



Centerline Communications
Andres Lopez
750 West Center Street, Floor 3
West Bridgewater, MA 02379
908-358-5305
alopez@clinellc.com

July 18, 2019

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

RE: Notice of Exempt Modification
320 Old Stagecoach Rd., Ridgefield, CT
Latitude: 41.3303080000
Longitude: -73.5168190000
T-Mobile Site#: CTFF702F_L600

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 126-foot level of the existing 149-foot monopole tower at 320 Old Stagecoach Road, Ridgefield, CT. The 149-foot tower and property are both owned by Insite Towers Development, LLC. T-Mobile now intends to replace three (3) of its existing antennas with three (3) new 600/700 MHz antennas. The new antennas will be installed at the 126-foot level of the tower.

The existing sector mounts will have adequate capacity for the proposed changes once each sector mount is modified. A new Stabilizer Kit will be installed and a new pipe will be installed and new Crossover Plate Kits per the attached Mount Analysis.

Planned Modifications:

Remove and Replace:

(3) LNX6515 Antenna **(Remove)** - (3) APXVAARR24_43U-NA20 Antenna 600/700 MHz **(Replace)**
(3) RRUS11 B12 **(Remove)** - (3) RRU 4449 B71+B12 **(Replace)**

Install New:

(1) Hybrid line

Existing to Remain:

(2) Hybrid Lines
(3) APXV18-C-A20 2100Mhz
(3) RRUS11 B4

This facility was approved by the Connecticut Siting Council Petition TS-T-MOBILE-118-160610 on July 22, 2016 with conditions.

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 First Selectman Rudy Marconi as elected official, Town of Ridgefield, Richard Baldelli, Director Planning & Zoning, Town of Ridgefield Building, and to Insite Towers as property and tower 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, T-Mobile 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).

Respectfully submitted,

Andres Lopez

Andres Lopez
Mobile: 908-358-5305
Fax: 508-819-3017
Office: 750 West Center Street, Floor 3 West Bridgewater, MA 02379
Email: alopez@clinellc.com

Attachments

cc: Rudy Marconi, First Selectman, Town of Ridgefield – as elected official
Insite Towers, LLC as tower and property owner
Town of Ridgefield, CT – Building/Zoning/Planning

Exhibit A

Original Facility Approval



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

www.ct.gov/csc

July 22, 2016

Eric Dahl
Vertical Development
20 Commercial Street
Branford, CT 06405

RE: **TS-T-MOBILE- 118-160610** – T-Mobile Northeast LLC request for an order to approve tower sharing at an existing telecommunications facility located at Old Stagecoach Road/Aspen Ledges Road, Ridgefield, Connecticut.

Dear Mr. Dahl:

At a public meeting held on July 21, 2016, the Connecticut Siting Council (Council) ruled that the shared use of this existing tower site is technically, legally, environmentally, and economically feasible and meets public safety concerns, and therefore, in compliance with General Statutes § 16-50aa, the Council has ordered the shared use of this facility to avoid the unnecessary proliferation of tower structures with the following conditions:

1. The antennas and supports are painted to match the color of the tower;
2. Any deviation from the proposed installation as specified in the original tower share request and supporting materials with the Council shall render this decision invalid;
3. Any material changes to the proposed installation as specified in the original tower share request and supporting materials filed with the Council shall require an explicit request for modification to the Council pursuant to Connecticut General Statutes § 16-50aa, including all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65;
4. Not less than 45 days after completion of the proposed installation, the Council shall be notified in writing that the installation has been completed;
5. Any nonfunctioning antenna and associated antenna mounting equipment on this facility owned and operated by T-Mobile Northeast LLC shall be removed within 60 days of the date the antenna ceased to function;
6. The validity of this action shall expire one year from the date of this letter; and
7. The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

This decision is under the exclusive jurisdiction of the Council and applies only to this request for tower sharing dated June 9, 2016 and additional information received on July 5, 2016. This facility has been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower. Any deviation from the approved tower sharing request is enforceable under the provisions of Connecticut General Statutes § 16-50u.

The proposed shared use is to be implemented as specified in your letter dated June 9, 2016, and additional information received on July 5, 2016, including the placement of all necessary equipment and shelters within the tower compound.



CONNECTICUT SITING COUNCIL

Affirmative Action / Equal Opportunity Employer

Please be advised that the validity of this action shall expire one year from the date of this letter.

Thank you for your attention and cooperation.

Very truly yours,

Robert Stein ^{KAB}

Robert Stein
Chairman

RS/FOC/lm

- c: The Honorable Rudolph P. Marconi, First Selectman, Town of Ridgefield
Betty Brosius, Town Planner, Town of Ridgefield
Insite Towers Development, LLC

Exhibit B

Property Card

DATE _____

[illegible]

9269

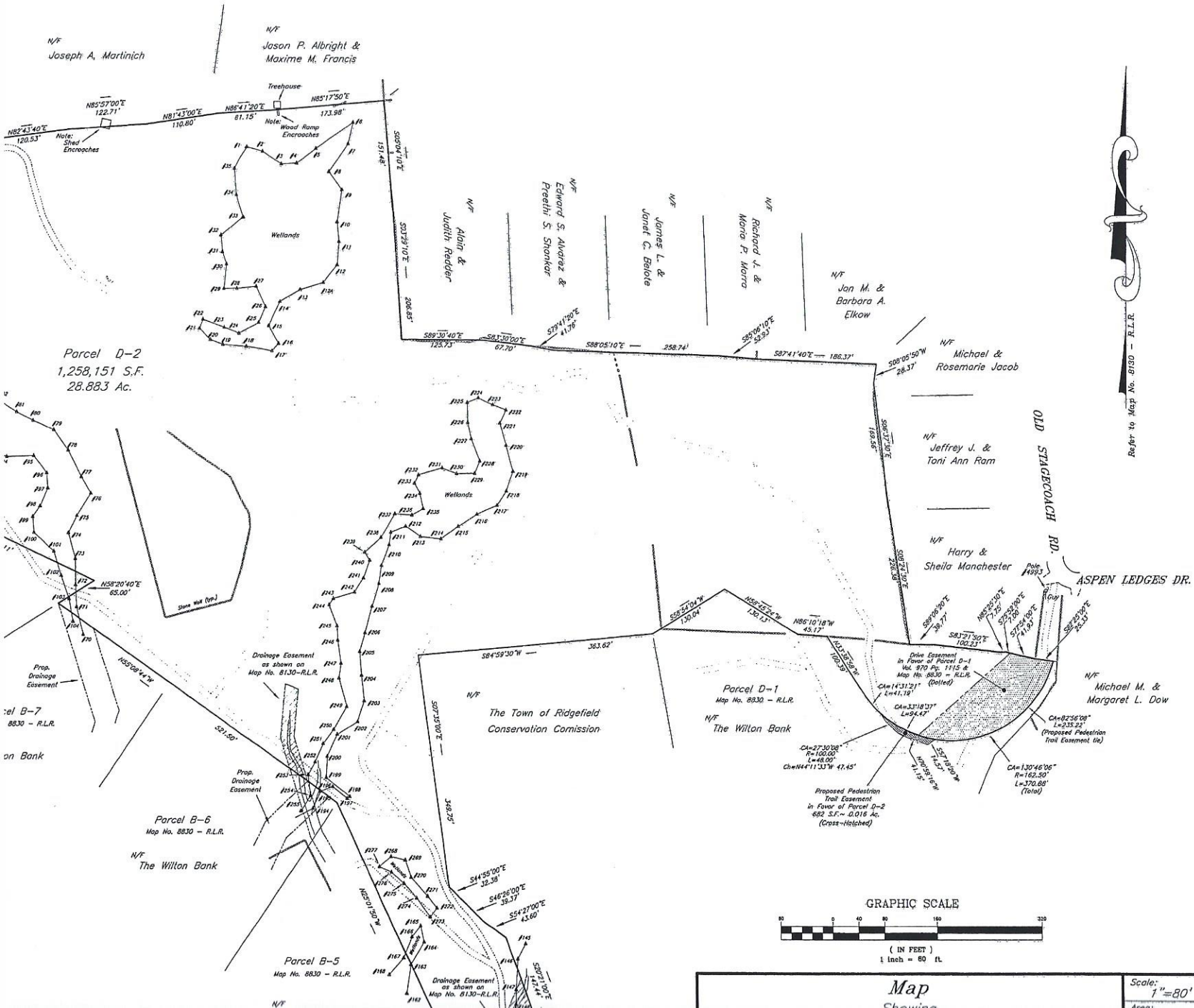
DRAWING NUMBER
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9269DRAWING NUMBER
9269BASIC PRODUCTS - NEW HAVEN, CONNECTICUT
REPRODUCED BY PATENT NUMBER 1552BASIC PRODUCTS - NEW HAVEN, CONNECTICUT
REPRODUCED BY PATENT NUMBER 1552BASIC PRODUCTS - NEW HAVEN, CONNECTICUT
REPRODUCED BY PATENT NUMBER 1552

Exhibit C

Construction Drawings

SITE NAME: CTFF702F

320 OLD STAGECOACH ROAD
RIDGEFIELD, CT 06877
FAIRFIELD COUNTY

SITE NUMBER: CTFF702F

PROJECT: T-MOBILE L600

CONFIGURATION: 67D07B 6102 MUAC

GENERAL NOTES

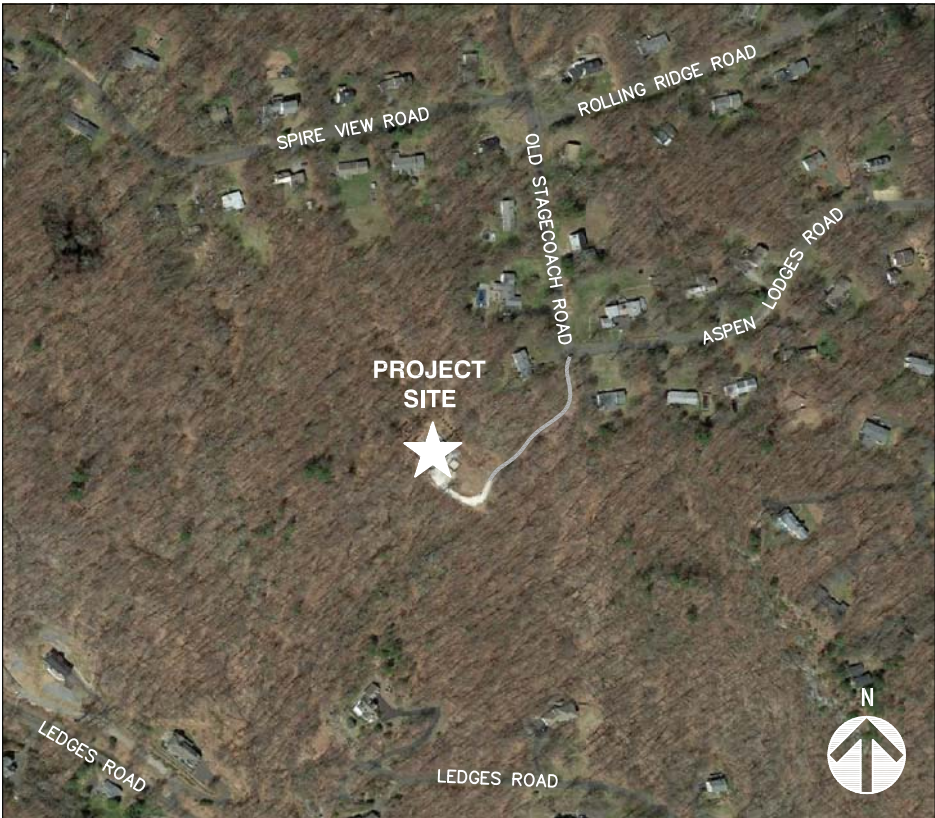
1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF T-MOBILE NORTHEAST, LLC. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE T-MOBILE NORTHEAST, LLC REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

SPECIAL CONSTRUCTION NOTES

1. ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE GLOBAL TOWER STRUCTURAL ANALYSIS PREPARED BY ENGINEERING TOWER SOLUTIONS, PLLC DATED 07/16/19.
2. PROTERRA DESIGN GROUP ASSUMES THAT THE MONOPOLE IS PROPERLY CONSTRUCTED AND MAINTAINED. ALL STRUCTURAL MEMBERS AND THEIR CONNECTION ARE ASSUMED TO BE IN GOOD CONDITION AND ARE FREE FROM DEFECTS WITH NO DETERIORATION TO ITS MEMBER CAPACITIES.
3. ANY REQUIRED ANTENNA MOUNT WORK SHALL BE COMPLETED PRIOR TO THE INSTALLATION OF ANY EQUIPMENT IN ACCORDANCE WITH THE ANTENNA MOUNT STRUCTURAL ANALYSIS (MSA) REPORT AND DRAWING PREPARED BY DESTEK ENGINEERING, LLC DATED 06/11/19.

T-MOBILE TECHNICIAN SITE SAFETY NOTES

LOCATION	SPECIAL RESTRICTIONS
SECTOR A:	ACCESS NOT PERMITTED
SECTOR B:	ACCESS NOT PERMITTED
SECTOR C:	ACCESS NOT PERMITTED
GPS/LMU:	UNRESTRICTED*
(*CAUTION: OSHA-APPROVED PORTABLE 8' STEP-LADDER REQUIRED)	
RADIO CABINETS:	UNRESTRICTED
PPC DISCONNECT:	UNRESTRICTED
MAIN CIRCUIT D/C:	UNRESTRICTED
NIU/T DEMARC:	UNRESTRICTED
OTHER/SPECIAL:	NONE



DIG SAFE SYSTEM
(MA, ME, NH, RI, VT):
1-888-344-7233

CALL BEFORE YOU DIG
(CT): 1-800-922-4455



PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY T-MOBILE EQUIPMENT ALTERATION
ZONING JURISDICTION:	SPECIAL ZONING NOTE (ELIGIBLE FACILITY REQUEST): BASED ON INFORMATION PROVIDED BY T-MOBILE REGULATORY COMPLIANCE PROFESSIONALS AND LEGAL COUNSEL, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE MIDDLE CLASS TAX RELIEF AND JOB CREATION ACT OF 2012, 47 USC 1455(A), SECTION 6409(A), AND IS SUBJECT TO AN ELIGIBLE FACILITY REQUEST, EXPEDITED REVIEW AND LIMITED/PARTIAL ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW OR ADMINISTRATIVE REVIEW).
SITE ADDRESS:	320 OLD STAGECOACH ROAD RIDGEFIELD, CT 06877
LATITUDE:	41° 19' 49.11" N (FROM RFDS: 41.330308)
LONGITUDE:	73° 31' 00.55" W (FROM RFDS: -73.516819)
GROUND ELEVATION:	810± (FROM GOOGLE EARTH)
JURISDICTION:	CONNECTICUT SITING COUNCIL / TOWN OF RIDGEFIELD
BUILDING CODE:	2018 CONNECTICUT STATE BUILDING CODE WITH AMENDMENTS (IBC 2015 BASED)
ELECTRICAL CODE:	2017 NATIONAL ELECTRICAL CODE AND AMENDMENTS
CURRENT/ PROPOSED USE:	TELECOMMUNICATIONS FACILITY
TOWER OWNER:	INSITE TOWERS, LLC
TOWER OWNER SITE ID:	CT897
TOWER OWNER SITE NAME:	RIDGEFIELD

DRAWING INDEX

SHEET NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
GN-1	GENERAL NOTES	0
A-1	COMPOUND & EQUIPMENT PLANS	0
A-2	ELEVATION & ANTENNA PLANS	0
A-3	DETAILS	0
S-1	ANTENNA MOUNTING DETAILS	0
E-1	ONE-LINE DIAGRAM & GROUNDING DETAILS	0



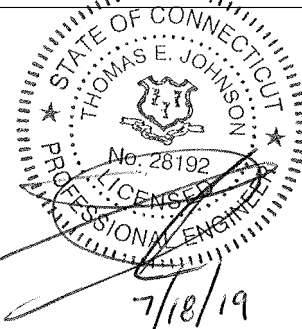
T-MOBILE NORTHEAST LLC
35 Griffin Road South
Bloomfield, CT 06002
Office: (860) 648-1116



750 West Center St. Suite 301
West Bridgewater, MA 02379



4 Bay Road, Building A
Suite 200
Hadley, MA 01035, 1194-1177, 320-4918



APPROVALS

CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING/SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE
PROJECT NO:	19-023
DRAWN BY:	JEB
CHECKED BY:	TEJ/JMM
0 07/18/19	ISSUED FOR CONSTRUCTION
0 06/14/19	ISSUED FOR REVIEW

SITE NUMBER: CTFF702F
SITE NAME:
CTFF702F

320 OLD STAGECOACH ROAD
RIDGEFIELD, CT 06877
FAIRFIELD COUNTY

SHEET TITLE

TITLE SHEET

SHEET NUMBER

T-1

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
- CONTRACTOR – CENTERLINE COMMUNICATIONS
SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
OWNER – T–MOBILE
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR 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 CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR 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.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER’S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR’S EXPENSE TO THE SATISFACTION OF THE OWNER.
11. SUBCONTRACTOR 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.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
14. ANY NEW CONCRETE NEEDED FOR CONSTRUCTION SHALL BE AIR–ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 35 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
16. CONSTRUCTION SHALL COMPLY WITH LTE OR 700 MHz SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF T–MOBILE SITES."
17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
20. APPLICABLE BUILDING CODES:
SUBCONTRACTOR’S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
- BUILDING CODE: 2018 CONNECTICUT STATE BUILDING CODE, (IBC 2015) WITH AMENDMENTS
- ELECTRICAL CODE: NEC 2017 AND AMENDMENTS
- SUBCONTRACTOR’S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:
- AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;
- AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC),
MANUAL OF STEEL CONSTRUCTION, 14TH EDITION;
- TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222–G, STRUCTURAL STANDARDS FOR STEEL
- ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.
- FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE–SPECIFIC (UL, LPI, OR NFPA) LIGHTNING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. 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.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
4. 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 SURCUITS TO BTS EQUIPMENT.
5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	EQ	EQUAL	RAN	RADIO ACCESS NETWORK
AWG	AMERICAN WIRE GAUGE	G.C.	GENERAL CONTRACTOR	REF	REFERENCE
BTCW	BARE TINNED SOLID COPPER WIRE	GRC	GALVANIZED RIGID CONDUIT	REQ	REQUIRED
BGR	BURIED GROUND RING	MSA	MOUNT STRUCTURAL ANALYSIS	RF	RADIO FREQUENCY
BTS	BASE TRANSCEIVER STATION	MGB	MASTER GROUND BAR	TBD	TO BE DETERMINED
EXISTING	EXISTING OR (E)	MIN	MINIMUM	TBR	TO BE REMOVED
EGB	EQUIPMENT GROUND BAR	PROPOSED	NEW OR (P)	TBRR	TO BE REMOVED AND REPLACED
EGR	EQUIPMENT GROUND RING	N.T.S.	NOT TO SCALE	TYP	TYPICAL
		RAD	RADIATION CENTERLINE (ANTENNA)	VIF	VERIFY IN FIELD



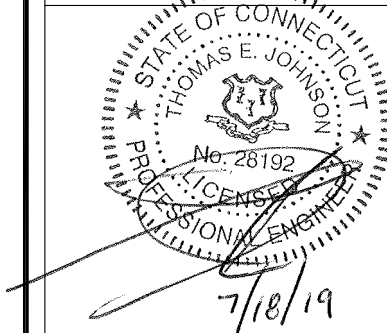
T-MOBILE NORTHEAST LLC
35 Griffin Road South
Bloomfield, CT 06002
Office: (860) 648–1116



750 West Center St. Suite 301
West Bridgewater, MA 02379

ProTerra
DESIGN GROUP, LLC

4 Bay Road, Building A
Suite 200
Hadley, MA 01035, 1194 (417) 320–4918



APPROVALS

CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING/SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE
PROJECT NO:	19–023
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CHECKED BY:	TEJ/JMM
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SITE NAME:
CTFF702F

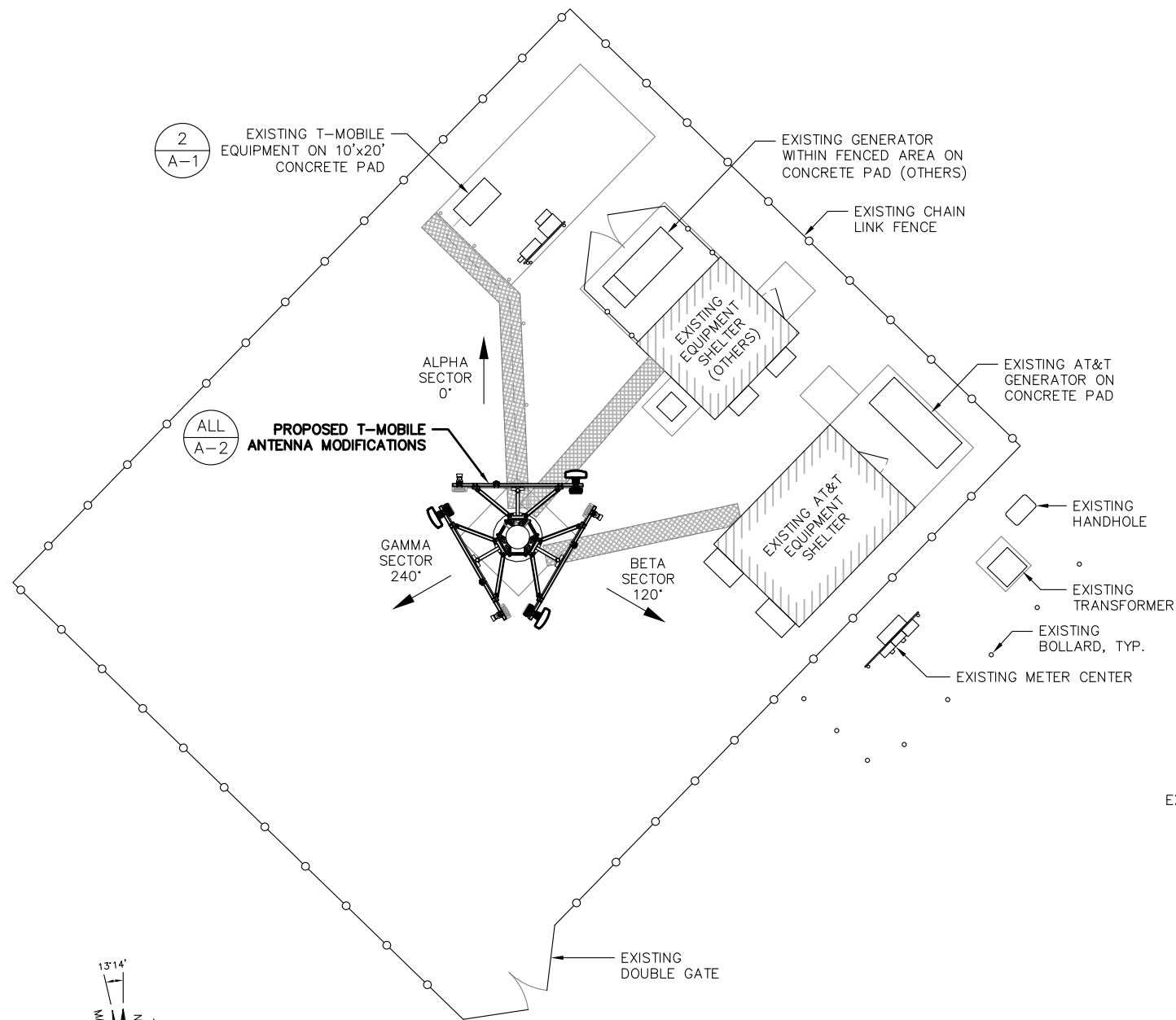
320 OLD STAGECOACH ROAD
RIDGEFIELD, CT 06877
FAIRFIELD COUNTY

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN–1



COMPOUND PLAN

SCALE: 1"=15' (11"x17")
1"=7.5' (22"x34")

1
A-1



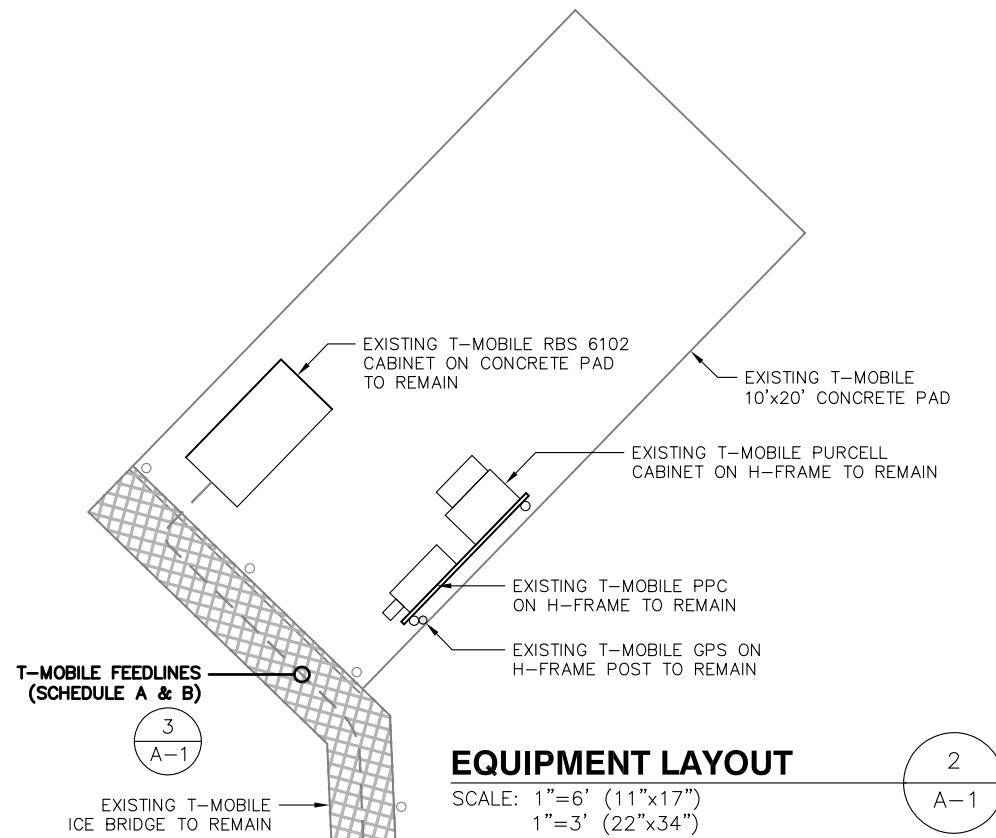
NOTE:
REFER TO THE FINAL RF DATA SHEET
FOR FINAL ANTENNA SETTINGS.

