



Northeast Site Solutions
Denise Sabo
4 Angela's Way, Burlington CT 06013
203-435-3640
denise@northeastsitesolutions.com

December 3, 2021

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Exempt Modification Application
64 Hungerford Road, Harwinton CT, 06791
Latitude: 41.757264
Longitude: -73.052556
Site#: 876369_Crown_VZW

Dear Ms. Bachman:

Verizon Wireless is requesting to file an exempt modification for an existing tower located at 64 Hungerford Road, Harwinton CT, 06791. Verizon Wireless currently maintains twelve (12) antennas at the 170-foot level of the existing 178-foot tower. The property is owned by Red Wolf Broadcasting Corporation and the tower is owned by Crown Castle. Verizon now intends to add three (3) antenna. The new antennas would be installed at the 170-foot level of the tower. This modification includes B2, B5 hardware that is both 4G (LTE), and 5G capable. Antenna mount medications will be completed as per the attached Maser mount analysis dated May 21, 2021.

Verizon Planned Modifications:

Remove: NONE

Remove and Replace:

- (3) Antel-BXA-70063-6CF Antenna (REMOVE) - (3) Quintel QS6656-5D Antenna
- (3) Antel-BXA-171065-12BF-2 Antenna (REMOVE) - (3) Samsung MT6407-77A Antenna

Install New:

- (3) Quintel QS6656-5D Antenna
- (1) Raycap
- (3) Samsung B2/B66A -BRO49 – RFV01U-D1A RRU
- (3) Samsung B5/B13 -BRO4C – RFV01U-D2A RRU
- (1) 1-5/8" Hybrid

Existing to Remain:

- (6) LPA-80080-6CF-5 Antenna
- (6) Coax Lines



The facility was approved by the Town of Harwinton Building Official by way of permit on May 29, 2001. Please see attached. Verizon Wireless completed a Tower Share TS-VER-066-030918 on October 15, 2003. Please see attached.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-SOj-73, a copy of this letter is being sent to Michael R. Criss, First Selectman, and Jeffrey Neumann, Building Official, for the Town of Harwinton. A copy is also being sent to the tower owner, and property owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, Verizon Wireless respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Denise Sabo
Mobile: 203-435-3640
Fax: 413-521-0558
Office: 4 Angela's Way, Burlington CT 06013
Email: denise@northeastsitesolutions.com



NSS **NORTHEAST**
SITE SOLUTIONS
Turnkey Wireless Development

Attachments

cc: Michael R. Criss, First Selectman
Town of Harwinton 100 Bentley Drive Harwinton CT, 06791

Jeffrey Neumann, Building Official
Polly Redmond, Land Use Coordinator
Town of Harwinton 100 Bentley Drive Harwinton CT, 06791

Red Wolf Broadcasting Corporation
758 Colonel Ledyard Highway Ledyard, CT 06339
(860) 464-1065

Crown Castle Tower Owner

Exhibit A

Original Facility Approval

Building Permit

09

TOWN OF HARWINTON

MINIMUM FEE: \$ _____

DATE: 5/29/01

TYPE OF INSTALLATION

ELECTRICAL SERVICE-NEW OR CHANGE _____	WATER HEATER _____
ELECTRICAL INSTALLATION _____	ROOFING _____
ELECTRICAL-SWIMMING POOL _____	RE-ROOFING: _____
PLUMBING INSTALLATION _____	HOW MANY LAYERS? _____
HEATING INSTALLATION _____	SIDING _____
AIR CONDITIONING _____	OTHER _____
OIL BURNER-GAS BURNER _____	
WOODBURNING STOVE _____	
CHIMNEY INSTALLATION _____	

Steve Florio 485-

NAME OF CONTRACTOR Baron M.H. Corporation
 ADDRESS OF CONTRACTOR 24 Corporate Circle Albany NY 12203
 LICENSE # 009-00-019 EXPIRATION DATE _____ TELE. # 518-886-8114
 REQUEST PERMISSION TO PERFORM _____
 AT: LOT # 21A-21-B STREET ADDRESS Hungerford Lane
 ESTIMATED COST \$272,000.00

REMARKS: _____

OWNER Tower owner: Sprint Spectrum LP
 ADDRESS one International Blvd.
3rd Floor
Metuchen NJ 07495

VALUATION OF WORK 972 M²
 FEE \$ per \$1000.00
 PERMIT # 4587

BUILDING OFFICIAL Frank Rybak 4

PAID DATE 5-29-01

10-15-2001

BUILDING INSPECTION DIVISION HARWINTON, CONN.
CERTIFICATE OF OCCUPANCY

Sprint Spectrum LP

This is to certify that the ~~new house~~ at *Tele Communication Tower*
Lot as constructed under Permit No conforms substantially to
the requirements of the State Building Code and is hereby approved for
occupancy as indicated below. At the date and time this Certificate is issued
the house is owned by

Approved for occupancy: *Sprint Spectrum LP*

- Basement
-
- First Floor
-
- Second Floor
-

Towers ok

Use Group:
Type of Construction:

Frank Lyjak

This certificate is VOID unless signed by the Building Official

Exhibit B

Property Card

Summary

ParcelId 341
Account Number 595
Location Address 64 HUNGERFORD LA
Map-Block-Lot D5 /02 /0032

Use Class/Description 2-1 COMM LAND
Assessing Neighborhood 0001A
Census Tract 2984
Acreage 40.28
Utilities



Owner

RED WOLF BROADCASTING CORPORATION
 758 COLONEL LEDYARD HIGHWAY
 LEDYARD, CT 06339

Current Appraised Value

	2019	2018	2017
+ Building Value	\$76,360	\$76,360	\$35,280
+ XF Value	\$0	\$0	\$0
+ OB Value	\$2,950	\$2,950	\$3,950
+ Land Value	\$3,139,960	\$3,139,960	\$367,850
+ Special Land Value			
+ Total Appraised Value	\$3,219,270	\$3,219,270	\$407,080
+ Net Appraised Value	\$3,219,270	\$3,219,270	\$407,080
+ Current Assessment	\$293,590	\$293,590	\$284,960

Assessment History

	2018	2017	2016	2015
+ Building Value	\$53,450	\$24,700	\$24,700	\$24,700
+ OB/Misc	\$2,060	\$2,760	\$2,760	\$2,760
+ Land	\$238,080	\$257,500	\$257,500	\$257,500
+ Total Assessment	\$293,590	\$284,960	\$284,960	\$284,960

Land

Use	Class	Zoning	Area	Value
2-1 COMM LAND	C	CR2	1 AC	\$74,330
5-2V EX COMM V	C		10.97 AC	\$78,980
3-1 IND LAND	I		1 BL	\$180,000
6-2 FOREST LD	R		28.31 AC	\$2,806,650

Commercial Building

Building # 1
Style Office Bldg
Actual Year Built 1964
Effective Year Built 1965
Gross Area 1230
Stories 1
Grade Below Average
Exterior Wall Brick/Masonry
Interior Wall Drywall/Sheet
Wall Height 8
Units 1
Roof Cover Asph/F Gls/Cmp
Roof Structure Gable/Hip
Floor Type Quarry Tile
Heat Type Oil
Heat Fuel Forced Air-Duc
AC Type HEAT/AC PKGS
Sprinkler 03

Construction MASONRY
 Plumbing AVERAGE
 Comm Walls 0

Building Sub Areas

Code	Description	Living Area	Gross Area	Effective Area
BAS		1200	1200	1200
FEP	Enclosed Porch	0	30	20
Totals		1200	1230	1220

Out Buildings\Extra Features

Description	Sub Description	Area	Year Built	Value
SHED FRAME AVE		360S.F.	2004	\$2,790
PATIO GOOD		36S.F.	2000	\$160

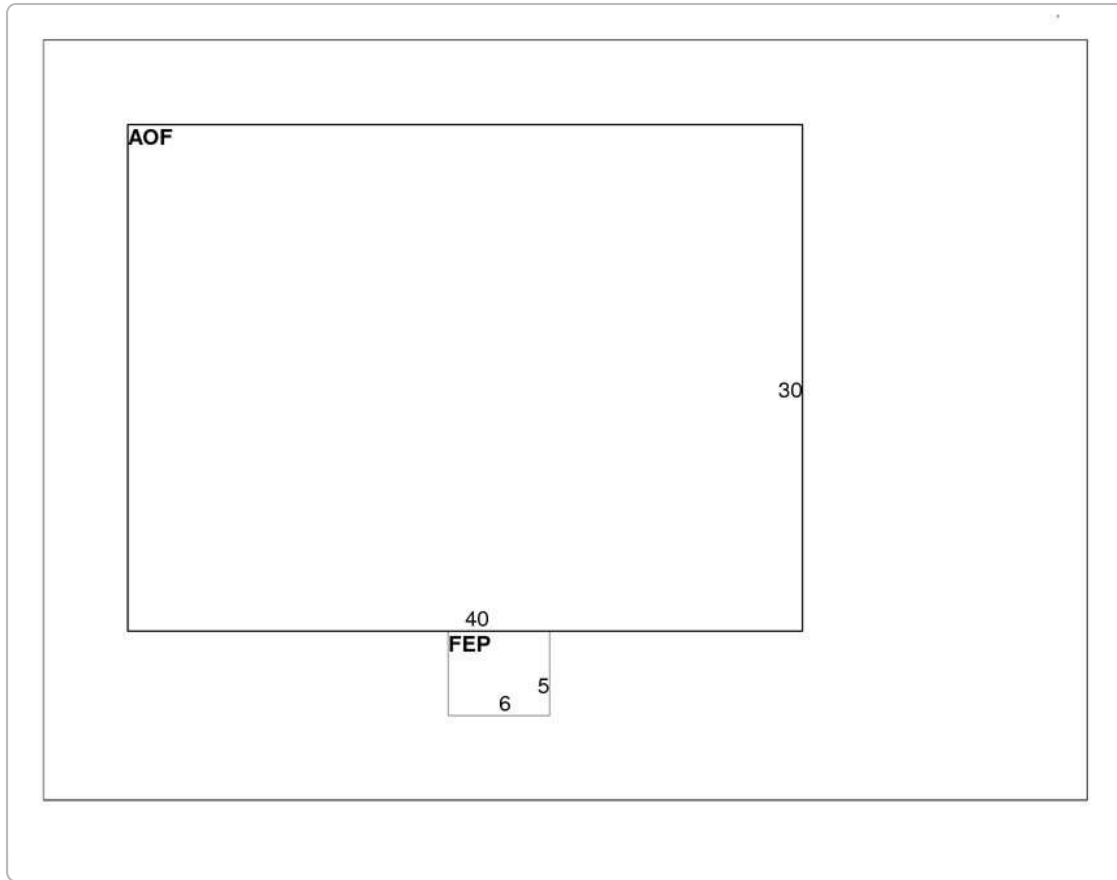
Sales History

Sales Date	Type of Document	Grantee	Vacant/Improved	Book/Page	Amount
04-04-2018		RED WOLF BROADCASTING CORPORATION	Improved	0256/0776	\$407,080
07-09-2014		CONNOISSEUR MEDIA OF CONNECTICUT LLC	Improved	0243/1029	\$407,080
07-23-1997		BUCKLEY BROADCASTING CORP OF CT	Improved	0145/0372	\$0
01-09-1997		USA	Improved	0145/0216	\$0
07-24-1985		CONSUMER SERVICE RADIO INC	Improved	0101/0665	\$0

Permit Information

Permit ID	Issue Date	Type	Description	Amount	Inspection Date	% Complete	Date Complete	Comments
17126B	09-11-2017		3 ANTENNAS	\$20,000		100		
	11-30-2015		CERTIFICATE OF APPROV	\$0		0		
9417	10-24-2014		MODIFICATIONS	\$20,000		0		
8721	11-29-2012		CELL TOWER MODIFICAT	\$25,000		0		
8703	11-21-2012		ANTENNAS	\$12,000		0		
8619	10-02-2012		REPLACE 6 ANTENNAS O	\$10,000		0		
CO	04-17-2006		CO ISSUED	\$0		0		
6239	01-17-2006			\$50,000		0		PREFAB CONCRETE SHELTER

Sketch



Photos



No data available for the following modules: Building Data.

The Town of Harwinton Assessor makes every effort to produce the most accurate information possible. No warranties, expressed or implied are provided for the data herein, its use or interpretation. The assessment information is from the last certified tax roll. All other data is subject to change.

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 Schneider
 GEOSPATIAL

Version 2.3.118

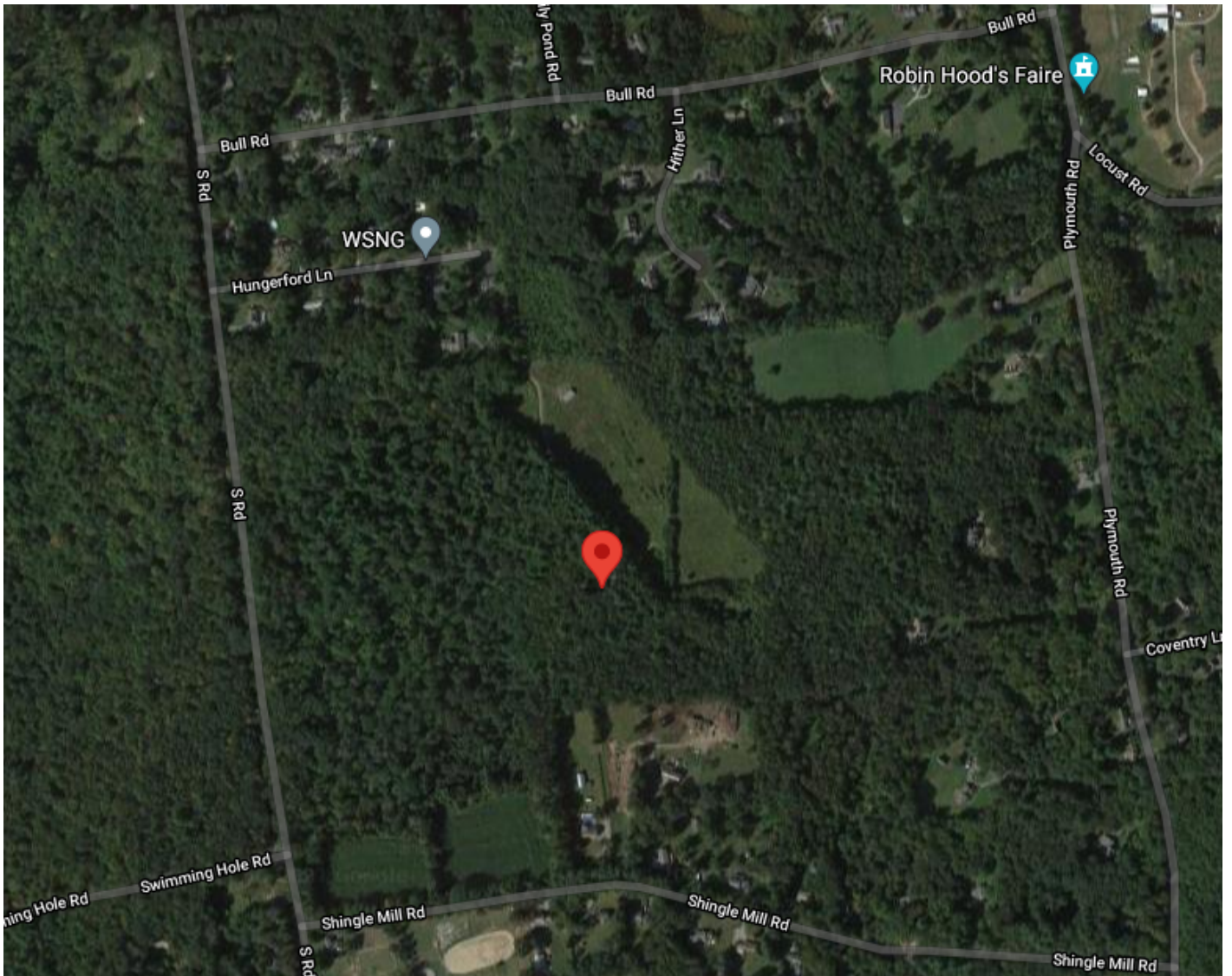


Exhibit C

Construction Drawings



VERIZON SITE NUMBER: 469283 **BUSINESS UNIT #:** 876369
VERIZON SITE NAME: HARWINTON 1 CT **SITE ADDRESS:** 64 HUNGERFORD LANE
SITE TYPE: MONOPOLE **COUNTY:** LITCHFIELD
TOWER HEIGHT: 178'-0" **JURISDICTION:** LITCHFIELD COUNTY
VERIZON ORDER NUMBER: 552649 **VERIZON FUZE PROJECT #:** 16271948

verizon
 180 WASHINGTON VALLEY ROAD
 BEDMINSTER, NJ 07921

CROWN CASTLE
 1500 CORPORATE DRIVE
 CANONSBURG, PA 15317

INFINIGY
 FROM ZERO TO INFINIGY
 the solutions are endless
 BELLEVUE, WA 98004

VERIZON SITE NUMBER:
 469283
BU #: 876369
HARWINTON / BUCKLEY BROADCASTI
 64 HUNGERFORD LANE
 HARWINTON, CT 06794
 EXISTING 178'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	06/04/2021	RCD	FINAL CDs	--
1	08/03/2021	RCD	FINAL CDs	--
2	09/29/2021	CB	FINAL CDs	--

SITE INFORMATION

CROWN CASTLE USA INC. HARWINTON / BUCKLEY BROADCASTI
 SITE NAME:
 SITE ADDRESS: 64 HUNGERFORD LANE
 HARWINTON, CT 06794
 COUNTY: LITCHFIELD
 MAP/PARCEL #: D5/02/0032
 AREA OF CONSTRUCTION: EXISTING
 LATITUDE: 41° 45' 26.1504" N (41.757264°)
 LONGITUDE: 73° 3' 9.2016" W (-73.052556°)
 LAT/LONG TYPE: NAD83
 GROUND ELEVATION: 847.0'
 CURRENT ZONING: 2-1 COMM LAND
 JURISDICTION: LITCHFIELD COUNTY
 OCCUPANCY CLASSIFICATION: U
 TYPE OF CONSTRUCTION: IIB
 A.D.A. COMPLIANCE: FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
 PROPERTY OWNER: RED WOLF BROADCASTING CORPORATION
 758 COLONEL LEDYARD HIGHWAY
 LEDYARD, CT 06339
 TOWER OWNER: CCAIT LLC
 1500 CORPORATE DRIVE
 CANONSBURG, PA 15317
 CARRIER/APPLICANT: VERIZON WIRELESS
 180 WASHINGTON VALLEY ROAD
 BEDMINSTER, NJ 07921

ELECTRIC PROVIDER: TBD
 TELCO PROVIDER: TBD

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1	SITE PLAN
C-2	TOWER ELEVATION & ANTENNA PLANS
C-3	EQUIPMENT SCHEDULES
C-4	EQUIPMENT DETAILS
C-5	EQUIPMENT DETAILS
C-6	PLUMBING DIAGRAM
G-1	GROUNDING DETAILS
G-2	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11X17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

APPROVALS

SIGNATURE	DATE
_____	_____
_____	_____
_____	_____
_____	_____

CONTRACTOR PMI REQUIREMENTS

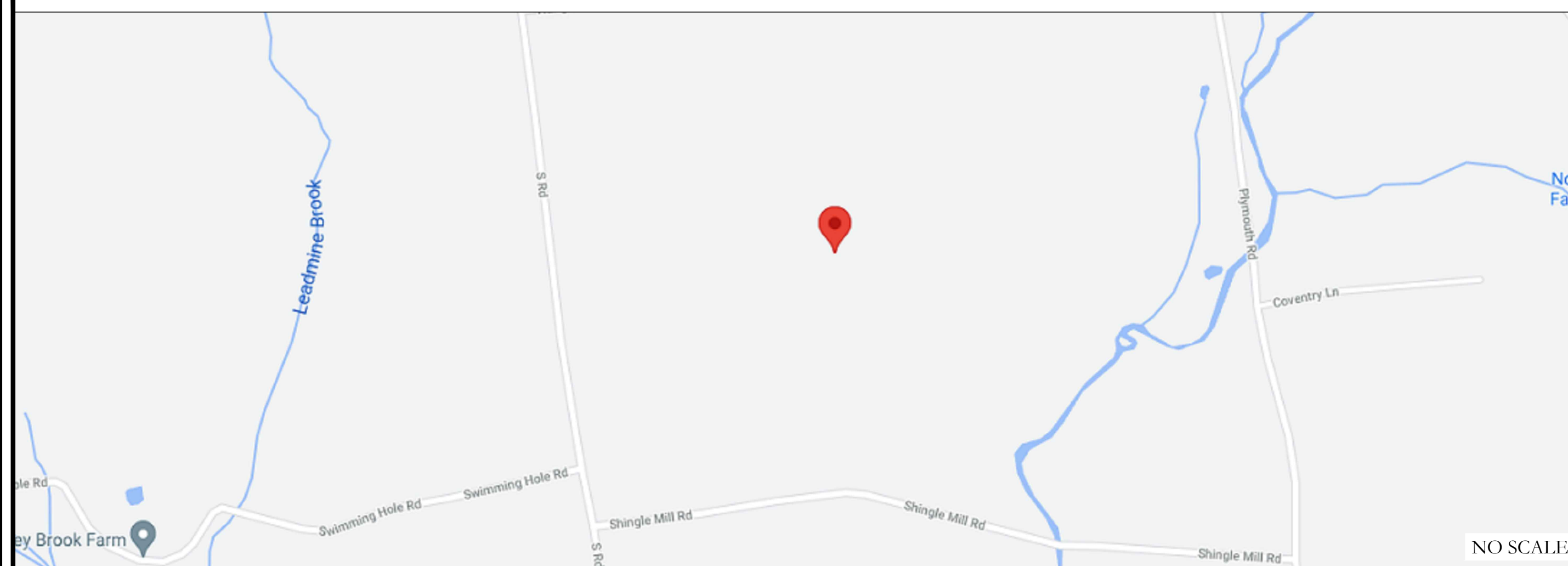
PMI ACCESSED AT <https://pmi.vxwsmart.com>
 SMART TOOL VENDOR PROJECT NUMBER 10063413
 V2W LOCATION CODE (PSLC) 469283
 *** PMI AND REQUIREMENTS ALSO EMBEDDED IN MOUNT ANALYSIS REPORT

MOUNT MODIFICATION REQUIRED Y

V2W APPROVED SMART KIT VENDORS

REFER TO MOUNT MODIFICATION DRAWINGS PAGE FOR V2W SMART KIT APPROVED VENDORS

LOCATION MAP



DRIVING DIRECTIONS FROM VERIZON LOCAL OFFICE (180 WASHINGTON VALLEY RD, BEDMINSTER, NJ 07921) DEPART AND HEAD TOWARD WASHINGTON VALLEY RD / COUNTY HWY-620, TURN LEFT ONTO WASHINGTON VALLEY RD / COUNTY HWY-620, BEAR RIGHT ONTO US-206 N / US-202 N / US HIGHWAY 202 206 BEAR RIGHT ONTO US-202 N / US-206 N / US HIGHWAY 202 206, TURN RIGHT ONTO SCHLEY MOUNTAIN RD, TAKE THE RAMP ON THE LEFT FOR I-287 N, KEEP STRAIGHT TO GET ONTO I-95 N / NEW JERSEY TPKE N, KEEP LEFT TO STAY ON I-95 N, TAKE THE RAMP ON THE RIGHT FOR CT-8 NORTH AND HEAD TOWARD SHELTON / WATERBURY, TAKE THE RAMP ON THE RIGHT FOR RIVERSIDE ST, TAKE THE RAMP ON THE LEFT FOR CT-8 NORTH AND HEAD TOWARD TORRINGTON / WATERTOWN, KEEP STRAIGHT TO GET ONTO US-6 E / CT-8 N / JAMES H DARCEY MEMORIAL HWY N, KEEP STRAIGHT TO GET ONTO CT-8 N / JAMES H DARCEY MEMORIAL HWY N, TURN RIGHT ONTO CT-118 / LITCHFIELD RD TOWARD HARWINTON, KEEP STRAIGHT TO GET ONTO CT-4 / LITCHFIELD RD, TURN RIGHT THEN BEAR RIGHT ONTO SOUTH RD, TURN LEFT ONTO HUNGERFORD LN, ARRIVE AT 64 HUNGERFORD LANE, HARWINTON CT, 06794

APPLICABLE CODES/REFERENCE DOCUMENTS

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	2018 CT STATE BUILDING CODE
MECHANICAL	2015 IMC
ELECTRICAL	2017 NEC

REFERENCE DOCUMENTS:
 STRUCTURAL ANALYSIS: TOWER ENGINEERING PROFESSIONALS
 DATED: 05/04/2021
 MOUNT ANALYSIS: MASER CONSULTING CONNECTICUT
 DATED: 05/21/2021
 RFDS REVISION: 1
 DATED: 03/18/2021
 ORDER ID: 552649
 REVISION: 0

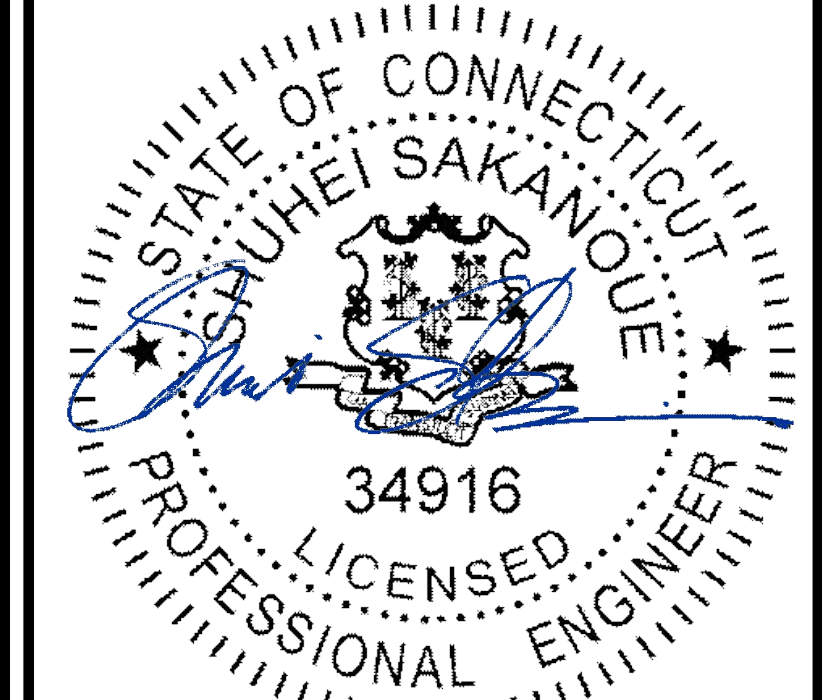
PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

- TOWER SCOPE OF WORK:**
- REMOVE (6) ANTENNAS
 - INSTALL (9) ANTENNAS
 - INSTALL (6) RRHs
 - INSTALL (1) OVP
 - INSTALL (1) HYBRID CABLE
 - INSTALL ANTENNA MOUNT MODIFICATIONS

- GROUND SCOPE OF WORK:**
- REMOVE (3) RRHs

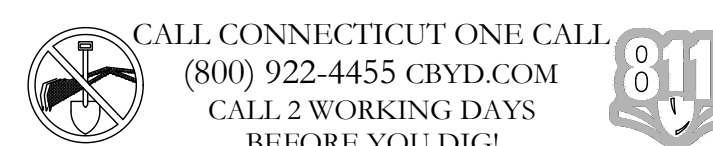
NOTE:
 PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER



10/4/2021

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: T-1 **REVISION:** 2



CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

- NOTICE TO PROCEED- NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800-788-7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
- "LOOK UP" - CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT: THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
- PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
- ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED-STD-10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA-322 (LATEST EDITION).
- ALL SITE WORK TO COMPLY WITH QAS-STD-10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE," CED-STD-10294 "STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES," AND LATEST VERSION OF ANSI/TIA-1019-A-2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS." IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
- ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
- THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
- ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
- ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS. LATEST APPROVED REVISION.
- CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
- ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
- THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
- THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
- THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
- THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
- CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
- THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
- CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
- CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
- NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GREENFIELD GROUNDING NOTES:

- ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
- THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
- THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
- METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
- METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
- EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
- CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
- ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
- ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
- USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
- EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
- ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
- COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
- ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
- APPROVED ANTI-OXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
- ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
- MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
- BOND ALL METALLIC OBJECTS WITHIN 6 FT. OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
- GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
- ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON-METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD-WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
- BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM. THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

GENERAL NOTES:

- FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
CARRIER: VERIZON
TOWER OWNER: CROWN CASTLE USA INC.
- THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
- THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
- NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
- SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
- PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CROWN CASTLE.
- ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
- UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
- THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND CROWN CASTLE PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
- CONTRACTOR IS TO PERFORM A SITE INVESTIGATION AND IS TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
- THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF CROWN CASTLE USA INC.
- CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
- CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

- ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
- UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
- ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.
- CONCRETE EXPOSED TO FREEZE-THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER-TO-CEMENT RATIO (W/C) OF 0.45.
- ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:
#4 BARS AND SMALLER.....40 ksi
#5 BARS AND LARGER.....60 ksi
- THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH.....3"
CONCRETE EXPOSED TO EARTH OR WEATHER:
#6 BARS AND LARGER.....2"
#5 BARS AND SMALLER.....1-1/2"
CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
SLAB AND WALLS.....3/4"
BEAMS AND COLUMNS.....1-1/2"
- A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

ELECTRICAL INSTALLATION NOTES:

- ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
- CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
- WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
- ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
- EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
- ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
- PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
- ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
- ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
- SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
- POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI-CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
- POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
- ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
- RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEC AND NEC.
- ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
- ELECTRICAL METALLIC TUBING (EMT) OR METAL-CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
- SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
- LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
- CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SET SIZES WHEN FITTING ARE NOT ACCEPTABLE.
- CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEC AND THE NEC.
- WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREFOLD SPECMATE WIREWAY).
- SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
- CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER-ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
- EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3R (OR BETTER) FOR EXTERIOR LOCATIONS.
- METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
- NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
- THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR CROWN CASTLE USA INC. BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
- THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
- INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "VERIZON".
- ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

CONDUCTOR COLOR CODE		
SYSTEM	CONDUCTOR	COLOR
120/240V, 1Ø	A PHASE	BLACK
	B PHASE	RED
	NEUTRAL	WHITE
	GROUND	GREEN
120/208V, 3Ø	A PHASE	BLACK
	B PHASE	RED
	C PHASE	BLUE
	NEUTRAL	WHITE
277/480V, 3Ø	GROUND	GREEN
	A PHASE	BROWN
	B PHASE	ORANGE OR PURPLE
	C PHASE	YELLOW
DC VOLTAGE	NEUTRAL	GREY
	GROUND	GREEN
	POS (+)	RED**
	NEG (-)	BLACK**

* SEE NEC 210.5(C)(1) AND (2)
** POLARITY MARKED AT TERMINATION

ABBREVIATIONS:

- ANT ANTENNA
- (E) EXISTING
- FIF FACILITY INTERFACE FRAME
- GEN GENERATOR
- GPS GLOBAL POSITIONING SYSTEM
- GSM GLOBAL SYSTEM FOR MOBILE
- LTE LONG TERM EVOLUTION
- MGB MASTER GROUND BAR
- MW MICROWAVE
- (N) NEW
- NEC NATIONAL ELECTRIC CODE
- (P) PROPOSED
- PP POWER PLANT
- QTY QUANTITY
- RECT RECTIFIER
- RBS RADIO BASE STATION
- RETS REMOTE ELECTRIC TILT
- RFDSD RADIO FREQUENCY DATA SHEET
- RRH REMOTE RADIO HEAD
- RRU REMOTE RADIO UNIT
- SIAD SMART INTEGRATED DEVICE
- TMA TOWER MOUNTED AMPLIFIER
- TYP TYPICAL
- UMTS UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
- W.P. WORK POINT

APWA UNIFORM COLOR CODE:

- WHITE PROPOSED EXCAVATION
- PINK TEMPORARY SURVEY MARKINGS
- RED ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
- YELLOW GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS
- ORANGE COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS
- BLUE POTABLE WATER
- PURPLE RECLAIMED WATER, IRRIGATION, AND SLURRY LINES
- GREEN SEWERS AND DRAIN LINES



VERIZON SITE NUMBER:
469283

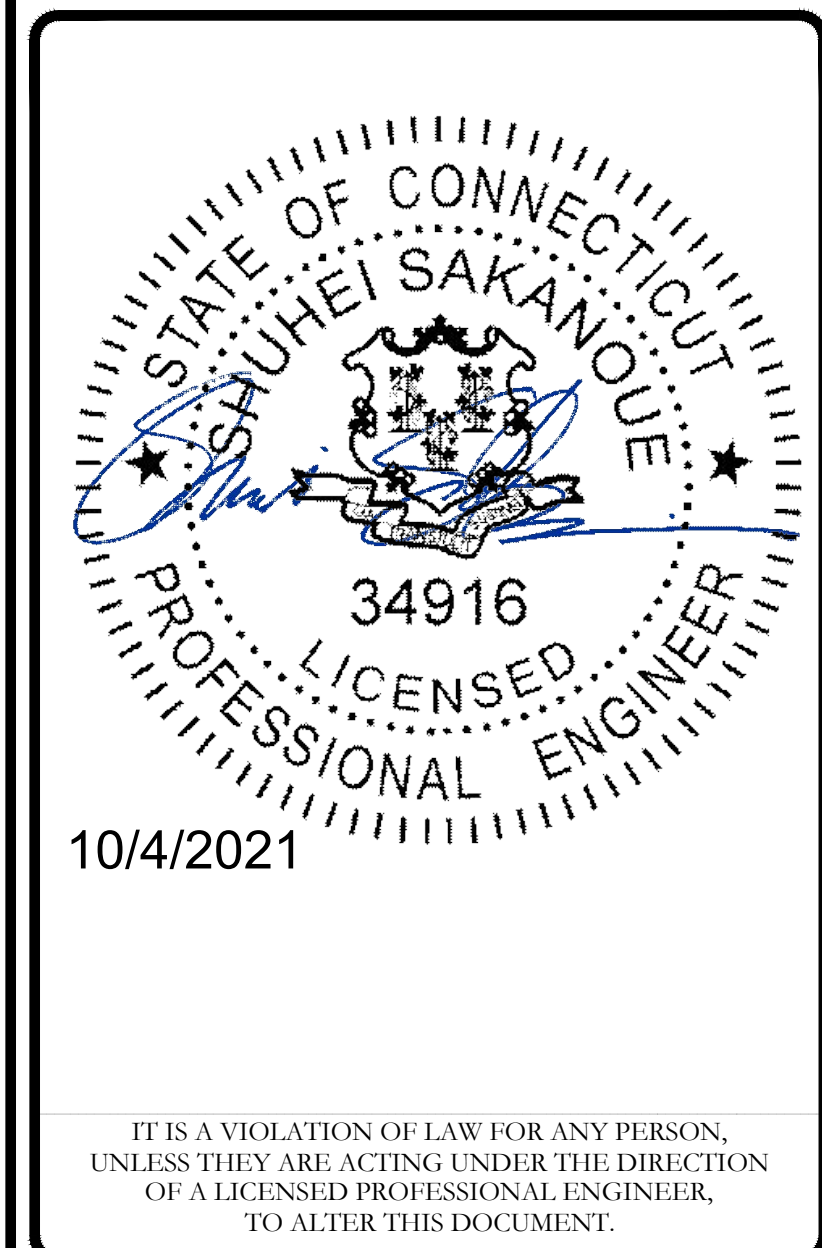
BU #: 876369
HARWINTON / BUCKLEY BROADCASTI

