Environmental Noise Assessment

Ione Sands Moto-X

Ione, California

BAC Job # 2017-069

Prepared For:

US Mine Corporation

Attn: Mr. Jason Cypher
8625 Highway 124
Ione, CA 95640

Prepared By:

Bollard Acoustical Consultants, Inc.

Paul Bollard, President

December 29, 2017

BOLLARD
Acoustical Consultants

Introduction

The proposed Ione Sands Moto-X (project) is located on a currently undeveloped parcel located west of Highway 124, and southeast of an existing surface mining site in Ione, CA. The project proposes a motocross training facility that includes the construction of dirt track with associated facilities and a parking area. Use of the proposed facility will be membership based (private), for training purposes only. Maximum daily attendance is projected to be 50 participants.

Although the project does not propose events, this analysis addresses potential noise impacts associated with events up to 1,000 spectators should such events be proposed in the future.

Existing land uses in the project vicinity include single-family residences to the south, a single-family residential development to the north, parks and recreation uses to the northeast, and surface mining uses in all other directions. In addition, proposed uses in the project vicinity include a single-family residential development to the northeast. The project area and site plans are shown in Figures 1 and 2, respectively.

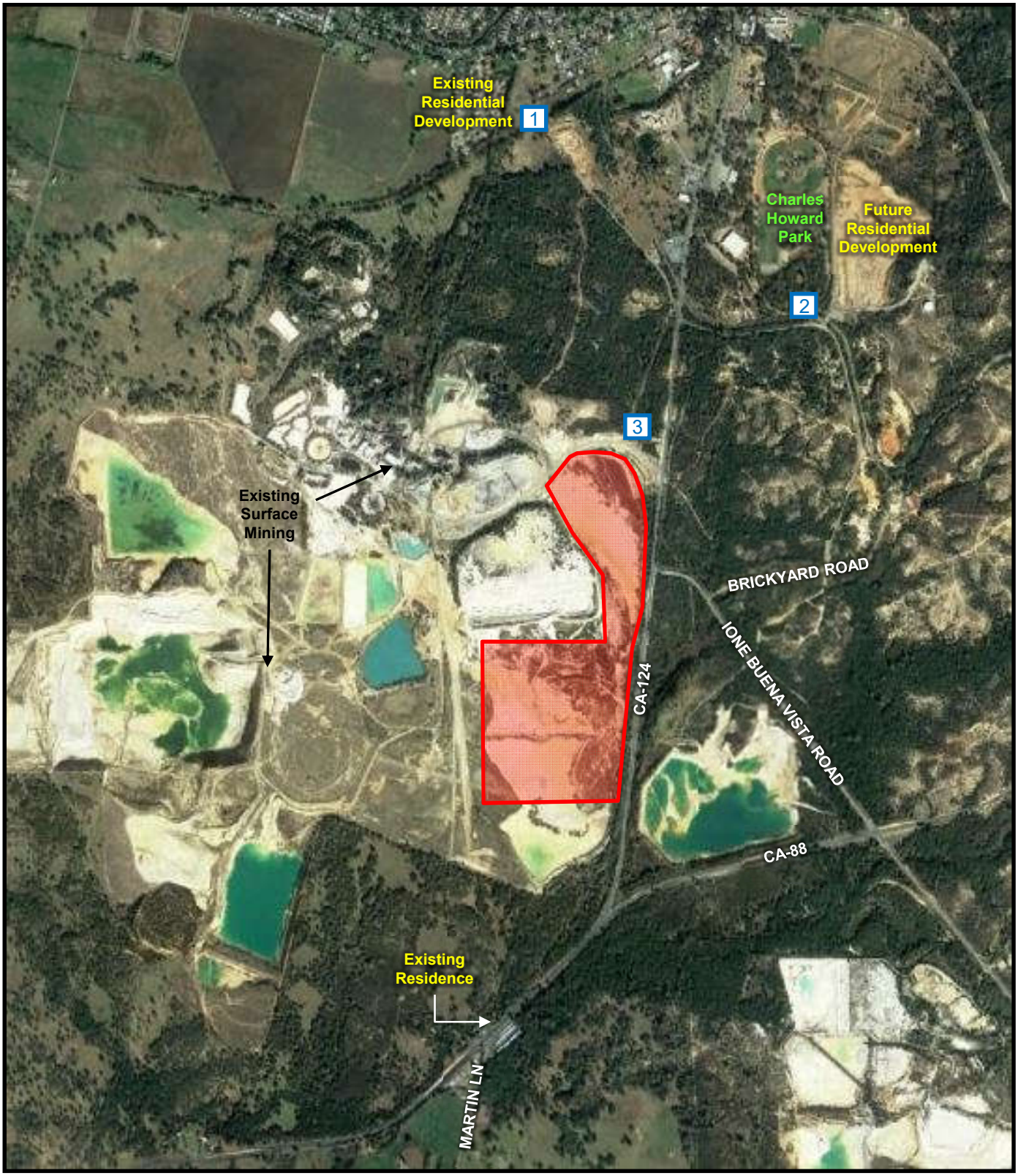
Due to the proximity of the proposed motocross facility to existing and proposed residential uses, Bollard Acoustical Consultants, Inc. (BAC) was retained by the project applicant to prepare this noise analysis. Specifically, the purposes of this analysis are to evaluate potential noise impacts resulting from the operations of the proposed motocross facility on the existing and proposed residential uses in the immediate project vicinity, and to compare those levels against the applicable City of Ione standards for acceptable noise exposure.

Noise Fundamentals and Terminology

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard, and are called sound. Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. As a result, the decibel scale was devised. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in levels (dB) correspond closely to human perception of relative loudness. Appendix A contains definitions of Acoustical Terminology. Figure 3 shows common noise levels associated with various sources.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by weighing the frequency response of a sound level meter by means of the standardized A-weighing network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels in decibels.

Figure 1
Project Area with Noise Measurement Locations
Ione Sands Moto-X - Ione, California



