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

January 12, 2021

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

RE: **Notice of Exempt Modification for T-Mobile:**
876341 - T-Mobile Site ID: CT11234C
1969 Saybrook Road, Middletown, CT 06457
Latitude: 41° 30′ 38.30" / Longitude: -72° 35′ 36.10″

Dear Ms. Bachman:

T-Mobile currently maintains three (3) antennas at the 111-foot mount on the existing 150-foot Monopole Tower, located at 1969 Saybrook Road, Middletown, CT. The tower is owned by Crown Castle and the property is owned by Regowset Ridge LLC. T-Mobile now intends to replace three (3) existing antennas with three (3) new 1900/2100/600/700 MHz antennas which will be capable of providing 5G service. The new antennas will be installed at the 111-ft level of the tower. T-Mobile is also proposing a tower mount replacement pursuant to the enclosed Mount Replacement Analysis.

Planned Modifications:
Tower:

Remove and Replace:
(3) APX16DWV-16DWV-S-E-A20 Antenna **(REMOVE)** - (3) RFS-APXVAARR24_43-U-NA20 Antenna 1900/2100/600/700 MHz **(REPLACE)**

Install New:
(1) 1 1/4" Hybrid Fiber Line
(3) Radio 4449 B71/B12

Existing to Remain:
(12) 1 5/8" Coax
(6) TMA

Ground:

Upgrade to existing ground cabinet. (Internally)
Upgrade existing breakers.
Install (3) RRUs on new utility frame.

The facility was originally approved by the City of Middletown, though original zoning documents could not be located. An original building permit dated March 31, 1997 for the construction of a 150' monopole is enclosed. T-Mobile as Omnipoint Communications was thereafter approved for tower sharing at this facility on October 8, 1999 by the Connecticut Siting Council.

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 Mr. Ben Florsheim, Mayor for the City of Middletown, Mr. Ronald Baia, Zoning Enforcement Officer, Crown Castle as the tower owner, and Regowset Ridge LLC as the property 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:

City Mayor Ben Florsheim (*via email to mayor@MiddletownCT.gov*)
City of Middletown
245 DeKoven Drive
Middletown, CT 06457
860-638-4801

Mr. Ronald Baia, Zoning Enforcement Officer (*via email to Ronald.Baia@middletownct.gov*)
City of Middletown
245 DeKoven Drive
Middletown, CT 06457
860-638-4870

Regowset Ridge LLC, Property Owner (*via email only to lwmarino17@gmail.com*)
88 High Street
Portland, CT 06480

Crown Castle, Tower Owner

From: Zsamba, Anne Marie
To: lwmarino17@gmail.com
Subject: Notice of Exempt Modification - T-Mobile - 876341 - 1969 Saybrook Road, Middletown
Date: Tuesday, January 12, 2021 9:06:00 AM
Attachments: EM-T-MOBILE-1969 SAYBROOK RD MIDDLETOWN-876341-CT11234C-NOTICE.pdf

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Dear Regowset Ridge LLC as Property Owner:

Attached please find T-Mobile's exempt modification application that is being submitted to the Connecticut Siting Council today, January 12, 2021.

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:	mayor@MiddletownCT.gov
Subject:	Notice of Exempt Modification - T-Mobile - 876341 - 1969 Saybrook Road, Middletown
Date:	Tuesday, January 12, 2021 9:06:00 AM
Attachments:	EM-T-MOBILE-1969 SAYBROOK RD MIDDLETOWN-876341-CT11234C-NOTICE.pdf

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Anne Marie Zsamba

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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:	"Ronald.Baia@middletownct.gov"
Subject:	Notice of Exempt Modification - T-Mobile - 876341 - 1969 Saybrook Road, Middletown
Date:	Tuesday, January 12, 2021 9:06:00 AM
Attachments:	EM-T-MOBILE-1969 SAYBROOK RD MIDDLETOWN-876341-CT11234C-NOTICE.pdf

Dear ZEO Baia:

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Best,
Anne Marie Zsamba

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T: (201) 236-9224
M: (518) 350-3639
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CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

Exhibit A

Original Facility Approval

CT03XC169

BUILDING PERMIT

BUILDING DEPARTMENT • 344-3416 • MIDDLETOWN, CT 06457

DATE March 31 19 97 PERMIT # _____

APPLICANT Sprint Spectrum, L.P.

