.01
JKRP
ARCHITECTS

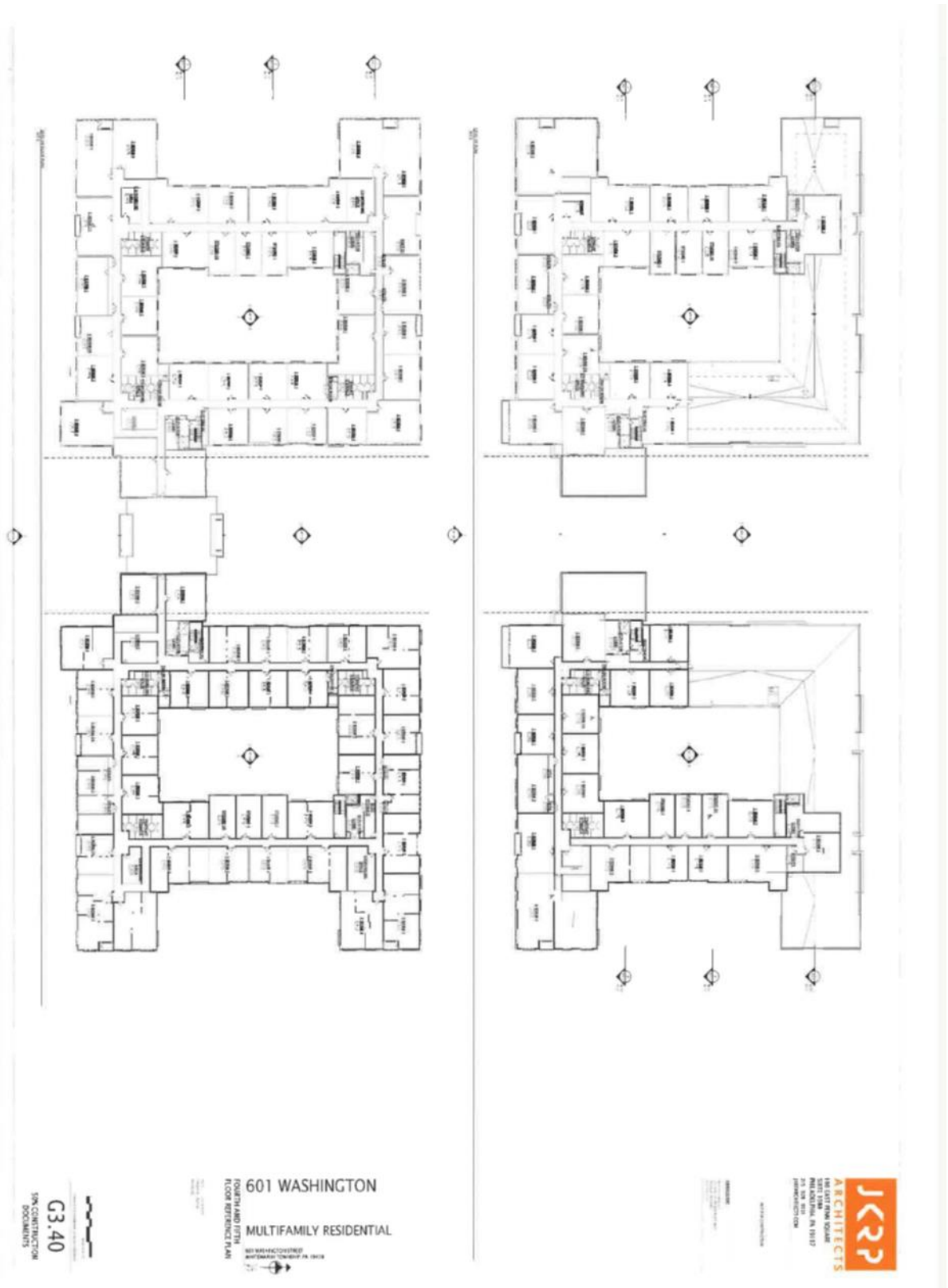

EXIT
601 WASHINGTON
MULTIFAMILY RESIDENTIAL
G1.02
JKRP
ARCHITECTS

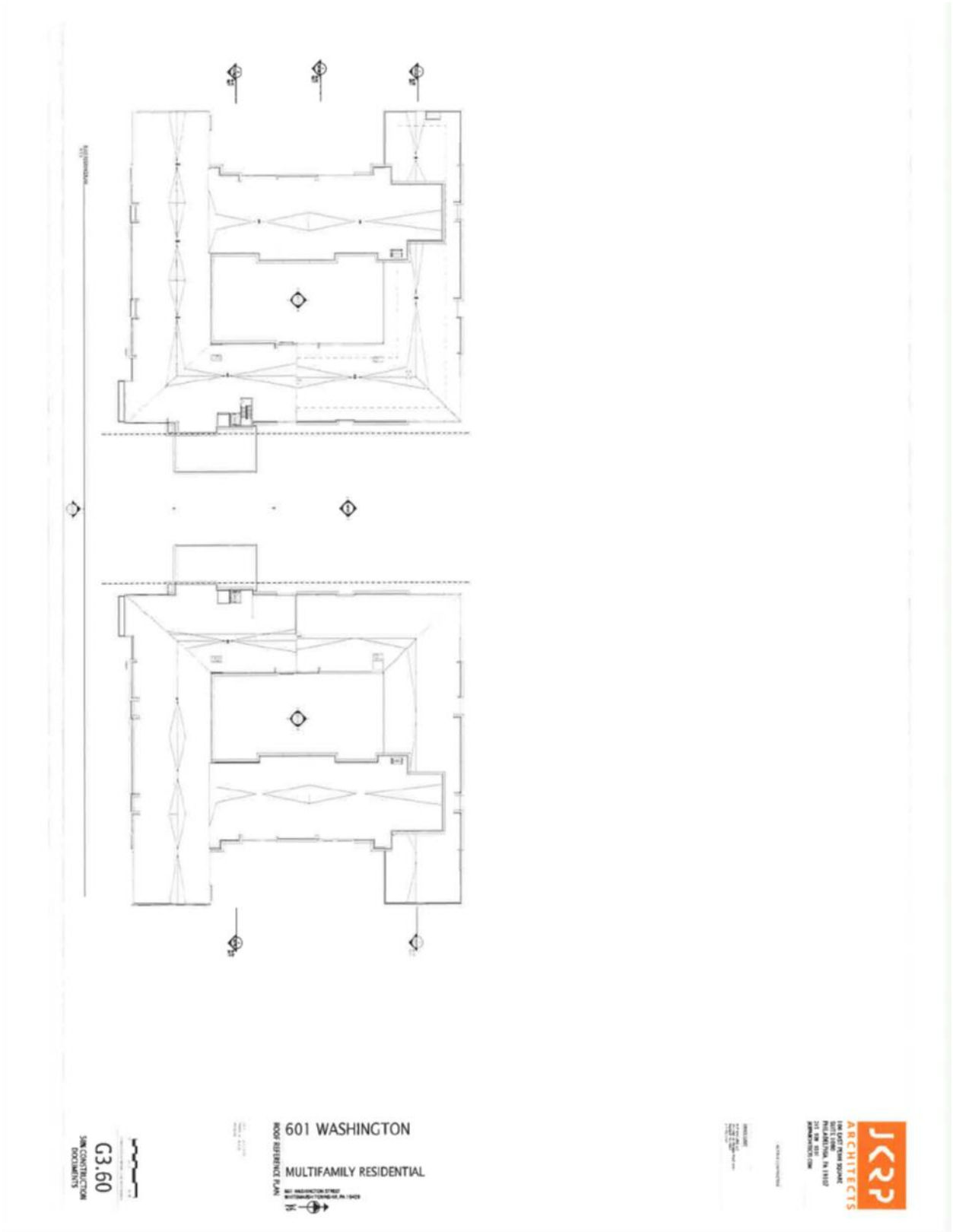

EXIT
601 WASHINGTON
LIFE SAFETY PLANS
MULTIFAMILY RESIDENTIAL
G1.03
50% CONSTRUCTION DOCUMENTS
JKRP
ARCHITECTS


EXIT
601 WASHINGTON
MULTIFAMILY RESIDENTIAL
LIFE SAFETY PLANS
G1.04
CONSTRUCTION DOCUMENTS
JKRP
ARCHITECTS


601 WASHINGTON
MULTIFAMILY RESIDENTIAL
G3.10
JKRP
ARCHITECTS


601 WASHINGTON
MULTIFAMILY RESIDENTIAL
G3.20
JKRP
ARCHITECTS


601 WASHINGTON
MULTIFAMILY RESIDENTIAL
G3.40
JKRP
ARCHITECTS


G3.60
601 WASHINGTON
MULTIFAMILY RESIDENTIAL
ARCHITECTS

EMPLOYEE /TENANT RESPONSIBILITIES

- BE FAMILIAR WITH ALARMS FOR EVACUATION AND SHELTERING.
- KNOW CLOSEST TWO EVACUATION AND ESCAPE ROUTES OR SHELTER AREAS.
- KNOW WHO TO CONTACT IN AN EMERGENCY.
- KNOW LOCATION OF ASSEMBLY AREA.
- KNOW EVACUATION COORDINATOR AND FLOOR CAPTAIN.
- STAY CALM AND EXIT QUICKLY.
- REPORT TO DESIGNATED ASSEMBLY AREA.
- FOLLOW INSTRUCTIONS.
- REPORT ANY EXIT OR ESCAPE OBSTRUCTIONS TO SUPERVISOR.
- IF TRAPPED, GO TO A ROOM WITH A WINDOW AND TELEPHONE FOR HELP IF POSSIBLE.

EVACUATION COORDINATOR:

Make sure all Emergency Plans are current and drilled frequently.

Assign appropriate number of Building Captains and Exit Guards to provide coverage at all times the facility is occupied.

Make sure Captains and Monitors know their responsibilities and assignments

Account for all evacuees. Identify the name and last know location of any missing or unaccounted person and pass information on to the Incident Commander.

BUILDING CAPTAINS:

Ensure the evacuation of your assigned area. Perform a sweep of the area, including restrooms, etc. to ensure all persons have been evacuated. Report the status of the evacuation to the Evacuation Coordinator.

EXIT GUARDS:

Make sure all exits are free from obstructions and provide a direct access to the exterior. Remain outside the exit door and prevent any persons from re-entering the building until the “All Clear” is given.

