Appendix B

Geology & Soils

"A nation that destroys its soils destroys itself. Forests are the lungs of our land, purifying the air and giving fresh strength to our people."

— Franklin Delano Roosevelt

Geology

Though seldom seen or considered, a region's geology plays an important role in all parts of the natural and built world above it. Underlying geology will influence the topography of an area, as well as, its soil types, hydrology, both surface and subsurface, vegetative communities and building suitability. Conceivably the most important geologic feature of Whitemarsh Township is the limestone formation which traverses the Township. The extraction and processing of lime for agriculture and construction have played major roles in the economic and land use development patterns of the Township.

Montgomery County is located within the Triassic Lowland and Piedmont Upland section of the Piedmont Province. The northern two thirds of the county are located in the Triassic Lowlands and the remaining part is located within the Piedmont Upland. Whitemarsh Township straddles the divide between the Piedmont Upland and Triassic Lowland sections found in Montgomery County.

The northern third of the Township is primarily underlain by the Stockton Formation, comprised of sandstones, shale and conglomerates. The middle third is underlain by the Ledger, Elbrook and Conestoga Formations; these are comprised of either dolomite, in the case of the Ledger, or limestone, in the case of the Elbrook and Conestoga. The southern portion of the Township is located above the Wissahickon Formation, which is comprised of schist, granite gneiss and hornblend gneiss. Situated throughout the township, mostly where other Formations meet, intrusions of the Chickies Formation, comprised of quartzite and quartz schist can be found.

Soils

Soils form primarily by weathering of bedrock and therefore have characteristics similar to those of the underlying rock formations. Soil characteristics are not however static, they are continually changing over time due to the actions of continued bedrock weathering and the activity of micro-organisms. As a result soils above similar geologies will vary with respect to depth to bedrock, depth to groundwater, color, mineral characteristics, fertility, erodibility and texture. Soils subsequently have a large influence on land cover and vegetation types, quality and quantity of groundwater, rates of erosion, and the aesthetic qualities of the landscape.

Whitemarsh Township's highly productive soils made it an attractive location to farmers, beginning in the 1600s. Portions of the Township are still prized for their fertility and agricultural suitability and productivity.

Soil in Whitemarsh Township is comprised of 72 different soil types. While each type has distinct characteristics, the soils can be grouped into a soil series. The series describes the overall characteristics of the soils with each series. The non-technical descrip-

tions for each soil series found in the Township are described below.

Abbottstown Series · The Abbottstown series consists of deep, somewhat poorly drained soils on uplands; formed in material weathered mainly from shale, siltstone and sandstone. The series is 36-80 inches to bedrock. Permeability is slow and available water holding capacity is medium. A water table when present is 0.5 to 1.5 feet. The soil productivity is moderate.

Alluvial Land · Alluvial land is found on the flood plains of small streams. It consists of frequently flooded, somewhat poorly drained and poorly drained soils formed in alluvium. Most suitabilities are constrained by wetness and flooding.

Beltsville Series · The Beltsville series consists of deep, moderately well-drained soils on uplands; formed by coastal plain sediments. The series is 60-99 inches to bedrock. Permeability is moderately slow and water holding capacity is medium. A water table when present is 1.0-2.5 feet. The soil productivity is moderate.

Bouldery Alluvial Land · These are areas of cut, fill and rubble or other areas with inconsistent natural soil properties and on-site investigations would be needed to determine specific suitabilities.

Bowmansville Series · The Bowmansville series consists of very deep, poorly and somewhat poorly drained soils on flood plains; formed in alluvium. The series is 36 to 96 inches to bedrock. Permeability is moderately slow and available water holding capacity is high. A water table when present is 0.0-0.5 feet. The soil productivity is high.

Chester Series · The Chester series consists of very, deep, well drained soils on uplands; formed in material weathered from micaceous schist. These soils typically are 60 to 99 inches to bedrock. Permeability is moderate and available water holding capacity is medium. A water table when present is greater than 6 feet. The soil productivity is very high.

Chalfont Series · The Chalfont series consists of deep, somewhat poorly drained soils on uplands; formed in loess and underlying residuum. The series is 48 to 96 inches to bedrock. Permeability is slow and water holding capacity is medium. A water table when present is 0.5-1.0 feet. The soil productivity is moderate. Permeability is moderate and water holding capacity is high. A water table when present is 1.0-2.5 feet. The soil productivity is very high.