ADDRESS 9 Barnes Industrial Road, Wallingford, CT 06492
(NO.) (STREET) (CITY) (STATE) (ZIP)

PERMIT TO construct ( ) STORY Communication tower & antennas NUMBER OF DWELLING UNITS _____
(TYPE OF IMPROVEMENT) (NO.) (PROPOSED USE)

AT (LOCATION) 1969 Sayrbook Road, Middletown, CT ZONING DISTRICT _____
(NO.) (STREET)

CONTRACTORS LICENSE to be determined WORK PHONE # _____ MOBILE PHONE # _____

BUILDING IS TO BE _____ FT. WIDE BY _____ FT. LONG BY _____ FT. IN HEIGHT AND SHALL CONFORM IN CONSTRUCTION

TO TYPE _____ USE GROUP _____ BASEMENT WALLS OR FOUNDATION _____
(TYPE)

REMARKS: Install 150' monopole tower, 6 antennas & associated communications equipment.

PUBLIC UTILITIES AVAILABLE:
CITY WATER ( ) SEWER ( ) SEPTIC/WELL ( ) ESTIMATED COST $ 274,000 PERMIT FEE $ _____

OWNER Seabstian G. Marino

ADDRESS 1969 Sayrbook Road BUILDING DEPT. BY _____

Exhibit B

Property Card

1987 SAYBROOK RD

Location	1987 SAYBROOK RD	**Map-Lot**	49/ / 0015/ /
Acct#	R07180	**Owner**	REGOWSET RIDGE LLC
Municipality		**Assessment**	$382,230
Appraisal	$546,030	**PID**	8044
Building Count	1	**Assessing District**	

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$167,630	$378,400	$546,030
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$117,350	$264,880	$382,230

Parcel Addreses

Additional Addresses
No Additional Addresses available for this parcel

Owner of Record

Owner	REGOWSET RIDGE LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	88 HIGH ST PORTLAND, CT 06480	**Book & Page**	1753/0973
		Sale Date	04/17/2012
		Instrument	29

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
REGOWSET RIDGE LLC	$0		1753/0973	29	04/17/2012
MARINO SEBASTIAN G (EST) (ETALS)	$0		1753/0970	29	04/17/2012
MARINO SEBASTIAN G (EST) (ETALS)	$0		1753/0967	29	04/17/2012

MARINO SEBASTIAN G (EST) (2/4 INT)	$0		1753/0964	29	04/17/2012
MARINO SEBASTIAN G (EST) (3/4 INT) &	$0		1753/0961	29	04/17/2012

Building Information

Building 1 : Section 1

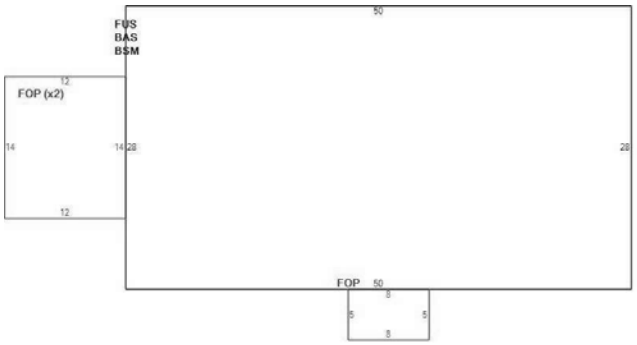
Year Built: 1965
Living Area: 2,800
Replacement Cost: $234,872
Building Percent Good: 65
Replacement Cost Less Depreciation: $152,670

