Environmental Noise Assessment

Freshwater Verizon Cellular Facility

Eureka (Humboldt County), California

BAC Job #2024-138

Prepared For:

Complete Wireless Consulting

Attn: Jerry Agloro
2009 V Street
Sacramento, CA 95818

Prepared By:

Bollard Acoustical Consultants, Inc.

Dario Gotchet, Principal
Institute of Noise Control Engineering (INCE), Elected Member

March 4, 2025

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Introduction

The Freshwater Verizon Wireless Unmanned Telecommunications Facility Project (project) proposes the installation of cellular equipment within a lease area located at 250 Misty Hill Lane in Eureka (Humboldt County), California (APN: 403-081-013). The proposed outdoor equipment cabinet cooling systems and an emergency standby diesel generator have been identified as the primary noise sources associated with the project. The project site location with aerial imagery is shown in Figure 1. The project overall site plan and enlarged site plan are presented in Figures 2 and 3, respectively. The studied site drawings are dated July 25, 2024.

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 project outdoor equipment cabinets and emergency generator.

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

Humboldt County General Plan

The Noise Element (Chapter 13) of the Humboldt County General Plan identifies the County's approach to managing noise levels to minimize the exposure of community residents to excessive noise. Specific General Plan policies of relevance to this analysis are reproduced below.

Policies

N-P1 **Minimize Noise from Stationary and Mobile Sources.** Minimize stationary noise sources and noise emanating from temporary activities by applying appropriate standards for average and short-term noise levels during permit review and subsequent monitoring.

N-P4 **Protection from Excessive Noise.** Protect persons from existing or future excessive levels of noise which interfere with sleep, communication, relaxation, health or legally permitted use of property.

Standards

N-S1 **Land Use/Noise Compatibility Matrix.** The Land Use/Noise Compatibility Standards contained in Table 13-C shall be used as a guide to ensure compatibility of land uses. Development may occur in areas identified as "normally unacceptable" if mitigation measures can reduce indoor noise levels to "Maximum Interior Noise Levels" and outdoor noise levels to the maximum "Normally Acceptable" value for the given Land Use Category.

N-S4 **Noise Study Requirements.** When a discretionary project has the potential to generate noise levels in excess of Plan standards, a noise study together with acceptable plans to assure compliance with the standards shall be required. The noise study shall measure or model as appropriate, Community Noise Equivalent Level (CNEL) and Maximum Noise Level (L_{max}) levels at property lines and, if feasible, receptor locations. Noise studies shall be prepared by qualified individuals using calibrated equipment under currently accepted professional standards and include an analysis of the characteristics of the project in relation to noise levels, all feasible mitigation, and projected noise impacts. The Noise Guidebook published by the U.S. Department of Housing and Urban Development, or its equivalent, shall be used to guide analysis and mitigation recommendations.

Note: General Plan Table 13-C establishes an exterior noise level environment of up to 60 dB CNEL as normally *acceptable for residential uses, such as those located within the vicinity of the project.*

Humboldt County Code

Humboldt County Code Section 314-91.2 contains specific noise-related criteria for wireless telecommunications facilities. Specific provisions of relevance to this analysis are reproduced below.

314-91.2.5.9 Special Provisions in Residential Zones.

91.2.5.9.2 Noise from routine operations and from backup generators shall not exceed fifty (50) dB or ambient, whichever is higher. This may require placement of equipment in a noise-attenuating structure.

314-91.2.8.3.6 Noise/Acoustical Information. Provide manufacturer specifications for all equipment such as air conditioning units and back-up generators, provide a proposal for a noise-attenuating structure to maintain noise levels below (50) dB, and provide a depiction of the equipment location in relation to adjoining properties.

Legend

- Project Cellular Facility Lease Area (Approximate Location)
- # Noise-Sensitive Receiver (Residence)

N

Scale (Feet)

0 250 500

Freshwater Verizon Cellular Facility

Humboldt County, California

Proposed Cellular Facility Lease Area & Nearby Noise-Sensitive Receivers

Figure 1

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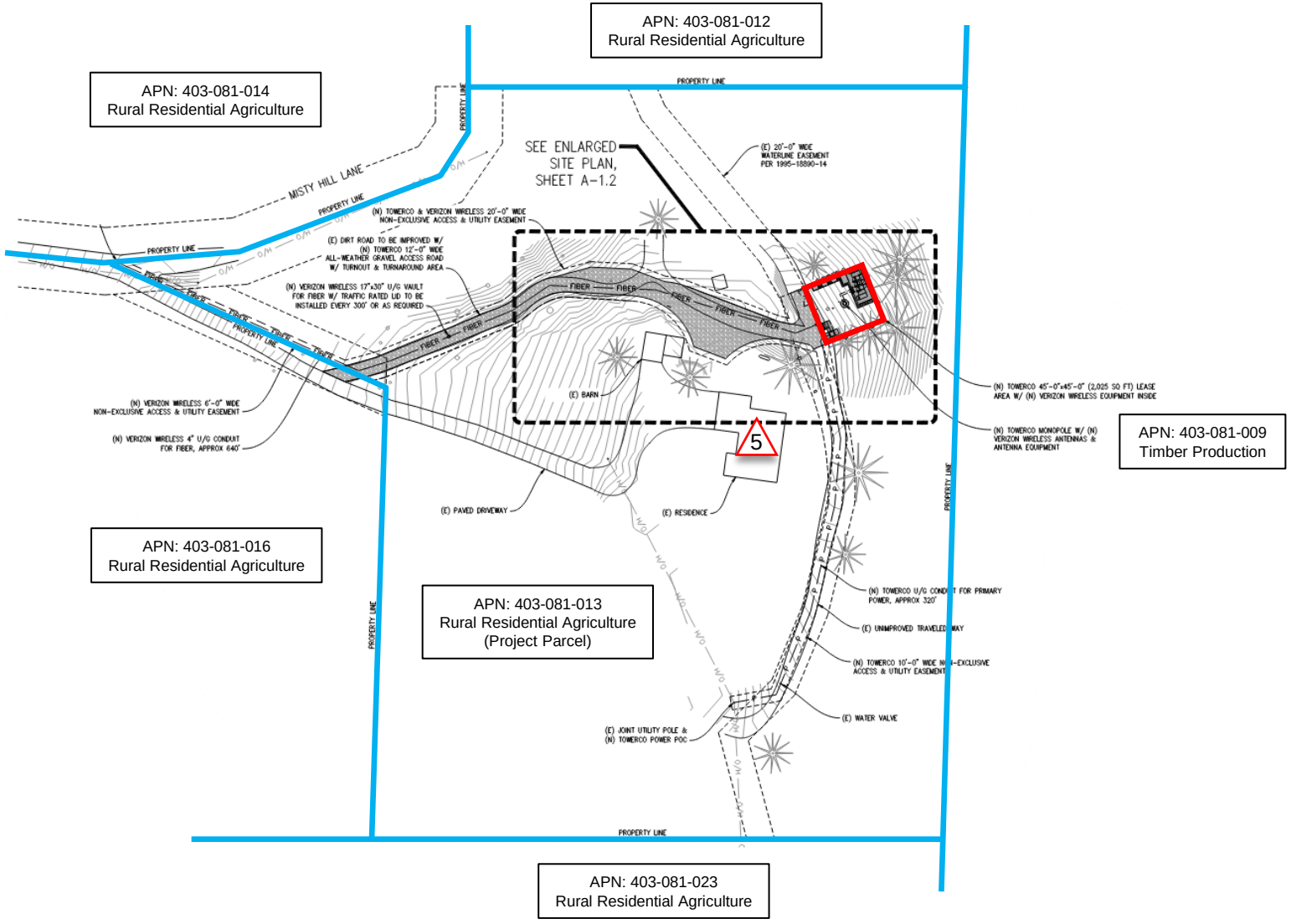

