

Environmental Noise Analysis

Montgomery HS Cellular Facility

City of Santa Rosa, California

BAC Job # 2017-038


Prepared For:

Complete Wireless Consulting

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City of Santa Rosa

JAN 16 2018

Planning & Economic
Development Department

Introduction

The Montgomery HS Verizon Wireless Unmanned Telecommunications Facility Project (project) proposes the installation of a wireless facility that would include antennas mounted within a proposed church tower, and a separate ground level lease area containing outdoor equipment cabinets. The project site is located at 1620 Sonoma Avenue in Santa Rosa, California. The outdoor equipment cabinets have been identified as the primary noise sources associated with the project. Please see Figure 1 for the overall project site plan. The studied site design is dated February 2, 2017.

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 addresses daily noise production and exposure associated with operation of the 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

Santa Rosa City Code

Section 17-16.030 Ambient base noise level criteria

Santa Rosa City Code (Section 17-16.030) provides ambient base exterior noise level criteria that vary depending on the zoning of the receiving land use and the time of day. The criteria are used as a base from which noise levels can be compared. For residential land uses, the section states that the base ambient noise level is considered to be 45 dBA during nighttime hours (10 p.m. to 7 a.m.), 50 dBA during evening hours (7 p.m. to 10 p.m.), and 55 dBA during daytime hours (7 a.m. to 7 p.m.). The base ambient noise levels for the various land uses are summarized in Table 1.

Section 17-16.120 Machinery and equipment

Santa Rosa City Code (Section 17-16.120), which applies to machinery and equipment, states that: "It is unlawful for any person to operate any machinery, equipment, pump, fan, air-conditioning apparatus or similar mechanical device in any manner so as to create any noise which would cause the noise level at the property line of any property to exceed the ambient base noise level by more than five decibels."

