3.1 Soils and Geology

The purpose of this section is to describe the existing soil conditions and geologic characteristics of the site and to evaluate their suitability to support the proposed development. This section also describes the site's existing topography and evaluates changes that will occur as a result of onsite grading. Steep slopes are identified, and disturbances to these slopes are quantified. Furthermore, this section evaluates the potential for soil erosion and sedimentation of water bodies associated with construction of the project. Mitigation measures are proposed for any identified impacts.

3.1.1 Existing Conditions

Soils

According to the United States Department of Agriculture (USDA) Dutchess County Soil Survey[16] for this site, 17 soil types are identified on the 670±-acre project site, as illustrated on Figure 3.1-1, "Soils Map." The following offers the location and a detailed description of the various soil classifications identified for this site.

Copake gravelly silt loam, rolling (CuC): This soil unit consists of very deep, well drained soils formed in glaciofluvial deposits high in limestone fragments. Permeability is moderate or moderately rapid in the surface layer and subsoil, and very rapid in the substratum. Surface runoff is medium and the erosion hazard is moderate. Slopes are complex and range from 5 to 16%. Depth to bedrock is more than 60 inches and the seasonal high water table is at a depth greater than 6 feet. This unit has been identified in the northeast portion of the site.

Copake gravelly silt loam, hilly (CuD): This soil unit consists of very deep, well drained soils formed in glaciofluvial deposits high in limestone fragments. Permeability is moderate or moderately rapid in the surface layer and subsoil, and very rapid in the substratum. Surface runoff is medium and the erosion hazard is severe. Slopes are complex and range from 15 to 30%. Depth to bedrock is more than 60 inches and the seasonal high water table is at a depth greater than 6 feet. This unit has been identified in the northeast portion of the site.

Copake channery silt loam, fan, 3-8% slopes (CwB): This soil unit consists of very deep, gently sloping and well drained soils formed in glacial outwash deposits. Slopes are generally smooth. Permeability is moderate or moderately rapid in the surface layer and subsoil, and very rapid in the substratum. Surface runoff is slow and the erosion hazard is slight. Depth to bedrock is more than 60 inches and the depth to the seasonal high water table (April-May) ranges from 3 to 6 feet. This unit

[16] USDA Natural Resource Conservation Service. Soil map for Dutchess County, New York.

meets the criteria for prime farmland. This mapping unit has been identified in the central portion of the project site.

Dutchess-Cardigan complex, hilly, rocky (DwD): This unit consists of very deep, well drained Dutchess soils and moderately deep, well drained Cardigan soils that formed in glacial till deposits. The Dutchess soil has a depth to bedrock of more than 60 inches and the seasonal high water table is at a depth of more than 6 feet. The Cardigan soil has a depth to bedrock of between 20 and 40 inches and a seasonal high water table at a depth of more than 6 feet. Both the Dutchess and Cardigan soils in this group have moderate permeability, rapid surface runoff, and severe erosion potential. This soil complex is identified on the northern portion of the project site, north of US Route 44.

Fluvaquents-Udifluvents complex, frequently flooded (Ff): This unit consists of nearly level, very deep, somewhat poorly drained to very poorly drained Fluvaquents and very deep, moderately well drained to somewhat excessively drained Udifluvents. It is subject to frequent flooding and soil characteristics such as texture, gravel content, and drainage are variable within short distances. Surface runoff is slow to ponded and the erosion hazard is moderate. Depth to bedrock is more than 60 inches and the seasonal high water table is at a depth of between 0.5 feet and 6 feet. This map unit is identified in a small area in the central portion of the project site, adjacent to a wetland area.

Galway-Farmington complex, hilly (GfD): This unit consists of moderately deep, well drained and moderately well drained Galway soils and shallow, well drained and somewhat excessively drained Farmington soils that formed in glacial till deposits. Slopes are complex and range from 15 to 30%. Permeability is moderate, surface runoff is rapid, and erosion hazard is severe. For Galway soils, the depth to bedrock is 20 to 40 inches and the seasonal high water table is perched at a depth of 1.5 to 3 feet. For Farmington soils, the depth to bedrock is 10 to 20 inches and the seasonal high water table is at a depth of more than 6 feet. This map unit is identified in a small area in the central portion of the project site adjacent to a wetland area.

Hollis-Chatfield-Rock outcrop complex, steep (HoE): This unit consists of shallow, well drained and somewhat excessively drained Hollis soils; moderately deep, well drained and somewhat excessively drained Chatfield soils; and areas of rock outcrop. It is typically found on hills and side slopes that are underlain by folded schist, granite, or gneiss bedrock. Slopes are complex and range from 25% to 45%. Hollis soils have a typical depth to bedrock of 10-20 inches, while Chatfield soils have a depth to bedrock of 20-40 inches. Both soils have very rapid surface runoff, a very severe erosion hazard, and a depth to the seasonal high water table of more than 6 feet. This soil complex is mapped in a small area of the eastern central portion of the site near Route 22.

