APPENDIX E

- **Noise Background Information**

--Environmental Noise Assessment, Brown-Buntin Associates, Inc.
(April 2008)

--Acoustical Analysis, Brown-Buntin Associates, Inc.
(May 2010)

--Updated Traffic Noise Analysis
(September 30, 2011)

--Response to Noise Section Comments
(October 6, 2011)

ENVIRONMENTAL NOISE ASSESSMENT

COLD CANYON LANDFILL EXPANSION
SAN LUIS OBISPO COUNTY, CALIFORNIA

PREPARED FOR

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APRIL 29, 2008

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BROWN • BUNTIN ASSOCIATES, INC.

1. INTRODUCTION

Project Description:

The project is a proposed expansion of the existing Cold Canyon Landfill in San Luis Obispo County. The applicant is proposing to expand the landfill footprint, increase permitted tonnage limits, increase landfill capacity, expand and relocate the resource recovery park, compost operation and materials recovery facility, change hours of operation and construct a new entrance.

Location:

The project site is located at 2268 Carpenter Canyon Road (State Route 227) within San Luis Obispo County. The project site is located in a hilly area bordered by State Route 227 (SR227) on the west and Patchett Road on the south. There are scattered residences and agricultural uses surrounding the project site. The site is located approximately 3½ miles south of the San Luis Obispo County Airport.

Environmental Noise Assessment:

This environmental noise assessment has been prepared to determine if significant noise impacts will be produced by the project and to describe mitigation measures for noise if significant impacts are determined.

Appendix A provides definitions of the acoustical terminology used in this report. Unless otherwise stated, all sound levels reported in this analysis are A-weighted sound pressure levels in decibels (dB). A-weighting de-emphasizes the very low and very high frequencies of sound in a manner similar to the human ear. Most community noise standards utilize A-weighted sound levels, as they correlate well with public reaction to noise.

2. THRESHOLDS OF SIGNIFICANCE

Appendix G (Environmental Checklist Form) of the CEQA Guidelines indicates that significant noise impacts occur when the project exposes people to noise levels in excess of standards established in local noise ordinances or general plan noise elements, or causes a substantial permanent or temporary increase in noise levels above levels existing without the project.

a. Noise Level Standards

The noise level may be considered significant if the project exceeds applicable noise standards. The standards for noise levels that apply to this project are those specified in the San Luis Obispo County General Plan Noise Element.

Section 3.3 of the County's Noise Element[1] establishes land use compatibility criteria for proposed noise sources or existing noise sources that will undergo modifications as they may affect nearby noise-sensitive land uses. Noise-sensitive uses include residences, schools, hospitals and churches. For transportation noise sources, the County's standard is 60 dB DNL at the exterior of noise-sensitive uses. Transportation noise sources include vehicles operated on public roadways, railroad operations and aircraft operations. With regard to the proposed landfill expansion project, the County's 60 dB DNL standard applies to project-related traffic (including trucks) on public roadways near or adjacent to the project site.

Acceptable noise levels from non-transportation noise sources (also referred to as stationary noise sources) are determined by the hourly L_{eq} (energy average) and L_{max} (maximum) noise levels produced by the project. During the daytime hours (defined as 7:00 a.m. to 10:00 p.m.), the L_{eq} standard is 50 dBA and the L_{max} standard is 70 dBA. During the nighttime hours (defined as 10:00 p.m. to 7:00 a.m.), the L_{eq} standard is 45 dBA and the L_{max} standard is 65 dBA. Stationary noise sources include all project-related activities that will occur within the project site.

The San Luis Obispo County noise level standards applicable to the project are summarized in Table I. There are no state or federal noise standards that would apply to the project.

TABLE I

NOISE LEVEL STANDARDS
SAN LUIS OBISPO COUNTY
NOISE-SENSITIVE USES

		Non-Transportation Sources			
	Transportation Sources	**Hourly L_{eq}, dBA**		**Hourly L_{max}, dBA**	
	DNL, dB	**7a-10p**	**10p-7a**	**7a-10p**	**10p-7a**
Exterior Exposure	60	50	45	70	65
Interior Exposure	45	--	--	--	--
Source: San Luis Obispo County Noise Element, adopted 1992.					

b. Substantial Noise Increases

CEQA does not define what constitutes a substantial increase in noise levels. Some guidance is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON)[2], which assessed changes in ambient noise levels resulting from aircraft operations. The FICON recommendations are based upon studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by the noise. The rationale for the FICON recommendations is that it is possible to consistently describe the annoyance of people exposed to transportation noise in terms of the DNL (or CNEL). Annoyance is a summary measure of the general adverse reaction of people to noise that results in speech interference, sleep disturbance, or interference with other daily activities.

Although the FICON recommendations were specifically developed to address aircraft noise impacts, they are used in this analysis for transportation noise sources that are described in terms of cumulative noise exposure metrics such as the DNL. Table II summarizes the FICON recommendations.

TABLE II

MEASURES OF SUBSTANTIAL NOISE INCREASE FOR TRANSPORTATION SOURCES

Ambient Noise Level Without Project (DNL/CNEL)	Significant Impact Assumed to Occur if the Project Increases Ambient Noise Levels By:
<60 dB	+ 5 dB or more
60-65 dB	+3 dB or more
>65 dB	+1.5 dB or more
Source: FICON, 1992, as applied by Brown-Buntin Associates, Inc.	

For non-transportation noise sources, it is common to assume that a 3-5 dB increase in noise levels represents a substantial increase in ambient noise levels. This is based on laboratory tests that indicate that a 3 dB increase is the minimum change "perceptible" to most people, and a 5 dB increase is perceived as a "definitely noticeable change."

b. Construction Noise and Vibration

Noise due to construction activities is generally considered to be less than significant if the construction activity is temporary, use of heavy equipment and noisy activities is limited to daytime hours, no pile driving or surface blasting is proposed, and all industry-standard noise abatement measures are implemented for noise-producing equipment. These general parameters acknowledge that people are not as likely to be annoyed by activities that are perceived as being necessary for normal commerce, so long as the inconveniences due to noise are of relatively short duration and all practical measures are being implemented to reduce the impacts of noise-producing activities.

The San Luis Obispo County Noise Element does not specifically limit hours during which construction may occur. However, it is a common practice to limit hours of construction activity to minimize construction noise impacts at nearby residential receptors during the early morning and late evening hours, and on weekends and holidays. Although not specifically stated in the Noise Element, it is also a standard requirement for many jurisdictions that all construction equipment be properly maintained and muffled to minimize noise generation at the source.

San Luis Obispo County does not have regulations that define acceptable levels of vibration. One of the most recent references suggesting vibration standards is the Federal Transit

Administration (FTA) publication concerning noise and vibration impact assessment from transit activities[3]. Although the FTA guidelines are to be applied to transit activities, they may be reasonably applied to the assessment of the potential for annoyance or structural damage resulting from other activities. To prevent vibration annoyance in residences, a vibration velocity level of 80 VdB or less is suggested when there are fewer than 70 vibration events per day. A level of 100 VdB or less is suggested by the FTA guidelines to prevent damage to fragile buildings.

3. SETTING

The existing landfill and the proposed expansion area are located in hilly terrain. Scattered rural residences are located around the landfill. The surrounding land is primarily used for grazing with some planted crops. The important existing sources of man-made noise in the project vicinity are activities at the landfill and traffic on roads, which includes refuse trucks approaching and leaving the landfill. There are also occasional aircraft over-flights as aircraft are preparing to land or after they have taken off from the San Luis Obispo County Airport.

a. Ambient Noise Level Measurements

Measurements of existing ambient noise levels in the project vicinity were conducted over a 24-hour period near the southern project expansion boundary on March 27, 2008. Noise monitoring equipment consisted of a Larson-Davis Laboratories Model LDL 820 sound level analyzer equipped with a Bruel & Kjaer (B&K) Type 4176 ½″ microphone. The microphone was mounted on a tripod at approximately five (5) feet above the ground and was equipped with a random incidence corrector so that noise from sources in all directions could be accurately measured. The monitor was calibrated with a B&K Type 4230 acoustical calibrator to ensure the accuracy of the measurements. The equipment complies with applicable specifications of the American National Standards Institute (ANSI) for Type 1 sound measurement systems.

Figure 1 shows the location of the ambient noise measurement site (Site 1) with reference to the project site. Figure 2 summarizes measured hourly noise levels in terms of the energy average (L_{eq}), maximum (L_{max}), and L_{90} noise level descriptors. The L_{eq} and L_{max} describe average and maximum noise levels measured during each hour of the noise monitoring period, and the L_{90} describes the noise level exceeded 90 percent of the time during each hour. The L_{90} is generally considered to represent the residual (or background) noise level in the absence of identifiable single noise events from traffic, aircraft and other local noise sources.

The measured DNL for existing conditions at the 24-hour site, including noise from all sources, was 48.0 dB. This is below the County's 60 dB DNL standard for transportation-related noise sources at noise-sensitive locations. The measured hourly L_{eq} values for existing conditions at the 24-hour ambient noise measurement site ranged from 37 to 51 dBA during the daytime hours and from 31 to 45 dBA during the nighttime hours. Measured hourly maximum noise levels ranged from 55 to 70 dBA during the daytime hours and from 44 to 68 dBA during the nighttime hours. Based upon field observations at the 24-hour noise monitoring site, hourly maximum noise levels were most likely caused by aircraft over-flights.

FIGURE 1: NOISE MEASUREMENT SITES

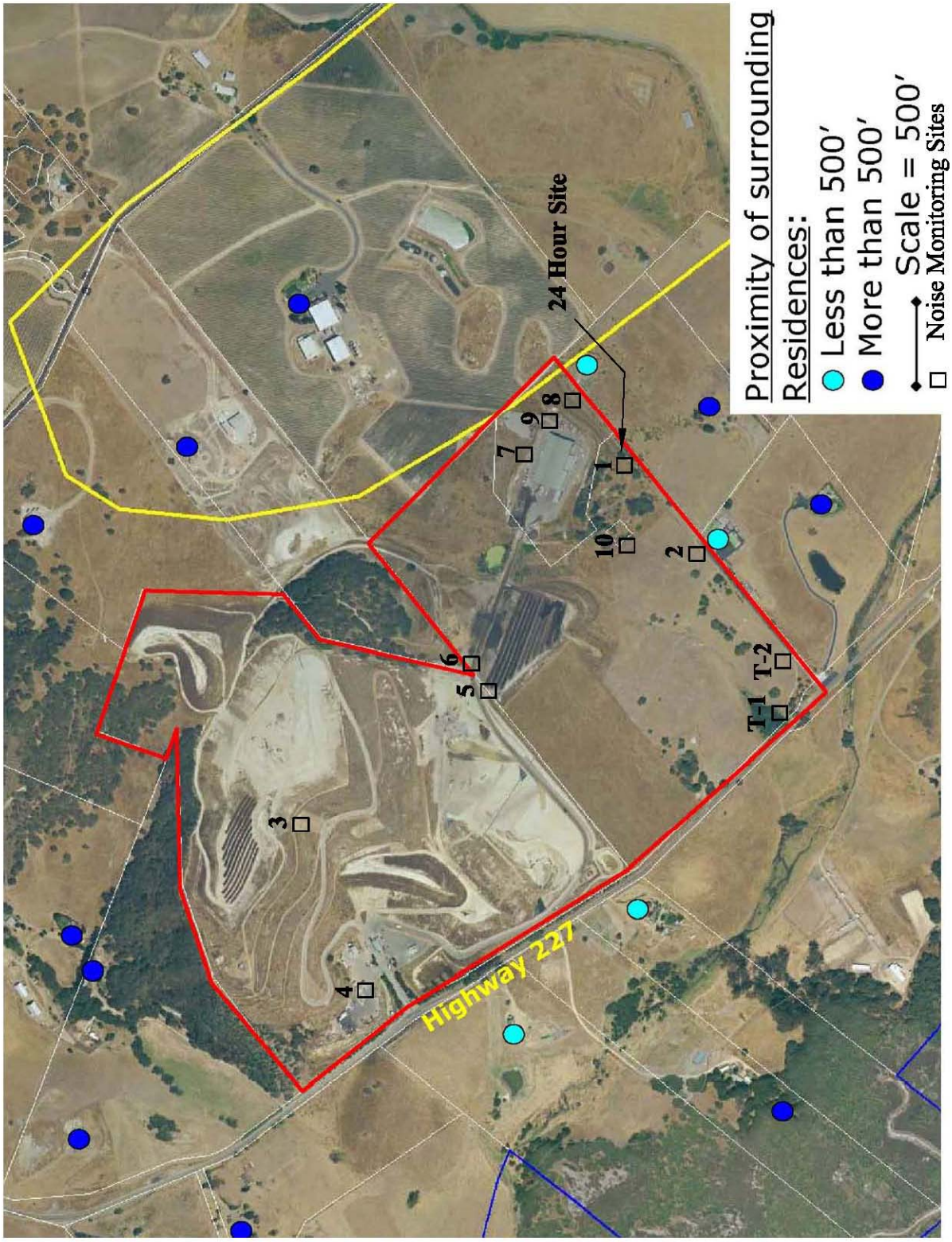
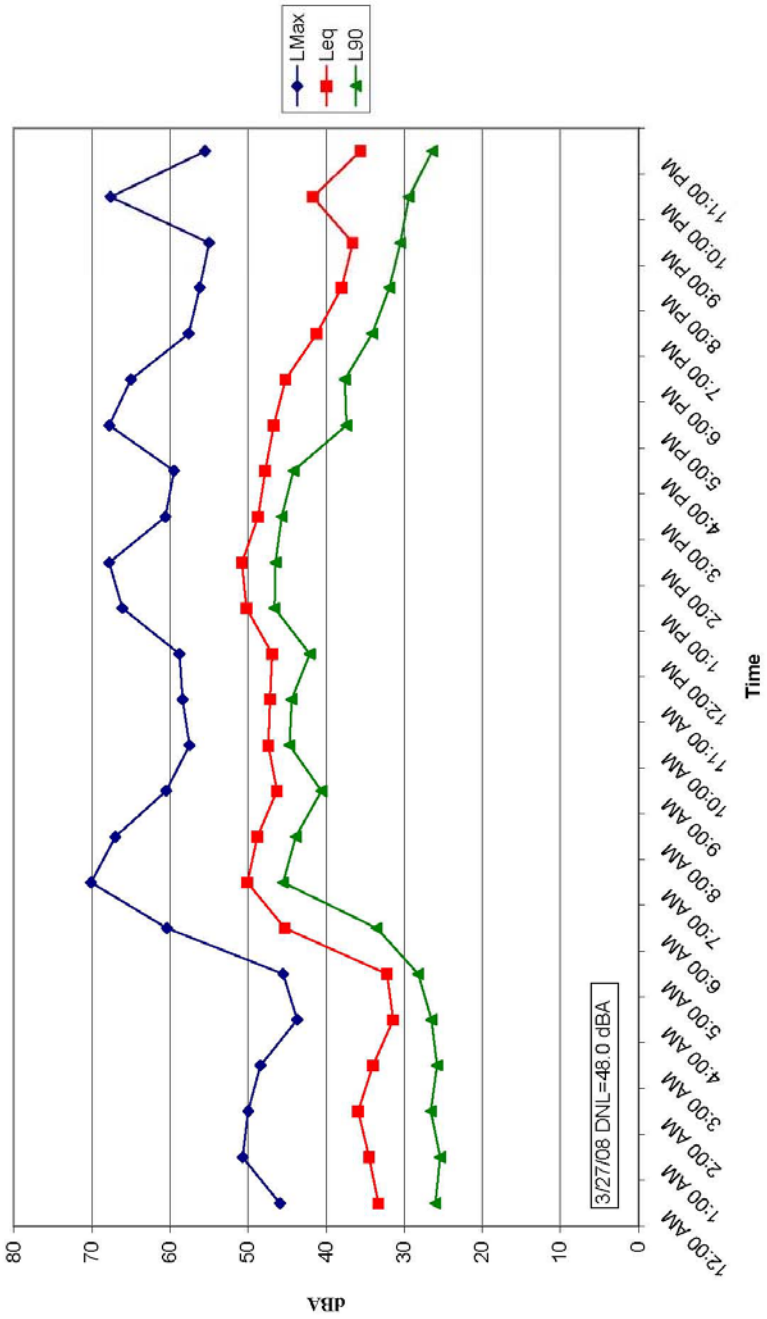


FIGURE 2: MEASURED HOURLY NOISE LEVELS
SITE #1 – March 27, 2008



b. Existing Landfill Activities

Existing operations at the Cold Canyon Landfill include an 88-acre landfill, a resource recovery park (RRP), a compost operation and a materials recovery facility (MRF). Noise producing activities associated with the landfill operation include the movement of trucks between the landfill entrance and active disposal site and heavy equipment used to spread, compact and cover the waste material. Heavy equipment used in the landfill operation includes a Caterpillar D7R bulldozer, Aljon 525 compactor and Caterpillar 627F earthmover. Landfill activities move around within the permitted landfill area over the life of the landfill site, but are focused in a single area at any given time. Landfill operations currently occur between the hours of 7:00 a.m. and 4:30 p.m.

The RRP is presently located near the public entrance to the site near SR227. Noise producing activities include the movement of vehicles within the RRP as materials are being delivered to the site and heavy equipment used to sort, transfer and store materials within the site. Heavy equipment used within the RRP includes front loaders (Caterpillar IT18B and IT14G) and a Caterpillar 312C excavator. Recovered paper, cardboard and plastic is transported to the MRF located near the southeast corner of the landfill site for processing and baling. The RRP is currently open between 7:30 a.m. and 4:30 p.m.

The compost operation is located near the center of the landfill site. Noise producing activities include the transport of raw materials to the site and processed materials from the site, truck loading activities, compost processing activities and water truck movements for dust control. Heavy equipment used in the compost operation includes a tub grinder powered by a Caterpillar 3412 engine, 18-foot Scarab compost row turner, Trommel screen, front loaders (Caterpillar IT28) and diesel-powered water truck. Noise-producing activities within the compost processing area presently occur between the hours of 7:30 a.m. and 4:30 p.m.