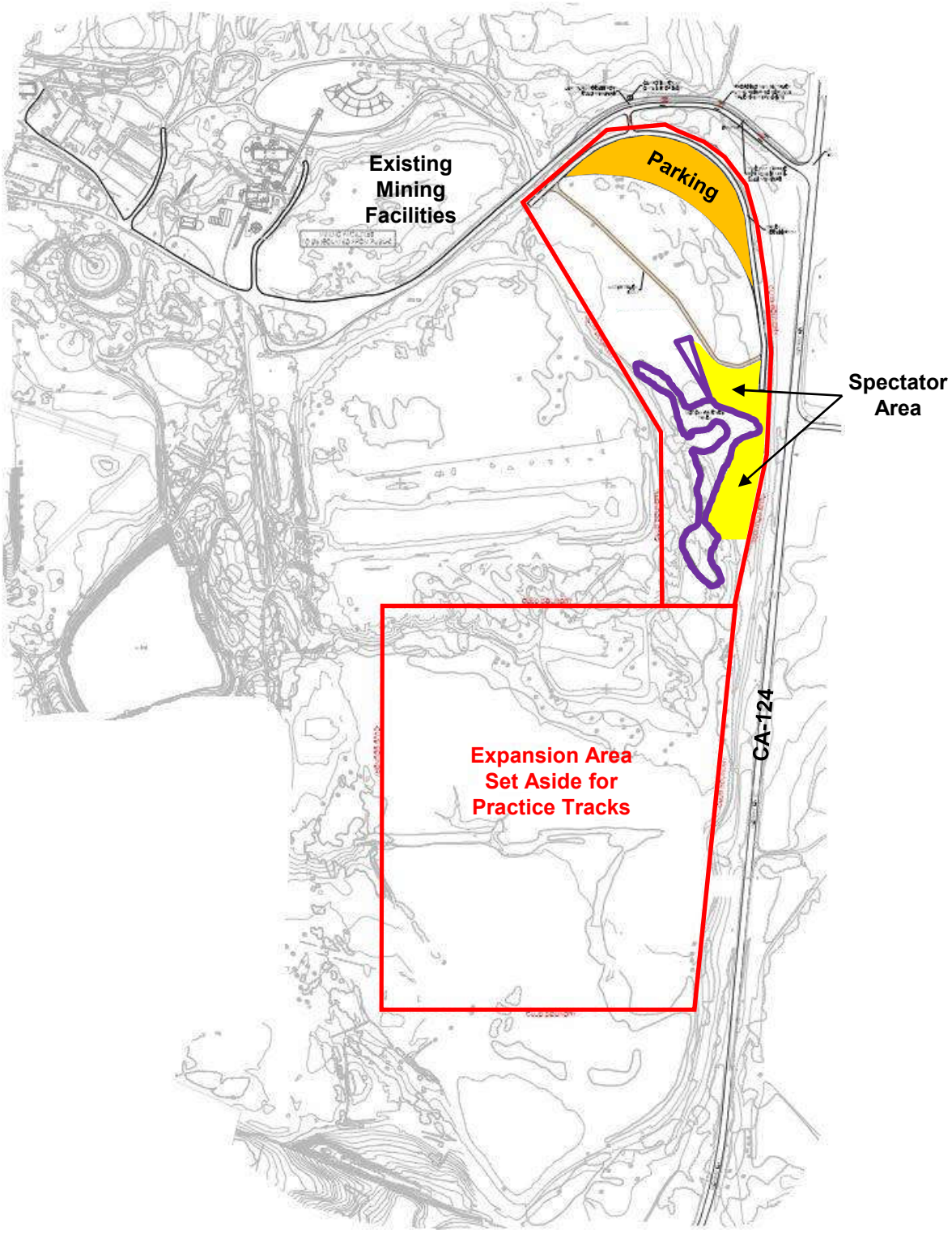
BOLLARD
Acoustical Consultants

N

Scale (feet)
0 1,000 2,000

Legend
Long-Term Noise Measurement Sites
Project Area

Figure 2
Project Site Plan
Ione Sands Moto-X – Ione, California

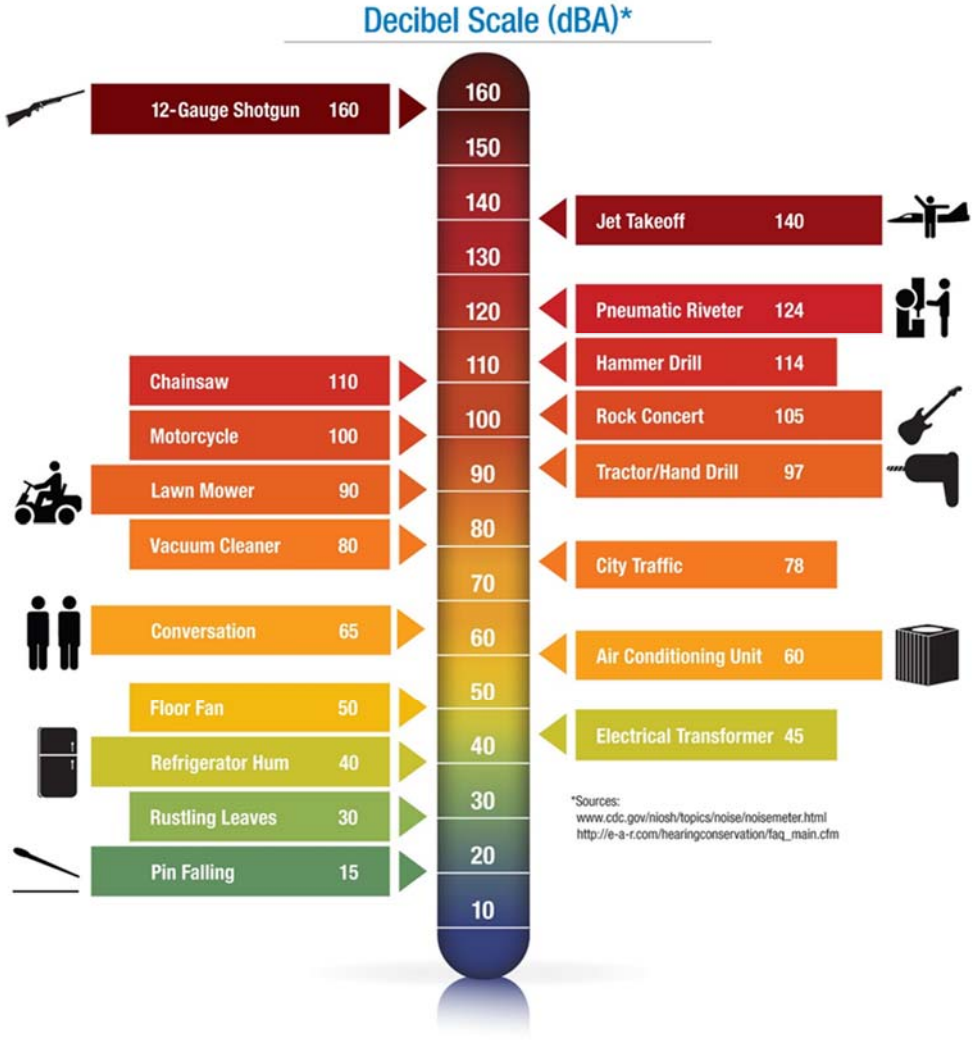


BOLLARD
Acoustical Consultants

Community noise is commonly described in terms of the "ambient" noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}) over a given time period (usually one hour). The L_{eq} is the foundation of the Day-Night Average Level noise descriptor, L_{dn}, and shows very good correlation with community response to noise generated by transportation noise sources.

The Day-Night Average Level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment. L_{dn}-based noise standards are commonly used to assess noise impacts associated with traffic, railroad and aircraft noise sources.

Figure 3
Noise Levels Associated with Common Noise Sources



Criteria for Acceptable Noise Exposure

City of Ione General Plan

The Noise and Safety Element of the City of Ione General Plan establishes noise level performance standards that govern maximum allowable sound levels in all new development. Specifically, Policy NS-1.1 of the Noise and Safety Element establishes performance standards for non-transportation noise sources, such as those proposed by the project. The following noise criteria which would be applicable to this project are reproduced in Table 1.

Table 1
Exterior Noise Level Performance Standards
for Non-Transportation Noise Sources
City of Ione General Plan

	Maximum Noise Exposure Level, dBA	
Land Use Type	**7 a.m. to 10 p.m.**	**10 p.m. to 7 a.m.**
Single-Family Homes	55	45
Multi-Family Residential	60	45

Notes:

The City may require noise level standards which are more or less restrictive than those specified above bases upon determination of existing low or high ambient noise levels.

Source: City of Ione General Plan Noise and Safety Element, Table 6-1

Existing Ambient Noise Environment

The existing ambient noise level environment in the project vicinity is primarily defined by traffic on Highway 124 and surface mining activities. To generally quantify noise levels in the project vicinity, BAC utilized long-term (48-hour) ambient noise level measurements collected from April 10-12, 2017 for the proposed Ione Industrial Park project to the north. The noise measurement sites are shown on Figure 1, identified as sites 1-3.

Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters were used for the noise level measurements. The meters were calibrated before use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

The results of the measurements are shown numerically and graphically in Appendices B and C, and are summarized in Table 2.

