STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

September 14, 2021

Victoria Masse
Northeast Site Solutions
420 Main Street Unit #2
Sturbridge, MA 01566
victoria@northeastsitesolutions.com

RE: **EM-T-MOBILE-035-210812 -** T-Mobile notice of intent to modify an existing telecommunications facility located at 0 Mechanic Street, Darien, Connecticut.

Dear Ms. Masse:

The Connecticut Siting Council (Council) received a notice of intent to modify the above-referenced facility on August 12, 2021. A revised notice that included Construction Drawings stamped and signed by a Professional Engineer licensed in the State of Connecticut was submitted September 10, 2021.

According to Section 16-50j-71 of the Regulations of Connecticut State Agencies, "…any modification, as defined in Section 16-50j-2a of the Regulations of Connecticut State Agencies, to an existing tower site, except as specified in Sections 16-50j-72 and 16-50j-88 of the Regulations of Connecticut State Agencies, may have a substantial adverse environmental effect."

Staff has reviewed this exempt modification request (initial and revised submittals) for completeness and has identified a deficiency in the request. The Antenna Mast Design drawings prepared by Centek Engineering and last revised November 29, 2018 are not stamped and signed by a Professional Engineer licensed in the State of Connecticut.

Therefore, the exempt modification request remains incomplete at this time. The Council recommends that Northeast Site Solutions provide Antenna Mast Design Drawings that are signed and stamped by a Professional Engineer licensed in the State of Connecticut, on or before October 13, 2021. If additional time is needed to gather the requested information, please submit a written request for an extension of time prior to October 13, 2021. **Please provide an electronic version and one hard copy of the requested information for the incomplete exempt modification to be rendered complete and processed. Please include the Council's exempt modification identification number referenced above with the submittal.**

This notice of incompletion shall have the effect of tolling the Federal Communications Commission (FCC) 60-day timeframe in accordance with Paragraph 217 of the FCC Wireless Infrastructure Report and Order issued on October 21, 2014 (FCC 14-153).

Thank you for your attention to this matter. Should you have any questions, please feel free to contact me at 860-827-2951.

Sincerely,

Melanie Bachman
Executive Director

MAB/FOC/emr

S:\EMS_TS\1_BYTOWN\EastHartford\ForbesSt\VERIZON\em-ver-043-180305_ForbesSt_incomplete.docx

From: Deborah Chase <deborah@northeastsitesolutions.com>
Sent: Friday, September 10, 2021 4:05 PM
To: CSC-DL Siting Council <Siting.Council@ct.gov>; Bachman, Melanie <Melanie.Bachman@ct.gov>; Mathews, Lisa A <Lisa.A.Mathews@ct.gov>
Cc: victoria@northeastsitesolutions.com
Subject: 3 Mechanic Street (aka 0 Mechanic Street), Darien CT 06820- EM Application CD not S&S

Siting Council-
We reviewed our filing on the Siting Council website and noticed the following discrepancy, the CD in the EM application was not signed and stamped.
Please see attached the updated EM Application as well as the signed and stamped CD's.
A hard copy is being sent to you as well via Priority Mail, see attached label.
Thank you very much

Deborah Chase
Senior Project Coordinator & Analyst
Mobile: 860-490-8839

NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
www.northeastsitesolutions.com

Save a tree. Refuse.Reduce. Reuse. Recycle.

Northeast Site Solutions
Victoria Masse
420 Main Street #2, Sturbridge, MA 01566
860-306-2326
victoria@northeastsitesolutions.com

July 23, 2021

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

RE: Exempt Modification Application
3 Mechanic Street (aka 0 Mechanic Street), Darien CT 06820
Latitude: 41.196250
Longitude: -73.431941
T-Mobile Site#: CT11290C_L700 4x2

Dear Ms. Bachman:

T-Mobile currently maintains three (3) antennas at the 124-foot level of the existing 115-foot transmission pole at 3 Mechanic Street, Darien CT 06820. The electric transmission pole is owned by CL&P d/b/a Eversource. The property is owned by State of CT DOT. T-Mobile now intends to install three (3) new 600/700/1900/2100 MHz. The new antennas would be installed at the 124-foot level of the tower. T-Mobile also intends to make the following modifications. As shown on the enclosed mount analysis.

Planned Modifications

Remove:

NONE

Remove and Replace:

(3) Andrew SBNHH Antenna (Remove) - (3) RFS APX16DWV 600/700/1900/2100 MHz Antenna (Replace)

(3) RRUS-11 B12 RRU (Remove) – (3) 4449 B71 B12 RRU (Replace) (At ground level)

Install New:

(6) 1-1/4” Coax

Existing to Remain:

(3) Smart Bias Tees

(18) 1-1/4” Coax

This facility was originally approved by the CSC in Petition No. 420 dated July 15, 1999. The original approval indicates a structure height of 95' which conflicts with future exempt modification approvals reflecting the tower height as 115'. This was most likely in error and the tower height is 115'. Outside of the discrepancy, the proposed modification complies with the original approval. The top of the antennas were approved to be approximately 10-feet above the top of the tower. Please see the enclosed.

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

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

1. The proposed modifications will not result in an increase in the height of the existing structure.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site. ·

6. The existing structure and its foundation can support the proposed loading.

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

Sincerely,

Victoria Masse
Mobile: 860-306-2326
Fax: 413-521-0558
Office: 420 Main Street, Unit 2, Sturbridge MA 01566
Email: victoria@northeastsitesolutions.com

Attachments
cc: The Honorable Jayme J. Stevenson – First Selectman - Jstevenson@darienct.gov
Darien Town Hall
2 Renshaw Rd
Darien, CT, 06820
(203) 656-7300

Kathleen A. Clark-Buch – Town Administrator - kbuch@darienct.gov
Darien Town Hall
2 Renshaw Rd, Room 202
Darien, CT, 06820
(203) 656-7300

CL&P d/b/a Eversource - as tower owner
107 SELDEN ST BERLIN CT 06037-1616

State of CT DOT - property owner
2800 BERLIN TURNPIKE NEWINGTON CT 06111

Exhibit A

Petition No. 420
Omnipoint Communications
Darien, CT
Staff Report
July 15, 1999

On July 7, 1999, Connecticut Siting Council (Council) member Edward S. Wilensky and Executive Director Joel M. Rinebold met with J. Brendan Sharkey, Mark Finley, Brian Ragazzine, and Cheatan Dhaduk of Omnipoint Communications, Inc. (Omnipoint) for a field review in the Town of Darien, Connecticut. Omnipoint is petitioning the Council for a determination that no Certificate of Environmental Compatibility and Public Need (Certificate) would be required for modifications to an existing Connecticut Light and Power Company (CL&P) electric transmission line facility in Darien. Omnipoint submits no Certificate would be required because the addition of three antennas and associated equipment would not have a substantial adverse environmental effect.

Omnipoint proposes to attach three PCS antennas to existing CL&P transmission line structure number 1068, located south of Mechanic Street in Darien, Connecticut. Access would be from Mechanic Street. A temporary staging area would be established adjacent to the transmission line structure in the right-of-way. The top of the antenna assembly would extend approximately 10 feet above the top of the existing 95-foot transmission line structure. The proposed antennas are 56 inches in length, 8 inches in width, and 2.75 inches in diameter, and weigh 18 lbs. The antennas would be placed on top of the existing tower structure and no compression post would be required. The communications equipment would be installed upon or eight-foot by 3.75–foot concrete slab, to be placed at the northeast corner of the tower base. Additional screening is recommended around the equipment cabinet at the base of the tower.

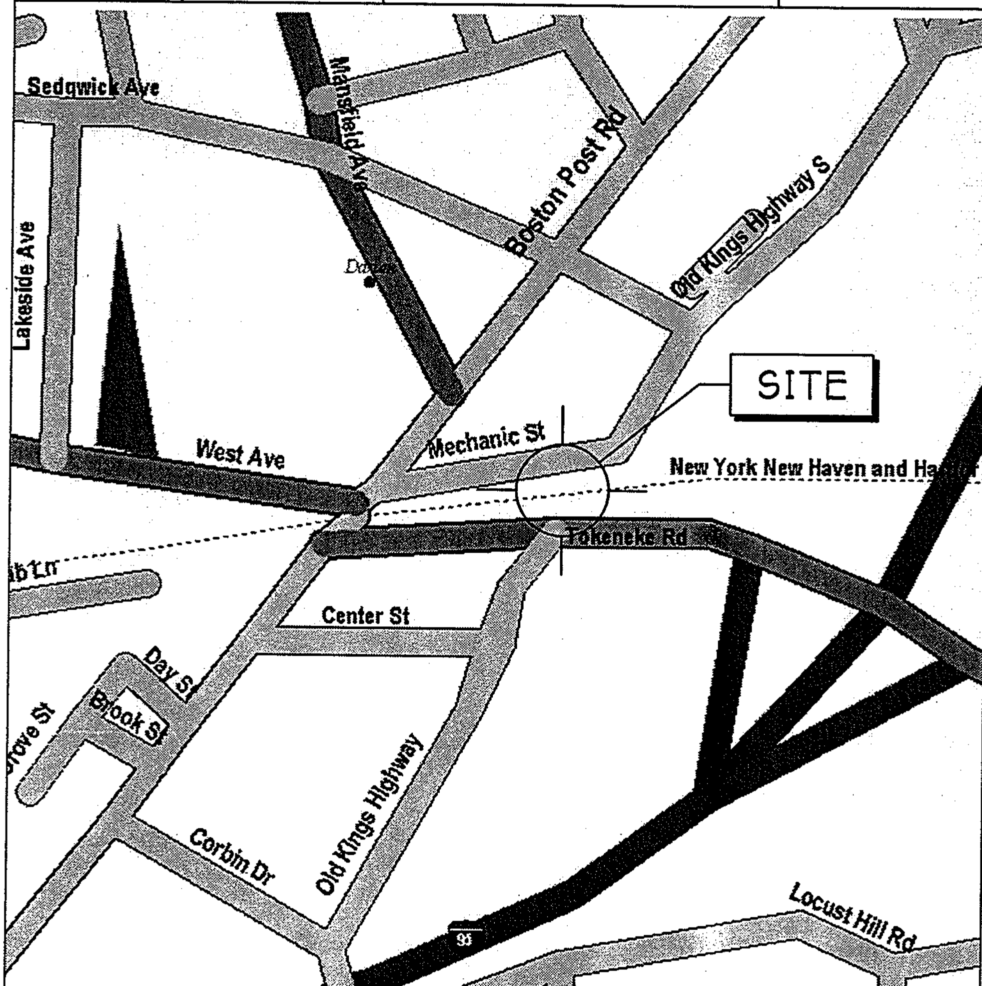
The total calculated radio frequency power density at the base of the tower would be 0.0149 mw/cm^2, which is 1.49 percent of the maximum permissible exposure for uncontrolled environments based on Federal Communications Commission (FCC) Bulletin 65, August 1997.

CL&P POLE #1068
MECHANIC STREET
DARIEN, CT

SEARCH AREA: **DARIEN / DOWNTOWN**

SITE I.D. #: **CT-11-290C**

LOT#:	BLOCK#:	ZONING DISTRICT:	MAP#:



DWG.:	TITLE:
A-1	SITE LAYOUT & KEY PLAN
A-2	EQUIPMENT PLAN
A-3	SOUTH ELEVATION
A-4	CABINET DETAIL
A-5	SUB-BASE DETAIL
A-6	EQUIPMENT ELEVATION
A-7	CABLE TRAY DETAIL
A-8	CABLE ROUTING ELEVATION
A-9	CABLE MOUNT ELEVATION
A-10	ANTENNA MOUNT DETAIL
A-11	ELECTRIC EQUIPMENT MOUNT
A-12	PLANTING DETAIL
A-13	FENCE DETAIL
A-14	GENERAL NOTES
A-15	GENERAL NOTES
A-16	GENERAL NOTES
A-17	CONCRETE NOTES
A-18	MATERIAL LIST
E-1	GENERAL INFORMATION
E-2	SERVICE PLAN
E-3	GROUNDING PLAN
E-4	RISER
E-5	GROUNDING DETAILS
E-6	GROUNDING DETAILS
E-7	GROUNDING DETAILS

ROBERT P. JUENGERT

STATE OF CONN · ROBERT PAUL JUENGERT · No. 4208 · REGISTERED ARCHITECT

CT-4208

DIRECTIONS TO SITE:

ROUTE 95 SOUTH TO EXIT 11. MAKE RIGHT ONTO BOSTON POST ROAD. GO ONE BLOCK TO A RIGHT ON MECHANIC STREET. SITE IS ON THE RIGHT JUST BEFORE THE SHARP CURVE IN THE ROAD (APPROXIMATELY 150 YARDS DOWN THE ROAD).

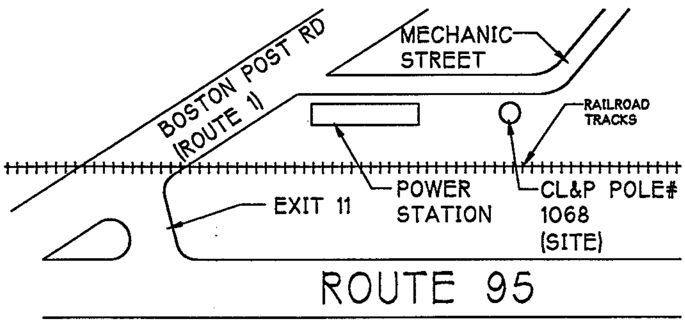
ARCNET PROJECT NO. A99.506-833A | P.C.: RVa | DATE: 4/22/99

NORTH

SITE LOCATION MAP

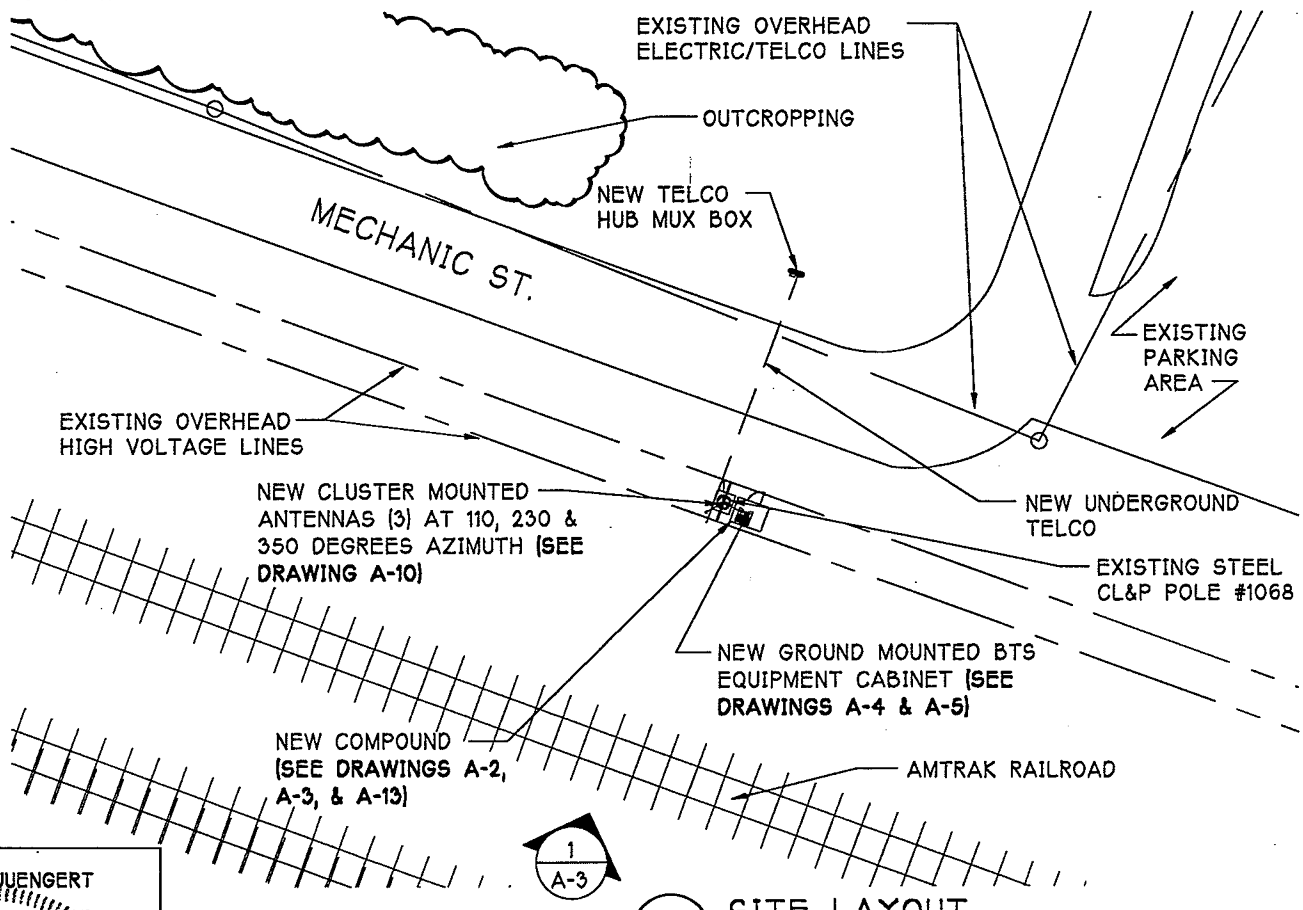
SCALE: NONE

ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

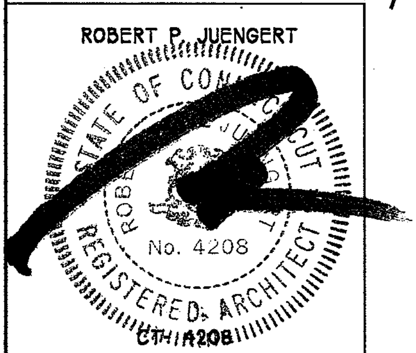


NOTE:
1.) FOR ITEMS SUPPLIED BY OTHERS SEE MATERIAL LIST. (DRAWING A-18)
2.) NORTH TO BE DETERMINED BY CIVIL ENGINEER

2 / A-1 KEY PLAN
SCALE: NOT TO SCALE

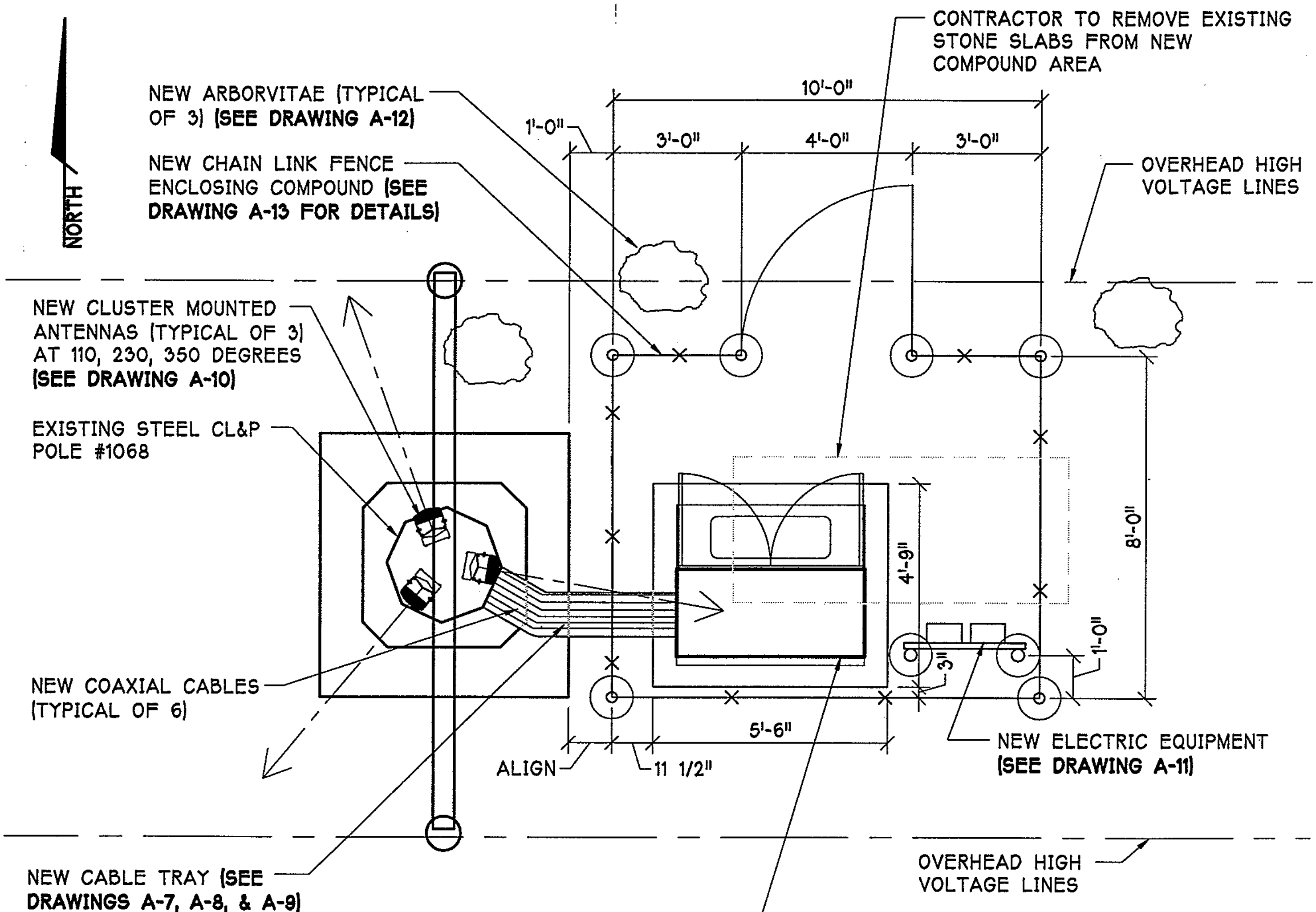


1 / A-1 SITE LAYOUT
SCALE: 1" = 60'



ARCNET ARCHITECTS, INC. 670 North Beers Street, Building 2, Holmdel, NJ 07733 Tel: 732.739.3200 Fax: 732.739.0440	Drawing Title: SITE LAYOUT & KEY PLAN	Project: CL&P POLE #1068
	Client: OCS	Address: MECHANIC STREET DARIEN, CT
		Search Area: DARIEN / DOWNTOWN
		Site ID No.: CT-11-290C

	P.C.:	P.C. Chkd:	Chkd. by:	ARCNET Project No.	Drawn:	Date:	Approved By:	Revision No.	Date:	Drawing No.
	RVa			A99.506.833A	CS	4/20/99	CLIENT: _______ DATE: _______			A-1



1/A-2 EQUIPMENT PLAN

SCALE: 1/4" = 1'0"

ROBERT P. JUENGERT

STATE OF CONNECTICUT · ROBERT PAUL JUENGERT · No. 4208 · REGISTERED ARCHITECT

CT-4208

NOTES:

1. **FOR A LIST OF ITEMS SUPPLIED BY OTHERS SEE MATERIAL LIST, DRAWING A-17**
2. **CONTRACTOR TO LOCATE AND MARK-OUT ALL PUBLIC AND PRIVATE UNDERGROUND UTILITIES AND STRUCTURES THROUGH THE USE OF A LOCATING SERVICE PRIOR TO ANY EXCAVATION WORK. HAND DIG IN AREAS OF EXISTING UTILITIES AND/ OR STRUCTURES.**
3. **TOWER HAS PASSED STRUCTURAL ANALYSIS FOR THE PROPOSED INSTALLATION.**

ARCNET ARCHITECTS, INC.

670 North Beers Street, Building 2, Holmdel, NJ 07733

Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title:	EQUIPMENT PLAN
Client:	OCS
Project:	**CL&P POLE # 1068**
Address:	MECHANIC STREET, DARIEN, CT
Search Area:	DARIEN / DOWNTOWN
Site ID No.:	CT-11-290C
P.C.:	RVa
P.C. Chkd.:	RJ
Chkd. by:	
ARCNET Project No.:	A99.506.833A
Drawn:	CS
Date:	4/20/99
Approved By:	CLIENT: ________ DATE: ________
Drawing No.	**A-2**

Revision No.	Date:
REV2KBa	7/16/99
REV1(JMc)	5/7/99

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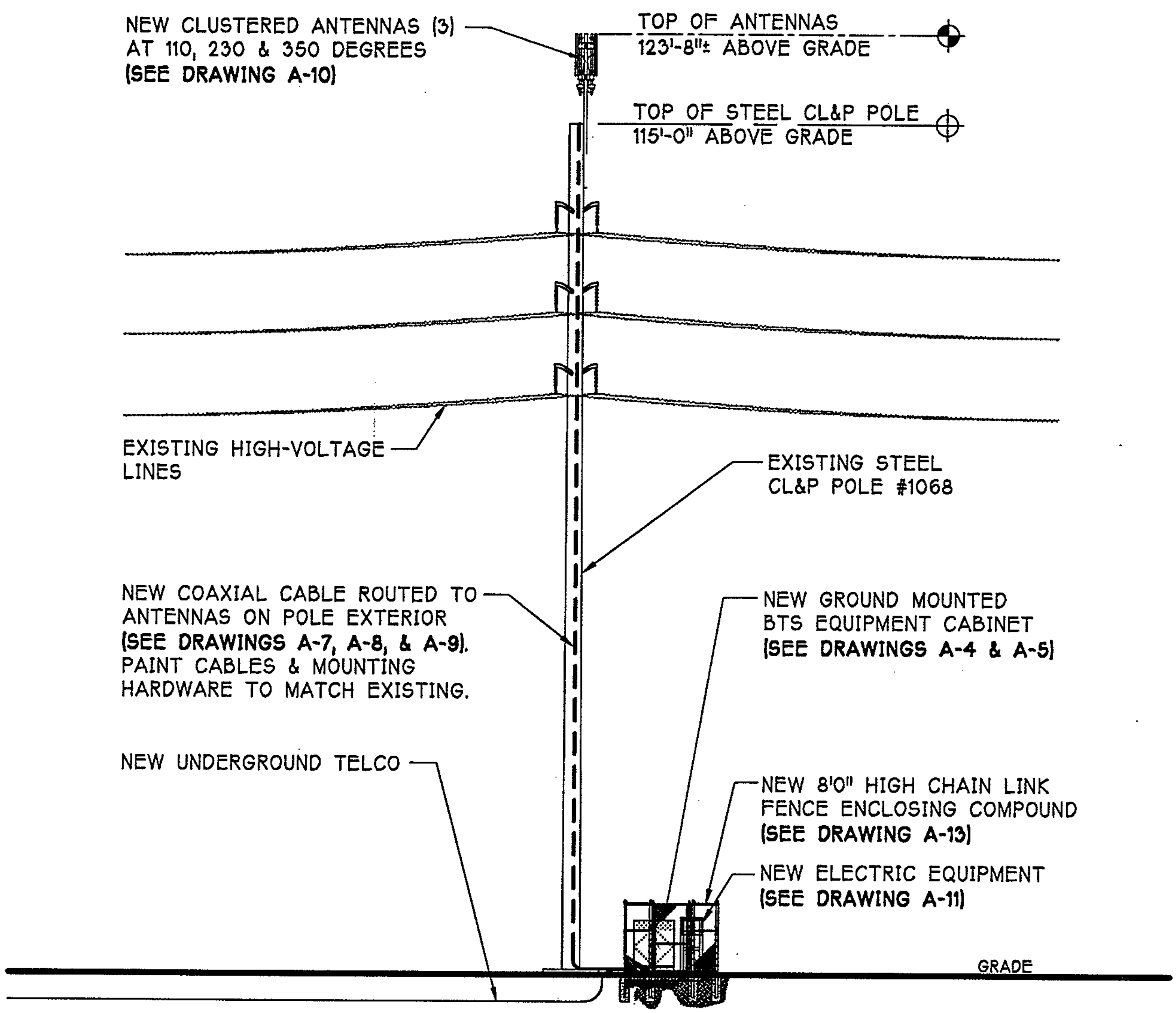

ROBERT P. JUENGERT

STATE OF CONNECTICUT REGISTERED ARCHITECT No. 4208

CT- 4208

1/A-3 SOUTH ELEVATION

SCALE: 1" = 20'0"

NOTE:
CL&P TO REMOVE EXISTING VINES FROM POLE.

ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title:	SOUTH ELEVATION
Client:	OCS
Project:	CL&P POLE # 1068
Address:	MECHANIC STREET DARIEN, CT
Search Area:	DARIEN / DOWNTOWN
Site ID No.:	CT-11-290C
P.C.:	RVa
P.C. Chkd:	
Chkd. by:	
ARCNET Project No.	A99.506.833A
Drawn:	CS
Date:	4/20/99
Revision No.	REV1(JMc)
Date:	5/7/99
Drawing No.	A-3

Approved By: CLIENT:________ DATE:________

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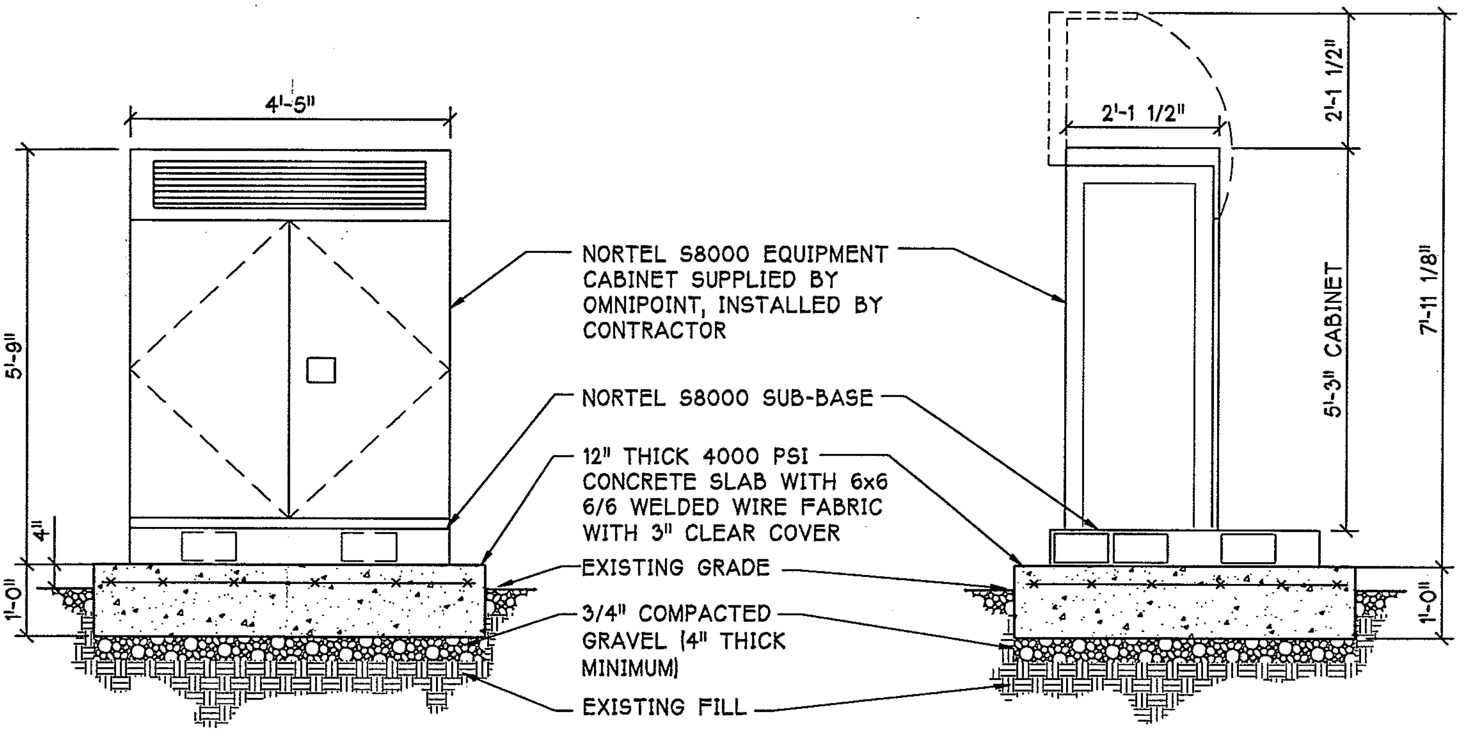
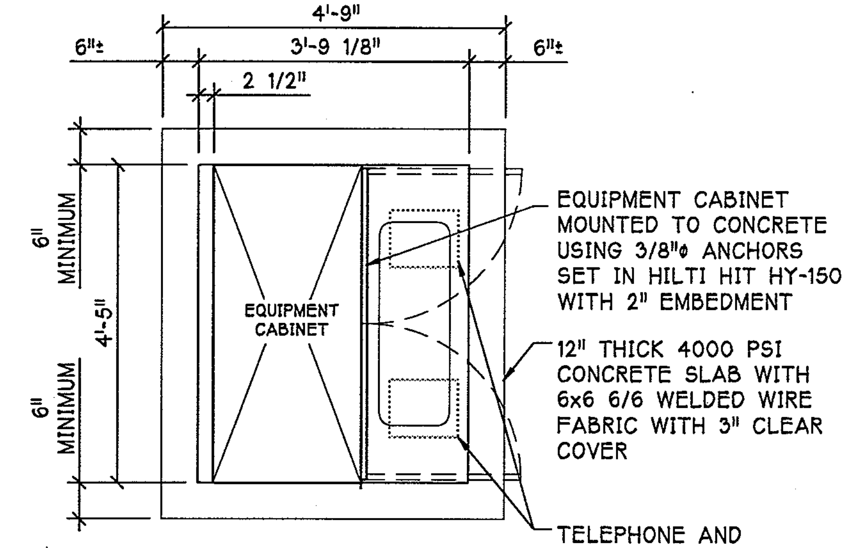


1 A-4 FRONT VIEW
SCALE: 1/2" = 1'-0"

2 A-4 SIDE VIEW
SCALE: 1/2" = 1'-0"



WEIGHT OF CABINET = 1065 lbs.
WEIGHT OF BASE = 110 lbs.

3 A-4 CABINET DETAIL
SCALE: 1/2" = 1'-0"

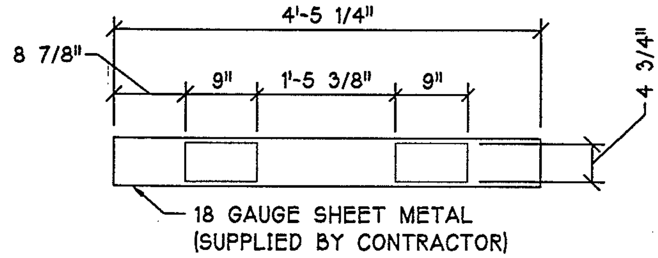
ROBERT P. JUENGERT
STATE OF CONNECTICUT REGISTERED ARCHITECT No. 4208
CT-4208

ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

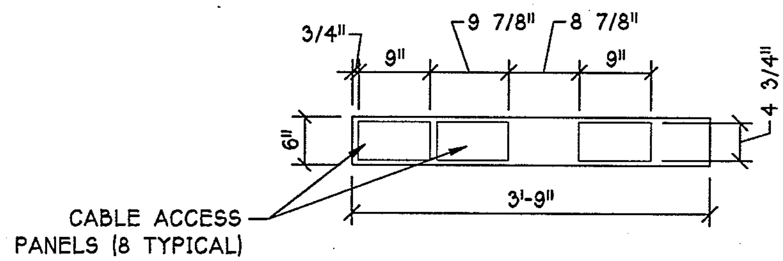
Drawing Title: CABINET DETAIL	Project: CL&P POLE #1068	REV1(JMc) 5/7/99
Client: OCS	Address: MECHANIC STREET DARIEN, CT	Revision No. / Date:
	Search Area: DARIEN / DOWNTOWN	
	Site ID No.: CT-11-290C	Drawing No. A-4

P.C.:	P.C. Chkd:	Chkd. by:	ARCNET Project No.	Drawn:	Date:
RVa			A99.506.833A	CS	4/20/99

Approved By:
CLIENT: ______________ DATE: ______________



2 / A-5 FRONT ELEVATION
SCALE: 1/2" = 1'-0"

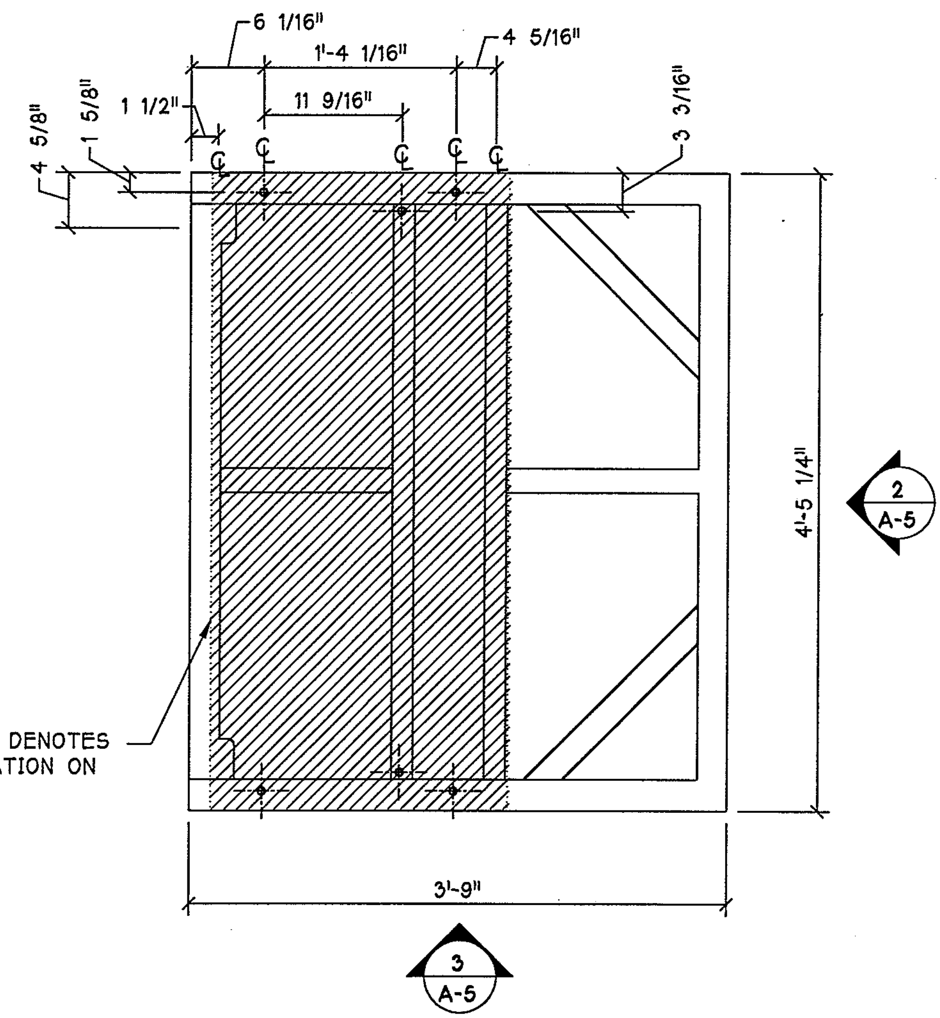


3 / A-5 SIDE ELEVATION
SCALE: 1/2" = 1'-0"

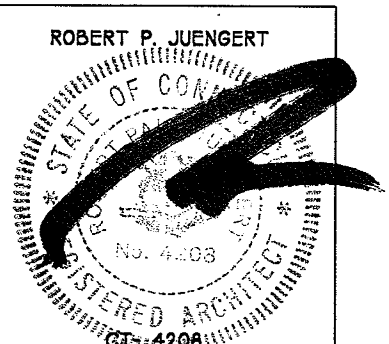
NOTES:
1. * CONTRACTOR TO VERIFY ALL BOLT LOCATIONS * ALL HOLES 11/16ø TYPICAL * WEIGHT OF SUB BASE = 110 LBS.

2. IN INSTANCES WHERE THE BTS IS DUNNAGE OR WALL MOUNTED THE CONTRACTOR SHALL PROVIDE AN 18 GAUGE ALUMINUM CLOSURE PANEL 3'-9" X 4'-5". HELD IN PLACE WHEN SANDWICHED BETWEEN SUB-BASE AND GRATING. DRILL (2) WEEP HOLES AT EACH CORNER AND AT CENTER.

3. ALL SUB-BASES TO BE MOUNTED TO SUBSTRATE USING 1/2"ø HIGH STRENGTH BOLTS. WHERE MOUNTING TO CONCRETE USE HILTI HIT HY 150 SYSTEM WITH 3 1/2" EMBEDMENT. WHERE MOUNTING TO GRATING USE HIGH STRENGTH SADDLE CLIPS.



1 / A-5 SUB-BASE DETAIL
SCALE: 1/2" = 1'-0"



ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title: SUB-BASE DETAIL	Project: CL&P POLE #1068	Revision No.	Date:
Client: OCS	Address: MECHANIC STREET, DARIEN, CT		
	Search Area: DARIEN / DOWNTOWN		
	Site ID No.: CT-11-290C		

P.C.	P.C. Chkd.	Chkd. By	ARCNET Project No.	Drawn	Date	Approved By	Drawing No.
RVa			A99.506.833A	CS	4/21/99	CLIENT: ______ DATE: ______	A-5

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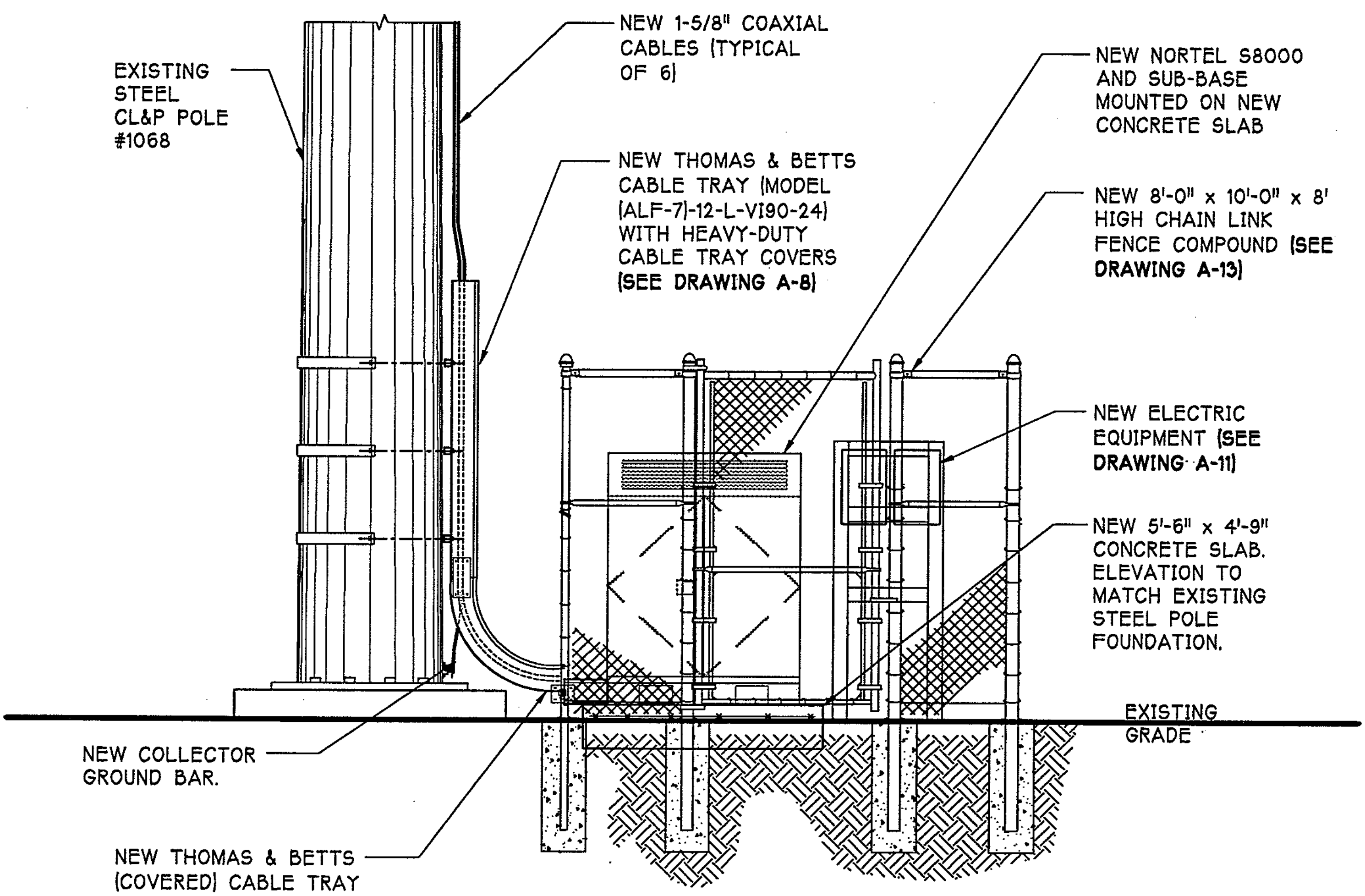


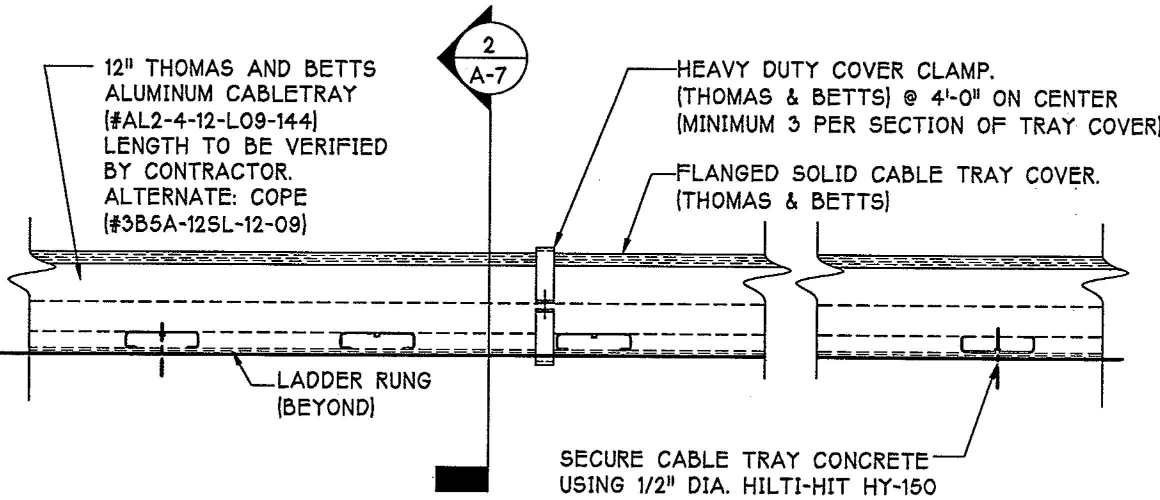
1 / A-6 EQUIPMENT ELEVATION (FROM SOUTH)
SCALE: 1/4" = 1'-0"

ROBERT P. JUENGERT
STATE OF CONNECTICUT REGISTERED ARCHITECT
CT-4208

NOTE:
1.) CONTRACTOR TO VERIFY LENGTHS IN FIELD.
2.) BUSHES NOT SHOWN FOR CLARITY.

ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

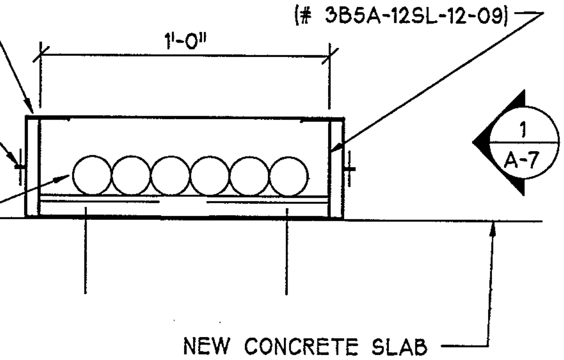
Drawing Title:	EQUIPMENT ELEVATION
Client:	OCS
Project:	CL&P POLE #1068
Address:	MECHANIC STREET DARIEN, CT
Search Area:	DARIEN / DOWNTOWN
Site ID No.:	CT-11-290C
P.C.:	RVa
P.C. Chkd:	
Chkd. by:	
ARCNET Project No.	A99.506.833A
Drawn:	CS
Date:	4/21/99
Approved By:	CLIENT: ______ DATE: ______
Revision No.	REV1(JMc)
Date:	5/7/99
Drawing No.	A-6



NOTE:
CONTRACTOR TO PAINT"DO NOT STEP OR STAND" ON TOP OF CABLE TRAY COVER IN 3" LETTERS (YELLOW) (SEE PAINT SPECIFICATIONS DRAWING A-15)

1/A-7 CABLE TRAY DETAIL

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



ROBERT P. JUENGERT
STATE OF CONNECTICUT · REGISTERED ARCHITECT
CT-4208

2/A-7 CABLE TRAY SECTION

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

NOTE:
ELEVATION OF NEW CONCRETE SLAB TO MATCH ELEVATION OF EXISTING STEEL POLE FOUNDATION

ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title:	CABLE TRAY DETAIL
Client:	OCS
P.C.:	RVa
P.C. Chkd:	
Chkd. by:	
ARCNET Project No.	A99.506.833A
Drawn:	CS
Date:	4/21/99
Project:	CL&P POLE #1068
Address:	MECHANIC STREET, DARIEN, CT
Search Area:	DARIEN / DOWNTOWN
Site ID No.:	CT-11-290C
Approved By:	CLIENT: ______ DATE: ______
Revision No.	
Date:	
Drawing No.	A-7

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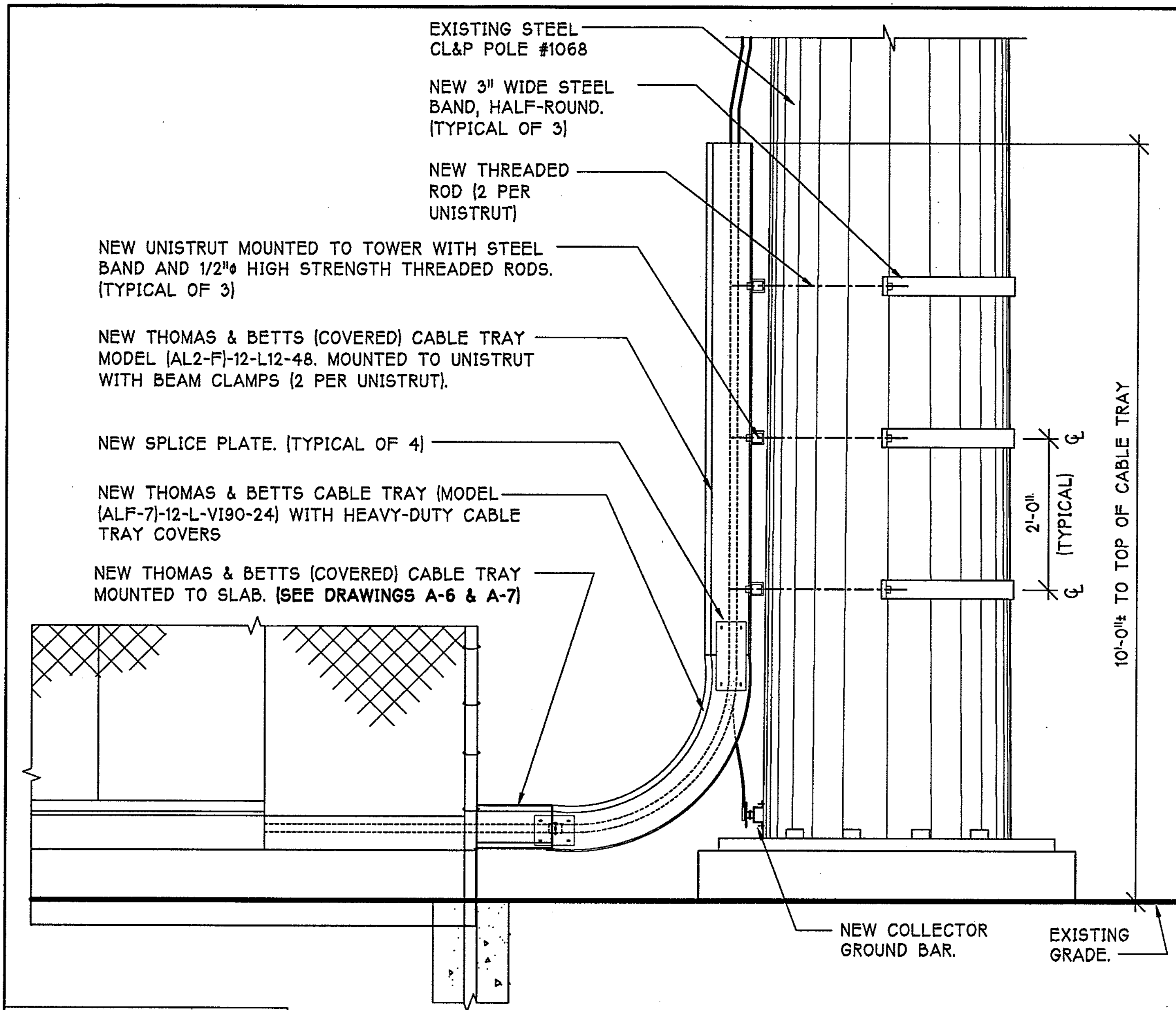


1 / A-8 CABLE ROUTING ELEVATION
SCALE: 1/2" = 1'-0"

NOTE:
1.) CONTRACTOR TO VERIFY CABLE TRAY LENGTHS IN FIELD.
2.) TOP OF BTS PAD TO MATCH TOP OF EXISTING POLE FOUNDATION.

ROBERT P. JUENGERT
STATE OF CONN... No. 4208 REGISTERED ARCHITECT
CT-4208

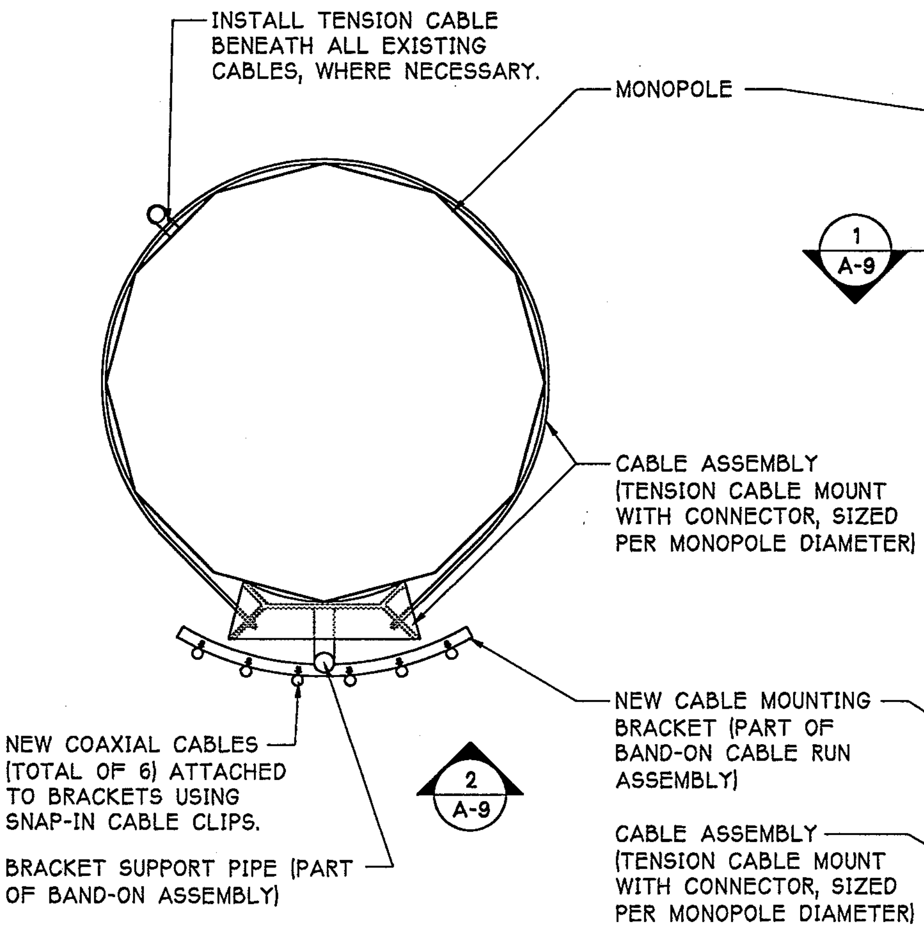
ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

P.C.:	P.C. Chkd:	Chkd. By:	ARCNET Project No.	Drawn:	Date:
RVa			A99.506.833A	CS	4/21/99

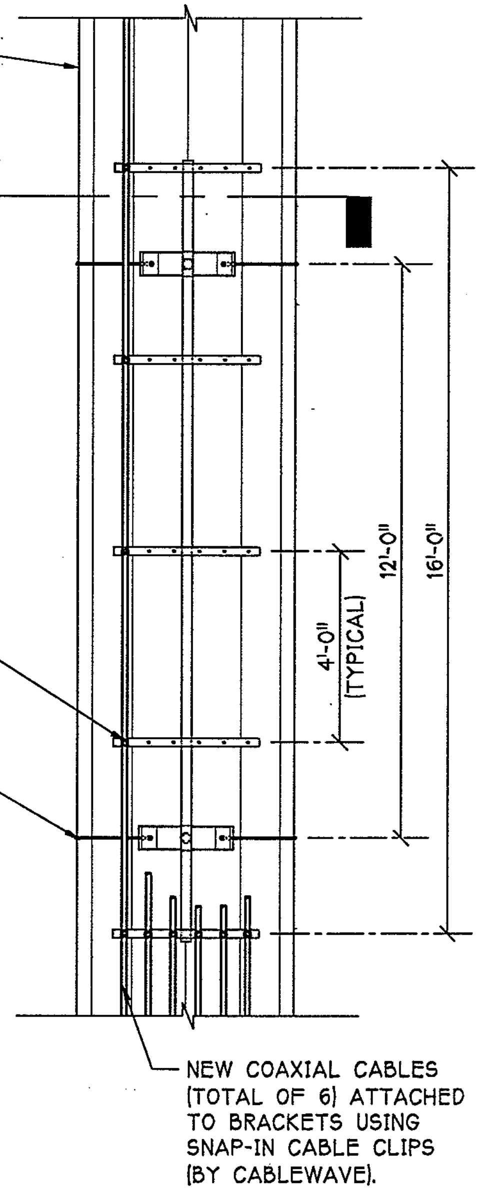
Drawing Title: CABLE ROUTING ELEVATION
Client: OCS

Project: CL&P POLE #1068
Address: MECHANIC STREET DARIEN, CT
Search Area: DARIEN / DOWNTOWN
Site ID No.: CT-11-290C
Approved By: CLIENT:______ DATE:______

Revision No. Date:
Drawing No. A-8



1 / A-9 CABLE MOUNT PLAN
SCALE: 1/2" = 1'-0"



2 / A-9 CABLE MOUNT ELEVATION
SCALE: 1/4" = 1'-0"

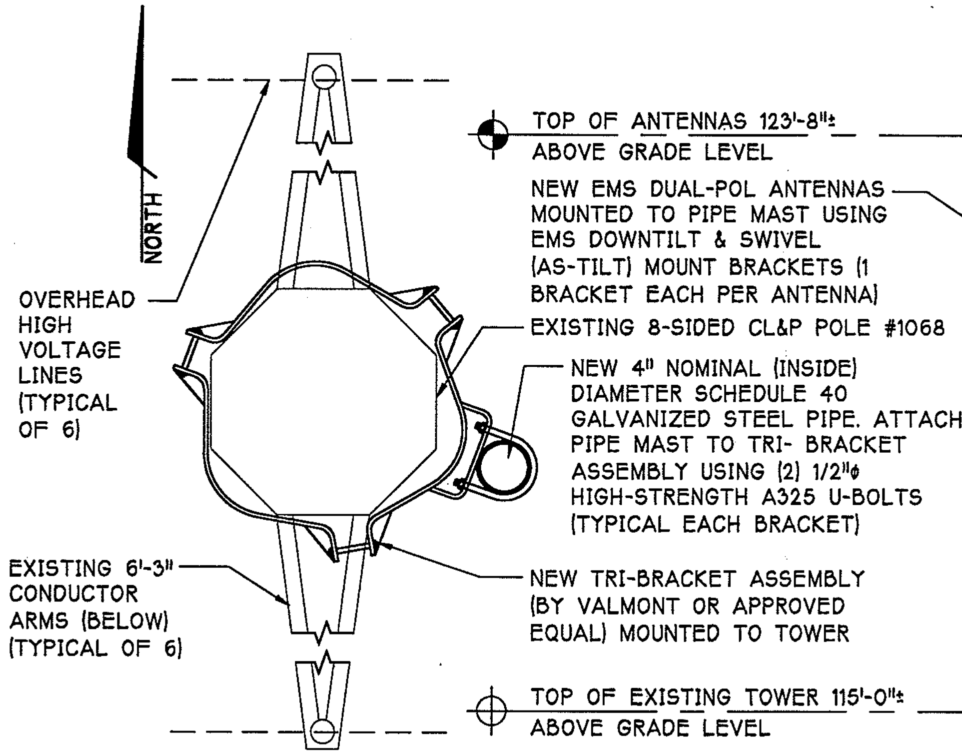
ROBERT P. JUENGERT
STATE OF CONNECTICUT · REGISTERED ARCHITECT · No. 4208
CT-4208

NOTES:

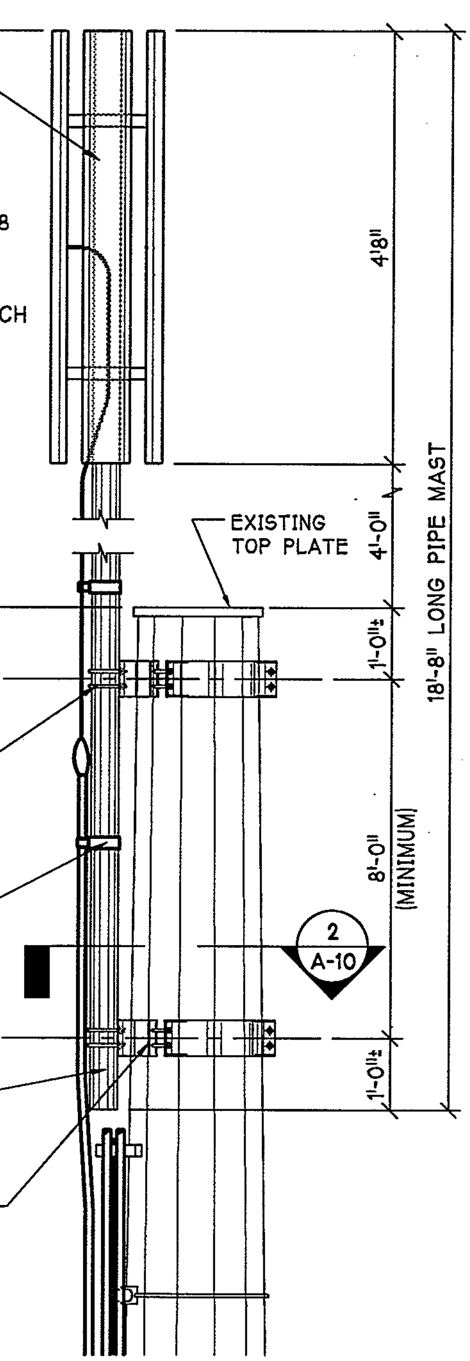
1. DRAWINGS REPRESENT SIZE & SPACING OF BAND-ON CABLE RUN (PART WA10784, AND CABLE\ ASSEMBLY PER MONOPOLE SIZE, BY ENGINEERED ENDEAVORS, INC.).
2. ALL STEEL TO BE HOT-DIPPED GALVANIZED.
3. INSTALL BAND-ON CABLE RUN WITH CABLE ASSEMBLY PER MANUFACTURER'S SPEFICIATIONS.

ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title:	CABLE MOUNT ELEVATION
Client:	OCS
Project:	CL&P POLE #1068
Address:	MECHANIC STREET, DARIEN, CT
Search Area:	DARIEN / DOWNTOWN
Site ID No.:	CT-11-290C
P.C.:	RVa
P.C. Chkd:	
Chkd. by:	
ARCNET Project No.	A99.506.833A
Drawn:	CS
Date:	4/21/99
Approved By:	CLIENT: ______ DATE: ______
Revision No.	
Date:	
Drawing No.	A-9



2 / A-10 ANTENNA MOUNT SECTION
SCALE: 1/2" = 1'-0"



1 / A-10 ANTENNA MOUNT ELEVATION
SCALE: 3/8" = 1'-0"

NOTES:

1. CONTRACTOR TO POSITION MAST TO LATERALLY AVOID CLIMBING RUNGS AND MONOPOLE TOP PLATE AS NECESSARY.
2. VERIFY ALL TOWER DIMENSIONS IN FIELD PRIOR TO CONSTRUCTION.
3.) EXISTING CLIMBING RINGS NOT DRAWN
4.) NORTH TO BE DETERMINED BY CIVIL ENGINEER

ROBERT P. JUENGERT
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CT. 4208

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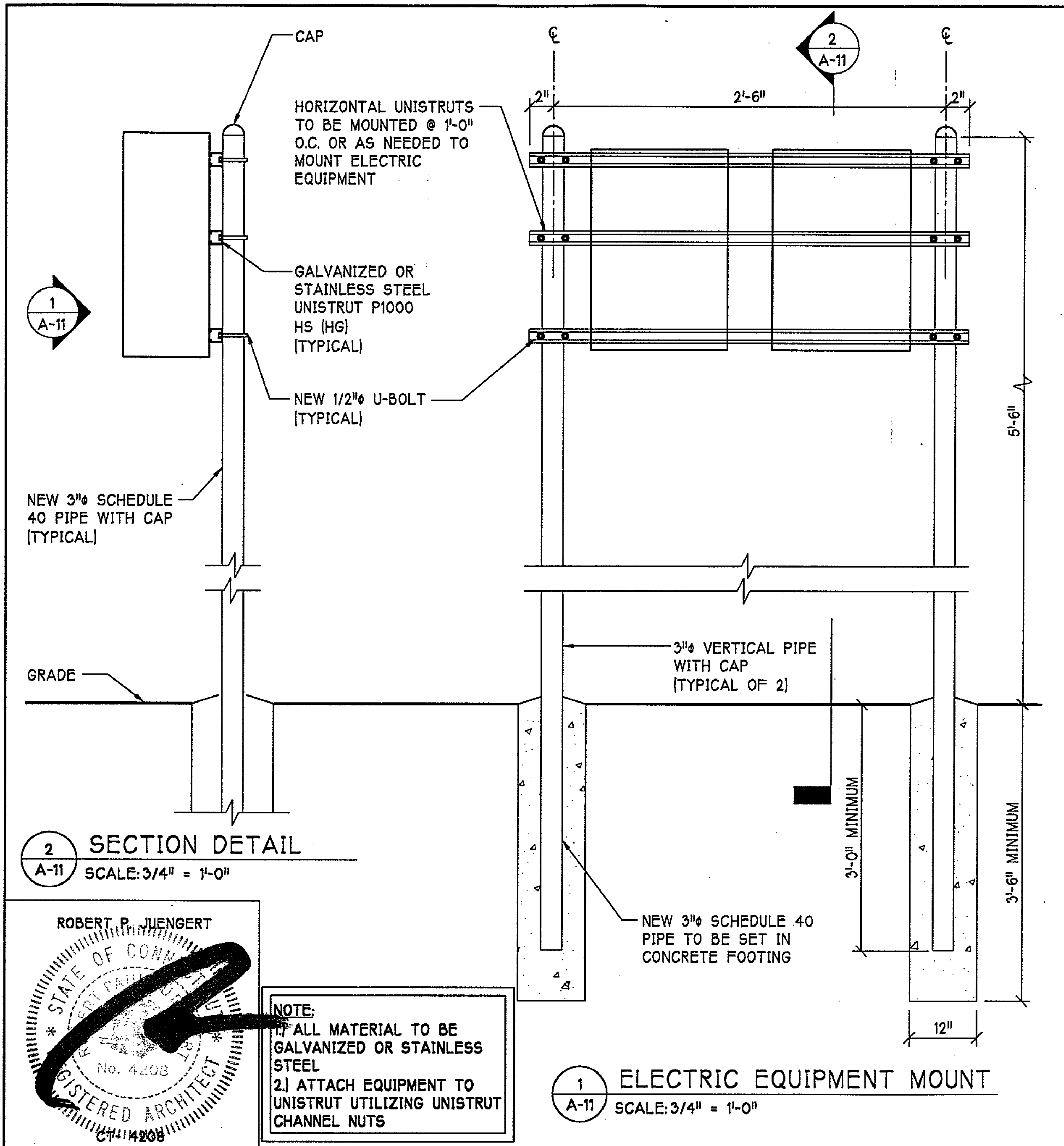
Drawing Title:	ANTENNA MOUNT DETAIL
Client:	OCS
Project:	CL&P POLE #1068
Address:	MECHANIC STREET, DARIEN, CT
Search Area:	DARIEN / DOWNTOWN
Site ID No.:	CT-11-290C
Revision No. / Date:	REV1(JMc) 5/7/99
P.C.:	RVa
P.C. Chkd.:	
Chkd. by:	
ARCNET Project No.:	A99.506.833A
Drawn:	CS
Date:	4/21/99
Approved By:	CLIENT:_______ DATE:_______
Drawing No.	A-10



ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title:	ELECTRIC EQUIPMENT MOUNT
Client:	OCS
Project:	CL&P POLE #1068
Address:	MECHANIC STREET DARIEN, CT
Search Area:	DARIEN / DOWNTOWN
Site ID No.:	CT-11-290C
P.C.:	RVa
P.C. Chkd:	
Chkd. by:	
ARCNET Project No.	A99.506.833A
Drawn:	CS
Date:	4/21/99
Revision No.	REV1(JMc)
Date:	5/7/99
Drawing No.	A-11
Approved By:	CLIENT: ______ DATE: ______

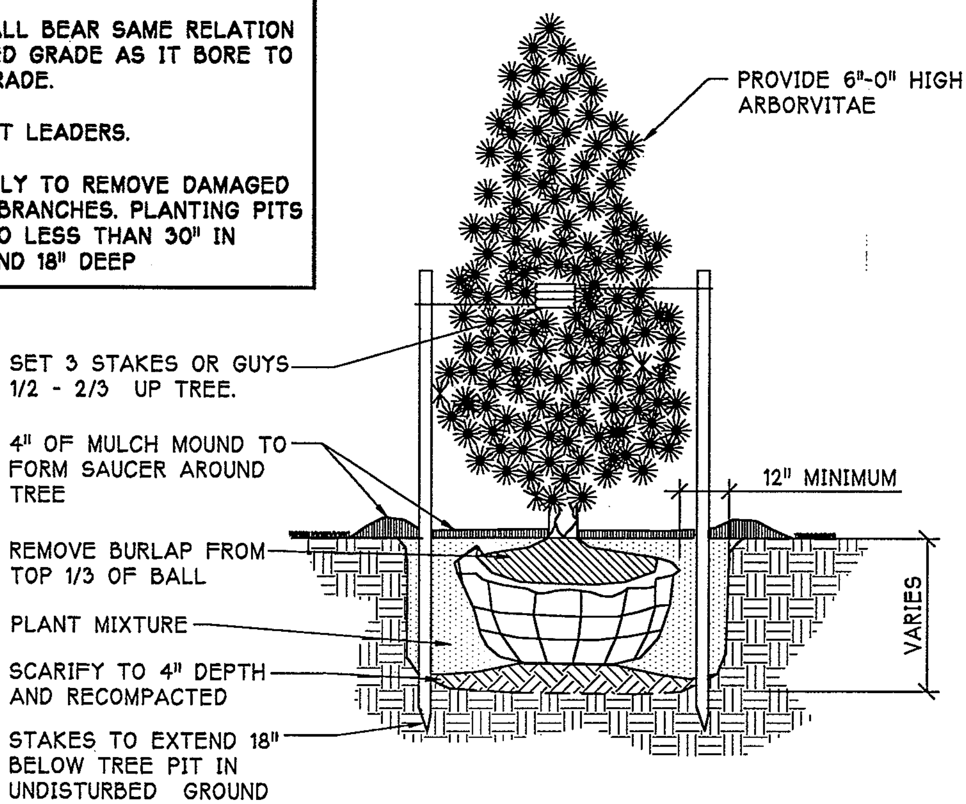
NOTES:

1) STAKE ALL EVERGREEN TREES

2) TREE SHALL BEAR SAME RELATION TO FINISHED GRADE AS IT BORE TO PREVIOUS GRADE.

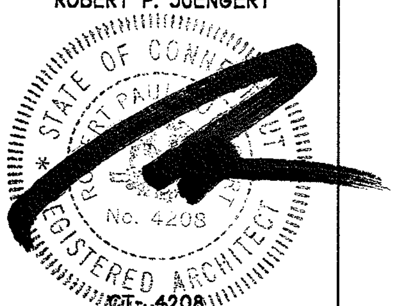
3) NEVER CUT LEADERS.

4) PRUNE ONLY TO REMOVE DAMAGED OR BROKEN BRANCHES. PLANTING PITS SHALL BE NO LESS THAN 30" IN DIAMETER AND 18" DEEP



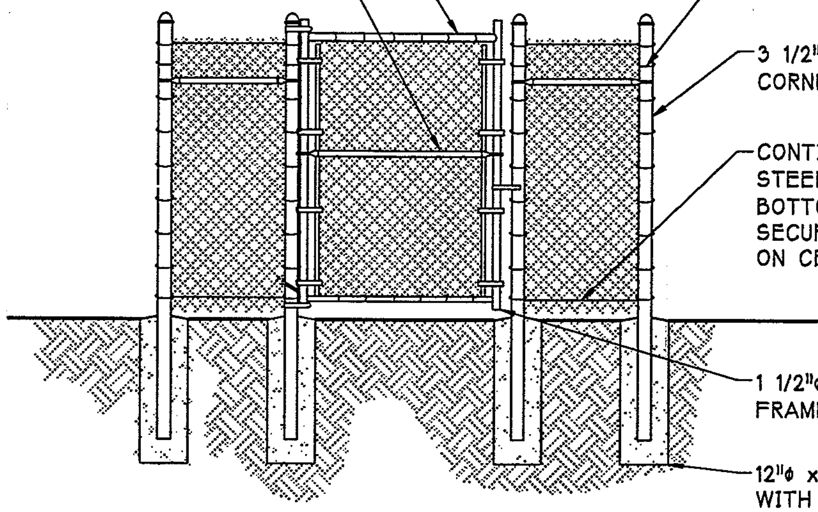
1
A-12
PLANTING DETAIL
SCALE: 1/8" = 1'-0"

ROBERT P. JUENGERT

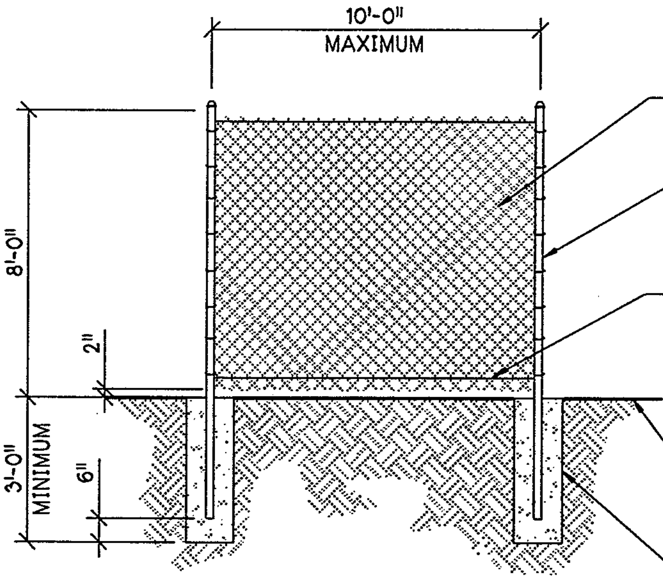


ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title:	PLANTING DETAIL
Client:	OCS
P.C.:	RVa
P.C. Chkd.:	
Chkd. by:	
ARCNET Project No.	A99.506.833A
Drawn:	CS
Date:	4/21/99
Project:	CL&P POLE #1068
Address:	MECHANIC STREET, DARIEN, CT
Search Area:	DARIEN / DOWNTOWN
Site ID No.:	CT-11-290C
Approved By:	CLIENT: ________ DATE: ________
Revision No.	
Date:	
Drawing No.	A-12



2 / A-13 GATE AND CORNER DETAIL
SCALE: NOT TO SCALE



1 / A-13 FENCE DETAIL
SCALE: NOT TO SCALE

ROBERT P. JUENGERT
STATE OF CONNECTICUT
REGISTERED ARCHITECT
No. 4208
CT- 4208

ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title:	FENCE DETAIL
Client:	OCS
Project:	CL&P POLE #1068
Address:	MECHANIC STREET DARIEN, CT
Search Area:	DARIEN / DOWNTOWN
Site ID No.:	CT-11-290C
P.C.:	RVa
P.C. Chkd:	
Chkd. by:	
ARCNET Project No.	A99.506.833A
Drawn:	CS
Date:	4/21/99
Approved By:	CLIENT: ________ DATE: ________
Revision No.	Date:
Drawing No.	A-13

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GENERAL NOTES:

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL STATE AND LOCAL CODES AND ORDINANCES.

2. CONTRACTOR SHALL INSTALL ALL EQUIPMENT SUPPLIED BY OMNIPOINT AS NOTED ON THE **MATERIAL LIST.** ALL ITEMS NOT SPECIFIED IN THE MATERIAL LIST SHALL BE SUPPLIED & INSTALLED BY THE CONTRACTOR.

3. ALL EQUIPMENT SHALL BE INSTALLED PLUMB AND LEVEL.

4. ALL STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST AISC CODE AND ASTM SPECIFICATION. STEEL SHALL CONFORM TO ASTM A-36. PIPE SHALL CONFORM TO ASTM A-501 OR ASTM A-53 (GRADE B)

5. ALL CONNECTIONS OF STRUCTURAL STEEL MEMBERS SHALL BE MADE USING SPECIFIED WELDS WITH WELDING ELECTRODES E-70XX OR SPECIFIED HIGH STRENGTH BOLTS TO BE ASTM A325, THREAD EXCLUDED FROM SHEAR PLANE.

6. **ALL STEEL, AFTER FABRICATION, SHALL BE HOT DIPPED GALVANIZED** PER ASTM A-123. ALL DAMAGED SURFACES, WELDED AREAS AND AUTHORIZED NON-GALVANIZED MEMBERS OR PARTS (EXISTING OR NEW) SHALL BE PAINTED WITH 2 COATS OF ZRC COLD GALVANIZING COMPOUND MANUFACTURED BY ZRC CHEMICAL PRODUCTS Co. QUINCY, MASS.. OR USE THERMAL SPRAYING WITH PLATTZINC 85/15 AS MANUFACTURED BY PLATT BROTHERS & COMPANY WATERBURY, CT 1-800-752-8276.

7. ALL SHOP AND FIELD WELDING SHALL BE DONE BY WELDERS QUALIFIED AS DESCRIBED IN THE "AMERICAN WELDING SOCIETY'S STANDARD QUALIFICATION PROCEDURE" TO PERFORM THE TYPE OF WORK REQUIRED.

8. **ALL GALVANIZED PIPE SIZES ARE NOMINAL DIAMETER. (INSIDE DIAMETER)**

9. **CONTRACTOR SHALL MEASURE AND VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS IN FIELD. ANY UNUSUAL CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER PRIOR TO THE PURCHASE, FABRICATION AND ERECTION OF ANY MATERIAL.**

10. INCORRECTLY FABRICATED, DAMAGED, OTHERWISE MISFITTING, OR NON-CONFORMING MATERIALS AND CONDITIONS SHALL BE REPORTED TO THE OWNER, ARCHITECT, AND CONSTRUCTION MANAGER PRIOR TO ANY REMEDIAL OR CORRECTIVE ACTION. ALL ACTIONS SHALL REQUIRE APPROVAL FROM THE OWNER.

11. CONTRACTOR SHALL EXECUTE ALL WORK PREVENTING ANY DAMAGE TO EXISTING STRUCTURES, ESPECIALLY TO ROOF. ANY ROOF WORK INVOLVING ATTACHMENT, REMOVAL OF FINISH SURFACE OR PENETRATION SHALL BE PERFORMED TO PRESERVE EXISTING, ROOFING GUARANTEES AND WARRANTIES. ROOF SHALL BE RESTORED TO COMPLETE WATER TIGHTNESS WITH THE APPROVED MATERIAL AND BY A SUB CONTRACTOR PRE-APPROVED BY THE OWNER IN WRITING.

12. MASONRY PENETRATIONS SHOULD USE ROTARY ACTION ONLY.(NO HAMMERING ACTION.)

13. ALL PENETRATIONS TO BE PROPERLY FIRE-STOPPED WITH 3M F.S.195 WRAP STRIP FIRE-STOP AND CP25 NON-SHRINKING PUTTY FIRE BARRIER SEALANT. MAINTAIN FIRE RATING OF ALL PENETRATED SURFACES.

14. ALL MOUNTS TO WALLS TO BE SEALED AT TOP AND SIDES WITH DOW CORNING CLEAR SILICONE SEALANT OR APPROVED EQUAL. SILICONE APPLICATIONS ARE TO BE TOOLED TO MAINTAIN A FINISHED APPEARANCE.

15. CONTRACTOR SHALL PROMPTLY REMOVE ANY & ALL DEBRIS FROM SITE.

16. CONTRACTOR SHALL PROVIDE A 3/4" CHAMFER ON ALL CONCRETE SLABS.

ROBERT P. JUENGERT

STATE OF CONN. REGISTERED ARCHITECT No. 4208

CT 4208

ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title:	GENERAL NOTES
Client:	OCS
P.C.:	RVa
P.C. Chkd:	
Chkd by:	
ARCNET Project No.	A99.506.833A
Drawn:	CS
Date:	4/21/99
Project:	CL&P POLE #1068
Address:	MECHANIC STREET DARIEN, CT
Search Area:	DARIEN / DOWNTOWN
Site ID No.:	CT-11-290C
Approved By:	CLIENT:______ DATE: ______
Revision No.	
Date:	
Drawing No.	A-14

17. WHERE SPECIFIED ON THE CONSTRUCTION DOCUMENTS, THE GENERAL CONTRACTOR SHALL PAINT ALL NEW ANTENNAS, SHROUD AND RELATED HARDWARE TO MATCH EXISTING CONDITIONS BELOW.
NOTE ALL PAINT TO BE SHERWIN WILLIAMS OR APPROVED EQUAL, UNLESS OTHERWISE SPECIFIED

A. ANTENNA PAINT SPECIFICATIONS

SURFACE PREPARATION:

REMOVE SURFACE CONTAMINATION USING ALCOHOL SOLVENT.

APPLICATION PROCEDURES

PAINTING TO BE DONE INDOORS.

1. APPLY ONE PRIMER COAT OF POLANE 2.8 PLUS FIL D61H75 PRIMER IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. APPLY ONE TOP COAT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
   a. FOR CELWAVE USE POLANE "HS 2.8 PLUS POLYURETHENE"
   b. FOR EMS USE POLANE B OR POLANE T POLYURETHANE ENAMEL

DO NOT USE THESE METAL BASED COLORS ON ANTENNAS:
TURBINE ORANGE....DECIBEL ORANGE.... BETA YELLOW.... ULTRASONIC CHROME

B. MOUNTING HARDWARE / CONDUIT PAINT SPECIFICATION

SURFACE PREPARATION

REMOVE SURFACE CONTAMINATION USING ALCOHOL SOLVENT, ETHANOL. PROPANOL, ISOPROPANOL, OR BUTANOL. A TEN PERCENT SOLUTION OF METHYL ETHYL KETONE IN WATER CAN ALSO BE USED WHENEVER STUBBORN OIL OR GREASE IS ENCOUNTERED.

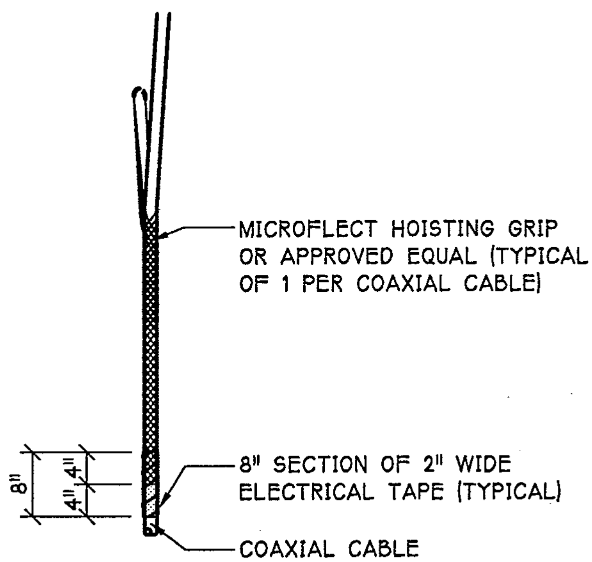
GALVANIZED SURFACES

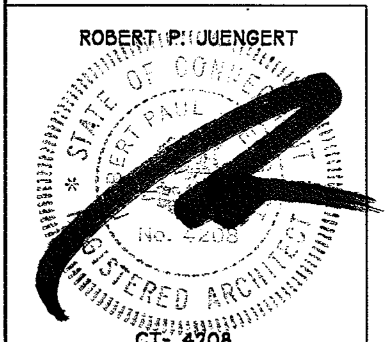
ONE COAT OF PERMABOND - BONDING AGENT BY CORONADO PAINT CO. #100 - 10 **DO NOT LET DRY** IMMEDIATELY APPLY ONE COAT OF SHERWIN WILLIAMS S-W A100 FLAT LATEX HOUSE & TRIM, A6 SERIES. LET DRY AND APPLY SECOND COAT OF SHERWIN WILLIAMS S-W A100 FLAT LATEX HOUSE & TRIM, A6 SERIES (4 MILS WET, 1.3 MILS DRY PER COAT).

C. BTS CLEARANCE LIMIT LINE DEMARCATION

WHEN SPECIFIED ON CONSTRUCTION DOCUMENTS, THE CONTRACTOR SHALL PAINT A CONTINUOUS 4" WIDE SAFETY LINE WITH CON-LUX ROAD PLEX #17 TRAFFIC YELLOW OR APPROVED EQUAL ON THE WALKING SURFACE ADJACENT TO CABINET TO DENOTE REQUIRED CLEARANCE LIMITS TO CABINET.

18. HOISTING GRIP TAPING DETAIL -





ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title: GENERAL NOTES

Client: OCS

Project: **CL&P POLE #1068**

Address: MECHANIC STREET DARIEN, CT

Search Area: DARIEN / DOWNTOWN

Site ID No.: CT-11-290C

P.C.	P.C. Chkd.	Chkd by	ARCNET Project No.	Drawn	Date
RVa			A99.506.833A	CS	4/21/99

Approved By: CLIENT:__________ DATE: __________

Revision No. | Date:

Drawing No. **A-15**

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CONCRETE NOTES

FOUNDATION

1. ALL FOOTINGS SHALL BEAR ON SOIL HAVING A MINIMUM SAFE BEARING CAPACITY OF 1.0 TONS PER SQUARE FOOT. SUBGRADE SHALL BE FREE FROM ALL LOOSE SOIL AND DEBRIS. CONFIRM IN FIELD PRIOR TO PLACING FOOTINGS.

2. ELEVATIONS GIVEN CORRESPOND TO THE COMPUTED BOTTOM OF FOOTINGS AND ARE MINIMUM DEPTHS. ADDITIONAL DEPTH MAY BE REQUIRED TO REACH GOOD BEARING. ALL OVER EXCAVATED MATERIALS SHALL BE REPLACED WITH 95% COMPACTED FILL, 3/4" CLEAN STONE, OR CONCRETE.

3. NO FOOTINGS SHALL BE PLACED IN WATER OR ON FROZEN GROUND. AFTER FOOTINGS ARE PLACED THEY SHALL BE PROTECTED AGAINST FROST.

4. FILL AND BACK FILL MATERIAL SHALL BE FREE OF DELETERIOUS ORGANIC MATTER.

CAST-IN-PLACE CONCRETE

1. ALL CONCRETE WORK SHALL CONFORM TO THE LATEST EDITION OF THE ACI BUILDING CODE.

2. ALL CONCRETE SHALL ATTAIN 4000 PSI COMPRESSIVE STRENGTH AT 28 DAYS.

3. READY MIX: COMPLY WITH ACI-301 AND ASTM C-94. ALL CONCRETE EXPOSED TO THE GROUND OR WEATHER SHALL BE AIR ENTRAINED.

4. COLD WEATHER CONCRETE POURING SHALL BE IN ACCORDANCE WITH ACI-306.

5. THROUGHOUT CONSTRUCTION THE CONCRETE WORK SHALL BE ADEQUATELY PROTECTED AGAINST DAMAGE DUE TO EXCESSIVE LOADING, CONSTRUCTION EQUIPMENT, MATERIALS OR METHODS, ICE, RAIN, SNOW, EXCESSIVE HEAT AND FREEZING TEMPERATURES.

6. EARLY DRYING OUT OF CONCRETE, ESPECIALLY DURING THE FIRST 24 HOURS, SHALL BE CAREFULLY GUARDED AGAINST. ALL SURFACES SHALL BE PROTECTED USING MOIST CURING OR A MEMBRANE CURING AGENT APPLIED AS SOON AS FORMS ARE REMOVED OR FINISHING OPERATIONS ARE COMPLETE. CARE SHALL BE EXERCISED SO AS NOT TO DAMAGE COATING.

7. APPLY NON-SLIP BROOM FINISH IMMEDIATELY AFTER TROWEL FINISHING.

8. CONTRACTOR TO COORDINATE REQUIREMENTS OF STRUCTURAL, ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS; INCLUDING ANY AND ALL PENETRATIONS SPECIFIED, PRIOR TO POURING CONCRETE.

REINFORCING

1. ALL REINFORCING BAR DETAILS SHALL CONFORM TO THE LATEST ACI CODE AND DETAILING MANUAL.

2. WHERE REINFORCING IS CALLED OUT IN THE CONSTRUCTION DOCUMENTS IT SHALL BE 3" CLEAR COVER (MINIMUM UNLESS OTHERWISE NOTED)

3. ALL BARS SHALL BE ASTM A-615, GRADE 60

4. WELDED WIRE FABRIC SHALL BE ASTM A-185

5. WHERE CONTINUOUS BARS ARE CALLED FOR, THEY SHALL BE RUN CONTINUOUSLY AROUND CORNERS AND LAPPED AT NECESSARY SPLICES OR HOOKED AT DISCONTINUOUS ENDS. LAP SHALL BE 40 BAR DIAMETERS.

ROBERT P. JUENGERT

STATE OF CONNECTICUT · No. 4208 · REGISTERED ARCHITECT

CT- 4208

ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

P.C.: RVa	P.C. Chkd.:	Chkd. by:	ARCNET Project No.: A99.506.833A	Drawn: CS	Date: 4/21/99	

Drawing Title: CONCRETE NOTES

Client: OCS

Project: CL&P POLE #1068

Address: MECHANIC STREET DARIEN, CT

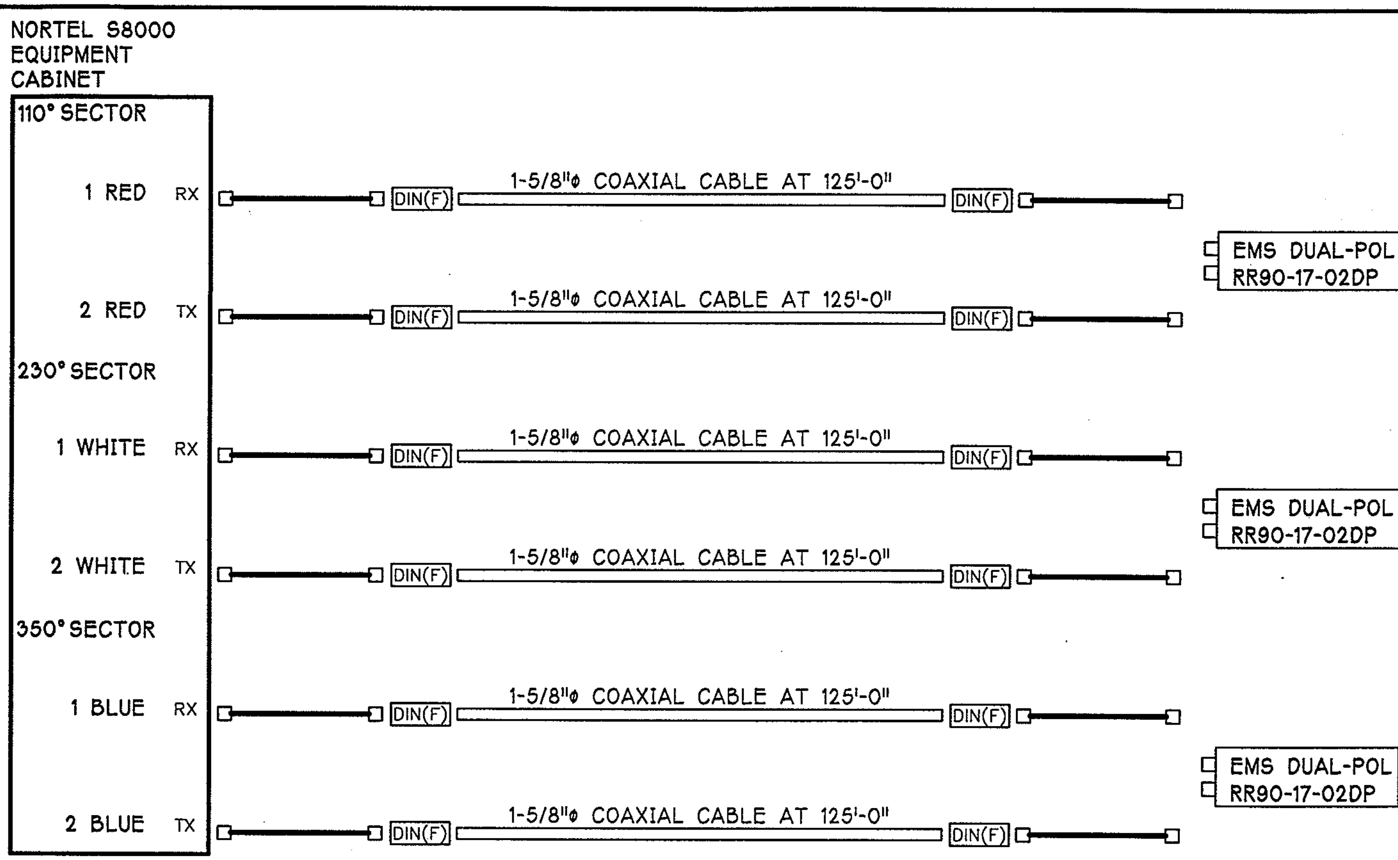
Search Area: DARIEN / DOWNTOWN

Site ID No.: CT-11-290C

Approved By: CLIENT:______ DATE: ______

Revision No.	Date:

Drawing No. A-17



CONTRACTOR: ____________

ADDRESS: ____________

PHONE: ____________

ROBERT P. JUENGERT
CT- 4208

BILL of MATERIALS

No.	QTY.	DESCRIPTION	MANUFACT	PART#
1	1	NORTEL S8000 EQUIPMENT CABINET		
2	6	DIN(M) - DIN(M) 1/2"φx6'-0" SUPERFLEX JUMPER		
3	6	DIN(M) - DIN(M) 1/2"φx6'-0" JUMPER		
4	12	1-5/8"φ DIN(F) CONNECTOR		
5	6	1-5/8"φ COAXIAL CABLES (SEE DIAGRAM)		
6	3	DUAL-POL ANTENNA	EMS	RR90-17-02DP
7	3	DOWNTILT BRACKET	EMS	MTG-D10-20
8	12	1-5/8"φ GROUNDING KITS		
9	12	1-5/8"φ WEATHER-PROOFING KITS		

ARCNET
ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title: MATERIAL LIST

Client: OCS

Project: CL&P POLE #1068
Address: MECHANIC STREET
DARIEN, CT
Search Area: DARIEN / DOWNTOWN
Site ID No.: CT-11-290C

Revision No.	Date:
REV2KBa	7/16/99
REV1(JMc)	5/7/99

P.C.: RVa | P.C. Chkd.: RO | Chkd. By:

ARCNET Project No.: A99.506.833A | Drawn: CS | Date: 4/21/99

Approved By:
CLIENT: ____________ DATE: ____________

Drawing No. A-18

DESIGN CRITERIA

1. ELECTRIC: PROVIDE AND INSTALL A 208V OR 240V, 2P, 60A CIRCUIT FROM A RELIABLE SOURCE TO THE COMMUNICATION CABINET. THIS SOURCE SHALL BE LOCKED ON WITH A CB LOCK. THE CONTRACTOR SHALL PROVIDE (2) SPARE FUSES WHEREVER A FUSED DISCONNECT IS REQUIRED. THE CONTRACTOR SHALL VERIFY (BEFORE ANY CONSTRUCTION IS STARTED) THAT THE POWER SOURCE IS BETWEEN 208V AND 240V LINE TO LINE. IF IT IS NOT BETWEEN THE SPECIFIED VOLTAGE, THEN CALL DLB ASSOCIATES, INC. AT (732) 922-8375 AND ASK FOR MARK WORTHLEY. ALL ELECTRICAL EQUIPMENT SHALL BE LABELED WITH A BLACK PLASTIC TAG WITH WHITE LETTERS "OCS" ENGRAVED IN IT.

2. UTILITY METER: IF A UTILITY METER IS SPECIFIED ON THE DRAWINGS, IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN ALL NECESSARY INSPECTIONS, CUT-IN CARDS, ETC., THAT ARE REQUIRED TO SET THE METER. THE CONTRACTOR SHALL MEET WITH THE UTILITY COMPANY TO VERIFY METER AND TAP LOCATION PRIOR TO INSTALLATION. DLB ASSOCIATES BEGINS THE PAPERWORK WITH THE VARIOUS UTILITY COMPANIES AND CAN PROVIDE THE ELECTRICAL DETAILERS NAME AND PHONE NUMBER. CONTACT DLB AT (732) 922-8375 AND ASK FOR MARIA DeVAUGHN FOR UTILITY RELATED QUESTIONS. IF TEMPORARY POWER IS REQUIRED, ALL NEC AND/OR LOCAL ELECTRIC CODES SHALL ADHERED TO. CONTACT OCS PRIOR TO MAKING AND TEMPORARY POWER CONNECTIONS.

3. TELEPHONE: PROVIDE A 1-1/2" CONDUIT (WITH DRAG LINE IN NY AND BELDEN CABLE #8768 IN NJ AND CT) FROM THE COMMUNICATION CABINET TO THE MAIN DEMARCATION POINT (USUALLY LOCATED IN THE BASEMENT). THE MAIN DEMARCATION POINT ALLOWS FOR THE LEAST AMOUNT OF NOISE AND THE MOST AMOUNT OF PROTECTION. FOR COST SAVINGS, A CLOSER DEMARCATION POINT MAY BE SPECIFIED IN MULTIPLE STORY BUILDINGS WITH THE APPROVAL OF THE TELEPHONE COMPANY. FOR NEW TELEPHONE SERVICES IN NJ, NY, & CT, PROVIDE A 4" CONDUIT WITH A DRAGLINE FROM THE SPECIFIED UTILITY POLE TO THE LOCATION OF THE NEW DEMARCATION POINT.

