BOLLARD ACOUSTICAL CONSULTANTS, INC.
Acoustics ▸ Vibration ▸ Noise Control Engineering

June 11, 2018

Complete Wireless Consulting, Inc.
Janet Carmickle
2009 V Street
Sacramento, CA 95818

Subject: Revised Noise Analysis for the Highway 680 Cygnus Cellular Facility located in Fairfield (Solano County), California

The Highway 680 Cygnus Verizon Wireless Unmanned Telecommunications Facility Project (project) proposes the construction of a monopole tower, and the installation of outdoor equipment cabinets inside a fenced area located on Goodyear Road (APN: 0046-110-280) in Fairfield (Solano County), California.

A noise study for this project was previously completed by Bollard Acoustical Consultants, Inc. (BAC) on June 21, 2016. The contents of the noise study included an analysis of outdoor equipment cabinet noise levels relative to the Solano County General Plan and County Code noise criteria. This noise study, which was based on project site plans dated May 13, 2016, concluded that project-related equipment noise exposure would satisfy the applicable Solano County General Plan and Municipal Code noise criteria at the nearest noise-sensitive uses.

On May 30, 2018, Bollard Acoustical Consultants, Inc. was contracted by Complete Wireless Consulting, Inc. to complete a revision to the previous noise study (dated June 21, 2016) based on the revised project site plans (dated April 5, 2018). However, because there are no identified changes to the location or configuration of the proposed noise-generating equipment in the revised site plans, it has been determined that a revised noise study is not warranted. Specifically, the results and conclusions identified in the previous noise study (dated June 21, 2016) are still valid, and a revised noise study based on the project site plans dated April 5, 2018 is not warranted for this project.

Please contact me at (916) 663-0500 or dariog@bacnoise.com if you have any questions or require additional information.

Sincerely,

Bollard Acoustical Consultants, Inc.

Dario Gotchet
Consultant

Environmental Noise Analysis

Hwy 680 Cygnus Cellular Facility

Solano County, California

BAC Job # 2015-237

Prepared For:

Complete Wireless Consulting

Attn: Ms. Kim Le
2009 V Street
Sacramento, CA 95818

Prepared By:

Bollard Acoustical Consultants, Inc.

Paul Bollard, President

June 21, 2016

BOLLARD
Acoustical Consultants

3551 Bankhead Road • Loomis, CA 95650 • Phone: (916) 663-0500 • Fax: (916) 663-0501 • BACNOISE.COM

Introduction

The Hwy 680 Cygnus Verizon Wireless Unmanned Telecommunications Facility Project (project) proposes the construction of a monopole tower, and the installation of outdoor equipment cabinets inside a fenced area located on Goodyear Road (APN: 0046-110-280) in Fairfield, California (Solano County). The outdoor equipment cabinets have been identified as the primary noise sources associated with the project. Please see Figure 1 for the general site location. The studied site design is dated May 13, 2016.

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 project 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

Solano County General Plan Public Health & Safety Element

The Solano County General Plan Public Health & Safety Chapter contains a noise section that establishes acceptable noise level limits for non-transportation (stationary) noise sources, such as those proposed by the project. The County's non-transportation noise level standards applied to residential land uses are provided below in Table 1. The General Plan requires that the noise level standards set forth below in Table 1 be applied at the common outdoor activity areas (e.g., backyards) of the residential land uses.

Table 1
Noise Level Standards for Non-Transportation Noise Sources – Residential Land Uses
Solano County Noise Element of the General Plan