Nassau-Cardigan complex, rolling, very rocky (NwC): This unit consists of shallow, somewhat excessively drained Nassau soils and moderately deep, well drained Cardigan soils that formed in glacial till deposits. Slopes are complex and range from 5 to 16%. Both soils have moderate permeability, medium surface runoff, moderate erosion hazard, and a depth to the seasonal high water table of more than 6 feet. Nassau soils have a depth to bedrock of between 10 and 20 inches and Cardigan soils have a depth to bedrock of 20 to 40 inches. This map unit is identified in the western portion of the project site.

Nassau-Cardigan complex, hilly, very rocky (NwD): This unit consists of shallow, somewhat excessively drained Nassau soils and moderately deep, well drained Cardigan soils that formed in glacial till deposits. It is found on hills and side slopes that are underlain by folded shale bedrock. Nassau soils are commonly on upper slopes and near areas of rock outcrop and Cardigan soils are commonly on lower concave slopes. Rock outcrop covers 2% to 10% of the surface. Slopes are complex and range from 15% to 30%. Both soils have moderate permeability, rapid surface runoff, severe erosion hazard, and a depth to the seasonal high water table of more than 6 feet. Nassau soils have a depth to bedrock of between 10 and 20 inches and Cardigan soils have a depth to bedrock of 20 to 40 inches. This soil complex is mapped in a very small area in the western hills of the project site.

Nassau-Rock outcrop complex, steep (NxE): This unit is comprised of shallow, somewhat excessively drained Nassau soils and areas of rock outcrop. Slopes are complex and range from 25% to 45%. Permeability is moderate, surface runoff is very rapid, and the erosion hazard is very severe. The depth to bedrock is 10 to 20 inches and the seasonal high water table is at a depth of more than 6 feet. NxE soils are found on the far western edge of the project site.

Nassau-Rock outcrop complex, very steep (NxF): This unit is comprised of shallow, somewhat excessively drained Nassau soils and areas of rock outcrop. It is found on hills and side slopes that are underlain by folded shale bedrock. Slopes are complex and range from 45% to 70%. Permeability is moderate, surface runoff is very rapid, and the erosion hazard is very severe. The depth to bedrock is 10 to 20 inches and the seasonal high water table is at a depth of more than 6 feet. This complex is mapped in the eastern hillsides of the project site and in areas north of Route 44.

Stockbridge silt loam, 8-15% slopes (SkC): This unit consists of very deep, sloping and well drained soils formed in glacial till deposits. Permeability is moderate in the surface layer and subsoil, and slow in the substratum. Surface runoff is rapid and erosion hazard is moderate. Depth to bedrock is more than 60 inches and the seasonal high water table is at a depth greater than 6 feet. Stockbridge soils are generally located within the central portion of the project site north and south of the hairpin turn in US Route 44. This soil is identified as a soil

of statewide significance by the Natural Resources Conservation Service (NRCS), indicating it is viable for agriculture.

Stockbridge silt loam, 15-25% slopes (SkD): This unit consists of very deep, moderately steep, well drained Stockbridge soils that formed in glacial till deposits. Slopes are smooth. Permeability is moderate in the surface layer and subsoil and slow to moderately slow in the substratum. The depth to bedrock is more than 60 inches and the seasonal high water table is at a depth of more than 6 feet. Stockbridge soils are generally located within the central portion of the project site north and south of the hairpin turn in US Route 44.

Stockbridge silt loam, 25-45% slopes (SkE): This unit consists of very deep, steep, and well drained Stockbridge soils that formed in glacial till deposits. Slopes are smooth. Permeability is moderate in the surface layer and subsoil, and slow or moderately slow in the substratum. Surface runoff is very rapid and erosion hazard is very severe. Depth to bedrock is more than 60 inches and the seasonal high water table is at a depth greater than 6 feet. Stockbridge soils are generally located within the central portion of the project site north and south of the hairpin turn in US Route 44.

Stockbridge-Farmington complex, hilly, rocky (SmD): This unit consists of very deep, well drained Stockbridge soils and shallow, well drained and somewhat excessively drained Farmington soils that formed in glacial till deposits. Slopes are complex and range from 15 to 30%. Permeability is moderate in the surface layer and subsoil, and slow or moderately slow in the substratum. Surface runoff is rapid and erosion hazard is severe. Depth to bedrock is more than 60 inches and the seasonal high water table is at a depth greater than 6 feet. SmD soils are identified in a band running north/south through the central portion of the project site.

Udorthents, smoothed (Ud): This unit consists of very deep, somewhat excessively drained to moderately well drained soils that have been altered by cutting and filling. Slopes are dominantly 0 to 8% but range from 8 to 25% on the sides of excavations and along highways. The characteristics of this soil are so variable that an onsite soil investigation is typically needed to determine suitability for proposed land uses. This unit is mapped in the southeastern portion of the project site, adjacent to Route 22.