EMERGENCY ACTION LOG

TIME	EVENT/ACTION TAKEN	BY

Whitemarsh TOWNSHIP
616 GERMANTOWN PIKE - LAFAYETTE HILL, PA 19444-1821
TEL: 610-825-3535 FAX: 610-825-9416
www.whitemarshtwp.org

BOARD of SUPERVISORS
Laura Boyle Nester – Chair
Fran McCusker – Vice Chair
Vincent Manuele
Jacy Toll
Patrice Turenne

Richard L. Mellor, Jr.
Township Manager

June 23, 2022

601 Washington Associates, LP
c/o Kevin Kyle
201 King of Prussia Road, Suite 501
Radnor, PA 19087

RE: SLD#09-18 / 601 Washington Street Associates, LP, Conshohocken, PA
Proposed 270 Apartments (Preliminary/Final Land Development Plan)
Zoning Ordinance Compliance Review

Dear Mr. Kyle:

Please accept this as a review of the Zoning Ordinance Compliance issues for your above referenced 37-Sheet Preliminary/Final Land Development Plan submission, prepared by Colliers Engineering and Design, dated March 1, 2022, with revisions dated March 16, 2022 and June 2, 2022. This plan also includes the landscape and lighting plans prepared by Glackin Thomas Panzak Land Planning & Landscape Architecture, dated March 1, 2022 with revisions June 2, 2022. On June 20, 2022 additional documents were provided to address the request by the Planning Commission. These include a site environmental history narrative and Act II plan, an updated emergency action plan, and a written review of the changes in anticipated traffic impact based on 2019 and 2022 analyses.

Please note that the site for this development is zoned HVY Heavy Industrial District with overlays of the Riverfront Development District, Sub-district 1 (RDD-1), the Floodplain Conservation District, and the Riparian Corridor Conservation District. A response letter from Ryan Armour dated June 2, 2022 addressed the issues raised in the original Whitemarsh Zoning Compliance Review letter dated April 20, 2022. All comment numbers are taken from that letter.

1. §116-28.A.(2)

Original Comment: The applicant shall furnish a letter from the appropriate authority indicating the availability and supply of water for the proposed project to the Zoning Officer
Response: A copy of Aqua America's Will Serve letter is attached.
Reply to Response: Comment acknowledged.

2. §116-29.

Original Comment: The applicant must obtain the approval of the Whitemarsh Township Authority with regard to proposed sanitary sewer facilities.
Response: We are working with the Borough of Conshohocken Sewer Authority to obtain approval.
Reply to Response: A 'will serve' letter from the Borough of Conshohocken Sewer Authority Engineer was attached with the June 2, 2022 submission.

3.	§116 33.2. §116-279.	**Original Comment:** In those areas of Whitemarsh Township where an overlay district exists, should the use be that allowed in the underlying district, the underlying requirements shall apply. For the purposes of this review, the requirements of the Riverfront Development Overlay District (RDD-1) are applicable given the use proposed and we note that is what the applicant has utilized. **Response:** Comment acknowledged. **Reply to Response:** No additional comment.
4.	§116-165 §116-166.A.(3)	**Original Comment:** Relief from these two sections (variance and special exception, respectively) to allow nonresidential structures in the Floodplain Conservation District, and to allow a stormwater retention facility in the floodway, was granted as the result of an appeal of a Zoning Hearing Board decision (based on a prior plan) to the Montgomery County Court of Common Pleas. While the Court's decision was appealed in part, the granting of the relief of these two sections, was not appealed. The applicant has relied on this relief for the current plan. There may be additional legal action required to confirm the applicability of this relief; the Township Solicitor will need to determine what additional actions, if any, are necessary. **Response:** Comment acknowledged. **Reply to Response:** The Township Solicitor has determined that no additional actions are necessary; the relief discussed herein may be relied on for the current plan.
5.	§116-166.C.	**Original Comment:** Any new construction must be in full compliance with 44 CFR 60.3(a) through (d) of the National Flood Insurance Program regulations. These regulations require that all new construction and substantial improvements of non-residential structures within Zones AE are required to have the lowest floor elevated 1 ½ feet above the base flood level or, together with attendant utility and sanitary facilities, be designed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. A registered professional engineer or architect shall develop and/or review structural design, specifications, and plans for the construction, and shall certify that the design and methods of construction are in accordance with accepted standards of practice. **Response:** The building will comply with National Flood Insurance Program regulations. **Outstanding Issue:** It appears that there is an electrical equipment pad near the southeast corner of the building. Given the location of the development in the floodplain, there needs to be appropriate floodproofing or elevation to comply with all relevant ordinance requirements. These need to be reviewed and approved by the Township Engineer/Floodplain Administrator. If this electrical equipment is permitted, it must additionally be screened from view as per §116-283.A.(6).