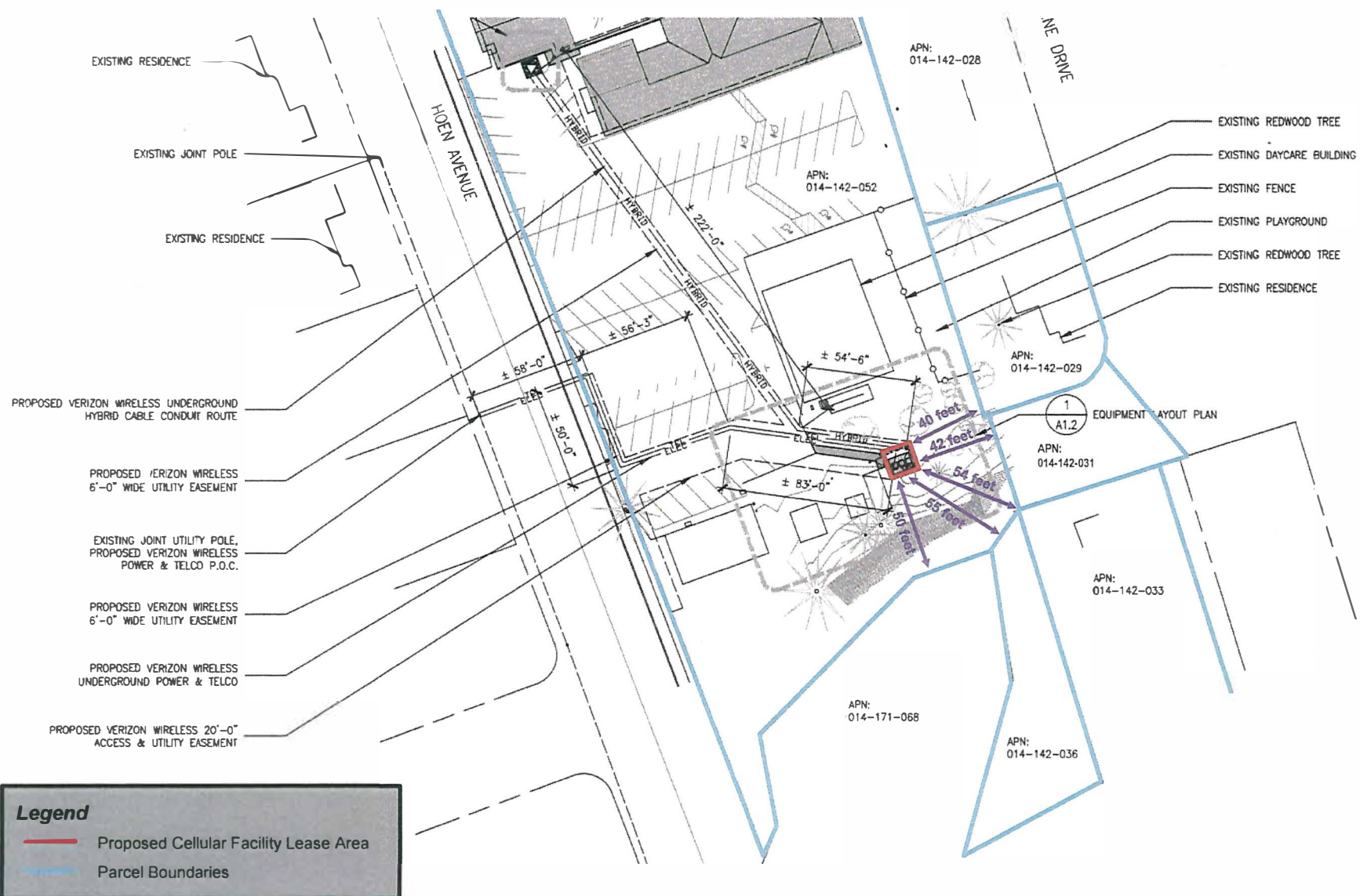


Figure 1
 Proposed Project Site Plan
 Montgomery HS Cellular Facility
 Santa Rosa, California

Table 1 Ambient Base Noise Level Criteria Receiving Land Uses		
Zone	Time	Sound Level A (dB) Community Environment Classification
R1 & R2	10 p.m. to 7 a.m.	45
R1 & R2	7 p.m. to 10 p.m.	50
R1 & R2	7 a.m. to 7 p.m.	55
Multi-Family	10 p.m. to 7 a.m.	50
Multi-Family	7 a.m. to 10 p.m.	55
Office & Commercial	10 p.m. to 7 a.m.	55
Office & Commercial	7 a.m. to 10 p.m.	60
Intensive Commercial	10 p.m. to 7 a.m.	55
Intensive Commercial	7 a.m. to 10 p.m.	65
Industrial	Anytime	70
Source: Santa Rosa City Code (Section 17-16.030)		

Noise Criteria Applicable to the Project

Because the project proposes noise-generating mechanical equipment, Section 17-16.120 would be applicable to this project. Section 17-16.120 states that noise generated from machinery not exceed the ambient base noise level by more than *five decibels* at the property line of the receiving land use. The ambient base noise level depends on the zoning of the receiving land use. The parcels adjacent to the project site, identified on Figure 1, are all zoned Residential (R-1).

Because the mechanical equipment could operate during nighttime hours, the nighttime (10 p.m. to 7 a.m.) ambient base noise level was assumed for the adjacent residential parcels. After application of the five decibel increase, the noise standard applied to the project is 50 dB for residential uses. The noise level standard was applied at the property line.

Project Noise Generation

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

Table 2 Reference Noise Level Data of Proposed Equipment Cabinets			
Equipment	Number of Cabinets	Reference Noise Level, dB	Reference Distance, feet
Charles Industries 48V Power Plant	2	60	5
McLean T-20	1	66	5
Notes: Manufacturer specification sheets provided as Appendix C.			

Predicted Facility Noise Levels at Nearest Residential Property Lines

As indicated on Figure 1, the proposed project equipment lease area maintains a separation of 40-55 feet from the nearest property lines. However, the distances from the project equipment to the nearest property lines vary from the distances to the overall lease area. The distances from the project equipment to the various property lines were scaled from the provided project site plans and are provided below in Table 3. Assuming standard spherical spreading loss (-6 dB per doubling of distance), project-equipment noise exposure at the nearest property lines was calculated and the results of those calculations are presented in Table 3.