Udorthents, wet substratum (Ue): This unit consists of moderately well drained soils that have been altered by filling. It is found on filled depressions, drainageways, and areas of tidal marsh. Slopes are dominantly 0 to 3%, but range up to 8%. The characteristics of this soil unit are so variable that an onsite soil investigation is typically needed to determine suitability for proposed land uses. This unit is mapped in a small area along Route 22 in the northern portion of the project site.

Wayland silt loam (Wy): This unit consists of very deep, nearly level, and poorly drained and very poorly drained Wayland soils that formed in alluvium deposits. It is found on flood plains. Slopes are smooth and range from 0 to 3%. Permeability is moderate to moderately slow in the surface layer and slow in the subsoil and substratum, surface runoff is slow, the erosion hazard is slight, and the depth to the seasonal high water table is 0.5-1.0 foot.

Table 3.1-1 provides a summary of the specific limitations for each soil unit within the project area. The construction limitation designations of "slight," "moderate," and "severe" refer to level of engineering which may be necessary to develop on a particular soil type. Soils with "slight" limitations are generally favorable for development and any limitations are easily overcome. Soils with "moderate" or "severe" limitations may require some special design, planning, or maintenance to address or minimize the limitation.

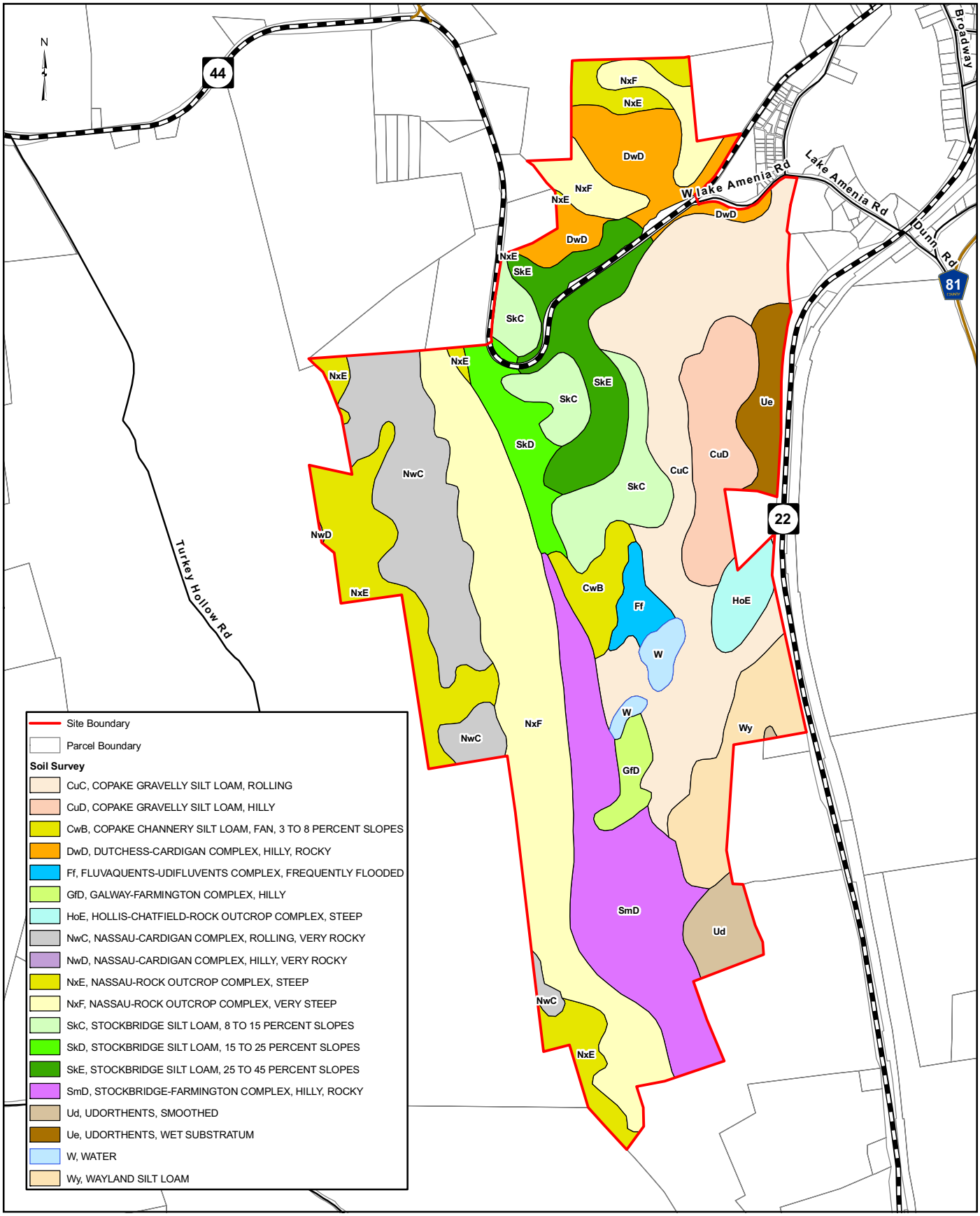
Table 3.1-1 Onsite Soil Limitations

Map Symbol/Description	Construction Limitations		Permeability	Depth to Water Table (ft.)	Depth to Bedrock (in.)
	Dwellings without Basements	Local Roads and Streets			
CuC / Copake gravelly silt loam, rolling	Moderate (slope)	Moderate (slope; frost action)	Moderate-very rapid	> 6.0	> 60
CuD / Copake gravelly silt loam, hilly	Severe (slope)	Severe (slope)	Moderate-very rapid	> 6.0	> 60
CwB / Copake channery silt loam, 3 to 8 % slopes	Severe (flooding)	Moderate (flooding; frost action)	Moderate-very rapid	3.0 to 6.0	> 60
DwD / Dutchess-Cardigan complex, hilly, rocky	Severe (slope)	Severe (slope)	Moderate	> 6.0	20 to 40, > 60 & rock outcropping
Ff / Fluvaquents-Udifluvents complex, frequently flooded	Severe (flooding; ponding)	Severe (flooding; ponding, frost action)	Slow-very rapid	+0.5 to 1.5 & 2.0 to 6.0	> 60
GfD / Galway-Farmington complex, hilly	Severe (slope; depth to rock)	Severe (slope; depth to rock)	Moderate	1.5 to 3.0 & >60	10-20, 20-40, & rock outcropping
