APPENDIX 20

CONSTRUCTION AND OPERATIONS NOISE STUDY

February 24, 2012

Kevin Franke
Director Resort Development Client Services
The LA Group
40 Long Alley
Saratoga Springs, NY 12866

RE: SDEIS Noise Impact Assessment – Addendum 1
Revised Preferred Alternative Plan – Modified Belleayre Resort at Catskill Park Project

FILE: 13972/42106

Dear Mr. Franke:

This addendum to the Modified Belleayre Resort SDEIS Noise Assessment (March, 2011) addresses changes in noise impacts related to the recent revision to the project's preferred alternative plan known as the Modified Project Plan.

As compared to the AIP Plan Alternative examined in our March 2011 assessment, the Modified Project Plan eliminates the upper part of the Highmount development consisting of 1) elimination of the access road section from the Hotel and Lodge to the top of Highmount, 2) elimination of 5 single housing units from along the former access road and 19 single units located at the top of the old Highmount ski center, and 3) extension of the ski tow and addition of a warming hut into area at the top of the old Highmount ski center. The 24 Highmount units will be relocated to Wildacres, and added into already proposed buildings in the northeast corner of Wildacres (the Front-9 Village) and near the Wildacres Hotel (West Village) by adding a third floor to those units.

Our review of the potential noise impact implication of the Modified Project Plan as compared to the AIP Plan Alternative is as follows:

- Elimination of the access road to the top of Highmount and housing units along and at the top of that access road is estimated to reduce blasting and construction activities by at least 18 months; substantially reducing the overall noise impact for receptors W1 & W2.
- Elimination of the housing units from the access road and top of Highmount would result in no additional noise impact at Wildacres since no additional housing buildings or housing footprint is proposed.
- Extension of the ski tow and addition of a warming hut is not proposed to include any additional snowmaking operations, snowmaking units, or reduction in snowmaker proximity to receptors. Therefore, the ski tow extension and warming hut would not result in any increased noise impact.

Overall therefore, compared to the project as documented in our March 2011 assessment, the Modified Project Plan is estimated to result in no additional noise impacts and at Highmount significantly reduced noise.

If you have any questions or need additional information, please contact me at (315) 956-6410.

Very truly yours,
O'BRIEN & GERE ENGIENERS, INC.

Scott Manchester
Project Manager

REPORT

Noise Assessment
Modified Belleayre Resort at Catskill Park

Crossroads Ventures, LLC
Mount Temper, New York

March 2011

O'BRIEN & GERE

13972 | 42106

Modified Belleayre Resort at Catskill Park Noise Assessment

Crossroads Ventures, LLC
Mount Temper, New York

SCOTT C. MANCHESTER
Project Manager

MARK A. DISTLER
Vice President

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ENCLOSURES

EXECUTIVE SUMMARY

A noise assessment was performed on behalf of Crossroads Ventures by O'Brien & Gere Engineers, Inc. for the proposed Modified Belleayre Resort at Catskill Park project (Project) in the Towns of Shandaken and Middletown NY. The purpose of this study is to evaluate potential noise impacts of major Project noise sources from construction and operation, and determine mitigative controls. This report was prepared pursuant to requirements specified the Agreement in Principle (AIP) and in Part B of the Final Scoping Document (NYSDEC, 2008), and supplements the original Project noise assessment conducted for the Project DEIS (ENSR, 2002).

It is important to note that sound levels estimated in this assessment are conservatively based. Construction noise impacts were evaluated at the work areas nearest to the receptor, which represents a worst-case condition. Further, estimates used sound levels of typical equipment that maybe higher that sound from lower-noise equipment options ultimately selected for the Project. Since Project sound levels from actual Project construction and operation may be lower that estimated herein, reduced noise levels may be achieved through alternate mitigation methods such as selection of lower-noise equipment, and need for mitigative barriers may in some cases be reduced or eliminated.

The noise assessment consisted of: 1) an ambient sound survey, 2) estimation of predicted sound levels from Project construction and operation, and 3) evaluation of potential adverse noise impacts. Where adverse noise impacts were predicted, noise mitigation was proposed to address the impact.

The ambient sound survey was conducted in February 2001 for the original Project DEIS to determine existing ambient sound levels at the nearest residential receptors to the Project. A second sound survey was conducted in May 2007 to determine existing ambient sound levels at the nearest State Forest Preserve land. Average sound levels for each area were determined to be characteristic of a typical rural environment. Results were used with estimated Project sound levels from construction and operation to determine the predicted noise impact from the Project at each receptor based on the increase in ambient sound level.

Project construction sound levels were estimated and noise impacts were assessed for construction of the following: access roads, golf course, and buildings/facilities. Rock crushing to support construction was also assessed. Construction noise impact assessment results and proposed mitigation are summarized as follows:

- *Access Road* – Unmitigated sound for a limited time period would likely impact receptors W-1 and W-7, and W-8 under worst-case conditions when construction is within 500 feet of receptors only. Proposed mitigation consists of minimizing on-site equipment usage when within 500 feet of residences. Additional mitigation of access road construction, such as the construction of barriers, was not deemed practical due to the local topography and the additional construction sound that would result during barrier construction compared with the limited duration of the noise impacts.
- *Highmount Golf Club* – Unmitigated sound was, at times, expected to impact residences at receptors W-7, W-11, and to a lesser degree other nearby receptors with a line-of-sight view of construction. These impacts are only anticipated under the worst-case condition when golf course construction activities are near receptors, and not predicted under more typical construction distances. Mitigation of noise can be accomplished within 500 feet of receptors by minimizing equipment use and by placing temporary earthen berms when construction is anticipated for an extended period. Mitigation of noise when over 500 feet of receptors can be accomplished by maintaining vegetative buffers between the construction and the receptor, as feasible.
- *Building and Facility Construction and Renovation* – Unmitigated sound from construction of the Front-9 Village and Clubhouse, Golf Maintenance Facility, and the Highmount Hotel, Lodge and Detached Lodging Units may at times result in noise impact at receptors W-11, W-6 and W-1, respectively. Proposed mitigation consisted of minimizing on-site equipment during excavation and finishing aspects of construction. In addition, added control of sound during Front-9 Clubhouse and Highmount Lodge construction can be accomplished when needed by placing a temporary line-of-sight barrier between the construction equipment and receptors W-11 and W-1, respectively.

- *Rock Crushing at Highmount* – Unmitigated sound from rock crushing near the Highmount Hotel during construction Year 1 was predicted to result in potential noise impacts at receptor W-1. As a result, mitigation was proposed consisting of constructing a barrier between the rock crusher and W-1 which is predicted to control the temporary rock crushing noise at W-1 to below significance.

Project operation noise levels and impacts were assessed for both the daytime and nighttime considering all major Project noise sources, continuous and non-continuous. In addition, nighttime continuous sound levels were also assessed considering only continuous Project noise sources. Major continuous noise sources consist of heating, cooling and ventilation system (HVAC) for the hotels and major facility buildings, and hotel room heater/air conditioners. Major non-continuous (intermittent or time-varying) noise sources consisted of on-site traffic, golf course maintenance, and new ski slope snowmaking operations. Operation noise impact assessment results and proposed mitigations are summarized as follows:

- *Nighttime Sound Levels; Continuous Sources* – Without mitigation, Project operation of continuous sound sources are predicted to result in potential noise impacts at receptors W-1, W-3, W-4, W-5, and W-11 due to HVAC noise. Mitigative options to reduce HVAC sound include specifying lower-noise HVAC units, or placing sound shielding barriers around each HVAC units. A combination of lower-noise HVACs and shielding is also an option, since HVAC systems with lower noise specifications may reduce or eliminate need for sound shielding.
- *Nighttime Sound Levels; Continuous and Non-continuous Sources* – Without mitigation, Project nighttime operation of intermittent or time-varying sound sources (including continuous sound sources) is predicted to result in potential noise impacts at receptor W-1 due to snowmaking equipment operation. Mitigation of snowmaking equipment noise at night can be accomplished by curtailing nighttime operation (no operation between 10 PM and 7 AM) of the six north-most snowmakers on the west slope. Snowmaking equipment at these six locations would only be operated during the daytime (7 AM to 10 PM).
- *Daytime Sound Levels* – Project daytime operation, assuming mitigation of HVAC sound as proposed above, is predicted to increase ambient sound levels by 2 dBA or less at all receptors which indicates no adverse noise impact. As a result, no further mitigation to reduce daytime sound levels was proposed.

1. INTRODUCTION AND PROJECT REVIEW

This report presents the noise assessment for the Modified Belleayre Resort at Catskill Park (Project) in the Towns of Shandaken and Middletown NY. The purpose of this study is to evaluate potential noise impacts of major Project noise sources from construction and operation, and determine mitigative controls. This report is prepared pursuant to requirements specified the AIP and in Part B of the Final Scoping Document (NYSDEC, 2008), and supplements the original Project noise assessment conducted for the Project DEIS.

The Project consists of two development areas- the Wildacres Resort (Wildacres) and the Highmount Spa Resort (Highmount). Both Wildacres and Highmount are currently primarily wooded. Wildacres is located on approximately 254 acres on the eastern side of the Project site with access from County Route 49A south of the Alpine Osteria Bed and Breakfast, and near the upper driveway to Belleayre Mountain Ski Center and access from Gunnison/Kraft Road. The old Wildacres Motel and the former Marlowe Mansion are currently located on this part of the site. Development proposed for Wildacres Resort includes the following:

- a 250 unit hotel building with dining, spa and limited hotel-related commercial space,
- 139 detached lodging units operated by the hotel
- an 18-hole golf club, and
- the Wilderness Activity Center using existing buildings at the base of the former Highmount Ski Area

Highmount is located on approximately 237 acres with development proposed to the south and west of the former Highmount Ski Area with access proposed off Route 49A. Highmount includes the upper portion of the old Ski Area and lands to the west including the old Leach farm. Development proposed for the Highmount includes the following:

- a 120 unit hotel with spa facilities,
- 53 semi-detached lodging units located in the hotel,
- a multi-level lodge building containing 27 detached lodging units,
- 40 additional detached lodging units in 32 buildings, and
- a public ski lift and two trails to be operated by Belleayre Mountain Ski Center (BMSC).

Construction of Wildacres and Highmount is anticipated to be conducted in three phases over an 8-year period. During construction, sound will be generated from the following:

- off-site construction traffic,
- access road construction and improvement,
- golf course construction, and
- construction and renovation of buildings.

As construction phases are completed and operation begins, project operation may generate sound from the following:

1. On-site traffic at the Wildacres and Highmount resorts and facilities consisting of the following sources:
   - traffic along on-site access roads
   - parking area traffic
2. Stationary sources consisting of the following major sources:
   - heating, ventilation and cooling (HVAC) systems and room heater/air conditioners at the Wildacres and Highmount hotel and resort facilities
   - snowmaking equipment for two new ski slopes along the Highmount access road

3. Quasi-stationary golf course maintenance sources consisting of equipment for the Highmount Golf Club

The following assessment first discusses the nearest potential area that may be impacted by noise from Project construction and operations, then evaluates potential noise impacts, and finally proposes noise mitigation where appropriate to control potential adverse impacts.

2. NOISE RECEPTORS AND EXISTING SOUND LEVELS

Receptors are areas that may be sensitive to unwanted sound (noise), and typically include residences, schools, houses of' worship, and hospitals. Recreational areas such as certain types of State Forest Preserve are also considered noise-sensitive receptors. Commercial and industrial properties are not considered noise-sensitive receptors.

Residences lie within a half-mile of Project boundaries to the northwest, northeast and southeast. The nearest recreational area is a State Forest Preserve located over a half-mile south of Highmount. These residences and recreational use areas may be affected by noise from the Project construction and/or operation, and are classified as potential noise-sensitive receptors. The nearest individual residences and Forest Preserve location were selected as the specific receptors at which Project sound levels were predicted and potential impacts were assessed. Receptors for the Project are identified in Figure 1. Residential receptors are discussed in further detail in the Project DEIS Noise Assessment (ENSR, 2002).

The measurement locations pertinent to this Project site are summarized below and depicted in Figure 1.

Site ID	Location and Description
ML-1	County Road 49A (CR 49A) approximately 1 mile northeast of Hanley Corner. Characterizes residences on CR 49A in the Highmount Resort area (receptors W-1, W-2, W-3, W-4 and W-5).
ML-2	Gunnison Road approximately 1500 yards west of the intersection of Gunnison Road and CR 49A. Characterizes the residences along Gunnison Road north and northeast of the Wildacres Resort area (receptors W-6, W-7, W-8, W-9, W-11, and W-12)
ML-4	At east end of Lake Street. Characterizes residences on Van Loan Road near Route 28 (receptor W-10).
ML-W1	New York State Forest Preserve; 0.9 miles south of the former Highmount Ski Area. Characterizes recreational land use/Forest Preserve.

Sound measurement surveys were conducted to characterize the acoustical environment of the nearby receptors and determine existing (ambient) sound levels. The sound survey of residential receptors is presented in the Project DEIS Noise Assessment (DEIS Appendix 22).

The sound survey at the State Forest Preserve was conducted on May 9 to 10, 2007 at one location in the State Forest Preserve, 0.9 miles south of the former Highmount Ski Area. This location is the very northwest corner of the Big Indian Wilderness Area, and the closest location of Forest Preserve classified as Wilderness. Sound levels were measured for a 24-hour period using an ANSI S1.4 Type 1 portable real-time sound level meter. To minimize extraneous weather-related noise, the sound level meter microphone was equipped with a windscreen. Field calibration checks of the sound level meter were conducted before and after the measurements using a sound level calibrator, and the sound level meter was factory-calibrated within 12 months of the measurements. Calibration certificates, field forms and data summary printouts are presented in Enclosure 1. Weather conditions were recorded at the start and end of the measurement period. During the measurement period, winds were calm to 3 miles per hour from the south, air temperature was 69 to 74 degrees Fahrenheit, humidity was 41 to 71 percent, and there was no precipitation. Major sources of ambient noise were from birds, distant aircraft, and wind in the trees.

Results of the sound level survey including applicable results from the original DEIS noise assessment are presented in Table 2-1. Results as presented in terms of the daytime and nighttime residual sound level (L_{90}), energy-average sound level (L_d and L_n) and the day-night sound level (L_{dn}). The L_{90} is used for evaluating continuous steady-state noise, while the L_d and L_n are used for evaluating non-continuous and/or time-varying noise. The L_{dn} is used to compare each location's acoustical environment with typical settings. The L_{dn} at each receptor was between 46 and 52 dBA, which is typical of a "rural" type environment (USEPA, 1974).

3. NOISE ASSESSMENT GUIDELINES

3.1 PROJECT CONSTRUCTION

There are no Federal, or state regulations that apply to this Project's construction noise. In addition, there are no local ordinances that limit construction noise for this Project. However, the NYSDEC has guidelines that require estimation and evaluation of construction noise impacts as part of their review and approval. The NYSDEC provides guidance on evaluating the impact from project noise in the program policy document "Assessing and Mitigating Noise Impacts" (NYSDEC Program Policy) (NYSDEC, 2001). These guidelines were used in this project to assist in assessing construction noise impacts.

The NYSDEC Program Policy recommends that project noise impacts be assessed based on the increase that the project noise causes to the existing ambient sound level. Generally, noise from continuous steady-state sound sources is added to the ambient residual (L_{90}) sound level. However, since construction sound has significant temporal variations, construction sound levels for the Project were added to the ambient average energy-equivalent sound level (L_{eq}).

To determine noise impacts, the total sound level resulting from the decibel sum of the Project construction L_{eq} sound level and the ambient L_{eq} sound level was compared to the ambient L_{eq} sound level. Human responses to increases in the ambient sound level as suggested in the NYSDEC Program Policy are presented below:

Increase in Sound Pressure Level	Expected Human Reaction
Under 5	Unnoticeable to tolerable
5 to 10	Intrusive
10 to 15	Very noticeable
15 to 20	Objectionable
Over 20	Very objectionable to intolerable

A limit for noise impacts is not specifically defined in the NYSDEC Program Policy. However, according to the NYDEC Program Policy, sound sources increasing the ambient sound level by 6 dBA may cause complaints, but that in some instances increases of greater than 6 dBA may be acceptable. The NYSDEC Program Policy specifies that "an increase in 10 dBA deserves consideration of avoidance and mitigation" (NYSDEC, 2001). Therefore, the Project construction noise assessment assumes that increases in ambient sound level due to the Project construction of 10 dBA or more (very noticeable) indicate a potentially significant temporary noise impact that requires further consideration and possible mitigation.

Therefore, temporary Project construction sound was evaluated for noise impact significance and need for mitigation as follows:

- Estimated Project construction sound levels at the nearest residential receptors was compared to the existing daytime energy-equivalent A-weighted sound levels (L_d);
- Increases in existing L_d at the nearest residential receptor due to construction of 9 dBA or less indicated an insignificant temporary construction noise impact and will not require mitigation;
- Increases in existing L_d at the nearest residential receptor due to construction of 10 dBA or greater indicated a potential significant construction noise impact requiring further discussion and/or possible mitigative steps to reduce or eliminate the impact.

Project construction tonal sound levels (prominent discrete tones) will also be identified and discussed.

