4 Environmental Setting, Potential Impacts and Mitigation Measures

4.1 Land Use and Community Character

This section describes the existing regional and local land uses, local zoning ordinances, public policy issues, and the character of the communities in the land use study area that could be affected by the improvements, modernization and expansion proposed in the UMP/DEIS at the Belleayre Mountain Ski Center, also known as the "Project Site". Any identified or anticipated future changes in land use, zoning, public policy, or community character are also described here.

The land use study area comprises the Belleayre Mountain Ski Center (803 acres), the communities adjacent to the Belleayre Mountain Ski Center (1,116 acres) and the communities that border the Route 28 corridor (14,736 acres) one parcel deep between Boiceville and Margaretville, which are in the Town of Olive and the Town of Middletown in Ulster and Delaware County, respectively. Twenty-six communities (hamlets and incorporated villages) and the Town of Shandaken border the Route 28 Corridor (see Figure 4.1-1).

4.1.1 Overview of the Land Use Study Area

As shown in Table 4.1-1, the Town of Olive, the Town of Middletown, and the Town of Shandaken had a combined population of 7,471 residents in 2008, or 3.2% of Delaware and Ulster Counties' total population.

Table 4.1-1 Counties and Towns in the Land Use Study Area

Community	2000 Population [1]	2008 Population [2]
Delaware County	48,055	48,114
Town of Middletown	4,051	4,045
Ulster County	177,749	186,662
Town of Olive	4,579	4,579[3]
Town of Shandaken	3,235	3,426
Total Population within the Land Use Study Area	**11,755**	**12,050**

[1] U.S. Bureau of the Census 2000.
[2] ESRI, Inc. 2008.
[3] 2008 data not available. 2000 Census data was used for this estimate.

The mountainous Catskill region is centrally located between the densely populated and large metropolitan areas of Albany, Syracuse, Scranton, and New York City. The Catskills are west of the Hudson River and border on the Poconos and Shawangunk Ridge. It is an uplift region, maturely dissected and eroded into sharp relief.

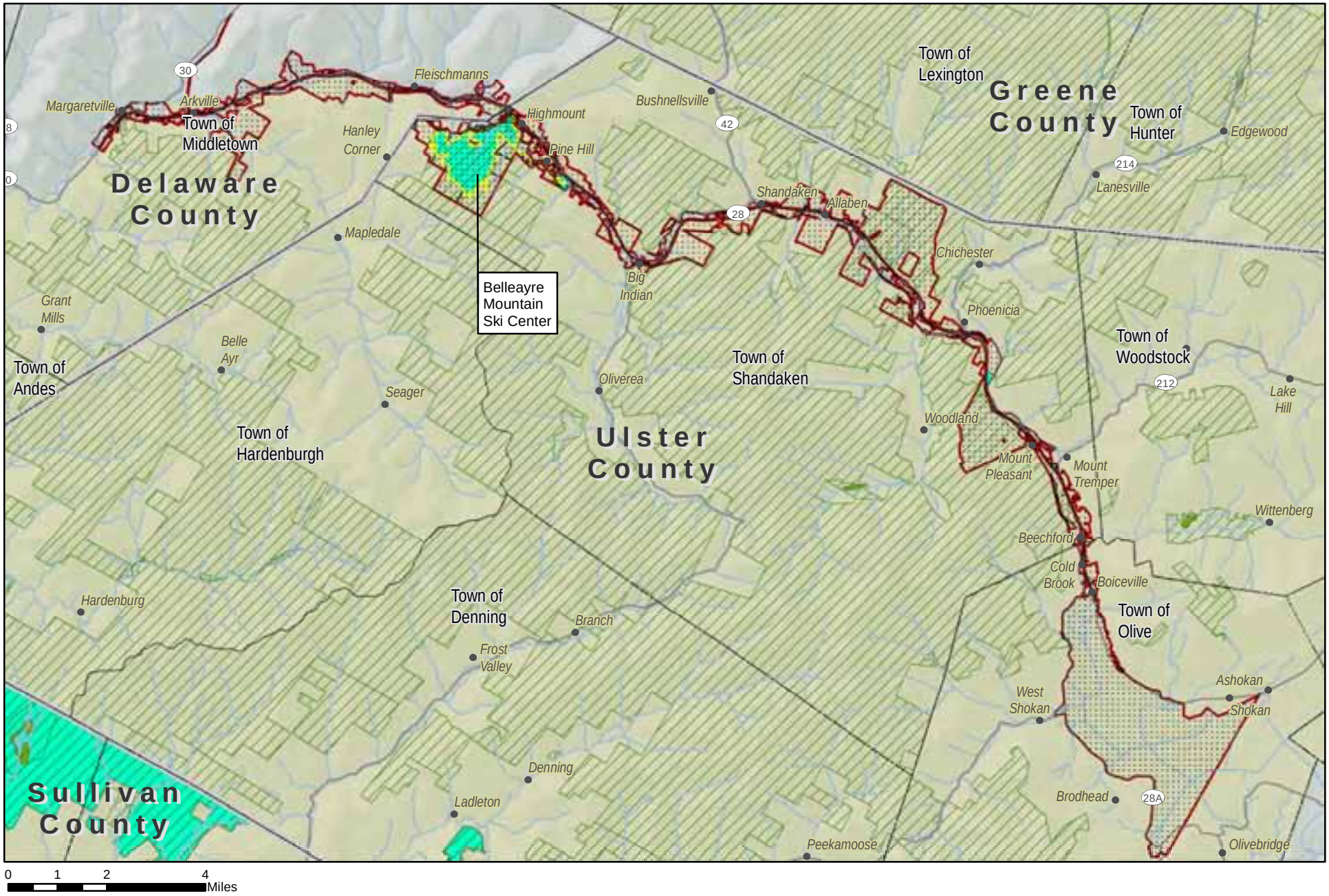
The eastern end of the mountain range is a continuation of the Allegheny Plateau and begins with the Catskill Escarpment rising suddenly from the Hudson River Valley, creating a clear, physical separation between the Catskill communities and other New York State communities. As the Catskill Mountains continue to the north, south, and west, the mountains gradually decline in height and grade into the rest of the Allegheny Plateau.

The Catskills are divided by four major drainages that flow either southeast toward the Delaware River or east toward the Hudson River. Esopus Creek is a major tributary to the Hudson River, with an upper and lower stream that is divided by the Ashokan Reservoir. Esopus Creek originates at Winnisook Lake near Big Indian and drains the eastern part of the Catskills. It is a part of the land use study area (Photo 1). The creek flows in a circle around Panther Mountain and eventually reaches the Ashokan reservoir, where it discharges down a dam spillway at Olivebridge. Esopus Creek then crosses I-87 and continues to flow north through Saugerties where it empties into the Hudson River.

Source: *Esopus Creek Stream Management Newsletter,* Summer 2006, Vol. 1, Issue 3. New York City Department of Environmental Protection. http://www.flyfishingconnection.com/esopus.html

Photo 1 Esopus Creek near Mount Tremper

The Upper Esopus Creek watershed covers 192 square miles in the south-central Catskill Mountain region of southeast New York State. The entire 26-mile course of the creek flows "clockwise" in a sweeping arc from the headwaters at Winnisook Lake on Slide Mountain to the Ashokan reservoir. The stream and watershed are located within the Catskill Park. The Upper Esopus Creek and its tributary network of at least 330 stream miles drain some of the most rugged terrain in the Catskill Mountains, including 21 peaks higher than 3,000 feet above mean sea level ("amsl"). Slide Mountain is the highest peak in the Esopus watershed and the Catskills at 4,180 feet amsl, while the Ashokan Reservoir elevation is 633 feet amsl. The resulting steep streams convey strong erosive forces as water and sediment make the quick descent from mountain top to the reservoir.



Belleayre Mountain Ski Center
Catskill State Park

Belleayre Mountain Ski Center
Adjacent Parcels
Route 28 Corridor Boiceville to Margaretville
Land Use Study Area
Community
Road
Stream
State DEC Lands
State Recreation Area
State Campground
Catskill Park
Township Boundary
County Boundary

Figure 4.1-1 Belleayre Mountain Ski Center Land Use Study Area

Sheet No. 1

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Date: February 25, 2010

The Upper Esopus Creek is a regulated river for inter-basin transfers of water. The Shandaken Tunnel and its outfall—often referred to as the "Portal"— is a man-made 18-mile aqueduct that connects the Schoharie reservoir to the Upper Esopus. The Catskill District of New York City's west-of-Hudson water supply system is one of three systems that supply water to New York City, and it includes the Schoharie reservoir, the Shandaken tunnel, the Ashokan reservoir, and the Catskill aqueduct west of the Hudson River. According to the Upper Esopus Creek Management Plan, approximately 40% of the New York City's average water supply demand is provided by the Catskill system (Ulster County, New York City Department of Environmental Conservation, and U.S. Army Corps of Engineers 2007).

The broad, physical boundaries of the land use study area are defined by mountains in the vicinity of Belleayre Mountain Ski Center such as Belleayre, Rose, Menna, Todd, Slide, and Schmann. The mountains are separated by numerous drainages—Todd Mountain Brook, Emory Brook, Crystal Spring Brook, Cathedral Glen Brook, Woodchuck Hollow, Giggle Hollow Brook, Birch Creek, and Lost Clove Brook—which all flow into the Esopus Creek and ultimately to the Hudson River. These mountains and valley drainages generally define the boundaries of the land use study area and, as described in the following sections, contribute to the character of the local communities.

4.1.2 Community Character

The power to define the community character is a unique prerogative of municipalities acting in their governmental capacity (*Matter of Vil. of Chestnut Ridge v. Town of Ramapo*, 45 A.D.3d 74, 94). Community character is defined by municipalities, through their comprehensive plans, which document their existing community character, set out their vision for the future, and configure a road map for achieving that by guiding land use patterns and development. Ideally, comprehensive plans goals are implemented through land use regulations and other municipal actions.

Municipalities commonly define existing character by the synergy of their natural and built environments. The natural environment may include such things as a community's visual and scenic qualities, river corridors, open lands, farmlands, wetlands, woodlands, mountains, critical habitats, air quality, water quality and noise levels.

The built environment may include historic buildings, particular development patterns, and the visual character of the built landscape. Social and cultural environments and the economic environment are also part of the built environment. The social and cultural environment of a community includes such things as the crime rate, property maintenance, school quality, property values, and historic and cultural resources. The economic environment of a community includes types of jobs, their quantity and quality, commuting patterns, and the integrity of a downtown area.

4.1.2.1 Physical Features

Over time, natural physical features such as regional and local geography and land-use patterns influence the settlement and development of a community. Thus, identifying the land-use patterns that developed over time is essential in describing a community's character (Alexander et al. 1997). Because of its many natural resources (fish, game, fertile valley soils, creeks and waterfalls), the Catskills have attracted settlers, industry (e.g., the timber and bluestone quarrying), agriculture, and vacationers. As a result, the area has developed its own unique character over the years.

Through the years, land use development occurred in the valleys, taking advantage of access to the water, flat land, and fertile soil. Initially, Native Americans inhabited the area, hunting and using the flat, fertile valleys for large-scale agriculture. These Native Americans influenced place names and community locations. The natives between the Hudson and Delaware Rivers were collectively known as the River Indians. They included the Mohicans (also known as "Mahicans" which means People of the Great River), and the Esopus tribe of the Lenape Indians (of Ulster County), who lived along the Delaware. The Mohawks (People of Flint) later displaced the Mohicans.

The large-scale corn and bean agriculture and hunting attracted European settlement, which began in the late 1600s. Dutch, English, Irish, and German settlers used the area for trapping, hunting, fishing, logging, quarrying, and agriculture.

The oldest of the communities within the land use study area were agricultural valley communities that developed along the most convenient transportation routes: initially horse and wagon, then rail, and then Route 28 as it follows Birch Creek down from Belleayre and Balsam Mountains.

The communities along what is now Route 28 had access to water flowing through Esopus Creek and its tributaries (see Photo 1). Other small communities located just off Route 28 had access to associated mountain valley drainage-ways or "hollows." Early human settlements were generally about 1 to 1.5 miles apart, which generally still holds true today, with communities spread out along Route 28: Stony Hollow, West Hurley, Glenford, Ashokan, Shokan, Boiceville, Cold Brook, Beechford, Mount Tremper, Mount Pleasant, Phoenicia, Allaben, Shandaken, Big Indian, Pine Hill, Highmount, Harden Bridge, Fleischmanns, Clovenville, Arkville, and Margaretville (Photo 2).

The Town of Olive is mountainous and lies entirely within Catskill Park. Approximately 8,000 acres in the town is the publicly owned Catskill Forest Preserve, a constitutionally protected wild forest land. Olive is geographically divided, north and south, by the Ashokan Reservoir. The Town of Middletown is mountainous and is bisected by the deep, narrow valley of the east branch of the Delaware River flowing southwest. Other principal streams in Middletown are the Platte Kill, Batavia Kill, Red Kill, Bush Kill, and Mill Creek. The Town of

Shandaken contains Slide Mountain, the highest peak in the Catskills. Waterways in Shandaken include Esopus Creek, which flows through the eastern portion of the town. The stream valleys in these towns are bordered by steep, rocky hillsides and mountainsides. The soil is a shaley and gravelly loam, which restricted agriculture but supported a dairy and sheep industry that was further reinforced with the introduction of rail service in the late 1870s to outside markets.

Photo by Tim Mallery
Source: *Catskill Guide*

Photo 2 A panoramic view across the Catskills off Route 28 between Andes and Margaretville

4.1.2.2 Sense of Place

"Sense of place" is defined as those tangible and intangible characteristics which, over a period of time, have given a place its distinctiveness, identity, and authenticity. Distinctiveness can be globally, nationally, or regionally important. It can also be locally or personally significant. The various elements that comprise the land use study area's sense of place are described above and include settlement patterns; demographics; transportation and access; gateways; and regional and local planning efforts and documents. Each of these elements contributes significantly to the land use study area's sense of place. In addition, the land use study area's sense of place is influenced by the topography, its drainage, the reservoir as well as the region's potential for tourism and commercial development along and around the Route 28 corridor (see Section 4.1.6.6 for further information on the Watershed Memorandum Agreement).

Interviews were conducted with local residents and officials of communities along Route 28 between Boiceville and Margaretville to further characterize the land use study area's sense of place. Residents of this area share their history, their resources, common concerns, and have a similar way of life. The residents view the land use study area as having a number of small, scattered, rural mountain

hamlets with panoramic views of natural beauty as well as and clean water and air. Residents and local officials described the area and region as having a rural character, a low-density population, and few buildings, structures, or development. Rural elements cited include tree-lined meandering streets, farmland, woodland, forests, and natural areas. Views and vistas are dominated by undeveloped open space. The inhabited places are small and the pace of life is pleasantly slow. With the exception of communities immediately along the Route 28 corridor, these hamlets are generally pedestrian-friendly.

Residents describe the historic and local arts scene as significantly contributing to their sense of place. For centuries the Catskills has been a place where art colonies flourished. The Hudson River School, the first American school of landscape painting, opened in 1835. In 1887, the painter J. Francis Murphy founded the Pakatakan Artists Colony in Arkville. In 1902, Ralph Radcliffe Whitehead founded an experimental artists' colony, the Byrdcliffe Arts Colony, on 1,500 acres above Woodstock. The region continues to be home to an exceptionally large number of artists and craftspeople working in fields ranging from glassblowing to painting to woodblock prints.

In describing the area's sense of place, residents noted the area's access to recreational activities such as hiking, fishing and biking. The presence of the Catskills Forest Preserve, the ability to commune with nature, and the intangible spiritual connection to the mountains were described.

Another element that contributes to a sense of place is the length of residence in an area. The land use study area communities are populated by "old timers" who were born and raised in the Catskills, current full-time residents, weekenders and seasonal residents who own second homes within the area, and visitors, who have long been a vital economic part of this resort area. The Catskill Park has about half a million visitors a year; and the visitors and part-time residents outnumber local full-time residents. The seasonal resident and weekend population continues to increase and includes many Orthodox Jewish families who travel from the New York City area. According to interviews with local residents and officials, these part-time residents tend to socialize in their second homes and are not as involved in the community at large or with civic organizations or local activities such as Little League baseball or other community events. However, both old-timers and weekenders enjoy similar activities such as angling, tubing, and whitewater sports, or birding, hiking, rock climbing, biking, or stream fly-fishing.

Local officials noted that despite the shared history, culture, and resources, there are some distinctions between the communities in the land use study area arising from the balance and mix of land-use types, building styles/types, and location in relation to the Route 28 corridor. Additionally, municipalities have their own school districts and local governments, contributing to the distinction from one town to the next. Agricultural land uses are mainly west of Margaretville and predominate in Delaware County, while much of the forest cover and resulting logging activities occur around the communities of Fleischmanns and Phoenicia. The center of tourism is around Pine Hill, Arkville, and Margaretville where there

are bed and breakfast lodgings, cabin colonies, small motels, campgrounds, restaurants, museums, specialty stores, convenience stores, and gas stations.

Officials described the following key areas as having a distinct sense of place, based on their history, services/amenities, or setting: Margaretville, Arkville, Fleischmanns, Pine Hill, Big Indian, Shandaken, and Boiceville. Some characteristic elements of these places are described below:

Margaretville is one of two relatively larger communities in the land use study area. Many homes front the foothills of the adjacent mountain slopes of the park. Residents note that they can attend movie showings under the stars on Main Street in Margaretville and that in the wintertime, fields are flooded to provide outdoor ice skating.

Arkville, approximately 1 mile from Margaretville, is a true hamlet in the Town of Middletown. The hamlet straddles Route 28 and Route 38, Church Street, and Franks Street, and there is ample commercial development along Route 28 between Arkville and Margaretville. The Town of Middletown's town hall is located here, along with the Catskill Forest Association. The community has plans for a watershed museum here.

Fleischmanns, a village in the Town of Middletown, is separated from Arkville by a 4-mile drive through undeveloped forest land. Located just off Route 28, Fleischmanns is laid out along a main street with residences also off Wagner Avenue and Lake Street. The village is known for its beautiful cottages on the bluffs south of the railroad tracks and has attracted visitors since the early 1900s. In interviews, residents noted their historical connection with the turn-of-the-century Roxbury baseball team as well as their current Little League baseball team; the presence of a Mexican restaurant; and other readily available services such as a post office, gas station, banks, and car repair shops.

Pine Hill is one of the few Catskill Mountain hamlets that have retained much of their 19th century charm. It has restaurants, lodging, craft and antique stores, a stately stone library and museum, two bowling alleys, and two newspapers. It also features the Pine Hill Catskill covered wooden bridge off Route 28 east and southeast of Birch Creek Pond. Pine Hill is known for its lower rents, eclectic buildings, and resident artists.

Big Indian, a hamlet located 1,212 feet above Esopus Creek, is set within a mountain valley at the intersection of Route 28 with Oliverea Road (Route 47). It is noted for Big Indian Park, which offers hunting, fishing, and hiking, and it has numerous boarding houses, motels, cabins, and restaurants with mountain views.

The hamlet of Shandaken is located in the central portion of the Town of Shandaken, along Route 28. Shandaken proper is in the heart of Catskill Park and is entirely forested and mountainous. Slide Mountain, the Catskill's highest peak at 4,180 feet, is located in the town. The many summer houses here and scattered

around Shandaken are set within beautiful scenery, numerous streams, and abundant fauna.

Phoenicia, the largest hamlet in the Town of Shandaken, is located along old Route 28 and Route 214 at the railroad junction of the Ulster & Delaware main line. Phoenicia is about 28 miles from the Hudson River at elevation of 794 feet. Its many shops, stores, cottages, hotels, boarding houses, and churches are laid out in a grid pattern. Residents note that Phoenicia has a distinct appearance of cohesion and place.

Boiceville is a valley community in the Town of Olive that was once a train stop for an excelsior mill. Today it is a small community of about 518 full-time residents. Most of these residents have homes along Deer Field Road, which parallels Route 28. Most of the commercial development in this region is concentrated either here in Boiceville or in Margaretville. The commercial development along Route 28 serves many of the other smaller communities as well. Boiceville is located at the head of the Ashokan reservoir and was one of several communities that were relocated in the early 1900s when the reservoir was constructed.

4.1.3 Past Uses of Properties and Local Communities

4.1.3.1 Tourism

While the construction of the railroad along Esopus Creek to Phoenicia in the Town of Shandaken facilitated the transport of the area's resources (e.g., timber and bluestone) to other markets, it also brought vacationers and tourists to the Catskills. As the resource extraction industries began closing in the late 1800s and early 1900s, tourism began to occupy a significant place in the local economy.

In 1822, a group of Catskill merchants persuaded investors to build grand mountain hotels for wealthy guests, spawning a resort industry that lasted into the 1960s. The Grand Hotel at Highmount (1881-1966) was owned and operated by the Ulster & Delaware Railroad. It offered a view down Big Indian Valley towards Slide Mountain. Other grand hotels were also built, including Catskill Mountain House, Hotel Kaaterskill (1881-1924), and Laurel House.

In addition to the grand hotels, wealthy vacationers built cottages along the rail and road routes, with Highmount, Pine Hill, and Fleischmanns being some of the better known of these cottage settlements. Thousands of cottages were scattered throughout the Catskills by the early 1900s and the demand exceeded the supply. The New York Times would report regularly on who and where the well-known and wealthy were staying in the Catskills, which encouraged the middle class to also want to vacation in the Catskills. The Catskill Park was established in 1904 and the state began constructing public campgrounds and trails on Forest Preserve lands within the Park. By 1918 the middle classes were vacationing in the area,

but they preferred the smaller, less expensive hotels, boarding houses, summer camps, and resorts.

In the early to mid-1900s, many ethnic groups from New York City, including Germans, Czechs, and Italians, established summer resorts in the region. The Catskills are famous in American cultural history as the "Borscht Belt" (named after a beet-based soup from Russia that was brought by Jewish immigrants to the United States), where many Jewish residents of New York City vacationed in hotels and bungalow colonies. The Borsht Belt is where some of America's most famous Twentieth Century singers, musicians, and comedians got their start or regularly performed.

Shortly after the 1930s, the Adirondacks and higher peaks of northern New England began to gain favor with the general public, and visitors to the Catskills began to decline. To encourage visitors to come to the Catskills, the state constructed the Belleayre Mountain Ski Center in the late 1940s, after an authorizing constitutional amendment was adopted. In the 1950s and 1960s construction of Interstate 87 and upgrade of Route 17 increased Park access and the number of visitors.

With the advent of air travel, visitors to the Catskills again dwindled and various initiatives were undertaken to revitalize tourism and settlement. In 1966, the Catskill Mountain 3500 Club was formally incorporated and for many years was the only organization with Catskill in its name and the only voice for the area. The organization promoted hiking and other passive recreational activities. In the late 1990s, New York State designated most of the Catskill Park summits as Bird Conservation Areas, establishing the area as a destination for bird watchers and other nature enthusiasts. Sometime after 1996, the economy of the Catskills communities again focused on tourism and mountain-related resource activities. Today the Catskills have about 50,000 permanent residents and approximately 500,000 visitors a year. Residents and visitors share an interest in hiking, fishing, theater, skiing, and biking, which have become a permanent part of the region's culture and character. Further, local planning initiatives emphasize tourism as a tool to stimulate economic growth while sharing the natural and cultural aspects of the Catskills with visitors (see Section 3.4 for further discussion of planning documents).

4.1.3.2 Reservoir Construction

Development of the Catskill communities was significantly affected by the construction of reservoirs to provide water for New York City. Construction began on the Ashokan reservoir in 1906, requiring the removal of several small hamlets in the agricultural communities of Olive and Shandaken, including West Hurley, Olivebridge, Brown's Station, Brodhead's Bridge, Shokan, West Shokan, and Boiceville. Portions of a few communities survived on the reservoir banks, but many of the farms and farmlands were lost, and a significant number of residents were displaced. In 1913, Esopus Creek was dammed in order to provide water for New York City. The Neversink, Rondout, and Pepacton reservoirs also were constructed, resulting in further displacement of residents. As discussed in Section 4.1.6.6 of this UMP, in 1997 a formal Watershed Memorandum of Agreement came about as a result of negotiations over whether the Catskill/Delaware watershed could continue to be used as a source of drinking water for New York City without filtration. As a part of the agreement, New York City outlined measures it would undertake to protect water quality within the watershed in order to avoid water filtration. These measures are carried out through a number of watershed protection and improvement programs, including the Watershed Land Acquisition Program, the Watershed Agricultural Program, the Wastewater Treatment Plant Upgrade Program, the New Sewage Treatment Infrastructure Program, the Phosphorus Offset Pilot Program, Reservoir Modeling and TMDLs, the Waterborne Disease Risk Assessment Program, the Stream Management Program, the Kensico Modeling and Remediation Program, and the Catskill/Delaware Water Supply System UV disinfection facilities.

For example, the Watershed Land Acquisition Program seeks to acquire as much land as possible to preserve the New York City water supply. The program enables towns to delineate hamlet areas in which New York City cannot acquire land. Protection of the reservoirs precludes a large portion of the land use study area from being developed.

4.1.3.3 Route 28 Corridor Development

In the early 1900s the road connecting Kingston to Shandaken and Pine Hill was considered modern and was in good condition, providing visitors from New York City with relatively easy access to the Catskills. Visitors came to enjoy the small communities along this route such as West Shokan, Shokan, Brodheads, and Olivebridge, which were picturesque, provided relief from the summer heat, and quiet compared with New York City. Communities in the area were located along the Birch Creek and Esopus Creek drainages. Early visitors stayed in local boarding houses or luxury hotels (Photo 3) with panoramic views and played golf, hiked, or took carriage tours of the area waterfalls and wildflower meadows.

Source: http://www.catskillarchive.com/grand/ (Catskill Archive website)

Photo 3 Historic Grand Hotel Set into the Catskills (1881-1966), Highmount, NY.

Between 1960 and 1970, Route 28 was rebuilt and realigned to facilitate more direct travel through the Catskills, bypassing many of the hamlets through which it originally passed. The realignment of Route 28 contributed to the already shifting population in the land use study area, as residents along the transportation corridor were forced to relocate to neighboring communities. The acquisition of land for the road's realignment resulted in the permanent relocation of some communities, and the loss of others. The realignment of Route 28 therefore had a long lasting impact on the identity of the relocated communities.

Today, Route 28 is one of the main traffic arteries through the Catskill Mountains. Route 28 enters Catskill Park where it becomes a four-lane road highway. It has at-grade access and connects the communities that formed along it or that are near each other. The Route 28 corridor in its present form is the subject of recent studies and revitalization efforts.

4.1.4 Current Land Uses

The land use assessment was conducted through a desktop review of GIS mapping and existing project-related documents such as the 2003 Belleayre Mountain Ski Center Draft Environmental Impact Statement (DEIS) (The LA Group, Landscape Architecture and Engineering September 2003) and associated public comments; individual reports and web sites; local comprehensive plans for the Town of Shandaken and Village of Margaretville, Town of Middletown, and Fleischmanns; planning documents and efforts such as the New York City Watershed Memorandum of Agreement (see Section 4.1.6.6 below); the Catskill Park State Land Master Plan; and the Route 28 Scenic Corridor Study (see Section 4.1.4.3 below). Additionally, consultations with the New York State Department of Environmental Conservation (NYSDEC) and the Belleayre Mountain Ski Center staff, a site visit and windshield survey, and interviews with local planning staff and governmental officials were all conducted to support this analysis.

Land Use/Land Cover

This section describes the types, locations, and acreages of existing land uses, land cover, and zoning at the county and regional level, which includes Ulster and Delaware County, and of the land use study area, which includes the Belleayre Mountain Ski Resort and adjacent communities, as well as the communities that border the Route 28 Corridor. Table 4.1-2 provides property classification descriptions taken from the U.S. Geological Survey (USGS) National Land-Cover Database 2001. Each description has been reclassified and grouped into one of the four main categories: Open Space/Forest, Developed, Open Water, and Agriculture. This table is the reference for Table 4.1-5, USGS Land Use/Land Cover within the Route 28 Corridor, and Table 4.1-8, USGS Land Use/Land Cover within the land use study area.

Table 4.1-2 USGS National Land-Cover Database 2001 Reclassification

Source Classification Description	Reclassification Description
Woody Wetland	Open Space/Forest
Mixed Forest	
Evergreen Forest	
Deciduous Forest	
Developed, Open Space	
Barren Land	
Emergent, Herbaceous Wetlands	
Grassland/Herbaceous	
Shrub/Scrub	
Developed, Low Intensity	Developed
Developed, Medium Intensity	
Developed, High Intensity	
Open Water	Open Water
Pasture/Hay	Agriculture
Cultivated Crops	

A description of current land uses found within the counties of Ulster and Delaware follows. The land use study area is located within the southern portion of Delaware County, and the northern and eastern portions of Ulster County (Figure 4.1-1).

Ulster County

Land Use

Ulster County is 1,161.7 square miles (743,488 acres) in area and is located in the Catskill Mountains in the Hudson River Valley of southeastern New York State. There are 24 municipal jurisdictions in addition to the county, with the City of Kingston as the county seat. The countywide population as determined by the 2000 Census was 177, 749 and the New York Statistical Information System (NYSIS) population projections estimate a 2020 population of 203,871.

More than half of Ulster County is forested and approximately 5% of the county is classified as developed. While approximately 14% of the county is agricultural land, agriculture/farming is locally considered to be of high importance to the economy and the character of the county. According to the Ulster County Open Space Plan, more than 32% (227,434 acres) of Ulster County is permanently protected from development. The major areas of designated open space include:

- Catskill Forest Preserve (160,000 acres)
- Minnewaska State Park (12,000 acres)
- Mohonk Preserve (> 6,500 acres)
- County parks (3,000 feet of Hudson River Frontage)
- New Paltz Park (150 acres)

The Ulster County Open Space Plan also notes that nearly 90% of New York City's water supply passes through the county; there are more than 160 sites on the National Register of Historic Places (NRHP) and 27 historic districts in the county; and the county is a major tourism and recreation destination.

Zoning. Each town in Ulster County falls are made up of various zoning districts**,** which are primarily residential with some business and commercial zones. Most residential zoning areas are listed as Residential 5 (R5). Table 4.1-3 lists the percent of each zoning category within Ulster County.

Table 4.1-3 Ulster County Zoning

Zoning Description	Definition	Percent of Ulster County
Business	1/2 acre per business use	1.34%
Commercial / Light Industrial	The CLI Commercial/Light Industrial District permits research, commercial, manufacturing and wholesale activities to occur under general performance standards.	0.13%
Conservation Residential	10 acres per dwelling unit	16.78%
Ex Urban Residential	1 acre per dwelling unit	1.98%
Hamlet Commercial	The HC Hamlet Commercial District may only occur in areas where municipal water and/or sewers are provided. This district permits residential, commercial and civic/institutional uses to coexist at a moderate density and with adequate public services.	0.17%

Table 4.1-3 Ulster County Zoning

Zoning Description	Definition	Percent of Ulster County
Hamlet Residential	The HR Hamlet Residential District provides for moderate-density residential development within hamlet centers. This district permits a reduction in minimum lot area for development serviced by central water and/or common sewer facilities.	1.34%
Not Available	No data available	20.58%
Residential 1.5 Acres	The Residential R1.5 District is a moderate-density residential district which generally encompasses the town's less environmentally constrained acreage, lies in the vicinity of the town's principal hamlet areas and is readily accessible for permanent residence. General, institutional and certain limited commercial uses are authorized by special use permit. This district permits an increase in density for cluster residential development serviced by central water or central water and municipal sanitary sewer facilities.	14.60%
Residential 3 Acres	The R3 Residential District provides for low-density rural residential development or moderately sized lots and certain general, institutional and recreational uses through the special use permit procedure.	5.34%
Residential 5 Acres	The R5 Residential District is a very low-density residential district that generally encompasses the most ecologically sensitive land areas of the community, based upon their slope, soil and water-related characteristics. Conservation, recreation and large-lot residential uses are encouraged.	37.09%
Rural Residential	3 acres per dwelling unit	0.49%
Village Business	1 acres per dwelling unit	0.17%
Grand Total		**100%**

Delaware County

Land Use

Delaware County is 1,468 square miles (939,520 acres) and is located in part of the Catskill Mountains in the Hudson River Valley of southeastern New York State. Delaware County is separated from the state of Pennsylvania by the Delaware River. The Belleayre Mountain Ski Center borders Delaware County, which is just north of Belleayre Mountain. As of the 2000 census, there were 48,055 people, 19,270 households, and 12,737 families residing in the county. The population density was 33 people per square mile.

Agriculture is a major industry in Delaware County and covers approximately 200,000 acres. Dairy sales constitute approximately 80% of agricultural sales in the county. Delaware County dairy farms represent 80% of the dairy farms in the New York City watershed area.

In addition to agriculture, forestry is another major economic land use within Delaware County. Although the Catskill Park is located in the southern region of Delaware County, none of the parcels located in the land use study area, along the Route 28 corridor, are considered state-owned forested land. According to the Delaware County Agricultural and Farmland Protection Plan (2000), "Delaware County has an established forest industry that contributes to the economic well-being of the county, the Catskill region, and New York State. Loggers, foresters, sawmills, and agribusinesses producing value-added wood products abound, with approximately $7 million in timber sales generated annually. Non-timber or agro-forestry crops, such as ginseng and maple syrup, are prominent agro-forestry crops in the county."

Up until the end of the 19th century, a large number of tourists visited the Catskill and Delaware County area. In recent decades, this historically important industry has declined. However, there are current efforts to revive the tourism industry as a foundation of the economy of the area.

The commercial industry within the county consists of small specialty shops, department stores, and restaurants, which continue to join the ranks of the county's more than 350 retail merchants. Manufacturers employ more than 4,000 people in Delaware County. Goods include components for the aerospace industry, pharmaceuticals, printing, and dairy products.

Zoning

Each town in Delaware County are made up of various zoning districts, which are primarily residential zoning districts—specifically Rural Districts III and V—with some business and business commercial zoning (Table 4.1-4).

Table 4.1-4 Delaware County Zoning

Zoning Description	Definition	Percent of Delaware County
Business	Areas best suited for business services because of location, transportation, parking, in relation to other land uses.	4.10%
Business Commercial	Consists of a corridor of land along New York State Route 28 from the Village of Margaretville boundary line to and including the Delaware and Ulster railroad recreational complex on the eastern side of the hamlet of Arkville. Includes commercial, retail and business establishments.	4.04%
Commercial	Commercial development	0.24%
General Village	Mixed use development	3.29%
Hamlet 1/2	The residential portion of the unincorporated hamlet of Arkville that is not in the Business Commercial or Industrial zones but served by public water supply and public sewer. Recognizes high density and predominantly residential settlement and limits and controls nonresidential uses.	0.59%
Hamlet 1 District	The unincorporated hamlets of New Kingston, Halcottsville, Dunraven and Clovesville and a portion of Arkville that is not in the Business Commercial, Industrial or Hamlet ½ zones. Made up of high density, predominantly residential and limits the intrusion of non-residential uses.	0.47%
Industrial	Areas best suited for industrial uses because of location, topography, transportation, existing facilities, and relation to other land uses.	2.11%
Industrial District	Includes the industrial park located along the Arkville cut-off road and several adjacent properties. Provides for the establishment of industrial uses essential to the development of a balanced economic base and to regulate this development so it will not be detrimental or hazardous to the surrounding community.	0.23%
Not Available	No data available	0.72%
Residential	Low and medium density residential	1.93%

Table 4.1-4 Delaware County Zoning

Zoning Description	Definition	Percent of Delaware County
	development.	
Rural III District	Lands located within 500 feet of all New York State and Delaware County public highways shown on the district map and with direct minimum frontage and direct access to the public. Allows for a variety of mixed uses that are appropriate for existing traffic type and volume and quality of road surface.	23.37%
Rural V District	This district includes all lands not described as part of any other district. It generally includes most of the land in the Town of Middletown. Includes low density, residential development and limited commercial development.	58.92%
Grand Total		**100%**

Route 28 Corridor

Land Use

The Route 28 Corridor, which is part of the land use study area, is 14,736 acres and comprises the bordering communities between Boiceville and Margaretville, which are in the Towns of Olive and Middletown in Ulster and Delaware County, respectively. Twenty-six communities (hamlets and incorporated villages) and the Town of Shandaken border the Route 28 Corridor and are therefore included in the land use study area (see Figure 4.1-1).

Land uses of the parcels along Route 28, categorized by the United States Geological Survey (USGS) National Land Cover Dataset (2001), have been re-categorized into agriculture, developed land, open space and forest, and open water. USGS data indicate that the land use/land cover within the communities along Route 28 is predominantly open space/forest (80%) followed by open water (15.73%), agriculture (2.36%) and developed land (1.6%) (Table 4.1-5).

Table 4.1-5 USGS Land Use/Land Cover in the Route 28 Corridor

Description	Acres	Percent of Total Acres
Agriculture	348.1	2.36%
Developed	236.4	1.60%
Open Space/Forest	11,833.9	80.30%
Open Water	2,317.9	15.73%
Total	**14,736**	**100%**

Zoning

The communities and hamlets along the Route 28 corridor are divided into various zoning districts, which primarily include business, residential, and some commercial (see Tables 4.1-3 and 4.1-4). These data are also listed above by county, Delaware and Ulster County. Table 4.1-6 provides information on the percent of each zoning category within the Route 28 corridor.

Table 4.1-6 Zoning in the Route 28 Corridor

Zoning Description	Percent of Route 28 Corridor
Business	1.70%
Business Commercial	0.53%
Commercial	0.03%
Commercial / Light Industrial	0.11%
Conservation Residential	14.58%
Ex Urban Residential	1.72%
General Village	0.43%
Hamlet 1/2	0.08%
Hamlet 1 District	0.06%
Hamlet Commercial	0.14%
Hamlet Residential	1.17%
Industrial	0.28%
Industrial District	0.03%
Not Available	17.97%
Residential	0.25%
Residential 1.5 Acres	12.68%
Residential 3 Acres	4.64%
Residential 5 Acres	32.23%
Rural III District	3.06%
Rural Residential	0.43%
Rural V District	7.72%
Village Business	0.15%
Grand Total	**100.00%**

Belleayre Mountain Ski Resort (Project Site)

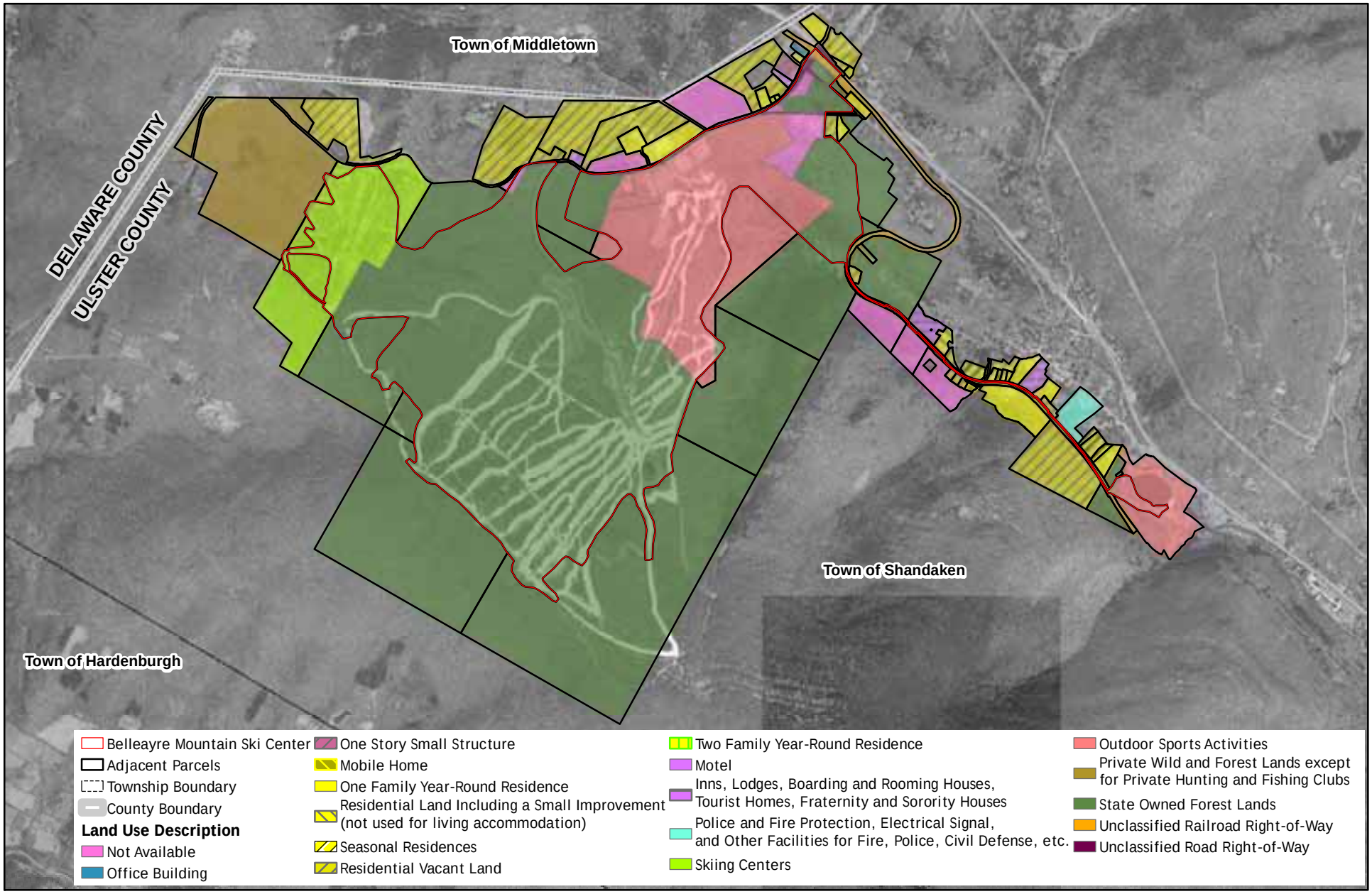
Land Use

The project site is a part of the land use study area and is approximately 803 acres. Property classification information from current county assessment data indicates that the project site is situated on land classified by the New York State Office of Real Property Services (NYSORP) as state-owned forest lands (69.77%), outdoor sports activities (20.5%), skiing centers (6.52%), private wild and forest lands except for private hunting and fishing clubs (.07%), residential vacant land (.05%), one-family year-round residences (.01%), and police and fire protection, electrical signal, equipment, and other facilities for fire, police, civil defense (<.01%). The remaining 3.07% is unclassified land. Unclassified land is land that was not classified by the county. The 3.07% was determined by identifying features on a USGS map. Of the 3.07%, 0.52% is railroad right-of-way (ROW) and 0.65% is road ROW (see Figure 4.1-2 and Table 4.1-7).

Table 4.1-7 Land Uses Based on Tax Parcel Information of the Project Site

Property Type Classification	Acres within Project Site	Percent of Total Acres
Parcel Ownership Data Unavailable from County	15.3	1.90%
One Family Year-Round Residence	0.1	0.01%
Outdoor Sports Activities	164.7	20.50%
Police and Fire Protection, Electrical Signal, Equipment and Other Facilities for Fire, Police, Civil Defense, etc	0.0	0.00%
Private Wild and Forest Lands except for Private Hunting and Fishing Clubs	0.6	0.07%
Residential Vacant Land	0.4	0.05%
Skiing Centers	52.3	6.52%
State Owned Forest Lands	560.4	69.77%
Unclass_RR_ROW	4.1	0.52%
Unclass_Road_ROW	5.2	0.65%
Total	**803**	**100%**

The tax parcel information presented in Figure 4.1-2 and Table 4.1-7 separates most of the Belleayre project site into "Outdoor Sports Activities" and "State-Owned Forest Lands." From a land use cover perspective, these lands are forested with clearings that represent the ski slopes. To further characterize land use of the project site, the USGS National Land Cover Dataset (2001) and aerial photographs also were reviewed. Results of the review indicate that the project site is predominantly deciduous forest (63% of the project site) followed by developed, open space (28% of the project site) and mixed forest (7% of the project site) (see Figure 4.1-3 and Table 4.1-8).



Belleayre Mountain Ski Center
Catskill State Park

Project Area, NYS Orthoimagery , 2004

Figure 4.1-2 Tax Parcel Land Use within the Belleayre Mountain Ski Center and Adjacent Parcels

Sheet No. 1

File: L:\Buffalo\BelleayreUMP\Maps\MXDs\DEIS\Parcel_LU_121309.mxd

Date: November 12, 2010

0 2,000 Feet

Belleayre Mountain Ski Center
Catskill State Park

Project Area, NYS Orthoimagery , 2004

Belleayre Mountain Ski Center
Adjacent Parcels
Township Boundary
County Boundary

Land Cover
Agriculture
Developed
Open Space/Forest
Open Water

Figure 4.1-3 USGS Land Use/Land Cover within the Belleayre Mountain Ski Center and Adjacent Parcels

Sheet No. 1

File: L:\Buffalo\BelleayreUMP\Maps\MXDs\DEIS\USGS_LULC_121309.mxd

Date: November 12, 2010

Source: USGS National Land-Cover Database 2001

Table 4.1-8 USGS Land Use/Land Cover within the Project Site

Description	Acres	Percent of Total Acres
Agriculture	3.1	0.39%
Developed	8.8	1.10%
Open Space/Forest	791.4	98.51%
Open Water	0.0	0.01%
Total	**803**	**100%**

Zoning

The project site is divided into residential zoning districts that include Residential R1.5, R3, and R5**.** Table 4.1-9 shows that 94.72% of the residential zoning within the project site is categorized as R5.

Table 4.1-9 Zoning within the Project Site

Zoning Description	Zoning	Acres	Percent of Total Acres
Residential 1.5Acres	R1.5	31.9	3.98%
Residential 3Acres	R3	10.5	1.30%
Residential 5Acres	R5	760.8	94.72%
Total		**803**	100%

Adjacent Areas

Land Use

The parcels adjacent to the Belleayre Mountain Ski Resort or project site make up approximately 1,116 acres. These adjacent parcels are part of the land use study area. Property classification information from current county assessment data indicates that the adjacent areas are situated on land classified by NYSORP (Figure 4.1-2). Table 4.1-10 shows the number of acres of each property classification adjacent to the project site boundary, as well as the percent of the total acreage of adjacent areas for each property classification; 6.47% of the total number of acres adjacent to the project site is unclassified land. Of this 6.47%, 1.61% is unclassified railroad ROW, 0.56% is unclassified road ROW, and 4.3% is unknown parcel data not provided by the county.

More than eighteen landowners own land bordering the Belleayre property on the easterly and westerly boundaries. The very northeastern portion of the Belleayre property is adjacent to the abandoned New York Central Railroad tracks, now owned by Ulster County. The Belleayre Mountain Ski Center is bordered on the south by state-owned land classified as the Big Indian Wilderness Area. The Big Indian Wilderness Area makes up just more than half of the total number of acres adjacent to the Belleayre property, which is categorized as state-owned forest lands (56.24%). The remaining parcels are primarily classified as residential and recreation; and a very small percentage of the adjacent parcels are classified as office buildings and emergency-related services.

To further characterize land use of the adjacent parcels, the USGS National Land Cover Dataset (2001) and aerial photographs also were reviewed. Results of the review indicate that the adjacent properties are predominantly deciduous forest (see Figure 4.1-3).

Table 4.1-10 Property Type Classification Acreage Adjacent to the Project Site Boundary

Property Type Classification	Acres Adjacent to Study Boundary	Percent of Total Acres
Inns, Lodges, Boarding and Rooming Houses, Tourist Homes, Fraternity and Sorority Houses	8.5	0.76%
Mobile Home	0.5	0.04%
Motel	1.0	0.09%
Office Building	0.9	0.08%
One Family Year-Round Residence	37.7	3.38%
One Story Small Structure	2.6	0.23%
Outdoor Sports Activities	66.0	5.91%
Police and Fire Protection, Electrical Signal, Equipment and Other Facilities for Fire, Police, Civil Defense, etc	7.6	0.68%
Private Wild and Forest Lands except for Private Hunting and Fishing Clubs	100.3	8.99%
Residential Land Including a Small Improvement (not used for living accommodations)	2.8	0.25%
Residential Vacant Land	129.2	11.58%
Seasonal Residences	6.9	0.62%
Skiing Centers	52.0	4.66%
State-Owned Forest Lands	627.6	56.24%
Two Family Year-Round Residence	0.2	0.02%
Unclassified Railroad ROW	18.0	1.61%
Unclassified Road ROW	6.2	0.56%
Parcel Ownership Data Unavailable from County	48.0	4.30%
Total	**1,116**	**100%**

Zoning

The areas adjacent to the project site are divided into hamlet business, hamlet residential, and residential zoning. These include commercial (HB) and residential (HR, 1.5A, 3A and 5A). Table 4.1-11 shows that most of the land adjacent to the project site is residential; 73.96% of the total adjacent acreage is categorized as R5 zoning.

Table 4.1-11 Zoning Adjacent to the Project Site

Zoning Description	Zoning	Acres	Percent of Total Acres
Hamlet Business	HB	4.9	0.44%
Hamlet Residential	HR	6.8	0.61%
Residential 1.5 Acres	R1.5	93.2	8.36%
Residential 3 Acres	R3	185.6	16.63%
Residential 5 Acres	R5	825.2	73.96%
Total		**1,116**	100%

4.1.5 Land Use Plans

The present land use pattern has been influenced by the historic pattern of hamlet development, highway-oriented transportation, and state land ownership. Development is generally left to the discretion of county and town zoning and planning boards, which originally adopted traditional forms of regulation in an effort to protect land use and natural resources. Local and regional development is guided by a number of open space plans, comprehensive plans, and strategic plans. These documents are broadly reflective of a community's history, values, future goals, and character.

The following documents were reviewed to understand the factors guiding development, land use, and community character in the land use study area:

- The Comprehensive Plan for the Town of Shandaken
- The Town of Middletown Draft Comprehensive Plan
- Village of Fleischmanns Comprehensive Plan
- The Village of Margaretville Comprehensive Land Use and Action Plan
- Ulster County Open Space Plan; and Ulster Tomorrow, a Sustainable Economic Development Plan for Ulster County
- New York City Watershed Memorandum of Agreement.
- Route 28 Scenic Corridor Study
- The Resource Protection and Economic Development Strategy Planning and Tourism Study
- Catskill Park State Land Master Plan

The Town of Olive is currently applying for a grant to develop a Comprehensive Plan and is therefore not included in this analysis.

4.1.5.1 The Comprehensive Plan for the Town of Shandaken

The Town of Shandaken, in Ulster County, adopted a Comprehensive Plan in July 2005. The town comprises approximately 79,200 acres. According to the plan, 94% of the town is developed, has significant development limitations, or is highly regulated. Therefore only 6% of the Town of Shandaken (4,760 acres) has the potential for future development.

General land uses are as follows:

- 66% public open space
- 14% residential
- 9% private open space
- 7% vacant land
- 4% miscellaneous.

The landforms that make up Shandaken include mountaintops, wooded and steep hillsides, mountain valleys, and significant natural communities of beech, maple, hemlock, ash, oak, other northern hardwoods, and conifer forests. The main watercourse is Esopus Creek. Scattered throughout these natural land features are the town's 12 hamlets. The hamlets were developed over the years where the terrain was accessible, mainly in the valleys and along major streams such as Esopus Creek, Woodland Valley, Birch Creek, and Stony Cove.

Each of the 12 hamlets (six delineated areas) has a distinct character. The town includes older residences and tourist-oriented businesses, such as motels and restaurants, intermingled with real estate offices and businesses and services. A small area of resource-related industries such as sawmills and quarries are present but are not a major economic factor as they were a century ago. There are also Forest Preserve lands, which span the Route 28 corridor in a fragmented pattern.

The plan notes that the town continues to struggle to provide a stable economy for its residents, and it identifies the natural resources of the region as having clear potential for importing and harnessing the tourism market.

4.1.5.2 The Town of Middletown Draft Comprehensive Plan

The Town of Middletown adopted a Comprehensive Plan in 1984, and included a survey of residents, establishment of a vision, goals and objectives, and a land-use study. The Town Board assigned the task of updating the Comprehensive Plan to the Town Planning Board. The Planning Board released a Draft Comprehensive Plan in August 2010. This plan is still in draft form. The draft plan specifically describes Middletown's character as having the following qualities:

- Beautiful
- Scenic
- Friendly
- Long way from the city but not too far
- Picturesque
- Convenient village walking
- Beautiful mountains
- Economic diversity of population
- Rural with farms, woodlands, open space, small-city features, low-density, hamlets and villages, barns
- Peace and quiet
- Outdoor recreation
- Artistic and creative community
- Easy for visitors to get to and at the cross roads of two state highways
- People are entrepreneurial and resourceful
- Second homeowners
- A bedroom community
- Offers full public services such as hospital and grocery store

The plan includes a vision statement that states the city will be a place where the scenic beauty of the mountains remains a hallmark that defines it as a community. It envisions open spaces and a clean environment supporting outdoor recreation, improved wildlife habitats, and contributing to a high quality of life for residents. The vision statement was developed directly from a resident survey, two planning workshops, and other public comments received. The vision statement depicts in

words what the community is striving to become. Specifically, the vision statement prioritizes preservation of farms along with diverse agricultural businesses, housing for various income levels and ages, and recreational programs and facilities. Middletown will offer recreational programs and facilities that offer indoor, outdoor, passive, and active activities for all ages. Middletown will also be home to new, innovative, clean and green light industrial and commercial businesses.

Additionally, the vision statement seeks vital and thriving hamlets and villages, schools and amenities that will attract year-round employment and residences, and active part-time residents.

Middletown's vision statement specifically defines its community character as follows: "Our natural beauty, traditional villages and hamlets, cultural and historic resources, attractive streets, buildings and roads all contribute to our community character. A small city lifestyle that promotes neighborliness, community spirit, and pride will be vital parts of who we are as a community. Parks and recreation facilities, a diversity of quality retail services, thriving main streets, and active community life defines our community character. We maintain our uniqueness by ensuring that our built and natural environment, including signs, buildings, roads, and development patterns, reflect these values. Quality public services including a full service hospital will be provided for. The tax burden needed to provide quality local services is supported through fair taxes paid by New York City."

The overall economic development goal of the Town of Middletown Comprehensive Plan is to expand and strengthen the city's multi-faceted economic base, preserve and increase the tax base and revenues, provide employment opportunities for a diverse, concentrated work force, and provide adequate infrastructure and a desirable level of municipal services. The Town would also like to provide adequate land and resources for recreation and preservation of the Town's rural character.

Detailed objectives and recommended actions were drafted to support the goals of this Plan. The objectives when completed will move Middletown towards achieving the vision and goals stated in this Plan. Recommended actions offer more specific, realistic steps that the Town can apply over time to achieve the objectives, goals, and ultimately, the vision established by the community. The Belleayre Mountain Ski Center was included in some of the recommended actions:

- ❄ Continue the Joint Youth Program with Mine Kill State Park and Belleayre Ski Center and look for ways to expand this effort.

- ❄ Improve the Belleayre Ski Center

These recommendations are consistent with the Town of Middletown's economic and recreational goals- to provide adequate land and resources for recreation and

preservation of the Town's rural character and to expand and strengthen the city's multi-faceted economic base.

4.1.5.3 Village of Fleischmanns Comprehensive Plan

The goal of the Village of Fleischmanns Comprehensive Plan is to preserve historic community character, revitalize the business community, and enhance the quality of life. The Village carefully manages the development and redevelopment of its historic districts, the Main Street business district, cultural and civic institutions, public parks, and natural resources. The village preserves historic buildings, open space, and the integrity of historic residential neighborhoods; enhances the convenience of pedestrian access to services and facilities within the community and employment opportunities for residents; provides sustainable public infrastructure and services to meet growing community needs in a cost-effective manner; provides recreational opportunities for all age groups; and sets quality design standards to ensure that new growth and redevelopment enriches community aesthetics and are in harmony with the existing makeup of the Village of Fleischmanns.

The Comprehensive Plan summarizes the major recommendations organized under the following topics:

- Natural resource protection
- Transportation planning
- Cultural resources
- Recreational and historic resources
- Community facilities
- Main Street revitalization
- Economic and housing policy
- Land use and zoning.

For each subject there is a list of specific recommendations, along with an indication of when the recommendation should be implemented and the party responsible for ensuring that the recommendation is followed.

Under recreation, the plan recommends that the Village of Fleischmanns explore opportunities to develop trails linking the village to existing public hiking trails in the region. It also suggests that the village should secure grant funding opportunities to enhance cultural, historic, and recreational resources. The Plan states that recommendations will be implemented over the next two to five years.

4.1.5.4 The Village of Margaretville Comprehensive Land Use and Action Plan

In 2006, the Village of Margaretville undertook a comprehensive strategic community planning process to provide a framework for future development and to assess community needs in order to strengthen the economy. The plan was revised in 2008. The Comprehensive Plan provides information on how to maintain the community character of Margaretville. The plan also recommends actions to showcase Margaretville's setting, mountain vistas and striking riverfronts, four seasons, streets that are walk-able and compact, and a quaint community with great people. Chapter 3 of the plan states that Margaretville's development is physically constrained by the surrounding mountains and its political boundaries and that suitable land for development is limited. The plan notes the importance of natural resources when planning development programs.

In the plan, the village describes itself as a "charming commercial, social, and cultural hub for the surrounding areas" and states that it offers "ample opportunities for healthy, peaceful living in a quiet but vital country setting." The plan states that one of its biggest assets is its small village ambience, rural character and lack of strip malls. The plan itself describes its character as having the best of small-town rural life, lifestyle and population diversity, a budding art and culture scene, and information-gathering places such as coffee shops and the post office.

Specifically, the community strives to enhance its land use and natural resource programs by promoting the following:

- A walk-able, vibrant central business district
- Quiet and child-friendly residential neighborhoods
- Attractive and informative signs
- A visitor-friendly environment
- Context sensitive development
- Streamlined processes for zoning, site plan review, and subdivision
- Balance between flood protection, waterway enhancement, and water use.

One of the primary goals of the Comprehensive Plan is to strengthen the tourism industry by "giving travelers a reason to leave the highway, disembark from their cars and spend money."

The plan includes the following recommendations:

1. Identify and develop complementary retail and tourism support services

2. Cooperate and integrate marketing programs, packages, and retail services with regional tourism, arts and cultural venues, agribusinesses, festivals and other events

3. Develop guide services, package tours, and other tourism support service venues

4. Evaluate the needs and benefits of outdoors vendors, and how they might add to the ambience and liveliness of the village

5. Identify common ground with neighboring communities on the Routes 28 and 30 corridors and discuss collaborating on regional projects, such as tourism development

6. Work with NYSDEC and the New York City Department of Environmental Protection to promote recreational access to public lands

7. Work NYSDEC (and the New York State Department of Transportation to promote interpretive and directional signs, brochures, and maps that help residents and visitors take advantage of the public lands and recreational facilities that exist around Margaretville.

4.1.5.5 Ulster County Open Space Plan and Economic Development Plan

Ulster County, where the Belleayre Mountain Ski Center is located, has an open space plan that was developed in 2007. The plan identifies the following goals and action items:

1. Identify critical natural resource "systems"

2. Preserve and protect open space, unique natural areas and heritage areas and sites, wetlands, water, and woodland resources, scenic views, areas of natural beauty, and rural character

3. Integrate and link planning, development, and environmental goals and efforts

4. Integrate considerations of community well-being, economic prosperity, and ecological integrity

5. Protect water resources and the critical watershed areas of the county

6. Enhance the viability of existing farming operations and agricultural businesses and encourage new ones to be formed

7. Protect and enhance the county's most valuable open space landforms and natural features with coordinated planning and safeguarding policies

8. Safeguard priority biological diversity areas by promoting biologically sensitive land use and increasing research and understanding

9. Create, preserve, enhance, and provide managed access to parks, hiking trails, active and passive recreation facilities, and historic resources

10. Balance the needs of present and future generations through sustainable development.

The Ulster County Development Corporation also has published *Ulster Tomorrow, a Sustainable Economic Development Plan for Ulster County*. This strategic planning effort is designed to help the county deliver economic development services, coordinate various activities, and provide a focus for the economic development efforts across the county. The plan identifies four key industry clusters that operate as economic drivers for the rest of the economy as a whole, the first of which is to enhance the travel and tourist industry. The overarching goal of this strategy is to improve promotion of the county's tourism sector.

4.1.5.6 New York City Watershed Memorandum of Agreement

The New York City Watershed Memorandum of Agreement ("Watershed Agreement" or "MOA"), signed on January 21, 1997 was a negotiated agreement to provide for the continuation of the Catskill/Delaware watershed to be used as a source of drinking water for New York City without filtration. The MOA established NYC land acquisition requirements, set more stringent New York City watershed rules and regulations, activated the NYC Watershed Protection and Partnership Council and other partnership committees, initiated NYC watershed protection and partnership programs, and details other watershed protection provisions. As part of the MOA, the New York City Department of Environmental Protection outlined measures it will undertake to ensure the continued protection of water quality within the watershed.

4.1.5.7 Route 28 Scenic Corridor Study

As discussed above, the Route 28 corridor runs through the heart of the Catskill Mountains and encounters small historic hamlets and roadside businesses that are surrounded by public lands and vast areas of wild forests. Given the significant public land holdings and the mountainous topography of the Catskill Park, the economy of the Central Catskills largely depends on tourism, outdoor recreation, arts and culture, and natural resource based businesses.

Throughout the decades, the Route 28 corridor has been rebuilt and realigned to allow easier access into the Catskills. This realignment allowed better access to many of the corridor's historic, vibrant, small communities.

The Catskill Watershed Coalition recently agreed to fund the development of a nomination package for the Route 28 corridor to be designated as a scenic byway; the nomination package would include a resource inventory, a narrative of the byway, and a corridor management plan, as required for a scenic byway designation. The corridor management plan will promote revitalization efforts along the Route 28 corridor and ensure that tourism-related development pressure is accommodated in a manner consistent with the unique character and vision of the communities along the corridor. The study therefore seeks to enhance the connection of residents and visitors to the Catskill's natural resources and the variety of recreational opportunities.

4.1.5.8 The Resource Protection and Economic Development Strategy Planning and Tourism Study

In 1994, a planning and tourism study was undertaken by the Route 28 Corridor Committee for the Town of Shandaken, Ulster County in cooperation with the Town of Middletown, Delaware County to "develop a specific plan to guide land use, capitalize upon the ecological resources preserved by the New York DEC and leverage those resources with appropriate tourism development and infrastructure utilizing both public and private investment along the Route 28 Corridor." The study noted that a comprehensive, whole planning effort, consisting of public and private partnerships, would need to be undertaken in various phases to be fully implemented.

As a part of this study, the committee outlined the need to further detail the following work elements:

1. Prepare a land use/economic development strategy to capitalize on the existing pattern of small hamlets connected by the strong transportation corridor

2. Prepare a marketing strategy for expansion of the tourist industry based on Shandaken-Middletown's central location in the Catskill Forest Preserve and the growth of "eco-tourism"

3. Implement necessary sewer and water system improvements and/or expansion to complement the land use strategy

4. Consider an economic development stimulus program based on existing programs and those that can be created under the Whole Community Planning Program

5. Develop management techniques to guide land use and protect environmental resources in conjunction with the development strategy

6. Recommend an administrative structure to guide economic development, create a public-private partnership for investment in the Central Catskills and identify resources and techniques for financing development opportunities.

The plan describes the following constraints of the Route 28 corridor, notably, that:

- There is no sense of arrival to the Central Catskills as a specific destination, particularly from the east; no announcement at the Shandaken-Olive line that one is entering the "high peaks" area.
- Route 28 is designed to move travelers through the Catskills quickly rather than to enjoy and experience the region.
- The Ashokan Reservoir is not easily seen or identified from Route 28 and offers virtually no recreational opportunities.
- There is no defined identity or theme for the area, its history, culture, or traditions.
- Few tourist shopping opportunities exist and they are not coordinated in any way.
- There is no single major destination that warrants an over-night stay and serves as a magnet for the entire region.
- There are few large lodging opportunities with facilities to serve tourists.
- Large state-land holdings and development restrictions limit opportunities for creation of major tourist facilities.
- The Belleayre Ski Center has limited capacity, short runs, and limited seasonal use.
- The Plan also notes the following assets:
- Vast expanses of scenic open space are preserved in perpetuity and accessible to the public.
- The Belleayre Ski Center has the potential to become one of the finest ski destinations in the northeast if trails are expanded and it is linked to the nearby villages.
- Existing hamlets and villages have unique characters and can become focal points for development.
- Widespread new attitudes toward an interest in the environment make eco-tourism a viable economic strategy, and emerging vacation patterns of several annual three-or-four-day breaks favor close-in destinations.

4.1.5.9 Catskill Park State Land Master Plan (CPSLMP)

The Catskill Forest Preserve has grown from 34,000 acres in 1885 to approximately 290,000 acres. The Catskill Park State Land Master Plan

(CPSLMP) was developed by NYSDEC in 1985, and revised in 2008, to provide guidance for consistent and overall management of the Catskill Forest Preserve. The CPSLMP establishes standards and criteria for the classification, intensity of public use, and development of state-owned land. The plan identifies and classifies five geographic management units based on the level of public use and the unit's characteristics:

1. Wilderness
2. Wild Forest
3. Intensive Use
4. Administrative
5. Primitive Bicycle Corridor.

The CPSLMP states that the Catskill Forest Preserve is an important economic asset for the Catskill region because it is an attraction for tourists and has a positive influence on private land values. The State also pays property taxes on Forest Preserve lands to local governments. These assets indicate the Forest Preserve's substantial contributions to the local economy, which serve to enhance the quality of life for the local residents.

The CPSLMP requires a ten-year Unit Management Plan (UMP) for each unit of land. A UMP provides detailed information on facilities, natural resources, and recreational uses in each unit, in addition to management objectives and actions to take to meet those objectives, and includes an analysis of the ability of the natural resource's capacity to accommodate the proposed development. Belleayre Mountain Ski Center, the only ski center on Forest Preserve land in the Catskill Park, has been managed and developed pursuant to a UMP which was adopted by DEC in 1998 (the "1998 UMP"). This draft UMP is a proposed revision to the 1998 UMP to permit additional development and modernization of the Ski Center's inventories and to provide for management goals for the Belleayre Mountain Ski Center.

The Belleayre Mountain Ski Center is located in a unique wild forest setting-Forest Preserve. It is classified in the CPSLMP as an Intensive Use Area (see below) which permits the development of the lands within the management unit. The development proposed in this UMP contains several measures or actions to mitigate potential impacts to this unique environmental setting. Generally, the construction associated with the proposed development of the Ski Center as set forth in this UMP includes the construction of parking areas, trails, lifts and lodges. The SEQRA analysis found in this Section 4 examines the potential impact associated with the Full Build-Out Alternative, as described in Section 6 herein. Additionally, the UMP provides for alternative levels of construction for consideration by the public pursuant to this SEQR process.

4.1.6 Potential Project Impacts

4.1.6.1 Potential Impacts on Land Use

As stated above, the expansion to the Belleayre Mountain Ski Center is compatible with local and regional communities' land use and character and would not preclude existing uses or planned uses in the vicinity of the land use study area. Additionally, the proposed Project facilities have been carefully planned to support the existing ski center and therefore do not have a significant impact on the current land use and zoning of the land use study area. There will be no changes to the land use, zoning, and community character of the land use study area.

While significant residential, commercial, or industrial development is not planned for the area, the Project will not preclude future development activities and may actually assist in the success of various local businesses, as more services are required by people operating, maintaining, and visiting the Project. Currently, there are only three development projects within the land use study area that are either under construction or under review for a building permit. Both the Village of Fleischmanns and the Town of Middletown are updating their water system. The Village of Fleischmanns is installing two new wells and a pumping station and the Town of Middletown is installing one new well and piping. The Town of Middletown Planning Board also reviewed permit applications to construct three residential subdivisions in January of 2010.

The only known large-scale future development plan within the land use study area is a private resort facility (Belleayre Resort at Catskill Park) to be located adjacent to the project site. The goals of the proposed private resort development are as follows:

- to serve as the tourism focal point for the Catskill Park, including many of the picturesque small hamlets and villages in the region;
- to build upon, and strengthen, the Belleayre Mountain Ski Center; and
- To be seen as an example of environmentally sensitive construction and operation practices that balances economic vitality with environmental stewardship.

Project Compatibility with Land Use Plans

The proposed Belleayre Mountain Ski Center Expansion Project facilities have been carefully planned to be consistent with the character of the existing ski center. Although an increase in scale, the UMP Plan does not represent a change or significant impact on the current community character, land use and zoning (where appropriate) of the land use plans described in Section 4.1.6.

The Comprehensive Plan for the Town of Shandaken

The Project would be consistent with the overall goals of the Town of Shandaken Comprehensive Plan, which are intended to preserve the environment, while supporting growth that is compatible with community standards. Specifically, the Project would be consistent with the following goals:

- Promote the economic development of the Town of Shandaken to ensure an acceptable standard of living for its residents.

- Promote and develop four-season tourism based on the town's extensive natural, historic, and cultural resources.

- Develop a means to support tourism in the area that includes encouraging government and non-profit organizations and businesses to better plan, coordinate, and expand tourism-related activities.

The Comprehensive Plan specifically mentions the Belleayre Mountain Ski Center as one of several major developments that have shaped the Central Catskills and the Town of Shandaken over the past century. The Plan states that recent investments to improve physical facilities and marketing at Belleayre have demonstrated the state's long-term commitment to maintaining this resource. The plan also states that the Belleayre Mountain Ski Center, among other destinations, has the potential to revitalize the Town of Shandaken. In addition, the plan indicates that any development occurring on Belleayre Mountain Ski Center and other mountaintops not under Forest Preserve protection must consider such items as visibility, erosion control, impacts on wildlife, significant ecological communities, scenic vistas, and other sensitive environmental features.

The Town of Middletown Draft Comprehensive Plan

The Project would be consistent with the overall economic development goal of the Town of Middletown Comprehensive Plan, which is to expand and strengthen the town's multi-faceted economic base, preserve and increase the tax base and revenues, provide employment opportunities for a diverse, concentrated work force, and provide adequate infrastructure and a desirable level of municipal services. The Project may assist in the success of various local businesses as more services are required by people operating and maintaining Belleayre Mountain Ski Center and as more visitors travel to the area. In addition, the Project will provide more employment opportunities for those residing in the surrounding communities such as the Town of Middletown.

Village of Fleischmanns Comprehensive Plan

The Project would be consistent with the overall goal of the Village of Fleishmanns Comprehensive Plan to promote the health, safety, and general welfare of the people in the community and to give due consideration to the needs of the people of the region. The Project may assist in the success of various local businesses as more services are required by people operating and maintaining Belleayre Mountain Ski Center and as more visitors travel to the area and increase the network of tourism in the area.

The Village of Margaretville Comprehensive Land Use and Action Plan

The Project would be consistent with the overall goal of the Village of Margaretville Comprehensive Land Use and Action Plan to provide a framework

for future development and to assess community needs in order to strengthen the economy. Specifically, it focuses on expanding tourism efforts through partnerships with local communities and the state. These efforts described in the plan are listed below:

The expansion of the Belleayre Mountain Ski Center will attract a larger number of tourists each year. This will give surrounding communities more incentive to strengthen their tourism industry, form partnerships with local and state organizations, and increase marketing efforts throughout the region.

Ulster County Open Space Plan; and Ulster Tomorrow, a Sustainable Economic Development Plan for Ulster County

The Ulster County Open Space Plan and Economic Development Plan seeks to preserve and protect open space, natural and sensitive areas, recreational facilities, historic resources, and the rural nature of the county. The plan also states the importance of strengthening farming operations and agricultural business as well as increasing business development and tourist flow into the county. The Belleayre Mountain Ski Center Project is consistent with the overall goals stated above, specifically the goal that states the importance of meeting the recreational needs— active and passive—of all Ulster County residents. The Project not only meets the recreational needs of Ulster County's residents, but it also ensures that the county remains a leading provider of regional recreational open space.

New York City Watershed Memorandum of Agreement

Wetland delineations and stream surveys were conducted to determine which water resources within the Project boundary are subject to jurisdictional determinations and regulatory authority of the U.S. Army Corps of Engineers (USACE) and NYSDEC under the requirements of the Clean Water Act of 1977; New York State Article 15, Title 5; and New York State Article 24. Proposed project facilities were designed around the delineated wetlands and streams in order to avoid impacts on state waters. The Project is therefore consistent with the New York City Watershed MOA.

Route 28 Scenic Corridor Study

The Route 28 Scenic Corridor Study found that the corridor has tremendous potential to accommodate visitors by enhancing services within historic hamlets and providing physical and visual connections to cultural and recreational sites. The corridor is the only road in the land use study area that connects visitors and residents to commercial, residential, and recreational sites. The proposed Project facilities would result in an increase in the number of visitors due to expansion of the ski center although would not significantly impact the corridor (see Section 4.6, Traffic).

The Resource Protection and Economic Development Strategy Planning and Tourism Study

The Project is compatible with the findings of the Resource Protection and Economic Development Strategy Planning and Tourism Study. Through the study, the Corridor Committee notes that the combined tourist attractions and facilities of the Central Catskills must be developed simultaneously to create a

major destination to attract new visitors. Additionally, the study noted that the Belleayre Ski Center is a major tourism asset of the Central Catskills that should be expanded to its maximum winter potential and supported by year-round sports and cultural facilities connected to lodging, restaurant, and entertainment facilities to serve as the magnet for tourist visits. The study also notes that year-round, long-term tourist visitation must be encouraged by stimulation of a diversity of family-friend activities.

Emphasis is placed on maximization of facilities at Belleayre Mountain and the revitalization of Pine Hill and Fleischmanns. According to the study, "this circle of intensive year-round activity as the key locus of attraction will draw the number of over-night and day visitors sufficient to spark the construction of lodging and entertainment facilities at appropriate spots along the Route 28 corridor through the two towns: Phoenicia through Mt. Tremper in the east and Margaretville to Arkville/Halcottsville in the west."