HoE / Hollis-Chatfield-Rock outcrop complex, steep	Severe (slope; depth to rock)	Severe (slope; depth to rock)	Moderate-moderately rapid	> 6.0	10-20, 20-40, & rock outcropping
NwC / Nassau-Cardigan complex, rolling, very rocky	Severe (slope; depth to rock)	Severe to moderate (slope; depth to rock; frost action)	Moderate	> 6.0	10-20, 20-40, & rock outcropping

Table 3.1-1 Onsite Soil Limitations

	Construction Limitations				
NwD / Nassau-Cardigan complex, hilly, very rocky	Severe (slope; depth to rock)	Severe (slope; depth to rock)	Moderate	> 6.0	10-20, 20-40, & rock outcropping
NxE / Nassau-Rock outcrop complex, steep	Severe (slope; depth to rock)	Severe (slope; depth to rock)	Moderate	> 6.0	10-20 & rock outcropping
NxF / Nassau-Rock outcrop complex, very steep	Severe (slope; depth to rock)	Severe (slope; depth to rock)	Moderate	> 6.0	10-20 & rock outcropping
SkC / Stockbridge silt loam, 8 to 15 % slopes	Moderate (slope)	Moderate (slope; frost action)	Slow-moderate	> 6.0	> 60
SkD / Stockbridge silt loam, 15 to 25 % slopes	Severe (slope)	Severe (slope)	Slow-moderate	> 6.0	> 60
SkE / Stockbridge silt loam, 25 to 45 % slopes	Severe (slope)	Severe (slope)	Slow-moderate	> 6.0	> 60
SmD / Stockbridge-Farmington complex, hilly, rocky	Severe (slope; depth to rock)	Severe (slope; depth to rock)	Slow-moderate	> 6.0	10-20, > 60 & rock outcropping
Ud / Udorthents, smoothed	Slight	Moderate (frost action)	NA	> 3.0	> 60
Ue / Udorthents, wet substratum	Severe (wetness)	Moderate (slope; frost action)	NA	1.0-3.0	> 60
Wy / Wayland silt loam	Severe (ponding; flooding)	Severe (low strength; ponding; flooding)	Slow-moderate	+0.5-1.0	> 60

Source: United States Department of Agriculture (USDA) *Soil Survey of Dutchess County, New York,* 1992.
NA = Not Applicable



THE Chazen COMPANIES

Silo Ridge Resort Community

Soils Map

Town of Amenia, Dutchess County, New York

Source: USDA Natural Resource Conservation Service, 2003.

Drawn by: CLC

1 inch equals 1,333 feet

Figure 3.1-1

Map Document: (R:\11\10400-10499\10454.00\GIS\maps\10454_00_SoilSurvey_8x11.mxd)
6/7/2007 – 9:13:40 AM

Rock Outcrops and Slopes

Areas of rock outcrop can be found in the western portion of the project site along the hillsides and ridge. Slopes are varied over the project site, as shown on Figure 3.1-2, "Existing Slopes Map." Approximately 29% of the site has slopes that range from 0% to 10%; 13% of the site has slopes ranging from 10% to 15%; and 58% has slopes greater than 15%. The majority of the steeply sloped areas are located in the western portion of the site in association with the ridge.