Table 3 Project-Related Noise Exposure at Nearest Residential Property Lines Montgomery HS Verizon Wireless Telecommunications Facility Project		
APN¹	Distance from Cabinets (feet)²	Predicted Outdoor Cabinet Noise Levels (dB)³
014-142-029	47	48
014-142-031	49	48
014-142-033	63	46
014-142-036	64	46
014-171-068	56	47
Notes:		
¹ Parcel boundaries are shown on Figure 1.		
² Distances from the project equipment to the nearest property lines were scaled from the provided site plans.		
³ The three equipment cabinets were conservatively assumed to be in operation concurrently.		

As indicated in Table 3, the predicted outdoor equipment cabinet noise levels of 46-48 dB at the nearest residential property lines would satisfy the City of Santa Rosa's noise level standard of 50 dB. As a result, no additional noise mitigation measures would be warranted for the project.

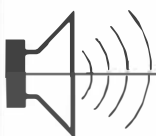
Conclusions

Based on the equipment noise level data and analyses presented above, project-related equipment noise exposure is expected to satisfy the applicable City of Santa Rosa noise exposure limits at the nearest property lines. As a result, no additional noise mitigation measures would be warranted for this project.

This concludes our environmental noise assessment for the proposed Montgomery HS Cellular Facility in Santa Rosa, California. Please contact BAC at (916) 663-0500 or paulb@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.
L_{dn}	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
L_{eq}	Equivalent or energy-averaged sound level.
L_{max}	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.
RT₆₀	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.