Table 2
Summary of Long-Term Ambient Noise Monitoring Results[1]
Ione Sands Moto-X – Ione, California
April 10-12, 2017

			Average Measured Hourly Noise Levels (dB)					
			Daytime (7 a.m. to 10 p.m.)			Nighttime (10 p.m. to 7 a.m.)		
Site	Date	L_{dn}, dB	L_{eq}	L_{50}	L_{max}	L_{eq}	L_{50}	L_{max}
Site 1 – North of project site, approximately 350' from nearest residences.	4/10 – 4/11	45	42	39	57	37	35	47
	4/11 – 4/12	47	45	42	58	38	36	51
Site 2 – Northeast of project site, approximately 400' from nearest proposed residential development.	4/10 – 4/11	43	42	38	56	35	31	46
	4/11 – 4/12	44	44	40	54	34	30	45
Site 3 – Southern end of project site, approximately 350' from proposed motor cross facility parking lot A.	4/10 – 4/11	51	49	43	59	42	32	54
	4/11 – 4/12	52	50	45	62	44	33	56

Notes:
[1] Long-term ambient noise monitoring locations are shown on Figure 1, identified as sites 1-3.
Source: Bollard Acoustical Consultants, Inc. (2017)

As shown in Table 2, measured hourly average noise levels were generally comparable at sites 1 and 2, and highest at site 3. This was most likely due to the location of site 3 relative to Highway 124 and surfacing mining operations to the south.

Noise Impacts Resulting from On-Site Activities

The primary noise-producing components of the proposed project consist of motocross bikes on the training/race track. Should events be proposed at some point in the future, increased crowd noise from spectator areas during race events, and increased vehicle movements in the parking area would also contribute to the overall project noise generation. The locations of these noise sources are shown on Figure 2.

It should be noted that the project site plan identifies a 72.5 acre expansion area set aside for practice tracks, as identified on Figure 2. However, because there is an insufficient level of detail regarding this expansion area (e.g., location and size of tracks, other facilities, etc.), it is infeasible to accurately determine predicted noise generation and potential noise impacts from these uses. As a result, this analysis does not address that future expansion area.

Motocross Bike Noise Generation

According to the project applicant, the proposed motocross track will serve primarily as a race training tool for members of a private club. In the event that race events are proposed at this facility at some point in the future, this analysis evaluates the potential noise impacts associated with those events assuming 1,000 spectators and participants combined per event. During either training sessions or potential future race events, the project applicant states that a maximum of 50 motocross bikes would be on the track at any given time.

To quantify motocross bike noise generation at the proposed motocross track, BAC utilized published reference noise level data for motocross bike exhaust system measurements conducted by DPS Technical, Inc. (DPS). Specifically, DPS conducted a sound test representative of common stock and aftermarket exhaust systems from a variety of motocross bike companies. The sound test was conducted at a distance of two (2) meters, and measured the bikes at full throttle (the "Federale Internationale Motorcyclisme (FIM) 2-meter maximum test"). All tests were conducted using class one instruments that were calibrated before and halfway through the day of testing. In each case multiple instruments were used for each reading, and the bikes were given a uniform warm-up. A summary of the sound test results is shown in Table 3.

It should be noted that the DPS conducted FIM 2-meter maximum test is a universally recognized test, also used by the American Motorcycle Association (AMA) for supercross/motocross. According to the AMA, the 2 meter max test method shows a very good correlation between the sound power level (LwA) issued by motorcycles in full acceleration, and the maximum sound pressure levels measured at proximity of the same motorcycles, with engines at idle and quickly taken to their maximum rotational speeds.

Table 3
Summary of 2 Meter Maximum Sound Test Results
Ione Sands Moto-X – Ione, California

Bike	Exhaust System	L_{max} @ 2 meters (dBA)
Honda CRF150F	Stock	88.7
Honda CRF150F	FMF Q slip-on (modified)	92.0
Honda CRF150R	Stock	107.1
Honda CRF150R	Pro Circuit T4S slip-on (modified)	101.2
Honda CRF250R	Stock	111.1
Honda CRF250R	FMF 4.1/MegaBomb (modified)	110.1
Honda CRF450R	Stock	113.4
Honda CRF450R	DEP S7 full (modified)	112.7
Honda CRF450X	Stock small tip	97.0
Honda CRF450X	FMF Q4/MegaBomb (modified)	101.2
KTM 250 SX	Stock	102.6
KTM 250 SX	Enduro Engineering E3 (modified)	102.9
KTM 450 XC-W	Stock	108.7
KTM 450 XC-W	DR.D slip-on (modified)	111.7
Suzuki RMX450Z	Stock	100.6
Suzuki RMX450Z	Akrapovic Racing (modified)	107.3
Suzuki RM-Z450	Stock	112.2
Suzuki RM-Z450	Yoshimura Carbon RS-4 (modified)	113.5
Yamaha YZ125	Stock	106.5
Yamaha YZ125	DEP Torque (modified)	102.9
Yamaha YZ250	Stock	104.6
Yamaha YZ250	FMF Gnarly/TurbineCore 2 (modified)	101.8
Yamaha YZ250F	Stock	108.6
Yamaha YZ250F	Two Brothers slip-on/M2R Carbon (modified)	109.4
Yamaha YZ450F	Stock	109.9
Yamaha YZ450F	Devil (modified)	109.9
	Average L_{max}, dBA	**105.7**

Source: DPS Technical, Inc. (DPS) via Dirt Rider Magazine (online)

As indicated in Table 3, noise measurements from the 2 meter max test ranged from 89 to 114 dB L_{max}, and had an average maximum noise level of 106 dB L_{max}.

As mentioned previously, the project applicant estimates that a maximum of 50 motocross bikes could be using the track concurrently (worst-case scenario). Although not all 50 motorcycles would be accelerating at the same time, the noise generation of the multiple motorcycles on the track concurrently would be additive.

Because the project does not propose criteria for motorbike size or exhaust system, it is reasonable to assume that a variety of motorbike sizes and exhaust system configurations would use the facility. Thus, the average maximum noise level from the 2 meter maximum sound test results for both standard and modified exhaust systems shown in Table 3 was selected to be representative of motocross bike noise generation (106 dB L_{max} @ 2 meters). In addition, for a conservative assessment of noise generation during training and race events, a 10 dB offset was added to the average maximum reference noise level shown in Table 4 to account for multiple motorcycles running concurrently. This offset results in a reference noise level of 116 dB L_{max} at a distance of 2 meters (6.5 feet).

The reference sound level of 116 dB at 6.5 feet was projected to the nearest noise-sensitive areas assuming standard spherical spreading loss (-6 dB per doubling of distance from the source). In addition, a standard correction for atmospheric absorption of sound in air of 1.5 dB per thousand feet was also applied. Finally, an offset of -5 dB was applied to the calculations to account for shielding by intervening topography.

The -5 dB estimate for topography is considered conservative because once intervening topography intercepts line of sight between the noise source and residential use, a 5 dB reduction in noise levels results. Because intervening topography at the project site would provide shielding in excess of merely intercepting line of site, the actual noise attenuation that will be provided by intervening topography will likely be closer to 10 dB.

The noise level projections at the nearest residences are presented in Table 4.

Table 4
Predicted Worst-Case Motocross Bike Noise Generation at Nearest Residential Uses
Ione Sands Moto-X – Ione, California

Description[1]	Distance to Center of Motocross Track (feet)[2]	Predicted Noise Level, L_{max} (dBA)
Existing Residence (South)	5,400	45
Existing Residential Development (North)	4,400	48
Future Residential Development (Northeast)	5,600	44
Daytime Noise Standard (Single-Family Residential)[3]:		**55**

Notes:

[1] Nearest residential uses are shown on Figure 1.

[2] Distances measured from center of proposed motocross track to nearest residential uses.