Legend

- Project Cellular Facility Lease Area
- Noise-Sensitive Receiver (Residence)
- Parcel Boundaries

N

Scale (Feet)

0 100 200

Freshwater Verizon Cellular Facility

Humboldt County, California

Overall Site Plan

Figure 2

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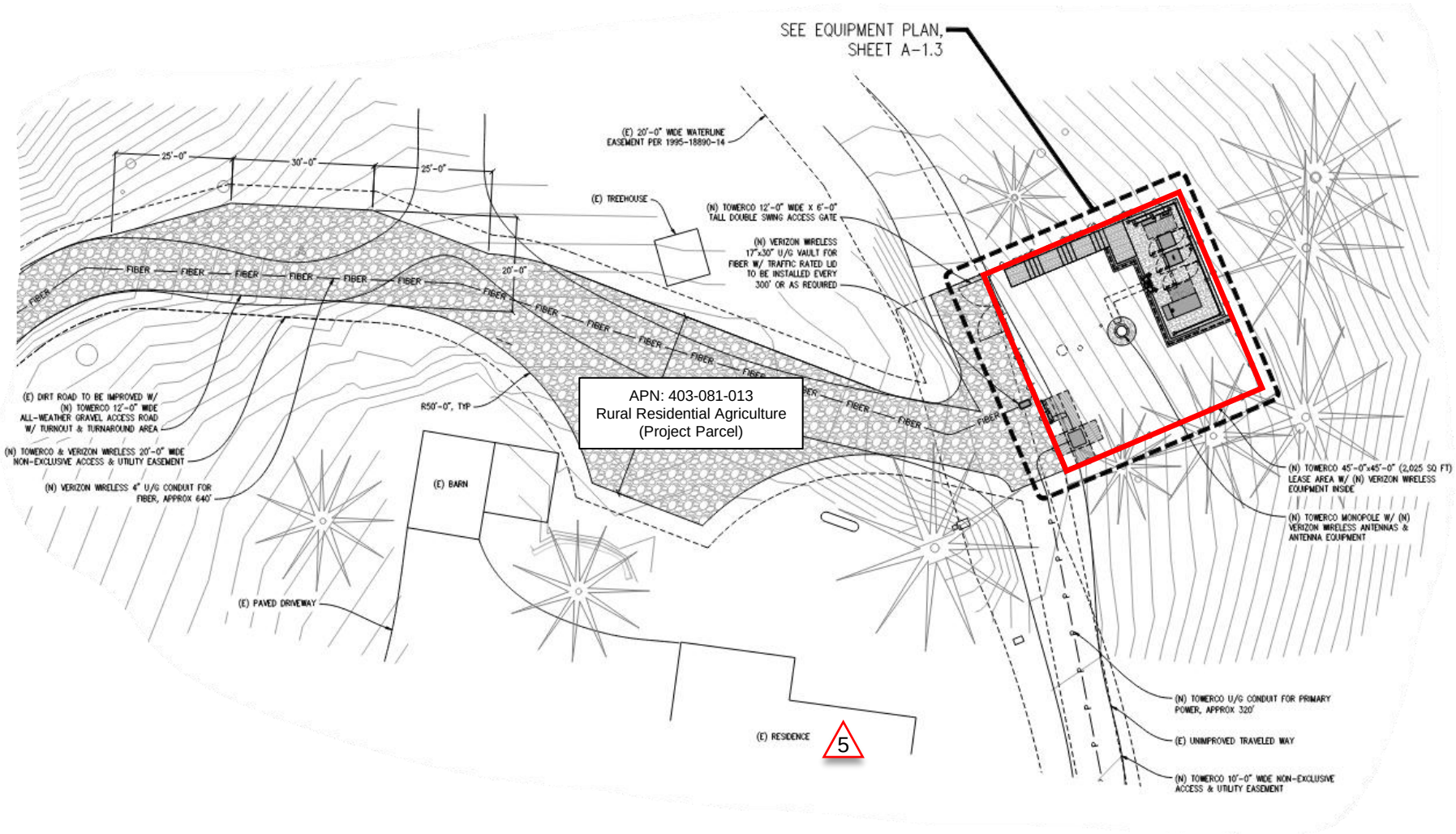