4. CONDUIT ROUTING: THE ROUTING OF THE CONDUIT SHALL BE SUCH THAT THE EASIEST AND MOST PRACTICAL METHODS ARE USED WITHOUT IMPACTING THE BUILDING OWNER AND THE AESTHETIC APPEAL OF THE BUILDING. BECAUSE THE WORK BEING DONE IS IN EXISTING STRUCTURES, IT IS IMPOSSIBLE TO SHOW EVERY JUNCTION BOX, LB, CONDUIT BEND, ETC. IN A TWO DIMENSIONAL PLAN. IT IS FOR THIS REASON THAT THE CONTRACTOR MUST VISIT THE SITE BEFORE ACCEPTING THE OFFER AND UNDERSTAND THE TRUE INSTALLATION OBSTACLES THAT ARE UNIQUE TO THAT BUILDING.

WIRING METHODS

1. GENERAL: ALL WIRING IN FINISHED AREAS SHALL BE CONCEALED UNLESS NOTED OTHERWISE. IN UNFINISHED AREAS, SUCH AS BASEMENTS, MECHANICAL ROOMS, ELECTRICAL CLOSETS, ETC. WIRING SHALL BE ROUTED ON THE INTERIOR SURFACE. NO WIRING SHALL BE ROUTED ON THE OUTSIDE SURFACES OF THE BUILDING UNLESS SPECIFICALLY NOTED. ALL NEC AND LOCAL ELECTRIC CODES SHALL BE ADHERED TO. ALL CONDUCTORS SHALL BE COPPER UNLESS OTHERWISE NOTED.

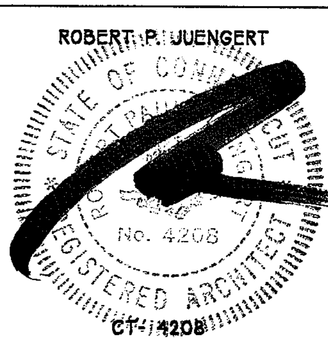
2. BELOW GRADE (UNDERGROUND IN EARTH OR FILL): ALL CONDUITS SHALL HAVE A MINIMUM BURIAL DEPTH OF 24". BRANCH CIRCUITS SHALL CONSIST OF PULLED CONDUCTORS IN DIRECT BURIED SCHEDULE 40 PVC CONDUITS. CONDUITS THAT ARE BURIED UNDER EARTH THAT HAVE HEAVY VEHICLE TRAFFIC OVER IT SHALL BE ENCASED IN CONCRETE. CONCRETE ENCASEMENT SHALL BE 3" MINIMUM ALL AROUND AND BETWEEN CONDUITS. ALL ELBOWS USED WITH PVC CONDUIT SHALL BE SCHEDULE 80 PVC. ALL CONDUIT INSTALLED ABOVE FINISHED GRADE SHALL BE SCHEDULE 80 PVC. PRIOR TO EXCAVATION, A UTILITY MARK OUT SHALL BE DONE TO LOCATE EXISTING UNDERGROUND UTILITIES. PICTURES SHALL BE TAKEN OF ALL UNDERGROUND WORK TO BE VIEWED AT THE PUNCHLIST.

3. INDOORS (UNCLASSIFIED AREAS): ALL FEEDERS SHALL CONSIST OF PULLED CONDUCTORS IN EMT. ALL BRANCH CIRCUITS SHALL CONSIST OF PULLED CONDUCTORS IN EMT., EXCEPT 15 AND 20 AMPERE 1 POLE LIGHTING RECEPTACLE, OR MISCELLANEOUS BRANCH CIRCUITS CONCEALED ABOVE SUSPENDED CEILINGS OR WITHIN DRY WALLS SHALL CONSIST OF TYPE MC METAL CLAD CABLE IF ALLOWED BY CODE. CONNECTIONS TO COMMUNICATION CABINET AND VIBRATING EQUIPMENT SHALL CONSIST OF PULLED CONDUCTORS IN FLEXIBLE METALLIC CONDUIT, MAXIMUM 6' IN LENGTH.

4. OUTDOORS OR INDOORS CLASSIFIED 'DAMP' OR 'WET' LOCATIONS: ALL FEEDERS AND BRANCH CIRCUITS SHALL CONSIST OF PULLED CONDUCTORS IN RGS OR RA CONDUIT. CONNECTIONS TO COMMUNICATION CABINET AND VIBRATING EQUIPMENT SHALL CONSIST OF PULLED CONDUCTORS IN LIQUID TIGHT FLEXIBLE STEEL CONDUIT, MAXIMUM 6' IN LENGTH.

SYMBOLS

IDENTIFIER	DESCRIPTION
	SAFETY SWITCH
	PANEL BOARD
	ELECTRIC METER
	ELECTRICAL WIRING (TURNING UP)
	ELECTRICAL WIRING (TURNING DOWN)
CAB	COMMUNICATIONS CABINET
	BACKBOARD
	RECEPTACLE
	NEW UTILITY POLE
	EXISTING UTILITY POLE
	MASTER GROUND BAR
	INSULATED GROUND BAR
	UNINSULATED GROUND BAR



LEGEND

IDENTIFIER	DESCRIPTION
—— E ——	EXISTING ELECTRIC
—— NE ——	NEW ELECTRIC
—— T ——	EXISTING TELEPHONE
—— NT ——	NEW TELEPHONE
– – – NE – – –	NEW UNDERGROUND ELECTRIC
– – – E – – –	EXISTING UNDERGROUND ELECTRIC
– – – NT – – –	NEW UNDERGROUND TELEPHONE
– – – T – – –	EXISTING UNDERGROUND TELEPHONE
—— PL ——	PROPERTY LINE

ABBREVIATIONS AND LABELS

AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AWG	AMERICAN WIRE GAUGE
C	CONDUIT
CB	CIRCUIT BREAKER
EMT	ELECTRICAL METALLIC TUBING
GND	GROUND
MC	METAL CLAD CABLE
MCB	MAIN CIRCUIT BREAKER
MDP	MAIN DISTRIBUTION PANEL
MGB	MASTER GROUND BAR
MLO	MAIN LUGS ONLY
N	NEUTRAL
NEC	NATIONAL ELECTRIC CODE
PNL	PANEL
PP	POWER PANEL
PVC	POLYVINYL CHLORIDE
RA	RIGID ALUMINUM
RGS	RIGID GALVANIZED STEEL
WP	WEATHER PROOF

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Drawing Title: GENERAL INFORMATION

Client: OCS

Project: CL&P POLE # 1068

Address: MECHANIC STREET DARIEN, CT

Search Area: DARIEN / DOWNTOWN

Site ID No: CT-11-290C

P.C.: RVa | P.C. Chkd: | Chkd. By: | ARCNET Project No. A99.506-833A | Drawn: MW | Date: 4/26/99

Approved By: CLIENT: ____________ DATE: ________

Revision No. | Date:

Drawing No. E-1

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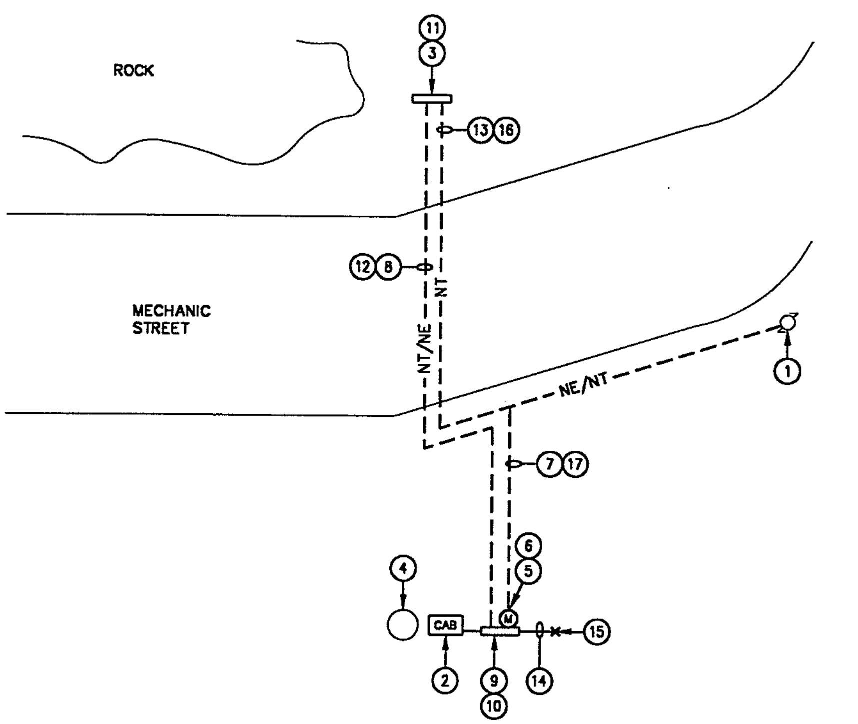

KEY NOTES (Symbols ①, ②, Etc.)

1. PROPOSED TELCO DEMARCATION POINT.
2. NORTEL S8000 CABINET.
3. PAD MOUNTED TELCO EQUIPMENT.
4. EXISTING MONOPOLE.
5. NO TEMPORARY POWER AVAILABLE AT THIS SITE.
6. PROVIDE NEW 200A BYPASS UTILITY APPROVED METER SOCKET.
7. NEW ELECTRIC FEEDER ROUTED UNDERGROUND. PROVIDE (1) 3" CONDUIT WITH DRAG LINE FROM THE UTILITY POLE TO THE NEW METER. APPROXIMATE DISTANCE = 70'.
8. NEW ELECTRIC FEEDER ROUTED UNDERGROUND. PROVIDE A 3/4" CONDUIT WITH 2#12 & 1#12G FROM THE PANEL TO THE TELCO DEMARCATION. APPROXIMATE DISTANCE = 75'.
9. PROVIDE NEW 240/120V, 1 PHASE, 100A, WEATHERPROOF PANEL WITH A MINIMUM OF 12 SPACES AND A 100A MAIN CIRCUIT BREAKER. PROVIDE (1) 40A, 240V, 2 POLE, 1 PHASE AND (1) 20A, 120V, 1 POLE, 1 PHASE CIRCUIT BREAKER.
10. UNISTRUT-MOUNTED ELECTRIC EQUIPMENT. SEE ARCHITECTURAL DRAWINGS FOR MOUNTING AND DETAIL 1/E-4.
11. PROVIDE 120V GFI RECEPTACLE INSIDE TELCO BOX.
12. NEW TELEPHONE SERVICE ROUTED UNDERGROUND. PROVIDE A 1-1/2" CONDUIT WITH 1(6) PAIR, #22 AWG INDIVIDUALLY SHIELDED, SOLID TINNED COPPER CONDUCTOR CABLE (BELDEN CABLE PART #8768). APPROXIMATE DISTANCE = 75'.
13. NEW TELEPHONE SERVICE ROUTED UNDERGROUND. PROVIDE A 4" CONDUIT WITH DRAG LINE. APPROXIMATE DISTANCE = 100'.
14. 2#2 SOLID TINNED COPPER GROUNDS. REMOVE PAINT AND OTHER FOREIGN MATTER IN ORDER TO ACHIEVE A GOOD BOND. APPROXIMATE DISTANCE = 10'.
15. ATTACH TO NEW GROUND RING.
16. TELEPHONE COMPANY TO PULL TELEPHONE LINES IN CONDUIT SUPPLIED BY CONTRACTOR.
17. POWER COMPANY TO PULL ELECTRIC LINES IN CONDUIT PROVIDED BY CONTRACTOR.

NOTE: THE CONTRACTOR MUST VERIFY TAP AND METER LOCATION WITH THE UTILITY COMPANY.

WARNING: THE TELCO DEMARC HAS NOT BEEN CONFIRMED BY THE TELEPHONE COMPANY.

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REGISTERED ARCHITECT
CT-4208

SITE LAYOUT | SCALE: NONE | E-2 | 01

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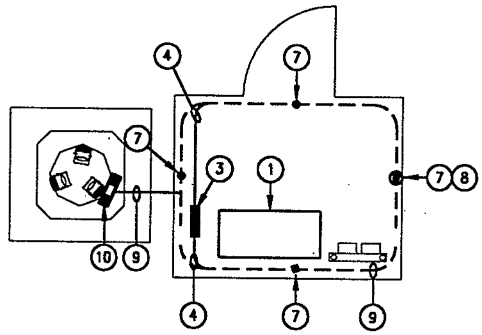
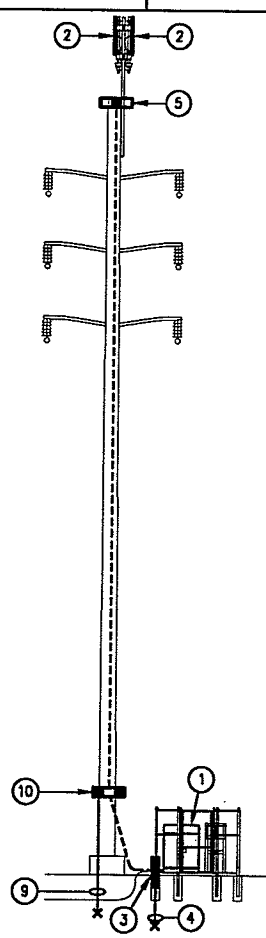
P.C.	RVa
P.C. Chkd.	
Chkd. By	
Drawing Title	SERVICE PLAN
Client	OCS
ARCNET Project No.	A99.506-833A
Drawn	MW
Date	4/26/99
Project	CL&P POLE # 1068
Address	MECHANIC STREET DARIEN, CT
Search Area	DARIEN / DOWNTOWN
Site ID No.	CT-11-290C
Approved By	CLIENT: ______ DATE: ______
Revision No.	
Date	
Drawing No.	E-2



SITE PLAN | SCALE: NONE | E-3 01



ELEVATION | SCALE: NONE | E-3 02

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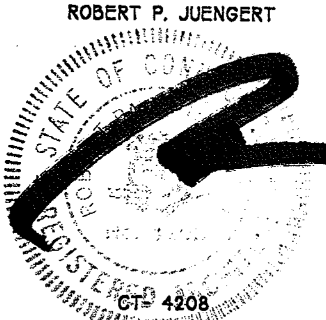

GENERAL NOTES

1. WHERE ICE BRIDGES AND ICE SHIELDS ARE USED, BOND ALL POSTS VIA #2 SOLID TINNED WIRE TO THE GROUND RING.
2. FOR NEW FENCE INSTALLATIONS BOND ALL CORNER FENCE POSTS AND GATES.

KEY NOTES (Symbols ①, ②, Etc.)

1. COMMUNICATIONS CABINET.
2. ANTENNA.
3. ALL COAXIAL CABLES SHALL BE GROUNDED AT THIS POINT VIA CABLE GROUND KITS TO GROUNDING BAR.
4. 2#2 SOLID TINNED COPPER GROUND. ATTACH TO GROUND ELECTRODE. REMOVE PAINT AND OTHER FOREIGN MATTER IN ORDER TO ACHIEVE A GOOD BOND.
5. ALL COAXIAL CABLES SHALL BE GROUNDED TO A GROUND BAR AT THIS POINT VIA CABLE GROUND KITS. NEWTON INSTRUMENT COMPANY OR EQUAL. THIS GROUND BAR SHALL BE LOCATED JUST BELOW THE POINT WHERE ALL CABLES COME TOGETHER AND DESCEND DOWN THE TOWER. THIS GROUND BAR SHALL BE ATTACHED DIRECTLY TO THE TOWER VIA BEAM CLAMP.
6. #2 SOLID TINNED COPPER CONDUCTOR RUN IN A CONTINUOUS LOOP A MINIMUM OF 30" BELOW GRADE. MAINTAIN A 24" CLEARANCE FROM CONCRETE PAD.
7. PROVIDE (4) 3/4" x 10' GROUND RODS. EVENLY SPACE AT A MINIMUM DISTANCE OF 10' BETWEEN RODS. CADWELD GROUND RODS TO GROUND RING.
8. PROVIDE A 8" TEST WELL FOR GROUND ROD. SEE DETAIL 2/E-7.
9. 2#2 SOLID TINNED COPPER CONDUCTOR FROM ISOLATING GROUND BAR TO GROUND RING.
10. ALL COAXIAL CABLES LEAVING THE COMMUNICATION CABINET SHALL BE GROUNDED AT THIS POINT VIA CABLE GROUND KITS. NEWTON INSTRUMENT COMPANY OR EQUAL. THIS GROUND BAR SHALL BE LOCATED AT THE POINT WHERE THE CABLES MAKE A NINETY DEGREE BEND OFF THE TOWER.

LEGEND	DESCRIPTION	DETAIL NO.
▬	MASTER GROUND BAR	1/E-5
▭	INSULATED GROUND BAR	1/E-5
▭	UNINSULATED GROUND BAR	1/E-7
▭	GROUND KIT(S)	E-6
------------	COAXIAL CABLES	NONE
▯	ANTENNA	1/E-7

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Drawing Title: GROUNDING PLAN

Client: OCS

Project: CL&P POLE # 1068
Address: MECHANIC STREET DARIEN, CT
Search Area: DARIEN / DOWNTOWN
Site ID No.: CT-11-290C

DLB ASSOCIATES, INC.
Electrical / Mechanical
Wanamassa, NJ CT-PE 14722

P.C.	P.C. Chkd.	Chkd. by	ARCNET Project No.	Drawn	Date
RVa			A99.506-833A	MW	4/26/99

Approved By: CLIENT:__________ DATE:__________

Revision No. | Date:

Drawing No. E-3

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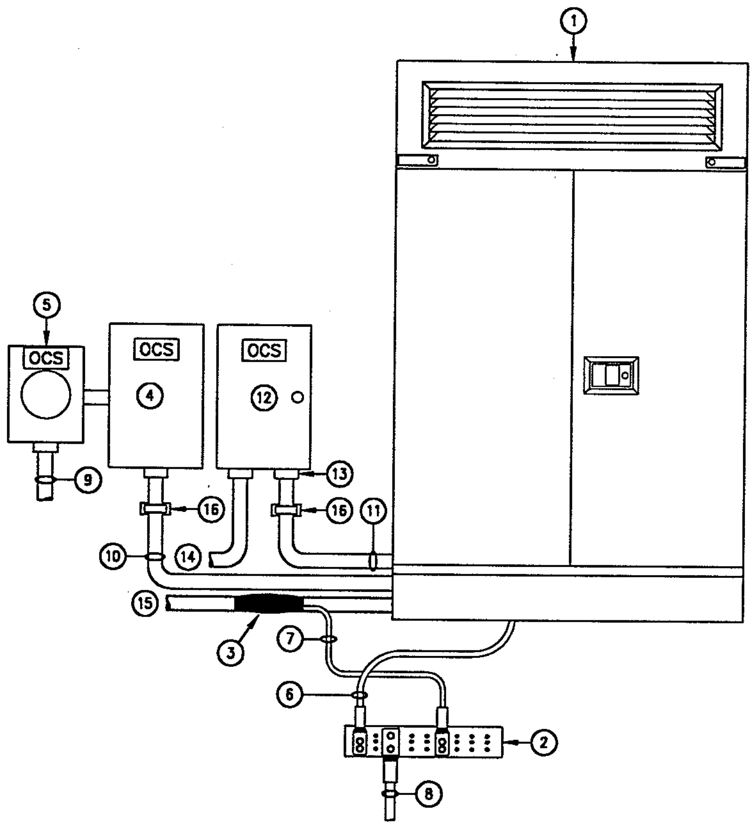

NORTEL S8000 CABINET RISER

SCALE: NONE	E-4
	01

KEY NOTES (Symbols ①, ②, Etc.)

1. NORTEL S8000 CABINET.
2. FIELD LOCATED MASTER GROUND BAR (MGB). MGB SHALL BE LOCATED SUCH THAT ALL GROUNDING CONDUCTORS ATTACHED TO IT ARE COMING FROM ABOVE. (I.E. BOTTOM OF BTS DUNNAGE, SIDE OF CONCRETE PAD, ETC). SEE DETAIL 1/E-5.
3. COAXIAL CABLE GROUNDING KIT. SEE DRAWING E-3 FOR LOCATION OF THE KITS.
4. NEW SQUARE D 240/120V, 100A WITH A 100A MAIN CIRCUIT BREAKER, 1 PHASE, WEATHERPROOF PANEL. PROVIDE A 40A, 240V, 1 PHASE CIRCUIT BREAKER. LABEL WITH A BLACK PLASTIC TAG THAT HAS THE LETTERS "OCS" ENGRAVED IN IT.
5. NEW ELECTRIC METER. SEE DRAWING E-2 FOR ADDITIONAL INFORMATION.
6. 1#2 STRANDED, INSULATED GROUND WIRE FROM COMMUNICATION CABINET TO THE MGB.
7. INTEGRAL GROUND KIT CONDUCTOR WITH TWO HOLE LUG. ATTACH DIRECTLY TO THE MGB OR CONNECT TO A #2 SOLID TINNED COPPER GROUND WIRE VIA CTAP PANDUIT #2-4Q. CONNECT #2 SOLID TO THE MGB VIA LONG BARREL TWO HOLE LUG.
8. MAIN GROUND WIRE FROM THE MGB TO THE GROUND POINT. FOR CONTINUATION SEE DRAWING E-2.
9. CONDUIT FROM THE POWER SOURCE TO THE NEW METER AND NEW PANEL. FOR CONTINUATION SEE DRAWING E-2.
10. 1" SEALTIGHT FLEXIBLE CONDUIT WITH 3#6 & 1#10G FROM NEW PANEL TO THE COMMUNICATION CABINET TERMINATION POINT.
11. 1-1/2" SEALTIGHT FLEXIBLE CONDUIT FROM THE DEMARCATION BOX TO THE COMMUNICATION CABINET. PULL (1) 6 PAIR #22 AWG INDIVIDUALLY SHIELDED TINNED COPPER CONDUCTOR CABLE (BELDEN CABLE PART # 8768). LEAVE 5' OF SLACK WIRE AT BOTH ENDS OF CONDUIT FOR CONNECTIONS.
12. DEMARCATION BOX INSTALLED BY CONTRACTOR AND SUPPLIED BY OMNIPOINT.
13. MYER'S HUB FOR ALL SIDE CONNECTIONS TO DISCONNECT SWITCH, DEMARCATION BOX, AND NORTEL SUB BASE.
14. CONDUIT WITH DRAG LINE FROM MAIN DEMARCATION SOURCE TO DEMARCATION BOX. FOR CONTINUATION SEE DRAWING E-2.
15. COAXIAL CABLES. REFER TO ARCHITECTURAL DRAWINGS FOR QUANTITY.
16. SINGLE HOLE CONDUIT SUPPORT WITH BACK STRAP.

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Drawing Title:	Client:	Project	Address	Search Area:	Site ID No:
RISER	OCS	CL&P POLE # 1088	MECHANIC STREET DARIEN, CT	DARIEN / DOWNTOWN	CT-11-290C

P.C.:	P.C. Chkd:	Chkd. by:	ARCNET Project No.	Drawn:	Date:	Revision No.	Date:	Drawing No.
RVa			A99.506-833A	MW	4/26/99			E-4

Approved by: CLIENT:________ DATE:________

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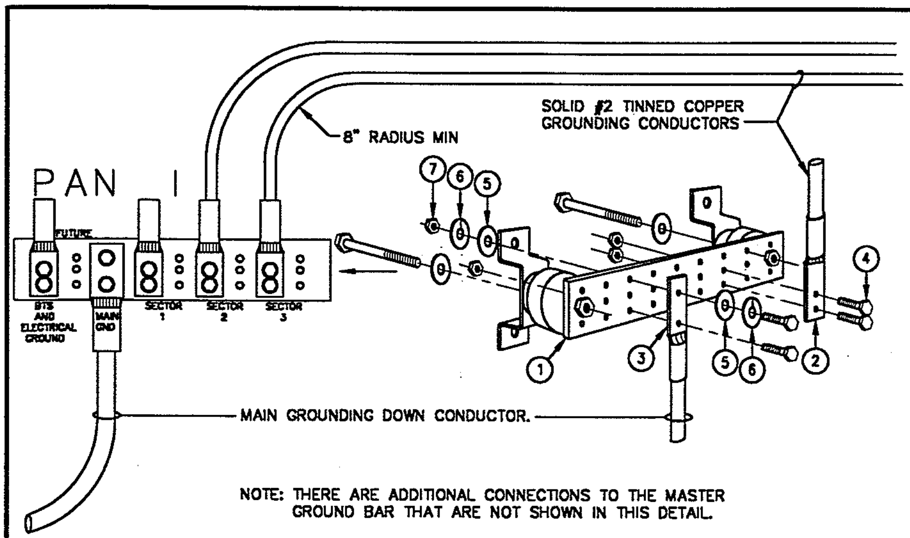

MASTER GROUND BAR TERMINATION DETAIL — SCALE: NONE — E-5 / 01

GENERAL GROUNDING NOTES

1. ANTI OXIDANT COMPOUND SHALL BE APPLIED TO ALL GROUNDING CONNECTIONS (CTAPS, MAIN GND, MGB, ETC.)
2. THE CONNECTIONS TO THE MASTER GROUND BAR MUST FOLLOW THE PANI METHOD. SEE SPECIFICATIONS.
3. THE GROUND RUN SHALL FOLLOW A DOWNWARD PATH FROM THE ANTENNAS TO THE MASTER GROUND BAR.
4. ALL CONNECTIONS SHALL BE MADE WITH AN 8" RADIUS MINIMUM.
5. ANY GROUND WIRES, SOLID OR STRANDED, THAT PASS THROUGH CONDUIT, METALLIC SLEEVE, OR CABLE COVER, SHALL BE BONDED AT BOTH ENDS.
6. WHERE TRAY IS USED BOND ADJACENT TRAY WITH A #6 STRANDED JUMPER VIA TWO HOLE LUGS. BOND BOTH ENDS TO THE #2 SOLID TINNED WIRE.

KEY NOTES (Symbols ①, ②, Etc.)

1. ALL COAXIAL CABLES LEAVING THE COMMUNICATION CABINET SHALL BE GROUNDED AT THIS POINT VIA CABLE GROUND KITS. NEWTON INSTRUMENT COMPANY OR EQUAL. #B-6142 (GROUND BAR 20" X 4" X 1/4"), #3061-4 (INSULATORS), #3015-8 (5/8" LOCKWASHERS), #A-6056 (WALL MOUNTING BRACKETS), AND #3012-1 (5/8"-11 X 1" H.H.C.S. BOLTS).
2. HYDRAULICALLY COMPRESSED LONG BARREL 2-HOLE GROUNDING LUG FOR GROUNDING CONDUCTORS BETWEEN CABLE AND THE MASTER GROUND BAR TERMINAL. THOMAS & BETTS #54811BE OR EQUAL.
3. HYDRAULICALLY COMPRESSED LONG BARREL 2-HOLE GROUNDING LUG FOR THE MAIN GROUNDING DOWN CONDUCTOR BETWEEN THE MASTER GROUND BAR TERMINAL AND THE MAIN GROUNDING ELECTRODE. THOMAS & BETTS #54862BE OR EQUAL.
4. 3/8" STAINLESS STEEL DIAMETER BOLTS TO CONNECT GROUNDING LUG TO THE GROUND BAR (TYPICAL).
5. 3/8" STAINLESS STEEL DIAMETER FLAT WASHER (TYPICAL).
6. 3/8" STAINLESS STEEL DIAMETER LOCK WASHER (TYPICAL).
7. 3/8" HEX HEAD STAINLESS STEEL NUT (TYPICAL).

	SOLID #2 TINNED COPPER	GROUND KIT	#2/0 STRANDED (MAIN DOWN CONDUCTOR)	MASTER GROUND BAR	STRUCTURAL OR TOWER STEEL	MAIN GROUNDING ELECTRODE	GROUND ROD
SOLID #2 TINNED COPPER	B or C	B or C		A or C	A, C or D		C
GROUND KIT	B or C			A	A, C or D		
#2/0 STRANDED (MAIN DOWN CONDUCTOR)				A or C	A, C or D	A	C
MASTER GROUND BAR	A or C	A	A or C				
STRUCTURAL OR TOWER STEEL	A, C or D	A, C or D	A, C or D				
GROUND ROD	C		C				

TERMINATION TYPES:

- A 2-HOLE MECHANICAL LUG WITH HYDRAULICALLY COMPRESSED LONG BARREL.
- B DOUBLE BARREL COPPER HYDRAULICALLY COMPRESSED CONNECTOR.
- C CADWELD
- D BEAM CLAMP

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GROUNDING MATRIX — SCALE: NONE — E-5 / 02

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Drawing Title: GROUNDING DETAILS

Client: OCS

P.C.: RVa | P.C. Chkd: | Chkd. by: | ARCNET Project No.: A99.506-833A | Drawn: MW | Date: 4/26/99

Project: CL&P POLE # 1068

Address: MECHANIC STREET DARIEN, CT

Search Area: DARIEN / DOWNTOWN

Site ID No.: CT-11-290C

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Revision No. | Date:

Drawing No. E-5

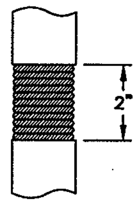

FIGURE 1 | SCALE: NONE | E-6 01

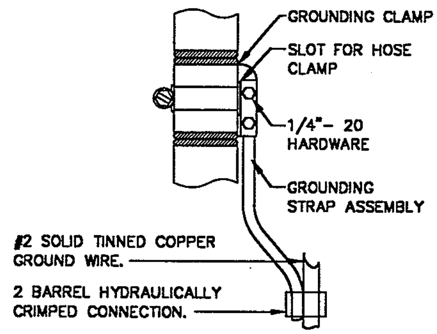

FIGURE 2 | SCALE: NONE | E-6 02

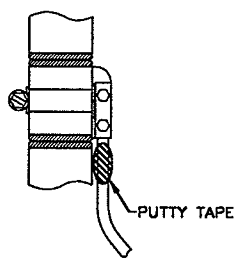

FIGURE 3 | SCALE: NONE | E-6 03

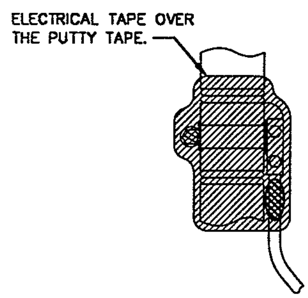

FIGURE 4 | SCALE: NONE | E-6 04

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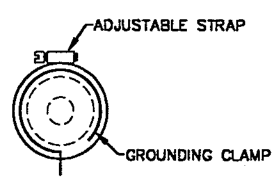

FIGURE 5 | SCALE: NONE | E-6 05

INSTALLATION:

1. CUT AND REMOVE A 2 INCH SECTION OF CABLE JACKET SHOWN IN FIGURE #1. USE CARE NOT TO GOUGE OR CRUSH THE CABLE.
2. CLEAN THE EXPOSED SURFACE OF THE OUTER CONDUCTOR WITH BRONZE OR STEEL WOOL UNTIL THE SURFACE IS CLEAN AND BRIGHT. ALSO CLEAN ONE INCH OF THE JACKET EACH SIDE OF THE CUT SURFACE WITH A CLEAN CLOTH.
3. WRAP THE COPPER GROUNDING CLAMP AROUND THE EXPOSED OUTER CONDUCTOR. SECURE THE GROUNDING CLAMP WITH THE STAINLESS STEEL HOSE CLAMP AS SHOWN IN FIGURE #2 AND #5.
4. ATTACH THE TWO HOLE GROUNDING LUG TO THE CABLE GROUNDING CLAMP WITH 1/4" – 20 HARDWARE. SEE FIGURE #2.
5. CLEAN THE SURFACE THOROUGHLY WHERE THE SINGLE HOLE GROUNDING LUG IS TO BE CONNECTED. THE GROUNDING SURFACE MUST BE CLEAN OF ANY PAINT, GREASE, RUST OR OXIDATION FOR A GOOD ELECTRICAL CONTACT. THE GROUNDING SURFACE SHOULD BE A METAL TOWER MEMBER OR DOWN CONDUCTOR LOCATED BELOW THE GROUNDING CLAMP. THE GROUNDING WIRE SHOULD BE RUN STRAIGHT DOWN – NO DRIP LOOP. SEE FIGURE #2.
6. BOLT THE GROUNDING LUG ONTO THE PREPARED SURFACE WITH A 3/8" – 16 HARDWARE. AFTER TIGHTENING, PAINT THE GROUNDING LUG AND SURROUNDING AREA WITH A ZINC BASED CORROSION CONTROL PAINT.
7. WRAP THE GROUNDING LUG AND WIRE AT THE CLAMP ASSEMBLY WITH SEVERAL TURNS OF PUTTY TAPE AS SHOWN IN FIGURE #3. FORM THE PUTTY BY HAND AROUND THE LUG. WRAP THE REMAINDER OF THE PUTTY AROUND THE ENTIRE GROUNDING CLAMP AND LUG, INCLUDING ONE INCH OF CABLE JACKET ON EACH SIDE OF THE CLAMP. FORM THE PUTTY AROUND THE GROUNDING CLAMP AND JACKET BY HAND TO ASSURE A WEATHERPROOF SEAL. SEE FIGURE #4. TO COMPLETE WEATHERPROOFING, APPLY ELECTRICAL TAPE OVER THE PUTTY COVERED CONNECTION. OVERLAP EACH TURN, STRETCHING THE TAPE SLIGHTLY WHILE APPLYING THE FIRST TWO LAYERS AND LIGHTLY WRAPPING THE LAST TWO LAYERS. COMPRESS THE WRAPPINGS WITH BOTH HANDS TO INSURE COMPLETE CONTACT WITH ALL LAYERS OF TAPE.

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P.C.:	P.C. Chkd:	Chkd. by:	ARCNET Project No.	Drawn:	Date:
RVa			A99.506-833A	MW	4/26/99

Drawing Title: GROUNDING DETAILS

Client: OCS

Project: CL&P POLE # 1068
Address: MECHANIC STREET DARIEN, CT
Search Area: DARIEN / DOWNTOWN
Site ID No.: CT-11-290C
Approved By: CLIENT:________ DATE:________

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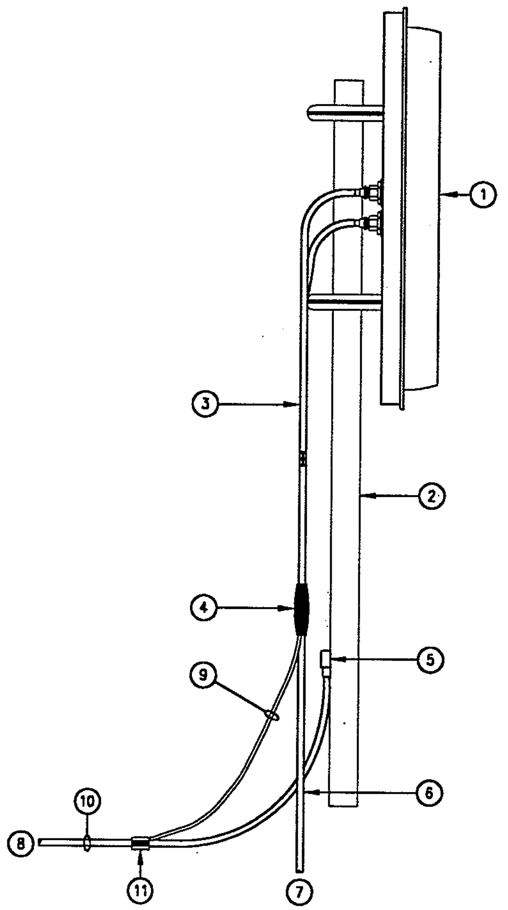
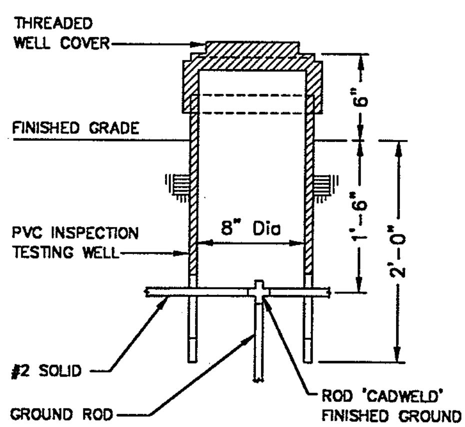


KEY NOTES (Symbols ①, ②, Etc.)

1. ANTENNA.
2. MAST.
3. ANTENNA JUMPER (TYPICAL FOR 2).
4. REFER TO GROUNDING KIT DETAIL. DO NOT INSTALL ON BENDS (TYPICAL FOR 2).
5. CADWELD TYPE "VS".
6. ANTENNA COAXIAL CABLE (TYPICAL FOR 2).
7. TO COMMUNICATION CABINET.
8. TO COLLECTOR BAR.
9. #6 INTEGRAL GROUND CONDUCTOR FROM GROUNDING KIT TO #2 SOLID.
10. #2 SOLID TINNED COPPER GROUNDING CONDUCTOR 8" MINIMUM RADIUS.
11. 2 BARREL HYDRAULICALLY COMPRESSED CONNECTION PANDUIT CATALOG # CTAP 2-4Q.

ANTENNA GROUNDING | SCALE: NONE | E-7 01



ROBERT P. JUENGERT
STATE OF CONNECTICUT REGISTERED ARCHITECT NO. 4208
CT-4208

TEST WELL DETAIL | SCALE: NONE | E-7 02

This Drawing Is The Property Of DLB Associates, Consulting Engineers P.C. – Last Saved: N:\238\23885E07.DWG, 04/26/99 at 12:32 by DBozard

ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

DLB ASSOCIATES, INC. Electrical / Mechanical Wanamassa, NJ CT-PE 14722

P.C.:	P.C. Chkd:	Chkd. By:	ARCNET Project No.	Drawn:	Date:
RVa			A99.506-833A	MW	4/26/99

Drawing Title: GROUNDING DETAIL

Client: OCS

Project: CL&P POLE # 1088
Address: MECHANIC STREET DARIEN, CT
Search Area: DARIEN / DOWNTOWN
Site ID No.: CT-11-280C
Approved By: CLIENT:______ DATE:______

Revision No. | Date:

Drawing No. E-7

Exhibit B

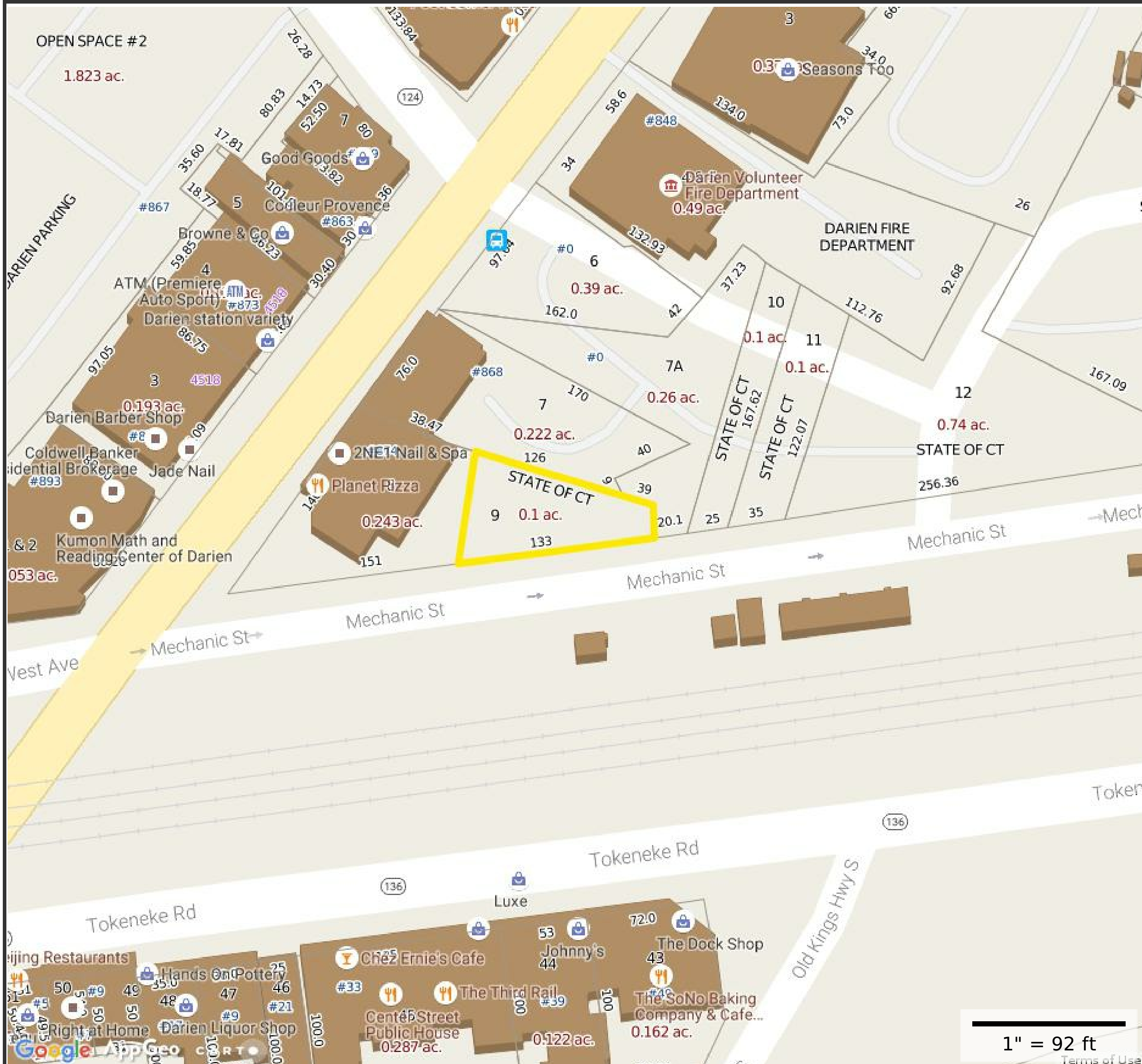
PARID: 29241
STATE OF CT DOT **MECHANIC STREET**

Parcel

Alt ID	71 9
Address	MECHANIC STREET
Unit	
Neighborhood	3050
Class	300
Land Use Code	901-STATE
Living Units	
Acres	.1
Zoning	CBD
Street1/Street2	8-SECONDARY /-
Topo1/Topo2/Topo3	-/-/-
Util1/Util2/Util3	-/-/-
Notes	TELECOM ANTENNAS & RELATED EQUIP ON CL&P POLE PERS PROP UPDATES 2010, AH, N.C.

Owners

Owner	Address	City	State	Zip
STATE OF CT DOT	2800 BERLIN TURNPIKE	NEWINGTON	CT	06111



Property Information

Property ID	29241
Location	0 MECHANIC STREET
Owner	STATE OF CT DOT

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of Darien, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Parcels updated 1/1/2016
Properties updated 3/22/2016

Exhibit C

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

DARIEN/ DTWN + RT-1

SITE ID: CT11290C

3 MECHANIC STREET

DARIEN, CT 06820

T-MOBILE RF CONFIGURATION

67D94B_1DP+1QP+1OP

PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:

   A. REMOVE (3) EXISTING PANEL ANTENNAS.
   B. INSTALL (3) PROPOSED PANEL ANTENNAS.
   C. REMOVE (3) EXISTING REMOTE RADIO UNITS FROM RACK AT GRADE.
   D. INSTALL (3) PROPOSED REMOTE RADIO UNITS ON RACK AT GRADE.
   E. INSTALL (6) COAX CABLES ROUTED FROM RRUs AT GRADE TO ANTENNAS ON TOWER.
   F. RELOCATE (3) EXISTING BIAS TEEs TO NEW PIPE MAST.
   G. REPLACE EXISTING PIPE MAST. REFER TO S-1 FOR DETAILS.

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2016 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. 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.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED' ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T-MOBILE 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.
13. 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.
14. 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.
15. 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.
16. 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.
17. 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.
18. 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. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. 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: 35 GRIFFIN ROAD SOUTH, BLOOMFIELD, CT 06002

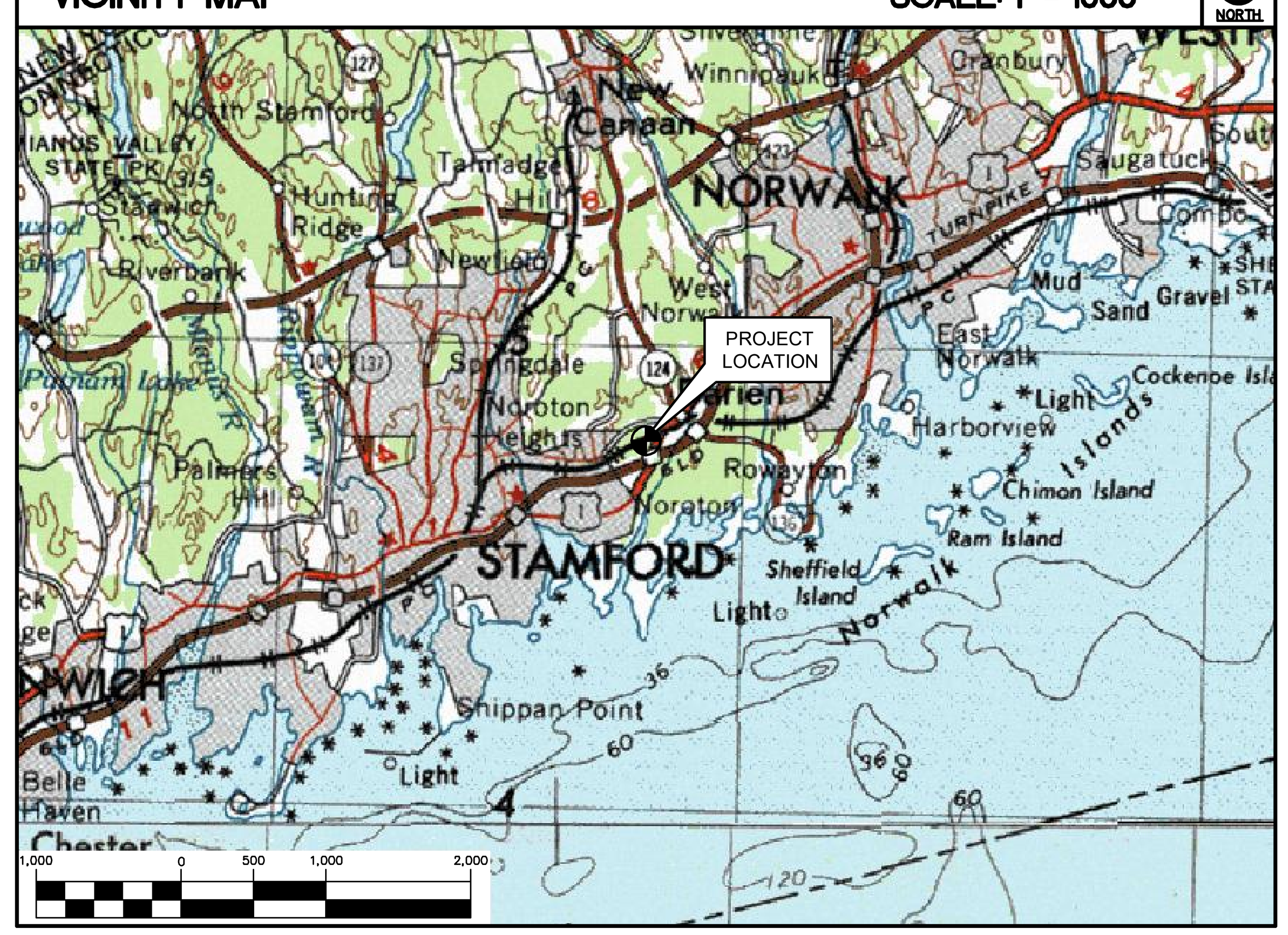
TO: 3 MECHANIC STREET, DARIEN, CT 06820

1.	HEAD NORTH ON GRIFFIN ROAD S. TOWARD HARTMAN RD.	0.21 MI.
2.	TAKE THE 2ND RIGHT ONTO DAY HILL RD.	0.14 MI.
3.	TAKE THE 1ST RIGHT ONTO BLUE HILLS AVENUE EXT/CT-187	1.89 MI.
4.	TURN LEFT ONTO CT-305/OLD WINDSOR RD.	2.32 MI.
5.	STAY STRAIGHT TO GO ONTO BLOOMFIELD AVE/CT-305.	0.01 MI.
6.	MERGE ONTO I-91 S TOWARD HARTFORD	45.80 MI.
7.	KEEP RIGHT TOWARD NY CITY	0.08 MI.
8.	MERGE ONTO I-95 S VIA THE EXIT ON THE LEFT TOWARD NY CITY	34.64 MI.
9.	TAKE THE US-1/POST RD EXIT, EXIT 13	0.12 MI.
10.	TURN RIGHT ONTO POST RD/ US-1 N	0.02 MI.
11.	MAKE A U-TURN ONTO POST RD/ US-1 S	1.04 MI.
12.	TURN SHARP LEFT ONTO MECHANIC ST.	0.0.1MI.