[3] Daytime hours: 7:00 a.m. to 10 p.m. Nighttime hours: 10:00 p.m. to 7:00 a.m.

[4] Predicted levels are based on a sound attenuation rate of 6 dB per doubling of distance and accounting for 5 dB shielding provided by intervening topography.

Source: Bollard Acoustical Consultants, Inc. (2017)

The Table 4 data indicate that predicted noise levels during even the loudest training or race events at the project site would satisfy the City of Ione 55 dB L_{max} daytime maximum noise level standard. Because no nighttime (10 pm – 7 am) usage of the facility is proposed, the City's nighttime noise level limit of 45 dB would not be applicable.

As a result of the motorcycle noise levels being projected to be well within compliance with the City's noise level standards no additional consideration of motocross bike noise mitigation measures would be warranted for this project.

Crowd Noise Generation

As noted previously, no race events are proposed as part of this application. As a result, any noise generated by the few spectators present to watch training activities is predicted to be negligible (inaudible) at the nearest residences located over 4,000 feet away. Nonetheless, to assess potential noise impacts associated with cheering crowds should such events be proposed in the future, an analysis of such crowd noise is included in this assessment. Specifically, this assessment assumes future race events (if permitted in the future), would likely be limited to approximately 1,000 people per event (participants and spectators included). The location of the spectator area is shown on Figure 2.

In order to quantify event-generated crowd noise from the spectator area at the nearest (single-family) residential uses, BAC utilized reference file data for persons speaking in normal and raised voices (normal voice = 57 dB per person at 3 feet and raised voice = 64 dB per person at 3 feet). Based on the provided information of typical guest's speech and sound generation in the spectator area, and assuming the same sound propagation characteristics as utilized for the motorcycle noise projections, predicted crowd noise generation at the nearest residences is provided in Table 5.

Table 5
Predicted Worst-Case Crowd Noise Generation at Nearest Residential Uses
Ione Sands Moto-X – Ione, California

Description[1]	Distance to Center of Spectator Area (feet)[2]	Predicted Noise Level, (dBA)
Existing Residence (South)	5,500	27
Existing Residential Development (North)	5,600	27
Future Residential Development (Northeast)	4,200	32
Daytime Noise Standard (Single-Family Residential)[3]:		**55**

Notes:

[5] Nearest residential uses are shown on Figure 1.

[6] Distances measured from center of spectator area to nearest residential uses.

[7] Daytime hours: 7:00 a.m. to 10 p.m. Nighttime hours: 10:00 p.m. to 7:00 a.m.

Source: Bollard Acoustical Consultants, Inc. (2017)

As indicated above in Table 5, worst-case crowd noise exposure at the nearest residential uses is predicted to satisfy the applicable City of Ione daytime exterior noise standard at the nearest residential uses by very wide margin, even with 1,000 spectators should future, open to the public, race events be allowed at this site. In addition, the Table 5 projections do not include shielding provided by intervening topography between the spectator area and nearest residential uses. Such shielding would provide additional noise reduction. As a result, no additional consideration of race event crowd noise mitigation measures would be warranted for this aspect of the project.

Parking Area Noise Generation

As noted previously, no race events are proposed as part of this application. As a result, any noise generated by light parking lot activity related to private training activities is predicted to be negligible (inaudible) at the nearest residences located over 3,400 feet away. However, should public race events be held in the future, such activity would be substantially increased. The proposed parking area for facility members and, for spectators in the event of future race events, is shown on Figure 2. The parking area maintains a separation of approximately 3,400 feet from the nearest residential use (future residential development to northeast). Based on a worst-case assumption of a 1,000 person per theoretical future race event, it was assumed for purposes of this study that the proposed parking area could accommodate up to approximately 750 vehicles. The following discussion provides an analysis of a worst-case scenario for parking area noise generation – during a race event.

As a means of determining potential noise exposure due to project parking lot activities, Bollard Acoustical Consultants, Inc. utilized specific parking lot noise level measurements conducted by BAC. Specifically, a series of individual noise measurements were conducted of multiple vehicle types arriving and departing a parking area, including engines starting and stopping, car doors opening and closing, and persons conversing as they entered and exited the vehicles. The results of those measurements revealed that individual parking lot movements generated mean noise levels of 70 dB SEL and 65 dB L_{max} at a reference distance of 50 feet.

For a conservative assessment of parking area noise generation, it was assumed that the parking area could fill or empty during a peak hour of event operations. During actual events, it is likely that parking area activity would be more spread out. Parking area noise exposure was determined using the following equation.

$$\text{Peak Hour } L_{eq} = 70+10*\log (N) - 35.6$$

Where 70 is the SEL for a single automobile parking operation, N is the number of parking area operations in a peak hour, and 35.6 is 10 times the logarithm of the number of seconds in an hour. Given this equation, and assuming standard spherical spreading loss (-6 dB per doubling of distance from the parking area), the predicted parking area noise exposure at the nearest residential use to the northeast (future residential development) was calculated to be 23 dB L_{max}, not including the noise level reduction resulting from the shielding provided by intervening topography.

Because the predicted worst-case scenario for parking area noise generation during race events (which are not proposed as part of this application), is predicted to be well within compliance of the City of Ione 55 dB L_{max} daytime exterior noise level standard, no additional consideration of parking area noise mitigation measures would be warranted for this aspect of the project.

Conclusions

Noise generated by proposed operations at the Ione Sands Moto-X facility is predicted to be well below measured existing ambient noise levels in the project vicinity. In addition, proposed project noise generation is predicted to satisfy the applicable City of Ione noise exposure limits at the nearest residential uses with a considerable margin of safety during proposed private training events. Furthermore, should public events be proposed at some point in the future, this analysis concludes that the noise generation of such events with up to 1,000 spectators would also be satisfactory relative to existing ambient conditions and City of Ione noise standards. As a result, no adverse noise impacts are identified for this project and no consideration of additional noise control measures would be warranted.

This concludes BAC's noise assessment for the proposed Ione Sands Moto-X in Ione, California. Please contact BAC at (916) 663-0500 or paulb@bacnoise.com with any questions regarding this assessment.

Appendix A

Acoustical Terminology

Acoustics The science of sound.

Ambient Noise The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.

Attenuation The reduction of an acoustic signal.

A-Weighting A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.

Decibel or dB Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.

CNEL Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.

Frequency The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.

Ldn Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.

Leq Equivalent or energy-averaged sound level.

Lmax The highest root-mean-square (RMS) sound level measured over a given period of time.

Loudness A subjective term for the sensation of the magnitude of sound.

Masking The amount (or the process) by which the threshold of audibility is for one sound is raised by the presence of another (masking) sound.

Noise Unwanted sound.

Peak Noise The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the Maximum level, which is the highest RMS level.

RT_{60} The time it takes reverberant sound to decay by 60 dB once the source has been removed.

Sabin The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.

SEL A rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy of the event into a 1-s time period.

Threshold of Hearing The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.

Threshold of Pain Approximately 120 dB above the threshold of hearing.