Legend

Project Cellular Facility Lease Area

Noise-Sensitive Receiver (Residence)

N

Scale (Feet)

0 25 50

Freshwater Verizon Cellular Facility

Humboldt County, California

Enlarged Site Plan

Figure 3

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Project Noise Generation

As discussed previously, there are two project noise sources which are considered in this evaluation: the equipment cabinet cooling systems and the emergency generator. The evaluation of potential noise impacts associated with the operation of each noise source is evaluated separately as follows:

Equipment Cabinet Noise Sources and Reference Noise Levels

According to the provided site drawings, the project proposes the installation of two (2) equipment cabinets within the equipment lease area shown in Figure 1. The cabinet models assumed for the project are as follows: one (1) Charles Industries 48V Power Plant 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 1. The manufacturer's noise level data specification sheets for the proposed equipment cabinets are provided as Appendix C.

Table 1
Reference Noise Level Data of Proposed Equipment Cabinets

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

Generator Noise Sources and Reference Noise Level

The project also proposes the installation of an emergency standby diesel generator within the lease area to maintain cellular service during emergency power outages. Based on a review of the provided site plans, the generator proposed for installation at this site is a Generac Industrial Power Systems Model SDC030. The site plans further indicate that the proposed generator will be equipped with the Level 2 Sound Attenuated Enclosure, which results in an average sound level of 65 dB at reference distance of 23 feet. The manufacturer's specification sheet containing sound level data for the proposed generator model and enclosure is provided as Appendix D.

The generator which is proposed at this site would only operate during emergencies (power outages) and brief daytime periods for periodic maintenance/lubrication. According to the project applicant, testing of the generator would occur twice per month on weekdays only, during daytime hours, for a duration of approximately 15 minutes. The emergency generator would not operate at night, except during power outages.

Predicted Equipment Noise Exposure at Nearby Noise-Sensitive Uses

The adjacent parcels to the north, northwest, west and south of the project are zoned Rural Residential Agriculture and contain residences. The locations of the adjacent parcels and residences, which are identified as receivers 1-4, are shown in Figures 1 and 2. In addition, the project parcel (also zoned Rural Residential Agriculture) contains a residence, which is identified as receiver 5 in Figures 1 and 2. Assuming standard spherical spreading loss (-6 dB per doubling

of distance), project equipment noise levels at adjacent property lines and receivers (residences) was calculated and the results of those calculations are presented in Tables 2 and 3. Satisfaction of the County's noise level criteria at the closest noise-sensitive uses would ensure for compliance at noise-sensitive uses located farther away.

Table 2
Project Equipment Noise Exposure at the Nearby Noise-Sensitive Uses – CNEL

APN[1]	Assessment Location[1]	Distance from Equipment (ft)[2]		Predicted Noise Level, CNEL (dB)		
		Cabinets	Generator	Cabinets[3]	Generator[4]	Combined[5]
403-081-016	Property Line	360	360	36	37	40
	Receiver 1	380	380	36	37	39
403-081-014	Property Line	310	315	38	38	41
	Receiver 2	445	450	34	35	38
403-081-012	Property Line	145	155	44	45	47
	Receiver 3	510	515	33	34	37
403-081-023	Property Line	415	405	35	36	39
	Receiver 4	1,075	1,070	27	28	30
Project Parcel	Receiver 5	110	100	47	48	51

[1] Receiver (residence) and parcel locations are shown in Figures 1 and 2.
[2] Distances scaled from equipment to property line or receiver location (outdoor area of residence) using the provided site plans.
[3] Cabinet CNEL calculated by assuming 24 hours of continuous (and concurrent) operations.
[4] Generator CNEL calculated by assuming 1 hour of continuous operation during nighttime hours.
[5] Logarithmic sum of predicted equipment cabinet and generator noise levels.

Source: BAC 2025

Table 3
Project Equipment Noise Exposure at the Nearby Noise-Sensitive Uses – Maximum, L_{max}

APN[1]	Assessment Location[1]	Distance from Equipment (ft)[2]		Predicted Noise Level, L_{max} (dB)		
		Cabinets	Generator	Cabinets	Generator	Combined[3]
403-081-016	Property Line	360	360	30	41	41
	Receiver 1	380	380	30	41	42
403-081-014	Property Line	310	315	31	42	43
	Receiver 2	445	450	28	39	39
403-081-012	Property Line	145	155	38	48	49
	Receiver 3	510	515	27	38	38
403-081-023	Property Line	415	405	29	40	40
	Receiver 4	1,075	1,070	20	32	32
Project Parcel	Receiver 5	110	100	40	52	52

[1] Receiver (residence) and parcel locations are shown in Figures 1 and 2.
[2] Distances scaled from equipment to property line or receiver location (outdoor area of residence) using the provided site plans.
[3] Logarithmic sum of predicted equipment cabinet and generator noise levels.

Source: BAC 2025

Assessment Relative to County Community Noise Equivalent Level (CNEL) Criteria

The Humboldt County General Plan establishes an exterior noise level environment of up to 60 dB CNEL as normally acceptable for residential uses. Additionally, the General Plan establishes an interior noise level limit of 45 dB CNEL for residential uses. As indicated in Table 2, predicted combined project equipment noise levels ranging from 30 dB CNEL to 47 dB CNEL at nearby residential property lines and off-site noise-sensitive receptors (residences, receivers 1-4) would satisfy the General Plan 60 dB CNEL exterior noise level standard for residential uses. Further, the predicted combined project equipment noise level of 51 dB CNEL at the noise-sensitive receptor located on the project parcel (receiver 5) would also satisfy the applicable General Plan 60 dB CNEL exterior noise level limit (Table 2).

