Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

December 14, 2020

Melanie A. Bachman
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: **Notice of Exempt Modification for T-Mobile:**
824359 - T-Mobile Site ID: CT11044E
725 Flanders Road, Groton, CT 06340
Latitude: 41° 22′ 11.74″ / Longitude: -72° 0′ 29.77″

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 133-foot mount on the existing 130-foot Monopole Tower, located at 725 Flanders Road, Groton, CT. The tower is owned by Crown Castle and the property is owned by the Town of Groton. T-Mobile now intends to replace three (3) existing antennas with three (3) new 600/700 MHz at the 133-foot mount. These new antennas with be capable of providing 5G services. T-Mobile is also proposing tower mount modifications, as shown on the enclosed mount analysis.

Planned Modifications:
Tower:

Remove:
(6) 1 5/8" Coax

Remove and Replace:
(3) LNX 6515DS-A1M Antenna **(REMOVE)** - (3) RFS-APXVAARR24_43-U-NA20 **5G** Antenna 600/700 MHz **(REPLACE)**

(3) RRUS11 B12 **(REMOVE) –** (3) Radio 4449 B71/B12 **(REPLACE)**

Install New:
(3) 1 5/8" Hybrid Fiber Line

Existing to Remain:
(6) 1 5/8" Coax
(1) Fiber line
(3) AIR21 KRC118023-1_B2P_B4A Antenna 2100 MHz
(3) AIR21 KRC118023-1_B2A_B4P Antenna 1900 MHz
(3) TMA

Ground:
Upgrade to existing ground cabinet. (Internally)

The facility was approved by the Town of Groton Zoning Commission on September 10, 1998 via Grant of Special Permit #225.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Patrice Granatosky, Mayor for the Town of Groton, as the municipality and the property owner, Jonathan J. Reiner, AICP, Director of Planning, and Crown Castle is the tower owner.

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

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

3. The proposed modification 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 Communication 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-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Anne Marie Zsamba.

Sincerely,

Anne Marie Zsamba
Site Acquisition Specialist
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
(201) 236-9224
AnneMarie.Zsamba@crowncastle.com

Attachments
cc:

The Honorable Patrice Granatosky, Mayor *(via email only to pgranatosky@groton-ct.gov)*
Town of Groton - Town Hall
45 Fort Hill Road

Groton, CT 06340
860-441-6640

Jonathan J. Reiner, AICP, Director of Planning *(via email only to jreiner@groton-ct.gov)*
Town of Groton
Town Hall – Planning Department
134 Groton Long Point Road
Groton, CT 06340
860-448-4094

Crown Castle, Tower Owner

From: Zsamba, Anne Marie
To: "pgranatosky@groton-ct.gov"
Subject: Notice of Exempt Modification - T-Mobile - 725 Flanders Road - Crown Site #824359
Date: Monday, December 14, 2020 6:04:00 AM
Attachments: EM-T-MOBILE_725 FLANDERS RD GROTON_824359_CT11044E.pdf

---

Dear Mayor Granatosky:

Attached please find T-Mobile's exempt modification application that is being submitted to the Connecticut Siting Council today, December 14, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,
Anne Marie Zsamba

ANNE MARIE ZSAMBA
Site Acquisition Specialist
T: (201) 236-9224
M: (518) 350-3639
F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

From: Zsamba, Anne Marie
To: "jreiner@groton-ct.gov"
Subject: Notice of Exempt Modification - T-Mobile - 725 Flanders Road - Crown Site #824359
Date: Monday, December 14, 2020 6:04:00 AM
Attachments: EM-T-MOBILE_725 FLANDERS RD GROTON_824359_CT11044E.pdf

---

Dear Planning Director Reiner:

Attached please find T-Mobile's exempt modification application that is being submitted to the Connecticut Siting Council today, December 14, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,
Anne Marie Zsamba

ANNE MARIE ZSAMBA
Site Acquisition Specialist
T: (201) 236-9224
M: (518) 350-3639
F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

Exhibit A

Original Facility Approval

VOL 673 PAGE 538

TOWN OF GROTON

ZONING COMMISSION

NOTICE OF GRANT OF SPECIAL PERMIT #225

This is to certify that on September 2, 1998 the Zoning Commission of the Town of Groton granted a Special Permit under Section 7.1-41 of the Zoning Regulations as follows:

1. Owner of Record: Town of Groton (Omnipoint Communications, Inc., Applicant)

2. Description of the premises: 741 Flanders Road

3. Description of the special permit:

   Erection of a 150' telecommunications tower and associated equipment cabinet.

ZONING COMMISSION

by _____
James S. Butler, AICP
Director of Planning

Date: September 10, 1998

NOTE: This notice is to be recorded on the Land Records of the Town of Groton, indexed in the grantor's index under the name of the record owner.

RECEIVED FOR RECORD AT GROTON, CONN.
ON 9-22-98 AT 12:44 P
ATTEST BARBARA TARBOX, TOWN CLERK

Town of Groton

Building Inspection

CT11-044-E

BUILDING/ZONING PERMIT APPLICATION

Please Print

(office use only)

Permit No. 98-534 Date Permit Issued 11-24-98

Bldg. Zon. C.O.

Estimated Cost $53,000 Fee 436 50

Address of Building Groton Landfill Flanders Road @ I-95

Zone IP-80B zone Map Block Lot

Owner Town of Groton Address 45 Fort Hill Rd. Ph. #

Contractor Conti Enterprises, Inc. Address 3001 S. Clinton Ave. South Plainfiel NJ 07080

Nature of Proposed Work and Use. The constuction of a 150' monopole along with related equppment cabinet. Omnipcint Communications will use this site as a wireless telecommunications facility. (FAA REGULATIONS - IF ANY APPLY FOR LIGHT PAINT)

Plans: Yes ☒ No ☐ Type of Construction Size

No. of Stories 150' monopole No. of Rooms N/A No. of Baths N/A

Garage N/A Breezeway N/A Fireplace N/A Heat N/A

ZONING PERMIT

(To be filled out in conjunction with a building permit involving any new structure, addition to an existing structure, or change of use.)

Flood Hazard District C HDC # N/A ZBA #

Site Plan Approval # X Special Zoning Permit # #255

Wetlands Coastal Area Management N/A

Site Suitability # Sewer # A2 Survey

Zoning Official Signature

I hereby certify that the proposed construction will conform to the applicable building and zoning regulations of the Town of Groton. AND ANY FAA REGULATIONS THAT MAY APPLY

Signed Scott C. Hutchins As Agent Date Nov. 24, 1998 Lic. # 00900869

Phone # (203)855-5428 Building Official Approval

NO BUILDING OR STRUCTURE SHALL BE OCCUPIED OR USED, UNTIL A CERTIFICATE OF OCCUPANCY HAS BEEN ISSUED.

Exhibit B

Property Card

TAX DIVISION - TOWN OF GROTON

TAX DIVISION - TOWN OF GROTON
45 Fort Hill Road
Groton, CT 06340
(860) 441-6670

Bill Information

Taxpayer Information			
Bill #	2019-2-0201639 (PERSONALPROPERTY)	Town Benefit	
Unique ID	225180	Elderly Benefit	
District/Flag	District: 2		
Name	T-MOBILE NORTHEAST LLC	Assessment	123,930
Care of/DBA	C/O PROP TAX DEPT/ K MCGUIRE /FKA OMNIPOINT COMMUN	Exemption	0
Address		Net	123,930
Detail Information	741 FLANDERS RD		
Volume/Page		Mill Rate	Town 25.11 District 5.95 Other 0.56

Bill Information As of 12/14/2020

Installment	Due Date	Town	District		Total Due	
Inst #1	07/01/2020	1,555.94	737.38	69.40	Tax/ Princ/ Bond Due	0.00
Inst #2	01/01/2021	1,555.94			Interest Due	0.00
Inst #3					Lien Due	0.00
Inst #4					Fee Due	0.00
Total Adjustments		0.00	0.00		**Total Due Now**	0.00
Total Installment + Adjustment		3,111.88	737.38	69.40	**Balance Due**	0.00
Total Payments		3,918.66				

***** Note: This is not a tax form, please contact your financial advisor for information regarding tax reporting. *****

Payment History

Payment Date	Type	Tax/Principal/Bond	Interest	Lien	Fee	Total
07/24/2020	PAY	3,918.66	0.00	0.00	0.00	3,918.66

***** Total payments made to taxes in** 2019	$0.00

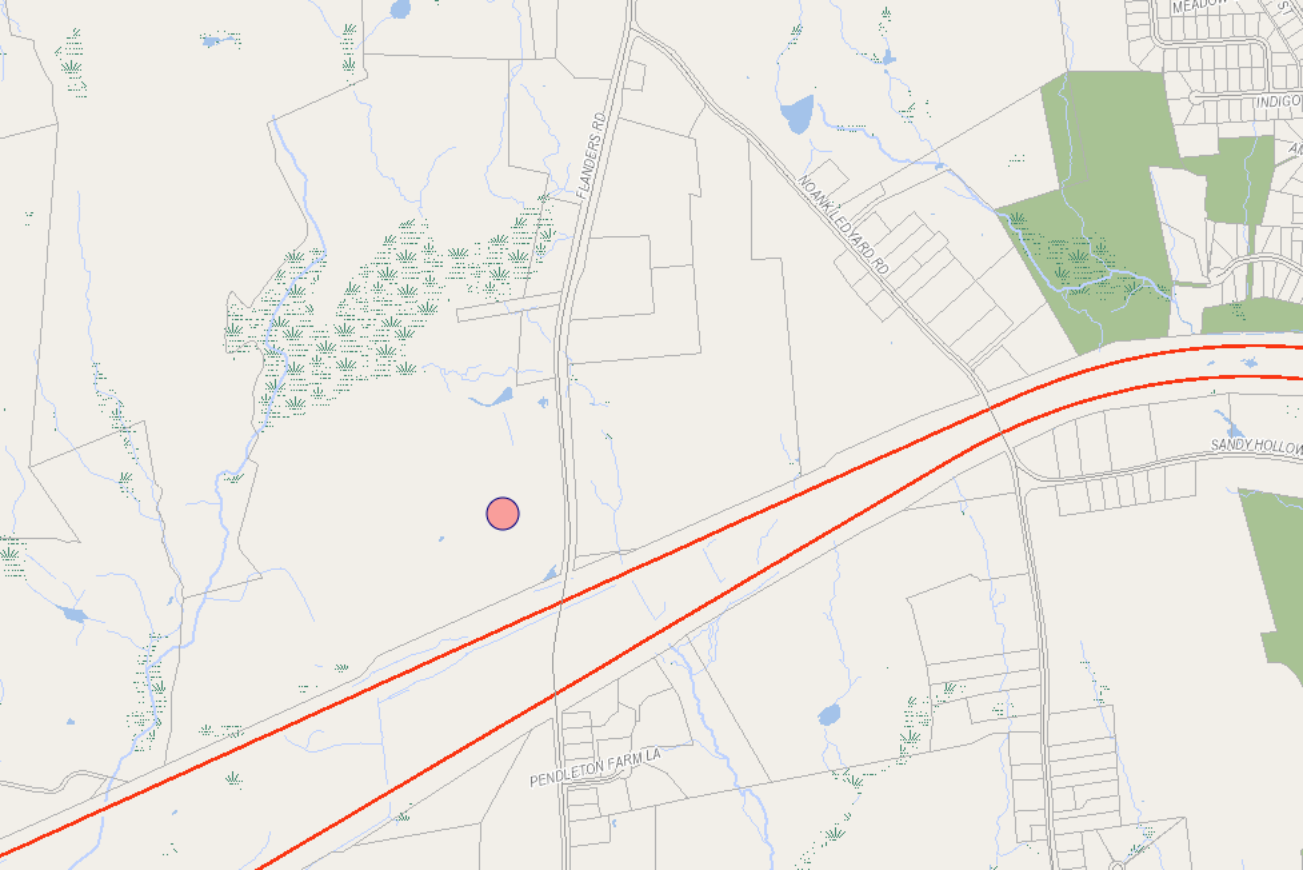

FLANDERS RD
NOANK LEDYARD RD
SANDY HOLLOW
PENDLETON FARM LA

Exhibit C

Construction Drawings

T-MOBILE SITE NAME:

GROTON/ I-95/ X89/ NOA_1

T-MOBILE SITE NUMBER:

CT11044E

CROWN BU: 824359 / APP#: 479800

67D02C CONFIGURATION

725 FLANDERS RD
GROTON, CT 06340

EXISTING 130'-0" MONOPOLE

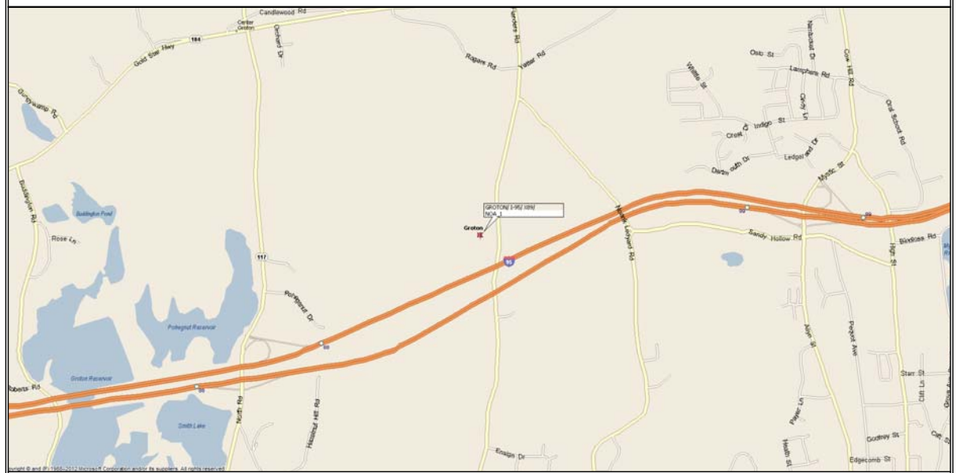
PROJECT SUMMARY

SITE TYPE:	EXISTING EQUIPMENT UPGRADE
SITE ADDRESS:	725 FLANDERS RD GROTON, CT 06340
JURISDICTION:	NEW LONDON COUNTY

NAD83

LATITUDE:	41.369955' N
LONGITUDE:	72.008269' W
TOWER OWNER:	CROWN CASTLE 3200 HORIZON DRIVE, SUITE 150 KING OF PRUSSIA, PA 19406 JASON SMITH (610) 635-3225
CUSTOMER/APPLICANT:	T-MOBILE 4 SYLVAN WAY PARSIPPANY, NJ 07054 (973) 397-4800
OCCUPANCY TYPE:	UNMANNED
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION

LOCATION MAP



NO SCALE

DRAWING INDEX

SHEET #	SHEET DESCRIPTION	REV. #
T-1	TITLE SHEET	2
A-1	OVERALL SITE PLAN	2
A-2	ANTENNA/CABLE SCHEDULE AND AZIMUTH PLANS	2
A-3	TOWER ELEVATION	2
A-4	ANTENNA AND RRU DETAILS	2
E-1	PANEL SCEHDULE AND ONE-LINE DIAGRAM	2
S-1	MOUNT MODIFICATION	A
S-2	MOUNT MODIFICATION	A
S-3	MOUNT MODIFICATION	A

CONTACT INFORMATION

A&E FIRM:	B+T GROUP 1717 S. BOULDER, STE. 300 TULSA, OK 74119
CONTACT:	MIKE OAKES
PHONE:	(918) 587-4630
ELECTRIC PROVIDER:	CONNECTICUT LIGHT & POWER (860) 947-2000
TELCO PROVIDER:	PIONEER TELEPHONE (800) 808-9000

DRIVING DIRECTIONS

DEPART BRADLEY INTERNATIONAL AIRPORT ON TERMINAL RD. ROAD NAME CHANGES TO BRADLEY FIELD CONNECTOR. ROAD NAME CHANGES TO CT-20. TAKE RAMP ONTO I-91. AT EXIT 30, TAKE RAMP ONTO I-84. AT EXIT 55, TAKE RAMP ONTO CT-2. AT EXIT 19, KEEP RIGHT ONTO RAMP. ROAD NAME CHANGES TO CT-11. AT EXIT 4, KEEP STRAIGHT ONTO RAMP. TURN LEFT ONTO CT-82. TURN RIGHT ONTO CT-85. TAKE RAMP ONTO I-95. AT EXIT 86, TURN LEFT ONTO RAMP. ROAD NAME CHANGES TO CT-184. TURN RIGHT ONTO FLANDERS RD. TURN RIGHT ONTO ACCESS ROAD. ARRIVE AT GROTON/ I-95/ X89/ NOA_1.

A/E DOCUMENT REVIEW STATUS

TITLE	SIGNATURE	DATE
T-MOBILE PROP:		
T-MOBILE R.F. MGR.:		
T-MOBILE NetOps:		
T-MOBILE CONST. MGR.:		
INTERCONNECT:		
T-MOBILE SITE DEV. MGR.:		
PROPERTY OWNER:		
PLANNING:		

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

CODE COMPLIANCE

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

CODE TYPE	CODE
BUILDING/DWELLING	2018 BUILDING CODE OF CONNECTICUT
STRUCTURAL	2018 BUILDING CODE OF CONNECTICUT
MECHANICAL	2018 MECHANICAL CODE OF CONNECTICUT
ELECTRICAL	NEC 2017

PROJECT DESCRIPTION

THE PROPOSED PROJECT INCLUDES:

- REMOVE (3) EXISTING ANTENNAS AT 132'-0".
- REMOVE (3) EXISTING RRUS AT 132'-0".
- REMOVE (6) EXISTING 1 5/8" COAX.
- REMOVE (1) EXISTING DUS41.
- REMOVE (1) EXISTING XMU.
- INSTALL (3) NEW ANTENNAS AT 132'-0".
- INSTALL (3) NEW RRUS AT 132'-0".
- INSTALL (3) NEW 6x12 HCS FIBER.
- INSTALL (2) NEW BB6630.
- MODIFY EXISTING MOUNTS PER MOUNT ANALYSIS BY PAUL J FORD AND COMPANY DATED 6/5/19.

DO NOT SCALE DRAWINGS

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

CALL CONNECTICUT ONE CALL
(800) 922-4455
CALL 3 WORKING DAYS
BEFORE YOU DIG!

B+T GRP

CROWN CASTLE

T-Mobile

CT11044E
BU #: 824359
GROTON/ I-95/ X89/ NOA_1
725 FLANDERS RD
GROTON, CT 06340
EXISTING 130'-0" MONOPOLE

PROJECT NO: 137216.001.01
CHECKED BY: GEH

ISSUED FOR:

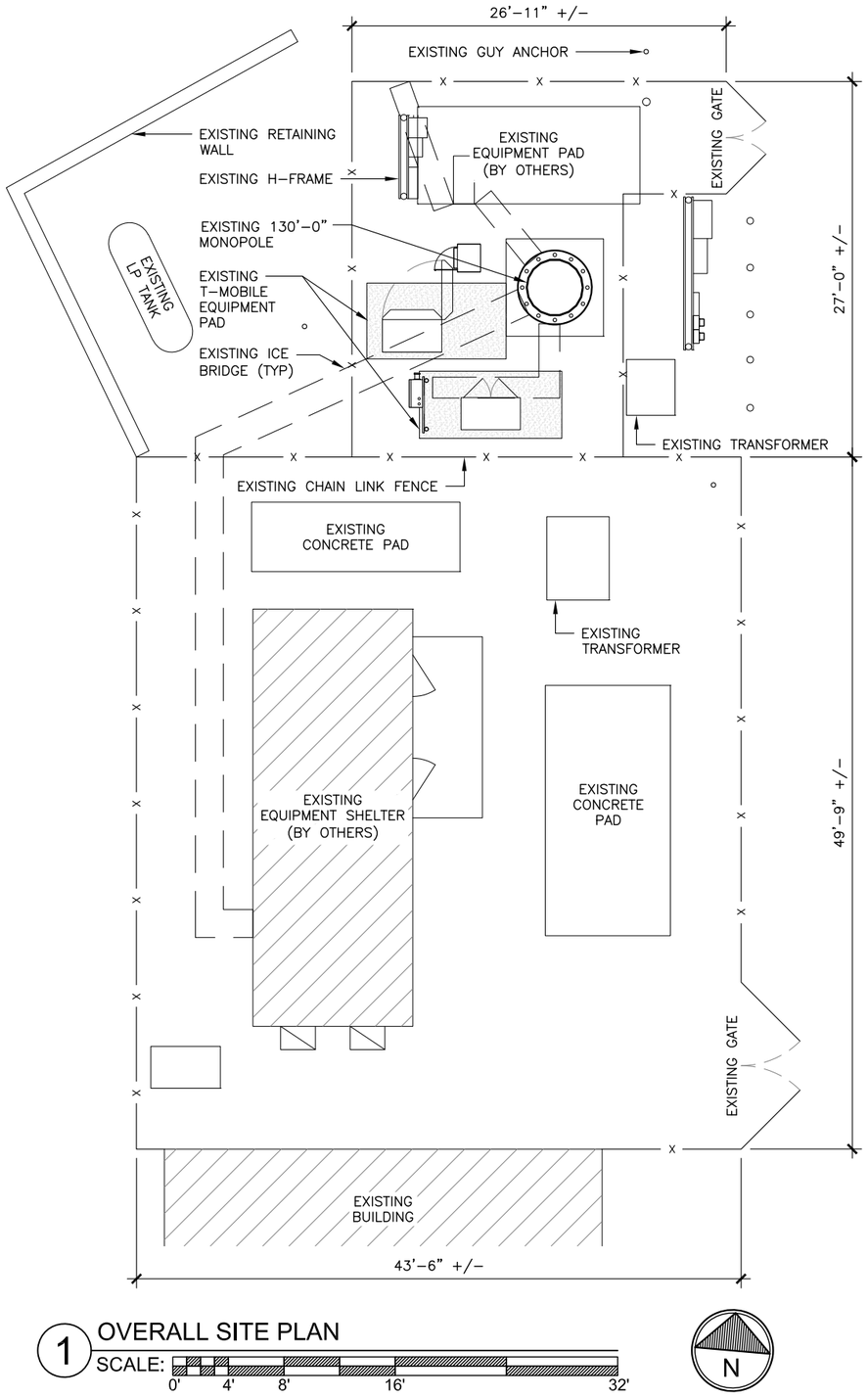
REV	DATE	DRWN	DESCRIPTION
0	7/31/19	JDP	CONSTRUCTION
1	9/25/19	RFC	CONSTRUCTION
2	12/10/20	MC	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

STATE OF CONNECTICUT
31627
LICENSED PROFESSIONAL ENGINEER
12/10/20

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

SHEET NUMBER: T-1
REVISION: 2



1 OVERALL SITE PLAN

SCALE: 0' 4' 8' 16' 32'

GENERAL NOTES:

1. SUBJECT PROPERTY IS SITUATED AT 725 FLANDERS RD, GROTON, CT 06340.

2. APPLICANT: T-MOBILE
A DELAWARE LIMITED LIABILITY COMPANY
4 SYLVAN WAY
PARSIPPANY, NEW JERSEY 07054
(973) 397-4800

   TOWER OWNER: CROWN CASTLE INTERNATIONAL

- THE APPLICANT IS TO UPDATE THEIR NETWORK BY INSTALLING THREE (3) NEW PANEL ANTENNAS, THREE (3) RRUS, AND THREE (3) ADDITIONAL CABLES MOUNTED ON AN EXISTING MONOPOLE.

3. THIS FACILITY SHALL BE VISITED ON THE AVERAGE OF ONCE A MONTH FOR MAINTENANCE AND SHALL BE MONITORED FROM A REMOTE FACILITY.

4. THE EXISTING SITE IS LOCATED AT LATITUDE OF 41.369955° N± AND LONGITUDE OF 72.008269° W±. THE HORIZONTAL DATUM ARE IN TERMS OF NORTH AMERICAN DATUM OF 1983 (NAD 83).

5. THIS SET OF PLANS HAS BEEN PREPARED FOR THE PURPOSES OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL CONDITIONS OF APPROVAL HAVE BEEN SATISFIED AND EACH OF THE DRAWINGS HAVE BEEN REVISED TO INDICATED "ISSUED FOR CONSTRUCTION"

6. ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREON SHALL BE IN ACCORDANCE WITH:

   6.A. CURRENT PREVAILING MUNICIPAL AND/OR COUNTY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
   6.B. CURRENT PREVAILING UTILITY COMPANY AUTHORITY SPECIFICATIONS, STANDARDS AND REQUIREMENTS.

7. THE CONTRACTOR SHALL NOTIFY B+T GROUP, P.A. IMMEDIATELY IF ANY FIELD-CONDITIONS ENCOUNTERED DIFFER FROM THOSE REPRESENTED HEREON, AND/OR IF SUCH CONDITIONS WOULD OR COULD RENDER THE DESIGNS SHOWN HEREON INAPPROPRIATE AND/OR INEFFECTIVE.

8. THE CONTRACTOR IS RESPONSIBLE TO PROTECT, REPAIR AND/OR REPLACE ANY DAMAGED STRUCTURES, UTILITIES OR LANDSCAPED AREA WHICH MAY BE DISTURBED DURING THE CONSTRUCTION OF THIS FACILITY.

9. THE CONSTRUCTION CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ALL CONSTRUCTION MEANS AND METHODS. THE CONSTRUCTION CONTRACTOR IS ALSO RESPONSIBLE FOR ALL JOB SITE SAFETY.

10. SITE INFORMATION SHOWN TAKEN FROM CROWN CASTLE SITE PLANS AND FROM CROWN CASTLE INSPECTION PHOTOS.

11. NO GUARANTEE IS MADE NOR SHOULD BE ASSUMED AS TO THE COMPLETENESS OR ACCURACY OF THE HORIZONTAL OR VERTICAL LOCATIONS. ALL PARTIES UTILIZING THIS INFORMATION SHALL FIELD VERIFY THE ACCURACY AND COMPLETENESS OF THE INFORMATION SHOWN PRIOR TO CONSTRUCTION ACTIVITIES.

12. ALL IMPROVEMENTS SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY THE TOWNSHIP ENGINEER WHO WILL BE GIVEN PROPER NOTIFICATION PRIOR TO THE START OF ANY CONSTRUCTION.

B+T GRP

CROWN CASTLE

T-Mobile

CT11044E
BU #: 824359
GROTON/ I-95/ X89/ NOA_1
725 FLANDERS RD
GROTON, CT 06340
EXISTING 130'-0" MONOPOLE

PROJECT NO:	137216.001.01
CHECKED BY:	GEH

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	7/31/19	JDP	CONSTRUCTION
1	9/25/19	RFC	CONSTRUCTION
2	12/10/20	MC	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER

12/10/20

SHEET NUMBER: A-1

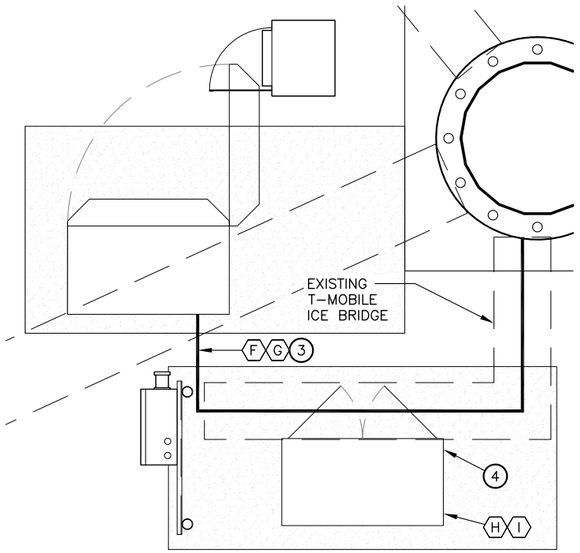
REVISION: 2

LEGEND

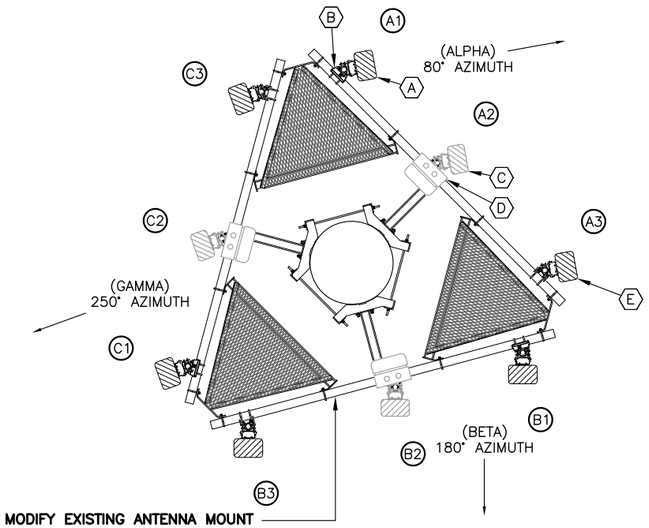
EXISTING/DEMOLITION NOTES		INSTALLATION NOTES	
A	EXISTING ERICSSON AIR21 KRC118023-1_B2A_B4P ANTENNA TO REMAIN (TOTAL OF 3)	1	INSTALL RFS APXVAARR24_43-U-NA20 (8 FT) ANTENNAS ON EXISTING MOUNT. PROVIDE NEW 2 7/8" OD SCH.40 PIPE MAST (LENGTH TO BE V.I.F) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
B	EXISTING TMA TO REMAIN (TOTAL OF 3)	2	INSTALL RADIO 4449 B12/B71 (TYP. OF 1 PER SECTOR, TOTAL OF 3)
C	EXISTING ANDREW LNX-6515DS-A1M ANTENNA TO BE REMOVED (TOTAL OF 3)	3	INSTALL (3) 6x12 HCS FIBER. RUN FROM EQUIPMENT TO ANTENNAS FOLLOWING EXISTING ROUTING
D	EXISTING RRUS11 B12 RADIO TO BE REMOVED (TOTAL OF 3)	4	INSTALL (2) NEW BB6630 IN EXISTING 6131 CABINET
E	EXISTING ERICSSON AIR21 KRC118023-1_B2P_B4A ANTENNA TO REMAIN (TOTAL OF 3)		
F	EXISTING 9X18 HCS FIBER TO REMAIN (TOTAL OF 1)		
G	EXISTING 1 5/8" COAX (6) TO REMAIN (6) TO BE REMOVED (TOTAL OF 12)		
H	REMOVE (1) EXISTING DUS41 FROM EXISTING 6131 CABINET		
I	REMOVE (1) EXISTING XMU FROM EXISTING 6131 CABINET		

ANTENNA AND CABLE SCHEDULE

SECTOR	POSITION	EXISTING ANTENNAS	PROPOSED ANTENNA CONFIGURATION		E-TILT	M-TILT	ANTENNA CENTERLINE	TMA/RRU	CABLES	JUMPER TYPE	CABLE LENGTH
80° – ALPHA	A1	ERICSSON AIR21 KRC118023-1_B2A_B4P	UMTS GSM	B4	2°/2°	0°	132'-0"	1/1	(2) 1 5/8" COAX **(1) 6x12 HCS FIBER**	(2) FIBER	182'-0"
	A2	**RFS APXVAARR24_43-U-NA20**	**LTE**	**B71 B12**	**2°/2°**	**0°**	**131'-0"**	**0/1**	**(1) 6x12 HCS FIBER**	**(4) COAX (1) FIBER**	**182'-0"**
	A3	ERICSSON AIR21 KRC118023-1_B2P_B4A	LTE	–	2°	0°	132'-0"	0/0	**(1) 6X12 HCS FIBER**	(2) FIBER	182'-0"
180° – BETA	B1	ERICSSON AIR21 KRC118023-1_B2A_B4P	UMTS GSM	B4	2°/2°	0°	132'-0"	1/1	(2) 1 5/8" COAX **SHARED FIBER**	(2) FIBER	182'-0"
	B2	**RFS APXVAARR24_43-U-NA20**	**LTE**	**B71 B12**	**2°/2°**	**0°**	**131'-0"**	**0/1**	**SHARED FIBER**	**(4) COAX (1) FIBER**	**–**
	B3	ERICSSON AIR21 KRC118023-1_B2P_B4A	LTE	–	2°	0°	132'-0"	0/0	(1) 9x18 HCS FIBER	(2) FIBER	182'-0"
250° – GAMMA	C1	ERICSSON AIR21 KRC118023-1_B2A_B4P	UMTS GSM	B4	2°/2°	0°	132'-0"	1/1	(2) 1 5/8" COAX **SHARED FIBER**	(2) FIBER	182'-0"
	C2	**RFS APXVAARR24_43-U-NA20**	**LTE**	**B71 B12**	**2°/2°**	**0°**	**131'-0"**	**0/1**	**SHARED FIBER**	**(4) COAX (1) FIBER**	**–**
	C3	ERICSSON AIR21 KRC118023-1_B2P_B4A	LTE	–	2°	0°	132'-0"	0/0	SHARED FIBER	(2) FIBER	182'-0"