Building Attributes	
Field	**Description**
Style	Two Family
Model	Multi-Family
Grade	C
Stories	2 Stories
Occupancy	2
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt Shingl
Interior Wall 1	Plastered
Interior Wall 2	
Interior Floor 1	Hardwood
Interior Floor 2	
Heat Fuel	Oil
Heat Type	Hot Water
Ac Type	None
Bedrooms	6
Full Baths	2
Half Baths	0
Extra Fixtures	0
Total Rooms	10
Bath Remodel	Not Updated
Kitchen Remodel	Not Updated
Extra Kitchens	2
Fireplaces	1
Extra Openings	1
Gas Fireplace	0
Int vs Ext	Same

Building Photo

(http://images.vgsi.com/photos/MiddletownCTPhotos//\00\03\17\55.jpg)

Building Layout



(ParcelSketch.ashx?pid=8044&bid=8044)

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	1,400	1,400
FUS	Finished Upper Story	1,400	1,400
BSM	Basement	1,400	0
FOP	Framed Open Porch	376	0
		4,576	2,800

A/C Type	None
A/C %	0
Fireplaces 1	2900
Fin Bsmt Area	0.00
FBM grade	0
Bsmt Garage	0
Fndtn Cndtn	
In Law	0

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code 102
Description 2 Family
Zone R-60
Neighborhood 12
Alt Land Appr No
Category

Land Line Valuation

Size (Acres) 55.30
Assessed Value $264,880
Appraised Value $378,400

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
FGR1	Garage			520.00 UNITS	$7,280	1
FGR2	Garage W/ Loft			480.00 UNITS	$7,680	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$167,630	$378,400	$546,030
2018	$167,630	$378,400	$546,030
2017	$167,630	$378,400	$546,030

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$117,350	$264,880	$382,230
2018	$117,350	$264,880	$382,230
2017	$117,350	$264,880	$382,230

Exhibit C

Construction Drawings

T-Mobile

T-MOBILE SITE NUMBER: CT11234C
T-MOBILE SITE NAME: MIDDLETOWN/RT9
SITE TYPE: MONOPOLE
TOWER HEIGHT: 150'-0"

BUSINESS UNIT #: 876341
SITE ADDRESS: 1969 SAYBROOK RD MIDDLETOWN, CT 06457
COUNTY: MIDDLESEX
JURISDICTION: CITY OF MIDDLETOWN

T-MOBILE L600 SITE CONFIGURATION: 67D95F

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	MIDDLETOWN 2 - MARINO PROPERTY
SITE ADDRESS:	1969 SAYBROOK RD MIDDLETOWN, CT 06457
COUNTY:	MIDDLESEX
MAP/PARCEL #:	MTWN-000000-000000-007180R
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41° 30' 38.30"
LONGITUDE:	-72° 35' 36.10"
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	388 FT.
CURRENT ZONING:	NOT REQUIRED
JURISDICTION:	CITY OF MIDDLETOWN
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	REGOWSET RIDGE LLC 88 HIGH STREET C/O LAWRENCE W. MARINO PORTLAND, CT 06480
TOWER OWNER:	GLOBAL SIGNAL ACQUISITIONS II LLC 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE 35 GRIFFIN ROAD BLOOMFIELD, CT 06002
CROWN CASTLE USA INC. APPLICATION ID:	479819
ELECTRIC PROVIDER:	CONNECTICUT LIGHT & POWER CO (800) 286-2000
TELCO PROVIDER:	LIGHTOWER (866) 586-7890

PROJECT TEAM

A&E FIRM:	KIMLEY-HORN & ASSOCIATES COA #: PEC.0000738 3875 EMBASSY PKWY, SUITE 280 AKRON, OH 44333 KEVIN.CLEMENTS@KIMLEY-HORN.COM
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3 CORPORATE PARK DRIVE, SUITE 101 CLIFTON PARK, NY 12065 CATHERINE COVINGTON - PROJECT MANAGER (518) 373-3499 JASON D'AMICO - CONSTRUCTION MANAGER (860) 209-0104 ALLISON SQUIRES - A&E SPECIALIST ALLISON.SQUIRES.CONTRACTOR@CROWNCASTLE.COM (518) 373-3523