64 HUNGERFORD LANE
HARWINTON, CT 06794

EXISTING 178'-0" MONOPOLE

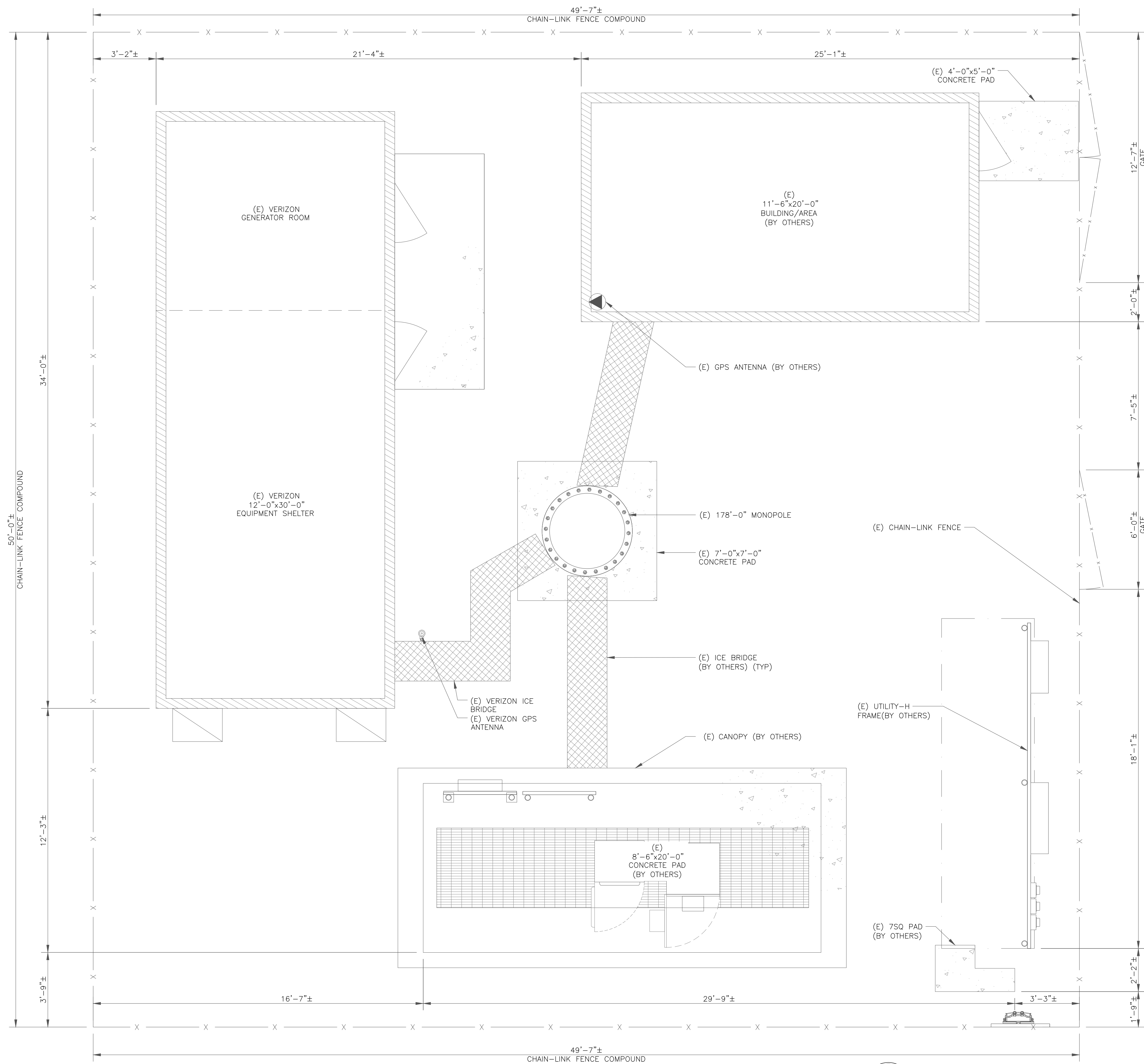
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	06/04/2021	RCD	FINAL CDs	--
1	08/03/2021	RCD	FINAL CDs	--
2	09/29/2021	CB	FINAL CDs	--



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: **T-2** REVISION: **2**



1 SITE PLAN
 SCALE: 3/8"=1'-0" (FULL SIZE)
 3/16"=1'-0" (11x17)

verizon

180 WASHINGTON VALLEY ROAD
 BEDMINSTER, NJ 07921

CROWN CASTLE

1500 CORPORATE DRIVE
 CANONSBURG, PA 15317

INFINIGY

FROM ZERO TO INFINIGY
 the solutions are endless

BELLEVUE, WA 98004

VERIZON SITE NUMBER:
 469283

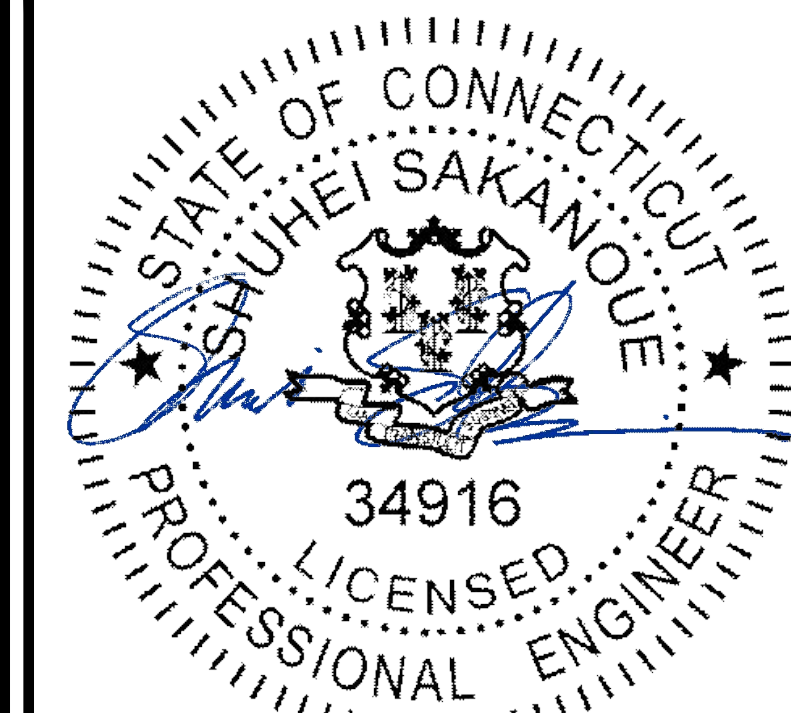
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HARWINTON / BUCKLEY BROADCASTI

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REV	DATE	DRWN	DESCRIPTION	DES./QA
0	06/04/2021	RCD	FINAL CDs	--
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10/4/2021

IT IS A VIOLATION OF LAW FOR ANY PERSON,
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 OF A LICENSED PROFESSIONAL ENGINEER,
 TO ALTER THIS DOCUMENT.

SHEET NUMBER: **C-1** REVISION: **2**

NEW VERIZON EQUIPMENT
 (6) QUINTEL - QS6656-5D ANTENNAS
 (3) SAMSUNG - MT6407-77A ANTENNAS
 (3) SAMSUNG - B2/B66A RRH-BR049 RRHS
 (3) SAMSUNG - B5/B13 RRH-BR04C RRHS
 (1) RAYCAP - DBC1-12C-24AB-0Z
 INSTALLED ON MODIFIED MOUNTS

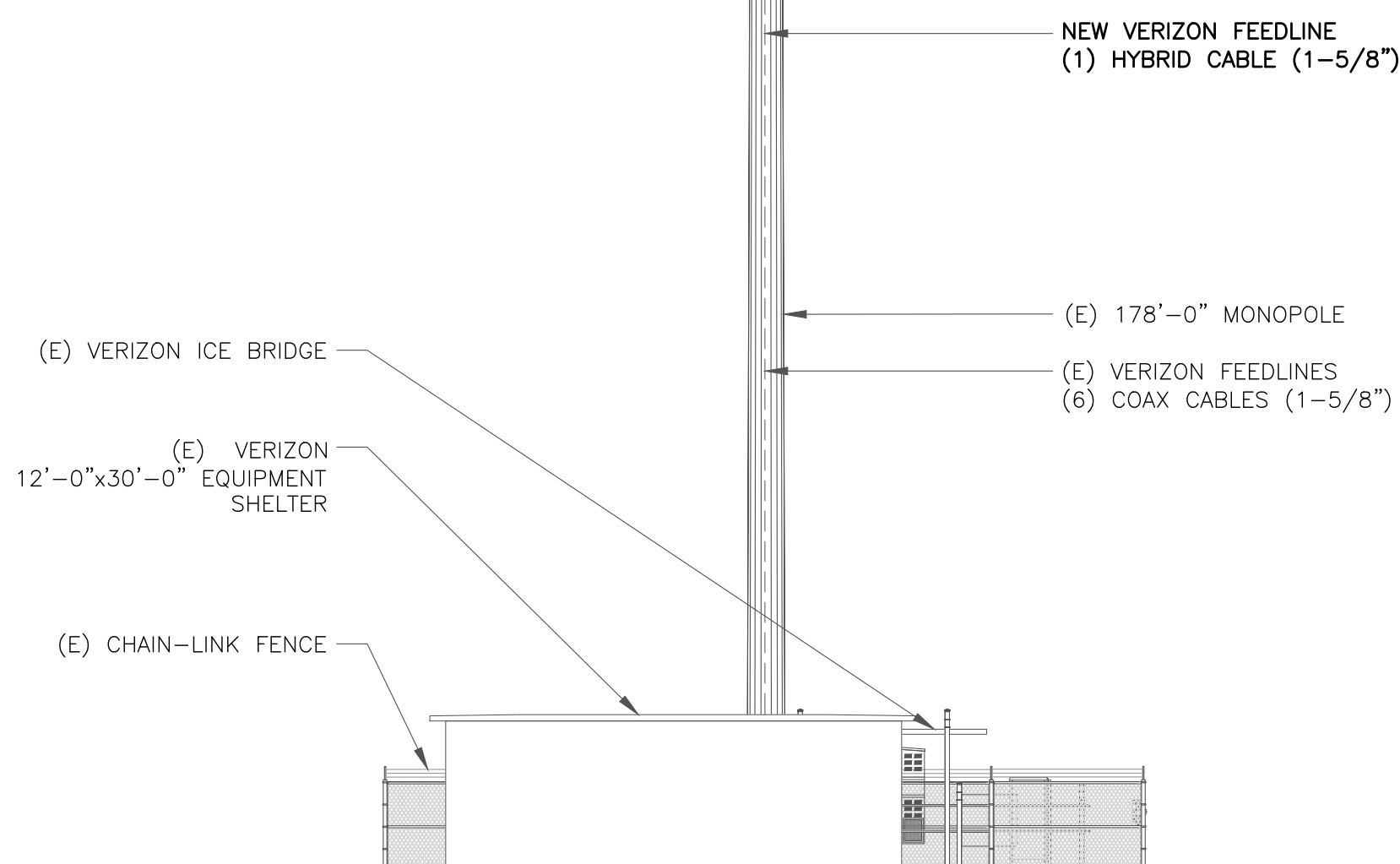
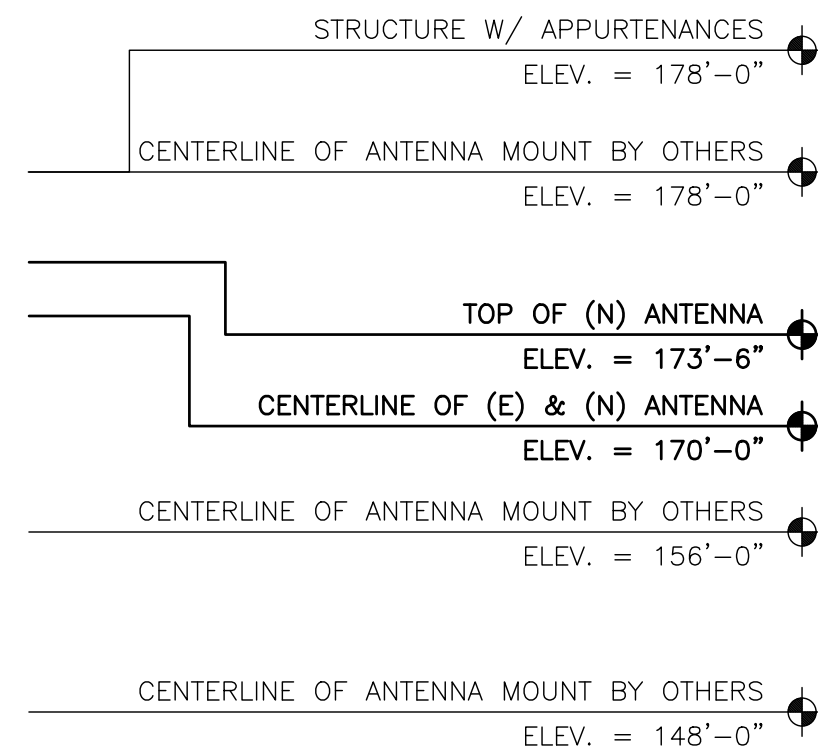
(E) VERIZON EQUIPMENT TO REMAIN
 (6) ANTEL - LPA-80080/6CF (178916)
 INSTALLED ON MODIFIED MOUNTS

NOTES:

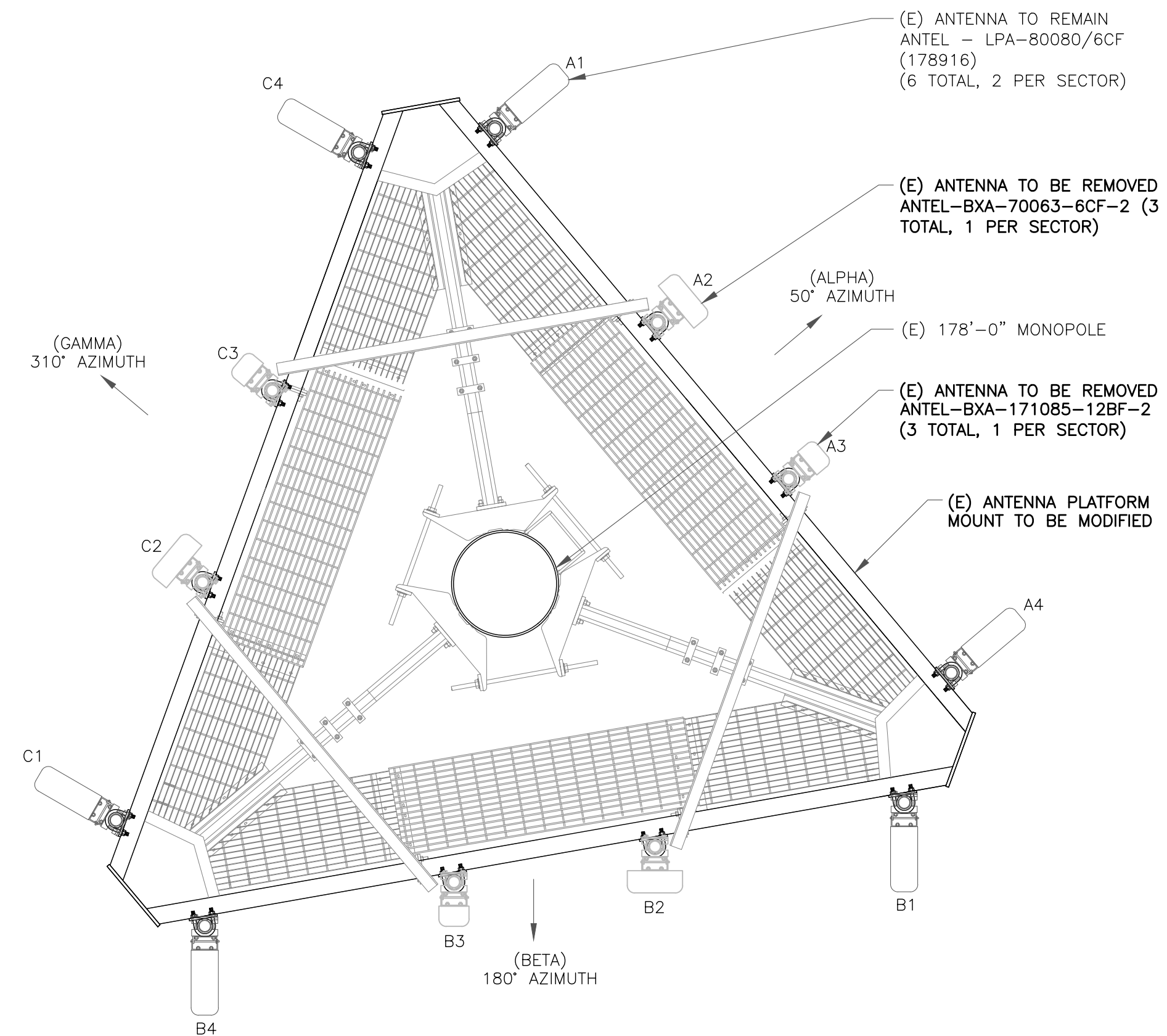
- THESE DRAWINGS ARE NOT INTENDED TO BE A VERIFICATION THAT THE STRUCTURE OR MOUNTS ARE ADEQUATE TO SUPPORT THE PROPOSED LOADING. VERIFICATION THAT THE EXISTING STRUCTURE AND MOUNTS CAN SUPPORT THE PROPOSED LOADING SHALL BE PERFORMED BY A REGISTERED PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.
- CONTRACTOR TO REFER TO THE STRUCTURAL ANALYSIS AND MOUNT ASSESSMENT AND VERIFY LOADING WITH THE MOST RECENT RFDS PRIOR TO CONSTRUCTION

VERIZON EQUIPMENT

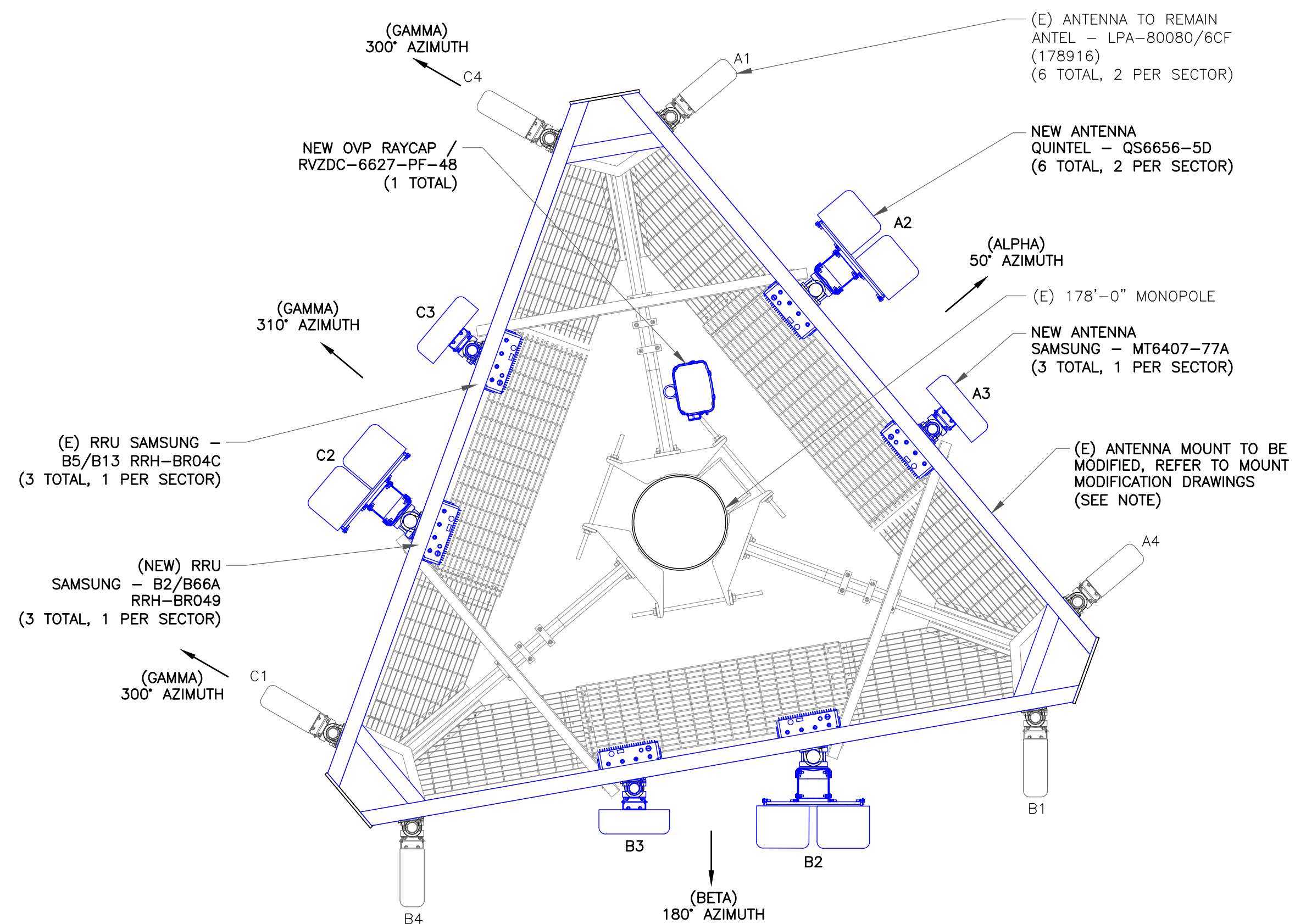
ANTENNA CL: 138'-0"
 ANTENNA CL: 137'-0"
 ANTENNA CL: 138'-11"
 MOUNT CL: 138'-0"



1 TOWER ELEVATION
SCALE: NOT TO SCALE



2 EXISTING ANTENNA PLAN
SCALE: NOT TO SCALE



3 NEW ANTENNA PLAN
SCALE: NOT TO SCALE

verizon

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BEDMINSTER, NJ 07921

CROWN CASTLE

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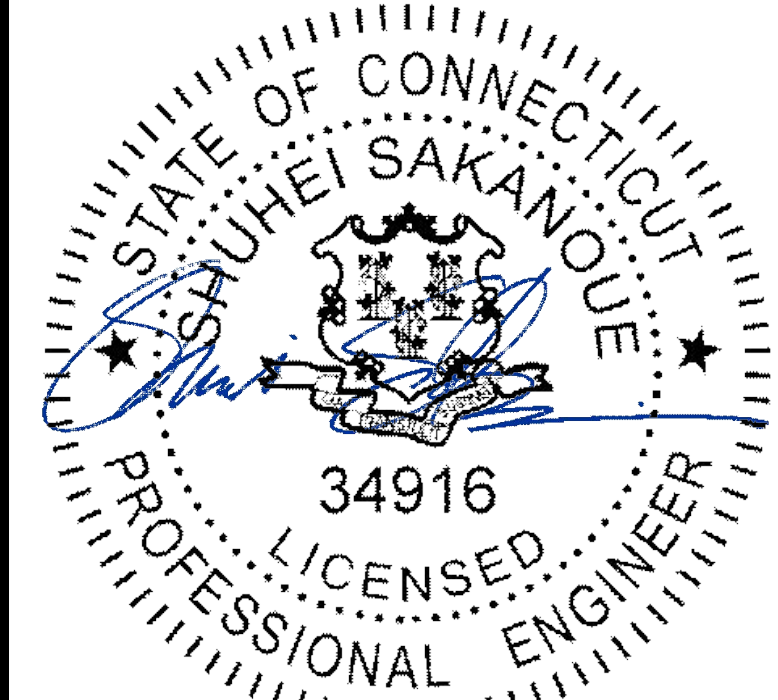
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2	09/29/2021	CB	FINAL CDs	--



10/4/2021

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SHEET NUMBER:

C-2

REVISION:

2

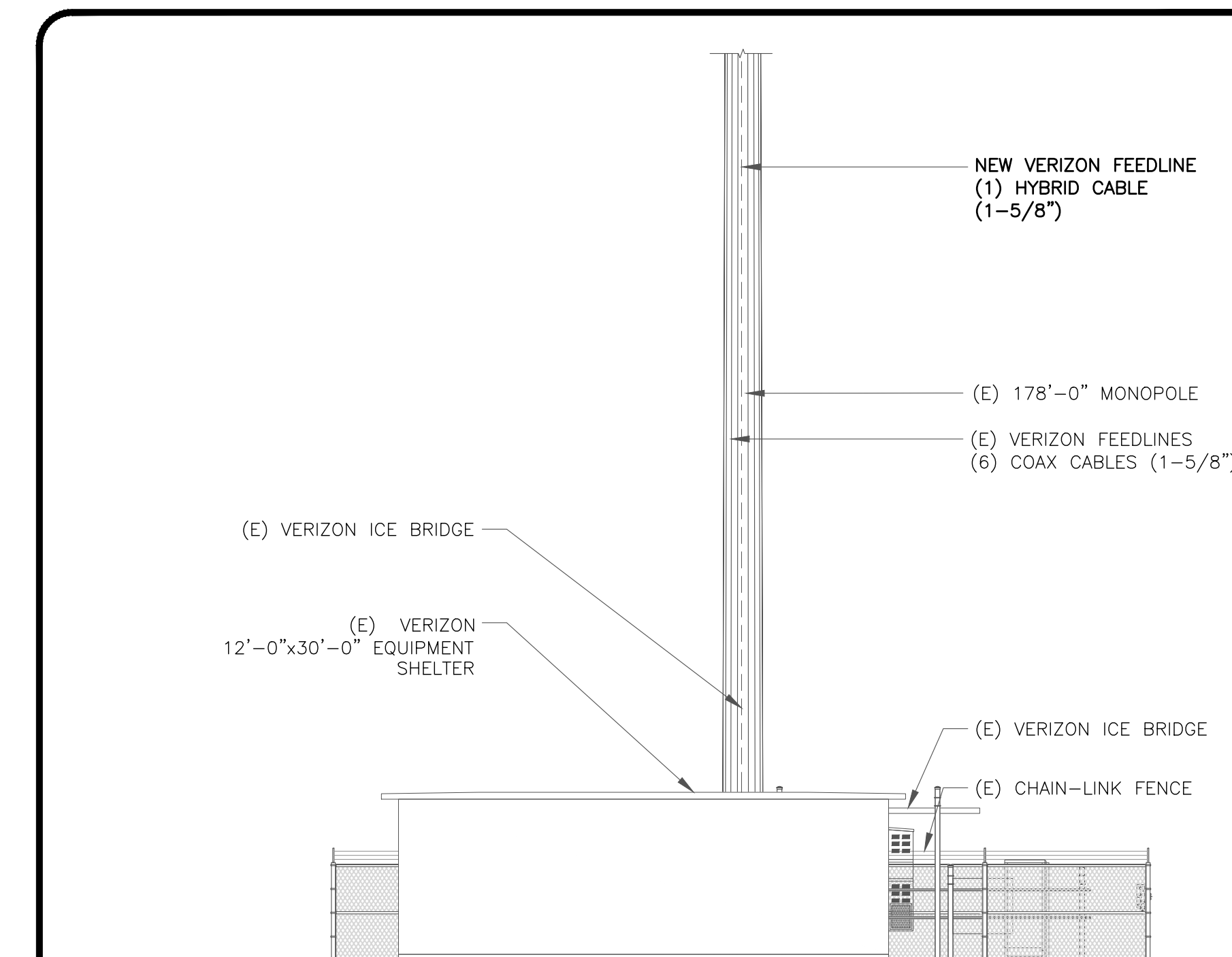
ANTENNA/RRH SCHEDULE

SECTOR	STATUS	ANTENNA MANUFACTURER	ANTENNA MODEL	ANTENNA CENTERLINE	AZIMUTH	MECHANICAL DOWNTILTS	ELECTRICAL DOWNTILTS	TOWER EQUIPMENT MANUFACTURER	TOWER EQUIPMENT QTY/MODEL
A1	EXISTING	ANTEL	LPA-80080/6CF (178916)	138'-0"	50°	2'	0'	RFS/CELWAVE	(1) DBC1-12C-24AB-0Z
A2	NEW	QUINTEL	(2) QS6656-5D	138'-0"	50°	0'	2'/2'/0'/0'	SAMSUNG	(1) B2/B66A RRH-BR049 (RFV01U-D1A)
A3	NEW	SAMSUNG	MT6407-77A	138'-0"	50°	0'	6'	SAMSUNG	(1) B5/B13 RRH-BR04C (RFV01U-D2A)
A4	EXISTING	ANTEL	LPA-80080/6CF (178916)	138'-0"	50°	2'	0'	-	-
B1	EXISTING	ANTEL	LPA-80080/6CF (178916)	138'-0"	180°	3'	0'	-	-
B2	NEW	QUINTEL	(2) QS6656-5D	138'-0"	180°	0'	5'/5'/2'/2'	SAMSUNG	(1) B2/B66A RRH-BR049 (RFV01U-D1A)
B3	NEW	SAMSUNG	MT6407-77A	138'-0"	180°	0'	6'	SAMSUNG	(1) B5/B13 RRH-BR04C (RFV01U-D2A)
B4	EXISTING	ANTEL	LPA-80080/6CF (178916)	138'-0"	180°	3'	0'	-	-
C1	EXISTING	ANTEL	LPA-80080/6CF (178916)	138'-0"	300°	3'	0'	-	-
C2	NEW	QUINTEL	(2) QS6656-5D	138'-0"	310°	0'	5'/5'/2'/2'	SAMSUNG	(1) B2/B66A RRH-BR049 (RFV01U-D1A)
C3	NEW	SAMSUNG	MT6407-77A	138'-0"	310°	0'	6'	SAMSUNG	(1) B5/B13 RRH-BR04C (RFV01U-D2A)
C4	EXISTING	ANTEL	LPA-80080/6CF (178916)	138'-0"	300°	3'	0'	-	-

1 VERIZON TOWER EQUIPMENT SCHEDULE
SCALE: NOT TO SCALE

CABLE SCHEDULE

STATUS	CABLE TYPE	SIZE	LENGTH	QTY
EXISTING	COAX	1-5/8"	220'-0"±	6
NEW	HYBRID	1-5/8"	220'-0"±	1
TOTAL CABLE QTY:				7



2 BASE LEVEL DETAIL
SCALE: NOT TO SCALE



VERIZON SITE NUMBER:
469283

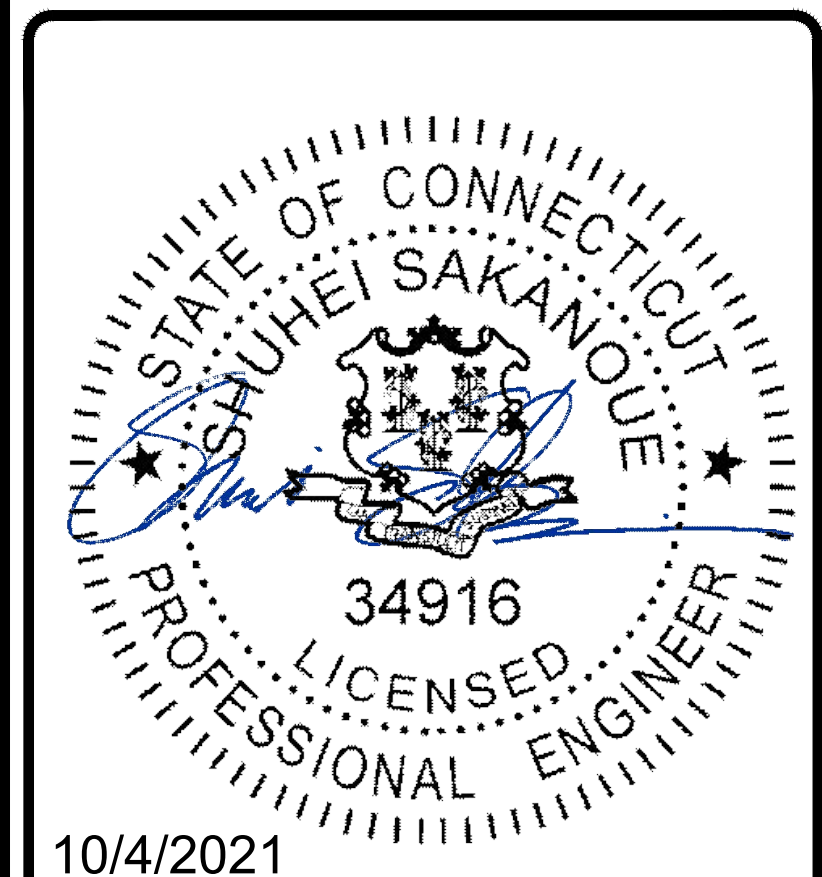
BU #: 876369
HARWINTON / BUCKLEY BROADCASTI