The study also notes that Belleayre Ski Center is the largest single recreational attraction in the Route 28 corridor but has yet to be developed to achieve its full potential as a major tourist destination.

Catskill Park State Land Master Plan

The Belleayre Mountain Ski Center is classified in the CPSLMP as an Intensive Use Area, which allows for development of the area for public recreation. The CPSLMP defines an Intensive Use Area as "a location where the State provides facilities for highly concentrated forms of outdoor recreation including facilities designed to accommodate significant numbers of visitors, such as campgrounds, ski centers, and visitor information centers." The CPSLMP explains that "the existing ski center at Belleayre should be modernized to the extent physical resources allow and within the constraints of the amendment to Article XIV of the State Constitution authorizing its establishment." Article XIV is often referred to as the "forever wild" section of the Constitution and states in relevant part:

> *The lands of the state, now owned or hereafter acquired, constituting the forest preserve as now fixed by law, shall be forever kept as wild forest lands. They shall not be leased, sold or exchanged, or be taken by any corporation, public or private, nor shall the timber thereon be sold, removed or destroyed.*

With respect ;to the Belleyare Ski Area, amendments to the forever wild clause provide that "...nothing hereing contained shall prevent the state from . . . construction and maintaining not more than twenty-five miles of ski trails thirty to two hundred feet wide, together with appurtenances thereto, provided that no more than two miles of such trails shall be in excess of one hundred twenty feet wide, on the slopes of Belleayre Mountain in Ulster and Delaware counties…

The primary management guidelines for intensive use areas according to the CPSLMP "will be to provide the public opportunities for group and family camping, picnicking, swimming, fishing, boating, skiing and other similar outdoor recreation in a setting and on a scale in harmony with the relatively wild and

undeveloped character of the Catskill Forest Preserve and Catskill Park. All intensive use facilities will be located, designed and managed to blend with the Catskill environment and to have the minimum adverse impact on surrounding state lands and nearby private holdings. Such facilities will be adjacent to or serviceable from existing public road systems within the Catskill Park."

The Belleayre Mountain Ski Center is also designated as a Forest Preserve "information station," distributing publications and presenting informational displays to visitors. The Plan states that the information system will be designed to blend environmental and open space protection. The primary goals of the visitor information system will be to increase public understanding and enjoyment of the Forest Preserve while contributing to the protection of its natural resources for future generations. These goals will be achieved by encouraging visitors to discover less well-known recreational opportunities, educating them about the proper use of Forest Preserve lands, and enhancing their experience as they travel the scenic byways of Catskill Park. A major component of the information system will be a strategy to interpret the natural and cultural history of the Forest Preserve and the benefits of the "forever wild" lands to the region and state.

The CPSLMP's Public Information, Education and Interpretation section describes various elements of the Catskill Forest Preserve's character. The Plan emphasizes the Forest Preserve's rich history, natural resource values, recreational opportunities, and importance to the economy of the Catskill region.

The CPSLMP recognizes the need to periodically redesign and rehabilitate recreational facilities to meet health codes, provide for current recreational needs of the camping public, and to protect the environment. Any expansion or new developments will be made through the unit management planning process. All new construction or reconstruction of structures must blend with the Catskill environment and have the minimum adverse impact on surrounding state lands and nearby private holdings.

The management goals and objectives set forth in the Belleayre UMP are the following:

- Manage recreation programs in a manner that ensures protection of the natural resources base in accordance with the Environmental Conservation Law, the Catskill State Land Master Plan, and Article XIV, Section 1 of the New York State Constitution (e.g. proposed improvements to the Belleayre Mountain ski trails will not exceed the constitutionally allowed 25 mile trail length and trail widths limits)

- Offer recreational opportunities for leisure time enjoyment for the people of the state

- Ensure that revenues equal or exceed operating costs for that portion of the program covered by user fees

- Manage the program to enhance economic benefits to local communities and the state.

Beneficial effects of proposed actions include:

- Compliance with state health codes
- Adherence to Americans with Disabilities Act (ADA) standards
- Maintenance of physical plant investment
- Modernization of facilities which enhances a satisfactory recreational experience by users
- Upkeep of facilities to contribute to public safety
- Providing conditions in a setting and scale that are in harmony with the character of the Catskill Park.

The UMP for the Belleayre Mountain Ski Center is the mechanism to refine and apply general guidelines of the CPSLMP to specific conditions, at a level of detail for management to enhance public recreational use of this facility. Final adoption of the unit plan will signify that the following managerial, environmental, social, and economic concerns have been recognized and addressed.

- The proposed facilities incorporate mitigation measures (see below) to ensure that they will be consistent with the setting and on a scale that is in harmony with the relatively wild and undeveloped character of Catskill Park. Section 4.13 of this UMP includes a discussion of mitigating measures to mitigate the impacts to the relatively wild and undeveloped character of Catskill Park.

- The proposed facilities will be located, designed, and managed so as to blend with the Catskill Mountain environment and to have minimum adverse effects as possible on surrounding state lands and nearby private holdings. Sections 4.1 and 4.13 of this UMP includes a discussion of mitigating measures to mitigate the impacts to the Catskill Mountain environment.

- The proposed activities will avoid material alteration of wetlands; minimize extensive topographic alterations; limit vegetative clearing; and preserve the scenic, natural, and on-site resources of the area; Sections 4.1 – 4.12 of this UMP includes a discussion of mitigating measures to mitigate the impacts to the wetlands, topography and natural resources of the area.

- The inventory of facilities is adequate; Section 3 of this UMP includes a discussion of the inventory proposed to be developed.

- The plan contains an adequate assessment of actual and projected public use and physical, biological, and social carrying capacity. Section 3 of this UMP includes a discussion of assessment of the public use and associated ability of the natural resource to accommodate the proposed development, rehabilitation and modernization of the site.

Mitigation measures to minimize environmental impacts have been considered and are as follows:

- Proposed modernization projects will stay within constitutional interpretation limits for removal of vegetation. Sections 4.3 - 4.5 of this UMP include a discussion of mitigating impacts to wetlands, streams, vegetation and wildlife and wildlife habitat. These measures minimizes clearing and results in approximately the same visual impact.

- Architectural designs will be selected to achieve a harmonious blending with the character of the recreation area and surrounding forest.

- Seeding and mulching of construction sites will re-establish vegetation readily, effectively stabilizing the soil.

- Adjacent forest cover will not be altered.

As previously indicated Belleayre is an intensive use area and is expected to withstand "relatively high densities of visitors while conforming in design and intensity of development with the wild character of the Forest Preserve (2008 CSLMP, p. 48). In light of this intensive use classification, that the proposed construction projects will take place at an existing ski center, and the SEQRA mitigation measures to avoid impacts to water quality, it is anticipate that there will be minimal impacts to the wild forest setting of the Forest Preserve notwithstanding the substantial removal of forest cover. (See the subsections in this Section 4 for full discussion of SEQRA mitigation). Approximately 100.8 acres (96.1 on the Belleayre property and 4.7 in the Highmount property) of the natural resources study area or 5% of forest out of 1884.6 total acres of forest will be cleared to construct project facilities. Section 4 includes a comprehensive assessment of impacts and associated mitigation measures. For example proposed facilities have been sited, to the extent practicable, within previously disturbed areas. For example, many of the new ski trails and chairlifts would be built in disturbed areas such as the reverting ski slopes in the Highmount Ski Area. Undisturbed forest in the Belleayre Mountain Ski Center and Highmount Ski areas would be cleared for some new ski trails and chair lifts and the expansion of the Discovery Lodge. Parking lots would be built in both undisturbed and disturbed areas of the Belleayre Mountain Ski Center.

Other measures to mitigate the potential impact on vegetation include BMPs for the control of invasive species, minimal tree-cutting through careful on-site design of ski trails, trimming of branches in lieu of tree-cutting where possible, restoration of unused roads or ski trails, and signs and interpretive material

educating the public about the forest preserve and areas of sensitive vegetation. Trees cleared will be kept to the minimum required for a successful project. In conformance with Division of Lands and Forests Policy LF-91-2, the wood from the cleared areas would be milled and used, to the extent practicable, for rustic-style on-site improvements such as terracing retaining walls, cribbing, stream bridging, fencing, signs, benches, picnic tables, or in other state Forest Preserve facilities as much as feasible. Wood from cleared areas will not be sold to private buyers.

Section 4 of the UMP includes a provision for erosion prevention, sediment control and stormwater pollution prevention plans. A 50 foot vegetative buffer would be established around all streams within the natural resources study area in order to avoid run-off from construction and post-construction activities. Impacted areas adjacent to wetlands would be returned to pre-construction contours and re-vegetated after construction is finished. Impacts on water resources would be mitigated through proper implementation of a well designed SWPPP as set forth in Appendix E.

4.1.6.2 Project Impact Summary

The land use study area communities can be described as small, mountain valley, rural communities that are both diverse and complex (Photo 6). Their collective interests and concerns center on their mountain and valley landscape and their connections to the land, neighbors, and their ability to commune with nature.

Interviews with local officials indicated that efforts are under way in smaller hamlets to increase regional tourism through scenic train rides, historic homes tours, and recreational events with historic roots. Local planning documents and initiatives also point to a local desire to attract and enhance tourism. As described in Section 4.11, Socioeconomics, the Belleayre Ski Center is a major tourist attraction in the area. The projected increase from approximately 166,000 to up to 320,000 visitors is consistent with the local goal of attracting tourists and stimulating local spending.

The area's sense of place is influenced by its relationship to the mountains, its drainages, the reservoir; and its potential for tourism and commercial development along and around the Route 28 corridor. The main characteristics of these communities are significant natural landscape and well-established and nationally important local flora and fauna (Photo 7).

The settlement pattern has been historically established and is of regional importance. Much of the history is preserved in buildings and local museums and sustained in traditional crafts and festivals (Photo 8). Outdoor pursuits such as hiking, skiing, fishing, and white water activities prevail. The area remains an important heritage, tourist, and leisure destination. The expansion to the Belleayre Mountain Ski Center would further enhance residents' quality of life by expanding recreational and economic opportunities.

Source: Catskill Guide, Tim Mallery
http://www.catskillguide.com/gallery-15.htm

Photo 6 Fall Colors Seen from the Belleayre Ski Center

Source: Catskill Guide, Tim Mallery
http://www.catskillguide.com/gallery-20.htm

Photo 7 A Woodland Bouquet by a Hiking Trail

Source: Catskill Guide Gallery, Tim Mallery
http://www.catskillguide.com/gallery-12.htm

Photo 8 Empire State Railway Museum, Phoenicia

The Project is compatible with local and regional land use and community character and would not preclude existing uses or planned uses in the land use study area or in the vicinity of the land use study area. Overall, construction activities, implementation of the expansion design, and operations would temporarily impact approximately .13 acres of land categorized as Agriculture and 154.28 acres of Open Space/Forest would be permanently impacted. Previously disturbed areas and newly disturbed areas will be restored with subsoil and stockpiled topsoil and allowed to re-vegetate naturally. Impacts on forestland are considered permanent because the clearing and the periodic maintenance to control woody vegetation surrounding the skiing and hiking trails, ski lifts and parking lots will result in the permanent conversion of forestland to other vegetative communities (i.e., successional shrub land and old field). Impacts on forested land are discussed in Section 4.5, Terrestrial and Aquatic Ecology. While the Project will result in the permanent loss of some forest, it is consistent with the goals of local planning documents and zoning law.

The proposed slopes and ski lifts will alter the visual landscape of Belleayre Mountain. Visual impacts outside of the land use study area in the towns and adjacent towns are discussed in detail in Section 4.7 Visual Resources

4.1.7 Mitigation

As noted above, the Belleayre Mountain Ski Center Expansion project is compatible with local and regional land use and community character as well as the goals of local planning documents and zoning ordinances. The Project would not preclude existing uses or interfere with planned future uses outside of the land use study area. All of the proposed Project facilities were carefully planned to support the existing ski center. Therefore there would be no changes in the land use of the land use study area. All exposed areas, resulting from tree removal, will be seeded and mulched following construction.

4.2 Geologic and Topographic Resources

4.2.1 Existing Conditions

4.2.1.1 Existing Geologic Resources

The project site lies within the glaciated Catskill Mountains portion of the Appalachian Plateau, a large dissected plateau area in western and central New York, northern and western Pennsylvania, northern West Virginia, and eastern Ohio. The Catskill Delta Complex deposits were buried beneath younger sediments, and then uplifted as a plateau. Prior to and during the Alleghanian uplift, intersecting sets of vertical fractures formed in the Devonian rocks of the Catskill Delta Complex. The overlying rock was eroded away over many years where streams incised multiple channels into the slowly rising plateau.

According to the 1970 Geologic Map of New York State, the Upper Devonian shales, sandstones and conglomerates of the Slide Mountain Formation of the Upper West Falls Group underlies the southern portion of the site along the mountain ridge. Early Upper Devonian shales, sandstones, and conglomerates of the Lower Walton Formation of the Sonyea Group underlie most of the northeastern half of the site. The Upper Devonian shales and sandstones of the Upper Walton Formation of the Lower West Falls Group underlie the remainder of the site.

Soils Information

Soil Maps

See Section 4.5 Figure 4.5-3 for soil mapping information for the entire project site.

Table 4.2-1 below is a list of soils that are mapped within the project site.

Table 4.2 - 1 NRCS Soil Units

Map Unit Symbol	Map Unit Name
AA	Alluvial land
ARD	Arnot-Lordstown-Rock outcrop complex, moderately steep
ARF	Arnot-Oquaga-Rock outcrop complex, very steep
CF	Cut and Fill land
HgB	Hoosic gravelly loam, 3 to 8 percent slopes
LaB	Lackawanna flaggy silt loam, 3 to 8 percent slopes
LaC	Lackawanna flaggy silt loam, 8 to 15 percent slopes

Table 4.2 - 1 NRCS Soil Units

LCD	Lackawanna and Swartswood very bouldery soils, moderately steep
LCF	Lackawanna and Swartswood very bouldery soils, very steep
LEE	Lackawanna and Swartswood extremely bouldery soils, steep
MTB	Morris-Tuller complex, very bouldery, gently sloping
OgB	Oquaga channery silt loam, 3 to 8 percent slopes
OlC	Oquaga and Lordstown channery silt loams, 8 to 15 percent slopes
ORC	Oquaga-Arnot-Rock outcrop complex, sloping
ORD	Oquaga-Arnot-Rock outcrop complex, moderately steep
RXF	Rock outcrop-Arnot complex, very steep
SaB	Schoharie silt loam, 3 to 8 percent slopes
SaC	Schoharie silt loam, 8 to 15 percent slopes
VAB	Valois very bouldery soils, gently sloping
VAD	Valois very bouldery soils, moderately steep
WLB	Wellsboro and Wurtsboro very bouldery soils, gently sloping
WOB	Wellsboro and Wurtsboro extremely bouldery soils, gently sloping

General Soil Descriptions

The following is the NRCS general description of each of the soil units mapped in Intense Development Areas (IDA's) of the project site.

WLB: Wellsboro and Wurtsboro very bouldery soils, gently sloping
This map unit consists of deep, moderately well drained soils on glaciated uplands. These are bouldery soils formed in glacial till.

The Wellsboro series is the soil that is found in the project site and consists of coarse-loamy, mixed, active, mesic Typic Fragiudepts. Typically, the surface layer of the Wellsboro soils is dark brown, very bouldery silt loam about 9 inches thick. The subsoil extends to a depth of about 50 inches. The upper 7 inches of the subsoil is friable, yellowish red flaggy silt loam; the next 5 inches is firm, mottled, brown gravelly loam; the lower 29 inches is a firm, brittle, mottled, reddish brown gravelly loam fragipan. These soils are generally deep, moderately well drained on sloping and gently sloping land. They are on glaciated uplands. These soils formed in glacial till derived mainly from reddish sandstone, siltstone, and shale. These soils have a medium texture and moderately coarse textured subsoil. Slope ranges from 3 to 15 percent.

The solum ranges from 40 to 75 inches in thickness. A dense fragipan restricts water and root penetration at a depth from 15 to 25 inches , but is commonly found at a depth of 18 inches . Depth to bedrock is more than 5 feet. Rock fragments of angular or sub rounded sandstone, siltstone, and shale range from 15 to 35 percent by volume in individual horizons above the fragipan and from 15 to 50 percent in the fragipan and deeper. Reaction in the unlimed areas is very strongly acid to medium acid throughout.

VAB: Valois very bouldery soils, gently sloping
These deep, well drained soils formed in glacial till on knolls and lower parts of valley sides. The slope is generally complex and ranges from 3 to 8 percent.

Typically, the surface layer in a wooded area is very bouldery loam about 2 inches thick. The subsoil extends to a depth of about 40 inches. The upper 9 inches of the subsoil is very friable, strong brown gravelly silt loam; the next 18 inches is friable, strong brown gravelly loam; and the lower 11 inches is friable, brown gravelly loam. The substratum to a depth of about 65 inches is dark brown very gravelly sandy loam.

These soils have a seasonal high water table at a depth of 3 to 6 ft. below ground surface in winter, spring, and other excessively wet periods. Roots are generally unrestricted, but most roots are confined to the upper 30 to 40 inches of the soil. Permeability is moderate in the surface layer and subsoil and is moderate or moderately rapid in the substratum. Runoff is medium to rapid. Boulders are dominantly 1 to 2 feet thick and 2 to 6 feet across. In unlimed areas, reaction is very strongly acid in the surface layer and is very strongly acid to medium acid in the subsoil.

ARF: Arnot-Oquaga-Rock outcrop complex, very steep and ORD: Oquaga-Arnot-Rock outcrop complex, moderately steep
Arnot-Oquaga-Rock outcrop complex, very steep is the dominant mapping unit on Belleayre Mountain. These two map units consist of a moderately deep, well drained and excessively drained Oquaga soil; a shallow, somewhat excessively drained and moderately well drained Arnot soil; and small areas of exposed bedrock. These very bouldery soils formed in reddish glacial till over sandstone, siltstone and shale bedrock in the Catskill Mountains and their foothills. Relief is affected by bedrock. These soils mainly are on a series of benches that have a stair step appearance. The Oquaga soil is on benches and at the base of slopes where the till mantle is 20 to 40 inches thick. The Arnot soil is on narrow benches, slope breaks, and mountain tops where the till mantle is 10 to 20 inches thick.

The Oquaga series consists of loamy-skeletal, mixed, superactive, mesic Typic Dystrudepts. They are on glacially modified, bedrock controlled land forms. These soils formed in 20 to 40 inches of glacial till derived mainly from reddish sandstone, siltstone, and shale. They have a medium textured subsoil. Slope ranges from 3 to 70 percent.

The thickness of the solum ranges to a depth of 20 to 40 inches and coincides with the depth to bedrock. Rock fragments, dominantly flat angular fragments and flagstones, increase as depth increases. They range from 15 to 30 percent by volume in the A horizon and upper part of the B horizon and from 35 to 70 percent in the lower part of the B horizon and in the C horizon. Reaction in unlimed areas is extremely acid to medium acid throughout. Typically, the subsoil of the Oquaga soil in a wooded area is directly under the forest litter and humus. The subsoil is very friable, strong brown very bouldery silt loam in the upper 5 inches and very friable and friable, yellowish red channery loam in the lower 20 inches. The substratum to a depth of about 32 inches below ground surface is reddish brown very gravelly loam. Olive gray sandstone bedrock is at a depth of about 32 inches below ground surface.

The Arnot series consists of loamy-skeletal, mixed, active, mesic Lithic Dystrudepts. These soils are shallow, somewhat excessively drained to moderately well drained. They are on glacially modified, bedrock controlled land forms. These soils formed in a thin mantle of glacial till derived mainly from sandstone, siltstone, and shale. They have a medium textured subsoil. Slope ranges from 0 to 70 percent. The thickness of the solum ranges from 10 to 20 inches, which coincides with the depth to bedrock. Rock fragments, dominantly flat stones, range from 20 to 35 percent by volume in the A horizon and from 25 to 50 percent in the B horizon. Reaction in the solum in unlimed areas is medium acid to extremely acid.

Typically, the subsoil of the Arnot soil in a wooded area is directly under the forest litter and humus. The subsoil is friable, brown very bouldery silt loam in the upper 3 inches and friable, reddish brown very channery silt loam in the lower 14 inches. Dusty red, fractured shale bedrock is at a depth of about 17 inches below ground surface.
Free water is above the bedrock in the Oquaga soil for brief periods after very rainy periods, but is generally below a depth of 6 feet. The root zone consists of the 20 to 40 inches of soil over the bedrock. The Arnot soil has free water above the bedrock for brief periods in spring and after heavy rain. The root zone consists of 10 to 20 inches of well aerated soil material over bedrock.

Permeability is moderate in both soils. Runoff is very rapid. Boulders are mainly 2 to 6 feet across and 1 to 2 feet thick. In unlimed areas, reaction is extremely acid to medium acid throughout both soils.

LEE: Lackawanna and Swartswood extremely bouldery soils, steep
This map unit consists of deep, well drained soils that are mainly on valley walls or on the ridge sides below rock ledges in glaciated uplands. These extremely bouldery soils formed in glacial till. Slope ranges from 25 to 35 percent. Boulders and slopes dominate the capabilities of this unit. Lackawanna series is the soil found on this site and consists of coarse-loamy, mixed, active, mesic Typic Fragiudepts. These soils formed in glacial till derived mainly from reddish sandstone, siltstone, and shale.

Typically, the surface layer of the Lackawanna soil is dark reddish brown, extremely bouldery silt loam 3 inches thick under the forest litter and humus. The upper part of the subsoil extends to a depth of about 23 inches below ground surface. It is friable, reddish brown gravelly silt loam. The lower part of the subsoil extends to a depth of about 49 inches. There is a very firm and brittle, dark reddish brown gravelly loam fragipan that restricts water and root penetration at a depth of 17 to 36 inches. The substratum is dusty red gravelly loam that extends to a depth of about 80 inches below ground surface. Depth to bedrock is more than 5 feet below ground surface. Rock fragments of angular or sub rounded sandstone, siltstone, and shale range from 15 to 35 percent by volume in individual horizons above the fragipan and from 20 to 35 percent in and below the fragipan. Reaction in unlimed areas is very strongly acid or strongly acid in the upper horizons and very strongly acid to medium acid in the lower horizons.

Free water is generally above the fragipan for brief periods in late fall, winter, and in early spring. Because the fragipan is so dense, roots cannot easily penetrate it, so they are mostly confined to the 17 to 36 inch zone above the fragipan.

Permeability is moderate above the fragipan and slow in the fragipan and substratum of the Lackawanna soil. Runoff is very rapid. Boulders are mainly 2 to 4 feet thick and 2 to 10 feet across. In unlimed areas, reaction of the Lackawanna soil is very strongly acid or strongly acid in the surface layer.

LCF: Lackawanna and Swartswood very bouldery soils, very steep
This map unit is the same as the above description except it is very bouldery and very steep.

LCD: Lackawanna and Swartswood very bouldery soils, moderately steep
This map unit would be the same as the above description except it is very bouldery and moderately steep.

Soil Properties

The purpose of obtaining specific soil properties is to determine how the soil will behave and what the limitations are. The soil types found onsite have clay contents that range from 7 to 11 percent. Clay percentages in this range do not present a problem because they will offer some water infiltration while not impeding drainage. However, the presence of a fragipan will restrict water movement down into the soil profile, thereby increasing overland flow and the risk of erosion.

Percent slope is a measure of the soil surface angle from horizontal. Areas with steep slopes have a higher degree of erosion and runoff potential that require precautions to minimize soil loss. The majority of intense development will occur on nearly flat to gently sloping land. For the few areas where development is planned on steeply sloping land, erosion protection will be put in place. The Hydrologic Soils Group (HSG) is used to estimate the runoff from precipitation, and is defined by the NRCS in the National Soil Survey Handbook as follows:

Hydrologic Group
A 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.

Classes
The soils in the United States are placed into four classes (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). In the definitions of these classes provided below, infiltration rate is the rate at which water enters the soil at the surface and is controlled by the surface conditions. Transmission rate is the rate at which water moves in the soil and is controlled by soil properties. Definitions of the classes are as follows:

A. Low runoff potential. Soils having 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. Soils having a moderate infiltration rate when thoroughly wetted. They are chiefly 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. Soils having 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. Soils having 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 clay pan or clay layer at or near the surface, and shallow soils over nearly impervious material. They have a very slow rate of water transmission.

Dual hydrologic groups, A/D, B/D, and C/D, are given for certain wet soils that can be adequately drained. The first letter applies to the drained condition, the second to the undrained condition. Only soils that are rated D in their natural condition are assigned to dual classes. Soils may be assigned to dual groups if drainage is feasible and practical.

Significance
Hydrologic groups are used in equations that estimate runoff from rainfall. These estimates are needed for solving hydrologic problems that arise in planning watershed-protection and flood-prevention projects and for planning or designing structures for the use, control, and disposal of water.

The majority of site soils are in Hydrologic Group "C", which indicates the soil has a slow infiltration rate.

Water table is a measure of the depth to the highest level of a saturated zone more than 6 inches thick for a continuous period of more than two weeks during most years. The depth to water is important in assessing the need for specially designed foundations, the need for specific kinds of drainage systems and the ease of excavations.

Erosion potential is the soil loss tolerance which can be used with the Universal Soil Loss Equation and is a measure of the potential for erosion to occur based on soil physical properties and slope. Erosion potential is defined as the maximum rate of annual soil erosion that will permit crop productivity to be sustained economically and indefinitely. Erosion potential is expressed by integer values from 1 through 5, which represents the tons of soil eroded per acre per year. A 1-ton per acre per year is for shallow or otherwise fragile soils and 5 tons per acre per year is for deep soils that are least subject to damage by erosion. The proposed development will involve the disturbance of soils with an increased potential for soil erosion during the construction phase. The existing fragipan can act as a restricting zone that perches the water table. This restricting zone, coupled with areas with steep slopes, gives rise to the erosional risk. Erosional risks will be greatest during the construction phase. The finished grades will allow for proper drainage in conjunction with the storm water management plan for the project.

Soil characteristics, such as soil structure, soil bearing capacity and soil bulk density, will be altered through earthwork activities associated with the construction of the project. In addition, the short term removal of vegetation, and especially root systems from portions of the site, will create a greater susceptibility to wind and water erosion. Even though the soils on this project site that will be subject to disturbance are generally shallow, moderately well drained silt loam soils which

are potentially highly erodible , the areas of soil disturbance will for the most part be occurring on gently sloping areas (see Site Specific Soil Descriptions).

Depth to bedrock is a measure of the depth to consolidated bedrock. The depth to bedrock has been taken into consideration and an effort has been made to minimize the need for bedrock removal. In the Ski-Over Bridge Area, where bedrock is shallow, additional of soil fill material is planned. Little or no bedrock removal is expected.

The depth to bedrock is 10 to 20 inches below ground surface in the areas of the upper slopes where lifts and trails are proposed.

The following soil properties represent the conditions in the main body of the soil (B horizon). (NRCS Ulster County Soil Survey, 1979).

Table 4.2 - 2 Soil Properties

Soil Type	% Clay	% Slope	Hydro-logic Group	Water Table	Erosion Poten-tial	Depth to Bedrock
ARF Arnot Oqua-ga	7 - 10 7 - 10	>35 >35	C/D C	Perched, 1 - 1.5 ft > 6 ft	2/1 2/1	10 - 20" 20 - 40"
ORD Arnot Oquaga	7 - 10 7 - 10	15 - 25 15 - 20	C/D C	Perched, 1 - 1.5 ft > 6 ft	2 3	10 - 20" 20 - 40"
LCD,LCF Lackawanna Swartswood	7 - 10 7 - 10	15 - > 35 15 - > 35	C C	Perched, 2 - 4 ft Perched, 2 - 4 ft	3 3	> 60" > 60"
LEE Lackawanna Swartswood	7 - 10 7 - 10	25 - 35 25 - 35	C C	Perched, 2 - 4 ft Perched, 2 - 4 ft	3 3	> 60" > 60"
WLB Wellsboro	11	3 - 8	C	Perched, 1.5 - 3ft	3	> 60"

Soil limitations have been determined by the NRCS for Shallow Excavations, Septic Tank Absorption Fields, Small Commercial Buildings, Local Roads & Streets, Paths & Trails, and Lawns & Landscaping. These limitations are based on the soils' physical properties and position on the landscape. The following table indicates the degree of the limitation and what the limitation is due to.

Table 4.2 - 3 Soil Limitations

Soil Type	Shallow Excava-tions	Septic Tank Absorp-tion Fields	Small Commer-cial Buildings	Local Roads & Streets	Paths & Trails	Lawns & Landscaping
ARF Arnot Oquaga	Severe: Slope Depth to bedrock Small Stones Severe: Slope Depth to bedrock	Severe: Slope Depth to bedrock Severe: Slope Depth to bedrock	Severe: Slope Depth to bedrock Severe: Slope	Severe: Slope Depth to be-drock Severe: Slope	Severe: Slope Severe: Slope	Severe: Slope Depth to bedrock Severe: Slope
ORD Arnot Oquaga	Severe: Slope Depth to bedrock Small stones Severe: Slope Depth to bedrock	Severe: Slope Depth to bedrock Severe: Slope Depth to bedrock	Severe: Slope Depth to bedrock Severe: Slope	Severe: Slope Depth to rock Severe: Slope	Mod-erate: Slope Small stones Mod-erate: Slope Small stones	Severe: Slope Depth to bedrock Severe: Slope
Soil Type	**Shallow Excava-tions**	**Septic Tank Absorp-tion Fields**	**Small Commer-cial Buildings**	**Local Roads & Streets**	**Paths & Trails**	**Lawns & Landscaping**

LCD,LCF Lack-awanna Swartswo od	Severe: Slope Severe: Slope	Severe: Slope Percs slowly Severe: Slope Percs slowly	Severe: Slope Severe: Slope	Severe: Slope Severe: Slope	Mod-erate: Slope Large stones Mod-erate: Slope Large stones	Severe: Slope Severe: Slope
WLB Wellsbo-ro	Severe: Wetness	Severe: Wetness Percs slowly	Moderate: Slope Wetness Large stones	Mod-erate: Frost Action	Mod-erate: Large stones	Moderate: Large stones

Table 4.2 - 3 Soil Limitations (cont.)

Site-Specific Soil Investigation

A detailed subsurface soil investigation was performed by the Department for proposed Intensive Development Areas (IDA's). This section documents the results of that investigation.
The locations of the Department's deep test pits were determined based on NRCS soil maps and on an understanding of the proposed project. The locations of the Department's grid of shallow excavations was selected in order to provide a more comprehensive understanding of the soils in each area and to confirm the NRCS soil boundaries shown on NRCS soil maps.

Current Observations by Department

Field observations by the department show that the surficial geology generally consists of exposed bedrock or bedrock within approximately three feet of the ground surface in the higher elevations. At lower elevations, bedrock was encountered at depths of 25 to 40 ft. below ground surface. Overburden consisted of glacial till. The majority of boulders and outcrop found at the base of the Belleayre Mountain were composed of sandstone. Shale was the predominant bedrock type found half way up Belleayre Mountain. At the top of the mountain, sandstone was again the predominant bedrock type. The exposed shale in the Mining Area is described by the Department as flat-lying to gently sloping to the north and west. The exposed shale is highly weathered and relatively soft. The unweathered shale is also relatively soft and would be described as rippable.

Outcrop observed by the Department was typically sandstone. Sandstone was also the predominant bedrock first encountered in the SJB Services test borings. The frequency of outcrop generally increases with elevation and depth to bedrock increases at lower elevations. Depth to bedrock at the Ski-Over Bridge ranges from an exposed ledge at the surface to about two ft. below ground surface. Bedrock was not encountered in any of the Department's deep soil test pits located in the Upper Discovery Parking Lot Area, North Parking Lot & Snowmaking Pond Area, and East Parking. These test pits ranged in depth from 6 to 12.5 feet deep.

Upper Discovery Parking Lot Area

Two deep soil test pits locations were performed in this area to reflect the two soil mapping units in the area, along with a grid work of shallow excavations. The locations are shown on UMP Drawing EX17. The soil pit located next to the meadow area is described in the deep soil excavation report to a depth of 6.5 feet. This location is relatively flat and vegetated with young deciduous trees. A two-inch thick black, very strongly acid organic layer overlies a brown friable silt loam/loam textured subsoil. A brown sandy loam textured fragipan is encountered at a depth of 30 inches below ground surface and is 17 inches thick. There are five percent coarse fragments in the surface horizon and 15 percent cobble sized coarse fragments throughout most of the remaining soil profile.

The second soil pit in the Upper Discovery Parking Area is described to a depth of just over six feet. This location has a north facing slope of 25 to 35 percent and is wooded with mostly moderate to young poplars and red maples. A two-inch thick very dark brown organic horizon overlies a dark reddish brown and reddish brown loam textured subsoil. There are 15 percent cobble-sized coarse fragments. A fragipan is found at a depth of 32 to 48 inches. The pH is consistently very strongly acid throughout the soil profile. The center of this area exhibited evidence of overland flow and the north-central portion of this site had nearly 100 percent surface coverage of cobbles and boulders. The two soil types mapped in this location are LEE Lackawanna and Swartswood extremely bouldery soils, steep and WLB Wellsboro and Wurtsboro very bouldery soils, gently sloping (See Figure 4.2-1). The field soil descriptions observed agrees with the mapped soil descriptions by the NRCS.

Figure 4.2-1 - Upper Discovery Parking - NRCS Soil Survey

The following is a summary of findings for the grid work of shallow excavations conducted at the Upper Discovery Parking Area. See UMP Drawing EX17 for map showing sample locations. The descriptions are of the upper 18 inches of the soil profile and were used to verify the NRCS soil mapping.

Date: 9/11,10/7	**Location: Upper Discovery Parking Lot**	
By: R Kruzansky		
Location	**Description**	**NRCS Mapped Soil(s)**
A	Thin O over Brown SiL/L with CB's	WLB
B	Disturbed, Brown L	WLB
C	Stones and CB's near surface, Brown L	WLB
D	Disturbance, CB's near surface , Brown L	WLB
E	Brown L with CB's, open field	WLB
F	Brown SiL with CB's, Seep	WLB
G	Disturbed, Brown L with CB's	WLB
H	Brown SiL with CB's , next to stonewall	WLB
I	Brown L with CB's, Evidence of overland flow & Scour	WLB
J	Surface Stones and CB's	LEE
K	Surface Stones and CB's	LEE
L	CB's, Brown L	LEE
M	Brown Gravelly L	LEE
N	Surface CB's , Evidence of Surface Scour	LEE
O	Surface CB's, Brown L	LEE
P	Disturbed, CB's ,Brown L	LEE
Q	CB's & Stones near surface, Brown Gravelly L	LEE
R	Brown L/SL	LEE

Table 4.2 – 4 Upper Discovery Parking Shallow Excavation Field Descriptions

North Parking Lot and Snowmaking Pond Area

Four deep soil excavations were performed in this area along with a grid work of shallow excavations. At the site of the new Maintenance Garage three (3) soil borings were performed previously by Atlantic Testing Labs (ATL). The ATL Soil Boring Report is attached as Appendix H. At the site of the proposed pond, SJB recently performed five (5) soil borings. The SJB Soil Boring Report is attached as Appendix I. The locations of all of these subsurface investigations are shown on UMP Drawing EX18 and EX20.

Most of this area has slopes ranging from 3 to 8 percent, although some slopes range from 25 to 35 percent. Approximately half of this area is densely wooded, with the dominant species being red maple and beech. The other half of the area has been cleared of trees and presently has a meadow type vegetated cover of grasses and clover. The soils in the meadow area surrounding the maintenance facility have a dense fill layer 18 inches thick. This is a dark brown silt loam/loam textured horizon with about 5 percent coarse fragments. A brown six-inch layer of silt loam soil with 15 percent cobbles lies below. From 2 to 6 ft. below ground surface there is a brown gravelly silt loam soil with 35 percent cobbles which contains flagstones. From 6 to 12 ft below ground surface the soil is a brown gravelly silt loam with 35 percent cobbles. The soils in the forested area also have a disturbed surface horizon but they were not compacted. They had dark brown and brown friable loam with 10 percent coarse fragments. The subsoil observed in the forested area is similar to the meadow area.

The soil units mapped in this area are WLB, LCD and LCF (See Figure 4.2-2). The soil conditions observed fall within the range of characteristics described by the NRCS Ulster County soil survey for soils mapped in this area.

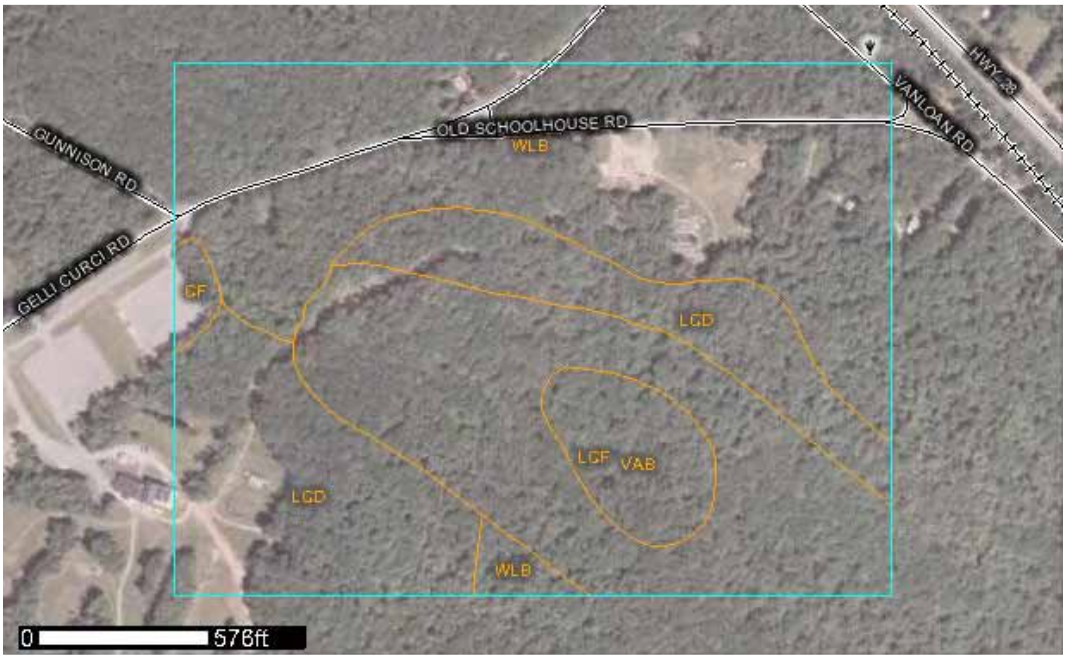


Figure 4.2-2 North Parking & Snowmaking Pond - NRCS Soil Survey

The following is a summary of findings for the grid work of shallow excavations conducted at the North Parking Area. See UMP Drawing EX18 for map showing sample locations. The descriptions are of the upper 18 inches of the soil profile and were used to verify the NRCS soil mapping.

Date: 9/23/08, 10/8/08	**Location: North Parking Area**	
By: R Kruzansky		
Location	**Description**	**NRCS Mapped Soil(s)**
A	Recent alluvium from road culvert over Brown SL, Brown Gravelly L at depth	WLB
B	Thick A no CF, Brown Gravelly L at depth	WLB
C	Undisturbed, A over Brown Gravelly L/SiL	WLB
D	Undisturbed, A over Brown Gravelly L	WLB
G	Shallow CB's & Stony, Brown Gravelly L	WLB
H	Undisturbed, A over Brown Gravelly L	WLB
I	Recent Alluvial, Thick A over Brown L	WLB
J	Thick A no CF, Brown L/SiL at depth	WLB
K	Undisturbed, A over Brown Gravelly L	WLB
O	Disturbed, Brown Gravelly L , Cemetery	WLB
P	Disturbed, Brown L , Cemetery Edge	WLB
Q	See Test Pit	WLB
R	Disturbed, Thick Ap, Surface & Subsurface Debris	WLB
S	Thin A over Brown SL	WLB
Y	Thin A - Wet	WLB
Z	Undisturbed, A over Brown Gravelly L	WLB
1	Disturbed, Lt. Brown SL, Surface & Subsurface Debris	WLB
2	Disturbed, Lt. Brown SL, Surface & Subsurface Debris	WLB
9	Brown L , Edge of Incised Stream	WLB

Table 4.2 – 5 North Parking Shallow Excavation Field Descriptions

The following is a summary of findings for the three Deep Test Pits that were performed in the area of the proposed Snowmaking Pond.

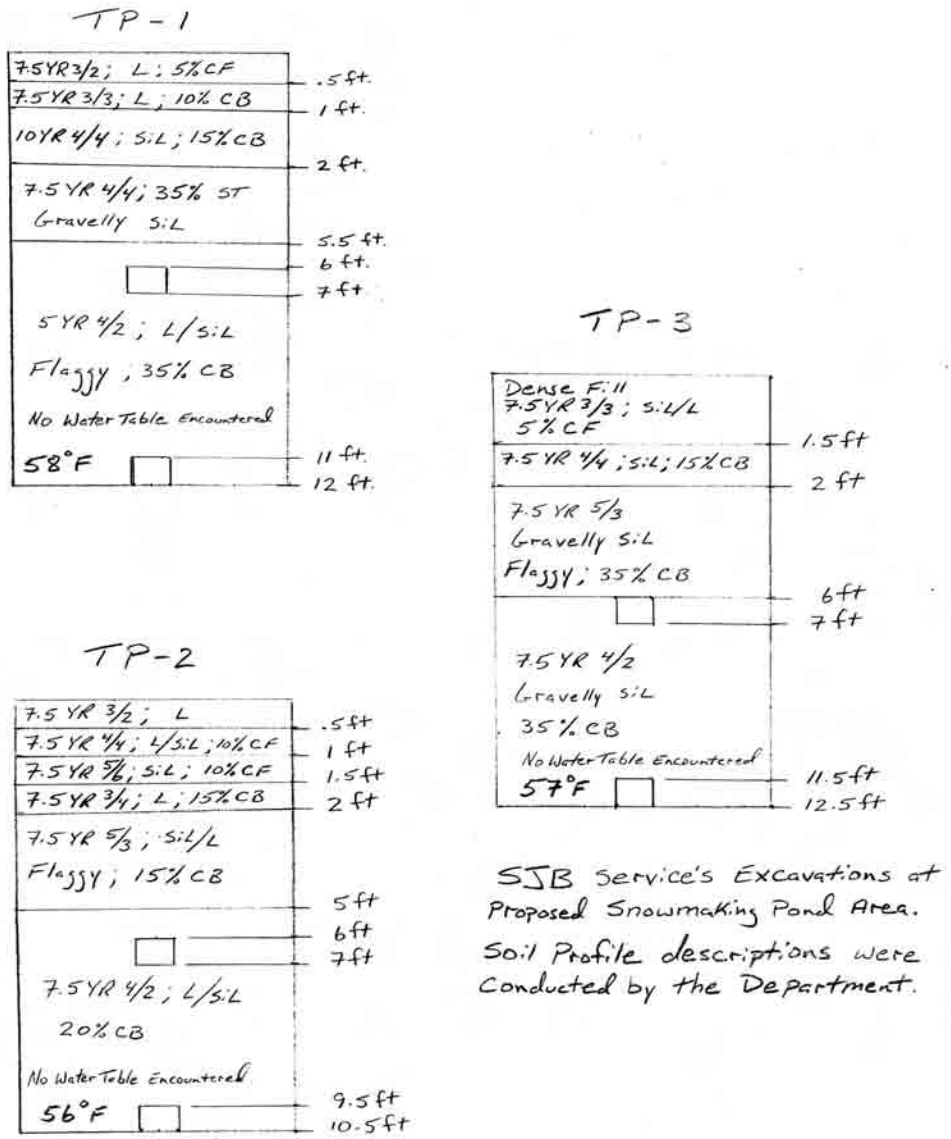


Figure 4.2-3 Snowmaking Pond Area Deep Test Pit Descriptions

Two soil samples were collected from each of the three deep test pits, one at a 6 to 7 foot depth and the other from the bottom of the pit. The purpose of these samples was to determine the suitability of the excavated soil for reuse in proposed embankment construction.

Three potable water wells were completed by Titan Well Drilling in 2002 near the proposed Snowmaking Pond. The locations of all of these wells are shown on UMP Drawing EX20.

Well # 1 was completed to a depth of 348 ft. below ground surface. This 6-inch diameter well was completed with 50 ft. of casing. Soil and gravel were encountered from the surface to 37 ft. below ground surface. Brown sandstone was encountered from 37 ft. to 110 ft. below ground surface. The remainder of the boring consisted of alternating layers of shale and sandstone.

Well # 2 was completed to a depth of 497 ft. below ground surface. This 6-inch diameter well was completed with 110 ft. of casing. Soil and gravel were encountered from the surface to 101 ft. below ground surface. From 101 to 325 ft. below ground surface was predominantly sandstone, and the remaining 172 ft. consisted of alternating layers of shale and sandstone.

Well # 3 was completed to a depth of 498 ft. below ground surface. This 6-inch diameter well was completed with 40 ft. of casing. Sand and gravel were encountered from the surface to 26 ft. below ground surface. Sandstone was encountered from 26 to 117 ft. below ground surface. Layers of sandstone and shale were encountered from 117 ft. to 156 ft. below ground surface. Sandstone was encountered from 156 to 330 ft. below ground surface. Alternating layers of sandstone and shale were encountered from 330 ft. to 498 ft.

Three soil borings were completed by Atlantic Testing Laboratories in 2006, located at the Maintenance Center. The ATL Soil Boring Report is attached as Appendix H. The locations of all of these soil borings are shown on UMP Drawing EX20.

Boring B-1 was completed on December 4, 2006 to a total depth of 31 feet below ground surface. The predominant material encountered was coarse, medium and fine sand with some gravel. Bedrock was not encountered.

Boring B-2 was completed on December 5, 2006 to a total depth of 29.5 ft. below ground surface. The predominant material encountered from zero to ten ft. below ground surface was brown coarse, medium and fine sand with some gravel. Gravel with some sand was encountered from ten to 12 ft. below ground surface. Sand with silt was encountered from 12 to 14 ft. below ground surface. Brown coarse medium fine sand with gravel was encountered from 14 to 2.5 ft. below ground surface. Cobbles and boulders were encountered from 26.5 ft. to 29 ft. Bedrock was not encountered.

Boring B-3 was completed on December 6, 2006 to a total depth of 26 ft. below ground surface. The top 4.5 ft. was brown coarse medium fine sand with silt and little gravel. From 4.5 to 12 ft. below ground surface was brown coarse medium fine sand with some gravel and silt. From 12 to 14.5 ft. below ground surface was coarse medium fine gravel and some sand. Cobbles and boulders were encountered from 14.5 to 17.5 ft. below ground surface. Bedrock was not encountered.

Five soil borings were completed by SJB in 2008 at the site of the proposed Snowmaking Pond. The SJB Soil Boring Report is attached as Appendix I. The locations of these soil borings are shown on UMP Drawing EX20.

Bedrock was encountered in three of the five soil borings conducted by SJB Services at the North Parking Lot and Snowmaking Pond area at depths of 33.5, 23.8 and 25 ft. below ground surface. Bedrock was not encountered in the other two borings with total depths of 41.6 and 40.7 ft below ground surface. Bedrock was not encountered in any of the three test pits dug by SJB Services. Well logs completed previously by Titan Drilling Corp. in the area of the maintenance garage encountered bedrock at depths ranging from 25 to 101 ft. below ground surface.

East Parking Lot Area

Two soil pits were excavated in this area using a backhoe, each to a depth of approximately six feet, along with a grid work of shallow excavations. The locations are shown on UMP Drawing EX19. The subsurface conditions at these two pit locations are representative of the East Parking Lot Area. The pit excavations were located based on soil boundaries mapped by the NRCS, vegetation and topography observed on the site.

The soils observed in this area are deep and moderately well drained. The topography in the area is gently sloping and heavily wooded with young trees. A1.5-inch black organic horizon overlies a dark brown horizon that is 2.5 to 3.5 inches thick. The soil texture throughout the profile is either a loam or a silt loam. There are a number of locations that had a sandy loam textured horizon in the upper two feet. The percent coarse fragments ranged from 5 % at the surface to 45% in the lower horizons. The coarse fragment size increased with depth, ranging from gravel- to boulder-sized. A fragipan approximately 3 feet thick is first encountered at a depth of about 2 ft. below ground surface and restricts root penetration and water movement in both soil pits. This is evident by the many fine and medium sized roots that are above the fragipan and very few, if any, roots in or below the fragipan. Soil mottling, which can be an indication of prolonged wetness, is found immediately above the fragipan and is an indication of potential water movement atop the fragipan. The pH is very strongly acid throughout. The deep excavation reports and the shallow excavation descriptions, prepared by the Department's soil scientist, are included. The soil description includes the soil classification and temperature regime. UMP Drawing EX19 shows the sampling locations.

The soils shown on the NRCS map in this location are WLB: Wellsboro and Wurtsboro very bouldery soils, gently sloping (See Figure 4.2-4). The soils observed are consistent with the NRCS Ulster County soil survey descriptions.

Figure 4.2-4 East Parking - NRCS Soil Survey

The following is a summary of findings for the grid work of shallow excavations conducted at the East Parking Area. See UMP Drawing EX19 for map showing sample locations. The descriptions are of the upper 18 inches of the soil profile and were used to verify the NRCS soil mapping.

Date: 8/19,9/17,9/24	Location: East Parking Lot Area	
By: R Kruzansky		
Location	Description	NRCS Mapped Soil(s)
A	Dk. Brown L over Brown L, Acidic	WLB
B	Dk Brown L/SL , Gravelly	WLB
C	Dk Brown SiL/L	WLB
D	Dk Brown L , Shallow CB's	WLB
E	Dk Brown L/SL , Shallow CB's	WLB
F	Dk Brown SiL/L , 5 % Stones	WLB
G	Dk Brown SL/L	WLB
H	Dk Brown L , CB's & Stones	WLB
I	Dk Brown SL , 10 % CB's	WLB
J	Dk Brown Gravelly SL , 5% CB's	WLB
K	Brown L , 15 % Stone & CB's near surface	WLB
L	Brown L , 15 % Stone & CB's near surface	WLB
M	Dk Brown L , Stones & CB's at surface	WLB
N	Brown SL , 10 % CB's , evergreen opening	WLB
O	Disturbed , Brown Gravelly SL	WLB
P	Disturbed , Brown SL , Stones	WLB
Q	Brown SL , Shallow Stones & CB's	WLB
R	Brown Gravelly L with CB's	WLB
S	Dk Brown L , Shallow Stones & CB's	WLB
T	Dk Brown L , 5 % CB's	WLB
U	Disturbed , Brown L/SL	WLB
V	Dk Brown L/SL	WLB
W	Dk Brown SL	WLB
X	Disturbed , Brown SL	WLB
Y	Disturbed , Dk Brown compact	WLB
Z	Dk Brown thick A over Brown SL/L	WLB

Table 4.2 – 6 East Parking Shallow Excavation Field Descriptions

Tomahawk Skier Bridge Area

Two deep soil excavations were dug along with a grid work of shallow excavations in the proposed area of the Tomahawk Skier Bridge. The locations are shown on UMP Drawing EX21. This site is a steeply sloping woodland that was extremely bouldery. The boulders and bedrock consist of sandstone. The soil in this location is described to a depth of 18 inches below ground surface. The surface soil horizon is 3 inches thick and consists of a black, very strongly acid organic layer with many fine roots. A five-inch thick reddish brown layer of loam with 10 percent cobbles and 15 percent stones is found next in the soil profile. The next horizon is found from 8 to 11 inches below ground surface. This horizon is a yellowish red loam with many fine, medium and coarse roots. There are 15 percent cobbles and 15 percent stones. From 11 inches down to 18 inches the soil is a dark reddish brown loam with many medium roots and few fine and coarse roots. There are 10 percent cobbles and 15 percent stones in this very strongly acid soil. The soil in this location is mapped as ORD, which is the Arnot-Oquaga series.

There are a number of different soil units mapped in this area, including LCD Lackawanna-Swartswood, ARF Arnot-Oquaga, WOB Wellsboro series which is the same as WLB except it is extremely bouldery (See Figure 4.2-5). The field soil descriptions observed agrees with the mapped soil descriptions by the NRCS.

Figure 4.2-5 – Tomahawk Skier Bridge - NRCS Soil Survey

The following is a summary of findings for the grid work of shallow excavations conducted at the Tomahawk Skier Bridge Area. See UMP Drawing EX21 for map showing sample locations. The descriptions are of the upper 18 inches of the soil profile and were used to verify the NRCS soil mapping.

Location	Description	NRCS Mapped Soil(s)
J	Shallow Brown L, Stones & CB's	ORD
K	Disturbed, Thin Brown L	ORD
L	Thin Brown L	ORD
M	Stones & CB's on surface & at depth	ORD
N	Stones & CB's throughout	ORD
O	Brown L with CB's	ORD
P	Shallow & Stony	ORD
Q	Brown L with CB's	ORD
R	Stony Brown L , Boulders	ORD
S	CB's & Shallow Stones, flattens out	ORD
T	Alluvial, Flaggy & CB's near surface, flattens out	ORD
U	Boulders , Brown L , nearly level	ORD
V	Flagstones & CB's, deeper Brown L, nearly level	ORD

Table 4.2 – 7 Tomahawk Skier Bridge Shallow Excavation Field Descriptions

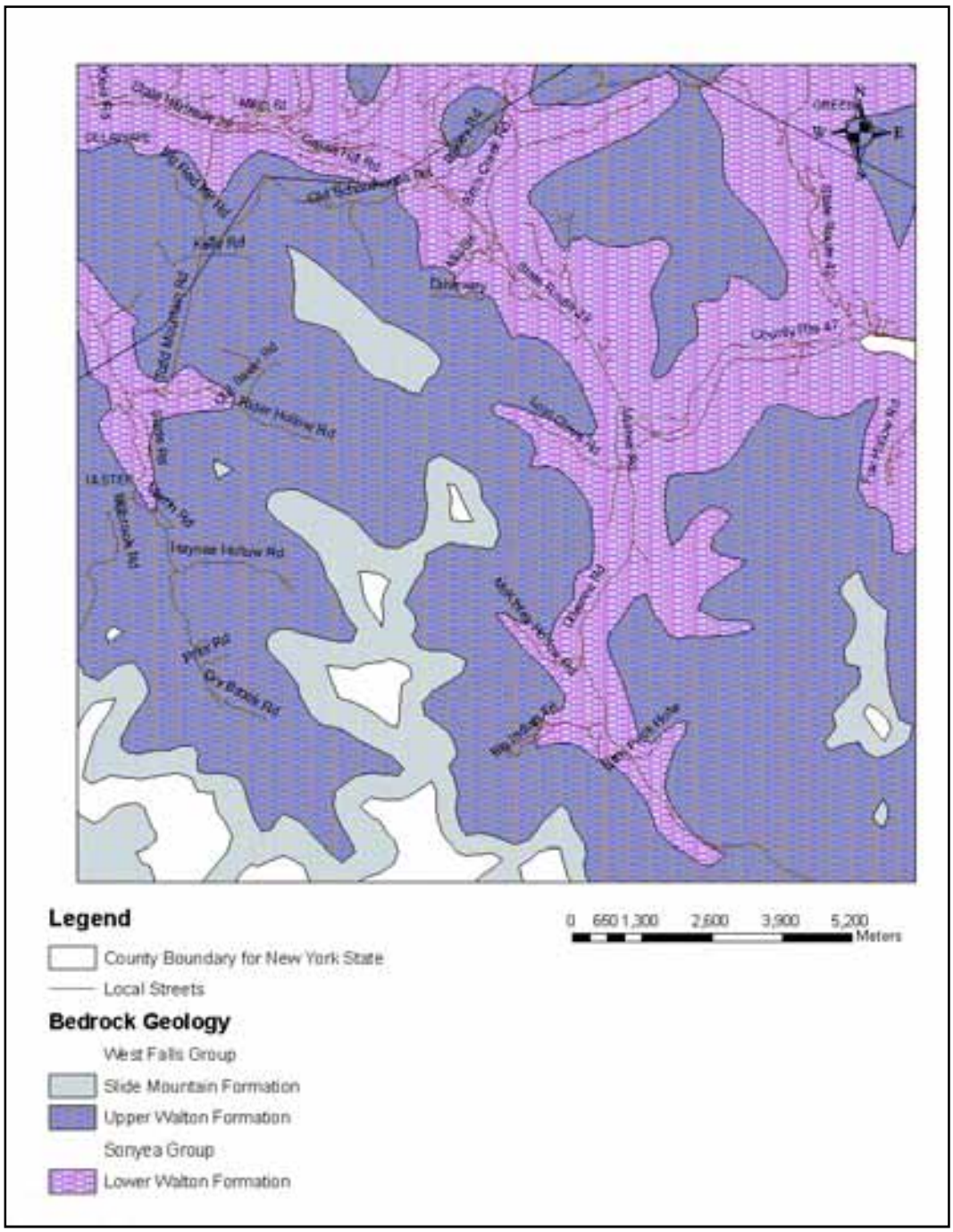


Figure 4.2-6 Bedrock Geology Map

Conclusion

Conclusions regarding potential limitations to on-site planning based on data reviewed and the department's on-site observations are that large stones and boulders can be expected at depth in the North Parking Lot and Snowmaking Pond Area, Discovery Lodge Expansion Area, and Upper Discovery Parking Lot Area. The large stones and boulders will not impact construction, but will affect the amount of excavated material that can be reused. The East Parking Lot Area shows no indication of limitations due to stones or bedrock. The Ski-Over Bridge Area contains large boulders and exposed bedrock that will affect access and construction activities. However, filling is proposed in this area with little or no excavation planned.

4.2.1.2 Existing Topography

Site Topography

See UMP Drawing Sheet EX24 in the attached plan set for topographic mapping of the entire project site.

The topography within the project boundary ranges in elevation from approximately 3,430 feet above mean sea level (amsl) at the ultimate summit of Belleayre Mountain down to an elevation of approximately 1,200 feet amsl along Route 28 in the northeast section of the site.

Belleayre Mountain is an elongated mountain with the ridge line oriented in a northwest to southeast direction. The ridgeline has three high points along its length, of which the western most one is the ultimate summit of Belleayre at 3430' amsl. The project site is located on the northeast side of the ridge and the entire site generally slopes to the northeast. In the core of the existing ski area, the upper mountain slopes from the top of the ridge is very steep, and abruptly changes to moderately sloped at the mid upper mountain, at an elevation of approximately 3000-3100 feet amsl. The moderate slopes continue to the bottom of the upper mountain near the Overlook Lodge at elevation of approximately 2500-2600 feet amsl. Further to the western side of the existing ski area, the change in slope from steep on the upper mountain to moderate on the lower is less distinguished. From the Overlook Lodge the mountain slopes gently down to the Discovery Lodge at an elevation of approximately 2050 feet amsl.

The site of the former Highmount Ski Area consists of consistently 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 consist of both north facing and east facing slopes, with flatter lands on either side of the ridge line that continues runs in a northwest to southeast direction.

Land on either side of County Road 49A, where up to three new parking areas and the Snowmaking Pond Area are proposed, is generally flat. Elevations in these areas range from 1,500 to 1,900 feet amsl.

There are six Slope Classes; "A" (0 to 3 % slope); "B" (3 to 8% slope), "C" (8 to 15% slope), "D" (15 to 25% slope), "E" (25 to 35% slope), and "F" (over 35% slope).

The proposed location of the East Parking Lot Area is nearly flat and has a slope classification of B. There are no slope concerns here.

The proposed location of the North Parking Lot and Snowmaking Pond Area is relatively flat with an "A" slope class. The southeast portion of this site has steeper slopes that range from 15 to over 35 percent.

The proposed location of the Discovery Lodge Expansion Area is predominantly class “B” and “D” slope classes. Even though the “D” slopes are relatively short slopes they are still prone to erosion and will require erosion control measures.

The proposed location of the Upper Discovery Parking Lot is identified as having class “B” slope. The slope here is a uniform broad north facing slope. The slope concern here is the length of slope. Overland flow with scour was observed at this location, so special attention will be made to divert water during construction.

The proposed location of the Ski-Over Bridge at the Tomahawk Base Area is a relatively flat topographic shelf approximately one third up the mountain at an elevation of 2,100 feet above mean sea level. This area has some class “B” slopes but mostly consists of class “D” slopes. There is an abrupt steep drop-off about 25 feet in from the road edge (north side of Overlook road). This drop-off gradually levels off to where the toe of the slope has a slope in the 3 to 8 percent range. Even though the majority of this site has steep slopes, there will be minor surficial disturbance due to the fact that this area will be receiving fill.

In general areas mapped with class “B” slopes do not have limitations due to slope. The areas mapped as “D” slopes and “F” slopes do have limitations due to slope. There is a severe erosion hazard during construction on these soils. The majority of the proposed development will be on soils with a class “B” slope class.

Existing site topography and its influence of drainage patterns are discussed in Section 4.3 “Surface Waters Including Aquatic Habitat”.

4.2.2 Potential Impacts & Mitigation

4.2.2.1 Geologic Resources Impacts & Mitigation

The proposed work on the project site includes grading in several areas including the Proposed Parking Lots, Discovery Lodge Area, Ski Lift Terminals, Snowmaking/Stormwater Pond, and the Highmount Connector Trail. The proposed grading work is summarized on UMP Drawing Sheet G5 "Proposed Grading Master Plan"

Rock blasting may be necessary during the construction upper mountain buried utility lines. If as excavation proceeds and bedrock or large boulders are encountered and it is determined that blasting is necessary, the project manager, blaster, and driller will determine what specific areas are to blasted. In consultation with the blaster, the driller will lay out the locations, depths, and spacing of the holes to be drilled. The blaster will be responsible for the loading, detonation, and safety of the blast. A properly calibrated seismograph will be used to monitor all blasts to ensure compliance with the guidelines established in USBM RI-8485 and USBM RI-8507 as discussed below. A blasting plan will be developed prior to blasting.

Potential Blasting Impacts

Blasting issues for blasters and the public, although related, may be perceived somewhat differently. The blaster, who relies on blasting as part of the extraction process, is most concerned with safety, productivity (effective fragmentation) and reduction of ground vibrations, air blast, over break and flyrock. On the other hand, the local public may view blasting as an annoyance. Blasting complaints typically include the following issues:

* nearby residents are startled
* residents contend that cracks in their home have resulted from a recent blast
* blasting has adversely affected groundwater quality or quantity
* blasting has caused property damage due to flyrock, or the presence of flyrock beyond the mine property boundary
* pollution from blasting-related noise, dust and gas.

The majority of the U.S. jurisdictions, relating to the regulation of blasting, have based their vibration limits on research done by the now-defunct United States Bureau of Mines (USBM). The research is generally documented in three publications released by the Bureau. They are:

* Bulletin 656 - Blasting Vibrations and Their Effects on Structures.
* Report of Investigation 8507- Structural Response & Damage Produced by Ground Vibration from Surface Mine Blasting
* Report of Investigation 8485- Structural Response & Damage Produced by Air Blast from Surface Mining

Bulletin 656 proposed a maximum peak particle velocity of 2.0 inches/second as a "reasonable separation between the safe and damage zones": based upon the data compiled in that report. Shortly after Bulletin 656 was published, the blasting industry recognized that a standard based solely on peak particle velocity was overly simplistic. Those involved in blast vibration research came to realize that the frequency content of a seismic wave played a significant role in both the structural response and the potential for damage. The USBM criteria developed in Report of Investigations (RI) 8507, Structural Response and Damage Produced by Ground Vibration From Surface Mine Blasting, (Siskind, D.E. and others, 1980) measured and summarized the effects of blasting on residential structures as blasting operations approached the structures. The study incorporated the results of nine prior studies involving over 900 monitored blasts at over 150 structures. In addition, RI-8507 incorporated the results of shaker tests (a fatigue study) run on a model structure. The shaker test simulated the effect of a thousand blasts at high ground vibration levels.

RI 8507, published nine years after Bulletin 656, recommended a blasting level criteria which set a peak particle limit based upon predominant frequency of the seismic wave. At frequencies above 40 hertz, 2.0 inches/second was determined to adequately protect residential structures. At frequencies below 12 hertz, levels of 0.5 inches/second or 0.75 inches/second were suggested for structures with plaster or drywall construction.

The limits in RI 8507 remain the most restrictive criteria that are based upon measured structural responses and observations of cracking correlated to specific vibration events. They provide a guaranteed safe level to guide blasting practices and limits suitable for regulations. They account for the widest possible range and worst-case conditions for low-rise residential structures. Research done since RI 8507 by the USBM and others has reaffirmed the conclusions from those studies.

The guidelines set forth by the US Bureau of Mines are the industry standard and represent the most comprehensive and sophisticated method of preventing damage to off-site structures. The standards represent rational, enforceable conditions. Furthermore, case law has shown the standards and RI-8507 to be admissible in court.

Mitigation of Blasting Impacts

All of the potential impacts from blasting can be mitigated through proper blast design, best management practices and diligent liaison between the project and the community.

Blasting Plan

If it is determined that blasting will be required a written blasting plan will be developed and approved prior to the commencement of blasting. In general, the blast plan will contain information about the blasting methods to be employed, measures to be taken to protect the safety of the public, and how the applicable rules and regulations will be complied with. If during the evolution of the project

there are significant changes in the blast design a new blast plan will be required. A test shot will be required for the first shot after the approval of each blast plan.

While each blast plan is tailored to meet the specific needs of a particular project, they all contain certain elements. Typically the general information provided will include the blasting contractor; the project blaster; locations of blasting; the duration of blasting operations; locations of offsite receptors; location of any nearby utilities; the drill hole pattern; the explosives and detonation systems to be employed; the proposed loading of the holes; the maximum weight of explosives to be detonated in any 8ms delay period; measures to be taken to minimize the offsite impacts of blasting; traffic control and warning signs; the sequence and type of blasting warning signals; location of seismographs to monitor blast induced vibrations; what, if any local permits are required; will preblast surveys be performed, and if so where; and other information as necessary.

In addition, prior to the commencement of blasting, a preblast meeting will be held with the blaster, project manager, and other interested parties.

Record Keeping

A record of each blast should be made by the blaster, and a copy provided to and retained by the project, which contains at a minimum the following information:

* Name of the operator and/or contractor conducting the blast.
* The location, date and time of the blast.
* Name, signature and identification number of the blaster (certificate of competency number, as issued by the Department of Labor).
* Type of material to be blasted.
* Diagram of shot including number of holes, depth of holes, diameter of holes, burden, spacing, and face orientation.
* Location and distance of nearest non-company owned structure.
* A record of the shot including amount of subdrilling, decking, stemming height and type, quantity and type of explosive, quantity and type of detonator, weather conditions (including wind speed and direction), type of initiation system and all delay periods progressively, in milliseconds. A drill log reviewed and signed by the licensed blaster and company supervisor including date, time, location, shot number, number of holes, hole depth, average face height, burden, spacing, diameter and any potential problem areas such as seams, cracks, voids and water.

Required Qualifications of Blasting Contractor
Blasters in New York State are required to possess a valid NY State Department of Labor issued Explosive License and Blaster Certificate of Competence. The Explosives License permits the licensee to purchase, own, posses or transport explosives. The Blaster Certificate of Competence permits the use of explosives.

Blasting Protocol
The blaster will conduct all blasting operations in a skillful manner so as not to cause injury, damage property, adversely affect traffic, or cause the migration or accumulation of noxious gases.

Ground Vibrations
All blasts create ground vibrations. When a charge is detonated in a borehole it creates a shock wave that crushes the material around the hole and creates many of the initial cracks needed for fragmentation. As this wave travels outward, it becomes a seismic, or vibration wave. As the wave passes through a given piece of ground it causes that ground to vibrate. The situation is similar to the circular ripples that are produced on the surface of a pool of calm water when it is struck by a rock. Most blasts are detonated as a series of smaller events which are delayed by milliseconds.

Ground vibrations are measured in terms of amplitude (size of vibration) and frequency (number of times the ground moves back and forth in a given time period). In blasting, amplitude is measured in terms of velocity (inches per second) and frequency is measured in hertz, or cycles per second. In addition to wave amplitude and frequency, the duration of ground vibration is a third factor that directly affects structural response.

The maximum vibration level at a particular location is primarily determined by the maximum weight of explosives per single delay, and the distance of that location from the blast. The delays in a blast sequence break it up into a series of smaller, closely spaced individual blasts.

Vibration amplitude and frequency characteristics have been studied extensively to determine the effects caused by variations in blast design and geology. The amplitude, frequencies, and durations of the ground vibrations change as they propagate. These characteristics change because of interactions with various geologic media and structural interfaces, spreading out of the wave-train through dispersion, and absorption of the wave energy, which is greater for the higher frequencies.

A portion of the energy that is not used in fragmenting and displacing the rock will go into ground vibrations. Excessively high ground vibrations can cause damage to structures and can be caused by an improperly designed shot or drill hole deviation.

Minimizing Ground Vibrations
The following techniques and control measures will be considered in blast design to reduce ground vibration:

* Adjusting the blast hole pattern
* Reducing the pounds of explosive per delay:
    - use of smaller diameter blast holes
    - reduce bench height
    - use of decking
* Avoiding overly confined charges (e.g. excessive burden).
* Avoiding excessive subdrilling.
* Strict control over spacing and orientation of blast holes.
* Borehole deviation monitoring.
* If possible, designing the blast sequence to direct vibration away from structures of concern.

A properly designed blast will give lower vibrations per pound of explosive. Close to the blast, the ground vibration character is affected by factors of blast design and mine geometry, particularly charge weight per delay, delay interval, and to some extent direction of initiation, burden, and spacing.

Additionally, to reduce the public's concern regarding ground vibrations:

* Blasts will be scheduled for the same time of day whenever possible.
* Blasts will be scheduled for periods of high local activity.
* Blasts will not be scheduled for quiet periods.
* Neighbors will be notified of the blast schedule in advance.

Air Blast
Air blast is a transient impulse that travels through the atmosphere. Much of the air blast produced by mine blasting has a frequency below 20 Hz and cannot be heard effectively by the human ear. However, all blasts, both audible and inaudible can cause a structure to vibrate in much the same way as ground vibrations. Amplitude is measured in decibels. Research has shown that air blast has less potential than ground vibration to cause damage to a structure. However, it is air blast that is frequently the cause of complaints. When a person senses vibrations from a blast, or experiences house rattling, it is usually impossible for untrained persons to determine whether air blast or ground vibration is being sensed.

Properly executed blasts, where explosives are adequately covered and confined, drill hole charges are not likely to produce harmful levels of air blast. The US Bureau of Mines has conducted extensive research on the effects of air blast on residential structures. Their research has produced a recommended air blast limit of 133 decibels, for a 2 hertz microphone system, as measured at any dwelling. This maximum, when adhered to, protects residential structures from air blast damage.

Acceptable and safe levels of off-site air blast vibrations have been established by the U.S. Bureau of Mines through repeated testing and investigation. The results

are reported in Report of Investigations (RI) 8485. Use the following table, excerpted from RI 8485 to maintain safe levels of air blast vibrations for off-site building receptors.

0.1 Hz high-pass system	134 db
2 Hz high pass system	133 db
5 or 6 Hz high pass system	129 db
C-slow (events not > 2-sec. duration)	105 db

Minimizing Air Blast

* Sufficient burden and stemming are essential.
    - Drill cuttings shall not be used for stemming.
    - Stemming material shall clean, angular stone that will pack tightly in the hole.
    - Proper stemming size depends on the size of the drill hole. New York State Department of Transportation's crushed angular stone (1’s or lA's) work well for most blast hole applications.
    - Stemming alternatives such as "stem-tites" can be used at the discretion of the licensed blaster.
    - Drill blast holes accurately to maintain desired burden dimensions.

* Unnecessary material will be eliminated in front of the rock face to be blasted (e.g. muckpile at toe of face).
* Appropriate delay intervals will be used to promote forward rather than upward movement of burden.
* Orient the face away from structures if possible.
* Blasting will be restricted to favorable weather conditions. The propagation of air blast emissions is subject to meteorological conditions including refractions by wind and temperature gradients, as well as clouds. Whenever possible blasting will be avoided in the early morning or late evening to minimize the noise-enhancing effects of temperature inversions.

Potential Impacts to Ground Water and Wells

Blasters and regulatory personnel routinely receive complaints regarding impacts to wells and ground water quality and quantity. In nearly all instances, the complaints or claims regarding deterioration of ground water yield and quality are the result of other factors and are not related to blasting. Typical blasting-related complaints include the following:

* Reduction in well production
* Air in water / water lines
* Damage to well pump
* Damage to well screen
* Turbidity
* Discoloration
* Nitrate contamination
* Coliform bacteria.

Several investigations covering this subject were performed under contract with the United States Bureau of Mines. In the Bureau of Mines report, entitled "Blasting Effects on Appalachian Water Wells", the blasting vibration impacts on 36 domestic water wells were examined in the Appalachian coal mining region where changes in water quality or quantity were reported. Researchers found no evidence of blasting effects at any of the 36 well sites. Instead, the researchers detected other causes for the deterioration of groundwater quality or quantity. Subsequently, field studies were conducted at four sites where the impacts from surface mining were directly measured on operating wells of known capacity. In three of the four cases, static water levels and specific capacities changed as mining approached to within 300 feet of the well. These water level/specific yield changes were attributed to the opening of vertical fractures from the mechanism of lateral stress relief due to the proximity of the mine excavation. With groundwater recharge, water levels recovered and specific capacities increased to greater than original capacities (provided that the adjacent mine excavation did not drain the aquifer).

