SECTION 3 ENVIRONMENTAL SETTING, POTENTIAL IMPACTS AND MITIGATION MEASURES

3.1 Geologic and Topographic Resources

3.1.1 Existing Conditions

A. Geologic Resources

The project site lies within the Appalachian Upland, the largest landform region in New York State. The entire area is underlain with Paleozoic sedimentary rocks dipping slightly toward the south and west. The area has been glaciated and deeply scoured. The site is in the Catskill Mountains subdivision, where summit elevations range from about 2,000 to 4,000 feet above mean sea level (AMSL). According to Thompson (1966) "the resistant sandstones underlying the area may be delta deposits from a Paleozoic Sea. Both stream and glacial erosion have resulted in deep dissection. A striking characteristic of Catskill topography is its coarse texture. Valleys are relatively few, and the intervening masses correspondingly bulky. The paucity of small tributaries is thought to be due to the permeability of the sandstones, which causes water to soak in rather than run off."

The gently sloping to flat-lying bedrock underlying the majority of the project site consists of the Upper Walton Formation of shale, sandstone and conglomerate. The Lower Walton Formation (consisting of similar rock types) is located at the base of the higher elevations. According to Fisher, et al., (1970) these formations are of Upper Devonian Age. The nature of the bedrock is such that it forms layers of shale and sandstone that weather and erode and are rippable to some extent. The Devonian sedimentary rocks of the Catskill Region have long been mined for their use as flagstone.

According to published sources, the surficial geology consists of exposed rock or rock within approximately three feet of the ground surface, with till at the base of the mountains. Cadwell and Dineen (1987) indicates that glacial outwash sand and gravel deposits are located at the valley bottom, and these may reach thicknesses of up to 40 meters (Kudish, 1979). Mineralogic differences among sedimentary rocks in the Catskill Mountains are minor, and most sediments are composed of detrital quartz, fine-grained metamorphic rocks, and minor amounts of mica and feldspar (Ethridge, 1977). Trace amounts of calcite and hematite also are present as cement materials in the sandstones.

Geotechnical and hydrogeological investigations on the site confirmed published reports. Depth to bedrock on the project site at higher elevations ranged from 12 to 22 inches in the few areas of Halcott soils to greater than the bottom of seven to eight foot deep test pits excavated on the site. Well logs in the valley along NY Route 28 indicate that bedrock is 80 to 100 feet below grade.

B. Topography

The topography within the project boundaries ranges from an elevational high of 3,100 feet AMSL near the top of the lift at the former Highmount Ski Center to an elevational low of 1,225 feet AMSL near NY Route 28 and Lasher Road. Refer to Figure 3-1, "Topography", for an illustration of the project site and surrounding lands. More detailed topography information at 2 foot and 5 foot contour intervals is illustrated on Figures 3-2, "Eastern Portion Existing Topography 2 Foot and 5 Foot Contours," and Figure 3-3, "Western Portion Existing Topography 2 Foot and 5 Foot Contours." (Figures 3-2 and 3-3 are full size plan sheets located in the front pocket of this Volume 1 of the DEIS).

The project site is located on lands on either side of the peak of Belleayre Mountain, a somewhat elongated mountain that has a ridgeline oriented in a northwest/southeast direction. The project site is located several hundred feet below the ridgeline of Belleayre Mountain. Along the ridgeline there are three high points with elevations of 3,375 feet, 3,360 feet, and 3,430 feet AMSL. The highest point of the ridgeline is located just to the southwest of the Ski Center where lifts reach elevations up to 3,430 feet. The two other high points of the ridgeline are located approximately one mile to the east, with the easternmost the former site of a lookout tower. From these high points, elevations decrease via a combination of steep slopes and flatter plateaus, typical of the topography of mountains in the Catskills. In most instances where the slope abruptly becomes very steep, it is a good indication of shallow soil and rock outcrops. Outcropping may also be associated with any abrupt topographic feature.

The western portion of the project site consists of flatter lands at the bottom of the mountain that extend up to the westernmost portion of the Belleayre Mountain ridgeline. The eastern portion of the project site consists of lands that include the eastern extension of the Belleayre Mountain ridgeline as well as portions of the northern and southern side slopes.

