CUDDY
+FEDER
LLP

445 Hamilton Avenue, 14th Floor
White Plains, New York 10601
T 914 761 1300
F 914 761 5372
cuddyfeder.com

Daniel M. Laub
dlaub@cuddyfeder.com

August 24, 2018

VIA EMAIL & OVERNIGHT DELIVERY
Melanie Bachman, Esq.
Acting Executive Director and Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Petition 1103
New Cingular Wireless PCS, LLC (AT&T)
Modification of Approval Granted for Petition
Premises: 227 Whitewood Road Waterbury, Connecticut

Dear Executive Director Bachman:

On behalf of our client, New Cingular Wireless PCS, LLC ("AT&T") this letter is submitted in furtherance of the captioned approved Petition. AT&T is moving ahead with construction of this facility with minor modifications from the original submission. As approved, the facility included twelve (12) antennas at a centerline height of 105', twelve (12) tower mounted amplifiers with an 11.5' x 16' equipment shelter, a 50kw propane generator, and 1000-gallon propane tank in the compound. AT&T instead plans to install nine (9) antennas with eighteen (18) tower mounted amplifiers with a 11.5' x 12' shelter at grade. Backup power will now consist of a 30kw propane generator as the power demands of the site are reduced. The mounting of the antennas and TMAs will utilize two (2) horizontal supports instead of just one as in the original proposal.

Please find included with this letter drawings prepared by Centek Engineering last revised July 30, 2018, a structural report also prepared by Centek Engineering last revised April 11, 2018 as well as letters evidencing Eversource's approval of this design.

Given the minimal change from the original Petition we respectfully request administrative approval of these minor modifications. Of course, should you or staff have any questions please do not hesitate to contact me.

Thank you in advance for your consideration of this request.

Very truly yours,

Daniel M. Laub

cc: Mayor Neil O'Leary, City of Waterbury; AT&T, Eversource, SAI Communications

EVERSOURCE
ENERGY

107 Selden Street
Berlin, CT 06037
(860) 665-2008
Christopher.Gelinas@Eversource.com

August 20, 2018

Mr. Dan Bilezikian
SAI Communications
125 Tremond Street
Rehoboth, MA 02769

RE: No Amendment required
AT&T Site ID: CT-2901
228 Whitewood Road
Waterbury, CT

Dear Dan:

In furtherance of the attached letter dated July 31, 2018 from Joel Szarkowicz, Eversource Transmission Line Engineer whereby you are asked to contact me for an amendment to your existing lease at the above location.

I have reviewed the file. There is no Amendment required for this installation.

AT&T is approved to move forward with their filing with the CT Siting Council.

Please feel free to call with any questions.

Best regards,

Christopher Gelinas
Senior Specialist – Real Estate

EVERSOURCE
ENERGY

56 Prospect Street,
Hartford, CT 06103

P.O. Box 270
Hartford, CT 06141-0270
(860) 665-5000

July 31, 2018

Mr. Dan Bilezikian
SAI Communications
125 Tremond St.
Rehoboth, MA 02769

RE: AT&T Antenna Site, CT-2901, 229 Whitewood Road, Waterbury CT.

Dear Mr. Bilezikian:

Based on our reviews of the site drawings, the structural and foundation analysis provided by Centek Engineering and, along with a third party review performed by Leidos, we have reviewed for acceptance this new site.

Since there are no outstanding structural or site related tasks to resolve at this time, please contact Chris Gelinas at 860-665-2008 to complete the lease amendment.

Sincerely,

Joel Szarkowicz

Joel Szarkowicz
Transmission Line Engineering

ref: 17010.09 CT2901 Waterbury North CD – Rev 16_18.07.30 (SS).pdf
17010.09 - CT2901 Structural Analysis Rev5 18.04.11.pdf

WIRELESS COMMUNICATIONS FACILITY

CTSR2901
WATERBURY NORTH
EVERSOURCE UTILITY STRUCTURE NO. 11229
227 WHITEWOOD ROAD
WATERBURY, CT 06708

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE, INCLUDING THE TIA-222 REVISION "G" STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES, 2016 CONNECTICUT FIRE SAFETY CODE AND, 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

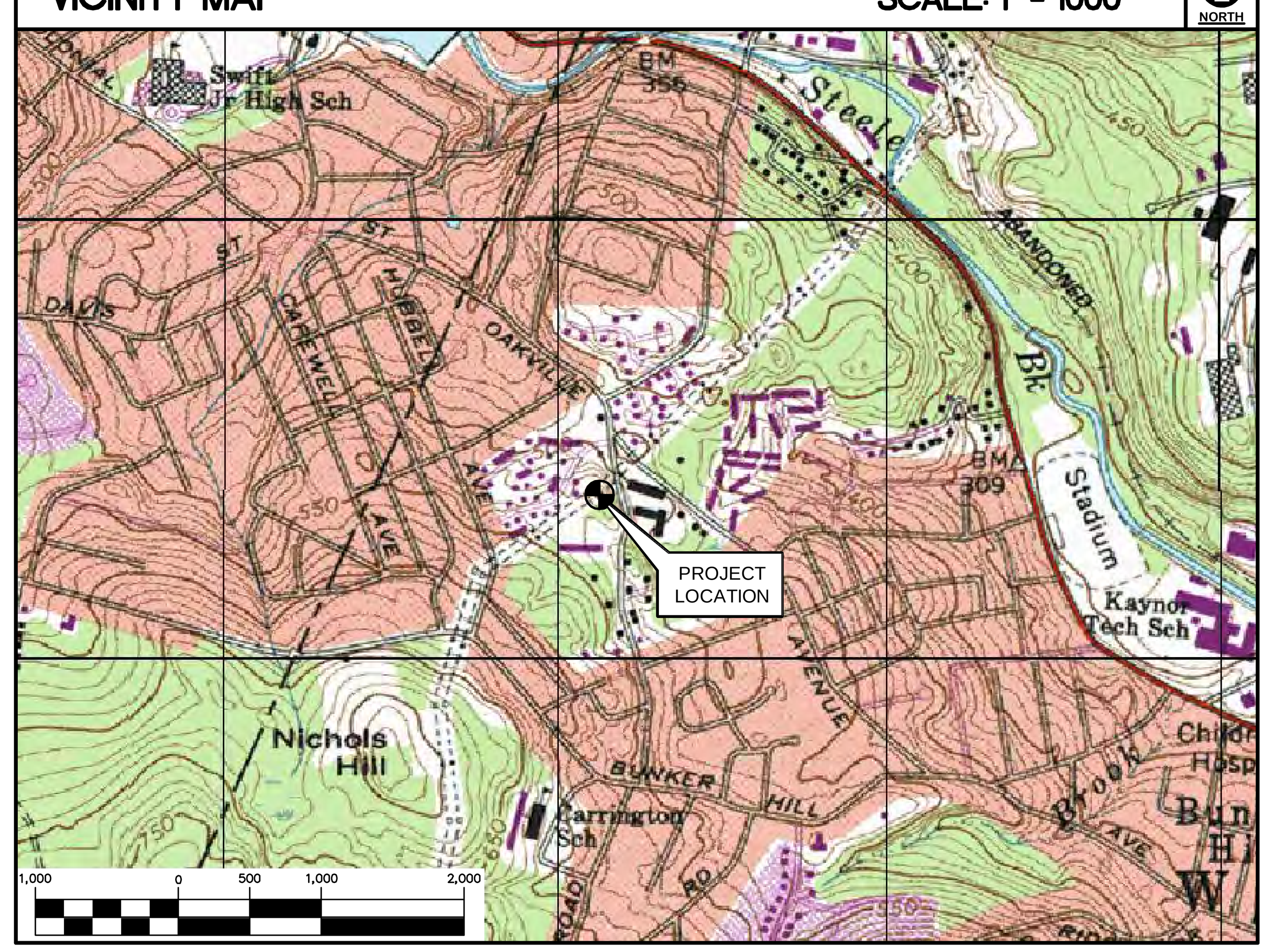
TO: 227 WHITEWOOD ROAD
WATERBURY, CT 06708

1. HEAD NORTHEAST ON ENTERPRISE DRIVE TOWARD CAPITAL BLVD	0.3 MI
2. TURN LEFT ONTO CAPITOL BLVD	0.3 MI
3. TURN LEFT ONTO WEST ST	0.3 MI
4. TURN LEFT TO MERGE ONTO I-91 S TOWARD NEW HAVEN	0.3 MI
5. MERGE ONTO I-91 S	8.8 MI
6. TAKE EXIT 18 TO MERGE ONTO I-691 W TOWARD MERIDEN/WATERBURY	7.9 MI
7. TAKE EXIT 1 ON THE LEFT FOR I-84 W TOWARD WATERBURY/DANBURY	1.0 MI
8. MERGE ONTO I-84	7.7 MI
9. TAKE EXIT 20 TO MERGE ONTO CT-8 N TOWARD TORRINGTON	1.1 MI
10. TAKE EXIT 35 ON THE LEFT FOR CT-73 TOWARD OAKVILLE/WATERTOWN	0.4 MI
11. MERGE ONTO RUDY AVE	0.2 MI
12. CONTINUE ONTO WATERTOWN AVE	0.2 MI
13. TURN LEFT ONTO IRVINGTON AVE	0.3 MI
14. CONTINUE ONTO BUNKER HILL AVE	456 FT
15. TURN RIGHT ONTO OAKVILLE AVE	0.6 MI
16. TAKE THE 3RD LEFT ONTO WHITEWOOD RD	72 FT
17. TAKE THE 1ST LEFT TO STAY ON WHITEWOOD AND THE DESTINATION WILL BE ON THE RIGHT	194 FT

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK GENERALLY INCLUDES THE INSTALLATION OF A 11'-5"X 12'-0" PREFABRICATED WIRELESS EQUIPMENT SHELTER AND DIESEL FUELED BACKUP POWER GENERATOR ON A CONCRETE FOUNDATION WITHIN THE WIRELESS COMMUNICATIONS LEASE AREA.
2. A TOTAL OF TWELVE (9) DIRECTIONAL PANEL ANTENNAS ARE TO BE MOUNTED ON A PIPE MAST ATTACHED TO THE EXISTING ±80' TALL EVERSOURCE STRUCTURE #11229 AT A CENTERLINE ELEVATION OF 105' ABOVE THE EXISTING TOWER BASE PLATE.
3. INSTALL EIGHTEEN (18) TMA'S BEHIND PROPOSED DIRECTIONAL PANEL ANTENNAS, (6) PER SECTOR.
4. A TOTAL OF TWELVE (12) REMOTE RADIO UNITS ARE TO BE INSTALLED WITHIN PROPOSED EQUIPMENT SHELTER AT GRADE.
5. A TOTAL OF TWENTY-FOUR (24) DIPLEXERS ARE TO BE INSTALLED WITHIN PROPOSED EQUIPMENT SHELTER AT GRADE.
6. INSTALL THIRTY (30) SURGE ARRESTORS, (10) PER SECTOR, CONNECTED TO PROPOSED TO PROPOSED REMOTE RADIO UNITS WITHIN PROPOSED EQUIPMENT SHELTER AT GRADE.
7. UTILITIES WILL BE ROUTED UNDERGROUND FROM WHITEWOOD ROAD. ALL UTILITY WORK AND ROUTING TO BE COORDINATED AND APPROVED BY THE LOCAL UTILITY COMPANIES AND LAND OWNER.

PROJECT INFORMATION

AT&T SITE NUMBER:	CTSR2901
AT&T SITE NAME:	WATERBURY NORTH
SITE ADDRESS:	EVERSOURCE STRUCTURE NO. 11229 227 WHITEWOOD ROAD WATERBURY, CT 06708
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT. 06405
PROJECT COORDINATES:	LATITUDE: 41°-34'-41.35"N LONGITUDE: 73°-04'-54.30"W GROUND ELEVATION: ±544'AMSL

SHEET INDEX

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
16	07/30/18	CAG	TJL	CONSTRUCTION DRAWINGS – REVISED GENERATOR
15	04/02/18	KAWJR	CAG	CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS
14	03/21/18	CAG	TJL	CONSTRUCTION DRAWINGS – REVISED U/G CONDUIT DETAILS
13	01/31/18	CAG	TJL	CONSTRUCTION DRAWINGS – U/G VAULT DETAILS
12	12/12/17	FJP	CAG	CONSTRUCTION – SHEET INDEX UPDATE
11	11/08/17	LGL	CAG	CONSTRUCTION – SHEET INDEX UPDATE
10	09/14/17	DMD	TJL	GENERATOR FUEL UPDATE
9	09/08/17	CAG	TJL	REVISED RFDS AND GENERATOR MODEL

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AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
WATERBURY NORTH
SITE NUMBER: CTSR2901
227 WHITEWOOD ROAD
WATERBURY, CT 06708

DATE:	10/08/13
SCALE:	AS NOTED
JOB NO.	13130.000

TITLE SHEET

T-1

NOTES AND SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2012 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2016 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS): 95–115 MPH (3 SECOND GUST)
- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 97 MPH (Vasd) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7–10) PER 2012 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7–10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

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 THE PRE MANUFACTURED EQUIPMENT BUILDING SHOP DRAWINGS.
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. THE CONTRACTOR SHALL LIMIT THE DURATION OF ANY FOUNDATION MODIFICATION WORK. THE EXISTING FOUNDATION WITHIN THE SHOWN LIMITS IS STABLE FOR WIND SPEEDS LESS THAN 50MPH WITHOUT ICE LOADING. IF HIGHER WIND SPEED OR ICE EVENT IS EXPECTED, THE EXCAVATION AREA SHALL BE FILLED WITH COMPACT FILL MATERIAL.
12. 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.
13. 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.
14. NO DRILLING WELDING OR TAPING ON CL&P OWNED EQUIPMENT.
15. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

SITE NOTES

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ACTIVE EXISTING UTILITIES, WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, PRIOR TO PROCEEDING, SHOULD ANY UNCOVERED EXISTING UTILITY PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. ALL RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED OFF SITE AND BE LEGALLY DISPOSED, AT NO ADDITIONAL COST.
4. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE EQUIPMENT AND TOWER AREAS.
5. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
6. THE SUBGRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
7. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
8. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
9. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.
10. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST THE PRE MANUFACTURED EQUIPMENT BUILDING SHOP DRAWINGS.
11. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.

EARTHWORK NOTES

1. COMPACTED GRAVEL FILL SHALL BE FURNISHED AND PLACED AS A FOUNDATION FOR STRUCTURES, WHERE SHOWN ON THE CONTRACT DRAWINGS OR DIRECTED BY THE ENGINEER.
2. CRUSHED STONE FILL SHALL BE PLACED IN 12" MAX. LIFTS AND CONSOLIDATED USING A HAND OPERATED VIBRATORY PLATE COMPACTOR WITH A MINIMUM OF 2 PAQSSES OF COMPACTOR PER LIFT.
3. COMPACTED GRAVEL FILL TO BE WELL GRADED BANK RUN GRAVEL MEETING THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE DESIGNATION	% PASSING
1 ½"	100
No. 4	40–70
No. 100	5–20
No. 200	4–8

4. CRUSHED STONE TO BE UNIFORMLY GRADED, CLEAN, HARD PROCESS AGGREGATE MEETING THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE DESIGNATION	% PASSING
1"	100
¾"	90–100
½"	0–15
⅜"	0–5

5. SELECT BACKFILL FOR FOUNDATION WALLS SHALL BE FREE OF ORGANIC MATERIAL, TOPSOIL, DEBRIS AND BOULDERS LARGER THAN 6".
6. GRAVEL AND GRANULAR FILL SHALL BE INSTALLED IN 10" MAX. LIFTS. COMPACTED TO 95% MIN. AT MAX. DRY DENSITY.
7. NON WOVEN GEOTEXTILE FOR SEPARATION PURPOSES SHALL BE MIRAFI 140N, OR ENGINEER APPROVED EQUAL.

FOUNDATION CONSTRUCTION NOTES

1. ALL FOOTINGS SHALL BE PLACED ON SUITABLE, COMPACTED SOIL HAVING ADEQUATE BEARING CAPACITY AND FREE OF ORGANIC CONTENT, CLAY, OR OTHER UNSUITABLE MATERIAL. ADDITIONAL EXCAVATION MAY BE REQUIRED BELOW FOOTING ELEVATIONS INDICATED IF UNSUITABLE MATERIAL IS ENCOUNTERED.
2. SUBGRADE PREPARATION: IF UNSUITABLE SOIL IS ENCOUNTERED, REMOVE ALL UNSUITABLE MATERIALS FROM BELOW PROPOSED STRUCTURE FOUNDATIONS AND COMPACT EXPOSED SOIL SURFACES. PLACE AND COMPACT APPROVED GRAVEL FILL. PLACEMENT OF ALL COMPACTED FILL MUST BE UNDER SUPERVISION OF AN APPROVED TESTING LABORATORY. FILL SHALL BE COMPACTED IN LAYERS NOT TO EXCEED 10" BEFORE COMPACTION. DETERMINE MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D1557–70 AND MAKE ONE (1) FIELD DENSITY TEST IN ACCORDANCE WITH ASTM D2167–66 FOR EACH 50 CUBIC YARDS OF COMPACTED FILL. BUT NOT LESS THAN ONE (1) PER LAYER, TO INSURE COMPACTION TO 95% OF MAX. DRY DENSITY.
3. ALL SOIL SURROUNDING AND UNDER ALL FOOTINGS SHALL BE KEPT REASONABLY DRY AND PROTECTED FROM FREEZING AND FROST ACTION DURING THE COURSE OF CONSTRUCTION.
4. WHERE GROUNDWATER IS ENCOUNTERED, DEWATERING SHALL BE ACCOMPLISHED CONTINUOUSLY AND COMPLETELY DURING FOUNDATION CONSTRUCTION. PROVIDE CRUSHED STONE AS REQUIRED TO STABILIZE FOOTING SUBGRADE.
5. ALL FOOTINGS ARE TO REST ON FIRM SOIL, REGARDLESS OF ELEVATIONS SHOWN ON THE DRAWINGS, BUT IN NO CASE MAY FOOTING ELEVATIONS BE HIGHER THAN INDICATED ON THE FOUNDATION PLAN, UNLESS SPECIFICALLY DIRECTED BY THE ENGINEER.
6. FOUNDATION WATERPROOFING AND DAMPPROOFING SHALL COMPLY WITH BUILDING CODE REQUIREMENTS UNLESS A MORE SUBSTANTIAL SYSTEM IS INDICATED OR SPECIFIED.

CONCRETE CONSTRUCTION NOTES

1. CONCRETE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING STANDARDS:

   ACI 211 – STANDARD PRACTICE FOR SELECTING PROPORTIONS FOR NORMAL AND HEAVYWEIGHT CONCRETE.

   ACI 301 – SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS.

   ACI 302 – GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION

   ACI 304 – RECOMMENDED PRACTICE FOR MEASURING, MIXING, TRANSPORTING, AND PLACING CONCRETE.

   ACI 306.1 STANDARD SPECIFICATION FOR COLD WEATHER CONCRETING

   ACI 318 – BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.

2. CONCRETE SHALL DEVELOP COMPRESSIVE STRENGTH IN 28 DAYS AS FOLLOWS:

SLABS ON GRADE	4,000 PSI
ALL OTHER CONCRETE	3,000 PSI

   – PORTLAND CEMENT: ASTM C150, TYPE II, (540 LBS/CUBIC YARD)
   – AGGREGATE: ASTM C33, No. 67, TYPICAL
   – WATER: POTABLE WITH MAXIMUM WATER CEMENT RATIO OF .55
   – SLUMP: 3" TO 4"
   – ADMIXTURES: USE AIR ENTRAINING AGENT CONFORMING TO ASTM C260 WITH 4 TO 6% TOTAL AIR. USE WATER REDUCING AGENT CONFORMING TO ASTM C494, TYPE A, IN ALL CONCRETE. CALCIUM CHLORIDE MAY NOT BE USED TO ACCELERATE THE CONCRETE SETTING TIME.

3. REINFORCING STEEL SHALL BE 60,000 PSI YIELD STRENGTH.
4. WELDED WIRE FABRIC SHALL CONFORM TO ASTM– A–185.
5. ALL DETAILING, FABRICATION, AND ERECTION OF REINFORCING BARS, UNLESS OTHERWISE NOTED, MUST FOLLOW THE LATEST ACI CODE AND LATEST ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES".
6. CONCRETE COVER OVER REINFORCING SHALL CONFORM TO THE FOLLOWING, UNLESS OTHERWISE SHOWN:

CONCRETE CAST AGAINST & PERMANENTLY EXPOSED TO EARTH	3 INCHES
CONCRETE EXPOSED TO EARTH OR WEATHER:	
#6 THROUGH #18 BARS	2 INCHES
#5 BAR, W31 OR D31 WIRE, AND SMALLER	1–1/2 INCHES
CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH THE GROUND:	
#14 THROUGH #18 BARS	1–1/2 INCHES
#11 BAR AND SMALLER	3/4 INCHES

7. NO STEEL WIRE, METAL FORM TIES, OR ANY OTHER METAL SHALL REMAIN WITHIN THE REQUIRED COVER OF ANY CONCRETE SURFACE.
8. ALL REINFORCEMENT SHALL BE CONTINUOUS UNLESS OTHERWISE NOTED. SPLICES SHALL BE WELL STAGGERED. ADDITIONAL BARS AND SPECIAL BENDING DETAILS ARE REQUIRED AT INTERSECTING WALLS AND AT JOINTS. SUCH DETAILS SHALL COMPLY WITH ACI 315 RECOMMENDATIONS UNLESS OTHERWISE SHOWN.
9. NO TACK WELDING OF REINFORCING WILL BE PERMITTED.
10. NO CALCIUM CHLORIDE OR ADMIXTURES CONTAINING MORE THAN 1% CHLORIDE BY WEIGHT OF ADMIXTURE SHALL BE USED IN THE CONCRETE.
11. UNLESS OTHERWISE NOTED, ALL LAP SPLICES SHALL BE 48 BAR DIAMETERS.
12. SLAB ON GRADE FINISHES:

    EXTERIOR SLAB: NON–SLIP BROOM FINISH
    INTERIOR SLAB: STEEL TROWEL FINISH

13. INSPECTION AND TESTING OF CONCRETE WORK SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY, PAID BY THE OWNER, AND APPROVED BY THE ENGINEER. THE INSPECTOR SHALL OBSERVE CONDITION OF SOILS AND FORMWORK BEFORE FOOTINGS ARE PLACED, SIZE, SPACING AND LOCATION OF REINFORCEMENT, AND PLACEMENT OF CONCRETE.
14. THE TESTING COMPANY SHALL ALSO OBTAIN A MINIMUM OF THREE (3) COMPRESSIVE STRENGTH TEST SPECIMENS FOR EACH CONCRETE MIX DESIGN. ONE SPECIMEN TESTED AT 7 DAYS, ONE AT 28 DAYS, AND ONE HELD IN RESERVE FOR FUTURE TESTING, IF NEEDED.
15. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

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. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.
11. 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.
12. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
13. 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.
14. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
15. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
16. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
17. FABRICATE BEAMS WITH MILL CAMBER UP.
18. 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.
19. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
20. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
21. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
5	06/XX/17	KAWJR	CAG	REVISED PER CLIENT COMMENTS
4	03/24/14	HMR	CFC	REVISED FOR SITE SURVEY
3	02/14/14	HMR	CFC	REVISED FOR PROPANE TANK – CLIENT REVIEW
2	11/19/13	HMR	CFC	REVISED ANTENNA AZIMUTH
1	11/08/13	HMR	CFC	CONSTRUCTION
0	10/25/13	HMR	CFC	CONSTRUCTION – CLIENT REVIEW

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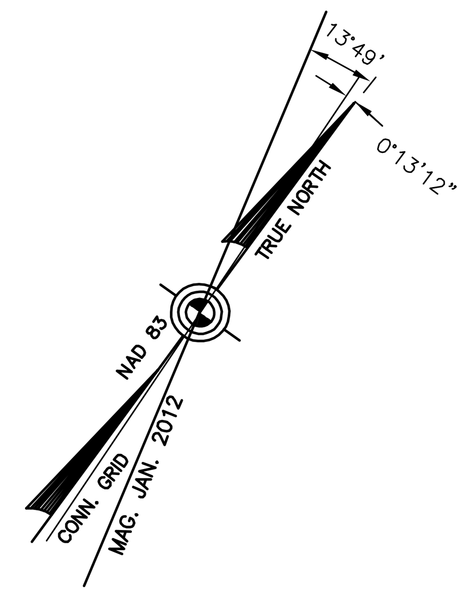
WATERBURY NORTH
SITE NUMBER: CTSR2901
227 WHITEWOOD ROAD
WATERBURY, CT 06708

DATE:	10/08/13
SCALE:	AS NOTED
JOB NO.	13130.000

NOTES AND SPECIFICATIONS

N-1

Sheet No. 2 of 22



CONDO OWNERS:

26 ANGEL DRIVE:

UNIT A
NAGEENA LLC
26 BROOKSIDE DR
MIDDLEBURY, CT 06762

UNIT B
MEDINA-PEREZ ANGIE
26 ANGEL DR #26B
WATERBURY, CT 06708

UNIT C
TEACH KENNETH A
855 MAPLE HILL RD
NAUGATUCK, CT 06770

UNIT D
FAYAD SAWSAN & JANANE EZZEDDINE (TC)
43 PLEASANT ST
DANBURY, CT 06810

UNIT E
LEMKE BRENDA H
26 ANGEL DR #E
WATERBURY, CT 06708

UNIT F
SALAM GAZI A
181 GEDDES TERR
WATERBURY, CT 06708

44 ANGEL DRIVE:

UNIT A
JASAVIC RAFAT
PO BOX 156
WURTSBORO, NY 12790

UNIT B
JASAVIC RAFAT
PO BOX 156
WURTSBORO, NY 12790

UNIT C
JASAVIC RAFAT
PO BOX 156
WURTSBORO, NY 12790

UNIT D
JASAVIC RAFAT
PO BOX 156
WURTSBORO, NY 12790

55 ANGEL DRIVE:

UNIT A
ZAPPALA DEBORAH
22 SPRING HILL RD
MERRIMAC, MA 01650

UNIT B
L & Z MARKET LLC
49 ROWAN ST
DANBURY, CT 06810

UNIT C
KOZAK JASON GREGORY
363 HOMESTEAD AVE
WATERBURY, CT 06705

UNIT D
SUTTON JAMES & JAYNE SURV
8 CIRCLE DRIVE EXT
BANTAM, CT 06750

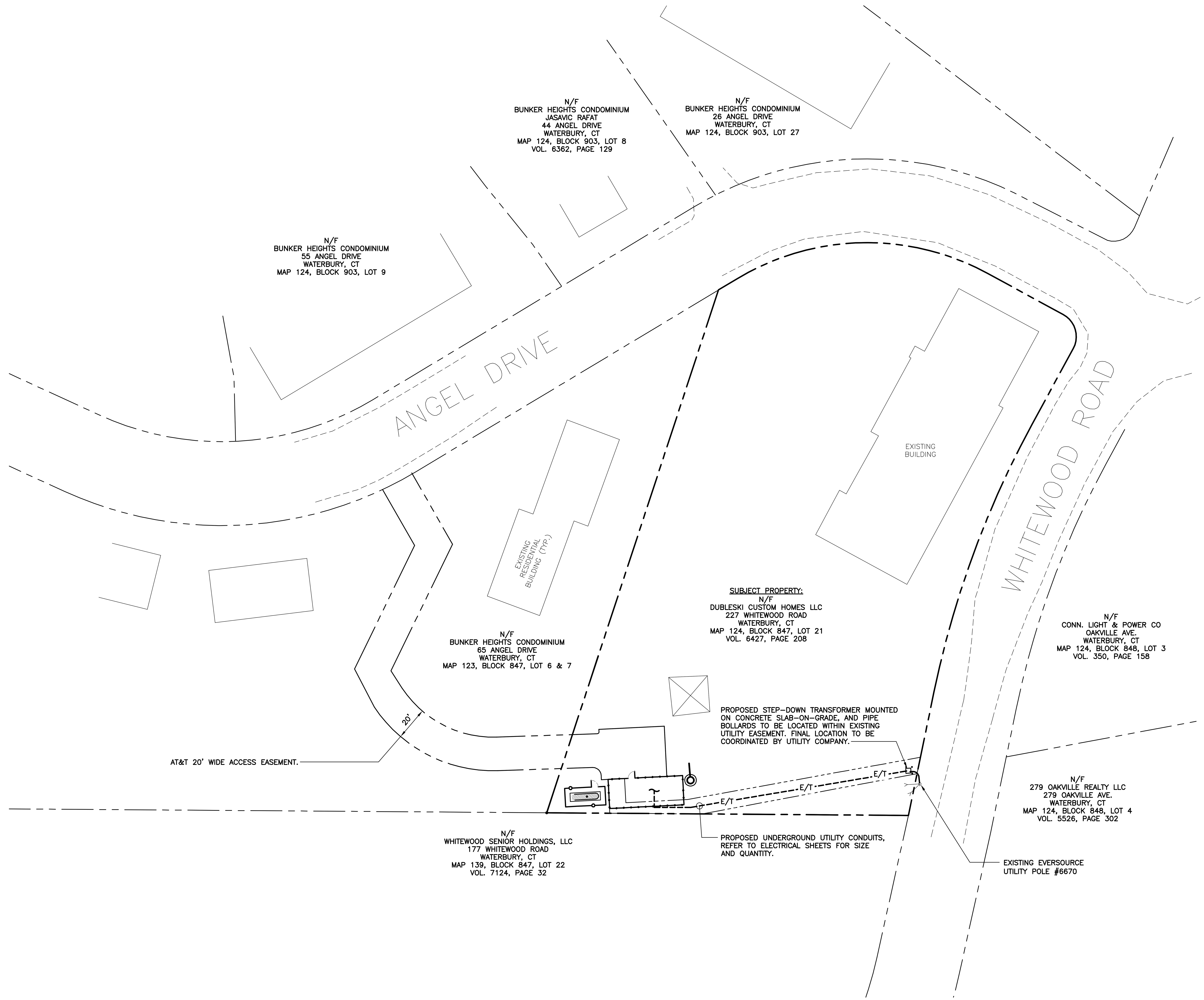
65 ANGEL DRIVE:

UNIT A
FAYAD HASHIM
43 PLEASANT ST
DANBURY, CT 06810

UNIT B
OLIVER SHEDINA & SYLVESTER JENKINS
190-A MAIN SDT
MANCHESTER, CT 06042

UNIT C
HOLYST REAL ESTATE LLC
1 SAW MILL LANE
PLANTSVILLE, CT 06479

UNIT D
FAYAD HASHIM
43 PLEASANT ST
DANBURY, CT 06810



1 / C-1 **ABUTTERS MAP**
SCALE: 1" = 30'

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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
11	11/08/17	LGL	CAG	CONSTRUCTION – UTILITY ROUTE CHANGE
9	09/08/17	CAG	TJL	REVISED RFDS AND GENERATOR MODEL

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WATERBURY, CT 06708

DATE: 10/08/13
SCALE: AS NOTED
JOB NO. 13130.000

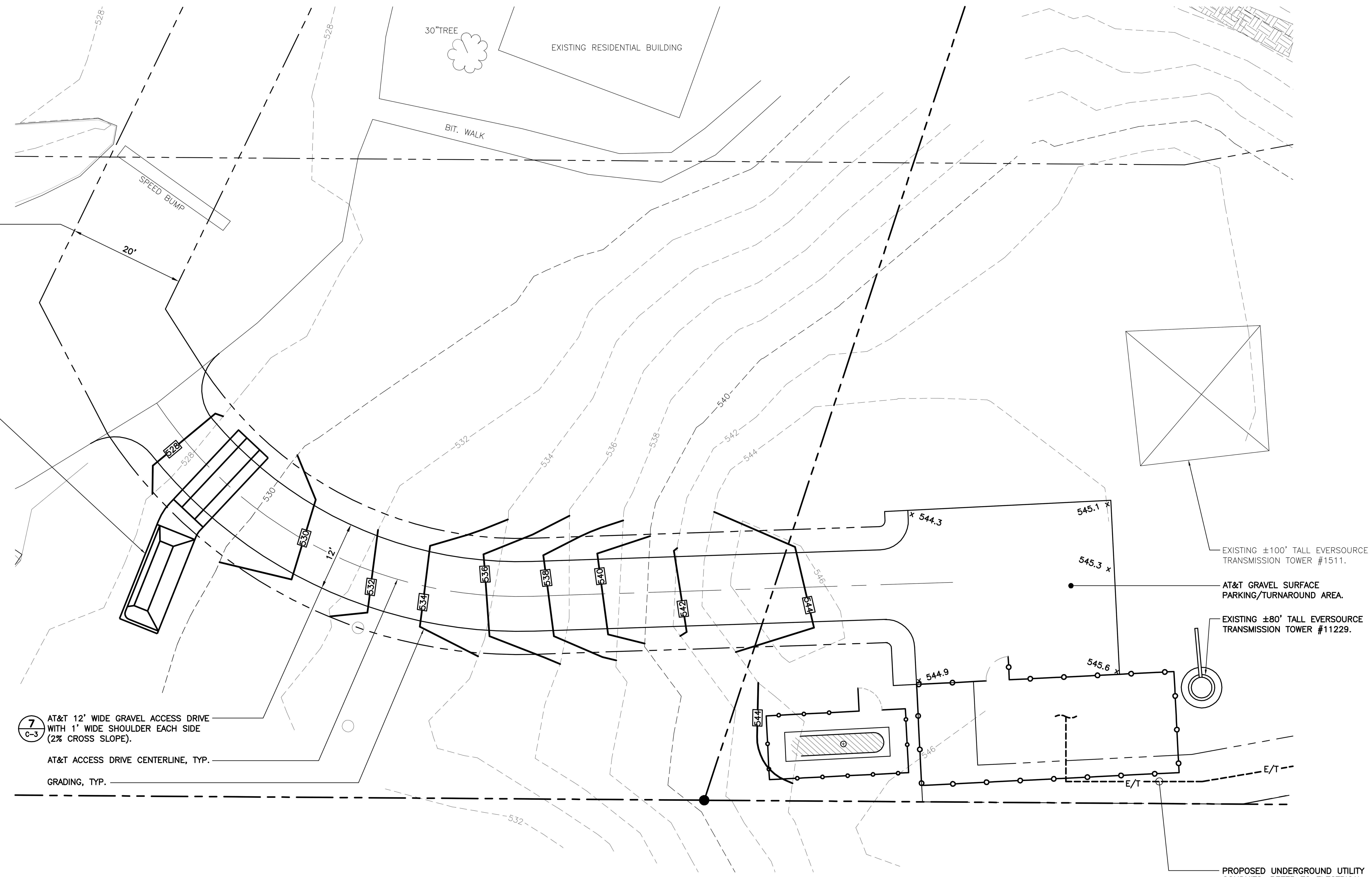
ABUTTERS MAP

C-1

Sheet No. 3 of 22

SYMBOLS LEGEND

	PROPERTY LINE
	EASEMENT LINE
	DRIVE (EXISTING)
650	CONTOUR LINE
650	GRADING LINE
	UTILITY POLE
	EXISTING DECIDUOUS TREE
	FENCE LINE
	PROPOSED SPOT GRADE



SURVEY NOTES

THIS SURVEY AND MAP HAS BEEN PREPARED IN ACCORDANCE WITH SECTIONS 20-300B-1 THRU 20-300B-20 OF THE REGULATIONS OF CONNECTICUT STATE AGENCIES – "MINIMUM STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ENDORSED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPT. 26, 1996. IT IS A TOPOGRAPHIC MAP AND IS BASED UPON A DEPENDENT RESURVEY CONFORMING TO HORIZONTAL ACCURACY CLASS A-2 AND A VERTICAL ACCURACY OF CLASS T-2 AND IS INTENDED TO BE USED TO DEPICT A PROPOSED TELECOMMUNICATION SITE.

VERTICAL DATUM IS BASED ON NGVD 29.

COORDINATES REFER TO NAD 83.

PARCEL OWNER OF RECORD: DUBLESKI CUSTOM HOMES LLC
227 WHITEWOOD ROAD
WATERBURY, CT

PARCEL AREA = 1.58± ACRES.

PARCEL ID: MAP 124, BLOCK 847, LOT 21 WATERBURY ASSESSOR'S OFFICE.

PARCEL IS IN ZONE X ON THE FLOOD INSURANCE RATE MAP, WATERBURY, CONNECTICUT, NEW HAVEN COUNTY, PANEL 104 OF 635, COMMUNITY PANEL NUMBER 09009C0104H , EFFECTIVE DATE DECEMBER 17, 2010

PARCEL IS SUBJECT TO A CL&P RIGHT OF WAY AS DESCRIBED IN VOL. 348 PAGE 188

REFERENCE IS MADE TO THE FOLLOWING MAPS

1) "SUBDIVISION PLAN – WHITE-WOOD SECTION 1, LAND OF DRAZEN STRUCTURES INC. WATERBURY, CONN.", SCALE 1"=40', DATED JULY 29, 1972, PREPARED BY L. T. SCOTT-SMITH CO. CERTIFIED SUBSTANTIALLY CORRECT BY KEITH I SCOTT-SMITH,

NOT ALL IMPROVEMENTS SHOWN.

TO MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON

THIS MAP IS NOT VALID WITHOUT A LIVE SIGNATURE AND SEAL

A. RAFAEL MARTINEZ LLS #18833 DATE

1 C-1A **PARTIAL SITE SURVEY PLAN**
SCALE: 1" = 10'

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
11	11/08/17	LGL	CAG	CONSTRUCTION – UTILITY ROUTE CHANGE
6	09/08/17	CAG	TJL	REVISED RFDS AND GENERATOR MODEL
5	08/14/17	CAG	TJL	CONSTRUCTION DRAWINGS – REVISED PER SAI SA COMMENTS
4	03/24/14	HMR	CFC	REVISED FOR SITE SURVEY
3	02/14/14	HMR	CFC	REVISED FOR PROPANE TANK – CLIENT REVIEW
2	11/19/13	HMR	CFC	REVISED ANTENNA AZIMUTH
1	11/08/13	HMR	CFC	CONSTRUCTION
0	10/25/13	HMR	CFC	CONSTRUCTION – CLIENT REVIEW

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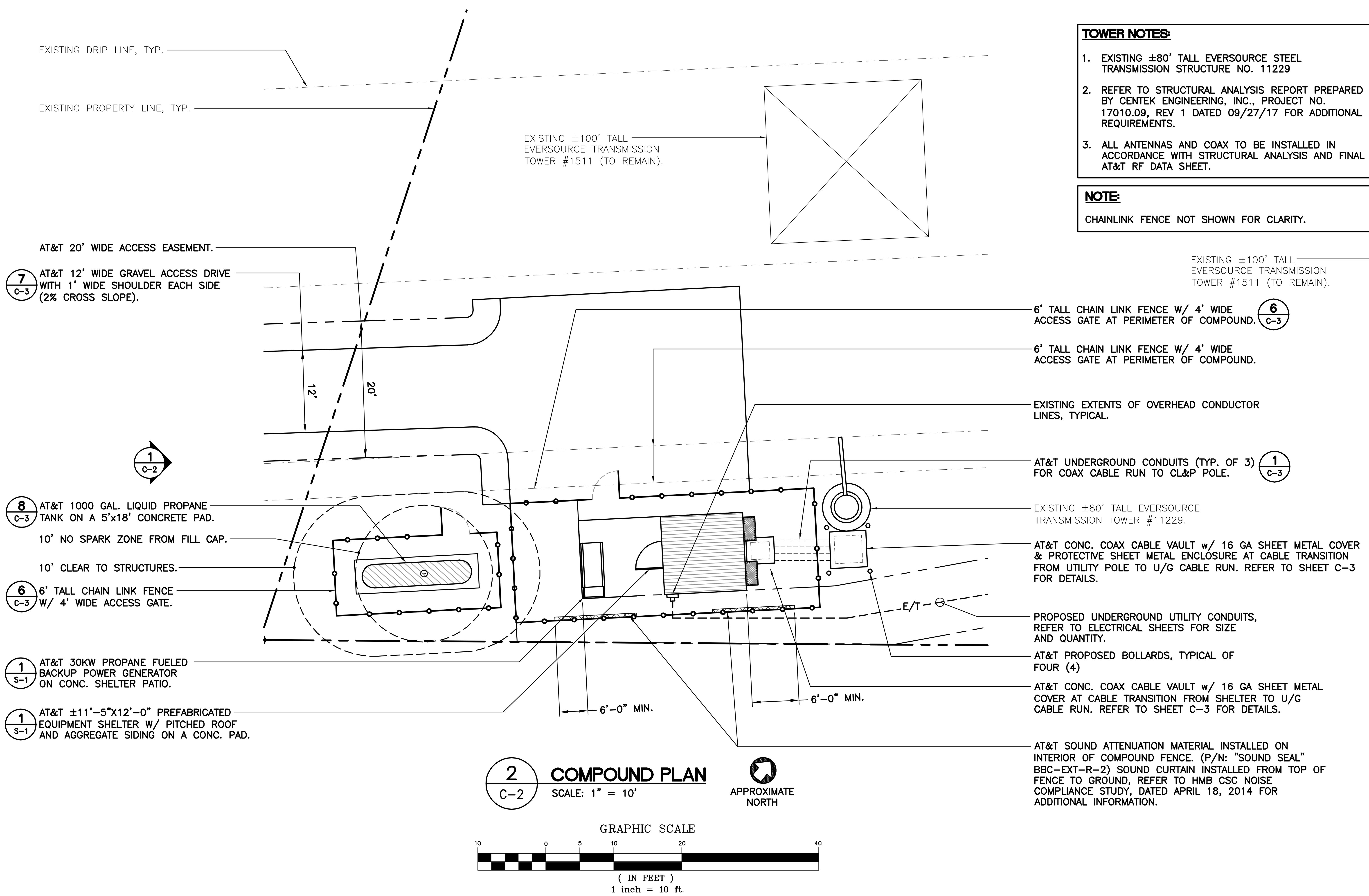
WATERBURY, CT 06708

DATE:	10/08/13
SCALE:	AS NOTED
JOB NO.	13130.000

PARTIAL SITE SURVEY PLAN

C-1A

Sheet No. 4 of 22



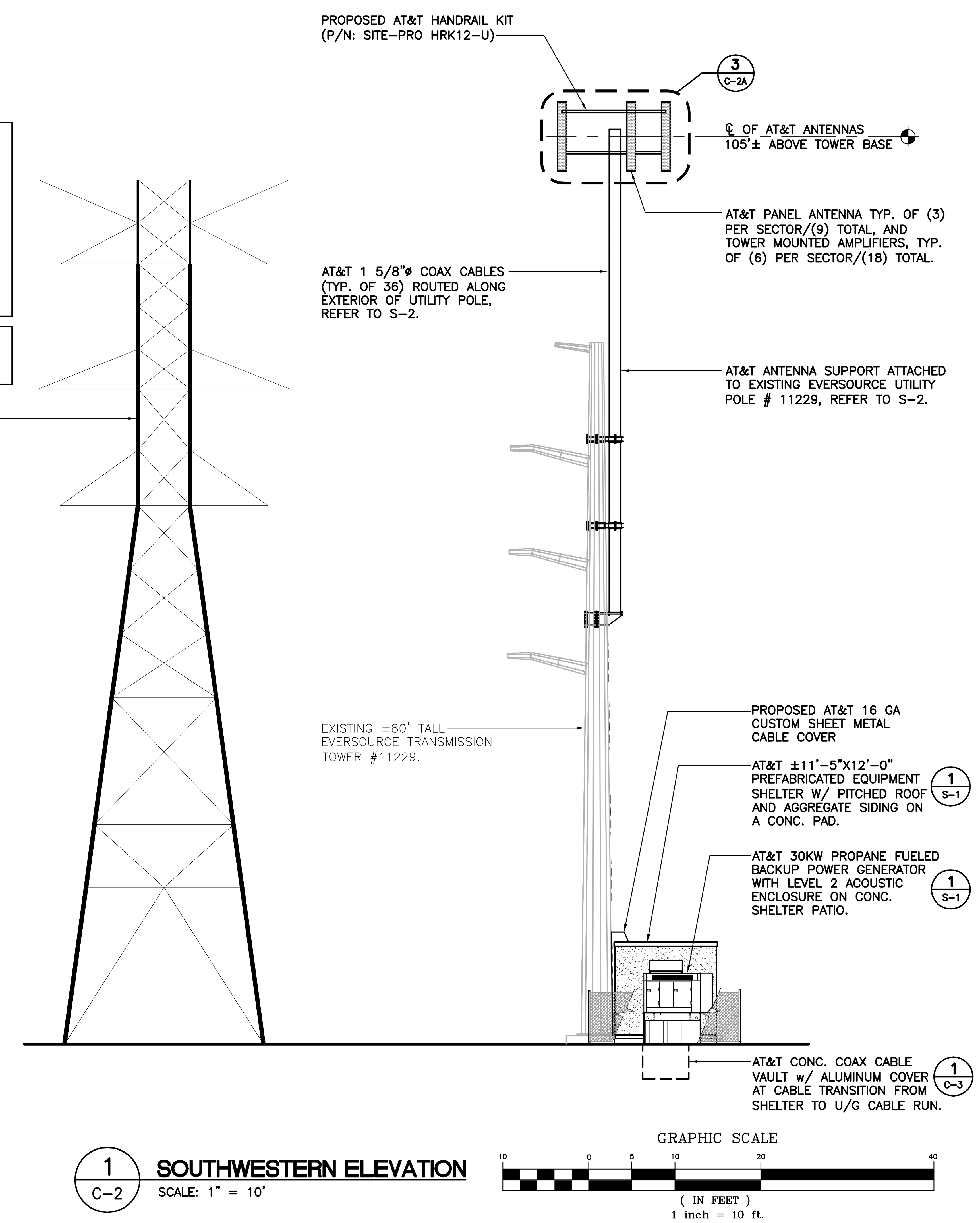
2 C-2 **COMPOUND PLAN**
SCALE: 1" = 10'

TOWER NOTES:

1. EXISTING ±80' TALL EVERSOURCE STEEL TRANSMISSION STRUCTURE NO. 11229
2. REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., PROJECT NO. 17010.09, REV 1 DATED 09/27/17 FOR ADDITIONAL REQUIREMENTS.
3. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS AND FINAL AT&T RF DATA SHEET.

NOTE:

CHAINLINK FENCE NOT SHOWN FOR CLARITY.



1 C-2 **SOUTHWESTERN ELEVATION**
SCALE: 1" = 10'

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
13	01/31/18	CAG	TJL	CONSTRUCTION DRAWINGS – U/G VAULT DETAILS
11	11/08/17	LGL	CAG	CONSTRUCTION – UTILITY ROUTE CHANGE
10	09/14/17	DMD	TJL	GENERATOR FUEL UPDATE
9	09/08/17	CAG	TJL	REVISED RFDS AND GENERATOR MODEL

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DATE: 10/08/13
SCALE: AS NOTED
JOB NO. 13130.000

COMPOUND PLAN AND ELEVATION

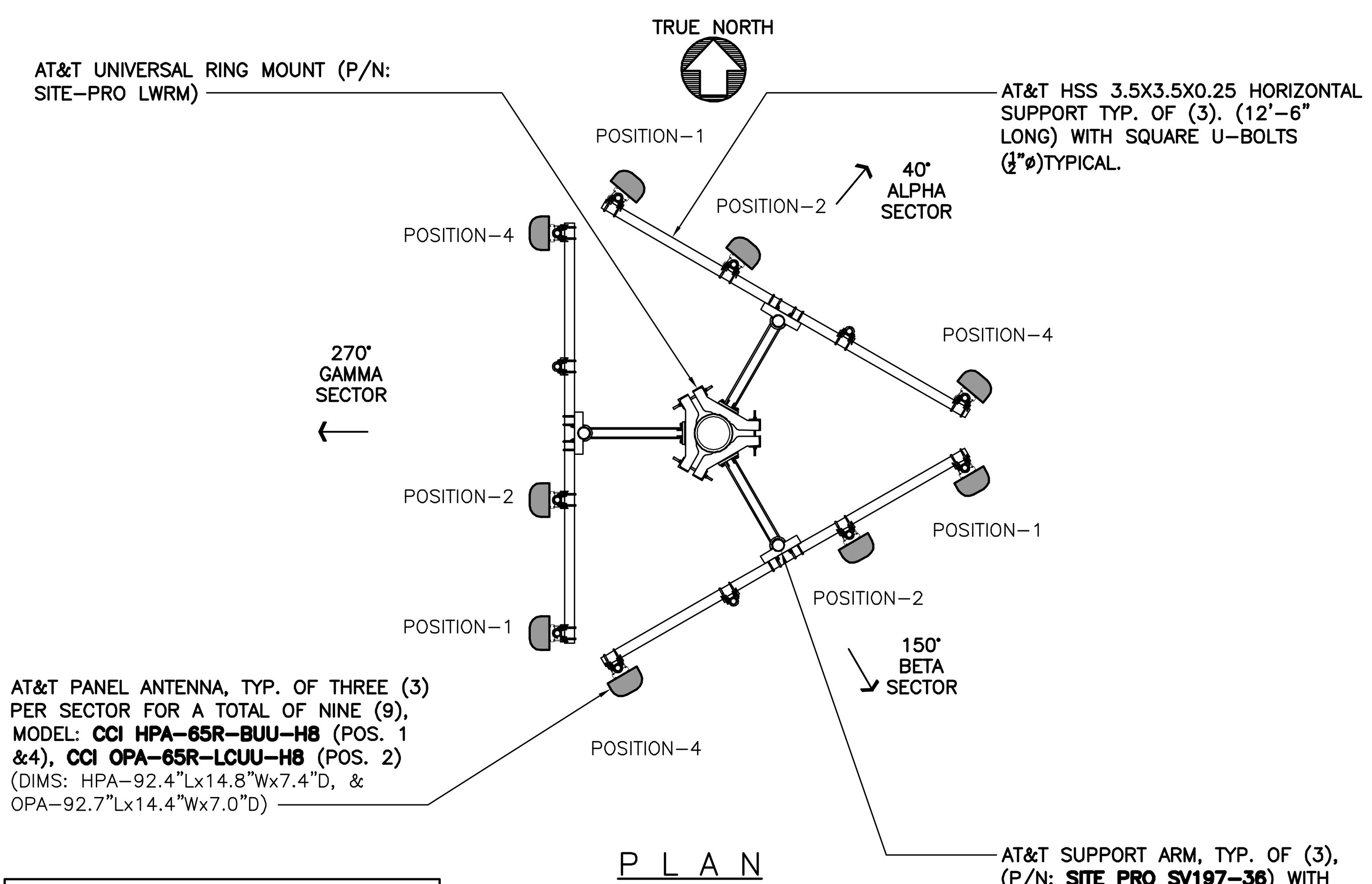
C-2

Sheet No. 5 of 22

RF EQUIPMENT TABLE

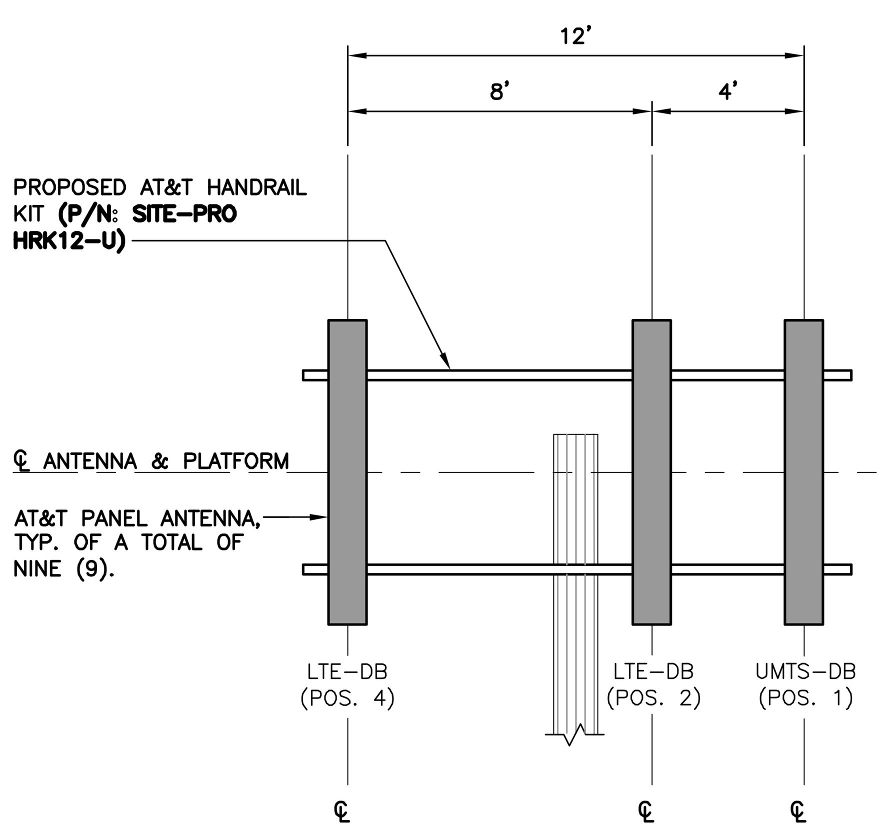
SECTOR	PANEL ANTENNAS					FILTER	FROM TMA				TMA		REMOTE RADIO UNIT		FROM SHELTER		
	AZIMUTH	QTY.	MAKE & MODEL	RAD CENTER (AGL)	DOWNTILT	QTY.	COAX QTY.	COAX SIZE	COAX LENGTH	RET QTY.	QTY.	MAKE & MODEL	QTY.	MAKE & MODEL	COAX QTY.	COAX SIZE	FIBER & DC LENGTH
ALPHA	40°	2	CCI HPA-65R-BUU-H8	105.0'	0°M 0°/0°E	0	20	1/2" ø	15' ±	0	6	CCI TMABPDB7823VG12A	1	ERICSSON RRUS-11	36	1 5/8"	120'±
													3	ERICSSON RRUS-12			
		1	CCI OPA-65R-LCUU-H8	105.0'	0°M 0°/0°E								1	ERICSSON RRUS-32			
													1	ERICSSON RRUS-32B66			
BETA	150°	2	CCI HPA-65R-BUU-H8	105.0'	0°M 0°/0°E	0	20	1/2" ø	15' ±	0	6	CCI TMABPDB7823VG12A	1	ERICSSON RRUS-11			120'±
													3	ERICSSON RRUS-12			
		1	CCI OPA-65R-LCUU-H8	105.0'	0°M 0°/0°E								1	ERICSSON RRUS-32			
													1	ERICSSON RRUS-32B66			
GAMMA	270°	2	CCI HPA-65R-BUU-H8	105.0'	0°M 0°/0°E	0	20	1/2" ø	15' ±	0	6	CCI TMABPDB7823VG12A	1	ERICSSON RRUS-11			120'±
													3	ERICSSON RRUS-12			
		1	CCI OPA-65R-LCUU-H8	105.0'	0°M 0°/0°E								1	ERICSSON RRUS-32			
													1	ERICSSON RRUS-32B66			

1 / C-2A **RF EQUIPMENT TABLE**
NOT TO SCALE



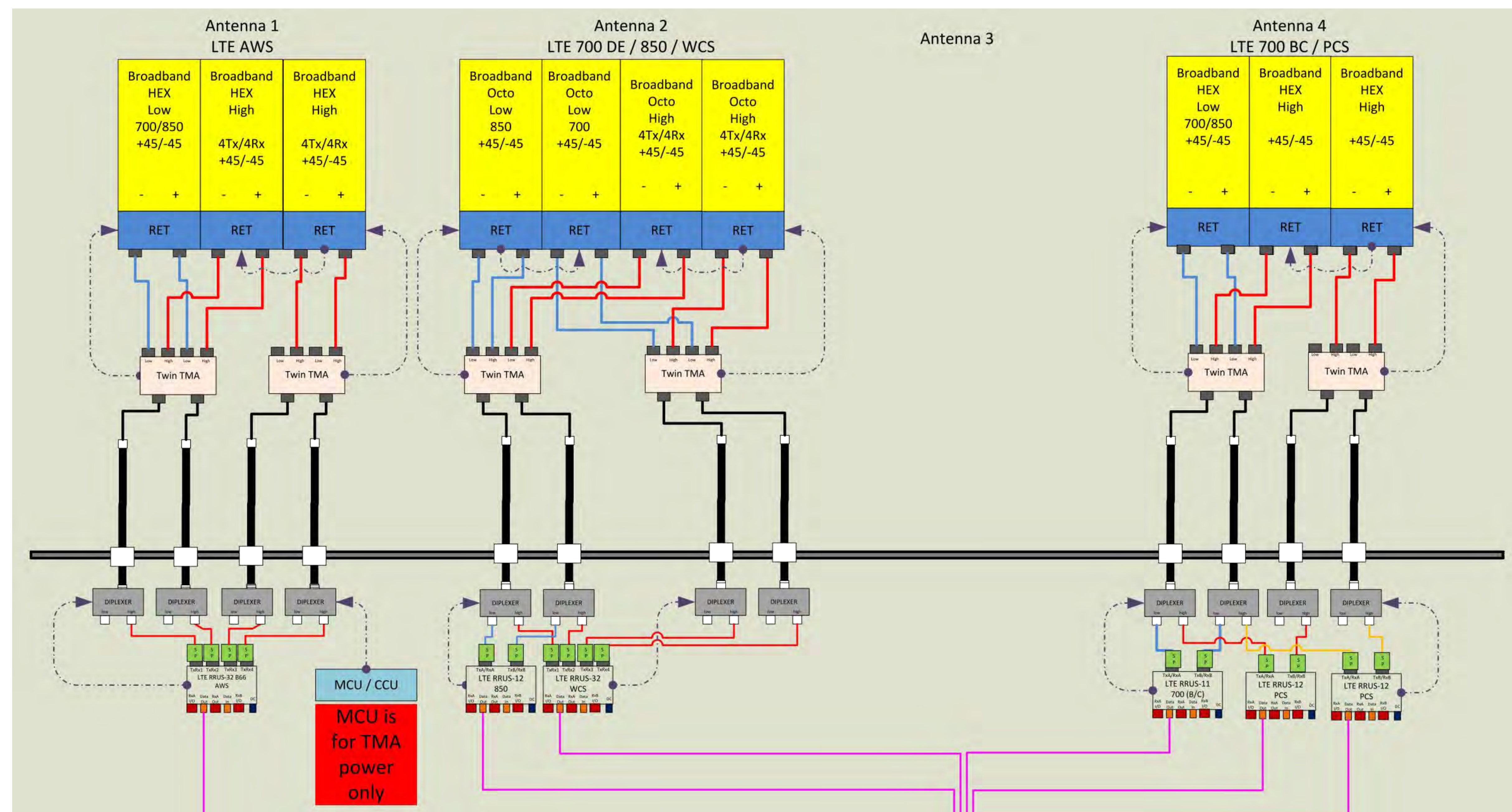
P L A N

NOTE: PROVIDE PROPOSED AT&T HANDRAIL KIT AT TOP OF ANTENNA MOUNT PIPES. (P/N: SITE-PRO HRK12-U)



E L E V A T I O N

3 / C-2 **ANTENNA MOUNTING CONFIGURATION DETAILS**
NOT TO SCALE



5216	A	B	C	D	E	F
IDLe	XMU2-3	XMU2-2	XMU2-1	XMU1-3	XMU1-2	XMU1-1

	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
XMU 1	PCS1 A	PCS2 A	700BC A	WCS A	PCS1 B	PCS2 B	700BC B	WCS B	DNU	PCS1 C	PCS2 C	700BC C	WCS C	XMU1-3	XMU1-2	XMU1-1

	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
XMU 2	AWS1 A		850 A		AWS1 B		850 B		DNU	AWS1 C		850 C		XMU2-3	XMU2-2	XMU2-1

2 / C-2A **RF PLUMBING DIAGRAM**
NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	08/14/17	CAG	TJL	CONSTRUCTION DRAWINGS – REVISED PER SAI SA COMMENTS
1	09/08/17	CAG	TJL	REVISED RFDS AND GENERATOR MODEL
11	11/08/17	LGL	CAG	CONSTRUCTION – AZIMUTH CHANGE
12	12/12/17	FJP	CAG	CONSTRUCTION – REVISED MOUNT SUPPORT
13	01/31/18	CAG	TJL	CONSTRUCTION DRAWINGS – U/G VAULT DETAILS

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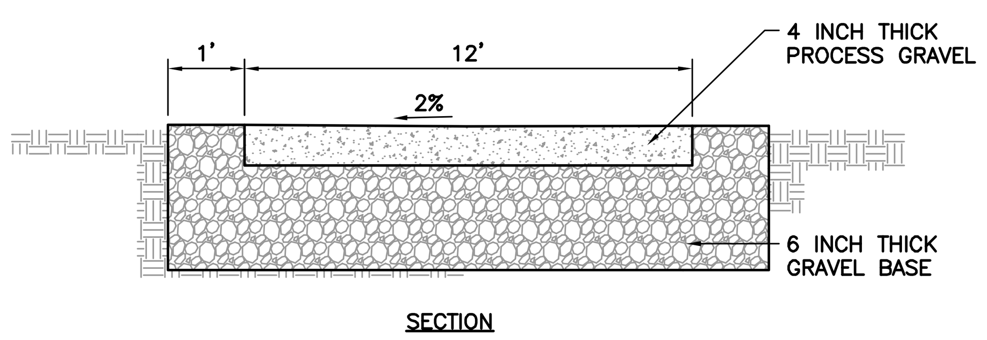
227 WHITEWOOD ROAD
WATERBURY, CT 06708

DATE: 10/08/13
SCALE: AS NOTED
JOB NO. 13130.000

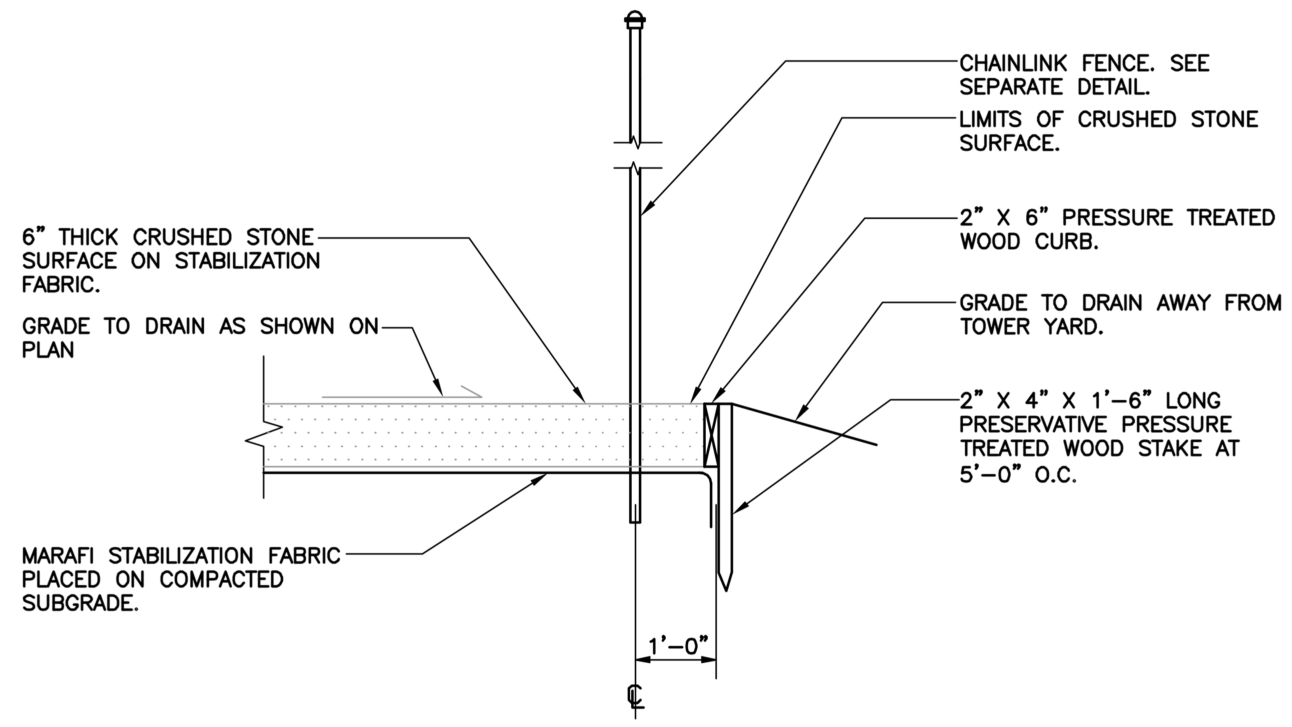
COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING DETAILS

C-2A

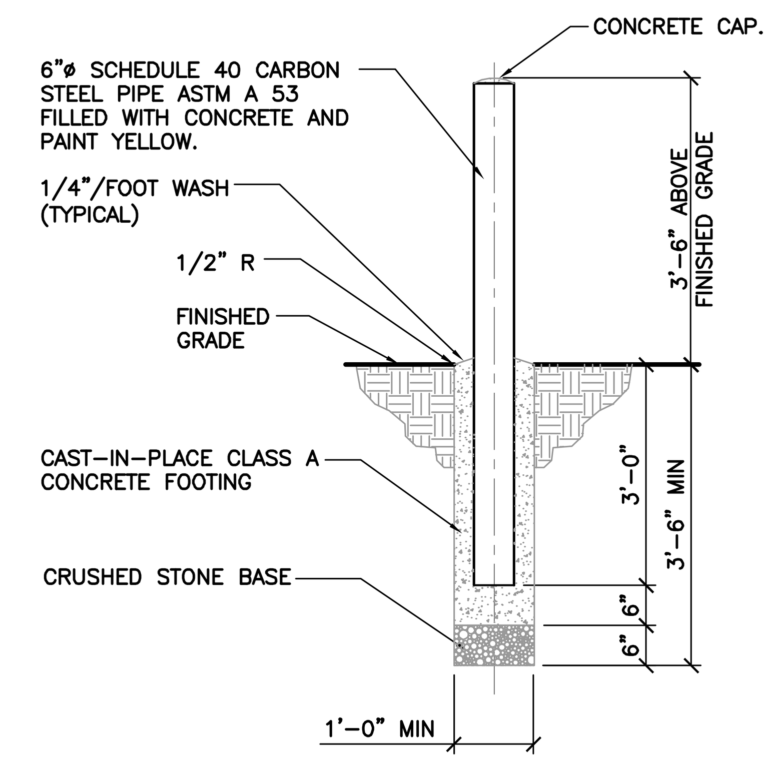
Sheet No. 6 of 22



7 GRAVEL SURFACE PARKING AREA AND ACCESS DRIVE
C-3
NOT TO SCALE



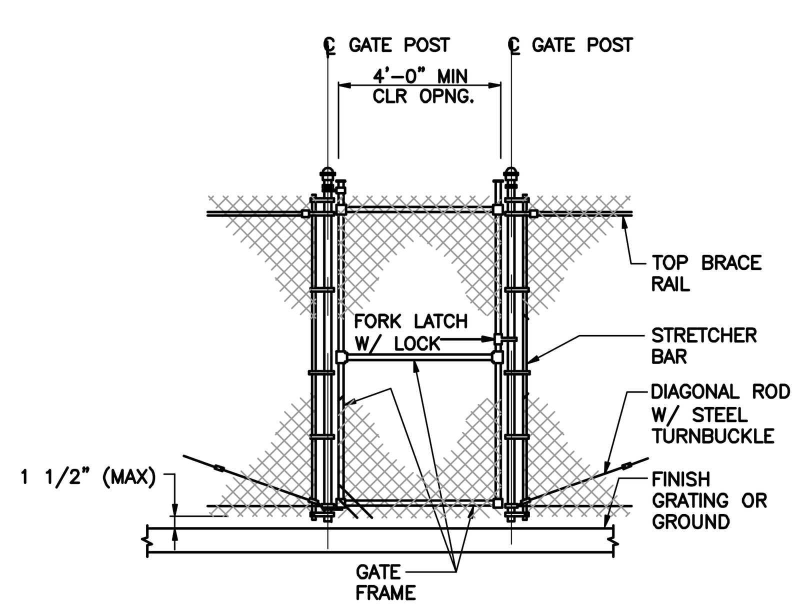
2 COMPOUND SURFACING DETAIL
C-3
NOT TO SCALE



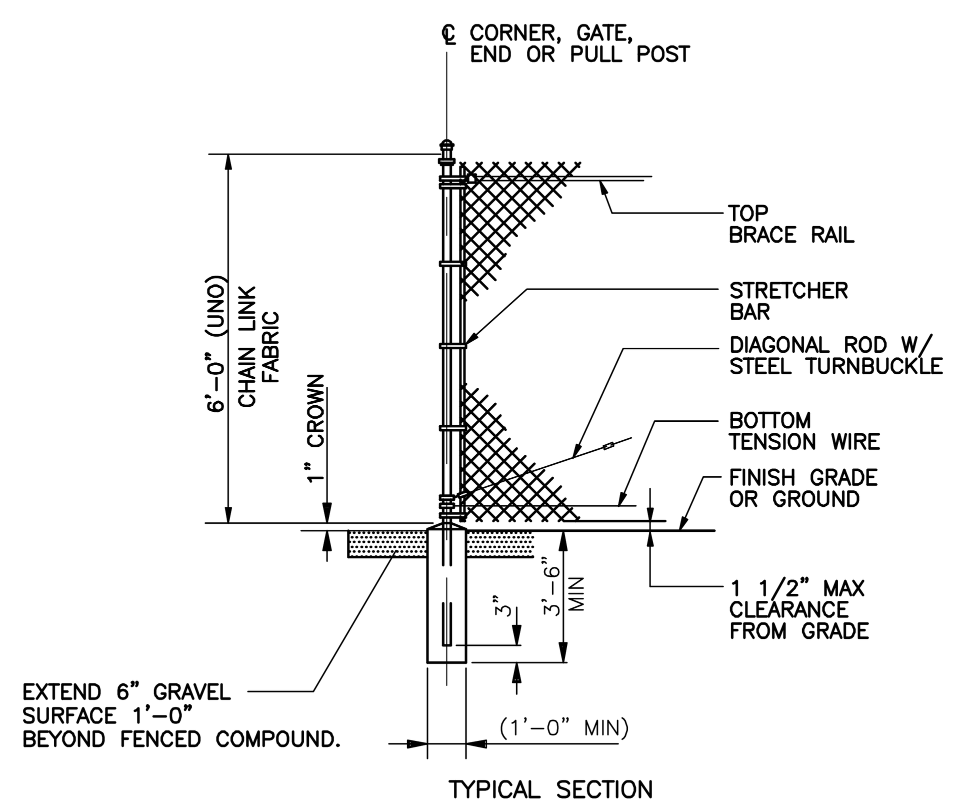
1 BOLLARD DETAIL
C-3
NOT TO SCALE

WOVEN WIRE FENCE NOTES

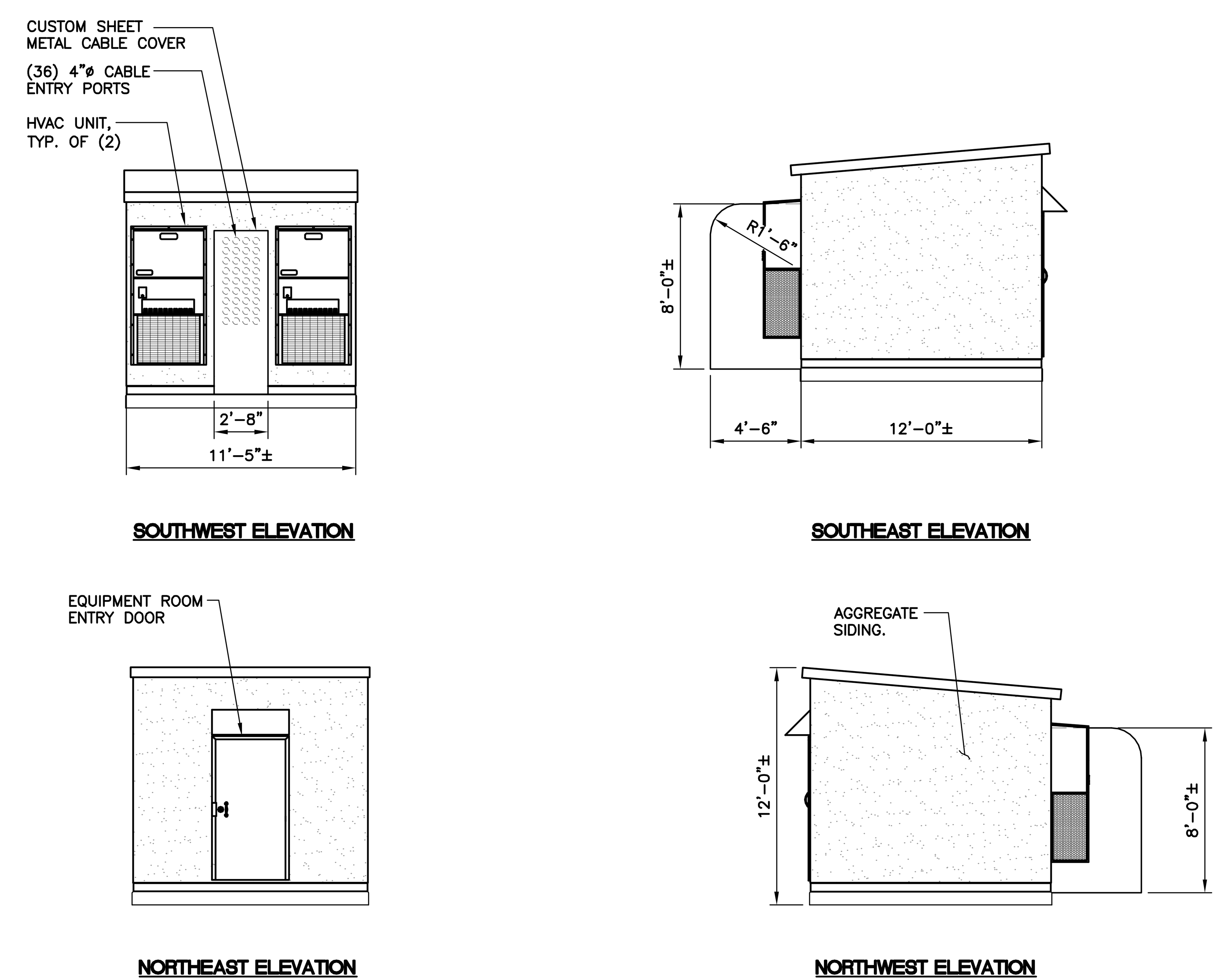
1. GATE POST, CORNER, TERMINAL OR PULL POST 2 1/2" ø SCHEDULE 40 FOR GATE WIDTHS UP THRU 6 FEET OR 12 FEET FOR DOUBLE SWING GATE PER ASTM-F1083.
2. LINE POST: 2" ø SCHEDULE 40 PIPE PER ASTM-F1083.
3. GATE FRAME: 1 1/2" ø SCHEDULE 40 PIPE PER ASTM-F1083.
4. TOP RAIL & BRACE RAIL: 1 1/2" ø SCHEDULE 40 PIPE PER ASTM-F1083.
5. FABRIC: 12 GA. CORE WIRE SIZE 2" MESH, CONFORMING TO ASTM-A392.
6. TIE WIRE: MINIMUM 11 GA. GALVANIZED STEEL AT POSTS AND RAILS A SINGLE WRAP OF FABRIC TIE AND AT TENSION WIRE BY HOG RINGS SPACED MAX 24" INTERVALS.
7. TENSION WIRE: 7 GA. GALVANIZED STEEL.
8. GATE LATCH: DROP DOWN LOCKABLE FORK LATCH AND LOCK, KEYED ALIKE FOR ALL SITES IN A GIVEN MTA.
9. HEIGHT = 6'



6A WOVEN WIRE SINGLE SWING GATE
C-3
NOT TO SCALE



6 WOVEN WIRE FENCE DETAIL
C-3
NOT TO SCALE



4 EQUIPMENT SHELTER ELEVATIONS
C-3
SCALE: 3/16" = 1'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
13	01/31/18	CAG	TJL	CONSTRUCTION DRAWINGS – U/G VAULT DETAILS
6	09/08/17	CAG	TJL	REVISED RFDS AND GENERATOR MODEL
5	08/09/17	KAWJR	CAG	REVISED PER CLIENT COMMENTS
4	03/24/14	HMR	CFC	REVISED FOR SITE SURVEY
3	02/14/14	HMR	CFC	REVISED FOR PROPANE TANK – CLIENT REVIEW
2	11/19/13	HMR	CFC	REVISED ANTENNA AZIMUTH
1	11/08/13	HMR	CFC	CONSTRUCTION
0	10/25/13	HMR	CFC	CONSTRUCTION – CLIENT REVIEW

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SCALE: AS NOTED
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SITE DETAILS AND NOTES

C-3

Sheet No. 7 of 22

GENERAL CONSTRUCTION / PRE-CONSTRUCTION NOTES

1. PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES, A MANDITORY ON-SITE PRE-CONSTRUCTION MEETING SHALL BE CONDUCTED WITH THE VERIZON WIRELESS CONSTRUCTION MANAGER, CONTRACTOR'S CONSTRUCTION MANAGER, THE PROJECT EROSION AND SEDIMENTATION CONTROL/ENVIRONMENTAL MONITOR AND THE ENGINEER OF RECORD.
2. THE SOUTHERN PROPERTY LINE ADJACENT TO THE PROPOSED ACCESS DRIVE IS STAKED IN FIELD. THE CONTRACTOR SHALL MAINTAIN THE PROPERTY LINE STAKE LOCATIONS DURING THE ENTIRE PERIOD OF CONSTRUCTION. ALL CONSTRUCTION ACTIVITIES SHALL BE CONDUCTED ON THE SUBJECT PROPERTY.

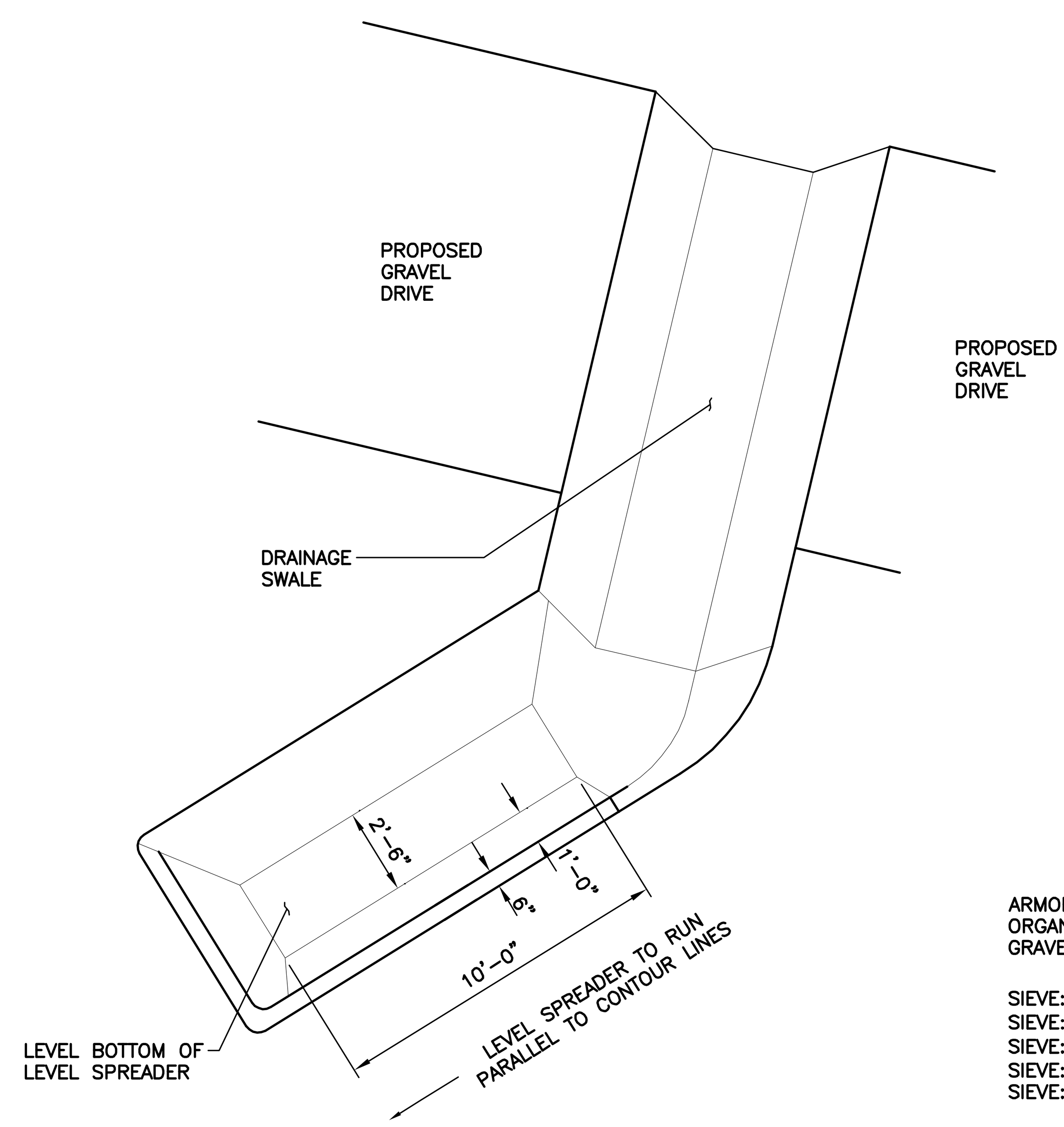
GENERAL CONSTRUCTION SEQUENCE

THIS IS A GENERAL CONSTRUCTION SEQUENCE OUTLINE SOME ITEMS OF WHICH MAY NOT APPLY TO PARTICULAR SITES.

1. CUT AND STUMP AREAS OF PROPOSED CONSTRUCTION.
2. INSTALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES AS REQUIRED.
3. REMOVE AND STOCKPILE TOPSOIL. STOCKPILE SHALL BE SEEDED TO PREVENT EROSION.
4. CONSTRUCT CLOSED DRAINAGE SYSTEM. PRECEPT CULVERT INLETS AND CATCH BASINS WITH SEDIMENTATION BARRIERS.
5. CONSTRUCT ROADWAYS AND PERFORM SITE GRADING, PLACING HAY BALES AND SILTATION FENCES AS REQUIRED TO CONTROL SOIL EROSION.
6. INSTALL UNDERGROUND UTILITIES.
7. BEGIN TEMPORARY AND PERMANENT SEEDING AND MULCHING. ALL CUT AND FILL SLOPES SHALL BE SEEDED OR MULCHED IMMEDIATELY AFTER THEIR CONSTRUCTION. NO AREA SHALL BE LEFT UNSTABILIZED FOR A TIME PERIOD OF MORE THAN 30 DAYS.
8. DAILY, OR AS REQUIRED, CONSTRUCT, INSPECT, AND IF NECESSARY, RECONSTRUCT TEMPORARY BERMS, DRAINS, DITCHES, SILT FENCES AND SEDIMENT TRAPS INCLUDING MULCHING AND SEEDING.
9. BEGIN EXCAVATION FOR AND CONSTRUCTION OF TOWERS AND PLATFORMS.
10. FINISH PAVING ALL ROADWAYS, DRIVES, AND PARKING AREAS.
11. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
12. NO FLOW SHALL BE DIVERTED TO ANY WETLANDS UNTIL A HEALTHY STAND OF GRASS HAS BEEN ESTABLISHED IN REGARDED AREAS.
13. AFTER GRASS HAS BEEN FULLY GERMINATED IN ALL SEEDED AREAS, REMOVE ALL TEMPORARY EROSION CONTROL MEASURES.

SOIL EROSION AND SEDIMENT CONTROL SEQUENCE

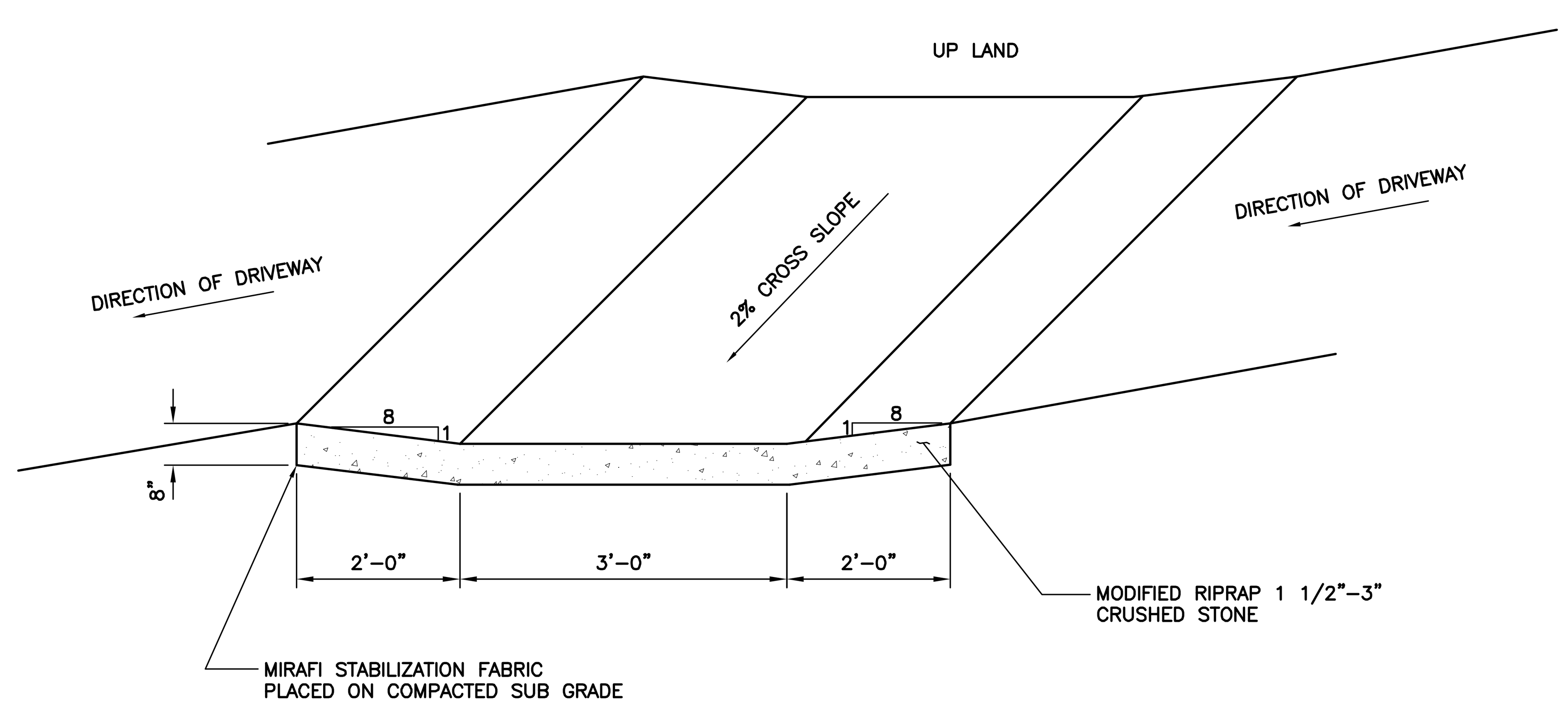
1. ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES, SUCH AS CONSTRUCTION ENTRANCE / ANTI TRACKING PAD, SILTATION FENCE, AND SILTATION FENCE / HAY BALE SHALL BE IN PLACE PRIOR TO ANY GRADING ACTIVITY, INSTALLATION OF PROPOSED STRUCTURES OR UTILITIES. MEASURES SHALL BE LEFT IN PLACE AND MAINTAINED UNTIL CONSTRUCTION IS COMPLETED AND/OR AREA IS STABILIZED.
2. THE ENTRANCE TO THE PROJECT SITE IS TO BE PROTECTED BY STONE ANTI TRACKING PAD OF ASTM C-33, SIZE NO. 2 OR 3, OR D.O.T. 2" CRUSHED GRAVEL. THE STONE ANTI TRACKING PAD IS TO BE MAINTAINED AT ALL TIMES DURING THE CONSTRUCTION PERIOD.
3. THE ENTRANCE TO THE PROJECT SITE IS TO BE PROTECTED BY STONE ANTI TRACKING PAD OF ASTM C-33, SIZE NO. 2 OR 3, OR D.O.T. 2" CRUSHED GRAVEL. THE STONE ANTI TRACKING PAD IS TO BE MAINTAINED AT ALL TIMES DURING THE CONSTRUCTION PERIOD.
4. LAND DISTURBANCE WILL BE KEPT TO A MINIMUM AND RESTABILIZATIONS WILL BE SCHEDULED AS SOON AS PRACTICAL.
5. ALL SOIL EROSION AND SEDIMENT CONTROL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE CONNECTICUT GUIDELINES FOR EROSION AND SEDIMENT CONTROL INCLUDING THE LATEST DATE FROM THE COUNCIL ON SOIL AND WATER CONSERVATION.
6. ANY ADDITIONAL EROSION/SEDIMENTATION CONTROL DEEMED NECESSARY BY TOWN STAFF DURING CONSTRUCTION, SHALL BE INSTALLED BY THE DEVELOPER. IN ADDITION, THE DEVELOPER SHALL BE RESPONSIBLE FOR THE REPAIR/REPLACEMENT/MAINTENANCE OF ALL EROSION CONTROL MEASURES UNTIL ALL DISTURBED AREAS ARE STABILIZED TO THE SATISFACTION OF THE TOWN STAFF.
7. IN ALL AREAS, REMOVAL OF TREES, BUSHES AND OTHER VEGETATION AS WELL AS DISTURBANCE OF THE SOIL IS TO BE KEPT TO AN ABSOLUTE MINIMUM WHILE ALLOWING PROPER DEVELOPMENT OF THE SITE. DURING CONSTRUCTION, EXPOSE AS SMALL AN AREA OF SOIL AS POSSIBLE FOR AS SHORT A TIME AS POSSIBLE.
8. SILTATION FENCE SHALL BE PLACED AS INDICATED BEFORE A CUT SLOPE HAS BEEN CREATED. SEDIMENT DEPOSITS SHOULD BE PERIODICALLY REMOVED FROM THE UPSTREAM SIDES OF SILTATION FENCE. THIS MATERIAL IS TO BE SPREAD AND STABILIZED IN AREAS NOT SUBJECT TO EROSION, OR TO BE USED IN AREAS WHICH ARE NOT TO BE PAVED OR BUILT ON. SILTATION FENCE IS TO BE REPLACED AS NECESSARY TO PROVIDE PROPER FILTERING ACTION. THE FENCE IS TO REMAIN IN PLACE AND BE MAINTAINED TO INSURE EFFICIENT SILTATION CONTROL UNTIL ALL AREAS ABOVE THE EROSION CHECKS ARE STABILIZED AND VEGETATION HAS BEEN ESTABLISHED.
9. SWALE DISCHARGE AREA WILL BE PROTECTED WITH RIP RAP SPLASH PAD/ ENERGY DISSIPATER.
10. ALL FILL AREAS SHALL BE COMPACTED SUFFICIENTLY FOR THEIR INTENDED PURPOSE AND AS REQUIRED TO REDUCE SLIPPING, EROSION OR EXCESS SATURATION.
11. THE SOIL SHALL NOT BE PLACED WHILE IN A FROZEN OR MUDDY CONDITION, WHEN THE SUBGRADE IS EXCESSIVELY WET, OR IN A CONDITION THAT MAY OTHERWISE BE DETRIMENTAL TO PROPER GRADING OR PROPOSED SODDING OR SEEDING.
12. AFTER CONSTRUCTION IS COMPLETE AND GROUND IS STABLE, REMOVE SILTS IN THE RIP RAP ENERGY DISSIPATERS. REMOVE OTHER EROSION AND SEDIMENT DEVICES.