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT INFORMATION

SITE NAME:	DARIEN/ DTWN & RT-1
SITE ID:	CT11290C
SITE ADDRESS:	3 MECHANIC STREET, DARIEN, CT 06820
APPLICANT:	T-MOBILE NORTHEAST, LLC, 35 GRIFFIN ROAD SOUTH, BLOOMFIELD, CT 06002
CONTACT PERSON:	DAN REID (PROJECT MANAGER), TRANSCEND WIRELESS, LLC, (203) 592-8291
ENGINEER:	CENTEK ENGINEERING, INC., 63-2 NORTH BRANFORD RD., BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-4'-39.25" N; LONGITUDE: 73°-28'-3.29" W; GROUND ELEVATION: 55'± AMSL. SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	DESIGN BASIS AND SITE NOTES	0
C-1	COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.	0
C-2	TYPICAL DETAILS	0
S-1	MAST DETAILS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	5/13/19	TJL	CAG	ISSUED FOR CONSTRUCTION – ADJUSTED FENCE EXTENSION LAYOUT
0	1/10/19	TJL	CAG	ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

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

T-Mobile

Transcend Wireless

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

T-MOBILE NORTHEAST LLC

WIRELESS COMMUNICATIONS FACILITY

DARIEN/ DTWN + RT-1

SITE ID: CT11290C

3 MECHANIC STREET

DARIEN, CT 06820

DATE:	10/1/18
SCALE:	AS NOTED
JOB NO.	18058.58

TITLE SHEET

T-1

Sheet No. 1 of 5

DESIGN BASIS:

1. GOVERNING CODE: 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CT STATE BUILDING CODE.
2. ASCE MANUAL NO. 48-11 – "DESIGN OF STEEL TRANSMISSION POLE STRUCTURES", NESC C2-2012 AND NORTHEAST UTILITIES DESIGN CRITERIA.
3. DESIGN CRITERIA

   WIND LOAD: (UTILITY POLE & FOUNDATION)
   BASIC WIND SPEED (V) =110 MPH (3-SECOND GUST) BASED ON NESC C2-2012, SECTION 25 RULE 250C.

   WIND LOAD: (ANTENNA MAST)
   NOMINAL DESIGN SPEED (OTHER STRUCTURE): 93 MPH (Vasd) (EXPOSURE C) BASED ON TIA 222 G AND CT BUILDING CODE APPENDIX N.

GENERAL NOTES:

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

STRUCTURAL STEEL

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

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS---ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX
2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	5/13/19	TJL	CAG	ISSUED FOR CONSTRUCTION – ADJUSTED FENCE EXTENSION LAYOUT
0	1/10/19	TJL	CAG	ISSUED FOR CONSTRUCTION

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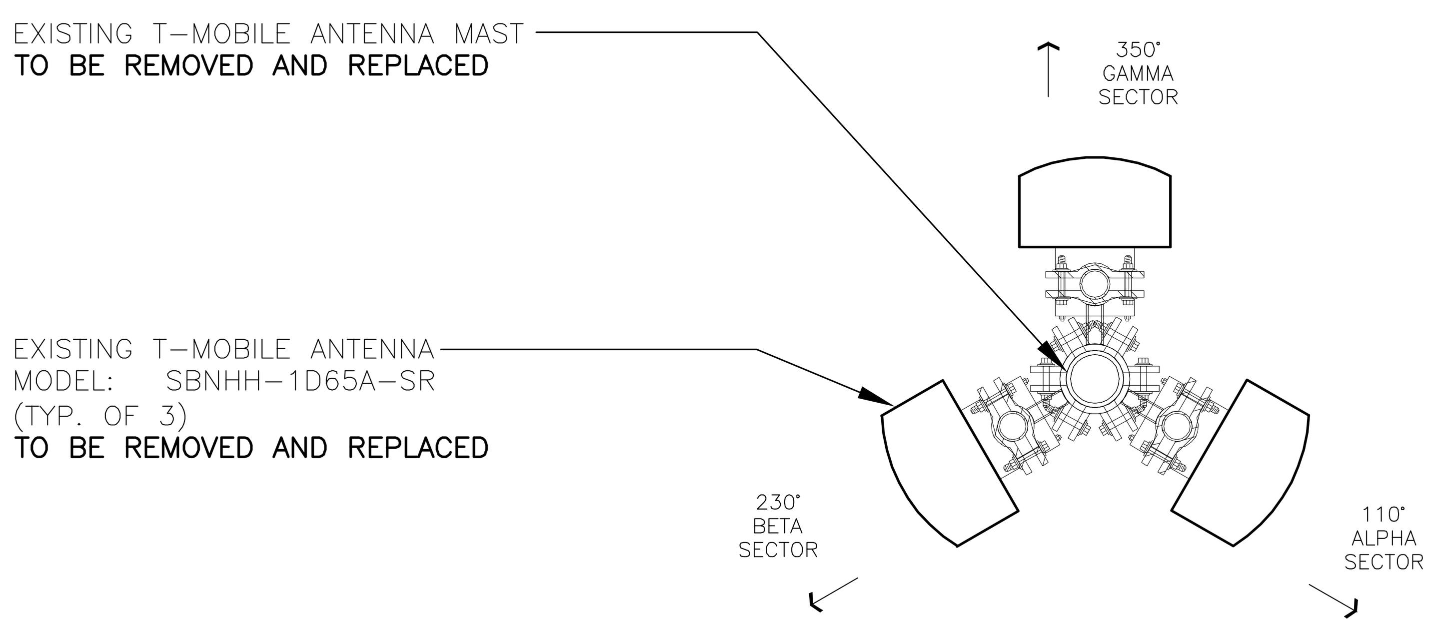
T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
DARIEN/ DTWN + RT-1
SITE ID: CT11290C
3 MECHANIC STREET
DARIEN, CT 06820

DATE: 10/1/18
SCALE: AS NOTED
JOB NO. 18058.58

DESIGN BASIS AND SITE NOTES

N-1

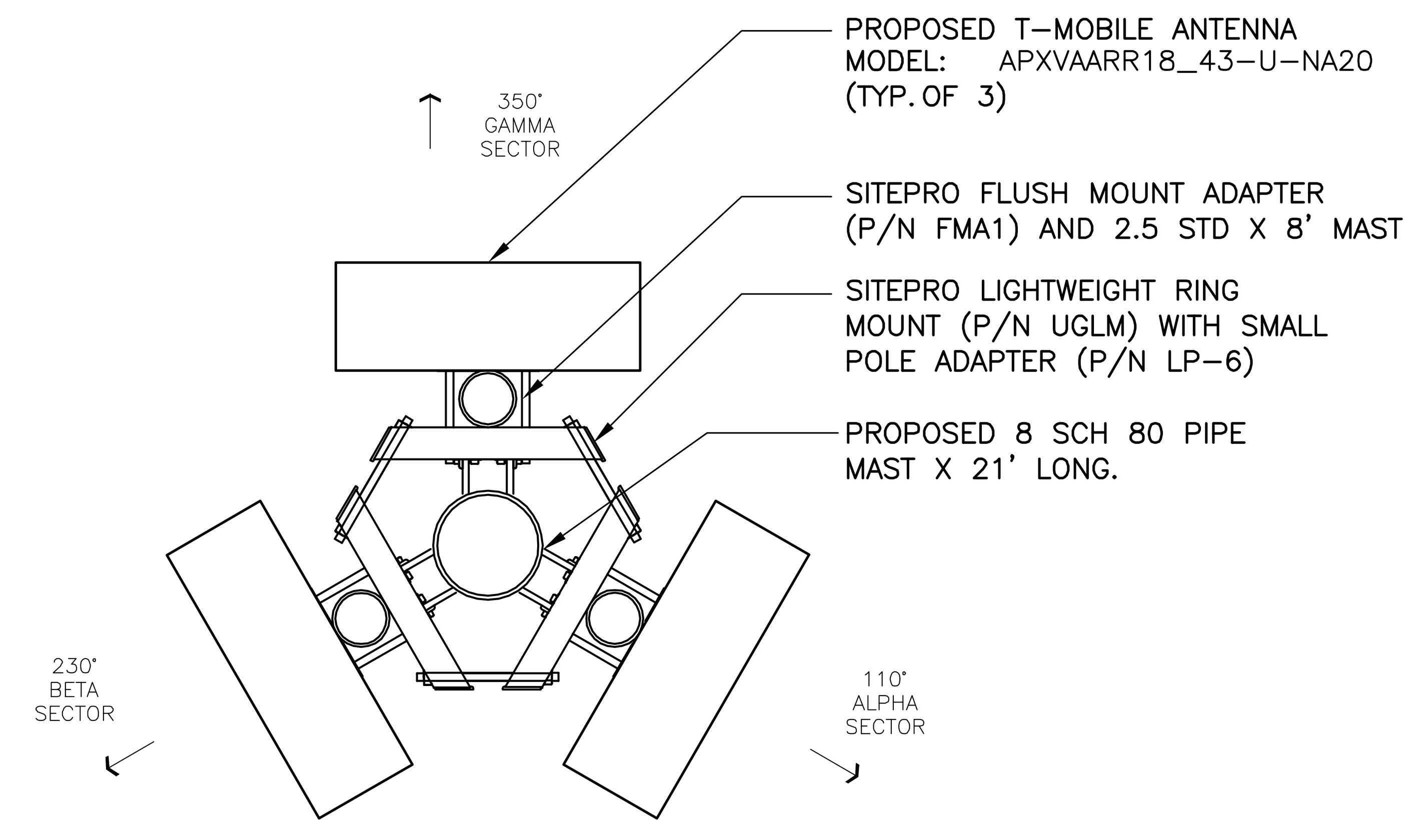
Sheet No. 2 of 5



4 C-1 EXISTING ANTENNA MOUNTING CONFIGURATION

SCALE: 1" = 1' 124' ELEVATION

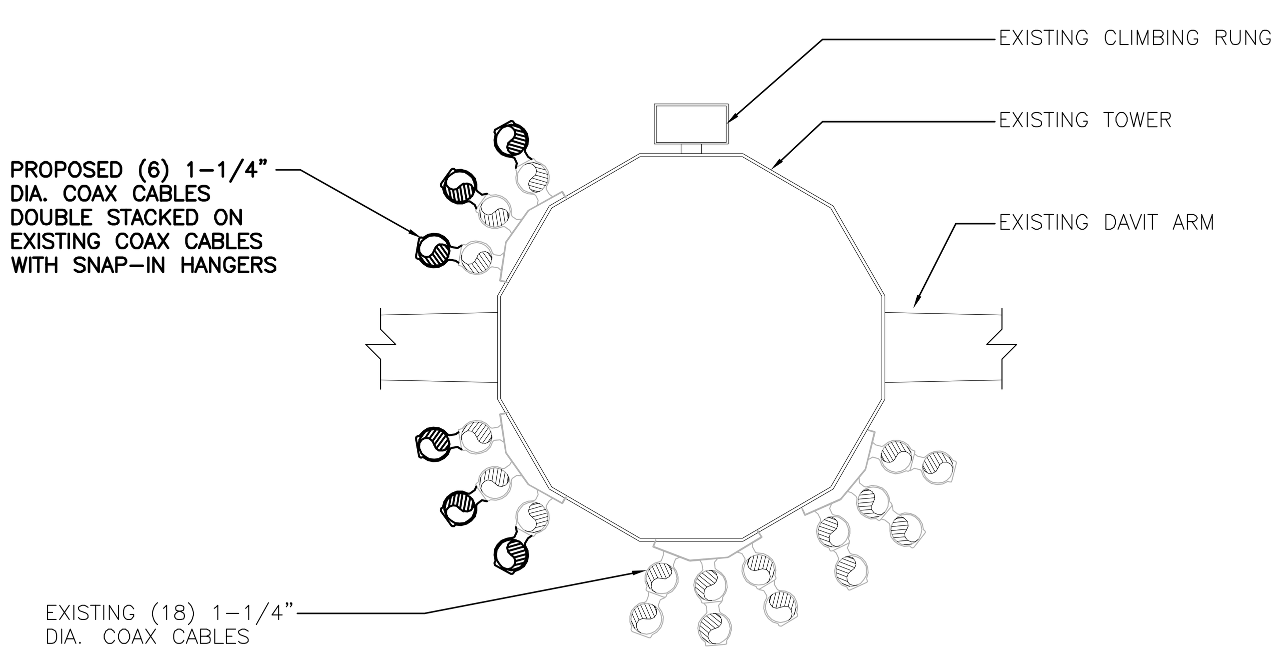
TRUE NORTH



5 C-1 PROPOSED ANTENNA MOUNTING CONFIGURATION

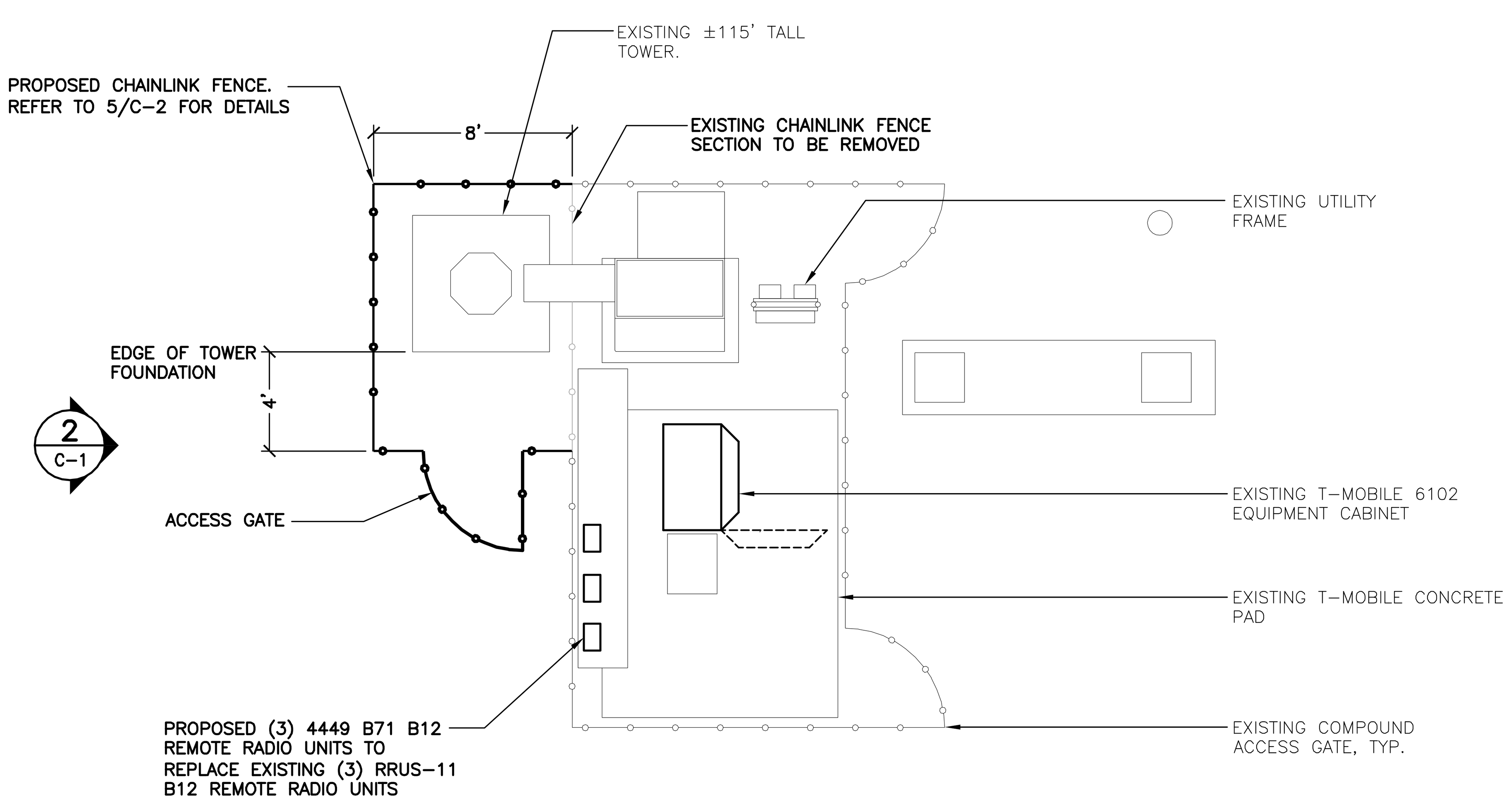
SCALE: 3/8" = 1' 124' ELEVATION

TRUE NORTH



3 C-1 COAX CABLE PLAN

SCALE: NTS

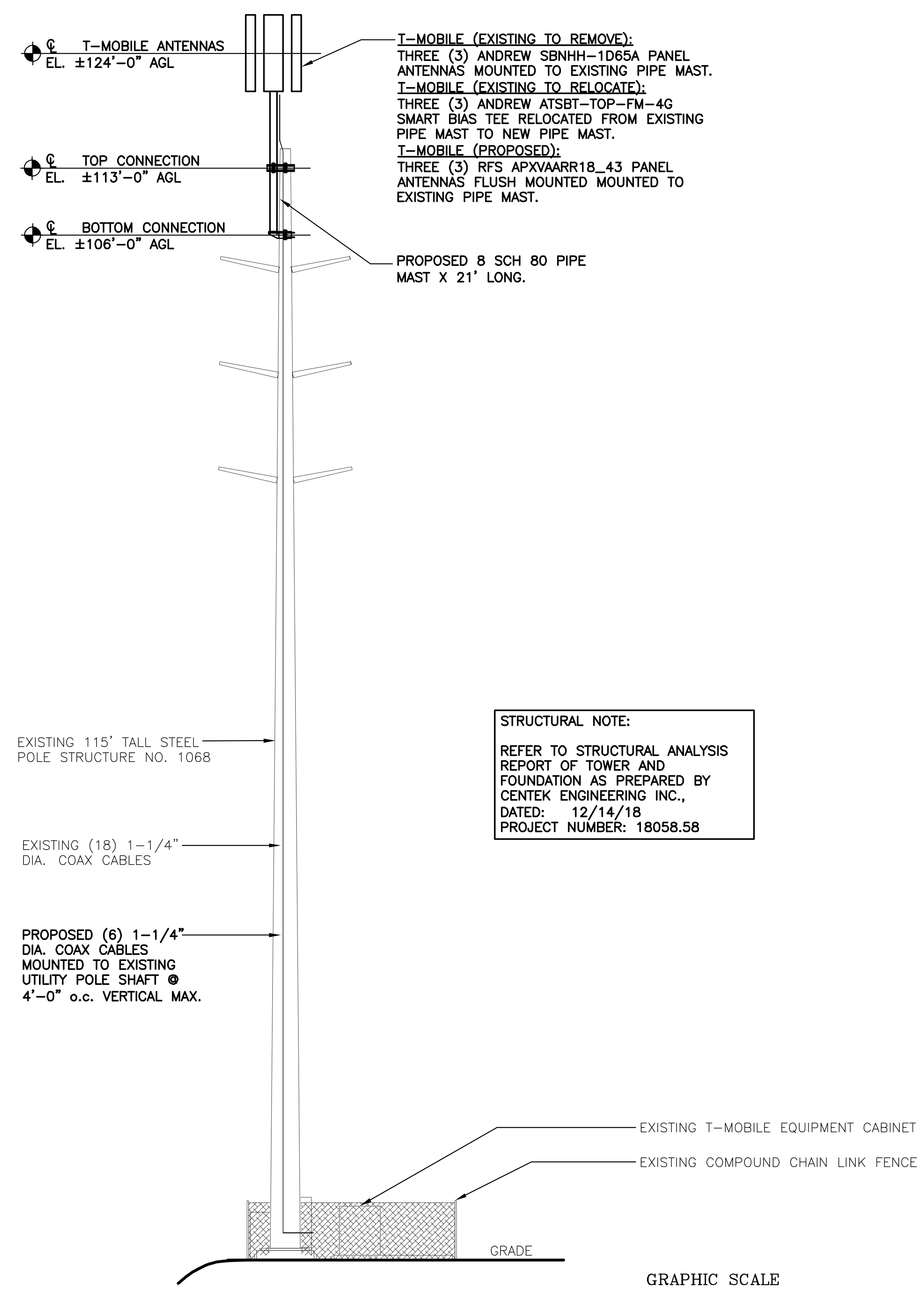


1 C-1 COMPOUND PLAN

SCALE: 1" = 10'

TRUE NORTH

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



STRUCTURAL NOTE:

REFER TO STRUCTURAL ANALYSIS REPORT OF TOWER AND FOUNDATION AS PREPARED BY CENTEK ENGINEERING INC., DATED: 12/14/18 PROJECT NUMBER: 18058.58

2 C-1 TOWER ELEVATION

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
1	5/13/19	TJL	CAG	ISSUED FOR CONSTRUCTION - ADJUSTED FENCE EXTENSION LAYOUT
0	1/10/19	TJL	CAG	ISSUED FOR CONSTRUCTION

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T-MOBILE NORTHEAST LLC

WIRELESS COMMUNICATIONS FACILITY

DARIEN/ DTWN + RT-1

SITE ID: CT11290C

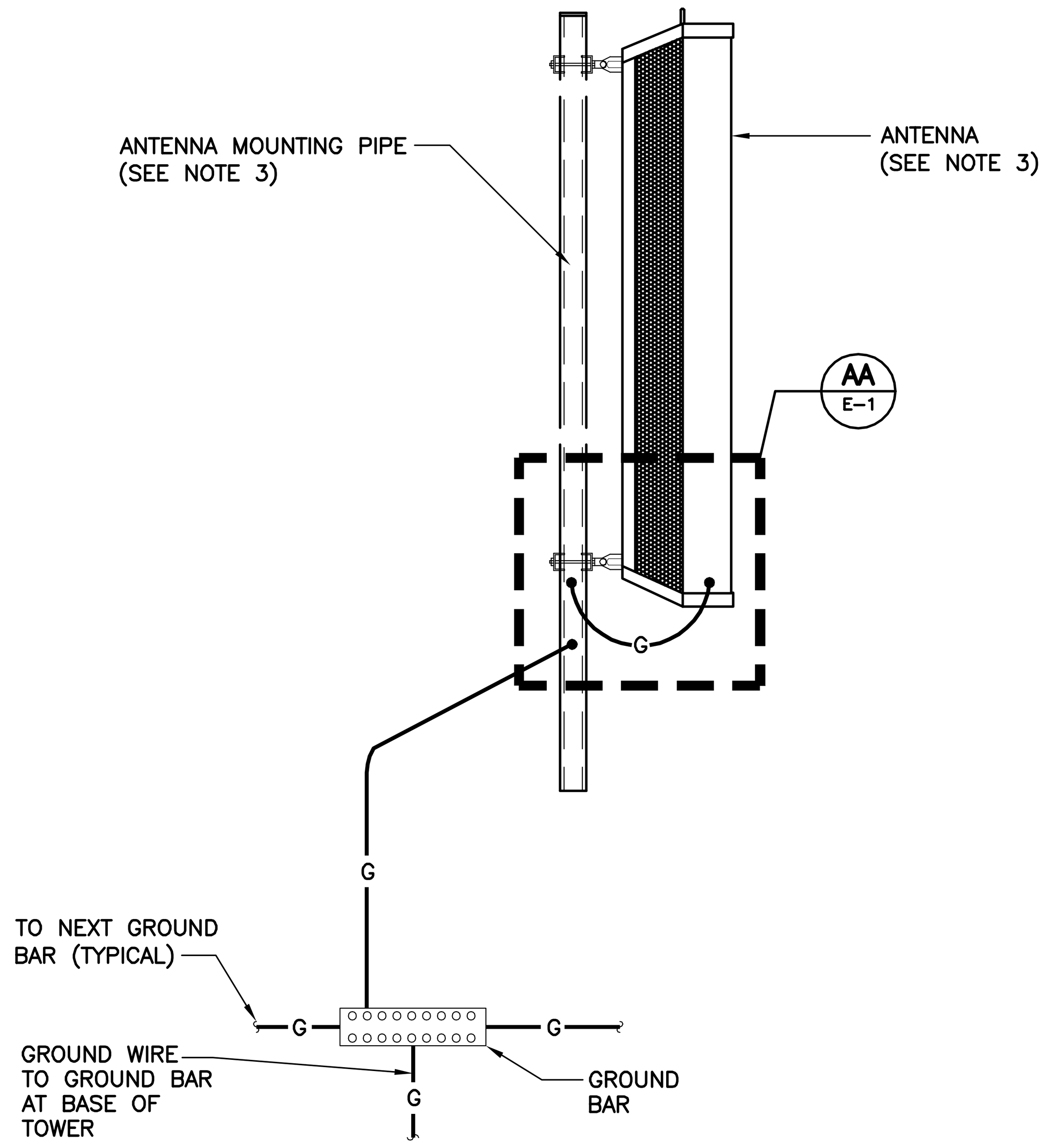
3 MECHANIC STREET DARIEN, CT 06820

DATE:	10/1/18
SCALE:	AS NOTED
JOB NO.	18058.58

COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.

C-1

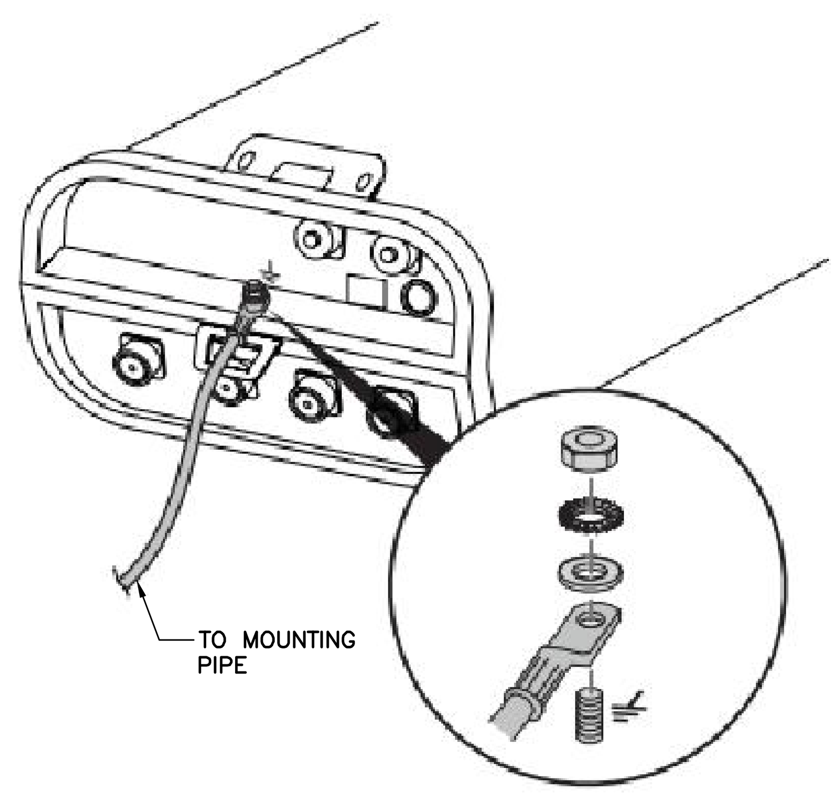
Sheet No. 3 of 5



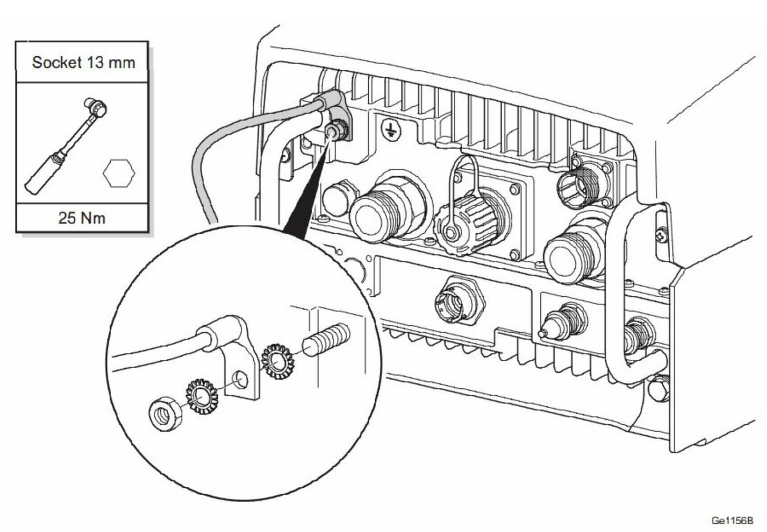
NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

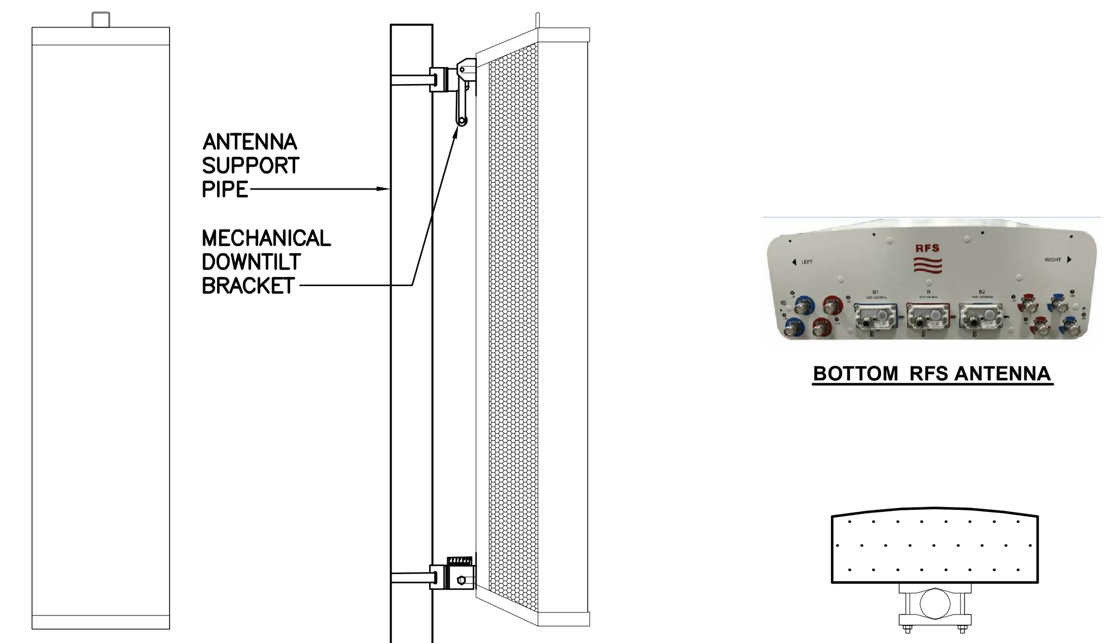
1 (C-2) TYPICAL ANTENNA GROUNDING DETAIL
SCALE: NONE



AA (C-2) TYPICAL ANTENNA GROUNDING DETAIL
SCALE: NONE



2 (C-2) TYPICAL RRU GROUNDING DETAIL
NOT TO SCALE



ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: APXVAARR18_43-U-NA20	72"L x 24.0"W x 8.5"D	154 LBS.

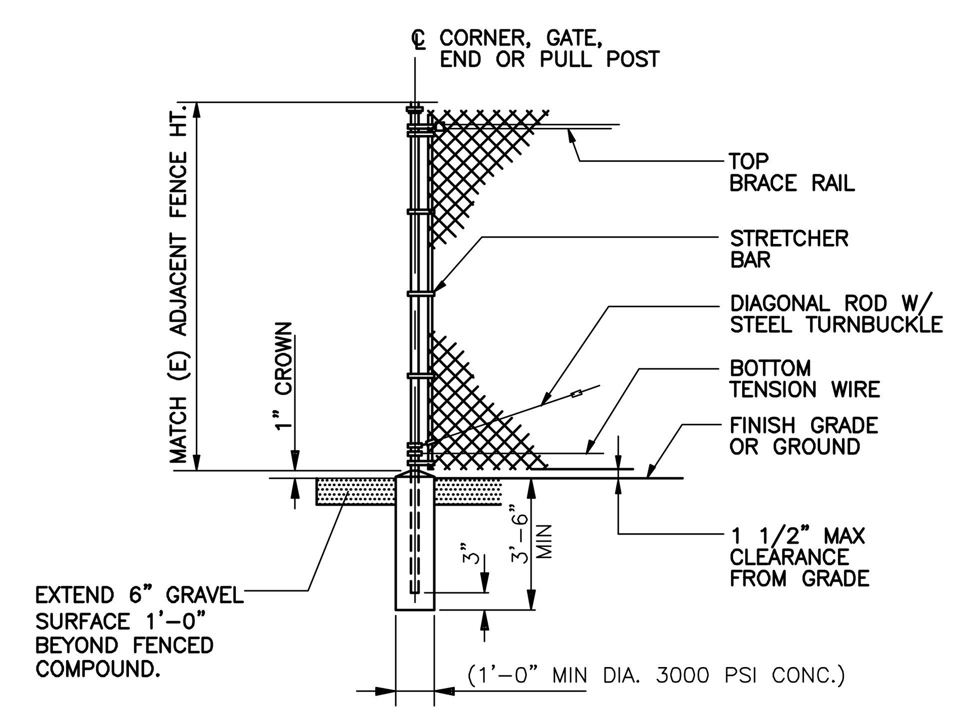
3 (C-2) PROPOSED ANTENNA DETAIL
SCALE: NONE

ISOMETRIC VIEW

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4449 B71B12	14.9"L x 13.2"W x 10.4"D	74 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

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

4 (C-2) PROPOSED RRU DETAIL
SCALE: NONE



TYPICAL SECTION

5 (C-2) WOVEN WIRE FENCE DETAIL
NOT TO SCALE

WOVEN WIRE FENCE NOTES:

1. LINE POST: 2"ø SCHEDULE 40 PIPE PER ASTM-F1083.
2. GATE FRAME: 1 ½"ø SCHEDULE 40 PIPE PER ASTM-F1083.
3. TOP RAIL & BRACE RAIL: 1 ½"ø SCHEDULE 40 PIPE PER ASTM-F1083.
4. FABRIC: 12 GA. CORE WIRE SIZE 1 ¾" MESH, CONFORMING TO ASTM-A392.
5. TIE WIRE: MINIMUM 11 GA. GALVANIZED STEEL AT POSTS AND RAILS. A SINGLE WRAP OF FABRIC TIE AND TENSION WIRE BY HOG RINGS SPACED 24" INTERVALS.
6. TENSION WIRE: 7 GA. GALVANIZED STEEL.
7. LOCAL ORDINANCE OF BARBED WIRE REQUIREMENTS SHALL BE COMPLIED WITH IF APPLICABLE.
8. FENCE HEIGHT TO MATCH HEIGHT OF ADJACENT CHAINLINK FENCE..

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	1/10/19	TJL	CAG	ISSUED FOR CONSTRUCTION
1	5/13/19	TJL	CAG	ISSUED FOR CONSTRUCTION – ADJUSTED FENCE EXTENSION LAYOUT

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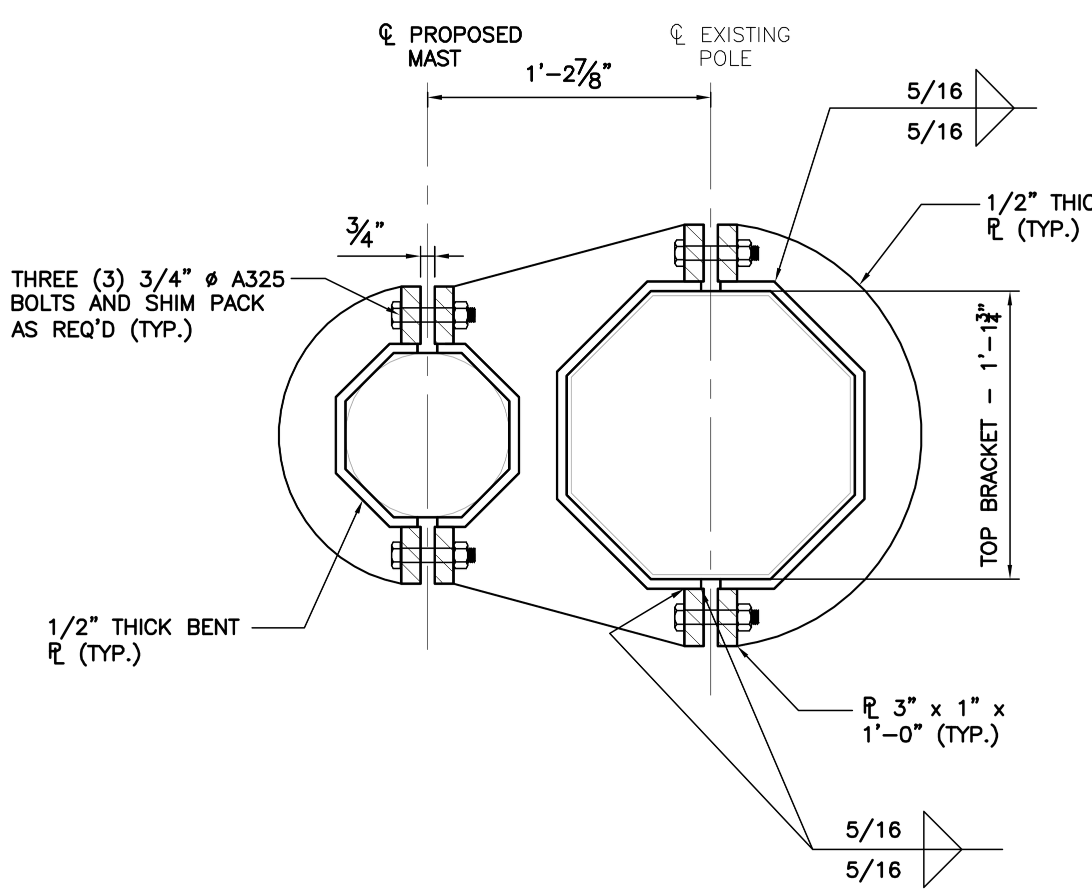
WIRELESS COMMUNICATIONS FACILITY
DARIEN/ DTWN + RT-1
SITE ID: CT11290C
3 MECHANIC STREET
DARIEN, CT 06820

DATE: 10/1/18
SCALE: AS NOTED
JOB NO. 18058.58

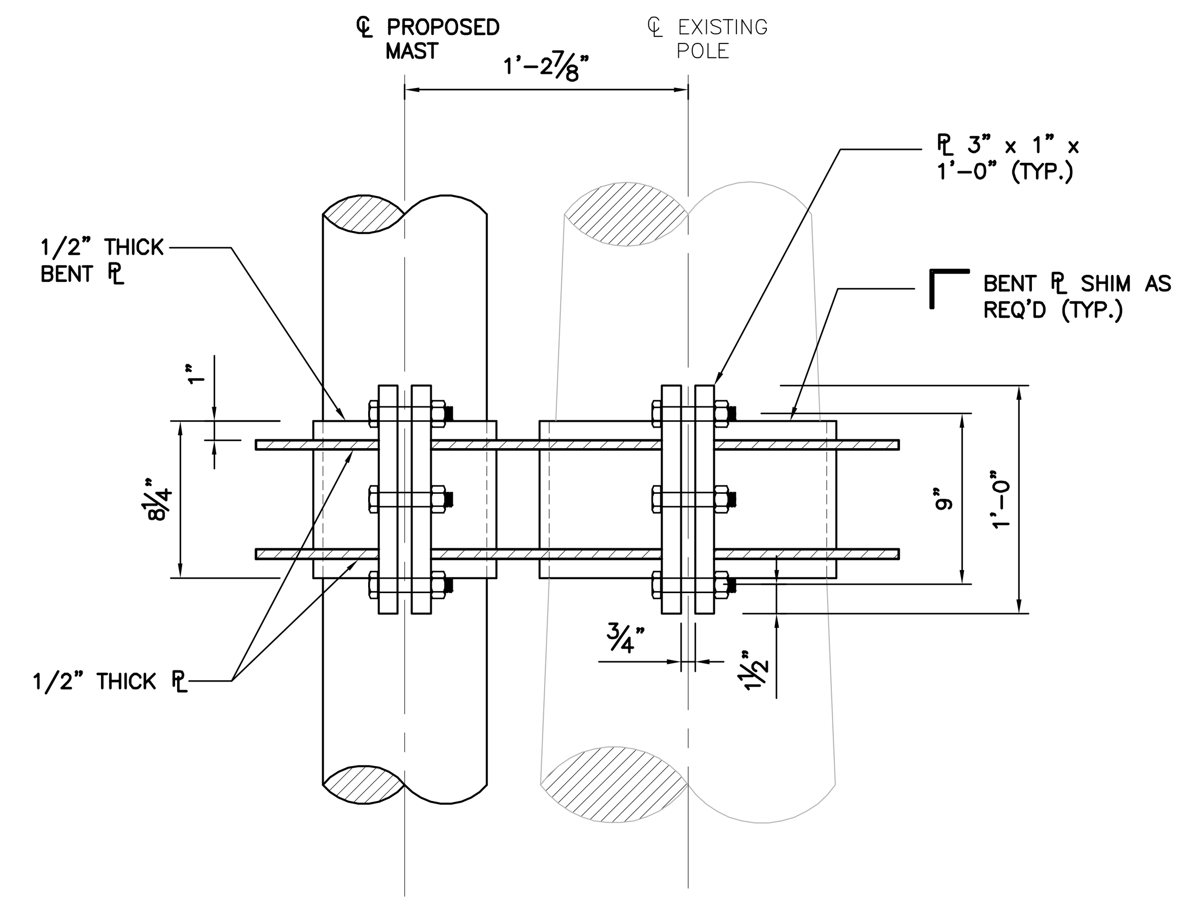
TYPICAL DETAILS

C-2

Sheet No. 4 of 5

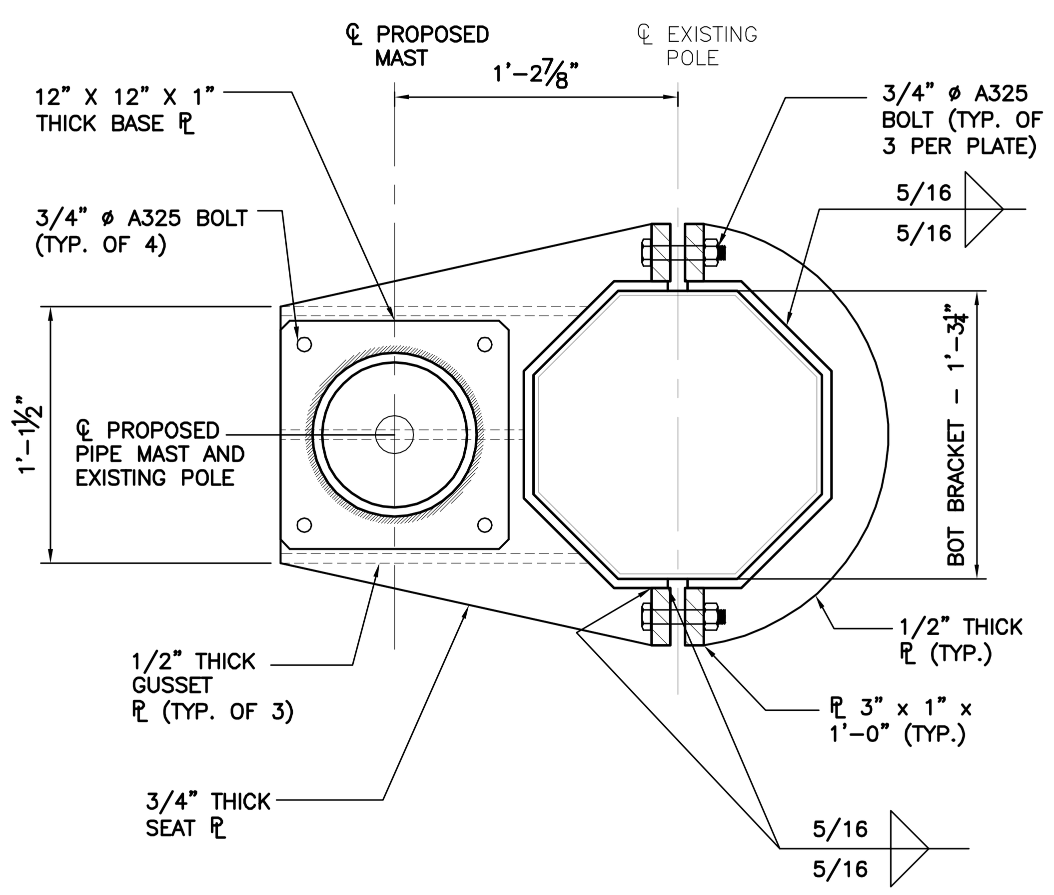


2 S-1 **TOP BRACKET PLAN VIEW**
SCALE: 1-1/2" = 1'-0"

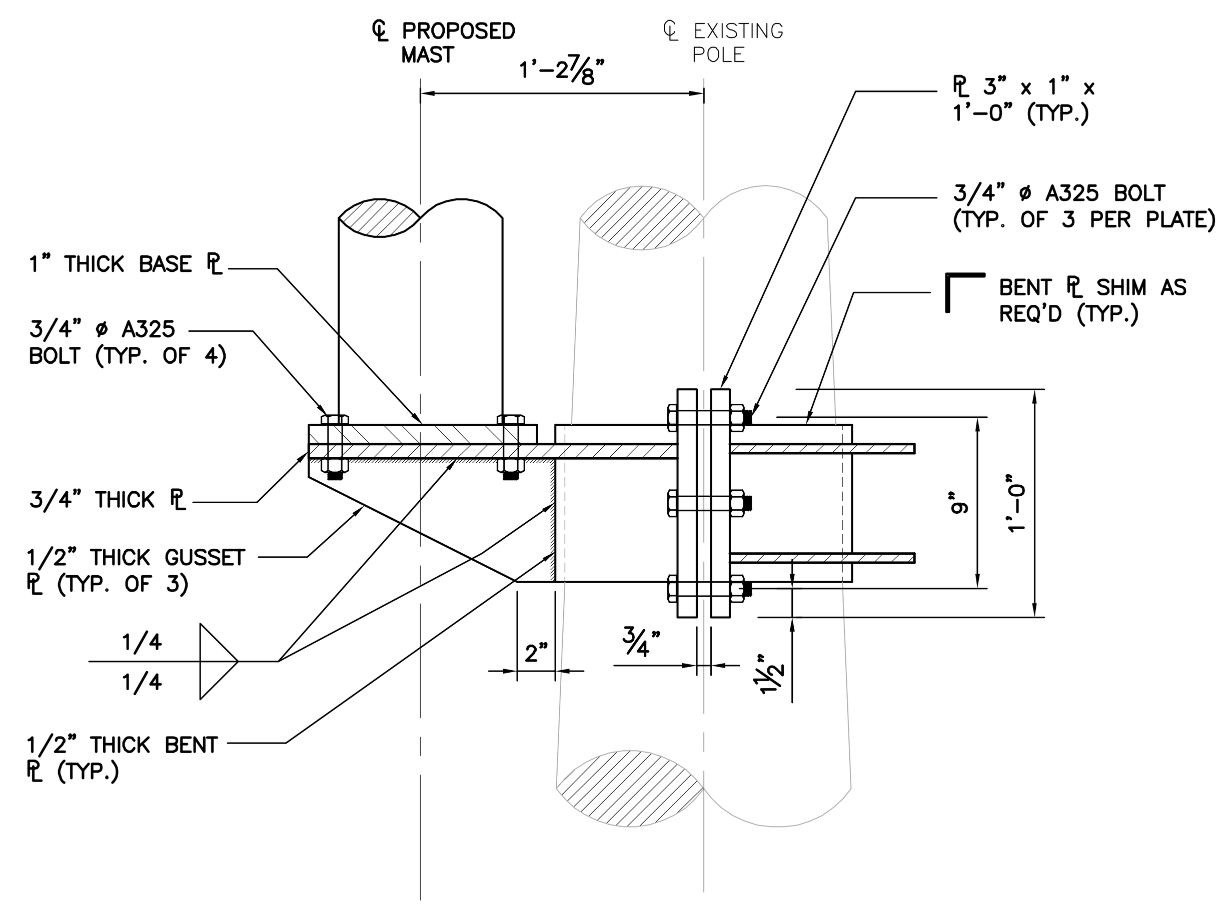


1 S-1 **TOP BRACKET DETAIL**
SCALE: 1-1/2" = 1'-0"

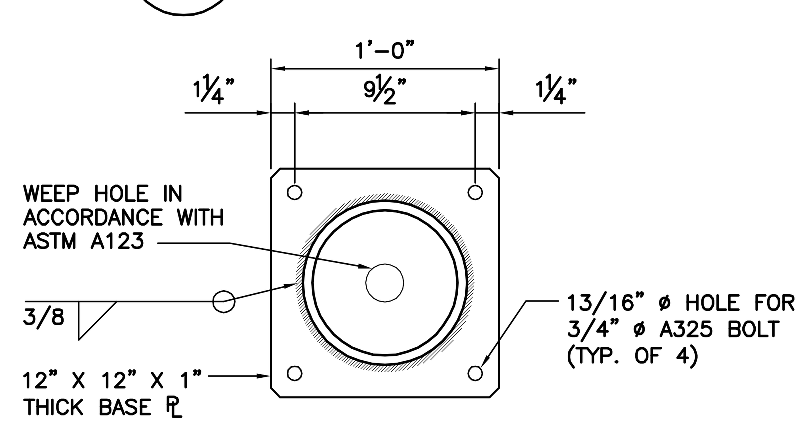
NOTE:
1. POLE TAPER = 0.2099"/FT (V.I.F.)