The common causes of the problems that most of these complaints are based on are related to other environmental factors, poor construction, or the wells were found to be in need of repair or replacement prior to blasting.

Existing Nearby Wells

See Figure 4.2-7 below for the location of nearby Water Wells. Due to the distance it is not anticipated that these wells will be impacted by potential blasting.

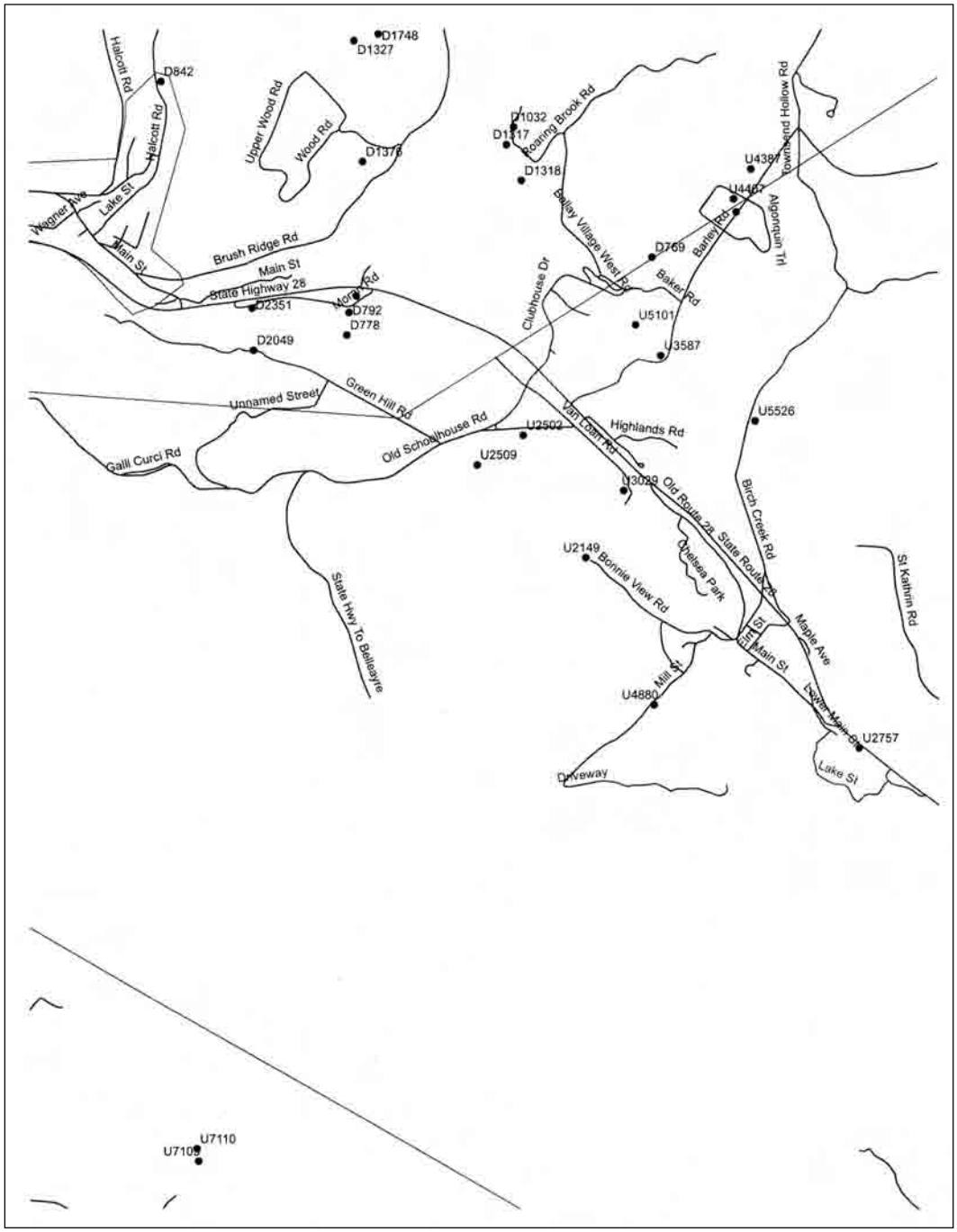


Figure 4.2-7 - Map of Water Wells in project vicinity (NYSDEC Water Well Database)

Dust and Gas

Every blast has the potential to generate minor quantities of gases and dust. The dust generated by blasting does not typically present a serious problem. Blasting is an infrequent operation, and as a result, the total amount of dust produced is insignificant when compared to other sources. The most common types of gases produced by blasting are carbon monoxide, carbon dioxide, and oxides of nitrogen. Blast fumes are quickly diluted to acceptable levels by natural air movement. Excessive nitrogen oxides are caused by:

* Poor blasting agent mixtures
* Degradation of blasting agents during storage
* Inefficient detonation of the blasting agent due to lack of confinement
* Use of non-water resistant products in wet blast holes.

Minimizing Dust and Gas Emissions

The following measures will be used to reduce dust and gas emissions as applicable:

* Avoiding the use of drill cuttings as stemming material.
* Removing drill cuttings from the blast area.
* Ensuring proper coupling of primers to blasting materials to achieve efficient detonation of the explosives.
* For wet conditions use materials that retain their sensitivity when wet.

Flyrock

Flyrock results from the unplanned throw of rock beyond the blast area as delineated by the licensed blaster. Reasons for flyrock often include: overloading of holes, lack of burden and confinement, insufficient stemming, lack of relief, improper timing (delay patterns), or structural irregularities and zones of weakness in the bedrock being blasted (cavities, caves weathered rock, faults, mud seams, crevices, etc.). These potential problems can almost always be foreseen through consultation with the driller, adequate drill logs and proper blast design. For example, a lack of resistance to drill penetration could indicate a mud seam, a zone of incompetent rock or a void. Any explosive loaded in this zone of weakness will follow the path of least resistance and "blow out" causing flyrock. Additionally, if the zone goes unnoted, the interval can be loaded with excessive explosives. It is not always possible for the blaster to know, with complete certainty, that a particular section of rock may have planes of weakness or other characteristics that will cause flyrock. For this reason, it is imperative that the possibility of flyrock is never discounted.

Minimizing Flyrock

Flyrock minimization techniques include:

* Accurate drilling.
* Sufficiently detailed drill logs.
* Good communication between the driller and the blaster.
* Properly designed and executed shots.
* Pre-blast inspections of rock face and bench.
* Accurate detonation and timing delays.
* Use of electronic devices such as bore-trackers and laser profiles.
* Ensuring sufficient stemming is used.
* Ensuring that the shot is not overly confined.
* The use of blasting mats where applicable.

4.2.2.2 Topographic Resources Impacts & Mitigation

Drainage Patterns

The Stormwater Pollution Prevention Plan (SWPPP) located in Appendix E of this document addresses in detail the existing and proposed stormwater drainage on disturbed areas of the project site. The SWPPP includes any mitigation measures proposed for changes to stormwater drainage. An underlying design premise for the stormwater management systems is to maintain the existing drainage patterns, and not "jumping watersheds" with the drainage.

Steep Slopes & Stormwater Management

Disturbance of areas of steep slopes during construction can lead to an increased vulnerability of the soils to erosion. The existing slopes in the Intense Development Areas (IDAs) and the nature of proposed disturbances can be characterized as follows:

Table 4.2 - 8 Slopes in Intensive Development Areas (IDAs)

Proposed Development Area	Approximate Range of Existing Slopes	Nature of Proposed Disturbance
Upper Discovery Parking Lots	3 - 8 %	Regrading
Discovery Lodge Expansion Area	3 – 25%	Regrading
North Parking Lots	3 – 25%	Regrading
East Parking Lots	3 – 8%	Regrading
Snowmaking Pond	3 – 35%	Excavation & Fill
Ski-Over Bridge	3 – Over 35%	Additions of Fill
Upper Trails/Lift Areas	3 – Over 35%	Vegetation Removal

The majority of the IDAs are located on nearly flat to moderately sloping land. Given that the site soils are susceptible to erosion, efforts were made to minimize the area of disturbance, especially in areas of steep slopes. In the areas where disturbance will occur on steep slopes, an appropriate erosion control method will be used that would include mulching with woodchips, seeding and sodding, erosion control blankets, silt fencing, and/or construction of berms. In addition, water will be diverted away from disturbed areas. Identified issues associated with Stormwater Management and Erosion and Sediment Control are addressed in the Stormwater Pollution Prevention Plan (SWPPP) included as Appendix E.

The proposed lift lines and trails, many of which occur on steep slopes, will require the removal of trees with minimal grading. Erosion and Sediment Control Details for the proposed lifts and trails are included in the SWPPP (Appendix E)

The Tomahawk Base Area Skier Bridge area lies on steep slopes, but minimal excavation is planned. The majority of the work will entail placement of fill material, efforts will be made to minimize possible runoff by diverting overland flow. Silt fencing will be used down slope to protect against possible runoff. Exposed fill material will be protected from wash off where possible. Erosion and Sediment Control plans are included in the SWPPP (Appendix E).

The Upper Discovery Parking Lot Area is particularly susceptible to erosion due to the length of the slope. Evidence of erosion was observed at this location on the undisturbed soil surface. Planned disturbances in this area include tree removal and regrading. The regrading will reduce the slope length and steepness. Berms or silt fencing will likely be used during construction to redirect overland flow. The construction is also to be conducted in phases to minimize the exposure of soils to potential erosion. Details of the Stormwater Management facilities, and Erosion and Sediment Control are included in the SWPPP (Appendix E).

The Discovery Lodge Expansion Area contains some steeply sloping areas. Some excavation will occur here, but few trees will be removed. Details of the Stormwater Management facilities, and Erosion and Sediment Control are included in the SWPPP (Appendix E).

In the North Parking Lot and Snowmaking Pond Area, a deep excavation and tree removal is planned. Most of the work will be on gently to moderately steep slopes. However, a berm will be constructed on the steep slope using excavated material, with special attention to stabilization of this newly constructed berm. Details of the Stormwater Management facilities, and Erosion and Sediment Control are included in the SWPPP (Appendix E).

The East Parking Lot area will have trees removed and regrading is planned. This area is gently sloping, so the impact of the slope here is minimal. Erosion prevention measures will be put in place wherever there is soil disturbance regardless of slope. Details of the Stormwater Management facilities, and Erosion and Sediment Control are included in the SWPPP (Appendix E).

Earthwork Calculation

Proposed areas of earthwork are shown on UMP Drawing G5 "Proposed Grading Master Plan". For each area of proposed grading, the existing grade surface and the final finished grade surface were modeled using Autocad Civil 3D software. The raw cut, fill, and net cubic yards of earthwork were computed in the software. Volumes of imported gravel and pavement for the proposed parking lots were also computed based on the proposed section, and the area determined from the drawings.

Area Description	Cut (cys)	Fill (cys)	Net (cys) *
East Parking Lot	15,414	10,366	5,047
North Parking Lot	10,208	12,553	-2,345
Upper Discovery Parking Lot	33,439	31,554	1,885
Overlook Lodge Public Assembly Area	3,821	1,333	2,488
Tomahawk Base Area	322	34,809	-34,487
Snowmaking Pond	155,000	115,000	40,000
Discovery Lodge Expansion	5,219	12,280	-7,061
Discovery Lift Base Terminal	1,520	58	1,462
Discovery Lift Top Terminal	1	242	-241
Novice Lift Base Terminal	3,010	3,088	-78
Novice Lift Top Terminal	1	242	-241
West Lift Base Terminal	6,801	473	6,328
West Lift Top Terminal	1,136	1,177	-41
Highmount Lift Base Area	3,564	3,507	57
Highmount Lift Top Terminal	1,507	1,452	55
Highmount Connector Trail	2,604	2,546	58
RAW VOLUME TOTALS	243,566	230,680	12,886

* Note: (-) value represents additional material required

IMPORTED GRAVEL AND PAVEMENT

East Parking Lot Area	1,933
North Parking Lot Area	1,543
Upper Discovery Parking Lot Area	3,896
TOTAL IMPORTED GRAVEL & PAVEMENT	7,372

Table 4.2 - 9 Raw Earthwork Volumes

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Mitigation Measures

Mitigation measures to reduce any potential impacts to soil resources and water resources due to soil disturbance and/or erosion are described in detail in the SWPPP (Appendix E), and are described here in general. Enhanced erosion control measures in the form of phasing, maintaining vegetated buffers, sediment basins, temporary stabilization, and comprehensive stabilization planning will be implemented throughout the project site.

1. Silt fencing and construction fencing will be used to physically define the limit of work and will be installed prior to any major soil disturbance. Silt fences will not be relied upon as a sole method of controlling erosion. Silt fencing will be checked for depth of sediment, tears, and to ensure posts are stable.

2. Construction will occur in multiple phases to minimize the amount of actively disturbed and destabilized soil at any given time. The smaller areas of construction will provide for a rapid soil stabilization and placement of sediment controls. Work will not begin in a new area until the current area is stabilized.

3. Bare soil will be protected from wind or water erosion using protective mulch or establishing quick-growing temporary grass cover or permanent vegetation cover.

4. All soil stock piles not actively in use will be seeded, mulched, or covered and protected in some fashion and surrounded with silt fence. Soil piles will not be located within 50 feet of a stream, ditch or steep slope.

5. Diversions or berms will be created to intercept runoff that would otherwise run across exposed soil. Care will be taken to divert water to areas where the water can adequately infiltrate.

6. To control wind erosion, bare soil will be covered with vegetation or securely anchored mulch. Water will be used to temporarily keep bare soil moist for wind erosion control, if necessary.

7. All erosion control measures will be checked daily and repairs made, if necessary.

Imported Fill

Importing of fill materials can have the impact of being a nuisance to neighbors due to the noise and fugitive dust of passing trucks. The grading design of this project has been done through iterations so that the volume of embankment cut and fill nearly balance in order to minimize importation of material from off site. The only materials planned to be imported from off-site are the surface finishing materials that are not available on-site such as select gravel, asphalt concrete pavement, stone rip-rap, etc.

Importing of fill material shall meet any Department requirements for the control of invasive species.

4.3 Surface Waters Including Aquatic Habitat

4.3.1 Surface Water Resources

Surface and subsurface water resources within the Project Site include ponds, Pine Hill Lake, streams, and wetlands. The analysis of the proposed action's surface and subsurface water impacts is an essential component of the SEQR review because these resources are spread throughout the Project Site.

No waters within the immediate Project Area have been identified as Section 303(d) Impaired Waters or as waters not meeting state water quality standards (New York State Department of Environmental Conservation 2008). However those that are contiguous with a protected stream fall under the jurisdiction of NYSDEC.

Watersheds

The Project Area is located within two USGS 8-digit Hydrologic Unit Codes (HUC): the Middle Hudson watershed (HUC 02020006) and the East Branch Delaware River watershed (HUC 2040102). While there are no large water bodies within the Project Area, the East Branch Delaware River is located approximately 5 aerial miles and 8.0 river miles west of the site and Esopus Creek is located approximately 3.5 aerial miles and 17.7 river miles to the east of the site. The Hudson River is located approximately 30 aerial miles to the east of the Project Area (See Figure 3-2 in Appendix AA, Wetland and Waterbodies Report).

The Middle Hudson watershed encompasses 1,531,913 acres of land in Ulster, Greene, Columbia, Albany, and Rensselaer counties. The East Branch Delaware River watershed encompasses 537,724 acres of land with 644.4 total stream miles in Delaware, Greene, Sullivan, Ulster, and Wayne Counties. The watershed includes land within 11 townships and 5 counties. While the majority of the watershed is contained within Delaware County, sections of the headwaters are found in the western Catskill Mountains of Ulster and Greene counties.

The Middle Hudson watershed and East Branch Delaware River watershed are subject to the New York City Watershed Rules and Regulations (http://www.nysefc.org/home/index.asp?page=287), which govern activities such as sewer collection, storm water discharges, and impervious surfaces that could degrade water supplied to New York City via the Catskill/Delaware system. Watershed protection is necessary in order to maintain clean drinking water by preventing contaminants such as oil, bacteria, nutrients, sediment, and metals from reaching the natural flow-path of surface water.

Both the Middle Hudson and the East Branch Delaware River watersheds have been designated as Category I watersheds by the New York Unified Watershed Assessment Program. Category I watersheds are defined as those watersheds in

need of restoration. These watersheds do not meet, or face imminent threat of not meeting, clean water and other natural resources goals (http://www.dec.ny.gov/lands/34488.html#Watershed).

Wetlands

Wetlands on the Project Site total approximately 3.606 acres, of which approximately 3.558 acres are under the jurisdiction of the USACE, 0.008 acres are isolated, and none are under the jurisdiction of NYSDEC. Approximately 0.41 acres of identified wetlands located in the Highmount Ski Area were delineated. Wetland locations are depicted in relation to project facilities in Figure 4-3.1, Appendix AA, Wetlands and Waterbodies Report. Full descriptions of each wetland are also available in Appendix AA.

NYSDEC Stream Classification

There are no perennial streams in the study area that drain into the East Branch Delaware watershed. One ephemeral stream, which is a Class B stream, is mapped along the western side of the Project Area that drains into Emory Brook, which drains in turn to Vly Creek, then to Bush Kill, and finally into the East Branch of the Delaware River. (This complex drainage was confirmed with the USGS National Hydrographic 2007 Dataset. This unnamed tributary was dry and not surveyed during field work in July and August of 2008).

Table 4.3.1-1 provides descriptions of all of the perennial streams that were identified during surveys within the Project Area. The streams range from well-defined stream channels to poorly defined headwater channels. These unnamed streams drain to the north into Crystal Spring Brook, which flows eastward and discharges to Birch Creek in Pine Hill. The location of these streams is depicted in relation to project facilities in Figure 4.3-1, Appendix AA, Wetlands and Waterbodies Report. There are two stream ID numbers listed in Table 4.3.1-1, the Watershed Index Number (WIN) and the project ID number. The project ID number begins with an S.

Table 4.3.1-1 Stream Characteristics, Belleayre Mountain Ski Center

Stream ID (WIN & Project ID#)	Flow	Left Bank Height (Feet)	Right Bank Height (feet)	Width Bank to Bank (Feet)	Width of Water (Feet)[1]	Substrate	Classification (NYSDEC)	Connection
H-171-52-4-1 (S3)	**Perennial**	**0-3**	**0-3**	**5**	**3**	**Gravel/Cobble**	**Not Classified**	**Unnamed Tributary to Birch Creek**
H-171-52-4-1 (S5)	**Perennial**	**6+**	**0-3**	**6**	**4**	**Gravel/Cobble**	**Not Classified**	**Unnamed Tributary to Birch Creek**
H-171-52-4-1 (S6)	**Perennial**	**0-3**	**3-6**	**4**	**2**	**Gravel/Cobble/Silt/ Clay**	**Not Classified**	**Unnamed Tributary to Birch Creek**
H-171-52-3 (S7)	**Perennial**	**6+**	**6+**	**15**	**12**	**Gravel/Cobble**	**B(T)**	**Crystal Spring Brook (Trib. 4)**

[1]This is an estimate of the width of the water during a 25-year storm event based on indicators in the field.

NYSDEC stream classification data were reviewed to determine whether streams in the Project Area are protected by New York State under Article 15 of the Environmental Conservation Law (ECL). NYSDEC uses a stream classification system in order to identify the value and uses of watercourses in the state. A protected stream is any stream or particular portion of a stream for which any of the following classifications or standards have been adopted by the department or any of its predecessors: AA, AA(T), A, A(T), B, B(T),or C(T). These categories refer to the designated best uses of the streams. Class AA and A are potential or actual drinking water sources, Class B indicates a best use for swimming or fishing, and Class C includes waters that can support propagating fish populations. Streams designated with the modifier (T) - trout - also include those more specifically designated as (TS) - trout spawning. Disturbance to the bed or banks of protected streams requires a permit under Article 15 of the New York ECL.

The majority of the watercourses within the Project Area are identified as Class B, C, B(T), and B(TS) streams with no mapped classification and are considered to have the same classification and standards as the downstream reach to which they are connected. Stream 7 (S7), Crystal Spring Brook, a perennial stream, is the only classified B(T) stream delineated within the Belleayre Mountain Ski Center Project Site. This stream runs northeast and then southeast into Birch Creek, a B(TS) classified stream. Crystal Spring Brook (S7) has many unnamed tributaries that flow from the slopes of Belleayre Mountain. Two of the tributaries, Cathedral Glen Brook and Woodchuck Hollow Brook, are categorized as Class C by NYSDEC and cross only a small portion of the survey corridor, which is over the railroad tracks that lead to Pine Hill Lake. Those waters designated as Class C are waters supporting fisheries and are suitable for non-contact activities NYSDEC Environmental Resource Mapper available at: http://www.dec.ny.gov/imsmaps/ERM/viewer.htm). These two streams contain trout species; however, they have not been classified as (T) or (TS).

The unnamed tributaries that flow into S7 were identified in the field. These tributaries (S9, S10, S11, S12, S13, and S14) are low-gradient, intermittent streams that likely have flow during rainstorms and during the spring when the snow from the mountain is melting. Although these streams are intermittent during periods of the year, fish may spawn in the spring or fall when water is flowing. Therefore, intermittent streams within the project area may potentially provide fish habitat and are considered for purposes of this impact assessment as candidates for protection to the same level as trout (TS) streams. However, the very steep gradients and intermittent flows render these streams mostly unsuitable for fish species. Construction would be scheduled during times when trout or trout eggs are not present. Regulation of these streams would be through conditions on a Temporary Revocable Permit (TRP) or in the form of intra-agency memos.

Class B indicates a best usage for swimming and other contact recreation but not for drinking water. There is one Class B stream that originates in the Highmount

Ski Area portion of the Project Area, and continues north. This stream was not located during field investigations.

Pine Hill Lake and Other Waterbodies

Pine Hill Lake, which is located in the southeastern part of the Project Site and has an estimated capacity of 29.4 million gallons, is an impounded National Wetland Inventory (NWI) freshwater wetland. The lake surface covers approximately 5.62 acres. The lake is used for snowmaking during the winter months and incidental recreational purposes during the summer months. The water level varies throughout the year depending on evaporation, precipitation, and the volume of water used for snowmaking.

In addition to Pine Hill Lake, there are two more waterbodies on the Project Site that serve as reservoirs for snowmaking. The Upper Impoundment, which is estimated to hold 1.5 million gallons of water and is approximately 0.86 acres, is adjacent to the easternmost ski slope in the Project Site. The Cathedral Glen Impoundment, which is estimated to hold 2 million gallons of water and is approximately 0.62 acres, is located northeast of the Project Site at the intersection of Cathedral Glen Brook and Bonnie View Avenue. Both reservoirs are freshwater NWI wetlands.

Potential Impacts on Waterbodies

The Project may result in temporary impacts to wetlands, particularly in the area of the proposed Highmount Ski trails. Figure 4.3-2 of Appendix AA, Belleayre Mountain Ski Center Expansion Wetland and Waterbodies Report detail where proposed project features intersect the delineated wetlands within the Highmount Ski Area. It should be noted that the wetlands in this area were identified by the LA Group in a survey performed during September 1999 as part of the study conducted for the Modified Belleayre Resort at Catskill Park SDEIS. The replacement of an existing lift base is proposed as part of the Highmount Ski trail construction and the majority of the wetland disturbance that is anticipated would be the result of slope grading and vegetation clearing. It is estimated that a maximum of 0.148 acres of wetlands would be disturbed during construction. Of the 0.148 acres, 0.009 acres would entail brush-clearing and mowing for ski trails that would not entail dredging or filling in jurisdictional wetlands.

Approximately 0.139 acres of wetland would be impacted during construction because of necessary re-grading for the proposed Highmount Ski Lift. Wetlands and streams crossed by the project are currently under review for jurisdictional determination by USACE. Based on the total impacted area estimated above, it is not anticipated that the project areas would require an individual permit or mitiga-

tion plans. The 0.139 acres of permanent impacts associated with the proposed construction at the Highmount Ski Area would fall under the Nationwide Permit 42, as regulated by USACE. This permit allows "Discharges of dredged or fill material into non-tidal waters of the United States for the construction or expansion of recreational facilities." The key provisions of this Permit are that impacts must be less than 0.5 acres and 300 feet of linear impacts. A Pre-construction Notification (PCN) must also be provided. Mitigation is required as part of the PCN if permanent impacts to federal wetlands exceed 0.1 acres. In that case the project would require an individual permit or mitigation plans. It is anticipated that the disturbed wetlands identified above would be restored to pre-construction conditions through appropriate selection of vegetation without permanent impacts.

A concept plan for the mitigation of these impacts is shown in Figure 4.3-2 in Appendix AA of the BMSC UMP DEIS and described therein. Wetland 14, which is one of the wetlands regulated by the Army Corps of Engineers, is a low-lying drainage swale through an existing flat, grassy area. The drainage continues to an unnamed tributary of Emory Brook. Grading would impact 0.024 acres of this 0.090-acre wetland. The proposed mitigation area is a 0.219-acre grassy area north of Wetland 14. This represents a mitigation ratio of 1.6.

The majority of impacts within the remaining Project boundary are associated with disturbance to forest cover caused by construction. Impacts to forest cover are discussed in Section 4.5.4.2. Appropriate permit applications with USACE and NYSDEC will be filed. The activity for the Project Site is covered under Nationwide Permit 42, as regulated by USACE. This permit allows "Discharges of dredged or fill material into non-tidal waters of the United States for the construction or expansion of recreational facilities." The key provisions of this Permit are that impacts must be less than 0.5 acres and 300 feet of linear impacts. A Pre-construction Notification (PCN) will be provided. Mitigation is required as part of the PCN if impacts to federal wetlands exceed 0.1 acres.

Potential impacts from construction and operation on waterbodies and aquatic ecological communities (streams, wetlands and reservoirs) found in the study area may include siltation, increased turbidity, decreased levels of dissolved oxygen, increased warming, drainage from ski slopes and pollution from runoff material from roads, parking lots, and tree clearing. During the winter months, runoff from roads and parking lots and ski trail maintenance could increase the salinity and pH of the waterbodies within the project site. This potential impact is addressed in Section 4.2.11. Construction activities could cause pollutants to enter the waterbodies in the project area from increased sediment-loading of storm water runoff. However, using best management practices (BMPs) to control runoff would mitigate these potential impacts.

Aquatic Habitat

All of the streams within the project area may be used to some extent by wildlife as a source of drinking water. These watercourses also provide habitat for macroinvertebrates and amphibians, reptiles and fish that may use surface water when streams are flowing. Some of these streams are intermittent, and in headwater areas water availability is intermittent and may be present only during periods of continuous or heavy precipitation or during the snowmelt period in the spring. Field investigations were conducted in June 2008 (see Section 4.5.1.11).

Crystal Spring Brook (S7 or H-171-52-3) is a Class B(T) stream that flows through a large percentage of the project area and is designated for recreation and as trout species' habitat. Portions of Crystal Spring Brook were completely dry during field reconnaissance.

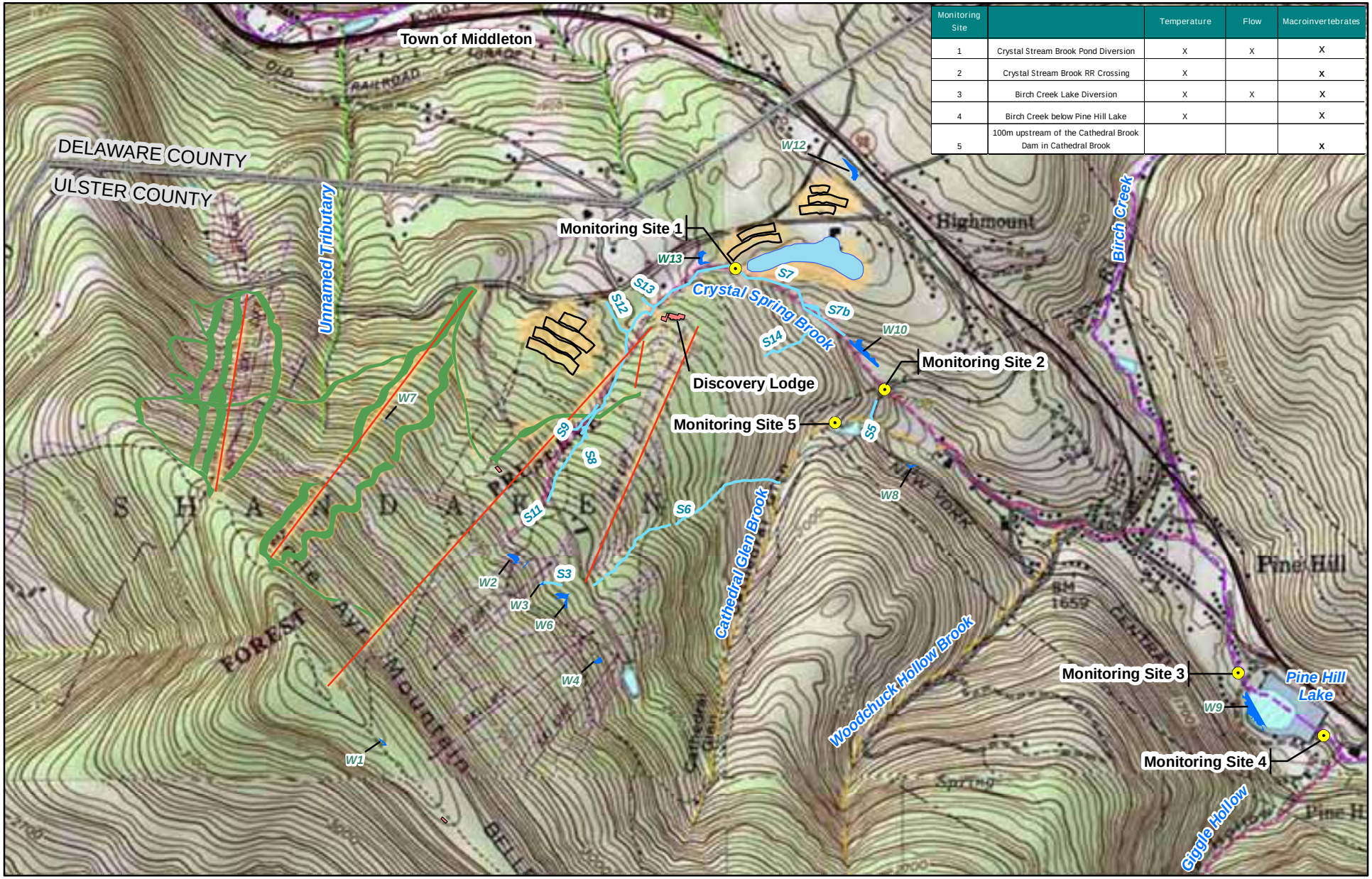
Pine Hill Lake, the Upper Impoundment, and the Cathedral Glen Impoundment provide habitat for various fish species, reptiles, waterfowl, Canada geese, and small mammals.

Stream Monitoring

The streams that drain Belleayre Mountain and its surroundings are high-gradient, small headwater streams that characteristically have mostly rock, cobble, gravel, and sand substrates. These small streams provide numerous important functions that are characteristic of all natural headwater streams, including control of sediments, aeration of the water, recharge of groundwater, nutrient spiraling (retention and subsequent release), removal of toxicants, habitat for semi-aquatic species, and aquatic species habitat. These streams support a rich community of macroinvertebrates that provide food for trout and other fish species.

Since the bulk of the runoff from the Belleayre Mountain ski slopes drains into Crystal Spring Brook and subsequently to Birch Creek, biological (macroinvertebrate sampling) and physical (flow and temperature) monitoring is proposed to determine if the construction and operations of the new proposed facilities will have any significant impacts on the water flow and water quality in these small streams. Biological monitoring involves sampling biological indicators (i.e., pollution-sensitive species) of a stream's health to determine the water quality of a stream. The presence of pollution- sensitive species indicates that water quality is suitable for the survival of the sensitive species throughout its lifecycle. Macroinvertebrates would be sampled as biological indicators of the water quality in the streams listed below because they are permanently located in streams and move very short distances. The rationale for biological monitoring and the results of a 2004 survey of Birch Creek are further described in Bode et al. (2005) (see Appendix AH).

Five stream monitoring stations are proposed to be located as shown in Figure 4.3.1-1. Two of these stations are on Crystal Spring Brook (Sites 1 and 2), and two are on Birch Creek (Sites 3 and 4). Site 1 is upstream of the proposed diversion for the proposed new pond. Site 2 is below the proposed pond and just above the confluence of Crystal Spring Brook with Cathedral Glen Brook. The sites on Birch Creek are above (Site 3) and below (Site 4) the existing Pine Hill Lake. The Cathedral Glen Brook (Site 5) is to provide baseline data from a relatively undeveloped watershed and is located approximately 300 ft. upstream of the existing Cathedral Glen Impoundment.



Monitoring Site		Temperature	Flow	Macroinvertebrates
1	Crystal Stream Brook Pond Diversion	X	X	X
2	Crystal Stream Brook RR Crossing	X		x
3	Birch Creek Lake Diversion	X	X	X
4	Birch Creek below Pine Hill Lake	X		X
5	100m upstream of the Cathedral Brook Dam in Cathedral Brook			x

0 1,000 Feet

Belleayre Mountain Ski Center
Catskill State Park

Project Area, USGS Topographic Imagery

- Proposed Ski Lift (July, 2009)
- Proposed Trail Clearing (July, 2009)
- Proposed Tree Cutting Area
- Proposed Snow Making Pond (July 2009)
- Parking Lot
- NWI Wetland
- NYSDEC Freshwater Wetland
- Delineated Wetland Polygon
- Unclassified Delineated Stream Line

NYSDEC Stream Class
- B
- B(T)
- B(TS)
- C(T)
- C

Stream Monitoring Stations

Figure 4.3.1-1 Stream Monitoring Stations

Sheet No. 1

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Date: January 26, 2011

The proposed stream monitoring is intended to observe changes in flow, temperature, and water quality. Flow will be measured with a simple weir constructed in the in-channel diversion structures at Sites 1 and 3. NYSDEC staff will take weekly readings of flow as a minimum. Flow will be recorded more frequently during periods of high runoff (e.g. continuously recording, submerged, pressure-sensitive transducers). Temperature will be measured with recording, submersible thermometers that will be periodically collected to download the hourly data they record. Macroinvertebrate sampling will be conducted at all 5 Sites. The macroinvertebrates distributions will be used to describe water quality using methods summarized in Bode et al. (2005). An initial survey will be made before construction. The macroinvertebrates will be re-surveyed annually during construction and then at three-year intervals for another six years. The sampling types and frequencies are shown in Table 4.3.1-2.

Table 4.3.1-2 Proposed Surface Water Monitoring Plan

Monitoring Site		Temperature	Flow	Macroinvertebrates
	Frequency	**Hourly Recording**	**Weekly Observation**	**Annually during construction, then every 3 years**
1	**Crystal Spring Brook Pond Diversion**	**X**	**X**	**X**
2	**Crystal Spring Brook RR Crossing**	**X**		**X**
3	**Birch Creek Lake Diversion**	**X**	**X**	**X**
4	**Birch Creek Below Pine Hill Lake**	**X**		**X**
5	**Cathedral Glen Brook**			**X**

The methods in Bode et al. (2005) are standard, and the availability of this report (see Appendix AH) provides a very useful baseline. Bode et al. sampled four locations along Birch Creek. Site 2 in the Bode study corresponds with Site 3, Birch Creek Lake diversion. The other sites in Bode et al (2005) are upstream of the confluence with Crystal Spring Brook (Site 1) or farther downstream (Sites 3 and 4). Bode et al (2005) Site 2 was sampled in 2004. All the sites sampled by Bode et al (2005) represent natural stream habitats and communities with minor impacts from development. Site 2 displayed some characteristics of siltation—in particular sedimentation of fine clay. The narrative description of this site (Bode et al, 2005 Site 2 and Site 3 in this report) is as follows:

"*The fauna was dominated by clean-water mayflies, although more worms and black flies were noted compared to Station 1. Impact Source Determination indicated mild nutrient enrichment. All metrics were within the range of non-impacted water quality*." (Bode et al. 2005; page 11).

It is anticipated that the proposed construction will not have any statistically significant impacts on flow, temperature, or macro invertebrate distributions. If any

impacts are detected, a meeting will be convened with NYSDEC natural resources specialists to discuss mitigating any impacts and restoring any damages.

4.3.2 Snowmaking Water Supply

Potential Impacts and Mitigation

Ski area plans call for improvements to the snowmaking water supply system that may have an impact on surface waters and aquatic habitats. As referenced in Snowmaking Engineers Report (Appendix B), the volume of water to be used for snowmaking during a typical year will increase from 155 MG to 207 MG, an increase of 34%. The plans call for an increase in the volume of withdrawal of surface water from the existing Pine Hill Lake. The plans also include the construction of a new storage reservoir at the base of Belleayre Mountain Ski Center.

The proposed expansion of the trail system at the ski center will result in an increased demand for water over the course of a typical ski season. As indicated in Appendix B "Snowmaking Engineers Report," the snowmaking area is proposed to be increased by 52 acres. At a rate of 1 million gallons per acre, this results in 52 MG additional water withdrawal per ski season or a total of 207 MG.

The primary existing source of snowmaking water for the ski center is the Pine Hill Lake Reservoir, located off of Rte 28 near the village of Pine Hill, which stores a usable capacity of 25 million gallons. The Pine Hill Reservoir is located adjacent to Birch Creek and has a drainage area of approximately 7.9 sq. miles. The reservoir is located off-line of Birch Creek, and is currently designed to be able to take water from the creek when flows are in excess of 5 cubic feet per second (cfs). The proposed seasonal changes to the maximum diversion flow rates are outlined below in the Impact on Stream Habitat Section. The Natural Resources Impact Section 4.5.3.1 discusses the increased water withdrawal volume.

The proposed storage reservoir will have a usable capacity of approximately 35 MG, and have a surface area of approximately 8.1 acres. The proposed location of the storage reservoir is adjacent to the Maintenance Center.

Potential temporary impacts of disturbance during construction are fully addressed in the SWPPP (Appendix E), and are discussed in the Section 4.3.4.

Impact on Stream Habitat

Maintaining a minimum base flow in streams where water can be diverted into an off-line storage reservoir is critical to avoid having a negative impact on the stream habitat. The management objective of the snowmaking system is to first maintain the pass-by flows necessary for Birch Creek at the Pine Hill Lake withdrawal, and for Crystal Spring Brook at the proposed Lower Reservoir withdrawal. Withdrawals from the streams into the reservoirs are allowed for flows in excess of these minimum stream flow needs.

Pine Hill Lake

In 1985, an assessment of flows diverted to Pine Hill Lake for snowmaking purposes was performed by the NYSDEC Instream Flow and Wind Unit. This assessment determined the required pass-by flow of 5 CFS in Birch Creek at Pine Hill Lake.

In 2007 a reassessment of the required pass-by flow at Pine Hill Lake was performed. To mitigate any potential impacts due to increased snowmaking water usage, the study recommended increasing the minimum pass-by flow in Birch Creek at Pine Hill Lake to reflect seasonal variations in hydrology. Aquatic base flows to be maintained in Birch Creek are summarized as follows:

- October 15 through April 15, a base flow of no less than 8 CFS or natural flow provided by the watershed upstream from the Pine Hill Lake water diversion structure, whichever is less, should be continuously maintained in Birch Creek immediately downstream from the water withdrawal structure.

- April 16 through May 31, a base flow of no less than 36 CFS or natural flow provided by the watershed upstream from the Pine Hill Lake water diversion structure, whichever is less, shall be continuously maintained in Birch Creek immediately downstream from the water diversion structure.

- June 1 through October 14, a base flow of no less than 5 CFS or natural flow provided by the watershed upstream from the Pine Hill Lake water diversion structure, whichever is less, shall be continuously maintained in Birch Creek immediately downstream from the water diversion structure.

The existing water control structure at Pine Hill Lake will be modified by constructing a second notch on the existing weir to increase the current 5 CFS pass-by flow to 8 CFS. The first 5 CFS will be passed through the existing steep-pass fish passage structure built into the existing diversion structure. Additional recommended flow amounts would be allowed to flow over the concrete weir to the downstream reach of Birch Creek.

Proposed Lower Snowmaking Reservoir

The required pass-by flow at the Lower Snowmaking Reservoir location was determined to be 0.5CFS. This pass-by flow was initially determined by prorating the drainage area of the Pine Hill Lake water control structure to the drainage area of the proposed Lower Snowmaking Reservoir. Using the Aquatic Base Flow method for protecting aquatic resources, the pass-by flow was calculated to be 0.3 CFS, using a base flow requirement of 1 CFS per acre of drainage area. This was based on a drainage area to the Crystal Spring Brook diversion structure of approximately 0.3 acres.

The Aquatic Base Flow (ABF) method is a component of the USFWS's New England Flow Policy (Annear, et.al., 2002).

Upon physical examination of the downstream segment of Crystal Spring Brook, which supports natural reproduction of brook trout, the pass-by flow was increased to 0.5 CFS. The need for slightly more surface water flow was based on the uncertainty of the interaction between surface and groundwater flows in this steep-sided drainage that contains a number of springs. Additionally, the desire for a more conservative pass-by flow is based on the uncertainty of using the Aquatic Base Flow method in such small drainage areas.

The Belleayre Mountain Ski Center snowmaking plan provides the pass-by flows to protect aquatic life as defined by the NYSDEC Division of Fish, Wildlife and Marine Resources. Additionally, a uniform seasonal stream flow during the late fall and winter may be beneficial to natural brook trout populations by minimizing peak flows that may impact spawning/incubation periods. The snowmaking reservoirs will serve to attenuate peak stormwater flows and minimize stream disturbances during the fall trout spawning period.

Assessment of the Snowmaking Plan with the New Minimum Pass-by Stream Flow for Birch Creek

From historical records, the overall annual volume of water required for the ski area snowmaking system is approximately 1 MG per acre of man-made snow terrain. This means a volume of 200 MG will be required per ski season for the proposed expanded ski area. Per the snowmaking equipment modeling, the Initial Opening requires 8.5 MG, and a total of 54 MG for the Christmas Holiday Operation. The existing usable storage volume at Pine Hill Lake is 25 MG.

To evaluate the water recharge to the Pine Hill Lake reservoir available from Birch Creek, stream flow data were retrieved from the USGS Stream Monitoring Station # 013621955 located on Birch Creek at Big Indian NY, downstream of Pine Hill Lake. Data were retrieved from the period of 1999-2007. The data were then prorated by a factor of 0.632, which is the ratio of the size of the respective drainage areas to estimate the flow at the Pine Hill Lake diversion structure.

The available volumes to recharge the Pine Hill Lake reservoir from the Birch Creek diversion structure based on the computed Birch Creek at Pine Hill flows minus the 5 CFS and 8CFS pass-by flows are presented in Table 4.3.2-1. The numbers are provided for the potential snowmaking portion of the ski season, Nov. 1 – Feb. 28, and for December only which is a critical month in the water supply for snowmaking.

Since the overall required volume of water for the Christmas holiday phase is 54 MG per the snowmaking model, and the usable storage in Pine Hill Lake reservoir is 25 MG, the minimum required recharge is 54-25 = 29 MG. Based on the Table, there are 2 years within the 1998-2007 data with less than this volume of recharge available. Additional storage is required to ensure that there will be sufficient water available for the Christmas Holiday Operation.

Table 4.3.2-1 Available Pine Hill Lake Recharge from Birch Creek

Ski Season	Ski Season	Ski Season	December	December
	Recharge Vol. (MG)	Recharge Vol. (MG)	Recharge Vol. (MG)	Recharge Vol. (MG)
	over 5 CFS	over 8 CFS	over 5 CFS	over 8 CFS
1998 - 1999	1101	938	0	**0**
1999 - 2000	1517	1260	166	106
2000 - 2001	802	617	421	391
2001 - 2002	758	610	38	**18**
2002 - 2003	1647	1390	243	183
2003 - 2004	2106	1871	815	755
2004 - 2005	1617	1335	549	489
2005 - 2006	1823	1570	277	220
2006 - 2007	1272	1092	112	53

Assessment of the Proposed Lower Snowmaking Reservoir

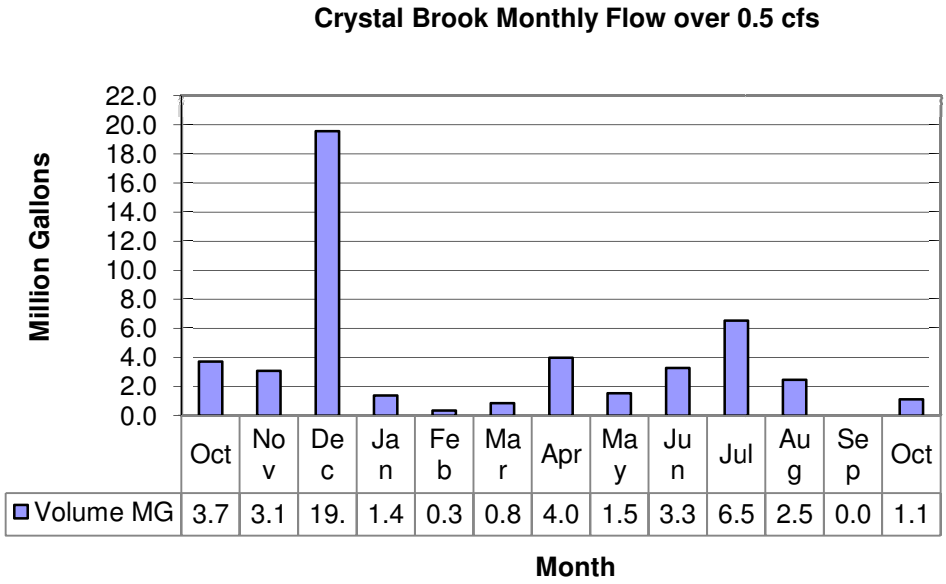
A 35 MG snowmaking reservoir is proposed near the new Maintenance Center to provide additional storage volume, pumping capacity, and energy efficiency. Additional information for the proposed lower snowmaking reservoir is provided in Appendix B - Snowmaking Engineers Report.

The proposed reservoir site selection criteria included the following; land area availability, suitable soils, adequate buffers to environmentally sensitive areas, as high in elevation and as close to the ski trails as possible, in proximity to existing stream to utilize excess runoff from stream. The site behind the new Maintenance Center met all of these criteria.

In addition to providing the required storage volume for the holiday operation, there are several other distinct benefits of providing a new storage reservoir at this location; ability to store available water from the existing Cathedral Glen reservoir at a higher elevation, ability to pump from Pine Hill Lake at off-peak hours to avoid higher electrical use and demand charges, ability to divert higher stream flows during storm events from existing Crystal Spring Brook stream.

To evaluate the water recharge to the proposed Lower Snowmaking Reservoir available from Crystal Spring Brook, a stream flow gauge was installed at the proposed stream diversion site in fall 2008. Data was retrieved from the period of Oct 2008 to Oct 2009. The total available diversion volume for this one year period was 47.9 MG. A significant volume of water can be diverted for snowmaking reservoir recharge, while maintaining pass-by flows based on the limited historical data available. Figure 4.3.2-1 shows the volume of water available (above the 0.5 cfs minimum pass by flow) to be diverted from Crystal Spring Brook to the proposed lower reservoir. The balance of water required for snowmaking will be pumped to the Lower Snowmaking Reservoir from the Pine Hill Lake, and Cathedral Glen Pond.

Figure 4.3.2-1 Available Lower Reservoir Recharge from Crystal Spring Brook.



	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Volume MG	3.7	3.1	19.	1.4	0.3	0.8	4.0	1.5	3.3	6.5	2.5	0.0	1.1

Thermal Impacts of Water Storage

The seasonal timing and the rates of water release from snowmaking reservoirs can potentially impact the receiving water course.

Water releases to Birch Creek from Pine Hill Lake have been historically minimized during the summer months. Currently, from the beginning of May until the beginning of September the water diversion structure at Pine Hill Lake is usually not utilized. Water from other sources, primarily springs, draining to Pine Hill Lake have typically provided enough flow to maintain the water quality of Pine Hill Lake. During dry periods the water diversion structure has been utilized just enough to maintain the Pine Hill Lake water quality. After Labor Day water is diverted to Pine Hill Lake to begin cooling the water before the snowmaking season.

Efforts to mitigate thermal impacts to Birch Creek from Pine Hill Lake, Crystal Spring Brook from the proposed Lower Reservoir and the existing Cathedral Glen Reservoir are as follows;

- Dam Safety regulations require that the reservoir have the ability to be drained within 14 days in an emergency situation. The 25 MG Pine Hill Lake would require a discharge rate of 2.8 CFS. The 35 MG proposed snowmaking reservoir would require a discharge rate of 3.9 CFS. The peak flows observed in Crystal Spring Brook have been observed to be up to 12 CFS. The Crystal Spring Brook average flow is 0.8 CFS based on the available data from the Crystal Spring Brook data station. A discharge flow of 3 to 4 CFS is significantly less than observed peak flows. Under normal circumstances however, if a maintenance drawdown of the reservoirs is required, the maximum drawdown rate should be limited to 2-3 CFS to minimize any potential thermal impacts to the downstream environment.

- Continue to minimize the amount of water diverted to the snow making reservoirs during the summer months. Water will be diverted only as needed to maintain the reservoir water quality, while ensuring that the water quality standards within Birch Creek are not compromised.

- Water quality of Birch Creek and Crystal Spring Brook will be monitored.. The sampling types and frequencies are shown in Table 4.3.1-2 and discussed in Section 4.3.1. Pine Hill Lake is routinely tested per NYS Department of Health guidelines during the summer operation of the swimming area.

- Cold water outlets that drain colder water from the bottom of the reservoirs when no surface ice is present will be installed in both Pine Hill Lake and the proposed Lower Snowmaking Reservoir. Details of the out-

let structures are shown on UMP Drawings SM21 for Pine Hill Lake and SM11A for the proposed snowmaking reservoir.

- Aeration systems will be installed in both the Pine Hill and new Lower Reservoir. The aerators consist of "bubbler" systems which pump air to diffusers located in various locations at the bottom of the reservoirs. Benefits of aeration include cooling of the water used for snowmaking during the early ski season. The aeration systems may also help to maintain water quality, although the aeration should not be used during warmer times of the year if it is determined that it will disrupt the thermal stratification of the reservoir.

- The existing Cathedral Glen Reservoir should be investigated for thermal stratification during the summer months to determine if the installation of a cold water outlet from this impoundment would improve downstream habitat. However the Cathedral Glen Reservoir is significantly smaller in volume than Pine Hill or the proposed Lower Reservoir, and there are no significant changes in the volumes of snowmaking water to be pumped from this reservoir. Due to the smaller size of this reservoir, it is not known if this would provide a benefit. The existing spring fed perennial stream S5 (See Figure 4-3, Appendix AA, Wetlands and Waterbodies Report) flows along the railroad tracks and discharges into Cathedral Glen Brook at the reservoir discharge. The flow from this spring fed perennial stream should be protected and left undisturbed and not be diverted into the Cathedral Glen Reservoir. This S5 stream and some other spring discharges provide minimum base flow to the short section of Cathedral Glen Brook before it joins with Crystal Spring Brook approximately 1000 feet downstream. The base flow in the S5 stream was measured in the field to be approximately. 1.1 cfs which is in excess of the recommended minimum baseflow computed to be approximately 1.0 cfs for this drainage area for the operational months of Nov – Feb. (See Appendix P). Since the existing snowmaking pumping volumes from Cathedral Glen reservoir are not proposed to be changed significantly, there is sufficient base flow from the S5 stream, the downstream segment of Cathedral Glen Brook is only 1000 feet until it joins Crystal Spring Brook, and the health of the stream in this segment has been determined to be excellent, there should be no negative impacts from this project on this short segment of Cathedral Glen Brook downstream of the Cathedral Glen Reservoir.

Diversion of Water from Ashokan Watershed to Pepacton Watershed and the Potential Impacts from Runoff from Man-made Snow Melt

Fifty two +/- acres of ski trails are proposed at the west side of Belleayre Mountain Ski Area (lands of the former Highmount Ski Area) within the Pepacton watershed. Using a conservative value of 1MG of water usage per acre per year for snowmaking, 52 MG of water will be diverted from the Ashokan to the Pepacton watershed annually. Flow meter records of snowmaking water usage obtained from 1998 to 2009 average 0.88 MG per acre per year.

Ashokan Watershed Snowmaking Impacts

The primary concern in the Ashokan watershed is potential impacts from diverting stream flows of Birch Creek and Crystal Spring Brook during snowmaking operations that occur in late November through February. To protect the aquatic resources within these streams, a pass-by flow, as defined by the NYSDEC Division of Fish Wildlife and Marine Resources, will be maintained at the withdrawal points during this timeframe. Other seasonal pass-by flows may be required to protect the aquatic resources, should water be withdrawn for purposes other than snowmaking, as is presently the case at Pine Hill Lake.

Pepacton Watershed Snowmaking Impacts

The impact of transferring 52 MG of water to the Pepacton watershed would typically not be realized until the spring season when the snowpack melts. The primary concern in the Pepacton watershed will be the potential impact to watercourses tributary to the "Highmount" Ski Area due to runoff from snowmelt.

The potential impacts to the Pepacton watershed from manmade snowmelt runoff are quantified by comparing the estimated rate of snowmelt runoff to the peak flows associated with a one year storm event.

The majority of the proposed "Highmount" trail development is located in 96.99 acre subcatchment which flows to two culverts located at the base of the ski area. Thirty seven acres of this 96.99 acre subcatchment were previously ski trails during the Highmount ski area operation. Currently the 37 acre area is a combination of grass, brush and woods with trees of approximately 10 to 20 feet in height. The proposed "Highmount" ski trails cover an area of twenty one acres. The "Highmount" subcatchment is shown on UMP Drawing EX 16 and is defined as subcatchment 1.5. The trail layout is also shown on drawing UMP Drawing TR1, Highmount Lift and Trails.

The peak discharge of the 96.99 acre subcatchment from a one year storm event was calculated to be 52 CFS. The upland flow from the subcatchment is conveyed to two culverts crossing under CR 49A near the base of the former Highmount ski area. One culvert is a 30 inch CMP (Culvert 1.5 B, and the other is a 5Hx3V elliptical CMP (Culvert 1.5 A), see UMP Appendix A Drawing EX16 for locations.

Based on historical observations, manmade snowmelt at the ski center typically occurs uniformly over a period of approximately two months. A sixty day snow melt period is assumed based on historic observations. There are approximately 21 acres of trails that could have manmade snow within the subcatchment. The average rate of runoff from 21 million gallons (21 acres x 1mg/acre) of water over a sixty day period yields 0.5 CFS.

The sixty day average manmade snow melt rate of 0.5 CFS is less than 1% of the 52 CFS for the one year rain event. The two existing downsteam culverts (1.5A, & 1.5B) which pass under CR49A, or the downstream drainage channels would not be negatively impacted due to the 0.5 cfs increase in base flow over the 60 day period of snowmelt. In addition, during construction of the ski trails, water bars would be included which would act to slow snowmelt/ stormwater runoff from the ski trails.

4.3.3 Stream Crossings

General

Three proposed stream crossings for skiers are included in the proposed UMP plans. An improved pedestrian walkway is proposed to connect the Upper Discovery Bus Lot to the Discovery Lodge.

Utility lines would cross streams as depicted on Figure 4.3-3 Appendix AA, Wetlands and Waterbodies Report. An improved stream crossing for an existing culvert pipe located on the maintenance garage access is also proposed. This is an in-kind replacement and maintenance activity.

The stream crossings for skiers and pedestrians are described below and depicted on Figure4.3-1 in Appendix AA, Wetlands and Waterbodies Report:

1. Bridge on the Deer Run Extension Trail, crossing an unnamed stream. The unnamed stream conveys flow under the Overlook Road toward the culvert crossing under CR49a, Gelli Curci Rd., and from there to Emory Brook.

2. Bridge on the WEST-6 Connector Trail from the Tomahawk Base Area to the Belleayre West Lift Base Terminal area, crossing a second unnamed stream. This unnamed stream would also convey flow under the Overlook Road toward the culvert crossing under CR49a, Gelli Curci Rd., and from there to Emory Brook.

3. An at-grade crossing on the HMT-9A Connector Trail would span the upper reach of another unnamed tributary of Emory Brook, which is mapped as a Class B stream, (Section 4.3.1 above). This mapped stream will be crossed by a ski trail and utility lines (see Figure 4.3-1 and Figure 4,3-3, Appendix AA, Wetlands and Waterbodies Report). During the wetland delineation conducted in 2008, this stream channel was not observed. Subsequent review of the stream mapping, which is based on topographic surveys on a large scale, depicted the headwaters of this stream extending up to the proposed utility line. Prior to any construction, the Department will conduct another wetland survey during the growing season to confirm if the headwaters extend to the utility crossing. If there would be a potential for these utilities to cross the stream, adjustments may be made to the utility line route to avoid the stream. If adjustments to the utility line alignments are not feasible, a permit application will be developed in accordance with Protection of Waters (6NYCRR Part 608.8) Standards prior to any construction.

Potential Impacts & Mitigation

The proposed stream crossings will use bridges to completely span the stream bed and channel avoiding any narrowing of the streambed itself. Construction will require work in and adjacent to the streambed creating the potential for releasing sediment into the stream. Crossings for utilities involve hand clearing of brush, installation of pipes or buried cable, and restoration of existing conditions with no permanent impacts. Work would be conducted using BMPs Dry season scheduling of the work will help to minimize the potential impact.

The Stormwater Pollution Prevention Plan, Appendix E, includes erosion and sediment control measures for use during construction to mitigate potential impacts.

4.3.4 Stormwater Discharge from Developed Areas

Potential Impacts & Mitigation

The potential impacts from stormwater discharge include water quantity, quality and thermal impacts. Mitigation of these potential impacts is discussed below. A comprehensive Stormwater Pollution Prevention Plan (SWPPP) was prepared for this project to mitigate potential impacts, see Appendix E.

Stormwater Discharge Peak Flow Attenuation

Stormwater management systems were designed for Intensive Development Areas (IDA's) so that there is no increase in the peak flow at the design discharge points when comparing pre to post development conditions for design storm events.

Storage based peak attenuation methods are generally proposed and the Upper Discovery Parking Area and Discovery Lodge will use infiltration to also reduce the overall volume of flows.

Stormwater Management for Water Quality treatment and Runoff Reduction

The runoff from proposed parking lot and other impervious areas created will be treated using stormwater quality treatment systems before entering the streams.

Design of the site facilities commenced with 2008 stormwater regulations in effect at the time when the UMP-DEIS Final Scope was developed. All of the site IDA's were initially designed to meet the 2008 regulations. In 2010, NYSDEC updated their design manual to include additional design requirements such as to include runoff reduction and green infrastructure requirements. NYCDEP updated their stormwater regulations in 2010 as well with additional requirements such as requiring treatment of up to the 1-year storm event for water quality in lieu of the former 90% storm, and to include a requirement for two water quality treatment practices in series when the impervious cover in a practices particular subcatchment area is greater than 20 percent.

A meeting was held with NYSDEC regulators late in 2010 to decide on how to proceed with updating the SWPPP to comply with the updated standards. Attending were representatives from DEC Central Office and Region 3. A consensus was reached that included the following:

- Areas to be constructed in the near future; the Upper Discovery Parking Area and and Discovery Lodge Reconstruction, would have their stormwater system designs updated to incorporate the 2010 standards.
- Other Intense Development Areas (IDA's) would have their stormwater management system designs remain complying with the 2008 standards

for purposes of the UMP-DEIS, and will be updated to meet the current standards at the time of construction.

The stormwater management systems for the Upper Discovery Parking Area and the Discovery Lodge Site were updated to meet the NYSSMDM 2010 and the NYCDEP 2010 updates.

The Stormwater management system for the UD Parking Area uses Porous Asphalt Pavement, Dry Swales and a Surface Sand Filter for stormwater quality treatment.

Thermal Impacts of Parking Areas

The following design features will help to potential mitigate thermal impacts

- Narrow linear (elongated) parking terraces will allow shading from forested areas retained and planted between the terraces.

- No stormwater ponds or stormwater wetlands, both of which can have permanent pools, are proposed for stormwater quality treatment.

- Stormwater management systems were chosen that promote underground treatment and infiltration of stormwater runoff. DSWs, SSFs, BRFs, allow water to move underground from the surface

- Twelve-hour extended detention times, associated with trout waters, were also used for ED of the CPv, in order to reduce any potential thermal impacts to the stream at the discharge points.

- Upper Discovery Area PA pavement will promote rapid infiltration of runoff from the parking surfaces to deep underground storage areas, reducing any thermal impacts. The North and East parking area terraces use light colored stone surfaces, which have less thermal impact than conventional asphalt pavement.

4.4 Groundwater Resources

Existing Conditions

A map of ground water wells located in the project vicinity was obtained from the NYSDEC Water Well Database which shows the location of nearby groundwater wells (See Figure 4.2-7 in Section 4.2 herein). There are 5 existing potable water wells located on the Belleayre property. Their location is shown on UMP Drawing EX7. All available well logs and pump test results for these wells are located in Potable Water Engineers Report (Appendix D). All of the wells are located on the lower area of the mountain on the Belleayre Property and are drilled into sandstone or shale and have significant yields ranging from 10 to 60 gpm, with the exception of the well located on the summit which has a low (<1gpm) untested yield.

Potential Impacts and Mitigation

Diversion of Surface Water

Only surface water is used for snowmaking, no water is drawn from the aquifer for snowmaking. The elevation of the Diversion Structure in Birch Creek is 1424.5 and the surface elevation of Pine Hill Lake is 1424.0. There is a public water supply system for Pine Hill that is below the Cathedral Glen reservoir but well above the Birch Creek Diversion Structure. This water supply utilizes a naturally flowing spring that is available at elevation 1680 and is supplemented by two drilled wells. The Water Control Structure in Birch Creek is 255 feet lower in elevation than the Pine Hill Water Supply, so any water removed from Birch Creek for snowmaking should have no affect on the Pine Hill Public Water System. The Cathedral Glen Reservoir has been in operation for approximately 30 years, with no documented affect on the quantity of water for Pine Hill. Discussions with the Water District Superintendent indicate the only reduction in flow availability they experience is during extended summer droughts. The Superintendent indicated the current water supply provides 2-4 times more water than is required, depending on the time of year. He indicated that there are 3 or 4 private wells still in use in Pine Hill, but all could be served by the Water District if necessary.

The Belleayre Mountain Ski Center potable water supply and distribution systems were upgraded in 2004. The Water Supply System consists of three drilled wells located on the lower mountain at approximate elevation of 1900. The wells are located up-gradient in the watershed from the Pine Hill Diversion Structure in Birch Creek approximately 475 feet in elevation higher, and several thousand feet away horizontally. Therefore withdrawal of snowmaking water from Birch Creek should have no affect on Belleayre's Potable Water Supply.

Potential Impacts and Mitigation from blasting is addressed in Section 4.2.

Potable Water Supply Modifications

The state currently owns and operates its own Public Water Supply at BMSC. The system was substantially modified in 2004. A copy of the Engineer's Report and existing well logs for that work is included in this UMP as Appendix D.

As part of this UMP it is proposed to discontinue use of and properly close existing Well #3 due to turbidity issues, and to operate the system entirely on Well's #1, #2, and #4. Also proposed is to abandon the existing Summit Well (Sunset Lodge), and install a booster pump at the upper 50,000 gallon reservoir to pump potable water to the Summit (Sunset Lodge).

The proposed expansion of facilities will result in an increased maximum daily water demand of approximately 60,000 gpd. This figure is obtained from the "Wastewater Engineers Report" which is included in this UMP as Appendix C.

Existing Well Yields from pump tests are:

Well #1 – 18gpm
Well #2 – 60 gpm
Well #4 - 24 gpm

Assuming pumping at 67% of well yield capacity, the maximum daily capacity of the existing well sources is 0.67 x (18 + 60 + 24) x 1440 = 146,880 gpd. This indicates that the existing supply capacity is well in excess of the projected maximum daily demand of 60,000 gpd.

Assuming that the main well (60 gpm) is offline, the remaining 24 hour well capacity would be (18 gpm + 24 gpm) x 1440 minutes = 60,480 which is enough supply for the projected maximum daily demand.

Therefore, it is determined that there will be no significant impact on the groundwater resources from the increased potable water demand from the expanded facility. The projected maximum daily demand of 60,000 gpd was determined in the Wastewater Engineers Report, see Appendix C.

It will also be necessary to reroute the existing transmission lines from existing Wells #1 and #2 to the existing Chlorine Building, due to construction of the proposed Snowmaking/Stormwater Pond.

Proposed layout and details of proposed potable water system modifications are shown on UMP Drawings UT-2 through UT-6.

4.5 Terrestrial and Aquatic Ecology

4.5.1 Existing Conditions

Section 4.5 of the BMSC UMP DEIS describes the existing terrestrial and aquatic ecology of the BMSC natural resources study area. Temporary impacts and mitigation methods are also described in this section. The natural resources study area (803 acres) comprises a portion of the Belleayre Mountain Ski Center property, and a portion of the land proposed for acquisition (site of the former Highmount Ski Area). The study area is shown on UMP Drawing G7. The term Belleayre Mountain Ski Center (BMSC) and natural resources study area are used interchangeably throughout this section.

The BMSC is located on 2,178 acres of state forest preserve lands. The Belleayre property contains 52 ski slopes, 5 aerial lifts, 3 surface lifts, 6.4 kilometers of cross-country ski trails, 23.7 miles of hiking trails, and undeveloped forest area. Belleayre Mountain has a summit elevation of 3,429 feet above mean sea level (amsl), a base elevation of 2,541 feet amsl, and a lower base elevation of 2,025 feet amsl. In addition to downhill skiing, land within the project area is used for cross-country skiing and hiking. Forestland and abandoned ski trails in various stages of ecological succession are also within the natural resources study area. Out of a total of 1,884.6 forested acres of the natural resources study area, 100.8 acres (96.1 on the Belleayre property and 4.7 in the Highmount property) of the natural resources study area will be developed as part of the Belleayre expansion (see Section 3 above, Proposed Management Actions and Projected Uses). Figure 4.5-1 indicates the proposed project facilities.

The terrestrial and aquatic ecology of the natural resources study area includes 1) various types of wetlands and the vegetation associated with these wetlands and 2) upland vegetative communities and common wildlife species associated with vegetative communities.

The natural resources study area and its surroundings are dominated by secondary northern hardwood forest. Other cover types include red maple hardwood swamp, hemlock northern hardwood forest, and brushy cleared land. There are also several small red maple hardwood swamps, shallow emergent marshes, and alluvial land, which surrounds Pine Hill Lake, located east of the BMSC.

Wildlife associated with the plant communities includes common neotropical migrant and resident bird species and a diverse array of common mammal, bat, reptile, and amphibian species.

Thirteen wetlands (i.e., areas with hydrophytic vegetation, hydric soils, and wetland hydrology) were delineated within the natural resources study area during field investigations conducted by E & E. Four additional wetlands were delineated by the LA Group during field surveys performed in September 1999 with the area

at the base of the Highmount Ski Resort and are included in this assessment. Data were recorded on USACE wetland delineation datasheets (see Appendix AA, Wetland and Waterbodies Report and Appendix 14 of the Modified Belleayre Resort at Catskills Park SDEIS). Of the 17 delineated wetlands, 2 are non-jurisdictional and 15 are jurisdictional. Wetlands that are contiguous with a protected stream fall under the jurisdiction of New York State Department of Environmental Conservation (NYSDEC). There are no NYSDEC state-regulated wetlands and six National Wetlands Inventory (NWI) federally regulated wetlands in the natural resources study area.

4.5.1.1 Preliminary Desktop Data Review

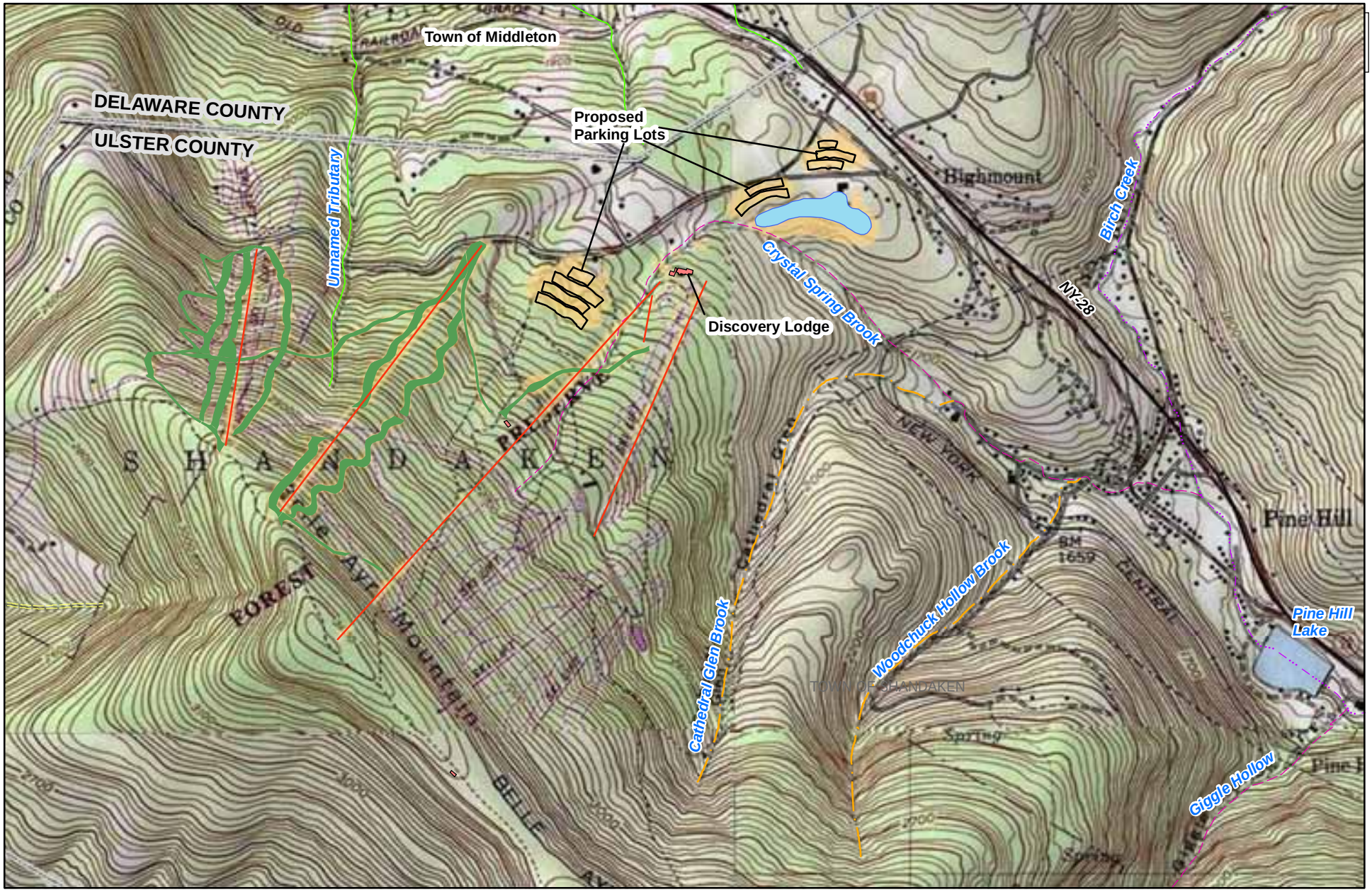
A desktop review of topographic maps, soils information, and NYSDEC Freshwater Wetlands Program and NWI maps was conducted in order to determine the type, extent, and quality of wetlands and vegetative cover types in the natural resources study area. The desktop review determined that field verification would be needed in order to determine the presence and extent of wetlands and threatened and endangered species in the natural resources study area. Results of the desktop review were used to guide field reconnaissance-level wetland, stream, threatened and endangered species, birds, amphibian and plant surveys of the entire natural resources study area during the spring and summer of 2008. These surveys verified the wetland locations, habitat types, and the absence of threatened and endangered species throughout the natural resources study area. Each phase of the desktop and reconnaissance-level study was used to refine siting for the project facilities to minimize impacts on wetlands and streams while balancing impacts on other resources.

The desktop review indicated the possible presence of a few wetlands in the natural resources study area. The NWI maps depict one wetland—a freshwater pond—occurring within the natural resources study area. A second NWI-mapped freshwater pond located in the southern part of the natural resources study area is just outside of the project boundaries. Review of existing data indicated that there are no mapped NYSDEC wetlands within the natural resources study area.

Using the results of the desktop review, field reconnaissance-level surveys were conducted to develop general siting constraints. Detailed delineations of wetlands and streams were conducted throughout the survey corridor based on preliminary siting of facilities. The general locations of wetlands were identified, and wetland and stream buffer areas were identified in order to delineate the survey corridor where construction activities would take place.

The delineations were conducted around the proposed locations of the project facilities to identify in-field wetland and stream boundaries. The objective of the these delineations was to identify and document wetlands that could be temporarily or permanently disturbed as a result of construction and operation of

the proposed facilities (see also Section 4.3, Surface Waters and Aquatic Habitat, and Appendix AA, Wetland and Waterbodies Report). The delineated wetland and stream boundaries were added to facility mapping and used to further refine the location of the proposed project facilities to avoid and minimize impacts to the extent practicable. Figure 4.5-2 shows the NWI wetlands and NYSDEC streams located within the natural resources study area. The field investigations resulted in the delineation of 11 wetlands within the natural resources study area. Four additional wetlands near the Highmount Ski Lift ere evaluated during the SDEIS for the adjacent Crossroads Resort at Catskill Park and reported here as part of the UMP action (Figure 4-3.1, Table 5-1, Appendix AA, Wetland and Waterbodies Report).



