

DUDEK

COMMERCIAL
SOUND MEASUREMENTS
NOISE ASSESSMENT
AND CONSULTING

February 15 2007

Mr. Morgan Miller
P.O. Box 939
Borrego Springs, CA 92004

RECEIVED
SEP 25 2007

5495-01

DEPARTMENT OF PLANNING
AND LAND USE

RE: *TPM 20978 Project*
Noise Assessment of Wireless Cell Facility

Dear Mr. Miller:

Dudek has conducted noise measurements at the TPM 20978 project site. The noise measurements were made to determine the noise level associated with the mechanical equipment noise from the existing Sprint Wireless Tower Facility on Parcel 3. In summary, the existing wireless facility generates a noise level of 56 dBA at the property line between Parcels 2 and 3. This noise level exceeds the County's noise ordinance criteria by up to 11 dBA. To mitigate the noise impact a six-foot high noise barrier could be constructed along a portion of the property line adjacent to the wireless facility. With this noise barrier the noise level would be 45 dBA or less at the adjacent residential property at Parcel 2.

Project Setting

The TPM 20978 project site is located at the northern terminus of Emerald Grove Avenue in the community of Lakeside in the County of San Diego (*Figures 1 and 2*). The TPM 20978 would develop two single-family lots (Parcels 1 and 2) on three parcels. Parcel 3 has an existing water tank and a Sprint Wireless Tower facility. The County has requested an evaluation of the noise associated with the wireless facility. It is my understanding that the wireless facility operates 24 hours per day.

Results of Sound Tests

The noise measurements were conducted immediately adjacent to the Sprint Wireless Tower facility along the northern property line of Parcel 2. The noise measurements were made starting at 11:30 a.m. on February 6, 2007. The noise measurements were made with a Rion Model NA 27 Model (S.N. 701307) integrating sound level meter 1/3 octave band analyzer with a ½-inch pre-polarized condenser microphone and pre-amplifier. The sound level meter meets with current American National Standards Institute standard for a Type 1 precision sound level meter. The sound level meter was positioned five-feet above the ground.

Mr. Morgan Miller

Re: TPM 20978 Project

Noise Assessment of Wireless Cell Facility

The measured noise level was 56 dBA at the property line adjacent to the Sprint Wireless Tower facility. The noise measurement site (Site 1) is depicted in *Figure 3*. The primary noise source appears to be noise escaping from two small cooling fan vents within the wireless tower cabinet enclosure. The properties are zoned single-family residential (RS4). The County's noise ordinance requires that the noise level not exceed 50 dBA from 7:00 a.m. to 10:00 p.m., and 45 dBA from 10:00 p.m. to 7:00 a.m. Thus, the measured noise level exceeds the County's noise ordinance limits by up to 11 dBA.

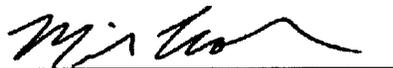
Mitigation

To mitigate the noise impact, a six-foot high noise barrier could be constructed along a portion of the property line adjacent to the wireless facility. The noise barrier location is depicted in *Figure 4*. With this noise barrier, the noise level from the Sprint Wireless Tower facility would be 45 dBA or less at the residential property at Parcel 2.

The noise barrier may be constructed as a wall, berm, or combination of both. The materials used in the construction of the barrier are required to have a minimum surface density of 3.5 pounds per square foot. They may consist of masonry material, acrylic glass, tempered glass or a combination of these materials. The barrier must be designed so there are no openings or cracks.

If you have any questions, please call me.

