III.E Geology, Soils and Topography

Geology

1. Introduction and Principal Conclusions

The proposed project will have little to no impact to geological resources due to the relatively deep depth to bedrock as determined by the geotechnical investigations, and any impacts will be fully mitigated.

Geotechnical investigations were conducted on the site, and borings were drilled within the four proposed building footprints to depths of 12 to 22.5± feet below existing grade. The stormwater and septic test pits were advanced to depths ranging from 5.5 to 12± feet and 8 to 10.5± feet, respectively. Bedrock was not encountered to the depths explored. Since bedrock is very far below the surface, blasting is not expected to be needed to remove bedrock. Conventional earth excavation equipment is anticipated to be used to handle all grading activities. If it is determined to be necessary, blasting will be conducted in accordance with applicable local, state, and federal regulations including Town Code Chapter 71, "Explosives and Blasting." Blasting is strictly controlled by local, state, and federal regulations.

2. Existing Conditions

a. Composition And Thickness Of Subsurface Material

According to the study "Bedrock Geology of Parts of Putnam and Westchester Counties, New York, and Fairfield County Connecticut," published in 1968, the subsurface geology of the site and the surrounding region is part of the Hudson Highlands formation which extends from the northern Housatonic Valley of Connecticut southwest through Putnam County and onward to form part of the

New Jersey Highlands. This formation is known to extend as far west as Reading, Pennsylvania.

The Hudson Highlands formation is the oldest and the dominant of the two rock formations found in Putnam County. Classified as a Precambrian age formation, it is comprised of a complex of gneisses, migmatite, calc-silicate bearing marble, granite and granodiorite. The specific formation underlying the project site is hornblende-biotite-quartz-plagioclase gneiss with intercalated marble. Typical of granite-gneiss complexes, the underlying rock formation is very resistant to weathering, as reflected in the rugged topography and higher altitude of the project area.

Drumlins (glacial land forms in the shape of smoothly rounded oval hills, two of which are the dominant land form on the project site) typically lie in a zone behind the terminal or recessional moraine, resulting from the receding of the glaciers of the last ice age. Between moraines, the ground surface left behind by the ice is usually termed a ground moraine. Commonly, ground moraines are thick, burying the bedrock under deep layers of glacial till. This is the case for the project site.

b. Depth To And Nature Of Bedrock Conditions

A subsurface investigation of the site was conducted by SESI Consulting Engineers during September 1987 over the entire property, and has been updated to provide additional data for the specific areas proposed for construction of the project. The 1987 investigation consisted of advancing (8) soil borings using hollow-stem augers and excavating fifty-two (52) test pits using a rubber-tired backhoe. The soil borings were advanced to a maximum depth of approximately 27 feet below existing grade, while the test pits were excavated to depths ranging from 7 to 11 feet below the existing grade. Bedrock was encountered in neither the borings nor the test pits.

According to a field survey of the site conducted in the fall of 1985, bedrock was found to be close to the surface (5-10 feet) along the western property boundary in the cut made by a stream, with outcrops occurring at the extreme southwest corner; however, neither of these areas is proposed to be developed. Depth to bedrock in the northeastern portion of the site in the vicinity of Fields Corner Road is also shallow (10-20 feet). Actual rock outcroppings in the vicinity of Fields Corner Road, however, are limited to the eastern side of the roadway outside of the property boundaries. Bedrock underlying the site is undifferentiated granite, gneiss and schist. Due to its considerable depth over the majority of the site, bedrock is not considered a constraint to development.

A subsequent subsurface investigation of the site for the proposed project was conducted by SESI Consulting Engineers during early 2018 (see Appendix E-1). The field investigation consisted of observing seventy-three (73) test-pits and twenty-six (26) borings. Fifteen (15) borings and four (4) test pits were performed within the vicinity of the proposed buildings, eleven (11) borings along Pugsley Road, thirty-two (32) test pits within the proposed septic fields, and forty-one (41) test pits within the vicinity of the proposed stormwater management areas.

The borings were drilled within the four proposed building footprints to depths of 12 to 22.5± feet below existing grade. The stormwater and septic test pits were advanced to depths ranging from 5.5 to 12± feet and 8 to 10.5± feet, respectively. Bedrock was not encountered to the depths explored.

3. Future Without the Proposed Project

Without the proposed project, there would no subsurface excavation and no impact to bedrock geology, which is unlikely in any event since bedrock is far below the surface in the areas proposed for excavation. Therefore, there would no potential at all for rock removal including via the low likelihood for blasting.