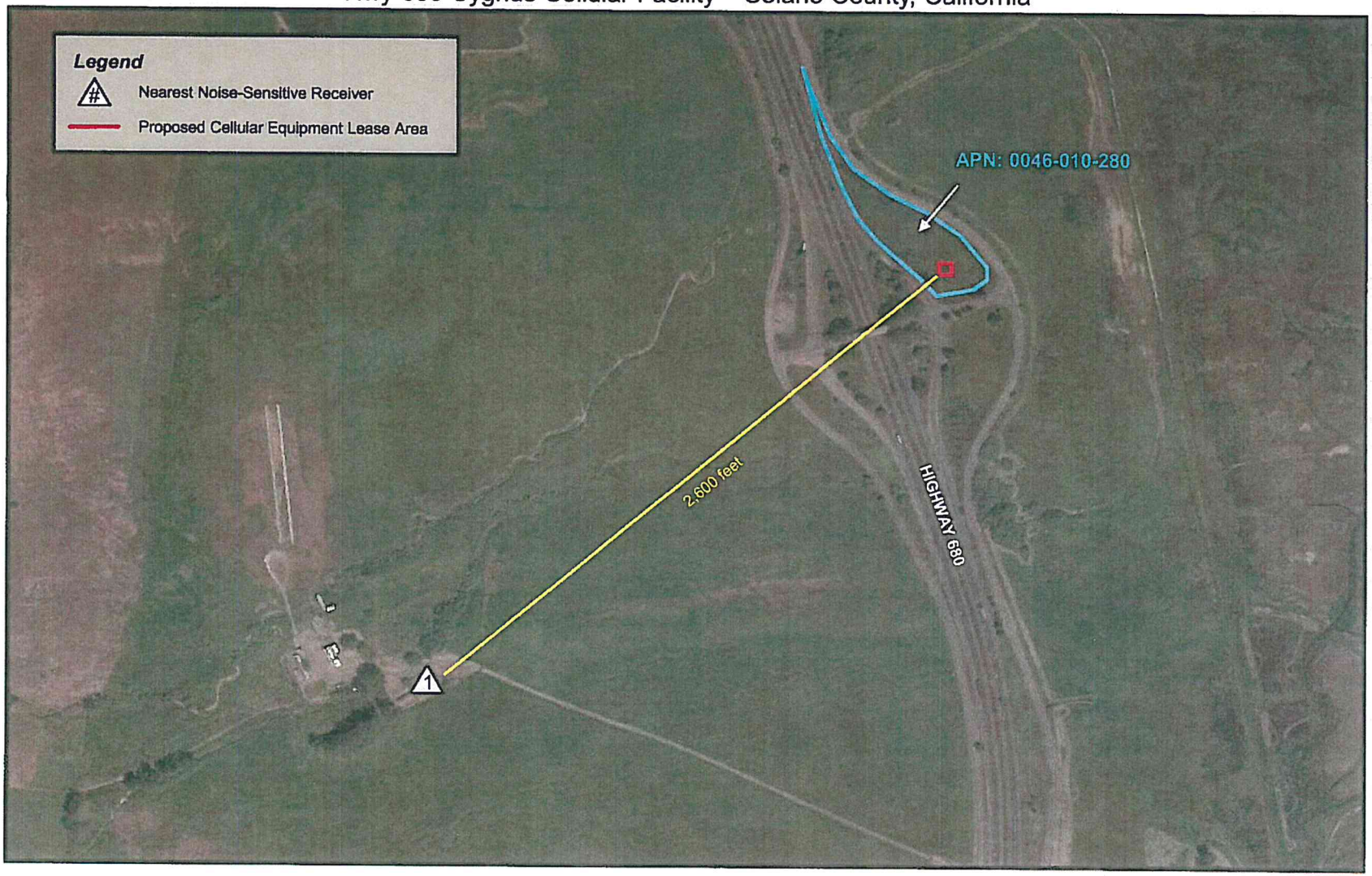
Noise Level Descriptor	Daytime 7 a.m. to 10 p.m.	Nighttime 10 p.m. to 7 a.m.
Hourly L_{eq}, dB	55	50
Maximum Level (L_{max}), dB	70	65

Source: Solano County General Plan, Public Health & Safety Element

Solano County Code

Section 28.70.10(B)(1)(b) of the Solano County Code, which pertains to general development standards applicable to all uses in every zoning district, requires that all uses of land shall not generate noise that exceeds 65 dBA L_{dn} at any property line.

Figure 1
Proposed Cellular Equipment Lease Area & Distance to Nearest Noise-Sensitive Receiver
Hwy 680 Cygnus Cellular Facility – Solano County, California



Section 28.81(D)(10) of the Solano County Code, which pertains to noise generation of wireless communications facilities, reads as follows:

> *All wireless communication facilities shall be designed to minimize noise. If a facility is located in or within 100 feet of a residential district, noise attenuation measures shall be included to reduce noise levels to a maximum exterior noise level of 50 L_{dn} at the facility site's property lines.*

Noise Standards Applied to the Project

The Solano County General Plan non-transportation (stationary) noise level standards seen in Table 1 were applied to the project. In addition to the general plan noise level standards, the Solano County Code, Section 28.70.10(B)(1)(b), property line noise level standard of 65 dB L_{dn} was applied at the nearest property line. Compliance with the 65 dB L_{dn} noise level standard at the nearest property line would ensure compliance at all other property lines.

The proposed facility is located within and adjacent to agriculturally zoned land (A 20 Exclusive Agriculture). The nearest residential district is located over a mile away to the northwest. Because the facility is located well in excess of 100 feet from the nearest residential district, Section 28.81(D)(10) of Solano County Code was not applied to the project.

