*crossroads ventures llc*

# DRAFT
# Environmental Impact Statement

## Appendix 22A

## Air Quality Assessment of Construction Activities

## The Belleayre Resort at Catskill Park

ENSR INTERNATIONAL

ENSR International
6601 Kirkville Road
East Syracuse, NY 13057-9672
(315) 432-0506
FAX (315) 437-0509
www.ensr.com

December 18, 2002

Mr. Dean Gitter
Crossroads Ventures, LLC
72 Andrew Lane Road
Mt. Tremper, NY 12457

**RE: Air Quality Impact Analysis for Concrete and Rock Crushing Plants**
**Proposed Belleayre Resort**
**ENSR Project Number 08736331**

Dear Mr. Gitter:

ENSR International (ENSR) has prepared this report to summarize the approach and results of an air quality impact analysis performed for particulate emitted to the ambient air from one portable concrete batch plant and two portable rock crushing plants. These three plants are anticipated to be temporarily installed and operated during the first two years of construction of the proposed Belleayre Resort at Catskill Park Development Project.

## 1.0 IMPACT ASSESSMENT OVERVIEW

The primary purpose of this analysis is to define a preliminary design and operating scenario of the plants such that they would not cause significant air quality impacts on the public, specifically the neighboring residential properties. Assumptions that were developed regarding the design and operation of the plants include:

- types of processing equipment that have the potential to emit particulate (hereafter referred to as emission sources),
- amount of particulate emissions for each piece of equipment,
- processing capacities (throughput) of each piece of equipment, and
- types of emission control devices or techniques, if applicable.

These assumptions are discussed in detail in Section 2.0 of this report, and should be considered as preliminary because the plants' manufacturer and model have not been selected (these decisions are not typically made at this stage of project development). Therefore, the analysis may need to be revised when the final design and operating parameters are known.

For the purpose of this analysis, air quality impacts from these three plants are defined as the concentrations of particulate in ambient air at existing residential properties nearest to the plants. ENSR has predicted the ambient air concentrations using air dispersion modeling and following USEPA protocols, as described in Section 3.0.

Air quality impacts were determined to be acceptable if the concentrations are less than the National Ambient Air Quality Standards (NAAQS). The USEPA has established a NAAQS for particulate less than 10 microns in aerodynamic diameter, referred to as $PM_{10}$. Therefore, this analysis has exclusively evaluated impacts for $PM_{10}$. Note that there can be other pollutants emitted by these plants but $PM_{10}$ is considered to be the primary pollutant. The impacts (modeling results) are presented and evaluated in Section 4.0.

## 2.0 PLANT DESCRIPTION AND EMISSION INVENTORY

Descriptions for both the concrete plant and rock crushing plants are provided below. These descriptions provide preliminary details about the plants' designs and operations as obtained through conversations with Crossroads Ventures, its consultant (The LA Group), and equipment vendors. Typical plant design and operations were provided in USEPA's AP-42 documents for concrete batch (AP-42, Section 11.12) and rock crushing plants (AP-42, Section 11.19.2). AP-42 documents also provided emission factors for the various emission sources. These descriptions were used as the basis to develop emission inventories (emission sources and emission rates) that are used in the air dispersion modeling.

### 2.1 Concrete Plant Description

Concrete batch plants mix sand, crushed rock, cement, ash and water to produce batches of concrete that are then delivered for use at construction sites. Sand and rock are delivered via dump trucks and conveyed onto ground level storage piles. Using a front-end loader, the sand and rock are transferred onto conveyors, which convey the sand and rock into elevated storage bins. The tops of these elevated storage bins are open to the atmosphere. Cement and cement supplement (fly ash) are blown into an enclosed silo from a delivery truck. All four raw materials (sand, rock, cement and fly ash) are then gravity fed to a weigh hopper. From the weigh hopper, the mixture is gravity fed into trucks, where it is mixed with water to form concrete.

All of these above processes are potential sources of $PM_{10}$ emissions. It is assumed that the concrete plant will have a central dust collector that will control particulate emissions from the silo, weigh hopper and the truck filling, along with a dust suppression (wet spray) on the rock delivery and conveying sources. The owner/operator will be responsible for installing and operating all control devices.