4. Anticipated Impacts

a. Potential For Blasting

As noted above, the borings taken in 1987 on the site indicate that no bedrock is encountered to depths ranging from 20 to 27 feet below the existing grade, and from the 2018 investigation no bedrock was encountered from 12 to 22.5± feet below existing grade. Since bedrock is very far below the surface, blasting is not expected to be needed to remove bedrock. Conventional earth excavation equipment will be used to handle all grading activities. As noted in the 1987 subsurface investigation report prepared by SESI, to facilitate excavation of soils that are dense to very dense within the moraine, a large bulldozer, equipped with a ripper, may be required to loosen the soil matrix.

5. Mitigation Measures

If it is determined to be necessary, blasting will be conducted in accordance with applicable local, state, and federal regulations including Town Code Chapter 71, "Explosives and Blasting." Blasting is strictly controlled by local, state, and federal regulations.

The licensed blasting specialist will follow all of the blasting regulations. The blasting of material will be conducted so as not to cause any damage to off-site buildings or structures. All blasting will be under the direct supervision of persons approved and licensed by New York State.

Soils

1. Introduction and Principal Conclusions

No significant adverse impacts to soils are anticipated for the proposed project. An Erosion and Sediment Control Management Program will be implemented for the proposed development, beginning at the start of construction and continuing throughout its course, mitigating any potential adverse impacts to soils.

The soils map for the site as presented in the DEIS depicts the location and acreages of soils within the limit of disturbance. The majority (85%) of the proposed disturbance is situated within Paxton fine sandy loam, and approximately 14% is within Woodbridge loam. These soils do not present severe limitations such as those that are very steep, very stony, which have a shallow depth to bedrock, or which are very wet.

The geotechnical investigation conducted during early 2018 concluded that from a soils and foundation support standpoint, the existing subsurface conditions can be considered good with respect to providing satisfactory support of the planned buildings and roadways.

The intent of the grading design of the site is to balance the earthwork, such that no excess material will need to be exported off of the site, and no material will need to be brought into the site as fill. Currently, the existing grading design results in slightly more cut than fill. The site is large, and this excess amount of excavated material will be utilized as berm material within the limit of disturbance.

2. Existing Conditions

a. Soil Types, Characteristics, And Limitations

Soil types for the site have been mapped by the Natural Resource Conservation Service (NRCS) web soil survey, along with their hydrologic grouping, as depicted on Figure III.E.1, with their location, percent coverage, and area. The soils present on the site are as follows:

Symbol	Soil Name
Sh	Sun loam
Sm	Sun loam, extremely stony
ChE	Charlton loam, 25 to 35 percent slopes
PnB	Paxton fine sandy loam, 3 to 8 percent slopes
PnC	Paxton fine sandy loam, 8 to 15 percent slopes
PnD	Paxton fine sandy loam, 15 to 25 percent slopes
PoB	Paxton fine sandy loam, 0 to 8 percent slopes, very stony
PoC	Paxton fine sandy loam, 8 to 15 percent slopes, very stony
WdA	Woodbridge loam, 0 to 3 percent slopes
WdB	Woodbridge loam, 3 to 8 percent slopes
WdC	Woodbridge loam, 8 to 15 percent slopes
CrC	Charlton-Chatfield complex, rolling, very rocky
Ce	Catden muck, 0 to 2 percent slopes
RdB	Ridgebury loam, 3 to 8 percent slopes
RgB	Ridgebury loam, 2 to 8 percent slopes, very stony
Pa	Palms muck
Ff	Fluvaquents – Udifluvents, complex, frequently flooded
Uc	Udorthents, wet substratum

Descriptions of these soil types follow, including their hydrologic group (see Figure III.E-1 for locations). Hydrologic group is a group of soils having similar runoff potential under similar storm and cover conditions. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonally high water table, intake rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The influence of ground cover is treated independently.

Soils are placed into four hydrologic groups: A, B, C, and D. Definitions of the hydrologic groups are as follows:

A. Low runoff potential. The soils have a high infiltration rate even when thoroughly wetted. They chiefly consist of deep, well drained to excessively drained sands or gravels. They have a high rate of water transmission.

B. The soils have a moderate infiltration rate when thoroughly wetted. They chiefly are moderately deep to deep, moderately well drained to well drained soils that have moderately fine to moderately coarse textures. They have a moderate rate of water transmission.

C. The soils have a slow infiltration rate when thoroughly wetted. They chiefly have a layer that impedes downward movement of water or have moderately fine to fine texture. They have a slow rate of water transmission.