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: one Ericsson eNB RBS6101, one Charles Industries 48V Power Plant 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
Ericsson eNB RBS6101	1	53	5
Charles Industries 48V Power Plant	1	60	5
McLean T-20	1	66	5

Notes: Manufacturer specification sheets provided as Appendix C.

Predicted Facility Noise Levels at Nearby Sensitive Receptor

Assessment Relative to Solano County General Plan:

The project parcel and the adjacent parcels are zoned agricultural (A 20 Exclusive Agriculture) which are not typically considered sensitive to noise. The proposed cellular facility maintains a separation of approximately 2,600 feet from the outdoor activity area of the nearest noise-sensitive receptor, identified as receiver 1 (APN:0180-130-010) on Figure 1. Assuming standard spherical spreading

loss (-6 dB per doubling of distance), project-equipment noise exposure at the closest receiver was calculated and the results of those calculations are presented below in Table 3.

Table 3
Summary of Project-Related Noise Exposure at Nearest Noise-Sensitive Receptor
Hwy 680 Cygnus Verizon Wireless Telecommunications Facility Project

Nearest Noise Sensitive Receptor[1]	Distance from Cellular Equipment (feet)[2]	Predicted Cabinet Noise Levels (L_{eq}, dBA)[3]
1	2,600	<20

Notes:
[1] Receptor location and distance are shown on Figure 1.
[2] Predicted equipment noise levels were applied at outdoor activity areas of nearest noise-sensitive receptors.
[3] The three equipment cabinets were conservatively assumed to be in operation concurrently.

Because the proposed equipment cabinets could potentially be in operation during nighttime hours, the operation of the cabinets would be subject to the County's nighttime noise level standard of 50 dB L_{eq}. As shown in Table 3, the predicted equipment cabinet noise levels of less than 20 dB L_{eq} at the outdoor activity areas of the nearest noise-sensitive receiver locations would satisfy the Solano County 50 dB L_{eq} nighttime noise level standard. As a result, no additional noise mitigation measures would be warranted for this aspect of the project.

Assessment Relative to Solano County Code:

The proposed project equipment maintains a separation of approximately 65 feet from the nearest property line to the west. To predict cellular facility noise emissions relative to the Solano County Code 65 dB L_{dn} noise standard at the nearest property line, the number of hours per day the equipment would be in operation must be known. For the purpose of this analysis, the equipment cabinets were conservatively assumed to be operating continuously for 24 hours.

Assuming standard spherical spreading loss (-6 dB per doubling of distance), the project-equipment noise exposure at the nearest property line was calculated to be 51 dB L_{dn}. 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 Solano County General Plan noise exposure limits applied at the outdoor activity areas of the nearest noise-sensitive land uses. In addition, project-related equipment noise exposure is expected to satisfy the Solano County Code noise exposure limits applied at the nearest property line. As a result, no additional noise mitigation measures would be warranted for this project.

This concludes our environmental noise assessment for the proposed Hwy 680 Cygnus Cellular Facility in Solano County, California. Please contact BAC at (916) 663-0500 or paulb@bacnoise.com with any questions or requests for additional information.