The western portion of the project site consists of areas of varying topography. Lands to the west and north of County Road 49A, and on either side of Gunnison Road, are generally flatter and it is here that the Wildacres Resort is proposed. Elevations in this area range from approximately 2,260 to 1,800 feet AMSL. With the exception of the lands at its very top where grades are not as steep, the former Highmount Ski Area consists of steep north-facing slopes with elevations ranging from a high point of approximately 3,400 feet down to 2,260 feet AMSL. Lands to the west of the Highmount Ski Area and around the proposed Highmount Estates consists of both north facing and east facing slopes, with flatter lands on either side of the ridge line that runs in a northwest/southeast direction. Lands to the west of Galli Curci Road are less steeply sloping on the portion between Galli Curci Road and Todd Mountain Road and slope to the west with the lowest elevation being approximately 1,800 feet AMSL. Lands on the project site to the west of Todd Mountain Road are more steeply sloping and slope in a northeastern direction.

The eastern portion of the project site consists of the eastern portion of the Belleayre Mountain ridgeline as well as some of the steep south slopes and a portion of the northern slopes above Lost Clove. Within this portion of the eastern ridge of Belleayre Mountain there is a large area of relatively flatter plateau. **The major portions of development of the Big Indian Country Club and associated buildings will take place on this plateau.** Downslope of the plateau in many areas there are a series of relatively flat "benches" connected by areas of steeper slope. Giggle Hollow divides the eastern portion of the project site, running in a north/south direction. The slopes on either side of Giggle Hollow are steep, with relatively the same slopes as the middle and lower elevations of the overall eastern portion of the project site.

Slopes on the site range from relatively flat lands, 0-5%, to over 40%. Refer to Figures 3-4 and 3-5, "Slope Map -Eastern Portion," and "Slope Map- Western Portion" for relative positions in the landscape of slopes in the 0 to 20% range, and slopes over 20%. Also refer to Figures 3-6 and 3-7, "Soils Map – Eastern Portion", and "Soils Map Western Portion", for additional slope class information. The project site is underlain by slopes of 3 to 8% (B soils), 8 to 15% (C soils), 15 to 25% (D soils), 25 to 35% (E soils) and over 35% (F soils). In general, development is proposed on B and C soils.

From a general land planning perspective, topography has dictated where the various development components of the proposed project could be located. The only portion of the land planning associated with the project that was seriously affected by the site's topography was designing a road to access the Big Indian Plateau portion of the project site. In order to access the flatter plateaus on which development is proposed, it was necessary to overcome slopes of up to 35% for the roadway. In order to provide a suitable access road and attempting to maximize the amount of access road with slopes of 10% or less, it was necessary to incorporate some switchbacks into the access road design.

Existing site topography and its influence on drainage patterns are discussed in Section 3.2, "Surface Water Resources."

3.1.2 Potential Impacts

A. Geologic Resources

Construction on the project site will require grading for the various components including access roads, building locations and the proposed golf courses. There-grading of the site will result in some new configuration of surface grades. Proposed grading is shown in LA Group Plan Sheets SG-1 through SG-0, "Grading Plans."

Rock blasting will be necessary to accomplish some of the proposed grading. The blasting work will occur at the surface. On the eastern portion of the project site the irrigation ponds near the Big Indian Resort and Spa as well as portions of the foundation of the building will require blasting. It will take approximately one month to perform the blasting necessary to create the proposed irrigation ponds and more time for the Resort.

It is anticipated the blasting for the Hotel building will take place first and the ponds will be blasted separately. While there will be some large flagstone boulders that will have to be dealt with for site grading, it is not anticipated there will be other extensive blasting.

Blasting will also be required at one location in the western portion of the project site to construct the Hotel at the Wildacres Resort. There are less soil-related limitations at the Wildacres parcel in regard to depth to bedrock. There is a broad area of shallow Halcott soils on top of the parcel where the Hotel is proposed. This area will likely have to be blasted. The northern portion of the parcel appears to be mostly deep, very stony glacial till. Based upon the existing topography and the proposed Hotel building, it is estimated that approximately 374,600 cubic yards of material will need to be removed by blasting over the course of 3 months.

Two investigations of the effects of mine blasting on water wells, water supply, and water quality were conducted by the seismological consulting firm of Philip R. Berger and Associates, Inc., in 1980 and 1982. The studies were prepared for the US Bureau of Mines, which is a research and advisory group (and not a regulatory agency). A total of five sites were studied in four states to represent a range of geologic conditions. Water supply wells were installed and designed specifically to duplicate typical domestic well construction and use.

The reports which detail well performance in relation to blasting at surface mines indicate that "no evidence of changes in water quantity or quality could be directly attributed to the blasts."