4 S-1 **BOTTOM BRACKET PLAN VIEW**
SCALE: 1-1/2" = 1'-0"



3 S-1 **BOTTOM BRACKET DETAIL**
SCALE: 1-1/2" = 1'-0"



5 S-1 **BOTTOM PLATE DETAIL**
SCALE: 1-1/2" = 1'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	5/13/19	TJL	CAG	ISSUED FOR CONSTRUCTION – ADJUSTED FENCE EXTENSION LAYOUT
0	1/10/19	TJL	CAG	ISSUED FOR CONSTRUCTION

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3 MECHANIC STREET
DARIEN, CT 06820

DATE: 10/1/18
SCALE: AS NOTED
JOB NO. 18058.58

MAST DETAILS

S-1

Sheet No. 5 of 5

Exhibit D

CENTEK engineering

Centered on Solutions℠

Structural Analysis of Antenna Mast and Pole

T-Mobile Site Ref: CT11290C

Eversource Structure No. 1068
115' Electric Transmission Pole

3 Mechanic Street
Darien, CT

CENTEK Project No. 18058.58

~~Date: September 27, 2018~~
Rev 6: December 14, 2018

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

Prepared for:
T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

Introduction

The purpose of this report is to analyze the existing mast and 115' utility pole located at 3 Mechanic Street in Darien, CT for the proposed antenna and equipment upgrade by T-Mobile.

The existing/proposed loads consist of the following:

- T-MOBILE (Existing to Remain):
  Coax Cables: Eighteen (18) 1-1/4" ∅ coax cables running on the outside of the tower as indicated in section 4 of this report.
- T-MOBILE (Existing to Relocate):
  Antennas: Three (3) Andrew ATSBT-TOP-FM-4G Smart Bias Tees mounted relocated from existing pipe mast to new pipe mast.
- T-MOBILE (Existing to be Removed):
  Antennas: Three (3) Andrew SBNHH-1D65A panel antennas mounted on a mast with a RAD center elevation of 120-ft above tower base plate.
- **T-MOBILE (Proposed):**
  Antennas: Three (3) RFS APXVAARR18_43 panel antennas mounted on a proposed mast with a RAD center elevation of 124-ft above tower base plate.
  Coax Cables: Six (6) 1-1/4" ∅ coax cables running on the outside of the tower as indicated in section 4 of this report.

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 Manual No. 48-11, "Design of Steel Transmission Pole Structures", defines allowable 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 analysis of the existing antenna mast was independently completed using the current version of RISA-3D computer program licensed to CENTEK Engineering, Inc.

The existing mast was found to be structural inadequate to support the new equipment configuration and will need to be replaced with a 8-in x 21-ft long SCH. 80 pipe (O.D. = 8.625") connected at two points to the existing tower. The proposed mast was designed to resist loads prescribed by the TIA-222G standard. Section 5 of this report details these gravity and lateral wind loads. NESC prescribed loads were also applied to the mast in order to obtain reactions needed for analyzing the utility pole structure. These loads are developed in Section 7 of this report. Load cases and combinations used in RISA-3D for TIA-222-G 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 Manual No. 48-11, "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 Manual No. 48-11.

  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"

  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………………………………... 93 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 existing mast was found to be structural inadequate to support the new equipment configuration and will need to be replaced with a 8-in x 21-ft long SCH. 80 pipe.

Member	Stress Ratio (% of capacity)	Result
8” Sch. 80 Pipe	45.0%	**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 Manual No. 48-11, “Design of Steel Transmission Pole Structures”, for the applied NESC Heavy and Hi-Wind load cases. The detailed analysis results are provided in Section 6 of this report. The analysis results are summarized as follows:

A maximum usage of **97.81%** occurs in the utility pole under the **NESC Extreme** loading condition.

POLE SECTION:

The utility pole was found to be **structurally adequate** to support the proposed equipment.

Tower Section	Elevation	Stress Ratio (% of capacity)	Result
Tube Number 4	0.00’-15.08’ (AGL)	97.81%	**PASS**

BASE PLATE:

The base plate was found to be within allowable limits from the PLS output based on 10 bend lines.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Base Plate	Bending	93.44%	**PASS**

- FOUNDATION AND ANCHORS

  The existing foundation consists of a 6-ft diameter x 18-ft long reinforced concrete caisson. The base of the tower is connected to the foundation by means of (12) 2.25"∅, ASTM A432 Grade 60 anchor bolts embedded into the concrete foundation structure.

  BASE REACTIONS:

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

Load Case	Shear	Axial	Moment
NESC Heavy Wind	17.64 kips	47.37 kips	1617.52 ft-kips
NESC Extreme Wind	26.07 kips	24.75 kips	2188.86 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	53.89%	**PASS**

FOUNDATION:

The foundation was found to be within allowable limits.

Design Limit	Original Design Reaction	Proposed Reaction [1]	Result
Shear	29.5 kips	28.7 kips	**PASS**
Moment	2414.4 ft-kips	2407.8 ft-kips	**PASS**

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

Conclusion

This analysis shows that the subject utility pole **is adequate** to support the proposed T-Mobile equipment upgrade.

The analysis is based, in part on the information provided to this office by Eversource and T-Mobile. 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-TOWER

PLS-TOWER is a Microsoft Windows program for the analysis and design of steel latticed towers used in electric power lines or communication facilities. Both self-supporting and guyed towers can be modeled. The program performs design checks of structures under user specified loads. For electric power structures it can also calculate maximum allowable wind and weight spans and interaction diagrams between different ratios of allowable wind and weight spans.

Modeling Features:

- Powerful graphics module (stress usages shown in different colors)
- Graphical selection of joints and members allows graphical editing and checking
- Towers can be shown as lines, wire frames or can be rendered as 3-d polygon surfaces
- Can extract geometry and connectivity information from a DXF CAD drawing
- CAD design drawings, title blocks, drawing borders or photos can be tied to structure model
- XML based post processor interface
- Steel Detailing Neutral File (SDNF) export to link with detailing packages
- Can link directly to line design program PLS-CADD
- Automatic generation of structure files for PLS-CADD
- Databases of steel angles, rounds, bolts, guys, etc.
- Automatic generation of joints and members by symmetries and interpolations
- Automated mast generation (quickly builds model for towers that have regular repeating sections) via graphical copy/paste
- Steel angles and rounds modeled either as truss, beam or tension-only elements
- Guys are easily handled (can be modeled as exact cable elements)

Analysis Features:

- Automatic handling of tension-only members
- Automatic distribution of loads in 2-part suspension insulators (v-strings, horizontal vees, etc.)
- Automatic calculation of tower dead, ice, and wind loads as well as 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
- Minimization of problems caused by unstable joints and mechanisms
- Automatic bandwidth minimization and ability to solve large problems
- Design checks according to (other standards can be added easily):
  - ASCE Standard 10-90

- AS 3995 (Australian Standard 3995)
- BS 8100 (British Standard 8100)
- EN50341-1 (CENELEC, both empirical and analytical methods are available)
- ECCS 1985
- NGT-ECCS
- PN-90/B-03200
- EIA/TIA 222-F
- ANSI/TIA 222-G
- CSA S37-01
- EDF/RTE Resal
- IS 802 (India Standard 802)

Results Features:

- Design summaries printed for each group of members
- 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
- Capability to batch run multiple tower configurations and consolidate the results
- Automated optimum angle member size selection and bolt quantity determination

Tool for interactive angle member sizing and bolt quantity determination.

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
Eversource Design Criteria

		Attachment A NU Design Criteria	Basic Wind Speed	Pressure	Height factor	Gust Factor	Load or Stress Factor	Force Coef. - Shape Factor
			V (MPH)	Q (PSF)	Kz	Gh		
Ice Condition	TIA/EIA	Antenna Mount	TIA	TIA (0.75Wi)	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
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/EIA	Antenna Mount	85	TIA	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
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						

mount as specified below, and shall include the wireless communication mast and antenna loads per NESC criteria)

The strength reduction factor obtained from the field investigation shall be applied to the members or connections that are showing signs of deterioration from their original condition

With the written approval of Eversource Transmission Line Engineering on a case by case the existing structures may be analyzed initially using the current NESC code, then it is permitted to use the original design code with the original conductor load should the existing tower fail the current NESC code.

The structure shall be analyzed using yield stress theory in accordance with Attachment A, "Eversource Design Criteria." This specifies uniform loadings (different from the TIA loadings) on each of the following components of the installed facility:

a) Wireless communication mast for its total height above ground level, including the initial and any planned future equipment (Support Platforms, Antennas, TMA's etc.) above the top of an electric transmission structure.

b) Conductors and related devices and hardware (wire loads will be provided by Eversource).

c) Electric Transmission Structure

   i) The loads from the wireless communication equipment components based on NESC and Eversource Criteria in Attachment A, and from the electric conductors shall be applied to the structure at conductor and wireless communication mast attachment points, where those loads transfer to the tower.

   ii) Shape Factor Multiplier:

NESC Structure Shape	Cd
Polyround (for polygonal steel poles)	1.3
Flat	1.6
Open Lattice	3.2
Pole with Coaxial Cable	1.6

   iii) When Coaxial Cables are mounted alongside the pole structure, the shape multiplier shall be:

Mount Type	Cable Cd	Pole Cd
Coaxial Cables on outside periphery (One layer)	1.45	1.45
Coaxial Cables mounted on stand offs	1.6	1.6

d) The uniform loadings and factors specified for the above components in Attachment A, "Eversource Design Criteria" are based upon the National Electric Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to the TIA and its loads and factors with the exceptions noted above.

   Note: The NESC does not require ice load be included in the supporting structure. (Ice on conductors and shield wire only, and Eversource will provide these loads).

e) Mast reaction loads shall be evaluated for local effects on the transmission structure members at the attachment points.

INPUT DATA

TOWER ID: 1068

Structure Height (ft) : 115

Wind Zone : Central CT (green)

Wind Speed : 110 mph

Tower Type : (●) Suspension ( ) Strain

Extreme Wind Model : PCS Addition

Shield Wire Properties:

	BACK	AHEAD
NAME =	*OPGW-012*	*OPGW-012*
DESCRIPTION =	2-Groove	2-Groove
STRANDING =	12 #8 FOCAS	12 #8 FOCAS
DIAMETER =	0.635 in	0.635 in
WEIGHT =	0.563 lb/ft	0.563 lb/ft

Conductor Properties:

	BACK	AHEAD
NAME =	*BITTERN*	*BITTERN*
	1272.000	1272.000
	45/7 ACSR	45/7 ACSR
DIAMETER =	1.345 in	1.345 in
WEIGHT =	1.432 lb/ft	1.432 lb/ft
Number of Conductors per phase	1	1

Insulator Weight = 200 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK		AHEAD	
	Shield	Conductor	Shield	Conductor
NESC HEAVY =	3,800	10,000	3,800	10,000
EXTREME WIND =	2,500	6,751	2,500	6,751
LONG. WIND =	na	na	na	na
250D COMBINED =	na	na	na	na
NESC W/O OLF =	na	na	na	na
60 DEG F NO WIND =	1,319	4,289	1,319	4,289

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	2	AHEAD:	2	**3**
WIND SPAN (ft) =	BACK:	210	AHEAD:	210	**420**
WEIGHT SPAN (ft) =	BACK:	217	AHEAD:	217	**434**

Northeast Utilities System

Job :	Spec. Number	Page	of
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		Date	

WIRE LOADING AT ATTACHMENTS

TOWER ID: 1068

Wind Span = 420 ft
Weight Span = 434 ft
Total Angle = 3 degrees

Broken Wire Span = AHEAD SPAN
Type of Insulator Attachment = SUSPENSION

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	901 lb	0 lb	826 lb	450 lb	4,369 lb	413 lb
Conductor =	1,685 lb	0 lb	2,279 lb	842 lb	11,496 lb	1,140 lb

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	828 lb	0 lb	244 lb
Conductor =	1,830 lb	0 lb	1,021 lb

3. NESC RULE 250C Longitudinal Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	244 lb
Conductor =	#VALUE!	#VALUE!	1,021 lb

4. NESC RULE 250D Extreme Ice & Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,127 lb
Conductor =	#VALUE!	#VALUE!	2,287 lb

5. NESC RULE 250B w/o OLF's

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	551 lb
Conductor =	#VALUE!	#VALUE!	1,519 lb

6. 60 Deg. F, No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	69 lb	0 lb	244 lb
Conductor =	225 lb	0 lb	1,021 lb

7. Construction

	Horizontal	Longitudinal	Vertical
Shield Wire =	104 lb	0 lb	367 lb
Conductor =	337 lb	0 lb	1,532 lb

NOTE: All loads include required overload factors (OLF's).

Northeast Utilities System

Job :	Spec. Number	Page	of
Description:	Computed by	Sheet	of
	Checked by	Date	5/26/09
		Date	

INPUT DATA

TOWER ID: 1068

Structure Height (ft) : 115

Wind Zone : Central CT (green)

Wind Speed : 110 mph

Tower Type : ◉ Suspension ○ Strain

Extreme Wind Model : PCS Addition

Shield Wire Properties:

	BACK	AHEAD
NAME =	*OPGW-012*	*OPGW-012*
DESCRIPTION =	2-Groove	2-Groove
STRANDING =	12 #8 FOCAS	12 #8 FOCAS
DIAMETER =	0.635 in	0.635 in
WEIGHT =	0.563 lb/ft	0.563 lb/ft

Conductor Properties:

		BACK	AHEAD		
	NAME =	*LINNET*	*LINNET*		
Number of Conductors per phase	1	336	336	1	Number of Conductors per phase
		26/7 ACSR	26/7 ACSR		
	DIAMETER =	0.720 in	0.720 in		
	WEIGHT =	0.462 lb/ft	0.462 lb/ft		

Insulator Weight = 200 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK		AHEAD	
	Shield	Conductor	Shield	Conductor
NESC HEAVY =	3,800	5,000	3,800	5,000
EXTREME WIND =	2,500	3,464	2,500	3,464
LONG. WIND =	na	na	na	na
250D COMBINED =	na	na	na	na
NESC W/O OLF =	na	na	na	na
60 DEG F NO WIND =	1,319	1,943	1,319	1,943

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	2	AHEAD:	2	**3**
WIND SPAN (ft) =	BACK:	210	AHEAD:	210	**420**
WEIGHT SPAN (ft) =	BACK:	217	AHEAD:	217	**434**

Northeast Utilities System

Job :				Page	of
Description:		Spec. Number		Sheet	of
		Computed by		Date	5/26/09
		Checked by		Date	

WIRE LOADING AT ATTACHMENTS

TOWER ID: 1068

Wind Span =	420 ft
Weight Span =	434 ft
Total Angle =	3 degrees

Broken Wire Span =	AHEAD SPAN
Type of Insulator Attachment =	SUSPENSION

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	901 lb	0 lb	826 lb	450 lb	4,369 lb	413 lb
Conductor =	1,034 lb	0 lb	1,395 lb	517 lb	5,748 lb	697 lb

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	828 lb	0 lb	244 lb
Conductor =	972 lb	0 lb	601 lb

3. NESC RULE 250C Longitudinal Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	244 lb
Conductor =	#VALUE!	#VALUE!	601 lb

4. NESC RULE 250D Extreme Ice & Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,127 lb
Conductor =	#VALUE!	#VALUE!	1,529 lb

5. NESC RULE 250B w/o OLF's

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	551 lb
Conductor =	#VALUE!	#VALUE!	930 lb

6. 60 Deg. F, No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	69 lb	0 lb	244 lb
Conductor =	102 lb	0 lb	601 lb

7. Construction

	Horizontal	Longitudinal	Vertical
Shield Wire =	104 lb	0 lb	367 lb
Conductor =	153 lb	0 lb	901 lb

NOTE: All loads include required overload factors (OLF's).

ANTENNA MAST DESIGN

STRUCT. NO. 1068
3 MECHANIC STREET
DARIEN, CT 06820

VICINITY MAP

NORTH

PROJECT SUMMARY

SITE ADDRESS:	3 MECHANIC STREET DARIEN, CT 06820
PROJECT COORDINATES:	LAT: 41°–04'–39.25N LON: 73°–28'–03.29W ELEV:±55' AMSL
EVERSOURCE STRUCT NO:	1068
EVERSOURCE CONTACT:	JOEL SZARKOWICZ 860.728.4503
T–MOBILE SITE REF.:	CT11290C
T–MOBILE CONTACT:	DAN REID 203.592.8291
ANTENNA CL HEIGHT:	124'–0"
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD ROAD BRANFORD, CT 06405
CENTEK CONTACT:	TIMOTHY J LYNN, PE 203.433.7507

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
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REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
3	11/29/18	TJL	CAG	ISSUED FOR CONSTRUCTION – ADDED WELD TO S–3
2	11/19/18	TJL	CAG	ISSUED FOR CONSTRUCTION
1	10/31/18	TJL	CAG	ISSUED FOR CONSTRUCTION
0	10/01/18	TJL	CAG	ISSUED FOR CONSTRUCTION

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DATE:	10/1/18
SCALE:	AS SHOWN
JOB NO.	18058.58

TITLE SHEET

SHEET NO. T–1

Sheet No. 1 of 7

DESIGN BASIS

1. GOVERNING CODE: 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CT STATE SUPPLEMENT.

2. TIA-222-G, ASCE MANUAL NO. 48-11 – "DESIGN OF STEEL TRANSMISSION POLE STRUCTURES SECOND EDITION", NESC C2-2007 AND NORTHEAST UTILITIES DESIGN CRITERIA.

3. DESIGN CRITERIA

   WIND LOAD: (ANTENNA MAST)
   NOMINAL DESIGN WIND SPEED (V) = 93 MPH (2018 CSBC: APPENDIX 'N')

   WIND LOAD: (UTILITY POLE & FOUNDATION)
   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 T-MOBILE, DATED 11/1/18.

2. TOWER GEOMETRY AND STRUCTURE MEMBER SIZES WERE OBTAINED FROM THE TOWER DESIGN DRAWINGS PREPARED BY UNIVERSAL POLE BRACKET CORP.; SHOP ORDER T-6291 DATED MAY 17, 1967.

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
3	11/29/18	TJL	CAG	ISSUED FOR CONSTRUCTION – ADDED WELD TO S-3
2	11/19/18	TJL	CAG	ISSUED FOR CONSTRUCTION
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SCALE: AS SHOWN
JOB NO. 18058.58

DESIGN BASIS AND GENERAL NOTES

SHEET NO.
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Sheet No. 2 of 7

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.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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DATE: 10/1/18
SCALE: AS SHOWN
JOB NO. 18058.58

STRUCTURAL STEEL NOTES

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Sheet No. 3 of 7

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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
3	11/29/18	TJL	CAG	ISSUED FOR CONSTRUCTION – ADDED WELD TO S–3
2	11/19/18	TJL	CAG	ISSUED FOR CONSTRUCTION
1	10/31/18	TJL	CAG	ISSUED FOR CONSTRUCTION
0	10/01/18	TJL	CAG	ISSUED FOR CONSTRUCTION

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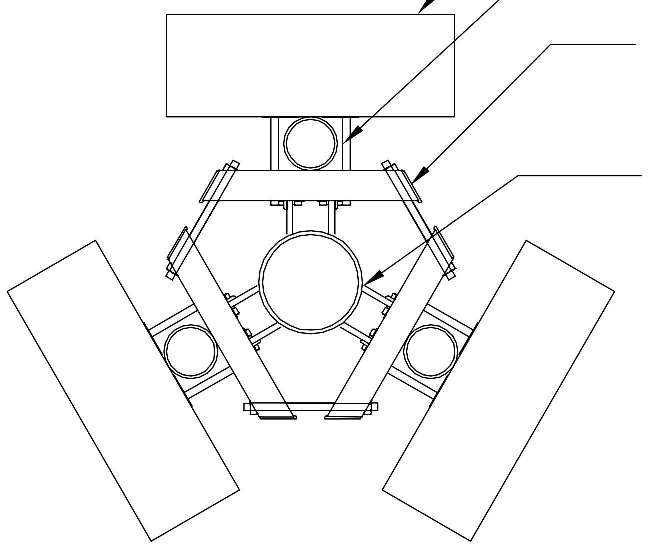
JOB NO. 18058.58

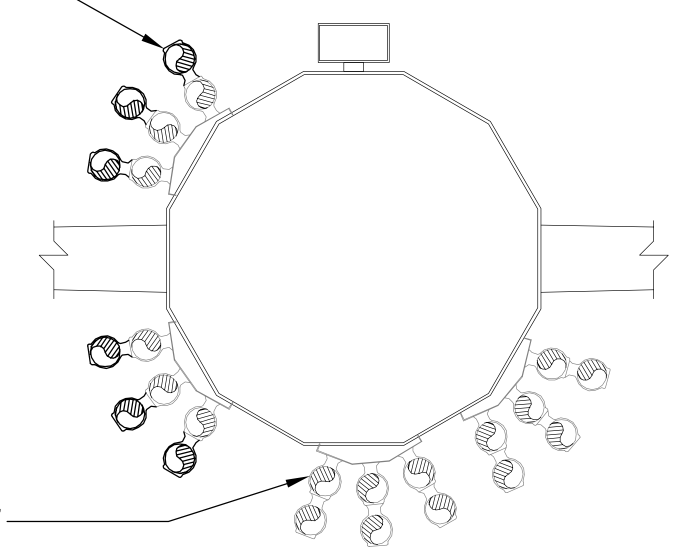
MODIFICATION INSPECTION REQUIREMENTS

SHEET NO.
MI–1
Sheet No. 4 of 7



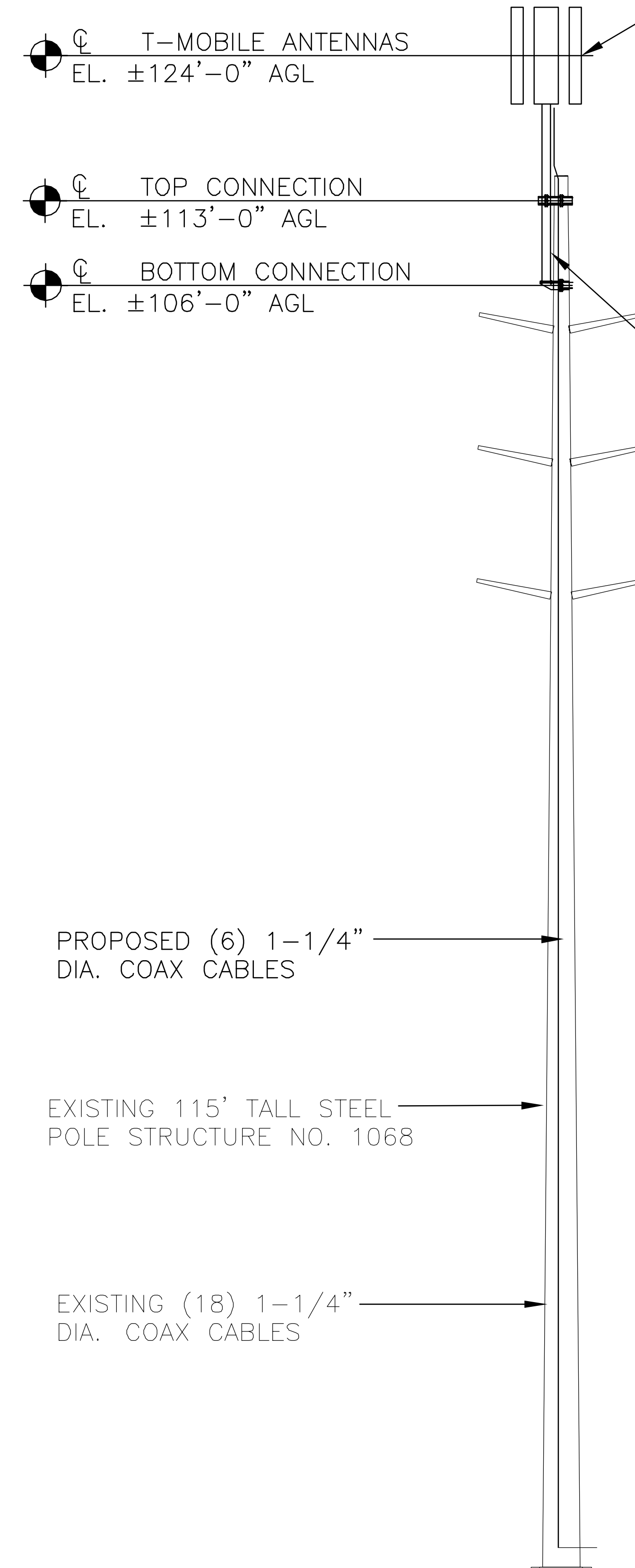
2 S-1 ANTENNA MOUNTING DETAIL

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



3 S-1 COAX CABLE PLAN

SCALE: NTS



1 EL-1 TOWER + MAST ELEVATION

SCALE: NOT TO SCALE

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3	11/29/18	TJL	CAG	ISSUED FOR CONSTRUCTION – ADDED WELD TO S-3
2	11/19/18	TJL	CAG	ISSUED FOR CONSTRUCTION
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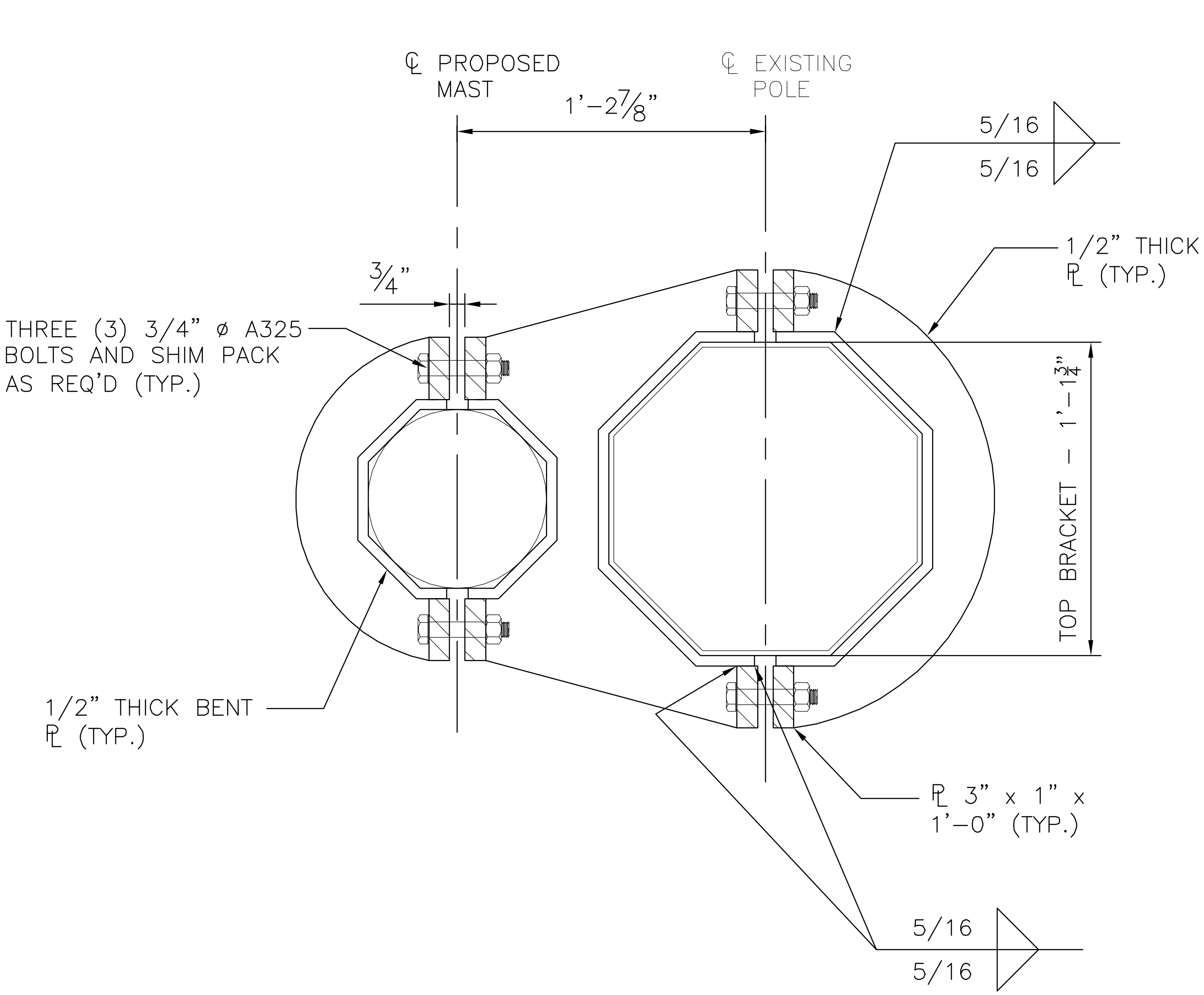
TOWER ELEVATION AND FEEDLINE PLAN

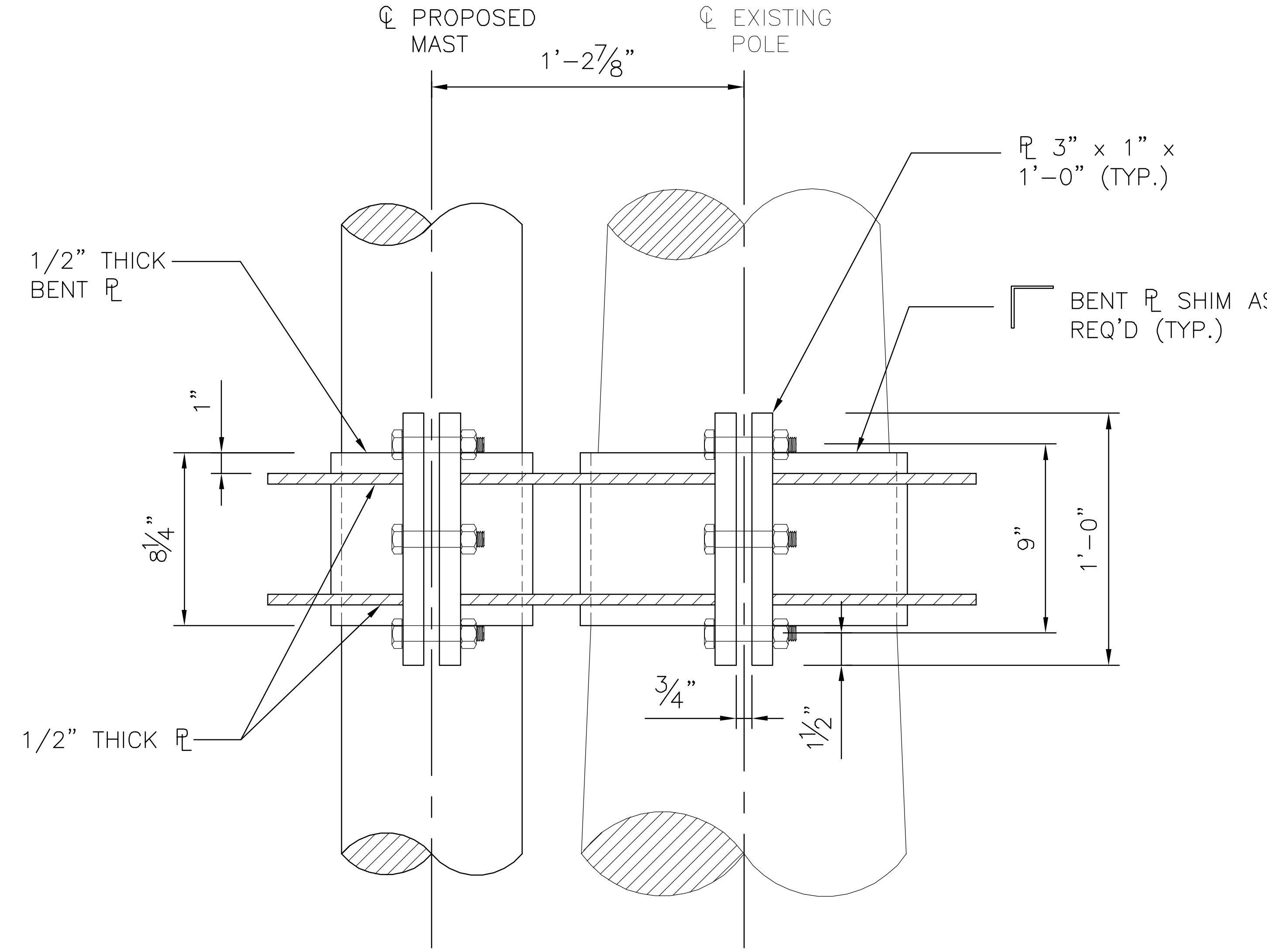
SHEET NO. S-1

Sheet No. 5 of 7



2 S-2 TOP BRACKET PLAN VIEW

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



1 S-2 TOP BRACKET DETAIL

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

NOTE:

1. POLE TAPER = 0.2099"/FT (V.I.F.)

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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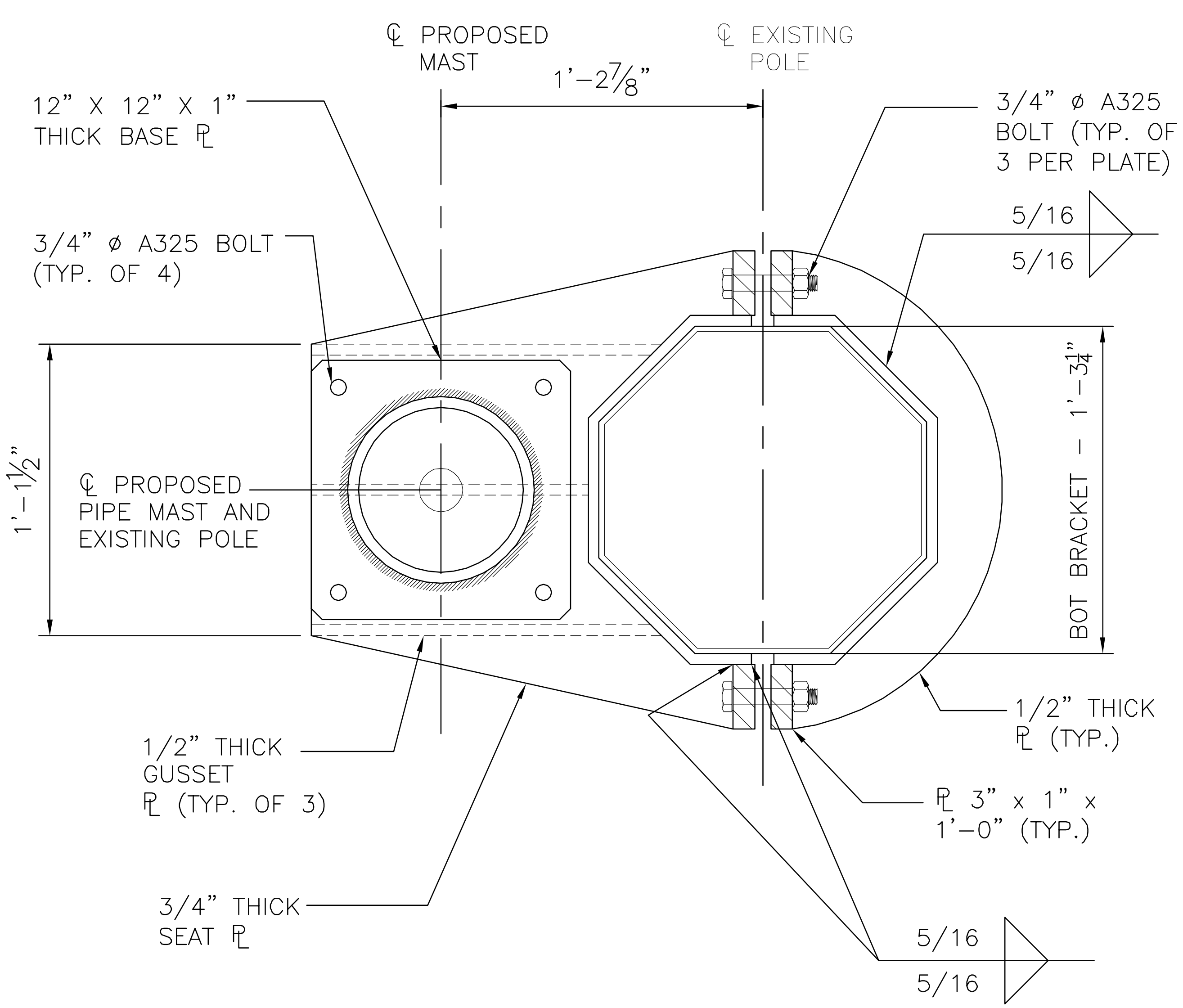
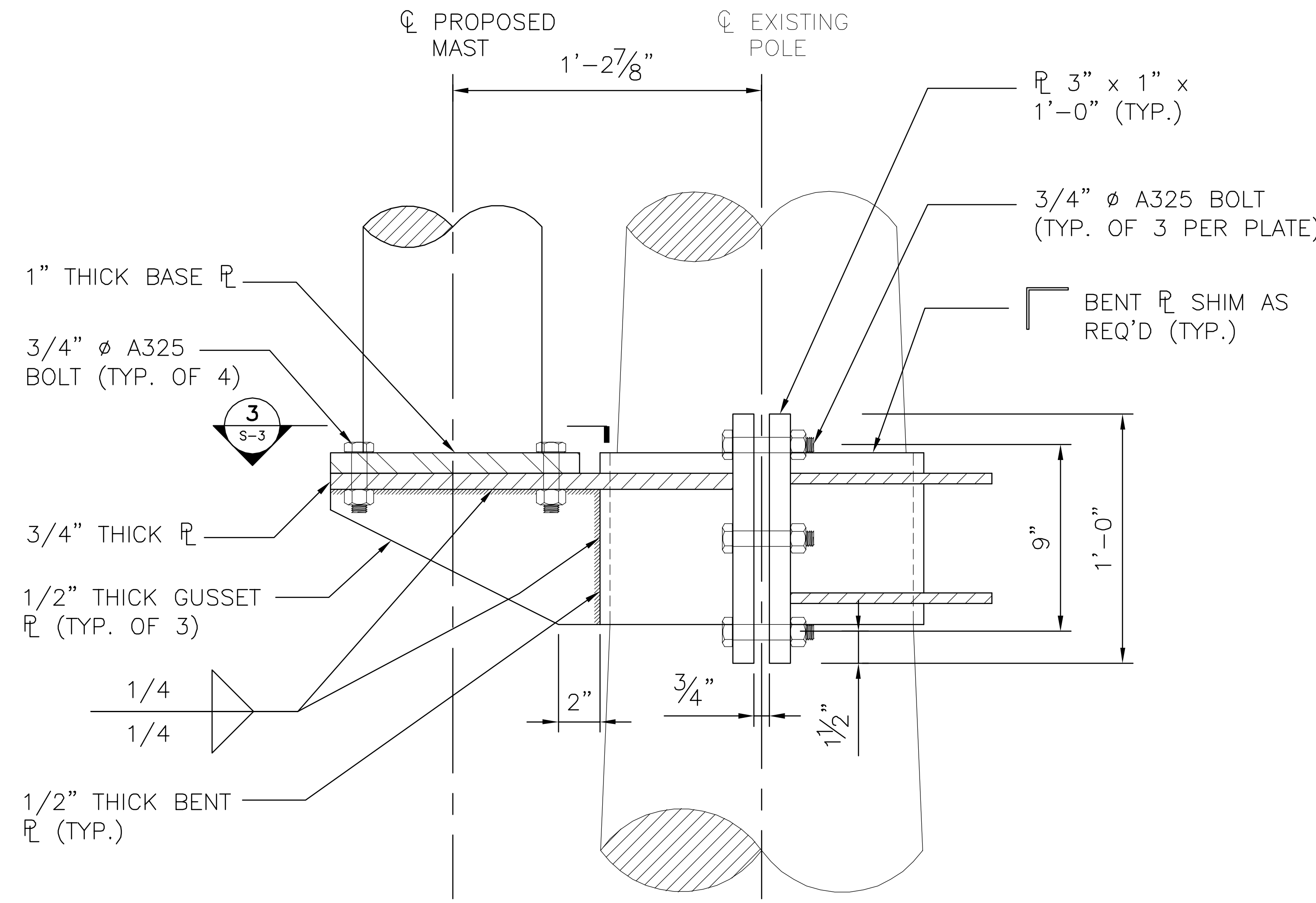
TOP CONNECTION DETAILS

SHEET NO.
S-2
Sheet No. 6 of 7



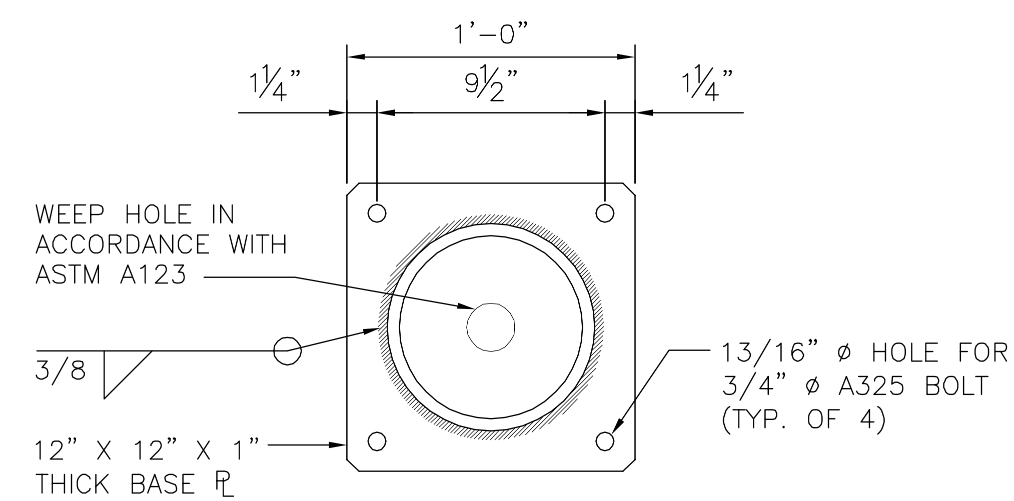
2 / S-3 BOTTOM BRACKET PLAN VIEW

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



1 / S-3 BOTTOM BRACKET DETAIL

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



3 / S-3 BOTTOM PLATE DETAIL

SCALE: 1" = 1'-0"

NOTE:

1. POLE TAPER = 0.2099"/FT (V.I.F.)

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BOTTOM CONNECTION DETAILS

SHEET NO.
S-3
Sheet No. 7 of 7

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

Wind Speeds

Basic Wind Speed $V := 93$ 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)

Input

Structure Type = Structure_Type := Pole (User Input)

Structure Category = SC := III (User Input)

Exposure Category = Exp := C (User Input)

Structure Height = $h := 115$ ft (User Input)

Height to Center of Antennas = $z_{ant} := 124$ 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)

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)

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

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

$$K_{iz} := \left(\frac{z_{ant}}{33}\right)^{0.1} = 1.142 \qquad t_{iz.ant} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.14$$

Velocity Pressure Coefficient Antennas = $Kz_{ant} := 2.01\left(\left(\frac{z_{ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.324$

Velocity Pressure w/o Ice Antennas = $qz_{ant} := 0.00256 \cdot K_d \cdot Kz_{ant} \cdot V^2 \cdot I_{Wind} = 32.033$

Velocity Pressure with Ice Antennas = $qz_{ice.ant} := 0.00256 \cdot K_d \cdot Kz_{ant} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 8.051$

Development of Wind & Ice Load on Mast

Mast Data: (8" Sch. 80 Pipe) (User Input)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 8.625$ in (User Input)

Mast Length = $L_{mast} := 22$ ft (User Input)

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

Velocity Coefficient = $C := \sqrt{I \cdot Kz_{ant}} \cdot V \cdot \frac{D_{mast}}{12} = 77$

Mast Force Coefficient = $CF_{mast} = 0.6$

Wind Load (without ice)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.719$ sf/ft

Total Mast Wind Force = $qz_{ant} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 19$ plf **BLC 5**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{iz.ant})}{12} = 1.075$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.ant} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 7$ plf **BLC 4**

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 = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + t_{iz.ant} \cdot 2)^2 - D_{mast}^{\,2}\right] = 72.4$ sq in

Weight of Ice on Mast = $W_{ICEmast2} := Id \cdot \frac{Ai_{mast}}{144} = 28$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model = RFSAPXVAARR18_43

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 72$ in (User Input)

Antenna Width = $W_{ant} := 24$ in (User Input)

Antenna Thickness = $T_{ant} := 8.5$ in (User Input)

Antenna Weight = $WT_{ant} := 132$ lbs (User Input)

Number of Antennas = $N_{ant} := 3$ (User Input)

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 3.0$

Antenna Force Coefficient = $Ca_{ant} = 1.22$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 12$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 36$ sf

Total Antenna Wind Force = $F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 1903$ lbs **BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz.ant}) \cdot (W_{ant} + 2 \cdot t_{iz.ant})}{144} = 15$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 44.9$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 597$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 396$ lbs **BLC 2**

Gravity Loads (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 =

$$V_{ice} := (L_{ant} + 2 \cdot t_{iz.ant})(W_{ant} + 2 \cdot t_{iz.ant}) \cdot (T_{ant} + 2 \cdot t_{iz.ant}) - V_{ant} = 1 \times 10^4$$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 418$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 1253$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model = Commscope ATSBT-TOP-FM-4G Bias Tee

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 5.63$ in (User Input)

Antenna Width = $W_{ant} := 3.7$ in (User Input)

Antenna Thickness = $T_{ant} := 2.0$ in (User Input)

Antenna Weight = $WT_{ant} := 2$ lbs (User Input)

Number of Antennas = $N_{ant} := 3$ (User Input)

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.5$

Antenna Force Coefficient = $Ca_{ant} = 1.2$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.1$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 0.4$ sf

Total Antenna Wind Force = $F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 23$ lbs **BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz.ant}) \cdot (W_{ant} + 2 \cdot t_{iz.ant})}{144} = 0.5$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 1.6$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 21$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 6$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 42$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{iz.ant})(W_{ant} + 2 \cdot t_{iz.ant}) \cdot (T_{ant} + 2 \cdot t_{iz.ant}) - V_{ant} = 455$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 15$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 44$ lbs **BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data:

Mount Type: Lightweight Ring Mount with Flush Adapters

Mount Shape =	Flat		(User Input)
Mount Projected Surface Area =	$CaAa := 0$	sf	(User Input)
Mount Projected Surface Area w/ Ice =	$CaAa_{ice} := 0$	sf	(User Input)
Mount Weight =	$WT_{mnt} := 305$	lbs	(User Input)
Mount Weight w/ Ice =	$WT_{mnt.ice} := 425$	lbs	

Wind Load (without ice)

Total Mount Wind Force =	$F_{mnt} := qz_{ant} \cdot G_H \cdot CaAa = 0$	lbs	**BLC 5**

Wind Load (with ice)

Total Mount Wind Force =	$Fi_{mnt} := qz_{ice.ant} \cdot G_H \cdot CaAa_{ice} = 0$	lbs	**BLC 4**

Gravity Loads (without ice)

Weight of All Mounts =	$WT_{mnt} = 305$	lbs	**BLC 2**

Gravity Loads (ice only)

Weight of Ice on All Mounts =	$WT_{mnt.ice} - WT_{mnt} = 120$	lbs	**BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type = HELIAX 1-1/4"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax} := 1.55$ in (User Input)

Coax Cable Length = $L_{coax} := 15$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 0.66$ plf (User Input)

Total Number of Coax = $N_{coax} := 24$ (User Input)

Total Number of Exterior Coax = $Ne_{coax} := 24$ (User Input)

No. of Coax Projecting Outside Face of Mast = $NP_{coax} := 4$ (User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 116.1$

Coax Cable Force Factor Coefficient = $Ca_{coax} = 1.2$

Wind Load (without ice)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.5$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{ant} \cdot G_H \cdot A_{coax} = 27$ plf **BLC 5**

Wind Load (with ice)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{iz.ant})}{12} = 0.9$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.ant} \cdot G_H \cdot AICE_{coax} = 11$ plf **BLC 4**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 16$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot t_{iz.ant})^2 - D_{coax}^{\ 2}\right] = 24.8$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 232$ 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
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

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	Existing Mast	PIPE_8.0X	Column	Wide Flange	A53 Gr. B	Typical	11.9	100	100	199

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	Existing Mast	21			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOTMA...	TOPMA...			Existing Mast	Column	Wide Flange	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTMAST	0	0	0	0	
2	TOPCONNECTION	0	7	0	0	
3	TOPMAST	0	21	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	TOPCONNECTION	Reaction		Reaction			
2	BOTMAST	Reaction	Reaction	Reaction		Reaction	

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.396	18
2	M1	Y	-.006	18
3	M1	Y	-.305	18

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-1.253	18
2	M1	Y	-.044	18
3	M1	Y	-.12	18

Member Point Loads (BLC 4 : TIA Wind with Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.597	18
2	M1	X	.021	18

Member Point Loads (BLC 5 : TIA Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	1.903	18
2	M1	X	.023	18

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.016	-.016	9	15

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.028	-.028	0	0
2	M1	Y	-.232	-.232	9	15

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.007	.007	0	15
2	M1	X	.011	.011	9	15

Member Distributed Loads (BLC 5 : TIA Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.019	.019	0	15
2	M1	X	.027	.027	9	15

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight	None		-1						
2	Weight of Appurtenances	None					3	1		
3	Weight of Ice Only	None					3	2		
4	TIA Wind with Ice	None					2	2		
5	TIA Wind	None					2	2		

Load Combinations

	Description	So...	P...	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	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W	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												

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	TOPCONNEC...	max	-1.829	3	0	3	0	3	0	3	0	3	0	3
2		min	-8.88	1	0	1	0	1	0	1	0	1	0	1
3	BOTMAST	max	5.084	1	5.381	3	0	3	0	3	0	3	0	3
4		min	1.04	3	1.488	2	0	1	0	1	0	1	0	1
5	Totals:	max	-.789	3	5.381	3	0	3						
6		min	-3.797	1	1.488	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	BOTMAST	max	0	3	0	3	0	3	0	3	0	3	2.531e-03	1
2		min	0	1	0	1	0	1	0	1	0	1	5.183e-04	3
3	TOPCONNECT...	max	0	3	0	2	0	3	0	3	0	3	-1.088e-03	3
4		min	0	1	-.002	3	0	1	0	1	0	1	-5.308e-03	1
5	TOPMAST	max	2.397	1	0	2	0	3	0	3	0	3	-3.546e-03	3
6		min	.49	3	-.003	3	0	1	0	1	0	1	-1.734e-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*M...	phi*M...	...	Eqn
1	M1	PIPE_8.0X	.450	7	1	.047	7		1	254.613	374.85	81.375	81.375	1..	H1-1b