3.2 PROJECT OPERATION

Local regulations that apply to the Project's operational noise are contained in the town codes for the towns of Middleton and Shandaken. The Town of Middletown Code specifies that 70 dBA must not be exceeded at the property line. However, the Town of Shandaken has more restrictive limits that apply to Project operation as follows:

Receiving Property	Time Period	Sound Level Limit (dBA)[a]
Residential Zones (R5, R3, R1.5, HR)	7 AM to 7 PM	57
	7 PM to 7 AM	53
Commercial Zones (HC, HB, and CLI)	7 AM to 9 PM	64
	9 PM to 7 AM	60

[a] Sound level limits are reduced by 5 dBA if the noise is a pure tone.
Source: Town of Shandaken, 1992

The Shandaken code, however, does not address potential noise impacts due to increases in ambient noise as suggested by NYSDEC. In its noise Program Policy document, NYSDEC suggests that an incremental increase of over 6 dBA at the receptor may result in complaints. For operation noise, which unlike noise from temporary construction has potential for long term noise impact, it is appropriate to use this NYSDEC 6 dBA incremental increase guideline as a noise impact criterion. Steady-state noise sources that operate continuously every day such as hotel building HVAC systems will be evaluated based in comparison with the ambient L_{90} sound level. Non-continuous, time-varying Project operation sources such as snowmakers, golf course mowers, and traffic will be evaluated in comparison with the ambient L_{eq} sound level.

Review of existing ambient sound levels indicated that the NYSDEC 6 dBA criterion would be lower and thus more restrictive than the Town of Shandaken noise limits with the exception of in the evening when the Town's evening/nighttime limit of 53 dBA would be most restrictive. Therefore, the Project operation noise impact significance criterion was evaluated for noise impact significance and need for mitigation as follows:

- Estimated Project operation sound levels from continuous steady-state noise sources will be compared to the existing nighttime A-weighted L_{90} sound levels and evening 53 dBA limit;
- Estimated Project operation sound levels from non-continuous, time-varying sources from continuous steady-state noise sources will be compared to the existing daytime and nighttime A-weighted L_{eq} sound levels (L_d and L_n);
- Increases in existing L_{90}, L_d, or L_n due to Project operation of 6 dBA or less indicated an insignificant operational noise impact and will not require mitigation;
- Increases in existing L_d L_{90}, L_d, or L_n due to Project operation greater than 6 dBA indicated a potential significant noise impact from Project operation requiring further mitigative steps to reduce or eliminate the impact.

4. CONSTRUCTION NOISE

4.1 NOISE PREDICTION METHODOLOGY AND ASSUMPTIONS

Construction noise generated by the proposed Project's construction equipment (noise sources) was estimated and extrapolated to the nearest potential noise-sensitive receptor locations using the same methods used in the original DEIS noise assessment. The resultant sound levels at the receptors were used to predict Project construction sound levels and potential noise impacts at each location.

Construction activities that may generate noise emissions at Highmount and Wildacres Resorts will be the same as in the original DEIS and consist of the following:

- Off-site Construction Traffic
- Access Road Construction and Improvement
- Golf Course Construction
- Buildings Construction and Renovation (hotels, detached lodging units, and activity buildings)

Most Project construction activities except for the detached lodging units will be conducted in the first three years. Construction of detached lodging units and some limited construction of other facilities will be conducted during construction Years 4 through 8, or at a later date, according to demand. Construction will be conducted in three phases as follows:

Phase 1 (Years 1 and 2)

- Wildacres hotel, 10 holes of the Highmount Golf Club, and Wilderness Activities Center at old Highmount Ski Center buildings
- Highmount Spa Hotel, the access road to the top of Highmount and the conference/clubhouse facilities at the old Leach Farm

Phase 2 (Years 3 through 5)

- Remaining 8 holes at the Highmount Golf Club
- The Highmount Lodge and the lower elevation detached units

Phase 3 (Years 4 through 8)

- Wildacres Front-9 Village and other detached lodging units
- Highmount higher elevation detached units

Project construction noise will consist of on-site activities as well as off-site noise created by the transportation of construction materials. Each activity will consist of one or more aspects, which were assessed separately or together depending upon whether the aspects will coincide.

4.2 NOISE SOURCES AND SOUND LEVELS

4.2.1 Off-site Construction Traffic

Construction of the Project will result in some temporary increase in construction vehicle traffic along NY 28, CR 49A, and the access roads to the Wildacres and Highmount parcels. Commuter automobile traffic to the construction sites is assumed to be minor in comparison, and an insignificant source of construction traffic noise. All construction traffic is expected to arrive via NY 28 to CR 49A to the Wildacres Resort access roads or the Highmount access road.

Maximum noise impacts due to construction traffic are expected to occur along CR 49A and the site access roads, due to the proximity of residences and relatively low volumes of existing traffic. Construction vehicles are expected during daytime periods only for a nine-month season each year. Most construction traffic will occur during the first two years of construction to complete the following activities:

- Fill for Highmount access road sub-base
- Golf course topsoil and material
- Topsoil for Highmount and Wildacres resort buildings
- Trucking in construction equipment and miscellaneous deliveries

For the first two years, there is expected to be an average of 53 truck roundtrips per 10-hour day. In comparison with the first two years, construction traffic for construction Years 3 and after will be significantly less at only 7 to 10 trucks per day, and resulting noise levels will be significantly lower.

Sound levels due to construction traffic were calculated using the same procedure used in the DEIS noise assessment, and were based on the expected number of vehicle pass-bys per hour using the following equation (adapted from ESEERCO, 1977):

Equation 1. *Sound Level from Construction Traffic*

Sound Level at Receptor (L_{eq} in dBA) = SPL_a - A - B - 15Log[D] - C - E

where: $SPL_a = L_{so}$ sound level (50 feet) for given vehicle trips/hr at 30 mph

A = L_{so} to L_{10} sound level correction
B = L_{10} to L_{eq} sound level correction
SPLa – A –B = Average construction traffic sound level (L_{eq}) at 50 feet
D = distance between traffic and receptor, in feet
C = 3 dB/100 foot correction for insertion loss of woods (NYSDEC, 2000)
E = -6 dBA reduction for terrain barrier to line-of sight (Hoover and Keith, 1981)

Equation 1 estimates sound levels at receptors assuming a reduction of 4.5 dBA per doubling of the source reference distance that occurs between the source and the receptor. When woods were located between the construction source and the receptor, estimated sound levels also include a conservative insertion loss of 3 dBA per 100 feet of woods up to a maximum insertion loss of 25 dBA. According to the NYSDEC Program Policy document, the actual insertion loss by vegetated areas may be up to 7 dBA per 100 feet depending on vegetation type and density. Reductions due to barriers caused by topography between the construction source and the receptor were also conservatively assumed to reduce sound levels by 6 dBA. Actual reductions due to topography barriers can range from 6 to over 20 dBA (Hoover & Keith, 1981).

Predicted sound levels at nearest receptors for off-site construction traffic are presented in Table 4-1. Estimates are based on the average number of vehicle pass-bys per hour, assuming two vehicle pass-bys per trip, trips are made over a 10-hour day, and half of the vehicle trips would continue on past Wildacres to Highmount.

4.2.2 Access Road Construction

Access road construction for the Project will be conducted and substantively completed during the first three years of Project construction. An estimate of the aspects of construction was estimated by the applicant's engineer for the original Project DEIS. The aspects for this current Project are anticipated to be the same, and consist of the following aspects:

- Clearing
- Earth Excavation
- Rock Excavation
- Drainage Pipework (Highmount only)
- Subgrade Subbase
- Trim/Clean-up/Topsoil/Grade
- Asphalt Pavement
- Rock Crushing

Rock crushing will be the only aspect of the access road construction that is not conducted by moving along the length of the roadway. Rock crushing will be conducted at two fixed locations – one just north of the Wildacres Resort, and one next to the Highmount access road just south of the Highmount Hotel. The construction equipment types, size, quantities, and methodology used to estimate access road construction noise was the same as used in the noise assessment for original Project DEIS. Aspects were assumed to be performed sequentially along the roadway. Sound levels estimates for the Project access road construction were calculated for each construction aspect at the nearest sensitive receptor to the roadway. Estimates reflect the worst-case scenario in that they are calculated based on the closest point of roadway construction to the receptor.

Access road construction sound levels were calculate using the same procedure used in the DEIS noise assessment. The maximum instantaneous construction sound pressure level (SPL) of each piece of equipment at its rated peak output was converted to its L_{eq} sound levels based on the following equation (adapted from ESEERCO, 1974):

Equation 2. *Equipment Reference Sound Level*

Equipment Reference L_{eq} (dBA) = SPL_a - A - B

where: SPL_a = Equipment maximum sound level (50 feet) at peak load
A = Usage Factor; correction for percent time of actual use (BBN, 1971)
B = Acoustical Max Factor; correction for operation at less than peak load.

The reference L_{eq}'s for each piece of equipment at 50 feet were then summed using decibel addition to yield the total construction reference L_{eq} for each aspect using the following equation for summating sound levels from multiple sources:

Equation 3. *Decibel Addition*

Total Sound Level (dBA) = $10\ Log\{(10^{L1/10} + 10^{L2/10} + ... + 10^{Ln/10}\}$

where: L_n = nth sound level (piece of equipment)

Total construction reference L_{eq} for each construction aspect was then used to estimate the construction sound level at the nearest receptor based on the following equation (adapted from NYSDEC, 2001):

Equation 4. *Total Construction L_{eq} at Receptor*

Total Construction L_{eq} at Receptor (dBA) for each aspect = $SPL_a - 20Log[D_{rec}/D_{ref}]$ - A - B

where: SPL_a = Total Construction Reference L_{eq} for each aspect
$20Log[D_{rec}/D_{ref}]$ = attenuation of sound due to distance (6 dBA per doubling)
D_{rec} = distance to nearest receptor in feet
D_{ref} = construction reference L_{eq} distance = 50 feet
A = 3 dBA per 100 feet insertion loss for woods between source and receptor
B = -6 dBA reduction for terrain barrier to line-of sight

As indicated in Equation 4, estimated construction sound levels at receptors were calculated assuming a reduction of 6 dBA per doubling of the 50-foot reference distance between the source and receptor. When woods were located between the construction source and the receptor, estimated sound levels also include a conservative insertion loss of 3 dBA per 100 feet of woods up to a maximum insertion loss of 25 dBA. Distances from the nearest receptor were conservatively determined by choosing the closest point in the road construction to the receptor. Estimated sound levels from access road construction are presented in Table 4-2.

4.2.3 Golf Course Construction

Noise from the Project golf course construction is expected to occur over the first two years of construction. During the first year of construction, 10 of the holes will be completed, with the remaining 8 the following year. An estimate of the construction to be completed each year was provided by the applicant's engineer and the applicant for the Project DEIS, and consists of clearing, grubbing, pond excavation, limited blasting, and golf course construction. These aspects of construction within each year are expected to overlap each year (some aspects will take place concurrent with others). Therefore, sound levels were calculated by conservatively assuming that all construction aspects during the given year occur at the same time (worst-case scenario).

The types and quantities of noise-generating equipment used in the golf course construction are the same as in the noise assessment for original Project DEIS. The sound level from each individual piece of equipment was determined from literature based on the equipment type, size and/or horsepower expected to be used. Sound level estimates for the golf course construction were calculated based on the expected construction sound level (L_{eq}) for each construction aspect at the nearest sensitive receptor to the course. Estimates present the worst-case scenario in that they are calculated for the golf course hole closest to the receptor, and at the nearest tee-box, fairway section or green.

Estimated sound levels from golf course construction are presented in Table 4-3. Methodologies and equations for estimating the golf course construction levels at each receptor are the same as used for estimating the access road construction sound level. Sound levels were estimated for each year of construction, assuming aspects of construction would overlap within each year.

4.2.4 Buildings Construction and Renovation

Project building construction and renovation will include hotels, support facilities, and detached lodging units. Specific equipment details for the construction and renovations are not available at this design stage of the Project. However, it is anticipated noise will be emitted from a variety of construction equipment that generally includes the following:

- Earth moving equipment (compactors, loaders, backhoes, graders, pavers, and trucks)
- Material handling equipment (cranes, concrete mixers and concrete pumps)
- Stationary diesel equipment (pumps, compressors and generators)
- Impact equipment (jack hammers, pneumatic tools, and pile drivers)
- Other equipment such as welders, vibrators and saws

Such equipment will be operated simultaneously, individually or in various combinations. Since details on types, quantities and sizes of the major construction noise sources are not available, single descriptors of overall sound levels at typical building construction sites were used to estimate Project building construction. Table 4-4 presents the typical energy-average (L_{eq} at 50 feet) construction noise estimates that are provided in literature for five types of construction including large and small buildings and differing equipment quantities (BBN, 1971). As indicated in Table 4-4, the highest typical construction sound levels generally occur during the excavation and finishing, where energy-average sound levels (L_{eq}) are 88 dBA for residences and smaller building construction and 89 dBA at 50 feet for hotels, and large buildings.

Most building construction except for the Highmount Lodge building and detached lodging is planned for the first three years of Project construction (Phases 1 and 2). The Highmount Lodge building is scheduled to be constructed in Years 4 and 5 (Phase 3). Though a few lodging units are planned for the first three construction years, most will be constructed as needed over construction Years 4 through 8.

Estimated sound levels for building construction are presented in Table 4-5. Methodologies and equations for estimating the reduction in construction level to each receptor were the same as used for estimating sound reductions for the access road and golf course constructions. Receptor distances were assumed to be from building site to the receptor, or in the cases of multiple buildings, from worst-case scenario of the nearest

building site to the receptor. Estimates were also conservatively estimated based on the worst-case scenario of the loudest construction type, and, except where noted, assumed that all pertinent equipment would be present at the site rather than minimum required equipment. Due to the relatively large size of the overall Project construction area compared with the distances to receptors, construction sound levels for each building were estimated separately, and assume that sound from construction of one building will not increase sound levels in the construction of other buildings.

4.3 CONSTRUCTION NOISE IMPACT ASSESSMENT AND MITIGATION

Noise impact assessment for each construction activity is summarized in Table 4-6 and discussed below. In general, temporary noise impacts were predicted where Project construction was estimated to increase the ambient sound levels by 10 dBA or more. Increases in sound level at receptors of 9 dBA or less were assessed an insignificant temporary noise impact, assuming the character of the sound was not dominated by tonal noise (prominent discrete tones). In addition, potential impacts from tonal noise and blasting are also discussed.

Table 4-6 indicates temporary construction noise impacts before mitigation are predicted to potentially occur during portions of the following construction activities:

- Access Roads
- Highmount Golf Club
- Front-9 Village and Front-9 Village Clubhouse
- Golf Maintenance Facility
- Highmount Hotel and Highmount Lodge
- Rock Crushing at Highmount
- Highmount Detached Lodging Units

Each of these construction activities are discussed below along with proposed mitigation, if applicable.

4.3.1 Access Roads

Noise from the Wildacres and Highmount access road construction will occur during construction Year 1 and is, for a very limited period of time, expected to impact receptors W-1 and W-7, and to a lesser degree may impact receptor W-8 which is within 500 feet of a small portion of the access road. Noise impacts are expected to be transient and limited to portions of the access road within 500 feet of receptors. Access road construction conducted more than 500 feet from receptors is not expected to result in significant noise impacts (9 dBA increase or less). Since only approximately 15 percent of any access roadways are within 500 feet of a receptor, access road construction impacts are expected to be short term, and noise impacts on any specific receptor are expected to be limited to approximately a month and a half in duration. Mitigation of the Wildacres access roads would be accomplished by minimizing on-site equipment usage when within 500 feet of residences. A reduction of approximately 3 dBA can be expected by reducing on-site equipment usage by 50%. Additional mitigation of access road construction, such as the construction of barriers, is not deemed practical due to the local topography and the additional construction sound that would result during barrier construction compared with the limited duration of the noise impacts.

4.3.2 Highmount Golf Club

Noise from the golf course construction of the Highmount Golf Club will occur during construction Years 1 and 2, and is, at times, expected to impact residences at receptors W-7, W-11, and to a lesser degree other nearby receptors with a line-of-sight view of construction. As a result, mitigation is recommended in order to reduce the noise impacts.

Mitigation of the Highmount Golf Club construction noise impacts is recommended in two steps. Mitigation of noise at distances of greater than 500 feet from the line-of-sight to a receptor may be accomplished by maintaining a 500-foot vegetative barrier between the construction and the receptor. This would mean that the

clearing, grading and preparation of holes within 500 feet of receptors should be conducted later in the construction schedule. Please note that where line-of-sight from the construction area to the receptor is blocked by a natural or man-made barrier, then the vegetative-buffer distance may be reduced to 300 feet. Sound level reductions due to distance attenuation and vegetative insertion loss over the 500 feet are expected to be -23 dBA and sufficient to decrease noise impacts at all receptors to below significance.

For distances within 500 feet of a residence, a mitigative barrier and reduced equipment usage is recommended when construction is anticipated for an extended period. To provide satisfactory sound reduction, the barrier should be located within 150 feet of either the receptor or the construction area, and it should extend at least 10 feet above the line-of-sight between the construction noise sources and the receptor (see Enclosure 2). In addition to the barrier, further sound reduction can be achieved by using the minimal required construction equipment. In addition, construction equipment not in active use at the site should be shut off. Additional sound attenuation due to the barrier (approximately -20 dBA) and reduced equipment usage of 50% (approximately -3 dBA) are estimated to decrease noise impacts of the golf course construction at all receptors below significance. Please note that the barrier is expected to consist of an earthen berm, which will require approximately two weeks to construct and one week to remove. During this time period, construction noise at the receptor may temporarily exceed significance criteria. Further, when golf course construction time (and potential noise impacts) within 500 feet of the receptor is anticipated to be short with respect to the barrier construction time, then berms will not be constructed.