6.	§116-169.B.(1) §116-169.B.(2)	**Original Comment:** There was a lack of clarity regarding slope disturbance calculations for the site that has been resolved. On March 25 ,2022 Mr. Roseberry submitted a series of photographs and a site plan indicating the locations where the photos were taken. These photographs show that mounds of material originally believed to be sloped ground are in fact piles of firewood, gravel, and loose soil and thus the slopes of these piles need not be included in steep slope disturbance calculations. The slope disturbance limitations have been adequately addressed. **Response:** Comment Acknowledged **Reply to Response:** No additional comment.
7.	116-184.A 116-282.E	**Original Comment:** The required number of parking spaces for this plan is based upon Section 116-282.E, in which the RDD overlay requires a minimum of 1.75 spaces per unit. However, there has been a recent amendment to Section 116-184.A. which allows 1.5 spaces per unit to be used for multi-family housing. This lower requirement may be used if desired. **Response:** The site plans have been revised to utilize the 1.5 parking spaces per unit. **Reply to Response:** No additional comment.
8.	§116-184.F.	**Original Comment:** This section does not allow parking within 10 feet of structures; handicapped parking in the entry court is approximately 4 feet from the building. This must be corrected or a variance must be obtained. **Response:** The plans have been revised so that no parking is located within 10 feet of the building. **Reply to Response:** No additional comment.
9.	§116-184.G.	**Original Comment:** All parking shall conform to the requirements of the Whitemarsh Township Fire Prevention Code as enacted and amended. The applicant must obtain approval from the Whitemarsh Township Fire Marshal. He has issued a review memo dated March, 25 2022 (enclosed). **Response**: We will address the Township Fire Marshal comments in a separate response letter. **Reply to Response:** The Fire Marshal will review the response.
10.	§116-279.B.(3)	**Original Comment:** If a structure is otherwise permitted by virtue of the requirements of the RDD, relief from the Zoning Hearing Board from the provisions of Article XXXV - Riparian Corridor Conservation District shall not be required, provided approval is recommended to the Board of Supervisors by the Township Engineer. There is no objection to the location of the structures within the Riparian Corridor Conservation District by the Township Engineer. **Response:** Comment acknowledged. **Reply to Response:** No additional comment.

11. §116-280.H.

Original Comment: In the RDD-1 Sub-district, a minimum of 2% of the footprint area of a residential development must contain a permitted nonresidential use(s), provided, however, that such area shall not be less than 2,000 square feet. We do not see any indication of how this requirement has been met; if it is not, a variance must be obtained.
Response: A non-residential area breakdown table has been added to the Architectural plans, see plan G3.20.
Outstanding Issue: We do not concur that the lobby area should be included as part of the required non-residential area; it is a direct auxiliary use for accessing the residences. Other areas/facilities should be provided to comply with this minimum square-foot area required by this section.

12. §116-282.A.

Original Comment: Parking structures, whether freestanding or integral with other uses in the same building, shall have another permitted first floor use on any portion of the structure visible from any streets, required pathways, or riverfront access or suitable architectural treatment shall be provided. Suitable architectural treatment shall be as defined in Sections 116-282.B., C. and D., and Sections 116-283.A.(2) and (4). There is no indication that an architectural treatment or screening has been provided for the ground floor.
Response: Architectural elevations plans are attached.
Outstanding Issue: Details of the architectural treatment used to obscure views of the parking area must be clearly shown to assess compliance with this section.

13. §116-282.F.

Original Comment: Parking may be permitted in the floodplain and riparian corridor in the RDD without relief from the Zoning Hearing Board from the provisions of Article XXII, Floodplain Conservation District, and Article XXXV, Riparian Corridor Conservation District, provided that a parking evacuation plan is provided by the applicant and is approved by the Board of Supervisors. Such plan must be reviewed and approved by the Emergency Management Coordinator and Police Chief. (Please see enclosed Fire Marshal memo and Emergency Action Plan Checklist.)
Response: The owner will coordinate a parking evacuation plan with the Emergency Management Coordinator and Police Chief.
Reply to Response: The appropriate officials will review these plans.

14. §116-283.

Original Comment: Up to date architectural renderings of building facades are needed to assess compliance with parts of this section.
Response: The current architectural renderings are attached.
Outstanding issue:
Section 116-283.A.2. This section describes façade material requirements. Each façade should have a dominant façade material of 60% or greater. There is a list of permitted and excluded façade materials. The plan shows the dominant façade material to be 'white hardie panel', which we consider a permitted façade material. Calculations of the relative proportions of façade materials should be included to document compliance with the minimum percentage requirement.

15. §116-283.C.

Original Comment: We note that several waivers have been requested from landscape requirements. These will be evaluated by the Planning Commission and Shade Tree Commission. Prior to this proposal being considered by the Board of Supervisors, the Shade Tree Commission must recommend approval of the landscape plans.
Response: The waivers have been updated based on the revised site layout. See Landscape Plan Sheet LP-1 for updated waiver request(s).
Outstanding issue: These waivers will be evaluated by the Planning Commission and/or Shade Tree Commission.

16. §116-283.D.(1)

Original Comment: For all developments the following elements shall be included to create a pedestrian oriented development:

(a) Lighting along all street frontages with lighting fixtures to be of a style as approved by the Board of Supervisors.
(b) Benches, trash receptacles, bicycle racks and other street furniture in a style approved by the Board of Supervisors.
(c) Wide sidewalks and other pedestrian amenities, landscaping, shade trees.
(d) A variety of pavement materials for street surfaces and sidewalks.
(e) Planting strips, located between the curb and sidewalk.