Appendix B-1
Ione Industrial Park
Ambient Noise Monitoring Results - Site 1
4/10/17 - 4/11/17

Hour	Leq	Lmax	L50	L90
14:00	43	66	38	35
15:00	40	56	38	36
16:00	41	56	39	36
17:00	42	56	39	37
18:00	38	52	37	35
19:00	40	52	39	37
20:00	42	61	39	37
21:00	39	53	38	36
22:00	37	45	36	35
23:00	37	55	36	35
0:00	35	44	35	34
1:00	34	46	33	32
2:00	34	43	33	32
3:00	34	43	33	32
4:00	34	42	34	32
5:00	39	51	38	35
6:00	42	53	41	37
7:00	43	53	42	40
8:00	43	65	41	39
9:00	42	62	40	38
10:00	43	58	41	38
11:00	43	55	41	38
12:00	43	60	40	37
13:00	46	63	43	41

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	46	37	42	42	34	37
Lmax (Maximum)	66	45	57	55	42	47
L50 (Median)	43	36	39	41	33	35
L90 (Background)	41	35	37	37	32	34

Computed Ldn, dB	45
% Daytime Energy	85%
% Nighttime Energy	15%

BOLLARD
Acoustical Consultants

Appendix B-2
Ione Industrial Park
Ambient Noise Monitoring Results - Site 1
4/11/17 - 4/12/17

Hour	Leq	Lmax	L50	L90
14:00	48	71	41	39
15:00	42	55	42	39
16:00	46	64	44	42
17:00	43	52	43	40
18:00	41	52	40	38
19:00	41	52	40	38
20:00	40	49	39	38
21:00	39	51	39	37
22:00	38	47	38	36
23:00	37	56	35	34
0:00	34	49	34	32
1:00	34	44	34	32
2:00	34	44	33	32
3:00	35	47	34	32
4:00	36	53	35	34
5:00	41	60	40	37
6:00	44	56	44	41
7:00	44	54	43	42
8:00	50	71	47	42
9:00	45	65	43	39
10:00	46	61	43	38
11:00	47	67	45	42
12:00	46	57	45	42
13:00	44	57	43	40

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	50	38	45	44	34	38
Lmax (Maximum)	71	47	58	60	44	51
L50 (Median)	47	38	42	44	33	36
L90 (Background)	42	36	40	41	32	34

Computed Ldn, dB	47
% Daytime Energy	89%
% Nighttime Energy	11%

BOLLARD
Acoustical Consultants

Appendix B-3
Ione Industrial Park
Ambient Noise Monitoring Results - Site 2
4/10/17 - 4/11/17

Hour	Leq	Lmax	L50	L90
15:00	43	58	42	39
16:00	41	56	39	35
17:00	40	51	39	36
18:00	38	46	37	34
19:00	39	56	36	32
20:00	37	50	35	32
21:00	36	52	34	31
22:00	34	47	32	29
23:00	34	48	31	28
0:00	30	44	29	26
1:00	29	38	28	26
2:00	29	41	28	23
3:00	30	46	28	25
4:00	30	47	29	26
5:00	36	48	33	30
6:00	42	51	40	36
7:00	43	53	41	37
8:00	39	50	39	36
9:00	41	60	39	36
10:00	43	59	41	38
11:00	42	60	40	36
12:00	43	62	40	38
13:00	43	58	42	39
14:00	48	71	40	38

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	48	34	42	42	29	35
Lmax (Maximum)	71	46	56	51	38	46
L50 (Median)	42	32	38	40	28	31
L90 (Background)	39	29	35	36	23	28

Computed Ldn, dB	43
% Daytime Energy	90%
% Nighttime Energy	10%

BOLLARD
Acoustical Consultants

Appendix B-4
Ione Industrial Park
Ambient Noise Monitoring Results - Site 2
4/11/17 - 4/12/17

Hour	Leq	Lmax	L50	L90
15:00	41	54	40	38
16:00	44	62	42	39
17:00	36	53	35	33
18:00	37	51	34	31
19:00	36	52	33	29
20:00	35	49	32	30
21:00	36	49	33	30
22:00	34	49	32	29
23:00	33	49	30	27
0:00	30	43	28	26
1:00	30	41	29	26
2:00	28	43	26	24
3:00	29	44	26	23
4:00	31	46	29	26
5:00	35	44	33	29
6:00	41	49	40	37
7:00	42	52	40	38
8:00	45	56	44	41
9:00	44	58	43	42
10:00	47	57	45	43
11:00	48	60	47	45
12:00	45	58	43	40
13:00	45	54	44	42
14:00	46	57	45	43

Statistical Summary						
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	48	34	44	41	28	34
Lmax (Maximum)	62	49	54	49	41	45
L50 (Median)	47	32	40	40	26	30
L90 (Background)	45	29	37	37	23	27

Computed Ldn, dB	44
% Daytime Energy	94%
% Nighttime Energy	6%

BOLLARD
Acoustical Consultants

Appendix B-5
Ione Industrial Park
Ambient Noise Monitoring Results - Site 3
4/10/17 - 4/11/17

Hour	Leq	Lmax	L50	L90
15:00	42	57	37	33
16:00	40	54	38	34
17:00	40	54	38	33
18:00	38	49	36	32
19:00	43	60	39	34
20:00	43	60	39	31
21:00	44	59	40	31
22:00	42	55	38	28
23:00	36	52	29	26
0:00	38	56	28	25
1:00	32	54	26	23
2:00	31	48	24	22
3:00	35	50	28	24
4:00	38	50	33	26
5:00	45	55	43	37
6:00	50	65	48	42
7:00	48	58	47	44
8:00	47	60	46	41
9:00	46	57	44	39
10:00	47	59	45	39
11:00	48	58	46	40
12:00	49	62	47	40
13:00	57	67	56	49
14:00	54	71	52	45

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	57	38	49	50	31	42
Lmax (Maximum)	71	49	59	65	48	54
L50 (Median)	56	36	43	48	24	32
L90 (Background)	49	28	37	42	22	28

Computed Ldn, dB	51
% Daytime Energy	89%
% Nighttime Energy	11%

BOLLARD
Acoustical Consultants

Appendix B-6
Ione Industrial Park
Ambient Noise Monitoring Results - Site 3
4/11/17 - 4/12/17