D. High runoff potential. The soils have a very slow infiltration rate when thoroughly wetted. They chiefly consist of clay soils that have a high swelling potential, soils that have a permanent high water table, soils that have a

claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. They have a very slow rate of water transmission.

As indicated on Figure III.E-1, CrC and ChE soil units are classified within hydrologic group B; the PnB, PnC, PnD, PoB and PoC soil units are classified within hydrologic group C; and dual hydrologic soil groups for certain wet soils that could be adequately drained (the first letter applies to the drained soil and the second letter applies to the undrained soil condition), with the Ff and Uc soil units classified within dual hydrologic group A/D; the RdB, RgB, Pa and Ce soil units classified within dual hydrologic group B/D; and the WdA, WdB, WdC, Sm and Sh soil units classified within dual hydrologic group C/D. .

Sun Soils

The Sun series consists of deep, poorly-drained and very poorly drained soils of medium to moderately coarse texture. Formed in medium to high lime glacial till, these soils are defined as having slopes ranging between 0 and 3 percent. Usually the water table is at or immediately below the surface, though during dry periods it may be as much as two to three feet below the surface. Permeability is moderate on the surface and slow in the subsoil and substratum. (Soil permeability is the ability of a soil to transmit water and air.) Sun soils have a moderate load-carrying capacity and a low shrink-swell potential. (Load-carrying capacity is the capability of a soil to support loads applied to the ground, such as a building or other structure placed on the soil. A soil's shrink-swell potential refers to the extent to which a soil shrinks or swells with changes in soil moisture content.) Sun soils can be found in the two drainageways along the eastern central and western central portions of the site. A small area along the northern boundary of the site is mapped as Sun loam.

Charlton Soils

Charlton soils are generally deep, well-drained medium to moderately coarse-textured soils with slopes that range from 0 to 45 percent. Soils in this series are formed by gravelly and stony glacial till deposits sourcing mainly from schist and gneiss. The water table lies well below the surface throughout most of the year with seasonal fluctuations to within three feet of the surface. Permeability is moderate to moderately rapid throughout. Charlton soils have a medium load-carrying capacity and a low shrink-swell potential. A lineal section of Charlton soils is found along the western portion of the project site.

Paxton Soils

Paxton is one of the two dominant soil classifications on the project site, the other being Woodbridge loam. The proposed buildings are primarily sited on these Paxton soils. The Paxton series consists of deep, well-drained soils found on the tops and side slopes of drumlins and hills. Ranging from non-stony to very stony, these soils formed in compact, loamy, low to medium lime glacial till derived mainly from gneiss, schist, and granite. Slopes vary from 0 to 35 percent. In general, the water table is many feet below the surface throughout the year, but seasonally it fluctuates to within a depth of two feet. Permeability is moderate in the subsoil layers above the fragipan and is very slow in the fragipan. Paxton soils have a medium load-carrying capacity and low shrink-swell potential.

Paxton-very stony soils have qualities similar to the typical Paxton series; however, stones and boulders can cover up to three percent of the surface.

Woodbridge Soils

Woodbridge fine sandy loam is the second-most prominent soil on the project

site. This series consists of deep, moderately-drained soils found on the tops and side slopes of drumlins and hills. Formed in glacial till derived mainly from granite, gneiss or schist, these moderately coarse textured soils have slopes which vary between 0 and 25 percent. In the spring and during wet periods, the water table may temporarily reach a seasonal high level of approximately 1½ feet below the surface. Permeability is moderate in the surface and subsoil and slow to very slow in the substratum. Woodbridge soils have a high load carrying capacity and a low shrink-swell potential. Woodbridge soils can be found in the project site's east, west and north central regions.

Charlton-Chatfield Soils

The Charlton-Chatfield soils occur in the extreme southwestern corner of the project site. The Charlton portion of this soil series consists of deep to shallow, well-drained, medium to moderately-coarse textured soils which form in gravelly and stony glacial till deposits. Rock exposures usually cover 10 to 25 percent of the surface of this soil group. The Chatfield portion of this soil is moderately deep, medium-textured and well drained.

Catden Soils

Catden soils comprise the majority of the large wetland area in the southeastern corner of the site adjacent to Interstate 84. The Catden series consist of deep, very poorly drained soils formed in deposits of organic material in an advanced state of decomposition. Slopes typically range between 0 and 2 percent. These soils are characterized by depressional or basinlike areas that remain ponded for extensive periods during the year. The normal level of the water table is at or immediately below the surface. Permeability is moderately rapid. Catden soils have a low load-carrying capacity.