MOUNT MODIFICATIONS TO BE COMPLETED PRIOR
TO THE INSTALLATION OF ANY EQUIPMENT.
REFER TO THE MOUNT STRUCTURAL ANALYSIS
REPORT AND DRAWING BY
DESTEK ENGINEERING, LLC DATED 06/11/19.

ALL WORK TO BE COMPLETED IN ACCORDANCE
WITH THE GLOBAL TOWER STRUCTURAL
ANALYSIS PREPARED BY ENGINEERING TOWER
SOLUTIONS, PLLC DATED 07/16/19.

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO REMAIN: (2) 6X12 HYBRID TO 126' RAD	UP MONOPOLE TO RAD
B	PROPOSED: (1) 6X12 HYBRID TO 126' RAD	UP MONOPOLE TO RAD

NOTE: EXISTING T-MOBILE EQUIPMENT FEEDLINE LEASING ENTITLEMENTS BASED
ON T-MOBILE RFDS. OBSERVED FIELD CONDITIONS MAY DIFFER.



EQUIPMENT LAYOUT

SCALE: 1"=6' (11"x17")
1"=3' (22"x34")

2
A-1

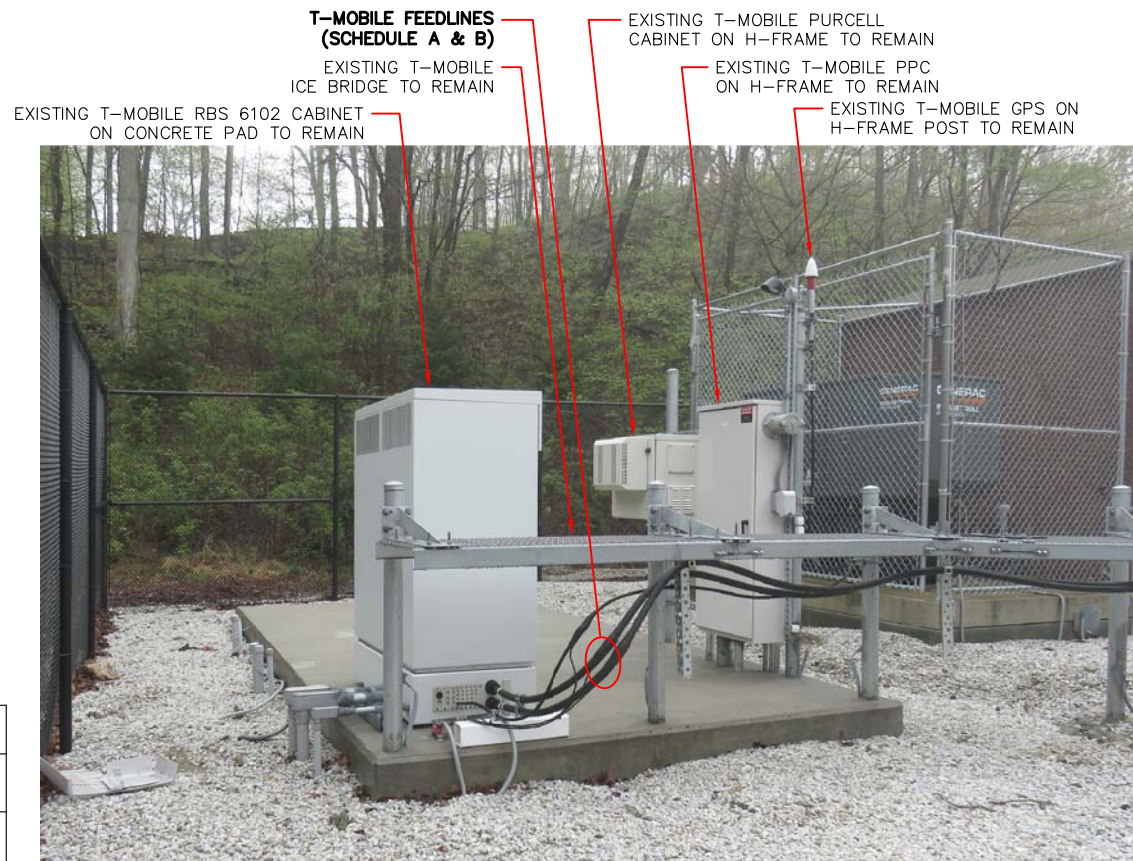


IMAGE SOURCE: PROTERRA 05/04/19

GROUND EQUIPMENT PHOTO DETAIL

SCALE: N.T.S.

3
A-1

T-Mobile

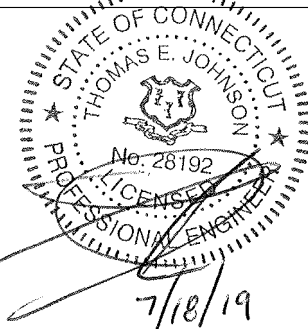
T-MOBILE NORTHEAST LLC
35 Griffin Road South
Bloomfield, CT 06002
Office: (860) 648-1116

CENTERLINE
COMMUNICATIONS

750 West Center St. Suite 301
West Bridgewater, MA 02379

ProTerra
DESIGN GROUP, LLC

4 Bay Road, Building A
Suite 200
Hadley, MA 01035, PH: (417) 320-4918



APPROVALS

CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING/SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE
PROJECT NO:	19-023
DRAWN BY:	JEB
CHECKED BY:	TEJ/JMM
0 07/18/19	ISSUED FOR CONSTRUCTION
0 06/14/19	ISSUED FOR REVIEW

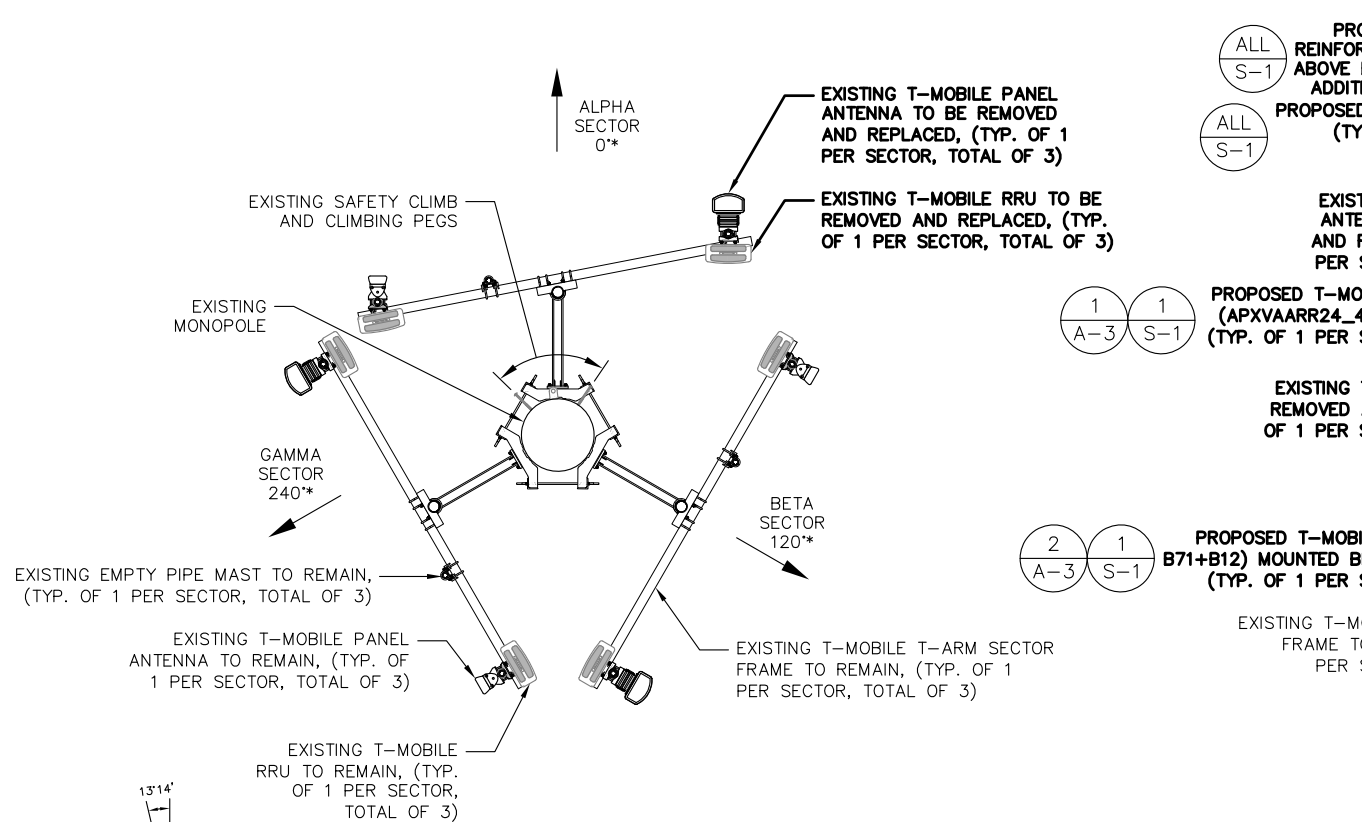
SITE NUMBER: CTFF702F
SITE NAME:
CTFF702F

320 OLD STAGECOACH ROAD
RIDGEFIELD, CT 06877
FAIRFIELD COUNTY

SHEET TITLE
COMPOUND &
EQUIPMENT PLANS

SHEET NUMBER

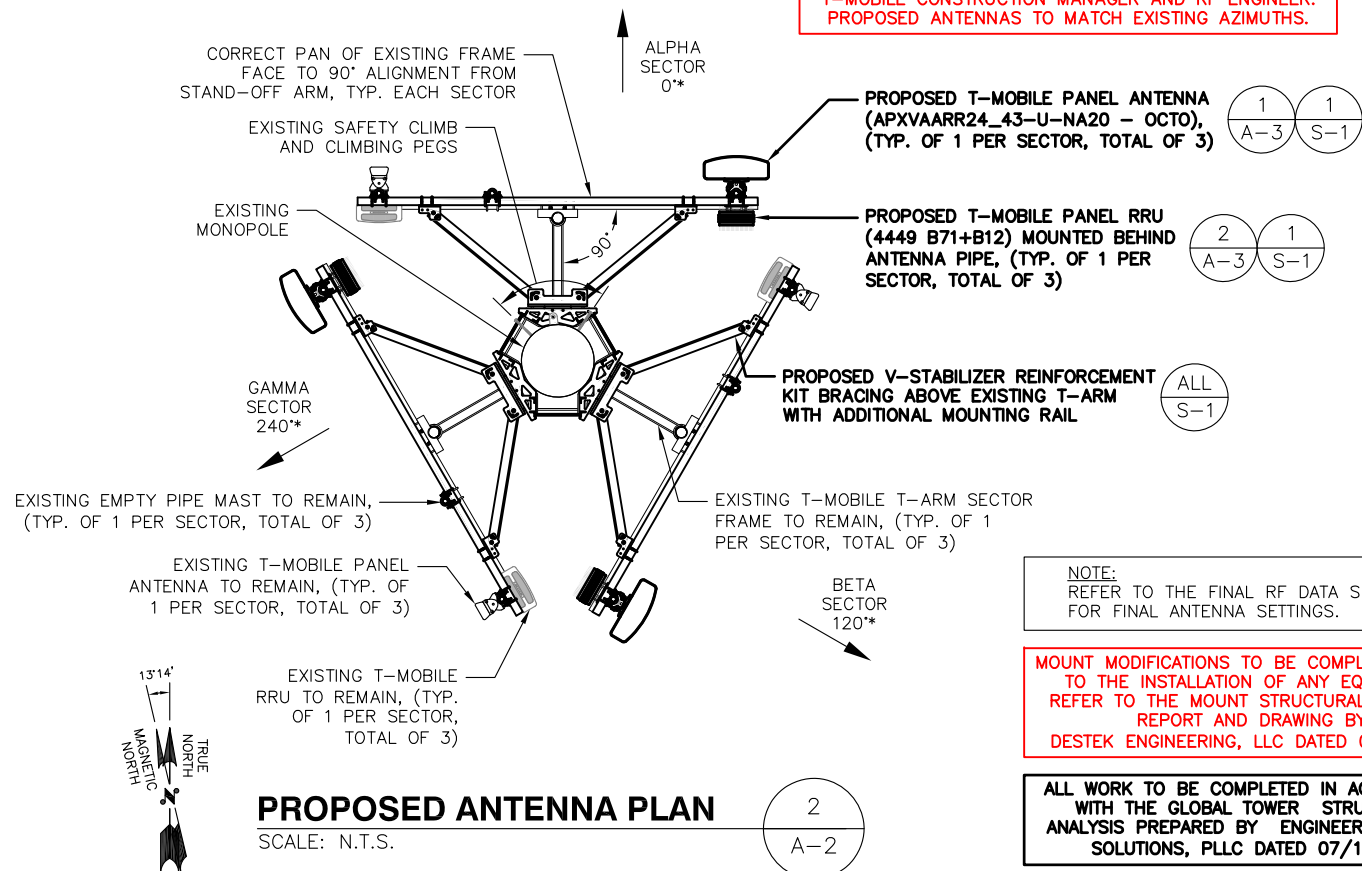
A-1



EXISTING ANTENNA PLAN

SCALE: N.T.S.

1
A-2



PROPOSED ANTENNA PLAN

SCALE: N.T.S.

2
A-2

- PROPOSED V-STABILIZER REINFORCEMENT KIT BRACING ABOVE EXISTING T-ARM WITH ADDITIONAL MOUNTING RAIL (TYP. OF 1 PER SECTOR, TOTAL OF 3)
- EXISTING T-MOBILE PANEL ANTENNA TO BE REMOVED AND REPLACED, (TYP. OF 1 PER SECTOR, TOTAL OF 3)
- EXISTING T-MOBILE RRU TO BE REMOVED AND REPLACED, (TYP. OF 1 PER SECTOR, TOTAL OF 3)
- PROPOSED T-MOBILE PANEL ANTENNA (APXVAARR24_43-U-NA20 - OCTO), (TYP. OF 1 PER SECTOR, TOTAL OF 3)
- EXISTING T-MOBILE RRU TO BE REMOVED AND REPLACED, (TYP. OF 1 PER SECTOR, TOTAL OF 3)
- PROPOSED T-MOBILE PANEL RRU (4449 B71+B12) MOUNTED BEHIND ANTENNA PIPE, (TYP. OF 1 PER SECTOR, TOTAL OF 3)



ANTENNA PHOTO DETAIL

SCALE: N.T.S.

3
A-2

- TOP OF EXISTING MONOPOLE
ELEV.= 149'± AGL (RECORD STRUCTURAL)
- TOP OF PROPOSED T-MOBILE ANTENNAS
ELEV.= 130'± AGL
- CL OF PROPOSED T-MOBILE ANTENNAS
ELEV.= 126'± AGL (T-MOBILE RFDS)

ALL
A-2

EXISTING AND PROPOSED T-MOBILE EQUIPMENT ON EXISTING SECTOR FRAME

T-MOBILE FEEDLINES (SCHEDULE A & B)

EXISTING MONOPOLE



PARTIAL ELEVATION PHOTO DETAIL

SCALE: N.T.S.

4
A-2

T-Mobile
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DESIGN GROUP, LLC
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Hadley, MA 01035, PH: (417) 320-4918

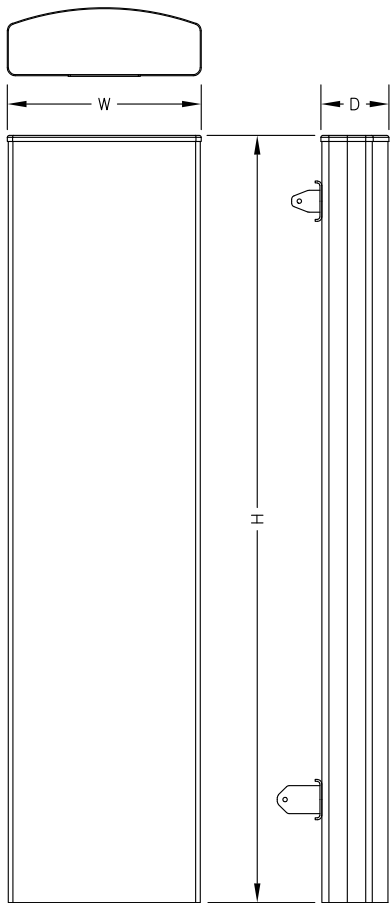
STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
PROFESSIONAL ENGINEER
7/18/19

APPROVALS	
CONSTRUCTION	DATE
RF ENGINEERING	DATE
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320 OLD STAGECOACH ROAD
RIDGEBFIELD, CT 06877
FAIRFIELD COUNTY

SHEET TITLE
ELEVATION &
ANTENNA PLANS

SHEET NUMBER
A-2



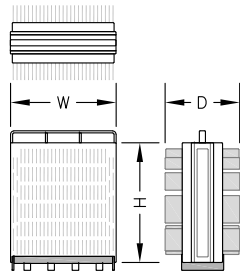
APXVAARR24_43-U-NA20 (OCTO) ANTENNA SPECIFICATIONS	
MANUF.	RFS
MODEL #	APXVAARR24_43-U-NA20 (OCTO)
HEIGHT	95.9"
WIDTH	24"
DEPTH	8.7"
WEIGHT	128± LBS.

ANTENNA DETAIL
SCALE: N.T.S.

1
A-3

ANTENNA CONFIGURATION								
SECTOR	BAND	ANTENNA MODEL	ANTENNA RAD (FROM RFDS)	AZIMUTH	DOWNTILT MECH./ELEC.		RADIOS	CABLE FEED LINES (APPROX. CABLE LENGTH 210')
ALPHA	L2100 U2100	(1) RFS — APXV18–206516S–C–A20 (DUAL)	126'±	0°*	0°	2°	EXISTING (1) RRUS11 B4 RRU	PROPOSED (1) 6x12 HYBRID CABLE TRUNK EXISTING (2) 6x12 HYBRID CABLE TRUNK
	L600 L700	(1) RFS — APXVAARR24_43–U–NA20 (OCTO)	126'±	0°*	0°	2°	PROPOSED (1) 4449 B71+B12 RRU	
BETA	L2100 U2100	(1) RFS — APXV18–206516S–C–A20 (DUAL)	126'±	120°*	0°	2°	EXISTING (1) RRUS11 B4 RRU	
	L600 L700	(1) RFS — APXVAARR24_43–U–NA20 (OCTO)	126'±	120°*	0°	2°	PROPOSED (1) 4449 B71+B12 RRU	
GAMMA	L2100 U2100	(1) RFS — APXV18–206516S–C–A20 (DUAL)	126'±	240°*	0°	2°	EXISTING (1) RRUS11 B4 RRU	
	L600 L700	(1) RFS — APXVAARR24_43–U–NA20 (OCTO)	126'±	240°*	0°	2°	PROPOSED (1) 4449 B71+B12 RRU	
BASED ON RFDS DATED 04/16/19. REFER TO FINAL RFDS FOR FINAL ANTENNA SETTINGS, CONFIGURATION, QUANTITIES AND RAN WIRING. *NOTE: AZIMUTH SHOWN ABOVE BASED UPON RECORD RFDS AND MAY VARY FROM OBSERVED FIELD CONDITIONS. CONFIRM DISCREPANCIES PRIOR TO INSTALLATION.								

4449 B71+B12 SPECIFICATIONS	
MANUF.	ERICSSON
MODEL #	4449 B71+B12
HEIGHT	14.9"
WIDTH	13.2"
DEPTH	9.2"
WEIGHT	74± LBS.



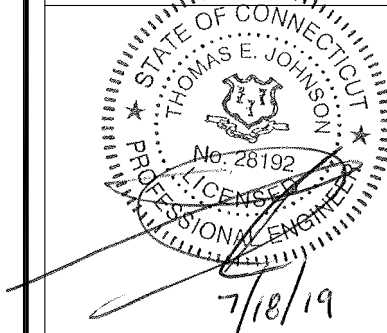
REMOTE RADIO UNIT (RRU) DETAIL
SCALE: N.T.S.

2
A-3

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4 Bay Road, Building A
Suite 200
Hadley, MA 01035, 194K (#17) 320-4918



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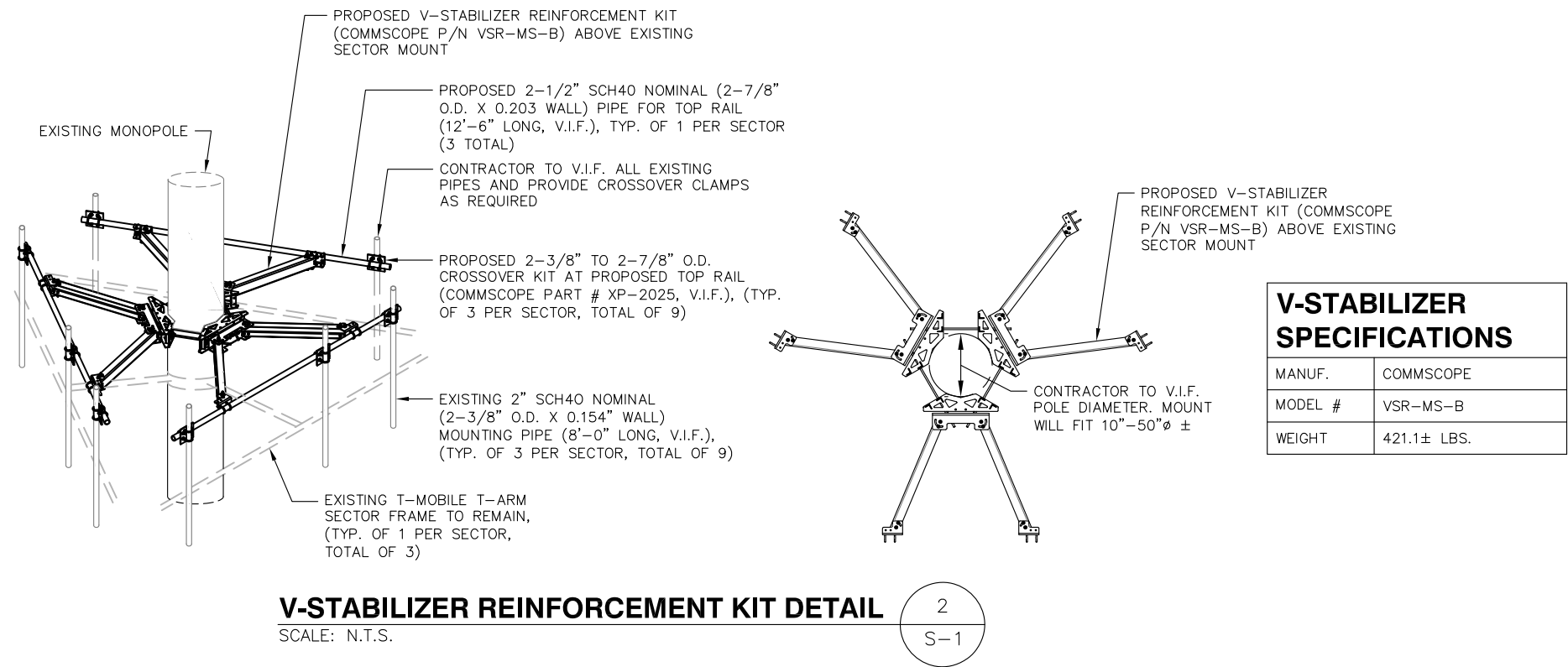
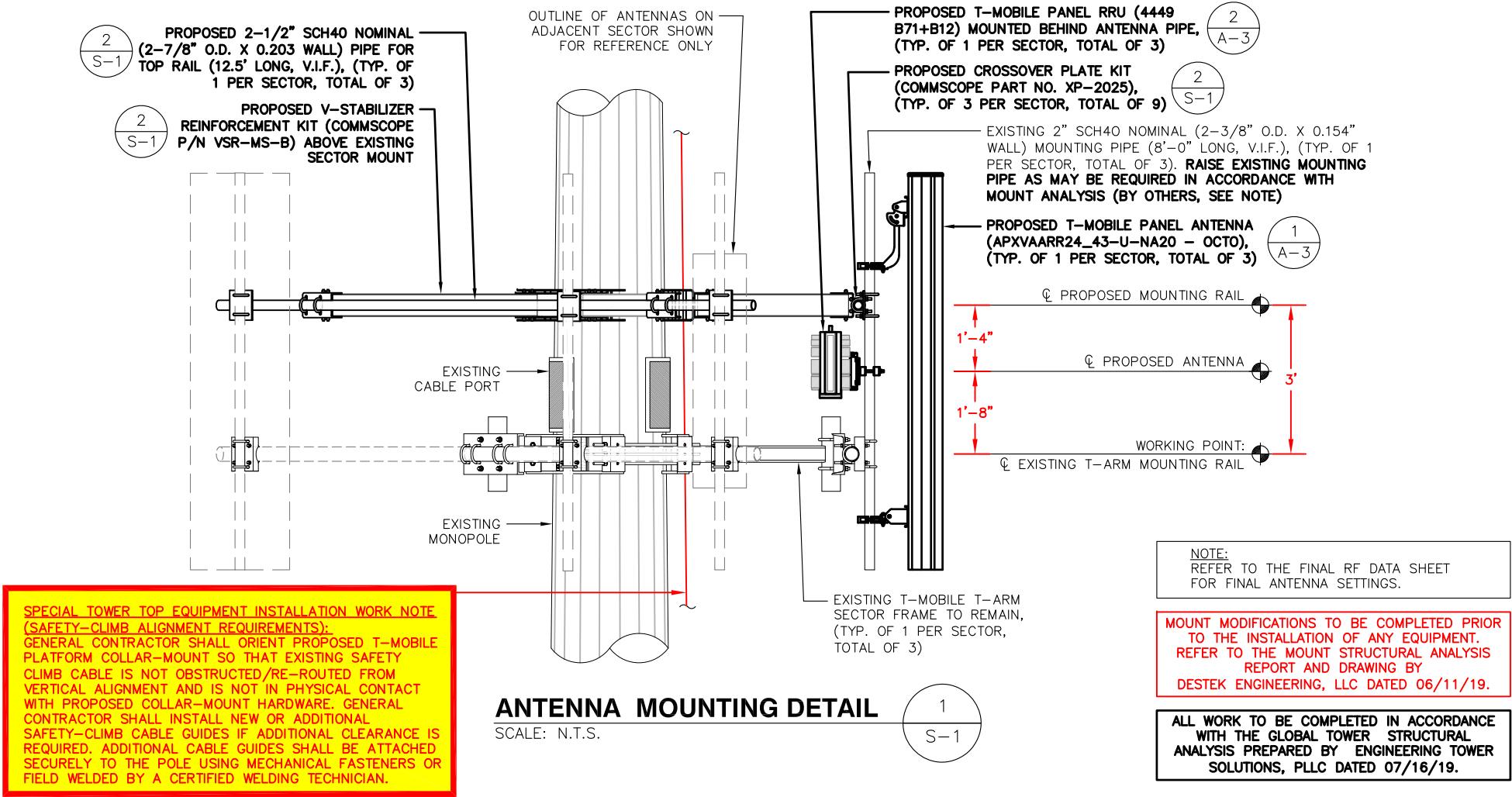
320 OLD STAGECOACH ROAD
RIDGFIELD, CT 06877
FAIRFIELD COUNTY