The MRF is located within a large building near the southeast corner of the project site. The facility processes recyclable materials from curbside residential pickup and commercial/industrial sources. It also processes materials from the on-site RRP as noted above. Noise producing activities associated with the MRF include truck movements to and from the facility, glass cleaning equipment located outside the east side of the building, forklift movements and other activities within the building, and ventilation fans on the south end of the building. Current hours of operation for the MRF are 7:30 a.m. to 4:30 p.m.

Noise levels from the above-described activities and associated equipment were documented by conducting reference noise level measurements at various locations within or near the project site on March 27 and 28, 2008. Since the tub grinder used at the Cold Canyon Landfill compost operation was not on-site at that time, noise measurements were conducted on April 16, 2008 at another compost operation in Visalia, California where similar equipment is used. Noise monitoring equipment was the same as described above for conducting ambient noise level measurements at Site 1. The reference noise measurement locations at the Cold Canyon Landfill are noted in Figure 1.

Table III summarizes the results of reference noise level measurements. Described by Table III are the measurement site, source(s) measured, reference distance from the source(s) and measured noise levels. Measured noise levels are reported in terms of the L_{eq} and range (minimum-maximum) during the sample period.

TABLE III

SUMMARY OF REFERENCE NOISE LEVEL MEASUREMENTS
COLD CANYON LANDFILL

Site	Source Description	Distance, Ft.	Noise Level, dBA L_{eq} (Range)
1	MRF (glass cleaner, fans)	300	46.1 (44.0-48.6)
2	Compost Operation (trucks, loaders)	1100	44.5 (44.0-45.0)
3	Landfill (dozer, compactor, earthmover, trucks)	200-300	70.1 (62.3-77.2)
	Landfill (compactor)	200-300	67.5 (64.6-70.1)
	Landfill (earthmover)	200	72.1 (67.7-80.1)
4	RRP (loaders, alarms, dumping materials)	100-200	68.7 (59.6-75.1)
5/6	Compost Operation (18' Scarab row turner)	100	84.2 (83.4-85.1)
7	MRF (glass cleaner – unobstructed view)	50	77.3 (75.1-79.9)
8	MRF (fans – top of berm)	150	63.4 (62.5-63.9)
9	MRF (fans plus glass cleaner)	100	66.3 (65.4-67.4)
10	Compost Operation (loaders, trucks, alarms)	900	48.7 (39.2-59.5)
	Landfill (dozer, compactor, alarms)	2500	----- (42-48)
*	Diamond Z 1260 Grinder (CAT 3412)	100	81.0 (80.2-82.4)

*Measurements conducted 4/16/08 at Wood Industries Company in Visalia, California.

Source: Brown-Buntin Associates, Inc.

b. Existing Traffic Noise Levels

An analysis of existing traffic noise levels on SR227 and the existing site entrance road was prepared using the FHWA Highway Traffic Noise Prediction Model[4] with traffic data obtained from Caltrans and the project description prepared by the project applicant[6]. SR227 is the only access to the landfill. Homes are located north and south of the SR227 entrance to the landfill.

The FHWA Model is an analytical method used by state and local agencies, including Caltrans, for highway traffic noise prediction. The model is based upon reference energy emission levels for automobiles, medium trucks (2 axles) and heavy trucks (3 or more axles), with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA Model was developed to predict hourly L_{eq} values for free-flowing traffic conditions, and is generally considered to be accurate within +/- 1.5 dB. The model assumes a clear view of traffic with no shielding at the receiver location. To

predict DNL values, it is necessary to determine the hourly distribution of traffic for a typical day and adjust the traffic volume input data to yield an equivalent hourly traffic volume.

Traffic noise level measurements and concurrent traffic counts were performed at two sites along SR227 for the purpose of evaluating the accuracy of the FHWA Model in describing traffic noise exposure in the project area. The traffic noise monitoring sites are noted in Figure 1 as Sites T-1 and T-2. Site T-1 was located 50 feet from the center of the roadway at about the same elevation as the pavement. Site T-2 was located on a low hill overlooking SR227 at about 250 feet from the center of the roadway and 30 feet above the pavement.

Table IV compares measured noise levels to those calculated by the FHWA Model using as model inputs the observed traffic conditions. Table IV shows that the FHWA Model over-predicted traffic noise exposure at Site T-1 by 1.5 dB and calculated the same noise level as was measured at Site T-2. This is considered excellent agreement between measured and predicted results, and indicates that the FHWA Model may be used without adjustments to provide a realistic assessment of annual average traffic noise exposure in the project area.

TABLE IV

COMPARISON OF MEASURED AND PREDICTED (FHWA MODEL) NOISE LEVELS SR227 NEAR COLD CANYON LANDFILL

	Site T-1	Site T-2
Microphone Height, Ft. (above ground)	5	5
Distance, ft. (from center of roadway)	50	300
Observed # Autos/Hr.	224	216
Observed # Medium Trucks/Hr.	4	8
Observed # Heavy Trucks/Hr.	12	16
Estimated Speed (MPH)	55	55
L_{eq}, dBA (Measured)	63.2	54.4
L_{eq}, dBA (Predicted)	64.7	54.4
Difference between Measured and Predicted L_{eq}, dBA	**+1.5**	**0**

Note: FHWA "soft site" assumed for calculations

Source: Brown-Buntin Associates, Inc.

Appendix B provides a summary of the traffic data used to calculate existing annual average traffic noise levels. Annual Average Daily Traffic (AADT) and truck mix data for SR227 were obtained from the Caltrans website. The day/night distribution of traffic on SR227 was estimated by BBA based upon studies conducted along similar roadways since project-specific data were not available from government sources. The data summarized in Appendix B represent the best information known to Brown-Buntin Associates, Inc. (BBA) at the time this analysis was prepared.

The closest residential setbacks from SR227 near the project site are estimated to be in the range of 150 feet from the center of the roadway. The annual average traffic noise exposure calculated by the FHWA Model for a distance of 150 feet from the center of SR227 was 59.2 dB DNL for existing traffic conditions (2006). The calculated distance to the 60 dB DNL contour for existing traffic conditions is 133 feet from the roadway centerline.

4. PROJECT IMPACTS AND MITIGATION MEASURES

The project would expand the area of the landfill operation, expand and relocate the compost operation, expand and relocate the Resource Recovery Park, expand the Materials Recovery Facility, extend hours of operation, relocate the main entrance road and increase traffic on SR227. As described above, noise sources within the landfill site are considered non-transportation (stationary) noise sources for comparison to applicable noise standards. Since extended operating hours would not include the nighttime hours as defined by the County's Noise Element (10:00 p.m.-7:00 a.m.), only the County's daytime noise level standards would apply to the project.

a. Proposed Landfill Activities

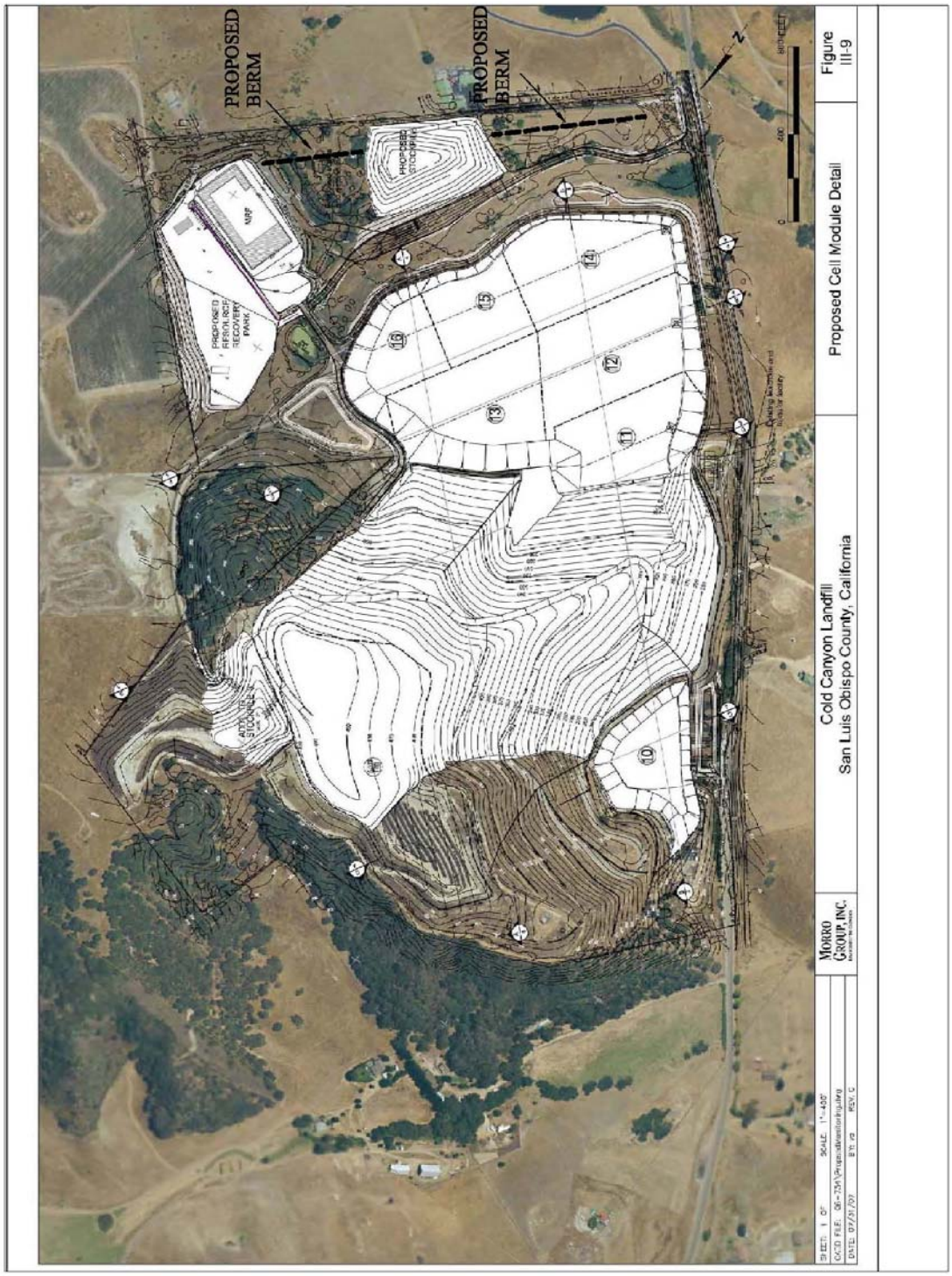
The landfill area would be expanded by 46 acres. The expansion area would potentially move noise producing activities closer to existing homes located to the south of the project site but would not change the nature of noise-producing activities or equipment within the project site. The landfill would be expanded in phases with landfill disposal activities moving around the expansion area over the life of the site. Landfill-related noise levels would not be expected to change significantly with the project at existing homes to the west of the expansion area because such homes are already adjacent to the permitted landfill area.

Based upon noise measurement data summarized in Table II, landfill activities produce an equivalent energy level (L_{eq}) of approximately 70 dBA and a maximum noise level (L_{max}) of approximately 70 dBA at 200-300 feet from simultaneous activities by disposal trucks, the dozer, compactor and earthmover. The proposed landfill expansion would move landfill operations as close as approximately 700 feet from the closest existing home to the south of the project site. Assuming noise attenuation due to geometric spreading over distance and no topographic shielding, noise levels from landfill activities at the closest home to the south would be expected to exceed the County's daytime hourly L_{eq} standard of 50 dBA by approximately 11 dB. This is a significant noise impact that will require mitigation. Noise levels from landfill activities would not be expected to exceed the County's daytime hourly L_{max} standard of 70 dBA at the closest home to the south of the landfill expansion area.

Landfill Noise Mitigation

The project applicant has proposed that a stockpile of fill earth be created near the center of the southern boundary of the expansion area as shown in Figure 3. The stockpile would acoustically shield the closest home to the south of the expansion area and achieve compliance with applicable County noise level requirements during work within Modules 13, 15 and 16 (Please

FIGURE 3: POTENTIAL NOISE MITIGATION



refer to Figure 3). The stockpile would not provide effective noise mitigation at that home during work on Modules 12 and 14.

Additional mitigation of landfill activities may be accomplished by constructing an earthen berm along the southern boundary of the landfill expansion area that is continuous with the proposed stockpile. Determination of the precise location and height of the berm would require a more detailed analysis. Generally, the berm would need to be tall enough to interrupt line of site between the closest homes and heavy equipment noise sources within the landfill expansion area at the full height of each module. The approximate location of the berm is shown in Figure 3.

b. Proposed Compost Operation Expansion and Relocation

The compost operation would be expanded and relocated near the top of the hill in the northern portion of the project site. This would result in moving associated noise sources farther away from the closest homes south and west of the site but closer to existing homes to the north and east of the site. However, the closest homes to the north and east of the site are already exposed to noise levels from existing landfill operations. Expansion of the compost operation would not be expected to cause an increase in noise levels produced by the facility since the existing equipment would continue in use.

Based upon noise measurement data summarized in Table II, the existing compost operation produces an L_{eq} of approximately 81 dBA at 100 feet from the tub grinder and 84 dBA at 100 feet from the Scarab row turner. Such levels are comparable to those produced by the heavy equipment used at the landfill disposal site as described above. Assuming noise attenuation due to geometric spreading over distance and no topographic shielding, it is estimated that operations by the grinder and/or row turner produce L_{eq} values of approximately 55-60 dBA at the closest existing homes to the south and west (1,000-1,800 feet away). Such levels exceed the County's 50 dBA daytime L_{eq} standard by 5-10 dB. During more typical compost activities, loader operations and truck movements produce L_{eq} values that are less than the County's 50 dBA standard at the closest existing homes.

When the compost operation is relocated, the closest existing homes to the north and east will be located at approximately the same setbacks from compost-related equipment as are existing homes to the south and west of the existing compost operation. This means that the relocated compost operation could result in hourly L_{eq} values of approximately 55-60 dBA at the closest homes to the north and east. Such levels exceed the County's 50 dBA L_{eq} standard. However, as previously noted, heavy equipment associated with the landfill operation produce noise levels that are comparable to those produced by the loudest compost-related equipment (Scarab row turner and tub grinder), and existing homes to the north and east are already potentially affected by such noise levels due to their proximity to the existing landfill area.

Compost Noise Mitigation

When the compost operation is relocated, it is estimated that noise levels from that operation would be reduced at the closest existing homes to the south and west by approximately 10 dB

due to increased distance and ground absorption. This would result in a beneficial impact to those residences. Since the relocated compost operation would not cause noise levels to increase at existing homes to the north and east of the project site, additional noise mitigation is not required.

c. Proposed Expansion and Relocation of Resource Recovery Park (RRP)

The RRP would be expanded from two to four acres and relocated near the southeastern corner of the project site. The site would be recessed into a hillside at that location just east of the existing MRF building. The proposed expansion of the RRP would include a sort line that is elevated approximately 15 feet above the ground. There is an existing earthen berm approximately 25 feet high between the MRF facility and the closest home to the south that would be effective for mitigating noise from the relocated and expanded RRP.

Based upon noise measurement data summarized in Table II, the existing RRP operation produces an L_{eq} of about 69 dBA and an L_{max} of approximately 75 dBA at 100-200 feet from loaders engaged in the movement and sorting of materials. These are typical activities at the RRP. Maximum noise levels are generally caused by backup alarms and/or materials being dumped into sorting bins. Noise levels produced by the proposed elevated sort line would be expected to produce a noise level comparable to glass cleaning equipment currently located on the east side of the MRF building, which is an L_{eq} of approximately 77 dBA at 50 feet.

The closest homes to the relocated RRP site are about 500 and 1,000 feet to the south of the site. Accounting for noise attenuation due to geometric spreading over distance , estimated noise levels from the relocated and expanded RRP at the closest homes are L_{eq} and L_{max} values of 58.2 and 64.6 dBA at 500 feet and 52.2 and 58.6 dBA at 1,000 feet, respectively. When acoustic shielding from the existing berm and MRF building are taken into consideration, noise levels from the relocated and expanded RRP would not be expected to exceed applicable County noise standards.

RRP Noise Mitigation

None required.

d. Proposed Expansion and Enhancement of the Materials Recycling Facility (MRF)

The MRF capacity would be increased by adding upgraded equipment and increasing hours of operation. The upgraded equipment would be located inside an expanded building. As previously noted, the extended hours of operation would not occur during the nighttime hours of 10:00 p.m. to 7:00 a.m.

Based upon noise measurement data summarized in Table II, MRF operations produce an L_{eq} of 46.1 dB at approximately 300 feet from the east side of the MRF building. This includes noise from ventilation fans, sorting operations inside the building, and the glass cleaner located outside and on the east (opposite) side of the building. The maximum noise level from the glass cleaner

was 48.6 dBA at that location. There is an existing earthen berm between the MRF and the closest home to the south that is effective for mitigating noise from that facility.

Noise levels from the existing MRF do not exceed applicable County noise standards at the closest homes to the south. It is not anticipated that proposed facilities or equipment associated with the expansion and/or enhancement of the MRF would result in a significant noise impact. This is based upon the assumptions that new ventilation fans will not produce higher noise levels than the existing fans and the new fans would be oriented in the same direction as the existing fans.

MRF Noise Mitigation

Ventilation fans should be oriented to the southeast or northeast of the expanded MRF building.

e. Proposed Relocation of Main Entrance

The main entrance to the Cold Canyon Landfill from SR227 would be relocated about 2,800 feet to the south. This would result in moving on-site traffic closer to existing homes located to the south and southwest of the project site. The closest existing home would be located approximately 350 feet from the main entrance road.