Codorus Series · The Codorus series consists of deep moderately well and somewhat poorly drained soils formed in recently deposited micaceous sediments washed from uplands. These soils are typically 60 to 72 inches to bedrock.

Croton Series · The Croton series consists of deep, poorly drained soils on uplands; formed in medium or moderately-fine textured materials mainly over argillite, siltstone or shale. The series is 40 to 60 inches to bedrock. Permeability is moderately slow and available water holding capacity is low. A water table when present is 0.0–0.5 feet. The soil productivity is low.

Doylestown Series · The Doylestown series consists of deep, poorly drained soils on uplands; formed in silty materials over many types of rock. The series is 48 to 96 inches to bedrock. Permeability is slow and available water holding capacity is low. A water table when present is 0.0-0.5 feet. The soil is generally not used for row crops.

Duffield Series · The Duffield series consists of very deep and deep, well drained soils on uplands; formed in material weathered from impure limestone. The series is 48 to 99 inches to bedrock. Permeability is moderate and available water holding capacity is high. A water table when present is greater than 6 feet. The soil productivity is very high.

Edgemont Series · The Edgemont series consists of deep and very deep well drained soils on uplands; formed in materials weathered over quartzite, metaquartzite and conglomerate. These soils are typically 48 to 99 inches to bedrock. Permeability is moderate and available water holding capacity is low. A water table when present is greater than 6 feet. The soil productivity is high.

Glenelg Series · The Glenelg series consists of very deep, well drained soils on uplands; formed in micaceous material weathered mainly from schist and gneiss. These soils are typically 30 to 60 inches to bedrock. Permeability is moderate and available water holding capacity is high. A water table when present is greater than 6 feet. The soil productivity is very high.

Glenville Series · The Glenville series consists of very deep, moderately well to somewhat poorly-drained soils on uplands. The soils are typically 48 to 96 inches to bedrock. Permeability is slow and available water holding capacity is medium. A water table when present is 1.0-2.5 feet. The soil productivity is moderate.

Hatboro Series · The Hatboro series consists of deep poorly drained soils on flood plains; formed in recently deposited micaceous sediments washed from uplands. The series is typically 48 to 96 inches to bedrock. Permeability is moderate and available water holding capacity is high. A water table when present is 0.0 – 1.0 feet. The soil productivity is high.

Howell Series · The Howell series consists of deep, well drained soils on uplands; formed in coastal plain sediments. The series is 72 to 99 inches to bedrock. Permeability is moderately slow and available water holding capacity is high. A water table when present is 2.5 – 3.0 feet. The soil productivity is high.

Lansdale Series · The Lansdale series consists of deep, well drained soils on uplands; formed in residuum weathered from sandstone and conglomerate. The series is 40 to 99 inches to bedrock. Permeability is moderate and available water holding capacity is low. A water table when present is greater than 6 feet. The soil productivity is high.

Lawrenceville Series · The Lawrenceville series consists of deep, moderately well drained soils on uplands and terraces; formed in silty transported materials. The series is 48 to 99 inches to bedrock. Permeability is moderately slow and available water holding capacity is high. A water table when present is 1.0 – 2.0 feet. The soil productivity is moderate.

Made Land · Made land is mostly comprised of cut, fill, rubble land or other areas with little or no natural soil or are soils with such variable properties that on-site investigations are needed to determine suitability for most uses.

Manor Series · The Manor series consists of very deep, well drained to somewhat excessively drained soils on uplands; formed in materials weathered mainly from micaceous schist. These soils are typically 24 to 99 inches to bedrock. Permeability is moderate and available water holding capacity is medium. A water table when present is greater than 6 feet. The soil productivity is moderate.

Murrill Series · The Murrill series consists of very deep, well drained soils on uplands; formed from colluvial material. These soils are typically 60 to 99 inches to bedrock. Permeability is moderately slow and available water holding capacity is medium. A water table when present is greater than 6 feet. The soil productivity is high.