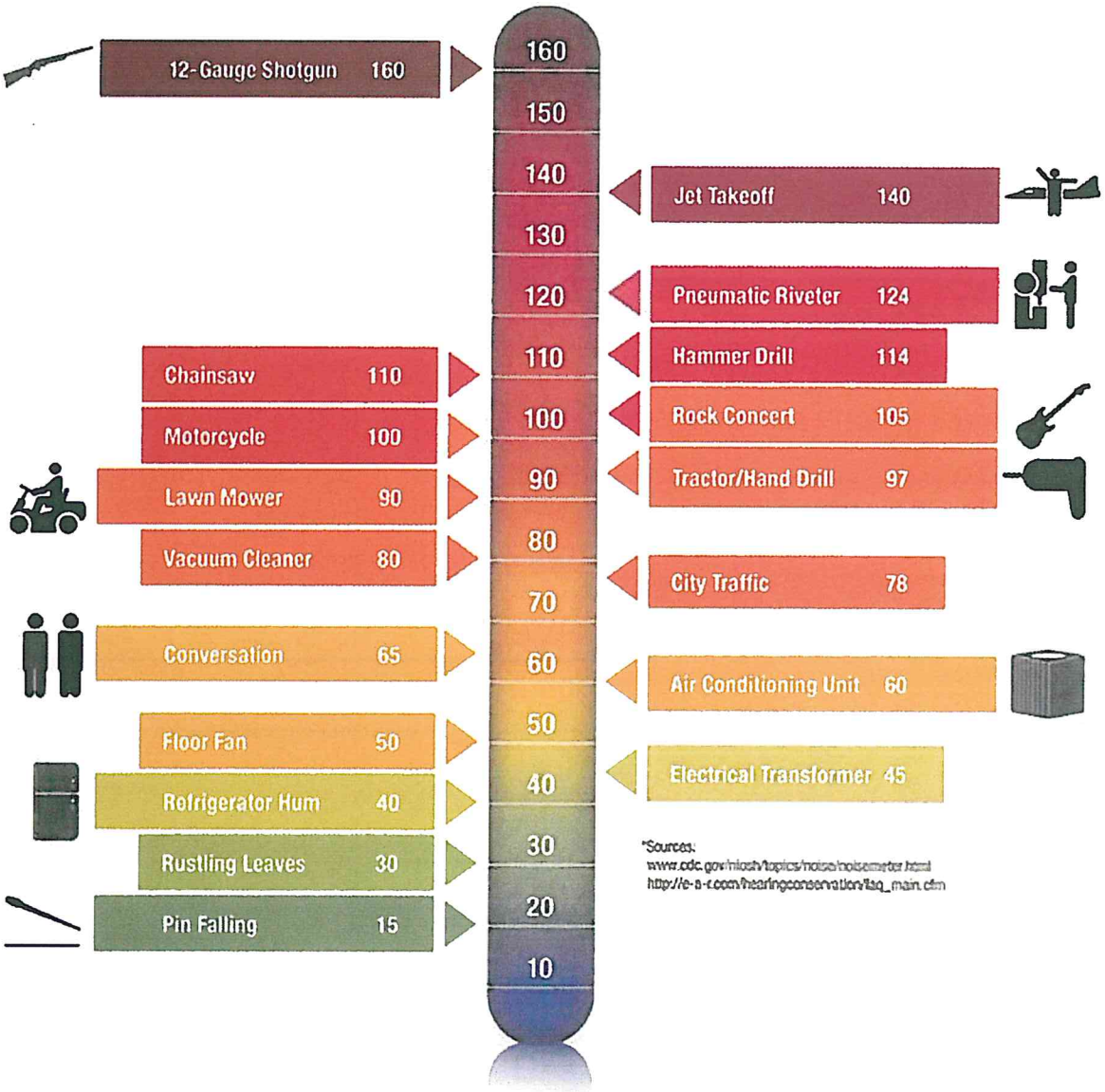
Appendix A

Acoustical Terminology

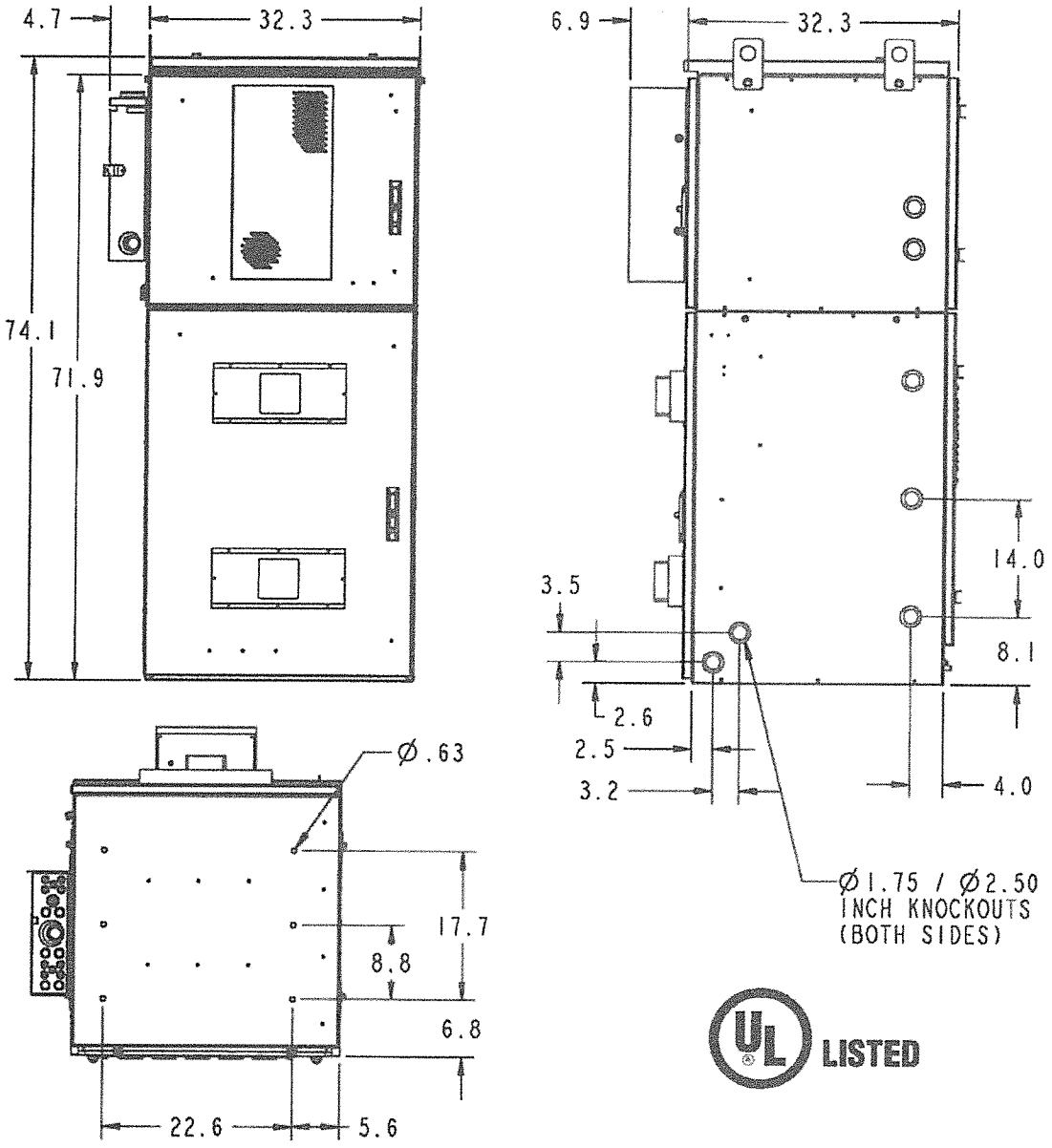
Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.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