4.3.3 Front-9 Village and Front-9 Village Clubhouse

Sound during portions of construction of the Front-9 Village Clubhouse during construction Year 1, and the nearest Front-9 Village lodging units during the eight-year construction period is estimated to impact receptor W-11. As a result, mitigation is recommended to reduce the noise impacts.

During Clubhouse construction, mitigation resulting in 11 dBA lower construction sound levels can be accomplished by minimizing on-site equipment, and placing a temporary barrier when needed between the construction equipment and receptor W-11. The barrier should be tall enough to prevent line-of-sight from the construction equipment noise sources to receptor W-11, and may be constructed of any material (including earth or stone berms, or a fence with hanging flexible curtain barrier walls) having a sound transmission loss of 16 dBA or more. The actual height of the barrier above grade will depend upon siting and local topography.

During the construction of the Front-9 Village, mitigation resulting in 5 dBA lower construction sound levels can be accomplished by minimizing on-site equipment. This is predicted to reduce typical construction levels to below significance. Noise during construction of the nearest units, especially those closest to receptor W-11 may result in brief noise impacts typical of residential construction. During such construction at the nearest set of housing units, therefore, temporary barriers or shielding will be used as-needed to further control noise.

4.3.4 Golf Maintenance Facility

Noise from construction of Golf Maintenance Facility will occur during construction Years 1 and 2, and are, at times, estimated to impact receptor W-6. As a result, mitigation is recommended to reduce the noise impacts to below significance. Mitigation resulting in 5 to 15 dBA lower sound levels can be accomplished by minimizing on-site equipment during excavation and finishing aspects of construction.

4.3.5 Highmount Hotel and Highmount Lodge

Sound from construction of the Highmount Hotel (Years 1 and 2) and Highmount Lodge (Years 1 through 5) is predicted to result in noise impacts at receptor W-1 during portions of their construction. As a result, mitigation is recommended to reduce the noise impacts to below significance. Mitigation resulting in 5 dBA lower sound levels can be accomplished by minimizing on-site equipment during excavation and finishing aspects of construction. In addition, a barrier between the construction equipment and receptor W-1 should be constructed. The barrier should be tall enough to prevent line-of-sight from the construction equipment noise sources to receptor W-1, and may be constructed of any material (including earth or stone berms, or a fence with hanging flexible curtain barrier walls) having a sound transmission loss of 16 dBA or more. The actual height of the barrier above grade will depend upon siting and local topography.

4.3.6 Rock Crushing at Highmount.

Sound from rock crushing near the Highmount Hotel during construction Year 1 is predicted to result in potential noise impacts at receptor W-1. As a result, mitigation by is recommended to reduce the noise impacts.

Mitigation of noise impacts from the rock crusher the can be accomplished by constructing a barrier between the rock crusher and W-1. A reduction of approximately -16 dBA can be expected from the barrier. The barrier should be located in the direction of W-1, placed within 30 feet of the crusher, and extend straight 30 feet past each end of the crusher. The barrier should be built to a height at least 10 feet above the line-of-sight between the top of the rock crusher noise source and the receptor (see Enclosure 2). The barrier may be constructed of any material (including earthen or stone berms, or berms with a barrier on top) having a sound transmission loss of 27 dBA or more[1].

4.3.7 Highmount Detached Lodging Units.

Sound from construction of the Highmount detached lodging units located along the Highmount access road will occur likely after the eight-year construction period. Sound from construction of the four units nearest receptor W-1 during clearing foundations and finishing is predicted to result in noise impacts. Such temporary construction sound levels would be brief and typical of normal residential construction. However, mitigation resulting in 5 dBA lower sound levels can be accomplished at the four units nearest W-1 by minimizing on-site equipment, which would reduce noise impacts to below significance.

4.4 IMPACT AND TONAL NOISE

Project construction will consist primarily of diesel engine noise that is broadband in nature without predominant tonal noise, and not characterized as impact noise. Though some tonal noise may be emitted by some individual pieces of equipment, these tones would be masked by sound from other sources, and are anticipated to result in no audible prominent discrete tones at any receptor. The only major tonal noise expected from Project construction will be due to back-up beepers, which are a law-required safety feature that cannot practically be avoided on temporary construction sites. However, since most construction will be conducted at considerable distance from receptors, and through large distances of wooded areas, impacts from back-up beeper tonal noise on any specific receptor are expected to be minimal and short term.

4.5 BLASTING NOISE

Excavation for Wildacres and Highmount buildings, roadways and golf course will include some explosive blasting of bedrock. The size of the explosive charges to be used is not yet determined. However, instantaneous sound levels from typical construction blasting has been documented as approximately 93 to 94 dBA at a distance of 50 feet (Hoover and Keith, 1981), which is only a few decibels higher than the expected reference sound level from several of the Project construction activities. In comparison with other construction sound, the sound from blasting will be brief and relatively infrequent. Though some limited and minor blasting may be conducted at locations proximal to residential properties, most blasting will be conducted at locations several hundred feet from receptors, and will often be shielded by woods and terrain. The SDEIS contain numerous mitigation measures relating to blasting, including providing pre-blast notification to people with ¼ mile who wish to be notified in the hour before blasts will be made.

[1] Sound transmission loss is the dBA reduction of sound that passes directly through the barrier material. Sound transmission loss of shields and barriers should be at least 10 dBA above its insertion loss so the barrier's effectiveness is not compromised by sound going through the barrier.

5. OPERATIONS NOISE

5.1 NOISE PREDICTION METHODOLOGY AND ASSUMPTIONS

Project operation sound levels were estimated at the nearest receptors using CadnaA noise prediction software. CadnaA predicts sound propagation from each noise source taking into account sound attenuation due the following:

- normal hemispheric sound propagation over distance (standard conditions of 10°F/90% humidity),
- reductions to sound due to ground attenuation over absorptive surfaces,
- additions to sound due to reflection, and
- reductions in sound due to shielding from intervening topography, barriers and wooded areas.

Other conditions and bases for the noise evaluation include the following:

- octave band reference sound level data were used for HVAC, snowmaking equipment, and on-site traffic,
- overall A-weighted reference sound levels were used for golf course mowers and hotel PTACs, and
- receptor heights were assumed to be 4 meters above ground surface.

As indicated Section 3, Project noise was assessed by comparing the predicted total sound level at each receptor due to the Project with the 6 dBA incremental increase limit. Existing ambient sound levels were assumed to be the energy-average sound level (L_d or L_n) for non-continuous/time-varying sound sources, and the L_{90} for continuous sound sources. Project noise impacts were deemed significant and in need of mitigation if predicted Project sound levels exceeded the 6 dBA limit.

5.2 NOISE SOURCES AND SOUND LEVELS

5.2.1 On-site Traffic Sources

On-site Project traffic sound will result from: 1) entering or exiting traffic travelling on access roads within the Project site, and 2) vehicles entering or exiting site parking areas.

On-site access road traffic can be evaluated separately from the stationary noise sources by assessing off-site Project traffic. Potential noise impacts from Project traffic was assessed as part of the Project off-site traffic study of traffic entering and exiting the Project sites (Creighton Manning, 2011). Results indicated receptor sound levels would increase by 3 dBA or less during peak Project traffic. Compared with the off-site traffic entering and exiting the Project site, on-site traffic along site access roads will have lower speeds and will be farther from receptors. Therefore, sound levels due to on-site access road traffic are predicted to be less than the 3 dBA, and would add at most 1 dBA to the average sound level (L_{eq}) at any receptor.

On-site traffic entering, exiting and moving within parking areas will generate sound similar to other stationary sound sources from Project operations. The largest parking areas at the site were assumed to be the major noise sources of parking area sound at any given time. The Project's major parking areas are located at the following four areas:

- Wildacres Hotel - 458 parking spaces
- Golf Clubhouse and Front-9 Village -117 parking spaces
- Highmount Hotel - 310 parking spaces
- Highmount Lodge – 31 parking spaces

Traffic in these parking areas will constantly vary. However, to quantify normal traffic sound levels, sound level estimates assumed that 10 percent of the parking capacity may be operating at any given time during the day (7 AM to 10 PM) and 2 percent of the parking capacity may be operating at any given time during the night (10 PM to 7 AM). Parking area traffic sound levels were determined assuming traffic would be predominantly comprised

of passenger vehicles traveling at 10 mph and located at the parking entrance. Reference sound levels for the Project's four major parking areas are presented in Table 5-1.

5.2.2 Stationary Sources

Major Project stationary noise sources will consist of the following:

- Air handling systems (HVAC) for common space at Wildacres Hotel, Highmount Hotel, Highmount Lodge, and the four other major building facilities (Clubhouse at Old Leach Farm, Wilderness Activities Center, Marlowe Mansion, and the Front-9 Village Clubhouse),
- Hotel room heater/air conditioners (PTACs) at Wildacres Hotel and Highmount Hotel, and
- Snowmaking equipment along the two new ski trails adjacent to the Highmount access road.

Sound levels for each major stationary noise source are presented in Table 5-1. Other lesser noise sources such small outdoor pumps and motors associated with ski lift operations and heating/cooling of detached housing units are assumed to be minor and insignificant in comparison with higher sound levels of the HVAC, PTAC and snowmaking major noise sources.

HVAC system design details including location and specification are not currently determined. Therefore, sound levels of open common space at hotels and major facilities were evaluated based on typical HVAC engineering requirements specifying approximately 1-ton of capacity per 400 square feet[2]. Reference sound levels for the HVAC were based on published empirical octave band sound level data versus tonnage for package chillers using reciprocating compressors (below 200 tons) or centrifugal compressors (above 200 tons). HVACs will operate as-needed based on heating and cooling needs. However, estimated sound levels conservatively assume worst-case conditions that HVACs operate continuously and at all seven major buildings.

In addition to the HVAC system servicing hotel common area, each hotel room at Wildacres Hotel and Highmount Hotel will have an individual package terminal air conditioner (PTAC). PTACs will operate as-needed based on heating cooling needs and occupancy, However, estimated sound level conservatively assume the worst-case conditions of all PTACs in simultaneous operation.

Snowmaking equipment will consist of Standard Polecat fan-driven snowmakers. Reference sound levels for the Standard Polecat were based on manufacturer's octave band sound level data from measured sound levels of 67 dBA at 50 feet to the side of the snow maker. Estimated sound levels assume the following:

- snowmakers will be placed at a height of 10-feet above grade approximately every 100 feet along the west edge of each of the two new ski trails, and
- snowmakers will be oriented facing northeast across each trail and aligned so that they are not pointed directly at or away from receptors W-1 and W-2 (sound levels directly in front or directly behind the snowmakers are estimated to be 7 dBA higher than sound levels to the side).

Sound levels during snowmaking conservatively assume all snowmakers will be operated simultaneously. Estimated sound levels from snowmaking were also included as both a day and nighttime sound source of intermittent Project noise, since snowmaking may occur during any time period.

5.2.3 Golf Course (Quasi Mobile) Sources

Major noise sources for the operation and maintenance of the Highmount Golf Club will consist primarily of grass cutting and rolling equipment. Though some maintenance of the rough will be conducted in the afternoon, most maintenance operations will be conducted in the morning, which will represent the period of worst-case noise levels. Morning maintenance equipment and duration of activities for each type is anticipated to be the following:

[2] Based on conversations with O'Brien & Gere engineering staff; engineering typical rule-of-thumb for estimating HVAC needs from total floor space area prior to building design.

- 4 greens mowers (3.5 AM hours),
- 1 greens roller (4 AM hours),
- 1 collar mower/stepcut mower (4 AM hours)
- approach mowers (4 mowers x 4 hours in the morning), and
- fairway mowers (4 mowers x 4 hours in the morning).

Reference sound levels for each mower are presented in Table 5-1 and are based on sound levels measured for similar golf maintenance equipment (PCD, 2004). Estimation of potential noise impacts also conservatively assumes the worst-case condition when mowers are operating in the nearest greens and fairways to potential receptors, and assumes one mower is operating at any given part of a hole at any given time. Predicted sound levels were compared with daytime average ambient sound levels (L_d), since the mowing will not be continuous and will occur only during the day.

5.3 OPERATIONAL NOISE IMPACT ASSESSMENT AND MITIGATION

Potential noise generated by the proposed Project's operation was estimated and extrapolated to the nearest potential receptor locations using CadnaA noise prediction software. Similar to the construction noise assessment, resultant total sound levels at the receptors were estimated and used to predict potential Project noise impacts at each receptor including the State Forest Preserve. Project operation was assessed for the following three conditions:

- Nighttime from continuous Project operations – Compared continuous steady-state Project sound to the nighttime residual ambient sound level (L_{90}).
- Nighttime from continuous and non-continuous Project operations – Compared Project nighttime sound to the average nighttime ambient sound level (L_d), and
- Daytime (continuous and non-continuous Project operations) – Compared Project daytime sound to the average daytime ambient sound levels (L_d),

5.3.1 Nighttime Sound Levels – Continuous Project Operations

As indicated in Section 3, major continuous sound from Project operations is due to hotel and facility building ventilation systems. Estimated Project sound levels are presented in Table 5-2. CadnaA graphical output depicting decibel contours before and after mitigation are presented in Enclosure 3.

As indicated in Table 5-2, building ventilation systems, without mitigation (unshielded), are predicted to result in noise impacts at receptors W-1, W-3, W-4, W-5, and W-11. The greatest increase in sound levels is predicted at W-1 (18 dBA), and is due to Highmount Lodge and Highmount Hotel HVACs, and, to a lesser degree, the Clubhouse at Old Leach Farm HVAC. Predicted elevations in sound level at W-3, W-4 and W-5 are predominantly affected by noise from the Wilderness Activities Center HVACs and to a lesser degree by HVACs at the Wildacres Hotel and Marlowe Mansion (W-5 only). Sound levels at estimated at W-11 are affected almost entirely by the Font-9 Village Clubhouse HVAC.

Mitigation of HVAC sound can be accomplished by 1) attenuating the sound from the HVAC by shielding them from transmitting sound in the direction of potentially impacted receptors, or by specifying lower-noise HVAC units than the typical HVACs assumed in Table 5-1. Lower-noise HVACs would reduced or possibly eliminate shielding needs. Mitigation of typical HVAC units may be accomplished by placing a sound shielding barrier around and within six feet of the HVAC units. The shielding should extend six feet above the noise sources on the HVAC, except for the side of the Highmount Lodge HVAC facing receptor W-1 which should be 8 feet above the HVAC. The estimated effective sound reduction (insertion loss) of such shielding would be -16 dBA and the mitigation would reduce potential for audible Project sound at the State Forest Preserve. The shielding can be constructed out of any material or structure having sound transmission loss of at least 26 dBA or more and absorptive on the interior side facing the HVAC. If building walls are to be used as all or part of the shielding, then absorptive material may be needed on the wall surfaces to minimize reflection of sound.

Estimated sound levels after proposed mitigation are presented in Table 5-2 and indicate that increases in ambient sound levels will be 4 dBA or less at all receptors. In addition, estimated nighttime continuous sound levels from Project operation at the State Forest Preserve are predicted to be below 10 dBA and result in no increase to the ambient sound level.

5.3.2 Nighttime Sound Levels – Continuous and Non-continuous Project Operations

In addition to continuous nighttime Project sound, at times Project operation will also generate non-continuous nighttime sound that is intermittent and/or time-varying. As indicated in Section 3, intermittent or time-varying operational sound at night is generated by on-site traffic and snowmaking equipment, and is evaluated in comparison with the average ambient sound level (Leq). Estimated Project nighttime sound levels are presented in Table 5-3. CadnaA graphical output depicting decibel contours before and after mitigation are presented in Enclosure 3.

As indicated in Table 5-3, Project nighttime operation, without additional mitigation[3], is predicted to result in potential noise impacts at receptor W-1. The increase in sound levels at W-1 (+9 dBA) is primarily due to sound from operation of the snowmaking equipment – most notably the snowmaking equipment on the west slope, closest to W-1.

Mitigation of snowmaking equipment noise at night can be accomplished by curtailing nighttime operation (10 PM to 7AM) of the six north-most snow guns on the west slope. Snowmaking at these six locations would only be conducted during the daytime (7 AM to 10 PM). The estimated effectiveness of the proposed mitigation is predicted to be -5 dBA at W-1. In addition, overall nighttime sound levels from snowmaking will be reduced by approximately 1 dBA, which may tend to reduce nighttime audibility of snow maker operation at the State Forest Preserve.

Estimated sound levels after proposed mitigation of snowmaking sound, presented in a Table 5-3, indicate that increases in ambient sound levels will be 4 dBA or less at all receptors. In addition, Project nighttime sound levels at all receptors will be well below the Town of Shandaken nighttime noise limit of 53 dBA. Estimated Project nighttime sound levels at the State Forest Preserve are predicted to be below 20 dBA and result in no increase to the average ambient sound level.

5.3.3 Daytime Sound Levels

Project operational noise during the daytime may be higher at some receptors than at night due to the following conditions:

- maintenance of the Highmount Golf Club 18-hole golf course (not conduced at night)
- operation of snowmakers – all 30 proposed snowmakers are conservatively assumed to be in simultaneous operation (worst-case condition), and
- increased sound from on-site traffic at major parking areas (from 2% of parking area capacity at night to 10% during the day).