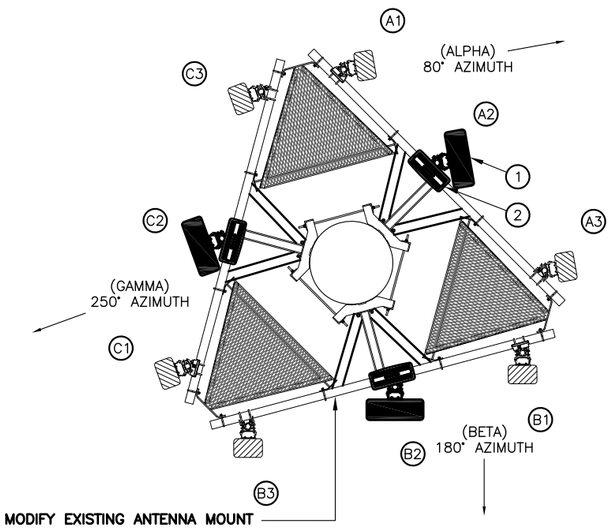
1 ENLARGED AREA PLAN
SCALE: 0' 1' 2' 4' 10'



MODIFY EXISTING ANTENNA MOUNT PER MA BY PAUL J FORD AND COMPANY DATED 6/5/19

2 EXISTING ANTENNA ORIENTATION
SCALE: 0' 1' 4' 8' 16'

N



MODIFY EXISTING ANTENNA MOUNT PER MA BY PAUL J FORD AND COMPANY DATED 6/5/19

3 PROPOSED ANTENNA ORIENTATION
SCALE: 0' 1' 4' 8' 16'

N

B+T GRP

CROWN CASTLE

T-Mobile

CT11044E
BU #: 824359
GROTON/ I-95/ X89/ NOA_1

725 FLANDERS RD
GROTON, CT 06340

EXISTING 130'-0" MONOPOLE

PROJECT NO:	137216.001.01
CHECKED BY:	GEH

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	7/31/19	JDP	CONSTRUCTION
1	9/25/19	RFC	CONSTRUCTION
2	12/10/20	MC	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

STATE OF CONNECTICUT * 31627 LICENSED PROFESSIONAL ENGINEER *

12/10/20

SHEET NUMBER:	REVISION:
A-2	2

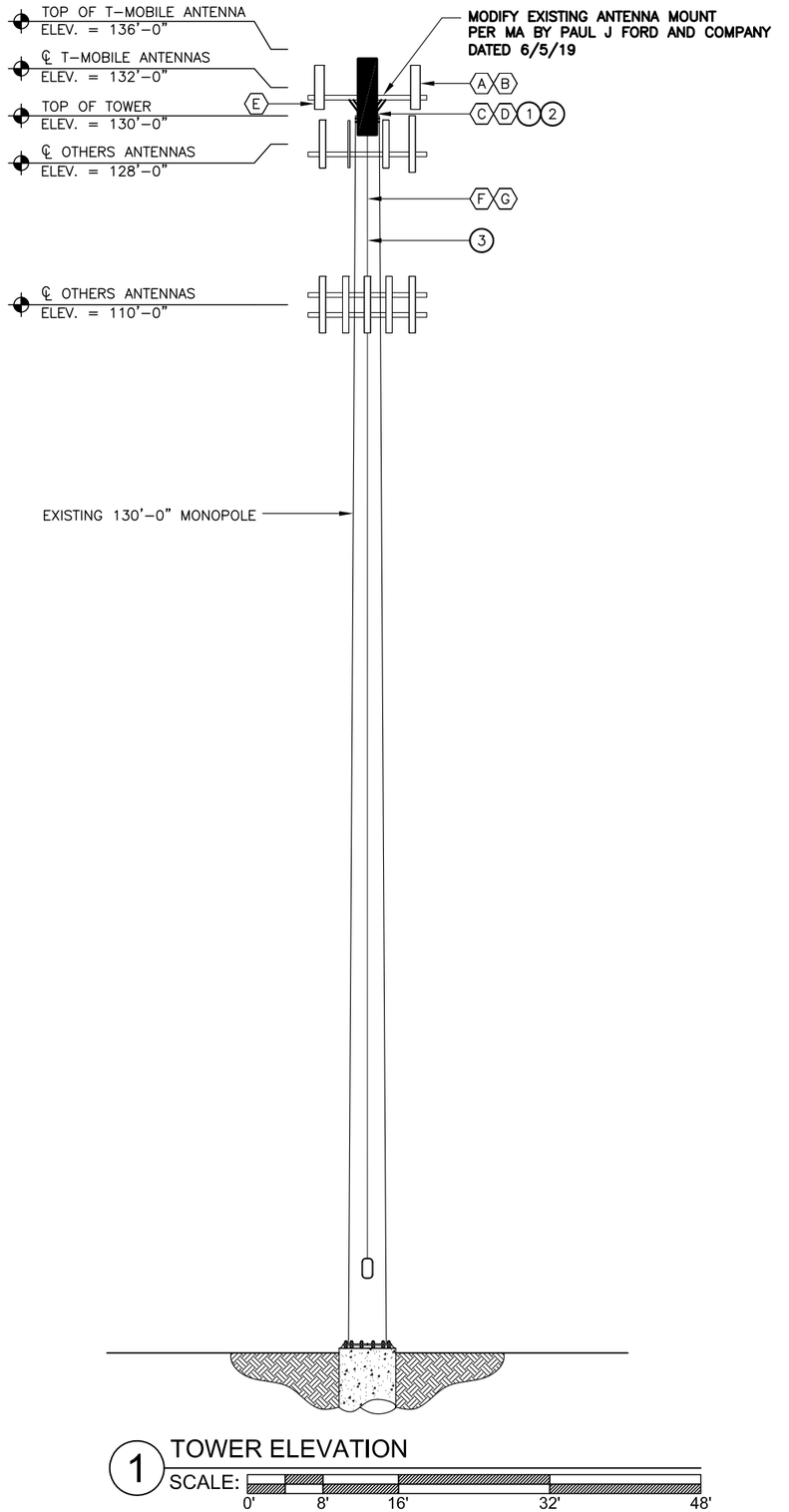
LEGEND			
EXISTING/DEMOLITION NOTES		INSTALLATION NOTES	
A	EXISTING ERICSSON AIR21 KRC118023-1_B2A_B4P ANTENNA TO REMAIN (TOTAL OF 3)	1	INSTALL RFS APXVAARR24_43-U-NA20 (8 FT) ANTENNAS ON EXISTING MOUNT. PROVIDE NEW 2 7/8" OD SCH.40 PIPE MAST (LENGTH TO BE V.I.F) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
B	EXISTING TMA TO REMAIN (TOTAL OF 3)	2	INSTALL RADIO 4449 B12/B71 (TYP. OF 1 PER SECTOR, TOTAL OF 3)
C	EXISTING ANDREW LNX-6515DS-A1M ANTENNA TO BE REMOVED (TOTAL OF 3)	3	INSTALL (3) 6x12 HCS FIBER. RUN FROM EQUIPMENT TO ANTENNAS FOLLOWING EXISTING ROUTING
D	EXISTING RRUS11 B12 RADIO TO BE REMOVED (TOTAL OF 3)		
E	EXISTING ERICSSON AIR21 KRC118023-1_B2P_B4A ANTENNA TO REMAIN (TOTAL OF 3)		
F	EXISTING 9X18 HCS FIBER TO REMAIN (TOTAL OF 1)		
G	EXISTING 1 5/8" COAX (6) TO REMAIN (6) TO BE REMOVED (TOTAL OF 12)		

EXISTING TOWER IS SUFFICIENT PER STRUCTURAL ANALYSIS BY CROWN CASTLE DATED 11/20/20.

EXISTING MOUNT TO BE MODIFIED PER MOUNT ANALYSIS BY PAUL J FORD & COMPANY DATED 6/5/19.

LEGEND:

- **NEW**
- EXISTING
- FUTURE



1 TOWER ELEVATION

SCALE: 0' 8' 16' 32' 48'

B+T GRP

CROWN CASTLE

T-Mobile

CT11044E
BU #: 824359
GROTON/ I-95/ X89/ NOA_1

725 FLANDERS RD
GROTON, CT 06340

EXISTING 130'-0" MONOPOLE

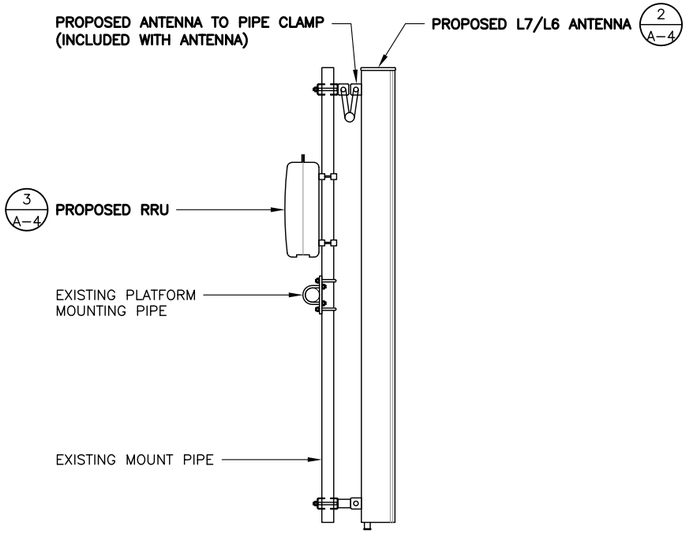
PROJECT NO:	137216.001.01
CHECKED BY:	GEH

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	7/31/19	JDP	CONSTRUCTION
1	9/25/19	RFC	CONSTRUCTION
2	12/10/20	MC	CONSTRUCTION

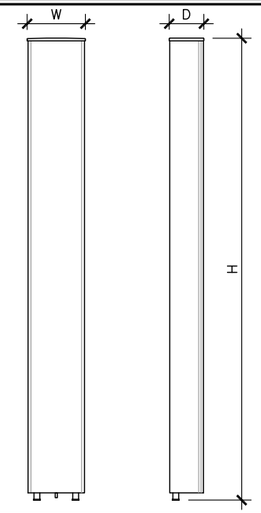
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER:	REVISION:
A-3	2



1 PROPOSED L7/L6 ANTENNA & RRU MOUNTING DETAIL

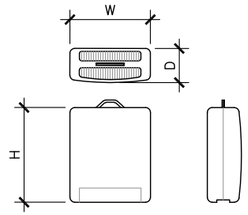
SCALE: 3/8" = 1'-0"



ANTENNA SPECS	
MANUFACTURER	RFS
MODEL #	APXVAARR24_43-U-NA20
WIDTH	24.0"
DEPTH	8.7"
HEIGHT	95.9"
WEIGHT	128.0 LBS

2 L7/L6 ANTENNA DETAIL

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

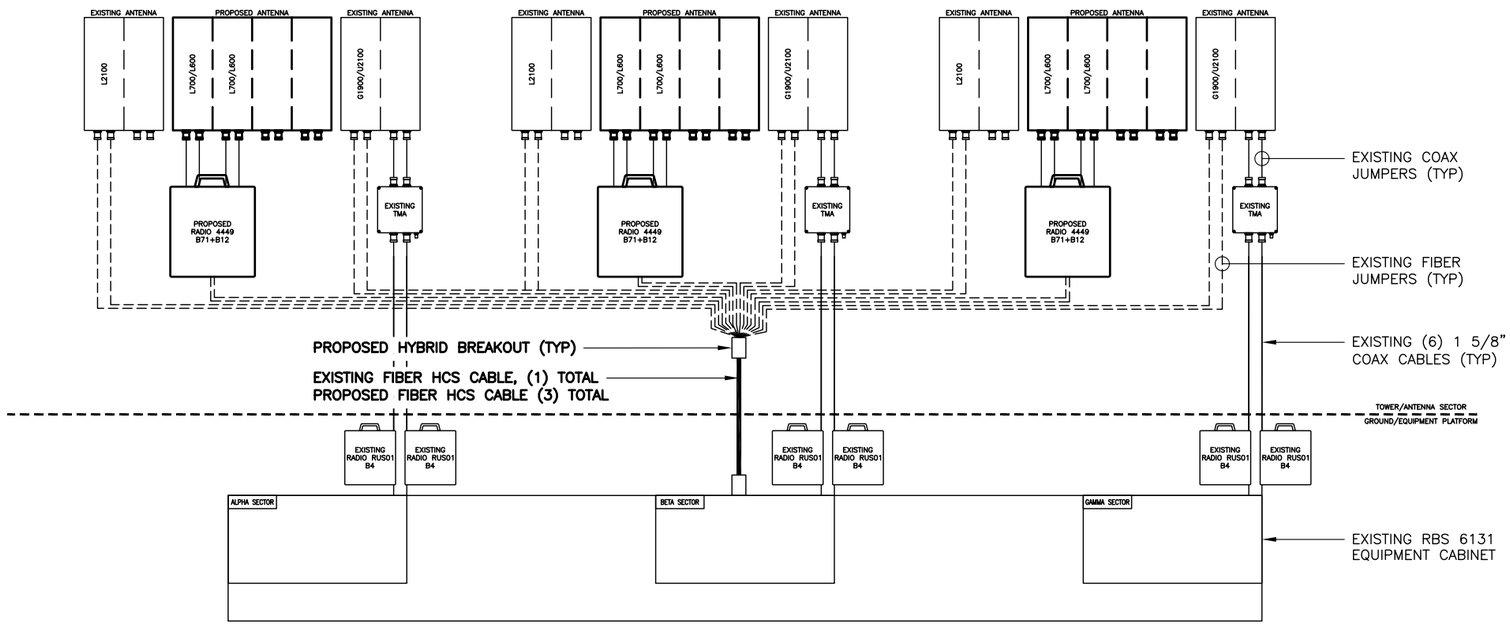


RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	4449
WIDTH	13.2"
DEPTH	10.4"
HEIGHT	14.9"
WEIGHT	74 LBS

3 REMOTE RADIO UNIT (RRU)

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

NOTES:
1. TAG ALL EXISTING AND PROPOSED CABLES/JUMPERS PER T-MOBILE SPECIFICATIONS.
2. SEE RF SCHEDULE FOR CABLE AND JUMPER LENGTHS.
3. REFER TO ANTENNA ORIENTATION ON SHEET A-2 FOR EXACT ANTENNA POSITIONING.



4 ANTENNA & CABLING SCHEMATIC

SCALE: N.T.S.

B+T GRP

CROWN CASTLE

T-Mobile

CT11044E
BU #: 824359
GROTON/ I-95/ X89/ NOA_1
725 FLANDERS RD
GROTON, CT 06340
EXISTING 130'-0" MONOPOLE

PROJECT NO:	137216.001.01
CHECKED BY:	GEH

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	7/31/19	JDP	CONSTRUCTION
1	9/25/19	RFC	CONSTRUCTION
2	12/10/20	MC	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

STATE OF CONNECTICUT 31627 LICENSED PROFESSIONAL ENGINEER

12/10/20

SHEET NUMBER: A-4

REVISION: 2

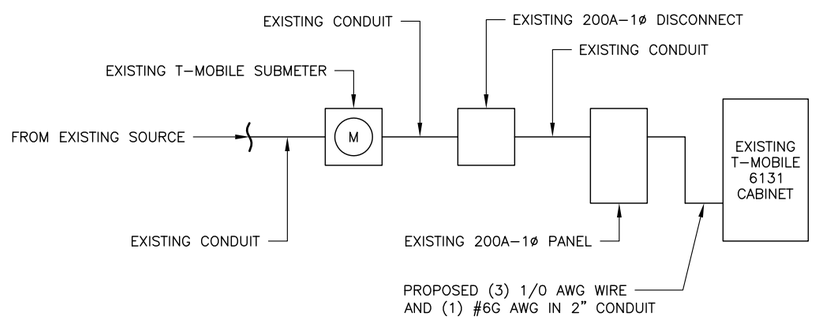
FINAL PANEL SCHEDULE							
LOAD	POLES	AMPS	BUS L1	BUS L2	AMPS	POLES	LOAD
S12000	1	20A	1	2	50A	2	BTS
RBS 6131	2	**100A**	3	4			
			5	6			

RATED VOLTAGE: ■120/240 □_____. 1 PHASE, 3 WIRE		BRANCH POLES: ■16 □24 □30 □42		APPROVED MF'RS
RATED AMPS: □100 ■200 □400 □_____.		CABINET: ■SURFACE □FLUSH		NEMA □1 ■3R □4X
□MAIN LUGS ONLY	MAIN 200 AMPS ■BREAKER □FUSED SWITCH	■HINGED DOOR		■KEYED DOOR LATCH
□FUSED ■CIRCUIT BREAKER	BRANCH DEVICES	□_____ TO BE GFCI BREAKERS		FULL NEUTRAL BUS / GROUND BAR
ALL BREAKERS MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF 10,000 AMPS SYMMETRICAL				

REPLACE EXISTING BREAKER IN POSITION 3 AND 5 WITH A NEW 2P 100A BREAKER
REPLACE EXISTING WIRES FOR EXISTING 6131 CABINET WITH (3) 1/0 AWG THWN (COPPER) AND (1) #6G AWG. MINIMUM CONDUIT SIZE TO BE 2".
IF 100A BREAKER WILL NOT PROPERLY FIT IN EXISTING PANEL, REPLACE (E) PANEL WITH SQUARE D PANEL QO12040M200RB (OR APPROVED EQUAL).
UPGRADE FEEDER WIRES TO MEET AMPACITY IF NEW PANEL IS REQUIRED.
FINAL PANEL DESIGN AND CALCULATIONS FOR WIRE SIZE WERE BASED OFF OF EXISTING PHOTOS

1 FINAL T-MOBILE PANEL DETAIL

SCALE: N.T.S.



2 ONE-LINE DIAGRAM

SCALE: N.T.S.

B+T GRP

CROWN CASTLE

T···Mobile

CT11044E
BU #: 824359
GROTON/ I-95/ X89/ NOA_1
725 FLANDERS RD
GROTON, CT 06340
EXISTING 130'-0" MONOPOLE

PROJECT NO:	137216.001.01
CHECKED BY:	GEH

ISSUED FOR:

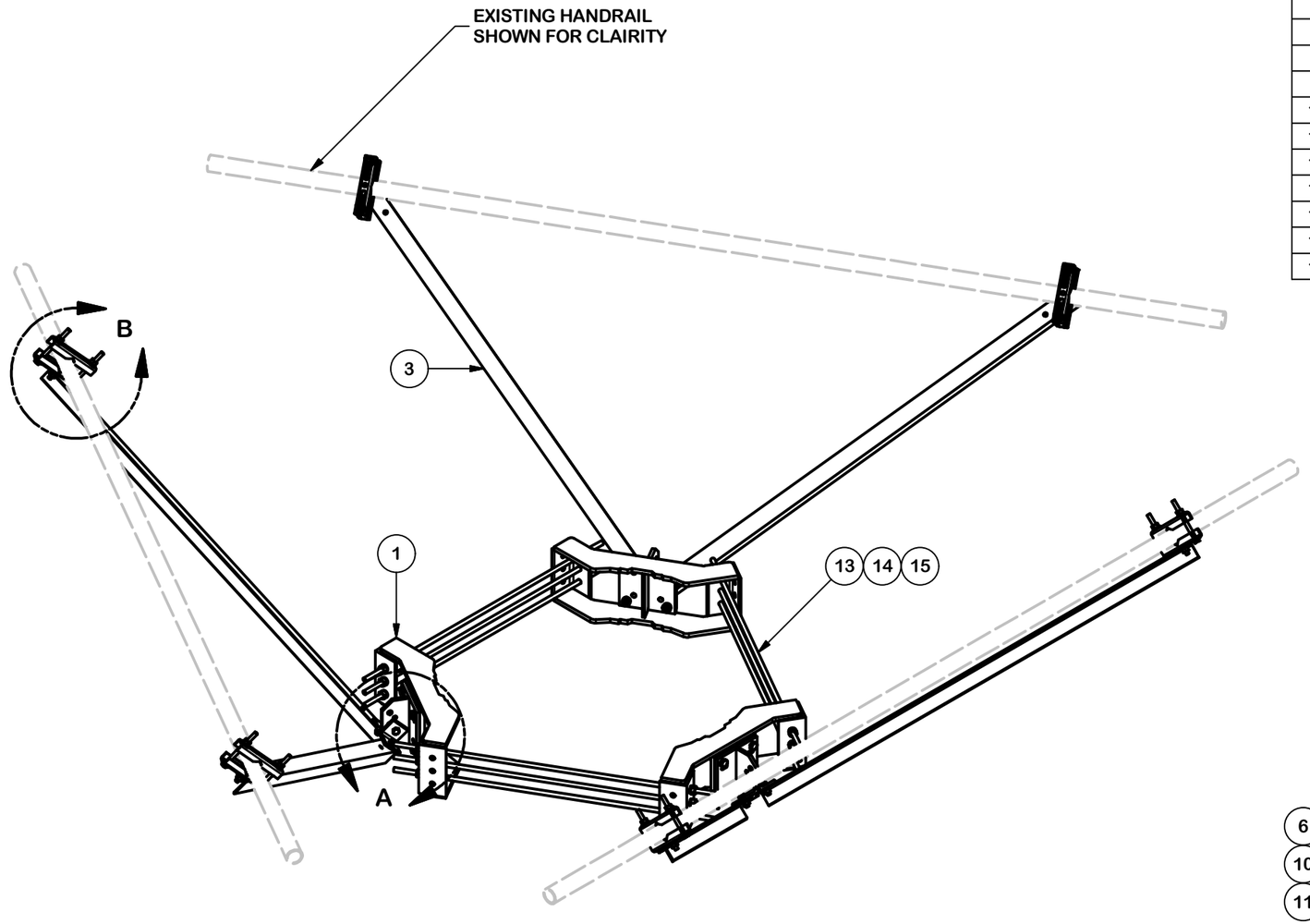
REV	DATE	DRWN	DESCRIPTION
0	7/31/19	JDP	CONSTRUCTION
1	9/25/19	RFC	CONSTRUCTION
2	12/10/20	MC	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

STATE OF CONNECTICUT 31627 LICENSED PROFESSIONAL ENGINEER

12/10/20

SHEET NUMBER:	REVISION:
E-1	2



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	X-LWRM	RING MOUNT WELDMENT		68.81	206.42
2	3	X-TBW	T-BRACKET WELDMENT		13.60	40.80
3	6	X-254924	DIAGONAL ANGLE - SITE PRO 1	72 in	19.71	118.24
4	12	X-STU	STIFF ARM CHANNEL BRACKET	8 1/2 in	1.37	16.46
5	6	SHCM-T	CHAIN MOUNT TIGHTENER BRACKET	3 in	1.86	11.15
6	12	G12112	1/2" x 1-1/2" HDG HEX BOLT GR5	1/2 in	0.15	1.77
7	3	G12212	1/2" x 2-1/2" HDG HEX BOLT GR5	2 1/2 in	0.20	0.61
8	12	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	6 1/2 in	0.41	4.91
9	24	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	0.82
10	27	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	0.38
11	27	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.93
12	12	A582114	5/8" x 2-1/4" HDG A325 HEX BOLT	2 1/4 in	0.31	3.75
13	9	G58R-24	5/8" x 24" THREADED ROD (HDG.)	24 in	0.40	3.59
13	9	G58R-48	5/8" x 48" THREADED ROD (HDG.)	48 in	0.40	3.59
14	30	G58LW	5/8" HDG LOCKWASHER		0.03	0.78
15	30	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	3.90
					TOTAL WT. #	642.04

DETAIL A

DETAIL B

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED MAX. DIA. FOR HANDRAIL CONNECTION	SP1	BC	10/25/2017

REVISION HISTORY

TOLERANCE NOTES

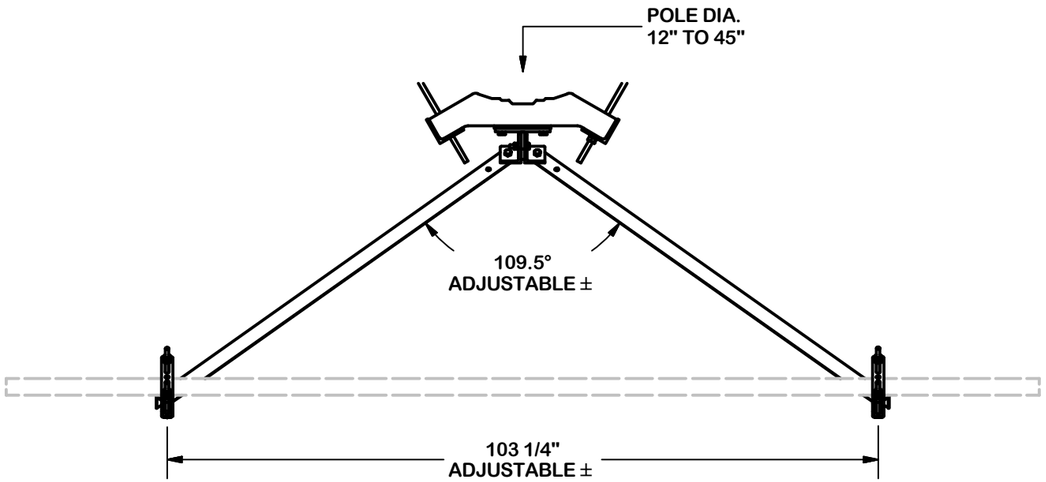
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES (± 0.030")
DRILLED AND GAS CUT HOLES (± 0.030") - NO CONING OF HOLES
LASER CUT EDGES AND HOLES (± 0.010") - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING (± 0.030")
ALL OTHER ASSEMBLY (± 0.060")

DESCRIPTION: HANDRAIL REINFORCEMENT KIT (LONG)

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
SP1	CSL3 2/23/2017	3RD PARTY	PRK-SFS-L

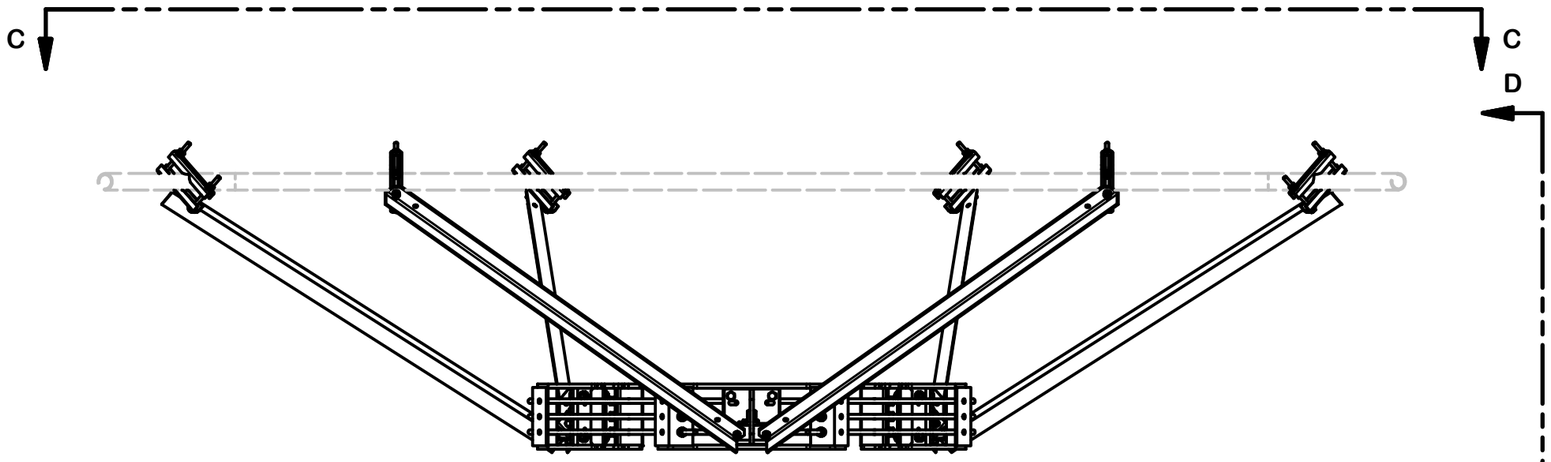
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	SHOP	BMC 9/8/2017	PRK-SFS-L

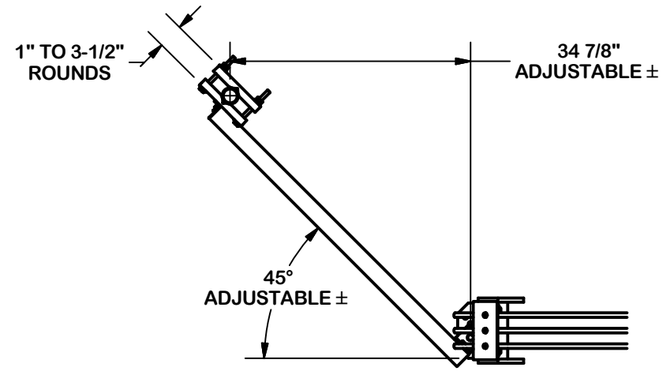
SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX



PARTIAL VIEW C-C

VERTICAL POSITION





PARTIAL VIEW D-D

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED MAX. DIA. FOR HANDRAIL CONNECTION	SP1	BC	10/25/2017

REVISION HISTORY

TOLERANCE NOTES

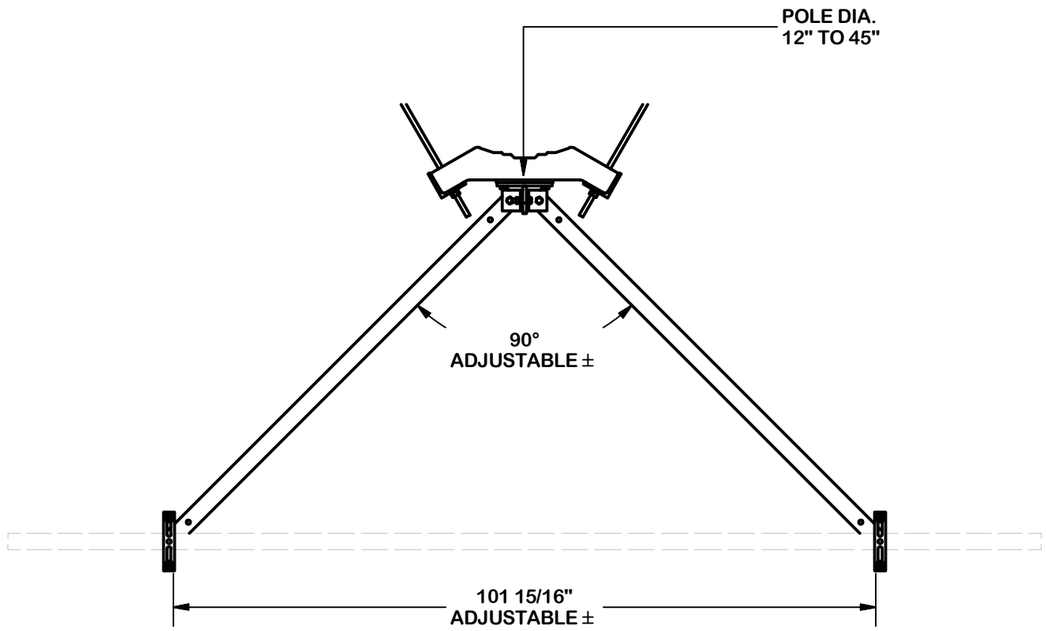
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES (± 0.030")
DRILLED AND GAS CUT HOLES (± 0.030") - NO CONING OF HOLES
LASER CUT EDGES AND HOLES (± 0.010") - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING (± 0.030")
ALL OTHER ASSEMBLY (± 0.060")

DESCRIPTION: HANDRAIL REINFORCEMENT KIT (LONG)

SITE PRO 1 — A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

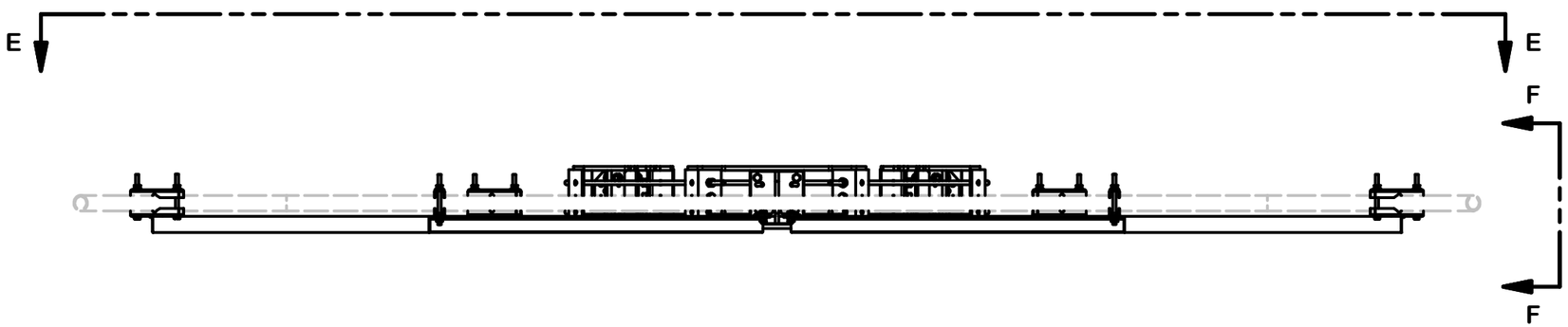
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
SP1	CSL3 2/23/2017	3RD PARTY	PRK-SFS-L

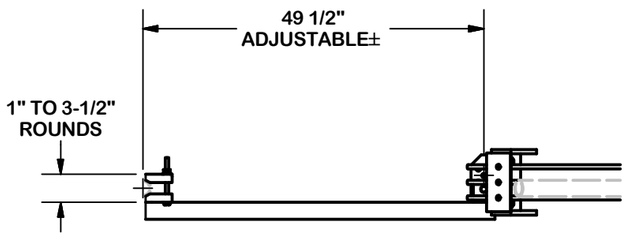
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	SHOP	BMC 9/8/2017	PRK-SFS-L



PARTIAL VIEW E-E

HORIZONTAL POSITION





PARTIAL VIEW F-F

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES (± 0.030")
DRILLED AND GAS CUT HOLES (± 0.030") - NO CONING OF HOLES
LASER CUT EDGES AND HOLES (± 0.010") - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING (± 0.030")
ALL OTHER ASSEMBLY (± 0.060")

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED MAX. DIA. FOR HANDRAIL CONNECTION	SP1	BC	10/25/2017

REVISION HISTORY

DESCRIPTION
HANDRAIL REINFORCEMENT KIT (LONG)

CPD NO.	DRAWN BY	ENG. APPROVAL
SP1	CSL3 2/23/2017	3RD PARTY

CLASS	SUB	DRAWING USAGE	CHECKED BY
81	02	SHOP	BMC 9/8/2017

SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

PART NO. PRK-SFS-L

DWG. NO. PRK-SFS-L

Exhibit D

Structural Analysis Report

Date: **November 20, 2020**

Rebecca Klein
Crown Castle
6325 Ardrey Kell Road, Suite 600
Charlotte, NC 28277

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11044E
	Carrier Site Name:	Groton/ I-95/ X89/ Noa_1
Crown Castle Designation:	**Crown Castle BU Number:**	824359
	Crown Castle Site Name:	Groton/ I-95/ X89/ Noa_1
	Crown Castle JDE Job Number:	559238
	Crown Castle Work Order Number:	1901214
	Crown Castle Order Number:	479800 Rev. 2
Engineering Firm Designation:	**Crown Castle Project Number:**	1901214
Site Data:	**725 Flanders Rd, Groton, New London County, CT**	
	Latitude *41° 22' 11.74"*, Longitude *-72° 0' 29.77"*	
	130 Foot - Monopole Tower	

Dear Rebecca Klein,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

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

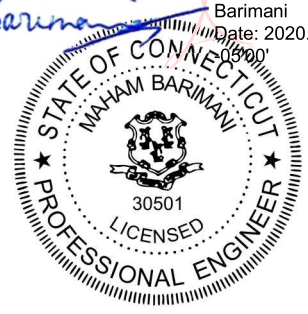
LC5: Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 135 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - ''Analysis Criteria''.