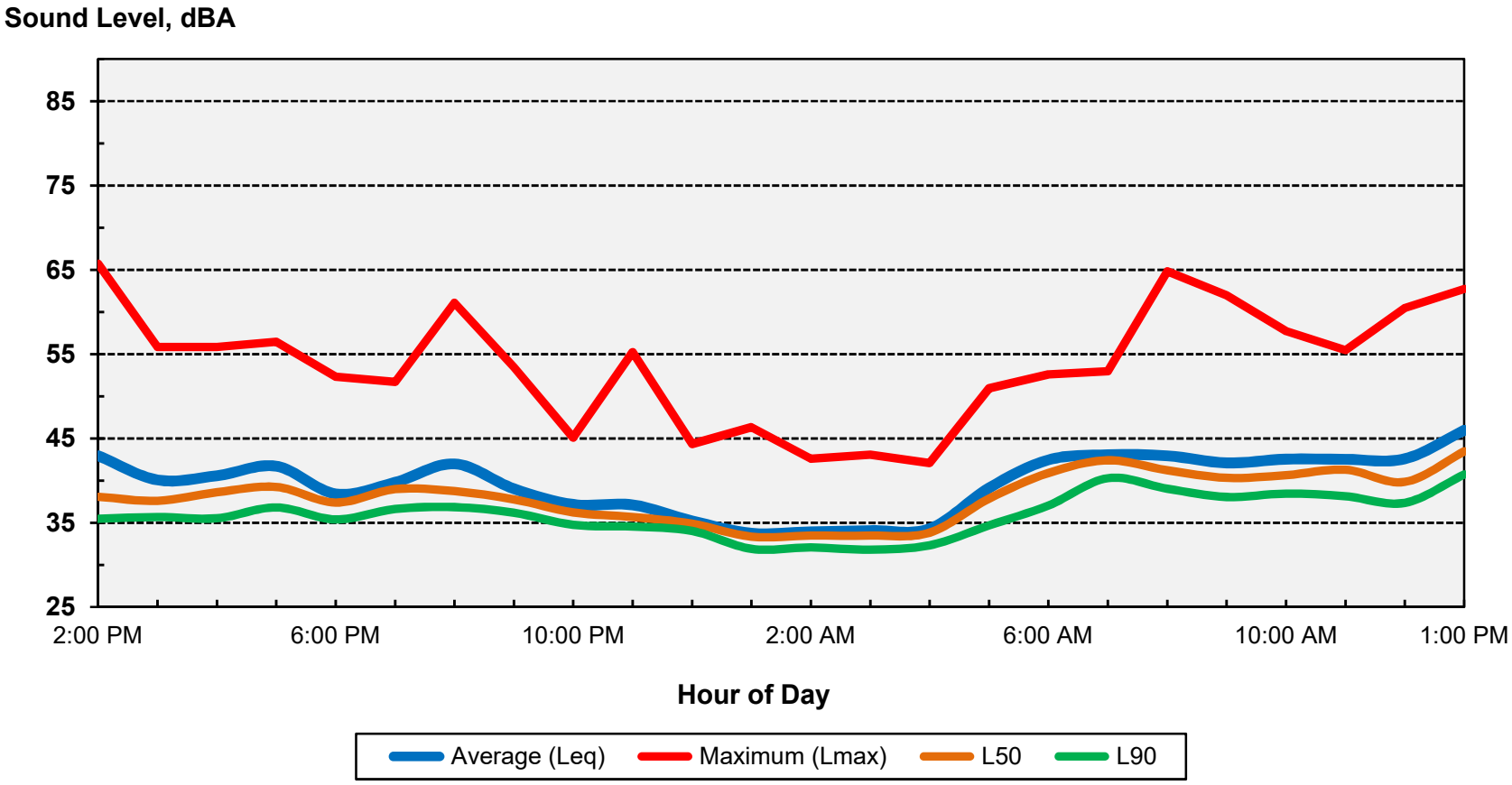
Hour	Leq	Lmax	L50	L90
15:00	52	63	51	45
16:00	56	69	54	46
17:00	48	61	46	39
18:00	49	61	47	39
19:00	45	56	42	35
20:00	43	56	41	31
21:00	42	62	37	29
22:00	40	57	35	28
23:00	40	56	31	24
0:00	34	50	27	24
1:00	32	48	25	23
2:00	36	53	25	23
3:00	38	58	30	25
4:00	41	56	34	27
5:00	48	63	46	39
6:00	52	65	50	45
7:00	49	58	48	44
8:00	47	58	46	41
9:00	45	60	42	37
10:00	50	64	48	41
11:00	51	66	49	43
12:00	52	66	49	43
13:00	51	65	48	43
14:00	46	71	41	38

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	56	40	50	52	32	44
Lmax (Maximum)	71	56	62	65	48	56
L50 (Median)	54	35	45	50	25	33
L90 (Background)	46	28	39	45	23	29

Computed Ldn, dB	52
% Daytime Energy	85%
% Nighttime Energy	15%

BOLLARD
Acoustical Consultants

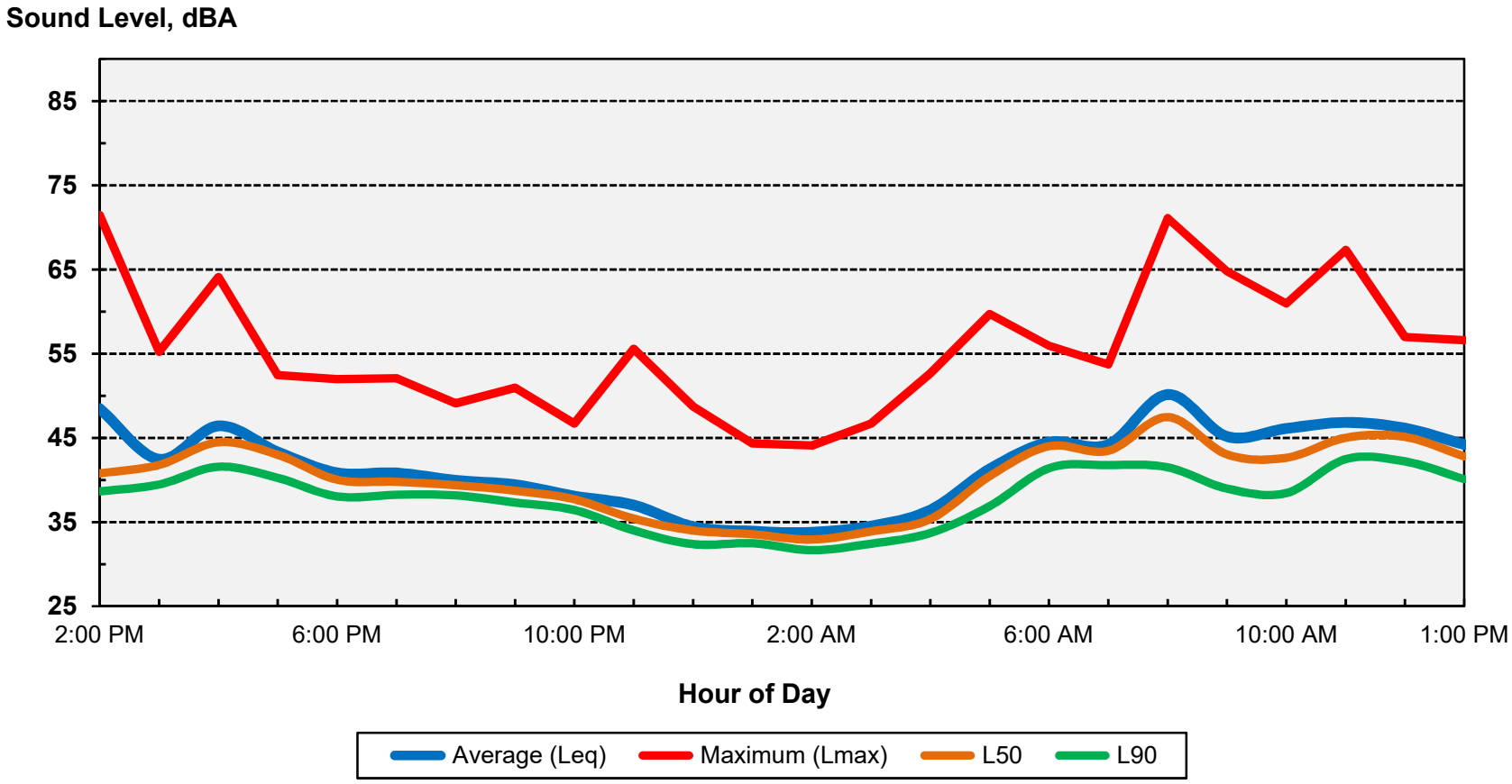
Appendix C-1
Ione Industrial Park
Ambient Noise Monitoring Results - Site 1
4/10/17 - 4/11/17