### 2.2 Rock Crushing Plant Description

Rock crushing plants mechanically reduce the size of rocks into one or more size categories of crushed stone. The proposed rock crushing plants are expected to produce one stone size through a series of primary and secondary screeners and crushers. The two plants are assumed to be identical. Rock is delivered via a dump truck onto the primary sorting screens. The primary screens serve to sort the rock in order to prevent rock that is too big from entering the primary crusher. Rock that passes through the primary screens drops into the primary crusher. The rock that is too large to pass through the primary screens drops off the screen onto the ground where it is broken into smaller pieces and fed back onto the primary screens. Rock from the primary crusher is then horizontally conveyed to the secondary sorting screens. The rock is then sorted again through the secondary screens. Rock that passes through the secondary screens drops in the secondary crusher. Rock that is too large to pass through the secondary screens drops onto the ground and is fed back onto the primary screens for re-crushing through the primary crusher. The crushed stone that exists the secondary crusher is conveyed to a storage stockpile. The stone is then loaded via a front-end loader to trucks and sent to the job site.

All of these above processes (loading, unloading, conveying, screeners, and crushers) are potential sources of $PM_{10}$ emissions. It is assumed that particulate emissions from the rock crushing operations are controlled with a dust suppression system (wet spray). The owner/operator will be responsible for installing and operating all control devices.

## 2.3 Emission Inventory

The emission sources described above are identified in Attachment I. Their maximum hourly emission rates of $PM_{10}$ were calculated using each source's emission factors (controlled or uncontrolled) and throughput. Attachment I presents the emission factors, emission rate calculations, the resulting emission rates, and assumptions used for each source. Annual emission rates were calculated using the maximum hourly emission rates times the number of hours the plants are expected to operate in a year (conservatively, 12 hours per day, six days per week for 52 weeks per year).

Emission factors, based upon the throughput of material and/or product, were taken from the USEPA AP-42 documents referenced above. Preliminary assumptions regarding the throughput rate were provided by Crossroads Ventures and The LA Group. The removal efficiency of the dust collector for the weigh hopper loading and truck mix loading was assumed to be 99.9 percent as provided by a dust collector vendor (C&W Manufacturing), with an assumed capture efficiency of 95 percent. Table 1 presents the total hourly and annual emission rates for the two types of plants.

The emission inventory includes process sources only and does not include emissions from combustion sources, emissions due to wind erosion of storage piles, or emissions due to the movement of associated trucks over unpaved roads.

# 3.0 AIR DISPERSION MODELING METHODOLOGY

Emissions were modeled using the latest version of the USEPA Screen3 (96043) air dispersion model. Modeling procedures presented in the USEPA document *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised* (USEPA 1992) were followed. Screen3 is a screening level model that assumes worst-case meteorological conditions to yield conservative upper bound predictions of ambient air concentrations. It also includes an algorithm to calculate cavity impacts and can simulate downwash situations. For this analysis, flat terrain was assumed (i.e., complex terrain was not considered).

Screen3 is limited to calculating impacts on a one-hour basis. The applicable USEPA NAAQS for $PM_{10}$ are on a 24-hour and annual basis. Therefore, representative impacts need to be calculated by using multiplying factors to scale the impacts to representative 24-hour and annual impacts, as suggested in the USEPA document referenced above (USEPA 1992). For 24-hour impacts, this was accomplished by multiplying the one-hour impact given by Screen3 by 0.6 to scale it to a 12-hour impact. This 12-hour impact was then divided by two to represent a 24-hour impact. This calculation was used instead of a direct scaling from a one-hour impact to a 24-hour impact since the rock crushing and concrete plants will operate only a maximum of 12 hours a day, except for brief monolithic pours. One-hour impacts given by Screen3 were multiplied by 0.08 to scale them to representative annual impacts.

Since one of the rock crushing plants and the concrete plant will be installed at the same location (the practice range at the Highmount Golf Club), the combined impact from both facilities was used for comparison against the $PM_{10}$ NAAQS. Therefore, combined impacts were totaled for one rock crushing plant and the concrete plant. Annual and 24-hour background $PM_{10}$ concentrations of 14 $ug/m^3$ and 58 $ug/m^3$, respectively, were added to the modeling results. These background concentrations were obtained from the New York State Department of Environmental Conservation (NYSDEC) continuous monitoring site on Belleayre Mountain.

Because of the overall fugitive nature and close proximity of the emission sources, two different modeling approaches were utilized in this analysis. Emissions from each plant were modeled as one large volume source and as one point source with low (0.01 meter per second) exit velocity and small stack diameter (0.01 meter). The maximum one-hour impacts from the volume and point source modeling approaches were averaged before scaling to 24-hour and annual impacts (discussed above). Table 1 presents the release parameters used for the point and volume source modeling.