Structural analysis prepared by: Nicholas Cvetic, E.I.T.

Respectfully submitted by:

Digitally signed by Maham Barimani
Date: 2020.11.20 16:06:43 -05'00'



Maham Barimani, P.E.
Senior Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 130 ft monopole tower designed by Pirod Manufacturers, Inc.

The tower has been modified in the past to accommodate additional loading. The modifications are considered ineffective in this analysis.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	135 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
133.0	133.0	1	site pro 1	PRK-SFS-L Stabilizer Kit	10	1-5/8
		1	tower mounts	Platform Mount [LP 405-1]		
		1	tower mounts	Side Arm Mount [SO 102-1]		
	132.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe		
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe		
		3	ericsson	KRY 112 144/1		
		3	ericsson	RADIO 4449 B12/B71		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
122.0	124.0	4	cci antennas	DMP65R-BU4D w/ Mount Pipe	6 3 2 3	1-1/4 7/8 3/4 3/8
		2	cci antennas	DMP65R-BU8D w/ Mount Pipe		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS 8843 B2/B66A		
		3	powerwave tech	7770.00 w/ Mount Pipe		
		3	powerwave tech	LGP21401		
		1	raycap	DC6-48-60-18-8F		
		1	raycap	DC9-48-60-24-8C-EV		
	122.0	1	tower mounts	Side Arm Mount [SO 102-1]		
		1	tower mounts	T-Arm Mount[TA 601-3]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
110.0	110.0	6	antel	LPA-80063/6CF w/ Mount Pipe	20	1-5/8
		3	commscope	LNX-6514DS-A1M w/ Mount Pipe		
		2	rfs celwave	DB-T1-6Z-8AB-0Z		
		1	tower mounts	Platform Mount [LP 303-1]		
	109.0	3	alcatel lucent	RRH2X60-AWS		
		3	alcatel lucent	RRH2X60-PCS		
		6	commscope	HBXX-6517DS-A2M w/ Mount Pipe		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	French & Parrello Associates, P.A.	3472178	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	FDH (Mapping)	3804602	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Pirod Manufacturers, Inc.	3472179	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Structural Components	3472487	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.7.5), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

3.2) Assumptions

1) Tower and structures were maintained in accordance with the TIA-222 Standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) Base and flange plate design methodology of the manufacturer has been reviewed and found to be an acceptable means of designing to resist the full capacity of the bolts and shaft.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	130 - 120	Pole	P30x3/8	1	-7.9480	1376.6129	10.9	Pass
L2	120 - 100	Pole	P36x3/8	2	-14.8677	1564.6049	33.0	Pass
L3	100 - 80	Pole	P42x3/8	3	-19.6959	1752.3134	50.0	Pass
L4	80 - 60	Pole	P48x3/8	4	-27.0125	1939.8644	62.1	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L5	60 - 40	Pole	P54x3/8	5	-33.7299	2127.2999	71.2	Pass
L6	40 - 20	Pole	P60x3/8	6	-41.0757	2314.6514	77.5	Pass
L7	20 - 0	Pole	P60x3/4	7	-54.0320	5506.4412	46.0	Pass
							Summary	
						Pole (L6)	77.5	Pass
						Rating =	77.5	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Bolts	120	10.2	Pass
1,2	Flange Plates		10.9	Pass
1	Flange Bolts	100	33.4	Pass
1,2	Flange Plates		33.4	Pass
1	Flange Bolts	80	52.3	Pass
1,2	Flange Plates		52.3	Pass
1	Flange Bolts	60	65.8	Pass
1,2	Flange Plates		65.8	Pass
1	Flange Bolts	40	63.5	Pass
1,2	Flange Plates		71.2	Pass
1	Flange Bolts	20	45.5	Pass
1,2	Flange Plates		77.5	Pass
1	Anchor Rods	0	44.0	Pass
1,2	Base Plate		46.0	Pass
1	Base Foundation (Structure)	0	64.8	Pass
	Base Foundation (Soil Interaction)		85.6	Pass

Structure Rating (max from all components) =	85.6%

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity consumed.
2) Base/flange plates are assumed to have the same capacity as their respective splice bolts or shaft.

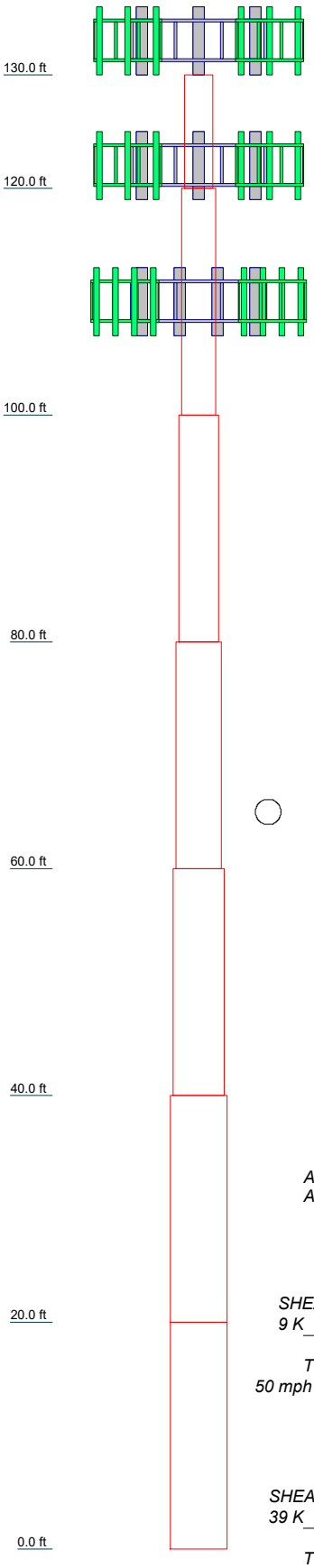
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Size	Length (ft)	Grade	Weight (K)
1	P30x3/8	10.0000	A53-B-42	1.2
2	P36x3/8	20.0000		2.9
3	P42x3/8	20.0000		3.3
4	P48x3/8	20.0000		3.8
5	P54x3/8	20.0000		4.3
6	P60x3/8	20.0000		4.8
7	P60x3/4	20.0000		9.5
				29.8



MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi			

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 135 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 77.5%

ALL REACTIONS ARE FACTORED

AXIAL 83 K

SHEAR 9 K *MOMENT 771 kip-ft*

TORQUE 0 kip-ft
50 mph WIND - 1.5000 in ICE

AXIAL 54 K

SHEAR 39 K *MOMENT 3578 kip-ft*

TORQUE 2 kip-ft
REACTIONS - 135 mph WIND

CROWN CASTLE
The Pathway to Possible

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX:

Job: ***BU# 824359***			
Project:			
Client: Crown Castle	Drawn by: NCvetic		App'd:
Code: TIA-222-H	Date: 11/20/20		Scale: NTS
Path: \\netapp4\cad\Structural Work Area\820000-829999\824359\WO 1901214 - SA\Prod\824359_RPA.er			Dwg No. E-1

Tower Input Data

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

4) Tower is located in New London County, Connecticut.
5) Tower base elevation above sea level: 193.0000 ft.
6) Basic wind speed of 135 mph.
7) Risk Category II.
8) Exposure Category C.
9) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
10) Topographic Category: 1.
11) Crest Height: 0.0000 ft.
12) Nominal ice thickness of 1.5000 in.
13) Ice thickness is considered to increase with height.
14) Ice density of 56.0000 pcf.
15) A wind speed of 50 mph is used in combination with ice.
16) Temperature drop of 50.0000 °F.
17) Deflections calculated using a wind speed of 60 mph.
18) A non-linear (P-delta) analysis was used.
19) Pressures are calculated at each section.
20) Stress ratio used in pole design is 1.05.
21) Tower analysis based on target reliabilities in accordance with Annex S.
22) Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
23) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Pole Section Geometry

Section	*Elevation*	*Section Length*	*Pole Size*	*Pole Grade*	*Socket Length*
	ft	*ft*			*ft*
L1	130.0000-120.0000	10.0000	P30x3/8	A53-B-42 (42 ksi)	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L2	120.0000-100.0000	20.0000	P36x3/8	A53-B-42 (42 ksi)	
L3	100.0000-80.0000	20.0000	P42x3/8	A53-B-42 (42 ksi)	
L4	80.0000-60.0000	20.0000	P48x3/8	A53-B-42 (42 ksi)	
L5	60.0000-40.0000	20.0000	P54x3/8	A53-B-42 (42 ksi)	
L6	40.0000-20.0000	20.0000	P60x3/8	A53-B-42 (42 ksi)	
L7	20.0000-0.0000	20.0000	P60x3/4	A53-B-42 (42 ksi)	

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 130.0000-120.0000				1	1	1			
L2 120.0000-100.0000				1	1	1			
L3 100.0000-80.0000				1	1	1			
L4 80.0000-60.0000				1	1	1			
L5 60.0000-40.0000				1	1	1			
L6 40.0000-20.0000				1	1	1			
L7 20.0000-0.0000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
Channel C8x18.75	A	No	Surface Af (CaAa)	79.4200 - 60.5800	1	1	0.000 0.000	8.0000	21.0600	18.7500
Channel C8x18.75	B	No	Surface Af (CaAa)	79.4200 - 60.5800	1	1	0.000 0.000	8.0000	21.0600	18.7500
Channel C8x18.75	C	No	Surface Af (CaAa)	79.4200 - 60.5800	1	1	0.000 0.000	8.0000	21.0600	18.7500
LDF7-50A(1-5/8) **	C	No	Surface Ar (CaAa)	110.0000 - 0.0000	8	6	0.000 0.000	1.9800		0.8200

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1-3/4 SR	A	No	No	CaAa (Out Of Face)	72.9000 - 0.0000	1	No Ice	0.1750	8.1846
							1/2" Ice	0.2750	9.5591
							1" Ice	0.3750	11.5444
							2" Ice	0.5750	17.3476
1-3/4 SR	B	No	No	CaAa (Out	72.9000 -	1	No Ice	0.1750	8.1846

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
				Of Face)	0.0000		1/2" Ice	0.2750	9.5591
							1" Ice	0.3750	11.5444
							2" Ice	0.5750	17.3476
1-3/4 SR	C	No	No	CaAa (Out Of Face)	72.9000 - 0.0000	1	No Ice	0.1750	8.1846
							1/2" Ice	0.2750	9.5591
							1" Ice	0.3750	11.5444
							2" Ice	0.5750	17.3476
**									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	130.0000 - 0.0000	10	No Ice	0.0000	0.8200
							1/2" Ice	0.0000	0.8200
							1" Ice	0.0000	0.8200
							2" Ice	0.0000	0.8200
**									
LDF6-50A(1-1/4)	B	No	No	Inside Pole	122.0000 - 0.0000	6	No Ice	0.0000	0.6000
							1/2" Ice	0.0000	0.6000
							1" Ice	0.0000	0.6000
							2" Ice	0.0000	0.6000
WR-VG66ST-BRD(7/8")	B	No	No	Inside Pole	122.0000 - 0.0000	3	No Ice	0.0000	0.9120
							1/2" Ice	0.0000	0.9120
							1" Ice	0.0000	0.9120
							2" Ice	0.0000	0.9120
WR-VG86ST-BRD(3/4")	B	No	No	Inside Pole	122.0000 - 0.0000	2	No Ice	0.0000	0.5840
							1/2" Ice	0.0000	0.5840
							1" Ice	0.0000	0.5840
							2" Ice	0.0000	0.5840
FB-L98B-034-XXXXXX(3/8")	B	No	No	Inside Pole	122.0000 - 0.0000	3	No Ice	0.0000	0.0500
							1/2" Ice	0.0000	0.0500
							1" Ice	0.0000	0.0500
							2" Ice	0.0000	0.0500
**									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	110.0000 - 0.0000	12	No Ice	0.0000	0.8200
							1/2" Ice	0.0000	0.8200
							1" Ice	0.0000	0.8200
							2" Ice	0.0000	0.8200
**									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130.0000-120.0000	A	0.000	0.000	0.000	0.000	0.0000
		B	0.000	0.000	0.000	0.000	0.0153
		C	0.000	0.000	0.000	0.000	0.0820
L2	120.0000-100.0000	A	0.000	0.000	0.000	0.000	0.0000
		B	0.000	0.000	0.000	0.000	0.1531
		C	0.000	0.000	11.880	0.000	0.3280
L3	100.0000-80.0000	A	0.000	0.000	0.000	0.000	0.0000
		B	0.000	0.000	0.000	0.000	0.1531
		C	0.000	0.000	23.760	0.000	0.4920
L4	80.0000-60.0000	A	0.000	0.000	25.120	2.257	0.4588
		B	0.000	0.000	25.120	2.257	0.6119
		C	0.000	0.000	48.880	2.257	0.9508
L5	60.0000-40.0000	A	0.000	0.000	0.000	3.500	0.1637
		B	0.000	0.000	0.000	3.500	0.3168
		C	0.000	0.000	23.760	3.500	0.6557
L6	40.0000-20.0000	A	0.000	0.000	0.000	3.500	0.1637
		B	0.000	0.000	0.000	3.500	0.3168
		C	0.000	0.000	23.760	3.500	0.6557
L7	20.0000-0.0000	A	0.000	0.000	0.000	3.500	0.1637
		B	0.000	0.000	0.000	3.500	0.3168
		C	0.000	0.000	23.760	3.500	0.6557

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130.0000-120.0000	A	1.457	0.000	0.000	0.000	0.000	0.0000
		B		0.000	0.000	0.000	0.000	0.0153
		C		0.000	0.000	0.000	0.000	0.0820
L2	120.0000-100.0000	A	1.438	0.000	0.000	0.000	0.000	0.0000
		B		0.000	0.000	0.000	0.000	0.1531
		C		0.000	0.000	18.445	0.000	0.5389
L3	100.0000-80.0000	A	1.410	0.000	0.000	0.000	0.000	0.0000
		B		0.000	0.000	0.000	0.000	0.1531
		C		0.000	0.000	36.748	0.000	0.9055
L4	80.0000-60.0000	A	1.375	0.000	0.000	28.739	5.804	0.7947
		B		0.000	0.000	28.739	5.804	0.9478
		C		0.000	0.000	65.312	5.804	1.6899
L5	60.0000-40.0000	A	1.329	0.000	0.000	0.000	8.816	0.2691
		B		0.000	0.000	0.000	8.816	0.4222
		C		0.000	0.000	36.345	8.816	1.1510
L6	40.0000-20.0000	A	1.263	0.000	0.000	0.000	8.552	0.2614
		B		0.000	0.000	0.000	8.552	0.4145
		C		0.000	0.000	36.015	8.552	1.1242
L7	20.0000-0.0000	A	1.132	0.000	0.000	0.000	8.026	0.2462
		B		0.000	0.000	0.000	8.026	0.3992
		C		0.000	0.000	35.358	8.026	1.0716

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	130.0000-120.0000	0.0000	0.0000	0.0000	0.0000
L2	120.0000-100.0000	0.0000	4.9574	0.0000	3.6036
L3	100.0000-80.0000	0.0000	8.3030	0.0000	6.1023
L4	80.0000-60.0000	0.0000	4.0111	0.0000	3.7479
L5	60.0000-40.0000	0.0000	7.8016	0.0000	5.6114
L6	40.0000-20.0000	0.0000	8.0612	0.0000	5.8173
L7	20.0000-0.0000	0.0000	8.0612	0.0000	5.8115

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L2	16	LDF7-50A(1-5/8)	100.00 - 110.00	1.0000	1.0000
L3	16	LDF7-50A(1-5/8)	80.00 - 100.00	1.0000	1.0000
L4	4	Channel C8x18.75	60.58 - 79.42	1.0000	1.0000
L4	5	Channel C8x18.75	60.58 - 79.42	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L4	6	Channel C8x18.75	60.58 - 79.42	1.0000	1.0000
L4	16	LDF7-50A(1-5/8)	60.00 - 80.00	1.0000	1.0000
L5	16	LDF7-50A(1-5/8)	40.00 - 60.00	1.0000	1.0000
L6	16	LDF7-50A(1-5/8)	20.00 - 40.00	1.0000	1.0000
L7	16	LDF7-50A(1-5/8)	0.00 - 20.00	1.0000	1.0000

Effective Width of Flat Linear Attachments / Feed Lines

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L4	4	Channel C8x18.75	60.58 - 79.42	Manual	1.0000
L4	5	Channel C8x18.75	60.58 - 79.42	Manual	1.0000
L4	6	Channel C8x18.75	60.58 - 79.42	Manual	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
L3x3x1/4 (11.82' horizontal)	A	From Leg	2.0000 0.0000 0.0000	0.0000	68.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.5458 4.3541 5.1698 6.8235	0.0750 0.1120 0.1565 0.2676	0.0600 0.0906 0.1331 0.2481
L3x3x1/4 (11.82' horizontal)	B	From Leg	2.0000 0.0000 0.0000	0.0000	68.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.5458 4.3541 5.1698 6.8235	0.0750 0.1120 0.1565 0.2676	0.0600 0.0906 0.1331 0.2481
L3x3x1/4 (11.82' horizontal)	C	From Leg	2.0000 0.0000 0.0000	0.0000	68.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.5458 4.3541 5.1698 6.8235	0.0750 0.1120 0.1565 0.2676	0.0600 0.0906 0.1331 0.2481
C7x14.75 (8-ft long) web horizontal	A	From Leg	4.0000 0.0000 0.0000	0.0000	68.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.1342 0.1895 0.2523 0.4001	0.1342 0.1895 0.2523 0.4001	0.0100 0.0179 0.0224 0.0358
C7x14.75 (8-ft long) web horizontal	B	From Leg	4.0000 0.0000 0.0000	0.0000	68.0000	No Ice 1/2" Ice	0.1342 0.1895 0.2523	0.1342 0.1895 0.2523	0.0100 0.0179 0.0224

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	0.4001	0.4001	0.0358
						2" Ice			
C7x14.75 (8-ft long) web horizontal	C	From Leg	4.0000 0.0000 0.0000	0.0000	68.0000	No Ice	0.1342	0.1342	0.0100
						1/2" Ice	0.1895	0.1895	0.0179
						1" Ice	0.2523	0.2523	0.0224
						2" Ice	0.4001	0.4001	0.0358
**									
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.0000 0.0000 -1.0000	0.0000	133.0000	No Ice	6.3292	5.6424	0.1122
						1/2" Ice	6.7751	6.4259	0.1690
						1" Ice	7.2137	7.1313	0.2326
						2" Ice	8.1168	8.5907	0.3831
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.0000 0.0000 -1.0000	0.0000	133.0000	No Ice	6.3292	5.6424	0.1122
						1/2" Ice	6.7751	6.4259	0.1690
						1" Ice	7.2137	7.1313	0.2326
						2" Ice	8.1168	8.5907	0.3831
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.0000 0.0000 -1.0000	0.0000	133.0000	No Ice	6.3292	5.6424	0.1122
						1/2" Ice	6.7751	6.4259	0.1690
						1" Ice	7.2137	7.1313	0.2326
						2" Ice	8.1168	8.5907	0.3831
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.0000 0.0000 -1.0000	0.0000	133.0000	No Ice	14.6900	6.8700	0.1862
						1/2" Ice	15.4600	7.5500	0.3147
						1" Ice	16.2300	8.2500	0.4577
						2" Ice	17.8200	9.6700	0.7882
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.0000 0.0000 -1.0000	0.0000	133.0000	No Ice	14.6900	6.8700	0.1862
						1/2" Ice	15.4600	7.5500	0.3147
						1" Ice	16.2300	8.2500	0.4577
						2" Ice	17.8200	9.6700	0.7882
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.0000 0.0000 -1.0000	0.0000	133.0000	No Ice	14.6900	6.8700	0.1862
						1/2" Ice	15.4600	7.5500	0.3147
						1" Ice	16.2300	8.2500	0.4577
						2" Ice	17.8200	9.6700	0.7882
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.0000 0.0000 -1.0000	0.0000	133.0000	No Ice	6.3292	5.6424	0.1122
						1/2" Ice	6.7751	6.4259	0.1690
						1" Ice	7.2137	7.1313	0.2326
						2" Ice	8.1168	8.5907	0.3831
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.0000 0.0000 -1.0000	0.0000	133.0000	No Ice	6.3292	5.6424	0.1122
						1/2" Ice	6.7751	6.4259	0.1690
						1" Ice	7.2137	7.1313	0.2326
						2" Ice	8.1168	8.5907	0.3831
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.0000 0.0000 -1.0000	0.0000	133.0000	No Ice	6.3292	5.6424	0.1122
						1/2" Ice	6.7751	6.4259	0.1690
						1" Ice	7.2137	7.1313	0.2326
						2" Ice	8.1168	8.5907	0.3831
RADIO 4449 B12/B71	A	From Leg	4.0000 0.0000 -1.0000	0.0000	133.0000	No Ice	1.6500	1.1625	0.0740
						1/2" Ice	1.8104	1.3012	0.0902
						1" Ice	1.9781	1.4473	0.1090
						2" Ice	2.3359	1.7618	0.1552
RADIO 4449 B12/B71	B	From Leg	4.0000 0.0000 -1.0000	0.0000	133.0000	No Ice	1.6500	1.1625	0.0740
						1/2" Ice	1.8104	1.3012	0.0902
						1" Ice	1.9781	1.4473	0.1090
						2" Ice	2.3359	1.7618	0.1552
RADIO 4449 B12/B71	C	From Leg	4.0000 0.0000	0.0000	133.0000	No Ice	1.6500	1.1625	0.0740
						1/2" Ice	1.8104	1.3012	0.0902

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
				-1.0000			Ice	1.9781	1.4473	0.1090
							1" Ice	2.3359	1.7618	0.1552
							2" Ice			
KRY 112 144/1	A	From Leg	4.0000		0.0000	133.0000	No Ice	0.3500	0.1750	0.0110
			0.0000				1/2"	0.4259	0.2343	0.0142
				-1.0000			Ice	0.5093	0.3009	0.0186
							1" Ice	0.6981	0.4565	0.0319
							2" Ice			
KRY 112 144/1	B	From Leg	4.0000		0.0000	133.0000	No Ice	0.3500	0.1750	0.0110
			0.0000				1/2"	0.4259	0.2343	0.0142
				-1.0000			Ice	0.5093	0.3009	0.0186
							1" Ice	0.6981	0.4565	0.0319
							2" Ice			
KRY 112 144/1	C	From Leg	4.0000		0.0000	133.0000	No Ice	0.3500	0.1750	0.0110
			0.0000				1/2"	0.4259	0.2343	0.0142
				-1.0000			Ice	0.5093	0.3009	0.0186
							1" Ice	0.6981	0.4565	0.0319
							2" Ice			
Platform Mount [LP 405-1]	C	None			0.0000	133.0000	No Ice	20.8800	20.8800	1.8000
							1/2"	28.8900	28.8900	2.2769
							Ice	37.0400	37.0400	2.8683
							1" Ice	53.7300	53.7300	4.3938
							2" Ice			
Side Arm Mount [SO 102-1]	C	None			0.0000	133.0000	No Ice	1.5000	1.5000	0.0250
							1/2"	1.7400	1.7400	0.0350
							Ice	1.9800	1.9800	0.0450
							1" Ice	2.4600	2.4600	0.0650
							2" Ice			
(2) L2 1/2 x 2 1/2 x 3/16 x 6.2-ft	A	From Leg	2.0000		0.0000	133.0000	No Ice	2.1875	0.0608	0.0161
			0.0000				1/2"	2.5717	0.1191	0.0224
			0.0000				Ice	2.9561	0.1774	0.0311
							1" Ice	3.7470	0.2941	0.0556
							2" Ice			
(2) L2 1/2 x 2 1/2 x 3/16 x 6.2-ft	B	From Leg	2.0000		0.0000	133.0000	No Ice	2.1875	0.0608	0.0161
			0.0000				1/2"	2.5717	0.1191	0.0224
			0.0000				Ice	2.9561	0.1774	0.0311
							1" Ice	3.7470	0.2941	0.0556
							2" Ice			
(2) L2 1/2 x 2 1/2 x 3/16 x 6.2-ft	C	From Leg	2.0000		0.0000	133.0000	No Ice	2.1875	0.0608	0.0161
			0.0000				1/2"	2.5717	0.1191	0.0224
			0.0000				Ice	2.9561	0.1774	0.0311
							1" Ice	3.7470	0.2941	0.0556
							2" Ice			
**										
7770.00 w/ Mount Pipe	A	From Leg	4.0000		0.0000	122.0000	No Ice	5.7460	4.2543	0.0600
			0.0000				1/2"	6.1791	5.0137	0.1028
			2.0000				Ice	6.6067	5.7109	0.1566
							1" Ice	7.4880	7.1553	0.2866
							2" Ice			
7770.00 w/ Mount Pipe	B	From Leg	4.0000		0.0000	122.0000	No Ice	5.7460	4.2543	0.0600
			0.0000				1/2"	6.1791	5.0137	0.1028
			2.0000				Ice	6.6067	5.7109	0.1566
							1" Ice	7.4880	7.1553	0.2866
							2" Ice			
7770.00 w/ Mount Pipe	C	From Leg	4.0000		0.0000	122.0000	No Ice	5.7460	4.2543	0.0600
			0.0000				1/2"	6.1791	5.0137	0.1028
			2.0000				Ice	6.6067	5.7109	0.1566
							1" Ice	7.4880	7.1553	0.2866
							2" Ice			
(2) DMP65R-BU8D w/ Mount Pipe	A	From Leg	4.0000		0.0000	122.0000	No Ice	15.8900	7.8900	0.1385
			0.0000				1/2"	16.8100	8.7400	0.2520
			2.0000				Ice	17.7600	9.6000	0.3797
							1" Ice	19.7000	11.3700	0.6789
							2" Ice			
(2) DMP65R-BU4D w/	B	From Leg	4.0000		0.0000	122.0000	No Ice	7.5300	3.7900	0.0948

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.0000 2.0000			1/2" Ice 1" Ice 2" Ice	8.0400 8.5700 9.6800	4.2300 4.6800 5.6300	0.1556 0.2249 0.3909
(2) DMP65R-BU4D w/ Mount Pipe	C	From Leg	4.0000 0.0000 2.0000	0.0000	122.0000	No Ice 1/2" Ice 1" Ice 2" Ice	7.5300 8.0400 8.5700 9.6800	3.7900 4.2300 4.6800 5.6300	0.0948 0.1556 0.2249 0.3909
LGP21401	A	From Leg	4.0000 0.0000 2.0000	0.0000	122.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.1040 1.2388 1.3810 1.6877	0.2070 0.2738 0.3475 0.5208	0.0100 0.0213 0.0303 0.0549
LGP21401	B	From Leg	4.0000 0.0000 2.0000	0.0000	122.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.1040 1.2388 1.3810 1.6877	0.2070 0.2738 0.3475 0.5208	0.0100 0.0213 0.0303 0.0549
LGP21401	C	From Leg	4.0000 0.0000 2.0000	0.0000	122.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.1040 1.2388 1.3810 1.6877	0.2070 0.2738 0.3475 0.5208	0.0100 0.0213 0.0303 0.0549
RRUS 4478 B14	A	From Leg	4.0000 0.0000 2.0000	0.0000	122.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.8425 2.0123 2.1895 2.5662	1.0588 1.1969 1.3425 1.6558	0.0600 0.0758 0.0943 0.1400
(2) RRUS 4478 B14	B	From Leg	4.0000 0.0000 2.0000	0.0000	122.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.8425 2.0123 2.1895 2.5662	1.0588 1.1969 1.3425 1.6558	0.0600 0.0758 0.0943 0.1400
RRUS 4449 B5/B12	A	From Leg	4.0000 0.0000 2.0000	0.0000	122.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.9675 2.1439 2.3278 2.7177	1.4081 1.5637 1.7267 2.0749	0.0700 0.0895 0.1108 0.1627
(2) RRUS 4449 B5/B12	C	From Leg	4.0000 0.0000 2.0000	0.0000	122.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.9675 2.1439 2.3278 2.7177	1.4081 1.5637 1.7267 2.0749	0.0700 0.0895 0.1108 0.1627
RRUS 8843 B2/B66A	B	From Leg	4.0000 0.0000 2.0000	0.0000	122.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.6390 1.7988 1.9660 2.3227	1.3534 1.5005 1.6549 1.9860	0.0700 0.0896 0.1099 0.1595
(2) RRUS 8843 B2/B66A	C	From Leg	4.0000 0.0000 2.0000	0.0000	122.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.6390 1.7988 1.9660 2.3227	1.3534 1.5005 1.6549 1.9860	0.0700 0.0896 0.1099 0.1595
DC6-48-60-18-8F	A	From Leg	4.0000 0.0000 2.0000	0.0000	122.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.2117 1.8924 2.1051 2.5703	1.2117 1.8924 2.1051 2.5703	0.0200 0.0420 0.0668 0.1256
DC9-48-60-24-8C-EV	B	From Leg	4.0000 0.0000 2.0000	0.0000	122.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.1450 1.7924 2.0024 2.4512	1.1450 1.7924 2.0024 2.4512	0.0300 0.0466 0.0698 0.1251
T-Arm Mount [TA 601-3]	C	None		0.0000	122.0000	No Ice	12.5600	12.5600	0.7260