Standard residential construction typically results in an exterior to interior noise reduction of approximately 25 dB with windows closed and approximately 15 dB with windows open. Based on that information, and after consideration of the predicted exterior noise levels at receiver locations presented in Table 2, project equipment noise levels are expected to be well below the General Plan 45 dB CNEL interior noise level limit within nearby off-site residences (receivers 1-4), as well as within the residence constructed on the project parcel (receiver 5).

Finally, General Plan Policy N-P4 relates to the protection of persons within the County from existing or future excessive levels of noise which interfere with sleep, communication, relaxation, health or legally permitted use of property. According to the United States Environmental Protection Agency (EPA) (*Information on Levels of Environmental Noise Requisite to Protect Publish Health and Welfare with an Adequate Margin of Safety*), exterior environmental noise level exposure in excess of 55 dB CNEL is identified as a threshold for outdoor activity interference and/or annoyance in residential areas. The EPA also identifies an interior noise level threshold of 45 dB CNEL for indoor residential areas. These levels of noise are considered by the EPA as those which will permit spoken conversation and other activities such as sleeping, working and recreation.

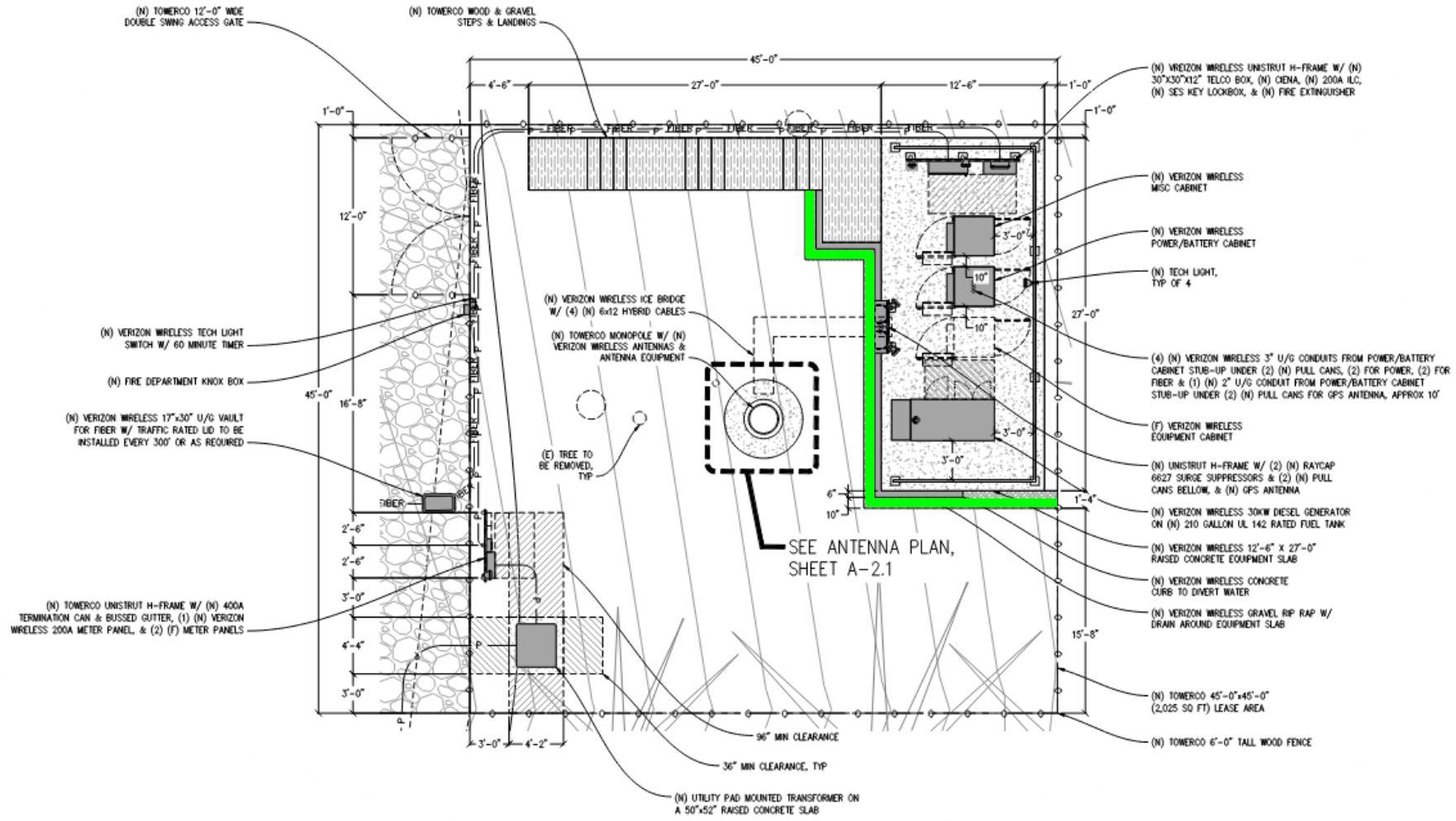
Predicted project-generated exterior noise levels ranging from 30 dB CNEL to 51 dB CNEL at the exterior areas of nearby residences (shown in Table 2) are below the County- and EPA-established CNEL thresholds for residential uses. Further, as discussed above, project equipment noise levels are expected to be well below the General Plan- and EPA-established 45 dB CNEL interior threshold within nearby on- and off-site residences.

Assessment Relative to County Maximum (L_{max}) Criteria

Section 314-91.2.5.9.2 of the Humboldt County Code states that noise from routine operations including back-up generators associated with wireless telecommunications facilities shall not exceed 50 dB in residential zones. For this analysis, the County Code “shall not exceed” language has been reasonably interpreted as a maximum (L_{max}) exterior noise level limit. Additionally, General Plan Policy N-S4 requires that noise studies shall provide project noise in terms of both Community Noise Equivalent Level (CNEL) and maximum noise level (L_{max}) at property lines and (if feasible) receptor locations. However, while the General Plan establishes acceptable CNEL exposure for residential uses (60 dB CNEL), it does not contain an acceptable maximum (L_{max}) noise level limit for residential uses. As a result, this analysis presents project equipment noise level exposure relative to the County Code 50 dB L_{max} at nearby residential uses.