ARMORED STONE SURFACE SHALL BE FREE OF ORGANICS AND CONSIST SOLELY OF CRUSHED GRAVEL WITH THE FOLLOWING GRADATION:

SIEVE: 3 1/2"	% PASSING: 100
SIEVE: 2"	% PASSING: 35-70
SIEVE: 1 1/2"	% PASSING: 0-15
SIEVE: 1/2"	% PASSING: 0-5
SIEVE: NO. 4	% PASSING: 0

2 / C-4 LEVEL SPREADER W/ CROSS DRAINAGE SWALE
NOT TO SCALE



1 / C-4 CROSS DRAINAGE SWALE
NOT TO SCALE

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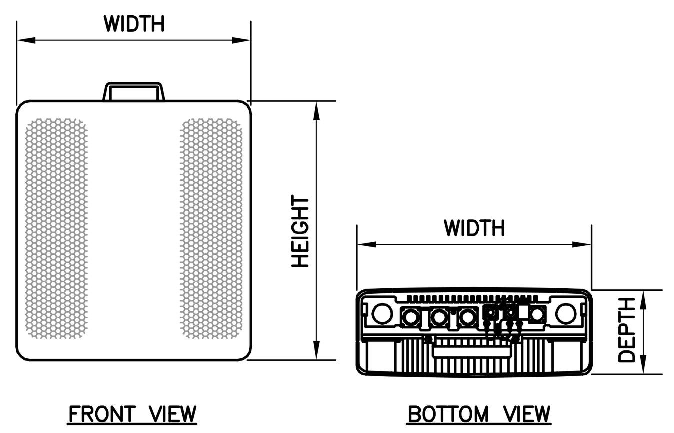
DRAINAGE CONTROL NOTES AND DETAILS

C-4

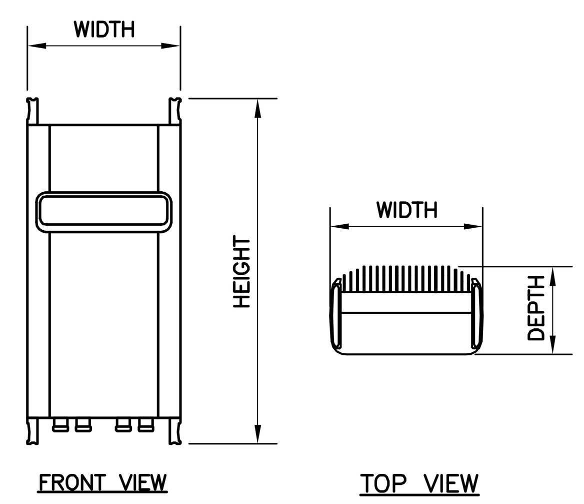
Sheet No. 8 of 22



RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS 12	20.4"L x 18.5"W x 7.5"D	50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

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

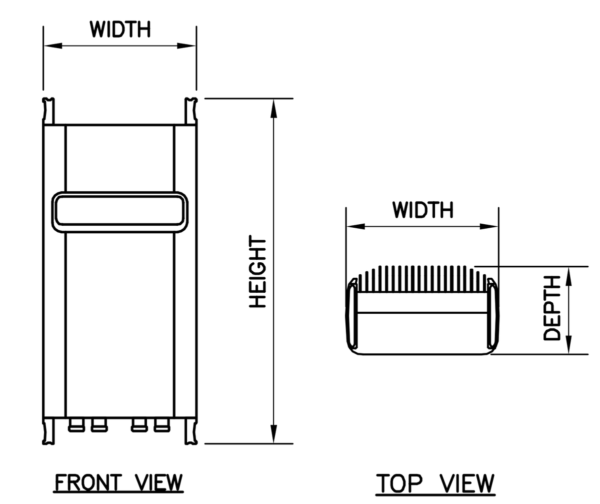
1 C-5 ERICSSON RRUS 12 DETAIL
SCALE: 1" = 1'-0"



RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS-32	27.17"H x 12.05"W x 7.01"D	52.91 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

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

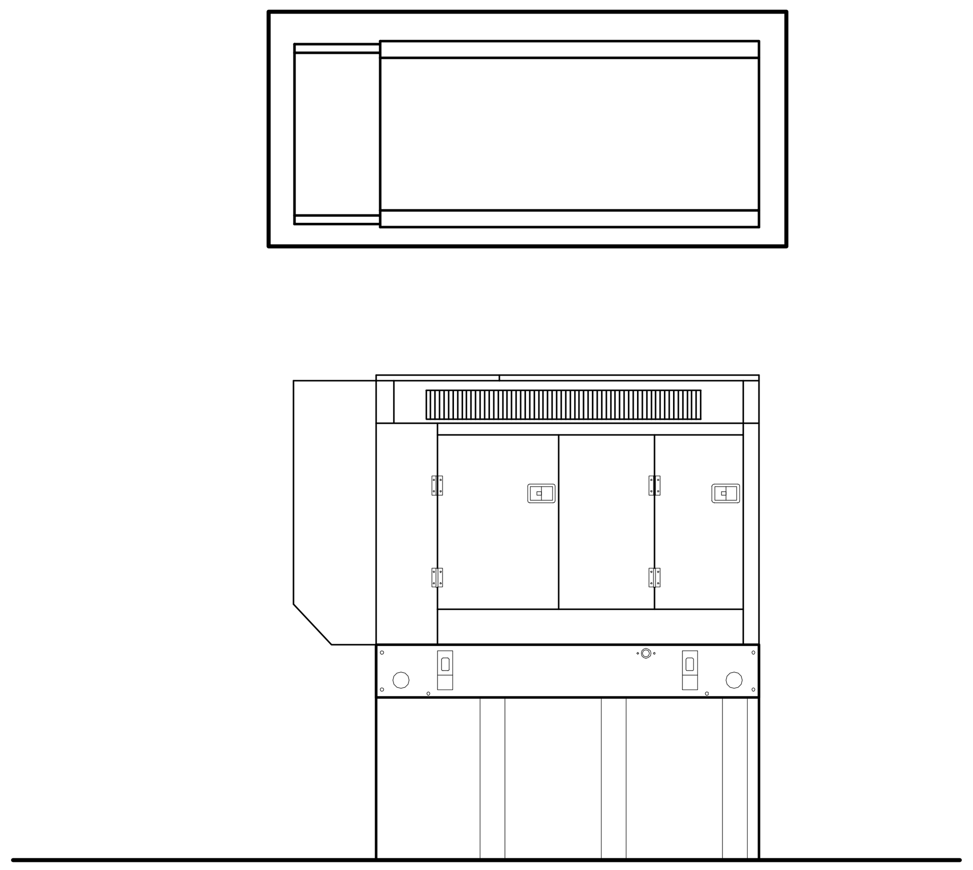
2 C-5 ERICSSON RRUS B2 DETAIL
SCALE: 1" = 1'-0"



RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS-32 B66	27.17"H x 12.05"W x 7.01"D	52.91 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

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

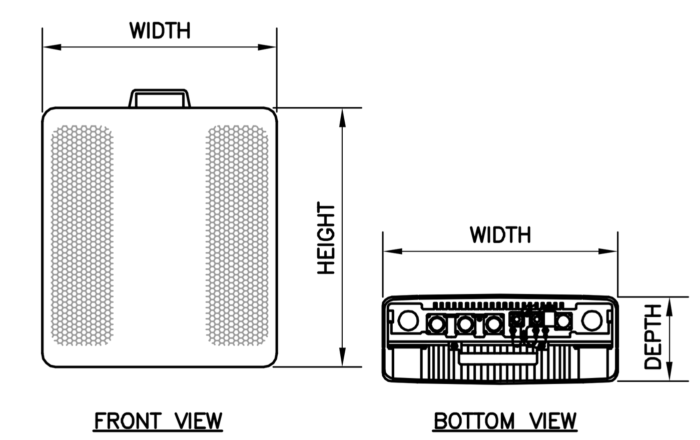
3 C-5 ERICSSON RRUS B2 DETAIL
SCALE: 1" = 1'-0"



6 C-5 GENERAC 30kw DIESEL FUELED GENERATOR DETAIL
SCALE: NOT TO SCALE

Product Data:	
Description	Vinyl coated polyester faced 2" quilted fiberglass/ 1 lb-psf reinforced loaded vinyl noise barrier
Nominal Thickness	2-inches
Wind Load	140 MPH per ASTM E330 "Wind Load Test Procedure"
Temperature range	-20° to +180° F
Standard panel size	54" wide, lengths as required up to 20' high
Weight	1.45 lb psf

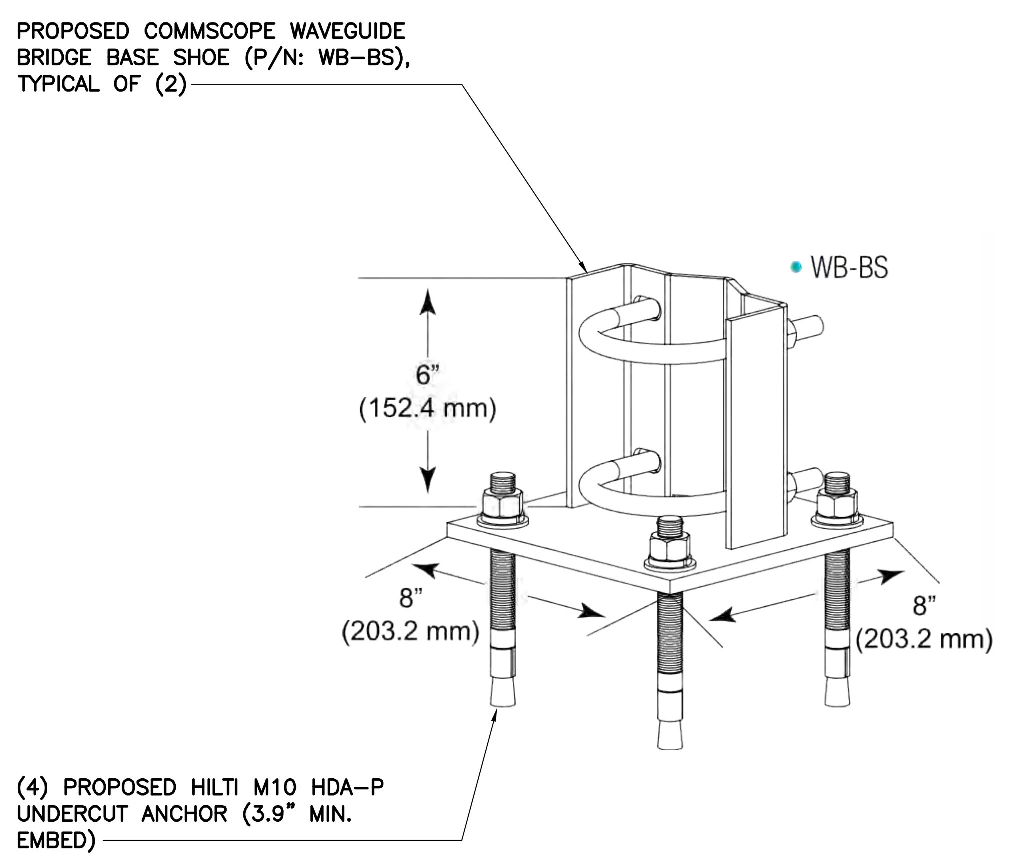
5 C-5 PROPOSED SOUND BARRIER DETAIL
SCALE: NOT TO SCALE



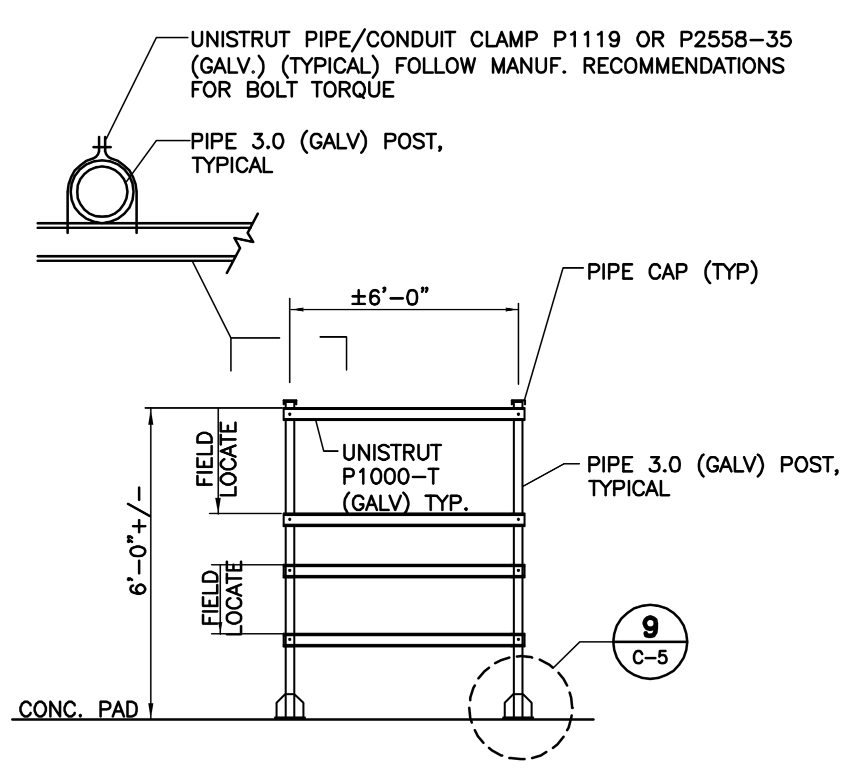
RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS 12	20.4"L x 18.5"W x 7.5"D	50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

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

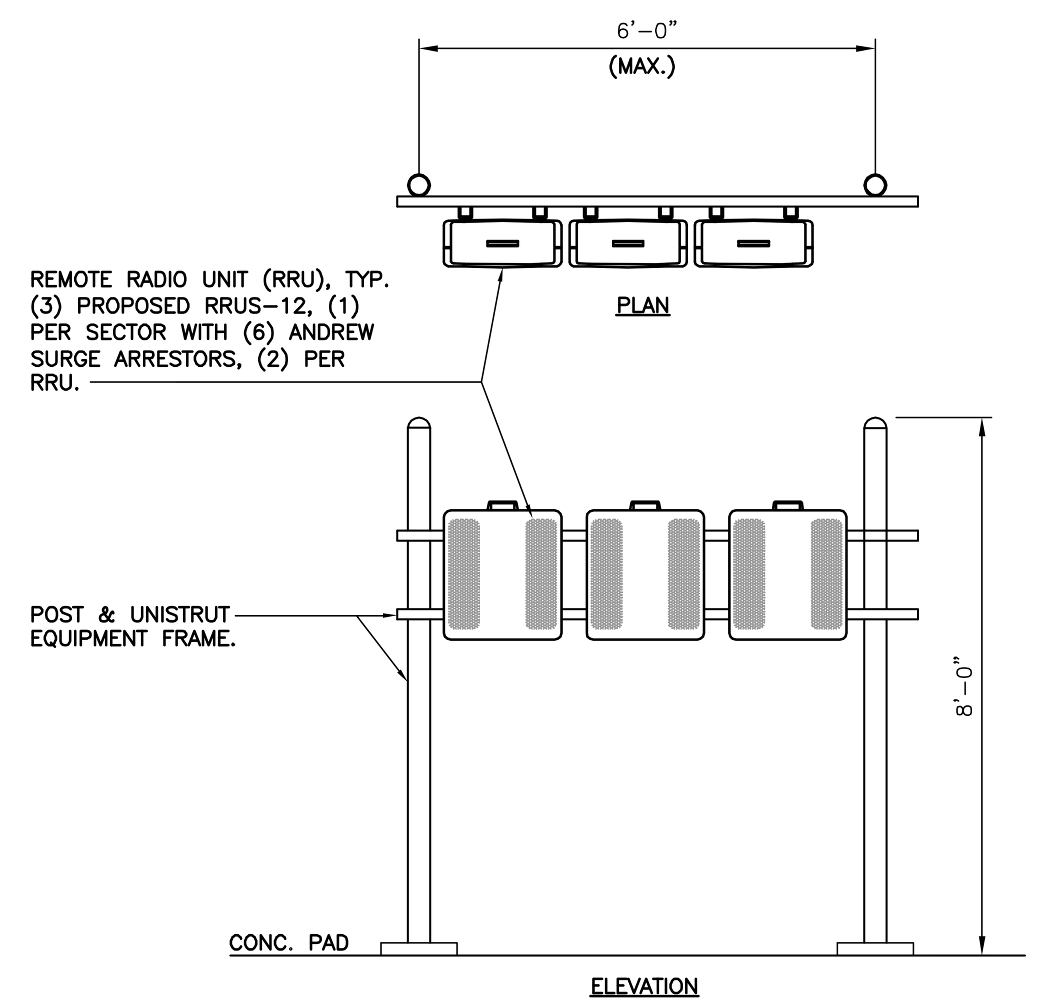
4 C-5 ERICSSON RRUS 12 DETAIL
SCALE: 1" = 1'-0"



9 C-5 EQUIPMENT FRAME POST ATTACHMENT DETAIL
SCALE: NOT TO SCALE



8 C-5 PROPOSED EQUIPMENT MOUNTING FRAME DETAIL
SCALE: NOT TO SCALE



7 C-5 PROPOSED EQUIPMENT RACK
SCALE: 1/2" = 1'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
11	11/08/17	LGL	CAG	CONSTRUCTION – SHEET ADDED
4	03/24/14	HMR	CFC	REVISED FOR SITE SURVEY
3	02/14/14	HMR	CFC	REVISED FOR PROPANE TANK – CLIENT REVIEW
2	11/19/13	HMR	CFC	REVISED ANTENNA AZIMUTH
1	11/08/13	HMR	CFC	CONSTRUCTION
0	10/25/13	HMR	CFC	CONSTRUCTION – CLIENT REVIEW

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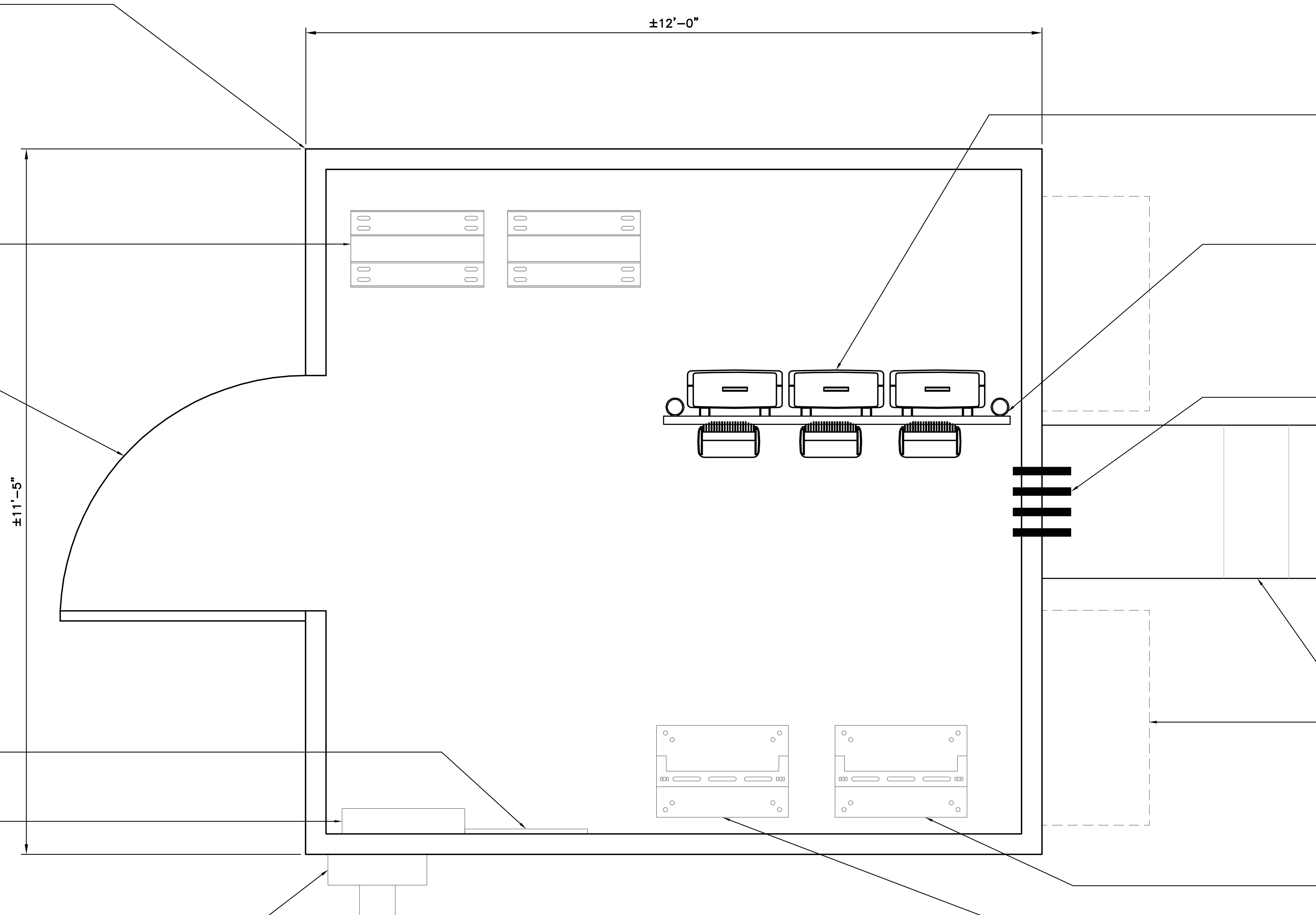
EQUIPMENT SPECIFICATIONS

C-5



1 C-6 **EQUIPMENT SHELTER LAYOUT PLAN**
SCALE: 3/4" = 1'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
13	01/31/18	CAG	TJL	CONSTRUCTION DRAWINGS – U/G VAULT DETAILS
11	11/08/17	LGL	CAG	CONSTRUCTION – SHEET ADDED
4	03/24/14	HMR	CFC	REVISED FOR SITE SURVEY
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EQUIPMENT SHELTER LAYOUT PLAN

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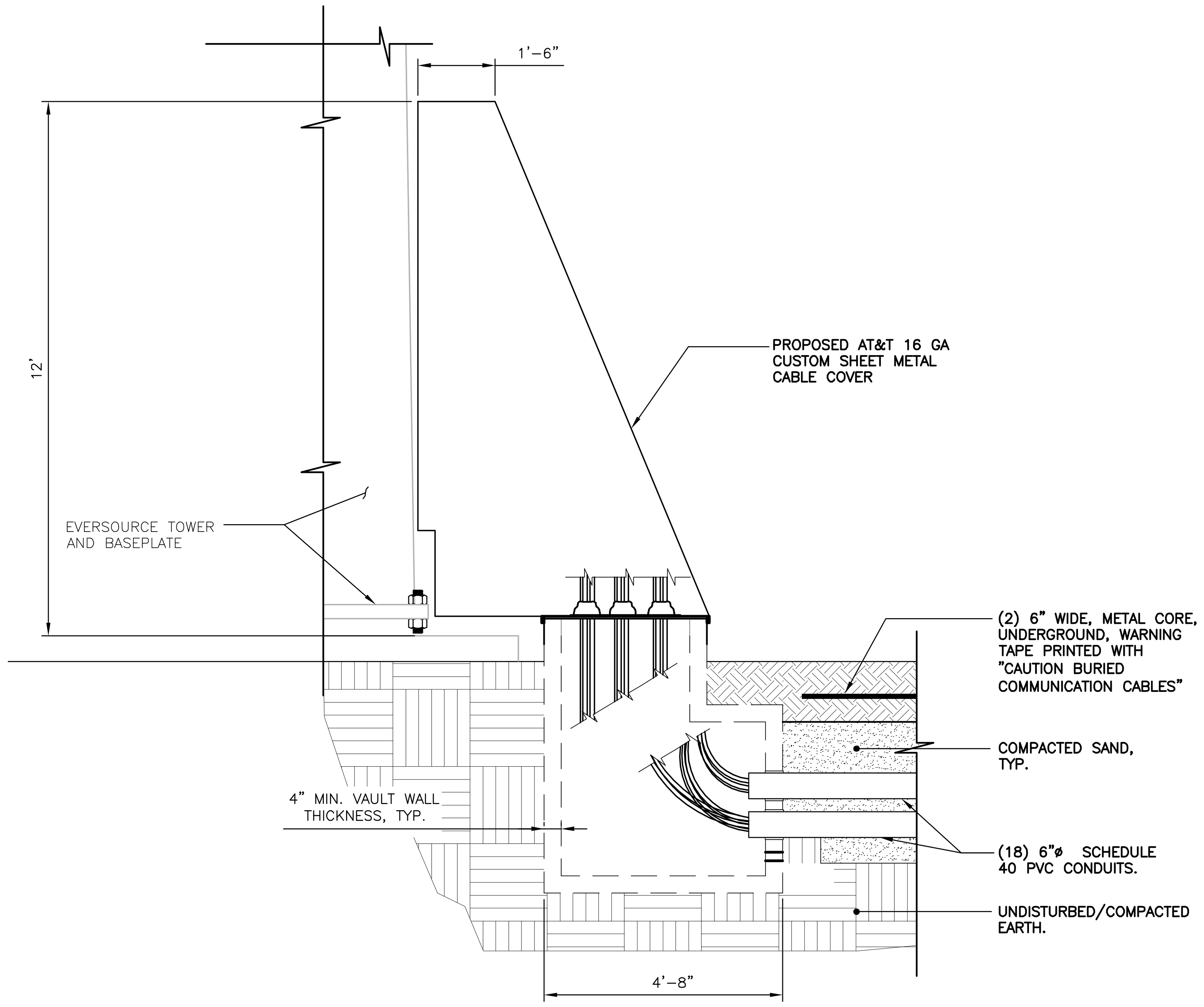
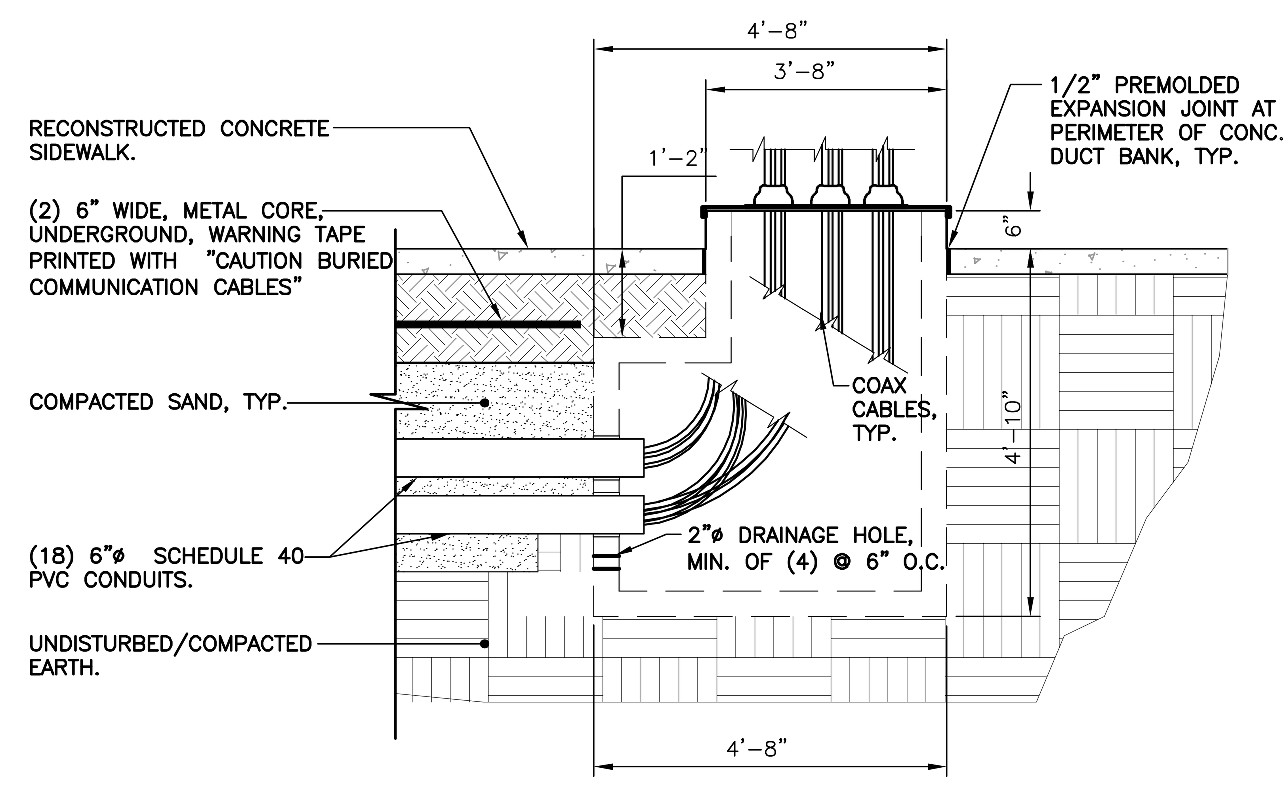


3 C-7 **UNDERGROUND VAULT SECTION - AT TOWER**

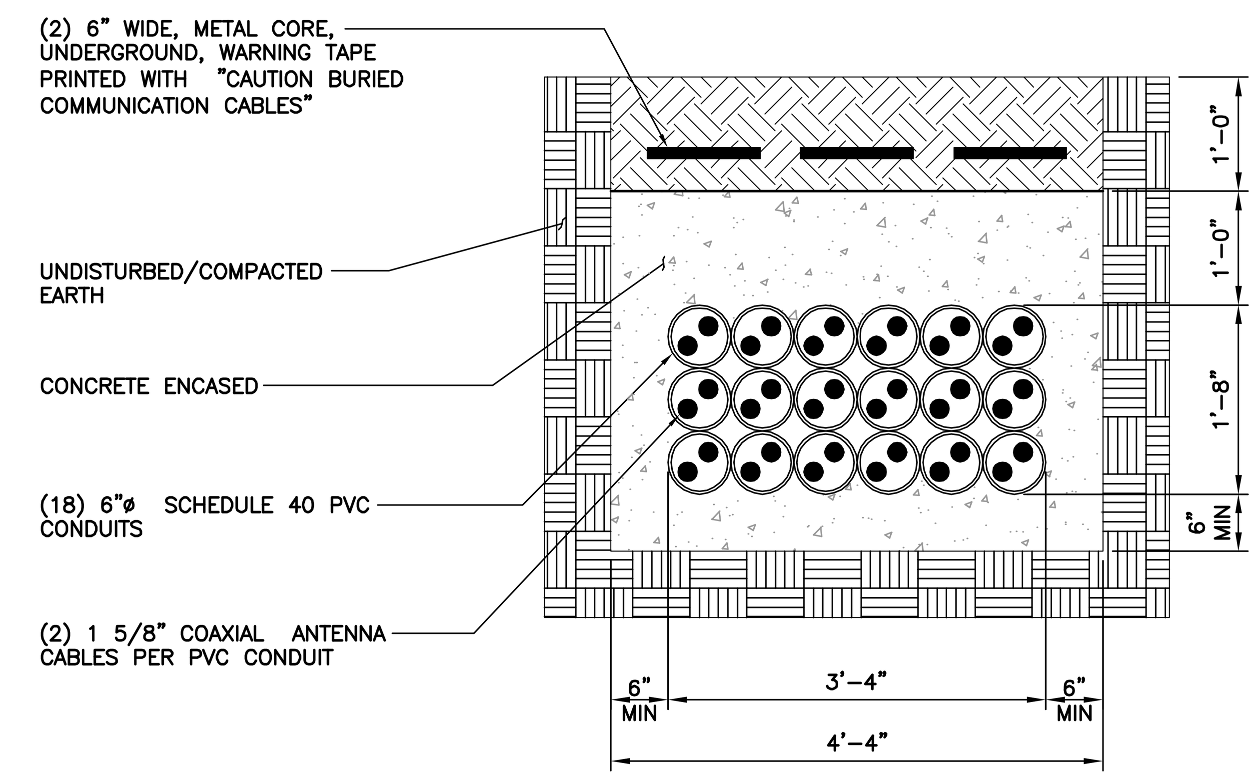
SCALE: 1/2" = 1'- 0"



2 C-7 **UNDERGROUND VAULT SECTION - AT SHELTER**

SCALE: 1/2" = 1'- 0"

NOTE: SHEET METAL VAULT COVER NOT SHOWN FOR CLARITY.



1 C-7 **UNDERGROUND COAX DUCT BANK SECTION**

NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
14	03/21/18	CAG	TJL	CONSTRUCTION DRAWINGS – REVISED U/G CONDUIT DETAILS
13	01/31/18	CAG	TJL	CONSTRUCTION DRAWINGS – U/G VAULT DETAILS

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UNDERGROUND CABLE VAULT DETAILS

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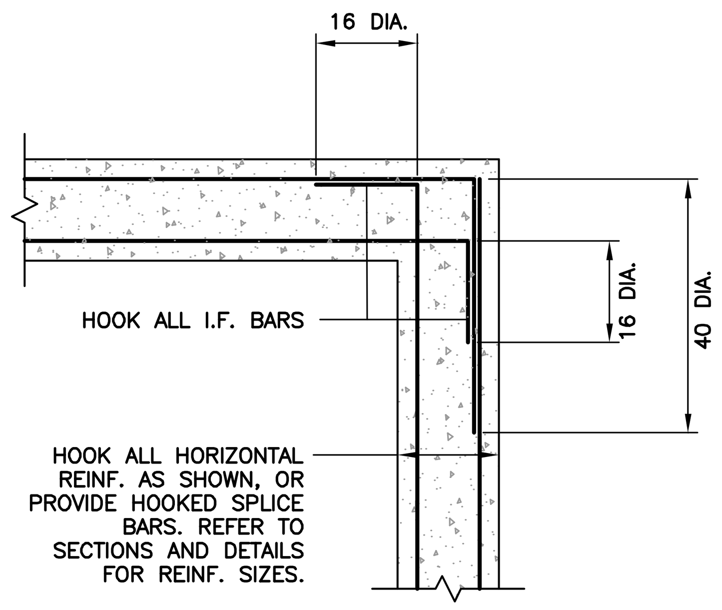
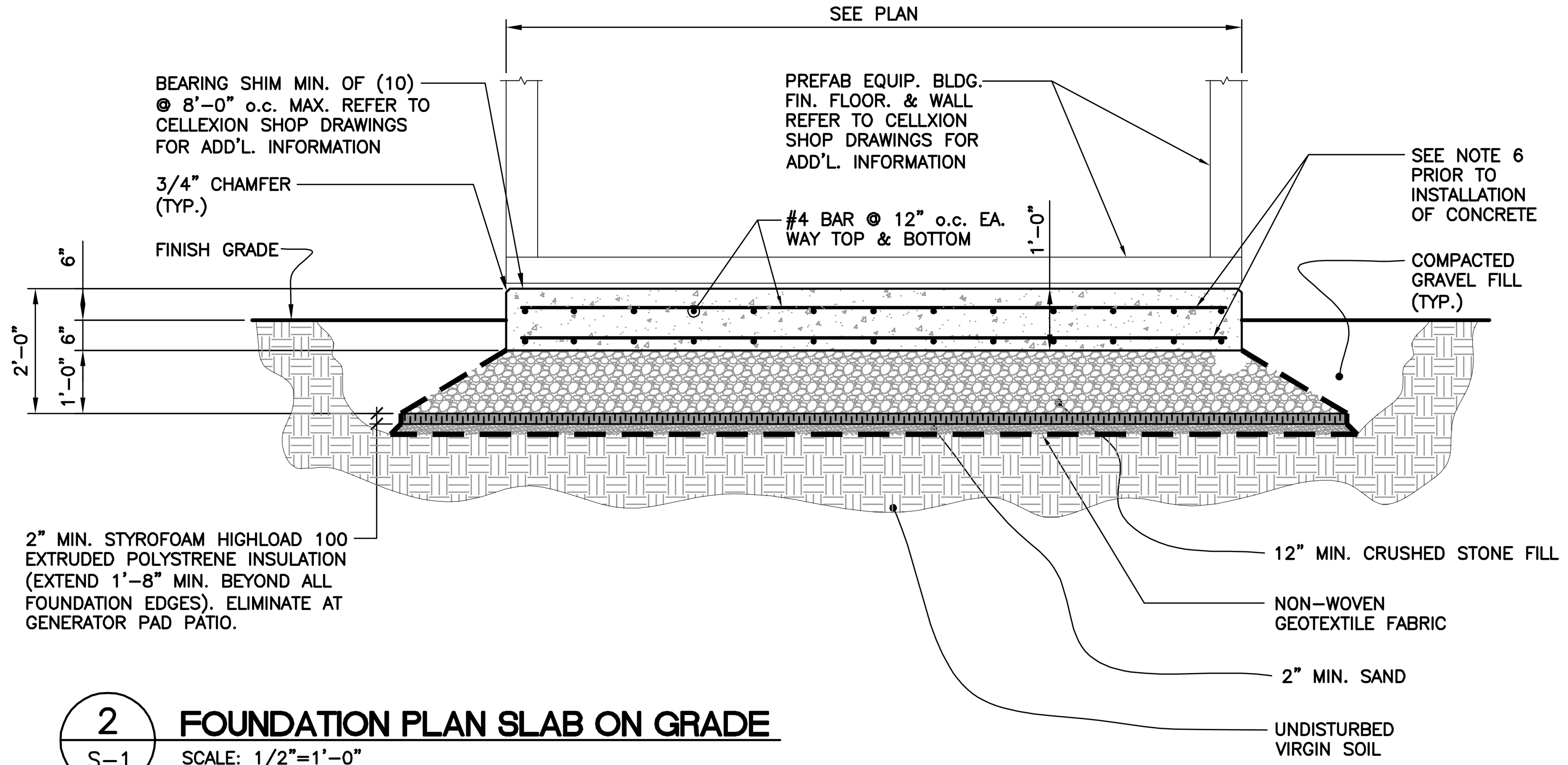
Sheet No. 11 of 22

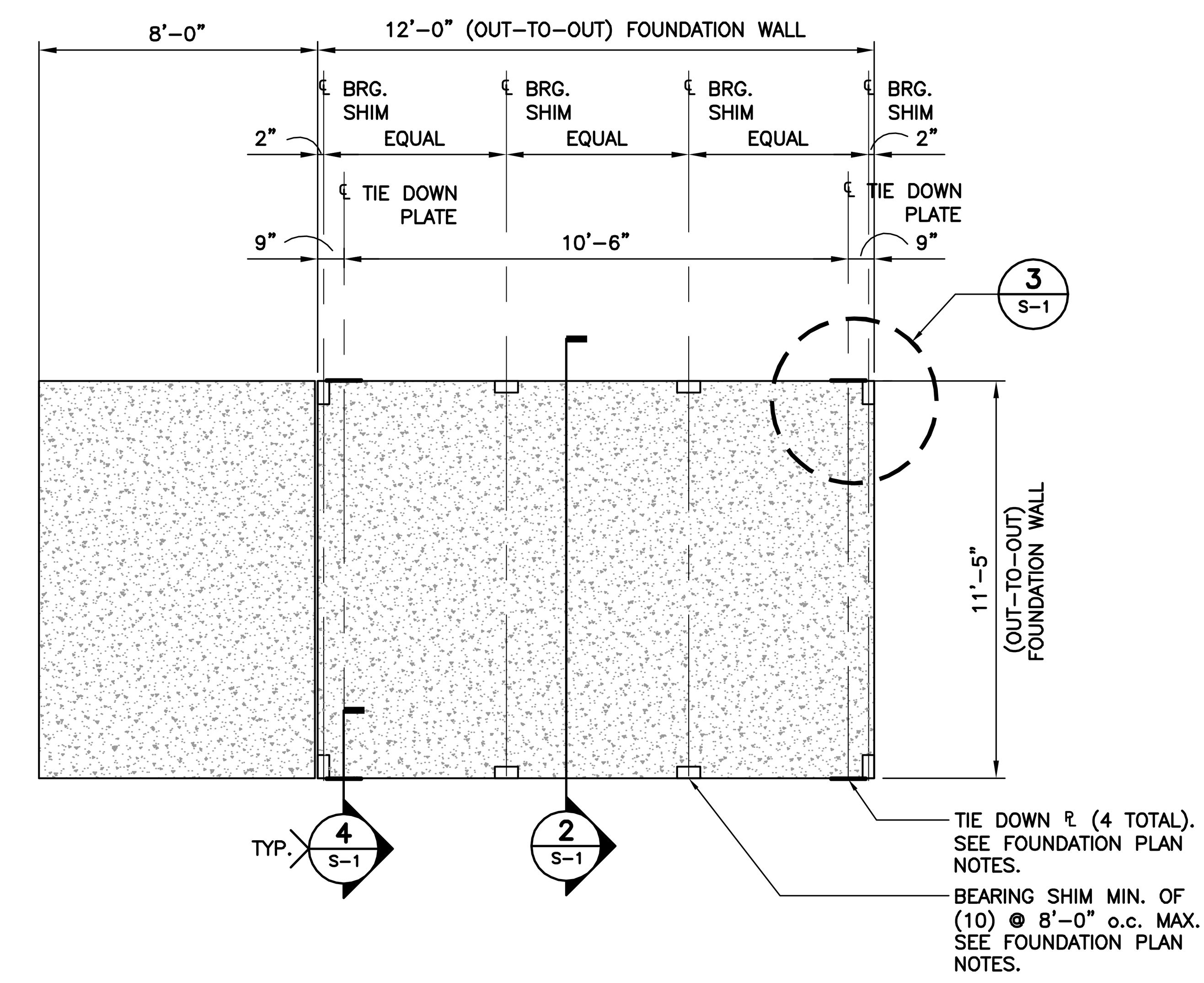


3 S-1 **PLAN DETAIL**
NOT TO SCALE

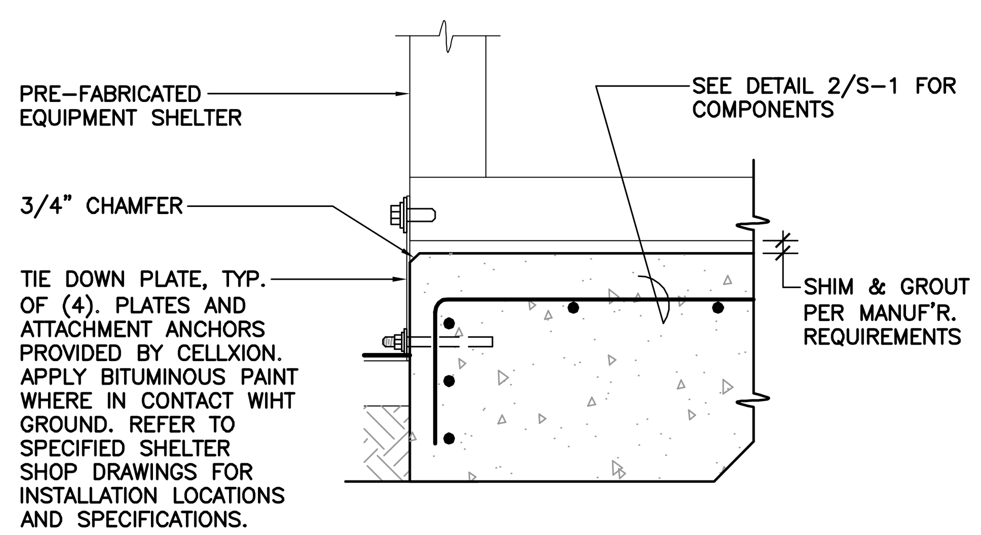


2 S-1 **FOUNDATION PLAN SLAB ON GRADE**
SCALE: 1/2"=1'-0"

NOTE:
PROVIDE #4 DOWELS AT 12"o/c, EACH DIRECTION. DRILL AND EPOXY INTO ROCK LEDGE WHERE APPLICABLE UTILIZING HILTI HY-200 ADHESIVE WITH A MINIMUM OF 12" EMBEDMENT.



1 S-1 **FOUNDATION PLAN**
SCALE: 1/4"=1'-0"



4 S-1 **BUILDING TIE DOWN**
SCALE: 1"=1'-0"

EQUIPMENT SHELTER BY CELLXION. VERIFY ALL SHELTER DIMENSIONS, EQUIPMENT DIMENSIONS, EQUIPMENT LOCATIONS AND UTILITY OPENINGS WITH BUILDING SHOP DRAWINGS PRIOR TO COMMENCEMENT OF WORK.

FOUNDATION PLAN NOTES:

1. BEARING SHIMS, TIE-DOWN PLATES AND ASSOCIATED INSTALLATION ANCHORS PROVIDED BY PRE-FABRICATED EQUIPMENT SHELTER MANUFACTURER. CONTRACTOR SHALL VERIFY ALL SHIM & TIE-DOWN QUANTITIES AND LOCATIONS WITH MANUFACTURER PRIOR TO PERFORMING FOUNDATION WORK.
2. SLAB/TOP OF WALL TOLERANCE IS 1/4"±
3. TOP 8" OF FOUNDATION SIDES MUST BE FORMED FLAT TO ACCEPT TIE-DOWN PLATES.
4. REFER TO NOTES ON DWG. S-2 FOR ADDITIONAL REQUIREMENTS.
5. PER NEC REQUIREMENTS, THE REBAR IN FOUNDATION AND FOOTING SHALL BE BONDED TO GROUND RING WITH A #2 AWG SOLID CONDUCTOR USING LISTED AND APPROVED METHODS.
6. PROVIDE PVC SLEEVES FOR UTILITY CONDUIT PASSAGE THROUGH FOUNDATION OR CAST CONDUITS IN PLACE. REFER TO ELECTRICAL DRAWINGS FOR CONDUIT SIZES AND QUANTITIES.

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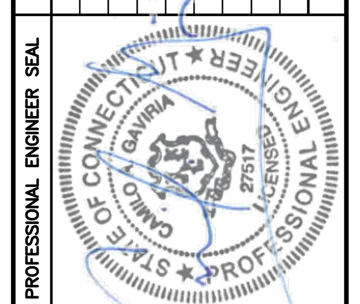

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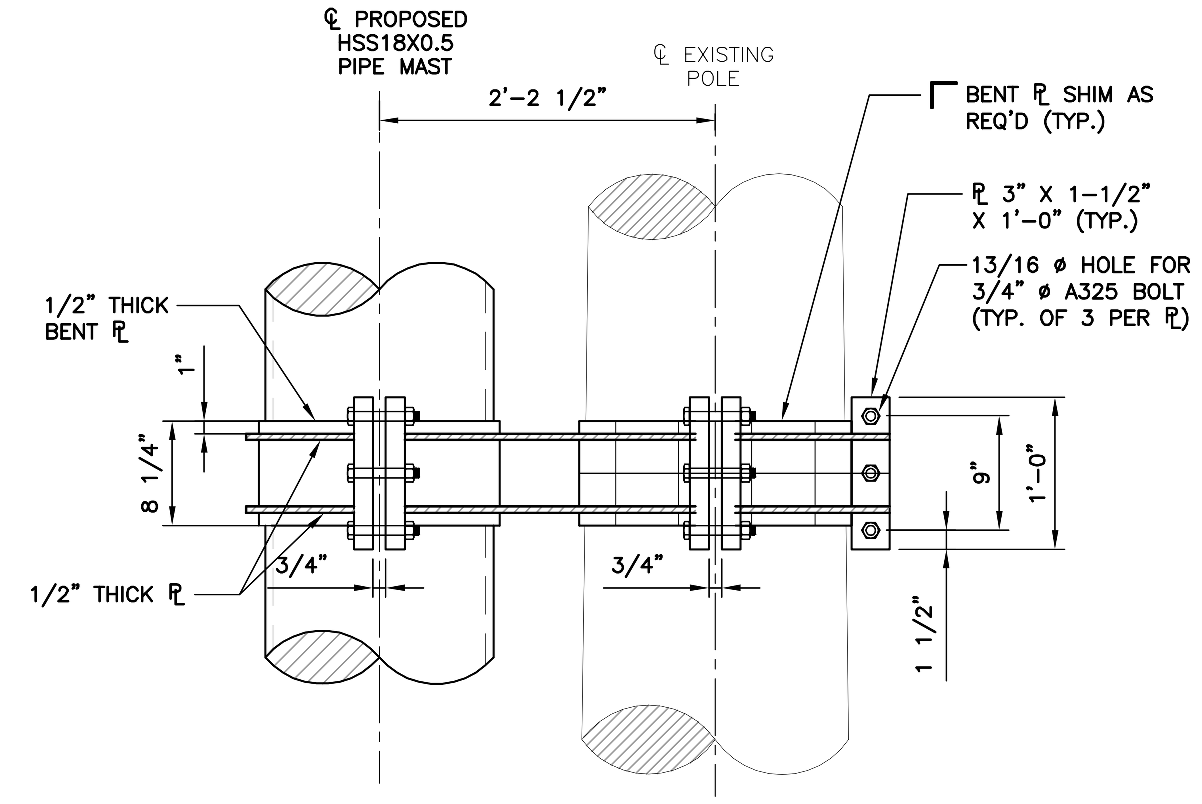
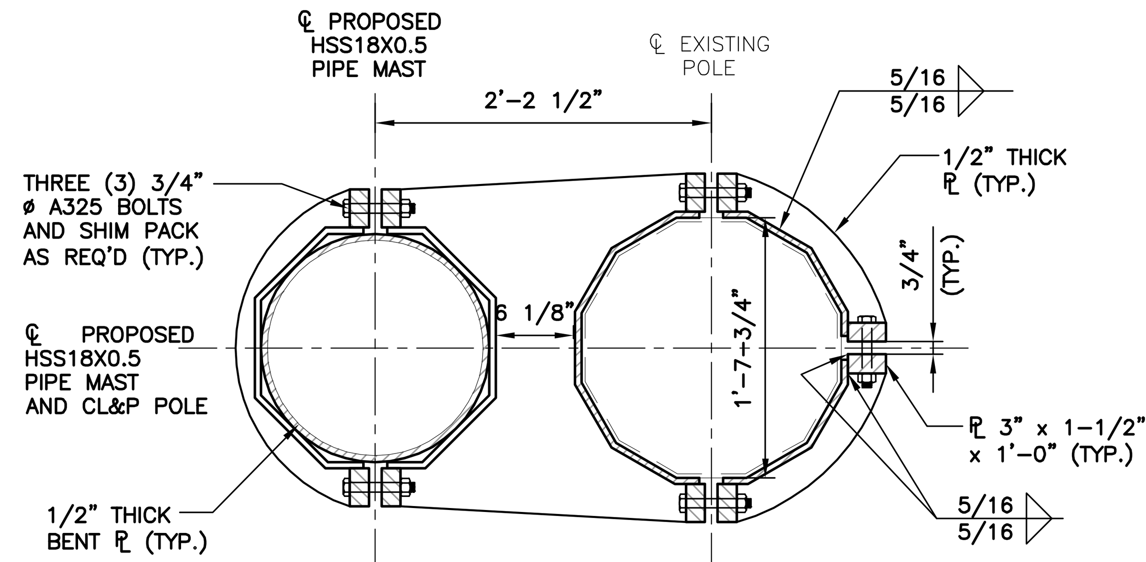
FOUNDATION PLAN AND DETAILS

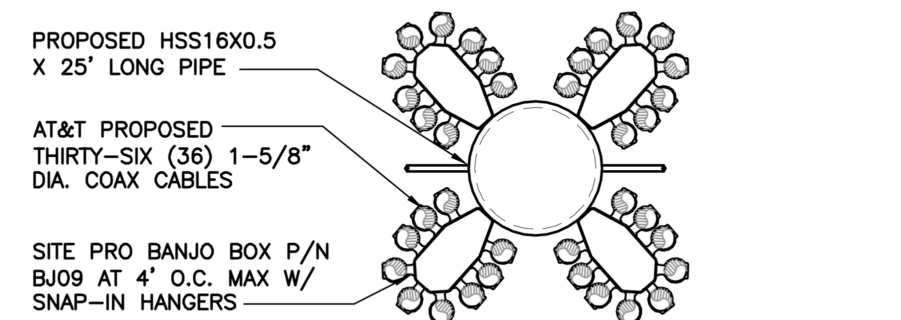
S-1



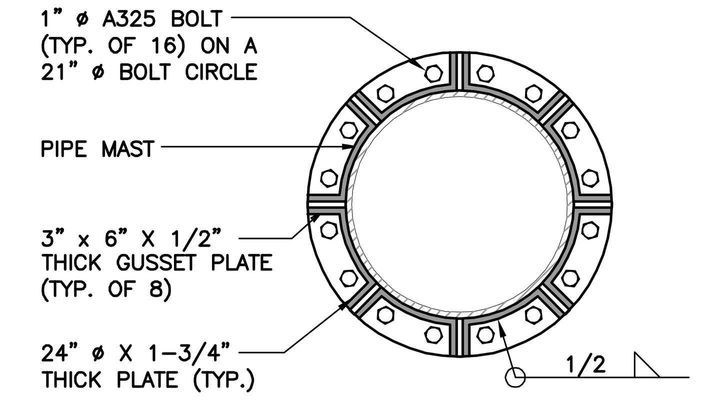
5 S-2 TOP PCS BRACKET DETAIL
SCALE: 1" = 1'-0"



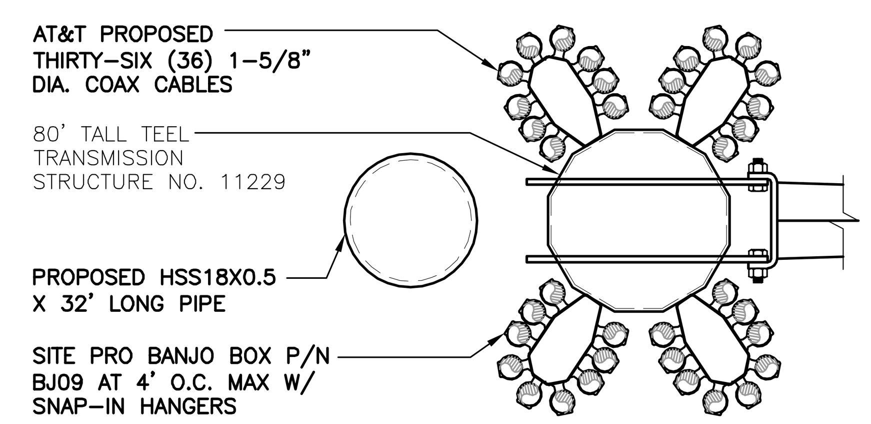
5A S-2 TOP PCS BRACKET PLAN VIEW
SCALE: 1" = 1'-0"



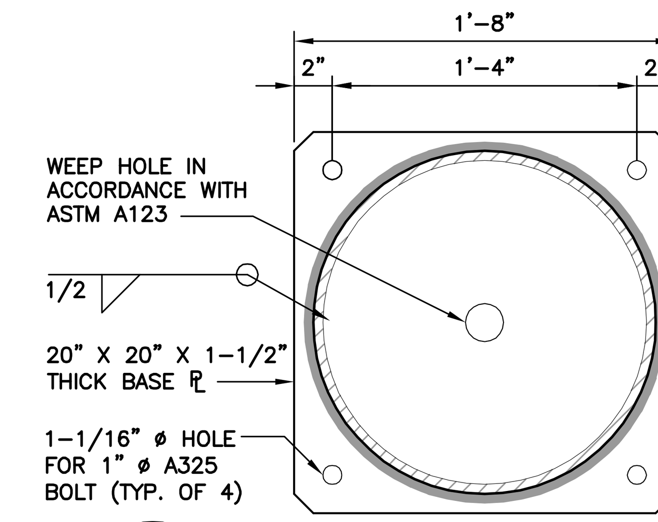
2 S-2 COAX CABLE PLAN (ABOVE TOWER)
SCALE: 3/4" = 1'-0"



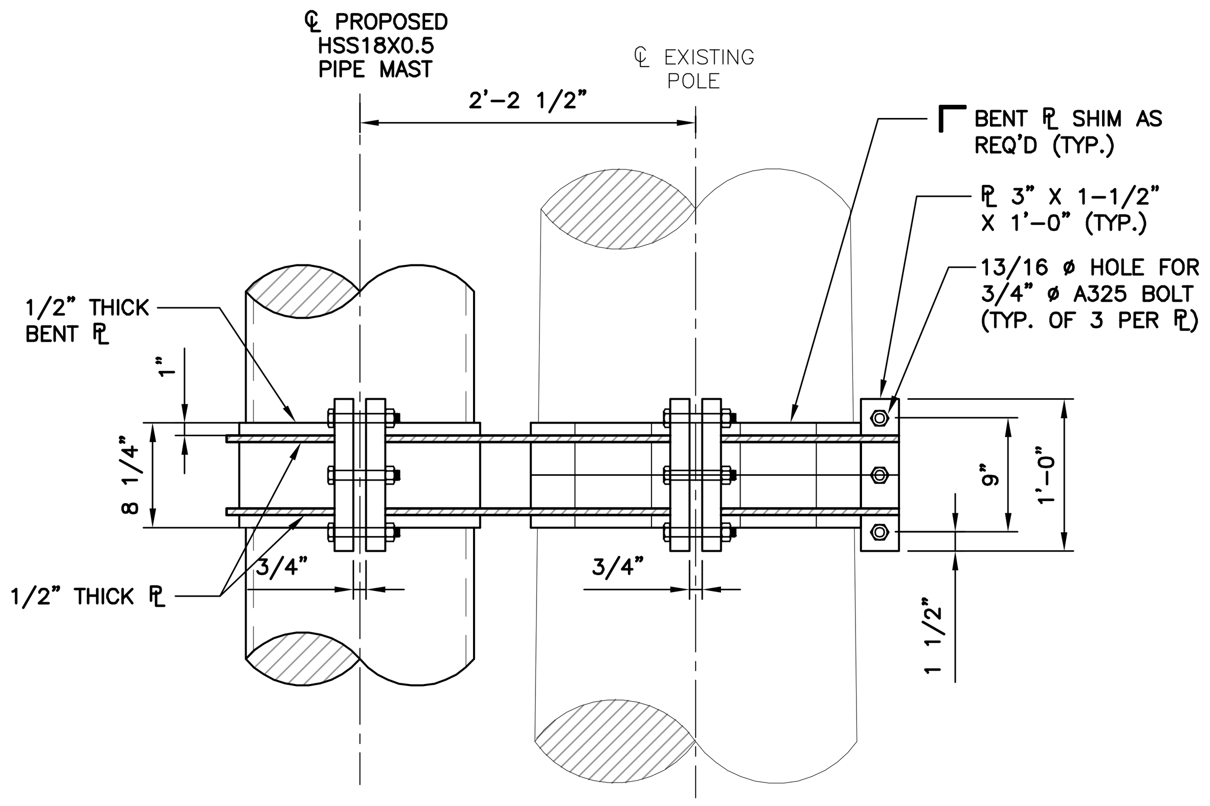
8 S-2 FLANGE PLATE DETAIL
SCALE: 1" = 1'-0"



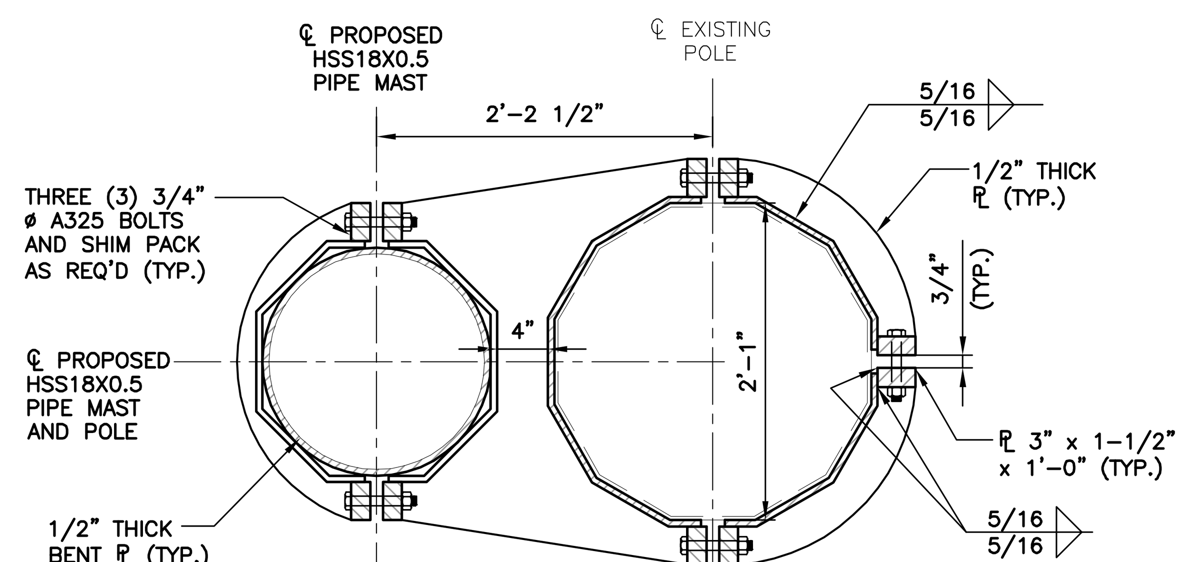
3 S-2 COAX CABLE PLAN (40'-80' ATB)
SCALE: 3/4" = 1'-0"



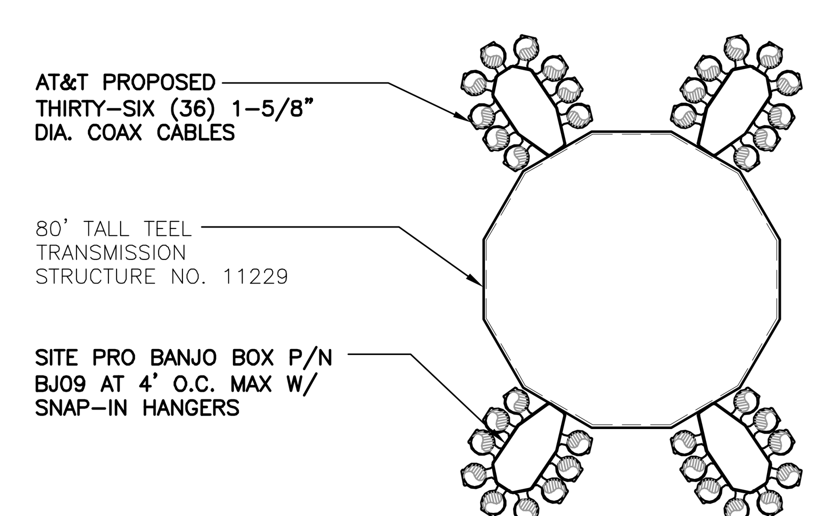
9 S-2 BASE PLATE DETAIL
SCALE: 1-1/2" = 1'-0"



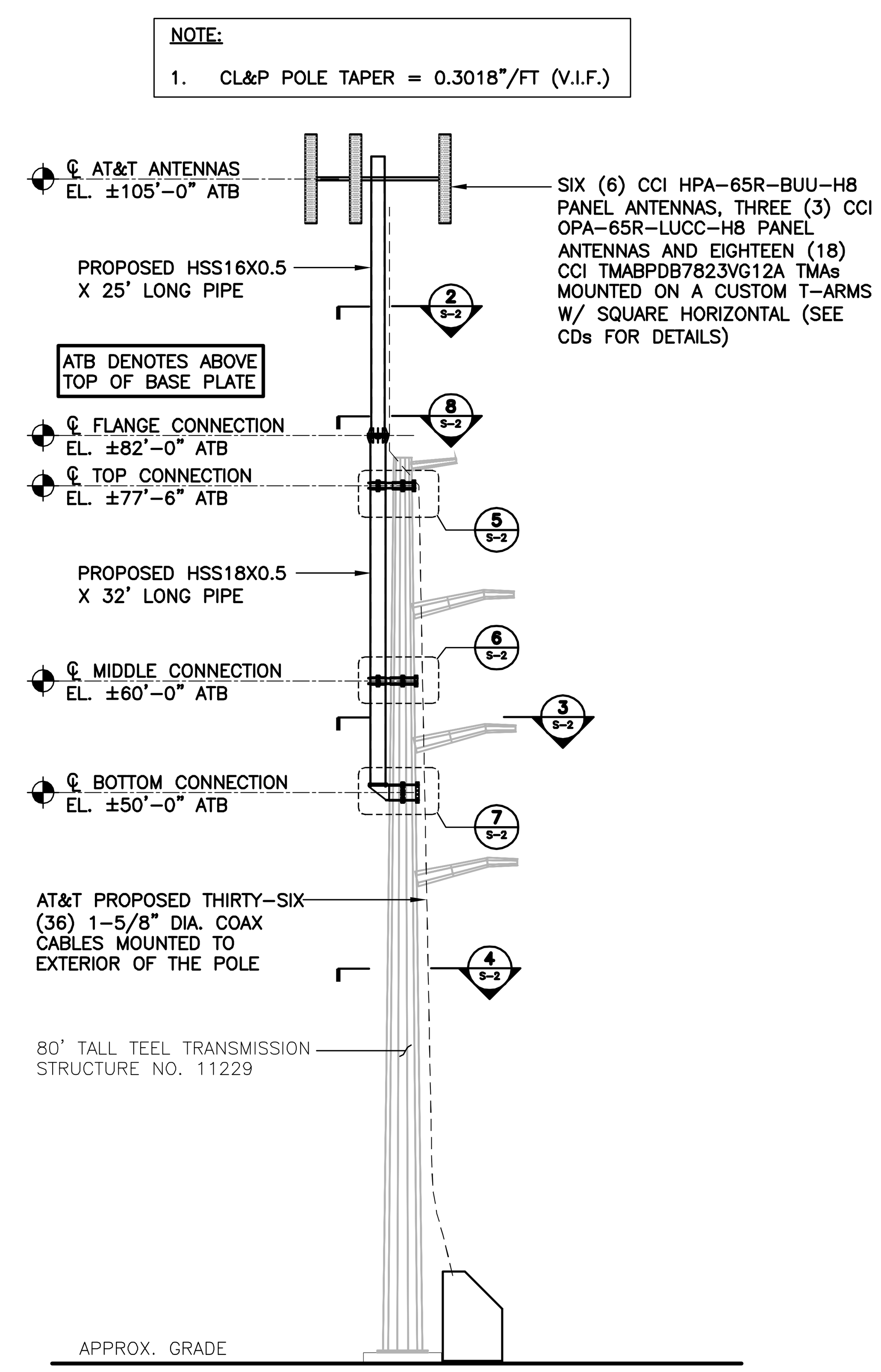
6 S-2 MIDDLE PCS BRACKET DETAIL
SCALE: 1" = 1'-0"



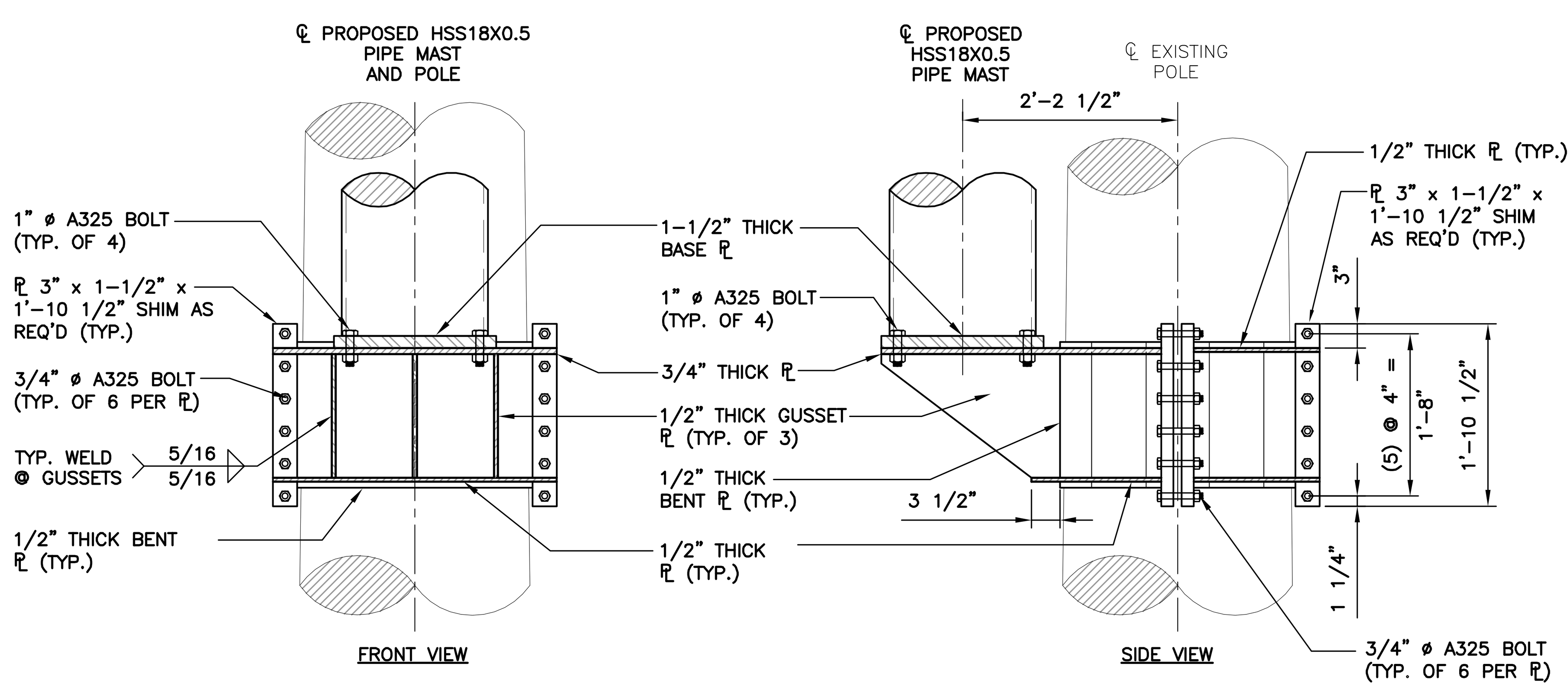
6A S-2 MIDDLE PCS BRACKET PLAN VIEW
SCALE: 1" = 1'-0"



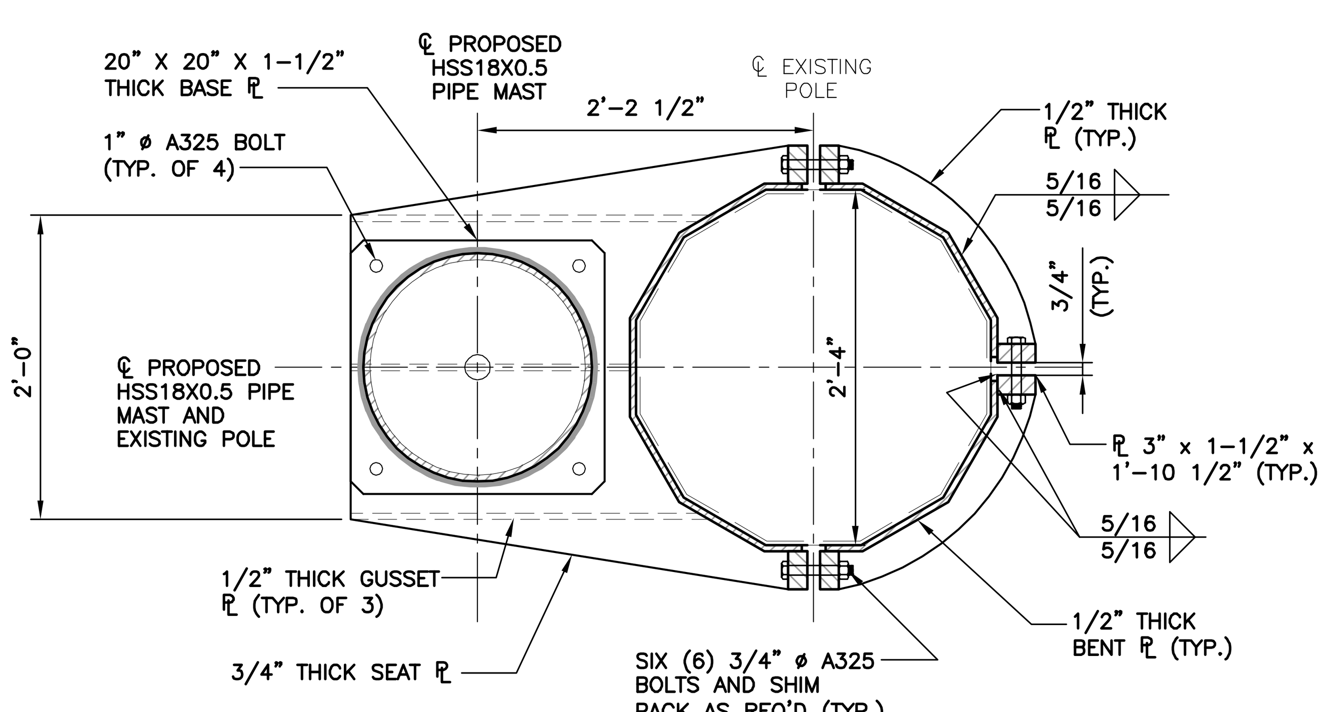
4 S-2 COAX CABLE PLAN (0'-40' ATB)
SCALE: 3/4" = 1'-0"



1 S-2 TOWER AND MAST ELEVATION
SCALE: NTS



7 S-2 BOTTOM PCS BRACKET DETAIL
SCALE: 3/4" = 1'-0"



7A S-2 BOTTOM PCS BRACKET PLAN VIEW
SCALE: 1" = 1'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
13	01/31/18	CAG	TJL	CONSTRUCTION DRAWINGS – U/G VAULT DETAILS
12	12/12/17	FJP	CAG	CONSTRUCTION – REVISED MOUNT SUPPORT
11	11/08/17	LGL	CAG	CONSTRUCTION – ANTENNA CABLE QUANTITY CHANGE
5	07/13/15	CAG	LVP	REVISED UTILITY EASEMENT
4	03/24/14	HMR	CFC	REVISED FOR SITE SURVEY
3	02/14/14	HMR	CFC	REVISED FOR PROPANE TANK – CLIENT REVIEW
2	11/19/13	HMR	CFC	REVISED ANTENNA AZIMUTH
1	11/08/13	HMR	CFC	CONSTRUCTION
0	10/25/13	HMR	CFC	CONSTRUCTION – CLIENT REVIEW

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JOB NO. 13130.000

ANTENNA MOUNT DETAILS

S-2

Sheet No. 13 of 22

ELECTRICAL ABBREVIATIONS

ABBREVIATION	DESCRIPTION
AFF	ABOVE FINISHED FLOOR
AIC	AMPERE INTERRUPTING CAPACITY
AWG	AMERICAN WIRE GAGE
C	CONDUIT
EGR	EXTERIOR GROUND RING
G – GRD	GROUND
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
IGR	INTERIOR GROUND RING MOUNTED 9'–0" ABOVE FINISHED FLOOR
KWH	KILO–WATT–HOUR
MCCB	MOLDED CASE CIRCUIT BREAKER
MDP	MAIN DISTRIBUTION PANEL
NC	NORMALLY CLOSED
OC	ON CENTER
SA	SURGE ARRESTOR
VM	VOLTAGE MONITOR
WP	WEATHERPROOF
ER	EXISTING TO REMAIN
RR	REMOVE AND RELOCATE
RE	RELOCATED EXISTING

GENERAL NOTES

1. REFER TO CIVIL DRAWINGS FOR ACTUAL LOCATIONS OF STRUCTURES ON SITE.
2. COORDINATION, LAYOUT AND FURNISHING OF CONDUIT, CABLE AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL / TELECOMMUNICATIONS SERVICES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
3. THE EXACT BUILDING FOUNDATION SIZE AND BUILDING WALL PENETRATIONS FOR UTILITIES SHALL BE CONFIRMED WITH THE BUILDING SPECIFICATIONS AND PLANS PRIOR TO LAYOUT.
4. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
5. PROVIDE CADWELD CONNECTION STYLES: THROUGH (CABLE TO CABLE) TYPE "TA"
(CABLE TO SURFACE) TYPE "LA" OR "VS" (PIPE)
(CABLE TO ROD) TYPE "GT" OR "NC"
(CABLE TO CABLE) TYPE "SS"
6. EXTEND UTILITY SERVICES TO UTILITY BACKBOARD IN OWNER'S EQUIPMENT SHELTER. COORDINATE WITH SHELTER SHOP DRAWINGS FOR LOCATION. COORDINATE ALL UTILITY SERVICES TO NEW EQUIPMENT SHELTER.

WORK NOTES:

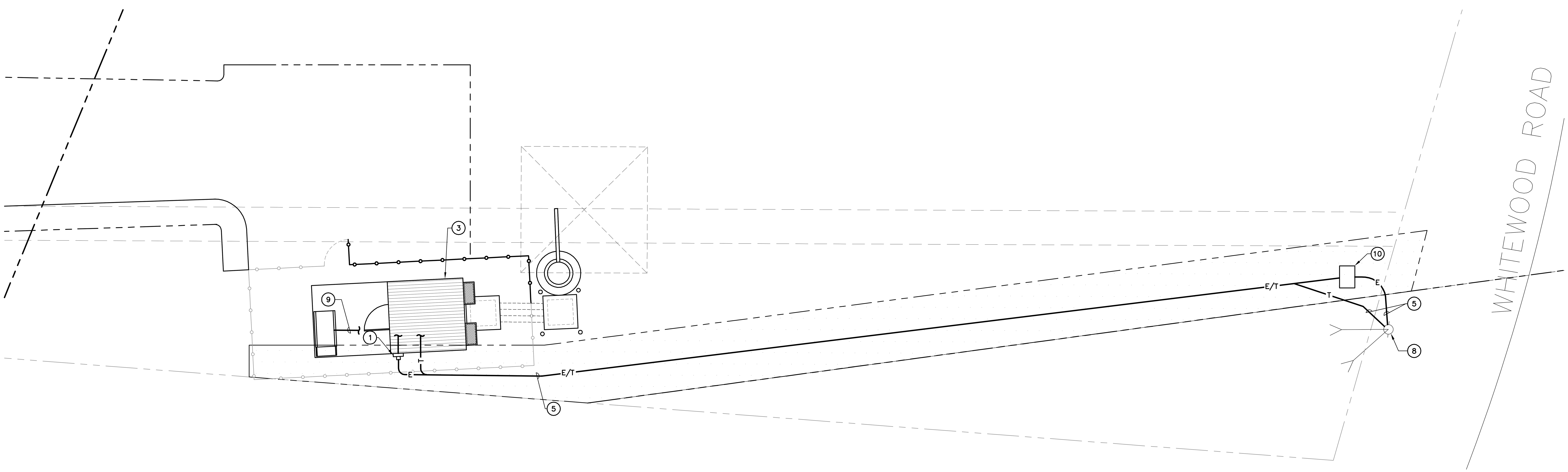
1. NEW UTILITY METERING EQUIPMENT. REFER TO RISER DUAGRAM.
2. NOT USED.
3. OUTLINE OF OWNERS EQUIPMENT SHELTER.
4. NOT USED
5. UNDERGROUND ROUTING OF ELECTRIC AND TELEPHONE SERVICES. (REFER TO RISER DIAGRAM FOR SIZE AND QUANTITY).
6. NOT USED.
7. NOT USED.
8. EXISTING UTILITY POLE #6670.
9. POWER AND CONTROL CONDUITS FROM GENERATOR. REFER TO RISER DIAGRAM.
10. UTILITY TRANSFORMER.

EASEMENT NOTES:

1. UTILITY ROUTING SHOWN ON THIS PLAN IS SCHEMATIC. CONTRACTOR SHALL COORDINATE FINAL ROUTING WITH RESPECTIVE UTILITY COMPANIES PRIOR TO PERFORMING ANY UTILITY TRENCH WORK. ALL UTILITY CONDUITS AND PULL BOXES SHALL BE LOCATED WITHIN THE EASEMENT OR OTHER APPROVED AREAS.
2. UTILITY PULL BOXES/SILOS TO BE INSTALLED IN APPROXIMATE LOCATIONS SHOWN ON THIS PLAN. CONTRACTOR TO COORDINATE FINAL PULL BOX LOCATIONS WITH RESPECTIVE LOCAL UTILITY COMPANIES.
3. ALL UTILITY EQUIPMENT SHALL BE LOCATED WITHIN THE EASEMENT OR OTHER APPROVED AREAS. PRIOR TO START OF CONSTRUCTION THE CONTRACTOR SHALL OBTAIN A VALID COPY OF EASEMENT MAPS FROM THE OWNER.
4. ALL WORK MUST BE COORDINATED WITH ALL UTILITY COMPANIES. ALL LOCATIONS AND EQUIPMENT TYPES MUST BE UTILITY COMPANY APPROVED.

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
— — —	PROPERTY LINE
———	DIRT DRIVE (EXISTING)
— — —	DRIP LINE
– – – –	CL&P RIGHT OF WAY
—— E ——	ELECTRICAL CONDUIT RUN (UNDERGROUND)
—— T ——	TELCO CONDUIT RUN (UNDERGROUND)
—— O/H ——	UTILITY LINES (OVERHEAD)
●	POWER UTILITY PULL BOX/SILO
■	TELCO UTILITY PULL BOX
◇	UTILITY POLE (EXISTING)
◆	UTILITY POLE
	GROUND BAR AT WAVE PORT
⊗	5/8" DIAMETER x 10'–0" COPPER GROUND ROD
⊠	5/8" DIAMETER x 10'–0" COPPER GROUND ROD WITH ACCESS
■	EXOTHERMIC WELD TYPE "TA"
—··—··—	NEW EXTERIOR GROUND RING



1 E-1 **COMPOUND UTILITY PLAN**
SCALE: 1/8" = 1'–0"
NORTH

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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
8	11/03/17	TJB	TGK	REVISED PER AT&T COMMENTS
7	09/08/17	CAG	TGK	REVISED RFDS AND GENERATOR MODEL
6	08/15/17	TJB	TGK	CONSTRUCTION DRAWINGS – REVISED PER SAI SA COMMENTS
5	07/13/15	TJB	CKD	REVISED UTILITY EASEMENT
4	03/24/14	HMR	CFC	REVISED FOR SITE SURVEY
3	02/14/14	HMR	CFC	REVISED FOR PROPANE TANK – CLIENT REVIEW
2	11/19/13	HMR	CFC	REVISED ANTENNA AZIMUTH
1	11/08/13	HMR	CFC	CONSTRUCTION
0	10/25/13	TJB	CKD	CONSTRUCTION – CLIENT REVIEW

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JOB NO. 13130.000

SITE UTILITY PLAN AND NOTES

E-1

RISER DIAGRAM NOTES

(1) EXISTING UTILITY POLE TO BE USED. REFER TO SITE SURVEY AND UTILITY PLAN.

(2) (2) 3" CONDUITS FOR ELECTRIC CONDUCTORS FROM POLE TO TRANSFORMER. PROVIDE ALL COUPLINGS, ADAPTERS, SWEEPS, AND ASSOCIATED HARDWARE. MATERIAL SHALL BE PER UTILITY COMPANY SPECIFICATIONS.

(3) UTILITY COMPANY APPROVED METER FOR AT&T. PROVIDE LABEL STATING "AT&T WIRELESS". ALSO PROVIDE LABEL STATING TYPE AND LOCATION OF ONSITE GENERATOR PER NEC REQUIREMENTS.

(4) 200A, 240V, 2P, SE RATED SERVICE DISCONNECT CIRCUIT BREAKER.

(5) (3) 600 KCMIL, (1) #3 AWG GROUND, 4"C.

(6) TWO 4" CONDUITS WITH PULL ROPES FOR TELEPHONE COMPANY CONDUCTORS. CONDUCTORS PROVIDED BY TELEPHONE COMPANY FROM UTILITY POLE TO UTILITY BOARD. PROVIDE ALL COUPLINGS, ADAPTERS, SWEEPS, AND ASSOCIATED HARDWARE. MATERIAL SHALL BE PER TELEPHONE COMPANY SPECIFICATIONS.

(7) 200A/240V, METER MAIN COMBINATION DEVICE MOUNTED TO EXTERIOR OF SHELTER.

(8) NOT USED.

(9) 30KW DIESEL FUELED GENERATOR.

(10) WORK LIGHT ON 4 HOUR TIMER SWITCH (DAYBRITE: VFN-42-C-U-W-PG).

(11) NOT USED.

(12) NOT USED.

(13) EXTEND COMMERCIAL ELECTRIC SERVICE TO NORMAL POWER LUGS IN TRANSFER SWITCH IN AT&T WIRELESS SHELTER.

(14) NOT USED.

(15) NOT USED.

(16) NOT USED.

(17) NOT USED,

(18) EXTEND GENERATOR POWER OUTPUT CONDUCTORS TO EMERGENCY LUGS IN TRANSFER SWITCH.

(19) 200A/2P MAIN CIRCUIT BREAKER IN AVAILABLE POSITION CORRESPONDING TO METER FOR OWNER.

(20) 1/0 AWG GROUNDING ELECTRODE CONDUCTOR IN 3/4 PVC CONDUIT BONDED TO GROUNDING TRIAD LOCATED AT UTILITY BACKBOARD. GROUNDING TRIAD SHALL BE BONDED TO COMPOUND GROUND RING WITH #2 AWG SOLID TINNED BARE COPPER WIRE.

(21) (3) #3/0 AWG, (1) #6 AWG GROUND, 2-1/2"C.

(22) (2) #12 AWG, #12 AWG GROUND, 3/4"C. FROM DEDICATED 20A/1P CIRCUIT BREAKER IN OWNERS POWER PANEL TO RECEPTACLE IN TELCO BOXES.

(23) EXPANSION COUPLING, TYPICAL.

(24) NOT USED.

(25) AT&T EQUIPMENT SHELTER.

(26) GENERATOR BLOCK HEATER.

(27) 200A, 240V, MAIN CIRCUIT BREAKER AT GENERATOR OUTPUT.

(28) GROUND GENERATOR PER NEC AND MANUFACTURER'S SPECIFICATIONS.

(29) 1" CONDUIT WITH CONTROL AND ALARM CONDUCTORS FROM GENERATOR TO TRANSFER SWITCH AND ALARM PANEL IN SHELTER. INSTALL CONDUCTORS AS REQUIRED BY MANUFACTURER.

(30) REMOTE GENERATOR SHUT OFF SWITCH IN BREAK GLASS ENCLOSURE MOUNTED TO THE EXTERIOR OF THE SHELTER IN LOCATION APPROVED BY LOCAL FIRE MARSHAL. INSTALL ALL REQUIRED SIGNAGE.

(31) 3/4" CONDUIT AND CONDUCTORS REQUIRED FOR PROPER OPERATION OF EMERGENCY GENERATOR SHUT OFF SWITCH.

(32) DEDICATED 20A, 120V, CIRCUIT IN 3/4" CONDUIT FROM AT&T ELECTRIC PANEL TO GENERATOR BLOCK HEATER.

(33) DEDICATED 20A, 120V, CIRCUIT IN 3/4" CONDUIT FROM AT&T ELECTRIC PANEL TO GENERATOR BATTERY CHARGER, DUPLEX RECEPTACLE, AND WORK LIGHT.

(34) DUPLEX GFCI RECEPTACLE IN WEATHERPROOF ENCLOSURE MOUNT IN CONVENIENT LOCATION AT GENERATOR.

(35) GENERATOR BATTERY CHARGER.

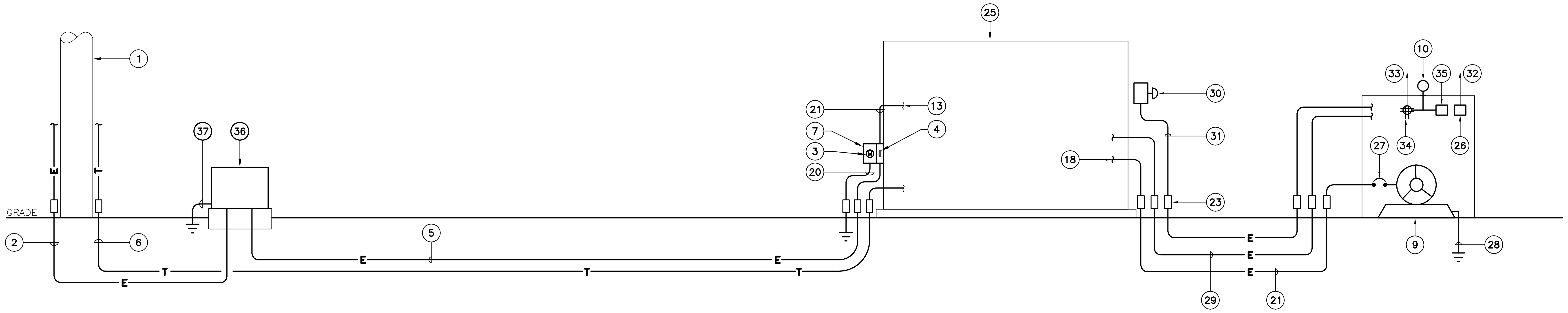
(36) TRANSFORMER PROVIDED BY UTILITY COMPANY. TRANSFORMER VAULT, HOUSING, AND GROUND GRID BY ELECTRICAL CONTRACTOR, PER UTILITY COMPANY SPECIFICATIONS.

(37) PROVIDE TRANSFORMER GROUNDING PER NEC AND UTILITY COMPANY SPECIFICATIONS.

GENERAL RISER NOTES

1. CONTRACTOR TO VERIFY ALL CONDUIT ROUTING AND INSTALLATION REQUIREMENTS WITH LOCAL UTILITIES PRIOR TO INSTALLATION.
2. ALL CONDUITS SHALL HAVE EXPANSION COUPLINGS WHERE EXTENDING ABOVE GRADE.
3. ALL UTILITY SUPPLY CONDUITS, CONDUCTORS AND ASSOCIATED EQUIPMENT MUST BE LOCATED WITHIN THE LIMITS OF THE UTILITY EASEMENT. COORDINATE WITH OWNER FOR EASEMENT DOCUMENTATION.
4. REFER TO SITE UTILITY PLAN.
5. TELEPHONE EQUIPMENT SHOWN APPROXIMATE. COORDINATE WITH TELEPHONE UTILITY COMPANY AND PROVIDE ALL SPECIFIED EQUIPMENT.
6. COORDINATE SERVICE EQUIPMENT INTERRUPTING RATING WITH AVAILABLE FAULT CURRENT FROM UTILITY COMPANY. EQUIPMENT SHALL NOT BE RATED LESS THAN 65 KAIC.
7. ALL TELEPHONE AND ELECTRIC UTILITY WORK MUST BE COORDINATED WITH EACH UTILITY COMPANY, AND ALL EQUIPMENT MUST BE UTILITY COMPANY APPROVED. CONTRACTOR SHALL PROVIDE ALL ELEMENTS NOT PROVIDED BY UTILITY COMPANIES.
8. CONDUCTOR SIZES SHALL NOT BE REDUCED OR SUBSTITUTED WITHOUT ENGINEERS APPROVAL.
9. INSTALL PULLROPES IN ALL EMPTY CONDUITS.
10. ALL CONDUCTORS AND CONDUCTOR TERMINATIONS SHALL BE RATED FOR 75°C OPERATION.
11. COORDINATE WITH SHELTER SHOP DRAWINGS FOR ITEMS PROVIDED WITH SHELTER.
12. COORDINATE ELECTRIC UTILITY WORK WITH GREG MILNER (203)-597-4475. REFER TO NEW SERVICE REQUEST #: 178-8862.

EQUIPMENT SHELTER BY OTHERS. VERIFY ALL SHELTER DIMENSIONS, EQUIPMENT DIMENSIONS, EQUIPMENT LOCATIONS AND UTILITY OPENINGS WITH BUILDING SHOP DRAWINGS PRIOR TO COMMENCEMENT OF WORK.



1 / E-2 **RISER DIAGRAM**
SCALE: N.T.S.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
8	11/03/17	TJB	TGK	REVISED PER AT&T COMMENTS
6	08/15/17	TJB	TGK	CONSTRUCTION DRAWINGS – REVISED PER SAI SA COMMENTS
5	07/13/15	TJB	CKD	REVISED UTILITY EASEMENT
4	03/24/14	HMR	CFC	REVISED FOR SITE SURVEY
3	02/14/14	HMR	CFC	REVISED FOR PROPANE TANK – CLIENT REVIEW
2	11/19/13	HMR	CFC	REVISED ANTENNA AZIMUTH
1	11/08/13	HMR	CFC	CONSTRUCTION
0	10/25/13	TJB	CKD	CONSTRUCTION – CLIENT REVIEW

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ELECTRICAL RISER DIAGRAM, NOTES AND LEGEND

E-2

Sheet No. 15 of 22

CELLULAR GROUNDING NOTES

OBJECTIVE

PROVIDE A CELLULAR GROUNDING SYSTEM WITH MAXIMUM ALTERNATING CURRENT RESISTANCE OF 5 OHMS BETWEEN ANY POINT ON THE GROUNDING SYSTEM AND REFERENCE GROUND. PROVIDE EXTERIOR GROUNDING SCHEME WITH OWNERS APPROVAL AS REQUIRED TO ACHIEVE DESIRED MAXIMUM AC RESISTANCE TO GROUND. CONNECT

TESTING

CONTRACTOR TO PROVIDE AN INDEPENDENT TESTING CONTRACTOR TO DETERMINE THE GROUNDING SYSTEM RESISTANCE BY USE OF THE THREE POINT TEST AND AN AEMC MODEL 4500, OR APPROVED EQUAL. TEST TO BE PERFORMED PRIOR TO CONNECTION OF POWER SUPPLY TO THE CELL SITE AND CONNECTION OF THE GROUNDING SYSTEM TO THE WATER MAIN OR AC SUPPLY AS APPLICABLE.

CONDUCTOR USED FOR CELLULAR GROUNDING SYSTEM

EGR – #2 AWG ANNEALED SOLID TINNED BARE COPPER
IGR – #2 AWG ANNEALED STRANDED (7 STRAND) 'THW' GREEN COLORED INSULATION
INTER–BUS EXTENSION (FROM IGR TO EGR) – SEE DETAILS
EXTERNAL BOND CONNECTIONS TO EGR – #2 ANNEALED SOLID TINNED BARE COPPER
INTERIOR BOND CONNECTIONS TO IGR – #6 ANNEALED STRANDED (7 STRAND) 'THW' GREEN COLORED INSULATION

MINIMUM BENDING RADIUS

IGR #2 : 1'–0" NOMINAL AND 8" MINIMUM
EGR #2 : 2'–0" NOMINAL AND 8" MINIMUM
CELLULAR GROUNDING CONDUCTOR SHALL BE AS STRAIGHT AS POSSIBLE WITH MINIMUM 6" BENDING RADIUS.

FASTENER FOR CELLULAR GROUNDING CONDUCTOR

USE NON–METALLIC FASTENER AND STANDOFF 'CLIC' (AVAIL. FROM NEFCO 203–289–0285) TO SURFACE SUPPORT CONDUCTOR 3" AWAY FROM SURFACES.

SPACING OF FASTENERS: 2'–0" O.C. OUTSIDE BUILDING
3'–0" O.C. INSIDE BUILDING

GROUNDING ELECTRODE

GROUNDING ELECTRODE SHALL BE 5/8" DIA. x 10'–0" I. COPPER CLAD STEEL ROD. ADJUST LOCATION OF GROUNDING ELECTRODE IF SOIL CONDITION IS NOT CONDUCTIVE (GRAVEL, SANDY SOIL, ROCKS). SPACE GROUNDING ELECTRODES 8'–0" TO 10'–0" APART. ELECTRODES SHALL BE DRIVEN ONLY WITH PROPER DRIVER SLEEVE TO PREVENT MUSHROOMING TOP OF ROD. WHEN ROCK BOTTOM IS ENCOUNTERED, THE ELECTRODE SHALL BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45° FROM THE VERTICAL AWAY FROM STRUCTURES. TOP OF GROUNDING ELECTRODE SHALL BE MIN. 3'–6" BELOW FINISH GRADE.

CONNECTIONS ABOVE GRADE (MECHANICAL)

COMPRESSION LUG CONNECTOR – 15 TON COMPRESSION, 2 HOLE, LONG BARREL, ELECTRO TINNED PLATED, HIGH CONDUCTIVITY, COPPER 600V RATED. USE 1/4" ø BOLT, 3/4" SPACING LUGS TO BOND OBJECTS FROM THE IGR. (CONNECTOR SHALL BE BURNDY HYLUG SERIES OR EQUAL.)

EXOTHERMIC WELD LUG CONNECTOR – 2 HOLE, OFFSET, ELECTRO TINNED PLATED, HIGH CONDUCTIVITY, COPPER 600V. USE 1/2"ø BOLT, 1–3/4" SPACING LUGS. CONNECTOR SHALL BE CADWELD CONNECTION STYLE (CABLE TO SURFACE) TYPE LA, LUG SIZE 1/8 x 1. EXOTHERMIC WELD TO LUG AS REQUIRED.

C–TAP COMPRESSION CONNECTOR – HIGH CONDUCTIVITY COPPER FOR MAIN TO BRANCH LINE TAPPING. (CONNECTOR SHALL BE BURNDY HYTAP SERIES OR EQUAL.)

MECHANICAL CONNECTIONS

USE MATCHING MANUFACTURER TOOL AND DIE FOR COMPRESSION CONNECTION.

APPLY ANTI–OXIDANT CONDUCTIVITY ENHANCER COMPOUND ON SURFACES THAT ARE COMPRESSED.

SURFACES INTENDED TO BE CONNECTED WITH MECHANICAL CONNECTORS SHALL BE BARE METAL TO BARE METAL. PRIME AND PAINT OVER BONDED AREA TO PREVENT CORROSION.

WHEN BONDING #2 TO #2

EXTERIOR OF BUILDING – USE EXOTHERMIC WELD CONNECTION
INTERIOR OF BUILDING – USE COMPRESSION CONNECTION ON STRANDED CONDUCTORS ONLY.
– USE EXOTHERMIC WELD CONNECTION ON SOLID CONDUCTOR.