64 HUNGERFORD LANE
HARWINTON, CT 06794

EXISTING 178'-0" MONOPOLE

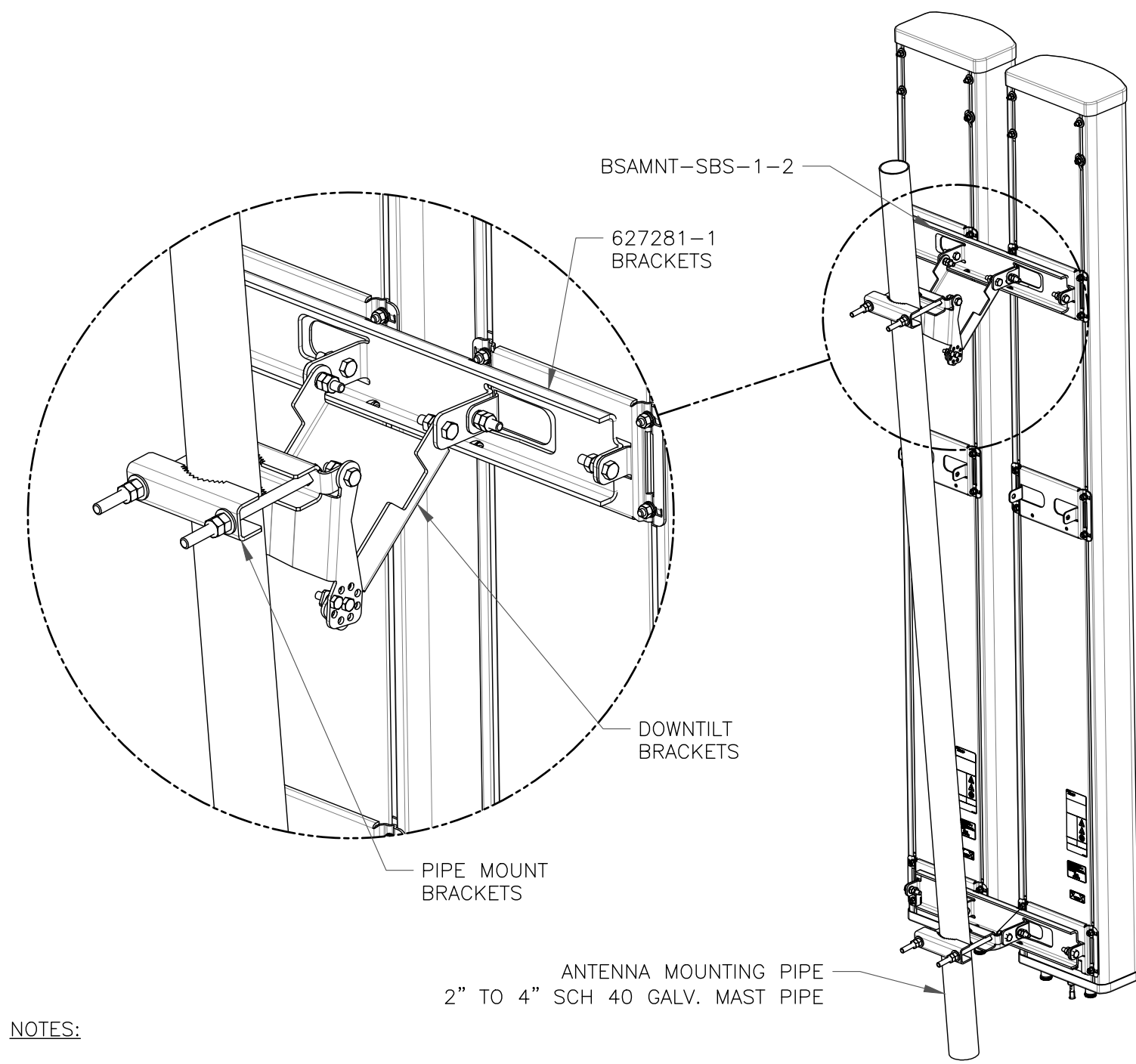
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1	08/03/2021	RCD	FINAL CDs	--
2	09/29/2021	CB	FINAL CDs	--



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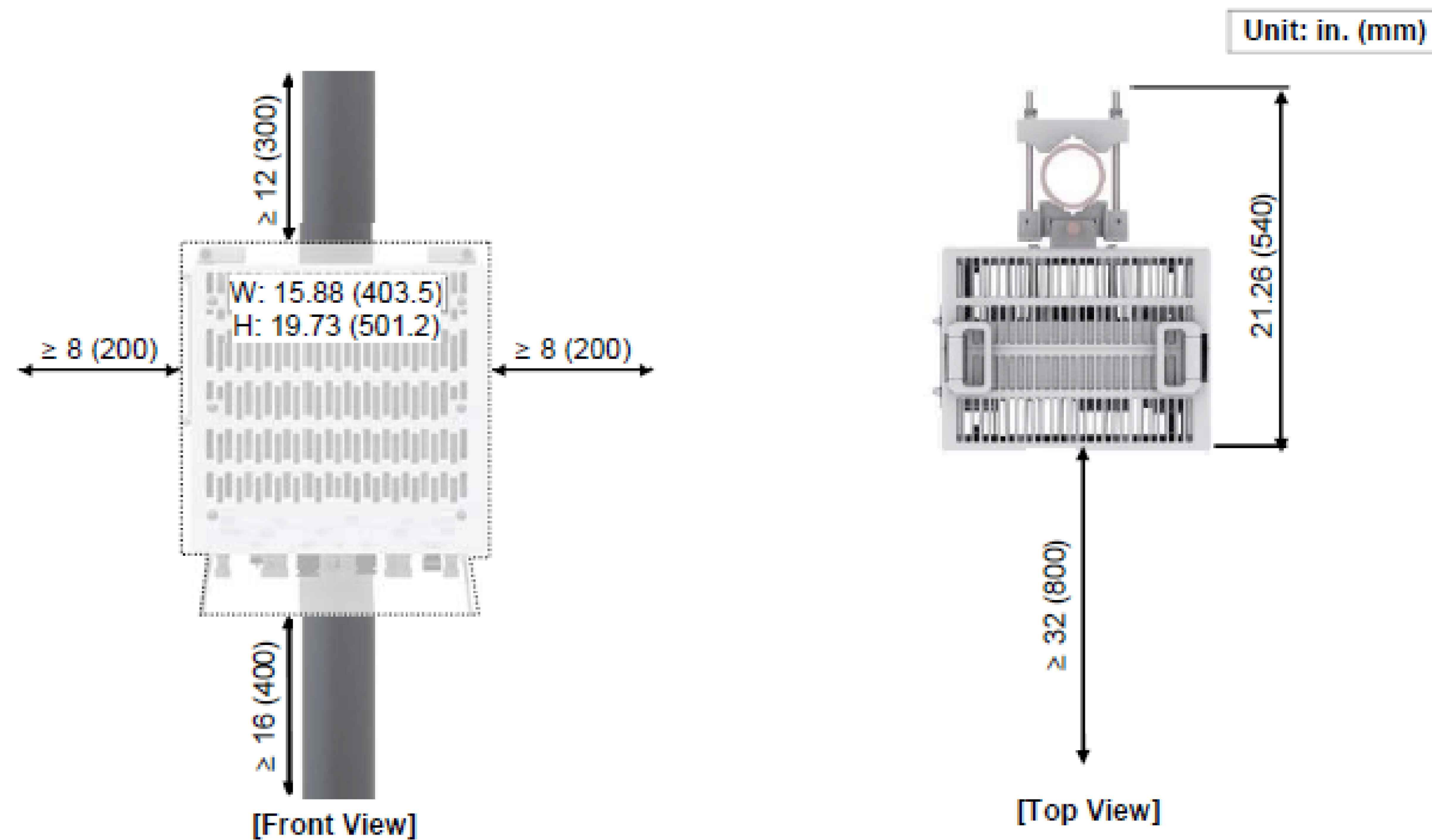


NOTES:

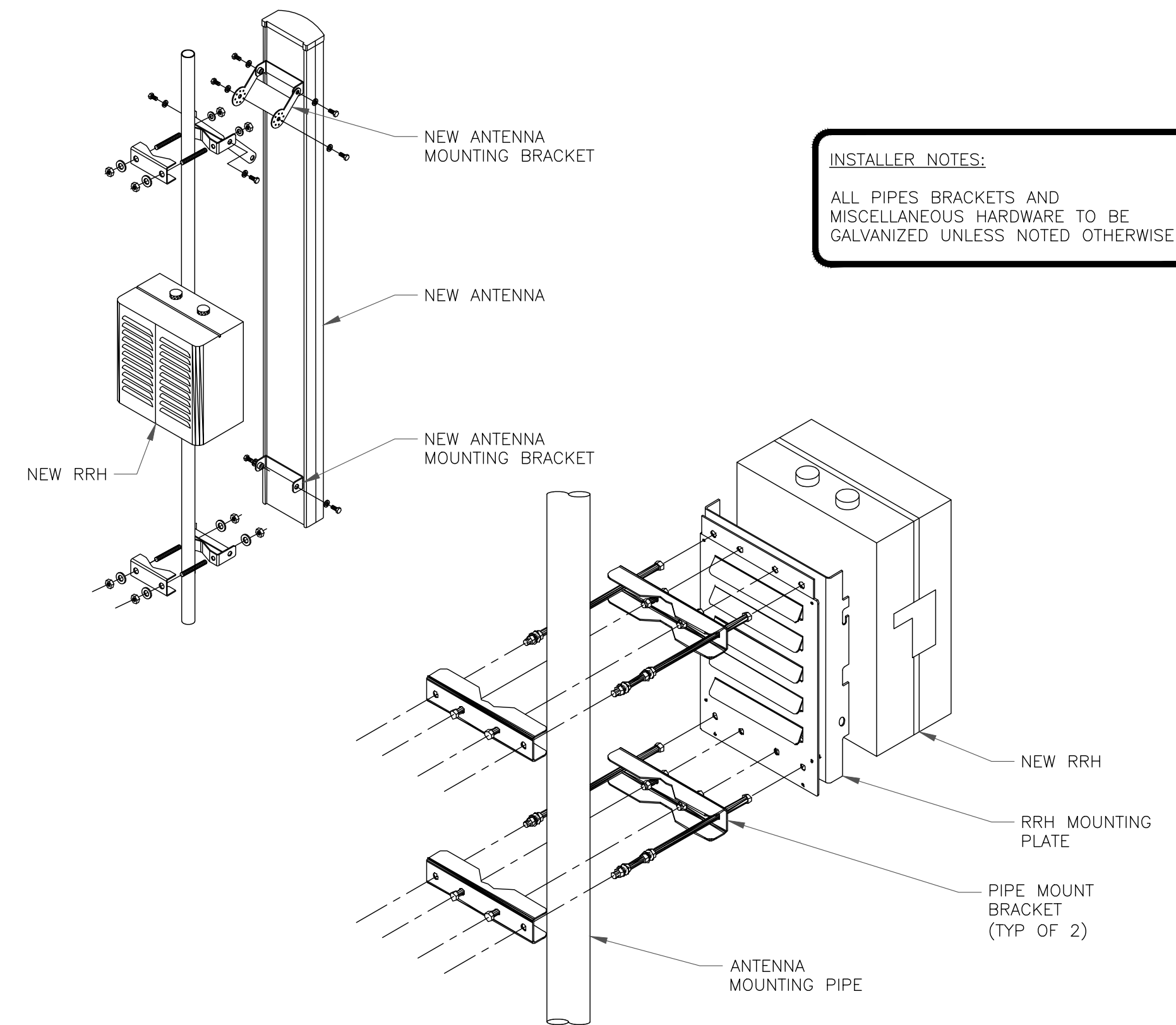
- BSAMNT-SBS-1-2 KIT CONTAINS (2) 627281 MOUNTING BRACKETS.
- TORQUE THE M10 BOLT ASSEMBLY TO 37 N.m. PER MANUFACTURE'S RECOMMENDATIONS.

1 COMMSCOPE - BSAMNT-SBS-1-2
SCALE: NOT TO SCALE

2 NOT USED
SCALE: NOT TO SCALE



3 SAMSUNG - FPKA BRACKET MOUNTING DETAIL
SCALE: NOT TO SCALE



INSTALLER NOTES:
ALL PIPES BRACKETS AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.

4 ANTENNA & RRH MOUNTING DETAIL
SCALE: NOT TO SCALE

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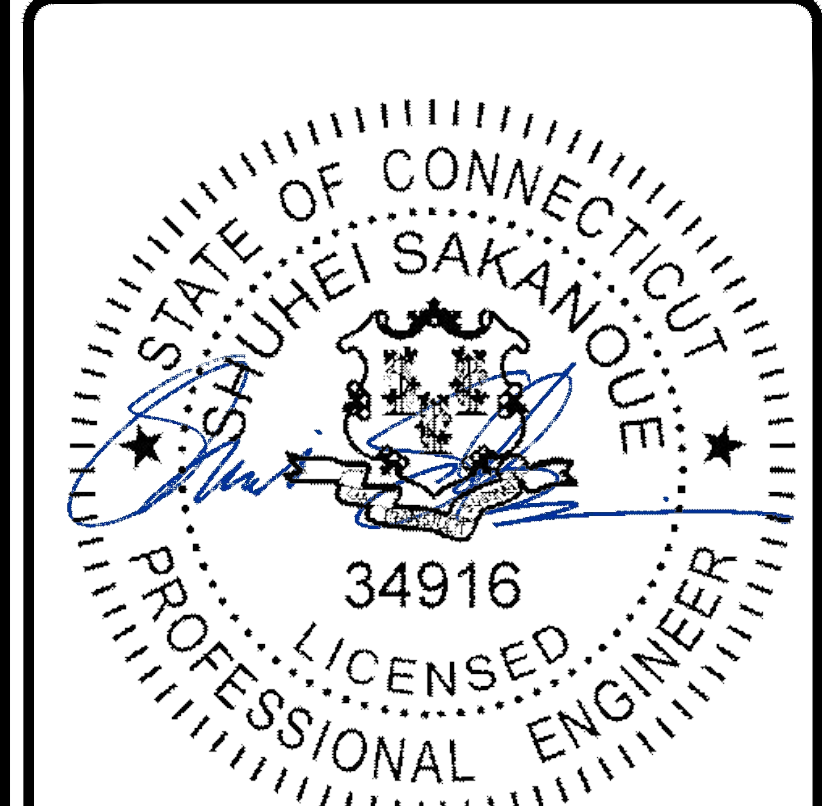
BU #: **876369**
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64 HUNGERFORD LANE
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EXISTING 178'-0" MONOPOLE

ISSUED FOR:

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2	09/29/2021	CB	FINAL CDs	--



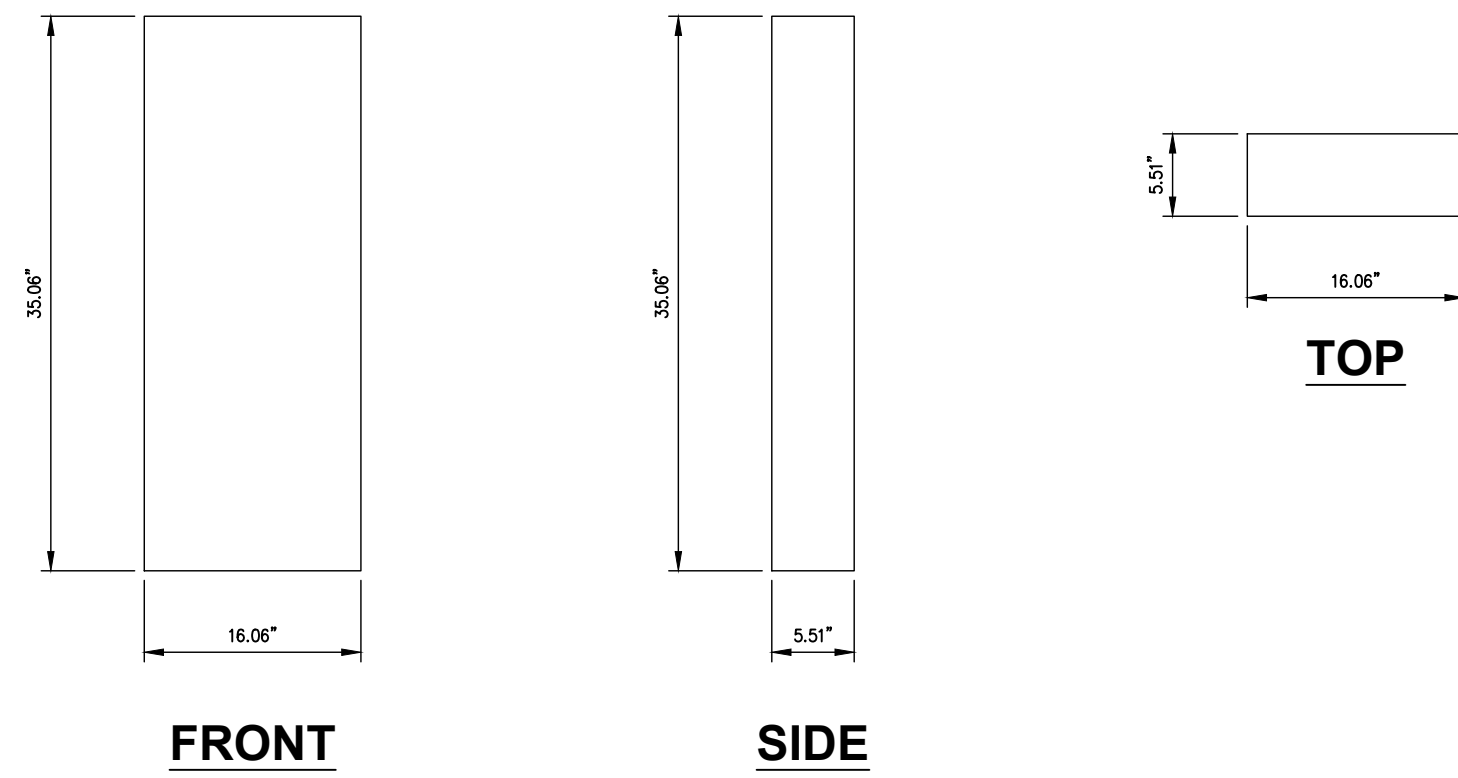
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SHEET NUMBER: **C-4** REVISION: **2**

VZW PANEL ANTENNA (MT6407-77A)

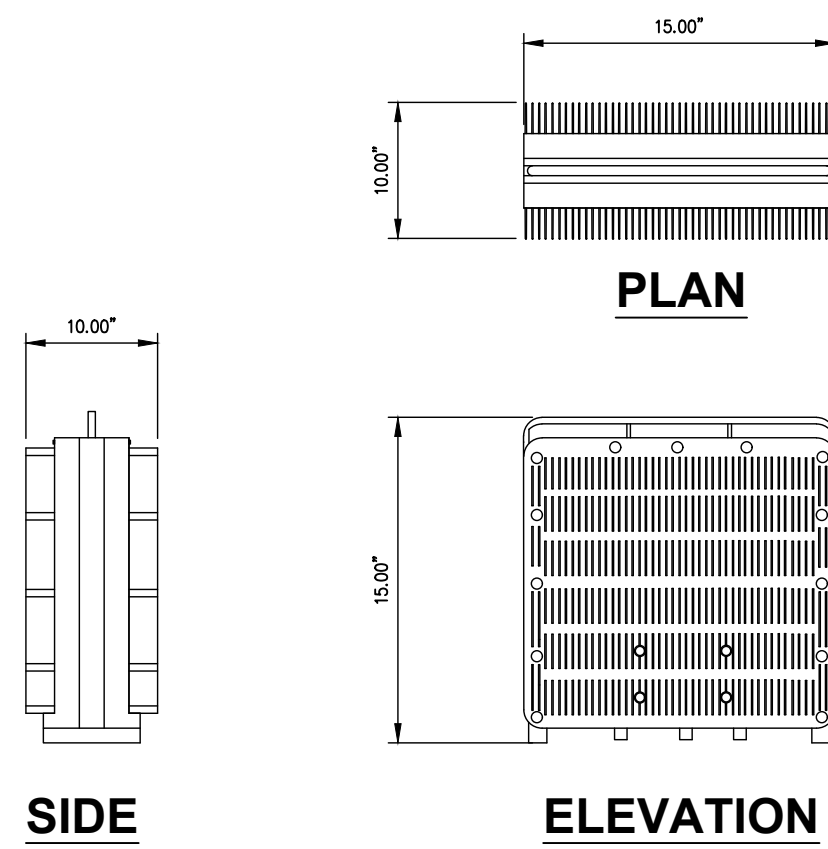
DIMENSIONS, HxWxD: 35.06"x16.06"x5.51"
 WEIGHT, W/O BRACKETS: 81.57 lbs



1 VZW SUB6 ANTENNA – VZS01 ANTENNA DETAIL
 SCALE: NOT TO SCALE

SAMSUNG B2/B66A RRH-BR049 (RFV01U-D1A)

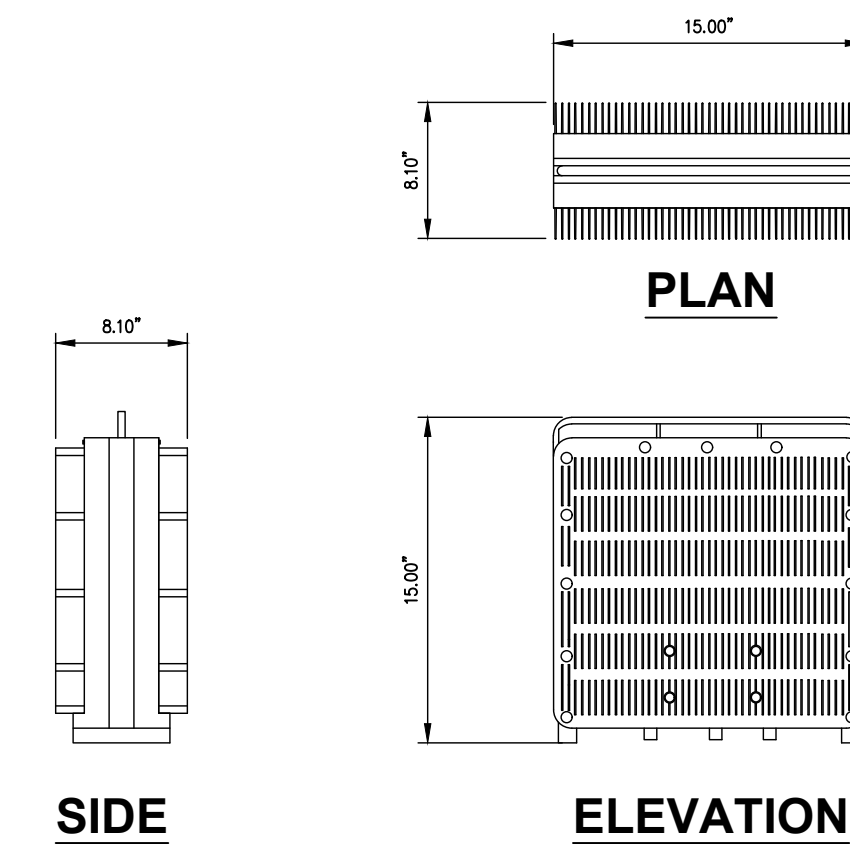
DIMENSIONS, WxDxH: 15.00" X 15.00" X 10.00"
 TOTAL WEIGHT: 84.40 lbs
 TEMPERATURE: -40° TO 55° C



2 SAMSUNG B2/B66A RRH-BR049 DETAIL
 SCALE: NOT TO SCALE

SAMSUNG B5/B13 RRH-BR04C (RFV01U-D2A)

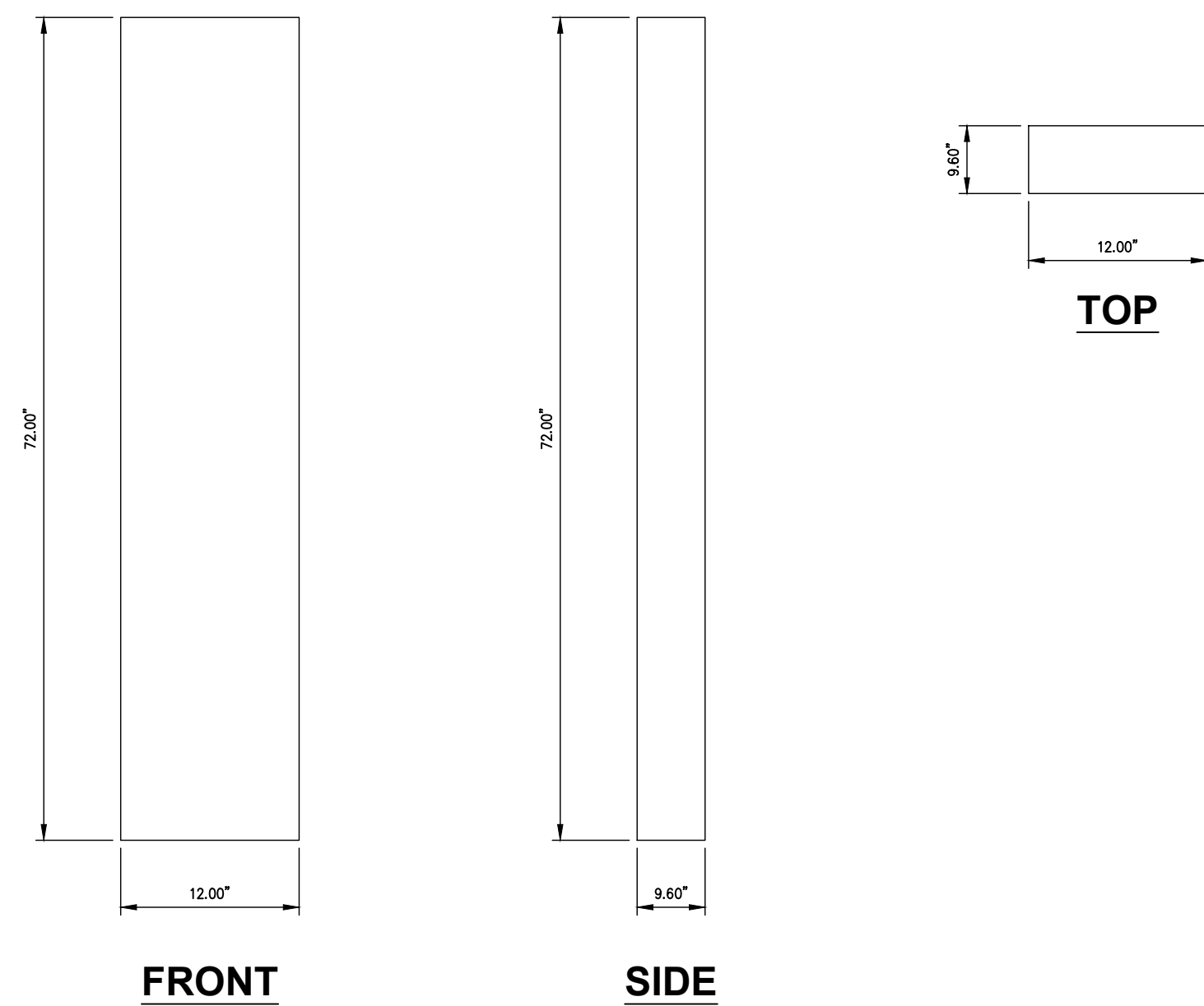
DIMENSIONS, WxDxH: 15.00" X 15.00" X 8.10"
 TOTAL WEIGHT: 70.30 lbs
 TEMPERATURE: -40° TO 55° C



3 SAMSUNG B5/B13 RRH-BR04C DETAIL
 SCALE: NOT TO SCALE

QUINTEL PANEL ANTENNA (QS6656-5D)

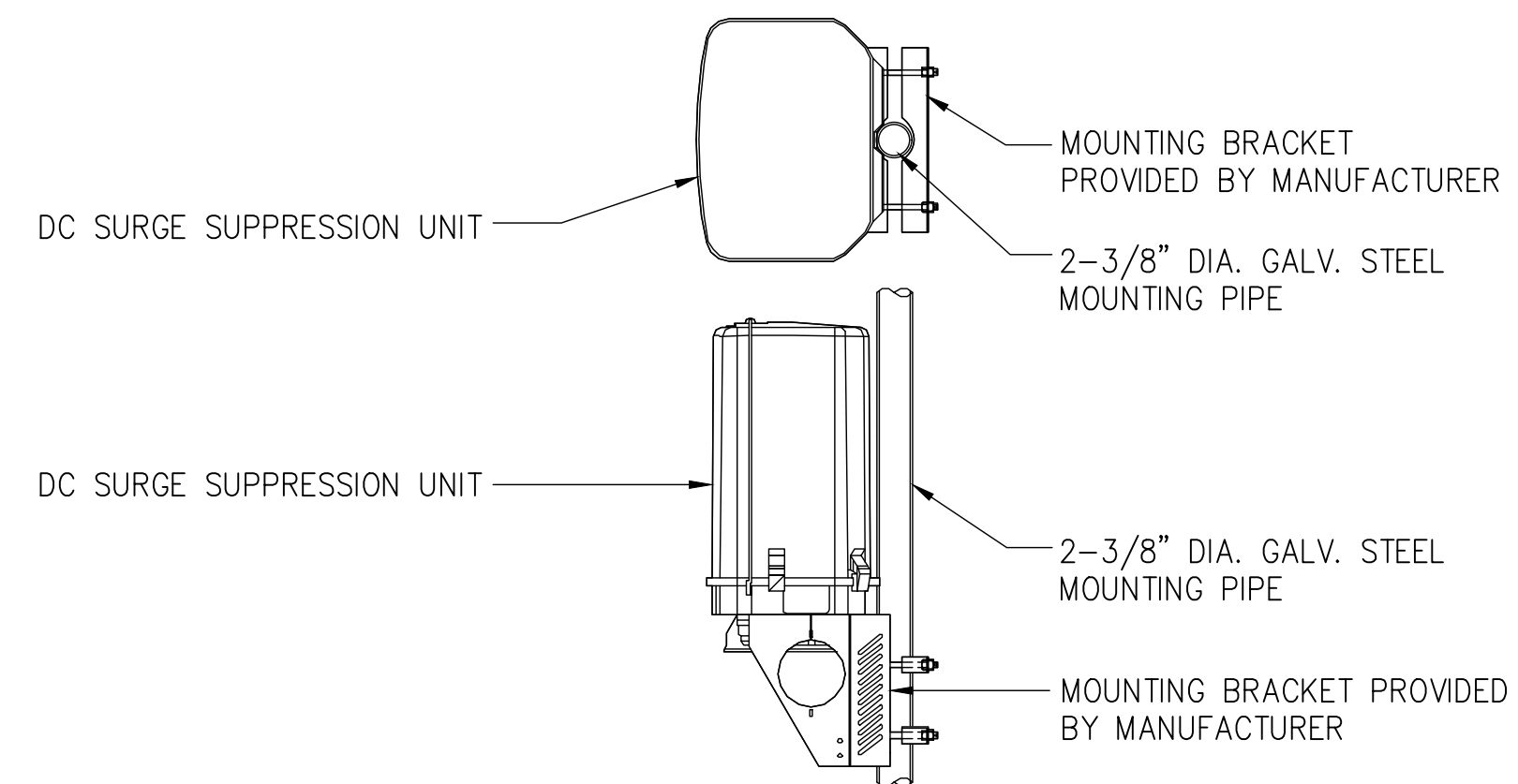
DIMENSIONS, HxWxD: 72.00"x11.90"x9.60"
 WEIGHT, W/O BRACKETS: 88.00 lbs



4 QUINTEL QS6656-5D ANTENNA DETAIL
 SCALE: NOT TO SCALE

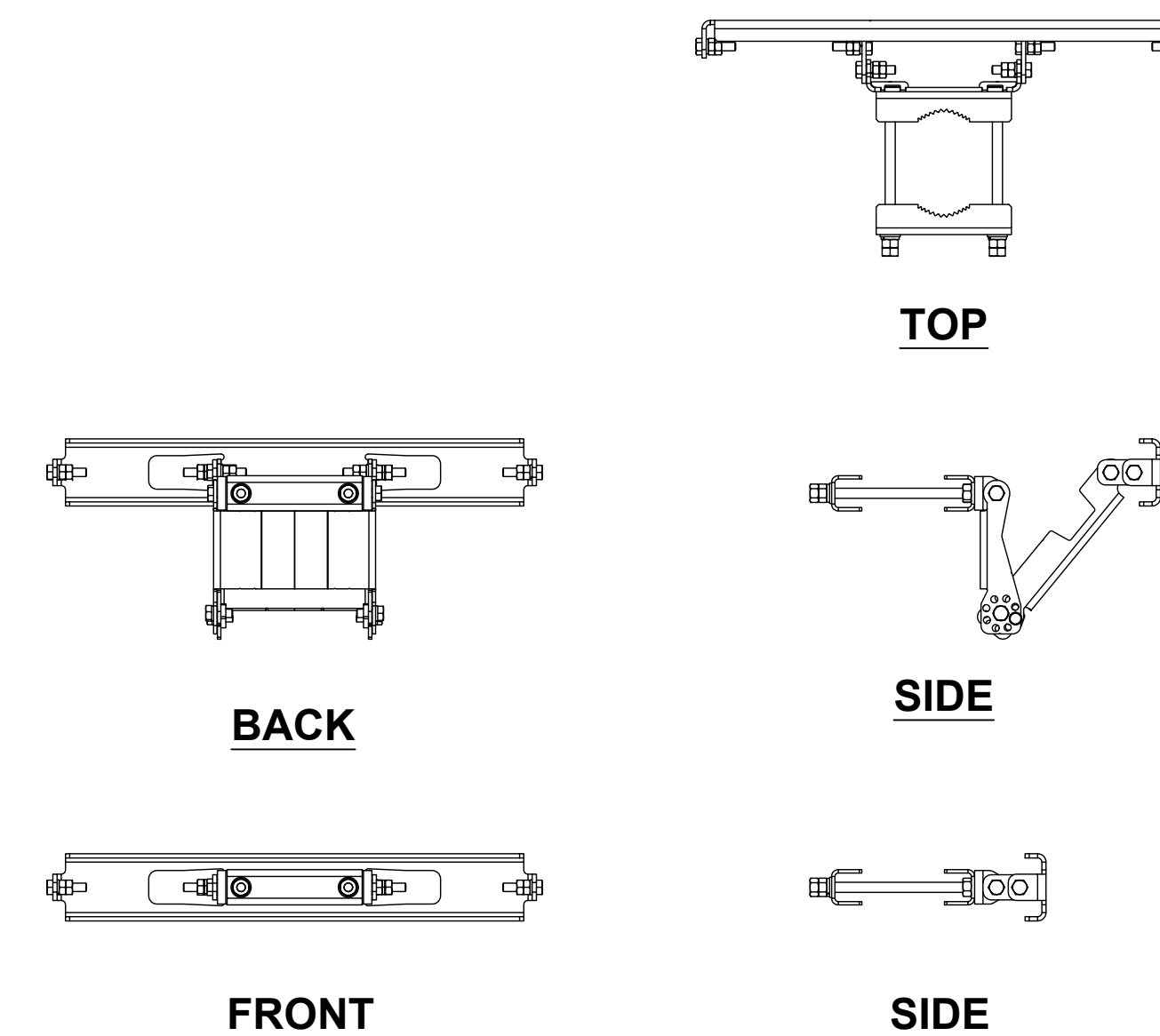
RAYCAP (RVZDC-6627-PF-48)