As indicated in Table 3, predicted combined project equipment noise levels ranging from 32 dB L_{max} to 49 dB L_{max} at nearby residential property lines and off-site noise-sensitive receptors (residences, receivers 1-4) would satisfy the County Code 50 dB L_{max} exterior noise level standard applicable to residential zones. However, the predicted combined project equipment noise level of 52 dB L_{max} at the noise-sensitive receptor located on the project parcel (receiver 5) would exceed the County Code 50 dB L_{max} exterior noise level limit (Table 3). While it is likely that the receptor on the project parcel (receiver 5) currently experiences existing ambient maximum noise levels greater than 50 dB L_{max}, should County planning staff determine that the County Code 50 dB L_{max} noise level standard is to be enforced at the residence constructed on the project parcel, consideration of noise reduction measures would be warranted for compliance.

To comply with the County Code 50 dB L_{max} noise level limit at the residence constructed on the project parcel (receiver 5), the effectiveness of the screening provided by a localized noise barrier around the noise-generating facility equipment was evaluated. Barrier insertion loss calculation worksheets are provided as Appendix E. The evaluation concluded that an 8-foot tall wood (or composite wood) fence constructed at the location shown in Figure 4 is calculated to reduce combined project equipment noise level exposure to approximately 47 dB L_{max} at the residence constructed on the project parcel (receiver 5), which would satisfy the County Code 50 dB L_{max} noise level standard. The wood (or composite wood) fence would perform as an effective noise barrier *provided* the slats overlap by a minimum of 2 inches and are screwed into the framing. The purpose of overlapping slats and using screws rather than nails is to ensure that prolonged exposure to the elements does not result in visible gaps through the slats which would result in reduced noise barrier effectiveness.



Legend

8-Foot-Tall Noise Barrier (Wood Fence w/Overlapping Slat Construction)

N

Scale (Feet)

0 10 20

Freshwater Verizon Cellular Facility

Humboldt County, California

8-Foot-Tall Noise Barrier

Figure 4

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Conclusions

Based on the equipment noise level data and analyses presented in this report, project-related equipment noise exposure is expected to satisfy applicable Humboldt County General Plan and County Code noise level criteria at adjacent residential property lines and noise-sensitive receptors constructed on those parcels (i.e., residences). However, project equipment noise level exposure is predicted to exceed the County Code noise level limit at the noise-sensitive receptor located on the project parcel. Should County planning staff determine that the County Code noise level limit is to be enforced at the residence constructed on the project parcel, the following equipment noise reduction measure would be required for the project:

1. To comply with the County Code 50 dB L_{max} noise level limit at the residence constructed on the project parcel, the project design should include the construction of an 8-foot-tall noise barrier at the location illustrated in Figure 4. Specifically, the project design shall include an 8-foot-tall wood (or composite wood) fence at that location. To ensure an effective noise barrier, the fence slats shall overlap by a minimum of 2 inches and be screwed to the frame rather than nailed.

This concludes our environmental noise assessment for the proposed Freshwater Verizon Cellular Facility in Humboldt County, California. Please contact BAC at (530) 537-2328 or dariog@bacnoise.com with any questions or requests for additional information.