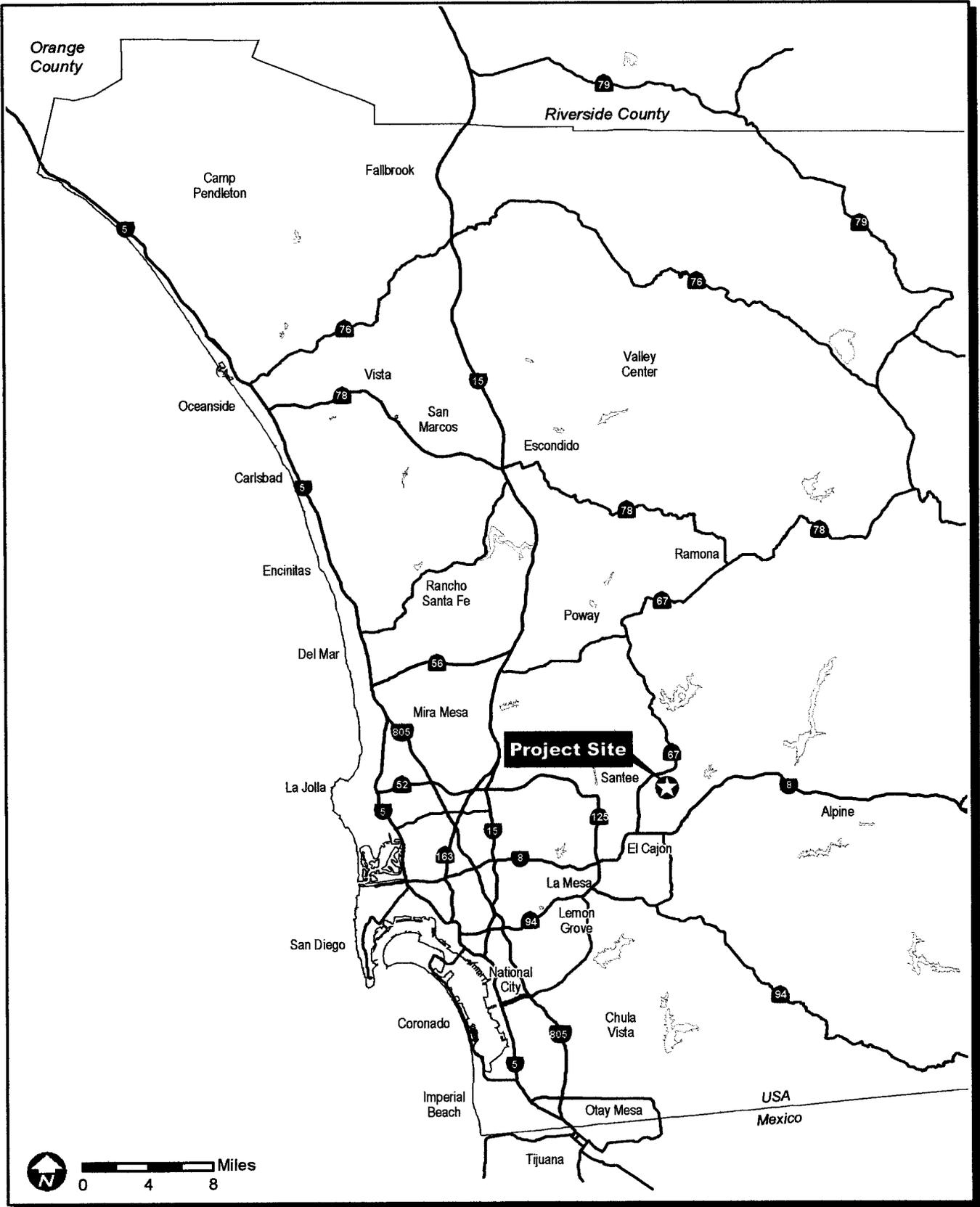
Very truly yours,



Mike Komula
Acoustician

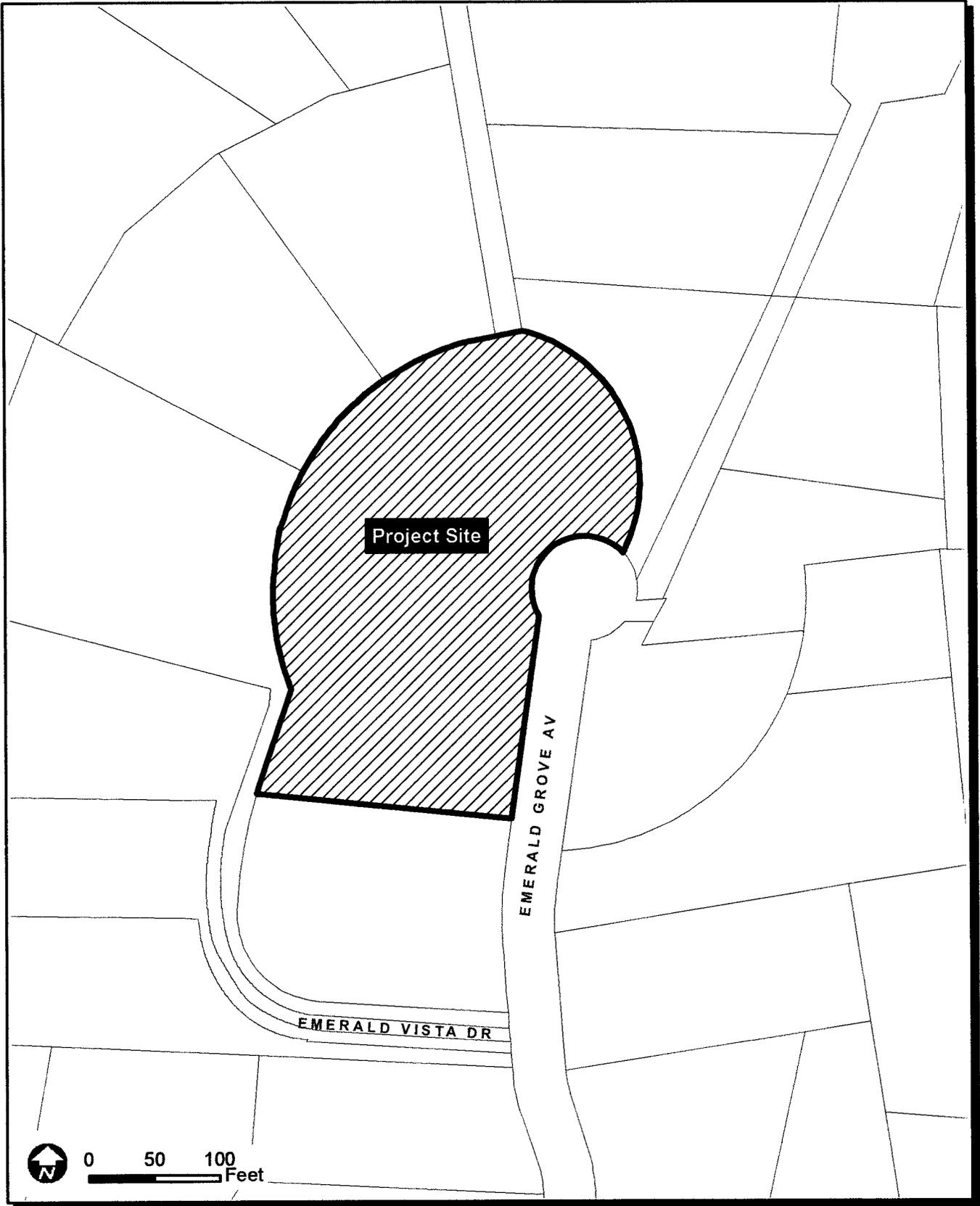
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Att.: Attachment A Definitions
Attachment B Noise Level Data and Calculations