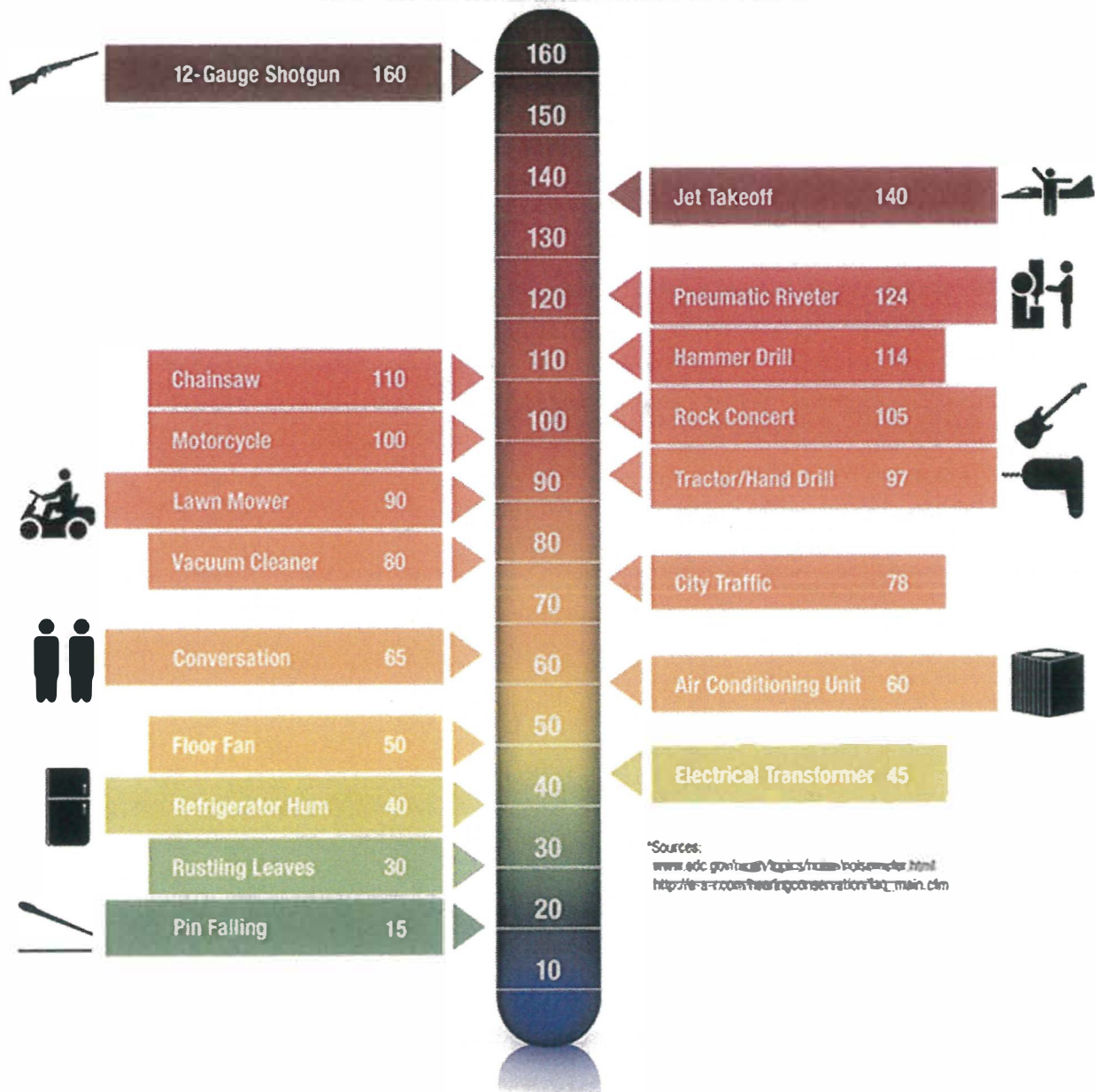


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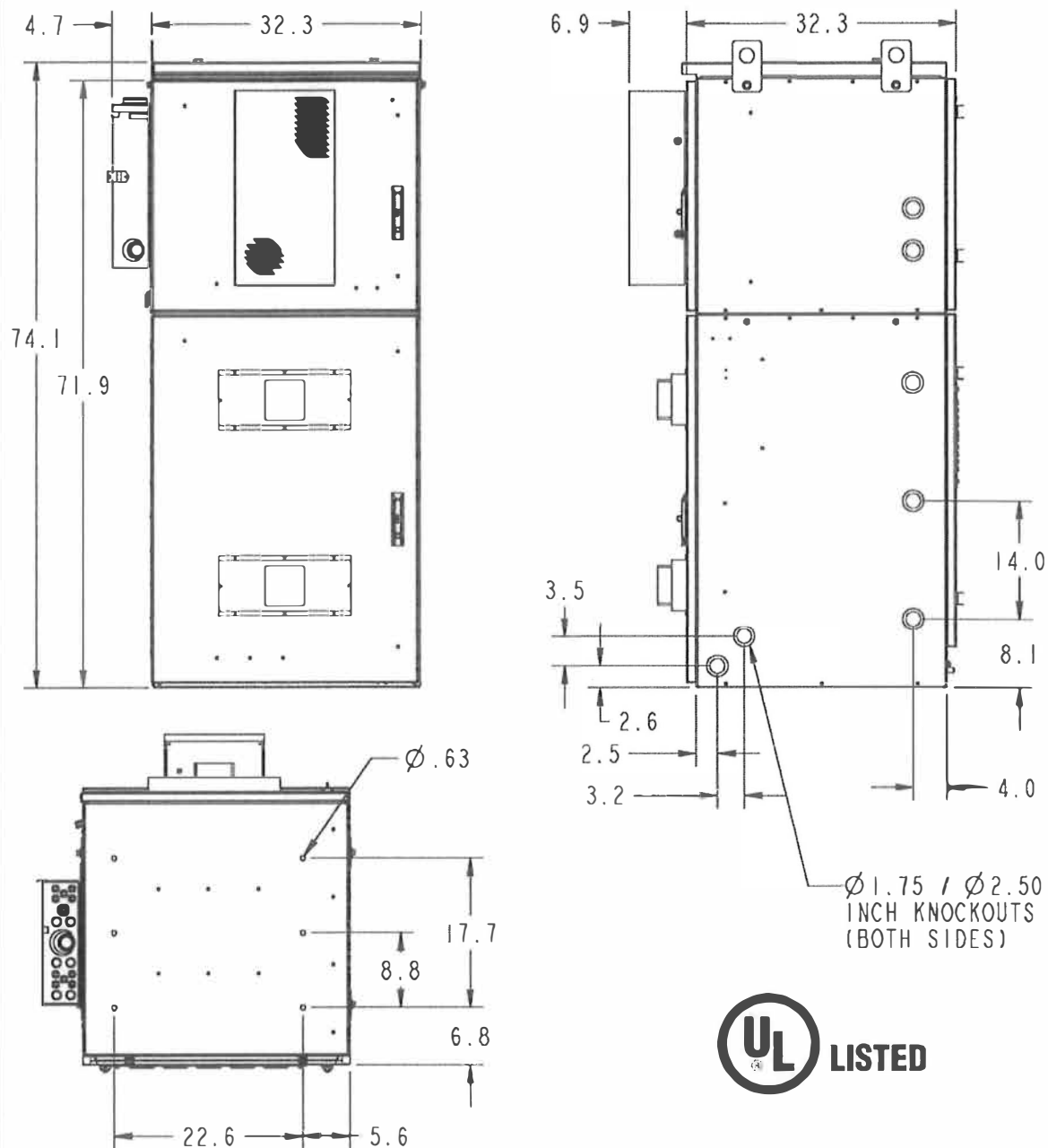
Acoustical Consultants

