C. Geology

1. Additional Technical Studies

No additional technical studies related to geology were necessary for the FEIS.

2. Plan Changes and Impact Summary

The modified FEIS plan has altered the development footprint and reduced the overall area of disturbance. The calculations of slope disturbance and earthwork have been accordingly revised. As indicated in the attached Exhibits, the project's limit of disturbance has been reduced to approximately 311 acres, with 13 acres of potential disturbance to slopes over 25 percent and 42 acres of disturbance to slopes between 15 percent and 25 percent. In total, approximately 18 percent of the site's slopes in excess of 15 percent would be disturbed. Table II.C-1 below summarizes the changes to impacts to slopes between the DEIS and the modified FEIS plan. The modifications to the plan would reduce the estimated cut by approximately 100,000 cubic yards to a new estimated total cut of approximately 950,000 cubic yards. Of this total, more than 75 percent of the total cut would occur in areas with less than 15 percent slope.

Table II.C-1
Potential Disturbance by Slope Category

Slope Category	Estimated Amount of Disturbance (acres)	
Slope Category	DEIS Plan	FEIS Plan*
0-15%	260	256
15-25%	41	42
25%+	11	13

*Note: FEIS Plan calculations include trail system. DEIS plan did not have trail system detailed and therefore were not included in the disturbance calculations.

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Comments in the Geology Section generally concerned the extent of development on steep slopes and sensitive soil groups and the resulting potential for erosion and sedimentation. Construction on slopes greater than 15 percent has been minimized to the greatest extent practicable. As illustrated graphically on Exhibit II.PA-2, the steep slope impacts occur primarily in scattered locations, including portions of the golf course on the western portion of the site and in various locations on the eastern portion of the site. Some of these impacts are related to improvements of existing areas of development or disturbance (e.g., the road leading up the hill to the reservoir, and areas surrounding the H-buildings and the hospital structure). Most of the referenced sensitive soils are in the extremely steep slope terrain to the east of the existing prison buildings, the vast majority of which is proposed as open space. As detailed in the DEIS, a Stormwater Pollution Prevention Plan would be prepared for DEC and Town approval. The SWPPP will include plans and details of all sediment and erosion control measures to be employed and implementation will help prevent pollutants from migrating off-site or beyond the limits of erosion controls. The SWPP will also specify pre- and post-construction inspection and maintenance program details.

3. Comments and Responses

Comment C.1

The Town Board should not permit building on slopes greater than 15 percent. There are good reasons, good environmental, biological, stormwater management reasons why people do not

build in slopes steeper than 15 percent. 15 percent is the guideline in Dutchess County. Every town follows that. I want to see this Town Board come out in favor of restricting development to slopes no steeper than 15 percent. I would expect the advice of every other town's planners about not building on steep slopes greater than 15 percent would be taken into account.

Our highway department does a great job at maintaining our roads, but many of the problems appear to be the result of steep slopes. I know what it is like to see the erosion of our steep slopes. Debris clogs our brook and fills in our wetlands. Duell Hollow is full of phragmites because it is one of the few things that grow in silt.

Eliminating Reservoir Village leaves the forested slope intact and significantly reduces proposed steep slope impacts.

If the construction on steep slopes greater than 15 percent is permitted, I would respectively suggest that you look very closely at that to be absolutely satisfied that it is in the Town's best interest.

(Donna Hearn, Public Hearing Transcript, 6/3/09, Pg. 59-60; Constance DuHamel, Public Hearing Transcript, 5/30/09, Pg. 104-109; Evelyn Chiarito, Public Hearing Transcript, 6/3/09, Pg. 136-138; Donna Hearn, Letter, 6/3/09, Pg. 1-2; Christopher Wood, Chairman of the Oblong Land Conservancy, Public Hearing Transcript, 6/3/09, Pg. 142-143; Stephen P. Dolce, President, Mid-Hudson Trout Unlimited, Letter, 6/24/09, Pg. 2; Rebecca E. C. Thornton, President, Dutchess Land Conservancy, Letter, 6/3/09, Pg. 5; James Utter, Chairman of Friends of the Great Swamp, Letter, 6/30/09, Pg. 4; Evelyn and Joseph Chiarito, Letter, 6/30/09, Pg. 2)

Response C.1

Comments noted. Please see Exhibit II.PA-2 for a description of steep slope impacts. Construction on slopes greater than 15 percent has been minimized to the greatest extent practicable. Slope impacts occur primarily on the golf course and in scattered areas on the eastern portion of the Project Site. It is also noted that, as reported in their comment letter, the Dutchess County Planning Department generally considers the steep slope threshold to be 20%.