3.1.2 Potential Impacts

Soil Disturbance

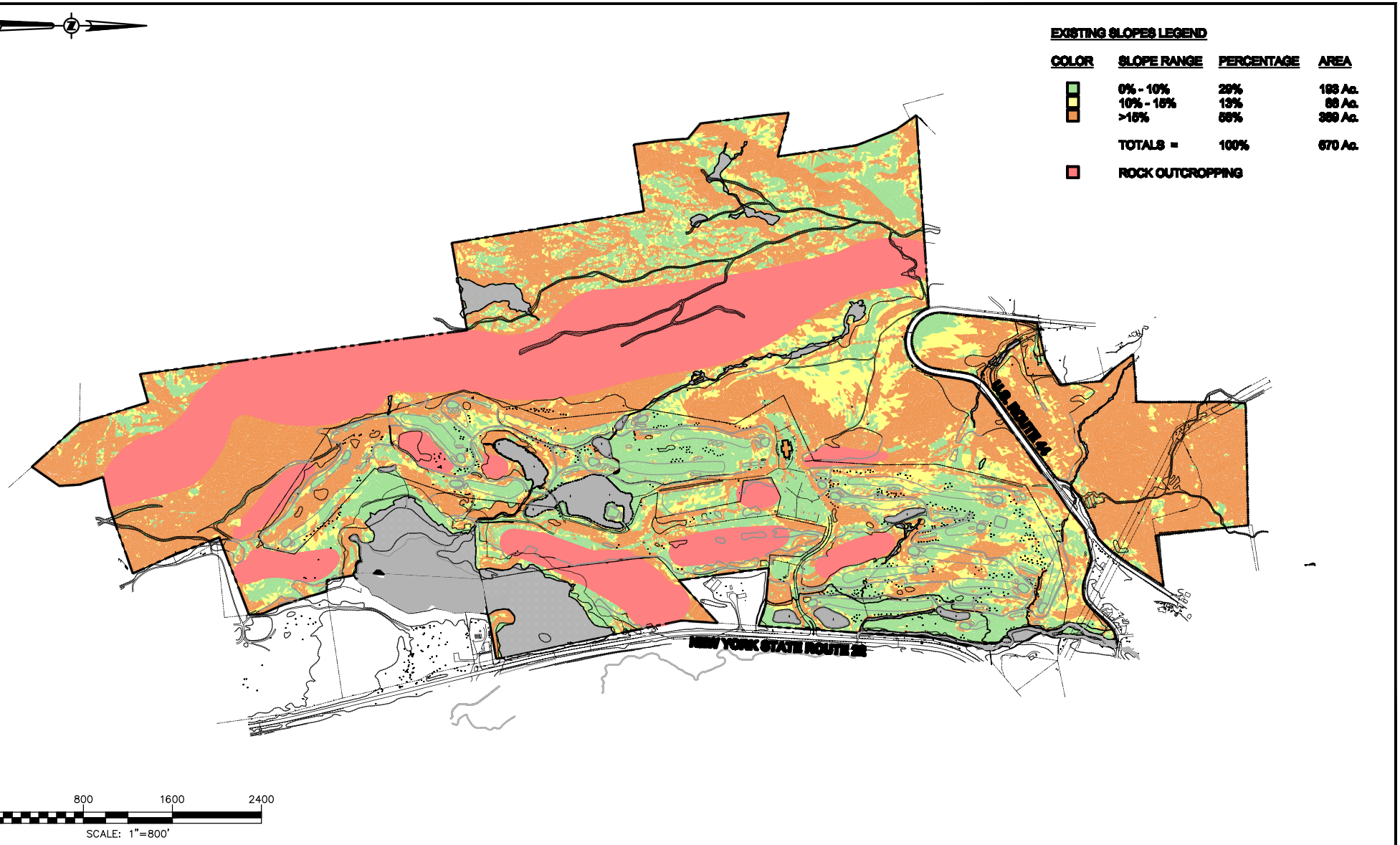
The proposed project will disturb approximately 274 acres of the site (41± %), including approximately 119 acres of disturbance related to golf course improvements and modifications. The remaining 155 acres of disturbed area is related to construction of the resort development. Based on the preliminary Grading Plan for construction of roads, the hotel, and residential buildings, it is estimated that approximately 483,000 cubic yards of cut and 596,000 cubic yards of fill will be required. An additional 156,500 cubic yards of cut and 43,500 cubic yards of fill are projected to occur in association with the proposed golf course improvements. Overall grading is estimated at 639,500 cubic yards of cut and fill to be balanced onsite; therefore, material will not be taken offsite or delivered to the site for construction purposes. See SP3, "Overall Grading and Drainage Plan" in "Engineering Drawings" for an illustration of the grading plan for the site. The majority of the soil disturbance associated with construction of the project will consist of the following:

- Disturbance to soils and geology, primarily due to overall grading, the construction of roads and stormwater control structures, and the excavation of building foundations and parking areas.

- Removal and stockpiling of topsoil.

- Grading associated with modifications to the existing golf course.

Of the approximate 119 acres of disturbance associated with modifications to the golf course, all except for a small, 0.25-acre wooded area has already been disturbed in the past. Of the 155 acres of disturbance that will occur due to construction of the resort development, approximately 44 acres have not been previously disturbed.