Joint Reactions

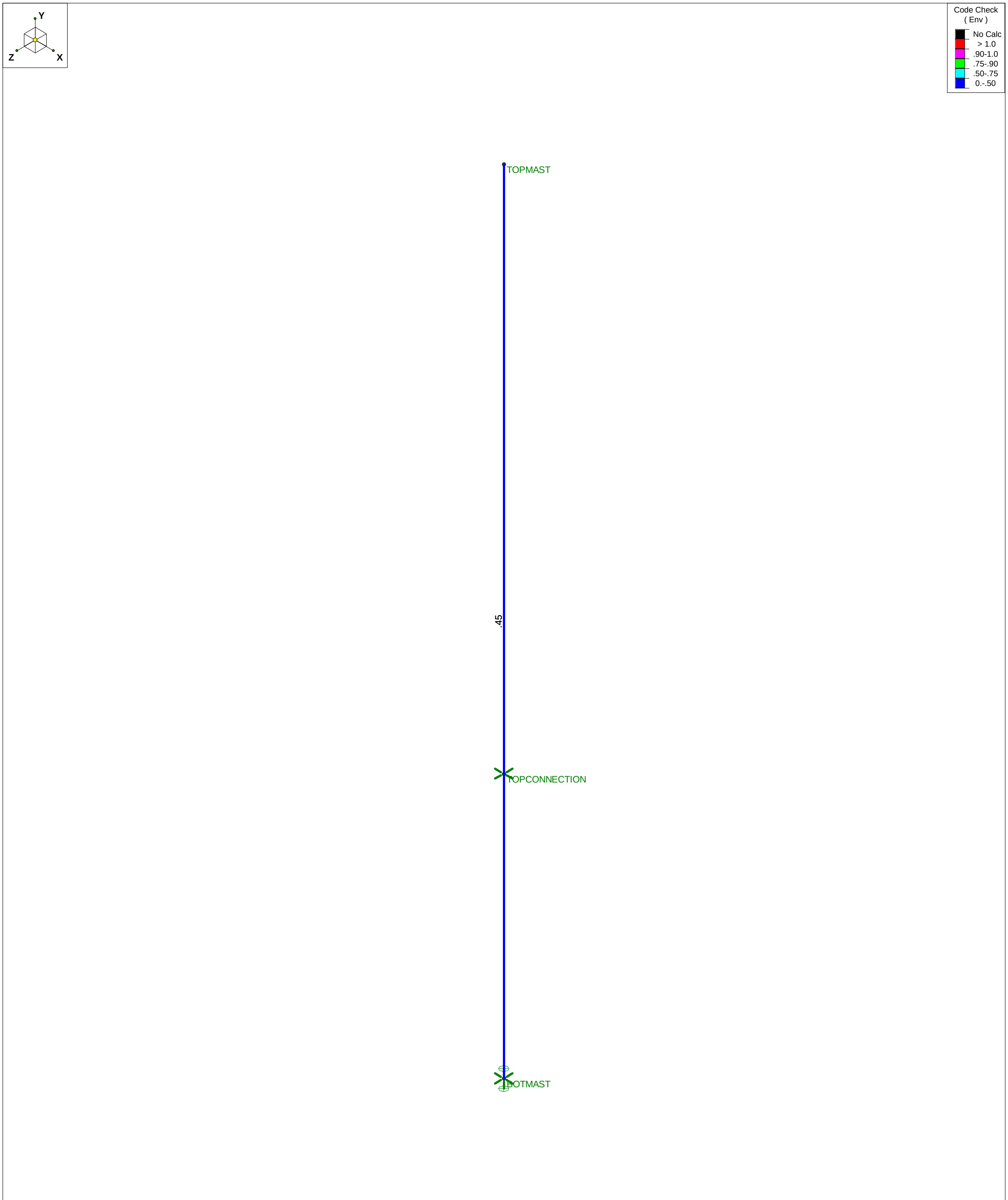
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	TOPCONNECTION	-8.88	0	0	0	0	0
2	1	BOTMAST	5.084	1.984	0	0	0	0
3	1	Totals:	-3.797	1.984	0			
4	1	COG (ft):	X: 0	Y: 13.794	Z: 0			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	TOPCONNECTION	-8.875	0	0	0	0	0
2	2	BOTMAST	5.078	1.488	0	0	0	0
3	2	Totals:	-3.797	1.488	0			
4	2	COG (ft):	X: 0	Y: 13.794	Z: 0			

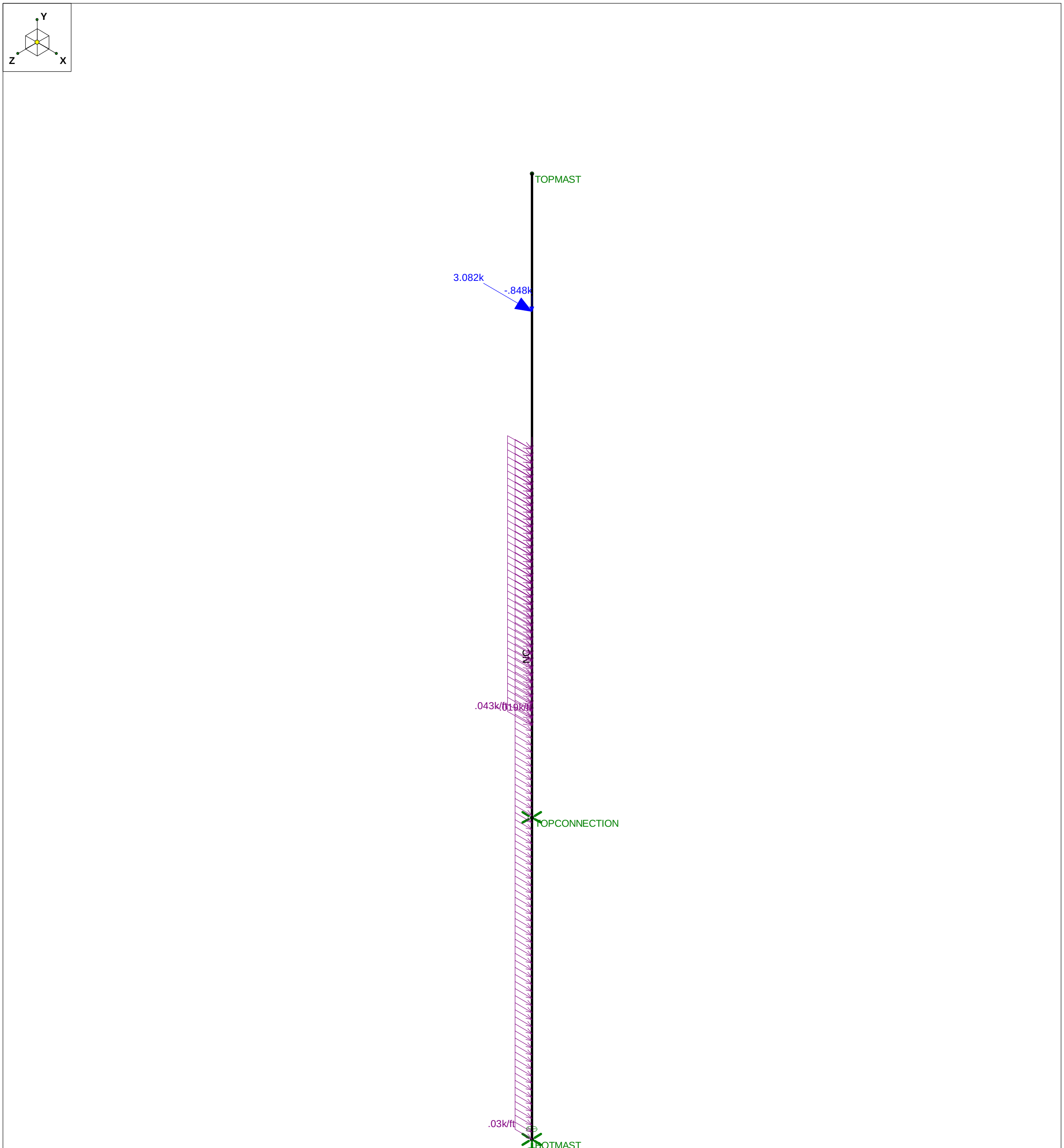
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	TOPCONNECTION	-1.829	0	0	0	0	0
2	3	BOTMAST	1.04	5.381	0	0	0	0
3	3	Totals:	-.789	5.381	0			
4	3	COG (ft):	X: 0	Y: 14.078	Z: 0			



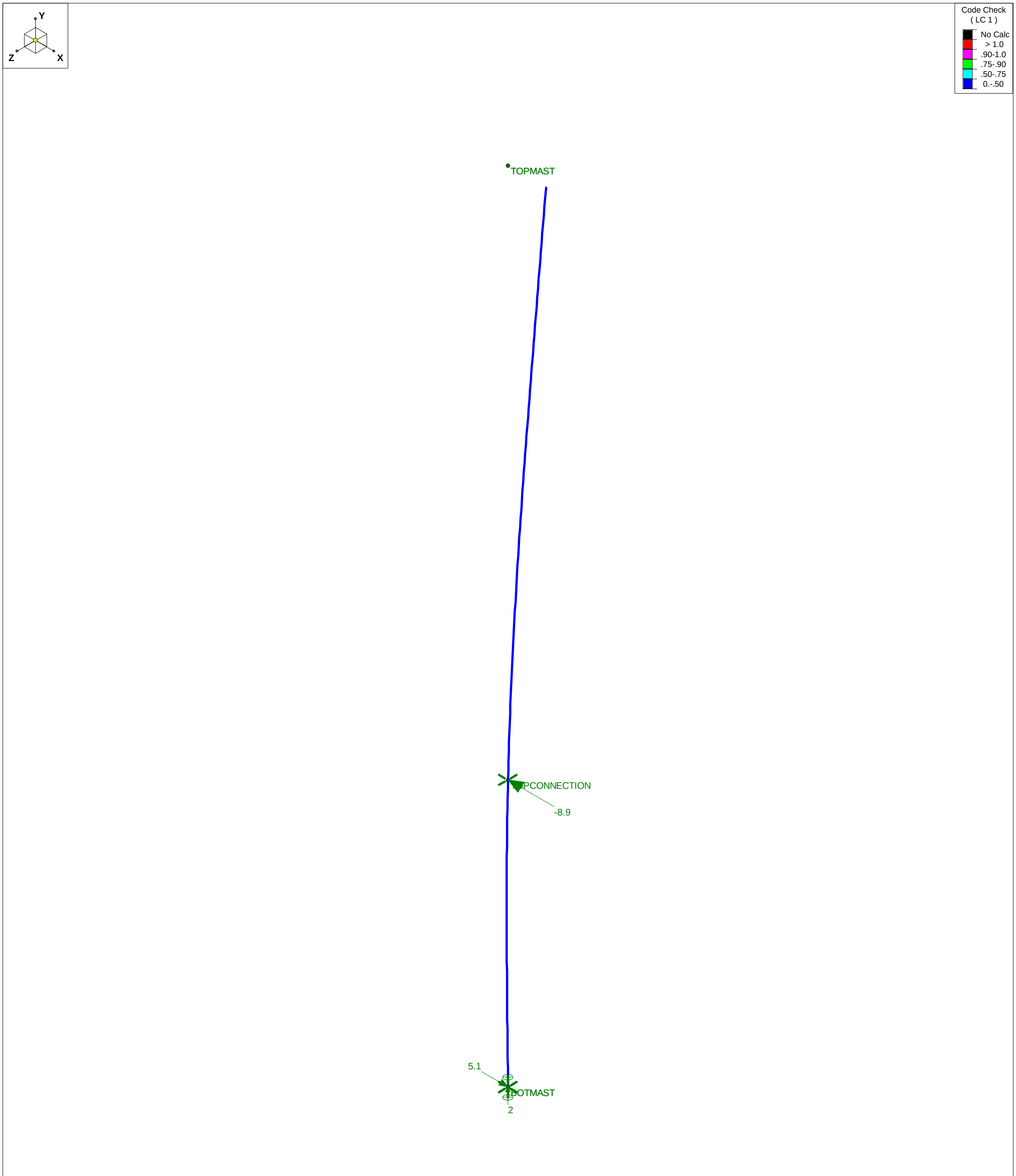
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

CENTEK		
TJL	Strcuture #1068 - Mast	Oct 31, 2018 at 3:40 PM
18058.58 /T-Mobile CT112...	Unity Check	TIA.r3d



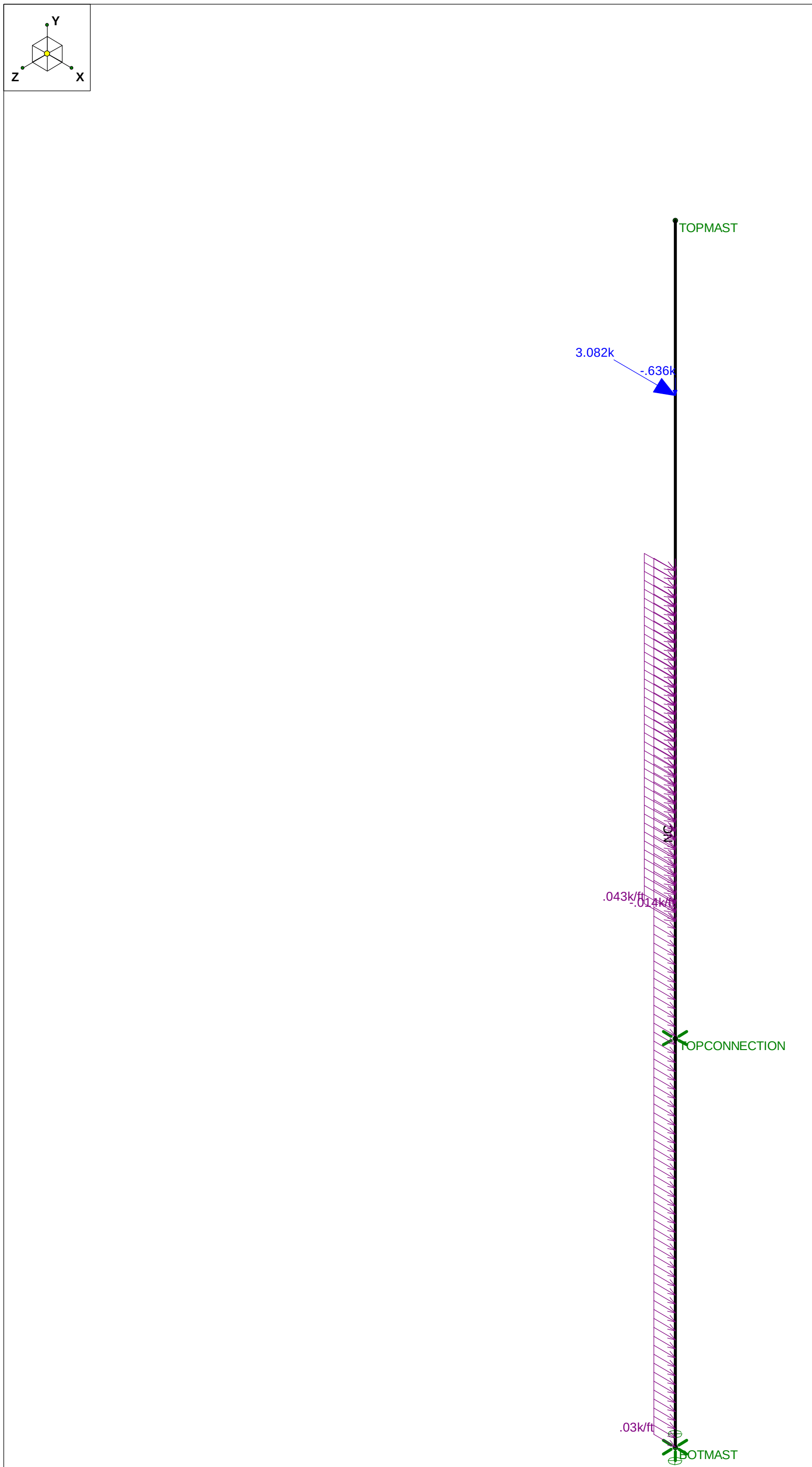
Member Code Checks Displayed
Loads: LC 1, 1.2D + 1.6W

CENTEK	Strcuture #1068 - Mast	
TJL		Oct 31, 2018 at 3:40 PM
18058.58 /T-Mobile CT112...	LC #1 Loads	TIA.r3d



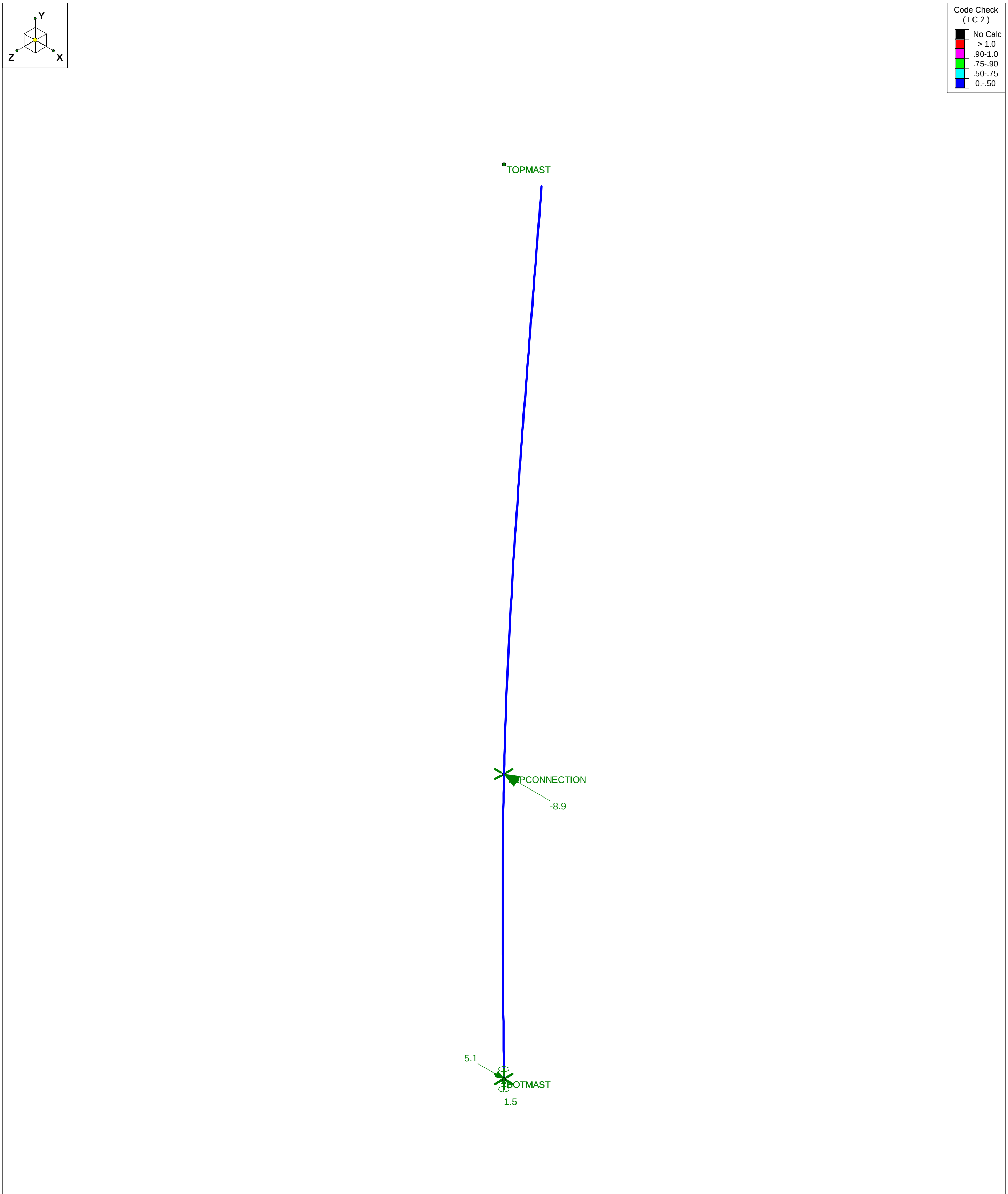
Member Code Checks Displayed
Results for LC 1, 1.2D + 1.6W
Reaction and Moment Units are k and k-ft

CENTEK		
TJL	Strcuture #1068 - Mast	Oct 31, 2018 at 3:41 PM
18058.58 /T-Mobile CT112...	LC #1 Reactions and Deflected Shape	TIA.r3d



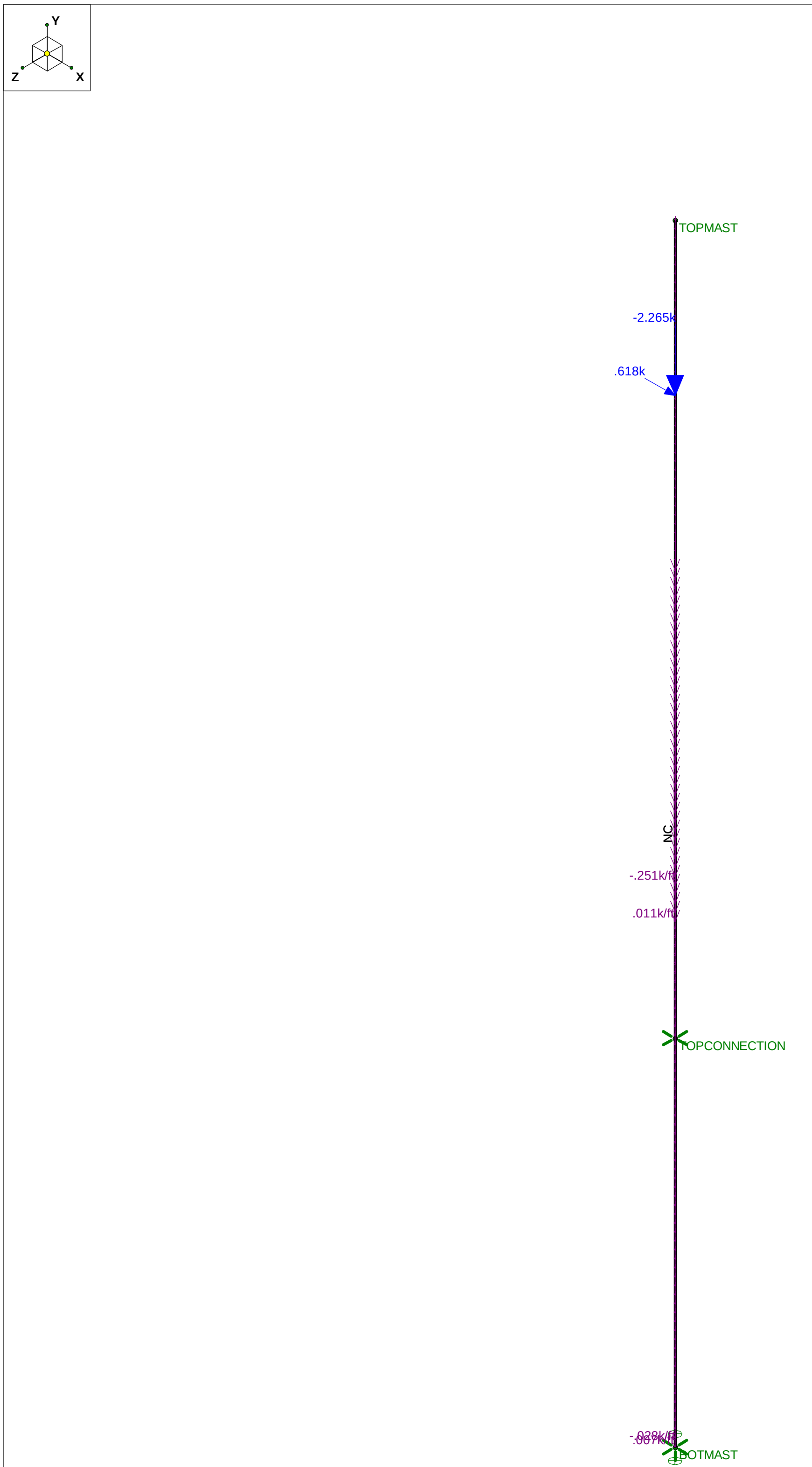
Member Code Checks Displayed
Loads: LC 2, 0.9D + 1.6W

CENTEK	Strcuture #1068 - Mast	
TJL		Oct 31, 2018 at 3:41 PM
18058.58 /T-Mobile CT112...	LC #2 Loads	TIA.r3d



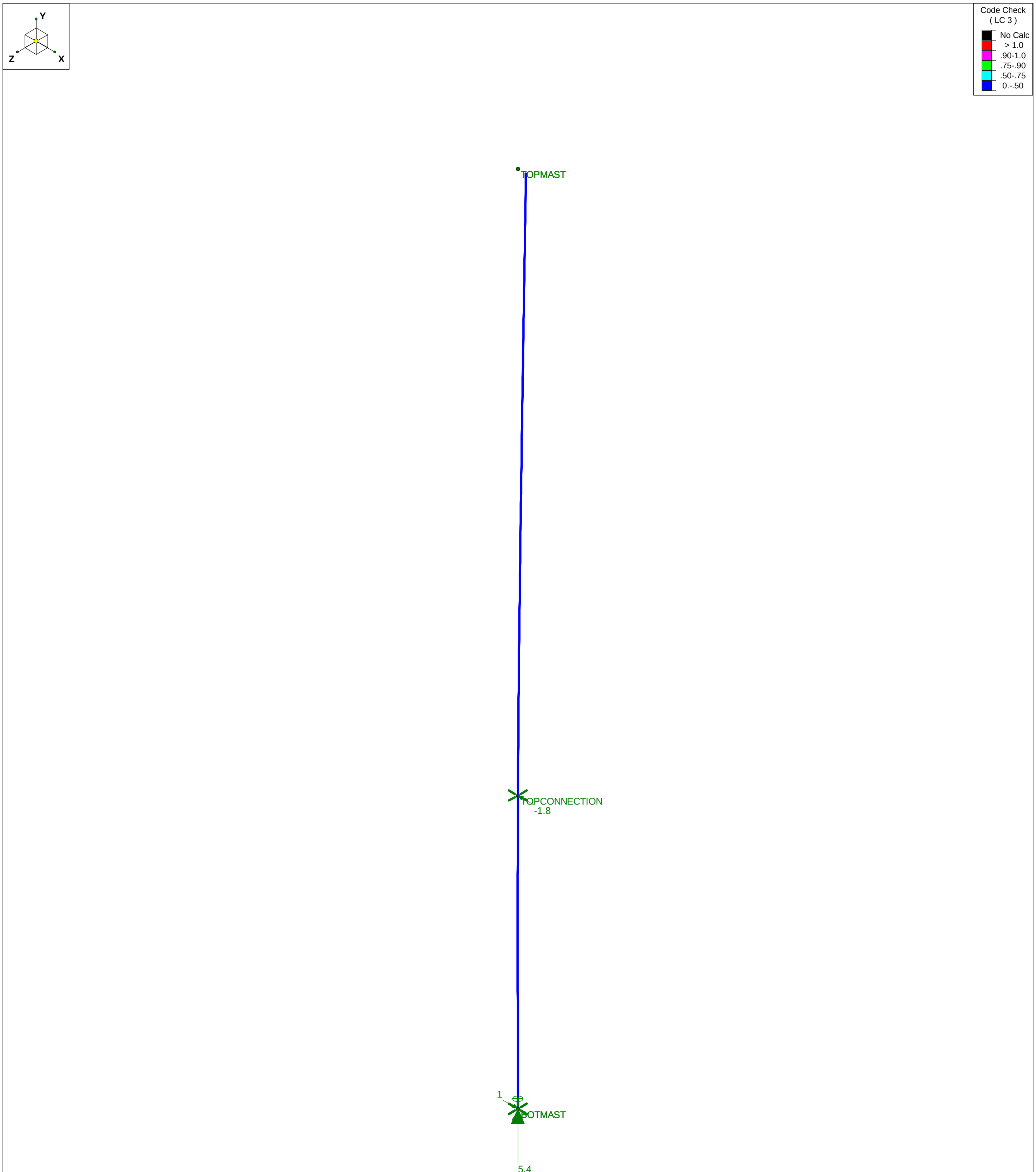
Member Code Checks Displayed
Results for LC 2, 0.9D + 1.6W
Reaction and Moment Units are k and k-ft

CENTEK		
TJL	Strcuture #1068 - Mast	Oct 31, 2018 at 3:42 PM
18058.58 /T-Mobile CT112...	LC #2 Reactions and Deflected Shape	TIA.r3d



Member Code Checks Displayed
Loads: LC 3, 1.2D +1.0Di + 1.0Wi

CENTEK	Strcuture #1068 - Mast	
TJL		Oct 31, 2018 at 3:41 PM
18058.58 /T-Mobile CT112...	LC #3 Loads	TIA.r3d



Member Code Checks Displayed
Results for LC 3, 1.2D +1.0Di + 1.0Wi
Reaction and Moment Units are k and k-ft

CENTEK		
TJL	Strcuture #1068 - Mast	Oct 31, 2018 at 3:42 PM
18058.58 /T-Mobile CT112...	LC #3 Reactions and Deflected Shape	TIA.r3d

Mast Top Connection:

Maximum Design Reactions at Brace:

Vertical =	$Vert := 0 \cdot kips$	(User Input)
Horizontal =	$Horz := 8.9 \cdot kips$	(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 =	$e := 14.875 \cdot in$	(User Input)
Vetical Spacing Between Top and Bottom Bolts =	$S_{vert} := 9 \cdot in$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 17.75 \cdot in$	(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($f_v < \phi \cdot F_{nv}$, "OK", "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 = $F_{tension.bolt} := \frac{Horz}{n_b} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 1.483 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.bolt}}{a_b} = 3.4 \cdot ksi$

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

Condition2 = "OK"

$\frac{f_t}{(\phi \cdot F'_{nt})} = 5 \cdot \%$

Wind Acting Perpendicular to Stiffiner Plate:

Shear Stress per Bolt = $f_v := \frac{\sqrt{Vert^2 + Horz^2}}{n_b \cdot a_b} = 3.358 \cdot ksi$

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

Condition3 = "OK"

$\frac{f_v}{(\phi \cdot F_{nv})} = 8.3 \cdot \%$

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 = $F_{tension.conn} := \frac{Horz \cdot e}{S_{horz} \cdot \frac{n_b}{2}} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 2.486 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.conn}}{a_b} = 5.627 \cdot ksi$

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

Condition4 = "OK"

$\frac{f_t}{(\phi \cdot F'_{nt})} = 8.3 \cdot \%$

Mast Connection to Bottom Bracket:

Design Reactions at Brace:

Axial =	$Axial := 2.0 \cdot kips$	(User Input)
Shear =	$Shear := 5.1 \cdot kips$	(User Input)
Moment =	$Moment := 0 \cdot kips \cdot ft$	(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 =	$d_b := 0.75in$	(User Input)
Bolt Spacing X Direction =	$S_x := 9.5 \cdot in$	(User Input)
Bolt Spacing Z Direction =	$S_z := 9.5 \cdot in$	(User Input)

Base Plate Data:

Base Plate Steel =	A36	(User Input)
Allowable Yield Stress =	$F_y := 36 \cdot ksi$	(User Input)
Base Plate Width =	$Pl_w := 12 \cdot in$	(User Input)
Base Plate Thickness =	$Pl_t := 1.00 \cdot in$	(User Input)
Bolt Edge Distance =	$B_E := 1.25 \cdot in$	(User Input)
Pole Diameter =	$D_p := 8.625 \cdot in$	(User Input)

Base Plate Data:

Weld Grade	E70XX	(User Input)
Weld Yield Stress =	$F_{yw} := 70 \cdot ksi$	(User Input)
Weld Size =	$sw := 0.375 \cdot in$	(User Input)

Anchor Bolt Check:

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

Bolt Spacing Diag. Direction = $S_{diag} := \sqrt{S_x^{\,2} + S_z^{\,2}} = 13.44 \cdot in$

Tension Load per Bolt Parallel = $T_{par} := \frac{Moment}{S_x \cdot n_{b.par}} - \frac{Axial}{n_b} = -0.5 \cdot kips$

Tension Load per Bolt Diagonal = $T_{diag} := \frac{Moment}{S_{diag} \cdot n_{b.diag}} - \frac{Axial}{n_b} = -0.5 \cdot kips$

Tension per bolt = $T := if\left(T_{par} > T_{diag}, T_{par}, T_{diag}\right) = -0.5 \cdot kips$

Actual Tensile Stress = $f_t := \frac{T}{a_b} = -1.13 \cdot ksi$

Condition2 := if($f_t < F_T$, "OK", "Overstressed")

Condition2 = "OK"

Base Plate Check:

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

Plate Bending Width = $Z := \left(Pl_w \cdot \sqrt{2} - D_p\right) = 8.35 \cdot in$

Moment Arm = $K := \frac{\left(S_{diag} - D_p\right)}{2} = 2.41 \cdot in$

Load per Bolt Diagonal = $P_{diag} := \frac{Moment}{S_{diag} \cdot n_{b.diag}} + \frac{Axial}{n_b} = 0.5 \cdot kips$

Moment in Base Plate = $M := K \cdot P_{diag} = 1.2 \cdot kips \cdot in$

Section Modulus = $S_Z := \frac{1}{6} \cdot Z \cdot Pl_t^{\,2} = 1.39 \cdot in^3$

Bending Stress = $f_b := \frac{M}{S_Z} = 0.86 \cdot ksi$

Condition3 := if($f_b < F_b$, "OK", "Overstressed")

Condition3 = "OK"

Base Plate to PCS Mast Weld Check:

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

Weld Area = $A_w := \frac{\pi}{4} \cdot \left[\left(D_p + 2sw \cdot 0.707 \right)^2 - D_p^{\,2} \right] = 7.4 \cdot in^2$

Weld Moment of Inertia = $I_w := \frac{\pi}{64} \cdot \left[\left(D_p + 2sw \cdot 0.707 \right)^4 - D_p^{\,4} \right] = 73.22 \cdot in^4$

$c := \frac{D_p}{2} + sw \cdot 0.707 = 4.58 \cdot in$

Section Modulus of Weld = $S_w := \frac{I_w}{c} = 15.99 \cdot in^3$

Weld Stress = $f_w := \frac{Moment}{S_w} + \frac{Shear}{A_w} = 0.69 \cdot ksi$

Condition4 := if$\left(f_w < F_w, \text{"OK"}, \text{"Overstressed"} \right)$

Condition4 = "OK"

Mast Bottom Connection:

Maximum Design Reactions at Brace:

Vertical =	$Vert := 2.0 \cdot kips$	(User Input)
Horizontal =	$Horz := 5.1 \cdot kips$	(User Input)
Moment =	$Moment := 0 \cdot ft \cdot kips$	(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 =	$e := 14.875 \cdot in$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 19.25 \cdot in$	(User Input)
Vetical Spacing Between Top and Bottom Bolts =	$S_{vert} := 9 \cdot in$	(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 Stiffener Plate:

Shear Stress per Bolt = $f_v := \frac{Vert}{n_b \cdot a_b} = 0.755 \cdot ksi$

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

$Condition1 = "OK"$

$\frac{f_v}{(\phi \cdot F_{nv})} = 1.9 \cdot \%$

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

Tension Force Each Bolt = $F_{tension.bolt} := \frac{Horz}{n_b} + \frac{(Vert \cdot e + Moment)}{2 \cdot S_{vert}} = 2.503 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.bolt}}{a_b} = 5.7 \cdot ksi$

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

$Condition2 = "OK"$

$\frac{f_t}{(\phi \cdot F'_{nt})} = 8.4 \cdot \%$

Wind Acting Perpendicular to Stiffener Plate:

Shear Stress per Bolt = $f_v := \sqrt{\left(\frac{Vert}{n_b \cdot a_b} + \frac{Moment \cdot 2}{S_{horz} \cdot n_b \cdot a_b}\right)^2 + \left(\frac{Horz}{n_b \cdot a_b}\right)^2} = 2.067 \cdot ksi$

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

$Condition3 = "OK"$

$\frac{f_v}{(\phi \cdot F_{nv})} = 5.1 \cdot \%$

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

Tension Force per Bolt = $F_{tension.conn} := \frac{Horz \cdot e}{S_{horz} \cdot \frac{n_b}{2}} + \frac{Vert \cdot e}{2 \cdot S_{vert}} = 2.966 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.conn}}{a_b} = 6.715 \cdot ksi$

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

$Condition4 = "OK"$

$\frac{f_t}{(\phi \cdot F'_{nt})} = 9.9 \cdot \%$

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 Mast Above Grade = $TME := 127$ 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 = $$Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.331$$ (NESC 2007 Table 250-2)

Exposure Factor = $$Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.302$$ (NESC 2007 Table 250-3)

Response Term = $$Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.822$$ (NESC 2007 Table 250-3)

Gust Response Factor = $$Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.851$$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 35.1$ psf (NESC 2007 Section 250.C.2)

Shape Factors

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 Loading =	**2.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

Overload Factors for Vertical Loads:

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

Development of Wind & Ice Load on PCS Mast

Mast Data: (Pipe 8" Sch. 80)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 8.625$ in (User Input)

Mast Length = $L_{mast} := 22$ ft (User Input)

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

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.719$ sf/ft

Total Mast Wind Force (Above NU Structure) = $qz \cdot Cd_{coax} \cdot A_{mast} \cdot m = 50$ Coax on Mast Above Tower plf **BLC 5**

Total Mast Wind Force (Below NU Structure) = $qz \cdot Cd_R \cdot A_{mast} = 33$ plf **BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 0.802$ sf/ft

Total Mast Wind Force w/ Ice = $p \cdot Cd_{coax} \cdot AICE_{mast} = 5$ plf **BLC 4**

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 = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^{\ 2}\right] = 14.3$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 6$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

Proposed Antenna Data:

Antenna Model =	RFSAPXVAARR18_43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 72$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.5$	in	(User Input)
Antenna Weight =	$WT_{ant} := 132$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 12$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 36$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 2525$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 12.7$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 38$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 243$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 396$ 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 = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 2650$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 86$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 258$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Proposed Antenna Data:

Antenna Model = Commscope ATSBT-TOP-FM-4G Bias Tee

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 5.63$ in (User Input)

Antenna Width = $W_{ant} := 3.7$ in (User Input)

Antenna Thickness = $T_{ant} := 2.0$ in (User Input)

Antenna Weight = $WT_{ant} := 2$ lbs (User Input)

Number of Antennas = $N_{ant} := 3$ (User Input)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.1$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 0.4$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 30$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 0.2$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 0.6$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 4$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 6$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 42$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 52$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 2$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 5$ lbs **BLC 3**

Development of Wind & Ice Load on Mount

Mount Data:

Model =	Lightweight Ring Mount with Flush Adapters		
Mount Shape =	Flat		
Mount Projected Surface Area =	$CdAa := 0$	sf	(User Input)
Mount Projected Surface Area w/ Ice =	$CdAa_{ice} := 0$	sf	(User Input)
Mount Weight =	$WT_{mnt} := 305$	lbs	(User Input)
Mount Weight w/ Ice =	$WT_{mnt.ice} := 425$	lbs	(User Input)

Gravity Loads (without ice)

Weight of All Mounts = $Wt_{mnt1} := WT_{mnt} = 305$ lbs

Gravity Load (ice only)

Weight of Ice on All Mounts = $Wt_{ice.mnt1} := \left(WT_{mnt.ice} - WT_{mnt}\right) = 120$ lbs

Wind Load (NESC Heavy)

Total Mount Wind Force w/ Ice = $Fi_{mnt1} := p \cdot CdAa_{ice} = 0$ lbs

Wind Load (NESC Extreme)

Total Mount Wind Force = $F_{mnt1} := qz \cdot CdAa \cdot m = 0$ lbs

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type = HELIAX 1-1/4"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax} := 1.55$ in (User Input)

Coax Cable Length = $L_{coax} := 15$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 0.66$ plf (User Input)

Total Number of Coax = $N_{coax} := 24$ (User Input)

No. of Coax Projecting Outside Face of PCS Mast = $NP_{coax} := 4$ (User Input)

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.5$ sf/ft

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 36$ plf **BLC 5**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot Ir)}{12} = 0.6$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 4$ plf **BLC 4**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 16$ plf **BLC 2**

Gravity Load (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^{\,2}\right] = 3.2$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 30$ 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 9th: ASD
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
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

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	Existing Mast	PIPE_8.0X	Column	Wide Flange	A53 Gr. B	Typical	11.9	100	100	199

Hot Rolled Steel Design Parameters

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
1	M1	Existing ...	21			Lbyy									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOTMA...	TOPMA...			Existing Mast	Column	Wide Flange	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTMAST	0	0	0	0	
2	TOPCONNECTION	0	7	0	0	
3	TOPMAST	0	21	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	TOPCONNECTION	Reaction		Reaction			
2	BOTMAST	Reaction	Reaction	Reaction		Reaction	

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.396	18
2	M1	Y	-.006	18
3	M1	Y	-.305	18

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.258	18
2	M1	Y	-.005	18
3	M1	Y	-.12	18

Member Point Loads (BLC 4 : NESC Heavy Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.243	18
2	M1	X	.004	18

Member Point Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	2.525	18
2	M1	X	.03	18

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.016	-.016	9	15

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.006	-.006	0	0
2	M1	Y	-.03	-.03	9	15

Member Distributed Loads (BLC 4 : NESC Heavy Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.005	.005	0	15
2	M1	X	.004	.004	9	15

Member Distributed Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.05	.05	9	15
2	M1	X	.033	.033	0	9
3	M1	X	.036	.036	9	15

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight	None		-1						
2	Weight of Appurtenances	None					3	1		
3	Weight of Ice Only	None					3	2		
4	NESC Heavy Wind	None					2	2		
5	NESC Extreme Wind	None					2	3		

Load Combinations

	Description	So..	P...	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			1	1.5	2	1.5	3	1.5	4	2.5												
2	NESC Extreme Wind	Yes			1	1	2	1	5	1														
3	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	TOPCONNEC...	max	-1.892	1	0	2	0	2	0	2	0	2	0	2
2		min	-7.645	2	0	1	0	1	0	1	0	1	0	1
3	BOTMAST	max	4.277	2	3.514	1	0	2	0	2	0	2	0	2
4		min	1.027	1	1.653	2	0	1	0	1	0	1	0	1
5	Totals:	max	-.865	1	3.514	1	0	2						
6		min	-3.368	2	1.653	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	BOTMAST	max	0	2	0	2	0	2	0	2	0	2	1.696e-03	2
2		min	0	1	0	1	0	1	0	1	0	1	4.101e-04	1
3	TOPCONNECT...	max	0	2	0	2	0	2	0	2	0	2	-8.743e-04	1
4		min	0	1	0	1	0	1	0	1	0	1	-3.602e-03	2
5	TOPMAST	max	1.614	2	0	2	0	2	0	2	0	2	-2.824e-03	1
6		min	.392	1	-.002	1	0	1	0	1	0	1	-1.164e-02	2

Envelope AISC ASD Steel Code Checks

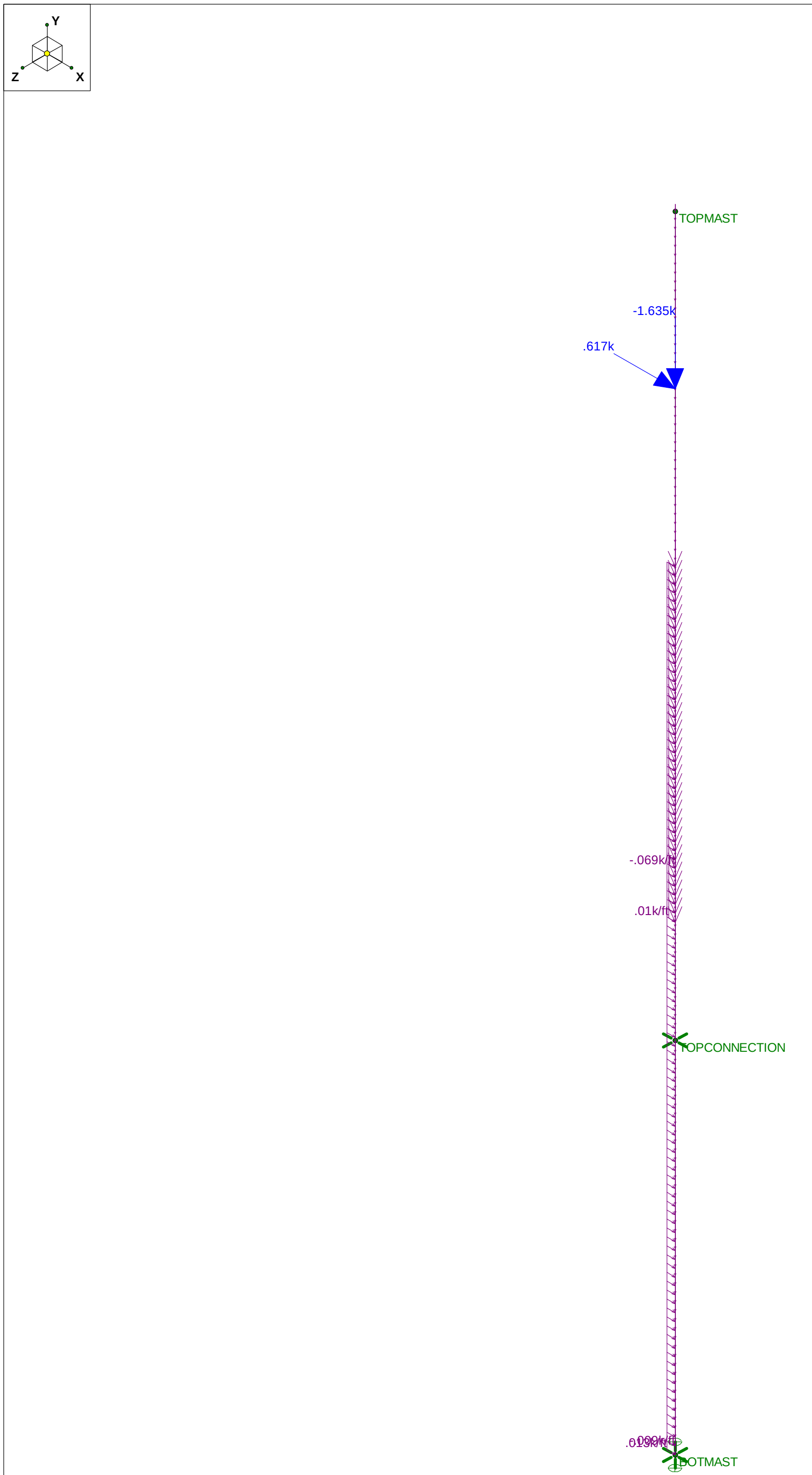
	Mem...	Shape	Code Check	Loc[ft]	LC	She...	Lo...	...	...	Fa [...	Ft [...	Fb y...	Fb z...	...	C...	C...	AS...
1	M1	PIPE_8.0X	.694	7	2	.054	7		2	14.2...	21	23.1	23.1	1	.6	.85	H1-2

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	TOPCONNECTION	-1.892	0	0	0	0	0
2	1	BOTMAST	1.027	3.514	0	0	0	0
3	1	Totals:	-.865	3.514	0			
4	1	COG (ft):	X: 0	Y: 14.167	Z: 0			

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	TOPCONNECTION	-7.645	0	0	0	0	0
2	2	BOTMAST	4.277	1.653	0	0	0	0
3	2	Totals:	-3.368	1.653	0			
4	2	COG (ft):	X: 0	Y: 13.794	Z: 0			