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1/2" Ice	15.3600	15.3600	0.9411
						1" Ice	18.0400	18.0400	1.2103
						2" Ice	23.6900	23.6900	1.9237
Side Arm Mount [SO 102-1]	C	None		0.0000	122.0000	No Ice	1.5000	1.5000	0.0250
						1/2" Ice	1.7400	1.7400	0.0350
						1" Ice	1.9800	1.9800	0.0450
						2" Ice	2.4600	2.4600	0.0650
2.4" Dia. x 6-ft	A	From Leg	4.0000 0.0000 0.0000	0.0000	122.0000	No Ice	1.4250	1.4250	0.0200
						1/2" Ice	1.9250	1.9250	0.0328
						1" Ice	2.2939	2.2939	0.0477
						2" Ice	3.0596	3.0596	0.0902
2.4" Dia. x 6-ft	B	From Leg	4.0000 0.0000 0.0000	0.0000	122.0000	No Ice	1.4250	1.4250	0.0200
						1/2" Ice	1.9250	1.9250	0.0328
						1" Ice	2.2939	2.2939	0.0477
						2" Ice	3.0596	3.0596	0.0902
2.4" Dia. x 6-ft	C	From Leg	4.0000 0.0000 0.0000	0.0000	122.0000	No Ice	1.4250	1.4250	0.0200
						1/2" Ice	1.9250	1.9250	0.0328
						1" Ice	2.2939	2.2939	0.0477
						2" Ice	3.0596	3.0596	0.0902
**									
(2) LPA-80063/6CF w/ Mount Pipe	A	From Leg	4.0000 0.0000 0.0000	0.0000	110.0000	No Ice	9.8309	10.2155	0.0500
						1/2" Ice	10.3998	11.3844	0.1446
						1" Ice	10.9334	12.2686	0.2455
						2" Ice	12.0258	14.0859	0.4764
(2) LPA-80063/6CF w/ Mount Pipe	B	From Leg	4.0000 0.0000 0.0000	0.0000	110.0000	No Ice	9.8309	10.2155	0.0500
						1/2" Ice	10.3998	11.3844	0.1446
						1" Ice	10.9334	12.2686	0.2455
						2" Ice	12.0258	14.0859	0.4764
(2) LPA-80063/6CF w/ Mount Pipe	C	From Leg	4.0000 0.0000 0.0000	0.0000	110.0000	No Ice	9.8309	10.2155	0.0500
						1/2" Ice	10.3998	11.3844	0.1446
						1" Ice	10.9334	12.2686	0.2455
						2" Ice	12.0258	14.0859	0.4764
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.0000 0.0000 -1.0000	0.0000	110.0000	No Ice	7.9700	5.9900	0.0780
						1/2" Ice	8.7300	6.7200	0.1413
						1" Ice	9.5000	7.4700	0.2158
						2" Ice	11.1100	9.0200	0.3992
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.0000 0.0000 -1.0000	0.0000	110.0000	No Ice	7.9700	5.9900	0.0780
						1/2" Ice	8.7300	6.7200	0.1413
						1" Ice	9.5000	7.4700	0.2158
						2" Ice	11.1100	9.0200	0.3992
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.0000 0.0000 -1.0000	0.0000	110.0000	No Ice	7.9700	5.9900	0.0780
						1/2" Ice	8.7300	6.7200	0.1413
						1" Ice	9.5000	7.4700	0.2158
						2" Ice	11.1100	9.0200	0.3992
LNX-6514DS-A1M w/ Mount Pipe	A	From Leg	4.0000 0.0000 0.0000	0.0000	110.0000	No Ice	4.0900	3.3000	0.0646
						1/2" Ice	4.4900	3.6800	0.1277
						1" Ice	4.8900	4.0600	0.2016
						2" Ice	5.7100	4.8700	0.3833
LNX-6514DS-A1M w/ Mount Pipe	B	From Leg	4.0000 0.0000 0.0000	0.0000	110.0000	No Ice	4.0900	3.3000	0.0646
						1/2" Ice	4.4900	3.6800	0.1277
						1" Ice	4.8900	4.0600	0.2016
						2" Ice	5.7100	4.8700	0.3833

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
LNX-6514DS-A1M w/ Mount Pipe	C	From Leg	4.0000 0.0000 0.0000	0.0000	110.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.0900 4.4900 4.8900 5.7100	3.3000 3.6800 4.0600 4.8700	0.0646 0.1277 0.2016 0.3833
RRH2X60-AWS	A	From Leg	4.0000 0.0000 -1.0000	0.0000	110.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.5002 3.7609 4.0285 4.5849	1.8157 2.0519 2.2894 2.7852	0.0600 0.0827 0.1091 0.1734
RRH2X60-AWS	B	From Leg	4.0000 0.0000 -1.0000	0.0000	110.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.5002 3.7609 4.0285 4.5849	1.8157 2.0519 2.2894 2.7852	0.0600 0.0827 0.1091 0.1734
RRH2X60-AWS	C	From Leg	4.0000 0.0000 -1.0000	0.0000	110.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.5002 3.7609 4.0285 4.5849	1.8157 2.0519 2.2894 2.7852	0.0600 0.0827 0.1091 0.1734
RRH2X60-PCS	A	From Leg	4.0000 0.0000 -1.0000	0.0000	110.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.2000 2.3926 2.5926 3.0148	1.7233 1.9015 2.0870 2.4804	0.0600 0.0754 0.0987 0.1552
RRH2X60-PCS	B	From Leg	4.0000 0.0000 -1.0000	0.0000	110.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.2000 2.3926 2.5926 3.0148	1.7233 1.9015 2.0870 2.4804	0.0600 0.0754 0.0987 0.1552
RRH2X60-PCS	C	From Leg	4.0000 0.0000 -1.0000	0.0000	110.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.2000 2.3926 2.5926 3.0148	1.7233 1.9015 2.0870 2.4804	0.0600 0.0754 0.0987 0.1552
(2) DB-T1-6Z-8AB-0Z	A	From Leg	2.0000 0.0000 0.0000	0.0000	110.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.8000 5.0704 5.3481 5.9259	2.0000 2.1926 2.3926 2.8148	0.0400 0.0801 0.1202 0.2130
Platform Mount [LP 303-1]	C	None		0.0000	110.0000	No Ice 1/2" Ice 1" Ice 2" Ice	14.6900 18.0100 21.3400 28.0800	14.6900 18.0100 21.3400 28.0800	1.2500 1.5689 1.9420 2.8522
**									

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice

Comb. No.	Description
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	130 - 120	Pole	Max Tension	26	0.0000	0.0000	0.0000
			Max. Compression	26	-17.3804	0.4014	1.4481
			Max. Mx	20	-7.9852	99.9874	-0.1175
			Max. My	14	-7.9480	0.3072	-101.4084
			Max. Vy	20	-12.1648	99.9874	-0.1175
			Max. Vx	14	12.5732	0.3072	-101.4084
			Max. Torque	21			-1.7390
L2	120 - 100	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-31.5852	0.4014	2.1481
			Max. Mx	20	-14.9070	435.0979	0.1603
			Max. My	14	-14.8469	0.2421	-447.2577
			Max. Vy	20	-21.5964	435.0979	0.1603
			Max. Vx	14	22.2820	0.2421	-447.2577
			Max. Torque	20			-2.4148
L3	100 - 80	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-38.2727	0.4014	1.0548
			Max. Mx	20	-19.7518	891.4550	-0.0517
			Max. My	14	-19.6959	0.1760	-917.6822
			Max. Vy	20	-24.0237	891.4550	-0.0517

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	14	24.7143	0.1760	-917.6822
			Max. Torque	20			-2.4146
L4	80 - 60	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-49.0011	0.4014	-0.1590
			Max. Mx	20	-27.1126	1406.2107	-0.3131
			Max. My	14	-27.0125	0.1088	-1470.7570
			Max. Vy	20	-27.4835	1406.2107	-0.3131
			Max. Vx	14	30.5899	0.1088	-1470.7570
			Max. Torque	20			-2.4139
L5	60 - 40	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-58.0268	0.4014	-1.4809
			Max. Mx	20	-33.7973	1987.2778	-0.6208
			Max. My	14	-33.7299	0.0407	-2114.2971
			Max. Vy	20	-30.6074	1987.2778	-0.6208
			Max. Vx	14	33.7088	0.0407	-2114.2971
			Max. Torque	20			-2.4132
L6	40 - 20	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-67.6812	0.4014	-2.8887
			Max. Mx	20	-41.1048	2629.2899	-0.9729
			Max. My	14	-41.0757	-0.0281	-2818.6296
			Max. Vy	20	-33.5794	2629.2899	-0.9729
			Max. Vx	14	36.6668	-0.0281	-2818.6296
			Max. Torque	20			-2.4126
L7	20 - 0	Pole	Max Tension	1	0.0000	0.0000	0.0000
			Max. Compression	26	-82.7166	0.4014	-4.1968
			Max. Mx	20	-54.0328	3326.5798	-1.3262
			Max. My	14	-54.0320	-0.0972	-3577.9504
			Max. Vy	20	-36.1358	3326.5798	-1.3262
			Max. Vx	14	39.2084	-0.0972	-3577.9504
			Max. Torque	20			-2.4123

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	82.7166	0.0000	0.0000
	Max. H_x	20	54.0376	36.1285	0.0034
	Max. H_z	2	54.0376	0.0034	36.5389
	Max. M_x	2	3386.2465	0.0034	36.5389
	Max. M_z	8	3325.9056	-36.1285	-0.0034
	Max. Torsion	8	2.4119	-36.1285	-0.0034
	Min. Vert	19	40.5282	31.0700	-18.2665
	Min. H_x	8	54.0376	-36.1285	-0.0034
	Min. H_z	14	54.0376	-0.0034	-39.2006
	Min. M_x	14	-3577.9504	-0.0034	-39.2006
	Min. M_z	20	-3326.5798	36.1285	0.0034
	Min. Torsion	20	-2.4122	36.1285	0.0034

Tower Mast Reaction Summary

Load Combination	*Vertical*	*Shear$_x$*	*Shear$_z$*	*Overturning Moment, M$_x$*	*Overturning Moment, M$_z$*	*Torque*
	K	*K*	*K*	*kip-ft*	*kip-ft*	*kip-ft*
Dead Only	45.0313	0.0000	0.0000	1.4465	0.2728	0.0000
1.2 Dead+1.0 Wind 0 deg - No Ice	54.0376	-0.0034	-36.5389	-3386.2465	0.7715	-0.2128
0.9 Dead+1.0 Wind 0 deg - No Ice	40.5282	-0.0034	-36.5389	-3373.4937	0.6834	-0.2097
1.2 Dead+1.0 Wind 30 deg - No Ice	54.0376	17.9363	-31.6419	-2932.1311	-1653.5570	-1.3946
0.9 Dead+1.0 Wind 30 deg - No Ice	40.5282	17.9363	-31.6419	-2921.1470	-1647.2157	-1.3908
1.2 Dead+1.0 Wind 60 deg - No Ice	54.0376	33.3751	-19.5973	-1785.9770	-3027.7219	-2.2000
0.9 Dead+1.0 Wind 60 deg - No Ice	40.5282	33.3751	-19.5973	-1779.5793	-3016.2489	-2.1964
1.2 Dead+1.0 Wind 90 deg - No Ice	54.0376	36.1285	0.0034	2.1950	-3325.9056	-2.4119
0.9 Dead+1.0 Wind 90 deg - No Ice	40.5282	36.1285	0.0034	1.7488	-3313.0880	-2.4097
1.2 Dead+1.0 Wind 120 deg - No Ice	54.0376	31.0734	18.2724	1696.1524	-2865.1719	-1.9781
0.9 Dead+1.0 Wind 120 deg - No Ice	40.5282	31.0734	18.2724	1689.1082	-2854.1224	-1.9776
1.2 Dead+1.0 Wind 150 deg - No Ice	54.0376	17.9422	31.6453	2936.0804	-1654.3056	-1.0175
0.9 Dead+1.0 Wind 150 deg - No Ice	40.5282	17.9422	31.6453	2924.2073	-1647.9619	-1.0190
1.2 Dead+1.0 Wind 180 deg - No Ice	54.0376	0.0034	39.2006	3577.9504	-0.0972	0.2128
0.9 Dead+1.0 Wind 180 deg - No Ice	40.5282	0.0034	39.2006	3563.8210	-0.1815	0.2096
1.2 Dead+1.0 Wind 210 deg - No Ice	54.0376	-17.9363	31.6419	2935.6464	1654.2278	1.3856
0.9 Dead+1.0 Wind 210 deg - No Ice	40.5282	-17.9363	31.6419	2923.7752	1647.7150	1.3819
1.2 Dead+1.0 Wind 240 deg - No Ice	54.0376	-31.0700	18.2665	1695.4002	2865.4121	2.1909
0.9 Dead+1.0 Wind 240 deg - No Ice	40.5282	-31.0700	18.2665	1688.3593	2854.1921	2.1874
1.2 Dead+1.0 Wind 270 deg - No Ice	54.0376	-36.1285	-0.0034	1.3263	3326.5798	2.4122
0.9 Dead+1.0 Wind 270 deg - No Ice	40.5282	-36.1285	-0.0034	0.8839	3313.5898	2.4099
1.2 Dead+1.0 Wind 300 deg - No Ice	54.0376	-33.3786	-19.6033	-1786.7291	3028.8301	1.9872
0.9 Dead+1.0 Wind 300 deg - No Ice	40.5282	-33.3786	-19.6033	-1780.3281	3017.1828	1.9868
1.2 Dead+1.0 Wind 330 deg - No Ice	54.0376	-17.9422	-31.6453	-2932.5650	1654.9834	1.0261
0.9 Dead+1.0 Wind 330 deg - No Ice	40.5282	-17.9422	-31.6453	-2921.5791	1648.4664	1.0276
1.2 Dead+1.0 Ice+1.0 Temp	82.7166	0.0000	0.0000	4.1968	0.4014	0.0000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	82.7166	-0.0005	-8.7641	-761.3363	0.4954	-0.0153
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	82.7166	4.3349	-7.5897	-658.7338	-376.6140	-0.2419
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	82.7166	7.5176	-4.3866	-378.8489	-653.3202	-0.4037
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	82.7166	8.6708	0.0005	4.3080	-753.7747	-0.4571
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	82.7166	7.5094	4.3825	387.0857	-652.7659	-0.3881
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	82.7166	4.3359	7.5902	667.2794	-376.7352	-0.2151
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	82.7166	0.0005	8.7742	770.5323	0.3552	0.0153
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	82.7166	-4.3349	7.5897	667.2092	377.4643	0.2417
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	82.7166	-7.5089	4.3816	386.9642	653.5463	0.4034
1.2 Dead+1.0 Wind 270	82.7166	-8.6708	-0.0005	4.1678	754.6252	0.4572

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	82.7166	-7.5181	-4.3876	-378.9703	654.2408	0.3884
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	82.7166	-4.3359	-7.5902	-658.8039	377.5860	0.2155
Dead+Wind 0 deg - Service	45.0313	-0.0006	-6.7977	-627.3356	0.3604	-0.0392
Dead+Wind 30 deg - Service	45.0313	3.3369	-5.8867	-543.0524	-306.6755	-0.2587
Dead+Wind 60 deg - Service	45.0313	6.2091	-3.6459	-330.3482	-561.7411	-0.4089
Dead+Wind 90 deg - Service	45.0313	6.7214	0.0006	1.5423	-617.0544	-0.4492
Dead+Wind 120 deg - Service	45.0313	5.7809	3.3994	315.9302	-531.5435	-0.3692
Dead+Wind 150 deg - Service	45.0313	3.3380	5.8873	546.0563	-306.8150	-0.1905
Dead+Wind 180 deg - Service	45.0313	0.0006	7.2929	665.2208	0.1992	0.0393
Dead+Wind 210 deg - Service	45.0313	-3.3369	5.8867	545.9757	307.2350	0.2584
Dead+Wind 240 deg - Service	45.0313	-5.7803	3.3983	315.7906	532.0225	0.4085
Dead+Wind 270 deg - Service	45.0313	-6.7214	-0.0006	1.3811	617.6140	0.4492
Dead+Wind 300 deg - Service	45.0313	-6.2098	-3.6470	-330.4878	562.3812	0.3696
Dead+Wind 330 deg - Service	45.0313	-3.3380	-5.8873	-543.1330	307.3746	0.1908

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.0000	-45.0313	0.0000	0.0000	45.0313	0.0000	0.000%
2	-0.0034	-54.0376	-36.5389	0.0034	54.0376	36.5389	0.000%
3	-0.0034	-40.5282	-36.5389	0.0034	40.5282	36.5389	0.000%
4	17.9363	-54.0376	-31.6419	-17.9363	54.0376	31.6419	0.000%
5	17.9363	-40.5282	-31.6419	-17.9363	40.5282	31.6419	0.000%
6	33.3751	-54.0376	-19.5973	-33.3751	54.0376	19.5973	0.000%
7	33.3751	-40.5282	-19.5973	-33.3751	40.5282	19.5973	0.000%
8	36.1285	-54.0376	0.0034	-36.1285	54.0376	-0.0034	0.000%
9	36.1285	-40.5282	0.0034	-36.1285	40.5282	-0.0034	0.000%
10	31.0734	-54.0376	18.2724	-31.0734	54.0376	-18.2724	0.000%
11	31.0734	-40.5282	18.2724	-31.0734	40.5282	-18.2724	0.000%
12	17.9422	-54.0376	31.6453	-17.9422	54.0376	-31.6453	0.000%
13	17.9422	-40.5282	31.6453	-17.9422	40.5282	-31.6453	0.000%
14	0.0034	-54.0376	39.2006	-0.0034	54.0376	-39.2006	0.000%
15	0.0034	-40.5282	39.2006	-0.0034	40.5282	-39.2006	0.000%
16	-17.9363	-54.0376	31.6419	17.9363	54.0376	-31.6419	0.000%
17	-17.9363	-40.5282	31.6419	17.9363	40.5282	-31.6419	0.000%
18	-31.0700	-54.0376	18.2665	31.0700	54.0376	-18.2665	0.000%
19	-31.0700	-40.5282	18.2665	31.0700	40.5282	-18.2665	0.000%
20	-36.1285	-54.0376	-0.0034	36.1285	54.0376	0.0034	0.000%
21	-36.1285	-40.5282	-0.0034	36.1285	40.5282	0.0034	0.000%
22	-33.3786	-54.0376	-19.6033	33.3786	54.0376	19.6033	0.000%
23	-33.3786	-40.5282	-19.6033	33.3786	40.5282	19.6033	0.000%
24	-17.9422	-54.0376	-31.6453	17.9422	54.0376	31.6453	0.000%
25	-17.9422	-40.5282	-31.6453	17.9422	40.5282	31.6453	0.000%
26	0.0000	-82.7166	0.0000	0.0000	82.7166	0.0000	0.000%
27	-0.0005	-82.7166	-8.7641	0.0005	82.7166	8.7641	0.000%
28	4.3349	-82.7166	-7.5897	-4.3349	82.7166	7.5897	0.000%
29	7.5176	-82.7166	-4.3866	-7.5176	82.7166	4.3866	0.000%
30	8.6708	-82.7166	0.0005	-8.6708	82.7166	-0.0005	0.000%
31	7.5094	-82.7166	4.3825	-7.5094	82.7166	-4.3825	0.000%
32	4.3359	-82.7166	7.5902	-4.3359	82.7166	-7.5902	0.000%
33	0.0005	-82.7166	8.7742	-0.0005	82.7166	-8.7742	0.000%
34	-4.3349	-82.7166	7.5897	4.3349	82.7166	-7.5897	0.000%
35	-7.5089	-82.7166	4.3816	7.5089	82.7166	-4.3816	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
36	-8.6708	-82.7166	-0.0005	8.6708	82.7166	0.0005	0.000%
37	-7.5181	-82.7166	-4.3876	7.5181	82.7166	4.3876	0.000%
38	-4.3359	-82.7166	-7.5902	4.3359	82.7166	7.5902	0.000%
39	-0.0006	-45.0313	-6.7977	0.0006	45.0313	6.7977	0.000%
40	3.3369	-45.0313	-5.8867	-3.3369	45.0313	5.8867	0.000%
41	6.2091	-45.0313	-3.6459	-6.2091	45.0313	3.6459	0.000%
42	6.7214	-45.0313	0.0006	-6.7214	45.0313	-0.0006	0.000%
43	5.7809	-45.0313	3.3994	-5.7809	45.0313	-3.3994	0.000%
44	3.3380	-45.0313	5.8873	-3.3380	45.0313	-5.8873	0.000%
45	0.0006	-45.0313	7.2929	-0.0006	45.0313	-7.2929	0.000%
46	-3.3369	-45.0313	5.8867	3.3369	45.0313	-5.8867	0.000%
47	-5.7803	-45.0313	3.3983	5.7803	45.0313	-3.3983	0.000%
48	-6.7214	-45.0313	-0.0006	6.7214	45.0313	0.0006	0.000%
49	-6.2098	-45.0313	-3.6470	6.2098	45.0313	3.6470	0.000%
50	-3.3380	-45.0313	-5.8873	3.3380	45.0313	5.8873	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00009889
3	Yes	4	0.00000001	0.00004936
4	Yes	5	0.00000001	0.00004085
5	Yes	5	0.00000001	0.00001878
6	Yes	5	0.00000001	0.00004876
7	Yes	5	0.00000001	0.00002237
8	Yes	4	0.00000001	0.00037731
9	Yes	4	0.00000001	0.00023935
10	Yes	5	0.00000001	0.00004020
11	Yes	5	0.00000001	0.00001849
12	Yes	5	0.00000001	0.00004475
13	Yes	5	0.00000001	0.00002066
14	Yes	4	0.00000001	0.00009852
15	Yes	4	0.00000001	0.00004854
16	Yes	5	0.00000001	0.00004544
17	Yes	5	0.00000001	0.00002098
18	Yes	5	0.00000001	0.00003998
19	Yes	5	0.00000001	0.00001838
20	Yes	4	0.00000001	0.00037889
21	Yes	4	0.00000001	0.00024035
22	Yes	5	0.00000001	0.00004844
23	Yes	5	0.00000001	0.00002221
24	Yes	5	0.00000001	0.00004145
25	Yes	5	0.00000001	0.00001905
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00005821
28	Yes	5	0.00000001	0.00005975
29	Yes	5	0.00000001	0.00005936
30	Yes	5	0.00000001	0.00005722
31	Yes	5	0.00000001	0.00005933
32	Yes	5	0.00000001	0.00005988
33	Yes	5	0.00000001	0.00005833
34	Yes	5	0.00000001	0.00005996
35	Yes	5	0.00000001	0.00005946
36	Yes	5	0.00000001	0.00005738
37	Yes	5	0.00000001	0.00005951
38	Yes	5	0.00000001	0.00005985
39	Yes	4	0.00000001	0.00001680
40	Yes	4	0.00000001	0.00002790
41	Yes	4	0.00000001	0.00003670
42	Yes	4	0.00000001	0.00002185
43	Yes	4	0.00000001	0.00002842
44	Yes	4	0.00000001	0.00003156
45	Yes	4	0.00000001	0.00001736

46	Yes	4	0.00000001	0.00003274
47	Yes	4	0.00000001	0.00002869
48	Yes	4	0.00000001	0.00002190
49	Yes	4	0.00000001	0.00003606
50	Yes	4	0.00000001	0.00002808

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 120	6.3247	45	0.4145	0.0013
L2	120 - 100	5.4620	45	0.4075	0.0013
L3	100 - 80	3.8196	45	0.3676	0.0008
L4	80 - 60	2.4044	45	0.3002	0.0005
L5	60 - 40	1.2986	45	0.2216	0.0003
L6	40 - 20	0.5339	45	0.1385	0.0002
L7	20 - 0	0.1201	45	0.0551	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
133.0000	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	45	6.3247	0.4145	0.0013	111102
122.0000	7770.00 w/ Mount Pipe	45	5.6335	0.4094	0.0013	69628
110.0000	(2) LPA-80063/6CF w/ Mount Pipe	45	4.6204	0.3920	0.0011	29436
68.0000	L3x3x1/4 (11.82' horizontal)	45	1.7011	0.2537	0.0004	14385

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 120	34.0540	14	2.2328	0.0071
L2	120 - 100	29.4074	14	2.1954	0.0067
L3	100 - 80	20.5615	14	1.9801	0.0044
L4	80 - 60	12.9418	14	1.6167	0.0028
L5	60 - 40	6.9886	14	1.1931	0.0016
L6	40 - 20	2.8728	14	0.7453	0.0009
L7	20 - 0	0.6459	14	0.2966	0.0003

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
133.0000	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	14	34.0540	2.2328	0.0071	20780
122.0000	7770.00 w/ Mount Pipe	14	30.3312	2.2056	0.0068	13017
110.0000	(2) LPA-80063/6CF w/ Mount Pipe	14	24.8746	2.1117	0.0057	5471
68.0000	L3x3x1/4 (11.82' horizontal)	14	9.1553	1.3659	0.0020	2673

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	130 - 120 (1)	P30x3/8	10.0000	0.0000	0.0	34.9011	-7.9480	1311.0600	0.006
L2	120 - 100 (2)	P36x3/8	20.0000	0.0000	0.0	41.9697	-14.8677	1490.1000	0.010
L3	100 - 80 (3)	P42x3/8	20.0000	0.0000	0.0	49.0383	-19.6959	1668.8700	0.012
L4	80 - 60 (4)	P48x3/8	20.0000	0.0000	0.0	56.1069	-27.0125	1847.4900	0.015
L5	60 - 40 (5)	P54x3/8	20.0000	0.0000	0.0	63.1755	-33.7299	2026.0000	0.017
L6	40 - 20 (6)	P60x3/8	20.0000	0.0000	0.0	70.2440	-41.0757	2204.4300	0.019
L7	20 - 0 (7)	P60x3/4	20.0000	0.0000	0.0	139.6050	-54.0320	5244.2300	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	130 - 120 (1)	P30x3/8	101.4092	947.8583	0.107	0.0000	947.8583	0.000
L2	120 - 100 (2)	P36x3/8	447.2500	1338.8083	0.334	0.0000	1338.8083	0.000
L3	100 - 80 (3)	P42x3/8	917.6833	1796.5583	0.511	0.0000	1796.5583	0.000
L4	80 - 60 (4)	P48x3/8	1470.7583	2321.1083	0.634	0.0000	2321.1083	0.000
L5	60 - 40 (5)	P54x3/8	2114.3000	2912.4583	0.726	0.0000	2912.4583	0.000
L6	40 - 20 (6)	P60x3/8	2818.6333	3570.6083	0.789	0.0000	3570.6083	0.000
L7	20 - 0 (7)	P60x3/4	3577.9500	7582.8747	0.472	0.0000	7582.8747	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	130 - 120 (1)	P30x3/8	12.5732	395.7790	0.032	0.2130	994.7250	0.000
L2	120 - 100 (2)	P36x3/8	22.2682	454.1870	0.049	0.2130	1094.2750	0.000
L3	100 - 80 (3)	P42x3/8	24.7143	461.1110	0.054	0.2129	1297.2500	0.000
L4	80 - 60 (4)	P48x3/8	30.5899	477.3010	0.064	0.2129	1536.3583	0.000
L5	60 - 40 (5)	P54x3/8	33.7088	491.9950	0.069	0.2128	1783.1667	0.000
L6	40 - 20 (6)	P60x3/8	36.6668	505.4790	0.073	0.2128	2037.0250	0.000
L7	20 - 0 (7)	P60x3/4	39.2084	1583.1200	0.025	0.2128	8246.7080	0.000

Pole Interaction Design Data

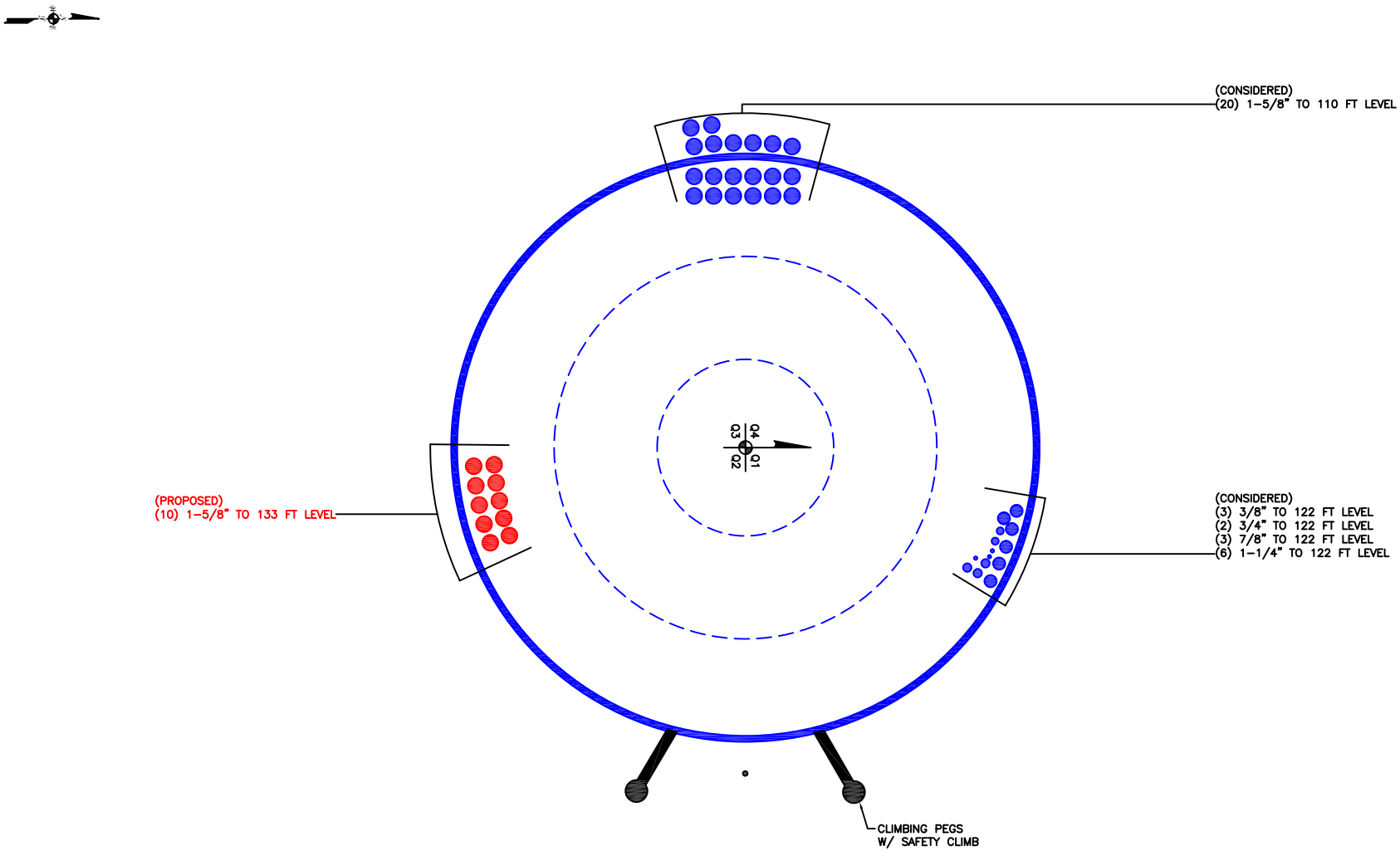
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	130 - 120 (1)	0.006	0.107	0.000	0.032	0.000	0.114	1.050	4.8.2
L2	120 - 100 (2)	0.010	0.334	0.000	0.049	0.000	0.346	1.050	4.8.2
L3	100 - 80 (3)	0.012	0.511	0.000	0.054	0.000	0.525	1.050	4.8.2
L4	80 - 60 (4)	0.015	0.634	0.000	0.064	0.000	0.652	1.050	4.8.2
L5	60 - 40 (5)	0.017	0.726	0.000	0.069	0.000	0.747	1.050	4.8.2
L6	40 - 20 (6)	0.019	0.789	0.000	0.073	0.000	0.813	1.050	4.8.2
L7	20 - 0 (7)	0.010	0.472	0.000	0.025	0.000	0.483	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	130 - 120	Pole	P30x3/8	1	-7.9480	1376.6129	10.9	Pass
L2	120 - 100	Pole	P36x3/8	2	-14.8677	1564.6049	33.0	Pass
L3	100 - 80	Pole	P42x3/8	3	-19.6959	1752.3134	50.0	Pass
L4	80 - 60	Pole	P48x3/8	4	-27.0125	1939.8644	62.1	Pass
L5	60 - 40	Pole	P54x3/8	5	-33.7299	2127.2999	71.2	Pass
L6	40 - 20	Pole	P60x3/8	6	-41.0757	2314.6514	77.5	Pass
L7	20 - 0	Pole	P60x3/4	7	-54.0320	5506.4412	46.0	Pass
							Summary	
						Pole (L6)	77.5	Pass
						RATING =	**77.5**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(CONSIDERED)
(20) 1-5/8" TO 110 FT LEVEL
(PROPOSED)
(10) 1-5/8" TO 133 FT LEVEL
(CONSIDERED)
(3) 3/8" TO 122 FT LEVEL
(2) 3/4" TO 122 FT LEVEL
(3) 7/8" TO 122 FT LEVEL
(6) 1-1/4" TO 122 FT LEVEL
Q4
Q3
Q1
Q2
CLIMBING PEGS
W/ SAFETY CLIMB

APPENDIX C

ADDITIONAL CALCULATIONS

Monopole Flange Plate Connection

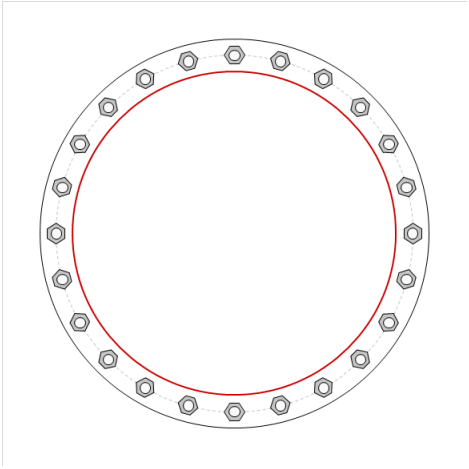
Elevation = 120 ft.