Ldn: 45 dB

BOLLARD
Acoustical Consultants

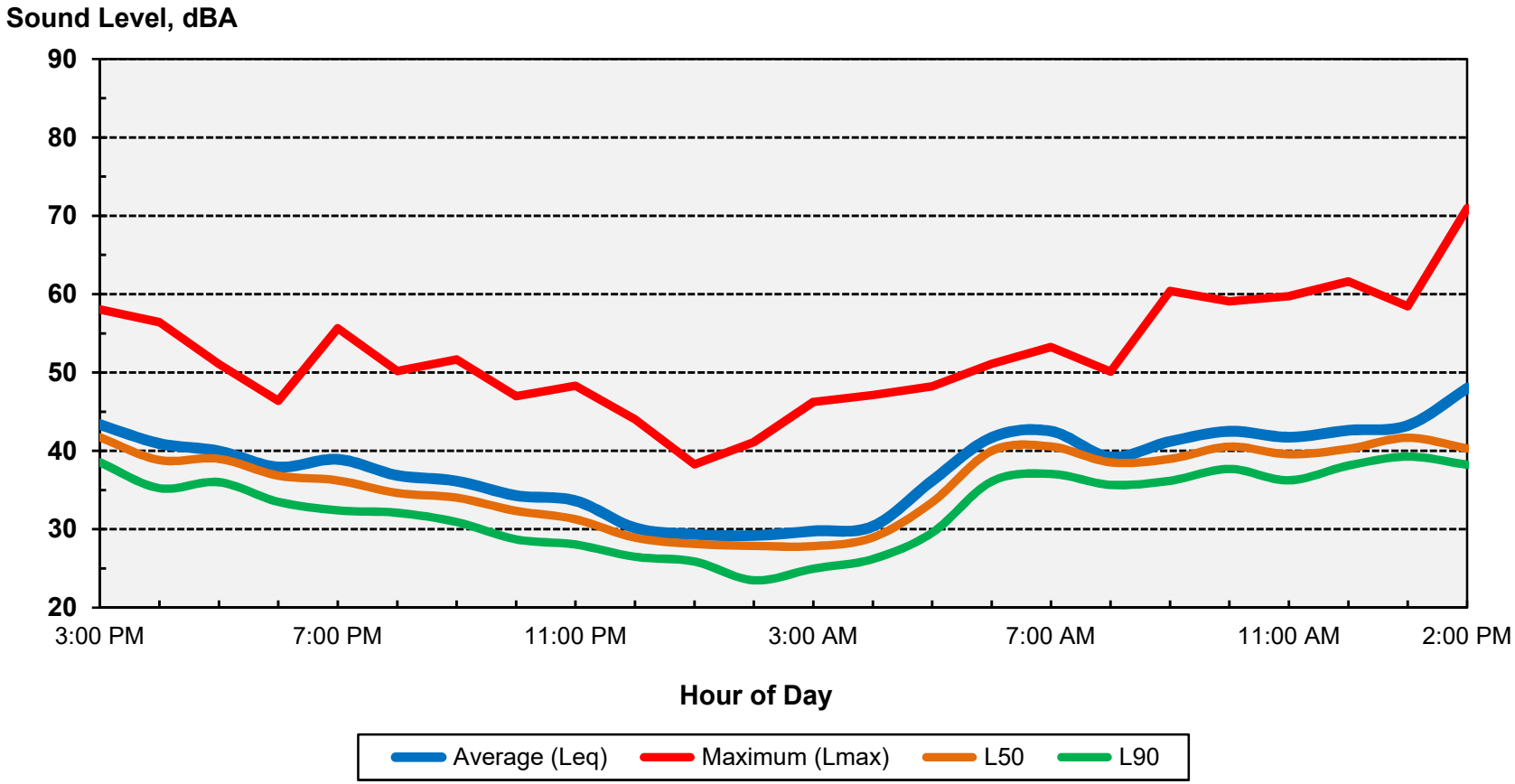
Appendix C-2
Ione Industrial Park
Ambient Noise Monitoring Results - Site 1
4/11/17 - 4/12/17



Ldn: 47 dB

BOLLARD
Acoustical Consultants

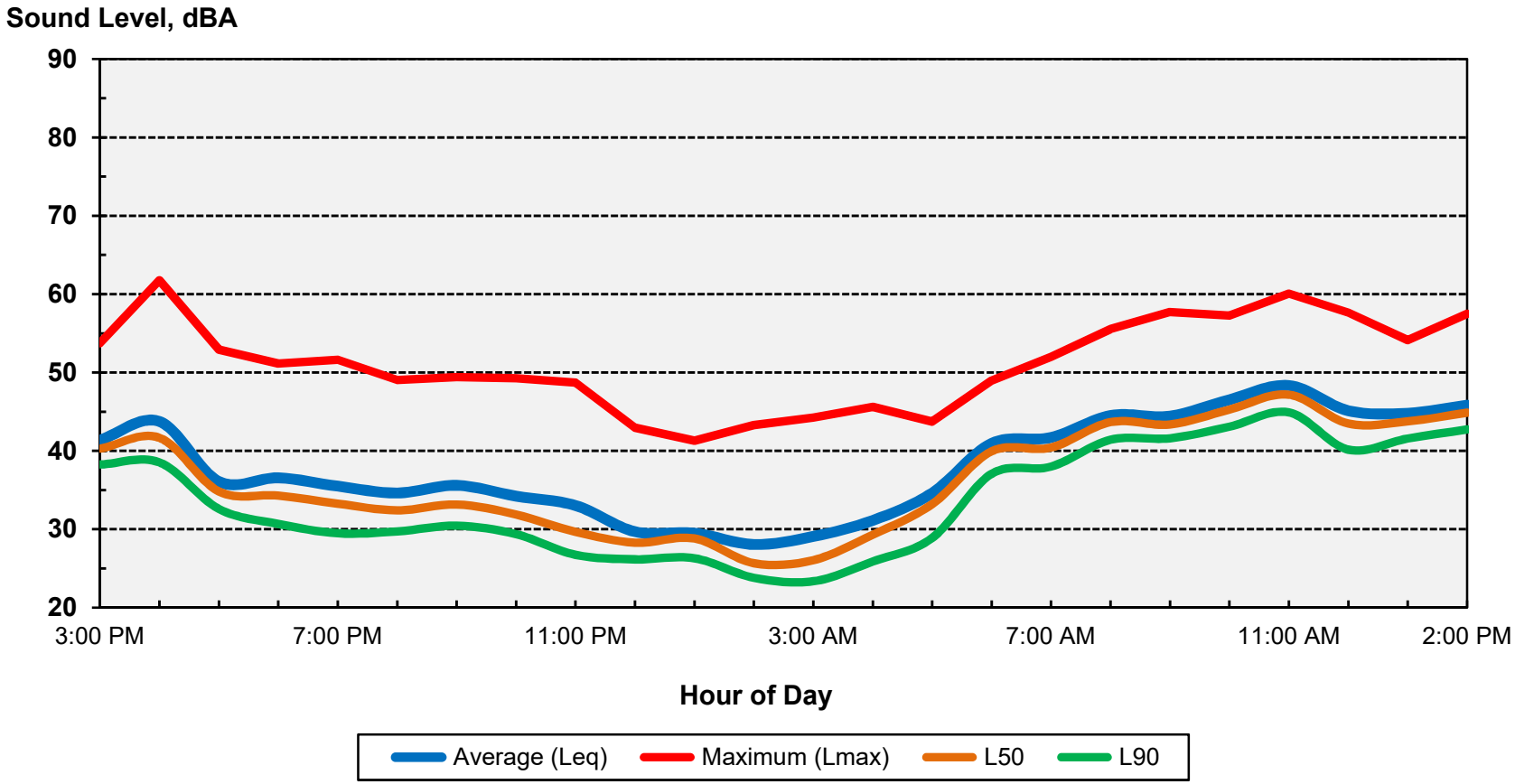
Appendix C-3
Ione Industrial Park
Ambient Noise Monitoring Results - Site 2
4/10/17 - 4/11/17