Belleayre Mountain Ski Center
Catskill State Park

Project Area, USGS Topographic Imagery

Proposed Ski Lift Centerline (July, 2009)
Proposed Tree Cutting Area
Proposed Trail Clearing (July, 2009)
Parking Lot
Proposed Snow Making Pond (July 2009)

NYSDEC Stream Class
B
B(T)
B(TS)
C
C(T)

Figure 4.5-1: Ski Center Project Facilities

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Date: December 16, 2010

0 2,000 Feet

Belleayre Mountain Ski Center
Catskill State Park

Project Area, NYSDEC Streams and USFWS NWI Wetlands

Study Boundary (October, 2009)
NYSDEC Stream
USFWS NWI Wetland

Figure 4.5-2: Belleayre Mountain Ski Center NWI and NYSDEC-Mapped Wetlands and Streams

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Date: December 16, 2010

The desktop study, field methodology and wetland delineation results, and federal and state regulations, are summarized below. Wetlands are classified according to vegetative composition and hydrologic activity.

Information sources used included aerial photographs of the natural resources study area, U.S. Geological Survey (USGS) 7.5-minute series topographic maps, United States Fish and Wildlife Service (USFWS) NWI and NYSDEC Freshwater Wetlands map (see Figures 4.5-2 and 4.5-3 and Figures 3-1 and 4-1 in Appendix AA, Wetland and Waterbodies Report).

As noted above, NWI and NYSDEC maps were initially reviewed to identify potential wetland locations. The NWI maps showed a few small wetlands below the 12.4-acre minimum size of a NYSDEC-regulated wetland within the natural resources study area,. The NYSDEC Freshwater Wetlands Maps, developed by NYSDEC from a variety of resources—including aerial photographs, soil surveys, and some field verification—showed no NYSDEC-regulated wetlands in the natural resources study area.

Four soil types are found in the natural resources study area (Figure 4.5-3). The Arnot series is found within the higher elevations, i.e., on the ski slopes. The Lackawanna and Wellsboro series are found within the lower elevation areas and are associated with wetlands within the natural resources study area (see Table 4.5-1). Alluvial land also is associated with wetlands and is located around Pine Hill Lake, which is in the natural resources study area, i.e., the area of potential impacts.

Table 4.5-1 Natural Resources Study Area Soil Units

Name/Type	Description	Slope	Permeability	Taxonomic Class
Wellsboro	Very deep, moderately well, and somewhat poorly drained soils.	0 to 50%	Moderate at the surface and upper subsoil layers; slow or very slower in lower subsoil and substratum.	Coarse-loamy, mixed, active, mesic Typic Fragiudepts.
Lackawanna	Very deep, well-drained soils on uplands. Formed in till derived form reddish colored sandstone, siltstone, and shale.	0 to 55%	Relatively slow permeability; a dense fragipan is present starting at a depth of 17 to 36 inches below the soil surface.	Coarse-loamy, mixed, active, mesic Typic Fragiudepts.
Arnot	Shallow, somewhat excessively to moderately well-drained soils formed in loamy till.	0 to 70%	The potential for surface runoff is medium to very high. Saturated hydraulic conductivity in the mineral soil is moderately high or high.	Loamy-skeletal, mixed, active, mesic Lithic Dystrudepts
Alluvial	Very deep; poorly drained.	0 to 3%.	Highly permeable	Fluvaquents

4.5.1.2 Field Delineations and Results

Activities within wetlands with an apparent hydrologic or functional connection to other waters of the U.S. are regulated by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (CWA). There is no minimum size for wetlands that would require regulation under federal jurisdiction. There are no regulatory maps identifying federal jurisdictional wetlands; however, NWI maps are often used to assist biologists in planning field reviews.

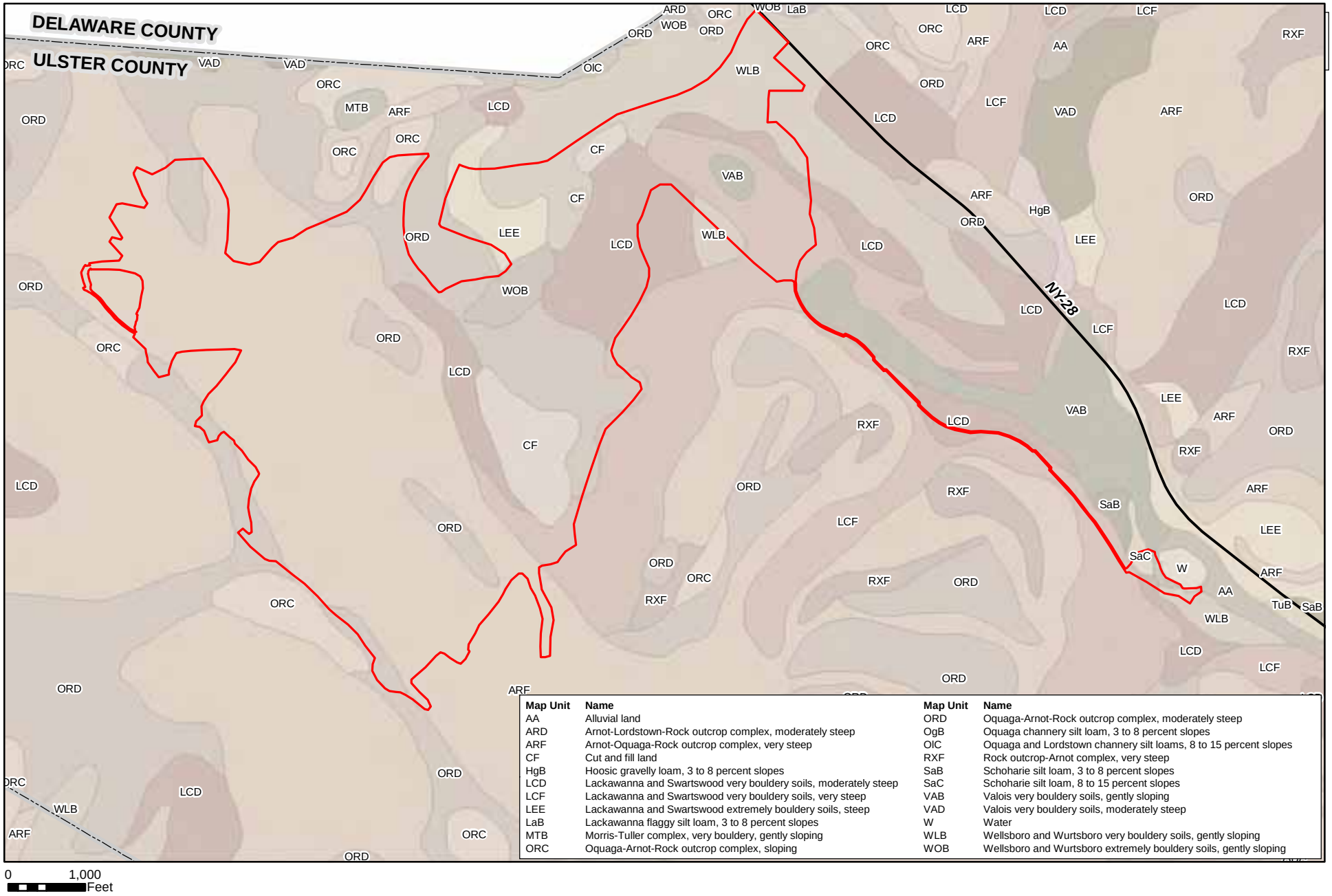
Under Article 24 of the New York State Environmental Conservation Law (ECL), New York State regulates wetlands that exceed 12.4 acres in size or have locally significant ecological value. New York State also regulates the 100-foot adjacent upland buffer area surrounding each regulated wetland to protect the wetland. Work within state-regulated wetlands and the regulated adjacent area, including removal of vegetation, requires a permit from NYSDEC. Generally, wetlands regulated by NYSDEC have to be 12.4 acres or larger or be formally mapped and designated as "wetlands of unusual local importance." No wetlands of unusual local importance in the natural resources study area have been identified by NYSDEC. (Some small, isolated wetlands do not fall under jurisdiction of either agency.)

Field surveys were conducted during summer 2008 by E & E within the natural resources study area and in the fall 1999 by LA Group for the Highmount Ski area and private property west and north of the Project Site. Field investigations within the natural resources study area consisted of an extensive series of both wetland and upland soil pits; results were consistent with soils mapping provided by the NRCS map (U.S. Department of Agriculture, Natural Resources Conservation Service). All wetlands and waterbodies, including perennial and seasonal relatively permanent waters, non-relatively permanent waters, and seeps within a wide survey corridor around the project facilities were characterized in accordance with the USACE Wetland Delineation Manual (Environmental Laboratory 1987) and the NYSDEC Freshwater Wetlands Delineation Manual (1995).

If a survey point met the criteria for a wetland within the survey corridor, the boundary of the wetland was clearly marked in the field and surveyed using a submeter-accuracy global positioning system (GPS) unit. In addition to mapping the wetland boundaries, the functions and values of each wetland were assessed. This functional assessment has been used to determine overall project impacts and to establish goals for a wetland compensation plan to offset the impacts. (Results of the functional assessment may be found in Section 7 of Appendix AA, Wetland and Waterbodies Report).

Eleven wetlands (i.e., areas with hydrophytic vegetation, hydric soils, and wetland hydrology) were delineated within the natural resources study area by E&E

and four additional wetlands were identified by the LA Group within the Highmount Ski Resort area. The habitat types and likely federal- and state-protection status of existing wetlands are described below. Additional descriptions are included for state-regulated wetlands because of their dual regulation and their recognized ecological value.



Map Unit	Name	Map Unit	Name
AA	Alluvial land	ORD	Oquaga-Arnot-Rock outcrop complex, moderately steep
ARD	Arnot-Lordstown-Rock outcrop complex, moderately steep	OgB	Oquaga channery silt loam, 3 to 8 percent slopes
ARF	Arnot-Oquaga-Rock outcrop complex, very steep	OlC	Oquaga and Lordstown channery silt loams, 8 to 15 percent slopes
CF	Cut and fill land	RXF	Rock outcrop-Arnot complex, very steep
HgB	Hoosic gravelly loam, 3 to 8 percent slopes	SaB	Schoharie silt loam, 3 to 8 percent slopes
LCD	Lackawanna and Swartswood very bouldery soils, moderately steep	SaC	Schoharie silt loam, 8 to 15 percent slopes
LCF	Lackawanna and Swartswood very bouldery soils, very steep	VAB	Valois very bouldery soils, gently sloping
LEE	Lackawanna and Swartswood extremely bouldery soils, steep	VAD	Valois very bouldery soils, moderately steep
LaB	Lackawanna flaggy silt loam, 3 to 8 percent slopes	W	Water
MTB	Morris-Tuller complex, very bouldery, gently sloping	WLB	Wellsboro and Wurtsboro very bouldery soils, gently sloping
ORC	Oquaga-Arnot-Rock outcrop complex, sloping	WOB	Wellsboro and Wurtsboro extremely bouldery soils, gently sloping

0 1,000 Feet

Belleayre Mountain Ski Center
Catskill State Park

Project Area, USDA SSURGO Soils

Study Boundary (October, 2009)

Sheet No. 1

Figure 4.5-3: Belleayre Mountain Ski Center Ulster County Soil Map

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Date: December 16, 2010

One of the 15 wetlands does not have any hydrological surface connection to any other jurisdictional waters of the United States and are isolated pursuant to Solid Waste Agency of Northern Cook County *V.* United States Army Corps of Engineers (SWANCC).

Wetlands were typically found in conjunction with side-slope seeps and in topographic depressions that collect and hold water from precipitation and snow melt on the ski slopes. All wetlands on the site had both groundwater and surface water components. The wetlands identified as a result of field delineations were composed of common wetland communities of northeastern New York. Many also exhibited evidence of direct and indirect disturbance as a result of past and present land use. All of the wetlands delineated other than Wetland W9 and W12 were less than 1 acre. Wetlands 9 and 12 extend off-site and only the portions of these wetlands located within the survey corridor were delineated. Wetlands 9 and 12 are not NYSDEC-regulated wetlands because they are smaller than 12.4 acres. Final determinations of jurisdiction will be made by the regulatory agencies' during their field review. More detailed wetland descriptions are provided in the Wetland Delineation Report (Appendix AA, Wetland and Waterbodies Report).

Wetland Classification

For purposes of discussion, each wetland was categorized according to the Cowardin et al. (1979) classification system (see Table 4.5-2). The Cowardin system used to determine community type broadly defines wetland types by hydrology and vegetative stem cover. Each system is referred to as a class. The wetland classes identified within the BMSC natural resources study area under this classification system include palustrine emergent wetlands (PEM) and palustrine forested wetland (PFO).

Table 4.5-2 Belleayre Mountain Ski Center Delineated Wetland Summary

Wetland Community Type (Cowardin et al. 1979)	No. of Wetlands Delineated	No. of Wetlands Likely under Federal Jurisdiction	No. of Wetlands with No Apparent Connection to Waters of the U.S.	No. of Wetlands Likely under NYSDEC Jurisdiction
PEM	10	9	0	0
PFO1	6	5	1	0
Total Wetlands Delineated	**15**	**14**	**1**	**0**
Total Acreage of Wetlands Delineated	**3.606**	**3. 598**	**0.008**	**0**

Note: Wetland classifications from Cowardin et al. 1979

Key:
PEM = Palustrine emergent wetland.
PFO1 = Forested hardwood wetland.

PEM Wetlands. The vegetative species composition of PEM-classified wetlands is highly variable. Commonly observed species within these delineated wetlands included mannagrass (*Glyceria spp.*), fowl mannagrass (*Glyceria striata*), rough-stemmed goldenrod (*Solidago rugosa*), flat-top goldenrod (*Euthamia graminifolia*), green bulrush (*Scirpus atrovirens),* bottlebrush sedge (*Carex hystericina*), canada goldenrod (*Solidago canadensis*), reed canary grass (*Phalaris arundinacea*), fringed sedge (*Carex crinita*), spotted touch-me-not (*Impatiens capensis*), sensitive fern (*Onoclea sensibilis*), glossy-leaved aster (*Aster puniceus*), and arrowleaf tearthumb (*Polygonum sagittatum*). The emergent wetland systems have been disturbed by various activities related to the Belleayre Mountain Ski Center such as mowing, recreation, ditching, draining, filling, and clearing.

PFO1 Wetlands. These wetlands are dominated by hardwood tree species. Commonly observed understory species within the delineated PFO-classified wetlands include fringed sedge (*Carex crinita*), hairy sedge (*Carex lacustris*), melic mannagrass (*Glyceria melicaria*),spotted touch-me-not (*Impatiens capensis*), spinulose woodfern (*Dryopteris carthusiana*), white snakeroot (*Ageratina altissima*), and purpleleaf willowherb (*Epilobium coloratum*). Dominant trees are yellow birch (*Betula alleghaniensis*), green ash (*Fraxinus pennsylvanica*), and red maple (*Acer rubrum*).

4.5.1.3 Wetland Vegetative Communities in the Natural Resources Study Area

In addition to the field delineation, wetland vegetation was classified using the New York State ecological community classifications (Edinger et al. 2002). A variety of region-specific plant communities can be found within each class of wetlands. Identifying these specific wetland plant communities is important in determining the role of a wetland system in the ecology of the surrounding landscape. These plant communities provide different functions and values in the surrounding landscape and are described below (see Appendix AB, Plant Inventory Report, for a more detailed description of the plant communities found within the natural resources study area).

As noted above, palustrine emergent wetlands (PEM) and palustrine forested wetlands (PFO) are two classes of wetland found in the natural resources study area. Two wetland vegetative community types—shallow emergent marsh and red maple hardwood swamp—are associated with the PEM and PFO wetlands, respectively.

Shallow Emergent Marsh

A majority of the PEM wetlands delineated are shallow emergent marsh communities. This includes most of the wetlands located around the base of the ski slopes in disturbed areas that have been maintained for recreational purposes.

Wetlands were found at the base of ski slopes, bowl-shaped depressional areas in rolling topography, and on steep-sided slopes.

The characteristics of this type of wetland can vary widely. A shallow emergent marsh can have fluctuations in water depths from 12 inches or more below the soil surface during summer months to 0.5 feet to 3.3 feet of inundation during flood stages. These herbaceous wetland systems found within the natural resources study area are typically seasonally flooded to permanently saturated and have water depths that may range from 6 to 12 inches below the soil surface to as much as 3.3 feet of water during flood stages. They mainly occur on mineral soil with some containing muck or peat overlying mineral soils (Edinger et al. 2002).

Red Maple Hardwood Swamp

Red maple hardwood swamps, which are common wetland communities in New York State, are often found in PFO wetlands. They occur in poorly drained topographic depressions in mineral soils. This wetland cover type was generally found at the base of ski and hillside slopes within the natural resources study area. The canopy is usually dominated by red maple or can be mixed with other hardwoods such as American elm (*Alnus Americana*), trembling aspen (*Populus tremula*), and green ash (*Fraxinus pennsylvanica*). The shrub layer, which can be dense at times, includes winterberry (*Ilex verticillata*), arrowwood (*Viburnum recognitum*), dogwoods (*Cornus spp.*), willows (*Salix spp.*), spice bush (*Lindera benzoin*), and canopy tree saplings. There was no shrub layer in this community. The groundcover in some instances is highly productive and consists of ferns, sedges, mosses, bugleweed, and spotted touch-me-not (Edinger et al. 2002).

4.5.1.4 Upland Vegetative Communities

After the desktop study, it was determined that field verification would be required to determine the locations of the various ecological communities within the natural resources study area. Field surveys were conducted in the spring of 2008.

Field surveys verified that the natural resources study area is a patchwork of vegetative cover types. Nine ecological communities were identified during field visits and subsequent aerial photograph review (see Figure 4.5-4 and Section 3.2 in Appendix AA, Wetland and Waterbodies Report). The dominant woodland community is successional northern hardwood forest whereas the hemlock northern hardwood forest was only found around the base of the Belleayre property, along route 28. Historically the land was cleared for agriculture but was subsequently abandoned because of its excessive stoniness or slope. These previously cultivated areas were most likely timbered during the 19th century timber boom across New York State. Timbering activities have continued to occur throughout the area. As a result, forested areas are in varies stages of maturity, stem density, canopy cover and structure. The most commonly

observed tree species within the natural resources study area are a mixture of deciduous and evergreen species that include striped maple (*Acer pensylvanicum*), sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), eastern hemlock (*Tsuga canadensis*) and red spruce (*Picea rubens*). Additional species observed in the woodlots included quaking aspen (*Populus tremuloides*), paper birch (*Betula papyrifera*), gray birch (*B. populifolia*), yellow birch (*Betula alleghaniensis*), and black cherry (*Prunus serotina*). Commonly observed species in the understory include partridgeberry (*Mitchella repens*), New York fern (*Thelypteris noveboracensis*), spinulose wood fern (*Drypoteris carthusiana*), brambles (*Rubus ideaus, R. allegheniensis, R. occidentalis*), and rough stem goldenrod (*Solidago rugosa*).

4.5.1.5 Wildlife Species Associated with Vegetative Communities

The natural resources study area is composed almost entirely of upland wildlife habitat. Wildlife species are few in number throughout the natural resources study area because habitats are fragmented, recreational use is moderate, and the Belleayre Mountain slopes are steep. For example, the exposed, steep north-northeast slope aspects preclude the area from serving as a deer wintering area and no deer wintering areas are known to be on Belleayre Mountain Ski Center property.

Figure 4.5-4 indicates the nine ecological communities found within the Belleayre Mountain Ski Center. These communities are largely determined by the vegetative composition of the natural resources study area. Sections 4.5.1.2 and 4.5.1.3 discuss three of the nine upland ecological communities and wetlands in the natural resources study area (see Appendix AA, Wetland and Waterbodies Report, for further discussion of wetlands). Wildlife species that inhabit the delineated upland ecological communities and wetlands are discussed in the following sections. Some species may have habitat requirements that extend into other community types or may have a respective habitat niche that comprises a small portion of the community. Bird and bat species are discussed separately.

Table 4.5-3 lists the fauna common to each of the vegetative communities.

Table 4.5-3 Mammalian, Amphibian and Fish Species Associated with Vegetative Communities

Common Name	Scientific Name
Successional Northern Hardwood Forest	
Eastern chipmunk	*Tamias striatus*
White-tailed deer	*Odocoileus virginianus*
Eastern cottontail	*Syvilagus floridanus*
Gray fox	*Urocyon cinereoargenteus*
Gray squirrel	*Sciurus carolinensis*
Virginia opossum	*Didelphis virginiana*
Porcupine	*Erethizon dorsatum*

Table 4.5-3 Mammalian, Amphibian and Fish Species Associated with Vegetative Communities

Common Name	Scientific Name
Red bat	*Lasiurus borealis*
Red squirrel	*Tamiasciurus hudsonicus*
Deer mouse	*Peromyscus maniculatus*
White-footed mouse	Peromyscus *leucopus*
Coyote	*Canis latrans*
Striped skunk	*Mephitis mephitis*
Northern redback salamander	*Plethodon cinereus*
Northern slimy salamander	*Plethodon glutinosis*
Northern spring salamander	*Gyrinophilus porphyriticus porphyriticus*
Hemlock-Northern Hardwood Forest	
Bat species	
Gray fox	*Urocyon cinereoargenteus*
Gray squirrel	*Sciurus carolinensis*
Virginia opossum	*Didelphis virginiana*
Porcupine	*Erethizon dorsatum*
Eastern chipmunk	*Tamias striatus*
Red squirrel	*Tamiasciurus hudsonicus*
Raccoon	*Procyon lotor*
White-tailed deer	*Odocoileus virginianus*
Fisher	*Martes pennanti*
Northern flying squirrel	*Glauchomys sabrinus*
Coyote	*Canis latrans*
American toad	*Bufo americanus*
Red-spotted newt	*Notopthalmus viridescens*
Woodland salamander species	*Plethodon spp.*
Wetland Vegetative Communities	
Beaver	*Castor canadensis*
Muskrat	*Ondatra zibethicas*
River otter	*Lutra canadensis*
Star-nosed mole	*Condylura ristata*
Water shrew	*Sorex palustris*
Northern water snake	*Nerodia sipedon*
Various salamander, frog, toad, and turtle species	
Aquatic Habitats	
River otter	*Lutra canadensis*
Mink	*Mustela vison*
Mudpuppy	*Necturus maculosus*
Painted turtle	*Chrysemys picta*
Red-spotted newt	*Notophthalmus viridescens*
Blacknose dace	*Rhinichthys atratulus*
Creek chub	*Semotilus atromaculatus*
Darters	*Etheostoma* spp.

Table 4.5-3 Mammalian, Amphibian and Fish Species Associated with Vegetative Communities

Common Name	Scientific Name
Fathead minnow	*Pimephales promelas*
Brook trout	*Salvelinus fontinalis*
Brown trout	*Salmo trutta*
Rainbow trout	*Oncorhynchus mykiss*
Various frog and toad species	

Source: New York State Department of Environmental Conservation 2006; DeGraaf and Yamasaki 2001

4.5.1.6 Threatened and Endangered Plant Species and Communities

The USFWS and NYSDEC's Natural Heritage Program (NHP) were consulted to determine the potential occurrence of federally and state-listed endangered and threatened species and significant natural communities and habitats within the natural resources study area. Federally listed threatened and endangered plant and animal species are protected by the Endangered Species Act (ESA) of 1973, which is administered by the USFWS. State-listed threatened and endangered plant and animal species are protected by the ECL, Articles 9 and 11, administered by NYSDEC.

The USFWS and New York's NHP provided data detailing the known occurrences of threatened and endangered species, species of concern, and rare communities within the natural resources study area. Existing databases track species that are protected by law as well as unprotected species that are identified as species of concern. The existing databases also track significant community assemblages. Although not specifically protected by law, these areas are recognized for their rare/unique features as well as their greater likelihood of providing habitat for protected species.

According to the USFWS database, there are two federally listed threatened plant species in Ulster County— the northern wild monkshood (*Aconitum noveboracense*) and the small whorled pogonia (*Isotria medeoloides*) (Appendix AA, Section 3.3, Wetland and Waterbodies Report). Correspondence with the NHP indicated that no state-listed or proposed endangered or threatened plant species or plant communities are known to occur in the natural resources study area (Appendix AA, Section 3.3, Wetland and Waterbodies Report).

During field investigations, no federally or state-listed endangered or threatened plant species or plant communities, species of concern, or critical habitat were identified.

4.5.1.7 Threatened and Endangered Animal Species and Communities

According to the USFWS database, there are four federally listed or proposed endangered or threatened animal species known to occur in Ulster County (see Appendix AA, Agency Correspondence, Wetland and Waterbodies Report)—the bald eagle (*Haliaeetus leucocephalus*), bog turtle (*Clemmys [Glyptemys] muhlenbergii*), Indiana bat (*Myotis sodalis*), and shortnose sturgeon (*Acipenser brevirostrum*). During field surveys, a bald eagle was spotted, flying 12 miles outside of the natural resources study area at nearby lakes off Route 28. Bald eagles are often found near aquatic systems such as lakes, reservoirs, and major rivers and tend to nest in large trees near these waterways. No bald eagles were spotted in the natural resources study area, which is consistent with the USFWS response stating that there are no federally listed or proposed endangered or threatened animal species on the natural resources study area (see Appendix AA, Section 3.5, Wetland and Waterbodies Report).

Correspondence with the New York NHP indicates there are no known state-listed endangered or threatened animal species in the natural resources study area.

During field investigations no federally or state-listed endangered or threatened animal species, species of concern, or critical habitat were identified.

0 1,000 Feet

Belleayre Mountain Ski Center
Catskill State Park

Project Area, NYS Orthoimagery, 2004

Study Boundary (October, 2009)

Ecological Communities

- Brushy Cleared Land
- Developed
- Hemlock - Northern Hardwood Forest
- Maintained Ski Slope and Attendant Features
- Mowed Lawn
- Railroad
- Red Maple - Hardwood Swamp
- Shallow Emergent Marsh
- Successional Northern Hardwoods

Sheet No. 1

Figure 4.5-4: Belleayre Mountain Ski Center Ecological Communities

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Date: December 16, 2010

4.5.1.8 Birds

Migrating Birds

The primary bird migration seasons in the natural resources study area are spring and fall. In New York State and the northeast in general, migrating birds include the following:

- Raptors (e.g., hawks, falcons, eagles, and vultures), which migrate primarily between mid-March and mid-May and then between September and early November;
- Passerines (i.e., songbirds), which primarily migrate between mid-April through May and between late August through October;
- Waterbirds (e.g., waterfowl, herons, and shorebirds), which migrate primarily between mid-March and mid-May and then between September and mid-November.

Raptor migration areas in New York State are well documented and locations where large numbers (thousands to tens of thousands) of migrating raptors occur are already known. There are 13 sites in New York State that regularly report results to the Hawk Migration Association of North America (HMANA) database (hawkwatch.org). Most of these prime raptor locations are along the Great Lakes (in spring) and in the lower Hudson Valley (in fall). In spring, raptor migration is concentrated along the southern shores of the Great Lakes as raptors avoid crossing large bodies of water. Migratory raptors are also found in concentrated numbers along prominent ridgelines. There is one raptor monitoring location (hawk watch) in Ulster County (www.hawkcount.org). The closest hawk watch is the Mohonk Preserve in New Paltz, New York, approximately 34 miles southeast of the natural resources study area, where modest raptor numbers (fewer than 1,500) are tallied each fall. Because the natural resources study area is not near the shorelines of the Great Lakes, large bodies of water, or lengthy ridgelines, raptor migration is diffuse and without regularly occurring concentration points. There are no geographical and topographical features in the natural resources study area that attract or concentrate large numbers of migrating raptors.

Migrating Bird Surveys

Baseline migratory bird surveys were conducted in the natural resources study area for three days in May 2008. The effort included conducting a reconnaissance survey to document bird species and a search for threatened and endangered species and appropriate habitat.

Eighteen sampling points were selected prior to field activities based on the location of the proposed project facilities, a variety of habitats, and areas suited for avian occurrence (see Figure 4.5-5). The observer documented all birds (except the unprotected rock pigeons, European starlings, and house sparrows) identified by sight or sound in 10-minute modified point counts of 3-, 2-, and 5-minute intervals at the 18 selected survey points. The 10-minute period was broken up in 3-, 2-, and 5-minute intervals because birds may be startled by the arrival of the observer and need some time to resume normal activities. Therefore, the longest interval occurred at the end of the 10-minute period. Because avian activity is greatest in the morning, the survey was conducted during the morning hours. Surveys were conducted throughout the natural resources study area in forests, meadows, ski trails, reverted ski trails, roadsides, wetlands, and streams. Data from this survey were used to document the occurrence and distribution of bird species in the natural resources study area and help identify the presence/absence of listed species and areas of higher/lesser bird activity. Two raptors, the bald eagle and turkey vulture, were spotted outside of the survey area. None were spotted inside the natural resources study area.

Breeding Birds

Primary avian breeding occurs during the months of May, June, and July in the natural resources study area. Breeding activity in and/or near the natural resources study area has been documented by the New York State Breeding Bird Atlas projects and the North American Breeding Bird Survey.

Breeding Bird Surveys

Two breeding bird surveys of the natural resources study area were conducted on June 26 and 27, 2008 using USFWS breeding bird survey techniques. A total of 602 birds of 82 species were recorded during the survey and the findings were consistent with the existing knowledge of the bird resources in the region (New York State Department of Environmental Conservation 2005; Sauer 2008).

The observer recorded all birds identified by sight or sound in 10-minute modified point counts of 3-, 2-, and 5-minute intervals at each of the 18 survey points. Survey points were selected based on the location of proposed project facilities and a variety of habitats (see Figure 4.5-5). Any species observed during other site visits and surveys in the natural resources study area were also documented, as was breeding behavior. Data from these surveys were used to document the occurrence and distribution of breeding bird species in the natural resources study area and help identify the presence/absence of listed species and areas of higher/lesser bird activity.

During the bird surveys and other activities in the natural resources study area, 89 species were identified (Table 4.5-4).

Belleayre Mountain Ski Center
Catskill State Park

Project Area, NYS Orthoimagery, 2004

- Bird Survey Point
- Proposed Ski Lift Centerline (July, 2009)
- Proposed Tree Cutting Area
- Proposed Trail Clearing (July, 2009)
- Study Boundary (October, 2009)
- Proposed Snow Making Pond (July 2009)
- Parking Lot

Sheet No. 1

Figure 4.5-5 : Belleayre Mountain Ski Center Bird Survey Count Locations

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Date: December 16, 2010

Table 4.5-4 Bird Species Identified During Field Investigations

Common Name	Scientific Name	Common Name	Scientific Name	Common Name	Scientific Name
Acadian Flycatcher	*Empidonax virescens*	Dark-eyed Junco	*Junco hyemalis*	Red-eyed Vireo	*Vireo Vireo olivaceus*
Alder Flycatcher	*Empidonax alnorum*	Downy Woodpecker	*Picoides pubescens*	Red-headed Woodpecker **(SC)**	*Melanerpes erythrocephalus*
American Crow	*Corvus brachyrhynchos*	Eastern Bluebird	*Sialia sialis*	Red-tailed Hawk	*Buteo jamaicensus*
American Goldfinch	*Carduelis tristis*	Eastern Kingbird	*Tyrannidae tyrannus*	Red-winged Blackbird	*Agelaius phoeniceus*
American Redstart	*Setophaga ruticilla*	Eastern Phoebe	*Sayornis phoebe*	Rose-breasted Grosbeak	*Pheucticus ludovicianus*
American Robin	*Turdus migratorius*	Eastern Towhee	*Pipilo erythrophthalmus*	Ruby-crowned Kinglet	*Regulus calendula*
Bald Eagle **(T)**	*Haliaeetus leucocephalus*	Eastern Wood-Pewee	*Contopus virens*	Ruby-throated Hummingbird	*Archilochus colubris*
Baltimore Oriole	*Icterus galbula*	European Starling	*Sturnus vulgaris*	Ruffed Grouse	*Bonasa umbellus*
Barn Swallow	*Hirundo rustica*	Gray Catbird	*Dumetella carolinensis*	Savannah Sparrow	*Passerculus sandwichensis*
Belted Kingfisher	*Megaceryle alcyon*	Great Crested Flycatcher	*Myiarchus crinitus*	Scarlet Tanager	*Piranga olivacea*
Black and White Warbler	*Mniotilta varia*	Hairy Woodpecker	*Picoides villosus*	Sharp-shinned Hawk **(SC)**	*Accipiter striatus*
Black-billed Cuckoo	*Coccyzus erythropthalmus*	Hermit Thrush	*Catharus guttatus*	Song Sparrow	*Melospiza melodia*
Blackburnian Warbler	*Dendroica fusca*	House Wren	*Troglodytes aedon*	Swainson's Thrush	*Catharus ustulatus*
Black-capped Chickadee	*Poecile atricapillus*	Indigo Bunting	*Passerina cyanea*	Tennessee Warbler	*Vermivora peregrina*
Black-throated Blue Warbler	*Dendroica caerulescens*	Killdeer	*Charadrius vociferus*	Tree Swallow	*Tachycineta bicolor*
Black-throated Green Warbler	*Dendroica virens*	Least Flycatcher	*Empidonax minimus*	Tufted Titmouse	*Baeolophus bicolor*
Blue Jay	*Cyanocitta cristata*	Magnolia Warbler	*Dendroica magnolia*	Turkey Vulture	*Cathartes aura*
Blue-headed Vireo	*Vireo solitarius*	Mourning Warbler	*Oporornis philadelphia*	Veery	*Catharus fuscescens*
Brown Creeper	*Certhia americana*	Mourning Dove	*Zenaida macroura*	Vesper Sparrow **(SC)**	*Pooecetes gramineus*
Brown headed Cowbird	*Molothrus ater*	Nashville Warbler	*Vermivora ruficapilla*	Warbling Vireo	*Vireo Vireo gilvus*

Table 4.5-4 Bird Species Identified During Field Investigations

Common Name	Scientific Name	Common Name	Scientific Name	Common Name	Scientific Name
Brown Thrasher	*Toxostoma rufum*	Northern Cardinal	*Cardinalis cardinalis*	White-breasted Nuthatch	*Sitta carolinensis*
Canada Goose	*Branta canadensis*	Northern Flicker	*Colaptes auratus*	Wild Turkey	*Meleagris gallopavo*
Canada Warbler	*Wilsonia canadensis*	Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	Winter Wren	*Troglodytes troglodytes*
Cedar Waxwing	*Bombycilla cedrorum*	Ovenbird	*Seiurus aurocapilla*	Wood Thrush	*Hylocichla mustelina*
Chestnut-sided Warbler	*Dendroica pensylvanica*	Pileated Woodpecker	*Dryocopus pileatus*	Yellow Warbler	*Dendroica petechia*
Chimney Swift	*Chaetura pelagica*	Pine Warbler	*Dendroica pinus*	Yellow-bellied Sapsucker	*Sphyrapicus varius*
Chipping Sparrow	*Spizella passerina*	Purple Finch	*Carpodacus purpureus*	Yellow-billed Cuckoo	*Coccyzus americanus*
Common Grackle	*Quiscalus quiscula*	Purple Martin	*Progne subis*	Yellow-rumped Warbler	*Dendroica coronata*
Common Raven	*Corvus corax*	Red-bellied Woodpecker	*Melanerpes carolinus*		
Common Yellowthroat	*Geothlypis trichas*	Red-breasted Nuthatch	*Sitta canadensis*		

Source: New York Ornithological Association, Inc. http://www.nybirds.org/Publications/ChecklistNYS.htm

Note: 89 species were observed.

Key:
ST = State-listed as threatened (T) species and species of special concern
SC = Species of special concern.

NYSDEC maintains a list of bird species that are considered endangered (10 species), threatened (10 species), or of special concern (19 species) within the State of New York, inclusive of several federally listed species. Information was reviewed from various sources, including field surveys conducted for this project, Breeding Bird Atlas (BBA) projects, and other available data to determine the potential occurrence of endangered, threatened, or special concern species in the natural resources study area.

According to the USFWS, the BBA projects, and field surveys, no endangered species have been identified in the natural resources study area. However, three special concern species were observed during the spring and summer 2008 field surveys:

- Red-headed woodpecker (special concern): This species can be found in New York State year-round. The location/natural resources study area is suitable for breeding because the red-headed woodpecker prefers open woodlands and forest edges and clearings. Red-headed woodpeckers are often found in deciduous woodlands, river bottoms, open woods, orchards, parks, open country, savannas, and grasslands with scattered trees. They generally prefer habitat with few tall, large-diameter trees. Red-headed woodpeckers were observed on two occasions during the May 2008 field surveys.

- Vesper sparrow (special concern). The location/habitat is suitable for breeding. One specimen was observed during the June breeding surveys.

- Sharp-shinned hawk (special concern). According to the BBA projects, the Natural resources study area is suitable year-round habitat for the sharp-shinned hawk. One sharp-shinned hawk was observed during wetland delineations in August 2008.

The bald eagle, which is a state- and federally listed threatened species, is a migrant and transient over the natural resources study area, but location/habitat within the natural resources study area is not ideal for breeding. One high-flying adult was observed 12 miles outside of the natural resources study area on May 22, 2008.

4.5.1.9 Bats

Nine species of bats use the various landscapes found in the State of New York (Table 4.5-5).

Table 4.5-5 Bat Species of New York, Habitat Types, and Abundance

Common Name	Scientific Name	Average Body Size (grams)	Preferred Habitat		Abundance
			Summer	Winter	
Small-footed Myotis	*Myotis leibii*	2.9-3.2	Hemlock stands, rock crevices, tree bark, urban structures	Regional hibernacula, rock outcropping	Uncommon; state species of special concern
Indiana Bat	*Myotis sodalis*	2.9-3.9	Exfoliating bark, cavities, and dead trees in riparian corridors	Regional Hibernacula	Uncommon; federally endangered
Little Brown Bat	*Myotis lucifigus*	2.4-4.0	Tree cavities, urban structures	Regional Hibernacula	Most common
E. Long-eared Bat	*Myotis septentrionalis*	3.2-3.8	Tree cavities, exfoliating bark, barns, eves, shingles	Regional Hibernacula	Uncommon to common
Eastern Pipistrelle	*Pipistrellus subflavus*	3.0-3.6	Tree foliage, leaf litter	Regional Hibernacula	Uncommon to common
Eastern Red bat	*Lasiurus borealis*	3.6-4.6	Dense riparian tree foliage	Migrates outside region?	Uncommon (status uncertain in NY); most common tree-roosting bat
Hoary Bat	*Lasiurus cinereus*	5.1-5.9	Tree foliage	Migrates outside region?	Uncommon (status uncertain)
Silver-haired Bat	*Lasionycteris noctivagans*	3.6-4.6	Tree cavities, exfoliating bark in coniferous forested stands, and rock crevices	Migrates outside region?	Uncommon (status uncertain)
Big Brown Bat	*Eptesicus fuscus*	3.4-5.4	Tree cavities, exfoliating bark, urban structures	Regional hibernacula, buildings, urban structures	Common

Source: Cornell University 2001; New York State Department of Conservation 2005.

Habitats used by these species include wetlands, agricultural and reverting fields, forests, and cities with a variety of micro-habitats used for foraging, roosting, and maternity roosting. Bats thrive in these various habitats because they are

proficient predators of insect populations. Bats generally are solitary outside of mating, hibernation periods, and rearing of young, although some colonial roosting does occur. The most common species of bats (e.g., little brown bat, big brown bat, Eastern pipistrelle, and red bat) have adapted to a multitude of habitat types, including landscapes altered by humans (Mies et al. 2002). As such, these species are assumed to use the natural resources study area.

The remaining bat species tend to be found only in densely forested stands. Therefore, there is potential for these species to be present, primarily in the eastern section of the natural resources study area close to Pine Hill Lake and a residential neighborhood. These forested areas are used as cross country ski areas in the winter and hiking trails in the summer.

The Indiana bat, which is protected by both the state and federal governments, has not been identified in the natural resources study area. According to a NYSDEC representative, there are roughly 27,000 Indiana bats near the 5th Binnewater Lakes, north of Rosendale, New York, which is approximately 28 miles from the natural resources study area. NYSDEC has confirmed females at summer colonies on the shore of Ashokan Reservoir, which is 20 miles from the natural resources study area. Upland areas like Belleayre Mountain are less likely to include Indiana bats than lowland areas. If Indiana bats are present in the natural resources study area, they will most likely be males or non-reproductive females (Hicks August 20, 2008)

Specialized habitats required for bats include winter hibernacula, where bat species congregate during hibernation periods (November through March). Identified hibernacula include limestone caves, old mines, old well shafts, and buildings. Most bats require a moderate constant temperature and humidity provided by the hibernacula to survive over the winter. Measures have been taken by state and federal agencies in the last decade to protect important bat hibernacula habitats because any disturbances during critical hibernation periods can be detrimental to large populations of bats as well as individual bat species. Bats return in the fall to establish hibernacula. Some New York bats migrate relatively short distances to these locations, and some winter in small hibernacula near their summer roosting areas or migrate farther south to warmer climates following foraging sources, where shorter periods of hibernation may occur (Mies et al. 2002).

Summer roosts are generally daytime or nighttime roosts, where bats will spend the entire day resting or portions of the night resting. Day roosts for New York bats can vary between buildings, exfoliating bark, tree cavities, rock piles, and caves, depending on species-specific preferences. No roosting areas were found in the natural resources study area during site visits or were documented in the literature.

4.5.1.10 Fish

Electrofishing surveys were conducted by NYSDEC's Bureau of Fisheries in six streams in the natural resources study area from 1936 to 2000. Four species of trout are found in New York waters: brook trout, lake trout, brown trout, and rainbow trout. Six fish species were found during the surveys and three of these species were trout (Table 4.5-6). All of the streams listed in Table 4.5-6 contain adult and fingerling trout; however, to date not all of the above streams have been classified as trout (T) or trout-spawning (TS) streams by NYSDEC.

Rainbow trout spawn or reproduce in the spring, while New York's other trout spawn in the fall. While much effort has been expended at rearing and keeping trout healthy, few other fish have suffered as much as trout from human activity. All species of trout require cool, clean water. Impacts from human activity easily affect these water conditions. Activities such as clearing forests for farming, housing, or commercial purposes can convert cool, fast-flowing gravelly streams into still, warm, silty waterways incapable of supporting trout. Various industrial, agricultural, or domestic sources can pollute the water, reducing the high levels of oxygen that trout need to survive. In some cases, toxic chemicals, which can kill trout or make them less desirable for anglers to catch, have been released into water systems. In addition, high mountain streams and ponds are affected by acid rain caused by industries (New York State Department of Environmental Conservation 2008e).

Table 4.5-6 Fish Species in Ulster County, New York Streams that flow within the Natural Resources Study Area

Stream	Year Survey Conducted	Brook Trout (*Salvelinus fontinalis)*	Rainbow Trout (*Oncorhynchus mykiss)*	Brown Trout (*Salmo trutta)*	Slimy Sculpin (*Cottus cognatus*)	White Sucker (*Catostomus commersonii*)	Blacknose Dace (*Rhinichthys atratulus)*
Cathedral Glen Brook	2000	33	1	0	0	0	0
Crystal Spring Brook	2000	22	0	0	0	0	0
Woodchuck Hollow	2000	5	4	4	0	0	0
Giggle Hollow	2000	28	0	0	0	0	0
Birch Creek	1936, 1956, 1980, 1988, 1989, 1993, 1996	2	83	42	1	2	3
Lost Cove Brook	1936, 1957, 2000	25	16	3	2	0	1

Source: NYSDEC Division of Fish, Wildlife, & Marine Resources, Electrofishing Survey Data (see Appendix AC)

4.5.1.11 Amphibians

A variety of amphibian species is found in New York State. Table 4.5-7 lists five amphibian species found in the natural resources study area during June 2008 field investigations.

In addition to the salamander species identified during field investigations, the Herp Atlas Project provided information on the geographic distribution of amphibians and reptiles in New York State (Table 4.5-8). The Herp Atlas Project was a ten-year survey used to monitor changes in reptile and amphibian populations, guiding habitat and wildlife management decisions. According to these distribution maps, the salamander species that are starred (*) in Table 4.5-8 are found in Ulster County, NY.

Table 4.5-7 Amphibians Identified During Field Investigations

Species	Location
Northern Redback Salamander	Under rocks on a slight slope in an upland area of a hardwood forest; in a hardwood forest under rocks in a streambed, primarily in areas with no running water; on a slight slope, under rocks in dry soils of a hardwood forest.
Allegheny Dusky Salamander	Under rocks in a small wetland in a hardwood forest; in a hardwood forest under rocks in a streambed, primarily in areas with no running water; under rocks in an area of the streambed with running water.
Northern Spring Salamander	In a hardwood forest under rocks in a streambed, primarily in areas with no running water.
Northern Two-lined Salamander	In a hardwood forest under rocks in a streambed, primarily in areas with no running water
Northern Slimy Salamander	On a slight slope, under rocks in dry soils of a hardwood forest.

Table 4.5-8 Salamanders of New York State

Common Name	Scientific Name
Eastern Hellbender	*Cryptobranchus a. alleganiensis*
Common Mudpuppy	*Necturus maculosus*
Marbled Salamander*	*Ambystoma opacum*
Jefferson Salamander Complex	*Ambystoma jeffersonianum x laterale*
Jefferson Salamander*	*Ambystoma jeffersonianum*
Blue-spotted Salamander*	*Ambystoma laterale*
Spotted Salamander*	*Ambystoma maculatum*
Eastern Tiger Salamander	*Ambystoma tigrinum*
Red-spotted Newt*	*Notophthalmus v. viridescens*
Northern Dusky Salamander*	*Desmognathus fuscus*

Table 4.5-8 Salamanders of New York State

Common Name	Scientific Name
Allegheny Dusky Salamander*	*Desmognathus ochrophaeus*
Northern Redback Salamander*	*Plethodon c. cinereus*
Northern Slimy Salamander*	*Plethodon glutinosus*
Wehrle's Salamander	*Plethodon wehrlei*
Four-toed Salamander*	*Hemidactylium scutatum*
Northern Spring Salamander*	*Gyrinophilus p. porphyriticus*
Northern Red Salamander*	*Pseudotriton r. ruber*
Northern Two-lined Salamander*	*Eurycea bislineata*
Longtail Salamander	*Eurycea l. longicauda*

Source: New York State Amphibian and Reptile Atlas Project (http://www.dec.ny.gov/animals/7485.html)

* Occurs in Ulster County, New York

The maps on the Herp Atlas Project website reflect the current distribution of species based upon data collected for the Atlas through 1998. Data from the Atlas are collected to demonstrate broad trends in distribution, not site-specific information. The most recent data are not reflected in these interim maps.

4.5.1.12 Wildlife or Wildlife Communities of Local Significance

This section focuses on species that are not listed as state or federally protected but are locally important resources or are species of concern. These species include white-tailed deer (*Odocoileus virginianus*) and black bear (*Ursus americanus*). Black bear and white-tailed deer are locally important hunting resources.

No other species identified on-site are thought to be of local significance or concern.

Black Bear

The black bear is New York's second largest land mammal; only the moose is larger. An average adult male weighs about 300 pounds while females average about 170 pounds. Black bears are omnivorous, eating grasses, berries, fruit, nuts, seeds, insects, grubs, carrion, and human food sources such as corn, honey, bird seed, trash, and pet food, when available.

Once thought to inhabit only large forests, over the past two decades black bears have been expanding their range throughout New York State and can now be found in a variety of habitats, including developed areas. As recently as the mid-1990s, black bears occupied three relatively distinct ranges: Adirondack, Catskill, and Allegany. The Catskill region in the Southern Bear Range contains the second largest population in New York State (1,500 to 2,000).

4.5.2 Future Conditions without the Project

Presuming no significant, alternative, human-initiated alteration of the environment, natural succession would change the environment over time. The most noticeable change over the next 30 to 50 years would be the successional change at the abandoned Highmount Ski Center from brushy cleared land to successional northern hardwoods. This natural succession at the Highmount Ski Center would result in a more uniform, less diverse environment across the west slope, providing fewer niches for vegetation and wildlife species. It would also provide more expansive, uniform habitat for forest-dependent species.

4.5.3 Impacts of the Proposed Action

4.5.3.1 Wetlands and Streams

The project would impact 0.139 acres of wetlands during construction of the new ski trails and the ski lift base proposed within the Highmount Ski Resort area. The majority of impacts on surface waterbodies within the Project Site are associated with disturbance to forest cover caused by construction. The potential impacts to wetlands are discussed further in Section 4.3 and Appendix AA, and potential impacts to forest cover are discussed in Section 4.5.4.2. Appropriate permit applications with USACE and NYSDEC will be filed. A concept plan for mitigation of the impacts to wetlands is presented in Appendix AA.

Construction Impacts

Construction activities include clearing vegetation and grading and building a new reservoir to increase the water supply for snowmaking.

Clearing of brush and mowing would temporarily impact 0.008 acres of wetlands. Grading work would permanently impact 0.139 acres. None of the delineated wetlands would be permanently impacted during clearing and grading.

The stream channels that drain the project are classified as Waters of the United States (see Sections 2.1 and 2.2) under the Rivers and Harbors Act and Clean Water Act) because they have direct hydrological connections to navigable waters. All of these stream channels are depicted on Figure 4.3-1, Appendix AA. Three stream crossings are required for ski trails as shown in Table 5-2, Appendix AA, and depicted on the inset map on Figure 4.3-1 in Appendix AA. Two wooden bridges would span the channels and have no direct impacts on the streams. The third crossing would require brush clearing so skiers could ski across the channel, which has very shallow banks and freezes solid in the winter. These three crossings add to a potential impact of up to 75 feet of stream reach (Table 5-2, Appendix AA). No mitigation for this *de mininmis* impact is proposed. Stream monitoring for aquatic species would occur pre-construction and during construction.

The project plan includes building a pond at the entrance to Belleayre, adjacent to Route 28, to increase the amount of water to produce more snow for the proposed ski trails. Building the pond would require tree removal; however, there would be no impact on wetlands.

A diversion structure, to be located downstream from the proposed pond behind the maintenance building, would be constructed to measure the available water for snowmaking in Crystal Spring Brook. The diversion structure would be a retrofit of the diversion structure located at Pine Hill Lake. Impacts from the monitoring station would be minimal because the construction would be timed to coincide with normally dry periods when there is no flow. Best management practices would be utilized to avoid runoff of sediments and solids, and the streambank area would be restored and planted with native vegetation. Continuous flow monitoring to determine water quality would be conducted during construction (see Section 4.3.1, Stream Monitoring).

Construction activities could cause pollutants to enter the streams in the natural resources study area from increased sediment-loading of storm water runoff. Except for the flow diversion structure on Crystal Spring Brook, all disturbances would avoid a 50-foot buffer zone around water courses. The implementation of a Stormwater Pollution Prevention Plan (SWPPP) would mitigate the potential impacts.

Facility Operational Impacts

Facilities associated with the operational phase of the project (e.g., new ski trails, new lodge and ski lifts) would have no adverse impacts on wetlands under federal or state jurisdiction.

Maintaining the ski trails would result in minimal impacts on wetlands. Emergent wetlands currently are located on and adjacent to ski slopes. These slopes remain as emergent wetlands because they are mowed and cleared of vegetation during peak recreational months. No forested wetland would be impacted by facility operations.

The Pine Hill Lake pump house is currently capable of pumping 3,600 gallons per minute of water. The proposed new ski trails would require more snowmaking. An increase of 1,600 gallons per minute in pumping capacity from Pine Hill Lake to the uphill reservoir is recommended to accommodate the needed increase in trail area from 160 acres to an estimated 203 acres. Increased snowmaking would not significantly alter the hydrology and surficial geology of the natural resources study area. Because machine-made snow is of higher density than natural snow and holds up and lasts longer than natural snow under adverse weather conditions (rain, warm weather), snowmaking would provide a higher safety factor: build-up of machine-made snow will reduce bare ground on slopes, lift lines, and high-use

areas during warm or rainy weather. Machine-made snow also packs well and is impervious to high winds that blow natural snow off trails.

4.5.3.2 Vegetation

Correspondence with the New York NHP indicated no state-listed threatened or endangered vegetation or plant communities are in the natural resources study area (Seoane 2008). Although the USFWS stated that northern monkshood (*Aconitum noveboracense*) and small whorled pegonia *(Isotria medeoloides*), two federally listed threatened species, may occur in the area (Stilwell 2008), no threatened or endangered vegetation or plant communities were identified in the natural resources study area during field investigations. Therefore, no impacts on threatened and endangered plant species are expected as a result of construction of the project.

Construction Impacts

Approximately 100.8 acres (96.1 on the Belleayre property and 4.7 in the Highmount property) of the natural resources study area or 5% of forest out of 1,884.6 total acres of forest would be cleared to construct project facilities. Field surveys indicate that the largest percentage of forested vegetation impacted by the project would be within the successional northern hardwood community. Other forest communities that may be affected include red maple hardwood swamp and shallow emergent marsh. Approximately 100.8 acres (96.1 on the BMSC property and 4.7 in the Highmount property) of forest within the natural resource study area would be cleared for new ski slopes and approximately 19.9 acres of reclaimed land on the Highmount property would be cleared to build new ski slopes. The reclaimed areas, which were ski slopes about 15 years ago, are located in the Highmount Ski area, and are now early successional forests.

Primary impacts on the natural resources study area would include clearing forest and herbaceous vegetation during construction activities. Four species make up nearly 90% of the trees in the area to be cleared: sugar maple (39.6%); red maple (19.8%); black cherry (6.5%); and white ash (*Fraxinus americana*) (13.7%). The volume by species may not be the same as the percentage of stems for each species. Secondary impacts may include increased soil erosion and a decrease in the available habitat for wildlife resulting from vegetation clearing and grading. Soil erosion could be problematic on the ski and mountain slopes. These potential impacts would most likely occur in conjunction with the construction of ski lifts, ski trails, parking lots, the new Tomahawk lodge, and the expansion of the Discovery Lodge. All of these project facilities are located along the slopes of Belleayre Mountain. These impacts will be mitigated with the proper implementation of a well-designed SWPPP.

Successional old fields that have either been routinely subjected to disturbance or have been subjected to past disturbance would be impacted by the construction of new project facilities.

Facility Operational Impacts

Maintenance of the BMSC project facilities would result in primary impacts on upland vegetation at some locations. Vegetation, primarily within the successional northern hardwood cover type, would be permanently removed in areas where the Discovery Lodge would be expanded; the proposed new ski lifts, ski trails, and parking lots would be built; existing trail maintenance would increase and at the base of the BMSC, behind the new maintenance building where the new pond would be built. The remainder of the areas temporarily cleared during construction would be allowed to undergo natural succession, although it will be subject to periodic removal of woody vegetation so that an herbaceous and scrub-shrub state is maintained, especially in the recreational areas. The degree and impact depends on the type and amount of vegetation to be cleared, the rate of succession, and the frequency of maintenance such as clearing and mowing during operation of the project.

BMSC does not expect to use herbicides or pesticides to control vegetation or pests along ski trails, hiking trails, ski lifts, around Pine Hill Lake Pond and the proposed pond to be built at the base of the property along Route 28, or around the lodges and administration offices. If there is a need for herbicides or pesticides, then BMSC will comply with applicable laws and best practices standards.

4.5.3.3 Impacts on Wildlife

Consultation with the NHP and the USFWS and field investigations indicate no threatened or endangered animal species or communities have been identified in the natural resources study area. Thus, no impacts on threatened and endangered wildlife are expected as a result of construction of the project.

Construction Impacts

Adverse impacts on wildlife species at a population level are not expected as a result of construction. Wildlife species present in the natural resources study area are widely distributed. Therefore, direct mortality to some individuals during the construction process would not result in an adverse impact to wildlife populations throughout the natural resources study area. However, additional minor and accidental wildlife mortality may occur as a result of increased traffic following the proposed expansion. Additionally, it is not likely that expansion of the BMSC would have any adverse effect on the local bear or deer populations.

Potential impacts from construction may affect the state's species having the greatest conservation needs (e.g. brook trout). However, a 50 foot vegetative buffer along both sides of all streams within the natural resources study area would minimize the transport of contaminants to the streams during construction. Best management practices would be required of the Contractors to control any potential discharges. These measures would further minimize the threat of pollutants to the streams.

Most species are expected to avoid the natural resources study area during the active construction period because of the noise from equipment, tree clearing, increased vehicle traffic, infrastructure construction, etc. Some limited mortality of less mobile species (e.g., rodents) may occur during the course of construction. Indirect impacts on wildlife would also occur as a result of habitat alteration and some permanent habitat loss associated with the construction of the project (e.g., tree clearing). Five percent of the forest would be lost to tree clearing; however vegetative buffer zones around streams and wetlands would be implemented before construction, and plans to re-vegetate impacted areas would be carried out after construction to minimize any potentially adverse impacts.

Specifically, tree clearing could disrupt wildlife travel corridors for species such as deer and bear. However, the new ski slopes are nearby and parallel to existing trails, so no currently established wildlife corridors are in these areas. Tree-clearing would also increase fragmentation and the edge effect of the landscape in the natural resources study area, increasing habitat for wildlife such as deer and raccoons and decreasing habitat for bears and forest nesting birds. Fragmentation allows for more parasites and predators to invade nesting bird habitat.

In addition, the impacts are consistent with activities such as ground disturbance and recreation that already occur throughout the natural resources study area. Ground is disturbed by trail maintenance, mowing, and grooming the slopes. It is anticipated that wildlife in the natural resources study area are accustomed to disturbance of this nature and would either relocate to other adjacent suitable habitat or, upon cessation of construction, make use of areas temporarily disturbed as revegetation takes place.

Breeding bird populations are not expected to be affected significantly by construction of the project. If construction begins before the breeding season, it is anticipated that breeding birds would likely avoid areas during the active construction phase. If construction begins during breeding season, breeding birds would either be accustomed to disruption of this nature or they would relocate to other adjacent suitable habitat. Indirect impacts on breeding birds would be minimal and involve some habitat alteration in association with the construction of parking lots, the Tomahawk Lodge, ski lifts, and ski slopes, and the expansion of Discovery Lodge; however, these impacts are not expected to be significant because of similar disturbances in the natural resources study area.

Adverse impacts on bat populations should not occur during the construction phase. Some potential indirect impacts on bats may occur as a result of habitat alteration or loss due to construction activities; however, these potential impacts are not expected to have adverse impacts on bat populations. In addition, the impacts are consistent with activities that already occur throughout the natural resources study area. It is anticipated that bats would return to temporarily disturbed areas upon completion of construction.

Facility Operational Impacts

Operation of the project facilities is not expected to result in significant impacts on most wildlife species, including migratory and breeding bird populations and bat populations. The new project facilities are similar to existing project facilities and would therefore not significantly change the operation of the BMSC.

Loss of wildlife habitat would be minimal from operational impacts because many of the project facilities would be constructed in areas that are already disturbed Exceptions are the new Tomahawk Lodge, the new ski slopes, chair lifts, and trails, and the expansion of Discovery Lodge. In addition, operational impacts on wildlife habitat are consistent with activities and conditions that regularly occur throughout the natural resources study area, e.g., mowing; operation of ski lifts, lodges, and other recreational facilities; use of parking lots; and noise pollution from lodges and other facilities, recreational activities, and tree removal. A slight disruption of wildlife corridors for bear would occur during the winter months when recreational activities such as cross-country skiing and downhill skiing increase, and during the summer months when recreational activities such as hiking, biking, and the use of interpretive nature trails increase.

Tree-removal occurs in the residential areas located adjacent to the natural resources study area. It is anticipated that wildlife in the natural resources study area is accustomed to disturbance of this nature, but if disturbed by operation of the project, wildlife would relocate to other adjacent suitable habitat or adapt to post-construction activities.

4.5.4 Mitigation

4.5.4.1 Wetlands and Streams

After initial siting of the facilities, the Project-component locations were modified during field surveys to avoid sensitive areas such as wetlands to the greatest extent feasible.

No wetland areas would be permanently impacted by the Project but approximately 0.14 acres of wetland would be temporarily impacted during construction. Wetlands and streams crossed by the Project are currently under

review for jurisdictional determination by USACE. Based on the total impacted area estimated above, it is not anticipated that the project areas would require an individual permit or mitigation plans. The impacts associated with the proposed ski trails at the Highmount Ski Area would fall under the Nationwide Permit 42, as regulated by USACE. This permit allows "Discharges of dredged or fill material into non-tidal waters of the United States for the construction or expansion of recreational facilities." The key provisions of this Permit are that impacts must be less than 0.5 acres and 300 feet of linear impacts. A Pre-construction Notification (PCN) must also be provided. Mitigation is required as part of the PCN if permanent impacts to federal wetlands exceed 0.1 acres. In that case the project would require an individual permit or mitigation plans. It is anticipated that the disturbed wetlands identified above would be restored to pre-construction conditions through appropriate selection of vegetation.

Crystal Spring Brook is the only stream that would be permanently impacted. The impact would be caused by construction of a flow diversion structure and construction of the pipeline across the brook. Three stream crossings would be required. These are described in Section 4.3.3

Stream monitoring would occur pre-construction and during construction at the proposed five monitoring sites (Section 4.3, Figure 4.3.1-1). The proposed monitoring is intended to observe changes in flow, temperature, and water quality. Section 4.3 provides a detailed discussion on the proposed monitoring plan.

Best management practices to be implemented by the Contractor would further avoid and minimize impacts. A specific construction plan and a Stormwater Pollution Prevention Plan (SWPPP) would be developed by the Contractor and reviewed by NYSDEC. Practices might include installation of hay bales and silt fences, digging of channels to capture runoff into a treatment sedimentation pond, or other practices.

A 50-foot vegetative buffer would be established around all streams within the natural resources study area in order to avoid run-off from construction and post-construction activities.

Impacted areas adjacent to wetlands would be returned to pre-construction contours and revegetated after construction is finished.

Impacts on water resources would be mitigated through proper implementation of a well designed SWPPP.

4.5.4.2 Vegetation

The overall impact of the project on vegetation is anticipated to be minimal because of careful site planning and the amount of disturbance already present in the natural resources study area. To minimize impacts on vegetation, facilities have been sited, to the extent practicable, within previously disturbed areas. For example, many of the new ski trails and chairlifts would be built in disturbed areas such as the former ski slopes in the Highmount Ski Area. Undisturbed forest in the BMSC and Highmount Ski areas would be cleared for some new ski trails and chair lifts and the expansion of the Discovery Lodge. Parking lots would be built in both undisturbed and disturbed areas of the BMSC.

Other measures to mitigate the potential impact on vegetation include BMPs for the control of invasive species, minimal tree-cutting through careful on-site design of ski trails, trimming of branches in lieu of tree-cutting where possible, restoration of unused roads or ski trails, and signs and interpretive material educating the public about the forest preserve and areas of sensitive vegetation. Tree clearing would be minimized. In conformance with Division of Lands and Forests Policy LF-91-2, the wood from the cleared areas would be milled and used, to the extent practicable, for rustic-style on-site improvements such as terracing retaining walls, cribbing, stream bridging, fencing, signs, benches, picnic tables, or in other state forest preserve facilities as much as feasible. Smaller chipped material would be used, to the extent practicable, for erosion and sediment control measures. In order to avoid the transmission of invasive species, wood would not be taken off site. Section 5.10, Climate Change and Carbon Footprint, discusses timber use in greater detail.

Another means of mitigating impact is to plant trees, shrubs, and herbaceous vegetation to minimize soil erosion. Erosion is caused by wind, water, and ice that displace sediment, soil, rocks, and other particles. Vegetation cover slows down the movement of surface runoff and allows excess surface water to infiltrate. Seeding and mulching of construction sites would re-establish vegetation readily, which effectively stabilizes the soil. The adjacent forest cover would not be altered.

Degradation of the mountain ski slopes through erosion is not evident at Belleayre and is not identified as an environmental management issue. Periodic and localized erosion may occur as a result of heavy rains and spring thaws, but these situations are kept under control by annual maintenance.

The project facilities would be improved and updated in order to accommodate present peak-use periods and the carrying capacity of the facility. Impacts on biological resources would be further minimized through implementation of BMPs to stabilize the ground surface and allow for successful revegetation following construction of the project.

Another way to implement and conserve water quality, soils, and vegetation is to develop and implement a SWPPP. See Section 4.3 for detailed information on the implementation of a SWPPP.

4.5.4.3 Wildlife

The overall impact of the project on wildlife species is anticipated to be minimal because of careful site planning, as described in the previous section. Five percent of the total number of forested acres throughout the natural resources study area would be disturbed (100.8 acres would be cleared out of 1884.6 total acres of forest).

Potential mitigation measures may include creation of mitigation wetlands, conservation of wildlife corridors, and protection of habitats during the operational phase. Assessment of road and stream crossing sites must be carried out in order to avoid impairing the movement of wildlife throughout the natural resources study area.

There is a potential for nuisance wildlife issues to arise in the natural resources study area. Possible nuisance issues include black bears feeding on garbage and Canada geese occasionally found nesting in shrubbery near buildings or parking lots, demonstrating aggressive behavior toward people while defending their nesting territory. In addition, high geese concentrations around shallow water areas may elevate bacterial levels..

BMPs would be included for managing or avoiding conflicts between humans and wildlife that may arise from increased human/wildlife interaction. For example, mitigation measures such as locking dumpsters would prevent black bears from feeding on garbage. Vegetative buffers discourage visits by Canada geese.

4.6 Traffic

To assess potential impacts related to the Belleayre Mountain Ski Center UMP/DEIS, nine intersections and five roadway segments within the vicinity of the project were evaluated and are as follows:

Intersections

- NY Route 28 & NY Route 212
- NY Route 28 & NY Route 214
- NY Route 28 & NY Route 42
- NY Route 28 & County Road (CR) 47
- NY Route 28 & Main Street
- NY Route 28 & CR 49A
- NY Route 28 & CR 38 (in Arkville)
- CR 49A & Gunnison Road/Belleayre Lower Driveway
- CR 49A & Belleayre Upper Driveway

Roadway Segments

- NY Route 28 west of NY Route 209
- NY Route 28 between NY Route 212 & NY Route 214
- NY Route 28 between CR 38 and NY Route 30
- CR 49A south of the Ski Center Access
- Right turn ramp from NYS Thruway Exit 19

Existing traffic volumes for a Saturday PM peak hour were compiled from various traffic counts conducted during 2008 and 2009. Future traffic volumes were estimated based on a background traffic growth rate and an estimation of new site generated trips related to the UMP/DEIS. Refer to Appendix AD for traffic volume figures and supporting documentation.

At the time that the traffic analysis was prepared, the planned schedule for the UMP was for an estimated time of completion (ETC) in 2015. An annual growth rate was used to represent the background traffic growth to this ETC year based on rates used by previous traffic studies completed in the study area. A conservative growth rate of 2% per year was applied to the 2008 Existing condition to obtain the 2015 (ETC) No-Build traffic volumes. The schedule for the UMP has been revised, subsequent to the completion of the traffic projections and analysis for the future conditions, such that the ETC for the project is now 2018.

A review of historic traffic volumes reported by NYSDOT for Route 28 within the study area (*Traffic Data Reports for New York State*, 2000-2011) shows that the volumes in the corridor have changed over the 10-year period from 2001 to 2011 (latest year of available data) at annualized rates varying from -2.45% to

+0.91%. Furthermore, this data shows that the volumes have been relatively unchanged over the 5-year period from 2006-2011. The historic volumes show that the annual 2% background growth rate that was used to establish the ETC volumes is a conservatively high projection of future traffic. Further, the data shows that there has generally been little or no change in volume between the 2008 base-year volumes and current volumes. Based on this, the evaluations of the 2015 (ETC) year and subsequent design horizons (ETC+10 and ETC+20) are still applicable for the revised ETC year of 2018.

The new site trips related to the expansion of Belleayre Mountain Ski Center were estimated based on data collected and information regarding the current facility. The estimated new site trips are summarized in Table 4.6-1.

It is noted that the conditions analyzed are for a "worst-case" condition that represents the Saturday PM peak hour when patrons are exiting Belleayre Mountain Ski Center on the Martin Luther King, Jr. holiday weekend. This is viewed as the peak weekend at the ski center and was analyzed to perform a conservative evaluation of the operations.

Table 4.6-1 Site Generated Traffic Saturday Peak Hour

	Enter	Exit	Total
Total Trips (9,000 patrons)	246	1463	1709
Existing Trips	136	837	973
New Trips	110	626	736

4.6.1 Potential Impacts

The traffic for the Existing, No-Build and Build conditions were evaluated to determine the traffic impacts related to the UMP/DEIS. The No-Build and Build conditions were evaluated for the estimated time of completion (ETC) year of 2015, 2025 (ETC+10) and 2035 (ETC+20). Based on this analysis, a level of service (LOS) was assigned to each intersection and roadway segment for the conditions analyzed using criteria set forth in the Highway Capacity Manual 2000 published by the Transportation Research Board. Descriptions of the LOS criteria can be found in Appendix AD. The results of the analysis are summarized in Tables 4.6-2 and 4.6-3.

Table 4.6-2 Level of Service Summary: Intersections							
Intersection	2008 Existing	2015 No-Build	2015 Build	2025 No-Build	2025 Build	2035 No-Build	2035 Build
NY Route 28 & NY Route 212	C	C	F	D	F	E	F
NY Route 28 & NY Route 214	C/C*	C/D	F/F	D/E	F/F	D/F	F/F
NY Route 28 & NY Route 42	C	C	F	C	F	D	F
NY Route 28 & CR 47	C/B	C/B	F/C	C/B	F/C	C/C	F/D
NY Route 28 & Main Street	C	C	D	C	E	C	E
NY Route 28 & CR 49A	F/D	F/E	F/F	F/F	F/F	F/F	F/F
NY Route 28 & CR 38	B	C	C	C	C	C	D
CR 49A & Van Loan Road	-	-	F/F	-	F/F	-	F/F
CR 49A & North Parking	-	-	F	-	F	-	F
CR 49A & Lower Driveway	D/E	D/E	F/F	D/E	F/F	D/E	F/F
CR 49A & Discovery Lodge	C	C	F	C	F	C	F
CR 49A & Upper Discovery Parking	-	-	F	-	F	-	F
CR 49A & Overlook Road	B	B	D	B	D	B	D

*LOS is provided for both minor street approaches

Table 4.6-3 Level of Service Summary: Roadway Segments							
Segment	2008 Existing	2015 No-Build	2015 Build	2025 No-Build	2025 Build	2035 No-Build	2035 Build
NY Route 28: NY Route 209 to NY Route 375*	A/A	A/B	B/B	B/B	B/B	B/B	B/B
NY Route 28: NY Route 375 to NY Route 212	D	D	E	D	E	D	E
NY Route 28: NY Route 212 to NY Route 214	C	C	D	D	D	D	D
NY Route 28: CR 38 to NY Route 30	C	C	C	C	C	C	C
CR 49A: South of Belleayre Access	C	C	C	C	C	C	C

* This is a multilane segment, therefore LOS is provided for each direction (EB/WB).
All other segments are analyzed as two-lane segments.

For the Existing condition, all of the intersection approaches operate at LOS D or better except for CR 49A approach to NY Route 28 and the ski center Lower Driveway. For the ETC No-Build condition, the Clubhouse Drive approach to the intersection of NY Route 28 & CR 49A also drops to LOS E. For the Existing and ETC No-Build conditions, all of the roadway segments operate at LOS D or better.

Analysis of traffic associated with the Belleayre Mountain Ski Center UMP/DEIS for the ETC year shows that operations do degrade to LOS F at many intersections. The LOS F designation is based on the delay experienced per

vehicle on the stop-controlled approach. However, some of these intersections still operate with acceptable volume to capacity ratios, indicating that there is reserve capacity (i.e. the hourly volume is less than the hourly service rate). Refer to Section 4.3 of Appendix AD for a detailed discussion on this condition.

Additionally, these operations reflect the peak season conditions during the peak hour of the day, which is not a reasonable design condition. Delay during off-season and off-peak times of the day would be much less. A sensitivity analysis of the site generated traffic was completed to test the operations if the ten highest attendance days of the year were disregarded. The analysis concluded that the only mitigation measure necessary for the year of opening (ETC) is the addition of a right-turn lane on the CR 49A approach to NY Route 28.

Other traffic demand and event management strategies could be implemented to distribute the traffic load on the system.

- Staggering ski lift closing times
- Keeping other lodge facilities open longer after the lifts are closed
- Providing variable message signs at key locations in the corridor
- Expand shuttle and transit services to BMSC

Refer to Section 5.0 of Appendix AD for a more detailed discussion of mitigation improvement strategies.

4.6.2 Mitigation Measures

4.6.2.1 Study Area Intersections

A sensitivity analysis was conducted for a reduced attendance condition that would represent the 11th highest attendance day of the year (i.e. disregarding the top ten highest attendance days). For the year of opening (2015), it is recommended that a right-turn lane be installed on the northbound approach of CR 49A to NY Route 28. This will bring operations to the same level as the No-Build condition. It is also recommended that event management strategies are implemented to help control and direct traffic during the peak hour. An expanded shuttle service and transit services to Belleayre Mountain Ski Center could also reduce the impacts to the study area intersections.

For the future conditions (ETC+10 and ETC+20), it is recommended that traffic conditions are monitored to determine if background traffic growth and site generation are consistent with the projections. Additional delay experienced for future years beyond ETC are related to growth in background traffic volumes, not to traffic related to Belleayre Mountain Ski Center.

Refer to Appendix AD for a detailed description of mitigation measures.

4.6.2.2 Site Driveways

A sight distance evaluation was conducted for the existing and proposed driveway access points to Belleayre Mountain Ski Center based on the criteria set forth in A Policy on Geometric Design of Highways and Streets, 2004 published by the American Association of State Highway and Transportation Officials (AASHTO). It was determined that the stopping sight distance along CR 49A and Van Loan Road is sufficient based on this criteria at each driveway location for vehicles approaching the driveways from the major roadway.