SHEET TITLE

DETAILS

SHEET NUMBER

A-3



T-Mobile

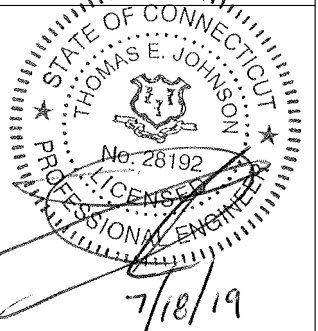
T-MOBILE NORTHEAST LLC
35 Griffin Road South
Bloomfield, CT 06002
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CENTERLINE
COMMUNICATIONS

750 West Center St. Suite 301
West Bridgewater, MA 02379

ProTerra
DESIGN GROUP, LLC

4 Bay Road, Building A
Suite 200
Hadley, MA 01035, PH: (417) 320-4918



APPROVALS

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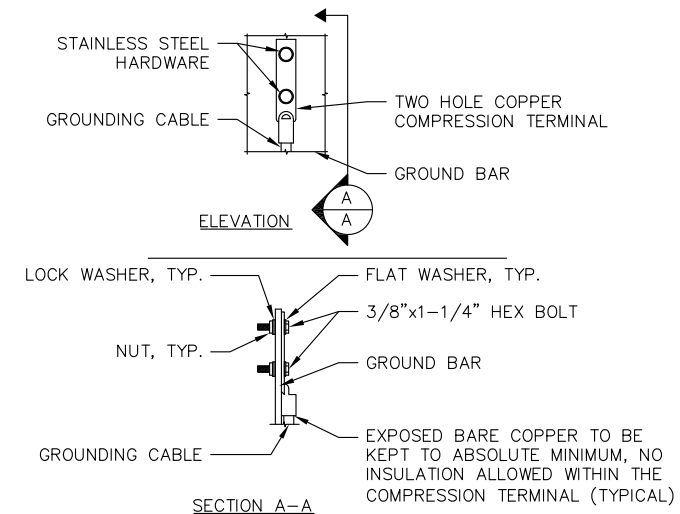
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SITE NAME:
CTFF702F

320 OLD STAGECOACH ROAD
RIDGEBFIELD, CT 06877
FAIRFIELD COUNTY

SHEET TITLE
ANTENNA
MOUNTING
DETAILS

SHEET NUMBER

S-1

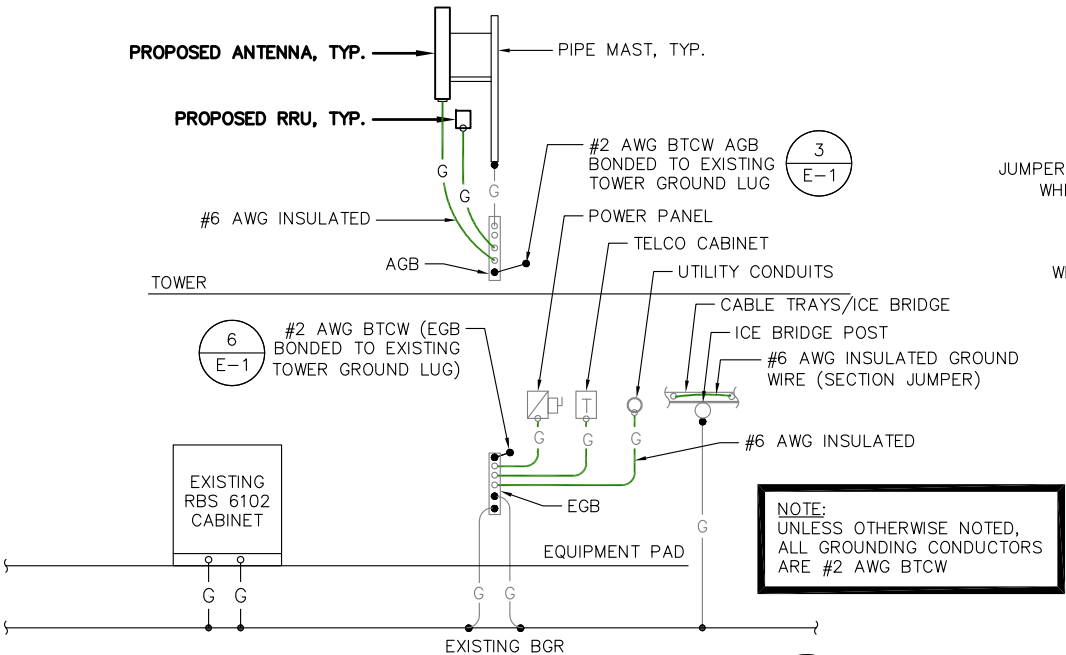


- NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
 2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
 3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR
CONNECTION DETAIL

SCALE: N.T.S.

1
E-1



TYPICAL GROUNDING RISER DIAGRAM

SCALE: N.T.S.

2
E-1

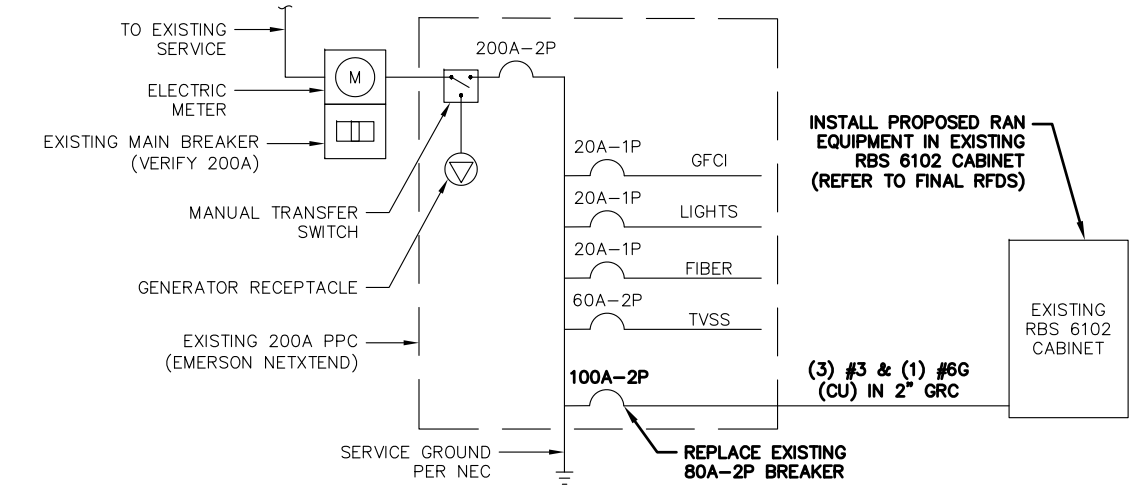
CONTRACTOR NOTE:
G.C. TO VERIFY THAT THE EXISTING CONDUITS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSED LOADING IN ACCORDANCE WITH NEC AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORK AS REQUIRED.

ELECTRICAL LEGEND	
A	AMPERE
V	VOLT
KWH	KILOWATT - HOUR
C	CONDUIT
GRC	GALVANIZED RIGID CONDUIT
BTCW	BARE TINNED (SOLID) COPPER WIRE (#2 AWG, UNLESS NOTES OTHERWISE)
G	GROUND
MGB	MASTER GROUND BAR
AGB/EGB	EQUIPMENT GROUND BAR/ANTENNA GROUND BAR
C	GROUND COPPER WIRE, SIZE AS NOTED
---	EXPOSED WIRING
---	INSULATED GROUNDING CONDUCTOR (#6 AWG STRANDED, UNLESS NOTED OTHERWISE)
5/8"x10"	COPPER CLAD STAINLESS STEEL GROUND ROD
PPC	POWER PROTECTION CABINET
⊗	OMNI-DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALL
○	MECHANICAL CONNECTION
●	CADWELD CONNECTION
○	MECHANICAL (COMPRESSION TYPE) CONNECTION

ONE LINE POWER SCHEMATIC

SCALE: N.T.S.

4
E-1



ELECTRICAL & GROUNDING NOTES:

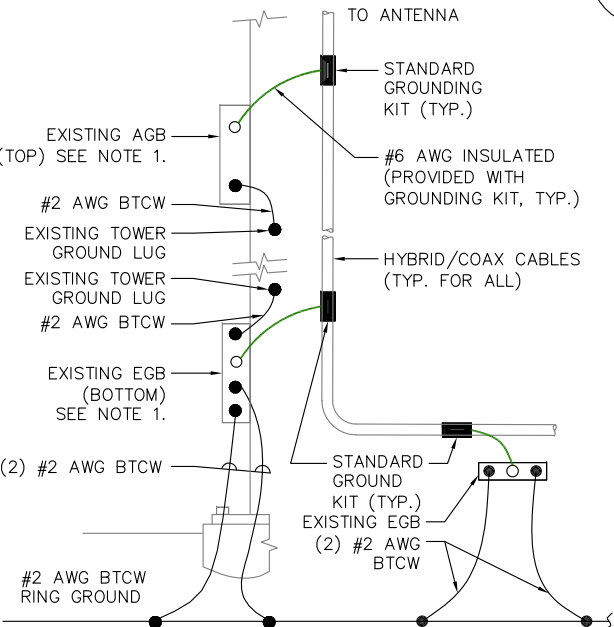
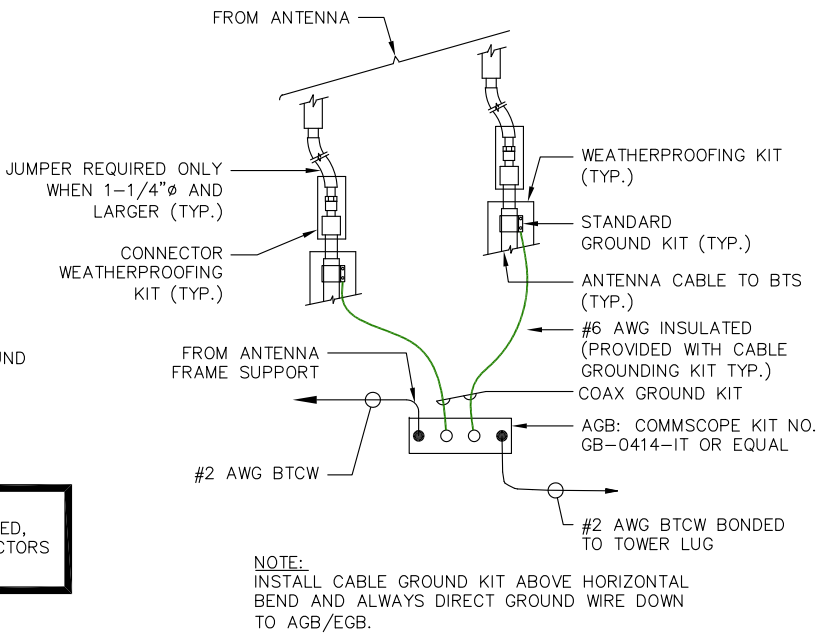
1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) 2017 AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
6. RIGID STEEL CONDUITS SHALL BE GROUNDED AT BOTH ENDS.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THHN INSULATION AS REQUIRED BY NEC.
8. RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL ROOM AND PROPOSED CELL SITE POWER PEDESTAL AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROPOSED CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON DRAWING A-1. PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
11. GROUNDING SHALL COMPLY WITH NEC ART. 250.
12. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.

13. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
14. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
15. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
16. CONNECTIONS TO MGB SHALL BE ARRANGED IN THREE MAIN GROUPS: SURGE PRODUCERS (COAXIAL CABLE GROUND KITS, TELCO AND POWER PANEL GROUND); (GROUNDING ELECTRODE RING OR BUILDING STEEL); NON-SURGING OBJECTS (EGB GROUND IN BTS UNIT).
17. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LYGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
18. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
19. BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
20. BOND ANTENNA EGB'S AND MGB TO WATER MAIN/GROUND RING.
21. TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
22. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
23. VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.

TOWER TOP CABLE GROUNDING DETAIL

SCALE: N.T.S.

3
E-1



TOWER BOTTOM CABLE
GROUNDING DETAIL

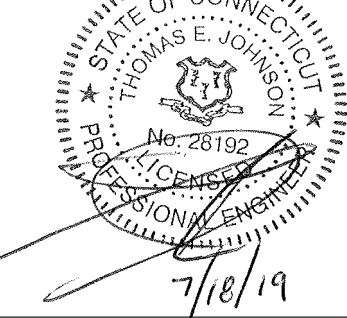
SCALE: N.T.S.

5
E-1

T-Mobile
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ProTerra
DESIGN GROUP, LLC
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0	07/18/19	ISSUED FOR CONSTRUCTION
0	06/14/19	ISSUED FOR REVIEW

SITE NUMBER: CTFF702F
SITE NAME:
CTFF702F
320 OLD STAGECOACH ROAD
RIDGFIELD, CT 06877
FAIRFIELD COUNTY

SHEET TITLE
ONE LINE DIAGRAM &
GROUNDING DETAILS

SHEET NUMBER
E-1

Exhibit D

Structural Analysis Report



Date: **July 16, 2019**

Mikala Charron
InSite Wireless
1199 North Fairfax Street, Suite 700
Alexandria, VA 22314

Subject: **Structural Analysis Report**

Carrier Designation: **T-Mobile Co-Locate**
Carrier Site Number: CTFF702F
Carrier Site Name: CTFF702F

Insite Wireless Designation: **Insite Wireless Site Number:** CT897
Insite Wireless Site Name: Ridgefield

Engineering Firm Designation: **ETS Project Number:** 192527.14C

Site Data: **320 Old Stagecoach Rd, Ridgefield, Fairfield County, CT 06877**
Latitude 41.330308', Longitude -73.516819'
149 Foot - Monopole Tower

Dear Mikala Charron,

Engineered Tower Solutions, PLLC 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:

Proposed Equipment Configuration	Tower: 60.4%	Sufficient Capacity
	Foundation: 43.4%	Sufficient Capacity

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by:

Paul A. Bridges, EI

Respectfully submitted by:

Frederic G. Bost, PE, GC, CWI
President/Owner



TABLE OF CONTENTS

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4) ANALYSIS RESULTS

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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 149 ft Monopole tower designed by Valmont in November of 2014. The tower was originally designed for a wind speed of 100 mph per TIA/EIA-222-G.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	III
Wind Speed:	125 mph
Exposure Category:	B
Topographic Factor:	1
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)
129.0	129.0	1	Commscope	VSR-MS-B Kit	3	1-1/4
		3	-	2.5 Sch 40 x 12.5' Horiz. Pipe		
126.0	126.0	3	Tower Mounts	8' T-Arm Mount		
		3	Ericsson	4449 B71+B12		
		3	Ericsson	RRUS 11 B4		
		3	RFS	APXV18-206516S-C-A20		
		3	RFS	APXVAARR24_43-U-NA20		

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)
150.0	155.0	1	RFI	BA40-41	1	7/8
	150.0	1	Tower Mount	Side Arm		
146.0	146.0	12	CCI	HPA-65R-BUU-118	2 3 8	1/2 3/8 5/8
		1	Tower Mount	Low Profile Platform		
		6	Ericsson	RRU-11		
		3	Ericsson	RRUS-12		
		3	Ericsson	RRUS-32		
		3	Ericsson	RRUS-4478 B14		
		3	Ericsson	RRUS-4478 B5		
		6	Ericsson	A2 MODULE		
		3	Ericsson	RRUS-E2		
		3	Kaelus	DBC0061F1V51-2		
		4	Raycap	DC6-48-60-18-8F		
136.0	136.0	3	Commscope	CBC78T-DS-43-2X	2	1-5/8
		9	Commscope	JAHH-1D65B		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		1	Site Pro 1	RMQP-496-HK		
		1	RFS	DB-C1-12C-24AB-OZ		
		3	Samsung	B2/B66 RRH BR049		
		3	Samsung	B5/B13 RRH BR04C		
70.0	70.0	1	Commscope	VHLP3-11W-6GR	1	EW90
		1	Tower Mount	Pipe Mount		
66.0	66.0	1	Tower Mount	Side Arm	1	7/8
		1	Sinclair	SD210R-SF2P90LDF		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Tower Design Drawings	Valmont	11/18/2014	InSite
Tower Erection Drawings	Valmont	11/25/2014	InSite
Foundation Design Drawings	Valmont	11/19/2014	InSite
Geotechnical Report	Terracon Consultants, Inc	10/07/2014	InSite
Mount Modification Construction Drawings	ProTerra Design Group, LLC	19-023	InSite

3.1) Analysis Method

tnxTower (version 8.0.5.0), 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.

3.2) Assumptions

- 1) Tower and structures were built and have been maintained in accordance with the manufacturer's specifications.
- 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. Engineered Tower Solutions, PLLC 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)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	149 - 116.67	Pole	TP28.81x20.5x0.219	1	-12.80	1173.23	47.6	Pass
L2	116.67 - 89.25	Pole	TP35.43x27.259x0.313	2	-17.16	2060.51	53.7	Pass
L3	89.25 - 46.25	Pole	TP45.86x33.4529x0.438	3	-287.86	3470.04	60.4	Pass
L4	46.25 - 0	Pole	TP56.88x43.3331x0.5	4	-297.44	4336.41	50.7	Pass
							Summary	
						Pole (L3)	60.4	Pass
						RATING =	60.4	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	45.9	Pass
1	Base Plate	0	22.4	Pass
1	Base Foundation Structural	0	40.2	Pass
1	Base Foundation Soil Interaction	0	43.4	Pass

Structure Rating (max from all components) =	60.4%
---	--------------

Notes:

- 1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity consumed.

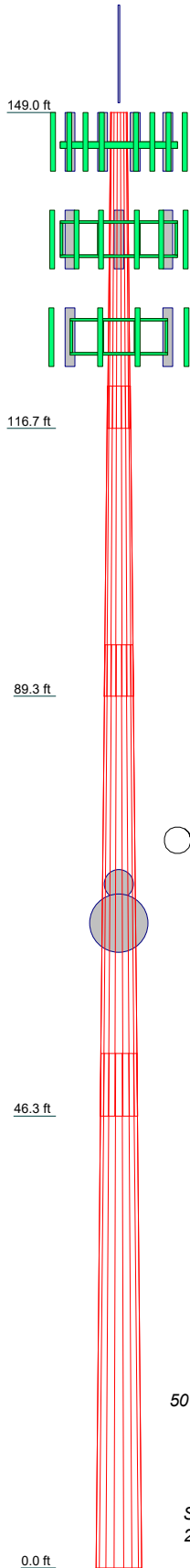
4.1) Recommendations

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

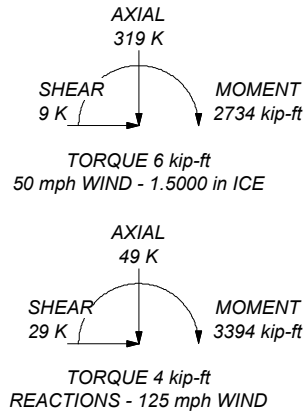
APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4	
Length (ft)	32.330	31.750	48.250	52.670	
Number of Sides	18	18	18	18	
Thickness (in)	0.2190	0.3130	0.4380	0.5000	
Socket Length (ft)	4.330	5.250	6.420	43.3331	
Top Dia (in)	20.5000	27.2590	33.4529	56.8800	
Bot Dia (in)	28.8100	35.4300	45.8600		
Grade	A572-65				
Weight (K)	1.9	3.3	9.0	14.1	28.3



ALL REACTIONS
ARE FACTORED



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
BA40-41	150	B2/B66 RRH BR049	136
Side Arm Mount [SO 303-1]	150	B2/B66 RRH BR049	136
Platform Mount [LP 303-1]	146	B2/B66 RRH BR049	136
Miscellaneous [NA 509-3]	146	B5/B13 RRH BR04C	136
(4) HPA-65R-BUU-H8 w/ 7.5' MP	146	B5/B13 RRH BR04C	136
(4) HPA-65R-BUU-H8 w/ 7.5' MP	146	B5/B13 RRH BR04C	136
(4) HPA-65R-BUU-H8 w/ 7.5' MP	146	CBC78T-DS-43-2X	136
(2) RRU-11	146	CBC78T-DS-43-2X	136
(2) RRU-11	146	CBC78T-DS-43-2X	136
(2) RRU-11	146	DB-C1-12C-24AB-OZ	136
(2) RRUS A2 MODULE	146	(2) Miscellaneous [NA 509-3]	129
(2) RRUS A2 MODULE	146	Miscellaneous [NA 507-1]	129
(2) RRUS A2 MODULE	146	RRUS 11 B4	126
RRUS-E2	146	RRUS 11 B4	126
RRUS-E2	146	6' x 2" Mount Pipe	126
RRUS-E2	146	6' x 2" Mount Pipe	126
RRUS 12	146	6' x 2" Mount Pipe	126
RRUS 12	146	T-Arm Mount [TA 601-3]	126
RRUS 12	146	4449 B71+B12	126
RRUS 32	146	RRUS 11 B4	126
RRUS 32	146	APXV18-206516S-C-A20 W/ Mount Pipe	126
RRUS 32	146	APXV18-206516S-C-A20 W/ Mount Pipe	126
RRUS 4478 B5	146	APXV18-206516S-C-A20 W/ Mount Pipe	126
RRUS 4478 B5	146	APXV18-206516S-C-A20 W/ Mount Pipe	126
RRUS 4478 B5	146	APXV18-206516S-C-A20 W/ Mount Pipe	126
RRUS 4478 B14	146	APXVARR24_43-U-NA20 W/ Mount Pipe	126
RRUS 4478 B14	146	APXVARR24_43-U-NA20 W/ Mount Pipe	126
RRUS 4478 B14	146	APXVARR24_43-U-NA20 W/ Mount Pipe	126
DBC0061F1V51-2	146	APXVARR24_43-U-NA20 W/ Mount Pipe	126
DBC0061F1V51-2	146	4449 B71+B12	126
DBC0061F1V51-2	146	4449 B71+B12	126
(2) DC6-48-60-18-8F	146	4'6"x3" Pipe Mount	70
DC6-48-60-18-8F	146	VHLP3-11W-6GR	70
DC6-48-60-18-8F	146	SD210R-SF2P90LDF	66
Platform Mount [LP 1301-1]	136	Side Arm Mount [SO 303-1]	66
(3) JAHH-1D65B	136		
(3) JAHH-1D65B	136		
(3) JAHH-1D65B	136		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure B to the TIA-222-H Standard.
2. Tower designed for a 125 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 III.
6. Topographic Category 1 with Crest Height of 0.000 ft
7. TOWER RATING: 60.4%

Engineered Tower Solutions, PLLC

3227 Wellington Court
Raleigh, NC 27615
Phone: (919) 782-2710
FAX: (555) 555-1235

Job: **CT897 Ridgefield**

Project: **ETS Job No. 192527.14C**

Client: InSite Wireless Drawn by: Paul.Bridges App'd:

Code: TIA-222-H Date: 07/16/19 Scale: NTS

Path: R:\2019\2527_Ridgefield\SA-C\Analysis\Tower\Ridgefield.eri Dwg No. E-1

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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: 802.130 ft.

Basic wind speed of 125 mph.

Risk Category III.

Exposure Category B.

Simplified Topographic Factor Procedure for wind speed-up calculations is used.

Topographic Category: 1.