Ldn: 43 dB

BOLLARD
Acoustical Consultants

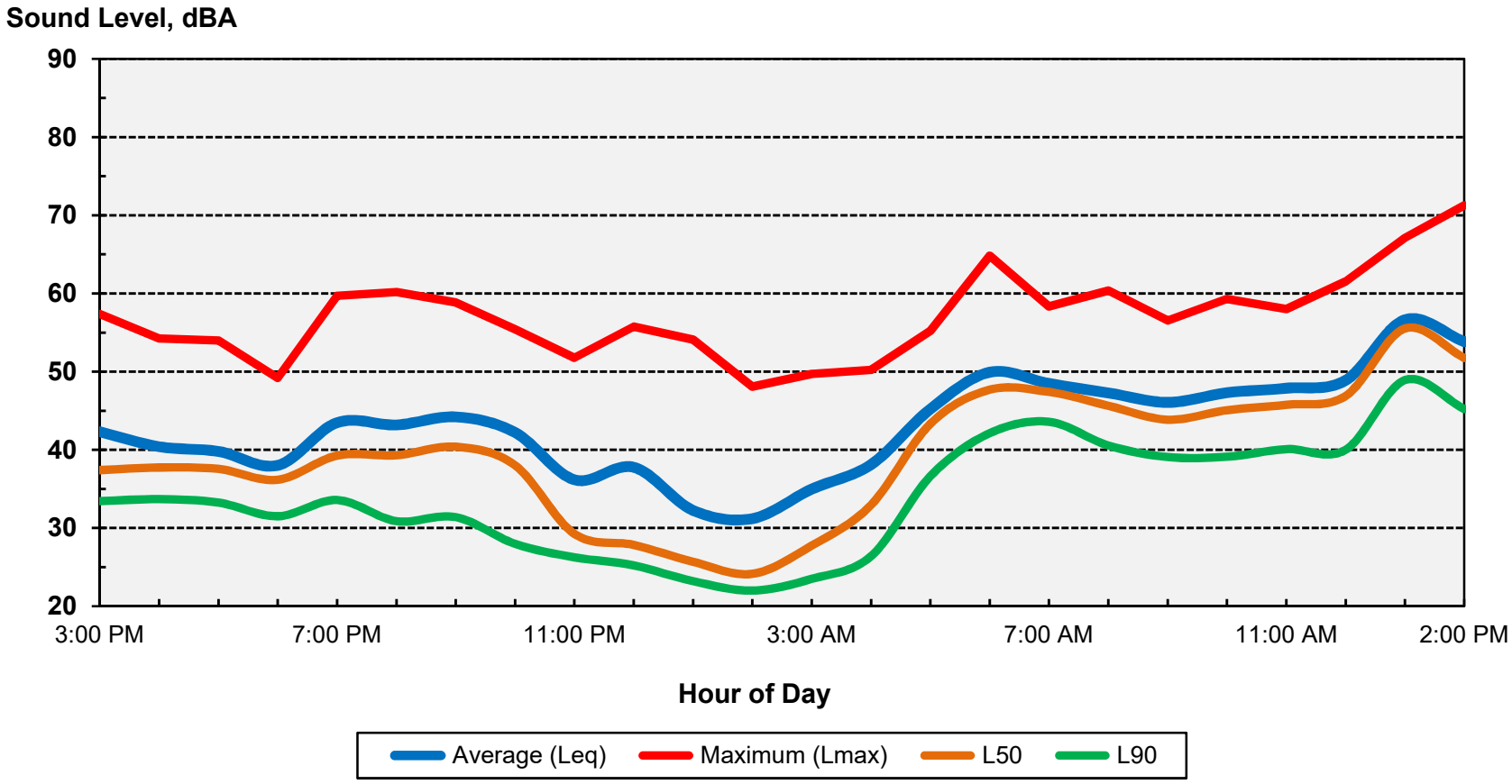
Appendix C-4
Ione Industrial Park
Ambient Noise Monitoring Results - Site 2
4/11/17 - 4/12/17



Ldn: 44 dB

BOLLARD
Acoustical Consultants

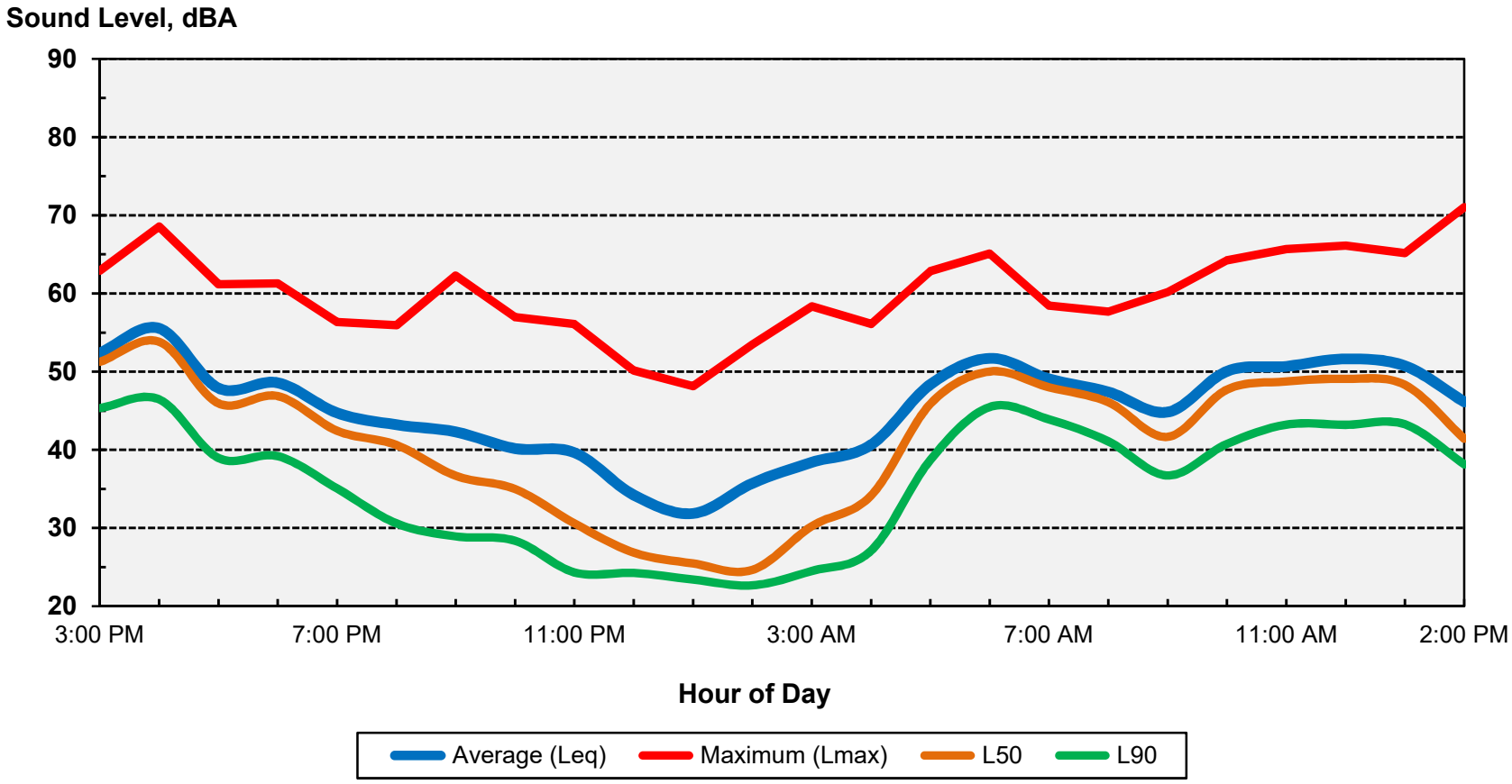
Appendix C-5
Ione Industrial Park
Ambient Noise Monitoring Results - Site 3
4/10/17 - 4/11/17



Ldn: 51 dB

BOLLARD
Acoustical Consultants

Appendix C-6
Ione Industrial Park
Ambient Noise Monitoring Results - Site 3
4/11/17 - 4/12/17



Ldn: 52 dB

BOLLARD
Acoustical Consultants