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1	SITE PLAN AND ENLARGED SITE PLAN
C-2	FINAL ELEVATION AND ANTENNA PLANS
C-3	ANTENNA AND CABLE SCHEDULE
C-4	EQUIPMENT SPECIFICATIONS
E-1	AC PANEL SCHEDULES AND ONE LINE DIAGRAM
G-1	ANTENNA GROUNDING DIAGRAM
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS

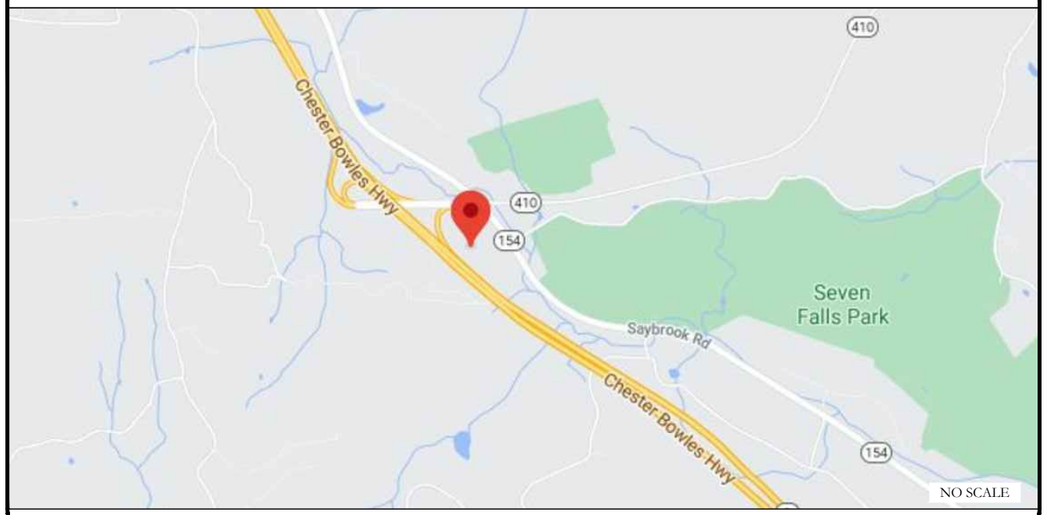
ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11x17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

APPROVALS

APPROVAL	SIGNATURE	DATE
PROPERTY OWNER OR REP.		
LAND USE PLANNER		
T-MOBILE		
OPERATIONS		
RF		
NETWORK		
BACKHAUL		
CONSTRUCTION MANAGER		

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

LOCATION MAP



NO SCALE

APPLICABLE CODES/REFERENCE DOCUMENTS

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	2018 CT STATE BUILDING CODE/2012 IBC W/ CT AMENDMENTS
MECHANICAL	2018 CT STATE BUILDING CODE/2012 IMC W/ CT AMENDMENTS
ELECTRICAL	2018 CT STATE BUILDING CODE/2014 NEC W/ CT AMENDMENTS

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS: BY OTHERS

MOUNT ANALYSIS: PAUL J. FORD AND COMPANY DATED JUNE 27, 2019

PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK:
- REMOVE (3) ANTENNAS
- INSTALL (3) ANTENNAS
- INSTALL (3) RRUs
- INSTALL (1) 1-1/4" HYBRID CABLE
- REPLACE EXISTING PLATFORM WITH NEW PLATFORM
- TRIM EACH COLLAR TENSION ROD TO NEW PLATFORM WITHIN 3" FROM NUT

GROUND SCOPE OF WORK:
- REMOVE (6) RUS01 B4
- REMOVE (1) DUS41
- INSTALL (3) RRUs ON A NEW UTILITY FRAME
- INSTALL (2) BB 6630
- INSTALL NEW 200A PPC CABINET
- INSTALL NEW 100A BREAKER FOR RBS CABINET

DESIGN PACKAGE BASED ON THE APPLICATION ID: 479819 REVISION: 0	DESIGN PACKAGE BASED ON THE RFDS REVISION: R2.2 DATE: 5/29/19

