January 29, 2021

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

Re: **Request for Tower Share**
New Cingular Wireless, PCS, LLC ("AT&T") Request for Approval of the Shared Use of an Existing Tower at 15 Great Pasture Road, Danbury, CT
AT&T Site: 12684101 / S2873

Dear Members of the Council:

AT&T proposes to collocate on an existing telecommunications tower located at 15 Great Pasture Road in Danbury, CT ("the facility"). The subject parcel is identified by the City of Danbury as Parcel L16 – 5 and owned by Eppoliti Industrial Realty Inc. The tower is owned by Cellco Partnership ("Verizon Wireless"). The property is roughly 12.63± acres and accommodates an existing fenced compound for the telecommunication facility including an existing 50' x 50' raised concrete tower mat foundation, +/- 119' monopole tower, an existing platform with canopy and ice bridge for the existing telecommunications carrier's equipment and an existing propane tank. The facility is and will continue to be owned and operated by Verizon Wireless.

Pursuant to Connecticut General Statues Section 16-50aa ("the Statute"), AT&T requests a finding from the Connecticut Siting Council that the shared use of this facility is technically, legally, environmentally and economically feasible, will meet safety concerns, will avoid the unnecessary proliferation of towers and is in the public interest. It further requests an order approving the shared use of this facility.

The purpose of this request is to use an existing tower to develop AT&T's wireless network to provide high speed wireless data and wireless service within the State of Connecticut and in this part of Danbury: avoiding the need for an additional tower in Danbury, CT.

AT&T is licensed by the Federal Communications Commission ("FCC") to provide multiple technologies, including PCS, long-term evolution ("LTE") services, AWS, WCS, FirstNet and 850MHz in Fairfield County. AT&T is building and enhancing its network to take advantage of its licensed spectrum and improve its broadband high speed wireless voice and data services.

Existing Facility & Proposed Modification

The existing facility is a +/- 119' monopole tower located at 15 Great Pasture Road in Danbury. Site coordinates (NAD83) are N41° 22' 58.8" and W73° 25' 19.77" (or 41.383, -73.422). Currently there is one other major commercial wireless carrier located on this tower (Verizon) installed at a centerline of +/-120.' The monopole will be extended by 20' to a total height of +/-140' as AT&T intends to install at a centerline of +/-140.' The site plan of the facility is included in the proposed

Monopole Extension Package and Construction Drawings, prepared by Semaan Engineering Solutions dated September 2, 2020 and by Centek Engineering Inc. dated December 16, 2020, respectively, enclosed herewith.

AT&T intends to install a 20' monopole tower extension to the top of the existing monopole, as shown in the Monopole Extension Package. On the extended tower, AT&T intends to install six (6) CCI TPA65R-BU6DA-K panel antennas, twelve (12) Ericsson RRUs and three (3) surge arrestors and associated cabling on an antenna platform mount to be attached to the extended monopole tower at the 140' mount level as detailed and described in the Construction Drawings. This proposal includes B2, B5, and B12 hardware that is both 4G(LTE) and 5GNR capable through remote software configuration and either or both services may be turned on or off at various times.

AT&T is entering into a new agreement for this tower space as well as in order to license the portion of space within the existing compound for the installation of a walk-in cabinet (WIC), ice bridge, a propane generator and a propane tank inside the existing fenced compound as more fully detailed and described in the enclosed Construction Drawings.

Consistent with the requirements of the Statute, it is feasible for AT&T to collocate at this facility. AT&T is proposing to collocate on the existing monopole tower that will continue to remain in the ownership of Verizon Wireless. Included with this application is a Monopole Extension Package from Semaan Engineering Solutions dated September 2, 2020 that shows that the existing tower can support AT&T's proposed equipment once modified.

The Proposal is Legally Feasible

The Council has authority, pursuant to statute, to issue an order approving of the shared use of this tower. By issuing an order approving AT&T's shared use of this tower, AT&T will be able to proceed with obtaining a building permit for the proposed installation. Verizon Wireless has executed a Letter of Authorization that approved AT&T's Request for Tower Share filing on November 16, 2020, which is included with this application. AT&T's proposal is legally feasible.

AT&T is a telecommunication provider licensed by the FCC to provide service in the State of Connecticut, including but not limited to Fairfield County. AT&T will enter into an agreement with the owner of this facility, Verizon Wireless, for the location of this proposed equipment on the existing tower so that it may provide telecommunications services to the surrounding community. Consequently, the proposal is legally feasible.

The Proposal is Environmentally Feasible

Pursuant to the Statute, the proposal will be environmentally feasible for the following reasons:

- The overall impact on the City of Danbury will be decreased with the sharing of a single tower versus the proliferation of multiple towers.

- Although the 20' extension and the addition of the antennas and associated equipment on the tower may minimally increase the visibility of the tower, this modification should not be

considered a substantial change to the facility and will avoid the unnecessary proliferation of towers in the area. *Please see Photo Simulations and Viewshed Analysis of the proposal enclosed herewith.*

- There will be no increased impact on air quality because no air pollutants will be generated during normal operation of the facility.

- There will only be a brief, slight increase in noise pollution while the site is under construction.

- During construction, the proposed project will generate a small amount of traffic as construction takes place. Upon completion, traffic will be limited to an average of one trip per month for maintenance and inspections.

- The operation of the modified facility will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard. *Please see the RF emissions calculation for AT&T's facility enclosed herewith.*

- AT&T expects to enhance safety in this portion of Danbury by improving wireless telecommunications for local residents and travelers. AT&T is currently developing its network to provide its customers with quality and reliable coverage to comply with their FCC license, the site is a necessary part of AT&T's network development.

- Specifically, this proposal is designed to provide reliable wireless coverage for this section of Danbury, CT.

Conclusion

For the reasons stated above, the attachment of AT&T's antennas and associated equipment to the tower would meet all the requirements set forth in the Statute. The proposal is legally, technically, economically and environmentally feasible and meets all public safety concerns. Therefore, AT&T respectfully requests that the Council approve this request to collocate on the tower located at 15 Great Pasture Road, Danbury, CT.

Sincerely,

Jennifer Iliades, Site Acquisition Consultant
Jeff Delli Colli, Program Manager
Centerline Communications, LLC for New Cingular Wireless, PCS, LLC ("AT&T")
750 West Center Street, Suite 301
West Bridgewater, MA 02379
jiliades@clinellc.com
jdellicolli@clinellc.com

Enclosures (9): Exhibit 1 – Construction Drawings
Exhibit 2 – Property Card and GIS
Exhibit 3 – Structural Analysis
Exhibit 4 – Mount Analysis
Exhibit 5 – RF Emissions Analysis Report Evaluation
Exhibit 6 – Letter of Authorization from Verizon Wireless
Exhibit 7 – Original Tower Approval
Exhibit 8 – Photo Simulations and Viewshed Analysis
Exhibit 9 – Notice Delivery Confirmations

cc: The Honorable Joseph M. Cavo, Mayor, City of Danbury, as elected official
Sharon B. Calitro, AICP, Director, Planning & Zoning, City of Danbury
Cellco Partnership ("Verizon Wireless"), as tower owner
Eppoliti Industrial Realty Inc, as underlying property owner

EXHIBIT 1

WIRELESS COMMUNICATIONS FACILITY
CT2873 BETHEL
15 GREAT PASTURE ROAD
DANBURY, CT 06810

PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF THE PROPOSED COLLOCATION OF AT&T AT AN EXISTING UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY, GENERALLY INCLUDING THE FOLLOWING:

   A. INSTALLATION OF A PROPOSED 20' MONOPOLE TOWER EXTENSION TO THE TOP OF THE EXISTING MONOPOLE TOWER. THE DESIGN OF THE PROPOSED EXTENSION IS BY OTHERS.

   B. INSTALLATION OF A PROPOSED ANTENNA MOUNTING PLATFORM. THE PROPOSED PLATFORM TO ACCOMMODATE THE INSTALLATION OF A TOTAL OF (6) PANEL ANTENNAS, (12) RRU UNITS AND (3) SURGE ARRESTOR UNITS ALONG WITH ASSOCIATED CABLING.

   C. THE PROPOSED AT&T GROUND MOUNTED EQUIPMENT TO CONSIST OF A "WALK-IN EQUIPMENT CABINET (WIC) AND A 24 KW PROPANE FUELED GENERATOR, AND A 500 GALLON PROPANE TANK LOCATED WITHIN THE EXISTING FENCED FACILITY COMPOUND. AN ANTENNA CABLE ICE BRIDGE IS PROPOSED TO FACILITATE AT&T ANTENNA CABLES FROM THE WIC TO THE EXISTING MONOPOLE.

PROJECT INFORMATION

AT&T SITE NUMBER:	CT2873
AT&T SITE NAME:	BETHEL
SITE ADDRESS:	15 GREAT PASTURE ROAD DANBURY, CT 06810
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
AT&T PACE JOB:	PACE JOB 1 – MRCTB026223 PACE JOB 2 – MRCTB047907 PACE JOB 3 – MRCTB026243 PACE JOB 4 – MRCTB026229 PACE JOB 5 – MRCTB006512 PACE JOB 6 – MRCTB026247
AT&T FA LOCATION CODE:	12684101
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-22'-58.813" LONGITUDE: 73°-25'-19.811" GROUND ELEVATION: 387.1'± A.M.S.L. SITE COORDINATES AND GROUND ELEVATION AND REFERENCED FROM FAA-1A SURVEY CERTIFICATION AS PREPARED BY MARTINEZ COUCH AND ASSOCIATES LLC, DATED FEBRUARY 17, 2015.

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT STATE BUILDING CODE, INCLUDING THE TIA-222 REVISION "G" STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES, 2018 CONNECTICUT FIRE SAFETY CODE AND, 2017 NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. THE COMPOUND, TOWER, PRIMARY GROUND RING, ELECTRICAL SERVICE TO THE METER BANK AND TELEPHONE SERVICE TO THE DEMARCATION POINT ARE PROVIDED BY SITE OWNER. AS BUILT FIELD CONDITIONS REGARDING THESE ITEMS SHALL BE CONFIRMED BY THE CONTRACTOR. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
5. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
6. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
7. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
8. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING BUILDING'S/PROPERTY'S OPERATIONS, COORDINATE WORK WITH BUILDING/PROPERTY OWNER.
10. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
11. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
12. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
13. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
15. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
16. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
17. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
19. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
20. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED PRIOR TO ANY EXCAVATION WORK. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
21. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

FROM: 500 ENTERPRISE DRIVE, ROCKY HILL, CONNECTICUT

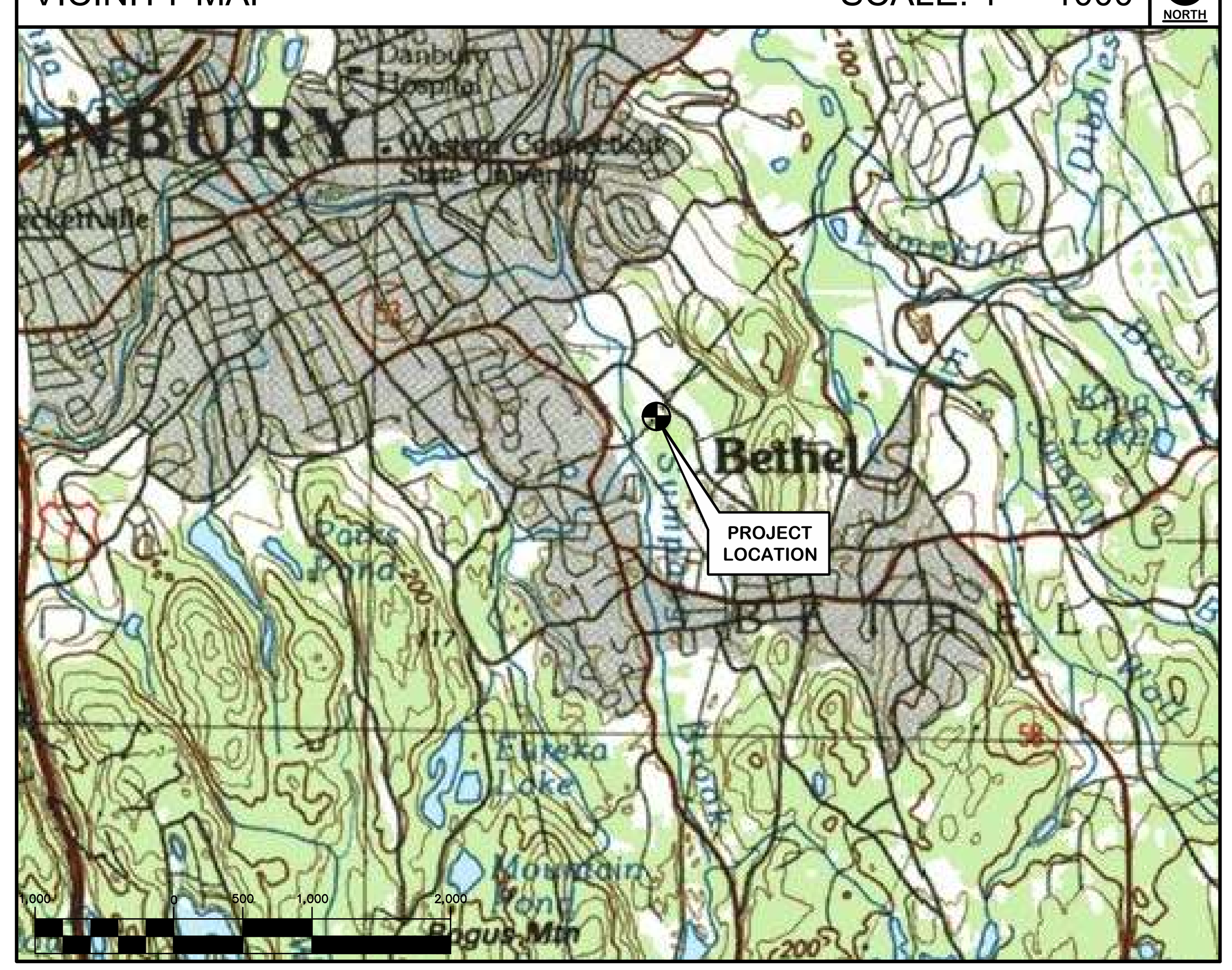
TO: 15 GREAT PASTURE ROAD, DANBURY, CONNECTICUT

1.	HEAD NORTHEAST ON ENTERPRISE DRIVE TOWARD CAPITAL BLVD.	0.36 MI
2.	TURN LEFT ONTO CAPITAL BLVD.	0.27 MI
3.	TURN LEFT ONTO WEST STREET.	0.30 MI
4.	MERGE ONTO I-91 S VIA RAMP ON THE LEFT TOWARD NEW HAVEN.	9.60 MI
5.	MERGE ONTO I-691 W VIA EXIT 18 TOWARD MERIDEN/WATERBURY.	7.98 MI
6.	MERGE ONTO I-84 W VIA EXIT 1 ON THE LEFT TOWARD WATERBURY/DANBURY.	32.11 MI
7.	MERGE ONTO NEWTOWN ROAD VIA EXIT 8 TOWARD BETHEL.	1.68 MI
8.	TURN LEFT ONTO OLD SHELTER ROCK ROAD.	0.59 MI
9.	OLD SHELTER ROCK ROAD BECOMES CROSS STREET.	0.17 MI
10.	TURN LEFT ONTO SHELTER ROCK ROAD.	0.04 MI
11.	TURN SLIGHT RIGHT ONTO SHELTER ROCK LANE.	0.41 MI
12.	TURN LEFT ONTO GREAT PASTURE ROAD.	0.18 MI
13.	15 GREAT PASTURE ROAD IS ON THE RIGHT.	

VICINITY MAP

SCALE: 1" = 1000'

NORTH



SHEET INDEX

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REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	12/16/20	DMD	TJR	CONSTRUCTION DRAWINGS – SHEET INDEX UPDATE
1	11/02/20	DMD	TJR	CONSTRUCTION DRAWINGS – SHEET INDEX UPDATE
0	09/28/20	DMD	TJR	CONSTRUCTION DRAWINGS – FINAL PER DESCOPED RFDS

PROFESSIONAL ENGINEER SEAL

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AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
CT2873 BETHEL
15 GREAT PASTURE ROAD
DANBURY, CT 06810

DATE: 08/20/19
SCALE: AS NOTED
JOB NO. 19101.00

TITLE SHEET

T-1

Sheet No. 1 of 16

STRUCTURAL SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2015 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2018 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS): 93 MPH (Vasd)

- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 118 MPH (Vasd) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10) PER 2015 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2018 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

SPECIAL INSPECTIONS

1. SPECIAL INSPECTIONS ARE TO BE PROVIDED BY AN APPROVED AGENCY HIRED BY AT&T.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON EVERSOURCE OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS---ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

ANTENNA AND APPURTENANCE SCHEDULE

SECTOR	EXISTING/PROPOSED	BAND	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	DOWNTILT	(E/P) TMA/DIPLEXER /TRIPLEXER (QTY)	(E/P) RRU (QTY)	FEEDER	(E/P) RAYCAP (QTY)
A1	PROPOSED	LTE 700 B14/LTE AWS/LTE WCS	CCI TPA65R-BU6DA-K	71.2 x 21 x 7.8	140'	15°	0°		(P) 4478 B14 (1 AT ANTENNA LOCATION), (P) 4415 B30 (1 AT ANTENNA LOCATION)	FIBER AND DC POWER	(P) RAYCAP DC6-48-60-0-18-8F (1)
A2	PROPOSED	LTE 700/ 850 5G/LTE 1900	CCI TPA65R-BU6DA-K	71.2 x 21 x 7.8	140'	15°	0°		(P) 4449 B5/B12 (1 AT ANTENNA LOCATION), (P) 8843 B2/B66A (1 AT ANTENNA LOCATION)	FIBER AND DC POWER	
A3											
A4											
B1	PROPOSED	LTE 700 B14/LTE AWS/LTE WCS	CCI TPA65R-BU6DA-K	71.2 x 21 x 7.8	140'	140°	0°		(P) 4478 B14 (1 AT ANTENNA LOCATION), (P) 4415 B30 (1 AT ANTENNA LOCATION)	FIBER AND DC POWER	(P) RAYCAP DC6-48-60-0-18-8F (1)
B2	PROPOSED	LTE 700/ 850 5G/LTE 1900	CCI TPA65R-BU6DA-K	71.2 x 21 x 7.8	140'	140°	0°		(P) 4449 B5/B12 (1 AT ANTENNA LOCATION), (P) 8843 B2/B66A (1 AT ANTENNA LOCATION)	FIBER AND DC POWER	
B3											
B4											
C1	PROPOSED	LTE 700 B14/LTE AWS/LTE WCS	CCI TPA65R-BU6DA-K	71.2 x 21 x 7.8	140'	260°	0°		(P) 4478 B14 (1 AT ANTENNA LOCATION), (P) 4415 B30 (1 AT ANTENNA LOCATION)	FIBER AND DC POWER	(P) RAYCAP DC6-48-60-0-18-8F (1)
C2	PROPOSED	LTE 700/ 850 5G/LTE 1900	CCI TPA65R-BU6DA-K	71.2 x 21 x 7.8	140'	260°	0°		(P) 4449 B5/B12 (1 AT ANTENNA LOCATION), (P) 8843 B2/B66A (1 AT ANTENNA LOCATION)	FIBER AND DC POWER	
C3											
C4											

RRU	SIZE (INCHES) (L x W x D)
B14 4478	14.9 x 13.1 x 7.3
4415 B30	14.9 x 13.2 x 5.4
B5/B12 4449	17.9 x 13.2 x 9.4
B2/B66A 8843	14.9 x 13.2 x 10.9

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/28/20	DMD	TJR	CONSTRUCTION DRAWINGS - FINAL PER DESCOPED RFDS

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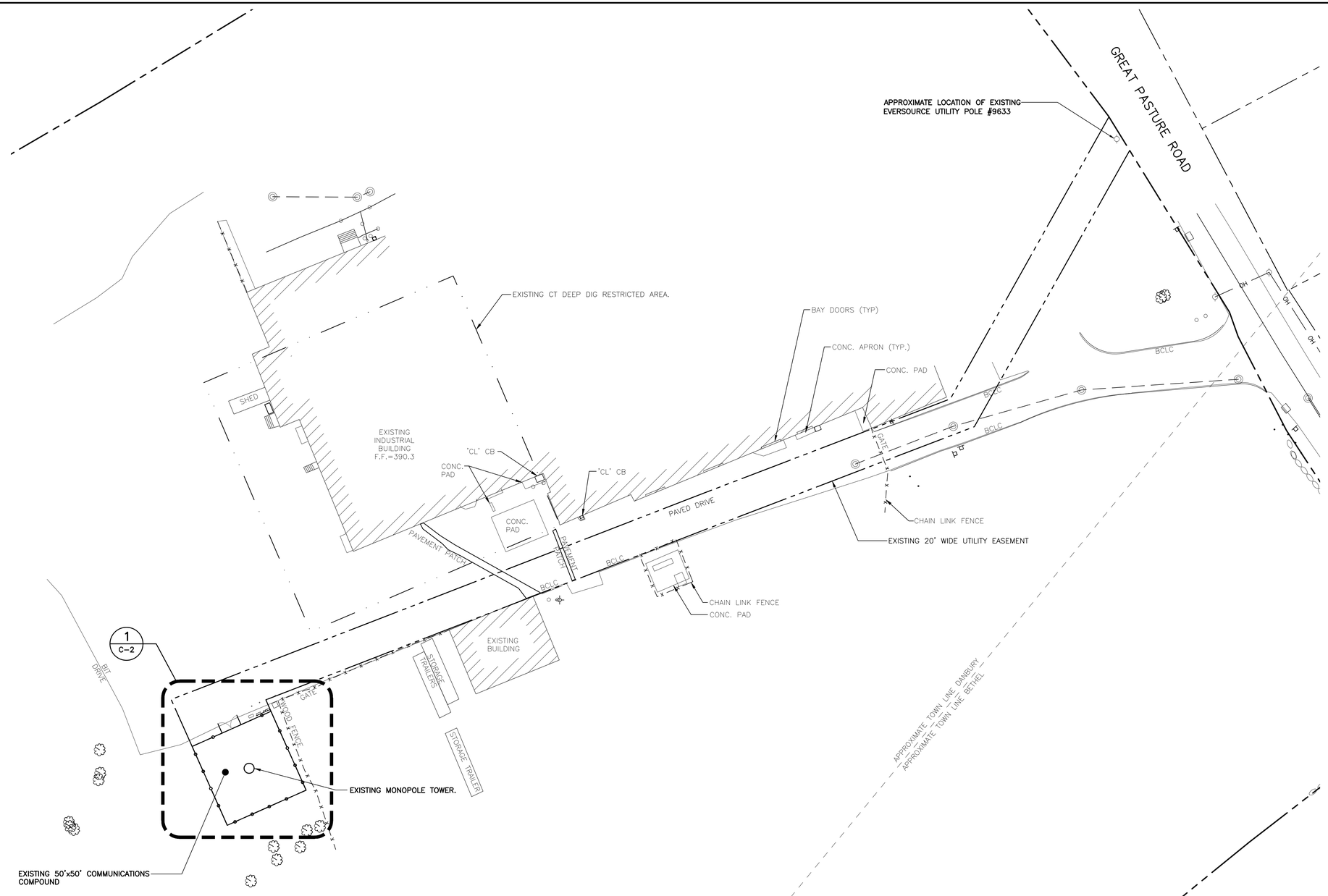
SCALE: AS NOTED
JOB NO. 19101.00

NOTES, SPECIFICATIONS AND ANTENNA SCHEDULE

N-1



SYMBOLS LEGEND

- PROPERTY LINE
- EASEMENT LINE
- EXISTING ROAD
- UTILITY POLE
- EXISTING DECIDUOUS TREE
- FENCE LINE

1 / C-1 **SITE LOCATION PLAN**
SCALE: 1"=30'

APPROXIMATE NORTH

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 ft.

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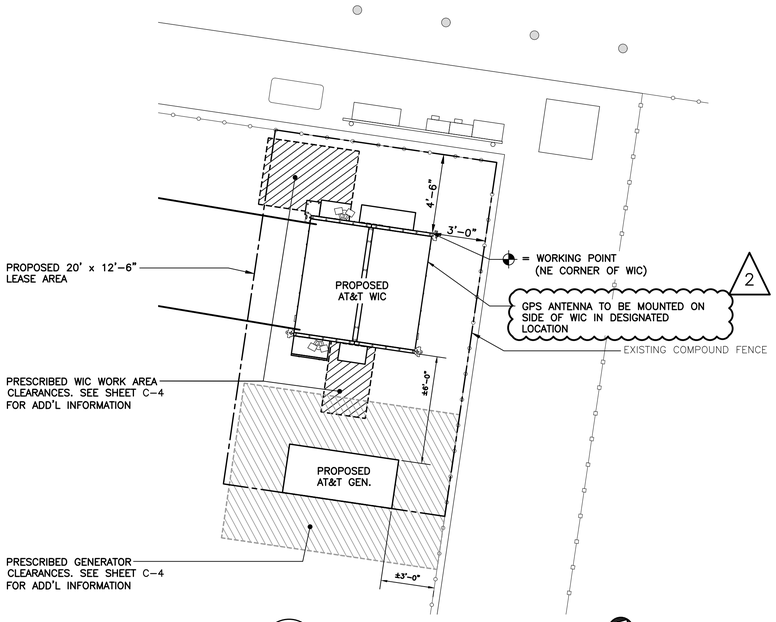
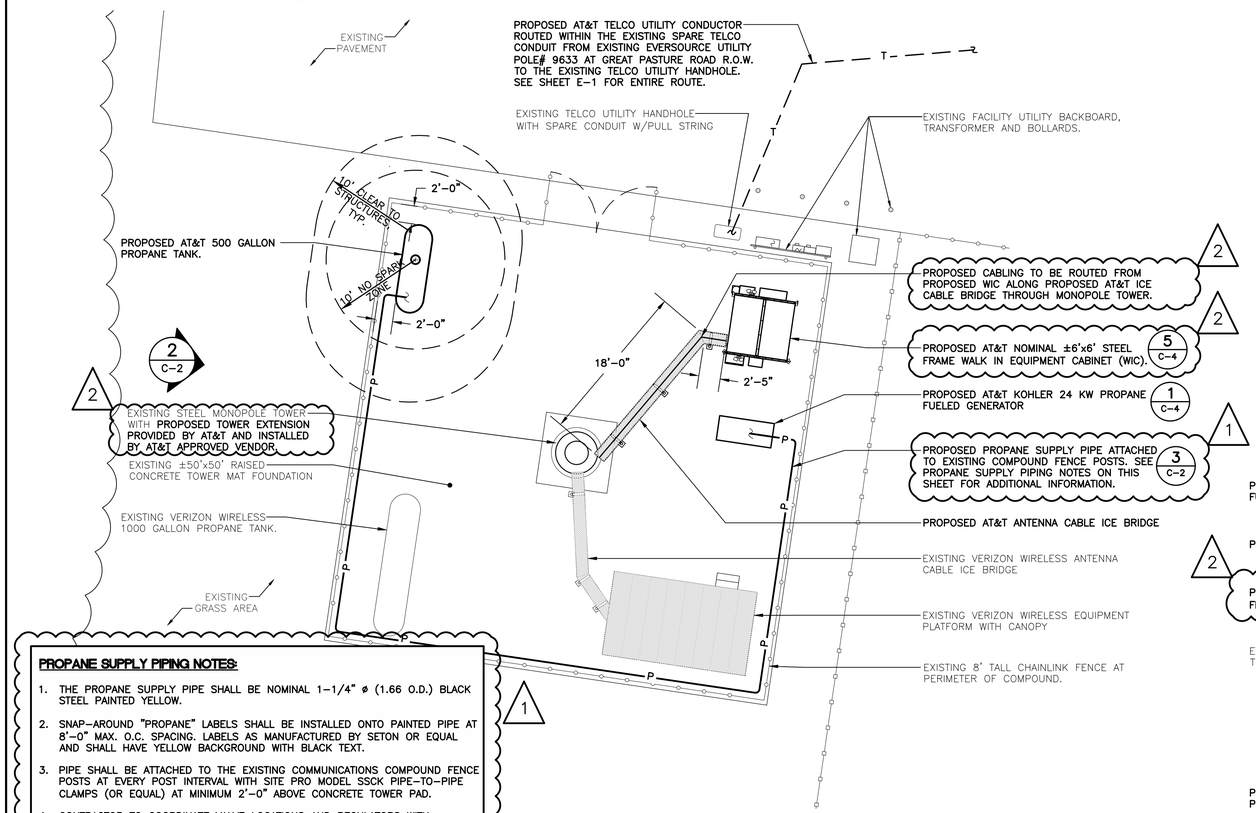
SITE LOCATION PLAN

C-1
Sheet No. 3 of 16



1A / C-2 **PARTIAL COMPOUND PLAN**
SCALE: 1/4" = 1'- 0"

APPROXIMATE NORTH



PROPANE SUPPLY PIPING NOTES:

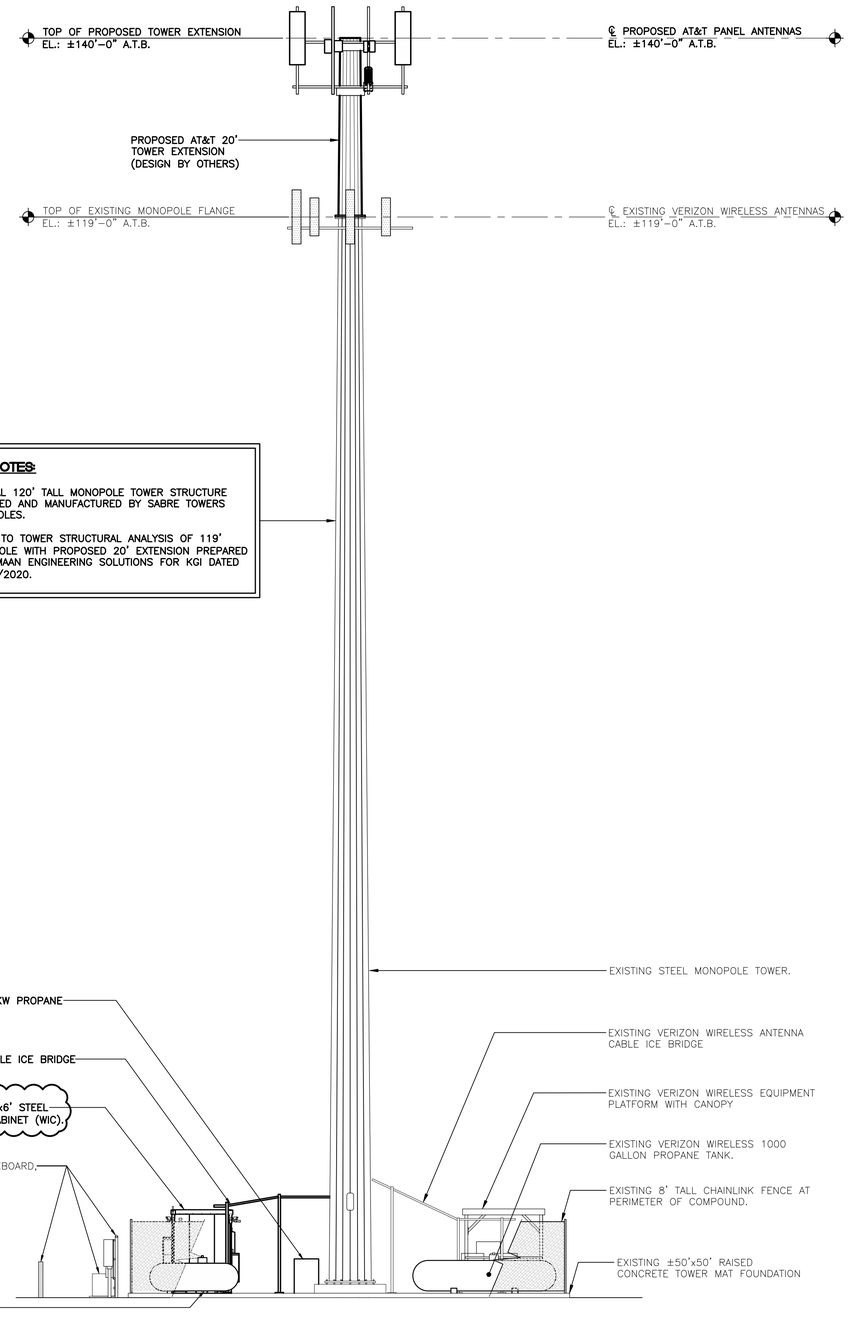
1. THE PROPANE SUPPLY PIPE SHALL BE NOMINAL 1-1/4" ø (1.66 O.D.) BLACK STEEL PAINTED YELLOW.
2. SNAP-AROUND "PROPANE" LABELS SHALL BE INSTALLED ONTO PAINTED PIPE AT 8'-0" MAX. O.C. SPACING. LABELS AS MANUFACTURED BY SETON OR EQUAL AND SHALL HAVE YELLOW BACKGROUND WITH BLACK TEXT.
3. PIPE SHALL BE ATTACHED TO THE EXISTING COMMUNICATIONS COMPOUND FENCE POSTS AT EVERY POST INTERVAL WITH SITE PRO MODEL SSCK PIPE-TO-PIPE CLAMPS (OR EQUAL) AT MINIMUM 2'-0" ABOVE CONCRETE TOWER PAD.
4. CONTRACTOR TO COORDINATE VALVE LOCATIONS AND REGULATORS WITH PROPANE TANK SUPPLIER/INSTALLER.

1 / C-2 **COMPOUND PLAN**
SCALE: 1/8" = 1'- 0"

APPROXIMATE NORTH

GRAPHIC SCALE
8 0 4 8 16 32
(IN FEET)
1 inch = 8 ft.

A.T.B. = ABOVE TOWER BASEPLATE



TOWER NOTES:

1. NOMINAL 120' TALL MONOPOLE TOWER STRUCTURE DESIGNED AND MANUFACTURED BY SABRE TOWERS AND POLES.
2. REFER TO TOWER STRUCTURAL ANALYSIS OF 119' MONOPOLE WITH PROPOSED 20' EXTENSION PREPARED BY SEMAAN ENGINEERING SOLUTIONS FOR KGI DATED 09/02/2020.

2 / C-2 **WEST ELEVATION**
SCALE: 1/8" = 1'- 0"

GRAPHIC SCALE
8 0 4 8 16 32
(IN FEET)
1 inch = 8 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	12/16/20	DMD	TJR	CONSTRUCTION DRAWINGS - WIC MODEL CHANGE
1	11/02/20	DMD	TJR	CONSTRUCTION DRAWINGS - PROPANE SUPPLY PIPE ROUTING
0	09/28/20	DMD	TJR	CONSTRUCTION DRAWINGS - FINAL PER DESCOPED RFDS

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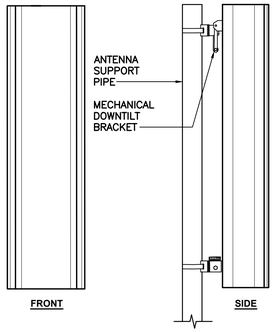
COMPOUND PLANS AND ELEVATION

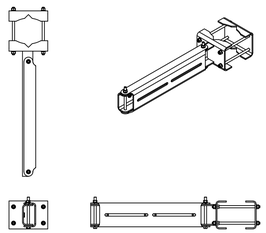
C-2
Sheet No. 4 of 16



ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: CCI MODEL: TPA65R-BU6DA-K	71.2"L x 21.0"W x 7.8"D	87 LBS.

1 C-3 PROPOSED ANTENNA DETAIL

NOT TO SCALE



RRU DUAL SWIVEL MOUNT		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: SITE PRO 1 PART NO.: RRUDSM	27.75"L x 6.5"W x 4.7"D	39.4 LBS.
NOTE: SWIVEL MOUNT KIT INCLUDES (2) SWIVEL MOUNTS.		

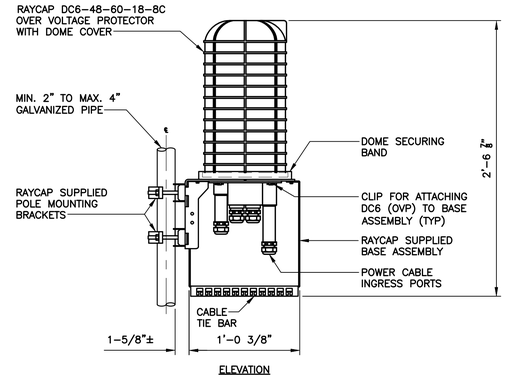
2 C-3 RRH DUAL SWIVEL MOUNT DETAIL

NOT TO SCALE

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT (W/O MOUNTING HDWR)	CLEARANCES
MAKE: ERICSSON MODEL: B14 4478	14.9"L x 13.1"W x 7.3"D	60 LBS.	BELOW: 20" MIN.
MAKE: ERICSSON MODEL: 4415 B30	14.9"L x 13.2"W x 5.4"D	44 LBS.	BELOW: 20" MIN.
MAKE: ERICSSON MODEL: B5/B12 4449	17.9"L x 13.2"W x 9.4"D	71 LBS.	BELOW: 20" MIN.
MAKE: ERICSSON MODEL: B2/B66A 8843	14.9"L x 13.2"W x 10.9"D	72 LBS.	BELOW: 20" MIN. TO EDGE OF ANTENNA: 8"
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING. 2. RRUs TO BE MOUNTED A MINIMUM OF 8" AWAY FROM THE BACK PLANE OF ANTENNAS.			

3 C-3 PROPOSED RRU SPECIFICATIONS

NOT TO SCALE



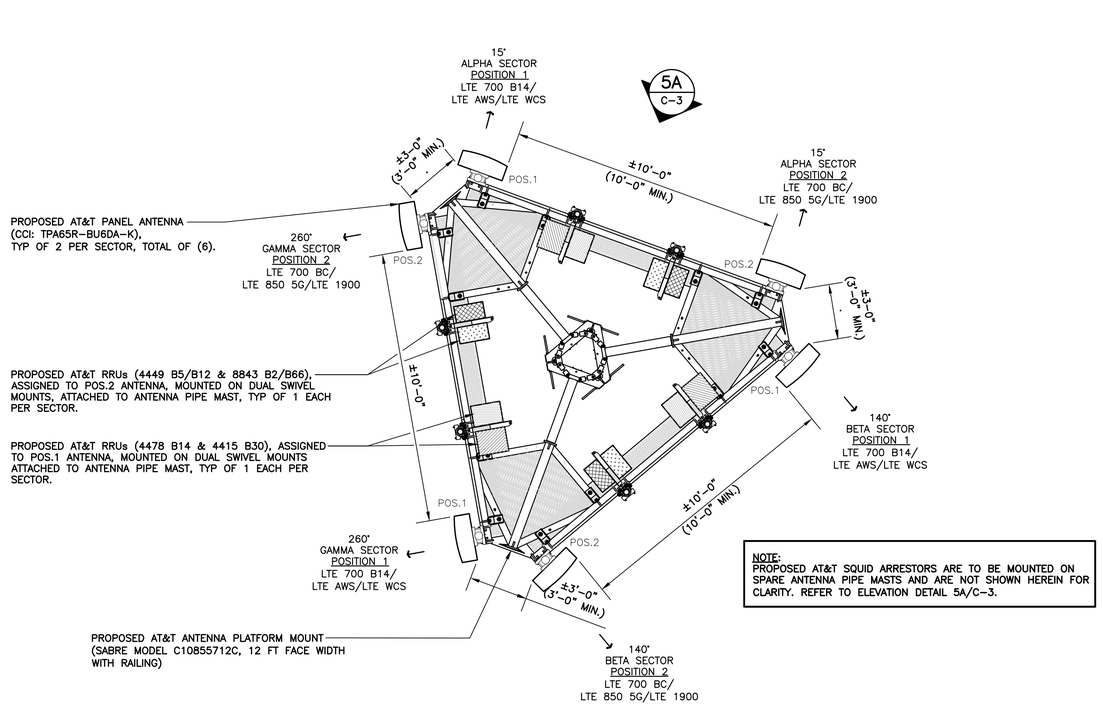
ELEVATION

SITE TYPE	ARRESTOR MAKE/MODEL	QTY REQUIRED	ARRESTOR LOCATION	WEIGHT
MONOPOLE	MAKE: RAYCAP (FIBER DC SQUID) MODEL: DC6-48-60-18-8F	(3)	TOWER, ADJACENT TO AT&T ANTENNAS AND RRUs.	20 LBS. (WITHOUT MOUNT)

NOTES:
1. CONTRACTOR TO COORDINATE FINAL SURGE ARRESTOR MODEL SELECTION(S) WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.
2. CONTRACTOR TO INSTALL ARRESTOR IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.
3. RAYCAP VIA AT&T SUPPLIES THE DC6 OVER VOLTAGE PROTECTOR AND PIPE MOUNTING BRACKETS. SUBCONTRACTOR SHALL SUPPLY THE PIPE.

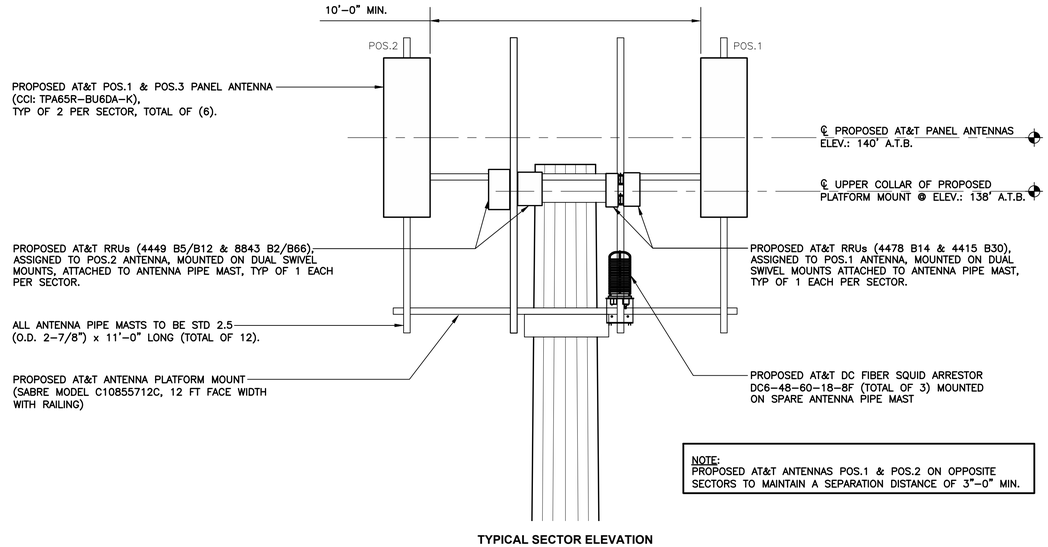
4 C-3 PROPOSED SURGE ARRESTOR DETAIL

NOT TO SCALE



5 C-3 ANTENNA MOUNTING CONFIG. PLAN

SCALE: 3/8" = 1'- 0"



TYPICAL SECTOR ELEVATION

5A C-3 ANTENNA MOUNTING CONFIG. ELEVATION

SCALE: 3/8" = 1'- 0"

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0	09/28/20	DMD	TJR	CONSTRUCTION DRAWINGS - FINAL PER DESCOPED RFDS
A	12/16/20	LGL	DMD	CONSTRUCTION DRAWINGS - ANTENNA SEPERATIONS ADDED

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ANTENNA CONFIGURATION AND EQUIPMENT DETAILS

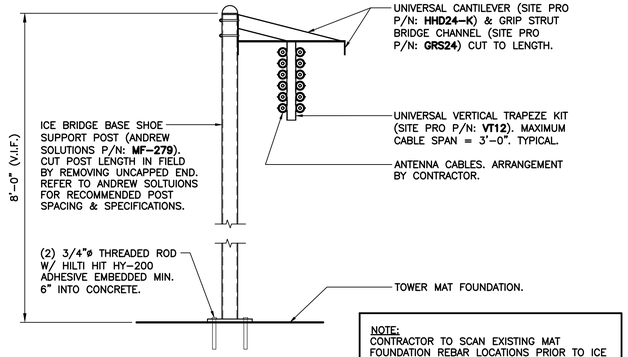
C-3

Sheet No. 5 of 16

PROPANE FUELED GENERATOR		
EQUIPMENT	POWER GENERATION (AC/DC)	DIMENSIONS
MAKE: KOHLER MODEL: 24RCL	AC	74.0"L x 32.9"W x 46.0"H

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.
2. THE RECOMMENDED DISTANCE FROM A STRUCTURE IS DEPENDENT ON STATE AND LOCAL CODES. NFPA 37 (STANDARDS FOR THE INSTALLATION AND USE OF STATIONARY COMBUSTION ENGINES AND GAS TURBINES) STATES THIS DISTANCE SHOULD BE AT LEAST 5 FEET FROM A COMBUSTIBLE MATERIAL. FOR INSTALLATIONS NEAR NON-COMBUSTIBLE MATERIAL BE SURE TO LEAVE A MINIMUM DISTANCE OF 3 FEET TO ENSURE PROPER GENERATOR COOLING.

1 / C-4 **BACK UP GENERATOR DETAIL**
NOT TO SCALE



NOTE:
CONTRACTOR TO SCAN EXISTING MAT FOUNDATION REBAR LOCATIONS PRIOR TO ICE BRIDGE BASE PLATE ANCHOR INSTALLATION SO AS TO AVOID REBAR.

2 / C-4 **ICE BRIDGE DETAIL**
NOT TO SCALE

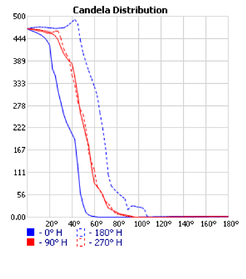
GPS ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: PCTEL MODEL: GPS-TMG-HR-26N	5.0"H x 3.2"D	0.6 LBS.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

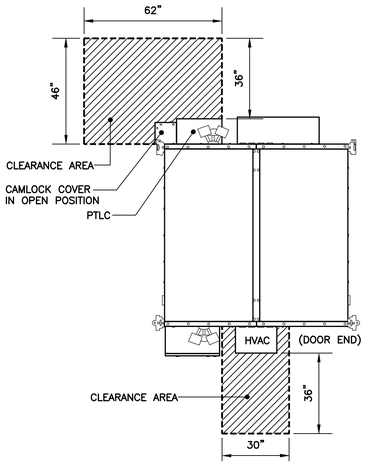
3 / C-4 **GPS UNIT DETAIL**
NOT TO SCALE

EXTERIOR LIGHT		
EQUIPMENT	WATTAGE	VOLTAGE
MAKE: LITHONIA LIGHTING MODEL: OFLR 6 MO	21.89 W	120 V

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.



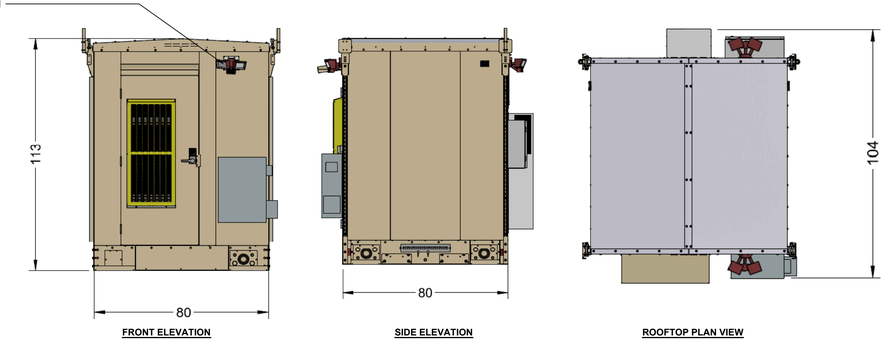
6 / C-4 **EXTERIOR LIGHT DETAIL**
NOT TO SCALE



4 / C-4 **EQUIPMENT SHELTER CLEARANCES PLAN**
SCALE: 3/8" = 1'- 0"

2

(2) ±22W MOTION CONTROLLED OUTSIDE LIGHTS, (1) IN THE FRONT AND (1) IN THE REAR OF THE WIC. THE LIGHTS WILL CONTAIN A TIMER FOR AN AUTOMATIC SHUT-OFF. THESE LIGHTS WILL BE FACING DOWN AND WILL HAVE NO SPILLOVER TO ADJACENT PROPERTIES.



FRONT ELEVATION — SIDE ELEVATION — ROOFTOP PLAN VIEW

WALK-IN CABINET				
EQUIPMENT	CONSTRUCTION	DIMENSIONS	WEIGHTS	WIC BASE OPTION
MAKE: VERTIV MODEL: 6'X6' WIC P/N: F2018001-WIC	14 GA. INTERLOCKING STEEL PANEL CONSTRUCTION	80"L x 80"W x 113.0"H	EMPTY: ±5500 LBS. FULLY INTEGRATED: ±7500 LBS	CONCRETE FOUNDATION KIT P/N.: D1007-0000-0012 (SEE NOTES BELOW)

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION AND ALL OPTIONAL EQUIPMENT INCLUSIONS WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.
2. CONTRACTOR TO SCAN EXISTING MAT FOUNDATION REBAR LOCATIONS PRIOR TO WIC BASE HOLD-DOWN ANCHOR INSTALLATION SO AS TO AVOID REBAR.
3. WIC HOLD-DOWN ANCHORS BY WIC MANUFACTURER. INSTALL PER MANUFACTURER'S WRITTEN RECOMMENDATIONS.

5 / C-4 **WALK-IN CABINET DETAIL**
NOT TO SCALE

TYP. FOUNDATION WIC BASE ATTACHMENT KIT

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/28/20	DMD	TJR	CONSTRUCTION DRAWINGS - FINAL PER DESCOPED RFDS
A	11/25/20	DMD	TJR	CONSTRUCTION DRAWINGS - WIC MODEL CHANGE

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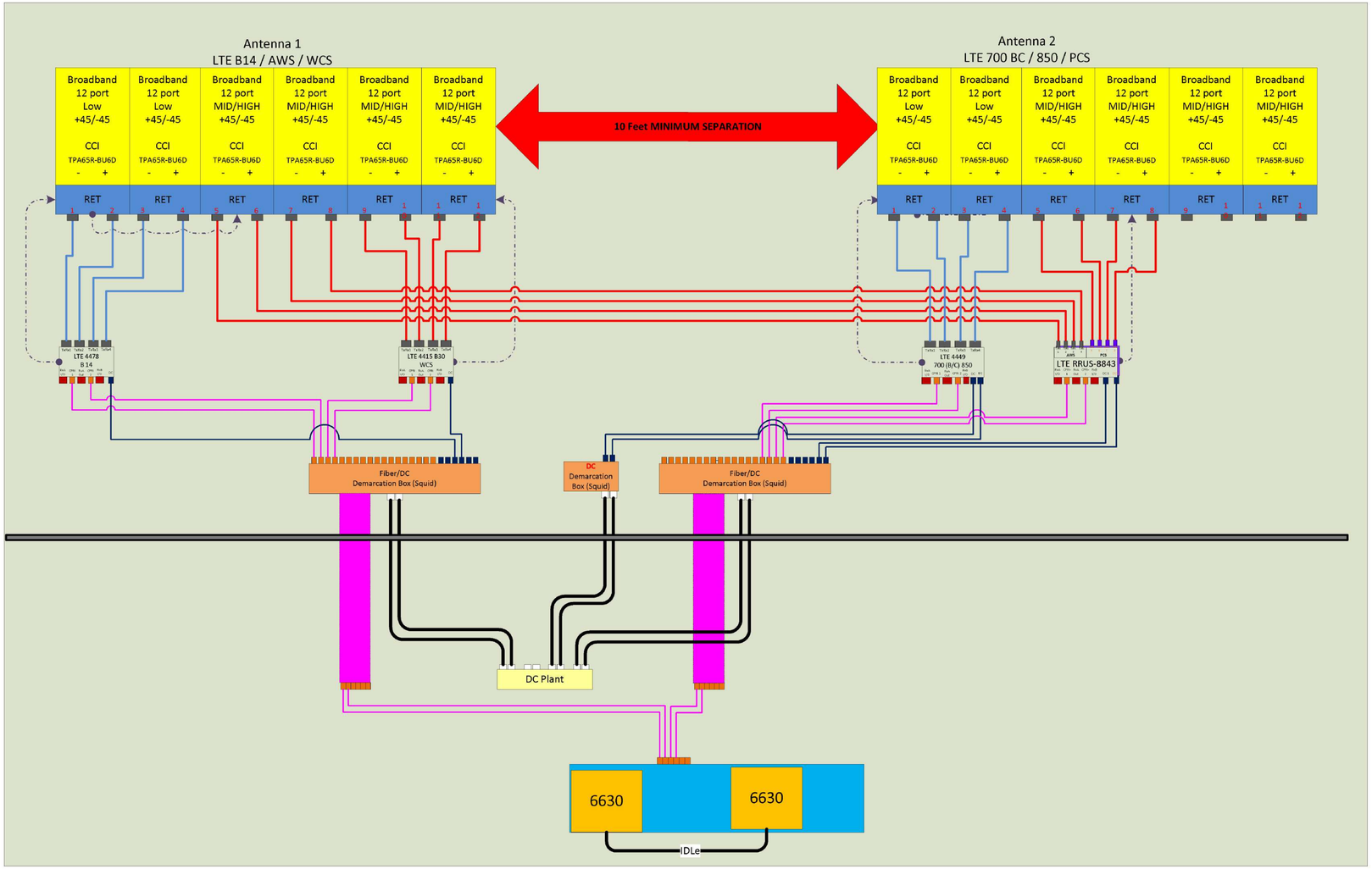
SITE AND EQUIPMENT DETAILS

C-4
Sheet No. 6 of 16



ALL SECTORS

1 / C-5 **RFDS PLUMBING DIAGRAM**

NOT TO SCALE

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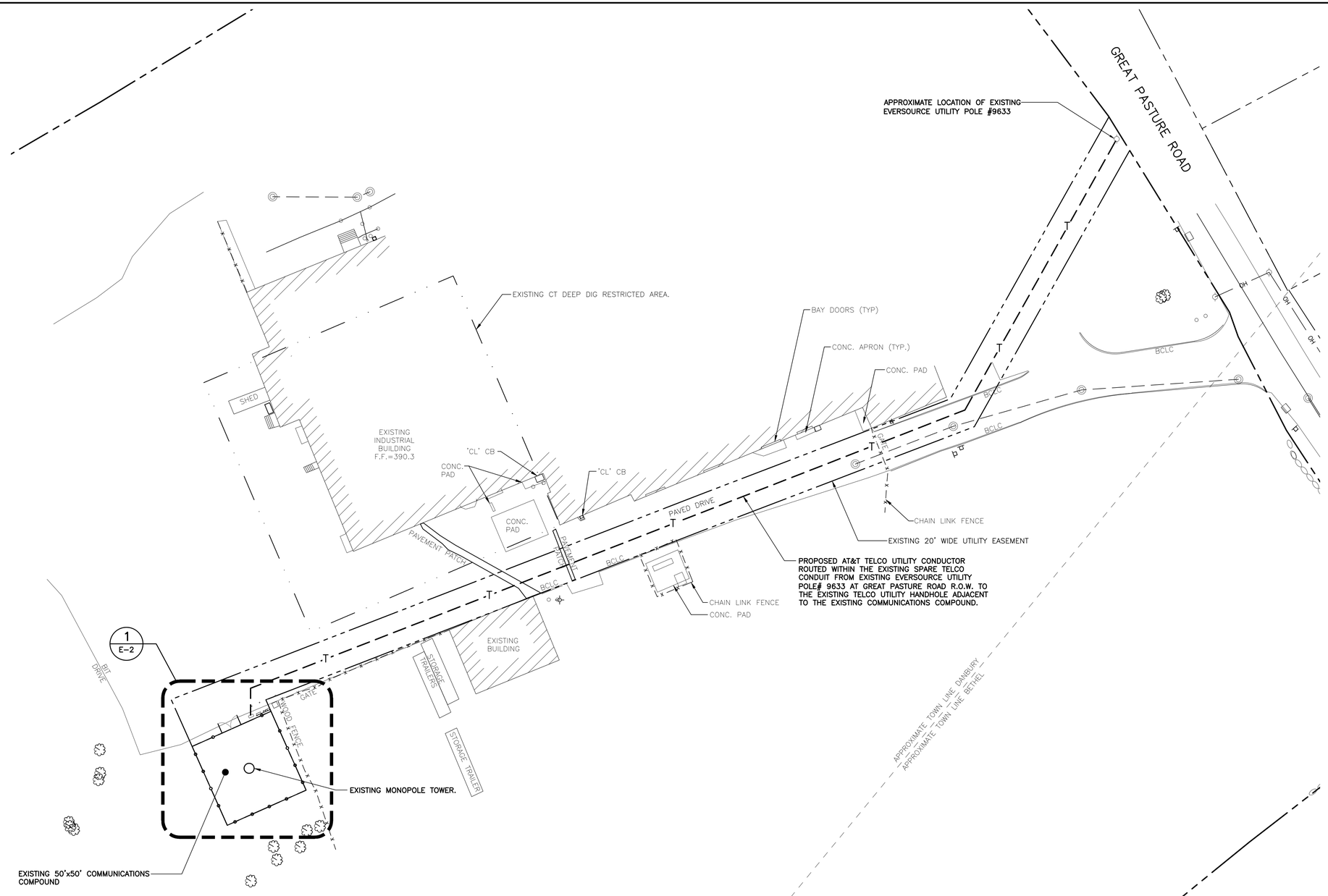
PLUMBING DIAGRAM

C-5

Sheet No. 7 of 16



SYMBOLS LEGEND

- PROPERTY LINE
- EASEMENT LINE
- EXISTING ROAD
- UTILITY POLE
- EXISTING DECIDUOUS TREE
- FENCE LINE

1 / E-1 **SITE UTILITY PLAN**
SCALE: 1"=30'

APPROXIMATE NORTH

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	12/16/20	RTS	DMD	CONSTRUCTION DRAWINGS – GPS GROUNDING DETAIL
1	12/15/20	LGL	DMD	CONSTRUCTION DRAWINGS – EME SIGNAGE DETAIL ADDED
0	09/28/20	DMD	TJR	CONSTRUCTION DRAWINGS – FINAL PER DESCOPED RFDS

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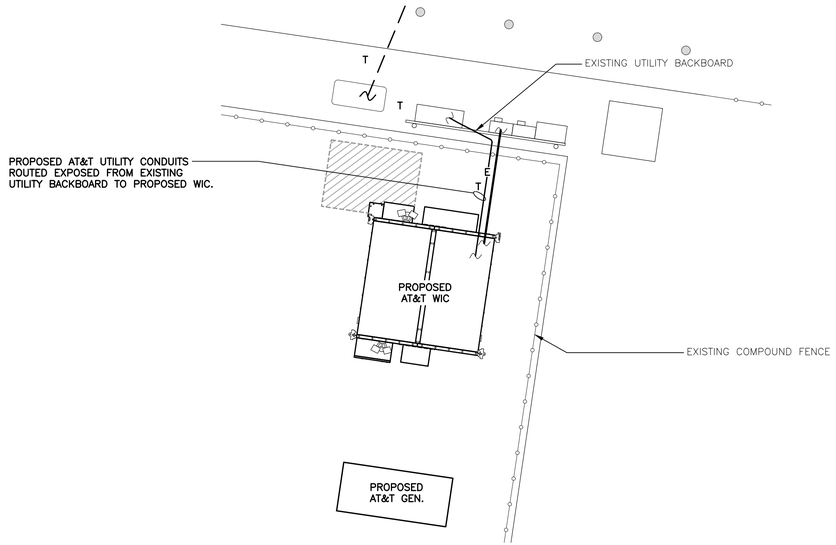
SITE UTILITY PLAN

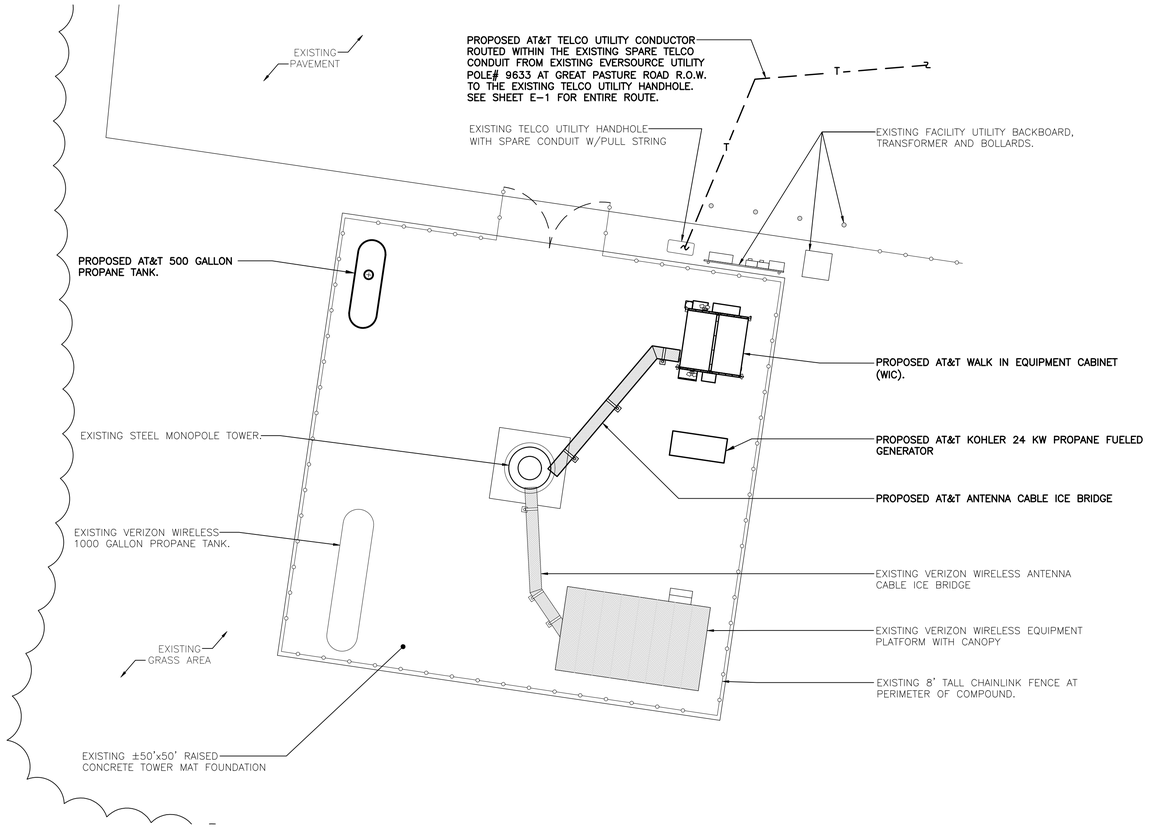
E-1

Sheet No. 8 of 16



1A / E-2 **PARTIAL COMPOUND PLAN**
SCALE: 1/4" = 1'- 0"

APPROXIMATE NORTH



1 / E-2 **COMPOUND PLAN**
SCALE: 1/8" = 1'- 0"

APPROXIMATE NORTH

GRAPHIC SCALE
8 0 4 8 16 32
(IN FEET)
1 inch = 8 ft.