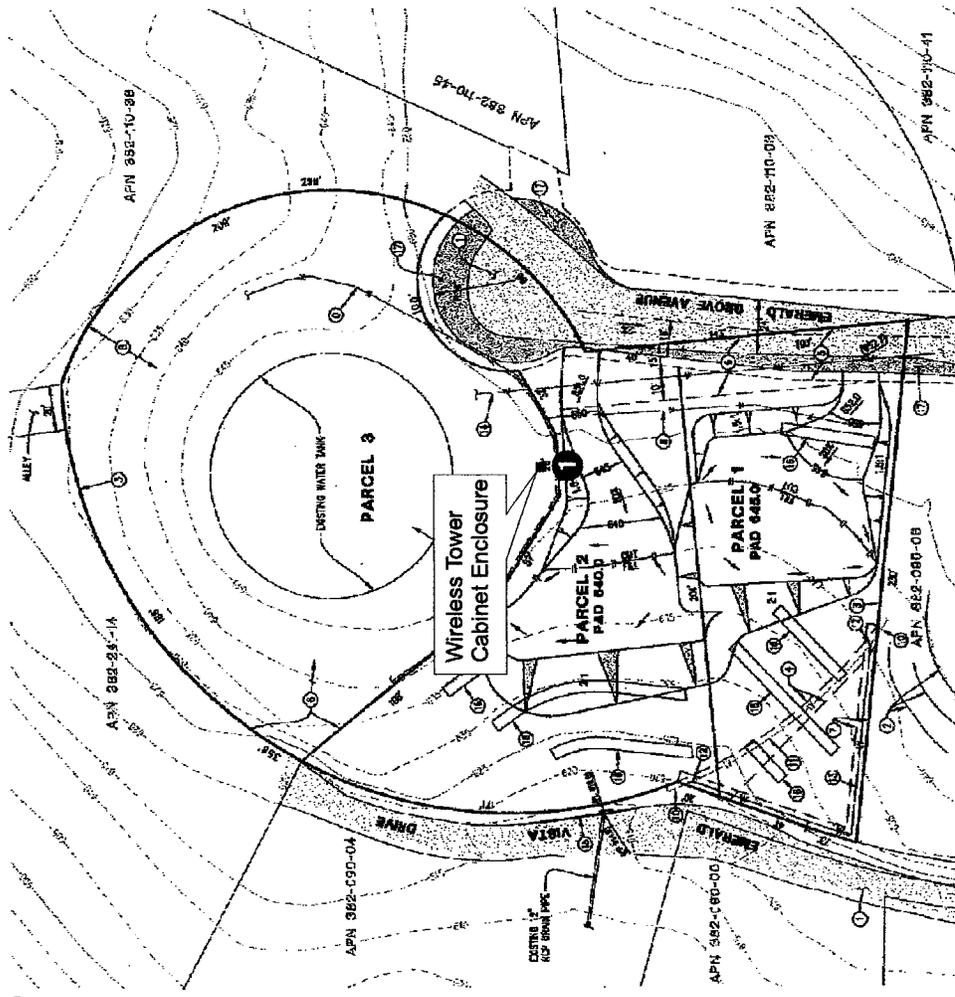
TPM 20978 Project - Noise Assessment of Wireless Cell Facility
Regional Location

FIGURE
1



TPM 20978 Project - Noise Assessment of Wireless Cell Facility
Project Vicinity

FIGURE
2



Wireless Tower
Cabinet Enclosure

SOURCE: WALSH ENGINEERING & SURVEYING, APRIL 2006



1" = 80 Feet

FIGURE
3

TPM 20978 Project - Noise Assessment of Wireless Cell Facility
Noise Measurement Location

ATTACHMENT A

Definitions

ATTACHMENT A DEFINITIONS

Terms

Definitions

Ambient Noise Level

The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.

A-Weighted Sound Level, (dB[A])
(Symbol L_A)

The sound pressure level in decibels as measured on a sound level meter using the A-weighted 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 frequency response of the human ear and correlates well with subjective reactions to noise.

Community Noise Equivalent Level,
(CNEL)

CNEL is the A-weighted equivalent continuous sound exposure level for a 24-hour period with a ten dB adjustment added to sound levels occurring during nighttime hours (10 pm to 7 am) and a five dB adjustment added to the sound levels occurring during the evening hours (7 pm to 10 pm).

Decibel, (dB)

A unit for measuring sound pressure level, equal to 10 times the logarithm to the base 10 of the ratio of the measured sound pressure squared to a reference pressure, which is 20 micropascals.

Maximum A-Weighted Sound
Level, (MXFA)
(Symbol L_{max})

The greatest sound level measured on a sound level meter during a designated time interval or event using fast time-averaging (125-ms) and A-weighting.