Dispersion modeling uses six atmospheric stability classes ranging from A (very unstable) to F (very stable). These stability classes are defined according to wind speed and the amount of solar radiation. E and F (stable and very stable) stabilities occur only during night time hours when solar radiation is absent. E and F stabilities were excluded from the analysis in both the volume and point source approach.

## 4.0 IMPACT RESULTS AND EVALUATION

Modeling results are summarized in Table 2. The results show the distance from the center of each plant location to a point where $PM_{10}$ ambient air concentrations meet the applicable NAAQS. Note that for the rock crushing plant co located with the concrete plant at the Highmount Golf Club practice range, the distance to compliant concentrations is 533 feet for the 24-hour standard and 148 feet for the annual standard. Similarly, the distance to compliant concentrations for the rock crushing plant only at the Big Indian Country Club practice range is 312 feet and 82 feet for the 24-hour and annual standards, respectively.

The location of the rock crushing/concrete plant is anticipated to be on the Wildacres Resort south of

Gunnison Road and north of Route 49A, as shown on Figure 1. The location of the rock crushing plant alone is anticipated to be on the Big Indian Country Club between Lost Cove Road and Route 28, as shown on Figure 2. These proposed locations of the rock crushing/concrete plant and rock crushing plant are expected to be 700 feet and 2,118 feet, respectively, away from the nearest residence. Therefore, since the nearest residences are further away from the plants than the compliant distances, the modeling shows that there will not be a significant air quality impact on existing residential properties.

If there are any questions regarding this analysis, please contact either of the undersigned at (315) 432-0506.

Sincerely,

Katie Cooper
Meteorologist

Mark A. Distler
Vice President
Senior Program Manager

Attachments: Tables 1 and 2
Figures 1 and 2
Attachment I – Emission Inventory

**Table 1**
**Model Inputs**
**Proposed Belleayre Resort**

| Source | Emission Rate (hourly) (lb/hr)[a] | Emission Rate (annual) (lb/hr)[b] | Point Source - Stack Height (ft)[c] | Point Source - Diam (ft) | Point Source - Velocity (ft/s) | Point Source - Temp (F) | Volume Source - Length (ft)[d] | Volume Source - Height (ft)[d] | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Concrete Plant | 1.1 | 0.46 | 20 | 0.03 | 0.03 | 70 | 100 | 40 | 1 |
| Rock Crushing Plant | 0.70 | 0.30 | 15 | 0.03 | 0.03 | 70 | 100 | 21 | 2 |

[a]Obtained from the emissions inventory.
[b]Calculated by taking annual emissions from the emissions inventory and dividing by 8,760 hrs/yr.
[c] The average of the release heights of all emission sources was used as the stack height.
[d] Volume lengths and heights were estimated based upon as assumed plant layout.