The FHWA Model was used to calculate hourly L_{eq} values for on-site traffic along the main entrance road during a peak hour as defined by Reference 6. The analysis showed that the peak hour L_{eq} at 350 feet would be 52.6 dBA for 2031 traffic conditions. This exceeds the County's 50 dBA daytime L_{eq} standard, and means that noise mitigation will be required.

Entrance Road Noise Mitigation

Mitigation of noise from the relocated main entrance road could be achieved by the same berm proposed for mitigation of expanded landfill operations, as described above and noted in Figure 3. The berm would have to be tall enough to interrupt line of sight between the traffic noise source and the mid-window height of the closest homes.

f. Traffic Noise Impacts

The proposed expansion of the landfill would increase the number of allowed daily trips for the landfill, according to Reference 6. Currently, there is an average of 346 daily trips at the landfill. This is expected to increase to an average of 891 daily trips by 2031. All such vehicles would access the site from SR227. According to the Caltrans website and the statewide annual traffic growth rate over the past few years (2000-2006), the annual average daily traffic volume on SR227 in the vicinity of the project site would be expected to increase from 5,500 in 2006 to 8,590 by 2031. This does not include the effects of the landfill expansion project. Accounting for project-related traffic, the future (2031) AADT on SR227 near the project site would be 9,135. Assuming that 84% of project-related traffic would be trucks, the overall truck percentage on SR227 would increase from 5.2% to 8.2% by 2031 with the project.

The FHWA Model was used to calculate project-related changes in traffic noise exposure at the closest residential setbacks along SR227 near the project site. Noise modeling assumptions are summarized in Appendix B. At a setback of 150 feet from the center of the roadway, future (2031) annual average traffic noise exposure *without* the project would be 61.2 dB DNL. This exceeds the County's 60 dB DNL noise compatibility standard. Including project-related traffic, the future traffic noise exposure would increase by 0.8 dB to 62.0 dB DNL. This is not considered a significant increase in traffic noise exposure. Since the project would not directly result in a traffic noise exposure that exceeds the County's 60 dB DNL standard at the closest residential setbacks or a significant increase in traffic noise exposure, traffic noise mitigation is not required for the project.

Traffic Noise Mitigation

None required.

g. Construction Noise Impacts

Construction noise could occur at various locations within and adjacent to the project site through the build-out period. During the construction of the project, noise from construction activities could potentially impact noise-sensitive land uses in the immediate area. Activities involved in construction would generate noise levels at 50 feet as indicated by Table V. It is anticipated that no single home or group of homes will be continuously subject to construction noise throughout the phasing and build-out of the project, although construction noise could occur on a frequent basis during construction and maintenance of the stockpile near the southern boundary of the landfill expansion area.

TABLE V

TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVELS

Type of Equipment	Maximum Noise Level, dBA @ 50 Ft.
Backhoe	78
Concrete Saw	90
Crane	81
Excavator	81
Front End Loader	79
Jackhammer	89
Paver	77
Pneumatic Tools	85
Dozer	82

Source: FHWA[5]

Construction Noise Mitigation

Construction noise is not usually considered to be a significant impact if construction occurring near noise-sensitive land uses is limited to the daytime hours, extraordinary noise-producing activities (e.g., pile driving) are not anticipated, and construction equipment is adequately maintained and muffled. The effects of noise from the construction and maintenance of a stockpile near the southern boundary of the landfill expansion could be mitigated by requiring that the stockpile be worked from the north side to the greatest practical extent.

h. Vibration Impacts

The important sources of man-made vibration are sonic booms, blasting, pile driving, pavement breaking, demolition, diesel locomotives, and rail-car coupling. None of these sources are anticipated from the project site. The primary vibratory source during the construction and operation of the project would be heavy equipment and loaded trucks. Typical bulldozer or loaded truck activities generate an approximate vibration level of 86-87 VdB at a distance of 25 feet[5]. The closest homes are at least 300 feet from where vibration-producing equipment might operate. Typically, vibration levels must exceed 80 VdB before annoyance occurs or 100 VdB before building damage occurs.

Vibration Mitigation

Construction vibration, if it is detected at all at the closest homes, would be temporary. Vibration due to landfill activities would not be expected to exceed acceptable limits at the closest homes. Additionally, no one residence or group of residences would be subject to vibration throughout the phasing and build-out of the project. Vibration mitigation is therefore not required.

i. Cumulative Noise Impacts

Cumulative noise impacts due to the project would not be expected provided proposed mitigation measures are implemented, including a properly designed berm (noise barrier) along the southern boundary of the landfill expansion area.

REFERENCES

1. San Luis Obispo County, *Noise Element of the General Plan*, adopted by Resolution No. 92-227, May 5,1992.
2. *Federal Agency Review of Selected Airport Noise Analysis Issues*, Federal Interagency Committee on Noise, August, 1992.
3. U.S. Department of Transportation, Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, April 1995.
4. Federal Highway Administration, *Traffic Noise Model, Version 2.5*, April 14, 2004.
5. Federal Highway Administration, *Roadway Construction Noise Model User's Guide*, January 2006.
6. Waste Connections, Inc., *Project Description-Cold Creek Landfill*, Project 115271, July17, 2007.

APPENDIX A

ACOUSTICAL TERMINOLOGY

AMBIENT NOISE LEVEL: The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

CNEL: Community Noise Equivalent Level. The average equivalent sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.

DECIBEL, dB: A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).

DNL/L_{dn}: Day/Night Average Sound Level. The average equivalent sound level during a 24-hour day, obtained after addition of ten decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.

L_{eq}: Equivalent Sound Level. The sound level containing the same total energy as a time varying signal over a given sample period. L_{eq} is typically computed over 1, 8 and 24-hour sample periods.

NOTE: The CNEL and DNL represent daily levels of noise exposure averaged on an annual basis, while L_{eq} represents the average noise exposure for a shorter time period, typically one hour.

L_{max}: The maximum noise level recorded during a noise event.

L_n: The sound level exceeded "n" percent of the time during a sample interval (L_{90}, L_{50}, L_{10}, etc.). For example, L_{10} equals the level exceeded 10 percent of the time.

A-2

ACOUSTICAL TERMINOLOGY

NOISE EXPOSURE CONTOURS: Lines drawn about a noise source indicating constant levels of noise exposure. CNEL and DNL contours are frequently utilized to describe community exposure to noise.

NOISE LEVEL REDUCTION (NLR): The noise reduction between indoor and outdoor environments or between two rooms that is the numerical difference, in decibels, of the average sound pressure levels in those areas or rooms. A measurement of "noise level reduction" combines the effect of the transmission loss performance of the structure plus the effect of acoustic absorption present in the receiving room.

SEL or SENEL: Sound Exposure Level or Single Event Noise Exposure Level. The level of noise accumulated during a single noise event, such as an aircraft overflight, with reference to a duration of one second. More specifically, it is the time-integrated A-weighted squared sound pressure for a stated time interval or event, based on a reference pressure of 20 micropascals and a reference duration of one second.

SOUND LEVEL: The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.

SOUND TRANSMISSION CLASS (STC): The single-number rating of sound transmission loss for a construction element (window, door, etc.) over a frequency range where speech intelligibility largely occurs.

APPENDIX B: TRAFFIC MODELING ASSUMPTIONS
FHWA-RD-77-108
Calculation Sheets
April 17, 2008

Project #:	08-007
Description:	Cold Canyon
Ldn/Cnel:	Ldn
Site Type:	Soft

Contour Levels (dB)	55	60	65	70	

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	Truck % Med	Truck % Hvy	Speed mph	Dist ft	Offset dB
1	SR227	n/o Price Canyon Road-2006	5500	90		10	3.7	1.5	55	150	
2	SR227	n/o Price Canyon Road-2031-NP	8590	90		10	3.7	1.5	55	150	
3	SR227	n/o Price Canyon Road-2031-P	9135	90		10	5.8	2.4	55	150	
4	Entrance Rd	existing-2006	1752	100			58.9	24.7	25	350	
5	Entrance Rd	with project-2031	4520	100			58.9	24.7	25	350	

ACOUSTICAL ANALYSIS

COLD CANYON LANDFILL
SAN LUIS OBISPO COUNTY, CALIFORNIA

BBA Report No. 10-001

PREPARED FOR

SAN LUIS OBISPO COUNTY
ENVIRONMENTAL AND RESOURCE MANAGEMENT DIVISION
976 OSOS STREET, ROOM 200
SAN LUIS OBISPO, CALIFORNIA 93408

PREPARED BY

BROWN-BUNTIN ASSOCIATES, INC.
VISALIA, CALIFORNIA

May 28, 2010

INTRODUCTION

The Cold Canyon Landfill (landfill) is located at 2268 Carpenter Canyon Road (SR 227) within San Luis Obispo County. The project site is located in a hilly area bordered by SR 227 on the west and Patchett Road on the south. There are scattered residences and agricultural uses surrounding the project site. The applicant is proposing to expand the landfill footprint, increase permitted tonnage limits, increase landfill capacity, expand and relocate the resource recovery park, composting operation and materials recovery facility, change hours of operation and construct a new entrance.

A Draft Environmental Impact Report (DEIR) has been prepared for the proposed landfill expansion. The noise study for the DEIR was prepared by Brown-Buntin Associates, Inc. (BBA), and was based upon noise level measurements conducted during March of 2008. Most of those measurements were conducted at the Cold Canyon Landfill site. However, the wood waste grinder was not being operated on the site at the time of that study. It was therefore necessary to conduct measurements at another facility that utilizes a similar grinder for noise assessment purposes. Additionally, the Scarab was not in use at the time of the DEIR noise study and it was necessary to test the Scarab in a stationary position at the landfill site.

It is the purpose of this analysis to provide additional information on existing and potential noise sources and levels at the landfill, and to reevaluate the extent and type of noise mitigation that may be required. The study included noise measurements conducted over a two-week period starting on January 29, 2010. All significant noise-producing equipment associated with the landfill operated for at least part of the time during the noise monitoring period. Noise measurements were conducted at five (5) long-term sites that were at or near existing residential uses, and at a series of short-term sites at various locations to document noise levels from specific landfill activities.

Appendix A provides a description of the acoustical terminology used in this report. Unless otherwise stated, all sound levels reported are in A-weighted decibels (dB). A-weighting de-emphasizes the very low and very high frequencies of sound in a manner similar to the human ear. Most community noise standards utilize A-weighting, as it provides a high degree of correlation with human annoyance and health effects.

CRITERIA FOR ACCEPTABLE NOISE EXPOSURE

Section 3.3 of the San Luis Obispo County Noise Element establishes land use compatibility criteria for proposed noise sources or existing noise sources that will undergo modifications as they may affect nearby noise-sensitive land uses. Noise-sensitive uses include residences, schools, hospitals and churches. For transportation noise sources, the County's standard is 60 dB DNL at the exterior of noise-sensitive uses. Transportation noise sources include vehicles operated on public roadways, railroad operations and aircraft operations. Project-related traffic on public roadways was addressed in the DEIR and will not be discussed further in this report.

Acceptable noise levels from non-transportation noise sources (also referred to as stationary noise sources) are assessed using the hourly L_{eq} (energy average) and L_{max} (maximum) noise

level metrics. Stationary noise sources include all project-related activities that will occur within the landfill site. According to the Noise Element, stationary noise level standards are to be applied at the noise-sensitive receptor property line. *Property-line noise standards are not typical in rural residential areas where the noise-sensitive use on the property may be located at some distance from the property line.* The County's noise standards are summarized in Table I.

TABLE I

NOISE LEVEL STANDARDS
SAN LUIS OBISPO COUNTY
NOISE-SENSITIVE USES

		Non-Transportation (Stationary) Sources			
	Transportation Sources	**Hourly L_{eq}, dBA**		**Hourly L_{max}, dBA**	
	DNL, dB	**7a-10p**	**10p-7a**	**7a-10p**	**10p-7a**
Exterior Exposure	60	50	45	70	65
Interior Exposure	45	--	--	--	--
Source: San Luis Obispo County Noise Element, adopted 1992.					

LANDFILL EQUIPMENT AND OPERATIONS

Existing operations at the Cold Canyon Landfill include an 88-acre landfill, a resource recovery park (RRP), a composting operation and a materials recovery facility (MRF). Noise producing activities associated with the landfill operation include the movement of trucks between the landfill entrance and active disposal site and heavy equipment used to spread, compact and cover the waste material. Heavy equipment used in the landfill operation includes a Caterpillar D7R bulldozer, Aljon 525 compactor and Caterpillar 627F earthmover. Landfill activities move around within the permitted landfill area over the life of the landfill site, but are generally focused in a single area at any given time. Landfill operations currently occur between the hours of 7:00 a.m. and 4:30 p.m.

The RRP is presently located near the public entrance to the site off of SR 227. Noise producing activities at the RRP include the movement of vehicles within the site as materials are being delivered to the site and the operation of heavy equipment used to sort, transfer and store materials within the site. Heavy equipment used within the RRP includes front loaders (Caterpillar IT18B and IT14G) and a Caterpillar 312C excavator. Recovered paper, cardboard and plastic is transported to the MRF located near the southeast corner of the landfill site for processing and baling. The RRP is currently open between 7:30 a.m. and 4:30 p.m.

The composting operation is located near the center of the landfill site. Noise producing activities include the transport of raw materials to the site and processed materials from the site, truck loading activities, compost processing activities and water truck movements for dust control. Heavy equipment used in the composting operation includes a 760 horsepower Moorbark XL 1200 tub grinder powered by a Caterpillar 3412 engine, 525 horsepower 18-foot Scarab compost row turner powered by a Caterpillar C15 Acert engine, Trommel screen, front loaders (Caterpillar IT28) and diesel-powered water truck. Noise-producing activities within the compost processing area presently occur between the hours of 7:30 a.m. and 4:30 p.m.

The MRF is located within a large building near the southeast corner of the landfill site. The facility processes recyclable materials from curbside residential pickup and commercial/industrial sources. It also processes materials from the on-site RRP as noted above. Noise producing activities associated with the MRF include truck movements to and from the facility, glass cleaning equipment located outside the east side of the building, forklift movements and other activities within the building, and ventilation fans on the south end of the building. Current hours of operation for the MRF are 7:30 a.m. to 4:30 p.m.

Other noise producing activities associated with the landfill operation include vehicle back up warning bells and bird whistles. Both activities occur at various times throughout the day, and are not necessarily associated with a specific area of the landfill. Bird whistles are intended to clear birds from the active dumping area, and are fired off throughout the day during times of high bird activity. Backup warning bells are required for worker safety.

NOISE MONITORING PROGRAM

Overview:

Long-term noise measurements were conducted during a two-week period beginning on January 29, 2010 at four (4) potentially noise-sensitive locations around the landfill site. A fifth long-term site was added starting on February 2, 2010. Long-term noise measurement locations were selected by BBA after consultation with San Luis Obispo County to represent existing residential uses or rural residential property lines near the landfill. Figure 1 shows the locations of the long-term noise measurement sites (Sites A through E) with reference to the landfill site.

Noise levels were measured continuously at the long-term sites using automated noise monitoring equipment. It is important to note that noise levels from *all* sources affecting the long-term sites were measured during the study. This includes landfill activities, traffic on public roadways, aircraft over-flights, agricultural operations, residential maintenance activities and other sources.

BBA staff visited each of the long-term sites several or more times during the long-term noise monitoring program to identify the sources of noise that were audible at the sites and to note the noise levels being generated by specific landfill equipment and/or operations. BBA staff also discussed landfill operations and noise levels with property owners at each of the long-term sites to gain an understanding of the landfill noise sources that potentially impact each site.

Noise measurements were also conducted by BBA at additional short-term sites for the purpose of documenting noise levels generated by landfill equipment and/or operations without interference from other noise sources such as vehicular traffic. The short-term noise monitoring sites were located relatively close to the landfill property or within the landfill site. The general locations of the short-term noise monitoring sites are shown in Figure 2 (Sites 1 through 8). BBA used noise level data from both the long- and short-term sites to quantify noise levels produced by the landfill operation for comparison to noise level data previously gathered for noise impact assessment purposes in the DEIR.

Weather conditions during the noise measurement period consisted of a combination of clear and cloudy skies with temperatures ranging from approximately 35-45°F during early morning hours to approximately 55-65°F during the mid-afternoon. Moderate amounts of precipitation fell during the first weekend of monitoring. Winds were generally light to moderate with sustained high winds occurring throughout the day on February 5th, affecting measured noise levels. Data collected from the monitoring sites on February 5th are considered to be invalid.

Instrumentation:

Noise monitoring equipment consisted of Larson-Davis Laboratories Model LDL 820 sound level analyzers equipped with Bruel & Kjaer (B&K) Type 4176 ½″ microphones. Microphones were mounted on tripods at approximately five (5) feet above the ground and were situated so that there was a clear view of the landfill site. Where appropriate, microphones were fitted with random incidence correctors so that noise from sources in all directions could be accurately measured. Instrumentation was calibrated prior to use with a B&K Type 4230 acoustical calibrator to ensure the accuracy of the measurements. The equipment complies with applicable specifications of the American National Standards Institute (ANSI) for Type 1 sound measurement systems.

Long-term Noise Monitoring Data:

Following are discussions of the findings of the long-term noise monitoring program at each site. Included in the discussions are descriptions of the site, noise sources affecting the site and measured noise levels. An hourly noise level chart is included for each site that graphically depicts measured noise levels at the site on a representative day when landfill activities affecting the site were known to occur. A complete summary of long-term noise monitoring data for each day of the noise monitoring period is included in the Appendix of this report.

Noise level descriptors utilized in the following discussions and in the Appendices include the DNL for each full 24-hour measurement day and hourly maximum (L_{max}), energy average (L_{eq}), and selected (L_n) values. L_n values are statistical descriptors used to define noise levels exceeded "n" percent of the time during each hourly noise measurement period. For example, the L_{50} defines the noise level exceeded 50% of the time during each one-hour period (i.e. 30 minutes).