The report also concludes that it is possible the blasting actually improves well yields in wells within a few hundred feet of the active face by increasing the fractures which transmit and store water. The more open fractures improve the permeability of the rock mass and improve well yield. In laymen's terms; the removal of bedrock may cause stress relief in the rock which widens and extends water-containing fractures. This increases the storage capacity in the ground, thereby improving adjacent well yields. The ground water level will temporarily drop somewhat while the additional groundwater storage space is filled. Shallow wells exhibit substantially improved performance while deeper wells indicate improvement to a lesser degree. This decline in well static water level appears to coincide with the approach of the overburden removal to within 300 feet or less from the subject well, but this decline was temporary. As noted in Section 3.1.3(A), Item #6 below, the nearest residences and associated wells are 2,000± feet away from the proposed blasting for the Big Indian Resort and Spa irrigation ponds. The closest private wells to the area to be blasted for the Hotel at Wildacres are approximately 1,500 feet away. **Therefore, it is not anticipated that the groundwater capacity will be negatively affected.**

It is also, therefore, highly unlikely that blasting, or blasting-induced changes to groundwater level will adversely affect wells in the area of the proposed project. On the contrary, studies of blasting effects on nearby wells indicate increased well yield over

time. In fact, well shooting as it is known, or blasting of a drilled well, is a commonly used method in the well drilling industry to obtain increased well yield.

According to Berger's studies, no significant changes in water quality occurred which could be related to blasting. Samples were routinely collected and analyzed for a number of parameters for a year before and after blasting to monitor water quality. A long term reduction of total dissolved solids and specific conductance (a desirable change) appears to occur, but this is probably the result of the cumulative pumping of the groundwater from the numerous drawdown tests.

A review of more recent technical reports (Siskind and Kopp, 2000, "Blasting Effects of Appalachian Water Wells"; Matheson and Miller, 1997, Schnabel Engineering Associates, "Blast Vibration Damage to Water Supply Well Water Quality and Quantity") available from the United States Bureau of Mines and the International Society of Explosives Engineers was conducted. These studies confirm that complaints of well impacts from blasting are not related to blasting and can be shown to be related to either environmental factors, poor well construction, or wells whose elements required repair or replacement prior to blasting.

B. Topographic Resources

The proposed grading will not result in any significant impact to drainage patterns. The Stormwater Management Plan prepared for the project (see Appendix 9A, and a discussion in Section 3-2, "Surface Water Resources") divides the project site and surroundings into numerous drainage subcatchments for the existing topographic conditions as well as the proposed conditions. Under the proposed grading, the only change in surface drainage patterns will occur on approximately 0.2 acres on the Big Indian Country Club site. The grading on approximately 0.2 acres along the ridgeline will result in these two areas that currently drain to Lost Clove Brook now draining to Birch Creek. The 0.2 acres represent approximately 0.01% of the drainage for Lost Clove Brook and 0.002% of the drainage area for Birch Creek.

During the construction phase of the project the existing topography will be altered only in the areas proposed for construction; that is, building sites and attendant infrastructure and grading for golf fairways, parking areas and driveways. Re-grading will generally occur on areas with slopes less than 15% and will be accomplished by cutting and moving this soil toward the topographically lower portion of the site. Calculations of cuts and fills for the project indicate that there will be a balance of cuts and fills for the project as a whole. Cuts and fills are also now balanced within the eastern portion of the project site and balanced within the western portion of the project site, minimizing potential impacts from construction phase traffic.

Proposed grading plans require a much smaller fill slope on one area of the Big Indian Country Club. Grading plan modifications have been made by the golf course architect to dramatically reduce the depth of the fill slope around holes six and seven on the Big Indian Country Club. At one time approximately 30 feet of fill over a fairly large area on

hole #6 would have been required. At the deepest point, up to 50 feet of fill would have been required over a smaller area within this golf hole. The grading plans for this area (See LA Group Plan Sheet SG-9) first reduces the total area where fill is needed, second, reduces the general depth of fill to 5 to 10 feet, and third, reduces the maximum fill depth to 15 feet. These changes also eliminated the need to transport approximately 90,000 cubic yards of material from Wildacres to Big Indian Plateau.

As stated previously in Section 2.2.6, the following is a breakdown of the cuts and fills for the various components of the project.

Table 3-1
Cut and Fill Volumes

1. Big Indian Plateau including Belleayre Highlands: NET 597 yd^3 Cut

Phase 1	287,331 yd^3 Cut
Phase 2	134,042 yd^3 Fill
Phase 3	45,186 yd^3 Fill
Phases 4-8	107,506 yd^3 Fill

2. Highmount Estates (Access Roads): 50,756 yd^3 Cut
3. Wildacres Resort: NET 3,937 yd^3 Cut

Phase 1	173,069 yd^3 Cut
Phase 2	161,609 yd^3 Fill
Phase 3	66,153 yd^3 Fill (includes Highmount Estates home sites)

The quantities in the table above are raw earthwork values and do not incorporate the topsoil that will be imported when constructing the two golf courses and landscaped areas around the resorts. Approximately 108,000 cubic yards of topsoil will be brought in for each of the golf courses and approximately 11,000 yards of topsoil for landscaped areas will be required at each Big Indian Plateau and Wildacres Resort.