Ridgebury Soils

Ridgebury soils, which are found in depressional areas of the site, are deep, somewhat poorly-drained, medium-textured soils formed in medium to high lime glacial till deposits. Slopes range between 0 and 15 percent. During periods of high precipitation, the seasonal high water table is from 1 to 1 ½ feet below the surface. During dry periods, the water table lies between 3 and 4 feet below the surface. Permeability is moderate in the surface and moderately slow to slow in the subsoil and substratum. Ridgebury soils have a medium load carrying capacity and low shrink-swell potential.

Palms Soils

Palms muck is found in the southeastern portion of the site around the perimeter of the Catden soils adjacent to Interstate 84. This series consists of deep, very poorly drained, level soils in broad depressional areas. They are formed in deposits of organic material in an advanced state of decomposition which are underlain by mineral soil material of a moderately fine, medium, or moderately coarse texture. Except in the driest times of the year, the water table is on or immediately below the surface. At such times, however, the water table may drop several feet below the surface. Permeability is moderately rapid in the organic layers and is moderately slow or moderate in the underlying mineral material. Palms soils have a low load-carrying capacity. Shrink-swell potential is high in the organic layers and low to medium in the underlying mineral material.

Fluvaquents – Udifluvents Soils

Fluvaquents – Udifluvents soils comprise a very small (0.2 acre) area in the southern west-central portion of the site. This soil unit consists of very deep, well drained to very poorly drained, nearly level soils that formed in recent alluvial deposits. The soils are frequently flooded, which results in stream scouring,

lateral erosion, and shifting of the soil from place to place. Soil characteristics, including texture, content of gravel, and drainage class, are variable within short distances. Slopes range from 0 to 3 percent. Individual areas are mostly long and narrow and are adjacent to streams.

Udorthents Wet Substratum Soils

The Udorthents Wet Substratum soil is situated in one area of the site, adjacent to the south side of the westerly portion of Barrett Road. This soil unit consists of somewhat poorly drained and very poorly drained soils that have been altered mainly by filling. Filled areas are in lower landscape positions, such as depressions, drainageways, and areas of tidal marsh. The fill material ranges in texture from sand to silt loam. Slopes are dominantly 0 to 3 percent, but they range from 0 to 15 percent. Udorthents are variable. Fill material is usually more than 20 inches deep over the original soil material. The buried soils range from loamy or sandy mineral material to organic deposits. The fill material includes manufactured materials in some places.

The properties and characteristic of the Udorthents are so variable that onsite investigation and evaluation are required to determine the suitability and limitations for proposed uses. However, no disturbance is proposed by the project within the areas of these soils.

Summary Tables

Table III.E-1 summarizes the basic properties of each of the soils found on the project site.

Table III.E-2 summarizes soil limitations for selected categories. The soil limitation classifications of slight, moderate, and severe are not indicators of the

feasibility of construction. Rather, these designations reflect the difficulty of construction and relative cost for such types of construction, and whether corrective or preventive measures will be necessary. It should also be noted that these limitations are generalized, and that on-site testing is being conducted to determine the specific characteristics and capacities of soil and subsurface materials within the proposed limit of disturbance, and the geotechnical engineering practices that are to be applied to permit construction of the proposed project on the site. The limitations may be summarized as follows:

Slight — Where the proposed use is feasible with few or no corrective measures.

Moderate — Where the proposed use is feasible with some corrective or preventive measures. These can be readily applied to overcome site limitations.

Severe — Where the proposed use is feasible only with extensive corrective or preventive measures. These may be difficult to apply to site limitations. The rating does not imply that the indicated soil may not be utilized for the use under consideration. It does indicate the nature and degree of problems which must be overcome.

Table III.E-1
Soil Properties

Soil Name and (Slope)	Parent Material	Erodibility			Depth to Bedrock (ft)	Depth to Seasonal Watertable (ft)
		Surface	Subsoil	Substratum		
Catden muck (2-2%)	organic material	-	-	-	6'+	0-½'
Charlton loam (25-35%	glacial till	low	high	high	6'+	3'+
Charlton very rocky	glacial till	low	high	high	4-6'	3'+
Fluvaquents-Udifluvents	alluvial deposits	medium	medium	medium	3'+	½ - 1 ½'
Palms muck	organic	-	-	-	6'+	0-½'
Paxton fine sandy loam (3-8%)	glacial till	medium	high	low	6'+	2'+
Paxton fine sandy loam (8-15%)	glacial till	medium	high	low	6'+	2'+
Paxton fine sandy loam (15-25%)	glacial till	medium	high	low	6'+	2'+
Paxton very stony (0-15%)	glacial till	medium	high	low	4-6'	2'+
Ridgebury loam (3-8%)	glacial till	medium	medium	medium	6'+	½ - 1 ½'
Ridgebury loam, very stony (2-8%)	glacial till	medium	medium	medium	5'+	0-1½'
Sun loam	glacial till	medium	medium	medium	6'+	0-½+
Sun loam extremely stony	glacial till	medium	medium	medium	4'+	0-½+
Udorthents- wet substratum	Too Variable to Classify					
Woodbridge fine sandy loam (0-3%)	glacial till	medium	medium	low	6'+	1½-3'
Woodbridge fine sandy loam (3-15%)	glacial till	medium	medium	low	6'+	1½-3'