DIMENSIONS, HxWxD: 25.66"x15.73"x10.25"
 WEIGHT, W/O BRACKETS: 21.40 lbs



5 RVZDC-6627-PF-48 OVP DETAIL
 SCALE: NOT TO SCALE

COMMSCOPE ANTENNA BRACKET (BSAMNT-SBS-2-2)



6 COMMSCOPE BSAMNT-SBS-2-2 ANTENNA BRACKET DETAIL
 SCALE: NOT TO SCALE

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 BU #: 876369
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 64 HUNGERFORD LANE
 HARWINTON, CT 06794
 EXISTING 178'-0" MONOPOLE

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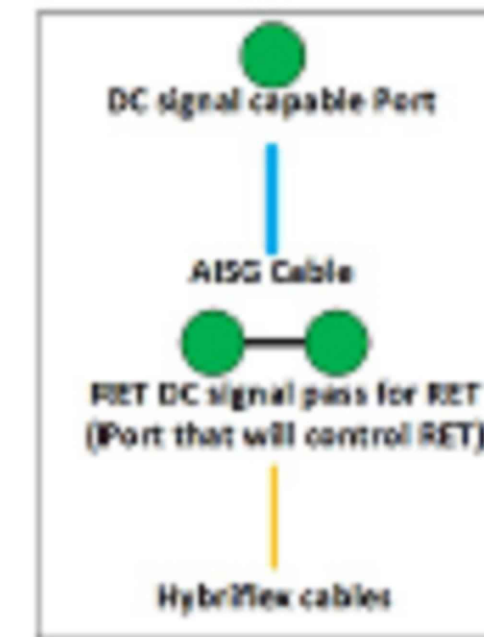
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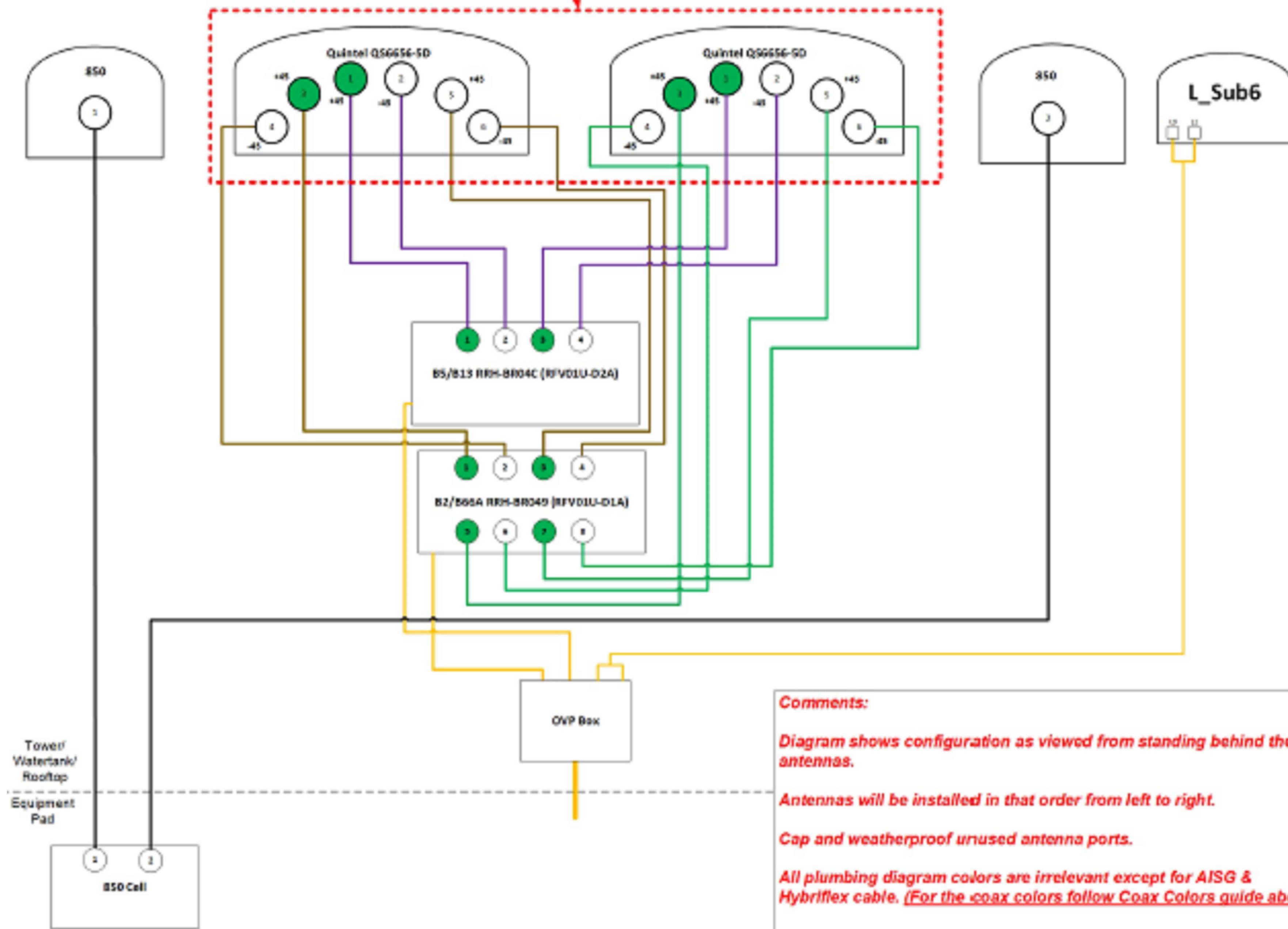
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- Port 1 & 2 are for low band (698-836 MHz).
- Port 3,4,5, & 6 are for high band (1695-2360 MHz).
- Antenna Smart Bias Tee (SBT) is through port 1 for low band and port 3 for high band.
- AISG cable is only needed when drawn in the diagrams below, if it is not drawn then SBT is enough to control all RET motors.
- Not all SBT ports are needed to control RET, only green port connection to green port will control RET.



2" Side By Side Mount



Comments:

Diagram shows configuration as viewed from standing behind the antennas.

Antennas will be installed in that order from left to right.

Cap and weatherproof unused antenna ports.

All plumbing diagram colors are irrelevant except for AISG & Hybriflex cable. (For the coax colors follow Coax Colors guide above)

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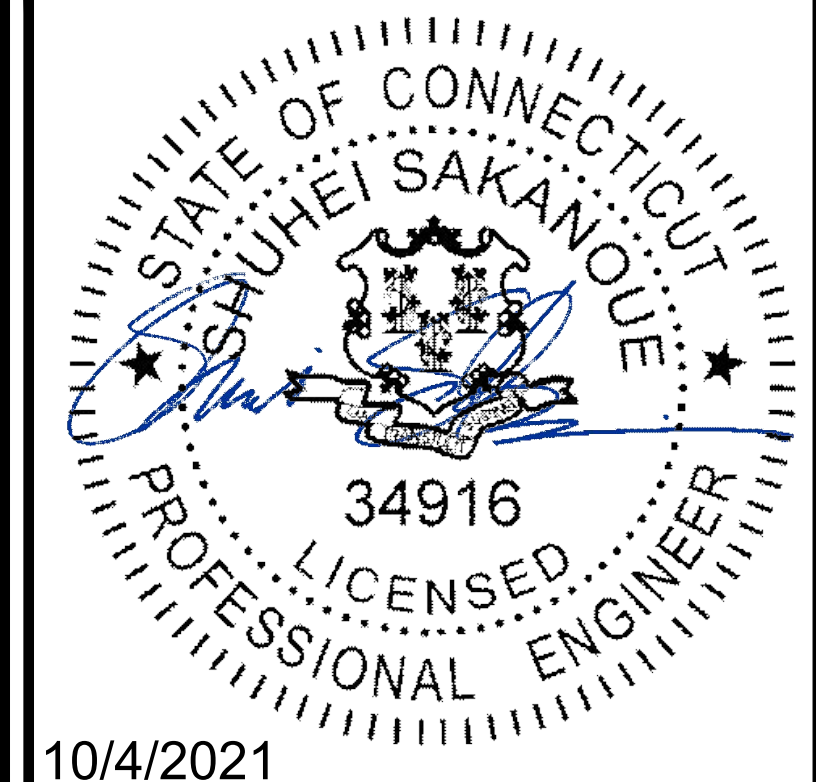
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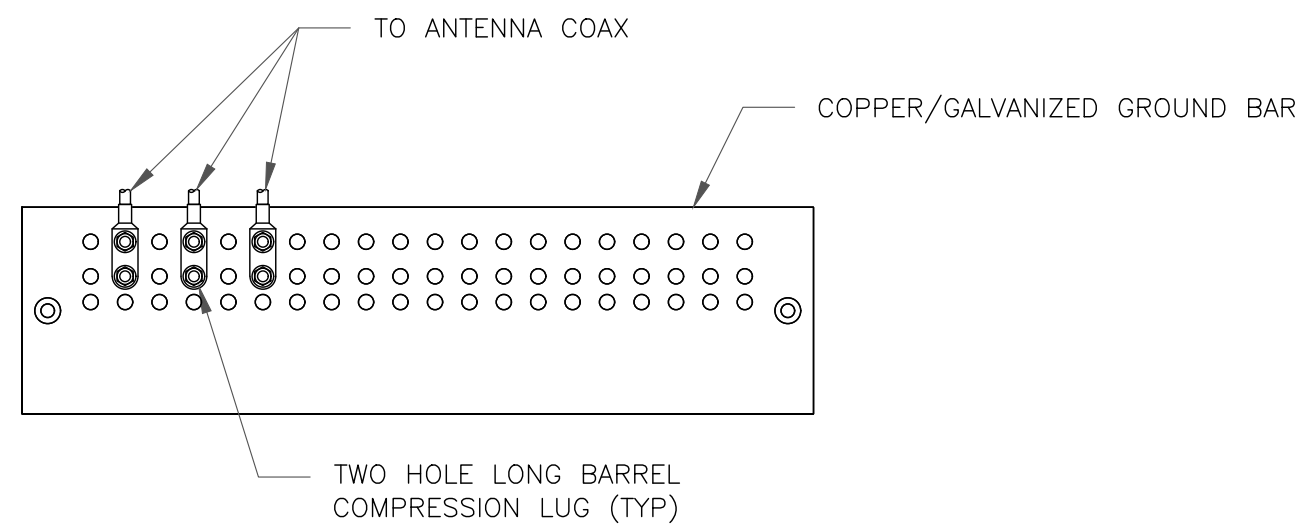
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BU #: 876369
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64 HUNGERFORD LANE
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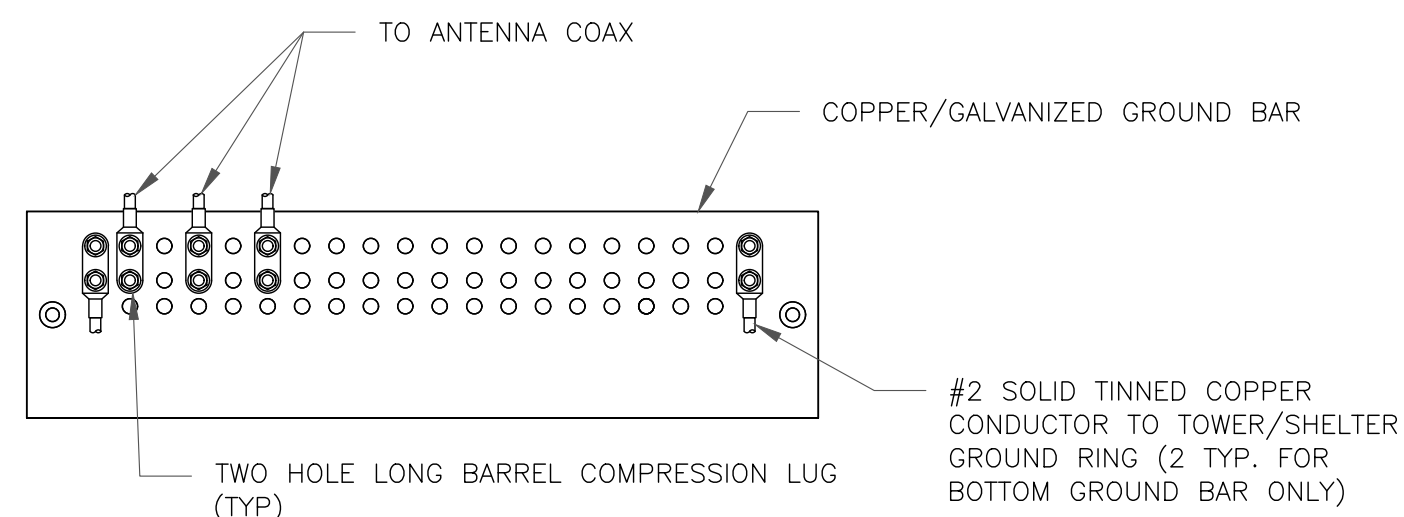
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NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO ANTENNA MOUNT STEEL.

1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE

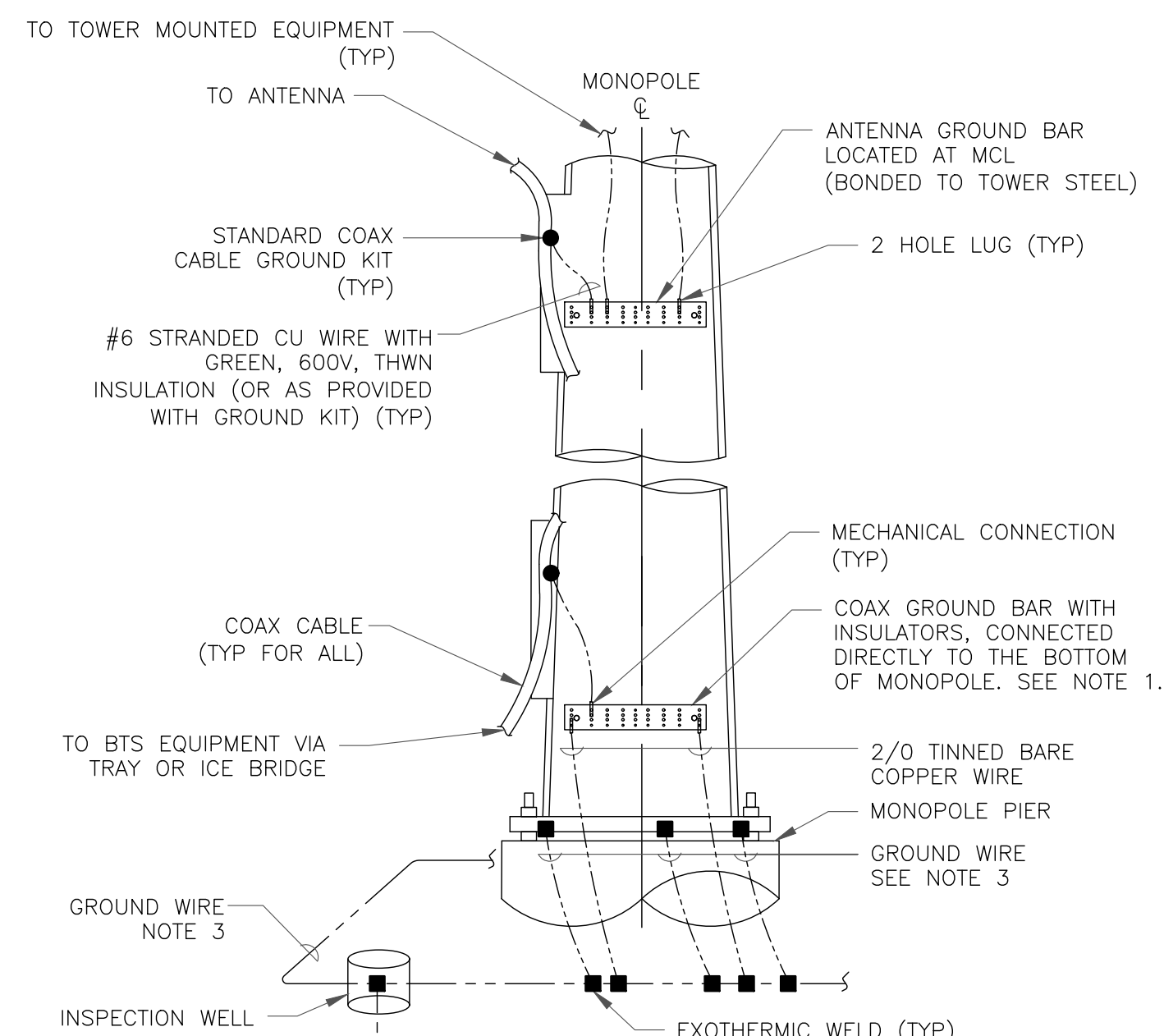


NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE

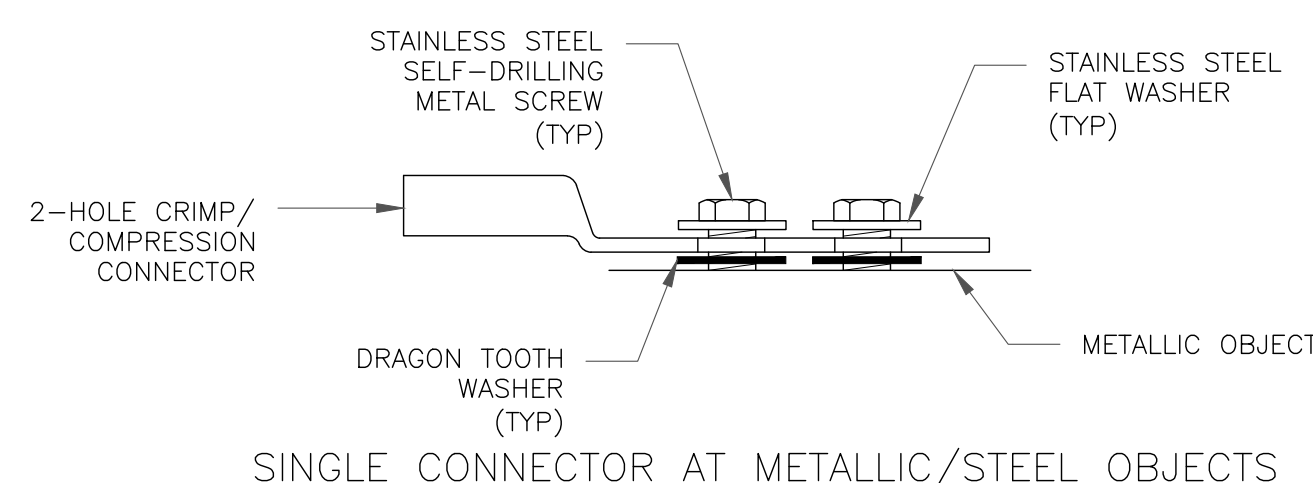
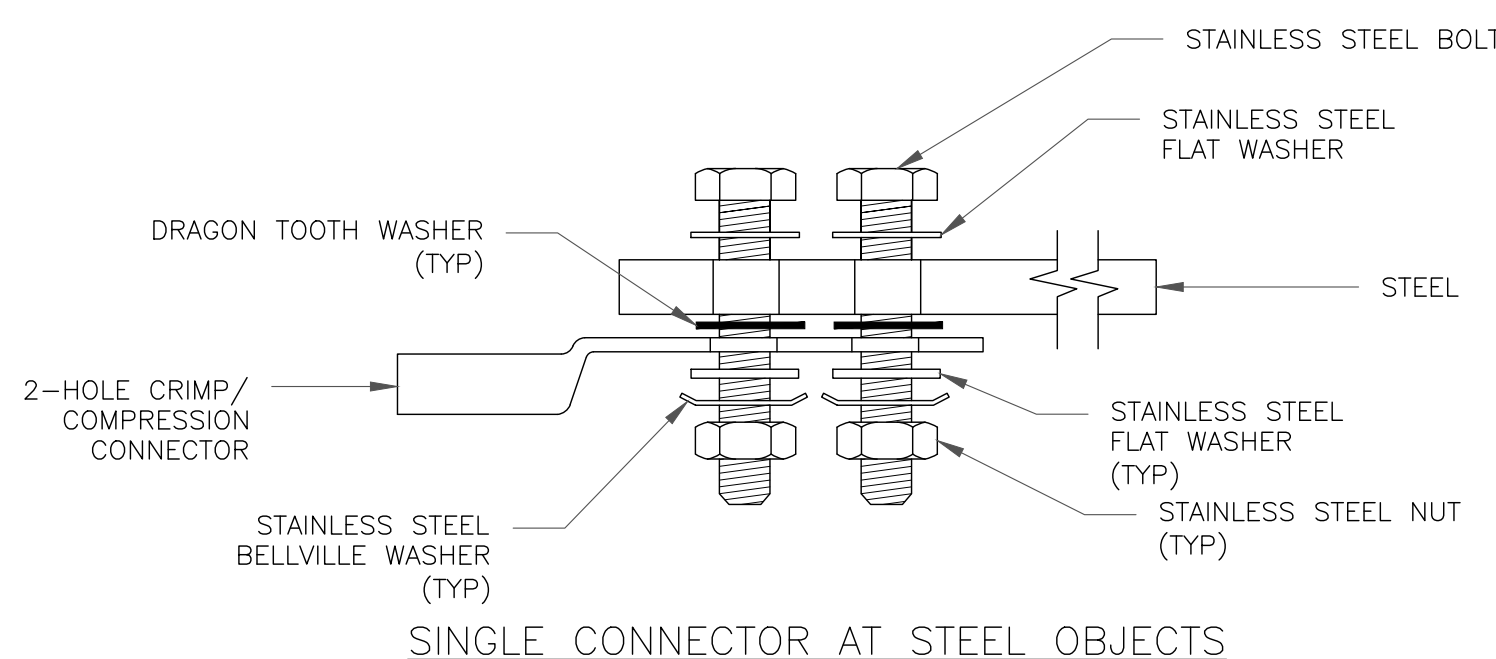
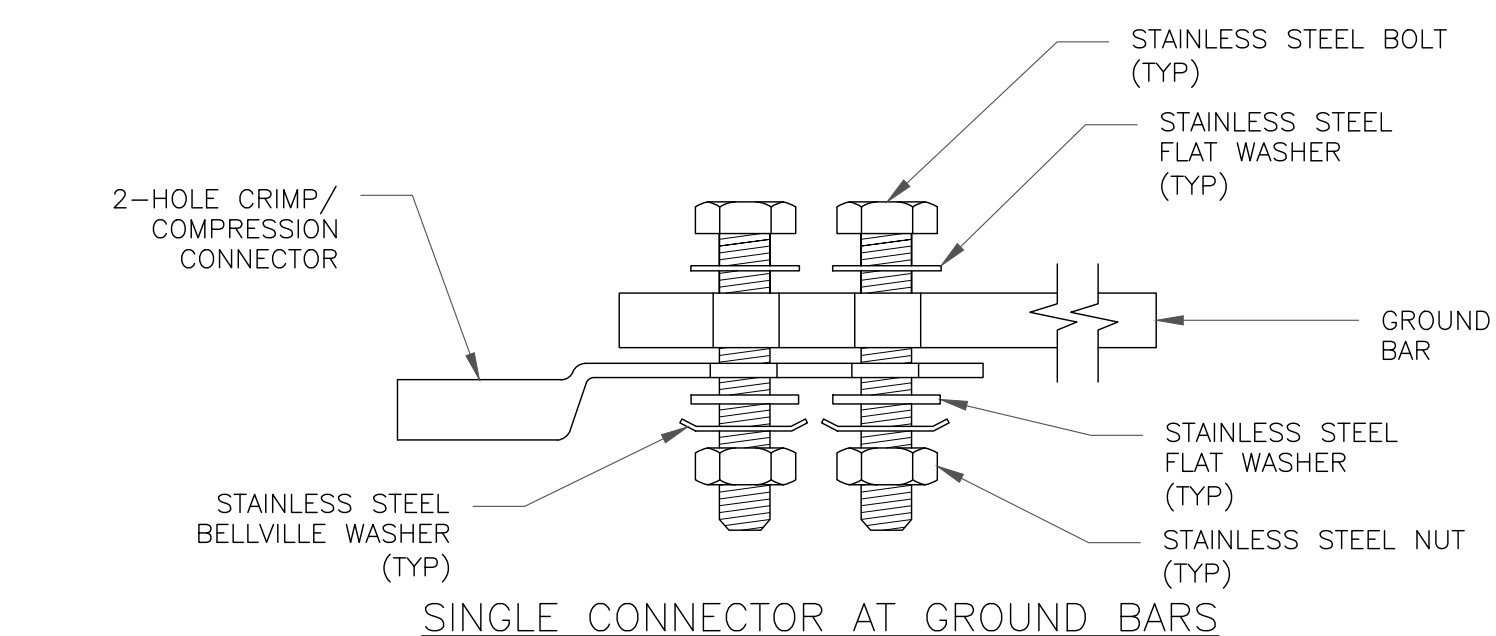
3 NOT USED
SCALE: NOT TO SCALE



NOTES:

1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATIONS AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET ON THE TOWER SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE USA INC. TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE RECOGNIZED EDITION OF ANSI/TIA 222 AND NFPA 780.

4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE

6 NOT USED
SCALE: NOT TO SCALE

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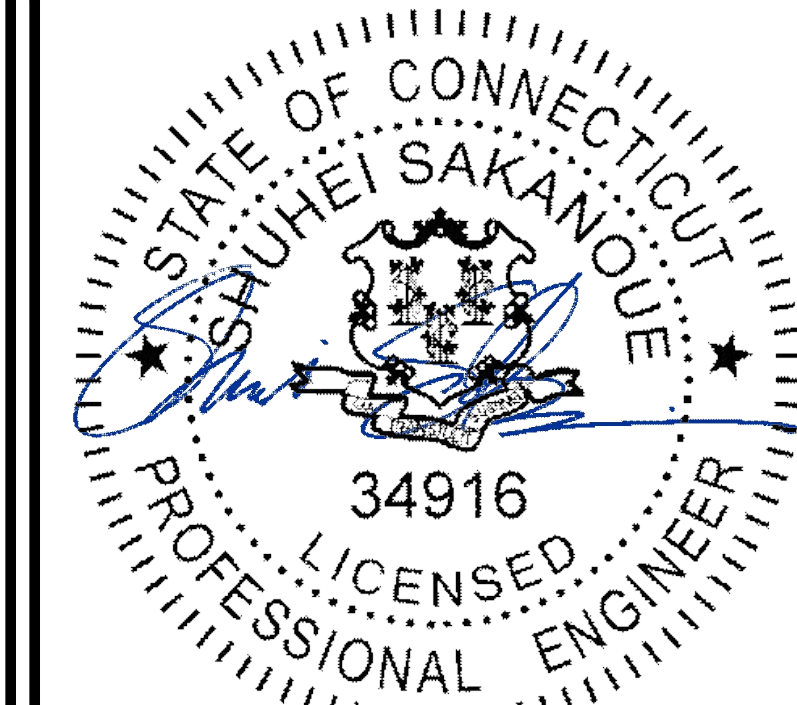
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BROADCASTI

64 HUNGERFORD LANE
HARWINTON, CT 06794

EXISTING 178'-0" MONOPOLE

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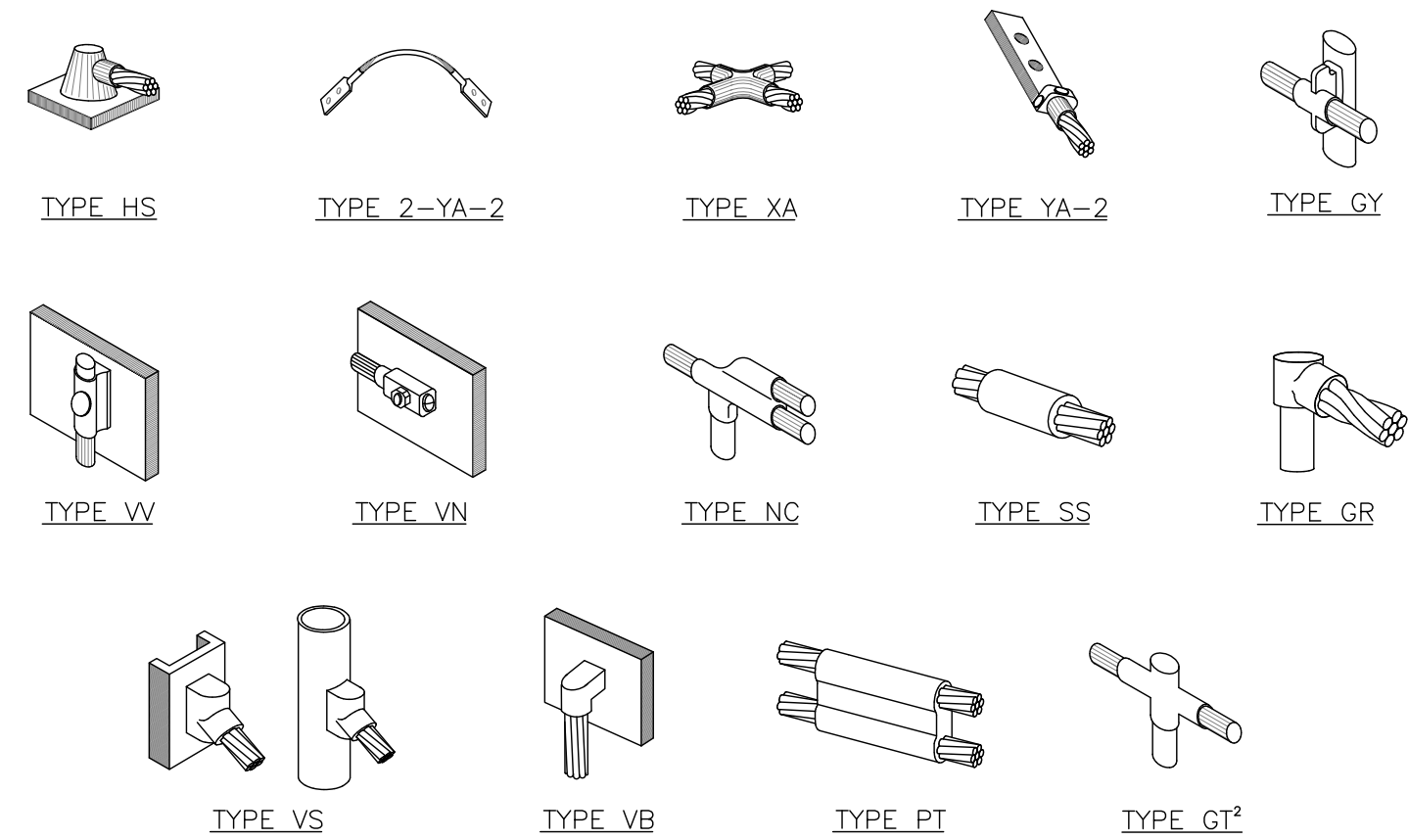
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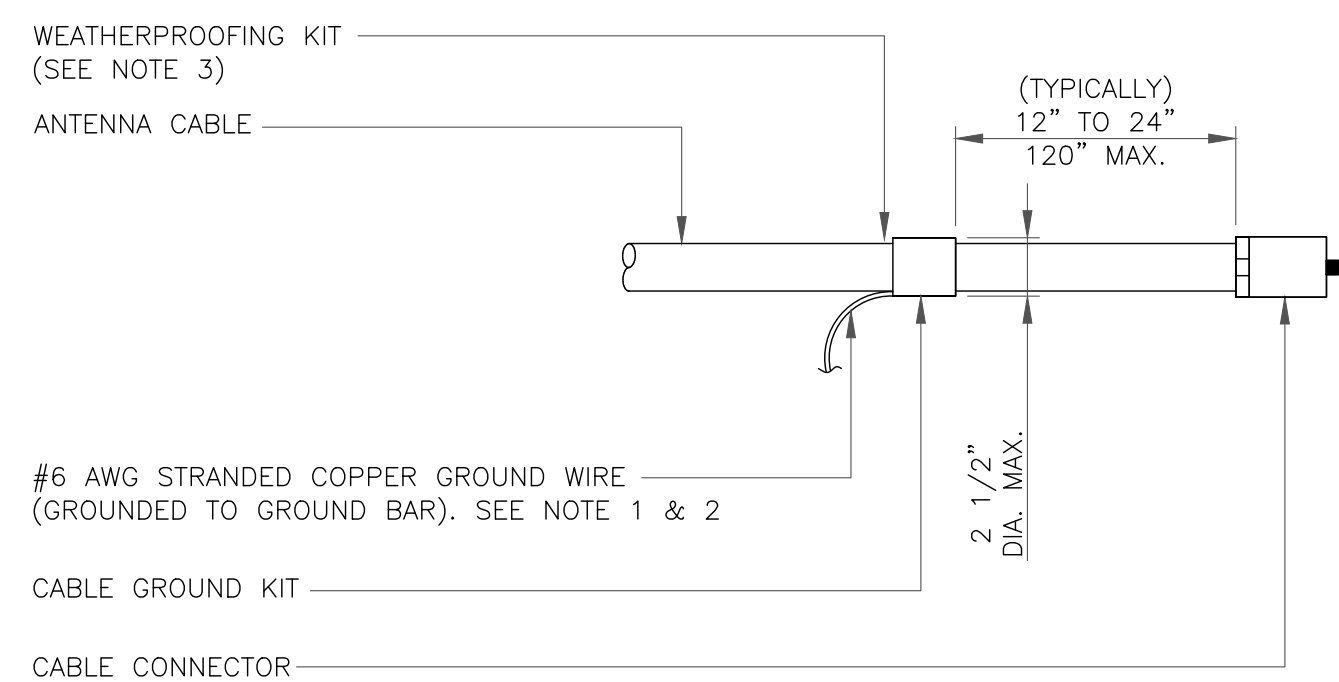
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NOTE:

1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

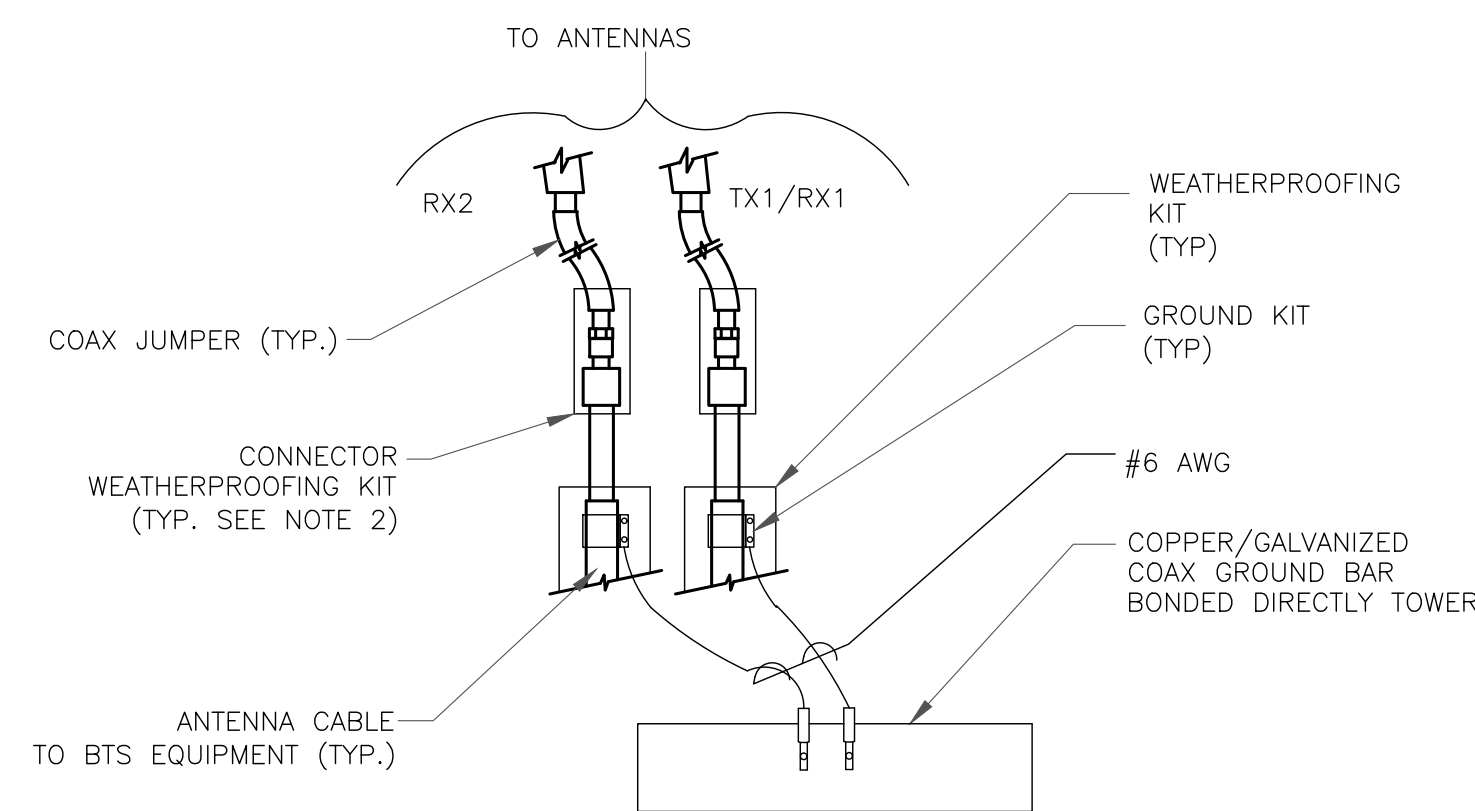
1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

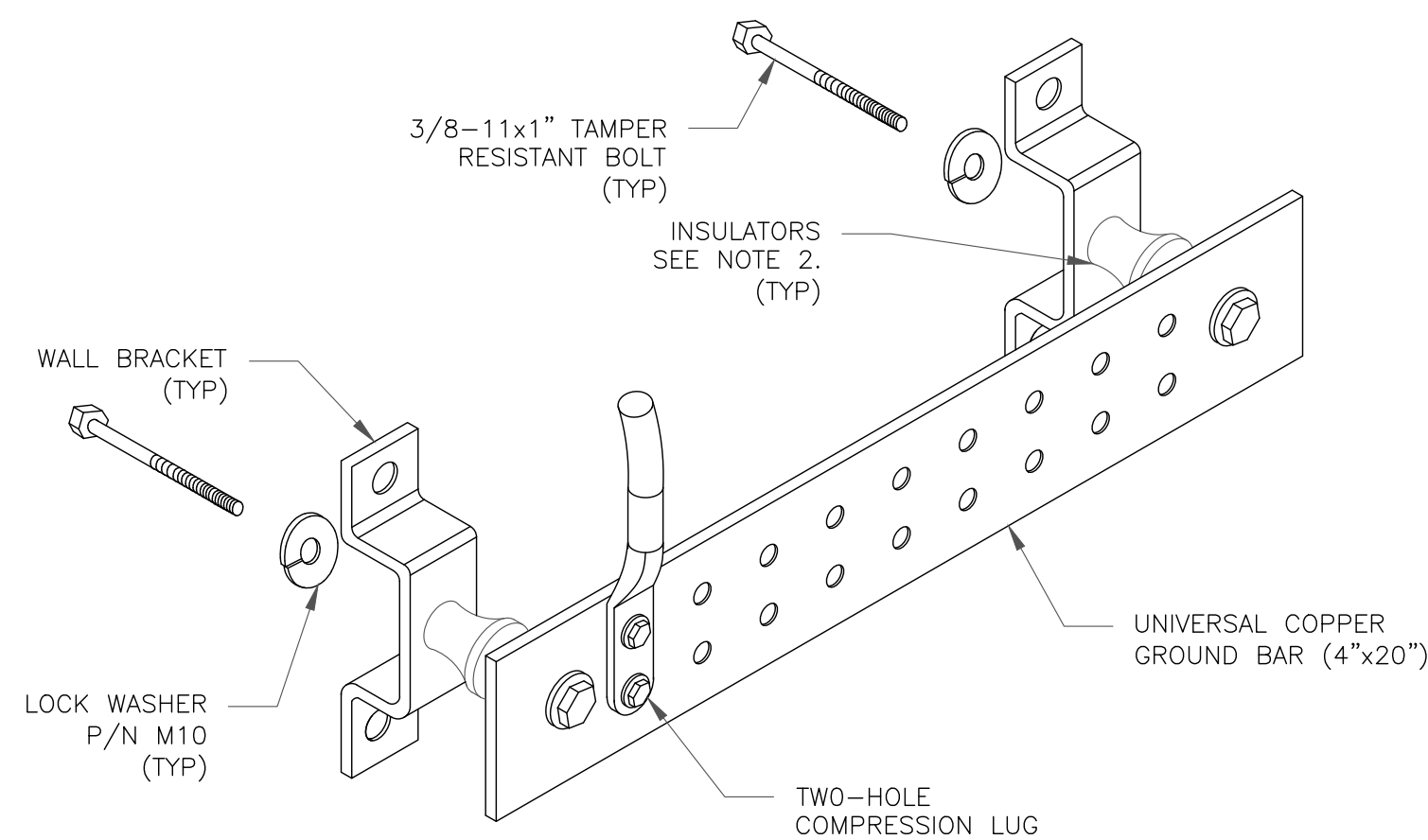
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

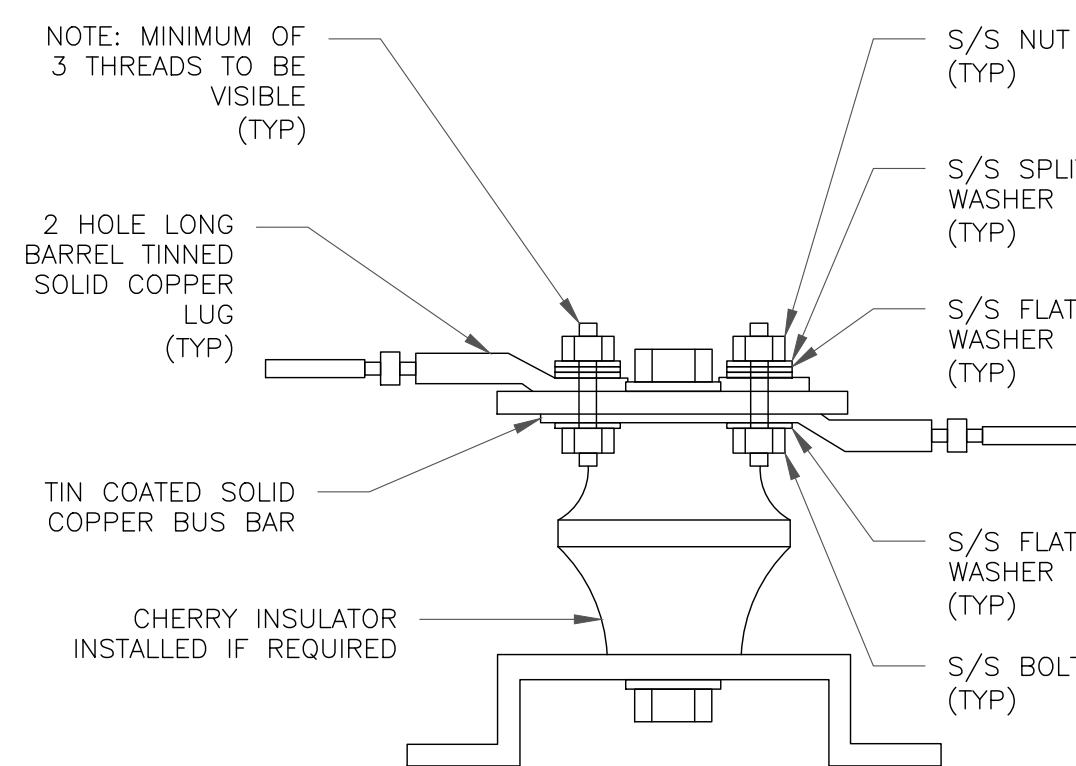
4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



NOTES:

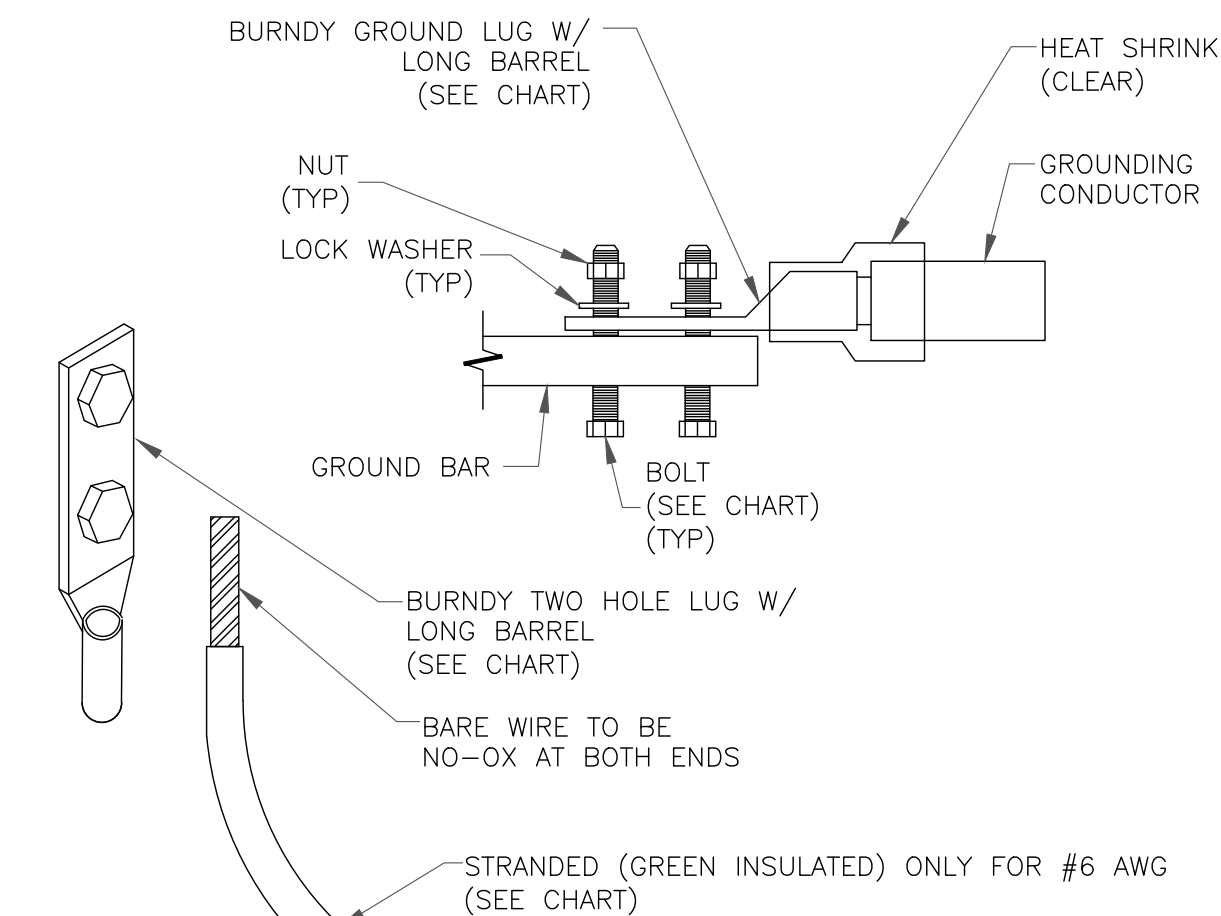
1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION. CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL. USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE

WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER, GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE

5 NOT USED
SCALE: NOT TO SCALE

8 NOT USED
SCALE: NOT TO SCALE

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STATE OF CONNECTICUT
SHUHEI SAKANOU
34916
LICENSED PROFESSIONAL ENGINEER
10/4/2021

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SHEET NUMBER: **G-2** REVISION: **2**

Exhibit D

Structural Analysis Report

Date: **May 4, 2021**



Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351

Subject: Structural Analysis Report

Carrier Designation: **Verizon Wireless Co-Locate**
Site Number: 469283
Site Name: Harwinton 1 CT

Crown Castle Designation: **BU Number:** 876369
Site Name: Harwinton / Buckley Broadcasti
JDE Job Number: 644650
Work Order Number: 1957191
Order Number: 552649 Rev. 1

Engineering Firm Designation: **TEP Project Number:** 217429.537478

Site Data: **64 Hungerford Lane, Harwinton, Litchfield County, CT 06791**
Latitude 41° 45' 26.15", Longitude -73° 3' 9.20"
178 Foot - Monopole Tower

Tower Engineering Professionals is pleased to submit this “**Structural Analysis Report**” to determine the structural integrity of the above-mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Proposed Equipment Configuration

Sufficient Capacity - 73.3%

This analysis utilizes an ultimate 3-second gust wind speed of 118 mph as required by the 2015 International Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Adam J. Schutt / RAL

Respectfully submitted by:

Aaron T. Rucker, P.E.



Electronic Copy

05/04/2021

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Equipment Configuration

Table 2 - Other Considered Equipment

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Table 5 - Tower Component Stresses vs. Capacity

4.1) Recommendations

5) APPENDIX A

tnxTower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 178-ft monopole tower designed by Engineered Endeavors, Inc.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	118 mph
Exposure Category:	C
Topographic Factor:	1.0
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
168.0	170.0	6	Antel	LPA-80080/6CF w/ Mount Pipe	7	1-5/8
		6	Quintel Technology	QS6656-5D w/ Mount Pipe		
		3	Samsung Telecom.	MT6407-77A w/ Mount Pipe		
		1	RFS Celwave	DB-C1-12C-24AB-0Z		
		3	Samsung Telecom.	RFV01U-D1A		
		3	Samsung Telecom.	RFV01U-D2A		
	168.0	1	Tower Mounts	Platform Mount [LP 403-1]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
178.0	180.0	3	RFS Celwave	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	4	1-5/8
		3	RFS Celwave	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe		
		3	Ericsson	AIR6449 B41_T-MOBILE w/ Mount Pipe		
		3	Ericsson	RADIO 4415 B66A_CCIV3		
		3	Ericsson	RADIO 4449 B71 B85A_T-MOBILE		
		3	Ericsson	RADIO 4424 B25_TMO		
	178.0	1	SitePro1	RMQP-496-HK Platform Mount		
		3	SitePro1	PRK-1245 Kicker Kit		
		1	SitePro1	HRK12 Support Rail		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
156.0	158.0	3	Powerwave Tech.	7770.00 w/ Mount Pipe	12 2 2 2	1-5/8 3/8 7/16 3/4
		1	CCI Antennas	HPA65R-BU6A w/ Mount Pipe		
		2	Commscope	SBNHH-1D65A w/ Mount Pipe		
		3	Kathrein	80010964 w/ Mount Pipe		
		6	Powerwave Tech.	LGP21401		
		3	Ericsson	RRUS 4449 B5/B12		
		3	Ericsson	RRUS 8843 B2/B66A		
		1	Raycap	DC6-48-60-18-8C-EV		
	1	Raycap	DC6-48-60-18-8F			
	156.0	1	Tower Mounts	Platform Mount [LP 303-1]		
75.0	76.0	1	Lucent	KS24019-L112A	1	1/2
	75.0	1	Tower Mount	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Geotechnical Report	1532983	CCISites
Tower Foundation Drawings	2150286	CCISites
Tower Manufacturer Drawings	2150280	CCISites

3.1) Analysis Method

tnxTower (version 8.0.9.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 Standard.

3.2) Assumptions

- 1) The tower and structures were maintained in accordance with the TIA-222 Standard.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2, and the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Tower Engineering Professionals should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (k)	ϕP_{allow} (k)	% Capacity	Pass / Fail	
L1	178 - 129.87	Pole	TP29.64x19.5x0.25	1	-14.01	1388.85	60.8	Pass	
L2	129.87 - 84.83	Pole	TP38.5x28.2446x0.375	2	-23.19	2706.23	56.6	Pass	
L3	84.83 - 41.2833	Pole	TP46.8x36.6403x0.4375	3	-35.99	3840.78	56.1	Pass	
L4	41.2833 - 0	Pole	TP54.5x44.5913x0.5	4	-55.10	5264.00	53.2	Pass	
							Summary		
							Pole (L1)	60.8	Pass
							RATING =	60.8	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	-	54.5	Pass
1,2	Base Plate	-	60.2	Pass
1,2	Base Foundation Soil Interaction	-	65.4	Pass
1,2	Base Foundation Structural	-	73.3	Pass

Structure Rating (max from all components) =	73.3%
---	--------------

Notes:

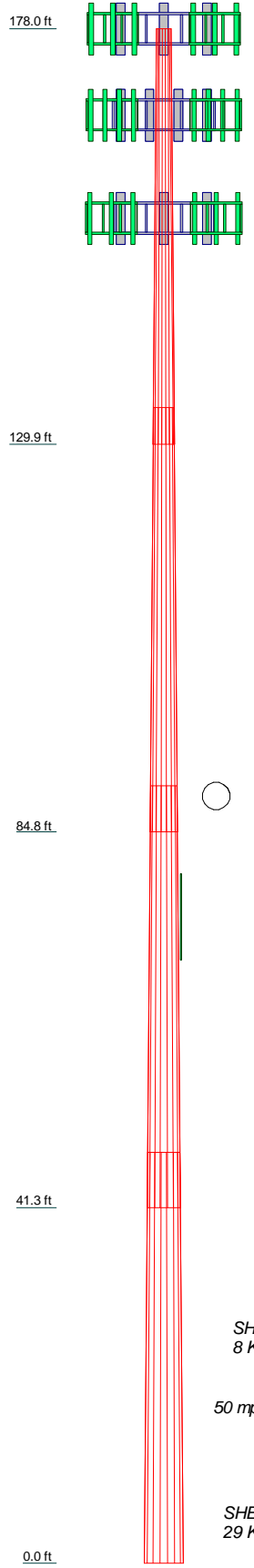
- 1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.
- 2) Rating per TIA-222-H Section 15.5

4.1) Recommendations

- 1) The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A
TNXTOWER OUTPUT

Section	1	2	3	4	
Length (ft)	48.13	49.29	48.88	47.70	
Number of Sides	18	18	18	18	
Thickness (in)	0.2500	0.3750	0.4375	0.5000	
Socket Length (ft)	4.25	5.33	6.42		
Top Dia (in)	19.5000	28.2446	36.6403	44.5913	
Bot Dia (in)	29.6400	38.5000	46.8000	54.5000	
Grade		A572-65			
Weight (K)	3.2	6.6	9.5	12.6	31.9



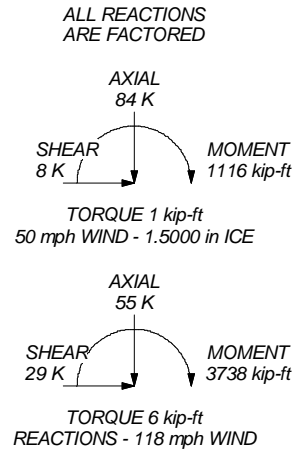
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-H Standard.
2. Tower designed for a 118 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 60.8%

178.0 ft
129.9 ft
84.8 ft
41.3 ft
0.0 ft



Tower Engineering Professionals		Job: Harwinton/ Buckley Broadcasti (BU 876369)	
326 Tryon Road Raleigh, NC 27603		Project: TEP No. 217429.537478	
Phone: (919) 661-6351		Client: Crown Castle	Drawn by: Julie C. Ryland
FAX: (919) 661-6350		Code: TIA-222-H	Date: 05/03/21
Tower Engineering Professionals		Path:	App'd: _____ Scale: NTS
		Dwg No. E-1	

tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job Harwinton/ Buckley Broadcasti (BU 876369)	Page 1 of 12
	Project TEP No. 217429.537478	Date 19:48:26 05/03/21
	Client Crown Castle	Designed by Julie C. Ryland

Tower Input Data

The tower is a monopole.

This tower is designed using the TIA-222-H standard.

The following design criteria apply:

- Tower base elevation above sea level: 841.00 ft.
- Basic wind speed of 118 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.5000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- Maximum demand-capacity ratio is: 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

- | | | |
|--|---|---|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination √ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs | <ul style="list-style-type: none"> Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption <li style="text-align: center;">Poles √ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known |
|--|---|---|

Tapered Pole Section Geometry

tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job Harwinton/ Buckley Broadcasti (BU 876369)	Page 3 of 12
	Project TEP No. 217429.537478	Date 19:48:26 05/03/21
	Client Crown Castle	Designed by Julie C. Ryland

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _{AA} ft ² /ft	Weight plf

HB158-21U6S24-xx M_TMO(1-5/8)	C	No	No	Inside Pole	178.00 - 0.00	4	No Ice	0.00	2.50
							1/2" Ice	0.00	2.50
							1" Ice	0.00	2.50
							2" Ice	0.00	2.50
LDF7-50A(1-5/8)	C	No	No	Inside Pole	168.00 - 0.00	4	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82

2" innerduct conduit	C	No	No	Inside Pole	156.00 - 0.00	1	No Ice	0.00	0.20
							1/2" Ice	0.00	0.20
							1" Ice	0.00	0.20
							2" Ice	0.00	0.20
LDF7-50A(1-5/8)	C	No	No	Inside Pole	156.00 - 0.00	12	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
FB-L98B-002-75000 (3/8)	C	No	No	Inside Pole	156.00 - 0.00	2	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-VG122ST-BRD A(7/16)	C	No	No	Inside Pole	156.00 - 0.00	2	No Ice	0.00	0.14
							1/2" Ice	0.00	0.14
							1" Ice	0.00	0.14
							2" Ice	0.00	0.14
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	156.00 - 0.00	2	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
							2" Ice	0.00	0.58

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	178.00-129.87	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	22.649	0.000	0.09
		C	0.000	0.000	1.805	0.000	0.92
L2	129.87-84.83	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	26.754	0.000	0.11
		C	0.000	0.000	1.689	0.000	1.13
L3	84.83-41.28	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	27.974	0.000	0.11
		C	0.000	0.000	1.633	0.000	1.09
L4	41.28-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	26.602	0.000	0.11
		C	0.000	0.000	1.173	0.000	1.03

tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job Harwinton/ Buckley Broadcasti (BU 876369)	Page 4 of 12
	Project TEP No. 217429.537478	Date 19:48:26 05/03/21
	Client Crown Castle	Designed by Julie C. Ryland

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L1	178.00-129.87	A	1.486	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	42.475	0.000	0.53
		C		0.000	0.000	16.108	0.000	1.08
L2	129.87-84.83	A	1.434	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	50.173	0.000	0.63
		C		0.000	0.000	15.074	0.000	1.28
L3	84.83-41.28	A	1.359	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	59.714	0.000	0.71
		C		0.000	0.000	14.118	0.000	1.23
L4	41.28-0.00	A	1.218	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	55.813	0.000	0.65
		C		0.000	0.000	9.679	0.000	1.12

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	178.00-129.87	3.1396	0.8985	2.6501	1.4918
L2	129.87-84.83	3.8276	1.0495	3.3727	1.7063
L3	84.83-41.28	4.0727	0.7946	3.9066	0.9966
L4	41.28-0.00	4.1891	0.7522	4.1286	0.7782

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	1	Safety Line 3/8	129.87 - 178.00	1.0000	1.0000
L1	7	LDF7-50A(1-5/8)	129.87 - 168.00	1.0000	1.0000
L2	1	Safety Line 3/8	84.83 - 129.87	1.0000	1.0000
L2	7	LDF7-50A(1-5/8)	84.83 - 129.87	1.0000	1.0000
L3	1	Safety Line 3/8	41.28 - 84.83	1.0000	1.0000
L3	7	LDF7-50A(1-5/8)	41.28 - 84.83	1.0000	1.0000
L3	16	LDF4-50A(1/2)	41.28 - 75.00	1.0000	1.0000
L4	1	Safety Line 3/8	10.00 - 41.28	1.0000	1.0000
L4	7	LDF7-50A(1-5/8)	0.00 - 41.28	1.0000	1.0000
L4	16	LDF4-50A(1/2)	8.00 - 41.28	1.0000	1.0000

tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job Harwinton/ Buckley Broadcasti (BU 876369)	Page 5 of 12
	Project TEP No. 217429.537478	Date 19:48:26 05/03/21
	Client Crown Castle	Designed by Julie C. Ryland

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	CAAA Front	CAAA Side	Weight
			Horz Lateral	Vert					
			ft	ft	°	ft	ft ²	ft ²	K
178									
APX16DWV-16DWV-S-E-A 20 w/ Mount Pipe	A	From Centroid-Face	4.00	0.0000	178.00	No Ice	6.29	2.76	0.06
			0.00	0.0000		1/2" Ice	6.86	3.27	0.11
			2.00	0.0000		1" Ice	7.45	3.79	0.16
				0.0000		2" Ice	8.68	4.90	0.29
APX16DWV-16DWV-S-E-A 20 w/ Mount Pipe	B	From Centroid-Face	4.00	0.0000	178.00	No Ice	6.29	2.76	0.06
			0.00	0.0000		1/2" Ice	6.86	3.27	0.11
			2.00	0.0000		1" Ice	7.45	3.79	0.16
				0.0000		2" Ice	8.68	4.90	0.29
APX16DWV-16DWV-S-E-A 20 w/ Mount Pipe	C	From Centroid-Face	4.00	0.0000	178.00	No Ice	6.29	2.76	0.06
			0.00	0.0000		1/2" Ice	6.86	3.27	0.11
			2.00	0.0000		1" Ice	7.45	3.79	0.16
				0.0000		2" Ice	8.68	4.90	0.29
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	A	From Centroid-Face	4.00	0.0000	178.00	No Ice	14.69	6.87	0.18
			0.00	0.0000		1/2" Ice	15.46	7.55	0.31
			2.00	0.0000		1" Ice	16.23	8.25	0.45
				0.0000		2" Ice	17.82	9.67	0.78
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	B	From Centroid-Face	4.00	0.0000	178.00	No Ice	14.69	6.87	0.18
			0.00	0.0000		1/2" Ice	15.46	7.55	0.31
			2.00	0.0000		1" Ice	16.23	8.25	0.45
				0.0000		2" Ice	17.82	9.67	0.78
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	C	From Centroid-Face	4.00	0.0000	178.00	No Ice	14.69	6.87	0.18
			0.00	0.0000		1/2" Ice	15.46	7.55	0.31
			2.00	0.0000		1" Ice	16.23	8.25	0.45
				0.0000		2" Ice	17.82	9.67	0.78
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Centroid-Face	4.00	0.0000	178.00	No Ice	5.19	2.71	0.13
			0.00	0.0000		1/2" Ice	5.59	3.04	0.17
			2.00	0.0000		1" Ice	6.02	3.38	0.23
				0.0000		2" Ice	6.90	4.12	0.35
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Centroid-Face	4.00	0.0000	178.00	No Ice	5.19	2.71	0.13
			0.00	0.0000		1/2" Ice	5.59	3.04	0.17
			2.00	0.0000		1" Ice	6.02	3.38	0.23
				0.0000		2" Ice	6.90	4.12	0.35
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Centroid-Face	4.00	0.0000	178.00	No Ice	5.19	2.71	0.13
			0.00	0.0000		1/2" Ice	5.59	3.04	0.17
			2.00	0.0000		1" Ice	6.02	3.38	0.23
				0.0000		2" Ice	6.90	4.12	0.35
RADIO 4415 B66A_CCIV3	A	From Centroid-Face	4.00	0.0000	178.00	No Ice	1.64	0.68	0.05
			0.00	0.0000		1/2" Ice	1.80	0.79	0.06
			2.00	0.0000		1" Ice	1.97	0.91	0.07
				0.0000		2" Ice	2.32	1.18	0.11
RADIO 4415 B66A_CCIV3	B	From Centroid-Face	4.00	0.0000	178.00	No Ice	1.64	0.68	0.05
			0.00	0.0000		1/2" Ice	1.80	0.79	0.06
			2.00	0.0000		1" Ice	1.97	0.91	0.07
				0.0000		2" Ice	2.32	1.18	0.11
RADIO 4415 B66A_CCIV3	C	From Centroid-Face	4.00	0.0000	178.00	No Ice	1.64	0.68	0.05
			0.00	0.0000		1/2" Ice	1.80	0.79	0.06
			2.00	0.0000		1" Ice	1.97	0.91	0.07
				0.0000		2" Ice	2.32	1.18	0.11
RADIO 4449 B71	A	From	4.00	0.0000	178.00	No Ice	1.97	1.59	0.07

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	Project TEP No. 217429.537478	Date 19:48:26 05/03/21
	Client Crown Castle	Designed by Julie C. Ryland

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	CAAA Front	CAAA Side	Weight
			Horz Lateral	Vert					
B85A_T-MOBILE		Centroid-Fa	0.00			1/2" Ice	2.15	1.75	0.09
		ce	2.00			1" Ice	2.33	1.92	0.12
						2" Ice	2.72	2.28	0.17
RADIO 4449 B71	B	From	4.00	0.0000	178.00	No Ice	1.97	1.59	0.07
B85A_T-MOBILE		Centroid-Fa	0.00			1/2" Ice	2.15	1.75	0.09
		ce	2.00			1" Ice	2.33	1.92	0.12
						2" Ice	2.72	2.28	0.17
RADIO 4449 B71	C	From	4.00	0.0000	178.00	No Ice	1.97	1.59	0.07
B85A_T-MOBILE		Centroid-Fa	0.00			1/2" Ice	2.15	1.75	0.09
		ce	2.00			1" Ice	2.33	1.92	0.12
						2" Ice	2.72	2.28	0.17
RADIO 4424 B25_TMO	A	From	4.00	0.0000	178.00	No Ice	2.05	1.61	0.09
		Centroid-Fa	0.00			1/2" Ice	2.23	1.77	0.11
		ce	2.00			1" Ice	2.42	1.94	0.13
						2" Ice	2.81	2.30	0.19
RADIO 4424 B25_TMO	B	From	4.00	0.0000	178.00	No Ice	2.05	1.61	0.09
		Centroid-Fa	0.00			1/2" Ice	2.23	1.77	0.11
		ce	2.00			1" Ice	2.42	1.94	0.13
						2" Ice	2.81	2.30	0.19
RADIO 4424 B25_TMO	C	From	4.00	0.0000	178.00	No Ice	2.05	1.61	0.09
		Centroid-Fa	0.00			1/2" Ice	2.23	1.77	0.11
		ce	2.00			1" Ice	2.42	1.94	0.13
						2" Ice	2.81	2.30	0.19
Site Pro 1 RMQP-496-HK + PRK-1245 + HRK12	C	None		0.0000	178.00	No Ice	28.31	28.31	1.77
						1/2" Ice	35.69	35.69	2.30
						1" Ice	43.11	43.11	2.94
						2" Ice	58.21	58.21	4.60