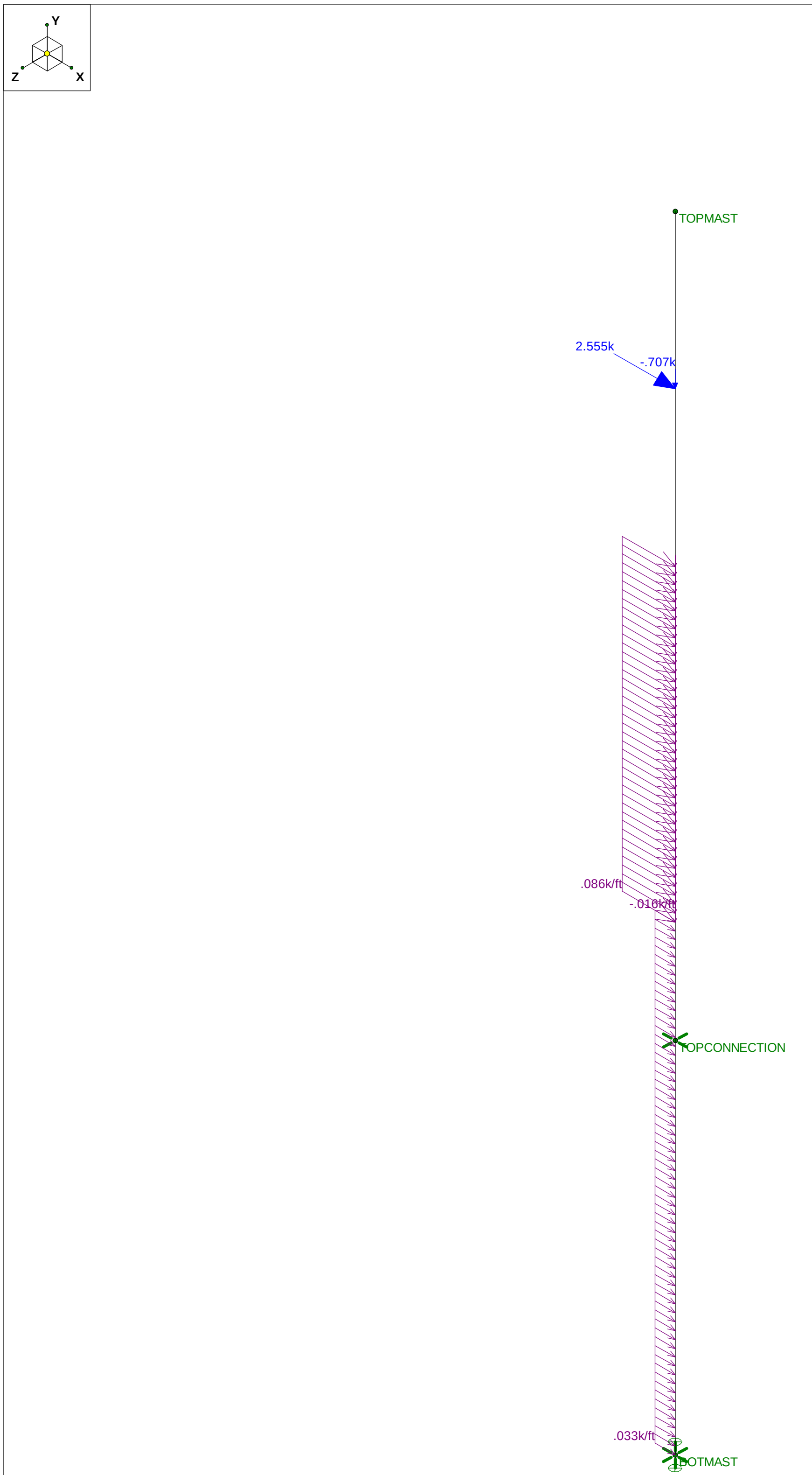


Loads: LC 1, NESC Heavy Wind

Centek	Structure # 1068 - Mast	
TJL		Dec 14, 2018 at 10:06 AM
18058.58 /T-Mobile CT112...	LC #1 Loads	NESC.r3d

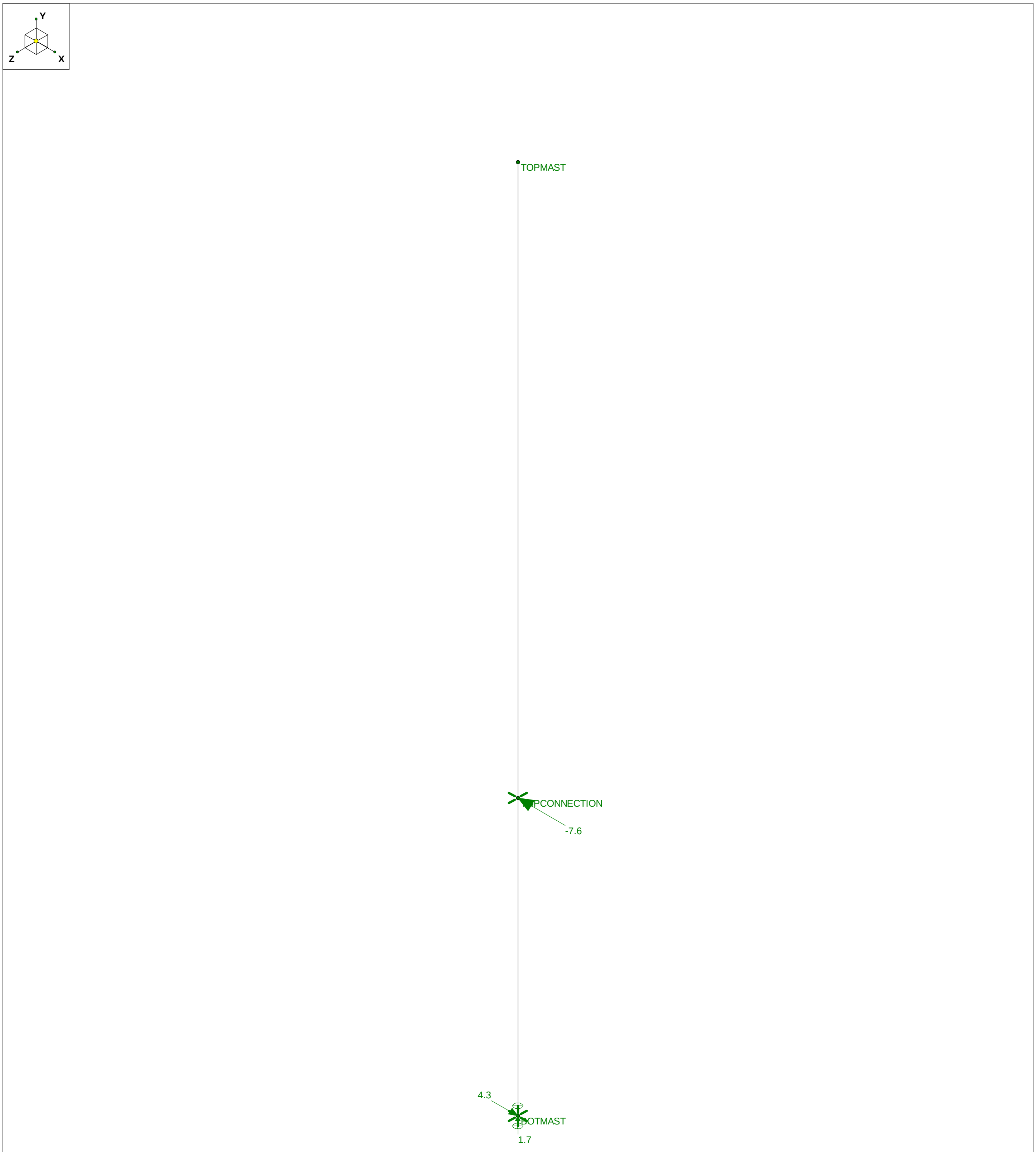
Results for LC 1, NESC Heavy Wind
Reaction and Moment Units are k and k-ft

Centek	Structure # 1068 - Mast	
TJL		Dec 14, 2018 at 10:07 AM
18058.58 /T-Mobile CT112...	LC #1 Reactions	NESC.r3d



Loads: LC 2, NESC Extreme Wind

Centek	Structure # 1068 - Mast	
TJL		Dec 14, 2018 at 10:06 AM
18058.58 /T-Mobile CT112...	LC #2 Loads	NESC.r3d



Results for LC 2, NESC Extreme Wind
Reaction and Moment Units are k and k-ft

Centek		
TJL	Structure # 1068 - Mast	Dec 14, 2018 at 10:07 AM
18058.58 /T-Mobile CT112...	LC #2 Reactions	NESC.r3d

Coax Cable on CL&P Pole

Coaxial Cable Span $Coax_{Span} := \begin{pmatrix} 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \end{pmatrix} \cdot ft$ *(User Input)*

Heavy Wind Pressure = $p := 4 \cdot psf$ *(User Input)*

Radial Ice Thickness = $Ir := 0.5 \cdot in$ *(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 = $TC := 115$ 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 = $Kz := 2.01 \cdot \left(\frac{0.67TC}{900}\right)^{\frac{2}{9.5}} = 1.198$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TC)}\right]^{\frac{1}{7}} = 0.307$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TC}{220}\right)} = 0.836$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.859$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 31.9$ psf (NESC 2007 Section 250.C.2)

Diameter of Coax Cable = $D_{coax} := 1.55 \cdot in$ *(User Input)*

Weight of Coax Cable = $W_{coax} := 0.66 \cdot plf$ *(User Input)*

Number of Coax Cables = $N_{coax} := 24$ *(User Input)*

Number of Projected Coax Cables = $NP_{coax} := 3$ *(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)*

Wind Area without Ice = $A := \left(NP_{coax} \cdot D_{coax}\right) = 4.65 \cdot in$

Wind Area with Ice = $A_{ice} := \left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir\right) = 5.65 \cdot in$

Ice Area per Liner Ft = $Ai_{coax} := \frac{\pi}{4} \cdot \left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^{\;2}\right] = 0.022\,ft^2$

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 30.055 \cdot plf$

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 =

$$Heavy\_Wind_{Trans} := \overrightarrow{\left(p \cdot A_{ice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HWT}\right)}$$

$$Heavy\_WInd_{Vert} = \begin{pmatrix} 688 \\ 688 \\ 688 \\ 688 \\ 688 \\ 688 \\ 688 \\ 688 \\ 688 \\ 688 \end{pmatrix} lb \qquad Heavy\_Wind_{Trans} = \begin{pmatrix} 75 \\ 75 \\ 75 \\ 75 \\ 75 \\ 75 \\ 75 \\ 75 \\ 75 \\ 75 \end{pmatrix} lb$$

Extreme Wind Vertical Load =

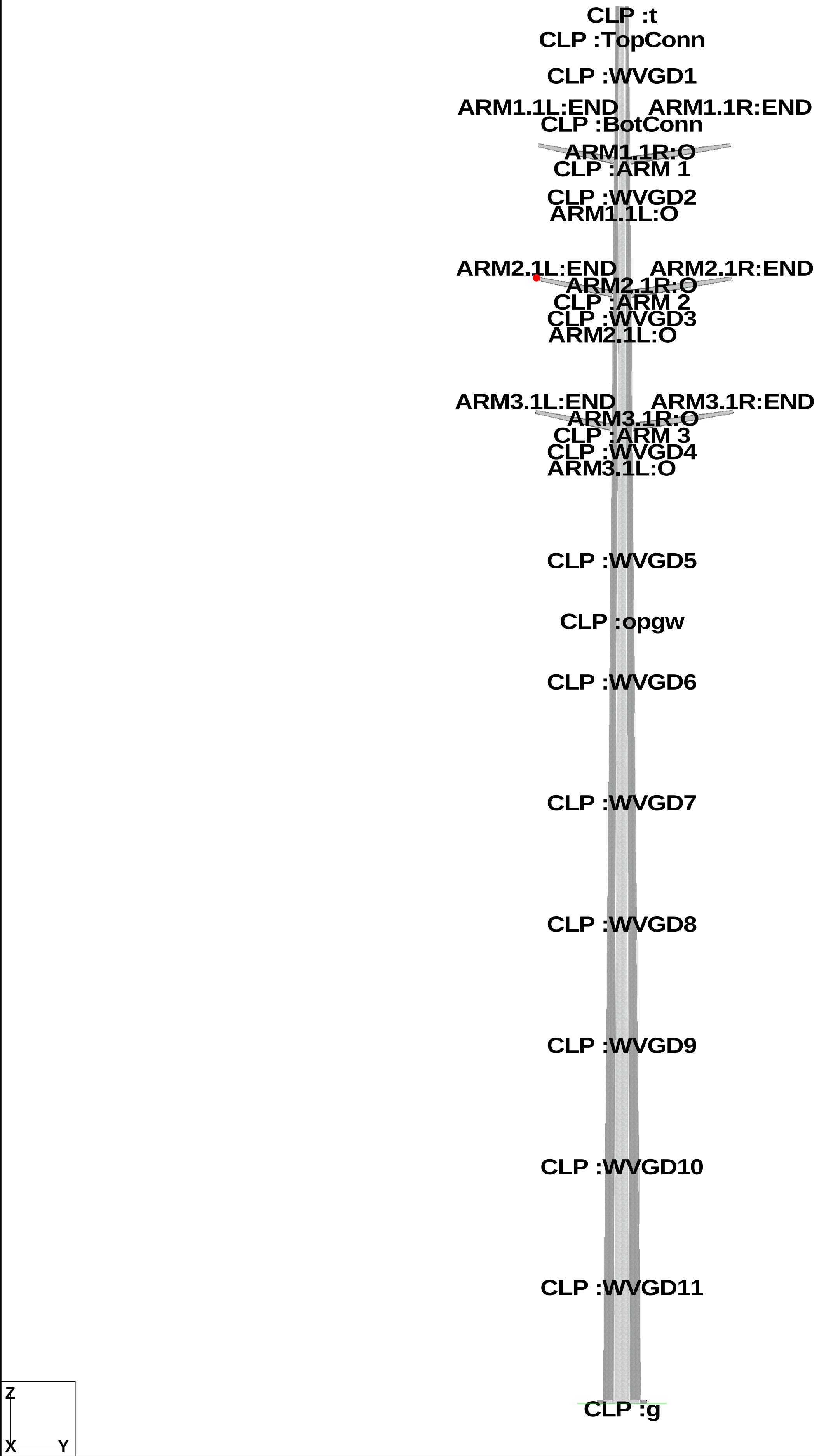
$$Extreme\_Wind_{Vert} := \overrightarrow{\left(N_{coax} \cdot W_{coax} \cdot Coax_{Span} \cdot OF_{EWV}\right)}$$

Extreme Wind Transverse Load =

$$Extreme\_Wind_{Trans} := \overrightarrow{\left[\left(qz \cdot psf \cdot A \cdot Cd_{coax}\right) \cdot Coax_{Span} \cdot OF_{EWT}\right]}$$

$$Extreme\_Wind_{Vert} = \begin{pmatrix} 158 \\ 158 \\ 158 \\ 158 \\ 158 \\ 158 \\ 158 \\ 158 \\ 158 \\ 158 \end{pmatrix} lb \qquad Extreme\_Wind_{Trans} = \begin{pmatrix} 198 \\ 198 \\ 198 \\ 198 \\ 198 \\ 198 \\ 198 \\ 198 \\ 198 \\ 198 \end{pmatrix} lb$$

Centek Engineering Inc, Project: "CLP Pole 1068"
PLS-POLE Version 12.50, 3:27:56 PM Wednesday, October 31, 2018
Undeformed geometry displayed



Project Name : 18058.58 - Darien, CT
Project Notes: Structure # 1068/ T-Mobile CT11290C
Project File : J:\Jobs\1805800.WI\58_CT11290C\05_Structural\Backup Documentation\Rev (6)\Calcs\PLS Pole\CLP Pole 1068.pol
Date run : 10:04:34 AM Friday, December 14, 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\1805800.wi\58_ct11290c\05_structural\backup documentation\rev (6)\calcs\pls pole\cl&p pole # 1068.lca

*** Analysis Results:

Maximum element usage is 97.81% for Steel Pole "CLP " in load case "EXTREME"
Maximum insulator usage is 28.79% for Clamp "C17" in load case "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	CLP :g	-0.10	-17.64	-47.37	17.64	1617.51	-5.43	1617.52	0.00	0.00
EXTREME	CLP :g	-0.03	-26.07	-24.75	26.07	2188.86	-1.35	2188.86	-0.00	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	CLP :t	0.22	89.85	-4.00	89.94	0.01	-6.81	0.00
EXTREME	CLP :t	0.05	121.03	-7.28	121.25	0.00	-9.55	0.00

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
CLP	1	1854	EXTREME	96.86	379.48
CLP	2	3496	EXTREME	97.25	1121.28
CLP	3	4553	EXTREME	89.99	1804.18
CLP	4	2253	EXTREME	97.81	2188.86

*** 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)
CLP	97.81	EXTREME	22	13365.5

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
ARM1.1R	55.24	NESC HEAVY	1	97.0
ARM1.1L	40.79	NESC HEAVY	1	67.4
ARM2.1R	55.52	NESC HEAVY	1	97.0
ARM2.1L	41.22	NESC HEAVY	1	67.4
ARM3.1R	55.96	NESC HEAVY	1	97.0
ARM3.1L	41.88	NESC HEAVY	1	67.4

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC HEAVY	78.43	CLP	Steel Pole
EXTREME	97.81	CLP	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC HEAVY	78.43	CLP	17
EXTREME	97.81	CLP	22

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	CLP	1	15.491	46.156	1617.507	-5.435	39.164	63.726	3	79.793	2.321	71.21
EXTREME	CLP	1	15.491	23.542	2188.864	-1.349	51.393	83.623	3	104.563	2.658	93.44

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC HEAVY	55.96	ARM3.1R	1
EXTREME	25.90	ARM3.1R	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
C1	Clamp	9.45	NESC HEAVY	0.0
C2	Clamp	9.45	NESC HEAVY	0.0
C3	Clamp	9.45	NESC HEAVY	0.0
C4	Clamp	9.45	NESC HEAVY	0.0

C5	Clamp	9.45	NESC HEAVY	0.0
C6	Clamp	9.45	NESC HEAVY	0.0
C7	Clamp	2.31	NESC HEAVY	0.0
C8	Clamp	2.31	NESC HEAVY	0.0
C9	Clamp	2.31	NESC HEAVY	0.0
C10	Clamp	2.31	NESC HEAVY	0.0
C11	Clamp	2.31	NESC HEAVY	0.0
C12	Clamp	2.31	NESC HEAVY	0.0
C13	Clamp	2.31	NESC HEAVY	0.0
C14	Clamp	2.31	NESC HEAVY	0.0
C15	Clamp	2.31	NESC HEAVY	0.0
C16	Clamp	2.31	NESC HEAVY	0.0
C17	Clamp	28.79	EXTREME	0.0
C18	Clamp	15.28	EXTREME	0.0
C19	Clamp	2.31	NESC HEAVY	0.0
C20	Clamp	4.07	NESC HEAVY	0.0

*** Weight of structure (lbs):

Weight of Tubular Davit Arms:	493.2
Weight of Steel Poles:	13365.5
Total:	13858.7