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REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	12/16/20	RTS	DMD	CONSTRUCTION DRAWINGS – GPS GROUNDING DETAIL
1	12/15/20	LGL	DMD	CONSTRUCTION DRAWINGS – EME SIGNAGE DETAIL ADDED
0	09/28/20	DMD	TJR	CONSTRUCTION DRAWINGS – FINAL PER DESCOPED RFDS

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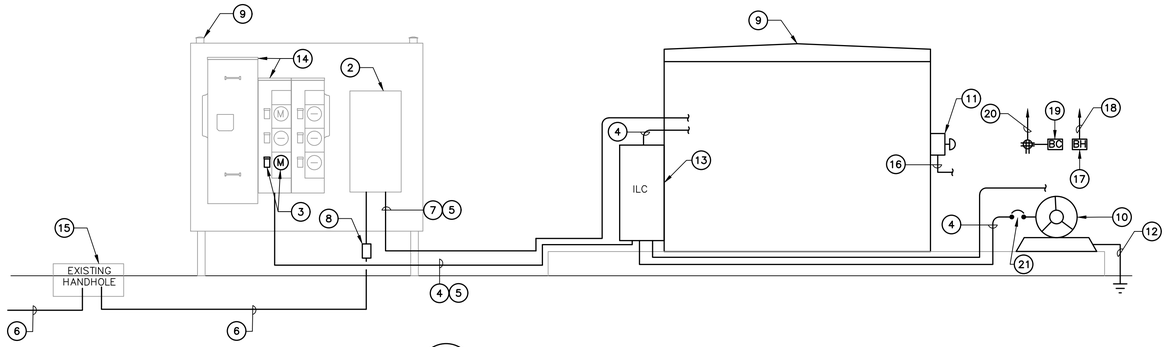
COMPOUND PLANS

E-2
Sheet No. 9 of 16

RISER DIAGRAM NOTES

1. EXISTING UTILITY FRAME TO REMAIN.
2. EXISTING TELCO HOFFMAN BOX TO REMAIN.
3. NEW 200A, 240V UTILITY METER AND 200A/2P CIRCUIT BREAKER
4. #3/0 AWG, (1) #6 AWG GROUND, 2" CONDUIT.
5. CONDUIT TO BE MOUNTED ON SLEEPERS WHERE ROUTED ACROSS PAVEMENT AND/OR CONCRETE PAD
6. 4" CONDUIT WITH DRAG LINE FOR FIBER TELCO SERVICE. COORDINATE WITH FIBER SERVICE PROVIDER FOR REQUIREMENTS.
7. CONDUITS AND CONDUCTORS FOR FIBER TELCO SERVICE CONNECTION. COORDINATE REQUIREMENTS WITH CONSTRUCTION MANAGER.
8. EXPANSION COUPLING (TYP).
9. WALK IN EQUIPMENT CABINET.
10. 24KW PROPANE FUELED GENERATOR.
11. REMOTE GENERATOR SHUT OFF SWITCH IN BREAK GLASS ENCLOSURE MOUNTED TO THE EXTERIOR OF THE WALK IN CABINET IN LOCATION APPROVED BY LOCAL FIRE MARSHAL. INSTALL ALL REQUIRED SIGNAGE.
12. GENERATOR GROUND PER NEC AND MANUFACTURER SPECIFICATIONS.
13. 200A, 240V RATED, NEMA 3R, 2 SOURCE, INTEGRATED LOAD CENTER WITH DOOR-IN-DOOR FRAME, COPPER BUS, BOLT-ON BREAKERS, 200A/2P MCB.
14. EXISTING METER CENTER TO REMAIN.
15. EXISTING TELCO HAND-HOLE VERIFY LOCATION IN FIELD.
16. 3/4" CONDUIT AND CONDUCTORS REQUIRED FOR PROPER OPERATION OF EMERGENCY GENERATOR SHUT OFF SWITCH.
17. GENERATOR BLOCK HEATER.
18. PROVIDE DEDICATED 20A, 120V CIRCUIT BREAKER IN ILC FOR GENERATOR BLOCK HEATER.
19. GENERATOR BATTERY CHARGER AND CONVENIENCE RECEPTACLE IN WEATHERPROOF ENCLOSURE.
20. PROVIDE DEDICATED 20A, 120V CIRCUIT BREAKER IN ILC FOR GENERATOR BATTERY CHARGER AND RECEPTACLE.
21. 200A/2P GENERATOR OUTPUT CIRCUIT BREAKER.



1 / E-3 **ELECTRICAL POWER RISER DIAGRAM**
NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	12/16/20	RTS	DMD	CONSTRUCTION DRAWINGS – GPS GROUNDING DETAIL
1	12/15/20	LGL	DMD	CONSTRUCTION DRAWINGS – EME SIGNAGE DETAIL ADDED
0	09/28/20	DMD	TJR	CONSTRUCTION DRAWINGS – FINAL PER DESCOPED RFDS

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ELECTRICAL RISER DIAGRAM AND NOTES

E-3

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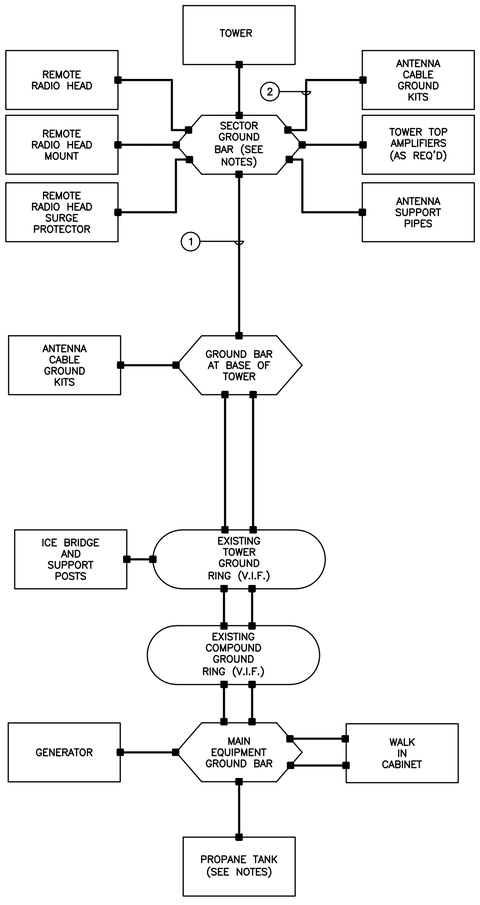

1 / E-4 **GROUNDING SCHEMATIC DIAGRAM**

NOT TO SCALE

GROUNDING SCHEMATIC NOTES

(1) #2/0 GREEN INSULATED

(2) #6 AWG

GENERAL NOTES:

1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW – EXTERIOR; STRANDED GREEN INSULATED – INTERIOR).
3. BOND CABLE TRAY AND ICE BRIDGE SECTIONS TOGETHER WITH #6 AWG STRANDED GREEN INSULATED JUMPERS.
4. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
5. BOND ALL EQUIPMENT CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
6. ALL BONDS TO TOWER SHALL BE MADE IN STRICT ACCORDANCE WITH SPECIFICATIONS OF TOWER MANUFACTURER OR STRUCTURAL ENGINEER.
7. REFER TO GROUNDING PLAN FOR LOCATION OF GROUNDING DEVICES.
8. REFER TO ALL ELECTRICAL AND GROUNDING DETAILS.
9. COORDINATE ALL TOWER MOUNTED EQUIPMENT WITH OWNER.
10. ALL TOWER MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
11. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.
15. BOND PROPANE TANK TO GROUND RING PER NEC AND MANUFACTURERS SPECIFICATIONS. COORDINATE WITH TANK MANUFACTURER FOR REQUIREMENTS PRIOR TO INSTALLATION.

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SCHEMATIC RISER DIAGRAM AND NOTES

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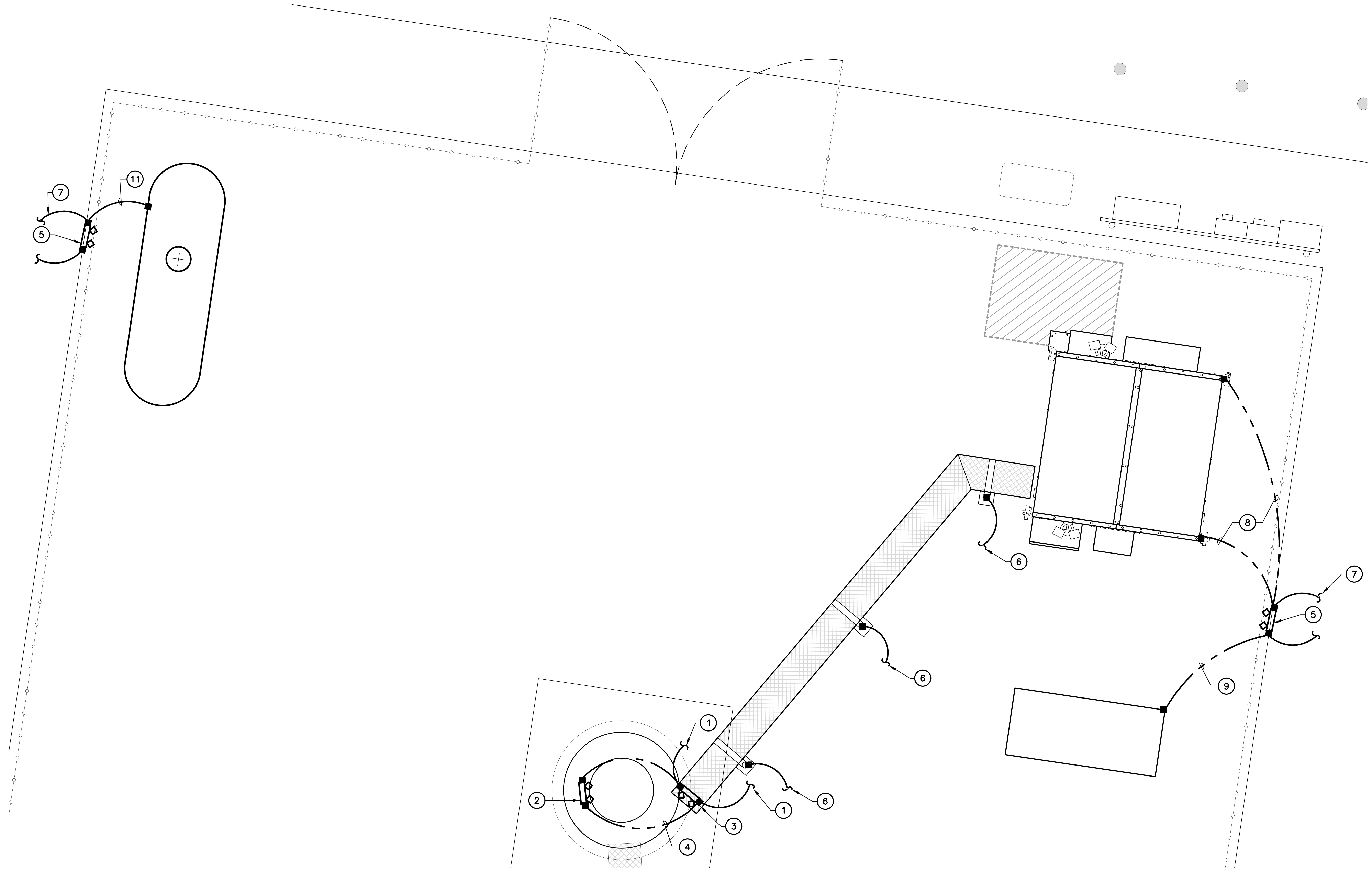

1 E-5 EQUIPMENT GROUNDING PLAN

SCALE: 1/4" = 1'- 0"

APPROXIMATE NORTH

GRAPHIC SCALE

4 0 2 4 8 16

(IN FEET)
1 inch = 4 ft.

GROUNDING PLAN NOTES

1. BOND GROUND BAR TO EXISTING TOWER GROUND RING (TYP OF 2). CONTRACTOR TO VERIFY LOCATION IN FIELD.
2. UPPER TOWER MOUNTED GROUND BAR PER DETAILS.
3. LOWER TOWER MOUNTED GROUND BAR PER DETAILS.
4. BOND UPPER TOWER MOUNTED GROUND BAR TO LOWER TOWER MOUNTED GROUND BAR (2 GROUND LEADS) PER DETAILS.
5. MAIN EQUIPMENT GROUND BAR MOUNTED TO CONCRETE PAD PER DETAILS.
6. ICE BRIDGE POST AND COVER. BOND EACH SECTION AND SUPPORT TO GROUND RING PER DETAILS.
7. BOND EXISTING COMPOUND GROUND RING. VERIFY LOCATION IN FIELD.
8. BOND EQUIPMENT CABINET TO GROUND PER MANUFACTUREERS SPECIFICATIONS.
9. BOND GENERATOR TO GROUND PER MANUFACTURERS SPECIFICATIONS AND NEC REQUIREMENTS
10. BOND HVAC UNIT TO GROUND RING (TYPICAL).
11. BOND PROPANE TANK TO GROUND PER MANUFACTURERS SPECIFICATIONS AND NEC REQUIREMENTS

GENERAL NOTES

ALL GROUNDING CONDUITS TO BE MOUNTED ON SLEEPERS PER DETAILS WHERE ROUTED ACROSS CONCRETE PAD

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ELECTRICAL GROUNDING PLAN AND NOTES

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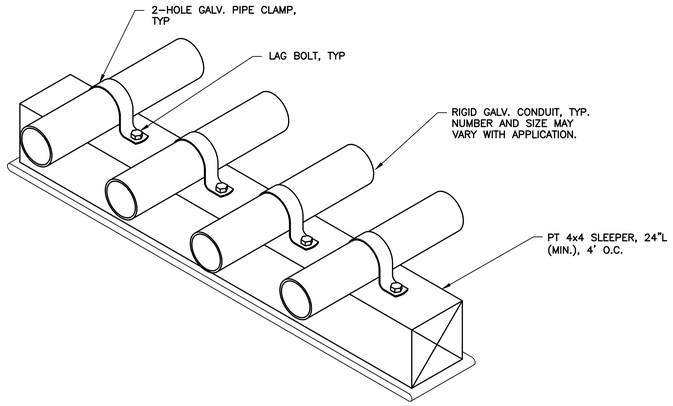
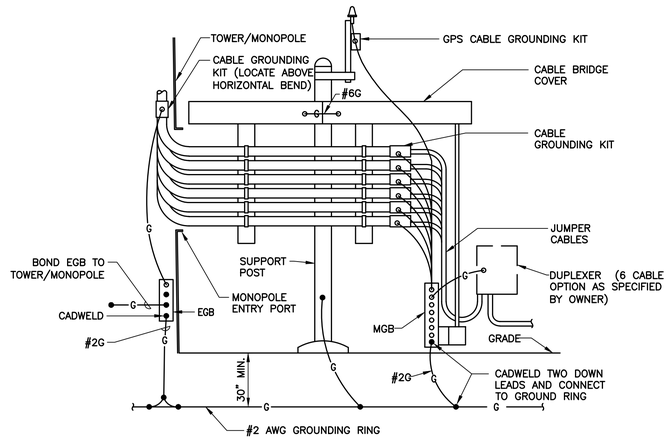
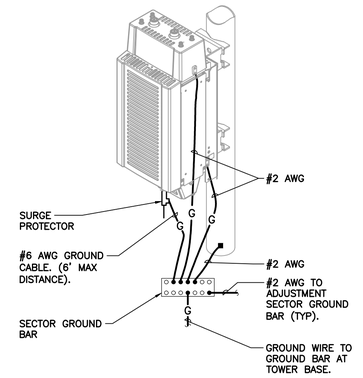


1 E-6 **CONDUIT SLEEPER DETAIL**
NOT TO SCALE

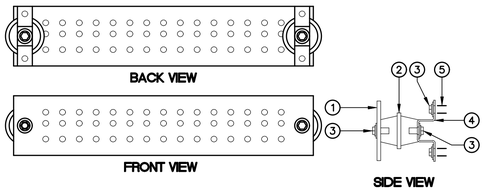


2 E-6 **CABLE BRIDGE GROUNDING DIAGRAM**
NOT TO SCALE

EACH RRH CABINET SHALL BE GROUNDED IN THE FOLLOWING MANNER:
1. AT TOP OF THE CABINET
2. AT RIGHT SIDE OF THE CABINET.



3 E-6 **RRH POLE MOUNT GROUNDING**
NOT TO SCALE

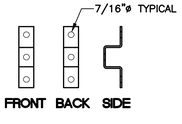


TYPICAL GROUND BAR ASSEMBLY
N.T.S.

TYPICAL GROUND BAR - DIMENSIONS
N.T.S.

NOTES

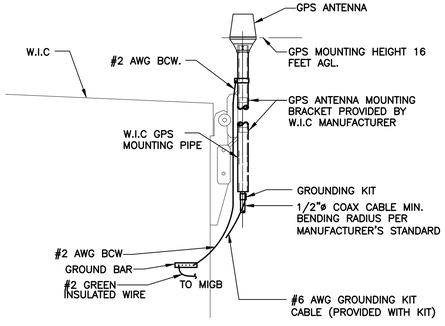
1. HIGH CONDUCTIVITY TINNED COPPER BAR 1'-8"Lx4"Wx1/4"D.
2. RED COLORED STANDOFF INSULATOR PLASTIC #1872-1A.
3. STAINLESS STEEL TRUSS SPANNER MACHINE SCREWS, SPLIT LOCKWASHER AND FLAT WASHER.
4. 1"Wx1/8"T STAINLESS STEEL TYPE 304 BRACKET.
5. STAINLESS STEEL TYPE 304 HARDWARE - 3/8"ø EXPANSION BOLT FOR CONCRETE.



BRACKET FOR GROUND BAR-DIMENSIONS
N.T.S.

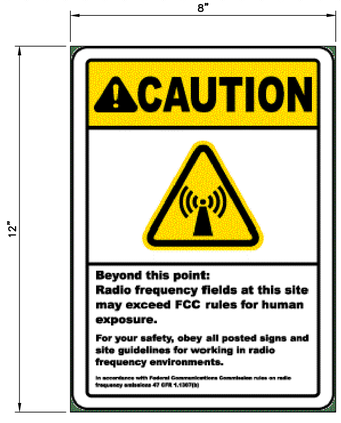
4 E-6 **MASTER/EQUIPMENT GROUND BAR DETAILS**
N.T.S.

2



5 E-6 **GPS GROUNDING DETAIL**
NOT TO SCALE

1



6 E-6 **TYPICAL EME INFORMATION SIGN DETAIL**
SCALE: NTS

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2	12/16/20	RTS	DMD	CONSTRUCTION DRAWINGS - GPS GROUNDING DETAIL
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ELECTRICAL DETAILS

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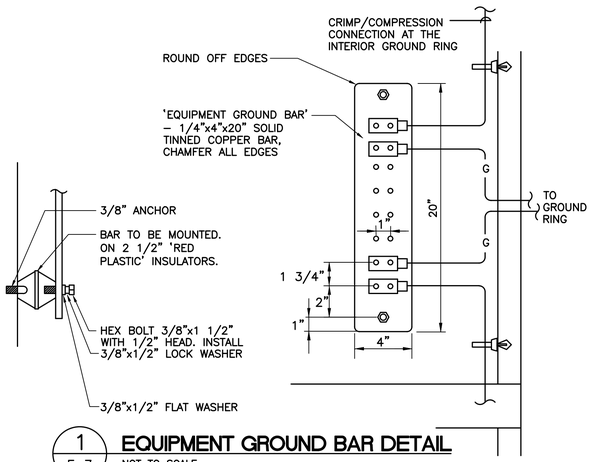
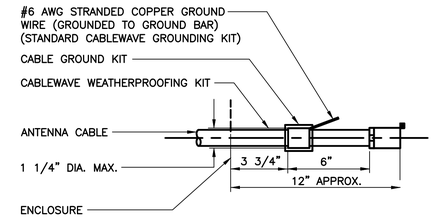


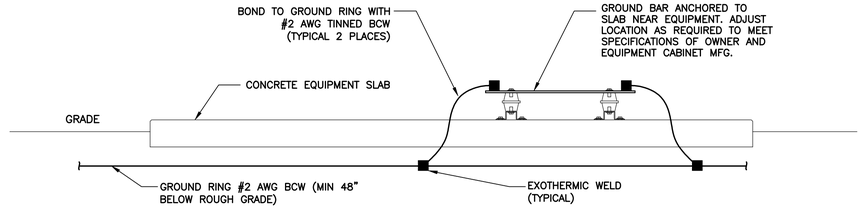
1 E–7 **EQUIPMENT GROUND BAR DETAIL**
NOT TO SCALE



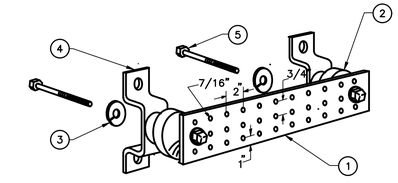
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

2 E–7 **ANTENNA CABLE GROUNDING DETAIL**
NOT TO SCALE



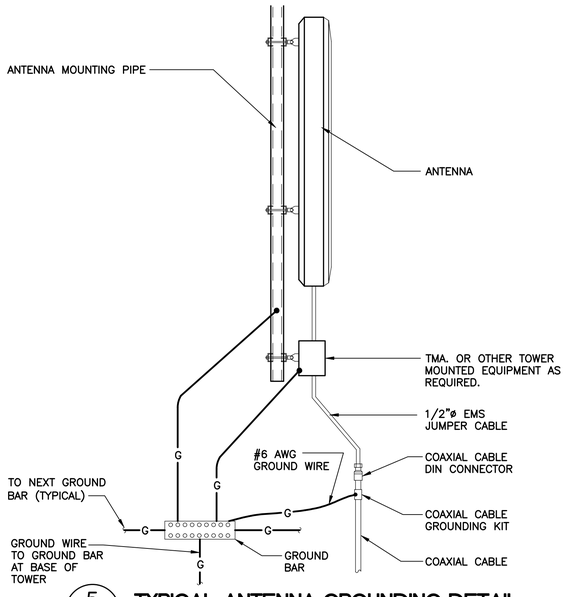
3 E–7 **GROUNDING AND BONDING AT CONCRETE SLAB**
NOT TO SCALE



NOTES

1. TINNED COPPER GROUND BAR, 1/4" x 4" x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061–4.
3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015–8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A–6056.
5. 5/8–11 x 1" STAINLESS STEEL TRUSS SPANNER MACHINE SCREWS.

4 E–7 **GROUND BAR DETAIL**
NOT TO SCALE



5 E–7 **TYPICAL ANTENNA GROUNDING DETAIL**
NOT TO SCALE

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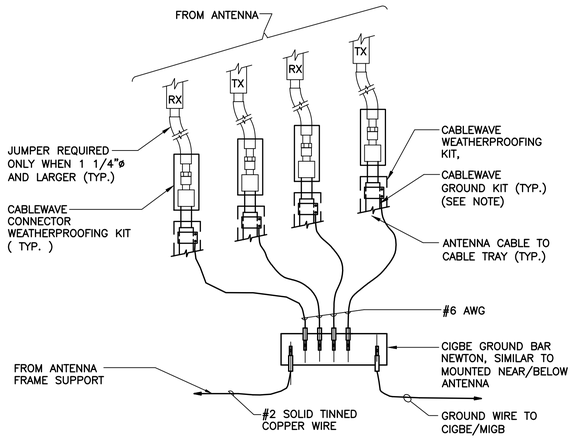
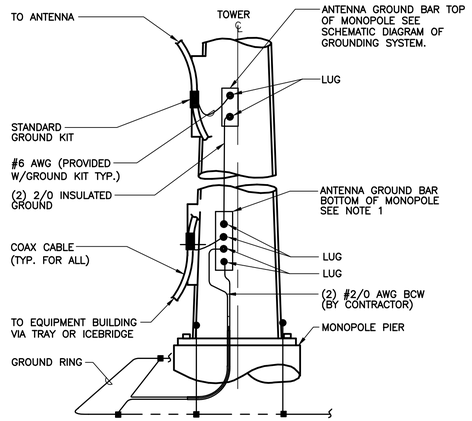


NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

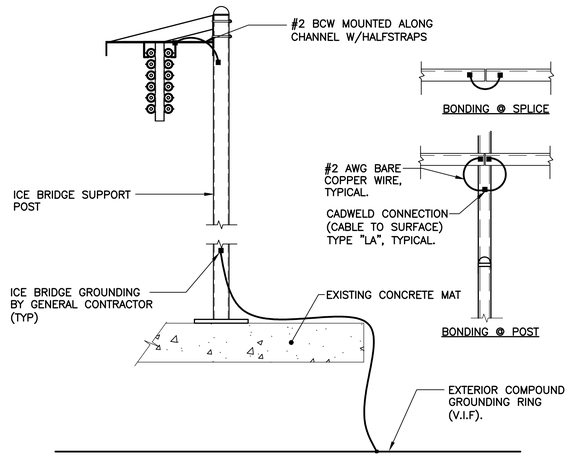
1 E-8 **CONNECTION OF GROUND WIRES TO GROUND BAR**
NOT TO SCALE



NOTES:

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

2 E-8 **ANTENNA CABLE GROUNDING**
NOT TO SCALE



3 E-8 **ICE BRIDGE BONDING DETAIL**
NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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ELECTRICAL DETAILS

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ELECTRICAL SPECIFICATIONS

SECTION 16010

1.1. SCOPE OF WORK

A. WORK SHALL INCLUDE ALL LABOR, EQUIPMENT AND SERVICES REQUIRED TO COMPLETE (MAKE READY FOR OPERATION) ALL THE ELECTRICAL WORK INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING:

1. INSTALL 200A, 240/120V, 1P, 3 WIRE ELECTRIC SERVICE WITH REVENUE METER AND 200A MAIN CIRCUIT BREAKER FOR OWNER AND ASSOCIATED DISTRIBUTION EQUIPMENT. (AS REQUIRED BY UTILITY CO.)
2. NEW SITE TELEPHONE SERVICE AS SPECIFIED BY TELEPHONE COMPANY.
3. GENERATOR.
4. CELLULAR GROUNDING SYSTEMS, CONSISTING OF ANTENNA GROUNDING, INTERIOR GROUNDING RING, GROUND BARS, ETC.
5. FIELD MEASURE EXISTING ELECTRICAL SERVICES TO CONFIRM AVAILABLE EXISTING POWER.
6. COORDINATE ALL WORK SHOWN, ON THESE PLANS WITH LOCAL UTILITY COMPANIES.

B. LOCAL UTILITY COMPANIES SHALL PROVIDE THE FOLLOWING:

1. TELEPHONE CABLES.
2. SHUTDOWN OF SERVICE (COORDINATE WITH OWNER).

C. CONTRACTOR SHALL CONFER WITH LOCAL UTILITY COMPANIES TO ASCERTAIN THE LIMITS OF THEIR WORK AND SHALL INCLUDE IN BID ANY CHARGES OR FEES MADE BY THE UTILITY COMPANIES FOR THEIR PORTION OF THE WORK AND SHALL PROVIDE AND INSTALL ALL ITEMS REQUIRED, BUT NOT PROVIDED BY UTILITY COMPANY.

D. ELECTRICAL CONTRACTOR SHALL COORDINATE ELECTRICAL INSTALLATION WITH ELECTRIC UTILITY CO. PRIOR TO INSTALLATION.

E. CONTRACTOR SHALL COORDINATE WITH TELEPHONE UTILITY COMPANY FOR LOCATION OF TELEPHONE SERVICE AND TO DETERMINE ANY REQUIRED EQUIPMENT TO BE INSTALLED BY CONTRACTOR.

1.02. GENERAL REQUIREMENTS

A. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.

B. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNERS REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES THAT MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS THAT MAY BE REQUIRED BY THE LOCAL AUTHORITY.

D. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.

E. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH LOCAL TELEPHONE COMPANY THAT MAY BE REQUIRED FOR THE INSTALLATION OF TELEPHONE SERVICE TO THE PROPOSED CELLULAR SITE.

F. NO MATERIAL OTHER THAN THAT CONTAINED IN THE "LATEST LIST OF ELECTRICAL FITTINGS" APPROVED BY THE UNDERWRITERS' LABORATORIES, SHALL BE USED IN ANY PART OF THE WORK. ALL MATERIAL FOR WHICH LABEL SERVICE HAS BEEN ESTABLISHED SHALL BEAR THE U.L. LABEL.

G. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.

H. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.

I. THE ELECTRICAL CONTRACTOR SHALL SUPPLY THREE (3) COMPLETE SETS OF APPROVED DRAWINGS, ENGINEERING DATA SHEETS, MAINTENANCE AND OPERATING INSTRUCTION MANUALS FOR ALL SYSTEMS AND THEIR RESPECTIVE EQUIPMENT. THESE MANUALS SHALL BE INSERTED IN VINYL COVERED 3-RING BINDERS AND TURNED OVER TO OWNER'S REPRESENTATIVE ONE (1) WEEK PRIOR TO FINAL PUNCH LIST.

J. ALL WORK SHALL BE INSTALLED IN A NEAT AND WORKMAN LIKE MANNER AND WILL BE SUBJECT TO THE APPROVAL OF THE OWNER'S REPRESENTATIVE.

K. ALL EQUIPMENT AND MATERIALS TO BE INSTALLED SHALL BE NEW, UNLESS OTHERWISE NOTED.

L. BEFORE FINAL PAYMENT, THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF PRINTS (AS-BUILTS), LEGIBLY MARKED IN RED PENCIL TO SHOW ALL CHANGES FROM THE ORIGINAL PLANS.

M. PROVIDE TEMPORARY POWER AND LIGHTING IN WORK AREAS AS REQUIRED.

N. SHOP DRAWINGS:

1. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF SHOP DRAWINGS ON ALL EQUIPMENT AND MATERIALS PROPOSED FOR USE ON THIS PROJECT, GIVING ALL DETAILS, WHICH INCLUDE DIMENSIONS, CAPACITIES, ETC.
2. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF ALL TEST REPORTS CALLED FOR IN THE SPECIFICATIONS AND DRAWINGS.

O. ENTIRE ELECTRICAL INSTALLATION SHALL BE IN ACCORDANCE WITH OWNER'S SPECIFICATIONS, AND REQUIREMENTS OF ALL LOCAL AUTHORITIES HAVING JURISDICTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH APPROPRIATE INDIVIDUALS TO OBTAIN ALL SUCH SPECIFICATIONS AND REQUIREMENTS. NOTHING CONTAINED IN, OR OMITTED FROM, THESE DOCUMENTS SHALL RELIEVE CONTRACTOR FROM THIS OBLIGATION.

SECTION 16111

1.01. CONDUIT

A. MINIMUM CONDUIT SIZE FOR BRANCH CIRCUITS, LOW VOLTAGE CONTROL AND ALARM CIRCUITS SHALL BE 3/4". ALL CONDUIT RUNS LOCATED WITHIN THE OWNER'S EQUIPMENT ROOM SHALL ORIGINATE FROM THE WIREWAY AND RUN VERTICALLY TO ITS DESTINATION. NO BENDS WILL BE ACCEPTED. CONDUITS SHALL BE PROPERLY FASTENED TO THE WALLS AND CEILINGS AS REQUIRED BY THE N.E.C.

CONDUIT MATERIAL SHALL BE AS FOLLOWS:

1. ELECTRIC METALLIC TUBING (EMT) – BRANCH CIRCUITS INSIDE EQUIPMENT ROOM
2. GALVANIZED RIGID CONDUIT (GRC) – FEEDERS AND CIRCUITS EXPOSED TO EXTERIOR & UNDERGROUND.
3. LIQUID TIGHT FLEXIBLE METAL CONDUIT – FOR SHORT LENGTHS (MAX. 3'-0") WIRING TO VIBRATING EQUIPMENT (HVAC UNITS, MOTORS, ETC.) IN WET LOCATIONS.
4. FLEXIBLE METAL CONDUIT – FOR SHORT LENGTHS (MAX. 3'-0") WIRING TO VIBRATING EQUIPMENT IN DRY LOCATIONS.
5. PVC CONDUIT – WHERE SHOWN ON GROUNDING DETAILS.

SECTION 16114

1.01. CABLE TRAY

A. CABLE TRAY SHALL BE SOLID SIDE BAR, 18" WIDE (NEWTON INSTRUMENT COMPANY, INC.). TRAY SHALL BE INSTALLED AS SHOWN ON CONTRACT DOCUMENTS.

B. CROSSWISE RUNS SHALL BE COORDINATED WITH THE SPECIFIC EQUIPMENT THE TRAY SHALL SERVE.

C. ALL PROTRUDING CABLE TRAY SUPPORT RODS SHALL BE FILED SMOOTH WITH NO SHARP EDGES. ALL SUPPORT RODS SHALL BE CAD-PLATED FOR RUST RESISTANCE AND A MINIMUM 1/2" DIAMETER.

SECTION 16123

1.01. CONDUCTORS

A. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS. #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:

LINE	120/208/240V COLOR	277/480V COLOR
A	BLACK	BROWN
B	RED	ORANGE
C	BLUE	YELLOW
N	CONTINUOUS WHITE	GREY
G	CONTINUOUS GREEN	GREEN WITH YELLOW STRIPE

B. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.

SECTION 16130

1.01. BOXES

A. FURNISH AND INSTALL OUTLET BOXES FOR ALL DEVICES, SWITCHES, RECEPTACLES, ETC.. BOXES TO BE ZINC COATED STEEL.

B. FURNISH AND INSTALL PULL BOXES IN MAIN FEEDERS RUNS WHERE REQUIRED. PULL BOXES SHALL BE GALVANIZED STEEL WITH SCREW REMOVABLE COVERS, SIZE AND QUANTITY AS REQUIRED. PROVIDE WEATHERPROOF CONSTRUCTION IN WET LOCATIONS.

SECTION 16140

1.01. WIRING DEVICES

A. THE FOLLOWING LIST IS PROVIDED TO CONVEY THE QUALITY AND RATING OF WIRING DEVICES WHICH ARE TO BE INSTALLED. A COMPLETE LIST OF ALL DEVICES MUST BE SUBMITTED BEFORE INSTALLATION FOR APPROVAL.

1. 15 MINUTE TIMER SWITCH – INTERMATIC #FF15M (INTERIOR LIGHTS)
2. DUPLEX RECEPTACLE – P&S #2095 (GFCI) SPECIFICATION GRADE
3. SINGLE POLE SWITCH – P&S #CSB20AC2 (20A-120V HARD USE) SPECIFICATION GRADE
4. DUPLEX RECEPTACLE – P&S #5362 (20A-120V HARD USE) SPECIFICATION GRADE

B. PLATES – ALL PLATES USED SHALL BE CORROSION RESISTANT TYPE 304 STAINLESS STEEL. PLATES SHALL BE FROM SAME MANUFACTURER AS SWITCHES AND RECEPTACLES. PROVIDE WEATHERPROOF HOUSING FOR DEVICES LOCATED IN WET LOCATIONS.

C. OTHER MANUFACTURERS OF THE SWITCHES, RECEPTACLES AND PLATES MAY BE SUBMITTED FOR APPROVAL BY THE ENGINEER.

SECTION 16170

1.01. DISCONNECT SWITCHES

A. FUSIBLE AND NON-FUSIBLE, 600V, HEAVY DUTY DISCONNECT SWITCHES SHALL BE AS MANUFACTURED BY SQUARE "D". PROVIDE FUSES AS CALLED FOR ON THE CONTRACT DRAWINGS. AMPERE RATING SHALL BE CONSISTENT WITH LOAD BEING SERVED. DISCONNECT SWITCH COVER SHALL BE MECHANICALLY INTERLOCKED TO PREVENT COVER FROM OPENING WHEN THE SWITCH IS IN THE "ON" POSITION. EXTERIOR APPLICATIONS SHALL BE NEMA 3R CONSTRUCTION WITH PADLOCK FEATURE.

SECTION 16190

1.01. SEISMIC RESTRAINT

A. ALL DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH ZONE 2 SEISMIC REQUIREMENTS.

SECTION 16195

1.01. LABELING AND IDENTIFICATION NOMENCLATURE FOR ELECTRICAL EQUIPMENT

A. CONTRACTOR SHALL FURNISH AND INSTALL NON-METALLIC ENGRAVED BACK-LIT NAMEPLATES ON ALL PANELS AND MAJOR ITEMS OF ELECTRICAL EQUIPMENT.

B. LETTERS TO BE WHITE ON BLACK BACKGROUND WITH LETTERS 1-1/2 INCH HIGH WITH 1/4 INCH MARGIN.

C. IDENTIFICATION NOMENCLATURE SHALL BE IN ACCORDANCE WITH OWNER'S STANDARDS.

D. PROVIDE NAMEPLATE FOR PORTABLE ENGINE/GENERATOR CONNECTION SHOWING VOLTAGE KVA/KW RATING, # PHASE, AND # OF WIRES. PLATE TO BE PLASTIC ENGRAVED, RED WITH WHITE LETTERS.

E. ALL RECEPTACLES, SWITCHES, DISCONNECT SWITCHES, ETC. SHALL BE LABELED WITH THE CORRECT BRANCH CIRCUIT NUMBER SERVED BY MEANS OF PERMANENT PRESSED TYPE BLACK 1/4" TRANSFER LETTERING. (FOR EXAMPLE: "MDP-5", ETC.).

F. PROVIDE A NAMEPLATE AT THE SERVICE EQUIPMENT INDICATING THE TYPE AND LOCATION OF THE ON SITE GENERATOR.

SECTION 16450

1.01. GROUNDING

A. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.

B. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.

C. GROUNDING OF PANELBOARDS:

1. PANELBOARD SHALL BE GROUNDED BY TERMINATING THE PANELBOARD FEEDER'S EQUIPMENT GROUND CONDUCTOR TO THE EQUIPMENT GROUND BAR KIT(S) LUGGED TO THE CABINET. ENSURE THAT THE SURFACE BETWEEN THE KIT AND CABINET ARE BARE METAL TO BARE METAL. PRIME AND PAINT OVER TO PREVENT CORROSION.
2. CONDUIT(S) TERMINATING INTO THE PANELBOARD SHALL HAVE GROUNDING TYPE BUSHINGS. THE BUSHINGS SHALL BE BONDED TOGETHER WITH BARE #10 AWG COPPER CONDUCTOR WHICH IN TURN IS TERMINATED INTO THE PANELBOARD'S EQUIPMENT GROUND BAR KIT(S).

D. EQUIPMENT GROUNDING CONDUCTOR:

1. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122.
2. THE MINIMUM SIZE OF EQUIPMENT GROUND CONDUCTOR SHALL BE #12 AWG COPPER.
3. REFER TO PANEL SCHEDULE "BRANCH CIRCUIT" DATA FOR EQUIPMENT GROUND CONDUCTOR SIZE FOR EACH BRANCH CIRCUIT.
4. EACH FEEDER OR BRANCH CIRCUIT SHALL HAVE EQUIPMENT GROUND CONDUCTOR(S) INSTALLED IN THE SAME RACEWAY(S).

E. CELLULAR GROUNDING SYSTEM:

CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 5 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

PROVIDE THE CELLULAR GROUNDING SYSTEM AS SPECIFIED ON DRAWINGS, INCLUDING, BUT NOT LIMITED TO:

1. GROUND BARS
2. INTERIOR GROUND RING
3. EXTERIOR GROUNDING (WHERE REQUIRED DUE TO MEASURED AC RESISTANCE GREATER THAN SPECIFIED).
4. ANTENNA GROUND CONNECTIONS AND PLATES.

F. CONTRACTOR, AFTER COMPLETION OF THE COMPLETE GROUNDING SYSTEM BUT PRIOR TO CONCEALMENT/BURIAL OF SAME, SHALL NOTIFY OWNER'S PROJECT ENGINEER WHO WILL HAVE A DESIGN ENGINEER VISIT SITE AND MAKE A VISUAL INSPECTION OF THE GROUNDING GRID AND CONNECTIONS OF THE SYSTEM.

G. ALL EQUIPMENT SHALL BE BONDED TO GROUND AS REQUIRED BY N.E.C., MFG. SPECIFICATIONS, AND OWNER'S SPECIFICATIONS.

SECTION 16470

1.01. DISTRIBUTION EQUIPMENT

A. REFER TO CONTRACT DRAWINGS FOR DETAILS AND SCHEDULES.

SECTION 16477

1.01. FUSES

A. FUSES SHALL BE NONRENEWABLE TYPE AS MANUFACTURED BY "BUSSMAN" OR APPROVED EQUAL. FUSES RATED TO 1/10 AMPERE UP TO 600 AMPERES SHALL BE EQUIVALENT TO BUSSMAN TYPE LPN-RK (250V) UL CLASS RK1, LOW PEAK, DUAL ELEMENT, TIME-DELAY FUSES. FUSES SHALL HAVE SEPARATE SHORT CIRCUIT AND OVERLOAD ELEMENTS AND HAVE AN INTERRUPTING RATING OF 200 KAIC. UPON COMPLETION OF WORK, PROVIDE ONE SPARE SET OF FUSES FOR EACH TYPE INSTALLED.

SECTION 16620
(SUPPLIED BY OWNER, INSTALLED BY CONTRACTOR)

1.01. GENERATOR SET

A. REFER TO CONTRACT DRAWINGS FOR DETAILS AND SCHEDULES.

SECTION 16960

1.01. TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

TEST 1: THERMAL OVERLOAD AND MAGNETIC TRIP TEST, AND CABLE INSULATION TEST FOR ALL CIRCUIT BREAKERS RATED 100 AMPS OR GREATER.

TEST 2: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. THESE TESTS SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNER'S CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION REPRESENTATIVE AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM'S REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

SECTION 16961

1.01. TESTS BY CONTRACTOR

A. ALL TESTS AS REQUIRED UPON COMPLETION OF WORK, SHALL BE MADE BY THIS CONTRACTOR. THESE SHALL BE CONTINUITY AND INSULATION TESTS; TEST TO DETERMINE THE QUALITY OF MATERIALS, ETC. AND SHALL BE MADE IN ACCORDANCE WITH N.E.C. RECOMMENDATIONS. ALL FEEDERS AND BRANCH CIRCUIT WIRING (EXCEPT CLASS 2 SIGNAL CIRCUITS) MUST BE TESTED FREE FROM SHORT CIRCUIT AND GROUND FAULT CONDITIONS AT 500V IN A REASONABLY DRY AMBIENT OF APPROXIMATELY 70 DEGREES F.

B. CONTRACTOR SHALL PERFORM LOAD PHASE BALANCING TESTS. CIRCUITS SHALL BE SO CONNECTED TO THE PANELBOARDS SUCH THAT THE NEW LOAD IS DISTRIBUTED AS EQUALLY AS POSSIBLE BETWEEN EACH LOAD AND NEUTRAL. 10% SHALL BE CONSIDERED AS A REASONABLE AND ACCEPTABLE ALLOWANCE. BRANCH CIRCUITS SHALL BE BALANCED ON THEIR OWN PANELBOARDS; FEEDER LOADS SHALL, IN TURN, BE BALANCED ON THE SERVICE EQUIPMENT. REASONABLE LOAD TEST SHALL BE ARRANGED TO VERIFY LOAD BALANCE IF REQUESTED BY THE ENGINEER.

C. ALL TESTS, UPON REQUEST, SHALL BE REPEATED IN THE PRESENCE OF OWNER'S REPRESENTATIVE. ALL TESTS SHALL BE DOCUMENTED AND TURNED OVER TO OWNER. OWNER SHALL HAVE THE AUTHORITY TO STOP ANY OF THE WORK NOT BEING PROPERLY INSTALLED. ALL SUCH DETECTED WORK SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL EXPENSE TO THE OWNER AND THE TESTS SHALL BE REPEATED.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	12/16/20	RTS	DMD	CONSTRUCTION DRAWINGS – GPS GROUNDING DETAIL
1	12/15/20	LGL	DMD	CONSTRUCTION DRAWINGS – EME SIGNAGE DETAIL ADDED
0	09/28/20	DMD	TJR	CONSTRUCTION DRAWINGS – FINAL PER DESCOPED RFDS

PROFESSIONAL ENGINEER SEAL

at&t

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www.CentekEng.com

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
CT2873 BETHEL
15 GREAT PASTURE ROAD
DANBURY, CT 06810

DATE: 08/20/19
SCALE: AS NOTED
JOB NO. 19101.00

ELECTRICAL SPECIFICATIONS

E-9

Sheet No. 16 of 16

EXHIBIT 2

15 GREAT PASTURE RD

Location	15 GREAT PASTURE RD	**Mblu**	L16/ / 5/ /
Acct#		**Owner**	EPPOLITI INDUSTRIAL REALTY INC
Assessment	$2,895,300	**Appraisal**	$4,135,900
PID	10559	**Building Count**	2

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$1,975,300	$2,160,600	$4,135,900
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$1,382,900	$1,512,400	$2,895,300

Owner of Record

Owner	EPPOLITI INDUSTRIAL REALTY INC	**Sale Price**	$0
Co-Owner		**Book & Page**	2028/1121
Address	37 DANBURY RD STE 203 RIDGEFIELD, CT 06877	**Sale Date**	02/02/2009
		Instrument	06

Ownership History

Ownership History				
Owner	**Sale Price**	**Book & Page**	**Instrument**	**Sale Date**
EPPOLITI INDUSTRIAL REALTY INC	$0	2028/1121	06	02/02/2009
K & E REALTY INC	$0	0858/0281		09/18/1987

Building Information

Building 1 : Section 1

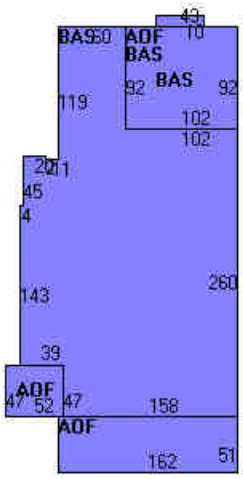
Year Built:	1958
Living Area:	83,734
Replacement Cost:	$3,781,312
Building Percent Good:	45
Replacement Cost Less Depreciation:	$1,701,600

Building Attributes	
Field	**Description**
STYLE	Light Industrial
MODEL	Ind/Comm
Grade	Average
Stories:	1
Occupancy	11
Exterior Wall 1	Concr/Cinder
Exterior Wall 2	Brick/Masonry
Roof Structure	Flat
Roof Cover	Tar & Gravel
Interior Wall 1	Drywall/Sheet
Interior Wall 2	
Interior Floor 1	Vinyl/Asphalt
Interior Floor 2	Concr-Finished
Heating Fuel	Gas
Heating Type	Forced Air-Duc
AC Type	None
Bldg Use	Industrial MDL-94
Total Rooms	
Total Bedrms	
Total Baths	
1st Floor Use:	
Heat/AC	NONE
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	CEILING ONLY
Rooms/Prtns	AVERAGE
Wall Height	16
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos2/DanburyCTPhotos//\00\02\87/89.jpg)

Building Layout



(http://images.vgsi.com/photos2/DanburyCTPhotos//Sketches/10559_1055

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	63,644	63,644
AOF	Office, (Average)	20,090	20,090
		83,734	83,734

Building 2 : Section 1

Year Built: 1980
Living Area: 2,912
Replacement Cost: $154,220
Building Percent Good: 56
Replacement Cost Less Depreciation: $86,400

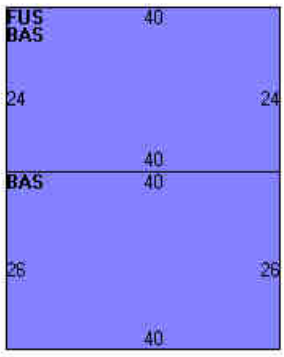
Building Attributes : Bldg 2 of 2	
Field	**Description**
STYLE	Warehouse
MODEL	Commercial

Grade	Average
Stories:	1
Occupancy	1
Exterior Wall 1	Stucco on Wood
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Metal/Tin
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	Carpet
Heating Fuel	Gas
Heating Type	Forced Air-Duc
AC Type	None
Bldg Use	Industrial MDL-96
Total Rooms	
Total Bedrms	
Total Baths	
1st Floor Use:	
Heat/AC	NONE
Frame Type	STEEL
Baths/Plumbing	NONE
Ceiling/Wall	CEILING ONLY
Rooms/Prtns	AVERAGE
Wall Height	24
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos2/DanburyCTPhotos//\00\02\87/90.jpg)

Building Layout



(http://images.vgsi.com/photos2/DanburyCTPhotos//Sketches/10559_1256

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	2,000	2,000
FUS	Finished Upper Story	960	912
		2,960	2,912

Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
SPR1	Sprinklers-Wet	72585 S.F.	$55,100	1
A/C	Air Condition	8262 UNITS	$10,500	1
LDL1	Load Leveler	4 UNITS	$2,500	1

Land

Land Use

Land Line Valuation

Use Code	300C	**Size (Acres)**	12.63
Description	Industrial MDL-94	**Frontage**	0
Zone	IL40	**Depth**	0
Neighborhood	4000	**Assessed Value**	$1,512,400
Alt Land Appr	No	**Appraised Value**	$2,160,600
Category			

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
	BLDG INFO LOST			1	$75,100	2
PAV1	Paving-Asphalt			70000 S.F.	$44,100	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$1,975,300	$2,160,600	$4,135,900
2018	$1,975,300	$2,160,600	$4,135,900
2017	$1,975,300	$2,160,600	$4,135,900

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$1,382,900	$1,512,400	$2,895,300
2018	$1,382,900	$1,512,400	$2,895,300
2017	$1,382,900	$1,512,400	$2,895,300

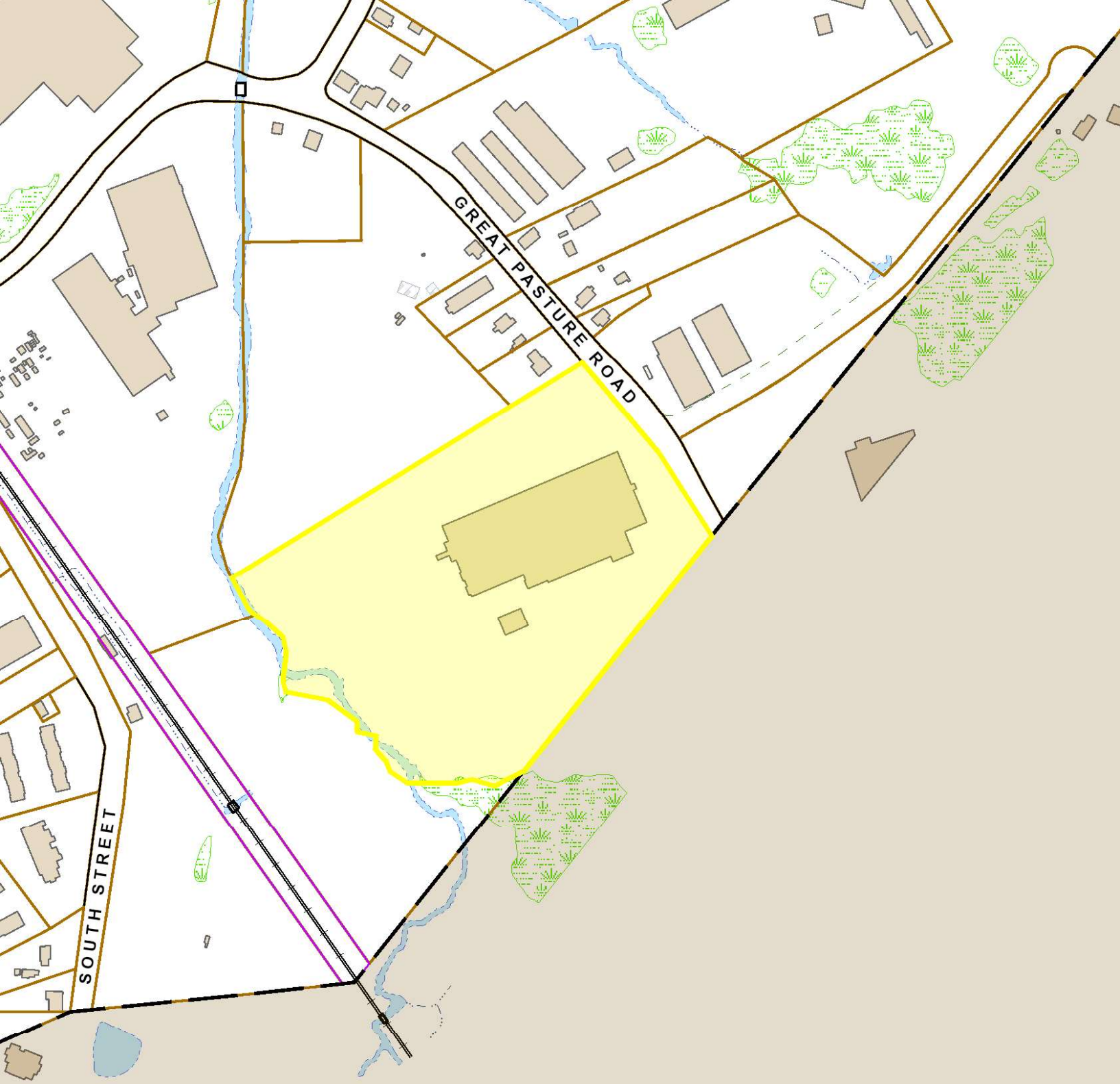

GREAT PASTURE ROAD
SOUTH STREET

EXHIBIT 3

Monopole Extension Package

Prepared for:

KGI

805 Las Cimas Parkway, Building Three, Suite 370

Austin, TX 78746

ATTN: Ms. Stephanie Oswald

Structure	:	**119 ft Monopole w/ Proposed 20 ft Extension**
Site ID	:	**28493**
Proposed Carrier	:	**AT&T Wireless**
Site Name	:	**Bethel West 2**
Site Location	:	**15 Great Pasture Road**
		Danbury, CT
		41.383, -73.4222
County	:	**Fairfield**
Date	:	**September 2, 2020**
Max Usage	:	**69%**
Result	:	**Pass**

Prepared By:
Thomas Taylor, P.E., S.E.
Engineering Manager

Thomas L. Taylor

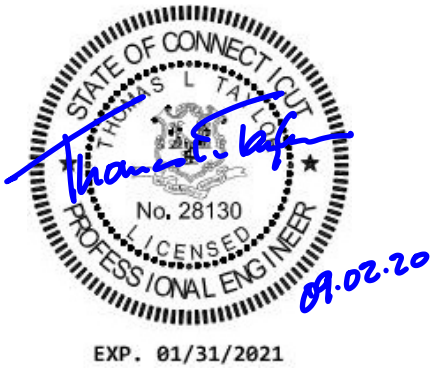


Table of Contents

Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 119 ft Monopole w/ Proposed 20 ft Extension to reflect the change in loading by AT&T Wireless.