Estimated Project daytime sound levels are presented in Table 5-4. CadnaA graphical output depicting decibel contours are presented in Enclosure 3. As indicated in Table 5-4, Project daytime operation is predicted to increase ambient sound levels by 2 dBA or less at all receptors. Further, estimated Project daytime sound levels at the State Forest Preserve are predicted to be 20 dBA, which is 19 dBA below the average ambient sound level, and would not increase to the average ambient sound level. Therefore, no additional mitigation of Project daytime noise sources is needed or proposed.

5.4 IMPACT AND TONAL NOISE

Project operation will consist primarily of reciprocating engines, fans, compressors, and gas/diesel engine noise that is broadband in nature without predominant tonal noise. Impact noise is not anticipated. Though some minor tonal noise may be emitted by some individual pieces of equipment, these tones would be masked by sound from other sources, and are anticipated to result in no audible prominent discrete tones at any receptor.

[3] In addition to mitigation proposed in Table 5.2.

6. REFERENCES

BBN, 1971. Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, Bolt, Beranek and Newman Inc., December 31, 1971.

ENSR, 2002. Community Sound Survey and Construction Noise Impact Assessment - Belleayre Resort at Catskill Park. ENSR Corporation, January 2002.

Crossroads Ventures, 2001. Ken Graham of Crossroads Ventures telephone conversation with Scott Manchester of ENSR, January 14, 2001.

ESEERCO, 1977. Empire State Electric Energy Research Corporation. Power Plant Construction Noise Guide. Bolt Beranek and Newman, Inc. Report No. 3321. May 1977.

Hoover & Keith, 1981. Noise Control for Buildings. Manufacturing Plants. Equipment. and Products. Hoover & Keith, Inc. 1981.

Goodman, 2008. Amana® Brand PTAC Sound Report. Goodman Company, L.P., October 4, 2008.

K&S, 2006. Measured Sound Levels of the Standard Polecat by Snow Machines Incorporated. Kolano and Saha Engineers, March 30, 2006.

NYSDEC, 2001. New York State Department of Environmental Conservation Program Policy: Assessing and Mitigating Noise Impacts, October 6, 2000; revised February 2, 2001.

NYSDEC, 2008. Final Scoping Document – Belleayre Mountain Ski Center Unit Management Plan – DEIS and Modified Belleayre Resort at Catskill Park, Supplemental DEIS. February 28, 2008.

PCD, 2004. Rancho San Juan Specific Plan and HYH Property Project EIR, Section 5.6. Project Design Consultants, May, 2004

Town of Shandaken, 1992. Zoning Code of the Town of Shandaken, Chapter 116 Article VI Section 116-23 – Supplementary Regulations. Amended December 28, 1992.

USEPA 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. Document No. 550/9-74-004. United States Environmental Protection Agency. March 1974.

Table 2-1. Ambient Sound Levels Results

Measurement Location (Site ID)	Receptor(s) Characterized (ID)	Daytime Average Sound Level (L_d dBA)	Nighttime Average Sound Level (L_n dBA)	Day-Night Sound Level (L_{dn} dBA)	Daytime Residual Sound Level (L_{90} dBA)	Nighttime Residual Sound Level (L_{90} dBA)
ML-1	W-1, W-2, W-3, W-4, W-5	50	39	49	35	27
ML-2	W-6, W-7, W-8, W-9, W-11, W-12	50	37	49	41	30
ML-4	W-10	48	45	52	43	41
ML-W1	FP-1	39	40	46	24	21

Notes:

Daytime: 7 AM to 10 PM (includes evening hours from 7 PM to 10 PM); Nighttime: 10 PM to 7 AM

L_d and L_n based on time-weighted energy-equivalent average sound level (Leq)

$L_{dn} = 10\text{Log}\{(15*(10^{Ln/10})+9(10^{Ln+10})\}/24$

L_{90} = sound level exceeded for 90 percent of measurement period

Table 4-1 Off-site Construction Traffic - Predicted Sound Levels

Project Area	Year	Average Vehicle Pass-bys per hour	Average Traffic Sound Level[a] (dBA at 50 feet)	Nearest Receptor	Receptor Distance (feet)	Distance Attenuation (dBA)	Wooded Distance (feet)	Woods Insertion Loss (dBA)	Traffic Sound Level at Receptor (dBA)
Wildacres	1 to 2	10.6	61	W11	80	-3	0	0	58
	3 to 8	2	42	W11	80	-3	0	0	39
Highmount	1 to 2	5.3	55	W3	50	0	0	0	55
	3 to 8	1	39	W3	50	0	0	0	39

[a] L_{eq} at 50 feet assuming truck traffic at 30 mph.

Table 4-2 Access Road Construction - Predicted Sound Levels

Project Area	Aspect	Construction Reference Sound Level (dBA at 50 ft)[a]	Nearest Receptor	Receptor Distance (feet)	Distance Attenuation (dBA)	Wooded Distance (feet)	Woods Insertion Loss (dBA)	Construction Sound Level (dBA)
Wildacres	Clearing	85	W7	200	-12	200	-6	67
	Earth Excavation	90	W7	200	-12	200	-6	72
	Rock Excavation	85	W7	200	-12	200	-6	67
	Subgrade Subbase	81	W7	200	-12	200	-6	63
	Trim/Cleanup/Topsoil/Grade	84	W7	200	-12	200	-6	66
	Asphalt Pavement	79	W7	200	-12	200	-6	61
	Rock Crushing[a]	89 (100 feet)	W7	900	-19	400	-12	58
	Typical[c]	**84**	**-**	**1000**	**-26**	**400**	**-12**	**46**
Highmount	Clearing	85	W1	160	-10	100	-3	72
	Earth Excavation	90	W1	160	-10	100	-3	77
	Rock Excavation	85	W1	160	-10	100	-3	74
	Subgrade Subbase	81	W1	160	-10	100	-3	68
	Trim/Cleanup/Topsoil/Grade	84	W1	160	-10	100	-3	71
	Asphalt Pavement	79	W1	160	-10	100	-3	66
	Rock Crushing[d]	89 (100 feet)	W1	360	-11	100	-3	75
	Typical[c]	**84**	**-**	**1200**	**-26**	**500**	**-15**	**41**

[a] Access road construction reference sound levels from DEIS Noise Assessment (ENSR, 2002)
[b] Rock crusher to be permanently located during construction near the proposed fractional units, ~ 250 feet west of the golf practice/driving range tees.
[c] Based on typical construction sound level at 50 feet, and average distance from receptor. Excluding rock crusher noise which is a fixed sound source.
[d] Rock crusher to be permanently located during construction at southwest parking lot of Highmount Resort Hotel.

Table 4-3 Golf Course Construction – Predicted Sound Levels

Construction Year	Holes	Construction Reference Sound Level (dBA at 50 ft)[a]	Nearest Receptor	Receptor Distance (feet)	Distance Attenuation (dBA)	Wooded Distance (feet)	Woods Insertion Loss (dBA)	Construction Sound Level (dBA)
1	3 through 8, 10, 11, driving range	91	W11	340 (min) 1400 (typical)	-17 -29	0 200	0 -6	74 56
2	1, 2, 9, 12 through 18	91	W7	370 (min) 1200 (typical)	-17 -28	200 200	-6 -6	68 57

[a]Golf course construction reference sound levels from DEIS Noise Assessment (ENSR, 2002)

Table 4-4 Typical Building Construction Sound Levels[a]

Construction Aspect	Hotel and Major Facilities		Residences and Small Buildings	
	Minimum Equipment On-site (dBA)	All Pertinent Equipment On-site (dBA)	Minimum Equipment On-site (dBA)	All Pertinent Equipment On-site (dBA)
Clearing	84	84	83	83
Excavation	79	89	75	88
Foundations	78	78	81	81
Erection	75	87	65	81
Finishing	75	89	72	88

[a] L_{eq} at 50 feet.
Reference: BBN, 1971

Table 4-5 Building Construction and Renovation Sound Levels

Location	Aspect	Construction Sound Level (dBA at 50 ft)	Nearest Receptor	Receptor Distance (feet)	Distance Attenuation (dBA)	Wooded Distance (feet)	Woods Insertion Loss (dBA)	Construction Sound Level (dBA)
Wildacres	Hotel and Facilities	89	W-7	1280	-28	400	-12	49
	Clubhouse	88	W-7	920	-25	440	-13	50
	Front-9 Village (Lodging Unit) Clubhouse, Pool and Tennis Courts	88	W-9	400	-18	100	-3	67
	Water Treat. Facility[a]	72	W-6	300	-15	150	-5	52
	Wilderness Activities Center Renovation[b]	81	W-4	240	-14	240 + terrain barrier	-7+ -6	54
	Marlow Mansion	88	W-5	1400	-29	400	-12	47
	Golf Maintenance Facility	88	W-6	720	-23	100	-3	62
	Front-9 (East) Village - 84 Units	88	W-11	200 (min) 800 (typical)	-12 -24	0 0	0 0	76 64
	West Village - 56 units	88	W-7	770	-24	640	-18	46
Highmount	Highmount Spa Hotel	89	W-1	620	-22	130	-4	63
	Highmount Lodge	88	W-1	330	-16	100	-3	69
	Conference/Clubhouse; Renov. Old Leach Farm[b]	81	W-2	600	-22	400	-12	47
	19 Detached Lodging Units (top of Highmount)	88	W-1	2,000	-32	200	-6	50
	21 Detached Lodging Units (along access road)	88	W-1	480	-20	180	-5	63

[a] Pre-fabricated building anticipated. Sound level assumes minimal ground clearing, excavation and foundation work. Sound levels from finishing aspect assuming a minimum of equipment is required on-site.

[b] Sound level assumes minimal or no significant ground clearing and minimum construction equipment on-site.

Table 4-6 Project Construction Noise Assessment and Mitigation

Construction	Const. Years	Nearest Receptor	Project Sound Level (dBA)	Ambient Sound Level[a] (L_d, dBA)	Total Sound Level (dBA)	Ambient Sound Level Change (dBA)	Mitigative Action/ Estimated Reduction (dBA)	Mitigated Ambient Sound Level Change (dBA)
Off-site Traffic	1-2	W11 W3	57 55	50 50	58 56	8 6	None required	
Access Roads – Construction max when within 500 ft. of receptor (~1.5 mo./receptor)	1-2	W1, W7	61-77 (max); ≤46 (typical)	50	61-77 (max); 51 (typical)	11-27 (max); 1 (typical)	Use minimum equipment on-site: -3 dBA	9-24 (max); 1 (typical)
Highmount Golf Club – Maximum: Closest part of nearest hole	1-2	W7, W11	74 (max); ≤57 (typical)	50	74 (max); ≤58 (typical)	24 (max); ≤8 (typical)	Under 500 feet Minimum equip. on-site:-3 dBA; Barrier[b]: -15 dBA Over 500 feet 500 foot vegetative buffer: -18 dBA[c]	≤8
Wildacres Hotel & Facilities	1-2	W7	49	50	53	3	None required	
Rock Crushing – Wildacres Hotel/Golf Club, Access Rd	1-2	W7	58	50	59	9	None required.	
Clubhouse	1	W7	50	50	53	3	None required	
Front-9 Village (Lodging Unit) Clubhouse, Pool and Tennis Courts	1	W9	67	50	67	17	Minimum equip. on-site:-5 dBA; Barrier[d]: -6 dBA	7
Wilderness Act. Center	1	W5	54	50	54	4	None required	
Marlow Mansion		W6	47	50	52	2	None required	
Golf Maintenance Facility	1	W6	62	50	62	12	Minimum equip. on-site: ≥-5 dBA;	≤8
Front-9 (East) Village – 84 Units	3-8	W11	77 (max); 63 (typical)	50	77 (max); 63(typical)	27 (max); 13 (typical)	Minimum equip. on-site:-5 dBA	≤22 (max)[e]; <9 (typical)
West Village – 56 Units	4-8	W7	46	50	51	1	None required	
Water Treatment Facility	1	W6	52	50	54	4	None required	

Table 4-6 Project Construction Noise Assessment and Mitigation

Construction	Const. Years	Nearest Receptor	Project Sound Level (dBA)	Ambient Sound Level[a] (L_d, dBA)	Total Sound Level (dBA)	Ambient Sound Level Change (dBA)	Mitigative Action/ Estimated Reduction (dBA)	Mitigated Ambient Sound Level Change (dBA)
Highmount Hotel	1-2	W1	63	50	63	13	Minimum equip. on-site: ≥-5 dBA	≤9
Rock Crushing – Highmount Hotel and Access Road	1-2	W1	75	50	75	25	Barrier[f]:-16 dBA	9
Highmount Lodge	1-5	W1	69	50	69	19	Minimum equip. on-site: ≥-5 dBA; Barrier[d]: -6 dBA	≤9
Conference Clubhouse (Old Leach Farm)	1	W2	47	50	52	2	None required	
19 Detached Lodging Units (top of Highmount)	4-8	W1	50	50	53	3	None required	
21 Detached Lodging Units (along access road)	After Yr-8 (9-11)	W1	63	50	63	13	Minimum equip. on-site:-5 dBA;	≤9

[a] Ambient sound level from average daytime L_{eq} (L_d).
[b] Barrier assumption: only when within 150 feet of residence; extending 10 feet above source/receptor line-of-sight (Enclosure 2, Barrier B1). Barrier may be a temporary berm or solid fencing, or a combination of the two.
[c] Includes -3 dBA for additional distance attenuation from 370 feet to 500 feet.
[d] Line-of-sight barrier (berm or other temporary barrier such as a solid fence or barrier curtain) placed between construction noise sources and receptor as needed depending on construction sound levels.
[e] Only during portions of the residential construction of the nearest octoplex of housing units. During such construction, temporary shielding will be used as needed depending on construction sound levels
[f] Barrier assumption: within 30 feet of rock crusher, extending 10 feet above receptor/breaker line-of-sight (See Enclosure 2, Barrier B2).

Table 5-1 Project Operation – Sound Sources and Reference Sound Levels

Source	Location	Major Noise Source	Unit Reference Sound Power Level (dBA)	Quantity	Total Power Sound Level (dBA all units)
On-site Traffic[a]	Wildacres Hotel	Parking Lot Traffic	79	45 (Day) 9 (Night)	95 89
	Highmount Hotel	Parking Lot Traffic	79	31 (Day) 6 (Night)	94 87
	Front-9 Village Clubhouse and Front-9 Village	Parking Lot Traffic	79	12 (Day) 2 (Night)	90 82
	Highmount Lodge	Parking Lot Traffic	79	3 (Day) 1 (Night)	84 79
Hotels, Conference Buildings and Clubhouses[b,c]	Wildacres Hotel	HVAC – 490 ton	104	1	104
		PTACs	61	250	85
	Highmount Hotel	HVAC – 275 ton	102	1	102
		PTACs	61	120	82
	Highmount Lodge	HVAC – 30 ton	97	1	97
	Wilderness Activities Center	HVAC – 20 ton	97	1	97
	Marlow Mansion	HVAC – 30 ton	97	1	97
	Front-9 Village Clubhouse	HVAC – 15 ton	97	1	97
	Clubhouse @Old Leach Farm	HVAC – 30 ton	97	1	97
Ski Slopes[d]	West Slope and Top	Std. Pole Cat Snow Maker	99	17	111
	East Slope	Std. Pole Cat Snow Maker	99	13	110
Highmount Golf Club[e]	Fairway Mowers	Fairway Mowers	96	4	102
	Approach Mower	Approach Mower	96	4	102
	Collar/Stepcut Mower	Collar/Stepcut Mower	94	1	94
	Green	Green Mowers	94	4	100
	Greens	Greens Roller	94	1	94

[a] Traffic level estimated assuming 10 percent of parking area capacity operates at any given time during the day and 2 percent at night (10 pm to 7 AM).
[b] HVAC data based on square footage of common areas (excludes rooms); assumes HVAC = 400 sq. feet/ ton. HVAC reference sound levels are unshielded (unmitigated). Reference sound level source: Hoover and Keith, 1984. <200 Ton: Table 7.1; >200 ton: Equation 7-2 and Table 7-3.
[c] PTAC Reference sound level source: Goodman 2008.
[d] Reference sound level source: Octave band sound level measurements to the side of the Standard Polecat - K&S, 2006.
[e] Reference sound level source: PCD. 2004

Table 5-2 Project Operation Noise Assessment and Mitigation – Nighttime; Continuous Sources

Receptor	Unmitigated Hotels Conference Buildings and Clubhouses (dBA)	Unmitigated Project Sound Level (dBA)	Ambient Sound Level (dBA)	Unmitigated Total Sound Level (dBA)	Ambient Sound Level Change (dBA)	Mitigation: (Control HVAC)[a]/ Estimated Reduction (dBA)	Mitigated Project Sound Level (dBA)	Ambient Sound Level (dBA)	Mitigated Total Sound Level (dBA)	Mitigated Ambient Sound Level Change (dBA)
FP-1	10	10	21	21	0	0	<10	21	21	0
W-1	45	45	27	45	18	-16	29	27	31	4
W-2	30	30	27	32	5	>-10	<20	27	28	1
W-3	35	35	27	36	9	-11	24	27	29	2
W-4	37	37	27	37	10	-13	24	27	29	2
W-5	39	39	27	39	12	-13	26	27	30	3
W-6	24	24	30	31	1	>-14	<20	30	30	0
W-7	32	32	30	34	4	-11	21	30	31	1
W-8	32	32	30	34	4	>-12	<20	30	30	0
W-9	27	27	30	32	2	>-7	<20	30	30	0
W-10	38	38	41	43	2	-13	25	41	41	0
W-11	42	42	30	42	12	-15	27	30	32	2
W-12	28	28	30	32	2	>-8	<20	30	30	0

Assumptions:

NA – Not Applicable

Ambient sound level from average nighttime L_{eq} (L_n).