Some of the sight distance measurements for movements turning into or out of the site driveways were less than the recommended criteria. For these locations, clearing of vegetation and driveway warning signs on CR 49A are recommended. It is noted that there is currently no posted speed limit on CR 49A. Based on collected operating speeds on the roadway, it is recommended that it be posted for a 40 mph speed limit. The following measures are recommended to mitigate the sight distance limitations:

- Lower Driveway – clear trees and vegetation on south side of CR 49A, east of intersection
- Discovery Lodge – install intersection warning sign for eastbound traffic on CR 49A in advance of driveway.
- Overlook Road – clear trees and vegetation on south side of CR 49A, east of intersection. Install intersection warning signs in both directions on CR 49A in advance of driveway.
- Upper Discovery - install intersection warning sign for eastbound traffic on CR 49A in advance of driveway.
- North Lot - install intersection warning sign for westbound traffic on CR 49A in advance of driveway.

See Section 6.2 of Appendix AD for a detailed discussion of the sight distance evaluation.

4.7 Visual Resources

An evaluation of the potential impacts to visual resources of the proposed expansion of the Belleayre Mountain Ski Center (the Project) pursuant to the issuance of an amendment to the Unit Management Plan (UMP) has been prepared in accordance with the Final Scoping Document for the UMP-DEIS (NYSDEC, 2008) and NYSDEC Program Policy "Assessing and Mitigating Visual Impacts" (NYSDEC, 2000). This analysis characterizes the visual and aesthetic resources of the area surrounding the Belleayre Mountain Ski Center and the visibility and visual character of the proposed Project, identifies the individuals and groups that may be affected by the Project, evaluates the impact of the Project on those resources and recommends mitigations if necessary. More detail can be found in the full VIA Report, which is attached to the UMP-DEIS as Appendix AE.

The visual assessment process consists of the following steps:

- Develop an inventory of local and statewide significant aesthetic resources and describe the existing visual/aesthetic character of the landscape;
- Characterize viewer groups;
- Evaluate project visibility using viewshed mapping, and balloon studies;
- Prepare daytime and nighttime simulations of the project from sensitive and representative viewpoints;
- Determine significance of the visual and aesthetic impact by evaluating project consistency/contrast with existing landscape components and effect on user groups;
- Evaluate mitigation measures as suggested in the DEC Policy.

NYSDEC Guidance notes that a five-mile radius provides a "safe" visual assessment study area, but also notes that greater distances should also be considered. This assessment provides an evaluation of visibility as far as 25 miles from the Project for specific resources, particularly those identified in the Final Scoping Document, while also providing an assessment of specific resources and general visual impacts within 5 miles of the Project (the visual assessment study area).

4.7.1 Existing Visual Resources Conditions

Belleayre Mountain has been a downhill ski center since 1949. The alpine ski slopes are located on the north slope of the mountain, about one mile wide, extending from the peak of 3,429 feet elevation to the base lodge (Discovery Lodge) at 2,025 feet. Currently, 52 slopes are accessible from 8 lifts. Three

surface lifts are near the base of the slopes just above the ground. Five (5) aerial lifts provide access to the upper slopes, with loading and unloading stations, towers, and cables at about 30 ft high. The facility also maintains 6.4 kilometers of cross country ski trails and 23.7 miles of hiking trails.(NYSDEC, 2010)

Structures on the mountain are minimal. The Discovery Lodge is located at the bottom of the slopes (See Figure 4.7-1), the Overlook and Longhouse Lodges are located midway, at about 2,541 feet, and the Sunset Lodge is located at the top of Belleayre Mountain. These buildings are low and dark in color, therefore they blend into the surrounding wooded landscape. Other structures include maintenance buildings for vehicles and snowmaking equipment, which are single story industrial style buildings. Pine Hill Lake and Belleayre Beach, which are on State property that is not part of this UMP, are located below the ski center along Route 28. They are operated as swimming locations during the summer months.

Figure 4.7-1 Existing Discovery Lodge, North Façade, from parking lots along County Route 49A (Gelli-Curci Road).

The total area managed as the Belleayre Ski Center includes 2,178 acres, 155 of which are cleared and groomed for skiing. Gravel and paved parking areas are located near the base at Discovery Lodge and midway up the mountain near the base of the Tomahawk Lift. Roadways provide access to the Discovery Lodge and Overlook Lodge from County Road 48A (Gelli-Curci Road).. In addition to Pine Hill Lake, two ponds, one near the base of the hill, and one just above the Overlook Lodge, provide water for snowmaking. The remaining area of the facility is forested.

Inventory of Aesthetic Resources

An inventory of aesthetic resources was developed using a multi-step study process. Locations of visual resources as described in the NYS Visual Assessment Policy within a 25-mile radius of the Project were documented. In addition, locally significant visual resources and areas of intensive land use were also considered. A historic structure survey was conducted by Larson Fisher Associates in the fall of 2008 to identify and document relevant historical buildings within the five-mile area. Details of this study are presented in Section 4.12 (Cultural Resources) with supporting material in Appendix AF.

In addition to the 23 visual resources specified in the Scoping Document, Over 150 resources in the counties of Delaware, Greene, and Ulster were included in the inventory and considered based on state and local significance, user groups, and visibility. The types of visual resources are described below.

Recreational Resources. Catskill Park consists of 700,000 acres of publicly (40%) and privately (60%) owned lands in the Catskill Mountains. The park has 98 peaks more than 3,000 feet high and spans four counties: Delaware, Greene, Sullivan, and Ulster Counties. 287,514 acres of the Catskill Park is state owned Forest Preserve, managed by NYSDEC.

Access to visual resources includes trails, roadways, and residential areas. The 5-mile visual assessment study area includes several public and private trails (Table 4.7-1) as well as trails that lead to summits and vistas that provide views throughout the Catskills (Table 4.7-2).

Table 4.7-1 Public and Private Trails within the 5-Mile Visual Assessment Study Area

German Hollow Trail	Cathedral Glen Trail	Devil's Path trails
Dry Brook ridge Trail	Belleayre Ridge Trail	Pine Hill, West Branch Trail
Mine Hollow Trail	Oliverea-Mapledale Trail	Seager-Big Indian Trail

Table 4.7-2 Summits and Vistas Beyond 5 Miles of the Project

Tremper Mountain	Panther Mountain	Cornell Mountain
Slide Mountain	Table Mountain	Overlook Mountain
Twin Mountain	Sugarloaf Mountain	Plateau Mountain
Hunter Mountain	Westkill Mountain	North Dome Mountain
Bearpen Mountain	Fir Mountain	Giant Ledge
Halcott Mountain	Balsam Lake Mountain	

Historic and Cultural Resources. Of the 88 historical structures identified in the historical structures survey, 44 were determined to be of historical significance. The Catskills has a rich history of agriculture, commerce, industry, transportation, and recreation. In particular, the region's long and distinctive history in farming and seasonal resort tourism characterizes most of the cultural landscape. The historic structures identified are primarily associated with historic agricultural and recreation (resort tourism) uses, except for two properties that are commercial in function and one that contains an historic schoolhouse. Architectural distinctiveness plays a role in each case, and the farmsteads are also significant in their depiction of the region's settlement history. Three properties have already have been listed on the NRHP: the Pakatakan Artists Colony in Arkville, Skene Memorial Library in Fleischmanns, and B'nai Israel Synagogue in Fleischmanns.

Six properties have been determined to be eligible for the NRHP: the Turner estate, Country estate, Suttner estate, the Wild Acres hotel, and the Leach farmstead, all in Shandaken. The Commercial building on the southwest corner of intersection of Route 28 and Dry Brook Road in Middletown also has been determined to be eligible for the NRHP.

Residential Resources. Housing in the area is rural and dispersed. Year-round and seasonal homes are located throughout the area, with concentrations in the village centers such as the towns such as Fleischmanns, Pine Hill, and Arkville. Many local residents have chosen the area for its natural beauty and access to recreational resources. Field investigations included the observation and record of views from concentrations of residential buildings, and noting prominent of typical views from residential resources throughout the area. According to the U.S. Census, in 2000 there were 7,987 housing units within the three towns that contain the visual assessment study area and a total of 133,152 housing units located in the Tri-County area (U.S. Bureau of Census, 2008)

Roads and Highways. There are minor roads and major roads that could provide travelers with views of the project. Route 28 is the main east/west road across the Catskill Mountains, running west from Hudson, past the Belleayre Mountain Ski Area, to Oneonta. Route 42 is about 5 miles east of the site, where it runs north/south between Shandaken to Lexington. Route 49A(Gelli-Curci Road) runs along the north and west edge of the project site. Route 30 runs through Margaretville about 6 miles to the west of the site. Other minor routes, such as Red Kill Road, provide access to residential and recreational areas throughout the project area.

4.7.2 Future Visual Resources without the Project

On clear days in the winter and into the spring, existing slopes of the Ski Center are highly visible from the southern direction, as the contrast of the snow against the forested areas is easy to recognize. During the summer and fall, with the snow gone, this contrast is not as noticeable because of the full vegetation in the area and the green grass of the slopes, although the slopes are still recognizable. Topography and tree cover block the view of most of the chair lifts and buildings from the surrounding area. Lift 7 is visible because of its unique triangular shape and bright blue color, but generally the built structures at the Ski Center are not visible from the surrounding area because of topography, distance, or atmospheric conditions. Though blocked by topography and tree cover from most locations, the large parking areas near the Discovery Lodge are visible from the slopes of Halcott Mountain, while the tiered parking areas near the Tomahawk Lift are surrounded by trees and are not visible.

General Visibility in Catskills. Atmospheric conditions will have a significant influence on the visibility of the Project from distant locations. To assess the percentage of days of the year that the region experiences conditions that allow visibility of the project, visibility data were collected from the National Weather Service for the Catskill Region from the closest reporting station at Stewart Airport, about 40 miles to the south. Looking at data on distances of visibility recorded in 2007, the number of days of visibility within each season (or quarter of the year) from 5, 10, and over 15 miles away were calculated. (Refer to Figure 5.1 of Appendix AE). Only 31% of days exhibit conditions to provide over 15 miles of visibility in the Catskills, and 62% of the time, visibility is significantly limited beyond 10 miles.

Views of the Project from eighteen mountain summits were identified during the scoping process as valuable aesthetic resources that require evaluation in the DEIS (Table 4.7-3), and existing views were evaluated for visibility and quality to assess the potential impact of the project. This evaluation was completed using digital terrain modeling, on-line research, interviews with local guides, and field observations. Beyond five miles, only the ski slopes were visible to the naked eye, and from many locations distance, topography, and angle prevented a clear view of the ski area. A full description of these observations and assessment is provided in Appendix AE, including figures that summarize the evaluations, with viewsheds, line-of-sight profiles, details on each visual resource, and photographs taken from these peaks (when available) provided in Attachment B of Appendix AE. There will be no change to the visual resources in the region without the implementation of this Project.

Table 4.7-3 Summary of Visibility of Project from Mountaintop Viewpoints

Mountain Viewpoint	Elevation (feet)	Distance from Belleayre (miles)	Visibility
Tremper	2,740	13	Existing trails are visible from fire tower; new ski slopes will be visible. Lifts and buildings will not be visible. See Appendix AE, Attachment C, simulation C-11.
Panther	3,720	7	Belleayre Mountain is visible, but the angle prevents a view of ski slopes
Cornell	3,708	11	No View
Slide	4,204	10	No View
Table	3,806	12	No View
Overlook	3,150	22	Belleayre not discernable from surrounding mountains
Twin	3,647	20	Belleayre not discernable from surrounding mountains
Sugarloaf (East)	3,782	18	Belleayre not discernable from surrounding mountains
Sugarloaf (West)	2,100	20	No View
Plateau	3,855	18	Belleayre not discernable from surrounding mountains
Hunter	4,040	15	Belleayre not discernable from surrounding mountains
Westkill	3,880	11	Belleayre visible during winter months, but usually blocked by vegetation in other seasons
North Dome	3,610	8	View would be similar to views from Halcott Mountain, but not as prominent. No trail access.
Bearpen	3,610	10	Belleayre likely visible during winter months. View would be similar to views from Halcott Mountain, but not as prominent. No access.
Fir	3,619	6	No View
Giant Ledge			Belleayre Mountain is visible, but the angle prevents view of ski slopes
Halcott	3,527	5	No access to peak. Views of ski slopes available from southern slope, with some views of new parking and lifts. See simulations.
Balsam Lake	3,723	7	No View
Vly	3,529	8.5	No view due to vegetation at viewpoint. No trail access
Red Hill	3,000	14	No View

4.7.3 Potential Impacts to Visual Resources

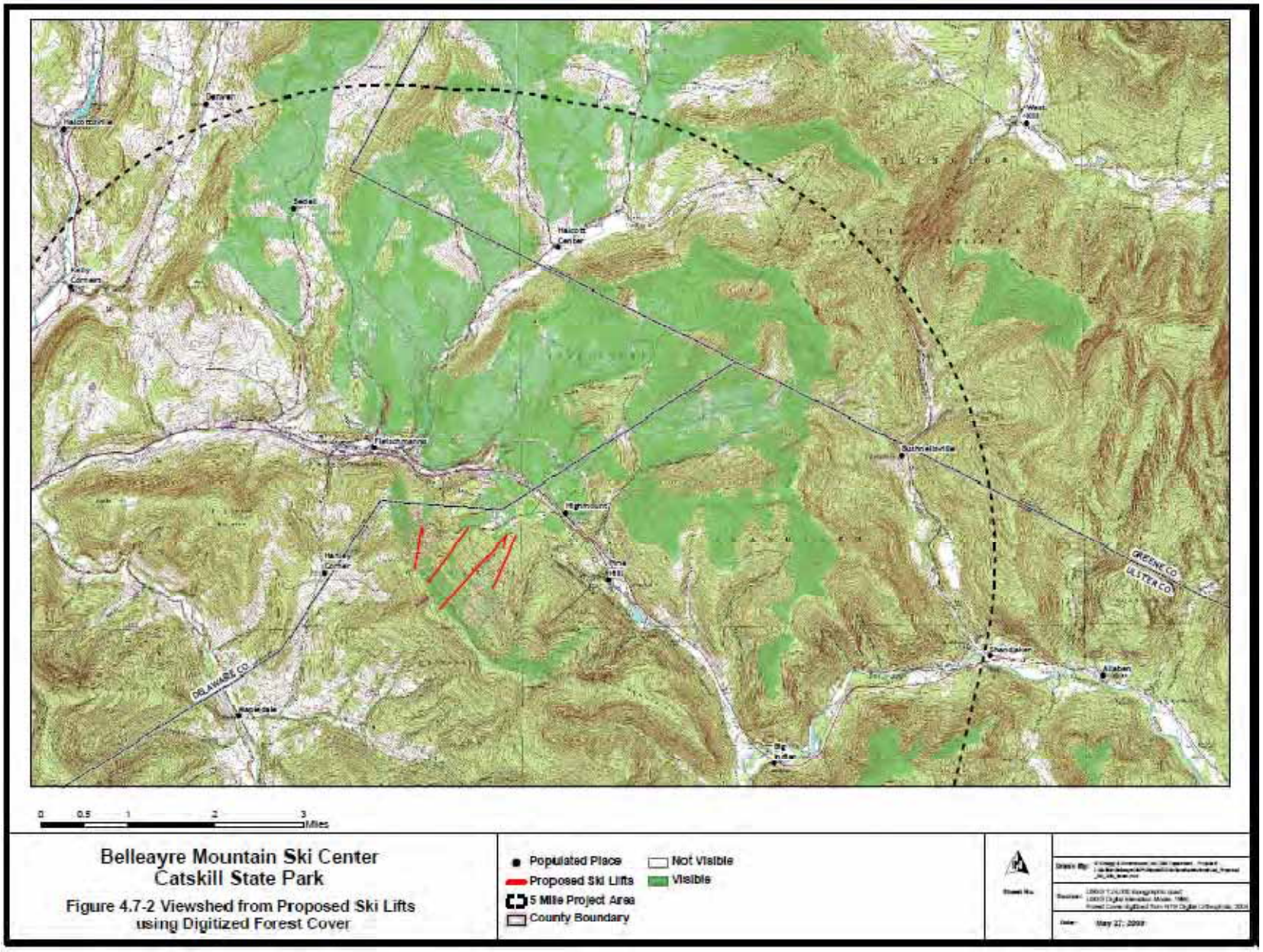
Assessing the visibility of the Project requires the determination of the extent of the area where the project may be visible. This is best demonstrated with Zone of Visual Impact (ZVI) maps and line-of-sight profile diagrams. In addition, the demonstration of what parts of the project are visible and what they will look like from representative locations is provided through photo simulations. The assessment of visual resources was conducted through the use of digital information review, computer simulations, and field investigations and photography. A detailed description of the methods and observations, in addition to ZVI maps, simulations, and line-of-sight diagrams are provided in the VIA Report as Appendix AE.

Project Description. The UMP proposes the creation of new ski slopes to the west of the existing slopes, with three new chair lifts and two replacement chair lifts, expansion of Discovery and Sunset Lodges, a new snowmaking supply pond, new parking lots, and improvement of snowmaking systems. These additions and improvements will require clearing 95.7 acres of forest. 53.9 acres will be cleared for new ski slopes and lifts. The new buildings and equipment on the upper areas of the hill will have exterior finishes that will blend into the landscape. A full description and maps of the improvements associated with this action are provided in Sections 1 and 3, and Appendix A UMP Drawings.

Zone of Visual Influence (ZVI). An evaluation of area topography using computer software was conducted to determine where line-of-sight observation of the existing and planned facilities is available. Design drawings and lay-out plans of the proposed project elements were used to locate new buildings, ski lifts, ski slopes, parking lots, and snowmaking pond on area maps. Digital terrain modeling was then utilized to create ZVI mapping. Several figures were developed to assess the 5-mile and 25-mile ZVI based on topography, and with or without vegetation (See Figures 4.1, 5.2, and 5.3 in Appendix AE). Figure 4.7-2 represents the five-mile radius of ZVI, considering both topography and vegetation on the project site.

Throughout the region, there are many locations that do not have a view of Belleayre Mountain because of topography and vegetation. Based only on topography and vegetation cover on Belleayre, 98% of the region within 25 miles of the site will not have a view, and 79% of the region within 5 miles will not have a view.

See on next page, Figure 4.7-2 - Viewshed from Proposed Ski Lifts using Digitized Forest Cover.



Belleayre Mountain Ski Center
Catskill State Park

Figure 4.7-2 Viewshed from Proposed Ski Lifts using Digitized Forest Cover

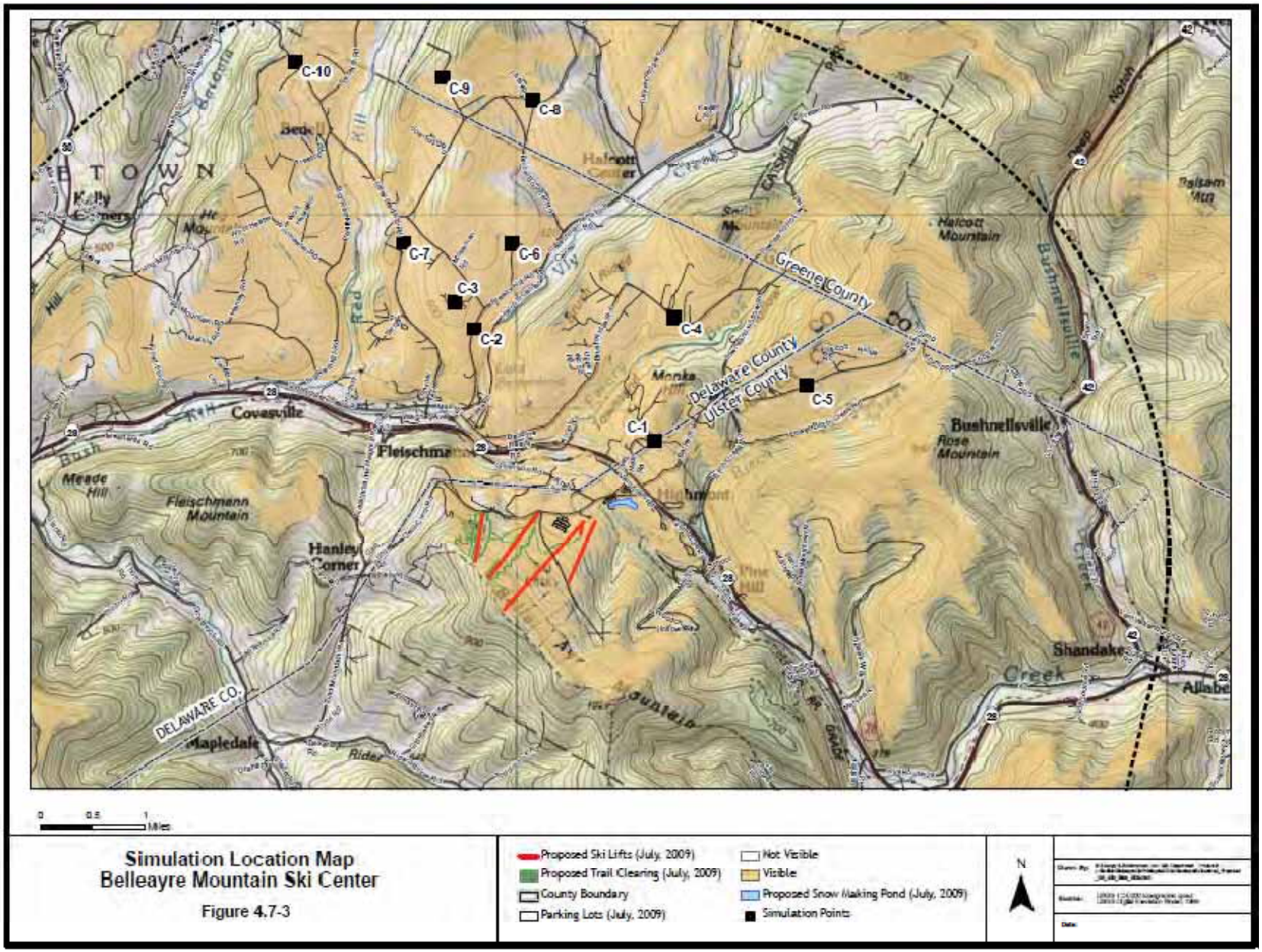
Evaluation of Visibility Within the 5 Mile Visual Assessment Study Area
Comparing the map of visual resources and the ZVI maps, resources that potentially had views of the project were identified. Based on topography and vegetation on Belleayre only, 16 of the noted visual resources identified within 5 miles of the project area had potential views of the project. Using the maps of all aesthetic resources and the ZVI, three teams travelled throughout the area to observe visual quality of the region and visibility of Belleayre Mountain.

Photographs were taken from using digital cameras with the aperture set to approximately 50 mm to simulate normal human eyesight relative to scale. Using the list of aesthetic resources as a guide, the location selected for each photograph was judged by the field observer to be the most unobstructed line-of-sight to the project area from the subject visual resource. The project site and surrounding area is heavily forested. However, drastic elevation changes, roadways, fields and clearings created specifically to appreciate the view could allow views from within forested areas. Since vegetation beyond the immediate project area was not included in the modeling, field observations were used to assess and confirm if vegetation would block views from specific locations.

Based on a review of ZVIs, visual resource locations, concentrations of residential areas, and all photographs taken in the field, 12 photographs from 11 locations were selected to best simulate the visual impact of the project. Figure 4.7-3 is a map of the simulation locations, which are listed in Table 4.7-4. The simulations are provided in Attachment C of Appendix AE. These locations were chosen from the views of the project to provide a variety of angles and distances that capture the project elements, considering nearby visual resources and visibility.

Table 4.7-4 Summary of Photo-Simulations

Simulation	Location (street)	Distance (Miles to Discovery Lodge)	Direction of View
C-1	Owl's Nest Restaurant	1.8	SE
C-2	Breezy Hill Rd.	2.3	SSE
C-3	Oak Ridge Rd.	2.6	SSW
C-4	Brush Ridge Rd.	2.6	SW
C-5	Upper Birch Creek Rd.	3	SW
C-6	Top of Bellows Rd.	3.1	SW
C-7	Little Red Kill Rd.	3.4	SE
C-8	Kaftas Rd.	4.4	SE
C-9	De. Nacola Rd.	4.7	SE
C-10	Dimmick Mtn Rd.	5.4	SE
C-11	Mt. Temper fire tower	12.6	NW



Simulation Location Map
Belleayre Mountain Ski Center

Figure 4.7-3

Line-of-sight Profiles. In addition to the line-of-sight diagrams from each of the mountain peaks identified in the scoping process, three additional rendered cross sections have been prepared, to demonstrate the line of sight from Fleishmanns, Pine Lake, and Highmount. Attachment D of Appendix AE provides these figures. These more specific diagrams were developed using existing topographic information, tree cover assessed during field studies and aerial photographs, and project element descriptions and locations. These profiles illustrate the type and extent of screening from locations adjacent to the project area.

Nighttime visibility. During project scoping, it was determined that the visual impact study will include visibility at night and the issues of nighttime "sky glow" and direct glare. The visual impact of night-time lighting on the night sky is a concern in many communities. The Dark Sky Society defines light pollution as "glare, light trespass, and light which is reflected into the night sky, contributing to sky glow, through the use of unshielded, misplaced, excessive, or unnecessary outdoor night lighting"(Dark Sky Society 2009). Light pollution from ski resorts represents a challenge because the resorts are often located in rural areas, where natural darkness is prevalent but where lighting can also bounce off snow on the slopes or be trapped by low clouds or snowmaking operations. During snowmaking activities, lighting is necessary for the safety of personnel working with the snowmaking equipment. There are no plans to provide night-time skiing at Belleayre Mountain, which eliminates the source of most light pollution concerns associated with ski centers in general. Project plans include the removal of some lighting that currently exists to aid snowmaking.

The variety of possible lighting scenarios in different weather conditions prevents an accurate simulation of potential light pollution. Since lighting on the mountain will remain the same or will be reduced, the potential for light pollution in the no-build and build conditions will remain the same—only changes in weather conditions provide a change in the different levels of light pollution from Belleayre. To document current lighting conditions and provide a demonstration of potential light pollution under different conditions, nighttime photographs were taken from various locations in the region. These locations were chosen to represent local visual resources and represent views from various directions, distances, and ambient lighting conditions. Refer to Figure 5-6 of Appendix AE for Nighttime simulation photo locations. The locations chosen for these simulations were as follows:

- Route 28 East-bound Parking Area at Big Indian
- Alder Lake
- Dry Brook Community Center
- Fleishmanns Sports Fields

Different aperture settings represent a different skyglow and light trespass conditions. Attachment E of Appendix AE provides the photo simulations and discussion of impacts.

Lighting impacts can be mitigated to significantly limit light pollution. The amount and type of light pollution is affected by the amount and type of lighting used and the positioning or aim of the lighting. The lighting on the new slopes will be designed to limit light pollution. Lighting on all new buildings will also be designed to control light pollution, in accordance with Leadership in Energy and Environmental Design (LEED) standards.
Since night skiing is not available and there are no plans to offer night skiing, the need for lighting is significantly reduced. Snowmaking activities will continue to occur during after hours, requiring lighting for the safety of workers. In addition, some pole-mounted lights that currently exist will be removed. Buildings will have security lights around them, but these will be designed to minimize stray light. The overall night lighting will therefore be reduced by the proposed action, resulting in a reduced nighttime visual impact.

Visual Impact Assessment
To assess the significance of the aesthetic impact of the proposed project, all the maps, figures, and simulations described above were reviewed, along with the assessment of field observations and research. While visibility of the Project can be estimated and verified, which is the first task of this assessment, the evaluation of visual impacts on those locations where views are possible is a difficult task. Visual character and aesthetic quality is a subjective evaluation, with each person likely to have a different opinion on what would be considered impact on character and quality. NYSDEC policy states that "aesthetic impact occurs when there is a detrimental effect on the perceived beauty of a place or structure. Significant aesthetic impacts are those that may cause a diminishment of the public enjoyment and appreciation of an inventoried resource" (New York State Department of Environmental Conservation July 31, 2000). The goal of this assessment has been to provide the reader with a clear and scientific understanding of the visibility of the project and to assess visual impact based on the project's compatibility, contrast, and scale as well as any changes in the aesthetic character of the landscape and the impact on users groups.

The changes to the Belleayre Ski Center will be blocked from view by topography and vegetation from most locations in the region. As demonstrated in the simulations and line-of-sight profiles, distance, angle, and seasonal changes in vegetation will often prevent the viewers from recognizing built structures from the locations where visibility is possible. The new ski slopes, like the existing ones, will be highly visible from some locations in the winter months because the white groomed snow provides a high contrast with the forested areas of the Mountain. Since Belleayre currently includes existing ski slopes and the new slopes are of similar length and width, the new expansion is compatible with the existing site. While the new slopes will be visible feature of the landscape from

certain locations, the 53.9 acres of new slopes represent an increase in 35% of groomed trails at Belleayre; thus, the expansion is not excessive in scale compared with the size of the existing ski center. The new lifts and other built structures will not be visible from mountaintop viewpoints because of the distances involved. Based on the similarity of the Project's contrast and scale to existing visual elements on the landscape, the visual presence of the Project will not have a detrimental effect on the perceived beauty of the surrounding location.

Access to and public enjoyment of surrounding historical, recreational, and commercial land uses will not be impacted by the visual character or visibility of the Project. Access for recreational skiing and hiking will be improved as a result of the project, as the Ski Center will improve existing facilities, provide new trails, and provide for more skiers.

4.7.4 Proposed Visual Resources Mitigation Measures

The Project has been designed to mitigate visual impact and improve the aesthetic quality of Belleayre Mountain. New ski lifts are streamlined to be lower in profile than the existing ski lifts, and will be painted colors that blend into the wooded landscape. Parking lots will be terraced and tree cover will be preserved to block views of the lots. External finishes of the new buildings will also be chosen to blend into the landscape, using earth tone colors and non-reflective glass.

To prevent light pollution, outdoor lighting will be designed to meet the standards of the International Dark Sky Association. Cut off light fixtures will be used in new applications, and the facility will not be equipped with lighting to allow night skiing.

4.8 Air Quality Analysis

The proposed action has been evaluated for its potential impacts on air quality. The air quality in the vicinity of the development could be impacted by the increase in air emissions caused by additional vehicular traffic at local roadway intersections, the potential increase in engine use associated with snowmaking, impacts from space heating equipment, and temporary impacts caused by construction. The potential impacts from mobile sources (traffic), construction, and stationary sources on the site are discussed following a review of air quality standards and existing conditions in the following sections.

4.8.1 Existing Air Quality Conditions

4.8.1.1 Air Quality Standards

National and New York State Ambient Air Quality Standards (NAAQS)

The United States Environmental Protection Agency (EPA) has promulgated air quality standards to protect the public health and welfare. The EPA has established National Ambient Air Quality Standards (NAAQS) for seven criteria pollutants: carbon monoxide (CO), lead, nitrogen dioxide (NO_2), ozone, particulate matter with aerodynamic diameters less than or equal to 10 microns (PM_{10}), particulate matter with aerodynamic diameters less than or equal to 2.5 microns ($PM_{2.5}$), and sulfur dioxide (SO_2). A summary of the National Ambient Air Quality Standards (NAAQS) is presented in Table 4.8-1. The NAAQS are set at levels the EPA believe necessary to protect human health (primary standards) and human welfare (secondary standards). NYSDEC has adopted the EPA's NAAQS for each of the pollutants identified in Table 1-1.

The United States is divided into "air quality control regions," and ambient air monitoring of criteria air pollutants within these regions is used to determine compliance with the NAAQS. Regions (or portions of regions) with air pollutant concentrations that are less than or equal to NAAQS are categorized as attainment areas. Regions where no monitoring data is available but are likely attainment are categorized as unclassifiable/attainment. EPA categorizes regions (or portions of regions) with criteria air pollutant concentrations greater than the NAAQS as nonattainment areas. For ozone and PM_{10}, nonattainment areas may be further categorized by the degree of nonattainment relative to the NAAQS.

Belleayre Mountain Ski Center is located in Ulster County, New York, which is part of the Hudson Valley Intrastate Air Quality Control Region (AQCR). The current air quality designation status for this AQCR is shown in Table 4.8-1. Although the project location is located in an area designated as unclassifiable/ attainment, all of New York State is considered part of the Northeast Ozone Transport Region (NOTR) and is treated as moderate ozone nonattainment for air quality planning purposes.

Table 4.8-1 National and New York Ambient Air Quality Standards and Attainment Status

Pollutant	Averaging Time	Primary Standard	Secondary Standard	Attainment Status
Ozone	1-Hour[1]	235 µg/m^3 (0.125 ppm)	235 µg/m^3 (0.125 ppm)	Unclassifiable/ attainment
	8-Hour 1997 [2]	156 µg/m^3 (0.084 ppm)	156 µg/m^3 (0.084 ppm)	Unclassifiable/attainment
	8-Hour 2008 [2]	139 µg/m3 (0.075 ppm)	139 µg/m3 (0.075 ppm)	Designations to be finalized by March 2011
CO	1-Hour[3]	40,000 µg/m^3	none	Unclassifiable/ attainment
	8-Hour[3]	10,000 µg/m^3	none	Unclassifiable/ attainment
NO_2	Annual[4]	100 µg/m^3	100 µg/m^3	Cannot be classified/better than national standards
	1-Hour[8]	188.7 µg/m^3	none	Classification not determined yet
$PM_{2.5}$	24-Hour[5]	35 µg/m^3	35 µg/m^3	Unclassifiable/ attainment
	Annual[6]	15 µg/m^3	15 µg/m^3	Unclassifiable/ attainment
Lead	Quarter[4]	1.5 µg/m^3	1.5 µg/m^3	Not designated
	Rolling 3-month average	0.15 µg/m^3	0.15 µg/m^3	Not designated
PM_{10}	24-Hour[1]	150 µg/m^3	150 µg/m^3	Cannot be classified/better than national standards
	Annual[7]	50 µg/m^3	50 µg/m^3	Cannot be classified/better than national standards
SO_2	1-Hour[3]	75 ppb	none	Classification not determined yet
	3-Hour[9]	none	0.5 ppm (1,300 µg/m^3)	attainment
	24-Hour[9]	0.14 ppm (365 µg/m^3)	none	attainment
	Annual[4]	0.03 ppm (80 µg/m^3)	none	attainment

Notes:

(1) Standard is attained when expected number of exceedances is less than or equal to one per year.

(2) Standard is compared with the average of the annual fourth-highest 8-hour concentrations over a 3-year period.

(3) Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

(4) Standard never to be exceeded.

(5) Standard is compared with the average of the annual 98th percentile 24-hour concentrations over a 3-year period.

(6) Standard is compared with the average of the annual concentrations over a 3-year period.

(7) Standard (as expected annual arithmetic mean of 24-hour concentrations) never to be exceeded. Standard is maintained by New York but is rescinded at the federal level.

(8) Standard is compared with the 3-year average of the 98th percentile of the annual distribution of daily maximum 1-hour concentrations.

(9) Standard not to be exceeded more than once per year.

Key:

µg/m^3 = Micrograms per cubic meter.

ppm = Parts per million.

4.8.1.2 Existing Air Quality Data

NYSDEC maintains an air quality monitoring station network to continuously monitor criteria air pollutants and other air toxins throughout New York State. The monitoring network provides air quality information to form the basis of making policy, characterizing existing air quality in the vicinity of the monitoring location, reporting a pollutant's exposure hazard, and studying the effects and patterns of air pollutants. The most recent available air quality monitoring data can be found in the NYSDEC-compiled Air Quality Data Report of 2008. Air quality monitoring results from monitoring sites that are near the project site or are most representative of the project site are listed in Table 4.8-2. No exceedances of NAAQS and New York State Ambient Air Quality Standards (NYAAQS) occurred during 2008 at these listed monitoring sites.

Table 4.8-2 Existing Air Quality Data (2008)

Pollutant	Monitoring Station	Averaging Period	Concentration (NAAQS)[1]
Sulfur Dioxide	Belleayre	Annual 3-hour 24-hour	0.9 ppb (30 ppb) 11 ppb (500 ppb) 8 ppb (140 ppb)
Fine Particulates ($PM_{2.5}$)	Newburgh	Annual 24-hour	9.9 $\mu g/m^3$ (15 $\mu g/m^3$) 28 $\mu g/m^3$ (35 $\mu g/m^3$)
Inhalable Particulates (PM_{10})	No local monitor in NYSDEC Region 3	Annual 24-hour	N/A $\mu g/m^3$ (75 $\mu g/m^3$) NA $\mu g/m^3$ (250 $\mu g/m^3$)
Ozone	Belleayre	1-hour 8-hour	0.09 ppm (0.12 ppm) 0.072 ppm (0.075 ppm)
Lead	Wallkill	3-month	0.039 $\mu g/m^3$ (1.5 $\mu g/m^3$)
Carbon Monoxide	No local monitor in NYSDEC Region 3	1-hour 8-hour	N/A ppm (35 ppm) N/A ppm (9 ppm)
Nitrogen Dioxide	No local monitor in NYSDEC Region 3	Annual 1-Hour	N/A ppm (0.05 ppm) N/A ppm (0.100 ppm)

[1] Number in parenthesis represents applicable NAAQS or NYAAQS.

Key:

N/A = Not available.
$\mu g/m^3$ = Micrograms per cubic meter.
ppb = Parts per billion.
ppm = Parts per million.

The Clean Air Act (CAA) mandates that states adopt State Implementation Plans (SIPs), with the objective of eliminating or reducing the severity and number of violations of the NAAQS. SIPs set forth plans to expeditiously achieve and maintain attainment of the NAAQS.

4.8.1.3 Existing Emissions from Ski Center Operations

Current emission sources at Belleayre Mountain Ski Center include diesel engine driven air compressors for snowmaking, diesel engine driven grooming equipment for ski trail grooming, miscellaneous gasoline engine powered equipment including on-road light vehicles, snowmobiles, and landscaping equipment, and miscellaneous diesel equipment, including tractors, light and heavy on-road vehicles, and other non-road equipment. Emissions also result from the operation of heating boilers and furnaces in buildings.

The dominant source of emissions at Belleayre Mountain Ski Center is portable diesel-powered air compressors used to compress large volumes of air for snowmaking. In 2008 there were 11 compressors, one at Barneyville and 10 rental compressors of approximately 500 hp each housed in the compressor building and attached to an underground pipe network that brings the compressed air to most of the ski trails. In addition, a generator at Pine Lake is used to provide electricity to the Pine Lake Pump House for water-pumping during daytime hours. During the 2007/2008 season approximately 245,000 gallons of diesel fuel was consumed exclusively for snowmaking.

Criteria pollutant emissions from mobile and non-road diesel equipment were calculated using per gallon emission factors developed by the EPA for non-road equipment engines and assumes that equipment was powered by off-road engines meeting EPA Tier 1 emission rates; Tier 1 emission rates were required for 1996-2000 for engines at this horsepower. A similar approach was used for gasoline-powered equipment and vehicles. Because equipment and vehicles are fueled from common tanks, and because accurate data on vehicle distance traveled or fuel consumption by vehicle or equipment is not collected, it was assumed that all emissions were from snowmobiles, which is considered a reasonable worst case. Boiler emissions were calculated using EPA, AP-42 emission factors using measured fuel consumption.

Table 4.8-3 shows the emissions from existing equipment at the site. As noted above, the portable air compressors dominate emissions.

Table 4.8-3 Existing Equipment Emissions

Equipment	Fuel Type	Emission (tpy)					
		VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Compressors/Generators	Diesel	1.06	6.85	31.54	NA	1.053	1.05
Groomers	Diesel	0.13	0.86	3.97	0.17	0.13	0.13
Misc. Gasoline Equipment	Gasoline	0.76	4.79	0.47	0.01	0.08	0.08
Misc. Diesel Equipment	Diesel	0.03	0.21	0.96	0.04	0.03	0.03
Boilers	Fuel Oil	0.01	0.08	0.28	0.06	0.006	0.006
	Total	**2.00**	**12.79**	**37.22**	**0.29**	**1.31**	**1.30**

Key:

CO = Carbon monoxide.
NO_x = Nitrogen oxides.
$PM_{2.5}$ = Particulate matter less than 2.5 microns in diameter.
PM_{10} = Particulate matter less than 10 microns in diameter.
SO_2 = Sulfur dioxide.
tpy = Tons per year.
VOCs = Volatile organic compounds.

No microscale or mesoscale analysis of transportation emissions was conducted for the existing project because, as described in Section 4.8.3, transportation emissions are screened out for detailed analysis as required by NYSDOT environmental procedures.

4.8.2 Future Air Quality Conditions without the Project

Future air quality conditions will remain the same or could improve slightly without the project. Snowmaking operations would continue to rely on the use of diesel compressors and generators, which represent the site's largest source of emissions. Small improvements could be attributed to increasingly stringent requirements for vehicle and equipment engines and fuels that tend to reduce emissions as older equipment is retired and replaced with new equipment. As Belleayre Mountain Ski Center is currently operating at close to capacity, there is no possibility for a large increase in guests, and therefore there is no anticipated change in activity that would adversely affect emissions.

4.8.3 Potential Impacts on Air Quality

Construction Phase Sources

Diesel construction equipment would be on-site for short durations and would not represent a source of long-term emissions. Short-term emissions would not result in more than 50 tons per year (tpy) of all criteria pollutants. Since total annual emissions are below major source thresholds, these emissions would not have a significant adverse impact on air quality.

The construction plans are described in Section 1, and impacts related to greenhouse gases are described in Section 4.9. The construction activity includes some grading and clearing that will utilize diesel-powered equipment. Emissions from construction would result from building the Discovery Lodge and several equipment buildings, clearing new trail and parking areas, adding water storage, and adding and replacing ski lifts. Construction is scheduled to take place over several years; however, equipment operation will not be continuous during the construction period.

Construction emissions estimates are based on detailed equipment lists and activity estimates provided by the NYSDEC design team. Project construction would take place over four summers, but the greatest amount of equipment use and, therefore, emissions is planned for the second year. As major source thresholds are annual, emissions were only estimated for this highest activity year.

The initial study for this project used an operational year of 2015, with construction starting in 2013. Project delays suggest that 2018 is a more realistic start date for operations. Population growth in this region is small (1.5% over the next five years, or 0.3%/year), and traffic and other sources of air emissions is not anticipated to change, except for gradual improvements as the older fleet of vehicles retired. This change in date for the analyses is not expected to have a measurable change in any of the air quality analyses presented here.

Emission factors for non-road equipment are from the EPA Non-road 2008 a model, are specific to Ulster County, NY, and were estimated for 2010. Based upon this information, an analysis was done upon an assumption that Year 1 of construction was likely to start later than 2010, and as equipment emissions improve in the future, the use of 2010 emission factors produces a conservative estimate. Non-road equipment is the largest source of proposed construction emissions. Equipment will include bulldozers, excavators, compactors, compressors, and off-road dump trucks. Emissions were also estimated for helicopters, on-road heavy trucks, and on-road light duty vehicles, including material-delivery trucks and employee personal vehicles used for commuting to the site. The worst-year construction phase emissions are estimated to be significantly lower than major source thresholds (Table 4.8-4). Therefore no significant adverse impacts to air quality are expected as a result of the proposed construction activities.

Table 4.8-4 Worst Year Construction Phase Emissions

Source	Emission (tpy)					
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Nonroad Equipment	6.74	13.71	24.46	0.61	1.64	1.59
Helicopter	0.02	0.32	0.18	0.02	NA	NA
On-Road Heavy Trucks	1.66	9.04	17.31	0.02	0.76	0.65
On-Road Light Duty Vehicles	0.39	3.54	0.39	0.00	0.04	0.02
Total	**8.821**	**26.613**	**42.349**	**0.655**	**2.437**	**2.262**

Key:

CO = Carbon monoxide.
NO_x = Nitrogen oxides.
$PM_{2.5}$ = Particulate matter less than 2.5 microns in diameter.
PM_{10} = Particulate matter less than 10 microns in diameter.
SO_2 = Sulfur dioxide.
tpy = Tons per year.
VOCs = Volatile organic compounds.

Operation-Phase Ski Center Emission Sources

Projected emission sources will include vehicles, non-road equipment, and stationary sources associated with the project. Overall, the emissions will be reduced due to the proposed change from diesel compressors to electric equipment for snowmaking (see Section 4.9, Global Climate Change, and Section 9, Energy). There would be an additional source of emissions from increased snow-grooming, facility maintenance, and new space heating in the Discovery Lodge. The new space heating would use fuel oil and is not likely to require an air quality permit because of the proposed size. Overall consumption of diesel fuel from both mobile and stationary sources would be reduced by more than 80% at Belleayre Mountain Ski Center, resulting in a substantial reduction in emissions.

Once construction is complete, emissions of all criteria pollutants will be reduced due to the removal of the large diesel air compressors. Diesel snow-grooming equipment is currently used on the trails; any new equipment used for the additional trails will produce lower emissions than the older equipment that was available, and as new equipment replaces older equipment emissions will continue to decrease. Other emission sources include the oil burning space heating to be added at the Discovery Lodge. This boiler will be sized at approximately 1,250,000 British thermal units (BTU) per hour and will generate significantly less than 50 tons per year of all criteria pollutants.

Based upon Year 1 of construction as 2010, estimates of operational phase emissions were made for 2015. These references to the operation phase are subject to change based upon the actual dates of construction. Energy modeling data provided by the project architect were used for the Discovery Lodge emissions. For vehicles and non-road equipment owned by Belleayre Mountain Ski Center it was assumed that activity and emissions would increase proportionally to the projected 27% increase in trail area. Mobile source emissions from ski center guests are not included in this analysis.

As shown on Table 4.8-5, without the emissions from the air compressors, overall emissions decrease from existing conditions by more than 40% for VOC and CO and by more than 70% for NO_x, SO_2, $PM_{2.5}$ and PM_{10}. Groomers would be the largest source of emissions. Emissions for all pollutants are significantly less than the major source thresholds of 50 tpy for volatile organic compounds (VOCs) and 100 tpy for the other criteria pollutants. Given the mobile and dispersed nature of most of the emission sources, there is no significant risk of the proposed project causing an exceedance of air quality standards.

Table 4.8-5 Operation Phase Emissions

Equipment	Fuel Type	Emissions (ton/year)					
		VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Compressors/Generators	Diesel	0.00	0.00	0.00	0.00	0.00	0.00
Groomers	Diesel	0.17	1.09	5.02	0.22	0.17	0.17
Misc. Gasoline Vehicles and Equipment	Gasoline	0.97	6.06	0.60	0.02	0.10	0.10
Misc. Diesel Vehicles and Equipment	Diesel	0.04	0.26	1.22	0.05	0.04	0.04
Boilers	Fuel Oil	0.01	0.10	0.38	0.10	0.008	0.008
Total		**1.19**	**7.52**	**7.21**	**0.39**	**0.32**	**0.31**
Change in Emissions		**-0.81**	**-5.26**	**-30.00**	**-0.95**	**-0.99**	**-0.99**
Percent Change in Emissions		**-40%**	**-41%**	**-81%**	**-71%**	**-75%**	**-76%**

Key:

CO = Carbon monoxide.
NO_x = Nitrogen oxides.
$PM_{2.5}$ = Particulate matter less than 2.5 microns in diameter.
PM_{10} = Particulate matter less than 10 microns in diameter.
SO_2 = Sulfur dioxide.
tpy = Tons per year.
VOCs = Volatile organic compounds.

Lead emissions from typical combustion sources have been virtually eliminated as a result of regulations and legislation prohibiting the manufacture, sale, or introduction of any engine requiring leaded gasoline after 1992 and the removal of leaded gasoline from retail sale. Therefore, no estimates for lead emissions were included in this analysis.

Mobile Sources CO and PM Screening

In addition to estimating emissions from the proposed ski center expansion, the State Environmental Quality Review Act (SEQRA) requires that hot spot CO and PM emissions be assessed to ensure that there are no localized exceedances of air quality standards from mobile sources.

The majority of traffic to/from Belleayre Mountain Ski Center uses New York State Route 28 (see Section 4.6, Traffic). Morning traffic to the ski center is spread out over several hours, centered on the opening time of 9:00 a.m. Most skiers stay the day and depart shortly after closing time (5:00 p.m.). The peak hour traffic, as determined by the Traffic Study (Section 4.6), occurs on a Saturday afternoon around the closing time of the ski center. The expansion is expected to increase the number of skiers using Belleayre Mountain Ski Center; hence, traffic on Route 28 and County Road (CR) 49A and intersections leading to the ski center are projected to increase. Currently, traffic along Route 28 is in a free-flow condition. Vehicles entering/exiting Belleayre Mountain Ski Center must use the intersection of Route 28 and CR49A. During the peak hour departure

time on Saturday afternoon, the majority of the traffic using this intersection is turning right from CR49A to eastbound Route 28. As traffic flows eastbound on Route 28, volume is reduced slightly as vehicles turn from Route 28 onto Routes 47, 214 and 212. However, the majority of traffic volume continues eastbound past the Route 28/212 intersection.

Mobile Source air quality impacts of the proposed action can be evaluated on two scales:

Microscale: CO, the predominant pollutant emitted by motor vehicles, is a site-specific pollutant with higher concentrations found adjacent to roadways, and especially at roadway intersections due to idling of vehicles. As a result, it is usually of concern on a local or micro-scale basis. It is typically evaluated using a series of steps defined by NYSDOT guidance. The process consists of a screening analysis to determine the necessity of modeling. If needed, a modeling study of traffic-related emission impacts at specific intersections in the project's vicinity is conducted.

Mesoscale: Typically, a mesoscale analysis is conducted for NO_x and VOC, precursors of ground-level ozone, if the project is located in a non-attainment area for ozone. A mesoscale analysis is typically only conducted for large transportation infrastructure projects such as new highway construction, addition of travel lanes to an existing limited access highway, etc. The Belleayre Mountain Ski Center expansion project does not involve large transportation infrastructure changes, and therefore a mesoscale analysis was not conducted.

Microscale Analysis and Results

A screening procedure is used in the first step of a microscale analysis. For roadways/intersections that do not pass the steps in the screening test, a refined modeling analysis is used to quantitatively evaluate impacts. To determine if any intersections in the project area required a refined modeling analysis, a three-tiered screening process was conducted to identify intersections that potentially could cause a significant air quality impact. The guidelines in the Environmental Procedure Manual (EPM) promulgated by New York State Department of Transportation (NYSDOT [2001]) were used in the screening analysis. The three-tiered screening procedures and processes are detailed in Appendix A. All intersections in the project vicinity passed the screening test. No quantitative modeling for CO microscale impacts is needed.

Construction activities associated with the project are not expected to result in traffic disruption on Route 28 due to diversions or detours. Deliveries of material for the Discovery Lodge and ski lift components of the project would temporarily

increase truck traffic by fewer than ten deliveries per day. No air quality impacts associated with construction traffic are anticipated.

Mobile Source Particulate Matter

Particulate matter analysis guidance is provided by the NYSDOT in "New York State Department of Transportation Project Level Particulate Matter Analysis – Final Policy." The policy addresses analysis procedures for highway construction projects and any resulting change in traffic associated with the project. The Belleayre Mountain Ski Center expansion project's main impact with respect to traffic would be to induce an increase in traffic volume; thus, there is a potential for an increase in particulate matter emissions.

The traffic study indicates the peak hour volume occurs on a Saturday afternoon near the 5:00 p.m. closing time as vehicles exit parking lots and enter County Road 49 and Route 28. Once traffic is on Route 28, it moves in a free-flow condition, primarily eastbound, through the Route 28 corridor and out of the project area. Some traffic also turns from CR49A and travels westbound on Route 28. The highest peak hour volume at an intersection for the Build ETC year (2015) is projected to occur at the intersection of County Road 49A and New York Route 28. This volume is 1,899 vehicles/hour for the Build condition and 1,200 vehicles/hour for the No Build. Thus a traffic volume increase due to the Build condition is expected to occur. The morning peak volume is lower than the afternoon volume because skiers arrive over a several hour period. It should be noted that outside of the morning arrival and afternoon departure periods, traffic volume is significantly lower than the peak hour.

According to NYSDOT PM procedures and because the project area is in attainment for PM, the critical analysis year is the ETC year (2015). The traffic site selected for the emission source strength analysis is the intersection of CR49A and Route 28 because this intersection is projected to have the highest traffic volume resulting from the Project.

The NYSDOT PM emission factor look-up table on-line tool was used to determine emission factors based on the following input:

- Ulster County as project location;
- Analysis year of 2015 (ETC year); and
- Road Functional Class – 07/08/09 (major/minor rural collector and local road).

The vehicle volume increase associated with the project will be Belleayre Mountain Ski Center patron private vehicles, consisting of gasoline-powered automobiles (classification LDGV) and light duty trucks (classification LDGT1). The PM emission factors for these classes of vehicles are:

- 0.011 grams per mile travelled (non-idle $PM_{2.5}$);
- 0.025 grams per mile travelled (non-idle PM_{10}); and
- 0.000 gram/hour (idle $PM_{2.5}$ and PM_{10}).

In order to determine the emission source strength for the intersection, an estimate of vehicle distance travelled through the intersection must be determined. The intersection is a typical arrangement with the roads intersecting perpendicular to each other. Therefore, a distance of 100 feet for each approach and departure to the intersection is assumed as the deceleration and acceleration distance. For the Build and No Build Volume in the peak hour, the following vehicle miles travelled (VMT) are determined based on the Build and No Build vehicle volumes for through and turning traffic and the 100-foot deceleration and 100-foot acceleration distance:

- Build –72 miles of VMT; and
- No Build – 45 miles of VMT;

Using the estimate of VMT and the NYSDOT MOBILE6.2 $PM_{2.5}$ and PM_{10} emission factors, the estimate of emissions during the peak hour for this intersection is less than 1 gram of $PM_{2.5}$ and between 1 and 2 grams of PM_{10} for the Build and No Build. Over a 24-hour period (24-hours is the short-term averaging period of the $PM_{2.5}$ and PM_{10} ambient air quality standards) emissions from this intersection would likely be <10 grams of particulate matter because traffic volume at other hours of the 24-hour period would be significantly less. These levels of emissions are insignificant and will not result in any impact on ambient particulate matter air quality. Since this intersection has the highest traffic volume of any intersections in the project area, all other intersection impacts will be lower compared with the CR49A/Route 28 intersection.

Mesoscale Analysis

An estimate of vehicle emissions from staff and visitor trips was made for the existing condition and future condition after completion of the project. Emissions were calculated for vehicle round-trips along the Route 28 corridor between the I-87/Route 28 interchange and Belleayre Mountain Ski Center. Vehicle miles tra-

velled increases by approximately 76%; however, the resulting increase in NO_x and VOC emissions are small, increasing 0.8 tpy and 1.1 tpy, respectively.

Table 4.8-6 Study Area Vehicle Emissions from Staff and Visitor Trips

	Vehicle Miles Travelled	VOC (tons/yr)	CO (tons/yr)	NO_x (tons/yr)	SO_2 (tons/yr)	PM_{10} (tons/yr)	$PM_{2.5}$ (tons/yr)
Existing							
Staff - PV	170,804	0.2	1.6	0.1	0.0	0.0	0.0
Staff - LT	244,590	0.3	2.8	0.2	0.0	0.0	0.0
Visitor - PV	1,580,395	1.5	14.6	1.0	0.0	0.0	0.0
Visitor - LT	2,972,037	3.4	33.9	2.7	0.0	0.1	0.0
Visitor - Bus	15,790	0.0	0.0	0.2	0.0	0.0	0.0
Total Existing	**4,983,615**	**5.4**	**52.9**	**4.2**	**0.0**	**0.1**	**0.0**
Proposed							
Staff - PV	301,127	0.2	2.2	0.1	0.0	0.0	0.0
Staff - LT	431,211	0.4	3.9	0.3	0.0	0.0	0.0
Visitor - PV	2,786,233	1.7	20.0	1.1	0.0	0.1	0.0
Visitor - LT	5,239,695	4.3	47.0	3.2	0.1	0.1	0.0
Visitor - Bus	27,838	0.0	0.0	0.2	0.0	0.0	0.0
Total Proposed	**8,786,104**	**6.5**	**73.1**	**4.9**	**0.1**	**0.2**	**0.0**
Difference	**3,802,488**	**1.1**	**20.2**	**0.8**	**0.0**	**0.1**	**0.0**

Notes:

1) Vehicle occupancy and types from actual passenger and vehicle counts on 2/13/2010 and 2/14/2010 except bus occupancy, which was obtained from group sales records.
2) Maximum round trip distance considered was 70.2 miles, the distance from Belleayre Mountain Ski Center to I-87.
3) MOBILE6.2 emission factors for 2010 were used for the existing condition and year 2015 for the proposed project.

Key:

PV = Passenger vehicle.
LT = Light truck.

Effect on the Northeast Ozone Transport Region

The ozone transport region includes a multi-state area in the mid-Atlantic and New England region. Therefore, the NOTR includes the Catskill Region. Within the NOTR, emissions of NOx and VOC are monitored and regulated to control the formation of tropospheric ozone.

The traffic study projects an increase in Belleayre Mountain Ski Center patrons if the project is built. An increase in ski center attendance will generate an increase in vehicle miles traveled and an increase in NOx and VOC emissions due to vehicle use to visit the ski center. These emissions will occur during the winter, outside of the summertime ozone season of May 15 to September 15. Thus, any increase in NOx and VOC emissions would not be expected to contribute to additional ozone formation in the summer ozone season in the NOTR.

Summary of Potential Impacts on Air Quality

Impacts from construction equipment and particulates from earth-moving are of short duration, very localized, and not likely to impact areas outside the site. Existing air quality impacts from operations are primarily due to diesel engine powered air compression equipment. This equipment will be removed and replaced with electric motor- driven air compression equipment which will eliminate emission from the air compression equipment. Emissions from the space heating additions are very minor and do not require a detailed analysis.

The CO screening-level microscale mobile source air quality analysis indicates that the proposed project will not cause traffic changes requiring a detailed microscale modeling analysis. As a result of passing the screening-level test, it follows that traffic associated with the project will not cause exceedance of air quality standards. The additional traffic due to the project is expected to lower the Level of Service (LOS) at key intersections to a LOS of D or lower during the peak hour; however, due to low emission factors for the current vehicle population and the low peak hour volume at these intersections, the project passes the volume threshold screening test. In addition, the change in the emissions of ozone precursor compounds is anticipated to be insignificant compared with regional emission levels of these compounds. Thus, regional ozone levels will not be affected by the project.

4.8.4 Proposed Air Quality Mitigation Measures

Construction emissions can be mitigated using best management practices. Exhaust emissions from construction vehicles can be reduced by using fuel-efficient vehicles with emission controls and ensuring that all equipment is properly maintained. Dust emissions from ground disturbance and road traffic should be controlled by spraying water on soil piles and graded areas and keeping roadways clean. Other possible mitigation includes:

- Minimizing idling of construction vehicles;
- Using existing power sources (e.g., power poles) or clean fuel generators rather than diesel-powered generators;
- Ensuring that all construction equipment is properly tuned and maintained prior to and during on-site operation;
- Developing a project-specific dust control plan to control dust in accordance with best construction practices. Specific practices include:
  - Using traffic control to restrict traffic to predetermined routes
  - Maintaining as much natural vegetation as is practicable

- Phasing construction to reduce the area of land disturbed at any one time
- Using temporary mulching, permanent mulching, temporary vegetative cover, permanent vegetative cover, or sodding to reduce the need for dust control
- Using mechanical sweepers on paved surfaces where necessary to prevent dirt buildup, which can create dust
- Periodically moistening exposed soil surfaces with adequate water to control dust
- Repeatedly applying treatments, as needed, to control dust when temporary dust control measures are used.

Proposed project operation phase mitigation is to remove the diesel-powered air compression system, which will greatly reduce air quality impacts relative to 2008 emissions. Additionally, the new Discovery Lodge will be built to LEED (Leadership in Energy and Environmental Design) Silver energy efficiency requirements, which will minimize fuel combustion and resulting emissions.

Mitigation measures will also be encouraged to reduce the air quality impact from staff and visitor traffic. Mitigation measures are described in Section 3.3 for Parking and Vehicle Circulation; many of the mitigation measures described would increase the number of passengers in vehicles and thereby reduce the number of vehicles travelling to Belleayre Mountain Ski Center. A reduction in the number of vehicles will result in a reduction in vehicle mobile source emissions. Key mitigation measures include preferential parking areas for high occupancy vehicles; other incentives for car pooling such as rewards of food, beverages, free/ reduced price lift tickets or equipment tuning; and increasing use of mass transit and/or shuttle buses by providing additional parking for buses.

4.9 Global Climate Change and Carbon Footprint

Climate change refers to any significant change in measures of climate (temperature, precipitation, or wind) that lasts for an extended period (e.g., decades or longer). Climate change may be affected by a number of factors including natural cycles (e.g., changes in the sun's intensity or Earth's orbit around the sun); natural processes within the climate system (e.g., changes in ocean circulation); and human activities that change the atmosphere's composition (e.g., burning fossil fuels) or land surface (e.g., deforestation, reforestation, urbanization, and desertification). "Ninety-seven percent of climate scientists agree that climate-warming trends over the past century are very likely due to human activities and most of the leading scientific organizations worldwide have issued public statements endorsing this position" (National Atmospheric and Space Administration, http://climate.nasa.gov/scientific-consensus#ft1).

Carbon footprint refers to the quantity of GHG resulting from an organization or activity. GHGs consist primarily of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). The presence of these gases in the atmosphere reduces the ability of the atmosphere to allow long-wave radiation (heat) to escape to space. CO_2, CH_4, N_2O, and water vapor are produced by natural processes (e.g., volcanic activity and the decay of vegetable matter) and human activities. The largest man-made sources of GHGs are stationary and mobile sources that burn fossil fuels (NOAA 2009).

Emissions of GHGs are assessed to measure carbon footprint. Each of the GHGs has a different contribution to global climate change. Carbon dioxide equivalency is a quantity that describes, for a given greenhouse gas, the amount of CO_2 that would have the same global warming potential (GWP), when measured over a specified timescale (generally, 100 years). The carbon dioxide equivalency for a gas is obtained by multiplying the mass and the GWP of the gas. For example, the GWP for methane over 100 years is 21. This means that emission of 1 metric ton of methane is often reported as 21 carbon dioxide equivalent (CO_2e) metric tons of GHG emissions.

GHG emissions are subject to regulation by the federal government. The 'Tailoring Rule' creates a Prevention of Significant Deterioration significance threshold for GHGs of 25,000 annual metric tons CO_2e (EPA 2010). In addition, there is a Mandatory GHG reporting rule at the Federal level. NYSDEC has issued guidance for assessing GHG and energy use in a SEQR EIS (NYSDEC 2009). Additionally, New York State is a member state of The Climate Registry, and which provides a General Reporting Protocol (GRP) (TCR 2008). The GRP is a primary source for methodologies and emission factors for this carbon footprint analysis.

4.9.1 Global Climate Change

Major winter recreation areas such as the Belleayre Mountain Ski Center may face operational challenges during the 21st Century if average global temperatures continue to rise. An increase in reliance on snowmaking to maintain a reliable snowpack would help to mitigate or adapt to these potential changing conditions.

Climate change challenges to construction of the Project, if the Project is built in the next 10 years, are expected to be minimal. It is anticipated that the effects from climate change over the next 10 years would be small and that local soil and water conditions, which could impact operation of construction equipment, would not change significantly from current conditions.

A study of the impacts of climate change on the U.S. Northeast was recently completed. The study results are summarized in the NECIA Synthesis Report (Frumhoff et al, 2007). Among many other assessments, the study also hypothesized on the potential effects on the snow season for a "lower" and "higher" greenhouse gas emission scenario. The "lower" emission scenario is generally characterized as one in which societies choose to rely less on fossil fuels and adopt more resource-efficient technologies, thus lower the rate of global average temperature increase. The "higher" emission scenario is defined as the continued rapid growth in greenhouse gas emissions resulting in an increase in the rate of global average temperature rise. Both scenarios were developed by the Intergovernmental Panel on Climate Change (IPCC) and used in the analysis prepared by the NECIA study team.

The NECIA Synthesis report states that regional temperature data over the past 30 years (1970 to 2000) shows that the average daily temperature in the U.S. Northeast has warmed at a rate of about 0.5 degrees Fahrenheit (°F) per decade. Winter daily average temperatures have warmed at a rate of 1.3°F per decade during this period. Average daily temperature data from the Belleayre Mountain monitoring station for the period of record of 1991 to March 2010 shows an increase in the average daily temperature of 1.2°F per decade, as determined by comparing the average of the daily mean temperature for the 1991/2001 period to the average for the 2001/2010 period. While a two-decade period is not necessarily indicative of longer term trends or a projection of future trends, the data show a change that compares favorably to the trend observed in the 30-year regional northeast US data analyzed for the NECIA Synthesis report.

The NECIA climate projections found that over the next several decades, due to greenhouse gas emissions in the recent past, average daily temperatures across the Northeast will rise 2.5°F to 4°F per decade in winter and 1.5°F to 3.5°F per decade in summer even if actions are taken to reduce emissions. Temperature would increase at a slightly higher rate under the "lower" emission scenario and would increase much more quickly under the "higher" emission scenario, compared to the projected temperature increases of 2.5°F to 4°F in winter and 1.5°F to 3.5°F in

summer. The NECIA study suggests that the climate of the Project area by mid-century (i.e. in 50 years) could be similar to current conditions in Maryland/Northern Virginia under the lower emission scenario and more similar to Southern Virginia/Northern North Carolina under the higher emission scenario.

Ski areas are currently in operation as far south as Virginia (four areas) and North Carolina (five areas with >500 feet vertical drop and three areas with <500 feet vertical drop). North Carolina ski areas and two of the more viable Virginia ski areas are located on peaks in the Blue Ridge and Appalachian Mountains. The ski areas in the Blue Ridge Mountains receive approximately 50 to 70 inches of natural snowfall on average annually (33% to about 50% less annual natural snowfall than BELLEAYRE MOUNTAIN SKI CENTER) and most areas have 100% snowmaking coverage. The summit elevations of the North Carolina ski areas are approximately 2,000 feet higher than Belleayre's summit; North Carolina ski area base elevations are between 4,000 and 4,500 feet above sea level – both higher than Belleayre's summit. The two main Virginia ski areas have summit elevations between 3,000 feet and 3,500 feet. The elevation of the North Carolina and Virginia ski areas provides colder temperatures for snow making and compensates for the warmer temperatures that might be expected given their more southern latitude. Ski resorts in Virginia tend to rely more on multi-season activities to remain viable.

The days available for skiing at BELLEAYRE MOUNTAIN SKI CENTER can be affected by a number of factors, one of which is weather. The ski center currently averages 150 days per year when considering only days with favorable weather conditions; a 100 day ski season is typically considered the minimum necessary to successfully operate a ski center. In developing the snowmaking requirements for the expansion project, baseline data was developed on the minimum and average number of hours of air temperature at the ski center within the acceptable temperature range for snowmaking (0°F to 28°F). The temperature data are from the NYSDEC Division of Air Resources Air/meteorological monitoring station at the base of Belleayre Mountain for the period 1999 to 2007. A summary of the minimum and average number of hours available for this period by month is shown in Table 4.9.1-1.

Table 4.9.1-1 Average and Minimum Snowmaking Hours 1999 to 2007

	Month					Total for Season
Scenario	November	December	January	February	March	
Average	102	389	428	429	264	1612
Minimum	44	150	165	251	124	734

Projections of the available average snowmaking hours, based on an increase in winter temperature of 1.3°F per decade (corresponding to the NECIA observed increase in winter daily average temperature for the 1970 to 2000 period) , are shown in Table 4.9.1-2. If temperatures were to increase at the rates correspond-

ing to NECIA projections of 2.5°F to 4°F during the winter season, the average snowmaking hours would be reduced more quickly. For example, if temperature increased by 4°F, the average number of hours available for snowmaking in 2009-2016 would be approximately the same as the hours shown for 2029-2036 in Table 4.9.1-2. Projections of the minimum number of hours available for snowmaking in future decades are not feasible because it is not possible to predict how temperatures in individual years may vary.

Table 4.9.1-2 Projected Average Snowmaking Hours for Future Years

	Month					Total for Season
Year Range	November	December	January	February	March	
2009 – 2016	82	353	410	397	233	1474
2019 – 2026	67	319	387	368	201	1341
2029 – 2036	53	288	365	337	175	1218
2039 - 2046	40	259	347	306	155	1106

During the 1990's, despite warming temperatures, the investment in snow making equipment at ski resorts in the U.S. Northeast kept the ski industry viable. The increase in snowmaking capability at Belleayre Mountain Ski Center would allow the production of more snow when conditions are favorable, thus potentially offsetting some of the reduction in the number of hours available for snowmaking that may occur over the next few decades.

However, the primary affect of increasing global temperatures will likely be a shortening of the ski season, reduction in annual snowfall, increased reliance on snowmaking and a general lessening of the snow quality as more mixed precipitation or rain falls during the winter months. The NECIA Synthesis report suggests that under either the lower or higher emissions scenario, ski areas in areas south of Northern New York and Western Maine will be highly vulnerable to climate change over the next 50 years (Frumhoff et al, 2007). Natural snow fall will decrease and air temperatures will warm, reducing the number of hours for making snow. As seen in the annual snowfall totals for the North Carolina and Virginia resorts, it can be expected that if the climate of the Project area becomes more like southern Virginia or North Carolina in 50 years annual snowfall at Belleayre could decrease as much as 50%. Thus, an increased reliance on snowmaking could compensate for a decline in natural snowfall. The northward facing slopes at Belleayre will help retain snow during warmer temperatures since sunlight on sunny days will not be as direct as it would be on south facing slopes.

Some current research suggests that while global warming as a long term trend will continue, there may be periods of a slowed warming rate or even a pause in the rise of average temperatures over the next 10 to 30 years. There are warmer and cooler cycles superimposed on the general long term rise in temperatures.

One such cycle is known as the "multi-decadal oscillation". This phenomenon relates to the warming and cooling of subsurface ocean temperatures in the Pacific and Atlantic and the subsequent effects on relatively short-term climate patterns. Some of this research suggests that a 20 to 30-year slowing in temperature increase or pause in the rise of global temperature may be beginning. The effects of this phenomenon, if realized, could be a delay in the decline in the snow season suggested in the NECIA study. However, these studies caution that the observations do not suggest global warming is reversing over the longer term period (beyond 30 years).

The NECIA Synthesis report also addresses the effect of the lower and higher emission scenarios on plant and animal species. For the lower emission scenario, there could be a 350 mile northward shift in plant species by the end of the century. Many existing hardwood forest and plant species could adapt to these climate conditions and remain viable in the region. Under the higher emission scenario, the NECIA Synthesis report suggests the northward shift could be as much as 500 miles (Frumhoff et al, 2007). This degree of climate shift could reduce the productivity of spruce/fir forests through a reduction of habitat capable of supporting these forests. Hemlock forests may also be more susceptible to the northward migration of pests as winter temperatures continue to warm.

Water resources would also be affected by climate change. Rain events during the winter could be more prevalent and of higher intensity, thus increasing runoff and high stream flow conditions. With an earlier end to the snow season, the peak spring runoff could be as much as 2 weeks earlier than current conditions. During the summer months, there could be extended periods of hot, dry weather, interspersed with periods of strong summer thunderstorms and associated heavy, short duration rain events (Frumhoff et al, 2007).

4.9.2 Carbon Footprint: Assessing GHG Emissions

The Belleayre Mountain Ski Center carbon footprint is the sum of all GHG emissions and is calculated as metric tons per year CO_2e. GHG emissions from the ski center primarily result from fossil fuel combustion. In this section, green building materials and design for the proposed ski center expansion are discussed, followed by a presentation of quantified impacts from the existing project and from construction and operation of the proposed project.

4.9.2.1 Green Building Design and Materials

In the US, buildings have a significant impact on the environment, consuming approximately 39% of the total energy, more than 70% of the electricity, and generating 39% of CO_2 emissions (USGBC 2010). Emissions from the manufacture of building materials and products and the transport of construction and demolition materials result in an even larger GHG footprint.

In accordance with New York Executive Order No. 111 *"Green and Clean" State Buildings and Vehicles,* the DEC will attempt to reduce or eliminate negative environmental impacts during building construction and operation by employing green building practices that encourage energy and water conservation, protection of natural resources, and waste minimization during building design, construction, and operation. Building 'green' is one of the best strategies for meeting the challenge of climate change because the technology to make substantial reductions in energy and CO_2 emissions already exists.

The nationally accepted benchmark for green building design is certification under the United States Green Building Council's (USGBC) Leadership in Energy and Environmental (LEED) rating system. LEED is a green building rating system that assesses the performance of a building in five key areas of human and environmental health:

- Sustainable sites;
- Water Efficiency;
- Energy and Atmosphere;
- Materials and Resources; and
- Indoor Environmental Quality

LEED is a performance-oriented system where credits are earned for satisfying criterion designed to address specific environmental impacts inherent in the design, construction and operation and maintenance (O&M) of the building. Different levels of certification (i.e., Certified, Silver, Gold, and Platinum) are awarded based on the total credits earned. The average LEED certified building uses 32% less electricity, 36% less total energy and saves 350 metric tons of CO_2 emissions annually (USGBC 2010).

In order to achieve LEED certification at the Discovery Lodge, green building strategies and technologies will be employed. These strategies and technologies will improve energy efficiency, reduce GHG emissions, conserve water and other resources, and minimize waste generation during the construction and operation of the Discovery Lodge. As a result of these measures, the Discovery Lodge is expected to achieve a Gold rating, the second highest level of certification. These strategies consist of building design and operational measures and selection of environmentally preferable building materials.