Supporting Documents

Tower Drawing	Sabre Job #16-7133-SCB, dated July 13, 2016
Foundation Drawing	Centek Engineering Job #14216.000, dated July 28, 2016
Geotechnical Report	DET Job #2015.13, dated February 19, 2016
Foundation Analysis	Centek Engineering Project #14216.00, dated March 12, 2020
Mount Analysis	Hudson Design Group Site #S2873 (NSB), dated October 10, 2019

Analysis

The tower was analyzed using TNX tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

Basic Wind Speed	91 mph (3-Second Gust) Vasd / 117 mph (3-Second Gust) Vult
Basic Wind Speed w/Ice	50 mph (3-Second Gust) w/ 3/4" radial ice concurrent
Code	ANSI/TIA-222-G / 2015 IBC / 2018 Connecticut State Building Code
Structure Class	II
Exposure Category	B
Topographic Category	1
Crest Height	0 ft
Spectral Response	Ss = 0.22* , S1 = 0.07
Site Class	D - Stiff Soil

* Seismic analysis is not included in this analysis due to the value of Ss less than 1.

Conclusion

Based on the analysis results, the monopole with the proposed extension **meets** the requirements per the applicable codes listed above. The monopole and foundation can support the equipment as described in this report. If you have any questions or require additional information, please contact Semaan Engineering Solutions at 402-289-1888.

Attachments

1. Drawing T-1, Revision1, dated 09/02/2020.
2. Drawing N-1, Revision 1, dated 09/02/2020.
3. Drawing N-2, Revision 0, dated 05/15/2020.
4. Drawing S-1, Revision 0, dated 05/15/2020.
5. Drawing S-2, Revision 0, dated 05/15/2020.
6. Drawing S-3, Revision 0, dated 05/15/2020.

Existing and Reserved Equipment

This loading **is** included in the analysis.

Centerline Elevation (ft)		Qty.	Antenna	Mount Type	Coax (in)	Carrier
Mount	Equip.					
120.0	120.0	12	BXA-70080/8CF	Platform w/Rail	(12) 1 5/8" (3) Hybrid	Verizon
		12	RRUS A2 Module			
		6	3JR52709AA			
		3	RRH 4x30-4R B13			
		3	RRH 4x30-4R B25			
		12	10"x7"x2" TMA			
		3	OVP Junction Box			

Equipment to be Removed

This loading **is not** included in the analysis.

Centerline Elevation (ft)		Qty.	Antenna	Mount Type	Coax (in)	Carrier
Mount	Equip.					
No loading considered as to be removed						

Proposed Equipment

This loading **is** included in the analysis.

Centerline Elevation (ft)		Qty.	Antenna	Mount Type	Coax (in)	Carrier
Mount	Equip.					
140.0	140.0	9	TPA65R-BU6D	C10855721C Platform w/Rail	(6) 7/8" DC (2) 3/8" Fiber (2) 1/2"	AT&T
		3	4478 B14 RRU			
		3	8843 B2/B66A RRU			
		3	4415 B30 RRU			
		3	4449 B5/B12 RRU			
		3	DC6-48-60-18-8F			
		2	GPS			

Install proposed coax anywhere on tower.

Structure Usages

Structural Component	Controlling Usage	Pass/Fail
Shaft	41%	Pass
Anchor Bolts	39%	Pass
Baseplate	40%	Pass
Flange	52%	Pass

Foundations

Reaction Component	Original Design Reactions	Analysis Reactions	% of Design
Moment (Kips-Ft)	4,952.3	2,024.9	41%
Axial (Kips)	57.2	39.1	68%
Shear (Kips)	48.9	19.9	41%

The structure base reactions resulting from this analysis are acceptable when compared to those shown on the original structure drawings.

The attached foundation analysis by Centek Engineering also shows that the existing mat foundation is acceptable without considering the center (4) overloaded micropiles, therefore no modification or reinforcement of the foundation will be required.

Standard Conditions

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessary limited, to:

--Information supplied by the client regarding the structure itself, antenna, mounts and feed line loading on the structure and its components, or other relevant information.

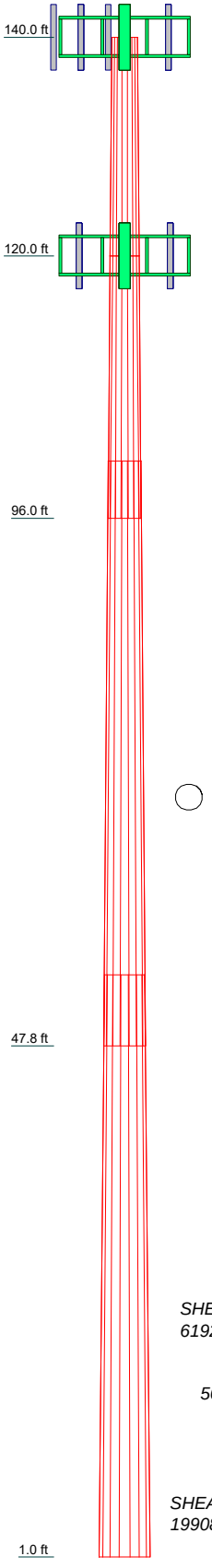
--Information from drawings in the possession of Semaan Engineering Solutions, or generated by field inspections or measurements of the structure.

It is the responsibility of the client to ensure that the information provided to Semaan Engineering Solutions Holdings and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and that their capacity has not significantly changed from the "as new" condition.

Unless explicitly agreed by both the client and Semaan Engineering Solutions, all services will be performed in accordance with the current revision of ANSI/TIA -222. The design basic wind speed will be determined based on the minimum basic wind speed as prescribed in ANSI/TIA-222. Although every effort is taken to ensure that the loading considered is adequate to meet the requirements of all applicable regulatory entities, we can provide no assurance to meet any other local and state codes or requirements. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Semaan Engineering Solutions Holdings is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (lb)
1	20.000	18	0.250		27.000	31.419		1563.9
2	24.000	18	0.250	5.250	31.419	36.723		2191.7
3	53.500	18	0.313	6.500	35.063	46.885	A572-65	7342.2
4	53.250	18	0.375		44.823	56.590		10855.1
								21952.9



ALL REACTIONS ARE FACTORED

AXIAL 67024 lb

SHEAR 6192 lb

MOMENT 611759 lb-ft

TORQUE 38 lb-ft
50 mph WIND - 0.750 in ICE

AXIAL 39098 lb

SHEAR 19908 lb

MOMENT 2024947 lb-ft

TORQUE 93 lb-ft
REACTIONS - 91 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
C10855721C Platform w/Rail (ATI)	140	(4) BXA-70080/8CF (Verizon)	120
(3) TPA65R-BU6D (ATI)	140	(4) BXA-70080/8CF (Verizon)	120
(3) TPA65R-BU6D (ATI)	140	(4) BXA-70080/8CF (Verizon)	120
(3) TPA65R-BU6D (ATI)	140	(4) RRUS A2 Module (Verizon)	120
4478 B14 RRU (ATI)	140	(4) RRUS A2 Module (Verizon)	120
4478 B14 RRU (ATI)	140	(4) RRUS A2 Module (Verizon)	120
4478 B14 RRU (ATI)	140	(2) 3JR52709AA (Verizon)	120
8843 B2/B66A RRU (ATI)	140	(2) 3JR52709AA (Verizon)	120
8843 B2/B66A RRU (ATI)	140	(2) 3JR52709AA (Verizon)	120
8843 B2/B66A RRU (ATI)	140	RRH 4x30-4R B13 (Verizon)	120
4415 B30 RRU (ATI)	140	RRH 4x30-4R B13 (Verizon)	120
4415 B30 RRU (ATI)	140	RRH 4x30-4R B13 (Verizon)	120
4415 B30 RRU (ATI)	140	RRH 4x30-4R B25 (Verizon)	120
4449 B5/B12 RRU (ATI)	140	RRH 4x30-4R B25 (Verizon)	120
4449 B5/B12 RRU (ATI)	140	RRH 4x30-4R B25 (Verizon)	120
4449 B5/B12 RRU (ATI)	140	(4) 10"x7"x2" TMA (Verizon)	120
DC6-48-60-18-8F (ATI)	140	(4) 10"x7"x2" TMA (Verizon)	120
DC6-48-60-18-8F (ATI)	140	(4) 10"x7"x2" TMA (Verizon)	120
DC6-48-60-18-8F (ATI)	140	OVP Junction Box (Verizon)	120
(2) GPS (ATI)	140	OVP Junction Box (Verizon)	120
Platform w/Rail (Verizon)	120	OVP Junction Box (Verizon)	120

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 91 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. Weld together tower sections have flange connections.
9. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
10. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
11. Welds are fabricated with ER-70S-6 electrodes.
12. TOWER RATING: 41.1%

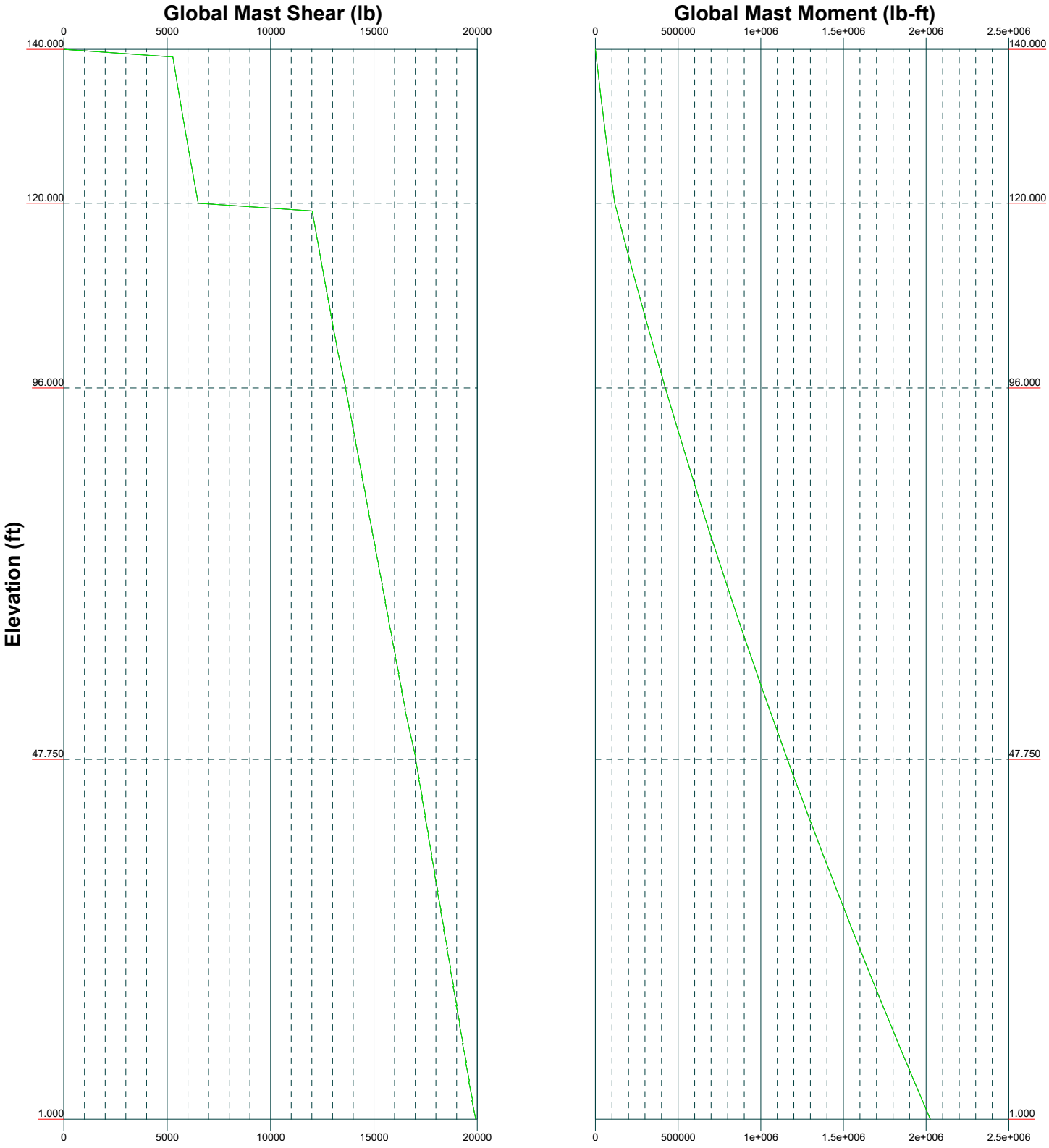
Semaan Engineering Solutions LLC
1047 N. 205th St.
Elkhorn, NE 68022
Phone: 402-289-1888
FAX:

Job: ***28493_Bethel West 2***			
Project: ***REV03***			
Client: KGI	Drawn by: TLT	App'd:	
Code: TIA-222-G	Date: 09/02/20	Scale: NTS	
Path: \\DMZSESSERVER01\Common\TNX files\28493\REV03\28493_REV03.eri		Dwg No. E-1	

TIA-222-G - 91 mph/50 mph 0.750 in Ice Exposure B

Maximum Values

Vx Vz Mx Mz



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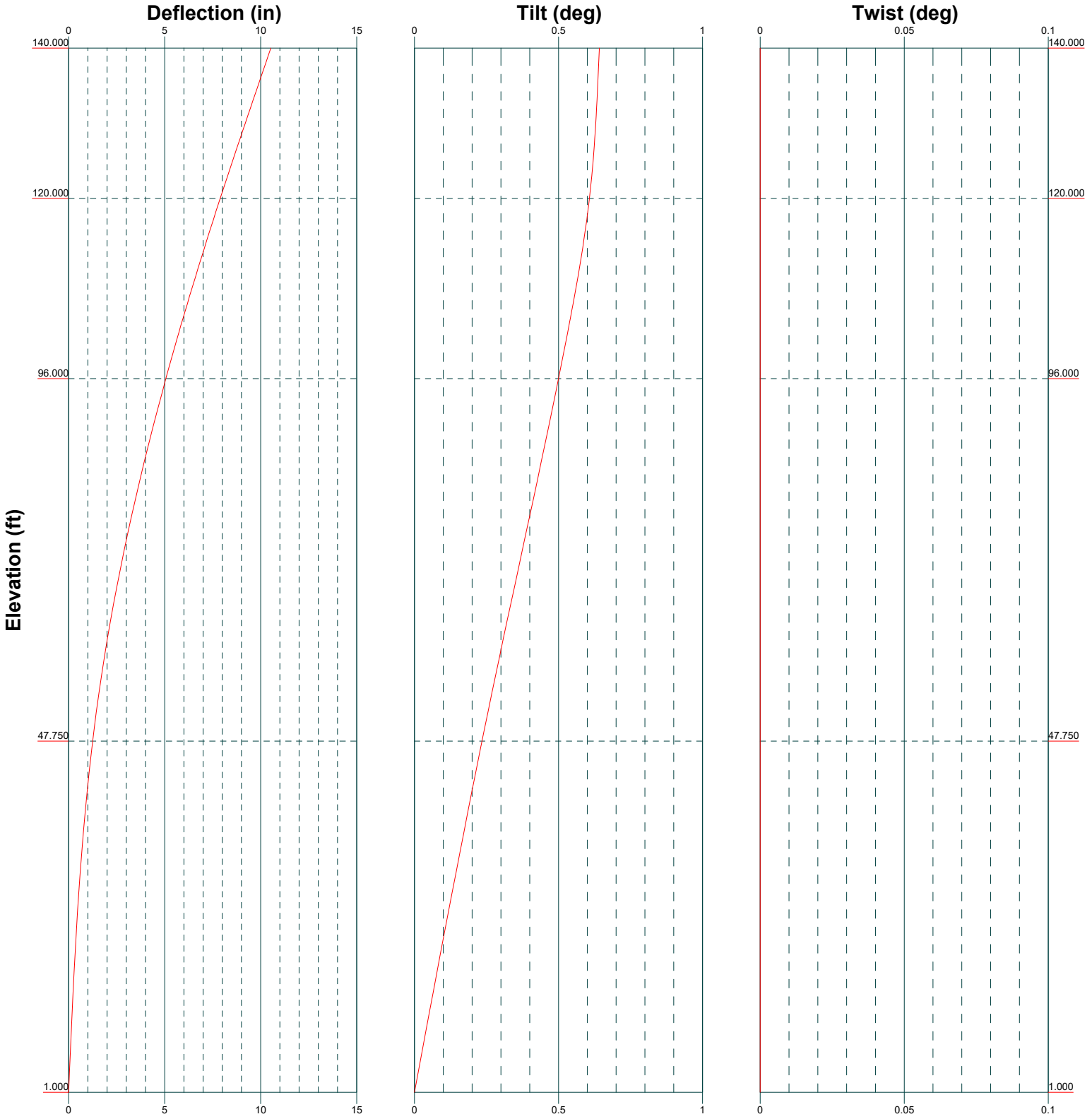
Code: TIA-222-G	Date: 09/02/20	Scale: NTS
Path: \\DMZSESSERVER01\Common\TNX files\28493\REV03\28493_REV03.eri		Dwg No. E-4

TIA-222-G - Service - 60 mph

Maximum Values



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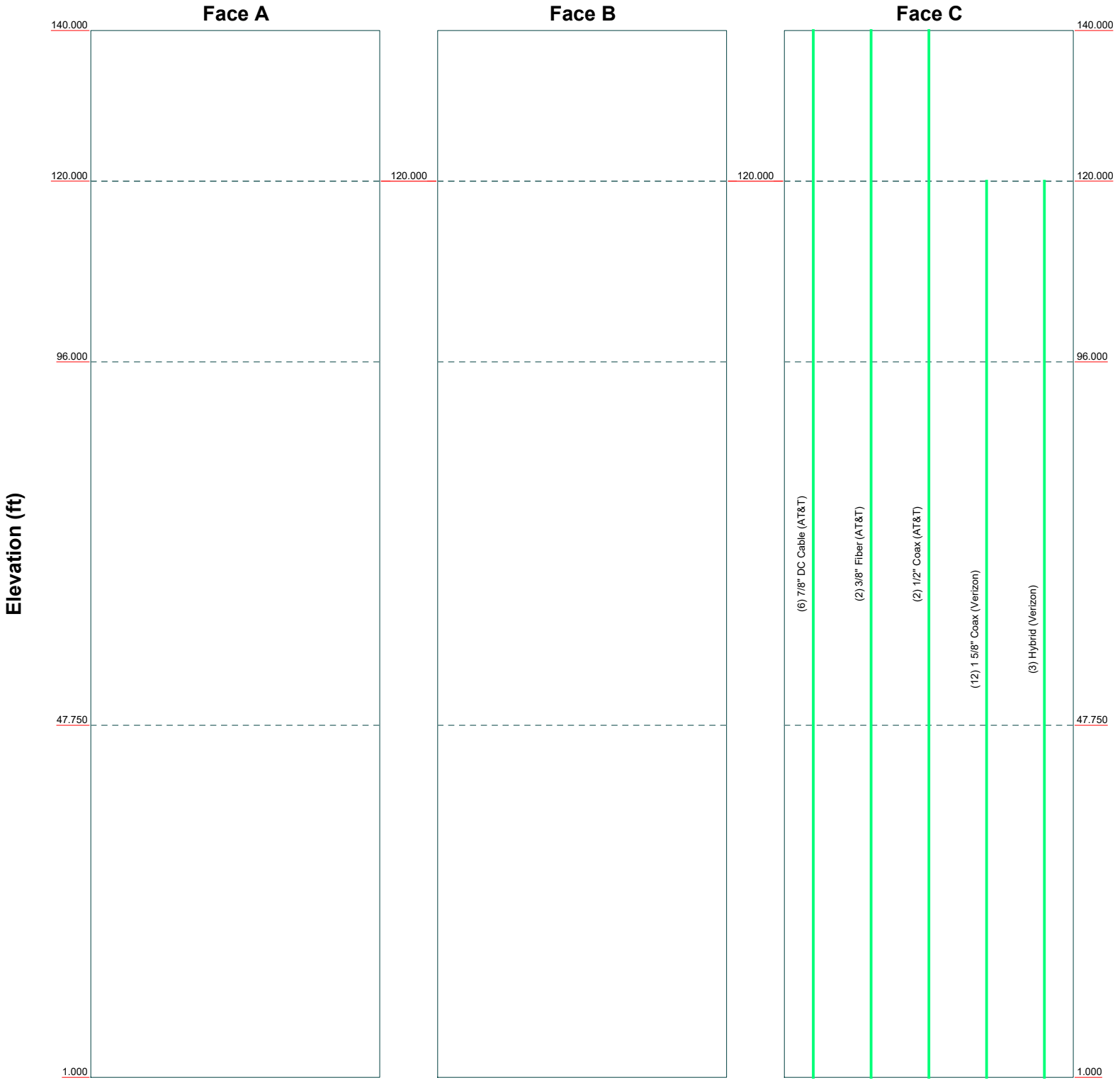
Phone: 402-289-1888
FAX:

Job: ***28493_Bethel West 2***			
Project: ***REV03***			
Client: KGI	Drawn by: TLT	App'd:	
Code: TIA-222-G	Date: 09/02/20	Scale: NTS	
Path: \\DMZSESSERVER01\Common\TNX files\28493\REV03\28493_REV03.eri		Dwg No. E-5	

Feed Line Distribution Chart
1' - 140'

Round | Flat | App In Face | App Out Face | Truss Leg



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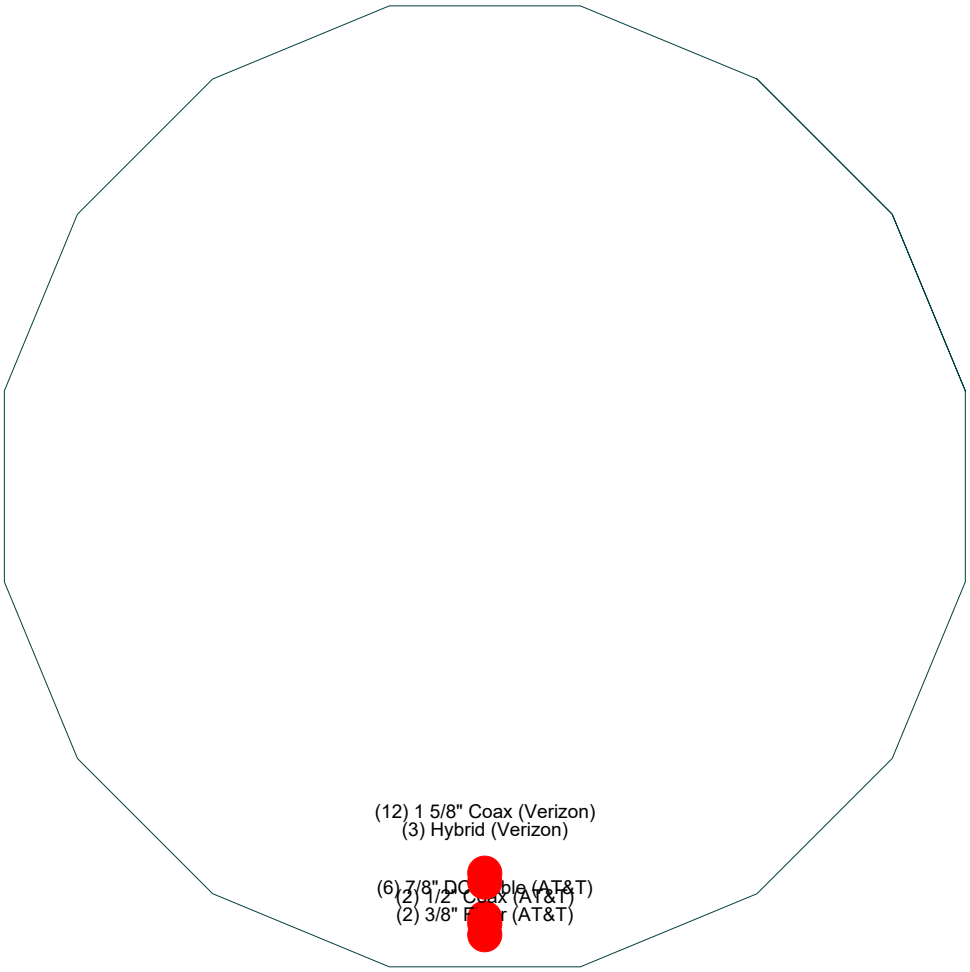
Job: ***28493_Bethel West 2***		
Project: ***REV03***		
Client: KGI	Drawn by: TLT	App'd:
Code: TIA-222-G	Date: 09/02/20	Scale: NTS
Path: \\DMZSESSERVER01\Common\TNX files\28493\REV03\28493_REV03.eri		Dwg No. E-7

Feed Line Plan

Round Flat App In Face App Out Face



Semaan Engineering Solutions LLC
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Elkhorn, NE 68022
Phone: 402-289-1888
FAX:

Job: ***28493_Bethel West 2***		
Project: ***REV03***		
Client: KGI	Drawn by: TLT	App'd:
Code: TIA-222-G	Date: 09/02/20	Scale: NTS
Path: \\DMZSESSERVER01\Common\TNX files\28493\REV03\28493_REV03.eri		Dwg No. E-7

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Fairfield County, Connecticut.
Basic wind speed of 91 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 0.750 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.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	√ Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	√ SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	√ All Leg Panels Have Same Allowable
Use Code Safety Factors - Guys	√ Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
√ Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	√ Ignore KL/ry For 60 Deg. Angle Legs	√ Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

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	140.000-120.000	20.000	0.000	18	27.000	31.419	0.250	1.000	A572-65 (65 ksi)
L2	120.000-96.000	24.000	5.250	18	31.419	36.723	0.250	1.000	A572-65 (65 ksi)
L3	96.000-47.750	53.500	6.500	18	35.063	46.885	0.313	1.250	A572-65 (65 ksi)
L4	47.750-1.000	53.250		18	44.823	56.590	0.375	1.500	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	27.378	21.226	1918.915	9.496	13.716	139.903	3840.355	10.615	4.312	17.248
	31.866	24.733	3035.783	11.065	15.961	190.199	6075.561	12.369	5.090	20.359
L2	31.866	24.733	3035.783	11.065	15.961	190.199	6075.561	12.369	5.090	20.359
	37.251	28.941	4863.953	12.948	18.655	260.730	9734.306	14.473	6.023	24.093
L3	36.733	34.468	5258.525	12.336	17.812	295.227	10523.969	17.237	5.621	17.987
	47.560	46.194	12658.196	16.533	23.817	531.469	25333.047	23.101	7.702	24.645
L4	46.915	52.905	13205.069	15.779	22.770	579.927	26427.513	26.457	7.229	19.277
	57.405	66.910	26713.597	19.956	28.748	929.242	53462.345	33.461	9.300	24.8

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	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
L1 140.000-120.000				1	1	1			
L2 120.000-96.000				1	1	1			
L3 96.000-47.750				1	1	1			
L4 47.750-1.000				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_AA_A ft^2/ft	Weight klf
7/8" DC Cable (AT&T)	C	No	No	Inside Pole	140.000 - 1.000	6	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
3/8" Fiber (AT&T)	C	No	No	Inside Pole	140.000 - 1.000	2	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
							1" Ice	0.000	0.000
1/2" Coax (AT&T)	C	No	No	Inside Pole	140.000 - 1.000	2	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
1 5/8" Coax (Verizon)	C	No	No	Inside Pole	120.000 - 1.000	12	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
Hybrid (Verizon)	C	No	No	Inside Pole	120.000 - 1.000	3	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	140.000-120.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	79.600
L2	120.000-96.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	523.200
L3	96.000-47.750	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	1051.850
L4	47.750-1.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	1019.150

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_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	140.000-120.000	A	1.720	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	79.600
L2	120.000-96.000	A	1.688	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	523.200
L3	96.000-47.750	A	1.620	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	1051.850
L4	47.750-1.000	A	1.452	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	1019.150

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	140.000-120.000	0.000	0.000	0.000	0.000
L2	120.000-96.000	0.000	0.000	0.000	0.000
L3	96.000-47.750	0.000	0.000	0.000	0.000
L4	47.750-1.000	0.000	0.000	0.000	0.000

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

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
C10855721C Platform w/Rail (AT&T)	A	None		0.000	140.000	No Ice 1/2" Ice 1" Ice	35.850 40.460 45.070	35.850 40.460 45.070	2500.000 3500.000 4500.000
(3) TPA65R-BU6D (AT&T)	A	From Face	3.500 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	12.709 13.206 13.709	5.615 6.067 6.526	69.000 142.956 223.562
(3) TPA65R-BU6D (AT&T)	B	From Face	3.500 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	12.709 13.206 13.709	5.615 6.067 6.526	69.000 142.956 223.562
(3) TPA65R-BU6D (AT&T)	C	From Face	3.500 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	12.709 13.206 13.709	5.615 6.067 6.526	69.000 142.956 223.562
4478 B14 RRU (AT&T)	A	From Face	3.500 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	2.021 2.200 2.386	1.246 1.396 1.554	59.400 77.013 97.398
4478 B14 RRU (AT&T)	B	From Face	3.500 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	2.021 2.200 2.386	1.246 1.396 1.554	59.400 77.013 97.398
4478 B14 RRU (AT&T)	C	From Face	3.500 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	2.021 2.200 2.386	1.246 1.396 1.554	59.400 77.013 97.398
8843 B2/B66A RRU (AT&T)	A	From Face	3.500 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	1.639 1.799 1.966	1.353 1.500 1.655	72.000 89.596 109.915
8843 B2/B66A RRU (AT&T)	B	From Face	3.500 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	1.639 1.799 1.966	1.353 1.500 1.655	72.000 89.596 109.915
8843 B2/B66A RRU (AT&T)	C	From Face	3.500 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	1.639 1.799 1.966	1.353 1.500 1.655	72.000 89.596 109.915
4415 B30 RRU (AT&T)	A	From Face	3.500 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	1.843 2.012 2.190	0.820 0.943 1.075	46.000 60.075 76.665
4415 B30 RRU (AT&T)	B	From Face	3.500 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	1.843 2.012 2.190	0.820 0.943 1.075	46.000 60.075 76.665

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
4415 B30 RRU	C	From Face	3.500	0.000	0.000	140.000	No Ice	1.843	0.820	46.000
(AT&T)			0.000				1/2" Ice	2.012	0.943	60.075
			0.000				1" Ice	2.190	1.075	76.665
4449 B5/B12 RRU	A	From Face	3.500	0.000	0.000	140.000	No Ice	1.968	1.408	71.000
(AT&T)			0.000				1/2" Ice	2.144	1.564	89.509
			0.000				1" Ice	2.328	1.727	110.838
4449 B5/B12 RRU	B	From Face	3.500	0.000	0.000	140.000	No Ice	1.968	1.408	71.000
(AT&T)			0.000				1/2" Ice	2.144	1.564	89.509
			0.000				1" Ice	2.328	1.727	110.838
4449 B5/B12 RRU	C	From Face	3.500	0.000	0.000	140.000	No Ice	1.968	1.408	71.000
(AT&T)			0.000				1/2" Ice	2.144	1.564	89.509
			0.000				1" Ice	2.328	1.727	110.838
DC6-48-60-18-8F	A	From Face	3.500	0.000	0.000	140.000	No Ice	0.917	0.917	32.800
(AT&T)			0.000				1/2" Ice	1.458	1.458	50.515
			0.000				1" Ice	1.643	1.643	70.725
DC6-48-60-18-8F	B	From Face	3.500	0.000	0.000	140.000	No Ice	0.917	0.917	32.800
(AT&T)			0.000				1/2" Ice	1.458	1.458	50.515
			0.000				1" Ice	1.643	1.643	70.725
DC6-48-60-18-8F	C	From Face	3.500	0.000	0.000	140.000	No Ice	0.917	0.917	32.800
(AT&T)			0.000				1/2" Ice	1.458	1.458	50.515
			0.000				1" Ice	1.643	1.643	70.725
(2) GPS	A	From Face	3.500	0.000	0.000	140.000	No Ice	0.267	0.267	15.000
(AT&T)			0.000				1/2" Ice	0.337	0.337	19.829
			0.000				1" Ice	0.415	0.415	26.148
Platform w/Rail	A	None			0.000	120.000	No Ice	35.850	35.850	2500.000
(Verizon)							1/2" Ice	40.460	40.460	3500.000
							1" Ice	45.070	45.070	4500.000
(4) BXA-70080/8CF	A	From Face	3.500	0.000	0.000	120.000	No Ice	8.291	6.449	23.000
(Verizon)			0.000				1/2" Ice	8.879	7.024	70.397
			0.000				1" Ice	9.474	7.607	125.021
(4) BXA-70080/8CF	B	From Face	3.500	0.000	0.000	120.000	No Ice	8.291	6.449	23.000
(Verizon)			0.000				1/2" Ice	8.879	7.024	70.397
			0.000				1" Ice	9.474	7.607	125.021
(4) BXA-70080/8CF	C	From Face	3.500	0.000	0.000	120.000	No Ice	8.291	6.449	23.000
(Verizon)			0.000				1/2" Ice	8.879	7.024	70.397
			0.000				1" Ice	9.474	7.607	125.021
(4) RRUS A2 Module	A	From Face	3.500	0.000	0.000	120.000	No Ice	1.600	0.455	21.160
(Verizon)			0.000				1/2" Ice	1.758	0.558	31.489
			0.000				1" Ice	1.924	0.667	44.034
(4) RRUS A2 Module	B	From Face	3.500	0.000	0.000	120.000	No Ice	1.600	0.455	21.160
(Verizon)			0.000				1/2" Ice	1.758	0.558	31.489
			0.000				1" Ice	1.924	0.667	44.034
(4) RRUS A2 Module	C	From Face	3.500	0.000	0.000	120.000	No Ice	1.600	0.455	21.160
(Verizon)			0.000				1/2" Ice	1.758	0.558	31.489
			0.000				1" Ice	1.924	0.667	44.034
(2) 3JR52709AA	A	From Face	3.500	0.000	0.000	120.000	No Ice	3.355	2.005	55.000
(Verizon)			0.000				1/2" Ice	3.612	2.237	78.159
			0.000				1" Ice	3.876	2.476	104.946
(2) 3JR52709AA	B	From Face	3.500	0.000	0.000	120.000	No Ice	3.355	2.005	55.000
(Verizon)			0.000				1/2" Ice	3.612	2.237	78.159
			0.000				1" Ice	3.876	2.476	104.946
(2) 3JR52709AA	C	From Face	3.500	0.000	0.000	120.000	No Ice	3.355	2.005	55.000
(Verizon)			0.000				1/2" Ice	3.612	2.237	78.159
			0.000				1" Ice	3.876	2.476	104.946
RRH 4x30-4R B13	A	From Face	3.500	0.000	0.000	120.000	No Ice	2.160	1.620	57.200
(Verizon)			0.000				1/2" Ice	2.350	1.794	76.813
			0.000				1" Ice	2.548	1.975	99.381

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
RRH 4x30-4R B13	B	From Face	3.500	0.000	120.000	No Ice	2.160	1.620	57.200
(Verizon)			0.000			1/2" Ice	2.350	1.794	76.813
			0.000			1" Ice	2.548	1.975	99.381
RRH 4x30-4R B13	C	From Face	3.500	0.000	120.000	No Ice	2.160	1.620	57.200
(Verizon)			0.000			1/2" Ice	2.350	1.794	76.813
			0.000			1" Ice	2.548	1.975	99.381
RRH 4x30-4R B25	A	From Face	3.500	0.000	120.000	No Ice	2.136	1.304	51.000
(Verizon)			0.000			1/2" Ice	2.325	1.460	68.438
			0.000			1" Ice	2.521	1.623	88.698
RRH 4x30-4R B25	B	From Face	3.500	0.000	120.000	No Ice	2.136	1.304	51.000
(Verizon)			0.000			1/2" Ice	2.325	1.460	68.438
			0.000			1" Ice	2.521	1.623	88.698
RRH 4x30-4R B25	C	From Face	3.500	0.000	120.000	No Ice	2.136	1.304	51.000
(Verizon)			0.000			1/2" Ice	2.325	1.460	68.438
			0.000			1" Ice	2.521	1.623	88.698
(4) 10"x7"x2" TMA	A	From Face	3.500	0.000	120.000	No Ice	0.583	0.182	15.000
(Verizon)			0.000			1/2" Ice	0.681	0.250	19.019
			0.000			1" Ice	0.787	0.325	24.463
(4) 10"x7"x2" TMA	B	From Face	3.500	0.000	120.000	No Ice	0.583	0.182	15.000
(Verizon)			0.000			1/2" Ice	0.681	0.250	19.019
			0.000			1" Ice	0.787	0.325	24.463
(4) 10"x7"x2" TMA	C	From Face	3.500	0.000	120.000	No Ice	0.583	0.182	15.000
(Verizon)			0.000			1/2" Ice	0.681	0.250	19.019
			0.000			1" Ice	0.787	0.325	24.463
OVP Junction Box	A	From Face	3.500	0.000	120.000	No Ice	3.791	2.511	32.000
(Verizon)			0.000			1/2" Ice	4.043	2.724	63.460
			0.000			1" Ice	4.302	2.944	98.675
OVP Junction Box	B	From Face	3.500	0.000	120.000	No Ice	3.791	2.511	32.000
(Verizon)			0.000			1/2" Ice	4.043	2.724	63.460
			0.000			1" Ice	4.302	2.944	98.675
OVP Junction Box	C	From Face	3.500	0.000	120.000	No Ice	3.791	2.511	32.000
(Verizon)			0.000			1/2" Ice	4.043	2.724	63.460
			0.000			1" Ice	4.302	2.944	98.675

Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	129.748	1.065	0.021	49.370	A	0.000	49.370	49.370	100.00	0.000	0.000
140.000-120.0					B	0.000	49.370		100.00	0.000	0.000
00					C	0.000	49.370		100.00	0.000	0.000
L2	107.689	1.009	0.020	69.116	A	0.000	69.116	69.116	100.00	0.000	0.000
120.000-96.00					B	0.000	69.116		100.00	0.000	0.000
0					C	0.000	69.116		100.00	0.000	0.000
L3	71.426	0.898	0.018	169.464	A	0.000	169.464	169.464	100.00	0.000	0.000
96.000-47.750					B	0.000	169.464		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	169.464		100.00	0.000	0.000
L4	23.893	0.7	0.014	203.208	A	0.000	203.208	203.208	100.00	0.000	0.000
47.750-1.000					B	0.000	203.208		100.00	0.000	0.000
					C	0.000	203.208		100.00	0.000	0.000

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	129.748	1.065	0.006	1.720	55.103	A	0.000	55.103	55.103	100.00	0.000	0.000
140.000-120.000						B	0.000	55.103		100.00	0.000	0.000
						C	0.000	55.103		100.00	0.000	0.000
L2	107.689	1.009	0.006	1.688	75.870	A	0.000	75.870	75.870	100.00	0.000	0.000
120.000-96.000						B	0.000	75.870		100.00	0.000	0.000
						C	0.000	75.870		100.00	0.000	0.000
L3	71.426	0.898	0.005	1.620	183.041	A	0.000	183.041	183.041	100.00	0.000	0.000
96.000-47.750						B	0.000	183.041		100.00	0.000	0.000
						C	0.000	183.041		100.00	0.000	0.000
L4 47.750-1.000	23.893	0.7	0.004	1.452	215.833	A	0.000	215.833	215.833	100.00	0.000	0.000
						B	0.000	215.833		100.00	0.000	0.000
						C	0.000	215.833		100.00	0.000	0.000

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	129.748	1.065	0.008	49.370	A	0.000	49.370	49.370	100.00	0.000	0.000
140.000-120.0					B	0.000	49.370		100.00	0.000	0.000
00					C	0.000	49.370		100.00	0.000	0.000
L2	107.689	1.009	0.008	69.116	A	0.000	69.116	69.116	100.00	0.000	0.000
120.000-96.00					B	0.000	69.116		100.00	0.000	0.000
0					C	0.000	69.116		100.00	0.000	0.000
L3	71.426	0.898	0.007	169.464	A	0.000	169.464	169.464	100.00	0.000	0.000
96.000-47.750					B	0.000	169.464		100.00	0.000	0.000
					C	0.000	169.464		100.00	0.000	0.000
L4	23.893	0.7	0.006	203.208	A	0.000	203.208	203.208	100.00	0.000	0.000
47.750-1.000					B	0.000	203.208		100.00	0.000	0.000
					C	0.000	203.208		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F lb	w klf	Ctrl. Face
L1	79.600	1563.891	A	1	0.65	0.021	1	1	49.370	756.806	0.038	C
140.000-120.0			B	1	0.65		1	1	49.370			
00			C	1	0.65		1	1	49.370			
L2	523.200	2191.700	A	1	0.65	0.020	1	1	69.116	1004.575	0.042	C
120.000-96.00			B	1	0.65		1	1	69.116			
0			C	1	0.65		1	1	69.116			
L3	1051.850	7342.187	A	1	0.65	0.018	1	1	169.464	2178.906	0.045	C
96.000-47.750			B	1	0.65		1	1	169.464			
			C	1	0.65		1	1	169.464			
L4	1019.150	10855.112	A	1	0.65	0.014	1	1	203.208	2099.990	0.045	C
47.750-1.000			B	1	0.65		1	1	203.208			
			C	1	0.65		1	1	203.208			
Sum Weight:	2673.800	21952.890						OTM	406140.72 7 lb-ft	6040.277		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F lb	w klf	Ctrl. Face
L1	79.600	1563.891	A	1	0.65	0.021	1	1	49.370	756.806	0.038	C
140.000-120.0			B	1	0.65		1	1	49.370			
00			C	1	0.65		1	1	49.370			
L2	523.200	2191.700	A	1	0.65	0.020	1	1	69.116	1004.575	0.042	C
120.000-96.00			B	1	0.65		1	1	69.116			
0			C	1	0.65		1	1	69.116			
L3	1051.850	7342.187	A	1	0.65	0.018	1	1	169.464	2178.906	0.045	C
96.000-47.750			B	1	0.65		1	1	169.464			
			C	1	0.65		1	1	169.464			
L4	1019.150	10855.112	A	1	0.65	0.014	1	1	203.208	2099.990	0.045	C
47.750-1.000			B	1	0.65		1	1	203.208			
			C	1	0.65		1	1	203.208			
Sum Weight:	2673.800	21952.890						OTM	406140.72 7 lb-ft	6040.277		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F lb	w klf	Ctrl. Face
L1	79.600	1563.891	A	1	0.65	0.021	1	1	49.370	756.806	0.038	C
140.000-120.0			B	1	0.65		1	1	49.370			
00			C	1	0.65		1	1	49.370			
L2	523.200	2191.700	A	1	0.65	0.020	1	1	69.116	1004.575	0.042	C
120.000-96.00			B	1	0.65		1	1	69.116			
0			C	1	0.65		1	1	69.116			
L3	1051.850	7342.187	A	1	0.65	0.018	1	1	169.464	2178.906	0.045	C

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F lb	w klf	Ctrl. Face
96.000-47.750			B	1	0.65		1	1	169.464			
			C	1	0.65		1	1	169.464			
L4	1019.150	10855.112	A	1	0.65	0.014	1	1	203.208	2099.990	0.045	C
47.750-1.000			B	1	0.65		1	1	203.208			
			C	1	0.65		1	1	203.208			
Sum Weight:	2673.800	21952.890						OTM	406140.72 7 lb-ft	6040.277		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F lb	w klf	Ctrl. Face
L1	79.600	2877.268	A	1	1.2	0.006	1	1	55.103	470.790	0.024	C
140.000-120.0			B	1	1.2		1	1	55.103			
00			C	1	1.2		1	1	55.103			
L2	523.200	3980.208	A	1	1.2	0.006	1	1	75.870	614.603	0.026	C
120.000-96.00			B	1	1.2		1	1	75.870			
0			C	1	1.2		1	1	75.870			
L3	1051.850	11508.751	A	1	1.2	0.005	1	1	182.495	1307.786	0.027	C
96.000-47.750			B	1	1.2		1	1	182.495			
			C	1	1.2		1	1	182.495			
L4	1019.150	15286.603	A	1	1.2	0.004	1	1	214.524	1235.599	0.026	C
47.750-1.000			B	1	1.2		1	1	214.524			
			C	1	1.2		1	1	214.524			
Sum Weight:	2673.800	33652.830						OTM	246573.14 9 lb-ft	3628.779		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F lb	w klf	Ctrl. Face
L1	79.600	2877.268	A	1	1.2	0.006	1	1	55.103	470.790	0.024	C
140.000-120.0			B	1	1.2		1	1	55.103			
00			C	1	1.2		1	1	55.103			
L2	523.200	3980.208	A	1	1.2	0.006	1	1	75.870	614.603	0.026	C
120.000-96.00			B	1	1.2		1	1	75.870			
0			C	1	1.2		1	1	75.870			
L3	1051.850	11508.751	A	1	1.2	0.005	1	1	182.495	1307.786	0.027	C
96.000-47.750			B	1	1.2		1	1	182.495			
			C	1	1.2		1	1	182.495			
L4	1019.150	15286.603	A	1	1.2	0.004	1	1	214.524	1235.599	0.026	C
47.750-1.000			B	1	1.2		1	1	214.524			
			C	1	1.2		1	1	214.524			
Sum Weight:	2673.800	33652.830						OTM	246573.14 9 lb-ft	3628.779		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F lb	w klf	Ctrl. Face
L1	79.600	2877.268	A	1	1.2	0.006	1	1	55.103	470.790	0.024	C
140.000-120.0			B	1	1.2		1	1	55.103			
00			C	1	1.2		1	1	55.103			
L2	523.200	3980.208	A	1	1.2	0.006	1	1	75.870	614.603	0.026	C
120.000-96.00			B	1	1.2		1	1	75.870			
0			C	1	1.2		1	1	75.870			
L3	1051.850	11508.751	A	1	1.2	0.005	1	1	182.495	1307.786	0.027	C
96.000-47.750			B	1	1.2		1	1	182.495			
			C	1	1.2		1	1	182.495			
L4	1019.150	15286.603	A	1	1.2	0.004	1	1	214.524	1235.599	0.026	C
47.750-1.000			B	1	1.2		1	1	214.524			
			C	1	1.2		1	1	214.524			
Sum Weight:	2673.800	33652.830						OTM	246573.14 9 lb-ft	3628.779		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F lb	w klf	Ctrl. Face
L1	79.600	1563.891	A	1	0.65	0.008	1	1	49.370	294.374	0.015	C
140.000-120.0			B	1	0.65		1	1	49.370			
00			C	1	0.65		1	1	49.370			
L2	523.200	2191.700	A	1	0.65	0.008	1	1	69.116	390.749	0.016	C
120.000-96.00			B	1	0.65		1	1	69.116			
0			C	1	0.65		1	1	69.116			
L3	1051.850	7342.187	A	1	0.65	0.007	1	1	169.464	847.527	0.018	C
96.000-47.750			B	1	0.65		1	1	169.464			
			C	1	0.65		1	1	169.464			
L4	1019.150	10855.112	A	1	0.65	0.006	1	1	203.208	816.831	0.017	C
47.750-1.000			B	1	0.65		1	1	203.208			
			C	1	0.65		1	1	203.208			
Sum Weight:	2673.800	21952.890						OTM	157976.16 9 lb-ft	2349.481		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F lb	w klf	Ctrl. Face
L1	79.600	1563.891	A	1	0.65	0.008	1	1	49.370	294.374	0.015	C
140.000-120.0			B	1	0.65		1	1	49.370			
00			C	1	0.65		1	1	49.370			
L2	523.200	2191.700	A	1	0.65	0.008	1	1	69.116	390.749	0.016	C
120.000-96.00			B	1	0.65		1	1	69.116			
0			C	1	0.65		1	1	69.116			
L3	1051.850	7342.187	A	1	0.65	0.007	1	1	169.464	847.527	0.018	C
96.000-47.750			B	1	0.65		1	1	169.464			
			C	1	0.65		1	1	169.464			
L4	1019.150	10855.112	A	1	0.65	0.006	1	1	203.208	816.831	0.017	C
47.750-1.000			B	1	0.65		1	1	203.208			
			C	1	0.65		1	1	203.208			
Sum Weight:	2673.800	21952.890						OTM	157976.16 9 lb-ft	2349.481		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F lb	w klf	Ctrl. Face
L1	79.600	1563.891	A	1	0.65	0.008	1	1	49.370	294.374	0.015	C
140.000-120.0			B	1	0.65		1	1	49.370			
00			C	1	0.65		1	1	49.370			
L2	523.200	2191.700	A	1	0.65	0.008	1	1	69.116	390.749	0.016	C
120.000-96.00			B	1	0.65		1	1	69.116			
0			C	1	0.65		1	1	69.116			
L3	1051.850	7342.187	A	1	0.65	0.007	1	1	169.464	847.527	0.018	C
96.000-47.750			B	1	0.65		1	1	169.464			
			C	1	0.65		1	1	169.464			
L4	1019.150	10855.112	A	1	0.65	0.006	1	1	203.208	816.831	0.017	C
47.750-1.000			B	1	0.65		1	1	203.208			
			C	1	0.65		1	1	203.208			
Sum Weight:	2673.800	21952.890						OTM	157976.16 9 lb-ft	2349.481		

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Leg Weight	21952.890					
Bracing Weight	0.000					
Total Member Self-Weight	21952.890			-69.375	120.161	
Total Weight	32581.810			-69.375	120.161	
Wind 0 deg - No Ice		0.000	-12442.688	-1230579.307	120.161	-46.338
Wind 30 deg - No Ice		6221.344	-10775.684	-1065722.236	-615134.805	-53.506
Wind 60 deg - No Ice		10775.684	-6221.344	-615324.341	-1065532.700	-46.338

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Wind 90 deg - No Ice		12442.688	0.000	-69.375	-1230389.771	-26.753
Wind 120 deg - No Ice		10775.684	6221.344	615185.591	-1065532.700	0.000
Wind 150 deg - No Ice		6221.344	10775.684	1065583.486	-615134.805	26.753
Wind 180 deg - No Ice		0.000	12442.688	1230440.557	120.161	46.338
Wind 210 deg - No Ice		-6221.344	10775.684	1065583.486	615375.127	53.506
Wind 240 deg - No Ice		-10775.684	6221.344	615185.591	1065773.022	46.338
Wind 270 deg - No Ice		-12442.688	0.000	-69.375	1230630.093	26.753
Wind 300 deg - No Ice		-10775.684	-6221.344	-615324.341	1065773.022	0.000
Wind 330 deg - No Ice		-6221.344	-10775.684	-1065722.236	615375.127	-26.753
Member Ice	11699.940					
Total Weight Ice	59438.393			-181.598	314.538	
Wind 0 deg - Ice		0.000	-6192.090	-576341.429	314.538	-28.599
Wind 30 deg - Ice		3096.045	-5362.508	-499150.648	-287765.378	-33.023
Wind 60 deg - Ice		5362.508	-3096.045	-288261.513	-498654.512	-28.599
Wind 90 deg - Ice		6192.090	0.000	-181.598	-575845.293	-16.512
Wind 120 deg - Ice		5362.508	3096.045	287898.317	-498654.512	0.000
Wind 150 deg - Ice		3096.045	5362.508	498787.451	-287765.378	16.512
Wind 180 deg - Ice		0.000	6192.090	575978.232	314.538	28.599
Wind 210 deg - Ice		-3096.045	5362.508	498787.451	288394.453	33.023
Wind 240 deg - Ice		-5362.508	3096.045	287898.317	499283.587	28.599
Wind 270 deg - Ice		-6192.090	0.000	-181.598	576474.368	16.512
Wind 300 deg - Ice		-5362.508	-3096.045	-288261.513	499283.587	0.000
Wind 330 deg - Ice		-3096.045	-5362.508	-499150.648	288394.453	-16.512
Total Weight	32581.810			-69.375	120.161	
Wind 0 deg - Service		0.000	-4839.821	-478699.644	120.161	-18.024
Wind 30 deg - Service		2419.910	-4191.408	-414575.347	-239194.973	-20.812
Wind 60 deg - Service		4191.408	-2419.910	-239384.509	-414385.811	-18.024
Wind 90 deg - Service		4839.821	0.000	-69.375	-478510.108	-10.406
Wind 120 deg - Service		4191.408	2419.910	239245.759	-414385.811	0.000
Wind 150 deg - Service		2419.910	4191.408	414436.597	-239194.973	10.406
Wind 180 deg - Service		0.000	4839.821	478560.894	120.161	18.024
Wind 210 deg - Service		-2419.910	4191.408	414436.597	239435.295	20.812
Wind 240 deg - Service		-4191.408	2419.910	239245.759	414626.133	18.024
Wind 270 deg - Service		-4839.821	0.000	-69.375	478750.430	10.406
Wind 300 deg - Service		-4191.408	-2419.910	-239384.509	414626.133	0.000
Wind 330 deg - Service		-2419.910	-4191.408	-414575.347	239435.295	-10.406

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice

Comb. No.	Description
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	140 - 120	Pole	Max Tension	26	0.000	0.000	0.000
			Max. Compression	26	-15269.640	338.570	195.473
			Max. Mx	20	-6485.401	117020.547	82.552
			Max. My	2	-6485.428	142.985	116959.024
			Max. Vy	20	-6501.820	117020.547	82.552
			Max. Vx	2	-6501.792	142.985	116959.024
			Max. Torque	16			-93.196
L2	120 - 96	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-31895.604	338.570	195.473
			Max. Mx	20	-13530.045	352821.008	84.233
			Max. My	2	-13530.080	145.897	352758.722
			Max. Vy	20	-13219.374	352821.008	84.233
			Max. Vx	2	-13219.338	145.897	352758.722
			Max. Torque	16			-93.189
L3	96 - 47.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-45789.011	338.570	195.473
			Max. Mx	20	-23143.998	1052606.564	86.889

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. My	2	-23144.012	150.496	1052542.905
			Max. Vy	20	-16525.124	1052606.564	86.889
			Max. Vx	2	-16525.103	150.496	1052542.905
			Max. Torque	16			-93.156
L4	47.75 - 1	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-67024.255	338.570	195.473
			Max. Mx	20	-39088.891	2024921.331	87.788
			Max. My	2	-39088.891	152.053	2024857.066
			Max. Vy	20	-19926.523	2024921.331	87.788
			Max. Vx	2	-19926.522	152.053	2024857.066
			Max. Torque	16			-93.071

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	36	67024.255	6192.104	0.000
	Max. H_x	20	39098.173	19908.304	0.000
	Max. H_z	2	39098.173	0.000	19908.304
	Max. M_x	2	2024857.066	0.000	19908.304
	Max. M_z	8	2024617.225	-19908.304	0.000
	Max. Torsion	4	93.036	-9954.151	17241.095
	Min. Vert	11	29323.629	-17241.095	-9954.151
	Min. H_x	8	39098.173	-19908.304	0.000
	Min. H_z	14	39098.173	0.000	-19908.304
	Min. M_x	14	-2024681.491	0.000	-19908.304
	Min. M_z	20	-2024921.331	19908.304	0.000
	Min. Torsion	16	-93.039	9954.151	-17241.095

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	32581.810	0.000	0.000	-69.375	120.161	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	39098.173	-0.000	-19908.304	-2024857.066	152.042	-80.573
0.9 Dead+1.6 Wind 0 deg - No Ice	29323.629	-0.000	-19908.302	-2010305.141	112.472	-78.868
1.2 Dead+1.6 Wind 30 deg - No Ice	39098.172	9954.151	-17241.095	-1753591.442	-1012233.771	-93.036
0.9 Dead+1.6 Wind 30 deg - No Ice	29323.629	9954.151	-17241.095	-1740984.641	-1005007.990	-91.068
1.2 Dead+1.6 Wind 60 deg - No Ice	39098.172	17241.095	-9954.151	-1012473.591	-1753351.613	-80.575