WHEN BONDING #2 TO FENCE POST

USE EXOTHERMIC WELD 'CADWELD TYPE VS' CONNECTION TO FENCE POST STEEL SURFACE. TEST WELD FOR POSSIBLE BURN THRU. PATCH WELDED AREA WITH GALVANIZED COATING AS REQUIRED FOR PROPER WELDED PERMANENT BOND. REFER TO MANUFACTURER'S REQUIREMENTS FOR DETAILS

GROUNDING SYSTEM INTERCONNECTION

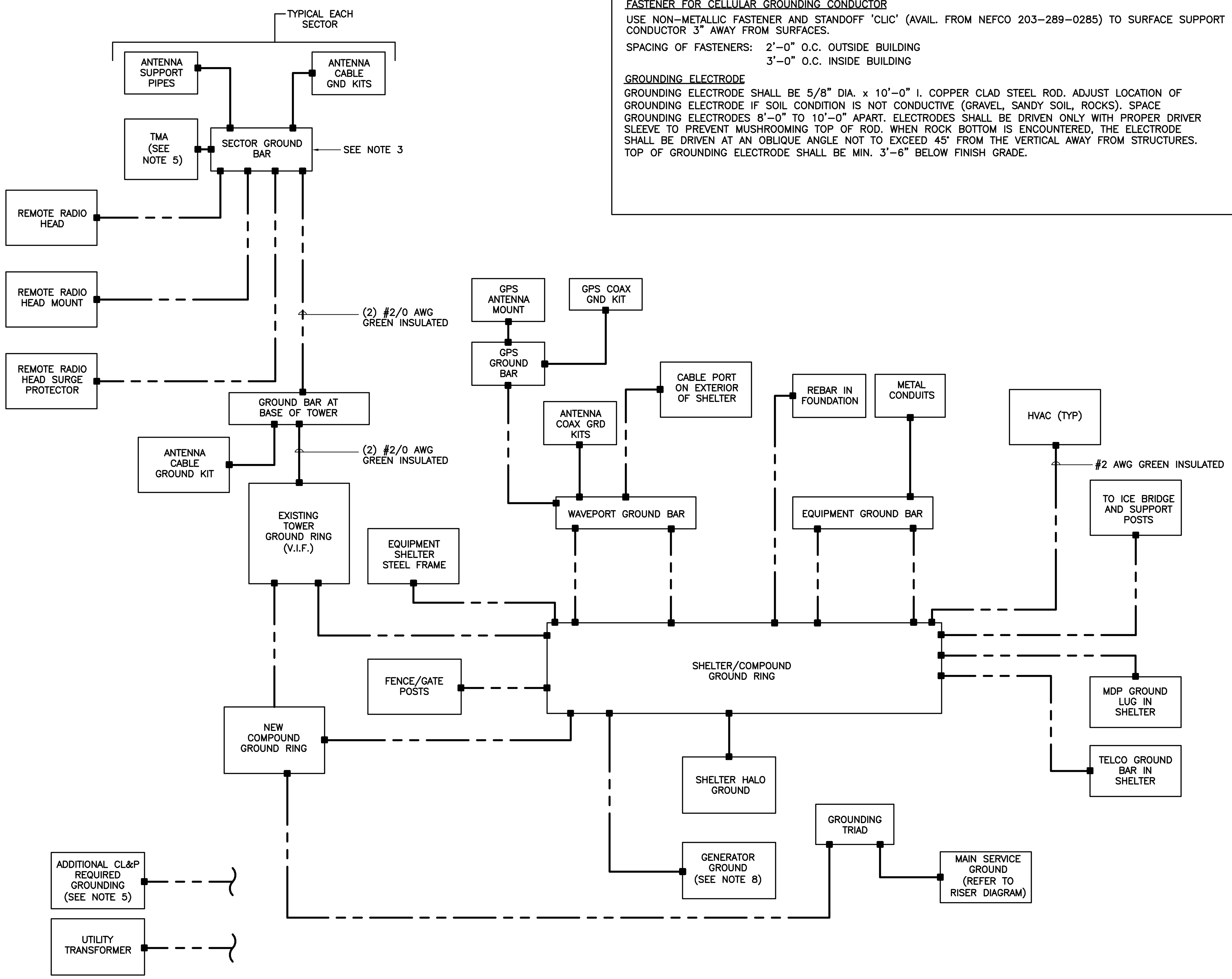
BOND THE EGR DOWN CONDUCTORS, AND/OR BURIED GROUND RING TO ANY METALLIC OBJECT OR EXISTING GROUNDING SYSTEM WITHIN 6'.

WHEN BONDING #2 TO TOWER GROUND PLATE

TOWER GROUND PLATE SHALL BE 6" x 8" x 1/4" COPPER AND BE MADE AVAILABLE TO TOWER CONTRACTOR TO BE INSTALLED DURING TOWER CONSTRUCTION. USE EXOTHERMIC WELD 'CADWELD TYPE HS' TO TOWER GROUND PLATE TEST WELD FOR POSSIBLE BURN THRU. COORDINATE THE SIZE OF THE MOUNTING HOLE WITH TOWER CONTRACTOR.

METALLIC CONDUITS

BOND ALL STEEL CONDUITS TO PANELS AT POINT OF CONTACT WITH APPROVED GROUNDING BUSHING.



1
E-3
SCHEMATIC DIAGRAM-GROUNDING SYSTEM
NOT TO SCALE

NOTES

1. GROUND CONDUCTORS SHOWN SHALL BE #2 AWG BCW UNLESS OTHERWISE NOTED.
2. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH A #2 AWG BCW.
3. ALL EXPOSED METAL OBJECTS IN SHELTER SHALL BE BONDED TO HALO GROUND.
4. ALL TOWER MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
5. COORDINATE WITH EVERSOURCE TRANSMISSION DEPARTMENT REPRESENTATIVE TO DETERMINE ADDITIONAL GROUNDING REQUIREMENTS. PROVIDE ALL REQUIRED ELEMENTS TO MEET EVERSOURCE APPROVAL.
6. COORDINATE WITH TOWER OWNER BEFORE INSTALLING ANY GROUNDING ELEMENTS ON TOWER OR BONDING TO EXISTING TOWER GROUND RING.
7. COORDINATE WITH GROUNDING PLAN AND ALL GROUNDING DETAILS IN THESE PLANS.
8. BOND GENERATOR TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
9. BOND PROPANE TANK TO GROUND RING PER NEC AND MANUFACTURER'S SPECIFICATIONS.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
8	11/03/17	TJB	TGK	REVISED PER AT&T COMMENTS
7	09/08/17	CAG	TGK	REVISED RFDS AND GENERATOR MODEL
6	08/15/17	TJB	TGK	CONSTRUCTION DRAWINGS – REVISED PER SAI SA COMMENTS
5	07/13/15	TJB	CKD	REVISED UTILITY EASEMENT
4	03/24/14	HMR	CFC	REVISED FOR SITE SURVEY
3	02/14/14	HMR	CFC	REVISED FOR PROPANE TANK – CLIENT REVIEW
2	11/19/13	HMR	CFC	REVISED ANTENNA AZIMUTH
1	11/08/13	HMR	CFC	CONSTRUCTION
0	10/25/13	TJB	CKD	CONSTRUCTION – CLIENT REVIEW

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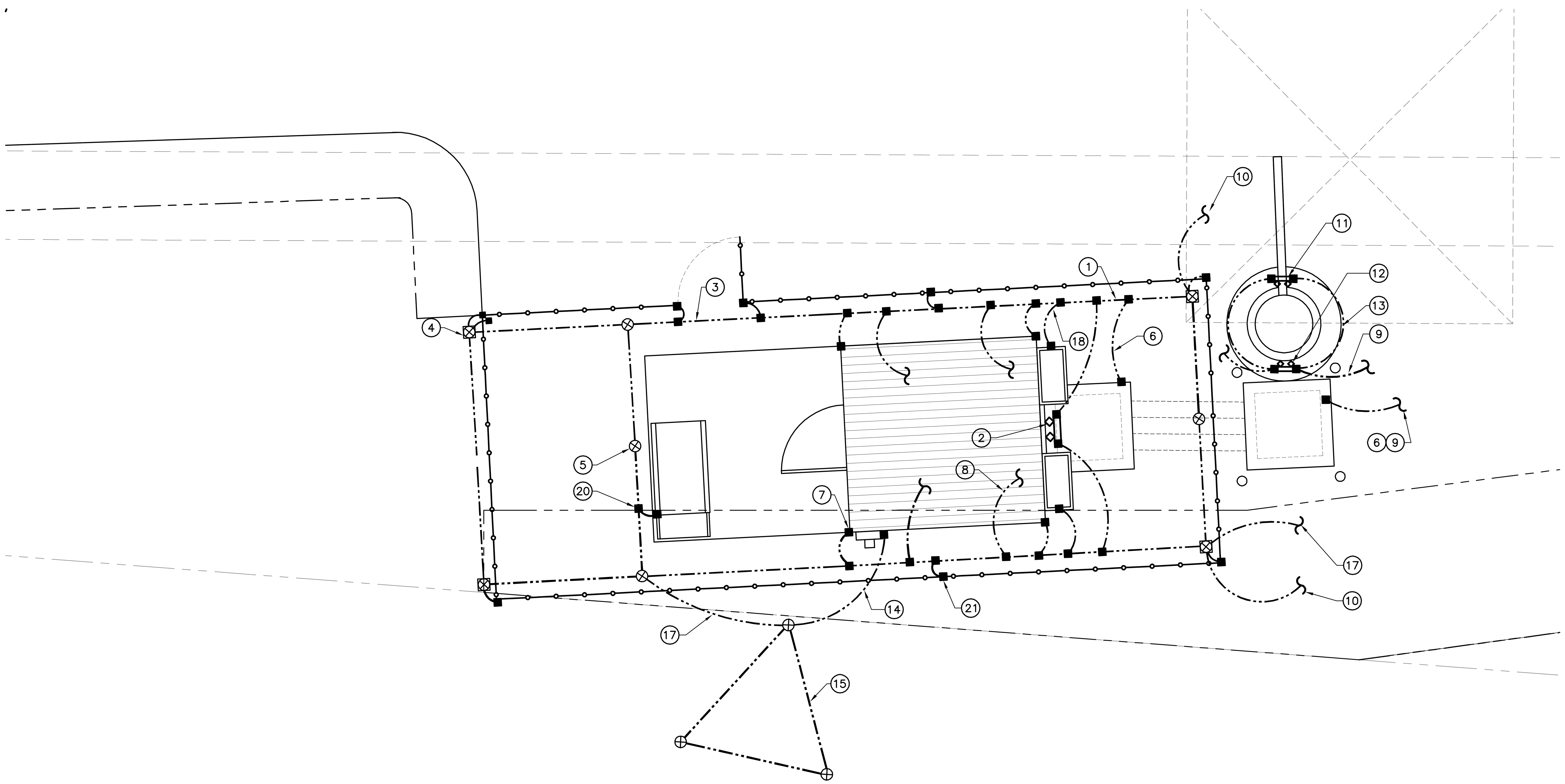
DATE: 10/08/13
SCALE: AS NOTED
JOB NO. 13130.000

GROUNDING SYSTEM DIAGRAM AND NOTES

E-3



1 E-4 **GROUNDING PLAN**
SCALE: 1/4" = 1'-0"

NORTH

GRAPHIC SCALE
4 0 2 4 8 16
(IN FEET)
1 inch = 4 ft.

GROUNDING PLAN NOTES:

1. #2 SOLID TINNED BCW GROUND RING (TYP. 2'-0" FROM OUTSIDE EDGE OF EQUIPMENT SHELTER FOUNDATION) (TYP.).
2. WAVEPORT GROUND BAR PER DETAILS.
3. EXTEND SHELTER GROUND RING ALONG ENTIRE PERIMETER OF FENCED COMPOUND.
4. GROUNDING ROD WITH ACCESS (TYP.) PER DETAILS.
5. GROUNDING ROD (TYP.) PER DETAILS.
6. BOND VAULT TO GROUND RING.
7. CADWELD EQUIPMENT BUILDING TO GROUND RING (TYP.) PER DETAILS.
8. BOND SHELTER HALO GROUND LEADS TO SHELTER GROUND RING (TYP. 4 PLACES).
9. BOND TO EXISTING TOWER GROUND RING. CONTRACTOR TO VERIFY LOCATION/CONFIGURATION IN FIELD. COORDINATE WITH TOWER OWNER. (TYP.)
10. #2 SOLID TINNED BCW BONDED TO EXISTING TOWER GROUND RING (TYP.) COORDINATE WITH TOWER OWNER.
11. UPPER TOWER MOUNTED GROUND BAR PER DETAILS.
12. LOWER TOWER MOUNTED GROUND BAR PER DETAILS.
13. BOND UPPER TOWER MOUNTED GROUND BAR TO LOWER TOWER MOUNTED GROUND BAR (2 GROUND LEADS) PER DETAILS.
14. MAIN SERVICE GROUND. (SEE RISER DIAGRAM).
15. GROUNDING TRIAD (REFER TO DETAILS).
16. NOT USED
17. BOND GROUNDING TRIAD TO COMPOUND GROUND RING.
18. BOND HVAC EQUIPMENT TO EQUIPMENT SHELTER GND RING WITH #2 AWG BCW.
19. NOT USED.
20. BOND GENERATOR TO GROUND RING PER NEC AND MANUFACTURERS SPECIFICATIONS.
21. BOND FENCE TO GROUND RING PER DETAILS (TYP).

NOTES

1. COORDINATE WITH RISER DIAGRAM AND GROUNDING SYSTEM SCHEMATIC DIAGRAM.
2. REFER TO ALL ELECTRICAL AND GROUNDING DETAILS.

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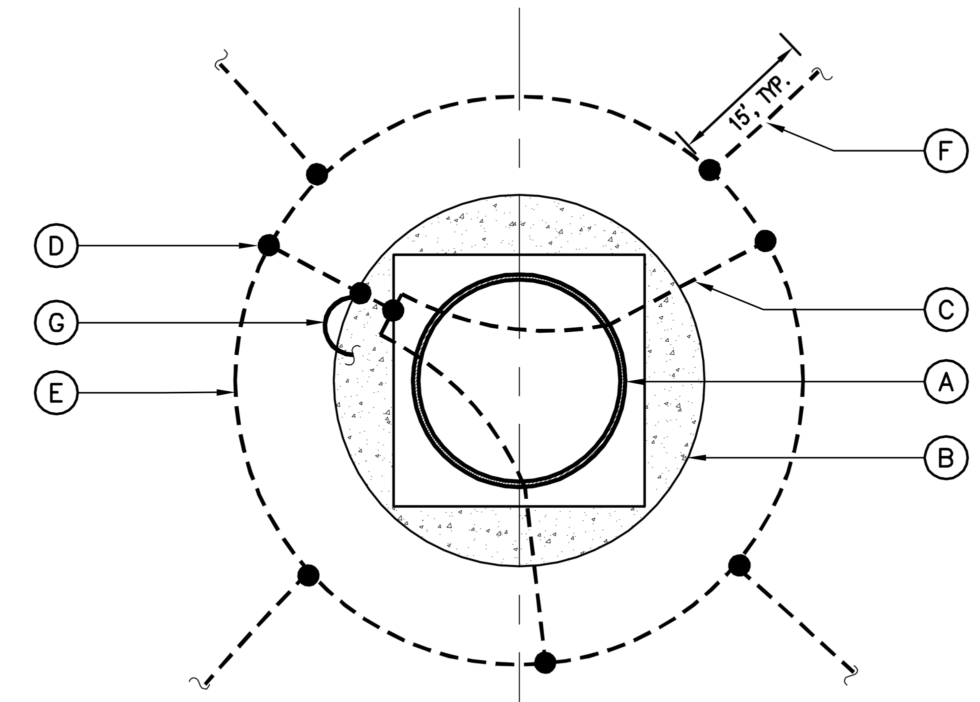
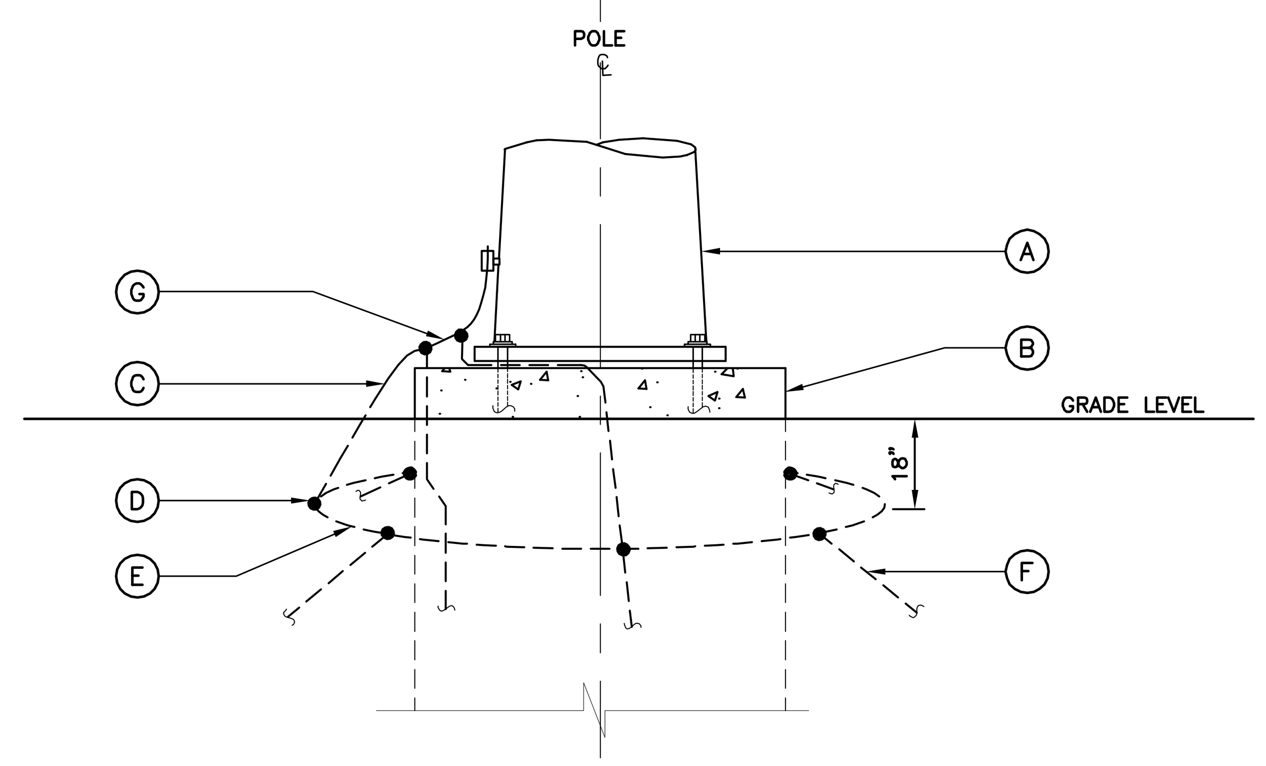
ELECTRICAL GROUNDING PLAN

E-4

Sheet No. 17 of 22





1
E-5
NU TOWER GROUNDING DETAIL
NOT TO SCALE

NU TOWER GROUNDING NOTES:
(NORTHEAST UTILITIES REQUIREMENTS)

- (A) STEEL HYBRID POLE.
- (B) CONCRETE CAISSON TYPE FOUNDATION.
- (C) STRANDED COPPERWELD SPOKE FROM POLE GROUND TO GRADING RING. SPOKES ARE A CONTINUATION OF STRANDED COPPERWELD COUNTERPOISE CONNECTING GRADING RING TO POLE GROUND. SPOKES TO SLOPE ON STRAIGHT LINE FROM GROND LEVEL TO GRADING RING.
- (D) PARALLEL GROVE CONNECTOR, NU SC190052.
- (E) GRADING RING @ 18" MINIMUM BELOW GRADE AND 24" TO 30" FROM TOWER FOUNDATION. GRADING RING TO BE 3 NO. 8 STRANDED ANEALED COPPERWELD.
- (F) COUNTERPOISE, 3 NO. 8 STRANDED ANEALED COPPERWELD (TYPICAL).
- (G) COPPERWELD POLE GROUND.

GENERAL NOTE:
THE INFORMATION ON THIS SHEET REPRESENTS TYPICAL NORTHEAST UTILITIES GROUNDING REQUIREMENTS. CONTRACTOR MUST COORDINATE WITH NORTHEAST UTILITIES SITE MANAGER FOR SPECIFIC (AND CURRENT) GROUNDING REQUIREMENTS AT THIS SITE.

NORTHEAST UTILITIES - TOWER GROUNDING SYSTEM NOTES

GENERAL–
1. THE OWNER WILL FURNISH THE WIRE, CONNECTORS, AND MISCELANEOUS MATERIAL ASSOCIATED WITH THE COUNTERPOISE GROUNDING SYSTEM.
2. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY TO INSTALL THE GROUNDING SYSTEM AND TO REHABILITATE THE RIGHT–OF–WAY AS CLOSE AS POSSIBLE TO ITS ORIGINAL CONDITION.
3. THE CONTRACTOR SHALL HANDLE AND TRANSPORT THE OWNER SUPPLIED MATERIAL FROM THE OWNER'S STOREROOMS AND YARDS TO THE JOB SITE AND SHALL RETURN SURPLUS MATERIAL AND EMPTY REELS TO DESIGNATED STOREROOMS AND YARDS UPON COMPLETION OF THE CONTRACT.
4. NORTHEAST UTILITIES WILL BE RESPONSIBLE FOR PERFORMING TESTS FOR SURGE IMPEDANCE AND WAVE IMPEDENCE.

INSTALLATION–
1. UNLESS OTHERWISE DURECTED BY THE OWNER'S REPRESENTATIVE, COUNTERPOISE SHALL BE BURIED A MINIMUM OF 24" IN CULTIVATED AREAS AND 18" IN WOODED OR OTHER AREAS. IN ROCKY AREAS OR WHERE OBSTRUCTIONS ARE ENCOUNTERED, THE COUNTERPOISE SHALL BE DIVERTED AROUND SUCH OBSTRUCTIONS. ALL INSTALLATIONS SHALL INCLUDE CONNECTIONS TO EXISTING OR PROPOSED STRUCTURES, AND SUCH CONNECTIONS SHALL BE MADE BELOW GROUND USING BOLTED PARALLEL GROVE CONNECTORS.
2. WHERE MULTIPLE STUCTURE GROUNDS EXIST AT MULTI POLE STRUCTURES, THEY SHALL BE CONNECTED TOGETHER WITH BURIED COPPERWELD WIRE, BUT ONLY IF SUCH GROUNDS HAVE METALLIC CONNECTIONS UP THE POLES TO THE SHIELD WIRE(S). AT STRUCTURES THAT HAVE PALE GROUNDS AND ALSO POLE GUY GROUNDS, CONNECTIONS SHALL BE MADE ONLY TO THE POLE GROUNDS, AND THE MINIMUM SPACING BETWEEN THE COUNTERPOISE AND ANCHOR RODS SHALL BE 10'. AT WOOD POLE STRUCTURES WHERE NO SUCH POLE GROUND EXISTS, COUNTERPOISE CONNECTIONS SHALL BE MADE TO THE POLE TOP GUYS.
3. FOR SINGLE COUNTINUOUS (TYPE A) AND SINGLE BROKEN (TYPE B) COUNTERPOISE, THE WIRE SHALL IN GENERAL BE LAYED AT THE CENTERLINE OF THE TRANSMISSION LINE. FOR DOUBLE CONTINUOUS (TYPE C) AND DOUBLE BROKEN (TYPE D) COUNTERPOISE, THE WIRES SHALL IN GENERAL SHALL BE LAYED UNDER THE OUTSIDE PHASE WIRES OF THE TRANSMISSION LINE. COUNTERPOISE SHALL NOT BE INSTALLED ACROSS BROOKS, RIVERS, HIGHWAYS, RAILROADS, OR IN THE VICINITY OF TELEPHONE CABLES OR PIPELINES.
4. AT STEEL POLE STRUCTURES, A BURIED GRADING RING AND SPOKES SHALL ALSO BE INSTALLED AROUND THE STRUCTURE UNLESS THE STRUCTURE HAS A PAD AND PIER FOUNDATION OR UNLESS A RING ALREADY EXISTS. COUNTERPOISE WIRE SHALL BE CONNECTED AT TWO PLACES TO EACH RING, AND COPPERWELD SPOKES SHALL SLOPE LINEARLY UP TO THE STRUCTURE GROUND.
5. AT WOOD POLE STRUCTURES, AN 8' LENGTH OF PLASTIC MOULDING SHALL BE STAPLED OVER THE BOTTOM WITH 8' OF DOWNLEAD.

GROUND RODS–
1. WHERE GROUND RODS ARE REQUIRED, THEY SHALL BE SINGLE OR SECTIONAL WITH THE LENGTH SPECIFIED. THEY SHALL BE DRIVEN VERTICALLY INTO THE GROUND TO A DEPTH WHICH WILL LEAVE THE TOP OF THE ROD AT LEAST 12" BELOW GRADE. ALL RODS SHALL BE CONNECTED TO COUNTERPOISE OR TO POLE GROUNDS USING BOLTED CONNECTORS.

REHABILITATION–
1. SELECTIVE CLEARING PROCEDURES WERE USED IN THE DEVELOPMENT OF THE RIGHT–OF–WAY, AND GROWTH OF SELECTED SPECIES HAS BEEN SAVED. THE CONTRACTOR SHALL NOT VIOLATE THE OWNER'S INTENT TO SAVE SELECTIVE SPECIES AND IMPOSE THE MINIMUM ENVIRONMENTAL IMPACT ON THE RIGHT OF WAY DURING THE EXECUTION OF THE WORK. THE CONTRACTOR SHALL REVIEW THE ROUTING OF EACH SECTION OF COUNTERPOISE WITH THE OWNER'S REPRESENTATIVE PRIOR TO ITS FIELD SPECIFIED LOCATION. THE CONTRACTOR IS RESPONSIBLE TO THE OWNER FOR DAMAGES TO THE RIGHT–OF–WAY IN OTHER THAN THE FIELD SPECIFIED LOCATIONS.
2. ANY BRUSH ALONG THE FIELD SPECIFIED COUNTERPOISE ROUTES WHICH IS LEFT IN AN UNSIGHTLY CONDITION BY THE INSTALLATION WORK WILL BE CUT TO THE GROUND BY THE CONTRACTOR AND LEFT IN SMALL, NEAT PILES IN PLACE WHERE CUT.
3. IN LOCATIONS WHERE EXCAVATION FOR THE INSTALLATION OF COUNTERPOISE BRINGS TO THE SURFACE ANY SMALL BOULDERS, THEY WILL BE BACKFILLED BELOW GRADE OR DIPERSED ON THE RIGHT–OF–WAY AS THE OWNER'S REPRESENTATIVE MAY DIRECT. INSTALLATION OF THE COUNTERPOISE SHALL NOT RESULT IN A PATH OF SMALL BOULDERS ON THE FINISHED SURFACE.
4. THE OWNER ANTICIPATES THAT SEASONAL CONDITIONS MAY NOT ALLOW PERMANENT REHABILITATION OF WORK SITES AND THE RIGHT–OF–WAY UPON COMPLETION OF THE INSTALLATION OF THE COUNTERPOISE. WHERE TEMPORARY REHABILITATION HAS BEEN COMPLETED IN ADVERSE SEASON, THE CONTRACTOR SHALL TAKE THE FOLLOWING STEPS:
   A. WATERBARS WILL BE CONSTRUCTED ON ACCESS ROADS AND TRENCH LINES TO SHUNT WATER OFF THIS LINE OF DISTURBED SURFACES AND CONTROL EROSION ALONG THE DISTURBED SURFACE.
   B. ALL DISTURBED SURFACES OF FOUNDATION SITES OR ALONG TRENCH LINES OR ACCESS ROADS WILL BE GRADED AND COVERED WITH HAY MULCH. SUCH DISTURBED SY=URFACES ON SLOPES GREATER THAN ONE (VERTICAL) ON FOUR (HORIZONTAL) SHALL BE COVERED WITH WOOD CHIPS.
5. AS DRYING CONDITIONS PERMIT IN THE SPRING, FOLLOWING COMPLETION OF THE INSTALLATION OF COUNTERPOISE, PERMANENT REHABILITATION OF ALL DISTURBED OR ERODED SURFACES SHALL BE ACCOMPLISHED AS FOLLOWS:
   A. LAWNS, GOLF COURSES, CEMETARIES AND OTHER SIMILAR OCCUPANCIES SHALL BE LOAMED, GRADED, FERTILIZED, SEEDED AND WHERE APPROPRIATE, MULCHED, TO ESTABLISH A REHABILITATION CONSISTANT WITH THE USE ESTABLISHED BY THE OCCUPANT.
   B. GARDENS, OTHER CULTIVATED AREAS AND PASTURES, SHALL BE GRADED AND TOPSOILED TO RESTORE THE DEPTH OF FERTILE SOIL COMMON TO THE ADJACENT GROUND. WHERE APPROPRIATE, SEEDING SHALL BE DONE IN ACCORDANCE WITH STEP C BELOW.
   C. THE CONTRACTOR SHALL SEED ALL DISTURBED AREAS ALONG THE NEW COUNTERPOISE ROUTES. SEED SHALL BE SPREAD AT THE RATE OF 100 LBS. PER ACRE AND SHALL BE AS FOLLOWS OR APPROVED EQUAL:

	% BY WEIGHT	% BY GERMINATION	% BY PURITY
CREEPING RED FESCUE	30	85	98
DOMESTIC RYE	20	90	98
KENTUCKY TALL FESCUE	50	--	--
	100		

   D. ALL OTHER DISTURBED AREAS INCLUDING REMAINING FOUNDATION SITES, ACCESS ROADS, AND REPAIR OF EROSION OF SITUATION SHALL BE SEEDED WITH MIXED SPECIFICATION ABOVE. IN REMOTE AREAS, A CONSERVATION MIX, AS USED BY THE CONNECTICUT STATE PARKS AND FOREST COMMISION MAY BE SUBSTITUTED. ALL AREAS WHICH EXPERIENCED EROSION DAMAGE AND ALL SLOPES OVER ONE (VERTICAL) AND FOUR (HORIZONTAL) WHERE TEMPORARY REHABILITAION WORK HAS BEEN DONE SHALL BE REMULCHED.
6. IT IS IMPERATIVE THAT PERMANENT REHABILITATION BE ACCOMPLISHED IN GOOD TIME, WHICH WILL ALLOW THE OCCUPANT FULL AND UNDISTURBED USE OF THE SITE IN THE SUCCEEDING SEASON, AND TO PREVENT UNNECESSARY AND UNREASONABLE SPREADING OF CONTINUATION OF DISTURBED SURFACES.
7. ANY BRUSH ALONG THE ACCESS ROADS WHICH IS LEFT IN AN UNSIGHTLY CONDITION BY THE WORK CONDUCTED, SHALL BE CUT TO THE GROUND BY THE CONTRACTOR AND LEFT IN SMALL NEAT PILES IN PLACE WHERE CUT.

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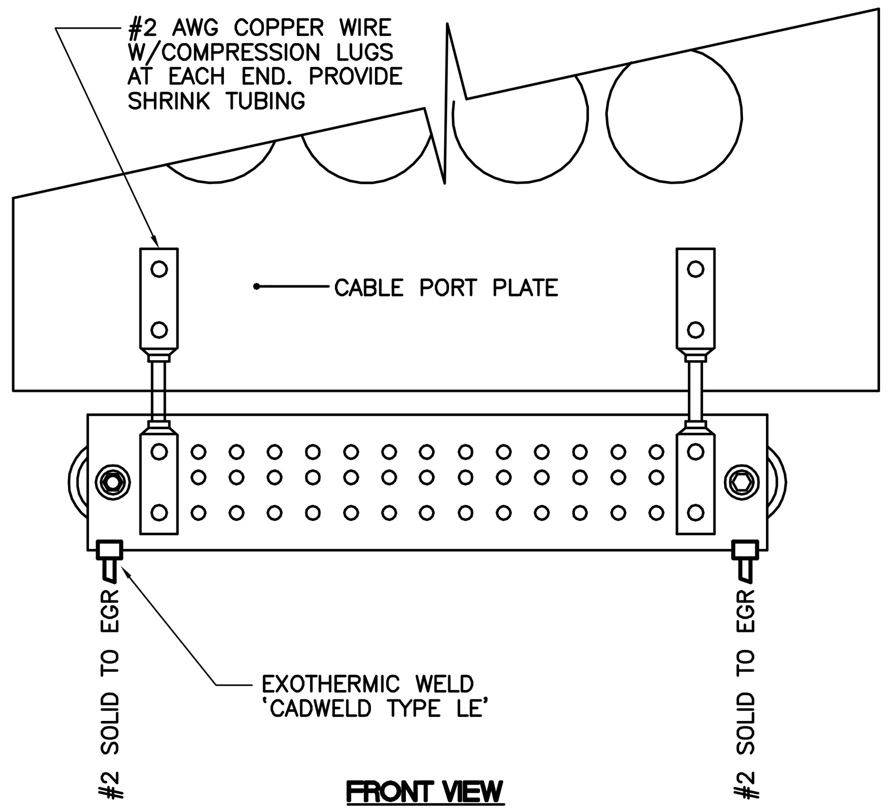
N.U.
TOWER
GROUNDING

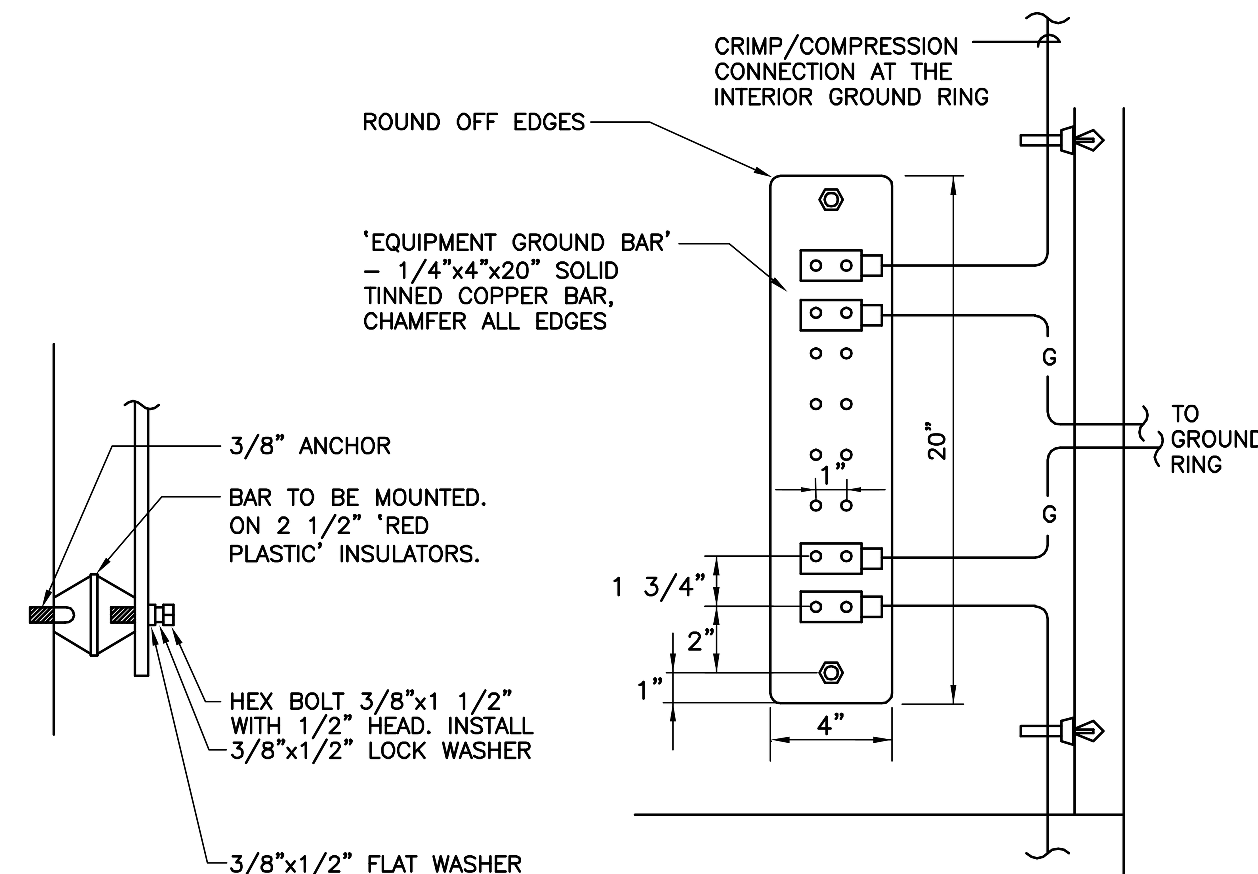
E-5

Sheet No. 18 of 22



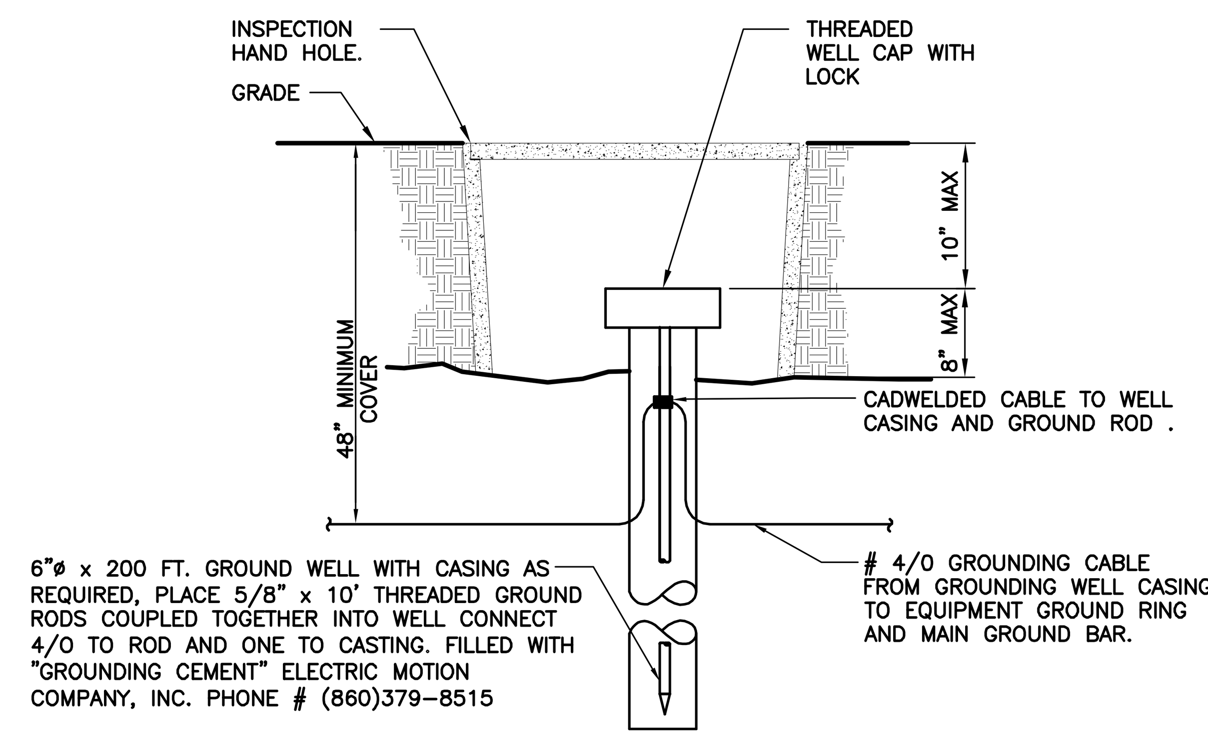
1 E-6 **WAVEPORT GROUND BAR LUG CONNECTION**

NOT TO SCALE



2 E-6 **EQUIPMENT GROUND BAR DETAIL**

NOT TO SCALE

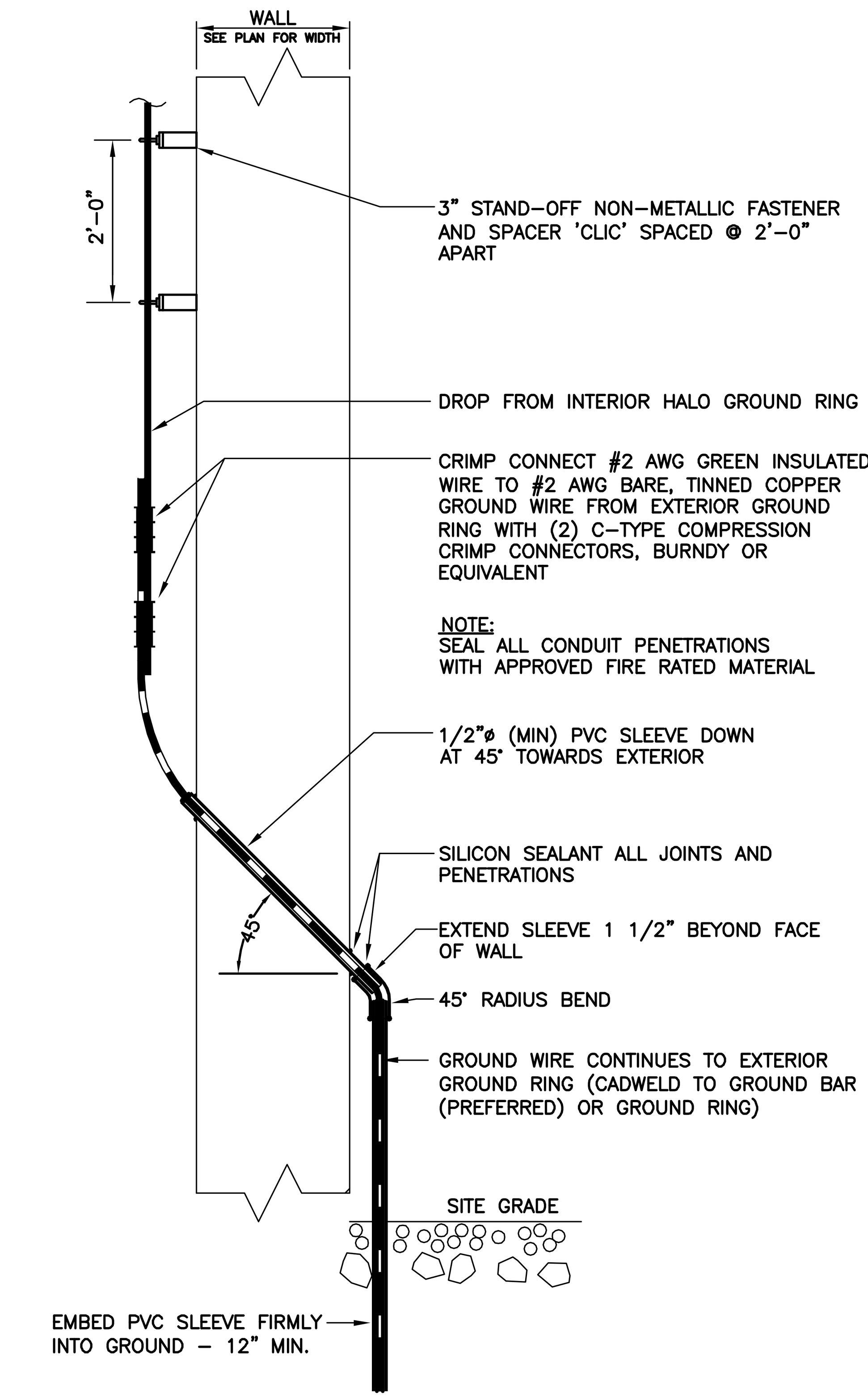


NOTE:

1. INSPECTION HAND HOLE MAY BE CONCRETE OR PVC AND SHALL BE A MINIMUM OF 12" DIA X 18" DEEP.
2. TO BE INCORPORATED INTO PROJECT IF 5 OHMS CAN NOT BE ACHIEVED AT THE PROJECT SITE

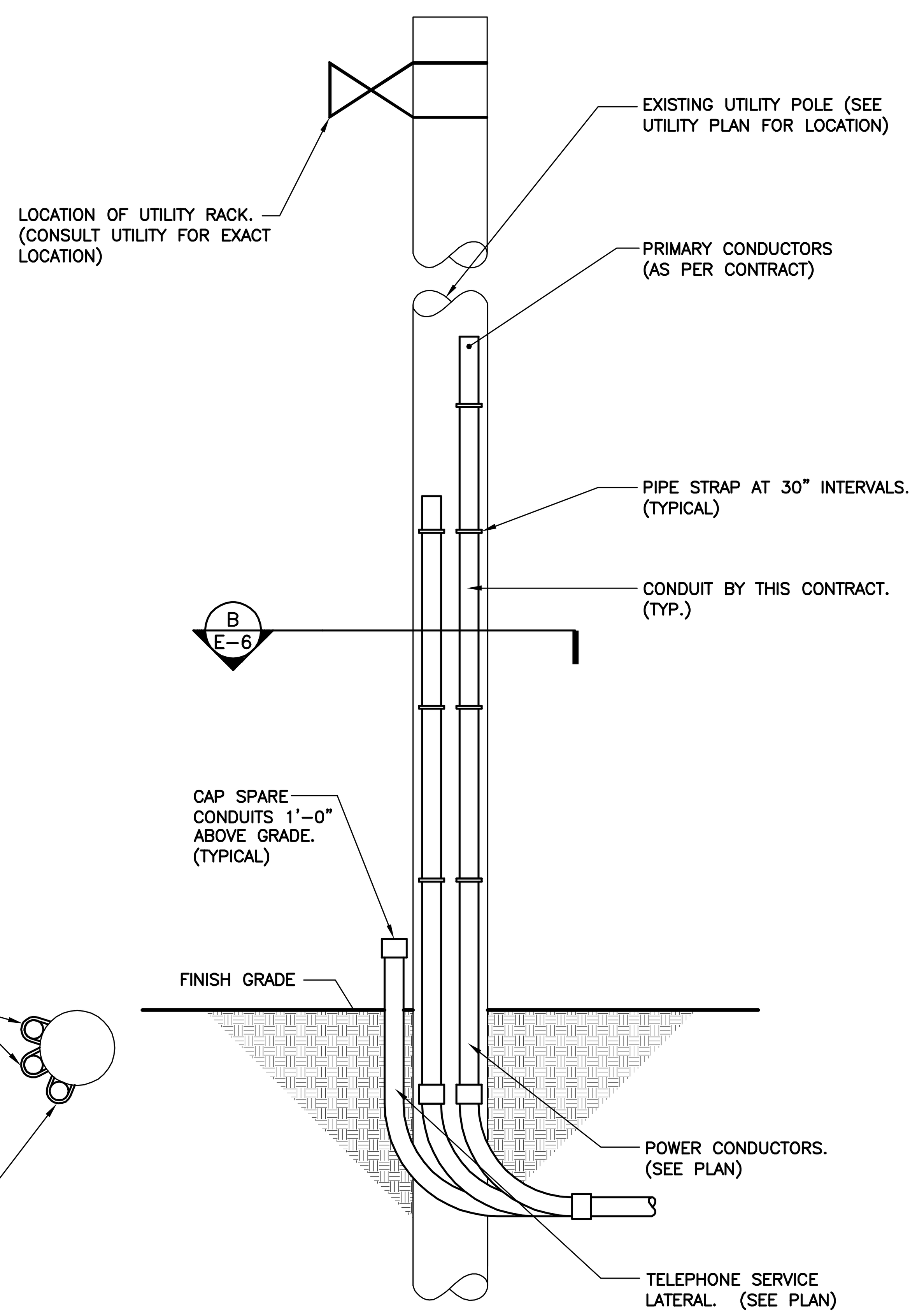
3 E-6 **GROUNDING WELL DETAIL**

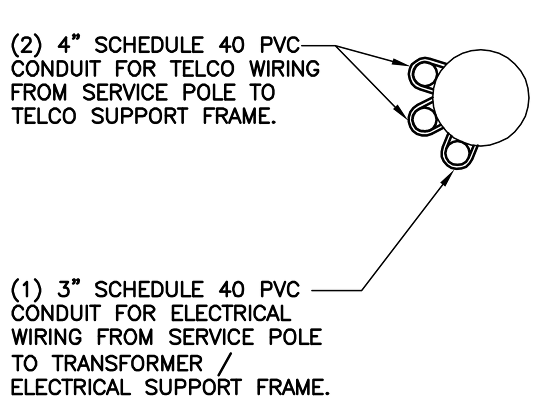
NOT TO SCALE



4 E-6 **CELLULAR GROUNDING CONDUCTOR SECURED ON WALL**

N.T.S.





B E-6 **DETAIL**

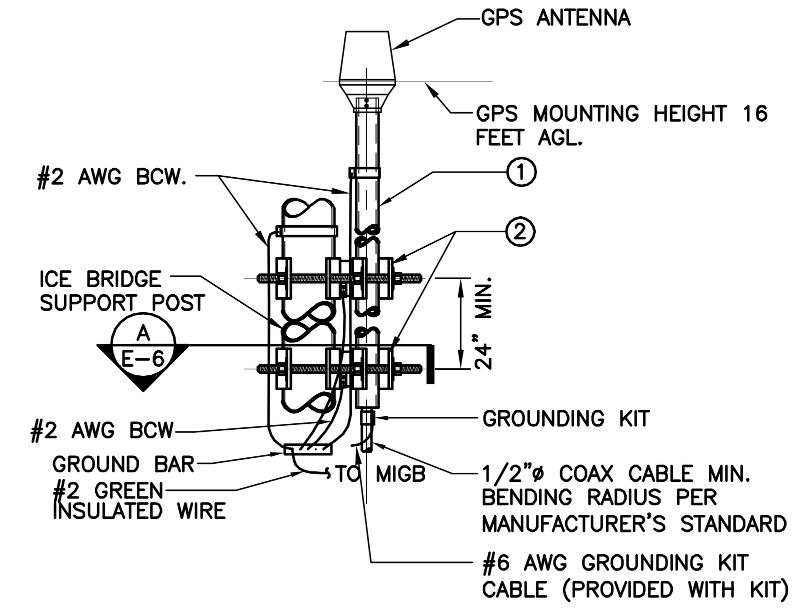
NOT TO SCALE

5 E-6 **INCOMING SERVICE POLE RISER**

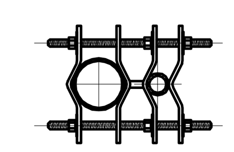
NOT TO SCALE

SERVICE RISER NOTES

1. THE LOCATION SHOWN FOR THE CONNECTION TO UTILITIES, AND INCOMING POWER AND TELEPHONE SERVICES IS FOR CONCEPT ONLY. THE CONTRACTOR SHALL COORDINATE THE ACTUAL LOCATION WITH LOCAL TELEPHONE COMPANY, THE OWNER AND LOCAL ELECTRIC UTILITY COMPANY.
2. CONTRACTOR IS RESPONSIBLE FOR MAKING ARRANGEMENTS WITH LOCAL UTILITY COMPANY AND LOCAL TELEPHONE COMPANY FOR A TIMELY INSTALLATION OF THE INCOMING POWER AND TELEPHONE SERVICE. CONTRACTOR WILL OBTAIN AN ELECTRIC SERVICE ORDER (ESO) FOR THE SITE FROM LOCAL UTILITY COMPANY AND LOCAL TELEPHONE COMPANY PRIOR TO CONSTRUCTION.
3. THE INCOMING ELECTRIC SERVICE WILL BE INSPECTED BY THE AUTHORITY HAVING JURISDICTION AND A CERTIFICATE OF SUCH INSPECTION SHALL BE FURNISHED TO THE OWNER AND A COPY FORWARDED TO LOCAL UTILITY COMPANY.
4. FOR INCOMING UNDERGROUND TELEPHONE SERVICE, THE CONTRACTOR SHALL INSTALL CONDUIT AND PULL WIRES BETWEEN THE RISER POLE AND THE TELCO SERVICE CABINET. THE CONTRACTOR SHALL PROVIDE PRE CAST PULL-BOXES INCLUSIVE OF THE PRE CAST COVERS OF THE TYPE AND AS REQUIRED BY LOCAL TELEPHONE COMPANY THE MAXIMUM DISTANCE BETWEEN PULL-BOXES CAN NOT EXCEED 750' (CONTRACTOR TO CONFIRM WITH LOCAL UTILITY). AT THE PROPOSED RISER POLE EXTEND THE TELEPHONE CONDUIT UP THE POLE APPROXIMATELY 8' AND SEAL.
5. THE CONTRACTOR SHALL COORDINATE THE METER REQUIREMENTS WITH LOCAL UTILITY COMPANY.
6. THE INCOMING ELECTRICAL SERVICE SHALL BE INSTALLED IN CONFORMANCE WITH LOCAL UTILITY COMPANY STANDARDS (LATEST EDITION).
7. THIS SITE MAY CONTAIN CRITICAL UNDERGROUND ELECTRIC AND TELEPHONE SERVICES IN THE VICINITY OF THE NEW UNDERGROUND SERVICE AND THE EQUIPMENT SUPPORTS. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DISRUPTION OF THESE EXISTING FACILITIES. THE CONTRACTOR SHALL ALSO CONTACT LOCAL UTILITY COMPANY AND LOCAL TELEPHONE COMPANY AND ALL THE APPROPRIATE AGENCIES PRIOR TO EXCAVATION AT THIS SITE.



GPS ANTENNA MOUNTING BRACKET



A E-6 **SECTION**

NOT TO SCALE

BILL OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	2-1/2"ø SCH. 40 x 8'-0" LG. MAX SS OR GALV. PIPE	1
2	UNIVERSAL CLAMP SET.	2

NOTES:

1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT.
2. THE GPS ANTENNA MOUNT IS DESIGNED TO FASTEN TO A STANDARD 2-1/2" DIAMETER, SCHEDULE 40, GALVANIZED STEEL OR STAINLESS STEEL PIPE. THE PIPE MUST NOT BE THREADED AT THE ANTENNA MOUNT END. THE PIPE SHALL BE CUT TO THE REQUIRED LENGTH (MINIMUM OF 24 INCHES) USING A HAND OR ROTARY PIPE CUTTER TO ASSURE A SMOOTH AND PERPENDICULAR CUT. A HACK SAW SHALL NOT BE USED. THE CUT PIPE END SHALL BE DEBURRED AND SMOOTH IN ORDER TO SEAL AGAINST THE NEOPRENE GASKET ATTACHED TO THE ANTENNA MOUNT.

6 E-6 **GPS GROUNDING/MOUNTING BRACKET DETAIL**

NOT TO SCALE

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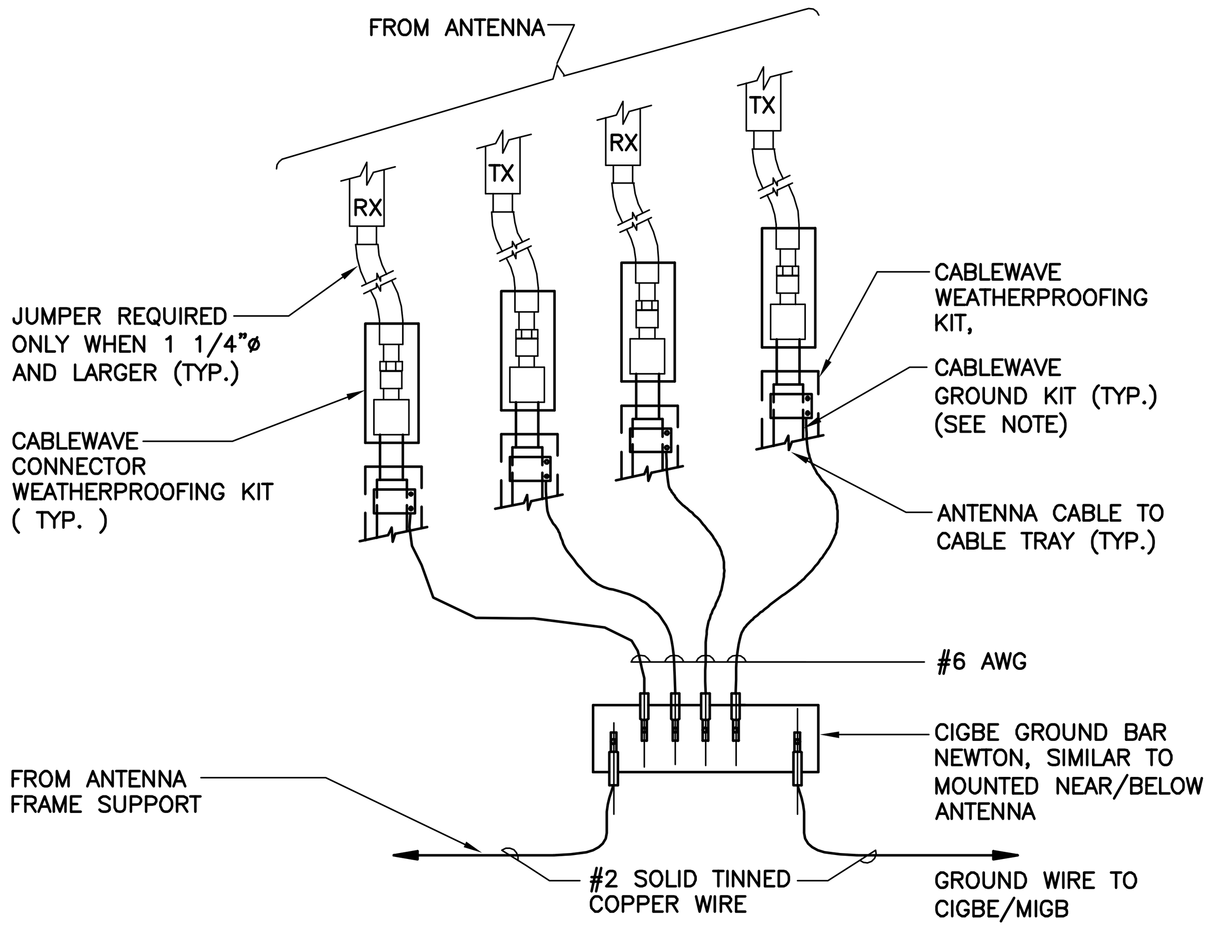
ELECTRICAL DETAILS

E-6

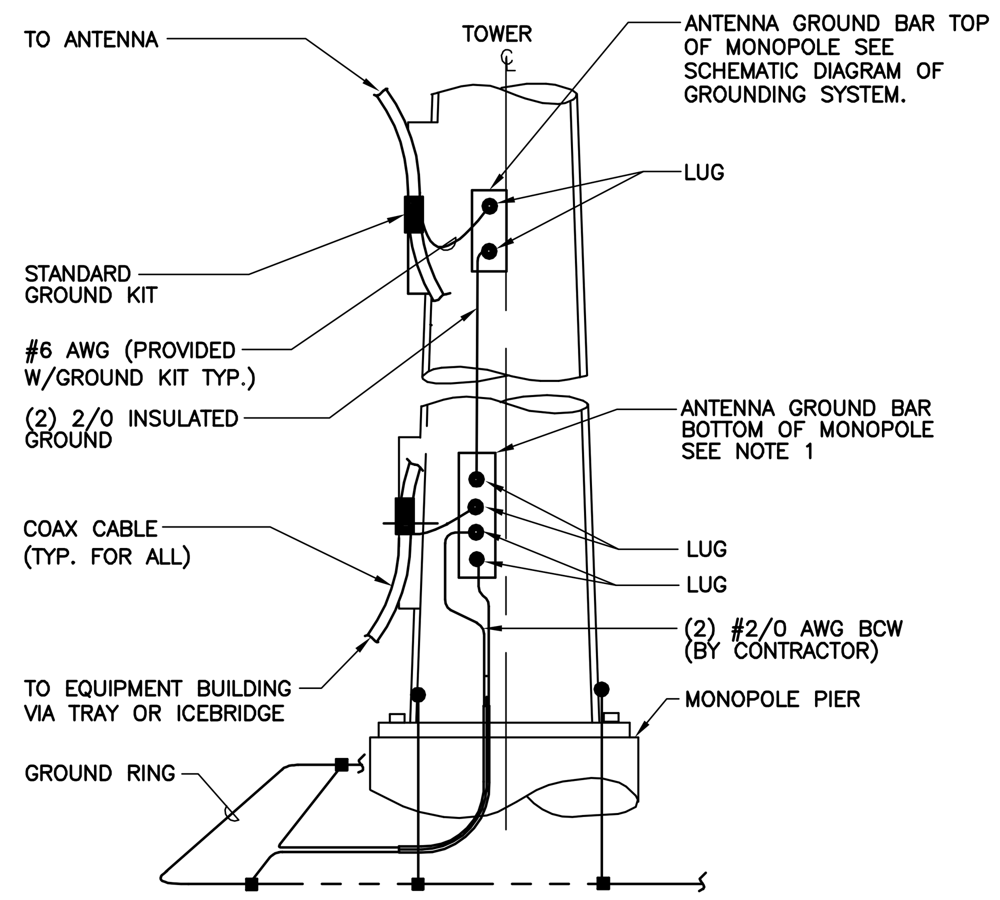


NOTE:

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

1 E-7 CONNECTION OF GROUND WIRES TO GROUND BAR

NOT TO SCALE

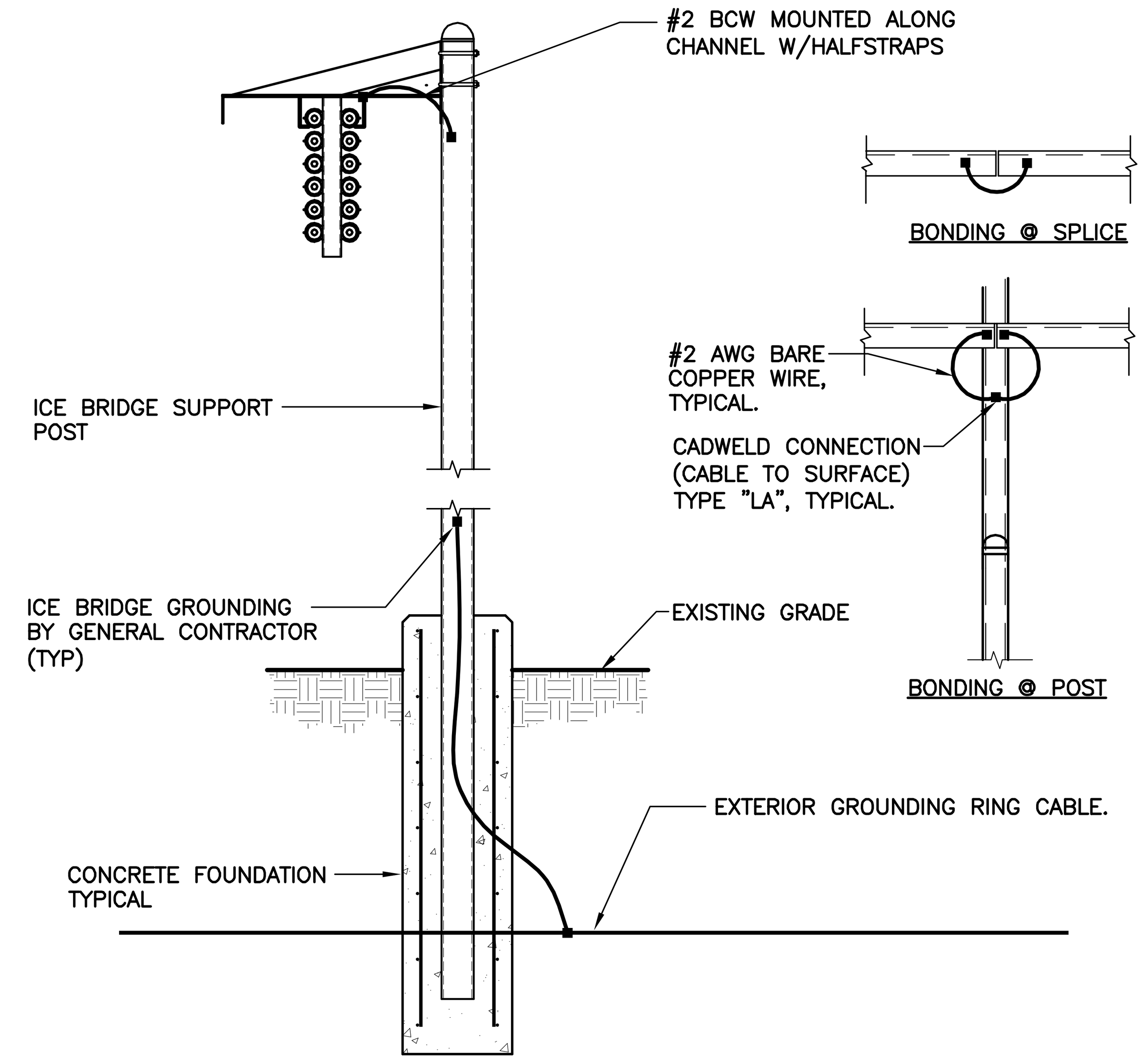


NOTES:

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.

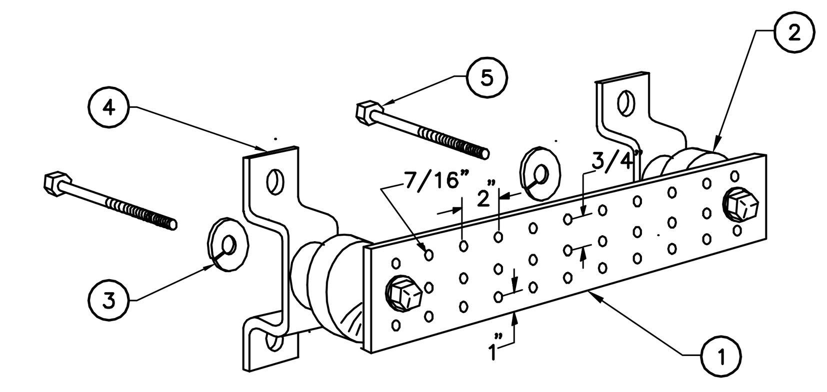
2 E-7 ANTENNA CABLE GROUNDING

NOT TO SCALE



3 E-7 ICE BRIDGE BONDING DETAIL

NOT TO SCALE

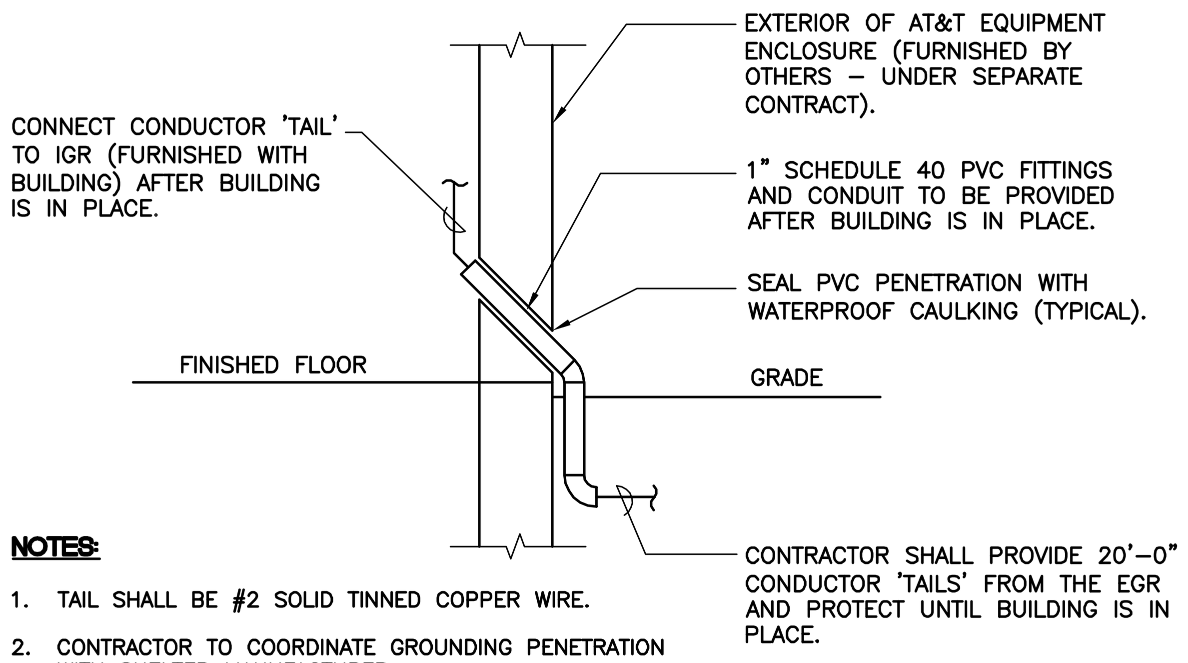


NOTES

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

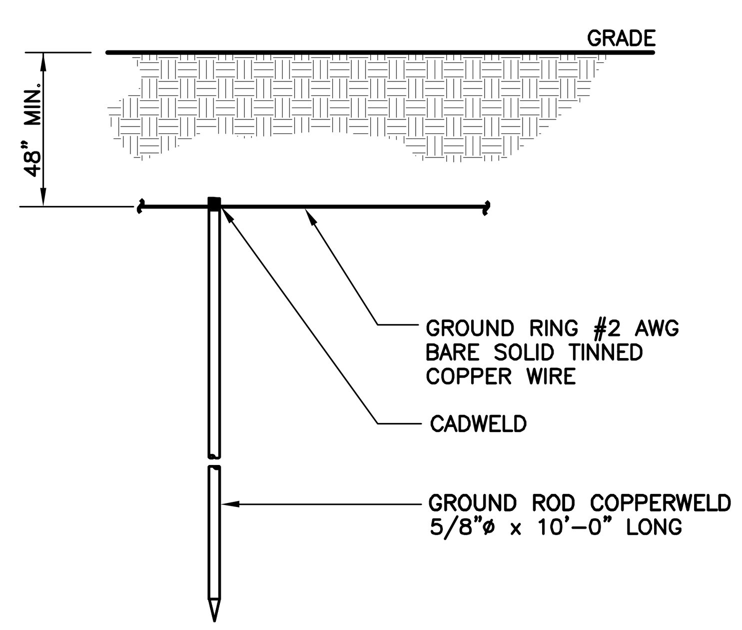


NOTES:

1. TAIL SHALL BE #2 SOLID TINNED COPPER WIRE.
2. CONTRACTOR TO COORDINATE GROUNDING PENETRATION WITH SHELTER MANUFACTURER.

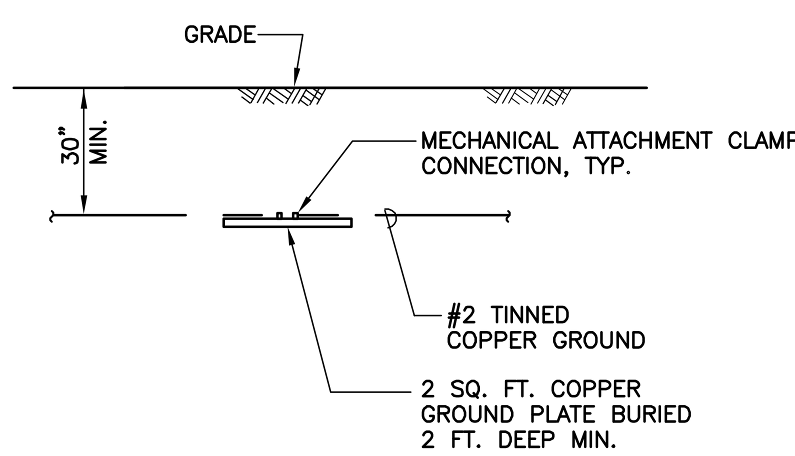
5 E-7 TYPICAL EXTERIOR/INTERIOR GROUNDING CONNECTION

NOT TO SCALE



6 E-7 GROUND ROD DETAIL

NOT TO SCALE

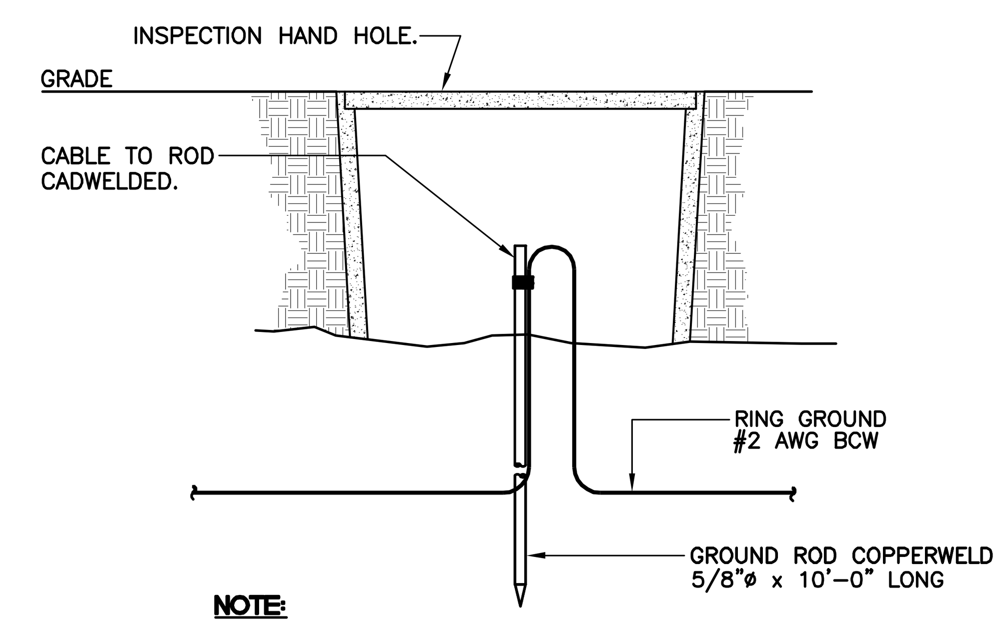


NOTE:

1. GROUND PLATE DETAIL TO BE USED ONLY IF 10 FT. GROUND ROD DEPTH CANNOT BE ACHIEVED DUE TO LEDGE CONDITION OR IF EXISTING TOWER FOUNDATION IS ENCOUNTERED.

6A E-7 GROUND PLATE DETAIL

NOT TO SCALE



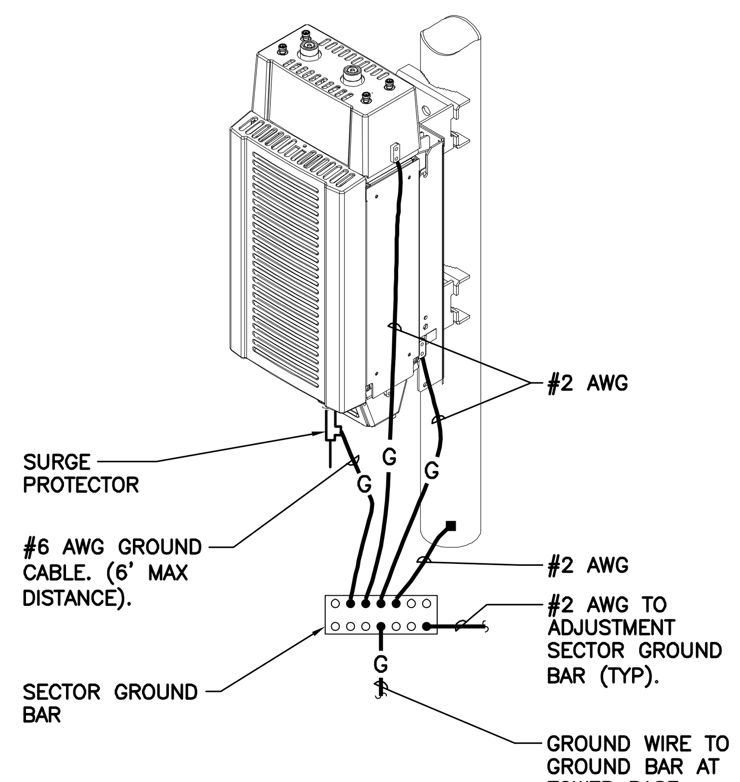
NOTE:

1. INSPECTION HAND HOLE MAY BE CONCRETE OR PVC AND SHALL BE A MINIMUM OF 12" DIA x 18" DEEP.

7 E-7 GROUND ROD WITH ACCESS DETAIL

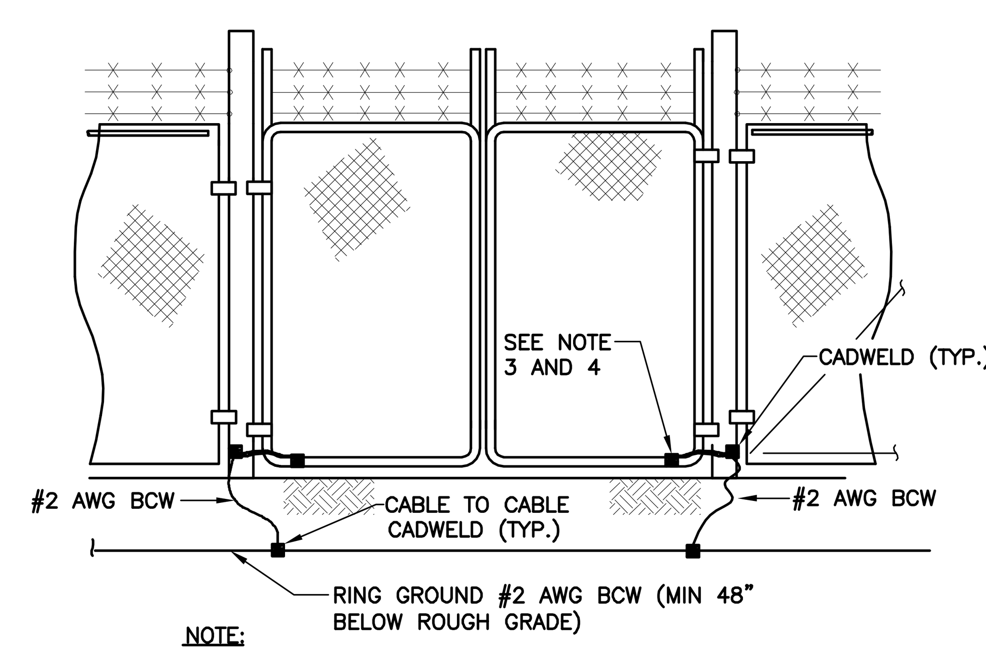
NOT TO SCALE

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



8 E-7 RRH POLE MOUNT GROUNDING

NOT TO SCALE

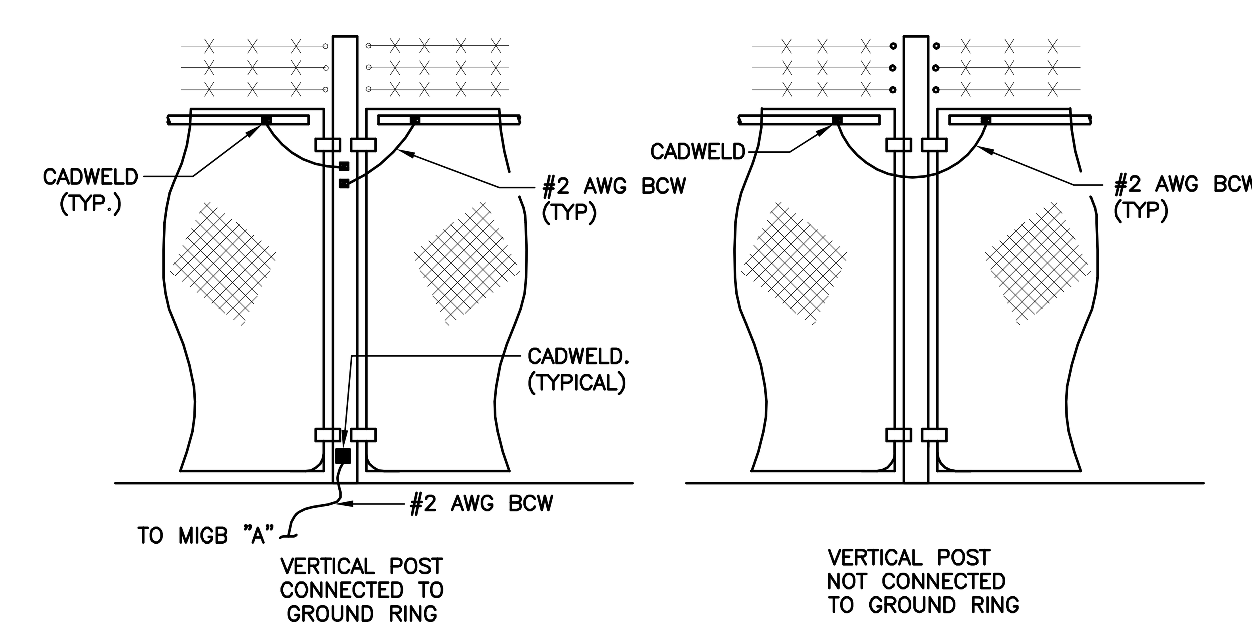


NOTE:

1. THE #2 AWG, BCW, FROM THE RING GROUND SHALL BE CADWELDED TO THE POST, ABOVE GRADE.
2. BOND EACH HORIZONTAL POLE/BRACE TO EACH OTHER AND TO EACH VERTICAL POLE BONDED TO THE EXTERIOR GROUND RING.
3. GATE JUMPER SHALL BE #4/0 AWG WELDING CABLE OR FLEXIBLE COPPER BRAID BURNDY TYPE B WITH SLEEVES ON EACH END DESIGNED FOR EXOTHERMIC WELDING.
4. GATE JUMPER SHALL BE INSTALLED SO THAT IT WILL NOT BE SUBJECTED TO DAMAGING STRAIN WHEN GATE IS FULLY OPEN IN EITHER DIRECTION.

9 E-7 FENCE GATE GROUNDING

NOT TO SCALE



NOTE:

1. VERTICAL POSTS SHALL BE BONDED TO THE RING AT EACH CORNER AND AT EACH GATE POST. AS A MINIMUM ONE VERTICAL POST SHALL BE BONDED TO THE GROUND RING IN EVERY 100 FOOT STRAIGHT RUN OF FENCE.
2. HORIZONTAL POLES SHALL BE BONDED TO EACH OTHER.
3. BOND EACH HORIZONTAL POLE / BRACE TO EACH OTHER AND TO EACH VERTICAL POST THAT IS BONDED TO THE EXTERIOR GROUND RING.

10 E-7 GROUND-STD. DETAIL FENCE GROUNDING

NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
5	07/13/15	TJB	CKD	REVISED UTILITY EASEMENT
4	03/24/14	HMR	CFC	REVISED FOR SITE SURVEY
3	02/14/14	HMR	CFC	REVISED FOR PROPANE TANK – CLIENT REVIEW
2	11/19/13	HMR	CFC	REVISED ANTENNA AZIMUTH
1	11/08/13	HMR	CFC	CONSTRUCTION
0	10/25/13	TJB	CKD	CONSTRUCTION – CLIENT REVIEW

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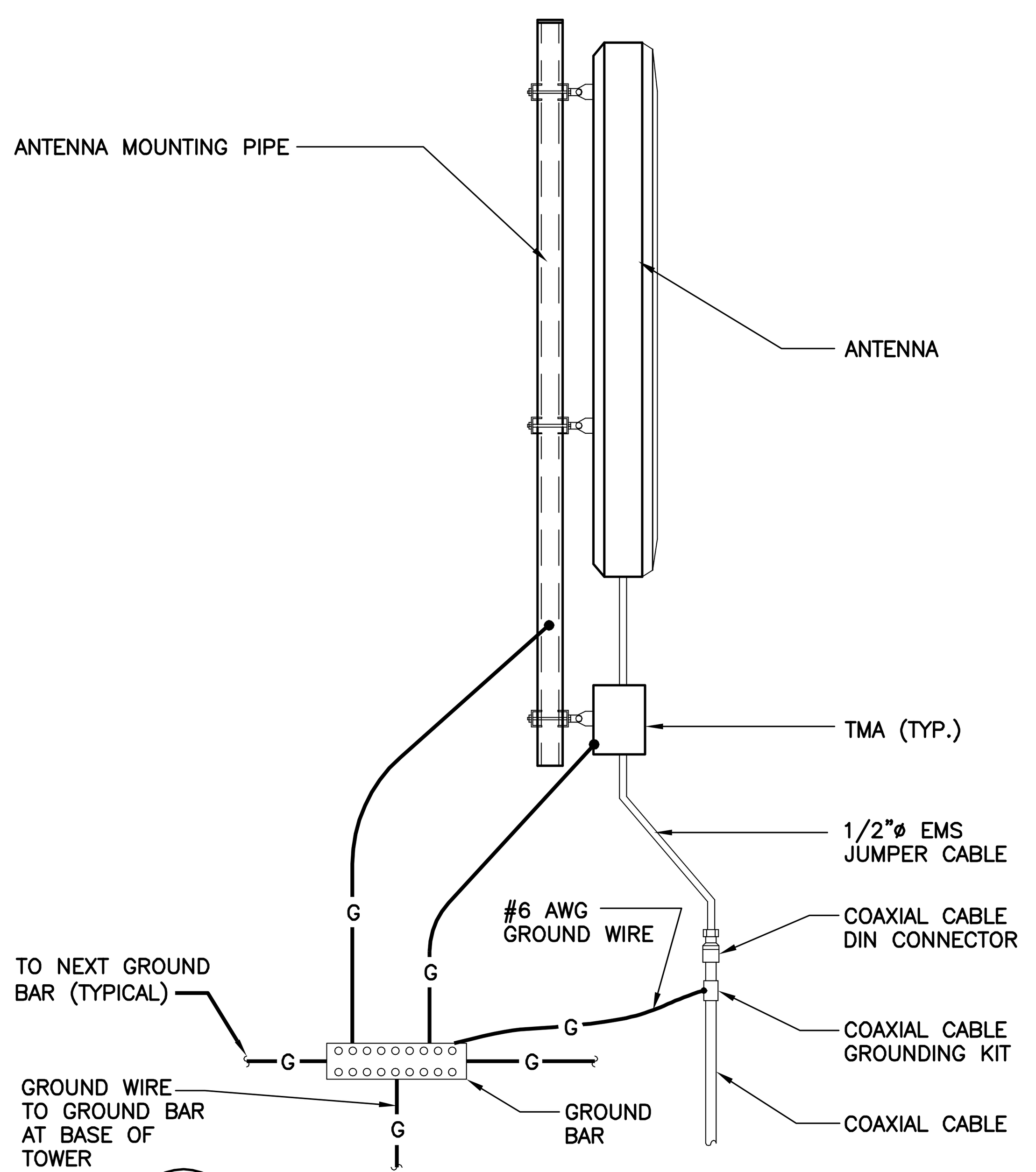
WATERBURY, CT 06708

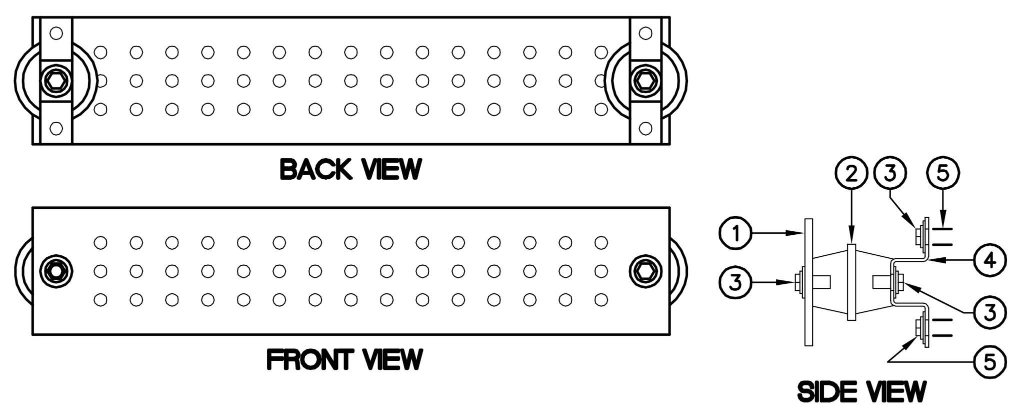
DATE:	10/08/13
SCALE:	AS NOTED
JOB NO.	13130.000

ELECTRICAL GROUNDING DETAILS

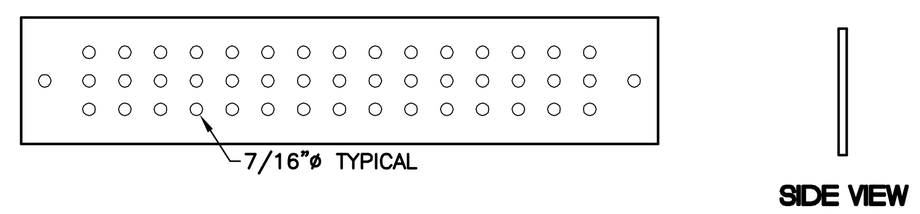
E-7



1 E-8 **TYPICAL ANTENNA GROUNDING DETAIL**
NOT TO SCALE



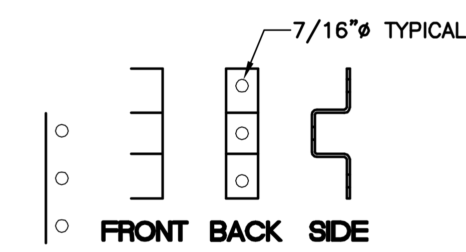
TYPICAL GROUND BAR ASSEMBLY
N.T.S.



TYPICAL GROUND BAR - DIMENSIONS
N.T.S.

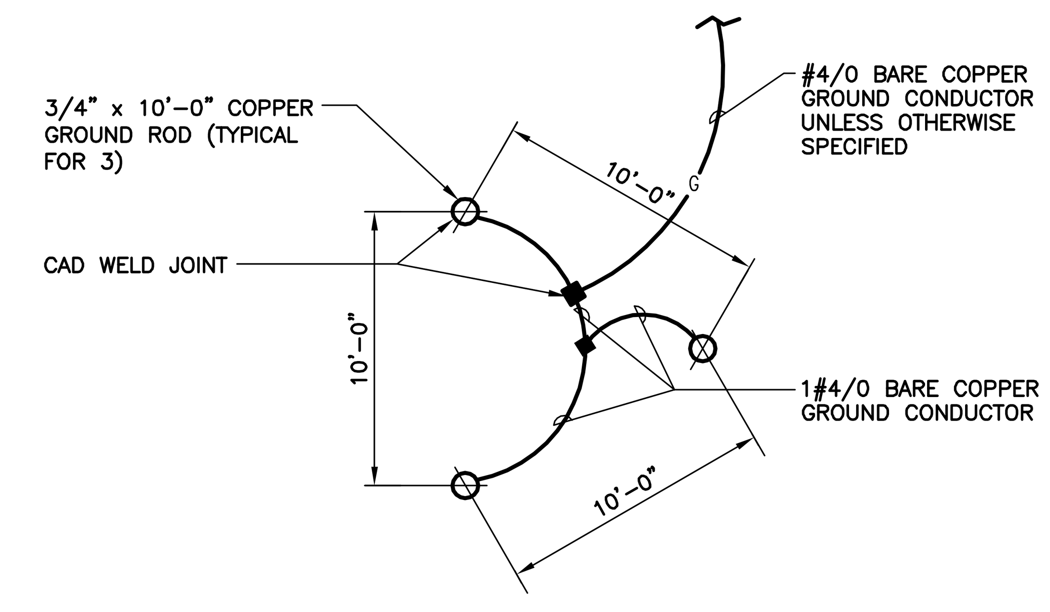
NOTES

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.

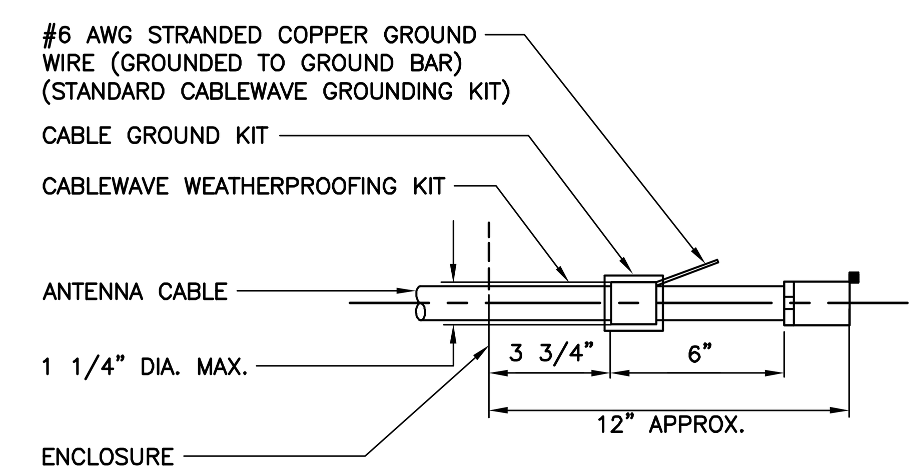


BRACKET FOR GROUND BAR-DIMENSIONS
N.T.S.