Table III.E-2
Soil Limitations for Selected Uses

Soil Name and (Slope)	Small Commercial Buildings	Septic Tank Absorption Fields
Catden muck (0-2%)	Severe/subsides/ponding/low strength	Severe/subsides/ponding/percs slowly
Charlton loam (25-35%)	Severe/slope	Severe/slope
Charlton very rocky	Severe/slope	Moderate/slope
Fluvaquents-Udifluvents	Severe/flooding	Severe/flooding/wetness/percs slowly
Palms muck	Severe/subsides/low strength	Severe/subsides/ponding/percs slowly
Paxton fine sandy loam (3-8%)	Moderate/wetness/slope	Severe/percs slowly
Paxton fine sandy loam (8-15%)	Severe/slope	Severe/percs slowly
Paxton fine sandy loam (15-25%)	Severe/slope	Severe/slope/percs slowly
Paxton very stony (0-15%)	Moderate to severe/slope/wetness	Severe/slope/percs slowly
Ridgebury loam (3-8%)	Severe/wetness	Severe/percs slowly/wetness
Ridgebury loam, very stony (2-8%)	Severe/wetness	Severe/percs slowly/wetness
Sun loam	Severe/wetness	Severe/wetness/percs slowly
Sun loam extremely stony	Severe/wetness	Severe/wetness/percs slowly
Udorthents wet substratum	Too variable to classify	
Woodbridge fine sandy loam (0-3%)	Moderate/wetness	Severe/percs slowly/wetness
Woodbridge fine sandy loam (3-15%)	Severe/slope	Severe/percs slowly/wetness

Geotechnical Investigation

A subsurface investigation of the site for the proposed project was conducted by SESI Consulting Engineers during early 2018 (see Appendix E-1), as noted above. The subsurface investigation found that the onsite soils are in general agreement with the geological mapping. In the areas investigated for the study. The following subsurface conditions were encountered in order of increasing depth:

Surficial Materials: Topsoil was encountered in all building borings and test pits. The building area test pits and borings encountered a layer of topsoil with thicknesses ranging from 4 to 8± inches. The septic and storm area test pits encountered 3 to 12± inches and 2 to 18± inches of topsoil respectively. Approximately 4 to 8± inches of gravel subbase with varied amounts of silt and sand was encountered in the roadway borings.

Natural Soils: Beneath the topsoil and asphalt, the natural soils encountered in both the test pits and borings primarily consisted of light brown clayey silt to sand and clayey silt with trace amounts of gravel with occasional cobbles. Cobbles and boulders were encountered periodically throughout the test pits and borings and increased in frequency with depth.

Based on the bucket resistance during excavation of the test pits and the blow counts from the borings, the granular soils are typically in a medium dense condition and the fine-grained soils are typically in a medium stiff to hard condition.

3. Future Without the Proposed Project

Soils would remain undisturbed without the proposed project. There would be no proposed 133.2 acres of soil disturbance. There would be no need to balance earthwork on the site so as to assure no excess material will need to be exported off of the site, and no material will need to be brought into the site as fill.

4. Potential Impacts

a. Impacts Of Soil Limitations

Figure III.E-2 "Soil Impacts Map" depicts the location and acreages of soils within the limit of disturbance. The majority (85%) of the proposed disturbance is situated within Paxton fine sandy loam, and approximately 14% is within Woodbridge loam. These soils do not present severe limitations such as those that are very steep, very stony, which have a shallow depth to bedrock, or which are very wet.

b. Geotechnical Investigation

The SESI Consulting Engineers geotechnical investigation conducted during early 2018 concluded that from a soils and foundation support standpoint, the existing subsurface conditions can be considered good with respect to providing satisfactory support of the planned buildings and roadways.