Comment C.2

I am concerned with the proposed development on the east side at Hammersley Ridge, because I was instrumental in working with the Dover Town Board at the time in having the CEA established, which was in response to concerns we had initially in Pawling about potential development on the steep slopes above the Pawling Nature Preserve. The sensitivity of the soils is extreme there.

The DEIS states that approximately 130 acres of the very sensitive "Hollis" Complex, which are 25 to 60 percent slopes in the affected area, will be disturbed. The Hollis Complex not only tends to be steep, but it's a very lightweight soil. It has an unusual composition of mica flakes from the bedrock and is unstable in water. It drifts with the water. A few years ago there was a logging operation that took place on Bird's Hill on steep slopes of 25 to 45 percent, and all of

this sediment washed down and it ended up in the wetlands of Duell Hollow. This degraded the wetlands. The 129 units proposed in this area at Hammersley Ridge should be reconsidered.

In the area on Hammersley Ridge, Askins Road washed out completely in the great storm of 1955. Subsequently, the road was abandoned.

According to the Soil Survey of Dutchess County, December 1955, in the Hollis Soil Areas, "From 75 percent to all of the original surface soil has been lost (on 5-15 percent slopes). The principal areas occur on Chestnut Ridge… and near Quaker Hill." On the steeper slopes the loss has been much greater.

(Sybill Gilbert, Vice Chair of the Oblong Land Conservancy, Public Hearing Transcript, 6/3/09, Pg. 78-80; Christopher Wood, Chair of the Oblong Land Conservancy, Letter, 6/30/09, Pg. 1-2)

Response C.2

The Applicant acknowledges that there is approximately 130 acres of Hollis Complex soils located on the Dover Knolls property all of which are located on the East Parcel. Under the Proposed Action development within these areas are limited to approximately 3 single-family residences, 5600 LF of a proposed on-site trailway system, and improvements to the approximately 1800 LF of the Reservoir Hamlet's access drive. Combined the potential area of disturbance to such soils is expected to be less than 6 acres. Refer to FEIS Exhibit II.C-1, Soils Map With Proposed Development and FEIS Exhibit II.PA-2, Areas Of Potential Steep Slope Disturbance.

The Applicant will prepare a Stormwater Pollution Prevention Plan (SWPPP) to obtain coverage under SPDES General Permit for Stormwater Discharges from Construction Activities (Permit No. 0-08-001). The SWPPP must be reviewed and approved by both NYSDEC and the Town prior to the start of construction and will serve to protect such sensitive areas as the Hollis Complex soils. Implementation of the SWPPP will help prevent pollutants from migrating off-site or beyond the limits of erosion controls. This will be achieved through the use of best management practices designed to avoid erosion, prevent construction materials from mixing with stormwater, and trap sediment laden runoff or other pollutant material prior to its discharge to other protected on-site and off-site areas.

Comment C.3

An overlay of the proposed development on a soils map has not been provided. However, the viewer can eyeball the maps and draw the conclusion that most of the development proposed at the uppermost elevation, just west of the reservoir is located on the "Stockbridge" Complex soils. These soils, according to the DEIS, can be problematical as surface water run-off is very rapid.

(Sybill Gilbert, Vice Chair of the Oblong Land Conservancy, Public Hearing Transcript, 6/3/09, Pg. 80; Christopher Wood, Chair of the Oblong Land Conservancy, Letter, 6/30/09, Pg. 1)

Response C.3

Exhibit II.C-1, Soils Map with Proposed Development presents an overlay of the proposed development on the soils map.

Comment C.4
I was reading that there would be one million cubic feet of soils to be either cut or filled. I imagine this relates largely to steep slopes on the eastern side of the site.

(Christopher Wood, Chairman of the Oblong Land Conservancy, Public Hearing Transcript, 6/3/09, Pg. 142; Christopher Wood, Chairman of the Oblong Land Conservancy, Letter, 6/30/09, Pg. 1)

Response C.4
The estimate of cut for the DEIS Site Plan totaled approximately 1,050,000 cubic yards and was not isolated to steep the steep slopes on the East Parcel but rather included all work across both the West and East Parcels. Under the modified FEIS plan the total estimate of cut required across the entire 937-acre Dover Knolls site has been reduced by approximately 100,000 cubic yards to a new estimated total cut of approximately 950,000 cubic yards. Of this revised estimate at least 75 percent of the total cut is to occur in areas with less than 15 percent slopes.

Comment C.5
Steep slopes shed more surface water at higher velocities than level areas do. These runoff characteristics accelerate erosion when the land is disturbed or cleared, stripping the slopes of valuable soil and adding to the sediment load of downstream waters.