2 E-8 **MASTER/EQUIPMENT GROUND BAR DETAILS**
N.T.S.



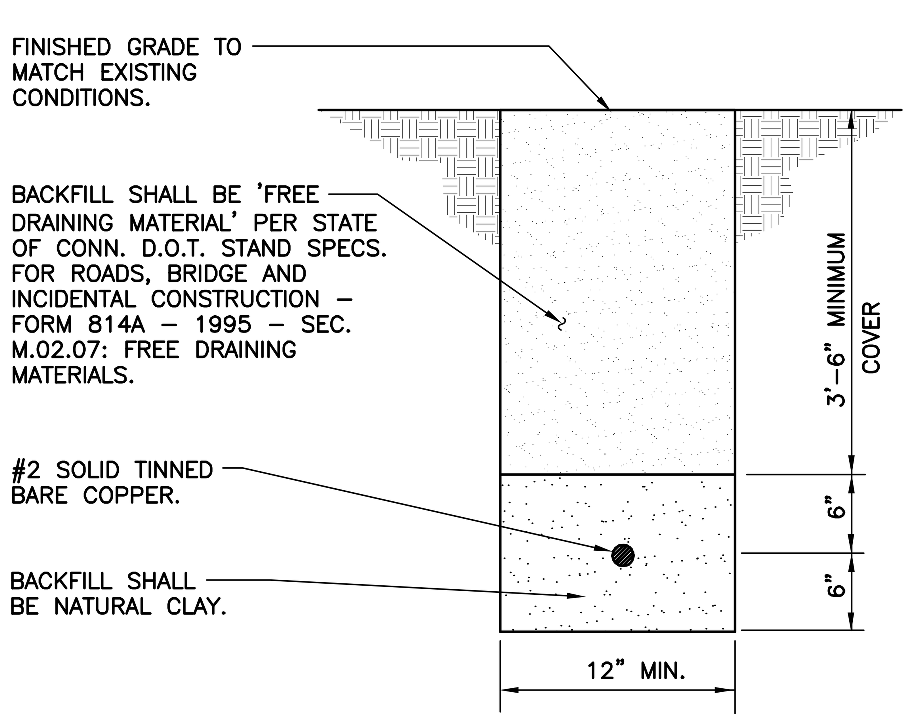
3 E-8 **GROUND TRIAD DETAIL**
NOT TO SCALE



NOTE:

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

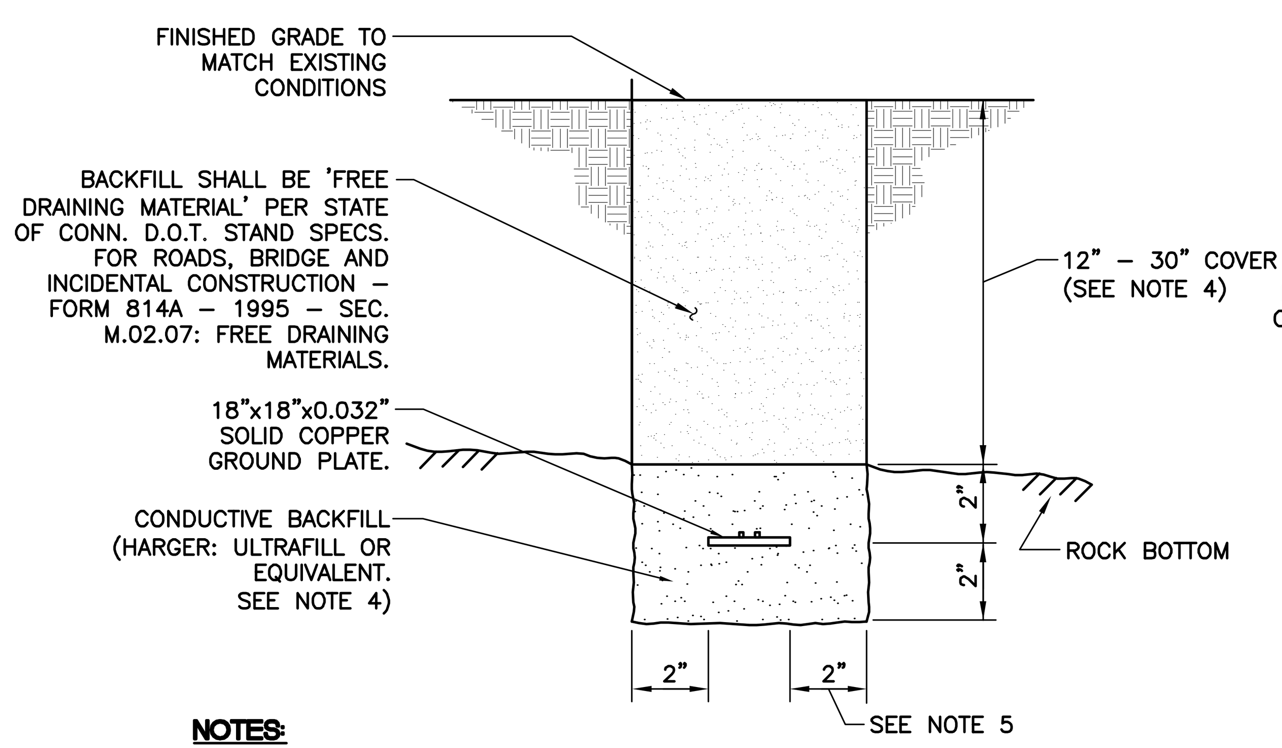
4 E-8 **CABLE GROUNDING ANTENNA DETAIL**
NOT TO SCALE



NOTES:

1. ENGINEER SHALL INSPECT PLACEMENT OF EGR CONDUCTOR PRIOR TO BACKFILLING.
2. MAINTAIN MIN. 2'-0" LINEAR CLEARANCE BETWEEN NATURAL CLAY BACKFILL AND THE FOLLOWING: FOUNDATION, UNDERGROUND PIPING/CONDUIT, UNDERGROUND SERVICES. IN THE CLEARANCE AREAS, USE EARTH BACKFILL INSTEAD.
3. EXERCISE HANDLING AND USE PRECAUTION OF BACKFILL MATERIAL PER MFR'S REQUIREMENTS.

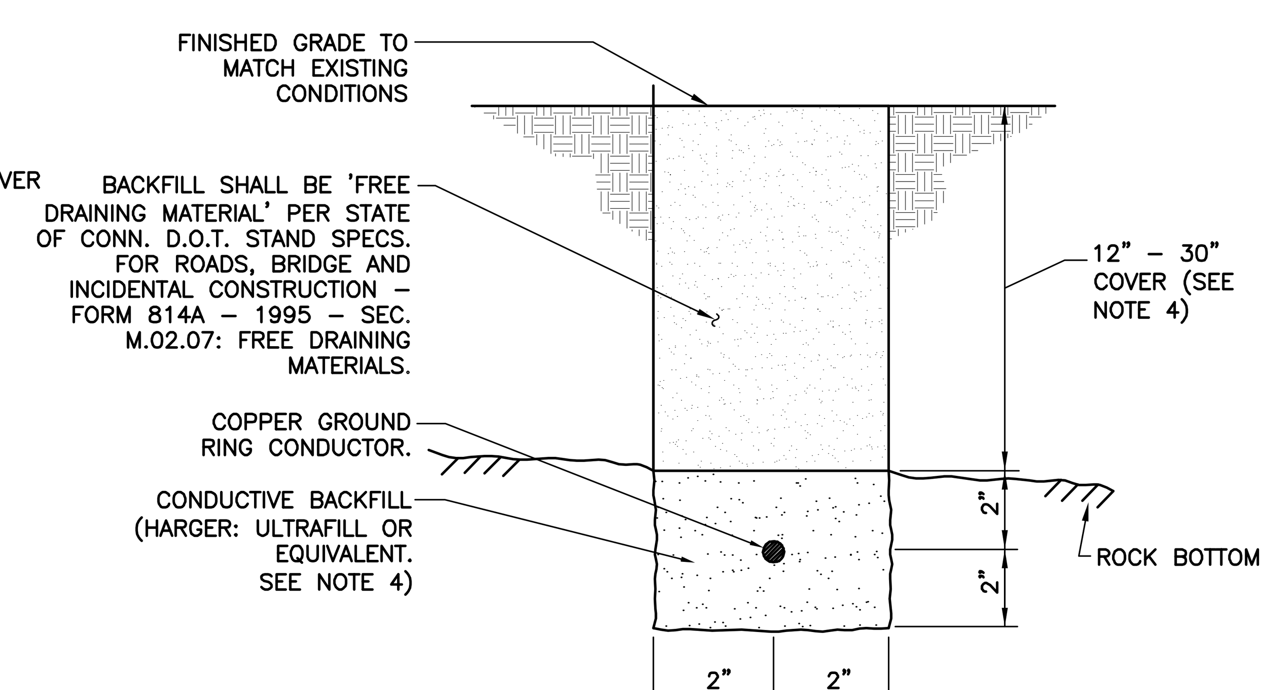
5 E-8 **EGR TRENCH/BACKFILL DETAIL**
NOT TO SCALE



NOTES:

1. ENGINEER SHALL INSPECT PLACEMENT OF EGR CONDUCTOR PRIOR TO BACKFILLING.
2. MAINTAIN MIN. 2'-0" LINEAR CLEARANCE BETWEEN BACKFILL AND THE FOLLOWING: FOUNDATION, UNDERGROUND PIPING/CONDUIT, UNDERGROUND SERVICES. IN THE CLEARANCE AREAS, USE EARTH BACKFILL INSTEAD.
3. EXERCISE HANDLING AND USE PRECAUTION OF BACKFILL MATERIAL PER MFR'S REQUIREMENTS.
4. FOR LOCATIONS WHERE ROCK BOTTOM DEPTH IS LESS THAN 12" CONDUCTIVE CONCRETE SHALL BE USED INSTEAD OF CONDUCTIVE BACKFILL.
5. PROVIDE MIN 2" CLEARANCE ON ALL SIDES OF GROUND PLATE.

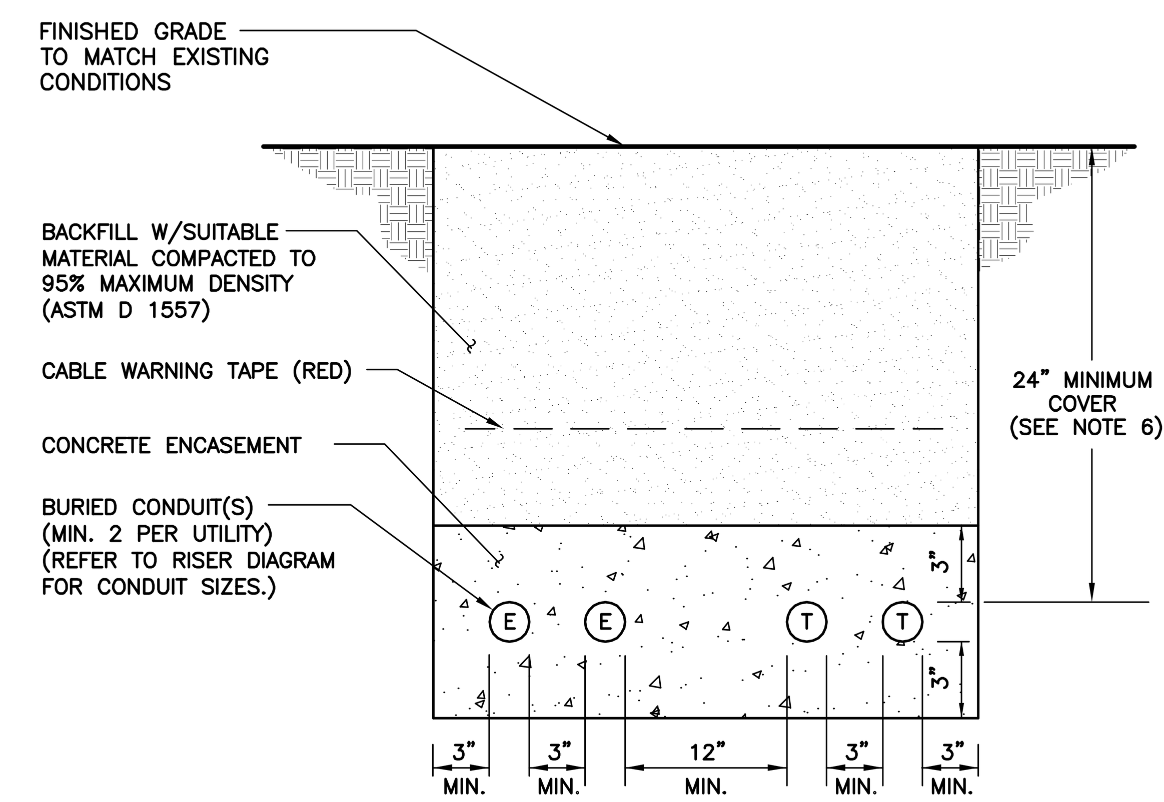
6 E-8 **GROUND PLATE TRENCH/ BACKFILL DETAIL (SHALLOW TOPSOIL)**
N.T.S.



NOTES:

1. ENGINEER SHALL INSPECT PLACEMENT OF EGR CONDUCTOR PRIOR TO BACKFILLING.
2. MAINTAIN MIN. 2'-0" LINEAR CLEARANCE BETWEEN BACKFILL AND THE FOLLOWING: FOUNDATION, UNDERGROUND PIPING/CONDUIT, UNDERGROUND SERVICES. IN THE CLEARANCE AREAS, USE EARTH BACKFILL INSTEAD.
3. EXERCISE HANDLING AND USE PRECAUTION OF BACKFILL MATERIAL PER MFR'S REQUIREMENTS.
4. FOR LOCATIONS WHERE ROCK BOTTOM DEPTH IS LESS THAN 12" CONDUCTIVE CONCRETE SHALL BE USED INSTEAD OF CONDUCTIVE BACKFILL.

7 E-8 **EGR TRENCH/BACKFILL DETAIL (SHALLOW TOPSOIL)**
NOT TO SCALE



NOTES:

1. THE CLEAN FILL SHALL PASS THROUGH A 3/8" MESH SCREEN AND SHALL NOT CONTAIN SHARP STONES. OTHER BACKFILL SHALL NOT CONTAIN ASHES, CINDERS, SHELLS, FROZEN MATERIAL, LOOSE DEBRIS OR STONES LARGER THAN 2" IN MAXIMUM DIMENSION.
2. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.
3. WHERE SHALLOW BEDROCK IS ENCOUNTERED BETWEEN UTILITY SOURCE AND SERVICE EQUIPMENT, COORDINATE WITH UTILITY COMPANY FOR BURIAL DEPTH REQUIREMENTS.
4. COORDINATE WITH ELECTRICAL ENGINEER WHERE SHALLOW BEDROCK IS ENCOUNTERED BETWEEN SERVICE EQUIPMENT AND EQUIPMENT SHELTER.
5. PROVIDE MINIMUM TWO CONDUITS FOR EACH UTILITY.
6. THIS DETAIL SHALL BE USED FOR CONDUITS INSTALLED WITH LESS THAN 36" COVER. FOR INSTALLATIONS WITH 36" OR MORE COVER, INSTALL IN ELECTRICAL TRENCH WITHOUT CONCRETE (REFER TO APPROPRIATE DETAILS). CONDUIT COVER SHALL NOT BE LESS THAN 24".

8 E-8 **TYPICAL ELECTRICAL TRENCH WITH CONCRETE DETAIL**
NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
5	07/13/15	TJB	CKD	REVISED UTILITY EASEMENT
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2	11/19/13	HMR	CFC	REVISED ANTENNA AZIMUTH
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SCALE: AS NOTED
JOB NO. 13130.000

ELECTRICAL GROUNDING DETAILS

E-8

Sheet No. 21 of 22

ELECTRICAL SPECIFICATIONS

SECTION 16010

1.01. 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 NEW 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/TRANSFER SWITCH.
4. FEEDERS AND BRANCH CIRCUIT WIRING TO PANELS, RECEPTACLES, EQUIPMENT, LIGHTING FIXTURES, ETC. AS INDICATED OR NOTED ON PLANS.
5. POWER AND TEMPERATURE CONTROL WIRING FOR HVAC EQUIPMENT.
   a. FURNISH AND INSTALL ALL POWER WIRING FOR ALL HEATING, VENTILATING, AIR CONDITIONING, MOTORS AND DEVICES, AND FIRE PROTECTION EQUIPMENT INDICATED ON THE PLANS OR CALLED FOR IN THIS SPECIFICATION, EITHER ELECTRICAL OR MECHANICAL INCLUDING ALL CONTROL WIRING. ALL MAGNETIC STARTERS SHALL BE FURNISHED UNDER DIVISION 15 AND HAVE INSTALLED THEREIN A PROPER OVERLOAD HEATER FOR EACH MOTOR.
   b. ALL WIRING, BOTH POWER AND CONTROL, FOR SUCH ITEMS AS UNIT HEATERS, EXHAUST FANS, ETC., NOT SPECIFICALLY CALLED FOR IN THE TEMPERATURE CONTROL SPECIFICATIONS, SHALL BE WIRED UNDER DIVISION 16.
   c. ALL CONTROLS WHICH ARE TO BE WIRED BY THIS CONTRACTOR SHALL BE DELIVERED TO HIM BY THE CONTRACTOR/VENDOR FURNISHING THEM.
6. CELLULAR SITE ALARMS, ASSOCIATED WIRING AND DEVICES.
7. CELLULAR GROUNDING SYSTEMS, CONSISTING OF ANTENNA GROUNDING, INTERIOR GROUNDING RING, GROUND BARS, ETC.
8. FURNISH AND INSTALL 3/4" PLYWOOD BACKBOARD OF SIZE INDICATED ON DRAWINGS FOR MOUNTING OF POWER/SERVICE EQUIPMENT AND TELEPHONE/ALARM EQUIPMENT. BACKBOARDS SHALL BE PAINTED WITH TWO (2) COATS OF SEMI-GLOSS GRAY FIRE RETARDANT PAINT.
9. FIELD MEASURE EXISTING ELECTRICAL SERVICES TO CONFIRM AVAILABLE EXISTING POWER.
10. COORDINATE ALL WORK SHOWN, ON THESE PLANS WITH LOCAL UTILITY COMPANIES.

B. LOCAL UTILITY COMPANIES SHALL PROVIDING 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 AS MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS AS 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 AS 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 CONTRACTORS 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 WIRELESS ROOM
(2) GALVANIZED RIGID CONDUIT (GRC) – FEEDERS AND CIRCUITS EXPOSED TO EXTERIOR & UNDERGROUND.
(3) LIQUID TIGHT FLEXIBLE METAL CONDUIT – FOR SHORT LENGTH (MAX. 3'-0") WIRING TO VIBRATING EQUIPMENT (HVAC UNITS, MOTORS, ETC.) IN WET LOCATIONS.
(4) FLEXIBLE METAL CONDUIT – FOR SHORT LENGTH (MAX. 3'-0") WIRING TO VIBRATING EQUIPMENT IN DRY LOCATIONS.
(5) PVC CONDUIT – WHERE SHOWN ON GROUNDING DETAILS.

SECTION 16114

1.01. CABLE TRAY

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

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

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. #8AWG 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:

	120/240V/1PH
LINE	COLOR
A	BLACK
B	RED
N	CONTINUOUS WHITE
G	CONTINUOUS GREEN

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.

15 MINUTE TIMER SWITCH – INTERMATIC #FF15M (INTERIOR LIGHTS)

DUPLEX RECEPTACLE – P&S #2091-S (GFCI) SPECIFICATION GRADE

SINGLE POLE SWITCH – P&S #5021-1 (20A-120V HARD USE) SPECIFICATION GRADE

DUPLEX RECEPTACLE – P&S #5342-1 (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 ITEM 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 BAR #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 NO. 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 OWNERS WIRELESS 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 NEC, MFG. SPECIFICATIONS AND OWNERS 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 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 OWNERS 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 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

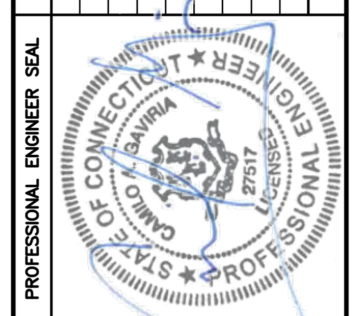
A. ALL TESTS AS REQUIRED UPON COMPLETION OF WORK, SHALL BE MADE BY THIS CONTRACTOR. THESE SHALL BE CONTINUITY AND INSULATION TESTS; TEST TO DETERMINE THE QUALITY OF MATERIALS, ETC. AND SHALL BE MADE IN ACCORDANCE WITH NEC RECOMMENDATIONS. ALL FEEDERS AND BRANCH CIRCUIT WIRING (EXCEPT CLASS 2 SIGNAL CIRCUITS) 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, BE REPEATED IN THE PRESENCE OF OWNERS 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
8	11/03/17	TJB	TGK	REVISED PER AT&T COMMENTS
5	07/13/15	TJB	CKD	REVISED UTILITY EASEMENT
4	03/24/14	HMR	CFC	REVISED FOR SITE SURVEY
3	02/14/14	HMR	CFC	REVISED FOR PROPANE TANK – CLIENT REVIEW
2	11/19/13	HMR	CFC	REVISED ANTENNA AZIMUTH
1	11/08/13	HMR	CFC	CONSTRUCTION
0	10/25/13	TJB	CKD	CONSTRUCTION – CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL



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

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
WATERBURY NORTH
SITE NUMBER: CTSR2901
227 WHITEWOOD ROAD
WATERBURY, CT 06708

DATE: 10/08/13
SCALE: AS NOTED
JOB NO. 13130.000

ELECTRICAL SPECIFICATIONS

E-9

Sheet No. 22 of 22

CENTEK engineering

Centered on Solutions℠

Structural Design of Antenna Mast and Utility Pole Analysis

AT&T Site Ref: CT2901

Eversource Structure No. 11229
80' Electric Transmission Pole

227 Whitewood Road
Waterbury, CT

CENTEK Project No. 17010.09

~~Date: July 5, 2017~~
Rev 5: April 11, 2018

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Prepared for:
AT&T Mobility
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

Table of Contents

Introduction

The purpose of this report is to design a proposed antenna mast and analyze the existing 80' utility pole located at 227 Whitewood Road in Waterbury, CT for the proposed AT&T Mobility antenna installation.

The existing/proposed loads consist of the following:

- **AT&T MOBILITY (Proposed):**

  Antennas: Six (6) CCI HPA-65R-BUU-H8 panel antennas, three (3) CCI OPA-65R-LCUU-H8 panel antennas and eighteen (18) CCI TMABPDB7823VG12A TMA's mounted on a custom T-Arms (refer to CDs for details) with a RAD center elevation of 105-ft above grade.
  Coax Cables: Thirty-six (36) 1-5/8" ∅ coax cables running on the exterior of the CL&P pole as indicated in section 4 of this report.
  Antenna Mast: HSS16x0.5 x 25-ft long pipe flanged connected to a HSS18x0.5 x 32-ft long pipe conforming to ASTM A500 Gr. B (Fy = 42 ksi).

Primary assumptions used in the analysis

- Design steel stresses are defined by AISC-LRFD 14th edition for design of the antenna Mast and antenna supporting elements.
- ASCE 48-05, "Design of Steel Transmission Pole Structures", defines steel stresses for evaluation of the utility pole.
- All utility pole members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- Pipe mast will be properly installed and maintained.
- No residual stresses exist due to incorrect pole erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- Pipe mast and utility pole will be in plumb condition.
- Utility pole was properly installed and maintained and all members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.

Analysis

Structural design of the *Antenna Mast* was independently completed using the current version of RISA-3D computer program licensed to CENTEK Engineering, Inc.

The antenna mast consisting of a HSS16x0.5 x 25-ft long pipe flange connected to a HSS18x0.5 x 32-ft long pipe conforming to ASTM A500 Gr. B (Fy = 42 ksi) connected at three points to the existing tower was analyzed for its ability to resist loads prescribed by the TIA standard. Section 5 of this report details these gravity and lateral wind loads. NESC prescribed loads were also applied to the antenna mast in order to obtain reactions needed for analyzing the pole structure. These loads are developed in Section 7 of this report. Load cases and combinations used in RISA-3D for TIA loading and for NESC/NU loading are listed in report Sections 6 and 8, respectively.

An envelope solution was first made to determine maximum and minimum forces, stresses, and deflections to confirm the selected section as adequate. Additional analyses were then made to determine the NESC forces to be applied to the pole structure.

The RISA-3D program contains a library of all AISC shapes and corresponding section properties are computed and applied directly within the program. The program's Steel Code Check option was also utilized. The forces calculated in RISA-3D using NESC guidelines were then applied to the pole using PLS-Pole. Maximum usage for the pole was calculated considering the additional forces from the mast and associated appurtenances

Design Basis

Our analysis was performed in accordance with TIA-222-G, ASCE 48-05, "Design of Steel Transmission Pole Structures", NESC C2-2007 and Northeast Utilities Design Criteria.

- UTILITY POLE ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility pole to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the NU Design Criteria Table, NESC C2-2007 ~ Construction Grade B, and ASCE 48-05.

  Load cases considered:

  Load Case 1: NESC Heavy
  Wind Pressure.…………………………….. 4.0 psf
  Radial Ice Thickness………………………. 0.5"
  Vertical Overload Capacity Factor…………. 1.50
  Wind Overload Capacity Factor……………. 2.50
  Wire Tension Overload Capacity Factor…… 1.65

  Load Case 2: NESC Extreme
  Wind Speed.………………………………. 110 mph (1)
  Radial Ice Thickness………………………. 0"

  Load Case 3: NESC Extreme Ice w/ Wind
  Wind Pressure.…………………………….. 4.0 psf
  Radial Ice Thickness………………………. 1.0"
  Vertical Overload Capacity Factor…………. 1.0
  Wind Overload Capacity Factor……………. 1.0

  Note 1: NESC C2-2007, Section25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)

- MAST ASSEMBLY ANALYSIS

Mast, appurtenances and connections to the utility tower were analyzed and designed in accordance with the NU Design Criteria Table, TIA-222-G and AISC standards.

Load cases considered:

Load Case 1:
Wind Speed………………………………... 97 mph (2016 CSBC Appendix-N)
Radial Ice Thickness……………………….. 0”

Load Case 2:
Wind Pressure.……………………………. 50 mph wind pressure
Radial Ice Thickness……………………….. 0.75”

Results

- MAST ASSEMBLY

The proposed mast was determined to be structurally **adequate**.

Member	Stress Ratio (% of capacity)	Result
HSS16x0.5 x 25-ft long	86.8%	**PASS**
HSS18x0.5 x 32-ft long	84.0%	**PASS**
Bottom bracket connection bolts	81.4%	**PASS**
Horizontal Displacement (% of Cantilever Height)	**Allowable**	**Result**
0.84 %	1.5 %	**PASS**

- UTILITY POLE

This analysis finds that the subject utility pole is adequate to support the proposed antenna mast and related appurtenances. The pole stresses meet the requirements set forth by the ASCE 48-05, “Design of Steel Transmission Pole Structures” for the applied NESC Heavy and Extreme load cases. The detailed analysis results are provided in Section 9 of this report. The analysis results are summarized as follows:

A maximum usage of **85.86%** occurs in the utility pole tube number 1 under the **NESC Extreme Wind** loading condition.

POLE SECTION:

The utility pole was found to be within allowable limits.

Tower Section	Elevation	Stress Ratio (% of capacity)	Result
Tube Number 1	28.25’ - 80.0’ (AGL)	85.86%	**PASS**

BASE PLATE:
The base plate was found to be within allowable limits from the PLS output based on 24 bend lines.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Base Plate	Bending	35.68%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation consists of a 7.0-ft ∅ x 20-ft long reinforced concrete caisson. The base of the tower is connected to the foundation by means of (12) 2.25”∅, ASTM A615 Gr. 75 anchor bolts embedded approximately 9-ft-6-in into the concrete foundation structure. Foundation information was obtained from the original Forth Worth Tower design calculations.

BASE REACTIONS:

From PLS-Pole analysis of CL&P pole based on NESC/NU prescribed loads.

Load Case	Shear	Axial	Moment
NESC Heavy Wind	19.24 kips	58.08 kips	1465.94 ft-kips
NESC Extreme Wind	26.73 kips	29.26 kips	2168.08 ft-kips
NESC Extreme Ice w/ Wind	13.13 kips	52.93 kips	1002.65 ft-kips

Note 1 – 10% increase applied to tower base reactions per OTRM 051

ANCHOR BOLTS:

The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (% of capacity)	Result
Anchor Bolts	Tension	75.13%	**PASS**

FOUNDATION:

The foundation with the proposed modifications was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading (1)	Result
Reinforced Concrete Caisson	Moment Capacity	30.3%	**PASS**
	Lateral Deflection	1.14 in.	**PASS**

Note 1: 10% increase to PLS base reactions used in foundation analysis per OTRM 051.

Conclusion

This analysis shows that the subject utility tower with the proposed antenna mast **is adequate** to support the proposed AT&T Mobility equipment installation.

The analysis is based, in part on the information provided to this office by Eversource and AT&T. If the existing conditions are different than the information in this report, CENTEK engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES

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

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

- Information from the field and/or drawings in the possession of CENTEK engineering, Inc. or generated by field inspections or measurements of the structure.

- It is the responsibility of the client to ensure that the information provided to CENTEK engineering, Inc. 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 are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.

- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. 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. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222.

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

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ RISA-3D

RISA-3D Structural Analysis Program is an integrated structural analysis and design software package for buildings, bridges, tower structures, etc.

Modeling Features:

- Comprehensive CAD-like graphic drawing/editing capabilities that let you draw, modify and load elements as well as snap, move, rotate, copy, mirror, scale, split, merge, mesh, delete, apply, etc.
- Versatile drawing grids (orthogonal, radial, skewed)
- Universal snaps and object snaps allow drawing without grids
- Versatile general truss generator
- Powerful graphic select/unselect tools including box, line, polygon, invert, criteria, spreadsheet selection, with locking
- Saved selections to quickly recall desired selections
- Modification tools that modify single items or entire selections
- Real spreadsheets with cut, paste, fill, math, sort, find, etc.
- Dynamic synchronization between spreadsheets and views so you can edit or view any data in the plotted views or in the spreadsheets
- Simultaneous view of multiple spreadsheets
- Constant in-stream error checking and data validation
- Unlimited undo/redo capability
- Generation templates for grids, disks, cylinders, cones, arcs, trusses, tanks, hydrostatic loads, etc.
- Support for all units systems & conversions at any time
- Automatic interaction with RISASection libraries
- Import DXF, RISA-2D, STAAD and ProSteel 3D files
- Export DXF, SDNF and ProSteel 3D files

Analysis Features:

- Static analysis and P-Delta effects
- Multiple simultaneous dynamic and response spectra analysis using Gupta, CQC or SRSS mode combinations
- Automatic inclusion of mass offset (5% or user defined) for dynamic analysis
- Physical member modeling that does not require members to be broken up at intermediate joints
- State of the art 3 or 4 node plate/shell elements
- High-end automatic mesh generation — draw a polygon with any number of sides to create a mesh of well-formed quadrilateral (NOT triangular) elements.
- Accurate analysis of tapered wide flanges - web, top and bottom flanges may all taper independently
- Automatic rigid diaphragm modeling
- Area loads with one-way or two-way distributions
- Multiple simultaneous moving loads with standard AASHTO loads and custom moving loads for bridges, cranes, etc.
- Torsional warping calculations for stiffness, stress and design
- Automatic Top of Member offset modeling
- Member end releases & rigid end offsets
- Joint master-slave assignments
- Joints detachable from diaphragms
- Enforced joint displacements
- 1-Way members, for tension only bracing, slipping, etc.

- 1-Way springs, for modeling soils and other effects
- Euler members that take compression up to their buckling load, then turn off.
- Stress calculations on any arbitrary shape
- Inactive members, plates, and diaphragms allows you to quickly remove parts of structures from consideration
- Story drift calculations provide relative drift and ratio to height
- Automatic self-weight calculations for members and plates
- Automatic subgrade soil spring generator

Graphics Features:

- Unlimited simultaneous model view windows
- Extraordinary “true to scale” rendering, even when drawing
- High-speed redraw algorithm for instant refreshing
- Dynamic scrolling stops right where you want
- Plot & print virtually everything with color coding & labeling
- Rotate, zoom, pan, scroll and snap views
- Saved views to quickly restore frequent or desired views
- Full render or wire-frame animations of deflected model and dynamic mode shapes with frame and speed control
- Animation of moving loads with speed control
- High quality customizable graphics printing

Design Features:

- Designs concrete, hot rolled steel, cold formed steel and wood
- ACI 1999/2002, BS 8110-97, CSA A23.3-94, IS456:2000,EC 2-1992 with consistent bar sizes through adjacent spans
- Exact integration of concrete stress distributions using parabolic or rectangular stress blocks
- Concrete beam detailing (Rectangular, T and L)
- Concrete column interaction diagrams
- Steel Design Codes: AISC ASD 9th, LRFD 2nd & 3rd, HSS Specification, CAN/CSA-S16.1-1994 & 2004, BS 5950-1-2000, IS 800-1984, Euro 3-1993 including local shape databases
- AISI 1999 cold formed steel design
- NDS 1991/1997/2001 wood design, including Structural Composite Lumber, multi-ply, full sawn
- Automatic spectra generation for UBC 1997, IBC 2000/2003
- Generation of load combinations: ASCE, UBC, IBC, BOCA, SBC, ACI
- Unbraced lengths for physical members that recognize connecting elements and full lengths of members
- Automatic approximation of K factors
- Tapered wide flange design with either ASD or LRFD codes
- Optimization of member sizes for all materials and all design codes, controlled by standard or user-defined lists of available sizes and criteria such as maximum depths
- Automatic calculation of custom shape properties
- Steel Shapes: AISC, HSS, CAN, ARBED, British, Euro, Indian, Chilean
- Light Gage Shapes: AISI, SSMA, Dale / Incor, Dietrich, Marino\WARE
- Wood Shapes: Complete NDS species/grade database
- Full seamless integration with RISAFoot (Ver 2 or better) for advanced footing design and detailing
- Plate force summation tool

Results Features:

- Graphic presentation of color-coded results and plotted designs
- Color contours of plate stresses and forces with quadratic smoothing, the contours may also be animated
- Spreadsheet results with sorting and filtering of: reactions, member & joint deflections, beam & plate forces/stresses, optimized sizes, code designs, concrete reinforcing, material takeoffs, frequencies and mode shapes
- Standard and user-defined reports
- Graphic member detail reports with force/stress/deflection diagrams and detailed design calculations and expanded diagrams that display magnitudes at any dialed location
- Saved solutions quickly restore analysis and design results.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS-POLE

PLS-POLE provides all of the capabilities a structural engineer requires to design transmission, substation or communications structures. It does so using a simple easy to use graphical interface that rests upon our time tested finite element engine. Regardless of whether you want to model a simple wood pole or a guyed steel X-Frame; PLS-POLE can handle the job simply, reliably and efficiently.

Modeling Features:

- Structures are made of standard reusable components that are available in libraries. You can easily create your own libraries or get them from a manufacturer
- Structure models are built interactively using interactive menus and graphical commands
- Automatic generation of underlying finite element model of structure
- Steel poles can have circular, 4, 6, 8, 12, 16, or 18-sided, regular, elliptical or user input cross sections (flat-to-flat or tip-to-tip orientations)
- Steel and concrete poles can be selected from standard sizes available from manufacturers
- Automatic pole class selection
- Cross brace position optimizer
- Capability to specify pole ground line rotations
- Capability to model foundation displacements
- Can optionally model foundation stiffness
- Guys are easily handled (modeled as exact cable elements in nonlinear analysis)
- Powerful graphics module (members color-coded by stress usage)
- Graphical selection of joints and components allows graphical editing and checking
- Poles can be shown as lines, wire frames or can be rendered as 3-d polygon surfaces

Analysis Features:

- Automatic distribution of loads in 2-part suspension insulators (v-strings, horizontal vees, etc.)
- Design checks for ASCE, ANSI/TIA/EIA 222 (Revisions F and G) or other requirements
- Automatic calculation of dead and wind loads
- Automated loading on structure (wind, ice and drag coefficients) according to:
    - ASCE 74-1991
    - NESC 2002
    - NESC 2007
    - IEC 60826:2003
    - EN50341-1:2001 (CENELEC)
    - EN50341-3-9:2001 (UK NNA)
    - EN50341-3-17:2001 (Portugal NNA)
    - ESAA C(b)1-2003 (Australia)
    - TPNZ (New Zealand)
    - REE (Spain)
    - EIA/TIA 222-F
    - ANSI/TIA 222-G
    - CSA S37-01
- Automated microwave antenna loading as per EIA/TIA 222-F and ANSI/TIA 222-G
- Detects buckling by nonlinear analysis

Results Features:

- Detects buckling by nonlinear analysis
- Easy to interpret text, spreadsheet and graphics design summaries
- Automatic determination of allowable wind and weight spans
- Automatic determination of interaction diagrams between allowable wind and weight spans
- Automatic tracking of part numbers and costs

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ LPILE PLUS

LPILE Plus is a special purpose program based on rational procedures for analyzing a pile under lateral loading. The program computes deflection, shear, bending moment, and soil response with respect to depth in nonlinear soils. Components of the stiffness matrix at the pile head may be computed internally by the program to help the users in their super-structure analysis. Several pile lengths may be automatically checked by the program in order to help the user produce a design with an optimum pile penetration.

Soil behavior is modeled with p-y curves internally generated by the computer program following published recommendations for various types of soils; alternatively, the user can manually introduce other p-y curves. Special procedures are programmed for developing p-y curves for layered soils and for rocks.

Several types of pile-head boundary conditions may be selected, and the properties of the pile can also vary as a function of depth. LPILE Plus has capabilities to compute the ultimate-moment capacity of a pile's section and can provide design information for rebar arrangement. The user may optionally ask the program to generate and take into account nonlinear values of flexural stiffness (EI) which are generated internally based on specified pile dimensions, material properties, and cracked/uncracked concrete behavior.

A single, user-friendly interface written for the Microsoft Windows© environment is provided for the preparation of input, analytical run, and for the graphical observation of data contained in the output file. The program has been written in 32-bit programming codes for compatibility with the latest versions of the Microsoft Windows operating system. The program produces plain-text input and output files that may be observed and/or edited for their inclusion in project reports.

Criteria for Design of PCS Facilities On or Extending Above Metal Electric Transmission Towers & Analysis of Transmission Towers Supporting PCS Masts [(1)]

Introduction

This criteria is the result from an evaluation of the methods and loadings specified by the separate standards, which are used in designing telecommunications towers and electric transmission towers. That evaluation is detailed elsewhere, but in summary; the methods and loadings are significantly different. This criteria specifies the manner in which the appropriate standard is used to design PCS facilities including masts and brackets (hereafter referred to as "masts"), and to evaluate the electric transmission towers to support PCS masts. The intent is to achieve an equivalent level of safety and security under the extreme design conditions expected in Connecticut and Massachusetts.

ANSI Standard TIA-222 covering the design of telecommunications structures specifies a working strength/allowable stress design approach. This approach applies the loads from extreme weather loading conditions, and designs the structure so that it does not exceed some defined percentage of failure strength (allowable stress).

ANSI Standard C2-2007 (National Electrical Safety Code) covering the design of electric transmission metal structures is based upon an ultimate strength/yield stress design approach. This approach applies a multiplier (overload capacity factor) to the loads possible from extreme weather loading conditions, and designs the structure so that it does not exceed its ultimate strength (yield stress).

Each standard defines the details of how loads are to be calculated differently. Most of the NU effort in "unifying" both codes was to establish what level of strength each approach would provide, and then increasing the appropriate elements of each to achieve a similar level of security under extreme weather loadings.

Two extreme weather conditions are considered. The first is an extreme wind condition (hurricane) based upon a 50-year recurrence (2% annual probability). The second is a winter condition combining wind and ice loadings.

The following sections describe the design criteria for any PCS mast extending above the top of an electric transmission tower, and the analysis criteria for evaluating the loads on the transmission tower from such a mast from the lower portions of such a mast, and loads on the pre-existing electric lower portions of such a mast, and loads on the pre-existing electric transmission tower and the conductors it supports.

Note 1: *Prepared from documentation provide from Northeast Utilities.*

P C S   M a s t

The PCS facility (mast, external cable/trays, including the initial and any planned future support platforms, antennas, etc. extending the full height above the top level of the electric transmission structure) shall be designed in accordance with the provisions of TIA 222-G:

E L E C T R I C   T R A N S M I S S I O N   T O W E R

The electric transmission tower shall be analyzed using yield stress theory in accordance with the attached table titled “NU Design Criteria”. This specifies uniform loadings (different from the TIA loadings) on the each of the following components of the installed facility:

- PCS mast for its total height above ground level, including the initial and planned future support platforms, antennas, etc. above the top of an electric transmission structure.
- Conductors are related devices and hardware.
- Electric transmission structure. The loads from the PCS facility and from the electric conductors shall be applied to the structure at conductor and PCS mast attachment points, where those load transfer to the tower.

The uniform loadings and factors specified for the above components in the table are based upon the National Electrical Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to TIA and its loads and factors with the exceptions noted above. (Note that the NESC does not require the projected wind surfaces of structures and equipment to be increased by the ice covering.)

In the event that the electric transmission tower is not sufficient to support the additional loadings of the PCS mast, reinforcement will be necessary to upgrade the strength of the overstressed members.

Attachment A

Condition		Attachment A NU Design Criteria	Basic Wind Speed V (MPH)	Pressure Q (PSF)	Height factor Kz	Gust Factor Gh	Load or Stress Factor	Force Coef. - Shape Factor
Ice Condition	TIA	Antenna Mount	TIA SUB 090	TIA SUB 090	TIA SUB 090	TIA SUB 090	TIA SUB 090	TIA SUB 090
Ice Condition	NESC Heavy	Tower/Pole Analysis with antennas extending above top of Tower/Pole (Yield Stress)	———	4	1	1	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
Ice Condition	NESC Heavy	Tower/Pole Analysis with antennas below top of Tower/Pole (on two faces)	———	4	1	1	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
Ice Condition	NESC Heavy	Conductors:	Conductor Loads Provided by NU					
High Wind Condition	TIA	Antenna Mount	TIA SUB 090	TIA SUB 090	TIA SUB 090	TIA SUB 090	TIA SUB 090	TIA SUB 090
High Wind Condition	NESC Extreme Wind	Tower/Pole Analysis with antennas extending above top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250C: Extreme Wind Loading Apply a 1.25 X Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure					1.6 Flat Surfaces 1.3 Round Surfaces
High Wind Condition	NESC Extreme Wind	Tower/Pole Analysis with antennas below top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250C: Extreme Wind Loading Height above ground is based on overall height to top of tower/pole					1.6 Flat Surfaces 1.3 Round Surfaces
High Wind Condition	NESC Extreme Wind	Conductors:	Conductor Loads Provided by NU					
NESC Extreme Ice with Wind Condition *		Tower/Pole Analysis with antennas extending above top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250D: Extreme Ice with Wind Loading 4 PSF Wind Load 1.25 X Gust Response Factor Apply a 1.25 X Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure					1.6 Flat Surfaces 1.3 Round Surfaces
NESC Extreme Ice with Wind Condition *		Tower/Pole Analysis with antennas below top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250D: Extreme Ice with Wind Loading 4 PSF Wind Load Height above ground is based on overall height to top of tower/pole					1.6 Flat Surfaces 1.3 Round Surfaces
NESC Extreme Ice with Wind Condition *		Conductors:	Conductor Loads Provided by NU					

* Only for structures installed after 2007

PLS-CADD Version 12.30   9:32:51 AM Monday, March 18, 2013
Northeast Utilities System
Project Name: 'c:\cps\pls-cadd\1990_20120109\xyz files\1990 rebuild_20130313.DON'
Line Title: 'Oxford Airport Glide Path Mitigation'

Criteria Notes:
NUSCO Criteria File nusco_green.cri
This criteria file is based on the 2007 edition of the National Electric Safety Code
This criteria file is to be applied to new transmission line designs in Central CT.
For a detailed map on the NUSCO design wind zones, please consult OTRM 060
Rule 250C Wind speed assumed to be 110 MPH
Rule 250D Assumed 15 deg F, 4 psf wind and 1 inch of radial ice

PLS-Pole models entered into the model from FWT on 5/10/2012

ADSS Line into Shaws Hill Entered 2/20/2013

Realignment at Municipal Rd and Quarry in Waterbury. 2/21/2013

Added Relocation of Distribution Circuits 13F61 & 13F62. 2/27/2013

Weather Cases

WC #	Description	Air Density Factor (psf/mph^2)	Wind Vel. (mph)	Wind Pres. (psf)	Wire Ice Thick (in)	Wire Ice Density (lbs/ft^3)	Wire Ice Load (lbs/ft)	Wire Temp (deg F)	Ambient Temp (deg F)	Weather Load Factor	NESC Constant (lbs/ft)	Wire Wind Height Adjust Model	Wire Gust Response Factor
1	NESC Rule 250B	0.00256	40	4.0	0.50	57.000	0.00	0	0	1.00	0.30	None	1
2	NESC Rule 250C	0.00256	110	31.0	0.00	0.000	0.00	60	60	1.00	0.00	NESC 2007	NESC 2007
3	NESC Rule 250D	0.00256	40	4.1	1.00	57.000	0.00	15	15	1.00	0.00	None	1
4	Uplift	0.00256	0	0.0	0.00	0.000	0.00	-20	-20	1.00	0.00	None	1
5	Maximum Operating	0.00256	0	0.0	0.00	0.000	0.00	356	285	1.00	0.00	None	1
6	NESC Blowout 6PSF	0.00256	48	6.0	0.00	0.000	0.00	60	60	1.00	0.00	None	1
7	GALLOPING (SWING)	0.00256	28	2.0	0.50	57.000	0.00	32	32	1.00	0.00	None	1
8	GALLOPING (SAG)	0.00256	0	0.0	0.50	57.000	0.00	32	32	1.00	0.00	None	1
9	0 Deg F	0.00256	0	0.0	0.00	0.000	0.00	0	0	1.00	0.00	None	1
10	30 Deg F	0.00256	0	0.0	0.00	0.000	0.00	30	30	1.00	0.00	None	1
11	32 Deg F	0.00256	0	0.0	0.50	57.000	0.00	32	32	1.00	0.00	None	1
12	60 Deg F	0.00256	0	0.0	0.00	0.000	0.00	60	60	1.00	0.00	None	1
13	90 Deg F	0.00256	0	0.0	0.00	0.000	0.00	90	90	1.00	0.00	None	1
14	120 Deg F	0.00256	0	0.0	0.00	0.000	0.00	120	120	1.00	0.00	None	1
15	167 Deg F	0.00256	0	0.0	0.00	0.000	0.00	167	167	1.00	0.00	None	1
16	212 Deg F	0.00256	0	0.0	0.00	0.000	0.00	212	212	1.00	0.00	None	1
17	356 Deg F	0.00256	0	0.0	0.00	0.000	0.00	356	285	1.00	0.00	None	1
18	NU Blowout	0.00256	59	9.0	0.00	0.000	0.00	60	60	1.00	0.00	None	1
19	NU Swing Cw	0.00256	0	0.0	0.00	0.000	0.00	60	60	1.00	0.00	None	1
20	NU Swing Cl	0.00256	35	3.1	0.00	0.000	0.00	45	45	1.00	0.00	None	1
21	NU Swing Cs	0.00256	48	6.0	0.00	0.000	0.00	60	60	1.00	0.00	None	1
22	NU Swing Ch	0.00256	60	9.2	0.00	0.000	0.00	60	60	1.00	0.00	None	1

Structure Loads Criteria

LC #	WC #	Load Case Description	Cable Condition	Wind Dir.	Bisect Wind Angle	Wire Vert. Load Factor	Wire + Struct. Wind Load Factor	Wire Tension Load Factor	Struct Weight Load Factor	Struct Wind Area Factor	Struct. Wind Load Model	Struct. Ice Thick (in)	Struct. Ice Density (lbs/ft^3)	Pole Tip Deflection Check	Pole Tip Deflect Limit % or (ft)
1	1	RULE 250B NA+	Creep RS	NA+		1.50	2.50	1.65	1.50	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00
2	1	RULE 250B NA-	Creep RS	NA-		1.50	2.50	1.65	1.50	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00
3	2	RULE 250C NA+	Creep RS	NA+		1.00	1.00	1.00	1.00	1.00	Pre V7 NESC 2002	0.00	0.000	No Limit	0.00
4	2	RULE 250C NA-	Creep RS	NA-		1.00	1.00	1.00	1.00	1.00	Pre V7 NESC 2002	0.00	0.000	No Limit	0.00
5	3	RULE 250D NA+	Creep RS	NA+		1.00	1.00	1.00	1.00	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00
6	3	RULE 250D NA-	Creep RS	NA-		1.00	1.00	1.00	1.00	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00
7	1	250B No OLF NA+	Creep RS	NA+		1.00	1.00	1.00	1.00	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00
8	1	250B No OLF NA-	Creep RS	NA-		1.00	1.00	1.00	1.00	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00
9	12	Deflection	Creep RS	NA+		1.00	1.00	1.00	1.00	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00
10	1	BROKEN SIDE NA+	Creep RS	NA+		1.50	2.50	1.65	1.50	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00
11	1	BROKEN SIDE NA-	Creep RS	NA-		1.50	2.50	1.65	1.50	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00
12	1	BROKEN WIRE NA+	Creep RS	NA+		1.50	2.50	1.65	1.50	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00
13	1	BROKEN WIRE NA-	Creep RS	NA-		1.50	2.50	1.65	1.50	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00

Cable Load Adjustments for each Load Case

LC #	WC #	Load Case Description	Struct Groups On Which To Apply	Command 1 Wire(s) Set: Phase: Side:	Command 1	Command 1 Value (lbs) (deg) (%)	Command 2 Wire(s) Set: Phase: Side:	Command 2	Command 2 Value (lbs) (deg) (%)
1	1	RULE 250B NA+	'All'						
2	1	RULE 250B NA-	'All'						
3	2	RULE 250C NA+	'All'						
4	2	RULE 250C NA-	'All'						

5	3	RULE 250D NA+	'All'				
6	3	RULE 250D NA-	'All'				
7	1	250B No OLF NA+	'All'				
8	1	250B No OLF NA-	'All'				
9	12	Deflection	'All'				
10	1	BROKEN SIDE NA+	'PLS-POLE has DE'	Ahead Spans # Broken Subconductors	1.0		
11	1	BROKEN SIDE NA-	'PLS-POLE has DE'	Ahead Spans # Broken Subconductors	1.0		
12	1	BROKEN WIRE NA+	'Angle'	1:1:Ahead # Broken Subconductors	1.0	2:1:Ahead # Broken Subconductors	1.0
13	1	BROKEN WIRE NA-	'Angle'	1:1:Ahead # Broken Subconductors	1.0	2:1:Ahead # Broken Subconductors	1.0

Span and Wire Summary For Structure Range

Span azimuth is measured clockwise from structure transverse axis (0=transverse, 90=back, 270=ahead)
Azimuth of structure transverse axis is 140.8940 (deg) measured clockwise from North.

Str. No.	Str. Name	LC #	WC #	Load Case Description	Set No.	Phase No.	Attach. Joint Labels	Back span Cable Name	Len. (ft)	Azi. (deg)	Horiz. Load (lbs/ft)	Vert. Load (lbs/ft)	Horiz. Tension (lbs)	Ahead span Cable Name	Len. (ft)	Azi. (deg)	Horiz. Load (lbs/ft)	Vert. Load (lbs/ft)	Horiz. Tension (lbs)
11229	type_c-80ft.pol	1	1	RULE 250B NA+	1	1	C1	falcon_acss.wir	606	95	2.12	4.97	17770	falcon_acss.wir	481	265	2.12	4.97	17767
11229	type_c-80ft.pol	1	1		1	2	C2	falcon_acss.wir	606	95	2.12	4.97	17770	falcon_acss.wir	481	265	2.12	4.97	17767
11229	type_c-80ft.pol	1	1		1	3	C3	falcon_acss.wir	606	95	2.12	4.97	17770	falcon_acss.wir	481	265	2.12	4.97	17767
11229	type_c-80ft.pol	1	1		2	1	SW:T	afl_hexacor_dno-7757.wir	606	95	1.37	1.66	8728	afl_hexacor_dno-7757.wir	481	265	1.37	1.66	8724
11229	type_c-80ft.pol	2	1	RULE 250B NA-	1	1	C1	falcon_acss.wir	606	95	2.12	4.97	17770	falcon_acss.wir	481	265	2.12	4.97	17767
11229	type_c-80ft.pol	2	1		1	2	C2	falcon_acss.wir	606	95	2.12	4.97	17770	falcon_acss.wir	481	265	2.12	4.97	17767
11229	type_c-80ft.pol	2	1		1	3	C3	falcon_acss.wir	606	95	2.12	4.97	17770	falcon_acss.wir	481	265	2.12	4.97	17767
11229	type_c-80ft.pol	2	1		2	1	SW:T	afl_hexacor_dno-7757.wir	606	95	1.37	1.66	8728	afl_hexacor_dno-7757.wir	481	265	1.37	1.66	8724
11229	type_c-80ft.pol	3	2	RULE 250C NA+	1	1	C1	falcon_acss.wir	606	95	3.39	2.04	10306	falcon_acss.wir	481	265	3.46	2.04	10284
11229	type_c-80ft.pol	3	2		1	2	C2	falcon_acss.wir	606	95	3.30	2.04	10306	falcon_acss.wir	481	265	3.36	2.04	10285
11229	type_c-80ft.pol	3	2		1	3	C3	falcon_acss.wir	606	95	3.18	2.04	10306	falcon_acss.wir	481	265	3.24	2.04	10285
11229	type_c-80ft.pol	3	2		2	1	SW:T	afl_hexacor_dno-7757.wir	606	95	1.46	0.40	4747	afl_hexacor_dno-7757.wir	481	265	1.49	0.40	4735
11229	type_c-80ft.pol	4	2	RULE 250C NA-	1	1	C1	falcon_acss.wir	606	95	3.39	2.04	10306	falcon_acss.wir	481	265	3.46	2.04	10284
11229	type_c-80ft.pol	4	2		1	2	C2	falcon_acss.wir	606	95	3.30	2.04	10306	falcon_acss.wir	481	265	3.36	2.04	10285
11229	type_c-80ft.pol	4	2		1	3	C3	falcon_acss.wir	606	95	3.18	2.04	10306	falcon_acss.wir	481	265	3.24	2.04	10285
11229	type_c-80ft.pol	4	2		2	1	SW:T	afl_hexacor_dno-7757.wir	606	95	1.46	0.40	4747	afl_hexacor_dno-7757.wir	481	265	1.49	0.40	4735
11229	type_c-80ft.pol	5	3	RULE 250D NA+	1	1	C1	falcon_acss.wir	606	95	1.21	5.21	13569	falcon_acss.wir	481	265	1.21	5.21	13567
11229	type_c-80ft.pol	5	3		1	2	C2	falcon_acss.wir	606	95	1.21	5.21	13569	falcon_acss.wir	481	265	1.21	5.21	13567
11229	type_c-80ft.pol	5	3		1	3	C3	falcon_acss.wir	606	95	1.21	5.21	13569	falcon_acss.wir	481	265	1.21	5.21	13567
11229	type_c-80ft.pol	5	3		2	1	SW:T	afl_hexacor_dno-7757.wir	606	95	0.90	2.44	7134	afl_hexacor_dno-7757.wir	481	265	0.90	2.44	7131
11229	type_c-80ft.pol	6	3	RULE 250D NA-	1	1	C1	falcon_acss.wir	606	95	1.21	5.21	13569	falcon_acss.wir	481	265	1.21	5.21	13567
11229	type_c-80ft.pol	6	3		1	2	C2	falcon_acss.wir	606	95	1.21	5.21	13569	falcon_acss.wir	481	265	1.21	5.21	13567
11229	type_c-80ft.pol	6	3		1	3	C3	falcon_acss.wir	606	95	1.21	5.21	13569	falcon_acss.wir	481	265	1.21	5.21	13567
11229	type_c-80ft.pol	6	3		2	1	SW:T	afl_hexacor_dno-7757.wir	606	95	0.90	2.44	7134	afl_hexacor_dno-7757.wir	481	265	0.90	2.44	7131
11229	type_c-80ft.pol	7	1	250B No OLF NA+	1	1	C1	falcon_acss.wir	606	95	0.85	3.31	10770	falcon_acss.wir	481	265	0.85	3.31	10768
11229	type_c-80ft.pol	7	1		1	2	C2	falcon_acss.wir	606	95	0.85	3.31	10770	falcon_acss.wir	481	265	0.85	3.31	10768
11229	type_c-80ft.pol	7	1		1	3	C3	falcon_acss.wir	606	95	0.85	3.31	10770	falcon_acss.wir	481	265	0.85	3.31	10768
11229	type_c-80ft.pol	7	1		2	1	SW:T	afl_hexacor_dno-7757.wir	606	95	0.55	1.11	5290	afl_hexacor_dno-7757.wir	481	265	0.55	1.11	5287
11229	type_c-80ft.pol	8	1	250B No OLF NA-	1	1	C1	falcon_acss.wir	606	95	0.85	3.31	10770	falcon_acss.wir	481	265	0.85	3.31	10768
11229	type_c-80ft.pol	8	1		1	2	C2	falcon_acss.wir	606	95	0.85	3.31	10770	falcon_acss.wir	481	265	0.85	3.31	10768
11229	type_c-80ft.pol	8	1		1	3	C3	falcon_acss.wir	606	95	0.85	3.31	10770	falcon_acss.wir	481	265	0.85	3.31	10768
11229	type_c-80ft.pol	8	1		2	1	SW:T	afl_hexacor_dno-7757.wir	606	95	0.55	1.11	5290	afl_hexacor_dno-7757.wir	481	265	0.55	1.11	5287
11229	type_c-80ft.pol	9	12	Deflection	1	1	C1	falcon_acss.wir	606	95	0.00	2.04	6127	falcon_acss.wir	481	265	0.00	2.04	6127
11229	type_c-80ft.pol	9	12		1	2	C2	falcon_acss.wir	606	95	0.00	2.04	6127	falcon_acss.wir	481	265	0.00	2.04	6127
11229	type_c-80ft.pol	9	12		1	3	C3	falcon_acss.wir	606	95	0.00	2.04	6127	falcon_acss.wir	481	265	0.00	2.04	6127
11229	type_c-80ft.pol	9	12		2	1	SW:T	afl_hexacor_dno-7757.wir	606	95	0.00	0.40	1778	afl_hexacor_dno-7757.wir	481	265	0.00	0.40	1778
11229	type_c-80ft.pol	12	1	BROKEN WIRE NA+	1	1	C1	falcon_acss.wir	606	95	2.12	4.97	17770	falcon_acss.wir	481	265	2.12	4.97	0
11229	type_c-80ft.pol	12	1		1	2	C2	falcon_acss.wir	606	95	2.12	4.97	17770	falcon_acss.wir	481	265	2.12	4.97	17767
11229	type_c-80ft.pol	12	1		1	3	C3	falcon_acss.wir	606	95	2.12	4.97	17770	falcon_acss.wir	481	265	2.12	4.97	17767
11229	type_c-80ft.pol	12	1		2	1	SW:T	afl_hexacor_dno-7757.wir	606	95	1.37	1.66	8728	afl_hexacor_dno-7757.wir	481	265	1.37	1.66	0
11229	type_c-80ft.pol	13	1	BROKEN WIRE NA-	1	1	C1	falcon_acss.wir	606	95	2.12	4.97	17770	falcon_acss.wir	481	265	2.12	4.97	0
11229	type_c-80ft.pol	13	1		1	2	C2	falcon_acss.wir	606	95	2.12	4.97	17770	falcon_acss.wir	481	265	2.12	4.97	17767
11229	type_c-80ft.pol	13	1		1	3	C3	falcon_acss.wir	606	95	2.12	4.97	17770	falcon_acss.wir	481	265	2.12	4.97	17767
11229	type_c-80ft.pol	13	1		2	1	SW:T	afl_hexacor_dno-7757.wir	606	95	1.37	1.66	8728	afl_hexacor_dno-7757.wir	481	265	1.37	1.66	0

Wire Loads In Span Coordinate System For Structure Range

Wire loads expressed in span coordinate system (Longitudinal axis is line connecting attach. points)
Note: Loads in this report do not include load from counter weights, insulator weight or insulator wind area.

Str. No.	Str. Name	LC #	WC #	Load Case Description	Set No.	Phase No.	Attach. Joint Labels	Loads from back span Vert. (lbs)	Trans. (lbs)	Long. (lbs)	Loads from ahead span Vert. (lbs)	Trans. (lbs)	Long. (lbs)	Warnings
11229	type_c-80ft.pol	1	1	RULE 250B NA+	1	1	C1	897	643	17770	2487	513	17767	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	1	1		1	2	C2	897	643	17770	2487	513	17767	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	1	1		1	3	C3	897	643	17770	2487	513	17767	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	1	1		2	1	SW:T	237	416	8728	946	332	8724	
11229	type_c-80ft.pol	2	1	RULE 250B NA-	1	1	C1	897	-643	17770	2487	-513	17767	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	2	1		1	2	C2	897	-643	17770	2487	-513	17767	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	2	1		1	3	C3	897	-643	17770	2487	-513	17767	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	2	1		2	1	SW:T	237	-416	8728	946	-332	8724	
11229	type_c-80ft.pol	3	2	RULE 250C NA+	1	1	C1	197	1030	10306	1383	837	10284	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	3	2		1	2	C2	197	1000	10306	1383	813	10285	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	3	2		1	3	C3	197	966	10306	1383	784	10285	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	3	2		2	1	SW:T	-79	442	4747	499	359	4735	

11229	type_c-80ft.pol	4	2	RULE 250C NA-	1	1	C1	197	-1030	10306	1383	-837	10284	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	4	2		1	2	C2	197	-1000	10306	1383	-813	10285	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	4	2		1	3	C3	197	-966	10306	1383	-784	10285	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	4	2		2	1	SW:T	-79	-442	4747	499	-359	4735	
11229	type_c-80ft.pol	5	3	RULE 250D NA+	1	1	C1	1022	367	13569	2434	293	13567	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	5	3		1	2	C2	1022	367	13569	2434	293	13567	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	5	3		1	3	C3	1022	367	13569	2434	293	13567	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	5	3		2	1	SW:T	442	274	7134	1199	219	7131	
11229	type_c-80ft.pol	6	3	RULE 250D NA-	1	1	C1	1022	-367	13569	2434	-293	13567	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	6	3		1	2	C2	1022	-367	13569	2434	-293	13567	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	6	3		1	3	C3	1022	-367	13569	2434	-293	13567	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	6	3		2	1	SW:T	442	-274	7134	1199	-219	7131	
11229	type_c-80ft.pol	7	1	250B No OLF NA+	1	1	C1	598	257	10770	1658	205	10768	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	7	1		1	2	C2	598	257	10770	1658	205	10768	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	7	1		1	3	C3	598	257	10770	1658	205	10768	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	7	1		2	1	SW:T	158	166	5290	631	133	5287	
11229	type_c-80ft.pol	8	1	250B No OLF NA-	1	1	C1	598	-257	10770	1658	-205	10768	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	8	1		1	2	C2	598	-257	10770	1658	-205	10768	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	8	1		1	3	C3	598	-257	10770	1658	-205	10768	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	8	1		2	1	SW:T	158	-166	5290	631	-133	5287	
11229	type_c-80ft.pol	9	12	Deflection	1	1	C1	368	0	6127	1024	0	6127	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	9	12		1	2	C2	368	0	6127	1024	0	6127	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	9	12		1	3	C3	368	0	6127	1024	0	6127	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	9	12		2	1	SW:T	46	0	1778	247	0	1778	
11229	type_c-80ft.pol	12	1	BROKEN WIRE NA+	1	1	C1	897	643	17770	0	0	0	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	12	1		1	2	C2	897	643	17770	2487	513	17767	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	12	1		1	3	C3	897	643	17770	2487	513	17767	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	12	1		2	1	SW:T	237	416	8728	0	0	0	
11229	type_c-80ft.pol	13	1	BROKEN WIRE NA-	1	1	C1	897	-643	17770	0	-0	0	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	13	1		1	2	C2	897	-643	17770	2487	-513	17767	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	13	1		1	3	C3	897	-643	17770	2487	-513	17767	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	13	1		2	1	SW:T	237	-416	8728	0	-0	0	

Wire Loads In Structure Coordinate System For Structure Range

Note: Loads in this report include load from counter weights, insulator weight and insulator wind area.

Str. No.	Str. Name	LC #	WC #	Load Case Description	Set No.	Phase No.	Attach. Joint Labels	----Structure Loads---- Vert.	Trans.	Long.	--Loads from back span- Vert.	Trans.	Long.	-Loads from ahead span- Vert.	Trans.	Long.	Warnings
								---------(lbs)---------			---------(lbs)---------			---------(lbs)---------			
11229	type_c-80ft.pol	1	1	RULE 250B NA+	1	1	C1	3984	-2136	15	1197	-1005	17750	2787	-1132	-17735	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	1	1		1	2	C2	3984	-2134	15	1197	-1004	17750	2787	-1130	-17735	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	1	1		1	3	C3	3984	-2132	15	1197	-1003	17750	2787	-1129	-17735	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	1	1		2	1	SW:T	1183	-927	13	237	-422	8728	946	-505	-8715	
11229	type_c-80ft.pol	2	1	RULE 250B NA-	1	1	C1	3984	-4665	-9	1197	-2398	17627	2787	-2267	-17637	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	2	1		1	2	C2	3984	-4662	-10	1197	-2397	17627	2787	-2265	-17637	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	2	1		1	3	C3	3984	-4660	-10	1197	-2396	17627	2787	-2264	-17637	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	2	1		2	1	SW:T	1183	-2417	-3	237	-1251	8648	946	-1166	-8652	
11229	type_c-80ft.pol	3	2	RULE 250C NA+	1	1	C1	1980	282	40	397	235	10357	1583	47	-10317	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	3	2		1	2	C2	1980	229	40	397	206	10355	1583	23	-10315	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	3	2		1	3	C3	1980	167	39	397	173	10352	1583	-5	-10313	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	3	2		2	1	SW:T	420	-111	20	-79	-15	4768	499	-96	-4748	
11229	type_c-80ft.pol	4	2	RULE 250C NA-	1	1	C1	1980	-4222	3	397	-2209	10160	1583	-2014	-10157	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	4	2		1	2	C2	1980	-4167	3	397	-2179	10163	1583	-1989	-10160	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	4	2		1	3	C3	1980	-4103	4	397	-2144	10167	1583	-1959	-10163	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	4	2		2	1	SW:T	420	-1706	4	-79	-895	4683	499	-811	-4679	
11229	type_c-80ft.pol	5	3	RULE 250D NA+	1	1	C1	3856	-1893	9	1222	-911	13542	2634	-983	-13533	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	5	3		1	2	C2	3856	-1891	9	1222	-910	13542	2634	-982	-13533	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	5	3		1	3	C3	3856	-1890	9	1222	-909	13542	2634	-981	-13533	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	5	3		2	1	SW:T	1642	-876	8	442	-411	7127	1199	-465	-7120	
11229	type_c-80ft.pol	6	3	RULE 250D NA-	1	1	C1	3856	-3300	-5	1222	-1687	13471	2634	-1612	-13477	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	6	3		1	2	C2	3856	-3298	-5	1222	-1687	13472	2634	-1611	-13477	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	6	3		1	3	C3	3856	-3296	-5	1222	-1686	13472	2634	-1610	-13477	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	6	3		2	1	SW:T	1642	-1857	-3	442	-957	7075	1199	-901	-7078	
11229	type_c-80ft.pol	7	1	250B No OLF NA+	1	1	C1	2656	-1555	7	798	-752	10745	1858	-803	-10738	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	7	1		1	2	C2	2656	-1554	7	798	-752	10745	1858	-802	-10738	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	7	1		1	3	C3	2656	-1552	7	798	-751	10745	1858	-801	-10738	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	7	1		2	1	SW:T	789	-715	6	158	-341	5281	631	-374	-5275	
11229	type_c-80ft.pol	8	1	250B No OLF NA-	1	1	C1	2656	-2567	-3	798	-1310	10696	1858	-1257	-10699	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	8	1		1	2	C2	2656	-2565	-3	798	-1309	10696	1858	-1256	-10699	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	8	1		1	3	C3	2656	-2564	-3	798	-1308	10696	1858	-1255	-10699	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	8	1		2	1	SW:T	789	-1311	-0	158	-673	5250	631	-639	-5250	
11229	type_c-80ft.pol	9	12	Deflection	1	1	C1	1792	-1172	-0	568	-587	6098	1224	-586	-6098	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	9	12		1	2	C2	1792	-1172	-0	568	-586	6098	1224	-585	-6098	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	9	12		1	3	C3	1792	-1171	-0	568	-586	6098	1224	-585	-6099	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	9	12		2	1	SW:T	293	-341	-0	46	-170	1770	247	-170	-1770	
11229	type_c-80ft.pol	12	1	BROKEN WIRE NA+	1	1	C1	1197	-1005	17750	1197	-1005	17750	0	0	0	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	12	1		1	2	C2	3984	-2134	15	1197	-1004	17750	2787	-1130	-17735	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	12	1		1	3	C3	3984	-2132	15	1197	-1003	17750	2787	-1129	-17735	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	12	1		2	1	SW:T	237	-422	8728	237	-422	8728	0	0	0	
11229	type_c-80ft.pol	13	1	BROKEN WIRE NA-	1	1	C1	1197	-2398	17627	1197	-2398	17627	0	0	0	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	13	1		1	2	C2	3984	-4662	-10	1197	-2397	17627	2787	-2265	-17637	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	13	1		1	3	C3	3984	-4660	-10	1197	-2396	17627	2787	-2264	-17637	Multiple spans sharing same strain insulator ??
11229	type_c-80ft.pol	13	1		2	1	SW:T	237	-1251	8648	237	-1251	8648	0	0	0	

Wire Load Induced Ground Line Moments For Single Pole Centered At Structure Origin For Structure Range

Note: not applicable to guyed structures or frames. These approximate values do not include nonlinear (P-delta) effects or wind on pole. ??

Str. No.	Str. Name	LC #	WC #	Load Case Description	Vert. Load (kips)	Trans. Shear (kips)	Long. Shear (kips)	Resultant Shear (kips)	Trans. Moment (ft-k)	Long. Moment (ft-k)	Resultant Moment (ft-k)
11229	type_c-80ft.pol	1	1	RULE 250B NA+	13.135	-7.329	0.059	7.330	-557.531	3.589	557.542
11229	type_c-80ft.pol	2	1	RULE 250B NA-	13.135	-16.403	-0.032	16.403	-1099.151	-1.863	1099.152
11229	type_c-80ft.pol	3	2	RULE 250C NA+	6.360	0.568	0.139	0.585	-31.716	8.234	32.767
11229	type_c-80ft.pol	4	2	RULE 250C NA-	6.360	-14.199	0.014	14.199	-896.083	0.902	896.083
11229	type_c-80ft.pol	5	3	RULE 250D NA+	13.210	-6.550	0.034	6.550	-511.168	2.103	511.173
11229	type_c-80ft.pol	6	3	RULE 250D NA-	13.210	-11.752	-0.019	11.752	-824.702	-1.117	824.703
11229	type_c-80ft.pol	7	1	250B No OLF NA+	8.757	-5.377	0.026	5.377	-401.374	1.613	401.378
11229	type_c-80ft.pol	8	1	250B No OLF NA-	8.757	-9.006	-0.010	9.006	-618.022	-0.568	618.023
11229	type_c-80ft.pol	9	12	Deflection	5.668	-3.856	-0.000	3.856	-278.934	-0.012	278.934
11229	type_c-80ft.pol	12	1	BROKEN WIRE NA+	9.402	-5.693	26.509	27.113	-408.286	1900.163	1943.532
11229	type_c-80ft.pol	13	1	BROKEN WIRE NA-	9.402	-12.970	26.256	29.285	-820.270	1882.988	2053.895

Basic factored design wind pressure on structure For Structure Range

Str. No.	Str. Name	LC #	WC #	Load Case Description	Trans. Wind Press. (psf)	Long. Wind Press. (psf)	Notes
11229	type_c-80ft.pol	1	1	RULE 250B NA+	10.0	0.0	
11229	type_c-80ft.pol	2	1	RULE 250B NA-	-10.0	-0.0	
11229	type_c-80ft.pol	3	2	RULE 250C NA+	30.5	0.0	Wind adjusted for terrain category 'C' and hgt. 53.33 (ft) (larger of hgt*2/3 and 6.67m)
11229	type_c-80ft.pol	4	2	RULE 250C NA-	-30.5	-0.0	Wind adjusted for terrain category 'C' and hgt. 53.33 (ft) (larger of hgt*2/3 and 6.67m)
11229	type_c-80ft.pol	5	3	RULE 250D NA+	4.1	0.0	
11229	type_c-80ft.pol	6	3	RULE 250D NA-	-4.1	-0.0	
11229	type_c-80ft.pol	7	1	250B No OLF NA+	4.0	0.0	
11229	type_c-80ft.pol	8	1	250B No OLF NA-	-4.0	-0.0	
11229	type_c-80ft.pol	9	12	Deflection	0.0	0.0	
11229	type_c-80ft.pol	12	1	BROKEN WIRE NA+	10.0	0.0	
11229	type_c-80ft.pol	13	1	BROKEN WIRE NA-	-10.0	-0.0	

Structure loads written to the following LCA files:
c:\pls\temp\11229.lca

ANTENNA MAST DESIGN

STRUCT. NO. 11229
227 WHITEWOOD ROAD
WATERBURY, CT 06708

VICINITY MAP

NORTH

PROJECT SUMMARY

SITE ADDRESS:	227 WHITEWOOD ROAD WATERBURY, CT 06708
PROJECT COORDINATES:	LAT: 41°-34'-41.50N LON: 73°-04'-54.00W ELEV:±544' AMSL
EVERSOURCE STRUCT NO:	11229
EVERSOURCE CONTACT:	JOEL SZARKOWICZ 860.728.4503
AT&T SITE REF.:	CT2901
AT&T CONTACT:	ANA SEMASHKA 603.475.6038
ANTENNA CL HEIGHT:	105'-0"
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD ROAD BRANFORD, CT 06405
CENTEK CONTACT:	CARLO F. CENTORE, PE 203.488.0580 ext. 122

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
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N-1	DESIGN BASIS & GENERAL NOTES	3
N-2	STRUCTURAL STEEL NOTES	3
MI-1	MODIFICATION INSPECTION REQUIREMENTS	3
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S-2	TOP CONNECTION DETAILS	3
S-3	MIDDLE CONNECTION DETAILS	3
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REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	3/23/18	TJL	CFC	ISSUED FOR CONSTRUCTION – FINAL
2	3/23/18	TJL	CFC	ISSUED FOR CONSTRUCTION – REVISED MAST
1	12/14/17	TJL	CFC	ISSUED FOR CONSTRUCTION
0	7/05/17	TJL	CFC	ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

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

NEW CINGULAR WIRELESS PCS, LLC
PROPOSED WIRELESS COMMUNICATIONS FACILITY
CT2901
EVERSOURCE STRUCTURE 11229
227 WHITEWOOD ROAD
WATERBURY, CT 06708

DATE: 7/5/17
SCALE: AS SHOWN
JOB NO. 17010.09

TITLE SHEET

SHEET NO.
T-1
Sheet No. 1 of 8

DESIGN BASIS

1. GOVERNING CODE: 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CT STATE SUPPLEMENT.

2. TIA-222-G, ASCE MANUAL NO. 48-05 – "DESIGN OF STEEL TRANSMISSION POLE STRUCTURES SECOND EDITION", NESC C2-2007 AND NORTHEAST UTILITIES DESIGN CRITERIA.

3. DESIGN CRITERIA

   <u>WIND LOAD: (ANTENNA MAST)</u>
   NOMINAL DESIGN WIND SPEED (V) = 97 MPH (2016 CSBC: APPENDIX 'N')

   <u>WIND LOAD: (UTILITY POLE & FOUNDATION)</u>
   BASIC WIND SPEED (V) =110 MPH (3-SECOND GUST) BASED ON NESC C2-2007, SECTION 25 RULE 250C.

GENERAL NOTES

1. REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., FOR AT&T, DATED 4/2/18.
2. TOWER GEOMETRY AND STRUCTURE MEMBER SIZES WERE OBTAINED FROM THE TOWER DESIGN DRAWINGS PREPARED BY FORTH WORTH TOWER (FWT); JOB NO. J120328001 DATED MAY 4, 2012.
3. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE GOVERNING BUILDING CODE.
4. 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 SCOPE OF WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
5. 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. THIS INCLUDES VERIFYING ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK.
6. PCS MAST INSTALLATION SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF TRANSMISSION STRUCTURES. ALL SAFETY PROCEDURES, RIGGING AND ERECTION METHODS SHALL BE STANDARD TO THE INDUSTRY AND IN COMPLIANCE WITH OSHA.
7. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.
8. 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.
9. NO DRILLING WELDING OR TAPING IS PERMITTED ON CL&P OWNED EQUIPMENT.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	3/23/18	TJL	CFC	ISSUED FOR CONSTRUCTION – FINAL
2	3/23/18	TJL	CFC	ISSUED FOR CONSTRUCTION – REVISED MAST
1	12/14/17	TJL	CFC	ISSUED FOR CONSTRUCTION
0	7/05/17	TJL	CFC	ISSUED FOR CONSTRUCTION

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(203) 488-8587 Fax
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CT2901
EVERSOURCE STRUCTURE 11229
227 WHITEWOOD ROAD
WATERBURY, CT 06708

DATE: 7/5/17
SCALE: AS SHOWN
JOB NO. 17010.09

DESIGN BASIS AND GENERAL NOTES

SHEET NO.
N-1
Sheet No. 2 of 8

STRUCTURAL STEEL

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

2. MATERIAL SPECIFICATIONS

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI).
   C. STRUCTURAL STEEL (TOWER REINF. SOLID ROUND BAR)--- ASTM A572_GR50 (50 KSI)
   D. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   E. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   F. PIPE---ASTM A53 GRADE B (FY = 35 KSI)

3. FASTENER SPECIFICATIONS

   A. CONNECTION BOLTS---ASTM A325-N, UNLESS OTHERWISE SCHEDULED.
   B U-BOLTS---ASTM A307
   C. ANCHOR RODS---ASTM F1554
   D. WELDING ELECTRODES---ASTM E70XX FOR A36 & A572_GR50 STEELS, ASTM E80XX FOR A572_GR65 STEEL.
   E. BLIND BOLTS---AS1252 PROPERTY CLASS 8.8 (FU=120 KSI).

4. 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.

5. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.

6. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.

7. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.

8. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.

9. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.

10. 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.

11. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".

12. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING THE SCHEDULED ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.

13. 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.

14. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.

15. 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.

16. ALL BOLTS SHALL BE INSTALLED PER THE REQUIREMENTS OF AISC 14TH EDITION & RCSC "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH STRENGTH BOLTS".

17. ALL BOLTS SHALL BE INSTALLED AS SNUG-TIGHT CONNECTIONS UNLESS OTHERWISE INDICATED. CONNECTIONS SPECIFIED AS PRETENSIONED OR SLIP-CRITICAL SHALL BE TIGHTENED TO A BOLT TENSION NOT LESS THAN THAT GIVEN IN TABLE J3.1 OF AISC 14TH EDITION.

18. LOCK WASHER ARE NOT PERMITTED FOR A325 BOLTED STEEL ASSEMBLIES.

19. LOAD INDICATOR WASHERS SHALL BE UTILIZED ON ALL PRETENSIONED OR SLIP-CRITICAL CONNECTIONS.

20. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.

21. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.

22. FABRICATE BEAMS WITH MILL CAMBER UP.

23. 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.

24. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

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STRUCTURAL STEEL NOTES

SHEET NO.
N-2
Sheet No. 3 of 8

MODIFICATION INSPECTION REPORT REQUIREMENTS

PRE-CONSTUCTION		DURING CONSTRUCTION		POST-CONSTRUCTION	
SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM
X	EOR MODIFICATION INSPECTION DRAWING	–	FOUNDATIONS	X	MODIFICATION INSPECTOR RECORD REDLINE DRAWING
X	EOR APPROVED SHOP DRAWINGS	–	EARTHWORK: BACKFILL MATERIAL & COMPACTION	–	POST–INSTALLED ANCHOR ROD PULL-OUT TEST
–	EOR APPROVED POST–INSTALLED ANCHOR MPII	–	REBAR & FORMWORK GEOMETRY VERIFICATION	X	PHOTOGRAPHS
–	FABRICATION INSPECTION	–	CONCRETE TESTING		
–	FABRICATOR CERTIFIED WELDER INSPECTION	X	STEEL INSPECTION		
X	MATERIAL CERTIFICATIONS	–	POST INSTALLED ANCHOR ROD VERIFICATION		
		–	BASE PLATE GROUT VERIFICATION		
		–	CONTRACTOR'S CERTIFIED WELD INSPECTION		
		X	ON–SITE COLD GALVANIZING VERIFICATION		
		X	CONTRACTOR AS–BUILT REDLINE DRAWINGS		

NOTES:
1. REFER TO MODIFICATION INSPECTION NOTES FOR ADDITIONAL REQUIREMENTS
2. "X" DENOTES DOCUMENT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
3. "–" DENOTES DOCUMENT NOT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
4. EOR – ENGINEER OF RECORD
4. MPII – "MANUFACTURER'S PRINTED INSTALLATION GUIDELINES"

GENERAL

1. THE MODIFICATION INSPECTION IS A VISUAL INSPECTION OF STRUCTURAL MODIFICATIONS, TO INCLUDE A REVIEW AND COMPILATION OF SPECIFIED SUBMITTALS AND CONSTRUCTION INSPECTIONS, AS AN ASSURANCE OF COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS PREPARED UNDER THE DIRECTION OF THE ENGINEER OF RECORD (EOR).

2. THE MODIFICATION INSPECTION IS TO CONFIRM INSTALLATION CONFIGURATION AND GENERAL WORKMANSHIP AND IS NOT A REVIEW OF THE MODIFICATION DESIGN. OWNERSHIP OF THE MODIFICATION DESIGN EFFECTIVENESS AND INTENT RESIDES WITH THE ENGINEER OF RECORD.

3. TO ENSURE COMPLIANCE WITH THE MODIFICATION INSPECTION REQUIREMENTS THE GENERAL CONTRACTOR (GC) AND THE MODIFICATION INSPECTOR (MI) COMMENCE COMMUNICATION UPON AUTHORIZATION TO PROCEED BY THE CLIENT. EACH PARTY SHALL BE PROACTIVE IN CONTACTING THE OTHER. THE EOR SHALL BE CONTACTED IF SPECIFIC GC/MI CONTACT INFORMATION IS NOT MADE AVAILABLE.

4. THE GC SHALL PROVIDE THE MI WITH A MINIMUM OF 5 BUSINESS DAYS NOTICE OF IMPENDING INSPECTIONS.

5. WHEN POSSIBLE, THE GC AND MI SHALL BE ON SITE DURING THE MODIFICATION INSPECTION TO HAVE ANY NOTED DEFICIENCIES ADDRESSED DURING THE INITIAL MODIFICATION INSPECTION.

MODIFICATION INSPECTOR (MI)

1. THE MI SHALL CONTACT THE GC UPON AUTHORIZATION BY THE CLIENT TO:

   – REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   – WORK WITH THE GC IN DEVELOPMENT OF A SCHEDULE FOR ON–SITE INSPECTIONS.
   – DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.

2. THE MI IS RESPONSIBLE FOR COLLECTION OF ALL INSPECTION AND TEST REPORTS, REVIEWING REPORTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING ON–SITE INSPECTIONS AND COMPILATION & SUBMISSION OF THE MODIFICATION INSPECTION REPORT TO THE CLIENT AND THE EOR.

GENERAL CONTRACTOR (GC)

1. THE GC IS REQUIRED TO CONTACT THE GC UPON AUTHORIZATION TO PROCEED WITH CONSTRUCTION BY THE CLIENT TO:

   – REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   – WORK WITH THE MI IN DEVELOPMENT OF A SCHEDULE FOR ON–SITE INSPECTIONS.
   – DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.

2. THE GC IS RESPONSIBLE FOR COORDINATING AND SCHEDULING IN ADVANCE ALL REQUIRED INSPECTIONS AND TESTS WITH THE MI.

CORRECTION OF FAILING MODIFICATION INSPECTION

1. SHOULD THE STRUCTURAL MODIFICATION NOT COMPLY WITH THE REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS, THE GC SHALL WORK WITH THE MODIFICATION INSPECTOR IN A VIABLE REMEDIATION PLAN AS FOLLOWS:

   – CORRECT ALL DEFICIENCIES TO COMPLY WITH THE CONTRACT DOCUMENTS AND COORDINATE WITH THE MI FOR A FOLLOW UP INSPECTION.
   – WITH CLIENT AUTHORIZATION, THE GC MAY WORK WITH THE EOR TO REANALYZE THE MODIFICATION USING THE AS–BUILT CONDITION.