[a] Mitigation: HVAC systems will be mitigated to reduce sound levels 16 dBA below unmitigated sound levels of typical HVAC systems (Table 5-1). Mitigation may be accomplished if 1) lower noise HVAC units are specified or 2) by shielding HVAC units. Mitigation can also be achieved through a combination of using lower noise HVACs and shielding. If shielding is used with typical HVACs, mitigation may be accomplished by placing the shield around the HVAC – within 6 feet horizontally and extending 6 feet above (except that the Highmount Lodge HVAC shield side facing Receptor W2 would extend 8 feet above the HVAC. Use of lower noise HVACs would reduce or potentially eliminated shielding needs.

Table 5-3 Project Operation Noise Assessment and Mitigation – Nighttime; Continuous and Non-continuous Sources

Receptor	Hotels Conference Buildings and Clubhouses[a] (dBA)	Unmitigated Ski Slopes (dBA)	On-site Traffic (dBA)	Project Sound Level (dBA)	Ambient Sound Level (dBA)	Total Sound Level (dBA)	Ambient Sound Level Change (dBA)	Additional Mitigative Action/ Estimated Reduction (dBA)	Mitigated Total Sound Level (dBA)	Mitigated Ambient Sound Level Change (dBA)
FP-1	<10	<20	<20	20	40	40	0	None needed	<20	
W-1	29	47	30	47	39	48	9	Reduced night operations[b]: -5 dBA	41	4
W-2	<20	31	<20	31	39	40	1	None needed	40	1
W-3	24	28	<20	29	39	39	0	None needed	39	0
W-4	24	33	<20	33	39	40	1	None needed	40	1
W-5	26	31	<20	32	39	40	1	None needed	40	1
W-6	<20	26	<20	26	37	37	0	None needed	37	0
W-7	21	28	<20	29	37	38	1	None needed	38	1
W-8	<20	27	<20	28	37	38	1	None needed	38	1
W-9	<20	22	<20	24	37	37	0	None needed	37	0
W-10	25	<20	24	28	45	45	0	None needed	45	0
W-11	27	<20	30	32	37	38	1	None needed	38	1
W-12	<20	24	<20	25	37	37	0	None needed	37	0

Assumptions:

Ambient sound level from average nighttime L_{eq} (L_n).

Golf Course – Equipment not operating.

Ski Slopes – Snow making equipment aligned on west side of each slope facing northeast, and not facing directly at or away from W-1 or W-2.

Parking Lot – Assumes 2% of the parking lot capacity is operating and moving at 10 mph (10 PM to 7 AM)

[a] Estimated sound levels assume HVAC mitigation as specified in Table 5-2.

[b] No nighttime (10 PM to 7 AM) operation of the six north-most snow makers along the west slope (west and northwest of Highmount Lodge).

Table 5-4 Project Operation Noise Assessment and Mitigation – Daytime

Receptor	Hotels Conference Buildings and Clubhouses[a] (dBA)	Golf Course (dBA)	Ski Slopes (dBA)	On-site Traffic (dBA)	Project Sound Level (dBA)	Ambient Sound Level (dBA)	Total Sound Level (dBA)	Ambient Sound Level Change (dBA)	Additional Mitigation Required (dBA)
FP-1	<10	<20	<20	<20	20	39	39	0	None
W-1	29	<20	47	36	47	50	52	2	None
W-2	<20	<20	31	21	31	50	50	0	None
W-3	24	23	28	<20	30	50	50	0	None
W-4	24	<20	33	<20	34	50	50	0	None
W-5	26	22	31	<20	32	50	50	0	None
W-6	<20	<20	26	<20	27	50	50	0	None
W-7	21	41	28	<20	42	50	51	1	None
W-8	<20	38	27	20	39	50	50	0	None
W-9	<20	38	22	22	38	50	50	0	None
W-10	25	45	<20	32	45	48	50	2	None
W-11	27	45	<20	38	46	50	51	1	None
W-12	<20	34	24	<20	35	50	50	0	None

Notes and Assumptions:

Ambient sound level from average daytime L_{eq} (L_d).

Golf Course – Sound from mowers during daytime only.

Ski Slopes – Snow makers aligned on west side of each slope facing northeast, and not facing directly at or away from W-1 or W-2.

Parking Lot – Assumes 10% of the parking lot capacity is operating and moving at 10 mph.

[a] Estimated sound levels assume HVAC mitigation as specified in Table 5-2.

Noise Survey and Receptor Locations

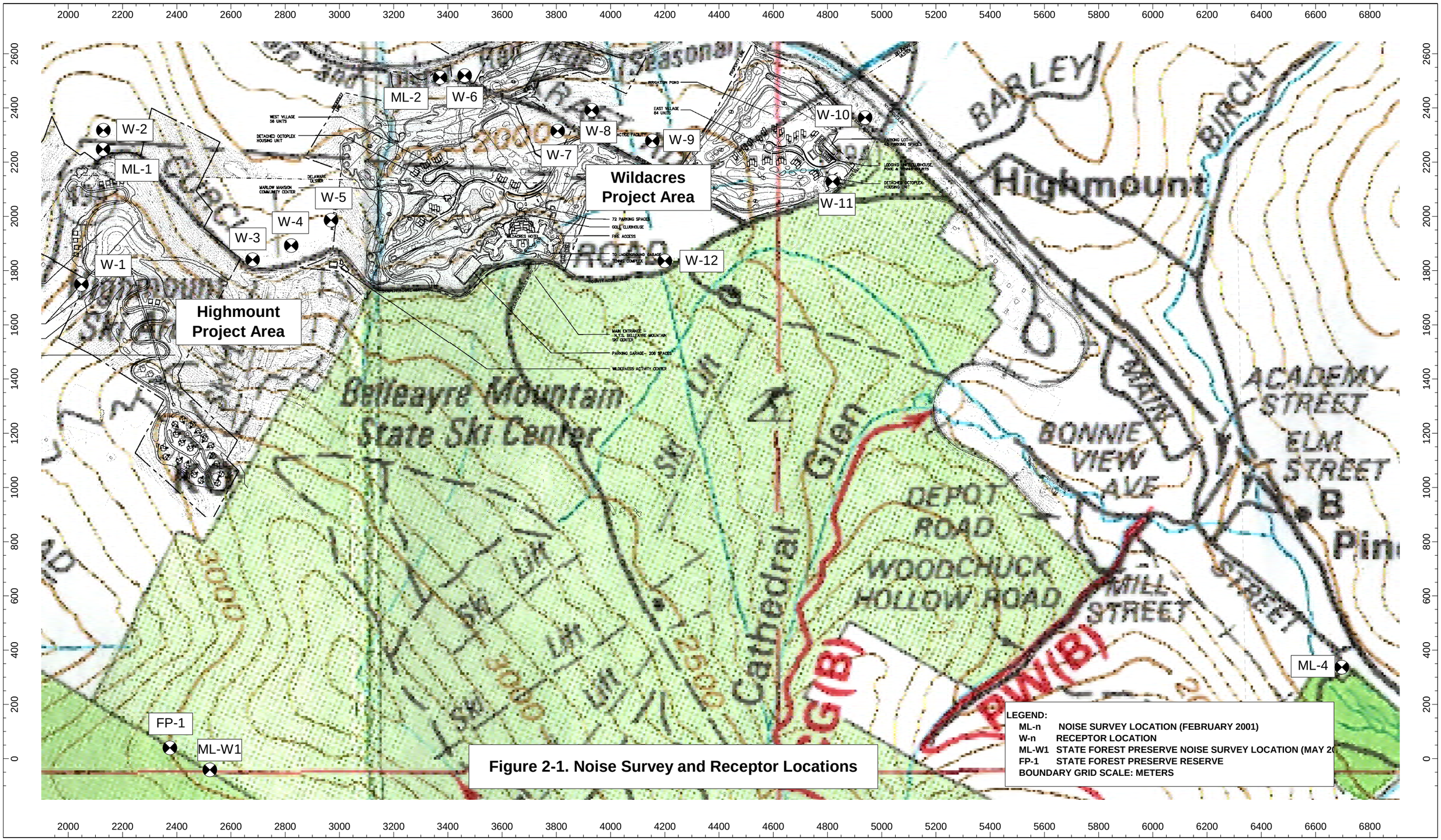


Figure 2-1. Noise Survey and Receptor Locations

LEGEND:
- ML-n NOISE SURVEY LOCATION (FEBRUARY 2001)
- W-n RECEPTOR LOCATION
- ML-W1 STATE FOREST PRESERVE NOISE SURVEY LOCATION (MAY 2
- FP-1 STATE FOREST PRESERVE RESERVE
- BOUNDARY GRID SCALE: METERS

Calibration Certificates, Field Forms, and Data Summary Printouts

Larson Davis

A PCB Group Co.

Certificate of Calibration and Conformance

Certificate Number 2006-84063

Instrument Model CAL200, Serial Number 4401, was calibrated on 12SEP2006. The instrument meets factory specifications per Procedure D0001.8190.

Instrument found to be in calibration as received: YES
Date Calibrated: 12SEP2006
Calibration due: 12SEP2007

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	PRM915	0112	12 Months	14SEP2006	2005-72135
Larson Davis	PRM902	0480	12 Months	14SEP2006	2005-72134
Schaevitz	P3061-15PSIA	17588	12 Months	16FEB2007	287327
Larson Davis	2900	0661	12 Months	04APR2007	2006-78704
Larson Davis	2559	2506	12 Months	18APR2007	14031-1
Hewlett Packard	34401A	US36033460	12 Months	02JUN2007	290347
Hewlett Packard	34401A	3146A10352	12 Months	23JUN2007	291010
Larson Davis	MTS1000/2201	0111	12 Months	11SEP2007	2006-0911-2

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Environmental test conditions as shown on calibration report.

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Corporate Headquarters. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"As Received" data is the same as shipped data.

Signed: Scott Montgomery

Technician: Scott Montgomery

CORPORATE HEADQUARTERS
1681 West 820 North
Provo, Utah 84601-1341 USA
Toll Free: 888-258-3222
Tel: 801-375-0177
Fax: 801-375-0182
info@LarsonDavis.com
www.LarsonDavis.com

SALES OFFICE
3425 Walden Avenue
Depew, New York 14043-2495 USA
Toll Free: 888-258-3222
Tel: 716-926-8243
Fax: 716-926-8215
info@LarsonDavis.com
www.LarsonDavis.com

824 A 3287

Larson Davis

A PCB Group Co.

Certificate of Calibration and Conformance

Certificate Number 2006-84084

Instrument Model 824, Serial Number 3287, was calibrated on 09AUG2006. The instrument meets factory specifications per Procedure D0001.8046, IEC 61672-1:2002 Class 1; IEC 60651-2001, 60804-2000 and ANSI S1.4-1983 Type 1 1/3, 1/1 Oct. Filters; S1.11-1986 Type 1C; IEC61260-am1-2001 Class 1 .

Instrument found to be in calibration as received: YES
Date Calibrated: 09AUG2006
Calibration due: 09AUG2007

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	2900 / 2239	0276 / 0105	12 Months	31OCT2006	2005-73676

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 23 ° Centigrade

Relative Humidity: 27 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Corporate Headquarters. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

As Received data is the same as shipped data.

Signed: _____
Technician: Jason Grace

CORPORATE HEADQUARTERS
1681 West 820 North
Provo, Utah 84601-1341 USA
Toll Free: 888-258-3222
Tel: 801-375-0177
Fax: 801-375-0182
info@LarsonDavis.com
www.LarsonDavis.com

SALES OFFICE
3425 Walden Avenue
Depew, New York 14043-2495 USA
Toll Free: 888-258-3222
Tel: 716-926-8243
Fax: 716-926-8215
info@LarsonDavis.com
www.LarsonDavis.com

Sound Level Survey Field Form

ENSR | AECOM

Client/Location	Project Number	Date	Conducted By
Cross Roads / Ventures	12883-001-0200	5/9/07	SM/RP

	Sound Level Meter	Microphone	Calibrator	Pistonphone
Model	824	377B02	CAL200	
Serial Number	3287	101866	4401	

Calibration Results	114 dB, 0.5 dBA, 0.5 dB	250 Hz, 124 dB, 1.5 dBA, 0.5 dB
Initial	93.9 / 93.9 (1044)	
Final		

Windy	Temperature	Humidity	Precipitation
Calm, <1 All West / Calm 0-3 South.	86	74/56 / 69-62	None.

Site Location	Test ID	Time Period
ML-W1	ML-W1	5/9 (1043) - 5/10 (1043)

Intrusive Events		Traffic Information		Site Location (GPS or Sketch)
Source	dBA	Type/Location	Count	
Operator Noise	0-40			
Bird chirp	44 dBa			
1005 – prop airplane.	– 45 dBa			
– Bird chirping / woodpecker	– 30 – 40			
1026 – distant prop plane	– 48			
1033 – Wind in trees	– 34 – 50			
	1044	Background Sources	Rank	
	1045	Bird chirp	8 - 40 dBA	
		" "	10 - 43	
		" "	10-45	
		airplane	3	
	1039	jet airplane		

Comments	wood pecker. Start 1043
	1051
	5/10/07 - arrive back to site - 1000 (955-1000) approach
	- Background Birds - dominate
	- Operator cough 1012
	- End Run 1043.

File Translated: I:\Crossroads-Vent.13972\42106.Acoustical-Cons\N-D\Belleayre Resort_ENSR Project
Model/Serial Number: 824 / A3287
Firmware/Software Revs: 4.272 / 3.120
Name: Enter Company Name
Descr1: Enter Address Line 1
Descr2: Enter Address Line 2
Setup/Setup Descr: fpl_2006.ssa / SLM & RTA; 1/3 Sp. Ln; 1s THi
Location: Crossroads Ventures - Pine Hill, NY
Note1: ML-W1
Note2: Wildacres - South

Overall Any Data
Start Time: 09-May-2007 10:43:08
Elapsed Time: 24:00:00.7

	A Weight		C Weight		Flat	
Leq:	39.5 dBA		45.9 dBC		49.8 dBF	
SEL:	88.9 dBA		95.2 dBC		99.2 dBF	
Peak:	89.0 dBA		88.3 dBC		88.7 dBF	
	10-May-2007	09:59:29	09-May-2007	10:49:02	10-May-2007	09:59:29
Lmax (slow):	65.6 dBA		69.4 dBC		74.6 dBF	
	10-May-2007	06:01:27	09-May-2007	15:34:51	09-May-2007	21:56:42
Lmin (slow):	19.1 dBA		26.3 dBC		28.5 dBF	
	10-May-2007	02:45:51	10-May-2007	03:32:02	10-May-2007	03:32:06
Lmax (fast):	69.0 dBA		72.4 dBC		78.6 dBF	
	10-May-2007	06:01:27	09-May-2007	15:34:29	09-May-2007	21:56:42
Lmin (fast):	18.9 dBA		25.1 dBC		26.9 dBF	
	10-May-2007	02:45:51	10-May-2007	02:45:49	10-May-2007	03:29:12
Lmax (impulse):	71.7 dBA		75.6 dBC		81.7 dBF	
	10-May-2007	10:12:02	09-May-2007	21:56:42	09-May-2007	21:56:42
Lmin (impulse):	19.0 dBA		26.6 dBC		29.1 dBF	
	10-May-2007	02:45:51	10-May-2007	03:22:58	10-May-2007	03:32:06

Spectra

Date	Time	Run Time
09-May-2007	10:43:08	24:00:00.7

Hz	Leq1/3	Leq1/1	Max1/3	Max1/1	Min1/3	Min1/1	Hz	Leq1/3	Leq1/1	Max1/3	Max1/1	Min1/3	Min1/1
12.5	44.1		35.4		6.1		630	22.2		13.5		6.3	
16.0	42.1	47.1	38.1	44.2	7.6	12.1	800	20.7		11.8		5.9	
20.0	39.8		42.2		8.0		1000	19.1	24.2	11.5	15.9	5.0	9.7
25.0	37.7		41.4		7.4		1250	18.0		9.8		3.6	
31.5	36.1	41.1	43.2	48.7	4.0	10.8	1600	17.9		17.3		2.2	
40.0	34.7		46.0		6.1		2000	16.9	22.8	24.8	29.2	1.9	6.8
50.0	35.2		43.7		6.0		2500	19.1		26.7		1.9	
63.0	36.7	40.5	37.6	44.9	5.8	10.6	3150	29.1		54.5		2.7	
80.0	35.0		31.6		5.8		4000	34.3	37.5	62.0	65.0	3.2	8.1
100	34.5		23.3		5.5		5000	33.3		61.1		3.9	
125	32.2	37.6	19.6	25.4	4.1	9.1	6300	28.7		54.7		4.5	
160	30.9		16.5		2.9		8000	23.4	29.9	51.1	56.3	4.6	9.2
200	29.3		11.7		4.6		10000	14.4		36.6		4.1	
250	29.2	33.5	13.0	18.7	5.3	10.3	12500	12.2		27.0		3.8	
315	27.3		15.9		6.5		16000	9.3	14.7	24.5	29.4	3.5	8.4
400	25.9		15.9		8.0		20000	6.2		19.1		3.5	
500	23.9	29.0	15.3	19.8	7.5	12.1							