Reported maximum noise levels were most likely caused by localized activities near the microphone, occasional aircraft over-flights or roadway traffic at all of the long-term sites. Since hourly L_{eq} values represent energy average noise levels, they can be significantly affected by occasional noise events that may or may not be related to landfill activities. This was most likely the case at Sites A, C and E. Hourly L_{eq} values measured at Sites B and D are assumed to be generally representative of landfill activities due to their locations relatively close to landfill noise sources and at some distance from major traffic noise sources.

The L_{50} and L_{90} statistical descriptors are particularly useful when interpreting long-term noise monitoring data for sites exposed to intermittent noise sources. Those descriptors have therefore been utilized to help differentiate between noise caused by intermittent and more-or-less constant noise sources.

Site A

Site A was located west of the landfill at 125 Tolosa Road. Landfill-related noise sources affecting Site A include heavy equipment operations at the active landfill face, trucks entering and exiting the facility, RRP activities and bird whistles. The site is also exposed to noise from traffic on SR 227, aircraft operations and localized residential activities. It was noted that bullfrogs in an adjacent pond generate significant noise levels during certain times of the evening and night. Long-term monitoring was begun on January 29th, but an equipment failure resulted in the first 7 days of monitoring data being lost. Daily DNL values for February 4-10, 2010, including noise from all sources, ranged from 49.2-57.7 dB. The chart below shows hourly noise monitoring data on a typical day during the study.

Field observations at Site A by BBA staff indicated that noise levels from heavy equipment operations and truck movements at the active landfill site were typically in the range of 40-50 dBA. Intermittent noise levels in the range of 50-57 dBA were observed due to trucks entering or leaving the facility or materials being dumped or moved around within the RRP. Bird whistles produced intermittent noise levels in the range of 57-61 dBA.

Based upon BBA's analysis of long-term noise measurement data and field observations at Site A, hourly energy average (L_{eq}) values from all normal landfill-related activities are in the range of 42-46 dBA. Maximum noise levels (L_{max}) from intermittent landfill-related activities are in the range of 55-60 dBA. Such levels do *not* exceed the County's noise standards. However, noise levels from the landfill are at times clearly audible at Site A, especially during certain activities at the RRP and when bird whistles are being deployed.

Site B

Site B was located northeast of the landfill at 2225 Corbett Canyon Road. The monitor was located near a shop building about 300 feet south of the house. Landfill-related noise sources affecting Site B include the MRF, composting operation, bird whistles and occasional soil scraping activities near the top of the landfill. Site B is also affected by noise from aircraft over-flights and localized residential and agricultural activities. Long-term noise monitoring was conducted at Site B from January 29 through February 10, 2010. Daily DNL values, including noise from all sources, ranged from 44.3-55.3 dB. The chart below shows hourly noise monitoring data for January 29th. The compost grinder was in operation on that day between the hours of approximately 9:00 a.m.-11:00 a.m. The Scarab was in operation immediately following that period.

Field observations on several different days at Site B by BBA staff indicated that the composting operation (including the grinder and Scarab) produced noise levels of 40-59 dBA, with L_{eq} values in the range of 42-55 dBA, depending upon equipment location and acoustic shielding by terrain. Bird whistles produced maximum noise levels in the range of 47-51 dBA. Soil scraping activities were observed on February 2, and produced noise levels in the range of 50-60 dBA. Noise levels were also measured at the Site B property line at approximately 450 feet from the grinder. Grinder noise levels at that location ranged from 64-75 dBA, with an L_{eq} of 73 dBA.

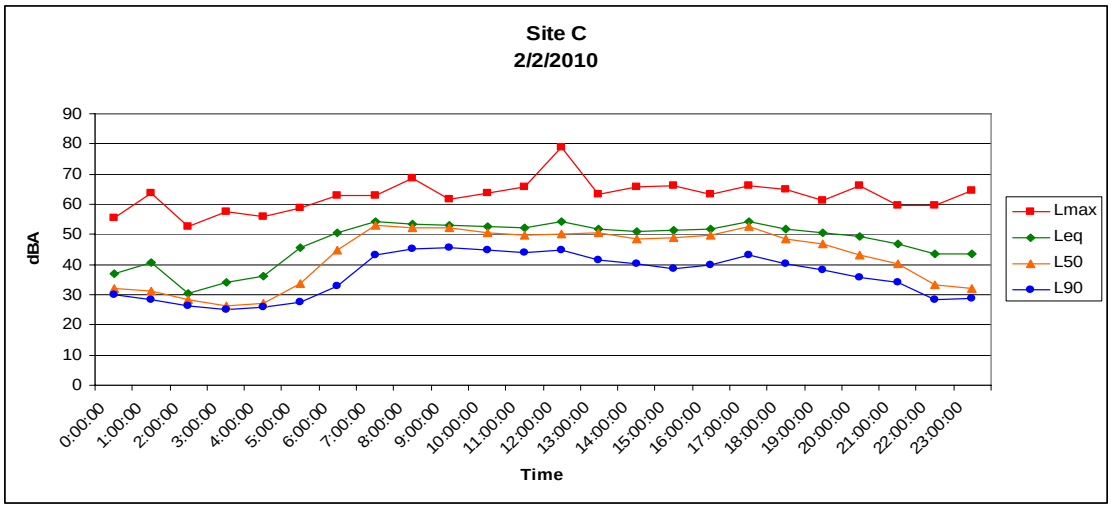
Based upon BBA's analysis of long-term noise measurement data and field observations at Site B, hourly energy average (L_{eq}) values from composting activities have the potential to exceed the County's hourly Leq 50 dBA standard, depending upon where the equipment is being operated. Maximum noise levels were not observed to exceed the County's 70 dBA standard at Site B.

Site C

Site C was located southeast of the landfill at 1966 Vineyard View Lane. The noise monitor was located next to the house facing the landfill. Audible sources of noise at Site C originating from within the landfill include composting activities, general landfill activities and bird whistles. Site C is predominantly exposed to noise generated by traffic on State Route 227, including trucks en-route to or from the landfill. Long-term noise measurements were taken over the two-week period beginning on January 29, 2010. Daily measured DNL values, including noise from all sources, ranged from 50.4-54.5 dB. The chart below shows hourly noise monitoring data on a typical during the study period.

Field observations were conducted at Site C by BBA staff on several occasions during the long-term monitoring period. Field observations indicated that the majority of landfill activity was not audible above traffic noise from State Route 227. Noise levels produced during composting operations and general landfill activities were occasionally audible above background noise levels, and were in the range of 40-48 dBA. Noise levels produced by bird whistles ranged from 42-43 dBA.

Based upon BBA's analysis of long-term noise measurement data and field observations at Site C, it was determined that landfill-related noise is occasionally audible above traffic noise from State Route 227, but that such levels do not exceed the County's hourly L_{eq} or L_{max} standards.

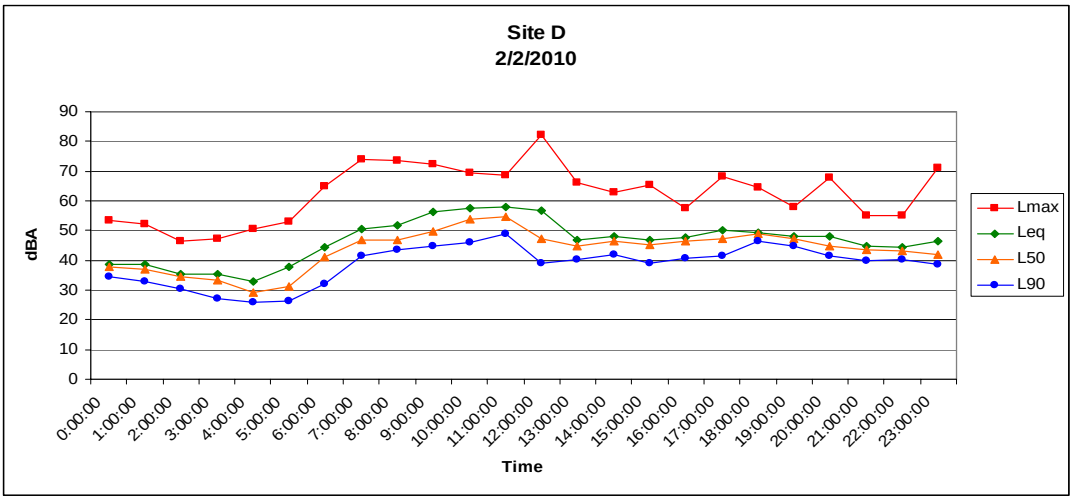


Site D

Site D was located south of the landfill next to Patchett Road. Landfill-related noise sources affecting Site D include heavy equipment operations and truck movements at the active landfill face, composting activities, MRF activities, backup warning bells and bird whistles. The site is also exposed to noise generated by traffic on State Route 227, aircraft operations and localized residential and/or commercial activities. Long-term noise measurements were conducted at Site D from January 29 to February 10, 2010. Measured daily DNL values, including noise from all sources, ranged from 50.1 to 54.5 dB. The chart below shows hourly noise monitoring data on a typical day during the study. February 2nd was chosen because it included observed composting activity.

Field observations by BBA staff at Site D indicated that noise levels from activities at the active landfill site are typically in the range of 42-49 dBA. Composting activities (including the compost grinder and the Scarab) are in the range of 44-63 dBA with L_{eq} values of 50-55 dBA. Noise levels from the MRF were observed to be in the range of 42-46 dBA. Bird whistles and backup warning bells produced maximum noise levels of 53-62 and 52-53 dBA, respectively.

Based upon BBA's analysis of long-term noise measurement data and field observations, hourly energy average (L_{eq}) values from landfill-related activities at Site D are in the range of 45-55 dBA, depending upon the type and location of equipment in use. Landfill noise levels, especially on days when the Scarab is being operated, may exceed the County's 50 dBA hourly L_{eq} standard. Intermittent maximum noise levels (L_{max}) from the Scarab and bird whistles are in the range of 53-63 dBA. Such levels do not exceed the County's L_{max} 70 dBA standard.



Site E

Site E was located west of the landfill at 2245 Carpenter Canyon road. Landfill-related noise sources affecting Site E include heavy equipment operations at the active landfill face, trucks entering and exiting the facility, RRP activities, composting activities, backup warning bells and bird whistles. The site is also exposed to noise from traffic on State Route 227, aircraft over-flights and localized residential activities. Long-term noise monitoring occurred at Site E for a period of nine days, beginning on February 2, 2010. Measured daily DNL values, including noise from all sources, ranged from 48.3-60.0 dB. The chart below shows hourly noise monitoring data on a typical day during the study period.

Field observations conducted at Site E by BBA staff indicated that noise levels from heavy equipment and truck operations at the active landfill were typically in the range of 40-50 dBA. Intermittent noise levels in the range of 50-57 dBA were observed due to unloading of materials at the RRP. Bird whistles and backup warning bells produced maximum noise levels of 66-73 and 40-52 dBA, respectively.

Based upon BBA's analysis of long-term noise measurement data and field observations at Site E, hourly L_{eq} values from a combination of all landfill-related activities are in the range of 45-50 dBA. Such levels approach but do not exceed the County's 50 dBA L_{eq} standard. Intermittent maximum noise levels from bird whistles may occasionally exceed the County's 70 dBA L_{max} standard. The dominant source of noise affecting the site is traffic on State Route 227.

COMPARISON OF MEASURED NOISE LEVELS

The DEIR presents an analysis of potential project-related noise impacts. As previously stated, it is the purpose of this study to provide additional information concerning noise levels generated by landfill equipment and/or operations. Noise monitoring conducted for the this study occurred over a longer period of time than for the DEIR study, and noise levels generated by equipment not in use during the DEIR study have been documented.

Landfill Disposal Noise Levels:

For the DEIR noise study, noise measurements were conducted during the combined operation of disposal trucks, the dozer, compactor and earthmover at a distance of 200-300 feet from the equipment. Measured noise levels were 65-77 dBA with an L_{eq} of 70 dBA. Measurements were also conducted at a distance of 2,500 feet from the active landfill and noise levels were observed to be in the range of 42-48 dBA. Noise levels were also measured during the DEIR study for the earthmover while scraping cover soil. At a distance of 200 feet, measured noise levels were 68-80 dBA with an L_{eq} of 72 dBA.

For the present study, noise levels associated with landfill disposal activities were measured at Sites A and E, at distances of 3,200 and 2,700 feet from the active disposal site, respectively. Measured noise levels at Site A were in the range of 40-45 dBA. Measured noise levels at Site E were in the range of 40-50 dBA with L_{eq} values of 44-46 dBA. Noise levels were also measured at Site B while the earthmover was scraping cover soil near the top of the landfill site. The measured noise levels at a distance of about 800 feet from the earthmover were 50-60 dBA.

The noise levels measured during the present study were determined to be consistent with the noise level data used to assess potential landfill noise impacts in the DEIR. However, noise levels reported for earthmover scraping activities in the DEIR are somewhat higher than were measured during the present study. This is probably due to the fact that the earthmover was slightly shielded by topography with reference to Site B during the present study.

Resource Recovery Park:

According to the DEIR noise study, the RRP operation produces L_{eq} and L_{max} values of approximately 69 and 75 dBA, respectively, at 100-200 feet from loaders engaged in the movement and sorting of materials. Maximum noise levels are generally caused by backup alarms and/or materials being dumped into sorting bins.

For the present study, noise levels associated with RRP were measured at Sites A and E and 1. The most definitive measurement data were collected at Site 1 where measured noise levels at a distance of 375 feet ranged from 47-59 dBA with an L_{eq} of 51.4 dBA during normal RRP activities. Noise levels measured at Sites A and E were in the range of 40-53 dBA. The noise levels measured during the present study are lower than used to assess potential RRP noise impacts in the DEIR noise study.

Composting Operation:

For the DEIR noise study, it was not possible to conduct noise measurements from the wood waste grinder on-site. It was also not possible to conduct noise measurements while the Scarab row turner was in use on the site. Noise measurement data were therefore obtained for a similar wood waste tub grinder at another facility near Visalia and for the Scarab while it was operated in a stationary position. It was determined for the DEIR study that the tub grinder produces an L_{eq} of 81 dBA at 100 feet and that the Scarab row turner produces an L_{eq} of 84 dBA at 100 feet.

Noise levels measured in close proximity to the tub grinder and Scarab were used as reference data in the DEIR noise study for the calculation of noise levels at greater distances from the equipment. Such calculations accounted for the normal attenuation of sound with increasing distance from a "point" noise source, but did not include adjustments for shielding by terrain, atmospheric absorption or excess attenuation of sound over the ground. Such factors can be significant at greater distances from a noise source, meaning that the methodology utilized for the DEIR noise study would be expected to provide a conservative (worst-case) assessment of noise levels at distances of more than a few hundred feet from the source.

For the present study, noise levels associated with the composting operation were measured at a number of long- and short-term sites including Sites B, C, D, 3, 4, 6, 7 and 8. With reference to a distance of 100 feet from the operating equipment, the tub grinder produced L_{eq} and L_{max} values of 84.6 and 89.5 dBA, respectively, while grinding wood waste. When green waste was being processed the tub grinder produced noise levels 1-2 dB lower at the same measurement location. At more distant sites, the wood waste grinding operation was observed to produce noise levels in the range of 44-58 dBA, with an L_{eq} of 52 dBA, at Site D (1,600 feet away). The Scarab produced L_{eq} and L_{max} values of 68.0 and 70.6 dBA, respectively, at a distance of 600 feet. The Scarab was also was observed to produce noise levels in the range of 52-63 dBA at Site D (1,000 feet away), 40-49 dBA at Site 6 (4,500 feet away) and 42-48 dBA at Site 7 (6,700 feet away).

Based on the above, it would appear that the DEIR may have understated potential noise impacts and mitigation requirements due to the wood waste grinding operation. However, as noted above, the DEIR used a conservative approach to calculating the attenuation of noise over distance from the source. Tub grinder noise levels measured at off-site locations during the present study were found to be consistent with the noise levels used for noise impact assessment purposes in the DEIR. The noise level data used to assess Scarab noise levels in the DEIR were also found to be consistent with the present study.

Materials Recovery Facility:

For the DEIR noise study, noise measurements were conducted at several locations to the north and east of the MRF building. Noise sources included vehicle movements, ventilation fans, sorting operations inside the building and the glass cleaner located outside the building. Measured noise levels at 150 feet east of the building were L_{eq} and L_{max} values of 66.3 and 67.4 dBA, respectively. The glass cleaner was observed to produce a maximum noise level of 80 dBA when measured at a distance 50 feet.

For the present study, noise levels associated with the MRF were conducted at Site 5 at a distance of 175 feet from the east side of the building. Noise sources observed during the noise monitoring period included truck movements, ventilation fans and cleaning and sorting activities. Measured noise levels were in the range of 56-67 dBA with an L_{eq} of 59 dBA. Maximum noise levels were caused by trucks dumping loads of material to be processed. At Sites D and E, MRF activities were observed to produce noise levels in the range of 44-46 dBA.

Noise measurements collected in close proximity to the MRF during the present study are consistent with the data used in the DEIR to assess noise impacts from the MRF.

Back-up Warning Devices:

Noise levels produced by backup alarms were not specifically documented by the DEIR noise study. Backup alarms are required for worker safety and are utilized on nearly all mobile equipment at the landfill and other similar facilities. The frequency content of noise produced by backup alarms is intended to be clearly audible above other sources of work-site noise. For that reason, they are often distinctly audible at some distance from the equipment in use.

Backup alarm noise levels were measured at Sites D and E at distances of approximately 1,250 and 2,500 feet, respectively, from where the alarms were being sounded. Measured maximum noise levels were in the range of 52-53 at Site D and 40-52 at Site E. Noise levels from backup alarms operating on equipment within the landfill are variable due to distance from the source, wind direction, equipment orientation, intervening terrain and other factors.