REQUIRED PHOTOGRAPHS

1. THE GC AND MI SHALL AT MINIMUM PHOTO DOCUMENT THE FOLLOWING FOR INCLUSION IN THE MODIFICATION INSPECTION REPORT:

   – PRE–CONSTRUCTION: GENERAL CONDITION OF THE SITE.
   – DURING CONSTRUCTION: RAW MATERIALS, CRITICAL DETAILS, WELD PREPARATION, BOLT INSTALLATION & TORQUE, FINAL INSTALLED CONDITION & SURFACE COATING REPAIRS.
   – POST–CONSTRUCTION: FINAL CONDITION OF THE SITE

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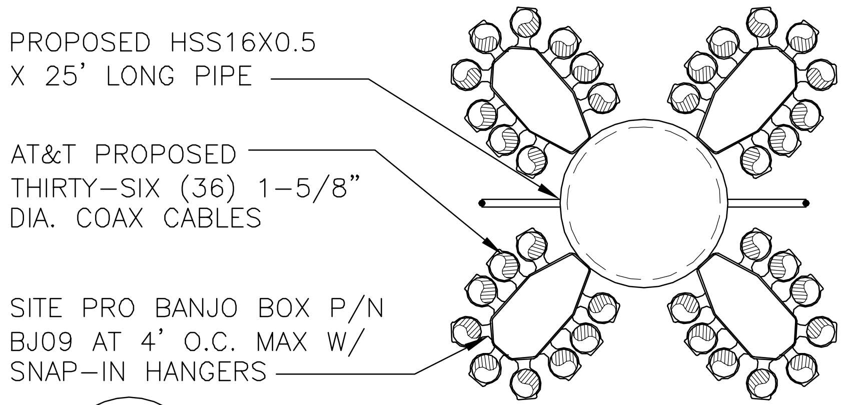
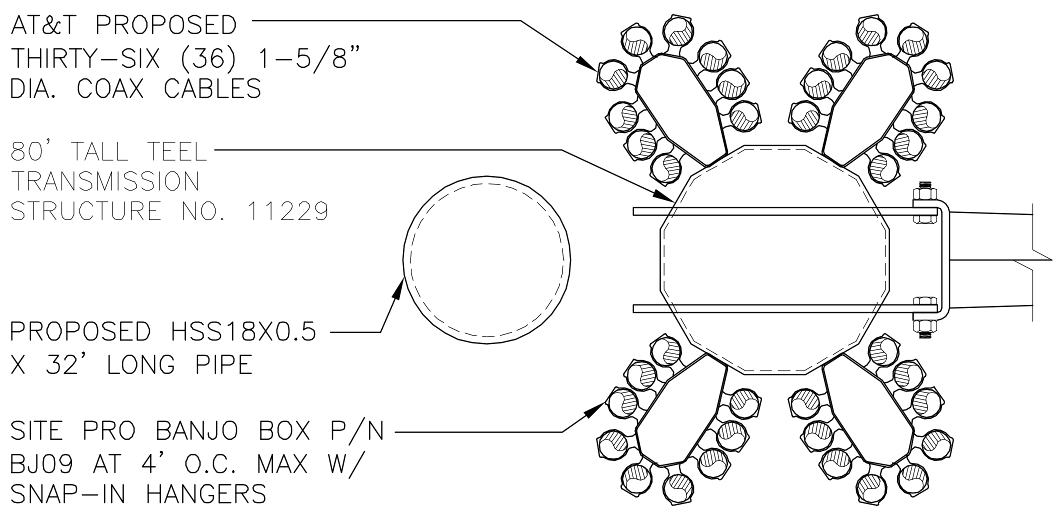
MODIFICATION INSPECTION REQUIREMENTS

SHEET NO.
MI-1



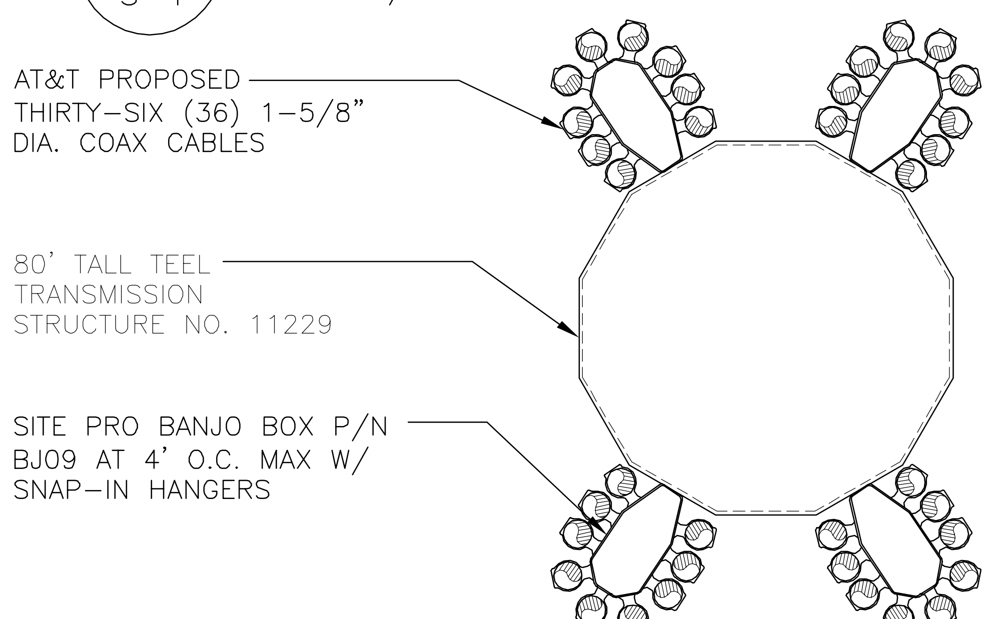
2 / S-1 COAX CABLE PLAN (ABOVE TOWER)

SCALE: 3/4" = 1'-0"



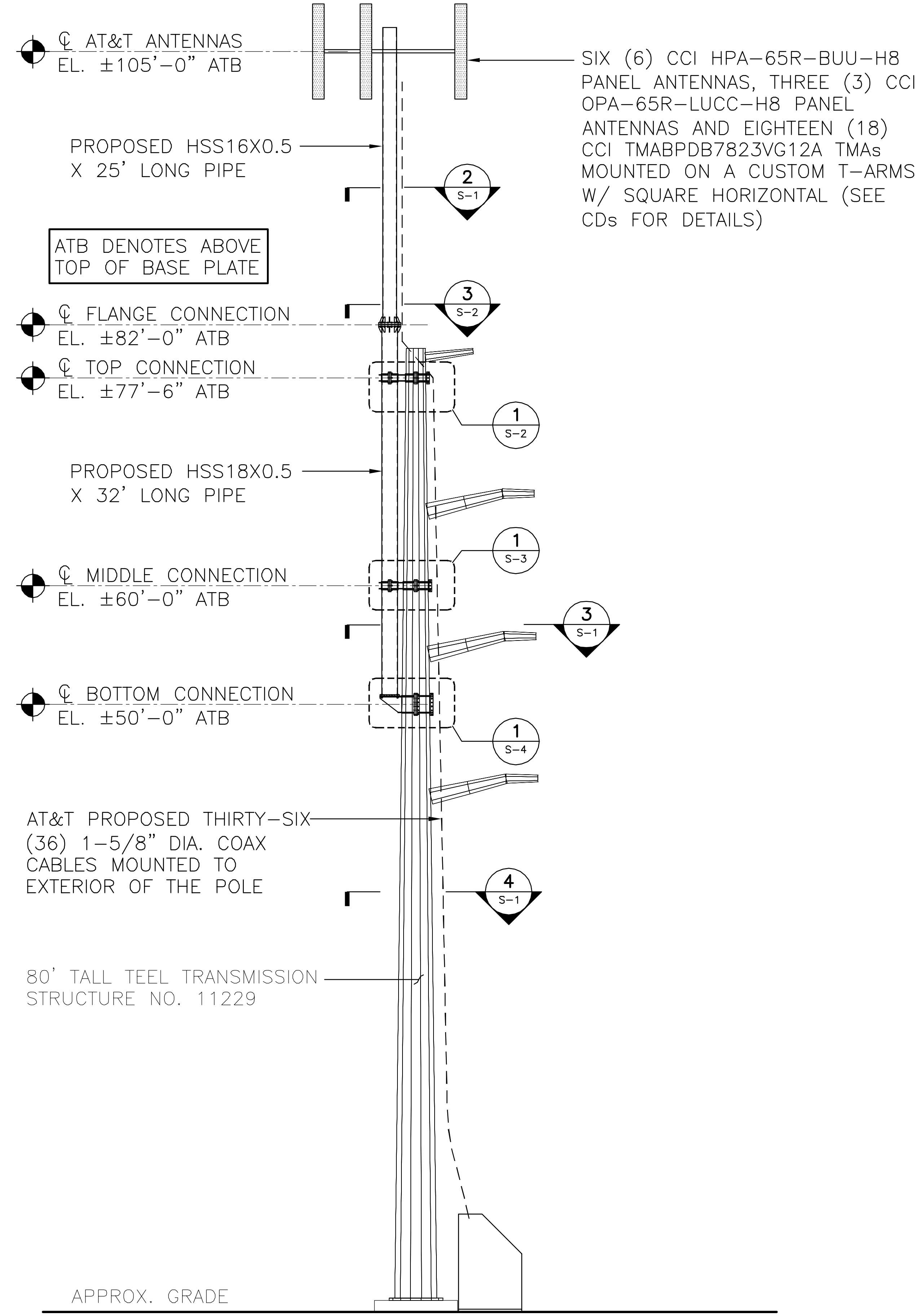
3 / S-1 COAX CABLE PLAN (40'-80' ATB)

SCALE: 3/4" = 1'-0"



4 / S-1 COAX CABLE PLAN (0'-40' ATB)

SCALE: 3/4" = 1'-0"



1 / S-1 TOWER AND MAST ELEVATION

SCALE: NTS

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TOWER ELEVATION AND FEEDLINE PLAN

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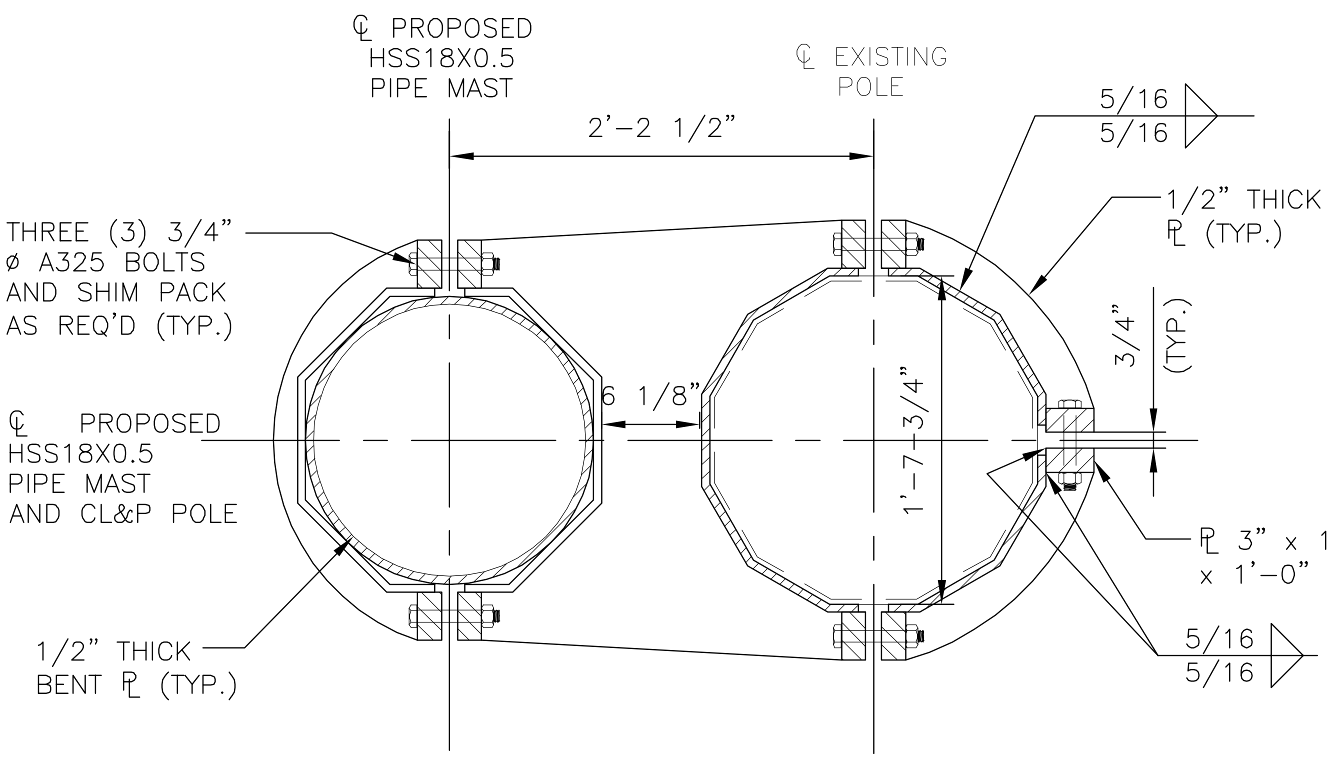
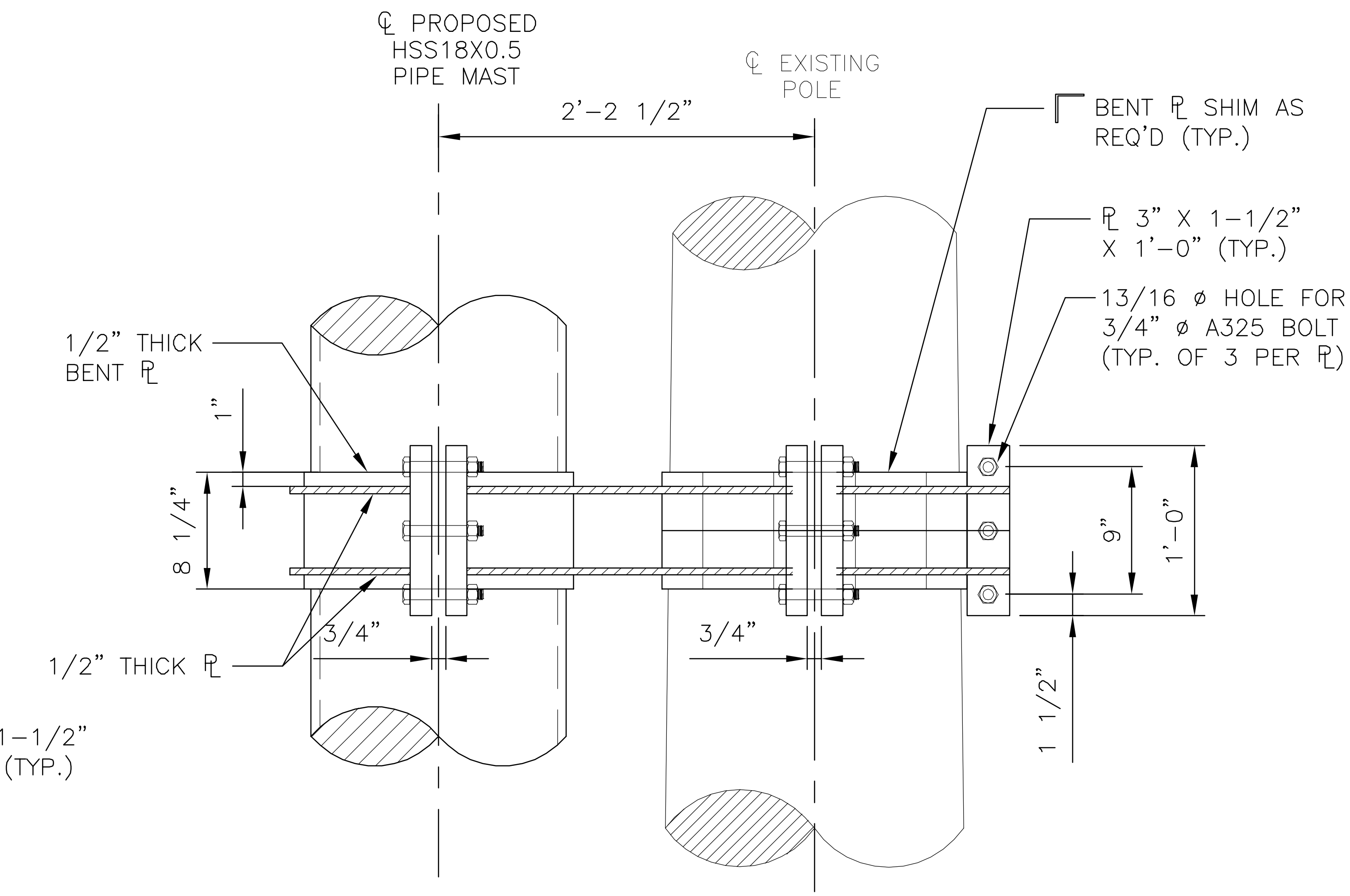


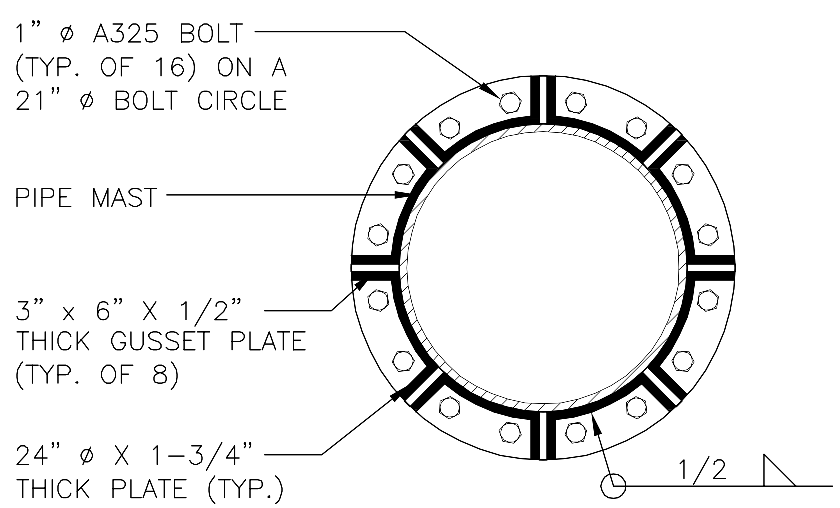
2 S-2 TOP PCS BRACKET PLAN VIEW

SCALE: 1" = 1'-0"



1 S-2 TOP PCS BRACKET DETAIL

SCALE: 1" = 1'-0"



3 S-2 FLANGE PLATE DETAIL

SCALE: 1" = 1'-0"

NOTE:

1. CL&P POLE TAPER = 0.3018"/FT (V.I.F.)

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TOP CONNECTION DETAILS

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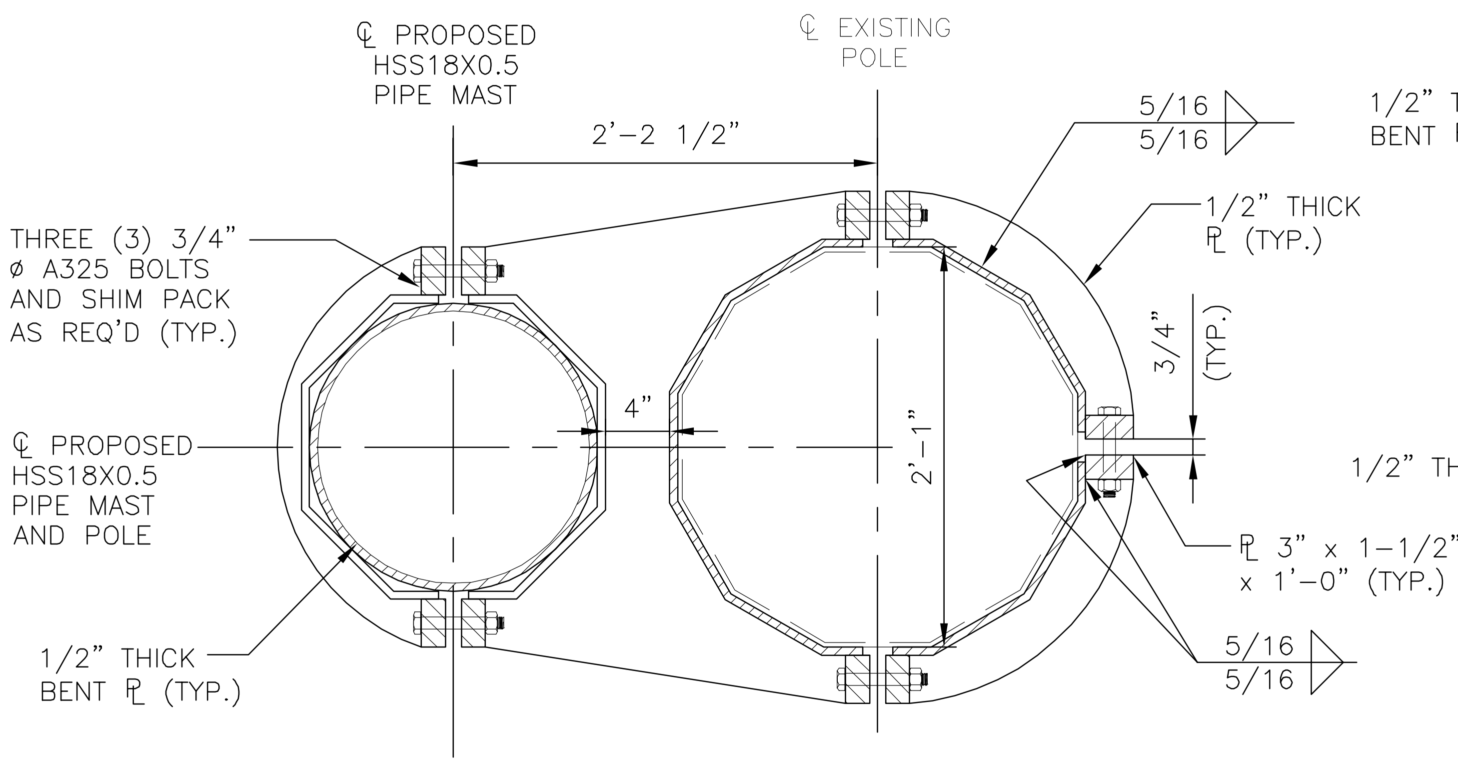
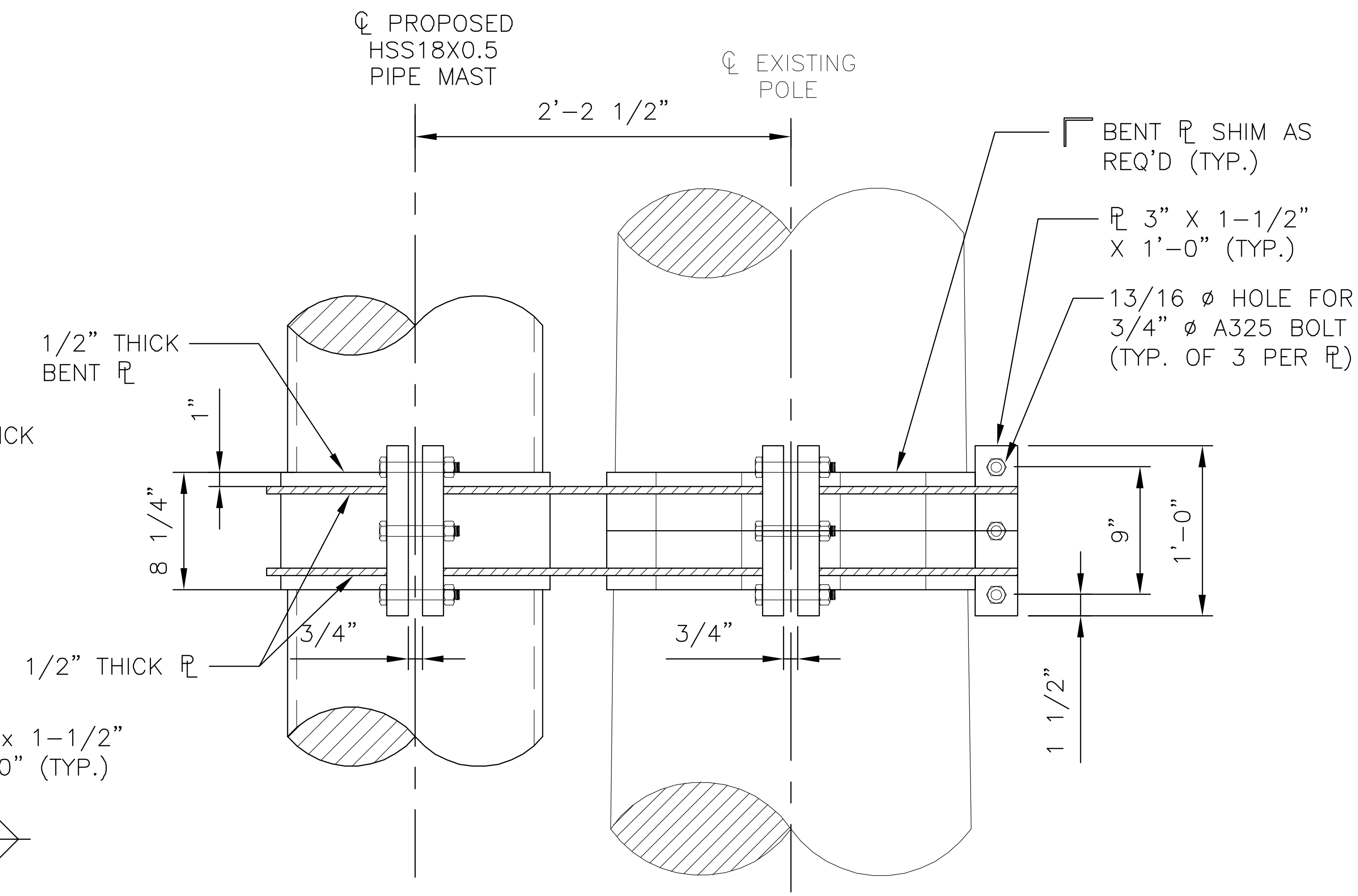


2 S-3 MIDDLE PCS BRACKET PLAN VIEW

SCALE: 1" = 1'-0"



1 S-3 MIDDLE PCS BRACKET DETAIL

SCALE: 1" = 1'-0"

NOTE:

1. CL&P POLE TAPER = 0.3018"/FT (V.I.F.)

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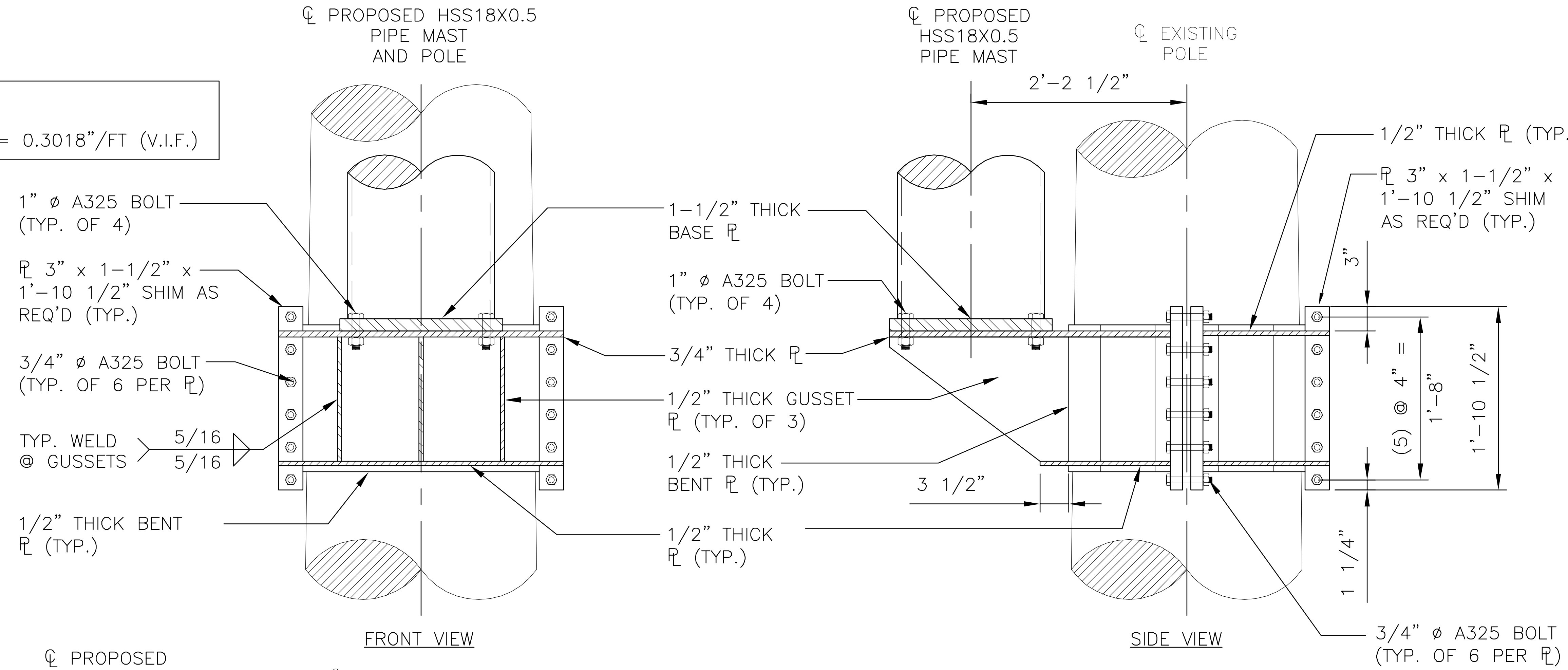
MIDDLE CONNECTION DETAILS

SHEET NO. S-3

Sheet No. 7 of 8

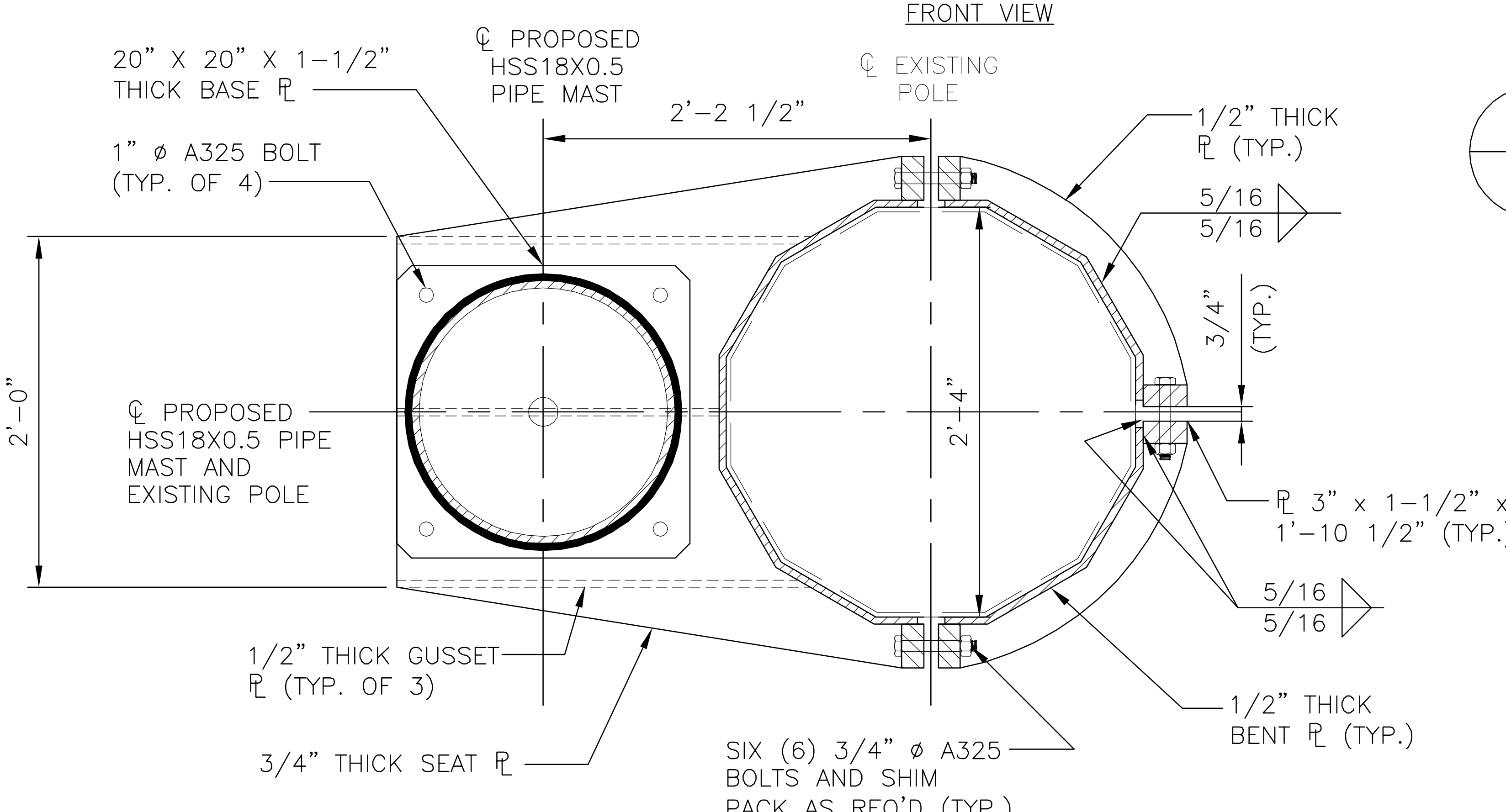
NOTE:

1. CL&P POLE TAPER = 0.3018"/FT (V.I.F.)



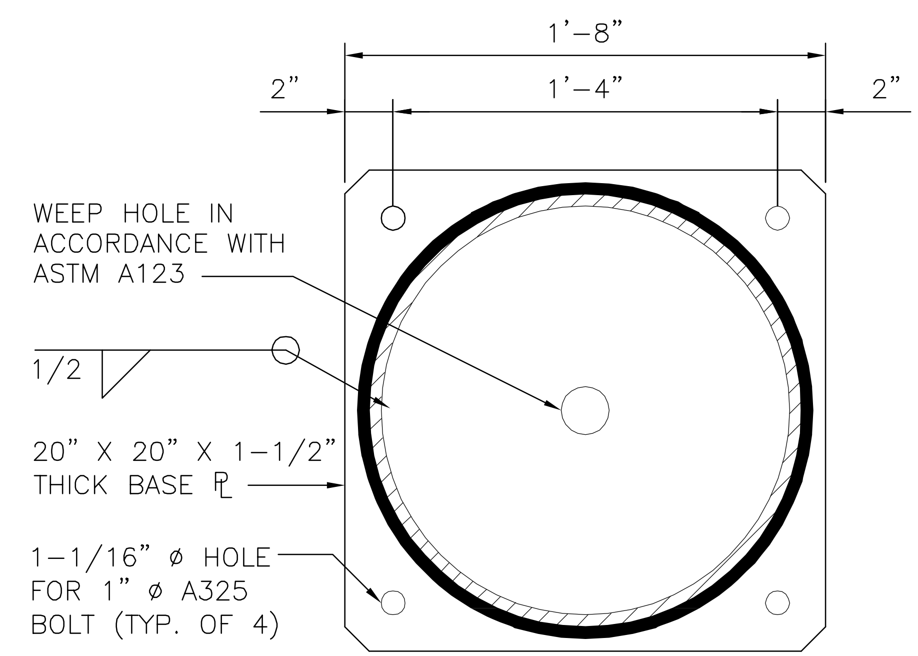
1 S-4 **BOTTOM PCS BRACKET DETAIL**

SCALE: 3/4" = 1'-0"



3 S-4 **BOTTOM PCS BRACKET PLAN VIEW**

SCALE: 1" = 1'-0"



2 S-4 **BASE PLATE DETAIL**

SCALE: 1-1/2" = 1'-0"

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BOTTOM CONNECTION DETAILS

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Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed $V := 97$ mph (User Input - 2016 CSBC Appendix N)

Basic Wind Speed with Ice $V_i := 50$ mph (User Input per Annex B of TIA-222-G)

Basic Wind Speed Service $V_s := 60$ mph (Per Section 2.8.3 of TIA-222-G)

Input

Structure Type = Structure_Type := Pole (User Input)

Structure Category = SC := III (User Input)

Exposure Category = Exp := C (User Input)

Structure Height = $h := 80$ ft (User Input)

Height to Center of Antennas = $z_{ant} := 105$ ft (User Input)

Height to Center of Mast = $z_{Mast1} := 94.5$ ft (User Input)

Height to Center of Mast = $z_{Mast2} := 66$ ft (User Input)

Radial Ice Thickness = $t_i := 0.75$ in (User Input per Annex B of TIA-222-G)

Radial Ice Density = $Id := 56.00$ pcf (User Input)

Topograpic Factor = $K_{zt} := 1.0$ (User Input)

$K_a := 1.0$ (User Input)

Gust Response Factor = $G_H := 1.35$ (User Input)

Output

Wind Direction Probability Factor =

$$K_d := \begin{cases} 0.95 & \text{if Structure\_Type = Pole} \\ 0.85 & \text{if Structure\_Type = Lattice} \end{cases} = 0.95$$

(Per Table 2-2 of TIA-222-G)

$K_{d.service} := 0.85$ (Per Section 2.8.3 of TIA-222-G)

Importance Factors =

$$I_{Wind} := \begin{cases} 0.87 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.15 & \text{if } SC = 3 \end{cases} = 1.15$$

(Per Table 2-3 of TIA-222-G)

$$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.00 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.25 & \text{if } SC = 3 \end{cases} = 1.25$$

$I_{service} := 1$ (Per Section 2.8.3 of TIA-222-G)

$K_{iz} := \left(\frac{z_{ant}}{33}\right)^{0.1} = 1.123$ $t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.105$

Velocity Pressure Coefficient Antennas = $Kz_{ant} := 2.01 \left(\left(\frac{z_{ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.279$

Velocity Pressure w/o Ice Antennas = $qz_{ant} := 0.00256 \cdot K_d \cdot Kz_{ant} \cdot V^2 \cdot I_{Wind} = 33.649$

Velocity Pressure with Ice Antennas = $qz_{ice.ant} := 0.00256 \cdot K_d \cdot Kz_{ant} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 7.774$

Velocity Pressure Service Antennas = $qz_{serv.ant} := 0.00256 \cdot K_{d.service} \cdot Kz_{ant} \cdot V_s^2 \cdot I_{service} = 10.017$

$K_{izMast1} := \left(\frac{z_{Mast1}}{33}\right)^{0.1} = 1.111$ $t_{izMast1} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast1} \cdot K_{zt}^{0.35} = 2.083$

Velocity Pressure Coefficient Mast = $Kz_{Mast1} := 2.01 \left(\left(\frac{z_{Mast1}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.251$

Velocity Pressure w/o Ice Mast= $qz_{Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V^2 \cdot I_{Wind} = 32.911$

Velocity Pressure with Ice Mast = $qz_{ice.Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 7.604$

Velocity Pressure Service Mast = $qz_{serv.Mast1} := 0.00256 \cdot K_{d.service} \cdot Kz_{Mast1} \cdot V_s^2 \cdot I_{service} = 9.797$

$K_{izMast2} := \left(\frac{z_{Mast2}}{33}\right)^{0.1} = 1.072$ $t_{izMast2} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast2} \cdot K_{zt}^{0.35} = 2.01$

Velocity Pressure Coefficient Mast = $Kz_{Mast2} := 2.01 \left(\left(\frac{z_{Mast2}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.16$

Velocity Pressure w/o Ice Mast= $qz_{Mast2} := 0.00256 \cdot K_d \cdot Kz_{Mast2} \cdot V^2 \cdot I_{Wind} = 30.515$

Velocity Pressure with Ice Mast = $qz_{ice.Mast2} := 0.00256 \cdot K_d \cdot Kz_{Mast2} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 7.05$

Velocity Pressure Service Mast = $qz_{serv.Mast2} := 0.00256 \cdot K_{d.service} \cdot Kz_{Mast2} \cdot V_s^2 \cdot I_{service} = 9.084$

Development of Wind & Ice Load on Mast

Mast Data:	(HSS16x0.5)		(User Input)	
Mast Shape =	Round		(User Input)	
Mast Diameter =	$D_{mast} := 16$	in	(User Input)	
Mast Length =	$L_{mast} := 25$	ft	(User Input)	
Mast Thickness =	$t_{mast} := 0.5$	in	(User Input)	
Mast Force Coefficient =	$CF_{mast} := 1.2$		Subcritical flow due to coax	

Wind Load (without ice)

Mast Projected Surface Area =	$A_{mast} := \frac{D_{mast}}{12} = 1.333$	sf/ft	
Total Mast Wind Force =	$qz_{Mast1} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 71$	plf	**BLC 5**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice =	$AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot t_{izMast1}\right)}{12} = 1.681$	sf/ft	
Total Mast Wind Force w/ Ice =	$qz_{ice.Mast1} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 21$	plf	**BLC 4**

Wind Load (Service)

Total Mast Wind Force Service =	$qz_{serv.Mast1} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 21$	plf	**BLC 6**

Gravity Loads (without ice)

Weight of the mast =	Self Weight	**(Computed internally by Risa-3D)**	plf	**BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + t_{izMast1} \cdot 2\right)^2 - D_{mast}^{\ 2}\right] = 118.3$	sq in	
Weight of Ice on Mast =	$W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 46$	plf	**BLC 3**

CENTEK engineering
Centered on Solutions™ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: Loads on AT&T Equipmnet Structure 11229

Location: Waterbury, CT

Rev. 5: 4/11/18

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 17010.09

Development of Wind & Ice Load on Mast

Mast Data:	(HSS18x0.5)		(User Input)
Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 18$	in	(User Input)
Mast Length =	$L_{mast} := 32$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.5$	in	(User Input)

Velocity Coefficient = $C := \sqrt{I \cdot Kz_{Mast2}} \cdot V \cdot \frac{D_{mast}}{12} = 157$

Mast Force Coefficient = $CF_{mast} = 0.6$ No coax on this portion of th mast - Supercritical flow

Wind Load (without ice)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.5$ sf/ft

Total Mast Wind Force = $qz_{Mast2} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 37$ plf **BLC 5**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot t_{izMast2}\right)}{12} = 1.835$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast2} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 10$ plf **BLC 4**

Wind Load (Service)

Total Mast Wind Force Service = $qz_{serv.Mast2} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 11$ plf **BLC 6**

Gravity Loads (without ice)

Weight of the mast = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + t_{izMast2} \cdot 2\right)^2 - D_{mast}^{\ 2}\right] = 126.3$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 49$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	CCI HPA-65R-BUU-H8		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 92.4$	in	(User Input)
Antenna Width =	$W_{ant} := 14.8$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.4$	in	(User Input)
Antenna Weight =	$WT_{ant} := 68$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 6$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.2$		
Antenna Force Coefficient =	$Ca_{ant} = 1.37$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 9.5$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 57$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 3537$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 12.8$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 76.5$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 1097$	lbs	**BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service =	$qz_{serv.ant} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 1053$	plf	**BLC 6**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 408$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 10120$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 11203$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 363$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 2178$	lbs	**BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	CCI OPA-65R-LCUU-H8		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 92.7$	in	(User Input)
Antenna Width =	$W_{ant} := 14.4$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.0$	in	(User Input)
Antenna Weight =	$WT_{ant} := 88$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.4$		
Antenna Force Coefficient =	$Ca_{ant} = 1.38$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 9.3$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 27.8$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 1737$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 12.5$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 37.6$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 542$	lbs	**BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service =	$qz_{serv.ant} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 517$	plf	**BLC 6**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 264$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 9344$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \times 10^4$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 352$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 1057$	lbs	**BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	CCI TMABPDB7823VG12A		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 14.22$	in	(User Input)
Antenna Width =	$W_{ant} := 11.56$	in	(User Input)
Antenna Thickness =	$T_{ant} := 4.24$	in	(User Input)
Antenna Weight =	$WT_{ant} := 25$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 18$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.2$		
Antenna Force Coefficient =	$Ca_{ant} = 1.2$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot T_{ant}}{144} = 0.4$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 7.5$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 411$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 1.1$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 19.5$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 245$	lbs	**BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service =	$qz_{serv.ant} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 122$	plf	**BLC 6**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 450$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 697$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1759$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 57$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 1026$	lbs	**BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data:

Mount Type:	Custom T-Arm Mount w/ Square Horz and Handrail		
Mount Shape =	Flat		(User Input)
Mount Projected Surface Area =	$CaAa := 25$	sf	(User Input)
Mount Projected Surface Area w/ Ice =	$CaAa_{ice} := 32$	sf	(User Input)
Mount Weight =	$WT_{mnt} := 1675$	lbs	(User Input)
Mount Weight w/ Ice =	$WT_{mnt.ice} := 2200$	lbs	

Wind Load (without ice)

Total Mount Wind Force =	$F_{mnt} := qz_{ant} \cdot G_H \cdot CaAa = 1136$	lbs	**BLC 5**

Wind Load (with ice)

Total Mount Wind Force =	$Fi_{mnt} := qz_{ice.ant} \cdot G_H \cdot CaAa_{ice} = 336$	lbs	**BLC 4**

Wind Load (Service)

Total Mount Wind Force Service =	$qz_{serv.ant} \cdot G_H \cdot CaAa = 338$	plf	**BLC 6**

Gravity Loads (without ice)

Weight of All Mounts =	$WT_{mnt} = 1675$	lbs	**BLC 2**

Gravity Loads (ice only)

Weight of Ice on All Mounts =	$WT_{mnt.ice} - WT_{mnt} = 525$	lbs	**BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax} := 1.98$ in (User Input)

Coax Cable Length = $L_{coax} := 25$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 1.04$ plf (User Input)

Total Number of Coax = $N_{coax} := 36$ (User Input)

Total Number of Exterior Coax = $Ne_{coax} := 36$ (User Input)

No. of Coax Projecting Outside Face of Mast = $NP_{coax} := 8$ (User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 151.5$

Coax Cable Force Factor Coefficient = $Ca_{coax} := 2$

Wind Load (without ice)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 1.3$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 117$ plf **BLC 5**

Wind Load (with ice)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast1})}{12} = 1.7$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast1} \cdot G_H \cdot AICE_{coax} = 34$ plf **BLC 4**

Wind Load (Service)

Total Coax Wind Force Service = $qz_{serv.Mast1} \cdot G_H \cdot Ca_{coax} \cdot A_{coax} = 35$ plf **BLC 6**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 37$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := 650$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := Id \cdot \frac{Ai_{coax}}{144} = 253$ plf **BLC 3**

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building
	AISC 14th(360-10): ASD

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	HSS18x0.500	Beam	Pipe	A500 Gr.42	Typical	25.6	985	985	1970
2	Mast 2	HSS16x0.500	Beam	Pipe	A500 Gr.42	Typical	22.7	685	685	1370

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Mast	32			Lbyy						Lateral
2	M2	Mast 2	25			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOTCO...	FLANGE			Mast	Beam	Pipe	A500 Gr....	Typical
2	M2	FLANGE	TOPMA...			Mast 2	Beam	Pipe	A500 Gr....	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTCONNECTION	0	0	0	0	
2	CONN	0	10	0	0	
3	TOPCONNECTION	0	27.5	0	0	
4	TOPMAST	0	57	0	0	
5	ANTCL	0	55	0	0	
6	FLANGE	0	32	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	BOTCONNECTION	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	TOPCONNECTION	Reaction		Reaction			
3	CONN	Reaction		Reaction			

Member Point Loads

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

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M2	Y	-.037	-.037	0	18

Member Distributed Loads (BLC 3 : Weight of Ice Only)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.049	-.049	0	0
2	M2	Y	-.046	-.046	0	0
3	M2	Y	-.253	-.253	0	18

Member Distributed Loads (BLC 4 : (x) TIA Wind with Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.01	.01	0	0
2	M2	X	.021	.021	0	18
3	M2	X	.034	.034	0	18

Member Distributed Loads (BLC 5 : (x) TIA Wind)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.037	.037	0	0
2	M2	X	.071	.071	0	18
3	M2	X	.117	.117	0	18

Member Distributed Loads (BLC 6 : (x) TIA Wind Service)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.011	.011	0	0
2	M2	X	.021	.021	0	18
3	M2	X	.035	.035	0	18

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Self Weight	None		-1						
2	Weight of Appurtenances	None				4		1		
3	Weight of Ice Only	None				4		3		
4	(x) TIA Wind with Ice	None				4		3		
5	(x) TIA Wind	None				4		3		
6	(x) TIA Wind Service	None				4		3		

Load Combinations

	Description	So...	PDelta	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	1.2D + 1.6W (X-dir...	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W (X-dir...	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D + 1.0Di + 1.0...	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.0D+1.0Ws (X-dir...	Yes	Y		1	1	2	1	6	1														

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	BOTCONNECT...	max	-3.414	4	21.876	3	0	1	0	1	0	1	57.029	1
2		min	-18.393	1	7.363	2	0	1	0	1	0	1	10.585	4
3	TOPCONNECT...	max	-8.519	4	0	1	0	1	0	1	0	1	0	1
4		min	-45.858	1	0	1	0	1	0	1	0	1	0	1
5	CONN	max	46.028	1	0	1	0	1	0	1	0	1	0	1
6		min	8.543	4	0	1	0	1	0	1	0	1	0	1
7	Totals:	max	-3.39	4	21.876	3	0	1						
8		min	-18.222	1	7.363	2	0	1						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	BOTCONNECT...	max	0	1	0	2	0	1	0	1	0	1	0	4
2		min	0	4	0	3	0	1	0	1	0	1	0	1
3	CONN	max	0	4	-.001	2	0	1	0	1	0	1	2.139e-03	1
4		min	0	1	-.004	3	0	1	0	1	0	1	3.97e-04	4
5	TOPCONNECT...	max	0	1	-.003	2	0	1	0	1	0	1	-2.183e-03	4
6		min	0	4	-.011	3	0	1	0	1	0	1	-1.176e-02	1
7	TOPMAST	max	13.571	1	-.006	2	0	1	0	1	0	1	-9.417e-03	4
8		min	2.518	4	-.019	3	0	1	0	1	0	1	-5.076e-02	1
9	ANTCL	max	12.353	1	-.006	2	0	1	0	1	0	1	-9.417e-03	4
10		min	2.292	4	-.019	3	0	1	0	1	0	1	-5.076e-02	1
11	FLANGE	max	.912	1	-.004	2	0	1	0	1	0	1	-3.982e-03	4
12		min	.169	4	-.013	3	0	1	0	1	0	1	-2.145e-02	1

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

	Member	Shape	Code Check	Loc...	LC	Shea...	Loc...	...	L...	phi*Pn...	phi*Pn...	phi*Mn...	phi*Mn...	...	Eqn
1	M1	HSS18x0...	.840	27....	1	.101	27....		1	764.731	967.68	450.45	450.45	2...	H1-1b
2	M2	HSS16x0...	.868	0	1	.064	0		1	714.437	858.06	352.8	352.8	1...	H1-1b

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTCONNECTION	-18.393	9.818	0	0	0	57.029
2	1	TOPCONNECTION	-45.858	0	0	0	0	0
3	1	CONN	46.028	0	0	0	0	0
4	1	Totals:	-18.222	9.818	0			
5	1	COG (ft):	X: 0	Y: 38.094	Z: 0			

Joint Reactions

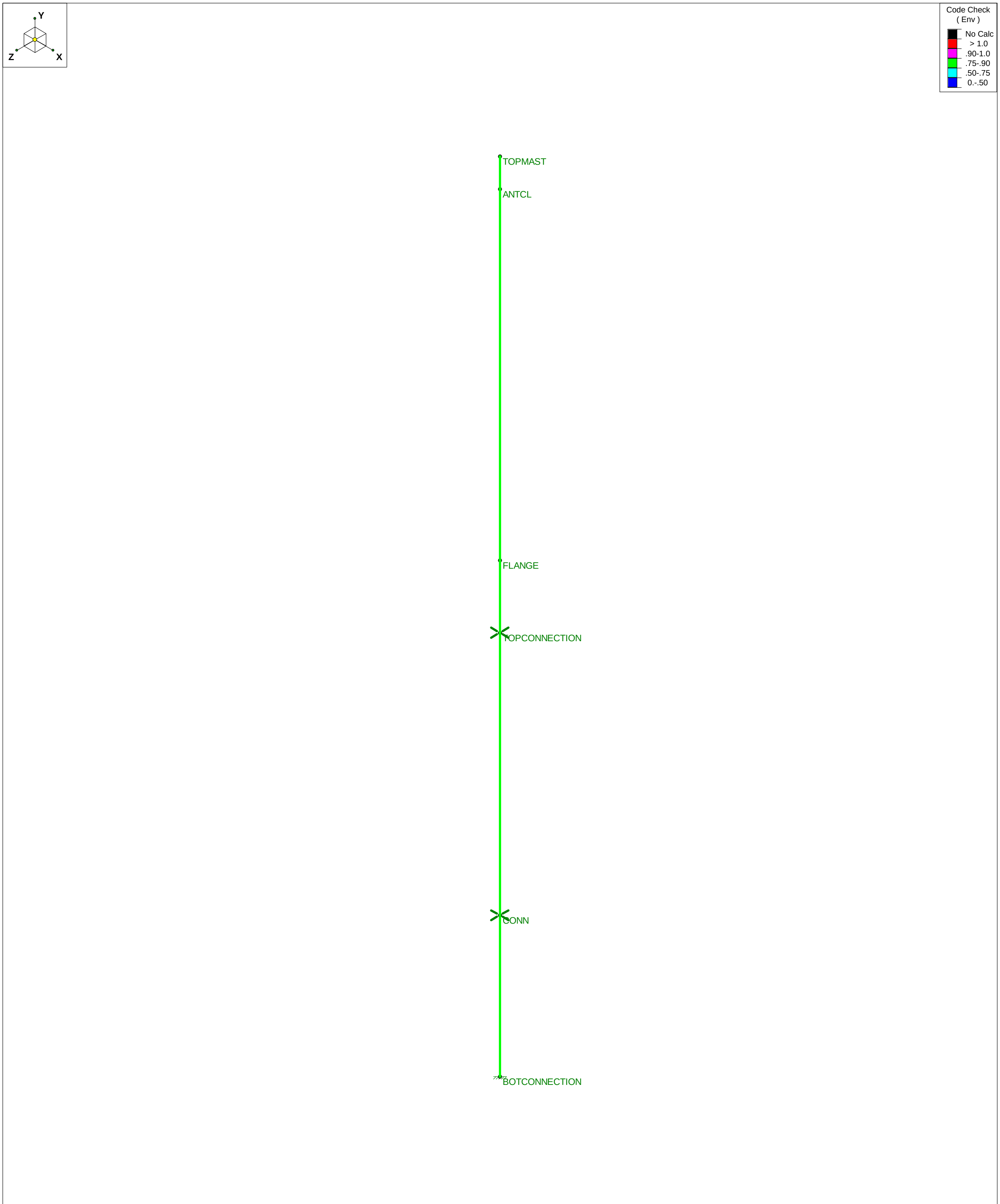
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTCONNECTION	-18.328	7.363	0	0	0	56.827
2	2	TOPCONNECTION	-45.756	0	0	0	0	0
3	2	CONN	45.862	0	0	0	0	0
4	2	Totals:	-18.222	7.363	0			
5	2	COG (ft):	X: 0	Y: 38.094	Z: 0			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	BOTCONNECTION	-3.744	21.876	0	0	0	11.625
2	3	TOPCONNECTION	-9.205	0	0	0	0	0
3	3	CONN	9.419	0	0	0	0	0
4	3	Totals:	-3.53	21.876	0			
5	3	COG (ft):	X: 0	Y: 41.151	Z: 0			

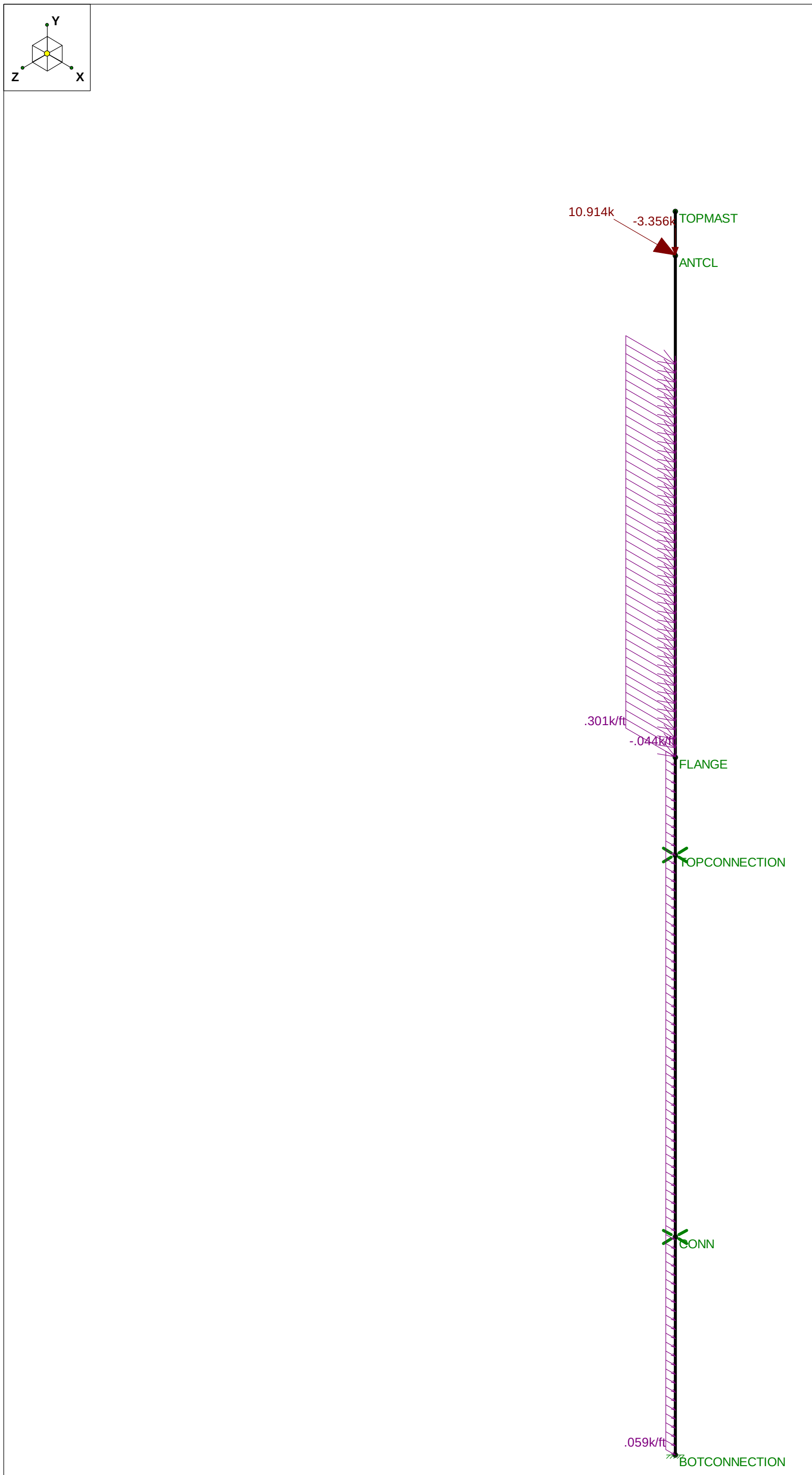
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	BOTCONNECTION	-3.414	8.182	0	0	0	10.585
2	4	TOPCONNECTION	-8.519	0	0	0	0	0
3	4	CONN	8.543	0	0	0	0	0
4	4	Totals:	-3.39	8.182	0			
5	4	COG (ft):	X: 0	Y: 38.094	Z: 0			



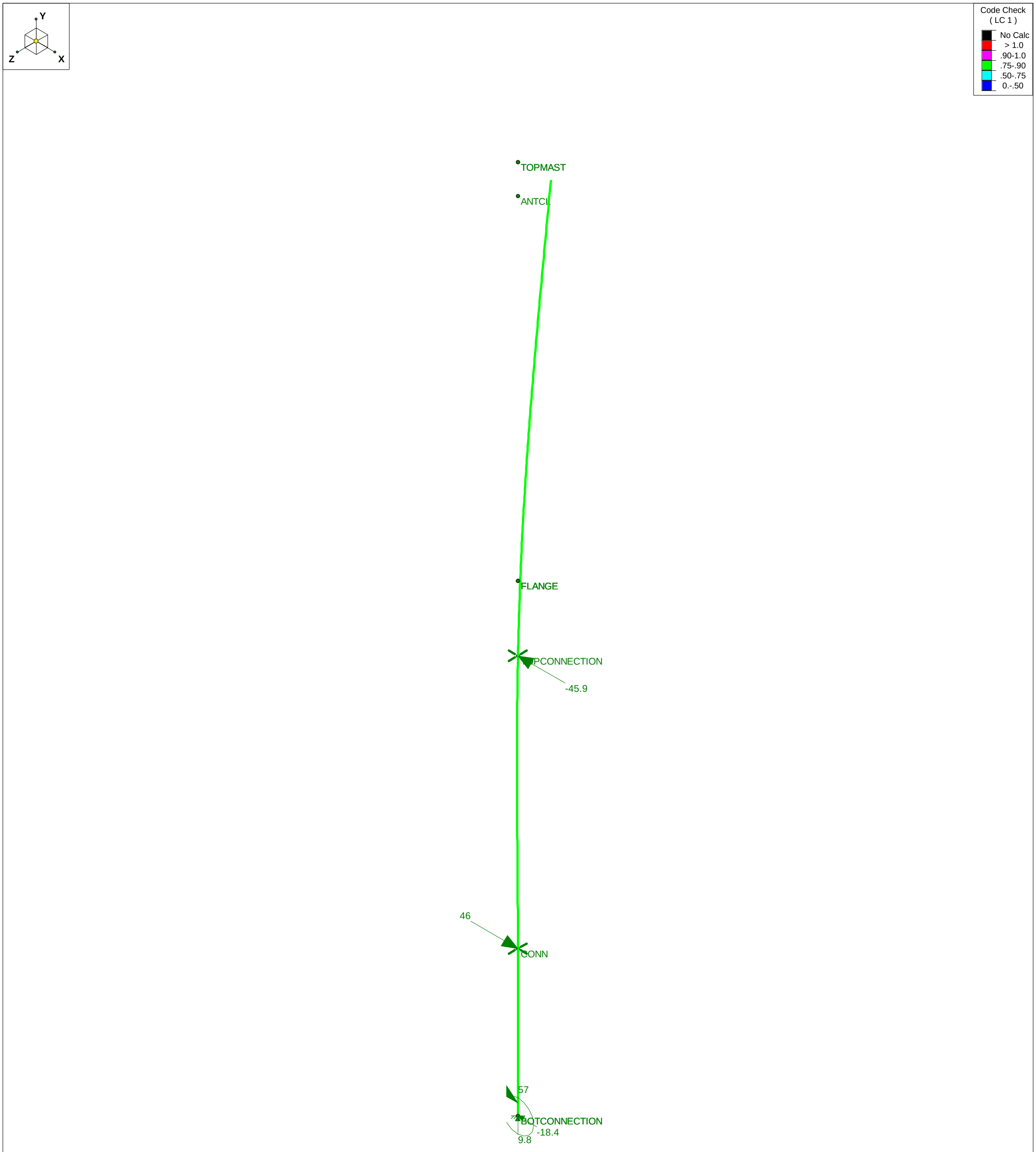
Envelope Only Solution

CENTEK Engineering, INC.		
tjl, cfc	Pole # 11229 - Mast	Apr 11, 2018 at 7:58 AM
17010.09 / AT&T CT2901	Unity Check	TIA Loads.r3d



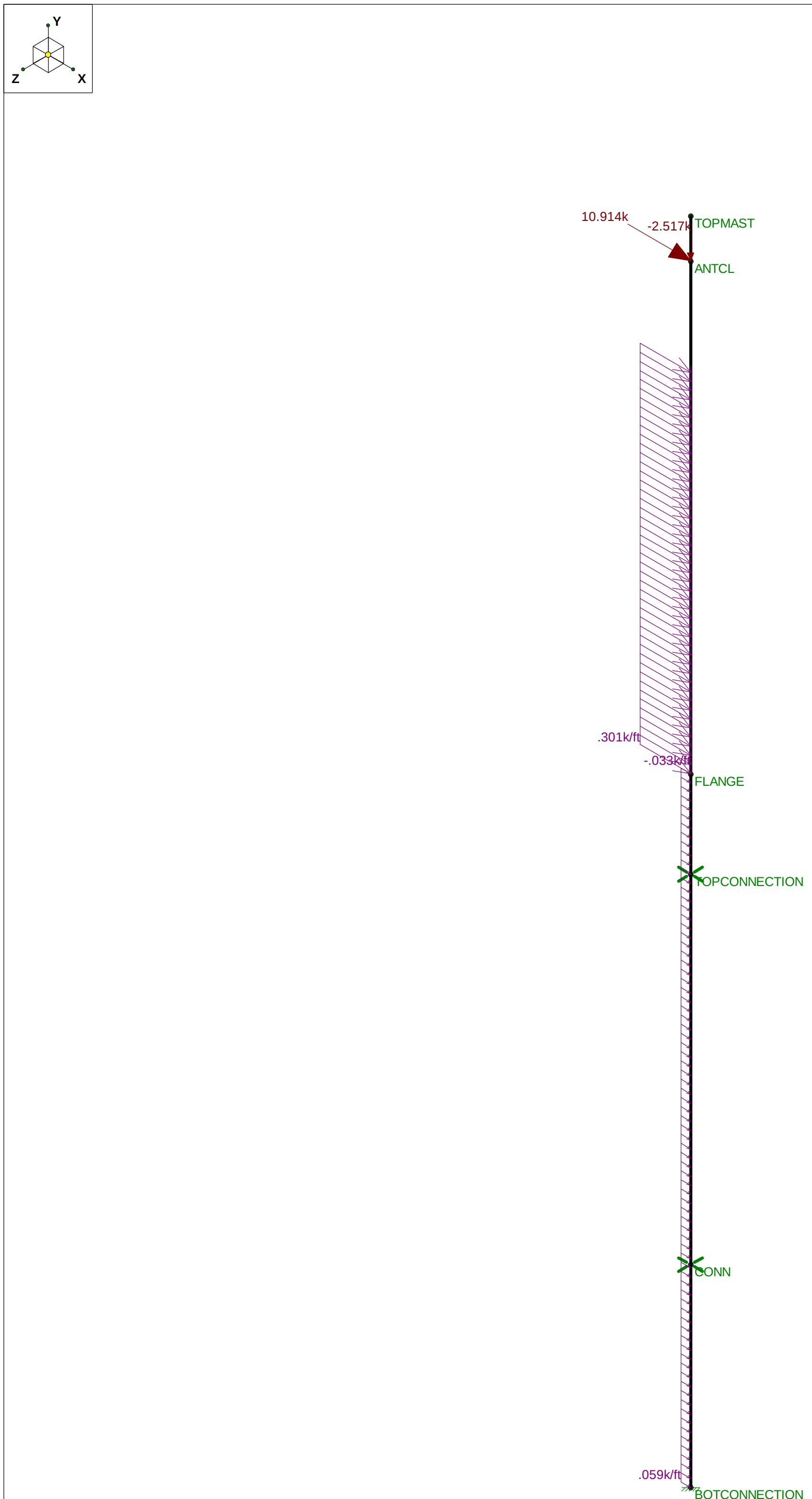
Loads: LC 1, 1.2D + 1.6W (X-direction)

CENTEK Engineering, INC.		
tjl, cfc	Pole # 11229 - Mast	Apr 11, 2018 at 7:58 AM
17010.09 / AT&T CT2901	LC #1 Loads	TIA Loads.r3d



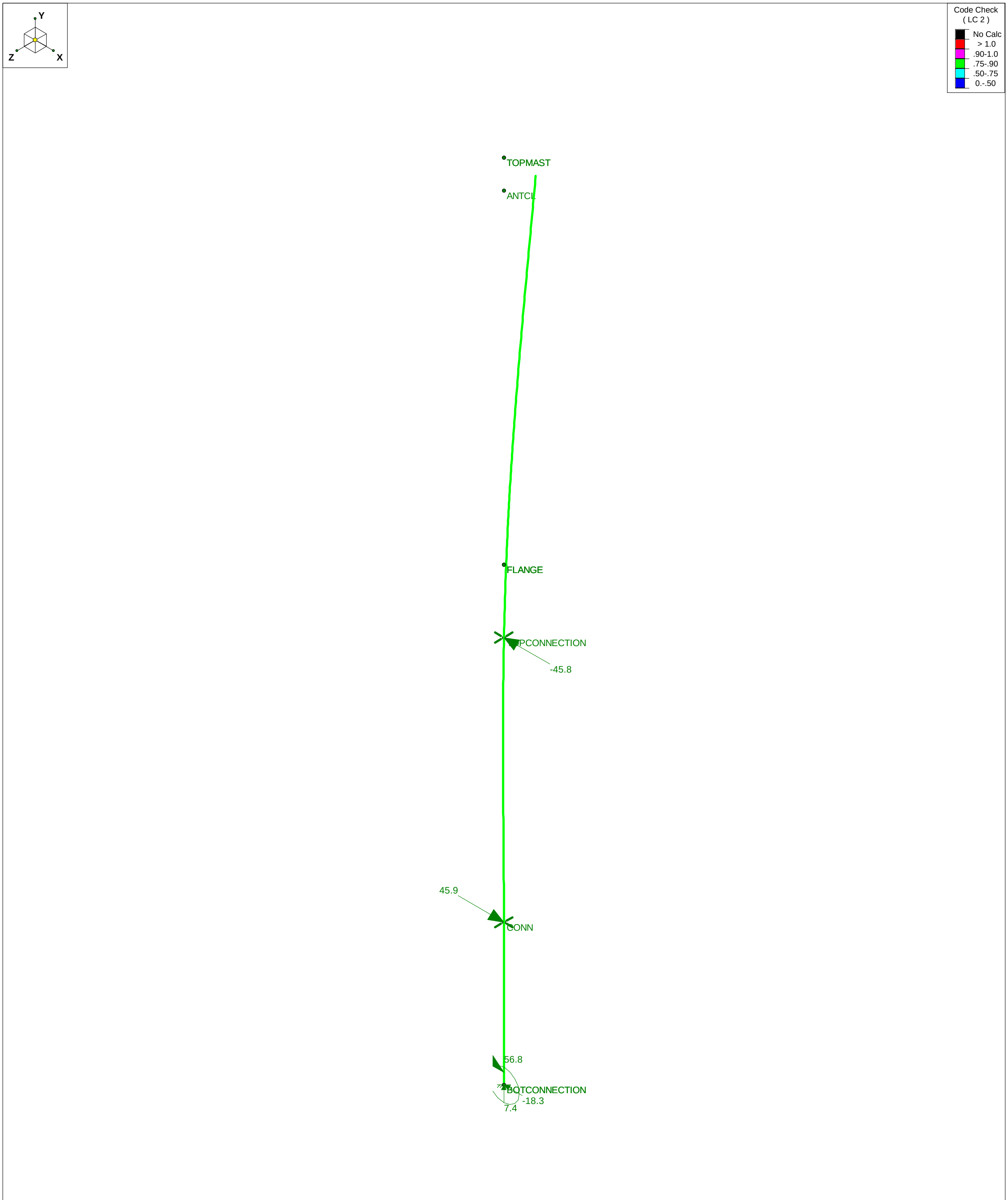
Results for LC 1, 1.2D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Pole # 11229 - Mast	Apr 11, 2018 at 7:59 AM
17010.09 / AT&T CT2901	LC #1 Reactions and Deflected Shape	TIA Loads.r3d



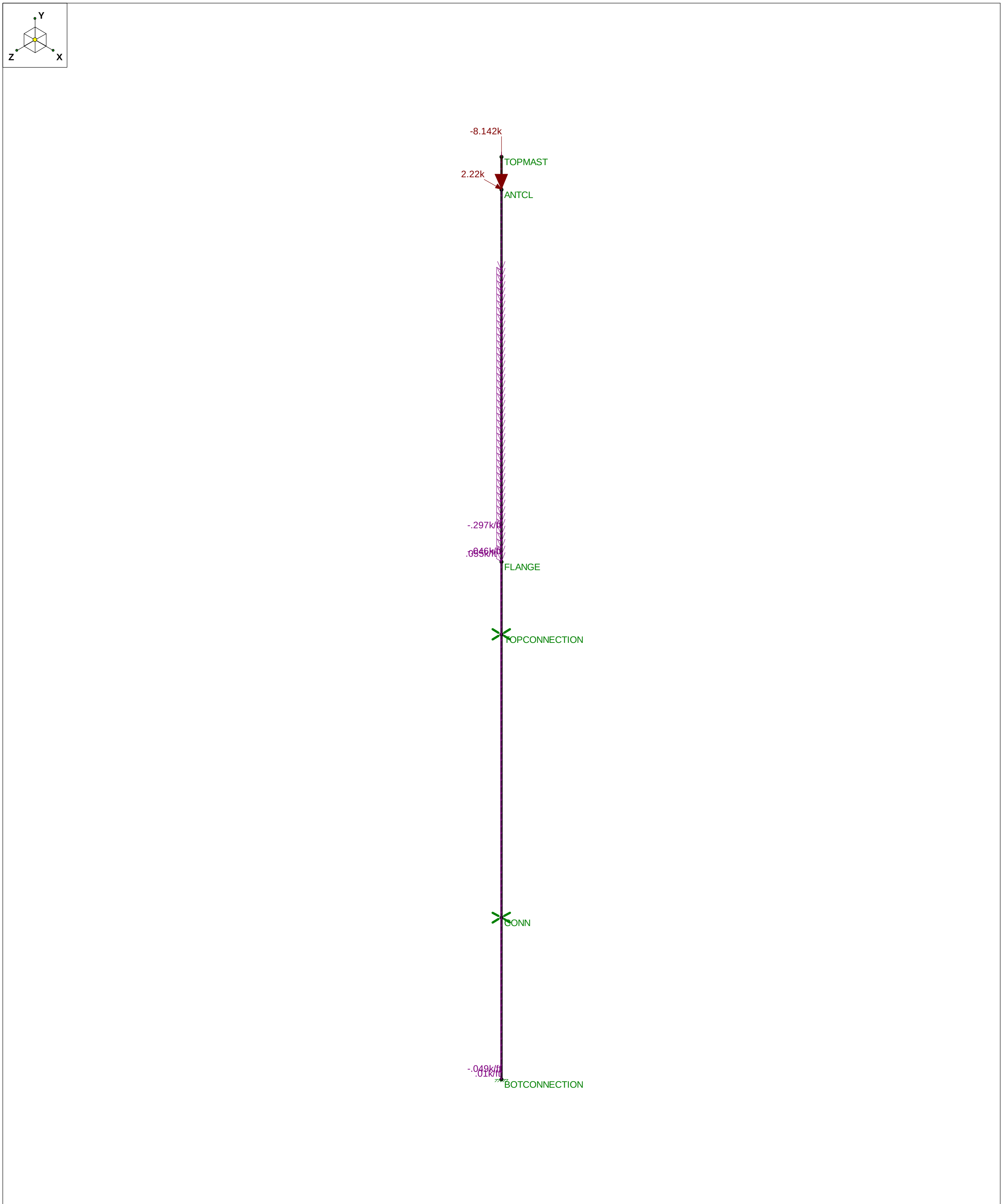
Loads: LC 2, 0.9D + 1.6W (X-direction)

CENTEK Engineering, INC.	Pole # 11229 - Mast	
tjl, cfc		Apr 11, 2018 at 7:58 AM
17010.09 / AT&T CT2901	LC #2 Loads	TIA Loads.r3d



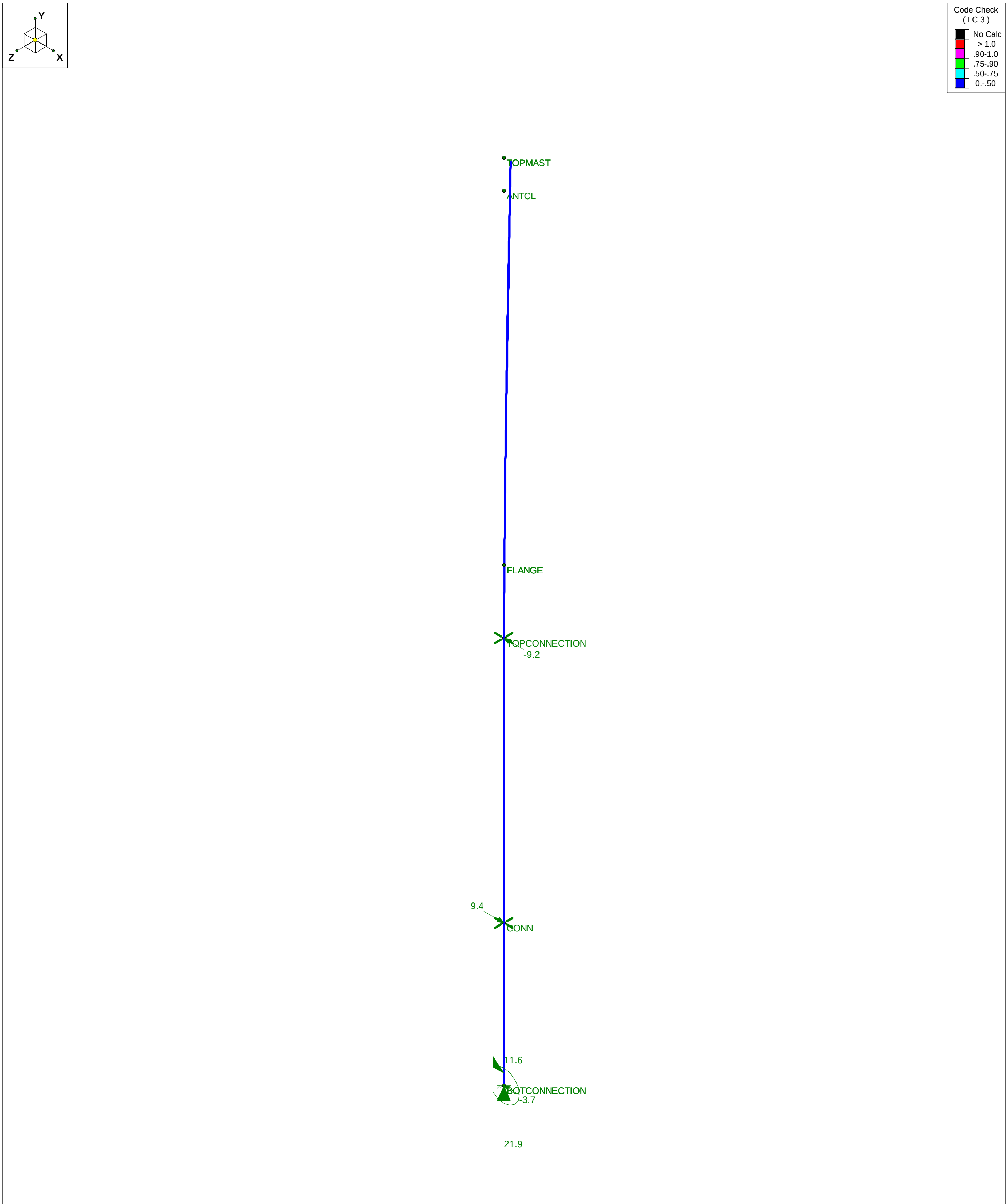
Results for LC 2, 0.9D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Pole # 11229 - Mast	Apr 11, 2018 at 8:00 AM
17010.09 / AT&T CT2901	LC #2 Reactions and Deflected Shape	TIA Loads.r3d



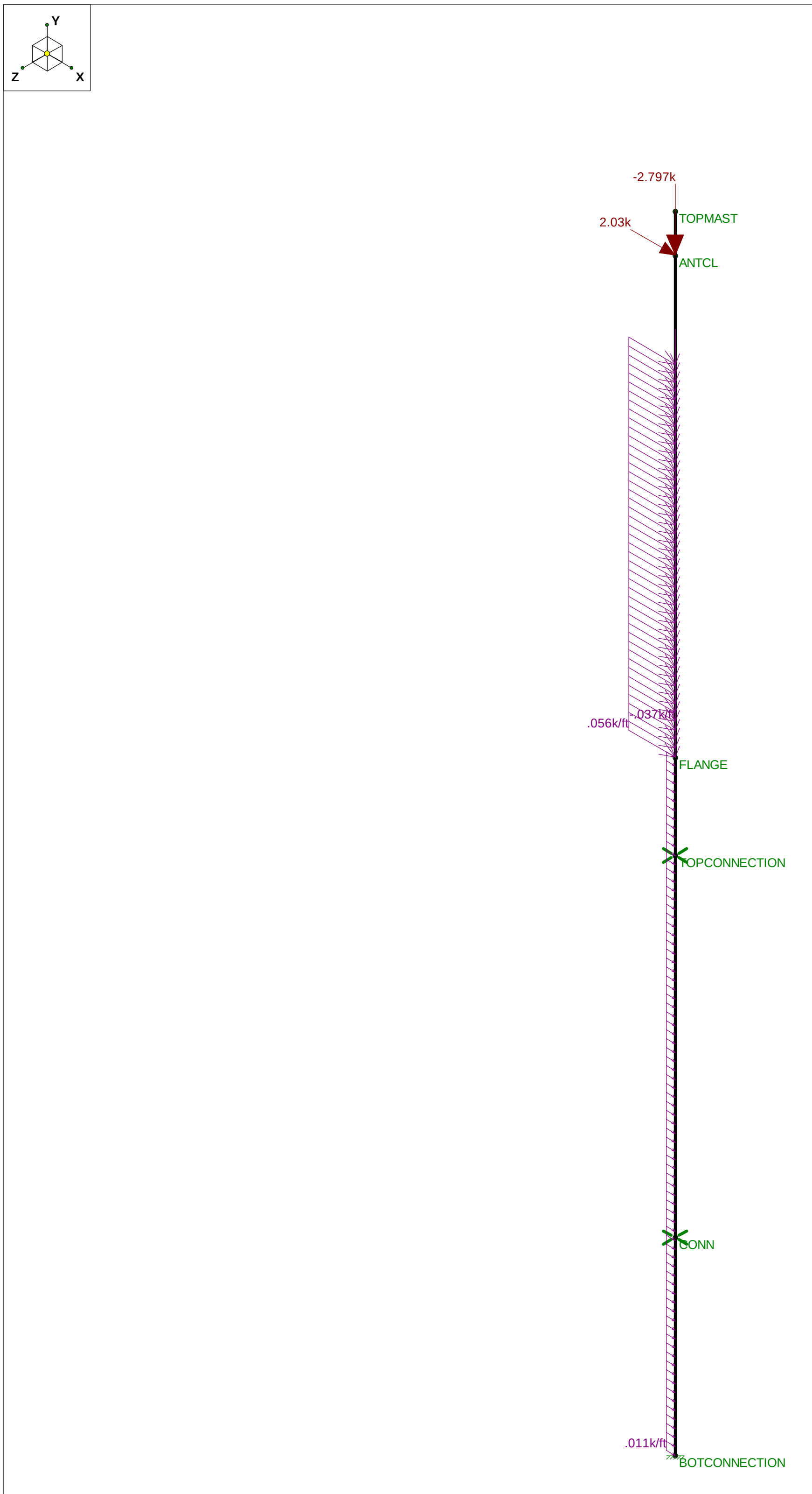
Loads: LC 3, 1.2D + 1.0Di + 1.0Wi (X-direction)

CENTEK Engineering, INC.		
tjl, cfc	Pole # 11229 - Mast	Apr 11, 2018 at 7:58 AM
17010.09 / AT&T CT2901	LC #3 Loads	TIA Loads.r3d



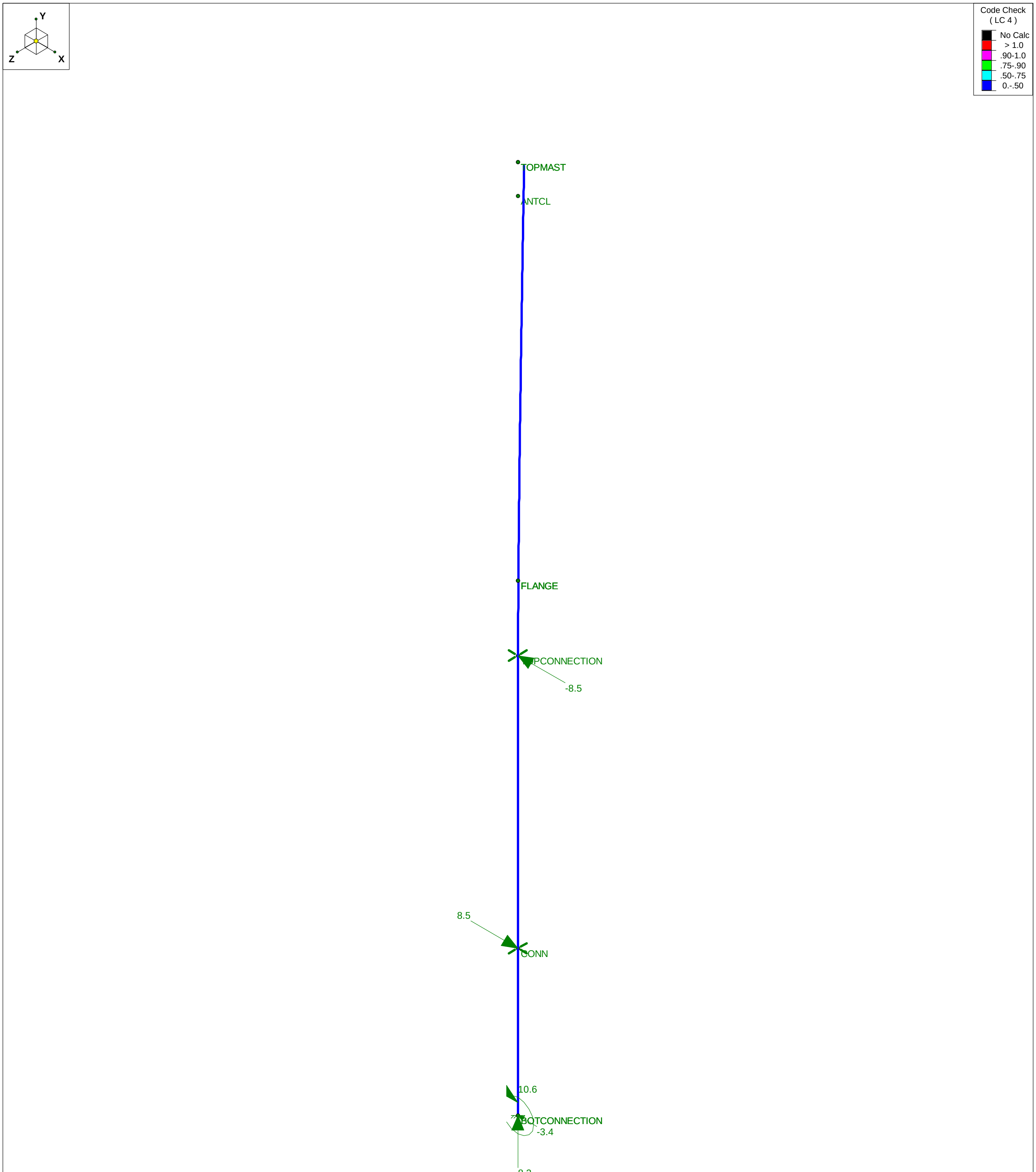
Results for LC 3, 1.2D + 1.0Di + 1.0Wi (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Pole # 11229 - Mast	Apr 11, 2018 at 8:01 AM
17010.09 / AT&T CT2901	LC #3 Reactions and Deflected Shape	TIA Loads.r3d



Loads: LC 4, 1.0D+1.0Ws (X-direction)

CENTEK Engineering, INC.	Pole # 11229 - Mast	
tjl, cfc		Apr 11, 2018 at 7:59 AM
17010.09 / AT&T CT2901	LC #4 Loads	TIA Loads.r3d

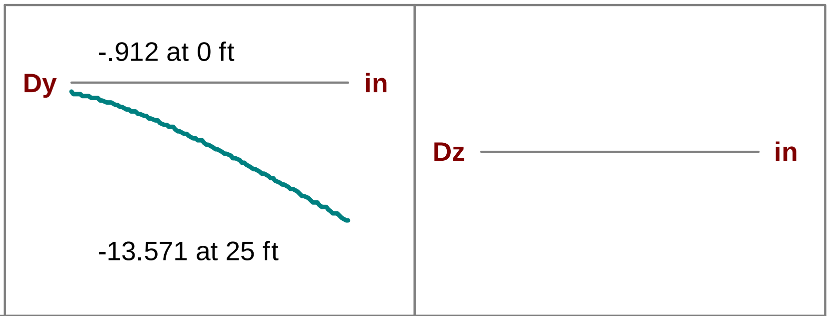


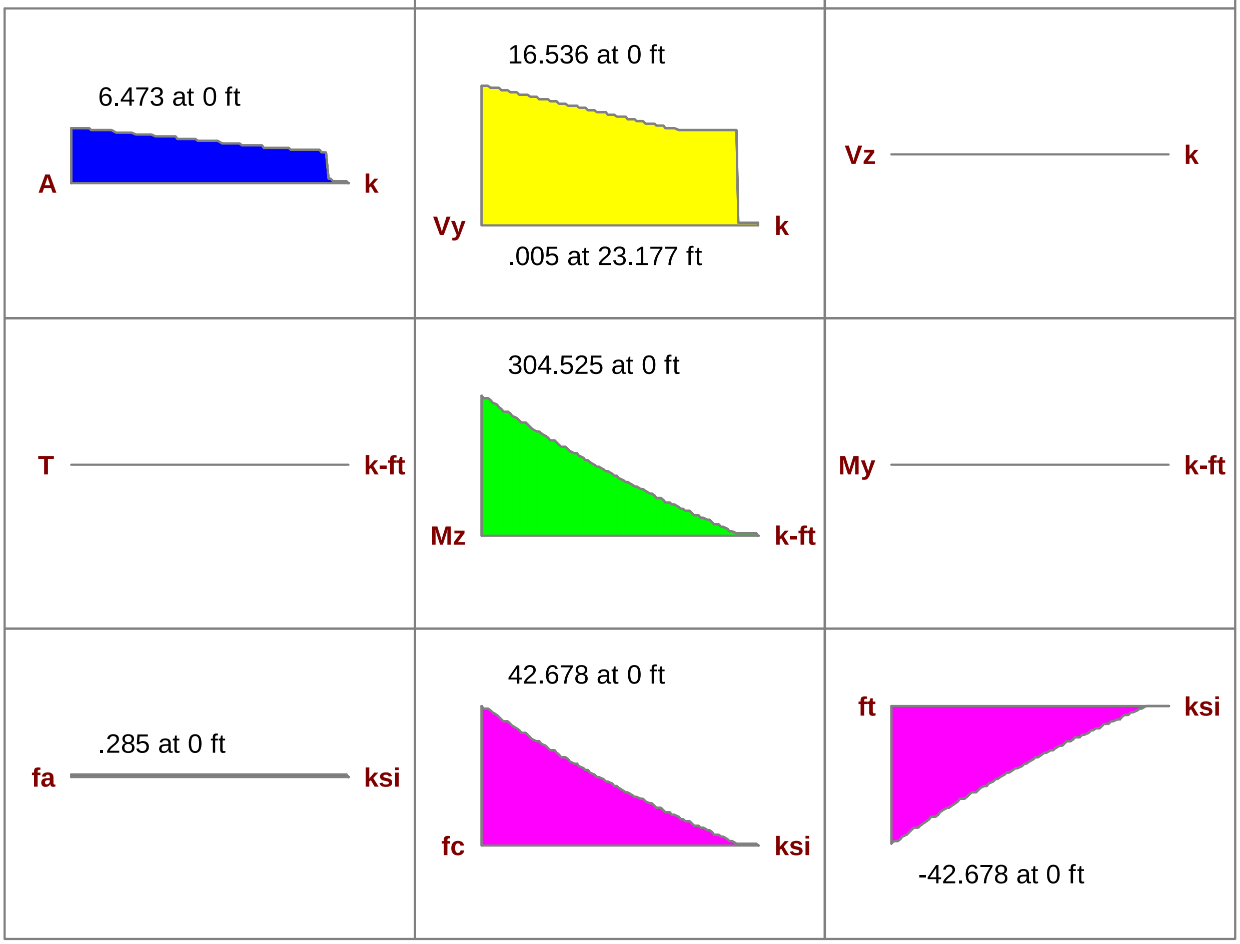
Results for LC 4, 1.0D+1.0Ws (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Pole # 11229 - Mast	Apr 11, 2018 at 8:01 AM
17010.09 / AT&T CT2901	LC #4 Reactions and Deflected Shape	TIA Loads.r3d

Beam: *M2*

Shape: **HSS16x0.500**
Material: **A500 Gr.42**
Length: **25 ft**
I Joint: **FLANGE**
J Joint: **TOPMAST**
LC 1: 1.2D + 1.6W (X-direction)
Code Check: **0.868 (bending)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

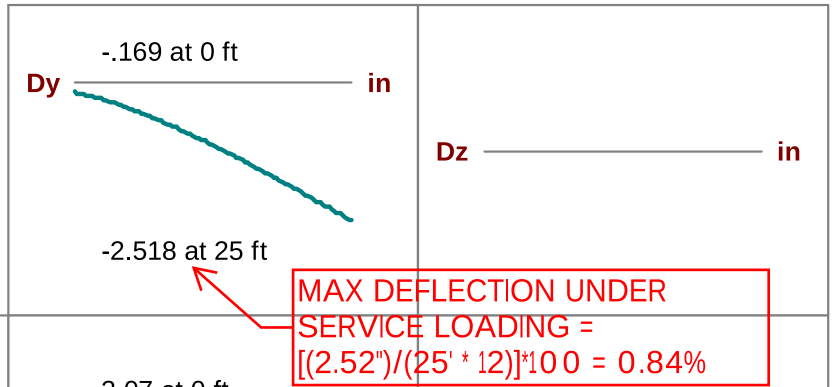
Max Bending Check	**0.868**	Max Shear Check	**0.064 (s)**	Max Defl Ratio	**L/270**
Location	**0 ft**	Location	**0 ft**	Location	**10.156 ft**
Equation	**H1-1b**			Span	**1**

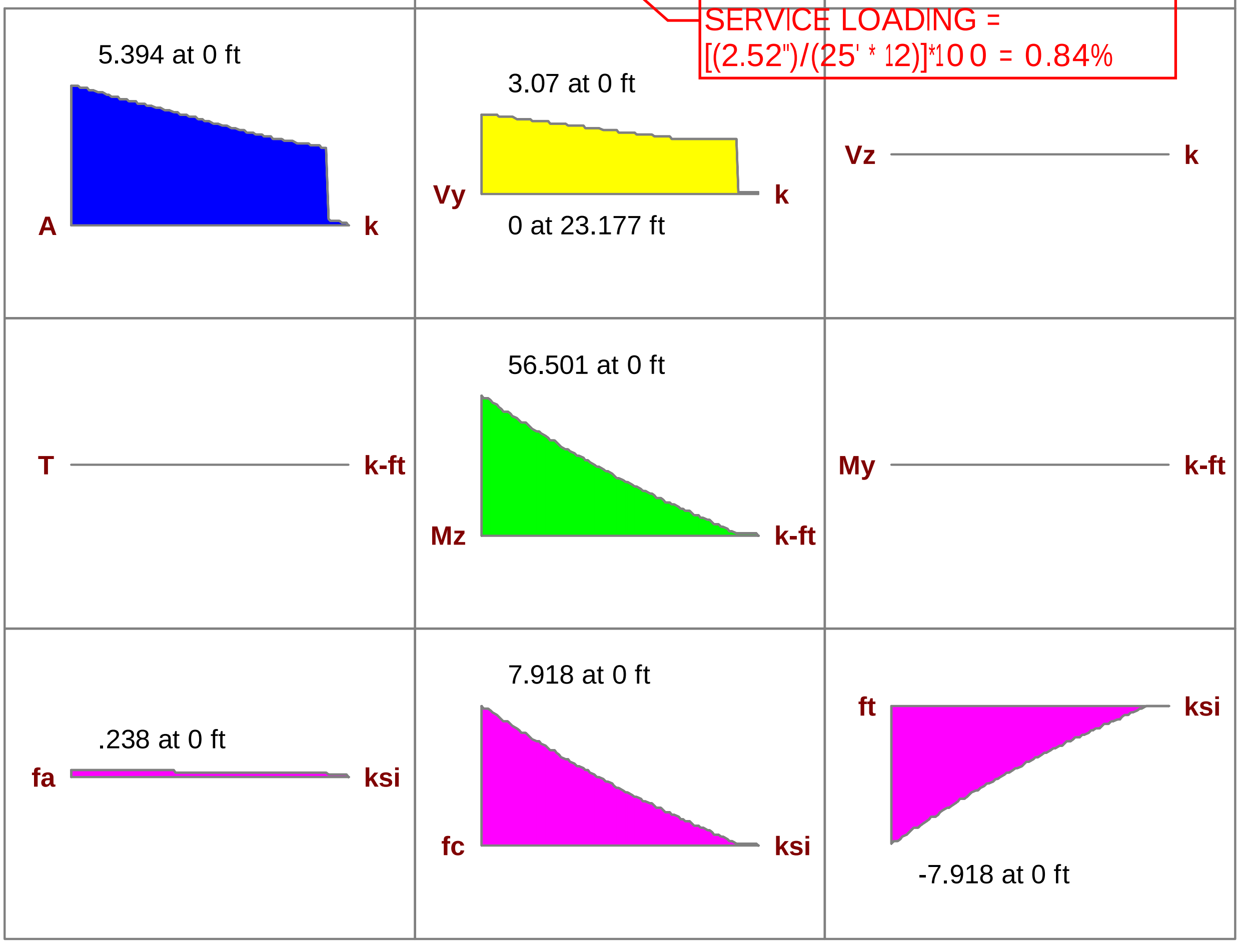
Bending **Compact** Compression **Non-Slender**

Fy	**42 ksi**		y-y	z-z
phi*Pnc	**714.437 k**	Lb	**25 ft**	**25 ft**
phi*Pnt	**858.06 k**	KL/r	**54.612**	**54.612**
phi*Mny	**352.8 k-ft**	L Comp Flange	**25 ft**	
phi*Mnz	**352.8 k-ft**	L-torque	**25 ft**	
phi*Vny	**257.418 k**	Tau_b	**1**	
phi*Vnz	**257.418 k**			
phi*Tn	**333.163 k-ft**			
Cb	**1.894**			

Beam: *M2*

Shape: **HSS16x0.500**
Material: **A500 Gr.42**
Length: **25 ft**
I Joint: **FLANGE**
J Joint: **TOPMAST**
LC 4: 1.0D+1.0Ws (X-direction)
Code Check: **0.164 (bending)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

Max Bending Check	**0.164**	Max Shear Check	**0.012 (s)**	Max Defl Ratio	**L/1460**
Location	**0 ft**	Location	**0 ft**	Location	**10.156 ft**
Equation	**H1-1b**			Span	**1**

Bending **Compact** Compression **Non-Slender**

			y-y	z-z
Fy	**42 ksi**	Lb	**25 ft**	**25 ft**
phi*Pnc	**714.437 k**	KL/r	**54.612**	**54.612**
phi*Pnt	**858.06 k**			
phi*Mny	**352.8 k-ft**	L Comp Flange	**25 ft**	
phi*Mnz	**352.8 k-ft**	L-torque	**25 ft**	
phi*Vny	**257.418 k**	Tau_b	**1**	
phi*Vnz	**257.418 k**			
phi*Tn	**333.163 k-ft**			
Cb	**1.895**			

Mast Top Connection:

Maximum Design Reactions at Brace:

Vertical =	$Vert := 0 \cdot kips$	(User Input)
Horizontal =	$Horz := 45.9 \cdot kips$	(User Input)
Moment =	$Moment := 0$	(User Input)

Bolt Data:

Bolt Grade =	A325	(User Input)
Number of Bolts =	$n_b := 6$	(User Input)
Bolt Diameter =	$d_b := 0.75in$	(User Input)
Nomianl Tensile Strength =	$F_{nt} := 90 \cdot ksi$	(User Input)
Nomianl Shear Strength =	$F_{nv} := 54 \cdot ksi$	(User Input)
Resistance Factor =	$\phi := 0.75$	(User Input)
Bolt Eccentricity from C.L. Mast =	$e := 26.5 \cdot in$	(User Input)
Vetical Spacing Between Top and Bottom Bolts =	$S_{vert} := 9 \cdot in$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 24.5 \cdot in$	(User Input)

Bolt Area = $a_b := \frac{1}{4} \cdot \pi \cdot d_b^{\,2} = 0.442 \cdot in^2$

Check Bolt Stresses:

Wind Acting Parallel to Stiffiner Plate:

Shear Stress per Bolt = $f_v := \frac{Vert}{n_b \cdot a_b} = 0 \cdot ksi$

Condition1 := if$(f_v < \phi \cdot F_{nv}, \text{"OK"}, \text{"Overstressed"})$

Condition1 = "OK"

$\frac{f_v}{(\phi \cdot F_{nv})} = 0 \cdot \%$

Tensile Stress Adjusted for Shear = $F'_{nt} := \begin{cases} \left(1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v\right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \le F_{nt} \\ F_{nt} & \text{otherwise} \end{cases} = 90 \cdot ksi$

Tension Force Each Bolt = $F_{tension.bolt} := \frac{Horz}{n_b} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 7.65 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.bolt}}{a_b} = 17.3 \cdot ksi$

Condition2 := if$(f_t < \phi \cdot F'_{nt}, \text{"OK"}, \text{"Overstressed"})$

Condition2 = "OK"

$\frac{f_t}{(\phi \cdot F'_{nt})} = 25.7 \cdot \%$

Wind Acting Perpendicular to Stiffiner Plate:

Shear Stress per Bolt = $f_v := \frac{\sqrt{Vert^2 + Horz^2}}{n_b \cdot a_b} = 17.316 \cdot ksi$

Condition3 := if$(f_v < \phi \cdot F_{nv}, \text{"OK"}, \text{"Overstressed"})$

Condition3 = "OK"

$\frac{f_v}{(\phi \cdot F_{nv})} = 42.8 \cdot \%$

Tensile Stress Adjusted for Shear = $F'_{nt} := \begin{cases} \left(1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v\right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \le F_{nt} \\ F_{nt} & \text{otherwise} \end{cases} = 78.52 \cdot ksi$

Tension Force per Bolt = $F_{tension.conn} := \frac{Horz \cdot e}{S_{horz} \cdot \frac{n_b}{2}} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 16.549 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.conn}}{a_b} = 37.459 \cdot ksi$

Condition4 := if$(f_t < \phi \cdot F'_{nt}, \text{"OK"}, \text{"Overstressed"})$

Condition4 = "OK"

$\frac{f_t}{(\phi \cdot F'_{nt})} = 63.6 \cdot \%$

Mast Middle Connection:

Maximum Design Reactions at Brace:

Vertical =	$Vert := 0 \cdot kips$	(User Input)
Horizontal =	$Horz := 46.1 \cdot kips$	(User Input)
Moment =	$Moment := 0$	(User Input)

Bolt Data:

Bolt Grade =	A325	(User Input)
Number of Bolts =	$n_b := 6$	(User Input)
Bolt Diameter =	$d_b := 0.75in$	(User Input)
Nomianl Tensile Strength =	$F_{nt} := 90 \cdot ksi$	(User Input)
Nomianl Shear Strength =	$F_{nv} := 54 \cdot ksi$	(User Input)
Resistance Factor =	$\phi := 0.75$	(User Input)
Bolt Eccentricity from C.L. Mast =	$e := 26.5 \cdot in$	(User Input)
Vetical Spacing Between Top and Bottom Bolts =	$S_{vert} := 9 \cdot in$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 29 \cdot in$	(User Input)

Bolt Area = $a_b := \frac{1}{4} \cdot \pi \cdot d_b^{\,2} = 0.442 \cdot in^2$

Check Bolt Stresses:

Wind Acting Parallel to Stiffiner Plate:

Shear Stress per Bolt = $f_v := \frac{Vert}{n_b \cdot a_b} = 0 \cdot ksi$

$Condition1 := if\left(f_v < \phi \cdot F_{nv}, \text{"OK"}, \text{"Overstressed"}\right)$

$Condition1 = \text{"OK"}$

$\frac{f_v}{\left(\phi \cdot F_{nv}\right)} = 0 \cdot \%$

Tensile Stress Adjusted for Shear = $F'_{nt} := \begin{cases} \left(1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v\right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \le F_{nt} \\ F_{nt} & \text{otherwise} \end{cases} = 90 \cdot ksi$

Tension Force Each Bolt = $F_{tension.bolt} := \frac{Horz}{n_b} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 7.683 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.bolt}}{a_b} = 17.4 \cdot ksi$

$Condition2 := if\left(f_t < \phi \cdot F'_{nt}, \text{"OK"}, \text{"Overstressed"}\right)$

$Condition2 = \text{"OK"}$

$\frac{f_t}{\left(\phi \cdot F'_{nt}\right)} = 25.8 \cdot \%$

Wind Acting Perpendicular to Stiffiner Plate:

Shear Stress per Bolt = $f_v := \frac{\sqrt{Vert^2 + Horz^2}}{n_b \cdot a_b} = 17.392 \cdot ksi$

$Condition3 := if\left(f_v < \phi \cdot F_{nv}, \text{"OK"}, \text{"Overstressed"}\right)$

$Condition3 = \text{"OK"}$

$\frac{f_v}{\left(\phi \cdot F_{nv}\right)} = 42.9 \cdot \%$

Tensile Stress Adjusted for Shear = $F'_{nt} := \begin{cases} \left(1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v\right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \le F_{nt} \\ F_{nt} & \text{otherwise} \end{cases} = 78.35 \cdot ksi$

Tension Force per Bolt = $F_{tension.conn} := \frac{Horz \cdot e}{S_{horz} \cdot \frac{n_b}{2}} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 14.042 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.conn}}{a_b} = 31.784 \cdot ksi$

$Condition4 := if\left(f_t < \phi \cdot F'_{nt}, \text{"OK"}, \text{"Overstressed"}\right)$

$Condition4 = \text{"OK"}$

$\frac{f_t}{\left(\phi \cdot F'_{nt}\right)} = 54.1 \cdot \%$

Mast Connection to Bottom Bracket:

Design Reactions at Brace:

Axial =	$Axial := 9.8 \cdot kips$	(User Input)
Shear =	$Shear := 18.4 \cdot kips$	(User Input)
Moment =	$Moment := 57.1 \cdot kips \cdot ft$	(User Input)

Anchor Bolt Data:

Bolt Grade =	A325	(User Input)
Design Shear Stress =	$F_v := 40.5 \cdot ksi$	(User Input)
Design Tension Stress =	$F_T := 67.5 \cdot ksi$	(User Input)
Total Number of Bolts =	$n_b := 4$	(User Input)
Number of Bolts Tension Side Parallel =	$n_{b.par} := 2$	(User Input)
Number of Bolts Tension Side Diagonal =	$n_{b.diag} := 1$	(User Input)
Bolt Diameter =	$d_b := 1.0in$	(User Input)
Bolt Spacing X Direction =	$S_x := 16 \cdot in$	(User Input)
Bolt Spacing Z Direction =	$S_z := 16 \cdot in$	(User Input)

Base Plate Data:

Base Plate Steel =	A36	(User Input)
Allowable Yield Stress =	$F_y := 36 \cdot ksi$	(User Input)
Base Plate Width =	$Pl_w := 20 \cdot in$	(User Input)
Base Plate Thickness =	$Pl_t := 1.5 \cdot in$	(User Input)
Bolt Edge Distance =	$B_E := 2 \cdot in$	(User Input)
Pole Diameter =	$D_p := 16 \cdot in$	(User Input)

Base Plate Data:

Weld Grade	E70XX	(User Input)
Weld Yield Stress =	$F_{yw} := 70 \cdot ksi$	(User Input)
Weld Size =	$sw := 0.5 \cdot in$	(User Input)

Anchor Bolt Check:

Bolt Area = $a_b := \frac{1}{4} \cdot \pi \cdot d_b^{\,2} = 0.785 \cdot in^2$

Bolt Spacing Diag. Direction = $S_{diag} := \sqrt{S_x^{\,2} + S_z^{\,2}} = 22.63 \cdot in$

Tension Load per Bolt Parallel = $T_{par} := \frac{Moment}{S_x \cdot n_{b.par}} - \frac{Axial}{n_b} = 18.96 \cdot kips$

Tension Load per Bolt Diagonal = $T_{diag} := \frac{Moment}{S_{diag} \cdot n_{b.diag}} - \frac{Axial}{n_b} = 27.83 \cdot kips$

Tension per bolt = $T := \mathrm{if}\left(T_{par} > T_{diag}, T_{par}, T_{diag}\right) = 27.832 \cdot kips$

Actual Tensile Stress = $f_t := \frac{T}{a_b} = 35.44 \cdot ksi$

$Condition2 := \mathrm{if}\left(f_t < F_T, \text{"OK"}, \text{"Overstressed"}\right)$

$Condition2 = \text{"OK"}$

Base Plate Check:

Design Bending Stress = $F_b := 0.9 \cdot F_y = 32.4 \cdot ksi$

Plate Bending Width = $Z := \left(Pl_w \cdot \sqrt{2} - D_p\right) = 12.28 \cdot in$

Moment Arm = $K := \frac{\left(S_{diag} - D_p\right)}{2} = 3.31 \cdot in$

Moment in Base Plate = $M := K \cdot T = 92.23 \cdot kips \cdot in$

Section Modulus = $S_Z := \frac{1}{6} \cdot Z \cdot Pl_t^{\,2} = 4.61 \cdot in^3$

Bending Stress = $f_b := \frac{M}{S_Z} = 20.02 \cdot ksi$

$Condition3 := \mathrm{if}\left(f_b < F_b, \text{"OK"}, \text{"Overstressed"}\right)$

$Condition3 = \text{"OK"}$

Base Plate to PCS Mast Weld Check:

Design Weld Stress = $F_w := 0.45 \cdot F_{yw} = 31.5 \cdot ksi$

Weld Area = $A_w := \frac{\pi}{4} \cdot \left[\left(D_p + 2sw \cdot 0.707 \right)^2 - D_p{}^2 \right] = 18.16 \cdot in^2$

Weld Moment of Inertia = $I_w := \frac{\pi}{64} \cdot \left[\left(D_p + 2sw \cdot 0.707 \right)^4 - D_p{}^4 \right] = 607.41 \cdot in^4$

$c := \frac{D_p}{2} + sw \cdot 0.707 = 8.35 \cdot in$

Section Modulus of Weld = $S_w := \frac{I_w}{c} = 72.71 \cdot in^3$

Weld Stress = $f_w := \frac{Moment}{S_w} + \frac{Shear}{A_w} = 10.44 \cdot ksi$

Condition4 := if($f_w < F_w$,"OK" ,"Overstressed")

Condition4 = "OK"

Mast Bottom Connection:

Maximum Design Reactions at Brace:

Vertical =	$Vert := 9.8 \cdot kips$	(User Input)
Horizontal =	$Horz := 18.4 \cdot kips$	(User Input)
Moment =	$Moment := 57.1 \cdot ft \cdot kips$	(User Input)

Bolt Data:

Bolt Grade =	A325	(User Input)
Number of Bolts =	$n_b := 12$	(User Input)
Bolt Diameter =	$d_b := 0.75in$	(User Input)
Nomianl Tensile Strength =	$F_{nt} := 90 \cdot ksi$	(User Input)
Nomianl Shear Strength =	$F_{nv} := 54 \cdot ksi$	(User Input)
Resistance Factor =	$\phi := 0.75$	(User Input)
Bolt Eccentricity from C.L. Mast =	$e := 26.5 \cdot in$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 32 \cdot in$	(User Input)
Vetical Spacing From Plate CL to Bolt 1 =	$S_{vert1} := 2 \cdot in$	(User Input)
Vetical Spacing From Plate CL to Bolt 2 =	$S_{vert2} := 6 \cdot in$	(User Input)
Vetical Spacing From Plate CL to Bolt 3 =	$S_{vert3} := 10 \cdot in$	(User Input)

Bolt Polar Moment of Inertia = $I_p := 2 \cdot S_{vert1}{}^2 + 2 \cdot S_{vert2}{}^2 + 2 \cdot S_{vert3}{}^2 = 280 \cdot in^2$

Bolt Area = $a_b := \frac{1}{4} \cdot \pi \cdot d_b{}^2 = 0.442 \cdot in^2$

Check Bolt Stresses:

Wind Acting Parallel to Stiffiner Plate:

Shear Stress per Bolt =

$$f_v := \frac{Vert}{n_b \cdot a_b} = 1.849 \cdot ksi$$

Condition1 := if($f_v < \phi \cdot F_{nv}$, "OK", "Overstressed")

Condition1 = "OK"

$$\frac{f_v}{(\phi \cdot F_{nv})} = 4.6 \cdot \%$$

Tensile Stress Adjusted for Shear =

$$F'_{nt} := \begin{cases} \left(1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v\right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \le F_{nt} \\ F_{nt} & \text{otherwise} \end{cases} = 90 \cdot ksi$$

Tension Force Each Bolt =

$$F_{tension.bolt} := \frac{Horz}{n_b} + \frac{(Vert \cdot e + Moment) \cdot S_{vert3}}{2 \cdot I_p} = 18.407 \cdot kips$$

Tension Stress Each Bolt =

$$f_t := \frac{F_{tension.bolt}}{a_b} = 41.7 \cdot ksi$$

Condition2 := if($f_t < \phi \cdot F'_{nt}$, "OK", "Overstressed")

Condition2 = "OK"

$$\frac{f_t}{(\phi \cdot F'_{nt})} = 61.7 \cdot \%$$

Wind Acting Perpendicular to Stiffiner Plate:

Shear Stress per Bolt =

$$f_v := \sqrt{\left(\frac{Vert}{n_b \cdot a_b} + \frac{Moment \cdot 2}{S_{horz} \cdot n_b \cdot a_b}\right)^2 + \left(\frac{Horz}{n_b \cdot a_b}\right)^2} = 10.516 \cdot ksi$$

Condition3 := if($f_v < \phi \cdot F_{nv}$, "OK", "Overstressed")

Condition3 = "OK"

$$\frac{f_v}{(\phi \cdot F_{nv})} = 26 \cdot \%$$

Tensile Stress Adjusted for Shear =

$$F'_{nt} := \begin{cases} \left(1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v\right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \le F_{nt} \\ F_{nt} & \text{otherwise} \end{cases} = 90 \cdot ksi$$

Tension Force per Bolt =

$$F_{tension.conn} := \frac{Horz \cdot e}{S_{horz} \cdot \frac{n_b}{2}} + \frac{Vert \cdot e \cdot S_{vert3}}{2 \cdot I_p} = 7.177 \cdot kips$$

Tension Stress Each Bolt =

$$f_t := \frac{F_{tension.conn}}{a_b} = 16.246 \cdot ksi$$

Condition4 := if($f_t < \phi \cdot F'_{nt}$, "OK", "Overstressed")

Condition4 = "OK"

$$\frac{f_t}{(\phi \cdot F'_{nt})} = 24.1 \cdot \%$$

Flange Bolt and Flange Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment = $OM := 305 \cdot ft \cdot kips$ (Input From Risa3D)

Shear Force = $Shear := 16.6 \cdot kips$ (Input From Risa3D)

Axial Force = $Axial := 6.5 \cdot kips$ (Input From Risa3D)

Flange Bolt Data:

Use ASTM A325

Number of Flange Bolts = $N := 16$ (User Input)

Diameter of Bolt Circle = $D_{bc} := 21 \cdot in$ (User Input)

Bolt Ultimate Strength = $F_u := 120 \cdot ksi$ (User Input)

Bolt Yield Strength = $F_y := 92 \cdot ksi$ (User Input)

Bolt Modulus = $E := 29000 \cdot ksi$ (User Input)

Diameter of Flange Bolts = $D := 1.0 \cdot in$ (User Input)

Threads per Inch = $n := 8$ (User Input)

Flange Plate Data:

Use ASTM A36

Plate Yield Strength = $Fy_{bp} := 36 \cdot ksi$ (User Input)

Flange Plate Thickness = $t_{bp} := 1.75 \cdot in$ (User Input)

Flange Plate Diameter = $D_{bp} := 24 \cdot in$ (User Input)

Outer Pole Diameter = $D_{pole} := 16 \cdot in$ (User Input)

Weld Plate Data:

Weld Grade E70XX (User Input)

Weld Yield Stress = $F_{yw} := 70 \cdot ksi$ (User Input)

Weld Size = $sw := 0.5 \cdot in$ (User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 10.5 \cdot in$

Distance to Bolts = $i := 1..N$

$$d_i := \left\| \begin{array}{l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N}\right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array} \right.$$

$d_1 = 4.02 \cdot in$	$d_7 = 4.02 \cdot in$
$d_2 = 7.42 \cdot in$	$d_8 = 0.00 \cdot in$
$d_3 = 9.70 \cdot in$	$d_9 = -4.02 \cdot in$
$d_4 = 10.50 \cdot in$	$d_{10} = -7.42 \cdot in$
$d_5 = 9.70 \cdot in$	$d_{11} = -9.70 \cdot in$
$d_6 = 7.42 \cdot in$	$d_{12} = -10.50 \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 8 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := \text{if}\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$	$MA_7 = 0.00 \cdot in$
$MA_2 = 0.00 \cdot in$	$MA_8 = 0.00 \cdot in$
$MA_3 = 1.70 \cdot in$	$MA_9 = 0.00 \cdot in$
$MA_4 = 2.50 \cdot in$	$MA_{10} = 0.00 \cdot in$
$MA_5 = 1.70 \cdot in$	$MA_{11} = 0.00 \cdot in$
$MA_6 = 0.00 \cdot in$	$MA_{12} = 0.00 \cdot in$

Effective Width of Flangeplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 14.3 \cdot in$

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 882 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.606 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 0.878 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.22 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^{\ 3}}{32} = 0.066 \cdot in^3$

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 43.2 \cdot kips$

Allowable Tensile Force = $T_{ALL.Gross} := 0.75 \cdot \left(0.75 \cdot A_g \cdot F_u\right) = 53 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Gross}} = 81.4 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Gross}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

Flange Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

$C_1 = 17.1 \cdot kips$ $C_7 = 17.1 \cdot kips$

$C_2 = 31.2 \cdot kips$ $C_8 = 0.4 \cdot kips$

$C_3 = 40.7 \cdot kips$ $C_9 = -16.3 \cdot kips$

$C_4 = 44.0 \cdot kips$ $C_{10} = -30.4 \cdot kips$

$C_5 = 40.7 \cdot kips$ $C_{11} = -39.8 \cdot kips$

$C_6 = 31.2 \cdot kips$ $C_{12} = -43.2 \cdot kips$

Maximum Bending Stress in Plate =

$$f_{bp} := \sum_i \frac{4 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^{\,2}\right)} = 22.7 \cdot ksi$$

Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 32.4 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 69.9 \cdot \%$

Condition3 = $Condition2 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$

$Condition2 = \text{"Ok"}$

Plate to PCS Mast Weld Check:

Design Weld Stress = $F_w := 0.45 \cdot F_{yw} = 31.5 \cdot ksi$

Weld Area = $A_w := 35.2 \cdot in^2$

Weld Moment of Inertia = $I_w := 1482 \cdot in^4$

$c := 10.625 \cdot in$

Section Modulus of Weld = $S_w := \frac{I_w}{c} = 139.48 \cdot in^3$

Weld Stress = $f_w := \frac{OM}{S_w} + \frac{Shear}{A_w} = 26.71 \cdot ksi$

Condition3 := if$\left(f_w < F_w, \text{"OK"}, \text{"Overstressed"}\right)$

Condition3 = "OK"

Basic Components

Heavy Wind Pressure = $p := 4.00$ psf (User Input NESC 2007 Figure 250-1 & Table 250-1)

Basic Windspeed = $V := 110$ mph (User Input NESC 2007 Figure 250-2(e))

Radial Ice Thickness = $Ir := 0.50$ in (User Input)

Radial Ice Density = $Id := 56.0$ pcf (User Input)

Factors for Extreme Wind Calculation

Elevation of Top of PCS Mast Above Grade = $TME := 107$ ft (User Input)

Multiplier Gust Response Factor = $m := 1.25$ (User Input - Only for NESC Extreme wind case)

NESC Factor = $kv := 1.43$ (User Input from NESC 2007 Table 250-3 equation)

Importance Factor = $I := 1.0$ (User Input from NESC 2007 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.284$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.31$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.846$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.865$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 34.4$ psf (NESC 2007 Section 250.C.2)

NESC Extreme Ice w/ Wind Components

Heavy Wind Pressure = $p_{ex} := 4.0$ psf (User Input NESC 2007 Figure 250-3 & Table 250-4)

Radial Ice Thickness = $Ir_{ex} := 1.0$ in (User Input NESC 2007 Figure 250-3)

Shape Factors

NUS Design Criteria Issued April 12, 2007

Shape Factor for Round Members = $Cd_R := 1.3$ (User Input)

Shape Factor for Flat Members = $Cd_F := 1.6$ (User Input)

Shape Factor for Coax Cables Attached to Outside of Pole = $Cd_{coax} := 1.6$ (User Input)

Overload Factors

NU Design Criteria Table

Overload Factors for Wind Loads:

NESC Heavy Wind Loading =	**2.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Wind Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Ice w/ Wind Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

Overload Factors for Vertical Loads:

NESC Heavy Wind Loading =	**1.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Wind Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Ice w/ Wind Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

Development of Wind & Ice Load on PCS Mast

PCS Mast Data: (HSS18x0.5)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 18$	in	(User Input)
Mast Length =	$L_{mast} := 32$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.5$	in	(User Input)

Gravity Loads (without ice)

Weight of the mast = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + Ir \cdot 2\right)^2 - D_{mast}{}^2\right] = 29.1$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 11$ plf **BLC 3**

Gravity Loads (Extreme ice only)

Extreme Ice Area per Linear Foot = $Ai_{ex.mast} := \frac{\pi}{4}\left[\left(D_{mast} + Ir_{ex} \cdot 2\right)^2 - D_{mast}{}^2\right] = 59.7$ sq in

Weight of Extreme Ice on Mast = $W_{ICE.exmast} := Id \cdot \frac{Ai_{ex.mast}}{144} = 23$ plf **BLC 4**

Wind Load (NESC Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot Ir\right)}{12} = 1.583$ sf/ft

Total Mast Wind Force w/ Ice = $Fi_{mast} := p \cdot Cd_R \cdot AICE_{mast} = 8$ plf **BLC 5**

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.5$ sf/ft

Total Mast Wind Force (Below NU Structure) = $F_{mast} := qz \cdot Cd_R \cdot A_{mast} = 67$ plf **BLC 6**

Wind Load (NESC Extreme Ice w/ Wind)

Mast Projected Surface Area w/ Extreme Ice = $AICE_{ex.mast} := \frac{\left(D_{mast} + 2 \cdot Ir_{ex}\right)}{12} = 1.667$ sf/ft

Total Mast Wind Force w/ Extreme Ice = $Fi_{ex.mast} := p_{ex} \cdot Cd_R \cdot AICE_{ex.mast} = 9$ plf **BLC 7**

CENTEK engineering Centered on Solutions™ www.centekeng.com 63-2 North Branford Road P: (203) 488-0580 Branford, CT 06405 F: (203) 488-8587	Subject:	Load Analysis of Mast and AT&T Equipment on Pole #11229
	Location:	Waterbury, CT
	Rev. 3: 3/23/18	Prepared by: T.J.L Checked by: C.F.C. Job No. 17010.09

Development of Wind & Ice Load on PCS Mast

PCS Mast Data: (HSS16x0.5)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 16$ in (User Input)

Mast Length = $L_{mast} := 25$ ft (User Input)

Mast Thickness = $t_{mast} := 0.5$ in (User Input)

Gravity Loads (without ice)

Weight of the mast = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + Ir \cdot 2\right)^2 - D_{mast}{}^2\right] = 25.9$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 10$ plf **BLC 3**

Gravity Loads (Extreme ice only)

Extreme Ice Area per Linear Foot = $Ai_{ex.mast} := \frac{\pi}{4}\left[\left(D_{mast} + Ir_{ex} \cdot 2\right)^2 - D_{mast}{}^2\right] = 53.4$ sq in

Weight of Extreme Ice on Mast = $W_{ICE.exmast} := Id \cdot \frac{Ai_{ex.mast}}{144} = 21$ plf **BLC 4**

Wind Load (NESC Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot Ir\right)}{12} = 1.417$ sf/ft

Total Mast Wind Force w/ Ice = $Fi_{mast} := p \cdot Cd_R \cdot AICE_{mast} = 7$ plf **BLC 5**

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.333$ sf/ft

Total Mast Wind Force (Above NU Structure) = $F_{mast} := qz \cdot Cd_R \cdot A_{mast} \cdot m = 75$ plf **BLC 6**

Wind Load (NESC Extreme Ice w/ Wind)

Mast Projected Surface Area w/ Extreme Ice = $AICE_{ex.mast} := \frac{\left(D_{mast} + 2 \cdot Ir_{ex}\right)}{12} = 1.5$ sf/ft

Total Mast Wind Force w/ Extreme Ice = $Fi_{ex.mast} := p_{ex} \cdot Cd_R \cdot AICE_{ex.mast} = 8$ plf **BLC 7**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	CCI HPA-65R-BUU-H8		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 92.4$	in	(User Input)
Antenna Width =	$W_{ant} := 14.8$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.4$	in	(User Input)
Antenna Weight =	$WT_{ant} := 70$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 6$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 420$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1 \times 10^4$ cu in

Volume of Ice on Each Antenna = $V_{ice} := \left(L_{ant} + 2 \cdot Ir\right)\left(W_{ant} + 2 \cdot Ir\right)\left(T_{ant} + 2 \cdot Ir\right) - V_{ant} = 2276$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 74$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 443$ lbs **BLC 3**

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := \left(L_{ant} + 2 \cdot Ir_{ex}\right)\left(W_{ant} + 2 \cdot Ir_{ex}\right)\left(T_{ant} + 2 \cdot Ir_{ex}\right) - V_{ant} = 4788$ cu in

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := \frac{V_{ice.ex}}{1728} \cdot Id = 155$ lbs

Weight of Extreme Ice on All Antennas = $W_{ICE.exant} \cdot N_{ant} = 931$ lbs **BLC 4**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(W_{ant} + 2 \cdot Ir\right)}{144} = 10.2$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 61.5$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 394$ lbs **BLC 5**

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 9.5$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 57$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 3920$ lbs **BLC 6**

Wind Load (NESC Extreme Ice w/ Wind)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := \frac{(L_{ant} + 2 \cdot Ir_{ex}) \cdot (W_{ant} + 2 \cdot Ir_{ex})}{144} = 11$ sf

Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 66.1$ sf

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} = 423$ lbs **BLC 7**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	CCI OPA-65R-LCUU-H8		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 92.7$	in	(User Input)
Antenna Width =	$W_{ant} := 14.4$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.0$	in	(User Input)
Antenna Weight =	$WT_{ant} := 90$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 270$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 9344$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 2200$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 71$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 214$ lbs **BLC 3**

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := (L_{ant} + 2 \cdot Ir_{ex})(W_{ant} + 2 \cdot Ir_{ex})(T_{ant} + 2 \cdot Ir_{ex}) - V_{ant} = 4634$ cu in

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := \frac{V_{ice.ex}}{1728} \cdot Id = 150$ lbs

Weight of Extreme Ice on All Antennas = $W_{ICE.exant} \cdot N_{ant} = 450$ lbs **BLC 4**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 10$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 30.1$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 192$ lbs **BLC 5**

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 9.3$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 27.8$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1913$ lbs **BLC 6**

Wind Load (NESC Extreme Ice w/ Wind)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := \frac{(L_{ant} + 2 \cdot Ir_{ex}) \cdot (W_{ant} + 2 \cdot Ir_{ex})}{144} = 10.8$ sf

Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 32.4$ sf

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} = 207$ lbs **BLC 7**

Development of Wind & Ice Load on TMA's

TMA Data:

TMA Model =	CCI TMABPDB7823VG12A		
TMA Shape =	Flat		(User Input)
TMA Height =	$L_{TMA} := 14.22$	in	(User Input)
TMA Width =	$W_{TMA} := 11.56$	in	(User Input)
TMA Thickness =	$T_{TMA} := 4.24$	in	(User Input)
TMA Weight =	$WT_{TMA} := 25$	lbs	(User Input)
Number of TMA's =	$N_{TMA} := 18$		(User Input)

Gravity Load (without ice)

Weight of All TMA's = $WT_{TMA} \cdot N_{TMA} = 450$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each TMA = $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 697$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 2 \cdot Ir)(W_{TMA} + 2 \cdot Ir)(T_{TMA} + 2 \cdot Ir) - V_{TMA} = 305$ cu in

Weight of Ice on Each TMA = $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 10$ lbs

Weight of Ice on All TMA's = $W_{ICETMA} \cdot N_{TMA} = 178$ lbs **BLC 3**

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each TMA = $V_{ice.ex} := (L_{TMA} + 2 \cdot Ir_{ex})(W_{TMA} + 2 \cdot Ir_{ex})(T_{TMA} + 2 \cdot Ir_{ex}) - V_{TMA} = 675$ cu in

Weight of Extreme Ice on Each TMA = $W_{ICE.exTMA} := \frac{V_{ice.ex}}{1728} \cdot Id = 22$ lbs

Weight of Extreme Ice on All TMA's = $W_{ICE.exTMA} \cdot N_{TMA} = 394$ lbs **BLC 4**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all TMA's Simultaneously

Surface Area for One TMA w/ Ice = $SA_{ICETMA} := \frac{(L_{TMA} + 2 \cdot Ir) \cdot (W_{TMA} + 2 \cdot Ir)}{144} = 1.3$ sf

TMA Projected Surface Area w/ Ice = $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 23.9$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := p \cdot Cd_F \cdot A_{ICETMA} = 153$ lbs **BLC 5**

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all TMA's Simultaneously

Surface Area for One TMA = $SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 1.1$ sf

TMA Projected Surface Area = $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 20.5$ sf

Total TMA Wind Force = $F_{TMA} := qz \cdot Cd_F \cdot A_{TMA} \cdot m = 1414$ lbs **BLC 6**

Wind Load (NESC Extreme Ice w/ Wind)

Assumes Maximum Possible Wind Pressure Applied to all TMA's Simultaneously

Surface Area for One TMA w/ Extreme Ice = $SA_{ICE.exTMA} := \frac{(L_{TMA} + 2 \cdot Ir_{ex}) \cdot (W_{TMA} + 2 \cdot Ir_{ex})}{144} = 1.5$ sf

TMA Projected Surface Area w/ Extreme Ice = $A_{ICE.exTMA} := SA_{ICE.exTMA} \cdot N_{TMA} = 27.5$ sf

Total TMA Wind Force w/ Extreme Ice = $Fi_{ex.TMA} := p_{ex} \cdot Cd_F \cdot A_{ICE.exTMA} = 176$ lbs **BLC 7**

Development of Wind & Ice Load on Antenna Mounts

Mount Data:

Mount Type:	Custom T-Arm Mount w/ Square Horz		
Mount Shape =	Flat		
Mount Projected Surface Area =	$CdAa := 25$	sf	(User Input)
Mount Projected Surface Area w/ Ice =	$CdAa_{ice} := 32$	sf	(User Input)
Mount Projected Surface Area w/ Extreme Ice =	$CdAa_{ice.ex} := 36$	sf	(User Input)
Mount Weight =	$WT_{mnt} := 1675$	lbs	(User Input)
Mount Weight w/ Ice =	$WT_{mnt.ice} := 2200$	lbs	(User Input)
Mount Weight w/ Extreme Ice =	$WT_{mnt.ice.ex} := 2500$	lbs	(User Input)

Gravity Loads (without ice)

Weight of All Mounts = $Wt_{mnt1} := WT_{mnt} = 1675$ lbs **BLC 2**

Gravity Load (ice only)

Weight of Ice on All Mounts = $Wt_{ice.mnt1} := \left(WT_{mnt.ice} - WT_{mnt}\right) = 525$ lbs **BLC 3**

Gravity Load (extreme ice only)

Weight of Ice on All Mounts = $Wt_{ice.ex.mnt1} := \left(WT_{mnt.ice.ex} - WT_{mnt}\right) = 825$ lbs **BLC 4**

Wind Load (NESC Heavy)

Total Mount Wind Force w/ Ice = $Fi_{mnt1} := p \cdot CdAa_{ice} = 128$ lbs **BLC 5**

Wind Load (NESC Extreme)

Total Mount Wind Force = $F_{mnt1} := qz \cdot CdAa \cdot m = 1075$ lbs **BLC 6**

Wind Load (NESC Extreme Ice w/ Wind)

Total Mount Wind Force w/ Extreme Ice = $Fi_{ex.mnt1} := p_{ex} \cdot CdAa_{ice.ex} = 144$ lbs **BLC 7**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 25$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 36$		(User Input)
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{coax} := 8$		(User Input)

Gravity Loads (without ice)

Weight of all cables w/o ice = $WT_{coax} := Wt_{coax} \cdot N_{coax} = 37$ plf **BLC 2**

Gravity Load (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}{}^2\right] = 3.9$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 55$ plf **BLC 3**

Gravity Loads (Extreme ice only)

Extreme Ice Area per Linear Foot = $Ai_{ex.coax} := \frac{\pi}{4}\left[\left(D_{coax} + 2 \cdot Ir_{ex}\right)^2 - D_{coax}{}^2\right] = 9.4$ sq in

Extreme Ice Weight All Coax per foot = $W_{ICE.excoax} := N_{coax} \cdot Id \cdot \frac{Ai_{ex.coax}}{144} = 131$ plf **BLC 4**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{NP_{coax} \cdot \left(D_{coax} + 2 \cdot Ir\right)}{12} = 2$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 13$ plf **BLC 5**

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{\left(NP_{coax} D_{coax}\right)}{12} = 1.3$ sf/ft

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 91$ plf **BLC 6**

Wind Load (NESC Extreme Ice w/ Wind)

Coax Projected Surface Area w/ Extreme Ice = $AICE_{ex.coax} := \frac{NP_{coax} \cdot \left(D_{coax} + 2 \cdot Ir_{ex}\right)}{12} = 2.653$ sf/ft

Total Coax Wind Force w/ Extreme Ice = $Fi_{ex.coax} := p_{ex} \cdot Cd_{coax} \cdot AICE_{ex.coax} = 17$ plf **BLC 7**

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building
	AISC 14th(360-10): ASD

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	HSS18x0.500	Beam	Pipe	A500 Gr.42	Typical	25.6	985	985	1970
2	Mast 2	HSS16x0.500	Beam	Pipe	A500 Gr.42	Typical	22.7	685	685	1370

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Mast	32			Lbyy						Lateral
2	M2	Mast 2	25			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOTCO...	FLANGE			Mast	Beam	Pipe	A500 Gr....	Typical
2	M2	FLANGE	TOPMA...			Mast 2	Beam	Pipe	A500 Gr....	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTCONNECTION	0	0	0	0	
2	CONN	0	10	0	0	
3	TOPCONNECTION	0	27.5	0	0	
4	TOPMAST	0	57	0	0	
5	ANTCL	0	55	0	0	
6	FLANGE	0	32	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	BOTCONNECTION	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	TOPCONNECTION	Reaction		Reaction			
3	CONN	Reaction		Reaction			

Member Point Loads

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

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M2	Y	-.037	-.037	0	18

Member Distributed Loads (BLC 3 : Weight of Ice Only on Struct)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.011	-.011	0	0
2	M2	Y	-.01	-.01	0	0
3	M2	Y	-.055	-.055	0	18

Member Distributed Loads (BLC 4 : Weight of Extreme Ice Only)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.023	-.023	0	0
2	M2	Y	-.021	-.021	0	18
3	M2	Y	-.131	-.131	0	18

Member Distributed Loads (BLC 5 : NESC Heavy Wind on Structure)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.008	.008	0	0
2	M2	X	.007	.007	0	18
3	M2	X	.013	.013	0	18

Member Distributed Loads (BLC 6 : NESC Extreme Wind on Structure)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.067	.067	0	0
2	M2	X	.075	.075	0	18
3	M2	X	.091	.091	0	18

Member Distributed Loads (BLC 7 : NESC Extreme Ice w/ Wind on Stru)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.009	.009	0	0
2	M2	X	.008	.008	0	18
3	M2	X	.017	.017	0	18

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Self Weight (Mast)	None		-1						
2	Weight of Appurtenances	None				4		1		
3	Weight of Ice Only on Struct	None				4		3		
4	Weight of Extreme Ice Only	None				4		3		
5	NESC Heavy Wind on Structure	None				4		3		
6	NESC Extreme Wind on Structure	None				4		3		
7	NESC Extreme Ice w/ Wind on Stru	None				4		3		

Load Combinations

	Description	So...	PDelta	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	NESC Heavy Wind ...	Yes	Y		1	1.5	2	1.5	3	1.5	5	2.5												
2	NESC Extreme Wi...	Yes	Y		1	1	2	1	6	1														
3	NESC Extreme Ice ...	Yes	Y		1	1	2	1	4	1	7	1												
4	Self Weight				1	1																		

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	BOTCONNECT...	max	-1.611	3	16.727	1	0	1	0	1	0	1	41.06	2
2		min	-13.299	2	8.2	2	0	1	0	1	0	1	4.967	3
3	TOPCONNECT...	max	-4.018	3	0	1	0	1	0	1	0	1	0	1
4		min	-32.865	2	0	1	0	1	0	1	0	1	0	1
5	CONN	max	32.711	2	0	1	0	1	0	1	0	1	0	1

Envelope Joint Reactions (Continued)

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
6		min	3.941	3	0	1	0	1	0	1	0	1	0	1
7	Totals:	max	-1.688	3	16.727	1	0	1						
8		min	-13.454	2	8.2	2	0	1						

Joint Reactions

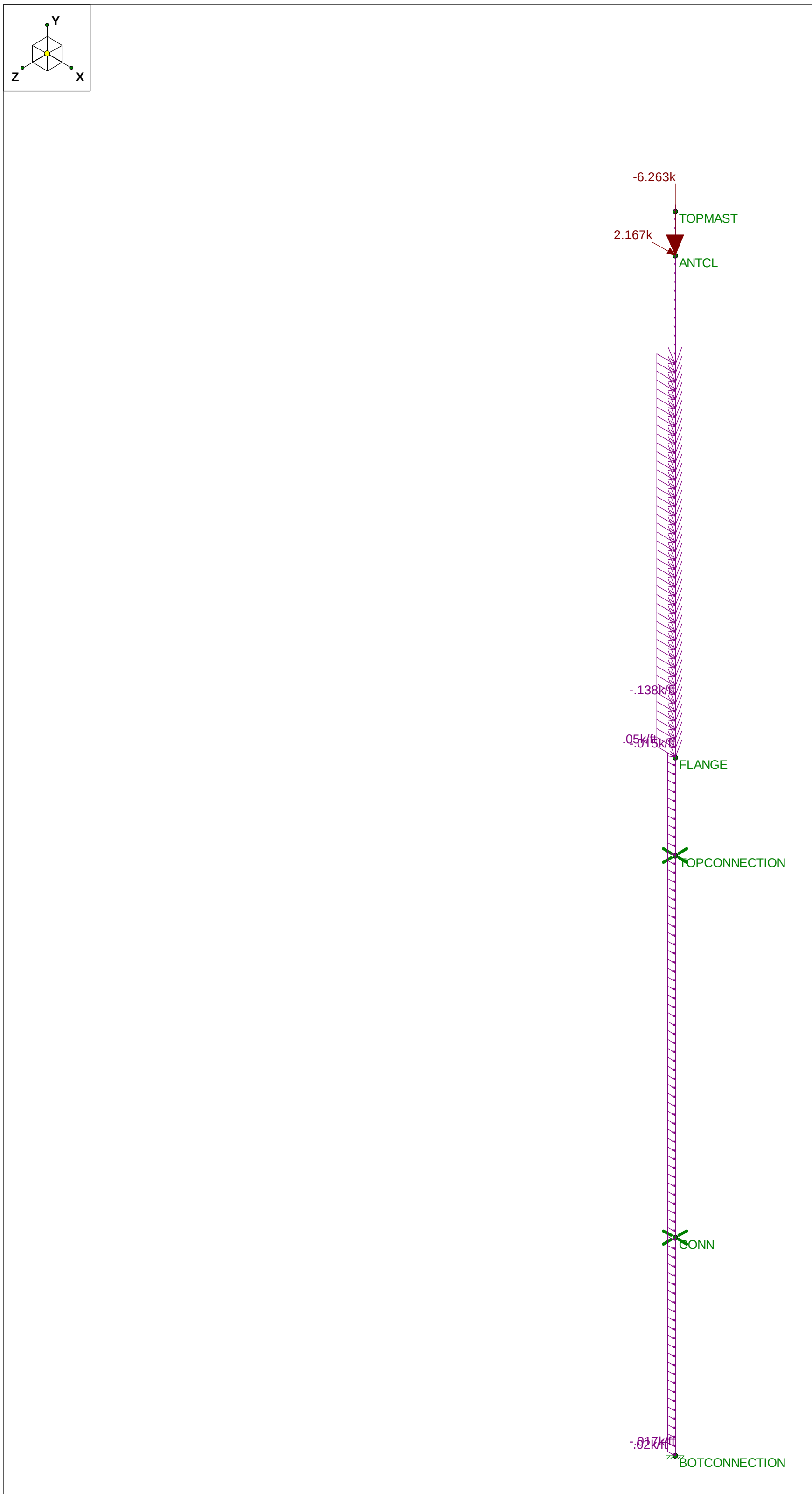
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTCONNECTION	-3.602	16.727	0	0	0	11.106
2	1	TOPCONNECTION	-8.92	0	0	0	0	0
3	1	CONN	8.814	0	0	0	0	0
4	1	Totals:	-3.708	16.727	0			
5	1	COG (ft):	X: 0	Y: 39.888	Z: 0			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTCONNECTION	-13.299	8.2	0	0	0	41.06
2	2	TOPCONNECTION	-32.865	0	0	0	0	0
3	2	CONN	32.711	0	0	0	0	0
4	2	Totals:	-13.454	8.2	0			
5	2	COG (ft):	X: 0	Y: 38.132	Z: 0			

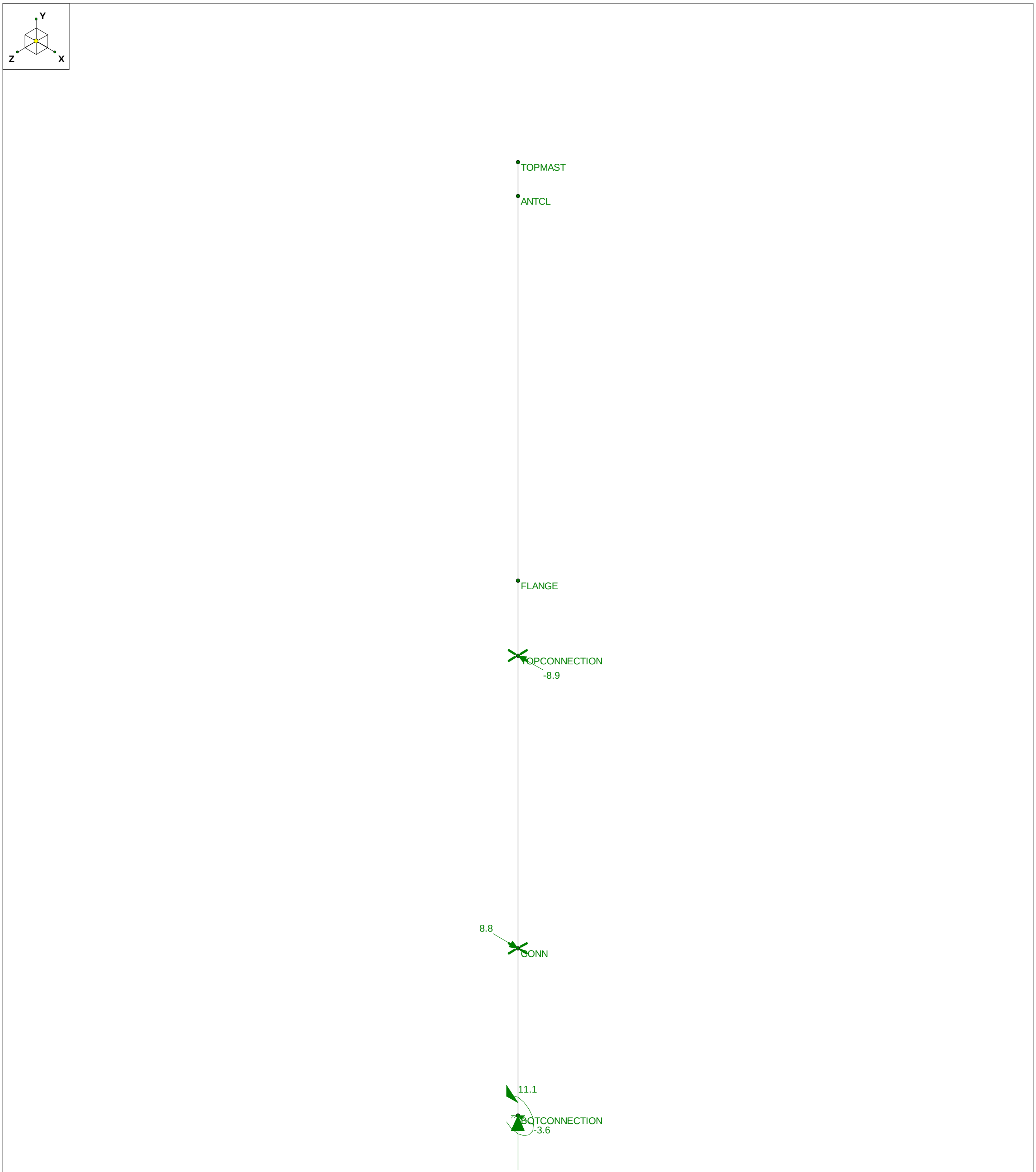
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	BOTCONNECTION	-1.611	14.272	0	0	0	4.967
2	3	TOPCONNECTION	-4.018	0	0	0	0	0
3	3	CONN	3.941	0	0	0	0	0
4	3	Totals:	-1.688	14.272	0			
5	3	COG (ft):	X: 0	Y: 40.613	Z: 0			



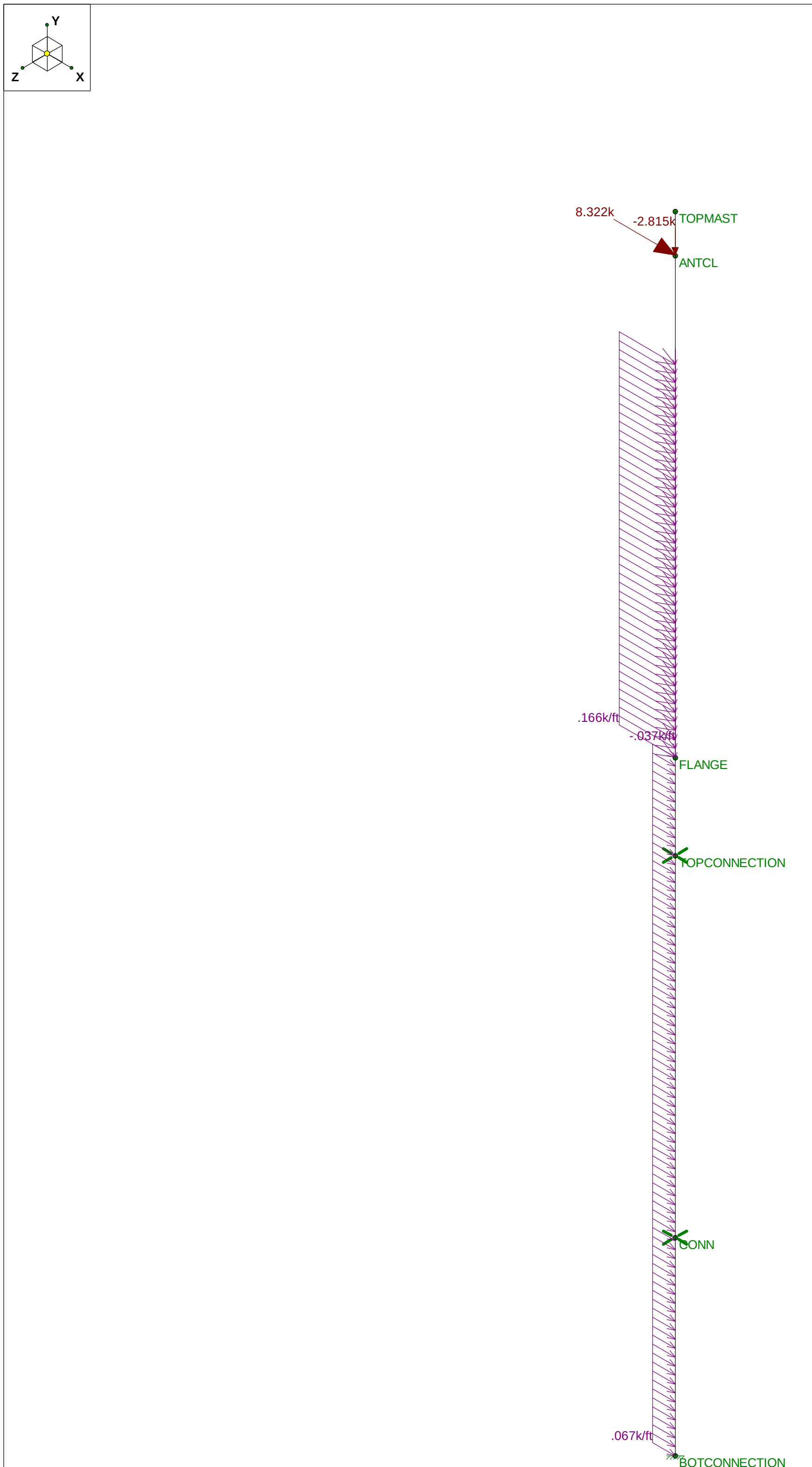
Loads: LC 1, NESC Heavy Wind on PCS Structure

CENTEK Engineering, INC.	Pole # 11229 - Mast	
tjl, cfc		Apr 2, 2018 at 1:15 PM
17010.09/ AT&T CT2901	LC #1 Loads	NESC Loads.r3d



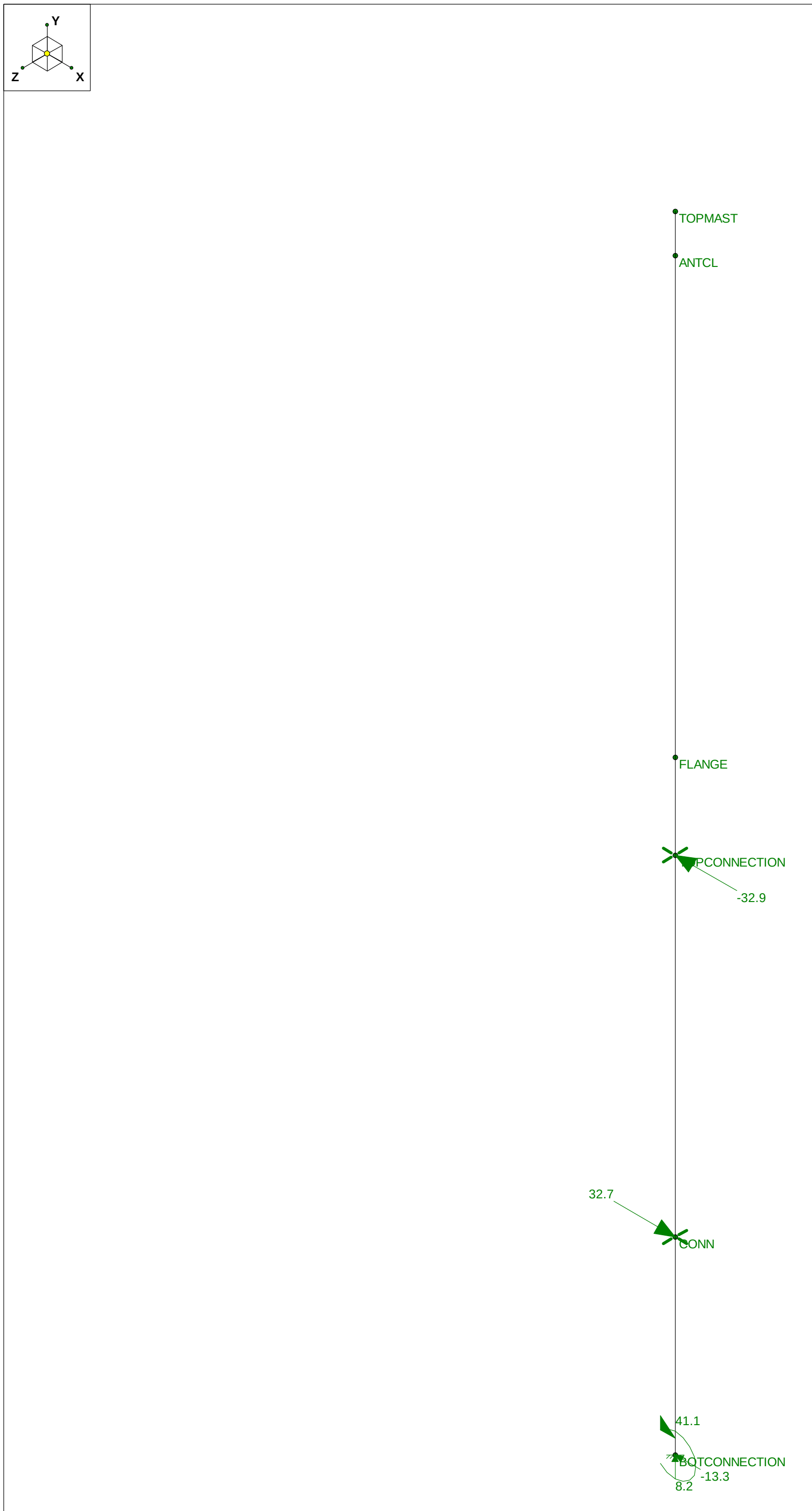
Results for LC 1, NESC Heavy Wind on PCS Structure
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Pole # 11229 - Mast	Apr 2, 2018 at 1:17 PM
17010.09/ AT&T CT2901	LC #1 Reactions	NESC Loads.r3d



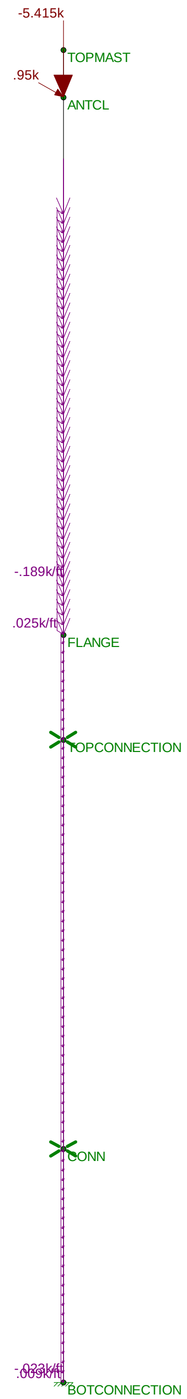
Loads: LC 2, NESC Extreme Wind on PCS Structure

CENTEK Engineering, INC.	Pole # 11229 - Mast	
tjl, cfc		Apr 2, 2018 at 1:15 PM
17010.09/ AT&T CT2901	LC #2 Loads	NESC Loads.r3d



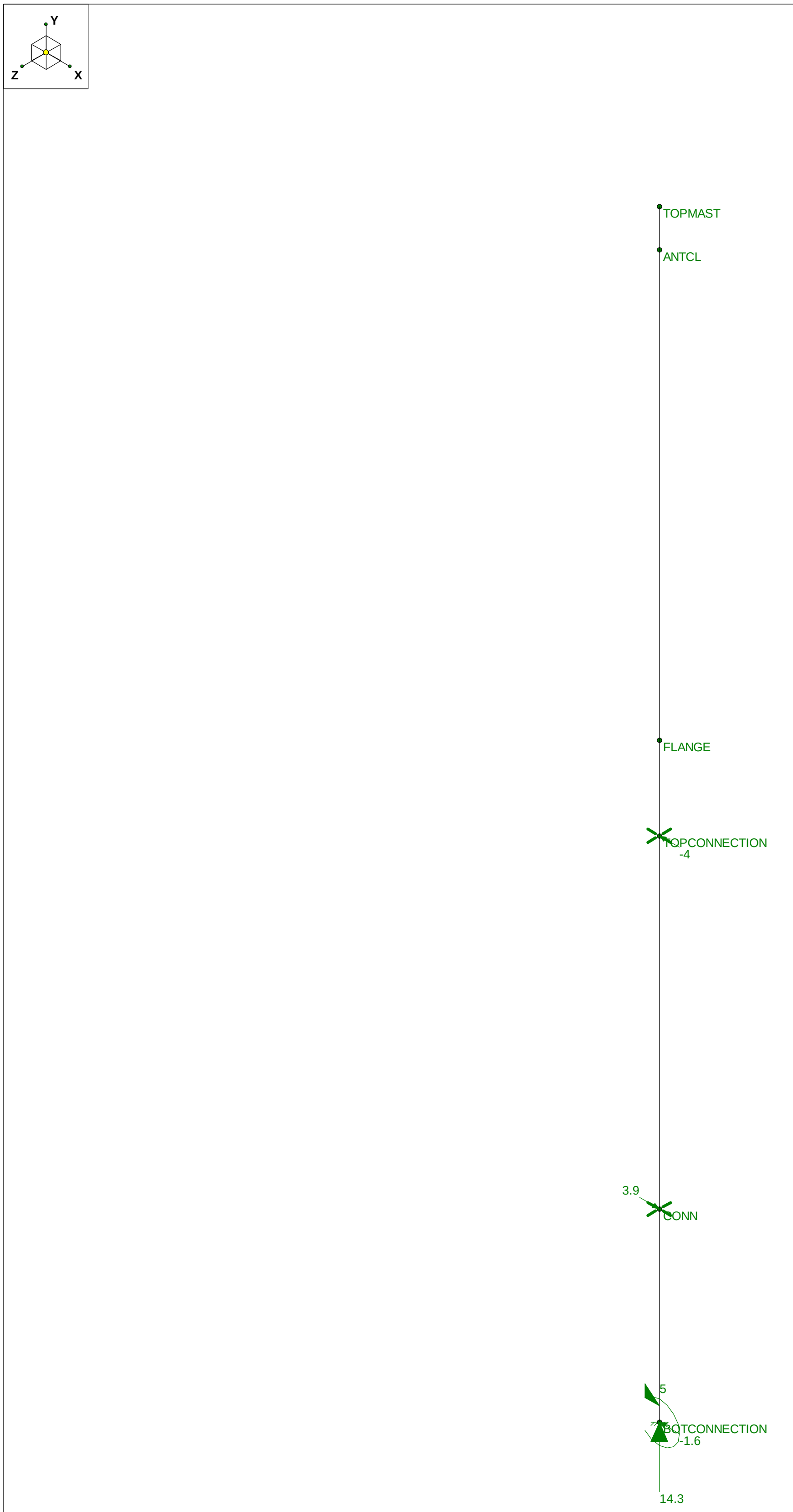
Results for LC 2, NESC Extreme Wind on PCS Structure
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Pole # 11229 - Mast	Apr 2, 2018 at 1:18 PM
17010.09/ AT&T CT2901	LC #2 Reactions	NESC Loads.r3d



Loads: LC 3, NESC Extreme Ice w/ Wind on PCS Structure

CENTEK Engineering, INC.		
tjl, cfc	Pole # 11229 - Mast	Apr 2, 2018 at 1:15 PM
17010.09/ AT&T CT2901	LC #3 Loads	NESC Loads.r3d



Results for LC 3, NESC Extreme Ice w/ Wind on PCS Structure
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Pole # 11229 - Mast	Apr 2, 2018 at 1:18 PM
17010.09/ AT&T CT2901	LC #3 Reactions	NESC Loads.r3d

Coax Cable on Pole

Heavy Wind Pressure =	$p := 4 \cdot psf$	(User Input)
Radial Ice Thickness =	$Ir := 0.5 \cdot in$	(User Input)
Extreme Ice w/ Wind Pressure =	$p_{ex} := 4 \cdot psf$	(User Input)
Extreme Radial Ice Thickness =	$Ir_{ex} := 1.0 \cdot in$	(User Input)
Radial Ice Density =	$Id := 56 \cdot pcf$	(User Input)
Basic Windspeed =	$V := 110$ mph	(User Input NESC 2007 Figure 250-2(e))
Height to Top of Coax Above Grade =	$TC := 107$ ft	(User Input)
NESC Factor =	$kv := 1.43$	(User Input from NESC 2007 Table 250-3 equation)
Importance Factor =	$I := 1.0$	(User Input from NESC 2007 Section 250.C.2)
Velocity Pressure Coefficient =	$Kz := 2.01 \cdot \left(\frac{0.67TC}{900}\right)^{\frac{2}{9.5}} = 1.18$	(NESC 2007 Table 250-2)
Exposure Factor =	$Es := 0.346 \left[\frac{33}{(0.67 \cdot TC)}\right]^{\frac{1}{7}} = 0.31$	(NESC 2007 Table 250-3)
Response Term =	$Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TC}{220}\right)} = 0.846$	(NESC 2007 Table 250-3)
Gust Response Factor =	$Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.865$	(NESC 2007 Table 250-3)
Wind Pressure =	$qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 31.6$ psf	(NESC 2007 Section 250.C.2)

Distance Between Coax Cable Attach Points =

Coaxial Cable Span $\quad Coax_{Span} := \begin{pmatrix} 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \end{pmatrix} \cdot ft$ *(User Input)*

Diameter of Coax Cable = $D_{coax} := 1.98 \cdot in$ *(User Input)*

Weight of Coax Cable = $W_{coax} := 1.04 \cdot plf$ *(User Input)*

Number of Coax Cables = $N_{coax} := 36$ *(User Input)*

Number of Projected Coax Cables = $NP_{coax} := 8$ *(User Input)*

Shape Factor = $Cd_{coax} := 1.6$ *(User Input)*

Overload Factor for NESC Heavy Wind Transverse Load = $OF_{HWT} := 2.5$ *(User Input)*

Overload Factor for NESC Heavy Wind Vertical Load = $OF_{HWV} := 1.5$ *(User Input)*

Overload Factor for NESC Extreme Wind Transverse Load = $OF_{EWT} := 1.0$ *(User Input)*

Overload Factor for NESC Extreme Wind Vertical Load = $OF_{EWV} := 1.0$ *(User Input)*

Overload Factor for NESC Extreme Ice w/ Wind Transverse Load = $OF_{EIT} := 1.0$ *(User Input)*

Overload Factor for NESC Extreme Ice w/ Wind Vertical Load = $OF_{EIV} := 1.0$ *(User Input)*

Wind Area without Ice = $A := \left(NP_{coax} \cdot D_{coax}\right) = 15.84 \cdot in$

Wind Area with Ice = $A_{ice} := \left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir\right) = 16.84 \cdot in$

Wind Area with Extreme Ice = $A_{ice.ex} := \left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir_{ex}\right) = 17.84 \cdot in$

Ice Area per Liner Ft = $Ai_{coax} := \frac{\pi}{4} \cdot \left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^{\ 2}\right] = 0.027\, ft^2$

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 54.538 \cdot plf$

Extreme Ice Area per Liner Ft = $Ai_{coax.ex} := \frac{\pi}{4} \cdot \left[\left(D_{coax} + 2 \cdot Ir_{ex}\right)^2 - D_{coax}^{\ 2}\right] = 0.065\, ft^2$

Weight of Extreme Ice on All Coax Cables = $W_{ice.ex} := Ai_{coax.ex} \cdot Id \cdot N_{coax} = 131.067 \cdot plf$

Heavy Wind Vertical Load =

$$Heavy\_WInd_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax} + W_{ice}\right) \cdot Coax_{Span} \cdot OF_{HWV}\right]}$$

Heavy Wind Transverse Load =

$$Heavy\_Wind_{Trans} := \overrightarrow{\left(p \cdot A_{ice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HWT}\right)}$$

$$Heavy\_WInd_{Vert} = \begin{pmatrix} 1380 \\ 1380 \\ 1380 \\ 1380 \\ 1380 \\ 1380 \\ 1380 \\ 1380 \end{pmatrix} lb \qquad Heavy\_Wind_{Trans} = \begin{pmatrix} 225 \\ 225 \\ 225 \\ 225 \\ 225 \\ 225 \\ 225 \\ 225 \end{pmatrix} lb$$

Extreme Wind Vertical Load =

$$Extreme\_Wind_{Vert} := \overrightarrow{\left(N_{coax} \cdot W_{coax} \cdot Coax_{Span} \cdot OF_{EWV}\right)}$$

Extreme Wind Transverse Load =

$$Extreme\_Wind_{Trans} := \overrightarrow{\left[\left(qz \cdot A \cdot Cd_{coax}\right) \cdot Coax_{Span} \cdot OF_{EWT}\right]}$$

$$Extreme\_Wind_{Vert} = \begin{pmatrix} 374 \\ 374 \\ 374 \\ 374 \\ 374 \\ 374 \\ 374 \\ 374 \end{pmatrix} lb \qquad Extreme\_Wind_{Trans} = \begin{pmatrix} 668 \\ 668 \\ 668 \\ 668 \\ 668 \\ 668 \\ 668 \\ 668 \end{pmatrix} ft^2$$

Extreme Ice w/ Wind Vertical Load =

$$Extreme\_Ice_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax} + W_{ice.ex}\right) \cdot Coax_{Span} \cdot OF_{EIV}\right]}$$

Extreme Ice w/ Wind Transverse Load =

$$Extreme\_Ice_{Trans} := \overrightarrow{\left(p_{ex} \cdot A_{ice.ex} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{EIT}\right)}$$

$$Extreme\_Ice_{Vert} = \begin{pmatrix} 1685 \\ 1685 \\ 1685 \\ 1685 \\ 1685 \\ 1685 \\ 1685 \\ 1685 \end{pmatrix} lb \qquad Extreme\_Ice_{Trans} = \begin{pmatrix} 95 \\ 95 \\ 95 \\ 95 \\ 95 \\ 95 \\ 95 \\ 95 \end{pmatrix} lb$$

Centek Engineering Inc, Project: "cl&p structure # 11229"
PLS-POLE Version 12.50, 1:26:41 PM Monday, April 02, 2018
Undeformed geometry displayed

Project Name : 17010.09 - Waterbury, CT
Project Notes: CL&P # 11229/ AT&T CT2901
Project File : J:\Jobs\1701000.WI\09_Waterbury North CT2901\04_Structural\Backup Documentation\Calcs\Rev (4)\PLS-Pole\cl&p structure # 11229.pol
Date run : 1:25:55 PM Monday, April 02, 2018
by : PLS-POLE Version 12.50
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.

Loads from file: j:\jobs\1701000.wi\09_waterbury north ct2901\04_structural\backup documentation\calcs\rev (4)\pls-pole\cl&p #11229.lca

*** Analysis Results:

Maximum element usage is 85.86% for Steel Pole "11229" in load case "NESC Extreme"
Maximum insulator usage is 41.06% for Clamp "Clamp 14" in load case "NESC Extreme"

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kips)	Tran. Force (kips)	Vert. Force (kips)	Shear Force (kips)	Tran. Moment (ft-k)	Long. Moment (ft-k)	Bending Moment (ft-k)	Vert. Moment (ft-k)	Found. Usage %
NESC Heavy	11229:g	-0.04	19.24	-58.08	19.24	-1465.90	10.96	1465.94	0.35	0.00
NESC Extreme	11229:g	-0.04	26.73	-29.26	26.73	-2167.71	40.31	2168.08	-0.01	0.00
NESC Extreme Ice w/ Wind	11229:g	-0.01	13.13	-52.93	13.13	-1002.64	5.27	1002.65	0.19	0.00

Summary of Tip Deflections For All Load Cases:

Note: postive tip load results in positive deflection

Load Case	Joint Label	Long. Defl. (in)	Tran. Defl. (in)	Vert. Defl. (in)	Resultant Defl. (in)	Long. Rot. (deg)	Tran. Rot. (deg)	Twist (deg)
NESC Heavy	11229:t	-0.31	-27.96	-0.57	27.97	-0.03	3.03	-0.00
NESC Extreme	11229:t	-1.09	-45.40	-1.51	45.44	-0.11	5.32	0.00
NESC Extreme Ice w/ Wind	11229:t	-0.14	-19.06	-0.28	19.07	-0.01	2.04	-0.00

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
11229	1	4692	NESC Extreme	85.86	1254.94
11229	2	5027	NESC Extreme	76.60	1621.34

*** Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
11229	85.86	NESC Extreme	18	11163.8

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Davit1	14.28	NESC Extreme Ice w/ Wind	1	52.8
Davit2	20.25	NESC Heavy	1	256.6
Davit3	20.39	NESC Heavy	1	256.6
Davit4	20.54	NESC Heavy	1	256.6

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	56.09	11229	Steel Pole
NESC Extreme	85.86	11229	Steel Pole
NESC Extreme Ice w/ Wind	39.18	11229	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	56.09	11229	18
NESC Extreme	85.86	11229	18
NESC Extreme Ice w/ Wind	39.18	11229	18

Summary of Base Plate Usages by Load Case:

Load Case	Pole Label	Bend Line #	Length (in)	Vertical Load (kips)	X Moment (ft-k)	Y Moment (ft-k)	Bending Stress (ksi)	Bolt Moment Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC Heavy	11229	6	27.000	56.638	-1465.899	10.964	16.083	30.532	1	126.558	1.119	24.74
NESC Extreme	11229	6	27.000	27.818	-2167.707	40.315	23.190	44.025	1	182.487	1.344	35.68
NESC Extreme Ice w/ Wind	11229	6	27.000	51.482	-1002.641	5.270	11.135	21.139	1	87.624	0.931	17.13

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	20.54	Davit4	1
NESC Extreme	11.32	Davit4	1
NESC Extreme Ice w/ Wind	18.94	Davit4	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp 1	Clamp	2.69	NESC Heavy	0.0
Clamp 2	Clamp	6.13	NESC Heavy	0.0

Clamp 3	Clamp	6.13	NESC Heavy	0.0
Clamp 4	Clamp	6.13	NESC Heavy	0.0
Clamp 5	Clamp	1.69	NESC Extreme Ice w/ Wind	0.0
Clamp 6	Clamp	1.69	NESC Extreme Ice w/ Wind	0.0
Clamp 7	Clamp	1.69	NESC Extreme Ice w/ Wind	0.0
Clamp 8	Clamp	1.69	NESC Extreme Ice w/ Wind	0.0
Clamp 9	Clamp	1.69	NESC Extreme Ice w/ Wind	0.0
Clamp 10	Clamp	1.69	NESC Extreme Ice w/ Wind	0.0
Clamp 11	Clamp	1.69	NESC Extreme Ice w/ Wind	0.0
Clamp 12	Clamp	1.69	NESC Extreme Ice w/ Wind	0.0
Clamp 13	Clamp	32.87	NESC Extreme	0.0
Clamp 14	Clamp	41.06	NESC Extreme	0.0
Clamp 15	Clamp	17.11	NESC Heavy	0.0
Clamp 16	Clamp	41.06	NESC Extreme	0.0
Clamp 17	Clamp	32.71	NESC Extreme	0.0

*** Weight of structure (lbs):

Weight of Tubular Davit Arms:	822.7
Weight of Steel Poles:	11163.8
Total:	11986.5