*** End of Report

```
***************************************************************************
*                                                                         *
*                                PLS-POLE                                 *
*                  POLE AND FRAME ANALYSIS AND DESIGN                     *
*              Copyright Power Line Systems, Inc. 1999-2011               *
*                                                                         *
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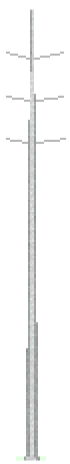
Project Name : 18058.58 - Darien, CT
Project Notes: Structure # 1068/ T-Mobile CT11290C
Project File : J:\Jobs\1805800.WI\58_CT11290C\05_Structural\Backup Documentation\Rev (6)\Calcs\PLS Pole\CLP Pole 1068.pol
Date run : 10:04:34 AM Friday, December 14, 2018
by : PLS-POLE Version 12.50
Licensed to : 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: No
  Use Alternate Convergence Process: No
  Steel poles checked with ASCE/SEI 48-11

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)
CLP 1068	1068	115.00	0	Yes	8F	13.26	37.4	0	1.6	4 tubes	0	0		Calculated	0.000	0.0000	0.0000

Steel Tubes Properties:

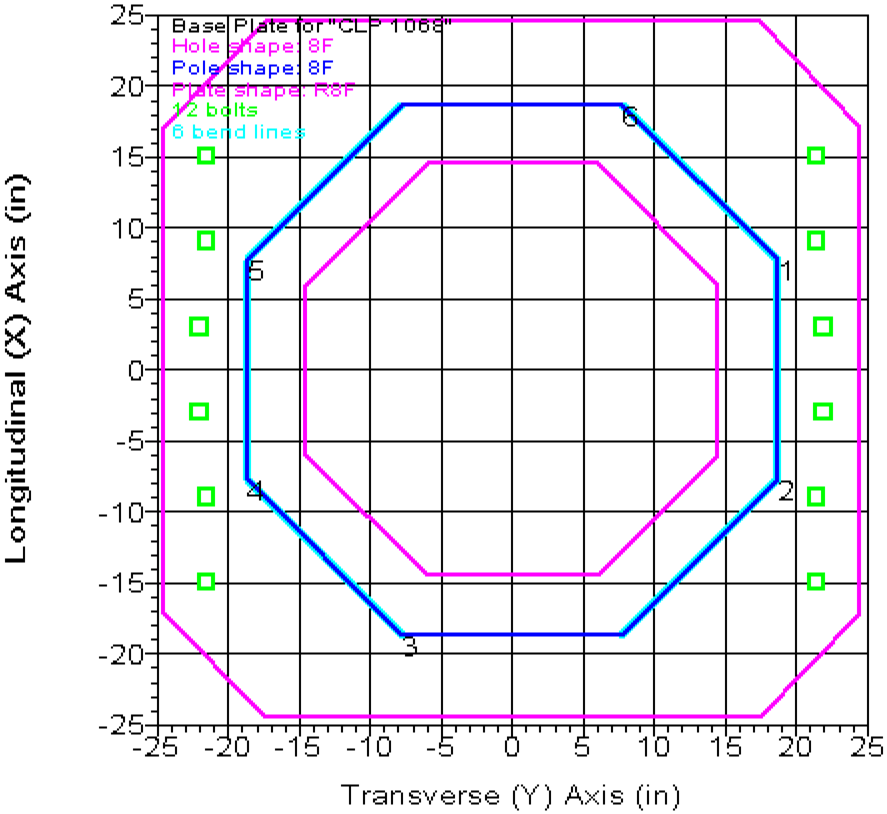
Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)	Actual Overlap (ft)
CLP 1068	1	38	0.25	2.833	0.000	0.000	50.000	0.000	1854	20.57	0.22619	13.26	21.86	2.670	2.833
CLP 1068	2	39.833	0.3125	4.000	0.000	0.000	65.000	0.000	3496	21.12	0.22619	20.72	29.73	3.638	4.000
CLP 1068	3	34	0.375	5.083	0.000	0.000	65.000	0.000	4553	17.69	0.22619	28.20	35.89	4.392	5.083
CLP 1068	4	15.083	0.375	0.000	0.000	0.000	65.000	0.000	2253	7.66	0.22619	33.99	37.40	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)
CLP 1068	49.000	R8F	2.750	1210	0.000	29.000	8F	490.00	55.000	2.250	44.000	12	22402.05	5009.80

Base Plate Bolt Coordinates for Property "CLP 1068":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0.1364	1	0
0.4091	0.9773	0
0.6818	0.9773	0



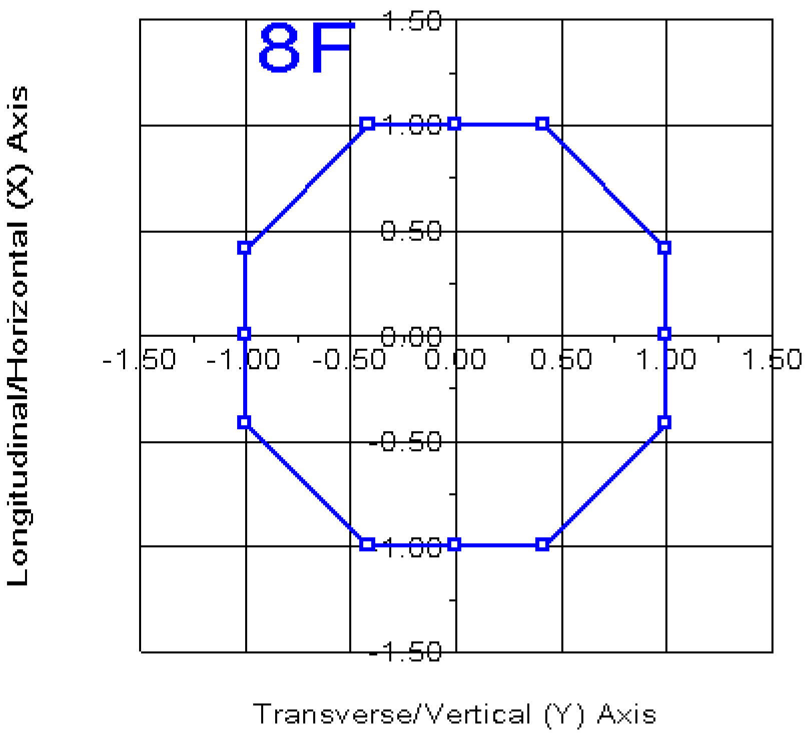
Steel Pole Connectivity:

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)
CLP			0	0	0	0	0	CLP 1068	17 labels		0.00	0

Relative Attachment Labels for Steel Pole "CLP ":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
CLP :ARM 1	12.67	0.00
CLP :ARM 2	23.67	0.00
CLP :ARM 3	34.67	0.00
CLP :WVGD1	0.00	110.00
CLP :WVGD2	0.00	100.00

CLP :WVGD3	0.00	90.00
CLP :WVGD4	0.00	80.00
CLP :WVGD5	0.00	70.00
CLP :WVGD6	0.00	60.00
CLP :WVGD7	0.00	50.00
CLP :WVGD8	0.00	40.00
CLP :WVGD9	0.00	30.00
CLP :WVGD10	0.00	20.00
CLP :WVGD11	0.00	10.00
CLP :TopConn	0.00	113.00
CLP :BotConn	0.00	106.00
CLP :opgw	0.00	65.00



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)
CLP	CLP :t	CLP :t Ori	0.00	13.26	10.78	241.33	241.33	0.00	17.8	50.00	50.00	151.63	151.63
CLP	CLP :TopConn	CLP :TopConn End	2.00	13.72	11.16	267.38	267.38	0.00	18.6	50.00	50.00	162.45	162.45
CLP	CLP :TopConn	CLP :TopConn Ori	2.00	13.72	11.16	267.38	267.38	0.00	18.6	50.00	50.00	162.45	162.45
CLP	CLP :WVGD1	CLP :WVGD1 End	5.00	14.39	11.72	309.86	309.86	0.00	19.7	50.00	50.00	179.39	179.39
CLP	CLP :WVGD1	CLP :WVGD1 Ori	5.00	14.39	11.72	309.86	309.86	0.00	19.7	50.00	50.00	179.39	179.39

CLP	CLP :BotConn	CLP :BotConn	End	9.00	15.30	12.47	373.19	373.19	0.00	21.2	50.00	50.00	203.28	203.28
CLP	CLP :BotConn	CLP :BotConn	Ori	9.00	15.30	12.47	373.19	373.19	0.00	21.2	50.00	50.00	203.28	203.28
CLP	CLP :ARM 1	CLP :ARM 1	End	12.67	16.13	13.15	438.41	438.41	0.00	22.6	50.00	50.00	226.51	226.51
CLP	CLP :ARM 1	CLP :ARM 1	Ori	12.67	16.13	13.15	438.41	438.41	0.00	22.6	50.00	50.00	226.51	226.51
CLP	CLP :WVGD2	CLP :WVGD2	End	15.00	16.66	13.59	483.52	483.52	0.00	23.5	50.00	50.00	241.92	241.92
CLP	CLP :WVGD2	CLP :WVGD2	Ori	15.00	16.66	13.59	483.52	483.52	0.00	23.5	50.00	50.00	241.92	241.92
CLP	CLP :ARM 2	CLP :ARM 2	End	23.67	18.62	15.22	678.43	678.43	0.00	26.7	50.00	50.00	303.68	303.68
CLP	CLP :ARM 2	CLP :ARM 2	Ori	23.67	18.62	15.22	678.43	678.43	0.00	26.7	50.00	50.00	303.68	303.68
CLP	CLP :WVGD3	CLP :WVGD3	End	25.00	18.92	15.46	712.31	712.31	0.00	27.2	50.00	50.00	313.78	313.78
CLP	CLP :WVGD3	CLP :WVGD3	Ori	25.00	18.92	15.46	712.31	712.31	0.00	27.2	50.00	50.00	313.78	313.78
CLP	CLP :ARM 3	CLP :ARM 3	End	34.67	21.11	17.28	993.14	993.14	0.00	30.8	50.00	50.00	392.14	392.14
CLP	CLP :ARM 3	CLP :ARM 3	Ori	34.67	21.11	17.28	993.14	993.14	0.00	30.8	50.00	50.00	392.14	392.14
CLP	CLP :WVGD4	CLP :WVGD4	End	35.00	21.18	17.34	1003.84	1003.84	0.00	30.9	50.00	50.00	394.97	394.97
CLP	CLP :WVGD4	CLP :WVGD4	Ori	35.00	21.18	17.34	1003.84	1003.84	0.00	30.9	50.00	50.00	394.97	394.97
CLP	#CLP :0	SpliceT	End	35.17	21.22	17.37	1009.29	1009.29	0.00	31.0	50.00	50.00	396.41	396.41
CLP	#CLP :0	SpliceT	Ori	35.17	21.22	17.37	1009.29	1009.29	0.00	31.0	50.00	50.00	396.41	396.41
CLP	#CLP :1	SpliceB	End	38.00	21.36	21.79	1275.90	1275.90	0.00	24.2	65.00	65.00	647.16	647.16
CLP	#CLP :1	SpliceB	Ori	38.00	21.36	21.79	1275.90	1275.90	0.00	24.2	65.00	65.00	647.16	647.16
CLP	CLP :WVGD5	CLP :WVGD5	End	45.00	22.94	23.43	1586.03	1586.03	0.00	26.3	65.00	65.00	748.94	748.94
CLP	CLP :WVGD5	CLP :WVGD5	Ori	45.00	22.94	23.43	1586.03	1586.03	0.00	26.3	65.00	65.00	748.94	748.94
CLP	CLP :opgw	CLP :opgw	End	50.00	24.07	24.60	1835.88	1835.88	0.00	27.8	65.00	65.00	826.20	826.20
CLP	CLP :opgw	CLP :opgw	Ori	50.00	24.07	24.60	1835.88	1835.88	0.00	27.8	65.00	65.00	826.20	826.20
CLP	CLP :WVGD6	CLP :WVGD6	End	55.00	25.20	25.78	2110.68	2110.68	0.00	29.3	65.00	65.00	907.24	907.24
CLP	CLP :WVGD6	CLP :WVGD6	Ori	55.00	25.20	25.78	2110.68	2110.68	0.00	29.3	65.00	65.00	907.24	907.24
CLP	CLP :WVGD7	CLP :WVGD7	End	65.00	27.47	28.12	2739.89	2739.89	0.00	32.3	65.00	64.93	1079.55	1079.55
CLP	CLP :WVGD7	CLP :WVGD7	Ori	65.00	27.47	28.12	2739.89	2739.89	0.00	32.3	65.00	64.93	1079.55	1079.55
CLP	#CLP :2	SpliceT	End	71.00	28.82	29.52	3171.56	3171.56	0.00	34.1	65.00	63.40	1162.81	1162.81
CLP	#CLP :2	SpliceT	Ori	71.00	28.82	29.52	3171.56	3171.56	0.00	34.1	65.00	63.40	1162.81	1162.81
CLP	CLP :WVGD8	CLP :WVGD8	End	75.00	29.10	35.70	3893.75	3893.75	0.00	28.0	65.00	65.00	1449.44	1449.44
CLP	CLP :WVGD8	CLP :WVGD8	Ori	75.00	29.10	35.70	3893.75	3893.75	0.00	28.0	65.00	65.00	1449.44	1449.44
CLP	CLP :WVGD9	CLP :WVGD9	End	85.00	31.36	38.51	4887.70	4887.70	0.00	30.5	65.00	65.00	1688.23	1688.23
CLP	CLP :WVGD9	CLP :WVGD9	Ori	85.00	31.36	38.51	4887.70	4887.70	0.00	30.5	65.00	65.00	1688.23	1688.23
CLP	CLP :WVGD10	CLP :WVGD10	End	95.00	33.63	41.32	6037.86	6037.86	0.00	33.0	65.00	64.30	1924.41	1924.41
CLP	CLP :WVGD10	CLP :WVGD10	Ori	95.00	33.63	41.32	6037.87	6037.87	0.00	33.0	65.00	64.30	1924.41	1924.41
CLP	#CLP :3	SpliceT	End	99.92	34.74	42.70	6664.16	6664.16	0.00	34.2	65.00	63.26	2022.70	2022.70
CLP	#CLP :3	SpliceT	Ori	99.92	34.74	42.70	6664.16	6664.16	0.00	34.2	65.00	63.26	2022.70	2022.70
CLP	CLP :WVGD11	CLP :WVGD11	End	105.00	35.14	43.20	6899.42	6899.42	0.00	34.7	65.00	62.89	2058.03	2058.03
CLP	CLP :WVGD11	CLP :WVGD11	Ori	105.00	35.14	43.20	6899.42	6899.42	0.00	34.7	65.00	62.89	2058.03	2058.03
CLP	CLP :g	CLP :g	End	115.00	37.40	46.01	8335.60	8335.60	0.00	37.2	65.00	60.77	2257.31	2257.31

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 Override (lbs/ft^3)	Steel Shape At End
D281-6S		8T	0.1875	6.875	3.5	0	1.3	29000	1 point	Calculated	0	0	0	0	50	0	
D281-8D		8T	0.1875	7.875	3.5	0	1.3	29000	1 point	Calculated	0	0	0	0	50	0	

Intermediate Joints for Davit Property "D281-6S":

Joint Label	Horz. Offset	Vert. Offset

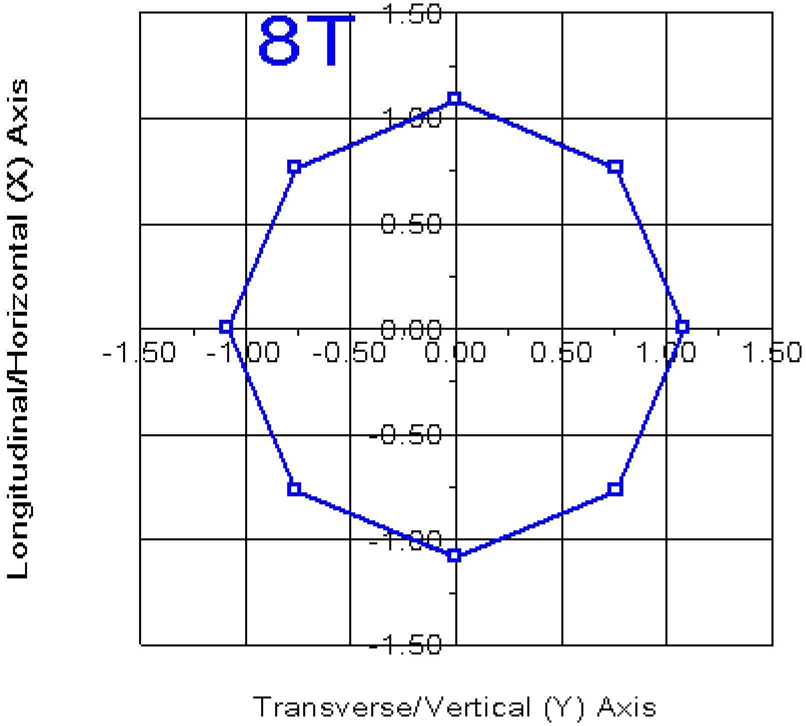
	(ft)	(ft)
END	6.25	-1.25

Intermediate Joints for Davit Property "D281-8D":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
END	8.25	-1.25

Tubular Davit Arm Connectivity:

Davit Label	Attach Label	Davit Property Set	Azimuth (deg)
ARM1.1R	CLP :ARM 1	D281-8D	0
ARM1.1L	CLP :ARM 1	D281-6S	180
ARM2.1R	CLP :ARM 2	D281-8D	0
ARM2.1L	CLP :ARM 2	D281-6S	180
ARM3.1R	CLP :ARM 3	D281-8D	0
ARM3.1L	CLP :ARM 3	D281-6S	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)
ARM1.1R	ARM1.1R:O	Origin	0.00	7.88	4.78	37.32	37.32	0.00	13.3	50.00	50.00	36.49	36.49
ARM1.1R	ARM1.1R:END	End	8.34	3.50	2.06	2.99	2.99	0.00	3.6	50.00	50.00	6.58	6.58
ARM1.1L	ARM1.1L:O	Origin	0.00	6.88	4.16	24.58	24.58	0.00	11.0	50.00	50.00	27.52	27.52
ARM1.1L	ARM1.1L:END	End	6.37	3.50	2.06	2.99	2.99	0.00	3.6	50.00	50.00	6.58	6.58
ARM2.1R	ARM2.1R:O	Origin	0.00	7.88	4.78	37.32	37.32	0.00	13.3	50.00	50.00	36.49	36.49
ARM2.1R	ARM2.1R:END	End	8.34	3.50	2.06	2.99	2.99	0.00	3.6	50.00	50.00	6.58	6.58
ARM2.1L	ARM2.1L:O	Origin	0.00	6.88	4.16	24.58	24.58	0.00	11.0	50.00	50.00	27.52	27.52
ARM2.1L	ARM2.1L:END	End	6.37	3.50	2.06	2.99	2.99	0.00	3.6	50.00	50.00	6.58	6.58
ARM3.1R	ARM3.1R:O	Origin	0.00	7.88	4.78	37.32	37.32	0.00	13.3	50.00	50.00	36.49	36.49
ARM3.1R	ARM3.1R:END	End	8.34	3.50	2.06	2.99	2.99	0.00	3.6	50.00	50.00	6.58	6.58
ARM3.1L	ARM3.1L:O	Origin	0.00	6.88	4.16	24.58	24.58	0.00	11.0	50.00	50.00	27.52	27.52
ARM3.1L	ARM3.1L:END	End	6.37	3.50	2.06	2.99	2.99	0.00	3.6	50.00	50.00	6.58	6.58

*** Insulator Data

Clamp Properties:

Label	Stock Number	Holding Capacity (lbs)
CLAMP		3e+004

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)
C1	ARM1.1R:END	CLAMP	No Limit
C2	ARM1.1L:END	CLAMP	No Limit
C3	ARM2.1R:END	CLAMP	No Limit
C4	ARM2.1L:END	CLAMP	No Limit
C5	ARM3.1R:END	CLAMP	No Limit
C6	ARM3.1L:END	CLAMP	No Limit
C7	CLP :WVGD1	CLAMP	No Limit
C8	CLP :WVGD2	CLAMP	No Limit
C9	CLP :WVGD3	CLAMP	No Limit
C10	CLP :WVGD4	CLAMP	No Limit
C11	CLP :WVGD5	CLAMP	No Limit
C12	CLP :WVGD6	CLAMP	No Limit
C13	CLP :WVGD7	CLAMP	No Limit
C14	CLP :WVGD8	CLAMP	No Limit
C15	CLP :WVGD9	CLAMP	No Limit
C16	CLP :WVGD10	CLAMP	No Limit
C17	CLP :TopConn	CLAMP	No Limit

C18	CLP :BotConn	CLAMP	No Limit
C19	CLP :WVGD11	CLAMP	No Limit
C20	CLP :opgw	CLAMP	No Limit

*** Loads Data

Loads from file: j:\jobs\1805800.wi\58_ct11290c\05_structural\backup documentation\rev (6)\calcs\pls pole\cl&p pole # 1068.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)   115.00 (ft)
  Structure height   115.00 (ft)
  Structure height above ground   115.00 (ft)

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Area Factor	SF for Steel Poles Tubular and Towers	SF for Wood Arms 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	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	21 loads	Wind on All	4	0	0.000	0.000	0.0	No Limit	0
EXTREME	1.0000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	21 loads	NESC 2012	31	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
CLP :TopConn	1395	1034	0	Linnet
ARM1.1L:END	2279	1685	0	BITTERN
ARM1.1R:END	2279	1685	0	BITTERN
ARM2.1L:END	2279	1685	0	BITTERN
ARM2.1R:END	2279	1685	0	BITTERN
ARM3.1L:END	2279	1685	0	BITTERN
ARM3.1R:END	2279	1685	0	BITTERN
CLP :opgw	826	901	0	OPGW-012
CLP :WVGD1	688	75	0	Coax Cable
CLP :WVGD2	688	75	0	Coax Cable
CLP :WVGD3	688	75	0	Coax Cable
CLP :WVGD4	688	75	0	Coax Cable
CLP :WVGD5	688	75	0	Coax Cable
CLP :WVGD6	688	75	0	Coax Cable
CLP :WVGD7	688	75	0	Coax Cable
CLP :WVGD8	688	75	0	Coax Cable

CLP :WVGD9	688	75	0	Coax Cable
CLP :WVGD10	688	75	0	Coax Cable
CLP :WVGD11	688	75	0	Coax Cable
CLP :TopConn	0	1892	0	Mast Top Connection
CLP :BotConn	3514	-1027	0	Mast Bottom Connection

Point Loads for Load Case "EXTREME":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
CLP :TopConn	601	972	0	Linnet
ARM1.1L:END	1021	1830	0	BITTERN
ARM1.1R:END	1021	1830	0	BITTERN
ARM2.1L:END	1021	1830	0	BITTERN
ARM2.1R:END	1021	1830	0	BITTERN
ARM3.1L:END	1021	1830	0	BITTERN
ARM3.1R:END	1021	1830	0	BITTERN
CLP :opgw	244	828	0	OPGW-012
CLP :WVGD1	158	198	0	Coax Cable
CLP :WVGD2	158	198	0	Coax Cable
CLP :WVGD3	158	198	0	Coax Cable
CLP :WVGD4	158	198	0	Coax Cable
CLP :WVGD5	158	198	0	Coax Cable
CLP :WVGD6	158	198	0	Coax Cable
CLP :WVGD7	158	198	0	Coax Cable
CLP :WVGD8	158	198	0	Coax Cable
CLP :WVGD9	158	198	0	Coax Cable
CLP :WVGD10	158	198	0	Coax Cable
CLP :WVGD11	158	198	0	Coax Cable
CLP :TopConn	0	7645	0	Mast Top Connection
CLP :BotConn	1653	-4277	0	Mast Bottom Connection

Detailed Pole Loading Data for Load Case "EXTREME":

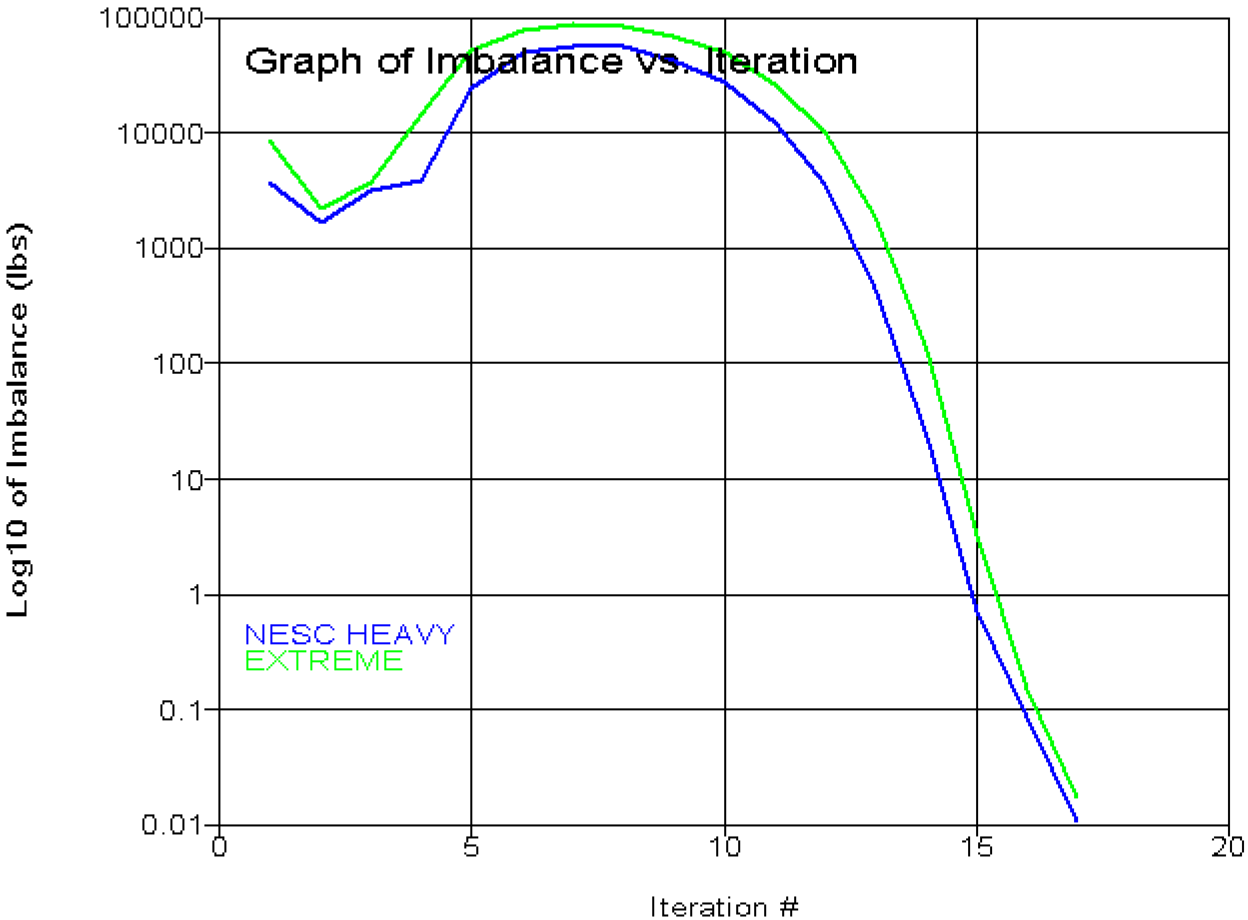
Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

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)
CLP	CLP :t	CLP :TopConn	115.00	113.00	114.00	13.489	1.14e+006	1.000	31.88	0.00	74.64	71.67	0.00	0.00	71.67	0.00
CLP	CLP :TopConn	CLP :WVGD1	113.00	110.00	111.50	14.055	1.19e+006	1.000	31.88	0.00	116.74	112.01	0.00	0.00	112.01	0.00
CLP	CLP :WVGD1	CLP :BotConn	110.00	106.00	108.00	14.846	1.25e+006	1.000	31.88	0.00	164.59	157.75	0.00	0.00	157.75	0.00
CLP	CLP :BotConn	CLP :ARM 1	106.00	102.33	104.16	15.714	1.33e+006	1.000	31.88	0.00	159.98	153.19	0.00	0.00	153.19	0.00
CLP	CLP :ARM 1	CLP :WVGD2	102.33	100.00	101.17	16.392	1.39e+006	1.000	31.88	0.00	106.03	101.46	0.00	0.00	101.46	0.00
CLP	CLP :WVGD2	CLP :ARM 2	100.00	91.33	95.67	17.636	1.49e+006	1.000	31.88	0.00	424.93	406.19	0.00	0.00	406.19	0.00
CLP	CLP :ARM 2	CLP :WVGD3	91.33	90.00	90.67	18.767	1.59e+006	1.000	31.88	0.00	69.43	66.31	0.00	0.00	66.31	0.00
CLP	CLP :WVGD3	CLP :ARM 3	90.00	80.33	85.17	20.011	1.69e+006	1.000	31.88	0.00	538.68	514.04	0.00	0.00	514.04	0.00
CLP	CLP :ARM 3	CLP :WVGD4	80.33	80.00	80.17	21.142	1.79e+006	1.000	31.88	0.00	19.44	18.53	0.00	0.00	18.53	0.00
CLP	CLP :WVGD4		80.00	79.83	79.92	21.199	1.79e+006	1.000	31.88	0.00	9.86	9.40	0.00	0.00	9.40	0.00
CLP			79.83	77.00	78.42	21.288	1.8e+006	1.000	31.88	0.00	376.80	160.20	0.00	0.00	160.20	0.00
CLP		CLP :WVGD5	77.00	70.00	73.50	22.150	1.87e+006	1.000	31.88	0.00	538.70	411.88	0.00	0.00	411.88	0.00
CLP	CLP :WVGD5	CLP :opgw	70.00	65.00	67.50	23.507	1.99e+006	1.000	31.88	0.00	408.65	312.22	0.00	0.00	312.22	0.00
CLP	CLP :opgw	CLP :WVGD6	65.00	60.00	62.50	24.638	2.08e+006	1.000	31.88	0.00	428.58	327.24	0.00	0.00	327.24	0.00
CLP	CLP :WVGD6	CLP :WVGD7	60.00	50.00	55.00	26.334	2.23e+006	1.000	31.88	0.00	916.93	699.55	0.00	0.00	699.55	0.00

CLP	CLP :WVGD7		50.00	44.00	47.00	28.144	2.38e+006	1.000	31.88	0.00	588.42	448.57	0.00	0.00	448.57	0.00
CLP		CLP :WVGD8	44.00	40.00	42.00	28.962	2.45e+006	1.000	31.88	0.00	886.29	307.75	0.00	0.00	307.75	0.00
CLP	CLP :WVGD8	CLP :WVGD9	40.00	30.00	35.00	30.233	2.56e+006	1.000	31.88	0.00	1262.62	803.12	0.00	0.00	803.12	0.00
CLP	CLP :WVGD9	CLP :WVGD10	30.00	20.00	25.00	32.495	2.75e+006	1.000	31.88	0.00	1358.18	863.21	0.00	0.00	863.21	0.00
CLP	CLP :WVGD10		20.00	15.08	17.54	34.182	2.89e+006	1.000	31.88	0.00	702.89	446.47	0.00	0.00	446.47	0.00
CLP		CLP :WVGD11	15.08	10.00	12.54	34.938	2.95e+006	1.000	31.88	0.00	1485.74	471.76	0.00	0.00	471.76	0.00
CLP	CLP :WVGD11	CLP :g	10.00	0.00	5.00	36.269	3.07e+006	1.000	31.88	0.00	1517.86	963.46	0.00	0.00	963.46	0.00

*** Analysis Results:

Maximum element usage is 97.81% for Steel Pole "CLP " in load case "EXTREME"
Maximum insulator usage is 28.79% for Clamp "C17" in load case "EXTREME"



*** Analysis Results for Load Case No. 1 "NESC HEAVY" - Number of iterations in SAPS 17

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)
CLP :g	0	0	0	0.0000	0.0000	0.0000	0	0	0
CLP :t	0.01829	7.487	-0.3335	-6.8099	0.0149	0.0002	0.01829	7.487	114.7
CLP :TopConn	0.01777	7.25	-0.3194	-6.8099	0.0149	0.0002	0.01777	7.25	112.7

CLP :WVGD1	0.01699	6.894	-0.2982	-6.7957	0.0149	0.0002	0.01699	6.894	109.7
CLP :BotConn	0.01596	6.423	-0.2703	-6.7413	0.0149	0.0002	0.01596	6.423	105.7
CLP :ARM 1	0.01501	5.994	-0.2451	-6.6681	0.0148	0.0002	0.01501	5.994	102.1
CLP :WVGD2	0.01441	5.725	-0.2294	-6.5950	0.0147	0.0002	0.01441	5.725	99.77
CLP :ARM 2	0.01223	4.754	-0.1747	-6.2135	0.0141	0.0002	0.01223	4.754	91.16
CLP :WVGD3	0.0119	4.611	-0.1669	-6.1388	0.0140	0.0002	0.0119	4.611	89.83
CLP :ARM 3	0.00962	3.625	-0.1162	-5.4943	0.0129	0.0001	0.00962	3.625	80.21
CLP :WVGD4	0.009546	3.594	-0.1147	-5.4693	0.0129	0.0001	0.009546	3.594	79.89
CLP :WVGD5	0.0074	2.702	-0.07439	-4.7359	0.0116	0.0001	0.0074	2.702	69.93
CLP :opgw	0.006414	2.305	-0.05843	-4.3513	0.0109	0.0001	0.006414	2.305	64.94
CLP :WVGD6	0.005491	1.942	-0.04505	-3.9597	0.0102	0.0001	0.005491	1.942	59.95
CLP :WVGD7	0.003845	1.317	-0.02508	-3.1752	0.0086	0.0000	0.003845	1.317	49.97
CLP :WVGD8	0.002494	0.8281	-0.01273	-2.4250	0.0069	0.0000	0.002494	0.8281	39.99
CLP :WVGD9	0.001427	0.4599	-0.005628	-1.7720	0.0053	0.0000	0.001427	0.4599	29.99
CLP :WVGD10	0.0006474	0.2026	-0.001991	-1.1575	0.0036	0.0000	0.0006474	0.2026	20
CLP :WVGD11	0.0001685	0.05116	-0.0004782	-0.5712	0.0018	-0.0000	0.0001685	0.05116	10
ARM1.1R:O	0.01499	5.989	-0.3231	-6.6681	0.0148	0.0002	0.01499	6.661	102
ARM1.1R:END	0.015	6.082	-1.404	-7.8401	0.0148	0.0002	0.015	15	102.2
ARM1.1L:O	0.01503	5.999	-0.1671	-6.6681	0.0148	0.0002	0.01503	5.326	102.2
ARM1.1L:END	0.01556	6.17	0.4991	-5.9497	0.0149	0.0003	0.01556	-0.7522	104.1
ARM2.1R:O	0.0122	4.749	-0.2586	-6.2135	0.0141	0.0002	0.0122	5.525	91.07
ARM2.1R:END	0.01224	4.84	-1.274	-7.3918	0.0141	0.0002	0.01224	13.87	91.31
ARM2.1L:O	0.01225	4.759	-0.09072	-6.2135	0.0141	0.0002	0.01225	3.983	91.24
ARM2.1L:END	0.01274	4.915	0.5266	-5.4874	0.0142	0.0003	0.01274	-2.111	93.11
ARM3.1R:O	0.009599	3.621	-0.2004	-5.4943	0.0129	0.0001	0.009599	4.501	80.13
ARM3.1R:END	0.009657	3.709	-1.112	-6.6825	0.0130	0.0001	0.009657	12.84	80.47
ARM3.1L:O	0.009641	3.629	-0.03199	-5.4943	0.0129	0.0001	0.009641	2.75	80.3
ARM3.1L:END	0.01007	3.762	0.5078	-4.7560	0.0130	0.0002	0.01007	-3.367	82.09

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 %
CLP :g	-0.10	0.0	-17.64	0.0	0.0	-47.37	0.0	0.0	50.54	0.0	1617.51	0.0	-5.4	0.0	0.0	0.00	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.
CLP	CLP :t	Origin	0.00	89.85	0.22	-4.00	-0.00	-0.00	0.0	-0.06	0.02	-0.00	-0.01	0.00	0.00	0.00	0.01	0.0	4
CLP	CLP :TopConn	End	2.00	87.00	0.21	-3.83	0.05	-0.00	0.0	-0.06	0.02	-0.00	-0.00	0.02	0.00	0.00	0.02	0.0	2
CLP	CLP :TopConn	Origin	2.00	87.00	0.21	-3.83	0.05	-0.00	-0.0	-1.24	3.16	-0.00	-0.11	0.00	0.59	0.00	1.02	2.0	4
CLP	CLP :WVGD1	End	5.00	82.73	0.20	-3.58	9.52	-0.01	-0.0	-1.24	3.16	-0.00	-0.11	2.65	0.21	0.00	2.79	5.6	2
CLP	CLP :WVGD1	Origin	5.00	82.73	0.20	-3.58	9.52	-0.01	0.0	-2.12	3.40	-0.00	-0.18	2.65	0.23	0.00	2.86	5.7	2
CLP	CLP :BotConn	End	9.00	77.07	0.19	-3.24	23.14	-0.02	0.0	-2.12	3.40	-0.00	-0.17	5.69	0.22	0.00	5.88	11.8	2
CLP	CLP :BotConn	Origin	9.00	77.07	0.19	-3.24	23.14	-0.02	0.0	-5.98	2.90	-0.01	-0.48	5.69	0.19	0.00	6.18	12.4	2
CLP	CLP :ARM 1	End	12.67	71.93	0.18	-2.94	33.77	-0.05	0.0	-5.98	2.90	-0.01	-0.45	7.46	0.18	0.00	7.92	15.8	2
CLP	CLP :ARM 1	Origin	12.67	71.93	0.18	-2.94	42.79	-0.05	-0.0	-10.56	6.88	-0.01	-0.80	9.45	0.42	0.00	10.28	20.6	2
CLP	CLP :WVGD2	End	15.00	68.70	0.17	-2.75	58.82	-0.08	-0.0	-10.56	6.88	-0.01	-0.78	12.16	0.40	0.00	12.96	25.9	2
CLP	CLP :WVGD2	Origin	15.00	68.70	0.17	-2.75	58.82	-0.08	-0.0	-11.66	7.16	-0.01	-0.86	12.16	0.42	0.00	13.04	26.1	2
CLP	CLP :ARM 2	End	23.67	57.05	0.15	-2.10	120.92	-0.20	-0.0	-11.66	7.16	-0.01	-0.77	19.92	0.37	0.00	20.70	41.4	2
CLP	CLP :ARM 2	Origin	23.67	57.05	0.15	-2.10	129.93	-0.20	-0.0	-16.47	11.14	-0.02	-1.08	21.41	0.58	0.00	22.51	45.0	2
CLP	CLP :WVGD3	End	25.00	55.33	0.14	-2.00	144.74	-0.22	-0.0	-16.47	11.14	-0.02	-1.06	23.08	0.57	0.00	24.16	48.3	2
CLP	CLP :WVGD3	Origin	25.00	55.33	0.14	-2.00	144.74	-0.22	-0.0	-17.66	11.38	-0.02	-1.14	23.08	0.58	0.00	24.24	48.5	2

CLP	CLP :ARM 3	End	34.67	43.50	0.12	-1.39	254.76	-0.44	-0.0	-17.66	11.38	-0.02	-1.02	32.51	0.52	0.00	33.54	67.1	2
CLP	CLP :ARM 3	Origin	34.67	43.50	0.12	-1.39	263.75	-0.44	-0.0	-22.61	15.25	-0.03	-1.31	33.65	0.70	0.00	34.98	70.0	2
CLP	CLP :WVGD4	End	35.00	43.12	0.11	-1.38	268.79	-0.45	-0.0	-22.61	15.25	-0.03	-1.30	34.05	0.70	0.00	35.37	70.7	2
CLP	CLP :WVGD4	Origin	35.00	43.12	0.11	-1.38	268.79	-0.45	-0.0	-23.31	15.39	-0.03	-1.34	34.05	0.70	0.00	35.42	70.8	2
CLP	SpliceT	End	35.17	42.93	0.11	-1.37	271.36	-0.45	-0.0	-23.31	15.39	-0.03	-1.34	34.25	0.70	0.00	35.61	71.2	2
CLP	SpliceT	Origin	35.17	42.93	0.11	-1.37	271.36	-0.45	-0.0	-23.63	15.42	-0.03	-1.36	34.25	0.70	0.00	35.63	71.3	2
CLP	SpliceB	End	38.00	39.76	0.11	-1.22	315.04	-0.53	-0.0	-23.63	15.42	-0.03	-1.08	31.66	0.56	0.00	32.76	50.4	2
CLP	SpliceB	Origin	38.00	39.76	0.11	-1.22	315.04	-0.53	-0.0	-24.41	15.48	-0.03	-1.12	31.66	0.56	0.00	32.80	50.5	2
CLP	CLP :WVGD5	End	45.00	32.42	0.09	-0.89	423.38	-0.76	-0.0	-24.41	15.48	-0.03	-1.04	36.77	0.52	0.00	37.82	58.2	2
CLP	CLP :WVGD5	Origin	45.00	32.42	0.09	-0.89	423.38	-0.76	-0.0	-25.92	15.65	-0.04	-1.11	36.77	0.53	0.00	37.89	58.3	2
CLP	CLP :opgw	End	50.00	27.66	0.08	-0.70	501.61	-0.94	-0.0	-25.92	15.65	-0.04	-1.05	39.49	0.50	0.00	40.56	62.4	2
CLP	CLP :opgw	Origin	50.00	27.66	0.08	-0.70	501.61	-0.94	-0.0	-27.41	16.64	-0.04	-1.11	39.49	0.54	0.00	40.62	62.5	2
CLP	CLP :WVGD6	End	55.00	23.31	0.07	-0.54	584.79	-1.15	-0.0	-27.41	16.64	-0.04	-1.06	41.93	0.51	0.00	43.00	66.2	2
CLP	CLP :WVGD6	Origin	55.00	23.31	0.07	-0.54	584.79	-1.14	-0.0	-29.27	16.80	-0.05	-1.14	41.93	0.52	0.00	43.08	66.3	2
CLP	CLP :WVGD7	End	65.00	15.80	0.05	-0.30	752.75	-1.62	-0.0	-29.27	16.80	-0.05	-1.04	45.32	0.47	0.00	46.36	74.0	2
CLP	CLP :WVGD7	Origin	65.00	15.80	0.05	-0.30	752.75	-1.62	-0.0	-31.26	16.93	-0.05	-1.11	45.32	0.48	0.00	46.43	74.1	2
CLP	SpliceT	End	71.00	12.09	0.04	-0.20	854.31	-1.94	-0.0	-31.26	16.93	-0.05	-1.06	46.63	0.45	0.00	47.69	78.4	2
CLP	SpliceT	Origin	71.00	12.09	0.04	-0.20	854.31	-1.94	-0.0	-32.48	16.96	-0.06	-1.10	46.63	0.46	0.00	47.73	78.4	2
CLP	CLP :WVGD8	End	75.00	9.94	0.03	-0.15	922.14	-2.18	-0.0	-32.48	16.96	-0.06	-0.91	41.39	0.38	0.00	42.31	65.1	2
CLP	CLP :WVGD8	Origin	75.00	9.94	0.03	-0.15	922.14	-2.18	-0.0	-34.91	17.13	-0.07	-0.98	41.39	0.38	0.00	42.38	65.2	2
CLP	CLP :WVGD9	End	85.00	5.52	0.02	-0.07	1093.47	-2.84	-0.0	-34.91	17.13	-0.07	-0.91	42.15	0.35	0.00	43.06	66.2	2
CLP	CLP :WVGD9	Origin	85.00	5.52	0.02	-0.07	1093.47	-2.83	-0.0	-37.75	17.31	-0.08	-0.98	42.15	0.36	0.00	43.13	66.4	2
CLP	CLP :WVGD10	End	95.00	2.43	0.01	-0.02	1266.53	-3.59	-0.0	-37.75	17.31	-0.08	-0.91	42.37	0.33	0.00	43.29	67.3	2
CLP	CLP :WVGD10	Origin	95.00	2.43	0.01	-0.02	1266.53	-3.59	-0.0	-40.12	17.45	-0.08	-0.97	42.37	0.33	0.00	43.35	67.4	2
CLP	SpliceT	End	99.92	1.38	0.00	-0.01	1352.32	-4.00	-0.0	-40.12	17.45	-0.08	-0.94	42.35	0.32	0.00	43.29	68.4	2
CLP	SpliceT	Origin	99.92	1.38	0.00	-0.01	1352.32	-4.00	-0.0	-41.85	17.49	-0.09	-0.98	42.35	0.32	0.00	43.33	68.5	2
CLP	CLP :WVGD11	End	105.00	0.61	0.00	-0.01	1441.23	-4.46	-0.0	-41.85	17.49	-0.09	-0.97	44.10	0.32	0.00	45.07	71.7	2
CLP	CLP :WVGD11	Origin	105.00	0.61	0.00	-0.01	1441.23	-4.46	-0.0	-44.93	17.63	-0.10	-1.04	44.10	0.32	0.00	45.14	74.9	2
CLP	CLP :g	End	115.00	0.00	0.00	0.00	1617.51	-5.43	-0.0	-44.93	17.63	-0.10	-0.98	43.61	0.30	0.00	44.58	73.4	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.
ARM1.1R	ARM1.1R:O	Origin	0.00	71.87	0.18	-3.88	-19.91	-0.01	0.0	1.64	2.39	0.00	0.34	27.28	0.00	0.00	27.62	55.2	1
ARM1.1R	ARM1.1R:END	End	8.34	72.98	0.18	-16.85	0.00	0.00	0.0	1.64	2.39	0.00	0.80	0.00	2.43	0.00	4.27	8.5	3
ARM1.1L	ARM1.1L:O	Origin	0.00	71.98	0.18	-2.00	-10.92	0.00	0.0	-2.31	1.71	-0.00	-0.56	19.84	0.00	0.00	20.40	40.8	1
ARM1.1L	ARM1.1L:END	End	6.37	74.04	0.19	5.99	-0.00	0.00	0.0	-2.31	1.71	-0.00	-1.12	0.00	1.74	0.00	3.22	6.4	3
ARM2.1R	ARM2.1R:O	Origin	0.00	56.99	0.15	-3.10	-20.01	-0.01	0.0	1.62	2.40	0.00	0.34	27.42	0.00	0.00	27.76	55.5	1
ARM2.1R	ARM2.1R:END	End	8.34	58.09	0.15	-15.29	0.00	0.00	0.0	1.62	2.40	0.00	0.79	0.00	2.44	0.00	4.30	8.6	3
ARM2.1L	ARM2.1L:O	Origin	0.00	57.10	0.15	-1.09	-11.04	0.00	0.0	-2.29	1.73	-0.00	-0.55	20.06	0.00	0.00	20.61	41.2	1
ARM2.1L	ARM2.1L:END	End	6.37	58.98	0.15	6.32	-0.00	0.00	0.0	-2.29	1.73	-0.00	-1.11	0.00	1.76	0.00	3.25	6.5	3
ARM3.1R	ARM3.1R:O	Origin	0.00	43.45	0.12	-2.40	-20.18	-0.00	0.0	1.59	2.42	0.00	0.33	27.65	0.00	0.00	27.98	56.0	1
ARM3.1R	ARM3.1R:END	End	8.34	44.50	0.12	-13.34	0.00	0.00	0.0	1.59	2.42	0.00	0.77	0.00	2.46	0.00	4.33	8.7	3
ARM3.1L	ARM3.1L:O	Origin	0.00	43.55	0.12	-0.38	-11.23	0.00	0.0	-2.27	1.76	-0.00	-0.55	20.39	0.00	0.00	20.94	41.9	1
ARM3.1L	ARM3.1L:END	End	6.37	45.15	0.12	6.09	-0.00	0.00	0.0	-2.27	1.76	-0.00	-1.10	0.00	1.79	0.00	3.29	6.6	3

Summary of Clamp Capacities and Usages for Load Case "NESC HEAVY":

Clamp	Force	Input	Factored	Usage

Label	(kips)	Holding Capacity (kips)	Holding Capacity (kips)	%
C1	2.834	30.00	30.00	9.45
C2	2.834	30.00	30.00	9.45
C3	2.834	30.00	30.00	9.45
C4	2.834	30.00	30.00	9.45
C5	2.834	30.00	30.00	9.45
C6	2.834	30.00	30.00	9.45
C7	0.692	30.00	30.00	2.31
C8	0.692	30.00	30.00	2.31
C9	0.692	30.00	30.00	2.31
C10	0.692	30.00	30.00	2.31
C11	0.692	30.00	30.00	2.31
C12	0.692	30.00	30.00	2.31
C13	0.692	30.00	30.00	2.31
C14	0.692	30.00	30.00	2.31
C15	0.692	30.00	30.00	2.31
C16	0.692	30.00	30.00	2.31
C17	3.242	30.00	30.00	10.81
C18	3.661	30.00	30.00	12.20
C19	0.692	30.00	30.00	2.31
C20	1.222	30.00	30.00	4.07

*** Analysis Results for Load Case No. 2 "EXTREME" - Number of iterations in SAPS 17

Equilibrium Joint Positions and Rotations for Load Case "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)
CLP :g	0	0	0	0.0000	0.0000	0.0000	0	0	0
CLP :t	0.004388	10.09	-0.6065	-9.5462	0.0035	0.0001	0.004388	10.09	114.4
CLP :TopConn	0.004265	9.754	-0.5788	-9.5461	0.0035	0.0001	0.004265	9.754	112.4
CLP :WVGD1	0.004081	9.257	-0.5374	-9.5071	0.0035	0.0001	0.004081	9.257	109.5
CLP :BotConn	0.003835	8.6	-0.4831	-9.3586	0.0035	0.0001	0.003835	8.6	105.5
CLP :ARM 1	0.003611	8.009	-0.4351	-9.1718	0.0035	0.0001	0.003611	8.009	101.9
CLP :WVGD2	0.00347	7.64	-0.4058	-9.0281	0.0035	0.0001	0.00347	7.64	99.59
CLP :ARM 2	0.002952	6.324	-0.3051	-8.3743	0.0034	0.0001	0.002952	6.324	91.02
CLP :WVGD3	0.002875	6.131	-0.2911	-8.2584	0.0033	0.0001	0.002875	6.131	89.71
CLP :ARM 3	0.002332	4.814	-0.2008	-7.3132	0.0031	0.0001	0.002332	4.814	80.13
CLP :WVGD4	0.002314	4.772	-0.1981	-7.2781	0.0031	0.0001	0.002314	4.772	79.8
CLP :WVGD5	0.0018	3.59	-0.1277	-6.2762	0.0028	0.0000	0.0018	3.59	69.87
CLP :opgw	0.001563	3.064	-0.1	-5.7622	0.0026	0.0000	0.001563	3.064	64.9
CLP :WVGD6	0.00134	2.584	-0.07679	-5.2430	0.0025	0.0000	0.00134	2.584	59.92
CLP :WVGD7	0.0009417	1.756	-0.04226	-4.2104	0.0021	0.0000	0.0009417	1.756	49.96
CLP :WVGD8	0.0006127	1.107	-0.02097	-3.2256	0.0017	0.0000	0.0006127	1.107	39.98
CLP :WVGD9	0.0003515	0.6167	-0.008784	-2.3657	0.0013	0.0000	0.0003515	0.6167	29.99
CLP :WVGD10	0.00016	0.2726	-0.002705	-1.5517	0.0009	0.0000	0.00016	0.2726	20
CLP :WVGD11	4.175e-005	0.06906	-0.0004132	-0.7694	0.0005	0.0000	4.175e-005	0.06906	10
ARM1.1R:O	0.003603	8	-0.5423	-9.1718	0.0035	0.0001	0.003603	8.672	101.8
ARM1.1R:END	0.003578	8.094	-1.923	-9.6831	0.0035	0.0001	0.003578	17.02	101.7
ARM1.1L:O	0.003619	8.018	-0.328	-9.1718	0.0035	0.0001	0.003619	7.346	102
ARM1.1L:END	0.003773	8.293	0.6421	-9.0275	0.0035	0.0002	0.003773	1.371	104.2
ARM2.1R:O	0.002945	6.315	-0.4181	-8.3743	0.0034	0.0001	0.002945	7.091	90.91
ARM2.1R:END	0.00293	6.41	-1.684	-8.8980	0.0034	0.0001	0.00293	15.44	90.9
ARM2.1L:O	0.00296	6.332	-0.1921	-8.3743	0.0034	0.0001	0.00296	5.556	91.14
ARM2.1L:END	0.0031	6.577	0.6937	-8.2175	0.0034	0.0001	0.0031	-0.4489	93.27
ARM3.1R:O	0.002325	4.807	-0.3128	-7.3132	0.0031	0.0001	0.002325	5.686	80.02
ARM3.1R:END	0.002323	4.9	-1.426	-7.8534	0.0031	0.0001	0.002323	14.03	80.15
ARM3.1L:O	0.002339	4.821	-0.08889	-7.3132	0.0031	0.0001	0.002339	3.942	80.24
ARM3.1L:END	0.002459	5.027	0.6842	-7.1399	0.0031	0.0001	0.002459	-2.102	82.26

Joint Support Reactions for Load Case "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 %
CLP :g	-0.03	0.0	-26.07	0.0	0.0	-24.75	0.0	0.0	35.95	0.0	2188.86	0.0	-1.3	0.0	0.0	-0.00	0.0	0.0

Detailed Steel Pole Usages for Load Case "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.
CLP	CLP :t	Origin	0.00	121.03	0.05	-7.28	-0.00	-0.00	0.0	-0.04	0.04	-0.00	-0.00	0.00	0.01	0.00	0.01	0.0	4
CLP	CLP :TopConn	End	2.00	117.05	0.05	-6.95	0.08	-0.00	0.0	-0.04	0.04	-0.00	-0.00	0.03	0.00	0.00	0.03	0.1	2
CLP	CLP :TopConn	Origin	2.00	117.05	0.05	-6.95	0.08	-0.00	-0.0	0.70	8.74	-0.00	0.06	0.00	1.62	0.00	2.81	5.6	4

CLP	CLP :WVGD1	End	5.00	111.08	0.05	-6.45	26.31	-0.00	-0.0	0.70	8.74	-0.00	0.06	7.33	0.59	0.00	7.47	14.9	2
CLP	CLP :WVGD1	Origin	5.00	111.08	0.05	-6.45	26.31	-0.00	0.0	0.43	9.12	-0.00	0.04	7.33	0.62	0.00	7.45	14.9	2
CLP	CLP :BotConn	End	9.00	103.20	0.05	-5.80	62.79	-0.01	0.0	0.43	9.12	-0.00	0.03	15.45	0.58	0.00	15.51	31.0	2
CLP	CLP :BotConn	Origin	9.00	103.20	0.05	-5.80	62.79	-0.01	0.0	-2.08	5.34	-0.00	-0.17	15.45	0.34	0.00	15.62	31.2	2
CLP	CLP :ARM 1	End	12.67	96.11	0.04	-5.22	82.41	-0.01	0.0	-2.08	5.34	-0.00	-0.16	18.19	0.32	0.00	18.36	36.7	2
CLP	CLP :ARM 1	Origin	12.67	96.11	0.04	-5.22	88.93	-0.01	0.0	-3.81	9.45	-0.00	-0.29	19.63	0.57	0.00	19.94	39.9	2
CLP	CLP :WVGD2	End	15.00	91.68	0.04	-4.87	110.94	-0.02	0.0	-3.81	9.45	-0.00	-0.28	22.93	0.55	0.00	23.23	46.5	2
CLP	CLP :WVGD2	Origin	15.00	91.68	0.04	-4.87	110.94	-0.02	0.0	-4.26	9.93	-0.00	-0.31	22.93	0.58	0.00	23.27	46.5	2
CLP	CLP :ARM 2	End	23.67	75.88	0.04	-3.66	197.05	-0.04	0.0	-4.26	9.93	-0.00	-0.28	32.45	0.52	0.00	32.74	65.5	2
CLP	CLP :ARM 2	Origin	23.67	75.88	0.04	-3.66	203.60	-0.04	0.0	-6.22	14.11	-0.00	-0.41	33.52	0.74	0.00	33.96	67.9	2
CLP	CLP :WVGD3	End	25.00	73.57	0.03	-3.49	222.36	-0.05	0.0	-6.22	14.11	-0.00	-0.40	35.44	0.72	0.00	35.86	71.7	2
CLP	CLP :WVGD3	Origin	25.00	73.57	0.03	-3.49	222.36	-0.05	0.0	-6.77	14.60	-0.01	-0.44	35.44	0.75	0.00	35.90	71.8	2
CLP	CLP :ARM 3	End	34.67	57.77	0.03	-2.41	363.55	-0.10	0.0	-6.77	14.60	-0.01	-0.39	46.36	0.67	0.00	46.77	93.5	2
CLP	CLP :ARM 3	Origin	34.67	57.77	0.03	-2.41	370.13	-0.10	0.0	-8.90	18.75	-0.01	-0.52	47.20	0.86	0.00	47.74	95.5	2
CLP	CLP :WVGD4	End	35.00	57.27	0.03	-2.38	376.31	-0.10	0.0	-8.90	18.75	-0.01	-0.51	47.64	0.86	0.00	48.18	96.4	2
CLP	CLP :WVGD4	Origin	35.00	57.27	0.03	-2.38	376.31	-0.10	0.0	-9.05	18.98	-0.01	-0.52	47.64	0.87	0.00	48.19	96.4	2
CLP	SpliceT	End	35.17	57.01	0.03	-2.36	379.48	-0.10	0.0	-9.05	18.98	-0.01	-0.52	47.87	0.87	0.00	48.42	96.8	2
CLP	SpliceT	Origin	35.17	57.01	0.03	-2.36	379.48	-0.10	0.0	-9.30	19.06	-0.01	-0.54	47.87	0.87	0.00	48.43	96.9	2
CLP	SpliceB	End	38.00	52.79	0.03	-2.10	433.47	-0.12	0.0	-9.30	19.06	-0.01	-0.43	43.54	0.70	0.00	43.99	67.7	2
CLP	SpliceB	Origin	38.00	52.79	0.03	-2.10	433.47	-0.12	0.0	-9.91	19.32	-0.01	-0.45	43.54	0.70	0.00	44.01	67.7	2
CLP	CLP :WVGD5	End	45.00	43.07	0.02	-1.53	568.68	-0.18	0.0	-9.91	19.32	-0.01	-0.42	49.36	0.65	0.00	49.80	76.6	2
CLP	CLP :WVGD5	Origin	45.00	43.07	0.02	-1.53	568.68	-0.17	0.0	-10.73	19.83	-0.01	-0.46	49.36	0.67	0.00	49.83	76.7	2
CLP	CLP :opgw	End	50.00	36.77	0.02	-1.20	667.83	-0.22	0.0	-10.73	19.83	-0.01	-0.44	52.55	0.64	0.00	53.00	81.5	2
CLP	CLP :opgw	Origin	50.00	36.77	0.02	-1.20	667.83	-0.22	0.0	-11.49	20.94	-0.01	-0.47	52.55	0.68	0.00	53.03	81.6	2
CLP	CLP :WVGD6	End	55.00	31.01	0.02	-0.92	772.50	-0.27	0.0	-11.49	20.94	-0.01	-0.45	55.35	0.64	0.00	55.81	85.9	2
CLP	CLP :WVGD6	Origin	55.00	31.01	0.02	-0.92	772.50	-0.27	0.0	-12.58	21.56	-0.01	-0.49	55.35	0.66	0.00	55.85	85.9	2
CLP	CLP :WVGD7	End	65.00	21.07	0.01	-0.51	988.07	-0.38	0.0	-12.58	21.56	-0.01	-0.45	59.44	0.61	0.00	59.89	92.2	2
CLP	CLP :WVGD7	Origin	65.00	21.07	0.01	-0.51	988.07	-0.38	0.0	-13.79	22.20	-0.01	-0.49	59.44	0.63	0.00	59.94	92.3	2
CLP	SpliceT	End	71.00	16.15	0.01	-0.34	1121.28	-0.46	0.0	-13.79	22.20	-0.01	-0.47	61.15	0.60	0.00	61.63	97.2	2
CLP	SpliceT	Origin	71.00	16.15	0.01	-0.34	1121.28	-0.46	0.0	-14.72	22.50	-0.01	-0.50	61.15	0.60	0.00	61.66	97.2	2
CLP	CLP :WVGD8	End	75.00	13.29	0.01	-0.25	1211.28	-0.52	0.0	-14.72	22.50	-0.01	-0.41	54.33	0.50	0.00	54.75	84.2	2
CLP	CLP :WVGD8	Origin	75.00	13.29	0.01	-0.25	1211.28	-0.52	0.0	-16.18	23.16	-0.02	-0.45	54.33	0.51	0.00	54.79	84.3	2
CLP	CLP :WVGD9	End	85.00	7.40	0.00	-0.11	1442.84	-0.69	0.0	-16.18	23.16	-0.02	-0.42	55.56	0.48	0.00	55.99	86.1	2
CLP	CLP :WVGD9	Origin	85.00	7.40	0.00	-0.11	1442.84	-0.69	0.0	-17.99	24.00	-0.02	-0.47	55.56	0.49	0.00	56.04	86.2	2
CLP	CLP :WVGD10	End	95.00	3.27	0.00	-0.03	1682.80	-0.88	0.0	-17.99	24.00	-0.02	-0.44	56.24	0.46	0.00	56.68	88.1	2
CLP	CLP :WVGD10	Origin	95.00	3.27	0.00	-0.03	1682.80	-0.88	0.0	-19.43	24.69	-0.02	-0.47	56.24	0.47	0.00	56.72	88.2	2
CLP	SpliceT	End	99.92	1.87	0.00	-0.01	1804.18	-0.98	0.0	-19.43	24.69	-0.02	-0.45	56.44	0.46	0.00	56.90	89.9	2
CLP	SpliceT	Origin	99.92	1.87	0.00	-0.01	1804.18	-0.98	0.0	-20.69	25.03	-0.02	-0.48	56.44	0.46	0.00	56.93	90.0	2
CLP	CLP :WVGD11	End	105.00	0.83	0.00	-0.00	1931.40	-1.10	0.0	-20.69	25.03	-0.02	-0.48	59.03	0.46	0.00	59.52	94.6	2
CLP	CLP :WVGD11	Origin	105.00	0.83	0.00	-0.00	1931.40	-1.10	0.0	-22.60	25.75	-0.03	-0.52	59.03	0.47	0.00	59.56	94.7	2
CLP	CLP :g	End	115.00	0.00	0.00	0.00	2188.86	-1.35	0.0	-22.60	25.75	-0.03	-0.49	58.94	0.44	0.00	59.44	97.8	2

Detailed Tubular Davit Arm Usages for Load Case "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.
ARM1.1R	ARM1.1R:O	Origin	0.00	96.01	0.04	-6.51	-8.68	-0.00	0.0	1.85	1.04	0.00	0.39	11.90	0.00	0.00	12.29	24.6	1
ARM1.1R	ARM1.1R:END	End	8.34	97.12	0.04	-23.08	0.00	0.00	0.0	1.85	1.04	0.00	0.90	0.00	1.06	0.00	2.04	4.1	3
ARM1.1L	ARM1.1L:O	Origin	0.00	96.21	0.04	-3.94	-2.19	0.00	0.0	-2.08	0.34	-0.00	-0.50	3.99	0.00	0.00	4.49	9.0	1
ARM1.1L	ARM1.1L:END	End	6.37	99.52	0.05	7.70	-0.00	0.00	0.0	-2.08	0.34	-0.00	-1.01	0.00	0.35	0.00	1.18	2.4	3
ARM2.1R	ARM2.1R:O	Origin	0.00	75.78	0.04	-5.02	-8.90	-0.00	0.0	1.83	1.07	0.00	0.38	12.19	0.00	0.00	12.57	25.1	1
ARM2.1R	ARM2.1R:END	End	8.34	76.92	0.04	-20.21	0.00	0.00	0.0	1.83	1.07	0.00	0.89	0.00	1.08	0.00	2.08	4.2	3
ARM2.1L	ARM2.1L:O	Origin	0.00	75.98	0.04	-2.31	-2.38	0.00	0.0	-2.08	0.37	-0.00	-0.50	4.33	0.00	0.00	4.83	9.7	1

ARM2.1L	ARM2.1L:END	End	6.37	78.92	0.04	8.32	-0.00	0.00	0.0	-2.08	0.37	-0.00	-1.01	0.00	0.38	0.00	1.21	2.4	3
ARM3.1R	ARM3.1R:O	Origin	0.00	57.68	0.03	-3.75	-9.17	-0.00	0.0	1.81	1.10	0.00	0.38	12.57	0.00	0.00	12.95	25.9	1
ARM3.1R	ARM3.1R:END	End	8.34	58.80	0.03	-17.11	0.00	0.00	0.0	1.81	1.10	0.00	0.88	0.00	1.12	0.00	2.13	4.3	3
ARM3.1L	ARM3.1L:O	Origin	0.00	57.85	0.03	-1.07	-2.64	0.00	0.0	-2.07	0.41	-0.00	-0.50	4.79	0.00	0.00	5.29	10.6	1
ARM3.1L	ARM3.1L:END	End	6.37	60.33	0.03	8.21	-0.00	0.00	0.0	-2.07	0.41	-0.00	-1.01	0.00	0.42	0.00	1.24	2.5	3

Summary of Clamp Capacities and Usages for Load Case "EXTREME":

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
C1	2.096	30.00	30.00	6.99
C2	2.096	30.00	30.00	6.99
C3	2.096	30.00	30.00	6.99
C4	2.096	30.00	30.00	6.99
C5	2.096	30.00	30.00	6.99
C6	2.096	30.00	30.00	6.99
C7	0.253	30.00	30.00	0.84
C8	0.253	30.00	30.00	0.84
C9	0.253	30.00	30.00	0.84
C10	0.253	30.00	30.00	0.84
C11	0.253	30.00	30.00	0.84
C12	0.253	30.00	30.00	0.84
C13	0.253	30.00	30.00	0.84
C14	0.253	30.00	30.00	0.84
C15	0.253	30.00	30.00	0.84
C16	0.253	30.00	30.00	0.84
C17	8.638	30.00	30.00	28.79
C18	4.585	30.00	30.00	15.28
C19	0.253	30.00	30.00	0.84
C20	0.863	30.00	30.00	2.88

*** 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)
CLP	97.81	EXTREME	22	13365.5

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 %
CLP	NESC HEAVY	1	0.645	1.558	-0.645	1.558	15.491	39.164	63.726	3	79.793	2.321	2.750	71.21
CLP	NESC HEAVY	2	-0.645	1.558	-1.558	0.645	15.492	34.812	56.645	1.5	78.693	2.188	2.750	63.30
CLP	NESC HEAVY	3	-1.558	-0.645	-0.645	-1.558	15.492	30.768	50.065	1.5	-69.758	2.057	2.750	55.94
CLP	NESC HEAVY	4	-0.645	-1.558	0.645	-1.558	15.491	35.355	57.528	3	-72.100	2.205	2.750	64.28
CLP	NESC HEAVY	5	0.645	-1.558	1.558	-0.645	15.492	31.407	51.104	1.5	-71.001	2.078	2.750	57.10
CLP	NESC HEAVY	6	1.558	0.645	0.645	1.558	15.492	34.174	55.606	1.5	77.451	2.168	2.750	62.13
CLP	EXTREME	1	0.645	1.558	-0.645	1.558	15.491	51.393	83.623	3	104.563	2.658	2.750	93.44
CLP	EXTREME	2	-0.645	1.558	-1.558	0.645	15.492	45.321	73.744	1.5	102.389	2.496	2.750	82.40
CLP	EXTREME	3	-1.558	-0.645	-0.645	-1.558	15.492	43.425	70.660	1.5	-98.157	2.444	2.750	78.95
CLP	EXTREME	4	-0.645	-1.558	0.645	-1.558	15.491	49.450	80.462	3	-100.640	2.608	2.750	89.91
CLP	EXTREME	5	0.645	-1.558	1.558	-0.645	15.492	43.584	70.918	1.5	-98.466	2.448	2.750	79.24
CLP	EXTREME	6	1.558	0.645	0.645	1.558	15.492	45.162	73.486	1.5	102.081	2.492	2.750	82.11

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
ARM1.1R	55.24	NESC HEAVY	1	97.0
ARM1.1L	40.79	NESC HEAVY	1	67.4
ARM2.1R	55.52	NESC HEAVY	1	97.0
ARM2.1L	41.22	NESC HEAVY	1	67.4
ARM3.1R	55.96	NESC HEAVY	1	97.0
ARM3.1L	41.88	NESC HEAVY	1	67.4

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC HEAVY	78.43	CLP	Steel Pole
EXTREME	97.81	CLP	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number

NESC HEAVY	78.43	CLP	17
EXTREME	97.81	CLP	22

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	CLP	1	15.491	46.156	1617.507	-5.435	39.164	63.726	3	79.793	2.321	71.21
EXTREME	CLP	1	15.491	23.542	2188.864	-1.349	51.393	83.623	3	104.563	2.658	93.44

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC HEAVY	55.96	ARM3.1R	1
EXTREME	25.90	ARM3.1R	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
C1	Clamp	9.45	NESC HEAVY	0.0
C2	Clamp	9.45	NESC HEAVY	0.0
C3	Clamp	9.45	NESC HEAVY	0.0
C4	Clamp	9.45	NESC HEAVY	0.0
C5	Clamp	9.45	NESC HEAVY	0.0
C6	Clamp	9.45	NESC HEAVY	0.0
C7	Clamp	2.31	NESC HEAVY	0.0
C8	Clamp	2.31	NESC HEAVY	0.0
C9	Clamp	2.31	NESC HEAVY	0.0
C10	Clamp	2.31	NESC HEAVY	0.0
C11	Clamp	2.31	NESC HEAVY	0.0
C12	Clamp	2.31	NESC HEAVY	0.0
C13	Clamp	2.31	NESC HEAVY	0.0
C14	Clamp	2.31	NESC HEAVY	0.0
C15	Clamp	2.31	NESC HEAVY	0.0
C16	Clamp	2.31	NESC HEAVY	0.0
C17	Clamp	28.79	EXTREME	0.0
C18	Clamp	15.28	EXTREME	0.0
C19	Clamp	2.31	NESC HEAVY	0.0
C20	Clamp	4.07	NESC HEAVY	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	C1	Clamp	ARM1.1R:END	0.000	1.685	2.279	2.834
NESC HEAVY	C2	Clamp	ARM1.1L:END	0.000	1.685	2.279	2.834
NESC HEAVY	C3	Clamp	ARM2.1R:END	0.000	1.685	2.279	2.834

NESC HEAVY	C4	Clamp	ARM2.1L:END	0.000	1.685	2.279	2.834
NESC HEAVY	C5	Clamp	ARM3.1R:END	0.000	1.685	2.279	2.834
NESC HEAVY	C6	Clamp	ARM3.1L:END	0.000	1.685	2.279	2.834
NESC HEAVY	C7	Clamp	CLP :WVGD1	0.000	0.075	0.688	0.692
NESC HEAVY	C8	Clamp	CLP :WVGD2	0.000	0.075	0.688	0.692
NESC HEAVY	C9	Clamp	CLP :WVGD3	0.000	0.075	0.688	0.692
NESC HEAVY	C10	Clamp	CLP :WVGD4	0.000	0.075	0.688	0.692
NESC HEAVY	C11	Clamp	CLP :WVGD5	0.000	0.075	0.688	0.692
NESC HEAVY	C12	Clamp	CLP :WVGD6	0.000	0.075	0.688	0.692
NESC HEAVY	C13	Clamp	CLP :WVGD7	0.000	0.075	0.688	0.692
NESC HEAVY	C14	Clamp	CLP :WVGD8	0.000	0.075	0.688	0.692
NESC HEAVY	C15	Clamp	CLP :WVGD9	0.000	0.075	0.688	0.692
NESC HEAVY	C16	Clamp	CLP :WVGD10	0.000	0.075	0.688	0.692
NESC HEAVY	C17	Clamp	CLP :TopConn	0.000	2.926	1.395	3.242
NESC HEAVY	C18	Clamp	CLP :BotConn	0.000	-1.027	3.514	3.661
NESC HEAVY	C19	Clamp	CLP :WVGD11	0.000	0.075	0.688	0.692
NESC HEAVY	C20	Clamp	CLP :opgw	0.000	0.901	0.826	1.222
EXTREME	C1	Clamp	ARM1.1R:END	0.000	1.830	1.021	2.096
EXTREME	C2	Clamp	ARM1.1L:END	0.000	1.830	1.021	2.096
EXTREME	C3	Clamp	ARM2.1R:END	0.000	1.830	1.021	2.096
EXTREME	C4	Clamp	ARM2.1L:END	0.000	1.830	1.021	2.096
EXTREME	C5	Clamp	ARM3.1R:END	0.000	1.830	1.021	2.096
EXTREME	C6	Clamp	ARM3.1L:END	0.000	1.830	1.021	2.096
EXTREME	C7	Clamp	CLP :WVGD1	0.000	0.198	0.158	0.253
EXTREME	C8	Clamp	CLP :WVGD2	0.000	0.198	0.158	0.253
EXTREME	C9	Clamp	CLP :WVGD3	0.000	0.198	0.158	0.253
EXTREME	C10	Clamp	CLP :WVGD4	0.000	0.198	0.158	0.253
EXTREME	C11	Clamp	CLP :WVGD5	0.000	0.198	0.158	0.253
EXTREME	C12	Clamp	CLP :WVGD6	0.000	0.198	0.158	0.253
EXTREME	C13	Clamp	CLP :WVGD7	0.000	0.198	0.158	0.253
EXTREME	C14	Clamp	CLP :WVGD8	0.000	0.198	0.158	0.253
EXTREME	C15	Clamp	CLP :WVGD9	0.000	0.198	0.158	0.253
EXTREME	C16	Clamp	CLP :WVGD10	0.000	0.198	0.158	0.253
EXTREME	C17	Clamp	CLP :TopConn	0.000	8.617	0.601	8.638
EXTREME	C18	Clamp	CLP :BotConn	0.000	-4.277	1.653	4.585
EXTREME	C19	Clamp	CLP :WVGD11	0.000	0.198	0.158	0.253
EXTREME	C20	Clamp	CLP :opgw	0.000	0.828	0.244	0.863

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	13.735	0.000	26.977	1279.499	-0.000	-0.000
EXTREME	18.326	0.000	10.362	1727.513	-0.000	-0.000

*** Weight of structure (lbs):
Weight of Tubular Davit Arms: 493.2
Weight of Steel Poles: 13365.5
Total: 13858.7

*** End of Report

Anchor Bolt Analysis:

Input Data:

Bolt Force:

Maximum Tension Force per Bolt = $T_{Max} := 105 \cdot kips$ (User Input from PLS-Pole)

Maximum Shear Force at Base = $V_{base} := 26.1 \cdot kips$ (User Input from PLS-Pole)

Anchor Bolt Data:

Use ASTM A432 Grade 60

Number of Anchor Bolts = $N := 12$ (User Input)

Bolt "Column" Distance = $l := 3.0 \cdot in$ (User Input)

Bolt Ultimate Strength = $F_u := 90 \cdot ksi$ (User Input)

Bolt Yeild Strength= $F_y := 60 \cdot ksi$ (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:

Stress Area of Bolt = $A_s := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Maximum Shear Force per Bolt = $V_{Max} := \frac{V_{base}}{N} = 2.2 \times 10^3 \, lbf$

Shear Stress per Bolt = $f_v := \frac{V_{Max}}{A_s} = 669.7 \, psi$

Tensile Stress Permitted = $F_t := \min\left(F_y, 0.83 \cdot F_u\right) = 60 \cdot ksi$

Shear Stress Permitted = $F_v := 0.65 F_y = 39 \cdot ksi$

Permitted Axial Tensile Stress in Conjuction with Shear = $F_{tv} := F_t \cdot \sqrt{1 - \left(\frac{f_v}{F_v}\right)^2} = 59.99 \cdot ksi$

Bolt Tension % of Capacity = $\frac{T_{Max}}{F_{tv} \cdot A_s} = 53.89 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{F_{tv} \cdot A_s} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

Exhibit E

March 14, 2019

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11290C – Eversource Structure # 1068**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **3 Mechanic Street, Darien, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **3 Mechanic Street, Darien, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 1 GSM channels (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 15 Watts per Channel.

2) 1 UMTS channel (AWS Band – 2100 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

4) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

6) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

7) Cable losses were factored in the calculations for this site. Since all of the proposed radios are ground mounted the following cable loss values were used. For each ground mounted 600 MHz radio there was 1.03 dB of cable loss calculated into the system gains / losses for this site. For each ground mounted 700 MHz radio there was 1.12 dB of cable loss calculated into the system gains / losses for this site. For each ground mounted 1900 MHz (PCS) radio there was 1.95 dB of cable loss calculated into the system gains / losses for this site. For each ground mounted 2100 MHz (AWS) radio there was 2.06 dB of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for 160 feet of 1-1/4" coax

8) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

9) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

10) The antennas used in this modeling are the **RFS APXVAARR18_43-U-NA20** for 600 MHz, 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) channels. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

11) The antenna mounting height centerline of the proposed antennas is **124 feet** above ground level (AGL).

12) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

13) All calculations were done with respect to uncontrolled / general population threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APXVAARR18_43-U-NA20	Make / Model:	RFS APXVAARR18_43-U-NA20	Make / Model:	RFS APXVAARR18_43-U-NA20
Gain:	12.85 / 13.55 / 15.85 / 17.15 dBd	Gain:	12.85 / 13.55 / 15.85 / 17.15 dBd	Gain:	12.85 / 13.55 / 15.85 / 17.15 dBd
Height (AGL):	124 feet	Height (AGL):	124 feet	Height (AGL):	124 feet
Frequency Bands	600 MHz / 700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	600 MHz / 700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	600 MHz / 700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	375	Total TX Power(W):	375	Total TX Power(W):	375
ERP (W):	9,413.94	ERP (W):	9,413.94	ERP (W):	9,413.94
Antenna A1 MPE%	**3.11**	Antenna B1 MPE%	**3.11**	Antenna C1 MPE%	**3.11**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**3.11 %**
No Additional Carriers	**NA**
Site Total MPE %:	**3.11 %**

T-Mobile Sector A Total:	3.11 %
T-Mobile Sector B Total:	3.11 %
T-Mobile Sector C Total:	3.11 %
Site Total:	3.11 %

T-Mobile Maximum MPE Power Values (Per Sector)

T-Mobile _Frequency Band / Technology (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile PCS - 1900 MHz GSM	1	368.21	124	0.95	PCS - 1900 MHz	1000.00	0.10%
T-Mobile PCS - 1900 MHz LTE	2	981.88	124	5.07	PCS - 1900 MHz	1000.00	0.51%
T-Mobile AWS - 2100 MHz UMTS	1	1,291.40	124	3.33	AWS - 2100 MHz	1000.00	0.33%
T-Mobile AWS - 2100 MHz LTE	2	1,937.10	124	10.00	AWS - 2100 MHz	1000.00	1.00%
T-Mobile 600 MHz LTE	2	608.22	124	3.14	600 MHz	400.00	0.78%
T-Mobile 700 MHz LTE	2	349.97	124	1.81	700 MHz	467.00	0.39%
						Total:	**3.11%**

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	3.11 %
Sector B:	3.11 %
Sector C:	3.11 %
T-Mobile Maximum MPE % (Per Sector):	3.11 %
Site Total:	3.11 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **3.11%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Exhibit F

EVERSOURCE ENERGY

56 Prospect Street,
Hartford, CT 06103

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

August 15, 2019

Mr. Mark Richard
T-Mobile
35 Griffin Rd. South
Bloomfield, CT 06002

RE: T-Mobile Antenna Site CT-11290C, Mechanic St, Darien CT, Eversource Structure 1068

Dear Mr. Richard:

Based on our reviews of the site drawings, the structural analysis and foundation review provided by Centek Engineering, along with a third party review performed by Paul J. Ford and Company, we accept the proposed modification.

Please work with Christopher Gelinas of Eversource Real Estate to process the site lease amendment. Please do not hesitate to contact us with questions or concerns. Christopher can be contacted at 860-665-2008, and I can be contacted at 860-728-4503.

Sincerely,

Joel Szarkowicz
Transmission Line Engineering

Ref: 18058.58 - CT11290C Structural Analysis Rev6 18.12.14
18058.58 - CT11290C CD Rev1 19.05.13 (S&S)

Exhibit G

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C006

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LISA A MATTHEWS
CT SITING COUNCIL
10 FRANKLIN SQ
NEW BRITAIN CT 06051-2655

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Ref#: 290-L700

To: LISA A MATTHEWS
CT SITING COUNCIL
10 FRANKLIN SQ
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0006

C014

SHIP TO:
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FIRST SELECTMAN-DARIEN
2 RENSHAW RD
DARIEN CT 06820-5344

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From: DEB CHASE
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420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: 290-L700

To: JAYME J STEVENSON
FIRST SELECTMAN-DARIEN
2 RENSHAW RD
DARIEN CT 06820-5344

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C015

SHIP TO:
CHRIS GELINAS
EVERSOURCE
107 SELDEN ST
BERLIN CT 06037-1616

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EVERSOURCE
107 SELDEN ST
BERLIN CT 06037-1616

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STE 1
STURBRIDGE MA 01566-1359

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Ref#: 290-L700
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STATE OF CT DEPT. OF TRANSPORTATION (DOT)
2800 BERLIN TPKE
NEWINGTON CT 06111-4113

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STE 1
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2800 BERLIN TPKE
NEWINGTON CT 06111-4113

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RM 202
DARIEN CT 06820-5344

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Total:	**$7.95**

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Ref#: 290-L700

To: KATHLEEN A CLARK-BUCH
TOWN PLANNER
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