Crest Height: 0.000 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 1.05.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

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

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

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

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	

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	Client	InSite Wireless	Designed by	Paul.Bridges

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	149.000-116.670	32.330	4.330	18	20.5000	28.8100	0.2190	0.8760	A572-65 (65 ksi)
L2	116.670-89.250	31.750	5.250	18	27.2590	35.4300	0.3130	1.2520	A572-65 (65 ksi)
L3	89.250-46.250	48.250	6.420	18	33.4529	45.8600	0.4380	1.7520	A572-65 (65 ksi)
L4	46.250-0.000	52.670		18	43.3331	56.8800	0.5000	2.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	It/Q in ²	w in	w/t
L1	20.7825	14.0974	732.5826	7.1998	10.4140	70.3459	1466.1291	7.0501	3.2226	14.715
	29.2207	19.8738	2052.4686	10.1498	14.6355	140.2392	4107.6379	9.9388	4.6851	21.393
L2	28.7628	26.7699	2455.6876	9.5658	13.8476	177.3369	4914.6065	13.3875	4.2467	13.568
	35.9283	34.8874	5435.5179	12.4665	17.9984	301.9994	10878.1881	17.4470	5.6848	18.162
L3	35.2722	45.8977	6320.4536	11.7203	16.9941	371.9211	12649.2237	22.9532	5.1168	11.682
	46.4999	63.1462	16459.5229	16.1248	23.2969	706.5119	32940.7036	31.5791	7.3005	16.668
L4	45.6012	67.9762	15756.3043	15.2058	22.0132	715.7649	31533.3411	33.9946	6.7466	13.493
	57.6803	89.4751	35932.6785	20.0149	28.8950	1243.5587	71912.6381	44.7460	9.1309	18.262

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
ft	ft ²	in							
L1 149.000-116.670				1	1	1			
L2 116.670-89.250				1	1	1			
L3 89.250-46.250				1	1	1			
L4 46.250-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf
Town of Ridgefield 7/8	A	No	No	Inside Pole	149.000 - 5.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.60 0.60 0.60 0.60
7/8	A	No	No	Inside Pole	66.000 - 5.000	1	No Ice 1/2" Ice	0.000 0.000	0.60 0.60

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Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _{AA} A ft²/ft	Weight plf
EW90	A	No	No	Inside Pole	70.000 - 5.000	1	1" Ice	0.000	0.60
							2" Ice	0.000	0.60
							No Ice	0.000	0.32
							1/2" Ice	0.000	0.32
							1" Ice	0.000	0.32
							2" Ice	0.000	0.32
AT&T									
FSJ4-50B(1/2")	A	No	No	Inside Pole	146.000 - 5.000	2	No Ice	0.000	0.14
							1/2" Ice	0.000	0.14
							1" Ice	0.000	0.14
							2" Ice	0.000	0.14
FSJ2-50 (3/8" RET)	A	No	No	Inside Pole	146.000 - 5.000	3	No Ice	0.000	0.08
							1/2" Ice	0.000	0.08
							1" Ice	0.000	0.08
							2" Ice	0.000	0.08
5/8	A	No	No	Inside Pole	146.000 - 5.000	8	No Ice	0.000	0.40
							1/2" Ice	0.000	0.40
							1" Ice	0.000	0.40
							2" Ice	0.000	0.40
T-Mobile									
942-98887-1FXXX(1-1/4)	A	No	No	Inside Pole	126.000 - 5.000	3	No Ice	0.000	1.26
							1/2" Ice	0.000	1.26
							1" Ice	0.000	1.26
							2" Ice	0.000	1.26
Verizon									
942-98888-1FXXX(1-5/8)	A	No	No	Inside Pole	136.000 - 5.000	2	No Ice	0.000	2.33
							1/2" Ice	0.000	2.33
							1" Ice	0.000	2.33
							2" Ice	0.000	2.33

Safety Line 3/8	C	No	No	CaAa (Out Of Face)	149.000 - 0.000	1	No Ice	0.037	0.22
							1/2" Ice	0.137	0.75
							1" Ice	0.238	1.28
							2" Ice	0.437	2.34
Step Pegs (5/8" SR) 7-in. w/ 30" Step	C	No	No	CaAa (Out Of Face)	149.000 - 0.000	2	No Ice	0.035	0.49
							1/2" Ice	0.135	1.01
							1" Ice	0.235	2.14
							2" Ice	0.435	6.23

Feed Line/Linear Appurtenances Section Areas

<i>Tower Section</i>	<i>Tower Elevation ft</i>	<i>Face</i>	<i>A_R ft²</i>	<i>A_F ft²</i>	<i>C_AA_A In Face ft²</i>	<i>C_AA_A Out Face ft²</i>	<i>Weight K</i>
L1	149.000-116.670	A	0.000	0.000	0.000	0.000	0.25
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.476	0.04
L2	116.670-89.250	A	0.000	0.000	0.000	0.000	0.35
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.948	0.03
L3	89.250-46.250	A	0.000	0.000	0.000	0.000	0.57
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.623	0.05
L4	46.250-0.000	A	0.000	0.000	0.000	0.000	0.56

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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
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.972	0.06

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	149.000-116.670	A	1.982	0.000	0.000	0.000	0.000	0.25
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	41.915	0.47
L2	116.670-89.250	A	1.932	0.000	0.000	0.000	0.000	0.35
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	35.549	0.40
L3	89.250-46.250	A	1.852	0.000	0.000	0.000	0.000	0.57
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	54.466	0.61
L4	46.250-0.000	A	1.660	0.000	0.000	0.000	0.000	0.56
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	56.373	0.62

Feed Line Center of Pressure

Section	Elevation ft	CP_x in	CP_z in	CP_x Ice in	CP_z Ice in
L1	149.000-116.670	-0.8082	0.4666	-3.5026	2.0223
L2	116.670-89.250	-0.8224	0.4748	-3.8724	2.2358
L3	89.250-46.250	-0.8329	0.4809	-4.1203	2.3789
L4	46.250-0.000	-0.8411	0.4856	-4.2722	2.4666

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
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Discrete Tower Loads

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	Client	InSite Wireless	Designed by	Paul.Bridges

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>		<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight K</i>
BA40-41	A	From Leg	4.000 0.000 5.000	0.0000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.147 5.792 6.784 8.196	4.147 5.792 6.784 8.196	0.03 0.06 0.10 0.21
Side Arm Mount [SO 303-1]	A	From Leg	3.000 0.000 0.000	0.0000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.240 3.190 4.140 6.040	5.320 7.690 10.060 14.800	0.12 0.16 0.20 0.29
AT&T									
Platform Mount [LP 303-1]	C	None		0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.660 18.870 23.080 31.500	14.660 18.870 23.080 31.500	1.25 1.48 1.71 2.18
Miscellaneous [NA 509-3]	C	None		0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	11.840 16.960 22.080 32.320	11.840 16.960 22.080 32.320	0.28 0.30 0.32 0.36
(4) HPA-65R-BUU-H8 w/ 7.5' MP	A	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	12.976 13.558 14.147 15.346	9.297 10.647 11.773 13.891	0.10 0.19 0.29 0.53
(4) HPA-65R-BUU-H8 w/ 7.5' MP	B	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	12.976 13.558 14.147 15.346	9.297 10.647 11.773 13.891	0.10 0.19 0.29 0.53
(4) HPA-65R-BUU-H8 w/ 7.5' MP	C	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	12.976 13.558 14.147 15.346	9.297 10.647 11.773 13.891	0.10 0.19 0.29 0.53
(2) RRU-11	A	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.639 1.802 1.972 2.336	1.262 1.410 1.566 1.901	0.04 0.06 0.08 0.12
(2) RRU-11	B	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.639 1.802 1.972 2.336	1.262 1.410 1.566 1.901	0.04 0.06 0.08 0.12
(2) RRU-11	C	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.639 1.802 1.972 2.336	1.262 1.410 1.566 1.901	0.04 0.06 0.08 0.12
(2) RRUS A2 MODULE	A	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.600 1.758 1.924 2.277	0.380 0.470 0.568 0.783	0.02 0.03 0.04 0.08
(2) RRUS A2 MODULE	B	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.600 1.758 1.924 2.277	0.380 0.470 0.568 0.783	0.02 0.03 0.04 0.08
(2) RRUS A2 MODULE	C	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.600 1.758 1.924 2.277	0.380 0.470 0.568 0.783	0.02 0.03 0.04 0.08
RRUS-E2	A	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.143 3.363 3.590 4.067	1.282 1.434 1.595 1.950	0.05 0.08 0.10 0.17

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	Client	InSite Wireless	Designed by	Paul.Bridges

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
RRUS-E2	B	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.143 3.363 3.590 4.067	1.282 1.434 1.595 1.950	0.05 0.08 0.10 0.17
RRUS-E2	C	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.143 3.363 3.590 4.067	1.282 1.434 1.595 1.950	0.05 0.08 0.10 0.17
RRUS 12	A	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.145 3.365 3.592 4.069	1.285 1.438 1.600 1.954	0.06 0.08 0.11 0.17
RRUS 12	B	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.145 3.365 3.592 4.069	1.285 1.438 1.600 1.954	0.06 0.08 0.11 0.17
RRUS 12	C	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.145 3.365 3.592 4.069	1.285 1.438 1.600 1.954	0.06 0.08 0.11 0.17
RRUS 32	A	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.857 3.083 3.316 3.805	1.777 1.968 2.166 2.583	0.06 0.08 0.10 0.16
RRUS 32	B	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.857 3.083 3.316 3.805	1.777 1.968 2.166 2.583	0.06 0.08 0.10 0.16
RRUS 32	C	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.857 3.083 3.316 3.805	1.777 1.968 2.166 2.583	0.06 0.08 0.10 0.16
RRUS 4478 B5	A	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.06 0.08 0.09 0.14
RRUS 4478 B5	B	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.06 0.08 0.09 0.14
RRUS 4478 B5	C	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.06 0.08 0.09 0.14
RRUS 4478 B14	A	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.06 0.08 0.09 0.14
RRUS 4478 B14	B	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.06 0.08 0.09 0.14
RRUS 4478 B14	C	From Leg	4.000 0.000 0.000	0.0000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.06 0.08 0.09 0.14
DBC0061F1V51-2	A	From Leg	4.000	0.0000	146.000	No Ice	0.413	0.433	0.03

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	Client	InSite Wireless	Designed by	Paul.Bridges

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
			0.000			1/2" Ice	0.496	0.518	0.03
			0.000			1" Ice	0.586	0.609	0.04
						2" Ice	0.788	0.815	0.06
DBC0061F1V51-2	B	From Leg	4.000	0.0000	146.000	No Ice	0.413	0.433	0.03
			0.000			1/2" Ice	0.496	0.518	0.03
			0.000			1" Ice	0.586	0.609	0.04
						2" Ice	0.788	0.815	0.06
DBC0061F1V51-2	C	From Leg	4.000	0.0000	146.000	No Ice	0.413	0.433	0.03
			0.000			1/2" Ice	0.496	0.518	0.03
			0.000			1" Ice	0.586	0.609	0.04
						2" Ice	0.788	0.815	0.06
(2) DC6-48-60-18-8F	A	From Leg	4.000	0.0000	146.000	No Ice	1.212	1.212	0.03
			0.000			1/2" Ice	1.892	1.892	0.05
			0.000			1" Ice	2.105	2.105	0.08
						2" Ice	2.570	2.570	0.14
DC6-48-60-18-8F	B	From Leg	4.000	0.0000	146.000	No Ice	1.212	1.212	0.03
			0.000			1/2" Ice	1.892	1.892	0.05
			0.000			1" Ice	2.105	2.105	0.08
						2" Ice	2.570	2.570	0.14
DC6-48-60-18-8F	C	From Leg	4.000	0.0000	146.000	No Ice	1.212	1.212	0.03
			0.000			1/2" Ice	1.892	1.892	0.05
			0.000			1" Ice	2.105	2.105	0.08
						2" Ice	2.570	2.570	0.14

4'6"x3" Pipe Mount	A	From Leg	0.500	0.0000	70.000	No Ice	1.296	1.296	0.03
			0.000			1/2" Ice	1.574	1.574	0.05
			0.000			1" Ice	1.862	1.862	0.06
						2" Ice	2.466	2.466	0.10

SD210R-SF2P90LDF	A	From Leg	4.000	0.0000	66.000	No Ice	3.720	3.720	0.04
			0.000			1/2" Ice	6.950	6.950	91.00
			0.000			1" Ice	10.180	10.180	144.00
						2" Ice	16.640	16.640	250.00
Side Arm Mount [SO 303-1]	A	From Leg	3.000	0.0000	66.000	No Ice	2.240	5.320	0.12
			0.000			1/2" Ice	3.190	7.690	0.16
			0.000			1" Ice	4.140	10.060	0.20
						2" Ice	6.040	14.800	0.29
T-Mobile									
T-Arm Mount [TA 601-3]	C	None		0.0000	126.000	No Ice	10.900	10.900	0.73
						1/2" Ice	14.650	14.650	0.93
						1" Ice	18.400	18.400	1.13
						2" Ice	25.900	25.900	1.52
(2) Miscellaneous [NA 509-3]	C	None		0.0000	129.000	No Ice	11.840	11.840	0.28
						1/2" Ice	16.960	16.960	0.30
						1" Ice	22.080	22.080	0.32
						2" Ice	32.320	32.320	0.36
Miscellaneous [NA 507-1]	C	None		0.0000	129.000	No Ice	4.800	4.800	0.25
						1/2" Ice	6.700	6.700	0.29
						1" Ice	8.600	8.600	0.34
						2" Ice	12.400	12.400	0.44
APXV18-206516S-C-A20 W/ Mount Pipe	A	From Leg	4.000	0.0000	126.000	No Ice	3.882	3.428	0.04
			0.000			1/2" Ice	4.356	4.251	0.08
			0.000			1" Ice	4.796	4.951	0.12
						2" Ice	5.686	6.400	0.22
APXV18-206516S-C-A20 W/ Mount Pipe	B	From Leg	4.000	0.0000	126.000	No Ice	3.882	3.428	0.04
			0.000			1/2" Ice	4.356	4.251	0.08
			0.000			1" Ice	4.796	4.951	0.12

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	Client	InSite Wireless	Designed by	Paul.Bridges

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>	<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight K</i>
APXV18-206516S-C-A20 W/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.0000	126.000	2" Ice 5.686 No Ice 3.882 1/2" Ice 4.356 1" Ice 4.796	6.400 3.428 4.251 4.951	0.22 0.04 0.08 0.12
APXVAARR24_43-U-NA20 W/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.0000	126.000	2" Ice 5.686 No Ice 20.482 1/2" Ice 21.233 1" Ice 21.994	6.400 11.026 12.552 14.103	0.22 0.16 0.30 0.44
APXVAARR24_43-U-NA20 W/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.0000	126.000	2" Ice 23.449 No Ice 20.482 1/2" Ice 21.233 1" Ice 21.994	16.457 11.026 12.552 14.103	0.78 0.16 0.30 0.44
APXVAARR24_43-U-NA20 W/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.0000	126.000	2" Ice 23.449 No Ice 20.482 1/2" Ice 21.233 1" Ice 21.994	16.457 11.026 12.552 14.103	0.78 0.16 0.30 0.44
4449 B71+B12	A	From Leg	4.000 0.000 0.000	0.0000	126.000	2" Ice 23.449 No Ice 1.627 1/2" Ice 1.786 1" Ice 1.953	16.457 1.004 1.132 1.267	0.78 0.07 0.09 0.11
4449 B71+B12	B	From Leg	4.000 0.000 0.000	0.0000	126.000	2" Ice 2.308 No Ice 1.627 1/2" Ice 1.786 1" Ice 1.953	1.559 1.004 1.132 1.267	0.15 0.07 0.09 0.11
4449 B71+B12	C	From Leg	4.000 0.000 0.000	0.0000	126.000	2" Ice 2.308 No Ice 1.627 1/2" Ice 1.786 1" Ice 1.953	1.559 1.004 1.132 1.267	0.15 0.07 0.09 0.11
RRUS 11 B4	A	From Leg	4.000 0.000 0.000	0.0000	126.000	2" Ice 2.308 No Ice 2.833 1/2" Ice 3.043 1" Ice 3.259	1.559 1.182 1.330 1.485	0.15 0.05 0.07 0.10
RRUS 11 B4	B	From Leg	4.000 0.000 0.000	0.0000	126.000	2" Ice 3.715 No Ice 2.833 1/2" Ice 3.043 1" Ice 3.259	1.826 1.182 1.330 1.485	0.15 0.05 0.07 0.10
RRUS 11 B4	C	From Leg	4.000 0.000 0.000	0.0000	126.000	2" Ice 3.715 No Ice 2.833 1/2" Ice 3.043 1" Ice 3.259	1.826 1.182 1.330 1.485	0.15 0.05 0.07 0.10
6' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.0000	126.000	2" Ice 3.715 No Ice 1.425 1/2" Ice 1.925 1" Ice 2.294	1.826 1.425 1.925 2.294	0.15 0.02 0.03 0.05
6' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.0000	126.000	2" Ice 3.060 No Ice 1.425 1/2" Ice 1.925 1" Ice 2.294	3.060 1.425 1.925 2.294	0.09 0.02 0.03 0.05
6' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.0000	126.000	2" Ice 3.060 No Ice 1.425 1/2" Ice 1.925 1" Ice 2.294	3.060 1.425 1.925 2.294	0.09 0.02 0.03 0.05
Verizon Platform Mount [LP 1301-1]	C	None		0.0000	136.000	2" Ice 3.060 No Ice 51.700 1/2" Ice 62.700 1" Ice 73.700	3.060 51.700 62.700 73.700	0.09 2.26 2.94 3.61

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	Client	InSite Wireless	Designed by	Paul.Bridges

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>	<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight K</i>
(3) JAHH-1D65B	A	From Leg	4.000 0.000 0.000	0.0000	136.000	2" Ice 95.700 No Ice 8.200 1/2" Ice 8.661 1" Ice 9.129	95.700 5.424 5.882 6.348	4.95 0.05 0.10 0.15
(3) JAHH-1D65B	B	From Leg	4.000 0.000 0.000	0.0000	136.000	2" Ice 10.086 No Ice 8.200 1/2" Ice 8.661 1" Ice 9.129	7.301 5.424 5.882 6.348	0.29 0.05 0.10 0.15
(3) JAHH-1D65B	C	From Leg	4.000 0.000 0.000	0.0000	136.000	2" Ice 10.086 No Ice 8.200 1/2" Ice 8.661 1" Ice 9.129	7.301 5.424 5.882 6.348	0.29 0.05 0.10 0.15
B2/B66 RRH BR049	A	From Leg	4.000 0.000 0.000	0.0000	136.000	2" Ice 10.086 No Ice 1.875 1/2" Ice 2.045 1" Ice 2.223	7.301 1.250 1.393 1.543	0.29 0.08 0.10 0.12
B2/B66 RRH BR049	B	From Leg	4.000 0.000 0.000	0.0000	136.000	2" Ice 2.601 No Ice 1.875 1/2" Ice 2.045 1" Ice 2.223	1.865 1.250 1.393 1.543	0.18 0.08 0.10 0.12
B2/B66 RRH BR049	C	From Leg	4.000 0.000 0.000	0.0000	136.000	2" Ice 2.601 No Ice 1.875 1/2" Ice 2.045 1" Ice 2.223	1.865 1.250 1.393 1.543	0.18 0.08 0.10 0.12
B5/B13 RRH BR04C	A	From Leg	4.000 0.000 0.000	0.0000	136.000	2" Ice 2.601 No Ice 1.875 1/2" Ice 2.045 1" Ice 2.223	1.865 1.013 1.145 1.284	0.18 0.07 0.09 0.11
B5/B13 RRH BR04C	C	From Leg	4.000 0.000 0.000	0.0000	136.000	2" Ice 2.601 No Ice 1.875 1/2" Ice 2.045 1" Ice 2.223	1.585 1.013 1.145 1.284	0.15 0.07 0.09 0.11
B5/B13 RRH BR04C	A	From Leg	4.000 0.000 0.000	0.0000	136.000	2" Ice 2.601 No Ice 1.875 1/2" Ice 2.045 1" Ice 2.223	1.585 1.013 1.145 1.284	0.15 0.07 0.09 0.11
CBC78T-DS-43-2X	A	From Leg	4.000 0.000 0.000	0.0000	136.000	2" Ice 2.601 No Ice 0.368 1/2" Ice 0.446 1" Ice 0.531	1.585 0.512 0.605 0.705	0.15 0.02 0.03 0.04
CBC78T-DS-43-2X	B	From Leg	4.000 0.000 0.000	0.0000	136.000	2" Ice 0.723 No Ice 0.368 1/2" Ice 0.446 1" Ice 0.531	0.927 0.512 0.605 0.705	0.06 0.02 0.03 0.04
CBC78T-DS-43-2X	C	From Leg	4.000 0.000 0.000	0.0000	136.000	2" Ice 0.723 No Ice 0.368 1/2" Ice 0.446 1" Ice 0.531	0.927 0.512 0.605 0.705	0.06 0.02 0.03 0.04
DB-C1-12C-24AB-OZ	C	From Leg	4.000 0.000 0.000	0.0000	136.000	2" Ice 0.723 No Ice 4.056 1/2" Ice 4.316 1" Ice 4.582	0.927 3.098 3.335 3.580	0.06 0.03 0.07 0.11
						2" Ice 5.138	4.092	0.20

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Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight K
VHLP3-11W-6GR	A	Paraboloid w/Shroud (HP)	From Leg	1.000 0.000 0.000	0.0000		70.000	3.000	No Ice 7.069 1/2" Ice 7.467 1" Ice 7.865 2" Ice 8.661	0.07 0.11 0.14 0.22

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M _x kip-ft	Sum of Overturning Moments, M _z kip-ft	Sum of Torques kip-ft
Leg Weight	28.26					
Bracing Weight	0.00					
Total Member Self-Weight	28.26			-2.05	0.68	
Total Weight	40.53			-2.05	0.68	
Wind 0 deg - No Ice		0.03	-29.37	-3268.56	-3.08	-1.40
Wind 30 deg - No Ice		14.73	-25.47	-2834.20	-1641.96	-3.05
Wind 60 deg - No Ice		25.52	-14.76	-1642.20	-2843.09	-3.97
Wind 90 deg - No Ice		29.49	-0.06	-7.77	-3283.00	-3.85
Wind 120 deg - No Ice		25.48	14.77	1635.80	-2838.07	-2.44
Wind 150 deg - No Ice		14.70	25.50	2830.89	-1636.50	-0.58
Wind 180 deg - No Ice		-0.03	29.43	3268.87	4.44	1.40
Wind 210 deg - No Ice		-14.75	25.53	2834.65	1644.38	3.00
Wind 240 deg - No Ice		-25.51	14.82	1642.31	2843.19	3.84
Wind 270 deg - No Ice		-29.49	-0.00	-0.25	3284.36	3.85
Wind 300 deg - No Ice		-25.50	-14.71	-1635.69	2840.69	2.58
Wind 330 deg - No Ice		-14.68	-25.44	-2830.44	1636.82	0.63
Member Ice	13.45					
Total Weight Ice	309.44			-1337.25	4.44	
Wind 0 deg - Ice		0.01	-9.11	-2299.31	3.76	-1.59
Wind 30 deg - Ice		4.60	-7.90	-2171.02	-481.99	-1.84
Wind 60 deg - Ice		7.96	-4.57	-1819.56	-837.85	-1.61
Wind 90 deg - Ice		9.20	-0.01	-1338.30	-968.17	-0.95
Wind 120 deg - Ice		7.95	4.57	-855.32	-836.93	0.01
Wind 150 deg - Ice		4.59	7.90	-503.29	-481.01	0.93
Wind 180 deg - Ice		-0.01	9.12	-374.34	5.12	1.59
Wind 210 deg - Ice		-4.60	7.91	-502.61	491.07	1.83
Wind 240 deg - Ice		-7.96	4.58	-854.14	846.49	1.59
Wind 270 deg - Ice		-9.20	-0.00	-1336.94	977.05	0.95
Wind 300 deg - Ice		-7.96	-4.56	-1818.38	846.05	0.02
Wind 330 deg - Ice		-4.59	-7.89	-2170.34	489.69	-0.92
Total Weight	40.53			-2.05	0.68	
Wind 0 deg - Service		0.01	-6.05	-675.58	-0.34	-0.29
Wind 30 deg - Service		3.04	-5.25	-586.03	-338.19	-0.63
Wind 60 deg - Service		5.26	-3.04	-340.31	-585.80	-0.82
Wind 90 deg - Service		6.08	-0.01	-3.37	-676.49	-0.79
Wind 120 deg - Service		5.25	3.05	335.44	-584.77	-0.50
Wind 150 deg - Service		3.03	5.26	581.81	-337.07	-0.12
Wind 180 deg - Service		-0.01	6.07	672.10	1.21	0.29
Wind 210 deg - Service		-3.04	5.26	582.59	339.28	0.62

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Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 240 deg - Service		-5.26	3.05	336.79	586.41	0.79
Wind 270 deg - Service		-6.08	-0.00	-1.82	677.36	0.79
Wind 300 deg - Service		-5.26	-3.03	-338.96	585.89	0.53
Wind 330 deg - Service		-3.03	-5.24	-585.26	337.72	0.13

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
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

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Comb. No.	Description
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	149 - 116.67	Pole	Max Tension	27	0.00	-0.00	-0.00
			Max. Compression	33	-35.78	2.24	-85.43
			Max. Mx	20	-12.80	358.79	0.92
			Max. My	2	-12.81	0.10	355.94
			Max. Vy	20	-20.46	358.79	0.92
			Max. Vx	2	-20.35	0.10	355.94
L2	116.67 - 89.25	Pole	Max. Torque	18			-2.15
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	33	-42.62	2.99	-232.25
			Max. Mx	20	-17.16	925.16	0.25
			Max. My	2	-17.17	-0.59	919.16
			Max. Vy	20	-22.28	925.16	0.25
L3	89.25 - 46.25	Pole	Max. Vx	2	-22.16	-0.59	919.16
			Max. Torque	18			-2.15
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	33	-292.78	4.43	867.45
			Max. Mx	20	-28.53	1931.56	0.73
			Max. My	27	-292.45	3.45	2106.25
L4	46.25 - 0	Pole	Max. Vy	20	-25.94	1931.56	0.73
			Max. Vx	14	25.88	3.12	-1917.90
			Max. Torque	36			6.14
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	32	-319.09	-564.46	627.08
			Max. Mx	20	-48.62	3394.17	0.68
			Max. My	2	-48.62	-3.04	3377.93
			Max. Vy	20	-29.51	3394.17	0.68
			Max. Vx	14	29.46	4.75	-3377.25
			Max. Torque	36			6.45

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	33	319.09	0.00	-9.12
	Max. H _x	21	36.48	29.49	0.00
	Max. H _z	3	36.48	-0.03	29.37
	Max. M _x	2	3377.93	-0.03	29.36
	Max. M _z	8	3392.46	-29.49	0.06
	Max. Torsion	36	6.45	9.20	-0.00
	Min. Vert	3	36.48	-0.03	29.37
	Min. H _x	9	36.48	-29.49	0.06
	Min. H _z	15	36.48	0.03	-29.43
	Min. M _x	14	-3377.25	0.03	-29.43
	Min. M _z	20	-3394.17	29.49	0.00
	Min. Torsion	30	-6.35	-9.20	0.01

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<i>Location</i>	<i>Condition</i>	<i>Gov. Load Comb.</i>	<i>Vertical K</i>	<i>Horizontal, X K</i>	<i>Horizontal, Z K</i>
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Tower Mast Reaction Summary