<u>Building Design and Operational Measures</u>

Based on preliminary building and site design information and the LEED application being prepared for the Discovery Lodge, the following measures are being incorporated into the Project:

- Use of energy efficient HVAC system equipment including air handling units with heat recovery and a ground source heat pump;

- Use of 'FreeAire' Refrigeration Systems for kitchen freezers and coolers that make use of free cold outside air to maintain refrigerated spaces;
- Design of a tight building envelope incorporating use of structural insulated panels (SIPs) and insulating concrete forms (ICFs) with addition of spray foam insulation at joints and envelope transitions to minimize heat loss;
- Use of high-albedo roofing material;
- Abundant use of interior daylighting from skylights and window glazing;
- Use of windows with a high R value and good thermal breaks to optimize daylighting while minimizing heat loss and solar heat gain;
- Use of occupancy/motion sensors on lighting and climate controls;
- Use of water conserving fixtures including low flow lavatory fixtures with automatic sensors, low flow toilets, and waterless urinals to reduce potable water consumption;
- Provide for storage and collection of recyclables (including, at a minimum, paper, corrugated cardboard, glass, plastic, and metals);
- Conduct fundamental building commissioning to ensure energy performance;
- Recycle at least 50% of construction and demolition debris;
- Incorporate green power through the purchase of Renewable Energy Certificates (RECs); and
- Use of refrigerants with low global warming potential (GWP) and ozone depletion potential (ODP) and minimize refrigerant leakage from HVAC and refrigeration equipment.

<u>Site Selection and Design Measures</u>

- Forested areas are managed for carbon sequestration;
- On-site natural areas are managed and protected;
- Project supports use of alternative transportation;
- Low impact development principles used for stormwater management; and
- Use of water efficient landscaping.

Selecting environmentally preferable building materials is one way to reduce the negative environmental impacts associated with the built environment. Building material choices are important in assessing the impacts resulting from construction activities because of the extensive network of extraction, processing and transportation steps required to process the materials and deliver them to the building site. The majority of building materials selected for the Discovery Lodge expansion project will meet one or more of the following criteria for sustainability:

- Contains recycled content;
- Extracted, processed & manufactured within a 500-mile radius of the project site; or

- Certified in accordance with the Forest Stewardship Council's (FSC) Principles and Criteria for wood building components.

Recycled-content materials reuse waste products that would otherwise be deposited in landfills and reduces the impacts resulting from the extraction and processing of virgin materials. Buying products containing recycled materials creates a market for recycled materials and "closes the recycling loop". The many benefits of recycling are described in more detail by USEPA (USEPA 2010a). Recycled-content products to be used in the Discovery Lodge expansion include steel, metal, gypsum drywall, portland cement, carpeting, toilet partitions, and acoustical ceiling tiles.

The use of regional materials reduces transportation activities and the accompanying air pollution associated with delivering materials to the job site from long distances. Further, the purchase of regionally manufactured building materials retains the money paid for these materials in the regional economy. A number of regional materials will be used in the Discovery Lodge expansion including stone, steel, metals, concrete, pavement, waterproofing materials, roofing, insulation, metal doors and frames, wood doors, steel studs, "densglass", drywall, paint, ceilings, and expansion joints. All interior wood trim and exterior siding will be obtained from New York State FSC-certified forests. FSC certification is awarded to forest managers who adopt forest management practices that are environmentally responsible, socially beneficial and economically viable. Use of third-party certified wood improves the stewardship of forests and the related ecosystems.

In addition to the environmentally preferable building materials discussed above, other building products to be used in the Discovery Lodge expansion will help improve the overall energy performance of the building. The energy performance of a building is dependent on the design of the building envelope, HVAC, lighting and other systems. Two energy efficient building products to be used to improve building envelope performance of the Discovery Lodge include structural insulated panels (SIPs) and insulating concrete forms (ICFs).

SIPs are engineered wall panels constructed of a layer of polyisocyanurate insulation sandwiched between two layers of oriented strand board (OSB) providing structural framing, insulation, and exterior sheathing in a solid, one-piece component. Generally arriving precut to the building site, SIPs minimize the amount of construction waste generated. SIPs generally provide better overall air tightness and thermal performance than conventionally framed walls because they offer a dense, uniform and continuous air barrier with few thermal bridges and no opportunity for internal convection (NAHB 2010).

ICFs consist of rigid foam forms made of expanded polystyrene (EPS) that hold concrete in place during curing and remain in place afterwards to serve as thermal insulation for concrete walls. ICFs will be used in the construction of the walls on the lower level of the Discovery lodge. The foam sections are lightweight and

result in energy-efficient, durable construction. Typical insulation values range from R-17 to R-26, compared to between R-13 and R-19 for most wood-framed walls (NAHB 2010a).

Other building renovation projects included in the proposed action will employ green building and energy efficiency practices and strategies to the extent practical to meet the directives of Executive Order Nos. 111 and 4 but will not attempt LEED certification.

4.9.2.2 Construction Activity Emissions

Proposed construction activities at Belleayre Mountain include the creation of 48 acres of new ski slopes with three new chair lifts and two replacement chair lifts, construction of new maintenance and ticket-purchase buildings, major renovation/expansion of the Discovery and Sunset Lodges, construction of the new Tomahawk Lodge, creation of a new snowmaking supply pond and installation of new parking lots. Emissions from construction are related to equipment use, on-site vehicle use, off-site vehicle emissions (including delivery trips and employee commuting) and biomass combustion. Construction is projected to occur over five years. Emissions are estimated both for the entire project, and for the highest emissions year in Table 4.9.2-1.

Delivery trips were estimated for the materials and equipment that would have greatest total travel distance. These include trips to deliver concrete, asphalt, gravel, structural steel, lumber, and ski lift equipment. For each material and equipment type, travel distance and number of trips were determined, and appropriate emission factors were applied.

Biomass combustion emissions result from the burning of woody materials due to tree removal, as discussed in the Changes in Carbon Sinks section below. It is assumed that all removed biomass is combusted and when possible, will be burned for space heating. Although it is likely that burning wood for space heating would offset some fuel oil combustion and therefore mitigate some GHG emissions, this mitigation is not included in the emissions estimates because an accurate estimate of the amount of biomass to be burned for space heating has not been determined.

Table 4.9.2-1 Construction GHG Emissions

Equipment Type	Highest Emissions Year (metric tons)				Total Project (metric tons)			
	CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O	CO_2e
Equipment	2,185	0.37	0.04	2,205	5,436	0.77	0.10	5,484
Helicopter	12	NA	NA	12	50	NA	NA	50
Commuting On-Road Vehicles	112	0.01	0.01	118	441	0.03	0.04	455
Contractor On-Road Vehicles	291	0.01	0.01	171	992	0.01	0.03	1,002
Biomass Combustion	21,127	2.09	1.33	21,583	40,333	4.00	2.54	41,203
Total Emissions	**23,727**	**2.48**	**1.39**	**24,089**	**47,252**	**4.81**	**2.71**	**48,194**

Key:
CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent

4.9.2.3 Direct and Indirect Emissions from Ski Center Operations

GHG emissions are categorized into direct and indirect emission categories. Direct emissions result from activity of equipment owned or leased by Belleayre Mountain Ski Center. Indirect emissions are emissions associated with ski center activity, but are not from Belleayre Mountain Ski Center owned or leased equipment.

4.9.2.3.1 Direct GHG Emissions

Sources of direct GHG emissions at Belleayre Mountain Ski Center include emissions from fossil fuel combustion conducted on-site, including space heating systems, snow making, trail grooming and maintenance equipment, and kitchen equipment. The primary fuels at the site are fuel oil, diesel, gasoline and propane, as discussed in Section 9, Energy. All fuel use on site is supplied from central fuel tanks, and therefore fuel consumption and resulting direct emissions are estimated with a high degree of accuracy. Emissions were calculated following the methods described in the TCR GRP (2008). Existing emissions are shown in Table 4.9.2-2

Because of the nature of Belleayre Mountain Ski Center operations, most existing GHG emissions are related to snow making operations. For the proposed project, the diesel fueled-engine driven air compression system will be replaced with an electric motor powered system, and direct emissions will be reduced considerably. Belleayre Mountain Ski Center direct GHG emissions from operations after the expansion is completed are shown in Table 4.9.2-3.

Fugitive emissions from HVAC and kitchen refrigeration systems and emissions resulting from welding are relatively small compared to the overall project and were not quantified.

Table 4.9.2.- 2 Existing Direct GHG Emissions

Type	Emission (metric tons per year)			
	CO_2	CH_4	N_2O	CO_2e
Compressors/Generators	2,751	0.07	0.20	2,814
Groomers	61	0.00	0.00	62
Misc. Gasoline Equipment and Vehicles	84	0.00	0.01	86
Misc. Diesel Equipment and Vehicles	346	0.01	0.03	354
Boilers	334	0.00	0.00	335
Total - Direct Emissions	**3,576**	**0.09**	**0.24**	**3,651**

Key:
CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent

Table 4.9.2.- 3 Direct GHG Emissions After Expansion

Type	Emission (metric tons per year)			
	CO_2	CH_4	N_2O	CO_2e
Compressors/Generators	-	-	-	-
Groomers	77	0.00	0.00	79
Misc. Gasoline Equipment and Vehicles	106	0.00	0.01	109
Misc. Diesel Equipment and Vehicles	438	0.01	0.03	448
Boilers	25	0.01	0.00	26
Total - Scope 1 Direct Emissions	**646**	**0.02**	**0.05**	**661**

Key:
CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent

The net effect of the project is an approximately 3,000 metric ton per year CO_2e decrease in direct emissions primarily because of the removal of the diesel powered air compression equipment used for snow making. The proposed project significantly expands the trail area covered by snowmaking, requiring additional compressed air capacity for operating snowmaking equipment. If the existing diesel air compressor station were expanded to address the required capacity increase, direct emissions would increase considerably compared to existing conditions.

4.9.2.3.2 Indirect GHG Emissions

Indirect GHG emissions are emissions that are not from Belleayre Mountain Ski Center owned or leased equipment, but that are associated with ski center activity. For this analysis, emissions associated with electricity consumption, visitor travel to and from the ski center, employee commuting emissions, and methane emissions associated with ski center waste landfilled off-site were included in the quantitative analysis.

The major uses for electricity at Belleayre Mountain Ski Center include water pumping and air compression for snow making. Building equipment, lighting, ski lifts and other equipment represent a relatively small amount of electricity con-

sumption. Electricity consumption increases significantly under the expansion project because of the introduction of a new electric powered snowmaking air compressor station that replaces the existing diesel powered air compression station, and from the elimination of a diesel fueled electric generator. Electricity consumption also increases because of increased water pumping for expanded snow making, and for additional ski lifts. Indirect emissions from electricity consumption were quantified using utility specific emission factors and following NYSDEC guidance (NYSDEC 2009).

Motor vehicle emissions result from visitors traveling to and from Belleayre Mountain Ski Center by personal vehicles and bus. Visitor and commuter trip emission estimates used MOBILE6.2 emission factors specific for 2010 and 2015, and were based on an on-site study of transportation mode and vehicle occupancy. Vehicle miles travelled data were obtained from visitor surveys; for visitors residing more than 300 miles from Belleayre Mountain Ski Center, their travel to the local area was not counted, however their local vehicle travel from a more local point of departure (i.e. hotel) was included. Emissions from contractor trips were considered, but not included, as they are at least two orders of magnitude smaller than the visitor trip emissions. Visitor and commuter trip related travel emissions increase substantially with the proposed project due to the projected increase in visitors to the ski center.

Offsite methane emissions would occur from kitchen and miscellaneous waste collected at Belleayre Mountain Ski Center that is transported and disposed of in an offsite landfill. Anaerobic decomposition of landfilled waste was assumed when determining methane emissions. Waste quantity information was obtained directly from the Ulster County Waste Recovery Agency, which receives ski center waste. Emissions associated with recycled waste are considerably less than from general waste, thus were not included. Waste transport emissions were included as direct emissions since a NYSDEC vehicle fueled on-site transports waste to the local waste facility.

Emissions related to tree removal for trail clearing are not addressed in this section, but are discussed in section 4.9.3. Emissions from the existing Belleayre Mountain Ski Center are shown in Tables 4.9.2.-4.

Table 4.9.2.-4 Existing Indirect GHG Emissions

Type	Emission (metric tons per year)			
	CO_2	CH_4	N_2O	CO_2e
Electricity Consumption	1,666	0.05	0.02	1,674
Visitor and Commuting Trips	2,376	0.13	0.27	2,463
Landfill Emissions	NA	NA	NA	143
Total Indirect Emissions	**4,042**	**0.18**	**0.30**	**4,280**

Key:
CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent; na = not available

Indirect operational GHG emissions after completion of the proposed project are shown in Table 4.9.2.-5. Total indirect GHG emissions increase by 3,001 tons CO_2e due to the proposed project.

Table 4.9.2.- 5 Indirect GHG Emissions After Expansion

Type	Emission (metric tons per year)			
	CO_2	CH_4	N_2O	CO_2e
Electricity Consumption	2,673	0.08	0.04	2,686
Visitor and Employee Trips	4,188	0.23	0.48	4,343
Landfill Emissions	NA	NA	NA	252
Total Indirect Emissions	**6,861**	**0.31**	**0.52**	**7,281**

Key:
CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent;na = not available

Indirect emissions increase due to increased electricity consumption for the new compression station, and for additional electricity used for water pumping related to snow making activities. Indirect emissions also result from additional travel related to the increased number of visitors to Belleayre Mountain Ski Center.

Table 4.9.2.-6 summarizes GHG emissions for the existing condition and after completion of the expansion project. Overall, the net effect of the combined changes in direct and indirect GHG emissions is estimated to be a slight reduction in total GHG emissions after completion of the proposed expansion project compared to existing conditions.

Table 4.9.2.-6 Summary of GHG Emissions

Type	Emission (metric tons per year)			
	CO_2	CH_4	N_2O	CO_2e
Existing Condition				
Direct Emissions	3,576	0.09	0.24	3,651
Indirect Emissions – Electricity	1,666	0.05	0.02	1,674
Indirect Emissions – Other	2,376	0.13	0.27	2,463
Total	**7,618**	**0.27**	**0.53**	**7,789**
Post-Expansion Operations				
Direct Emissions	646	0.02	0.05	661
Indirect Emissions - Electricity	2,673	0.08	0.04	2,686
Indirect Emissions - Other	4,188	0.23	0.48	4,343
Total	**7,508**	**0.33**	**0.56**	**7,690**
Difference	**(110)**	**0.07**	**0.03**	**(99)**

Key:
CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent;

4.9.3 Changes in Carbon Sinks

Implementation of the Preferred Action will result in the loss of some existing forested area and therefore release of sequestered carbon and some loss of carbon storage capacity. Characteristics of the existing forested area where site build-out would occur and changes in sequestered carbon and carbon storage capacity are described below.

Land Cover

The area proposed for the additional ski trails and lifts is within a maple-beech-birch forest stand. Almost 90 percent of the species in the overstory are hard maple, red maple, black cherry, and white ash. The stand has not been managed for forest products, but there is a relatively high volume of wood on the site.

Carbon Content of Project Area Forest

Carbon is sequestered on the project site in the form of live trees, soil carbon, and the other components of the forest such as standing dead trees, understory, down dead trees, and the forest floor.

Because actual Belleayre Mountain Ski Center forest inventory data for live trees was available and the stand is uneven-aged, United States Forest Service researchers (Smith 2008) recommended using the inventoried volume multiplied by the conversion factor of 0.0179 tons carbon per cubic foot of solid wood instead of the table in Smith et al (2006) for live tree carbon content.

The quantity of carbon sequestered in other components of the forest was determined using protocols and tables prepared by the United States Department of Agriculture (Smith et al 2006). Table 4.9.3-1 (adapted from Smith et al 2006) provides estimates of timber volume and carbon stocks for maple-beech-birch stands similar to those in the area that will be cleared for the expansion project. The table allocates carbon sequestered in the forest to soil organic matter and five non-soil components: live tree, standing dead tree, understory, down dead wood, and forest floor.

No actual measured quantities were available for the standing dead tree, understory, down dead wood, forest floor and soil carbon components of the forest. Therefore, Table 4.9.3-1 was used to estimate the amount of carbon sequestered in these components. Based on the large tree volume inventoried by NYSDEC, we have assumed that the conditions of the project area are approximately those of a relatively mature stand. Values for 95-year old stands were used.

The NYSDEC forest inventory of the area to be cleared for new ski trails indicates that there are 60.2 cords per acre of standing live trees (NYSDEC 2008). This is equivalent to 5,418 cubic feet of solid wood per acre, assuming one cord contains 90 cubic feet of solid wood. The NYSDEC inventory volume represents the total volume if used for firewood. NYSDEC determined stand volume by a tree volume table for deciduous hardwoods (Coalla 2008).

The estimated carbon content of the live trees is approximately 97 tons per acre (9,280 tons total). The carbon content of the standing dead tree, understory, down dead wood, and forest floor in the area to be cleared totals approximately 23 tons per acre (2,200 tons total). The amount of carbon in the non-soil components amounts to approximately 120 tons per acre (11,480 tons total).

Carbon Release

Essentially all of the carbon in the above ground forest components would eventually be released to the atmosphere as CO_2 or methane from biological decay.

Soil carbon in established forests remains relatively constant and is estimated to average 31.1 tons per acre in forested conditions (Smith et al 2006). Smith et al assume that carbon in soils that have not been in forests for several years ("afforested" soils) is about seventy-five percent of carbon in forested soils, or about 23.3 tons per acre. Therefore, it is estimated that soil carbon levels in the cleared

areas would gradually decrease after several years for a net decrease in carbon sequestered of approximately 7.8 tons per acre (750 tons total).

Total quantities of carbon in the various components of the forest were calculated

Table 4.9.3-1 Regional estimates of timber volume and carbon stocks for maple-beech-birch stands on forest land in the Northeast

Age (years)	Mean Volume Live Trees (ft^3/acre)	Mean carbon density (tons carbon/acre)						
		Live Tree[1]	Standing dead tree	Under-story	Downed dead wood	Forest floor	Soil organic	Total non-soil
0	0.0	0.0	0.0	0.9	14.3	12.4	31.0	27.6
5	0.0	3.3	0.3	0.9	9.7	9.1	31.0	23.3
15	400.2	14.2	1.4	0.8	5.1	7.3	31.0	28.9
25	830.3	23.7	2.4	0.8	3.5	7.9	31.0	38.2
35	1280.5	32.5	2.7	0.8	3.1	9.1	31.0	48.1
45	1702.1	39.2	2.9	0.8	3.1	10.3	31.0	56.2
55	2095.1	45.1	3.1	0.8	3.3	11.3	31.0	63.7
65	2459.5	50.5	3.3	0.8	3.7	12.2	31.0	70.3
75	2795.4	55.2	3.4	0.8	3.9	13.0	31.0	76.4
85	3102.6	59.6	3.5	0.8	4.2	13.7	31.0	81.7
95	**3381.3**	**63.4**	**3.6**	**0.8**	**4.5**	**14.3**	**31.0**	**86.5**
105	3631.4	66.8	3.7	0.7	4.7	14.8	31.0	90.7

Source: Smith, et al, 2006

[1] Live tree carbon content determined for this report by multiplying inventoried solid wood volume by 0.0179 tons carbon per cubic foot.

by multiplying the per-acre values by the 95.7 acres of forest that will be cleared for the project. Since essentially all of the approximately 120 tons per acre of non-soil sources of carbon and approximately 7.8 tons per acre of soil carbon would eventually be released to the atmosphere, the project would result in the release of approximately 12,000 tons of carbon to the atmosphere, equivalent to 44,000 tons CO_2e.

Assuming that herbaceous and low woody vegetation would occupy the slopes where the forest would be cleared, some amount of biomass that retains carbon would remain on site. It is estimated the above ground biomass on the site could amount to 2 to 11 tons of dried vegetative material, far less that the amount of wood and other organic material in a mature forest stand. Therefore the overall effect of the new vegetation would not appreciably offset the removed storage capacity.

The analysis of the changes in the amounts of carbon that would be stored in the cleared areas is based on the following assumptions:

- The cleared areas will have all or almost all trees cut to the ground. Remaining trees will be a negligible portion of the volume of the impacted area;
- Tree tops and some stems will be chipped and spread within the project area;
- Wood from the stems that is not chipped and spread will be used within the project area ;
- Stumps will be ground up or cleared with bulldozers for chipping, burial or burning;
- Some of the larger, higher quality logs may be milled and used in buildings of the proposed project or will be stored for use in future projects in the project area. This is likely to be a very small proportion of the total volume of wood in the standing trees;
- Firewood heat value will be negligible because fireplaces result in large quantities of combustion air and room air that is lost to the chimney flue. Large quantities of air will have to infiltrate the buildings with operating fireplaces to make up for the air lost up the chimney. (Firewood generated at Bellayre Mountain Ski Center would be used at the ski center only, it cannot be transported to other locations for use due to NYSDEC regulation);
- Given that values for carbon content of most of the components of the forest are estimated on a regional basis, the estimates should be considered relatively imprecise. Therefore, the estimated values of carbon storage changes for the project area are expressed only to within 1000 tons of the calculated amount.

Loss of Carbon Sequestration Capacity

Clearing of the ski trails and areas for other project facilities will eventually result in the conversion of trees and other woody materials to CO_2 and ash from combustion or to CO_2 or methane and soil organic matter if left to decompose naturally. Clearing forests in the project area would also result in less capacity to accumulate carbon annually.

The sequestration rate for the deforested area was estimated based on a study of Adirondack Park forests (ADKCAP 2009). Extrapolating from the carbon content and carbon flux determined in that report, the 95.7 acre area results in 29.8 tons CO2e sequestration per year. Tree removal in this area will mostly eliminate this sequestration capacity.

Net Reduction of Carbon Sequestration

In conclusion, it is estimated that the net reduction in carbon storage capacity at Belleayre Mountain Ski Center due to land clearing is approximately 44,000 tons CO2e during the construction phase, and sequestration will be reduced by approximately 29.8 tons per year during the operation phase.

4.9.4 GHG Emissions for Project Alternatives

Reasonable alternatives to the proposed Belleayre Mountain Ski Center UMP expansion that are feasible considering the goals and objectives consist of alternatives in three areas: trail and lift alternatives, snowmaking/water supply alternatives and building alternatives.

A major source of GHG emissions associated with snowmaking activities is the use of diesel engine driven air compressors. Under the no action alternative, the diesel equipment would not be replaced with electric motor driven air compressors, thus GHG emissions for the No Action alternative would be the same as existing emissions and would be higher than the Full Build Out Plan. Conversely, the No Action alternative would maintain the amount of existing forested area, thus preserving an estimated 11,500 metric tons of carbon storage capacity.

Table 4.9.4-1 shows a qualitative comparison of the alternatives to the Full Build Out Plan in terms of increase, decrease or no change with respect to GHG emissions.

Table 4.9.4-1 GHG Emissions for Alternatives Compared to Full Build Out Plan

Alternative	Characteristics of Alternative Affecting GHG Emissions	GHG Emissions Change Compared to Full Build Out Plan
No Action	• Continued use of diesel engines for snowmaking • No reduction in forested area • No construction activities	• Higher Direct • Lower Indirect • Maintains existing carbon storage capacity • No construction GHG emissions
West Alternative	• Replaces diesel engines with electric motors for snowmaking • Less clearing of forested area • Elimination of one lift results in slight electric use reduction • Reduced level of construction activity due to elimination of one lift, twelve trails and less clearing of forested areas	• No change in direct GHG emissions • Decreased indirect GHG emission due to reduction in electric use for lifts • Higher carbon storage capacity due to less cutting of forested area. • Decreased construction GHG emissions
Core Alternative	• Replaces diesel engines with electric motors for snowmaking • Less clearing of forested area • Elimination of two lifts results in electric use reduction • Reduced level of construction activity due to elimination of two lifts, eighteen trails and less clearing of forested areas	• No change in direct GHG emissions • Decreased indirect GHG emission due to reduction in electric use for lifts • Higher carbon storage capacity due to less cutting of forested area. • Decreased construction GHG emissions

4.9.5 Potential Mitigation Measures

The incorporating of green building principles into the new construction at the Discovery Lodge will result in a number of important mitigation measures to lower energy consumption and reduce greenhouse gas emissions. These measures are addressed in detail in section 4.9.2.1.

The most GHG intensive activity is diesel engine driven air compression for snowmaking, accounting for 77% of total direct GHG emissions (see Table 4.9.9-2). The replacement of the diesel engine air compressor station with a substantially larger electric compressor station will substantially mitigate direct GHG emissions from the expansion project. While the overall number of visitors to Belleayre Mountain Ski Center is expected to increase by 76%, the overall direct and indirect GHG emissions from the ski center are expected to decrease by 2%.

Additional proposed mitigation measures to reduce energy consumption from snowmaking operations include the following:

- Testing and repairing leaks in compressed air system;
- Replacement of existing compression system with new high efficiency electric snow guns;
- Strategic placement of the new water reservoir to take advantage of gravity and use of new higher efficiency pumps;
- Groundwater reclamation to reroute surface water run-off directly to the upper and new reservoirs instead of allowing it to flow to Pine Hill Lake;
- Establishment of procedures and automation for energy use.

The impact of the proposed project on the ability of the site to sequester carbon will be mitigated in a number of ways. First, clearing of forested areas will be kept to the minimum required for a successful project. Second, wood from the cleared areas will be milled and used in buildings in the project area if feasible. It is not anticipated that the cleared areas will provide a significant amount of milled wood when considered as a proportion of the total wood standing in the areas to be cleared. Third, wood that cannot be used for solid wood products should be used as much as practicable as firewood at the ski center. Fireplaces are not efficient in converting wood to net energy, however, and thus would offset negligible amounts of fossil fuel energy.

Another means of mitigating the impact on the ability of the site to sequester carbon could be to establish forest by planting trees in areas that are currently not in forest cover. Assuming those areas would otherwise remain un-forested, such action would sequester carbon over the long term in amounts greater than other types of vegetation. Afforested areas meant to mitigate release of carbon caused by the project should be protected for many decades from harvest.

Transportation GHG emissions mitigation measures will be the same as for air quality emissions mitigation. These are discussed in detail in Section 4.8, Air Quality.

4.10 Noise

Introduction

The evaluation of potential noise impacts from construction and operation of the expanded Belleayre Mountain Ski Center in the community and recreational areas surrounding the Project Site includes a review of ambient noise levels measured previously for this project by Sandstone Environmental Associates, Inc. (SEA) and additional measurements conducted on behalf of the adjacent private Crossroads Development project by ENSR International (ENSR). In addition, supplemental noise measurements were conducted to address the requirements contained in the *Final Scoping Document, Belleayre Mountain Ski Center Unit Management Plan*–DEIS (February 28, 2008). Potential sound levels from the operation of major noise-producing equipment that would be used during construction of the Ski Center were predicted using acoustical modeling. Acoustical modeling also was conducted to evaluate potential noise impacts from operation of the expanded center and the predicted increase in traffic. This section describes the ambient noise measurement methodology used, modeling procedures, measurement and modeling results, and the noise impact assessment approach and findings.

Noise Study Area

The Belleayre Mountain Ski Center is located on 2,178 acres of state forest preserve lands. (This excludes the Belleayre Day Use Area at Pine Lake). The Belleayre property contains 52 ski slopes, 5 aerial lifts, 3 surface lifts, 6.4 kilometers of cross-country ski trails, 23.7 miles of hiking trails, and undeveloped forest area. In addition to downhill skiing, land within the project area is used for cross-country skiing and hiking. Forest land and abandoned ski trails in various stages of ecological succession are also within the Project area. The noise study area includes the Belleayre Mountain Ski Center project area and residences which lie near the project within a half-mile of the project boundaries to the northwest and northeast.

4.10.1 Noise Fundamentals

Noise is defined as any unwanted sound. Sound is defined as any pressure variation that the human ear can detect. Humans can detect a wide range of sound pressures, but only the pressure variations occurring within a particular set of frequencies are experienced as sound. However, the acuity of human hearing is not the same at all frequencies. Humans are less sensitive to low frequencies than to mid-frequencies, and so noise measurements are often adjusted (or weighted) to account for human perception and sensitivities. The unit of noise measurement is a decibel (dB). The most common weighting scale used is the A-weighted scale, which was developed to allow sound-level meters to simulate the frequency sensitivity of human hearing. Sound levels measured using this weighting are

noted as dBA (A-weighted decibels). ("A" indicates that the sound has been filtered to reduce the strength of very low and very high frequency sounds, much as the human ear does.) The A-weighted scale is logarithmic, so an increase of 10 dB actually represents a sound that is 10 times louder. However, humans do not perceive the 10 dBA increase as ten times louder but as only twice as loud.

The following is typical of human responses to changes in noise level:

- A 3-dBA change is the threshold of change detectable by the human ear.
- A 5-dBA change is readily noticeable.
- A 10-dBA change is perceived as a doubling (or halving) of noise level.

Table 4.10-1 list some typical sources and levels of noise and corresponding human responses to the noise.

Table 4.10-1 Decibel Level of Some Common Sounds

Sound Source	dB(A)	Perception/Response
	150	
Carrier Deck Jet Operation	140	
	130	Painfully Loud Limit
Jet Takeoff (200 feet) Discotheque	120	
Auto Horn(3 feet) Riveting Machine	110	
Jet Takeoff (2000 feet) shout (0.5 feet)	100	
N.Y. Subway Station Heavy Truck (50 feet)	90	Very Annoying Hearing Damage (8 hours, continuous exposure)
Pneumatic Drill (50 feet)	80	Annoying
Freight Train (50 feet) Freeway Traffic (50 feet)	70	Telephone Use Difficult Intrusive
Air Conditioning Unit (20 feet)	60	
Light Auto Traffic (50 feet)	50	Quiet
Living Room Bedroom	40	
Library Soft Whisper (15 feet)	30	Very Quiet
Broadcasting Studio	20	
	10	Just Audible
	0	Threshold of Hearing

Source: New York State Department of Environmental Conservation 2003

Noise sources that affect the environment can be mobile sources such as automobiles, buses, trucks, aircraft, and trains, or stationary sources such as machinery or mechanical equipment associated with industrial and manufacturing operations or building heating, ventilating, and air-conditioning systems. Sources of construction noise are both mobile sources (e.g., trucks, bulldozers, etc.) and stationary sources (e.g., compressors, pile drivers, power tools, etc.).

Various descriptors are used to evaluate noise levels over time. A common description used to evaluate noise levels is L_{eq}, or the continuous equivalent sound level. L_{eq} values from various noise sources can be added and subtracted to determine cumulative noise levels.

4.10.2 Regulatory Standards and Criteria

A number of standards and guidelines for assessing noise impacts have been adopted by federal, state, and local agencies. The five primary sources that are appropriate for evaluating noise impacts from this project are described below.

4.10.2.1 New York State Department of Environmental Conservation

NYSDEC's Program Policy DEP-00-1 (February 2, 2001 revision), "Assessing and Mitigating Noise Impacts," provides guidance for evaluating sound levels and characteristics (such as pitch and duration) generated from proposed or existing facilities. This guidance also identifies noise levels that may cause a significant environmental impact and provides methods for noise impact assessment, avoidance, and reduction measures. Under this policy, noise level increases of more than 6 dBA over baseline conditions may require a closer analysis of impact potential, depending on existing and the character of surrounding land use and receptors.

The following human reactions to increases in noise level are listed in the document:

- Under 5 dBA — Unnoticed to tolerable
- 5 – 10 dBA — Intrusive
- 10 – 15 dBA — Very noticeable
- 15 to 20 dBA — Objectionable
- Over 20 dBA — Very objectionable to intolerable

4.10.2.2 Federal Highway Administration (23 CFR 772)

The Federal Highway Administration (FHWA) provides policies and guidance for the analysis and abatement of highway traffic noise that were adopted by the New York State Department of Transportation (NYSDOT). These standards govern the analysis and definition of impacts of traffic noise from highway projects using federal-aid funds. The current FHWA procedures for highway traffic noise analysis and abatement are contained in 23 CFR 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise."

The FHWA noise regulations contain noise abatement criteria (NAC) that the FHWA considers to be the acceptable limits for noise levels for exterior land uses and outdoor activities and for certain interior uses (see Table 4.10-2). According to the FHWA NAC, if noise levels from highway traffic at a receptor location approach (are at least 1 dBA less than the applicable NAC) or exceed the corresponding NAC presented in Table 4.10-2, abatement measures such as the installation of noise barriers, if feasible and reasonable, need to be considered

Table 4.10-2 Noise Abatement Criteria (NAC), Hourly A-Weighted Sound Level in Decibels (dBA)a

Activity Category	$L_{eq}(h)$	$L_{10}(h)$	Description of Activity Category
A	57 (Exterior)	60 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	–	–	Undeveloped lands.

[a] Either $L_{eq}(h)$ or $L_{10}(h)$ (but not both) may be used on a project.

Note: These sound levels are only measures to be used to determine *impact*. These are the absolute levels where abatement must be considered. Noise abatement should be designed to achieve a substantial noise reduction. A-Weighted refers to the sound frequency.

Source: 23 CFR 772

4.10.2.3 New York State Department of Transportation

NYSDOT typically defines a traffic noise impact on residential property as one of the following conditions:

- Exterior L_{eq} (h) of 67 dBA or L_{10} (h) of 70 dBA for NAC Category B (see Table 4.10-2);
- Exterior noise levels approach, i.e., are within 1 dBA of the above standards;
- Substantial incremental increase of 6 dBA compared with existing conditions.

4.10.2.4 U.S. Department of Housing and Urban Development (HUD)

Environmental Criteria and Standards
HUD has adopted environmental standards, criteria, and guidelines for determining the acceptability of federally assisted projects and has proposed mitigation measures to ensure that activities assisted by HUD will achieve the goal of a suitable living environment. These guideline values are strictly advisory. These standards, outlined in 24 CFR Part 51, establish a site acceptability standard based on day-night average sound levels (DNL). The DNL is the 24-hour average sound level, in decibels, obtained after the addition of 10 decibels (as a penalty) to sound levels in the night from 10 p.m. to 7 a.m. These standards are presented in Table 4.10-3.

Table 4.10-3 HUD Site Acceptability Standards

	Day-Night Average Sound Level in Decibels (DNL)
Acceptable	Not exceeding 65 dBA
Normally unacceptable	Above 65 dBA but not exceeding 75 dBA
Unacceptable	Above 75 dBA

Source: HUD 1991

4.10.2.5 Town of Shandaken

Article VI, Chapter 116 of the Shandaken Zoning Code (amended December 28, 1992) establishes maximum exterior noise levels allowed within the property line of a receiving property (Table 4.10-4). The maximum sound limits noted in Table 4.10-4 are reduced by 5 dBA for any source of sound that emits a pure tone, a discrete tone, or impulsive sound.

Table 4.10-4 Town of Shandaken Maximum Permissible Continuous Sound Levels at Specified Times

Receiving Property	Time	Sound Level Limits (dBA)
Residential zones (R5, R3, R1.5, HR)	7:00 a.m. to 7:00 p.m.	57
	7:00 p.m. to 7:00 a.m.	53
Commercial zones (HC, HB, and CLI)	7:00 a.m. to 9:00 p.m.	64
	9:00 p.m. to 7:00 a.m.	60

Source: Town of Shandaken 1992

4.10.3 Evaluation Criteria

Noise impacts of non-transportation sources such as operational equipment were evaluated using the limits specified in of the Town of Shandaken Zoning Code. However, because this code does not address relative increases in noise level, for the purposes of this study, an impact was also defined as an increase of 6 dBA in L_{eq} when comparing No Build and Build Conditions for operating and transportation noise. The 6 dBA impact criterion is based on the levels defined by NYSDEC as requiring further study, and it also matches the 6 dBA criterion used by NYSDOT to define a substantial increase in noise.

A 10 dB increase over background noise levels was used to evaluate noise impacts from project construction: Although noise level limits are not specifically defined by NYSDEC, guidance is provided for the increase in noise over ambient background noise contributed by the new or proposed sources. As stated in the guidance, an increase of 10 dB in sound pressure level over the ambient background sound level is considered to be very noticeable and deserves consideration of avoidance and mitigation. Construction activities that, for this project, would generate a noise increase of 10 dB or greater over background noise levels at the closest sensitive receptor will require mitigation measures.

4.10.4 Existing Ambient Noise Levels: Stationary Sources

4.10.4.1 Methodology

Previous Surveys and Measurements

In order to characterize the existing ambient noise levels, E & E reviewed previous background noise measurements collected on April 20 and 21, 2008 by SEA and on February 23 through 27, 2001 by ENSR. The reports containing these data are attached as Appendix AG, Section 1. All monitoring periods for characterizing ambient background noise were at least 20 minutes long and included L_{eq}, L_{min}, L_{max}, L_{90}, and L_{10}. With the exception of the pump station on Bonnieview Road, the selected sites were monitored two to three times, with one of the periods occurring during the evening (7 p.m. to 9 p.m.) or nighttime (after 9 p.m.). Monitoring during the evening and nighttime periods established baseline noise levels in residential zones for the time periods noted in Shandaken's noise code (57 dBA 7:00a.m. to 7:00 p.m.; 53 dBA 7:00 p.m. to 7:00 a.m.)

On February 22 through 27, 2001, ambient sound levels were measured by ENSR at five locations in the community surrounding the project during the operation of the ski center. Each location was chosen to characterize the acoustical environment of the noise-sensitive receptors near the proposed Crossroads project site. At the time of the survey, the proposed Belleayre Mountain Ski Center project was to consist of construction of the Wild Acres Resort and development of the Big Indian Plateau. Table 4.10-5 presents the results of the ambient noise monitoring. (Measurement locations are shown on Figures 3-1 and 3-2 in *Community Sound Survey and Construction Noise Impact Assessment* [ENSR International January 2002] in Appendix AG, section 1 of this report.)

Table 4.10-5 Ambient Noise Measurements Collected during Ski Center Operation

Measurement	Location	Average Daytime Sound Level (L_d dBA)	Average Nighttime Sound Level (L_n dBA)	Day-night Sound Level (Ldn dBA)
ML-1	County Road 49A	50	39	49
ML-2	Gunnison Road	50	37	49
ML-3	Station Road & Woodchuck Hollow Road	41	37	44
ML-4	East end of Lake Street	48	45	52
ML-5	Lasher Road	44	39	47

Source: ENSR International 2002

In April 2008, as part of the proposed ski center expansion project, ambient sound levels were measured by SEA at eight locations representative of sensitive receptors within 1 mile of the ski center. The monitoring locations were limited

primarily to sites on the Belleayre property or public property. Table 4.10-6 presents the results of the ambient noise monitoring. (Measurement locations are shown on Figure 1 in *Noise Technical Report Belleayre Mountain Ski Center Noise Monitoring Program* [Sandstone Environmental Associates, Inc. April 2008] in Appendix AG of this report.)

Table 4.10-6 Ambient Noise Measurements without the Ski Center Operating

Measurement Location	Time Period	Sound Level (L_{eq} dBA)
Highmount Ski Center – County Road 49A	9:47 – 10:07 a.m.	40.2
	10:18 – 10:43 a.m.	39.6
	7:03 – 7:23 p.m.	38.8
North hairpin turn - County Road 49A	3:25 – 3:45 p.m.	42.6
	7:00 – 7:25 p.m.	43.1
Discovery Lodge parking lot - County Road 49A	2:50 – 3:10 p.m.	55.6
	4:10 – 4:35 p.m.	47.3
	7:38 – 7:58 p.m.	47.6
Wooded Area – Green Hill Road	3:25 – 3:50 p.m.	46.8
	3:55 – 4:01 p.m.	41.8
	7:40 – 8:00 p.m.	39.5
Bed & Breakfast - County Road 49A	2:15 – 2:40 p.m.	51.2
	8:20 – 8:45 p.m.	51.2
Grassy Area – Route 28	1:40 – 2:05 p.m.	60.6
	4:07 – 4:32 p.m.	61.0
	8:20 – 8:40 p.m.	57.2
Fleishmann's – Main Street	12:50 – 1:15 p.m.	57.9
	9:00 – 9:25 p.m.	51.7
Pump Station – Bonnieview Avenue	9:22 – 9:47 a.m.	56.3
Source: SEA 2008		

4.10.4.2 Supplemental Background Noise Measurements

Additional ambient noise measurements were collected by E & E in July 2008 for use in validating the traffic noise model assumptions and to collect additional background measurements without the Ski Center operating. The E & E noise survey report can be found in Appendix AG section 1. A-weighted and one-third octave band sound levels were measured on July 1, 2008 in general accordance with ANSI (American National Standards Institute) S1.13 at approximately 5 feet above grade using a B & K Model 2260 Observer, an ANSI Type I sound analyzer with one-third octave band filter capability and a type 4189 microphone. The analyzer was tripod-mounted and equipped with a windscreen to eliminate noise associated with wind blowing across the microphone. Noise measurements were taken only when wind speeds were less than 12 miles per hour. The analyzer and microphone were factory-calibrated and field-calibrated with a Bruel & Kjaer Model 4231 sound-level calibrator before and after each series of

measurements. Measurements were collected for approximately 20-minute periods. Statistical sound measurements collected during the survey included L_{eq}, L_{min}, L_{max}, L_{10}, and L_{90}.

Table 4.10-7 presents the sound measurement results for each location. In general, the measured L_{eq} ranged between 60 and 62 dBA near Route 28 and between 48 and 56 on Van Loan Road.

Table 4.10-7 Ambient Sound Pressure Levels

Location Number	Location Description	Distance to Route 28 (feet)	Measured Results L_{eq} (dBA)
1	Route 28 Highmont to Fleischmans	57	61
2	Route 28 Grassy Area Opposite Post Office	73	60
3	Highlands Road at Route 28	60	62
4	Van Loan Road Daytime	375	56
5	Van Loan Road Nighttime	375	48

Source: E & E 2008
Key:
L_{eq} = equivalent sound level
dBA= decibels A-scale

Noise receptor locations were chosen to represent the residential areas around the ski center using the layout of the current and proposed future ski center and previous baseline noise monitoring. The following locations were selected (see Figure 4.10-1, Appendix AG, section 2):

- Alder Lane Residential Area near Pinehill Lake to the east;
- Bonnie View Avenue Residential Area to the east;
- Van Loan Road Residential Area to the northeast;
- Green Hill Road Residential Area to the west;
- 654 Galli Curci Road (Rt. 49A) at the hairpin turn; and
- Old Schoolhouse Road, residence nearest to the proposed new reservoir.
- Lower Galli Curci Road Residence near proposed lower pumphouse
- Rt. 49A Residence Opposite Highmount Ski Area

No receptor locations south of the ski center were selected because they would be located on the opposite side of the mountain; noise generated at the ski center would be insignificant on the south slope because of the intervening topography. See Figures 4.10-2 through 4.10-6 in Appendix AG, section 2, which show the noise contours developed with the noise modeling program. Table 4.10-8 presents

the ambient daytime and evening sound levels taken from the noise survey reports (SEA, ENSR, and E & E) at the representative receptor locations without snow-making equipment operating. These values were used as the basis of the operational and construction stationary source noise impact analysis.

Table 4.10-8 Ambient Sound Level Measurements

Receptor	Location	Daytime Ambient Sound Level (L_d dBA)	Evening Ambient Sound Level (L_n dBA)
1	Alder Lane Residential Area	48	45
2	Bonnie View Avenue Residential Area	56	45
3	Van Loan Road Residential Area	56	48
4	Green Hill Road Residential Area	47	40
5	654 Galli Curci Road (Rt. 49A)	43	43
6	Old Schoolhouse Road Residential Area	52	48
8	Rt. 49A Opposite Highmount	50	39
Source: ENSR International 2002, SEA 2008, E & E 2008			

The results indicate that receptors 4 and 5 had the lowest average ambient sound levels, while the highest sound levels were measured at receptors 2 and 3, which is consistent with their relative distance to traffic along Route 28.

4.10.4.3 Future Noise Conditions without the Project

Current noise levels associated with operation of the existing ski center result from snow-making, slope grooming, snow removal, and traffic. These activities and the resulting noise conditions would continue to the same degree in the future without the project.

4.10.5 Potential Noise Impacts

The initial noise and traffic studies for this project used an operational year of 2015, but project delays suggest that 2018 is a more realistic start date. A change in background traffic could impact the noise analysis, but this region is not experiencing significant changes in traffic volumes, so this potential change is not expected to have a detectable change in background noise,

4.10.5.1 Construction Noise Evaluation

Noise will result from project construction activities, during daytime hours only, approximately 10 hours per day, six days per week. Construction noise can vary during the different phases of a building construction project such as the Discovery Lodge. The phases would include site clearing, excavation, foundation work, and building erection. The ski center project also would generate noise during trail clearing, reservoir clearing and excavation, and parking lot clearing and paving.

There are no federal, state, or local regulations that apply to project construction noise. However, NYSDEC's "Assessing and Mitigating Noise Impacts" (2003 revision) provides guidance on construction noise. The document states that all facets of project construction and operation that produce noise—land clearing (chain saw and equipment operation), drilling, equipment operation for excavating, hauling or conveying materials, pile driving, steel work, material processing, and product storage and removal—should be included in the noise impact evaluation.

As part of this analysis, acoustic noise modeling was conducted to estimate the construction noise levels at residential receptors around the site. The algorithm used in the model considered the construction equipment type, numbers of each type, equipment noise emission data, usage factors, and relative distances of the noise-sensitive receptor to the source of noise.

The following logarithmic equation was used to compute projected noise levels:

$$L_{eq}\ (\text{equip}) = \text{E.L.} + 10_{\text{Log}}(\text{U.F.}) - 20_{\log}(D/50) - 10G_{\log}(D/50)$$

where:

L_{eq} (equip) is the L_{eq} at a receiver resulting from the operation of a single piece of equipment over a specified time period.

E.L. is the noise emission level of the particular piece of equipment at the reference distance of 50 feet (U. S. Department of Transportation Federal Highway Administration Table 9.1).

U.F. is a usage factor that accounts for the fraction of time that the equipment is in use over the specified time period.

D is the distance from the receiver to the piece of equipment.
G is a constant that accounts for topography, natural and man-made barriers, and ground effects.

In this case, as a conservative measure, ground effects were ignored and therefore G was equal to 0.

The construction noise modeling was conservative in that it did not include credits for atmospheric absorption, ground attenuation, or the noise-reducing effect of the terrain.

Construction equipment types and quantities and the construction schedule used in the noise modeling for the project were provided by NYSDEC. Noise emission levels were gathered from equipment manufacturers and government agency references. The usage factors were selected from the *FHWA Highway Construction Noise Handbook* (U.S. Department of Transportation August 2006). Usage factors are used to account for the intermittent use of construction equipment throughout the course of a normal workday. Noise emission levels, usage factors for the construction equipment as well as time frame and construction phases are included in Appendix AG, section 3.

Once the average noise level for an individual equipment unit was calculated, the contributions of all major noise-producing equipment on-site were added to provide a total noise level at each noise-sensitive receptor using the following formula:

$$Leq_{total} = 10\log\left(10^{\frac{Leq_1}{10}} + 10^{\frac{Leq_2}{10}} + 10^{\frac{Leq_3}{10}} ...etc.\right)$$

Noise levels were predicted following the construction schedule for Year 1 of Construction (2009) through Year 3 of Construction (2011) for the various phases of the planned construction activities. Because construction will take place during daytime hours, the predicted levels were then combined with the measured average daytime background levels to derive the total estimated sound level for project construction at each representative receptor. The increase in noise level due to the project construction phases was then calculated for each receptor. Table 4.10-9 presents the maximum predicted noise levels along with the predicted increase in noise over the existing level at representative residential receptors during the project construction phases.

As noted in Section 4.10.2.1, a 10 dBA increase in noise over background from construction activities will be considered an impact that will need to be addressed with noise mitigation controls. Table 4.10-9 shows that noise increases greater

than 10 dB over background would be expected to occur at times at the receptor located on Green Hill Road during the construction of the Discovery Lodge, clearing of the west trails and reservoir, and clearing and paving of the new parking lots. For the receptor at Old Schoolhouse Road, construction noise would be greater than 10dB over background at times during clearing and excavation for the new reservoir and clearing and paving of the north and east parking lots. The receptor on lower Gelli Curci Road (also Gali Curci Road) would experience levels greater than 10 dB over background at times during construction of the Discovery Lodge, clearing and excavation for the new reservoir and clearing and paving of the north and east parking lots.

Although these noise impacts are temporary in nature, mitigation measures will be necessary to address the construction noise impacts at these locations. The location of various construction activities are shown on the Comprehensive Plan figure in Appendix AG, section 3. The construction schedule for the scenario of the Full Build-Out alternative plan is discussed in Section 3.7 Phasing and Scheduling.

Table 4.10-9. Maximum Construction Noise Levels at Residential Receptors

Year/Construction Site	1. Alder Lane Residential Area				2. Bonnie View Residential Area			
	Ambient Daytime Sound Level (dBA L_d)	Maximum Sound Level (dBA)[1]	Total Estimated Sound Level (dBA)[2]	Increase Over Existing Sound Level (dBA)	Ambient Daytime Sound Level (dBA L_d)	Maximum Sound Level (dBA)[1]	Total Estimated Sound Level (dBA)[2]	Increase Over Existing Sound Level (dBA)
2009								
Discovery Lodge								
Clearing	48	41	49	1	56	46	57	0
Excavation	48	41	49	1	56	46	57	0
Foundation	48	45	50	2	56	50	57	1
Erection	48	44	50	2	56	49	57	1
2010								
West Trail Clearing	48	45	50	2	56	49	57	1
New Reservoir Clearing	48	48	51	3	56	54	58	2
New Reservoir Excavation	48	44	49	1	56	50	57	1
Upper Parking lots Clearing	48	47	50	2	56	51	57	1
Upper Parking lots Paving	48	47	50	2	56	51	57	1
North Parking lots Clearing	48	48	51	3	56	54	58	2
North Parking lots Paving	48	48	51	3	56	53	58	2
East Parking Lots Clearing	48	48	51	3	56	54	58	2
East Parking Lots Paving	48	48	51	3	56	53	58	2
2011								
Deer Run Trail	48	46	50	2	56	49	57	1

[1] Maximum sound level at receptor location with all construction equipment operating simultaneously
[2] Combined ambient daytime and maximum predicted construction sound levels using the following formula:
$L_{dn} = 10 \log (10^{(\text{Ambient Ldn}/10)} + 10^{(\text{Project construction Ldn}/10)})$
Shaded areas indicate an increase of 10 dBA or more over background.
Key: L_{dn} = DNL (day-nighy sound level)

Table 4.10-9 Maximum Construction Noise Levels at Residential Receptors (continued)

	3. Van Loan Rd Residential Area				4. Green Hill Road Residential Area			
Year/Construction Site	Ambient Daytime Sound Level dBA Ld	Maximum Sound Level (dBA)[1]	Total Estimated Sound Level (dBA)[2]	Increase Over Existing	Ambient Daytime Sound Level dBA Ld	Maximum Sound Level (dBA)[1]	Total Estimated Sound Level (dBA)[2]	Increase Over Existing
2009								
Discovery Lodge								
Clearing	56	48	57	1	47	53	54	7
Excavation	56	48	57	1	47	53	54	7
Foundation	56	53	58	2	47	58	58	11
Erection	56	52	57	1	47	57	57	10
2010								
West Trail Clearing	56	50	57	1	47	57	58	11
New Reservoir Clearing	56	58	60	4	47	57	58	11
New Reservoir Excavation	56	54	58	2	47	53	54	7
Upper Parking lots Clearing	56	52	58	1	47	58	59	12
Upper Parking lots Paving	56	52	58	1	47	58	59	12
North Parking lots Clearing	56	57	60	3	47	61	61	15
North Parking lots Paving	56	57	59	3	47	61	61	14
East Parking Lots Clearing	56	58	60	4	47	58	59	12
East Parking Lots Paving	56	57	60	4	47	58	58	12
2011								
Deer Run Trail	56	49	57	1	47	55	52	6

[1] Maximum sound level at receptor location with all construction equipment operating simultaneously

[2] Combined ambient daytime and maximum predicted construction sound levels using the following formula:

$$Ldn = 10 \log (10^{(Ambient\ Ldn/10)} + 10^{(Project\ construction\ Ldn/10)})$$

Shaded areas indicate an increase of 10 dBA or more over background.

Table 4.10-9 Maximum Construction Noise Levels at Residential Receptors (continued)

Year/Construction Site	5. 654 Galli Curci Road (Rt. 49A)				6. Old Schoolhouse Road			
	Ambient Daytime Sound Level dBA Ld	Maximum Sound Level (dBA)[1]	Total Estimated Sound Level (dBA)[2]	Increase Over Existing	Ambient Daytime Sound Level dBA Ld	Maximum Sound Level (dBA)[1]	Total Estimated Sound Level (dBA)[2]	Increase Over Existing
2009								
Discovery Lodge								
Clearing	43	41	45	2	52	51	54	3
Excavation	43	41	45	2	52	51	54	3
Foundation	43	45	47	5	52	55	57	5
Erection	43	44	47	4	52	54	56	5
2010								
West Trail Clearing	43	51	52	9	52	52	55	3
New Reservoir Clearing	43	46	47	5	52	66	66	14
New Reservoir Excavation	43	42	45	3	52	62	62	11
Upper Parking Lots Clearing	43	50	51	8	52	54	56	4
Upper Parking Lots Paving	43	50	50	8	52	54	56	4
North Parking Lots Clearing	43	47	49	6	52	64	64	12
North Parking Lots Paving	43	47	49	6	52	63	64	12
East Parking Lots Clearing	43	47	48	5	52	69	69	18
East Parking Lots Paving	43	46	48	5	52	69	69	18
2011								
Deer Run Trail	43	50	51	8	52	50	54	2

[1] Maximum sound level at receptor location with all construction equipment operating simultaneously

[2] Combined ambient daytime and maximum predicted construction sound levels using the following formula:

$$Ldn = 10 \log (10^{(Ambient\ Ldn/10)} + 10^{(Project\ construction\ Ldn/10)})$$

Shaded areas indicate an increase of 10 dBA or more over background.

Table 4.10-9 Maximum Construction Noise Levels at Residential Receptors (continued)

Year/Construction Site	7. Lower Galic Curci Road				8. Rt. 49A Opposite Highmount			
	Ambient Daytime Sound Level dBA Ld	Maximum Sound Level (dBA)[1]	Total Estimated Sound Level (dBA)[2]	Increase Over Existing	Ambient Daytime Sound Level dBA Ld	Maximum Sound Level (dBA)[1]	Total Estimated Sound Level (dBA)[2]	Increase Over Existing
2009								
Discovery Lodge								
Clearing	48	53	54	6	52	43	52	1
Excavation	48	53	54	6	52	43	52	1
Foundation	48	58	58	10	52	48	53	2
Erection	48	57	57	9	52	47	53	1
2010								
West Trail Clearing	48	54	55	7	52	56	57	6
New Reservoir Clearing	48	65	65	17	52	48	53	2
New Reservoir Excavation	48	61	61	13	52	44	52	1
Upper Parking Lots Clearing	48	56	56	8	52	54	56	4
Upper Parking Lots Paving	48	55	56	8	52	53	56	4
North Parking Lots Clearing	48	70	70	22	52	50	54	2
North Parking Lots Paving	48	70	70	22	52	49	54	2
East Parking Lots Clearing	48	69	69	21	52	48	53	2
East Parking Lots Paving	48	69	69	21	52	48	53	2
2011								
Deer Run Trail	48	50	52	4	52	54	56	5

[1] Maximum sound level at receptor location with all construction equipment operating simultaneously

[2] Combined ambient daytime and maximum predicted construction sound levels using the following formula:

$$Ldn = 10 \log (10^{(Ambient\ Ldn/10)} + 10^{(Project\ construction\ Ldn/10)})$$

Shaded areas indicate an increase of 10 dBA or more over background.

Construction of the project will result in some temporary increase in construction vehicle traffic along NY 28 and CR 49A. Commuter automobile traffic to the construction sites is assumed to be minor in comparison and an insignificant source of construction traffic noise. Maximum noise impacts from construction vehicle traffic are expected to occur along CR 49A because of the proximity of residences and relatively low volumes of existing traffic. The residences near the Green Hill Road and Old Schoolhouse Road monitoring locations would experience some nuisance-level noise in the daytime when the new parking lots are under construction. Construction vehicles would be using the road during the construction season and during daytime construction periods only. Most of the construction traffic would occur during the first two years of construction.

Construction of the project may include blasting on a limited basis for construction of utility trenches on the top ridge of the mountain. The size of the explosive charges to be used is not yet determined. However, the instantaneous sound level from typical construction blasting has been documented as approximately 94 dBA at a distance of 50 feet, which is only a few decibels higher than the expected reference sound level of the project construction activities and will be reduced considerably over the distance from the trench construction to the nearest residential receptors. In comparison with other construction sound, the sound from blasting will be brief and relatively infrequent.

Prior to any blasting, a Site-Specific Blasting Plan will be completed by the blasting contractor. The blasting plan will identify elements of the blast design, including perimeter drilling, hole size, depth, spacing, type of burden, charge weight, distribution, and delay sequence that will be used to reduce ground-borne noise, air-borne noise and vibration energy transfer associated with blasting. All blasting would be conducted during daylight hours and would not begin until occupants of nearby buildings, residences, and places of business are notified.

4.10.5.2 Operational Noise Evaluation

To identify potential noise impacts resulting from the operation of the expanded ski center, noise modeling was conducted and the modeling results were compared with applicable local noise ordinances and NYSDEC guidance. It is assumed that the maximum impact from operational noise would occur during the ski season. While the facility is used for other purposes year round, peak traffic, snowmaking, and grooming would only occur during the ski season.

Computer noise modeling of the major project sources was conducted using the CadnaA Model version 3.7.124 developed by Datakustik GmbH. Estimated noise level data for the major project noise sources were obtained from equipment vendors or calculated based on equipment horsepower. The model simulates the outdoor three-dimensional propagation of sound from each noise source and accounts for sound wave divergence, atmospheric and ground sound absorption, and sound attenuation due to interceding barriers and topography based on the International Standards Organization (ISO) 9613 standard. Standard conditions of 32°F and 50 percent relative humidity were assumed and ground absorption was set at 1 for porous ground. Atmospheric attenuation is calculated in the model based on the standard conditions following the methodology in ISO 9613-2. A database was developed which specified the location and sound power levels of each noise source. A receptor distance of 25 meters by 25 meters was specified for the grid of receiver points which covered the entire area of interest. The model calculated the overall A-weighted sound pressure levels within the receptor grid based on the sound level contribution of each noise source. Finally, a noise contour plot was produced based on the overall sound pressure levels within the receptor grid, including selected specific receptor locations that were in the same residential locations where ambient noise has been measured, to allow for direct comparison with existing noise levels. The accuracy of the sound levels predicted by the model depends upon the distance the receptor is from the noise source. For the model runs in this study, the accuracy ranged from ±0.6 to ±2.8 dBA. Appendix AG, section 4 contains tables for each operational noise level predicted at the representative residential receptors for the snowmaking phases.

Two types of snow guns are currently in use at the Belleayre Mountain Ski Center. Snow guns are placed along the upwind side of the trail at intervals of approximately 100 feet and at a height of approximately 10 to 12 feet. Higher energy snow guns are utilized on the upper portions of the ski trails. For the upper ski trails, the Snow Giant II is currently utilized. The Snow Giant II is a high energy gun with a sound power level (LwA) of 119 dBA. For lower ski trails, the Sky giant II is currently used. The Sky Giant II is a low energy gun with a LwA of 100 dBA. As part of the Belleayre Mountain Ski Center expansion, some of the existing snow guns will be replaced with snow guns manufactured by PoleCat. The new snow guns will include the Standard PoleCat for lower ski trails with a LwA of 99 dBA and the Super PoleCat for upper trails with a LwA of 103 dBA.

Sound power levels used in the model runs for the snow-making equipment were provided by the equipment manufacturers or calculated based on horsepower and are presented in Table 4.10-10 for existing equipment, and for future snow-making equipment in Table 4.10-11. Table 4.10-11 includes some of the existing snow-making equipment to be retained and the future, additional snow-making equipment to be installed under the project.

Table 4.10-10 Current Snow-Making Equipment and Sound Power Levels

Source	Quantity	Sound Power L_{wA} (dBA)	Location
Low Energy Snow Guns	Varies[1]	100	Ski Trails
High Energy Snow Guns	Varies[1]	119	Ski Trails
Compressors Diesel	10	102	Upper Pump House
Compressors Electric	3	85	Upper Pump House
Pumps 350 HP	2	109	Upper Pump House
4000 CFM Compressor	1	102	Compressor Building
800 KW Generator	1	106	Pine Hill Lake Pumphouse
400 HP Electric Pump	4	122	Pine Hill Lake Pumphouse
200 HP Electric Pump	1	119	Pine Hill Lake Pumphouse

[1]Number and location varies depending on snowmaking phase

Table 4.10-11 Future Snowmaking Equipment and Sound Power Levels

Source	Quantity	Sound Power L_{wA} (dBA)	Location
Snow Giant High Energy	Varies[1]	119	Ski Trails
Sky Giant Low Energy	Varies[1]	100	Ski Trails
Super Polecat	Varies[1]	103	Ski Trails
Standard Polecat	Varies[1]	99	Ski Trails
Compressors Diesel	6	102	New Compressor Building
Compressors Electric	3	85	Upper Pump House
Pumps 350 HP	2	109	Upper Pump House
800 KW Generator	1	116	Pine Hill Lake Pump House
400 HP Electric Pump	4	122	Pine Hill Lake Pumphouse
200 HP Electric Pump	1	119	Pine Hill Lake Pumphouse
450 HP Electric Pump	5	124	Proposed Lower Pumphouse

[1]Number and location varies depending on snowmaking phase

The ski lifts operate daily from 9:00 a.m. to 4:00 p.m. Snowmaking begins at 4:30 p.m. and typically occurs five times, beginning in December and ending in January. There are essentially five phases that are completed and then repeated during the snowmaking process. A specific set of trails is addressed during each phase of the snowmaking operation. Table 4.10-12 shows the trails included in each phase. In order to compare the existing snowmaking operations with future operations, a model was set up for each snowmaking phase that contained existing equipment noise sources and one for each snowmaking phase that contained future snowmaking equipment noise sources. Snowmaking noise on the Deer Run Trail was modeled and used as existing noise level for the phase 5 snowmaking operation since this trail is located nearest to the phase 5 snowmaking trails and would better represent existing snowmaking noise conditions in that area. Appendix AG, section 5 contains the types and quantities of snow guns that would be used on the various trails during each of the five phases for the proposed project and were included in the noise models. A comparison of the existing operation's snowmaking noise levels with the predicted future operation noise levels for each of the five phases is presented in Tables 4.10-13 through 4.10-17. There will be additional snow grooming on the added ski trails and additional snow removal activities in the added parking lots. Typical snow groomers such as the Bombardier BR280 generate noise levels of 74 dBA at a distance of 50 feet while traveling at 20 mph. Snow removal in parking lots would at times involve the use of front end loaders and dump trucks. Typical maximum noise levels associated with front end loaders would be 80 dBA at 50 feet and 84 dBA at 50 feet for dump trucks. Although the snow grooming activities would take place at night, this activity would not contribute significantly to the noise being generated by multiple snow guns in operation at the same time. Snow clearing activities in the parking lots may be audible at times but the equipment would operate intermittently as snow clearing is needed.

Table 4.10-12 Snowmaking on Ski Runs Phases 1 through 5

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Dot Nebel Upper	Yahoo Upper	Area 51	West-1	HMT-2
Dot Nebel Lower	Yahoo Lower	Seneca Upper	West-2	HMT-3A
Area 5 - Base Lift 8	Area 4 - Base Lift 7 Overlook	Seneca Lower	West-3	HMT-3B
Area 1 - Top Lift 8	Area 2 - Top Lift 7	Tuscarora	West-4	HMT-4
Deer Run	Onteora Upper	Peekamoose Upper	West-5	HMT-5
Deer Run	Onteora Lower	Peekamoose Lower	Connect PR 1	HMT-6A
Iroquois	Wanatuska Upper	Pepacton	HMT-1	HMT-6B
Huron Section A	Wanatuska Lower	Algonquin Upper	HMT-9A	SPA-1
Area 8 - Base Lift 1& 2 Discovery	Belleayre Run Upper	Algonquin Lower	Ashokan Section B	SPA-2
Running Bear	Belleayre Run Lower	Tomahawk Crossing	Dakota	SPA-3
Area 10 - Beginner Area	Onondaga	Expressway	Oneida	HMT-7
Area 9 - Kidscamp	Horseshoe Pass	Connect 1	Huron Section B	HMT-8
Connect 12	Roaring Brook Section B	Connect 4	Eagle Falls	HMT-9B
	Roaring Brook Section A	Connect 6	Tongora Upper	
	AREA 3 - Top Lift 6	Connect PR 2	Tongora Lower	
	AREA 7 - Base Lift 6	Connect 11		
	Connect 2	Chinook		
	Connect 3	The Canyon Upper		
	Connect 5	The Canyon Lower Section A		
	Connect 7	Easy In Section B		
	Connect 9	Easy Out Section B		
	Connect 10	Mohican		
	Ashokan Section A	Utsayantha Upper		
	Ashokan Bottom Extension	Mohawk Upper		
	The Canyon Lower Section B	Mohawk Lower		
	Easy In Section A			
	Easy Out Section A			
	Discovery Way			
	Little Creek			
	Winnisook Upper			

Table 4.10-13 Snowmaking Phase 1

Receptor Location	Average Evening Ambient Sound Level (L_n) (dBA)	NoBuild Operational Noise* (dBA)	Combined Ambient and No Build Operational Noise (dBA)	Predicted Build Operational Noise* (dBA)	Combined Ambient and Build Operational Noise (dBA)	Exceeds Shandaken Limits [1]	Change From Existing (dBA)	Exceeds NYSDEC +6dBA over Background
Alder Lane Residential Area	45	32	45	32	45	No	0	No
Bonnie View Avenue Residential Area	45	28	45	25	45	No	0	No
Van Loan Road Residential Area	48	45	50	37	48	No	-2	No
Green Hill Road Residential Area	40	41	44	29	40	No	-4	No
654 Galli Curci Road (Rt. 49A)	43	24	43	26	43	No	0	No
Old Schoolhouse Road	48	48	51	43	49	No	-2	No
Lower Galli Curci Road Residence	48	50	52	43	49	No	-3	No
Rt. 49A Opposite Highmount	39	42	44	41	43	No	-1	No

*During snow making operations
Notes: [1] See Table 4.10-4

Table 4.10-14 Snowmaking Operation Phase 2

Receptor Location	Average Evening Ambient Sound Level (L_n) (dBA)	NoBuild Operational Noise* (dBA)	Combined Ambient and NoBuild Operational Noise (dBA)	Predicted Build Operational Noise* (dBA)	Combined Ambient and Build Operational Noise (dBA)	Exceeds Shandaken Limits[1]	Change From Existing (dBA)	Exceeds NYSDEC +6 dBA over Background
Alder Lane Residential Area	45	43	47	32	45	No	-2	No
Bonnie View Avenue Residential Area	45	32	45	34	45	No	0	No
Van Loan Road Residential Area	48	45	50	45	50	No	0	No
Green Hill Road Residential Area	40	25	40	27	40	No	0	No
654 Galli Curci Road (Rt. 49A)	43	0	43	0	43	No	0	No
Old Schoolhouse Road	48	45	49	47	50	No	1	No
Lower Galli Curci Road Residence	48	45	50	46	50	No	0	No
Rt. 49A Opposite Highmount	39	9	39	9	39	No	0	No

*During snow making operations
Notes: [1] See Table 4.10-4

Table 4.10-15 Snowmaking Operation Phase 3

Receptor Location	Average Evening Ambient Sound Level (L_n) dBA)	NoBuild Operational Noise* (dBA)	Combined Ambient and NoBuild Operational Noise (dBA)	Predicted Build Operational Noise* (dBA)	Combined Ambient and Build Operational Noise	Exceeds Shandaken Limits [1]	Change From Existing (dBA)	Exceeds NYSDEC +6 dBA over Background
Alder Lane Residential Area	45	41	46	32	45	No	-1	No
Bonnie View Avenue Residential Area	45	26	45	25	45	No	0	No
Van Loan Road Residential Area	48	44	49	31	48	No	-1	No
Green Hill Road Residential Area	40	26	40	26	40	No	0	No
654 Galli Curci Road (Rt. 49A)	43	0	43	0	43	No	0	No
Old Schoolhouse Road	48	43	49	43	49	No	0	No
Lower Galli Curci Road Residence	48	44	49	40	48	No	-1	No
Rt. 49A Opposite Highmount	39	29	39	28	39	No	0	No

*During snow making operations
Notes: [1] See Table 4.10-4

Table 4.10-16 Snowmaking Operation Phase 4

Receptor Location	Average Evening Ambient Sound Level (L_n) (dBA)	NoBuild Operational Noise* (dBA)	Combined Ambient and No Build Operational Noise (dBA)	Predicted Build Operational Noise* (dBA)	Combined Ambient and Build Operational Noise (DBA)	Exceeds Shandaken Limits [1]	Change From Existing (dBA)	Exceeds NYSDEC +6 dBA over Background
Alder Lane Residential Area	45	41	46	34	45	No	-1	No
Bonnie View Avenue Residential Area	45	30	45	31	45	No	0	No
Van Loan Road Residential Area	48	48	51	48	51	No	0	No
Green Hill Road Residential Area	40	26	40	30	40	No	0	No
654 Galli Curci Road (Rt. 49A)	43	0	43	18	43	No	0	No
Old Schoolhouse Road	48	47	50	48	51	No	1	No
Lower Galli Curci Road Residence	48	47	50	48	51	No	1	No
Rt. 49A Opposite Highmount	39	21	39	35	40	No	1	No

*During snow making operations
Notes: [1] See Table 4.10-4

Table 4.10-17 Snowmaking Operation Phase 5

Receptor Location	Average Evening Ambient Sound Level (L_n) dBA)	NoBuild Operational Noise* (dBA)[2]	Combined Ambient and NoBuild Operational Noise (dBA)	Predicted Build Operational Noise* (dBA)	Combined Ambient and Build Operational Noise (dBA)	Exceeds Shandaken Limits [1]	Change From Existing (dBA)	Exceeds NYSDEC +6dBA over Background
Alder Lane Residential Area	45	32	45	32	45	No	0	No
Bonnie View Avenue Residential Area	45	28	45	24	45	No	0	No
Van Loan Road Residential Area	48	45	50	28	48	No	-2	No
Green Hill Road Residential Area	40	41	43	26	40	No	-3	No
654 Galli Curci Road (Rt. 49A)	43	24	43	18	43	No	0	No
Old Schoolhouse Road	48	48	51	43	49	No	-2	No
Lower Galli Curci Road Residence	48	50	52	39	48	No	-4	No
Rt. 49A Opposite Highmount	39	42	44	52	52	No	8	Yes

*During snow making operations

Notes: [1] See Table 4.10-4

[2]Existing during snowmaking on Deer Run Trail (existing Phase 1)

As indicated in Tables 4.10-13 through 4.10-17, the predicted change in noise level over the existing background ranges from -4 dBA to 8 dBA through the five phases of snowmaking. One of the increases exceeds the NYSDEC guideline of +6 dBA over background. An increase of 8 dBA would occur at the residence on Rt. 49A opposite the Highmount Trail Area during snowmaking phase 5. In order to mitigate the noise impact of the phase 5 operation at the residences across Rt. 49A, the five lowest snow guns on the Highmount Trails should not be operated past 10 p.m.

Other than the location opposite Highmount, the largest increase would be 1 dBA, which is not considered to be perceptible by the human ear. In addition, the noise levels resulting from operation of the project would range from 39 to 52 dBA and therefore would not exceed the Town of Shandaken noise limit of 53 dBA for a receiving property in a residential zone during the evening. For this analysis, the average evening ambient sound level for the lower Galli Curci Road residence was assumed to be the same as that for the nearby Old Schoolhouse Road residential location.

Since the project is adjacent to a potential land acquisition by the state that would become a portion of the state owned Big Indian Wilderness Area referred to as the Big Indian Parcel located east of the Belleayre Mountain Ski Center, the noise impact of the expanded ski center operation was evaluated at the nearest border of the Big Indian Parcel to the Belleayre Mountain Ski Center (see Appendix AG, Figure 4.10-1 - Big Indian parcel border receptor location), for each phase of the snowmaking operation. Table 4.10-18 presents the results of the noise evaluation for the Big Indian Parcel.

4.10-18 Operating Noise Contribution at Big Indian Parcel

Snowmaking Phase	Existing Operation Noise Contribution (dBA)	Future Operation Noise Contribution (dBA)	Noise Decrease or Increase (dBA)
1	49	36	-13
2	53	53	0
3	49	49	0
4	47	47	0
5	49	21	-28

As indicated in the table, the operational noise would be no increase for snowmaking phases 2, 3, and 4 and noise levels would be expected to decrease for

snowmaking phases 1, and 5 due to the replacement of some high energy snow guns with low energy snow guns and the relocation and enclosure of the of the diesel air compressors.

4.10.5. 3 Traffic Noise Evaluation

Traffic Noise Model (TNM) version 2.5, developed by the FHWA, was used to predict noise impacts associated with traffic increases from the proposed project. The TNM is a state-of-the-art model used to predict noise levels resulting from vehicles traveling on roadways. Noise-level calculations at each selected receiver compute the noise contributions from a series of roadway segments. The noise due to each segment is characterized by speed-dependent reference noise emission levels and vehicle density by vehicle type. The TNM can simulate complex geographic settings and calculate noise attenuation resulting from noise barriers. In addition, TNM can calculate the additional noise generated by vehicles accelerating away from traffic control devices (toll booths and traffic signals).