BU #	824359
Site Name	roton/ I-95/ X89/ Noa_
Order #	479800 Rev. 2
TIA-222 Revision	H

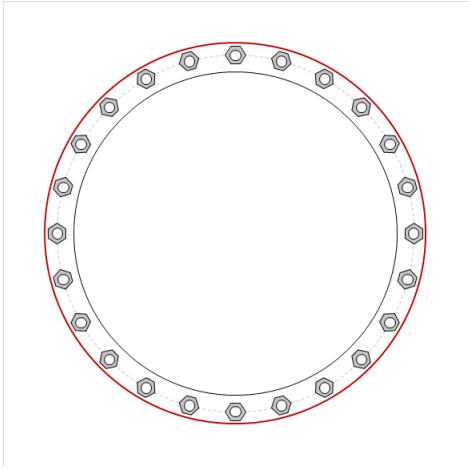
Applied Loads	
Moment (kip-ft)	101.41
Axial Force (kips)	7.95
Shear Force (kips)	12.57

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(24) 1" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 33" BC

Top Plate Data

36" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

30" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

30" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

36" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	5.81	
Allowable (kips)	54.53	
Stress Rating:	**10.2%**	**Pass**

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Monopole Flange Plate Connection

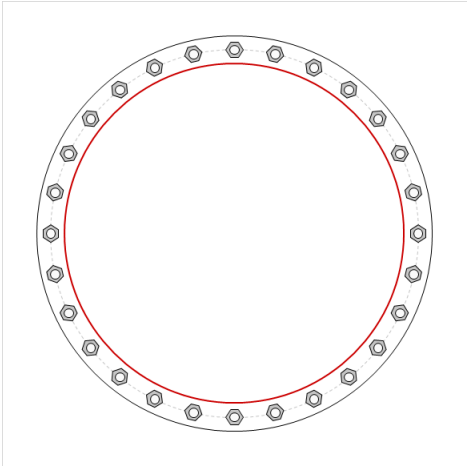
Elevation = 100 ft.

BU #	824359
Site Name	roton/ I-95/ X89/ Noa_
Order #	479800 Rev. 2
TIA-222 Revision	H

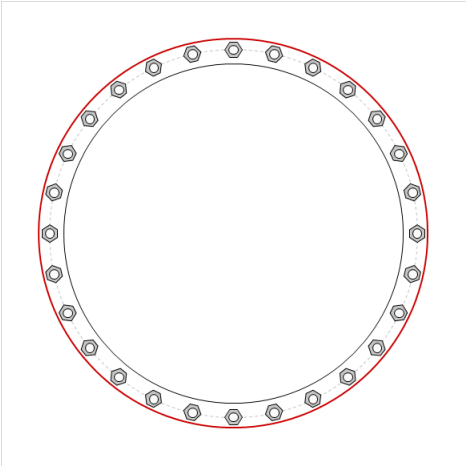
Applied Loads	
Moment (kip-ft)	447.26
Axial Force (kips)	14.85
Shear Force (kips)	22.28

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(28) 1" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 39" BC

Top Plate Data

42" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

36" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

36" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

42" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	19.12	
Allowable (kips)	54.53	
Stress Rating:	**33.4%**	**Pass**

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Monopole Flange Plate Connection

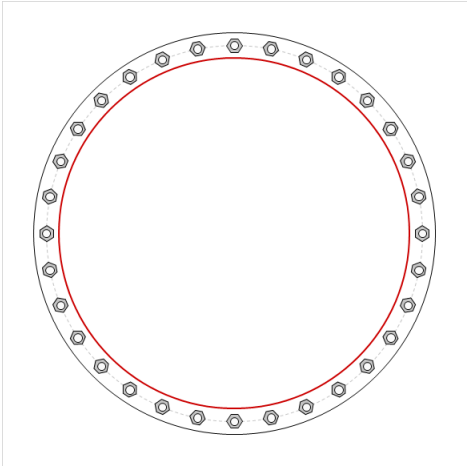
Elevation = 80 ft.

BU #	824359
Site Name	roton/ I-95/ X89/ Noa_
Order #	479800 Rev. 2
TIA-222 Revision	H

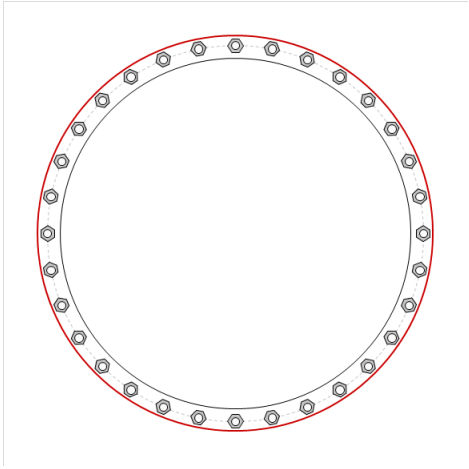
Applied Loads	
Moment (kip-ft)	917.68
Axial Force (kips)	19.70
Shear Force (kips)	24.71

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(32) 1" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 45" BC

Top Plate Data

48" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

42" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

42" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

48" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	29.97	
Allowable (kips)	54.53	
Stress Rating:	**52.3%**	**Pass**

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Monopole Flange Plate Connection

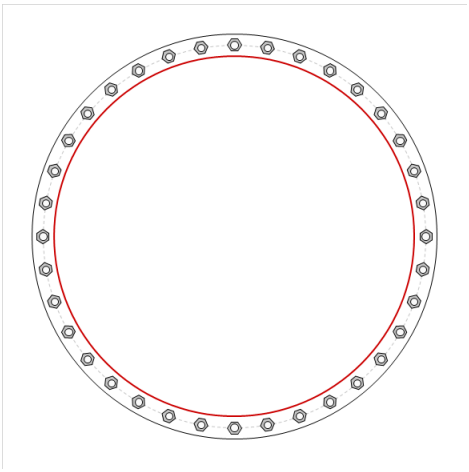
Elevation = 60 ft.

BU #	824359
Site Name	roton/ I-95/ X89/ Noa_
Order #	479800 Rev. 2
TIA-222 Revision	H

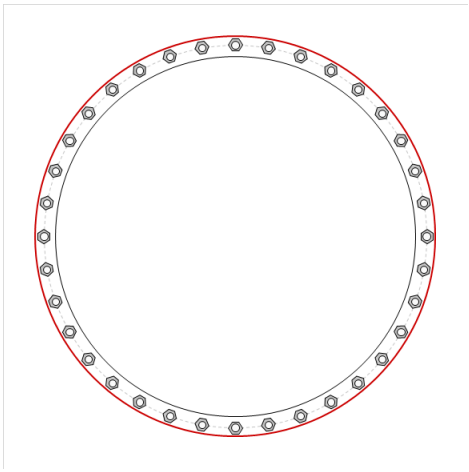
Applied Loads	
Moment (kip-ft)	1470.76
Axial Force (kips)	27.01
Shear Force (kips)	30.59

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(36) 1" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 51" BC

Top Plate Data

54" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

48" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

48" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

54" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	37.70	
Allowable (kips)	54.52	
Stress Rating:	**65.8%**	**Pass**

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Monopole Flange Plate Connection

Elevation = 40 ft.

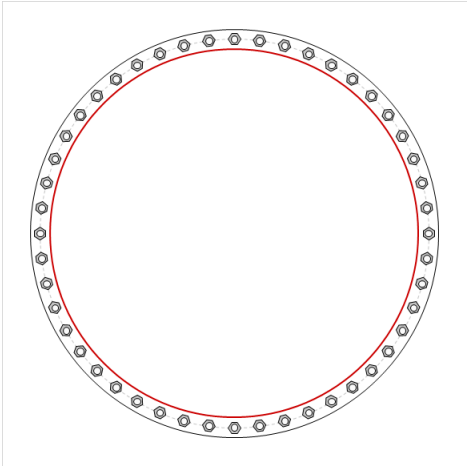
BU #	824359
Site Name	roton/ I-95/ X89/ Noa_
Order #	479800 Rev. 2

TIA-222 Revision	H

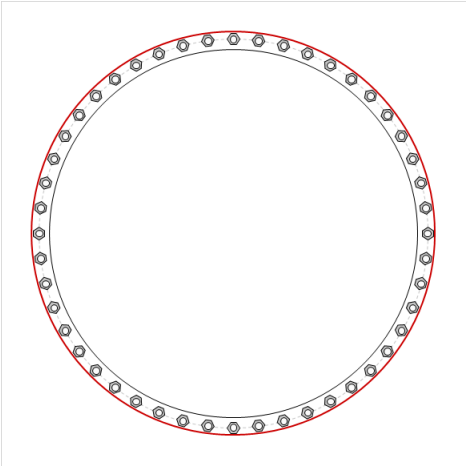
Applied Loads	
Moment (kip-ft)	2114.30
Axial Force (kips)	33.73
Shear Force (kips)	33.71

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(48) 1" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 57" BC

Top Plate Data

60" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

54" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

54" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

60" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	36.39	
Allowable (kips)	54.53	
Stress Rating:	**63.5%**	**Pass**

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Monopole Flange Plate Connection

Elevation = 20 ft.

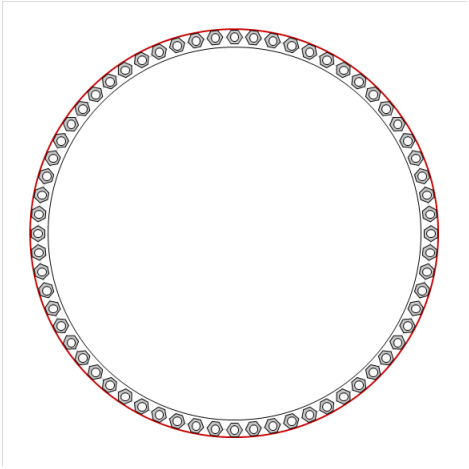
BU #	824359
Site Name	roton/ I-95/ X89/ Noa_
Order #	479800 Rev. 2

TIA-222 Revision	H

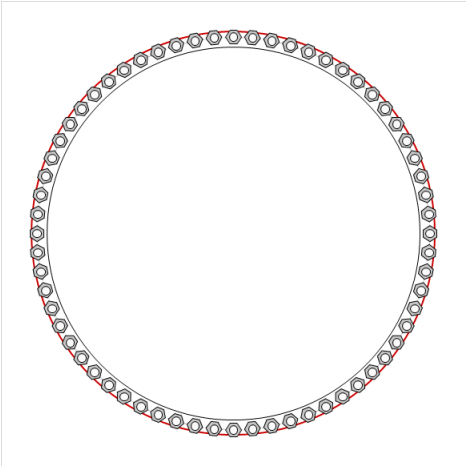
Applied Loads	
Moment (kip-ft)	2818.63
Axial Force (kips)	41.08
Shear Force (kips)	36.67

**TIA-222-H Section 15.5 Applied*

Top Plate - Internal



Bottom Plate - Internal



Connection Properties

Bolt Data

(64) 1-1/4" ø bolts (A325 N; Fy=81 ksi, Fu=105 ksi) on 57" BC

Top Plate Data

54" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

54" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

60" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

60" x 0.75" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	36.44	
Allowable (kips)	76.30	
Stress Rating:	**45.5%**	**Pass**

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**
Tension Side Stress Rating:	**Pirod OK**

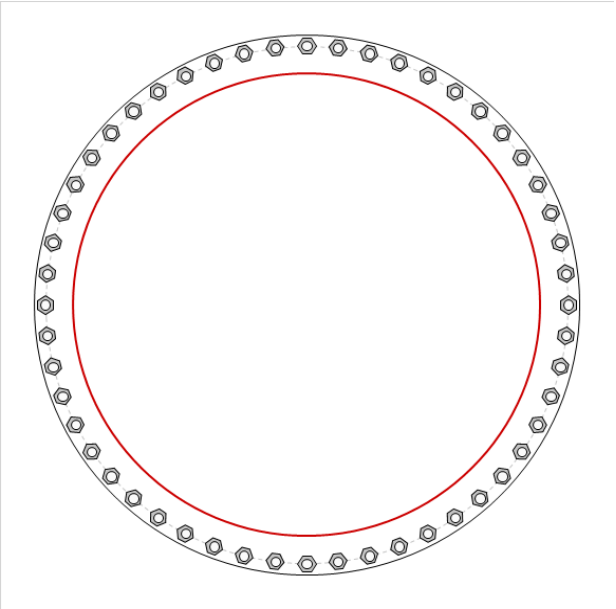
Monopole Base Plate Connection

Site Info	
BU #	824359
Site Name	roton/ I-95/ X89/ Noa
Order #	479800 Rev. 2

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.75

Applied Loads	
Moment (kip-ft)	3577.95
Axial Force (kips)	54.03
Shear Force (kips)	39.21

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(52) 1-1/4" ø bolts (A687 N; Fy=105 ksi, Fu=125 ksi) on 67" BC

Base Plate Data

70" OD x 1" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Stiffener Data

N/A

Pole Data

60" x 0.75" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_c = 50.33	ϕPn_c = 115.97	**Stress Rating**
Vu = 0.75	ϕVn = 52.19	**44.0%**
Mu = 0.86	ϕMn = 30.76	**Pass**

Base Plate Summary

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Pirod OK**

Pier and Pad Foundation

BU # :	824359
Site Name:	Groton/ I-95/ X89/
App. Number:	479800 Rev. 2

TIA-222 Revision:	H
Tower Type:	Monopole

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

Superstructure Analysis Reactions

Compression, P_{comp}:	54.04	kips
Base Shear, Vu_comp:	39.2	kips
Moment, M_u:	3577.95	ft-kips
Tower Height, **H**:	130	ft
BP Dist. Above Fdn, bp_{dist}:	3	in

Pier Properties

Pier Shape:	Square	
Pier Diameter, **dpier**:	7	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	9	
Pier Rebar Quantity, **mc**:	40	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	7	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties

Depth, **D**:	6.6	ft
Pad Width, W_1:	20.7	ft
Pad Thickness, **T**:	2.3	ft
Pad Rebar Size (Bottom dir. 2), Sp_2:	11	
Pad Rebar Quantity (Bottom dir. 2), mp_2:	24	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	3	ksi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	130	pcf
Ultimate Net Bearing, Qnet:	32.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	34	degrees
SPT Blow Count, N_{blows}:	31	
Base Friction, μ:	0.65	
Neglected Depth, **N**:	3.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	10	ft

<--Toggle between Gross and Net

Foundation Analysis Checks

	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	132.25	39.20	**28.2%**	**Pass**
Bearing Pressure (ksf)	24.64	5.57	**22.6%**	**Pass**
*Overturning (kip*ft)*	4514.70	3866.07	**85.6%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	6261.03	3766.11	**57.3%**	**Pass**
Pier Compression (kip)	23390.64	96.38	**0.4%**	**Pass**
*Pad Flexure (kip*ft)*	3489.52	2084.07	**56.9%**	**Pass**
Pad Shear - 1-way (kips)	458.88	312.44	**64.8%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.000	**0.0%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	4634.07	2259.67	**46.4%**	**Pass**

**Rating per TIA-222-H Section 15.5*

Soil Rating*:	**85.6%**
Structural Rating*:	**64.8%**

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 193.35 ft (NAVD 88)
Latitude: 41.369928
Longitude: -72.008269

Wind

Results:

Wind Speed:	135 Vmph
10-year MRI	80 Vmph
25-year MRI	90 Vmph
50-year MRI	99 Vmph
100-year MRI	110 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Wed Nov 18 2020

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

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

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

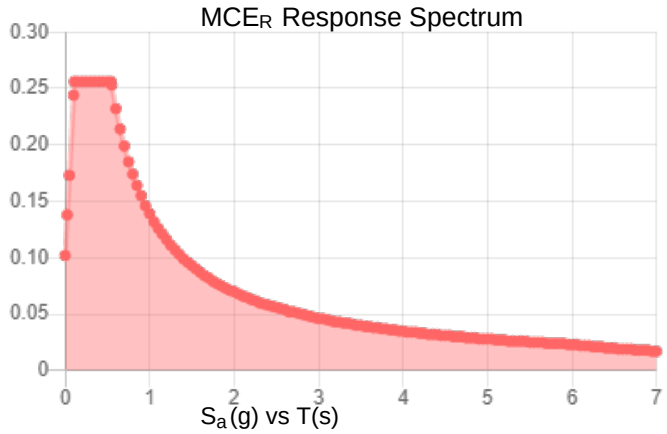
Seismic

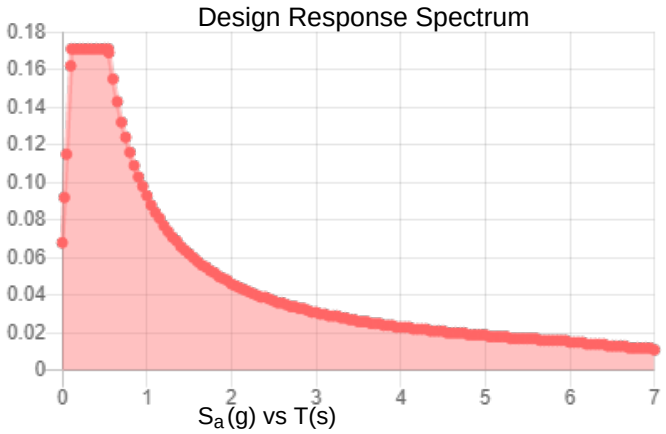
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.16	S_{DS} :	0.171
S_1 :	0.058	S_{D1} :	0.093
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.08
S_{MS} :	0.256	PGA_M :	0.127
S_{M1} :	0.139	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Wed Nov 18 2020

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

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Wed Nov 18 2020

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

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

Exhibit E

Mount Analysis

PAUL J. FORD & COMPANY

Date: June 5, 2019

Charles McGuirt
Crown Castle
3530 Toringdon Way
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679

Subject:	**Mount Modification Report**	
Carrier Designation:	***T-Mobile* Equipment Change-out**	
	Carrier Site Number:	CT11044E
	Carrier Site Name:	Groton/I-95/X89/Noa_1
Crown Castle Designation:	**Crown Castle BU Number:**	824359
	Crown Castle Site Name:	Groton/ I-95/ X89/ Noa_1
	Crown Castle JDE Job Number:	559238
	Crown Castle Purchase Order Number:	1390209
	Crown Castle Order Number:	479800 Rev. 2
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	A37519-1566.003.7191
Site Data:	**725 Flanders Rd, Groton, New London County, CT** **Latitude 41.369928°, Longitude -72.008269°**	
Structure Information:	**Tower Height & Type:**	**130 Foot Monopole**
	Mount Elevation:	**133 Foot**
	Mount Type:	**(1) 16.2 Foot Platform**

Dear Charles Mcguirt,

Paul J Ford and Company is pleased to submit this "Mount Modification Report" to determine the structural integrity of the T-Mobile antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point is not part of this document.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

16.2' Platform **SUFFICIENT***

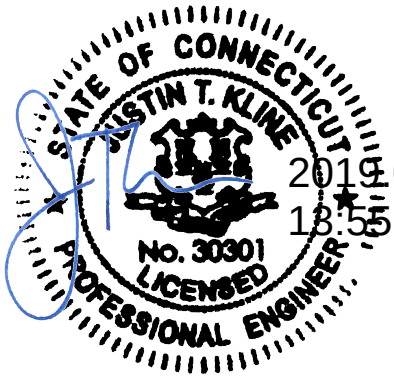
***The mount has sufficient capacity once the modifications, as described in Section 4.1 Recommendations of this report, are completed.**

This analysis utilizes an ultimate 3-second gust wind speed of 135 mph as required by the 2018 Connecticut State Building Code and Appendix N. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Respectfully submitted by:

Rebekah Dorris

Rebekah M. Dorris, PE
Project Engineer
RDorris@pauljford.com



2019.06.06
13:55:10-04'00'

TABLE OF CONTENTS

1) INTRODUCTION

The existing mount under consideration is (1) 16.2' Platform mount mapped by RKS on 04/11/19.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	135 mph
Exposure Category:	C
Topographic Factor at Base:	1.0
Topographic Factor at Mount:	1.0
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
133	132	3	Ericsson	ERICSSON AIR 21 B2A B4P	(1) 16.2' Platform
		3	RFS/Celwave	APXVAARR24_43-UNA20	
		3	Ericsson	ERICSSON AIR 21 B4A B2P	
		3	Ericsson	RADIO 4449 B12/B71	
		3	Ericsson	KRY 112 144/1	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Mount Mapping	RKS Dated: 04/11/19	8355364	CCISites
Order	ID: 479800 Rev. 2 Dated: 04/16/19	-	CCISites

3.1) Analysis Method

RISA-3D (version 17.0.2), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision C).

3.2) Assumptions

1) *The analysis of the existing tower or the effect of the mount attachment to the tower is not within the current scope of work.*
2) *The antenna mounting system was properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer's specifications and all bolts are tightened as specified by the manufacturer and AISC requirements.*
3) *The configuration of antennas, mounts, and other appurtenances are as specified in Table 1.*
4) *All member connections have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report. All U-Bolt connections have been properly tightened. This analysis will be required to be revised if the existing conditions in the field differ from those shown in the above referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.*
5) *Steel grades are as follows, unless noted otherwise:*
   - *a) Channel, Solid Round, Angle, Plate, Unistrut* — *ASTM A36 (GR 36)*
   - *b) Pipe* — *ASTM A53 (GR 35)*
   - *c) HSS (Rectangular)* — *ASTM 500 (GR B-46)*
   - *d) HSS (Round)* — *ASTM 500 (GR B-42)*
   - *e) Threaded Rods* — *ASTM F1554 (GR 36)*
   - *f) Connection Bolts* — *ASTM A325*
   - *g) U-Bolts* — *SAE J429 (GR 2)*
6) *Proposed equipment is to be installed in the locations specified in Appendix A. Any changes to the proposed equipment locations will render this report invalid.*

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the mount.

4) ANALYSIS RESULTS

Table 3- Mount Component Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Face Horizontals	133	48.7	Pass
1	Grating Support Members		46.2	Pass
1	Standoff Members		48.5	Pass
1	Corner Plates		30.5	Pass
1	Mount Pipes		65.2	Pass
1	Mount to Tower Connection		90.2	Pass

Mount Rating (max from all components) =	90.2%

Notes:
1) See additional documentation in "Appendix C – Software Analysis Output" for calculations supporting the % capacity consumed.

4.1) Recommendations

The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the structural modifications listed below must be completed.

- Install SitePro1 PRK-SFS-L Platform Reinforcement Kit or EOR approved equivalent as indicated in "Appendix D – Supplemental Modification Information" and in conformance with the attached manufacturer drawings.
- Replace existing mount pipes with 8-ft long, P2.5 STD (2.88" O.D. x 0.189") mount pipes where required. See Appendix A details.

Connection from the mount to the tower and local stresses on the tower are sufficient.

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING MOUNTS BY PAUL J. FORD AND COMPANY

1) It is the responsibility of the client to ensure that the information provided to Paul J. Ford and Company is accurate and complete. Paul J. Ford and Company will rely on the accuracy and completeness of such information in performing or furnishing services under this project.

2) If the existing conditions are not as represented on the referenced drawings and/or documents, Paul J. Ford and Company should be contacted immediately to evaluate the significance of the deviation.

3) The mount has been analyzed according to the minimum design loads recommended by the Reference Standard. If additional design loads are required, Paul J. Ford and Company should be made aware of this prior to the start of the project.

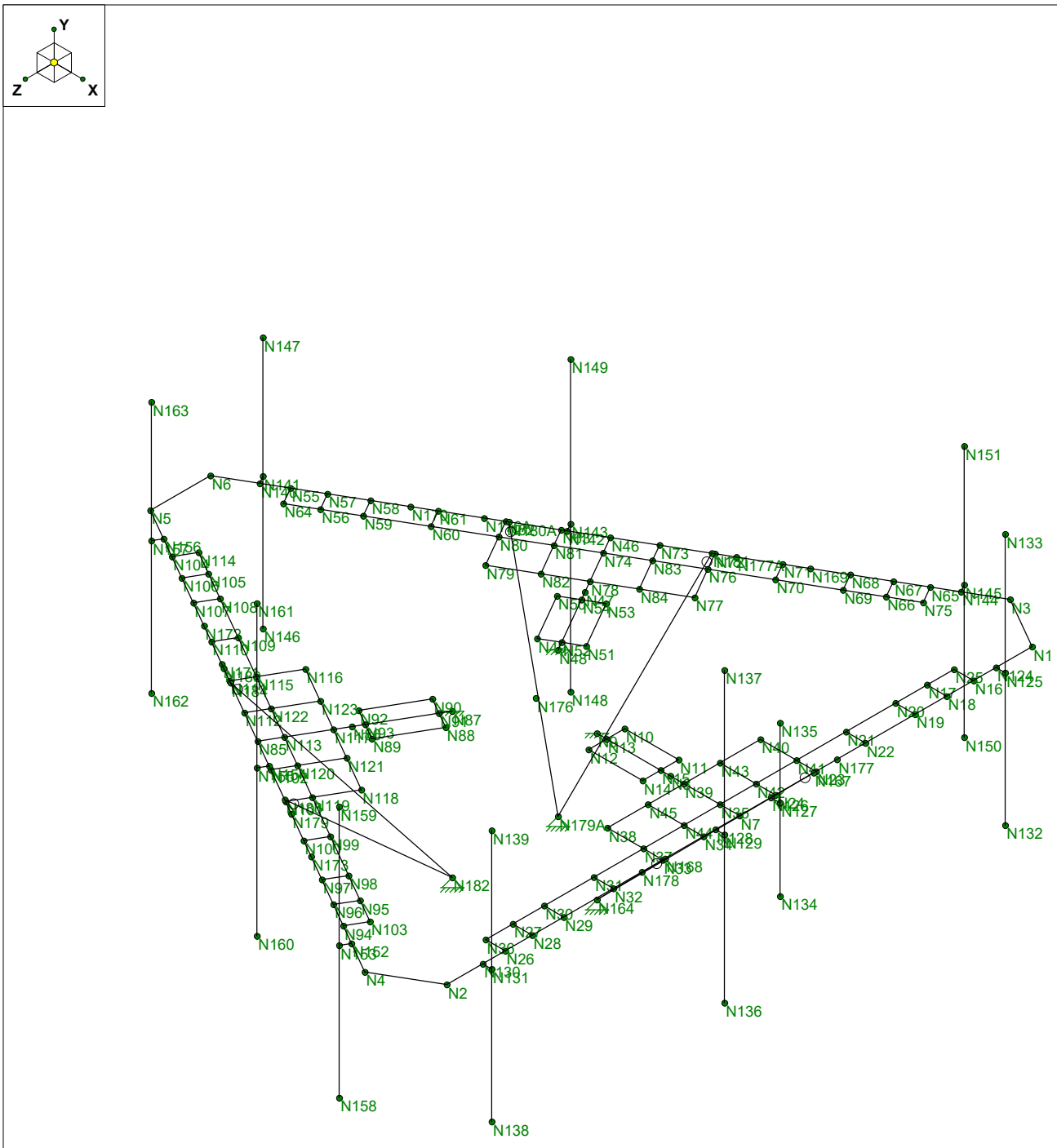
4) The standard of care for all Professional Engineering Services performed or furnished by Paul J. Ford and Company under this project will be the skill and care used by members of the Consultant's profession practicing under similar circumstances at the same time and in the same locality.

5) All Services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Paul J. Ford and Company is not responsible for the conclusions, opinions and/or recommendations made by others based on the information supplied herein.

****

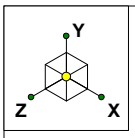
APPENDIX A

WIRE FRAME AND RENDERED MODELS

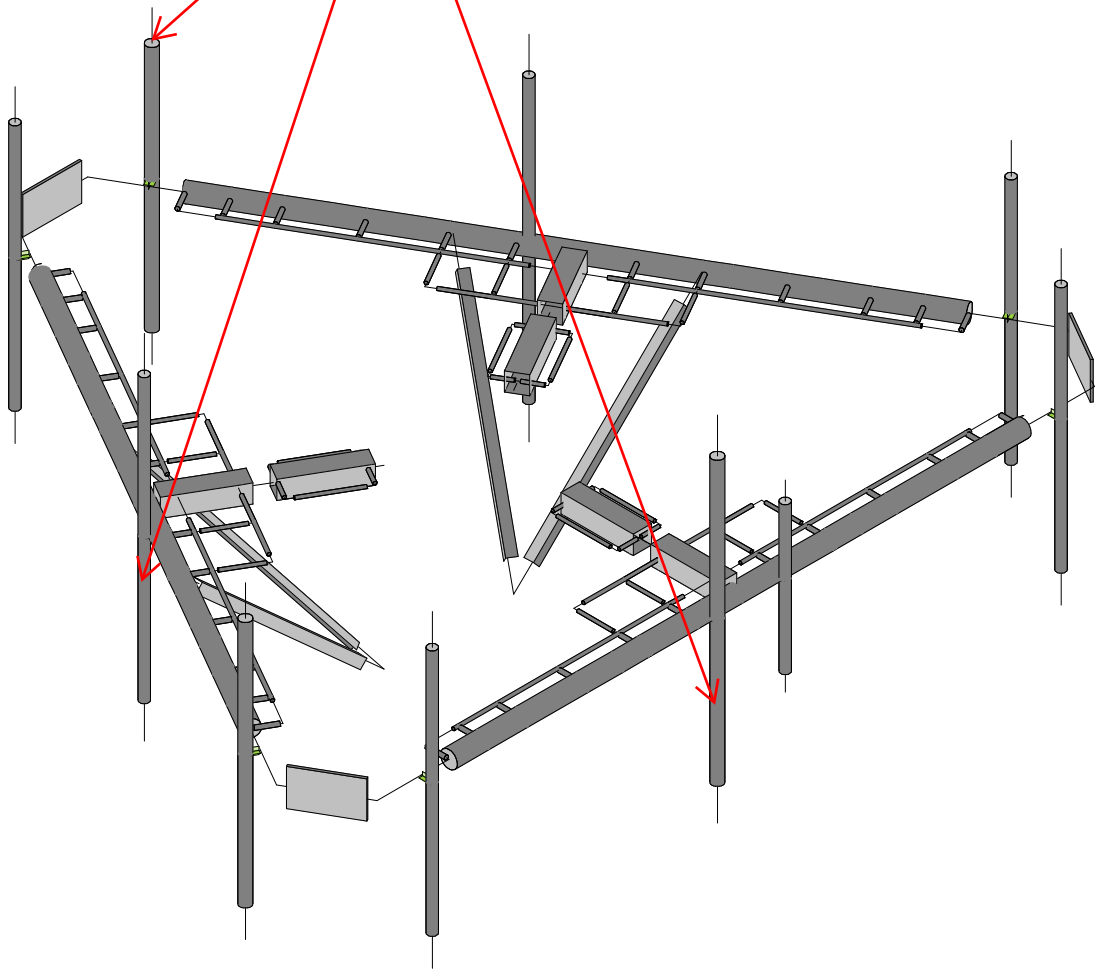


Envelope Only Solution

Paul J. Ford	824359_Groton I-95 X89 Noa_1	SK - 1
SS		June 6, 2019 at 9:21 AM
A37519-1566.003.7191		824359_Groton I-95 X89 Noa_1_R...



Proposed
(1) RFS/CELWAVE /
APXVAARR24_43-UNA20
(1) ERICSSON / RADIO 4449 B12/B71



Envelope Only Solution

Paul J. Ford	824359_Groton I-95 X89 Noa_1	SK - 2
SS		June 6, 2019 at 9:40 AM
A37519-1566.003.7191		824359_Groton I-95 X89 Noa_1_R...