168									
(2) LPA-80080/6CF w/ Mount Pipe	A	From	4.00	0.0000	168.00	No Ice	4.56	10.26	0.05
		Centroid-Fa	0.00			1/2" Ice	5.11	11.43	0.11
		ce	2.00			1" Ice	5.61	12.31	0.19
						2" Ice	6.65	14.13	0.36
(2) LPA-80080/6CF w/ Mount Pipe	B	From	4.00	0.0000	168.00	No Ice	4.56	10.26	0.05
		Centroid-Fa	0.00			1/2" Ice	5.11	11.43	0.11
		ce	2.00			1" Ice	5.61	12.31	0.19
						2" Ice	6.65	14.13	0.36
(2) LPA-80080/6CF w/ Mount Pipe	B	From	4.00	0.0000	168.00	No Ice	4.56	10.26	0.05
		Centroid-Fa	0.00			1/2" Ice	5.11	11.43	0.11
		ce	2.00			1" Ice	5.61	12.31	0.19
						2" Ice	6.65	14.13	0.36
(2) QS6656-5D w/ Mount Pipe	A	From	4.00	0.0000	168.00	No Ice	4.04	4.18	0.11
		Centroid-Fa	0.00			1/2" Ice	4.42	4.57	0.18
		ce	2.00			1" Ice	4.82	4.97	0.26
						2" Ice	5.63	5.79	0.46
(2) QS6656-5D w/ Mount Pipe	B	From	4.00	0.0000	168.00	No Ice	4.04	4.18	0.11
		Centroid-Fa	0.00			1/2" Ice	4.42	4.57	0.18
		ce	2.00			1" Ice	4.82	4.97	0.26
						2" Ice	5.63	5.79	0.46
(2) QS6656-5D w/ Mount Pipe	C	From	4.00	0.0000	168.00	No Ice	4.04	4.18	0.11
		Centroid-Fa	0.00			1/2" Ice	4.42	4.57	0.18
		ce	2.00			1" Ice	4.82	4.97	0.26
						2" Ice	5.63	5.79	0.46
MT6407-77A w/ Mount Pipe	A	From	4.00	0.0000	168.00	No Ice	4.91	2.68	0.10
		Centroid-Fa	0.00			1/2" Ice	5.26	3.14	0.14
		ce	2.00			1" Ice	5.61	3.62	0.18
						2" Ice	6.36	4.63	0.29

<p>tnxTower</p> <p>Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350</p>	Job Harwinton/ Buckley Broadcasti (BU 876369)	Page 7 of 12
	Project TEP No. 217429.537478	Date 19:48:26 05/03/21
	Client Crown Castle	Designed by Julie C. Ryland

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
MT6407-77A w/ Mount Pipe	B	From Centroid-Fa ce	4.00	0.0000	168.00	No Ice	4.91	2.68	0.10
			0.00			1/2" Ice	5.26	3.14	0.14
			2.00			1" Ice	5.61	3.62	0.18
						2" Ice	6.36	4.63	0.29
MT6407-77A w/ Mount Pipe	C	From Centroid-Fa ce	4.00	0.0000	168.00	No Ice	4.91	2.68	0.10
			0.00			1/2" Ice	5.26	3.14	0.14
			2.00			1" Ice	5.61	3.62	0.18
						2" Ice	6.36	4.63	0.29
DB-C1-12C-24AB-0Z	A	From Centroid-Fa ce	4.00	0.0000	168.00	No Ice	4.06	3.10	0.03
			0.00			1/2" Ice	4.32	3.34	0.07
			2.00			1" Ice	4.58	3.58	0.11
						2" Ice	5.14	4.09	0.20
RFV01U-D1A	A	From Centroid-Fa ce	4.00	0.0000	168.00	No Ice	1.88	1.25	0.08
			0.00			1/2" Ice	2.05	1.39	0.10
			2.00			1" Ice	2.22	1.54	0.12
						2" Ice	2.60	1.86	0.18
RFV01U-D1A	B	From Centroid-Fa ce	4.00	0.0000	168.00	No Ice	1.88	1.25	0.08
			0.00			1/2" Ice	2.05	1.39	0.10
			2.00			1" Ice	2.22	1.54	0.12
						2" Ice	2.60	1.86	0.18
RFV01U-D1A	C	From Centroid-Fa ce	4.00	0.0000	168.00	No Ice	1.88	1.25	0.08
			0.00			1/2" Ice	2.05	1.39	0.10
			2.00			1" Ice	2.22	1.54	0.12
						2" Ice	2.60	1.86	0.18
RFV01U-D2A	A	From Centroid-Fa ce	4.00	0.0000	168.00	No Ice	1.88	1.01	0.07
			0.00			1/2" Ice	2.05	1.14	0.09
			2.00			1" Ice	2.22	1.28	0.11
						2" Ice	2.60	1.59	0.15
RFV01U-D2A	B	From Centroid-Fa ce	4.00	0.0000	168.00	No Ice	1.88	1.01	0.07
			0.00			1/2" Ice	2.05	1.14	0.09
			2.00			1" Ice	2.22	1.28	0.11
						2" Ice	2.60	1.59	0.15
RFV01U-D2A	C	From Centroid-Fa ce	4.00	0.0000	168.00	No Ice	1.88	1.01	0.07
			0.00			1/2" Ice	2.05	1.14	0.09
			2.00			1" Ice	2.22	1.28	0.11
						2" Ice	2.60	1.59	0.15
Platform Mount [LP 403-1]	C	None		0.0000	168.00	No Ice	18.94	18.94	1.50
						1/2" Ice	23.31	23.31	1.90
						1" Ice	27.74	27.74	2.37
						2" Ice	36.77	36.77	3.53
156									
7770.00 w/ Mount Pipe	A	From Centroid-Le g	4.00	0.0000	156.00	No Ice	5.75	4.25	0.06
			0.00			1/2" Ice	6.18	5.01	0.10
			2.00			1" Ice	6.61	5.71	0.16
						2" Ice	7.49	7.16	0.29
7770.00 w/ Mount Pipe	B	From Centroid-Le g	4.00	0.0000	156.00	No Ice	5.75	4.25	0.06
			0.00			1/2" Ice	6.18	5.01	0.10
			2.00			1" Ice	6.61	5.71	0.16
						2" Ice	7.49	7.16	0.29
7770.00 w/ Mount Pipe	C	From Centroid-Le g	4.00	0.0000	156.00	No Ice	5.75	4.25	0.06
			0.00			1/2" Ice	6.18	5.01	0.10
			2.00			1" Ice	6.61	5.71	0.16
						2" Ice	7.49	7.16	0.29
HPA65R-BU6A w/ Mount Pipe	A	From Centroid-Le g	4.00	0.0000	156.00	No Ice	5.83	5.00	0.08
			0.00			1/2" Ice	6.40	5.56	0.14
			2.00			1" Ice	6.99	6.13	0.22
						2" Ice	8.19	7.32	0.40

tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	Harwinton/ Buckley Broadcasti (BU 876369)	Page	8 of 12
	Project	TEP No. 217429.537478	Date	19:48:26 05/03/21
	Client	Crown Castle	Designed by	Julie C. Ryland

Description	Face or Leg	Offset Type	Offsets:	Azimuth Adjustment	Placement		CAAA	CAAA	Weight
			Horz Lateral				Vert	Front	
			ft	°	ft		ft ²	ft ²	K
			ft						
			ft						
SBNHH-1D65A w/ Mount Pipe	B	From	4.00	0.0000	156.00	No Ice	3.04	2.45	0.05
		Centroid-Le	0.00			1/2" Ice	3.34	2.75	0.10
		g	2.00			1" Ice	3.65	3.05	0.16
						2" Ice	4.31	3.68	0.31
SBNHH-1D65A w/ Mount Pipe	C	From	4.00	0.0000	156.00	No Ice	3.04	2.45	0.05
		Centroid-Le	0.00			1/2" Ice	3.34	2.75	0.10
		g	2.00			1" Ice	3.65	3.05	0.16
						2" Ice	4.31	3.68	0.31
80010964 w/ Mount Pipe	A	From	4.00	0.0000	156.00	No Ice	8.61	4.10	0.12
		Centroid-Le	0.00			1/2" Ice	9.18	4.59	0.19
		g	2.00			1" Ice	9.77	5.10	0.26
						2" Ice	10.98	6.16	0.45
80010964 w/ Mount Pipe	B	From	4.00	0.0000	156.00	No Ice	8.61	4.10	0.12
		Centroid-Le	0.00			1/2" Ice	9.18	4.59	0.19
		g	2.00			1" Ice	9.77	5.10	0.26
						2" Ice	10.98	6.16	0.45
80010964 w/ Mount Pipe	C	From	4.00	0.0000	156.00	No Ice	8.61	4.10	0.12
		Centroid-Le	0.00			1/2" Ice	9.18	4.59	0.19
		g	2.00			1" Ice	9.77	5.10	0.26
						2" Ice	10.98	6.16	0.45
(2) LGP21401	A	From	4.00	0.0000	156.00	No Ice	1.10	0.21	0.01
		Centroid-Le	0.00			1/2" Ice	1.24	0.27	0.02
		g	2.00			1" Ice	1.38	0.35	0.03
						2" Ice	1.69	0.52	0.05
(2) LGP21401	B	From	4.00	0.0000	156.00	No Ice	1.10	0.21	0.01
		Centroid-Le	0.00			1/2" Ice	1.24	0.27	0.02
		g	2.00			1" Ice	1.38	0.35	0.03
						2" Ice	1.69	0.52	0.05
(2) LGP21401	C	From	4.00	0.0000	156.00	No Ice	1.10	0.21	0.01
		Centroid-Le	0.00			1/2" Ice	1.24	0.27	0.02
		g	2.00			1" Ice	1.38	0.35	0.03
						2" Ice	1.69	0.52	0.05
RRUS 4449 B5/B12	A	From	4.00	0.0000	156.00	No Ice	1.97	1.41	0.07
		Centroid-Le	0.00			1/2" Ice	2.14	1.56	0.09
		g	2.00			1" Ice	2.33	1.73	0.11
						2" Ice	2.72	2.07	0.16
RRUS 4449 B5/B12	B	From	4.00	0.0000	156.00	No Ice	1.97	1.41	0.07
		Centroid-Le	0.00			1/2" Ice	2.14	1.56	0.09
		g	2.00			1" Ice	2.33	1.73	0.11
						2" Ice	2.72	2.07	0.16
RRUS 4449 B5/B12	C	From	4.00	0.0000	156.00	No Ice	1.97	1.41	0.07
		Centroid-Le	0.00			1/2" Ice	2.14	1.56	0.09
		g	2.00			1" Ice	2.33	1.73	0.11
						2" Ice	2.72	2.07	0.16
RRUS 8843 B2/B66A	A	From	4.00	0.0000	156.00	No Ice	1.64	1.35	0.07
		Centroid-Le	0.00			1/2" Ice	1.80	1.50	0.09
		g	2.00			1" Ice	1.97	1.65	0.11
						2" Ice	2.32	1.99	0.16
RRUS 8843 B2/B66A	B	From	4.00	0.0000	156.00	No Ice	1.64	1.35	0.07
		Centroid-Le	0.00			1/2" Ice	1.80	1.50	0.09
		g	2.00			1" Ice	1.97	1.65	0.11
						2" Ice	2.32	1.99	0.16
RRUS 8843 B2/B66A	C	From	4.00	0.0000	156.00	No Ice	1.64	1.35	0.07
		Centroid-Le	0.00			1/2" Ice	1.80	1.50	0.09
		g	2.00			1" Ice	1.97	1.65	0.11
						2" Ice	2.32	1.99	0.16
DC6-48-60-18-8C-EV	A	From	2.00	0.0000	156.00	No Ice	1.14	1.14	0.03

tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	Harwinton/ Buckley Broadcasti (BU 876369)	Page	9 of 12
	Project	TEP No. 217429.537478	Date	19:48:26 05/03/21
	Client	Crown Castle	Designed by	Julie C. Ryland

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	CAAA Front	CAAA Side	Weight
			ft ft ft	°	ft	ft ²	ft ²	K
DC6-48-60-18-8F	C	Centroid-Le	0.00	0.0000	156.00	1/2" Ice	1.79	0.05
		g	2.00			1" Ice	2.00	0.07
						2" Ice	2.45	0.13
		From	2.00			No Ice	1.21	0.03
		Centroid-Le	0.00			1/2" Ice	1.89	0.05
		g	2.00			1" Ice	2.11	0.08
Platform Mount [LP 303-1]	C	None		0.0000	156.00	2" Ice	2.57	0.14
						No Ice	14.69	1.25
						1/2" Ice	18.01	1.57
						1" Ice	21.34	1.94
						2" Ice	28.08	2.85
						No Ice	1.14	0.02
1.9" Dia. x 6-ft	A	From	4.00	0.0000	156.00	1/2" Ice	1.76	0.03
		Centroid-Le	0.00			1" Ice	2.14	0.04
		g	0.00			2" Ice	2.90	0.08
		From	4.00			No Ice	1.14	0.02
		Centroid-Le	0.00			1/2" Ice	1.76	0.03
		g	0.00			1" Ice	2.14	0.04
1.9" Dia. x 6-ft	B	From	4.00	0.0000	156.00	2" Ice	2.90	0.08
		Centroid-Le	0.00			No Ice	1.14	0.02
		g	0.00			1/2" Ice	1.76	0.03
		From	4.00			1" Ice	2.14	0.04
		Centroid-Le	0.00			2" Ice	2.90	0.08
		g	0.00			No Ice	1.14	0.02
1.9" Dia. x 6-ft	C	From	4.00	0.0000	156.00	1/2" Ice	1.76	0.03
		Centroid-Le	0.00			1" Ice	2.14	0.04
		g	0.00			2" Ice	2.90	0.08
		From	4.00			No Ice	1.14	0.02
		Centroid-Le	0.00			1/2" Ice	1.76	0.03
		g	0.00			1" Ice	2.14	0.04
75 KS24019-L112A	C	From Face	3.00	0.0000	75.00	2" Ice	2.90	0.08
			0.00			No Ice	0.08	0.01
			1.00			1/2" Ice	0.13	0.01
						1" Ice	0.19	0.01
						2" Ice	0.35	0.02
						No Ice	0.85	0.07
Side Arm Mount [SO 701-1]	C	From Face	1.50	0.0000	75.00	1/2" Ice	1.14	0.08
			0.00			1" Ice	1.43	0.09
			0.00			2" Ice	2.01	0.12
						No Ice	0.85	0.07
						1/2" Ice	1.14	0.08
						1" Ice	1.43	0.09

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice

tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job Harwinton/ Buckley Broadcasti (BU 876369)	Page 10 of 12
	Project TEP No. 217429.537478	Date 19:48:26 05/03/21
	Client Crown Castle	Designed by Julie C. Ryland

Comb. No.	Description
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	178 - 129.87	33.481	50	1.8498	0.0192
L2	134.12 - 84.83	17.988	50	1.3925	0.0074
L3	90.1633 - 41.2833	7.605	50	0.8399	0.0028
L4	47.7 - 0	2.041	50	0.3953	0.0010

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178.00	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	50	33.481	1.8498	0.0194	30553

tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job Harwinton/ Buckley Broadcasti (BU 876369)	Page 11 of 12
	Project TEP No. 217429.537478	Date 19:48:26 05/03/21
	Client Crown Castle	Designed by Julie C. Ryland

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
168.00	(2) LPA-80080/6CF w/ Mount Pipe	50	29.711	1.7520	0.0163	15276
156.00	7770.00 w/ Mount Pipe	50	25.298	1.6318	0.0128	6943
75.00	KS24019-L112A	50	5.145	0.6667	0.0021	5297

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	178 - 129.87	138.353	2	7.6540	0.0767
L2	134.12 - 84.83	74.434	24	5.7702	0.0292
L3	90.1633 - 41.2833	31.491	24	3.4808	0.0112
L4	47.7 - 0	8.450	24	1.6373	0.0040

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
178.00	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	2	138.353	7.6540	0.0798	7628
168.00	(2) LPA-80080/6CF w/ Mount Pipe	2	122.797	7.2524	0.0671	3812
156.00	7770.00 w/ Mount Pipe	24	104.594	6.7577	0.0526	1730
75.00	KS24019-L112A	24	21.301	2.7624	0.0084	1283

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L _u	Kl/r	A	P _u	φP _n	Ratio
	ft		ft	ft		in ²	K	K	P _u /φP _n
L1	178 - 129.87 (1)	TP29.64x19.5x0.25	48.13	0.00	0.0	22.6105	-14.01	1322.71	0.011
L2	129.87 - 84.83 (2)	TP38.5x28.2446x0.375	49.29	0.00	0.0	44.0575	-23.19	2577.36	0.009
L3	84.83 - 41.2833 (3)	TP46.8x36.6403x0.4375	48.88	0.00	0.0	62.5281	-35.99	3657.89	0.010
L4	41.2833 - 0 (4)	TP54.5x44.5913x0.5	47.70	0.00	0.0	85.6980	-55.10	5013.33	0.011

Pole Bending Design Data

tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job Harwinton/ Buckley Broadcasti (BU 876369)	Page 12 of 12
	Project TEP No. 217429.537478	Date 19:48:26 05/03/21
	Client Crown Castle	Designed by Julie C. Ryland

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	178 - 129.87 (1)	TP29.64x19.5x0.25	586.15	936.75	0.626	0.00	936.75	0.000
L2	129.87 - 84.83 (2)	TP38.5x28.2446x0.375	1440.72	2463.13	0.585	0.00	2463.13	0.000
L3	84.83 - 41.2833 (3)	TP46.8x36.6403x0.4375	2435.18	4208.93	0.579	0.00	4208.93	0.000
L4	41.2833 - 0 (4)	TP54.5x44.5913x0.5	3737.99	6831.09	0.547	0.00	6831.09	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	178 - 129.87 (1)	TP29.64x19.5x0.25	17.50	396.81	0.044	4.95	990.22	0.005
L2	129.87 - 84.83 (2)	TP38.5x28.2446x0.375	21.41	773.21	0.028	4.93	2506.45	0.002
L3	84.83 - 41.2833 (3)	TP46.8x36.6403x0.4375	25.35	1097.37	0.023	4.80	4327.36	0.001
L4	41.2833 - 0 (4)	TP54.5x44.5913x0.5	29.02	1504.00	0.019	4.79	7112.49	0.001

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	178 - 129.87 (1)	0.011	0.626	0.000	0.044	0.005	0.639	1.050	4.8.2
L2	129.87 - 84.83 (2)	0.009	0.585	0.000	0.028	0.002	0.595	1.050	4.8.2
L3	84.83 - 41.2833 (3)	0.010	0.579	0.000	0.023	0.001	0.589	1.050	4.8.2
L4	41.2833 - 0 (4)	0.011	0.547	0.000	0.019	0.001	0.559	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	178 - 129.87	Pole	TP29.64x19.5x0.25	1	-14.01	1388.85	60.8	Pass
L2	129.87 - 84.83	Pole	TP38.5x28.2446x0.375	2	-23.19	2706.23	56.6	Pass
L3	84.83 - 41.2833	Pole	TP46.8x36.6403x0.4375	3	-35.99	3840.78	56.1	Pass
L4	41.2833 - 0	Pole	TP54.5x44.5913x0.5	4	-55.10	5264.00	53.2	Pass
Summary								
Pole (L1)							60.8	Pass
RATING =							60.8	Pass

APPENDIX B
BASE LEVEL DRAWING



(OTHER CONSIDERED EQUIPMENT—IN CONDUIT)

(1) 3/8" TO 156 FT LEVEL

(2) 7/16" TO 156 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)

(1) 3/8" TO 156 FT LEVEL

(2) 3/4" TO 156 FT LEVEL

(12) 1-5/8" TO 156 FT LEVEL

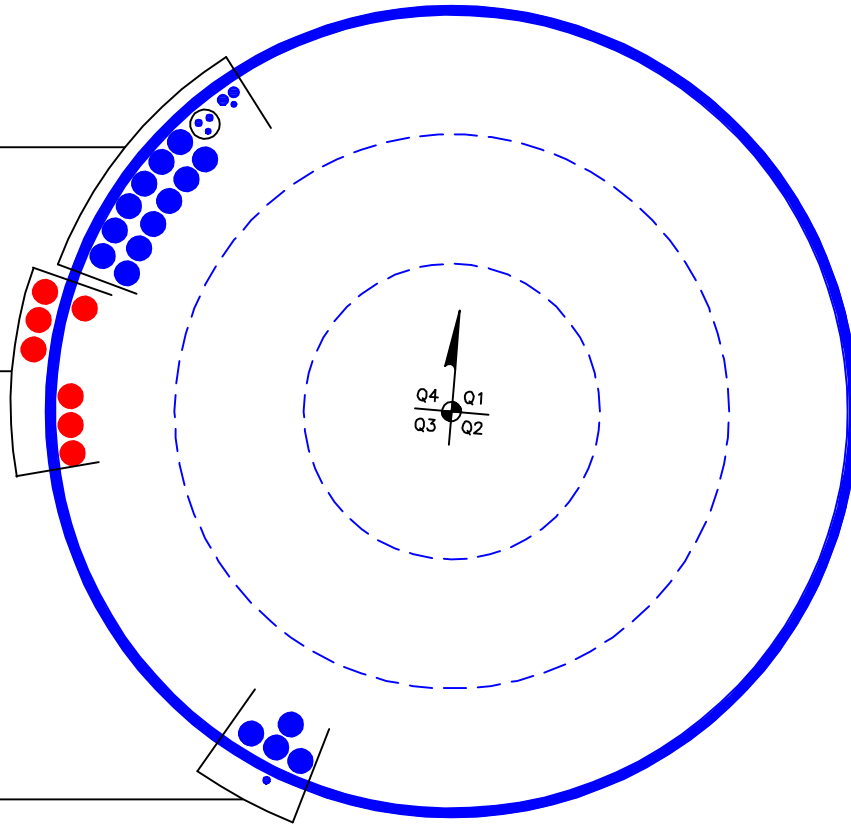
(PROPOSED EQUIPMENT CONFIGURATION)

(7) 1-5/8" TO 168 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)

(4) 1-5/8" TO 178 FT LEVEL

(1) 1/2" TO 75 FT LEVEL



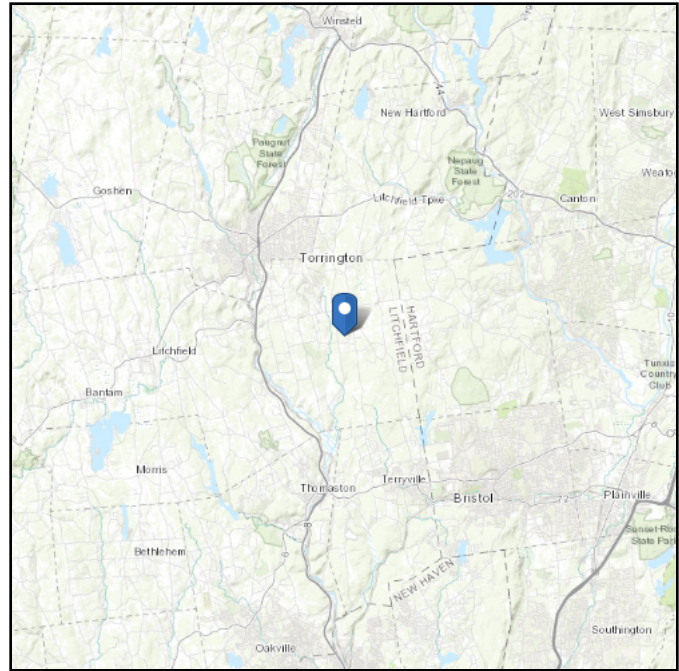
APPENDIX C
ADDITIONAL CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 840.53 ft (NAVD 88)
Latitude: 41.757264
Longitude: -73.052556



Wind

Results:

Wind Speed:	118 Vmph
10-year MRI	76 Vmph
25-year MRI	85 Vmph
50-year MRI	90 Vmph
100-year MRI	97 Vmph

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, and Section 26.5.2, incorporating errata of March 12, 2014

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

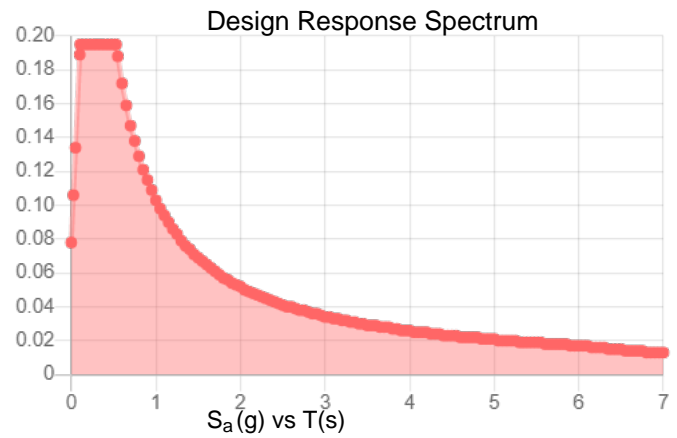
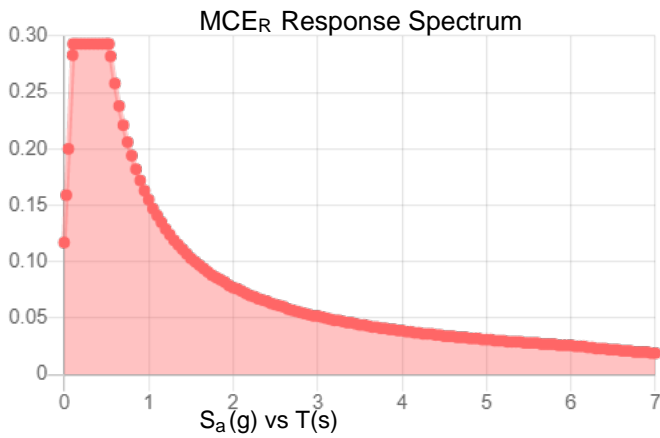
Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Site Soil Class: D - Stiff Soil

Results:

S_S :	0.183	S_{DS} :	0.195
S_1 :	0.065	S_{D1} :	0.103
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.093
S_{MS} :	0.293	PGA _M :	0.148
S_{M1} :	0.155	F _{PGA} :	1.6
		I_e :	1

Seismic Design Category B



Data Accessed:

Fri Apr 30 2021

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness: 0.75 in.

Concurrent Temperature: 5 F

Gust Speed: 50 mph

Data Source: Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

Date Accessed: Fri Apr 30 2021

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

Monopole Base Plate Connection

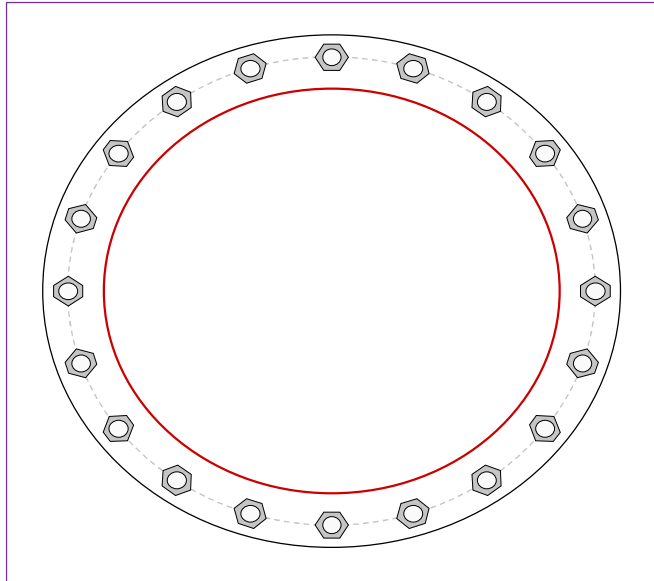


Site Info	
BU #	876369
Site Name	winton/Buckley Broad
Order #	552649 Rev. 1

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{gr} (in)	1

Applied Loads	
Moment (kip-ft)	3738.00
Axial Force (kips)	55.00
Shear Force (kips)	29.00

*TIA-222-H Section 15.5 Applied



Connection Properties		Analysis Results	
Anchor Rod Data		Anchor Rod Summary (units of kips, kip-in)	
(20) 2-1/4" ϕ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 63" BC		$Pu_t = 139.58$	$\phi Pn_t = 243.75$ Stress Rating
Base Plate Data		$Vu = 1.45$	$\phi Vn = 149.1$ 54.5%
69" OD x 2.25" Plate (A871 GR60; $F_y=60$ ksi, $F_u=75$ ksi)		$Mu = n/a$	$\phi Mn = n/a$ Pass
Stiffener Data		Base Plate Summary	
N/A		Max Stress (ksi):	34.12 (Flexural)
Pole Data		Allowable Stress (ksi):	54
54.5" x 0.5" 18-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)		Stress Rating:	60.2% Pass

Pier and Pad Foundation



BU #: 876369
 Site Name: Harwinton/Buckley
 App. Number: 552649 Rev. 1

TIA-222 Revision: H
 Tower Type: Monopole

Top & Bot. Pad Rein. Different?:
 Block Foundation?:
 Rectangular Pad?:

Superstructure Analysis Reactions		
Compression, P_{comp} :	55	kips
Base Shear, V_{u_comp} :	29	kips
Moment, M_u :	3738	ft-kips
Tower Height, H :	178	ft
BP Dist. Above Fdn, bp_{dist} :	3.25	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	315.99	29.00	8.7%	Pass
<i>Bearing Pressure (ksf)</i>	6.00	1.64	27.4%	Pass
<i>Overturing (kip*ft)</i>	6057.81	3963.35	65.4%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	5906.74	3868.50	62.4%	Pass
<i>Pier Compression (kip)</i>	31187.52	89.19	0.3%	Pass
<i>Pad Flexure (kip*ft)</i>	3722.15	1604.86	41.1%	Pass
<i>Pad Shear - 1-way (kips)</i>	1004.09	218.11	20.7%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.190	0.038	18.9%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	3015.04	2321.10	73.3%	Pass

*Rating per TIA-222-H Section 15.5

Soil Rating*:	65.4%
Structural Rating*:	73.3%

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$:	7	ft
Ext. Above Grade, E :	1	ft
Pier Rebar Size, Sc :	8	
Pier Rebar Quantity, mc :	46	
Pier Tie/Spiral Size, St :	4	
Pier Tie/Spiral Quantity, mt :	13	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier} :	3	in

Pad Properties		
Depth, D :	6.5	ft
Pad Width, W_1 :	28	ft
Pad Thickness, T :	3	ft
Pad Rebar Size (Top dir.2), Sp_{top2} :	8	
Pad Rebar Quantity (Top dir. 2), mp_{top2} :	15	
Pad Rebar Size (Bottom dir. 2), Sp_2 :	8	
Pad Rebar Quantity (Bottom dir. 2), mp_2 :	34	
Pad Clear Cover, cc_{pad} :	3	in

Material Properties		
Rebar Grade, F_y :	60	ksi
Concrete Compressive Strength, F'_c :	4	ksi
Dry Concrete Density, δ_c :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	125	pcf
Ultimate Gross Bearing, Q_{ult} :	8.000	ksf
Cohesion, C_u :	0.000	ksf
Friction Angle, ϕ :	38	degrees
SPT Blow Count, N_{blows} :		
Base Friction, μ :	0.6	
Neglected Depth, N :	4.00	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw :	2	ft

<--Toggle between Gross and Net

Exhibit E

Mount Analysis



Maser Consulting Connecticut
2000 Midlantic Drive, Suite 100
Mt. Laurel, NJ 08054
(856) 797-0412
peter.albano@colliersengineering.com

Post-Mod Antenna Mount Analysis Report and PMI Requirements

Mount Fix

SMART Tool Project #: 10063413
Maser Consulting Connecticut Project #: 21777068A

May 21, 2021

Site Information

Site ID: 469283-VZW / HARWINTON 1 CT
Site Name: HARWINTON 1 CT
Carrier Name: Verizon Wireless
Address: 64 Hungerford Lane
Harwinton, Connecticut 06794
Litchfield County
Latitude: 41.757264°
Longitude: -73.052556°

Structure Information

Tower Type: Monopole
Mount Type: 14.67-Ft Platform

FUZE ID # 16271948

Analysis Results

Platform: **78.4% Pass**

*****Contractor PMI Requirements:**

Included at the end of this MA report

Available & Submitted via portal at <https://pmi.vzwsmart.com>

Contractor - Please Review Specific Site PMI Requirements Upon Award

Requirements also Noted on Mount Modification Drawings

Requirements may also be Noted on A & E drawings

Report Prepared By: Selene Chen

Executive Summary:

The objective of this report is to summarize the analysis results of the antenna support mount including the proposed modifications at the subject facility for the final wireless telecommunications configuration, per the applicable codes and standards.

This analysis is inclusive of the mount structure only and does not address the structural capacity of the supporting structure. This mounting frame was not analyzed as an anchor attachment point for fall protection. All climbing activities are required to have a fall protection plan completed by a competent person.

Sources of Information:

Document Type	Remarks
<i>Radio Frequency Data Sheet (RFDS)</i>	<i>Verizon RFDS, Site ID: 324067, dated March 18, 2021</i>
<i>Mount Mapping Report</i>	<i>Hudson Design Group, LLC., Site ID: 469283, dated February 12, 2021</i>
<i>Mount Analysis Report</i>	<i>Maser Consulting Connecticut, Project #: 21777068A, dated April 9, 2021</i>
<i>Mount Modification Drawings</i>	<i>Maser Consulting Connecticut, Project #: 21777068A, dated May 21, 2021</i>

Analysis Criteria:

Codes and Standards:	ANSI/TIA-222-H
Wind Parameters:	Basic Wind Speed (Ultimate 3-sec. Gust), V_{ULT} : 115 mph Ice Wind Speed (3-sec. Gust): 50 mph Design Ice Thickness: 1.00 in Risk Category: II Exposure Category: C Topographic Category: 1 Topographic Feature Considered: N/A Topographic Method: N/A Ground Elevation Factor, K_e : 0.970
Seismic Parameters:	S_s : 0.179 S_1 : 0.054
Maintenance Parameters:	Wind Speed (3-sec. Gust): 30 mph Maintenance Live Load, L_v : 250 lbs. Maintenance Live Load, L_m : 500 lbs.
Analysis Software:	RISA-3D (V17)

Final Loading Configuration:

The following equipment has been considered for the analysis of the mount:

Mount Elevation (ft)	Equipment Elevation (ft)	Quantity	Manufacturer	Model	Status
168.00	170.00	6	Quintel	QS6656-5D	Added
		3	Samsung	MT6407-77A	
		3	Samsung	B2/B66A RRH-BR049	
		3	Samsung	B5/B13 RRH-BR04C	
		1	RFS	DB-C1-12C-24AB-0Z	
		6	Antel	LPA-80080/6CF	Retained

The recent mount mapping did not report existing OVP units. However, it is acceptable to install up to any three (3) of the OVP model numbers listed below as required at any location other than the mount face without affecting the structural capacity of the mount. If OVP units are installed on the mount face, a mount re-analysis may be required.