File Translated: I:\Crossroads-Vent.13972\42106.Acoustical-Cons\N-D\Belleayre Resort_ENSR Project Files to OB
Model/Serial Number: 824 / A3287

Overall Spectral Ln's

Hz	L1.00	L10.00	L50.00	L90.00	L99.00	L99.90	Hz	L1.00	L10.00	L50.00	L90.00	L99.00	L99.90
12.5	56.0	46.5	34.0	24.5	18.5	0.0	630	32.5	25.0	0.0	0.0	0.0	0.0
16.0	53.5	44.0	33.0	24.0	18.5	0.0	800	31.0	23.5	0.0	0.0	0.0	0.0
20.0	51.0	42.0	31.5	23.0	17.5	0.0	1000	29.5	21.5	0.0	0.0	0.0	0.0
25.0	48.0	40.5	30.5	22.0	16.5	0.0	1250	28.0	19.5	0.0	0.0	0.0	0.0
31.5	46.0	39.5	30.0	21.0	15.0	0.0	1600	27.0	18.0	0.0	0.0	0.0	0.0
40.0	44.5	38.0	29.5	19.5	0.0	0.0	2000	26.0	17.0	0.0	0.0	0.0	0.0
50.0	45.0	37.5	28.5	19.0	0.0	0.0	2500	29.0	16.5	0.0	0.0	0.0	0.0
63.0	46.5	36.0	27.5	18.0	0.0	0.0	3150	42.5	21.5	0.0	0.0	0.0	0.0
80.0	45.0	34.5	26.0	17.0	0.0	0.0	4000	47.5	24.5	0.0	0.0	0.0	0.0
100	45.0	34.0	24.0	15.5	0.0	0.0	5000	45.5	24.0	0.0	0.0	0.0	0.0
125	43.0	33.5	22.5	0.0	0.0	0.0	6300	40.5	19.0	0.0	0.0	0.0	0.0
160	40.0	32.0	21.5	0.0	0.0	0.0	8000	34.0	0.0	0.0	0.0	0.0	0.0
200	38.5	31.0	21.0	0.0	0.0	0.0	10000	22.5	0.0	0.0	0.0	0.0	0.0
250	38.5	31.0	20.5	0.0	0.0	0.0	12500	19.0	0.0	0.0	0.0	0.0	0.0
315	37.0	30.0	19.0	0.0	0.0	0.0	16000	15.0	0.0	0.0	0.0	0.0	0.0
400	35.5	29.0	18.0	0.0	0.0	0.0	20000	0.0	0.0	0.0	0.0	0.0	0.0
500	34.0	27.0	16.5	0.0	0.0	0.0							

Ln Start Level: 15 dB

L1.00	53.3 dBA	L50.00	28.2 dBA	L99.00	20.1 dBA
L10.00	38.0 dBA	L90.00	21.2 dBA	L99.90	19.7 dBA

Detector: Slow
Weighting: A
SPL Exceedance Level 1: 85.0 dB Exceeded: 0 times
SPL Exceedance level 2: 120 dB Exceeded: 0 times
Peak-1 Exceedance Level: 105 dB Exceeded: 0 times
Peak-2 Exceedance Level: 100 dB Exceeded: 0 times
Hysteresis: 2
Overloaded: 0 time(s)
Paused: 0 times for 00:00:00.0

Current Any Data
Start Time: 09-May-2007 10:43:08
Elapsed Time: 24:00:00.7

	A Weight		C Weight		Flat	
Leq:	39.5 dBA		45.9 dBC		49.8 dBF	
SEL:	88.9 dBA		95.2 dBC		99.2 dBF	
Peak:	89.0 dBA		88.3 dBC		88.7 dBF	
	10-May-2007	09:59:29	09-May-2007	10:49:02	10-May-2007	09:59:29
Lmax (slow):	65.6 dBA		69.4 dBC		74.6 dBF	
	10-May-2007	06:01:27	09-May-2007	15:34:51	09-May-2007	21:56:42
Lmin (slow):	19.1 dBA		26.3 dBC		28.5 dBF	
	10-May-2007	02:45:51	10-May-2007	03:32:02	10-May-2007	03:32:06
Lmax (fast):	69.0 dBA		72.4 dBC		78.6 dBF	
	10-May-2007	06:01:27	09-May-2007	15:34:29	09-May-2007	21:56:42
Lmin (fast):	18.9 dBA		25.1 dBC		26.9 dBF	
	10-May-2007	02:45:51	10-May-2007	02:45:49	10-May-2007	03:29:12
Lmax (impulse):	71.7 dBA		75.6 dBC		81.7 dBF	
	10-May-2007	10:12:02	09-May-2007	21:56:42	09-May-2007	21:56:42
Lmin (impulse):	19.0 dBA		26.6 dBC		29.1 dBF	
	10-May-2007	02:45:51	10-May-2007	03:22:58	10-May-2007	03:32:06

Calibrated: 13-Mar-2007 03:52:50 Offset: -47.8 dB
Checked: 10-May-2007 10:44:12 Level: 93.9 dB
Calibrator not set Level: 93.8 dB
Cal Records Count: 1

Interval Records: Enabled Number Interval Records: 25
History Records: Enabled Number History Records: 1442
Run/Stop Records: Number Run/Stop Records: 2

File Translated: I:\Crossroads-Vent.13972\42106.Acoustical-Cons\N-D\Belleayre Resort_ENSR Project
Model/Serial Number: 824 / A3287
Firmware/Software Revs: 4.272 / 3.120
Name: Enter Company Name
Descr1: Enter Address Line 1
Descr2: Enter Address Line 2
Setup/Setup Descr: fpl_2006.ssa / SLM & RTA; 1/3 Sp. Ln; 1s THi
Location: Crossroads Ventures - Pine Hill, NY
Note1: ML-W1
Note2: Wildacres - South

Interval Records: 25

Exch. Rate	Threshold	Intv Period	Sync Hours/Minutes	Save Ln	Auto Stop
3 dB	0	01:00:00	Yes	Yes	No

Note: Use 'File/Export' to see interval Leq and Max spectra

Rec #	Date	Time	Duration	Leq	SEL	Min	Max
1	09-May-2007	10:43:08	01:00:00	38.6 dBA	74.1 dBA	20.0 dBA	60.3 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
88.2 dBF	88.9 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
52.4 dBA	38.8 dBA	26.0 dBA	22.0 dBA	20.5 dBA	20.0 dBA		

Rec #	Date	Time	Duration	Leq	SEL	Min	Max
2	09-May-2007	11:43:08	01:00:00	35.0 dBA	70.5 dBA	21.1 dBA	54.8 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
77.9 dBF	68.5 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
49.6 dBA	32.4 dBA	26.9 dBA	23.2 dBA	21.7 dBA	21.1 dBA		

Rec #	Date	Time	Duration	Leq	SEL	Min	Max
3	09-May-2007	12:43:08	01:00:00	34.4 dBA	70.0 dBA	23.0 dBA	48.3 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
84.7 dBF	66.0 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
44.1 dBA	37.9 dBA	30.5 dBA	26.0 dBA	23.4 dBA	23.0 dBA		

Rec #	Date	Time	Duration	Leq	SEL	Min	Max
4	09-May-2007	13:43:08	01:00:00	33.7 dBA	69.3 dBA	21.4 dBA	56.6 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
84.7 dBF	71.3 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
40.2 dBA	34.9 dBA	29.8 dBA	24.6 dBA	22.0 dBA	21.4 dBA		

Rec #	Date	Time	Duration	Leq	SEL	Min	Max
5	09-May-2007	14:43:08	01:00:00	37.1 dBA	72.7 dBA	21.4 dBA	57.3 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
81.4 dBF	74.6 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
49.9 dBA	38.0 dBA	31.5 dBA	24.5 dBA	22.2 dBA	21.4 dBA		

Rec #	Date	Time	Duration	Leq	SEL	Min	Max
6	09-May-2007	15:43:08	01:00:00	30.6 dBA	66.1 dBA	21.0 dBA	46.9 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
78.1 dBF	62.8 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
38.8 dBA	33.3 dBA	28.4 dBA	23.7 dBA	21.4 dBA	21.0 dBA		

Rec #	Date	Time	Duration	Leq	SEL	Min	Max
7	09-May-2007	16:43:08	01:00:00	28.0 dBA	63.6 dBA	20.6 dBA	41.0 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
75.8 dBF	62.7 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
35.8 dBA	31.8 dBA	25.8 dBA	22.2 dBA	21.0 dBA	20.6 dBA		

Rec #	Date	Time	Duration	Leq	SEL	Min	Max
8	09-May-2007	17:43:08	01:00:00	26.7 dBA	62.3 dBA	20.1 dBA	41.4 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
70.6 dBF	60.4 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
35.0 dBA	29.5 dBA	24.8 dBA	22.0 dBA	20.4 dBA	20.1 dBA		

Rec #	Date	Time	Duration	Leq	SEL	Min	Max
9	09-May-2007	18:43:08	01:00:00	29.1 dBA	64.6 dBA	20.1 dBA	48.8 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
70.9 dBF	68.4 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
39.7 dBA	30.9 dBA	25.0 dBA	22.1 dBA	20.3 dBA	20.1 dBA		

Interval Records: 25

Rec #	Date	Time	Duration	Leq	SEL	Min	Max
10	09-May-2007	19:43:08	01:00:00	34.1 dBA	69.7 dBA	19.5 dBA	59.8 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
73.9 dBF	74.0 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
44.7 dBA	34.7 dBA	23.4 dBA	20.4 dBA	19.5 dBA	19.5 dBA		
Rec #	Date	Time	Duration	Leq	SEL	Min	Max
11	09-May-2007	20:43:08	01:00:00	33.7 dBA	69.3 dBA	24.3 dBA	45.6 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
82.7 dBF	70.1 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
41.3 dBA	36.9 dBA	32.1 dBA	27.3 dBA	24.7 dBA	24.3 dBA		
Rec #	Date	Time	Duration	Leq	SEL	Min	Max
12	09-May-2007	21:43:08	01:00:00	36.1 dBA	71.7 dBA	27.3 dBA	46.6 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
87.0 dBF	72.5 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
44.2 dBA	39.6 dBA	34.0 dBA	29.8 dBA	27.9 dBA	27.3 dBA		
Rec #	Date	Time	Duration	Leq	SEL	Min	Max
13	09-May-2007	22:43:08	01:00:00	33.4 dBA	69.0 dBA	24.2 dBA	46.2 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
82.1 dBF	67.4 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
41.1 dBA	36.6 dBA	31.3 dBA	27.1 dBA	25.1 dBA	24.2 dBA		
Rec #	Date	Time	Duration	Leq	SEL	Min	Max
14	09-May-2007	23:43:08	01:00:00	27.7 dBA	63.3 dBA	20.7 dBA	36.6 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
80.3 dBF	61.1 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
34.9 dBA	31.6 dBA	25.3 dBA	21.9 dBA	21.0 dBA	20.7 dBA		
Rec #	Date	Time	Duration	Leq	SEL	Min	Max
15	10-May-2007	00:43:08	01:00:00	24.7 dBA	60.3 dBA	21.0 dBA	36.1 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
70.1 dBF	59.0 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
31.3 dBA	27.3 dBA	23.3 dBA	21.9 dBA	21.1 dBA	21.0 dBA		
Rec #	Date	Time	Duration	Leq	SEL	Min	Max
16	10-May-2007	01:43:08	01:00:00	22.5 dBA	58.1 dBA	19.6 dBA	34.2 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
73.2 dBF	65.0 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
29.7 dBA	24.4 dBA	21.3 dBA	20.2 dBA	19.6 dBA	19.6 dBA		
Rec #	Date	Time	Duration	Leq	SEL	Min	Max
17	10-May-2007	02:43:08	01:00:00	20.9 dBA	56.5 dBA	19.1 dBA	36.0 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
69.5 dBF	66.1 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
23.7 dBA	21.7 dBA	20.7 dBA	20.0 dBA	19.1 dBA	19.1 dBA		
Rec #	Date	Time	Duration	Leq	SEL	Min	Max
18	10-May-2007	03:43:08	01:00:00	26.3 dBA	61.9 dBA	19.7 dBA	50.4 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
71.4 dBF	62.2 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
30.5 dBA	23.9 dBA	21.6 dBA	20.3 dBA	20.0 dBA	19.7 dBA		
Rec #	Date	Time	Duration	Leq	SEL	Min	Max
19	10-May-2007	04:43:08	01:00:00	44.1 dBA	79.6 dBA	19.6 dBA	62.5 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
76.2 dBF	77.1 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
56.9 dBA	46.8 dBA	31.8 dBA	20.7 dBA	20.0 dBA	19.6 dBA		
Rec #	Date	Time	Duration	Leq	SEL	Min	Max
20	10-May-2007	05:43:08	01:00:00	47.8 dBA	83.4 dBA	22.9 dBA	65.6 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
78.2 dBF	78.6 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
59.2 dBA	52.1 dBA	36.1 dBA	28.9 dBA	25.1 dBA	23.5 dBA		
Rec #	Date	Time	Duration	Leq	SEL	Min	Max
21	10-May-2007	06:43:08	01:00:00	44.1 dBA	79.7 dBA	23.4 dBA	60.8 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
75.7 dBF	75.6 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
56.8 dBA	47.5 dBA	34.5 dBA	28.2 dBA	25.0 dBA	23.4 dBA		

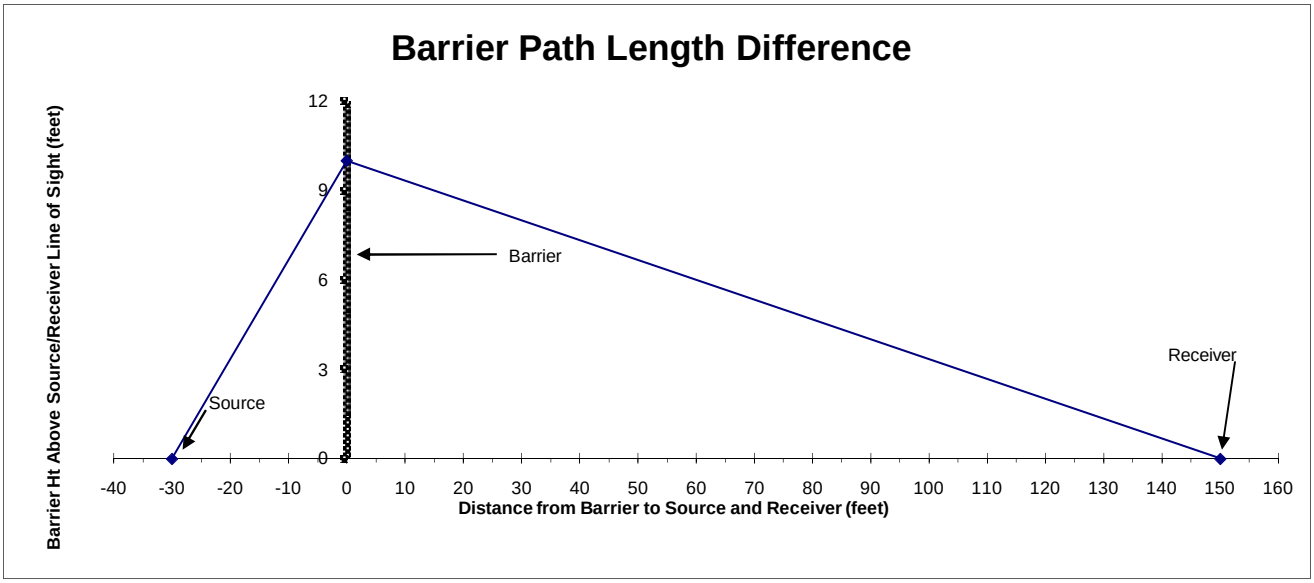
Interval Records: 25

Rec #	Date	Time	Duration	Leq	SEL	Min	Max
21	10-May-2007	06:43:08	01:00:00	44.1 dBA	79.7 dBA	23.4 dBA	60.8 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
75.7 dBF	75.6 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
56.8 dBA	47.5 dBA	34.5 dBA	28.2 dBA	25.0 dBA	23.4 dBA		
Rec #	Date	Time	Duration	Leq	SEL	Min	Max
22	10-May-2007	07:43:08	01:00:00	40.6 dBA	76.2 dBA	20.1 dBA	61.4 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
80.7 dBF	82.0 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
51.9 dBA	42.7 dBA	33.1 dBA	26.0 dBA	22.9 dBA	21.2 dBA		
Rec #	Date	Time	Duration	Leq	SEL	Min	Max
23	10-May-2007	08:43:08	01:00:00	46.4 dBA	82.0 dBA	20.3 dBA	61.9 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
75.5 dBF	76.1 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
59.0 dBA	49.3 dBA	33.3 dBA	26.2 dBA	22.3 dBA	20.4 dBA		
Rec #	Date	Time	Duration	Leq	SEL	Min	Max
24	10-May-2007	09:43:08	01:00:00	40.4 dBA	76.0 dBA	21.6 dBA	61.1 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
88.7 dBF	89.0 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
53.7 dBA	41.6 dBA	32.3 dBA	26.4 dBA	23.5 dBA	22.2 dBA		
Rec #	Date	Time	Duration	Leq	SEL	Min	Max
25	10-May-2007	10:43:08	00:00:00.8	31.3 dBA	30.1 dBA	30.9 dBA	31.8 dBA
UwPeak	Peak	Excd SPL	Excd Peak-1	Excd Peak-2	Overloads		
57.3 dBF	53.5 dBA	0	0	0	0		
L1.00	L10.00	L50.00	L90.00	L99.00	L99.90		
999.0 dBA	31.7 dBA	31.2 dBA	30.9 dBA	30.9 dBA	30.9 dBA		