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
0.9 Dead+1.6 Wind 60 deg - No Ice	29323.629	17241.095	-9954.151	-1005185.395	-1740807.230	-78.869
1.2 Dead+1.6 Wind 90 deg - No Ice	39098.173	19908.304	-0.000	-87.781	-2024617.225	-46.519
0.9 Dead+1.6 Wind 90 deg - No Ice	29323.629	19908.302	-0.000	-64.936	-2010127.722	-45.535
1.2 Dead+1.6 Wind 120 deg - No Ice	39098.172	17241.095	9954.151	1012298.025	-1753351.607	0.002
0.9 Dead+1.6 Wind 120 deg - No Ice	29323.629	17241.095	9954.151	1005055.521	-1740807.226	0.001
1.2 Dead+1.6 Wind 150 deg - No Ice	39098.172	9954.151	17241.095	1753415.869	-1012233.766	46.517
0.9 Dead+1.6 Wind 150 deg - No Ice	29323.629	9954.151	17241.095	1740854.763	-1005007.986	45.534
1.2 Dead+1.6 Wind 180 deg - No Ice	39098.173	-0.000	19908.304	2024681.491	152.042	80.573
0.9 Dead+1.6 Wind 180 deg - No Ice	29323.629	-0.000	19908.302	2010175.261	112.472	78.868
1.2 Dead+1.6 Wind 210 deg - No Ice	39098.172	-9954.151	17241.095	1753415.880	1012537.855	93.039
0.9 Dead+1.6 Wind 210 deg - No Ice	29323.629	-9954.151	17241.095	1740854.770	1005232.933	91.069
1.2 Dead+1.6 Wind 240 deg - No Ice	39098.172	-17241.095	9954.151	1012298.035	1753655.708	80.571
0.9 Dead+1.6 Wind 240 deg - No Ice	29323.629	-17241.095	9954.151	1005055.528	1741032.181	78.867
1.2 Dead+1.6 Wind 270 deg - No Ice	39098.173	-19908.304	-0.000	-87.781	2024921.331	46.519
0.9 Dead+1.6 Wind 270 deg - No Ice	29323.629	-19908.302	-0.000	-64.936	2010352.681	45.534
1.2 Dead+1.6 Wind 300 deg - No Ice	39098.172	-17241.095	-9954.151	-1012473.601	1753655.714	0.002
0.9 Dead+1.6 Wind 300 deg - No Ice	29323.629	-17241.095	-9954.151	-1005185.402	1741032.185	0.001
1.2 Dead+1.6 Wind 330 deg - No Ice	39098.172	-9954.151	-17241.095	-1753591.452	1012537.860	-46.520
0.9 Dead+1.6 Wind 330 deg - No Ice	29323.629	-9954.151	-17241.095	-1740984.648	1005232.937	-45.535
1.2 Dead+1.0 Ice+1.0 Temp	67024.255	0.000	0.000	-195.473	338.570	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	67024.255	-0.000	-6192.104	-611539.026	381.823	-33.169
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	67024.255	3096.052	-5362.519	-529637.858	-305277.464	-38.300
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	67024.255	5362.519	-3096.052	-305879.727	-529035.579	-33.169
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	67024.255	6192.104	-0.000	-220.446	-610936.727	-19.150
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	67024.255	5362.519	3096.052	305438.830	-529035.570	0.000
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	67024.255	3096.052	5362.519	529196.950	-305277.454	19.150
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	67024.255	-0.000	6192.104	611098.112	381.823	33.169
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	67024.255	-3096.052	5362.519	529196.967	306041.110	38.300
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	67024.255	-5362.519	3096.052	305438.847	529799.245	33.168
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	67024.255	-6192.104	-0.000	-220.446	611700.412	19.150
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	67024.255	-5362.519	-3096.052	-305879.744	529799.255	0.000

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	67024.255	-3096.052	-5362.519	-529637.875	306041.120	-19.150
Dead+Wind 0 deg - Service	32581.810	-0.000	-4839.821	-490103.015	125.740	-19.360
Dead+Wind 30 deg - Service	32581.810	2419.910	-4191.408	-424451.388	-244889.471	-22.355
Dead+Wind 60 deg - Service	32581.810	4191.408	-2419.910	-245087.806	-424253.052	-19.360
Dead+Wind 90 deg - Service	32581.810	4839.821	-0.000	-72.596	-489904.679	-11.178
Dead+Wind 120 deg - Service	32581.810	4191.408	2419.910	244942.614	-424253.052	0.000
Dead+Wind 150 deg - Service	32581.810	2419.910	4191.408	424306.196	-244889.470	11.178
Dead+Wind 180 deg - Service	32581.810	-0.000	4839.821	489957.823	125.740	19.360
Dead+Wind 210 deg - Service	32581.810	-2419.910	4191.408	424306.196	245140.950	22.355
Dead+Wind 240 deg - Service	32581.810	-4191.408	2419.910	244942.615	424504.532	19.360
Dead+Wind 270 deg - Service	32581.810	-4839.821	-0.000	-72.596	490156.159	11.178
Dead+Wind 300 deg - Service	32581.810	-4191.408	-2419.910	-245087.806	424504.532	0.000
Dead+Wind 330 deg - Service	32581.810	-2419.910	-4191.408	-424451.388	245140.950	-11.178

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	lb	lb	lb	lb	lb	lb	
1	0.000	-32581.810	0.000	0.000	32581.810	0.000	0.000%
2	0.000	-39098.172	-19908.301	0.000	39098.173	19908.304	0.000%
3	0.000	-29323.629	-19908.301	0.000	29323.629	19908.302	0.000%
4	9954.151	-39098.172	-17241.095	-9954.151	39098.172	17241.095	0.000%
5	9954.151	-29323.629	-17241.095	-9954.151	29323.629	17241.095	0.000%
6	17241.095	-39098.172	-9954.151	-17241.095	39098.172	9954.151	0.000%
7	17241.095	-29323.629	-9954.151	-17241.095	29323.629	9954.151	0.000%
8	19908.301	-39098.172	0.000	-19908.304	39098.173	0.000	0.000%
9	19908.301	-29323.629	0.000	-19908.302	29323.629	0.000	0.000%
10	17241.095	-39098.172	9954.151	-17241.095	39098.172	-9954.151	0.000%
11	17241.095	-29323.629	9954.151	-17241.095	29323.629	-9954.151	0.000%
12	9954.151	-39098.172	17241.095	-9954.151	39098.172	-17241.095	0.000%
13	9954.151	-29323.629	17241.095	-9954.151	29323.629	-17241.095	0.000%
14	0.000	-39098.172	19908.301	0.000	39098.173	-19908.304	0.000%
15	0.000	-29323.629	19908.301	0.000	29323.629	-19908.302	0.000%
16	-9954.151	-39098.172	17241.095	9954.151	39098.172	-17241.095	0.000%
17	-9954.151	-29323.629	17241.095	9954.151	29323.629	-17241.095	0.000%
18	-17241.095	-39098.172	9954.151	17241.095	39098.172	-9954.151	0.000%
19	-17241.095	-29323.629	9954.151	17241.095	29323.629	-9954.151	0.000%
20	-19908.301	-39098.172	0.000	19908.304	39098.173	0.000	0.000%
21	-19908.301	-29323.629	0.000	19908.302	29323.629	0.000	0.000%
22	-17241.095	-39098.172	-9954.151	17241.095	39098.172	9954.151	0.000%
23	-17241.095	-29323.629	-9954.151	17241.095	29323.629	9954.151	0.000%
24	-9954.151	-39098.172	-17241.095	9954.151	39098.172	17241.095	0.000%
25	-9954.151	-29323.629	-17241.095	9954.151	29323.629	17241.095	0.000%
26	0.000	-67024.255	0.000	0.000	67024.255	0.000	0.000%
27	0.000	-67024.255	-6192.090	0.000	67024.255	6192.104	0.000%
28	3096.045	-67024.255	-5362.508	-3096.052	67024.255	5362.519	0.000%
29	5362.508	-67024.255	-3096.045	-5362.519	67024.255	3096.052	0.000%
30	6192.090	-67024.255	0.000	-6192.104	67024.255	0.000	0.000%
31	5362.508	-67024.255	3096.045	-5362.519	67024.255	-3096.052	0.000%
32	3096.045	-67024.255	5362.508	-3096.052	67024.255	-5362.519	0.000%
33	0.000	-67024.255	6192.090	0.000	67024.255	-6192.104	0.000%
34	-3096.045	-67024.255	5362.508	3096.052	67024.255	-5362.519	0.000%
35	-5362.508	-67024.255	3096.045	5362.519	67024.255	-3096.052	0.000%
36	-6192.090	-67024.255	0.000	6192.104	67024.255	0.000	0.000%
37	-5362.508	-67024.255	-3096.045	5362.519	67024.255	3096.052	0.000%
38	-3096.045	-67024.255	-5362.508	3096.052	67024.255	5362.519	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
39	0.000	-32581.810	-4839.821	0.000	32581.810	4839.821	0.000%
40	2419.910	-32581.810	-4191.408	-2419.910	32581.810	4191.408	0.000%
41	4191.408	-32581.810	-2419.910	-4191.408	32581.810	2419.910	0.000%
42	4839.821	-32581.810	0.000	-4839.821	32581.810	0.000	0.000%
43	4191.408	-32581.810	2419.910	-4191.408	32581.810	-2419.910	0.000%
44	2419.910	-32581.810	4191.408	-2419.910	32581.810	-4191.408	0.000%
45	0.000	-32581.810	4839.821	0.000	32581.810	-4839.821	0.000%
46	-2419.910	-32581.810	4191.408	2419.910	32581.810	-4191.408	0.000%
47	-4191.408	-32581.810	2419.910	4191.408	32581.810	-2419.910	0.000%
48	-4839.821	-32581.810	0.000	4839.821	32581.810	0.000	0.000%
49	-4191.408	-32581.810	-2419.910	4191.408	32581.810	2419.910	0.000%
50	-2419.910	-32581.810	-4191.408	2419.910	32581.810	4191.408	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00016283
3	Yes	4	0.00000001	0.00008784
4	Yes	5	0.00000001	0.00031213
5	Yes	5	0.00000001	0.00015056
6	Yes	5	0.00000001	0.00031517
7	Yes	5	0.00000001	0.00015207
8	Yes	4	0.00000001	0.00014838
9	Yes	4	0.00000001	0.00007615
10	Yes	5	0.00000001	0.00031359
11	Yes	5	0.00000001	0.00015130
12	Yes	5	0.00000001	0.00031278
13	Yes	5	0.00000001	0.00015090
14	Yes	4	0.00000001	0.00016280
15	Yes	4	0.00000001	0.00008782
16	Yes	5	0.00000001	0.00031551
17	Yes	5	0.00000001	0.00015222
18	Yes	5	0.00000001	0.00031246
19	Yes	5	0.00000001	0.00015070
20	Yes	4	0.00000001	0.00014843
21	Yes	4	0.00000001	0.00007617
22	Yes	5	0.00000001	0.00031402
23	Yes	5	0.00000001	0.00015146
24	Yes	5	0.00000001	0.00031484
25	Yes	5	0.00000001	0.00015186
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00027439
28	Yes	5	0.00000001	0.00031943
29	Yes	5	0.00000001	0.00031977
30	Yes	5	0.00000001	0.00027376
31	Yes	5	0.00000001	0.00031907
32	Yes	5	0.00000001	0.00031898
33	Yes	5	0.00000001	0.00027394
34	Yes	5	0.00000001	0.00032019
35	Yes	5	0.00000001	0.00031984
36	Yes	5	0.00000001	0.00027455
37	Yes	5	0.00000001	0.00032053
38	Yes	5	0.00000001	0.00032063
39	Yes	4	0.00000001	0.00003022

40	Yes	4	0.00000001	0.00015321
41	Yes	4	0.00000001	0.00015744
42	Yes	4	0.00000001	0.00002993
43	Yes	4	0.00000001	0.00015517
44	Yes	4	0.00000001	0.00015405
45	Yes	4	0.00000001	0.00003020
46	Yes	4	0.00000001	0.00015794
47	Yes	4	0.00000001	0.00015368
48	Yes	4	0.00000001	0.00002997
49	Yes	4	0.00000001	0.00015585
50	Yes	4	0.00000001	0.00015700

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 120	10.529	49	0.640	0.000
L2	120 - 96	7.894	49	0.610	0.000
L3	101.25 - 47.75	5.639	49	0.530	0.000
L4	54.25 - 1	1.582	49	0.272	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
140.000	C10855721C Platform w/Rail	49	10.529	0.640	0.000	72323
120.000	Platform w/Rail	49	7.894	0.610	0.000	18526

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 120	43.527	20	2.644	0.001
L2	120 - 96	32.637	20	2.521	0.000
L3	101.25 - 47.75	23.314	20	2.192	0.000
L4	54.25 - 1	6.541	20	1.123	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
140.000	C10855721C Platform w/Rail	20	43.527	2.644	0.001	17612
120.000	Platform w/Rail	20	32.637	2.521	0.000	4509

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
L1	140 - 120 (1)	TP31.419x27x0.25	20.000	0.000	0.0	24.733	-6485.380	1724110.000	0.004
L2	120 - 96 (2)	TP36.723x31.419x0.25	24.000	0.000	0.0	28.021	-13530.000	1866770.000	0.007
L3	96 - 47.75 (3)	TP46.885x35.063x0.313	53.500	0.000	0.0	44.769	-23144.000	2956030.000	0.008
L4	47.75 - 1 (4)	TP56.59x44.823x0.375	53.250	0.000	0.0	66.910	-39088.898	4349740.000	0.009

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	140 - 120 (1)	TP31.419x27x0.25	117043.333	1104883.333	0.106	0.000	1104883.333	0.000
L2	120 - 96 (2)	TP36.723x31.419x0.25	352844.167	1356591.667	0.260	0.000	1356591.667	0.000
L3	96 - 47.75 (3)	TP46.885x35.063x0.313	1052633.333	2746158.333	0.383	0.000	2746158.333	0.000
L4	47.75 - 1 (4)	TP56.59x44.823x0.375	2024950.000	5034083.333	0.402	0.000	5034083.333	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	140 - 120 (1)	TP31.419x27x0.25	6502.070	862055.000	0.008	0.000	2215150.000	0.000
L2	120 - 96 (2)	TP36.723x31.419x0.25	13219.500	933386.000	0.014	0.001	2719416.667	0.000
L3	96 - 47.75 (3)	TP46.885x35.063x0.313	16525.100	1478010.000	0.011	0.001	5504775.000	0.000
L4	47.75 - 1 (4)	TP56.59x44.823x0.375	19926.500	2174870.000	0.009	0.002	10090666.667	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	140 - 120 (1)	0.004	0.106	0.000	0.008	0.000	0.110 ✔	1.000	4.8.2 ✔
L2	120 - 96 (2)	0.007	0.260	0.000	0.014	0.000	0.268 ✔	1.000	4.8.2 ✔

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L3	96 - 47.75 (3)	0.008	0.383	0.000	0.011	0.000	0.391 ✔	1.000	4.8.2 ✔
L4	47.75 - 1 (4)	0.009	0.402	0.000	0.009	0.000	0.411 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L1	140 - 120	Pole	TP31.419x27x0.25	1	-6485.380	1724110.000	11.0	Pass
L2	120 - 96	Pole	TP36.723x31.419x0.25	2	-13530.000	1866770.000	26.8	Pass
L3	96 - 47.75	Pole	TP46.885x35.063x0.313	3	-23144.000	2956030.000	39.1	Pass
L4	47.75 - 1	Pole	TP56.59x44.823x0.375	4	-39088.898	4349740.000	41.1	Pass
							Summary	
							Pole (L4) 41.1	Pass
							RATING = 41.1	**Pass**

Site Number:	**28493**
Site Name:	**Bethel West 2**
Job Number:	**REV03**
Engineer:	**CRB**
Date:	**9/2/2020**

Base Plate and Bolt Analysis

Moment:	2024.9	k-ft
Shear/Leg:	19.9	k
Compression/Leg:	39.1	k

TIA-222 Code Revision:	G	
Anchor Bolt Arrangement:	Round	
Monopole Shaft Diameter (Across Flats):	56.6	in
Lower Monopole Thickness:	0.375	in
# of Sides of Pole:	18	
Monopole Shaft Yield Strength:	65	ksi
Baseplate Diameter / Length:	69.00	
Base Plate Thickness:	2.25	in
Base Plate Yield Strength:	50	ksi
Baseplate Detail Type:	D	
Include Plate Thickness Beyond Bolt Circle:	Y	
Stress Increase:	1.00	
Fillet Weld Size:	0.375	in
Weld Type (CJP or F/F):	CJP	
Weld Strength:	70	ksi

Anchor Bolts

Anchor Bolt Yield Strength:	75	ksi
Anchor Bolt Ultimate Strength:	100	ksi
Anchor Bolt Diameter:	2.25	in
Anchor Bolt Circle:	63.25	in
# of Anchor Bolts:	16	
Minimum Anchor Bolt Separation:	6.00	in
Additional Anchor Bolts Installed:	N	

	Baseplate Flexural Capacity					Baseplate Shear Capacity			
Failure Mode:	Effective Width (in)	Moment (k-in)	S/Z (in^3)	Capacity (k-in)	Usage	Shear (k)	Area (in^2)	Capacity (k)	Usage
AA	32.75	496.0	41.5	1865.3	0.27	280.7	73.7	1989.6	0.14
AB	40.66	929.2	51.5	2315.6	0.40	280.7	91.5	2469.9	0.11
BA	30.93	373.4	39.1	1761.6	0.21	280.7	69.6	1879.0	0.15
BB	37.05	755.1	46.9	2110.0	0.36	280.7	83.4	2250.7	0.12

Anchor Bolt Capacity

Area of Bolt:	3.25	in^2
Inertia of Bolt:	0.84	in^4
Total Bolt Inertia:	25998.5	in^4
Maximum Bolt Tension:	93.5	k
Maximum Bolt Compression:	98.4	k
Bolt Shear:	1.2	k
Tensile Bolt Capacity:	259.8	k
Compressive Bolt Capacity:	259.8	k
Shear Bolt Capacity:	140.3	k
Interaction Equation:	0.39	Result:
		OK

Base Weld Capacity

Force / Weld:	7.7	k/in
Weld Capacity:	26.6	k/in
Interaction Equation:	0.29	Result:
		OK

SES Base Plate Design Moment:	327.8	k-in
Design Stress:	23.3	ksi
SES Base Plate Allowable Stress / Moment Capacity:	632.8	ksi / k-in
Usage:	0.52	
Moment Factor:	2.83	
Length Factor:	3.66	

Site Number:	**28493**
Site Name:	**Bethel West 2**
Job Number:	**REV03**
Engineer:	**CRB**
Date:	**9/2/2020**

Flange @ 120'

Moment:	117.0	k-ft
Shear/Leg:	6.5	k
Compression/Leg:	6.5	k

TIA-222 Code Revision:	G	
Anchor Bolt Arrangement:	Round	
Monopole Shaft Diameter (Across Flats):	31.4	in
Lower Monopole Thickness:	0.250	in
# of Sides of Pole:	18	
Monopole Shaft Yield Strength:	65	ksi
Baseplate Diameter / Length:	37.50	
Base Plate Thickness:	1.50	in
Base Plate Yield Strength:	50	ksi
Baseplate Detail Type:	D	
Include Plate Thickness Beyond Bolt Circle:	Y	
Stress Increase:	1.00	
Fillet Weld Size:	0.375	in
Weld Type (CJP or F/F):	CJP	
Weld Strength:	70	ksi

Anchor Bolts

Anchor Bolt Yield Strength:	92	ksi
Anchor Bolt Ultimate Strength:	120	ksi
Anchor Bolt Diameter:	1.00	in
Anchor Bolt Circle:	35.00	in
# of Anchor Bolts:	6	
Minimum Anchor Bolt Separation:	2.67	in
Additional Anchor Bolts Installed:	N	

	Baseplate Flexural Capacity					Baseplate Shear Capacity			
Failure Mode:	Effective Width (in)	Moment (k-in)	S/Z (in^3)	Capacity (k-in)	Usage	Shear (k)	Area (in^2)	Capacity (k)	Usage
AA	18.42	49.8	10.4	466.3	0.11	27.8	27.6	746.0	0.04
AB	13.61	49.8	7.7	344.4	0.14	27.8	20.4	551.1	0.05
BA	17.39	43.1	9.8	440.2	0.10	27.8	26.1	704.3	0.04
BB	10.55	43.1	5.9	267.1	0.16	27.8	15.8	427.3	0.07

Anchor Bolt Capacity

Area of Bolt:	0.61	in^2
Inertia of Bolt:	0.03	in^4
Total Bolt Inertia:	556.7	in^4
Maximum Bolt Tension:	25.7	k
Maximum Bolt Compression:	27.8	k
Bolt Shear:	1.1	k
Tensile Bolt Capacity:	58.2	k
Compressive Bolt Capacity:	58.2	k
Shear Bolt Capacity:	26.2	k
Interaction Equation:	0.52	Result:
		OK

Base Weld Capacity

Force / Weld:	1.4	k/in
Weld Capacity:	21.9	k/in
Interaction Equation:	0.07	Result:
		OK

SES Base Plate Design Moment:	49.8	k-in
Design Stress:	5.4	ksi
SES Base Plate Allowable Stress / Moment Capacity:	416.4	ksi / k-in
Usage:	0.12	
Moment Factor:	0.86	
Length Factor:	0.64	

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Centered on Solutions℠

Project

Tower Foundation
Structural Analysis Report

Bethel W 2

15 Great Pasture Road
Danbury, CT

Centek Project No. 14216.00

Prepared For

Verizon Wireless
99 East River Road
East Hartford, CT 06108

Attn: Joseph McCarty
CC: Scott Kisting, Shirley Rock

Prepared By

Centek Engineering, Inc.

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March 12, 2020

TABLE OF CONTENTS

1.00 EXECUTIVE SUMMARY

1.01 INTRODUCTION

This report was prepared on behalf of our client, Verizon Wireless, for the purpose of verifying the structural adequacy of the existing (As-Built) micropile supported tower mat foundation.

The tower foundation was originally designed by Centek in 2017. Upon re-analysis of the foundation by Thomas Taylor of Semaan engineering, a design deficiency in the micropiles was discovered. The deficiency identified consists of an overload condition of the inner (4) piles. Due to the placement of the aforementioned piles they receive the full tower axial load, the weight of the thickened portion of the mat and the associated mat weight. This combined loading exceeds the micro-plie allowable capacity.

Our reanalysis assumes the subject (4) inner micropiles to be failed and re-evaluates the system with the reinforced concrete mat supported by the remaining (40) micropiles. The reinforced concrete mat was conservatively analyzed as a one-way slab for its ability to span to the middle row of piles (31'-4"). The max pile loading was recalculated and compared to the as-built micropile capacity.

1.02 REFERENCE MATERIALS

The following documents were referenced in the structural analysis of the tower foundation:

- Monopole Tower Design Report prepared by Sabre Industries project no. 16-7133-SCB dated 7/13/16.
- Foundation Design Drawings prepared by Centek Engineering, Inc. project no. 14216.00 dated 5/3/17 Rev.2.
- Geotechnical Report prepared by Design Earth Technology project no. 2015.13, dated 2/19/16.
- Drilled Micropile Design submittal prepared by Helical Drilling Inc. dated 3/21/17.
- Grout Compression Tests prepared by Materials Testing, Inc. S-1000A, S-1001A and S-1002A dated 5/3/17.
- 2015 International Building Code (Section 1810 Deep Foundations)
- ACI 318-14 "Building Code Requirements for Structural Concrete"

1.03 FOUNDATION ANALYSIS RESULTS

A structural check was made of the tower foundation. Calculations are provided in Section 2.00 of this report. Refer to the following tables for a summary of the analysis results:

i. Table 1

Component Capacity Check			
Component	Type	Stress Ratio	Result
Reinforced Concrete Mat	Bending	77.4%	PASS
	Shear	72.3%	PASS
Micropile	Compression	87.9%	PASS
	Rock Socket	99.2%	PASS

1.04 CONCLUSION

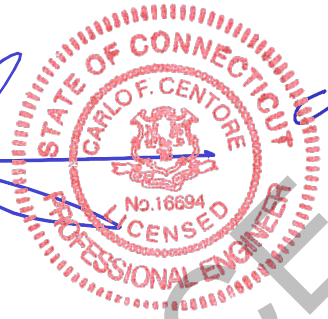
This analysis finds the micropile supported tower foundation in the as-built condition to be structurally adequate to accommodate the tower reactions from the Monopole Tower Design Report prepared by Sabre Industries project no. 16-7133-SCB dated 7/13/16 Sabre.

As discussed with Scott Kisting consultant to Verizon Wireless, the maintenance and condition assessment program that Verizon has in place would identify potential issues with the foundation should they present.

The analysis is based, in part, on the original foundation design documents, Helical micropile design documents and the tower installation field inspection documents, including material testing reports. The field inspection documents compiled during construction of the subject foundation alleviate any concerns with potential installation errors.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Carlo F. Centore, PE
Principal ~ Structural Engineer

Prepared by:

Timothy J. Lynn, PE
Structural Engineer

Section 2.0

Calculations

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JOB BETHEL WEST 2
SHEET NO. _____ OF _____
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

MICRO PILE CAPACITY

- **CHECK CASED PORTION**

AREA OF STEEL PIPE $= \frac{1}{4}\pi\left[(5.5)^2 - \left(5.5 - (2)(0.361)\right)^2\right] = 5.83\,in^2$

ALLOWABLE COMPRESSION STRESS $= 0.4F_y \leq 32{,}000$ (IBC 1810.3.2.6)
$0.4(80) = 32$ ksi

$P_{ALL} = (5.83\,in^2)(32\,ksi) = 186.6^k$ * ADDITIONAL STRENGTH PROVIDED BY GROUT/REBAR

- **CHECK UNCASED PORTION**

AREA OF REBAR $= 1.27\,in^2$ (#10 BAR)

ALLOWABLE COMP STRESS $= 0.5F_y \leq 32{,}000$ (IBC 1810.3.2.6)
$0.5(75) = 37.5$ ksi

AREA OF GROUT $= \frac{1}{4}\pi(4)^2 - 1.27\,in^2 = 11.3\,in^2$

ALLOWABLE COMP STRESS $= 0.33f'_c$ (IBC 1810.3.2.6)
$= (0.33)(7210\,psi)$
$= 2379$ psi

$P_{ALL_{COMP}} = (1.27\,in^2)(32\,ksi) + (11.3\,in^2)(2.38\,ksi) = 67.5^k$

- **CHECK END BEARING / GROUT BOND (ROCK SOCKET)**

ALLOWABLE BOND LOAD $= \pi(4")(5'\times 12)(75\,psi) = 56.5^k$

ALLOWABLE END BEARING $= \frac{1}{4}\pi(5.5")^2\left(10\,tons/ft^2\right)\left(\frac{2000}{144}\right) = 3.3^k$

$P_{ALL_{TR}} = 56.5^k + 3.3^k = 59.8^k$ ← CONTROLS

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JOB BETHEL WEST 2
SHEET NO. _____ OF _____
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

UNFACTORED TOWER BASE REACTIONS

SHEAR = 36^k
AXIAL = 47.6^k
MOMENT = 3941 $^{k-ft}$

FROM SABRE TOWER DESIGN CALCS, TIA-222-F LOADING

WEIGHT OF CONCRETE

PIER = $(8')^2(1')(0.15\ kcf)$ = 9.6^k

THICKED HAUNCH = $\frac{1}{2}(4.5')\left[(8')^2+(17')^2+\sqrt{(8)(17)}\right](0.15)$ = 110^k

TRIB AREA MAT INNER (16) PILES = $(39.15)^2$ = 1533 ft^2

WEIGHT MAT INNER (16) = $(1533\ ft^2)(2.25')(0.15)$ = 517.5^k

TRIB AREA MAT OUTTER (24) = $(50)^2 - 1533$ = 967 ft^2

WEIGHT MAT OUTTER (24) = $(967\ ft^2)(2.25')(0.15)$ = 326.5^k

$P_{CONC.\ (INNER)} = (9.6^k + 110^k + 517.5^k)/16$ = 39.8^k ←

$P_{CONC.\ (OUTTER)} = 326.5^k/24$ = 13.6^k ←

LOADS FROM TOWER

PILE POLAR MOMENT OF INERTIA

$I_P = (23.5)^2(14) + (15.67)^2(14) + (7.83')^2(8)$ = 11660 ft^2

$M_{OT} = (36^k)(3.5') + 3941^{k-ft}$ = 4067 $^{k-ft}$

$P_{TOWER\ (INNER)} = \frac{4067\ ^{k-ft}(15.67')}{11660\ ft^2} + \frac{47.6^k}{16}$ = 8.5^k ←

$P_{TOWER\ (OUTTER)} = \frac{4067\ ^{k-ft}(23.5')}{11660\ ft^2}$ = 8.2^k ←

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JOB BETHEL WEST 2
SHEET NO. _____ OF _____
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

EQUIPMENT DEAD LOAD

17,000 # TOT. / 4 = 4250 # (COMMSCOPE VZWA-9-4X16-6LSP-3)

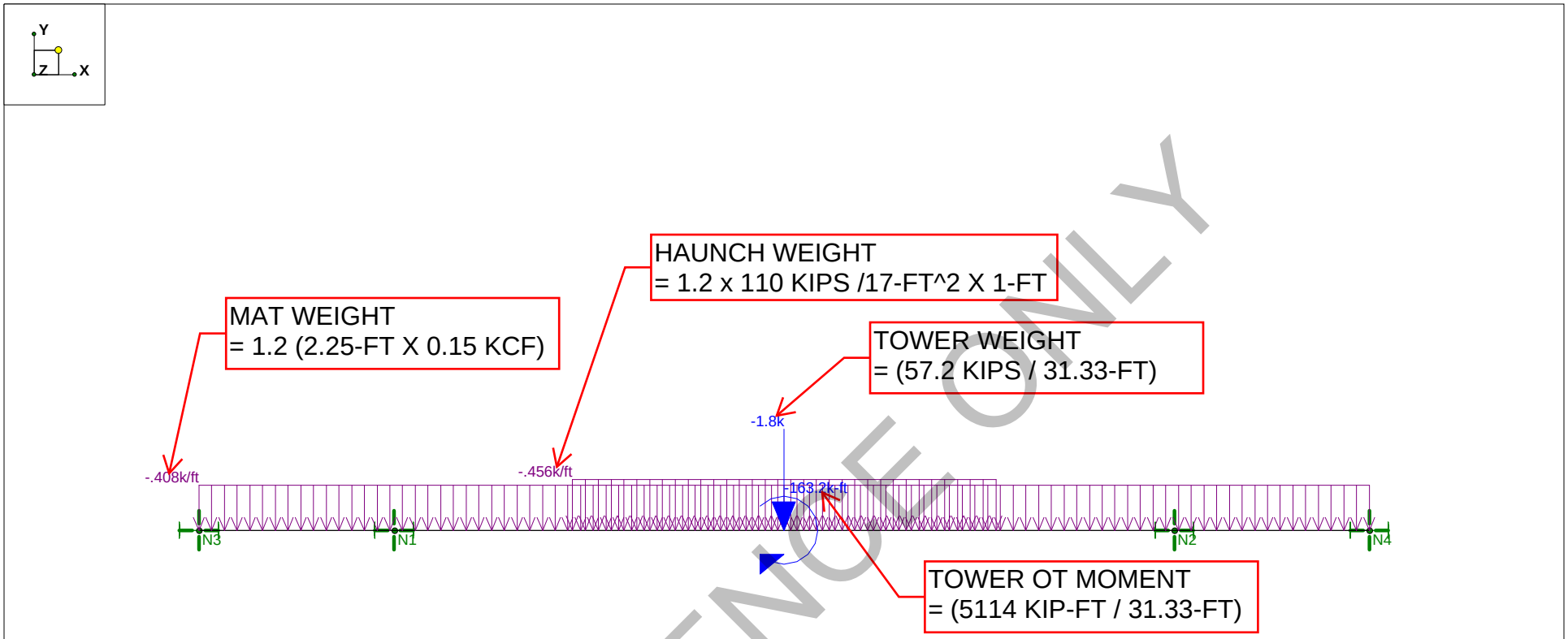
TOTAL LOADS ON PILES

$P_{TOT\ (INNER)} = 39.8^K + 8.5^K + 4.3^K + 6.7^K = 59.3^K < 59.8^K$ (OK)

$P_{TOT\ (OUTER)} = 13.6^K + 8.2^K + 4.3^K + 6.7^K = 32.8^K < 59.8^K$ (OK)

$$\frac{P_{TOT}}{P_{ALL\ COMP}} = \frac{59.3^K}{59.8^K} = 99.2\%$$

$$\frac{P_{TOT}}{P_{ALL\ RS}} = \frac{59.3^K}{67.5^K} = 87.9\%$$



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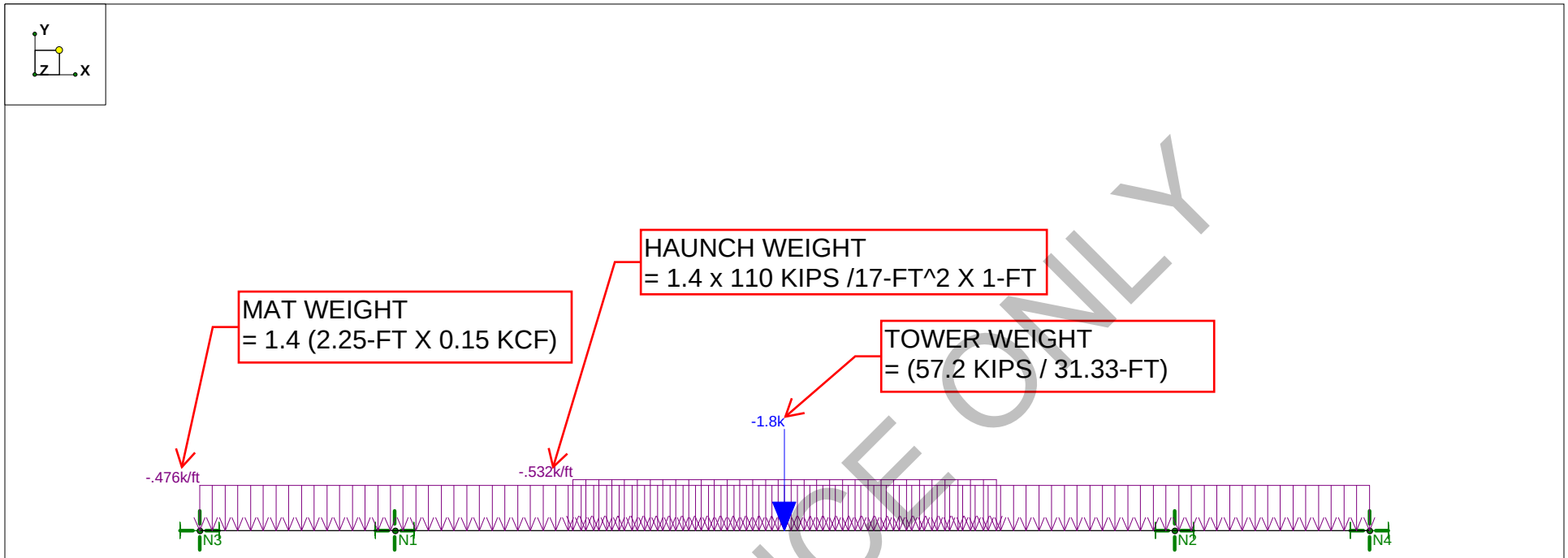

Loads: LC 1, IBC 16-1
Envelope Only Solution

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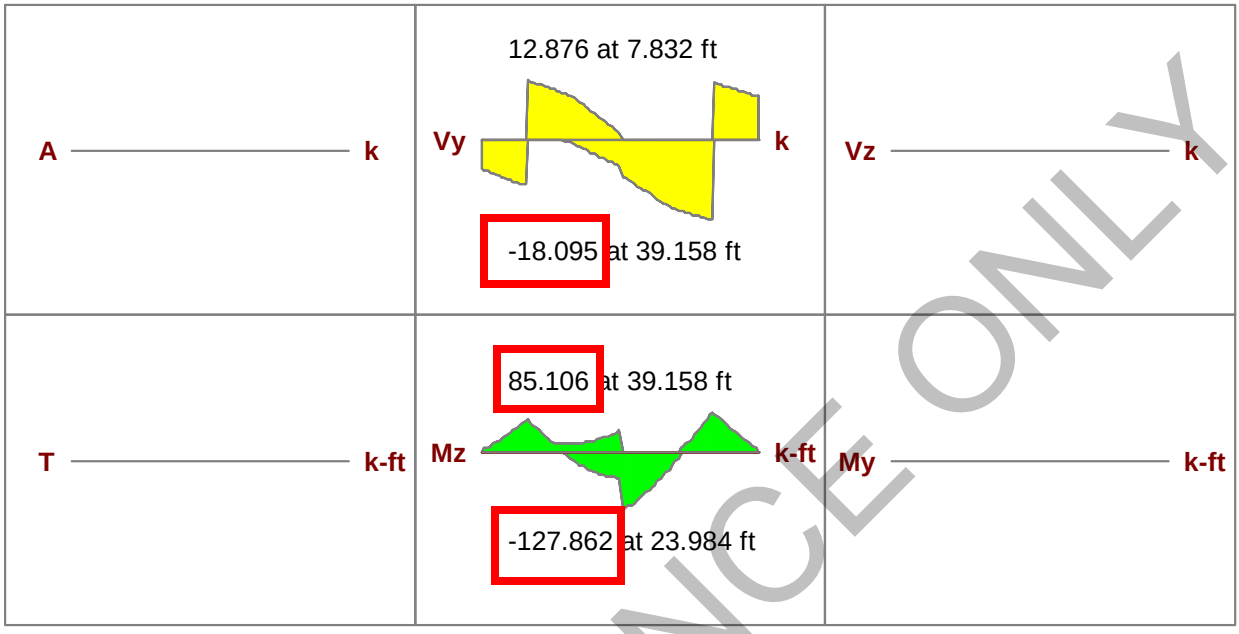
Beam: ***M1***

Shape: **CRECT24X12**
Material: **Conc4000NW**
Length: **46.99 ft**
I Joint: **N3**
J Joint: **N4**

Concrete Stress Block: **Rectangular**

Code Check: **No Calc**
Report Based On 97 Sections

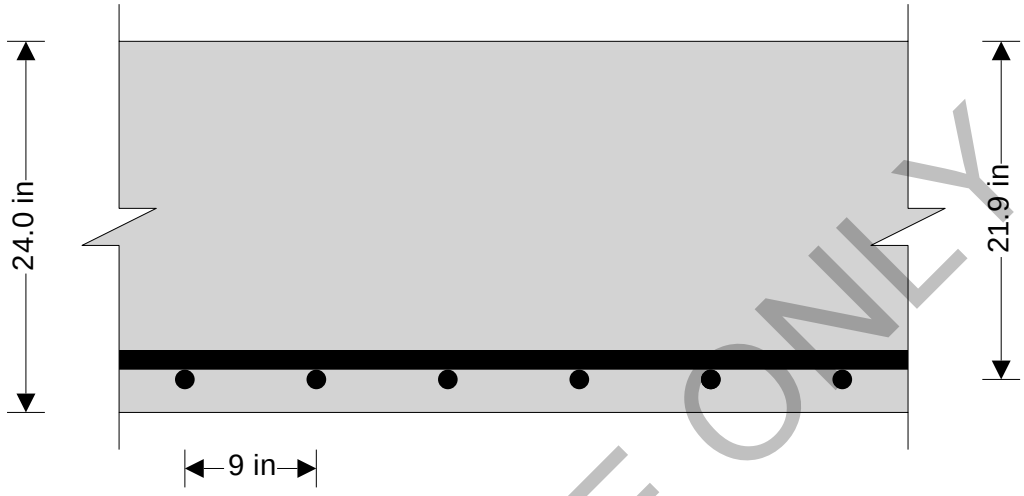


No Calc
- Concrete code check not calculated -

TEKLA Tedds Centek Engineering, Inc, 63-2 North Branford Road Branford, CT 06405	Project				Job Ref.	
	Section				Sheet no./rev. 1	
	Calc. by T	Date 3/11/2020	Chk'd by	Date	App'd by	Date

RC ONE-WAY SLAB DESIGN (ACI318-11)

Tedds calculation version 1.1.04



Slab definition

Slab type	**One-way continuous**
Overall thickness of slab	h = **24.000** in
Clear shorter span of slab	l_n = **31.33** ft
Clear cover to tension reinforcement	c_c = **1.50** in

Materials

Specified compressive strength of concrete	f'_c = **4000** psi
Specified yield strength of reinforcement	f_y = **60000** psi
Modulus of elasticity	E_{SACI} = **29000000** psi
Concrete modification factor	λ = **1.00**

Maximum design moment and shear in span(per 12 in width of slab)

Maximum ultimate positive moment	M_{us} = **128.000** kip_ft/ft
Maximum ultimate shear force	V_u = **18.000** kips/ft

Reinforcement calculation - positive moments

Tension steel provided	**No. 10 @ 8.5 in o.c.**
Depth to tension steel	d = (h – c_c – D / 2) = **21.87** in
Stress block depth factor	β_1 = 0.85
Reinforcement ratio at strain of 0.004	ρ^b = 0.85 × β_1 × f'_c / f_y × (0.003 / (0.003 + 0.004)) = **0.021**
Maximum reinforcement ratio	ρ^{max} = ρ^b = **0.021**
Maximum area of tension steel	A_{s_max} = ρ^{max} × d = **5.416** in^2/ft
Min ratio of transverse reinforcement (cl. 7.12.2.1)	ρ^t =**0.0018**
Min area tension steel req'd (cl. 10.5.4 & 7.12.2.1)	A_{s_min} = ρ^t × h = **0.518** in^2/ft
Area of tension steel provided	A_{s_prov} = **1.788** in^2/ft

PASS - Area of steel provided - OK

Steel stress (cl. 10.6.4)	f_s = 2/3 × f_y = **40000** psi
Max allowable spacing (cl. 10.5.4 & 10.6.4)	s_{max} = min(3×h, 18in, 15in×(40000 psi/f_s) – 2.5×c_c, 12in×(40000 psi/f_s))

s_{max} = **11.250** in

Actual tensile bar spacing provided — s = **8.500** in

PASS - Spacing of bars (+ve moment steel) less than maximum allowable

Check for section - positive moments

Depth of equivalent rectangular stress block — $a = (A_{s\_prov} \times f_y) / (0.85 \times f'_c)$ = **2.63** in

Depth of neutral axis — $c = a / \beta_1$ = **3.094** in

Net tensile strain in long. steel at nominal strength — $\varepsilon_t = 0.003 \times [(d - c) / c]$ = **0.0182**

Section is tension controlled, design OK

Strength reduction factor — ϕ = 0.9

Revised required nominal flexural strength — $M_{ns} = M_{us} / \phi$ = **142.222** kip_ft/ft

Actual nominal flexural strength — $M_{ns\_prov} = A_{s\_prov} \times f_y \times (d - a / 2)$ = **183.756** kip_ft/ft

PASS - Actual flexural strength exceeds required nominal flexural strength

Transverse reinforcement - (for shrinkage and temperature)

Transverse reinforcement provided — **No. 10 @ 8.5 in o.c.**

Area of reinforcement provided — A_{t_prov} = **1.788** in^2/ft

Min ratio of transverse reinforcement (cl. 7.12.2.1) — ρ^t =**0.0018**

Minimum area of transverse reinforcement required — $A_{t\_req} = \rho^t \times h$ = **0.518** in^2/ft

PASS - Area of transverse steel provided OK

Maximum allowable spacing of bars — s_{max_t} = min (5 × h, 18 in) = **18.000** in

Actual transverse bar spacing provided — s_t = **8.500** in

PASS - Spacing of transverse bars is less than allowable

Check for shear

Nominal shear strength required — $V_n = abs(V_u) / 0.75$ = **24.000** kips/ft

Shear strength provided by concrete — $V_c = 2 \times \lambda \times \sqrt{(f'_c \times 1\ psi)} \times d$ = **33.189** kips/ft

Shear strength provided by shear steel (assumed) — V_s = 0 kips/ft

Shear capacity of section — $V = V_c + V_s$ = **33.189** kips/ft

PASS - One-way shear capacity

Check of clear cover (ACI 7.7.1)

Permissible min nominal cover to all reinforcement — c_{min} = 0.75 in

Clear cover to tension reinforcement (+ve mnt) — $c_c = h - d - D/2$ = **1.500** in

PASS - Cover to steel resisting positive moment exceeds allowable minimum cover

Deflection

Support condition — **Both ends continuous**

Basic span-to-thickness ratio (Table 9.5(a)) — $ratio_{basic}$ = **28**

Type of concrete — **Normal weight**

Concrete density factor (Table 9.5(a)) — $f_{density}$ = **1.00**

Allowable span-to-thickness ratio — $ratio_{allow} = ratio_{basic} / (f_{density} \times (0.4 + f_y / 100000\ psi))$ = **28.000**

Actual span-to-thickness ratio — $ratio_{actual} = l_n / h$ = **15.665**

PASS - The slab thickness is adequate to control deflection

Design summary

Slab is 24.0 in thick in 4000 psi concrete

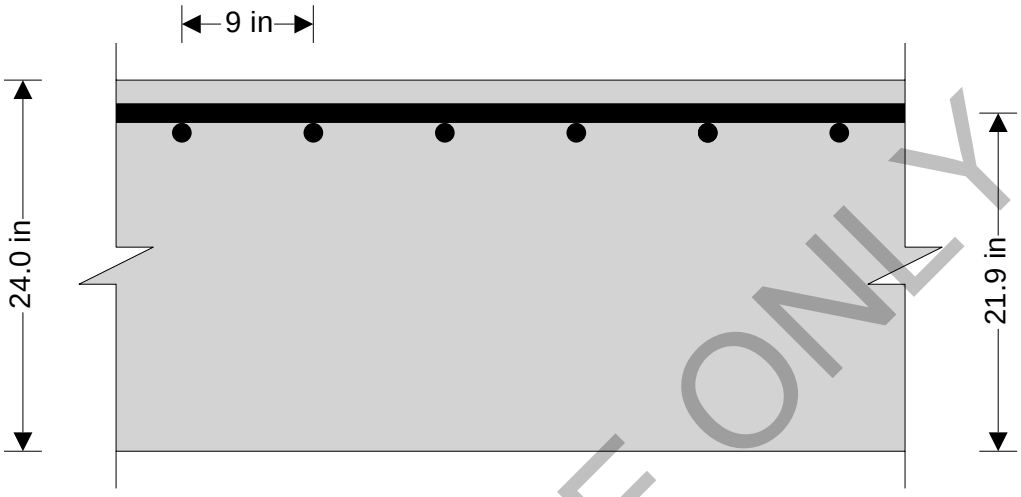
Tension steel provided - positive moment, No. 10 @ 8.5 in o.c. in 60000 psi steel

Transverse steel provided , No. 10 @ 8.5 in o.c. in 60000 psi steel

TEKLA Tedds Centek Engineering, Inc, 63-2 North Branford Road Branford, CT 06405	Project				Job Ref.	
	Section				Sheet no./rev. 1	
	Calc. by T	Date 3/11/2020	Chk'd by	Date	App'd by	Date

RC ONE-WAY SLAB DESIGN (ACI318-11)

Tedds calculation version 1.1.04



Slab definition

Slab type	**One-way continuous**
Overall thickness of slab	h = **24.00** in
Clear shorter span of slab	l_n = **31.33** ft
Clear cover to tension reinforcement	c_{c_hog} = **1.50** in

Materials

Specified compressive strength of concrete	f'_c = **4000** psi
Specified yield strength of reinforcement	f_y = **60000** psi
Modulus of elasticity	E_{SACI} = **29000000** psi
Concrete modification factor	λ = **1.00**

Maximum design moment and shear in span(per 12 in width of slab)

Maximum ultimate negative moment	M_{uh} = **86.000** kip_ft/ft
Maximum ultimate shear force	V_u = **18.000** kips/ft

Reinforcement calculations - negative moment

Tension steel provided	**No. 10 @ 8.5 in o.c.**
Depth to tension steel	d_{hog} = (h – c_{c_hog} – D_{hog} / 2) = **21.87** in
Stress block depth factor	β_1 = 0.85
Reinforcement ratio at strain of 0.004	ρ^b = 0.85 × β_1 × f'_c / f_y × (0.003 / (0.003 + 0.004)) = **0.021**
Maximum reinforcement ratio	ρ^{max} = ρ^b = **0.021**
Maximum area of tension steel	$A_{s\_max\_hog}$ = ρ^{max} × d_{hog} = **5.416** in^2/ft
Min ratio of transverse reinforcement (cl. 7.12.2.1)	ρ^t =**0.0018**
Min area tension steel req'd (cl. 10.5.4 & 7.12.2.1)	$A_{s\_min\_hog}$ = ρ^t × h = **0.518** in^2/ft
Area of tension steel provided	$A_{s\_prov\_hog}$ = **1.788** in^2/ft
	PASS - Area of steel provided - OK
Steel stress (cl. 10.6.4)	f_s = 2/3 × f_y = **40000** psi
Max allowable spacing (cl. 10.5.4 & 10.6.4)	s_{max} = min(3×h,18in,15in×(40000 psi/f_s) – 2.5×c_{c_hog},12in×(40000psi/f_s))

s_{max} = **11.250** in

Actual tensile bar spacing provided — s_{hog} = **8.500** in

PASS - Spacing of bars (-ve mnt) less than maximum allowable

Check for section - negative moment

Depth of equivalent rectangular stress block — $a_{hog} = (A_{s\_prov\_hog} \times f_y) / (0.85 \times f'_c)$ = **2.63** in

Depth of neutral axis — $c_{hog} = a_{hog} / \beta_1$ = **3.094** in

Net tensile strain in long. steel at nominal strength — $\varepsilon_{t\_hog} = 0.003 \times [(d_{hog} - c_{hog}) / c_{hog}]$ = **0.0182**

Section is tension controlled, Design OK

Strength reduction factor — ϕ_{hog} = 0.9

Revised required nominal flexural strength — $M_{nh} = M_{uh} / \phi_{hog}$ = **95.556** kip_ft/ft

Actual nominal flexural strength — $M_{nh\_prov} = A_{s\_prov\_hog} \times f_y \times (d_{hog} - a_{hog} / 2)$ = **183.756** kip_ft/ft

PASS - Actual flexural strength exceeds required nominal flexural strength

Transverse reinforcement - (for shrinkage and temperature)

Transverse reinforcement provided — **No. 10 @ 8.5 in o.c.**

Area of reinforcement provided — A_{t_prov} = **1.788** in^2/ft

Min ratio of transverse reinforcement (cl. 7.12.2.1) — ρ^t =**0.0018**

Minimum area of transverse reinforcement required — $A_{t\_req} = \rho^t \times h$ = **0.518** in^2/ft

PASS - Area of transverse steel provided OK

Maximum allowable spacing of bars — $s_{max\_t} = \min (5 \times h, 18 \text{ in})$ = **18.000** in

Actual transverse bar spacing provided — s_t = **8.500** in

PASS - Spacing of transverse bars is less than allowable

Check for shear

Nominal shear strength required — $V_n = \text{abs}(V_u) / 0.75$ = **24.000** kips/ft

Shear strength provided by concrete — $V_c = 2 \times \lambda \times \sqrt{(f'_c \times 1 \text{ psi})} \times d_{hog}$ = **33.189** kips/ft

Shear strength provided by shear steel (assumed) — V_s = 0 kips/ft

Shear capacity of section — $V = V_c + V_s$ = **33.189** kips/ft

PASS - One-way shear capacity

Check of clear cover (ACI 7.7.1)

Permissible min nominal cover to all reinforcement — c_{min} = 0.75 in

Clear cover to tension reinforcement (-ve mnt) — $c_{c\_hog} = h - d_{hog} - D_{hog}/2$ = **1.500** in

PASS - Cover to steel resisting negative moment exceeds allowable minimum cover

Deflection

Support condition — **Both ends continuous**

Basic span-to-thickness ratio (Table 9.5(a)) — ratio_{basic} = **28**

Type of concrete — **Normal weight**

Concrete density factor (Table 9.5(a)) — $f_{density}$ = **1.00**

Allowable span-to-thickness ratio — $\text{ratio}_{allow} = \text{ratio}_{basic} / (f_{density} \times (0.4 + f_y / 100000 \text{ psi}))$ = **28.000**

Actual span-to-thickness ratio — $\text{ratio}_{actual} = l_n / h$ = **15.665**

PASS - The slab thickness is adequate to control deflection

Design summary

Slab is 24.0 in thick in 4000 psi concrete

Tension steel provided - negative moment, No. 10 @ 8.5 in o.c. in 60000 psi steel

Transverse steel provided , No. 10 @ 8.5 in o.c. in 60000 psi steel

Section 3.0

Supporting Documentation

Sabre Industries™
Towers and Poles

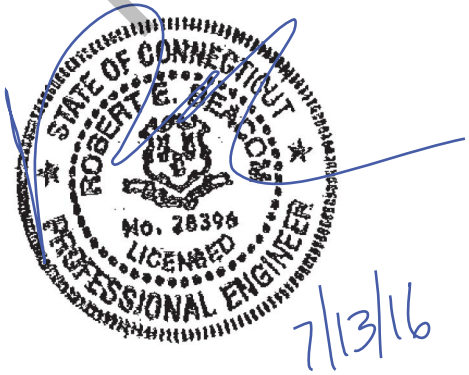
Structural Design Report

120' Extendible to 140' Monopole
Site: Bethel W2, CT
Site Number: 5-0157

Prepared for: VERIZON WIRELESS
by: Sabre Towers & Poles ™

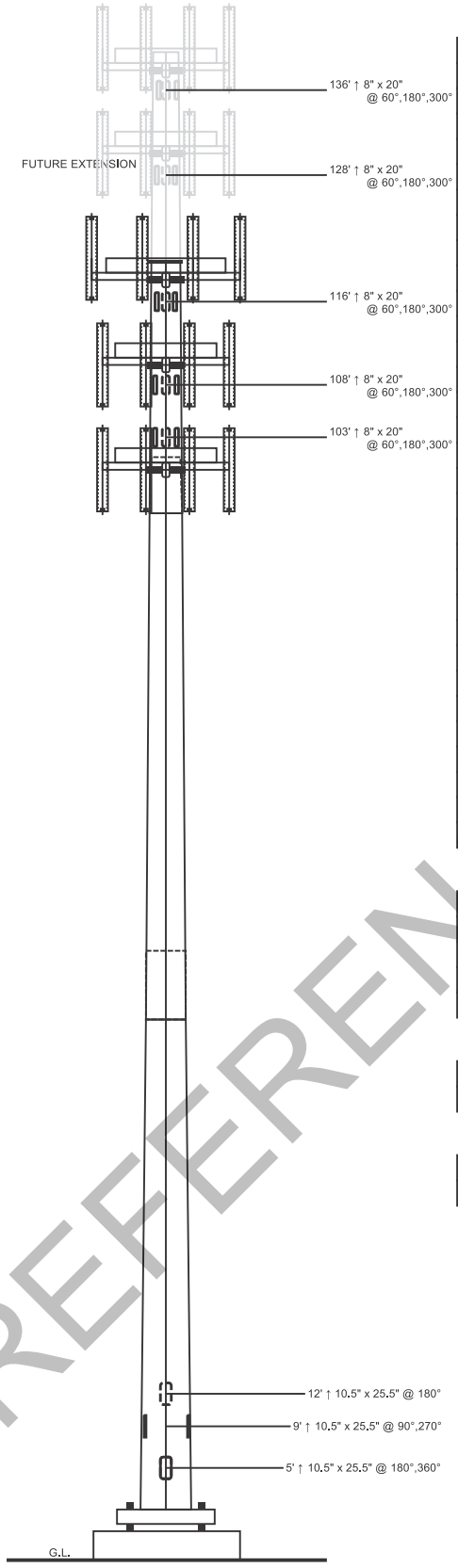
Job Number: 16-7133-SCB

July 13, 2016



7/13/16

Length (ft)	20' - 0"	24' - 0"	53' - 6"	53' - 3"						
Number Of Sides			18							
Thickness (in)			1/4"	5/16"	3/8"					
Lap Splice (ft)				5' - 3"	6' - 6"					
Top Diameter (in)	27"	31.42"		35.06"	44.83"					
Bottom Diameter (in)	31.42"	36.72"		46.89"	56.59"					
Taper (in/ft)				0.221						
Grade				A572-65						
Weight (lbs)	2331	3148		7793	13314					
Overall Steel Height (ft)	20 (Extension)	119								



Designed Appurtenance Loading

Elev	Description	Tx-Line
140***	(3) 800 10510	(3) 1 5/8"
140***	(18) TMA	
140***	(2) DB-B1-6C-12AB-0Z	(2) DC/Fiber Trunks
140***	(12) RRH2x40-AWS	
140***	(9) 800 10766	(9) 1 5/8"
138***	L.P. Platform (Monopole Only) - 12' w/ Handrail	
130***	L.P. Platform (Monopole Only) - 12' w/ Handrail	
130***	(12) RRH2x40-AWS	
130***	(18) TMA	
130***	(3) 800 10510	(3) 1 5/8"
130***	(9) 800 10766	(9) 1 5/8"
130***	(2) DB-B1-6C-12AB-0Z	(2) DC/Fiber Trunks
120	(6) HBX-6517DS-VTM	(9) 1 5/8"
120	(3) RRH2x60-AWS	
120	(3) RRH2x60-1900A-4R	
120	(2) DB-B1-6C-12AB-0Z	(2) DC/Fiber Trunks
120	(6) 800 10766	(9) 1 5/8"
120	(3) RRH2x60-700	
118	L.P. Platform (Monopole Only) - 14' w/ Handrail	
110	L.P. Platform (Monopole Only) - 12' w/ Handrail	
110	(12) RRH2x40-AWS	
110	(18) TMA	
110	(3) 800 10510	(3) 1 5/8"
110	(9) 800 10766	(9) 1 5/8"
110	(2) DB-B1-6C-12AB-0Z	(2) DC/Fiber Trunks
100	L.P. Platform (Monopole Only) - 12' w/ Handrail	
100	(12) RRH2x40-AWS	
100	(18) TMA	
100	(3) 800 10510	(3) 1 5/8"
100	(9) 800 10766	(9) 1 5/8"
100	(2) DB-B1-6C-12AB-0Z	(2) DC/Fiber Trunks

Load Case Reactions

Description	Axial (kips)	Shear (kips)	Moment (ft-k)	Deflection (ft)	Sway (deg)
3s Gusted Wind	57.21	45.89	4952.27	9.02	6.45
3s Gusted Wind 0.9 Dead	42.95	45.76	4867.79	8.82	6.3
3s Gusted Wind&Ice	81.12	14.08	1566.09	2.91	2.07
Service Loads	47.65	9.22	988.59	1.81	1.29

Base Plate Dimensions

Shape	Diameter	Thickness	Bolt Circle	Bolt Qty	Bolt Diameter
Round	69"	2.25"	63.25"	16	2.25"

Anchor Bolt Dimensions

Length	Diameter	Hole Diameter	Weight	Type	Finish
84"	2.25"	2.625"	1937.6	A615-75	Galv-18"

Notes

1) Antenna Feed Lines Run Inside Pole
2) All dimensions are above ground level, unless otherwise specified.
3) Weights shown are estimates. Final weights may vary.
4) The Monopole was designed for a basic wind speed of 100 mph with 0" of radial ice, and 50 mph with 3/4" of radial ice, in accordance with ANSI/TIA-222-G, Structure Class II, Exposure Category C, Topographic Category 1.
5) Full Height Step Bolts
6) The Monopole was designed for a basic wind speed of 85 mph with 1/2" radial ice with reduction, in accordance with EIA/TIA-222-F.
7) ANSI/TIA-222-G load case reactions are shown in the table above. EIA/TIA -222-F load case reactions can be found in the calcuations toward the end of this design report.