*** End of Report

```
****************************************************************************
*                                                                          *
*                                 PLS-POLE                                 *
*                     POLE AND FRAME ANALYSIS AND DESIGN                   *
*                Copyright Power Line Systems, Inc. 1999-2011              *
*                                                                          *
****************************************************************************
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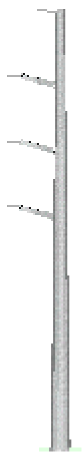
Project Name : 17010.09 - Waterbury, CT
Project Notes: CL&P # 11229/ AT&T CT2901
Project File : J:\Jobs\1701000.WI\09_Waterbury North CT2901\04_Structural\Backup Documentation\Calcs\Rev (4)\PLS-Pole\cl&p structure # 11229.pol
Date run   : 1:25:54 PM Monday, April 02, 2018
by   : PLS-POLE Version 12.50
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.



Modeling options:
  Offset Arms from Pole/Mast: Yes
  Offset Braces from Pole/Mast: Yes
  Offset Guys from Pole/Mast: Yes
  Offset Posts from Pole/Mast: Yes
  Offset Strains from Pole/Mast: Yes
  Use Alternate Convergence Process: No
  Steel poles checked with ASCE/SEI 48-05

Default Modulus of Elasticity for Steel = 29000.00 (ksi)
Default Weight Density for Steel = 490.00 (lbs/ft^3)

Steel Pole Properties:

Steel Pole Property	Stock Number	Length	Default Embedded	Base Plate	Shape	Tip Diameter	Base Diameter	Taper	Default Drag	Tubes	Modulus of Elasticity	Weight Density	Shape At	Strength Check	Distance From	Ultimate	Ultimate

Label		(ft)	Length (ft)			(in)	(in)	(in/ft)	Coef.		Override (ksi)	Override (lbs/ft^3)	Base	Type	Tip (ft)	Trans. Load (kips)	Long. Load (kips)
CL&P11229	11229	80.00	0	Yes	12F	19.06	42.46	0	1.3	2 tubes	0	0		Calculated	0.000	0.0000	0.0000

Steel Tubes Properties:

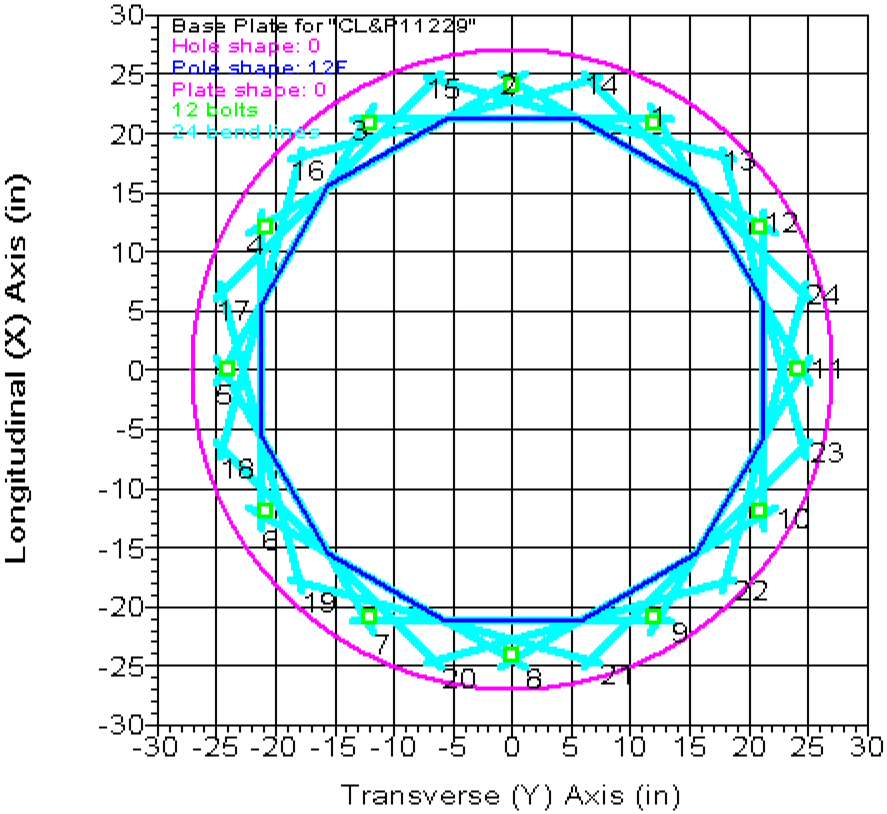
Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)	Actual Overlap (ft)
CL&P11229	1	51.75	0.3125	4.750	0.000	0.000	65.000	0.000	4692	28.40	0.30031	19.06	34.60	4.247	4.750
CL&P11229	2	33	0.375	0.000	0.000	0.000	65.000	0.000	5027	17.23	0.30031	32.55	42.46	0.000	0.000

Base Plate Properties:

Pole Property	Plate Diam. (in)	Plate Shape	Plate Thick. (in)	Plate Weight (lbs)	Bend Line Length Override (in)	Hole Diam. (in)	Hole Shape	Steel Density (lbs/ft^3)	Steel Yield Stress (ksi)	Bolt Diam. (in)	Bolt Pattern Diam. (in)	Num. Of Bolts	Bolt Cage X Inertia (in^4)	Bolt Cage Y Inertia (in^4)
CL&P11229	54.250	0	2.250	1444	27.000	0.000	0	490.00	65.000	2.250	48.250	12	13849.21	13849.21

Base Plate Bolt Coordinates for Property "CL&P11229":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0	1	0
0.4974	0.8653	0
0.8653	0.4974	0
1	0	0



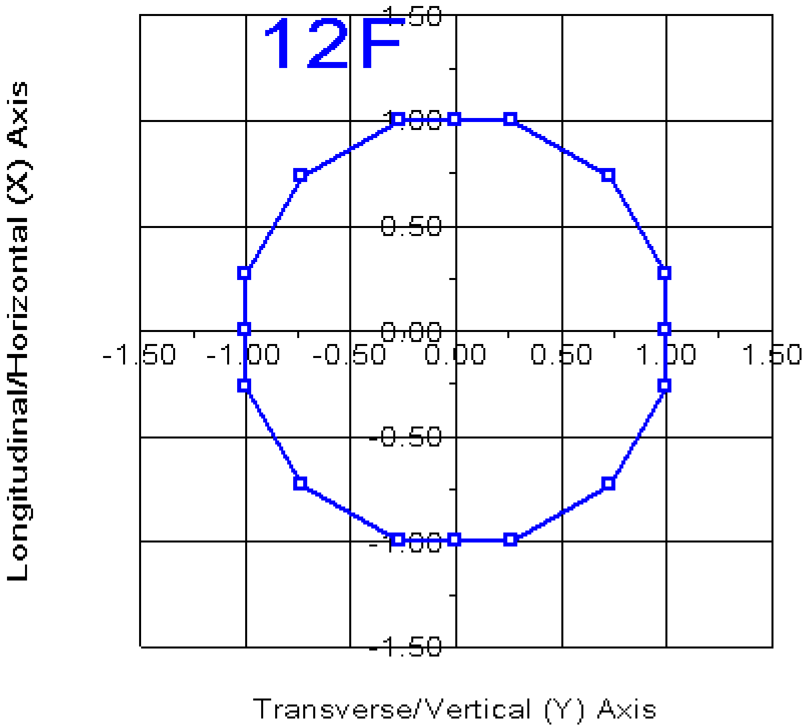
Steel Pole Connectivity:

Pole Label	Tip Joint	Base Joint	X of Base (ft)	Y of Base (ft)	Z of Base (ft)	Inclin. About X (deg)	Inclin. About Y (deg)	Property Set	Attach. Labels	Base Connect	Embed % Override	Embed C. Override (ft)
11229			0	0	0	0	0	CL&P11229	17 labels		0.00	0

Relative Attachment Labels for Steel Pole "11229":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
11229:Arm1	0.00	79.25
11229:Arm2	0.00	66.25
11229:Arm3	0.00	54.25
11229:Arm4	0.00	42.25
11229:WVGD1	0.00	5.00

11229:WVGD2	0.00	15.00
11229:WVGD3	0.00	25.00
11229:WVGD4	0.00	35.00
11229:WVGD5	0.00	45.00
11229:WVGD6	0.00	55.00
11229:WVGD7	0.00	65.00
11229:WVGD8	0.00	76.00
11229:TopConn	0.00	77.50
11229:BotConT	0.00	50.50
11229:BotConn	0.00	50.00
11229:BotConB	0.00	49.50
11229:conn	0.00	60.00



Pole Steel Properties:

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	T-Moment Inertia (in^4)	L-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	T-Moment Capacity (ft-k)	L-Moment Capacity (ft-k)
11229	11229:t	11229:t Ori	0.00	19.06	18.84	847.64	847.64	0.00	13.7	65.00	65.00	481.78	481.78
11229	11229:Arm1	11229:Arm1 End	0.75	19.29	19.06	878.56	878.56	0.00	13.9	65.00	65.00	493.52	493.52
11229	11229:Arm1	11229:Arm1 Ori	0.75	19.29	19.06	878.56	878.56	0.00	13.9	65.00	65.00	493.52	493.52
11229	11229:TopConn	11229:TopConn End	2.50	19.81	19.59	953.59	953.59	0.00	14.3	65.00	65.00	521.46	521.46
11229	11229:TopConn	11229:TopConn Ori	2.50	19.81	19.59	953.59	953.59	0.00	14.3	65.00	65.00	521.46	521.46

11229	11229:WVGD8	11229:WVGD8	End	4.00	20.26	20.04	1021.21	1021.21	0.00	14.7	65.00	65.00	546.02	546.02
11229	11229:WVGD8	11229:WVGD8	Ori	4.00	20.26	20.04	1021.21	1021.21	0.00	14.7	65.00	65.00	546.02	546.02
11229	#11229:0	Tube 1	End	8.88	21.73	21.52	1262.91	1262.91	0.00	15.9	65.00	65.00	629.75	629.75
11229	#11229:0	Tube 1	Ori	8.88	21.73	21.52	1262.91	1262.91	0.00	15.9	65.00	65.00	629.75	629.75
11229	11229:Arm2	11229:Arm2	End	13.75	23.19	22.99	1540.03	1540.03	0.00	17.2	65.00	65.00	719.45	719.45
11229	11229:Arm2	11229:Arm2	Ori	13.75	23.19	22.99	1540.03	1540.03	0.00	17.2	65.00	65.00	719.45	719.45
11229	11229:WVGD7	11229:WVGD7	End	15.00	23.56	23.36	1617.08	1617.08	0.00	17.5	65.00	65.00	743.42	743.42
11229	11229:WVGD7	11229:WVGD7	Ori	15.00	23.56	23.36	1617.09	1617.09	0.00	17.5	65.00	65.00	743.42	743.42
11229	11229:conn	11229:conn	End	20.00	25.07	24.87	1950.99	1950.99	0.00	18.8	65.00	65.00	843.19	843.19
11229	11229:conn	11229:conn	Ori	20.00	25.07	24.87	1950.99	1950.99	0.00	18.8	65.00	65.00	843.19	843.19
11229	11229:WVGD6	11229:WVGD6	End	25.00	26.57	26.38	2327.97	2327.97	0.00	20.1	65.00	65.00	949.25	949.25
11229	11229:WVGD6	11229:WVGD6	Ori	25.00	26.57	26.38	2327.97	2327.97	0.00	20.1	65.00	65.00	949.25	949.25
11229	11229:Arm3	11229:Arm3	End	25.75	26.79	26.61	2388.39	2388.39	0.00	20.3	65.00	65.00	965.70	965.70
11229	11229:Arm3	11229:Arm3	Ori	25.75	26.79	26.61	2388.39	2388.39	0.00	20.3	65.00	65.00	965.70	965.70
11229	11229:BotConT	11229:BotConT	End	29.50	27.92	27.74	2706.22	2706.22	0.00	21.3	65.00	65.00	1050.08	1050.08
11229	11229:BotConT	11229:BotConT	Ori	29.50	27.92	27.74	2706.22	2706.22	0.00	21.3	65.00	65.00	1050.08	1050.08
11229	11229:BotConn	11229:BotConn	End	30.00	28.07	27.89	2750.62	2750.62	0.00	21.4	65.00	65.00	1061.60	1061.60
11229	11229:BotConn	11229:BotConn	Ori	30.00	28.07	27.89	2750.62	2750.62	0.00	21.4	65.00	65.00	1061.60	1061.60
11229	11229:BotConB	11229:BotConB	End	30.50	28.22	28.04	2795.50	2795.50	0.00	21.5	65.00	65.00	1073.18	1073.18
11229	11229:BotConB	11229:BotConB	Ori	30.50	28.22	28.04	2795.50	2795.50	0.00	21.5	65.00	65.00	1073.18	1073.18
11229	11229:WVGD5	11229:WVGD5	End	35.00	29.57	29.40	3221.56	3221.56	0.00	22.7	65.00	65.00	1180.22	1180.22
11229	11229:WVGD5	11229:WVGD5	Ori	35.00	29.57	29.40	3221.56	3221.56	0.00	22.7	65.00	65.00	1180.22	1180.22
11229	11229:Arm4	11229:Arm4	End	37.75	30.40	30.23	3502.11	3502.11	0.00	23.4	65.00	65.00	1248.14	1248.14
11229	11229:Arm4	11229:Arm4	Ori	37.75	30.40	30.23	3502.11	3502.11	0.00	23.4	65.00	65.00	1248.14	1248.14
11229	#11229:1	Tube 1	End	41.38	31.49	31.32	3896.19	3896.19	0.00	24.3	65.00	65.00	1340.58	1340.58
11229	#11229:1	Tube 1	Ori	41.38	31.49	31.32	3896.19	3896.19	0.00	24.3	65.00	65.00	1340.58	1340.58
11229	11229:WVGD4	11229:WVGD4	End	45.00	32.57	32.42	4318.78	4318.78	0.00	25.3	65.00	65.00	1436.32	1436.32
11229	11229:WVGD4	11229:WVGD4	Ori	45.00	32.57	32.42	4318.78	4318.78	0.00	25.3	65.00	65.00	1436.32	1436.32
11229	#11229:2	SpliceT	End	47.00	33.17	33.02	4564.49	4564.49	0.00	25.8	65.00	65.00	1490.55	1490.55
11229	#11229:2	SpliceT	Ori	47.00	33.17	33.02	4564.50	4564.50	0.00	25.8	65.00	65.00	1490.55	1490.55
11229	#11229:3	SpliceB	End	51.75	33.98	40.52	5855.48	5855.48	0.00	21.6	65.00	65.00	1867.02	1867.02
11229	#11229:3	SpliceB	Ori	51.75	33.98	40.52	5855.48	5855.48	0.00	21.6	65.00	65.00	1867.02	1867.02
11229	11229:WVGD3	11229:WVGD3	End	55.00	34.95	41.69	6380.65	6380.65	0.00	22.3	65.00	65.00	1977.66	1977.66
11229	11229:WVGD3	11229:WVGD3	Ori	55.00	34.95	41.69	6380.65	6380.65	0.00	22.3	65.00	65.00	1977.66	1977.66
11229	#11229:4	Tube 2	End	60.00	36.45	43.50	7248.47	7248.47	0.00	23.4	65.00	65.00	2154.10	2154.10
11229	#11229:4	Tube 2	Ori	60.00	36.45	43.50	7248.47	7248.47	0.00	23.4	65.00	65.00	2154.10	2154.10
11229	11229:WVGD2	11229:WVGD2	End	65.00	37.96	45.31	8191.62	8191.62	0.00	24.4	65.00	65.00	2338.08	2338.08
11229	11229:WVGD2	11229:WVGD2	Ori	65.00	37.96	45.31	8191.62	8191.62	0.00	24.4	65.00	65.00	2338.08	2338.08
11229	#11229:5	Tube 2	End	70.00	39.46	47.12	9213.22	9213.22	0.00	25.5	65.00	65.00	2529.59	2529.59
11229	#11229:5	Tube 2	Ori	70.00	39.46	47.12	9213.22	9213.22	0.00	25.5	65.00	65.00	2529.59	2529.59
11229	11229:WVGD1	11229:WVGD1	End	75.00	40.96	48.93	10316.42	10316.42	0.00	26.6	65.00	65.00	2728.64	2728.64
11229	11229:WVGD1	11229:WVGD1	Ori	75.00	40.96	48.93	10316.42	10316.42	0.00	26.6	65.00	65.00	2728.64	2728.64
11229	11229:g	11229:g	End	80.00	42.46	50.74	11504.34	11504.34	0.00	27.7	65.00	65.00	2935.24	2935.24

Tubular Davit Properties:

Davit Property Label	Stock Number	Steel Shape	Thickness (in)	Base Diameter or Depth (in)	Tip Diameter or Depth (in)	Taper (in/ft)	Drag Coef.	Modulus of Elasticity (ksi)	Geometry	Strength Check Type	Vertical Capacity (lbs)	Tension Capacity (lbs)	Compres. Capacity (lbs)	Long. Capacity (lbs)	Yield Stress (ksi)	Weight Density (lbs/ft^3)	Steel Shape Override At End
ARM-09	J120328001	6T	0.1875	8	5	0	1.3	29000	1 point	Calculated	0	0	0	0	65	0	

ARM-10	J120328001	6T	0.25	14	6	0	1.3	29000	2 points	Calculated	0	0	0	0	65

0

Intermediate Joints for Davit Property "ARM-09":

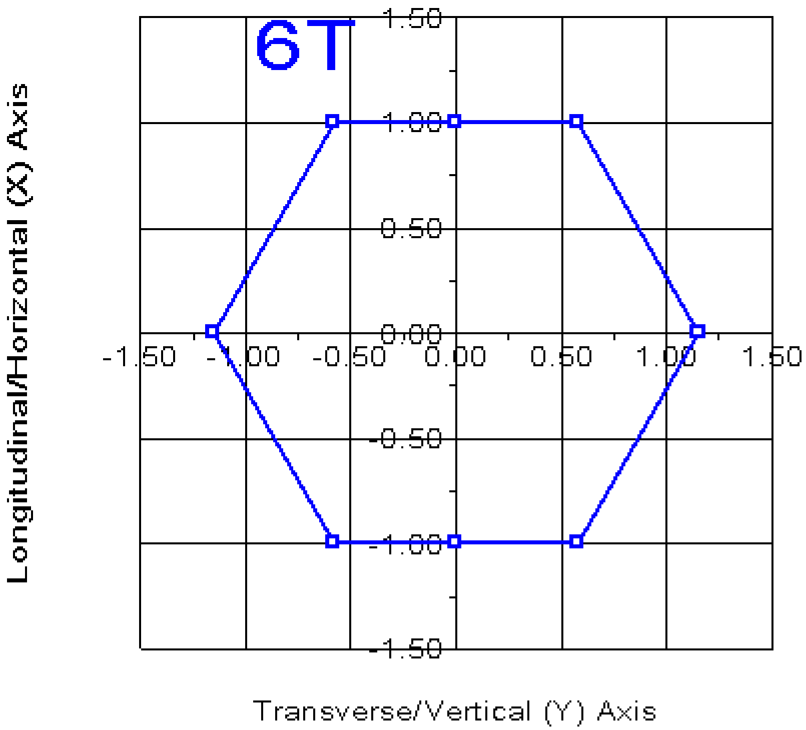
Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	3.75	-0.5

Intermediate Joints for Davit Property "ARM-10":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
Mid	6.08	-1.5
End	8.75	-1.5

Tubular Davit Arm Connectivity:

Davit Label	Attach Label	Davit Property Set	Azimuth (deg)
Davit1	11229:Arm1	ARM-09	180
Davit2	11229:Arm2	ARM-10	180
Davit3	11229:Arm3	ARM-10	180
Davit4	11229:Arm4	ARM-10	180



Tubular Davit Arm Steel Properties:

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	V-Moment Inertia (in^4)	H-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	V-Moment Capacity (ft-k)	H-Moment Capacity (ft-k)
Davit1	Davit1:O	Origin	0.00	8.00	5.07	43.04	43.04	0.00	18.9	65.00	65.00	50.47	58.28
Davit1	Davit1:End	End	3.78	5.00	3.13	10.07	10.07	0.00	9.6	65.00	65.00	18.89	21.82
Davit2	Davit2:O	Origin	0.00	14.00	11.91	312.77	312.77	0.00	26.6	65.00	65.00	209.60	242.03
Davit2	#Davit2:0	End	3.13	11.20	9.48	157.81	157.81	0.00	20.1	65.00	65.00	132.24	152.70
Davit2	#Davit2:0	Origin	3.13	11.20	9.48	157.81	157.81	0.00	20.1	65.00	65.00	132.24	152.70
Davit2	Davit2:Mid	End	6.26	8.39	7.05	64.96	64.96	0.00	13.6	65.00	65.00	72.63	83.87
Davit2	Davit2:Mid	Origin	6.26	8.39	7.05	64.96	64.96	0.00	13.6	65.00	65.00	72.63	83.87
Davit2	Davit2:End	End	8.93	6.00	4.98	22.91	22.91	0.00	8.1	65.00	65.00	35.82	41.36
Davit3	Davit3:O	Origin	0.00	14.00	11.91	312.77	312.77	0.00	26.6	65.00	65.00	209.60	242.03
Davit3	#Davit3:0	End	3.13	11.20	9.48	157.81	157.81	0.00	20.1	65.00	65.00	132.24	152.70
Davit3	#Davit3:0	Origin	3.13	11.20	9.48	157.81	157.81	0.00	20.1	65.00	65.00	132.24	152.70
Davit3	Davit3:Mid	End	6.26	8.39	7.05	64.96	64.96	0.00	13.6	65.00	65.00	72.63	83.87
Davit3	Davit3:Mid	Origin	6.26	8.39	7.05	64.96	64.96	0.00	13.6	65.00	65.00	72.63	83.87
Davit3	Davit3:End	End	8.93	6.00	4.98	22.91	22.91	0.00	8.1	65.00	65.00	35.82	41.36

Davit4	Davit4:O	Origin	0.00	14.00	11.91	312.77	312.77	0.00	26.6	65.00	65.00	209.60	242.03
Davit4	#Davit4:0	End	3.13	11.20	9.48	157.81	157.81	0.00	20.1	65.00	65.00	132.24	152.70
Davit4	#Davit4:0	Origin	3.13	11.20	9.48	157.81	157.81	0.00	20.1	65.00	65.00	132.24	152.70
Davit4	Davit4:Mid	End	6.26	8.39	7.05	64.96	64.96	0.00	13.6	65.00	65.00	72.63	83.87
Davit4	Davit4:Mid	Origin	6.26	8.39	7.05	64.96	64.96	0.00	13.6	65.00	65.00	72.63	83.87
Davit4	Davit4:End	End	8.93	6.00	4.98	22.91	22.91	0.00	8.1	65.00	65.00	35.82	41.36

*** Insulator Data

Clamp Properties:

Label	Stock Number	Holding Capacity (lbs)
clamp2	clamp2	1e+005

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)
Clamp 1	Davit1:End	clamp2	No Limit
Clamp 2	Davit2:End	clamp2	No Limit
Clamp 3	Davit3:End	clamp2	No Limit
Clamp 4	Davit4:End	clamp2	No Limit
Clamp 5	11229:WVGD1	clamp2	No Limit
Clamp 6	11229:WVGD2	clamp2	No Limit
Clamp 7	11229:WVGD3	clamp2	No Limit
Clamp 8	11229:WVGD4	clamp2	No Limit
Clamp 9	11229:WVGD5	clamp2	No Limit
Clamp 10	11229:WVGD6	clamp2	No Limit
Clamp 11	11229:WVGD7	clamp2	No Limit
Clamp 12	11229:WVGD8	clamp2	No Limit
Clamp 13	11229:TopConn	clamp2	No Limit
Clamp 14	11229:BotConT	clamp2	No Limit
Clamp 15	11229:BotConn	clamp2	No Limit
Clamp 16	11229:BotConB	clamp2	No Limit
Clamp 17	11229:conn	clamp2	No Limit

*** Loads Data

Loads from file: j:\jobs\1701000.wi\09_waterbury north ct2901\04_structural\backup documentation\calcs\rev (4)\pls-pole\cl&p #11229.lca

Insulator dead and wind loads are already included in the point loads printed below.

Loading Method Parameters:

Structure Height Summary (used for calculating wind/ice adjust with height):

Z of ground for wind height adjust	0.00 (ft)	and structure Z coordinate that will be put on the centerline ground profile in PLS-CADD.
Ground elevation shift	0.00 (ft)	
Z of ground with shift	0.00 (ft)	
Z of structure top (highest joint)	80.00 (ft)	
Structure height	80.00 (ft)	
Structure height above ground	80.00 (ft)	

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Area Factor	SF for Steel Poles Tubular Arms and Towers	SF for Wood Poles	SF for Conc. Ult.	SF for Conc. First Crack	SF for Conc. Zero Tens.	SF for Guys and Cables	SF for Non Tubular Arms	SF for Braces	SF for Insuls.	SF For Found.	Point Loads	Wind/Ice Model	Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)	Ice Thick. (in)	Ice Density (lbs/ft^3)	Temperature (deg F)	Pole Deflection Check	Pole Deflection Limit % or (ft)
NESC Heavy	1.5000	2.5000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	17 loads	Wind on All	4	0	0.000	0.000	0.0	No Limit	0
NESC Extreme	1.0000	1.0000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	17 loads	NESC 2012	31	0	0.000	0.000	0.0	No Limit	0
NESC Extreme Ice w/ Wind	1.0000	1.0000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	17 loads	Wind on All	4	0	0.000	0.000	0.0	No Limit	0

Point Loads for Load Case "NESC Heavy":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	1183	-2417	-3	Shield Wire
Davit2:End	3984	-4665	-9	Conductor
Davit3:End	3984	-4662	-10	Conductor
Davit4:End	3984	-4660	-10	Conductor
11229:WVGD1	1380	-225	0	Coax Cables
11229:WVGD2	1380	-225	0	Coax Cables
11229:WVGD3	1380	-225	0	Coax Cables
11229:WVGD4	1380	-225	0	Coax Cables
11229:WVGD5	1380	-225	0	Coax Cables
11229:WVGD6	1380	-225	0	Coax Cables
11229:WVGD7	1380	-225	0	Coax Cables
11229:WVGD8	1380	-225	0	Coax Cables
11229:TopConn	0	-8920	0	Top Connection
11229:conn	0	8814	0	Mid Connection

11229:BotConT	0	0	-11106	Bottom Connection
11229:BotConn	16727	-3602	0	Bottom Connection
11229:BotConB	0	0	11106	Bottom Connection

Point Loads for Load Case "NESC Extreme":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	420	-1706	4	Shield Wire
Davit2:End	1980	-4222	3	Conductor
Davit3:End	1980	-4167	3	Conductor
Davit4:End	1980	-4103	4	Conductor
11229:WVGD1	374	-668	0	Coax Cables
11229:WVGD2	374	-668	0	Coax Cables
11229:WVGD3	374	-668	0	Coax Cables
11229:WVGD4	374	-668	0	Coax Cables
11229:WVGD5	374	-668	0	Coax Cables
11229:WVGD6	374	-668	0	Coax Cables
11229:WVGD7	374	-668	0	Coax Cables
11229:WVGD8	374	-668	0	Coax Cables
11229:TopConn	0	-32865	0	Top Connection
11229:conn	0	32711	0	Mid Connection
11229:BotConT	0	0	-41060	Bottom Connection
11229:BotConn	8200	-13299	0	Bottom Connection
11229:BotConB	0	0	41060	Bottom Connection

Detailed Pole Loading Data for Load Case "NESC Extreme":

Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

Pole Label	Top Joint	Bottom Joint	Section Top Z (ft)	Section Bottom Z (ft)	Section Average Elevation (ft)	Outer Diameter (in)	Reynolds Number	Drag Coef.	Adjusted Wind Pressure (psf)	Adjusted Ice Thickness (in)	Pole Vert. Load (lbs)	Pole Wind Load (lbs)	Pole Ice Vertical Load (lbs)	Pole Ice Wind Load (lbs)	Tran. Wind Load (lbs)	Long. Wind Load (lbs)
11229	11229:t	11229:Arm1	80.00	79.25	79.63	19.173	1.59e+006	1.000	30.56	0.00	48.36	36.62	0.00	0.00	36.62	0.00
11229	11229:Arm1	11229:TopConn	79.25	77.50	78.38	19.548	1.62e+006	1.000	30.56	0.00	115.10	87.11	0.00	0.00	87.11	0.00
11229	11229:TopConn	11229:WVGD8	77.50	76.00	76.75	20.036	1.66e+006	1.000	30.56	0.00	101.16	76.53	0.00	0.00	76.53	0.00
11229	11229:WVGD8		76.00	71.13	73.56	20.993	1.74e+006	1.000	30.56	0.00	344.71	260.60	0.00	0.00	260.60	0.00
11229		11229:Arm2	71.13	66.25	68.69	22.457	1.86e+006	1.000	30.56	0.00	369.12	278.77	0.00	0.00	278.77	0.00
11229	11229:Arm2	11229:WVGD7	66.25	65.00	65.63	23.377	1.93e+006	1.000	30.56	0.00	98.58	74.41	0.00	0.00	74.41	0.00
11229	11229:WVGD7	11229:conn	65.00	60.00	62.50	24.315	2.01e+006	1.000	30.56	0.00	410.35	309.58	0.00	0.00	309.58	0.00
11229	11229:conn	11229:WVGD6	60.00	55.00	57.50	25.817	2.14e+006	1.000	30.56	0.00	436.02	328.69	0.00	0.00	328.69	0.00
11229	11229:WVGD6	11229:Arm3	55.00	54.25	54.63	26.680	2.21e+006	1.000	30.56	0.00	67.62	50.95	0.00	0.00	50.95	0.00
11229	11229:Arm3	11229:BotConT	54.25	50.50	52.38	27.356	2.26e+006	1.000	30.56	0.00	346.75	261.22	0.00	0.00	261.22	0.00
11229	11229:BotConT	11229:BotConn	50.50	50.00	50.25	27.994	2.32e+006	1.000	30.56	0.00	47.32	35.64	0.00	0.00	35.64	0.00
11229	11229:BotConn	11229:BotConB	50.00	49.50	49.75	28.144	2.33e+006	1.000	30.56	0.00	47.58	35.83	0.00	0.00	35.83	0.00
11229	11229:BotConB	11229:WVGD5	49.50	45.00	47.25	28.895	2.39e+006	1.000	30.56	0.00	439.78	331.10	0.00	0.00	331.10	0.00
11229	11229:WVGD5	11229:Arm4	45.00	42.25	43.63	29.984	2.48e+006	1.000	30.56	0.00	278.99	209.96	0.00	0.00	209.96	0.00
11229	11229:Arm4		42.25	38.63	40.44	30.941	2.56e+006	1.000	30.56	0.00	379.62	285.60	0.00	0.00	285.60	0.00
11229		11229:WVGD4	38.63	35.00	36.81	32.030	2.65e+006	1.000	30.56	0.00	393.12	295.65	0.00	0.00	295.65	0.00
11229	11229:WVGD4		35.00	33.00	34.00	32.874	2.72e+006	1.000	30.56	0.00	222.67	167.42	0.00	0.00	167.42	0.00
11229			33.00	28.25	30.62	33.575	2.78e+006	1.000	30.56	0.00	1186.25	406.10	0.00	0.00	406.10	0.00
11229		11229:WVGD3	28.25	25.00	26.63	34.464	2.85e+006	1.000	30.56	0.00	454.57	285.21	0.00	0.00	285.21	0.00
11229	11229:WVGD3		25.00	20.00	22.50	35.703	2.95e+006	1.000	30.56	0.00	724.75	454.56	0.00	0.00	454.56	0.00
11229		11229:WVGD2	20.00	15.00	17.50	37.205	3.08e+006	1.000	30.56	0.00	755.55	473.68	0.00	0.00	473.68	0.00

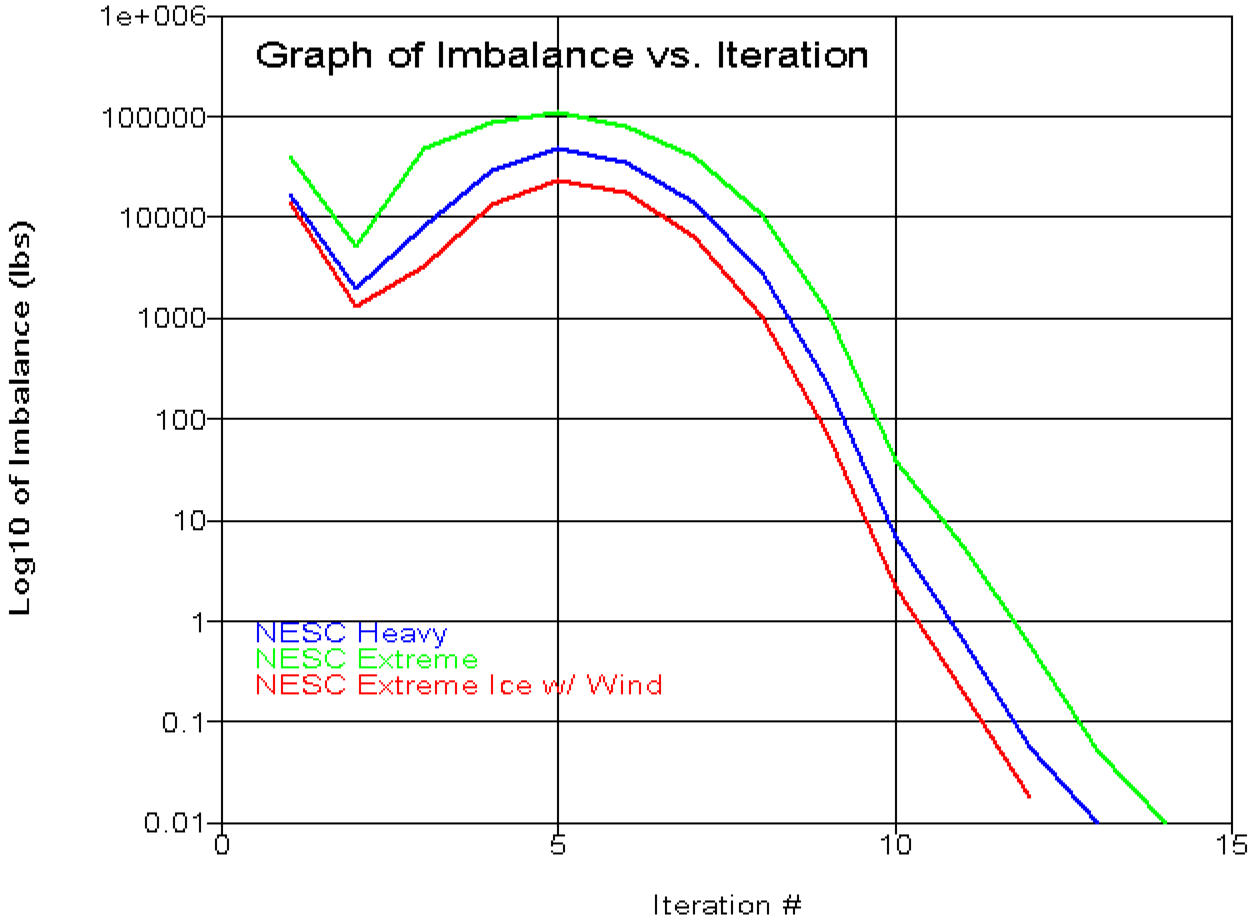
11229	11229:WVGD2		15.00	10.00	12.50	38.706	3.2e+006	1.000	30.56	0.00	786.36	492.79	0.00	0.00	492.79	0.00
11229		11229:WVGD1	10.00	5.00	7.50	40.208	3.33e+006	1.000	30.56	0.00	817.16	511.91	0.00	0.00	511.91	0.00
11229	11229:WVGD1	11229:g	5.00	0.00	2.50	41.709	3.45e+006	1.000	30.56	0.00	847.97	531.03	0.00	0.00	531.03	0.00

Point Loads for Load Case "NESC Extreme Ice w/ Wind":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	1642	-1857	-3	Shield Wire
Davit2:End	3856	-3300	-5	Conductor
Davit3:End	3856	-3298	-5	Conductor
Davit4:End	3856	-3296	-5	Conductor
11229:WVGD1	1685	-95	0	Coax Cables
11229:WVGD2	1685	-95	0	Coax Cables
11229:WVGD3	1685	-95	0	Coax Cables
11229:WVGD4	1685	-95	0	Coax Cables
11229:WVGD5	1685	-95	0	Coax Cables
11229:WVGD6	1685	-95	0	Coax Cables
11229:WVGD7	1685	-95	0	Coax Cables
11229:WVGD8	1685	-95	0	Coax Cables
11229:TopConn	0	-4018	0	Top Connection
11229:conn	0	3941	0	Mid Connection
11229:BotConT	0	0	-4967	Bottom Connection
11229:BotConn	14272	-1611	0	Bottom Connection
11229:BotConB	0	0	4967	Bottom Connection

*** Analysis Results:

Maximum element usage is 85.86% for Steel Pole "11229" in load case "NESC Extreme"
Maximum insulator usage is 41.06% for Clamp "Clamp 14" in load case "NESC Extreme"



*** Analysis Results for Load Case No. 1 "NESC Heavy" - Number of iterations in SAPS 13

Equilibrium Joint Positions and Rotations for Load Case "NESC Heavy":

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
11229:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
11229:t	-0.02553	-2.33	-0.04779	3.0260	-0.0299	-0.0014	-0.02553	-2.33	79.95
11229:Arm1	-0.02513	-2.291	-0.04674	3.0260	-0.0299	-0.0014	-0.02513	-2.291	79.2

11229:TopConn	-0.02422	-2.198	-0.0443	3.0215	-0.0299	-0.0014	-0.02422	-2.198	77.46
11229:WVGD8	-0.02343	-2.119	-0.04221	3.0132	-0.0299	-0.0014	-0.02343	-2.119	75.96
11229:Arm2	-0.01834	-1.619	-0.02931	2.8347	-0.0299	-0.0014	-0.01834	-1.619	66.22
11229:WVGD7	-0.01768	-1.557	-0.02778	2.7906	-0.0298	-0.0014	-0.01768	-1.557	64.97
11229:conn	-0.01507	-1.322	-0.02216	2.5937	-0.0298	-0.0014	-0.01507	-1.322	59.98
11229:WVGD6	-0.01247	-1.104	-0.01735	2.3894	-0.0298	-0.0014	-0.01247	-1.104	54.98
11229:Arm3	-0.01207	-1.073	-0.01669	2.3596	-0.0298	-0.0014	-0.01207	-1.073	54.23
11229:BotConT	-0.01012	-0.9237	-0.01364	2.1914	-0.0297	-0.0013	-0.01012	-0.9237	50.49
11229:BotConn	-0.009846	-0.9047	-0.01327	2.1691	-0.0296	-0.0013	-0.009846	-0.9047	49.99
11229:BotConB	-0.009571	-0.8858	-0.01289	2.1467	-0.0291	-0.0013	-0.009571	-0.8858	49.49
11229:WVGD5	-0.007467	-0.7248	-0.009822	1.9438	-0.0243	-0.0011	-0.007467	-0.7248	44.99
11229:Arm4	-0.006361	-0.6343	-0.008219	1.8188	-0.0217	-0.0010	-0.006361	-0.6343	42.24
11229:WVGD4	-0.004006	-0.4264	-0.004897	1.4576	-0.0156	-0.0007	-0.004006	-0.4264	35
11229:WVGD3	-0.001849	-0.2127	-0.002174	0.9956	-0.0094	-0.0004	-0.001849	-0.2127	25
11229:WVGD2	-0.0006081	-0.07505	-0.0008231	0.5765	-0.0049	-0.0002	-0.0006081	-0.07505	15
11229:WVGD1	-6.24e-005	-0.00833	-0.0002006	0.1848	-0.0014	-0.0001	-6.24e-005	-0.00833	5
Davit1:O	-0.02513	-2.289	-0.08916	3.0260	-0.0299	-0.0014	-0.02513	-3.093	79.16
Davit1:End	-0.02539	-2.311	-0.2927	3.1340	-0.0299	-0.0016	-0.02539	-6.865	79.46
Davit2:O	-0.01834	-1.618	-0.07709	2.8347	-0.0299	-0.0014	-0.01834	-2.584	66.17
Davit2:Mid	-0.01913	-1.687	-0.3947	3.1035	-0.0299	-0.0019	-0.01913	-8.733	67.36
Davit2:End	-0.01915	-1.683	-0.5421	3.1903	-0.0299	-0.0021	-0.01915	-11.4	67.21
Davit3:O	-0.01208	-1.072	-0.06265	2.3596	-0.0298	-0.0014	-0.01208	-2.188	54.19
Davit3:Mid	-0.0129	-1.132	-0.3294	2.6306	-0.0298	-0.0020	-0.0129	-8.328	55.42
Davit3:End	-0.01293	-1.129	-0.4549	2.7184	-0.0298	-0.0022	-0.01293	-11	55.3
Davit4:O	-0.006367	-0.6337	-0.04842	1.8188	-0.0217	-0.0010	-0.006367	-1.9	42.2
Davit4:Mid	-0.006994	-0.6816	-0.2574	2.0923	-0.0217	-0.0016	-0.006994	-8.028	43.49
Davit4:End	-0.007036	-0.6798	-0.3578	2.1811	-0.0217	-0.0018	-0.007036	-10.7	43.39

Joint Support Reactions for Load Case "NESC Heavy":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
11229:g	-0.04	0.0	19.24	0.0	0.0	-58.08	0.0	0.0	61.19	0.0	-1465.90	0.0	11.0	0.0	0.0	0.35	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC Heavy":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
11229	11229:t	Origin	0.00	-27.96	-0.31	-0.57	0.00	0.00	0.0	-0.04	0.01	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	5
11229	11229:Arm1	End	0.75	-27.49	-0.30	-0.56	0.00	-0.00	0.0	-0.04	0.01	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	2
11229	11229:Arm1	Origin	0.75	-27.49	-0.30	-0.56	-6.23	0.00	-0.0	-1.29	-2.45	0.00	-0.07	0.82	0.07	0.00	0.90	1.4	2
11229	11229:TopConn	End	2.50	-26.38	-0.29	-0.53	-10.53	0.01	-0.0	-1.29	-2.45	0.00	-0.07	1.31	0.07	0.00	1.38	2.1	2
11229	11229:TopConn	Origin	2.50	-26.38	-0.29	-0.53	-10.53	0.01	-0.0	-0.98	-11.34	0.00	-0.05	0.00	1.18	0.00	2.04	3.1	5
11229	11229:WVGD8	End	4.00	-25.43	-0.28	-0.51	-27.53	0.01	-0.0	-0.98	-11.34	0.00	-0.05	3.28	0.30	0.00	3.37	5.2	2
11229	11229:WVGD8	Origin	4.00	-25.43	-0.28	-0.51	-27.53	0.01	-0.0	-2.69	-11.58	0.00	-0.13	3.28	0.31	0.00	3.45	5.3	2
11229	Tube 1	End	8.88	-22.38	-0.25	-0.43	-83.97	0.01	-0.0	-2.69	-11.58	0.00	-0.13	8.67	0.29	0.00	8.81	13.5	2
11229	Tube 1	Origin	8.88	-22.38	-0.25	-0.43	-83.97	0.01	-0.0	-3.24	-11.49	-0.00	-0.15	8.67	0.28	0.00	8.83	13.6	2
11229	11229:Arm2	End	13.75	-19.42	-0.22	-0.35	-139.97	0.00	-0.0	-3.24	-11.49	-0.00	-0.14	12.65	0.27	0.00	12.80	19.7	2
11229	11229:Arm2	Origin	13.75	-19.42	-0.22	-0.35	-185.39	0.02	-0.1	-7.74	-16.30	0.01	-0.34	16.75	0.38	0.01	17.10	26.3	2
11229	11229:WVGD7	End	15.00	-18.69	-0.21	-0.33	-205.76	0.03	-0.1	-7.74	-16.30	0.01	-0.33	17.99	0.37	0.01	18.33	28.2	2
11229	11229:WVGD7	Origin	15.00	-18.69	-0.21	-0.33	-205.76	0.03	-0.1	-9.52	-16.51	0.01	-0.41	17.99	0.37	0.01	18.41	28.3	2
11229	11229:conn	End	20.00	-15.86	-0.18	-0.27	-288.30	0.06	-0.1	-9.52	-16.51	0.01	-0.38	22.23	0.35	0.00	22.62	34.8	2
11229	11229:conn	Origin	20.00	-15.86	-0.18	-0.27	-288.30	0.06	-0.1	-10.60	-7.56	0.00	-0.43	22.23	0.16	0.00	22.65	34.9	2
11229	11229:WVGD6	End	25.00	-13.25	-0.15	-0.21	-326.10	0.07	-0.1	-10.60	-7.56	0.00	-0.40	22.33	0.15	0.00	22.73	35.0	2

11229	11229:WVGD6	Origin	25.00	-13.25	-0.15	-0.21	-326.10	0.07	-0.1	-12.36	-7.76	0.00	-0.47	22.33	0.16	0.00	22.80	35.1	2
11229	11229:Arm3	End	25.75	-12.87	-0.14	-0.20	-331.92	0.07	-0.1	-12.36	-7.76	0.00	-0.46	22.34	0.15	0.00	22.81	35.1	2
11229	11229:Arm3	Origin	25.75	-12.87	-0.14	-0.20	-378.30	0.09	-0.2	-16.86	-12.51	0.01	-0.63	25.46	0.25	0.01	26.10	40.2	2
11229	11229:BotConT	End	29.50	-11.08	-0.12	-0.16	-425.22	0.13	-0.2	-16.86	-12.51	0.01	-0.61	26.32	0.24	0.01	26.93	41.4	2
11229	11229:BotConT	Origin	29.50	-11.08	-0.12	-0.16	-425.22	0.13	-0.3	-17.17	-12.43	11.12	-0.62	26.32	0.82	0.01	26.98	41.5	2
11229	11229:BotConn	End	30.00	-10.86	-0.12	-0.16	-431.43	5.69	-0.3	-17.17	-12.43	11.12	-0.62	26.51	0.82	0.01	27.16	41.8	2
11229	11229:BotConn	Origin	30.00	-10.86	-0.12	-0.16	-431.43	5.69	-0.3	-33.83	-16.64	11.13	-1.21	26.51	0.85	0.01	27.76	42.7	2
11229	11229:BotConB	End	30.50	-10.63	-0.11	-0.15	-439.75	11.25	-0.3	-33.83	-16.64	11.13	-1.21	26.82	0.84	0.01	28.06	43.2	2
11229	11229:BotConB	Origin	30.50	-10.63	-0.11	-0.15	-439.75	11.25	-0.2	-34.23	-16.51	0.01	-1.22	26.82	0.31	0.01	28.04	43.1	2
11229	11229:WVGD5	End	35.00	-8.70	-0.09	-0.12	-514.06	11.32	-0.2	-34.23	-16.51	0.01	-1.16	28.48	0.30	0.01	29.65	45.6	2
11229	11229:WVGD5	Origin	35.00	-8.70	-0.09	-0.12	-514.06	11.32	-0.2	-36.19	-16.59	0.01	-1.23	28.48	0.30	0.01	29.71	45.7	2
11229	11229:Arm4	End	37.75	-7.61	-0.08	-0.10	-559.67	11.35	-0.2	-36.19	-16.59	0.01	-1.20	29.30	0.29	0.01	30.51	46.9	2
11229	11229:Arm4	Origin	37.75	-7.61	-0.08	-0.10	-607.07	11.36	-0.4	-40.95	-21.19	0.02	-1.35	31.77	0.37	0.01	33.13	51.0	2
11229	Tube 1	End	41.38	-6.30	-0.06	-0.08	-683.88	11.43	-0.4	-40.95	-21.19	0.02	-1.31	33.31	0.36	0.01	34.62	53.3	2
11229	Tube 1	Origin	41.38	-6.30	-0.06	-0.08	-683.88	11.42	-0.4	-41.60	-20.95	0.01	-1.33	33.31	0.35	0.01	34.64	53.3	2
11229	11229:WVGD4	End	45.00	-5.12	-0.05	-0.06	-759.83	11.47	-0.4	-41.60	-20.95	0.01	-1.28	34.52	0.34	0.01	35.81	55.1	2
11229	11229:WVGD4	Origin	45.00	-5.12	-0.05	-0.06	-759.83	11.47	-0.4	-43.48	-21.02	0.01	-1.34	34.52	0.34	0.01	35.87	55.2	2
11229	SpliceT	End	47.00	-4.53	-0.04	-0.05	-801.87	11.48	-0.4	-43.48	-21.02	0.01	-1.32	35.10	0.34	0.01	36.42	56.0	2
11229	SpliceT	Origin	47.00	-4.53	-0.04	-0.05	-801.87	11.48	-0.4	-44.60	-20.80	0.00	-1.35	35.10	0.33	0.01	36.46	56.1	2
11229	SpliceB	End	51.75	-3.28	-0.03	-0.03	-900.68	11.50	-0.4	-44.60	-20.80	0.00	-1.10	31.46	0.27	0.01	32.57	50.1	2
11229	SpliceB	Origin	51.75	-3.28	-0.03	-0.03	-900.68	11.50	-0.4	-45.89	-20.54	-0.00	-1.13	31.46	0.27	0.01	32.60	50.2	2
11229	11229:WVGD3	End	55.00	-2.55	-0.02	-0.03	-967.42	11.50	-0.4	-45.89	-20.54	-0.00	-1.10	31.90	0.26	0.01	33.00	50.8	2
11229	11229:WVGD3	Origin	55.00	-2.55	-0.02	-0.03	-967.42	11.49	-0.4	-48.22	-20.50	-0.01	-1.16	31.90	0.26	0.01	33.06	50.9	2
11229	Tube 2	End	60.00	-1.62	-0.01	-0.02	-1069.90	11.46	-0.4	-48.22	-20.50	-0.01	-1.11	32.38	0.25	0.01	33.49	51.5	2
11229	Tube 2	Origin	60.00	-1.62	-0.01	-0.02	-1069.90	11.46	-0.4	-49.40	-20.14	-0.01	-1.14	32.38	0.24	0.01	33.52	51.6	2
11229	11229:WVGD2	End	65.00	-0.90	-0.01	-0.01	-1170.58	11.39	-0.4	-49.40	-20.14	-0.01	-1.09	32.63	0.23	0.01	33.72	51.9	2
11229	11229:WVGD2	Origin	65.00	-0.90	-0.01	-0.01	-1170.58	11.39	-0.4	-52.01	-20.00	-0.02	-1.15	32.63	0.23	0.01	33.78	52.0	2
11229	Tube 2	End	70.00	-0.40	-0.00	-0.01	-1270.59	11.28	-0.4	-52.01	-20.00	-0.02	-1.10	32.73	0.22	0.00	33.83	52.0	2
11229	Tube 2	Origin	70.00	-0.40	-0.00	-0.01	-1270.59	11.28	-0.4	-53.28	-19.62	-0.03	-1.13	32.73	0.22	0.00	33.86	52.1	2
11229	11229:WVGD1	End	75.00	-0.10	-0.00	-0.00	-1368.66	11.14	-0.4	-53.28	-19.62	-0.03	-1.09	32.67	0.21	0.00	33.77	51.9	2
11229	11229:WVGD1	Origin	75.00	-0.10	-0.00	-0.00	-1368.66	11.14	-0.4	-55.97	-19.45	-0.04	-1.14	32.67	0.21	0.00	33.82	52.0	2
11229	11229:g	End	80.00	0.00	0.00	0.00	-1465.90	10.96	-0.4	-55.97	-19.45	-0.04	-1.10	32.53	0.20	0.00	33.63	51.7	2

Detailed Tubular Davit Arm Usages for Load Case "NESC Heavy":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	-27.47	-0.30	-1.07	-5.33	-0.01	0.0	2.31	1.41	0.00	0.46	6.86	0.00	0.00	7.32	11.3	1
Davit1	Davit1:End	End	3.78	-27.73	-0.30	-3.51	0.00	0.00	0.0	2.31	1.41	0.00	0.74	0.00	0.96	0.00	1.82	2.8	3
Davit2	Davit2:O	Origin	0.00	-19.41	-0.22	-0.93	-41.43	-0.09	-0.0	3.77	5.09	0.01	0.32	12.85	0.00	0.00	13.16	20.3	1
Davit2	#Davit2:0	End	3.13	-19.82	-0.22	-2.79	-25.49	-0.06	-0.0	3.77	5.09	0.01	0.40	12.53	0.00	0.00	12.93	19.9	1
Davit2	#Davit2:0	Origin	3.13	-19.82	-0.22	-2.79	-25.49	-0.06	-0.0	3.81	4.93	0.01	0.40	12.53	0.00	0.00	12.93	19.9	1
Davit2	Davit2:Mid	End	6.26	-20.25	-0.23	-4.74	-10.04	-0.03	-0.0	3.81	4.93	0.01	0.54	8.99	0.00	0.00	9.53	14.7	1
Davit2	Davit2:Mid	Origin	6.26	-20.25	-0.23	-4.74	-10.04	-0.03	0.0	4.88	3.76	0.01	0.69	8.99	0.00	0.00	9.68	14.9	1
Davit2	Davit2:End	End	8.93	-20.20	-0.23	-6.51	0.00	0.00	0.0	4.88	3.76	0.01	0.98	0.00	1.62	0.00	2.97	4.6	3
Davit3	Davit3:O	Origin	0.00	-12.86	-0.14	-0.75	-41.73	-0.10	-0.0	3.72	5.12	0.01	0.31	12.94	0.00	0.00	13.25	20.4	1
Davit3	#Davit3:0	End	3.13	-13.21	-0.15	-2.31	-25.69	-0.07	-0.0	3.72	5.12	0.01	0.39	12.63	0.00	0.00	13.02	20.0	1
Davit3	#Davit3:0	Origin	3.13	-13.21	-0.15	-2.31	-25.69	-0.07	-0.0	3.76	4.96	0.01	0.40	12.63	0.00	0.00	13.03	20.0	1
Davit3	Davit3:Mid	End	6.26	-13.58	-0.15	-3.95	-10.15	-0.03	-0.0	3.76	4.96	0.01	0.53	9.08	0.00	0.00	9.62	14.8	1
Davit3	Davit3:Mid	Origin	6.26	-13.58	-0.15	-3.95	-10.15	-0.03	0.0	4.85	3.80	0.01	0.69	9.08	0.00	0.00	9.77	15.0	1
Davit3	Davit3:End	End	8.93	-13.55	-0.16	-5.46	0.00	0.00	0.0	4.85	3.80	0.01	0.97	0.00	1.63	0.00	2.99	4.6	3
Davit4	Davit4:O	Origin	0.00	-7.60	-0.08	-0.58	-42.06	-0.10	-0.0	3.67	5.15	0.01	0.31	13.04	0.00	0.00	13.35	20.5	1
Davit4	#Davit4:0	End	3.13	-7.88	-0.08	-1.79	-25.92	-0.06	-0.0	3.67	5.15	0.01	0.39	12.74	0.00	0.00	13.13	20.2	1

Davit4	#Davit4:0	Origin	3.13	-7.88	-0.08	-1.79	-25.92	-0.06	-0.0	3.71	5.00	0.01	0.39	12.74	0.00	0.00	13.13	20.2	1
Davit4	Davit4:Mid	End	6.26	-8.18	-0.08	-3.09	-10.27	-0.03	-0.0	3.71	5.00	0.01	0.53	9.19	0.00	0.00	9.72	15.0	1
Davit4	Davit4:Mid	Origin	6.26	-8.18	-0.08	-3.09	-10.27	-0.03	0.0	4.81	3.85	0.01	0.68	9.19	0.00	0.00	9.87	15.2	1
Davit4	Davit4:End	End	8.93	-8.16	-0.08	-4.29	-0.00	0.00	0.0	4.81	3.85	0.01	0.97	0.00	1.65	0.00	3.02	4.7	3

Summary of Clamp Capacities and Usages for Load Case "NESC Heavy":

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
Clamp 1	2.691	100.00	100.00	2.69
Clamp 2	6.135	100.00	100.00	6.13
Clamp 3	6.132	100.00	100.00	6.13
Clamp 4	6.131	100.00	100.00	6.13
Clamp 5	1.398	100.00	100.00	1.40
Clamp 6	1.398	100.00	100.00	1.40
Clamp 7	1.398	100.00	100.00	1.40
Clamp 8	1.398	100.00	100.00	1.40
Clamp 9	1.398	100.00	100.00	1.40
Clamp 10	1.398	100.00	100.00	1.40
Clamp 11	1.398	100.00	100.00	1.40
Clamp 12	1.398	100.00	100.00	1.40
Clamp 13	8.920	100.00	100.00	8.92
Clamp 14	11.106	100.00	100.00	11.11
Clamp 15	17.110	100.00	100.00	17.11
Clamp 16	11.106	100.00	100.00	11.11
Clamp 17	8.814	100.00	100.00	8.81

*** Analysis Results for Load Case No. 2 "NESC Extreme" - Number of iterations in SAPS 14

Equilibrium Joint Positions and Rotations for Load Case "NESC Extreme":

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
11229:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
11229:t	-0.09116	-3.784	-0.1259	5.3191	-0.1066	0.0026	-0.09116	-3.784	79.87
11229:Arm1	-0.08976	-3.714	-0.1226	5.3191	-0.1066	0.0026	-0.08976	-3.714	79.13
11229:TopConn	-0.08652	-3.552	-0.1151	5.3171	-0.1066	0.0026	-0.08652	-3.552	77.38
11229:WVGD8	-0.08373	-3.413	-0.1086	5.3038	-0.1066	0.0025	-0.08373	-3.413	75.89
11229:Arm2	-0.06562	-2.542	-0.06971	4.8239	-0.1066	0.0016	-0.06562	-2.542	66.18
11229:WVGD7	-0.0633	-2.438	-0.06535	4.7240	-0.1067	0.0014	-0.0633	-2.438	64.93
11229:conn	-0.054	-2.044	-0.04978	4.2726	-0.1067	0.0005	-0.054	-2.044	59.95
11229:WVGD6	-0.04469	-1.691	-0.03726	3.8199	-0.1067	-0.0003	-0.04469	-1.691	54.96
11229:Arm3	-0.04329	-1.641	-0.03561	3.7565	-0.1067	-0.0004	-0.04329	-1.641	54.21
11229:BotConT	-0.0363	-1.406	-0.02816	3.4434	-0.1068	-0.0010	-0.0363	-1.406	50.47
11229:BotConn	-0.0353	-1.376	-0.02726	3.4032	-0.1062	-0.0010	-0.0353	-1.376	49.97
11229:BotConB	-0.03432	-1.346	-0.02638	3.3632	-0.1047	-0.0010	-0.03432	-1.346	49.47
11229:WVGD5	-0.02678	-1.096	-0.0193	3.0051	-0.0872	-0.0007	-0.02678	-1.096	44.98
11229:Arm4	-0.02282	-0.9564	-0.01572	2.7886	-0.0777	-0.0005	-0.02282	-0.9564	42.23
11229:WVGD4	-0.0144	-0.6394	-0.008609	2.2105	-0.0559	-0.0002	-0.0144	-0.6394	34.99
11229:WVGD3	-0.006678	-0.3172	-0.003162	1.4938	-0.0339	-0.0000	-0.006678	-0.3172	25
11229:WVGD2	-0.002211	-0.1114	-0.0008206	0.8588	-0.0178	-0.0000	-0.002211	-0.1114	15
11229:WVGD1	-0.0002294	-0.01232	-0.0001097	0.2738	-0.0053	0.0000	-0.0002294	-0.01232	5
Davit1:O	-0.08959	-3.711	-0.1971	5.3191	-0.1066	0.0026	-0.08959	-4.514	79.05
Davit1:End	-0.08968	-3.741	-0.5487	5.3584	-0.1066	0.0029	-0.08968	-8.294	79.2
Davit2:O	-0.06545	-2.539	-0.151	4.8239	-0.1066	0.0016	-0.06545	-3.505	66.1
Davit2:Mid	-0.06709	-2.645	-0.6753	4.9580	-0.1066	0.0018	-0.06709	-9.691	67.07
Davit2:End	-0.06657	-2.635	-0.9073	4.9956	-0.1066	0.0018	-0.06657	-12.35	66.84
Davit3:O	-0.04316	-1.639	-0.1088	3.7565	-0.1067	-0.0004	-0.04316	-2.755	54.14
Davit3:Mid	-0.04523	-1.726	-0.5183	3.8951	-0.1067	-0.0002	-0.04523	-8.922	55.23
Davit3:End	-0.0449	-1.719	-0.701	3.9347	-0.1067	-0.0002	-0.0449	-11.59	55.05
Davit4:O	-0.02275	-0.9549	-0.07734	2.7886	-0.0777	-0.0005	-0.02275	-2.221	42.17
Davit4:Mid	-0.0244	-1.022	-0.383	2.9310	-0.0777	-0.0002	-0.0244	-8.369	43.37
Davit4:End	-0.02422	-1.019	-0.5209	2.9724	-0.0777	-0.0001	-0.02422	-11.04	43.23

Joint Support Reactions for Load Case "NESC Extreme":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
11229:g	-0.04	0.0	26.73	0.0	0.0	-29.26	0.0	0.0	39.64	0.0	-2167.71	0.0	40.3	0.0	0.0	-0.01	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC Extreme":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
11229	11229:t	Origin	0.00	-45.40	-1.09	-1.51	0.00	0.00	0.0	-0.02	0.02	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	5
11229	11229:Arm1	End	0.75	-44.57	-1.08	-1.47	0.01	-0.00	0.0	-0.02	0.02	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	4
11229	11229:Arm1	Origin	0.75	-44.57	-1.08	-1.47	-2.18	-0.00	0.0	-0.42	-1.67	-0.00	-0.02	0.21	0.13	0.00	0.32	0.5	3
11229	11229:TopConn	End	2.50	-42.62	-1.04	-1.38	-5.11	-0.01	0.0	-0.42	-1.67	-0.00	-0.02	0.64	0.05	0.00	0.66	1.0	2

11229	11229:TopConn	Origin	2.50	-42.62	-1.04	-1.38	-5.11	-0.01	0.0	2.52	-34.33	-0.00	0.13	0.00	3.57	0.00	6.18	9.5	5
11229	11229:WVGD8	End	4.00	-40.95	-1.00	-1.30	-56.59	-0.01	0.0	2.52	-34.33	-0.00	0.13	6.74	0.91	0.00	7.04	10.8	2
11229	11229:WVGD8	Origin	4.00	-40.95	-1.00	-1.30	-56.59	-0.01	0.0	1.94	-34.88	-0.00	0.10	6.74	0.92	0.00	7.02	10.8	2
11229	Tube 1	End	8.88	-35.61	-0.90	-1.06	-226.64	-0.02	0.0	1.94	-34.88	-0.00	0.09	23.39	0.86	0.00	23.53	36.2	2
11229	Tube 1	Origin	8.88	-35.61	-0.90	-1.06	-226.64	-0.02	0.0	1.44	-34.65	-0.00	0.07	23.39	0.86	0.00	23.51	36.2	2
11229	11229:Arm2	End	13.75	-30.51	-0.79	-0.84	-395.57	-0.03	0.0	1.44	-34.65	-0.00	0.06	35.74	0.80	0.00	35.83	55.1	2
11229	11229:Arm2	Origin	13.75	-30.51	-0.79	-0.84	-419.02	-0.03	0.0	-0.80	-38.89	-0.00	-0.03	37.86	0.90	0.00	37.92	58.3	2
11229	11229:WVGD7	End	15.00	-29.26	-0.76	-0.78	-467.63	-0.03	0.0	-0.80	-38.89	-0.00	-0.03	40.89	0.88	0.00	40.95	63.0	2
11229	11229:WVGD7	Origin	15.00	-29.26	-0.76	-0.78	-467.63	-0.03	0.0	-1.55	-39.42	-0.00	-0.07	40.89	0.89	0.00	40.98	63.1	2
11229	11229:conn	End	20.00	-24.53	-0.65	-0.60	-664.71	-0.04	0.0	-1.55	-39.42	-0.00	-0.06	51.24	0.84	0.00	51.32	79.0	2
11229	11229:conn	Origin	20.00	-24.53	-0.65	-0.60	-664.71	-0.05	0.0	-4.60	-6.48	-0.00	-0.19	51.24	0.14	0.00	51.43	79.1	2
11229	11229:WVGD6	End	25.00	-20.29	-0.54	-0.45	-697.13	-0.06	0.0	-4.60	-6.48	-0.00	-0.17	47.74	0.13	0.00	47.91	73.7	2
11229	11229:WVGD6	Origin	25.00	-20.29	-0.54	-0.45	-697.13	-0.06	0.0	-5.21	-6.98	-0.00	-0.20	47.74	0.14	0.00	47.94	73.7	2
11229	11229:Arm3	End	25.75	-19.70	-0.52	-0.43	-702.37	-0.06	0.0	-5.21	-6.98	-0.00	-0.20	47.28	0.14	0.00	47.47	73.0	2
11229	11229:Arm3	Origin	25.75	-19.70	-0.52	-0.43	-726.79	-0.07	-0.0	-7.41	-11.12	-0.00	-0.28	48.92	0.22	0.00	49.20	75.7	2
11229	11229:BotConT	End	29.50	-16.87	-0.44	-0.34	-768.49	-0.07	-0.0	-7.41	-11.12	-0.00	-0.27	47.57	0.21	0.00	47.84	73.6	2
11229	11229:BotConT	Origin	29.50	-16.87	-0.44	-0.34	-768.49	-0.07	-0.1	-7.55	-10.96	41.06	-0.27	47.57	3.01	0.00	48.13	74.0	1
11229	11229:BotConn	End	30.00	-16.51	-0.42	-0.33	-773.97	20.46	-0.1	-7.55	-10.96	41.06	-0.27	47.72	2.90	0.00	48.26	74.2	2
11229	11229:BotConn	Origin	30.00	-16.51	-0.42	-0.33	-773.97	20.46	-0.1	-15.01	-24.68	41.08	-0.54	47.72	2.94	0.00	48.53	74.7	2
11229	11229:BotConB	End	30.50	-16.16	-0.41	-0.32	-786.31	40.99	-0.1	-15.01	-24.68	41.08	-0.54	48.29	2.92	0.00	49.09	75.5	2
11229	11229:BotConB	Origin	30.50	-16.16	-0.41	-0.32	-786.31	40.99	-0.0	-15.42	-24.46	0.01	-0.55	48.29	0.46	0.00	48.85	75.1	2
11229	11229:WVGD5	End	35.00	-13.15	-0.32	-0.23	-896.39	41.04	-0.0	-15.42	-24.46	0.01	-0.52	49.97	0.44	0.00	50.50	77.7	2
11229	11229:WVGD5	Origin	35.00	-13.15	-0.32	-0.23	-896.39	41.03	-0.0	-16.24	-24.82	0.01	-0.55	49.97	0.45	0.00	50.53	77.7	2
11229	11229:Arm4	End	37.75	-11.48	-0.27	-0.19	-964.64	41.05	-0.0	-16.24	-24.82	0.01	-0.54	50.81	0.43	0.00	51.35	79.0	2
11229	11229:Arm4	Origin	37.75	-11.48	-0.27	-0.19	-989.96	41.04	0.0	-18.71	-28.72	0.00	-0.62	52.13	0.50	0.00	52.75	81.2	2
11229	Tube 1	End	41.38	-9.47	-0.22	-0.14	-1094.05	41.05	0.0	-18.71	-28.72	0.00	-0.60	53.58	0.48	0.00	54.18	83.4	2
11229	Tube 1	Origin	41.38	-9.47	-0.22	-0.14	-1094.05	41.05	0.0	-19.24	-28.35	-0.00	-0.61	53.58	0.48	0.00	54.20	83.4	2
11229	11229:WVGD4	End	45.00	-7.67	-0.17	-0.10	-1196.81	41.04	0.0	-19.24	-28.35	-0.00	-0.59	54.66	0.46	0.00	55.26	85.0	2
11229	11229:WVGD4	Origin	45.00	-7.67	-0.17	-0.10	-1196.81	41.03	0.0	-20.01	-28.73	-0.00	-0.62	54.66	0.47	0.00	55.28	85.0	2
11229	SpliceT	End	47.00	-6.78	-0.15	-0.09	-1254.27	41.02	0.0	-20.01	-28.73	-0.00	-0.61	55.18	0.46	0.00	55.79	85.8	2
11229	SpliceT	Origin	47.00	-6.78	-0.15	-0.09	-1254.27	41.02	0.0	-20.84	-28.38	-0.01	-0.63	55.18	0.45	0.00	55.81	85.9	2
11229	SpliceB	End	51.75	-4.90	-0.11	-0.05	-1389.09	40.98	0.0	-20.84	-28.38	-0.01	-0.51	48.74	0.37	0.00	49.26	75.8	2
11229	SpliceB	Origin	51.75	-4.90	-0.11	-0.05	-1389.09	40.98	0.0	-21.80	-27.96	-0.01	-0.54	48.74	0.37	0.00	49.29	75.8	2
11229	11229:WVGD3	End	55.00	-3.81	-0.08	-0.04	-1479.95	40.94	0.0	-21.80	-27.96	-0.01	-0.52	49.00	0.35	0.00	49.53	76.2	2
11229	11229:WVGD3	Origin	55.00	-3.81	-0.08	-0.04	-1479.95	40.93	0.0	-22.87	-28.18	-0.02	-0.55	49.00	0.36	0.00	49.55	76.2	2
11229	Tube 2	End	60.00	-2.41	-0.05	-0.02	-1620.83	40.86	0.0	-22.87	-28.18	-0.02	-0.53	49.24	0.34	0.00	49.77	76.6	2
11229	Tube 2	Origin	60.00	-2.41	-0.05	-0.02	-1620.83	40.85	0.0	-23.77	-27.60	-0.02	-0.55	49.24	0.34	0.00	49.79	76.6	2
11229	11229:WVGD2	End	65.00	-1.34	-0.03	-0.01	-1758.81	40.75	0.0	-23.77	-27.60	-0.02	-0.52	49.20	0.32	0.00	49.73	76.5	2
11229	11229:WVGD2	Origin	65.00	-1.34	-0.03	-0.01	-1758.81	40.75	0.0	-25.05	-27.67	-0.02	-0.55	49.20	0.32	0.00	49.76	76.5	2
11229	Tube 2	End	70.00	-0.59	-0.01	-0.00	-1897.16	40.63	0.0	-25.05	-27.67	-0.02	-0.53	49.03	0.31	0.00	49.56	76.3	2
11229	Tube 2	Origin	70.00	-0.59	-0.01	-0.00	-1897.16	40.62	0.0	-25.99	-27.04	-0.03	-0.55	49.03	0.30	0.00	49.58	76.3	2
11229	11229:WVGD1	End	75.00	-0.15	-0.00	-0.00	-2032.38	40.48	0.0	-25.99	-27.04	-0.03	-0.53	48.67	0.29	0.00	49.21	75.7	2
11229	11229:WVGD1	Origin	75.00	-0.15	-0.00	-0.00	-2032.38	40.48	0.0	-27.33	-27.07	-0.03	-0.56	48.67	0.29	0.00	49.23	75.7	2
11229	11229:g	End	80.00	0.00	0.00	0.00	-2167.71	40.31	0.0	-27.33	-27.07	-0.03	-0.54	48.24	0.28	0.00	48.78	75.1	2

Detailed Tubular Davit Arm Usages for Load Case "NESC Extreme":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	-44.53	-1.08	-2.37	-1.94	0.01	0.0	1.69	0.51	-0.00	0.33	2.50	0.00	0.00	2.83	4.4	1
Davit1	Davit1:End	End	3.78	-44.89	-1.08	-6.58	0.00	0.00	0.0	1.69	0.51	-0.00	0.54	0.00	0.35	0.00	0.81	1.3	3
Davit2	Davit2:O	Origin	0.00	-30.47	-0.79	-1.81	-21.64	-0.01	-0.0	3.83	2.81	0.00	0.32	6.71	0.00	0.00	7.03	10.8	1
Davit2	#Davit2:0	End	3.13	-31.10	-0.80	-4.93	-12.84	-0.00	-0.0	3.83	2.81	0.00	0.40	6.31	0.00	0.00	6.71	10.3	1
Davit2	#Davit2:0	Origin	3.13	-31.10	-0.80	-4.93	-12.84	-0.00	-0.0	3.85	2.71	0.00	0.41	6.31	0.00	0.00	6.72	10.3	1
Davit2	Davit2:Mid	End	6.26	-31.74	-0.81	-8.10	-4.36	-0.00	-0.0	3.85	2.71	0.00	0.55	3.90	0.00	0.00	4.45	6.8	1

Davit2	Davit2:Mid	Origin	6.26	-31.74	-0.81	-8.10	-4.36	-0.00	0.0	4.38	1.63	0.00	0.62	3.90	0.00	0.00	4.52	7.0	1
Davit2	Davit2:End	End	8.93	-31.62	-0.80	-10.89	0.00	0.00	0.0	4.38	1.63	0.00	0.88	0.00	0.70	0.00	1.50	2.3	3
Davit3	Davit3:O	Origin	0.00	-19.67	-0.52	-1.31	-22.24	-0.00	-0.0	3.72	2.87	0.00	0.31	6.90	0.00	0.00	7.21	11.1	1
Davit3	#Davit3:0	End	3.13	-20.18	-0.53	-3.74	-13.26	-0.00	-0.0	3.72	2.87	0.00	0.39	6.52	0.00	0.00	6.91	10.6	1
Davit3	#Davit3:0	Origin	3.13	-20.18	-0.53	-3.74	-13.26	-0.00	-0.0	3.74	2.77	0.00	0.39	6.52	0.00	0.00	6.91	10.6	1
Davit3	Davit3:Mid	End	6.26	-20.71	-0.54	-6.22	-4.59	-0.00	-0.0	3.74	2.77	0.00	0.53	4.10	0.00	0.00	4.64	7.1	1
Davit3	Davit3:Mid	Origin	6.26	-20.71	-0.54	-6.22	-4.59	-0.00	0.0	4.29	1.72	0.00	0.61	4.10	0.00	0.00	4.71	7.3	1
Davit3	Davit3:End	End	8.93	-20.63	-0.54	-8.41	0.00	0.00	0.0	4.29	1.72	0.00	0.86	0.00	0.74	0.00	1.54	2.4	3
Davit4	Davit4:O	Origin	0.00	-11.46	-0.27	-0.93	-22.75	0.01	0.0	3.61	2.92	-0.00	0.30	7.06	0.00	0.00	7.36	11.3	1
Davit4	#Davit4:0	End	3.13	-11.86	-0.28	-2.74	-13.61	0.01	0.0	3.61	2.92	-0.00	0.38	6.69	0.00	0.00	7.07	10.9	1
Davit4	#Davit4:0	Origin	3.13	-11.86	-0.28	-2.74	-13.61	0.01	0.0	3.63	2.82	-0.00	0.38	6.69	0.00	0.00	7.07	10.9	1
Davit4	Davit4:Mid	End	6.26	-12.27	-0.29	-4.60	-4.79	0.00	0.0	3.63	2.82	-0.00	0.52	4.28	0.00	0.00	4.80	7.4	1
Davit4	Davit4:Mid	Origin	6.26	-12.27	-0.29	-4.60	-4.79	0.00	0.0	4.20	1.79	-0.00	0.60	4.28	0.00	0.00	4.88	7.5	1
Davit4	Davit4:End	End	8.93	-12.23	-0.29	-6.25	0.00	0.00	0.0	4.20	1.79	-0.00	0.84	0.00	0.77	0.00	1.58	2.4	3

Summary of Clamp Capacities and Usages for Load Case "NESC Extreme":

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
Clamp 1	1.757	100.00	100.00	1.76
Clamp 2	4.663	100.00	100.00	4.66
Clamp 3	4.613	100.00	100.00	4.61
Clamp 4	4.556	100.00	100.00	4.56
Clamp 5	0.766	100.00	100.00	0.77
Clamp 6	0.766	100.00	100.00	0.77
Clamp 7	0.766	100.00	100.00	0.77
Clamp 8	0.766	100.00	100.00	0.77
Clamp 9	0.766	100.00	100.00	0.77
Clamp 10	0.766	100.00	100.00	0.77
Clamp 11	0.766	100.00	100.00	0.77
Clamp 12	0.766	100.00	100.00	0.77
Clamp 13	32.865	100.00	100.00	32.87
Clamp 14	41.060	100.00	100.00	41.06
Clamp 15	15.624	100.00	100.00	15.62
Clamp 16	41.060	100.00	100.00	41.06
Clamp 17	32.711	100.00	100.00	32.71

*** Analysis Results for Load Case No. 3 "NESC Extreme Ice w/ Wind" - Number of iterations in SAPS 12

Equilibrium Joint Positions and Rotations for Load Case "NESC Extreme Ice w/ Wind":

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
11229:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
11229:t	-0.01192	-1.589	-0.02324	2.0416	-0.0140	-0.0008	-0.01192	-1.589	79.98
11229:Arm1	-0.01174	-1.562	-0.02276	2.0416	-0.0140	-0.0008	-0.01174	-1.562	79.23
11229:TopConn	-0.01131	-1.5	-0.02165	2.0362	-0.0140	-0.0008	-0.01131	-1.5	77.48
11229:WVGD8	-0.01094	-1.446	-0.0207	2.0293	-0.0140	-0.0008	-0.01094	-1.446	75.98
11229:Arm2	-0.008556	-1.109	-0.01479	1.9227	-0.0139	-0.0008	-0.008556	-1.109	66.24
11229:WVGD7	-0.008251	-1.067	-0.01407	1.8939	-0.0139	-0.0008	-0.008251	-1.067	64.99
11229:conn	-0.007034	-0.9066	-0.01143	1.7683	-0.0139	-0.0007	-0.007034	-0.9066	59.99
11229:WVGD6	-0.005821	-0.7578	-0.009146	1.6386	-0.0138	-0.0007	-0.005821	-0.7578	54.99
11229:Arm3	-0.00564	-0.7364	-0.00883	1.6195	-0.0138	-0.0007	-0.00564	-0.7364	54.24
11229:BotConT	-0.004735	-0.634	-0.00735	1.5050	-0.0138	-0.0007	-0.004735	-0.634	50.49
11229:BotConn	-0.004607	-0.6209	-0.007169	1.4897	-0.0137	-0.0006	-0.004607	-0.6209	49.99
11229:BotConB	-0.00448	-0.608	-0.006982	1.4745	-0.0135	-0.0006	-0.00448	-0.608	49.49
11229:WVGD5	-0.003504	-0.4973	-0.00545	1.3363	-0.0113	-0.0005	-0.003504	-0.4973	44.99
11229:Arm4	-0.00299	-0.4351	-0.004639	1.2516	-0.0101	-0.0005	-0.00299	-0.4351	42.25
11229:WVGD4	-0.001891	-0.2922	-0.002919	1.0008	-0.0073	-0.0003	-0.001891	-0.2922	35
11229:WVGD3	-0.0008775	-0.1456	-0.00145	0.6822	-0.0044	-0.0002	-0.0008775	-0.1456	25
11229:WVGD2	-0.0002902	-0.05135	-0.0006428	0.3946	-0.0023	-0.0001	-0.0002902	-0.05135	15
11229:WVGD1	-2.999e-005	-0.005697	-0.0001798	0.1264	-0.0007	-0.0000	-2.999e-005	-0.005697	5
Davit1:O	-0.01174	-1.561	-0.05139	2.0416	-0.0140	-0.0008	-0.01174	-2.365	79.2
Davit1:End	-0.01189	-1.577	-0.1916	2.1825	-0.0140	-0.0011	-0.01189	-6.131	79.56
Davit2:O	-0.008562	-1.108	-0.0472	1.9227	-0.0139	-0.0008	-0.008562	-2.074	66.2
Davit2:Mid	-0.008976	-1.158	-0.2663	2.1790	-0.0140	-0.0011	-0.008976	-8.204	67.48
Davit2:End	-0.009005	-1.156	-0.3706	2.2656	-0.0140	-0.0012	-0.009005	-10.87	67.38
Davit3:O	-0.005646	-0.736	-0.04038	1.6195	-0.0138	-0.0007	-0.005646	-1.852	54.21
Davit3:Mid	-0.006054	-0.7791	-0.2271	1.8768	-0.0138	-0.0010	-0.006054	-7.975	55.52
Davit3:End	-0.006083	-0.7776	-0.3174	1.9638	-0.0138	-0.0011	-0.006083	-10.64	55.43
Davit4:O	-0.002996	-0.4348	-0.0323	1.2516	-0.0101	-0.0005	-0.002996	-1.701	42.22
Davit4:Mid	-0.003303	-0.4694	-0.1798	1.5099	-0.0101	-0.0008	-0.003303	-7.816	43.57
Davit4:End	-0.003331	-0.4684	-0.253	1.5975	-0.0101	-0.0009	-0.003331	-10.48	43.5

Joint Support Reactions for Load Case "NESC Extreme Ice w/ Wind":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
11229:g	-0.01	0.0	13.13	0.0	0.0	-52.93	0.0	0.0	54.53	0.0	-1002.64	0.0	5.3	0.0	0.0	0.19	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC Extreme Ice w/ Wind":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
11229	11229:t	Origin	0.00	-19.06	-0.14	-0.28	0.00	0.00	0.0	-0.02	0.00	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	5
11229	11229:Arm1	End	0.75	-18.74	-0.14	-0.27	0.00	-0.00	0.0	-0.02	0.00	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	2
11229	11229:Arm1	Origin	0.75	-18.74	-0.14	-0.27	-8.26	0.00	-0.0	-1.73	-1.91	0.00	-0.09	1.09	0.05	0.00	1.18	1.8	2
11229	11229:TopConn	End	2.50	-17.99	-0.14	-0.26	-11.59	0.01	-0.0	-1.73	-1.91	0.00	-0.09	1.45	0.05	0.00	1.54	2.4	2

11229	11229:TopConn	Origin	2.50	-17.99	-0.14	-0.26	-11.59	0.01	-0.0	-1.70	-5.91	0.00	-0.09	1.45	0.16	0.00	1.56	2.4	2
11229	11229:WVGD8	End	4.00	-17.36	-0.13	-0.25	-20.46	0.01	-0.0	-1.70	-5.91	0.00	-0.08	2.44	0.16	0.00	2.54	3.9	2
11229	11229:WVGD8	Origin	4.00	-17.36	-0.13	-0.25	-20.46	0.01	-0.0	-3.60	-6.04	0.00	-0.18	2.44	0.16	0.00	2.63	4.0	2
11229	Tube 1	End	8.88	-15.30	-0.12	-0.21	-49.93	0.02	-0.0	-3.60	-6.04	0.00	-0.17	5.15	0.15	0.00	5.33	8.2	2
11229	Tube 1	Origin	8.88	-15.30	-0.12	-0.21	-49.93	0.02	-0.0	-3.97	-6.01	0.00	-0.18	5.15	0.15	0.00	5.34	8.2	2
11229	11229:Arm2	End	13.75	-13.30	-0.10	-0.18	-79.21	0.03	-0.0	-3.97	-6.01	0.00	-0.17	7.16	0.14	0.00	7.33	11.3	2
11229	11229:Arm2	Origin	13.75	-13.30	-0.10	-0.18	-121.86	0.04	-0.1	-8.20	-9.42	0.01	-0.36	11.01	0.22	0.00	11.37	17.5	2
11229	11229:WVGD7	End	15.00	-12.80	-0.10	-0.17	-133.63	0.05	-0.1	-8.20	-9.42	0.01	-0.35	11.69	0.21	0.00	12.04	18.5	2
11229	11229:WVGD7	Origin	15.00	-12.80	-0.10	-0.17	-133.63	0.04	-0.1	-10.15	-9.53	0.01	-0.43	11.69	0.22	0.00	12.13	18.7	2
11229	11229:conn	End	20.00	-10.88	-0.08	-0.14	-181.29	0.07	-0.1	-10.15	-9.53	0.01	-0.41	13.98	0.20	0.00	14.39	22.1	2
11229	11229:conn	Origin	20.00	-10.88	-0.08	-0.14	-181.29	0.07	-0.1	-10.71	-5.53	0.00	-0.43	13.98	0.12	0.00	14.41	22.2	2
11229	11229:WVGD6	End	25.00	-9.09	-0.07	-0.11	-208.92	0.10	-0.1	-10.71	-5.53	0.00	-0.41	14.31	0.11	0.00	14.71	22.6	2
11229	11229:WVGD6	Origin	25.00	-9.09	-0.07	-0.11	-208.92	0.10	-0.1	-12.65	-5.63	0.00	-0.48	14.31	0.11	0.00	14.79	22.8	2
11229	11229:Arm3	End	25.75	-8.84	-0.07	-0.11	-213.14	0.10	-0.1	-12.65	-5.63	0.00	-0.48	14.35	0.11	0.00	14.82	22.8	2
11229	11229:Arm3	Origin	25.75	-8.84	-0.07	-0.11	-256.54	0.11	-0.1	-16.89	-9.00	0.01	-0.63	17.27	0.18	0.00	17.91	27.5	2
11229	11229:BotConT	End	29.50	-7.61	-0.06	-0.09	-290.30	0.15	-0.1	-16.89	-9.00	0.01	-0.61	17.97	0.17	0.00	18.58	28.6	2
11229	11229:BotConT	Origin	29.50	-7.61	-0.06	-0.09	-290.30	0.14	-0.1	-17.09	-8.96	4.98	-0.62	17.97	0.39	0.00	18.60	28.6	2
11229	11229:BotConn	End	30.00	-7.45	-0.06	-0.09	-294.78	2.63	-0.1	-17.09	-8.96	4.98	-0.61	18.09	0.39	0.00	18.72	28.8	2
11229	11229:BotConn	Origin	30.00	-7.45	-0.06	-0.09	-294.78	2.63	-0.1	-31.37	-10.93	4.98	-1.12	18.09	0.41	0.00	19.23	29.6	2
11229	11229:BotConB	End	30.50	-7.30	-0.05	-0.08	-300.25	5.12	-0.1	-31.37	-10.93	4.98	-1.12	18.27	0.41	0.00	19.40	29.8	2
11229	11229:BotConB	Origin	30.50	-7.30	-0.05	-0.08	-300.25	5.12	-0.1	-31.63	-10.87	0.01	-1.13	18.27	0.21	0.00	19.40	29.8	2
11229	11229:WVGD5	End	35.00	-5.97	-0.04	-0.07	-349.16	5.17	-0.1	-31.63	-10.87	0.01	-1.08	19.31	0.20	0.00	20.38	31.4	2
11229	11229:WVGD5	Origin	35.00	-5.97	-0.04	-0.07	-349.16	5.17	-0.1	-33.69	-10.90	0.01	-1.15	19.31	0.20	0.00	20.45	31.5	2
11229	11229:Arm4	End	37.75	-5.22	-0.04	-0.06	-379.13	5.19	-0.1	-33.69	-10.90	0.01	-1.11	19.82	0.19	0.00	20.93	32.2	2
11229	11229:Arm4	Origin	37.75	-5.22	-0.04	-0.06	-423.32	5.20	-0.2	-38.08	-14.19	0.01	-1.26	22.12	0.25	0.01	23.38	36.0	2
11229	Tube 1	End	41.38	-4.32	-0.03	-0.04	-474.74	5.25	-0.2	-38.08	-14.19	0.01	-1.22	23.09	0.24	0.00	24.31	37.4	2
11229	Tube 1	Origin	41.38	-4.32	-0.03	-0.04	-474.74	5.25	-0.2	-38.50	-14.06	0.01	-1.23	23.09	0.24	0.00	24.32	37.4	2
11229	11229:WVGD4	End	45.00	-3.51	-0.02	-0.04	-525.70	5.28	-0.2	-38.50	-14.06	0.01	-1.19	23.85	0.23	0.00	25.05	38.5	2
11229	11229:WVGD4	Origin	45.00	-3.51	-0.02	-0.04	-525.70	5.28	-0.2	-40.51	-14.08	0.01	-1.25	23.85	0.23	0.00	25.11	38.6	2
11229	SpliceT	End	47.00	-3.10	-0.02	-0.03	-553.87	5.30	-0.2	-40.51	-14.08	0.01	-1.23	24.21	0.23	0.00	25.44	39.1	2
11229	SpliceT	Origin	47.00	-3.10	-0.02	-0.03	-553.87	5.30	-0.2	-41.25	-13.97	0.01	-1.25	24.21	0.22	0.00	25.47	39.2	2
11229	SpliceB	End	51.75	-2.25	-0.01	-0.02	-620.21	5.34	-0.2	-41.25	-13.97	0.01	-1.02	21.64	0.18	0.00	22.66	34.9	2
11229	SpliceB	Origin	51.75	-2.25	-0.01	-0.02	-620.21	5.33	-0.2	-42.10	-13.83	0.00	-1.04	21.64	0.18	0.00	22.68	34.9	2
11229	11229:WVGD3	End	55.00	-1.75	-0.01	-0.02	-665.15	5.35	-0.2	-42.10	-13.83	0.00	-1.01	21.91	0.18	0.00	22.92	35.3	2
11229	11229:WVGD3	Origin	55.00	-1.75	-0.01	-0.02	-665.15	5.35	-0.2	-44.40	-13.80	0.00	-1.06	21.91	0.18	0.00	22.98	35.3	2
11229	Tube 2	End	60.00	-1.11	-0.01	-0.01	-734.12	5.36	-0.2	-44.40	-13.80	0.00	-1.02	22.20	0.17	0.00	23.22	35.7	2
11229	Tube 2	Origin	60.00	-1.11	-0.01	-0.01	-734.12	5.36	-0.2	-45.17	-13.61	-0.00	-1.04	22.20	0.17	0.00	23.24	35.7	2
11229	11229:WVGD2	End	65.00	-0.62	-0.00	-0.01	-802.17	5.36	-0.2	-45.17	-13.61	-0.00	-1.00	22.34	0.16	0.00	23.34	35.9	2
11229	11229:WVGD2	Origin	65.00	-0.62	-0.00	-0.01	-802.17	5.36	-0.2	-47.66	-13.53	-0.00	-1.05	22.34	0.16	0.00	23.39	36.0	2
11229	Tube 2	End	70.00	-0.27	-0.00	-0.00	-869.81	5.35	-0.2	-47.66	-13.53	-0.00	-1.01	22.39	0.15	0.00	23.40	36.0	2
11229	Tube 2	Origin	70.00	-0.27	-0.00	-0.00	-869.81	5.34	-0.2	-48.50	-13.33	-0.01	-1.03	22.39	0.15	0.00	23.42	36.0	2
11229	11229:WVGD1	End	75.00	-0.07	-0.00	-0.00	-936.48	5.31	-0.2	-48.50	-13.33	-0.01	-0.99	22.34	0.14	0.00	23.33	35.9	2
11229	11229:WVGD1	Origin	75.00	-0.07	-0.00	-0.00	-936.48	5.31	-0.2	-51.04	-13.23	-0.01	-1.04	22.34	0.14	0.00	23.39	36.0	2
11229	11229:g	End	80.00	0.00	0.00	0.00	-1002.64	5.27	-0.2	-51.04	-13.23	-0.01	-1.01	22.23	0.14	0.00	23.24	35.8	2

Detailed Tubular Davit Arm Usages for Load Case "NESC Extreme Ice w/ Wind":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	-18.74	-0.14	-0.62	-6.95	-0.01	0.0	1.69	1.84	0.00	0.33	8.95	0.00	0.00	9.28	14.3	1
Davit1	Davit1:End	End	3.78	-18.93	-0.14	-2.30	0.00	0.00	0.0	1.69	1.84	0.00	0.54	0.00	1.26	0.00	2.24	3.4	3
Davit2	Davit2:O	Origin	0.00	-13.30	-0.10	-0.57	-38.79	-0.05	-0.0	2.40	4.65	0.01	0.20	12.03	0.00	0.00	12.23	18.8	1
Davit2	#Davit2:0	End	3.13	-13.59	-0.11	-1.84	-24.24	-0.03	-0.0	2.40	4.65	0.01	0.25	11.92	0.00	0.00	12.17	18.7	1
Davit2	#Davit2:0	Origin	3.13	-13.59	-0.11	-1.84	-24.24	-0.03	-0.0	2.43	4.54	0.01	0.26	11.92	0.00	0.00	12.17	18.7	1
Davit2	Davit2:Mid	End	6.26	-13.90	-0.11	-3.20	-10.02	-0.01	-0.0	2.43	4.54	0.01	0.34	8.96	0.00	0.00	9.31	14.3	1

Davit2	Davit2:Mid	Origin	6.26	-13.90	-0.11	-3.20	-10.02	-0.02	0.0	3.45	3.75	0.01	0.49	8.96	0.00	0.00	9.45	14.5	1
Davit2	Davit2:End	End	8.93	-13.87	-0.11	-4.45	0.00	0.00	0.0	3.45	3.75	0.01	0.69	0.00	1.61	0.00	2.88	4.4	3
Davit3	Davit3:O	Origin	0.00	-8.83	-0.07	-0.48	-38.92	-0.05	-0.0	2.37	4.66	0.01	0.20	12.07	0.00	0.00	12.27	18.9	1
Davit3	#Davit3:0	End	3.13	-9.08	-0.07	-1.56	-24.33	-0.03	-0.0	2.37	4.66	0.01	0.25	11.96	0.00	0.00	12.21	18.8	1
Davit3	#Davit3:0	Origin	3.13	-9.08	-0.07	-1.56	-24.33	-0.03	-0.0	2.40	4.56	0.01	0.25	11.96	0.00	0.00	12.21	18.8	1
Davit3	Davit3:Mid	End	6.26	-9.35	-0.07	-2.73	-10.06	-0.01	-0.0	2.40	4.56	0.01	0.34	9.01	0.00	0.00	9.35	14.4	1
Davit3	Davit3:Mid	Origin	6.26	-9.35	-0.07	-2.73	-10.06	-0.02	0.0	3.43	3.77	0.01	0.49	9.01	0.00	0.00	9.49	14.6	1
Davit3	Davit3:End	End	8.93	-9.33	-0.07	-3.81	0.00	0.00	0.0	3.43	3.77	0.01	0.69	0.00	1.62	0.00	2.89	4.4	3
Davit4	Davit4:O	Origin	0.00	-5.22	-0.04	-0.39	-39.07	-0.05	-0.0	2.34	4.67	0.01	0.20	12.12	0.00	0.00	12.31	18.9	1
Davit4	#Davit4:0	End	3.13	-5.42	-0.04	-1.23	-24.43	-0.03	-0.0	2.34	4.67	0.01	0.25	12.01	0.00	0.00	12.26	18.9	1
Davit4	#Davit4:0	Origin	3.13	-5.42	-0.04	-1.23	-24.43	-0.03	-0.0	2.37	4.57	0.01	0.25	12.01	0.00	0.00	12.26	18.9	1
Davit4	Davit4:Mid	End	6.26	-5.63	-0.04	-2.16	-10.12	-0.01	-0.0	2.37	4.57	0.01	0.34	9.06	0.00	0.00	9.40	14.5	1
Davit4	Davit4:Mid	Origin	6.26	-5.63	-0.04	-2.16	-10.12	-0.02	0.0	3.40	3.79	0.01	0.48	9.06	0.00	0.00	9.54	14.7	1
Davit4	Davit4:End	End	8.93	-5.62	-0.04	-3.04	0.00	0.00	0.0	3.40	3.79	0.01	0.68	0.00	1.63	0.00	2.91	4.5	3

Summary of Clamp Capacities and Usages for Load Case "NESC Extreme Ice w/ Wind":

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
Clamp 1	2.479	100.00	100.00	2.48
Clamp 2	5.075	100.00	100.00	5.08
Clamp 3	5.074	100.00	100.00	5.07
Clamp 4	5.073	100.00	100.00	5.07
Clamp 5	1.688	100.00	100.00	1.69
Clamp 6	1.688	100.00	100.00	1.69
Clamp 7	1.688	100.00	100.00	1.69
Clamp 8	1.688	100.00	100.00	1.69
Clamp 9	1.688	100.00	100.00	1.69
Clamp 10	1.688	100.00	100.00	1.69
Clamp 11	1.688	100.00	100.00	1.69
Clamp 12	1.688	100.00	100.00	1.69
Clamp 13	4.018	100.00	100.00	4.02
Clamp 14	4.967	100.00	100.00	4.97
Clamp 15	14.363	100.00	100.00	14.36
Clamp 16	4.967	100.00	100.00	4.97
Clamp 17	3.941	100.00	100.00	3.94

*** Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
11229	85.86	NESC Extreme	18	11163.8

Base Plate Results by Bend Line:

Pole Label	Load Case	Bend Line #	Start X (ft)	Start Y (ft)	End X (ft)	End Y (ft)	Length (in)	Bending Stress (ksi)	Bolt Mom. Sum (ft-k)	# Bolts Acting	Bolt Max Load (kips)	Min Plate Thickness (in)	Actual Thickness (in)	Usage %
11229	NESC Heavy	1	1.859	0.970	-0.090	2.095	27.000	12.535	23.798	1	-100.253	0.988	2.250	19.29
11229	NESC Heavy	2	2.095	-0.090	0.970	1.859	27.000	6.889	13.078	1	-55.094	0.732	2.250	10.60
11229	NESC Heavy	3	1.769	-1.125	1.769	1.125	27.000	0.716	1.359	1	5.631	0.236	2.250	1.10
11229	NESC Heavy	4	0.970	-1.859	2.095	0.090	27.000	8.266	15.693	1	66.111	0.802	2.250	12.72
11229	NESC Heavy	5	-0.090	-2.095	1.859	-0.970	27.000	13.829	26.253	1	110.600	1.038	2.250	21.28
11229	NESC Heavy	6	-1.125	-1.769	1.125	-1.769	27.000	16.083	30.532	1	126.558	1.119	2.250	24.74
11229	NESC Heavy	7	-1.859	-0.970	0.090	-2.095	27.000	13.716	26.038	1	109.693	1.034	2.250	21.10
11229	NESC Heavy	8	-2.095	0.090	-0.970	-1.859	27.000	8.069	15.319	1	64.534	0.793	2.250	12.41
11229	NESC Heavy	9	-1.769	1.125	-1.769	-1.125	27.000	0.484	0.919	1	3.809	0.194	2.250	0.74
11229	NESC Heavy	10	-0.970	1.859	-2.095	-0.090	27.000	7.086	13.452	1	-56.671	0.743	2.250	10.90
11229	NESC Heavy	11	0.090	2.095	-1.859	0.970	27.000	12.649	24.013	1	-101.160	0.993	2.250	19.46
11229	NESC Heavy	12	1.125	1.769	-1.125	1.769	27.000	14.883	28.255	1	-117.118	1.077	2.250	22.90
11229	NESC Heavy	13	1.561	1.478	-0.613	2.060	27.000	12.488	23.707	2	-117.118	0.986	2.250	19.21
11229	NESC Heavy	14	2.091	0.500	0.500	2.091	27.000	8.642	16.407	2	-100.253	0.820	2.250	13.30
11229	NESC Heavy	15	2.060	-0.613	1.478	1.561	27.000	3.449	6.548	2	-55.094	0.518	2.250	5.31
11229	NESC Heavy	16	1.478	-1.561	2.060	0.613	27.000	4.073	7.733	2	66.111	0.563	2.250	6.27
11229	NESC Heavy	17	0.500	-2.091	2.091	-0.500	27.000	9.831	18.663	2	110.600	0.875	2.250	15.12
11229	NESC Heavy	18	-0.613	-2.060	1.561	-1.478	27.000	13.623	25.862	2	126.558	1.030	2.250	20.96
11229	NESC Heavy	19	-1.561	-1.478	0.613	-2.060	27.000	13.571	25.764	2	126.558	1.028	2.250	20.88
11229	NESC Heavy	20	-2.091	-0.500	-0.500	-2.091	27.000	9.692	18.400	2	109.693	0.869	2.250	14.91
11229	NESC Heavy	21	-2.060	0.613	-1.478	-1.561	27.000	3.878	7.362	2	64.534	0.550	2.250	5.97
11229	NESC Heavy	22	-1.478	1.561	-2.060	-0.613	27.000	3.433	6.517	2	-56.671	0.517	2.250	5.28
11229	NESC Heavy	23	-0.500	2.091	-2.091	0.500	27.000	8.780	16.669	2	-101.160	0.827	2.250	13.51
11229	NESC Heavy	24	0.613	2.060	-1.561	1.478	27.000	12.539	23.805	2	-117.118	0.988	2.250	19.29
11229	NESC Extreme	1	1.859	0.970	-0.090	2.095	27.000	18.995	36.061	1	-151.915	1.216	2.250	29.22
11229	NESC Extreme	2	2.095	-0.090	0.970	1.859	27.000	10.553	20.034	1	-84.398	0.907	2.250	16.24
11229	NESC Extreme	3	1.769	-1.125	1.769	1.125	27.000	0.720	1.368	1	5.669	0.237	2.250	1.11
11229	NESC Extreme	4	0.970	-1.859	2.095	0.090	27.000	11.858	22.511	1	94.833	0.961	2.250	18.24
11229	NESC Extreme	5	-0.090	-2.095	1.859	-0.970	27.000	19.991	37.953	1	159.885	1.248	2.250	30.76
11229	NESC Extreme	6	-1.125	-1.769	1.125	-1.769	27.000	23.190	44.025	1	182.487	1.344	2.250	35.68
11229	NESC Extreme	7	-1.859	-0.970	0.090	-2.095	27.000	19.575	37.161	1	156.551	1.235	2.250	30.11
11229	NESC Extreme	8	-2.095	0.090	-0.970	-1.859	27.000	11.133	21.135	1	89.035	0.931	2.250	17.13
11229	NESC Extreme	9	-1.769	1.125	-1.769	-1.125	27.000	0.131	0.249	1	-1.033	0.101	2.250	0.20
11229	NESC Extreme	10	-0.970	1.859	-2.095	-0.090	27.000	11.278	21.410	1	-90.197	0.937	2.250	17.35
11229	NESC Extreme	11	0.090	2.095	-1.859	0.970	27.000	19.412	36.852	1	-155.248	1.230	2.250	29.86
11229	NESC Extreme	12	1.125	1.769	-1.125	1.769	27.000	22.601	42.906	1	-177.850	1.327	2.250	34.77
11229	NESC Extreme	13	1.561	1.478	-0.613	2.060	27.000	18.945	35.966	2	-177.850	1.215	2.250	29.15
11229	NESC Extreme	14	2.091	0.500	0.500	2.091	27.000	13.146	24.958	2	-151.915	1.012	2.250	20.23
11229	NESC Extreme	15	2.060	-0.613	1.478	1.561	27.000	5.112	9.705	2	-84.398	0.631	2.250	7.86
11229	NESC Extreme	16	1.478	-1.561	2.060	0.613	27.000	5.703	10.827	2	94.833	0.666	2.250	8.77
11229	NESC Extreme	17	0.500	-2.091	2.091	-0.500	27.000	14.170	26.901	2	159.885	1.051	2.250	21.80

11229	NESC Extreme	18	-0.613	-2.060	1.561	-1.478	27.000	19.666	37.335	2	182.487	1.238	2.250	30.26
11229	NESC Extreme	19	-1.561	-1.478	0.613	-2.060	27.000	19.477	36.976	2	182.487	1.232	2.250	29.96
11229	NESC Extreme	20	-2.091	-0.500	-0.500	-2.091	27.000	13.662	25.937	2	156.551	1.032	2.250	21.02
11229	NESC Extreme	21	-2.060	0.613	-1.478	-1.561	27.000	5.105	9.692	2	89.035	0.631	2.250	7.85
11229	NESC Extreme	22	-1.478	1.561	-2.060	-0.613	27.000	5.171	9.817	2	-90.197	0.635	2.250	7.96
11229	NESC Extreme	23	-0.500	2.091	-2.091	0.500	27.000	13.654	25.922	2	-155.248	1.031	2.250	21.01
11229	NESC Extreme	24	0.613	2.060	-1.561	1.478	27.000	19.134	36.324	2	-177.850	1.221	2.250	29.44
11229	NESC Extreme Ice w/ Wind	1	1.859	0.970	-0.090	2.095	27.000	8.453	16.047	1	-67.601	0.811	2.250	13.00
11229	NESC Extreme Ice w/ Wind	2	2.095	-0.090	0.970	1.859	27.000	4.599	8.731	1	-36.781	0.598	2.250	7.08
11229	NESC Extreme Ice w/ Wind	3	1.769	-1.125	1.769	1.125	27.000	0.601	1.141	1	4.728	0.216	2.250	0.92
11229	NESC Extreme Ice w/ Wind	4	0.970	-1.859	2.095	0.090	27.000	5.767	10.948	1	46.120	0.670	2.250	8.87
11229	NESC Extreme Ice w/ Wind	5	-0.090	-2.095	1.859	-0.970	27.000	9.580	18.187	1	76.617	0.864	2.250	14.74
11229	NESC Extreme Ice w/ Wind	6	-1.125	-1.769	1.125	-1.769	27.000	11.135	21.139	1	87.624	0.931	2.250	17.13
11229	NESC Extreme Ice w/ Wind	7	-1.859	-0.970	0.090	-2.095	27.000	9.525	18.083	1	76.181	0.861	2.250	14.65
11229	NESC Extreme Ice w/ Wind	8	-2.095	0.090	-0.970	-1.859	27.000	5.672	10.768	1	45.362	0.665	2.250	8.73
11229	NESC Extreme Ice w/ Wind	9	-1.769	1.125	-1.769	-1.125	27.000	0.490	0.929	1	3.852	0.195	2.250	0.75
11229	NESC Extreme Ice w/ Wind	10	-0.970	1.859	-2.095	-0.090	27.000	4.694	8.911	1	-37.539	0.605	2.250	7.22
11229	NESC Extreme Ice w/ Wind	11	0.090	2.095	-1.859	0.970	27.000	8.507	16.150	1	-68.037	0.814	2.250	13.09
11229	NESC Extreme Ice w/ Wind	12	1.125	1.769	-1.125	1.769	27.000	10.045	19.069	1	-79.044	0.884	2.250	15.45
11229	NESC Extreme Ice w/ Wind	13	1.561	1.478	-0.613	2.060	27.000	8.425	15.994	2	-79.044	0.810	2.250	12.96
11229	NESC Extreme Ice w/ Wind	14	2.091	0.500	0.500	2.091	27.000	5.807	11.024	2	-67.601	0.673	2.250	8.93
11229	NESC Extreme Ice w/ Wind	15	2.060	-0.613	1.478	1.561	27.000	2.359	4.478	2	-36.781	0.429	2.250	3.63
11229	NESC Extreme Ice w/ Wind	16	1.478	-1.561	2.060	0.613	27.000	2.888	5.483	2	46.120	0.474	2.250	4.44
11229	NESC Extreme Ice w/ Wind	17	0.500	-2.091	2.091	-0.500	27.000	6.828	12.962	2	76.617	0.729	2.250	10.50
11229	NESC Extreme Ice w/ Wind	18	-0.613	-2.060	1.561	-1.478	27.000	9.434	17.910	2	87.624	0.857	2.250	14.51
11229	NESC Extreme Ice w/ Wind	19	-1.561	-1.478	0.613	-2.060	27.000	9.410	17.863	2	87.624	0.856	2.250	14.48
11229	NESC Extreme Ice w/ Wind	20	-2.091	-0.500	-0.500	-2.091	27.000	6.762	12.836	2	76.181	0.726	2.250	10.40
11229	NESC Extreme Ice w/ Wind	21	-2.060	0.613	-1.478	-1.561	27.000	2.794	5.305	2	45.362	0.467	2.250	4.30
11229	NESC Extreme Ice w/ Wind	22	-1.478	1.561	-2.060	-0.613	27.000	2.351	4.463	2	-37.539	0.428	2.250	3.62
11229	NESC Extreme Ice w/ Wind	23	-0.500	2.091	-2.091	0.500	27.000	5.873	11.150	2	-68.037	0.676	2.250	9.04
11229	NESC Extreme Ice w/ Wind	24	0.613	2.060	-1.561	1.478	27.000	8.449	16.041	2	-79.044	0.811	2.250	13.00

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Davit1	14.28	NESC Extreme Ice w/ Wind	1	52.8
Davit2	20.25	NESC Heavy	1	256.6
Davit3	20.39	NESC Heavy	1	256.6
Davit4	20.54	NESC Heavy	1	256.6

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	56.09	11229	Steel Pole
NESC Extreme	85.86	11229	Steel Pole
NESC Extreme Ice w/ Wind	39.18	11229	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case Maximum Steel Pole Segment

	Usage %	Label	Number
NESC Heavy	56.09	11229	18
NESC Extreme	85.86	11229	18
NESC Extreme Ice w/ Wind	39.18	11229	18

Summary of Base Plate Usages by Load Case:

Load Case	Pole Label	Bend Line #	Length (in)	Vertical Load (kips)	X Moment (ft-k)	Y Moment (ft-k)	Bending Stress (ksi)	Bolt Moment Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC Heavy	11229	6	27.000	56.638	-1465.899	10.964	16.083	30.532	1	126.558	1.119	24.74
NESC Extreme	11229	6	27.000	27.818	-2167.707	40.315	23.190	44.025	1	182.487	1.344	35.68
NESC Extreme Ice w/ Wind	11229	6	27.000	51.482	-1002.641	5.270	11.135	21.139	1	87.624	0.931	17.13

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	20.54	Davit4	1
NESC Extreme	11.32	Davit4	1
NESC Extreme Ice w/ Wind	18.94	Davit4	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp 1	Clamp	2.69	NESC Heavy	0.0
Clamp 2	Clamp	6.13	NESC Heavy	0.0
Clamp 3	Clamp	6.13	NESC Heavy	0.0
Clamp 4	Clamp	6.13	NESC Heavy	0.0
Clamp 5	Clamp	1.69	NESC Extreme Ice w/ Wind	0.0
Clamp 6	Clamp	1.69	NESC Extreme Ice w/ Wind	0.0
Clamp 7	Clamp	1.69	NESC Extreme Ice w/ Wind	0.0
Clamp 8	Clamp	1.69	NESC Extreme Ice w/ Wind	0.0
Clamp 9	Clamp	1.69	NESC Extreme Ice w/ Wind	0.0
Clamp 10	Clamp	1.69	NESC Extreme Ice w/ Wind	0.0
Clamp 11	Clamp	1.69	NESC Extreme Ice w/ Wind	0.0
Clamp 12	Clamp	1.69	NESC Extreme Ice w/ Wind	0.0
Clamp 13	Clamp	32.87	NESC Extreme	0.0
Clamp 14	Clamp	41.06	NESC Extreme	0.0
Clamp 15	Clamp	17.11	NESC Heavy	0.0
Clamp 16	Clamp	41.06	NESC Extreme	0.0
Clamp 17	Clamp	32.71	NESC Extreme	0.0

Loads At Insulator Attachments For All Load Cases:

Load Case	Insulator Label	Insulator Type	Structure Attach Label	Structure Attach Load X (kips)	Structure Attach Load Y (kips)	Structure Attach Load Z (kips)	Structure Attach Load Res. (kips)
NESC Heavy	Clamp 1	Clamp	Davit1:End	-0.003	-2.417	1.183	2.691
NESC Heavy	Clamp 2	Clamp	Davit2:End	-0.009	-4.665	3.984	6.135

NESC Heavy	Clamp 3	Clamp	Davit3:End	-0.010	-4.662	3.984	6.132
NESC Heavy	Clamp 4	Clamp	Davit4:End	-0.010	-4.660	3.984	6.131
NESC Heavy	Clamp 5	Clamp	11229:WVGD1	0.000	-0.225	1.380	1.398
NESC Heavy	Clamp 6	Clamp	11229:WVGD2	0.000	-0.225	1.380	1.398
NESC Heavy	Clamp 7	Clamp	11229:WVGD3	0.000	-0.225	1.380	1.398
NESC Heavy	Clamp 8	Clamp	11229:WVGD4	0.000	-0.225	1.380	1.398
NESC Heavy	Clamp 9	Clamp	11229:WVGD5	0.000	-0.225	1.380	1.398
NESC Heavy	Clamp 10	Clamp	11229:WVGD6	0.000	-0.225	1.380	1.398
NESC Heavy	Clamp 11	Clamp	11229:WVGD7	0.000	-0.225	1.380	1.398
NESC Heavy	Clamp 12	Clamp	11229:WVGD8	0.000	-0.225	1.380	1.398
NESC Heavy	Clamp 13	Clamp	11229:TopConn	0.000	-8.920	0.000	8.920
NESC Heavy	Clamp 14	Clamp	11229:BotConT	-11.106	0.000	0.000	11.106
NESC Heavy	Clamp 15	Clamp	11229:BotConn	0.000	-3.602	16.727	17.110
NESC Heavy	Clamp 16	Clamp	11229:BotConB	11.106	0.000	0.000	11.106
NESC Heavy	Clamp 17	Clamp	11229:conn	0.000	8.814	0.000	8.814
NESC Extreme	Clamp 1	Clamp	Davit1:End	0.004	-1.706	0.420	1.757
NESC Extreme	Clamp 2	Clamp	Davit2:End	0.003	-4.222	1.980	4.663
NESC Extreme	Clamp 3	Clamp	Davit3:End	0.003	-4.167	1.980	4.613
NESC Extreme	Clamp 4	Clamp	Davit4:End	0.004	-4.103	1.980	4.556
NESC Extreme	Clamp 5	Clamp	11229:WVGD1	0.000	-0.668	0.374	0.766
NESC Extreme	Clamp 6	Clamp	11229:WVGD2	0.000	-0.668	0.374	0.766
NESC Extreme	Clamp 7	Clamp	11229:WVGD3	0.000	-0.668	0.374	0.766
NESC Extreme	Clamp 8	Clamp	11229:WVGD4	0.000	-0.668	0.374	0.766
NESC Extreme	Clamp 9	Clamp	11229:WVGD5	0.000	-0.668	0.374	0.766
NESC Extreme	Clamp 10	Clamp	11229:WVGD6	0.000	-0.668	0.374	0.766
NESC Extreme	Clamp 11	Clamp	11229:WVGD7	0.000	-0.668	0.374	0.766
NESC Extreme	Clamp 12	Clamp	11229:WVGD8	0.000	-0.668	0.374	0.766
NESC Extreme	Clamp 13	Clamp	11229:TopConn	0.000	-32.865	0.000	32.865
NESC Extreme	Clamp 14	Clamp	11229:BotConT	-41.060	0.000	0.000	41.060
NESC Extreme	Clamp 15	Clamp	11229:BotConn	0.000	-13.299	8.200	15.624
NESC Extreme	Clamp 16	Clamp	11229:BotConB	41.060	0.000	0.000	41.060
NESC Extreme	Clamp 17	Clamp	11229:conn	0.000	32.711	0.000	32.711
NESC Extreme Ice w/ Wind	Clamp 1	Clamp	Davit1:End	-0.003	-1.857	1.642	2.479
NESC Extreme Ice w/ Wind	Clamp 2	Clamp	Davit2:End	-0.005	-3.300	3.856	5.075
NESC Extreme Ice w/ Wind	Clamp 3	Clamp	Davit3:End	-0.005	-3.298	3.856	5.074
NESC Extreme Ice w/ Wind	Clamp 4	Clamp	Davit4:End	-0.005	-3.296	3.856	5.073
NESC Extreme Ice w/ Wind	Clamp 5	Clamp	11229:WVGD1	0.000	-0.095	1.685	1.688
NESC Extreme Ice w/ Wind	Clamp 6	Clamp	11229:WVGD2	0.000	-0.095	1.685	1.688
NESC Extreme Ice w/ Wind	Clamp 7	Clamp	11229:WVGD3	0.000	-0.095	1.685	1.688
NESC Extreme Ice w/ Wind	Clamp 8	Clamp	11229:WVGD4	0.000	-0.095	1.685	1.688
NESC Extreme Ice w/ Wind	Clamp 9	Clamp	11229:WVGD5	0.000	-0.095	1.685	1.688
NESC Extreme Ice w/ Wind	Clamp 10	Clamp	11229:WVGD6	0.000	-0.095	1.685	1.688
NESC Extreme Ice w/ Wind	Clamp 11	Clamp	11229:WVGD7	0.000	-0.095	1.685	1.688
NESC Extreme Ice w/ Wind	Clamp 12	Clamp	11229:WVGD8	0.000	-0.095	1.685	1.688
NESC Extreme Ice w/ Wind	Clamp 13	Clamp	11229:TopConn	0.000	-4.018	0.000	4.018
NESC Extreme Ice w/ Wind	Clamp 14	Clamp	11229:BotConT	-4.967	0.000	0.000	4.967
NESC Extreme Ice w/ Wind	Clamp 15	Clamp	11229:BotConn	0.000	-1.611	14.272	14.363
NESC Extreme Ice w/ Wind	Clamp 16	Clamp	11229:BotConB	4.967	0.000	0.000	4.967
NESC Extreme Ice w/ Wind	Clamp 17	Clamp	11229:conn	0.000	3.941	0.000	3.941

Overturning Moments For User Input Concentrated Loads:

Moments are static equivalents based on central axis of 0,0 (i.e. a single pole).

Load Case	Total Tran. Load (kips)	Total Long. Load (kips)	Total Vert. Load (kips)	Transverse Overturning Moment (ft-k)	Longitudinal Overturning Moment (ft-k)	Torsional Moment (ft-k)

NESC Heavy	-21.912	-0.032	40.902	-1510.686	-12.950	-0.300
NESC Extreme	-32.995	0.014	17.552	-2358.185	-40.196	0.117
NESC Extreme Ice w/ Wind	-14.199	-0.018	40.962	-1007.325	-6.043	-0.162

*** Weight of structure (lbs):

Weight of Tubular Davit Arms:	822.7
Weight of Steel Poles:	11163.8
Total:	11986.5

*** End of Report

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Branford, CT 06405 F: (203) 488-8587

Subject:	Anchor Bolt Analysis Pole #11229
Location:	Waterbury,CT
Rev. 4: 4/2/18	Prepared by: T.J.L. Checked by: C.F.C. Job No. 17010.09

Anchor Bolt Analysis:

Input Data:

Bolt Force:

Maximum Tensile Force = $T_{Max} := 183 \cdot kips$ (User Input from PLS-Pole)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts = $N := 12$ (User Input)

Bolt "Column" Distance = $l := 3.0 \cdot in$ (User Input)

Bolt Ultimate Strength = $F_u := 100 \cdot ksi$ (User Input)

Bolt Yeild Strength= $F_y := 75 \cdot ksi$ (User Input)

Bolt Modulus = $E := 29000 \cdot ksi$ (User Input)

Diameter of Anchor Bolts = $D := 2.25 \cdot in$ (User Input)

Threads per Inch = $n := 4.5$ (User Input)

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Bolt Tension Check:

Allowable Tensile Force (Net Area) = $T_{ALL.Net} := 1.0 \cdot (A_n \cdot F_y) = 243.576 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Net}} = 75.13 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Net}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

Caisson Foundation:

Input Data:

Shear Force =	$S := 26.73 \cdot 1.1k = 29.403 \cdot k$	*USER INPUT-FROM PLS-Pole*
Overturning Moment =	$M := 2168 \cdot 1.1ft \cdot k = 2385 \cdot ft \cdot k$	*USER INPUT-FROM PLS-Pole*
Applied Axial Load =	$A1 := 29.26 \cdot 1.1k = 32.186 \cdot k$	*USER INPUT-FROM PLS-Pole*
Bending Moment =	$Mu := 2536ft \cdot k$	*USER INPUT--FROM LPILE*
Moment Capacity =	$Mn := 9365ft \cdot k$	*USER INPUT--FROM LPILE*
Foundation Diameter =	$d := 7.0ft$	*USER INPUT*
Overall Length of Caisson =	$L_c := 20.0ft$	*USER INPUT*
Depth From Top of Caisson to Grade =	$L_{pag} := 0.5ft$	*USER INPUT*
Number of Rebar =	$n := 36$	*USER INPUT*
Area of Rebar =	$Ar := 1.56in^2$	*USER INPUT*
Rebar Yield Strength =	$fy := 60ksi$	*USER INPUT*
Concrete Comp Strength =	$f'c := 3ksi$	*USER INPUT*

Check Moment Capacity:

Factor of Safety = $FS := \frac{0.9Mn}{Mu} = 3.3$

Factor of Safety Required = $FS_{reqd} := 1.0$

$FOSCheck := if\left(FS \geq FS_{reqd}, \text{"OK"}, \text{"NO GOOD"}\right)$

$FOSCheck = \text{"OK"}$

```
===============================================================================

              LPILE Plus for Windows, Version 5.0 (5.0.47)

              Analysis of Individual Piles and Drilled Shafts
             Subjected to Lateral Loading Using the p-y Method
```



```
===============================================================================

This program is licensed to:

TJL
Centek Engineering

--------------------------------------------------------------------------------
                          Files Used for Analysis
--------------------------------------------------------------------------------

Path to file locations:      J:\Jobs\1701000.WI\09_Waterbury North
CT2901\04_Structural\Backup Documentation\Calcs\Rev (4)\L-Pile\
Name of input data file:     Structure 11229.lpd
Name of output file:         Structure 11229.lpo
Name of plot output file:    Structure 11229.lpp
Name of runtime file:        Structure 11229.lpr


-------------------------------------------------------------------------------
                        Time and Date of Analysis
-------------------------------------------------------------------------------

               Date:  April  2, 2018     Time:  13:30:29


-------------------------------------------------------------------------------
                              Problem Title
-------------------------------------------------------------------------------

AT&T - CT2901 / Pole - 11229


-------------------------------------------------------------------------------
                              Program Options
-------------------------------------------------------------------------------