Appendix B

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



Appendix C-1



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

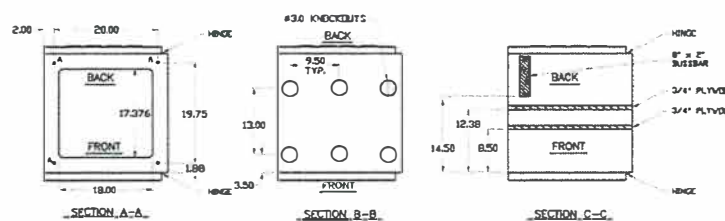
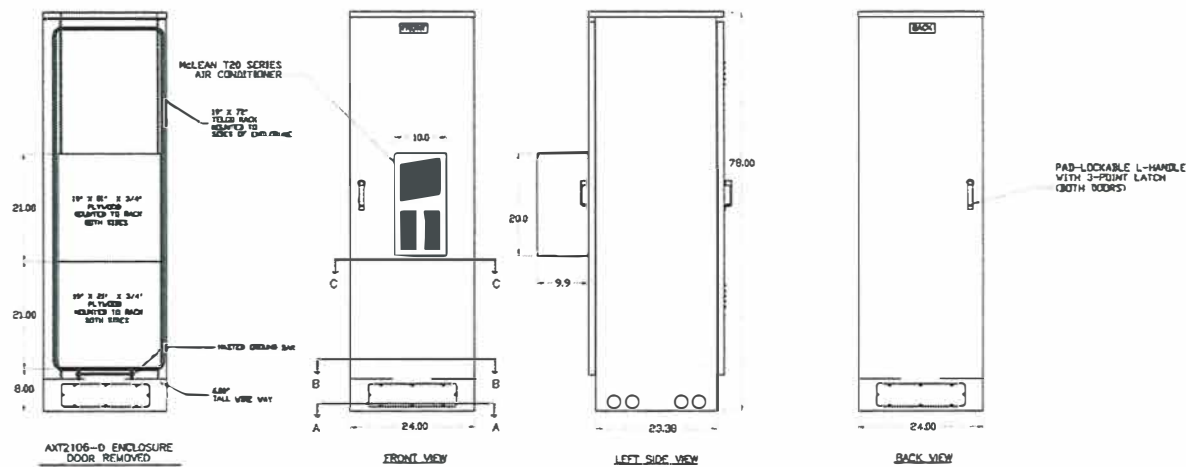


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Verizon Wireless
Large Site Support Enclosure

REV.	DESCRIPTION	DATE	APPROVED
000	INITIAL RELEASE	06/09/2011	J.S.
	A.C. DETAILS ADDED TO NOTES	05/01/2014	J.S.



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 \approx 300-lb
5. AIR CONDITIONER MODEL: McCLEAN #T200216G150, NOISE LEVEL AT A DISTANCE OF 1.5M = 66 dB (A)

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TOLERANCES		CHECKED	
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DECIMALS: 0.001"		MFG APPR	
ANGLES: 1/2°		QA	
HIDDEN ANGLES		COMMENTS	
FINISH			
APPLICATION			
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TITLE:		AXT WITH T20	
SIZE	DWG. NO.	REV	
B	T1134689AD2P000	000	
SCALE: -		SHEET 1 OF 1	