We note there are details of a bench and trash receptacle illustrated in the landscape plan set. Additionally, there are specific recommendations and guidance as to what might be appropriate and required along the riverfront in the Township's Riverfront Plan adopted in 2016. We encourage the applicant to work with the Township to develop an appropriate amenity package.
Response: Lighting, benches, trash receptacles, gathering areas and a variety of pavement materials are shown on the revised Landscape and Site Furniture Plans. The applicant is willing to work with the Township to refine this amenity package as the project progresses.
Outstanding Issue: Additional items that could be included as pedestrian and cyclist amenities include exterior bike racks for visitors, as well as additional benches located near the building entrance. We appreciate the steps taken to create a favorable pedestrian environment as shown on the landscape plans, and will continue to review refinements and provide input to help ensure a safe and pleasant pedestrian environment.

17. §116-284.A

Original Comment: This section requires a 150' area measured from the mean water elevation of the Rivers of the United States/Pennsylvania to be indicated in the plans to be dedicated to the Township or governed by an easement allowing public access. It appears, however, that the applicant has elected to reduce this to 100' in accordance with §116-284.C. (See Comment #18.) Both the mean water elevation and the boundary of the land to be dedicated/reserved must be shown on site plans. There may be several parking spaces located in this area. If this is the case, they must be relocated.
Response: The 100' area along the river that is to be dedicated to the Township has been shown on sheet 7. The parking has been revised so that it no longer encroaches into this area.
Reply to Response: No additional comment.

18. §116-284.C

Original Comment: This section requires the provision of two public amenities if the riverfront area dedicated to the Township or reserved for public use is reduced to 100', rather than the standard 150'. These do not include the river trail which is indicated on the plans as one of the public amenities. The riverfront trail is separately required for all developments with frontage on the river. A list of potential amenities is indicated in §116-283.B.
Response: A dog park and a gazebo have been proposed as public amenities. It should be clear to trail users that these amenities are available for public use.
Outstanding Issue: These amenities must be approved by the Board of Supervisors per §116-283.B.9. We recommend signage to be provided at the Washington Street river access points directing users to the dog park.

19. §116-284.D. §105-47.K.

Original Comment: Public riverfront access is required in accordance with Chapter 105, Subdivision and Land Development, §105-47.K. The plan currently does not provide the dimensional requirements for the riverfront access. A waiver has been requested to reduce the width of the right-of-way to 5' from the required 25'. Additionally, given the site's frontage, it would appear that 2 accesses to the river are required; however, only one is shown.

Response: The plan has been revised to provide the required 25' wide access easement and a 10' wide access path along the eastern and western sides of the site.

Outstanding Issue: The updated plans comply with this section with the exception of the two riverfront access paths being more than 500' apart. We note that a waiver from §105-47.K.(2) of the Subdivision and Land Development Ordinance has been requested to allow for the path spacing. §116-284.D.also requires that the Board of Supervisors approve the lighting plan.

Additional Comments:

20. At the April 26, 2022, Planning Commission Meeting, the Commission asked for a number of additional documents to be submitted before the next meeting. These include:

1. An Emergency Evacuation Plan
2. Environmental history of the site and Act 2 remediation Plan
3. Comments on the preservation and replacement of trees (as illustrated by landscaping plans).
4. Additional testimony about changes in traffic conditions between 2019 and 2022, and the extent to which the plans were modified based on these considerations.

These documents were submitted on Monday June 20, 2022 and will be reviewed by the appropriate officials; the landscaping plan information will be reviewed by the Shade Tree Commission.

Should you have any questions, please do not hesitate to contact me.

Very truly yours,

Charles L. Guttenplan, AICP
Director of Planning and Zoning/Zoning Officer

cc: Richard L. Mellor, Jr., Township Manager
Sean Halbom, Township Assistant Manager
Robert A. Sztubinski, B.C.O., Director of Building and Codes
Nick Weaver, Fire Marshal
Sean P. Kilkenny, Esq., Township Solicitor
Krista Heinrich, P.E., Township Engineer
C. Richard Roseberry, P.E., Colliers Engineering & Design, Inc, Applicant Engineer
Edmund J. Campbell, Jr. Esq. Applicant's Attorney

WHITEMARSH TOWNSHIP

To: Charlie L. Guttenplan, Director of Planning & Zoning/Zoning Officer

From: NICHOLAS W. WEAVER, FIRE MARSHAL

Subject: **SLD #09-18 601 Washington Street**

Date: June 24, 2022

cc:

This application is approved with the following conditions:

1. Fire department connections shall be installed within 100' of the approved hydrants in approved locations.

2. An Emergency Responder Radio Coverage Plan and any necessary permits shall be submitted and approved before construction permits shall be issued. This plan shall meet the requirements as set forth in Chapter 5 of the International Fire Code 2015.
    a. All new buildings shall have approved radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building.