Drawing Name: S:\Y\10400-10499\10454.00\ENG\DWG\110_PA_FIG 3.1-2_10454-00_SLOPES.dwg Date Printed: Jun 20, 2007, 11:50am

THE Chazen COMPANIES

Silo Ridge Resort Community

EXISTING SLOPE MAP

Town of Amenia, Dutchess County, New York

1"=800'

Figure 3.1-2

JOB NUMBER: 10454.00

Slightly more than 64 acres of the total disturbance will occur in the following soil categories:

Table 3.1-2 Soil Disturbance per Soil Category

Soil Category	Approximate Disturbance (Acres)
Statewide Importance	63±
Prime Farmland	< 0.1±
Hydric	0.9±
Partially Hydric	< 0.1±

During excavation, when the upper layers of soil are removed, erosion may occur. The most vulnerable time for soil erosion is when the soils have been removed from root structures and are no longer protected by existing growth. The greatest threat to soil erosion will occur during heavy rain events and to soils located on steep slopes. Erosion and sediment control practices are summarized in Section 3.1.3 below. Erosion control devices will be used to minimize soil erosion during the construction phase of the proposed project.

It is anticipated that construction vehicles will enter and exit the project site at stabilized construction entrances located at NYS Route 22 and US Route 44, and will use these routes to arrive at the site. Construction routes will be established internal to the project site as construction dictates.

Slope Disturbance

As noted, the proposed project will disturb approximately 274 acres of the site. Table 3.1-3 summarizes the anticipated amount of disturbance by slope category, which includes disturbance resulting from both modification of the golf course and construction of the resort development. The amount of slope disturbance is shown graphically in Figure 3.1-3.

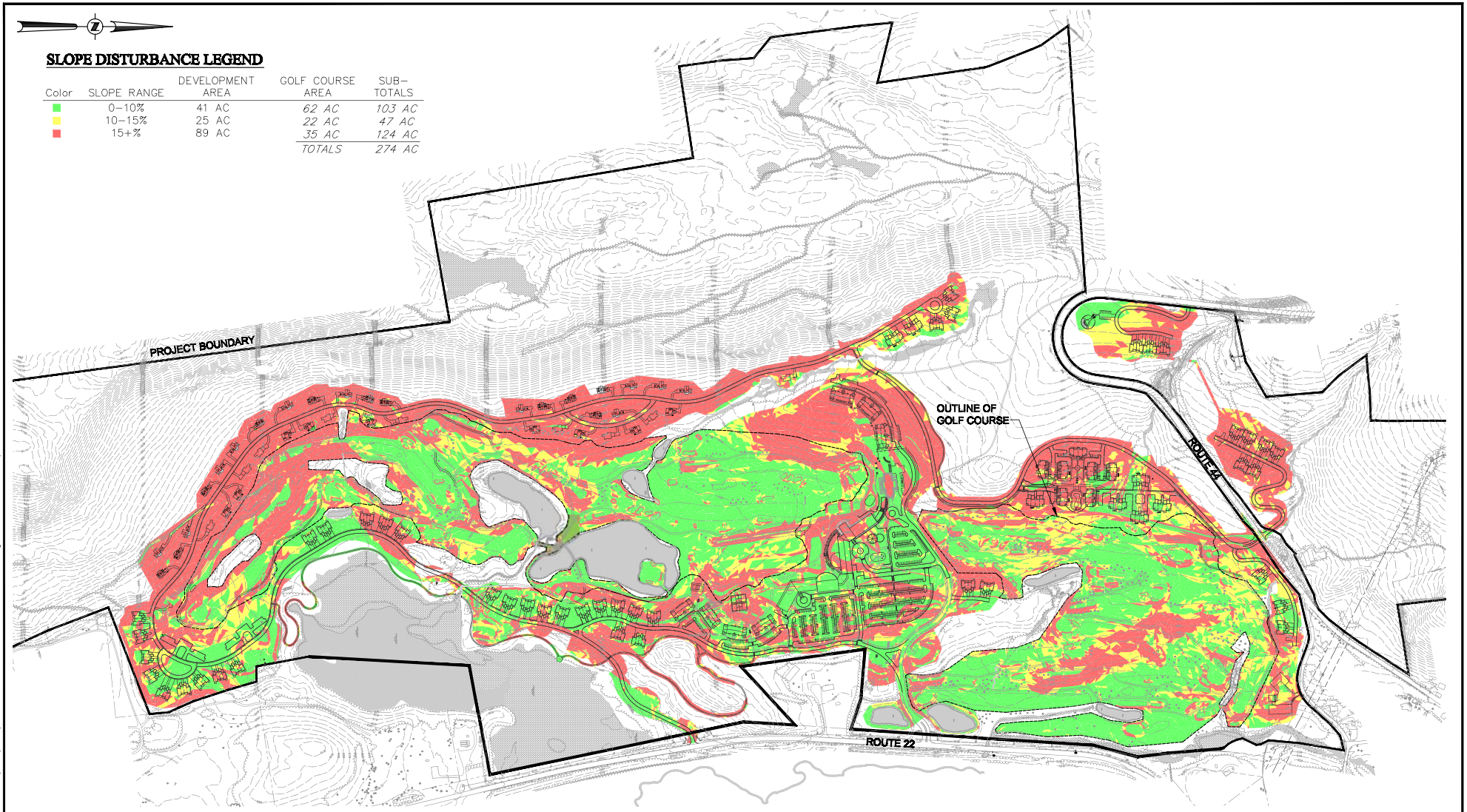
Table 3.1-3 Amount of Slope Disturbance

Slope Category	Acres Disturbed	Percent of Disturbed Slopes
0-10%	103±	38%
10-15%	47±	17%
> 15%	124±	45%
TOTAL	**274±**	**100%**

This page intentionally left blank.