*** These Appurtenances cannot be installed until the Monopole has been extended.

Sabre Industries™ Towers and Poles

Sabre Communications Corporation
7101 Southbridge Drive
P.O. Box 658
Sioux City, IA 51102-0658
Phone: (712) 258-6690
Fax: (712) 279-0814

Job:	**16-7133-SCB**
Customer:	VERIZON WIRELESS
Site Name:	Bethel W2, CT 5-0157
Description:	120' ext. 140' Monopole
Date:	7/13/2016 By: REB

	0.02	0.54	0.55	180.0	0.04	0.00	0.04	90.0
95.00								
	0.02	0.55	0.57	180.0	0.04	0.00	0.04	90.0
	0.02	0.74	0.75	180.0	0.04	0.00	0.04	90.0
81.08								
	0.02	0.74	0.75	180.0	0.04	0.00	0.04	90.0
	0.02	0.87	0.89	180.0	0.03	0.00	0.03	90.0
67.17								
	0.02	0.87	0.89	180.0	0.03	0.00	0.03	90.0
	0.02	0.97	0.98	180.0	0.03	0.00	0.03	90.0
53.25								
	0.01	0.81	0.82	180.0	0.03	0.00	0.03	90.0
	0.01	0.84	0.85	180.0	0.03	0.00	0.03	90.0
46.75								
	0.01	0.86	0.87	180.0	0.03	0.00	0.03	90.0
	0.01	0.90	0.92	180.0	0.03	0.00	0.03	90.0
35.06								
	0.01	0.90	0.92	180.0	0.03	0.00	0.03	90.0
	0.01	0.94	0.95	180.0	0.03	0.00	0.03	90.0
23.37								
	0.01	0.94	0.95	180.0	0.03	0.00	0.03	90.0
	0.01	0.96	0.97	180.0	0.03	0.00	0.03	90.0
11.69								
	0.01	0.96	0.98	180.0	0.03	0.00	0.03	90.0
	0.01	0.98	0.99	180.0	0.02	0.00	0.02	90.0
0.00								

EXTREME FIBRE STRESSES IN LAP SPLICE

ELEV	CONTACT.PRESSURE MAX	CONTACT.PRESSURE AZI	HOOP.STRESSES MAX	HOOP.STRESSES AZI	BENDING.STRESSES MAX	BENDING.STRESSES AZI
ft	ksi	deg	ksi	deg	ksi	deg
100.25	0.30	0.0	21.55	90.0	29.57	180.0
95.00	0.29	180.0	21.56	90.0	28.76	180.0
53.25	0.54	0.0	39.05	90.0	50.24	180.0
46.75	0.52	180.0	39.06	90.0	44.78	180.0

LOADS ONTO FOUNDATION(w.r.t. NORTH-EAST-DOWN coordinates)

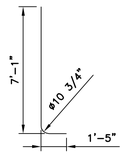
TOTAL AXIAL	SHEAR NORTH	SHEAR EAST	MOMENT NORTH	MOMENT EAST	TORSION
kip	kip	kip	ft-kip	ft-kip	ft-kip
47.56	-36.16	0.00	3940.84	0.00	0.00

LOADS ONTO FOUNDATION(w.r.t. wind direction)

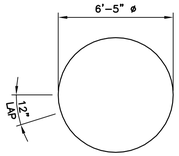
DOWN	SHEAR.w.r.t.WIND.DIR ALONG	SHEAR.w.r.t.WIND.DIR ACROSS	MOMENT.w.r.t.WIND.DIR ALONG	MOMENT.w.r.t.WIND.DIR ACROSS	TORSION
kip	kip	kip	ft-kip	ft-kip	ft-kip
47.56	36.16	0.00	-3940.84	0.00	0.00

LOADING CONDITION B ========== Iterations: Mast 5 ======

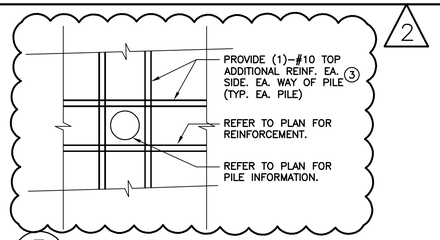
85 mph + 0.5" ice (Reduction Allowed)



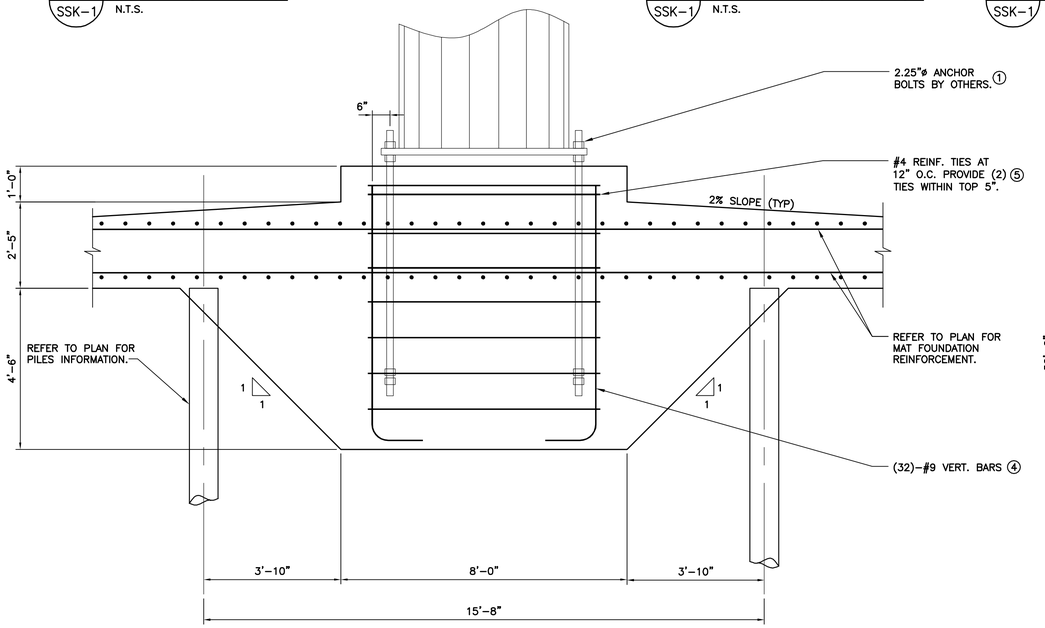
5 SSK-1 **L BARS (ITEMS #4)**
N.T.S.



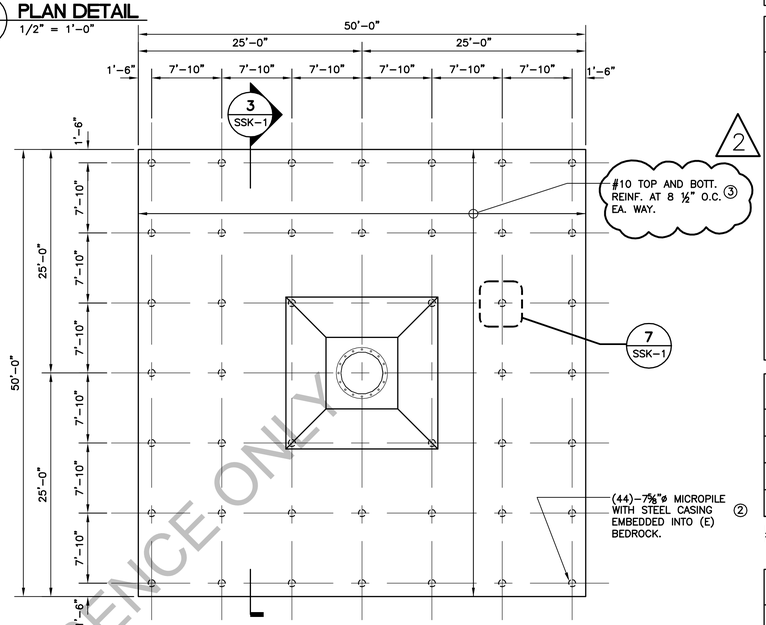
6 SSK-1 **HORZ. TIES (ITEMS #5)**
N.T.S.



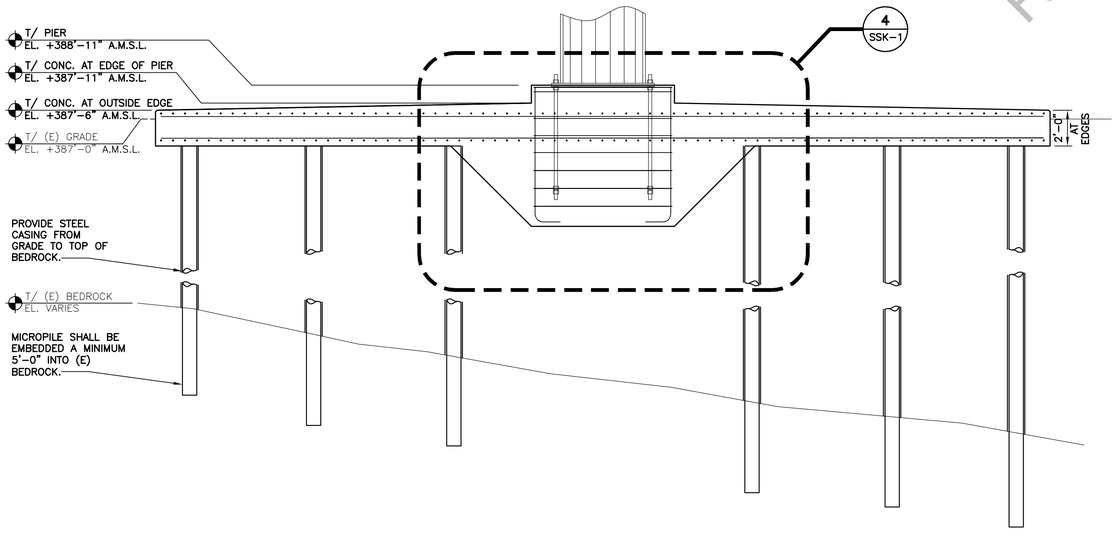
7 SSK-1 **PLAN DETAIL**
1/2" = 1'-0"



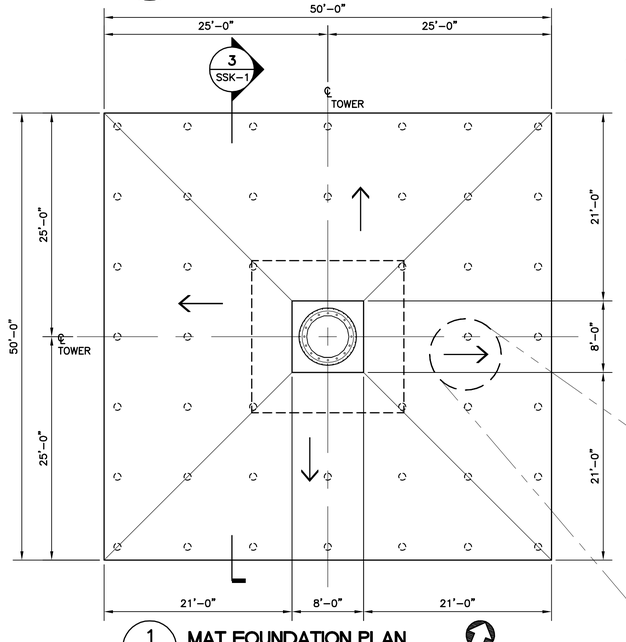
4 SSK-1 **MAT FOUNDATION REINF. PLAN**
SCALE: 1/2" = 1'-0"



2 SSK-1 **MAT FOUNDATION REINF. PLAN**
SCALE: 1/8" = 1'-0"
APPROXIMATE NORTH



3 SSK-1 **MAT FOUNDATION REINF. PLAN**
SCALE: 1/4" = 1'-0"



1 SSK-1 **MAT FOUNDATION PLAN**
SCALE: 1/8" = 1'-0"
APPROXIMATE NORTH

DESIGN BASIS

GOVERNING CODE: 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2009 CONNECTICUT SUPPLEMENT.

1. DESIGN CRITERIA:
   - WIND SPEED OF 85 MPH (FASTEST MILE) AND 74 MPH (FASTEST MILE) CONCURRENT WITH 0.5" OF RADIAL ICE PER EIA/TIA 222 F-96.
   - WIND SPEED OF 100 MPH (3 SECOND GUST) AND 50 MPH (3 SECOND GUST) CONCURRENT WITH 0.75" OF RADIAL ICE PER TIA-222-G.
   - SEISMIC LOAD: PER ASCE 7-95 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES (DOES NOT GOVERN).

GENERAL NOTES

1. FOUNDATION DESIGN IS BASED ON TOWER STRUCTURE DESIGN CALCULATIONS PREPARED BY ENGINEERED SABRE INDUSTRIES, JOB No. 16-7133-SCB, FOR VERIZON WIRELESS, DATED JULY 13, 2016.
2. PILE DESIGN IS BASED ON GEOTECHNICAL REPORT PREPARED BY DESIGN EARTH TECHNOLOGIES, DATED FEBRUARY 19, 2016 WITH A MAXIMUM ALLOWABLE ROCK BEARING PRESSURE OF 10 TONS/SF (20KSF).
3. THE TOWER FOUNDATION MUST BEAR ON COMPETENT (SOUND) ROCK. BEDROCK BEARING SURFACE SHALL BE LEVEL, CLEANED OF ANY SOIL, LOOSE ROCK FRAGMENTS AND ANY UNSUITABLE BEARING MATERIAL. THE FINISHED BEARING SURFACE IS TO BE INSPECTED BY THE DESIGN ENGINEER FOR APPROVAL.
4. DRILLED HOLES SHALL BE CLEAR OF DEBRIS BEFORE GROUTING.
5. ALL WORK SHALL BE SUBJECT TO SPECIAL INSPECTION RETAINED BY THE OWNER/CONTRACTOR AS PER THE 2005 CONNECTICUT STATE BUILDING CODE WITH 2009 SUPPLEMENT.
6. MICROPILES SHALL BE DESIGNED AND INSTALLED BY A RESPONSIBLE PROFESSIONAL EXPERIENCED IN MICROPILE WORK.
7. AN INDEPENDENT QUALIFIED INPESTION/TESTING AGENCY SHALL BE RETAINED BY THE OWNER FOR THE PURPOSE OF INSPECTING, TESTING AND DOCUMENTING ALL FIELD WORK PREFORMED BY THE PILE CONTRACTOR. ALL INSPECTION REPORTS AND DOCUMENTS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD (CENTEK ENGINEERING INC.) FOR REVIEW.

FOUNDATION DESIGN REACTIONS

BASE REACTION TYPE	TIA/EIA-222-F	TIA-222-G
SHEAR (kips)	36.00	45.89
AXIAL (kips)	47.56	57.21
BASE MOMENT (ft-kips)	3940.84	4952.27

NOTE:
1. REACTIONS SHOWN TAKEN FROM TOWER DESIGN AS PREPARED BY ENGINEERED SABRE INDUSTRIES. REFER TO GENERAL NOTE #1.

MATERIAL LIST

ITEM	QTY.	LENGTH	DESCRIPTION
①	16	7'-0"	2.625"ø A615-GR.75 ANCHOR BOLTS w/ (4) H.H.N. AND ANCHOR PLATES (x2) AS PROVIDED BY OTHERS.
②	44	VARIES	7⅝"ø MICROPILES (TO RESIST 55 KIP MINIMUM AXIAL LOAD) OR ENGINEER APPROVED EQUAL. REFER TO GEOTECHNICAL REPORT (GENERAL NOTE #2) FOR PILE LENGTHS.
③	624 308	20'-0" 25'-0"	#10 (ASTM A615-GR.60) EA. WAY TOP & BOTT. PROVIDE ADDITIONAL BAR EA. SIDE OF PILE.
④	32	8'-6"	#9 (ASTM A615-GR.60) L SHAPE BAR. REFER TO 5/SSK-1.
⑤	10	21'-2"	#4 TIE (ASTM A615-GR.60). PROVIDE (2) TIES WITHIN TOP 5". REFER TO 6/SSK-1.

CONCRETE	(cu.yd)	217	4000psi TYPE ii CEMENT

PILE LOAD CALCULATION

LOAD TYPE (PER PILE)	AXIAL FORCE (kips)
DEAD/EQUIPMENT LOAD	33.6
TOWER LOAD	10.0
DOWN DRAG LOAD	6.7
TOTAL REQUIRED LOAD	50.3
MINIMUM PILE CAPACITY	55.0

AS-BUILT PILE CAPACITY = 59.8 KIPS

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	06/03/17	MAM	LVP	REINFORCEMENT MODIFICATION
1	04/05/17	DMD	CFC	FOR CONSTRUCTION
0	08/03/16	LVP	CFC	FOR D&M APPROVAL

PROFESSIONAL ENGINEER SEAL

Cellco Partnership d.b.a. Verizon wireless

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

Cellco Partnership d/b/a Verizon Wireless
WIRELESS COMMUNICATIONS FACILITY
BETHEL W2
15 GREAT PASTURE ROAD
DANBURY, CT 06810

DATE: 07/28/16
SCALE: AS NOTED
JOB NO. 14216.000

MAT FOUNDATION AND PILE DETAILS

SSK-1
Sheet No. 1 of 2

NOTES:

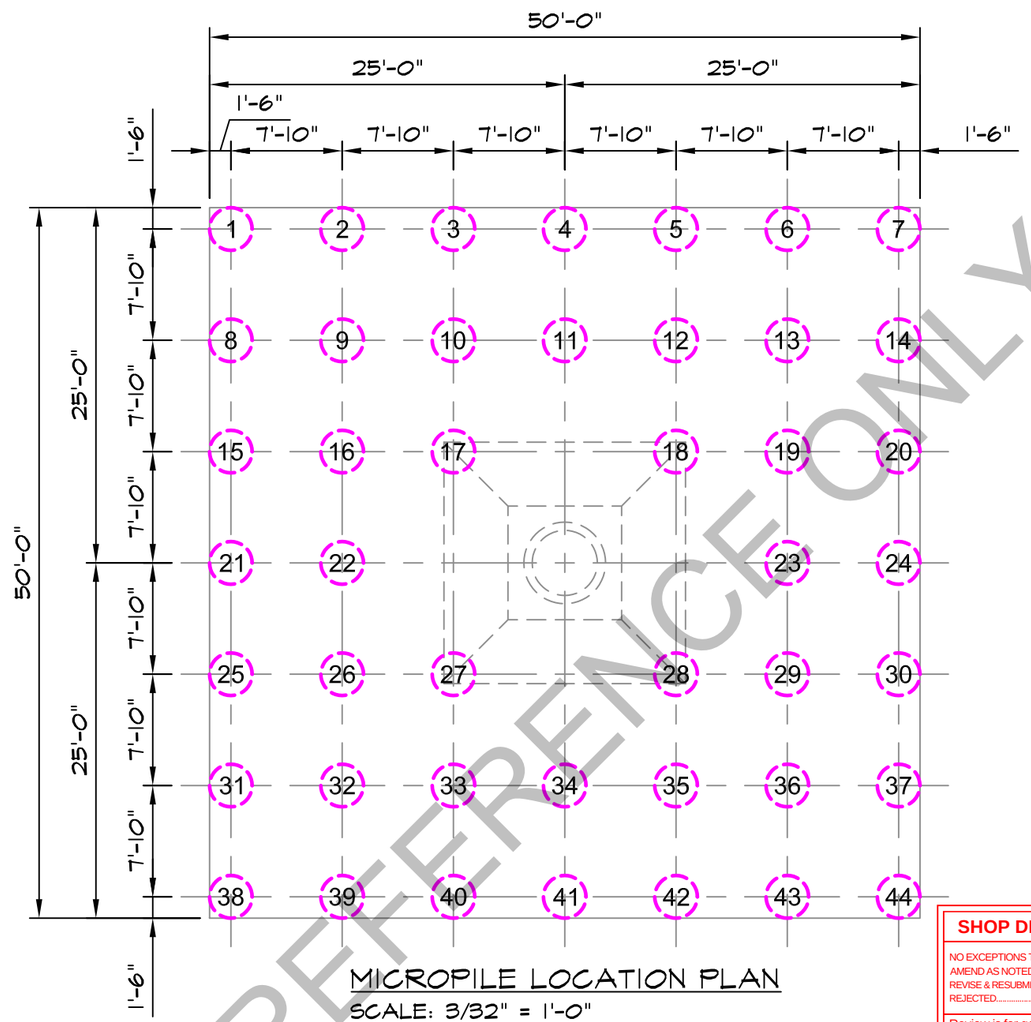
1. Micropiles shall be advanced through the fill soil and bonded into bedrock at an average maximum depth of 25.0' below working grade.

2. Micropiles shall consist of steel casing, with an outside diameter of 5.5" and a wall thickness of 0.361" as manufactured by PennDrill Manufacturing (Punxsutawney, PA) with N80 flush joint casing. The lead section of casing shall be fitted with carbide "J" teeth. Beyond that a 4.0" rock socket will be a drilled for the bond zone. The borehole will be filled with a minimum 4.0 ksi neat cement grout and a #10 (GR-75) thread bar. The thread bar will be centered using PVC centralizers. A minimum bond length of 5'-0" is required.

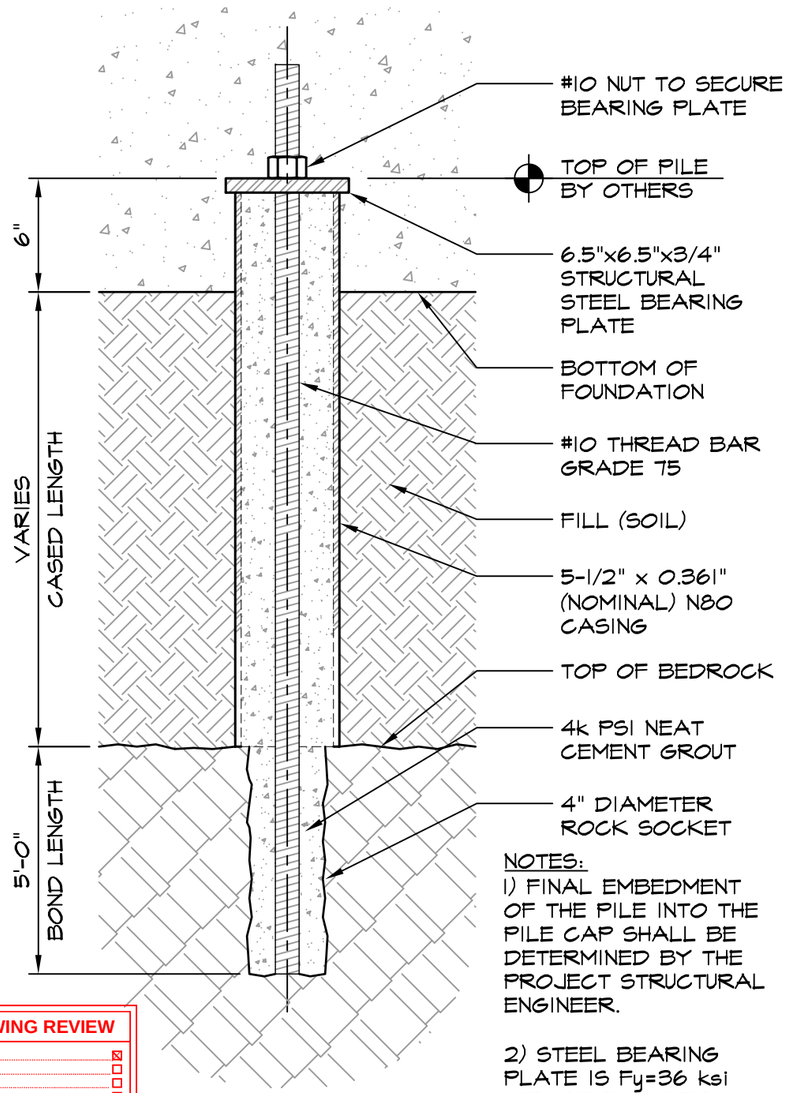
3. All Micropiles will be designed for 55 kips (allowable) axial compression.

4. Pile cap plates will be a minimum of 6.5" x 6.5" x .75" structural steel plates. Structural Engineer of Record to verify depth/height of bearing plates in pile cap.

5. Concrete pile caps and grade beams, including pile embedment into concrete, shall be sized and designed by the Structural Engineer of Record. We have schematically shown the pile caps. Pile layout will be the responsibility of others along with any as-built information. Minimum pile spacing shall be 3 times the pile diameter.



MICROPILE LOCATION PLAN
SCALE: 3/32" = 1'-0"



NOTES:
1) FINAL EMBEDMENT OF THE PILE INTO THE PILE CAP SHALL BE DETERMINED BY THE PROJECT STRUCTURAL ENGINEER.

2) STEEL BEARING PLATE IS Fy=36 ksi STRUCTURAL STEEL

MICROPILE DETAIL
SCALE: N.T.S.

SHOP DRAWING REVIEW

NO EXCEPTIONS TAKEN ☒
AMEND AS NOTED ☐
REVISE & RESUBMIT ☐
REJECTED ☐

Review is for general compliance with the Contract Documents. The contractor is responsible for construction methods, coordination of work, quantities and dimensions.

Centek Engineering, Inc.
Date: 03/23/17 Checked By: LVP
Centek Project #: 17000.01

(#) Indicates Micropile location and designation as indicated on Sheet SSK-1, dated 8/3/16. Micropile layouts, survey locations, and any as-builts are the responsibility of others.

STATE OF CONNECTICUT · SIGILLUM · REGISTERED PROFESSIONAL ENGINEER · No. 21882

SCALE	DATE	SHEET	PLAN #
AS NOTED	3/21/17	1 of 1	
DRAWN BY	CHKD BY	APPD BY	DISK REF #
MJP	PJY	RMV	

HELICAL
Geotechnical Design/Build
639 GRANITE ST.
BRAINTREE, MA
02184
(781) 848-2110

MICROPILE LOCATION PLAN AND DETAILS

Bethel W2 Verizon
15 Great Pasture Road
Danbury, CT

SHEET NO.
MP-1.0

accomplished by rotary percussive methods, which can address obstructions (i.e. cobbles, boulders, wood/stumps, debris). It is estimated that these mini-piles would be about 30 to 40 feet deep. Static load tests would be required to verify load capacity. These rock-socketed mini-piles would achieve capacity through side friction in the rock socket and end bearing.

There are a few considerations when the mini-piles are designed by the structural engineer. The design load shall be distributed into the bedrock using the bond strength between the bedrock and the grout. This bond strength value can be estimated from the bedrock core samples at Ultimate Bond Strength of 150 psi. A minimum of 5' shall used as the uncased bond length into bedrock. Due to the relatively small cross sectional area of the mini-pile, load carrying capacity resulting from end bearing is generally considered to be negligible for mini-piles, the use of 10.0 tons/square foot net allowable bearing capacity could be used if end bearing is being considered. Corrosion of the mini-piles needs to be addressed in both the bonded and un-bonded zones. It is recommended in the un-bonded zone to have steel installation casing left in-place (from top of bedrock to within the upper horizontal foundation component). This produces a superior mini-pile that has a higher quality of installation. Mini-piles are very slender elements that can not resist lateral load effectively. The use of battered mini-piles is recommended for the lateral loads. The mini-piles shall not be designed to carry tensile or uplift loads. Because the fill material will continue to settle, the mini-pile design must address "negative" skin friction. Negative skin friction develops along the contact surface between pile and soil when the soil settles relative to the pile. The negative skin friction must be added into the dead load of the pile. A preliminary estimate of this negative skin friction load could be as much as 20 tons per pile.

At least one verification load test should be performed to confirm the ultimate bond stress. A minimum of one proof test should also be performed on one of the production pile.

Equipment Shelter

If the shelter is allowed to settle because of the deep fill material, a spread footing is considered appropriate, if minimal settlement is allowed for the shelter, a deep foundation with a mini-pile foundation system is to be used.

EARTHQUAKE DESIGN (SEISMIC)

Seismic design requirements for the State of Connecticut are based on the Connecticut State Building Code, which incorporates the Seismic design Category approach from the International Building Code. The seismic design Category determination is based on a few category factors. One such category is the "Site Classification (soil type)". From our test borings, we consider that the site subsurface conditions match the General Description of "Very Dense Soil and Soft Rock". The site classification is therefore "C".

The proposed deep foundation is to bear on bedrock. This bedrock will not liquefy during a seismic event and needs not be addressed in the foundation design.

MATERIALS TESTING, INC.

55 LAURA STREET • NEW HAVEN, CONNECTICUT 06512 • (203)468-5216
42 BOSTON POST ROAD • WILLIMANTIC, CONNECTICUT 06226 • (860)423-1972
materialstestinginc.com

COMPRESSION TESTS (MASONRY)

CLIENT: Centek Engineering
63-2 North Branford Road
Branford, CT 06405
Attn: Erik Armas

S-1001A

PROJECT: 17000.01 Bethel West 2

LOCATION: Pile #36

MATERIAL: Type II Portland Cement

DATE CAST: 04-18-17 **DATE RECEIVED:** 05-03-17

TEMPERATURE-AMBIENT: **MIX:**

SAMPLES CAST BY: Contractor **SAMPLING TIME:**

REQUIRED STRENGTH: 5000 PSI

SAMPLE TYPE:
- ☐ 3½" x 3½" x 7" GROUT - ASTM C1019
- ☐ 6" x 12" CYLINDERS - COARSE GROUT - ASTM C31
- ☐ 2" x 2" CUBES - MORTAR - ASTM C109 MODIFIED
- ☒ 2" x 2" CUBES - GROUT USED FOR SUPPORT - ASTM C1107
- ☐ OTHER:_____

SLUMP: _____

FLOW RATE: _____

SAMPLE NUMBER	AGE DAYS	DATE TESTED	LOAD LBS.	COMPRESSIVE STRENGTH- PSI
S-50746	21	05-09-17	31,660	7920
S-50747	28	05-16-17	32,510	8130
S-50748	28	05-16-17	28,840	7210

Materials Testing, Inc.

William J. Soucy

1cc: Client

sw

STATE OF CONNECTICUT
M.S. RAVI SHARMA
No. 28322
LICENSED PROFESSIONAL ENGINEER
5/22/17

MATERIALS TESTING, INC.

55 LAURA STREET • NEW HAVEN, CONNECTICUT 06512 • (203)468-5216
42 BOSTON POST ROAD • WILLIMANTIC, CONNECTICUT 06226 • (860)423-1972
materialstestinginc.com

COMPRESSION TESTS (MASONRY)

CLIENT: Centek Engineering
63-2 North Branford Road
Branford, CT 06405
Attn: Erik Armas

S-1000A

PROJECT: 17000.01 Bethel West 2

LOCATION: Pile #3

MATERIAL: Type II Portland Cement

DATE CAST: 04-18-17 **DATE RECEIVED:** 05-03-17

TEMPERATURE-AMBIENT: **MIX:**

SAMPLES CAST BY: Contractor **SAMPLING TIME:**

REQUIRED STRENGTH: 5000 PSI

SAMPLE TYPE:
- ☐ 3½" x 3½" x 7" GROUT - ASTM C1019
- ☐ 6" x 12" CYLINDERS - COARSE GROUT - ASTM C31
- ☐ 2" x 2" CUBES - MORTAR - ASTM C109 MODIFIED
- ☒ 2" x 2" CUBES - GROUT USED FOR SUPPORT - ASTM C1107
- ☐ OTHER:_____

SLUMP: _____

FLOW RATE: _____

SAMPLE NUMBER	AGE DAYS	DATE TESTED	LOAD LBS.	COMPRESSIVE STRENGTH- PSI
S-50743	21	05-09-17	42,980	10,720
S-50744	28	05-16-17	39,580	9900
S-50745	28	05-16-17	45,380	11350

Materials Testing, Inc.

William J. Soucy

1cc: Client

sw

STATE OF CONNECTICUT
M. S. RAVI SHARMA
No. 28322
LICENSED PROFESSIONAL ENGINEER

5/24/17

MATERIALS TESTING, INC.

55 LAURA STREET • NEW HAVEN, CONNECTICUT 06512 • (203)468-5216
42 BOSTON POST ROAD • WILLIMANTIC, CONNECTICUT 06226 • (860)423-1972
materialstestinginc.com

COMPRESSION TESTS (MASONRY)

CLIENT: Centek Engineering
63-2 North Branford Road
Branford, CT 06405
Attn: Erik Armas

S-1002A

PROJECT: 17000.01 Bethel West 2

LOCATION: Pile #25

MATERIAL: Type II Portland Cement

DATE CAST: 04-18-17 **DATE RECEIVED:** 05-03-17

TEMPERATURE-AMBIENT: **MIX:**

SAMPLES CAST BY: Contractor **SAMPLING TIME:**

REQUIRED STRENGTH: 5000 PSI

SAMPLE TYPE:
- ☐ 3½" x 3½" x 7" GROUT - ASTM C1019
- ☐ 6" x 12" CYLINDERS - COARSE GROUT - ASTM C31
- ☐ 2" x 2" CUBES - MORTAR - ASTM C109 MODIFIED
- ☒ 2" x 2" CUBES - GROUT USED FOR SUPPORT - ASTM C1107
- ☐ OTHER:_____

SLUMP: _____

FLOW RATE: _____

SAMPLE NUMBER	AGE DAYS	DATE TESTED	LOAD LBS.	COMPRESSIVE STRENGTH- PSI
S-50749	21	05-09-17	28,840	7210
S-50750	28	05-16-17	30,750	7690
S-50751	28	05-16-17	30,690	7670

Materials Testing, Inc.

William J. Soucy

1cc: Client

sw

STATE OF CONNECTICUT
M. S. RAVI SHARMA
No. 28322
LICENSED
PROFESSIONAL ENGINEER

1810.3.2.6 Allowable stresses. The allowable stresses for materials used in deep foundation elements shall not exceed those specified in Table 1810.3.2.6.

❖ This section refers the code user to the table of allowable stresses in order to identify the correct values that apply to various types of deep foundations. Note that Section 1810.1.4 allows "special types of piles" using the allowable stresses for materials that are specified herein.

TABLE 1810.3.2.6. See below.

❖ This table provides a complete list of the relevant allowable stresses for deep foundation element materials including concrete, reinforcing steel and structural steel.

1810.3.2.7 Increased allowable compressive stress for cased cast-in-place elements. The allowable compressive stress in the concrete shall be permitted to be increased as specified in Table 1810.3.2.6 for those portions of permanently cased cast-in-place elements that satisfy all of the following conditions:

1. The design shall not use the casing to resist any portion of the axial load imposed.
2. The casing shall have a sealed tip and be mandrel driven.
3. The thickness of the casing shall not be less than manufacturer's standard gage No.14 (0.068 inch) (1.75 mm).
4. The casing shall be seamless or provided with seams of strength equal to the basic material and be of a configuration that will provide confinement to the cast-in-place concrete.
5. The ratio of steel yield strength (F_y) to specified compressive strength (f'_c) shall not be less than six.
6. The nominal diameter of the element shall not be greater than 16 inches (406 mm).

❖ For cased cast-in-place concrete elements formed by driving permanent steel casings, the allowable design compressive stress in Table 1810.3.2.6 is generally not to exceed $0.33f'_c$. When the permanent casing complies with the requirements of this section, the allowable concrete compressive stress may be increased to $0.40f'_c$. The basis for this increase in allowable concrete stress is the added strength given to the concrete by the confining action of the steel casing. The general formula for increased allowable stress caused by confinement is:

$$f_c 0.33 f'_c \left(\frac{1 + 7.5 t f_y}{D f'_c} \right)$$

where:

f_c = Allowable concrete stress.

f'_c = Specified concrete strength.

TABLE 1810.3.2.6
ALLOWABLE STRESSES FOR MATERIALS USED IN DEEP FOUNDATION ELEMENTS

MATERIAL TYPE AND CONDITION	MAXIMUM ALLOWABLE STRESS[a]
1. Concrete or grout in compression[b]	
Cast-in-place with a permanent casing in accordance with Section 1810.3.2.7	$0.4 f'_c$
Cast-in-place in a pipe, tube, other permanent casing or rock	$0.33 f'_c$
Cast-in-place without a permanent casing	$0.3 f'_c$
Precast nonprestressed	$0.33 f'_c$
Precast prestressed	$0.33 f'_c - 0.27 f_{pc}$
2. Nonprestressed reinforcement in compression	$0.4 f_y \le 30{,}000$ psi
3. Steel in compression	
Cores within concrete-filled pipes or tubes	$0.5 F_y \le 32{,}000$ psi
Pipes, tubes or H-piles, where justified in accordance with Section 1810.3.2.8	$0.5 F_y \le 32{,}000$ psi
Pipes or tubes for micropiles	$0.4 F_y \le 32{,}000$ psi
Other pipes, tubes or H-piles	$0.35 F_y \le 16{,}000$ psi
Helical piles	$0.6 F_y \le 0.5 F_u$
4. Nonprestressed reinforcement in tension	
Within micropiles	$0.6 f_y$
Other conditions	$0.5 f_y \le 24{,}000$ psi
5. Steel in tension	
Pipes, tubes or H-piles, where justified in accordance with Section 1810.3.2.8	$0.5 F_y \le 32{,}000$ psi
Other pipes, tubes or H-piles	$0.35 F_y \le 16{,}000$ psi
Helical piles	$0.6 F_y \le 0.5 F_u$
6. Timber	In accordance with the AWC NDS

a. f'_c is the specified compressive strength of the concrete or grout; f_{pc} is the compressive stress on the gross concrete section due to effective prestress forces only; f_y is the specified yield strength of reinforcement; F_y is the specified minimum yield stress of steel; F_u is the specified minimum tensile stress of structural steel.

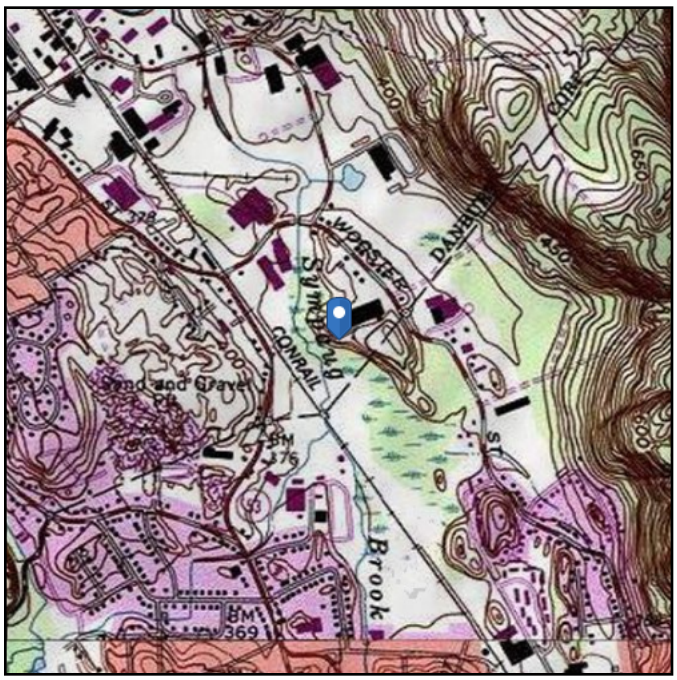
b. The stresses specified apply to the gross cross-sectional area within the concrete surface. Where a temporary or permanent casing is used, the inside face of the casing shall be considered the concrete surface.

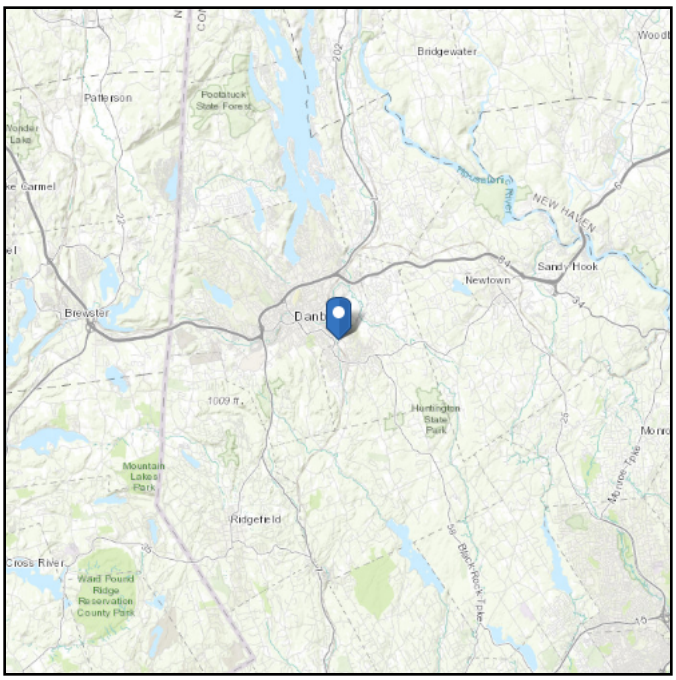
ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 386.01 ft (NAVD 88)
Latitude: 41.383
Longitude: -73.4222





Wind

Results:

Wind Speed:	117 Vmph
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. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

Date Accessed: Mon Feb 10 2020

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

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

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

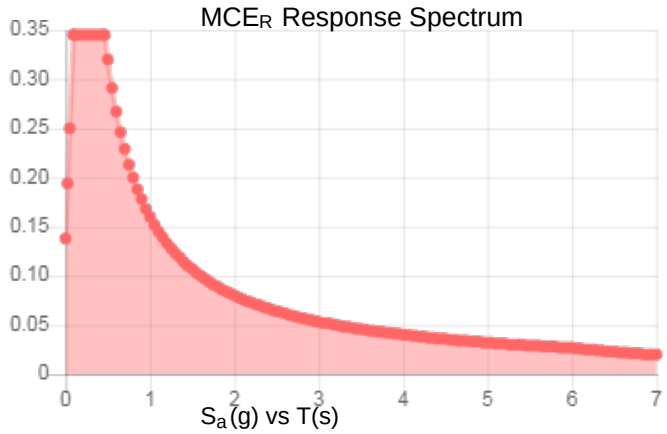
Seismic

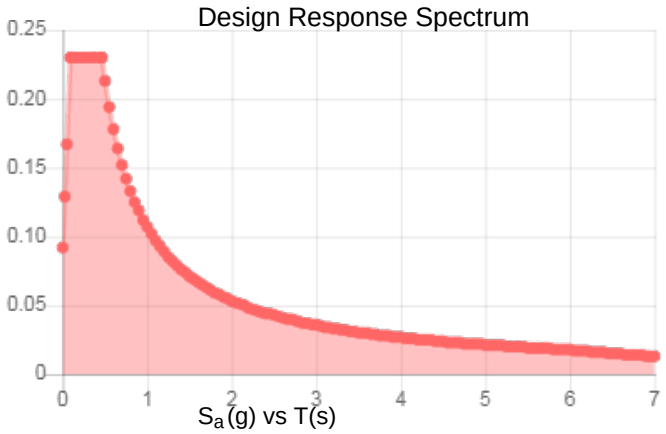
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.216	S_{DS} :	0.23
S_1 :	0.067	S_{D1} :	0.107
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.118
S_{MS} :	0.345	PGA_M :	0.184
S_{M1} :	0.16	F_{PGA} :	1.565
		I_e :	1

Seismic Design Category B





Data Accessed: Mon Feb 10 2020

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

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Mon Feb 10 2020

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

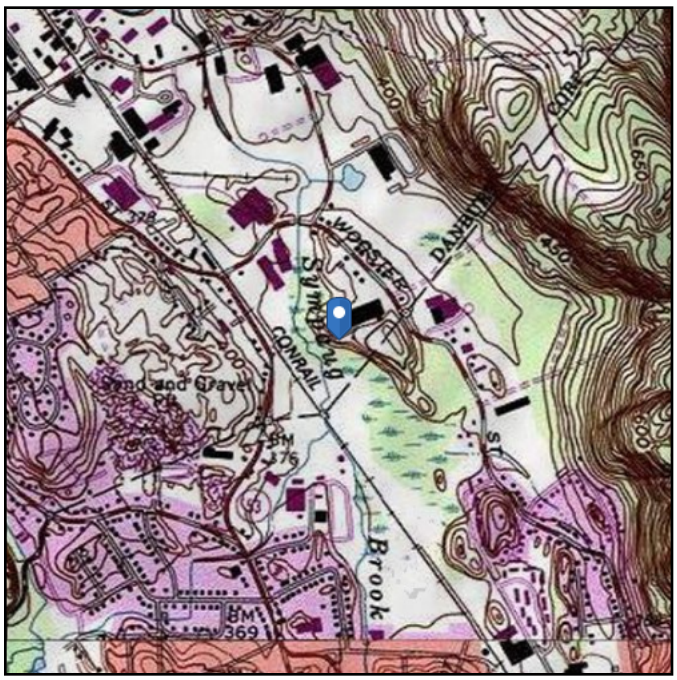
Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from 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.

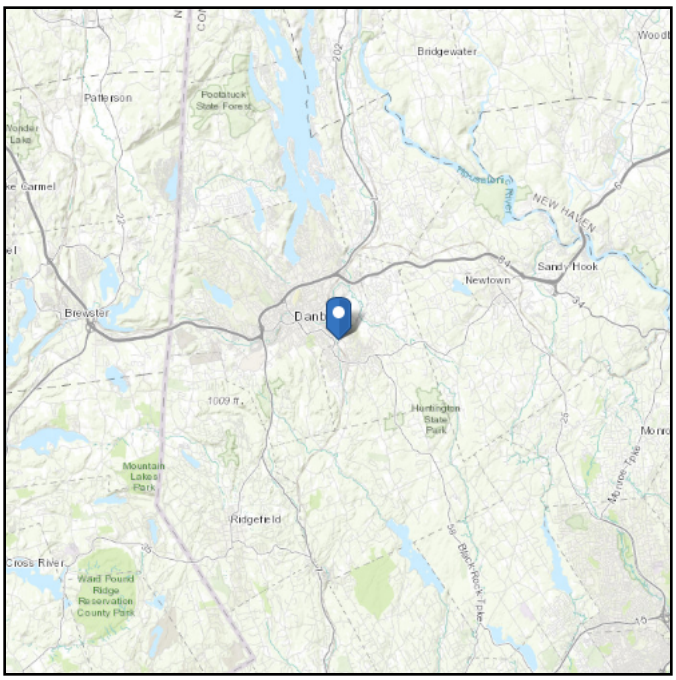
ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 386.01 ft (NAVD 88)
Latitude: 41.383
Longitude: -73.4222





Wind

Results:

Wind Speed:	117 Vmph
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. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

Date Accessed: Mon Feb 10 2020

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

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

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

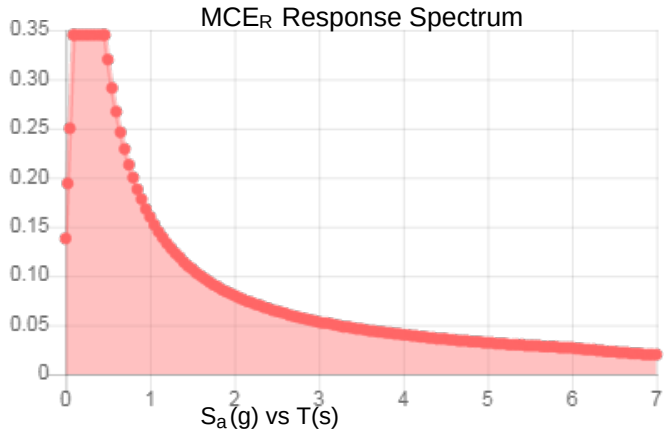
Seismic

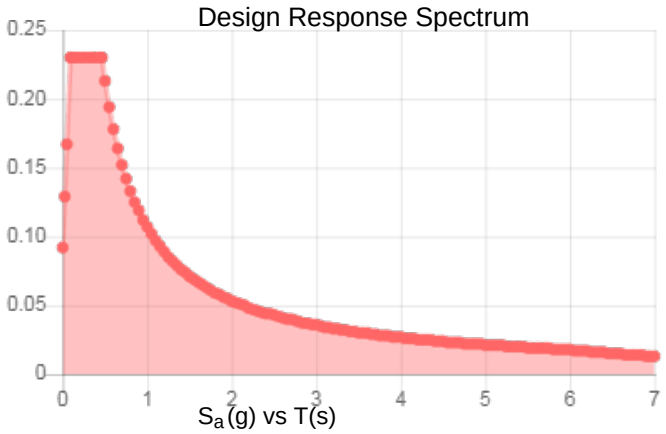
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.216	S_{DS} :	0.23
S_1 :	0.067	S_{D1} :	0.107
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.118
S_{MS} :	0.345	PGA_M :	0.184
S_{M1} :	0.16	F_{PGA} :	1.565
		I_e :	1

Seismic Design Category B





Data Accessed: Mon Feb 10 2020

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

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Mon Feb 10 2020

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.

PREPARED FOR

KGI WIRELESS

PREPARED BY

SEMAAN ENGINEERING SOLUTIONS

SEMAAN ENGINEERING SOLUTIONS HOLDINGS, LLC

MODIFICATION PACKAGE FOR A 119 FT 18-SIDED SABRE MONOPOLE WITH A PROPOSED 20 FT EXTENSION

CLIENT SITE NAME/NUMBER

28493

PROPOSED CARRIER / SITE NAME

AT&T / BETHEL WEST 2

SITE ADDRESS

15 GREAT PASTURE ROAD
DANBURY, CT 06810
FAIRFIELD COUNTY
N41°22'58.8", W73°25'19.92"

DATE:

09/02/2020

CONTACT INFORMATION

ENGINEER OF RECORD

NAME: SEMAAN ENGINEERING SOLUTIONS HOLDINGS, LLC
ADDRESS: 1047 N 205TH STREET
ELKHORN, NE 68022

CONTACT: THOMAS TAYLOR ----
(402) 289-1888 x1
EMAIL: TOMT@SEMAANENG.COM

SHEET INDEX

SHEET #	SHEET TITLE	REV #
T-1	TITLE SHEET	1
N-1	GENERAL NOTES	1
N-2	SITE SPECIFIC NOTES	0
S-1	MONOPOLE ELEVATION VIEW	0
S-2	MONOPOLE EXTENSION DETAILS	0
S-3	MONOPOLE EXTENSION SECTIONS	0

STAMP

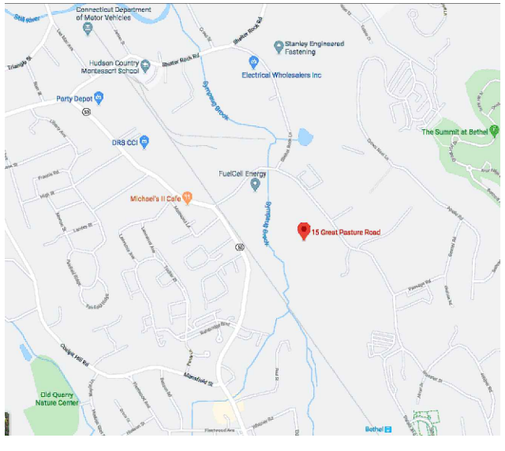
STATE OF CONNECTICUT
THOMAS L TAYLOR
No. 28130
LICENSED PROFESSIONAL ENGINEER

09.02.20

EXP. 01/31/2021

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF CONNECTICUT

VICINITY MAP



MODIFICATION OUTLINE

THE MODIFICATIONS PROVIDED IN THESE DRAWINGS ARE BASED ON THE RECOMMENDATIONS OUTLINED IN THE STRUCTURAL MODIFICATIONS ANALYSIS REPORT COMPLETED BY SEMAAN ENGINEERING SOLUTIONS HOLDINGS, LLC (SES) DATED 09/02/2020. THIS REPORT IS BASED ON A SPECIFIC ANTENNA LOADING AND COAX CONFIGURATION AS DEFINED IN THE REPORT. ANY OTHER ANTENNA OR COAX CONFIGURATION REQUIRES REVIEW BY SES

CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, QUANTITIES, PART NUMBERS AND COAX/ANTENNA PLACEMENTS PRIOR TO BIDDING, ORDERING MATERIALS, AND CONSTRUCTION.

GENERAL NOTES:

1. REFERENCE THE SEMAAN ENGINEERING SOLUTIONS ANALYSIS DATED 09/02/2020 FOR THE PROPOSED AND EXISTING LOADS CONSIDERED. THIS DRAWING IS NOT VALID IF LOADS OTHER THAN THOSE CONSIDERED IN THE ANALYSIS ARE ADDED TO OR REMOVED FROM THE STRUCTURE UNLESS APPROVED IN WRITING BY SEMAAN ENGINEERING SOLUTIONS HOLDINGS, LLC.
2. THE PROPOSED LOADS SHALL NOT BE ADDED TO THE STRUCTURE UNTIL ALL MODIFICATIONS HAVE BEEN COMPLETED, INSPECTED BY A 3RD PARTY, AND APPROVED BY THE ENGINEER OF RECORD.
3. ALL METHODS, MATERIALS AND WORKMANSHIP SHALL FOLLOW THE DICTATES OF GOOD CONSTRUCTION PRACTICE.
4. ALL WORK INDICATED ON THESE DRAWINGS SHALL BE PERFORMED BY QUALIFIED CONTRACTORS EXPERIENCED IN TOWER AND FOUNDATION CONSTRUCTION.
5. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING DIMENSIONS, ELEVATIONS AND CONDITIONS PRIOR TO FABRICATION. THE CONTRACTOR WILL BE SOLELY RESPONSIBLE FOR THE PROPER FIT AND CLEARANCE IN THE FIELD. CONTACT SEMAAN ENGINEERING IF ANY DISCREPANCIES EXIST.
6. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF RECORD IMMEDIATELY OF ANY INSTALLATION INTERFERENCES. ALL NEW WORK SHALL ACCOMMODATE EXISTING CONDITIONS. DETAILS NOT SPECIFICALLY SHOWN ON THE DRAWINGS SHALL FOLLOW SIMILAR DETAILS FOR THIS JOB.
7. THIS DRAWING DOES NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND INSPECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL THE CONSTRUCTION MEANS, TECHNIQUES, SEQUENCES AND PROCEDURES.
8. ALL WORK SHALL BE DONE IN ACCORDANCE WITH LOCAL CODES AND OSHA SAFETY REGULATIONS. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ON-SITE SAFETY ASSOCIATED WITH THE WORK TO BE PERFORMED AS WELL AS THE PUBLIC AFFECTED BY THE WORK IN THE VICINITY OF THE JOB SITE.
9. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND EXECUTION OF ALL MISCELLANEOUS SHORING, BRACING, TEMPORARY SUPPORTS, ETC. NECESSARY, PER TIA-322-A, TO PROVIDE A COMPLETE AND STABLE STRUCTURE AS SHOWN ON THESE DRAWINGS.
10. THE CONTRACTOR'S PROPOSED INSTALLATION SHALL NOT INTERFERE, NOR DENY ACCESS TO, ANY EXISTING OPERATIONAL AND SAFETY EQUIPMENT.
11. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR THE PROTECTION OF THE PROPERTY IN THE VICINITY OF THE JOB SITE. THE CONTRACTOR SHALL USE THE PRECAUTIONARY MEANS NECESSARY FOR ADEQUATE PROTECTION.
12. ALL WORK SHALL BE PERFORMED IN CALM WIND CONDITIONS, WHERE SPEED DOES NOT EXCEED 10 MPH.
13. ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR ONE YEAR FROM ACCEPTANCE DATE.
14. ALL TOWER MODIFICATION WORK SHALL BE IN ACCORDANCE WITH TIA-322-A STANDARDS FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.

APPLICABLE CODES AND STANDARDS:

1. ANSI/TIA-222 STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES, REV G.
2. 2015 INTERNATIONAL BUILDING CODE. WITH CONNECTICUT STATE AMENDMENTS.
3. ACI 318: AMERICAN CONCRETE INSTITUTE, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, 318-14 (LATEST EDITION).
4. CRSI: CONCRETE REINFORCEMENT STEEL INSTITUTE, MANUAL OF STANDARD PRACTICE, 318-14.
5. AISC: AMERICAN INSTITUTE OF STEEL CONSTRUCTION, MANUAL OF STEEL CONSTRUCTION, 15TH EDITION - 2017 (LATEST EDITION).
6. AWS: AMERICAN WELDING SOCIETY D1.1, STRUCTURAL WELDING CODE - 2015, (LATEST EDITION).

