

# Environmental Noise Assessment

## Marin Country Club Verizon Cellular Facility

City of Novato, California

BAC Job # 2022-007

Prepared For:

Complete Wireless Consulting

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Prepared By:

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## Introduction

The Marin Country Club Verizon Wireless Unmanned Telecommunications Facility Project (project) proposes the installation of cellular equipment within a lease area located at 1110 Highland Drive in the City of Novato, California (APN: 160-150-03 & 160-920-24). The outdoor equipment cabinets have been identified as the primary noise sources associated with the project. The project overall site plan is shown in Figure 1. The studied site drawings are dated March 15, 2023.

Bollard Acoustical Consultants, Inc. has been contracted by Complete Wireless Consulting, Inc. to complete an environmental noise assessment regarding the proposed project cellular equipment operations. Specifically, the following assessment addresses daily noise production and exposure associated with operation of the proposed outdoor equipment cabinets.

Please refer to Appendix A for definitions of acoustical terminology used in this report. Appendix B illustrates common noise levels associated with various sources.

## Criteria for Acceptable Noise Exposure

### City of Novato General Plan 2035

According to the MarinMap Viewer (accessed June 25, 2023), the project parcel is zoned Planned Development. The adjacent parcels to the east of the project are residentially zoned.

Chapter 4 of the City of Novato General Plan 2035 (Living Well) identifies acceptable noise level limits (in terms of  $L_{dn}$  or DNL) for residential uses, such as those proposed nearest to the proposed project. Those noise level limits are provided below in Table 1.

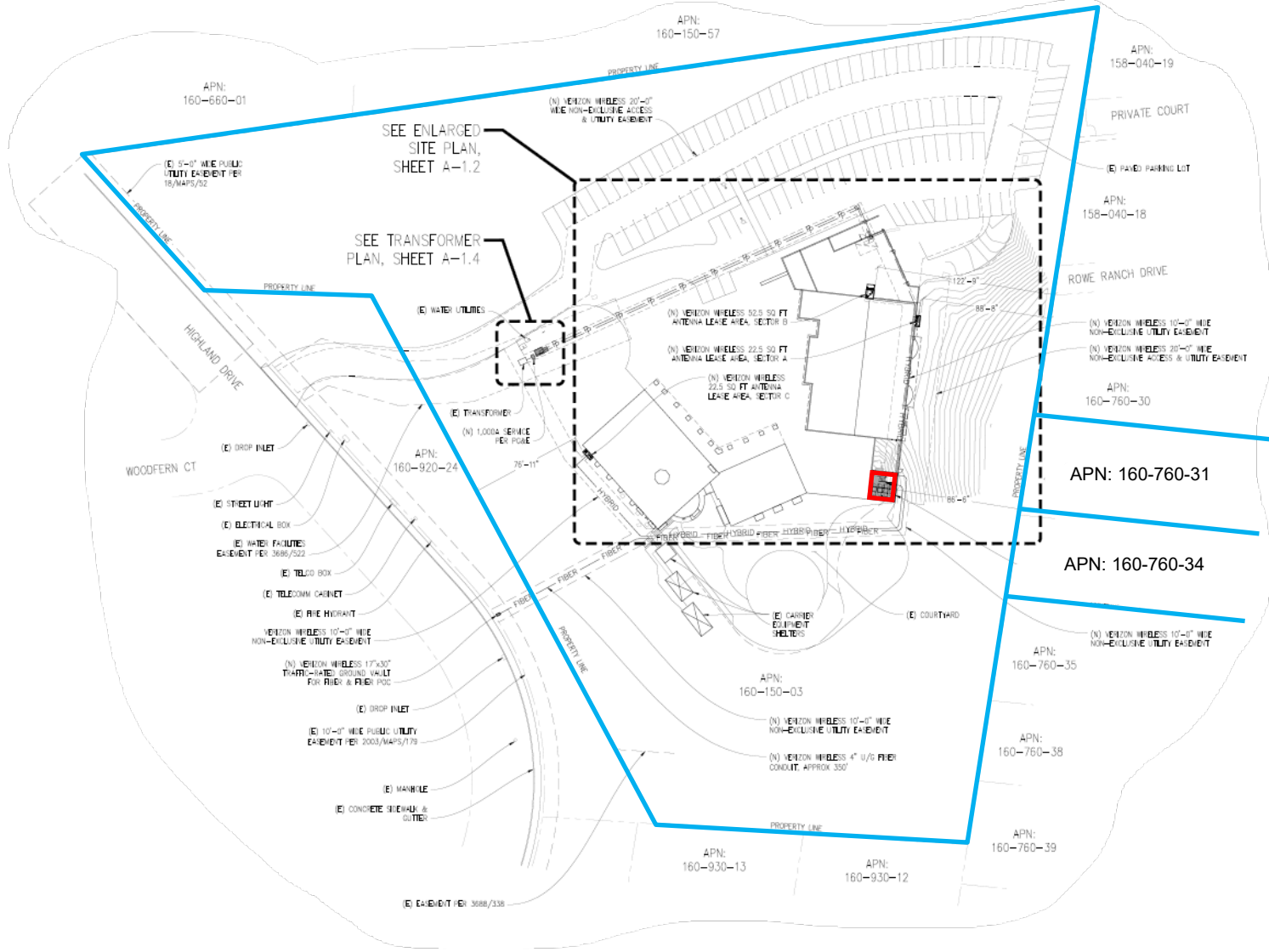
**Table 1**  
**Land Use Compatibility Standards – Residential, Hotels and Motels**