Model Number	Ports	AKA
DB-B1-6C-12AB-0Z	6	OVP-6
RVZDC-6627-PF-48	12	OVP-12

Standard Conditions:

1. All engineering services are performed on the basis that the information provided to Maser Consulting Connecticut and used in this analysis is current and correct. The existing equipment loading has been applied at locations determined from the supplied documentation. Any deviation from the loading locations specified in this report shall be communicated to Maser Consulting Connecticut to verify deviation will not adversely impact the analysis.
2. Mounts are assumed to have been properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer’s specifications.

Obvious safety and structural issues/deficiencies noticed at the time of the mount mapping and reported in the Mount Mapping Report are assumed to be corrected and documented as part of the PMI process and are not considered in the mount analysis.

The mount analysis and the mount mapping are not a condition assessment of the mount. Proper maintenance and condition assessments are still required post analysis.

3. For mount analyses completed from other data sources (including new replacement mounts) and not specifically mapped by Maser Consulting Connecticut, the mounts are assumed to have been properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer’s specifications.
4. All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
5. The mount was checked up to, and including, the bolts that fasten it to the mount collar/attachment and threaded rod connections in collar members if applicable. Local deformation and interaction between the mount collar/attachment and the supporting tower structure are outside the scope of this analysis.

6. All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Maser Consulting Connecticut is not responsible for the conclusion, opinions, and recommendations made by others based on the information supplied.
7. Structural Steel Grades have been assumed as follows, if applicable, unless otherwise noted in this analysis:
 - o Channel, Solid Round, Angle, Plate ASTM A36 (Gr. 36)
 - o HSS (Rectangular) ASTM 500 (Gr. B-46)
 - o Pipe ASTM A53 (Gr. B-35)
 - o Threaded Rod F1554 (Gr. 36)
 - o Bolts ASTM A325
8. Any mount modifications listed under Sources of Information are assumed to have been installed per the design specifications.

Discrepancies between in-field conditions and the assumptions listed above may render this analysis invalid unless explicitly approved by Maser Consulting Connecticut.

Analysis Results:

Component	Utilization %	Pass/Fail
<i>Standoff Pipe</i>	16.1%	<i>Pass</i>
<i>Standoff Angle</i>	15.1%	<i>Pass</i>
<i>Standoff Channel</i>	78.4%	<i>Pass</i>
<i>Standoff Plate</i>	24.9%	<i>Pass</i>
<i>Face Horizontal</i>	51.4%	<i>Pass</i>
<i>Cross Member</i>	31.2%	<i>Pass</i>
<i>Corner Plate</i>	29.7%	<i>Pass</i>
<i>Grating Angle</i>	9.6%	<i>Pass</i>
<i>Mount Pipe</i>	42.4%	<i>Pass</i>
<i>HSS Crossmember</i>	45.9%	<i>Pass</i>
<i>Kicker</i>	9.8%	<i>Pass</i>
<i>Mount Connection</i>	15.2%	<i>Pass</i>
Structure Rating – (Controlling Utilization of all Components)		78.4%

Recommendation:

The existing mount will be **SUFFICIENT** for the final loading after the proposed modifications are successfully completed.

ANSI/ASSP rigging plan review services compliant with the requirements of ANSI/TIA 322 are available for a Construction Class IV site or other, if required. Separate review fees will apply.

Attachments:

1. Mount Photos
2. Mount Mapping Report (for reference only)
3. Analysis Calculations
- 4. Contractor Required PMI Report Deliverables**
5. Antenna Placement Diagrams
6. TIA Adoption and Wind Speed Usage Letter



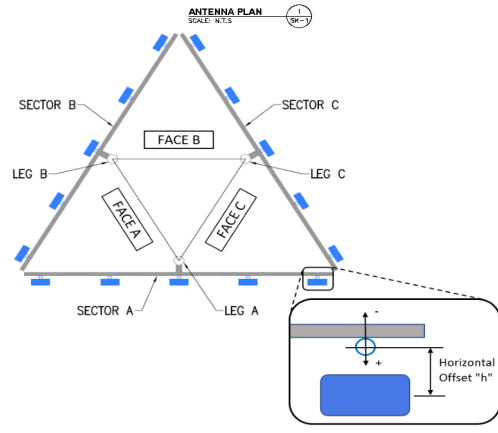
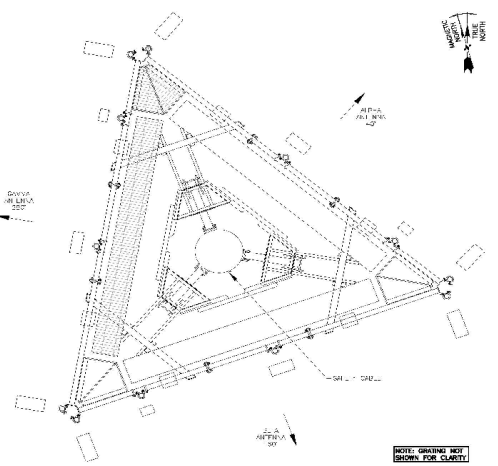


Antenna Mount Mapping Form (PATENT PENDING)

FCC #

Tower Owner:	CROWN CASTLE	Mapping Date:	2/12/2021
Site Name:	HARWINTON 1 CT	Tower Type:	Monopole
Site Number or ID:	469283	Tower Height (Ft.):	
Mapping Contractor:	HUDSON DESIGN GROUP, LLC.	Mount Elevation (Ft.):	165.25

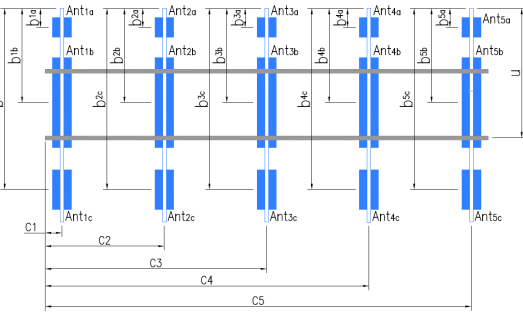
This antenna mapping form is the property of TES and under **PATENT PENDING**. The formation contained herein is considered confidential in nature and is to be used only for the specific customer it was intended for. Reproduction, transmission, publication, modification or disclosure by any method is prohibited except by express written permission of TES. All means and methods are the responsibility of the contractor and the work shall be compliant with ANSI/ASSE A 10.48, OSHA, FCC, FAA and other safety requirements that may apply. TES is not warranting the usability of the safety climb as it must be assessed prior to each use in compliance with OSHA requirements.



Mount Pipe Configuration and Geometries [Unit = Inches]							
Sector / Position	Mount Pipe Size & Length	Vertical Offset Dimension "U"	Horizontal Offset "C1, C2, C3, etc."	Sector / Position	Mount Pipe Size & Length	Vertical Offset Dimension "U"	Horizontal Offset "C1, C2, C3, etc."
A1	PIPE 2" STD. X 72" LONG	50.00	0.00	C1	PIPE 2" STD. X 72" LONG	50.00	0.00
A2	PIPE 2" STD. X 72" LONG	50.00	83.00	C2	PIPE 2" STD. X 72" LONG	50.00	83.00
A3	PIPE 2" STD. X 72" LONG	50.00	148.00	C3	PIPE 2" STD. X 72" LONG	50.00	148.00
A4	PIPE 2" STD. X 72" LONG	50.00	180.00	C4	PIPE 2" STD. X 72" LONG	50.00	180.00
A5				C5			
A6				C6			
B1	PIPE 2" STD. X 72" LONG	50.00	0.00	D1			
B2	PIPE 2" STD. X 72" LONG	50.00	83.00	D2			
B3	PIPE 2" STD. X 72" LONG	50.00	148.00	D3			
B4	PIPE 2" STD. X 72" LONG	50.00	180.00	D4			
B5				D5			
B6				D6			

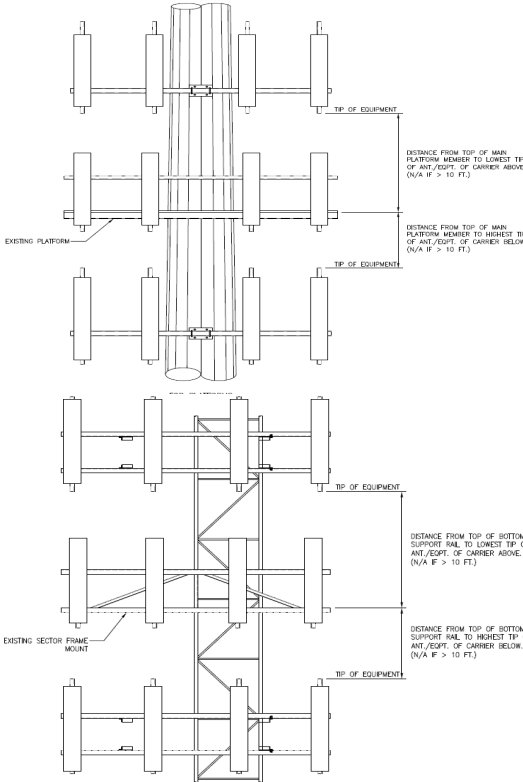
Distance between bottom rail and mount CL elevation (dim d). Unit is inches. See 'Mount Elev Ref' tab for details. :	0.00
Distance from top of bottom support rail to lowest tip of ant./eqpt. of Carrier above. (N/A if > 10 ft.):	4.5
Distance from top of bottom support rail to highest tip of ant./eqpt. of Carrier below. (N/A if > 10 ft.):	5
Please enter additional information or comments below.	
Tower Face Width at Mount Elev. (ft.):	22
Tower Leg Size or Pole Shaft Diameter at Mount Elev. (in.):	22

Ants. Items	Enter antenna model. If not labeled, enter "Unknown".					Mounting Locations [Units are inches and degrees]			Photos of antennas	
	Antenna Models if Known	Width (in.)	Depth (in.)	Height (in.)	Coax Size and Qty	Antenna Center-line (Ft.)	Vertical Distances "b _{1a} , b _{2a} , b _{3a} , b _{1b} ,..." (Inches)	Horiz. Offset "h" (Use "-" if Ant. is behind)	Antenna Azimuth (Degrees)	Photo Numbers
Sector A										
Ant _{1a}										
Ant _{1b}	LPA-80080-6CF	6.00	13.00	72.00		166.417	36.00	15.00	40.00	107
Ant _{1c}										
Ant _{2a}										
Ant _{2b}	BXA-70063-6CF	11.00	5.00	71.00		166.5	35.00	9.00	40.00	108
Ant _{2c}										
Ant _{3a}										
Ant _{3b}	BXA-171085-12BF	6.00	4.00	72.00		166.5	35.00	8.00	40.00	109
Ant _{3c}										
Ant _{4a}										
Ant _{4b}	LPA-80080-6CF	6.00	13.00	72.00		166.417	36.00	15.00	40.00	109
Ant _{4c}										
Ant _{5a}										
Ant _{5b}										
Ant _{5c}										
Ant on Standoff	(2) RFSM2018439	6.00	1.50	7.00						60 & 61
Ant on Standoff										
Ant on Tower										
Ant on Tower										



Antenna Layout (Looking Out From Tower)

Mount Azimuth (Degree) for Each Sector				Tower Leg Azimuth (Degree) for Each Sector				Sector B												
Sector A:	40.00	Deg	Leg A:		Deg			Ant _{1a}												
Sector B:	160.00	Deg	Leg B:		Deg			Ant _{1b}	LPA-80080-6CF	6.00	13.00	72.00		166.417	36.00	15.00	160.00		109	
Sector C:	280.00	Deg	Leg C:		Deg			Ant _{1c}												
Sector D:		Deg	Leg D:		Deg			Ant _{2a}												
Climbing Facility Information								Ant _{2b}	BXA-70063-6CF	11.00	5.00	71.00		166.5	35.00	9.00	160.00		110	
Location:	155.00	Deg						Ant _{2c}												
Climbing Facility	Corrosion Type:		Good condition.					Ant _{3a}												
	Access:		Climbing path was unobstructed.					Ant _{3b}	BXA-171085-12BF	6.00	4.00	72.00		166.5	35.00	8.00	160.00		111	
	Condition:		Good condition.					Ant _{3c}												
								Ant _{4a}												
								Ant _{4b}	LPA-80080-6CF	6.00	13.00	72.00		166.417	36.00	15.00	160.00		111	
								Ant _{4c}												
								Ant _{5a}												
								Ant _{5b}												
								Ant _{5c}												
								Ant on Standoff	(2) RFSM2018439	6.00	1.50	7.00								110
								Ant on Standoff												
								Ant on Tower												
								Ant on Tower												
								Sector C												
								Ant _{1a}												
								Ant _{1b}	LPA-80080-6CF	6.00	13.00	72.00		166.417	36.00	15.00	280.00		111	
								Ant _{1c}												
								Ant _{2a}												
								Ant _{2b}	BXA-70063-6CF	11.00	5.00	71.00		166.5	35.00	9.00	280.00		113	
								Ant _{2c}												
								Ant _{3a}												
								Ant _{3b}	BXA-171085-12BF	6.00	4.00	72.00		166.5	35.00	8.00	280.00		114	
								Ant _{3c}												
								Ant _{4a}												
								Ant _{4b}	LPA-80080-6CF	6.00	13.00	72.00		166.417	36.00	15.00	280.00		114	
								Ant _{4c}												
								Ant _{5a}												
								Ant _{5b}												
								Ant _{5c}												
								Ant on Standoff	(2) RFSM2018439	6.00	1.50	7.00								113
								Ant on Standoff												
								Ant on Tower												
								Ant on Tower												
								Sector D												
								Ant _{1a}												
								Ant _{1b}												
								Ant _{1c}												
								Ant _{2a}												
								Ant _{2b}												
								Ant _{2c}												
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								Ant _{4c}												
								Ant _{5a}												
								Ant _{5b}												
								Ant _{5c}												
								Ant on Standoff												
								Ant on Standoff												
								Ant on Tower												
								Ant on Tower												



Observed Safety and Structural Issues During the Mount Mapping		
Issue #	Description of Issue	Photo #

1		
2	(12) 1-5/8" COAX CABLES.	32 (GRD)
3	TOWER TAG: REF NO. GS52975	5 (GRD)
4		
5		
6		
7		
8		

Mapping Notes

1. Please report any visible structural or safety issues observed on the antenna mounts (Damaged members, loose connections, tilting mounts, safety climb issues, etc.)
2. If the thickness of the existing pipes or tubing can't be obtained from a general tool (such as Caliper), please use an ultrasonic measurement tool (thickness gauge) to measure the thickness.
3. Please create all required detail sketches of the mounts and insert them into the "Sketches" tab.
4. Please measure and enter the bolt sizes and types under the Members Box in the spreadsheet of the mount type.
5. Take and label the photos of the tower, mounts, connections, antennas and all measurements. Minimum 50 photos are required.
6. Please measure and report the size and length of all existing antenna mounting pipes.
7. Please measure and report the antenna information for all sectors.
8. Don't delete or rearrange any sheet or contents of any sheet from this mapping form.

Standard Conditions

1. Obvious safety and structural issues/deficiencies noticed at the time of the mount mapping are to be reported in this mapping. However, this mount mapping is not a condition assessment of the mount.



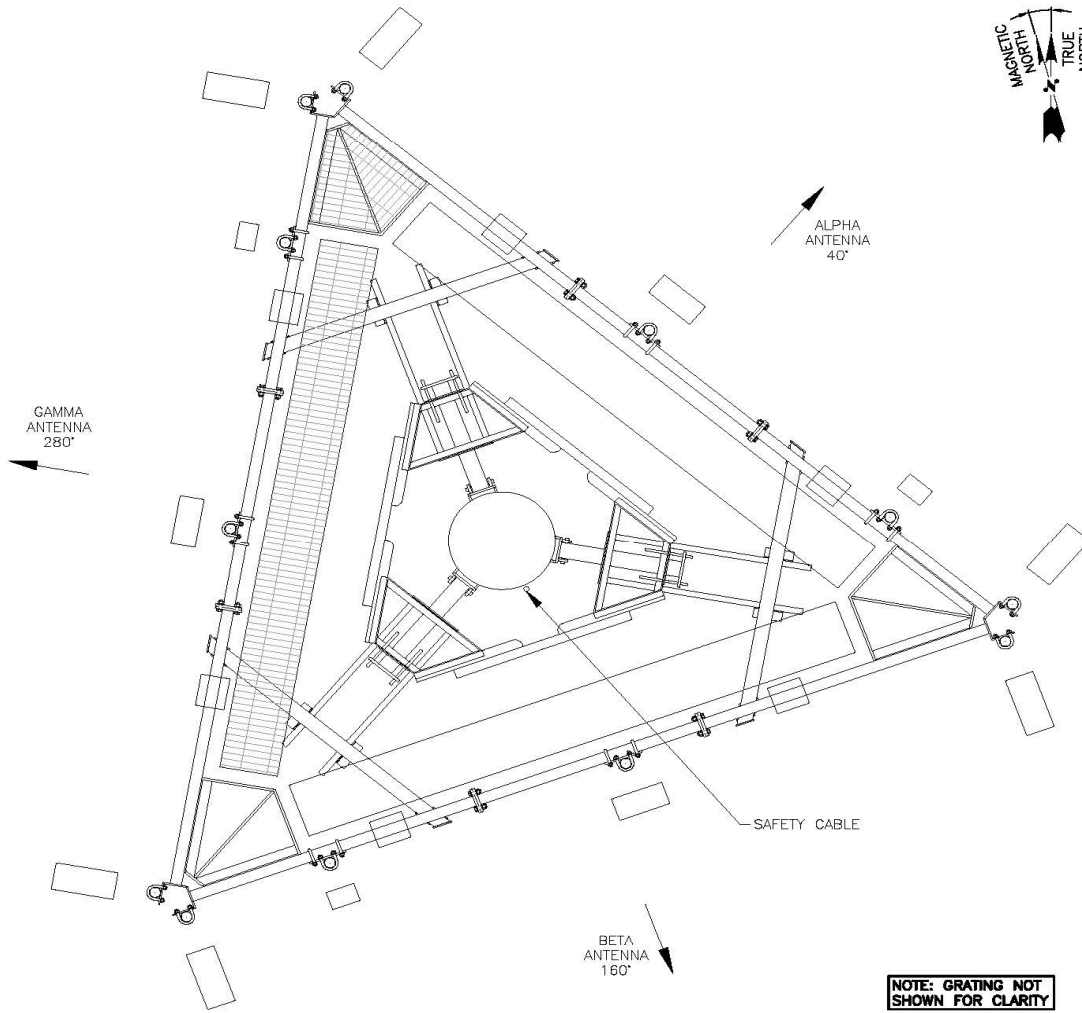
Antenna Mount Mapping Form (PATENT PENDING)

FCC #

Tower Owner:	CROWN CASTLE	Mapping Date:	2/12/2021
Site Name:	HARWINTON 1 CT	Tower Type:	Monopole
Site Number or ID:	469283	Tower Height (Ft.):	
Mapping Contractor:	HUDSON DESIGN GROUP, LLC.	Mount Elevation (Ft.):	165.25

This antenna mapping form is the property of TES and under **PATENT PENDING**. The formation contained herein is considered confidential in nature and is to be used only for the specific customer it was intended for. Reproduction, transmission, publication, modification or disclosure by any method is prohibited except by express written permission of TES. All means and methods are the responsibility of the contractor and the work shall be compliant with ANSI/ASSE A 10.48, OSHA, FCC, FAA and other safety requirements that may apply. TES is not warranting the usability of the safety climb as it must be assessed prior to each use in compliance with OSHA requirements.

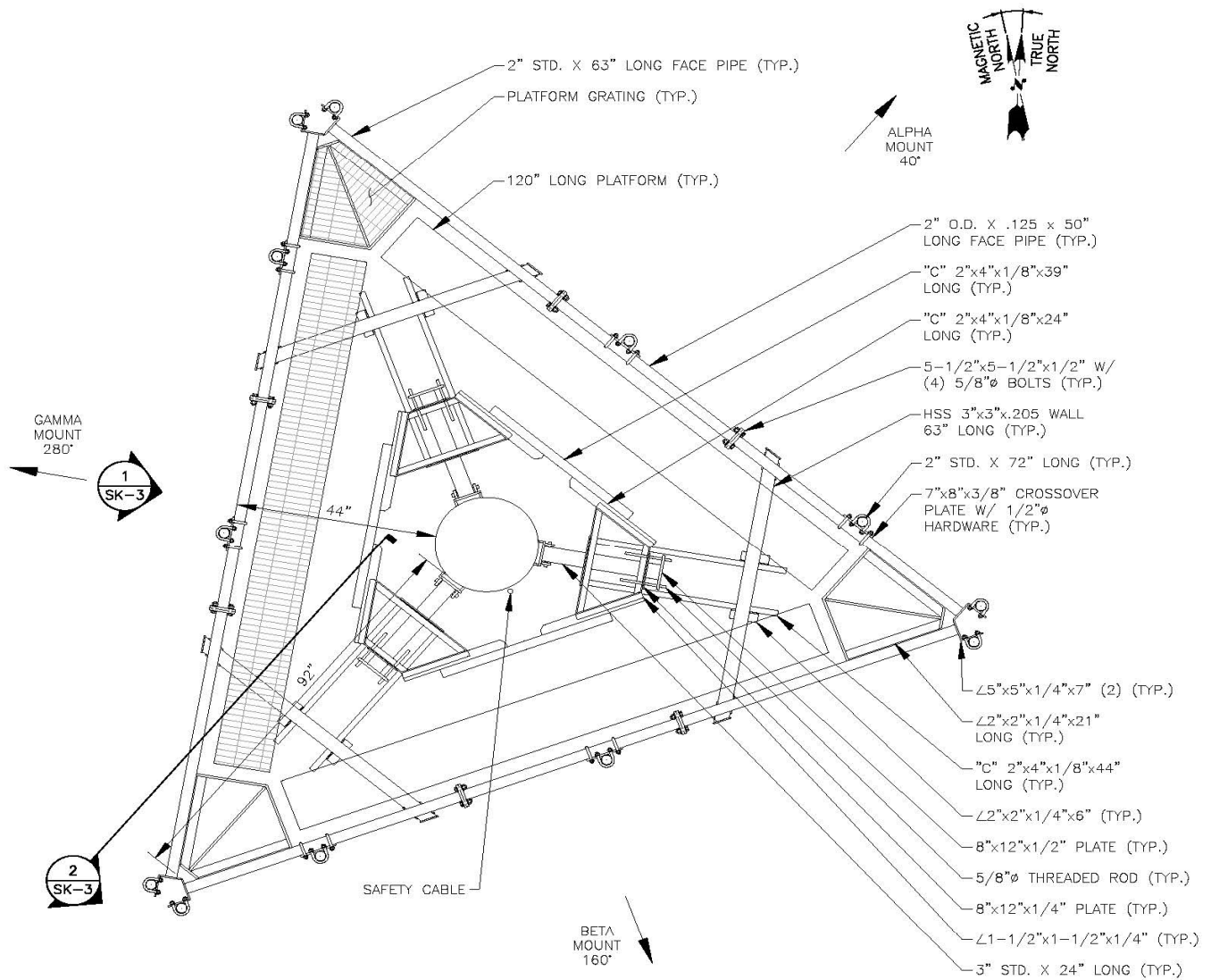
Please Insert Sketches of the Antenna Mount



NOTE: GRATING NOT SHOWN FOR CLARITY

ANTENNA PLAN
SCALE: N.T.S

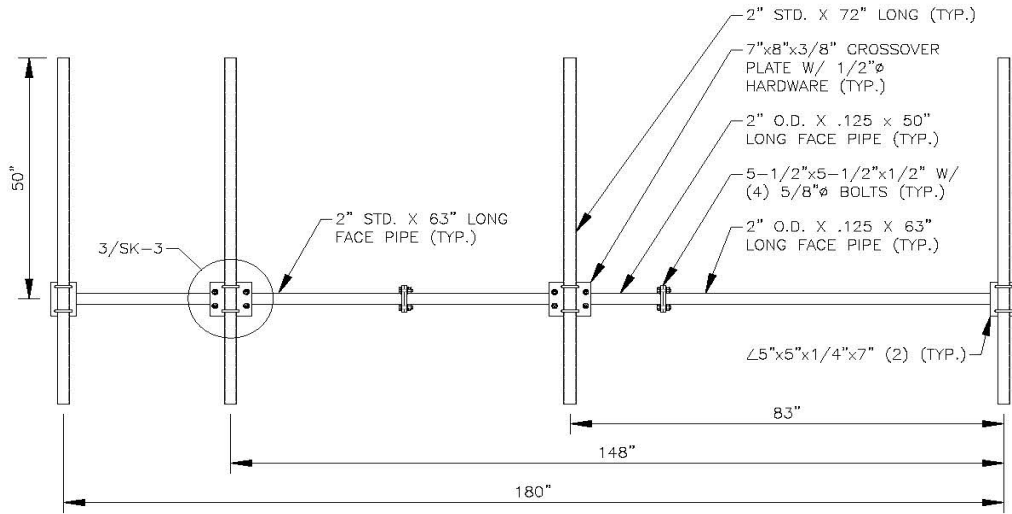
1
SK-1



MOUNT PLAN
SCALE: N.T.S

1
SK-2

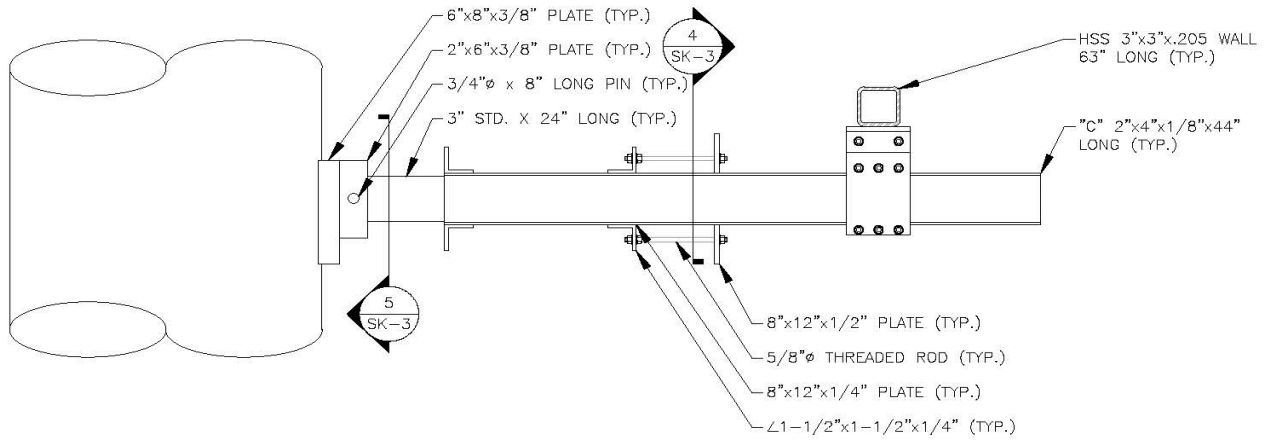
Please Insert Sketches of the Antenna Mount, cont'd



FRONT ELEVATION

SCALE: N.T.S

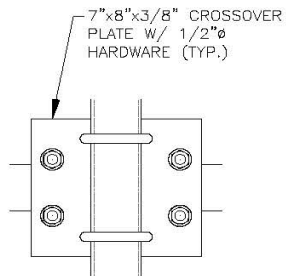
1
SK-3



MOUNT SIDE ELEVATION

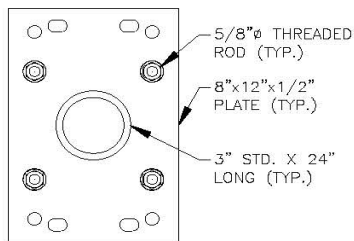
SCALE: N.T.S

2
SK-3



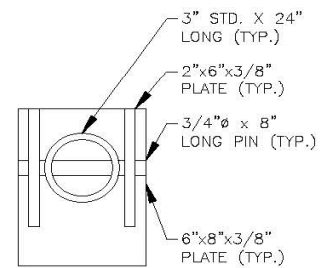
DETAIL - A
SCALE: N.T.S

3
SK-3



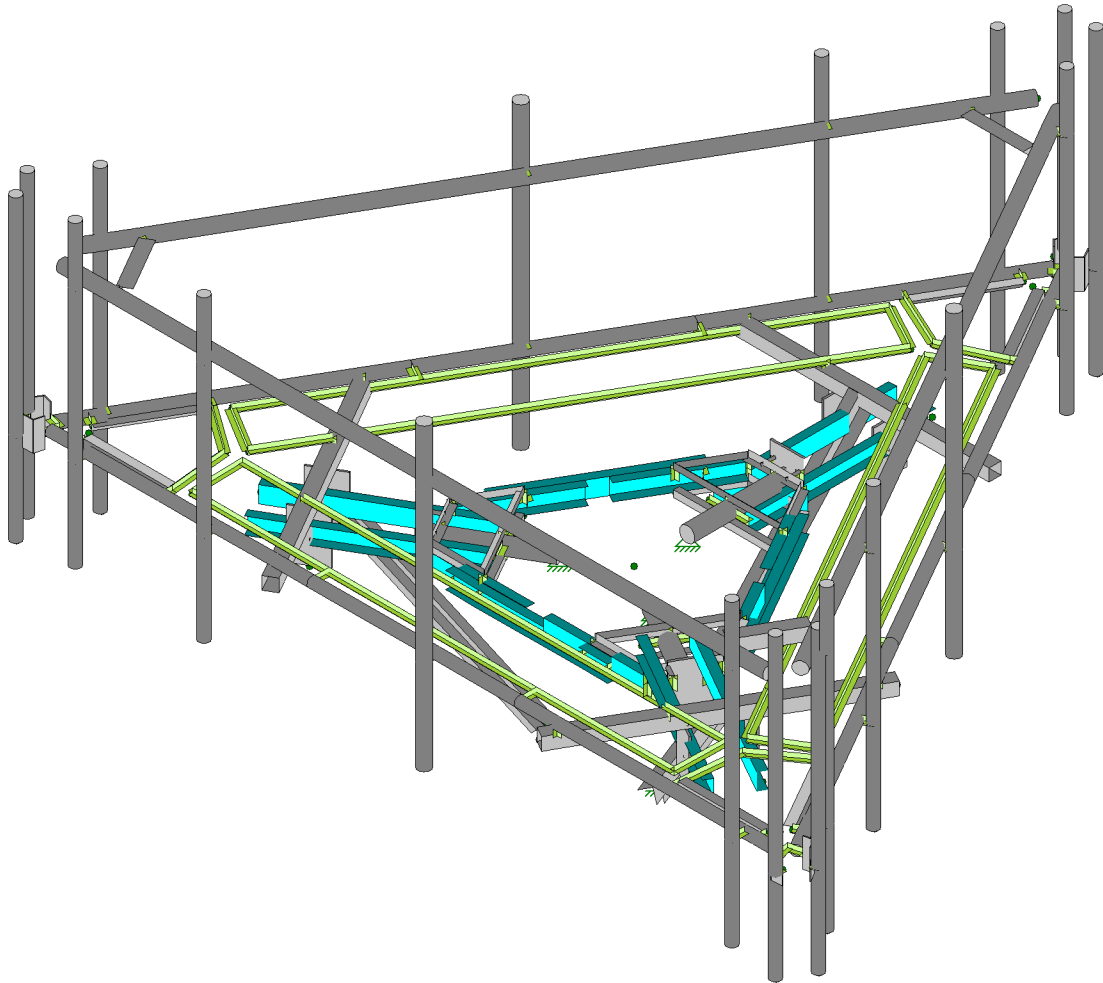
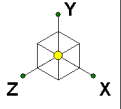
DETAIL - B
SCALE: N.T.S

4
SK-3



DETAIL - C
SCALE: N.T.S

5
SK-3



Tower Engineering Solutio...