Equivalent Continuous Sound Level,
(Symbols L_{eq})

The sound level corresponding to a steady state sound level containing the same total energy as a time varying signal over a given sample period. L_{eq} is designed to average all of the loud and quiet sound levels occurring over a specific time period.

ATTACHMENT B

Noise Level Data and Calculations

TABLE B1

Measured Average Sound Level (At Property Line 5.5' from Noise Source)

Octave Band Frequency (Hz)	dB
63	57.3
125	53.0
250	56.2
500	55.7
1000	48.5
2000	45.6
4000	42.0
8000	33.4
A-Weighted Sound Level	56 dBA

Note: The two vent openings are approximately 2 feet and 5 feet above the ground, and approximately one to two square feet. The cabinet enclosure is approximately 6-feet in height on a 6" concrete pad.

TABLE B2
NOISE BARRIER CALCULATION
 (Receptor Adjacent to Property Line)

Frequency (Hz)	Sound Level (dB at 5.5')	Northern Property Boundary (at Property Line)									
		Receiver: Source Elevation (feet)	Source to Receiver (feet)	Source to Barrier (feet)	Receiver to Barrier (feet)	Barrier (base) (feet)	Barrier Height (feet)	Fresnel No.	Barrier Attenuation (dB)	Lp w/o Barrier (dB)	Lp w/Barrier (dB)
63	57.3	654.0	6.0	5.5	0.5	648.0	6.0	0.06	6.2	56.5	50.3
125	53.0	654.0	6.0	5.5	0.5	648.0	6.0	0.12	7.3	52.2	44.9
250	56.2	654.0	6.0	5.5	0.5	648.0	6.0	0.24	8.9	55.4	46.5
500	55.7	654.0	6.0	5.5	0.5	648.0	6.0	0.48	11.0	54.9	44.0
1000	48.5	654.0	6.0	5.5	0.5	648.0	6.0	0.96	13.4	47.7	34.3
2000	45.6	654.0	6.0	5.5	0.5	648.0	6.0	1.91	16.2	44.8	28.7
4000	42.0	654.0	6.0	5.5	0.5	648.0	6.0	3.82	19.0	41.2	22.2
8000	33.4	654.0	6.0	5.5	0.5	648.0	6.0	7.65	21.9	32.7	12.7
										61.4	53.3
										55.1	43.6

(Maximum attenuation limited to 20 dB)

dB Leq
 dBA Leq

TABLE B3
NOISE BARRIER CALCULATION
 (Receptor 10 feet to Property Line)

Frequency (Hz)	Northern Property Boundary (at Property Line)											
	Sound Level (dB at 5.5')	Receiver Elevation (feet)	Source Elevation (feet)	Source to Receiver (feet)	Source to Barrier (feet)	Receiver to Barrier (feet)	Barrier (base) (feet)	Barrier Height (feet)	Fresnel No.	Barrier Attenuation (dB)	Lp w/o Barrier (dB)	Lp w/Barrier (dB)
63	57.3	650.0	654.0	15.0	5.5	9.5	648.0	6.0	0.03	5.6	48.6	43.0
125	53.0	650.0	654.0	15.0	5.5	9.5	648.0	6.0	0.06	6.3	44.3	38.0
250	56.2	650.0	654.0	15.0	5.5	9.5	648.0	6.0	0.13	7.4	47.5	40.1
500	56.7	650.0	654.0	15.0	5.5	9.5	648.0	6.0	0.25	9.1	47.0	37.9
1000	48.5	650.0	654.0	15.0	5.5	9.5	648.0	6.0	0.51	11.2	39.8	28.6
2000	45.6	650.0	654.0	15.0	5.5	9.5	648.0	6.0	1.01	13.7	36.9	23.2
4000	42.0	650.0	654.0	15.0	5.5	9.5	648.0	6.0	2.03	16.4	33.3	16.9
8000	33.4	650.0	654.0	15.0	5.5	9.5	648.0	6.0	4.05	19.2	24.7	5.5
											53.5	46.4
											47.1	37.5

(Maximum attenuation limited to 20 dB)

dB Leq
 dBA Leq