c. Estimated Cut and Fill

The intent of the grading design of the site is to balance the earthwork, such that no excess material will need to be exported off of the site, and no material will need to be brought into the site as fill. Currently, the existing grading design

results in slightly more cut than fill. The site is large, and this excess amount of excavated material will be utilized as berm material within the limit of disturbance.

c. Other Impacts

As discussed in Section III.M "Construction", during the construction process, dust may be generated. Any disturbed earth will be wet down with water, if necessary, to control dust. After construction activities, all disturbed areas will be covered and/or vegetated to provide for dust control on the site.

d. Erosion And Sediment Control Plan

As discussed in the "Preliminary Stormwater Pollution Prevention Plan" contained in Appendix D-1, a potential impact of the proposed development on any soils or slopes will be that of erosion and transport of sediment during construction. An Erosion and Sediment Control Management Program will be implemented for the proposed development, beginning at the start of construction and continuing throughout its course, as outlined in the "New York State Standards and Specifications for Erosion and Sediment Control," dated November 2016. A continuing maintenance program will be implemented for the control of sediment transport and erosion control after construction and throughout the useful life of the project. The Paxton soils on the site, with their soil component of fines, will warrant additional sediment and erosion control precautions, which will be set forth in the Final SWPPP to reflect the final design of the project.

The Applicant will have a qualified professional conduct an assessment of the site prior to the commencement of construction and certify that the appropriate erosion and sediment controls, as shown on the Erosion & Sediment Control Plans (full sized drawings C-401, C-402, C-403, C-404, and C-405) have been adequately installed to ensure overall preparedness of the site for the

commencement of construction. In addition, the Applicant shall have a qualified professional conduct one site inspection at least every seven calendar days and at least two site inspections every seven calendar days when greater than five acres of soil is disturbed at any one time.

Temporary control measures and facilities will include silt fences, interceptor swales, stabilized construction entrances, temporary seeding, mulching and sediment traps with temporary riser and anti-vortex devices.

Throughout the construction of the proposed development temporary control facilities will be implemented to control on-site erosion and sediment transfer. Interceptor swales will be used to direct stormwater runoff to temporary sediment traps for settlement. The sediment traps will be constructed as part of this project will serve as temporary sediment basins to remove sediment and pollutants from the stormwater runoff produced during construction.

Descriptions of the temporary sediment & erosion controls that will be used during the development of the site including silt fence, stabilized construction entrance, seeding, mulching and inlet protection are as follows:

1. Silt Fence is constructed using a geotextile fabric. The fence will be either 18 inches or 30 inches high. The height of the fence can be increased in the event of placing these devices on uncompacted fills or extremely loose undisturbed soils. The fences will not be placed in areas which receive concentrated flows such as ditches, swales and channels nor will the filter fabric material be placed across the entrance to pipes, culverts, spillway structures, sediment traps or basins.

2. Stabilized Construction Entrance consists of AASHTO No. 1 rock. The rock entrance will be a minimum of 50 feet in length by 20 feet in width by 8 inches in depth.

3. Seeding will be used to create a vegetative surface to stabilize disturbed earth until at least 70% of the disturbed area has a perennial vegetative cover. This amount is required to adequately function as a sediment and erosion control facility. Grass lining will also be used to line temporary channels and the surrounding disturbed areas.

4. Mulching is used as an anchor for seeding and disturbed areas to reduce soil loss due to storm events. These areas will be mulched with straw at a rate of 3 tons per acre such that the mulch forms a continuous blanket. Mulch must be placed after seeding or within 48 hours after seeding is completed.

5. Inlet Protection will be provided for all stormwater basins and inlets with the use of curb & gutter inlet protection and stone & block inlet protection structures, which will keep silt, sediment and construction debris out of the storm system. Existing structures within existing paved areas will be protected using "Silt Sacks" inside the structures.

6. Erosion Control Matting will be utilized on slopes and within swales, where applicable, to provide stabilization in advance of vegetation being established. Such matting will be biodegradable to facilitate long term growth of vegetation in swales, on slopes and within stormwater management facilities.

7. Sediments Traps will be used with the permanent SMP's until their contributing areas drainage are stabilized. Once stabilized, the temporary risers will be removed and final grading/planting of the basins will be completed for permanent use as Stormwater Management basins.

8. Temporary Sediment Basins will be constructed to intercept sediment laden runoff and trap and retain the sediment. The sediment basins are sized to provide a sediment storage volume of 3,600 cubic feet per acre draining to the basin. The Sediment Basins will be used with the permanent SMP's until their

contributing drainage areas are stabilized. Once stabilized, the temporary risers will be removed, permanent outlet control structures will be installed and final grading/planting of the sediment basins will be completed for permanent use as Stormwater Management basins.