Steep slopes in Dutchess County tend to be covered by shallow soils that cannot filter septic wastes properly.

Developing and maintaining such areas in ways that limit erosion, provide adequate waste treatment, and preserve natural features is expensive. Roads, utilities and building construction in rough terrain can require excessive cutting, filling and grading. Maintenance costs also increase in steeply sloped areas. Road surfaces deteriorate, roadside ditches erode, and downstream culverts fill with sediment. These conditions can be fixed only temporarily, and at the public's expense.

(Donna Hearn, Letter, 6/3/09, Pg. 2)

Response C.5
The Applicant will prepare for both the NYSDEC and the Town's approval a Stormwater Pollution Prevention Plan (SWPPP) required to reduce erosion and sediment loss. The SWPPP will include plans and details of all sediment and erosion control measures to be employed and will demonstrate conformance with those measures detailed in the latest version of the NY Standards and Specifications for Erosion and Sediment Control. In areas of steep slopes, the design of the project will include the use of geotextile fabrics both during construction and for final stabilization. The fabrics have been proven to reduce erosion on

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soils by covering the soils and allowing the plants root mass to take hold. The use of geotextiles for slope stabilization will be an important part of the overall SWPPP. Further, the SWPPP will specify the pre- and post-construction inspection and maintenance program details, and as required by NYSDEC prior to approval of the SWPPP shall identify the entity that will be required to inspect and maintain the systems. Culverts, catch basins and manholes will require inspection on a yearly basis and usually maintenance in the spring to remove sediment that may have been collected in the catch basins. Neighborhood homeowners associations ("HOAs") will be formed as part of the project and will be responsible for managing the common areas and/or facilities within each discrete community, including private roads, stormwater basins, and local community greens or open areas. As a result, maintenance would not be expected to create a significant public expense. See Response F.36 for additional discussion of maintenance responsibilities.

There are no septic systems proposed under the Proposed Action.

Comment C.6
The DEIS indicates development on steep slopes will take place. The applicant should be made to use a higher town estimate for road upkeep and repair costs for the project, knowing their design will contribute to higher cost maintenance.

(Donna Hearn, Letter, 6/3/09, Pg. 2)

Response C.6
See Response F.36. The Applicant will offer to dedicate Wheeler Road and Hutchinson Avenue to the Town; the remaining roads would be managed by individual HOA's.

Comment C.7
Cross-section diagrams should be provided to indicate how proposed grading would be accomplished in areas of steep slopes. Specifically, these cross-section diagrams should show any proposed retaining walls.

(Graham Trelstad, AKRF, Memorandum to the Town Board, 7/30/09, Pg. 5)

Response C.7
The modified FEIS plan, with minor exception within the Town Center, proposes the use of 2 on 1 graded slopes to conservatively estimate the limits of disturbance from construction activity. Detailed project layout and grading design during the Site Plan Approval phase of the project may include the study of the use of retaining walls in select areas to further reduce the limits of site disturbance and to establish level areas.

Comment C.8
Decreased canopy interception and more runoff could be especially problematic where slopes are steep such as on this site where significant construction is planned on slopes exceeding 15 percent. Not only does canopy interception reduce the amount of precipitation reaching the

ground by 20 to 40 percent (depending on forest type and time of year), it also greatly decreases the physical impact of falling raindrops on exposed soils and thereby contributes to a reduction in erosion.

(Stephen P. Dolce, President, Mid-Hudson Trout Unlimited, Letter, 6/24/09, Pg. 2)

Response C.8
A Stormwater Pollution Prevention Plan(SWPPP) must be prepared by the Applicant to obtain coverage under SPDES General Permit for Stormwater Discharges From Construction Activities (Permit No. 0-08-001) and must be reviewed and approved by both NYSDEC and the Town prior to the start of construction. The goal of the SWPPP is to improve water quality by reducing pollutants in storm water discharges. This goal will be achieved through the use of best management practices designed to avoid erosion, prevent construction materials from mixing with stormwater, and trap sediment laden runoff or other pollutant material prior to its discharge. Further, the SWPPP will specify the pre- and post-construction inspection and maintenance program details, and shall identify the entity that will be required to inspect and maintain the systems.

In areas of steep slopes, the design of the project will include the use of geotextile fabrics both during construction and form final stabilization. The fabrics have been proven to reduce erosion on soils by covering the soils and allowing the plants root mass to take hold. The use of geotextiles for slope stabilization will be an important part of the overall SWPPP.