<i>Load Combination</i>	<i>Vertical K</i>	<i>Shear_x K</i>	<i>Shear_z K</i>	<i>Overturning Moment, M_x kip-ft</i>	<i>Overturning Moment, M_z kip-ft</i>	<i>Torque kip-ft</i>
Dead Only	40.53	0.00	0.00	-2.05	0.68	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	48.64	0.03	-29.36	-3377.93	-3.04	-1.39
0.9 Dead+1.0 Wind 0 deg - No Ice	36.48	0.03	-29.37	-3348.39	-3.22	-1.39
1.2 Dead+1.0 Wind 30 deg - No Ice	48.64	14.73	-25.47	-2929.29	-1696.74	-3.06
0.9 Dead+1.0 Wind 30 deg - No Ice	36.48	14.73	-25.47	-2903.52	-1682.38	-3.05
1.2 Dead+1.0 Wind 60 deg - No Ice	48.64	25.52	-14.76	-1697.44	-2937.97	-4.00
0.9 Dead+1.0 Wind 60 deg - No Ice	36.48	25.52	-14.76	-1682.25	-2912.96	-3.98
1.2 Dead+1.0 Wind 90 deg - No Ice	48.64	29.49	-0.06	-8.47	-3392.46	-3.88
0.9 Dead+1.0 Wind 90 deg - No Ice	36.48	29.49	-0.06	-7.75	-3363.58	-3.86
1.2 Dead+1.0 Wind 120 deg - No Ice	48.64	25.48	14.77	1689.82	-2932.80	-2.48
0.9 Dead+1.0 Wind 120 deg - No Ice	36.48	25.48	14.77	1676.02	-2907.83	-2.47
1.2 Dead+1.0 Wind 150 deg - No Ice	48.64	14.70	25.50	2924.87	-1691.06	-0.61
0.9 Dead+1.0 Wind 150 deg - No Ice	36.48	14.70	25.50	2900.46	-1676.76	-0.60
1.2 Dead+1.0 Wind 180 deg - No Ice	48.64	-0.03	29.43	3377.25	4.75	1.40
0.9 Dead+1.0 Wind 180 deg - No Ice	36.48	-0.03	29.43	3349.04	4.49	1.39
1.2 Dead+1.0 Wind 210 deg - No Ice	48.64	-14.75	25.53	2928.75	1699.51	3.02
0.9 Dead+1.0 Wind 210 deg - No Ice	36.48	-14.75	25.53	2904.31	1684.70	3.01
1.2 Dead+1.0 Wind 240 deg - No Ice	48.64	-25.51	14.82	1696.56	2938.40	3.87
0.9 Dead+1.0 Wind 240 deg - No Ice	36.48	-25.51	14.82	1682.69	2912.94	3.86
1.2 Dead+1.0 Wind 270 deg - No Ice	48.64	-29.49	-0.00	-0.68	3394.17	3.88
0.9 Dead+1.0 Wind 270 deg - No Ice	36.48	-29.49	-0.00	-0.04	3364.85	3.86
1.2 Dead+1.0 Wind 300 deg - No Ice	48.64	-25.50	-14.71	-1690.71	2935.81	2.60
0.9 Dead+1.0 Wind 300 deg - No Ice	36.48	-25.50	-14.71	-1675.57	2910.38	2.59
1.2 Dead+1.0 Wind 330 deg - No Ice	48.64	-14.68	-25.44	-2925.41	1691.71	0.64
0.9 Dead+1.0 Wind 330 deg - No Ice	36.48	-14.68	-25.44	-2899.68	1676.97	0.64
1.2 Dead+1.0 Ice+1.0 Temp	319.09	0.00	0.00	-1605.86	5.62	-0.05
1.2 Dead+1.0 Wind 0 deg+1.0	319.09	0.01	-9.11	-2734.14	4.79	-1.64

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Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Ice+1.0 Temp						
1.2 Dead+1.0 Wind 30 deg+1.0	319.09	4.60	-7.89	-2583.69	-565.38	1.79
Ice+1.0 Temp						
1.2 Dead+1.0 Wind 60 deg+1.0	319.09	7.96	-4.57	-2171.66	-983.24	4.71
Ice+1.0 Temp						
1.2 Dead+1.0 Wind 90 deg+1.0	319.09	9.20	-0.01	-1606.92	-1136.26	6.35
Ice+1.0 Temp						
1.2 Dead+1.0 Wind 120	319.09	7.95	4.57	-1040.29	-982.35	6.33
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 150	319.09	4.59	7.90	-627.08	-564.46	4.56
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 180	319.09	-0.00	9.12	-475.63	6.43	1.55
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 210	319.09	-4.60	7.91	-626.27	577.11	-1.89
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 240	319.09	-7.96	4.58	-1038.88	994.41	-4.83
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 270	319.09	-9.20	0.00	-1605.31	1147.50	-6.45
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300	319.09	-7.96	-4.56	-2170.26	993.66	-6.39
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 330	319.09	-4.59	-7.89	-2582.89	575.19	-4.63
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	40.53	0.01	-6.05	-694.58	-0.08	-0.29
Dead+Wind 30 deg - Service	40.53	3.04	-5.25	-602.50	-347.51	-0.63
Dead+Wind 60 deg - Service	40.53	5.26	-3.04	-349.81	-602.13	-0.83
Dead+Wind 90 deg - Service	40.53	6.08	-0.01	-3.35	-695.37	-0.80
Dead+Wind 120 deg - Service	40.53	5.25	3.04	345.02	-601.06	-0.51
Dead+Wind 150 deg - Service	40.53	3.03	5.26	598.36	-346.35	-0.12
Dead+Wind 180 deg - Service	40.53	-0.01	6.07	691.21	1.51	0.29
Dead+Wind 210 deg - Service	40.53	-3.04	5.26	599.16	349.16	0.63
Dead+Wind 240 deg - Service	40.53	-5.26	3.05	346.40	603.29	0.80
Dead+Wind 270 deg - Service	40.53	-6.08	-0.00	-1.76	696.80	0.80
Dead+Wind 300 deg - Service	40.53	-5.25	-3.03	-348.43	602.75	0.54
Dead+Wind 330 deg - Service	40.53	-3.03	-5.24	-601.70	347.55	0.13

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-40.53	0.00	-0.00	40.53	-0.00	0.001%
2	0.03	-48.64	-29.37	-0.03	48.64	29.36	0.004%
3	0.03	-36.48	-29.37	-0.03	36.48	29.37	0.003%
4	14.73	-48.64	-25.47	-14.73	48.64	25.47	0.000%
5	14.73	-36.48	-25.47	-14.73	36.48	25.47	0.000%
6	25.52	-48.64	-14.76	-25.52	48.64	14.76	0.000%
7	25.52	-36.48	-14.76	-25.52	36.48	14.76	0.000%
8	29.49	-48.64	-0.06	-29.49	48.64	0.06	0.001%
9	29.49	-36.48	-0.06	-29.49	36.48	0.06	0.001%
10	25.48	-48.64	14.77	-25.48	48.64	-14.77	0.000%
11	25.48	-36.48	14.77	-25.48	36.48	-14.77	0.000%
12	14.70	-48.64	25.50	-14.70	48.64	-25.50	0.000%
13	14.70	-36.48	25.50	-14.70	36.48	-25.50	0.000%
14	-0.03	-48.64	29.43	0.03	48.64	-29.43	0.004%
15	-0.03	-36.48	29.43	0.03	36.48	-29.43	0.003%
16	-14.75	-48.64	25.53	14.75	48.64	-25.53	0.000%
17	-14.75	-36.48	25.53	14.75	36.48	-25.53	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
18	-25.51	-48.64	14.82	25.51	48.64	-14.82	0.000%
19	-25.51	-36.48	14.82	25.51	36.48	-14.82	0.000%
20	-29.49	-48.64	-0.00	29.49	48.64	0.00	0.001%
21	-29.49	-36.48	-0.00	29.49	36.48	0.00	0.001%
22	-25.50	-48.64	-14.71	25.50	48.64	14.71	0.000%
23	-25.50	-36.48	-14.71	25.50	36.48	14.71	0.000%
24	-14.68	-48.64	-25.44	14.68	48.64	25.44	0.000%
25	-14.68	-36.48	-25.44	14.68	36.48	25.44	0.000%
26	0.00	-319.09	0.00	-0.00	319.09	-0.00	0.000%
27	0.01	-319.09	-9.11	-0.01	319.09	9.11	0.001%
28	4.60	-319.09	-7.90	-4.60	319.09	7.89	0.001%
29	7.96	-319.09	-4.57	-7.96	319.09	4.57	0.000%
30	9.20	-319.09	-0.01	-9.20	319.09	0.01	0.000%
31	7.95	-319.09	4.57	-7.95	319.09	-4.57	0.000%
32	4.59	-319.09	7.90	-4.59	319.09	-7.90	0.000%
33	-0.01	-319.09	9.12	0.00	319.09	-9.12	0.000%
34	-4.60	-319.09	7.91	4.60	319.09	-7.91	0.000%
35	-7.96	-319.09	4.58	7.96	319.09	-4.58	0.000%
36	-9.20	-319.09	-0.00	9.20	319.09	-0.00	0.000%
37	-7.96	-319.09	-4.56	7.96	319.09	4.56	0.000%
38	-4.59	-319.09	-7.89	4.59	319.09	7.89	0.001%
39	0.01	-40.53	-6.05	-0.01	40.53	6.05	0.002%
40	3.04	-40.53	-5.25	-3.04	40.53	5.25	0.002%
41	5.26	-40.53	-3.04	-5.26	40.53	3.04	0.002%
42	6.08	-40.53	-0.01	-6.08	40.53	0.01	0.002%
43	5.25	-40.53	3.05	-5.25	40.53	-3.04	0.002%
44	3.03	-40.53	5.26	-3.03	40.53	-5.26	0.002%
45	-0.01	-40.53	6.07	0.01	40.53	-6.07	0.002%
46	-3.04	-40.53	5.26	3.04	40.53	-5.26	0.002%
47	-5.26	-40.53	3.05	5.26	40.53	-3.05	0.002%
48	-6.08	-40.53	-0.00	6.08	40.53	0.00	0.002%
49	-5.26	-40.53	-3.03	5.25	40.53	3.03	0.002%
50	-3.03	-40.53	-5.24	3.03	40.53	5.24	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	13	0.00005054	0.00010279
3	Yes	13	0.00003419	0.00008511
4	Yes	16	0.00000001	0.00012140
5	Yes	16	0.00000001	0.00009020
6	Yes	16	0.00000001	0.00013322
7	Yes	16	0.00000001	0.00009921
8	Yes	14	0.00000001	0.00009571
9	Yes	14	0.00000001	0.00007557
10	Yes	16	0.00000001	0.00012106
11	Yes	16	0.00000001	0.00009010
12	Yes	16	0.00000001	0.00012550
13	Yes	16	0.00000001	0.00009350
14	Yes	13	0.00005053	0.00011179
15	Yes	13	0.00003418	0.00009211
16	Yes	16	0.00000001	0.00013055
17	Yes	16	0.00000001	0.00009729
18	Yes	16	0.00000001	0.00012025

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19	Yes	16	0.00000001	0.00008939
20	Yes	14	0.00000001	0.00009077
21	Yes	14	0.00000001	0.00007172
22	Yes	16	0.00000001	0.00013022
23	Yes	16	0.00000001	0.00009689
24	Yes	16	0.00000001	0.00012425
25	Yes	16	0.00000001	0.00009238
26	Yes	15	0.00008571	0.00005011
27	Yes	15	0.00008413	0.00008396
28	Yes	15	0.00008412	0.00013650
29	Yes	16	0.00000001	0.00007699
30	Yes	15	0.00008462	0.00013747
31	Yes	15	0.00008524	0.00007506
32	Yes	15	0.00000001	0.00003252
33	Yes	15	0.00000001	0.00001651
34	Yes	15	0.00000001	0.00003319
35	Yes	15	0.00008521	0.00007621
36	Yes	15	0.00008460	0.00013925
37	Yes	16	0.00000001	0.00007980
38	Yes	15	0.00008411	0.00014927
39	Yes	12	0.00000001	0.00005387
40	Yes	12	0.00000001	0.00005203
41	Yes	12	0.00000001	0.00007676
42	Yes	12	0.00000001	0.00005966
43	Yes	12	0.00000001	0.00005178
44	Yes	12	0.00000001	0.00006013
45	Yes	12	0.00000001	0.00005335
46	Yes	12	0.00000001	0.00007082
47	Yes	12	0.00000001	0.00005100
48	Yes	12	0.00000001	0.00005975
49	Yes	12	0.00000001	0.00007031
50	Yes	12	0.00000001	0.00005704

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 116.67	16.097	49	1.0518	0.0062
L2	121 - 89.25	10.231	48	0.8923	0.0025
L3	94.5 - 46.25	5.925	48	0.6346	0.0014
L4	52.67 - 0	1.739	48	0.3104	0.0006

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.000	BA40-41	49	16.097	1.0518	0.0062	31121
146.000	Platform Mount [LP 303-1]	49	15.438	1.0382	0.0057	31121
136.000	Platform Mount [LP 1301-1]	48	13.271	0.9898	0.0042	11969
129.000	(2) Miscellaneous [NA 509-3]	48	11.809	0.9495	0.0034	7780
126.000	T-Arm Mount [TA 601-3]	48	11.204	0.9296	0.0030	6765
70.000	VHLP3-11W-6GR	48	3.099	0.4286	0.0009	6828
66.000	SD210R-SF2P90LDF	48	2.739	0.3999	0.0009	6852

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Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 116.67	78.371	20	5.1106	0.0299
L2	121 - 89.25	49.845	20	4.3481	0.0120
L3	94.5 - 46.25	28.872	20	3.0936	0.0068
L4	52.67 - 0	8.475	20	1.5131	0.0053

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.000	BA40-41	20	78.371	5.1106	0.0299	6546
146.000	Platform Mount [LP 303-1]	20	75.171	5.0463	0.0277	6546
136.000	Platform Mount [LP 1301-1]	20	64.632	4.8164	0.0207	2516
129.000	(2) Miscellaneous [NA 509-3]	20	57.520	4.6234	0.0164	1634
126.000	T-Arm Mount [TA 601-3]	20	54.576	4.5282	0.0148	1420
70.000	VHLP3-11W-6GR	20	15.104	2.0892	0.0045	1404
66.000	SD210R-SF2P90LDF	20	13.347	1.9491	0.0042	1409

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
L1	149 - 116.67 (1)	TP28.81x20.5x0.219	32.330	0.000	0.0	19.1001	-12.80	1117.36	0.011
L2	116.67 - 89.25 (2)	TP35.43x27.259x0.313	31.750	0.000	0.0	33.5451	-17.16	1962.39	0.009
L3	89.25 - 46.25 (3)	TP45.86x33.4529x0.438	48.250	0.000	0.0	56.4923	-287.86	3304.80	0.087
L4	46.25 - 0 (4)	TP56.88x43.3331x0.5	52.670	0.000	0.0	70.5967	-297.44	4129.91	0.072

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{ux} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M _{uy} kip-ft	φM _{uy} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
L1	149 - 116.67	TP28.81x20.5x0.219	358.79	740.59	0.484	0.00	740.59	0.000

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Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{ux} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M_{uy} kip-ft	ϕM_{uy} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
L2	(1) 116.67 - 89.25	TP35.43x27.259x0.313	925.17	1672.50	0.553	0.00	1672.50	0.000
L3	(2) 89.25 - 46.25	TP45.86x33.4529x0.438	1913.36	3496.98	0.547	0.00	3496.98	0.000
L4	(3) 46.25 - 0 (4)	TP56.88x43.3331x0.5	2200.02	4781.78	0.460	0.00	4781.78	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	149 - 116.67	TP28.81x20.5x0.219	20.46	335.21	0.061	2.05	806.64	0.003
L2	(1) 116.67 - 89.25	TP35.43x27.259x0.313	22.28	588.72	0.038	1.97	1740.87	0.001
L3	(2) 89.25 - 46.25	TP45.86x33.4529x0.438	17.16	991.44	0.017	0.95	3528.21	0.000
L4	(3) 46.25 - 0 (4)	TP56.88x43.3331x0.5	14.35	1256.41	0.011	1.18	4826.69	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	Ratio $\frac{M_{uy}}{\phi M_{uy}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	149 - 116.67	0.011	0.484	0.000	0.061	0.003	0.500	1.050	4.8.2
L2	(1) 116.67 - 89.25	0.009	0.553	0.000	0.038	0.001	0.563	1.050	4.8.2
L3	(2) 89.25 - 46.25	0.087	0.547	0.000	0.017	0.000	0.635	1.050	4.8.2
L4	(3) 46.25 - 0 (4)	0.072	0.460	0.000	0.011	0.000	0.532	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	149 - 116.67	Pole	TP28.81x20.5x0.219	1	-12.80	1173.23	47.6	Pass
L2	116.67 - 89.25	Pole	TP35.43x27.259x0.313	2	-17.16	2060.51	53.7	Pass
L3	89.25 - 46.25	Pole	TP45.86x33.4529x0.438	3	-287.86	3470.04	60.4	Pass
L4	46.25 - 0	Pole	TP56.88x43.3331x0.5	4	-297.44	4336.41	50.7	Pass
							Summary	
						Pole (L3)	60.4	Pass

<i>tnxTower</i> <i>Engineered Tower Solutions, PLLC</i> 3227 Wellington Court Raleigh, NC 27615 Phone: (919) 782-2710 FAX: (555) 555-1235	Job CT897 Ridgefield	Page 19 of 19
	Project ETS Job No. 192527.14C	Date 16:45:42 07/16/19
	Client InSite Wireless	Designed by Paul.Bridges

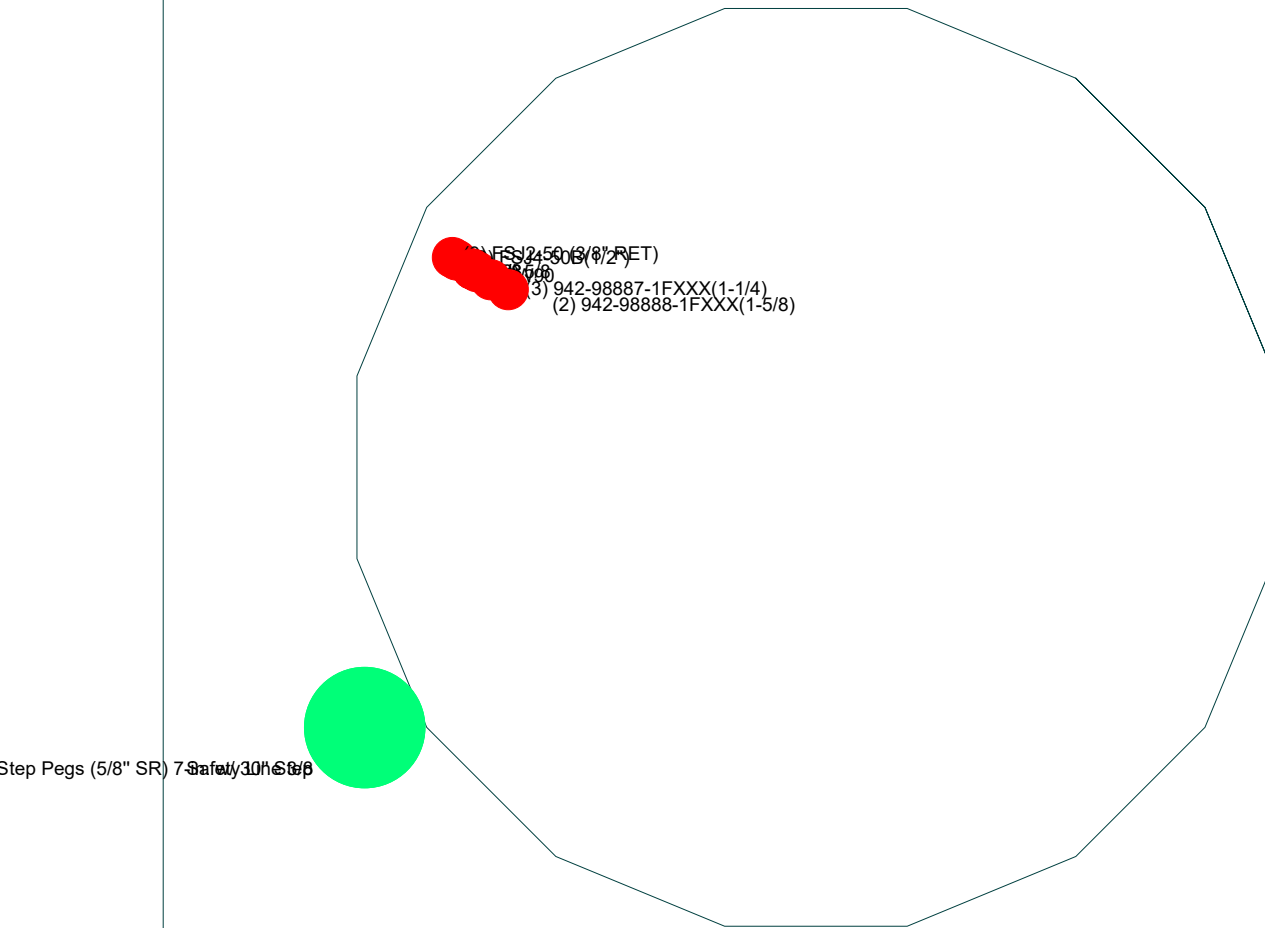
<i>Section No.</i>	<i>Elevation ft</i>	<i>Component Type</i>	<i>Size</i>	<i>Critical Element</i>	<i>P K</i>	<i>ϕP_{allow} K</i>	<i>% Capacity</i>	<i>Pass Fail</i>
RATING =							60.4	Pass

APPENDIX B
BASE LEVEL DRAWING

Feed Line Plan
46'3"

Round Flat App In Face App Out Face

Section @ 46'3"



Step Pegs (5/8" SR) 7-Safety Stop

Engineered Tower Solutions, PLLC
3227 Wellington Court
Raleigh, NC 27615
Phone: (919) 782-2710
FAX: (555) 555-1235

Job: CT897 Ridgefield		
Project: ETS Job No. 192527.14C		
Client: InSite Wireless	Drawn by: Paul.Bridges	App'd:
Code: TIA-222-H	Date: 07/16/19	Scale: NTS
Path: R:\2019\2527_Ridgefield\SA-C\Analysis\Tower\Ridgefield.eri	Dwg No. E-7	

APPENDIX C

ADDITIONAL CALCULATIONS

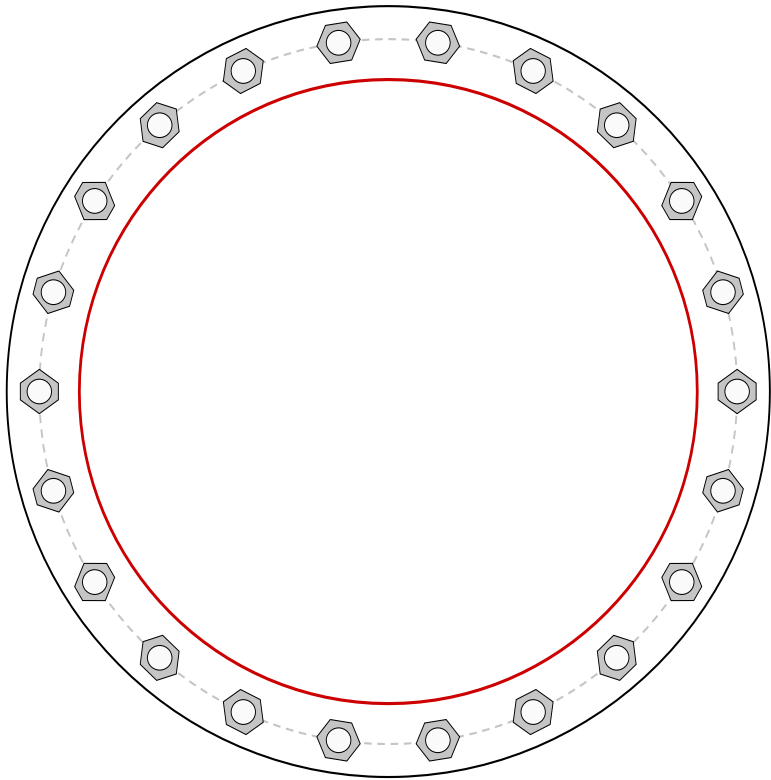
Monopole Base Plate Connection

Site Info	
Site Number	CT897
Site Name	Ridgefield

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0.75

Applied Loads	
Moment (kip-ft)	3394.17
Axial Force (kips)	48.62
Shear Force (kips)	29.51

*TIA-222-H Section 15.5 Applied



Connection Properties		Analysis Results	
Anchor Rod Data		Anchor Rod Summary <i>(units of kips, kip-in)</i>	
(22) 2-1/4" \varnothing bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 64.25" BC		Pu_c = 117.41	ϕPn_c = 243.75 Stress Rating
Base Plate Data		Vu = 1.34	ϕVn = 73.13 45.9%
70.25" OD x 3.5" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)		Mu = n/a	ϕMn = n/a Pass
Stiffener Data		Base Plate Summary	
N/A		Max Stress (ksi):	10.6 (Flexural)
Pole Data		Allowable Stress (ksi):	45
56.88" x 0.5" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)		Stress Rating:	22.4% Pass

Pier and Pad Foundation

Site Number:	CT897
Site Name:	Ridgefield

TIA-222 Revision:	H
Tower Type:	Monopole

Top & Bot. Pad Rein. Different?:	<input type="checkbox"/>
Block Foundation?:	<input type="checkbox"/>

Superstructure Analysis Reactions		
Compression, P_{comp} :	49	kips
Base Shear, Vu_{comp} :	29	kips
Moment, M_u :	3394	ft-kips
Tower Height, H :	149	ft
BP Dist. Above Fdn, bp_{dist} :	3	in

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, dpier :	8	ft
Ext. Above Grade, E :	0.5	ft
Pier Rebar Size, Sc :	11	
Pier Rebar Quantity, mc :	57	
Pier Tie/Spiral Size, St :	4	
Pier Tie/Spiral Quantity, mt :	8	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier} :	6	in

Pad Properties		
Depth, D :	6.5	ft
Pad Width, W :	27.5	ft
Pad Thickness, T :	2.75	ft
Pad Rebar Size (Bottom), Sp :	9	
Pad Rebar Quantity (Bottom), mp :	35	
Pad Clear Cover, cc_{pad} :	3	in

Material Properties		
Rebar Grade, Fy :	60	ksi
Concrete Compressive Strength, F'c :	3	ksi
Dry Concrete Density, δc :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	125	pcf
Ultimate Net Bearing, Qnet :	7.500	ksf
Cohesion, Cu :	0.000	ksf
Friction Angle, φ :	36	degrees
SPT Blow Count, N_{blows} :	81	
Base Friction, μ :	0.5	
Neglected Depth, N :	3.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw :	N/A	ft

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	384.15	29.00	7.2%	Pass
<i>Bearing Pressure (ksf)</i>	6.23	1.86	28.5%	Pass
<i>Overturing (kip*ft)</i>	8312.40	3604.25	43.4%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	14335.05	3517.25	23.4%	Pass
<i>Pier Compression (kip)</i>	23994.73	87.45	0.3%	Pass
<i>Pad Flexure (kip*ft)</i>	4261.99	1140.21	25.5%	Pass
<i>Pad Shear - 1-way (kips)</i>	767.49	170.45	21.2%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.164	0.035	20.6%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	5002.65	2110.35	40.2%	Pass

*Rating per TIA-222-H Section 15.5

Soil Rating*:	43.4%
Structural Rating*:	40.2%

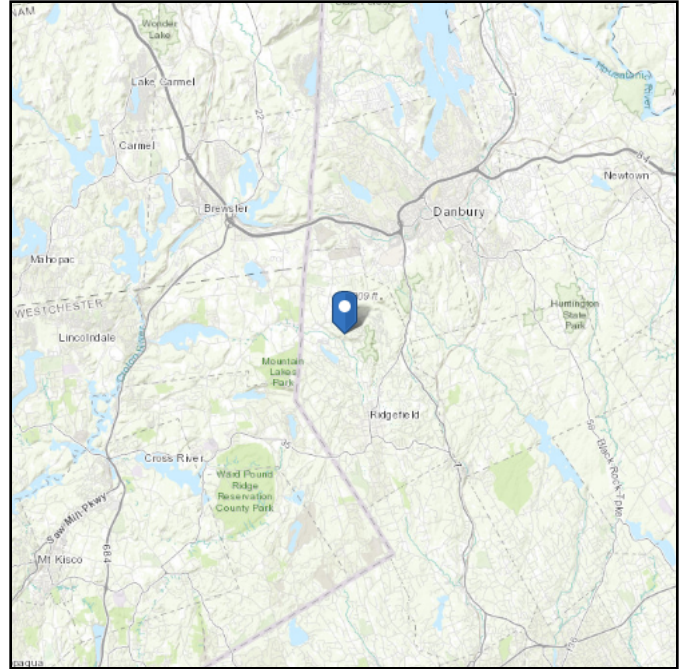
<--Toggle between Gross and Net

ASCE 7 Hazards Report

Address:
No Address at This
Location

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

Elevation: 802.13 ft (NAVD 88)
Latitude: 41.330308
Longitude: -73.516819



Wind

Results:

Wind Speed:	124 Vmph	125 mph per Connecticut Design Criteria: Ridgefield
10-year MRI	76 Vmph	
25-year MRI	85 Vmph	
50-year MRI	90 Vmph	
100-year MRI	96 Vmph	

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

Date Accessed: Tue Jul 16 2019

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 3% probability of exceedance in 50 years (annual exceedance probability = 0.000588, MRI = 1,700 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.