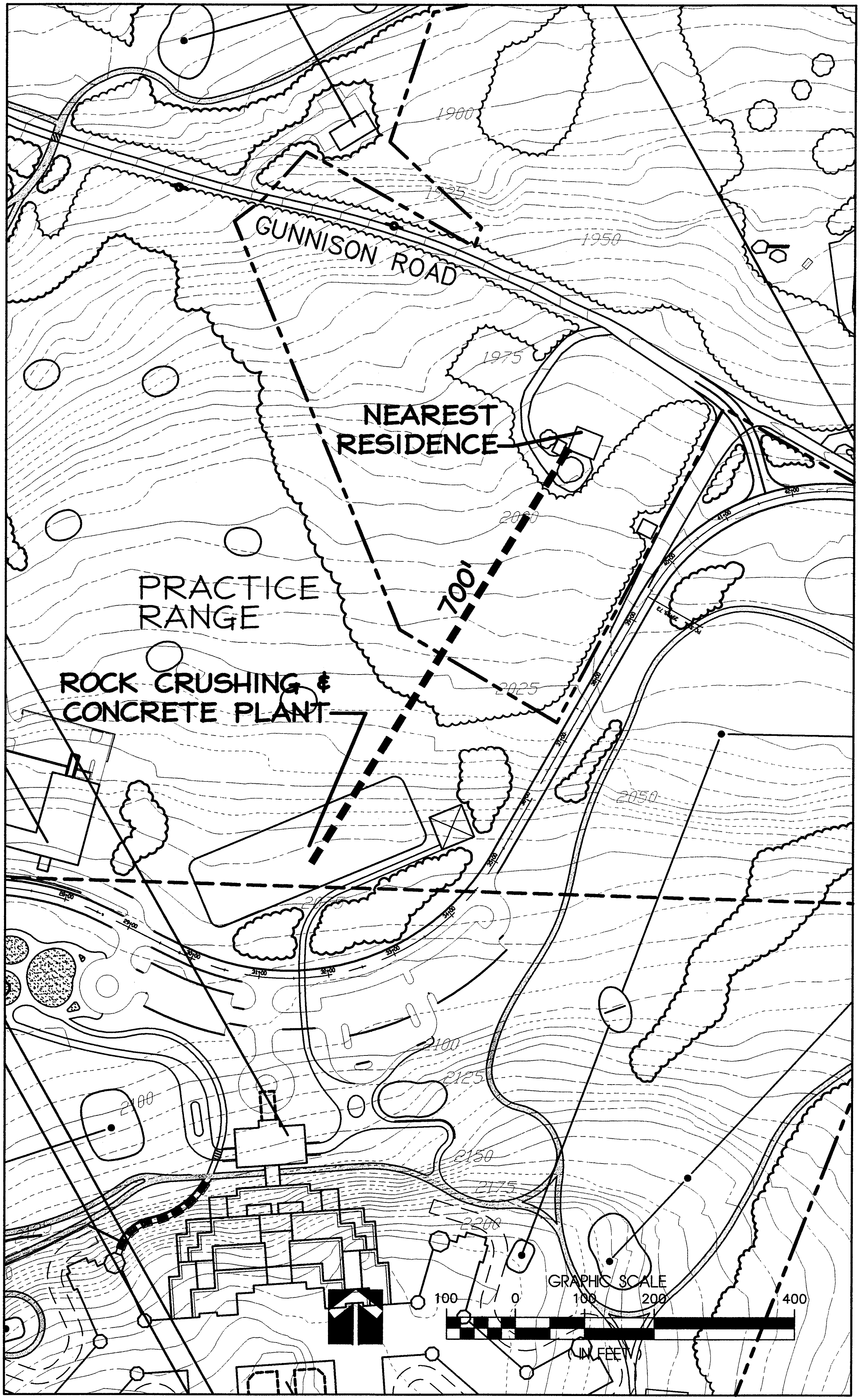
**Notes:**

**1.** Assumptions: (1) The rock and sand storage piles are within 200 ft. of the process equipment. (2) The rock and sand storage piles are 100 ft in diameter and 40-50 ft tall.
**2.** Assumptions: (1) The rock storage pile is 70 ft in diameter and 30 ft. tall.

**Table 2**
**Modeling Results**
**Proposed Belleayre Resort**

| Distance to Compliance (ft) [a] | | |
|---|---|---|
| **Rock Crushing & Concrete (Wildacres Resort)** | **Rock Crushing (Big Indian Plateau)** | **$PM_{10}$ NAAQS** |
| 533 | 312 | 24-hr[b] |
| 148 | 82 | annual[c] |

[a]Distance from center of plants to point of compliance with the respective NAAQS. Insignificant air quality impacts are expected at this distance and further.
[b]150 ug/$m^3$
[c] 50 ug/$m^3$




the LA group
Landscape Architecture
and Engineering, P.C.