STEEL CONSTRUCTION:

1. STRUCTURAL STEEL SHALL CONFORM TO THE AISC MANUAL OF STEEL CONSTRUCTION, 14TH EDITION, FOR THE DESIGN, FABRICATION, AND ERECTION OF STEEL COMPONENTS.
2. UNLESS NOTED OTHERWISE, ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.
   - ANGLE: ASTM A36
   - PIPE/TUBE: ASTM A500 (46 ksi YIELD)
   - PLATE: ASTM A36
   A. ALL BOLTS, ASTMA325 GALVANIZED HIGH STRENGTH BOLTS.
   B. ALL U-BOLTS, ASTM A36
   C. ALL NUTS, A563 CARBON AND STEEL ALLOY NUTS.
   D. ALL WASHERS, ASTM F436 HARDENED STEEL WASHERS
3. SHOP DRAWINGS SHALL BE SUBMITTED TO SES FOR APPROVAL PRIOR TO FABRICATION. SHOP DRAWINGS SHALL INCLUDE ALL FABRICATED STEEL ASSEMBLIES INCLUDING MONOPOLE/TOWER EXTENSIONS

STEEL CONSTRUCTION (CONT.):

4. ALL EXTERIOR STEEL WORK SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123 FOR COMPONENTS AND ASTM A153 FOR HARDWARE, AND AS FOLLOWS, UNLESS OTHERWISE NOTED.
   A. GALVANIZING SHALL BE PERFORMED AFTER SHOP FABRICATION AND WELDING TO THE GREATEST EXTENT POSSIBLE
   B. ALL DINGS, SCRAPES, MARS AND WELDS IN THE GALVANIZED AREA SHALL BE COATED WITH (3) BRUSH COATS OF ZRC COLD GALVANIZING COMPOUND OR APPROVED EQUAL. THE COATING SHALL BE APPLIED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
   C. IF THE STRUCTURE WAS ORIGINALLY PAINTED, AFTER ZINC-RICH COATING IS DRY, OVERCOAT WITH AN APPROPRIATE PAINT WITH THE SAME COLOR AS THE EXISTING.
5. NO TORCH CUTTING SHALL BE PERMITTED UNLESS APPROVED BY THE ENGINEER.
6. DO NOT PLACE HOLES THROUGH STRUCTURAL STEEL MEMBERS EXCEPT AS SHOWN AND DETAILED ON DRAWINGS.

WELDING NOTES:

1. ALL WELDING TO BE PERFORMED BY AWS CERTIFIED WELDERS AND CONDUCTED IN ACCORDANCE WITH THE LATEST EDITION OF THE AWS WELDING CODE D1.1.
2. CONTRACTOR SHALL RETAIN AN AWS CERTIFIED WELD INSPECTOR TO PERFORM VISUAL INSPECTIONS ON ALL FIELD WELDS. A REPORT SHALL BE SUBMITTED TO SEMAAN ENGINEERING FOR FINAL APPROVAL.
3. ALL ELECTRODES SHALL BE LOW HYDROGEN E70XX ELECTRODES, PER AWS D1.1, UNLESS NOTED OTHERWISE.
4. MINIMUM WELD SIZE TO BE 0.1875 INCH FILLET WELDS, UNLESS NOTED OTHERWISE.
5. PRIOR TO FIELD WELDING GALVANIZED MATERIAL, CONTRACTOR SHALL GRIND OFF GALVANIZING AND ANY OTHER CONTAMINANTS 2" BEYOND ALL FIELD WELD SURFACES. AFTER WELDING, REPAIR ALL GROUND AND WELDED SURFACES WITH (3) BRUSH COATS OF ZRC COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURERS REQUIREMENTS.
6. ALL FULL PENETRATION WELDS ARE REQUIRED TO BE 100% NDE INSPECTED BY ULTRASONIC TESTING (UT) IN ACCORDANCE WITH AWS D1.1.
7. ALL PARTIAL PENETRATION AND FILLET WELDS ARE REQUIRED TO BE 100% VISUALLY INSPECTED IN ACCORDANCE WITH AWS D1.1.

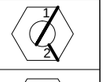
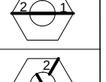
BOLTING NOTES:

1. STRUCTURAL CONNECTIONS TO BE ASSEMBLED AND INSPECTED IN ACCORDANCE WITH RCSC-2009 (SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 OR ASTM A490 BOLTS.)
2. ALL CONNECTION BOLTS SHALL BE ASTM A325N (GALVANIZED). UNLESS NOTED OTHERWISE.
3. SPLICE/FLANGE BOLTS SUBJECT TO DIRECT TENSION SHALL BE INSTALLED AND TIGHTENED AS PER SECTION 8.2.1 OF THE AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING A325 OR A490 BOLTS". LOCATED IN THE AISC MANUAL OF STEEL CONSTRUCTION. THE INSTALLATION PROCEDURE IS PARAPHRASED AS FOLLOWS:

   FASTENERS SHALL BE INSTALLED IN PROPERLY ALIGNED HOLES AND TIGHTENED BY ONE OF THE METHODS DESCRIBED IN SUBSECTION 8.2.1 THROUGH 8.2.4.

   8.2.1 TURN-OF-NUT PRETENSIONING
   BOLTS SHALL BE INSTALLED IN ALL HOLES OF THE CONNECTION AND BROUGHT TO A SNUG TIGHT CONDITION AS DEFINED IN SECTION 8.1, UNTIL ALL THE BOLTS ARE SIMULTANEOUSLY SNUG TIGHT AND THE CONNECTION IS FULLY COMPACTED. FOLLOWING THIS INITIAL OPERATION ALL BOLTS IN THE CONNECTION SHALL BE TIGHTENED FURTHER BY THE APPLICABLE AMOUNT OF ROTATION SPECIFIED IN THE TABLE PROVIDED. DURING THE TIGHTENING OPERATION THERE SHALL BE NO ROTATION OF THE PART NOT TURNED BY THE WRENCH. TIGHTENING SHALL PROGRESS SYSTEMATICALLY.

TURN-OF-NUT ROTATION FROM SNUG TIGHT CONDITION

BOLT LENGTH (UNDER SIDE OF HEAD TO END OF BOLT)	BOTH FACES NORMAL TO BOLT AXIS		
	NUT ROTATION	INITIAL MARKING POSITION	FINAL MARKING POSITION
UP TO AND INCLUDING 4 DIAMETERS	1/3 TURN		
OVER 4 DIA-METERS BUT NOT EXCEED-ING 8 DIA.	1/2 TURN		
OVER 8 DIA-METERS BUT NOT EXCEED-ING 12 DIA.	2/3 TURN		

USE A WATERPROOF BLACK MARKER TO MARK THE BOLT AND NUT AS SHOWN ON THE TABLE.

BOLTING NOTES (CONT.):

4. ALL OTHER BOLTED CONNECTIONS SHALL BE BROUGHT TO A SNUG TIGHT CONDITION AS DEFINED IN SECTION 8.1 OF THE SPECIFICATION.
5. ALL BOLT HOLES SHALL BE ALIGNED TO PERMIT INSERTION OF THE BOLTS WITHOUT UNDUE DAMAGE TO THE THREADS. BOLTS SHALL BE PLACED IN ALL HOLES WITH WASHERS POSITIONED AS REQUIRED AND NUTS THREADED TO COMPLETE THE ASSEMBLY. COMPACTING THE JOINT TO THE SNUG-TIGHT CONDITION SHALL PROGRESS SYSTEMATICALLY FROM THE MOST RIGID PART OF THE JOINT. THE SNUG-TIGHTENED CONDITION IS THE TIGHTNESS THAT IS ATTAINED WITH A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF AN IRONWORKER USING AN ORDINARY SPUD WRENCH TO BRING THE CONNECTED PLIES INTO FIRM CONTACT.
6. A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED BOLTS.
7. ALL NEW BOLTS SHALL BE LONG ENOUGH TO FULLY ENGAGE THE FULL DEPTH OF THE NUT AND LOCKING DEVICE.
8. GALVANIZED ASTM A325 BOLTS SHALL NOT BE REUSED.

CONCRETE CONSTRUCTION:

1. ALL CONCRETE SHALL CONFORM TO THE SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS, ACI 301
2. ALL CONCRETE SHALL BE MADE WITH STONE AGGREGATE & SHALL DEVELOP 4000 PSI MIN. COMPRESSIVE STRENGTH IN 28 DAYS. CONCRETE MIX DESIGN: 6 1/2 SACKS OF CEMENT MINIMUM PER CUBIC YARD, 3/4" MAXIMUM AGGREGATE. AIR ENTRAINMENT = 6% ± 1% AND SLUMP = 4" ± 1" (WITHOUT PLASTICIZER)
3. ALL REINFORCING SHALL BE HIGH STRENGTH DEFORMED BARS, GRADE 60, ASTM A615, WITH 60,000 PSI MINIMUM YIELD POINT.
4. REINFORCING PROTECTION: CONCRETE POURED AGAINST EARTH.....3"
5. ALL BAR LENGTHS ARE NOT DRAWN TO SCALE. NO SPLICES OF REINFORCEMENT SHALL BE MADE EXCEPT AS DETAILED OR AS AUTHORIZED BY THE STRUCTURAL ENGINEER. LAP SPLICES, WHERE PERMITTED, SHALL BE A MINIMUM OF 40 BAR DIAMETERS UNLESS NOTED.
6. DETAIL BARS IN ACCORDANCE WITH ACI DETAILING MANUAL & ACI BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.
7. PROVIDE ALL ACCESSORIES NECESSARY TO SUPPORT REINFORCING AT THE POSITIONS SHOWN ON THE PLANS.
8. BACKFILL AND COMPACT SOIL TO A MINIMUM 95% OF STANDARD PROCTOR DENSITY PER ASTM D 698.THE COMPACTED SOIL SHALL PROVIDE A MINIMUM UNIT WEIGHT OF 120 POUNDS PER CUBIC FOOT FOR THE FILL MATERIAL.
9. AS APPLICABLE, ORIENT NEW ANCHORS IN LINE WITH EXISTING ANCHORS.
10. AS APPLICABLE, ANCHOR RODS TO PASS THROUGH CENTROID OF BLOCK.

EPOXY-GROUTED FASTENER INSTALLATION:

1. CONTRACTOR SHALL VERIFY THAT DRILLING CLEARANCE IS ADEQUATE PRIOR TO CONSTRUCTION. NOTIFY THE ENGINEER IF A CLEARANCE PROBLEM EXISTS.
2. ALL HOLES SHALL BE WIRE-BRUSHED TO PROFILE THE CONCRETE SURFACE, ALL CORED HOLES WITH SMOOTH WALLS SHALL BE ROUGHENED.
3. USE COMPRESSED AIR TO BLOW ANY REMAINING DEBRIS OUT OF THE NEWLY DRILLED HOLES.
4. EPOXY GROUT THE NEW ANCHOR BOLTS OR REBAR IN PLACE PER THE MANUFACTURER'S INSTRUCTIONS.

CONTINUOUS INSPECTION AND MAINTENANCE:

CONTINUOUS INSPECTION OF THE STRUCTURE AND THE ADDED REINFORCING CONSISTENT WITH THE CURRENT REQUIREMENTS OF THE LATEST TIA 222 STANDARD SHALL BE IMPLEMENTED BY THE OWNER. ANY FUTURE CORROSION OR OTHER DETERIORATION OF THE STRUCTURE OR ITS REINFORCING WILL REDUCE ITS CAPACITY TO WITHSTAND THE REQUIRED LOADS. ANY DEFECTS SHALL BE REPAIRED TO ENSURE THE STRUCTURAL INTEGRITY FOR THE LIFE OF THE STRUCTURE.

CLIENT

KGI WIRELESS

SITE NAME/NUMBER

28493

SITE ADDRESS

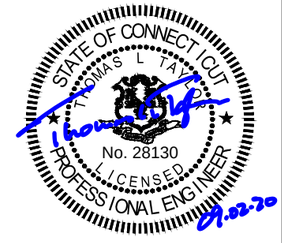
15 GREAT PASTURE ROAD
DANBURY, CT 06810
N41°22'58.8", W73°25'19.92"

DRAWINGS PREPARED BY:

SEMAAN ENGINEERING SOLUTIONS
SEMAAN ENGINEERING SOLUTIONS HOLDINGS, LLC

1047 NORTH 205TH STREET
OMAHA, NEBRASKA 68022
PHONE: (402) 289-1888
FAX: (402) 289-1861

STAMP



EXP. 01/31/2021

DRAWN BY: KRC
APPROVED BY: TLT

REV	DESCRIPTION	DATE
1	ANALYSIS REVISION	09/02/20

DRAWING DESCRIPTION

GENERAL NOTES

SHEET NUMBER: N-1

REVISION: 0

SPECIAL INSPECTION:

1. A QUALIFIED INDEPENDENT INSPECTION FIRM, EMPLOYED BY THE OWNER, SHALL PERFORM INSPECTION AND TESTING IN ACCORDANCE WITH THE IBC 2015, SECTION 1704 AS REQUIRED BY PROJECT SPECIFICATIONS FOR THE FOLLOWING CONSTRUCTION WORK TO BE INCLUDED IN THE POST-MODIFICATION INSPECTION (PMI) REPORT.

SPECIAL INSPECTION REQUIREMENTS (TO BE INCLUDED IN PMI REPORT)

REQUIRED (Y,N,NA)	REPORT ITEM
	PRE-CONSTRUCTION
N	PRE-APPROVED INSPECTION AGENCY APPROVED BY LOCAL JURISDICTION
N	PRE-APPROVED FABRICATOR APPROVED BY LOCAL JURISDICTION
Y	GC SITE VISIT TO FIELD VERIFY MODIFICATION INSTALLATION(S)
Y	EOR APPROVED SHOP DRAWINGS
Y	FABRICATOR CERTIFIED WELD INSPECTION/QA PROGRAM
Y	MATERIAL CERTIFICATIONS
	CONSTRUCTION
Y	CONSTRUCTION INSPECTIONS
NA	CONTINUOUS FOUNDATION INSPECTIONS
NA	CONCRETE COMPRESSIVE STRENGTH, AIR, AND SLUMP TESTS (SEE CONCRETE NOTES FOR TESTS)
Y	CONTINUOUS VISUAL WELD INSPECTION (FIELD WELDS)
Y	WELD NON-DESTRUCTIVE EVALUATION (NDE) REQUIRED
Y	HIGH STRENGTH BOLT INSPECTION (VERIFY TURN-OF-NUT INSTALLATION)
NA	EARTHWORK, LIFT, AND DENSITY
Y	ON-SITE COLD GALVANIZING VERIFICATIONS
NA	GUY CABLE TENSION VERIFICATIONS
Y	GC AS-BUILT DOCUMENTS
	POST-CONSTRUCTION
Y	SPECIAL INSPECTION NOTED DEVIATIONS
NA	POST-INSTALLED ANCHOR ROD PULL-OUT TESTS
Y	PHOTOGRAPHS (CLOSE-UP ON STRUCTURES)

2. THE INSPECTION AGENCY SHALL SUBMIT INSPECTION AND TEST REPORTS TO THE BUILDING DEPARTMENT, THE ENGINEER OF RECORD, AND THE OWNER IN ACCORDANCE WITH IBC 2015, 1704. THE INSPECTION FIRM SHALL ALSO PROVIDE A REDLINE SET OF THE AS-BUILT DRAWINGS AND COMPLETE PHOTO DOCUMENTATION OF THE MODIFICATIONS COMPLETED AT THE SITE.

CLIENT

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DANBURY, CT 06810
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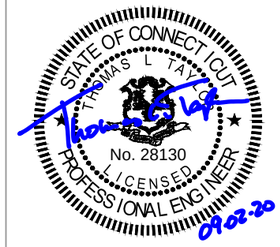


EXP. 01/31/2021

DRAWN BY: KRC
APPROVED BY: TLT

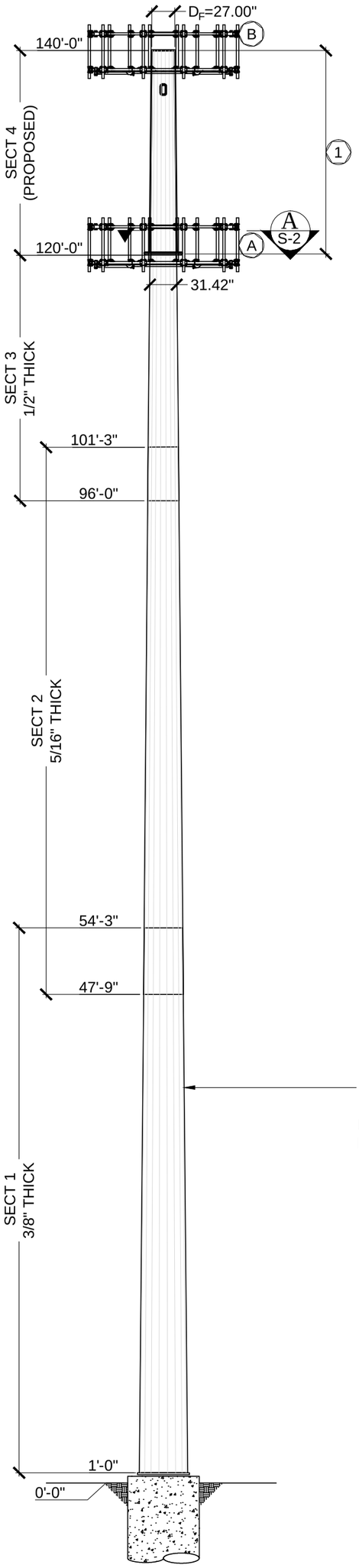
REV	DESCRIPTION	DATE

DRAWING DESCRIPTION

SITE SPECIFIC NOTES

SHEET NUMBER: N-2

REVISION: 0



EXISTING 18-SIDED SABRE MONOPOLE.
REFERENCE SABRE DRAWING # 16-7133-SBC
DATED JULY 13, 2016 FOR ADDITIONAL
INFORMATION.

MODIFICATION SCHEDULE

NO.	MODIFICATION DESCRIPTION	ELEVATIONS (FT)	SHEETS	DETAILS
1	INSTALL NEW MONOPOLE EXTENSION	120'-0" - 140'-0"	S-2	-

CARRIER SCHEDULE

NO.	CARRIER	ELEVATION (FT)	DESCRIPTION
A	VERIZON	120	EXISTING
B	AT&T	140	PROPOSED

BILL OF MATERIALS

NO.	ITEM DESCRIPTION	QUANTITY
1	NEW 18 SIDED x 20'-0" GALVANIZED MONOPOLE EXTENSION (F_Y=65 ksi t=1/4")	1
2	37.5" DIA x 1.5" FLANGE PLATE (A572-50)	1
3	6 x 12"PORTS (SABRE PART #C30-138-001 OR APPROVED EQUAL)	3
4	NEW 1" DIA. A325 BOLTS	6
5	NEW 1" DIA. A325 HEAVY HEX NUTS	12
6	NEW 1" DIA. A325 FLAT WASHERS	12

SABRE CONTACT INFORMATION:
PHONE: (800) 369-6690
(721) 258-6690

TOWER ELEVATION
NOT TO SCALE

SHEET NUMBER: S-1
REVISION: 0
DRAWING DESCRIPTION: MONOPOLE ELEVATION VIEW

REV	DESCRIPTION	DATE
0	FIRST ISSUE	08/31/2020

DRAWN BY: KRC
APPROVED BY: TLT

STAMP
STATE OF CONNECTICUT
THOMAS L. TAYLOR
No. 28130
LICENSED PROFESSIONAL ENGINEER
EXP. 01/31/2021

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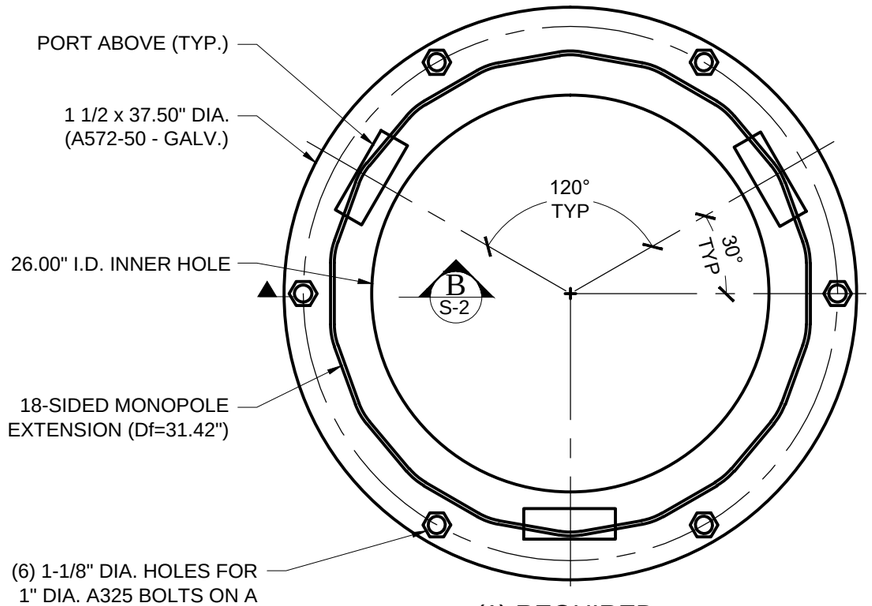
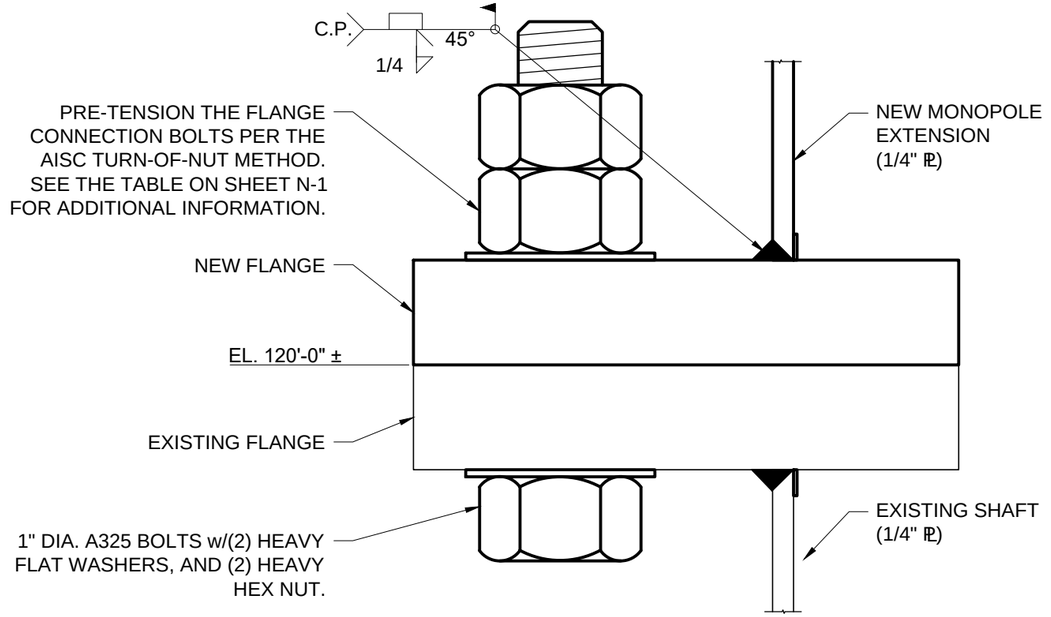
CONTRACTOR VERIFY EXISTING FLANGE AND BOLT HOLES PRIOR TO FABRICATION



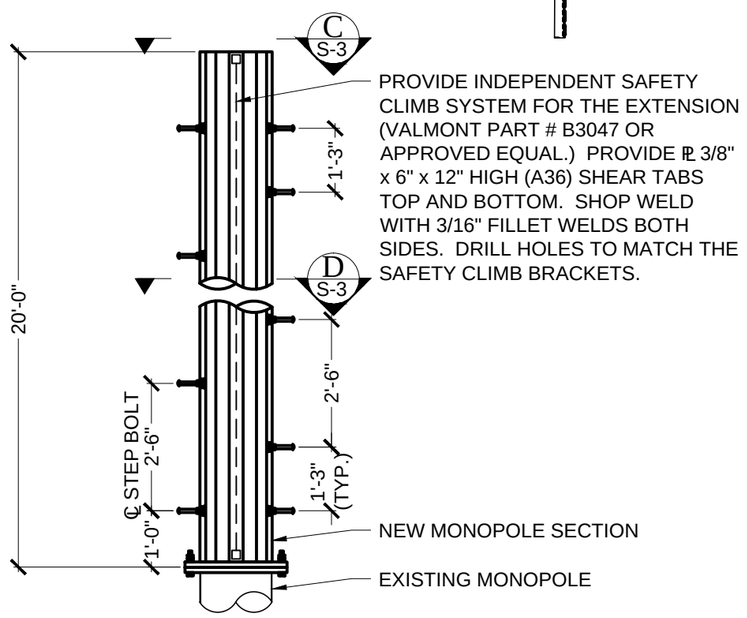
(1) REQUIRED



C.P. DENOTES COMPLETE PENETRATION

A FLANGE DETAIL
NOT TO SCALE

B SECTION
NOT TO SCALE



2 S-2 BASEPLATE CUTTING DETAIL
NOT TO SCALE

CLIENT

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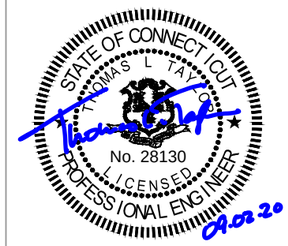


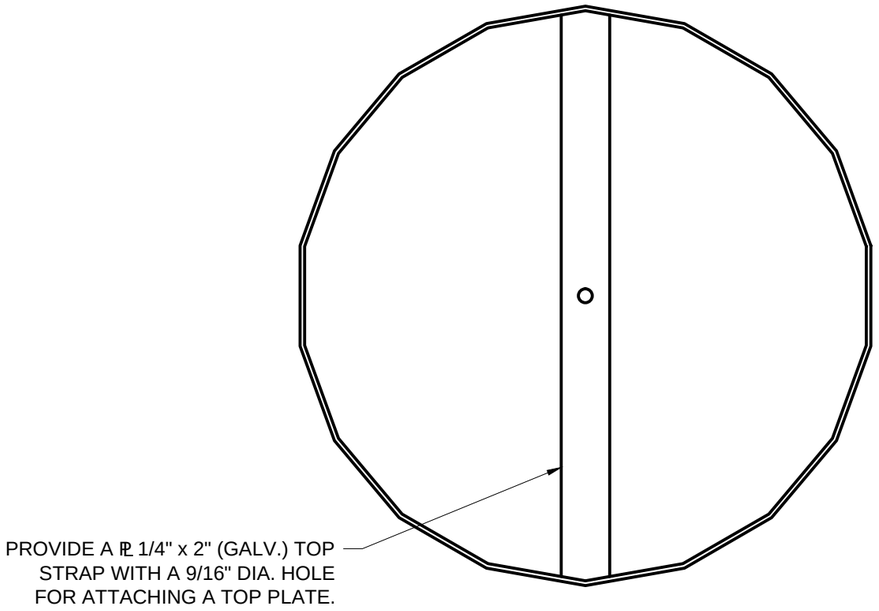
DRAWN BY: KRC
APPROVED BY: TLT

REV	DESCRIPTION	DATE
0	FIRST ISSUE	08/31/2020

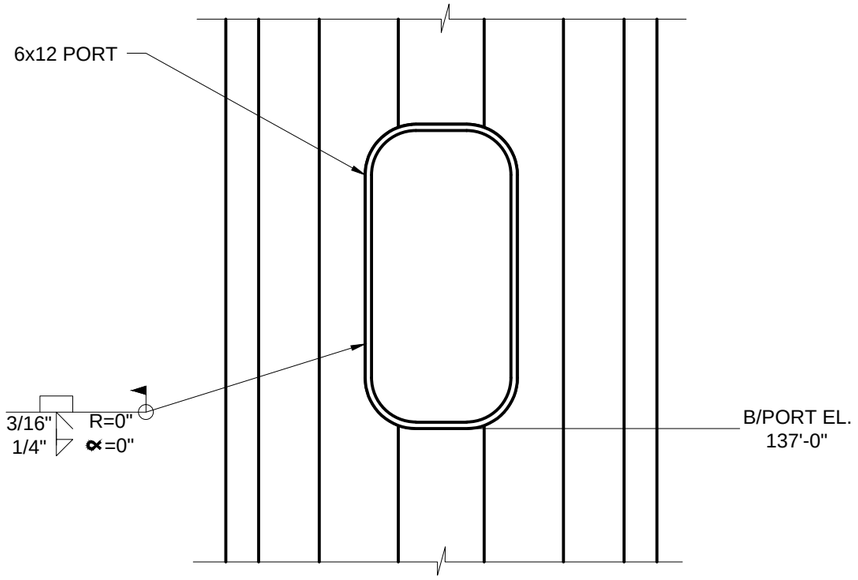
DRAWING DESCRIPTION

MONOPOLE
EXTENSION DETAILS

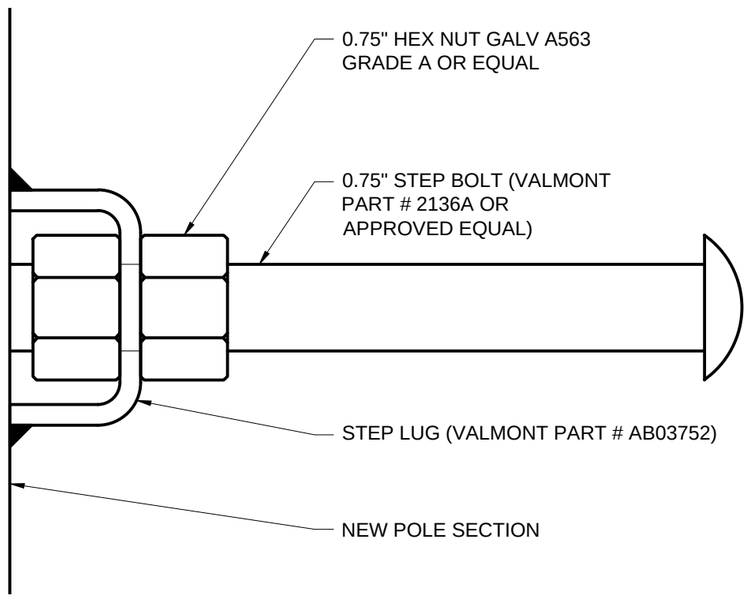
SHEET NUMBER	REVISION
S-2	0



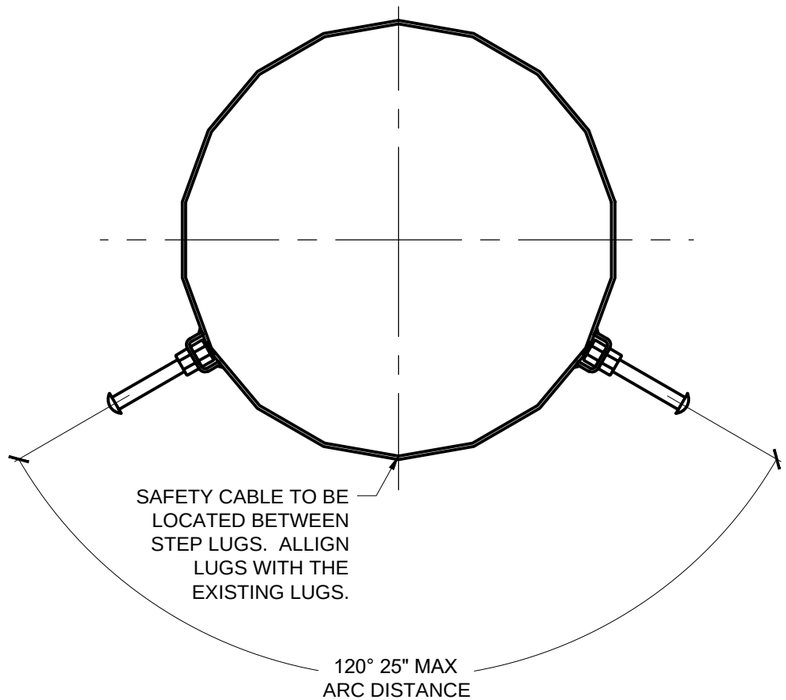
C TOP STRAP DETAIL
NOT TO SCALE



HANDHOLE DETAIL
NOT TO SCALE



STEP BOLT DETAIL
NOT TO SCALE



D ORIENTATION DETAIL
NOT TO SCALE

CLIENT

KGI WIRELESS

SITE NAME/NUMBER

28493

SITE ADDRESS

15 GREAT PASTURE ROAD
DANBURY, CT 06810
N41°22'58.8", W73°25'19.92"

DRAWINGS PREPARED BY:

SEMAAN ENGINEERING SOLUTIONS
SEMAAN ENGINEERING SOLUTIONS HOLDINGS, LLC

1047 NORTH 205TH STREET
OMAHA, NEBRASKA 68022
PHONE: (402) 289-1888
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STAMP

STATE OF CONNECTICUT
THOMAS L TAYLOR
No. 28130
LICENSED PROFESSIONAL ENGINEER
09.02.20

EXP. 01/31/2021

DRAWN BY: KRC
APPROVED BY: TLT

REV	DESCRIPTION	DATE
0	FIRST ISSUE	08/31/2020

DRAWING DESCRIPTION

MONOPOLE EXTENSION SECTIONS

SHEET NUMBER	REVISION
S-3	0

EXHIBIT 4

October 10, 2019
August 10, 2020 (Rev. 1)

Centerline Communications
750 West Center Street, Suite #301
West Bridgewater, MA 02379

RE:		
	Site Number:	S2873 (NSB)
	FA Number:	12684101
	PACE Number:	MRCTB036632
	PT Number:	2051A0LAWW
	Site Name:	DANBURY GREAT PASTURE ROAD
	Site Address:	15 Great Pasture Road Danbury, CT 06810

To Whom It May Concern:

Hudson Design Group LLC (HDG) has been authorized by Centerline Communications to perform a mount analysis on the proposed AT&T antenna/RRH mounts to determine their capability of supporting the following additional loading:

- **(9) TPA65R-BU6DA-K Antennas (71.2"x20.7"x7.7" – Wt. = 69 lbs. /each)**
- **(3) B14 4478 RRH's (18.1"x13.4"x8.3" – Wt. = 60 lbs. /each)**
- **(3) 4415 B30 RRH's (16.5"x13.4"x5.9" – Wt. = 46 lbs. /each)**
- **(3) 4449 B5/B12 RRH's (17.9"x13.2"x9.5" – Wt. = 71 lbs. /each)**
- **(3) B2/B66A 8843 RRH's (14.9"x13.2"x10.9" – Wt. = 72 lbs. /each)**
- **(3) Squid Surge Arrestors (24.0"x9.7" Ø – Wt. = 33 lbs.)**

**Proposed equipment shown in bold*

Mount fabrication drawings prepared by Sabre Industries Towers and Poles, P/N C10855721C, dated October 18, 2017 were available for the proposed mounts.

Mount Analysis Methods:

- This analysis was conducted in accordance with EIA/TIA-222-H, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, the International Building Code 2015 with 2018 Connecticut State Building Code, and AT&T Mount Technical Directive – R13.
- HDG considers this mount to be asymmetrical and has applied wind loads in 30 degree increments all around the mount. Per TIA-222-H and Appendix N of the Connecticut State Building Code, the max basic wind speed for this site is equal to 120 mph with a max basic wind speed with ice of 50 mph and a max ice thickness of 1.0 in. An escalated ice thickness of 1.16 in was used for this analysis.
- HDG considers this site to be exposure category B; tower is located in an urban/suburban or wooded area with numerous closely spaced obstructions.
- HDG considers this site to be topographic category 1; tower is located on flat terrain or the bottom of a hill or ridge.
- The mount has been analyzed with load combinations consisting of 250 lbs live load using a service wind speed of 30 mph wind on the worst case antenna. Analysis performed on each antenna pipe to determine worst case location; worst case location was antenna position 4.
- The mount has been analyzed with load combinations consisting of a 250 lbs live load in a worst case location on the mount.

Based on our evaluation, we have determined that the New Sabre Industries C10855721C mounts **ARE CAPABLE** of supporting the proposed installation.

	Component	Controlling Load Case	Stress Ratio	Pass/Fail
Proposed (NSB) Mount Rating	69	LC10	47%	**PASS**

Reference Documents:

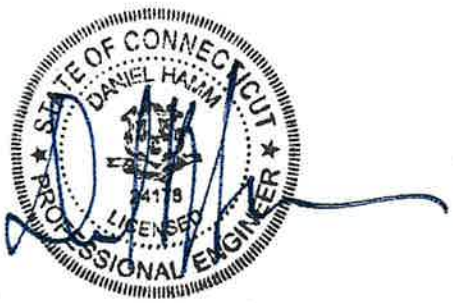
- Fabrication drawings prepared by Sabre Industries Towers and Poles, P/N C10855721C, dated October 18, 2017.

This determination was based on the following limitations and assumptions:

1. HDG is not responsible for any modifications completed prior to and hereafter which HDG was not directly involved.
2. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
3. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer's requirements.
4. The proposed mount will be adequately secured to the tower structure per the mount manufacturer's specifications.
5. All components pertaining to AT&T's mounts must be tightened and re-plumbed prior to the installation of new appurtenances.
6. HDG performed a localized analysis on the mount itself and not on the supporting tower structure.

Please feel free to contact our office should you have any questions.

Respectfully Submitted,
Hudson Design Group LLC



Michael Cabral
Vice President

Daniel P. Hamm, PE
Principal

HUDSON
Design Group LLC

Wind & Ice
Calculations

Date: 8/10/2020
Project Name: DANBURY GREAT PASTURE ROAD
Project No.: S2873
Designed By: RL **Checked By:** MSC

HUDSON Design Group LLC

2.6.5.2 Velocity Pressure Coeff:

$K_z = 2.01\ (z/z_g)^{2/\alpha}$

z=	140	(ft)
z_g=	1200	(ft)
α=	7.0	

K_z= 1.088

Kzmin ≤ Kz ≤ 2.01

Table 2-4

Exposure	Z_g	α	K_{zmin}	K_c
B	1200 ft	7.0	0.70	0.9
C	900 ft	9.5	0.85	1.0
D	700 ft	11.5	1.03	1.1

2.6.6.2 Topographic Factor:

Table 2-5

Topo. Category	K_t	f
2	0.43	1.25
3	0.53	2.0
4	0.72	1.5

$K_{zt} = [1+(K_c\ K_t/K_h)]^2$

$K_h = e^{(f*z/H)}$

K_{zt}= #DIV/0!

K_h=	#DIV/0!	
K_c=	0.9	(from Table 2-4)
K_t=		(from Table 2-5)
f=		(from Table 2-5)
z=	140	
z_s=	390	(Mean elevation of base of structure above sea level)
H=		(Ht. of the crest above surrounding terrain)
K_{zt}=	1.00	(from 2.6.6.2.1)
K_e=	0.99	(from 2.6.8)

(If Category 1 then K_{zt} =1.0)

Category= **1**

2.6.10 Design Ice Thickness

Max Ice Thickness = t_i =	1.00	in
Importance Factor = I=	1.00	(from Table 2-3)
K_{iz} =	1.16	(from Sec. 2.6.10)

$t_{iz} = t_i * I * K_{iz} * (K_{zt})^{0.35}$

t_{iz} = 1.16 in

Date: 8/10/2020
Project Name: DANBURY GREAT PASTURE ROAD
Project No.: S2873
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

2.6.9 Gust Effect Factor

2.6.9.1 Self Supporting Lattice Structures

G_h = 1.0 Latticed Structures > 600 ft

G_h = 0.85 Latticed Structures 450 ft or less

G_h = 0.85 + 0.15 [h/150 - 3.0] h= ht. of structure

h=	140	G_h=	0.85

2.6.9.2 Guyed Masts G_h= 0.85

2.6.9.3 Pole Structures G_h= 1.1

2.6.9 Appurtenances G_h= 1.0

2.6.9.4 Structures Supported on Other Structures

(Cantilivered tubular or latticed spines, pole, structures on buildings (ht. : width ratio > 5)

G_h=	1.35	**Gh=**	**1.00**

2.6.11.2 Design Wind Force on Appurtenances

$F = q_z * G_h * (EPA)_A$

$q_z = 0.00256 * K_z * K_{zt} * K_s * K_e * K_d * V_{max}^2$

		K_z=	1.088	(from 2.6.5.2)
		K_{zt}=	1.0	(from 2.6.6.2.1)
		K_s=	1.0	(from 2.6.7)
q_z=	**37.57**	K_e=	0.99	(from 2.6.8)
$q_{z\ (ice)}$=	**6.52**	K_d=	0.95	(from Table 2-2)
$q_{z\ (30)}$=	**2.35**	V_{max}=	120	mph (Ultimate Wind Speed)
		$V_{max\ (ice)}$=	50	mph
		V_{30}=	30	mph

Table 2-2

Structure Type	Wind Direction Probability Factor, Kd
Latticed structures with triangular, square or rectangular cross sections	0.85
Tubular pole structures, latticed structures with other cross sections, appurtenances	0.95
Tubular pole structures supporting antennas enclosed within a cylindrical shroud	1.00

Date: 8/10/2020
Project Name: DANBURY GREAT PASTURE ROAD
Project No.: S2873
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HUDSON Design Group LLC

Determine Ca:

Table 2-9

Force Coefficients (Ca) for Appurtenances				
Member Type		Aspect Ratio ≤ 2.5	Aspect Ratio = 7	Aspect Ratio ≥ 25
		Ca	Ca	Ca
Flat		1.2	1.4	2.0
Square/Rectangular HSS		1.2 - 2.8(r_s) ≥ 0.85	1.4 - 4.0(r_s) ≥ 0.90	2.0 - 6.0(r_s) ≥ 1.25
Round	**C < 39** (Subcritical)	0.7	0.8	1.2
	39 ≤ C ≤ 78 (Transitional)	$4.14/(C^{0.485})$	$3.66/(C^{0.415})$	$46.8/(C^{1.0})$
	C > 78 (Supercritical)	0.5	0.6	0.6

Aspect Ratio is the overall length/width ratio in the plane normal to the wind direction.
(Aspect ratio is independent of the spacing between support points of a linear appurtenance,

Note: Linear interpolation may be used for aspect ratios other than those shown.

Ice Thickness = **1.16** **in** | **Angle =** **0 (deg)** | **Equivalent Angle =** **180 (deg)**

Appurtenances	Height	Width	Depth	Flat Area	Aspect Ratio	Ca	Force (lbs)	Force (lbs) (w/ Ice)	Force (lbs) (30 mph)
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.44	1.24	**477**	**95**	**30**
B14 4478 RRH	18.1	13.4	8.3	1.68	1.35	1.20	**76**	**17**	**5**
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	2.18	1.20	**47**	**12**	**3**
4415 B30 RRH	16.5	13.4	5.9	1.54	1.23	1.20	**69**	**16**	**4**
4415 B30 RRH (Side)	16.5	5.9	13.4	0.68	2.80	1.21	**31**	**8**	**2**
4449 B5/B12 RRH	17.9	13.2	9.5	1.64	1.36	1.20	**74**	**17**	**5**
4449 B5/B12 RRH (Side)	17.9	9.5	13.2	1.18	1.88	1.20	**53**	**13**	**3**
B2/B66A 8843 RRH	14.9	13.2	10.9	1.37	1.13	1.20	**62**	**15**	**4**
B2/B66A 8843 RRH (Side)	14.9	10.9	13.2	1.13	1.37	1.20	**51**	**12**	**3**
Surge Arrestor	24.0	9.7	9.7	1.62	2.47	0.70	**43**	**10**	**3**
HSS 6x3	3.0	12.0	-	0.25	0.25	1.25	**12**		
HSS 3x3	3.0	12.0	-	0.25	0.25	1.25	**12**		
L 2x2 Angles	2.0	12.0	-	0.17	0.17	2.00	**13**		
PL 2x1/8	0.1	12.0	-	0.01	0.01	2.00	**1**		
2-1/2" Pipe	2.9	12.0	-	0.24	0.24	1.20	**11**		
2" Pipe	2.4	12.0	-	0.20	0.20	1.20	**9**		

Date: 8/10/2020
Project Name: DANBURY GREAT PASTURE ROAD
Project No.: S2873
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HUDSON Design Group LLC

WIND LOADS

Angle =	30	(deg)	Ice Thickness =	1.16	in.	Equivalent Angle =	210	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Aspect Ratio	Aspect Ratio	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	477	211	411
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	76	47	69
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	47	76	54
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	69	31	60
4415 B30 RRH (Side)	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	31	69	40
4449 B5/B12 RRH	17.9	13.2	9.5	1.64	1.18	1.36	1.88	1.20	1.20	74	53	69
4449 B5/B12 RRH (Side)	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	53	74	58
B2/B66A 8843 RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	62	51	59
B2/B66A 8843 RRH (Side)	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	51	62	54

WIND LOADS WITH ICE:

TPA65R-BU6DA-K Antenna	73.5	23.0	10.0	11.75	5.11	3.19	7.34	1.23	1.41	94	47	82
B14 4478 RRH	20.4	15.7	10.6	2.23	1.50	1.30	1.92	1.20	1.20	17	12	16
B14 4478 RRH (Side)	20.4	10.6	15.7	1.50	2.23	1.92	1.30	1.20	1.20	12	17	13
4415 B30 RRH	18.8	15.7	8.2	2.05	1.07	1.20	2.29	1.20	1.20	16	8	14
4415 B30 RRH (Side)	18.8	8.2	15.7	1.07	2.05	2.29	1.20	1.20	1.20	8	16	10
4449 B5/B12 RRH	20.2	15.5	11.8	2.18	1.66	1.30	1.71	1.20	1.20	17	13	16
4449 B5/B12 RRH (Side)	20.2	11.8	15.5	1.66	2.18	1.71	1.30	1.20	1.20	13	17	14
B2/B66A 8843 RRH	17.2	15.5	13.2	1.85	1.58	1.11	1.30	1.20	1.20	15	12	14
B2/B66A 8843 RRH (Side)	17.2	13.2	15.5	1.58	1.85	1.30	1.11	1.20	1.20	12	15	13

WIND LOADS AT 30 MPH:

TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	30	13	26
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	5	3	4
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	3
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	4	2	4
4415 B30 RRH (Side)	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	2	4	3
4449 B5/B12 RRH	17.9	13.2	9.5	1.64	1.18	1.36	1.88	1.20	1.20	5	3	4
4449 B5/B12 RRH (Side)	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	3	5	4
B2/B66A 8843 RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	4	3	4
B2/B66A 8843 RRH (Side)	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	3	4	3

Date: 8/10/2020
Project Name: DANBURY GREAT PASTURE ROAD
Project No.: S2873
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	60	(deg)	Ice Thickness =	1.16	in.	Equivalent Angle =	240	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	477	211	278
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	76	47	54
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	47	76	69
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	69	31	40
4415 B30 RRH (Side)	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	31	69	60
4449 B5/B12 RRH	17.9	13.2	9.5	1.64	1.18	1.36	1.88	1.20	1.20	74	53	58
4449 B5/B12 RRH (Side)	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	53	74	69
B2/B66A 8843 RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	62	51	54
B2/B66A 8843 RRH (Side)	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	51	62	59

WIND LOADS WITH ICE:

TPA65R-BU6DA-K Antenna	73.5	23.0	10.0	11.75	5.11	3.19	7.34	1.23	1.41	94	47	59
B14 4478 RRH	20.4	15.7	10.6	2.23	1.50	1.30	1.92	1.20	1.20	17	12	13
B14 4478 RRH (Side)	20.4	10.6	15.7	1.50	2.23	1.92	1.30	1.20	1.20	12	17	16
4415 B30 RRH	18.8	15.7	8.2	2.05	1.07	1.20	2.29	1.20	1.20	16	8	10
4415 B30 RRH (Side)	18.8	8.2	15.7	1.07	2.05	2.29	1.20	1.20	1.20	8	16	14
4449 B5/B12 RRH	20.2	15.5	11.8	2.18	1.66	1.30	1.71	1.20	1.20	17	13	14
4449 B5/B12 RRH (Side)	20.2	11.8	15.5	1.66	2.18	1.71	1.30	1.20	1.20	13	17	16
B2/B66A 8843 RRH	17.2	15.5	13.2	1.85	1.58	1.11	1.30	1.20	1.20	15	12	13
B2/B66A 8843 RRH (Side)	17.2	13.2	15.5	1.58	1.85	1.30	1.11	1.20	1.20	12	15	14

WIND LOADS AT 30 MPH:

TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	30	13	17
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	5	3	3
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	4
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	4	2	3
4415 B30 RRH (Side)	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	2	4	4
4449 B5/B12 RRH	17.9	13.2	9.5	1.64	1.18	1.36	1.88	1.20	1.20	5	3	4
4449 B5/B12 RRH (Side)	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	3	5	4
B2/B66A 8843 RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	4	3	3
B2/B66A 8843 RRH (Side)	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	3	4	4

Date: 8/10/2020
Project Name: DANBURY GREAT PASTURE ROAD
Project No.: S2873
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	90	(deg)	Ice Thickness =	1.16	in.	Equivalent Angle =	270	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	477	211	211
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	76	47	47
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	47	76	76
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	69	31	31
4415 B30 RRH (Side)	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	31	69	69
4449 B5/B12 RRH	17.9	13.2	9.5	1.64	1.18	1.36	1.88	1.20	1.20	74	53	53
4449 B5/B12 RRH (Side)	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	53	74	74
B2/B66A 8843 RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	62	51	51
B2/B66A 8843 RRH (Side)	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	51	62	62

WIND LOADS WITH ICE:

TPA65R-BU6DA-K Antenna	73.5	23.0	10.0	11.75	5.11	3.19	7.34	1.23	1.41	94	47	47
B14 4478 RRH	20.4	15.7	10.6	2.23	1.50	1.30	1.92	1.20	1.20	17	12	12
B14 4478 RRH (Side)	20.4	10.6	15.7	1.50	2.23	1.92	1.30	1.20	1.20	12	17	17
4415 B30 RRH	18.8	15.7	8.2	2.05	1.07	1.20	2.29	1.20	1.20	16	8	8
4415 B30 RRH (Side)	18.8	8.2	15.7	1.07	2.05	2.29	1.20	1.20	1.20	8	16	16
4449 B5/B12 RRH	20.2	15.5	11.8	2.18	1.66	1.30	1.71	1.20	1.20	17	13	13
4449 B5/B12 RRH (Side)	20.2	11.8	15.5	1.66	2.18	1.71	1.30	1.20	1.20	13	17	17
B2/B66A 8843 RRH	17.2	15.5	13.2	1.85	1.58	1.11	1.30	1.20	1.20	15	12	12
B2/B66A 8843 RRH (Side)	17.2	13.2	15.5	1.58	1.85	1.30	1.11	1.20	1.20	12	15	15

WIND LOADS AT 30 MPH:

TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	30	13	13
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	5	3	3
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	5
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	4	2	2
4415 B30 RRH (Side)	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	2	4	4
4449 B5/B12 RRH	17.9	13.2	9.5	1.64	1.18	1.36	1.88	1.20	1.20	5	3	3
4449 B5/B12 RRH (Side)	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	3	5	5
B2/B66A 8843 RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	4	3	3
B2/B66A 8843 RRH (Side)	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	3	4	4

Date: 8/10/2020
Project Name: DANBURY GREAT PASTURE ROAD
Project No.: S2873
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	120	(deg)	Ice Thickness =	1.16	in.	Equivalent Angle =	300	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	477	211	278
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	76	47	54
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	47	76	69
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	69	31	40
4415 B30 RRH (Side)	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	31	69	60
4449 B5/B12 RRH	17.9	13.2	9.5	1.64	1.18	1.36	1.88	1.20	1.20	74	53	58
4449 B5/B12 RRH (Side)	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	53	74	69
B2/B66A 8843 RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	62	51	54
B2/B66A 8843 RRH (Side)	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	51	62	59

WIND LOADS WITH ICE:

TPA65R-BU6DA-K Antenna	73.5	23.0	10.0	11.75	5.11	3.19	7.34	1.23	1.41	94	47	59
B14 4478 RRH	20.4	15.7	10.6	2.23	1.50	1.30	1.92	1.20	1.20	17	12	13
B14 4478 RRH (Side)	20.4	10.6	15.7	1.50	2.23	1.92	1.30	1.20	1.20	12	17	16
4415 B30 RRH	18.8	15.7	8.2	2.05	1.07	1.20	2.29	1.20	1.20	16	8	10
4415 B30 RRH (Side)	18.8	8.2	15.7	1.07	2.05	2.29	1.20	1.20	1.20	8	16	14
4449 B5/B12 RRH	20.2	15.5	11.8	2.18	1.66	1.30	1.71	1.20	1.20	17	13	14
4449 B5/B12 RRH (Side)	20.2	11.8	15.5	1.66	2.18	1.71	1.30	1.20	1.20	13	17	16
B2/B66A 8843 RRH	17.2	15.5	13.2	1.85	1.58	1.11	1.30	1.20	1.20	15	12	13
B2/B66A 8843 RRH (Side)	17.2	13.2	15.5	1.58	1.85	1.30	1.11	1.20	1.20	12	15	14

WIND LOADS AT 30 MPH:

TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	30	13	17
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	5	3	3
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	4
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	4	2	3
4415 B30 RRH (Side)	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	2	4	4
4449 B5/B12 RRH	17.9	13.2	9.5	1.64	1.18	1.36	1.88	1.20	1.20	5	3	4
4449 B5/B12 RRH (Side)	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	3	5	4
B2/B66A 8843 RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	4	3	3
B2/B66A 8843 RRH (Side)	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	3	4	4

Date: 8/10/2020
Project Name: DANBURY GREAT PASTURE ROAD
Project No.: S2873
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	150	(deg)	Ice Thickness =	1.16	in.	Equivalent Angle =	330	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	477	211	411
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	76	47	69
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	47	76	54
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	69	31	60
4415 B30 RRH (Side)	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	31	69	40
4449 B5/B12 RRH	17.9	13.2	9.5	1.64	1.18	1.36	1.88	1.20	1.20	74	53	69
4449 B5/B12 RRH (Side)	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	53	74	58
B2/B66A 8843 RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	62	51	59
B2/B66A 8843 RRH (Side)	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	51	62	54

WIND LOADS WITH ICE:

TPA65R-BU6DA-K Antenna	73.5	23.0	10.0	11.75	5.11	3.19	7.34	1.23	1.41	94	47	82
B14 4478 RRH	20.4	15.7	10.6	2.23	1.50	1.30	1.92	1.20	1.20	17	12	16
B14 4478 RRH (Side)	20.4	10.6	15.7	1.50	2.23	1.92	1.30	1.20	1.20	12	17	13
4415 B30 RRH	18.8	15.7	8.2	2.05	1.07	1.20	2.29	1.20	1.20	16	8	14
4415 B30 RRH (Side)	18.8	8.2	15.7	1.07	2.05	2.29	1.20	1.20	1.20	8	16	10
4449 B5/B12 RRH	20.2	15.5	11.8	2.18	1.66	1.30	1.71	1.20	1.20	17	13	16
4449 B5/B12 RRH (Side)	20.2	11.8	15.5	1.66	2.18	1.71	1.30	1.20	1.20	13	17	14
B2/B66A 8843 RRH	17.2	15.5	13.2	1.85	1.58	1.11	1.30	1.20	1.20	15	12	14
B2/B66A 8843 RRH (Side)	17.2	13.2	15.5	1.58	1.85	1.30	1.11	1.20	1.20	12	15	13

WIND LOADS AT 30 MPH:

TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	30	13	26
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	5	3	4
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	3
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	4	2	4
4415 B30 RRH (Side)	16.5	5.9	13.4	0.68	1.54	2.80	1.23	1.21	1.20	2	4	3
4449 B5/B12 RRH	17.9	13.2	9.5	1.64	1.18	1.36	1.88	1.20	1.20	5	3	4
4449 B5/B12 RRH (Side)	17.9	9.5	13.2	1.18	1.64	1.88	1.36	1.20	1.20	3	5	4
B2/B66A 8843 RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	4	3	4
B2/B66A 8843 RRH (Side)	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	3	4	3

Date: 8/10/2020
Project Name: DANBURY GREAT PASTURE ROAD
Project No.: S2873
Designed By: RL **Checked By:** MSC

HUDSON Design Group LLC

ICE WEIGHT CALCULATIONS

Thickness of ice:	1.16	in.
Density of ice:	56	pcf

TPA65R-BU6DA-K Antenna

Weight of ice based on total radial SF area:

Height (in):	71.2	
Width (in):	20.7	
Depth (in):	7.7	
Total weight of ice on object:	195	lbs
Weight of object:	69.0	lbs
Combined weight of ice and object:	264	lbs

B14 4478 RRH

Weight of ice based on total radial SF area:

Height (in):	18.1	
Width (in):	13.4	
Depth (in):	8.3	
Total weight of ice on object:	36	lbs
Weight of object:	60.0	lbs
Combined weight of ice and object:	96	lbs

4415 B30 RRH

Weight of ice based on total radial SF area:

Height (in):	16.5	
Width (in):	13.4	
Depth (in):	5.9	
Total weight of ice on object:	31	lbs
Weight of object:	46.0	lbs
Combined weight of ice and object:	77	lbs

4449 B5/B12 RRH

Weight of ice based on total radial SF area:

Height (in):	17.9	
Width (in):	13.2	
Depth (in):	9.5	
Total weight of ice on object:	37	lbs
Weight of object:	71.0	lbs
Combined weight of ice and object:	108	lbs

B2/B66A 8843 RRH

Weight of ice based on total radial SF area:

Height (in):	14.9	
Width (in):	13.2	
Depth (in):	10.9	
Total weight of ice on object:	32	lbs
Weight of object:	72.0	lbs
Combined weight of ice and object:	104	lbs

Squid Surge Arrestor

Weight of ice based on total radial SF area:

Depth (in):	24.0	
Diameter(in):	9.7	
Total weight of ice on object:	31	lbs
Weight of object:	33	lbs
Combined weight of ice and object:	64	lbs

HSS 6x3

Weight of ice based on total radial SF area:

Height (in):	6	
Width (in):	3	
Per foot weight of ice on object:	11	plf

HSS 3x3

Weight of ice based on total radial SF area:

Height (in):	3	
Width (in):	3	
Per foot weight of ice on object:	8	plf

L 2x2 Angles

Weight of ice based on total radial SF area:

Height (in):	2	
Width (in):	2	
Per foot weight of ice on object:	6	plf

PL 2x1/8

Weight of ice based on total radial SF area:

Height (in):	2	
Width (in):	0.13	
Per foot weight of ice on object:	4	plf

2-1/2" Pipe

Per foot weight of ice:

diameter (in):	2.88	
Per foot weight of ice on object:	6	plf

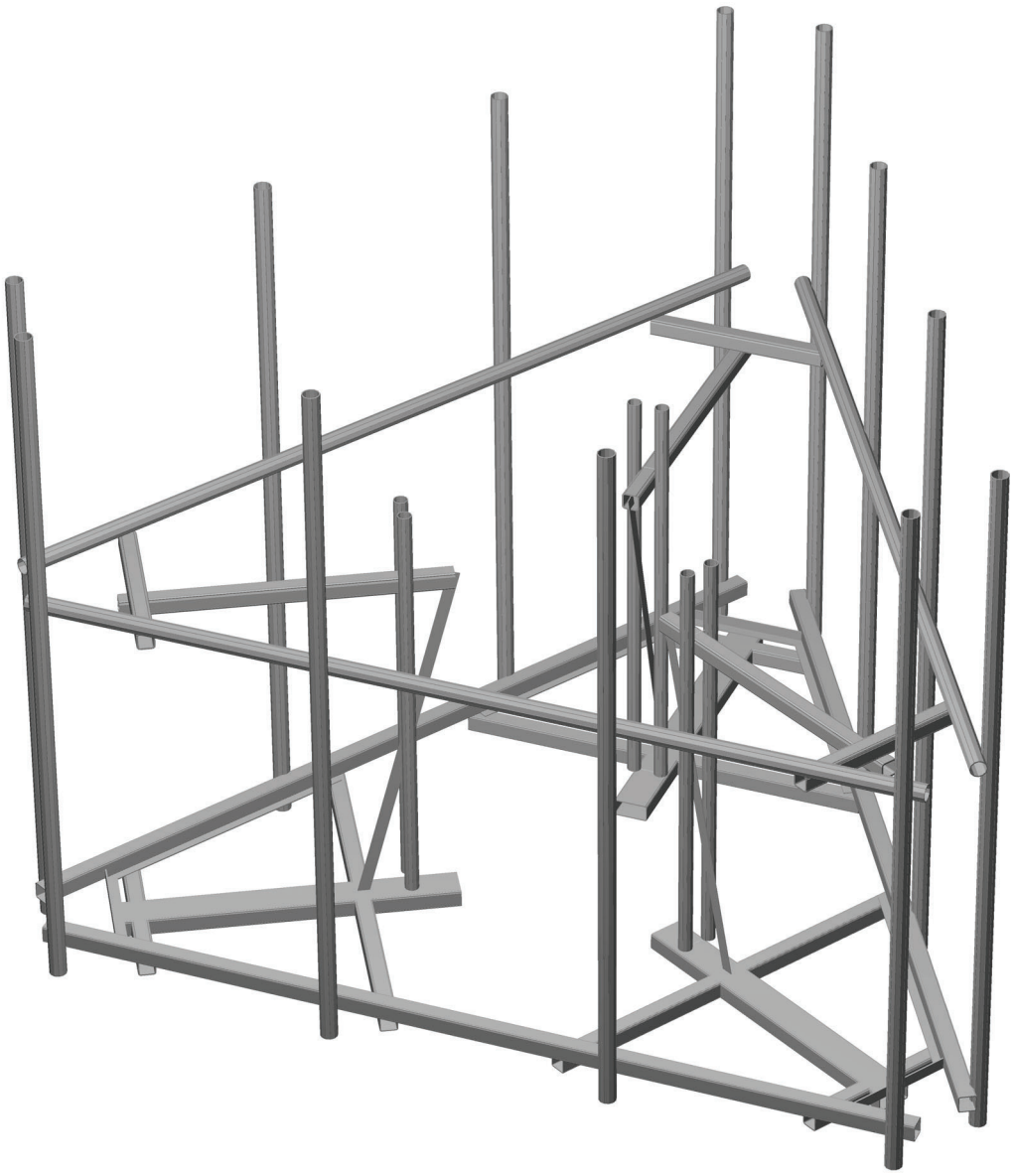
2" Pipe

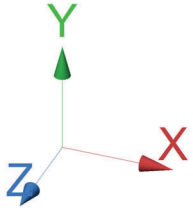
Per foot weight of ice:

diameter (in):	2.38	
Per foot weight of ice on object:	5	plf

HUDSON
Design Group LLC

Mount Calculations
(Existing Conditions)

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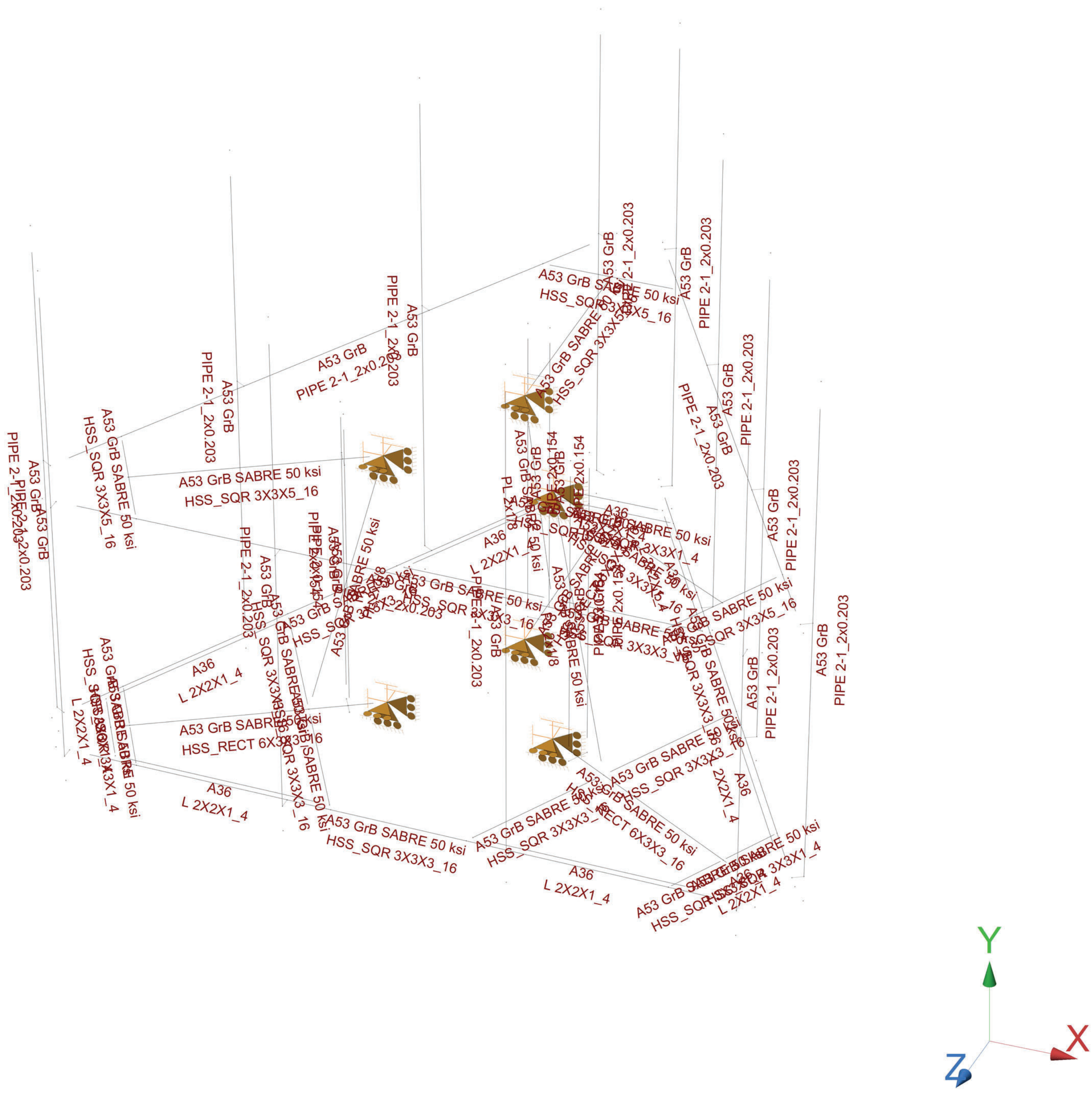

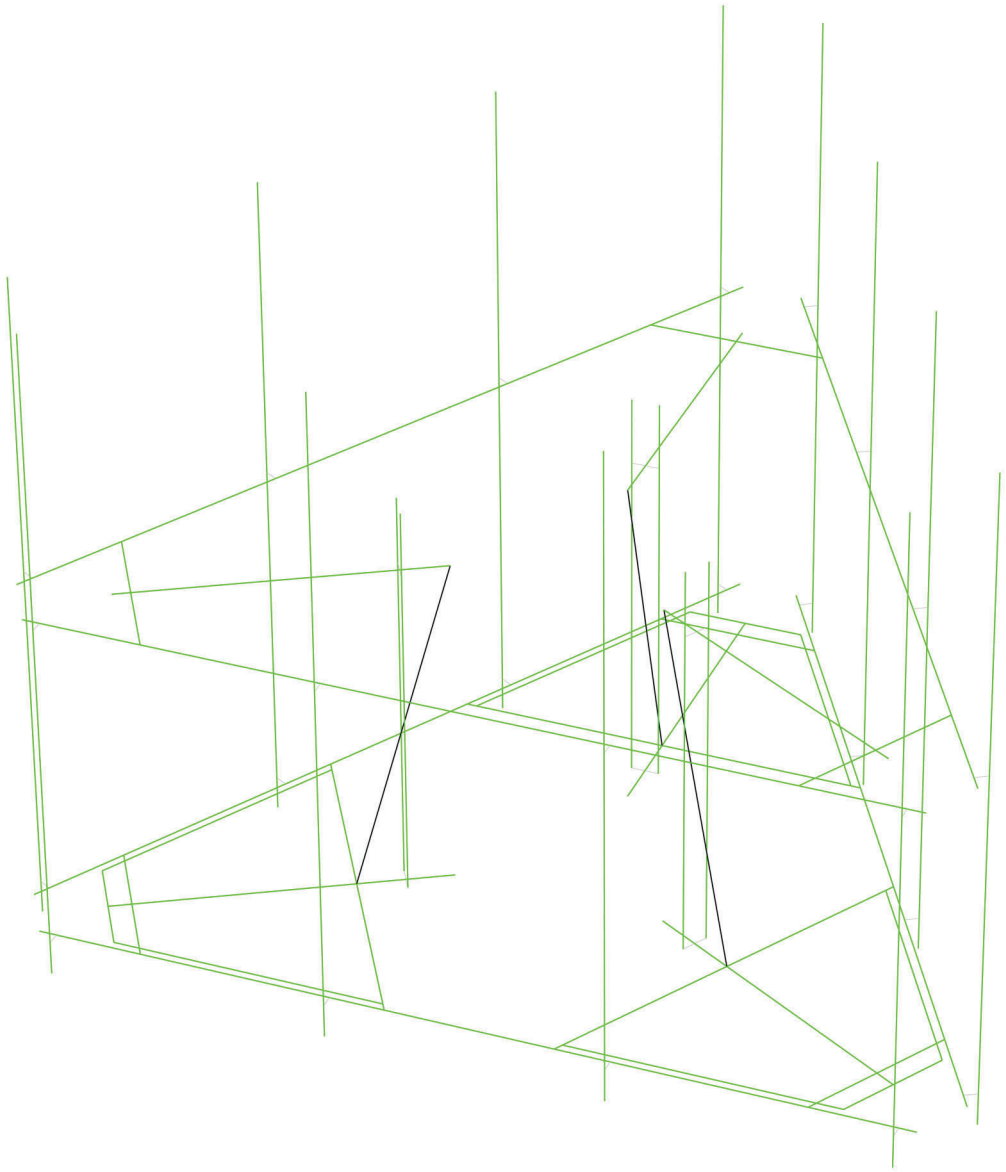

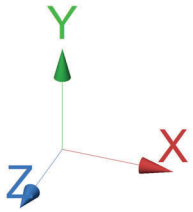
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Bentley

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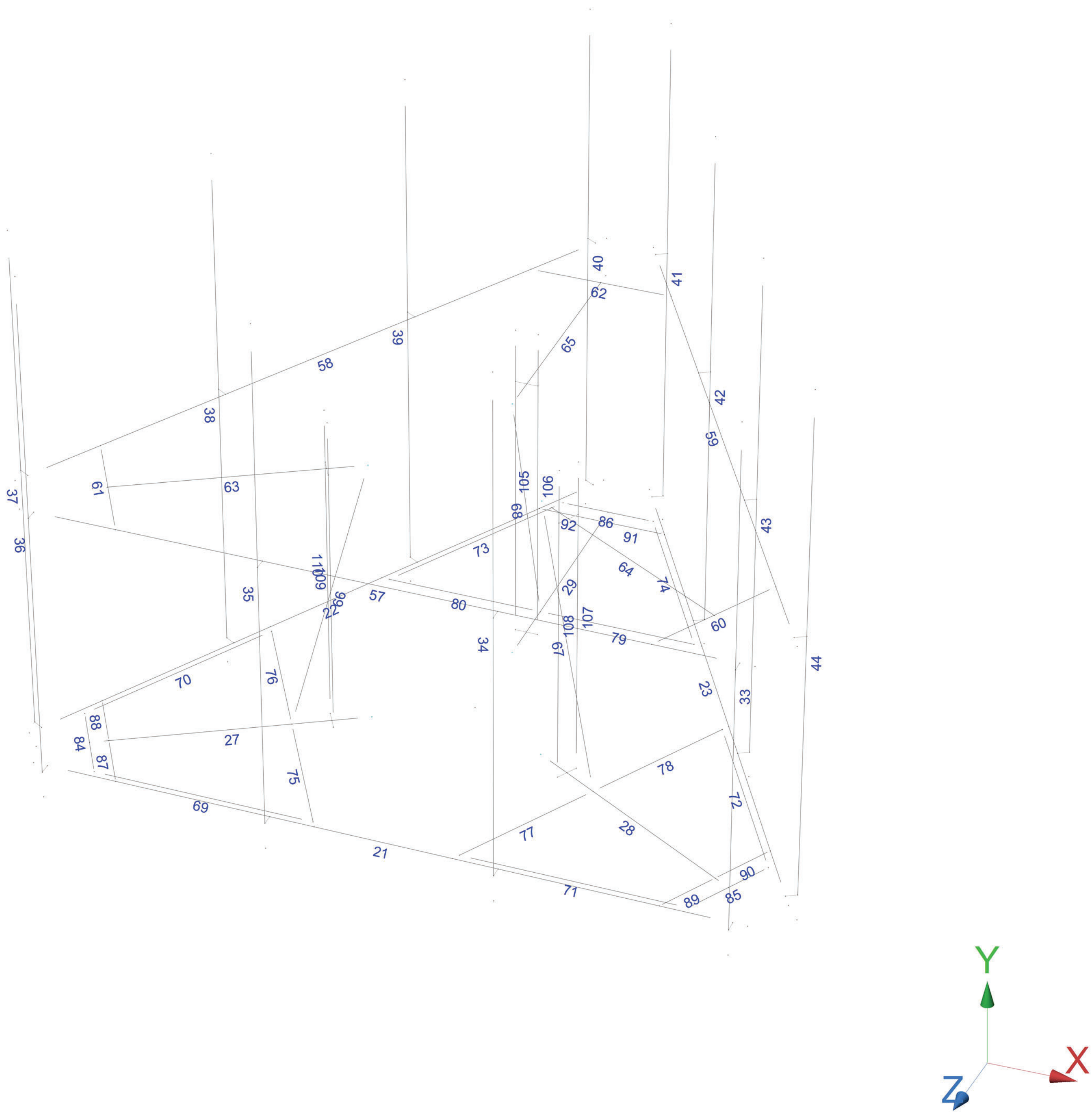

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Load data

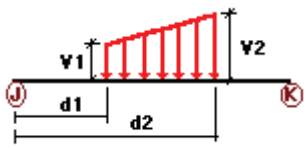
GLOSSARY

Comb : Indicates if load condition is a load combination

Load Conditions

Condition	Description	Comb.	Category
DL	Dead Load	No	DL
W0	Wind Load 0/60/120 deg	No	WIND
W30	Wind Load 30/90/150 deg	No	WIND
Di	Ice Load	No	LL
Wi0	Ice Wind Load 0/60/120 deg	No	WIND
Wi30	Ice Wind Load 30/90/150 deg	No	WIND
WL0	WL 30 mph 0/60/120 deg	No	WIND
WL30	WL 30 mph 30/90/150 deg	No	WIND
LL1	250 lb Live Load Center of Mount	No	LL
LL2	250 lb Live Load End of Mount	No	LL
LLa1	250 lb Live Load Antenna 1	No	LL
LLa2	250 lb Live Load Antenna 2	No	LL
LLa3	250 lb Live Load Antenna 3	No	LL
LLa4	250 lb Live Load Antenna 4	No	LL

Distributed force on members



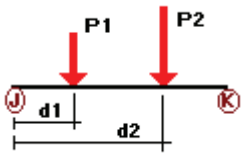
Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%
DL	71	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	69	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	74	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	72	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	70	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	73	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	84	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	75	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	76	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	86	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	80	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	79	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	77	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	78	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	85	Y	-0.01	-0.01	0.00	Yes	100.00	Yes

W0	35	z	-0.011	-0.011	0.00	No	100.00	Yes
	37	z	-0.011	-0.011	0.00	No	100.00	Yes
	38	z	-0.011	-0.011	0.00	No	100.00	Yes
	39	z	-0.011	-0.011	0.00	No	100.00	Yes
	40	z	-0.011	-0.011	0.00	No	100.00	Yes
	41	z	-0.011	-0.011	0.00	No	100.00	Yes
	42	z	-0.011	-0.011	0.00	No	100.00	Yes
	43	z	-0.011	-0.011	0.00	No	100.00	Yes
	44	z	-0.011	-0.011	0.00	No	100.00	Yes
	66	z	-0.001	-0.001	0.00	No	100.00	Yes
	67	z	-0.001	-0.001	0.00	No	100.00	Yes
	68	z	-0.001	-0.001	0.00	No	100.00	Yes
	105	z	-0.009	-0.009	0.00	No	100.00	Yes
	106	z	-0.009	-0.009	0.00	No	100.00	Yes
	107	z	-0.009	-0.009	0.00	No	100.00	Yes
	108	z	-0.009	-0.009	0.00	No	100.00	Yes
	109	z	-0.009	-0.009	0.00	No	100.00	Yes
	110	z	-0.009	-0.009	0.00	No	100.00	Yes
	71	z	-0.013	-0.013	0.00	No	100.00	Yes
	69	z	-0.013	-0.013	0.00	No	100.00	Yes
	21	z	-0.012	-0.012	0.00	No	100.00	Yes
	57	z	-0.011	-0.011	0.00	No	100.00	Yes
	74	z	-0.013	-0.013	0.00	No	100.00	Yes
	72	z	-0.013	-0.013	0.00	No	100.00	Yes
	23	z	-0.012	-0.012	0.00	No	100.00	Yes
	59	z	-0.011	-0.011	0.00	No	100.00	Yes
	70	z	-0.013	-0.013	0.00	No	100.00	Yes
	73	z	-0.013	-0.013	0.00	No	100.00	Yes
	22	z	-0.012	-0.012	0.00	No	100.00	Yes
	58	z	-0.011	-0.011	0.00	No	100.00	Yes
	84	z	-0.013	-0.013	0.00	No	100.00	Yes
	88	z	-0.012	-0.012	0.00	No	100.00	Yes
	61	z	-0.012	-0.012	0.00	No	100.00	Yes
	87	z	-0.012	-0.012	0.00	No	100.00	Yes
	27	z	-0.012	-0.012	0.00	No	100.00	Yes
	63	z	-0.012	-0.012	0.00	No	100.00	Yes
	75	z	-0.012	-0.012	0.00	No	100.00	Yes
	76	z	-0.012	-0.012	0.00	No	100.00	Yes
	62	z	-0.012	-0.012	0.00	No	100.00	Yes
	91	z	-0.012	-0.012	0.00	No	100.00	Yes
	86	z	-0.013	-0.013	0.00	No	100.00	Yes
	92	z	-0.012	-0.012	0.00	No	100.00	Yes
	80	z	-0.012	-0.012	0.00	No	100.00	Yes
	79	z	-0.012	-0.012	0.00	No	100.00	Yes
	28	z	-0.012	-0.012	0.00	No	100.00	Yes
	64	z	-0.012	-0.012	0.00	No	100.00	Yes
	77	z	-0.012	-0.012	0.00	No	100.00	Yes
	78	z	-0.012	-0.012	0.00	No	100.00	Yes
	60	z	-0.012	-0.012	0.00	No	100.00	Yes
	85	z	-0.013	-0.013	0.00	No	100.00	Yes
	89	z	-0.012	-0.012	0.00	No	100.00	Yes
	90	z	-0.012	-0.012	0.00	No	100.00	Yes
W30	33	x	-0.011	-0.011	0.00	No	100.00	Yes
	34	x	-0.011	-0.011	0.00	No	100.00	Yes
	35	x	-0.011	-0.011	0.00	No	100.00	Yes
	36	x	-0.011	-0.011	0.00	No	100.00	Yes
	37	x	-0.011	-0.011	0.00	No	100.00	Yes
	38	x	-0.011	-0.011	0.00	No	100.00	Yes
	39	x	-0.011	-0.011	0.00	No	100.00	Yes
	40	x	-0.011	-0.011	0.00	No	100.00	Yes

	43	x	-0.011	-0.011	0.00	No	100.00	Yes
	66	x	-0.001	-0.001	0.00	No	100.00	Yes
	67	x	-0.001	-0.001	0.00	No	100.00	Yes
	68	x	-0.001	-0.001	0.00	No	100.00	Yes
	105	x	-0.009	-0.009	0.00	No	100.00	Yes
	106	x	-0.009	-0.009	0.00	No	100.00	Yes
	107	x	-0.009	-0.009	0.00	No	100.00	Yes
	108	x	-0.009	-0.009	0.00	No	100.00	Yes
	109	x	-0.009	-0.009	0.00	No	100.00	Yes
	110	x	-0.009	-0.009	0.00	No	100.00	Yes
	57	x	-0.011	-0.011	0.00	No	100.00	Yes
	74	x	-0.013	-0.013	0.00	No	100.00	Yes
	72	x	-0.013	-0.013	0.00	No	100.00	Yes
	23	x	-0.012	-0.012	0.00	No	100.00	Yes
	59	x	-0.011	-0.011	0.00	No	100.00	Yes
	70	x	-0.013	-0.013	0.00	No	100.00	Yes
	73	x	-0.013	-0.013	0.00	No	100.00	Yes
	22	x	-0.012	-0.012	0.00	No	100.00	Yes
	58	x	-0.011	-0.011	0.00	No	100.00	Yes
	84	x	-0.013	-0.013	0.00	No	100.00	Yes
	88	x	-0.012	-0.012	0.00	No	100.00	Yes
	61	x	-0.012	-0.012	0.00	No	100.00	Yes
	87	x	-0.012	-0.012	0.00	No	100.00	Yes
	27	x	-0.012	-0.012	0.00	No	100.00	Yes
	63	x	-0.012	-0.012	0.00	No	100.00	Yes
	75	x	-0.012	-0.012	0.00	No	100.00	Yes
	76	x	-0.012	-0.012	0.00	No	100.00	Yes
	29	x	-0.012	-0.012	0.00	No	100.00	Yes
	65	x	-0.012	-0.012	0.00	No	100.00	Yes
	28	x	-0.012	-0.012	0.00	No	100.00	Yes
	64	x	-0.012	-0.012	0.00	No	100.00	Yes
	77	x	-0.012	-0.012	0.00	No	100.00	Yes
	78	x	-0.012	-0.012	0.00	No	100.00	Yes
	60	x	-0.012	-0.012	0.00	No	100.00	Yes
	85	x	-0.013	-0.013	0.00	No	100.00	Yes
	89	x	-0.012	-0.012	0.00	No	100.00	Yes
	90	x	-0.012	-0.012	0.00	No	100.00	Yes
Di	33	y	-0.006	-0.006	0.00	No	100.00	Yes
	34	y	-0.006	-0.006	0.00	No	100.00	Yes
	35	y	-0.006	-0.006	0.00	No	100.00	Yes
	36	y	-0.006	-0.006	0.00	No	100.00	Yes
	37	y	-0.006	-0.006	0.00	No	100.00	Yes
	38	y	-0.006	-0.006	0.00	No	100.00	Yes
	39	y	-0.006	-0.006	0.00	No	100.00	Yes
	40	y	-0.006	-0.006	0.00	No	100.00	Yes
	41	y	-0.006	-0.006	0.00	No	100.00	Yes
	42	y	-0.006	-0.006	0.00	No	100.00	Yes
	43	y	-0.006	-0.006	0.00	No	100.00	Yes
	44	y	-0.006	-0.006	0.00	No	100.00	Yes
	66	y	-0.004	-0.004	0.00	No	100.00	Yes
	67	y	-0.004	-0.004	0.00	No	100.00	Yes
	68	y	-0.004	-0.004	0.00	No	100.00	Yes
	105	y	-0.005	-0.005	0.00	No	100.00	Yes
	106	y	-0.005	-0.005	0.00	No	100.00	Yes
	107	y	-0.005	-0.005	0.00	No	100.00	Yes
	108	y	-0.005	-0.005	0.00	No	100.00	Yes
	109	y	-0.005	-0.005	0.00	No	100.00	Yes
	110	y	-0.005	-0.005	0.00	No	100.00	Yes
	71	y	-0.006	-0.006	0.00	No	100.00	Yes
	69	y	-0.006	-0.006	0.00	No	100.00	Yes

21	y	-0.008	-0.008	0.00	No	100.00	Yes
57	y	-0.006	-0.006	0.00	No	100.00	Yes
74	y	-0.006	-0.006	0.00	No	100.00	Yes
72	y	-0.006	-0.006	0.00	No	100.00	Yes
23	y	-0.008	-0.008	0.00	No	100.00	Yes
59	y	-0.006	-0.006	0.00	No	100.00	Yes
70	y	-0.006	-0.006	0.00	No	100.00	Yes
73	y	-0.006	-0.006	0.00	No	100.00	Yes
22	y	-0.008	-0.008	0.00	No	100.00	Yes
58	y	-0.006	-0.006	0.00	No	100.00	Yes
84	y	-0.006	-0.006	0.00	No	100.00	Yes
88	y	-0.008	-0.008	0.00	No	100.00	Yes
61	y	-0.008	-0.008	0.00	No	100.00	Yes
87	y	-0.008	-0.008	0.00	No	100.00	Yes
27	y	-0.011	-0.011	0.00	No	100.00	Yes
63	y	-0.008	-0.008	0.00	No	100.00	Yes
75	y	-0.008	-0.008	0.00	No	100.00	Yes
76	y	-0.008	-0.008	0.00	No	100.00	Yes
62	y	-0.008	-0.008	0.00	No	100.00	Yes
91	y	-0.008	-0.008	0.00	No	100.00	Yes
86	y	-0.006	-0.006	0.00	No	100.00	Yes
92	y	-0.008	-0.008	0.00	No	100.00	Yes
80	y	-0.008	-0.008	0.00	No	100.00	Yes
79	y	-0.008	-0.008	0.00	No	100.00	Yes
29	y	-0.011	-0.011	0.00	No	100.00	Yes
65	y	-0.008	-0.008	0.00	No	100.00	Yes
28	y	-0.011	-0.011	0.00	No	100.00	Yes
64	y	-0.008	-0.008	0.00	No	100.00	Yes
77	y	-0.008	-0.008	0.00	No	100.00	Yes
78	y	-0.008	-0.008	0.00	No	100.00	Yes
60	y	-0.008	-0.008	0.00	No	100.00	Yes
85	y	-0.006	-0.006	0.00	No	100.00	Yes
89	y	-0.008	-0.008	0.00	No	100.00	Yes
90	y	-0.008	-0.008	0.00	No	100.00	Yes

Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%
DL	33	y	-0.035	1.50	No
		y	-0.035	6.50	No
	34	y	-0.035	1.50	No
		y	-0.035	6.50	No
	35	y	-0.033	6.00	No
	36	y	-0.035	1.50	No
		y	-0.035	6.50	No
	37	y	-0.035	1.50	No
		y	-0.035	6.50	No
	38	y	-0.035	1.50	No
		y	-0.035	6.50	No

	39	y	-0.033	6.00	No
	40	y	-0.035	1.50	No
		y	-0.035	6.50	No
	41	y	-0.035	1.50	No
		y	-0.035	6.50	No
	42	y	-0.035	1.50	No
		y	-0.035	6.50	No
	43	y	-0.033	6.00	No
	44	y	-0.035	1.50	No
		y	-0.035	6.50	No
	105	y	-0.06	2.00	No
		y	-0.071	4.00	No
	106	y	-0.046	2.00	No
		y	-0.072	4.00	No
	107	y	-0.06	2.00	No
		y	-0.071	4.00	No
	108	y	-0.046	2.00	No
		y	-0.072	4.00	No
	109	y	-0.06	2.00	No
		y	-0.071	4.00	No
	110	y	-0.046	2.00	No
		y	-0.072	4.00	No
W0	33	z	-0.239	1.50	No
		z	-0.239	6.50	No
	34	z	-0.239	1.50	No
		z	-0.239	6.50	No
	35	z	-0.043	6.00	No
	36	z	-0.239	1.50	No
		z	-0.239	6.50	No
	37	z	-0.139	1.50	No
		z	-0.139	6.50	No
	38	z	-0.139	1.50	No
		z	-0.139	6.50	No
	39	z	-0.043	6.00	No
	40	z	-0.139	1.50	No
		z	-0.139	6.50	No
	41	z	-0.139	1.50	No
		z	-0.139	6.50	No
	42	z	-0.139	1.50	No
		z	-0.139	6.50	No
	43	z	-0.043	6.00	No
	44	z	-0.139	1.50	No
		z	-0.139	6.50	No
	105	z	-0.047	2.00	No
		z	-0.053	4.00	No
	106	z	-0.031	2.00	No
		z	-0.051	4.00	No
	107	z	-0.069	2.00	No
		z	-0.069	4.00	No
	108	z	-0.06	2.00	No
		z	-0.059	4.00	No
	109	z	-0.069	2.00	No
		z	-0.069	4.00	No
	110	z	-0.06	2.00	No
		z	-0.059	4.00	No
W30	33	x	-0.106	1.50	No
		x	-0.106	6.50	No
	34	x	-0.106	1.50	No
		x	-0.106	6.50	No
	35	x	-0.043	6.00	No

	36	x	-0.106	1.50	No
		x	-0.106	6.50	No
	37	x	-0.206	1.50	No
		x	-0.206	6.50	No
	38	x	-0.206	1.50	No
		x	-0.206	6.50	No
	39	x	-0.043	6.00	No
	40	x	-0.206	1.50	No
		x	-0.206	6.50	No
	41	x	-0.206	1.50	No
		x	-0.206	6.50	No
	42	x	-0.206	1.50	No
		x	-0.206	6.50	No
	43	x	-0.043	6.00	No
	44	x	-0.206	1.50	No
		x	-0.206	6.50	No
	105	x	-0.076	2.00	No
		x	-0.074	4.00	No
	106	x	-0.069	2.00	No
		x	-0.062	4.00	No
	107	x	-0.054	2.00	No
		x	-0.058	4.00	No
	108	x	-0.04	2.00	No
		x	-0.054	4.00	No
	109	x	-0.054	2.00	No
		x	-0.058	4.00	No
	110	x	-0.04	2.00	No
		x	-0.054	4.00	No
Di	33	y	-0.098	1.50	No
		y	-0.098	6.50	No
	34	y	-0.098	1.50	No
		y	-0.098	6.50	No
	35	y	-0.031	6.00	No
	36	y	-0.098	1.50	No
		y	-0.098	6.50	No
	37	y	-0.098	1.50	No
		y	-0.098	6.50	No
	38	y	-0.098	1.50	No
		y	-0.098	6.50	No
	39	y	-0.031	6.00	No
	40	y	-0.098	1.50	No
		y	-0.098	6.50	No
	41	y	-0.098	1.50	No
		y	-0.098	6.50	No
	42	y	-0.098	1.50	No
		y	-0.098	6.50	No
	43	y	-0.031	6.00	No
	44	y	-0.098	1.50	No
		y	-0.098	6.50	No
	105	y	-0.036	2.00	No
		y	-0.037	4.00	No
	106	y	-0.031	2.00	No
		y	-0.032	4.00	No
	107	y	-0.036	2.00	No
		y	-0.037	4.00	No
	108	y	-0.031	2.00	No
		y	-0.032	4.00	No
	109	y	-0.036	2.00	No
		y	-0.037	4.00	No
	110	y	-0.031	2.00	No

		y	-0.032	4.00	No
Wi0	33	z	-0.048	1.50	No
		z	-0.048	6.50	No
	34	z	-0.048	1.50	No
		z	-0.048	6.50	No
	35	z	-0.01	6.00	No
	36	z	-0.048	1.50	No
		z	-0.048	6.50	No
	37	z	-0.03	1.50	No
		z	-0.03	6.50	No
	38	z	-0.03	1.50	No
		z	-0.03	6.50	No
	39	z	-0.01	6.00	No
	40	z	-0.03	1.50	No
		z	-0.03	6.50	No
	41	z	-0.03	1.50	No
		z	-0.03	6.50	No
	42	z	-0.03	1.50	No
		z	-0.03	6.50	No
	43	z	-0.01	6.00	No
	44	z	-0.03	1.50	No
		z	-0.03	6.50	No
	105	z	-0.012	2.00	No
		z	-0.013	4.00	No
	106	z	-0.008	2.00	No
		z	-0.012	4.00	No
	107	z	-0.016	2.00	No
		z	-0.016	4.00	No
	108	z	-0.014	2.00	No
		z	-0.014	4.00	No
	109	z	-0.016	2.00	No
		z	-0.016	4.00	No
	110	z	-0.014	2.00	No
		z	-0.014	4.00	No
Wi30	33	x	-0.024	1.50	No
		x	-0.024	6.50	No
	34	x	-0.024	1.50	No
		x	-0.024	6.50	No
	35	x	-0.01	6.00	No
	36	x	-0.024	1.50	No
		x	-0.024	6.50	No
	37	x	-0.042	1.50	No
		x	-0.042	6.50	No
	38	x	-0.042	1.50	No
		x	-0.042	6.50	No
	39	x	-0.01	6.00	No
	40	x	-0.042	1.50	No
		x	-0.042	6.50	No
	41	x	-0.042	1.50	No
		x	-0.042	6.50	No
	42	x	-0.042	1.50	No
		x	-0.042	6.50	No
	43	x	-0.01	6.00	No
	44	x	-0.042	1.50	No
		x	-0.042	6.50	No
	105	x	-0.017	2.00	No
		x	-0.017	4.00	No
	106	x	-0.016	2.00	No
		x	-0.015	4.00	No
	107	x	-0.013	2.00	No

		x	-0.014	4.00	No
	108	x	-0.01	2.00	No
		x	-0.013	4.00	No
	109	x	-0.013	2.00	No
		x	-0.014	4.00	No
	110	x	-0.01	2.00	No
		x	-0.013	4.00	No
WL0	33	z	-0.015	1.50	No
		z	-0.015	6.50	No
	34	z	-0.015	1.50	No
		z	-0.015	6.50	No
	35	z	-0.003	6.00	No
	36	z	-0.015	1.50	No
		z	-0.015	6.50	No
	37	z	-0.009	1.50	No
		z	-0.009	6.50	No
	38	z	-0.009	1.50	No
		z	-0.009	6.50	No
	39	z	-0.003	6.00	No
	40	z	-0.009	1.50	No
		z	-0.009	6.50	No
	41	z	-0.009	1.50	No
		z	-0.009	6.50	No
	42	z	-0.009	1.50	No
		z	-0.009	6.50	No
	43	z	-0.003	6.00	No
	44	z	-0.009	1.50	No
		z	-0.009	6.50	No
	105	z	-0.003	2.00	No
		z	-0.003	4.00	No
	106	z	-0.002	2.00	No
		z	-0.003	4.00	No
	107	z	-0.004	2.00	No
		z	-0.004	4.00	No
	108	z	-0.004	2.00	No
		z	-0.004	4.00	No
	109	z	-0.004	2.00	No
		z	-0.004	4.00	No
	110	z	-0.004	2.00	No
		z	-0.004	4.00	No
WL30	33	x	-0.007	1.50	No
		x	-0.007	6.50	No
	34	x	-0.007	1.50	No
		x	-0.007	6.50	No
	35	x	-0.003	6.00	No
	36	x	-0.007	1.50	No
		x	-0.007	6.50	No
	37	x	-0.013	1.50	No
		x	-0.013	6.50	No
	38	x	-0.013	1.50	No
		x	-0.013	6.50	No
	39	x	-0.003	6.00	No
	40	x	-0.013	1.50	No
		x	-0.013	6.50	No
	41	x	-0.013	1.50	No
		x	-0.013	6.50	No
	42	x	-0.013	1.50	No
		x	-0.013	6.50	No
	43	x	-0.003	6.00	No
	44	x	-0.013	1.50	No

		x	-0.013	6.50	No
	105	x	-0.005	2.00	No
		x	-0.005	4.00	No
	106	x	-0.004	2.00	No
		x	-0.004	4.00	No
	107	x	-0.003	2.00	No
		x	-0.004	4.00	No
	108	x	-0.003	2.00	No
		x	-0.003	4.00	No
	109	x	-0.003	2.00	No
		x	-0.004	4.00	No
	110	x	-0.003	2.00	No
		x	-0.003	4.00	No
LL1	57	y	-0.25	50.00	Yes
LL2	57	y	-0.25	100.00	Yes
LLa1	33	y	-0.25	50.00	Yes
LLa2	34	y	-0.25	50.00	Yes
LLa3	35	y	-0.25	50.00	Yes
LLa4	36	y	-0.25	50.00	Yes

Self weight multipliers for load conditions

Condition	Description	Self weight multiplier			
		Comb.	MultX	MultY	MultZ
DL	Dead Load	No	0.00	-1.00	0.00
W0	Wind Load 0/60/120 deg	No	0.00	0.00	0.00
W30	Wind Load 30/90/150 deg	No	0.00	0.00	0.00
Di	Ice Load	No	0.00	0.00	0.00
Wi0	Ice Wind Load 0/60/120 deg	No	0.00	0.00	0.00
Wi30	Ice Wind Load 30/90/150 deg	No	0.00	0.00	0.00
WL0	WL 30 mph 0/60/120 deg	No	0.00	0.00	0.00
WL30	WL 30 mph 30/90/150 deg	No	0.00	0.00	0.00
LL1	250 lb Live Load Center of Mount	No	0.00	0.00	0.00
LL2	250 lb Live Load End of Mount	No	0.00	0.00	0.00
LLa1	250 lb Live Load Antenna 1	No	0.00	0.00	0.00
LLa2	250 lb Live Load Antenna 2	No	0.00	0.00	0.00
LLa3	250 lb Live Load Antenna 3	No	0.00	0.00	0.00
LLa4	250 lb Live Load Antenna 4	No	0.00	0.00	0.00

Earthquake (Dynamic analysis only)

Condition	a/g	Ang. [Deg]	Damp. [%]
DL	0.00	0.00	0.00
W0	0.00	0.00	0.00
W30	0.00	0.00	0.00
Di	0.00	0.00	0.00
Wi0	0.00	0.00	0.00
Wi30	0.00	0.00	0.00
WL0	0.00	0.00	0.00
WL30	0.00	0.00	0.00

LL1	0.00	0.00	0.00
LL2	0.00	0.00	0.00
LLa1	0.00	0.00	0.00
LLa2	0.00	0.00	0.00
LLa3	0.00	0.00	0.00
LLa4	0.00	0.00	0.00

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Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

LC1=1.2DL+W0
LC2=1.2DL+W30
LC3=1.2DL-W0
LC4=1.2DL-W30
LC5=0.9DL+W0
LC6=0.9DL+W30
LC7=0.9DL-W0
LC8=0.9DL-W30
LC9=1.2DL+Di+Wi0
LC10=1.2DL+Di+Wi30
LC11=1.2DL+Di-Wi0
LC12=1.2DL+Di-Wi30
LC13=1.2DL
LC15=1.2DL+1.5LL1
LC16=1.2DL+1.5LL2
LC17=1.2DL+WL0+1.5LLa1
LC18=1.2DL+WL30+1.5LLa1
LC19=1.2DL-WL0+1.5LLa1
LC20=1.2DL-WL30+1.5LLa1
LC21=1.2DL+WL0+1.5LLa2
LC22=1.2DL+WL30+1.5LLa2
LC23=1.2DL-WL0+1.5LLa2
LC24=1.2DL-WL30+1.5LLa2
LC25=1.2DL+WL0+1.5LLa3
LC26=1.2DL+WL30+1.5LLa3
LC27=1.2DL-WL0+1.5LLa3
LC28=1.2DL-WL30+1.5LLa3
LC29=1.2DL+WL0+1.5LLa4
LC30=1.2DL+WL30+1.5LLa4
LC31=1.2DL-WL0+1.5LLa4
LC32=1.2DL-WL30+1.5LLa4

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_RECT 6X3X3_16	**27**	LC10 at 0.00%	**0.20**	**OK**	Eq. H1-1b
		28	LC12 at 0.00%	0.20	OK	Eq. H1-1b
		29	LC10 at 0.00%	0.20	OK	Eq. H1-1b
	HSS_SQR 3X3X1_4	**87**	LC11 at 100.00%	0.11	OK	Eq. H1-1b
		88	LC10 at 0.00%	**0.12**	**OK**	Eq. H1-1b
		89	LC11 at 100.00%	0.12	OK	Eq. H1-1b
		90	LC12 at 0.00%	0.11	OK	Eq. H1-1b
		91	LC9 at 100.00%	0.12	OK	Eq. H1-1b
		92	LC9 at 0.00%	0.11	OK	Eq. H1-1b
	HSS_SQR 3X3X3_16	**21**	LC10 at 40.28%	0.10	OK	Eq. H1-1b
		22	LC9 at 59.72%	0.10	OK	Eq. H1-1b
		23	LC12 at 59.72%	0.10	OK	Eq. H1-1b
		75	LC10 at 100.00%	0.22	OK	Eq. H1-1b
		76	LC10 at 0.00%	0.22	OK	Eq. H1-1b
		77	LC11 at 100.00%	0.22	OK	Eq. H1-1b
		78	LC12 at 0.00%	0.22	OK	Eq. H1-1b

	79	LC9 at 100.00%	**0.22**	**OK**	Eq. H1-1b
	80	LC9 at 100.00%	0.22	OK	Eq. H1-1b
HSS_SQR 3X3X5_16	**60**	LC2 at 50.00%	0.26	OK	Eq. H1-1b
	61	LC4 at 50.00%	0.30	OK	Eq. H1-1b
	62	LC3 at 50.00%	0.25	OK	Eq. H1-1b
	63	LC3 at 0.00%	0.27	OK	Eq. H1-1b
	64	LC1 at 93.75%	0.29	OK	Eq. H1-1b
	65	LC2 at 0.00%	**0.34**	**OK**	Eq. H1-1b
L 2X2X1_4	**69**	LC10 at 90.63%	**0.47**	**OK**	Eq. H3-8
	70	LC11 at 90.63%	0.25	OK	Eq. H2-1
	71	LC12 at 90.63%	0.25	OK	Eq. H2-1
	72	LC12 at 9.38%	0.25	OK	Eq. H2-1
	73	LC9 at 90.63%	0.46	OK	Eq. H3-8
	74	LC9 at 9.38%	0.46	OK	Eq. H3-8
	84	LC10 at 50.00%	0.26	OK	Eq. H2-1
	85	LC11 at 50.00%	0.26	OK	Eq. H2-1
	86	LC9 at 50.00%	0.26	OK	Eq. H2-1
PIPE 2-1_2x0.203	**33**	LC1 at 43.75%	0.29	OK	Eq. H1-1b
	34	LC1 at 43.75%	0.29	OK	Eq. H1-1b
	35	LC10 at 93.75%	0.13	OK	Eq. H1-1b
	36	LC3 at 43.75%	0.29	OK	Eq. H1-1b
	37	LC2 at 43.75%	0.29	OK	Eq. H1-1b
	38	LC4 at 43.75%	0.29	OK	Eq. H1-1b
	39	LC12 at 93.75%	0.15	OK	Eq. H1-1b
	40	LC2 at 43.75%	0.29	OK	Eq. H1-1b
	41	LC4 at 43.75%	0.25	OK	Eq. H1-1b
	42	LC4 at 43.75%	0.25	OK	Eq. H1-1b
	43	LC11 at 93.75%	0.12	OK	Eq. H1-1b
	44	LC2 at 43.75%	0.25	OK	Eq. H1-1b
	57	LC1 at 86.61%	**0.42**	**OK**	Eq. H1-1b
	58	LC4 at 13.39%	0.39	OK	Eq. H1-1b
	59	LC2 at 13.39%	0.33	OK	Eq. H1-1b
PIPE 2x0.154	**105**	LC2 at 18.75%	0.11	OK	Eq. H1-1b
	106	LC4 at 18.75%	0.11	OK	Eq. H1-1b
	107	LC3 at 18.75%	0.11	OK	Eq. H1-1b
	108	LC3 at 18.75%	0.12	OK	Eq. H1-1b
	109	LC3 at 18.75%	**0.12**	**OK**	Eq. H1-1b
	110	LC3 at 18.75%	0.11	OK	Eq. H1-1b
PL 2x1/8	**66**	LC10 at 100.00%	0.29	With warnings	Eq. H1-1a
	67	LC12 at 100.00%	0.28	With warnings	Eq. H1-1a
	68	LC9 at 100.00%	**0.29**	**With warnings**	Eq. H1-1a

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Geometry data

GLOSSARY

Cb22, Cb33 : Moment gradient coefficients
Cm22, Cm33 : Coefficients applied to bending term in interaction formula
d0 : Tapered member section depth at J end of member
DJX : Rigid end offset distance measured from J node in axis X
DJY : Rigid end offset distance measured from J node in axis Y
DJZ : Rigid end offset distance measured from J node in axis Z
DKX : Rigid end offset distance measured from K node in axis X
DKY : Rigid end offset distance measured from K node in axis Y
DKZ : Rigid end offset distance measured from K node in axis Z
dL : Tapered member section depth at K end of member
Ig factor : Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
K22 : Effective length factor about axis 2
K33 : Effective length factor about axis 3
L22 : Member length for calculation of axial capacity
L33 : Member length for calculation of axial capacity
LB pos : Lateral unbraced length of the compression flange in the positive side of local axis 2
LB neg : Lateral unbraced length of the compression flange in the negative side of local axis 2
RX : Rotation about X
RY : Rotation about Y
RZ : Rotation about Z
TO : 1 = Tension only member 0 = Normal member
TX : Translation in X
TY : Translation in Y
TZ : Translation in Z

Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
9	0.00	0.00	-1.75	0
216	0.00	5.00	-1.75	0
172	1.5155	0.00	0.875	0
214	1.5155	5.00	0.875	0
174	-1.5155	0.00	0.875	0
215	-1.5155	5.00	0.875	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
9	1	1	1	1	1	1
216	1	1	1	1	1	1
172	1	1	1	1	1	1
214	1	1	1	1	1	1
174	1	1	1	1	1	1
215	1	1	1	1	1	1

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	lg factor
33	239	227		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
34	240	228		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
35	242	230		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
36	241	229		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
37	243	231		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
38	244	232		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
39	245	233		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
40	246	234		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
41	247	235		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
42	248	236		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
43	249	237		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
44	250	238		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
66	215	211		PL 2x1/8	A53 GrB SABRE 50...	0.00	0.00	0.00
67	214	212		PL 2x1/8	A53 GrB SABRE 50...	0.00	0.00	0.00
68	216	213		PL 2x1/8	A53 GrB SABRE 50...	0.00	0.00	0.00
105	380	377		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
106	379	375		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
107	384	371		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
108	383	369		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
109	382	365		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
110	381	363		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
71	288	286		L 2X2X1_4	A36	0.00	0.00	0.00
69	289	287		L 2X2X1_4	A36	0.00	0.00	0.00
21	29	28		HSS_SQR 3X3X3_16	A53 GrB SABRE 50...	0.00	0.00	0.00
57	314	315		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
74	273	272		L 2X2X1_4	A36	0.00	0.00	0.00
72	271	270		L 2X2X1_4	A36	0.00	0.00	0.00
23	4	5		HSS_SQR 3X3X3_16	A53 GrB SABRE 50...	0.00	0.00	0.00
59	318	319		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
70	284	282		L 2X2X1_4	A36	0.00	0.00	0.00
73	285	283		L 2X2X1_4	A36	0.00	0.00	0.00
22	25	26		HSS_SQR 3X3X3_16	A53 GrB SABRE 50...	0.00	0.00	0.00
58	316	317		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
84	287	282		L 2X2X1_4	A36	0.00	0.00	0.00
88	359	354		HSS_SQR 3X3X1_4	A53 GrB SABRE 50...	0.00	0.00	0.00
61	334	331		HSS_SQR 3X3X5_16	A53 GrB SABRE 50...	0.00	0.00	0.00
87	357	359		HSS_SQR 3X3X1_4	A53 GrB SABRE 50...	0.00	0.00	0.00
27	174	208		HSS_RECT 6X3X3_16	A53 GrB SABRE 50...	0.00	0.00	0.00
63	215	217		HSS_SQR 3X3X5_16	A53 GrB SABRE 50...	0.00	0.00	0.00
75	206	211		HSS_SQR 3X3X3_16	A53 GrB SABRE 50...	0.00	0.00	0.00
76	211	201		HSS_SQR 3X3X3_16	A53 GrB SABRE 50...	0.00	0.00	0.00
62	326	332		HSS_SQR 3X3X5_16	A53 GrB SABRE 50...	0.00	0.00	0.00
91	349	358		HSS_SQR 3X3X1_4	A53 GrB SABRE 50...	0.00	0.00	0.00
86	273	283		L 2X2X1_4	A36	0.00	0.00	0.00
92	358	355		HSS_SQR 3X3X1_4	A53 GrB SABRE 50...	0.00	0.00	0.00
80	202	213		HSS_SQR 3X3X3_16	A53 GrB SABRE 50...	0.00	0.00	0.00
79	189	213		HSS_SQR 3X3X3_16	A53 GrB SABRE 50...	0.00	0.00	0.00
29	9	210		HSS_RECT 6X3X3_16	A53 GrB SABRE 50...	0.00	0.00	0.00
65	216	225		HSS_SQR 3X3X5_16	A53 GrB SABRE 50...	0.00	0.00	0.00
28	172	209		HSS_RECT 6X3X3_16	A53 GrB SABRE 50...	0.00	0.00	0.00
64	214	223		HSS_SQR 3X3X5_16	A53 GrB SABRE 50...	0.00	0.00	0.00
77	205	212		HSS_SQR 3X3X3_16	A53 GrB SABRE 50...	0.00	0.00	0.00
78	212	180		HSS_SQR 3X3X3_16	A53 GrB SABRE 50...	0.00	0.00	0.00
60	333	321		HSS_SQR 3X3X5_16	A53 GrB SABRE 50...	0.00	0.00	0.00
85	286	271		L 2X2X1_4	A36	0.00	0.00	0.00
89	356	360		HSS_SQR 3X3X1_4	A53 GrB SABRE 50...	0.00	0.00	0.00
90	360	348		HSS_SQR 3X3X1_4	A53 GrB SABRE 50...	0.00	0.00	0.00

Orientation of local axes

Member	Rotation [Deg]	Axes23	NX	NY	NZ
71	270.00	0	0.00	0.00	0.00
72	270.00	0	0.00	0.00	0.00
70	270.00	0	0.00	0.00	0.00
27	90.00	0	0.00	0.00	0.00
86	270.00	0	0.00	0.00	0.00
29	90.00	0	0.00	0.00	0.00
28	90.00	0	0.00	0.00	0.00
85	270.00	0	0.00	0.00	0.00

Rigid end offsets

Member	DJX [in]	DJY [in]	DJZ [in]	DKX [in]	DKY [in]	DKZ [in]
66	0.00	-1.00	0.00	0.00	-3.00	0.00
67	0.00	-1.00	0.00	0.00	-3.00	0.00
68	0.00	-1.00	0.00	0.00	-3.00	0.00
71	0.00	-1.00	0.00	0.00	-1.00	0.00
69	0.00	-1.00	0.00	0.00	-1.00	0.00
57	0.00	3.50	0.00	0.00	3.50	0.00
74	0.00	-1.00	0.00	0.00	-1.00	0.00
72	0.00	-1.00	0.00	0.00	-1.00	0.00
59	0.00	3.50	0.00	0.00	3.50	0.00
70	0.00	-1.00	0.00	0.00	-1.00	0.00
73	0.00	-1.00	0.00	0.00	-1.00	0.00
58	0.00	3.50	0.00	0.00	3.50	0.00
84	0.00	-1.00	0.00	0.00	-1.00	0.00
88	0.00	-3.00	0.00	0.00	-3.00	0.00
61	0.00	0.75	0.00	0.00	0.75	0.00
87	0.00	-3.00	0.00	0.00	-3.00	0.00
27	0.00	-3.00	0.00	0.00	-3.00	0.00
63	0.00	-2.00	0.00	0.00	-2.00	0.00
75	0.00	-3.00	0.00	0.00	-3.00	0.00
76	0.00	-3.00	0.00	0.00	-3.00	0.00
62	0.00	0.75	0.00	0.00	0.75	0.00
91	0.00	-3.00	0.00	0.00	-3.00	0.00
86	0.00	-1.00	0.00	0.00	-1.00	0.00
92	0.00	-3.00	0.00	0.00	-3.00	0.00
80	0.00	-3.00	0.00	0.00	-3.00	0.00
79	0.00	-3.00	0.00	0.00	-3.00	0.00
29	0.00	-3.00	0.00	0.00	-3.00	0.00
65	0.00	-2.00	0.00	0.00	-2.00	0.00
28	0.00	-3.00	0.00	0.00	-3.00	0.00
64	0.00	-2.00	0.00	0.00	-2.00	0.00
77	0.00	-3.00	0.00	0.00	-3.00	0.00
78	0.00	-3.00	0.00	0.00	-3.00	0.00
60	0.00	0.75	0.00	0.00	0.75	0.00
85	0.00	-1.00	0.00	0.00	-1.00	0.00
89	0.00	-3.00	0.00	0.00	-3.00	0.00
90	0.00	-3.00	0.00	0.00	-3.00	0.00

Hinges

Member	Node-J				Node-K				TOR	AXL	Axial rigidity
	M33	M22	V3	V2	M33	M22	V3	V2			
66	0	0	0	0	0	0	0	0	0	0	Tension only
67	0	0	0	0	0	0	0	0	0	0	Tension only
68	0	0	0	0	0	0	0	0	0	0	Tension only

EXHIBIT 5

Radio Frequency Safety Survey Report Prediction (RFSSRP)

AT&T Wireless Monopole Facility

Site ID: CT2873 **Site Name:** DANBURY GREAT PASTURE ROAD **Address:** 15 GREAT PASTURE ROAD, DANBURY, CT 06810 **Latitude:** 41.383003 **Longitude:** -73.422159 **USID:** 253157 **FA**: 12684101	**Prepared for:** AT&T Mobility 550 Cochituate Road, Suite 13 Framingham, MA 01701 Report Writer: Dane Folie Date: September 28, 2020 Report Reviewer: Brandon Green

Statement of Compliance

AT&T will be compliant with FCC Regulations upon installation of recommended mitigation measures.

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1.0 GENERAL SUMMARY

Centerline Communications, LLC ("Centerline") has been contracted to provide a Radio Frequency (RF) Analysis for the following AT&T Mobility wireless monopole facility to determine whether the facility is in compliance with federal standards and regulations regarding RF emissions. This analysis includes theoretical emissions calculations, for all equipment for AT&T Mobility and any other wireless carriers on site.

1.1 SITE SUMMARY

Analysis Site Data	
Site USID:	253157
Site FA#:	12684101
Site Name:	DANBURY GREAT PASTURE ROAD
Site Address:	15 GREAT PASTURE ROAD, DANBURY CT 06810
Site Latitude:	41.383003
Site Longitude:	-73.422159
Facility Type:	Monopole
Compliance Summary	
Compliance Status:	Compliant Upon Mitigation Installation
Maximum Modeled AT&T MPE% on Walking Surface (General Public Limit):	0.06%
Maximum Modeled AT&T MPE% at Ground Level (General Public Limit):	0.06%
Site Survey Data	
Is Access Locked or Controlled? :	Unknown
Lock or Control Measures if Present:	Unknown
Parapet Height:	N/A
Site Data Information	
CD:	2020-0928 CT2873 Bethel - CD Rev0_19101.00 (S&S).pdf
RFDS:	NEW-ENGLAND_CONNECTICUT_CT2873_2020-New-Site_New_ra9161_2051A0DQ2P_12684101_253157_03-18-2019_Preliminary-In-Progress_v3.00.pdf

Signage and barriers are the primary means of mitigating access to accessible areas of exposure. Below is a summary of existing and recommended signage at this AT&T facility.