Units Used in Computations - US Customary Units: Inches, Pounds
```

Basic Program Options:

Analysis Type 3:
- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis uses p-y multiplers for group action
- Analysis assumes no shear resistance at pile tip
- Analysis includes automatic computation of pile-top deflection vs. pile embedment length
- No computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments   =   100
- Maximum number of iterations allowed =   1000
- Deflection tolerance for convergence =   1.0000E-05 in
- Maximum allowable deflection   =   1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 1

Pile Structural Properties and Geometry

Pile Length   =   240.00 in

Depth of ground surface below top of pile =   6.00 in

Slope angle of ground surface   =   8.50 deg.

Structural properties of pile defined using 2 points

Point No.	Point Depth in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	84.00000000	2443920.	5541.8000	3122019.
2	240.0000	84.00000000	2443920.	5541.8000	3122019.

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of moment of inertia and modulus of are not used for any computations other than total stress due to combined axial loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 6.000 in
Distance from top of pile to bottom of layer = 300.000 in
p-y subgrade modulus k for top of soil layer = 125.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 125.000 lbs/in**3

(Depth of lowest layer extends 60.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 2 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	6.00	0.07523
2	300.00	0.07523

Shear Strength of Soils

Shear strength parameters with depth defined using 2 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	6.000	0.00000	36.00	------	------
2	300.000	0.00000	36.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

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p-y Modification Factors

Distribution of p-y multipliers with depth defined using 2 points

Point No.	Depth X in	p-mult	y-mult
1	6.000	0.0100	1.0000
2	54.000	0.0100	1.0000

Loading Type

Static loading criteria was used for computation of p-y curves.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 29403.000 lbs
Bending moment at pile head = 28620000.000 in-lbs
Axial load at pile head = 32186.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

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Number of sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter	=	84.0000	in

Material Properties:

Compressive Strength of Concrete	=	3.000	kip/in**2
Yield Stress of Reinforcement	=	60.	kip/in**2
Modulus of Elasticity of Reinforcement	=	29000.	kip/in**2
Number of Reinforcing Bars	=	36	
Area of Single Bar	=	1.56000	in**2
Number of Rows of Reinforcing Bars	=	19	
Area of Steel	=	56.160	in**2
Area of Shaft	=	5541.769	in**2
Percentage of Steel Reinforcement	=	1.013	percent
Cover Thickness (edge to bar center)	=	4.330	in

Unfactored Axial Squash Load Capacity	=	17357.90	kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	1.560	37.670
2	3.120	37.098
3	3.120	35.398
4	3.120	32.623
5	3.120	28.857
6	3.120	24.214
7	3.120	18.835
8	3.120	12.884
9	3.120	6.541
10	3.120	0.000
11	3.120	-6.541
12	3.120	-12.884
13	3.120	-18.835

14	3.120	-24.214
15	3.120	-28.857
16	3.120	-32.623
17	3.120	-35.398
18	3.120	-37.098
19	1.560	-37.670

Axial Thrust Force = 32186.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
5517947.	8.828715E+12	6.250000E-07	0.00002804	44.85713857	86.17727794	734.55439
10983471.	8.786777E+12	0.00000125	0.00005438	43.50445658	165.72679	1420.07405
16396643.	8.744876E+12	0.00000188	0.00008076	43.07229799	244.07614	2106.61245
21755824.	8.702330E+12	0.00000250	0.00010711	42.84204322	321.01223	2792.12313
27061848.	8.659791E+12	0.00000313	0.00013345	42.70379823	396.64215	3477.62546
27061848.	7.216493E+12	0.00000375	0.00008951	23.86803335	266.28065	6068.46387
27061848.	6.185565E+12	0.00000438	0.00010369	23.70044357	307.06838	7101.13747
27061848.	5.412370E+12	0.00000500	0.00011771	23.54212886	347.01114	8138.54132
27061848.	4.810995E+12	0.00000563	0.00013175	23.42247158	386.65177	9175.37807
27061848.	4.329896E+12	0.00000625	0.00014581	23.32990104	425.98918	10211.64294
27061848.	3.936269E+12	0.00000688	0.00015989	23.25705224	465.02226	11247.33146
27061848.	3.608246E+12	0.00000750	0.00017399	23.19901103	503.74976	12282.44010
27061848.	3.330689E+12	0.00000813	0.00018811	23.15238279	542.17060	13316.96355
27061848.	3.092783E+12	0.00000875	0.00020225	23.11473674	580.28352	14350.89805
27061848.	2.886597E+12	0.00000938	0.00021642	23.08429545	618.08741	15384.23842
27061848.	2.706185E+12	0.00001000	0.00023060	23.05972213	655.58098	

16416.98058					
27061848.	2.546997E+12	0.00001063	0.00024480	23.03999537	692.76301
17449.12018					
27061848.	2.405498E+12	0.00001125	0.00025902	23.02432412	729.63231
18480.65176					
27137818.	2.285290E+12	0.00001188	0.00027327	23.01208252	766.18765
19511.57033					
28513594.	2.281088E+12	0.00001250	0.00028753	23.00276738	802.42770
20541.87182					
29887481.	2.277141E+12	0.00001313	0.00030182	22.99597567	838.35125
21571.55051					
31259466.	2.273416E+12	0.00001375	0.00031613	22.99137443	873.95695
22600.60194					
32629536.	2.269881E+12	0.00001438	0.00033046	22.98869079	909.24353
23629.02078					
33997677.	2.266512E+12	0.00001500	0.00034482	22.98769444	944.20956
24656.80292					
35363882.	2.263288E+12	0.00001563	0.00035919	22.98820013	978.85392
25683.94057					
36728131.	2.260193E+12	0.00001625	0.00037359	22.99004012	1013.17504
26710.43109					
38090413.	2.257210E+12	0.00001688	0.00038801	22.99307925	1047.17163
27736.26809					
39450716.	2.254327E+12	0.00001750	0.00040245	22.99719983	1080.84230
28761.44608					
40809027.	2.251533E+12	0.00001813	0.00041692	23.00230175	1114.18570
29785.95889					
42165330.	2.248818E+12	0.00001875	0.00043141	23.00829488	1147.20030
30809.80216					
43519611.	2.246173E+12	0.00001938	0.00044592	23.01510412	1179.88470
31832.96963					
44871859.	2.243593E+12	0.00002000	0.00046045	23.02266437	1212.23752
32855.45467					
46222057.	2.241069E+12	0.00002063	0.00047501	23.03091556	1244.25720
33877.25238					
47570188.	2.238597E+12	0.00002125	0.00048960	23.03980511	1275.94219
34898.35760					
48916241.	2.236171E+12	0.00002188	0.00050420	23.04929048	1307.29109
35918.76260					
50260203.	2.233787E+12	0.00002250	0.00051883	23.05933160	1338.30238
36938.46113					
51602054.	2.231440E+12	0.00002313	0.00053349	23.06989092	1368.97442
37957.44815					
52941783.	2.229128E+12	0.00002375	0.00054817	23.08093840	1399.30571
38975.71618					
54279369.	2.226846E+12	0.00002438	0.00056288	23.09244400	1429.29458
39993.25990					
56948061.	2.222363E+12	0.00002563	0.00059237	23.11673445	1488.23876
42026.14547					

59608001.	2.217972E+12	0.00002688	0.00062196	23.14258951	1545.79382	44056.05055
62259048.	2.213655E+12	0.00002813	0.00065165	23.16986650	1601.94610	46082.92138
64901076.	2.209398E+12	0.00002938	0.00068145	23.19845527	1656.68190	48106.69716
67533931.	2.205190E+12	0.00003063	0.00071137	23.22825819	1709.98671	50127.32194
70157477.	2.201019E+12	0.00003188	0.00074139	23.25920266	1761.84603	52144.73079
72771554.	2.196877E+12	0.00003313	0.00077152	23.29122359	1812.24462	54158.86209
75376003.	2.192756E+12	0.00003438	0.00080177	23.32426840	1861.16682	56169.65119
77970666.	2.188650E+12	0.00003563	0.00083214	23.35829705	1908.59669	58177.02811
80539550.	2.184123E+12	0.00003688	0.00086256	23.39154714	1954.42069	60000.00000
82662019.	2.168184E+12	0.00003813	0.00089132	23.37897509	1996.10703	60000.00000
84403524.	2.143582E+12	0.00003938	0.00091861	23.32966822	2034.18989	60000.00000
86008031.	2.117121E+12	0.00004063	0.00094540	23.27130157	2070.24558	60000.00000
87365005.	2.086328E+12	0.00004188	0.00097117	23.19218677	2103.65899	60000.00000
88716952.	2.057205E+12	0.00004313	0.00099702	23.11938554	2135.96098	60000.00000
89819743.	2.024107E+12	0.00004438	0.00102174	23.02519280	2165.66790	60000.00000
90870466.	1.991681E+12	0.00004563	0.00104629	22.93240196	2194.06727	60000.00000
91917062.	1.960897E+12	0.00004688	0.00107090	22.84594971	2221.45037	60000.00000
92864360.	1.929649E+12	0.00004813	0.00109506	22.75443310	2247.23874	60000.00000
93652006.	1.896749E+12	0.00004938	0.00111841	22.65128821	2271.13762	60000.00000
94436281.	1.865408E+12	0.00005063	0.00114181	22.55436426	2294.11102	60000.00000
95217163.	1.835512E+12	0.00005188	0.00116528	22.46322817	2316.15227	60000.00000
95856705.	1.804361E+12	0.00005313	0.00119000	22.39999992	2338.34106	60000.00000
96710271.	1.778580E+12	0.00005438	0.00121482	22.34146553	2359.50768	60000.00000
97268994.	1.748656E+12	0.00005563	0.00123669	22.23261791	2377.15312	60000.00000
97825107.	1.720002E+12	0.00005688	0.00125861	22.12946552	2393.98146	

						60000.00000
98378604.	1.692535E+12	0.00005813	0.00128059	22.03165537	2409.98697	60000.00000
98929438.	1.666180E+12	0.00005938	0.00130262	21.93885702	2425.16344	60000.00000
99477603.	1.640868E+12	0.00006063	0.00132470	21.85077506	2439.50492	60000.00000
1.000230E+08	1.616534E+12	0.00006188	0.00134684	21.76712912	2453.00493	60000.00000
1.004736E+08	1.591662E+12	0.00006313	0.00136826	21.67545229	2465.21493	60000.00000
1.008531E+08	1.566650E+12	0.00006438	0.00138916	21.57913166	2476.32142	60000.00000
1.012303E+08	1.542558E+12	0.00006563	0.00141010	21.48720700	2486.67217	60000.00000
1.016054E+08	1.519333E+12	0.00006688	0.00143109	21.39943296	2496.26166	60000.00000
1.019782E+08	1.496928E+12	0.00006813	0.00145212	21.31559426	2505.08464	60000.00000
1.023489E+08	1.475299E+12	0.00006938	0.00147321	21.23548311	2513.13552	60000.00000
1.027172E+08	1.454403E+12	0.00007063	0.00149435	21.15890926	2520.40871	60000.00000
1.030833E+08	1.434202E+12	0.00007188	0.00151553	21.08569497	2526.89849	60000.00000
1.034470E+08	1.414660E+12	0.00007313	0.00153677	21.01567751	2532.59913	60000.00000
1.037433E+08	1.394867E+12	0.00007438	0.00156187	20.99999875	2538.33164	60000.00000
1.043989E+08	1.358035E+12	0.00007688	0.00160350	20.85848683	2545.28000	60000.00000
1.048604E+08	1.321076E+12	0.00007938	0.00164276	20.69617671	2548.99450	60000.00000
1.053142E+08	1.286280E+12	0.00008188	0.00168221	20.54601806	2549.02856	60000.00000
1.057573E+08	1.253420E+12	0.00008438	0.00172184	20.40697700	2544.57348	60000.00000
1.061958E+08	1.222397E+12	0.00008688	0.00176166	20.27814478	2548.43427	60000.00000
1.066293E+08	1.193055E+12	0.00008938	0.00180169	20.15871531	2549.97218	60000.00000
1.070556E+08	1.165231E+12	0.00009188	0.00184197	20.04867107	2544.79400	60000.00000
1.074477E+08	1.138518E+12	0.00009438	0.00188197	19.94141060	2545.54374	60000.00000
1.077105E+08	1.111850E+12	0.00009688	0.00192013	19.82069689	2548.57466	60000.00000
1.079704E+08	1.086495E+12	0.00009938	0.00195844	19.70757598	2549.92603	60000.00000

1.082255E+08	1.062337E+12	0.00010188	0.00199697	19.60216302	2546.30711	60000.00000
1.085506E+08	1.040005E+12	0.00010438	0.00204523	19.59505087	2542.88178	60000.00000
1.087901E+08	1.017919E+12	0.00010688	0.00208284	19.48852891	2546.47541	60000.00000
1.090277E+08	9.968247E+11	0.00010938	0.00212056	19.38801008	2548.82732	60000.00000
1.092635E+08	9.766567E+11	0.00011188	0.00215842	19.29311389	2549.91912	60000.00000
1.094958E+08	9.573399E+11	0.00011438	0.00219647	19.20414823	2547.07379	60000.00000
1.097258E+08	9.388307E+11	0.00011688	0.00223468	19.12022191	2542.52173	60000.00000
1.099546E+08	9.210859E+11	0.00011938	0.00227297	19.04062396	2540.57651	60000.00000
1.101821E+08	9.040585E+11	0.00012188	0.00231137	18.96510655	2544.41377	60000.00000
1.104083E+08	8.877050E+11	0.00012438	0.00234987	18.89343435	2547.26385	60000.00000
1.105548E+08	8.713677E+11	0.00012688	0.00238638	18.80888468	2548.98624	60000.00000
1.106840E+08	8.555285E+11	0.00012938	0.00242253	18.72487825	2549.86271	60000.00000
1.108116E+08	8.402774E+11	0.00013188	0.00245882	18.64507753	2548.48228	60000.00000
1.109376E+08	8.255819E+11	0.00013438	0.00249524	18.56925720	2544.85586	60000.00000
1.110631E+08	8.114197E+11	0.00013688	0.00253173	18.49663371	2541.21919	60000.00000
1.111881E+08	7.977622E+11	0.00013938	0.00256827	18.42704183	2537.57210	60000.00000
1.113126E+08	7.845823E+11	0.00014188	0.00260487	18.36031884	2538.88320	60000.00000
1.114366E+08	7.718556E+11	0.00014438	0.00264153	18.29632455	2542.20907	60000.00000
1.115602E+08	7.595586E+11	0.00014688	0.00267825	18.23492128	2544.95381	60000.00000
1.115602E+08	7.468463E+11	0.00014938	0.00271862	18.19999892	2547.47908	60000.00000
1.115602E+08	7.345525E+11	0.00015188	0.00276412	18.19999892	2549.40842	60000.00000
1.119752E+08	7.253455E+11	0.00015438	0.00280908	18.19650167	2549.81707	60000.00000
1.120695E+08	7.143869E+11	0.00015688	0.00284630	18.14377016	2546.66518	60000.00000
1.121473E+08	7.036696E+11	0.00015938	0.00288478	18.10057658	2543.29291	60000.00000
1.122248E+08	6.932809E+11	0.00016188	0.00292332	18.05909532	2539.90990	

```
  60000.00000
  1.123019E+08  6.832057E+11    0.00016438    0.00296191   18.01925129    2536.51607
  60000.00000
  1.123786E+08  6.734300E+11    0.00016688    0.00300058   17.98097688    2533.11123
  60000.00000
  1.124549E+08  6.639403E+11    0.00016938    0.00303930   17.94420701    2535.67649
  60000.00000
  1.125308E+08  6.547244E+11    0.00017188    0.00307809   17.90888661    2539.21233
  60000.00000
  1.126062E+08  6.457702E+11    0.00017438    0.00311695   17.87495559    2542.25921
  60000.00000
  1.127557E+08  6.286034E+11    0.00017938    0.00319486   17.81105644    2546.86191
  60000.00000
  1.128692E+08  6.121720E+11    0.00018438    0.00327087   17.74032301    2549.32775
  60000.00000
  1.129080E+08  5.962138E+11    0.00018938    0.00334599   17.66857570    2549.41774
  60000.00000
  1.129312E+08  5.809967E+11    0.00019438    0.00342306   17.61059457    2543.87966
  60000.00000
  1.129538E+08  5.665395E+11    0.00019938    0.00350030   17.55637604    2538.31170
  60000.00000
  1.129757E+08  5.527861E+11    0.00020438    0.00357772   17.50566226    2532.71320
  60000.00000
  1.129968E+08  5.396861E+11    0.00020938    0.00365532   17.45822793    2527.08321
  60000.00000
  1.130171E+08  5.271937E+11    0.00021438    0.00373310   17.41386276    2531.69678
  60000.00000
  1.130367E+08  5.152671E+11    0.00021938    0.00381107   17.37238401    2537.86190
  60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 =  112377.48368
in-kip




-----------------------------------------------------------------------------
             Computed Values of Load Distribution and Deflection
                 for Lateral Loading for Load Case Number  1
-----------------------------------------------------------------------------

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
Specified shear force at pile head  =       29403.000 lbs
Specified moment at pile head       =    28620000.000 in-lbs
Specified axial load at pile head   =       32186.000 lbs

  Depth   Deflect.  Moment     Shear     Slope     Total   Flx. Rig. Soil Res.
Es*h
    X        y        M          V         S       Stress      EI        p
```

F/L

in	in	lbs-in	lbs	Rad.	lbs/in**2	lbs-in**2	lbs/in	
0.000	1.106	2.86E+07	29403.	-0.007290	497.657	2.28E+12	0.000	0.000
2.400	1.088	2.87E+07	29403.	-0.007260	498.879	2.28E+12	0.000	0.000
4.800	1.071	2.88E+07	29403.	-0.007230	500.102	2.28E+12	0.000	0.000
7.200	1.054	2.88E+07	29403.	-0.007199	501.324	2.28E+12	-0.411818	0.938123
9.600	1.036	2.89E+07	29401.	-0.007169	502.546	2.28E+12	-1.247	2.888
12.000	1.019	2.90E+07	29397.	-0.007138	503.768	2.28E+12	-2.097	4.937
14.400	1.002	2.90E+07	29390.	-0.007108	504.990	2.28E+12	-2.959	7.087
16.800	0.985026	2.91E+07	29382.	-0.007077	506.212	2.28E+12	-3.833	9.338
19.200	0.968077	2.92E+07	29372.	-0.007047	507.433	2.28E+12	-4.716	11.693
21.600	0.951202	2.93E+07	29360.	-0.007016	508.653	2.28E+12	-5.609	14.151
24.000	0.934401	2.93E+07	29345.	-0.006985	509.873	2.28E+12	-6.508	16.715
26.400	0.917675	2.94E+07	29328.	-0.006954	511.092	2.28E+12	-7.413	19.386
28.800	0.901022	2.95E+07	29310.	-0.006923	512.311	2.28E+12	-8.321	22.165
31.200	0.884444	2.95E+07	29288.	-0.006892	513.529	2.28E+12	-9.233	25.054
33.600	0.867941	2.96E+07	29265.	-0.006861	514.745	2.28E+12	-10.146	28.054
36.000	0.851513	2.97E+07	29240.	-0.006829	515.961	2.28E+12	-11.058	31.167
38.400	0.835160	2.98E+07	29212.	-0.006798	517.175	2.28E+12	-11.969	34.394
40.800	0.818882	2.98E+07	29182.	-0.006767	518.389	2.28E+12	-12.876	37.738
43.200	0.802679	2.99E+07	29150.	-0.006735	519.601	2.28E+12	-13.779	41.199
45.600	0.786552	3.00E+07	29116.	-0.006704	520.811	2.28E+12	-14.676	44.780
48.000	0.770501	3.00E+07	29080.	-0.006672	522.020	2.28E+12	-15.565	48.482
50.400	0.754526	3.01E+07	29041.	-0.006640	523.228	2.28E+12	-16.467	52.379
52.800	0.738627	3.02E+07	29001.	-0.006609	524.434	2.28E+12	-17.363	

56.417

55.200	0.722805	3.02E+07	26790.	-0.006577	525.638	2.28E+12	-1825.084	6060.007
57.600	0.707059	3.03E+07	22304.	-0.006545	526.661	2.28E+12	-1912.937	6493.164
60.000	0.691389	3.04E+07	17609.	-0.006513	527.495	2.28E+12	-1999.742	6941.647
62.400	0.675797	3.04E+07	12707.	-0.006481	528.131	2.28E+12	-2085.377	7405.930
64.800	0.660281	3.04E+07	7600.815	-0.006449	528.560	2.28E+12	-2169.718	7886.521
67.200	0.644843	3.04E+07	2293.983	-0.006417	528.775	2.28E+12	-2252.642	8383.968
69.600	0.629481	3.04E+07	-3210.021	-0.006385	528.766	2.28E+12	-2334.027	8898.858
72.000	0.614197	3.04E+07	-8907.351	-0.006353	528.527	2.28E+12	-2413.748	9431.824
74.400	0.598989	3.04E+07	-14794.	-0.006320	528.049	2.28E+12	-2491.684	9983.552
76.800	0.583859	3.03E+07	-20865.	-0.006288	527.323	2.28E+12	-2567.709	10555.
79.200	0.568805	3.03E+07	-27116.	-0.006256	526.344	2.28E+12	-2641.701	11146.
81.600	0.553828	3.02E+07	-33543.	-0.006225	525.103	2.28E+12	-2713.536	11759.
84.000	0.538927	3.01E+07	-40139.	-0.006193	523.594	2.28E+12	-2783.088	12394.
86.400	0.524103	3.00E+07	-46899.	-0.006161	521.809	2.28E+12	-2850.232	13052.
88.800	0.509354	2.99E+07	-53817.	-0.006129	519.741	2.28E+12	-2914.841	13734.
91.200	0.494681	2.98E+07	-60888.	-0.006098	517.386	2.28E+12	-2978.243	14449.
93.600	0.480084	2.96E+07	-68111.	-0.006067	514.735	2.28E+12	-3040.476	15200.
96.000	0.465561	2.94E+07	-75479.	-0.006036	511.783	2.28E+12	-3100.017	15981.
98.400	0.451113	2.93E+07	-82988.	-0.006005	508.525	2.28E+12	-3156.738	16794.
100.800	0.436739	2.90E+07	-90628.	-0.005974	504.953	2.28E+12	-3210.507	17643.
103.200	0.422438	2.88E+07	-98394.	-0.005944	501.064	2.28E+12	-3261.191	18528.
105.600	0.408210	2.86E+07	-1.06E+05	-0.005913	496.853	2.28E+12	-3308.653	19453.
108.000	0.394054	2.83E+07	-1.14E+05	-0.005883	492.313	2.28E+12	-3352.751	20420.
110.400	0.379969	2.80E+07	-1.22E+05	-0.005854	487.442	2.28E+12	-3393.342	21433.

112.800	0.365955	2.77E+07	-1.31E+05	-0.005825	482.235	2.28E+12	-3430.274	22496.
115.200	0.352011	2.74E+07	-1.39E+05	-0.005796	476.688	2.28E+12	-3463.392	23613.
117.600	0.338137	2.71E+07	-1.47E+05	-0.005777	470.798	8.66E+12	-3492.534	24789.
120.000	0.324280	2.67E+07	-1.56E+05	-0.005770	464.563	8.66E+12	-3517.362	26032.
122.400	0.310441	2.63E+07	-1.64E+05	-0.005763	457.979	8.66E+12	-3537.674	27350.
124.800	0.296619	2.59E+07	-1.73E+05	-0.005755	451.045	8.67E+12	-3553.250	28750.
127.200	0.282815	2.55E+07	-1.81E+05	-0.005748	443.759	8.67E+12	-3563.857	30243.
129.600	0.269028	2.50E+07	-1.90E+05	-0.005741	436.121	8.67E+12	-3569.242	31841.
132.000	0.255257	2.46E+07	-1.98E+05	-0.005734	428.129	8.68E+12	-3569.129	33558.
134.400	0.241503	2.41E+07	-2.07E+05	-0.005728	419.784	8.68E+12	-3571.178	35490.
136.800	0.227764	2.36E+07	-2.15E+05	-0.005721	411.086	8.69E+12	-3567.246	37589.
139.200	0.214041	2.31E+07	-2.24E+05	-0.005715	402.034	8.69E+12	-3556.917	39883.
141.600	0.200334	2.25E+07	-2.32E+05	-0.005708	392.630	8.70E+12	-3395.659	40680.
144.000	0.186641	2.19E+07	-2.40E+05	-0.005702	382.891	8.70E+12	-3219.561	41400.
146.400	0.172963	2.14E+07	-2.48E+05	-0.005696	372.832	8.70E+12	-3035.503	42120.
148.800	0.159299	2.08E+07	-2.55E+05	-0.005690	362.473	8.71E+12	-2843.491	42840.
151.200	0.145649	2.01E+07	-2.61E+05	-0.005685	351.832	8.71E+12	-2643.529	43560.
153.600	0.132012	1.95E+07	-2.67E+05	-0.005679	340.930	8.72E+12	-2435.622	44280.
156.000	0.118388	1.89E+07	-2.73E+05	-0.005674	329.787	8.72E+12	-2219.776	45000.
158.400	0.104776	1.82E+07	-2.78E+05	-0.005669	318.424	8.73E+12	-1995.991	45720.
160.800	0.091177	1.75E+07	-2.83E+05	-0.005664	306.863	8.73E+12	-1764.272	46440.
163.200	0.077589	1.68E+07	-2.87E+05	-0.005659	295.128	8.74E+12	-1524.621	47160.
165.600	0.064012	1.61E+07	-2.90E+05	-0.005655	283.241	8.75E+12	-1277.038	47880.
168.000	0.050446	1.54E+07	-2.93E+05	-0.005651	271.229	8.75E+12	-1021.524	48600.
170.400	0.036889	1.47E+07	-2.95E+05	-0.005646	259.115	8.75E+12	-758.079	

```
49320.
 172.800  0.023343  1.40E+07 -2.96E+05 -0.005642   246.926  8.76E+12  -486.703
50040.
 175.200  0.009806  1.33E+07 -2.97E+05 -0.005639   234.689  8.76E+12  -207.394
50760.
 177.600 -0.003723  1.26E+07 -2.97E+05 -0.005635   222.431  8.77E+12    79.850
51480.
 180.000 -0.017243  1.19E+07 -2.97E+05 -0.005632   210.182  8.78E+12   375.030
52200.
 182.400 -0.030755  1.12E+07 -2.95E+05 -0.005629   197.969  8.78E+12   678.151
52920.
 184.800 -0.044260  1.05E+07 -2.93E+05 -0.005626   185.824  8.79E+12   989.215
53640.
 187.200 -0.057758  9.77E+06 -2.91E+05 -0.005623   173.776  8.79E+12  1308.227
54360.
 189.600 -0.071250  9.08E+06 -2.87E+05 -0.005620   161.858  8.80E+12  1635.190
55080.
 192.000 -0.084736  8.40E+06 -2.83E+05 -0.005618   150.102  8.80E+12  1970.111
55800.
 194.400 -0.098216  7.72E+06 -2.78E+05 -0.005616   138.541  8.80E+12  2312.993
56520.
 196.800 -0.111692  7.06E+06 -2.72E+05 -0.005614   127.209  8.81E+12  2663.844
57240.
 199.200 -0.125162  6.42E+06 -2.65E+05 -0.005612   116.140  8.82E+12  3022.667
57960.
 201.600 -0.138629  5.79E+06 -2.57E+05 -0.005610   105.371  8.82E+12  3389.471
58680.
 204.000 -0.152091  5.19E+06 -2.49E+05 -0.005609    94.937  8.83E+12  3764.261
59400.
 206.400 -0.165551  4.60E+06 -2.39E+05 -0.005607    84.876  8.83E+12  4147.044
60120.
 208.800 -0.179007  4.04E+06 -2.29E+05 -0.005606    75.225  8.83E+12  4537.826
60840.
 211.200 -0.192461  3.50E+06 -2.17E+05 -0.005605    66.024  8.83E+12  4936.615
61560.
 213.600 -0.205912  3.00E+06 -2.05E+05 -0.005604    57.311  8.83E+12  5343.416
62280.
 216.000 -0.219361  2.52E+06 -1.92E+05 -0.005604    49.127  8.83E+12  5758.237
63000.
 218.400 -0.232809  2.08E+06 -1.77E+05 -0.005603    41.514  8.83E+12  6181.084
63720.
 220.800 -0.246256  1.67E+06 -1.62E+05 -0.005602    34.512  8.83E+12  6611.963
64440.
 223.200 -0.259701  1.30E+06 -1.46E+05 -0.005602    28.164  8.83E+12  7050.880
65160.
 225.600 -0.273145  9.72E+05 -1.28E+05 -0.005602    22.515  8.83E+12  7497.841
65880.
 228.000 -0.286589  6.87E+05 -1.10E+05 -0.005602    17.607  8.83E+12  7952.852
66600.
```

```
 230.400 -0.300033  4.47E+05   -89974. -0.005601    13.487  8.83E+12  8415.916
67320.
 232.800 -0.313476  2.56E+05   -69210. -0.005601    10.200  8.83E+12  8887.038
68040.
 235.200 -0.326919  1.15E+05   -47306. -0.005601     7.793  8.83E+12  9366.221
68760.
 237.600 -0.340362    29372.   -24243. -0.005601     6.313  8.83E+12  9853.467
69480.
 240.000 -0.353804     0.000     0.000 -0.005601     5.808  8.83E+12    10349.
35100.
```

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

```
Pile-head deflection             =     1.10571554 in
Computed slope at pile head      =    -0.00728995
Maximum bending moment           =      30430707. lbs-in
Maximum shear force              =  -297273.29270 lbs
Depth of maximum bending moment  =    67.20000000 in
Depth of maximum shear force     =      177.60000 in
Number of iterations             =            114
Number of zero deflection points =              1
```

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

```
Type 1 = Shear and Moment,          y = pile-head displacment in
Type 2 = Shear and Slope,           M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness,  V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment,     S = Pile-head Slope, radians
Type 5 = Deflection and Slope,      R = Rot. Stiffness of Pile-head in-lbs/rad
```

Structure 11229.lpo

Load Type	Pile-Head Condition 1		Pile-Head Condition 2		Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V=	29403.	M=	2.86E+07	32186.0000	1.1057	3.0431E+07	-297273.

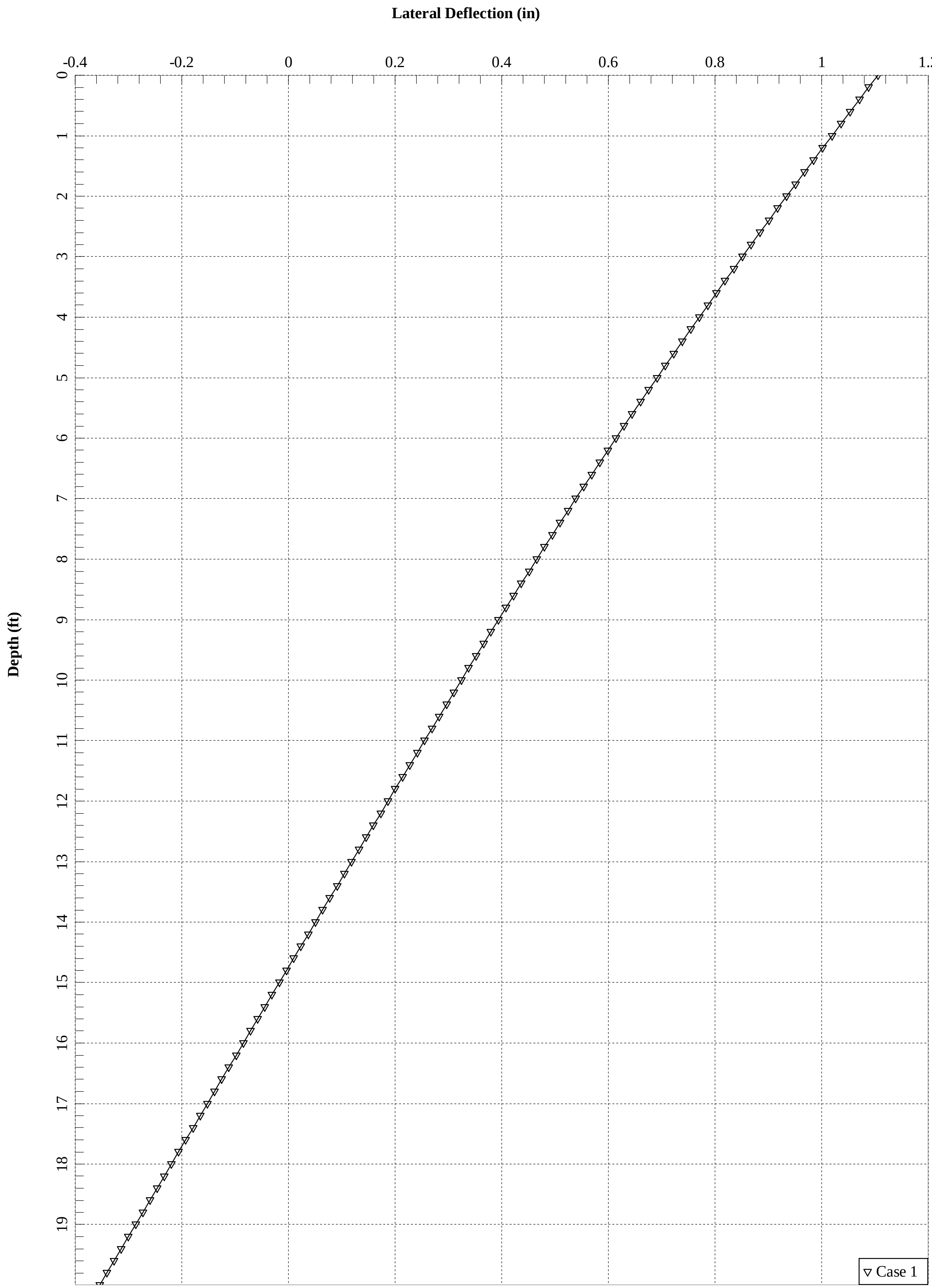
Pile-head Deflection vs. Pile Length

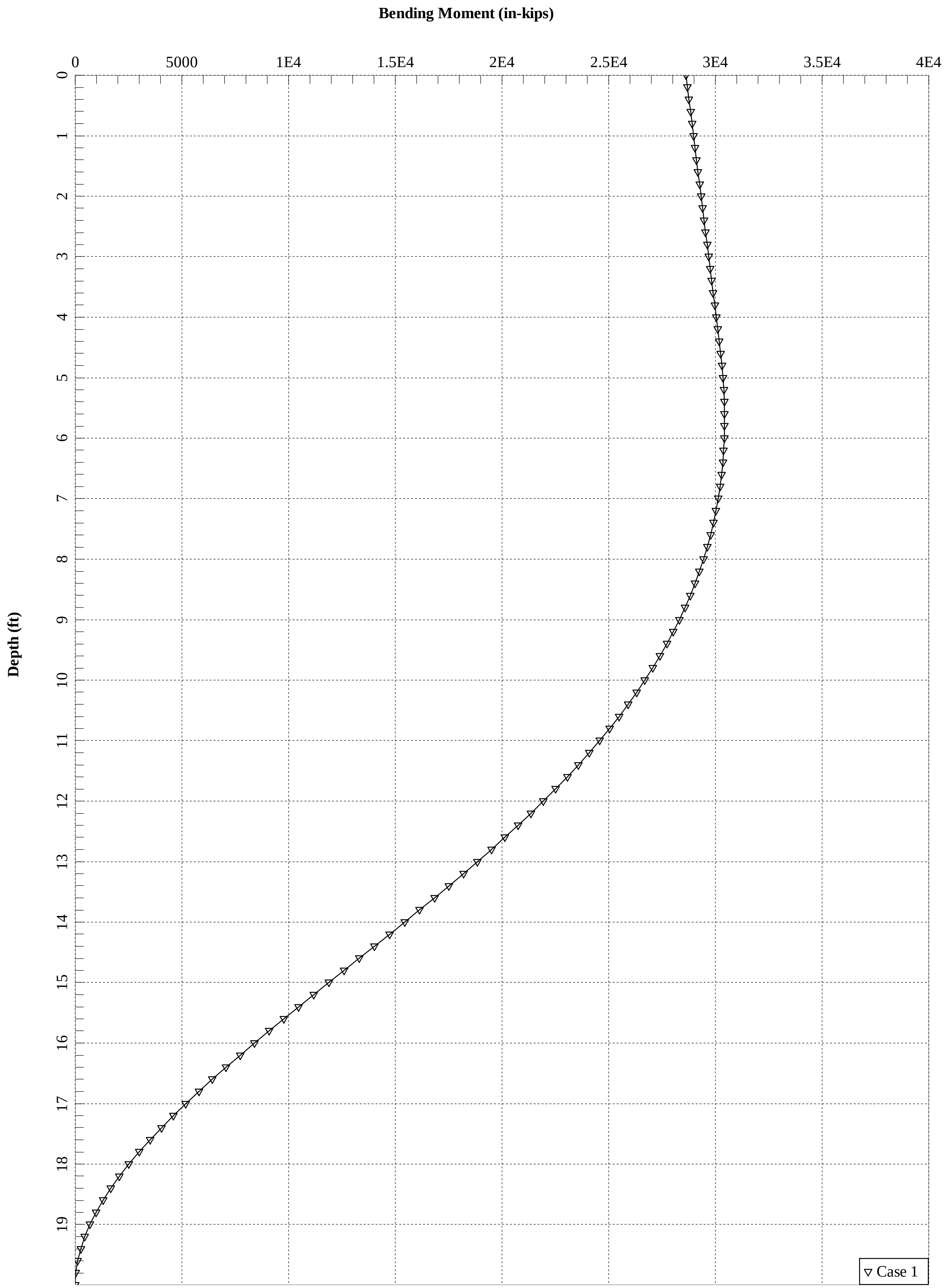
Boundary Condition Type 1, Shear and Moment

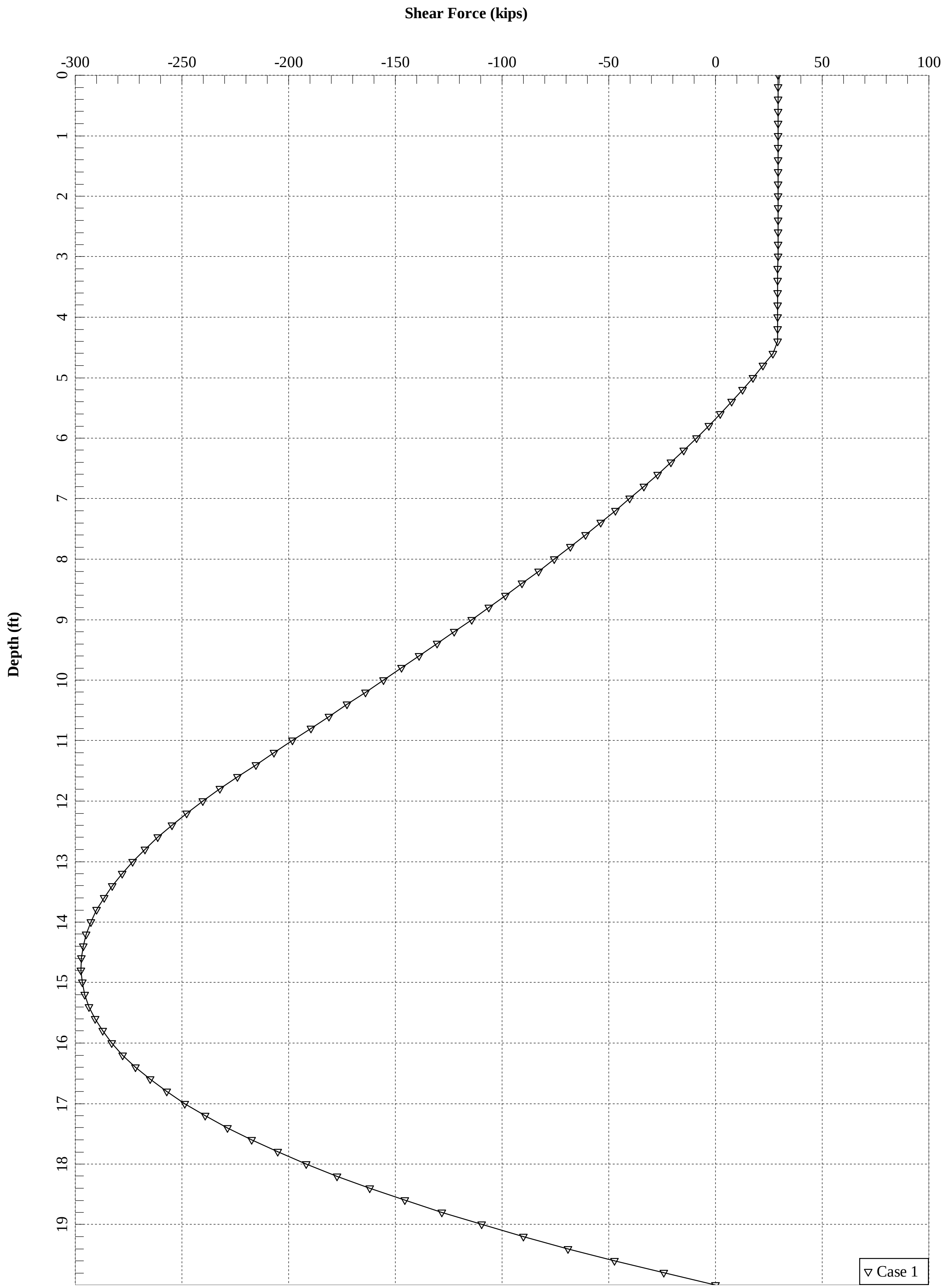
Shear = 29403. lbs
Moment = 28620000. in-lbs
Axial Load = 32186. lbs

Pile Length in	Pile Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
240.000	1.10571554	30430707.	-297273.29270
228.000	1.50408668	30407774.	-324064.62329
216.000	2.23885911	30435166.	-358361.94179
204.000	3.45377042	30399296.	-393495.71742
192.000	6.10073141	30430804.	-438192.59253

The analysis ended normally.


Lateral Deflection (in)
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
1.2
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
Case 1


Bending Moment (in-kips)
0
5000
1E4
1.5E4
2E4
2.5E4
3E4
3.5E4
4E4
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
Case 1


Shear Force (kips)
-300
-250
-200
-150
-100
-50
0
50
100
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
Case 1

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CT2901	DATE:	02/07/2017	RF DESIGN ENG:	Radu Alecsandru
ISSUE:	Bronze Standard	Approved? (Y/N):	Yes	RF DESIGN PHONE:	
REVISION:	FINAL	RF MANAGER:	John Benedetto	RF DESIGN EMAIL:	ra9161@att.com
INITIATIVE /PROJECT:	This is a carbon copy of the Excel Format RFDS.2/17/2017 updated TMA and plumbing				

RF PERF ENG:		RFDS PROGRAM TYPE:	2018 New Site		
RF PERF PHONE:		RFDS TECHNOLOGY:	New		
RF PERF EMAIL:		STATE/STATUS:	As Built/In Progress		
RFDS VERSION:	2.00	RFDS ID:	1598624		
GSM FREQUENCY:		Created By:	ra9161	Updated By:	ra9161
UMTS FREQUENCY:		Date Created:	1/11/2017 2:39:41 PM	Date Updated:	2/7/2017 12:18:54 PM
LTE FREQUENCY:	700, 1900, WCS				
I-PLAN JOB # 1:	NER-RCTB-12-01619	IPLAN PRD GRP || SUB GRP #1:	New Site || LTE Only 1C		
I-PLAN JOB # 2:		IPLAN PRD GRP || SUB GRP #2:			
I-PLAN JOB # 3:		IPLAN PRD GRP || SUB GRP #3:			
I-PLAN JOB # 4:		IPLAN PRD GRP || SUB GRP #4:			
I-PLAN JOB # 5:		IPLAN PRD GRP || SUB GRP #5:			
I-PLAN JOB # 6:		IPLAN PRD GRP || SUB GRP #6:			
I-PLAN JOB # 7:		IPLAN PRD GRP || SUB GRP #7:			
I-PLAN JOB # 8:		IPLAN PRD GRP || SUB GRP #8:			

Section 2 - LOCATION INFORMATION

USID:	143463	FA LOCATION CODE:	10549309	LOCATION NAME:	WATERBURY WHITEWOOD ROAD
REGION:	NORTHEAST	MARKET CLUSTER:	NEW ENGLAND	MARKET:	CONNECTICUT
ADDRESS:	227 WHITEWOOD ROAD	CITY:	WATERBURY	STATE:	CT
ZIP CODE:	06708	COUNTY:	NEW HAVEN	LONG (DEC. DEG.):	-73.0817500
LATITUDE (D-M-S):	41d 34m 41.35s	LONGITUDE (D-M-S):	-73d -4m -54.3s	LAT (DEC. DEG.):	41.5781528
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:	CL&P TOWER WITH SEPARATE GROUND LEASE.				

ORACLE PTN # 1:	2051279415	PACE JOB # 1:	MRCTB004743		
ORACLE PTN # 2:		PACE JOB # 2:			
ORACLE PTN # 3:		PACE JOB # 3:			
ORACLE PTN # 4:		PACE JOB # 4:			
ORACLE PTN # 5:		PACE JOB # 5:			
ORACLE PTN # 6:		PACE JOB # 6:			
ORACLE PTN # 7:		PACE JOB # 7:			
ORACLE PTN # 8:		PACE JOB # 8:			
BORDER CELL WITH CONTOUR COORD:		SEARCH RING NAME:	WATERBURY NORTH		
AM STUDY REQ'D (Y/N):	No	SEARCH_RING_ID:	2901		
FREQ COORD:		BTA:		MSA / RSA:	
OPS DISTRICT:		LAC(GSM):			
OPS ZONE:		LAC(UMTS):	05998		
RF DISTRICT:		BSC(GSM):			
RF ZONE:		RNC(UMTS):	BRPTCT04RNC002		
PARENT NAME(GSM):		MME POOL ID(LTE):	FF01		
PARENT NAME(UMTS):	BRIDGEPORT CT RNC002				

Section 3 - LICENSE COVERAGE/FILING INFORMATION

CGSA - NO FILING TRIGGERED (Yes/No):	No	CGSA LOSS:		PCS REDUCED - UPS ZIP:	
CGSA - MINOR FILING NEEDED (Yes/No)::	No	CGSA EXT AGMT NEEDED:		PCS POPS REDUCED:	
CGSA - MAJOR FILING NEEDED (Yes/No):	Yes	CGSA SCORECARD UPDATED:			

CGSA CALL SIGNS:	

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:	Yes	GROUND ELEVATION (ft):		STRUCTURE TYPE:	
ADDITIONAL REGULATORY?:	Yes	HEIGHT OVERALL (ft):	0.00	FCC ASR NUMBER:	
SUB-LEASE RIGHTS?:	Yes	STRUCTURE HEIGHT (ft):			
LIGHTING TYPE:					

MARKET LOCATION 700 MHz Band:	
MARKET LOCATION 850 MHz Band:	
MARKET LOCATION 1900 MHz Band:	
MARKET LOCATION AWS Band:	
MARKET LOCATION WCS Band:	
MARKET LOCATION Future Band:	

Section 5 - E-911 INFORMATION - existing

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:		
SECTOR A E-911										
SECTOR B										
SECTOR C										
SECTOR D										
SECTOR E										
SECTOR F										
OMNI										

Section 5 - E-911 INFORMATION - final

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:		
SECTOR A E-911										
SECTOR B										
SECTOR C										
SECTOR D										
SECTOR E										
SECTOR F										
OMNI										

Section 6 - RBS GENERAL INFORMATION - existing

	LTE 1ST RBS											
RBS ID:												
CTS COMMON ID:												
CELL ID / BCF:												
BTA/TID:												
4-9 DIGIT SITE ID:												
COW OR TOY?:												
CELL SITE TYPE:												
SITE TYPE:												
BTS LOCATION ID:												
BASE STATION TYPE:												
EQUIPMENT NAME:												
DISASTER PRIORITY:												

Section 6 - RBS GENERAL INFORMATION - final

	LTE 1ST RBS											
RBS ID:	576012											
CTS COMMON ID:	CTL02901											
CELL ID / BCF:	CTL02901											
BTA/TID:												
4-9 DIGIT SITE ID:	2901											
COW OR TOY?:	No											
CELL SITE TYPE:	SECTORIZED											
SITE TYPE:	MACRO-CONVENTIONAL											
BTS LOCATION ID:												
BASE STATION TYPE:	BASE											
EQUIPMENT NAME:	WATERBURY NORTH											
DISASTER PRIORITY:												

Section 7 - RBS SPECIFIC INFORMATION - existing

	LTE 1ST RBS											
RAC:												
EQUIPMENT VENDOR:												
EQUIPMENT TYPE:												
BASEBAND CONFIGURATION:												
LOCATION:												
CABINET LOCATION:												
MARKET STATE CODE:												
AGPS:												
NODE B NUMBER:												

Section 7 - RBS SPECIFIC INFORMATION - final

	LTE 1ST RBS											
RAC:												
EQUIPMENT VENDOR:	ERICSSON											
EQUIPMENT TYPE:	6601 INDOOR MU											
BASEBAND CONFIGURATION:												
LOCATION:												
CABINET LOCATION:												
MARKET STATE CODE:	CT											
AGPS:	Yes											
NODE B NUMBER:	2901											

Section 8 - RBS/SECTOR ASSOCIATION - existing

	LTE 1ST RBS																							
CTS Common ID																								

Section 8 - RBS/SECTOR ASSOCIATION - final

	LTE 1ST RBS																							
CTS Common ID	CTL02901																							
Soft Sector IDs	CTL02901_3A_1																							
	CTL02901_3B_1																							
	CTL02901_3C_1																							
	CTL02901_7A_1																							
	CTL02901_7B_1																							
	CTL02901_7C_1																							
	CTL02901_9A_1																							
	CTL02901_9B_1																							
	CTL02901_9C_1																							

Section 9 - SOFT SECTOR ID - existing

	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																							
USEID (excluding Hard Sector)																										
SECTOR A SOFT SECTOR ID																										
SECTOR B																										
SECTOR C																										
SECTOR D																										
SECTOR E																										
SECTOR F																										
OMNI																										

Section 9 - SOFT SECTOR ID - final

	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																							
USEID (excluding Hard Sector)																										
SECTOR A SOFT SECTOR ID	CTL02901_7A_1	CTL02901_9A_1	CTL02901_3A_1																							
SECTOR B	CTL02901_7B_1	CTL02901_9B_1	CTL02901_3B_1																							
SECTOR C	CTL02901_7C_1	CTL02901_9C_1	CTL02901_3C_1																							
SECTOR D																										
SECTOR E																										
SECTOR F																										
OMNI																										

Section 9 - Cell Number - existing

	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																							
USEID (excluding Hard Sector)																										
SECTOR A CELL NUMBER																										
SECTOR B																										
SECTOR C																										
SECTOR D																										
SECTOR E																										
SECTOR F																										
OMNI																										

Section 9 - Cell Number - final

	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																							
USEID (excluding Hard Sector)																										
SECTOR A CELL NUMBER	15	8	149																							
SECTOR B	16	9	150																							
SECTOR C	17	10	151																							
SECTOR D																										
SECTOR E																										
SECTOR F																										
OMNI																										

Section 10 - CID/SAC - existing

	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																								
SECTOR A CID/SAC																											
SECTOR B																											
SECTOR C																											
SECTOR D																											
SECTOR E																											
SECTOR F																											
OMNI																											

Section 10 - CID/SAC - final

	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																								
SECTOR A CID/SAC																											
SECTOR B																											
SECTOR C																											
SECTOR D																											
SECTOR E																											
SECTOR F																											
OMNI																											

Section 11 - CURRENT RADIO COUNTS existing

	UMTS 1ST 850	UMTS 2ND 850	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																						
SECTOR A RADIO COUNTS																											
SECTOR B																											
SECTOR C																											
SECTOR D																											
SECTOR E																											
SECTOR F																											
OMNI																											

Section 12 - CURRENT T1 COUNTS existing

	LTE 1ST Cabinet															
# T1s																
LINK PROFILE																
RF COMBINING																
FIBER or ETHERNET?																
Tx Board Model																
Tx Board QTY																
RAX/ECU Board Model																
RAX/ECU Board QTY																
BBU Board Model																
BBU Board QTY																
RRU - location																
FIBER JUMPER																
DC CABLE																
DC/Fiber Dem. Box																
Bundled Fiber Cable																
Bundled DC Cable																

Section 13 - NEW/PROPOSED RADIO COUNTS

	UMTS 1ST 850	UMTS 2ND 850	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																						
SECTOR A RADIO COUNTS			1	2	1																						
SECTOR B			1	2	1																						
SECTOR C			1	2	1																						
SECTOR D																											
SECTOR E																											
SECTOR F																											
OMNI																											

Section 14 - NEW/PROPOSED T1 COUNTS

	LTE 1ST Cabinet															
# T1s	1															
LINK PROFILE																
RF COMBINING																
FIBER or ETHERNET?	ETHERNET															
Tx Board Model																
Tx Board QTY																
RAX/ECU Board Model																
RAX/ECU Board QTY																
BBU Board Model																
BBU Board QTY																
RRU - location	Top															
FIBER JUMPER	FIBER															
DC CABLE	DC															
DC/Fiber Dem. Box	RAYCAP															
Bundled Fiber Cable	YES															
Bundled DC Cable	YES															

Section 16A - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
Existing Antenna?														
ANTENNA MAKE - MODEL	HPA-65R-BUU-H8		OPA-65R-LCUU-H8				HPA-65R-BUU-H8							
ANTENNA VENDOR	CCI Products		CCI Products				CCI Products							
ANTENNA SIZE (H x W x D)	92.4X14.8X7.4		92.7X14.4X7				92.4X14.8X7.4							
ANTENNA WEIGHT	68		88				68							
AZIMUTH	30		30				30							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	105		105				105							
ANTENNA TIP HEIGHT	109		109				109							
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	4		4				4							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)														
SURGE ARRESTOR (QTY/MODEL)			4	Andrew APTDC-BDFDM-DBW			6	Andrew APTDC-BDFDM-DBW						
DIPLEXER (QTY/MODEL)			2	Kaelus DBC2055F1V1-2			2	Kaelus DBC2055F1V1-2						
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)			1	CCU - Kathrein 860 10006										
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	CCI - TMABPDB7823VG12A (Twin-LBP)	2	CCI - TMABPDB7823VG12A (Twin-LBP)			2	CCI - TMABPDB7823VG12A (Twin-LBP)						
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							2	RRUS-12						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	12 feeders 1 5/8" per sector													
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1					TxRx/ TxRx	LTE	HPA-65R-LCUU-H8	15.4	30	2	BOTTOM	1-5/8" COAX	140	0			NO					
ANTENNA POSITION 2	PORT 5	143463.A.WCS.4G.1		CTL02901_3A_1	CTL02901_3A_1	TxRx/ TxRx	LTE WCS	OPA-65R-LCUU-H8_2350MHz_03DT	17.2	30	3	BOTTOM	1-5/8" COAX	140	0			NO					
ANTENNA POSITION 4	PORT 1	143463.A.700.4G.1		CTL02901_7A_1	CTL02901_7A_1	TxRx/ TxRx	LTE 700	HPA-65R-BUU-H8_719MHz_02DT	15.3	30	2	BOTTOM	1-5/8" COAX	140	0			NO					
	PORT 3	143463.A.1900.4G.1		CTL02901_9A_1	CTL02901_9A_1	TxRx/	LTE 1900	HPA-65R-BUU-	17.4	30	2	BOTTOM	1-5/8" COAX	140	0			NO					

						TxRx		H8_1930MHz_02DT															

Section 16B - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
Existing Antenna?														
ANTENNA MAKE - MODEL	HPA-65R-BUU-H8		OPA-65R-LCUU-H8				HPA-65R-BUU-H8							
ANTENNA VENDOR	CCI Products		CCI Products				CCI Products							
ANTENNA SIZE (H x W x D)	92.4X14.8X7.4		92.7X14.4X7				92.4X14.8X7.4							
ANTENNA WEIGHT	68		88				68							
AZIMUTH	150		150				150							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	105		105				105							
ANTENNA TIP HEIGHT	109		109				109							
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	4		4				4							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)														
SURGE ARRESTOR (QTY/MODEL)			4	Andrew APTDC-BDFDM-DBW			6	Andrew APTDC-BDFDM-DBW						
DIPLEXER (QTY/MODEL)			2	Kaelus DBC2055F1V1-2			2	Kaelus DBC2055F1V1-2						
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)														
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	CCI - TMABPDB7823VG12A (Twin-LBP)	2	CCI - TMABPDB7823VG12A (Twin-LBP)			2	CCI - TMABPDB7823VG12A (Twin-LBP)						
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							2	RRUS-12						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	12 feeders 1 5/8" per sector													
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1					TxRx/ TxRx	LTE	HPA-65R-LCUU-H8	15.4	150	2	BOTTOM	1-5/8" COAX	140	0			NO					
ANTENNA POSITION 2	PORT 5	143463.B.WCS.4G.1		CTL02901_3B_1	CTL02901_3B_1	TxRx/ TxRx	LTE WCS	OPA-65R-LCUU-H8_2350MHz_03DT	17.2	150	3	BOTTOM	1-5/8" COAX	140	0			NO					
ANTENNA POSITION 4	PORT 1	143463.B.700.4G.1		CTL02901_7B_1	CTL02901_7B_1	TxRx/ TxRx	LTE 700	HPA-65R-BUU-H8_719MHz_02DT	15.3	150	2	BOTTOM	1-5/8" COAX	140	0			NO					
	PORT 3	143463.B.1900.4G.1		CTL02901_9B_1	CTL02901_9B_1	TxRx/	LTE 1900	HPA-65R-BUU-	17.4	150	2	BOTTOM	1-5/8" COAX	140	0			NO					

						TxRx		H8_1930MHz_02DT															

Section 16C - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
Existing Antenna?														
ANTENNA MAKE - MODEL	HPA-65R-BUU-H8		OPA-65R-LCUU-H8				HPA-65R-BUU-H8							
ANTENNA VENDOR	CCI Products		CCI Products				CCI Products							
ANTENNA SIZE (H x W x D)	92.4X14.8X7.4		92.7X14.4X7				92.4X14.8X7.4							
ANTENNA WEIGHT	68		88				68							
AZIMUTH	270		270				270							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	105		105				105							
ANTENNA TIP HEIGHT	109		109				109							
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	4		4				4							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)														
SURGE ARRESTOR (QTY/MODEL)			4	Andrew APTDC-BDFDM-DBW			6	Andrew APTDC-BDFDM-DBW						
DIPLEXER (QTY/MODEL)			2	Kaelus DBC2055F1V1-2			2	Kaelus DBC2055F1V1-2						
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)														
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	CCI - TMABPDB7823VG12A (Twin-LBP)	2	CCI - TMABPDB7823VG12A (Twin-LBP)			2	CCI - TMABPDB7823VG12A (Twin-LBP)						
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							2	RRUS-12						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	12 feeders 1 5/8" per sector													
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1					TxRx/ TxRx	LTE	HPA-65R-LCUU-H8	15.4	270	2	BOTTOM	1-5/8" COAX	140	0			NO					
ANTENNA POSITION 2	PORT 5	143463.C.WCS.4G.1		CTL02901_3C_1	CTL02901_3C_1	TxRx/ TxRx	LTE WCS	OPA-65R-LCUU-H8_2350MHz_03DT	17.2	270	3	BOTTOM	1-5/8" COAX	140	0			NO					
ANTENNA POSITION 4	PORT 1	143463.C.700.4G.1		CTL02901_7C_1	CTL02901_7C_1	TxRx/ TxRx	LTE 700	HPA-65R-BUU-H8_719MHz_02DT	15.3	270	2	BOTTOM	1-5/8" COAX	140	0			NO					
	PORT 3	143463.C.1900.4G.1		CTL02901_9C_1	CTL02901_9C_1	TxRx/	LTE 1900	HPA-65R-BUU-	17.4	270	2	BOTTOM	1-5/8" COAX	140	0			NO					

						TxRx		H8_1930MHz_02DT															

Section 17A - FINAL TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	HPA-65R-BUU-H8		OPA-65R-LCUU-H8				HPA-65R-BUU-H8							
ANTENNA VENDOR	CCI Products		CCI Products				CCI Products							
ANTENNA SIZE (H x W x D)	92.4X14.8X7.4		92.7X14.4X7				92.4X14.8X7.4							
ANTENNA WEIGHT	68		88				68							
AZIMUTH	30		30				30							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	105		105				105							
ANTENNA TIP HEIGHT	109		109				109							
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	4		4				4							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)														
SURGE ARRESTOR (QTY/MODEL)			4	Andrew APTDC-BDFDM-DBW			6	Andrew APTDC-BDFDM-DBW						
DIPLEXER (QTY/MODEL)			2	Kaelus DBC2055F1V1-2			2	Kaelus DBC2055F1V1-2						
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)			1	CCU - Kathrein 860 10006										
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	CCI - TMABPDB7823VG12A (Twin-LBP)	2	CCI - TMABPDB7823VG12A (Twin-LBP)			2	CCI - TMABPDB7823VG12A (Twin-LBP)						
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							2	RRUS-12						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	12 feeders 1 5/8" per sector													
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1					TxRx/ TxRx	LTE	HPA-65R-LCUU-H8	15.4	30	2	BOTTOM	1-5/8" COAX	140	0			NO					
ANTENNA POSITION 2	PORT 5	143463.A.WCS.4G.1		CTL02901_3A_1	CTL02901_3A_1	TxRx/ TxRx	LTE WCS	OPA-65R-LCUU-H8_2350MHz_03DT	17.2	30	3	BOTTOM	1-5/8" COAX	140	0			NO					
ANTENNA POSITION 4	PORT 1	143463.A.700.4G.1		CTL02901_7A_1	CTL02901_7A_1	TxRx/ TxRx	LTE 700	HPA-65R-BUU-H8_719MHz_02DT	15.3	30	2	BOTTOM	1-5/8" COAX	140	0			NO					
	PORT 3	143463.A.1900.4G.1		CTL02901_9A_1	CTL02901_9A_1	TxRx/ TxRx	LTE 1900	HPA-65R-BUU-H8_1930MHz_02DT	17.4	30	2	BOTTOM	1-5/8" COAX	140	0			NO					

Section 17B - FINAL TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	HPA-65R-BUU-H8		OPA-65R-LCUU-H8				HPA-65R-BUU-H8							
ANTENNA VENDOR	CCI Products		CCI Products				CCI Products							
ANTENNA SIZE (H x W x D)	92.4X14.8X7.4		92.7X14.4X7				92.4X14.8X7.4							
ANTENNA WEIGHT	68		88				68							
AZIMUTH	150		150				150							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	105		105				105							
ANTENNA TIP HEIGHT	109		109				109							
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	4		4				4							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)														
SURGE ARRESTOR (QTY/MODEL)			4	Andrew APTDC-BDFDM-DBW			6	Andrew APTDC-BDFDM-DBW						
DIPLEXER (QTY/MODEL)			2	Kaelus DBC2055F1V1-2			2	Kaelus DBC2055F1V1-2						
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)														
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	CCI - TMABPDB7823VG12A (Twin-LBP)	2	CCI - TMABPDB7823VG12A (Twin-LBP)			2	CCI - TMABPDB7823VG12A (Twin-LBP)						
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							2	RRUS-12						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	12 feeders 1 5/8" per sector													
Local Market Note 2														
Local Market Note 3														

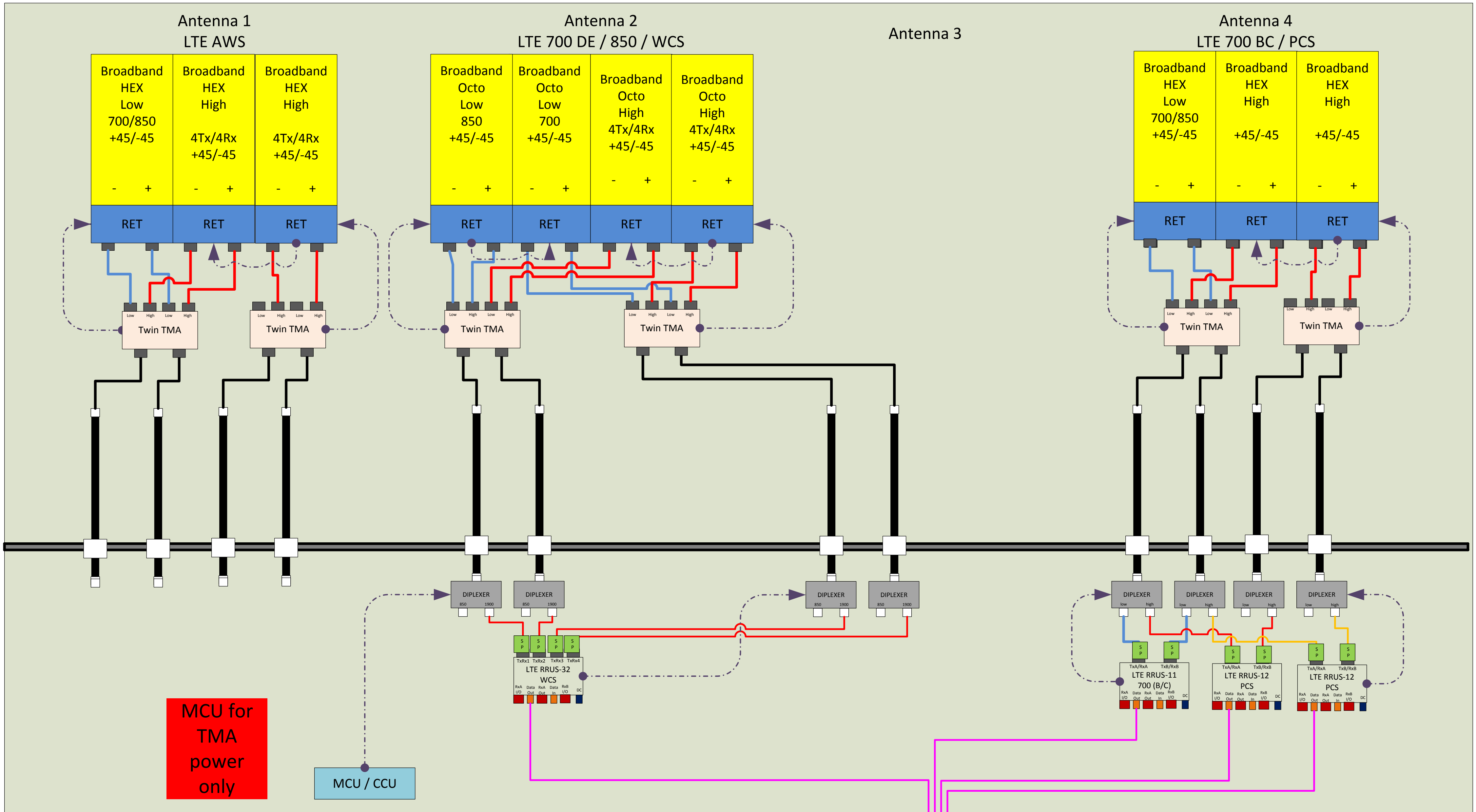
PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1					TxRx/ TxRx	LTE	HPA-65R-LCUU-H8	15.4	150	2	BOTTOM	1-5/8" COAX	140	0			NO					
ANTENNA POSITION 2	PORT 5	143463.B.WCS.4G.1		CTL02901_3B_1	CTL02901_3B_1	TxRx/ TxRx	LTE WCS	OPA-65R-LCUU-H8_2350MHz_03DT	17.2	150	3	BOTTOM	1-5/8" COAX	140	0			NO					
ANTENNA POSITION 4	PORT 1	143463.B.700.4G.1		CTL02901_7B_1	CTL02901_7B_1	TxRx/ TxRx	LTE 700	HPA-65R-BUU-H8_719MHz_02DT	15.3	150	2	BOTTOM	1-5/8" COAX	140	0			NO					
	PORT 3	143463.B.1900.4G.1		CTL02901_9B_1	CTL02901_9B_1	TxRx/ TxRx	LTE 1900	HPA-65R-BUU-H8_1930MHz_02DT	17.4	150	2	BOTTOM	1-5/8" COAX	140	0			NO					

Section 17C - FINAL TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	HPA-65R-BUU-H8		OPA-65R-LCUU-H8				HPA-65R-BUU-H8							
ANTENNA VENDOR	CCI Products		CCI Products				CCI Products							
ANTENNA SIZE (H x W x D)	92.4X14.8X7.4		92.7X14.4X7				92.4X14.8X7.4							
ANTENNA WEIGHT	68		88				68							
AZIMUTH	270		270				270							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	105		105				105							
ANTENNA TIP HEIGHT	109		109				109							
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	4		4				4							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)														
SURGE ARRESTOR (QTY/MODEL)			4	Andrew APTDC-BDFDM-DBW			6	Andrew APTDC-BDFDM-DBW						
DIPLEXER (QTY/MODEL)			2	Kaelus DBC2055F1V1-2			2	Kaelus DBC2055F1V1-2						
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)														
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	CCI - TMABPDB7823VG12A (Twin-LBP)	2	CCI - TMABPDB7823VG12A (Twin-LBP)			2	CCI - TMABPDB7823VG12A (Twin-LBP)						
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							2	RRUS-12						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	12 feeders 1 5/8" per sector													
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1					TxRx/ TxRx	LTE	HPA-65R-LCUU-H8	15.4	270	2	BOTTOM	1-5/8" COAX	140	0			NO					
ANTENNA POSITION 2	PORT 5	143463.C.WCS.4G.1		CTL02901_3C_1	CTL02901_3C_1	TxRx/ TxRx	LTE WCS	OPA-65R-LCUU-H8_2350MHz_03DT	17.2	270	3	BOTTOM	1-5/8" COAX	140	0			NO					
ANTENNA POSITION 4	PORT 1	143463.C.700.4G.1		CTL02901_7C_1	CTL02901_7C_1	TxRx/ TxRx	LTE 700	HPA-65R-BUU-H8_719MHz_02DT	15.3	270	2	BOTTOM	1-5/8" COAX	140	0			NO					
	PORT 3	143463.C.1900.4G.1		CTL02901_9C_1	CTL02901_9C_1	TxRx/ TxRx	LTE 1900	HPA-65R-BUU-H8_1930MHz_02DT	17.4	270	2	BOTTOM	1-5/8" COAX	140	0			NO					

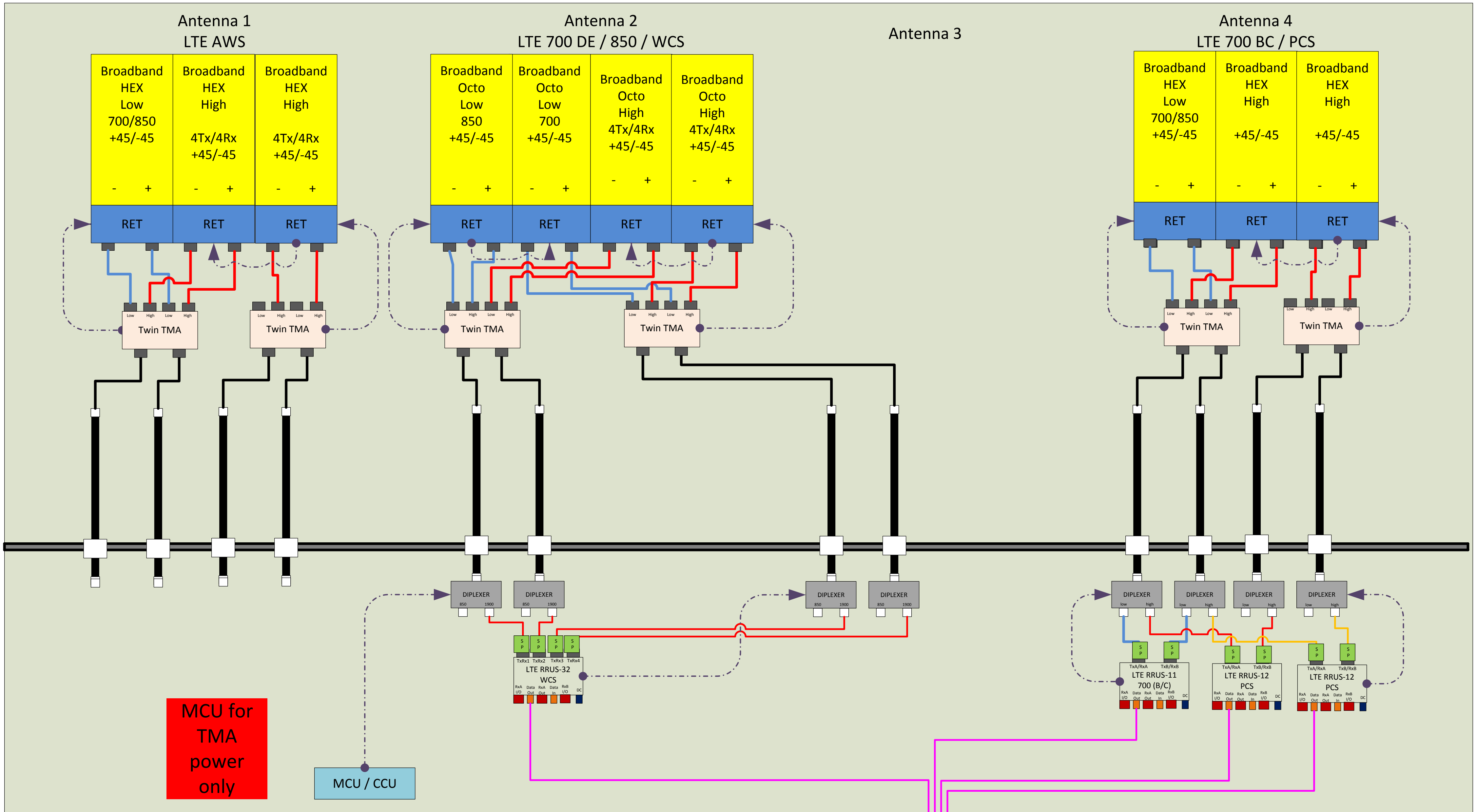
Diagram - Sector	A	Diagram File Name - s2901.vsd					
Atoll Site Name -	CT2901	Location Name -	WATERBURY WHITEWOOD ROAD	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:							



5216	A	B	C	D	E	F
	700 - A	700 - B	700 - C	XMU-2	XMU-1	XMU-3

XMU 1	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
	PCS 1 - A	PCS 2 - A	PCS 1 - B	PCS 2 - B	PCS 1 - C	PCS 2 - C	WCS - A	WCS - B	WCS - C							

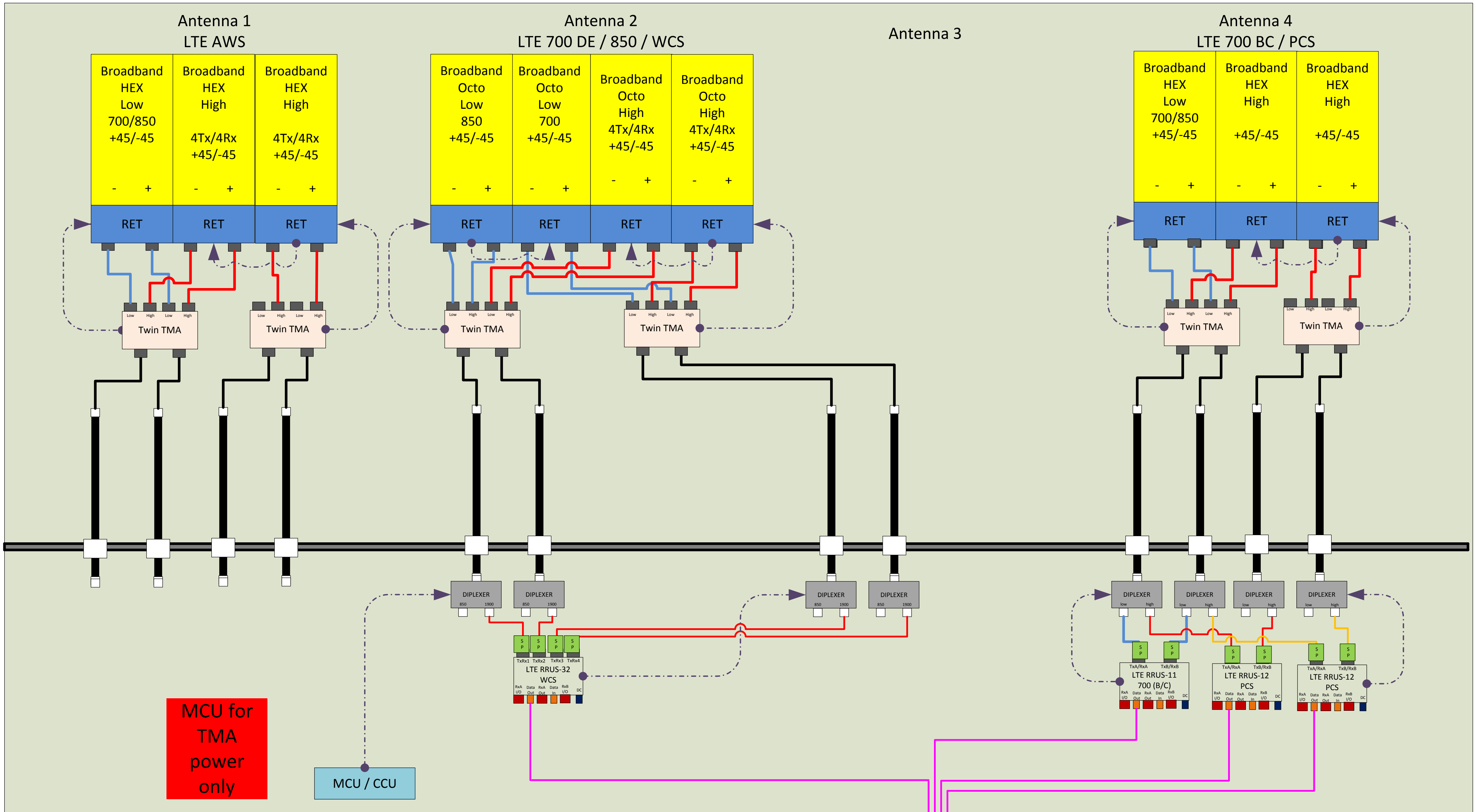
Diagram - Sector	B	Diagram File Name - s2901.vsd	
Atoll Site Name -	CT2901	Location Name -	WATERBURY WHITEWOOD ROAD
Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:			



5216	A	B	C	D	E	F
	700 - A	700 - B	700 - C	XMU-2	XMU-1	XMU-3

XMU 1	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
	PCS 1 - A	PCS 2 - A	PCS 1 - B	PCS 2 - B	PCS 1 - C	PCS 2 - C	WCS - A	WCS - B	WCS - C							

Diagram - Sector	C	Diagram File Name - s2901.vsd					
Atoll Site Name -	CT2901	Location Name -	WATERBURY WHITEWOOD ROAD	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:							



5216	A	B	C	D	E	F
	700 - A	700 - B	700 - C	XMU-2	XMU-1	XMU-3

XMU 1	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
	PCS 1 - A	PCS 2 - A	PCS 1 - B	PCS 2 - B	PCS 1 - C	PCS 2 - C	WCS - A	WCS - B	WCS - C							

WORKFLOW SUMMARY							
Date	FROM State / Status	FROM ATTUID	TO State / Status	TO ATTUID	Operation	Comments	PACE Status
02/07/2017	Preliminary In Progress	ra9161	Preliminary Submitted for Approval	RC475S	Promote		NER-RCTB-12-01619 FAILURE 02/07/2017 12:02:47 PM
02/07/2017	Preliminary Submitted for Approval	RC475S	Preliminary Approved	MH569V	Promote		
02/07/2017	Preliminary Approved	MH569V	Final RF Approval	RA9161	Promote	Promote for final RFDS	
02/07/2017	Final RF Approval	RA9161	Final Approved	MH569V	Promote		NER-RCTB-12-01619 FAILURE 02/07/2017 12:20:37 PM
02/07/2017	Final Approved	MH569V	As Built In Progress	MH569V	Promote	Promote for final RFDS	NER-RCTB-12-01619 MRCTB004743 SUCCESS 02/07/2017 12:45:13 PM

HexPort Multi-Band Antenna

Model HPA-65R-BUU-H8

Hexport Multi-Band Antenna Array

The CCI Hexport Multi-Band Antenna Array is an industry first 6-port antenna with full WCS Band Coverage. With four high band ports and two low band ports, our hexport antenna is ready for 4X4 high band MIMO.

Modern networks demand high performance, consequently CCI has incorporated several new and innovative design techniques to provide an antenna with excellent side-lobe performance, sharp elevation beams, and high front to back ratio.

Multiple networks can now be connected to a single antenna, reducing tower loading and leasing expense, while decreasing deployment time and installation cost.

Full band capability for 700 MHz , Cellular 850 MHz, PCS 1900 MHz, AWS 1710/2170 MHz and WCS 2300 MHz coverage in a single enclosure.

Benefits

- **Includes WCS Band**
- **Reduces tower loading**
- **Frees up space for tower mounted E-nodes**
- **Single radome with six ports**
- **All Band design simplifies radio assignments**
- **Sharp elevation beam eases network planning**

Features

- High Band Ports include WCS Band
- Four High Band ports with two Low Band ports in one antenna
- Sharp elevation beam
- Excellent elevation side-lobe performance
- Excellent MIMO performance due to array spacing
- Excellent PIM Performance
- A multi-network solution in one radome

Applications

- 4x4 MIMO on High Band and 2x2 MIMO on Low Band
- Adding additional capacity without adding additional antennas
- Adding WCS Band without increasing antenna count

HEXPORT Multi-Band ANTENNA

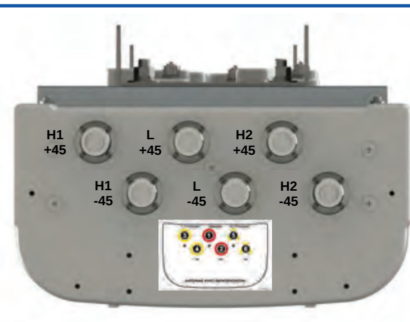
Model HPA-65R-BUU-H8

HPA-65R Multi-Band Antenna
Electrical Specifications

Frequency Range	2 X Low Band Ports which cover the full range from 698-894 MHz		4 X High Band Ports which cover the full range from 1710-2360 MHz			
	698-806 MHz	824-894 MHz	1850-1990 MHz	1710-1755/2110-2170 MHz		2305-2360 MHz
Gain	15.3 dBi	16.2 dBi	17.1 dBi	16.3 dBi	17.4 dBi	17.7 dBi
Azimuth Beamwidth (-3dB)	65°	61°	62°	68°	64°	60°
Elevation Beamwidth (-3dB)	10.1°	8.4°	5.6°	6.2°	5.0°	4.5°
Electrical Downtilt	2° to 10°	2° to 10°	0° to 8°	0° to 8°	0° to 8°	0° to 8°
Elevation Sidelobes (1st Upper)	< -17 dB	< -17 dB	< -19 dB	< -18 dB	< -18 dB	< -17 dB
Front-to-Back Ratio @180°	> 29 dB	> 28 dB	> 35 dB	> 35 dB	> 35 dB	> 35 dB
Front-to-Back Ratio over ± 20°	> 28 dB	> 27 dB	> 28 dB	> 27 dB	> 28 dB	> 28 dB
Cross-Polar Discrimination (at Peak)	> 24 dB	> 20 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
Cross-Polar Discrimination (at ± 60°)	> 16 dB	> 14 dB	> 18 dB	> 18 dB	> 18 dB	> 18 dB
Cross-Polar Port-to-Port Isolation	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
VSWR	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1
Passive Intermodulation (2x20W)	≤ -150dBc	≤ -150dBc	≤ -150dBc	≤ -150dBc	≤ -150dBc	≤ -150dBc
Input Power	500 Watts CW	500 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW
Polarization	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°
Input Impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms
Lightning Protection	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground

Mechanical Specifications

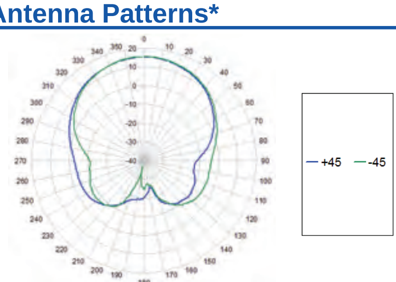
Dimensions (LxWxD)	92.4 x 14.8 x 7.4 inches (2348 x 376 x 189 mm)
Survival Wind Speed	> 150 mph
Front Wind Load	332 lbs (1479 N) @ 100 mph (161 kph)
Side Wind Load	193 lbs (860 N) @ 100 mph (161 kph)
Equivalent Flat Plate Area	13.0 ft^2 (1.2 m^2)
Weight (without Mounting)	68 lbs (31 kg)
RET System Weight	5.0 lbs (2.25 kg)
Connector	6; 7-16 DIN female long neck
Mounting Pole	2-5 inches (5-12 cm)



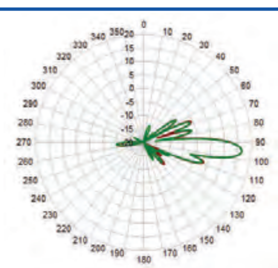
Bottom View

Rear View

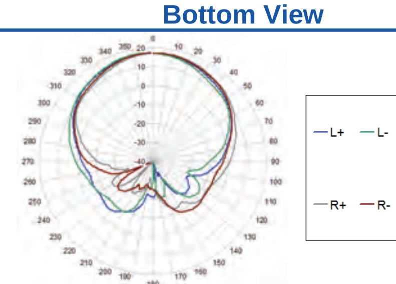
Antenna Patterns*



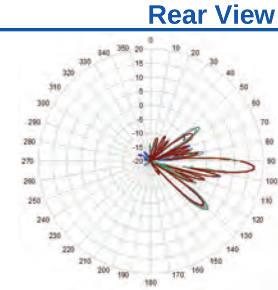
894 MHz Azimuth



Elevation 5°



1920 MHz Azimuth



Elevation 4°

*Typical antenna patterns. For detail information on antenna pattern, please contact us at info@cciproducts.com. All specifications are subject to change without notice.

www.cciproducts.com

USA HQ: 89 Leuning Street, South Hackensack, NJ 07606 Telephone: 201-342-3338,
Canada: 411 Legget Drive, Suite 104, Ottawa, ON, Canada K2K 3C9 Telephone: 613-591-6696

OPA Antenna Series

65° OctoPort Multi-Band Antenna

Model OPA-65R-LCUU-H8

Octoport Multi-Band Antenna Array

The CCI Octoport Multi-Band Antenna Array is an industry first 8-port antenna with full WCS Band Coverage. With four high band ports covering PCS, AWS and WCS bands, two 700 MHZ ports, and two 850 MHz ports our octoport antenna is ready for 4X4 high band MIMO.

Modern networks demand high performance, consequently CCI has incorporated several new and innovative design techniques to provide an antenna with excellent side-lobe performance, sharp elevation beams, and high front to back ratio.

Multiple networks can now be connected to a single antenna, reducing tower loading and leasing expense, while decreasing deployment time and installation cost.

Full band capability for 700 MHz , Cellular 850 MHz, PCS 1900 MHz, AWS 1710/2155 MHz and WCS 2300 MHz coverage in a single enclosure.

All CCI antennas are manufactured under ISO 9001.

Benefits

- **RET System allows Independent Tilt of each band specific paired port**
- **Reduces tower loading**
- **Frees up space for tower mounted Remote Radio Heads**
- **Single radome with eight ports**
- **All Band design simplifies radio assignments**
- **Sharp elevation beam eases network planning**

Features

- High Band Ports include WCS Band
- Four High Band ports with four Low Band ports in one antenna
- Sharp elevation beam
- Excellent elevation side-lobe performance
- Excellent MIMO performance due to array spacing
- Excellent PIM Performance
- A multi-network solution in one radome

Applications

- 4x4 MIMO on High Band and Dual 2x2 MIMO on 700 & 850 Low Bands
- Adding additional capacity without adding additional antennas
- Adding WCS Band without increasing antenna count

65° OctoPort Multi-Band Antenna

Model OPA-65R-LCUU-H8

OPA-65R Multi-Band Antenna

Electrical Specifications

Frequency Range	2 X Low Band Ports (L) which cover the range from 698-787 MHz	2 X Low Band Ports (C) which cover the range from 824-894 MHz	4 X High Band Ports (H1 & H2) which cover the full range from 1710-2360 MHz			
			1850-1990 MHz	1710-1755/2110-2170 MHz		2305-2360 MHz
Gain	14.7 dBi	15.5 dBi	17.0 dBi	16.5 dBi	17.2 dBi	17.1 dBi
Azimuth Beamwidth (-3dB)	65°	61°	62°	67°	64°	61°
Elevation Beamwidth (-3dB)	10.1°	8.5°	5.6°	6.2°	5.0°	4.5°
Electrical Downtilt	2° to 10°	2° to 10°	0° to 8°	0° to 8°	0° to 8°	0° to 8°
Elevation Sidelobes (1st Upper)	< -17 dB	< -17 dB	< -19 dB	< -18 dB	< -18 dB	< -17 dB
Front-to-Back Ratio @180°	> 28 dB	> 28 dB	> 35 dB	> 35 dB	> 35 dB	> 35 dB
Front-to-Back Ratio over ± 20°	> 28 dB	> 27 dB	> 28 dB	> 27 dB	> 27 dB	> 28 dB
Cross-Polar Discrimination (at Peak)	> 24 dB	> 20 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
Cross-Polar Discrimination (at ± 60°)	> 16 dB	> 14 dB	> 18 dB	> 18 dB	> 18 dB	> 18 dB
Cross-Polar Port-to-Port Isolation	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
VSWR	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1
Passive Intermodulation (2x20W)	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc
Input Power	500 Watts CW	500 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW
Polarization	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°
Input Impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms
Lightning Protection	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground

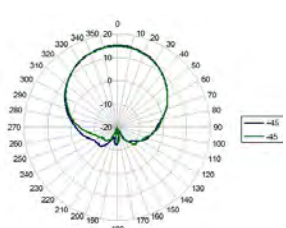
Mechanical Specifications

Dimensions (LxWxD)	92.7 x 14.4 x 7.0 inches (2355 x 366 x 179 mm)
Survival Wind Speed	> 150 mph
Front Wind Load	327 lbs (1453 N) @ 100 mph (161 kph)
Side Wind Load	186 lbs (829 N) @ 100 mph (161 kph)
Equivalent Flat Plate Area	12.9 ft^2 (1.2 m^2)
Weight (w/o RET/Mounting)	88 lbs (40 kg)
RET System Weight	7.0 lbs (3.0 kg)
Connector	8; 7-16 DIN female long neck
Mounting Pole	2-5 inches (5-12 cm)

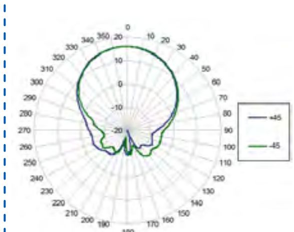
Bottom View

Rear View

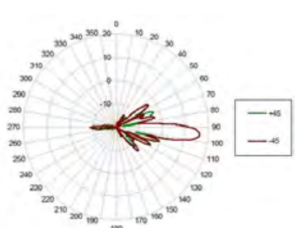
Antenna Patterns*



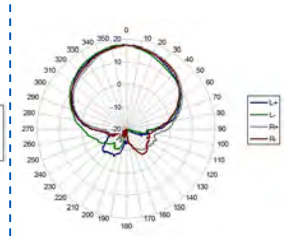
737 MHz Azimuth



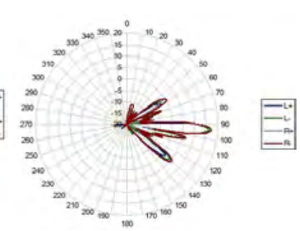
887 MHz Azimuth



Elevation 5°



1920 MHz Azimuth



Elevation 4°

*Typical antenna patterns. For detail information on antenna pattern, please contact us at info@cciproducts.com. All specifications are subject to change without notice.

CCI

Amplifiers

DATA SHEET

Triple Band Twin TMA (AWS/PCS/WCS) with AWS-3 and 700/850 Bypass

TMABPD7823VG12A

- Triple Band Twin TMA (AWS/PCS/WCS) which includes AWS-3 and 700/850 Bypass
- Each TMA has independent gain control of 6 to 12dB
- Fail-safe bypass mode and multi-strike lightning protection
- Small lightweight unit offers high reliability of >500K Hours MTBF
- Highly linear amplifier with low intermodulation

Overview

CCI's Triple Band Twin TMA (AWS/PCS/WCS), which includes AWS-3 and 700/850 bypass, contains two triple band TMA's in a single housing. Each TMA in the housing is fully duplexed and shares a single LNA for all three bands. The bypass path provides excellent isolation to the TMA path. Separate antenna ports for the bypass path and TMA path are combined onto a single BTS port. The Twin TMA's low noise, highly linear amplifiers improve the uplink sensitivity and the receive performance of the base station. The TMA is fully compliant with the AISG 2.0 specification and supports CDMA, EDGE/GSM, UMTS and LTE BTS equipment. The unit is ideally suited for sites upgraded to quad-band using the existing infrastructure. The TMA allows the sharing of feeder lines for all bands thus reducing tower loading, leasing, and installation costs. The input and output connectors are located inline for ease of installation in space constrained areas such as uni-pole structures and stealth antennas.

Technical Description:

The TMA system is an outdoor triple band twin tower mount unit which provides low noise amplification of PCS, AWS, AWS-3, and WCS uplink signals combined with 700/850 bypassed signals from separate antenna ports to a common BTS port. The tower mount unit consists of 14 band-pass filters, two redundant low noise amplifiers (LNA) with bypass failure circuitry, two bias tees, AISG control circuitry, and lightning protection circuitry all housed in an IP67 enclosure suited to long life masthead mounting. The AWS, PCS and WCS paths are dual duplexed to separate the low power uplink signals from the high power down link signals at the BTS and antenna ports. The AWS, PCS, and WCS uplink signals are amplified with a dedicated ultra-low noise PHEMT LNA with adjustable gain control. The unit provides protection against lightning strikes via a multistage surge protection circuit. DC power and AISG 2.0 control is provided via the BTS feeder cable. The unit operates in current window alarm (CWA) mode until a valid AISG message is detected, at which point it automatically switches to AISG mode. Once in AISG mode, the unit can only switch back to CWA mode with the receipt of an AISG CCI vendor defined command. In CWA mode, the unit requires 12VDC at each BTS port and follows typical current window convention. In AISG mode, the unit will accept 10-30 VDC from either BTS port. In AISG mode, the unit does not require an AISG 2.0 compatible site control unit (SCU) and may also be powered by a standard power distribution unit (PDU).
An optional Site Control Unit (SCU) is available to power up to 32 AISG modules per sector and to provide the monitoring and alarm functions for the system. The SCU is housed in a single (1U) 1.75" x 19" rack and contains dual redundant power supplies capable of being "hot swapped" that provide a regulated DC supply voltage on the RF coax for the tower mount amplifiers.

CCI

Amplifiers

SPECIFICATIONS

Triple Band Twin TMA (AWS/PCS/WCS) with AWS-3 and 700/850 Bypass

TMABPD7823VG12A

Electrical

RF Parameters	Ports	Frequency(MHz)	Specification
Return Loss (minimum)	700/850 ANT	698 - 894	18 dB
	PCS/AWS/WCS ANT	1850 - 1910	18 dB (10 dB bypass mode)
		1930 - 1990	18 dB
		1710 - 1780	18 dB (10 dB bypass mode)
		2110 - 2180	18 dB
		2305 - 2320	18 dB (10 dB bypass mode)
		2345 - 2360	18 dB
	BTS	698 - 894	18 dB
		1850 - 1910	18 dB (10 dB bypass mode)
		1930 - 1990	18 dB
		1710 - 1780	18 dB (10 dB bypass mode)
		2110 - 2180	18 dB
		2305 - 2320	18 dB (10 dB bypass mode)
		2345 - 2360	18 dB
Gain Setting	PCS/AWS/WCS ANT to BTS	1710 - 1780, 1850 - 1910, 2305 - 2320	6 to 12 dB adjustable in 0.25 dB steps via AISG (± 1.0 dB)
Gain, Actual (when set for 6 dB)	PCS/AWS/WCS ANT to BTS	1710 - 1780, 1850 - 1910	6 ± 1.0 dB
		2305 - 2320	5 ± 1.0 dB
Gain, Actual (when set for 9 dB)	PCS/AWS/WCS ANT to BTS	1710 - 1780, 1850 - 1910	9 ± 1.0 dB
		2305 - 2320	8 ± 1.0 dB
Gain, Actual (when set for 12 dB)	PCS/AWS/WCS ANT to BTS	1710 - 1780, 1850 - 1910	12 ± 1.0 dB
		2305 - 2320	11 ± 1.0 dB
Insertion Loss	700/850 ANT - BTS	698 - 894	0.25 dB typical
	PCS/AWS/WCS ANT to BTS (RX Bypass mode)	1850 - 1910	2.5 dB typical
		1710 - 1780	2.5 dB typical
		2305 - 2320	4.5 dB typical
	PCS/AWS/WCS ANT to BTS (TX)	1930 - 1990	0.5 dB typical
		2110 - 2180	0.4 dB typical
		2345 - 2360	0.7 dB typical
Isolation	700/850 ANT to PCS/AWS/WCS ANT	698 - 894	70 dB
		1710 - 2360	70 dB
Noise Figure	PCS/AWS/WCS ANT to BTS	1850 - 1910	1.5 dB typical
		1710 - 1780	1.3 dB typical
		2305 - 2320	2.3 dB typical
Input Third Order Intercept Point (minimum)	PCS/AWS/WCS ANT to BTS	1710 - 1780	+12 dBm at maximum gain
		1850 - 1910	+12 dBm at maximum gain
		2305 - 2320	+12 dBm at maximum gain

General Characteristics	
Impedance	50 ohms
Continuous Average Power	200 W max.
Peak Envelope Power	2 kW max.
Intermodulation Performance(all ports)	<-117 dBm (-160 dBc) typical (2 × +43 dBm tones) all bands
Operating Voltage	+10V to +30V DC provided via coax or AISG
Power Consumption	< 2.0 W

Triple Band Twin TMA (AWS/PCS/WCS) with AWS-3 and 700/850 Bypass

SPECIFICATIONS

TMABPD7823VG12A

Environmental

Operating Temperature	-40˚C to +65˚C
Ingress Protection	IP67
MTBF	>500,000 hours
Lightning Protection	8/20us, ±10KA max, 10 strikes each per IEC61000-4-5

Mechanical

Connectors	6 x 7-16 DIN female 1 x AISG
Dimensions enclosure (HxWxD)	10.63 x 11.04 x 3.75 in. (270.0 x 280.3 x 95.2 mm)
Dimensions with brackets (HxWxD)	14.22 x 11.56 x 4.24 in. (361.8 x 293.5 x 107.6 mm)
Weight enclosure	25.0 lbs (11.3 kg)
Weight with brackets	26.0 lbs (11.8 kg)
Mounting	Pole/Wall mounting bracket