Noise levels due to backup alarms would not be expected to exceed the County's noise standards at off-site locations. However, as noted above, backup alarms are at times distinctly audible in the vicinity of the landfill operation.

Bird Whistles:

Bird whistles are intended to clear birds from the active dumping area, and may be launched throughout the day during times of high bird activity. Bird whistles were not observed at the time the DEIR noise study was prepared and were not identified as a potential significant noise source.

During the present study, noise from bird whistles was measured at a number of sites including all of the long-term sites and Sites 6 and 7. Measured noise levels were found to be variable due to distance from the launch site, intervening terrain, weather conditions and other factors. Maximum noise levels from bird whistles at Site E were in the range of 66-73 dBA. Two of the three measurement samples at Site E exceeded the County's 70 dBA L_{max} standard. At the other sites, measured maximum noise levels during individual bird whistle launches were in the range of 40-62 dBA. Bird whistles can be clearly audible in the vicinity of the landfill due their distinctive sound.

NOISE MITIGATION

DEIR Noise Mitigation and Findings of Significance:

The Cold Canyon Landfill Expansion project would expand the area of the landfill operation, expand and relocate the compost operation, expand and relocate the Resource Recovery Park, expand the Materials Recovery Facility, extend hours of operation, relocate the main entrance road and increase traffic on SR227. Noise mitigation measures are directed at the "project" as identified in the DEIR and *not* at the resolution of existing noise-related conflicts around the landfill.

The DEIR presents a discussion of required noise mitigation based upon noise measurement data collected in March 2008, information provided by the project applicant *and the assumption that noise mitigation should focus on compliance with the County's standards at the locations of noise-sensitive receptors.* As discussed above, noise measurement data collected for the present study over a two-week period were found to be consistent with the DEIR noise data with the exception that bird whistles were not identified as a landfill-related noise source when the DEIR noise study was prepared.

The DEIR noise study concluded that noise levels from the landfill expansion project would result in noise levels exceeding the County's 50 dBA hourly L_{eq} standard at the closest existing homes to the south, east and north of the landfill site. That finding remains unchanged.

The DEIR noise study also concluded that maximum noise levels due to the project would not exceed the County's 70 dBA hourly L_{max} standard. That finding needs to be revised since the present study determined that intermittent bird whistles have the potential to exceed 70 dBA at the closest homes to the west of the site. There are no known noise mitigation measures for bird whistles and that impact will most likely remain significant and unavoidable.

Figure 3 shows proposed noise mitigation measures from the DEIR noise study. Mitigation measures include the construction of earthen berms near the southeast boundary of the landfill site. The DEIR did not specify how tall the berms (or other types of noise barriers) should be, but stated that they would have to interrupt line-of-sight between the noise source(s) and receiver(s) of concern in order to provide useful noise mitigation. It was assumed that the relocated RRP would be depressed below the existing grade to provide acoustic shielding between the RRP and closest homes to the east.

Noise Mitigation at Property Lines:

As noted above, the DEIR noise analysis focused on noise mitigation at the location of noise-sensitive receptors and not residential property lines. However, the San Luis Obispo County Noise Element specifies that hourly noise standards for stationary noise sources should be applied at the receiving land use property line. This presents a dilemma in that the design of effective noise mitigation at the property line may not provide effective mitigation at other locations within the property where the noise-sensitive uses are located. This is especially true in rural residential areas where individual homes are located on large land parcels with varying terrain.

Mitigation of noise at the property line requires that either some form of noise barrier be constructed around the expanded landfill operation or that the noise produced by landfill activities be reduced at the source. It may also be possible to reduce noise affecting nearby residential receptors and property lines by constructing on-site noise attenuation enclosures around noise generating activities, such as the wood waste grinding operation. There are practical limitations on how much noise generated by heavy equipment may be reduced at the equipment source without compromising the performance and safety of the equipment. Additionally, there are federal and state safety regulations that require audible warning devices on many types of heavy equipment.

Following are discussions of additional noise mitigation measures that could be utilized to reduce project-related noise impacts at the closest noise-sensitive receptors *and* at the closest property lines of parcels within which such uses are located.

Landfill Disposal Operations

The DEIR noise analysis recommended that an earthen berm be constructed along the southeast boundary of the project site as shown in Figure 3. A berm at that location would acoustically shield the property lines to the southeast of the landfill and the closest homes on those properties from landfill disposal, composting and MRF activities. The DEIR analysis did not state specifically how tall the berm should be.

One of the complicating factors with the landfill disposal expansion area is that the active landfill face will move around over time and become higher in elevation as expansion area modules are completed. Ultimately, that active landfill face in the expansion area could be 100-200 feet higher than the elevations of the closest homes to the southeast. An earthen berm 25 feet high would effectively mitigate noise levels from landfill disposal operations affecting nearby property lines to the southeast of the expansion area, but would not completely mitigate noise at the closest homes on those properties.

It is concluded that noise-sensitive receptors located within 1,500 feet of the active landfill face, and that have an unobstructed view of the active landfill face (with the recommended berms in place), may occasionally be exposed to hourly noise levels in excess of the County's 50 dBA hourly L_{eq} standard.

Composting Operation

Mitigation of noise from the composting operation at nearby property lines to the north and east would require that noise from the tub grinder and Scarab be reduced at their sources. Since it is not practical to reduce the noise produced by the tub grinder, a fixed grinding location could be established that is acoustically shielded from nearby homes and property lines by a combination of existing terrain and on-site noise barriers. This means that wood and green waste material would have to be transported to the established grinding location. Noise barriers around the grinding location could be constructed of earth, concrete, hay bales or any acoustically dense material. Hay bales have been effectively used for noise attenuation enclosures for aircraft maintenance run-ups at the San Luis Obispo County and Fresno Airports.

The height of the barrier required to effectively mitigate tub grinder noise would depend on how close to the tub grinder the barrier could be located and the relative elevations of nearby

receptors. A 12 foot-high barrier would be effective in reducing noise levels from the tub grinder by 5-10 dB, depending upon the location and elevation of the receptor of concern. It is likely that noise from the tub grinder could still exceed the County's 50 dBA hourly L_{eq} standard at some nearby property lines, even with an effective on-site noise barrier in place.

The Scarab row turner presents a difficult situation for effective noise mitigation. The equipment must operate over a wide area and the closest receiving property lines and homes are generally located at a higher elevation than the existing compost turning area. It is recommended that the project applicant consider modifications that would reduce the noise level generated by the Scarab at the equipment source. Such modifications could include more effective mufflers and/or shielding of noise-producing mechanical equipment. It is unknown how much noise from the Scarab could be reduced by such modifications. It is concluded that noise from the Scarab remains a significant impact that can not be reasonably mitigated at nearby property lines.

Resource Recovery Park (RRP)

The RRP would be relocated with the project to an area to the east of the MRF. The DEIR noise analysis concluded that the RRP would be acoustically shielded from the closest homes to the east since the facility would be recessed into the hillside. Due to the fact that the RRP would be cut into the hillside, the closest property lines to the east would directly overlook the facility. It would not be practical to construct a property line noise barrier along the east boundary of the RRP site and a barrier would provide limited effectiveness since the terrain slopes upward rather steeply.

Noise from the RRP could potentially be reduced at the closest property lines to the east by enclosing the operation in a covered structure. It is unknown whether this is feasible or by how much noise levels could be reduced. Noise reduction potential would depend on the final design of the structure. It is concluded that noise from the relocated RRP is a significant impact that can not be reasonably mitigated at nearby property lines.

FIGURE 1: LONG TERM NOISE MONITORING SITES

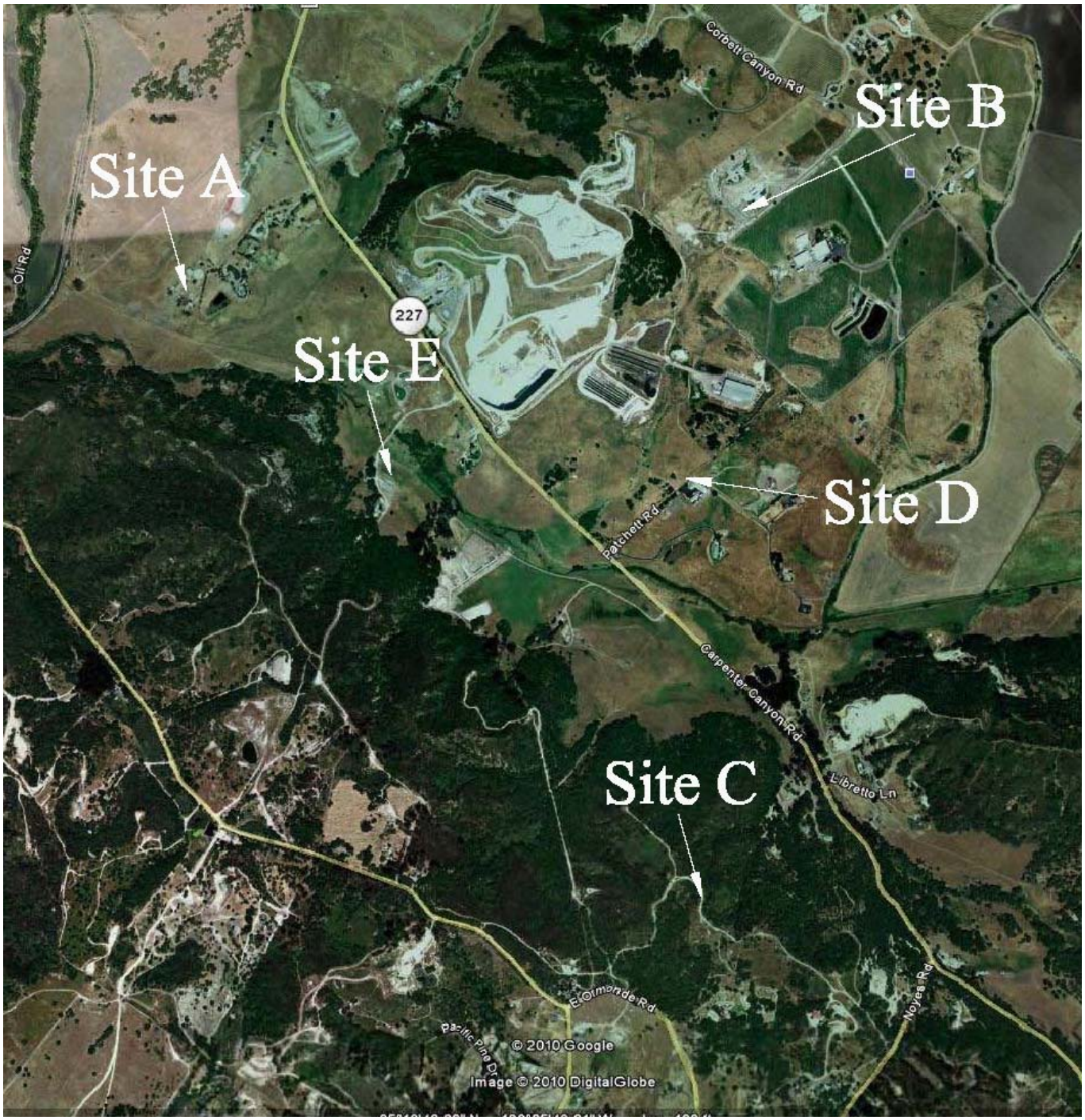
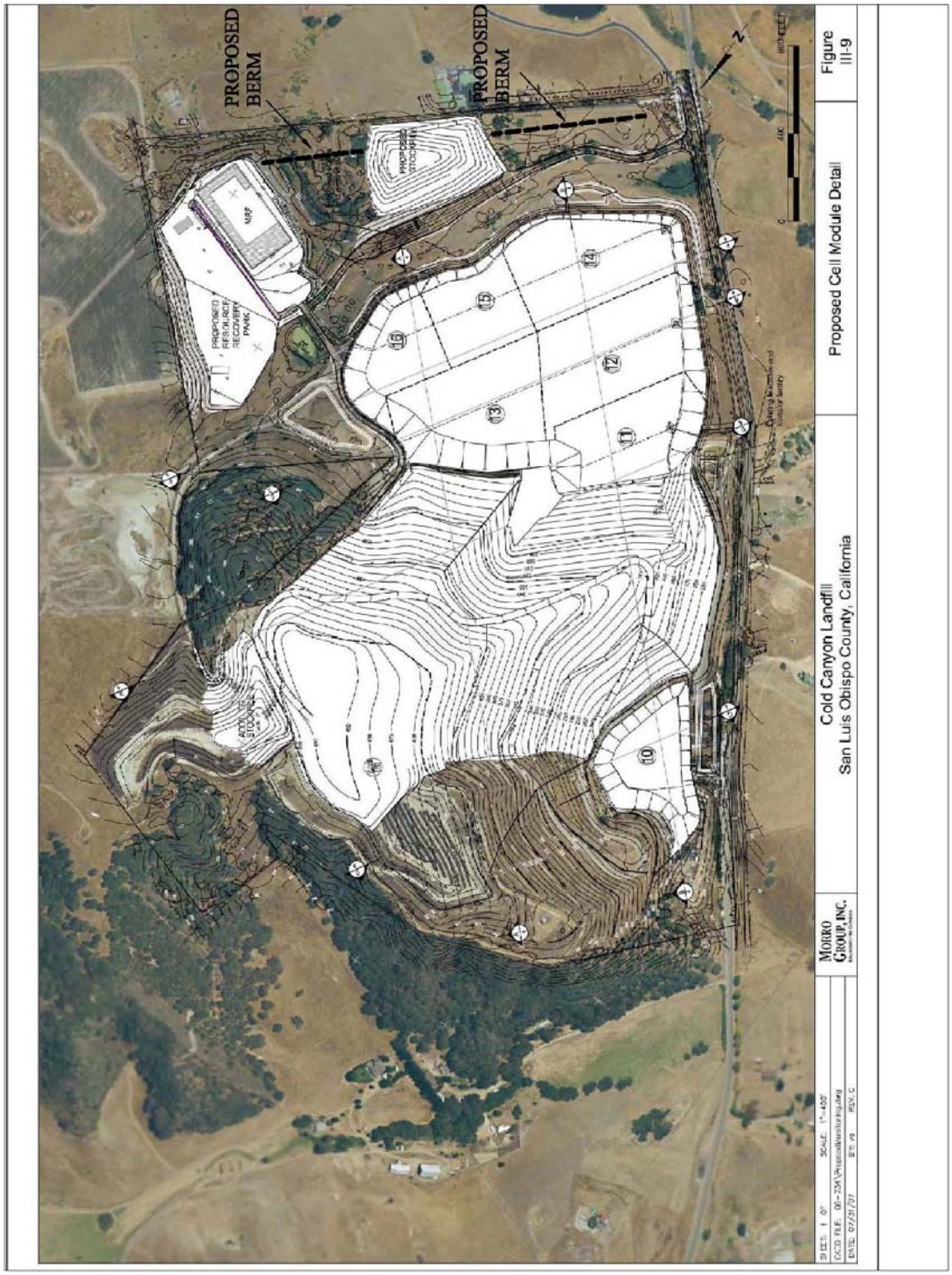


FIGURE 2: SHORT TERM NOISE MONITORING SITES

FIGURE 3: POTENTIAL NOISE MITIGATION MEASURES



APPENDIX A

ACOUSTICAL TERMINOLOGY

AMBIENT NOISE LEVEL: The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

CNEL: Community Noise Equivalent Level. The average equivalent sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.

DECIBEL, dB: A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).

DNL/L_{dn}: Day/Night Average Sound Level. The average equivalent sound level during a 24-hour day, obtained after addition of ten decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.

L_{eq}: Equivalent Sound Level. The sound level containing the same total energy as a time varying signal over a given sample period. L_{eq} is typically computed over 1, 8 and 24-hour sample periods.

NOTE: The CNEL and DNL represent daily levels of noise exposure averaged on an annual basis, while L_{eq} represents the average noise exposure for a shorter time period, typically one hour.

L_{max}: The maximum noise level recorded during a noise event.

L_n: The sound level exceeded "n" percent of the time during a sample interval (L_{90}, L_{50}, L_{10}, etc.). For example, L_{10} equals the level exceeded 10 percent of the time.

A-2

ACOUSTICAL TERMINOLOGY

NOISE EXPOSURE CONTOURS: Lines drawn about a noise source indicating constant levels of noise exposure. CNEL and DNL contours are frequently utilized to describe community exposure to noise.

NOISE LEVEL REDUCTION (NLR): The noise reduction between indoor and outdoor environments or between two rooms that is the numerical difference, in decibels, of the average sound pressure levels in those areas or rooms. A measurement of Anoise level reduction@ combines the effect of the transmission loss performance of the structure plus the effect of acoustic absorption present in the receiving room.

SEL or SENEL: Sound Exposure Level or Single Event Noise Exposure Level. The level of noise accumulated during a single noise event, such as an aircraft overflight, with reference to a duration of one second. More specifically, it is the time-integrated A-weighted squared sound pressure for a stated time interval or event, based on a reference pressure of 20 micropascals and a reference duration of one second.

SOUND LEVEL: The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.

SOUND TRANSMISSION CLASS (STC): The single-number rating of sound transmission loss for a construction element (window, door, etc.) over a frequency range where speech intelligibility largely occurs.