9. Temporary Riser and Anti-Vortex Devices- are placed at the bottom of the temporary sediment basins where they intercept and collect debris and litter from the pond before they can enter the off-site storm drainage system.

10. Stone Check Dams are small barriers of crushed stone which will be laid across the grass swales which are approximately 12 inches high, located at a minimum of two foot of elevation change along the swales so that the crest elevation of the downstream dam is at the same elevation of the toe of the upstream dam.

The contractor is responsible for maintaining the temporary sediment and erosion control measures throughout construction. This maintenance will include, but not be limited to, the following tasks:

1. For dust control purposes, moisten all exposed graded areas with water at least twice a day in those areas where soil is exposed and cannot be planted with a temporary cover due to construction operations or the season (December through March).

2. Inspection of erosion and sediment control measures shall be performed at the end of each construction day and immediately following each rainfall event. All required repairs shall be immediately executed by the contractor.

3. Sediment deposits shall be removed when they reach approximately ⅓ the height of the silt fence. All such sediment shall be properly disposed of in fill areas on the site, as directed by the Owner's Field Representative. Fill shall be protected following disposal with mulch, temporary and/or permanent

vegetation and be completely circumscribed on the downhill side by silt fence.

4. Rake all exposed areas parallel to the slope during earthwork operations.

5. Following final grading, the disturbed area shall be stabilized with a permanent surface treatment (i.e. turf grass, pavement or sidewalk). During rough grading, areas which are not to be disturbed for fourteen or more days shall be stabilized with the temporary seed mixture, as defined on the plans. Seed all piles of dirt in exposed soil areas that will not receive a permanent surface treatment.

Permanent Control Measures and Facilities for Long Term Protection

Towards the completion of construction, permanent sediment and erosion control measures will be developed for long term erosion protection. These are described in detail in Section III.D of the DEIS.

5. Mitigation Measures

No other mitigation measures are proposed.

Topography

1. Introduction and Principal Conclusions

The topography of the site will be developed in accordance with the Town Code, resulting in no significant adverse impacts.

The Town of Southeast Code defines "moderate slopes" as areas with a slope equal to or greater than 15% and less than 25% over a horizontal distance of 50 feet or more, or any minimum area of 200 square feet with a vertical elevation change of 10 feet or more. The Town's Code defines "steep slopes" as areas with an average slope

equal to or greater than 25%, with a minimum area of 200 square feet and a minimum width perpendicular to the contour of 10 feet.

Steep slopes on the site are concentrated near the western site perimeter, in the southern portion of the property near Pugsley Road, and in the south central portion of the site along a stream valley. Overall, approximately 80% of the site has slopes less than 15 percent, approximately 15 percent of the site has slopes ranging from 15 up to 25 percent; and 5% of the site has slopes 25% and greater.

The slopes map for the site as presented in the DEIS depicts the location and acreages of soils within the limit of disturbance. Approximately 133.2 acres are within the estimated limit of disturbance. Of this total, 4.9 acres are steep slopes (equal to or greater than 25%) or approximately 3.7% of the site disturbance area. 17.6 acres of moderate slopes equal to or greater than 15% and less than 25% are proposed to be impacted, or approximately 13% of the site disturbance area. 111 acres of slopes less than 15% are proposed to be impacted, or approximately 83% of the site disturbance area.

Ridgeline protection as required by the Town Code is discussed in Visual Resources, Section III.C.

2. Existing Conditions

a. Topographic Characteristics

The dominant topographical features of the project site are two drumlins, glacial land forms in the shape of smoothly rounded oval hills, each resembling the bowl of an inverted teaspoon. These drumlins have a north-south orientation, paralleling the direction of ice movement. They have peak elevations of approximately 672 and 690 feet, south to north. The peaks are relatively flat and

cover an area approximately 2,000 feet in a north-south direction, by 200 feet east to west. Their slopes are approximately 0-15 percent. The sides of the drumlins are moderately steep, with slopes ranging from 15 to 25 percent.

The Town of Southeast Code defines "moderate slopes" as areas with a slope equal to or greater than 15% and less than 25% over a horizontal distance of 50 feet or more, or any minimum area of 200 square feet with a vertical elevation change of 10 feet or more.

The Town's Code defines "steep slopes" as areas with an average slope equal to or greater than 25%, with a minimum area of 200 square feet and a minimum width perpendicular to the contour of 10 feet.