APPENDIX B

SOFTWARE INPUT CALCULATION

ANSI/TIA-222H - WIND & ICE LOAD CALCULATIONS

Site Code/Name	824359 - Groton/ I-95/ X89/ Noa_1
State	Connecticut
County	New London
V	135 mph
V_i	50 mph
t_i	1.5 in
z_s	193 ft
z	135 ft

Structure Class	II
Exposure Category	C
Topographic Category	1
Wind direction probability factor	0.95
Gust factor	1
Wind Pressure (including Ka = 0.9)	53.40 psf
t_{iz}	1.73 in

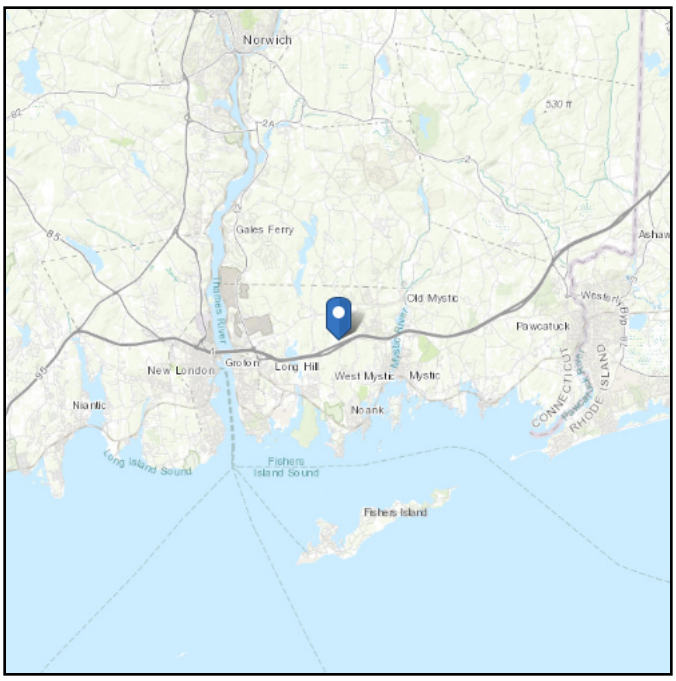
Dead and Wind Forces for Equipment									
Manufacturer	Model	L [in]	W [in]	D [in]	0° [lbs]	30° [lbs]	60° [lbs]	90° [lbs]	Weight [lbs]
ERICSSON	ERICSSON AIR 21 B2A B4P	56	12.1	7.87	325.3	301.4	253.4	229.5	91.5
RFS/CELWAVE	APXVAARR24_43-UNA20	95.6	24	8.7	1077.2	926.1	623.9	472.8	128.0
ERICSSON	ERICSSON AIR 21 B4A B2P	55.9	12.1	7.87	324.7	300.7	252.9	229.0	91.5
ERICSSON	RADIO 4449 B12/B71	14.95	13.19	9.25	87.8	81.2	68.1	61.5	75.0
ERICSSON	KRY 112 144/1	7	6	3	18.7	16.4	11.7	9.3	11.0

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 193.35 ft (NAVD 88)
Latitude: 41.369928
Longitude: -72.008269



Wind

Results:

Wind Speed:	135 Vmph
10-year MRI	80 Vmph
25-year MRI	90 Vmph
50-year MRI	99 Vmph
100-year MRI	110 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Thu May 02 2019

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

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

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

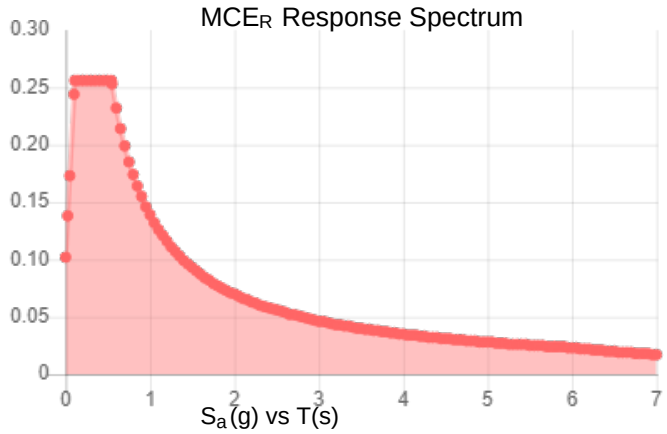
Seismic

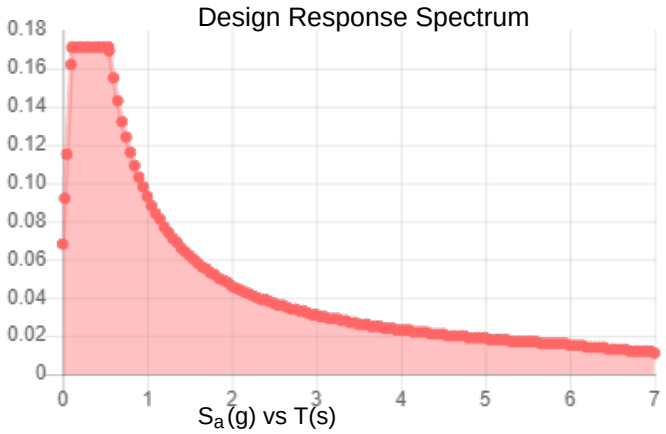
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.16	S_{DS} :	0.171
S_1 :	0.058	S_{D1} :	0.093
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.08
S_{MS} :	0.256	PGA_M :	0.127
S_{M1} :	0.139	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Thu May 02 2019

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

Ice

Results:

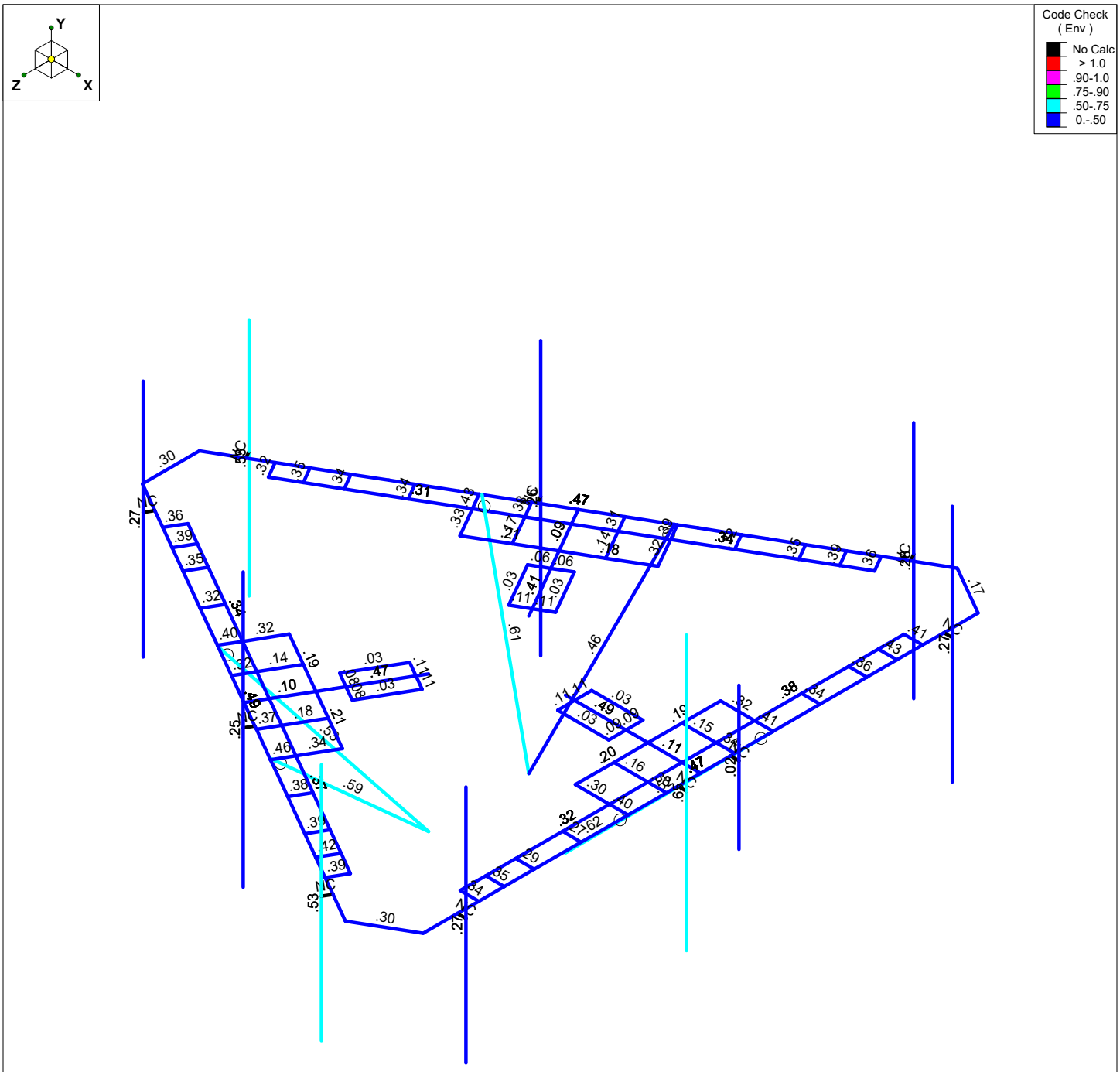
Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Thu May 02 2019

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

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

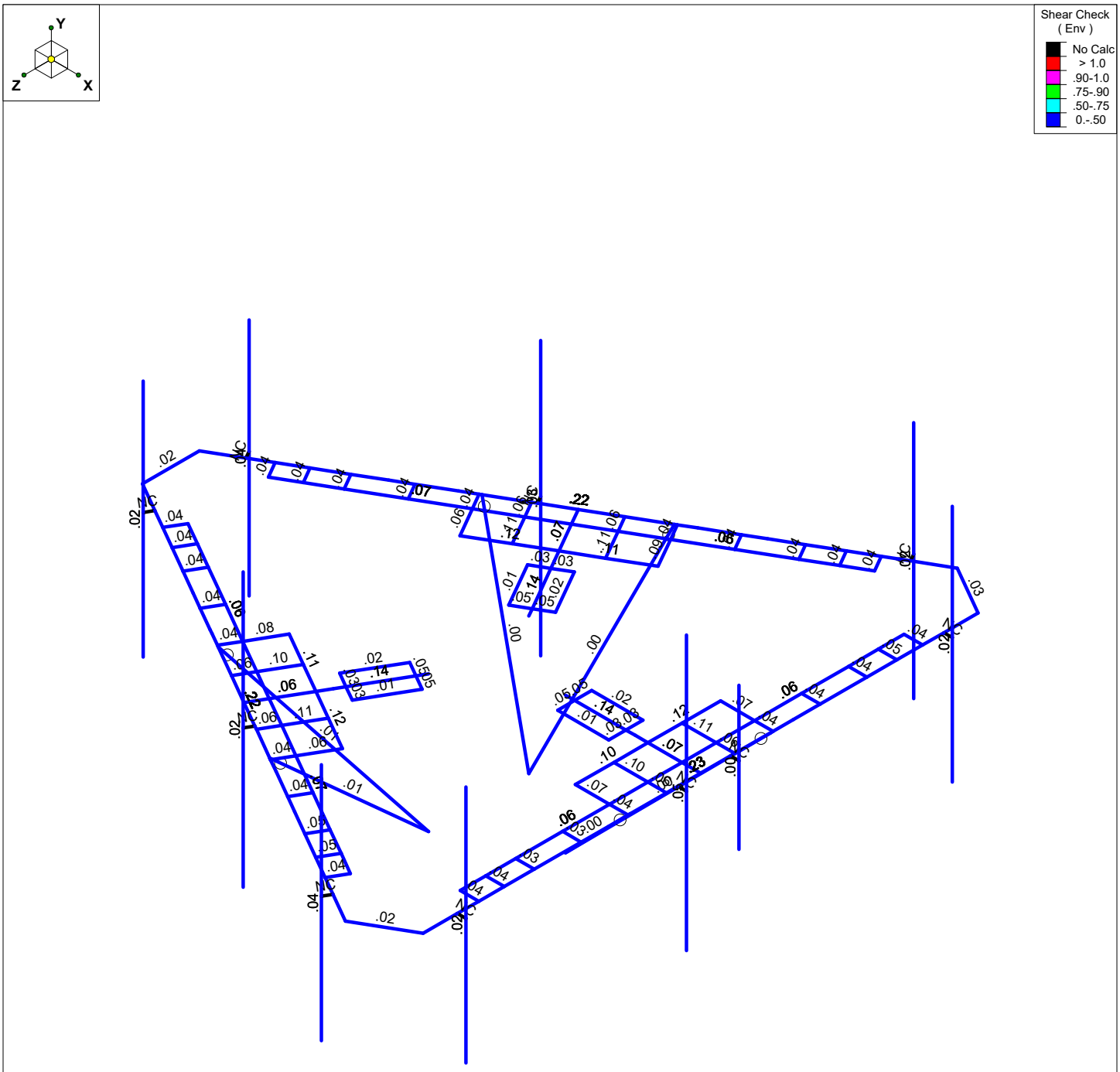
APPENDIX C

SOFTWARE ANALYSIS OUTPUT



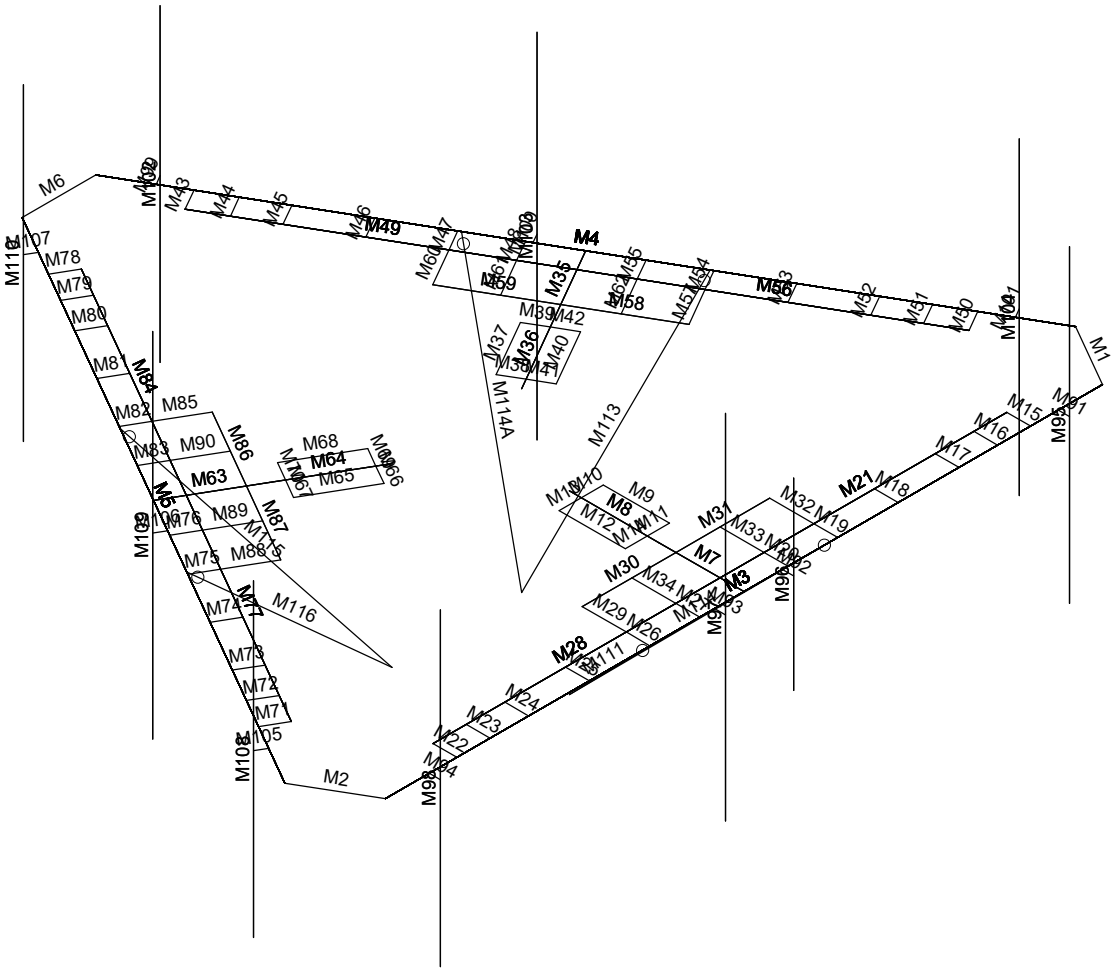
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Paul J. Ford	824359_Groton I-95 X89 Noa_1	SK - 3
SS		June 6, 2019 at 9:40 AM
A37519-1566.003.7191		824359_Groton I-95 X89 Noa_1_R...



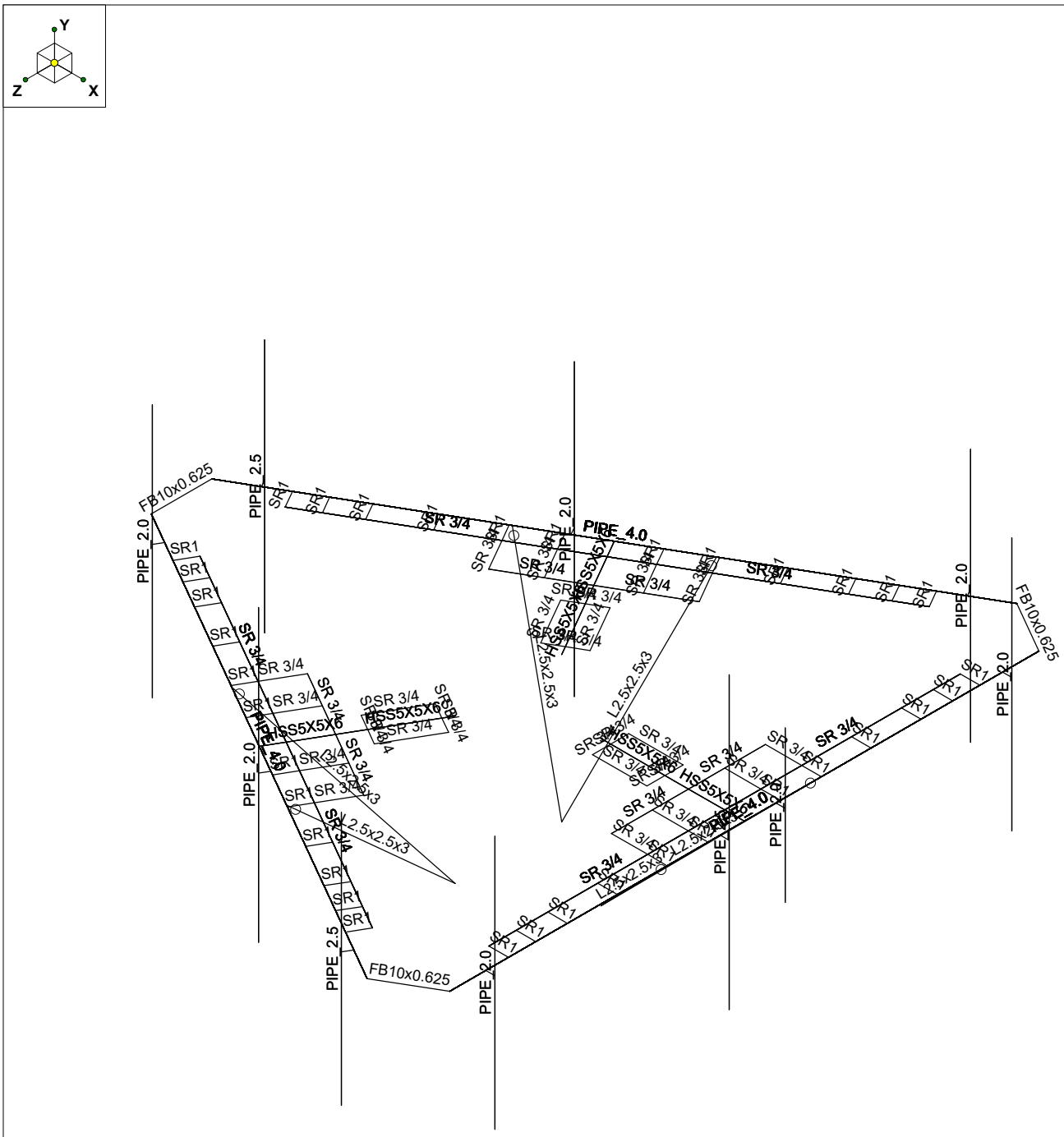
Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Paul J. Ford	824359_Groton I-95 X89 Noa_1	SK - 4
SS		June 6, 2019 at 9:40 AM
A37519-1566.003.7191		824359_Groton I-95 X89 Noa_1_R...



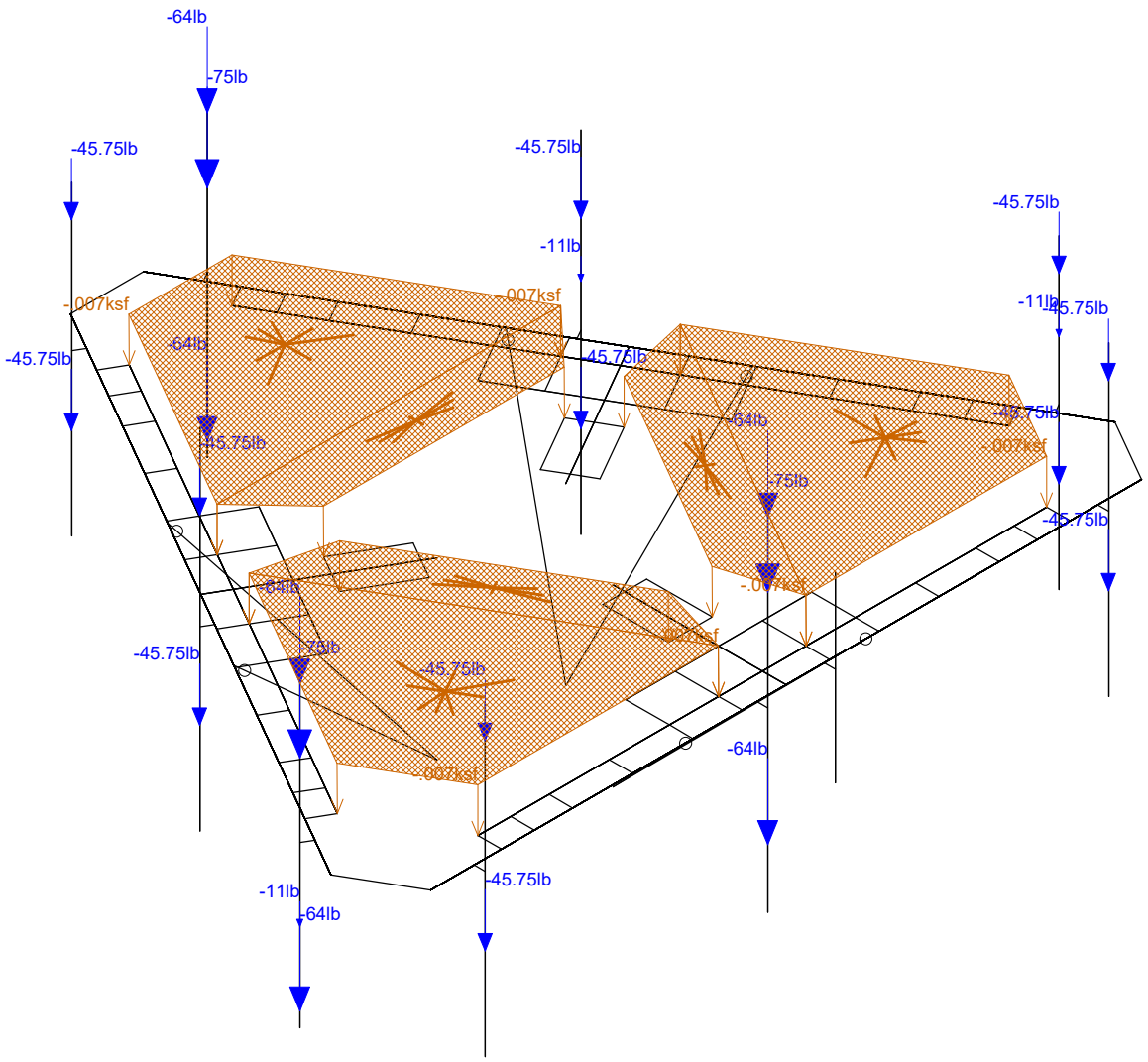
Envelope Only Solution

Paul J. Ford	824359_Groton I-95 X89 Noa_1	SK - 5
SS		June 6, 2019 at 9:40 AM
A37519-1566.003.7191		824359_Groton I-95 X89 Noa_1_R...



Envelope Only Solution

Paul J. Ford	824359_Groton I-95 X89 Noa_1	SK - 6
SS		June 6, 2019 at 9:40 AM
A37519-1566.003.7191		824359_Groton I-95 X89 Noa_1_R...



Loads: BLC 2, We
Envelope Only Solution

Paul J. Ford	824359_Groton I-95 X89 Noa_1	SK - 7
SS		June 6, 2019 at 9:41 AM
A37519-1566.003.7191		824359_Groton I-95 X89 Noa_1_R...

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	24
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 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): LRFD
Cold Formed Steel Code	AISI S100-16: LRFD
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
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	ASCE 7-10
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

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

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
1	M1	N3	N1			FB10x0.625	Beam	BAR	A36 Gr.36	Typical
2	M2	N4	N2			FB10x0.625	Beam	BAR	A36 Gr.36	Typical
3	M3	N1	N2			PIPE_4.0	Beam	Pipe	A53 Gr.B	Typical
4	M4	N6	N3			PIPE_4.0	Beam	Pipe	A53 Gr.B	Typical
5	M5	N5	N4			PIPE_4.0	Beam	Pipe	A53 Gr.B	Typical
6	M6	N5	N6			FB10x0.625	Beam	BAR	A36 Gr.36	Typical
7	M7	N7	N8			HSS5X5X6	Beam	Tube	A500 Gr.B 46	Typical
8	M8	N8	N9			HSS5X5X6	Beam	Tube	A500 Gr.B 46	Typical
9	M9	N11	N10			SR 3/4	Beam	BAR	A36 Gr.36	Typical
10	M10	N10	N13			SR 3/4	Beam	BAR	A36 Gr.36	Typical
11	M11	N11	N15			SR 3/4	Beam	BAR	A36 Gr.36	Typical
12	M12	N14	N12			SR 3/4	Beam	BAR	A36 Gr.36	Typical
13	M13	N12	N13			SR 3/4	Beam	BAR	A36 Gr.36	Typical
14	M14	N14	N15			SR 3/4	Beam	BAR	A36 Gr.36	Typical
15	M15	N16	N25			SR1	Beam	BAR	A36 Gr.36	Typical
16	M16	N17	N18			SR1	Beam	BAR	A36 Gr.36	Typical
17	M17	N19	N20			SR1	Beam	BAR	A36 Gr.36	Typical
18	M18	N21	N22			SR1	Beam	BAR	A36 Gr.36	Typical
19	M19	N23	N41			SR1	Beam	BAR	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
20	M20	N42	N24			SR1	Beam	BAR	A36 Gr.36	Typical
21	M21	N35	N25			SR 3/4	Beam	BAR	A36 Gr.36	Typical
22	M22	N26	N36			SR1	Beam	BAR	A36 Gr.36	Typical
23	M23	N27	N28			SR1	Beam	BAR	A36 Gr.36	Typical
24	M24	N29	N30			SR1	Beam	BAR	A36 Gr.36	Typical
25	M25	N31	N32			SR1	Beam	BAR	A36 Gr.36	Typical
26	M26	N33	N37			SR1	Beam	BAR	A36 Gr.36	Typical
27	M27	N44	N34			SR1	Beam	BAR	A36 Gr.36	Typical
28	M28	N35	N36			SR 3/4	Beam	BAR	A36 Gr.36	Typical
29	M29	N37	N38			SR 3/4	Beam	BAR	A36 Gr.36	Typical
30	M30	N38	N39			SR 3/4	Beam	BAR	A36 Gr.36	Typical
31	M31	N39	N40			SR 3/4	Beam	BAR	A36 Gr.36	Typical
32	M32	N40	N41			SR 3/4	Beam	BAR	A36 Gr.36	Typical
33	M33	N42	N43			SR 3/4	Beam	BAR	A36 Gr.36	Typical
34	M34	N44	N45			SR 3/4	Beam	BAR	A36 Gr.36	Typical
35	M35	N46	N47			HSS5X5X6	Beam	Tube	A500 Gr.B 46	Typical
36	M36	N47	N48			HSS5X5X6	Beam	Tube	A500 Gr.B 46	Typical
37	M37	N50	N49			SR 3/4	Beam	BAR	A36 Gr.36	Typical
38	M38	N49	N52			SR 3/4	Beam	BAR	A36 Gr.36	Typical
39	M39	N50	N54			SR 3/4	Beam	BAR	A36 Gr.36	Typical
40	M40	N53	N51			SR 3/4	Beam	BAR	A36 Gr.36	Typical
41	M41	N51	N52			SR 3/4	Beam	BAR	A36 Gr.36	Typical
42	M42	N53	N54			SR 3/4	Beam	BAR	A36 Gr.36	Typical
43	M43	N55	N64			SR1	Beam	BAR	A36 Gr.36	Typical
44	M44	N56	N57			SR1	Beam	BAR	A36 Gr.36	Typical
45	M45	N58	N59			SR1	Beam	BAR	A36 Gr.36	Typical
46	M46	N60	N61			SR1	Beam	BAR	A36 Gr.36	Typical
47	M47	N62	N80			SR1	Beam	BAR	A36 Gr.36	Typical
48	M48	N81	N63			SR1	Beam	BAR	A36 Gr.36	Typical
49	M49	N74	N64			SR 3/4	Beam	BAR	A36 Gr.36	Typical
50	M50	N65	N75			SR1	Beam	BAR	A36 Gr.36	Typical
51	M51	N66	N67			SR1	Beam	BAR	A36 Gr.36	Typical
52	M52	N68	N69			SR1	Beam	BAR	A36 Gr.36	Typical
53	M53	N70	N71			SR1	Beam	BAR	A36 Gr.36	Typical
54	M54	N72	N76			SR1	Beam	BAR	A36 Gr.36	Typical
55	M55	N83	N73			SR1	Beam	BAR	A36 Gr.36	Typical
56	M56	N74	N75			SR 3/4	Beam	BAR	A36 Gr.36	Typical
57	M57	N76	N77			SR 3/4	Beam	BAR	A36 Gr.36	Typical
58	M58	N77	N78			SR 3/4	Beam	BAR	A36 Gr.36	Typical
59	M59	N78	N79			SR 3/4	Beam	BAR	A36 Gr.36	Typical
60	M60	N79	N80			SR 3/4	Beam	BAR	A36 Gr.36	Typical
61	M61	N81	N82			SR 3/4	Beam	BAR	A36 Gr.36	Typical
62	M62	N83	N84			SR 3/4	Beam	BAR	A36 Gr.36	Typical
63	M63	N85	N86			HSS5X5X6	Beam	Tube	A500 Gr.B 46	Typical
64	M64	N86	N87			HSS5X5X6	Beam	Tube	A500 Gr.B 46	Typical
65	M65	N89	N88			SR 3/4	Beam	BAR	A36 Gr.36	Typical
66	M66	N88	N91			SR 3/4	Beam	BAR	A36 Gr.36	Typical
67	M67	N89	N93			SR 3/4	Beam	BAR	A36 Gr.36	Typical
68	M68	N92	N90			SR 3/4	Beam	BAR	A36 Gr.36	Typical
69	M69	N90	N91			SR 3/4	Beam	BAR	A36 Gr.36	Typical
70	M70	N92	N93			SR 3/4	Beam	BAR	A36 Gr.36	Typical
71	M71	N94	N103			SR1	Beam	BAR	A36 Gr.36	Typical
72	M72	N95	N96			SR1	Beam	BAR	A36 Gr.36	Typical
73	M73	N97	N98			SR1	Beam	BAR	A36 Gr.36	Typical
74	M74	N99	N100			SR1	Beam	BAR	A36 Gr.36	Typical
75	M75	N101	N119			SR1	Beam	BAR	A36 Gr.36	Typical
76	M76	N120	N102			SR1	Beam	BAR	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
77	M77	N113	N103			SR 3/4	Beam	BAR	A36 Gr.36	Typical
78	M78	N104	N114			SR1	Beam	BAR	A36 Gr.36	Typical
79	M79	N105	N106			SR1	Beam	BAR	A36 Gr.36	Typical
80	M80	N107	N108			SR1	Beam	BAR	A36 Gr.36	Typical
81	M81	N109	N110			SR1	Beam	BAR	A36 Gr.36	Typical
82	M82	N111	N115			SR1	Beam	BAR	A36 Gr.36	Typical
83	M83	N122	N112			SR1	Beam	BAR	A36 Gr.36	Typical
84	M84	N113	N114			SR 3/4	Beam	BAR	A36 Gr.36	Typical
85	M85	N115	N116			SR 3/4	Beam	BAR	A36 Gr.36	Typical
86	M86	N116	N117			SR 3/4	Beam	BAR	A36 Gr.36	Typical
87	M87	N117	N118			SR 3/4	Beam	BAR	A36 Gr.36	Typical
88	M88	N118	N119			SR 3/4	Beam	BAR	A36 Gr.36	Typical
89	M89	N120	N121			SR 3/4	Beam	BAR	A36 Gr.36	Typical
90	M90	N122	N123			SR 3/4	Beam	BAR	A36 Gr.36	Typical
91	M91	N124	N125			RIGID	None	None	RIGID	Typical
92	M92	N126	N127			RIGID	None	None	RIGID	Typical
93	M93	N128	N129			RIGID	None	None	RIGID	Typical
94	M94	N130	N131			RIGID	None	None	RIGID	Typical
95	M95	N132	N133			PIPE_2.0	Column	Pipe	A53 Gr.B	Typical
96	M96	N134	N135			PIPE_2.0	Column	Pipe	A53 Gr.B	Typical
97	M97	N137	N136			PIPE_2.5	Column	Pipe	A53 Gr.B	Typical
98	M98	N138	N139			PIPE_2.0	Column	Pipe	A53 Gr.B	Typical
99	M99	N140	N141			RIGID	None	None	RIGID	Typical
100	M100	N142	N143			RIGID	None	None	RIGID	Typical
101	M101	N144	N145			RIGID	None	None	RIGID	Typical
102	M102	N147	N146			PIPE_2.5	Column	Pipe	A53 Gr.B	Typical
103	M103	N148	N149			PIPE_2.0	Column	Pipe	A53 Gr.B	Typical
104	M104	N150	N151			PIPE_2.0	Column	Pipe	A53 Gr.B	Typical
105	M105	N152	N153			RIGID	None	None	RIGID	Typical
106	M106	N154	N155			RIGID	None	None	RIGID	Typical
107	M107	N156	N157			RIGID	None	None	RIGID	Typical
108	M108	N159	N158			PIPE_2.5	Column	Pipe	A53 Gr.B	Typical
109	M109	N160	N161			PIPE_2.0	Column	Pipe	A53 Gr.B	Typical
110	M110	N162	N163			PIPE_2.0	Column	Pipe	A53 Gr.B	Typical
111	M111	N168	N164		90	L2.5x2.5x3	Beam	Wide Flange	A36 Gr.36	Typical
112	M114	N167	N164		180	L2.5x2.5x3	Beam	Wide Flange	A36 Gr.36	Typical
113	M113	N181	N179A		90	L2.5x2.5x3	Beam	Wide Flange	A36 Gr.36	Typical
114	M114A	N180A	N179A		180	L2.5x2.5x3	Beam	Wide Flange	A36 Gr.36	Typical
115	M115	N184	N182		90	L2.5x2.5x3	Beam	Wide Flange	A36 Gr.36	Typical
116	M116	N183	N182		180	L2.5x2.5x3	Beam	Wide Flange	A36 Gr.36	Typical