APPENDIX B

HOURLY NOISE LEVEL SUMMARIES

MEASURED DAILY DNL VALUES AND HOURLY NOISE LEVELS[1]
FEBRUARY 4-10, 2010
SITE A

Date	Day	DNL	7:00 am-4:59 pm (Landfill Hours)				5:00 pm-6:59 am			
			L_{max}	L_{eq}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{50}	L_{90}
2/4/10	Thu	49.2	58-78	45-52	42-50	39-46	49-67	35-55	32-52	29-41
2/5/10[2]	Fri	51.7	58-92	41-60	38-49	35-45	52-71	41-56	39-57	36-42
2/6/10	Sat	55.8	57-71	41-52	37-47	36-45	55-67	42-64	37-64	30-62
2/7/10	Sun	55.3	59-81	44-53	36-42	33-39	55-77	43-61	38-61	34-58
2/8/10	Mon	56.3	61-71	44-49	40-45	36-42	55-71	45-65	36-65	31-64
2/9/10	Tues	57.7	53-73	40-49	38-45	36-42	56-67	43-65	42-65	28-64
2/10/10	Wed	55.8	55-74	43-52	41-48	38-45	52-70	41-64	38-64	32-62

[1]Includes noise from *all* sources affecting the site, including the landfill operation, traffic and aircraft.
[2] Sustained high winds occurred on 2/5/10, affecting measured noise levels. Data collected on 2/5/10 are considered to be invalid.
Source: Brown-Buntin Associates, Inc.

MEASURED DAILY DNL VALUES AND HOURLY NOISE LEVELS[1]
JANUARY 29-FEBRUARY 10, 2010
SITE B

Date	Day	DNL	7:00 am-4:59 pm (Landfill Hours)				5:00 pm-6:59 am			
			L_{max}	L_{eq}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{50}	L_{90}
1/29/10	Fri	48.4	58-79	45-53	38-48	35-42	43-69	34-46	33-41	31-38
1/30/10	Sat	47.6	55-74	38-54	33-42	28-36	44-72	30-47	29-41	26-38
1/31/10	Sun	45.1	56-69	39-47	32-37	27-31	44-65	33-45	29-39	25-35
2/1/10	Mon	45.7	52-74	39-51	33-41	29-37	42-72	31-48	30-38	28-36
2/2/10	Tues	48.5	57-81	42-56	35-46	32-41	40-71	31-49	30-40	27-37
2/3/10	Wed	48.2	59-69	42-49	34-46	29-40	40-72	30-54	30-48	27-42
2/4/10	Thu	51.8	53-71	39-49	37-44	34-40	43-73	31-53	29-49	27-43
2/5/10[2]	Fri	55.3	68-80	48-59	42-54	37-50	48-71	37-53	26-50	34-45
2/6/10	Sat	49.1	58-72	38-55	33-49	30-45	43-73	32-49	31-39	29-36
2/7/10	Sun	45.8	55-68	38-49	33-38	29-35	42-72	33-47	28-35	34-33
2/8/10	Mon	44.3	54-72	37-48	35-44	31-37	37-68	28-46	26-39	23-35
2/9/10	Tues	47.8	57-73	38-48	33-41	30-38	43-70	30-48	28-46	26-39
2/10/10	Wed	46.6	59-73	40-52	36-46	32-42	41-69	31-49	30-41	26-37

[1]Includes noise from *all* sources affecting the site, including the landfill operation, traffic and aircraft.
Source: Brown-Buntin Associates, Inc.
[2] Sustained high winds occurred on 2/5/10, affecting measured noise levels. Data collected on 2/5/10 are considered to be invalid.
Source: Brown-Buntin Associates, Inc.

MEASURED DAILY DNL VALUES AND HOURLY NOISE LEVELS[1]
JANUARY 29-FEBRUARY 10, 2010
SITE C

Date	Day	DNL	7:00 am-4:59 pm (Landfill Hours)				5:00 pm-6:59 am			
			L_{max}	L_{eq}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{50}	L_{90}
1/29/10	Fri	52.9	61-75	51-55	48-53	38-45	56-71	31-55	26-53	24-44
1/30/10	Sat	52.4	61-82	49-56	38-52	32-44	54-65	34-52	26-49	23-41
1/31/10	Sun	50.4	61-81	46-54	37-49	30-38	55-74	37-52	25-47	23-37
2/1/10	Mon	52.7	60-81	51-54	47-52	37-43	54-68	34-54	27-52	24-43
2/2/10	Tues	52.9	62-79	51-54	49-53	39-46	53-62	31-54	27-53	25-43
2/3/10	Wed	53.5	61-71	51-55	47-53	39-48	54-68	33-56	27-54	25-46
2/4/10	Thu	52.1	62-66	51-54	47-52	36-42	58-71	34-53	25-51	23-39
2/5/10[2]	Fri	54.5	61-79	51-55	49-51	37-45	54-67	44-53	31-52	28-45
2/6/10	Sat	52.0	59-82	50-56	46-52	36-47	56-66	36-51	24-47	22-40
2/7/10	Sun	50.9	56-67	34-56	26-54	24-45	59-78	46-54	38-49	32-41
2/8/10	Mon	53.7	62-70	52-55	49-53	41-45	56-67	34-56	26-54	24-45
2/9/10	Tues	54.0	62-69	51-55	47-54	37-46	57-69	35-54	24-51	22-46
2/10/10	Wed	53.9	62-71	52-54	50-54	41-47	55-75	32-56	27-55	25-47

[1]Includes noise from *all* sources affecting the site, including the landfill operation, traffic and aircraft.
[2] Sustained high winds occurred on 2/5/10, affecting measured noise levels. Data collected on 2/5/10 are considered to be invalid.
Source: Brown-Buntin Associates, Inc.

MEASURED DAILY DNL VALUES AND HOURLY NOISE LEVELS[1]
JANUARY 29-FEBRUARY 10, 2010
SITE D

Date	Day	DNL	7:00 am-4:59 pm (Landfill Hours)				5:00 pm-6:59 am			
			L_{max}	L_{eq}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{50}	L_{90}
1/29/10	Fri	50.9	65-74	48-53	45-48	40-44	54-74	39-53	36-48	32-44
1/30/10	Sat	50.3	61-75	42-55	39-52	34-45	46-74	32-52	29-49	25-44
1/31/10	Sun	50.1	52-79	33-52	26-46	23-43	52-79	33-52	26-46	23-43
2/1/10	Mon	51.6	60-86	47-57	41-49	35-43	50-75	35-51	34-48	30-44
2/2/10	Tues	52.5	57-82	47-58	45-55	39-49	47-71	33-50	29-49	26-46
2/3/10	Wed	52.3	62-90	46-59	43-49	39-46	50-78	34-56	33-49	29-44
2/4/10	Thu	51.8	61-81	44-53	41-46	36-42	43-78	29-52	26-45	24-30
2/5/10[2]	Fri	54.5	64-77	45-56	43-51	39-47	53-75	41-52	39-49	65-42
2/6/10	Sat	52.8	67-77	46-60	38-54	31-48	49-79	33-50	28-44	26-41
2/7/10	Sun	50.5	63-75	43-51	38-47	33-43	49-82	34-51	30-43	28-39
2/8/10	Mon	51.6	62-77	48-57	46-55	40-50	48-75	30-50	29-47	26-41
2/9/10	Tues	53.8	60-82	48-55	44-49	39-45	48-76	28-52	26-49	23-39
2/10/10	Wed	52.9	63-83	49-56	46-50	41-47	47-84	33-61	30-49	26-41

[1]Includes noise from *all* sources affecting the site, including the landfill operation, traffic and aircraft.
[2] Sustained high winds occurred on 2/5/10, affecting measured noise levels. Data collected on 2/5/10 are considered to be invalid.
Source: Brown-Buntin Associates, Inc.

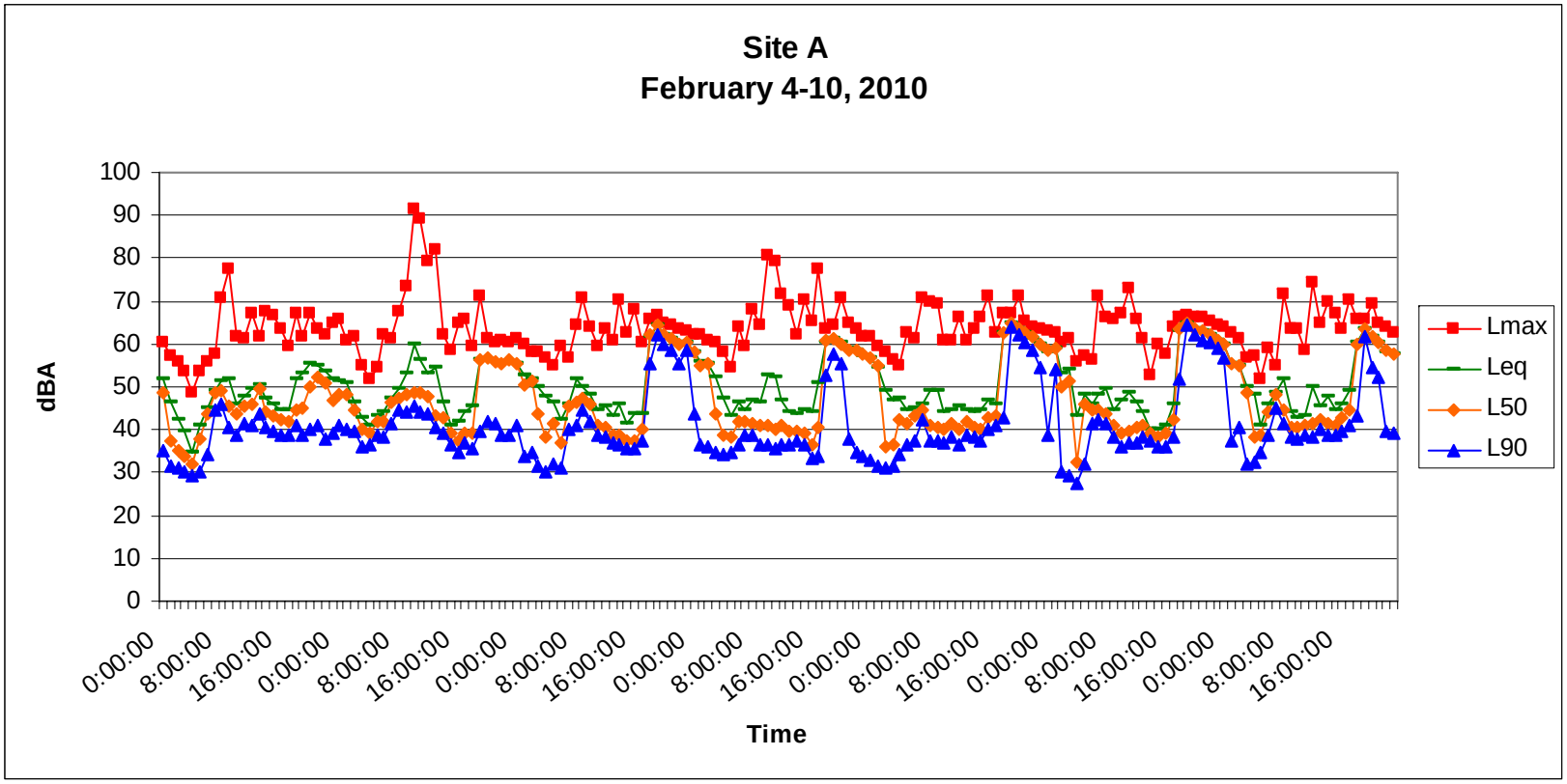
MEASURED DAILY DNL VALUES AND HOURLY NOISE LEVELS[1]
FEBRUARY 2-10, 2010
SITE E

Date	Day	DNL	7:00 am-4:59 pm (Landfill Hours)				5:00 pm-6:59 am			
			L_{max}	L_{eq}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{50}	L_{90}
2/2/10	Tues	60	66-73	46-61	41-59	36-47	42-71	34-63	32-61	30-60
2/3/10	Wed	59.5	62-73	47-58	44-53	40-49	46-71	33-63	32-61	29-46
2/4/10	Thu	51.6	61-77	45-58	42-51	49-48	48-71	33-48	30-47	28-45
2/5/10[2]	Fri	52.9	62-83	45-54	41-49	37-46	50-70	40-48	39-47	36-44
2/6/10	Sat	50.2	57-74	47-56	42-50	38-47	47-66	33-47	31-41	29-41
2/7/10	Sun	48.3	61-80	45-52	40-44	36-41	49-64	36-46	35-45	34-41
2/8/10	Mon	48.8	58-74	45-51	43-46	40-43	47-74	33-51	32-47	31-42
2/9/10	Tues	51.0	60-72	43-50	41-47	37-44	50-67	33-50	31-48	29-45
2/10/10	Wed	49.9	61-74	47-50	44-82	40-45	49-74	37-52	36-47	33-44

[1]Includes noise from *all* sources affecting the site, including the landfill operation, traffic and aircraft.
[2] Sustained high winds occurred on 2/5/10, affecting measured noise levels. Data collected on 2/5/10 are considered to be invalid.
Source: Brown-Buntin Associates, Inc.

APPENDIX C

HOURLY NOISE LEVEL CHARTS


Site A
February 4-10, 2010
dBA
100
90
80
70
60
50
40
30
20
10
0
0:00:00
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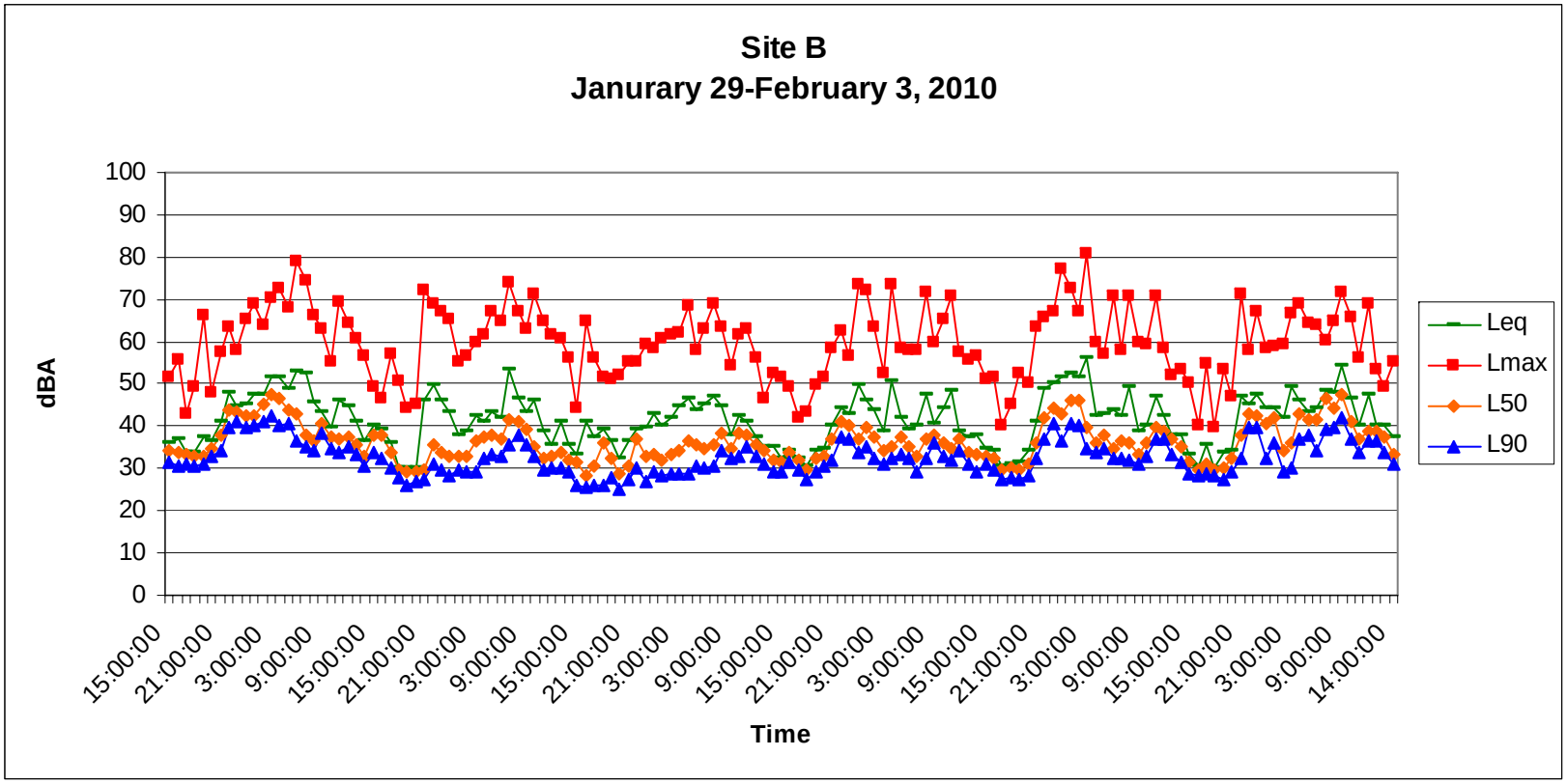
16:00:00
Time
Lmax
Leq
L50
L90