PD

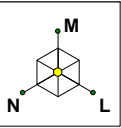
Project No. 10037960

469283-VZW_MT_LO_H

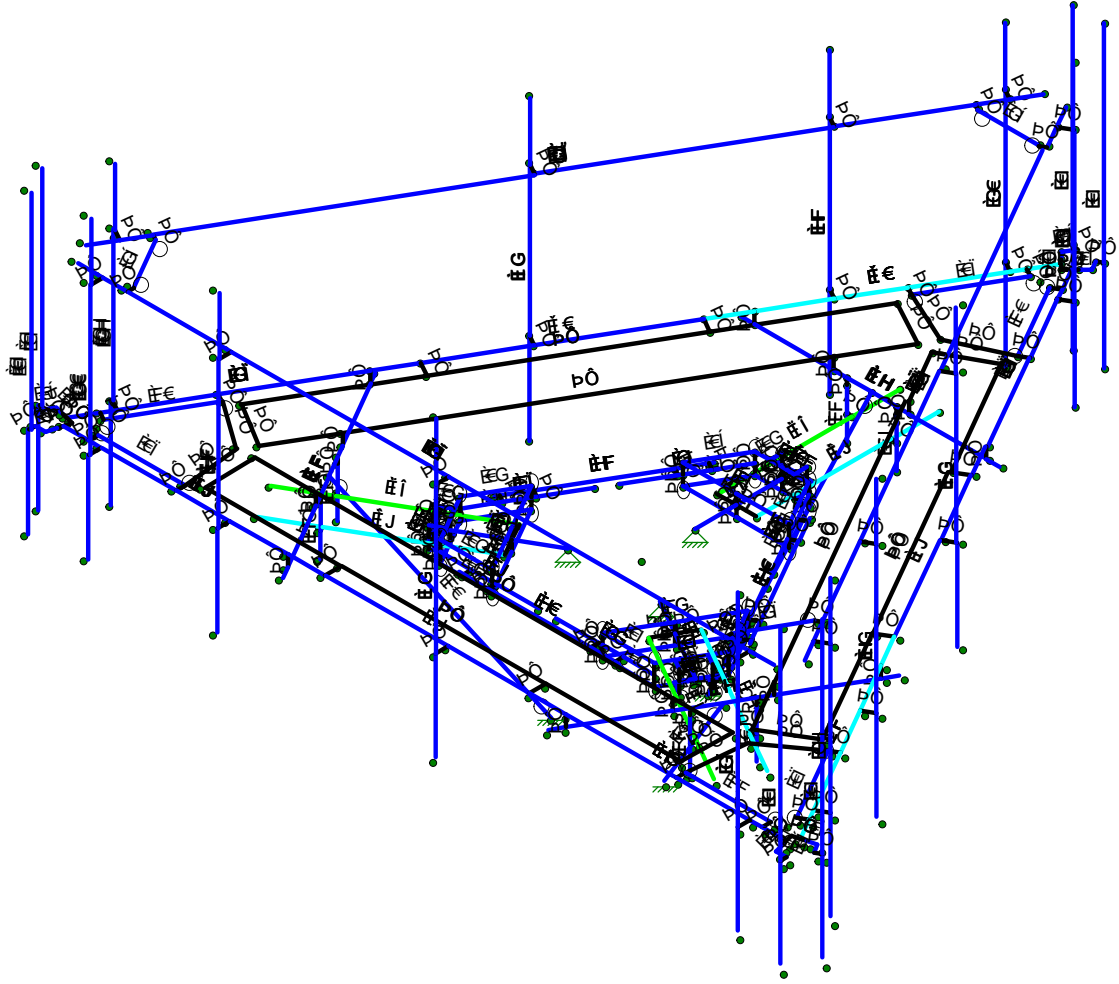
SK - 1

May 20, 2021 at 12:06 PM

469283-VZW_MT_LO_H.r3d



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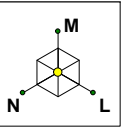


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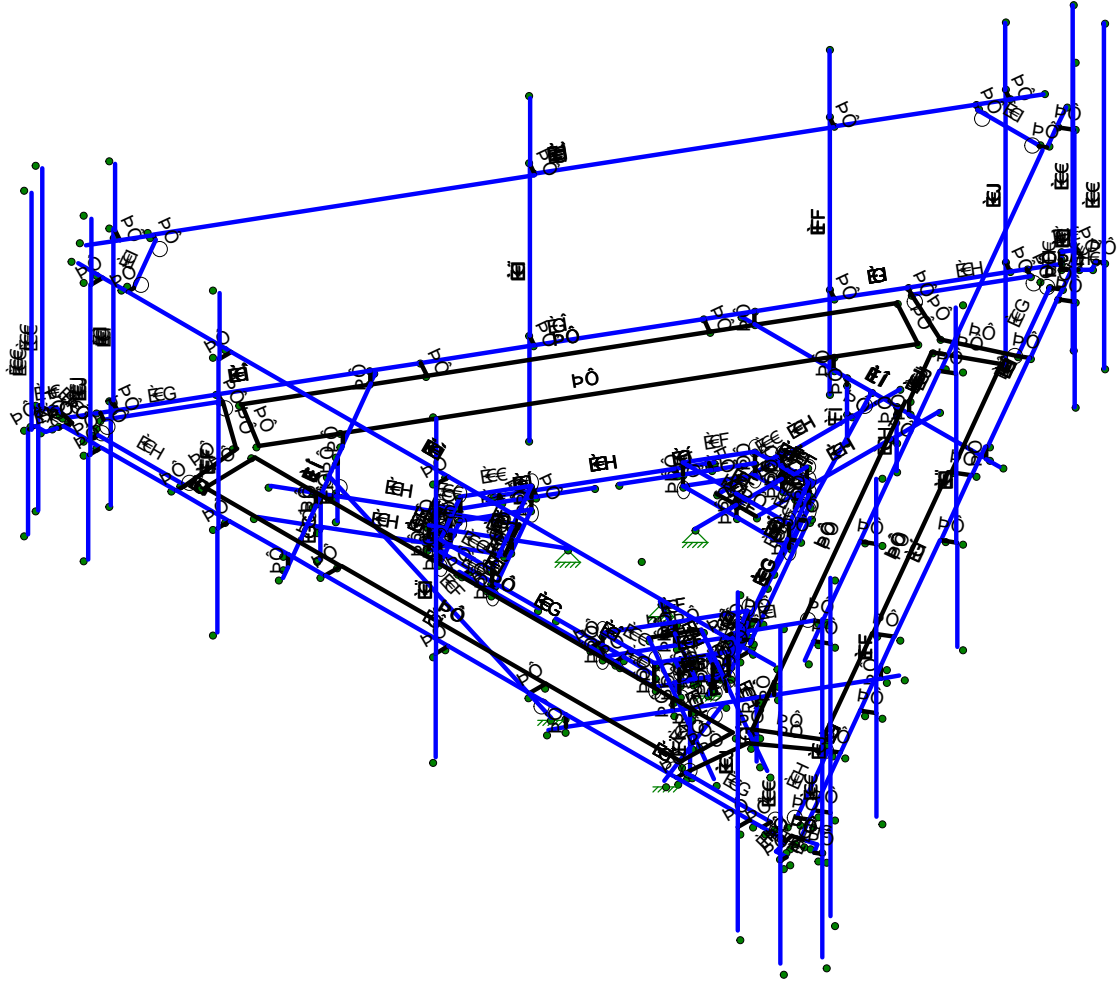
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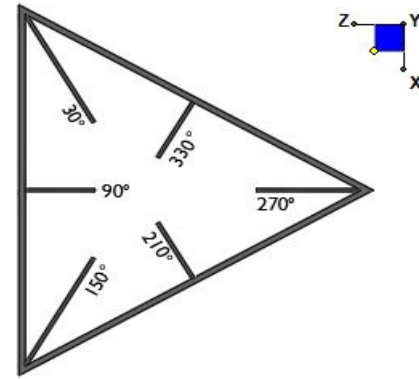
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H	TIG	Y	EH	EH	€	Å FEE
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IJ	TJF	Y	EH	EH	€	Å FEE
I€	TJF	Z	FF	FF	€	Å FEE
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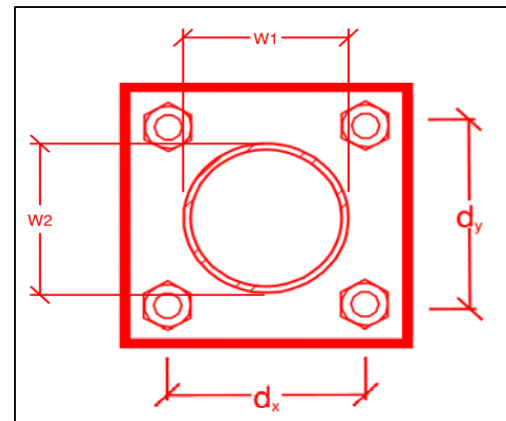
I. Mount-to-Tower Connection Check

RISA Model Data

Nodes (labeled per RISA)	Orientation (per graphic of typical platform)
N49A	30
N2	270
N96	150



TYPICAL PLATFORM



Tower Connection Plate and Weld Check

Connecting Standoff Member Shape:

Round

Unique Weld Check

Weld
Pattern:

(2) Vertical Fillet Welds

L1 (in):

0.75

L2 (in):

6

Weld Size (1/16 in):

3

Phi*Rn (kip/in):

4.18

Required Weld Strength (kip/in):

0.64

Weld Capacity:

15.2%

Mount Desktop – Post Modification Inspection (PMI) Report Requirements

Documents & Photos Required from Contractor – Mount Modification

Purpose – to provide Maser Consulting Connecticut the proper documentation in order to complete the required Mount Desktop review of the Post Modification Inspection Report.

- Contractor is responsible for making certain the photos provided as noted below provide confirmation that the modification was completed in accordance with the modification drawings.
- Contractor shall relay any data that can impact the performance of the mount or the mount modification, this includes safety issues.

Base Requirements:

- Any special photos outside of the standard requirements will be indicated on the drawings
- Provide “as built drawings” showing contractor’s name, preparer’s signature, and date. Any deviations from the drawings (proposed modification) must be shown.
- Notation that all hardware was properly installed, and the existing hardware was inspected for any issues.
- Verification that loading is as communicated in the modification drawings. NOTE If loading is different than what is conveyed in the modification drawing contact Maser Consulting Connecticut immediately.
- Each photo should be time and date stamped
- Photos should be high resolution and submitted in a Zip File and should be organized in the file structure as depicted in Schedule A attached.
- Contractor shall ensure that the safety climb wire rope is supported and not adversely impacted by the install of the modification components. This may involve the install of wire rope guides, or other items to protect the wire rope.
- The photos in the file structure should be uploaded to <https://pmi.vzsmart.com> as depicted on the drawings

Photo Requirements:

- Base and “During Installation Photos”
 - Base pictures include
 - Photo of Gate Signs showing the tower owner, site name, and number
 - Photo of carrier shelter showing the carrier site name and number if available
 - Photos of the galvanizing compound and/or paint used (if applicable), clearly showing the label and name
 - “During Installation Photos if provided - must be placed only in this folder
- Photos taken at ground level
 - Overall tower structure before and after installation of the modifications
 - Photos of the appropriate mount before and after installation of the modifications; if the mounts are at different rad elevations, pictures must be provided for all elevations that the modifications were installed

- Photos taken at Mount Elevation

- Photos showing each individual sector before and also after installation of modifications. Each entire sector must be in one photo to show in the inter-connection of members.
 - These photos should also certify that the placement and geometry of the equipment on the mount is as depicted on the sketch and table in the mount analysis
- Close-up photos of each installed modification per the modification drawings; pictures should also include connection hardware (U-bolts, bolts, nuts, all-threaded rods, etc.)
- Photos showing the measurements of the installed modification member sizes (i.e. lengths, widths, depths, diameters, thicknesses)
- Photos showing the elevation or distances of the installed modifications from the appropriate reference locations shown in the modification drawings
- Photos showing the installed modifications onto the tower with tape drop measurements (if applicable) (i.e. ring/collar mounts, tie-backs, V-bracing kits, etc.); if the existing mount elevation needs to be changed according to the modification drawings, a tape drop measurement shall be provided before the elevation change
- Photos showing the safety climb wire rope above and below the mount prior to modification.
- Photos showing the climbing facility and safety climb if present.

Material Certification:

- Materials utilized must be as per specification on the drawings or the equivalent as validated by Maser Consulting Connecticut.
 - If the drawings are as specified on the drawings
 - The contractor should provide the packing list or the materials utilized to perform the mount modification
 - If an equivalent is utilized
 - It is required that the Maser Consulting Connecticut certification of such is included in the contractor submission package. There may be an additional charge for this certification if the equivalent submission doesn't meet specifications as prescribed in the drawings.
- The contractor must certify that the materials meet these specifications by one of these methods.


















The Material utilized was as specified on the Maser Consulting Connecticut Mount Modification Drawings and included in the Material certification folder is a packing list or invoice for these materials

The material utilized was an "equivalent" and included as part of the contractor submission is the Maser Consulting Connecticut certification, invoices, or specifications validating accepted status

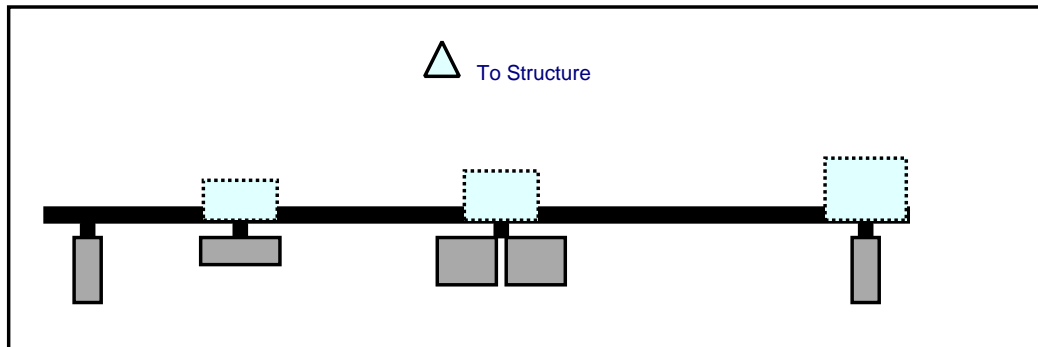
Certifying Individual: Company _____

Name _____

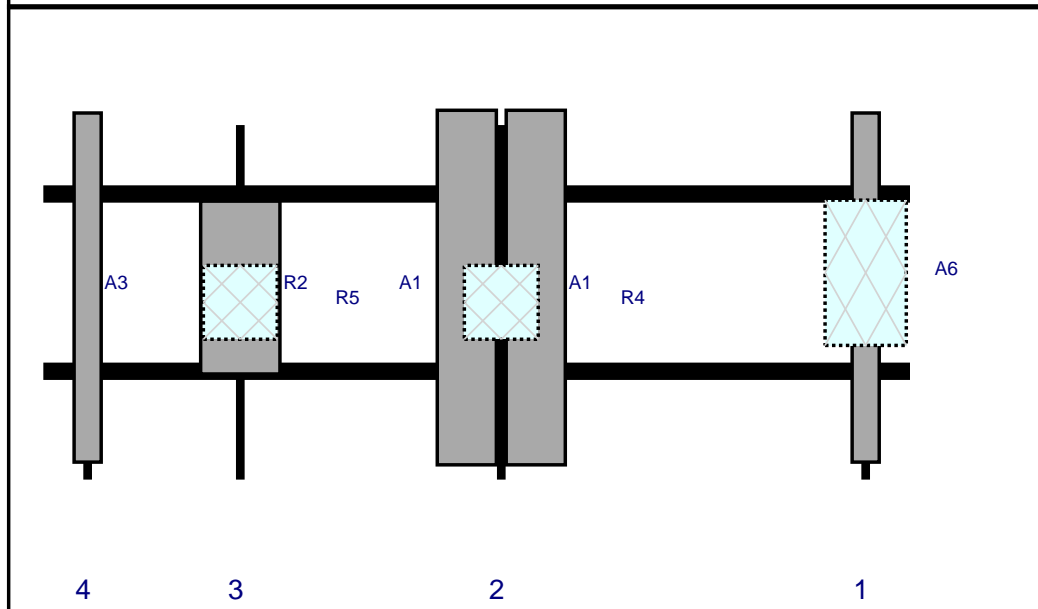
Schedule A – Photo & Document File Structure

-  VzW Site Number / Name
 -  Base & “During Installation” Photos
 -  Pre-Installation Photos
 -  Alpha
 -  Beta
 -  Gamma
 -  Ground Level
 -  Tape Drop
 -  Post-Installation Photos
 -  Alpha
 -  Beta
 -  Gamma
 -  Ground Level
 -  Tape Drop
 -  Photos of climbing facility and safety climb – If Present
-  Certifications – Submission of this document including certifications
-  Specific Required Additional Photos

Plan View

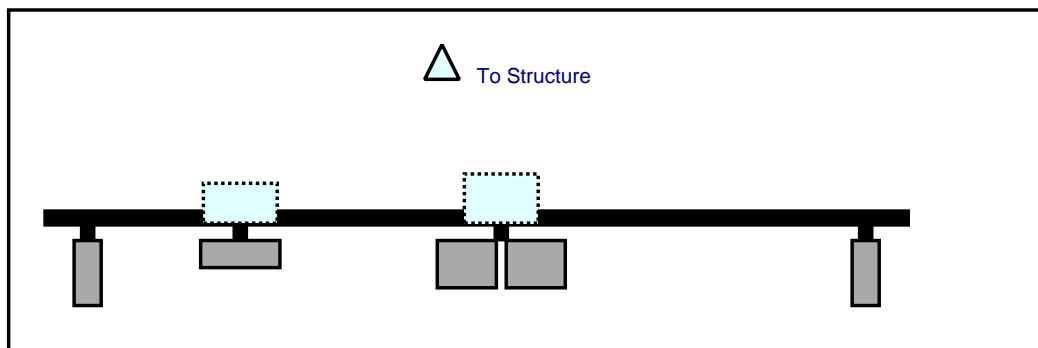


Front View
Looking at Structure

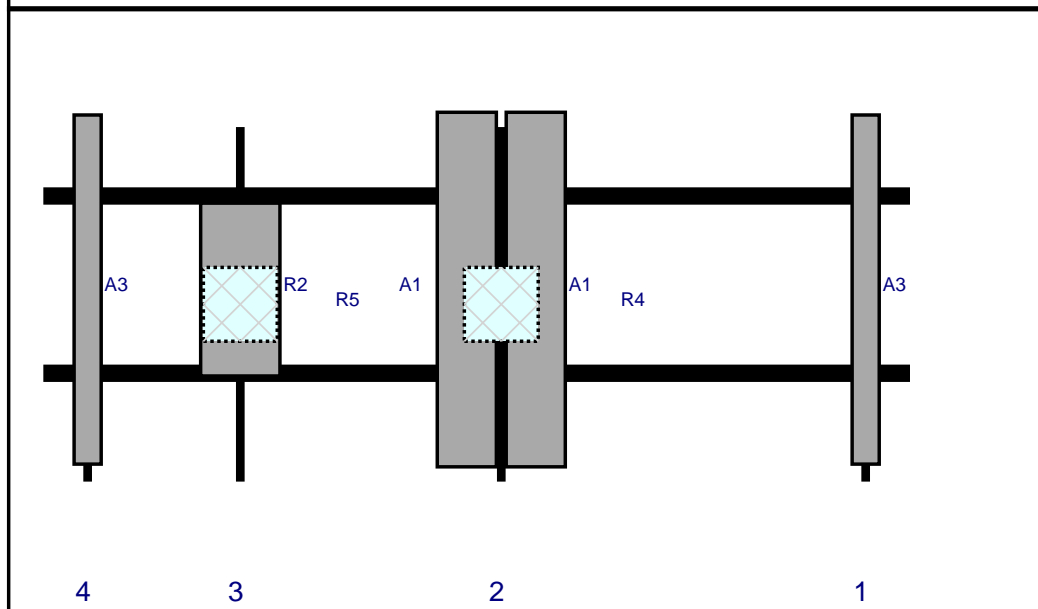


Ref#	Model	Height (in)	Width (in)	H Dist Frm L.	Pipe #	Pipe Pos V	Ant Pos	C. Ant Frm T.	Ant H Off	Status	Validation
A3	LPA-80080/6CF	70.9	5.5	167	1	a	Front	33	0	Retained	02/12/2021
A6	DB-C1-12C-24AB-0Z	29.5	16.5	167	1	a	Behind	30	0	Added	
A1	QS6656-5D	72	12	93	2	a	Front	33	7	Added	
A1	QS6656-5D	72	12	93	2	b	Front	33	-7	Added	
R4	B2/B66A RRH-BR049	15	15	93	2	a	Behind	36	0	Added	
R2	MT6407-77A	35.1	16.1	40	3	a	Front	33	0	Added	
R5	B5/B13 RRH-BR04C	15	15	40	3	a	Behind	36	0	Added	
A3	LPA-80080/6CF	70.9	5.5	9	4	a	Front	33	0	Retained	02/12/2021

Plan View

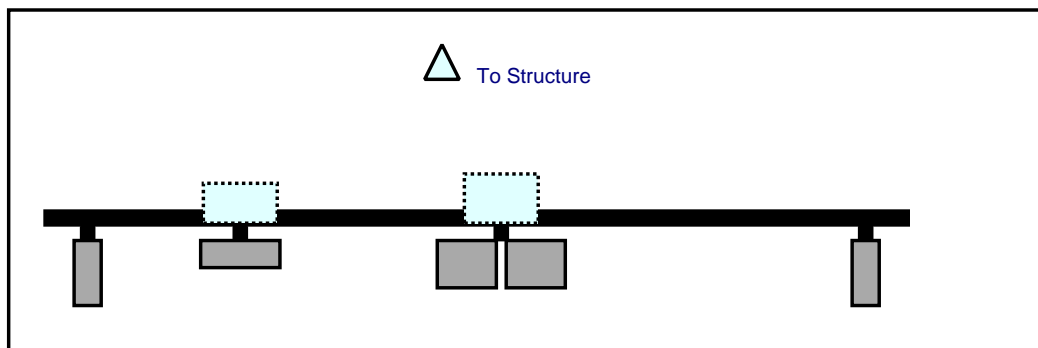


Front View
Looking at Structure

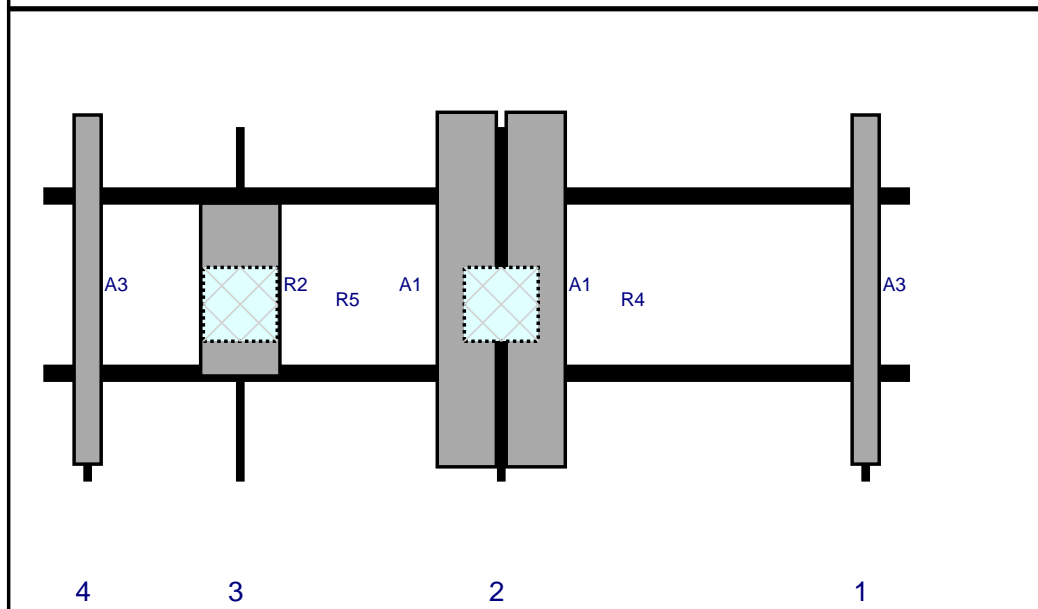


Ref#	Model	Height (in)	Width (in)	H Dist Frm L.	Pipe #	Pipe Pos V	Ant Pos	C. Ant Frm T.	Ant H Off	Status	Validation
A3	LPA-80080/6CF	70.9	5.5	167	1	a	Front	33	0	Retained	02/12/2021
A1	QS6656-5D	72	12	93	2	a	Front	33	7	Added	
A1	QS6656-5D	72	12	93	2	b	Front	33	-7	Added	
R4	B2/B66A RRH-BR049	15	15	93	2	a	Behind	36	0	Added	
R2	MT6407-77A	35.1	16.1	40	3	a	Front	33	0	Added	
R5	B5/B13 RRH-BR04C	15	15	40	3	a	Behind	36	0	Added	
A3	LPA-80080/6CF	70.9	5.5	9	4	a	Front	33	0	Retained	02/12/2021

Plan View



Front View
Looking at Structure



Ref#	Model	Height (in)	Width (in)	H Dist Frm L.	Pipe #	Pipe Pos V	Ant Pos	C. Ant Frm T.	Ant H Off	Status	Validation
A3	LPA-80080/6CF	70.9	5.5	167	1	a	Front	33	0	Retained	02/12/2021
A1	QS6656-5D	72	12	93	2	a	Front	33	7	Added	
A1	QS6656-5D	72	12	93	2	b	Front	33	-7	Added	
R4	B2/B66A RRH-BR049	15	15	93	2	a	Behind	36	0	Added	
R2	MT6407-77A	35.1	16.1	40	3	a	Front	33	0	Added	
R5	B5/B13 RRH-BR04C	15	15	40	3	a	Behind	36	0	Added	
A3	LPA-80080/6CF	70.9	5.5	9	4	a	Front	33	0	Retained	02/12/2021

Maser Consulting Connecticut

Subject

TIA-222-H Usage

Site Information

Site ID: 469283-VZW / HARWINTON 1 CT

Site Name: HARWINTON 1 CT

Carrier Name: Verizon Wireless

Address: 64 Hungerford Lane

Harwinton, Connecticut 06794

Litchfield County

Latitude: 41.757264°

Longitude: -73.052556°

Structure Information

Tower Type: Monopole

Mount Type: 14.67-Ft Platform

To Whom It May Concern,

We respectfully submit the above referenced Antenna Mount Structural Analysis report in conformance with ANSI/TIA-222-H, Structural Standard for Antenna Supporting Structures and Antennas and Small Wind Turbine Support Structures.

The 2015 International Building Code states that, in Section 3108, telecommunication towers shall be designed and constructed in accordance with the provisions of TIA-222. The TIA-222-H is the latest revision of the TIA-222 Standard, effective as of January 01, 2018.

As with all ANSI standards and engineering best practice is to apply the most current revision of the standard. This ensures the engineer is applying all updates. As an example, the TIA-222-H standard includes updates to bring it in line with the latest AISC and ACI standards and it also incorporates the latest wind speed maps by ASCE 7 based on updated studies of the wind data.

The TIA-222-H standard clarifies these specific requirements for the antenna mount analysis such as modeling methods, seismic analysis, 30-degree increment wind directions and maintenance loading. Therefore, it is our opinion that TIA-222-H is the most appropriate standard for antenna mount structural analysis and is acceptable for use at this site to ensure the engineer is taking into account the most current engineering standard available.

Sincerely,

Taqi Khawaja, PE
Technical Manager

Exhibit F

Power Density/RF Emissions Report

Site Name: HARWINTON 1 CT
Cumulative Power Density

Operator	Operating Frequency	Number of Trans.	ERP Per Trans.	Total ERP	Distance to Target	Calculated Power Density
	(MHz)		(watts)	(watts)	(feet)	(mW/cm ²)
VZW 700	751	4	452	1807	170	0.0022
VZW CDMA	878.49	2	491	982	170	0.0012
VZW Cellular	874	4	452	1807	170	0.0022
VZW PCS	1975	4	1640	6559	170	0.0082
VZW AWS	2120	4	1883	7531	170	0.0094
VZW CBAND	3730.005	4	6531	26125	170	0.0325

Total Percentage of Maximum Permissible Exposure

*Guidelines adopted by the FCC on August 1, 1996, 47 CFR Part 1 based on NCRP Report 86, 1986 and generally on ANSI

**Calculation includes a -10 dB Off Beam Antenna Pattern Adjustment pursuant to Attachments B and C of the Siting Council

MHz = Megahertz

mW/cm² = milliwatts per square centimeter

ERP = Effective Radiated Power

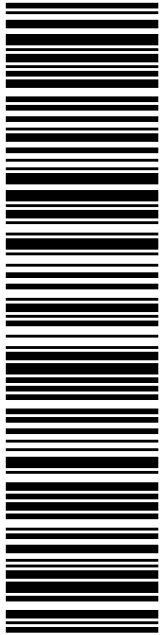
Absolute worst case maximum values used.

Maximum Permissible Exposure*	Fraction of MPE
(mW/cm ²)	(%)
0.5007	0.45%
0.5857	0.21%
0.5827	0.39%
1.0000	0.82%
1.0000	0.94%
1.0000	3.25%
	6.05%

/IEEE C95.1-1992
 il's November 10, 2015 Memorandum for Exempt Modification filings

Exhibit G

Recipient Mailings



USPS TRACKING #

9405 5036 9930 0082 4758 18

Electronic Rate Approved #038555749

SHIP TO: SARAH SNELL
CROWN CASTLE
1800 W PARK DR
WESTBOROUGH MA 01581-3926

P

12/03/2021

US POSTAGE
Flat Rate Env
\$8.70

9405 5036 9930 0082 4758 18 0087 0000 0010 1581

U.S. POSTAGE PAID
Click-N-Ship®


Mailed from 01566

PRIORITY MAIL 1-DAY™

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Expected Delivery Date: 12/06/21
Ref#: CR-876369
0006

C006



Click-N-Ship®



Cut on dotted line.

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3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.
4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
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Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0082 4758 18

Trans. #: 549946683	Priority Mail® Postage: \$8.70
Print Date: 12/03/2021	Total: \$8.70
Ship Date: 12/03/2021	
Expected Delivery Date: 12/06/2021	

From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

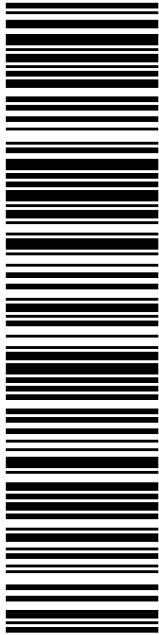
Ref#: CR-876369

To: SARAH SNELL
CROWN CASTLE
1800 W PARK DR
WESTBOROUGH MA 01581-3926

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.



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USPS TRACKING #

9405 5036 9930 0082 4758 25

Electronic Rate Approved #038555749

SHIP

TO: MICHAEL R CRISS
 FIRST SELECTMAN- HARWINTON
 100 BENTLEY DR
 HARWINTON CT 06791-2200

P

PRIORITY MAIL 2-DAY™

DEBORAH CHASE
 NORTHEAST SITE SOLUTIONS
 420 MAIN ST
 STE 1
 STURBRIDGE MA 01566-1359

Expected Delivery Date: 12/07/21
 Ref#: CR-876369
0006

R006

UNITED STATES POSTAL SERVICE®

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usps.com 9405 5036 9930 0082 4758 25 0087 0000 0010 6791
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Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0082 4758 25

Trans. #: 549946683	Priority Mail® Postage: \$8.70
Print Date: 12/03/2021	Total: \$8.70
Ship Date: 12/03/2021	
Expected Delivery Date: 12/07/2021	

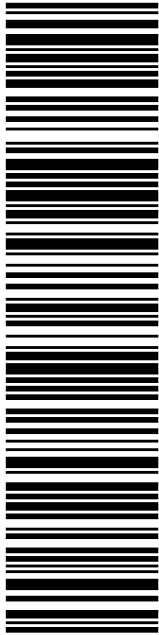
From: DEBORAH CHASE Ref#: CR-876369
 NORTHEAST SITE SOLUTIONS
 420 MAIN ST
 STE 1
 STURBRIDGE MA 01566-1359

To: MICHAEL R CRISS
 FIRST SELECTMAN- HARWINTON
 100 BENTLEY DR
 HARWINTON CT 06791-2200

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USPS TRACKING #

9405 5036 9930 0082 4758 32

Electronic Rate Approved #038555749

SHIP

TO: JEFFREY NEUMANN
BUILDING OFFICIAL
100 BENTLEY DR
HARWINTON CT 06791-2200

P

PRIORITY MAIL 2-DAY™

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Expected Delivery Date: 12/07/21
Ref#: CR-876369
0006

R006

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Flat Rate Env
US POSTAGE \$8.70
usps.com 9405 5036 9930 0082 4758 32 0087 0000 0010 6791

Mailed from 01566
12/03/2021



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Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0082 4758 32

Trans. #: 549946683	Priority Mail® Postage: \$8.70
Print Date: 12/03/2021	Total: \$8.70
Ship Date: 12/03/2021	
Expected Delivery Date: 12/07/2021	

From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

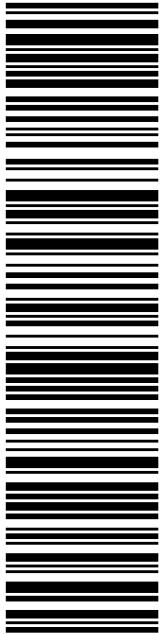
Ref#: CR-876369

To: JEFFREY NEUMANN
BUILDING OFFICIAL
100 BENTLEY DR
HARWINTON CT 06791-2200

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.



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USPS TRACKING #

9405 5036 9930 0082 4758 49

Electronic Rate Approved #038555749

SHIP TO:

RED WOLF BROADCASTING CORPORATION
758 COLONEL LEDYARD HWY
LEDYARD CT 06339

P

12/03/2021

US POSTAGE
Flat Rate Env
\$8.70

9405 5036 9930 0082 4758 49 0087 0000 0010 6339

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click-n-ship®

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PRIORITY MAIL 2-DAY™

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Expected Delivery Date: 12/07/21
Ref#: CR-876369
0006

R010



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Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0082 4758 49

Trans. #: 549946683	Priority Mail® Postage: \$8.70
Print Date: 12/03/2021	Total: \$8.70
Ship Date: 12/03/2021	
Expected Delivery Date: 12/07/2021	

From: DEBORAH CHASE Ref#: CR-876369
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

To: RED WOLF BROADCASTING CORPORATION
758 COLONEL LEDYARD HWY
LEDYARD CT 06339

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876369



FARMINGTON
210 MAIN ST
FARMINGTON, CT 06032-9998
(800)275-8777

12/08/2021

12:33 PM

Product	Qty	Unit Price	Price
Prepaid Mail Westborough, MA 01581 Weight: 0 lb 1.90 oz Acceptance Date: Wed 12/08/2021 Tracking #: 9405 5036 9930 0082 4758 18	1		\$0.00
Prepaid Mail Harwinton, CT 06791 Weight: 0 lb 7.10 oz Acceptance Date: Wed 12/08/2021 Tracking #: 9405 5036 9930 0082 4758 25	1		\$0.00
Prepaid Mail Harwinton, CT 06791 Weight: 0 lb 7.00 oz Acceptance Date: Wed 12/08/2021 Tracking #: 9405 5036 9930 0082 4758 32	1		\$0.00
Prepaid Mail Ledyard, CT 06339 Weight: 0 lb 7.10 oz Acceptance Date: Wed 12/08/2021 Tracking #: 9405 5036 9930 0082 4758 49	1		\$0.00
Grand Total:			\$0.00

Use in ...