A possible source of topsoil for the project has been identified. Rainbow Mountain Construction Corp., in Grand Gorge (Greene County) has indicated that they have sufficient materials to meet the needs of the project. A letter from Rainbow Mountain Construction Corp. is included in Appendix 6, "Letters of Record." In this letter they state that they have sufficient quantities of materials to meet project needs, and that delivery to the project site would be via NY Routes 23 and 23A to NY Route 42 to NY Route 28.

Clearly, altering topography by grading has the potential of creating steep slopes that may be unstable. To the contrary, the grading proposed for this project generally creates less steep areas so as to increase the various areas' suitability for roads, buildings, and golf course holes.

The re-grading required is a short term, local impact and will cause no significant adverse impacts.

There will be no impacts to the ridgeline of Belleayre Mountain that is on the project site.

3.1.3 Mitigative Measures

No specific mitigative measures are proposed since no adverse impacts from blasting on groundwater resources are anticipated.

However, if accurate benchmark data for local residents could be established, identification of well problems would be facilitated, and should be more conclusive with regards to cause. This benchmark data, which will be collected by the Blasting Contractor as part of a pre-blast survey, will include the following: depth of well, depth of pump below surface, type of pump, casing length, date drilled, name of driller, static water level, maintenance history, number of people and/or households using supply, pump capacity in gallons per minute, etc.

Blasting has consistently been used over several decades at the Belleayre Mountain Ski Center without causing any significant adverse environmental impacts. It is doubtful that most residents are even aware of the blasting which periodically occurs at the Ski Center. Ski Center staff, including a licensed blaster, use blasting mats, and small amounts of charge are used in the blast design. No dust or sound impacts have been identified in connection with this work. The area near the Ski Center is sparsely populated, and no complaints have ever been received at the Ski Center in relation to blasting (Mr. Anthony Lanza, Belleayre Mountain Ski Center, personal communication to H. Elmer, The LA Group, March 1, 2001). Blasting at the Ski Center typically occurs about 8 to 10 times per construction season (which consists chiefly of the summer months).

According to local newspaper reports, serious blasting has been occurring sporadically over the last few years as part of the exploration of the meteor impact site on Panther Mountain immediately to the east of Belleayre Mountain. News of such blasting was apparently a revelation to homeowners around the base of Panther Mountain who were otherwise unaware that it had been occurring.

Potential impacts of blasting to the sound environment are discussed in Section 3.8.4, Visual Resources and Aesthetics, while potential wildlife and traffic impacts from blasting are discussed in Section 3.5.3, "Wildlife" and 3.7, "Traffic."

A. Geologic Resources

The soil to be removed in areas where blasting is necessary will be stockpiled and utilized when final site grades are created.

The use of hydraulically-operated rippers, pneumatic tools, or drilling and blasting will be required to remove bedrock or large boulders if encountered. Where blasting is required, the following mitigative measures are proposed:

1. Two to four feet of rippable material will be left over the solid material to be blasted. This will serve as a cover to prevent excessive fly rock and will allow the explosives to be loaded higher for more efficient blasting. Blasting mats may be used if overburden is not available.

2. The size of the shot will be limited by sound and vibration control levels and the amount of area that can be blasted with good results.

3. Small diameter drilling with high speed equipment provides relatively low unit costs and permits fairly close spacing of holes. This allows for better distribution of explosives throughout the mass of rock and the better distribution produces better breakage. Another advantage of small diameter drilling is the reduction in the amount of explosives used in each hole.

4. Explosions in boreholes which have nearby free faces produces less ground vibration. The use of delay blasting techniques establishes internal free faces from which blast vibrations can be reflected. This reduces vibration.

5. Material stockpiles will be placed where they will help block noise transmission off-site.

6. Residents within a one-half mile radius of the blasting site will be notified in advance of blasting events, if requested. The blasting contractor will formally contact nearby residents to ensure that all persons requesting notification are identified. For example, the nearest house to the Big Indian Country Club irrigation ponds to be blasted is 2,000± feet (or 0.38 miles) away. There are two other houses located approximately 2,600 feet (or 0.49 miles) away. Pine Hill is over 1 mile away (or 5,800 feet), and the closest residence on NY Route 28 is 3,400 feet (or 0.65 miles) away. At the Wildacres Resort there are three residences just slightly less than ½ mile from the proposed hotel, one is located on County Road 49A and there are two residences on Gunnison Road that are also just within ½ mile of where blasting is proposed.