Member Advanced Data

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

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
13	M13						Yes				None
14	M14						Yes				None
15	M15						Yes				None
16	M16						Yes				None
17	M17						Yes				None
18	M18						Yes				None
19	M19						Yes				None
20	M20						Yes				None
21	M21						Yes	Default			None
22	M22						Yes				None
23	M23						Yes				None
24	M24						Yes				None
25	M25						Yes				None
26	M26						Yes				None
27	M27						Yes				None
28	M28						Yes	Default			None
29	M29						Yes				None
30	M30						Yes				None
31	M31						Yes				None
32	M32						Yes				None
33	M33						Yes				None
34	M34						Yes				None
35	M35						Yes				None
36	M36						Yes				None
37	M37						Yes				None
38	M38						Yes				None
39	M39						Yes				None
40	M40						Yes				None
41	M41						Yes				None
42	M42						Yes				None
43	M43						Yes				None
44	M44						Yes				None
45	M45						Yes				None
46	M46						Yes				None
47	M47						Yes				None
48	M48						Yes				None
49	M49						Yes				None
50	M50						Yes				None
51	M51						Yes				None
52	M52						Yes				None
53	M53						Yes				None
54	M54						Yes				None
55	M55						Yes				None
56	M56						Yes				None
57	M57						Yes				None
58	M58						Yes				None
59	M59						Yes				None
60	M60						Yes				None
61	M61						Yes				None
62	M62						Yes				None
63	M63						Yes				None
64	M64						Yes				None
65	M65						Yes				None
66	M66						Yes				None
67	M67						Yes				None
68	M68						Yes				None
69	M69						Yes				None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
70	M70						Yes				None
71	M71						Yes				None
72	M72						Yes				None
73	M73						Yes				None
74	M74						Yes				None
75	M75						Yes				None
76	M76						Yes				None
77	M77						Yes				None
78	M78						Yes				None
79	M79						Yes				None
80	M80						Yes				None
81	M81						Yes				None
82	M82						Yes				None
83	M83						Yes				None
84	M84						Yes				None
85	M85						Yes				None
86	M86						Yes				None
87	M87						Yes				None
88	M88						Yes				None
89	M89						Yes				None
90	M90						Yes				None
91	M91						Yes	** NA **			None
92	M92						Yes	** NA **			None
93	M93						Yes	** NA **			None
94	M94						Yes	** NA **			None
95	M95						Yes	** NA **			None
96	M96						Yes	** NA **			None
97	M97						Yes	** NA **			None
98	M98						Yes	** NA **			None
99	M99						Yes	** NA **			None
100	M100						Yes	** NA **			None
101	M101						Yes	** NA **			None
102	M102						Yes	** NA **			None
103	M103						Yes	** NA **			None
104	M104						Yes	** NA **			None
105	M105						Yes	** NA **			None
106	M106						Yes	** NA **			None
107	M107						Yes	** NA **			None
108	M108						Yes	** NA **			None
109	M109						Yes	** NA **			None
110	M110						Yes	** NA **			None
111	M111	BenPIN					Yes				None
112	M114	BenPIN					Yes				None
113	M113	BenPIN					Yes				None
114	M114A	BenPIN					Yes				None
115	M115	BenPIN					Yes				None
116	M116	BenPIN					Yes				None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	FB10x0.625	20			Lbyy						Lateral
2	M2	FB10x0.625	20			Lbyy						Lateral
3	M3	PIPE_4.0	195			Lbyy						Lateral
4	M4	PIPE_4.0	195			Lbyy						Lateral
5	M5	PIPE_4.0	195			Lbyy						Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
6	M6	FB10x0.625	20			Lbyy						Lateral
7	M7	HSS5X5X6	23			Lbyy						Lateral
8	M8	HSS5X5X6	24.5			Lbyy						Lateral
9	M9	SR 3/4	18			Lbyy						Lateral
10	M10	SR 3/4	6			Lbyy						Lateral
11	M11	SR 3/4	6			Lbyy						Lateral
12	M12	SR 3/4	18			Lbyy						Lateral
13	M13	SR 3/4	6			Lbyy						Lateral
14	M14	SR 3/4	6			Lbyy						Lateral
15	M15	SR1	6.5			Lbyy						Lateral
16	M16	SR1	6.5			Lbyy						Lateral
17	M17	SR1	6.5			Lbyy						Lateral
18	M18	SR1	6.5			Lbyy						Lateral
19	M19	SR1	6.5			Lbyy						Lateral
20	M20	SR1	6.5			Lbyy						Lateral
21	M21	SR 3/4	78	16	16	Lbyy						Lateral
22	M22	SR1	6.5			Lbyy						Lateral
23	M23	SR1	6.5			Lbyy						Lateral
24	M24	SR1	6.5			Lbyy						Lateral
25	M25	SR1	6.5			Lbyy						Lateral
26	M26	SR1	6.5			Lbyy						Lateral
27	M27	SR1	6.5			Lbyy						Lateral
28	M28	SR 3/4	78	16	16	Lbyy						Lateral
29	M29	SR 3/4	12			Lbyy						Lateral
30	M30	SR 3/4	25.5			Lbyy						Lateral
31	M31	SR 3/4	25.5			Lbyy						Lateral
32	M32	SR 3/4	12			Lbyy						Lateral
33	M33	SR 3/4	12			Lbyy						Lateral
34	M34	SR 3/4	12			Lbyy						Lateral
35	M35	HSS5X5X6	23			Lbyy						Lateral
36	M36	HSS5X5X6	24.5			Lbyy						Lateral
37	M37	SR 3/4	18			Lbyy						Lateral
38	M38	SR 3/4	6			Lbyy						Lateral
39	M39	SR 3/4	6			Lbyy						Lateral
40	M40	SR 3/4	18			Lbyy						Lateral
41	M41	SR 3/4	6			Lbyy						Lateral
42	M42	SR 3/4	6			Lbyy						Lateral
43	M43	SR1	6.5			Lbyy						Lateral
44	M44	SR1	6.5			Lbyy						Lateral
45	M45	SR1	6.5			Lbyy						Lateral
46	M46	SR1	6.5			Lbyy						Lateral
47	M47	SR1	6.5			Lbyy						Lateral
48	M48	SR1	6.5			Lbyy						Lateral
49	M49	SR 3/4	78	16	16	Lbyy						Lateral
50	M50	SR1	6.5			Lbyy						Lateral
51	M51	SR1	6.5			Lbyy						Lateral
52	M52	SR1	6.5			Lbyy						Lateral
53	M53	SR1	6.5			Lbyy						Lateral
54	M54	SR1	6.5			Lbyy						Lateral
55	M55	SR1	6.5			Lbyy						Lateral
56	M56	SR 3/4	78	16	16	Lbyy						Lateral
57	M57	SR 3/4	12			Lbyy						Lateral
58	M58	SR 3/4	25.5			Lbyy						Lateral
59	M59	SR 3/4	25.5			Lbyy						Lateral
60	M60	SR 3/4	12			Lbyy						Lateral
61	M61	SR 3/4	12			Lbyy						Lateral
62	M62	SR 3/4	12			Lbyy						Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
63	M63	HSS5X5X6	23			Lbyy						Lateral
64	M64	HSS5X5X6	24.5			Lbyy						Lateral
65	M65	SR 3/4	18			Lbyy						Lateral
66	M66	SR 3/4	6			Lbyy						Lateral
67	M67	SR 3/4	6			Lbyy						Lateral
68	M68	SR 3/4	18			Lbyy						Lateral
69	M69	SR 3/4	6			Lbyy						Lateral
70	M70	SR 3/4	6			Lbyy						Lateral
71	M71	SR1	6.5			Lbyy						Lateral
72	M72	SR1	6.5			Lbyy						Lateral
73	M73	SR1	6.5			Lbyy						Lateral
74	M74	SR1	6.5			Lbyy						Lateral
75	M75	SR1	6.5			Lbyy						Lateral
76	M76	SR1	6.5			Lbyy						Lateral
77	M77	SR 3/4	78	16	16	Lbyy						Lateral
78	M78	SR1	6.5			Lbyy						Lateral
79	M79	SR1	6.5			Lbyy						Lateral
80	M80	SR1	6.5			Lbyy						Lateral
81	M81	SR1	6.5			Lbyy						Lateral
82	M82	SR1	6.5			Lbyy						Lateral
83	M83	SR1	6.5			Lbyy						Lateral
84	M84	SR 3/4	78	16	16	Lbyy						Lateral
85	M85	SR 3/4	12			Lbyy						Lateral
86	M86	SR 3/4	25.5			Lbyy						Lateral
87	M87	SR 3/4	25.5			Lbyy						Lateral
88	M88	SR 3/4	12			Lbyy						Lateral
89	M89	SR 3/4	12			Lbyy						Lateral
90	M90	SR 3/4	12			Lbyy						Lateral
91	M95	PIPE_2.0	84			Lbyy						Lateral
92	M96	PIPE_2.0	50			Lbyy						Lateral
93	M97	PIPE_2.5	96			Lbyy						Lateral
94	M98	PIPE_2.0	84			Lbyy						Lateral
95	M102	PIPE_2.5	84			Lbyy						Lateral
96	M103	PIPE_2.0	96			Lbyy						Lateral
97	M104	PIPE_2.0	84			Lbyy						Lateral
98	M108	PIPE_2.5	84			Lbyy						Lateral
99	M109	PIPE_2.0	96			Lbyy						Lateral
100	M110	PIPE_2.0	84			Lbyy						Lateral
101	M111	L2.5x2.5x3	71.922									Lateral
102	M114	L2.5x2.5x3	71.922									Lateral
103	M113	L2.5x2.5x3	71.922									Lateral
104	M114A	L2.5x2.5x3	71.923									Lateral
105	M115	L2.5x2.5x3	71.922									Lateral
106	M116	L2.5x2.5x3	71.922									Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Self We	DL		-1.1						
2	We	DL					24		6	
3	Ice We	DL					24	19	6	
4	W0	WL					24	19		
5	W30	WL					48	38		
6	W60	WL					48	38		
7	W90	WL					24	19		
8	W120	WL					48	38		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
9	W150	WL					48	38		
10	W0 + Ice	WL					24	19		
11	W30 + Ice	WL					48	38		
12	W60 + Ice	WL					48	38		
13	W90 + Ice	WL					24	19		
14	W120 + Ice	WL					48	38		
15	W150 + Ice	WL					48	38		
16	500lbs LM 1	LL				1				
17	500lbs LM 2	LL				1				
18	500lbs LM 3	LL				1				
19	500lbs LM 4	LL				1				
20	250lbs LV 5	LL				1				
21	250lbs LV 6	LL				1				
22	BLC 2 Transient Area...	None						166		
23	BLC 3 Transient Area...	None						166		

Load Combinations

	Description	Solve	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	Dead	Yes	Y		1	1.4	2	1.4																
2	Dead + Wind 0°	Yes	Y		1	1.2	2	1.2	4	1														
3	Dead + Wind 30°	Yes	Y		1	1.2	2	1.2	5	1														
4	Dead + Wind 60°	Yes	Y		1	1.2	2	1.2	6	1														
5	Dead + Wind 90°	Yes	Y		1	1.2	2	1.2	7	1														
6	Dead + Wind 120°	Yes	Y		1	1.2	2	1.2	8	1														
7	Dead + Wind 150°	Yes	Y		1	1.2	2	1.2	9	1														
8	Dead + Wind 180°	Yes	Y		1	1.2	2	1.2	4	-1														
9	Dead + Wind 210°	Yes	Y		1	1.2	2	1.2	5	-1														
10	Dead + Wind 240°	Yes	Y		1	1.2	2	1.2	6	-1														
11	Dead + Wind 270°	Yes	Y		1	1.2	2	1.2	7	-1														
12	Dead + Wind 300°	Yes	Y		1	1.2	2	1.2	8	-1														
13	Dead + Wind 330°	Yes	Y		1	1.2	2	1.2	9	-1														
14	Dead + Ice + Wind Ice 0°	Yes	Y		1	1.2	2	1.2	10	1	3	1												
15	Dead + Ice + Wind Ice 30°	Yes	Y		1	1.2	2	1.2	11	1	3	1												
16	Dead + Ice + Wind Ice 60°	Yes	Y		1	1.2	2	1.2	12	1	3	1												
17	Dead + Ice + Wind Ice 90°	Yes	Y		1	1.2	2	1.2	13	1	3	1												
18	Dead + Ice + Wind Ice 1...	Yes	Y		1	1.2	2	1.2	14	1	3	1												
19	Dead + Ice + Wind Ice 1...	Yes	Y		1	1.2	2	1.2	15	1	3	1												
20	Dead + Ice + Wind Ice 1...	Yes	Y		1	1.2	2	1.2	10	-1	3	1												
21	Dead + Ice + Wind Ice 2...	Yes	Y		1	1.2	2	1.2	11	-1	3	1												
22	Dead + Ice + Wind Ice 2...	Yes	Y		1	1.2	2	1.2	12	-1	3	1												
23	Dead + Ice + Wind Ice 2...	Yes	Y		1	1.2	2	1.2	13	-1	3	1												
24	Dead + Ice + Wind Ice 3...	Yes	Y		1	1.2	2	1.2	14	-1	3	1												
25	Dead + Ice + Wind Ice 3...	Yes	Y		1	1.2	2	1.2	15	-1	3	1												
26	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	4	.049												
27	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	5	.049												
28	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	6	.049												
29	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	7	.049												
30	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	8	.049												
31	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	9	.049												
32	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	4	-.049												
33	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	5	-.049												
34	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	6	-.049												
35	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	7	-.049												
36	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	8	-.049												
37	Dead + LM5001 + Wred ...	Yes	Y		1	1.2	2	1.2	16	1.5	9	-.049												

Load Combinations (Continued)

	Description	Solve	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
38	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	4	.049												
39	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	5	.049												
40	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	6	.049												
41	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	7	.049												
42	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	8	.049												
43	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	9	.049												
44	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	4	-.049												
45	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	5	-.049												
46	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	6	-.049												
47	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	7	-.049												
48	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	8	-.049												
49	Dead + LM5002 + Wred ...	Yes	Y		1	1.2	2	1.2	17	1.5	9	-.049												
50	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	4	.049												
51	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	5	.049												
52	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	6	.049												
53	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	7	.049												
54	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	8	.049												
55	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	9	.049												
56	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	4	-.049												
57	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	5	-.049												
58	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	6	-.049												
59	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	7	-.049												
60	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	8	-.049												
61	Dead + LM5003 + Wred ...	Yes	Y		1	1.2	2	1.2	18	1.5	9	-.049												
62	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	4	.049												
63	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	5	.049												
64	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	6	.049												
65	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	7	.049												
66	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	8	.049												
67	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	9	.049												
68	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	4	-.049												
69	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	5	-.049												
70	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	6	-.049												
71	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	7	-.049												
72	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	8	-.049												
73	Dead + LM5004 + Wred ...	Yes	Y		1	1.2	2	1.2	19	1.5	9	-.049												
74	Dead + LV2505	Yes	Y		1	1.2	2	1.2	20	1.5														
75	Dead + LV2506	Yes	Y		1	1.2	2	1.2	21	1.5														
76	Service 60mph Wind 0°	Yes	Y		1	1	2	1	4	.198														

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-in]	LC	MY [k-in]	LC	MZ [k-in]	LC
1	N9	max	-1687.3817	2	9275.148	1	2451.7853	10	3.237	36	93.1493	4	132.4807	1
2		min	-6217.8832	20	6622.0974	76	-2741.0252	4	-5.4708	66	-86.7074	10	92.5384	76
3	N48	max	3697.3759	2	9201.9624	1	5019.2201	23	112.0293	1	53.3873	11	-47.3751	6
4		min	377.6083	8	6589.3494	76	1552.3113	5	80.6381	76	-58.7946	5	-66.2897	1
5	N87	max	3970.558	2	9150.9947	1	-1616.2904	11	-80.4666	76	80.4722	12	-45.531	22
6		min	-167.0533	8	6551.1118	76	-5586.9284	17	-111.4492	1	-82.4363	6	-63.4274	1
7	N164	max	6449.4459	17	6523.729	17	760.5096	63	0	76	0	76	0	76
8		min	3587.8048	76	3641.0113	76	-503.1059	33	0	1	0	1	0	1
9	N179A	max	-1851.2713	76	6335.2844	18	-3003.8689	76	0	76	0	76	0	76
10		min	-3557.3554	18	3578.6458	76	-5175.5142	18	0	1	0	1	0	1
11	N182	max	-1765.4001	76	6640.7482	22	5787.1852	22	0	76	0	76	0	76
12		min	-3119.6542	24	3647.1997	76	3131.9382	76	0	1	0	1	0	1
13	Totals:	max	5989.5582	2	42881.1809	1	5989.5868	11						

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-in]	LC	MY [k-in]	LC	MZ [k-in]	LC
14		min	-5989.5611	8	30629.4154	76	-5989.5882	5						

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shear Ch...	Lo...	Dir	LC	phi*Pnc ...	phi*Pnt [...	phi*Mn ...	phi*Mn z...	Cb	Eqn
1	M97	PIPE_2.5	.652	47	8	.045	47		8	30038.4...	50715	43.155	43.155	1.7823	H1-1b
2	M111	L2.5x2.5x3	.624	36.7...	17	.005	0	z	19	9141.80...	29192.4	10.4709	18.3415	1.1297	H2-1
3	M114A	L2.5x2.5x3	.613	36.7...	18	.005	0	y	24	9141.62...	29192.4	10.4709	18.3396	1.1293	H2-1
4	M116	L2.5x2.5x3	.593	36.7...	22	.006	0	y	17	9141.808	29192.4	10.4709	18.3485	1.131	H2-1
5	M108	PIPE_2.5	.531	40.25	4	.045	39....		4	33961.6...	50715	43.155	43.155	1.3993	H1-1b
6	M102	PIPE_2.5	.530	39.375	12	.045	39....		12	33961.6...	50715	43.155	43.155	1.4011	H1-1b
7	M115	L2.5x2.5x3	.530	36.7...	24	.006	0	z	16	9141.85...	29192.4	10.4709	18.3456	1.1305	H2-1
8	M114	L2.5x2.5x3	.522	36.7...	33	.005	0	y	21	9141.80...	29192.4	10.4709	18.3167	1.125	H2-1
9	M5	PIPE_4.0	.487	97.5	5	.220	10...		17	40064.5...	93240	127.575	127.575	1.2918	H1-1b
10	M8	HSS5X5X6	.485	24.5	10	.139	24.5	y	1	252926....	255852	438.84	438.84	2.0583	H1-1b
11	M3	PIPE_4.0	.471	97.5	8	.228	97.5		8	40064.5...	93240	127.575	127.575	1.3601	H1-1b
12	M64	HSS5X5X6	.467	24.5	6	.136	24.5	y	1	252926....	255852	438.84	438.84	2.1097	H1-1b
13	M4	PIPE_4.0	.465	97.5	12	.224	87....		23	40064.5...	93240	127.575	127.575	1.3506	H1-1b
14	M75	SR1	.462	0	5	.044	0		5	24557.2...	25446.8...	5.0893	5.0893	1.2887	H1-1b
15	M113	L2.5x2.5x3	.459	36.7...	15	.005	0	z	23	9141.796	29192.4	10.4709	18.3386	1.1291	H2-1
16	M47	SR1	.428	0	13	.041	0		13	24557.2...	25446.8...	5.0893	5.0893	1.2894	H1-1b
17	M16	SR1	.428	6.5	4	.048	6.5		4	24557.2...	25446.8...	5.0893	5.0893	1.7057	H1-1b
18	M72	SR1	.425	6.5	12	.051	6.5		12	24557.2...	25446.8...	5.0893	5.0893	1.683	H1-1b
19	M19	SR1	.414	0	9	.042	0		9	24557.2...	25446.8...	5.0893	5.0893	1.2936	H1-1b
20	M36	HSS5X5X6	.412	24.5	11	.138	24.5	y	1	252926....	255852	438.84	438.84	2.0483	H1-1b
21	M15	SR1	.410	0	4	.042	0		4	24557.2...	25446.8...	5.0893	5.0893	1.6139	H1-1b
22	M26	SR1	.404	0	19	.040	0		19	24557.2...	25446.8...	5.0893	5.0893	1.2793	H1-1b
23	M82	SR1	.397	0	3	.041	0		3	24557.2...	25446.8...	5.0893	5.0893	1.2926	H1-1b
24	M51	SR1	.394	6.5	5	.043	6.5		5	24557.2...	25446.8...	5.0893	5.0893	1.6921	H1-1b
25	M73	SR1	.394	0	11	.045	0		11	24557.2...	25446.8...	5.0893	5.0893	1.6975	H1-1b
26	M71	SR1	.393	0	12	.041	0		12	24557.2...	25446.8...	5.0893	5.0893	1.5282	H1-1b
27	M79	SR1	.392	6.5	9	.044	6.5		9	24557.2...	25446.8...	5.0893	5.0893	1.6905	H1-1b
28	M54	SR1	.390	0	11	.041	0		11	24557.2...	25446.8...	5.0893	5.0893	1.2899	H1-1b
29	M74	SR1	.385	6.5	5	.044	6.5		5	24557.2...	25446.8...	5.0893	5.0893	1.5496	H1-1b
30	M21	SR 3/4	.382	78	4	.055	41....		21	9869.12...	14320.8	2.2118	2.2118	1.8073	H1-1b
31	M48	SR1	.376	6.5	25	.061	6.5		25	24557.2...	25446.8...	5.0893	5.0893	1.2405	H1-1b
32	M27	SR1	.375	6.5	19	.063	6.5		17	24557.2...	25446.8...	5.0893	5.0893	1.2373	H1-1b
33	M76	SR1	.373	6.5	17	.060	6.5		17	24557.2...	25446.8...	5.0893	5.0893	1.2475	H1-1b
34	M77	SR 3/4	.371	78	12	.069	41....		17	9869.12...	14320.8	2.2118	2.2118	1.6624	H1-1b
35	M17	SR1	.364	0	3	.039	0		4	24557.2...	25446.8...	5.0893	5.0893	1.692	H1-1b
36	M78	SR1	.359	0	9	.036	0		9	24557.2...	25446.8...	5.0893	5.0893	1.8642	H1-1b
37	M50	SR1	.359	0	5	.035	0		5	24557.2...	25446.8...	5.0893	5.0893	1.9126	H1-1b
38	M23	SR1	.353	6.5	12	.039	6.5		12	24557.2...	25446.8...	5.0893	5.0893	1.7123	H1-1b
39	M52	SR1	.351	0	5	.038	0		5	24557.2...	25446.8...	5.0893	5.0893	1.6891	H1-1b
40	M44	SR1	.349	6.5	8	.042	6.5		8	24557.2...	25446.8...	5.0893	5.0893	1.6975	H1-1b
41	M80	SR1	.346	0	9	.038	0		9	24557.2...	25446.8...	5.0893	5.0893	1.6881	H1-1b
42	M22	SR1	.343	0	12	.036	0		23	24557.2...	25446.8...	5.0893	5.0893	1.6286	H1-1b
43	M56	SR 3/4	.340	78	5	.057	41....		23	9869.12...	14320.8	2.2118	2.2118	1.836	H1-1b
44	M84	SR 3/4	.340	78	9	.059	41....		17	9869.12...	14320.8	2.2118	2.2118	1.7174	H1-1b
45	M45	SR1	.338	0	7	.039	0		7	24557.2...	25446.8...	5.0893	5.0893	1.6893	H1-1b
46	M20	SR1	.337	6.5	9	.063	6.5		21	24557.2...	25446.8...	5.0893	5.0893	1.273	H1-1b
47	M46	SR1	.337	6.5	13	.039	6.5		13	24557.2...	25446.8...	5.0893	5.0893	1.5497	H1-1b
48	M88	SR 3/4	.335	12	17	.062	12		23	11614.9...	14320.8	2.2118	2.2118	2.0864	H1-1b
49	M18	SR1	.335	6.5	9	.037	6.5		9	24557.2...	25446.8...	5.0893	5.0893	1.5529	H1-1b
50	M60	SR 3/4	.326	12	25	.060	12		17	11614.9...	14320.8	2.2118	2.2118	2.0617	H1-1b
51	M83	SR1	.324	6.5	3	.061	6.5		15	24557.2...	25446.8...	5.0893	5.0893	1.289	H1-1b

Envelope AISC 15th(360-16): LRFD Steel Code Checks (Continued)

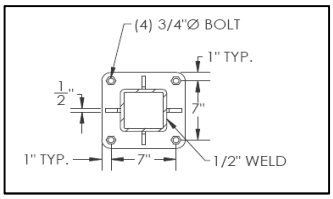
	Member	Shape	Code Check	Loc[in]	LC	Shear Ch...	Lo...	Dir	LC	phi*Pnc ...	phi*Pnt [...	phi*Mn ...	phi*Mn z...	Cb	Eqn
52	M85	SR 3/4	.323	0	15	.078	4.8...		23	11614.9...	14320.8	2.2118	2.2118	2.1627	H1-1b
53	M57	SR 3/4	.323	0	23	.086	4.8...		17	11614.9...	14320.8	2.2118	2.2118	2.1635	H1-1b
54	M53	SR1	.320	6.5	11	.037	6.5		11	24557.2...	25446.8...	5.0893	5.0893	1.5555	H1-1b
55	M43	SR1	.320	0	8	.036	0		20	24557.2...	25446.8...	5.0893	5.0893	1.5746	H1-1b
56	M28	SR 3/4	.318	78	12	.057	41....		19	9869.12...	14320.8	2.2118	2.2118	1.6777	H1-1b
57	M32	SR 3/4	.316	12	21	.072	12		14	11614.9...	14320.8	2.2118	2.2118	2.0976	H1-1b
58	M81	SR1	.316	6.5	3	.037	6.5		3	24557.2...	25446.8...	5.0893	5.0893	1.5545	H1-1b
59	M55	SR1	.312	6.5	11	.060	6.5		23	24557.2...	25446.8...	5.0893	5.0893	1.2845	H1-1b
60	M49	SR 3/4	.309	12.1...	13	.066	41....		23	9869.12...	14320.8	2.2118	2.2118	1	H1-1b
61	M2	FB10x0.625	.305	0	10	.022	20	y	17	106043....	202500	31.6406	506.25	1.3978	H1-1b
62	M29	SR 3/4	.305	0	19	.071	4.25		14	11614.9...	14320.8	2.2118	2.2118	2.2316	H1-1b
63	M6	FB10x0.625	.303	0	12	.022	0	y	23	106043....	202500	31.6406	506.25	1.2937	H1-1b
64	M24	SR1	.289	0	13	.031	0		12	24557.2...	25446.8...	5.0893	5.0893	1.6792	H1-1b
65	M104	PIPE_2.0	.275	44.625	12	.023	44....		12	17855.0...	32130	22.4595	22.4595	1.9919	H1-1b
66	M25	SR1	.274	6.5	7	.032	6.5		7	24557.2...	25446.8...	5.0893	5.0893	1.5516	H1-1b
67	M110	PIPE_2.0	.267	44.625	4	.023	43....		4	17855.0...	32130	22.4595	22.4595	1.9534	H1-1b
68	M98	PIPE_2.0	.267	44.625	8	.023	43....		8	17855.0...	32130	22.4595	22.4595	1.9549	H1-1b
69	M95	PIPE_2.0	.266	44.625	8	.023	43....		8	17855.0...	32130	22.4595	22.4595	1.9561	H1-1b
70	M103	PIPE_2.0	.263	49	12	.025	49		12	14916.0...	32130	22.4595	22.4595	1.8704	H1-1b
71	M109	PIPE_2.0	.254	49	4	.023	48		4	14916.0...	32130	22.4595	22.4595	1.8282	H1-1b
72	M59	SR 3/4	.214	0	25	.116	25.5		17	5558.77...	14320.8	2.2118	2.2118	2.005	H1-1b
73	M87	SR 3/4	.212	0	17	.117	25.5		23	5558.77...	14320.8	2.2118	2.2118	1.9947	H1-1b
74	M30	SR 3/4	.202	25.5	17	.096	13....		14	5558.77...	14320.8	2.2118	2.2118	2.1307	H1-1b
75	M86	SR 3/4	.195	25.5	14	.107	13....		23	5558.77...	14320.8	2.2118	2.2118	2.1057	H1-1b
76	M31	SR 3/4	.193	0	23	.121	25.5		25	5558.77...	14320.8	2.2118	2.2118	2.0541	H1-1b
77	M58	SR 3/4	.182	25.5	22	.110	13....		19	5558.77...	14320.8	2.2118	2.2118	2.1318	H1-1b
78	M89	SR 3/4	.176	12	5	.107	0		18	11614.9...	14320.8	2.2118	2.2118	1.7851	H1-1b
79	M1	FB10x0.625	.170	0	7	.026	0	y	31	106043....	202500	31.6406	506.25	1.8661	H1-1b
80	M61	SR 3/4	.165	12	13	.106	0		17	11614.9...	14320.8	2.2118	2.2118	1.78	H1-1b
81	M34	SR 3/4	.156	12	7	.099	0		15	11614.9...	14320.8	2.2118	2.2118	1.8629	H1-1b
82	M33	SR 3/4	.151	12	10	.111	0		23	11614.9...	14320.8	2.2118	2.2118	1.7846	H1-1b
83	M90	SR 3/4	.141	12	3	.105	0		23	11614.9...	14320.8	2.2118	2.2118	1.8388	H1-1b
84	M62	SR 3/4	.139	12	11	.105	0		20	11614.9...	14320.8	2.2118	2.2118	1.8224	H1-1b
85	M13	SR 3/4	.110	6	17	.054	6		20	13590.3...	14320.8	2.2118	2.2118	1.7276	H1-1b
86	M10	SR 3/4	.110	6	17	.051	6		21	13590.3...	14320.8	2.2118	2.2118	1.7519	H1-1b
87	M66	SR 3/4	.109	6	14	.051	6		17	13590.3...	14320.8	2.2118	2.2118	1.7343	H1-1b
88	M38	SR 3/4	.109	6	23	.052	6		24	13590.3...	14320.8	2.2118	2.2118	1.7293	H1-1b
89	M69	SR 3/4	.108	6	18	.049	6		17	13590.3...	14320.8	2.2118	2.2118	1.7453	H1-1b
90	M41	SR 3/4	.108	6	17	.050	6		23	13590.3...	14320.8	2.2118	2.2118	1.7493	H1-1b
91	M7	HSS5X5X6	.107	23	3	.065	0	y	66	253272....	255852	438.84	438.84	1.0856	H1-1b
92	M63	HSS5X5X6	.099	22.2...	9	.062	0	y	17	253272....	255852	438.84	438.84	1.1242	H1-1b
93	M11	SR 3/4	.094	6	4	.032	6		19	13590.3...	14320.8	2.2118	2.2118	1.536	H1-1b
94	M14	SR 3/4	.091	6	10	.030	6		23	13590.3...	14320.8	2.2118	2.2118	1.5492	H1-1b
95	M35	HSS5X5X6	.087	21.8...	5	.065	0	y	15	253272....	255852	438.84	438.84	1.1183	H1-1b
96	M70	SR 3/4	.084	6	6	.031	6		17	13590.3...	14320.8	2.2118	2.2118	1.5363	H1-1b
97	M67	SR 3/4	.083	6	12	.029	6		15	13590.3...	14320.8	2.2118	2.2118	1.55	H1-1b
98	M42	SR 3/4	.063	6	5	.032	6		25	13590.3...	14320.8	2.2118	2.2118	1.5522	H1-1b
99	M39	SR 3/4	.062	6	11	.029	6		23	13590.3...	14320.8	2.2118	2.2118	1.566	H1-1b
100	M12	SR 3/4	.034	18	21	.014	18		23	8939.85...	14320.8	2.2118	2.2118	1.7673	H1-1b
101	M37	SR 3/4	.033	18	23	.014	18		21	8939.85...	14320.8	2.2118	2.2118	1.6765	H1-1b
102	M9	SR 3/4	.033	18	20	.016	18		17	8939.85...	14320.8	2.2118	2.2118	1.7194	H1-1b
103	M65	SR 3/4	.032	18	17	.014	18		23	8939.85...	14320.8	2.2118	2.2118	1.6005	H1-1b
104	M40	SR 3/4	.032	18	25	.016	18		15	8939.85...	14320.8	2.2118	2.2118	1.6145	H1-1b
105	M68	SR 3/4	.031	18	17	.015	18		17	8939.85...	14320.8	2.2118	2.2118	1.5648	H1-1b
106	M96	PIPE_2.0	.020	26.5...	7	.004	26....		7	26092.12	32130	22.4595	22.4595	1.6954	H1-1b

SITE DETAILS

Site Name/Code	824359 - Groton/ I-95/ X89/ Noa_1
Date	6/6/2019
Engineer	LB

CONNECTION PARAMETERS

Loadcase #		**14**	
Number of bolts		**4**	
B		**7.0**	*in*
H		**7.0**	*in*
Bolt Diameter	d	**3/4**	*in*
Tensile Area	A_b	0.44	in^2
Tensile Area	A_n	0.33	in^2
Grade		A325	
Bolt Ultimate Strength	F_{ub}	120	*ksi*
Connection length reduction factor	Rb	1	



Connection Sketch/Photo

CONNECTION LOADS

Bending Moment	Mxx	**3.69**	*kips-in*
Bending Moment	Mzz	**132.48**	*kips-in*
Torsional Moment	Myy	**1.30**	*kips-in*
Shear Force	Vx	**9.28**	*kips*
Shear Force	Vz	**0.17**	*kips*
Axial Force	Ty	**4.54**	*kips*

SOFTWARE REACTIONS TABLE

1	N9	-4542.173	9275.1109	-167.9708	-1.3038	3.693	132.479
1	N48	2378.2802	9201.9249	3797.1649	112.028	-3.0545	-66.2887
1	N87	2220.9963	9150.9581	-3983.184	-111.4477	-1.2005	-63.4267
1	N164	5029.0407	5099.3533	150.1639	0	0	0
1	N179A	-2622.425	5027.9539	-4211.123	0	0	0
1	N182	-2463.719	5125.8807	4414.9491	0	0	0
1	Totals:	-.0019	42881.1819	-.0007			
1	COG (in):	X: -1202.7	Y: .1558	Z: -45683.			