Neshaminy Series · The Neshaminy series consists of deep and very deep well drained soils on uplands; formed in material weathered from mixed basic and acidic rocks. The series is 36 to 72 inches to bedrock. Permeability is moderately slow and available water holding capacity is medium. A water table when present is greater than 6 feet. The soil productivity is high.

Penn Series · The Penn series consists of moderately deep, well drained soils on uplands; formed in materials weathered from red shale, siltstone and fine grained sandstone. The series is 10 to 36 inches to bedrock. Permeability is moderate and available water holding capacity is low. A water table when present is greater than 6 feet. The soil productivity is moderate.

Raritan Series · The Raritan series consists of very deep, moderately well drained and somewhat poorly drained soils on stream terraces; formed in stream deposits washed from uplands underlain by reddish shale, siltstone and sandstone. The series is 48 to 99 inches to bedrock. Permeability is moderately slow and available water holding capacity is medium. A water table when present is 1.0 – 2.5 feet. The soil productivity is moderate.

Readington Series · The Readington series consists of deep, moderately well drained soils on uplands formed in material weathered from red shale, siltstone and sandstone. The series is 36 to 60 inches to bedrock. Permeability is moderately slow and available water holding capacity is low. A water table when present is 1.5–2.5 feet. The soil productivity is moderate.

Reaville Series · The Reaville series consists of moderately deep, moderately well and somewhat poorly drained soils on uplands; formed in material weathered from interbedded Triassic red shale and siltstone. The series is 12 to 36 inches to bedrock. Permeability is slow and available water holding capacity is low. A water table when present is 0.5–2.0 feet. The soil productivity is low.

Rowland Series · The Rowland series consists of very deep, moderately well to somewhat poorly drained soils on flood plains; formed in alluvial sediments.

The series is 48 to 72 inches to bedrock. Permeability is moderately slow and available water holding capacity is high. A water table when present is 1.0 – 2.0 feet. The soil productivity is very high.

Agricultural Soils

Primary Agricultural Soils

There are 17 primary agricultural soils in Whitemarsh Township. These soils comprise approximately 3,900 acres.The soil types are listed below.

1. Beltsville silt loam
2. Chester silt loam
3. Codorus silt loam
4. Duffield silt loam
5. Edgemont channery silt loam
6. Glenelg silt loam
7. Glenville silt loam
8. Howell silt loam
9. Lansdale silt loam
10. Lawrenceville silt loam
11. Manor channery silt loam
12. Neshaminy silt loam
13. Penn silt loam
14. Penn-Lansdale loams
15. Raritan silt loam
16. Readington silt loam
17. Rowland silt loam

Agricultural Soils of Statewide Importance

There are 15 soil types considered to be agricultural soils of statewide importance. These soils comprise approximately 2,200 acres of land. The soil types are listed below.

1. Abbotstown silt loam
2. Bouldery alluvial land
3. Bowmansville silt loam
4. Chalfont silt loam
5. Duffield silt loam
6. Edgemont channery loam
7. Glenelg silt loam
8. Hatboro silt loam
9. Lansdale loam
10. Lawrenceville silt loam
11. Manor channery silt loam
12. Penn-Lansdale loam
13. Penn silt loam
14. Readington silt loam
15. Rowland silt loam

Seasonal high water table

The following soil types are typically associated with a seasonal high water table:

1. Abbotstown silt loam
2. Beltsville silt loam
3. Bouldery alluvial land
4. Bowmansville silt loam
5. Chalfont silt loam
6. Codorus silt loam
7. Croton silt loam
8. Doylestown silt loam
9. Glenville silt loam
10. Hatboro silt loam
11. Lawrenceville silt loam
12. Raritan silt loam
13. Readington silt loam
14. Reaville silt loam
15. Rowland silt loam

Appendix B · Geology & Soils

Geologic Hazards

The most serious geologic hazard in Whitemarsh Township is hydric soil. In Whitemarsh Township, there are 13 distinct hydric soil types. They are listed below.

1. Abbottstown silt loam
2. Beltsville silt loam
3. Bowmansville silt loam
4. Chalfont silt loam
5. Croton silt loam
6. Doylestown silt loam
7. Glenville silt loam
8. Hatboro silt loam
9. Lawrenceville silt loam
10. Raritan silt loam
11. Readington silt loam
12. Reaville shaly silt loam
13. Rowland silt loam