SLOPE DISTURBANCE LEGEND

Color	SLOPE RANGE	DEVELOPMENT AREA	GOLF COURSE AREA	SUB-TOTALS
	0-10%	41 AC	*62 AC*	*103 AC*
	10-15%	25 AC	*22 AC*	*47 AC*
	15+%	89 AC	*35 AC*	*124 AC*
			TOTALS	*274 AC*



THE Chazen COMPANIES

Silo Ridge Resort Community
Proposed Action

SLOPE DISTURBANCE MAP

Town of Amenia, Dutchess County, New York

Figure 3.1-3

JOB NUMBER: 10454.00

Drawing Name: S:\1\10400-10499\10454.00\ENG\DWG\110_PA_FIG 3.1-3_10454-00_SLOPES.dwg Date Printed: Sep 13, 2007, 8:08am

Construction on slopes greater than 15% could result in soil and geological hazards such as mudslides, houses sliding downhill, rockfalls damaging homes or injuring people, and erosion gullies destroying hillsides or clogging streams. The proposed project includes mitigation measures, discussed below, to reduce the potential for such hazards to occur.

According to preliminary geotechnical investigations prepared by The Chazen Companies, blasting is not expected to be necessary over most of the site (see Appendices 9.14.1 and 9.14.2). Nevertheless, in the event that blasting is necessary, all blasting operations will adhere to New York State ordinances governing the use of explosives. Proper program guidelines will be established between the State, Town, and Blasting Contractor, prior to the undertaking of any blasting activity. The project will obtain applicable blasting certifications and comply with all blasting safety requirements. A rock excavation concept has been developed for the proposed project (see Appendix 9.13), which describes overall earthwork, excavation, and blasting procedures, if blasting is necessary, that would be undertaken on the project site.

3.1.3 Proposed Mitigation Measures

The Proposed Action will disturb approximately 274± acres of the site for the construction of roads, residential homes, a hotel, and related uses and the modification and improvement of the existing golf course. Impacts to soils and geology will be minimized through erosion and sediment control measures and the establishment of Best Management Practices (BMPs), as outlined in the *New York State Stormwater Management Design Manual* (2003) and *New York Standards and Specifications for Erosion and Sediment Control* (August 2005). Construction on steep slopes will be minimized where practical. Employing best design, engineering and construction practices can deal with potential hazards from arising with slope construction. The State Building code, when properly applied, provides the necessary protection for slope construction.

The following information is summarized from the Preliminary Master SWPPP for the Proposed Action, located in Appendix 9.5.1.

Construction-Period Erosion and Sediment Control Measures

Erosion control measures are designed to minimize soil loss, and sediment control measures are intended to retain eroded soil and prevent it from reaching water bodies or adjoining properties. Temporary erosion and sediment control measures that will apply during construction generally include:

1. Stabilized Construction Entrance

Prior to construction, stabilized construction entrances will be installed, as shown on the detail plan, to reduce the tracking of sediment onto public roadways. Construction traffic must enter and exit the site at the stabilized construction entrance. The intent is to trap dust and mud that would otherwise be carried off-site by construction traffic. The entrance will be maintained in a condition, which will control tracking of sediment onto public rights-of-way or streets. When necessary, the placement of additional aggregate atop the filter fabric will be done to assure the minimum thickness is maintained. All sediments and soils spilled, dropped, or washed onto the public rights-of-way must be removed immediately. To ensure the stability and effectiveness of all protective measures and practices during construction, all erosion and sediment control measures employed will be inspected by the Operator's engineer at least every seven calendar days and within 24 hours of the end of a storm even of ½-inch or greater.

2. Dust Control

Water trucks will be used as needed during construction to reduce dust generated on the site. Dust control must be provided by the general Contractor to a degree that is acceptable to the Owner, and in compliance with the applicable local and state dust control requirements.

3. Temporary Soil Stockpile

Materials, such as topsoil, will be temporarily stockpiled (if necessary) on the site during the construction process. Stockpiles shall be located in an area away from storm drainage, water bodies and/or courses, and will be properly protected from erosion by a surrounding silt fence barrier.