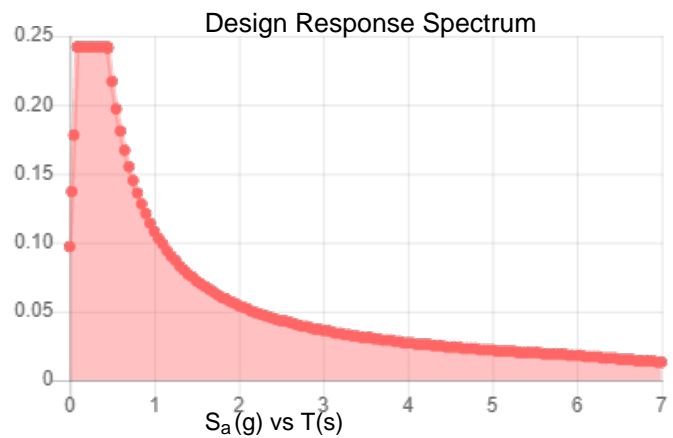
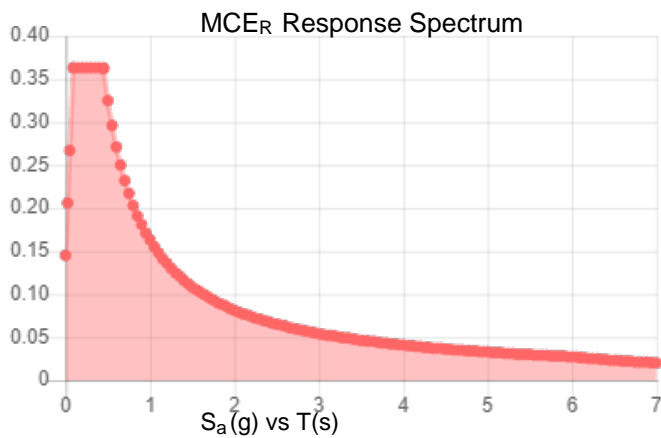
Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

Site Soil Class: D - Stiff Soil

Results:

S_S :	0.227	S_{DS} :	0.242
S_1 :	0.068	S_{D1} :	0.108
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.126
S_{MS} :	0.363	PGA _M :	0.196
S_{M1} :	0.163	F_{PGA} :	1.547
		I_e :	1.25

Seismic Design Category B



Data Accessed:

Tue Jul 16 2019

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.

Results:

Ice Thickness: 0.75 in.
Concurrent Temperature: 15 F
Gust Speed: 50 mph

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

Date Accessed: Tue Jul 16 2019

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.

Site Number:	CT897
Site Name:	Ridgefield

Code and Site Parameters	
Seismic Design Code:	TIA-222-H*
Site Soil:	D Dense Soil/Soft Rock
Risk Category:	III
<u>USGS Seismic Reference</u>	
S _s :	0.2300 g
S ₁ :	0.0680 g
T _L :	6 s
Seismic Design Category Determination	
Importance Factor, I _e :	1.25
Acceleration-based site coefficient, F _a :	1.6000
Velocity-based site coefficient, F _v :	2.4000
Design spectral response acceleration short period, S _{DS} :	0.2453 g
Design spectral response acceleration 1 s period, S _{D1} :	0.1088 g
Seismic Design Category Based on S _{DS} :	B
Seismic Design Category Based on S _{D1} :	B
Seismic Design Category Based on S ₁ :	N/A
Controlling Seismic Design Category:	B

*Using ASCE 7-10 Seismic Parameters

Exhibit E

Mount Analysis

Date: 6/11/2019

To: Mr. Peter Nute
ProTerra Design Group, LLC
4 Bay Road, Building A, Suite 200
Hadley, MA 01035

Subject: Mount Structural Analysis Report

T-Mobile Designation: **Site ID:** CTFF702F
 Site Name: CTFF702F

Destek Designation: **Project Number:** 1978006

Site Data: **320 Old Stagecoach Road, Ridgefield, CT 06877**
 Latitude 41.330308, Longitude -73.516819

Dear Mr. Nute,

Destek Engineering, LLC is pleased to submit this **“Mount Structural Analysis Report”** to determine the structural capacity of the antenna mount utilized by T-Mobile at the above referenced site.

The purpose of the analysis is to determine acceptability of the mount stress level for the changes proposed by T-Mobile. Under the following load case we have determined the mount to have:

Existing + Proposed Equipment **Adequate Capacity with Mods (71.1%)**
Note: See Analysis Criteria for loading configuration

The analysis has been performed in accordance with TIA-222-G Standard and the 2018 Connecticut State Building Code (2015 IBC).

We at *Destek Engineering, LLC* appreciate the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or any other projects please give us a call.

Sincerely,
Destek Engineering, LLC
License No: PEC 0001429

6/11/2019

Ahmet Colakoglu, PE
Connecticut Professional Engineer
License No: PEN 27057



1) ANALYSIS CRITERIA

The analysis was performed for the existing and proposed appurtenances as specified in the loading information referenced below, and per the following loading criteria of Table 1.

Table 1 – Loading and Analysis Criteria

Rad Center	126'
Structure Type	Monopole
Exposure Category	B
Wind Speed	120 mph* $\sqrt{0.6} = 93$ mph (ASD)
Ice Loading	0.75" with 50 mph Wind
Risk Category	II
Topographic Factor	Kzt = 1.00

Table 1.1 – Existing Appurtenance Configuration

Qty	Model
3	Andrew LNX-6515DS-A1M – Antennas
3	RFS APXV18-206516S-C-A20 – Antennas
3	RRUS 11 B4 – RRUs
3	RRUS 11 B12 – RRUs

Table 1.2 – Proposed and Final Appurtenance Configuration

Qty	Model
3	RFS APXVAARR24_43-U-NA20 – Antennas
3	RFS APXV18-206516S-C-A20 – Antennas
3	Radio 4449 B71+B12 – RRUs*
3	RRUS 11 B4 – RRUs*

***To be mounted behind antennas.**

Table 1.3 – Assumed Material Properties

Member Type	ASTM Material Designation	Fy (ksi)	Fu (ksi)
Pipes	A53 Gr. B	35	60
Angles/Channels	A36	36	58
Rectangular HSS	A500 Gr. B - 46	46	58
Round HSS	A500 Gr. B - 42	42	58
Others (UNO)	A572 Gr. 50	50	65

2) ANALYSIS PROCEDURE

The analysis is based on the following information:

Table 2 – Documents

Document	Provided By	Date
Site Photographs	ProTerra	05/03/2019
RFDS	T-Mobile	04/25/2019
Antenna Sketch	Centerline	05/22/2019

2.1) Analysis Method

Risa-3D, a commercially available analysis software package, was used to create a three-dimensional model of the mount and calculate member stresses for various loading cases. Selected output from the analysis is included in the Appendix.

2.2) Analysis Conditions and Assumptions

- 1) The mount was built and installed in accordance with the manufacturer's specifications.
- 2) The mount has been maintained and will be maintained in accordance with the manufacturer's specifications. All structural members and connections of the mount are in good condition and can achieve theoretical strength.
- 3) The configuration of antennas is as specified in "1) Analysis Criteria".
- 4) The analysis was performed for the subject mount only. It does not include an evaluation of the other mounts or the tower, which should be analyzed by others.
- 5) The evaluation does not include any antenna rigging loads. The equipment should not be rigged using the subject antenna mount as the support.
- 6) The analysis includes a minimum 250 lbf maintenance point load at the worst-case location on the mount, as well as a minimum 250 lbf maintenance point load at each antenna location in conjunction with a 30 mph wind load.
- 7) Any steel grating represented in this model is for loading purposes only and it is not considered to provide any structural restraint or support.
- 8) Member sizes per the available site photographs and assumed based on our experience with similar structures. Please refer to calculation output in the appendix of this report for sizes and lengths assumed.
- 9) 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.

Destek Engineering, LLC must be notified immediately if any of these assumptions are discovered to be incorrect. The results of this analysis may be affected if any of the assumptions are not valid or have been made in error.

3) ANALYSIS RESULTS AND CONCLUSION

The analysis results are shown on the table below.

Table 3.1 – Mount Component Stresses vs. Capacity

Component	% Capacity	Pass / Fail
Horizontal Face Pipe	61.8	Pass
Antenna Mount Pipe	71.1	Pass
VSR Stabilizer Arm	<20.0	Pass
Horizontal Standoff Tube	55.4	Pass

Sector Mount: The existing sector mounts **will have adequate** capacity for the proposed changes by T-Mobile, **once each sector mount is modified. A new Commscope VSR Stabilizer Kit (P/N: VSR-MS-B) should be installed to the pole 36" above the existing T-arm. A New 150" long 2.5 STD pipe should be installed as the face member of the stabilizer kit. The face member should be attached to all the mount pipes using Commscope Crossover Plate Kits (P/N: XP-2025).** For the code specified load combinations and as a maximum, the mount members are stressed to **71.1%** of their structural capacity.

APPENDIX

INPUT LOADS
ANALYSIS OUTPUT

CLIENT:

Proterra

PROJECT:

CTFF702F

SUBJECT:

Antenna Loads -TIA 222 G Stanadard (chapter 16 revisions)

Tower Height

180.00

ft

Basic Wind Speed, V

93

mph (≡Ultimate Speed* $\sqrt{\text{0.6}}$)

Basic Wind Speed with Ice, V_i

50

mph

Maintenance Load Factor, L_{FM}

0.1041

Load Factor for Maint. Load Cases (Basic Wind Speed=30 mph)

Design Ice Thickness, t_i

0.75

inches

Type of Mount

Sector

Table 2.3 Importance Factors

Structure Classification	Wind Load Without Ice	Wind Load With Ice	Ice Thickness	Earthquake
II	1	1	1	1

Table 2.4 Exposure Category Coefficients

Exposure Category	Z_g	α	K_{zmin}	K_e	m
B	1200	7	0.7	0.9	0.55

Table 2.5 Topographic Categories

K_{zt} 1.000

Table 2.2 Wind Directionality Factor, K_d

Structure Type	K_d
Monopole	DOES NOT CHANGE

Gust Effect Factor G_h

Structure Type	G_h
Monopole	DOES NOT CHANGE

Shielding Factor, K_a

Structure Type	K_a
Monopole	DOES NOT CHANGE

Seismic Factors

S_s	0.825
S_1	0.281
F_a	1.6
F_v	2.4
R	1.5

Truss or Pole

CLIENT:

Protera

PROJECT:

CTFF702F

SUBJECT:

Antenna Loads -TIA 222 G Stanadard (chapter 16 revisions)

Rad Center																	126.00		ft					
Antenna AND Mount Without Ice																	Pounds							
Mounting Pole	Height (ft)	Model Number	#	Weight (lbs)	H (in)	*W (in)	D (in)	Ka	**A _{ti} (ft2)	***A _T (ft2)	Aspect (FRONT)	Aspect (SIDE)	Ca (FRONT)	Ca (SIDE)	K _z	q _z (psf)	Wind Load (Front)	Wind Load (Side)	Total Dead Load	Lateral Load (Seismic)	Vertical Load (Seismic)			
Pos. 1	126.00	APXV18-206516S-C-A20	1	18.7	53.1	6.9	3.2	0.90	2.54	1.16	7.70	16.86	1.42	1.73	1.056	22.2	72.4	40.1	18.7	69	23	12		
	126.00	RRUS 11 B4	1	50.7	19.7	N/A	7.2	0.90	-	0.99	-	2.74	-	1.21	1.056	22.2	0.0	23.8	50.7	-	-	-		
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-			
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-			
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-			
Pos. 2		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-			
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-			
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-			
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-			
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-			
Pos. 3		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-			
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-			
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-			
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-			
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-			
Pos. 4	126.00	APXVAARR24-43-LLNA20	1	128.0	95.9	24.0	8.7	0.90	15.98	5.79	4.00	11.02	1.27	1.53	1.056	22.2	404.5	177.6	128	405	201	203	68	36
	126.00	Radio 4449 B71/B12	1	75.0	15.0	N/A	9.3	0.90	-	0.96	-	1.62	-	1.20	1.056	22.2	0.0	23.0	75	-	-	-	-	-
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-	-	-	-
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-	-	-	-
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-	-	-	-
Pos. 5		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-	-	-	-
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-	-	-	-
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-	-	-	-
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-	-	-	-
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	-	-	-	-	-

* Enter N/A in the W column for front shielded apertances.

** Au is the product of H and W

*** At is the product of H and D

DL

69

Mount	Height (ft)	Member	*L (in)	**W (in)	D (in)	Weight (lb/ft)	***Ca	Kz	qz (psf)	Wind Load (PLF)	Lateral Load (Seismic)	Vertical Load (Seismic)
	126.00	2 STD Pipe	12.00	2.38	0.00	0.00	1.20	1.056	20.0	5	-	-
	126.00	2.5 STD Pipe	12.00	2.88	0.00	0.00	1.20	1.056	20.0	6	-	-
	126.00	3 STD Pipe	12.00	3.50	0.00	0.00	1.20	1.056	20.0	7	-	-
	126.00	3/4" SR	0.00	0.75	0.00	0.00	-	-	-	-	-	-
	126.00	1" SR	0.00	1.00	0.00	0.00	-	-	-	-	-	-
	126.00	(L2.5x2.5x3)	0.00	2.50	2.50	0.00	-	-	-	-	-	-
	126.00	(L2x2x4)	0.00	2.00	2.00	0.00	-	-	-	-	-	-
	126.00	Angle Diagonal	0.00	0.00	0.00	0.00	-	-	-	-	-	-
	126.00	Plate Horizontal (PL4x0.25)	0.00	4.00	0.25	0.25	-	-	-	-	-	-
	126.00	Plate Horizontal (PL0.25x4)	0.00	0.25	4.00	4.00	-	-	-	-	-	-
	126.00	HSS 4x4x4	12.00	4.00	4.00	4.00	2.00	1.056	20.0	13	-	-
	126.00	Double Angle (LL2x2x3x0)	0.00	2.00	2.00	0.00	-	-	-	-	-	-
	126.00	Double Angle (LL3x3x4x0)	0.00	3.00	3.00	0.00	-	-	-	-	-	-
	126.00	Andrew VSR Channel	12.00	5.44	3.96	0.00	2.00	1.056	20.0	18	-	-
	126.00	WT 4x3/8x3.5x3/8	0.00	3.50	4.00	0.00	-	-	-	-	-	-
	126.00	WT 4x3/8x2.5x3/8	0.00	2.50	4.00	0.00	-	-	-	-	-	-
	126.00	WT 4x3/8x1.5x3/8	0.00	1.50	4.00	0.00	-	-	-	-	-	-
	126.00	WT 4x3/8x0.5x3/8	0.00	0.50	4.00	0.00	-	-	-	-	-	-

* The dimension L is the longest dimension of the member

** The dimension W is the height or width of the member that resists wind load

*** Ca will equal 1.2 for round members and 2.0 for flat members

CLIENT:

Protera

PROJECT:

CTFF702F

SUBJECT:

Antenna Loads -TIA 222 G Stanadard (chapter 16 revisions)

Antenna AND Mount With Ice																	reduction 0.28905							
																	Kiz 1.143367							
																	ti (in) 1.715051							
Mounting Pole	Height (ft)	Model Number	#	H (in)	W (in)	D (in)	Ka	*A _N (ft2)	*A _T (ft2)	*Volume Ice (ft3)	*Weight Ice (lbs)	**Ca (FRONT)	**Ca (SIDE)	Kz	q _z (psf)	Pounds								
																Ice Wind Load (Front)	Ice Wind Load (Side)	Combined Wind Load (Front)	Ice Wind Load (Side)	Ice Dead Load	**Total Wind Load (Front)	**Total Wind Load (Side)	Total Ice Load	
Pos. 1	126.00	APXV18-206516S-C-A20	1	53.1	6.9	3.2	0.90	1.51	1.42	1.56	87.12	0.77	0.84	1.056	6.4	6.7	6.9	27.6	18.5	87	28	28	0	172
	126.00	RRUS 11 B4	1	19.7	17.0	7.2	0.90	-	0.72	1.51	84.65	0.70	0.70	1.056	6.4	0.0	0.0	2.9	9.8	85	0	0	0	
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
Pos. 2		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	14	15	86	0
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
Pos. 3		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
Pos. 3	126.00	APXVAARR24-43-ULNA20	1	95.9	24.0	8.7	0.90	2.94	2.57	7.54	422.14	0.72	0.83	1.056	6.4	12.3	12.3	129.2	63.6	422	129	73	489	
	126.00	Radio 4449 B71/B12	1	15.0	13.2	9.3	0.90	-	0.66	1.19	66.42	0.70	0.70	1.056	6.4	0.0	2.7	0.0	9.3	66	0	0	0	
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
Pos. 4		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	65	37	245	0
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0	

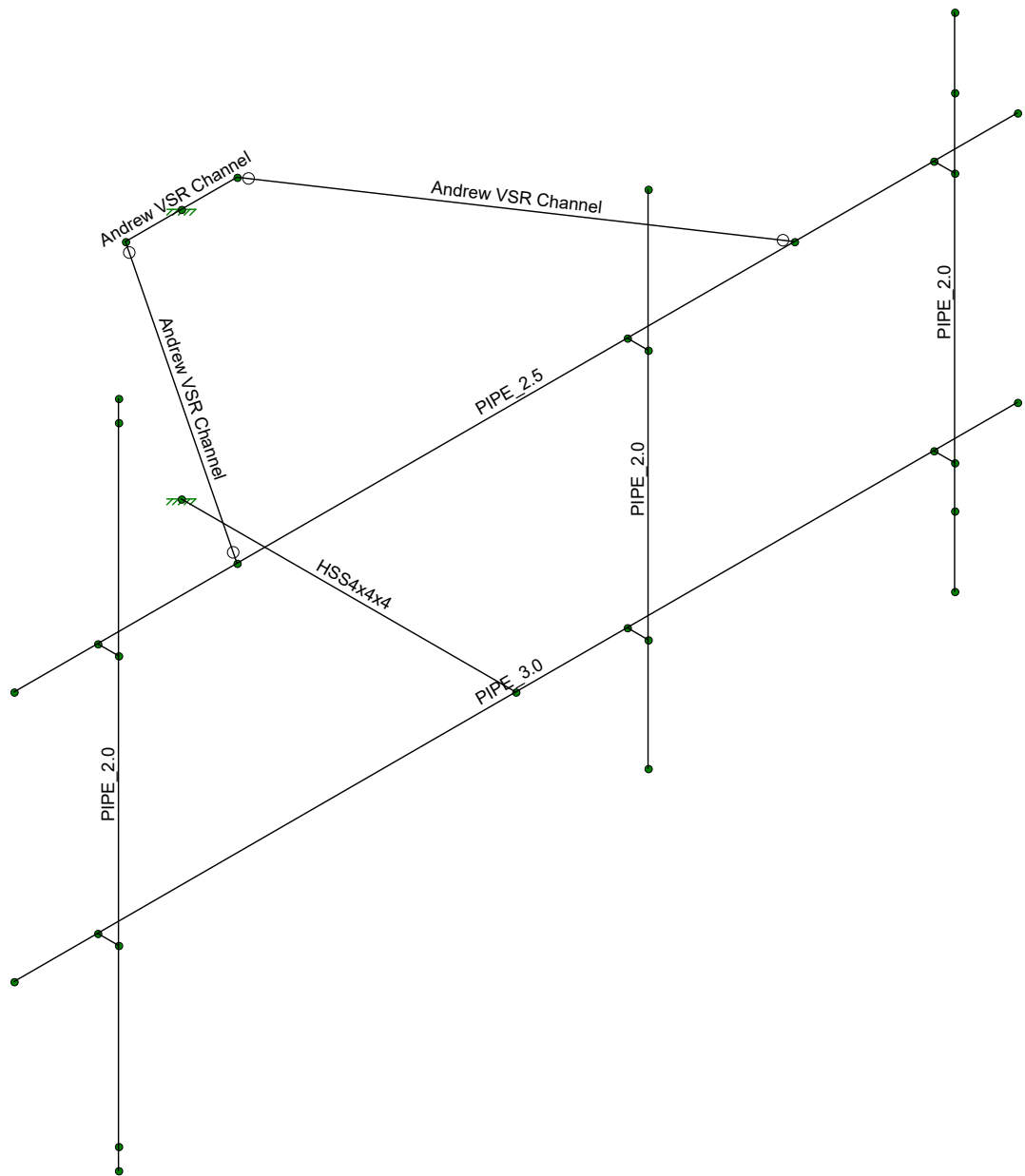
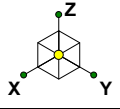
* A_N, A_T, Volume Ice and Weight Ice are calculated per unit

Ca will equal 1.2 for all ice load calculations

* A_N, A_T, Volume Ice and Weight Ice are calculated per unit
** Ca will equal 1.2 for all ice load calculations