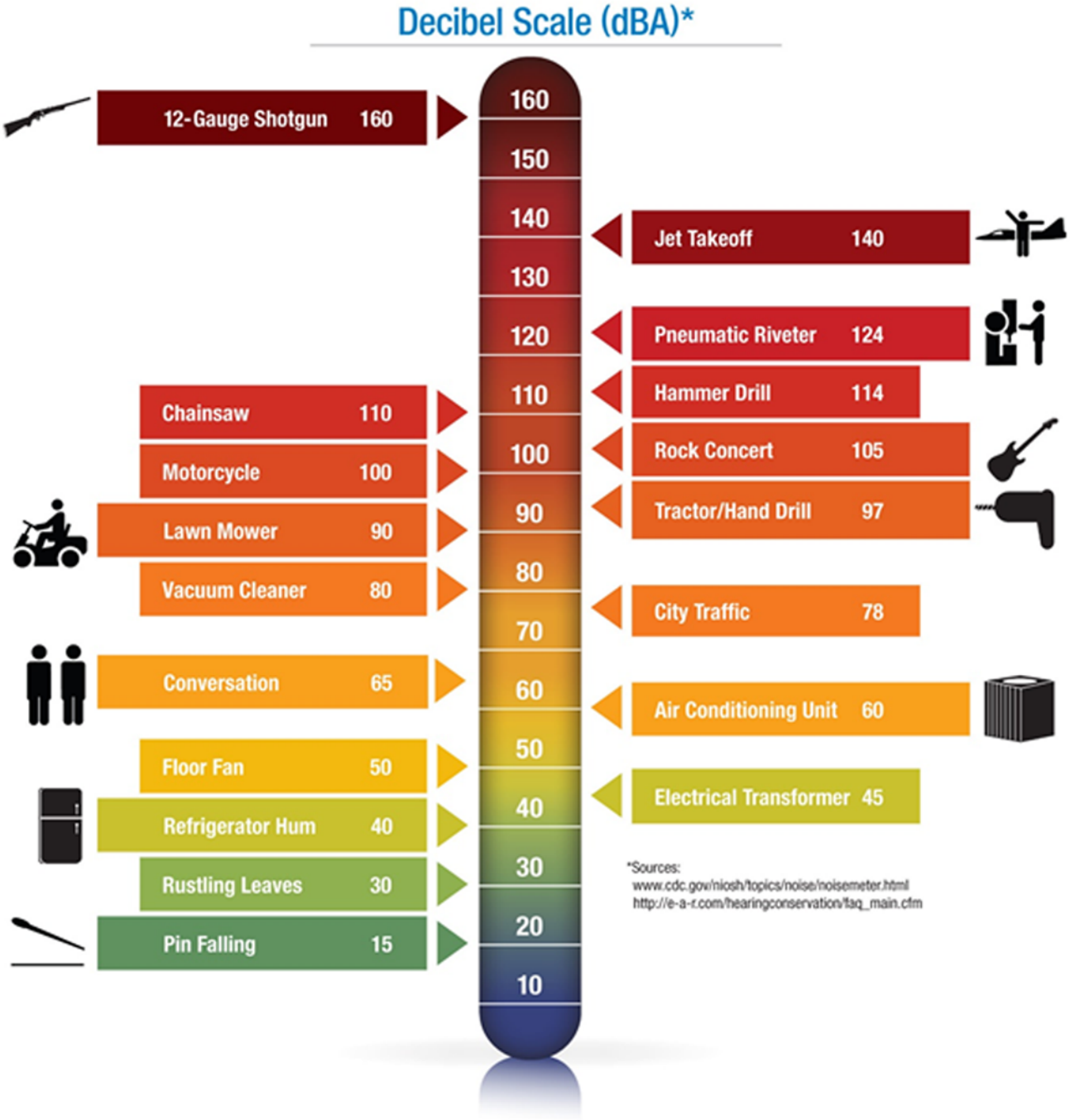
Appendix A

Acoustical Terminology

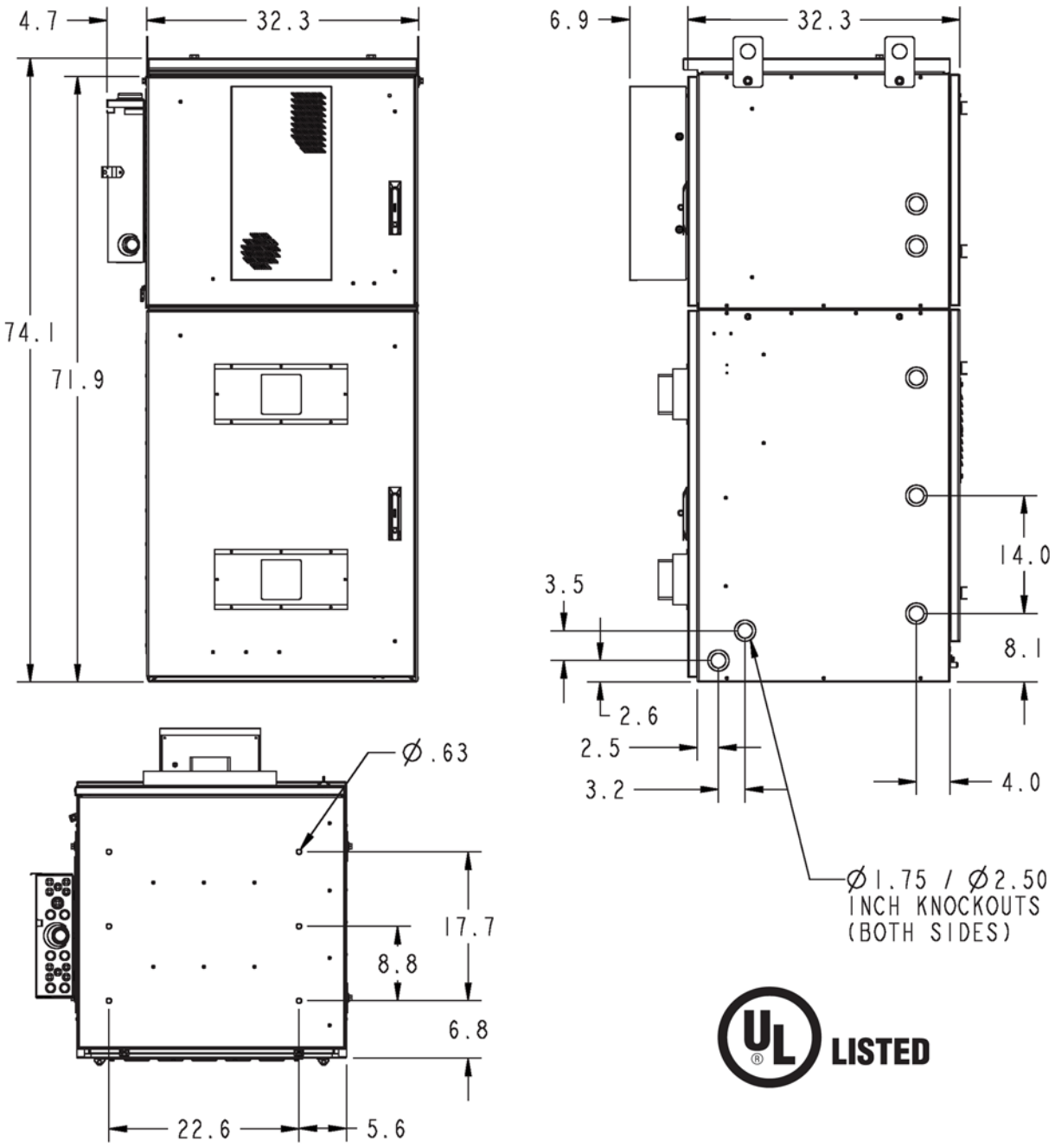
Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.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

Typical A-Weighted Sound Levels of Common Noise Sources



Appendix C-1



UL LISTED

WEIGHT WITH BATTERIES:
2296 LBS.
NorthStar NSB-170FT batteries at 128 lbs each, Qty 12

WEIGHT WITHOUT BATTERIES:
760 LBS.