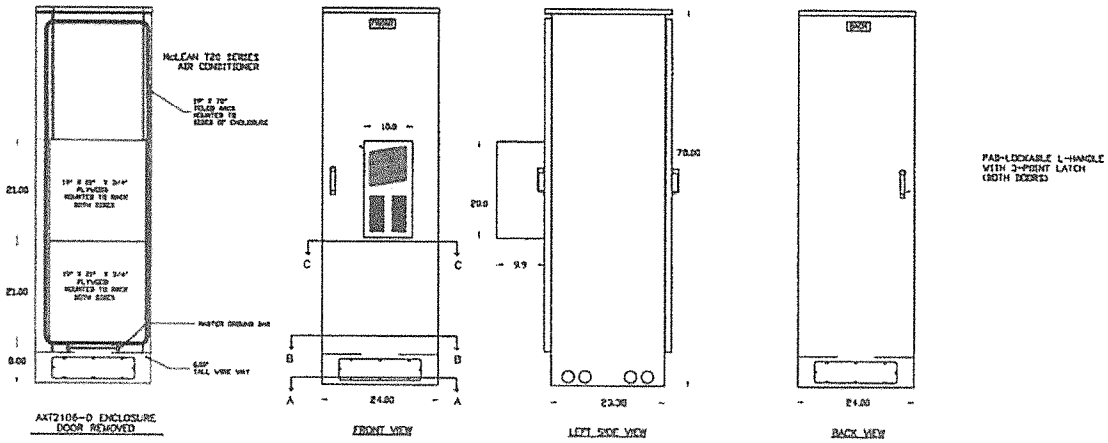
MAX NOISE LEVEL:
55-60dB

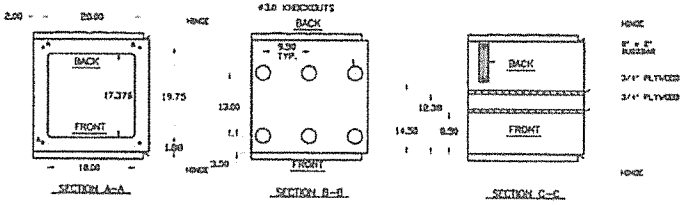
CHARLES PART #
CUBE-SS4C215XC1

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

Verizon Wireless
Large Site Support Enclosure

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

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/16
ANGULAR MACH ± 0.5° BEND ± 2°
TWO PLACE DECIMAL ± 0.03
THREE PLACE DECIMAL ± 0.01
THIRD ANGLE PROJECTION
MATERIAL
FINISH
APPLICATION
DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	J.GESSELE	
CHECKED		
ENG APPR.	J.GESSELE	
MFG APPR.		
Q.A.		
COMMENTS:		

pantrol
800-351-3343 www.pantrol.com

TITLE: AXT WITH T20

SIZE	DWG. NO.	REV
B	T1134689AD2P000	000

SCALE: - SHEET 1 OF 1