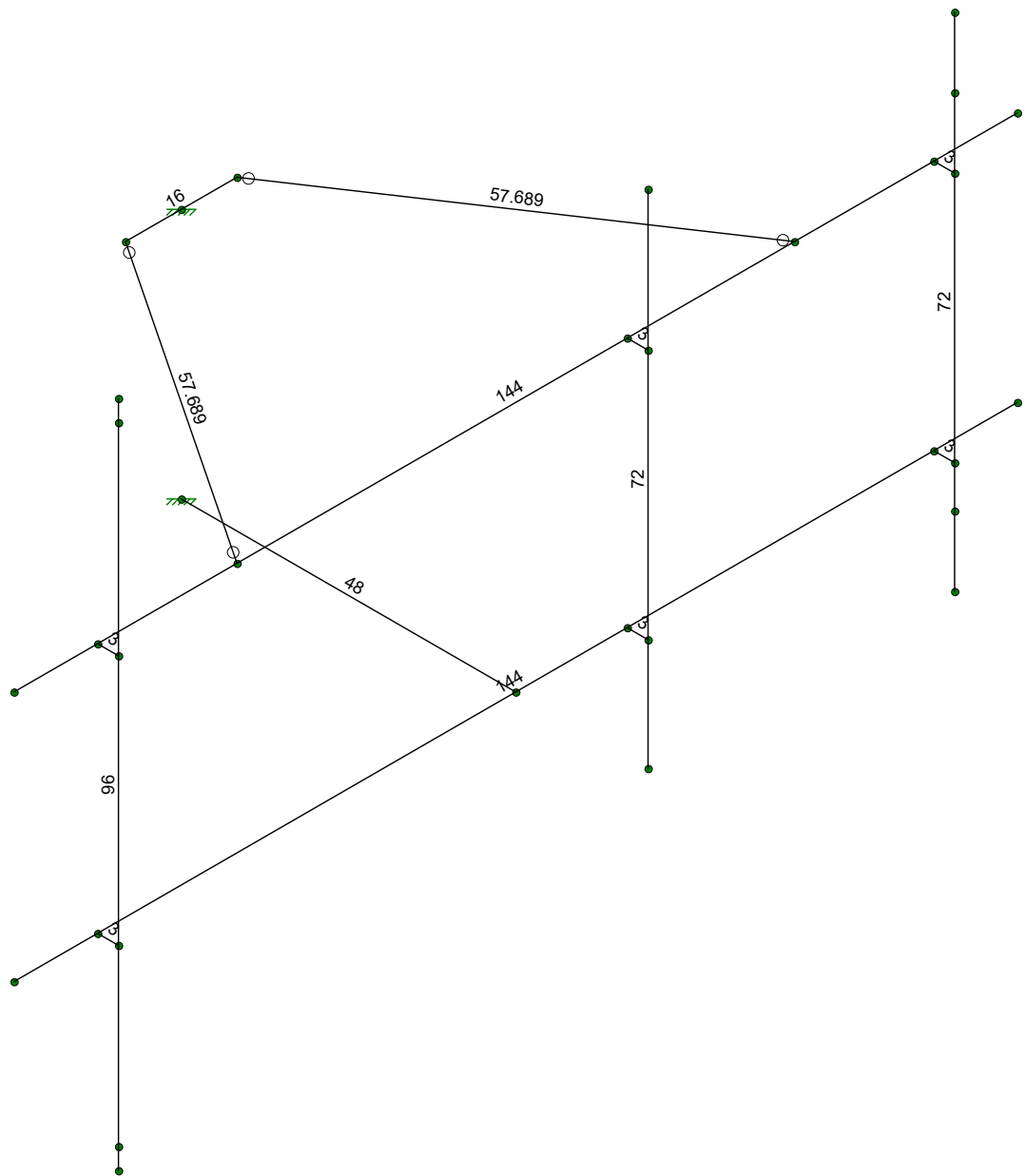
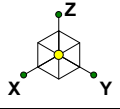
Mount	Height (ft)	Member	*L (in)	**W (in)	D (in)	***A _N (ft2)	Volume		****Ca (FRONT)	K _z	q _z (psf)	PLF			
							Ice (ft3)	Weight Ice (lbs)				Ice Wind Load (Front)	Combined Wind Load (Front)	Ice Dead Load	
	126.00	2 STD Pipe	12.00	2.38	0.00	0.42	0.15	8.58	1.20	1.056	5.8	2.9	4.3	9	
	126.00	2.5 STD Pipe	12.00	2.88	0.00	0.44	0.17	9.63	1.20	1.056	5.8	3.0	4.7	10	
	126.00	3 STD Pipe	12.00	3.50	0.00	0.45	0.20	10.93	1.20	1.056	5.8	3.1	5.1	11	
	126.00	3/4" SR	0.00	0.75	0.00	-	-	-	-	-	-	-	-	-	
	126.00	1" SR	0.00	1.00	0.00	-	-	-	-	-	-	-	-	-	
	126.00	(L2.5x2.5x3)	0.00	2.50	2.50	-	-	-	-	-	-	-	-	-	-
	126.00	(L2x2x4)	0.00	2.00	2.00	-	-	-	-	-	-	-	-	-	-
	126.00	Angle Diagonal	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-	-
	126.00	Plate Horizontal (PL4x0.25)	0.00	4.00	0.25	-	-	-	-	-	-	-	-	-	-
	126.00	Plate Horizontal (PL0.25x4)	0.00	0.25	4.00	-	-	-	-	-	-	-	-	-	-
	126.00	HSS 4x4x4	12.00	4.00	4.00	0.46	0.38	21.38	1.20	1.056	5.8	3.2	7.1	21	
	126.00	Double Angle (LL2x2x3x0)	0.00	2.00	2.00	-	-	-	-	-	-	-	-	-	-
	126.00	Double Angle (LL3x3x4x0)	0.00	3.00	3.00	-	-	-	-	-	-	-	-	-	-
	126.00	Andrew VSR Channel	12.00	5.44	3.96	0.50	0.35	19.80	1.20	1.056	5.8	3.4	8.7	20	
	126.00	WT 4x3/8x3.5x3/8	0.00	3.50	4.00	-	-	-	-	-	-	-	-	-	-
	126.00	WT 4x3/8x2.5x3/8	0.00	2.50	4.00	-	-	-	-	-	-	-	-	-	-
	126.00	WT 4x3/8x1.5x3/8	0.00	1.50	4.00	-	-	-	-	-	-	-	-	-	-
	126.00	WT 4x3/8x0.5x3/8	0.00	0.50	4.00	-	-	-	-	-	-	-	-	-	-

* The dimension L is the longest dimension of the member
** The dimension W is the height or width of the member that resists wind load
*** A_N is the area of ice built up on the LW plane
**** Ca will equal 1.2 for all ice load calculations



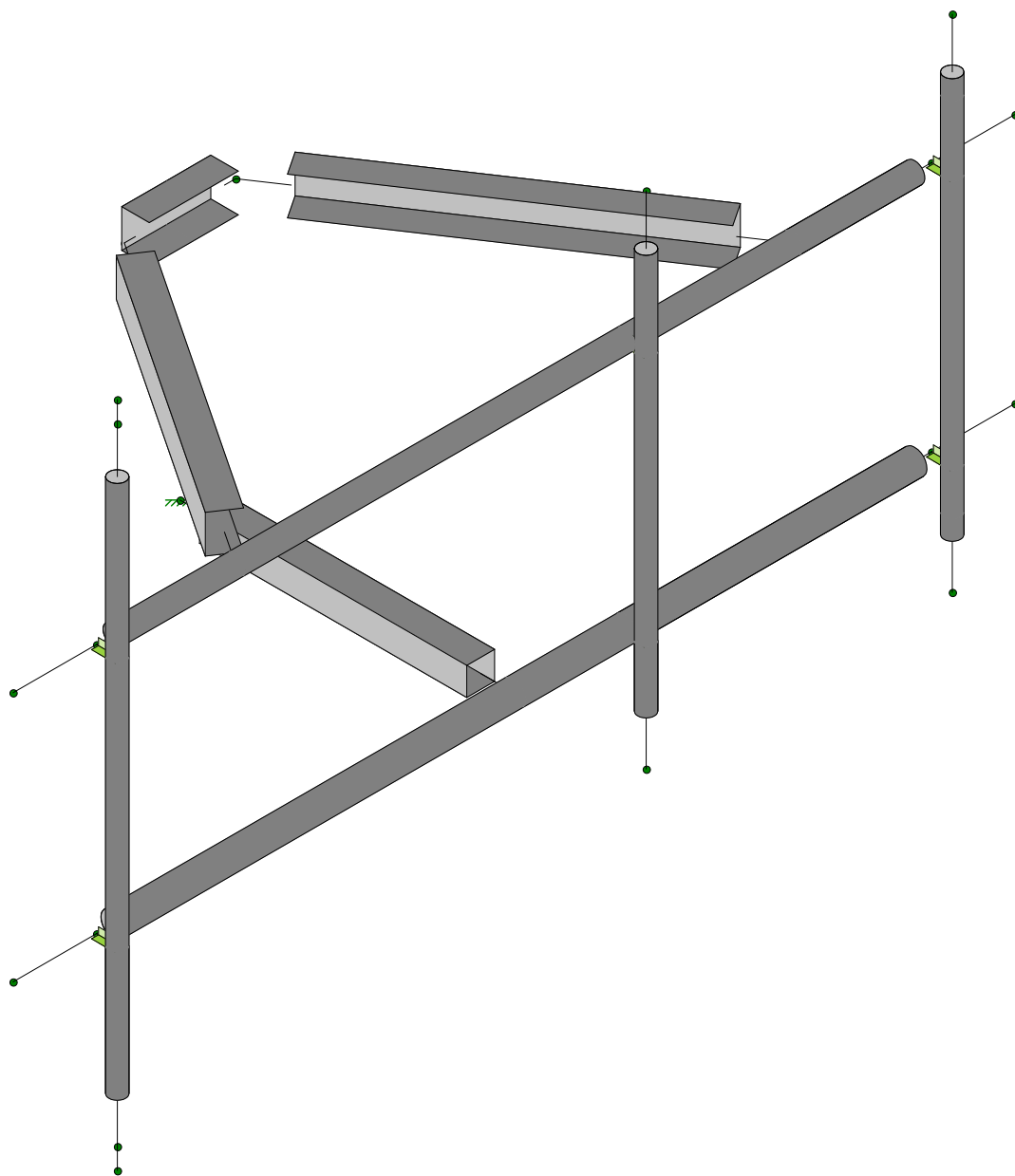
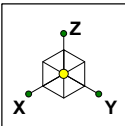
Envelope Only Solution

Proterra/Destek Engineeri...	CTFF702F	SK - 1
US		June 11, 2019 at 5:25 PM
1978006		CTFF702F.R3D



Member Length (in) Displayed
Envelope Only Solution

Proterra/Destek Engineeri...	CTFF702F	SK - 2
US		June 11, 2019 at 5:25 PM
1978006		CTFF702F.R3D



Envelope Only Solution

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US

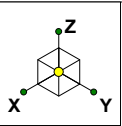
1978006

CTFF702F

SK - 3

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CTFF702F.R3D



Code Check
(Env)

No Calc

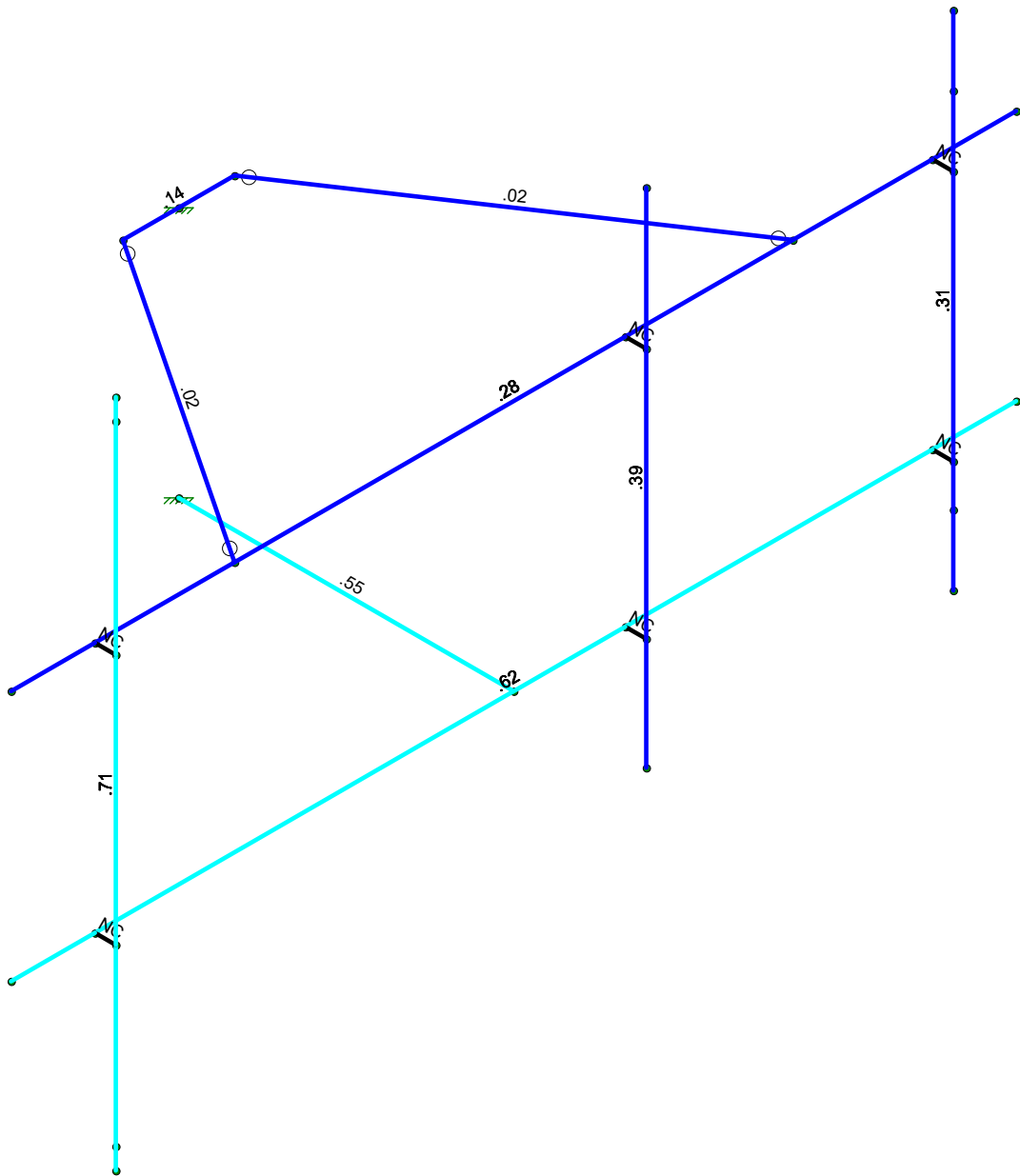
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.90-1.0

.75-.90

.50-.75

0.-.50



Member Code Checks Displayed (Enveloped)
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Proterra/Destek Engineeri...

US

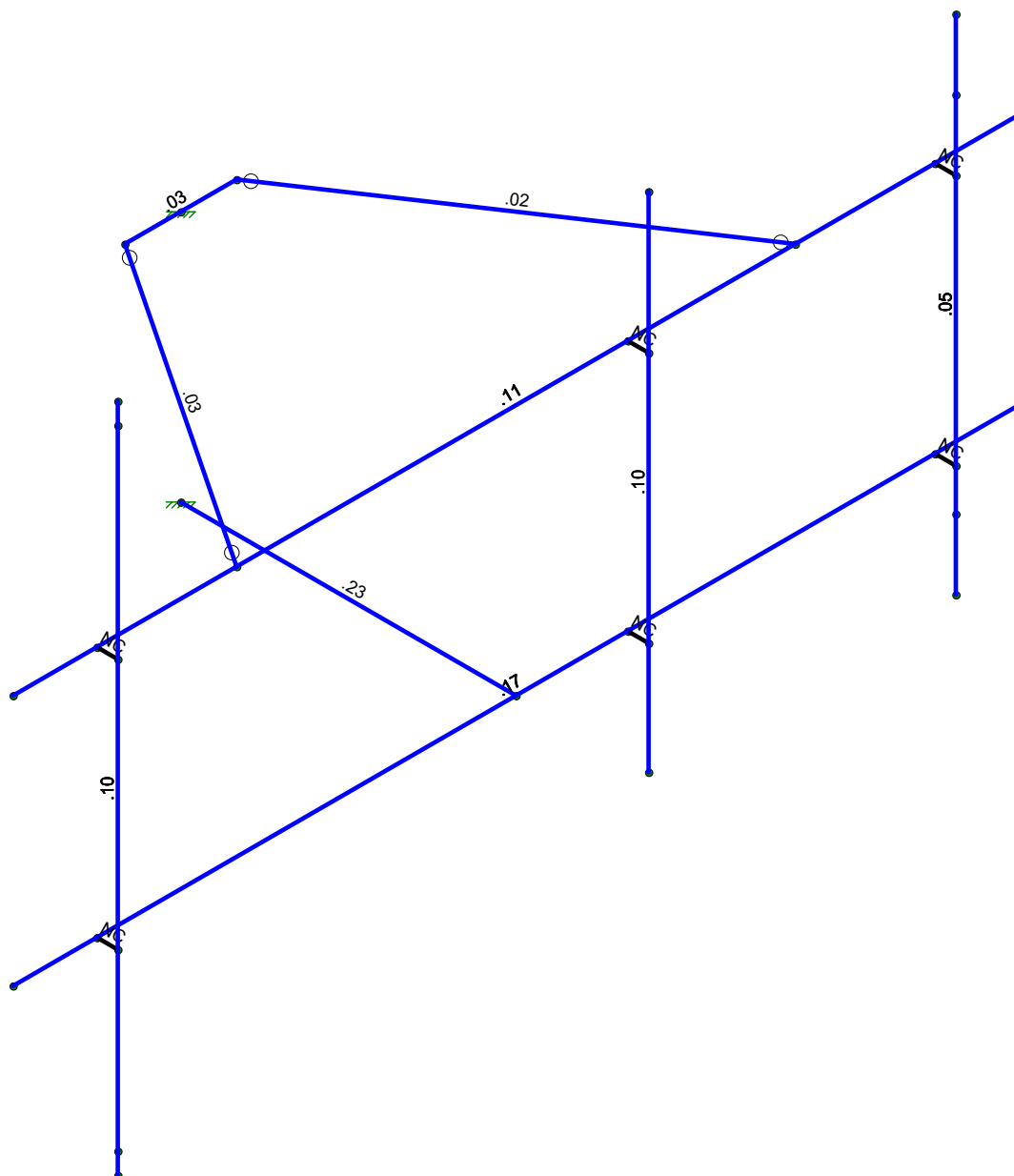
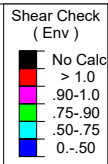
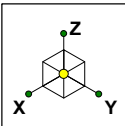
1978006

CTFF702F

SK - 4

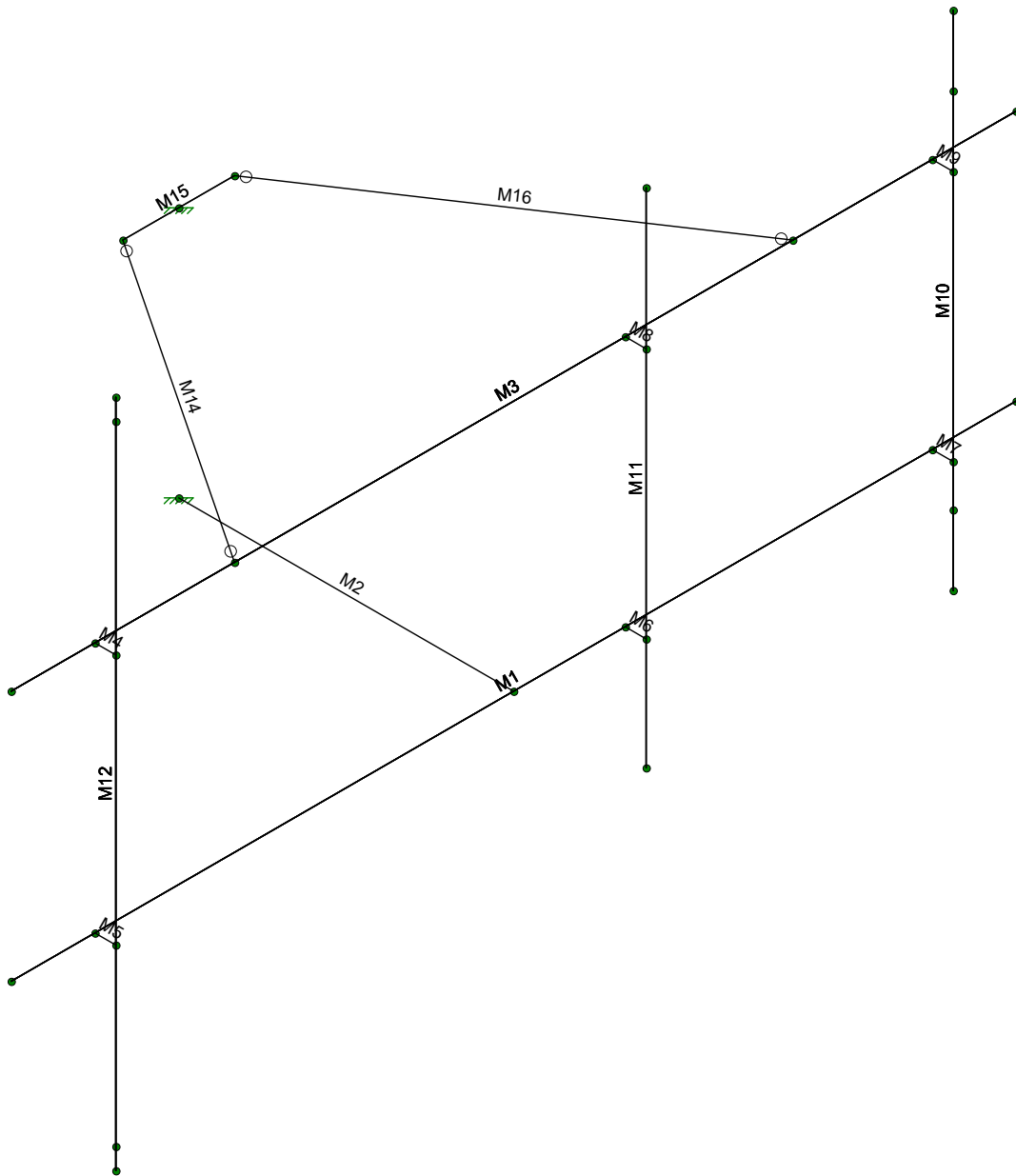
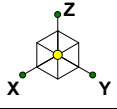
June 11, 2019 at 5:26 PM

CTFF702F.R3D



Member Shear Checks Displayed (Enveloped)
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Proterra/Destek Engineeri...	CTFF702F	SK - 5
US		June 11, 2019 at 5:26 PM
1978006		CTFF702F.R3D



Envelope Only Solution

Proterra/Destek Engineeri...

US

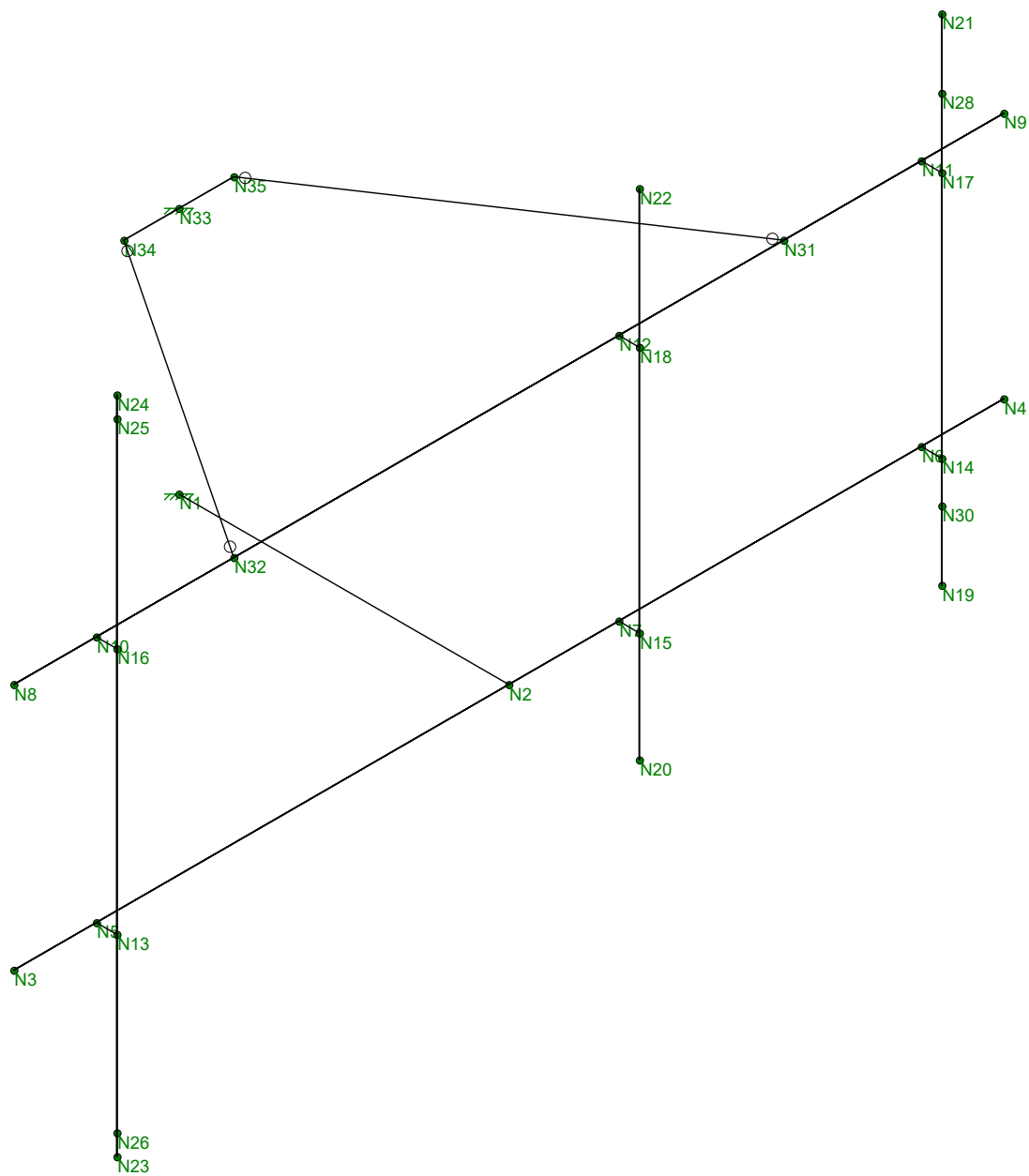
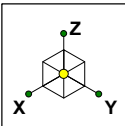
1978006

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SK - 6

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Proterra/Destek Engineeri...

US

1978006

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SK - 7

June 11, 2019 at 5:27 PM

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(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Z
Global Member Orientation Plane	XY
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 13th(360-05): ASD
Cold Formed Steel Code	AISI NAS-01: ASD
Wood Code	AF&PA NDS-05/08: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-05
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building AISC 14th(360-10): ASD

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parame Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR SET ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-05
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	Not Entered
Occupancy Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1

Project Grid Lines

Label	Start X [in]	End X [in]	Start Y [in]	End Y [in]	Start Bubble	End Bubble
No Data to Print ...						