Site B
Janurary 29-February 3, 2010
dBA
100
90
80
70
60
50
40
30
20
10
0
15:00:00
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3:00:00
9:00:00
15:00:00
21:00:00
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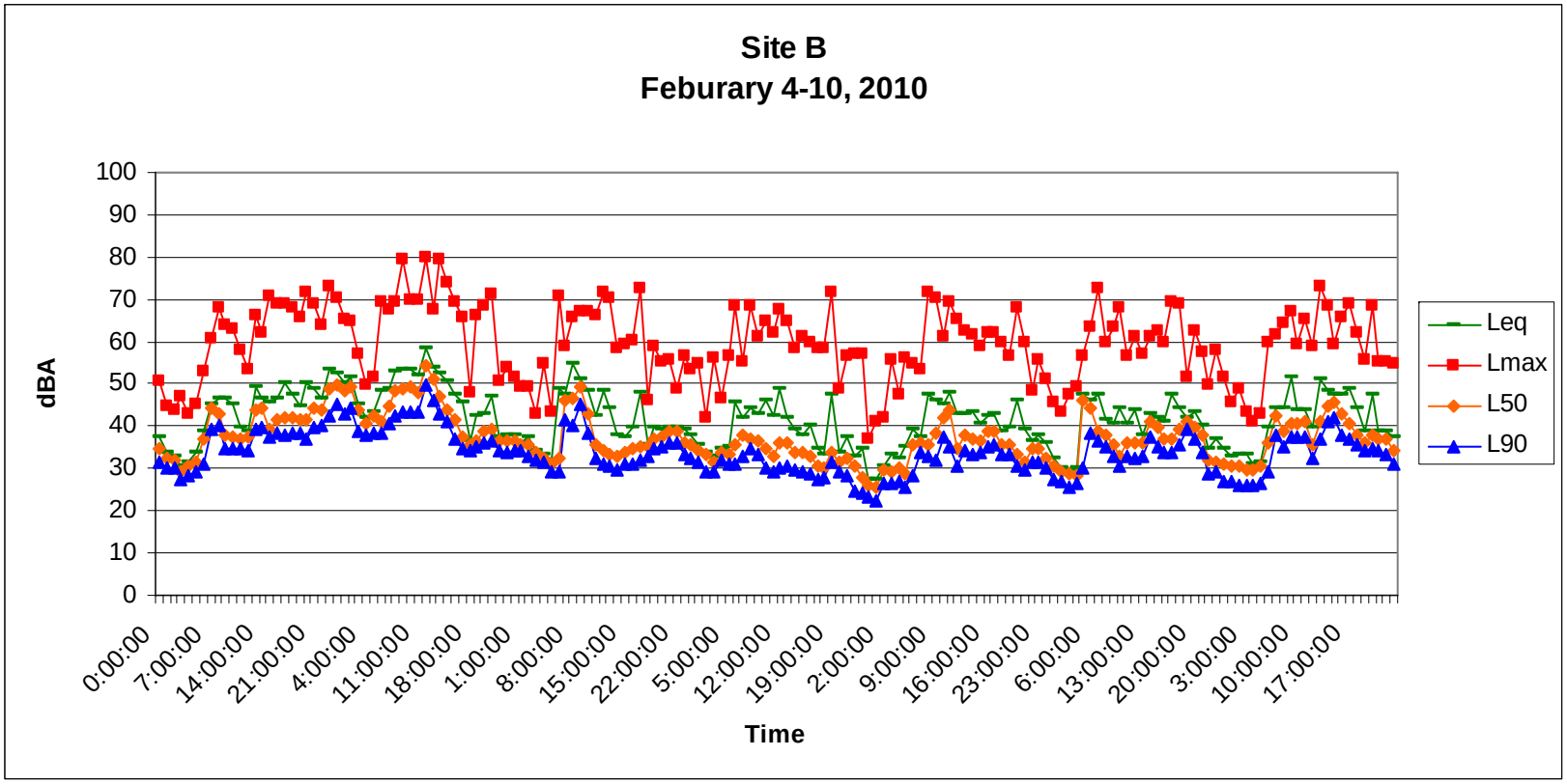
Time
Leq
Lmax
L50
L90


Site B
Feburary 4-10, 2010
dBA
100
90
80
70
60
50
40
30
20
10
0
0:00:00
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14:00:00
21:00:00
4:00:00
11:00:00
18:00:00
1:00:00
8:00:00
15:00:00
22:00:00
5:00:00
12:00:00
19:00:00
2:00:00
9:00:00
16:00:00
23:00:00
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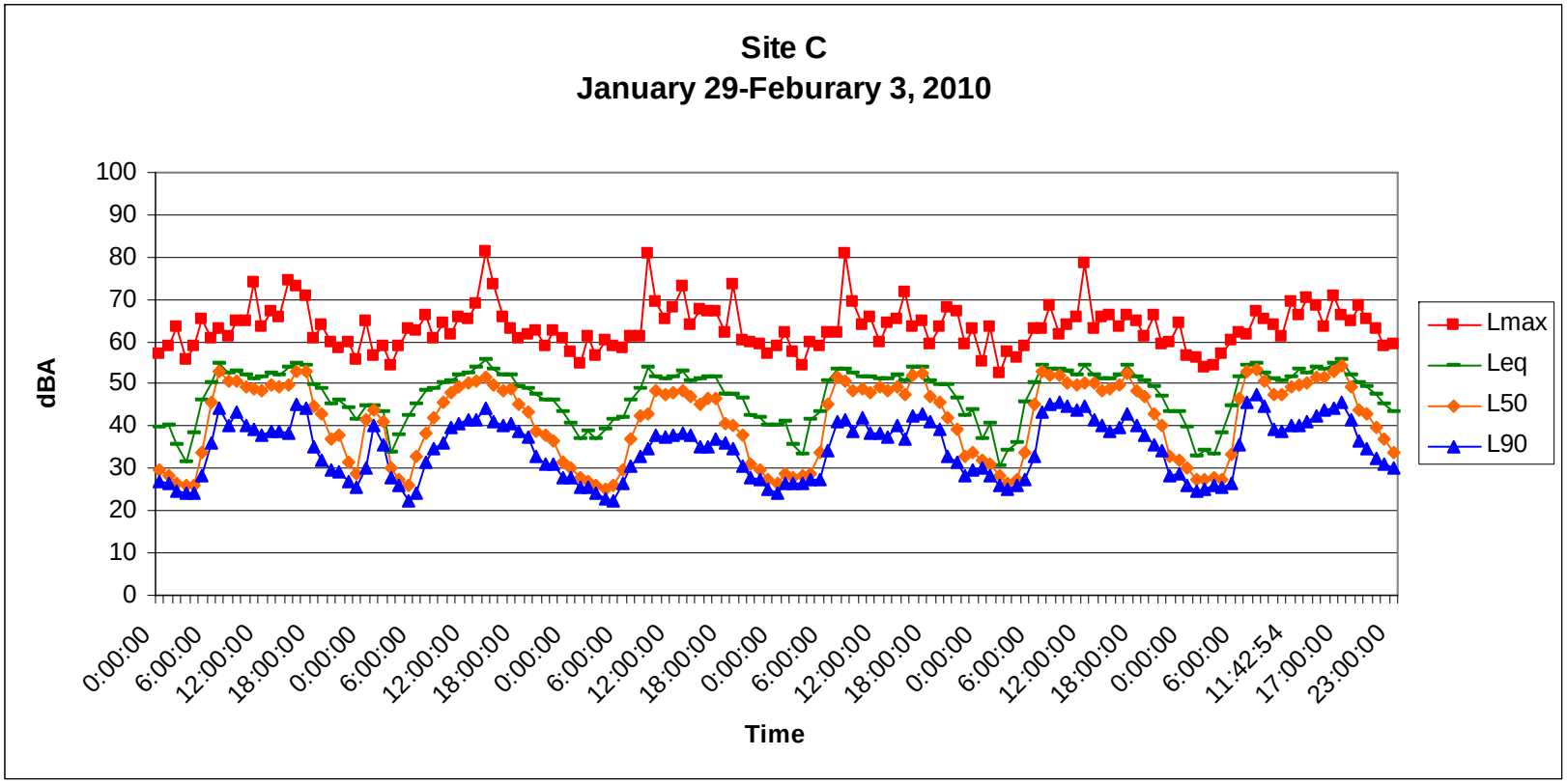
17:00:00
Time
Leq
Lmax
L50
L90


Site C
January 29-Feburary 3, 2010
dBA
100
90
80
70
60
50
40
30
20
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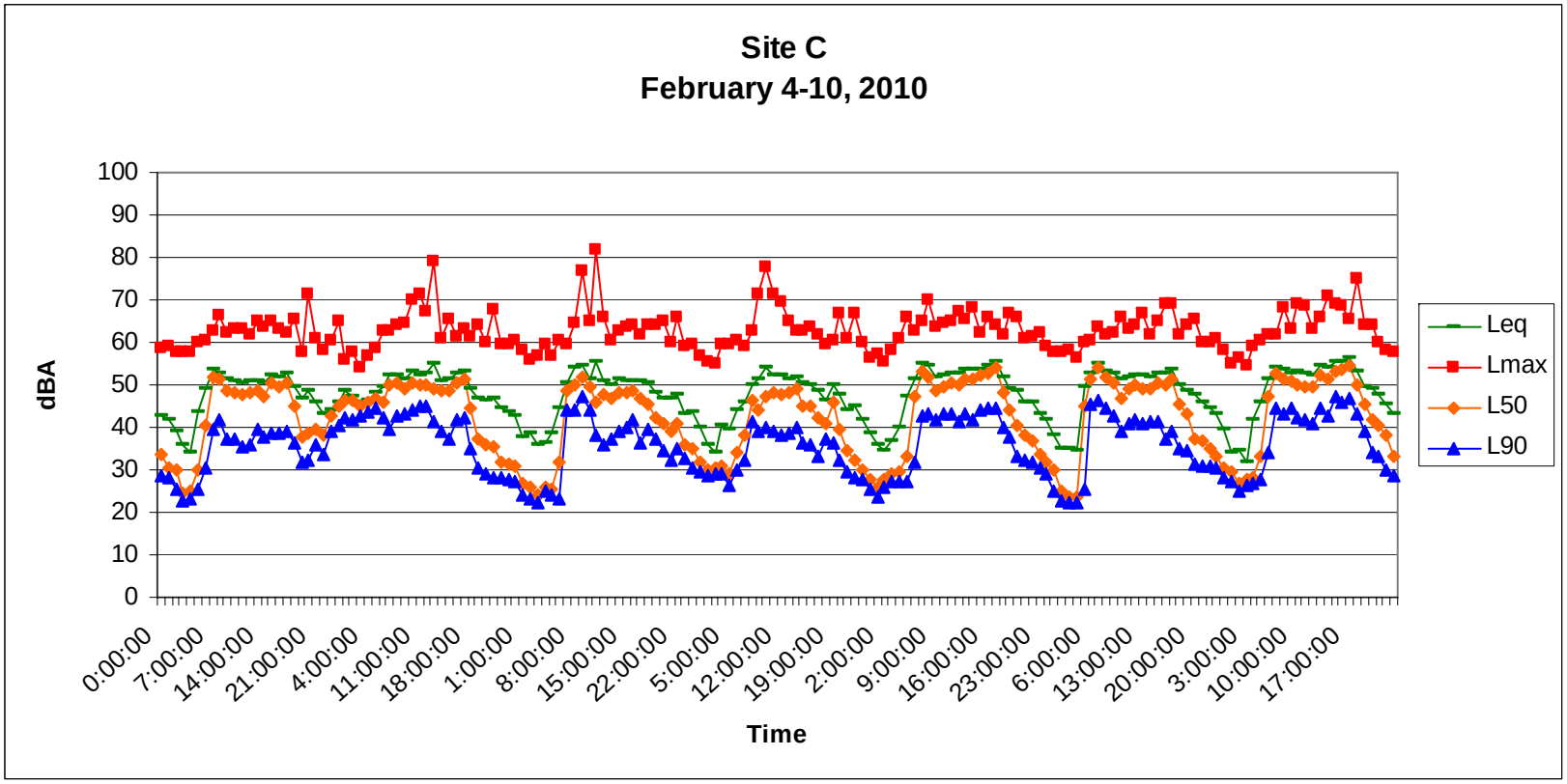
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February 4-10, 2010
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22:00:00
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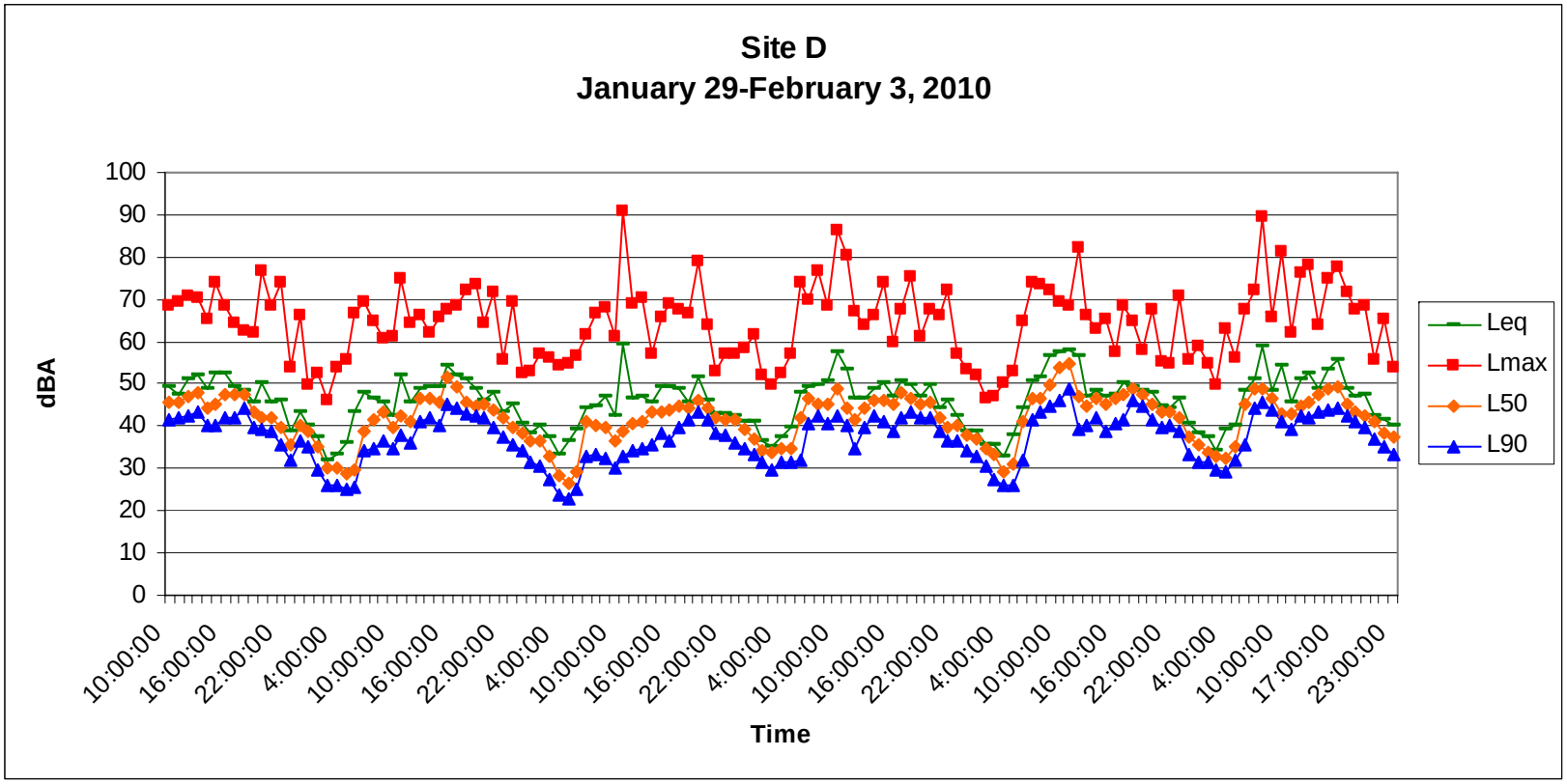
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January 29-February 3, 2010
dBA
100
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70
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10:00:00
16:00:00
22:00:00
4:00:00
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16:00:00
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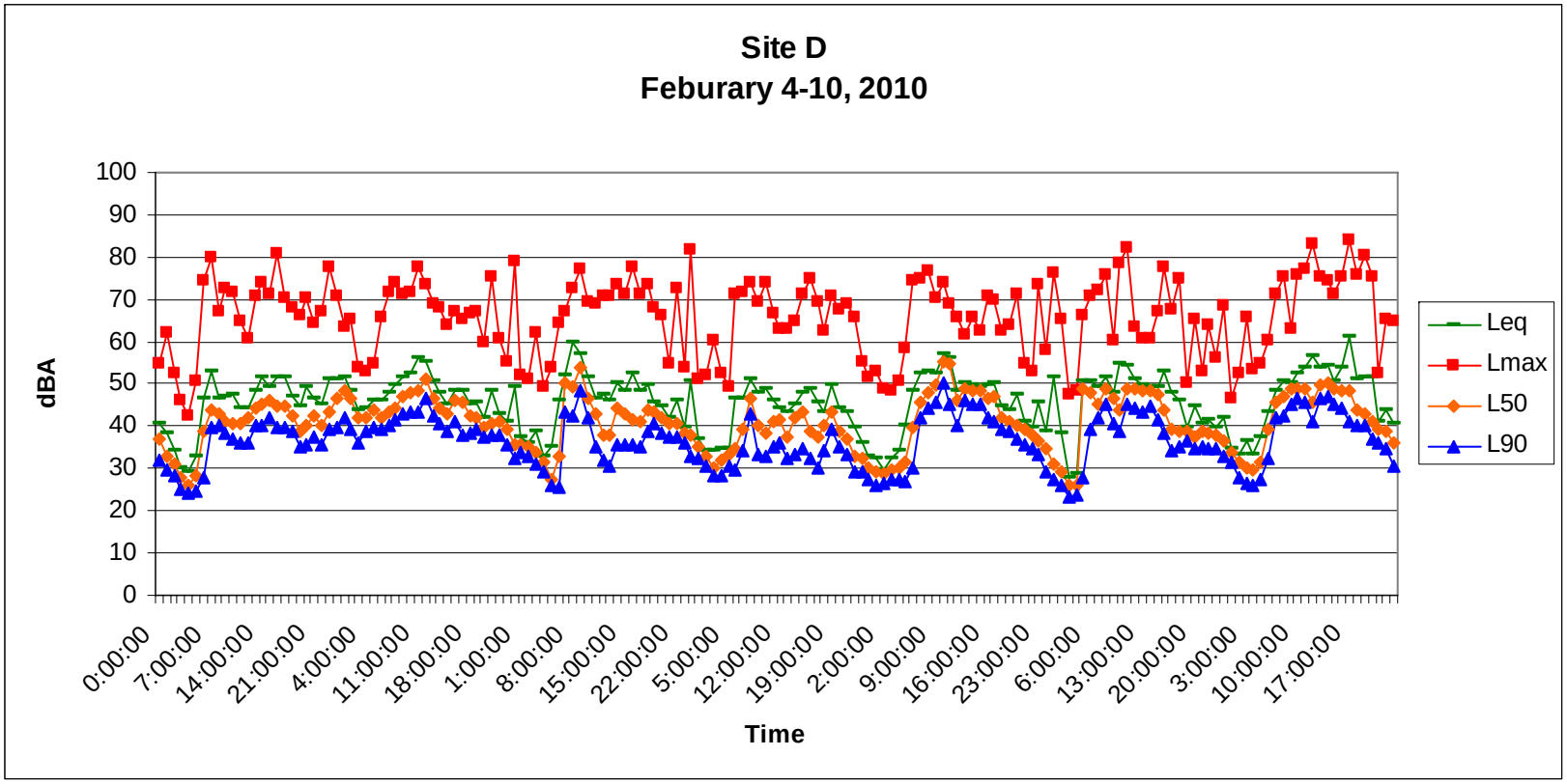
Site D
Feburary 4-10, 2010
dBA
100
90
80
70
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14:00:00
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Time
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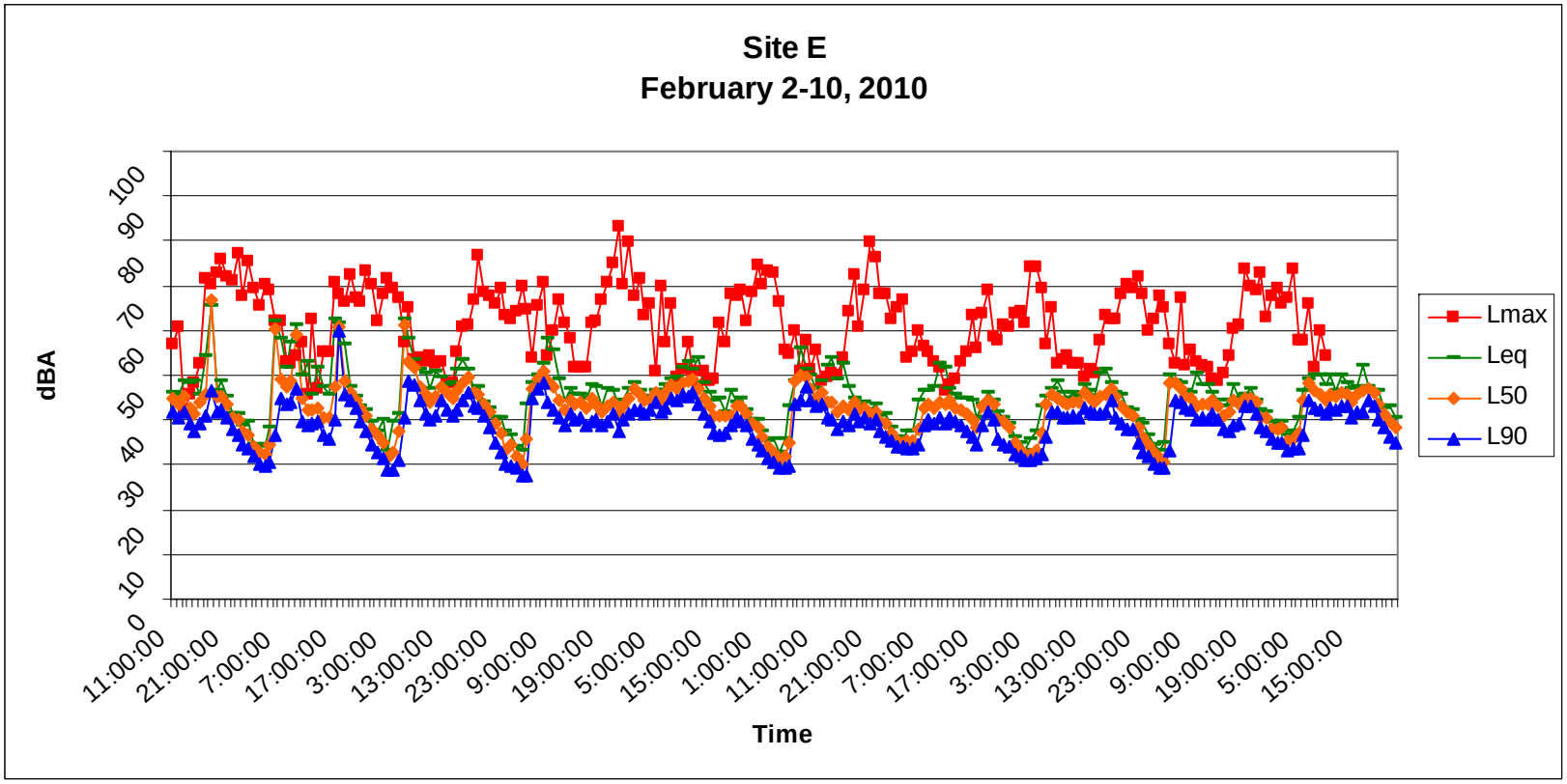
Site E
February 2-10, 2010
dBA
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17:00:00
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13:00:00
23:00:00
9:00:00
19:00:00
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Time
Lmax
Leq
L50
L90