3. Emergency Action Plan shall be reviewed, updated, and approved before residents occupy the building.

Nicholas W. Weaver
Fire Marshal
616 Germantown Pike
Lafayette Hill, PA 19444
Phone: 610-825-3535 ext. 2614
Email: nweaver@whitemarshtwp.org

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

July 21, 2022

Mr. Richard L. Mellor, Jr. - Township Manager
Whitemarsh Township Municipal Building
616 Germantown Pike
Lafayette Hill, PA 19444

RE: Preliminary Plan Review
601 Washington Street
Whitemarsh Township, Montgomery County, PA
S/LD # 09-18
Our Project Number 2022-04053

Dear Mr. Mellor:

As requested, we have reviewed plans for the above referenced Preliminary Plan Submission consisting of:

- 37-Sheet Plan prepared by Colliers Engineering & Design and dated March 1, 2022 and last revised June 2, 2022
- Post Construction Stormwater Management (PCSM) plan narrative prepared by Colliers Engineering & Design and dated March 1, 2022, and last revised June, 2022
- Various supporting documents, forms and correspondence enclosed with the application

The following comments are offered for your consideration:

The applicant is requesting waivers and/or relief from the requirements of the following sections of the ordinance:

	Section	Description
1.	105-30(A)	A waiver would be required in order to not require a tree zone along Washington Street, as required by Section 105-48. The plans show a proposed brick paver sidewalk contiguous with the curb, where section 105-48 requires a tree planting zone of lawn area, situated between the sidewalk and curb and measuring a minimum of five feet in width from the planting edge of the curb to the planting edge of the sidewalk. We recommend a minimum 2-foot grass verge between the curb line and sidewalk be provided to minimize pedestrian and vehicular conflicts. This is consistent with the preliminary typical cross sections within the "Spring Mill Multi - Modal and Land Use Study ".

	Section	Description
2.	105-30(A)	The applicant is requesting a waiver from the requirements of this section of the ordinance, to not require the cartway of Washington Street to be 36± feet, in order to permit a width of 30 feet. We have no objection to the granting of this waiver. The applicant is providing the required cartway half-width of 18 feet for Washington Street along the property frontage and the road cross section is consistent with the recommendations of the "Spring Mill Multi - Modal and Land Use Study ".
3.	105-39(A)	The applicant is requesting a waiver from the requirements of this section of the ordinance, which requires that all parking areas shall have at least one, three-inch-caliper tree for every two parking spaces provided.
4.	105-47(K)(2)	The applicant is requesting a waiver from the requirements of this section of the ordinance, which states that access points to the River must be located no more than 500 feet apart. The plans show two proposed access trails, on either end of the site, which is more than 500 feet wide.
5.	105-48(E)	The applicant is requesting a waiver from the requirements of this section of the ordinance, in order to permit the tree zone along Washington Street to not be located between the sidewalk and curb, where this section of the ordinance requires a tree planting zone of lawn area or other material approved by the Shade Tree Commission, situated between the sidewalk and curb and measuring a minimum of five feet in width from the planting edge of the curb to the planting edge of the sidewalk.
6.	105-52	The applicant is requesting a waiver from the requirements of this section of the ordinance, in order to not require buffers to have a minimum width of 50 feet.
7.	I(B)(4)(k)	The applicant is requesting relief from the requirements of this section of the ordinance, in order to allow edges of slopes to be less than five feet from property lines, in order to allow for construction of the proposed trails, which terminate at the property lines. We have no objection to the granting of this relief.

SUBDIVISION AND LAND DEVELOPMENT ORDINANCE

	Section	Description
8.	105-21(B)(1)(l)	The plans indicate an "area of apparent overlap" at the Southwestern Corner of the site. Property Boundaries must be resolved and properly monumented prior to final plan approval.
9.	105-21(B)(9)(d)[6]([a]	All streets and/or intersections showing a level of service below C shall be considered deficient, and the applicant's traffic engineer should provide a brief narrative listing specific recommendations for the elimination of these problems. Deficiencies are noted at the intersection of Ash Street and Elm Street with a delay increase of more than 10 seconds for the eastbound left-turn critical movement. This intersection is located in Conshohocken Borough. Any modifications to the intersection are subject to the review of the Borough or PennDOT.

	Section	Description
10.	105-21(B)(9)(d)[6]([a]	Overall the Traffic Impact Study was conducted in accordance with traffic engineering standards. There are minor technical discrepancies on the Figures, Table 6 and Capacity Analysis Worksheets for the PM LOS for Elm Street and Cherry Street but they do not affect the overall analysis. In our opinion the report conducted is acceptable.
11.	105-21(B)(10)(a), 105-78	The applicant shall submit a letter from the appropriate municipal authority indicating the availability of public sanitary sewer facilities.
12.	105-21(B)(15)	A Preliminary Resource Impact and Conservation Plan (the "Preliminary Impact Plan") shall be prepared for all Major Subdivision and Land Development applications to categorize the impacts of the proposed activities and physical alterations on those resources shown on the ERSAP. All proposed improvements, including but not necessarily limited to grading, fill, streets, buildings, utilities and stormwater management facilities, as proposed in the other Preliminary Plan documents, shall be taken into account in preparing the Preliminary Impact Plan, which shall clearly demonstrate that the applicant has minimized site disturbance to the greatest extent practicable.
13.	105-21(B)(17)(e)	The applicant shall submit a Community Association Document consistent with the requirements of this section of the ordinance.
14.	105-21(B)(18)	The applicant shall submit a 'Preliminary Common Open Space Ownership and Management Plan' consistent with the requirements of this section of the ordinance.
15.	105-21.1(K)(2)	Within the South Transportation Service Area an impact fee in the amount of Two Thousand Five Hundred and Twenty-Nine Dollars ($2,529.00) per anticipated peak hour trip must be provided by the applicant. Based on data documented within the latest edition of the ITE Trip Generation Manual, the proposed development will generate 106 PM peak hour trips. Therefore, the traffic impact fee totals $268,074.00 ($2,529.00 x 106 peak hour trips).
16.	105-26(E)	The applicant must provide evidence in sufficient detail to demonstrate that there are no environmental concerns related to previous uses of the site. Additional information must be provided related to the site's participation in the PADEP Act 2 Program, related to the former industrial uses.
17.	105-30	The applicant is proposing a brick paver sidewalk and granite curb along Washington Street. We have no objection to these materials, however we recommend the Planning Commission consider the materials, since Washington Street is largely unimproved and it may be desirable to utilize consistent materials along its length.