When using the TNM model, it is preferable that the modeling results and the actual measured data be consistent in traffic conditions. In general, the difference between the modeled result and measured data should not exceed 3 dBA unless there are other contributing factors that affect the modeling results. Comparing modeled results and measured results provides a check that the model is properly set up.

To validate the model set up, traffic counts were taken in July 2008 (E & E 2008) at several receptor locations on major routes in the vicinity of the project while 20-minute noise measurements were being conducted. These traffic counts were used in the TNM model to compare the measured and modeled results. As presented in Table 4.10-19, the differences between measured and modeled results for all receptors are within 3 dBA, which indicates that the model is set up correctly.

Specific noise modeling was conducted for the existing condition 2008, no build year 2035, (No Build Alternative) and build year 2035. Traffic speed was set at 60 miles per hour (mph) on the Route 28 roadway links and 45 mph on CR 49A links. Existing, no build, and build traffic volumes for the Saturday peak hours were provided by Clough Harbour & Associates LLP (see Appendix AG, section 6) and were entered into the model. Three classes of vehicles were considered for the TNM modeling: automobiles, medium trucks, and heavy trucks. Three locations were selected along Route 28 to represent the noise levels at residential receptors along the route. One location along CR 49A was selected to represent a residence 87 feet from CR 49A and 1,266 feet from Route 28. Receptor height was set at approximately 5 feet in all noise models. Figure 4.10-7 in Appendix AG, section 2 contains the receptor locations included in the traffic noise study.

Table 4.10-19 Comparison of Noise Model Results to Measured Levels

Location	Receptor Location	Distance to Highway (feet)	Measured Results (dBA)	Modeled Results (dBA)	Difference (dBA)
1	Route 28 Highmont to Fleischmans	57	60.7	61.3	0.6
2	Route 28 Grassy Area Opposite Post Office	73	60.4	62.6	2.2
3	Highlands Road at Route 28	60	62.1	61.7	0.4

The noise levels for the existing condition, the No Build Alternative, and the Build Alternative are presented in Table 4.10-20. This table also presents the predicted increases in noise level for No Build and Build conditions compared with the existing condition (existing noise levels). The modeled 2008 noise levels reflect the 2008 existing Saturday peak hour traffic volume. The predicted increase in noise over the existing noise level at the residential receptors due to project traffic would range from 2 dBA to 3.3 dBA. A predicted increase of 3.3 dBA and 3.2 dBA along Route 28 and CR 49A, respectively, is consistent with a future Saturday peak hour project traffic volume that is essentially twice that of the 2008 existing Saturday peak hour volume along the roadway links adjacent to those receptors.

Table 4.10-20 Traffic Noise Modeling Results

Location/ Receptor	Receptor Location	Modeled 2008 Noise Levels (dBA)	2035 No Build Noise Levels (dBA)	Increase	2035 Build Noise Levels (dBA)	Increase
1	Route 28 Highmont to Fleischmans	63	65	2	65	2
2	Highlands Road at Route 28	60	62	2	63	3
3	Route 28 near Moran Road	64	66	2	67	3
4	CR 49A Residence	57	58	1	61	4

To identify the traffic noise impacts, the predicted noise increases were compared with NYSDEC's *Assessing and Mitigating Noise Impacts* (June 2003 revision). As stated in the guidance, increases from 3 dBA to 6 dBA may have a potential for adverse noise impacts only in cases where the most sensitive of receptors are present. Sound pressure increases of more than 6 dBA may require a closer analysis of impact potential, depending on existing SPLs and the character of surrounding land use and receptors. According to NYSDEC guidelines, an increase of less than 5 dBA is considered unnoticeable to tolerable. Therefore, an increase in traffic noise of up to 4 dBA from the project is not likely to be noticeable.

According to the FHWA, for a highway project, if noise levels from highway traffic at an impacted receptor location approach are at least 1 dBA less than the applicable NAC, abatement measures such as the installation of noise barriers, if feasible and reasonable, need to be considered. The noise levels predicted for the 2035 peak hour project traffic were less than the NAC for a residential exterior (67 dBA). However, the level predicted at receptor 3 due to the project (67 dBA) exceeds the NAC. Since the peak traffic hour on CR 49A and Route 28 would normally coincide with the daily closing of the ski center, it would occur only in late afternoon and traffic volume would likely be much lower during the rest of the day. In addition, the peak traffic volume would occur only during the winter ski season when residential windows are normally closed, which would result in a 25 to 30 dB noise reduction (New York State Department of Transportation 1998) within the home.

4.10.6 Proposed Noise Mitigation Measures

As noted in Section 4.10.3, a 10 dBA increase in noise over background from construction activities will be considered an impact that will need to be addressed with noise mitigation controls. Table 4.10-9 shows that noise increases greater than 10 dB over background would be expected to occur at the receptor located on Green Hill Road during the construction of the parking lots and at the receptor located on Old Schoolhouse Road, during construction of the lowest parking lot and the new reservoir. Although these noise impacts are temporary in nature, mitigation measures will be necessary to address the construction noise impacts at these locations. The following measures will be employed as necessary to reduce the noise levels during construction:

- Stationary equipment such as compressors and generators will be located away from noise-sensitive receptors.
- Construction activities will be phased such that not all of the equipment is operating simultaneously.
- Maximum-sized intake and exhaust mufflers will be used on internal combustion engines.
- Idling equipment will be turned off when not in use.
- To the extent possible, construction sites should be laid out in a manner that reduces the need for backing up construction equipment in order to reduce the noise from backup alarms.
- Noise reduction blankets will be installed on perimeter site fencing at some locations, as necessary this could afford a five to ten decibel reduction in noise level.

4.11 Socioeconomic, Community Services and Resources

The project site is located in the Catskill Park region of New York State in the towns of Middletown, Delaware County, and Shandaken, Ulster County. In 2008 these relatively small communities had estimated populations of 4,045 and 3,426 full-time permanent residents, respectively.

This socioeconomic analysis encompasses the following:

- A fiscal and budgetary analysis and an analysis of municipal services in the towns of Middletown and Shandaken;
- A demographic and economic profile of a larger socioeconomic study area that includes three towns in the Route 28 corridor between Boiceville and Margaretville—Middletown, Shandaken, and Olive (see Figure 4.11-1); and
- An analysis of the regional socioeconomic impacts of the project in the Tri-County area of Delaware, Ulster, and Greene counties (Figure 4.11-2). These three counties were used to analyze the regional socioeconomic impacts because more than 80% of all workers currently employed at the Belleayre Ski Center reside in these counties.

Wherever practicable, socioeconomic data will be presented at the town level. However, given the rural nature of the region, many of the economic statistics and data sources are provided only at the more aggregate county level.

4.11.1 Socioeconomic Study Area Demographics

4.11.1.1 Population, Housing, and Transportation

Population and Demographics

According to 2008 population estimates made by ESRI, Inc., a demographic forecasting service, the total population in Delaware, Greene, and Ulster Counties is 48,114 persons, 51,139 persons, and 186,662 persons, respectively (ESRI, Inc. 2008). The socioeconomic study area's total population was 12,210 in 2008, which is approximately 4.3% of the Tri-County area. These 2008 estimates were extrapolated from data collected by the U.S. Census Bureau for the *2000 U.S. Census of Population and Housing* using various regional, statewide, and national demographic trends. Throughout this section, wherever possible, U.S. Census Bureau data has been used. ESRI, Inc. data is used only to augment and update the federal data.

This region is rural: a 2000 population density of 31.7 persons per square mile makes Delaware County one of the most rural counties in New York State. In 2000, Greene and Ulster Counties also had low population densities, with only 74.6 and 156.4 people per square mile, respectively. Ulster's population is larger

because it is closer to New York City and is considered part of the New York City metropolitan area, the most populated area in the country.

Recent population estimates show that the total number of residents in the socioeconomic study area increased by 2.8% between 2000 and 2008. Greene and Ulster Counties populations increased by 5.8% and 4.8%, respectively, since 2000, but Delaware County's population has remained relatively unchanged during the same time period with a growth rate of only 0.2%. Tables 4.11-1 and 4.11-2 show the 2000 U.S. Census population counts and 2008 population estimates for the counties and towns in the socioeconomic study area.

Table 4.11-1 Total Population Statistics for the Tri-County Area (2000 to 2008)

County	2000	2008[1]	% Change
Delaware County	48,005	48,114	0.2%
Greene County	48,195	51,139	5.8%
Ulster County	177,749	186,662	4.8%
Total Population Tri-County Area	**273,949**	**285,915**	**4.2%**

Source: U.S. Bureau of the Census 2002; ESRI, Inc. 2008.

Note:
[1] Estimated.

Table 4.11-2 Total Population Statistics for the Towns in the Socioeconomic Study Area (2000 to 2008)

Population	2000	2008[1]	% Change
Town of Middletown	4,051	4,045	-0.2%
Town of Shandaken	3,235	3,426	5.6%
Town of Olive	4,579	4,739	3.4%
Entire Socioeconomic Study Area	**11,865**	**12,210**	**2.8%**

Source: U.S. Census Bureau Census 2002; ESRI, Inc. 2008.

Note:
[1] Estimated.

The Town of Olive, in Ulster County, was settled around 1740 and established in 1823 from parts of the towns of Hurley, Marbletown, and Shandaken. The town encompasses approximately 65 square miles and had a population of 4,739 in 2008. The town consists of 12 hamlets or communities. Two communities, the hamlet of Brodhead's Bridge and Brown's Station, were lost to the Ashokan Reservoir. The town describes itself as "having something for everyone," including wild game hunting; hiking trails and maintained walkways; mountain bike trails; gift shops with local artisans work; diverse restaurants and famous beer pubs; and tubing and fishing on Esopus Creek (http://.town.olive.ny.us//.htm).

The Town of Shandaken, in Ulster County, was established in 1804. It consists of 12 hamlets: Allaben, Big Indian, Bushnellsville, Chichester, Highmount, Mt. Pleasant, Mt. Tremper, Oliverea, Phoenicia, Pine Hill, Shandaken, and Woodland

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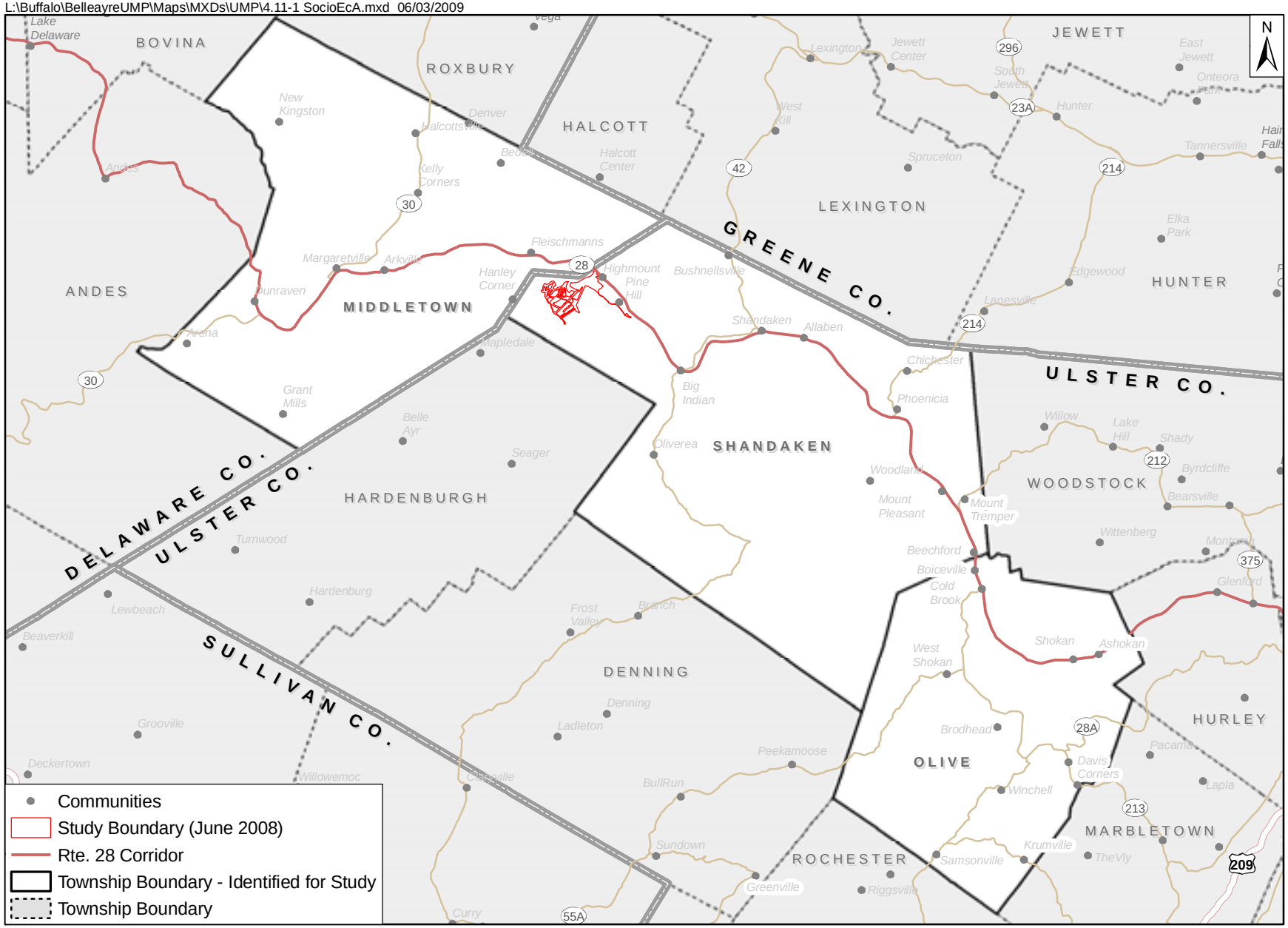

Communities
Study Boundary (June 2008)
Rte. 28 Corridor
Township Boundary - Identified for Study
Township Boundary

Figure 4.11-1 Belleayre Mountain Ski Center
Middletown, Shandaken, and Olive Townships

0 1.5 3 6
Miles

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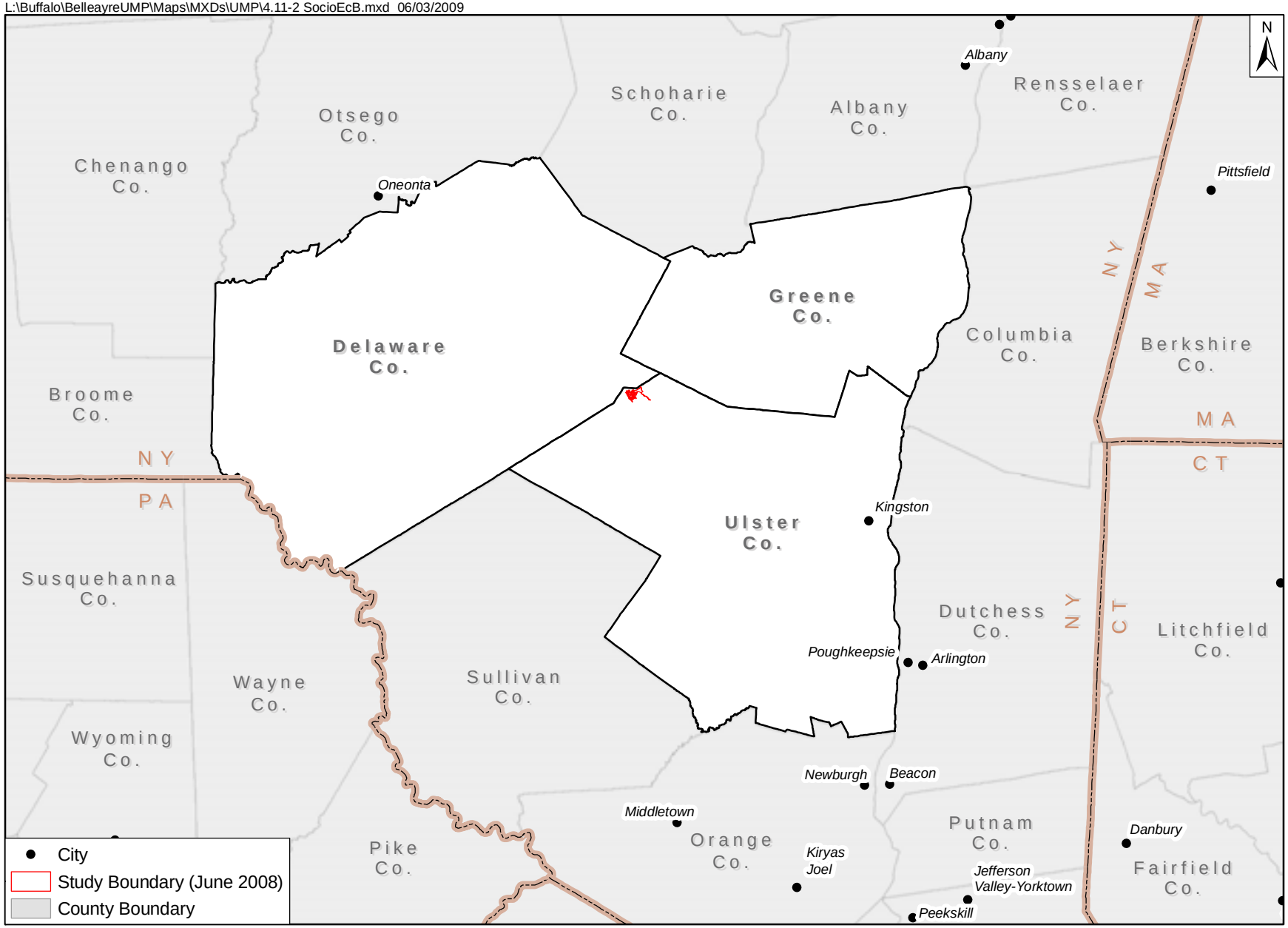

Figure 4.11-2 Belleayre Mountain Ski Center
Delaware, Greene, and Ulster Counties

0 5 10 20
Miles

Valley. The town describes itself as a "rural retreat and second-home community" (http://.shandaken.us/).

The Town of Middletown, in Delaware County, was established in 1789. It encompasses 97 square miles and consists of several hamlets such as Arkville, Bedel, Denver, Fleischmanns (Village), Grant Mills, Halcottsville, Hanley Corner, Kelly Corners, Margaretville (Village), and New Kingston. Other small settlements or hamlets are Spruceville, New Kingston, Clarks Factory, and Lumberville.

The population of full-time residents is more than 11,000 in the towns of Olive, Shandaken, and Middletown and 99,253 in the two counties. Initially settled by white Europeans, the population has remained predominantly white, with more than 95% consisting of German, Irish, English, and Italian descendants, among others. The U.S. Census Bureau and Delaware and Ulster County statistics indicate that the remaining population is about 7% Hispanic, 5% minority (Black, Asian, Pacific Islander, Native American, and other) in Middletown, and almost 4% Hispanic and about 7% minority in Shandaken. The biggest differences in the socioeconomic study area population are in age and income. (Age separates levels and types of recreational activities. Income is reported by education levels, ways of making a living, ability and time spent commuting to work, and leisure time.)

The total population distribution by age groups for the three towns located in the socioeconomic study area is shown in Table 4.11-3. As illustrated, 540 children under the age of 5, representing 4.4% of the total population, reside in the towns. School-age children (age 5 to 19) account for 16.4% of the area's total population, and senior citizens (age 65 and older) represent 18.2 % of the total population. These age group distributions are similar to the regional population distributions. However, Ulster County and Delaware County have a slightly greater percentage of children under the age of 5 years (5.4% and 5.2%, respectively) and also slightly more school-age children (18.8% and 18%, respectively) than in the three towns. In addition, Ulster County as a whole has relatively fewer senior citizens (13.9 %) than the towns in the socioeconomic study area.

Table 4.11-3 Population Distribution by Age Group for Residents Living in the Towns of Shandakan, Middletown, and Olive (2008)

Age Group	Three Towns	% of Total Population
Under 5 years	540	4.4%
5 to 19 years	1,998	16.4%
20 to 24 years	493	4.0%
25 to 34 years	1,026	8.4%
35 to 44 years	1,506	12.3%
45 to 54 years	2,227	18.2%
55 to 64 years	2,162	17.7%
65 years and older	2,258	18.5%
Total	**12,210**	**100%**

Source: ESRI, Inc. 2008.

In 2008 there were an estimated 5,216 households located within the three towns. Table 4.11-4 shows the total number of households and average household size for each county and town in the region.

Table 4.11-4 Characteristics of Households in the Socioeconomic Study Area (2008)

County/	Households	Average Household Size
Delaware County	19,735	2.33
Greene County	19,821	2.38
Ulster County	71,767	2.44
Total Tri-County Area	**111,323**	**2.38**
Town of Middletown	1,682	2.26
Town of Shandaken	1,571	2.13
Town of Olive	1,963	2.39
Total Three Towns	**5,216**	**2.26**

Source: ESRI, Inc. 2008.

A site visit and interviews with local residents including representatives of Ulster County, Delaware County, and the town of Middletown found that there are few young families, a growing number of telecommuters in their 30s and 40s, and younger "weekenders" who likely are unaccounted for in the area's census numbers because their primary residence is in the New York City metropolitan area. Volunteerism has diminished over the years as the "old-timers" age, and the weekenders are regarded as part-time residents with little social investment in the larger community. The largest minority communities are Orthodox Jewish and Hispanic, who generally live near the base of Belleayre Ski Center in Fleischmanns (Town of Middletown 2008; Delaware County Planning Dept 2008a; Delaware County Planning Department 2008b; Delaware County Planning Department 2008c; Ulster County Planning Board 2008: Town of Middletown 2008).

The initial study for this project used an operational year of 2015, with construction starting in 2013. Project delays suggest that 2018 is a more realistic start date for operations. Population growth in this region is small (1.5% over the next five years, or 0.3%/year), and inflation rates are also low, so this potential change in date for the analyses is not expected to have a measurable change in any of the socioeconomic analyses presented here.

Total population in the region is projected to increase slightly over the next few years. The Tri-County area is expected to have 290,286 residents by 2013, which equates to a 1.5% increase in population over the next five years (ESRI, Inc. 2008). The population of the three towns in the socioeconomic study area is expected to grow by 137 residents (1.1%) during the same time period (see Table 4.11-5).

Table 4.11-5 Projected 2013 Population for Counties and Towns in the Socioeconomic Study Area

County/	Projected Population 2013
Tri-County Area	
Delaware County	47,732
Greene County	53,032
Ulster County	190,522
Total Tri-County Area	290,286
Town Area	
Town of Middletown	4,012
Town of Shandaken	3,510
Town of Olive	4,825
Total Three Towns	12,347

Source: ESRI, Inc. 2008.

Housing

The housing market in the Tri-County area is diverse and comprises an assortment of single-family homes, multi-family units, and vacation and second homes. There is a wide disparity in the value of residences within the region. For example, single-family homes in Delaware County are older and smaller and typically worth less than larger, more modern single-family homes commonly found in Ulster or Greene Counties. Location and ease of access to the New York City area is also an important factor in determining the value and demand for housing within the region. With access to New York City much easier in Greene and Ulster Counties than in Delaware County, housing prices are affected accordingly.

According to the U.S. Census, in 2000 there were 7,987 housing units within the three towns and a total of 133,152 housing units located in the Tri-County area. The available housing stock, as expected, mirrors the regional population distribution. In 2000 Ulster County accounted for more than 41% of the regional housing stock.

In addition to data collected from the 2000 census of population and housing, the U.S. Bureau of the Census has also completed population and housing estimates for 2007 for large demographic areas. Table 4.11-6 shows the estimated number of housing units in Delaware, Ulster, and Greene counties. No 2007 estimates for the smaller census divisions used to define the Route 28 corridor area were available. As shown on Table 4.11-6, the total housing stock in the region increased by approximately 4.5% between March 2000 and July 2007.

Table 4.11-6 Actual and Estimated Total Number of Housing Units Located in the Tri-County Region as of July 2007

Geographical Area	2000 (Actual)	2007 (Estimated)
Delaware County	**28,952**	**29,556**
Town of Middletown	3,013	NA
Ulster County	**77,656**	**81,497**
Town of Shandaken	2,668	NA
Town of Olive	2,306	NA
Greene County	**26,544**	**28,175**
Total Tri-County Area	**133,152**	**139,228**

Source: U.S. Bureau of the Census 2002; July 21, 2008.

Because of the large number of seasonal and recreational homes located in the area, the Tri-County region vacancy rates are much higher than elsewhere in New York State. According to the 2000 census, vacancy rates in the region ranged from a high of 33.4% of all housing units in Delaware County to a low of 13.1% in Ulster County. In addition, the towns of Shandaken (45.3%) and Middletown (44.5%) experienced particularly high vacancy rates compared with the statewide average of 8.1% (Table 4.11-7).

Table 4.11-7 2000 Vacancy Rates for Selected Communities in the Tri-County Region

	2000 Vacancy Rate
Delaware County	**33.4%**
Town of Middletown	44.5%
Ulster County	**13.1%**
Town of Shandaken	45.3%
Town of Olive	19.0%
Greene County	**31.2%**
Total Tri-County Area	**21.1%**
New York State	8.1%

Source: U.S. Bureau of the Census 2002.

A review of the vacant units in the three-town area shows that the majority of the 2,986 vacant units are used for seasonal, recreational, or occasional use, while only 281 units are for sale or rent year-round. Similarly, more than 71% of all vacant units in the Tri-County area were classified as seasonal, recreational, or occasional use units. Tables 4.11-7 and 4.11-8 show the number of housing units and vacant housing within the socioeconomic study area.

Table 4.11-8 Status of Vacant Housing Units in the Socioeconomic Study Area and the Tri-County Area in 2000

Status	Three Towns in the Study Area	Tri-County Area
For rent	171	2,499
For sale only	110	1,958
Rented or sold, not occupied	62	1,001
For seasonal, recreational, or occasional use	2,422	20,163
For migrant workers	0	52
Other vacant	221	2,454
Total	**2,986**	**28,127**

Source: U.S. Bureau of the Census 2002.

Vacation or second homes account for a significant portion of the overall housing stock in the region. According to 2000 census data, approximately 30.3% of all housing units in the towns of Middletown, Shandaken, and Olive were considered improved seasonal, recreational, or occasional use units. During the same time period, approximately 15.1% of the entire housing stock in Delaware, Ulster, and Greene counties was classified as seasonal, recreational, or occasional use units (U.S. Bureau of the Census 2002).

The number of second homes in the Tri-County region has continued to grow. According to 2005 to 2007 estimates made by the U.S. Bureau of the Census, the total number of seasonal, recreational, or occasional-use housing units in the region has increased to 21,362 units. This figure includes 8,053 units in Delaware County, 7,318 units in Greene County and 5,991 in Ulster County. No estimates were available for the towns of Middletown, Shandaken, or Olive (U.S. Bureau of the Census 2009).

In an effort to further quantify and describe the existing housing stock in the region, data from the New York State Office of Real Property Services have been analyzed and are presented below. These data are not directly comparable to the U.S. Census figures because of differences in definitions and collection methods, but they provide a more detailed overview of the regional housing market. The total housing unit numbers reported by the census are based on a survey of population and households. In contrast, the data from the Office of Real Property Services is based on tax assessment roles and parcel counts. Therefore, the same unit may be counted differently by these two agencies. For example, a duplex may be counted as two housing units by the U.S. Bureau of the Census but may count as only one residential parcel by the New York State Office of Real Property Services.

The 2007 annual assessment rolls for Delaware, Ulster, and Greene counties show that residential properties accounted for the vast majority of parcels within their respective counties. As shown on Table 4.11-9, residential properties accounted

for more than 58% of all parcels in Delaware and Greene counties and for nearly 70% of all parcels in Ulster County.

Table 4.11-9 2007 No. of Parcels in Broad Use Categories

Broad Use Categories	Parcel Count		
	Delaware County	Ulster County	Greene County
Agricultural Properties	1,296	847	220
Residential Properties	24,096	60,211	22,203
Vacant Land	13,061	15,785	11,264
Commercial Properties	1,426	4,716	2,061
Recreation and Entertainment Properties	124	296	175
Community Service Properties	724	1,120	524
Industrial Properties	91	206	58
Public Service Properties	860	1,168	573
Public Parks, Wild, Forested and Conservation Properties	1,482	2,066	833
Total Parcels in All Broad Use Categories	**43,160**	**86,415**	**37,911**

Source: New York State Office of Real Property Services 2008a.

Similarly, the vast majority of residential properties in the Tri-County region were classified as single-family, year-round units: In Ulster County these units accounted for 79.9% of the residential properties on the tax rolls, and in Greene County and Delaware County, single-family units accounted for 74.7% and 61.2% of the units, respectively (see Table 4.11-10). Table 4.11-10 shows the residential properties according to individual property class codes.

Table 4.11-10 2007 No. of Parcels in Individual Property Classes

Description	Parcel Counts		
	Delaware County	Ulster County	Greene County
Single Family Year-Round Residence	14,742	48,111	16,587
Rural Residence with Acreage	3,490	2,958	1,503
2-Family, 3-Family, and Multiple Year-Round Residences	638	3,785	1,144
Seasonal Residences and Recreational Use	2,506	1,436	651
Mobile Homes (single and multiple units)	2,400	2,187	1,913
Residential Multi-Purpose /Structure	201	1,609	370
Residential with Agricultural Production	62	53	5
Estates	10	50	9
Other	47	22	21
Total	**24,096**	**60,211**	**22,203**

Source: New York State Office of Real Property Services 2008b.

Consistent with its extremely low population densities, Delaware County's housing stock is also more rural than Ulster or Greene County. Delaware County has the largest number of parcels that are classified as either rural residences with acreage or as seasonal residences/ uses in the Tri-County region. Approximately 14.5% of all parcels in Delaware County were designated rural residence with acreage, and an additional 10.4% were designated seasonal residences/use. In ad-

dition, underlying its affordable housing market, Delaware County had more mobile home parcels and relatively fewer estate parcels than either Ulster or Greene County.

Reflecting its relatively greater developed housing market and its slightly more urbanized character, Ulster County had the largest percentage of duplexes and multi-family residences in the Tri-County area. More than 6% of all residential parcels in the county were considered two-family, three-family, or multiple residences. Similarly, less than 5% of its total residential parcels were considered rural residences with acreage.

Housing prices within the region vary significantly between the counties. Housing in Delaware County is much more affordable than in Ulster or Greene counties. Property values, sales prices, asking prices, and rental prices all reflect this trend. Table 4.11-11 provides an overview of the housing values in the Tri-County area.

Table 4.11-11 2000 Median Value of Owner-Occupied Housing Units

County/	
Delaware County	**$74,800**
Town of Middletown	$86,200
Ulster County	**$111,500**
Town of Shandaken	$90,900
Town of Olive	$115,500
Greene County	**$91,900**
New York State	$148,700

Source: U.S. Bureau of the Census 2002.

The decennial U.S. Census of Population and Housing provides data on the median value of owner-occupied housing units as well as median rents paid in the socioeconomic study area. Table 4.11-11 shows the owner-reported value of housing units in the Tri-County region. Housing values in the Tri-County region were significantly less than those for New York State as a whole. Residents in Delaware and Ulster Counties reported median housing values of $74,800 and $111,500, respectively, compared with the statewide average of $148,700.

According to the U.S. Census Bureau, the median gross rent in 2000 for Delaware County and Ulster County was $451 and $626, respectively (see Table 4.11-12). These figures also are less than the state's overall median rent of $672. More recent estimates for Ulster County are provided by the 2006 U.S. Census American Community Survey, which showed an increase in the median rent for Ulster County of $906 per month, a 28% increase from 2000 (U.S. Bureau of the Census n.d.). No data were available for Delaware County or Greene County in this survey.

Table 4.11-12 Median Gross Rent in Socioeconomic Study Area in 2000

County/	Median Gross Rent[1]
Delaware County	**$451**
Town of Middletown	$450
Ulster County	**$626**
Town of Shandaken	$938
Town of Olive	$601
Greene County	$508
New York State	$672

Source: U.S. Bureau of the Census 2002.

Note:
[1] Gross rent includes contract rent and all utility costs.

Information gathered from the New York State Office of Real Property Services provides the most current housing-value data. The data in Table 4.11-13 represent the median sale price of residential properties in the Tri-County area. These figures only include homes that were sold during that year and do not include the value of any residences that were not on the market. As shown in Table 4.11-13, the median sale price of residential units in the three counties has gradually increased since 2005; however, the total number of residential housing sales has decreased during that time. Table 4.11-13 shows the total number of residential sales and the median sale price by county from 2005 to 2007.

Table 4.11-13 Median Value at Time of Sale and Total Sales of Residential Properties in the Tri-County Area (2005 to 2007)

	2005		2006		2007	
	Number of Sales	Median Value	Number of Sales	Median Value	Number of Sales	Median Value
Delaware County	919	$115,00	744	$125,000	668	$130,000
Greene County	882	$166,000	747	$175,000	634	$172,250
Ulster County	2,615	$239,000	2,192	$245,000	1,884	$246,000

Source: New York State Office of Real Property Services 2008a.

Finally, information from the Multiple Listing Service (MLS) categorizes residential units that were for sale in September 2008 by the asking price.

Table 4.11-14 shows the number and asking price of residential units for sale in the Tri-County area. As noted in the table, the median asking price for units in Delaware County is significantly lower at $159,900 than the asking price of units in Greene County ($250,000) or in Ulster County ($284,000). In addition, Delaware County had only six units (or 1.8% of all units) on the market for more than $700,000. In contrast, Greene County had 53 units (7.4% of all units) and Ulster County had 140 units (8.1% of all units) for sale above this price range.

Table 4.11-14 Number and Asking Price of Residential Units for Sale in the Tri-County Area as of the Week Ending 9//

Asking Price	Ulster County	Delaware County	Greene County
Less than $100,000	41	70	30
$100,000-$199,999	401	146	206
$200,000-$299,999	532	68	210
$300,000-$499,999	486	39	164
$500,000-$699,999	129	4	54
$700,000-$999,999	75	4	23
$1 million – $1,999,999	51	1	10
More than $2 million	14	1	20
Total	**1,729**	**333**	**717**
Median Asking Price	$284,900	$159,900	$250,000

Sources: Ulster County Board of Realtors 2008; Otsego-Delaware Board of Realtors 2008; Columbia-Greene Board of Realtors 2008.

Note: Figures include all residential units/listed for sale on the Multiple Listing Service (MLS) for each county.

It should be noted that the figures described in the table slightly inflate the value of the units and represent only the asking price for these residences, not the purchase price. Given the general state of the national housing market, the collapse of the subprime mortgage market, and the contraction of the financial sector in New York City, this area would be expected to feel some downward pressure on housing prices, and some stagnation in the regional market would be anticipated.

Transportation and Access

As part of the general trend in the United States post-World War II, Americans began to depend on automobiles more and rail and public transportation less. Currently, each of the local communities can be characterized by their relationship to the now expanded Route 28. Transportation and land-use patterns reinforce these communities and their character, distinguishing them as either a highway interchange location or a looped-road bypass that separates the community from passers-by and that offers tree-lined streets, raised pedestrian walks, and hiking and biking paths that dominate the local daily flow of life within the community. Population distribution patterns follow the layout of Route 28 and other transportation corridors, which in turn are a reflection of local valley and drainage topography (http://.brown.edu/).

4.11.1.2 Economy, Employment, and Income

The peak of local industry with tanneries, creameries, charcoal kilns, and stone quarries was between 1870 and about 1900. During this time, as noted above, the railroads brought products out and began actively promoting and bringing tourism in.

The region was first settled in the 18th century after the end of the American Revolutionary War. Timber and blue-stone mining developed as the first important industries in the area. As time went by, agriculture and tanning became more im-

portant to the region's economy. By 1884, timber, mining, tanning, and farming activities were so widespread and destructive that a state-appointed Forestry Commission felt that all of the saleable timber in the Catskill region had been harvested and that fires had destroyed any opportunity for the forest to regenerate. Because of the extreme environmental degradation, the Forestry Commission decided not to include the Catskill region in the State Forest Preserve in 1884. Eventually, however, this decision was reversed and Catskill Park was created in 1904. Catskill Park was initially connected to a delinquent property tax dispute. State forest preservation was provided by retiring the previous taxes owed and requiring that the state pay thereafter whatever local property taxes were required. This arrangement remains in effect today and is the difference between survival and insolvency for many towns and other local governments within the Park.

Tourism in Catskill Park started long before the park was officially created. In the early 1800s wealthy New Yorkers took steamboats and, later on, railroads to the area. Numerous grand hotels and resorts were built in the 19th century throughout the region to accommodate wealthy patrons for the summer. The tourist industry grew in regional importance as the tanning and timber industries in the area declined. Tourism is still one of the most important sectors in the regional economy.

Employment

The economies of the three counties diverge somewhat but each county is relatively rural in nature and has a high percentage of leisure and hospitality and retail workers. Table 4.11-15 shows the private sector employment by major industries for New York State and the Tri-County area.

- **Delaware County.** Delaware County has a vibrant manufacturing sector, which accounts for 36.7% of all jobs in the county. In comparison, the manufacturing sector in New York State accounts for only 8.1% of all jobs in the state as a whole (see Table 4.11-15 for more detail). The manufacturing industry in Delaware County ranges from aerospace technology, pharmaceuticals, and printing to dairy products (Delaware County Chamber of Commerce n.d.). Several top manufacturing companies in Delaware County include:
  - Amphenol Aerospace

Table 4.11-15 Significant Private Sector Industries, New York State and Ulster, Greene, and Delaware Counties, 2006

Industry	New York State		Ulster County		Greene County		Delaware County	
	Employees	% of Workforce	Employees	% of Workforce	Employees	% of Workforce	Employees	% of Workforce
Total, all industries	**7,011,126**	**100.0%**	**48,076**	**100.0%**	**10,107**	**100.0%**	**12,791**	**100.0%**
Construction	335,333	4.8%	2,758	5.7%	886	8.8%	813	6.4%
Manufacturing	564,564	8.1%	4,348	9.0%	953	9.4%	4,689	36.7%
Wholesale trade	351,793	5.0%	ND	ND	530	5.2%	290	2.3%
Retail trade	877,514	12.5%	9,257	19.3%	1,898	18.8%	1,888	14.8%
Information	266,721	3.8%	1,113	2.3%	213	2.1%	268	2.1%
Finance and insurance	538,248	7.7%	2,087	4.3%	292	2.9%	466	3.6%
Professional and technical services	549,758	7.8%	1,588	3.3%	371	3.7%	221	1.7%
Administrative and waste services	424,467	6.1%	3,248	6.8%	169	1.7%	135	1.1%
Health care and social services	1,188,333	16.9%	8,326	17.3%	1,135	11.2%	ND	ND
Arts, entertainment, and recreation	132,685	1.9%	723	1.5%	747	7.4%	121	1.0%
Accommodation and food services	542,324	7.7%	6,153	12.8%	1,643	16.3%	931	7.3%
Other services, except public administration	315,962	4.5%	2,181	4.5%	413	4.1%	491	3.8%
All other industries	923,424	13.1%	6,294	13.2%	857	8.4%	2,478	19.3%

Source: U.S. Department of Labor, Bureau of Labor Statistics n.d.

Note: Totals may not add up exactly due to rounding, i.e., the difference between the calculation approximation of a number and its exact mathematical value.

Key:
ND = Not Disclosable – the BLS withholds publication of employment and wage data for any industry level when necessary to protect the identity of cooperating employers.

- Mead Consumer and Office Products
- Audiosears
- DMV Nutritionals International
- Kraft Foods
- Tyco-Mallinckrodt Health Care

Delaware County's other major industries are retail trade, which employs 14.8% of the county's work force, accommodation and food service industries, which employ 7.3% of the county's work force, and professional or technical services, which employ 1.7% of the county's work force (New York State Department of Labor 2008).

- **Ulster County.** Ulster County's major industries include retail trade (19.3% of the employed work force), health care and social services (17.3% of the employed work force), accommodations and food service (12.8% of the employed work force), manufacturing (9%), and finance, real estate, and insurance services (4.3%). Higher education also employs a significant number of people in Ulster County, with the State University of New York (SUNY) in New Paltz and SUNY Ulster, which is located in Kingston and Stone Ridge, providing a large portion of these jobs. Ulster County also has numerous small businesses that are essential to the economy. Some of these small businesses are related to the construction and hospitality industries. Ulster County also has many tourist destinations that include ski resorts, dude ranches, and other leisure resorts. Ulster County's major employers as listed by the Ulster County Chamber of Commerce include:
  - SUNY in New Paltz
  - SUNY Ulster in Kingston and Stone Ridge
  - Uniprise/Health Care
  - Ulster-Greene ARC
  - Gateway Community Industries, Kingston, and Benedictine Hospitals
  - Ametek Rotron
  - Treasure Chest
  - Huck Manufacturing
  - Hunter Panels
  - VAW of America.

- **Greene County.** Major industries in Greene County include tourism, health care and social services, and manufacturing. Greene County has a large tourism industry that employs approximately 23.6% of the workforce (inclusive of the accommodation and food service and the arts, entertainment, and recreation industries [see Table 4.11-15]). The two major ski resorts in the county are Windham Mountain and Hunter Mountain. Many tourists drive from New York City, New Jersey, the Hudson Valley, and the capital region to stay at these resorts. The health care and social services industry accounts for 11.2% of the employed work force. The manufacturing sector is also a

significant industry in Greene County, employing 9.4% of the workforce in the county. Some of the major private-sector employers in the county include:

- Windham Mountain and Lodge
- Hunter Mountain Ski Center
- Stiefel Research Institute, Inc.
- Marriot Corporation
- Eden Park Healthcare Facility
- Glen Falls Lehigh Cement Company
- United Stationers
- Bryants Markets, Inc

In addition, two state prisons, the Greene Correctional Facility and the Coxsackie Correction Facility, are the two largest public sector employers in the county.

Tourism, which plays a critical role in the area's economy, is based around the wilderness and natural resource based amenities found in Catskill Park. Catskill Park consists of 700,000 acres of publicly (40%) and privately (60%) owned lands in the Catskill Mountains. The park has 98 peaks more than 3,000 feet high and spans four counties: Delaware, Greene, Sullivan, and Ulster Counties. Managed by the New York State Department of Environmental Conservation (NYSDEC), the Catskill Forest Preserve state-owned land in Catskill Park accounts for more than 287,514 acres. Major tourist activities in the park include hiking, camping, fishing, rafting, mountain climbing, snowshoeing, snowmobiling, and cross-country and alpine skiing.

Tourism in the socioeconomic study area is important in providing employment for county residents and supplementing county tax revenues. In 2006 approximately 5,920 jobs in the Tri-County region were directly attributable to the travel and tourism industry (see Table 4.11-16). These 5,920 travel and tourism jobs generated more than $118.5 million in wages and salaries in the region (see Table 4.11-17). In 2006, Greene County benefitted the most of all the counties in the region, with 12.0% of the total travel- and tourism-related jobs. Reflecting the lower average wages typically paid to these service-type jobs, $31.7 million (6.8%) of the total wages and salaries earned in the region were paid by the travel and tourism industry (New York State Department of Labor n.d.).

Table 4.11-16 2006 Total Travel and Tourism Jobs Categorized by Industry Group for the Tri-County Area

County/	Travel and Tourism Jobs (Total)	Accommodations	Culture, Recreation, and Amusement	Food Service	Passenger Transportation	Travel Retail
New York State	347,100	83,000	81,100	91,200	75,300	16,400
Delaware County	400	110	70	160	20	40
Greene County	1,730	640	650	200	100	140
Ulster County	3,790	2,050	300	820	330	290
Tri-County Area	**5,920**	**2,800**	**1,020**	**1,180**	**450**	**470**

Source: New York State Department of Labor n.d.

Table 4.11-17 Total Wages in 2006 for the Travel and Tourism Sector Categorized by Industry Group for the Tri-County Area[1]

County/	Total Travel and Tourism Wages	Accommodations	Culture, Recreation, and Amusement	Food Service	Passenger Transportation	Travel Retail
New York State	$12,227.8	$2,752.9	$4,051.0	$1,635.8	$3,433.7	$354.4
Delaware County	$5.8	$2.0	$1.3	$1.7	$0.3	$0.5
Greene County	$31.7	$9.2	$12.7	$2.3	$3.4	$4.2
Ulster County	$81.0	$42.9	$8.6	$10.7	$11.3	$7.4
Tri-County Area	**$118.5**	**$54.1**	**$22.6**	**$14.7**	**$15.0**	**$12.1**

Source: New York State Department of Labor n.d.

Note:
[1] Expressed in $ millions.

The size of the labor force in the Tri-County area has remained relatively constant over the last five years, varying by only 0.9% in Delaware County, 1.9% in Greene County, and 0.11% in Ulster County between 2003 and 2007. The unemployment rate for all three counties over the same five years has decreased overall, with the peak Tri-County unemployment rate occurring in 2004. According to the U.S. Bureau of Labor Statistics, there were 6,043 unemployed persons in the three counties in 2007, an unemployment rate of 4.4% for the region. This rate is down from a high of 6,738 unemployed workers and an unemployment rate of 4.9% in 2004 (Table 4.11-18).

Typically, unemployment rates in the region are higher in the winter months than in the summer months because many tourist and construction industries reduce their employment during the winter. A comparison of January and June unemployment rates for 2006 and 2007 can be found in Table 4.11-19. As illustrated on the table, unemployment rates for each county are higher in January than in June.

Table 4.11-18 Annual Labor Force and Unemployment Rate in the Tri-County Area 2003-2007

Year	Labor Force	Employed	Unemployed	Annual Average Unemployment Rate
Delaware County				
2003	23,000	21,882	1,118	4.9%
2004	23,193	22,140	1,053	4.5%
2005	23,535	22,491	1,044	4.4%
2006	23,505	22,486	1,019	4.3%
2007	23,199	22,208	991	4.3%
Greene County				
2003	23,715	22,491	1,224	5.2%
2004	23,338	22,102	1,236	5.3%
2005	23,764	22,607	1,157	4.9%
2006	24,109	22,956	1,153	4.8%
2007	24,153	23,001	1,152	4.8%

Table 4.11-18 Annual Labor Force and Unemployment Rate in the Tri-County Area 2003-2007

Year	Labor Force	Employed	Unemployed	Annual Average Unemployment Rate
Ulster County				
2003	91,342	87,138	4,204	4.6%
2004	91,506	87,057	4,449	4.9%
2005	91,849	87,825	4,024	4.8%
2006	92,535	88,655	3,880	4.2%
2007	91,437	87,537	3,900	4.3%
Total Tri-County Region				
2003	138,057	131,511	6,546	4.7%
2004	138,037	131,299	6,738	4.9%
2005	139,148	132,923	6,225	4.5%
2006	140,149	134,097	6,052	4.3%
2007	138,789	132,746	6,043	4.4%

Source: U.S. Department of Labor, Bureau of Labor Statistics n.d.

Table 4.11-19 Comparison of Unemployment Rate from January and July 2006/January and June 2007

County	January 2006	June 2006	January 2007	June 2007
Delaware County	5.2%	4.4%	5.2%	4.1%
Greene County	5.4%	4.6%	5.4%	4.5%
Ulster County	4.9%	4.2%	4.6%	4.2%

Source: New York State Department of Labor 2008.

Data collected for the 2000 census of population and housing show that a significant portion of the workers in the Tri-County area are employed outside their county of residence. More than 40% of Greene County workers, 32% of Ulster County workers, and 27% of Delaware County workers traveled outside the county of residence to find employment. In addition, 11% of Greene county workers, 10% of Ulster County workers, and 8% of Delaware County workers traveled more than one hour to their place of employment (Tables 4.11-20 and 4.11-21).

Income

Historically, residents in the Tri-County region have had lower incomes than residents of the state of New York as a whole. For example, county median household income levels in 1999 were below statewide figures for all counties in the region. In addition, there are significant income disparities within the region. According to U.S. Census estimates, the 2005 median household income levels for Delaware and Greene counties were significantly below the New York State median income. However, during the same time period, Ulster County enjoyed median household income levels that were slightly above the statewide figure (see Table 4.11-22).

Table 4.11-20 Place of Work for Workers 16 Years and Older (2000)

Place of Work	Delaware County	% of Total	Greene County	% of Total	Ulster County	% of Total
Employed Population 16 Years or Older	20,243	100%	19,964	100.%	81,726	100%
Worked in State of Residence	19,818	97.9%	19,702	98.7%	80,542	98.6%
Worked in County of Residence	14,373	71.0%	11,523	57.7%	54,373	66.5%
Worked outside County of Residence	5,445	26.9%	8,179	41.0%	26,169	32.0%
Worked Outside State of Residence	425	2.10%	262	1.3%	1,184	1.4%

Source: U.S. Bureau of the Census 2002.

Table 4.11-21 Commute Time for Workers 16 Years and Older (2000)

Commute Time	Delaware County	% of Total	Greene County	% of Total	Ulster County	% of Total
Employed Population 16 Years or Older	**20,243**	**100%**	**19,964**	**100.00%**	**81,726**	**100%**
Did not work at home:	19,089	94.3%	19,130	95.8%	77,776	95.2%
Less than 5 minutes	1,737	8.6%	1,333	6.7%	3,450	4.2%
5 to 29 minutes	11,932	58.9%	10,403	52.1%	47,389	57.9%
30 to 59 minutes	3,851	19.0%	5,216	26.1%	19,517	23.9%
60 to 89 minutes	763	3.8%	1,178	5.9%	4,000	4.9%
90 or more minutes	806	4.0%	1,000	5.0%	3,420	4.2%
Worked at home	1,154	5.7%	834	4.2%	3,950	4.8%

Source: U.S. Bureau of the Census 2002.

Note: Some columns may not add up exactly because of rounding errors, i.e., the difference between the calculated approximation of a number and its exact mathematical value.

Table 4.11-22 Tri-County Area 1999 and 2005 Median Household Income Statistics

County/	1999 Median Household Income (Dollars)	2005 Median Household Income (Dollars)	% Change (1999-2005)
New York State	**$43,393**	**$49,365**	**12.1%**
Delaware County	$32,461	$36,080	10.1%
Greene County	$36,493	$43,110	15.4%
Ulster County	$42,551	$49,854	14.7%

Source: U.S. Bureau of the Census 2002; U.S. Bureau of the Census n.d.

Note:
All figures are expressed in nominal dollars.

Income levels in the towns of Middletown, Shandaken, and Olive also vary greatly. In 1999 the Town of Olive had a median household income level of $45,361, which was almost $2,000 more than the statewide figure of $43,393. In contrast, during the same year, the Town of Middletown had a median household income of only $31,534, which was almost $12,000 less than the statewide median (see Table 4.11-23).

Table 4.11-23 Actual, Estimated, and Projected Median Household Income Levels for the Municipalities in the Socioeconomic Study Area 1999 to 2013

County/	Median Household Income	Estimated 2008 Median Household Income	Projected 2013 Median Household Income
Delaware County	**$32,461**	**$40,315**	**$47,220**
Town of Middletown	$31,534	$39,950	$47,026
Ulster County	**$42,551**	**$55,693**	**$64,539**
Town of Shandaken	$31,850	$39,080	$44,650
Town of Olive	$45,361	$56,561	$63,304
Greene County	**$36,493**	**$46,200**	**$53,147**

Source: U.S. Bureau of the Census 2002; ESRI, Inc. 2008.

Note: All figures are expressed in nominal dollars.

Median household income levels in the region are estimated to have increased since 1999. Today, 17% of Middletown's population and 12% of Shandaken's population is at or below the poverty level. Approximately 5% of Olive's population is at or below poverty level. Table 4.11-23 illustrates how household income levels have grown. According to 2008 estimates, Ulster County and the Town of Olive in particular are still the most affluent municipalities in the region. In 2008, it is estimated that Ulster County's median household income was $55,693 and the Town of Olive's median household income was $56,561.

Income projections developed by ESRI, Inc. do not predict any major relative changes in household income levels during the next five years. As shown in Table 4.11-23, Ulster County is projected to have the highest median household income—$64,539—in the region, and the Town of Shandaken is projected to have the lowest median household income—$44,650. Income levels in the Town of Middletown are predicted to reach approximately $47,026, thereby approaching county-wide levels.

As expected, poverty rates in the Tri-County area closely mirror the household income statistics discussed above. As a whole, the Tri-County area poverty rates for the total population in 2005 were slightly less than the statewide rate of 13.9%. Poverty rates in Greene, Ulster, and Delaware counties were less than the state averages in all categories. In contrast, Delaware County experienced slightly greater poverty rates for the total population and for children under 18 years than the state as a whole (Table 4.11-24).

Table 4.11-24 Tri-County Area Poverty Rates 2005

County/	Families with Children Age 5 to17	Population Under 18	Total Population
New York State	**18.6%**	**19.7%**	**13.9%**
Delaware County	16.5%	20.6%	14.2%
Greene County	16.1%	18.3%	12.9%
Ulster County	13.3%	15.8%	11.5%

Source: U.S. Bureau of the Census 2006.

Taxes and Revenues

The following section briefly describes the fiscal characteristics of the Delaware, Ulster, and Greene County governments and the Middletown and Shandaken town governments. Major revenue sources and major expenditure categories are described for each of these entities. Local property tax levies and total assessed valuations for each government are also discussed.

During fiscal year (FY) 2006 real property tax and sales tax receipts were major revenue sources for the county governments in the region, accounting for the vast majority of the locally generated funds. In FY 2006 these two taxes accounted for 22.6% and 18.8% of total revenue in Delaware County, respectively. During the same time period, sales and use tax receipts were slightly greater than real property receipts in Ulster and Greene counties. In FY 2006 sales taxes generated approximately $83.4 million for Ulster County and accounted for approximately 27.8% of its total revenue. Real property taxes generated more than $69.1 million for the county government, 23.1% of its total revenue during the same fiscal year. In FY 2006 Greene County generated $26.4 million through sales tax and an additional $19 million through real property tax (Table 4.11-25).

Table 4.11-25 FY 2006 Revenue by Data Source for County Governments in the Tri-County Region

Revenue Source	Delaware County	%	Ulster County	%	Greene County	%
Real Property Tax	$24,535,832	22.6%	$69,136,571	23.1%	$18,971,251	22.5%
Sales Tax	$20,438,386	18.8%	$83,450,734	27.8%	$26,431,417	31.3%
State Aid	$15,607,070	14.4%	$38,807,641	12.9%	$15,435,746	18.3%
Federal Aid	$21,827,676	20.1%	$34,489,449	11.5%	$10,550,381	12.5%
Other Inter-governmental Transfers	$2,590,955	2.4%	$16,883,681	5.6%	$972,974	1.2%
Interest	$2,365,155	2.2%	$4,477,624	1.5%	$773,841	0.9%
Other Taxes, Fees, Charges, and Revenue Sources	$21,182,832	19.5%	$52,468,626	17.5%	$11,221,695	13.3%
Total Revenue	**$108,547,906**		**$299,714,326**		**$84,357,305**	

Source: New York State Office of the State Comptroller 2008a.

State, federal, and other intergovernmental transfers also account for a relatively large portion of county revenues. During FY 2006, these intergovernmental transfers made up 36.9% of all county government revenues in Delaware County, 30.0% in Ulster County, and 32.0% in Greene County.

Real property tax receipts are the primary revenue source for the towns of Middletown and Shandaken. In FY 2006 Middletown collected $2.1 million (75.3%) of its revenues through real property taxes. The Town of Shandaken generated $2.7 million (66.5%) of its total revenues through real property taxes in the same year. In addition, Shandaken collected $103,000 from local sales and use taxes. The Town of Middletown did not receive any sales and use tax receipts during that year. Table 4.11-26 details revenues by source for each town. As shown on the table, state aid was the next most important revenue source for the towns and

accounted for 11.8% and 10.4% of Middletown's and Shandanken's total revenue, respectively.

Table 4.11-26 FY 2006 Revenue by Data Source for the Town of Middletown and the Town of Shandaken

Revenue Source	Town of Middletown	%	Town of Shandaken	%
Real Property Tax	$2,111,753	75.3%	$2,674,196	66.5%
Sales and Use Tax	-	0.0%	$103,176	2.6%
Charges for Services	$83,366	3.0%	$445,785	11.1%
Use and Sale of Property	$126,924	4.5%	$127,527	3.2%
Charges to Other Governments	$51,806	1.8%	-	0.0%
All Other Local Revenues	$38,552	1.4%	$49,736	1.2%
State Aid	$331,410	11.8%	$419,880	10.4%
Federal Aid	$62,256	2.2%	$203,088	5.0%
Total Revenues	**$2,806,067**	**100.0%**	**$4,023,388**	**100.0%**

Source: New York State Office of the State Comptroller 2008b.

Overall combined full value tax rates for Delaware, Ulster, and Greene counties are shown on Table 4.11-27. An equalization rate has been applied to these rates so that any differences in assessment methodology has been accounted for, making the rates directly comparable to each other. As shown on the table, property tax rates in Delaware and Greene counties were almost identical in 2005, with rates of 25.15 and 25.92 per $1,000 of assessed value. Ulster County had a significantly higher rate of 33.21 per $1,000 of assessed value during the same time.

Table 4.11-27 Overall Combined Full Value Tax Rate[1] by County, 1995-2005

County	1995	2005
Delaware County	23.21	25.15
Ulster County	29.65	33.21
Greene County	22.01	25.92

Source: Office of the New York State Comptroller, Division of Local Government & School Accountability April 2006.

Note:
[1] Full value tax rate is the tax rate applied to $1,000 of value after property tax assessments and equalizations are taken into account.

The 2007 real property tax rates for the Town of Middletown and the Town of Shandaken are detailed below. The total annual county tax rate and town tax rate and a range for the school district during 2007 are shown on Table 4.11-28. Total school district levies account for the nearly half of the overall levy in the towns.

All state lands associated with the Belleayre Mountain Ski Center are considered Forest Preserve Lands and are, therefore, fully taxable by local governments. Article 5, Title 2, Section 532 of the State Real Property Tax Law allows local governments to tax all Forest Preserve Lands within their jurisdiction at the same rate as private property owners.

Table 4.11-28 2007 Property Tax Rates for the Town of Middletown and the Town of Shandaken (as expressed per $1,000 of assessed value)

Town	County Tax	Town Tax	School District Range	Total Overall Range	Total Overall Full Value Range[1]
Middletown	8.65	6.42	13.51 – 20.23	28.58 – 35.30	17.72 – 21.88
Shandaken	15.45	16.62	34.90 – 42.08	66.97 – 74.15	16.07 – 17.79

Source: New York State Office of the State Comptroller 2008c.

Note:
[1] An equalization rate of .6200 for the Town of Middletown and an equalization rate of .2400 for the Town of Shandaken were used to determine the overall full value tax range.

Local Government Expenditures

Economic assistance programs, transportation, and spending on health and education programs were the largest expenses the counties incurred during FY 2006. In all three counties economic assistance programs accounted for more than 35% of the total budget. Other expense categories varied by county. For example, in FY 2006 transportation expenses took up more than 25% of the total expenditures made by Delaware County while the transportation expenses in Ulster and Greene counties were relatively smaller and accounted for only 8.9% and 11.6% of the total expenses, respectively. Table 4.11-29 shows county expenses by category.

Table 4.11-29 Total County Expenses by Category for FY 2006

Category	Delaware County	%	Ulster County	%	Greene County	%
General Government	8,287,420	8.0%	41,410,863	13.1%	9,591,513	11.1%
Education	498,277	0.5%	10,231,066	3.2%	8,829,408	10.2%
Police	6,638,251	6.4%	32,787,601	10.4%	6,435,336	7.5%
Fire	0	0.0%	117,952	0.0%	1,506,539	1.7%
Other Public Safety	810,698	0.8%	8,595,995	2.7%	741,154	0.9%
Health	8,391,515	8.1%	31,913,426	10.1%	9,056,704	10.5%
Transportation	26,744,341	25.8%	27,974,249	8.9%	9,980,194	11.6%
Economic Assistance	40,737,631	39.2%	139,782,748	44.4%	30,974,850	35.9%
Culture and Recreation	810,042	0.8%	1,063,489	0.3%	477,350	0.6%
Other Community Expenditures	7,946,845	7.7%	5,375,763	1.7%	6,639,590	7.7%
Debt Service	2,974,838	2.9%	15,671,894	5.0%	2,050,223	2.4%
Total Expenses	**$103,839,858**		**$314,925,046**		**$86,282,861**	

Source: New York State Office of the State Comptroller 2008b.

Transportation expenses accounted for the vast majority of the Town of Middletown's total expenditures. In FY 2006 approximately 60% of the town's total expenditures were transportation expenses. General government (16.3% of the total expenditures) and employee benefits (15.2% of the total expenditures) were the next largest expenses for the town. In contrast, the utilities were the largest expenditures for the Town of Shandaken. During FY 2006 utility expenses accounted for 27.5% of the town's total expenditures. Transportation expenses (26.3% of the total expenditures), employee benefits (14.0% of the total expenditures), and general government (13.6% of the total expenditures) were the next three largest categories (see Table 4.11-30).

Table 4.11-30 Total Town Expenses by Category for FY 2006

Category	Town of Middletown	%	Town of Shandaken	%
General Government	$466,202	16.3%	$663,855	13.6%
Public Safety	88,042	3.1%	543,180	11.1%
Health	2,418	0.1%	-	0.0%
Transportation	1,711,800	60.0%	1,283,199	26.3%
Utilities	39,404	1.4%	1,341,591	27.5%
Cultural and Recreation	24,459	0.9%	131,183	2.7%
Economic Development	-	0.0%	167,832	3.4%
Sanitation	70,129	2.5%	16,848	0.3%
Employee Benefits	435,081	15.2%	683,031	14.0%
Debt Service	12,005	0.4%	35,440	0.7%
Other Expenses	4,936	0.2%	8,547	0.2%
Total Expenses by Category	**$2,854,476**	**100.0%**	**$4,874,706**	**100.0%**

Source: New York State Office of the State Comptroller 2008b.

The data presented above were the most current information available at the time of this writing. However, because of the time lags involved in reporting and auditing local government accounts, this information does not reflect the fiscal impacts on local governments from the housing market crisis that started in 2007 and the resulting credit crisis and recession that is now occurring.

In the current economic climate, county and town governments throughout the state are facing reductions in revenues while at the same time experiencing increases in necessary expenditures. Revenues from sales and use taxes have declined statewide as individuals have cut back their personal consumption. Real property tax receipts have been reduced as the assessed value of existing property has declined, new construction has been curtailed, and more property owners have fallen in arrears on their tax liabilities. Interest and investment earnings have declined as investment opportunities as have become much less lucrative and more risky. In addition, severe financial constraints at the state level have led to a reduction in state aid available to municipal governments. The only revenue source that has shown any significant increase has been federal aid, via various stimulus funding mechanisms.

At the same time, local government expenditures have also increased. The demand for various health and human services and economic assistance programs has increased as more individuals are unemployed and as more businesses become insolvent. Difficulties obtaining local government financing have increased as the credit market has contracted, resulting in an increase in the costs of borrowing and sometimes the inability to gain this financing. Costs associated with pension funds have soared as the value of the assets in these funds have declined. Finally, the need for local government assistance at cultural and other non-profit organizations has increased as private sources of funding have declined.

4.11.1.3 Environmental Justice

According to NYSDEC Commissioner Policy 29, Environmental Justice and Permitting (New York State Department of Environmental Conservation March 2003) a potential environmental justice (EJ) area is defined as a minority or low-income community that bears a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the federal, state, local, and tribal programs and policies (New York State Department of Environmental Conservation 2003). The policy expands upon Executive Order (EO) 12898, issued by President Clinton on February 11, 1994, which requires that impacts on minority or low-income populations be accounted for when preparing environmental and socioeconomic analyses of projects or programs that are proposed, funded, or licensed by federal agencies.

The policy states that a NYSDEC permit applicant must conduct a preliminary screening to identify whether the proposed action is located in a potential EJ area. If the preliminary screening identifies a potential EJ area, the applicant must submit a written public participation plan as part of the complete application for a permit. At a minimum, the plan must demonstrate that the applicant will 1) identify stakeholders in the proposed action; 2) distribute and post written information on the proposed action and permit review process; 3) hold public information meetings to keep the public informed about the proposed action and permit review status; and 4) establish easily accessible document repositories in or near the potential environmental justice area and on the internet to make available pertinent project information.

According to the policy, a minority population is a group of individuals identified or recognized as African-American, Asian American/Islander, American Indian, or Hispanic. Hispanic refers to ethnicity and language, not race. In rural areas, a minority community is defined as having a minority population equal to or greater than 33.8%. A low-income population is defined as a group of individuals having an annual income that is less than the poverty threshold established by the U.S. Census Bureau. This poverty threshold varies based on family size. A low-income community is an area having a low-income population equal to or greater than 23.59% of the total population.

Policy 29 also requires potential adverse environmental impacts within the affected area to be identified. If an area does not meet the NYSDEC thresholds for a potential EJ area, the permit review process may continue independent of the elements of the policy. If an area does meet the NYSDEC thresholds that could indicate it might be an EJ area, the remainder of these policy requirements shall be incorporated into the review process. Figure 4.11-3 shows areas designated by NYSDEC that require further, more detailed EJ review. The proposed socioeconomic study area does not meet EJ thresholds; therefore, no significant EJ issues are expected to occur.

Race and Ethnicity

Table 4.11-31 provides race and income information for the three socioeconomic study area counties and the towns of Shandaken, Olive, and Middletown. As shown in Table 4.11-31, minority and Hispanic populations in the towns and their associated counties are significantly lower than the EJ threshold of 33.8%. Thus, none of the communities in the socioeconomic study area qualify as a minority community and there is no potential for disproportionate impacts on minority and Hispanic populations.

Table 4.11-31 Race and Ethnicity in 2008

	Delaware County	Town of Middletown	Ulster County	Town of Olive	Town of Shandaken	Greene County
Total Population	**48,114**	**4,045**	**186,662**	**4,739**	**3,426**	**51,139**
White Alone	46,310	3,837	161,943	4,535	3,204	45,440
Black Alone	598	26	11,379	35	43	3,172
American Indian Alone	154	13	533	9	15	155
Asian Alone	274	31	3,247	62	50	504
Pacific Islander Alone	6	0	67	10	4	11
Some Other Race Alone	270	93	4,695	26	19	909
Two or More Races	502	45	4,798	62	91	948
Hispanic Origin (Any Race)	1,045	277	13,883	151	124	2,673
Percent Minority	**3.75%**	**5.14%**	**13.24%**	**4.30%**	**6.48%**	**11.14%**
Percent Hispanic	**2.17%**	**6.85%**	**7.44%**	**3.19%**	**3.62%**	**5.23%**

Source: ESRI, Inc. 2008.

Poverty

Table 4.11-32 shows the median household income of the socioeconomic counties and municipalities. As shown in the table, the median household income of each municipality is similar to that of its respective county, and the percent of low-income population is significantly lower than the NYSDEC threshold of 23.59%. Therefore, the socioeconomic study area does not meet the screening criteria for a low-income community and there is no potential for disproportionate impacts on low-income populations.

Since the socioeconomic study area does not qualify as an EJ community, the permit review process may continue independent of the elements of Policy 29.

Table 4.11-32 Poverty Status in 1999

Income Indicators	Delaware County	Town of Middletown	Ulster County	Town of Olive	Town of Shandaken	Greene County
Median Household Income	**$32,461**	**$31,534**	**$42,551**	**$45,361**	**$31,850**	**$36,493**
Population for whom poverty status is determined	46,003	3,806	169,367	4,565	3,286	44,572
Number of people with income below poverty level	5,915	638	19,338	227	405	5,432
Percent below poverty level	**12.86%**	**16.76%**	**11.42%**	**4.97%**	**12.33%**	**12.19%**

Source: U.S. Census Bureau 2002.

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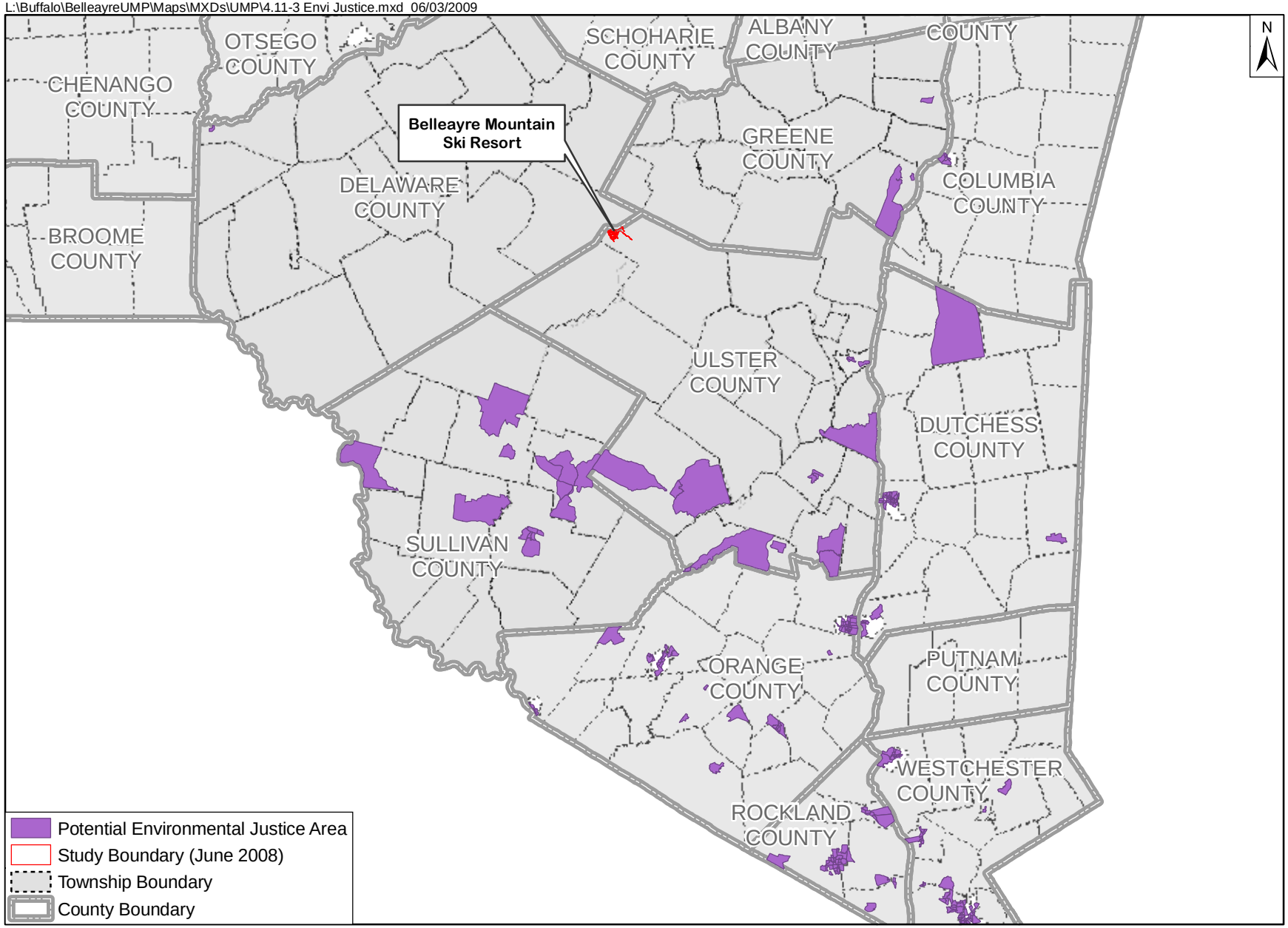

Figure 4.11-3 Potential Environmental Justice Areas in the Vicinity of Belleayre Mountain Ski Resort

0 5 10 20
Miles

4.11.2 Socioeconomic Impacts of the Belleayre Ski Center

The operation of Belleayre Ski Center has a significant positive impact on the regional economy both directly and indirectly. Direct activities at the Ski Center inject approximately $3.8 million into the regional economy through payroll and the purchase of local goods and services. The Belleayre Ski Center is a major employer in the Tri-County area. In 2008 the Ski Center employed approximately 70 full-time permanent employees, 20 temporary hourly workers, and 350 full and part-time seasonal staff. Annual payroll expenditures amounted in an estimated $3.7 million.

Nearly all of the workers currently employed at the Belleayre Ski Center live in the Tri-County region. A sampling of the residential distribution of current workers showed that approximately half of Belleayre's employees reside in Delaware County, with 39.3% residing in Ulster County and the remaining 10.7% residing in Greene County.

Additional economic activity was generated by concessionaires who operate the ski shop and cafeteria services at the Belleayre Ski Center. In 2008 approximately 45 employees worked for Boston Culinary Group, the current ski shop and food service concessionaire. These employees are responsible for an additional $1.6 million of payroll expenditures in the local area.

The Belleayre Ski Center also directly injects funds into the regional economy through its non-personnel operating budget. In 2007-2008 the ski center had a non-payroll operating budget of $2,998,000. Approximately $1,500,000 of this figure went toward energy purchases with the remaining $1,498,000 used to purchase other of goods and services. In 2008 the Ski Center spent approximately 8% of its non-payroll, non-energy budget in the local economy. In total, an estimated $120,000 in goods and services were purchased from local suppliers and vendors located in Delaware, Ulster, and Greene counties during that year.

During the 2007-2008 fiscal year, 181,509 skiers visited the Belleayre Mountain during the 149 days the facility was open for skiing that winter. These skiers spent approximately $6.1 million at the ski center. Approximately $407,000 of this gross revenue was collected during the off-season (May to November 2007) for various summertime activities, including the summer concert series (Table 4.11-33).