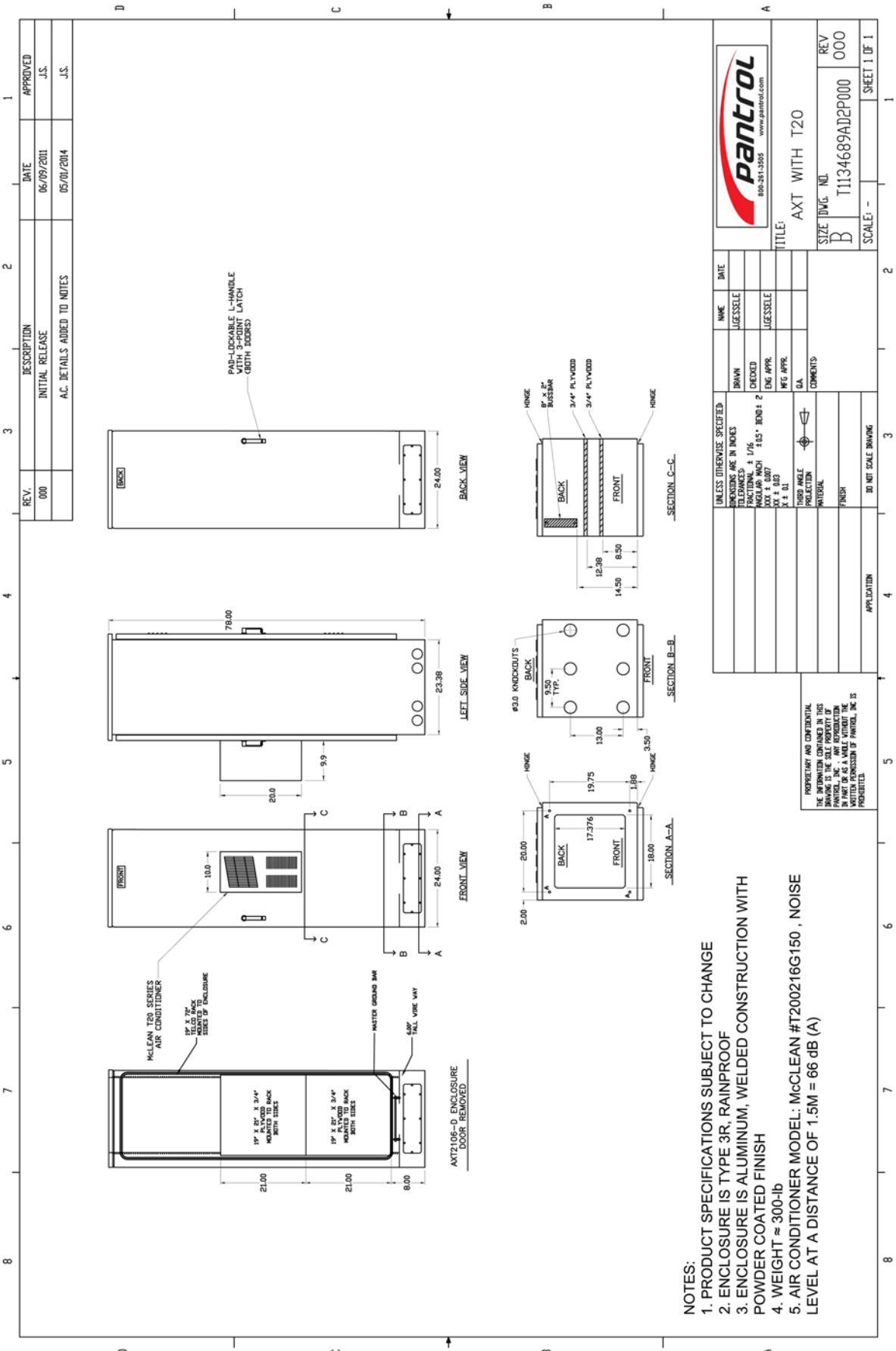
MAX NOISE LEVEL:
55-60dB

CHARLES PART #
CUBE-SS4C215XC1

Charles Industries Ltd.
Telecommunications Group
Charles Center, 5600 Apollo Drive
Rolling Meadows, IL 60008
Telephone: 847-806-6300

Verizon Wireless
Large Site Support Enclosure

Appendix C-2


REV.
DESCRIPTION
DATE
APPROVED
000
INITIAL RELEASE
06/09/2011
J.S.
A.C. DETAILS ADDED TO NOTES
05/01/2014
J.S.
PAD-LOCKABLE L-HANDLE WITH 3-POINT LATCH (BOTH DOORS)
BACK
24.00
BACK VIEW
78.00
23.38
20.0
9.9
LEFT SIDE VIEW
FRONT
10.0
24.00
FRONT VIEW
McLEAN T20 SERIES AIR CONDITIONER
19" X 72" TELCO RACK MOUNTED TO SIDES OF ENCLOSURE
MASTER GROUND BAR
6.69" TALL VIRE WAY
19" X 21" X 3/4" PLYWOOD MOUNTED TO RACK BOTH SIDES
19" X 21" X 3/4" PLYWOOD MOUNTED TO RACK BOTH SIDES
21.00
21.00
8.00
AXT2106-D ENCLOSURE DOOR REMOVED
HINGE
8" X 2" BUSSBAR
3/4" PLYWOOD
3/4" PLYWOOD
HINGE
BACK
FRONT
12.38
8.50
14.50
SECTION C-C
Ø3.0 KNOCKOUTS
BACK
9.50 TYP.
FRONT
13.00
SECTION B-B
HINGE
19.75
1.88
3.50
HINGE
20.00
BACK
17.376
FRONT
18.00
2.00
SECTION A-A
NOTES:
1. PRODUCT SPECIFICATIONS SUBJECT TO CHANGE
2. ENCLOSURE IS TYPE 3R, RAINPROOF
3. ENCLOSURE IS ALUMINUM, WELDED CONSTRUCTION WITH POWDER COATED FINISH
4. WEIGHT ≈ 300-lb
5. AIR CONDITIONER MODEL: McCLEAN #T200216G150 , NOISE LEVEL AT A DISTANCE OF 1.5M = 66 dB (A)
PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF PANTROL INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF PANTROL INC IS PROHIBITED.
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/16
ANGULAR: MACH ±.05° BEND ± 2°
XXX ± 0.007
XX ± 0.03
X ± .01
THIRD ANGLE PROJECTION
MATERIAL
FINISH
APPLICATION
DO NOT SCALE DRAWING
NAME
DATE
DRAWN
LGESSELE
CHECKED
ENG APPR.
LGESSELE
MFG APPR.
Q.A.
COMMENTS:
TITLE:
AXT WITH T20
SIZE
B
DWG. NO.
T1134689AD2P000
REV
000
SCALE: -
SHEET 1 OF 1
pantrol
800-361-3505
www.pantrol.com