September 30, 2011

Mr. Keith Miller
Project Manager
SWCA ENVIRONMENTAL CONSULTANTS
1422 Monterey Street, C200
San Luis Obispo, California 93401

RE: UPDATED TRAFFIC NOISE ANALYSIS-COLD CANYON LANDFILL EXPANSION DEIR

Dear Mr. Miller:

As requested, Brown-Buntin Associates, Inc. (BBA) has prepared the following updated traffic noise analysis for the above-referenced project in San Luis Obispo County. The analysis uses the same basic methodology as described in BBA's 2008 Environmental Noise Assessment Report, but incorporates newer and more comprehensive information concerning the number of project-related vehicle trips. The updated analysis and its findings are described below.

The traffic noise analysis addresses project-related noise impacts that could result from 1) project-related increases in traffic on State Route 227 (SR227), and 2) the relocation of the main entrance road within the landfill site. Information concerning existing and projected future traffic on SR227 (without the project) was obtained from Caltrans. Information concerning the number of vehicle trips within the landfill site was obtained from SWCA Environmental Consultants (SWCA). The FHWA Highway Traffic Noise Prediction was used for all calculations of traffic noise. That is the same model used in BBA's 2008 Environmental Noise Assessment.

Existing Off-site Traffic Noise Levels:

Annual Average Daily Traffic (AADT) and truck mix data for SR227 were obtained from the Caltrans website. For the project vicinity (south of Corbett Canyon Road), the 2010 AADT was 3,600. The day/night distribution of traffic on SR227 was estimated by BBA based upon studies conducted along similar roadways since project-specific data were not available from government sources. Traffic noise modeling assumptions are summarized in Attachment A.

The closest residential setbacks from SR227 near the project site are estimated to be in the range of 150 feet from the center of the roadway. The annual average traffic noise exposure calculated by the FHWA Model for a distance of 150 feet from the center of SR227 was 57.4 dB DNL for existing traffic conditions (2010). The calculated distance to the 60 dB DNL contour for existing traffic conditions is 101feet from the roadway centerline.

Future Off-site Traffic Noise Impacts:

Based on information provided by SWCA, the average number of vehicles passing the scale house (one way) during 2006 was 330 per weekday. This translates into a total of 660 vehicle movements per day on the haul road within the landfill site. With the project, the number of vehicle movements within the project site could increase to a maximum of 1,696 (848 vehicles each way) per day. All such vehicles would access the site from SR227. It is assumed that 47% of project-related traffic would turn south on SR227 and that 53% of project-related traffic would turn north on SR227. Eighty (80) percent of project-related traffic is assumed to be trucks and 20% of project-related traffic is assumed to be automobiles or pickup trucks.

According to the Caltrans website and the statewide annual traffic growth rate during the period of 2000-2006, the annual average daily traffic volume on SR227 south of Corbett Canyon Road would be expected to increase from 3,600 in 2010 to 5,236 by 2031. This does not include project-related increases due to the landfill expansion project. With the addition of project-related traffic, the future (2031) AADT on SR227 would be 5,723 south of the landfill entrance and 5,785 north of the landfill entrance. Assuming that 80% of project-related traffic would be trucks, the overall truck percentage on SR227 would increase from 5.3% in 2010 to 11.7% (south of the entrance) and 12.4% (north of the entrance) by 2031.

The FHWA Model was used to calculate project-related changes in traffic noise exposure at the closest residential setbacks along SR227 near the project site. Noise modeling assumptions are summarized in Attachment A. At a setback of 150 feet from the center of the roadway, future (2031) annual average traffic noise exposure *without* the project would be 59.0 dB DNL. Including project-related traffic, the future traffic noise exposure could increase by up to 1.6-1.7 dB to 60.6-60.7 dB DNL.

Relocation of Main Entrance Road:

The main entrance to the project site would be relocated about 2,800 feet to the south of the existing entrance. This would result in moving on-site traffic closer to existing homes located to the south and southwest of the project site. The closest existing home would be located approximately 350 feet from the main entrance road.

Roadways within the project site are considered stationary noise sources by the county's noise standards. This means that on-site traffic noise levels are calculated based upon the peak hour Equivalent Energy Level (L_{eq}). According to information provided by SWCA, the peak hour of vehicle activity within the landfill occurs between 2:00 p.m. and 3:00 p.m. In 2006, the typical peak hour traffic volume was 100 vehicles per hour. Using the same growth rate as described above for average weekday traffic within the site, the estimated peak hour traffic volume would be 257 vehicles per hour.

The FHWA Model was used to calculate hourly L_{eq} values for on-site traffic along the main entrance road during a peak hour. The calculated peak hour L_{eq} at 350 feet would be 52.7 dBA for 2031 traffic conditions. That exceeds the County's 50 dBA daytime L_{eq} standard and means that noise mitigation will be required.

Mitigation of noise from the relocated main entrance road could be achieved by constructing a berm along the southern boundary of the landfill site as described in BBA's 2008 Environmental Noise Assessment. The berm would have to be tall enough to interrupt line of sight between the traffic noise source and the mid-window height of the closest homes.

Conclusions:

The revised traffic noise analysis described by this letter report shows that the findings and recommendations of the 2008 BBA Environmental Noise Assessment are still applicable to the project. Noise levels from existing traffic on SR227 are somewhat lower than originally reported because the 2008 analysis used Caltrans traffic data for SR227 south of Price Canyon Road. This included traffic from Corbett Canyon Road which does not actually pass the project site.

Pease do not hesitate to contact me at (559) 627-4923 or rbrown@brown-buntin.com if there are questions or additional information is required.

Sincerely,

BROWN-BUNTIN ASSOCIATES, INC.

Robert E. Brown
President

REB:dm

Attachment: Attachment A: Traffic Noise Modeling Assumptions

Brown Buntin Associates, Inc
FHWA-RD-77-108
Calculation Sheets
September 30, 2011

Attachment A
Traffic Noise Modeling Assumptions

Project #: 08-007A
Description: Cold Canyon LF Exp DEIR-Revised Traffic Analysis
Ldn/Cnel: Ldn
Site Type: Soft

Contour Levels (dB)	55	60	65	70	

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	Truck % Med	Truck % Hvy	Speed mph	Dist ft	Offset dB
1	SR227	s/o Corbett Canyon Road-2010	3600	90		10	3.7	1.6	55	150	
2	SR227	s/o Corbett Canyon Road-2031-NP	5236	90		10	3.7	1.6	55	150	
3	SR227	s/o New Landfill Ent-2031-P	5723	90		10	8.2	3.5	55	150	
4	SR227	n/o New Landfill Ent-2031-P	5785	90		10	8.7	3.7	55	150	
5	Entrance Road	existing-2006-pk hr Leq	2460	100			56	24	20	350	
6	Entrance Road	future-2031w proj pk hr Leq	6168	100			56	24	20	350	

BROWN • BUNTIN ASSOCIATES, INC.

October 6, 2011

Mr. Keith Miller
Project Manager
SWCA ENVIRONMENTAL CONSULTANTS
1422 Monterey Street, C200
San Luis Obispo, California 93401

RE: RESPONSE TO NOISE SECTION COMMENTS-COLD CANYON LANDFILL EXPANSION RDEIR

Dear Mr. Miller:

As requested, Brown-Buntin Associates, Inc. (BBA) has prepared the following responses to comments on the noise impact assessment contained within the Re-circulated Draft EIR (RDEIR) for the Cold Canyon Landfill Expansion project. The responses are numbered according to the nomenclature provided by SWCA.

Comment CCL/DE-6: Table V.I-3 of the RDEIR provides a summary of noise measurement data collected by BBA January 29-February 10, 2010. The table is intended as a way of presenting a lot of complex information in a simplified format. The data presented in the table need to be further clarified as follows. For Site B, the tub grinder was observed to produce an energy average noise level (L_{eq}) of 73 dBA at a distance of 450 feet from the grinder. At a distance of approximately 2,200 feet, composting/soil movement activities were observed to produce noise levels in the range of 40-59 dBA with L_{eq} values of 42-55 dBA. Bird whistles at Site B produced noise levels in the range of 47-51 dBA. For Site C, landfill activities were observed to produce noise levels in the range of 40-48 dBA. L_{eq} values were not measured at Site C due to interference from traffic on SR227. Bird whistles at Site C produced noise levels in the range of 42-43 dBA. The maximum noise levels reported for Site D included the composting operation (Scarab) and bird whistles. For Site E, maximum noise levels from the disposal area and RRP were observed to be in the range of 50-57 dBA. Bird whistles at Site E produced noise levels in the range of 66-73 dBA.

Comment CCL/DE-8: Unless a jurisdiction has a specific standard regarding a significant increase in noise from non-transportation noise sources, it is common to assume that a 3-5 dB increase represents a substantial increase. This may need to be further clarified by San Luis Obispo County.

Comment CCL/DE-15: The commenter is correct that noise levels from the re-located RRP would be lower at the southeastern property line than at the northeastern property line due to an increase in distance from 50 to 275 feet. Accounting for the existing berm along a portion of the southeastern property line, noise from the re-located RRP would be expected to be less than 50 dBA, L_{eq}. NS Impact 4 and NS/mm-8 could therefore be reworded to refer only to noise from the relocated RRP at the northeastern property line.

Comment BF/2-42: Please refer to the response to Comment CCL/DE-6.

Comment BF/2-49: The discussion of noise levels associated with the CO in the first paragraph of page V-208 of the RDEIR should be clarified to note the distance from the source or the location where the levels were measured. Table V.I-2 reports L_{max} and L_{eq} values of 85.1 and 84.2 dBA, respectively, for the Scarab at a distance of 100 feet. The 2010 BBA study (Appendix E of the RDEIR) reports that the tub grinder produced L_{max} and L_{eq} values of 89.5 and 84.6 dBA, respectively, at a distance of 100 feet.

Comment BF/2-99: Page V-195 states that *landfill noise levels* were determined based upon field observations by BBA. Since an observer was not continuously present during the 2010 long-term measurements, it is not possible to identify all sources of noise that may have affected the noise measurement sites over a two-week period. Noise sources *not* associated with the landfill operation that could have produced the highest (maximum) noise levels during any given hour include roadway traffic, aircraft over-flights and a variety of localized sources such as yard maintenance, chirping birds and barking dogs. Long-term measurements, including noise from all sources, were reported for informational purposes in the charts and tables of Appendix E. With regard to aircraft activity, the FAA reports an average of 241 aircraft operations per day at the San Luis Obispo County Regional Airport (SBP) during the 2010 calendar year. Approximately one percent of those operations were commercial flights. Many general aviation aircraft generate higher noise levels than the types of commercial jet and turboprop aircraft that operate at SBP.

Comment BF/2-100: Please refer to the response to Comment CCL/DE-6.

Comment BF/2-102: BBA conducted specific noise measurements to define noise levels from back-up alarms. Measured noise levels were in the range of 52-53 dBA at a distance of 1,250 feet. Back-up alarms are normally considered intermittent noise sources because their noise levels do not contribute significantly to overall noise levels produced by the heavy equipment to which they are affixed. However, back-up alarms are often distinctly audible due to the character (frequency content) of the sound the alarms emit. Noise levels due to backup alarms would not be expected to exceed the county's standards at off-site locations.

Comment BF/2-112: Table V.I-2 reports the L_{eq} and range of noise levels (in parenthesis) measured while the referenced equipment was in operation at various distances from the microphone. The L_{max} is the highest value in the range of numbers and the L_{eq} represents the energy average noise level during the noise measurement period.

Comment BF/-2119: Please refer to the response to Comment 99.

Comment BF/2-120: Please refer to the response to Comment 99. In addition, the 24-hour measurement site utilized in 2008 was in a different location than Site D in the 2010 study. This makes it impossible to directly compare measured noise levels. However, Site D was located very close to a local service road with intermittent traffic that may have affected measured hourly maximum noise levels.

Comment BF/2-130: Please refer to the response to Comment 99.

Comment BF/2-133: NS/mm-6 requires that noise levels from the CO be monitored at the property line to determine if such levels comply with the county's noise standards. Additional mitigation will be required if compliance has not been achieved. This is a reasonable approach to ensuring effective noise mitigation will be achieved with the project.

Comment BF/2-141: The existing berm to the east-southeast of the MRF is an effective noise barrier due to its height and location relative to the MRF. At the closest property line to the MRF, the berm reduces noise by more than the required 9 dB to achieve compliance with the county's 50 dBA L_{eq} standard. Noise measurement Site 5 from the 2010 BBA study was located 175 feet from the southeast corner of the MRF building.

Comment BF/2-151: Please refer to the response to Comment 102.

Pease do not hesitate to contact me at (559) 627-4923 or rbrown@brown-buntin.com if there are questions or additional information is required.

Sincerely,

BROWN-BUNTIN ASSOCIATES, INC.

Robert E. Brown
President

REB:dm