4. Silt Fencing

Prior to the initiation of and during construction activities, a geotextile filter fabric (or silt fence) will be established along the perimeter of areas to be disturbed as a result of the construction which lie up gradient of water courses or adjacent properties. These barriers may extend into non-impact areas to ensure adequate protection of adjacent lands. Clearing and grubbing will be performed only as necessary for the installation of the sediment control barrier. To ensure effectiveness of the silt fencing, daily inspections and inspections immediately after significant storm events will be performed by site personnel. Maintenance of the fence will be performed as needed.

5. Temporary Seeding

Within 14 days after construction activity ceases on any particular area of the site, all disturbed areas where there will not be construction for longer than 21 days shall be temporarily seeded and mulched to minimize erosion and sediment loss.

6. Stone Inlet Protection Barrier

Concrete blocks surrounded by wire mesh and crushed stone will be placed around both existing catch basins and proposed catch basins once they have been installed, to keep sediment from entering the catch basins and storm sewer system. During construction, crushed stone shall be replaced as necessary to ensure proper function of the structure.

7. Erosion Control Blanket

Erosion control blankets shall be installed on all slopes exceeding 3:1. Erosion control blankets provide temporary erosion protection, rapid vegetative establishment, and long-term erosion resistance to shear stresses associated with high runoff flow velocities associated with steep slopes.

8. Stone Check Dams

Stone check dams will be installed within drainage ditches to reduce the velocity of stormwater runoff, to promote settling of sediment, and to reduce sediment transport offsite. The stone check dams will be inspected at least every seven (7) calendar days and within 24 hours of the end of a storm event of ½-inch or greater. Damage will be repaired upon discovery. If significant erosion has occurred between structures, a liner of stone or other suitable material will be installed in that portion of the channel. Sediment accumulated behind the stone check dam will be removed as needed to allow the channel to drain through the stone check dam and prevent large flows from carrying sediment over or around the dam. Stones shall be replaced as needed to maintain the design cross section of the structures.

9. Temporary Sediment Basin

Temporary sediment basins will be constructed to intercept sediment laden runoff and reduce the amount of sediment leaving the disturbed areas and to protect drainage ways, properties, and rights-of-way. Temporary sediment basins will be inspected at least every seven calendar days and within 24 hours of the end of a storm event of ½-inch or greater. All damages caused by soil erosion and construction equipment will be repaired upon discovery. Accumulated sediment will be removed from the basin when it reaches 50% of the design capacity and will not

exceed 50%. Sediment will not be placed downstream from the embankment, adjacent to a stream, or floodplain.

Post-Construction and Permanent Erosion Control Devices

Permanent erosion and sediment control measures to be implemented after completion of construction include the following:

1. Establishment of Permanent Vegetation

Disturbed areas that will be vegetated must be seeded in accordance with the contract documents. The type of seed, mulch, and maintenance measures as described in the contract documents shall also be followed. All areas at final grade must be seeded and mulched within 14 days after completion of the major construction activity. All seeded areas should be protected with mulch. Final site stabilization is achieved when all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of 80 percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

2. Rock Outlet Protection

Rock outlet protection shall be installed at the locations as indicated and detailed on the accompanying plans. The installation of rock outlet protection will reduce the depth, velocity, and energy of water, such that the flow will not erode the receiving water course or water body.

Blasting

Since rock excavation is expensive, especially when blasting is required, the amount of rock excavation will be minimized as much as possible by developing engineering alternatives to avoid rock wherever possible. Rock excavation and blasting are not anticipated for the following development components:

- Single family residential structures,
- Golf course areas, and
- Open areas.

For other areas of the site needing rock excavation, many areas will be excavated through mechanical means other than blasting. Nevertheless, where blasting may be required, all blasting operations will adhere to New York State ordinances governing the use of explosives. Proper program guidelines will be established

between the State, Town, and Blasting Contractor prior to the undertaking of any blasting activity. The project will obtain applicable blasting certifications and comply with all blasting safety requirements.

A rock excavation concept has been prepared for the proposed project and is included as Appendix 9.13. As described in that report, modern blasting operations are conducted routinely without damage or inconvenience to those people or properties located nearby. A controlled blast is performed by:

- Drilling holes into the bedrock to design depth, diameter and spacing;
- Placement of a charge, carefully designed for optimal breakage, into the drilled hole; and
- Timed detonation of the charges in an optimal sequence to fragment the rock while minimizing vibration and noise.
- Rock blasting creates three effects of concern:
- Flyrock – Rock pieces propelled into the air
- Ground Motion – Ground vibrations from the blast, and
- Airblast – Air pressure created by the blast.

These effects can be controlled and quantified by proper application of preventative measures, monitoring and proper design of the blast by a qualified explosive engineer. Prior to any blasting operations, the existing conditions of structures and areas adjacent to the site will be monitored and recorded. This is typically performed through a combination of background vibration monitoring and pre-blast site surveys. During the blast, ground vibration and air blast pressure are monitored and recorded at various intervals from the blast and at nearby structures. Flyrock is minimized by using blast mats over the surface.

As part of the overall development, rock excavation will be minimized to the extent possible and blasting operations will only be resorted to if necessary.

This page intentionally left blank.