Comment C.9
Soil mapping should be expanded to include the entire watershed boundary and not be limited to the property line as the soil groups for the entire watershed are needed to calculate the runoff rates in the stormwater analysis.

(Graham Trelstad, AKRF, Memorandum to the Town Board, 7/30/09, Pg. 4)

Response C.9
The Existing Soils Map found within the Stormwater Management Report has been expanded to include the entire watershed boundary (see the FEIS Appendix).

Comment C.10
The discussion only briefly mentions erosion and sediment control practices to be used and does not provide sufficient detail as to the types of practices that will be used to control erosion and sediment during and after construction.

(Graham Trelstad, AKRF, Memorandum to the Town Board, 7/30/09, Pg. 4)

Response C.10
The Applicant will prepare for both the NYSDEC and the Town's approval a Stormwater Pollution Prevention Plan (SWPPP) to mitigate any potential impacts from erosion. The SWPPP will include plans and details of all sediment and erosion control measures to be employed and will demonstrate conformance with those measures detailed in the latest version

of the NY Standards and Specifications for Erosion and Sediment Control. Further, the SWPPP will specify the pre- and post-construction inspection and maintenance program details, and, as is required by NYSDEC prior to approval of the SWPPP shall identify the entity that will be required to inspect and maintain the systems.

Comment C.11
How will sediment basins be sized and where will they be located?

(Graham Trelstad, AKRF, Memorandum to the Town Board, 7/30/09, Pg. 4)

Response C.11
Temporary construction sediment basins will be used for drainage areas in excess of five (5) acres. Temporary construction sediment traps will be used for smaller drainage areas. The sediment basins and sediment traps will both be sized to provide a minimum of 3600 cubic feet of storage per acre. Typically the basins and traps will be located in critical stormwater discharge locations to protect and preserve both on and off-site wetlands and other sensitive downstream areas.
Comment C.12
More detail should be provided as to who will be responsible for operation and maintenance of the erosion and sediment control system and how frequently each mitigation measure will be inspected.

(Graham Trelstad, AKRF, Memorandum to the Town Board, 7/30/09, Pg. 4)

Response C.12
The Applicant will prepare for both the NYSDEC and the Town's approval a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP will specify the pre- and post-construction inspection and maintenance program details, and, as is required by NYSDEC prior to approval of the SWPPP, shall identify the entity that will be required to inspect and maintain the systems. The Applicant will hire an independent engineer to perform the necessary ~~I~~inspection and cleaning of the stormwater systems~~ will be performed~~ and to prepare the maintenance records. The maintenance and inspection requirements for all stormwater best management practice measures will meet or exceed those as outlined in Appendix G: Maintenance Inspection Checklists of the NYSDEC Stormwater manual. The checklist also includes required frequency of inspections for these measures. Culverts, catch basins and manholes will require inspection on a yearly basis and usually maintenance in the spring to remove sediment that may have been collected in the catch basins. Copies of all inspection reports and logs will be maintained on-site and will be available for inspection by the Town.

Comment C.13
The Applicant should avoid the use of rock baskets (gabions) as retaining walls as they are unsightly and can degrade soon after installation.

(Graham Trelstad, AKRF, Memorandum to the Town Board, 7/30/09, Pg. 5)

Response C.13

Rock basket (gabions) may be used in areas where they are not generally in public view. These areas may include areas of slope stabilization at the water or sewage treatment plants and in low lying areas that are not generally seen by the public. When properly designed, they can be a cost effective and long term solution to soil stabilization.

Comment C.14
The FEIS should indicate how top soil would be stored and reused on the project site or how the top soil would be reused in a beneficial manner.

(Graham Trelstad, AKRF, Memorandum to the Town Board, 7/30/09, Pg. 5)

Response C.14
All areas to be disturbed by construction activities will have its topsoil stripped and stockpiled for reuse on-site either in newly developed landscaped areas or to supplement the depth of topsoil in existing on-site landscaped areas.

Comment C.15
Roughly 37 percent of the property (346 acres) contains prime and statewide important farmland soils (25 of these have been impacted by the existing HVPC development). Farmland soils, based on the USDA definition, are quality soils for producing food, feed, forage, fiber and oilseed crops, and are important for future use for growing food locally in an unsecured global economy and for the overall concern for national food security. As farmland soils and fields disappear due to development there will be less room to grow crops for the future. It takes over one-hundred years to build god quality agricultural soils; it only takes days to destroy it forever.

(Rebecca E. C. Thornton, President, Dutchess Land Conservancy, Letter, 6/3/09, Pg. 5)

Response C.15
See Responses 9 and 12 in Section II.PA.