40 Long Alley
Saratoga Springs
New York 12866
518/587-8100
Telefax 518/587-0180



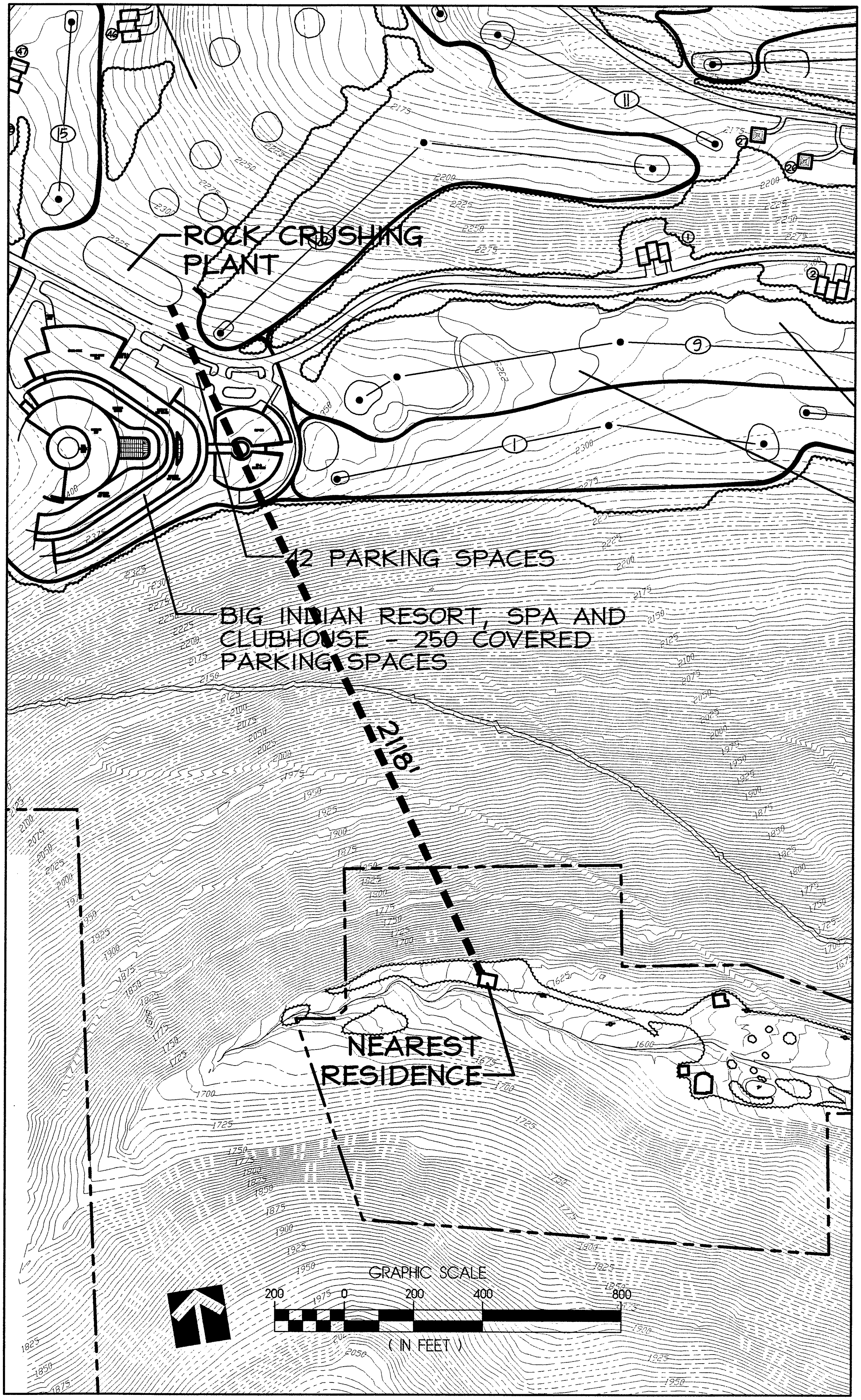
BELLEAYRE RESORT AT CATSKILL PARK

DRAFT ENVIRONMENTAL IMPACT STATEMENT

LOCATIONS OF ROCK CRUSHING & CONCRETE PLANT & NEAREST RESIDENCE

Project: 00052
Date:

Figure
1




**the LA group**
Landscape Architecture
and Engineering, P.C.

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Saratoga Springs
New York 12866
518/587-8100
Telefax 518/587-0180



BELLEAYRE RESORT AT CATSKILL PARK

DRAFT ENVIRONMENTAL IMPACT STATEMENT

LOCATIONS OF ROCK CRUSHING PLANT & NEAREST RESIDENCE

Project: 00052
Date:

Figure
2

Attachment I

Emission Inventory

**Emission Inventory - Concrete Plant**
**Proposed Belleayre Resort**

Emission estimates are based on emission factors and hourly throughputs. The source of emission factors is EPA's Compilation of Air Pollution Emission Factors, AP-42, Volume 11, Section 11.12, Concrete Batching (10/01).