Land Use Category	Community Noise Exposure, DNL (dB)
Normally Acceptable	60 or below
Conditionally Acceptable	60 to 75
Unacceptable	Above 75

Source: City of Novato 2035 General Plan, Chapter 4, Figure LW-6.

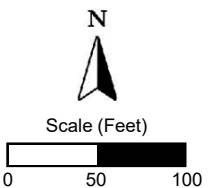
### City of Novato Municipal Code

General performance standards for exterior noise levels are provided in Section 19.22.070 of the City of Novato Municipal Code. The allowable exterior noise level limits are determined by the zoning of the subject property and shall not exceed the levels provided in Table 2 beyond the property line of the parcel on which they are located.



**Legend**

- Proposed Cellular Equipment Lease Area (Cabinets)
- Parcel Boundaries



**Marin CC Verizon Cellular Facility**  
Novato, California

Proposed Cellular Facility Lease Area  
& Nearest Noise-Sensitive Uses

Figure 1



**Table 2**  
**Allowable Exterior Noise Levels – Residential**

Land Use Type	Allowable Exterior Noise Level (dB) <sup>1</sup>	
	Time Interval	Maximum Noise Level <sup>2</sup>
Residential <sup>3</sup>	10:00 p.m. to 6:00 a.m.	45
	6:00 a.m. to 10:00 p.m.	60
<sup>1</sup> Each of the noise limits specified in Table 2 shall be reduced by 5 dBA for impulse or simple tone noises. If the ambient noise exceeds the resulting standard, the ambient shall be the standard. <sup>2</sup> Maximum noise levels shall not be exceeded for an aggregate period of time more than three minutes within a one-hour time period or by more than 20 dBA at any time. <sup>3</sup> Residential standards apply to sensitive receptors such as schools, hospitals, libraries, group care facilities, and convalescent homes. These uses may require special mitigation.		

Source: City of Novato Municipal Code, Section 19.22.070(c), Table 3-5

## Project Noise Generation

The project proposes the installation of three (3) equipment cabinets within the lease area shown on Figure 1. Based on the project equipment layout plan, the cabinets assumed for the project are as follows: two (2) Charles Industries 48V Power Plants and one (1) miscellaneous cabinet cooled by a McLean Model T-20 air conditioner. The cabinets and their respective reference noise levels are provided in Table 3. The manufacturer's noise level data specification sheets for the proposed cabinets are provided as Appendix C.

**Table 3**  
**Reference Noise Level Data of Proposed Equipment Cabinets**

Equipment	Number of Cabinets	Reference Noise Level (dB)	Reference Distance (ft)
Charles Industries 48V Power Plant	2	60	5
McLean T-20	1	66	5
<i>Note: Manufacturer specification sheets are provided as Appendix C.</i>			

## Predicted Facility Noise Levels at Nearest Residential Properties

### Assessment Relative to City of Novato General Plan 2035 Noise Level Criteria

Using the provided site plans, distances were scaled from the proposed equipment lease area to the nearest residential property lines (east of the project). Assuming standard spherical spreading loss (-6 dB per doubling of distance), project-equipment noise exposure at the nearest residential property lines was calculated and the results of those calculations relative to the City General Plan noise level criteria are presented in Table 4.