Construction Noise Barrier Calculation Diagram

Spreadsheet 9 (SS9) - Barrier Path Length Difference Calculation

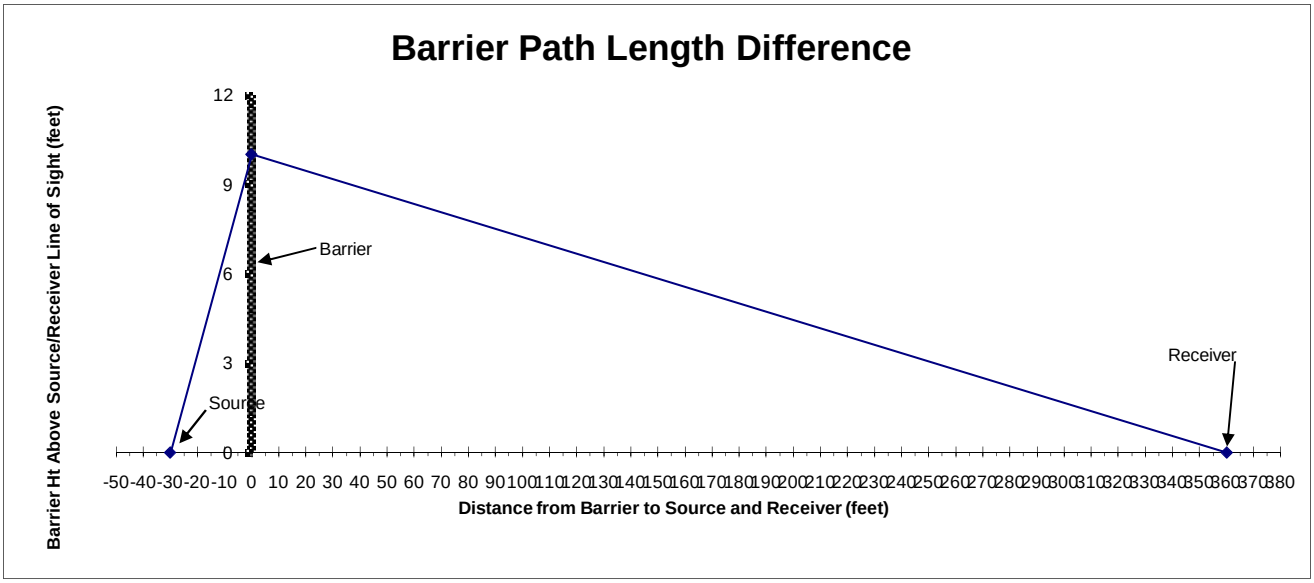
Barrier ID	Receiver to Barrier Distance S in feet	Source to Barrier Distance R in feet	Barrier Ht above LOS h in feet	Path Length Difference (delta in feet)	Source X Coordinate	Barrier X Coordinate	Receiver X Coordinate	Source Y Coordinate	Barrier Y Coordinate	Receiver Y Coordinate
B1	150	30	10	2.0	-30	0	150	0	10.0	0



Reference: 0

Spreadsheet 9 (SS9) - Barrier Path Length Difference Calculation

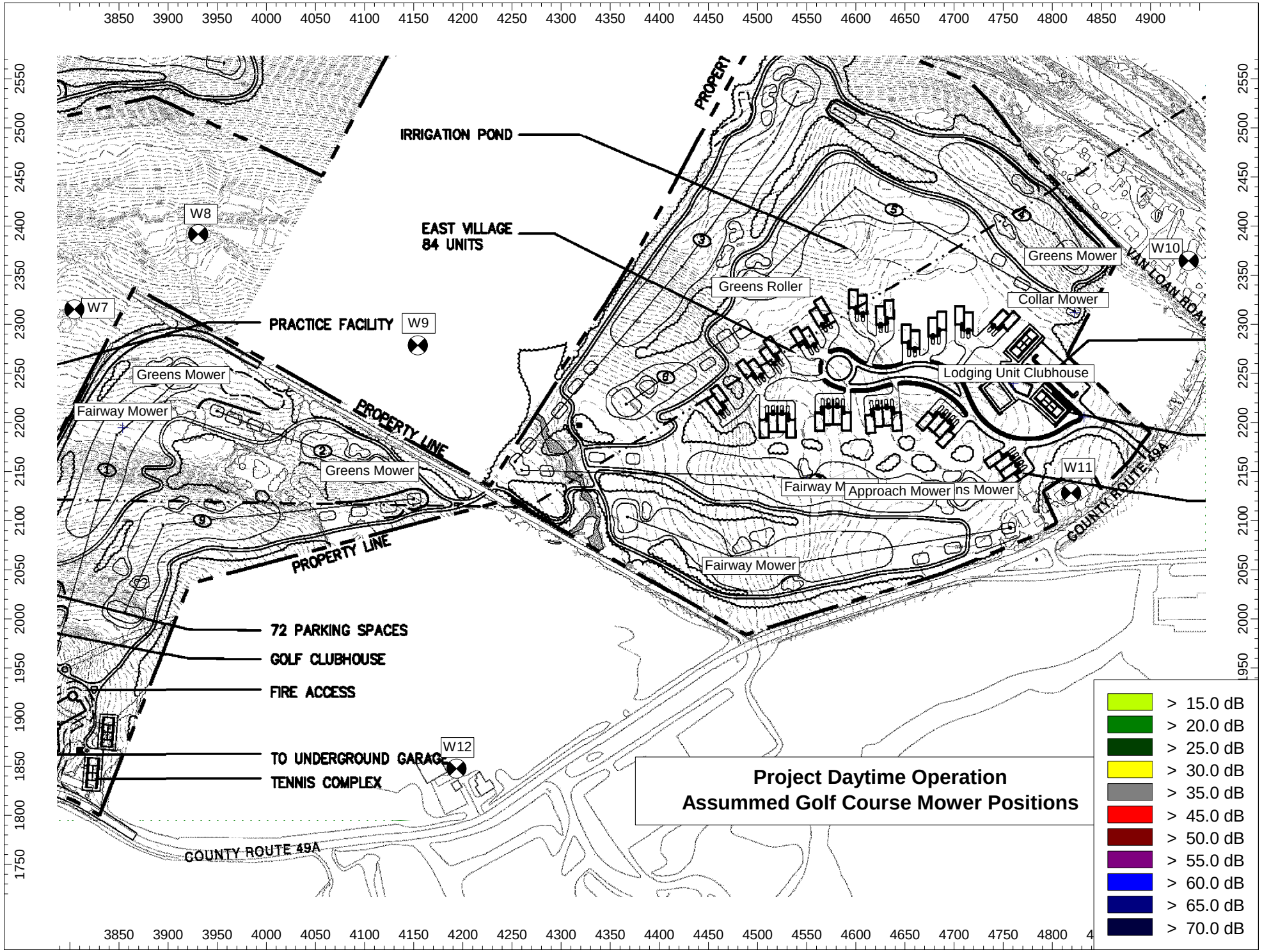
Barrier ID	Receiver to Barrier Distance S in feet	Source to Barrier Distance R in feet	Barrier Ht above LOS h in feet	Path Length Difference (delta in feet)	Source X Coordinate	Barrier X Coordinate	Receiver X Coordinate	Source Y Coordinate	Barrier Y Coordinate	Receiver Y Coordinate
B2	360	30	10	1.8	-30	0	360	0	10.0	0

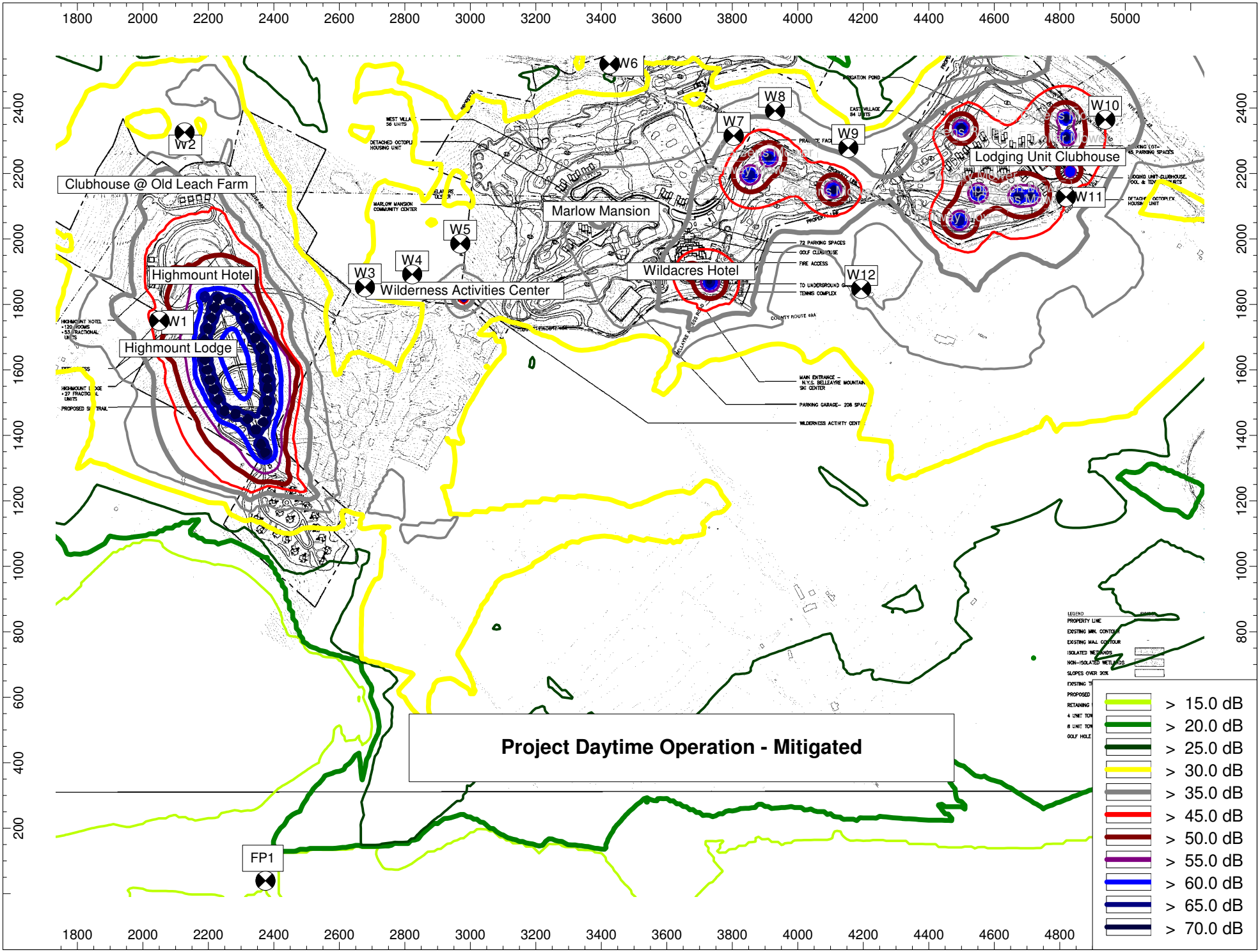


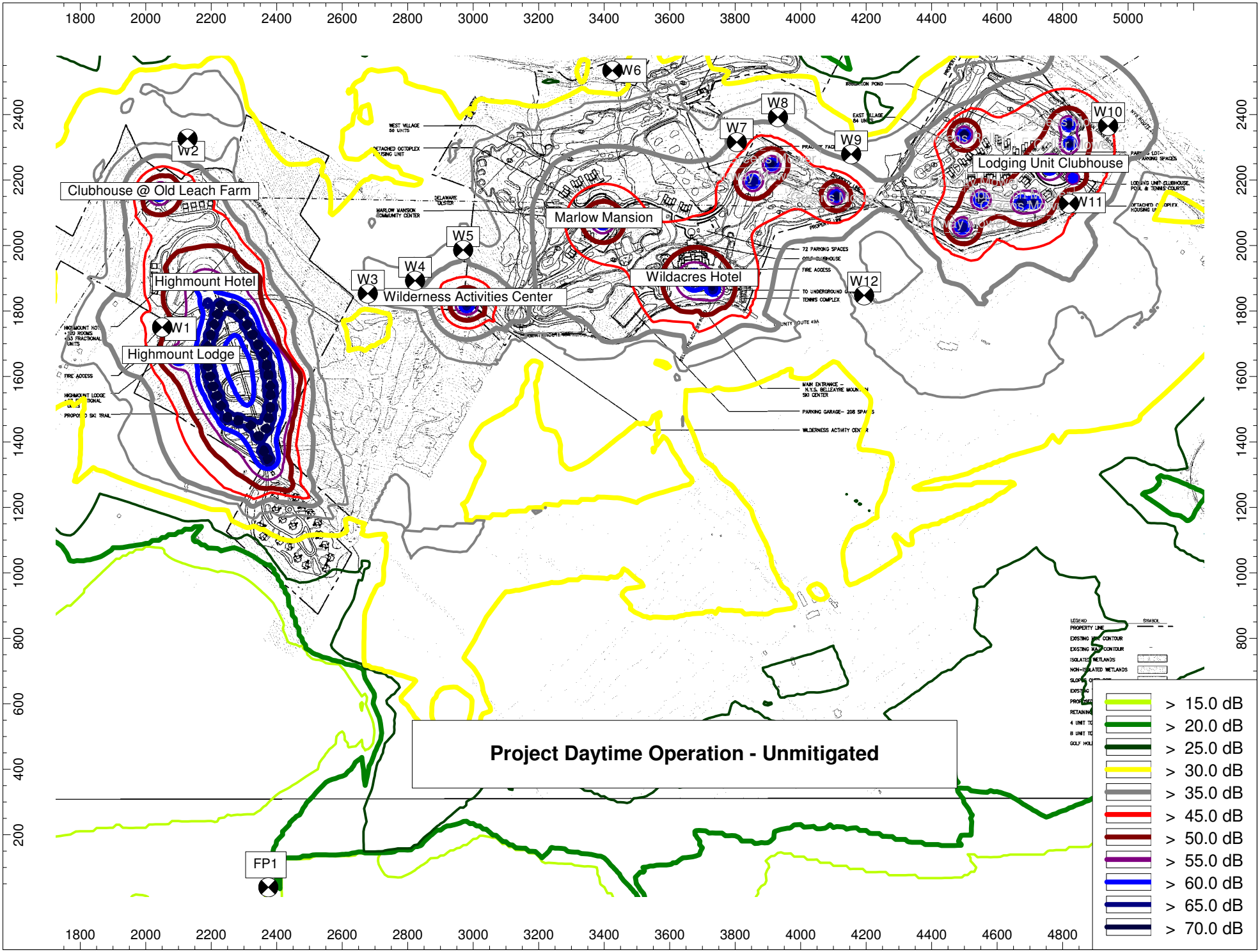
Reference: 0

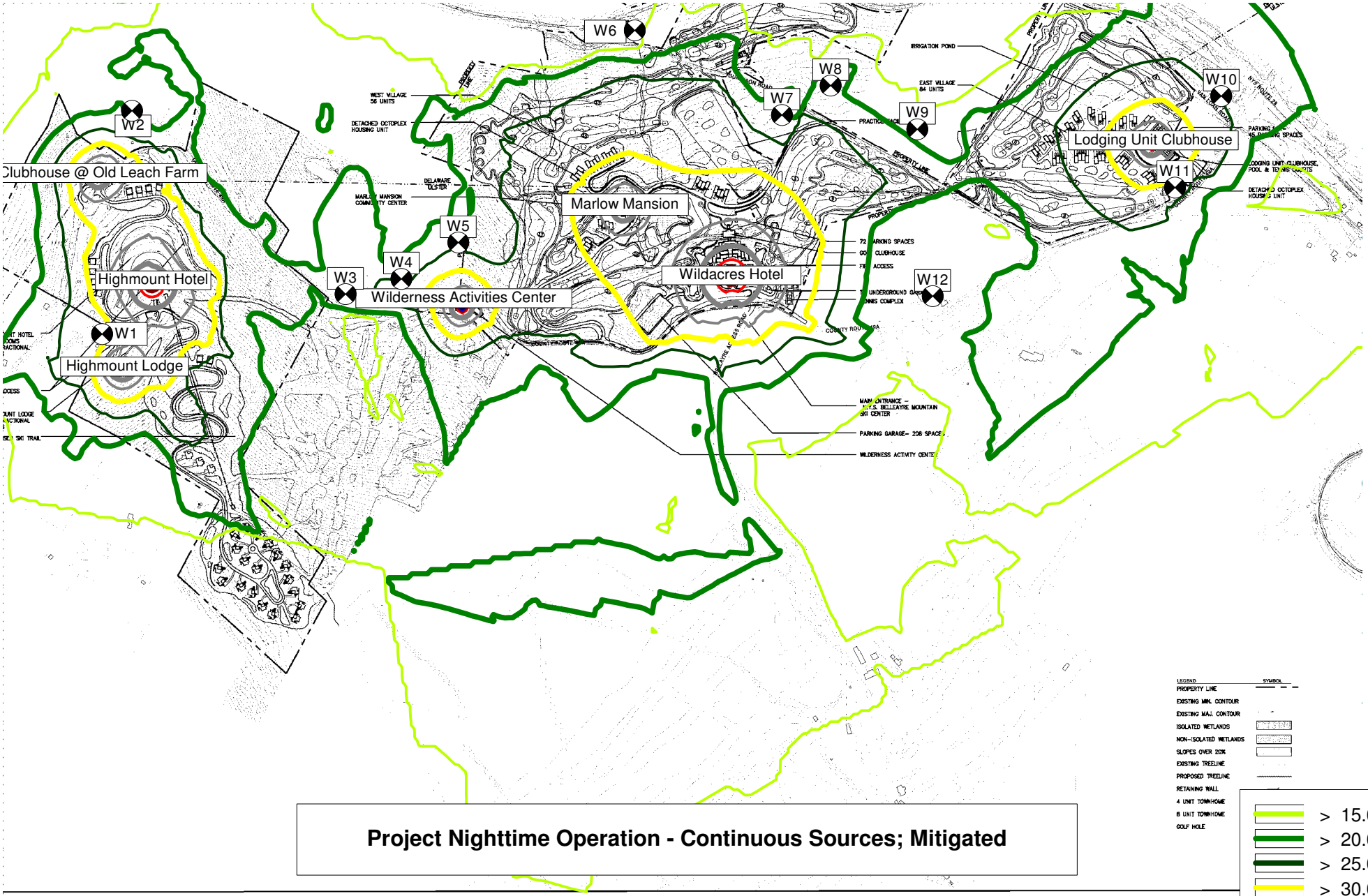
Note: Assumed sound reduction for 250 Hz.