Sample Calculation:
Hourly $PM_{10}$ Emission Rate Potential (lb/hr)=Hourly Throughput ($yd^3$/hr)*Emission Factor (lb/$yd^3$)

Annual $PM_{10}$ Emissions (tpy)=[Hourly Throughput ($yd^3$/hr)*Annual Hours of Operation (hr/yr)*Emission Factor (lb/$yd^3$)]/2000(lb/ton)

Annual Hours of Operation: 3744 hr/yr[b]

| Emission Source | Emission Factor (lb/$yd^3$) | Hourly Throughput ($yd^3$/hr)[a] | Hourly $PM_{10}$ Emission Rate Potential (lb/hr) | Annual $PM_{10}$ Emissions (tpy) |
|---|---|---|---|---|
| rock delivery to ground storage (controlled)[c] | 0.000031 | 228 | 0.0071 | 0.013 |
| sand delivery to ground storage | 0.0007 | 228 | 0.2 | 0.3 |
| rock transfer to conveyor by front end loader (controlled)[c] | 0.000031 | 228 | 0.0071 | 0.013 |
| sand transfer to conveyor by front end loader | 0.0007 | 228 | 0.2 | 0.3 |
| rock transfer to elevated storage (controlled)[c] | 0.000031 | 228 | 0.0071 | 0.013 |
| sand transfer to elevated storage | 0.0007 | 228 | 0.2 | 0.3 |
| cement delivery to Silo (controlled) | 0.0001 | 228 | 0.02 | 0.04 |
| cement supplement delivery to Silo (controlled) | 0.0002 | 228 | 0.05 | 0.1 |
| weigh hopper loading (controlled)[d] | 0.00019 | 228 | 0.043 | 0.081 |
| truck mix loading (controlled)[d] | 0.0021 | 228 | 0.48 | 0.9 |
| **Facility Total** | | | 1.1 | 2.0 |

[a] As provided by the manufacturer of the concrete plant. The emission factors provided in AP-42 are based on a facility wide throughput for concrete production, not on the throughput of each individual emission source. The emission factors assume a standard yard of concrete composed of 1,865 lbs rock, 1,428 lbs sand, 491 lbs cement, 73 lbs cement supplement and 20 gallons of water.
[b] Based on an operating schedule of 12 hr/day, 6 days/week and 52 weeks/yr.
[c] Rock delivery and conveying is controlled with a water spray with 99% efficiency, as provided by AP-42.
[d] The weigh hopper and truck mixing emissions are assumed to be controlled by a central dust collector with an overall efficiency of 95%.

## Emission Inventory - Rock Crushing Plant #1 and #2
## Proposed Belleayre Resort

Emission estimates are based on emission factors and hourly throughputs. The source of emission factors is EPA's Compilation of Air Pollution Emission Factors, AP-42, Volume 11, Section 11.19.2, Crushed Stone Processing (1/95).

Sample Calculation:
Hourly $PM_{10}$ Emission Rate Potential (lb/hr)=Hourly Throughput (ton/hr)*Emission Factor (lb/ton)

Annual $PM_{10}$ Emisisons (tpy)=[Hourly Throughput (ton/hr)*Annual Hours of Operation (hr/yr)*Emission Factor (lb/ton)]/2000 (lb/ton)

Annual Hours of Operation: 3744 hr/yr[b]

| Emission Source[d] | Emission Factor (lb/ton) | Hourly Throughput (ton/hr)[a] | Hourly $PM_{10}$ Emission Rate Potential (lb/hr) | Annual $PM_{10}$ Emissions (tpy) |
|---|---|---|---|---|
| Rock Delivery/Primary Screening | 0.000016 | 300 | 0.0048 | 0.0090 |
| Secondary Screening (controlled) | 0.00084 | 300 | 0.25 | 0.47 |
| Primary Crushing (controlled) | 0.00059 | 300 | 0.18 | 0.33 |
| Secondary Crushing (controlled) | 0.00059 | 300 | 0.177 | 0.33 |
| Conveyor Transfer from Primary Crusher (controlled) | 0.000048 | 300 | 0.014 | 0.027 |
| Conveyor Transfer from Secondary Crusher (controlled) | 0.000048 | 300 | 0.0144 | 0.027 |
| Conveyor Transfer into Secondary Screens (controlled) | 0.000048 | 300 | 0.014 | 0.027 |
| Conveyor Transfer to Ground Storage (controlled) | 0.000048 | 300 | 0.014 | 0.027 |
| Truck Loading (crushed stone)[c] | 0.0001 | 300 | 0.03 | 0.06 |
| **Facility Total** | | | 0.70 | 1.3 |

[a] Facility throughput of 300 ton/hr was provided by Crossroads Ventures, LLC.
[b] Based on an operating schedule of 12 hr/day, 6 days/week and 52 weeks/yr.

[c] This emission factor is based on rock being conveyed into the trucks. It is anticipated that the trucks will be filled using a front end loader, however, since an emission factor was not available for loading with a front end loader, the emission factor for conveyor loading was used.

[d] Control was assumed to be a water spray starting with primary crushing.