BOLT CHECK

Bolt Tension Capacity

$\phi R_{nt} = 0.75 * F_{ub} * A_n$

ϕR_{nt}= **30.1** *kips*

Maximum Bolt Tension

$T_{ub} = F_{Mxx} + F_{Mzz} + T_y/4$

T_{ub}= **10.86** *kips*

Tension Ratio: **36.1%** PASS

Bolt Shear Capacity

$\phi R_{nv} = 0.75 * 0.625 * 0.8 * Fub * Ab * Rb$

ϕR_{nv}= **19.9** *kips*

Maximum Bolt Shear

$V_{ub} = \text{sqrt}((V_x/4)^2 + (V_y/4)^2) + F_{Myy}$

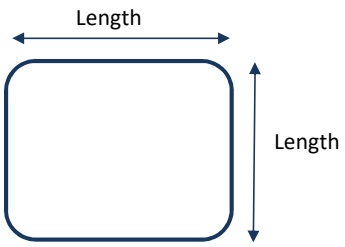
V_{ub}= **2.39** *kips*

Shear Ratio: **12.0%** PASS

$(T_{ub} / \phi R_{nt})^2 + (V_{ub} / \phi R_{nv})^2 < 1.0$ Ratio **14.5%** PASS

WELD CHECK

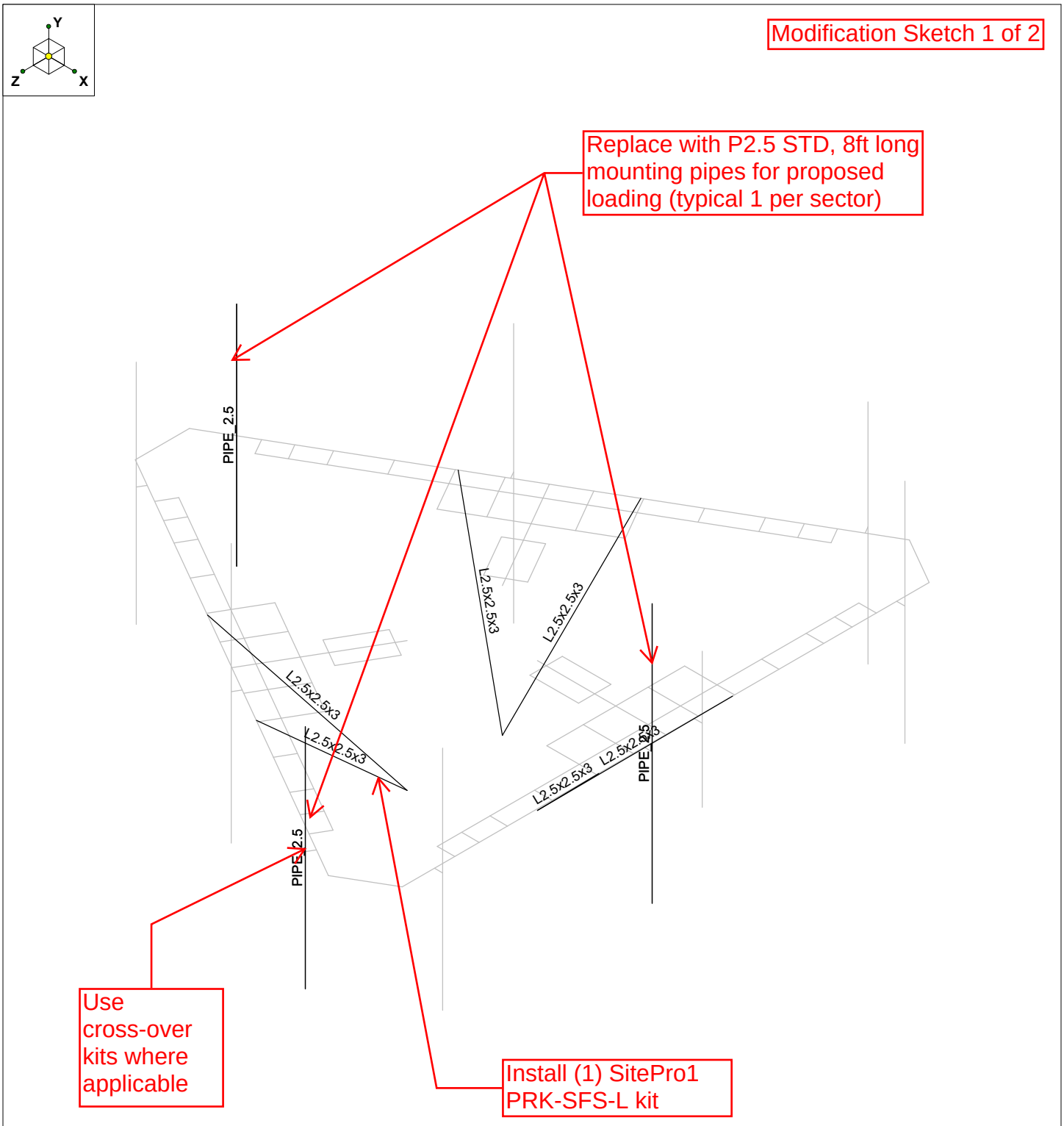
Filler Metal Strength	**70**	ksi	
Weld Thk.	**0.500**	in	
Nominal Weld Thk.	0.354	in	
Length	**3.0**	in	
Shear	9.28	kips	
Moment	136.17	kips-in	
A	**2.12**	in^2	
S_w	**4.85**	in^3	
f_v	4.37	ksi	
f_m	28.08	ksi	
f_r	28.42	ksi	
Allowable Weld Stress	31.5	ksi	**90.2%** PASS



APPENDIX D

SUPPLEMENTAL MODIFICATION INFORMATION

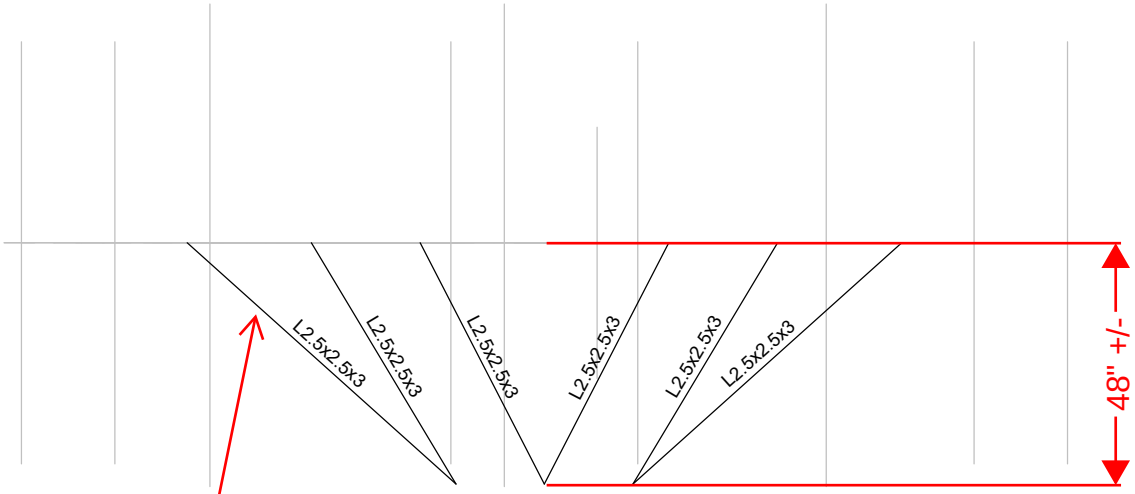
Modification Sketch 1 of 2



Envelope Only Solution

Paul J. Ford	824359_Groton I-95 X89 Noa_1	SK - 8
SS		June 6, 2019 at 9:44 AM
A37519-1566.003.7191		824359_Groton I-95 X89 Noa_1_R...

Modification Sketch 2 of 2



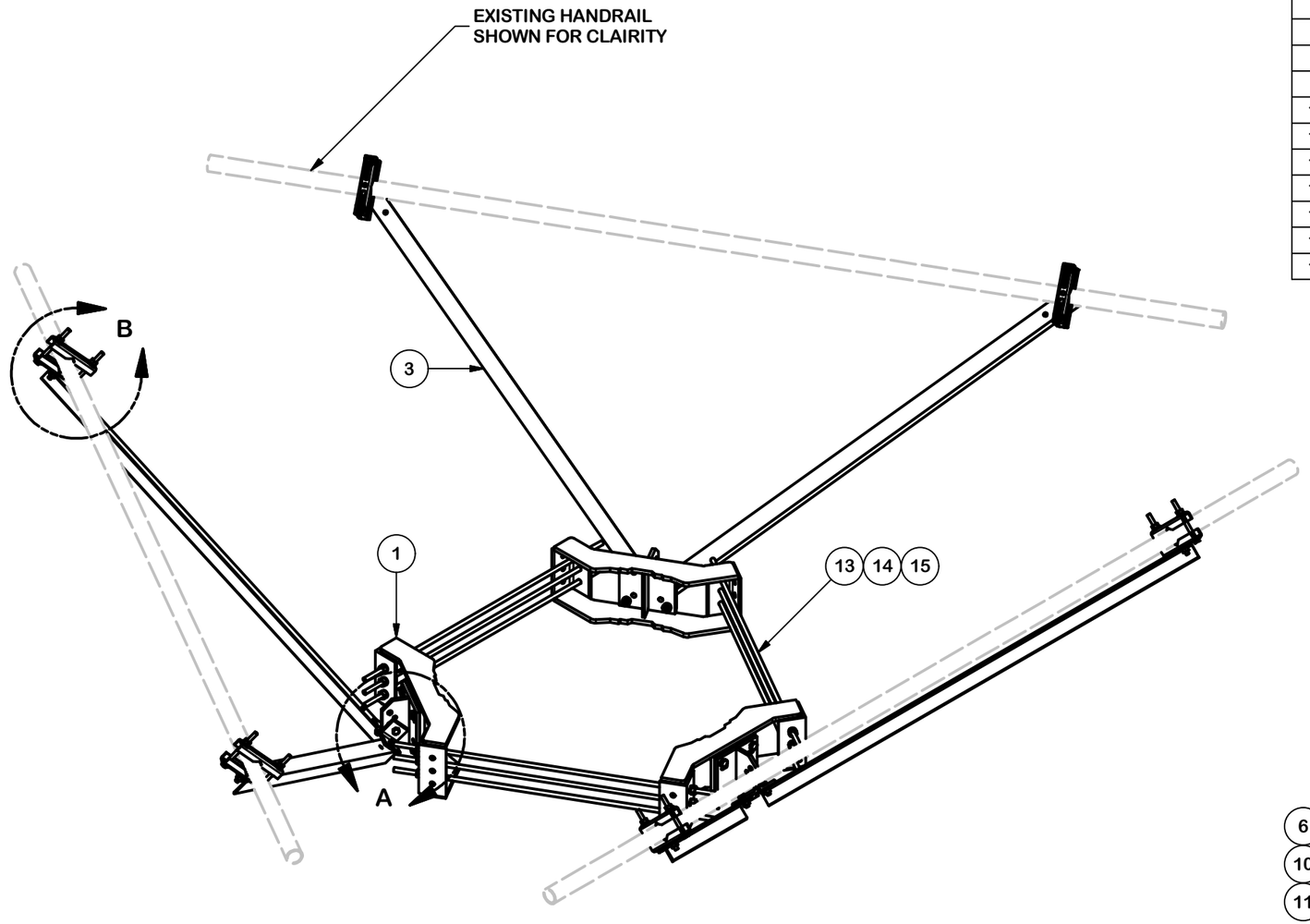
Install (1) SitePro1
PRK-SFS-L kit

Envelope Only Solution

Paul J. Ford	824359_Groton I-95 X89 Noa_1	SK - 9
SS		June 6, 2019 at 9:44 AM
A37519-1566.003.7191		824359_Groton I-95 X89 Noa_1_R...

APPENDIX E

MANUFACTURER DRAWINGS (FOR REFERENCE ONLY)



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	X-LWRM	RING MOUNT WELDMENT		68.81	206.42
2	3	X-TBW	T-BRACKET WELDMENT		13.60	40.80
3	6	X-254924	DIAGONAL ANGLE - SITE PRO 1	72 in	19.71	118.24
4	12	X-STU	STIFF ARM CHANNEL BRACKET	8 1/2 in	1.37	16.46
5	6	SHCM-T	CHAIN MOUNT TIGHTENER BRACKET	3 in	1.86	11.15
6	12	G12112	1/2" x 1-1/2" HDG HEX BOLT GR5	1/2 in	0.15	1.77
7	3	G12212	1/2" x 2-1/2" HDG HEX BOLT GR5	2 1/2 in	0.20	0.61
8	12	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	6 1/2 in	0.41	4.91
9	24	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	0.82
10	27	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	0.38
11	27	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.93
12	12	A582114	5/8" x 2-1/4" HDG A325 HEX BOLT	2 1/4 in	0.31	3.75
13	9	G58R-24	5/8" x 24" THREADED ROD (HDG.)	24 in	0.40	3.59
13	9	G58R-48	5/8" x 48" THREADED ROD (HDG.)	48 in	0.40	3.59
14	30	G58LW	5/8" HDG LOCKWASHER		0.03	0.78
15	30	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	3.90
					TOTAL WT. #	642.04

DETAIL A

DETAIL B

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED MAX. DIA. FOR HANDRAIL CONNECTION	SP1	BC	10/25/2017

REVISION HISTORY

TOLERANCE NOTES

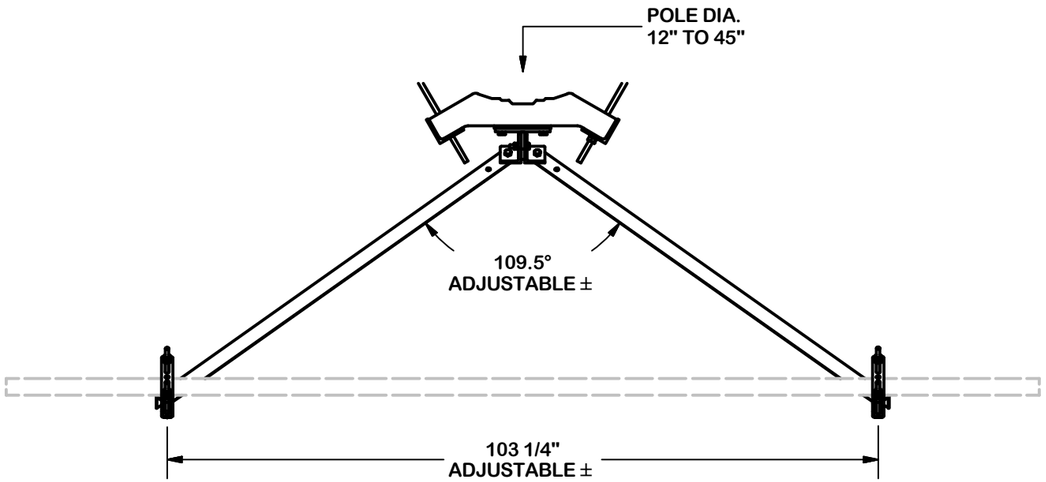
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES (± 0.030")
DRILLED AND GAS CUT HOLES (± 0.030") - NO CONING OF HOLES
LASER CUT EDGES AND HOLES (± 0.010") - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING (± 0.030")
ALL OTHER ASSEMBLY (± 0.060")

DESCRIPTION: HANDRAIL REINFORCEMENT KIT (LONG)

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
SP1	CSL3 2/23/2017	3RD PARTY	PRK-SFS-L

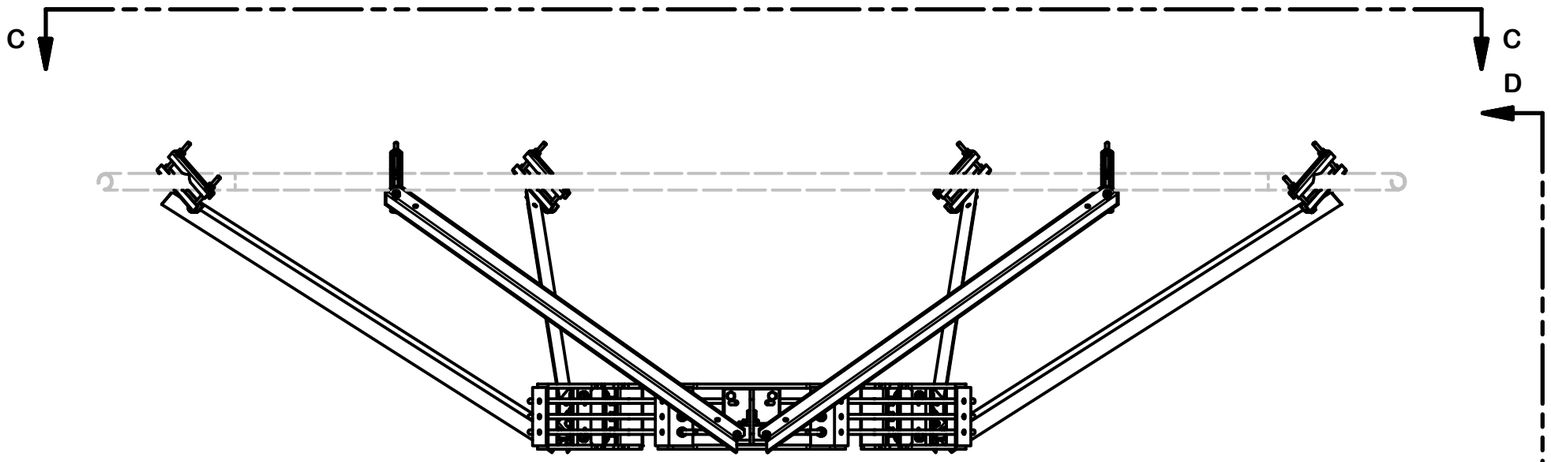
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	SHOP	BMC 9/8/2017	PRK-SFS-L

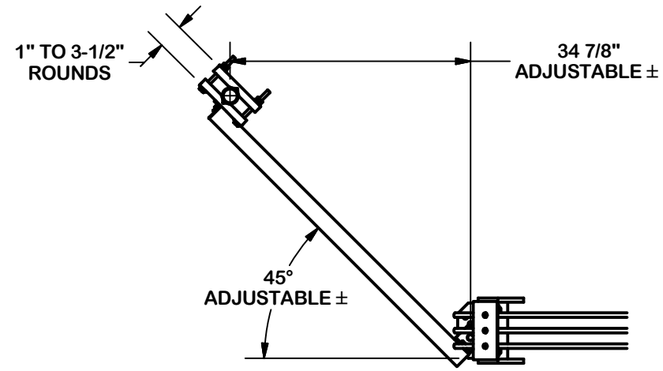
SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX



PARTIAL VIEW C-C

VERTICAL POSITION





PARTIAL VIEW D-D

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED MAX. DIA. FOR HANDRAIL CONNECTION	SP1	BC	10/25/2017

REVISION HISTORY

TOLERANCE NOTES

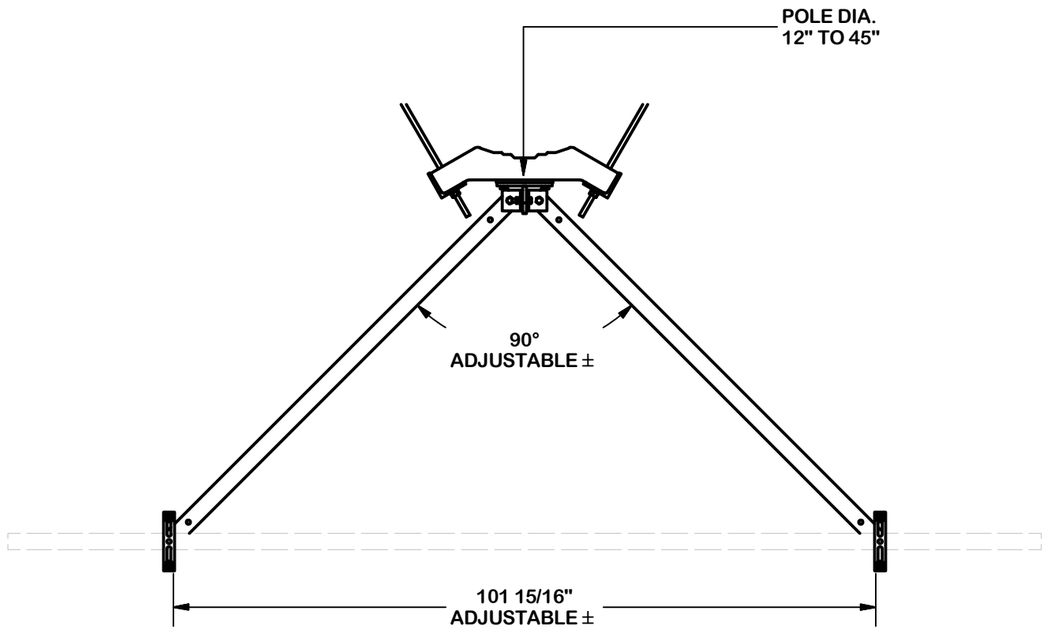
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES (± 0.030")
DRILLED AND GAS CUT HOLES (± 0.030") - NO CONING OF HOLES
LASER CUT EDGES AND HOLES (± 0.010") - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING (± 0.030")
ALL OTHER ASSEMBLY (± 0.060")

DESCRIPTION: HANDRAIL REINFORCEMENT KIT (LONG)

SITE PRO 1 — A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

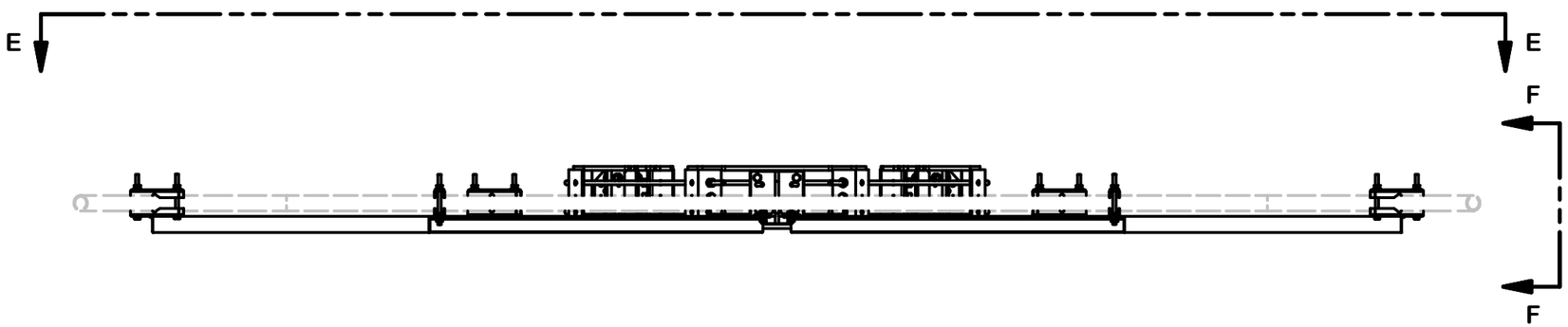
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
SP1	CSL3 2/23/2017	3RD PARTY	PRK-SFS-L

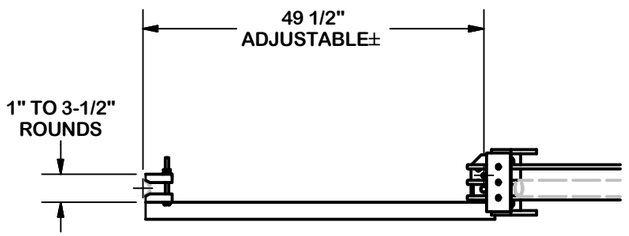
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	SHOP	BMC 9/8/2017	PRK-SFS-L



PARTIAL VIEW E-E

HORIZONTAL POSITION





PARTIAL VIEW F-F

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES (± 0.030")
DRILLED AND GAS CUT HOLES (± 0.030") - NO CONING OF HOLES
LASER CUT EDGES AND HOLES (± 0.010") - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING (± 0.030")
ALL OTHER ASSEMBLY (± 0.060")

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED MAX. DIA. FOR HANDRAIL CONNECTION	SP1	BC	10/25/2017

REVISION HISTORY

DESCRIPTION
HANDRAIL REINFORCEMENT KIT (LONG)

CPD NO.	DRAWN BY	ENG. APPROVAL
SP1	CSL3 2/23/2017	3RD PARTY

CLASS	SUB	DRAWING USAGE	CHECKED BY
81	02	SHOP	BMC 9/8/2017

SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

PART NO. PRK-SFS-L

DWG. NO. PRK-SFS-L

Exhibit F

Power Density/RF Emissions Report

Transcom Engineering, Inc.
Wireless Network Design and Deployment

Radio Frequency Emissions Analysis Report

T-MOBILE Existing Facility

Site ID: CT11044E

Groton/ I-95/ X89/ Noa_1
725 Flanders Rd
Groton, CT 06355

May 20, 2019

Transcom Engineering Project Number: 737001-0031

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**11.06 %**

May 20, 2019

T-MOBILE
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 6009

Emissions Analysis for Site: **CT11044E – Groton/ I-95/ X89/ Noa_1**

Transcom Engineering, Inc ("Transcom") was directed to analyze the proposed upgrades to the T-MOBILE facility located at **725 Flanders Rd, Groton, 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.

Population 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 & 700 MHz 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) 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 performed for the proposed upgrades to the T-MOBILE antenna facility located at **725 Flanders Rd, Groton, 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.

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. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
UMTS	1900 MHz (PCS)	1	40
GSM	1900 MHz (PCS)	1	15
LTE	2100 MHz (AWS)	2	60
LTE / 5G NR	600 MHz	2	40
LTE	700 MHz	2	20

Table 1: Channel Data Table

The following antennas listed in *Table 2* were used in the modeling for transmission in the 600, 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the 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.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Ericsson AIR21 B2A/B4P	132
A	2	Ericsson AIR21 B4A/B2P	132
A	3	RFS APXVAARR24_43-U-NA20	131
B	1	Ericsson AIR21 B2A/B4P	132
B	2	Ericsson AIR21 B4A/B2P	132
B	3	RFS APXVAARR24_43-U-NA20	131
C	1	Ericsson AIR21 B2A/B4P	132
C	2	Ericsson AIR21 B4A/B2P	132
C	3	RFS APXVAARR24_43-U-NA20	131

Table 2: Antenna Data

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

RESULTS

Per the calculations completed for the proposed T-MOBILE configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Ericsson AIR21 B2A/B4P	1900 MHz (PCS)	15.9	2	55	2,139.75	0.48
Antenna A2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	1.06
Antenna A3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.33
						Sector A Composite MPE%	**2.88**
Antenna B1	Ericsson AIR21 B2A/B4P	1900 MHz (PCS)	15.9	2	55	2,139.75	0.48
Antenna B2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	1.06
Antenna B3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.33
						Sector B Composite MPE%	**2.88**
Antenna C1	Ericsson AIR21 B2A/B4P	1900 MHz (PCS)	15.9	2	55	2,139.75	0.48
Antenna C2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	1.06
Antenna C3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.33
						Sector C Composite MPE%	**2.88**

Table 3: T-MOBILE Emissions Levels

The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum T-MOBILE MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. *Table 5* below shows a summary for each T-MOBILE Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	**MPE%**
T-MOBILE – Max Per Sector Value	**2.88 %**
Verizon Wireless	5.49 %
AT&T	2.69 %
Site Total MPE %:	**11.06 %**

Table 4: All Carrier MPE Contributions

T-MOBILE Sector A Total:	2.88 %
T-MOBILE Sector B Total:	2.88 %
T-MOBILE Sector C Total:	2.88 %
Site Total:	11.06 %

Table 5: Site MPE Summary

FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated T-MOBILE sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

T-MOBILE _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 1900 MHz (PCS) UMTS	1	1,556.18	132	3.52	1900 MHz (PCS)	1000	0.35%
T-Mobile 1900 MHz (PCS) GSM	1	583.57	132	1.32	1900 MHz (PCS)	1000	0.13%
T-Mobile 2100 MHz (AWS) LTE	2	2,334.27	132	10.57	2100 MHz (AWS)	1000	1.06%
T-Mobile 600 MHz LTE / 5G NR	2	788.97	131	3.63	600 MHz	400	0.91%
T-Mobile 700 MHz LTE	2	432.54	131	1.99	700 MHz	467	0.43%
						Total:	**2.88%**

Table 6: T-MOBILE Maximum Sector MPE Power Values

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:	2.88 %
Sector B:	2.88 %
Sector C:	2.88 %
T-MOBILE Maximum Total (per sector):	2.88 %
Site Total:	11.06 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **11.06 %** 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.

Scott Heffernan
RF Engineering Director
Transcom Engineering, Inc
PO Box 1048
Sterling, MA 01564