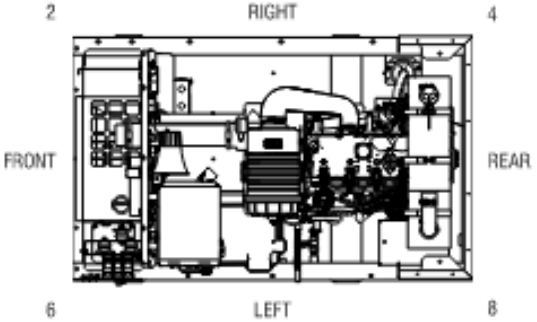
Appendix D
Generator Sound Level Data

GENERAC | INDUSTRIAL POWER

LEVEL 2 SOUND ATTENUATED ENCLOSURE
D2.2, Generac SDC030

	NO-LOAD, dB(A)								DISTANCE: 7 METERS	
	OCTAVE BAND CENTER FREQUENCY (Hz)									
	31.5	63	125	250	500	1,000	2,000	4,000	8,000	dB(A)
FRONT	25	47	52	51	53	49	44	43	35	**56**
2	25	48	52	50	50	52	49	46	40	**56**
RIGHT	26	47	50	52	55	53	50	48	43	**58**
4	28	49	50	51	53	53	48	45	40	**57**
REAR	25	51	51	54	54	48	46	40	34	**57**
6	25	51	50	54	59	53	52	49	45	**61**
LEFT	23	52	50	54	59	53	56	52	45	**62**
8	23	53	53	53	58	53	49	47	41	**61**
AVERAGE	**25**	**50**	**51**	**52**	**55**	**52**	**49**	**46**	**40**	**59**

	FULL-LOAD, dB(A)								DISTANCE: 7 METERS	
	OCTAVE BAND CENTER FREQUENCY (Hz)									
	31.5	63	125	250	500	1,000	2,000	4,000	8,000	dB(A)
FRONT	25	54	57	53	57	58	57	54	49	**63**
2	26	57	56	51	59	63	60	56	50	**64**
RIGHT	29	53	53	52	58	62	59	55	50	**65**
4	26	54	57	52	57	61	59	55	52	**65**
REAR	26	56	60	53	58	58	58	53	51	**65**
6	27	55	61	57	61	59	60	57	53	**67**
LEFT	23	56	56	57	62	60	62	59	52	**68**
8	20	56	55	55	61	60	59	56	52	**66**
AVERAGE	**25**	**55**	**57**	**54**	**59**	**60**	**59**	**56**	**51**	**65**



- All positions at 23 feet (7 meters) from side faces of generator set.
- Test conducted on a 100 foot diameter asphalt surface.
- Sound pressure levels are subject to instrumentation, installation and testing conditions.
- Sound levels are ±2 dB(A).
- Sound levels are corrected for 1 atm and 23C (73F) ambient temperature using ISO 3744.

Generac Power Systems, Inc. | P.O. Box 8 | Waukesha, WI 53187
P: (262) 544-4811

Part No. A0002713760
Rev. B 3/9/2023

Appendix E-1
Barrier Insertion Loss Calculation Worksheet

Project Information:

BAC Job Number: 2024-138
Project Name: Freshwater Verizon CF
Location: Humboldt County, CA

Noise Level Data:

Source Description: Equipment Cabinets
Source Noise Level (dBA): 40
Source Frequency (Hz): 500
Source Height (ft): 462

Site Geometry:

Receiver Description: Receiver 5 - Project Parcel Residence
Source to Barrier Distance, ft (C_1): 5
Barrier to Receiver Distance, ft (C_2): 105

Ground Elevation at Receiver (ft): 470
Receiver Elevation (ft): 475
Base of Barrier Elevation (ft): 455
Starting Barrier Height (ft): 8

Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height (ft)	Insertion Loss (dB)	Noise Level (dB)	Barrier Breaks Line of Site to Source?
463	8	-5	35	Yes
464	9	-7	33	Yes
465	10	-8	32	Yes
466	11	-10	30	Yes
467	12	-11	29	Yes
468	13	-12	28	Yes
469	14	-13	27	Yes
470	15	-14	26	Yes
471	16	-15	25	Yes
472	17	-15	25	Yes
473	18	-15	25	Yes

Notes: 1. Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s).

Appendix E-2
Barrier Insertion Loss Calculation Worksheet

Project Information:

BAC Job Number: 2024-138
Project Name: Freshwater Verizon CF
Location: Humboldt County, CA

Noise Level Data:

Source Description: Generator
Source Noise Level (dBA): 52
Source Frequency (Hz): 500
Source Height (ft): 463

Site Geometry:

Receiver Description: Receiver 5 - Project Parcel Residence
Source to Barrier Distance, ft (C_1): 1
Barrier to Receiver Distance, ft (C_2): 99

Ground Elevation at Receiver (ft): 470
Receiver Elevation (ft): 475
Base of Barrier Elevation (ft): 455
Starting Barrier Height (ft): 8

Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height (ft)	Insertion Loss (dB)	Noise Level (dB)	Barrier Breaks Line of Site to Source?
463	8	-5	47	Yes
464	9	-9	44	Yes
465	10	-11	42	Yes
466	11	-12	40	Yes
467	12	-13	39	Yes
468	13	-14	38	Yes
469	14	-15	37	Yes
470	15	-15	37	Yes
471	16	-16	36	Yes
472	17	-16	36	Yes
473	18	-16	36	Yes

Notes: 1. Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s).