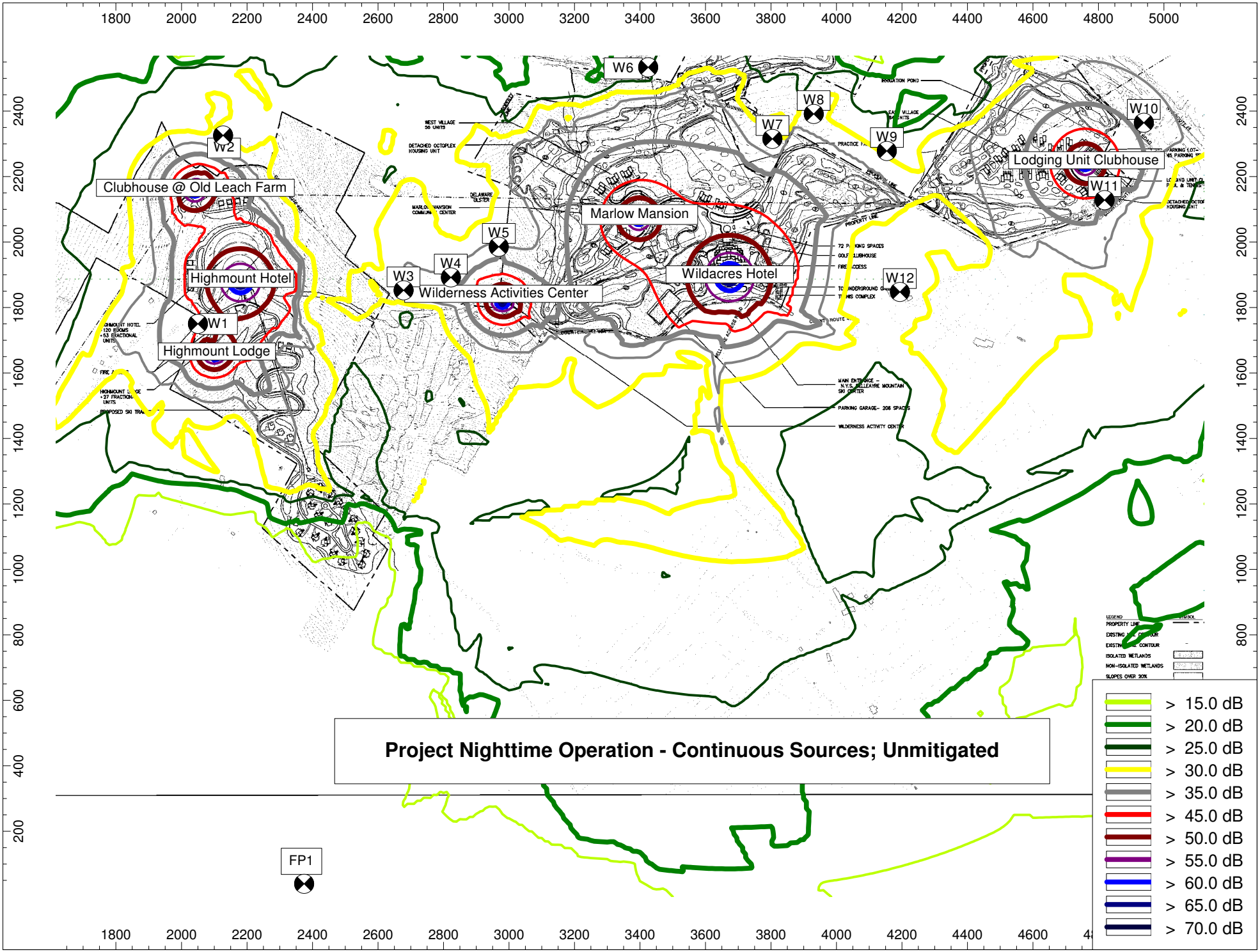
CadnaA Graphical Output – Decibel Contours

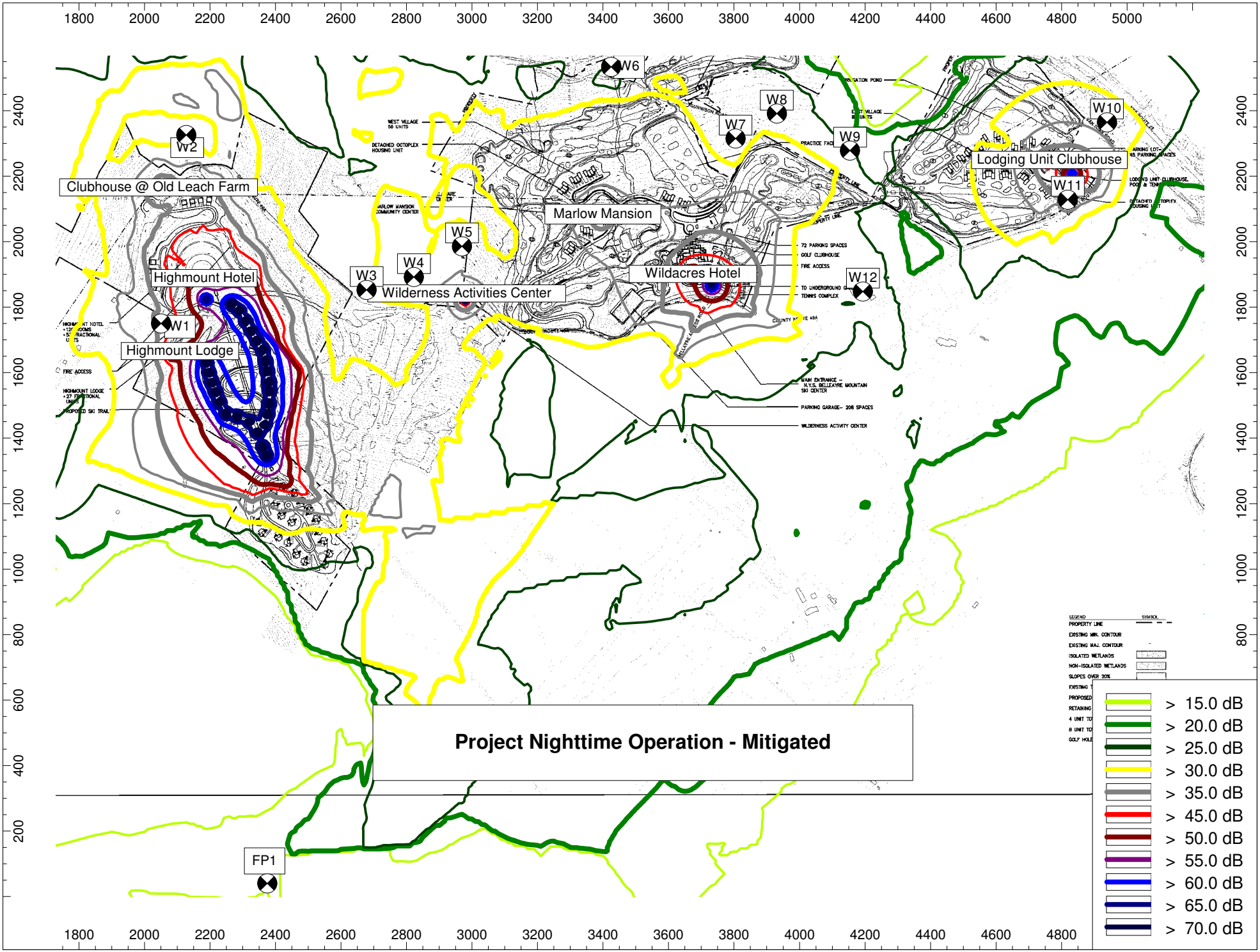

IRRIGATION POND
EAST VILLAGE
84 UNITS
PRACTICE FACILITY
PROPERTY LINE
PROPERTY LINE
72 PARKING SPACES
GOLF CLUBHOUSE
FIRE ACCESS
TO UNDERGROUND GARAGE
TENNIS COMPLEX
COUNTY ROUTE 49A
COUNTY ROUTE 49A
VAN LOAN ROAD
W7
W8
W9
W10
W11
W12
Greens Mower
Fairway Mower
Greens Mower
Greens Roller
Greens Mower
Collar Mower
Lodging Unit Clubhouse
Fairway M
Approach Mower
ns Mower
Fairway Mower
Project Daytime Operation
Assumed Golf Course Mower Positions
> 15.0 dB
> 20.0 dB
> 25.0 dB
> 30.0 dB
> 35.0 dB
> 45.0 dB
> 50.0 dB
> 55.0 dB
> 60.0 dB
> 65.0 dB
> 70.0 dB

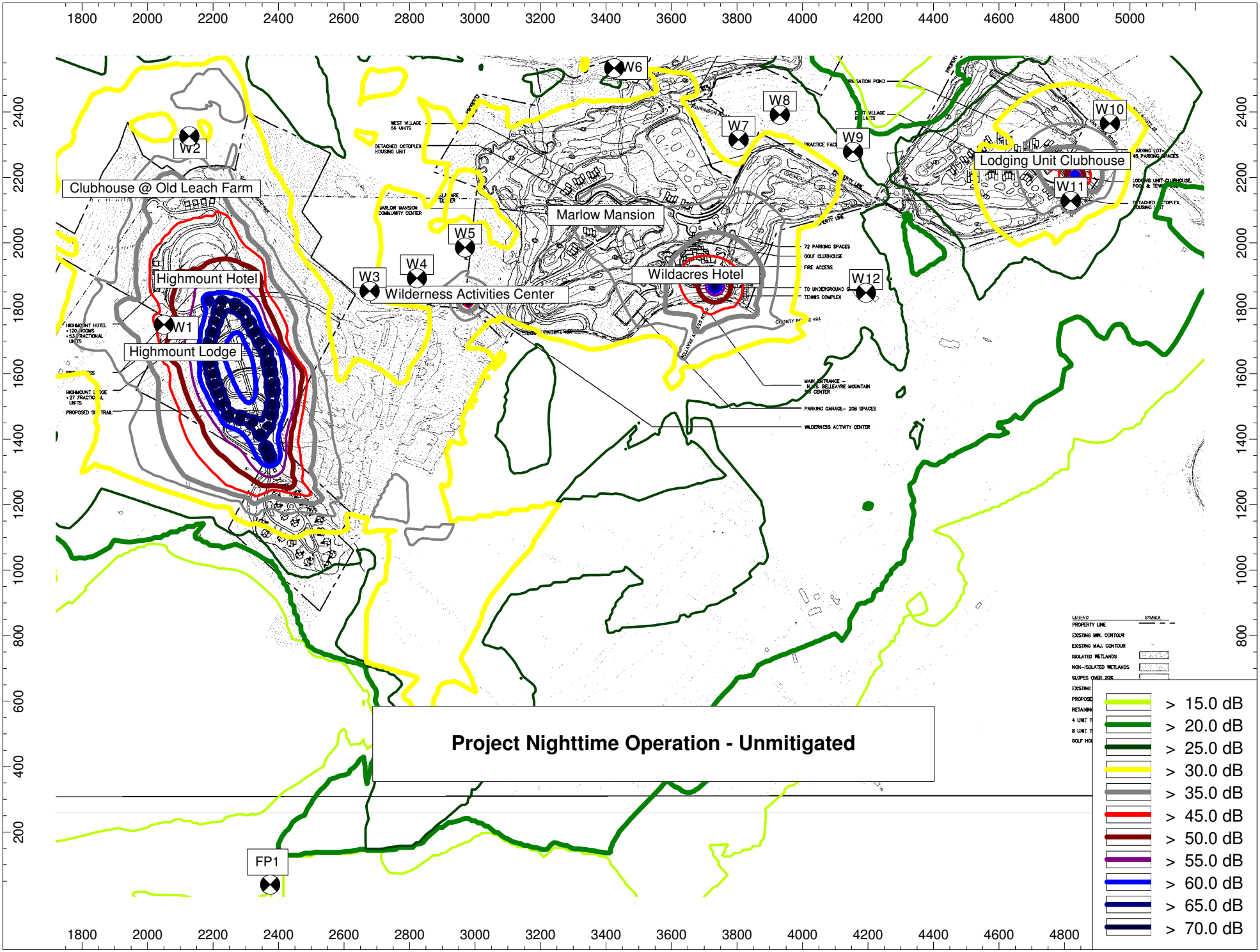

1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
W1
W2
W3
W4
W5
W6
W7
W8
W9
W10
W11
W12
FP1
Clubhouse @ Old Leach Farm
Highmount Hotel
Highmount Lodge
Wilderness Activities Center
Marlow Mansion
Wildacres Hotel
Lodging Unit Clubhouse
Project Daytime Operation - Mitigated
> 15.0 dB
> 20.0 dB
> 25.0 dB
> 30.0 dB
> 35.0 dB
> 45.0 dB
> 50.0 dB
> 55.0 dB
> 60.0 dB
> 65.0 dB
> 70.0 dB


W1
W2
W3
W4
W5
W6
W7
W8
W9
W10
W11
W12
FP1
Clubhouse @ Old Leach Farm
Highmount Hotel
Highmount Lodge
Wilderness Activities Center
Marlow Mansion
Wildacres Hotel
Lodging Unit Clubhouse
Project Daytime Operation - Unmitigated
> 15.0 dB
> 20.0 dB
> 25.0 dB
> 30.0 dB
> 35.0 dB
> 45.0 dB
> 50.0 dB
> 55.0 dB
> 60.0 dB
> 65.0 dB
> 70.0 dB


W1
W2
W3
W4
W5
W6
W7
W8
W9
W10
W11
W12
FP1
Highmount Hotel
Highmount Lodge
Clubhouse @ Old Leach Farm
Wilderness Activities Center
Marlow Mansion
Wildacres Hotel
Lodging Unit Clubhouse
Project Nighttime Operation - Continuous Sources; Mitigated
> 15.0 dB
> 20.0 dB
> 25.0 dB
> 30.0 dB
> 35.0 dB
> 45.0 dB
> 50.0 dB
> 55.0 dB
> 60.0 dB
> 65.0 dB
> 70.0 dB


1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
W1
W2
W3
W4
W5
W6
W7
W8
W9
W10
W11
W12
FP1
Clubhouse @ Old Leach Farm
Highmount Hotel
Highmount Lodge
Wilderness Activities Center
Marlow Mansion
Wildacres Hotel
Lodging Unit Clubhouse
Project Nighttime Operation - Continuous Sources; Unmitigated
> 15.0 dB
> 20.0 dB
> 25.0 dB
> 30.0 dB
> 35.0 dB
> 45.0 dB
> 50.0 dB
> 55.0 dB
> 60.0 dB
> 65.0 dB
> 70.0 dB


1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
W1
W2
W3
W4
W5
W6
W7
W8
W9
W10
W11
W12
FP1
Clubhouse @ Old Leach Farm
Highmount Hotel
Highmount Lodge
Wilderness Activities Center
Marlow Mansion
Wildacres Hotel
Lodging Unit Clubhouse
Project Nighttime Operation - Mitigated
> 15.0 dB
> 20.0 dB
> 25.0 dB
> 30.0 dB
> 35.0 dB
> 45.0 dB
> 50.0 dB
> 55.0 dB
> 60.0 dB
> 65.0 dB
> 70.0 dB


W1
W2
W3
W4
W5
W6
W7
W8
W9
W10
W11
W12
FP1
Clubhouse @ Old Leach Farm
Highmount Hotel
Highmount Lodge
Wilderness Activities Center
Marlow Mansion
Wildacres Hotel
Lodging Unit Clubhouse
Project Nighttime Operation - Unmitigated
> 15.0 dB
> 20.0 dB
> 25.0 dB
> 30.0 dB
> 35.0 dB
> 45.0 dB
> 50.0 dB
> 55.0 dB
> 60.0 dB
> 65.0 dB
> 70.0 dB

360° Engineering and Project Delivery Solutions

All materials printed on recycled paper.

O'BRIEN & GERE