Table 4.11-33 Selected Fiscal Statistics for the Belleayre Mountain Ski Center

	2007-2008	2006-2007	2005-2006	2004-2005	2003-2004
Attendance (skiers)	181,509	145,650	160,929	171,524	168,177
Days of Operation (winter)	149	150	142	156	163
Ski Center Gross Revenues	$6,105,794	$4,053,100	$5,210,200	$4,754,900	$4,909,500
Annual Operating Costs	$6,709,987	$5,624,926	$6,380,271	$45,633,531	$5,660,988
Annual Profit/Loss	-$604,193	-$1,571,826	-$1,170,071	-$878,631	-$751,488

Note: Financial and attendance figures may vary slightly between source. The data presented in this table are based on the fiscal year which ends March 31. This data may not be directly comparable to data provided for the ski season, which may extend into April depending on climatic conditions. Source: New York State Department of Environmental Conservation 2011.

As Table 4.11-33 shows, Belleayre Mountain experienced particularly high attendance during the 2007-2008 ski season. Approximately 181,500 skiers during the 2007-2008 season used the trails, an increase of more than 23.8% over the previous season. This increase reflects statewide, regional, and national trends in the skiing industry, where most of the country reported a particularly good year for attendance during the 2007-2008 winter. Ski resorts in New York State had some of the highest gains in estimated skier visits ever during the 2007-2008 ski season. State ski areas had more than 4.1 million visits during the 2007-2008 season, an increase of 20.5% over the previous year (National Ski Area Association July 2008).

The vast majority of skiers visiting the Belleayre Ski Center are from New York State. An analysis of credit card payments over the past five years indicates that an estimated 88.7% of all skiers at the center are from New York State, with the two largest groups within the state coming from the metropolitan New York City area and the local Catskills region. An additional 8.0% of the total skiers were from the State of New Jersey, with the remaining 3.0% of the skiers coming from all other states. As would be expected, when a sample of the 17,704 season passes that were sold in the past five years was analyzed, approximately 42% of these passes had been sold to residents in the local area.

In addition to the direct economic impacts mentioned above, the Belleayre Ski Center also has a positive, indirect impact on the regional economy. As the employees at the ski center and local vendors spend a portion of their income from Belleayre in the regional economy, they in turn support other merchants and suppliers in the area. As a result, the original economic value of this injection of funds is increased or "multiplied."

Multipliers developed by the US Bureau of Economic Analysis specifically for the Tri-county area of Delaware, Ulster, and Greene counties show on average that each job in an "amusement, gambling, or recreation establishment" supports 1.0745 jobs in the regional economy and each $1 in payroll earnings generates $1.1638 in employee earnings in the regional economy. Likewise, each job at a food or drinking establishment supports 1.0896 jobs in the regional economy and each $1 of employee earnings at these establishments generates $1.2047 in employee earnings in the three-county area (US Bureau of Economic Analysis 2008).

Additionally, the Belleayre Ski Center is a major tourist attraction in the area. During a typical year between 140,000 and 182,000 skiers use the slopes. Since Belleayre Ski Center is not a full-service resort, many of these skiers make use of local accommodations, dining facilities, and other retail establishments during their trips to the mountain.

A recent study was conducted by the Technical Assistance Center (TEC) at the State University of New York at Plattsburg, for the New York State Regional Olympic Development Authority, the authority that is in charge of operating

among others facilities the Gore Mountain Ski Center and the Whiteface Mountain Ski Center in the Adirondack Mountains. This study quantified the average amount visitors from outside the region who came to enjoy the recreational facilities offered by the authority spent per day in the local economy. The majority of the visitors were participants in winter sports activities, with downhill skiing being the most popular. According to that report on average visitors to the area spent $405.45 per party per day in the local economy. An average party consisted of four individuals. Lodging, meals, and entertainment accounted for the three largest categories of expenditures. In 2006 the average expenditure per visitor party per day was $122.98 for lodging; $63.68 for entertainment; and $62.80 for meals (TEC 2008).

Assuming patrons at the Belleayre Ski Center have similar spending habits, the 140,000 to 182,000 skiers a year inject approximately $14 million to $18 million into the regional economy through expenditures on lodging, meals, and entertainment.

4.11.3 Potential Socioeconomic Impacts

The proposed expansion of the Belleayre Ski Center would have a positive, long-term impact on the Tri-County region. As a result of the proposed facility improvements, total daily lift tickets purchased throughout an average season is expected to more than double over the current figures.

Currently, the Belleayre Ski Center is operating at a "comfortable carrying capacity" (CCC) of 4,500 skiers per day. This figure is derived by taking into account a combination of building capacities and lift/capacities and factoring in a measurement of the optimal level of use by the skiers. The CCC is not the absolute maximum number of skiers that can be at the center at one time. However, the CCC is a measure of the maximum number of skiers that can be comfortably accommodated on the mountain without patrons experiencing a loss of enjoyment due to overcrowded conditions.

Throughout the past eight seasons, the Belleayre Ski Center has operated above its CCC approximately 4.6 days per year, on average. During the 2001-2002 season the Ski Center exceeded its CCC only once; during the 2002-2003 ski season the ski center exceeded its CCC nine times.

The average annual utilization rate at the ski center is approximately 23.7% for the eight-year period (Total Attendance/(CCC * Days in Operations). This figure represents an approximation of how crowded the slopes and lodges are on an average day. However, because the monthly, weekly, and daily attendance is variable, this average annual utilization rate does not reflect some of the peak demand days. Thus the average utilization rates over the past eight seasons have been calculated by day of the week and month. Table 4.11-34 presents these average utilization rates.

Table 4.11-34 Average Utilization Rates over the Past Eight Years by Day of the Week and Month

Day of the Week	Month	Average Utilization Rate
Sunday	November	4.8%
	December	28.6%
	January	67.6%
	February	70.7%
	March	40.8%
	April	9.2%
	Total	**41.8%**
Monday	November	0.7%
	December	17.0%
	January	24.1%
	February	23.2%
	March	7.3%
	April	2.4%
	Total	**14.9%**
Tuesday	November	0.5%
	December	14.0%
	January	14.0%
	February	20.4%
	March	6.0%
	April	3.0%
	Total	**11.3%**
Wednesday	November	1.1%
	December	15.8%
	January	14.7%
	February	20.0%
	March	6.4%
	April	2.6%
	Total	**11.9%**
Thursday	November	0.3%
	December	15.7%
	January	16.5%
	February	18.9%
	March	7.0%
	April	2.8%
	Total	**12.0%**
Friday	November	5.2%
	December	23.0%
	January	28.4%
	February	36.3%
	March	17.6%
	April	4.4%
	Total	**22.1%**
Saturday	November	8.9%
	December	30.8%
	January	80.1%

Table 4.11-34 Average Utilization Rates over the Past Eight Years by Day of the Week and Month

Day of the Week	Month	Average Utilization Rate
	February	87.9%
	March	51.2%
	April	8.6%
	Total	**49.9%**
	Grand Total	**23.7%**

Source: New York State Department of Environmental Conservation 2008.

The proposed Unit Management Plan (UMP) would double the CCC at Belleayre Ski Center to 9,000 skiers/. Assuming that there are no significant demand constraints, the total seasonal attendance can be estimated using the CCC, the average utilization figures and the total number of days in operation. As the CCC of the facility increases, the number of skiers will increase proportionally. Assuming the slopes are open the average number of days a year, it is estimated that total daily attendance at the Belleayre Ski Center will reach approximately 320,000 skiers a year upon completion of the proposed expansion.

If the ski center is still facing budget constraints and the operation of the facility is still limited to 124 days/after the proposed expansion is completed, total annual attendance is expected to reach approximately 310,000 skiers. This estimate was derived using the same assumptions detailed above. However, instead of using all available data from the last eight years, only daily utilization figures that corresponded to the assumed time period (124 days starting the Friday after Thanksgiving) were used in the analysis.

The approximate average annual attendance at the facility is expected to reach 310,000 to 320,000 skiers upon completion of the proposed project. This figure equates to nearly a doubling of annual attendance figures from the average annual attendance of 165,978 for the last five years.

Since there is no plan to increase the price of lift tickets as a result of the proposed project, per capita expenditures are expected to remain relatively constant at the 2008 levels. Therefore, assuming an average expenditure of $32.80 per ski day at Belleayre, total revenues at the ski center are estimated to be approximately $10.2 million to $10.5 million. Assuming a constant expenditure pattern, total revenues at the food service concessionaire would be expected to increase to more than $2.2 million to $2.3 million and total revenues at the retail concessionaire would be expected to increase in the range of $419,000 to $432,000.

As a caveat to the above analysis, the effects of global climate change may have an impact on the numbers of days of operations and the amount of snowmaking that is required to keep the facility operational. The primary affect of increasing global temperatures will likely be a shortening of the ski season, a reduction in annual snowfall, an increased reliance on snowmaking and a general lessening of the snow quality as more mixed precipitation or rain falls during the winter

months. The timeframe for this change is not known, and short-term changes in weather could mask this effect for many years. The biggest operational impact resulting from climate change could be a greater reliance on snowmaking.

The NECIA synthesis report, which is discussed in greater detail in Section 4.9, identified the climate impacts in the Northeast United States suggests that under either a low or high emissions scenario, ski centers in areas in the Northeast with the exception of resorts in northern New York and western Maine will be highly vulnerable to climate change over the next 50 years. The term highly vulnerable means that it will be difficult for a ski area to be in operation for 100 days per season even with added snowmaking equipment; a 100 day ski season is typically considered the minimum necessary to operate a financially viable ski center (Frumhoff et al 2007).

According to this report, natural snow fall will decrease substantially and air temperatures may be too warm for making snow. As seen in the annual snowfall totals for the North Carolina and Virginia resorts, it can be expected that if the climate of the Project area becomes more like southern Virginia or North Carolina in 50 years annual snowfall at Belleayre could decrease as much as 50% over current levels (Frumhoff et al 2007).

4.11.3.1 Economy, Employment, and Income

Construction Impacts

Construction of the proposed project at the Belleayre Mountain Ski Center is expected to stimulate the state and regional economy by increasing construction expenditures and employment. In total the proposed expansion of the ski center is expected to cost approximately $74 million over five years. Table 4.11-35 shows the estimated annual construction costs for the duration of the project.

Table 4.11-35 Belleayre Mountain Ski Center Expansion, Estimated Construction Expenditures per Year

Task	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Core Area Trails and Lifts			$7,255,232	$2,214,820	$1,035,517	$10,505,569
Belleayre West Trails and Lifts		$6,533,161				$6,533,161
Highmount Trails and Lifts			$4,586,712			$4,586,712
Primary Electrical System Upgrades	$5,000,000	$1,500,000	$1,500,000	$1,500,000		$9,500,000
Potable Water System Upgrades	$100,000					$100,000
Parking Lots and Circulation		$750,000	$1,000,000	$1,000,000		$2,750,000
Stormwater Management		$2,500,000	$2,000,000	$500,000		$5,000,000
Snowmaking Upgrades	$1,250,000	$850,000	$1,050,000	$5,800,000	300,000	$9,250,000
Pine Hill Sewage Tank					$400,000	$400,000

Table 4.11-35 Belleayre Mountain Ski Center Expansion, Estimated Construction Expenditures per Year

Task	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Discovery Lodge Expansion	$11,000,000	$5,800,000				$16,800,000
Summit Lodge Expansion					$750,000	$750,000
Tomahawk Lodge					$1,000,000	$1,000,000
Information Booth					$300,000	$300,000
Contingency	$1,735,000	$1,793,316	$1,739,194	$1,101,482	$378,552	$6,747,544
Total	**$19,085,000**	**$19,726,477**	**$19,131,138**	**$12,116,302**	**$4,164,069**	**$74,222,986**

Source: New York State Department of Environmental Conservation 2008.

With the exception of specialized ski area equipment, such as lifts, a significant portion of the construction expenditures will be spent in the state and Tri-County region. Given the complex technical nature of some parts of this project, approximately $19 million of the construction funds are anticipated to be completed by specialized construction firms from outside the state. The New York State component of this project is expected to be nearly $55 million. Bids will be accepted from all qualified companies but it is anticipated that a portion of this work will be awarded to construction firms located in Ulster, Greene, and Delaware counties (New York State Department of Environmental Conservation 2008).

Existing Belleayre Ski Center maintenance staff will complete a portion of this construction project. All new trail-clearing activities are expected to be performed by these existing workers. All other construction activities will be completed by private firms under contract with New York State. Total new construction employment at the site is expected to reach 12 to 16 full-time equivalent workers annually. For the sake of the economic analysis, weekly estimates of construction workers employed on-site have been converted to year-round equivalents. This annual figure is used only to identify and assess the economic impact of this new construction employment. The actual number of workers at the site will fluctuate depending on the work load, with the number reaching a high of 34 construction workers during peak construction times (New York State Department of Environmental Conservation 2008).

In an effort to quantify the direct and indirect or multiplier impacts on Delaware, Ulster, and Greene counties associated with the proposed construction, an economic model developed by the U.S. Bureau of Economic Analysis, known as the Regional Input-Output Modeling System (RIMS II), was used. Using change in final demand multipliers from the RIMS II model shows that the $55 million of construction spending that will be spread over five years will generate approximately $4.2 million in employee earnings and approximately 89 jobs each year throughout the length of the project (see Table 4.11-36). These figures represent a combination of both the direct and indirect or "multiplier" impacts of the construction spending.

The increase in construction spending will directly impact the regional economy by increasing employment and earnings in the construction industry. In addition,

these construction expenditures will also have a positive indirect impact on the local economy.

As the new construction workers spend a portion of their payroll in the local area and construction companies purchase materials from local suppliers, the overall demand for local goods and services will expand. Revenues at local retail outlets and service providers will increase. As these local merchants respond to this increase in demand, they may in turn increase employment at their operations and/purchase more goods and services from their providers. These new workers may then spend a portion of their income in the area, thus "multiplying" the positive economic impacts of the original injection of funds. These "multiplier" effects will continue on until all of the original funds have left the regional economy through either taxes, savings, or through purchases from outside the local area.

The positive economic impacts associated with construction spending will be short-term. Since the construction costs are one-time expenditures, once the original funds leave the economy through taxes, savings, and purchases outside the region the positive economic effects will end.

Table 4.11-36 Direct and Indirect Impacts Resulting from the Increase in Construction Expenditures at Belleayre Mountain Ski Center

Economic Indicator	Expected Annual Change
Estimated Annual Construction Outlays	$11,000,000
Change in Regional Output	$14,300,000
Change in Annual Employee Earnings	$4,200,000
Change in Annual Employment (jobs)	89

Source: U.S. Bureau of Economic Analysis 2008.

Operational Impacts

Upon completion of the expansion, operational employment and expenses will increase at the Belleayre Ski Center. Revenues are also anticipated to increase as a result of the proposed expansion. Table 4.11-37 shows the existing and projected revenues and operational costs at the ski center upon completion of the proposed expansion.

Table 4.11-37 Existing and Projected Revenues and Operational Costs at the Belleayre Mountain Ski Center

Category	Existing (2007-2008)	Projected (Upon Completion of Expansion Project)
Revenues:		
Ski Center Gross Revenues	**$6,106,000**	**$11,327,400**
Operating Costs[1]:		
Payroll Costs	$3,712,000	$6,230,000
Energy Costs	$1,500,000	$1,100,000

Other Operating Costs	$1,498,000	$2,806,000
Total Operating Costs	**$6,710,000**	**$10,136,000**

[1]Operating costs presented on this table are estimates for the ski season. These figures are not directly comparable to those figures shown on Table 4.11-33 which are for the fiscal year.

Source: New York State Department of Environmental Conservation 2008.

Both the Ski Center and its concessionaires will increase employment as a result of the predicted increase in attendance. Table 4.11-38 shows the overall projected change in employment and expenses that will occur as a result of the expansion.

Table 4.11-38 Estimated Increases in Employment and Operational Expenses at the Belleayre Mountain Ski Center Upon Completion of the Expansion

Category	Additional Full Time and Seasonal Employees	Additional Operational Expenses
Direct Full-Time Employment	32	$1,018,025
Direct Seasonal Employment	200	$1,500,000
Concessionaire Seasonal Employment	40 to 45	$1,700,000[1]
Non-Personnel Operating Costs[2]		$908,000
Total	**277 to 282**	**$5,126,025**

Source: New York State Department of Environmental Conservation 2008.

[1]This figure is the midpoint between $1.6 million and $1.8 million, which represent the change in payroll from 45 and 50 food service/retail workers, respectively

[2]Enegry costs are projected to decrease as a result of energy conservation measures included in the proposed project despite the increase in total ski area and the increase in the number of building at Belleayre. Estimates of future non-personnel operating costs reflect this energy savings.

Direct employment at the Ski Center is expected to increase by an additional 32 full-time positions and by approximately 200 additional seasonal staff. Table 4.11-39 provides a breakdown of the full-time permanent jobs by grade and expected salary.

Table 4.11-39 Additional Full-Time, Permanent Positions at Belleayre Mountain Ski Center upon Completion of the Expansion

Job Grade	Number of Positions	Expected Salary
Grade 14	2	$40,394
Grade 12	10	$36,046
Clerk 2	7	$30,483
Clerk 1	1	$25,900
Park Worker 3	6	$30,483
Park Worker 1	4	$23,408
Maintenance Assistant	2	$30,483
Total	**32**	**$1,018,025**

Source: New York State Department of Environmental Conservation 2008.

This increase in direct employment is expected to inject approximately $2.5 million into the regional economy annually through payroll expenditures. Approximately $1 million of this amount is related to year-round, full-time employees. The remaining $1.5 payroll expenditures would be paid to seasonal employees (November to April) (New York State Department of Environmental Conservation 2009).

Private food service and retail concessionaires at the ski center are also expected to increase total employment and payroll over the current 2008 levels to accommodate the anticipated increase in daily attendance. A projected 45 to 50 additional seasonal employees would work for the food service and retail concessionaire upon completion of the proposed project. This expected increase in employment would generate a corresponding increase of an estimated $1.6 million to $1.8 million in payroll expenditures annually. The food service and retail concessionaires are expected generate approximately $3.5 million annually in sales upon completion of the proposed project (New York State Department of Environmental Conservation 2009).

Other operating expenses at the Belleayre Ski Center would also increase as a result of the proposed project. Based on information obtained from conversations with NYDEC personnel, total non-personnel annual operating costs are expected to increase to by $908,000 to approximately $3.9 million a year, assuming a constant relationship between attendance figures and non-personnel/ non-energy operating costs. Annual energy costs are expected to decrease upon completion of the proposed expansion project due to the implementation of numerous energy efficiency measures that are included in the project. Annual energy costs at Belleayre are expected to decrease by approximately $400,000 a year from the current amount of $1.5 million. See Table 4.11-40 for a more detailed description of existing and future non-personnel operating costs at the Belleayre Ski Center.

Table 4.11-40 Existing and Future Non-Personnel Operating Costs at the Belleayre Ski Center

Cost	Existing Costs 2007-2008	Expected Future Costs
Energy Costs	$1,500,000	$1,100,000
Non-Energy Operating Costs	$1,498,000	$2,806,000
Total Non-Personnel Operating Costs	**$2,998,000**	**$3,906,000**

Source: New York State Department of Environmental Conservation 2008.

The ski center anticipates that it will continue to purchase the same proportion of goods and services from the local economy as it did in 2008. Therefore, the proposed project is expected to result in an estimated $225,000 spent on local vendors and suppliers (New York State Department of Environmental Conservation 2008).

This injection of funds into the regional economy through increased employment and payroll and additional purchases from local suppliers will have also have a positive indirect impact on the regional economy. As the new employees from the ski center spend a portion of their payroll in the regional economy and as Belleayre's local suppliers make additional purchases in the area, the demand for local goods and services will expand. Revenues at local retail outlets and service providers will increase. As these local merchants respond to this increase in demand, they may in turn increase employment at their operations and/purchase more goods and services from their providers, thus "multiplying" the positive economic impacts of the original injection of funds. These "multiplier" effects will continue on until all of the original funds have left the regional economy through either taxes, savings, or through purchases from outside the local area.

The RIMS II model was used to quantify these multiplier effects. The model showed that expanded operations at the ski center are expected to generate an additional 10 to 20 indirect jobs and $800,000 in indirect employee earnings in the region each year. In total the completion of the expanded ski center would directly and indirectly generate 287 to 302 new jobs and increase employee earnings in the regional economy by more than $5.0 million. Table 4.11-41 provides a summary of the annual direct and indirect impacts on employment and employee earnings that are projected to occur upon completion and operation of the expanded ski center.

Table 4.11-41 Projected Direct and Indirect Impacts on Employment and Employee Earnings in the Delaware, Ulster, and Greene Counties upon Completion of the Expanded Ski Center

	Change in Employment	Change in Payroll
Direct Employment Impacts		
Belleayre Mountain Ski Center		
Full-Time Employees	32	$1,018,025
Seasonal Employees	200	$1,500,000
Food Service/Concessionaries		
Seasonal Employees	45 to 50	$1,700,000[1]
Indirect Employment Impacts	**10 to 20**	**$800,000**
Total Direct and Indirect Impacts	287 to 302	$5,018,025

[1]This figure is the midpoint between $1.6 million and $1.8 million, which represent the change in payroll from 45 and 50 food service/retail workers, respectively.

Source: New York State Department of Environmental Conservation May 12, 2009; 2008. U.S. Bureau of Economic Analysis 2008.

Other positive economic impacts will occur in the regional economy as attendance at Belleayre increases. The influx of additional skiers to the region will increase the demand at retail establishments and at lodging and dining facilities located near the ski center. As more visitors come to the area, local businesses will receive more incidental visits.

As described previously, a recent study was conducted by the Technical Assistance Center (TEC) at the State University of New York at Plattsburg, for the New York State Olympic Regional Development Authority, the authority that was, at the time of the study, in charge of operating among others facilities the Gore Mountain Ski Center and the Whiteface Mountain Ski Center in the Adirondack Mountains. This study quantified the average amount visitors from outside the region who came to enjoy the recreational facilities offered by the authority spent per day in the local economy. The majority of the visitors were participants in winter sports activities, with downhill skiing being the most popular. According to that report on average visitors to the area spent $405.45 per party per day in the local economy. An average party consisted of four individuals. Lodging, meals, and entertainment accounted for the three largest categories of expenditures. In 2006 the average expenditure per visitor party per day was $122.98 for lodging; $63.68 for entertainment; and $62.80 for meals (TEC 2008).

Visitors to the Belleayre Mountain Ski Center are anticipated to have a similar positive impact on the regional economy. If the spending patterns of the skiers visiting Belleayre are consistent with those visiting the Gore Mountain Ski Center and the Whiteface Mountain Ski Center, upon completion of the expansion, skiers visiting Belleayre will spend approximately $32 million for lodging, meals, and entertainment. Establishments located near the ski center and along the Route 28 corridor are expected to experience the greatest impacts. Most of these impacts will be concentrated in 12 to 15 weekends per year.

Labor Force Impacts

The construction and operation of the expanded ski center is not expected to have a significant impact on the local labor force. Construction of the proposed project is expected to employ an average of 12 to 16 workers. Peak construction employment is not anticipated to reach more than 35 workers at one time. In 2007 Delaware, Ulster, and Greene counties had a total labor force of 138,789 persons. At peak construction the estimated 35 jobs would represent less than 0.03% of the regional labor force. Therefore, the existing labor force in Delaware, Ulster, and Greene counties is sufficiently large and the project is sufficiently small that there would be no appreciable impact on the regional labor market during construction. There would be no supply constraints or upward pressure on wages as a result of the construction of the expansion.

During the operational phase of the proposed project, an estimated 32 new full-time, year-round positions and an additional 245 to 250 seasonal positions would be created at the ski center and its concessionaires. The 32 full-time positions would account for less than 0.03% of the regional labor force. In addition, the approximate 250 seasonal positions would account for only 0.2% of the regional labor force. The majority of the 250 seasonal positions are expected to be filled

by current unemployed or underemployed workers. Most of the seasonal positions are expected to be taken by people as a second job or by persons who are not in the labor force full time.

Given the current levels of employment in the region, the relatively small numbers of full-time positions being created and the relatively large size of the labor pool, no significant impacts are expected to occur in the region's labor market as a result of this project. Labor supply is not expected to be significantly affected and wage rates are expected to remain relatively constant.

The predicted indirect impacts on the regional labor market are also expected to be relatively minor. Approximately 20 additional jobs are expected to be created in the region as a result of the increase in employment and attendance at the Belleayre Ski Center. These indirect jobs would represent 0.01% of the region's labor force. The additional jobs could easily be filled by currently unemployed or underemployed persons living in Delaware, Ulster, and Greene counties. Therefore, the proposed project is not anticipated to significantly affect the demand or supply of labor in the three country region.

4.11.3.2 Population and Housing

The proposed expansion of the Belleayre Ski Center is not anticipated to have a significant impact on the population or demographic characteristics of Delaware, Ulster, and Greene counties. As described previously, construction employment is expected to peak at 35 workers and operations are expected to generate no more than 32 full-time jobs and only 250 seasonal jobs. The majority of these jobs are expected to be filled by individuals currently living in the Tri-County area or by those who are willing to commute into region.

During construction some specialized workers may temporarily relocate to the area during the construction season. However, given the transient nature of these jobs it is unlikely that these workers will permanently relocate to the area. Therefore, no significant in-migration is expected in the region as a direct result of this project.

As described in the previous section, the majority of the jobs that will be created by the operation of the expanded Belleayre Ski Center are expected to be filled either by commuters or residents of the Delaware, Ulster, and Greene counties. Therefore, there will be no significant in-migration into the region as a result of construction or operation of this project. Since there is no in-migration anticipated as a direct result of this project, there will be no change in the demand for housing or price of housing as a result of completion of the expansion. Therefore, no significant housing market impacts are expected as a direct result of this project.

The proposed project may have some minor indirect influence on the second home market in the nearby towns. The improvements at the ski center will create

more recreational amenities in the area and may improve the desirability of second homes in the area. This increase in desirability may translate to a slight increase in demand for and price of vacation homes in the area. However, this increase in demand is expected to be very minor because the ski center has already been in operation for many years and the incremental change in recreational facilities as a result of this project will be relatively small.

While no major empirical study has been completed that directly analyzes the impacts of ski resort improvements on the regional second home market, a wide body of economic analysis has proven the positive correlation between home values (both primary and second homes) and nearby recreational amenities. In fact this linkage is so widely accepted in economic theory that a valuation technique known as the hedonic pricing model has been developed that can quantify the value of a natural or recreational resource by analyzing prices and characteristics of the regional housing market.

4.11.3.3 Taxes and Revenues

Sales Tax and Property Tax

Completion of the proposed project will have minor positive fiscal impacts on the communities surrounding the ski resort. During the construction and operation phase, local sales tax receipts will expand as the amount of economic activity in the region expands. As the new workers spend a portion of their income in the local area and as Belleayre suppliers purchase materials in the local area, sales tax receipts in the region will increase.

In addition, local sales tax receipts will be positively affected during the operational phase of the project. Upon completion of the proposed expansion, annual daily attendance at the Belleayre Ski Center is expected to nearly double to 310,000 to 320,000 skiers per year. Gross revenues from the food concessions are expected to increase to $2.2 to $2.3 million, and gross revenues from the retail concessions are expected to increase to $419,000 to $432,000 per year. Based on an 8% state and local sales tax rate this expansion in gross receipts at Belleayre Ski Center would result in approximately $210,000 to $220,000 in state and local sales tax annually. Lift tickets are currently exempt from New York State sales tax.

Local sales tax generation will be further enhanced by the increased retail activity that will occur as attendance at the facility expands. As illustrated by the TEC study described in previous sections, as more skiers use Belleayre Mountain Ski Center, visits to area lodging, eating and drinking and retail establishments are expected expand and local retail sales will grow. Assuming a constant sales tax, the increased retail sales will increase local sales tax receipts.

Property tax revenues are not expected to be significantly impacted as a result of the proposed project. As described previously in Section 4.11.3.2, no significant

impacts are expected to occur in the primary housing market due to completion of the project. The price, availability, and supply of primary housing units in the region are not expected to be affected. Improvements at the resort may have a minor positive impact on the value of second homes in the region. However, this increase in the value is not expected to be large and the local property tax base is anticipated to remain relatively constant.

Local Government Expenditures

Local government expenditures are not anticipated to be impacted as result of the proposed project. New York State and its contractors will continue to supply all waste management, emergency and security personnel, and sewer and water needs at the facility. The increased attendance at Belleayre may slightly increase the number of calls for police and ambulance support; however, the additional numbers of calls are not expected to be significant and require additional financial outlays from the local communities.

As discussed in Section 4.11.3.2, the proposed project is not expected to generate any in-migration to the region. The majority of the employment opportunities that will be created by the project are anticipated to be filled by persons currently living in the region. Since no in-migration is expected to occur, the demand for community services and facilities is expected to remain relatively unchanged. Therefore, local government expenditures are not expected to be impacted as a result of this project.

4.12 Cultural Resources

The analysis of the potential impacts on cultural resources includes a consideration of prehistoric archaeological resources, historic archaeological resources, and changes to the viewshed.

4.12.1 Existing Cultural Resources Conditions

The archival research conducted at the Office of Parks, Recreation and Historic Preservation (OPRHP) did not produce evidence of known prehistoric archaeological resources within a 1-mile radius of the Project Area. The lack of prehistoric sites in this area is probably due to several factors, including the high elevation of the Project Area, the severity of the winter climate, and the large percentage of steep slopes. The surrounding countryside is replete with sandstones but has no cherts, quartzites, or other cryptocrystalline stones. This would mean that Native Americans had no locally available materials suitable for tool manufacture other than lithics introduced from outside the area.

Because of the steepness of slope in the vast majority of the acreage, the Project Area should be considered to have a minimal sensitivity to the presence of prehistoric archaeological sites. No additional analysis on the potential for impacts on prehistoric resources was conducted.

The remainder of this section first considers historic archaeological sites that could be impacted by the project, and then considers the visual impacts of the proposed project on cultural resources in the region.

The OPRHP files produced evidence of 14 historic archaeological sites within a 1-mile radius of the Project Area (Table 4.12-1): nine domestic or house sites, one reservoir, two springhouses, an historic-era rockshelter, and an historic dump (Greenhouse Consultants, Inc. August 2001).

Four historical maps of the project area were examined as part of the Phase I survey:

1. The 1853 Brink and Tillson Map of Ulster County shows the Mullinez and Whispell houses.

2. The 1858 French Map of Ulster County shows the same houses in the same locations with the Mullinez house now owned by “H. Johnson” and the Whispell house further identified as the home of “W. Whispell.”

3. The 1875 Beers Map of Ulster County shows the Mullinez/Johnson house now owned by “H. Whispell” and a house owned by “J.C. Loomis.”

4. The 1904 U.S.Geological Survey (USGS) Map also shows the Loomis domicile as well as the Whispell house.

As a rule, historic maps show only dwellings and do not indicate barns or associated farm structures that might be related to a dwelling and its owner. It is most likely that the families that lived in the houses identified on these maps were cattle farmers and also raised sheep and pigs. It should be noted that most, if not all of the entire Project Area, has probably been logged more then once since the early 19th century (Diamond Archaeological Consultants 2010).

Table 4.12-1 Historic Archaeological Resources within One Mile of the Project Area

Site ID	Resource Name	Distance from Project Area	Resource Type	
A025.14.001 00	Hiram Robinson Site	2,500 feet/762 meters	Historic	Domestic Site
A025.14.0099	Ruttson Greene Site	2,500 feet/762 meters	Historic	Domestic Site
A025.14.0098	Wildacres Reservoir #1	3,000 feet/914 meters	Historic	Reservoir
A025.14.0095	Three Cabins Ruin Site	2,000 feet/610 meters	Historic	Domestic Site
A025.14.0096	Monroe House Site	1,500 feet/457 meters	Historic	Domestic Site
A111.16.0081	Historic Dump	500 feet/152 meters	Historic	Dump
A111.16.0080	Van Loan Road Cellar Hole	850 feet/260 meters	Historic	Domestic Site
A111.16.0088	Leach Rockshelter	1,500 feet/457 meters	Historic	Rockshelter
A111.16.0082	Leach Farmstead	1,500 feet/457 meters	Historic	Domestic Site
A111.16.0083	P. Robison Site	2,000 feet/610 meters	Historic	Domestic Site
A111.16.0084	Springhouse Ruin #1	500 feet/152 meters	Historic	Springhouse
A111.16.0085	Springhouse Ruin #2	On edge of Project Area	Historic	Springhouse
A111.16.0079	N. Haines Site	4,000 feet/2,119 meters	Historic	Domestic Site
A111.16.0078	Turner/Brisbane Mansion	5,000 feet/1,524 meters	Historic	Domestic Site

An examination of historic maps of the Project Area determined that the area has high potential for containing historic archaeological resources.

A Phase IA archaeological survey (Diamond Archaeological Consultants 2010) consisting of archaeological reconnaissance and subsurface testing (if warranted), was carried out in all locations slated for ground-disturbing operations. See Appendix AF. The purpose of the Phase I survey was to determine whether archaeological resources eligible for listing in the National Register of Historic Places (NRHP) exist in the area of potential effect (APE).

The results of the Phase IA survey are summarized below.

Area A

Area A consists of a visitors booth and parking. Area A is an open area of grass that was completely tested with a total of 34 shovel tests. Nine of the tests yielded a small number of modern finds, including one slag, one cinder, ten charcoal, four coal, one mortar, one wood, one iron strap fragment, one plain whiteware ceramic (post-1820), one tumbler fragment (c.1840-1865), and one wine/liquor bottle fragment. The artifacts appear to be scattered across the potential impact area and showed no discernable concentration. No map-documented structures exist for this area and, as a consequence, these remains do not constitute an archaeological site *sensu strictu* and thus the site is not eligible for listing in the NRHP.

Area B

Area B consists of three parking lots and an entrance road. Area B is a triangular-shaped forested space bisected by a narrow lane that begins at Van Loan Road and runs towards the south. Composed of formal cut-stone walls and stone posts at its southern end, the lane ends in front of the structural remains of a house on the south side of Old Route 49A. This is the house of "J.C. Loomis" noted on the 1875 Beers Map. The Loomis house is outside of the APE.

A walkover of Area B found no indications of a cellar hole, suggesting that the map-documented structure might be a frame structure on a shallow stone foundation. Overall, Area B was tested with 149 shovel tests; 26 showed positive indications of historic and/or modern materials. Except for the disturbances and steep sections noted above, the entire APE within the triangle was tested. No pre-contact items were found.

Artifacts from Area B included 2 mortar, 26 window glass, 1 plate glass, 4 slag, 5 cinder, 9 coal, 8 charcoal, 3 modern wire nails, 1 hand-wrought nail, 2 machine-cut nails, 1 machine-cut lathe nail, and 2 iron lumps. Other fragments were of 1 oyster, 1 clam, 1 bone, 1 animal tooth, 32 unidentified bottles, 1 red earthenware, 21 whiteware, 5 iron cans, 2 Pepsi bottles, 1 flower pot, and 1 soda can tab closure. Personal items consisted of 1 whiskey flask fragment, one glass button, and 1 cream/pomade. One item of furniture hardware was found—a file cabinet attachment to hold a label. Modern artifacts consisted of two plastic items. This area does not constitute a resource eligible for listing on the NRHP.

Area C

Area C consists of a water reservoir for snowmaking, a salt storage building, and the proposed lower pump house site. Area C is severely disturbed by operations relating to the maintenance garage. However, a walkover and testing found two structures: The first of these is a circular foundation that is probably from a silo, a trench containing historic debris, a small rectangular grouping of stone that may have been a foundation, and a possible well. Five of the 21 shovel tests excavated around these structures produced artifacts (N=8). These included two machine-cut nails, two unidentifiable bottles, one iron can, and three window glass fragments.

The second structure is near the proposed lower pump house. This structure is composed of stone that was mostly buried under a pile of large pipes. Two shovel tests were squeezed in among the pipes, with one test encountering artifacts. Four concrete fragments with robin's egg blue paint were found, indicating that this structure was probably associated with water storage or a swimming pool. These resources are not NRHP-eligible.

Area D

Area D consists of an entrance with two additional parking areas. This location is a wooded, relatively level portion of the Project Area located between the maintenance garage and the small cemetery along County Route 49A. A total of 92 shovel tests were placed here, with two tests producing one stoneware item, nine coal , one window glass , one split ring, five iron can fragments, three paneled glass mug, nine jelly jar fragments, and one Rheingold Extra Dry can. Along the southern edge of Area D is a pair of barn foundations (one with stone ramp) that are typical of cattle barns in the Catskills region.

Substantial amounts of surface refuse were observed at three garbage dumps. These included modern screw-top bottles, amber Clorox bottles, blue screw-cap Milk of Magnesia bottles, magnum-sized champagne bottles, fruit jars (ca 1910 to 1940), Guldens mustard (ca 1940s to 1960s), green beer bottles (Rolling Rock/Molson), Ball Mason jars (ca 1930 to 1960s), modern paint cans, one-gallon vinegar jugs, porcelain toilets, pink depression glass, College Inn broth bottles, and a number of whiskey bottles embossed "Federal Law Forbids Sale or Reuse of this Bottle," an embossing common on whiskey bottles from 1933 to 1964 (Munsey 1970). Other artifacts included buckets, syrup bottles, vinegar jugs, Lavoris mouthwash bottles, amber Clorox bottles, hotelware with green stripes, and porcelain toilets.

These dumps appear to date from the 1930s through the 1970s. As archaeological resources they are not eligible for listing in the NRHP. However, modern/historic barns warrant field mapping.

The Cemetery

The small cemetery between Area D and the existing large parking lots (Area E) on Old Route 49A contains the graves of several families dating from ca 1848 into the 1890s. These include entombments for the Thompson, Deunslyne, Symond, Cure, Tyler, and Whitney families. Several Civil War veterans are buried here as several of the graves are decorated with GAR (Grand Army of the Republic) memorial pins. The cemetery is outside the potential impact area of the proposed project construction. It is recommended that a 30-foot buffer with orange snow fencing be maintained between the proposed construction and the cemetery.

Area E

Area E is an expansion of one parking area and changes to the rear of the Discovery Lodge. Area E encompasses the Discovery Lodge parking lot expansion just above the historic cemetery. Both locations correspond to areas that have been completely cut and filled. No archaeological work was undertaken in these two areas as they have no potential for cultural resources.

Area F

Area F is the construction of the upper Discovery Lodge parking lot. Area F is a partially wooded, partially open area that was tested both in the woods and in an open clearing. It has large trees along the main road, several stone walls, a driveway, and an iron fence enclosing the front yard of a small foundation, probably a small barn or outbuilding. A total of 49 shovel tests were excavated in the open area, 15 of which yielded historic artifacts.

Artifacts (N=144) from Area F can be categorized into building and structural materials; food remains/kitchen-related materials; lighting; arms-related materials; and modern artifacts. Building materials consisted of 7 mortar, 17 brick fragments, three plaster, 11 window glass, 5 plate glass, 3 melted window glass, 7 coal, 3 charcoal, 30 wire nails, 1 hand-wrought nail, 16 machine-cut nails, 10 machine-cut lathe nails, 1 iron sash weight, 1 iron fragment, 3 carbonized/burned boards, 5 board fragments, 1 painted board fragment, and 2 iron lumps. Food remains/kitchen-related materials consisted of 1 oyster, 5 unidentified bottles, 1 whiteware piece, and 1 Union Oval medicine/pharmacy bottle fragment. Lighting-related items consisted of 1 lamp chimney fragment. The arms group is represented by one .22 caliber brass cartridge. Modern artifacts consisted of 2 plastic items, 3 hydraulic rubber hose fragments, and 3 burned asphalt lumps.

This site appears to be the location of the Whispell house, which is shown on the 1904 USGS maps. Based on the large amounts of charcoal and the fact that there is no cellar hole, it is probably this structure burned down and the cellar hole was filled in with rubble. In all probability the location of the Whispell house corresponds to the clearing in Area F. The site appears to have good archaeological integrity and significant densities of artifacts, and it contains structural remains. The site appears to be eligible for listing in the NRHP. Given the high concentration of the artifacts discovered during the Phase IA archaeological survey and available cartographic evidence, the site will be protected by maintaining a buffer around it during construction.

Area G

Area G consists of a ski life and parking area. Area G is a 1- to 2-acre wooded triangle at the confluence of Old Route 49A and the upper Belleayre entrance driveway. It was tested with 35 shovel tests, two of which located evidence of cultural material (N=16)—15 fragments of charcoal and one bottle glass fragment. This location does not contain an archaeological site.

Area H

Area H consists of Tomahawk Lodge and skier bridge that is to be constructed near the Tomahawk Base. Area H is on the side of the mountain, in a location that has already had extensive cutting and filling episodes. It is presently the site of a three-tiered asphalt parking lot. A proposed new lodge and skier bridge will have no impacts on cultural resources.

Area I

Area I consists of three new ski lifts (the Discovery lift, Belleayre West lift, and the Highmount lift) and the proposed lift replacements of the novice and beginners lifts, Summit Lodge expansion, restoration of an existing trail, and Overlook Lodge amphitheatre. The five lift locations are in areas of extremely steep slope (ca 25% to 40%), making them unsuitable for habitation areas for Native Americans. Field reconnaissance also determined that they contained no rockshelters. The westernmost of the lifts is in an area adjacent to Site A111.16.0085, the Springhouse Ruin #2. This ruin is deemed eligible for the NRHP. Its position on the OPRHP maps shows it to be downhill of the proposed construction area. This site should be flagged and avoided during construction activities. The Summit Lodge Expansion, trail restoration, and Overlook Lodge Amphitheatre are all in locations of extreme slope or cut-and-fill manmade terrain and contain no cultural resources.

Area J

Area J consists of a water line to Pine Hill pump house, Cathedral Glen pump house, and modifications to existing upper pump house. The waterline to the Pine Hill pump house is an existing line that runs along the right-of-way of the railroad tracks from the Cathedral Glen pump house to Pine Hill. If it is determined that the water line requires replacement it will be replaced in the same location where it currently resides. From the proposed pond to the Cathedral Glen pumphouse, the line is in an area of extreme slope, as are the Cathedral Glen and Upper pump houses. As a consequence of being located in extremely steep terrain, this proposed area was not tested.

Area K

Area K is the former Highmount Ski Area to be acquired by the State of New York. Area K is an extremely steep slope that has been disturbed by prior construction operations. It has no potential for cultural resources (Diamond Archaeological Consultants 2010).

4.12.2 Future Cultural Resources Conditions without the Project

No significant benefit will accrue to cultural resources if the project is abandoned. The early 20th century Whispell House site is located in Area F. This site appears to be NRHP-eligible, and impacts can be mitigated either by archaeological data retrieval or avoidance.

4.12.3 Potential Cultural Resources Impacts

A Phase I archaeological survey determined that most of the areas of the proposed construction have either sustained a severe prior disturbance or were unsuitable for human habitation because of the extreme slope. With only one exception—the early 20th century Whispell house in Area F—all discovered modern /historical remains are not eligible for NRHP listing. Consequently, the proposed construction activities will have no effect on cultural resources (see Section 4.12.4 below).

4.12.4 Proposed Cultural Resources Mitigation Measures

The discovery of the remains of the early 20th century Whispell house in Area F necessitated agency consultation under the State Environmental Quality Review Act (SEQRA) to develop appropriate mitigation measures. In the course of agency consultation, it was determined that the areas of maximum artifact density, an existing small foundation, and projected location of the main structure may be avoided by the redesign of the proposed parking lot. This re-design was completed and is represented in the impact areas delineated in this Draft EIS.

Additional mitigation involves two cattle barns that were discovered in Area D and should be documented on detailed scale drawing.

Because the historic cemetery is outside the proposed APE, it is recommended that the cemetery be surrounded by orange snow fencing as a boundary between it and the proposed construction.

Site A111.16.0085, the Springhouse Ruin #2, is outside of the APE. It is, however, recommended that the site also be surrounded by orange snow fencing during construction.

4.12.5 Potential Visual Impacts on Cultural Resources

4.12.5.1 Existing Cultural Viewshed Conditions

Historical Overview

European history in the study area originated with the granting of the Hardenbergh Patent in 1708, which contained more than 1 million acres and encompassed nearly the entire extent of the Catskill Mountains. However, its inaccessibility and the lack of effective surveys delayed development until after the Revolutionary War. For example, the Town of Middletown in Delaware County was not created until 1789, with Shandaken in Ulster County coming even later in 1804. Both towns are characterized by mountainous uplands creased by deep, narrow stream valleys, with Belleayre Mountain serving as the divide between the watersheds of the Esopus Creek on the east (Shandaken) side and the East Branch of the Delaware River on the west (Middletown) side. The slopes and soils in both towns were not well-suited to agriculture, although valley farms were more productive than upland farms, a condition that is reflected in the quality of surviving house and barn architecture. In fact, few upland farms have survived into the 21st

century, with the area's intact and distinctive farmsteads existing primarily in the valleys.

Settlers migrated into the Catskills from eastern New York and New England where all the good agricultural land had been long developed and the region generally over-farmed and over-populated. Middling farmers settled in the more fertile valleys, while those of the poorer sort could only afford land in upland sections. By the mid-19th century, this latter class was expanded by the influx of refugees from Ireland. Initially, farmers followed a mixed husbandry model, raising a variety of livestock, but particularly beef cattle, for subsistence and market. Sheep were well-suited to hillside locations and provided the raw materials for the home-manufacture of woolen cloth as well as wool mills on the more substantial creeks. Other market crops were introduced with varying success. For example, cauliflower emerged as a profitable crop in Middletown and for a while was considered a national center of production. The local economy also relied on harvesting forest products, notably timber, but also tanning bark, potash, and charcoal. Quarrying was inconsequential because of the remoteness of the region.

Both Shandaken and Middletown benefited from their location on the turnpike leading west from Kingston and the Hudson River (now NY Rte 28) and transportation facilities formed the core of crossroad hamlets along its route. When the Ulster & Delaware Railroad opened in 1866, it essentially followed this route and brought the communities along its route better economic opportunities in relation to the western part of the region. At this time, the farm economy centered on dairy products, in particular bulk milk that could be transported by train to Kingston. The advent of the railroad brought a more significant transformation to the area. Tourists, primarily hunters and sportsmen, had been attracted to the scenic mountain wilderness ever since its settlement. The railroad made it a far easier journey, and within a short time great numbers of summer tourists were fleeing hot summers in the city for the fresh, healthful mountain air. This seasonal migration forever changed the cultural landscape of the area. Hundreds of hotels—large and small—as well as countless boarding houses (many of them created by farm wives in their homes to augment the family income) and cottages both single and in colonies appeared. City dwellers of all nationalities and classes flooded in and made it a much more cosmopolitan and democratic place. And the area has remained this way, even though most of the large hotels have been lost and single-family seasonal dwellings now predominate. Early architecture in the area reflects the New England origins of the bulk of its early settlers.

Farmhouses, barns, and the occasional old church or farmhouse all have classical design features that suggest both an enduring English (as opposed to Dutch) orientation and the influence of a broadening national taste occurring in the mid-19th century. The Greek Revival style predominates in the older and more modest houses, with picturesque Gothic and Italianate elements appearing in more substantial residences. A few remaining early barns embody the traditions of the small English barns of New England, which were designed to accommodate the

mixed husbandry practices of the period. Later dairy barns have the distinctive characteristics of stone basements, where livestock were quartered, with voluminous hay mows above them reached by ramps. The mountain slopes motivated a bank-barn style that has become identified with Delaware County. In any case, the architecture is more modest in scale and decoration than Hudson Valley farms, where rural communities were more prosperous and more fully developed. Tourist house architecture is more ornate in houses large and small. The remarkable resort buildings remaining in the Village of Fleischmanns represent the most distinctive evidence of this history within the survey area. Residential, commercial, and civic buildings survive from this period, but the lodging places are the most numerous and significant. Among the summer visitors were the rich and famous, who built extravagant country homes in elegant settings with stunning mountain vistas.

At the turn of the century, most of the mountaintop areas came under the jurisdiction of the state and Catskill Park was created. With the formalization of public trails, the conservation and enjoyment of the wilderness experience became a major factor in the region's identity. The growing popularity of winter sports led to the development of small downhill ski areas in each community beginning in the 1930s. As demand increased, the state constructed a large ski center on Belleayre Mountain, which became a major tourist destination and has played an important role in the local economy. In recent years the construction of single-family vacation homes, many in the rustic log and chalet styles, has proliferated in the survey area, particularly in sections closest to Belleayre Mountain. This period of development now far outweighs what remains of the historic farm and resort eras.

Summary of Significant Historic Contexts

The significance of historic resources in the survey area was evaluated in the following contexts as defined by guidelines for applying NRHP eligibility criteria.

- Agriculture – properties associated with the changing practice and pattern of farming in the Catskill region. For a property to be eligible in this context it should have domestic and agricultural buildings that retain their period design characteristics as well as landscape features that convey its historic agricultural setting.

- Architecture – properties with buildings that retain the distinguishing characteristics of their type, period, and method of construction as well as the design features distinctive to the changing uses and tastes occurring within the historical period.

- Commerce – properties associated with the business of trading goods and services

- Education – properties associated with the community's role in the schooling of children

- Recreation – properties associated with seasonal tourism, resort development, and outdoor recreational activities

- Settlement – properties that reflect the character and pattern of settlement in the region

- Transportation – properties directly associated with movement of people by road and railroad.

The integrity of the surveyed properties was a factor in determining National Register eligibility. A property was expected to retain its distinguishing architectural characteristics and, in the case of farmsteads, a discernable aspect of its agricultural setting. The survey indicated that 19th-century farmsteads are becoming increasing rare in the region. Many farms identified on historic maps were found to no longer exist: buildings are gone and the farmland reforested. Telltale stone walls are everywhere the only evidence of past agricultural activity. Furthermore, nearly all of the summer hotels and large boarding houses have been lost in the last 50 years, many the victims of arson. The predominant property type in the survey area is the year-round and vacation home built within the last 50 years.

All assessments were made at a local level of significance; however, a number of properties, particularly some of those associated with the history of summer tourism in the Catskill, could be considered of statewide significance.

4.12.5.2 Assessing Visual Sensitivity Methodology

Historic and cultural resources within the zone of visual impact (ZVI) of the Belleayre Mountain Ski Center includes elevated sections determined from four mountaintop visual resource points (Balsam Lake Mountain, Halcott Mountain, Panther Mountain and North Dome Mountain) (see Section 4.7 for the analysis of potential impacts on visual resources) The ZVI is the area within a 5-mile radius of the site and comprises the Town of Middletown in Delaware County, the Town of Shandaken in Ulster County, a small part of the Town of Hardenbergh, Ulster County at its southern limits, and some of the towns of Halcott and Lexington, Greene County in the north.

Every property that contained buildings that appeared to be 50 years or older was recorded with the county, town, and street address at which it is located as well as its GPS (global positioning system) coordinates. A digital photograph was taken and the buildings and site characteristics described. A table was created from this information with additional entries specifying if the property was listed on or determined eligible (officially or unofficially) for the NRHP (see Appendix AM). An estimated date of construction was assigned to each property on the list, and the names of owners annotating historic maps were also recorded. A brief historic overview was written for the survey area to provide contexts for recommendations of potential eligibility for listing as an historic place.

The identification of resource types was limited to buildings, since uninhabited structures, sites, and objects would not be affected by visual changes in the environment. Two exceptions are the Ulster &Delaware Railroad, which supports scenic train rides, and public hiking trails. Both are historic features that have views of the ski center. Historic resources were selected based on age (with components 50 years old or older) and assessed based on their association with historical contexts known to be significant in the region: agriculture, commerce, industry, transportation, and recreation. In particular, the region's long and distinctive history in farming and seasonal resort tourism characterizes most of the cultural landscape.

4.12.5.3 Existing Visual Resources.

A total of 88 historic resources were surveyed and recorded.

Three properties already have been listed on the National Register:

1. Pakatakan Artists Colony in Arkville, Town of Middletown, Delaware County

2. Skene Memorial Library in Fleischmanns, Town of Middletown, Delaware County

3. Bnai Israel Synagogue in Fleischmanns, Town of Middletown, Delaware County

Six properties already have been determined to be eligible for the National Register, five of them in response to a survey conducted for Crossroads Ventures's proposed Belleayre Resort:

1. Turner Estate, Woodchuck Hollow Road in Pine Hill, Town of Shandaken, Ulster County (SHPO Survey Nos. 11116.000067, 68, 69, and 73)

2. Country Estate, Gunnison/Kraft Road in Highmount, Town of Shandaken, Ulster County (SHPO Survey No. 02514.000086 and 87)

3. Wildacres Hotel, 83 Gunnison Road in Highmount, Town of Shandaken, Ulster County (SHPO Survey No. 11116.000072)

4. Sutter Estate, 352 Galli Curci Road in Highmount, Town of Shandaken, Ulster County (SHPO Survey No. 02514.000088)

5. Leach Farmstead, 375 Galli Curci Road in Highmount, Town of Shandaken, Ulster County (SHPO Survey No. 11116.000066)

6. Commercial building on the southwest corner of the intersection of NY Rte 28 and Dry Brook Road in Arkville, Town of Middletown, Delaware County (SHPO Survey No. 02514.000067)

An additional eligible resource is an historic district in the Village of Fleischmanns, Delaware County, which contains approximately 250 contributing features, including two of the National Register properties noted above.

4.12.5.4 Future Visual Resources without the Project

In a future without the project, the viewshed from cultural resources is not expected to change. No significant impact or benefit will accrue to cultural resources if the project is abandoned.

4.12.5.5 Potential Impacts on Visual Resources

The majority of the proposed new facilities at the Belleayre Ski Center will not be visible from the NRHP-listed, NRHP-eligible, or unevaluated historic structures documented above. These include the visitor's booth and parking; parking lots, water reservoir, salt storage, pumphouses; water lines, Tomahawk Lodge; and the Overlook Lodge amphitheatre. Historic structures would be screened from these facilities either by terrain or by the very extensive existing vegetation at the ski center.

Some of the historic structures would be within the visual zone of some of the proposed new ski slopes. However, ski slopes are an already existing part of the resort, and the new slopes, adjacent to existing slopes, would not introduce a discordant element into the landscape.

4.12.5.6 Proposed Visual Resources Mitigation Measures

Given the absence of the potential for adverse effect to visual resources, no mitigation measures are warranted.

Table 4.12-2 Belleayre Mountain Ski Center Cultural Resources Within 5-Mile Viewshed

Id No.	County	Town	Street	St. No.	North Coord	West Coord	Name / Type	Date	Notes
001	Delaware	Middletown	Pakatakan Rd		42 08.688	074 37.425	Pakatakan Artists Colony / boarding house, motel and 16 cottages & studios	1886-1930	listed on National Register 1989
002	Delaware	Middletown	NY Rt 28	44127	43 09.042	074 36.290	Arkville Manor / 2 story wood frame boarding house	c. 1900	cor. Morse Hill Rd
003	Delaware	Middletown	Morse Hill Rd	81	42 09.080	074 36.264	Four-Square house	c. 1910	
004	Delaware	Middletown	NY Rt 28	44681	42 09.245	074 35.738	Oakley's Place / 1 story wood frame commercial building & outbuildings	c. 1910	roadhouse, barn, cottage
005	Delaware	Middletown	NY Rt 28	44721	42 09.248	074 35.704	1 story wood frame Bungalow-style house	c. 1910	appears associated with roadhouse
006	Delaware	Middletown	NY Rt 28	45315	42 09.338	074 34.992	2 story wood frame house	c. 1900	uninhabited
007	Delaware	Middletown	NY Rt 28	45591	42 09.424	074 34.736	1.5 story wood frame Gothic-style farmhouse, barn & outbuildings	c. 1865	I. Todd on 1869 map
008	Delaware	Middletown	NY Rt 28	45855	42 09.510	074 34.439	1.5 story wood frame Federal-style farmhouse & outbuildings; stone wall	c. 1825	I. Todd on 1869 map
009	Delaware	Middletown	NY Rt 28	46046	42 09.515	074 34.181	Ray's Sporting Shop / 2 story wood frame commercial building	c. 1910	adjacent to Bushkill; in built-up area known as Clovesville
010	Delaware	Middletown	NY Rt 28	46007	42 09.552	074 34.265	Zullin's Outdoor Furniture / 1.5 story wood frame Federal-style farmhouse, non-historic outbuildings	c. 1825	G. Murry, "Farmers Home" on 1869 map; in Clovesville
011	Delaware	Middletown	Red Kill Rd	25	42 11.955	074 33.077	2 story wood frame farmhouse, barns & outbuildings; meadows	c. 1850	J. Lyon on 1869 map
012	Delaware	Middletown	Woolheater Rd	750	42 10.958	074 33.610	2 story wood frame Gothic style farmhouse	c. 1860	J. Woolheater on 1869 map
013	Delaware	Middletown	Woolheater Rd	951	42 11.121	074 33.737	1.5 story wood frame farmhouse, barn & outbuildings; meadows	c. 1850	E. Kelly on 1869 map; buldings in poor condition
014	Delaware	Middletown	Hog Mountain Rd	2445	42 09.981	074 33.410	2 story wood frame farmhouse, barn & outbuildings; meadows	c. 1850	J. McMullen, "Highland Home" on 1869 map; "Swiss Barch" painted on barn
015	Delaware	Middletown	Hanley Rd	445	42 10.468	074 33.947	1.5 story wood frame farm house, meadows	c. 1850	H. Mayes on 1869 map; altered
016	Delaware	Middletown	Hog Mountain Rd	1520	42 10.141	074 34.488	2 story wood frame farmhouse, barn & outbuildings	c. 1870	altered

Table 4.12-2 Belleayre Mountain Ski Center Cultural Resources Within 5-Mile Viewshed

Id No.	County	Town	Street	St. No.	North Coord	West Coord	Name / Type	Date	Notes
017	Delaware	Middletown	Little Red Kill Rd	1441	42 10.485	074 32.263	1 story wood frame casino, 2 cottages, mobile home	c.1920	remnant of resort
018	Delaware	Middletown	Basil Todd Rd	508	42 11.387	074 31.797	1.5 story wood frame farmhouse	c. 1850	A.A. Boughton, "Orchard Home" on 1869 map
019	Delaware	Middletown	Moseman Rd	800	42 10.593	074 31.625	2 story wood frame farmhouse, barn, outbuildings, eadows	c. 1850	J.T. Streeter on 1869 map
020	Ulster	Hardenbergh	Todd Mountain Rd	2026	42 07.438	074 32.891	2 story wood frame farmhouse, barn & outbuildings	c. 1850	J.D. Todd on 1875 map
021	Ulster	Shandaken	Kelly Rd	33	42 08.023	074 32.448	1 story wood frame cottage	c. 1950	
022	Ulster	Shandaken	Kelly Rd	58-60	42 07.934	074 32.246	1.5 story wood frame farmhouse, outbuilding	c. 1850	
023	Ulster	Shandaken	Kelly Rd	109	42 07.911	074 31 .916	1.5 story wood frame farmhouse, barn, meadow, pond	c. 1875	
024	Ulster	Shandaken	Belleayre Ridge	26	42 08.070	074 32.063	1.5 story wood frame farmhouse, barn	c. 1875	
025	Delaware	Middletown	off Fleishmanns Heights Rd	---	42 09.197	074 32.764	2 story wood frame Shingle Style house & landscape	1883	Fleishmanns Estate
026	Delaware	Middletown	off Fleishmanns Heights Rd	---	42 09.159	074 32.477	1 story wood frame railroad freight depot	1870	Fleishmanns Freight Depot
027	Delaware	Middletown	DePitts Ln	22	42 09.159	074 32.577	2 story wood frame house	c. 1875	
028	Delaware	Middletown	DePitts Ln	95	42 09.2 16	074 32.505	2 story wood frame house & boarding house	c. 1900	boarding house
029	Delaware	Middletown	Bellows Rd	480	42 10.754	074 30.954	2 story wood frame farmhouse, barn & meadows	c. 1875	
030	Delaware	Middletown	Bellows Rd	120	42 10.493	074 30.947	2 story wood frame house	c. 1900	tourist house
031	Greene	Halcott	Kaftas Rd	571	42 12.32 1	074 30.222	2 story wood frame farmhouse	c.1900	
032	Greene	Halcott	Greene Co Rt 1	566	42 12.405	074 29.964	2 story wood frame farmhouse	c. 1870	
033	Delaware	Middletown	Halcott Rd (Del Co Rt 37)	2499	42 10.988	074 30.094	2 story wood frame house	c. 1890	
034	Delaware	Middletown	Halcott Rd (Del Co Rt 37)	2257	42 10.874	074 30.374	2 story wood frame Four-Square Type farmhouse (c. 1900) & barn (c. 1865)	c. 1900	Farm indicated on 1869 map: M. Garrison
035	Delaware	Middletown	Halcott Rd (Del Co Rt 37)	2062	42 10.723	074 30.493	2 story wood frame Four-Square Type house	c. 1900	
036	Delaware	Middletown	Halcott Rd (Del Co Rt 37)	2003	42 10.677	074 30.532	2 story wood frame Colonial Revival style house	c. 1900	

Table 4.12-2 Belleayre Mountain Ski Center Cultural Resources Within 5-Mile Viewshed

Id No.	County	Town	Street	St. No.	North Coord	West Coord	Name / Type	Date	Notes
037	Delaware	Middletown	Halcott Rd (Del Co Rt 37)	940	42 09.963	074 31.196	Villa Heidenfeld / 2 story wood frame boarding house	c. 1890	
038	Delaware	Middletown	Halcott Rd (Del Co Rt 37)	425	42 09.52 1	074 31.203	Oppenheimer's Regis Hotel / 4 story wood frame hotel	c. 1900	part of Fleischmanns Historic District, see #086 below
039	Delaware	Middletown	Breezy Hill Rd	905	42 10.160	074 31.321	2 story wood frame farmhouse, barn & meadows	c.1880	
040	Delaware	Middletown	Breezy Hill Rd	835	42 10.082	074 31 .358	Breezy Hill Inn / 2 story wood frame tourist house, outbuildings	c. 1900	
041	Delaware	Middletown	Breezy Hill Rd	729	42 09.992	074 31.414	2 story wood frame farmhouse, barn & meadows	c. 1860	S. Osterhout on 1869 map
042	Delaware	Middletown	Breezy Hill Rd	377	42 09.655	074 31.359	1.5 story wood frame farmhouse	c. 1850	H. Hammond on 1869 map
043	Delaware	Middletown	Breezy Hill Rd	307	42 09.647	074 31.355	2 story wood frame tourist house	c. 1880	
044	Delaware	Middletown	Breezy Hill Rd	133	42 09.484	074 31.389	1 story wood frame Bungalow style house, garage & root cellar	c. 1910	
045	Delaware	Middletown	Breezy Hill Rd	107	42 09.447	074 31.398	Lances Hotel / 2 story wood frame tourist house, barn, roof cellar, privy	c. 1875	part of Fleischmanns Historic District, see #086 below
046	Delaware	Middletown	Breezy Hill Rd	301	42 09.677	074 31 .517	Breezy Hill House (site) / Camp Furasato / cabins, activity buildings, swimming pool, re-creational areas	c. 1950	
047	Delaware	Middletown	Brush Ridge Rd	214	42 09.136	074 31 .065	1.5 story wood frame house	c. 1850	
048	Delaware	Middletown	Brush Ridge Rd	103	42 09.121	074 30.214	1 story wood frame house	c. 1900	
049	Delaware	Middletown	Brush Ridge Rd	829	42 09.342	074 30.444	1 story wood frame Bungalow style house	c. 1910	
050	Delaware	Middletown	Brush Ridge Rd	1017	42 09.464	074 30.313	1 story wood frame cottage	c. 1940	
051	Delaware	Middletown	DiBenedetto Rd	87	42 10.049	074 29.971	2 story wood frame Four Square type farmhouse, barn & mea-dows	c. 1900	F. Scudder on 1869 map
052	Ulster	Shandaken	Barley Rd	99	42 09.019	074 29.083	1.5 story wood frame farmhouse	c. 1850	J. Simonds on 1875 map
053	Ulster	Shandaken	Barley Rd	50	42 08.870	074 29.234	1.5 story wood frame house & garage	c.1890	
054	Ulster	Shandaken	Barley Rd	18	42 08.774	074 29.436	1.5 story wood frame boarding house, garage & landscape fea-tures	c. 1900	

Table 4.12-2 Belleayre Mountain Ski Center Cultural Resources Within 5-Mile Viewshed

Id No.	County	Town	Street	St. No.	North Coord	West Coord	Name / Type	Date	Notes
055	Greene	Lexington	Echo Farm Rd	---	42 09.803	074 25.650	3 story stone house, stone garden house, pergola, wood frame farmhouse, barn foundation	c. 1920	Off Crump Hill Rd; Walter Crump, owner
056	Ulster	Shandaken	Woodchuck Hollow Rd	end	42 07.560	074 29.046	2 story wood frame Shingle Style house, outbuildings, landscale	c. 1890	Turner Estate, now owned by Crossroads Ventures; DOE 5/16/00, Proj. Ref No. 99 PR 4498; record nos. 11116.000067, 68, 69 & 73
057	Ulster	Shandaken	Woodchuck Hollow Rd	195	42 07.883	074 29.119	2 story wood frame house	c. 1870	W.W. Green on 1875 map
058	Ulster	Shandaken	Lower Birch Creek Rd	1594	42 09.517	074 26.724	1.5 story wood frame farmhouse, barn, meadows	c. 1850	G. Whispell on 1875 map
059	Ulster	Shandaken	Lower Birch Creek Rd	1463	42 09.412	074 27.156	1 story, wood frame one-room schoolhouse & privy	c. 1880	
060	Ulster	Shandaken	Lower Birch Creek Rd	1420	42 09.352	074 27.262	1.5 story wood frame house & small barn	c. 1880	Small dwelling converted into sportsmen camp, c.1880
061	Ulster	Shandaken	Upper Birch Creek Rd	2327	42 09.694	074 27.130	2 story wood frame farmhouse & barn (new)	c. 1860	J. Judd on 1875 map
062	Ulster	Shandaken	Upper Birch Creek Rd	2269	42 09.668	074 27.370	1.5 story wood frame house	c. 1860	not named on 1875 map; poor condition & uninhabited
063	Ulster	Shandaken	Upper Birch Creek Rd	2203-2239	42 09.608	074 27.592	2 story wood frame house & coop	c. 1870	not named on 1875 map
064	Ulster	Shandaken	Birch Creek Rd	280	42 08.953	074 28.530	2 story wood frame farmhouse & barn	c. 1860	R. Hammond on 1875 map
065	Ulster	Shandaken	Birch Creek Rd	266	42 08.941	074 28.542	2 story wood frame boarding house	c. 1880	
066	Ulster	Shandaken	Birch Creek Rd	207	42 08.766	074 28.775	2 story wood frame farmhouse & later camp buildings	c. 1860	J.J. Hasbrouck on 1875 map
067	Ulster	Shandaken	Chelsea Park Rd	58	42 08.222	074 29.052	2 story wood frame Shingle Style house & landscape	c. 1890	residential park at base of Belleayre Mountain
068	Ulster	Shandaken	Chelsea Park Rd	73	42 08.223	074 29.012	2 story wood frame house, outbuildings & landscape	c. 1890	residential park at base of Belleayre Mountain
069	Ulster	Shandaken	Chelsea Park Rd	63	42 08.258	074 29.051	2 story wood frame house	c. 1890	residential park at base of Belleayre Mountain
070	Ulster	Shandaken	Highlands Rd	11	42 08.678	074 29.426	Gateway Lodge, 2 story wood frame boarding house	c. 1900	
071	Ulster	Shandaken	Ulster & Delaware Tpk	92	42 08.446	074 29.304	2 story wood frame house	c. 1890	residential park at base of Belleayre Mountain

Table 4.12-2 Belleayre Mountain Ski Center Cultural Resources Within 5-Mile Viewshed

Id No.	County	Town	Street	St. No.	North Coord	West Coord	Name / Type	Date	Notes
072	Ulster	Shandaken	Ulster & Delaware Tpk	95	42 08.448	074 29.302	2 story wood frame house w/ barn, cottage & shed	c. 1890	residential park at base of Belleayre Mountain
073	Ulster	Shandaken	Ulster & Delaware Tpk	70	42 08.536	074 29.401	2 story wood frame house	c. 1890	residential park at base of Belleayre Mountain
074	Ulster	Shandaken	Ulster & Delaware Tpk	74	42 08.52 1	074 29.382	2 story wood frame house	c. 1890	residential park at base of Belleayre Mountain
075	Ulster	Shandaken	Ulster & Delaware Tpk	82	42 08.502	074 29.371	2 story wood frame house & barn	c. 1890	residential park at base of Belleayre Mountain
076	Ulster	Shandaken	Ulster & Delaware Tpk	209	42 08.614	074 29.557	2 story wood frame house, 2 cottages, shop	c. 1870	residential park at base of Belleayre Mountain
077	Ulster	Shandaken	Ulster Co Rt 49A	6-8	42 08.827	074 29.705	2 story wood frame hotel/motel & post office	c. 1870	H. Whispell on 1875 map neg. DOE 5/16/00, Proj. Ref No. 99 PR 4498; record no. 11116.000070
078	Delaware	Middletown	Gunnison/Kraft Rd		42 08.703	074 30.277	2 story wood frame house, stone gate, wood frame chapel, landscape	c. 1890	Country estate, DOE 5/16/00, Proj. Ref No. 99 PR 4498; record nos. 02514.000087 (gate) & 02514.000086 (chapel)
079	Ulster	Shandaken	Gunnison Rd	83	42 08.796	074 30.530	2 story wood frame hotel; Wildacres Hotel	c. 1900	DOE 5/16/00, Proj. Ref No. 99 PR 4498; record no. 11116.000072
080	Ulster	Shandaken	Ulster Co Rt 49A	132	42 08.613	074 30.323	2 story wood frame shingle style house (casino), tennis court w/ pavilion, remnants of other recreation features; new house & garage (128)	c. 1890	uninhabited
081	Ulster	Shandaken	Galli-Curci Rd (Ulster Co Rt 49A)	352	42 08.351	074 31 .042	Sutter Estate / 2 story stone Tudor Style house w/ outbuildings & landscape	c. 1920	DOE 5/16/00, Proj. Ref No. 99 PR 4498; record no. 02514.000088
082	Ulster	Shandaken	Galli-Curci Rd (Ulster Co Rt 49A)	374	42 08.720	074 31.846	Leach Farmstead ; 2 story wood frame farmhouse, barn, outbuildings & meadows	c. 1920	DOE 5/16/00, Proj. Ref No. 99 PR 4498; record no. 11116.000066
083	Ulster	Shandaken	Ulster Co Rt 49A	121	42 08.483	074 30.102	Belleayre Ski Center Lower (Discovery) Lodge	c.1960	
084	Ulster	Shandaken	NY Rt 28	9304	42 08.798	074 29.591	2 story wood frame house	c. 1880	
085	Delaware	Middletown	NY Rt 28 & Dry Brook Rd	---	42 08.688	074 37.225	2 story wood frame commercial building	c. 1880	Incorrectly classified as listed on NR; perhaps determined eligible; SHPO Inventory no. 02514.000067

Table 4.12-2 Belleayre Mountain Ski Center Cultural Resources Within 5-Mile Viewshed

Id No.	County	Town	Street	St. No.	North Coord	West Coord	Name / Type	Date	Notes
086	Delaware	Middletown	Main, Wagner & other streets	---			Fleischmanns Historic District	c. 1850 - 1958	Appears to be a historic district eligible for the National Register of approximately 250 contributing properties. Includes 2 properties already listed: Skeene memorial Library & Bnai Israel Synagogue.
087	Delaware & Ulster	Middletown & Shandaken	Ulster & Delaware RR ROW				Ulster & Delaware Railroad	1872 - 1954	Rail line intact or planned for reconstruction within survey area; scenic rides on a regular schedule; sections of route within view of
088	Delaware & Ulster	Middletown & Shandaken	Catskill Park				Catskill Park Trail System -- 6 trails in viewshed	1885 - present	A. Belleayre Mountain Trail B. Balsam Mountain Trail C. Haynes & Eagle Mountain Trail D. Big Indian Mountain Trail E. Balsam Lake Mountain Trail F. Dry Brook Ridge Trail

4.13 CATSKILL FOREST PRESERVE

The potential impacts of the proposed project as set forth in this UMP may be addressed, first, in relationship to the Belleayre Mountain Ski Center's Intensive Use Area, and secondly, to address the potential impacts from the proposed project to adjoining Forest Preserve lands.

As discussed in Section 1 of this UMP, the Belleayre Mountain Ski Center is located on New York State Forest Preserve lands which have been classified as an Intensive Use Area. The proposed projects set forth in this UMP are consistent with the uses allowed within an intensive use area and comply with the constitutional limitations.

The impact of the overall project, as described in this UMP, to the public use of the surrounding Forest Preserve lands is not expected to be significant. This is in large part due to the fact that the nature of the proposals in this revised plan is in support of recreational opportunities unique to the ski center property. None of the proposals are designed or intended to increase access to adjacent Forest Preserve lands. There is the potential for these projects to foster a greater interest in the surrounding area, or may result in the public seeking more remote locations, however, our analysis suggests that the likelihood of the expansion of the Ski Center, as set forth in the Full Build-Out alternative plan, causing either a significant increase or decrease in public use of the surrounding Forest Preserve lands is quite low. In making this determination we reviewed visitor use data from trail registers at trailheads throughout the Catskill Forest Preserve during periods of previous expansions at the Belleayre Ski Center. This review included registers for the adjacent Big Indian Wilderness Area and nearby Slide Mountain Wilderness Area for a five year period prior to and after the 1999 expansion at Belleayre. This 1999 expansion included new trails and lifts that resulted in a significant increase in skier attendance, while no significant change in use of surrounding Forest Preserve lands use was observed.

In conclusion, this mitigation analysis supports the conclusion that the impacts to the wild forest setting of adjacent Forest Preserve lands will be minimal and the management actions and goals set forth in this UMP will be in keeping with the wild forest setting of adjacent Forest Preserve lands and on a scale that is in harmony with the relatively wild and undeveloped character of Catskill Park.