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (1E...	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
3	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	HR1	W4x13	Beam	Wide Flange	A36 Gr.36	Typical	3.83	3.86	11.3	.151

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M14	N34	N32		180	Andrew VSR Chan...	Beam	Wide Flange	A36 Gr.36	Typical
2	M15	N34	N35			Andrew VSR Chan...	Beam	Wide Flange	A36 Gr.36	Typical
3	M16	N35	N31			Andrew VSR Chan...	Beam	Wide Flange	A36 Gr.36	Typical
4	M2	N2	N1			HSS4x4x4	Beam	Wide Flange	A500 Gr....	Typical
5	M10	N21	N19			PIPE 2.0	Beam	Wide Flange	A53 Gr.B	Typical
6	M11	N22	N20			PIPE 2.0	Beam	Wide Flange	A53 Gr.B	Typical
7	M12	N24	N23			PIPE 2.0	Beam	Wide Flange	A53 Gr.B	Typical
8	M3	N8	N9			PIPE 2.5	Beam	Wide Flange	A53 Gr.B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
9	M1	N3	N4			PIPE 3.0	Beam	Wide Flange	A53 Gr.B	Typical
10	M4	N10	N16			RIGID	None	None	RIGID	Typical
11	M5	N5	N13			RIGID	None	None	RIGID	Typical
12	M6	N7	N15			RIGID	None	None	RIGID	Typical
13	M7	N6	N14			RIGID	None	None	RIGID	Typical
14	M8	N12	N18			RIGID	None	None	RIGID	Typical
15	M9	N11	N17			RIGID	None	None	RIGID	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
1	M14	BenPIN	BenPIN				Yes			None
2	M15						Yes			None
3	M16	BenPIN	BenPIN				Yes			None
4	M2						Yes			None
5	M10						Yes			None
6	M11						Yes			None
7	M12						Yes			None
8	M3						Yes			None
9	M1						Yes			None
10	M4						Yes			None
11	M5						Yes			None
12	M6						Yes			None
13	M7						Yes			None
14	M8						Yes			None
15	M9						Yes			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torq...	Kyy	Kzz	Cb	Function
1	M14	Andrew VS...	57.689			Lbyy						Lateral
2	M15	Andrew VS...	16			Lbyy						Lateral
3	M16	Andrew VS...	57.689			Lbyy						Lateral
4	M2	HSS4x4x4	48			Lbyy						Lateral
5	M10	PIPE 2.0	72			Lbyy						Lateral
6	M11	PIPE 2.0	72			Lbyy						Lateral
7	M12	PIPE 2.0	96			Lbyy						Lateral
8	M3	PIPE 2.5	144			Lbyy						Lateral
9	M1	PIPE 3.0	144			Lbyy						Lateral

Joint Coordinates and Temperatures

	Label	X [in]	Y [in]	Z [in]	Temp [F]	Detach From Diap...
1	N1	0	0	0	0	
2	N2	0	48	0	0	
3	N3	72	48	0	0	
4	N4	-72	48	0	0	
5	N5	60	48	0	0	
6	N6	-60	48	0	0	
7	N7	-16	48	0	0	
8	N8	72	48	36	0	
9	N9	-72	48	36	0	
10	N10	60	48	36	0	
11	N11	-60	48	36	0	
12	N12	-16	48	36	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [in]	Y [in]	Z [in]	Temp [F]	Detach From Diap...
13	N13	60	51	0	0	
14	N14	-60	51	0	0	
15	N15	-16	51	0	0	
16	N16	60	51	36	0	
17	N17	-60	51	36	0	
18	N18	-16	51	36	0	
19	N19	-60	51	-16	0	
20	N20	-16	51	-16	0	
21	N21	-60	51	56	0	
22	N22	-16	51	56	0	
23	N23	60	51	-28	0	
24	N24	60	51	68	0	
25	N25	60	51	65	0	
26	N26	60	51	-25	0	
27	N28	-60	51	46	0	
28	N30	-60	51	-6	0	
29	N31	-40	48	36	0	
30	N32	40	48	36	0	
31	N33	0	0	36	0	
32	N34	8	0	36	0	
33	N35	-8	0	36	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N33	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N34						
4	N35						

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	DEAD LOAD	None			-1	4				
2	DEAD LOAD ICE	None				4		9		
3	WIND LOAD (NO ICE) FRONT	None				4		9		
4	WIND LOAD (NO ICE) SIDE	None				4		9		
5	WIND LOAD (ICE) FRONT	None				4		9		
6	WIND LOAD (ICE) SIDE	None				4		9		
7	LIVE LOAD 1	None				1				
8	LIVE LOAD 2	None				1				
9	LIVE LOAD 3	None								
10	MAINTENANCE LOAD 1	None				1				
11	MAINTENANCE LOAD 2	None				1				
12	MAINTENANCE LOAD 3	None				1				
13	MAINTENANCE LOAD 4	None								
14	EQ Horizontal Y	None								
15	EQ Horizontal X	None								
16	EQ Vertical	None								

Joint Loads and Enforced Displacements (BLC 1 : DEAD LOAD)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N28	L	Z	-35
2	N30	L	Z	-35

Joint Loads and Enforced Displacements (BLC 1 : DEAD LOAD) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
3	N25	L	Z	-102
4	N26	L	Z	-102

Joint Loads and Enforced Displacements (BLC 2 : DEAD LOAD ICE)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N28	L	Z	-86
2	N30	L	Z	-86
3	N25	L	Z	-245
4	N26	L	Z	-245

Joint Loads and Enforced Displacements (BLC 3 : WIND LOAD (NO ICE) FRONT)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N28	L	Y	-37
2	N30	L	Y	-37
3	N25	L	Y	-203
4	N26	L	Y	-203

Joint Loads and Enforced Displacements (BLC 4 : WIND LOAD (NO ICE) SIDE)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N28	L	X	-32
2	N30	L	X	-32
3	N25	L	X	-101
4	N26	L	X	-101

Joint Loads and Enforced Displacements (BLC 5 : WIND LOAD (ICE) FRONT)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N28	L	Y	-29
2	N30	L	Y	-29
3	N25	L	Y	-129
4	N26	L	Y	-129

Joint Loads and Enforced Displacements (BLC 6 : WIND LOAD (ICE) SIDE)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N28	L	X	-30
2	N30	L	X	-30
3	N25	L	X	-74
4	N26	L	X	-74

Joint Loads and Enforced Displacements (BLC 7 : LIVE LOAD 1)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N4	L	Z	-250

Joint Loads and Enforced Displacements (BLC 8 : LIVE LOAD 2)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N3	L	Z	-250

Joint Loads and Enforced Displacements (BLC 10 : MAINTENANCE LOAD 1)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
1	N19	L	Z	-250

Joint Loads and Enforced Displacements (BLC 11 : MAINTENANCE LOAD 2)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
--	-------------	-------	-----------	---

Joint Loads and Enforced Displacements (BLC 11 : MAINTENANCE LOAD 2) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...]
1	N20	L	Z	-250

Joint Loads and Enforced Displacements (BLC 12 : MAINTENANCE LOAD 3)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...]
1	N23	L	Z	-250

Member Point Loads

Member Label	Direction	Magnitude[(lb,k-ft)]	Location[in,%]
No Data to Print ...			

Member Distributed Loads (BLC 2 : DEAD LOAD ICE)

	Member Label	Direction	Start Magnitude[(lb/ft,...]	End Magnitude[(lb/ft,...]	Start Location[in,%]	End Location[in,%]
1	M14	Z	-20	-20	0	0
2	M15	Z	-20	-20	0	0
3	M16	Z	-20	-20	0	0
4	M2	Z	-21	-21	0	0
5	M10	Z	-9	-9	0	0
6	M11	Z	-9	-9	0	0
7	M12	Z	-9	-9	0	0
8	M3	Z	-10	-10	0	0
9	M1	Z	-11	-11	0	0

Member Distributed Loads (BLC 3 : WIND LOAD (NO ICE) FRONT)

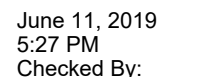
	Member Label	Direction	Start Magnitude[(lb/ft,...]	End Magnitude[(lb/ft,...]	Start Location[in,%]	End Location[in,%]
1	M14	PY	-18	-18	0	0
2	M15	PY	-18	-18	0	0
3	M16	PY	-18	-18	0	0
4	M2	PY	-13	-13	0	0
5	M10	PY	-5	-5	0	0
6	M11	PY	-5	-5	0	0
7	M12	PY	-5	-5	0	0
8	M3	PY	-6	-6	0	0
9	M1	PY	-7	-7	0	0

Member Distributed Loads (BLC 4 : WIND LOAD (NO ICE) SIDE)

	Member Label	Direction	Start Magnitude[(lb/ft,...]	End Magnitude[(lb/ft,...]	Start Location[in,%]	End Location[in,%]
1	M14	PX	-18	-18	0	0
2	M15	PX	-18	-18	0	0
3	M16	PX	-18	-18	0	0
4	M2	PX	-13	-13	0	0
5	M10	PX	-5	-5	0	0
6	M11	PX	-5	-5	0	0
7	M12	PX	-5	-5	0	0
8	M3	PX	-6	-6	0	0
9	M1	PX	-7	-7	0	0

Member Distributed Loads (BLC 5 : WIND LOAD (ICE) FRONT)

	Member Label	Direction	Start Magnitude[(lb/ft,...]	End Magnitude[(lb/ft,...]	Start Location[in,%]	End Location[in,%]
1	M14	PY	-18.4	-18.4	0	0
2	M15	PY	-18.4	-18.4	0	0
3	M16	PY	-18.4	-18.4	0	0
4	M2	PY	-7.1	-7.1	0	0



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Load Combinations (Continued)

	Description	So...	P...	S...	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..
30	DL + MAIN L3+30MP...	Yes	Y		1	1.2	12	1.5	3	.104									
31	DL + MAIN L4+30MP...	Yes	Y		1	1.2	13	1.5	3	.104									
32	DL + MAIN L1+30MP...	Yes	Y		1	1.2	10	1.5	4	.104									
33	DL + MAIN L2+30MP...	Yes	Y		1	1.2	11	1.5	4	.104									
34	DL + MAIN L3+30MP...	Yes	Y		1	1.2	12	1.5	4	.104									
35	DL + MAIN L4+30MP...	Yes	Y		1	1.2	13	1.5	4	.104									
36	DL + MAIN L1+30MP...	Yes	Y		1	1.2	10	1.5	3	-.104									
37	DL + MAIN L2+30MP...	Yes	Y		1	1.2	11	1.5	3	-.104									
38	DL + MAIN L3+30MP...	Yes	Y		1	1.2	12	1.5	3	-.104									
39	DL + MAIN L4+30MP...	Yes	Y		1	1.2	13	1.5	3	-.104									
40	DL + MAIN L1+30MP...	Yes	Y		1	1.2	10	1.5	4	-.104									
41	DL + MAIN L2+30MP...	Yes	Y		1	1.2	11	1.5	4	-.104									
42	DL + MAIN L3+30MP...	Yes	Y		1	1.2	12	1.5	4	-.104									
43	DL + MAIN L4+30MP...	Yes	Y		1	1.2	13	1.5	4	-.104									
44	DL + 1.0 EQ Hor. X + ...	Yes	Y		1	1.2	15	1	16	1									
45	DL + 1.0 EQ Hor. X + ...	Yes	Y		1	1.2	15	1	16	1									

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	833.063	5	540.94	13	1972.455	13	7.024	13	.986	25	4.025	11
2		min	-704.221	11	-205.469	7	695.583	9	1.753	7	-2.488	23	-3.859	5
3	N33	max	303.925	2	893.234	1	196.947	20	0	9	.006	25	.241	2
4		min	-435.549	8	-1164.177	7	53.988	1	-.002	15	-.016	21	-.386	7
5	Totals:	max	899.201	4	1369.671	1	2157.703	23						
6		min	-899.201	10	-1369.645	7	760.724	5						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...]	LC
1	N1	max	0	11	0	7	0	9	0	7	0	23	0	5
2		min	0	5	0	13	0	13	0	13	0	25	0	11
3	N2	max	.239	11	0	7	-.066	7	-1.269e-03	7	1.004e-02	23	7.135e-03	5
4		min	-.214	5	0	13	-.344	13	-1.008e-02	13	-3.979e-03	25	-8.472e-03	11
5	N3	max	.239	11	.819	6	.093	6	5.772e-03	7	2.055e-02	23	1.338e-02	6
6		min	-.215	5	-1.097	12	-1.734	23	-8.944e-03	1	-3.239e-03	25	-1.791e-02	12
7	N4	max	.24	11	.628	11	.633	11	1.95e-04	6	1.197e-02	11	6.838e-03	5
8		min	-.214	5	-.503	5	-.765	25	-8.041e-03	24	-9.64e-03	25	-8.858e-03	11
9	N5	max	.239	11	.659	6	.058	6	5.772e-03	7	2.055e-02	23	1.337e-02	6
10		min	-.215	5	-.883	12	-1.488	23	-8.944e-03	1	-3.242e-03	25	-1.791e-02	12
11	N6	max	.24	11	.522	11	.49	11	1.95e-04	6	1.197e-02	11	6.84e-03	5
12		min	-.214	5	-.421	5	-.65	25	-8.041e-03	24	-9.229e-03	25	-8.86e-03	11
13	N7	max	.239	11	.137	11	.005	11	-3.729e-04	7	1.002e-02	11	7.168e-03	5
14		min	-.214	5	-.115	5	-.266	16	-8.963e-03	13	-7.108e-03	25	-8.727e-03	11
15	N8	max	.716	11	.783	6	.158	6	5.954e-03	1	1.509e-02	23	1.531e-02	6
16		min	-.472	5	-1.079	12	-1.699	23	-4.014e-03	7	-6.995e-03	5	-1.938e-02	12
17	N9	max	.715	11	.761	11	.628	11	1.945e-03	25	1.19e-02	11	6.225e-03	5
18		min	-.471	5	-.513	5	-.752	25	-3.76e-03	26	-7.816e-03	25	-8.757e-03	11
19	N10	max	.716	11	.599	6	.083	6	5.954e-03	1	1.508e-02	23	1.531e-02	6
20		min	-.472	5	-.846	12	-1.518	23	-4.014e-03	7	-6.999e-03	5	-1.937e-02	12
21	N11	max	.715	11	.656	11	.485	11	1.945e-03	25	1.191e-02	11	6.229e-03	5
22		min	-.471	5	-.439	5	-.658	25	-3.76e-03	26	-7.812e-03	25	-8.76e-03	11
23	N12	max	.715	11	.256	12	-.005	11	2.001e-03	25	1.425e-02	23	6.88e-03	5
24		min	-.471	5	-.168	6	-.293	16	-1.187e-03	12	-6.398e-03	25	-1.05e-02	11
25	N13	max	.286	11	.659	6	.072	6	5.772e-03	7	2.055e-02	23	1.337e-02	6
26		min	-.248	5	-.883	12	-1.505	23	-8.944e-03	1	-3.242e-03	25	-1.791e-02	12

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...]	LC
27	N14	max	.266	11	.522	11	.477	11	1.95e-04	6	1.197e-02	11	6.84e-03	5
28		min	-.235	5	-.421	5	-.653	25	-8.041e-03	24	-9.229e-03	25	-8.86e-03	11
29	N15	max	.266	11	.137	11	-.007	10	-3.729e-04	7	1.002e-02	11	7.168e-03	5
30		min	-.236	5	-.115	5	-.289	16	-8.963e-03	13	-7.108e-03	25	-8.727e-03	11
31	N16	max	.764	11	.599	6	.072	6	5.954e-03	1	1.508e-02	23	1.531e-02	6
32		min	-.509	5	-.846	12	-1.506	23	-4.014e-03	7	-6.999e-03	5	-1.937e-02	12
33	N17	max	.741	11	.656	11	.477	11	1.945e-03	25	1.191e-02	11	6.229e-03	5
34		min	-.49	5	-.439	5	-.652	25	-3.76e-03	26	-7.812e-03	25	-8.76e-03	11
35	N18	max	.746	11	.256	12	-.007	10	2.001e-03	25	1.425e-02	23	6.88e-03	5
36		min	-.492	5	-.168	6	-.291	16	-1.187e-03	12	-6.398e-03	25	-1.05e-02	11
37	N19	max	.111	25	.453	11	.477	11	2.937e-04	7	1.189e-02	11	6.84e-03	5
38		min	-.124	5	-.428	5	-.653	25	-8.085e-03	24	-9.228e-03	25	-8.86e-03	11
39	N20	max	.106	11	.07	11	-.007	10	-3.416e-04	7	9.991e-03	11	7.168e-03	5
40		min	-.142	5	-.145	16	-.289	16	-8.98e-03	13	-7.108e-03	25	-8.727e-03	11
41	N21	max	.983	11	.708	11	.477	11	1.946e-03	25	1.211e-02	11	6.229e-03	5
42		min	-.639	5	-.455	5	-.652	25	-3.761e-03	26	-7.813e-03	25	-8.76e-03	11
43	N22	max	.989	11	.279	12	-.007	10	2.001e-03	25	1.428e-02	23	6.88e-03	5
44		min	-.597	5	-.2	6	-.291	16	-1.134e-03	12	-6.398e-03	25	-1.05e-02	11
45	N23	max	.058	25	.91	6	.071	6	1.289e-02	7	1.935e-02	24	1.337e-02	6
46		min	-.454	16	-1.221	12	-1.505	23	-1.605e-02	1	-3.233e-03	25	-1.791e-02	12
47	N24	max	1.305	11	.912	6	.071	6	1.564e-02	1	1.816e-02	11	1.531e-02	6
48		min	-.83	5	-1.223	12	-1.506	23	-1.369e-02	7	-1.13e-02	5	-1.937e-02	12
49	N25	max	1.25	11	.875	6	.071	6	1.564e-02	1	1.816e-02	11	1.531e-02	6
50		min	-.796	5	-1.18	12	-1.506	23	-1.369e-02	7	-1.13e-02	5	-1.937e-02	12
51	N26	max	.048	25	.877	6	.071	6	1.289e-02	7	1.935e-02	24	1.337e-02	6
52		min	-.409	16	-1.179	12	-1.505	23	-1.605e-02	1	-3.233e-03	25	-1.791e-02	12
53	N28	max	.862	11	.682	11	.477	11	1.946e-03	25	1.211e-02	11	6.229e-03	5
54		min	-.564	5	-.447	5	-.652	25	-3.761e-03	26	-7.813e-03	25	-8.76e-03	11
55	N30	max	.195	11	.496	11	.477	11	2.861e-04	7	1.189e-02	11	6.84e-03	5
56		min	-.193	5	-.423	5	-.653	25	-8.081e-03	24	-9.228e-03	25	-8.86e-03	11
57	N31	max	.715	11	.476	11	.262	11	1.962e-03	25	1.075e-02	11	6.487e-03	5
58		min	-.471	5	-.313	5	-.481	25	-2.416e-03	26	-9.3e-03	25	-9.425e-03	11
59	N32	max	.716	11	.316	5	-.006	6	4.108e-03	1	1.76e-02	23	1.321e-02	6
60		min	-.472	5	-.478	11	-1.193	24	-2.589e-03	7	-3.152e-03	5	-1.74e-02	12
61	N33	max	0	8	0	7	0	1	0	15	0	21	0	7
62		min	0	2	0	1	0	20	0	9	0	25	0	2
63	N34	max	0	7	.002	7	0	1	1.46e-05	23	1.186e-05	21	2.95e-04	7
64		min	0	1	-.001	1	0	20	-3.452e-06	6	2.457e-06	6	-2.111e-04	1
65	N35	max	0	12	0	7	0	26	7.908e-06	25	-1.754e-06	26	8.707e-05	1
66		min	0	6	0	1	0	17	-8.989e-06	12	-8.685e-06	17	-9.618e-05	7

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code C...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-...	phi*Mn z-...	Cb	Eqn
1	M14	Andrew VSR ...	.019	28.844	12	.034	57.689	y	23	53259.869	79088.4	4.287	13.811	1....	H1-1b
2	M15	Andrew VSR ...	.139	8	7	.030	8	z	7	66959.204	79088.4	4.287	13.811	1....	H1-1b
3	M16	Andrew VSR ...	.017	28.844	3	.021	0	y	23	53259.869	79088.4	4.287	13.811	1....	H1-1b
4	M2	HSS4x4x4	.554	48	23	.233	48	y	23	130481.58	139518	16.181	16.181	1....	H1-1b
5	M10	PIPE 2.0	.314	55.5	25	.046	55.5		21	20866.733	32130	1.872	1.872	1....	H1-1b
6	M11	PIPE 2.0	.392	55.5	23	.097	55.5		23	20866.733	32130	1.872	1.872	1....	H1-1b
7	M12	PIPE 2.0	.711	68	16	.101	32		19	14916.096	32130	1.872	1.872	3....	H1-1b
8	M3	PIPE 2.5	.281	87	16	.106	31.5		1	15797.3	50715	3.596	3.596	1....	H1-1b
9	M1	PIPE 3.0	.618	72	24	.170	72		19	30165.191	65205	5.749	5.749	1....	H1-1b

Exhibit F

Power Density/RF Emissions Report



EBI Consulting

environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CTFF702F

320 Old Stagecoach Road
Ridgefield, Connecticut 06877

May 17, 2019

EBI Project Number: 6219001634

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	14.48%

May 17, 2019

T-Mobile

Attn: Jason Overbey, RF Manager

35 Griffin Road South

Bloomfield, Connecticut 06002

Emissions Analysis for Site: CTFF702F

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **320 Old Stagecoach Road in Ridgefield, Connecticut** for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits; therefore, it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately $400 \mu\text{W}/\text{cm}^2$ and $467 \mu\text{W}/\text{cm}^2$, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is $1000 \mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.



Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 320 Old Stagecoach Road in Ridgefield, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

- 1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 UMTS channels (AWS Band - 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 4) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 5) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated



value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

- 6) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 7) The antennas used in the modeling are the RFS APXVI8-2065I6S-C-A20 for the 2100 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 700 MHz channel(s) in Sector A, the RFS APXVI8-2065I6S-C-A20 for the 2100 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 700 MHz channel(s) in Sector B, the RFS APXVI8-2065I6S-C-A20 for the 2100 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 700 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 8) The antenna mounting height centerline of the proposed antennas is 126 feet above ground level (AGL).
- 9) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.
- 10) All calculations were done with respect to uncontrolled / general population threshold limits.



T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APXV18-206516S-C-A20	Make / Model:	RFS APXV18-206516S-C-A20	Make / Model:	RFS APXV18-206516S-C-A20
Frequency Bands:	2100 MHz / 2100 MHz	Frequency Bands:	2100 MHz / 2100 MHz	Frequency Bands:	2100 MHz / 2100 MHz
Gain:	16.3 dBd / 16.3 dBd	Gain:	16.3 dBd / 16.3 dBd	Gain:	16.3 dBd / 16.3 dBd
Height (AGL):	126 feet	Height (AGL):	126 feet	Height (AGL):	126 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	180 Watts	Total TX Power (W):	180 Watts	Total TX Power (W):	180 Watts
ERP (W):	7,678.43	ERP (W):	7,678.43	ERP (W):	7,678.43
Antenna A1 MPE %:	1.74%	Antenna B1 MPE %:	1.74%	Antenna C1 MPE %:	1.74%
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Frequency Bands:	600 MHz / 700 MHz	Frequency Bands:	600 MHz / 700 MHz	Frequency Bands:	600 MHz / 700 MHz
Gain:	12.95 dBd / 13.35 dBd	Gain:	12.95 dBd / 13.35 dBd	Gain:	12.95 dBd / 13.35 dBd
Height (AGL):	126 feet	Height (AGL):	126 feet	Height (AGL):	126 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts
ERP (W):	2,481.08	ERP (W):	2,481.08	ERP (W):	2,481.08
Antenna A2 MPE %:	1.30%	Antenna B2 MPE %:	1.30%	Antenna C2 MPE %:	1.30%



Site Composite MPE %	
Carrier	MPE %
T-Mobile (Max at Sector A):	3.04%
Town	0.7%
Verizon	5.27%
AT&T	5.47%
Site Total MPE % :	14.48%

T-Mobile Sector A Total:	3.04%
T-Mobile Sector B Total:	3.04%
T-Mobile Sector C Total:	3.04%
Site Total:	14.48%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
T-Mobile 2100 MHz UMTS	2	1279.74	126.0	5.80	2100 MHz UMTS	1000	0.58%
T-Mobile 2100 MHz LTE	2	2559.48	126.0	11.59	2100 MHz LTE	1000	1.16%
T-Mobile 600 MHz LTE	2	591.73	126.0	2.68	600 MHz LTE	400	0.67%
T-Mobile 700 MHz LTE	2	648.82	126.0	2.94	700 MHz LTE	467	0.63%
						Total:	3.04%



Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	3.04%
Sector B:	3.04%
Sector C:	3.04%
T-Mobile Maximum MPE % (Sector A):	3.04%
Site Total:	14.48%
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **14.48%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Exhibit G

Mailing Receipts/Proof of Notice

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3. **GETTING YOUR SHIPMENT TO UPS**
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Your driver will pickup your shipment(s) as usual.

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Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.

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WEST HARTFORD ,CT 06117

UPS Access Point™
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WEST HARTFORD ,CT 06119

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ANDRES LOPEZ 9083585305 CENTERLINE COMMUNICATIONS, LLC 28 SENECA ROAD WEST HARTFORD CT 06117	2.0 LBS LTR SHIP TO: FIRST SELECTMAN RUDY MARCONI (203) 431-2774 RIDGEFIELD TOWN HALL UPPER LEVEL 400 MAIN STREET RIDGEFIELD CT 06877-4610	CT 068 0-02 	UPS 2ND DAY AIR TRACKING #: 1Z 9Y4 503 NY 2870 2747 	BILLING: P/P ATTENTION UPS DRIVER: SHIPPER RELEASE Reference # 1: CTFP702F 
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ANDRES LOPEZ 9083585305 CENTERLINE COMMUNICATIONS, LLC 28 SENECA ROAD WEST HARTFORD CT 06117	2.0 LBS LTR 1 OF 1	SHIP TO: INSITE WIRELESS GROUP 703.535.3009 SUITE 700 1199 N. FAIRFAX STREET ALEXANDRIA VA 22314-1437	VA 222 9-30 	UPS 2ND DAY AIR 2 TRACKING #: 1Z 9Y4 503 02 3195 8969 	BILLING: P/P Reference # 1: CTFP702F CS 21.5.22. WNTNVS0 12.0A.04/2019 
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