	Section	Description
18.	105-30(A)	The plans must be revised in accordance with the following: a. The plans must be revised to include roadway lane and shoulder dimensions. b. Washington Street must be designed so that the centerline, striping and cross section will be continuous along the length of the Street. It is recommended that a plan be prepared showing Washington Street from the municipal boundary to the Street terminus. This plan should show the road centerline, cartway edge and striping. The plan should consider the recommended cross section on Page 49 of the "Spring Mill Multi - Modal and Land Use Study[1]" and be coordinated with pending future land developments at 401/433 and 901 Washington Street. c. Shoulder tapers are not recommended at the western and eastern property lines. The plans must be revised to allow for connection by potential future improvements on adjacent properties.
19.	105-38(C), 105-76	The applicant must obtain a letter of approval from the Township Fire Marshal in order to ensure that adequate fire protection is provided.
20.	105-40, 105-50(C)(2)	The applicant should provide testimony describing the process for garbage collection. The plans appear to show indoor garbage collection locations, and an outdoor collection area.
21.	105-47(K)(3)	The perpendicular access to the River must be revised in order to be a red shale macadam pathway.
22.	105-52	The plans must be revised to provide a buffer between Washington Street and the SEPTA train tracks. Consideration must be given to restricting pedestrian access to the tracks by means of plantings, fencing, low walls or other safety measures. We recommend coordination with SEPTA with regard to safety along the tracks.
23.	105-52	All landscaping plans are subject to the review and approval of the Shade Tree Commission.
24.	105-53(D)	This section of the ordinance requires the dedication of land in the amount of 10% of the total Site Area for Park and/or Recreational use. The applicant has the option of offering a fee in lieu of dedicating actual land area and can also provide a combination of a fee in lieu and dedication of land. All offers of land and/or fees in lieu of dedication must meet the requirements of this section of the ordinance. If actual land area is offered, the applicant is advised that this section of the ordinance states that no more than 25% of the minimum land area required for park and recreation land may consist of floodplain or riparian corridor buffer areas, wetlands or areas with slopes in excess of 8%.
25.	105-69(C)	The Washington Street Typical Cross Section on Sheet 16 must be revised to call for a 25mm Superpave Binder Course.

[1] http://www.whitemarshtwp.org/DocumentCenter/View/3323/Whitemarsh-Spring-Mill-Multi-Modal-and-Land-Use-Study---Final-Report

	Section	Description
26.	105-78(C) 105-79	All preliminary plan submissions shall include a completed sewage facilities planning module (the planning module) for land development provided by DEP.
27.	105-83(E)	No Removal of a tree shall be permitted unless the applicant obtains a recommendation from the Shade Tree Commission based on a tree survey and removal plan submitted in accordance with Chapter 55 of the Whitemarsh Township Code.
28.	105-89	The developer shall enter into a written agreement with the Township in the manner and form approved by the Solicitor wherein the developer shall agree, to construct or cause to be constructed at his own expense all proposed improvements shown on the approved land development plan, all in strict accordance with the standards and specifications of the Township and within the time specified in said agreement, and to deposit with the Township financial security in an amount sufficient to cover the cost of all subdivision or land development improvements, including both public and private improvements.

CHAPTER 55 - TREE PROTECTION STANDARDS

	Section	Description
29.	55-4(A)(4)	The tree survey plan shall be reviewed by the Shade Tree Commission in a public meeting.

GRADING, EROSION CONTROL, STORMWATER MANAGEMENT AND BEST MANAGEMENT PRACTICES ORDINANCE:

	Section	Description
30.	58-4(B)(2)(p)	The plan must be revised to show the size, location and construction details of all existing and proposed storm drainage facilities. The next upstream or downstream structure and pipe slope for an existing 36” RCP within Washington Street Must be shown.
31.	58-4(D)(1)	Since the limit of disturbance is greater than one acre, the applicant must obtain a National Pollutant Discharge Elimination System (NPDES) permit from the Pennsylvania Department of Environmental Protection. Once obtained, a copy must be submitted to the Township.
32.	58-8(H)	All easements must be documented in the form of an easement agreement, approved by the Township Solicitor and recorded at the Recorder of Deeds for Montgomery County.

	Section	Description
33.	58-11(G)(1) 58-11(H)(1)	The property owner shall sign an operations and maintenance agreement with the Township addressing stormwater BMPs that are to be privately owned. The plans indicate that the lot owner is responsible for the "Ownership and Maintenance" of the BMPs. The operation and maintenance agreement shall be subject to review and approval of the Township.