Steep slopes on the site are concentrated near the western site perimeter, in the southern portion of the property near Pugsley Road, and in the south central portion of the site along a stream valley (Figure III.E-3). Overall, approximately 80% of the site has slopes less than 15 percent, approximately 15 percent of the site has slopes ranging from 15 up to 25 percent; and 5% of the site has slopes 25% and greater.

b. <u>Unique Topographic Features</u>

As discussed in Section III.A.1.b of the DEIS, Section 138-12.1 of the Town Zoning Code discusses ridgeline protection. The "ridgeline" is defined in the Code as the uppermost 50 vertical feet of a hill or mountain above a minimum elevation of 500 feet above mean sea level, and as depicted on Figures III.E-5 and III.E-6, applies to certain portions of the subject property. The Code specifies that buildings and structures within any area defined as ridgeline are not, to the maximum extent practicable, to be visible above the top of the ridgeline, or above

the top of vegetation located within the ridgeline area, from surrounding property or public rights-of-way in adjoining lowlands or adjoining ridgelines by cause of excessive clearing, building or structure height, or location of any building or structure with respect to the top of the ridgeline. Neither is excessive clearing of any ridgeline area to be permitted for the purpose of site access, site landscaping, installation of subsurface sewage disposal systems, or any other modification to the natural land. The term "excessive clearing" in this context is to mean the removal of more than 10 trees, eight inches or more in diameter at breast height, per quarter acre of land disturbed.

3. Future Without the Proposed Project

Without the proposed project, there would be no change to the topographical features of the site including areas of the Town regulated ridgeline protection that would be the site of the proposed buildings. There would be no impact to Town-regulated slopes.

4. Potential Impacts

a. Slope Disturbance by Category

Figure III.E-4 illustrates areas of slope disturbance on the property. Approximately 133.2 acres are within the estimated limit of disturbance. Of this total, 4.9 acres are steep slopes (equal to or greater than 25%) or approximately 3.7% of the site disturbance area. 17.6 acres of moderate slopes equal to or greater than 15% and less than 25% are proposed to be impacted, or approximately 13% of the site disturbance area. 111 acres of slopes less than 15% are proposed to be impacted, or approximately 83% of the site disturbance area.

5. Mitigation Measures

a. Ridgeline Protection

Buildings 1 and 2 are within one ridgeline area, and Buildings 3 and 4 are located in another ridgeline area (see Section III.C "Visual Resources" of the DEIS, and Figures III.C-1, III.C-2, III.C-3 and III.C-4). Several measures are proposed to comply with or be substantially less than the ridgeline protection provisions, as discussed in greater detail in Section III.C. The measures include designing the buildings to be approximately five feet lower than permitted, having the proposed finished floor elevations of the buildings being substantially below the existing tops of the ridgelines, removing trees at a ratio substantially below the maximum number of trees permitted by the Town, preserving existing trees within the ridgeline and adjacent areas where practicable, providing a substantial buffer from roadways and residents, coloring the building to blend into the surroundings, providing retaining walls, providing extensive evergreen and deciduous tree plantings, and providing dark sky friendly site lighting.

For example, Buildings 1 and 2 have been designed with the finished floor elevations of the buildings below the highest existing grades of the top of the ridgeline, thus reducing their visibility along the ridgeline. The proposed project would remove the top of the ridgeline and set the building at a lower elevation, thus minimizing the impact to the viewshed. Similarly, Buildings 3 and 4 have been sited so that the finished floor elevations of the buildings are below the highest existing grades, with Building 4 being 17.5 feet below the top of the existing ridgeline which will be removed. Figures III.C-1 and III.C-2 in Section III.C "Visual Resources" provide cross sections of the proposed buildings through the existing ridgelines. The cross sections illustrate the existing grades with a dashed line and the proposed grades with a solid line. With the proposed finished floor elevations below the existing grades of the ridgetops, the visibility

of the proposed buildings has been reduced to the maximum extent practicable. Further lowering of the buildings could create a major imbalance, on a phase by phase basis, of the amount of fill that would either need to be exported from the site. This reduces the effective height of the proposed roof level height for Building 4 from 40-42 feet to approximately 22.5 - 24.5 feet (after subtracting the 17.5 feet below the existing ridgetop) along the top of the existing ridgeline, as compared to the 49 feet of maximum permitted roof height including a four foot parapet, resulting in a total reduction of up to approximately 50 percent at the top of the existing ridgeline. Figure III.C-2A in Section III.C "Visual Resources" shows a comparison of the proposed Building 4 with a finished floor elevation 17.5 feet below the highest existing grade compared to a permitted 49 foot (including the parapet) high building constructed on the ridgetop.

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