To calculate project-related noise generation relative to the General Plan DNL exterior noise level descriptor, the number of hours the equipment is in operation must be known. For the purpose of this analysis, the equipment cabinets were conservatively assumed to be operating concurrently and continuously for 24 hours.

**Table 4**  
**Predicted Project Equipment Noise Exposure at Nearest Residential Property Lines**

<b>APN<sup>1</sup></b>	<b>Distance from Facility Lease Area (ft)<sup>2</sup></b>	<b>Predicted Equipment Noise Level, DNL (dB)<sup>3</sup></b>
160-760-31	85	50
160-760-34	90	49
<sup>1</sup> Parcel boundaries are shown on Figure 1. <sup>2</sup> Distances were scaled using the provided site plans dated October 28, 2019. <sup>3</sup> Cabinet DNL was calculated by conservatively assuming 24 continuous hours of operation.		

Source: BAC 2023.

As indicated in Table 4, predicted equipment cabinet noise levels of 49 to 50 dB DNL at the nearest residential property lines would satisfy the applicable City of Novato General Plan normally acceptable noise level limit for residential uses of 60 dB DNL by a wide margin. As a result, no further consideration of noise mitigation measures would be warranted for the project equipment relative to the General Plan noise level criteria.

#### Assessment Relative to City of Novato Municipal Code Noise Level Criteria

Assuming standard spherical spreading loss (-6 dB per doubling of distance), project-equipment noise exposure at the nearest residential property lines was calculated and the results of those calculations relative to the City Municipal Code noise level criteria are presented in Table 5.

**Table 5**  
**Predicted Project Equipment Noise Exposure at Nearest Residential Property Lines**

<b>APN<sup>1</sup></b>	<b>Distance from Facility Lease Area (ft)<sup>2</sup></b>	<b>Predicted Equipment Noise Level (dB)<sup>3</sup></b>
160-760-31	85	38
160-760-34	90	38

Source: BAC 2023.

Because the proposed equipment cabinets could potentially be in operation during nighttime hours, the operation of the equipment cabinets would be subject to the City of Novato Municipal Code nighttime noise level standard of 45 dB. As shown in Table 5, predicted equipment cabinet noise levels of 38 dB at the nearest residential property lines would satisfy the Municipal Code 45 dB nighttime noise level standard. As a result, no further consideration of noise mitigation measures would be warranted for the project equipment relative to the Municipal Code noise level criteria.

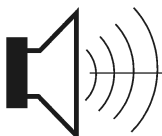
## Conclusions

Based on the equipment noise level data and analyses presented above, project-related equipment noise exposure is expected to satisfy the applicable City of Novato General Plan and Municipal Code noise exposure limits at the closest noise-sensitive (residential) uses. As a result, no additional noise mitigation measures would be warranted for this project.

This concludes our environmental noise assessment for the proposed Marin Country Club Verizon Cellular Facility in Novato, California. Please contact BAC at (530) 537-2328 or [info@bacnoise.com](mailto:info@bacnoise.com) with any questions or requests for additional information.

## Appendix A Acoustical Terminology

<b>Acoustics</b>	The science of sound.
<b>Ambient Noise</b>	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.
<b>Attenuation</b>	The reduction of an acoustic signal.
<b>A-Weighting</b>	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
<b>Decibel or dB</b>	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.
<b>CNEL</b>	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.
<b>Frequency</b>	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.
<b>L<sub>dn</sub></b>	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
<b>Leq</b>	Equivalent or energy-averaged sound level.
<b>L<sub>max</sub></b>	The highest root-mean-square (RMS) sound level measured over a given period of time.
<b>Loudness</b>	A subjective term for the sensation of the magnitude of sound.
<b>Masking</b>	The amount (or the process) by which the threshold of audibility is for one sound is raised by the presence of another (masking) sound.
<b>Noise</b>	Unwanted sound.
<b>Peak Noise</b>	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.
<b>RT<sub>60</sub></b>	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
<b>Sabin</b>	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.
<b>SEL</b>	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.
<b>Threshold of Hearing</b>	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
<b>Threshold of Pain</b>	Approximately 120 dB above the threshold of hearing.