RESOLUTION 2004-8:

	Section	Description
34.	I(C)(5)	Fills shall not encroach on natural watercourses, floodways, floodway fringes, constructed channels, or on wetlands unless permitted by the Army Corps of Engineers, Pennsylvania Department of Environmental Protection and approved by the Township.
35.	I(C)(6)	Fills placed adjacent to natural watercourses, floodways, floodway fringes, constructed channels, or wetlands shall have suitable protection against erosion during periods of flooding, where approved by the Army Corps of Engineers, the Pennsylvania Department of Environmental Protection, and the Township.
36.	II(A)(8)	If in the course of reviewing the stormwater management plan, the Township Engineer determines that off-site improvements are necessary to satisfactorily control the stormwater from the site, the applicant shall be responsible for such off-site improvements.
37.	II(B)(16)	The applicant must submit legal descriptions for any proposed rights-of-way, easements, or lands to be offered for dedication.
38.	II(F)(3)(d)(4)[e][7]	The volume below the MRC water storage elevation (44.60) shall not be used in computing the storage volume of the stormwater management facility, since this volume will be normally full. Appendix F of the Stormwater Management report appears to show storage volume below 44.60 was utilized in the basin routing.

ADDITIONAL COMMENTS

39. The proposed improvements will require the applicant to obtain a Chapter 105 Water Obstruction and Encroachment General Permit, administered by the Pennsylvania Department of Environmental Protection (PADEP) Bureau of Waterways Engineering and Wetlands. Once obtained, the permit must be submitted to the Township.

40. On Sheet 5, revise the quantity of Sign C (10) in the sign legend to reflect the number of signs noted on the plan.

Any future submission of the design plans for this project must be accompanied by a letter, prepared by the applicant's engineer, which addresses each of the comments contained in this report. Should you have any questions regarding this matter, please do not hesitate to contact me at this office.

Sincerely,

Krista Heinrich, PE
Township Engineer

c: Mr. Sean Halbom – Assistant Township Manager
Mr. Charles L. Guttenplan, AICP – Director of Planning and Zoning
Mr. Sean Kilkenny, Esq.; The Law Offices of Sean Kilkenny, LLC – Township Solicitor
Mr. Allen B. Mason, P.E., Carroll Engineering – Whitemarsh Township Authority Engineer
Mr. Kevin Kyle - 601 Washington Street Associates, LP
C. Richard Roseberry, PE– Colliers, Applicant's Engineer
Edmund J. Campbell, Jr. Esq., Applicant's Attorney

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WHITEMARSH TOWNSHIP

To: Richard L. Mellor, Jr., Township Manager

From: SEAN HALBOM, ASST. TOWNSHIP MANAGER

Subject: **601 Washington Street (SLD# 09-18) 270-unit apartment buidling**

Date: September 21, 2022

cc: **Krista Heinrich, P.E., Charlie Guttenplan, AICP**

Chris Garrity presented on behalf of the applicant. He displayed the plans included in the meeting agenda packet (Sheet LP-1) and provided a brief overview.

The applicant noted a 60" Heritage Tree (A Maple) that would be preserved. The applicant provided a breakdown of the replacement count, totaling 82 trees to be removed (1,150 inches) requiring 384 replacement trees. The applicant requested waivers to utilize the replacement species to layer understory trees, shrubs, and groundcover. These account for 252 replacement trees, leaving an outstanding 132 required replacement trees, or 396".

The applicant also requested a waiver to use larger caliper trees. 42 trees would be 3" caliper (126" replacement value), 20 trees would be 4" caliper (80" replacement value), and ten trees would be 5" caliper (50" replacement value). This left a remainder of 47 outstanding replacement trees, or 140". The applicant requested a waiver to replace the remaining 47 trees with a fee in lieu of planting.

The applicant next displayed the Landscape Plan (LP-2) and described the species being planted on the "Plant List". He offered that not all, but the majority of trees were native species. Chair Ziegler asked if 50% of the trees and plant material are native. Chris replied that he had not completed a percentage count, but anticipated it's around 75%. John Hosbach replied that the total count was well above 50%.

Chair Ziegler asked for Commission Comments. Christian Fassbender asked to review the street trees around Washington Street. Chris replied they were using Swamp White Oak. Christian asked John if that would provide amble shade over the street area. Chris shared that parking lot areas that did not have underground storm water management features have shade trees planted over them. Mr. Halbom asked the applicant to verify that none of the street trees were also counted toward Chapter 105 requirements. The applicant replied that those trees were not double-counted and called attention to the plans under section 105-48. Christian asked John Hosbach if he was comfortable with the layering on the site. John replied that he was satisfied with the layering.

The applicant was asked to review the riparian area on the slope. He shared the limitations presented by the slope but offered that the area was planted as best possible. Dave D'Amore asked John Hosbach if he was satisfied with the planting plan, and if it was maxed out, necessitating the use of a fee in lieu. John replied that the site was maxed out, and the use of fee in lieu was appropriate in these circumstances. Chair Ziegler asked for public comment.

Sean Halbom, MPA
Assistant Township Manager
616 Germantown Pike
Lafayette Hill, PA 19444
Phone: 610-825-3535 ext. 2604
Email: shalbom@whitemarshtwp.org

Christian Fassbender motioned to approve the plans and grant the requested waivers subject to the following conditions:

- **The applicant pay a fee in lieu of planting trees in the amount of $23,500.**
- **The applicant substitutes the Japanese Spiraea, Anthony Waterer, and Spiraea Japonica with native species presented on the plans at this evening's meeting.**

David D'Amore seconded the motion. The motion passed 4-0.