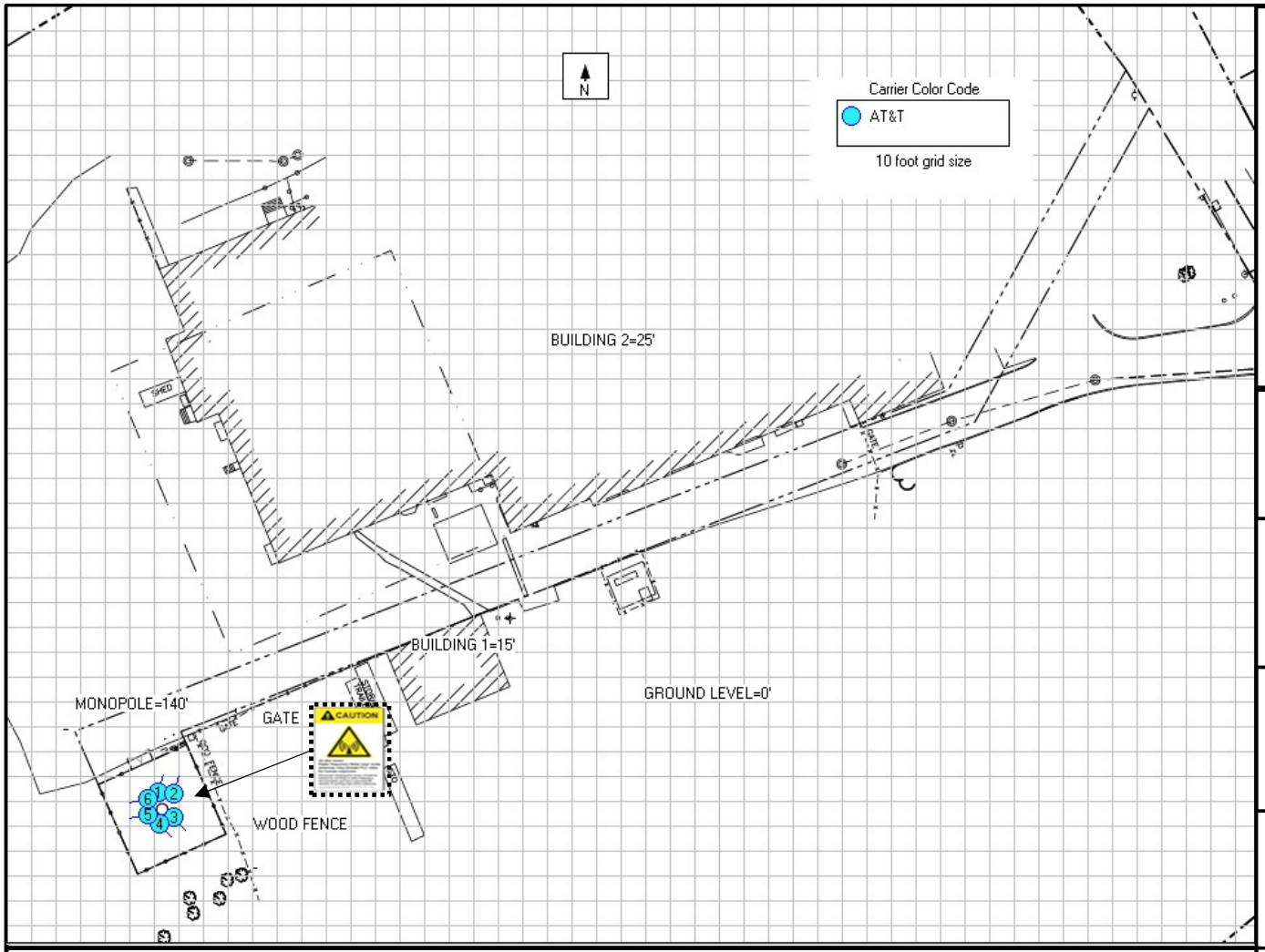
Existing Signage and Barriers (AT&T Sectors)										
Location	Information	Notice	Notice 2	Caution	Caution 2	Caution 2B	Caution 2C	Warning	Warning 2	Barriers
Gate	0	0	0	0	0	0	0	0	0	0
Monopole Base	0	0	0	0	0	0	0	0	0	0

Recommended Signage and Barriers (AT&T Sectors)						
Location	Notice 2	Caution 2	Caution 2B	Caution 2C	Warning 2	Barriers
Gate	0	0	0	0	0	0
Monopole Base	0	0	1	0	0	0

Monopole Base:

- Install (1) Caution 2B sign at the base of the monopole.

2.0 SITE SCALE MAP



Operator Antenna Identifiers

- AT&T Mobility
- Verizon
- Clearwire
- Cricket
- T-Mobile
- Sprint
- US Cellular
- Metro PCS
- Unknown


INFO 1 Sign

Caution 1 Sign

INFO 2 Sign


Tower Caution Sign

Notice 1 Sign


Caution 2 Sign


Notice 2 Sign

Warning 2 Sign

Signage/ Mitigation Plan

DANBURY GREAT PASTURE ROAD / 12684101

3.0 ANTENNA INVENTORY

ANT ID	Operator	Antenna Make	Antenna Model	Type	Freq (MHz)	TPO (Watts)	# of TX	Azimuth (°)	BW (°)	Gain (dBd)	Total ERP (Watts)	Length (ft.)	Antenna Z Value (ft.) AGL*
1	AT&T	CCI	TPA65R-BU6D	Panel	700	40	4	15	68	11.75	2393.98	5.9	137.3
1	AT&T	CCI	TPA65R-BU6D	Panel	2100	40	4	15	60	15.85	6153.47	5.9	137.3
1	AT&T	CCI	TPA65R-BU6D	Panel	2300	25	4	15	52	14.75	2985.38	5.9	137.3
2	AT&T	CCI	TPA65R-BU6D	Panel	700	40	2	15	68	11.75	1196.99	5.9	137.3
2	AT&T	CCI	TPA65R-BU6D	Panel	850	40	2	15	65	12.45	1406.34	5.9	137.3
2	AT&T	CCI	TPA65R-BU6D	Panel	1900	40	4	15	63	14.85	4887.87	5.9	137.3
3	AT&T	CCI	TPA65R-BU6D	Panel	700	40	4	140	68	11.75	2393.98	5.9	137.3
3	AT&T	CCI	TPA65R-BU6D	Panel	2100	40	4	140	60	15.85	6153.47	5.9	137.3
3	AT&T	CCI	TPA65R-BU6D	Panel	2300	25	4	140	52	14.75	2985.38	5.9	137.3
4	AT&T	CCI	TPA65R-BU6D	Panel	700	40	2	140	68	11.75	1196.99	5.9	137.3
4	AT&T	CCI	TPA65R-BU6D	Panel	850	40	2	140	65	12.45	1406.34	5.9	137.3
4	AT&T	CCI	TPA65R-BU6D	Panel	1900	40	4	140	63	14.85	4887.87	5.9	137.3
5	AT&T	CCI	TPA65R-BU6D	Panel	700	40	4	260	68	11.75	2393.98	5.9	137.3
5	AT&T	CCI	TPA65R-BU6D	Panel	2100	40	4	260	60	15.85	6153.47	5.9	137.3
5	AT&T	CCI	TPA65R-BU6D	Panel	2300	25	4	260	52	14.75	2985.38	5.9	137.3
6	AT&T	CCI	TPA65R-BU6D	Panel	700	40	2	260	68	11.75	1196.99	5.9	137.3
6	AT&T	CCI	TPA65R-BU6D	Panel	850	40	2	260	65	12.45	1406.34	5.9	137.3
6	AT&T	CCI	TPA65R-BU6D	Panel	1900	40	4	260	63	14.85	4887.87	5.9	137.3

*Table 1: Total Site Data Table (*AGL = Above Ground Level)*

Note: Z Value represents the bottom tip height of the antenna

4.0 PREDICTED EMISSION LEVELS AND DISCUSSION

All calculations performed based upon the data listed for this facility have produced results that are within allowable limits for General Population limits for exposure to RF emissions as specified by federal standards.

AT&T's RF Exposure: Responsibilities, Procedures & Guidelines document states that microwave dishes are compliant if they are mounted 20 feet or greater above any accessible walking or working surface.

Maximum Predicted MPE Level on Site:	% of MPE Limit:	Location:
Accessible **General Population** MPE Limits:	**0.06%**	**Sector A**
Accessible **Occupational** MPE Limits:	**0.01%**	

Ground Level Assessment:	% of MPE Limit:
Ground Level **General Population** MPE Limits:	**0.06%**
Ground Level **Occupational** MPE Limits:	**0.01%**

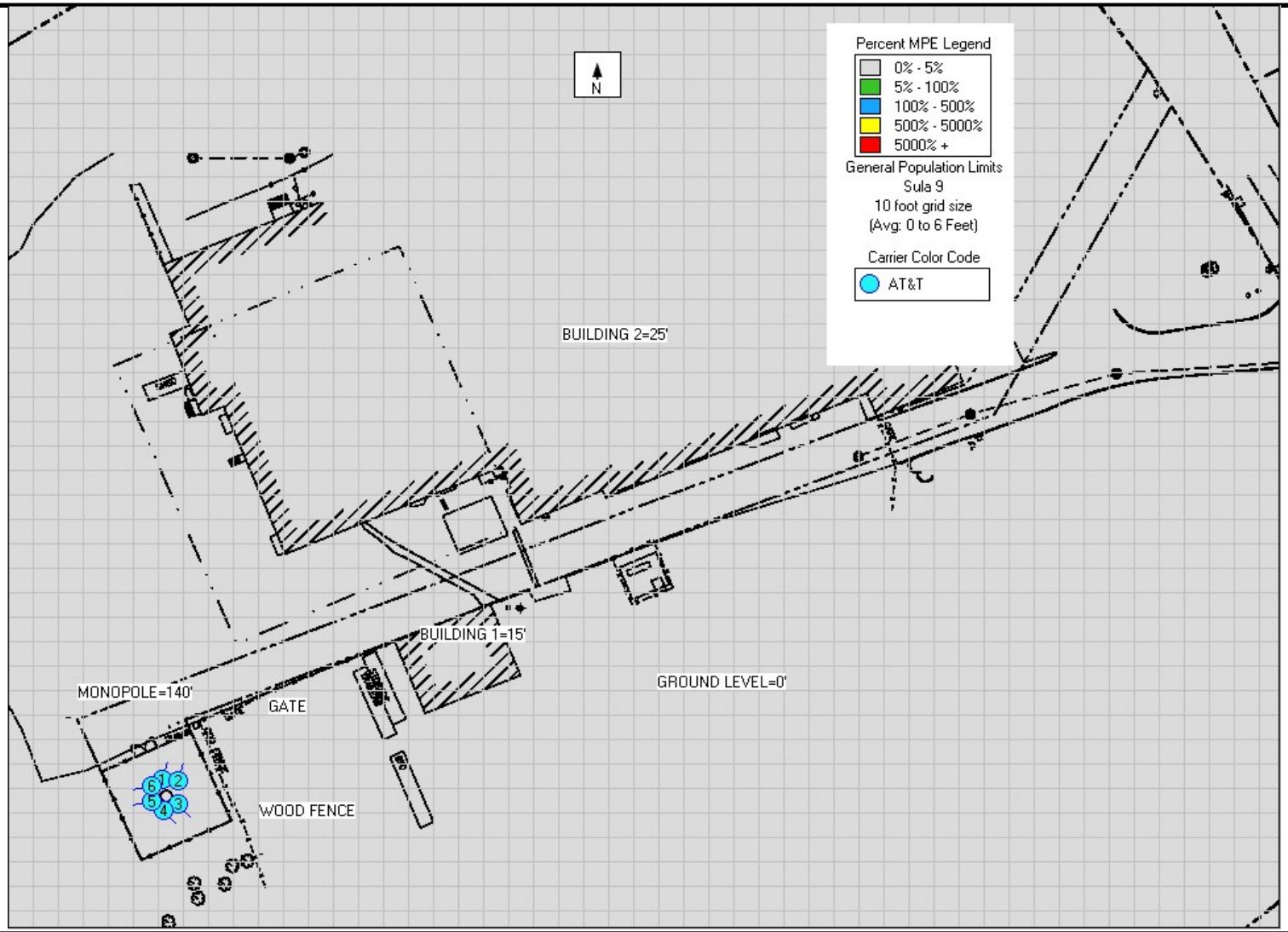
Sector A: Transmitting over Ground Level	% of MPE Limit:	*Distance from Antenna:
Accessible **General Population** MPE Limits:	**0.06%**	**0**
Accessible **Occupational** MPE Limits:	**0.01%**	**0**

Sector B: Transmitting over Ground Level	% of MPE Limit:	*Distance from Antenna:
Accessible **General Population** MPE Limits:	**0.05%**	**0**
Accessible **Occupational** MPE Limits:	**0.01%**	**0**

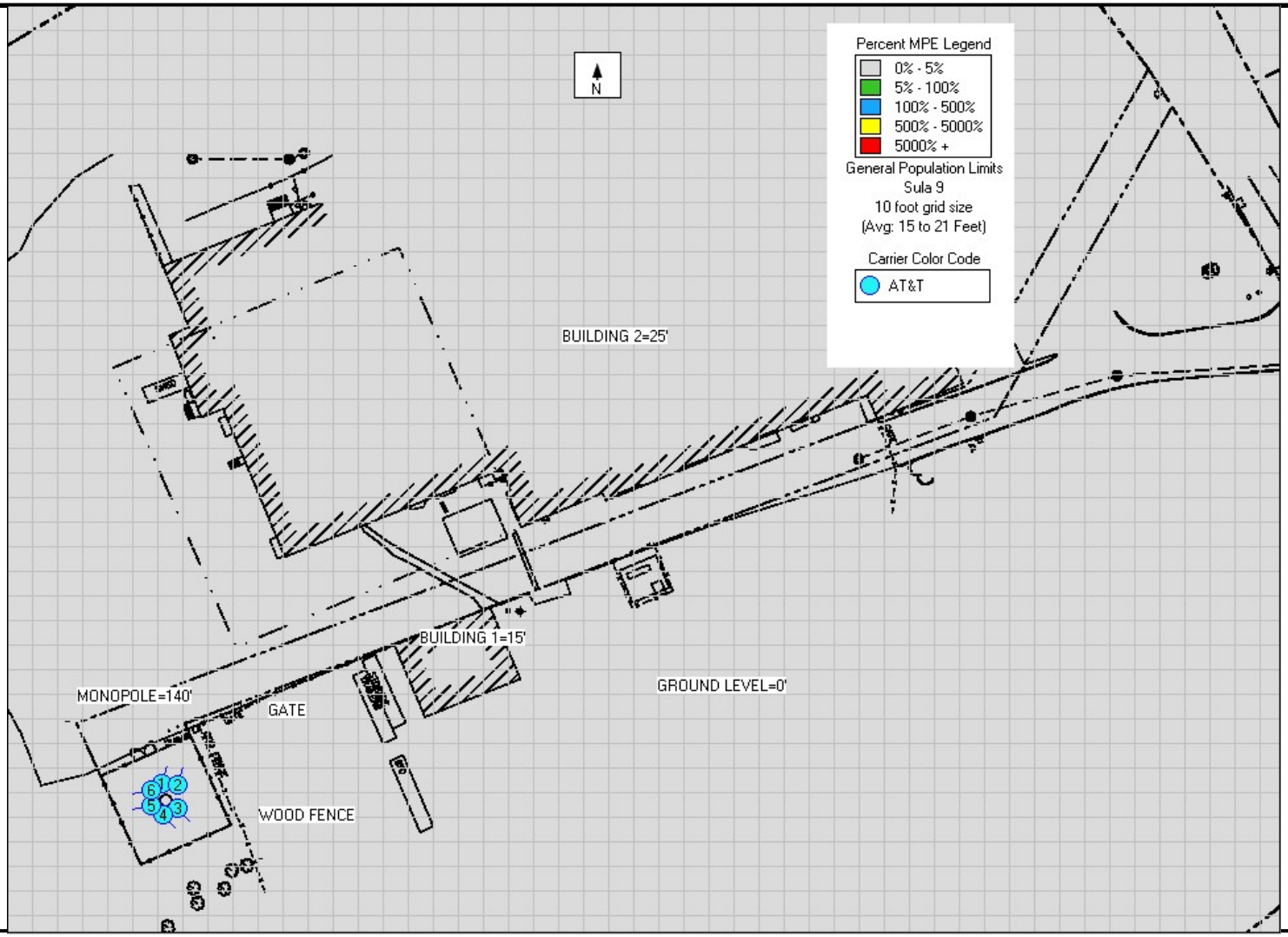
Sector C: Transmitting over Ground Level	% of MPE Limit:	*Distance from Antenna:
Accessible **General Population** MPE Limits:	**0.05%**	**0**
Accessible **Occupational** MPE Limits:	**0.01%**	**0**

**Distance from Antenna is the distance that the MPE limits are exceeded from the front face of the antenna, outward across an accessible area.*

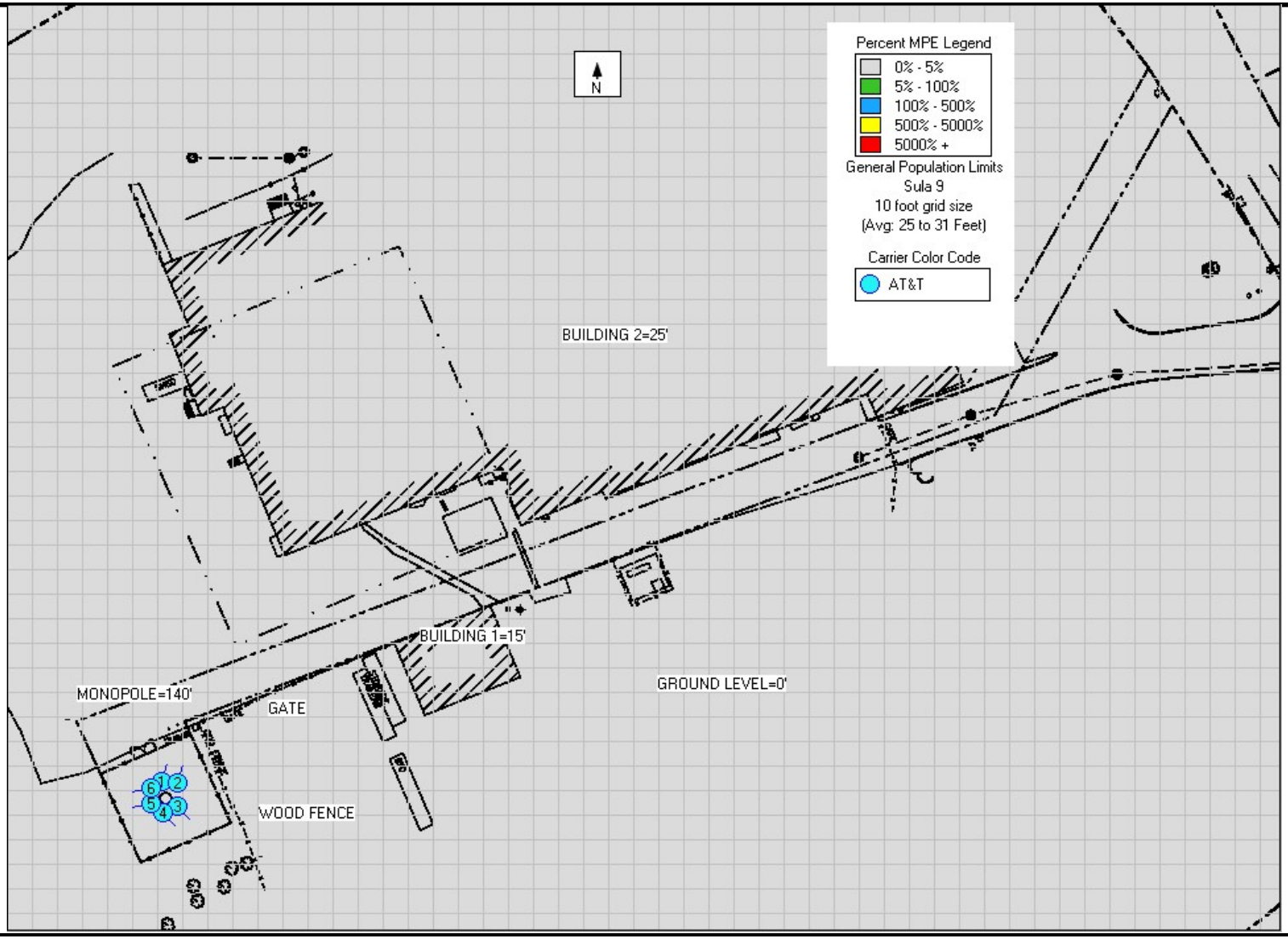
5.0 EMISSIONS DIAGRAMS



Emissions Thresholds for AT&T (Ground Level 0.00ft.) DANBURY GREAT PASTURE ROAD / 12684101



Emissions Thresholds for AT&T (Building 1 Level 15.00ft.) DANBURY GREAT PASTURE ROAD / 12684101



Emissions Thresholds for AT&T (Building 2 Level 25.00ft.) DANBURY GREAT PASTURE ROAD / 12684101

6.0 STATEMENT OF COMPLIANCE

Centerline conducted worst case modeling to determine whether the monopole facility located at 15 GREAT PASTURE ROAD in DANBURY, Connecticut is in compliance with FCC Regulations.

6.1 STATEMENT OF AT&T MOBILITY COMPLIANCE

Based on the information analyzed, AT&T will be compliant with FCC Regulations once the mitigation measures recommended in this report are implemented.

6.2 RECOMMENDATIONS

Recommended Signage and Barriers (AT&T Sectors)						
Location	Notice 2	Caution 2	Caution 2B	Caution 2C	Warning 2	Barriers
Gate	0	0	0	0	0	0
Monopole Base	0	0	1	0	0	0

Monopole Base:

- Install (1) Caution 2B sign at the base of the monopole.

7.0 FALL ARREST AND PARAPET INFORMATION

As per AT&T barrier policy, rooftop edges that are protected with a 39-inch parapet wall or guardrail are safe for work activity within six (6) feet of the edge. OSHA has stated that an existing 39-inch guardrail or parapet provides sufficient protection for employees. The height of the top rail or equivalent component of guardrail systems in new construction shall be at least 42 inches above the walking or working surface. It should also be noted that the height of the parapet or guardrail may be reduced to no less than 30 inches at any point provided the sum of the depth (horizontal distance) of the top edge, and the height of the top edge (vertical distance from the work surface to the top edge of the top member, is at least 48 inches. If there is no reason for working atop the roof, then edge protection is not required. In addition, workers may use personnel lifts or temporary fall protection measures to perform work within 6 feet of the roof edge in place of permanent edge protection. Reference: 29 CFR 1910.28, 29 CFR 1910.23 (NPRM-1990); OSHA Letters of Interpretation 2/9/83 and 3/8/9

APPENDIX A: RF SIGNAGE

AT&T RF Signage

Sign	Description	Sign	Description
	**Information 1 Sign** Gives guidelines on how to proceed and who to contact regarding areas that may exceed either the FCC's General Population or Occupational emissions limits.		**Information 2 Sign** Gives specific information on how to proceed and who to contact regarding antennas that are façade mounted, concealed or on stand-alone structures.
	**Blue Notice 1 Sign** Used to alert individuals that they are entering an area that may exceed the FCC's General Population emissions limit. Must be positioned such that persons approaching from any angle have ample warning to avoid the marked areas.		**Blue Notice 2 Sign** Used to alert individuals that they are entering an area that may exceed the FCC's General Population emissions limits. To be used on barriers or antenna sectors as a hybrid of the Information 1 and Blue Notice 1 signs.
	**Yellow Caution 1 Sign-Rooftop** Used to inform individuals that they are entering an area that may exceed the FCC's Occupational emissions limit. Must be positioned such that persons approaching from any angle have ample warning to avoid the marked areas.		**Yellow Caution 2 Sign-Rooftop** Used to alert individuals that they are entering an area that may exceed the FCC's Occupational emissions limit. To be used on barriers or antenna sectors as a hybrid of the Information 1 and Yellow Caution 1 signs.
	**Yellow Caution 1 Sign-Tower** Used to inform individuals that they are entering an area that may exceed the FCC's Occupational emissions limits. Must be placed at the base of the tower to warn tower climbers of potential for exposure.		**Warning 2 Sign** Used to inform individuals that they are entering an area that may exceed the FCC's Occupational emissions limit by a factor of 10 or greater. Must be positioned such that persons approaching from any angle have ample warning to avoid the marked areas.

APPENDIX B: FCC GUIDELINES AND EMISSIONS THRESHOLD LIMITS

All power density values used in this report were analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu W/cm^2$). The number of $\mu W/cm^2$ 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 public 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 public 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 ($\mu W/cm^2$). The general population exposure limit for the 700 and 800 MHz Bands is approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively, and the general population exposure limit for the 1900 MHz PCS and 2100 MHz AWS bands is 1000 $\mu W/cm^2$. 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, have been properly trained in RF safety 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, have been trained in RF safety and can exercise control over his or her exposure by leaving the area or by some other appropriate means. The Occupational/Controlled exposure limits all utilized frequency bands is five (5) times the FCC's General Public / Uncontrolled exposure limit.

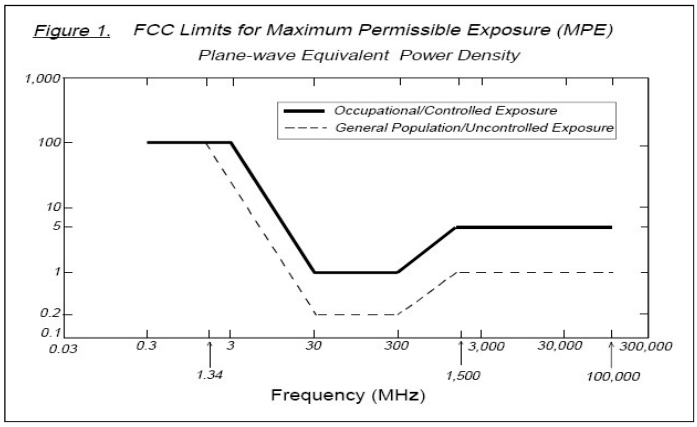
The FCC Mandates that if a site is found to be out of compliance with regard to emissions that any system operator contributing 5% or more to areas exceeding the FCC's allowable limits will be responsible for bringing the site into compliance.

Additional details can be found in FCC OET 65.

Table 1: Limits for Maximum Permissible Exposure (MPE)				
(A) Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	**Electric Field Strength (E) (V/m)**	**Magnetic Field Strength (H) (A/m)**	**Power Density (S) (mW/cm^2)**	**Averaging Time $[E]^2$, $[H]^2$, or S (minutes)**
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-I,500	--	--	f/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Public/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (E) (V/m)**	**Magnetic Field Strength (H) (A/m)**	**Power Density (S) (mW/cm^2)**	**Averaging Time $[E]^2$, $[H]^2$, or S (minutes)**
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-I,500	--	--	f/1,500	30
1,500-100,000	--	--	1.0	30

f = Frequency in (MHz)

* Plane-wave equivalent power density



APPENDIX C: CALCULATION METHODOLOGY

Centerline Communications, LLC has performed theoretical modeling using Waterford Consultants' RoofMaster™ 2020 Version 21.9.04.20 which uses a cylindrical model for conservative power density predictions within the near field of the antenna where the antenna pattern has not truly formed yet. Within this area power density values tend to decrease based upon an inverse distance function. At the point where it is appropriate for modeling to change from near-field calculations to far-field calculations the power decreases inversely with the square of the distance. This modeling technique is accurate with low antenna centerlines, such as rooftops, where persons can get close to the antennas and pass through fields in close proximity.

The modeling is based on worst-case assumptions for the number of antennas and transmitter power. No losses were included in the power calculations unless they were specifically provided for the project.

APPENDIX D: CERTIFICATIONS

I, Dane Folie, preparer of this report certify that I am fully trained and aware of the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation. I have been trained in the procedures and requirements outlined in AT&T's RF Exposure: Responsibilities, Procedures & Guidelines document.

Dane Folie

9/28/2020

I, Brandon Green, reviewer and approver of this report certify that I am fully trained and aware of the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation. I have been trained in the procedures and requirements outlined in AT&T's RF Exposure: Responsibilities, Procedures & Guidelines document.

Brandon Green

9/28/2020

APPENDIX E: PROPRIETARY STATEMENT

This report was prepared for the use of AT&T Mobility, LLC to meet requirements specified in AT&T's corporate RF safety guidelines. It was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same locale under like circumstances. The conclusions provided by Centerline Communications, LLC are based solely on the information provided by AT&T Mobility and all observations in this report are valid on the date of the investigation. Any additional information that becomes available concerning the site should be provided to Centerline Communications, LLC so that our conclusions may be revised and modified, if necessary. This report has been prepared in accordance with Standard Conditions for Engagement and authorized proposal, both of which are integral parts of this report. No other warranty, expressed or implied, is made.

EXHIBIT 6

Verizon Wireless
1515 E. Woodfield Rd.
Suite 1400
Schaumburg, IL 60173

LETTER OF AUTHORIZATION

Site Location:	**New England**
Coordinates:	**41° 22' 58.8" N, 73° 25' 19.8" W**
Site Address:	**15 Great Pasture Road, Danbury, CT 06810**
County:	**Fairfield**
Elevation	**387** Feet AMSL Tower Height: **120** Feet AGL

Tower Type:	**MonoPole**
Verizon Site Name:	**Bethel West 2 / LC: 467694**
Tenant Site Name:	**Bethel West 2 / S2873**
KGI Tower #:	**28493**

RE: Authorization of Agent – Jeff DelliColli, Attachment to Verizon Wireless Tower

Cellco Partnership ("Verizon Wireless"), FCC licensee and owner of the cellular tower located on the property referenced, hereby appoints and authorizes **Jeff DelliColli**, representing **AT&T** ("Tenant") to act, execute and deliver on behalf of and with full authority of Verizon Wireless, any documentation required by Federal, State or Local authorities to secure zoning or permitting approvals related to Tenant's application to attach to the above-referenced tower.

This authorization applies solely to the zoning and permitting process and shall not be used for any other purpose. The term of this Letter of Authorization shall be for six (6) months from the date of this letter.

Cellco Partnership
d/b/a Verizon Wireless

By: _____
Joe McCarty (Nov 16, 2020 07:30 CST)

Name: Joseph McCarty

Title: Manager-Network Engineering & Operations

Date: 11 16 20

EXHIBIT 7

Application Number . . . . . 16-00059302 Date 12/12/16
Application pin number . . . 415464
Property Address . . . . . 15 GREAT PASTURE RD
Tax Assessor's Lot Number . . L16005-
Tenant nbr, name . . . . . VERIZON
Application type description COMMERCIAL ALTERATION
Property Use . . . . . INDUSTRIAL
Property Zoning . . . . . IND, LIGHT INDUST 40000
Application valuation 175000

Owner	Contractor
EPPOLITI INDUSTRIAL REALTY INC	BELL ATLANTIC D/B/A VERIZON
37 DANBURY RD STE 203	WIRELESS/BRIAN RAGOZZINE
RIDGEFIELD CT 06877	99 EAST RIVER DRIVE 9TH FLOOR
	EAST HARTFORD CT 06108
	(860) 999-3481

--- Structure Information 000 000 TOWER/ANTENNAS/GENERATOR,PROPANE TANKS ---
Construction Type . . . . . TYPE 1B PROTECTED NONCOMB
Occupancy Type . . . . . UTILITY

Permit . . . . . BUILDING PERMIT COMM./INDUST.
Additional desc . .
Permit pin number . 1088616
Permit Fee . . . . 3150.00 Plan Check Fee . . .00
Issue Date . . . . 12/12/16 Valuation 175000
Expiration Date . . 12/12/17

Other Fees . . . . . CO FEE 28.00
STATE EDUCATION FEE PER K 45.50

Fee summary	Charged	Paid	Credited	Due
Permit Fee Total	3150.00	3150.00	.00	.00
Plan Check Total	.00	.00	.00	.00
Other Fee Total	73.50	73.50	.00	.00
Grand Total	3223.50	3223.50	.00	.00

Application Number . . . . . 16-00059302 Date 5/08/17
Application pin number . . . 415464
Property Address . . . . . 15 GREAT PASTURE RD
Tax Assessor's Lot Number . . L16005-
Tenant nbr, name . . . . . VERIZON
Application type description COMMERCIAL ALTERATION
Property Use . . . . . INDUSTRIAL
Property Zoning . . . . . IND, LIGHT INDUST 40000
Application valuation 175000

REVISED
MAY - 8 2017
PERMIT COORDINATION DEPT.
CITY OF DANBURY

Owner	Contractor
EPPOLITI INDUSTRIAL REALTY INC	BELL ATLANTIC D/B/A VERIZON
37 DANBURY RD STE 203	WIRELESS/BRIAN RAGOZZINE
RIDGEFIELD CT 06877	99 EAST RIVER DRIVE 9TH FLOOR
	EAST HARTFORD CT 06108
	(860) 999-3481

--- Structure Information 000 000 TOWER/ANTENNAS/GENERATOR,PROPANE TANKS ---
Construction Type . . . . . TYPE 1B PROTECTED NONCOMB
Occupancy Type . . . . . UTILITY

Permit . . . . . COMM ELECTRIC PERMIT
Additional desc . . RE-PRINT CORRECTED CONTRACTOR
Permit pin number . 1111285
Sub Contractor . . MCPHEE, MICHAEL E (E1)
Permit Fee . . . . 303.00 Plan Check Fee . . .00
Issue Date . . . . 3/27/17 Valuation 24000
Expiration Date . . 3/27/18

Special Notes and Comments
PER DOUG WITH MCPHEE ELECTRIC/THE
CONSTRUCTION VALUE IS SEPARATE THAN
ORIGINAL VALUE ON BUILDING PERMIT/THEY
WILL PULL STAND ALONE ELECTRICAL. CHRIS
crs# 2893257. McPhee Electric.

Other Fees . . . . . CO FEE 56.00
STATE EDUCATION FEE PER K 51.74

Fee summary	Charged	Paid	Credited	Due
Permit Fee Total	303.00	303.00	.00	.00
Plan Check Total	.00	.00	.00	.00
Other Fee Total	107.74	107.74	.00	.00
Grand Total	410.74	410.74	.00	.00

Application Number . . . . . 16-00059302 Date 3/27/17
Application pin number . . . 415464
Property Address . . . . . 15 GREAT PASTURE RD
Tax Assessor's Lot Number . . L16005-
Tenant nbr, name . . . . . VERIZON
Application type description COMMERCIAL ALTERATION
Property Use . . . . . INDUSTRIAL
Property Zoning . . . . . IND, LIGHT INDUST 40000
Application valuation 175000

Owner	Contractor
EPPOLITI INDUSTRIAL REALTY INC	BELL ATLANTIC D/B/A VERIZON
37 DANBURY RD STE 203	WIRELESS/BRIAN RAGOZZINE
RIDGEFIELD CT 06877	99 EAST RIVER DRIVE 9TH FLOOR
	EAST HARTFORD CT 06108
	(860) 999-3481

--- Structure Information 000 000 TOWER/ANTENNAS/GENERATOR,PROPANE TANKS ---
Construction Type . . . . . TYPE 1B PROTECTED NONCOMB
Occupancy Type . . . . . UTILITY

Permit . . . . . COMM ELECTRIC PERMIT
Additional desc . . SUPPLY POWER TO CELL SITE
Permit pin number . 1111285
Permit Fee . . . . 303.00 Plan Check Fee . . .00
Issue Date . . . . 3/27/17 Valuation 24000
Expiration Date . . 3/27/18

Special Notes and Comments
PER DOUG WITH MCPHEE ELECTRIC/THE
CONSTRUCTION VALUE IS SEPARATE THAN
ORIGINAL VALUE ON BUILDING PERMIT/THEY
WILL PULL STAND ALONE ELECTRICAL. CHRIS

Other Fees . . . . . CO FEE 56.00
STATE EDUCATION FEE PER K 51.74

Fee summary	Charged	Paid	Credited	Due
Permit Fee Total	303.00	303.00	.00	.00
Plan Check Total	.00	.00	.00	.00
Other Fee Total	107.74	107.74	.00	.00
Grand Total	410.74	410.74	.00	.00

Application Number . . . . . 16-00059302 Date 12/12/16
Application pin number . . . 415464
Property Address . . . . . 15 GREAT PASTURE RD
Tax Assessor's Lot Number . . L16005-
Tenant nbr, name . . . . . VERIZON
Application type description COMMERCIAL ALTERATION
Property Use . . . . . INDUSTRIAL
Property Zoning . . . . . IND, LIGHT INDUST 40000
Application valuation 175000

Owner	Contractor
EPPOLITI INDUSTRIAL REALTY INC	BELL ATLANTIC D/B/A VERIZON
37 DANBURY RD STE 203	WIRELESS/BRIAN RAGOZZINE
RIDGEFIELD CT 06877	99 EAST RIVER DRIVE 9TH FLOOR
	EAST HARTFORD CT 06108
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--- Structure Information 000 000 TOWER/ANTENNAS/GENERATOR,PROPANE TANKS ---
Construction Type . . . . . TYPE 1B PROTECTED NONCOMB
Occupancy Type . . . . . UTILITY

Permit . . . . . BUILDING PERMIT COMM./INDUST.
Additional desc . .
Permit pin number . 1088616
Permit Fee . . . . 3150.00 Plan Check Fee . . .00
Issue Date . . . . 12/12/16 Valuation 175000
Expiration Date . . 12/12/17

Other Fees . . . . . CO FEE 28.00
STATE EDUCATION FEE PER K 45.50

Fee summary	Charged	Paid	Credited	Due
Permit Fee Total	3150.00	3150.00	.00	.00
Plan Check Total	.00	.00	.00	.00
Other Fee Total	73.50	73.50	.00	.00
Grand Total	3223.50	3223.50	.00	.00

POST THIS PERMIT CONSPICUOUSLY

DEPARTMENT OF BUILDINGS, DANBURY, CONNECTICUT

Telephone 203-797-4580 Fax 203-796-1585

BUILDING PERMIT

Permit Number 59302 Issued 12 / 12 / 16 Expires 12 / 12 / 17

Location 15 Great Pasture Rd.

Owner Eppoliti Zone

Contractor Bell Atlantic License No.

Electrical Contractor License No.

Plumbing Contractor License No.

HVAC Contractor License No.

Contractor License No.

Description 120' Cell Tower & Equipment

12-7-16

Building Inspector

Special Inspection Required

☐ Yes ☒ No

In accordance with application, plans and specifications on file and subject to ordinances and building codes of the state of Connecticut and City of Danbury, otherwise this permit is void. Occupancy of this new building or addition prior to issuance of a Certificate of Occupancy will be considered a violation of the Building Code Regulations.

NOTICE: Changes, regardless of size, from stamped approved plans must be submitted to Building Inspector before they are made. Prompt notification by the Plumbing, Electrical and General contractors of completion of their respective portions of the work will avoid delay in issuance of the Certificate of Occupancy. This permit is null and void one year after date of issue, except by extension from the building official.

INSPECTIONS:

Normally there are nine or more required inspections of a new building, and as many as apply on alterations and additions*:

1. Soil Conditions (Footings)
2. Footing Drains & Damp Proofing
3. Electrical Rough X
4. Plumbing Rough
5. HVAC
6. Framing
7. Insulation
8. Gas or Oil Burner
9. Zoning (If Needed)
10. Final X

*Wall ReBar if Applicable

Application Number . . . . . 16-00059302 Date 6/05/17
Application pin number . . . 415464
Property Address . . . . . 15 GREAT PASTURE RD
Tax Assessor's Lot Number . . L16005-
Tenant nbr, name . . . . . VERIZON
Application type description COMMERCIAL ALTERATION
Property Use . . . . . INDUSTRIAL
Property Zoning . . . . . IND, LIGHT INDUST 40000
Application valuation 175000

Owner	Contractor
EPPOLITI INDUSTRIAL REALTY INC	BELL ATLANTIC D/B/A VERIZON
37 DANBURY RD STE 203	WIRELESS/BRIAN RAGOZZINE
RIDGEFIELD CT 06877	99 EAST RIVER DRIVE 9TH FLOOR
	EAST HARTFORD CT 06108
	(860) 999-3481

--- Structure Information 000 000 TOWER/ANTENNAS/GENERATOR,PROPANE TANKS ---
Construction Type . . . . . TYPE 1B PROTECTED NONCOMB
Occupancy Type . . . . . UTILITY

Permit . . . . . HVAC PERMIT
Additional desc . . 1000 AG >GENERATOR
Permit pin number . 1125863
Sub Contractor . . BOOTH, CHARLES A. (G1)
Permit Fee . . . . 72.00 Plan Check Fee . . .00
Issue Date . . . . 6/05/17 Valuation 3000
Expiration Date . . 6/05/18

Special Notes and Comments
PER DOUG WITH MCPHEE ELECTRIC/THE
CONSTRUCTION VALUE IS SEPARATE THAN
ORIGINAL VALUE ON BUILDING PERMIT/THEY
WILL PULL STAND ALONE ELECTRICAL. CHRIS
crs# 2893257. McPhee Electric.

Other Fees . . . . . CO FEE 84.00
STATE EDUCATION FEE PER K 52.52

Fee summary	Charged	Paid	Credited	Due
Permit Fee Total	72.00	72.00	.00	.00
Plan Check Total	.00	.00	.00	.00
Other Fee Total	136.52	136.52	.00	.00
Grand Total	208.52	208.52	.00	.00

DOCKET NO. 462 – Cellco Partnership d/b/a Verizon Wireless application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a telecommunications facility located at Danbury Tax Assessor's Map L16, Lot 5, 15 Great Pasture Road, Danbury, Connecticut.	}	Connecticut
	}	Siting
	}	Council

December 10, 2015

Decision and Order

Pursuant to Connecticut General Statutes §16-50p and the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, maintenance, and operation of a telecommunications facility, including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate, either alone or cumulatively with other effects, when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application, and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to Cellco Partnership d/b/a Verizon Wireless (Cellco), hereinafter referred to as the Certificate Holder, for a telecommunications facility at the proposed site, located at 15 Great Pasture Road, Danbury, Connecticut.

Unless otherwise approved by the Council, the facility shall be constructed, operated, and maintained substantially as specified in the Council's record in this matter, and subject to the following conditions:

1. The tower shall be constructed as a monopole at a height of 120-feet above ground level to provide the proposed wireless services, sufficient to accommodate the antennas of Cellco and other entities, both public and private. The height of the tower may be extended after the date of this Decision and Order pursuant to regulations of the Federal Communications Commission.

2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be served on the City of Danbury and Town of Bethel for comment, and all parties and intervenors as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction and shall include:
    a) final site plan(s) for development of the facility to include specifications for the tower, tower foundation, antennas, equipment compound including, but not limited to, fence design with anti-climbing measures, radio equipment, access road, utility line, utility trench depth relative to Department of Energy and Environmental Protection No Dig Restriction depth, emergency backup generator, and generator fuel tank with associated run time that employ the governing standard in the State of Connecticut for tower design in accordance with the currently adopted International Building Code;
    b) construction plans for site clearing, grading, landscaping, water drainage, and erosion and sedimentation controls consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended;
    c) Protection plans for eastern box turtle, wood turtle and bog turtle including plans for the bog turtle's terrestrial activity; and
    d) Wetland protection plans.

3. Prior to the commencement of operation, the Certificate Holder shall provide the Council worst-case modeling of the electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of the electromagnetic radio frequency power density be submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

4. Upon the establishment of any new federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.

5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.

6. Unless otherwise approved by the Council, if the facility authorized herein is not fully constructed with at least one fully operational wireless telecommunications carrier providing wireless service within eighteen months from the date of the mailing of the Council's Findings of Fact, Opinion, and Decision and Order (collectively called "Final Decision"), this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made. The time between the filing and resolution of any appeals of the Council's Final Decision shall not be counted in calculating this deadline. Authority to monitor and modify this schedule, as necessary, is delegated to the Executive Director. The Certificate Holder shall provide written notice to the Executive Director of any schedule changes as soon as is practicable.

7. Any request for extension of the time period referred to in Condition 6 shall be filed with the Council not later than 60 days prior to the expiration date of this Certificate and shall be served on all parties and intervenors, as listed in the service list, the City of Danbury and the Town of Bethel.

8. If the facility ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council within 90 days from the one year period of cessation of service. The Certificate Holder may submit a written request to the Council for an extension of the 90 day period not later than 60 days prior to the expiration of the 90 day period.

9. Any nonfunctioning antenna, and associated antenna mounting equipment, on this facility shall be removed within 60 days of the date the antenna ceased to function.

10. In accordance with Section 16-50j-77 of the Regulations of Connecticut State Agencies, the Certificate Holder shall provide the Council with written notice two weeks prior to the commencement of site construction activities. In addition, the Certificate Holder shall provide the Council with written notice of the completion of site construction, and the commencement of site operation.

11. The Certificate Holder shall remit timely payments associated with annual assessments and invoices submitted by the Council for expenses attributable to the facility under Conn. Gen. Stat. §16-50v.

12. This Certificate may be transferred in accordance with Conn. Gen. Stat. §16-50k(b), provided both the Certificate Holder/transferor and the transferee are current with payments to the Council for their respective annual assessments and invoices under Conn. Gen. Stat. §16-50v. In addition, both the Certificate Holder/transferor and the transferee shall provide the Council a written agreement as to the entity responsible for any quarterly assessment charges under Conn. Gen. Stat. §16-50v(b)(2) that may be associated with this facility.

13. The Certificate Holder shall maintain the facility and associated equipment, including but not limited to, the tower, tower foundation, antennas, equipment compound, radio equipment, access road, utility line and landscaping in a reasonable physical and operational condition that is consistent with this Decision and Order and a Development and Management Plan to be approved by the Council.

14. If the Certificate Holder is a wholly-owned subsidiary of a corporation or other entity and is sold/transferred to another corporation or other entity, the Council shall be notified of such sale and/or transfer and of any change in contact information for the individual or representative responsible for management and operations of the Certificate Holder within 30 days of the sale and/or transfer.

15. This Certificate may be surrendered by the Certificate Holder upon written notification and approval by the Council.

We hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed in the Service List, dated July 9, 2015, and notice of issuance published in the Danbury News Times.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of Connecticut State Agencies.

EXHIBIT 8

Photographic Simulation Package

Proposed Upgrade to Existing Wireless Telecommunications Facility:

CT2873 Bethel
15 Great Pasture Road
Danbury, CT 06810

- Proposed 20ft extension to existing 119ft tower

Package prepared by:

Virtual Site Simulations, LLC
24 Salt Pond Road
Suite C3
South Kingstown, Rhode Island 02879

www.VirtualSiteSimulations.com
www.ThinkVSSFirst.com

VSS
Your Visual Data Partner

CENTERLINE COMMUNICATIONS

at&t

Photolog

Wireless Telecommunications Facility:

CT2873 Bethel

15 Great Pasture Road

Danbury, CT 06810

Legend:

Facility Location

2640 Ft Radius

X Photo location - Year Round Visibility

X Photo location- Obscured Visibility

X Photo location - NOT visible

Photo Simulations are for demonstration purposes only. It should not be used in any other fashion or with any other intent. The accuracy of the resulting data is not guaranteed and is not for redistribution

VSS
Your Visual Data Partner

CENTERLINE COMMUNICATIONS

at&t

Existing

Photo #	Approximate Location	Gps Coordinates		Distance to site	Orientation	Bearing to site	Visibility
1	Great Pasture Rd	41.38483	-73.42102	0.14 Miles	North-East	205	Year Round

Site: CT2873 Bethel

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VSS

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at&t

Simulation

Photo #	Approximate Location	Gps Coordinates		Distance to site	Orientation	Bearing to site	Visibility
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Site: CT2873 Bethel

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VSS

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Existing

Photo #	Approximate Location	Gps Coordinates		Distance to site	Orientation	Bearing to site	Visibility
2	South St	41.38297	-73.42508	0.15 Miles	West	89	Year Round

Site: CT2873 Bethel

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VSS

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Existing

Photo #	Approximate Location	Gps Coordinates		Distance to site	Orientation	Bearing to site	Visibility
3	Great Pasture Rd	41.38585	-73.42505	0.25 Miles	North-West	143	Year Round

Site: CT2873 Bethel

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Simulation

Photo #	Approximate Location	Gps Coordinates		Distance to site	Orientation	Bearing to site	Visibility
3	Great Pasture Rd	41.38585	-73.42505	0.25 Miles	North-West	143	Year Round

Site: CT2873 Bethel

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Existing

Photo #	Approximate Location	Gps Coordinates		Distance to site	Orientation	Bearing to site	Visibility
4	Paul St	41.37817	-73.42328	0.34 Miles	South	10	Year Round

Site: CT2873 Bethel

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Simulation

Photo #	Approximate Location	Gps Coordinates		Distance to site	Orientation	Bearing to site	Visibility
4	Paul St	41.37817	-73.42328	0.34 Miles	South	10	Year Round

Site: CT2873 Bethel

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Tower Visibility

Tower Height:	120 ft	
Lat, Lon:	41.383003	-73.422169
Ring Range:	1 mi	
Color Bands:	4 equal + base	

Color	Location	% Vis	Acres
	Top 25%	0.56%	11.2
	Top 50%	0.78%	15.7
	Top 75%	0.38%	7.7
	Top 100%	0.08%	1.7
	Base	0.09%	1.9
	TOTAL	1.90%	38.2 Acres

Created by: VSS, LLC using VSS- IVS Interactive Viewshed Analysis Tool

Important Note:

Visibility percentages and acreages based on range perameter.

Tower Visibility

Tower Height:	140 ft	
Lat, Lon:	41.383003	-73.422169
Ring Range:	1 mi	
Color Bands:	4 equal + base	

Color	Location	% Vis	Acres
	Top 25%	0.61%	12.2
	Top 50%	0.56%	11.3
	Top 75%	0.66%	13.2
	Top 100%	0.47%	9.4
	Base	0.01%	0.3
	TOTAL	2.30%	46.3 Acres

Created by: VSS, LLC using VSS- IVS Interactive Viewshed Analysis Tool

Important Note:

Visibility percentages and acreages based on range perameter.

EXHIBIT 9

UPS CampusShip: View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   Customers with a Daily Pickup
   Your driver will pickup your shipment(s) as usual.

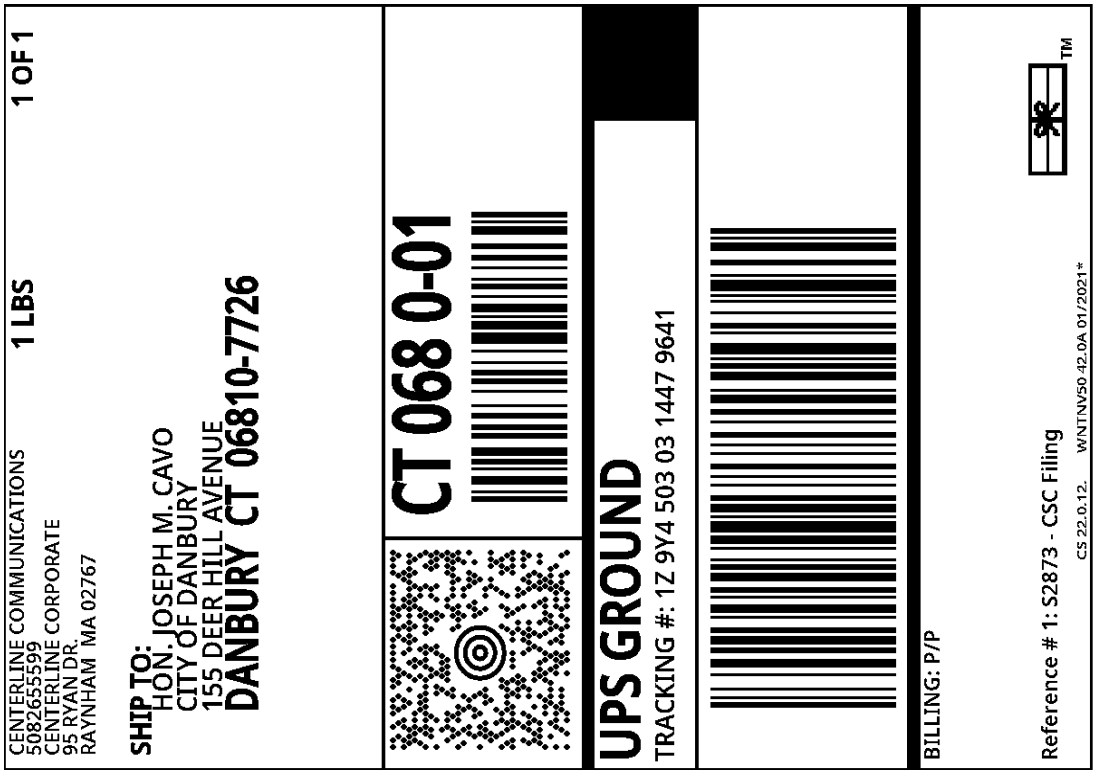
   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.
   Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
   Hand the package to any UPS driver in your area.

UPS Access Point™
CVS STORE # 972
555 WASHINGTON ST
SOUTH EASTON ,MA 02375

UPS Access Point™
CVS STORE # 7232
689 DEPOT ST
NORTH EASTON ,MA 02356

UPS Access Point™
TOWN LINE GENERAL STORE
450 E CENTER ST
WEST BRIDGEWATER ,MA 02379

FOLD HERE



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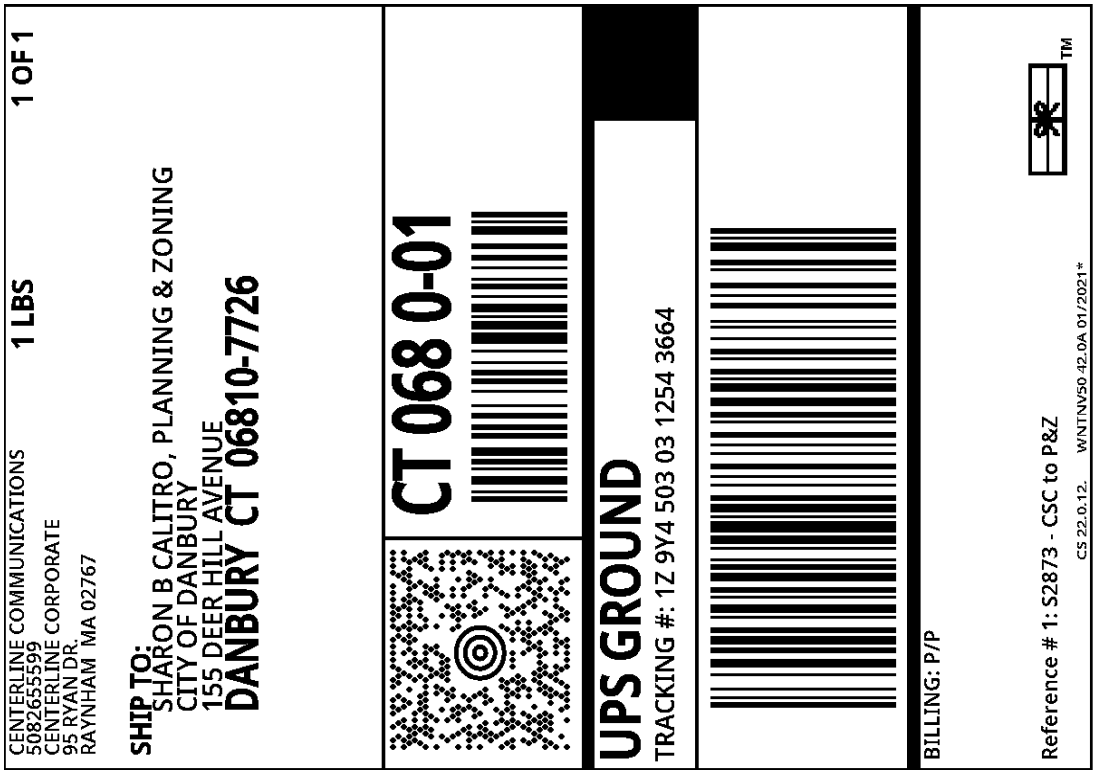

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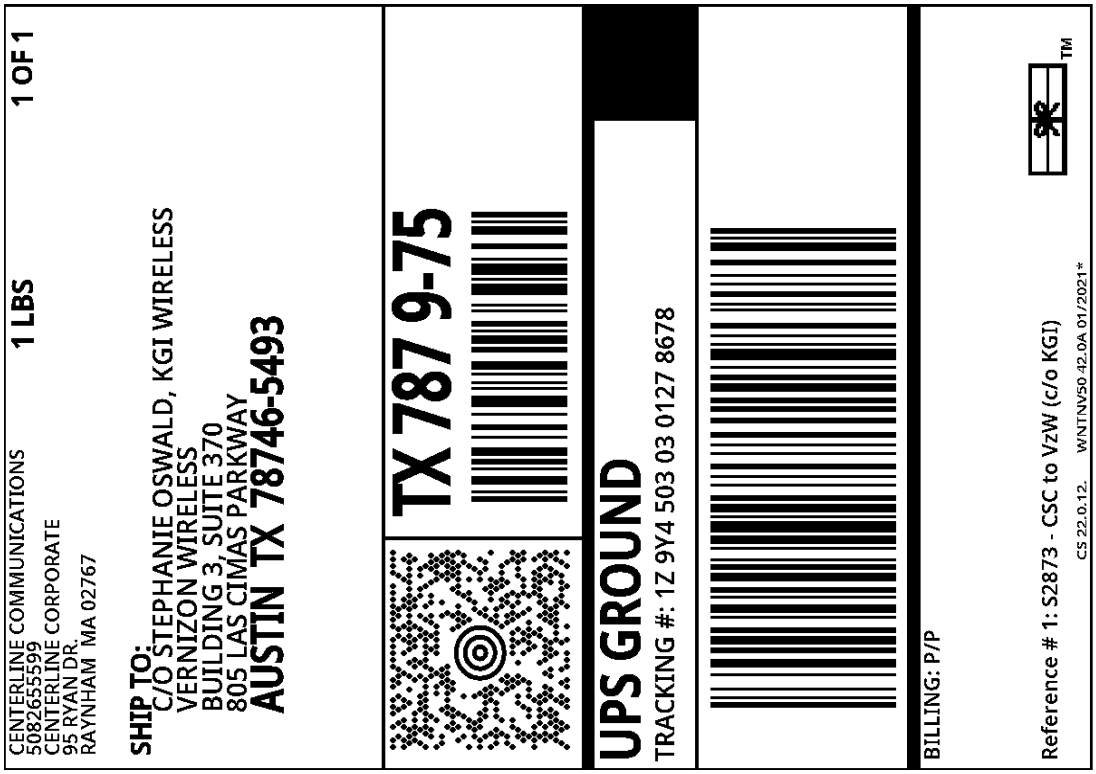

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