7. **Blasting will occur between the hours of 9:00 a.m. to 5:00 p.m. on weekdays only. Explosives will not be detonated on weekends or holidays.**

8. All blasting will be conducted by a qualified licensed blaster pursuant to the applicable requirements of the State of New York and federal government.

9. Blasting will not occur during adverse weather conditions such as high winds unless a loaded charge must be detonated before the end of the day.

10. Shots will be designed to minimize ground vibration and air blast.

11. Blasting mats of suitable size and material will be employed to dampen noise and contain blasted materials.

12. Blasting will be in compliance with applicable NYS Codes under the Department of Labor. Prior to the issuance of a building permit, the selected contractor will submit a specific blasting plan to the Town Building Department for their review. This will include a pre-blast survey to identify pre-existing conditions at nearby properties.

B. Topographic Resources

The following measures will be taken to mitigate potential impacts to topography on the project site.

1. Grading, cutting and filling will be limited to only those areas specified for the development of the project. Approximately 74 % of the project site topography will remain undisturbed.

2. The proposed grading will not result in any drastic cuts and fills along any ridgelines that would alter the overall silhouette of the landform.

3. Even though some components of the project may require substantial fill materials, and even though the opportunity exists to obtain some of these materials on-site, the proposed project does not include any significant "borrow areas" or soils and gravel pits on the project site.

4. Topsoil and other materials necessary for the project will be obtained from permitted off-site sources with approved mining permits, including approved reclamation plans. Cut and fill volumes are balanced for the project, but it will be necessary to import 108,000 cubic yards of topsoil for each golf course and 11,000 cubic yards for landscaping at both the Big Indian Plateau and Wildacres Resort.

5. Side slopes for grading necessary to construct the proposed access road to Big Indian Plateau were increased to 1.5:1 to reduce the impacts to topography for construction of the access road.

6. Any fills that create potentially unstable slopes greater than 1.5:1 will be constructed of suitable material such as large rocks, gabions, etc., to insure the stability of such slopes.

3.2 Surface Water Resources

3.2.1 Existing Conditions

Surface waters in two different watersheds exist on the 1,960 acre assemblage. The Big Indian Plateau portion of the project is within the Catskill Watershed, eventually draining into Esopus Creek and the Ashokan Reservoir. There are approximately 1,242 acres of the assemblage in the 365,440± acre Catskill Watershed. The approximately 331 acres proposed to be developed in this area constitutes less than 0.1% of the Catskill Watershed. The project site is located approximately 20 miles upstream of the Ashokan Reservoir which itself has a watershed of approximately 164,000 acres (256.25 square miles). Thus the 331 acres of the project site to be developed in the Ashokan watershed represents approximately 0.2% of the Ashokan Reservoir's watershed, 96% of which is currently forest or water (NYCDEP, 1999). Figure 3-8, "Ashokan Watershed Land Use", illustrates the amount of various land uses in the watershed as of 1999.

The Wildacres Resort and Highmount Estates portion of the project is within the Delaware Watershed draining to the East Branch Delaware River and the Pepacton Reservoir. There are approximately 718 acres of the assemblage in the Delaware Watershed that consists of 648,320± acres. The approximately 242 acres to be developed in this area (project site) represents 0.03% of the Delaware Watershed. The project site is located approximately 14 miles upstream of the Pepacton Reservoir, which itself has a watershed of 231,777 acres. The approximately 242 acres to be developed in the Pepacton Watershed represents 0.09% of the watershed that is currently 80% forested or water (NYCDEP, 1999). Figure 3-9, "Pepacton Watershed Land Use", illustrates the amount of various land uses in the watershed as of 1999.

According to NYCDEP mapping of these watersheds, the project site is outside of what is known as the 60-day travel time. In other words, any runoff from the project site would take more than 60 days to reach the water supply intake. The 60-day threshold is important because pathogens within the watershed drainage are considered to be able to live up to 60 days. Thus, even if there were any pathogens associated with runoff from the project site, they would die before reaching the water supply intake.

The location of surface water resources on the site is illustrated in Figure 3-10, "Surface Water Resources." Surface water resources consist of intermittent and perennial streams that originate in the higher elevations of the site, or above the site, and flow in a generally northerly direction in well defined stream channels. None of the waters on the site are listed by the USEPA as "impaired" waters under Section 303(d) of the Clean Water Act.