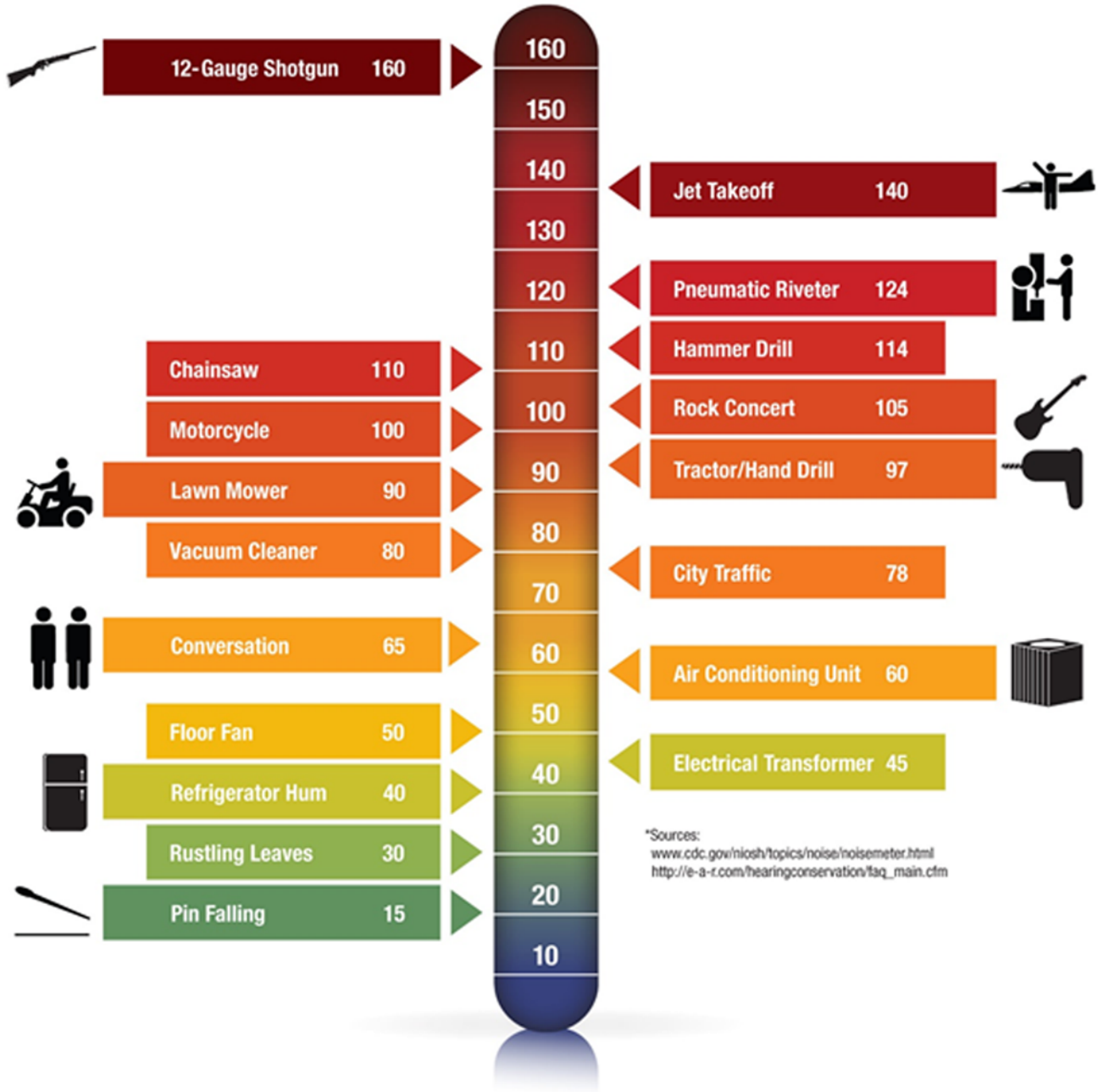


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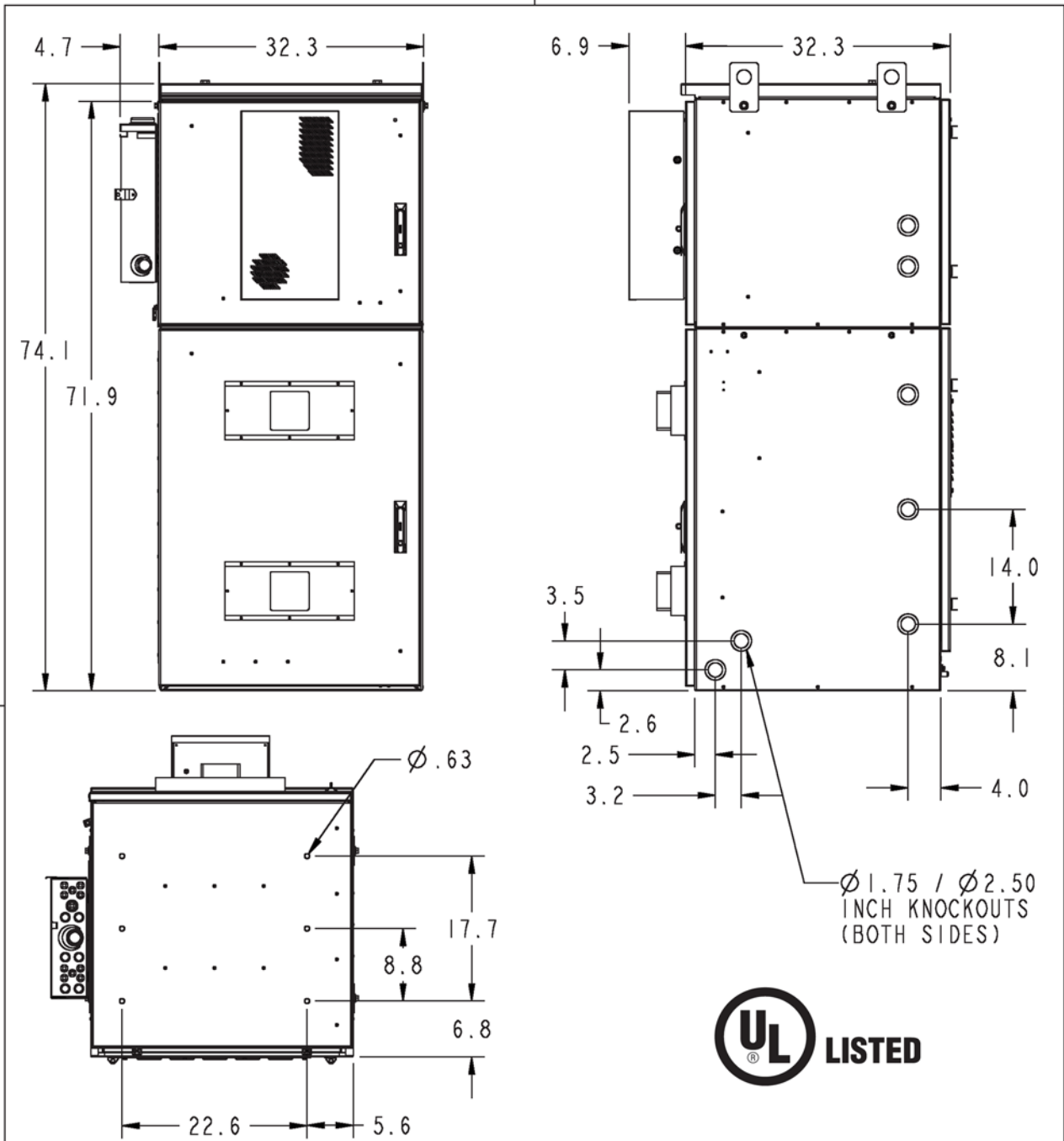
# Appendix B

## Typical A-Weighted Sound Levels of Common Noise Sources Decibel Scale (dBA)\*



\*Sources:  
[www.cdc.gov/niosh/topics/noise/noisemeter.html](http://www.cdc.gov/niosh/topics/noise/noisemeter.html)  
[http://e-a-r.com/hearingconservation/faq\\_main.cfm](http://e-a-r.com/hearingconservation/faq_main.cfm)

# Appendix C-1



**WEIGHT WITH BATTERIES:**  
2296 LBS.

**WEIGHT WITHOUT BATTERIES:**  
760 LBS.

**MAX NOISE LEVEL:**  
55-60dB

NorthStar NSB-170FT batteries  
at 128 lbs each, Qty 12

**CHARLES PART #**  
**CUBE-SS4C215XC1**



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