NOTE:
PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER

CALL CONNECTICUT ONE CALL (800) 922-4455 CBYD.COM CALL 2 WORKING DAYS BEFORE YOU DIG! 811

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

T-MOBILE SITE NUMBER:
CT11234C

BU #: **876341**
MIDDLETOWN 2 - MARINO PROPERTY

1969 SAYBROOK RD
MIDDLETOWN, CT 06457

EXISTING 150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	07/19/19	AJ	CONSTRUCTION	LR/AF
1	08/28/19	AJ	CONSTRUCTION	AF
2	12/11/20	MK	CONSTRUCTION	AF

STATE OF CONNECTICUT
BRUCE J. BREWER
29510
LICENSED
PROFESSIONAL ENGINEER

01/08/21
Exp. 01/31/21

SHEET NUMBER: T-1
REVISION: 2

SITE WORK GENERAL NOTES:

1. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
2. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES, SUBCONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION.
3. ALL SITE WORK TO COMPLY WITH QAS-STD-10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE" AND LATEST VERSION OF TIA 1019 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
4. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS.
5. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
6. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
7. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE.
8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS EQUIPMENT AND TOWER AREAS.
9. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
10. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
11. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE PROJECT SPECIFICATIONS.
12. SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
13. NOTICE TO PROCEED- NO WORK TO COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF A PURCHASE ORDER.
14. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD STANDARD CED-STD-10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TIA-322 (LATEST EDITION).

STRUCTURAL STEEL NOTES:

1. ALL STEEL WORK SHALL BE PAINTED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND IN ACCORDANCE WITH ASTM A36 UNLESS OTHERWISE NOTED.
2. BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4"ø) CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
3. NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8"ø ASTM A307 BOLTS UNLESS NOTED OTHERWISE.
4. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS.

CONCRETE AND REINFORCING STEEL NOTES:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. SLAB FOUNDATION DESIGN ASSUMING ALLOWABLE SOIL BEARING PRESSURE OF 2000 PSF.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.
4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

   CONCRETE CAST AGAINST EARTH.....3 IN.
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 AND LARGER.....2 IN.
   #5 AND SMALLER & WWF.....1 1/2 IN.
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
   SLAB AND WALLS.....3/4 IN.
   BEAMS AND COLUMNS.....1 1/2 IN.

5. A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE. IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

MASONRY NOTES:

1. HOLLOW CONCRETE MASONRY UNITS SHALL MEET A.S.T.M. SPECIFICATION C90, GRADE N. TYPE 1. THE SPECIFIED DESIGN COMPRESSIVE STRENGTH OF CONCRETE MASONRY (F'm) SHALL BE 1500 PSI.
2. MORTAR SHALL MEET THE PROPERTY SPECIFICATION OF A.S.T.M. C270 TYP. "S" MORTAR AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI.
3. GROUT SHALL MEET A.S.T.M. SPECIFICATION C475 AND HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2000 PSI.
4. CONCRETE MASONRY SHALL BE LAID IN RUNNING (COMMON) BOND.
5. WALL SHALL RECEIVE TEMPORARY BRACING. TEMPORARY BRACING SHALL NOT BE REMOVED UNTIL GROUT IS FULLY CURED.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

CONTRACTOR-	
SUBCONTRACTOR-	GENERAL CONTRACTOR (CONSTRUCTION)
CARRIER-	T-MOBILE
TOWER OWNER-	CROWN CASTLE USA INC.
OEM-	ORIGINAL EQUIPMENT MANUFACTURER

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR AND CROWN CASTLE USA INC.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO SCALE AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CONTRACTOR AND CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWINGS.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

ABBREVIATIONS AND SYMBOLS:

ABBREVIATIONS:

AGL	ABOVE GRADE LEVEL
BTS	BASE TRANSCEIVER STATION
(E)	EXISTING
MIN.	MINIMUM
REF	REFERENCE
RF	RADIO FREQUENCY
T.B.D.	TO BE DETERMINED
T.B.R.	TO BE RESOLVED
TYP	TYPICAL
REQ	REQUIRED
EGR	EQUIPMENT GROUND RING
AWG	AMERICAN WIRE GAUGE
MGB	MASTER GROUND BAR
EG	EQUIPMENT GROUND
BCW	BARE COPPER WIRE
SIAD	SMART INTEGRATED ACCESS DEVICE
GEN	GENERATOR
IGR	INTERIOR GROUND RING (HALO)
RBS	RADIO BASE STATION

SYMBOLS:

- SOLID GROUND BUS BAR (SGB)
- SOLID NEUTRAL BUS BAR (SNB)
- SUPPLEMENTAL GROUND CONDUCTOR
- 2-POLE THERMAL-MAGNETIC CIRCUIT BREAKER
- SINGLE-POLE THERMAL-MAGNETIC CIRCUIT BREAKER
- CHEMICAL GROUND ROD
- TEST WELL
- DISCONNECT SWITCH
- METER (M)
- EXOTHERMIC WELD (CADWELD) (UNLESS OTHERWISE NOTED)
- MECHANICAL CONNECTION
- GROUNDING WIRE

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. SUBCONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC. HILTI EPOXY ANCHORS ARE REQUIRED BY CROWN CASTLE USA INC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
5. CABLES SHALL NOT BE ROUTED THROUGH LADDER-STYLE CABLE TRAY RUNGS.
6. EACH END OF EVERY POWER, POWER PHASE CONDUCTOR (I.E., HOTS), GROUNDING AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
7. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH PLASTIC TAPE PER COLOR SCHEDULE. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (I.E. PANEL BOARD AND CIRCUIT ID'S).
8. PANEL BOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
9. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
10. POWER, CONTROL AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (#14 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET & DRY) OPERATION LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED UNLESS OTHERWISE SPECIFIED.
11. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (#6 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2 GREEN INSULATION CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET AND DRY) OPERATION LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#14 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET AND DRY) OPERATION WITH OUTER JACKET LISTED OR LABELED FOR THE LOCATION USED UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E. RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT) OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
21. WIREWAYS SHALL BE EPOXY-COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER).
22. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHIN ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
23. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL; SHALL MEET OR EXCEED UL 50 AND RATED NEMA 1 (OR BETTER) INDOORS OR NEMA 3R (OR BETTER) OUTDOORS.
24. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
25. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
26. THE SUBCONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CONTRACTOR BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
27. THE SUBCONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
28. INSTALL PLASTIC LABEL ON THE METER CENTER TO SHOW "T-MOBILE".
29. ALL CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE SUBCONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 AWG SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 AWG SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (I.E. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 FT. OF MAIN GROUND WIRES WITH 1-#2 AWG TIN-PLATED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS, WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 TINNED SOLID IN 3/4" LIQUID TIGHT CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD-WELD TERMINATION POINT. THE EXPOSED END OF THE LIQUID TIGHT CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).

NEC INSULATOR COLOR CODE

DESCRIPTION	PHASE/CODE LETTER	WIRE COLOR
240/120 1Ø	LEG 1	BLACK
	LEG 2	RED
AC NEUTRAL	N	WHITE
GROUND (EGC)	G	GREEN
VDC POS	+	*RED-POLARITY MARK AT TERMINATION
VDC NEG	-	*BLACK-POLARITY MARK AT TERMINATION
240V OR 208V, 3Ø	PHASE A	BLACK
	PHASE B	RED(ORG. IF HI LEG)
	PHASE C	BLUE
480V, 3Ø	PHASE A	BROWN
	PHASE B	ORANGE OR PURPLE
	PHASE C	YELLOW

* SEE NEC 210.5(C)(1) AND (2)

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

T-MOBILE SITE NUMBER:
CT11234C

BU #: **876341**
MIDDLETOWN 2 - MARINO PROPERTY

1969 SAYBROOK RD
MIDDLETOWN, CT 06457

EXISTING 150'-0" MONOPOLE

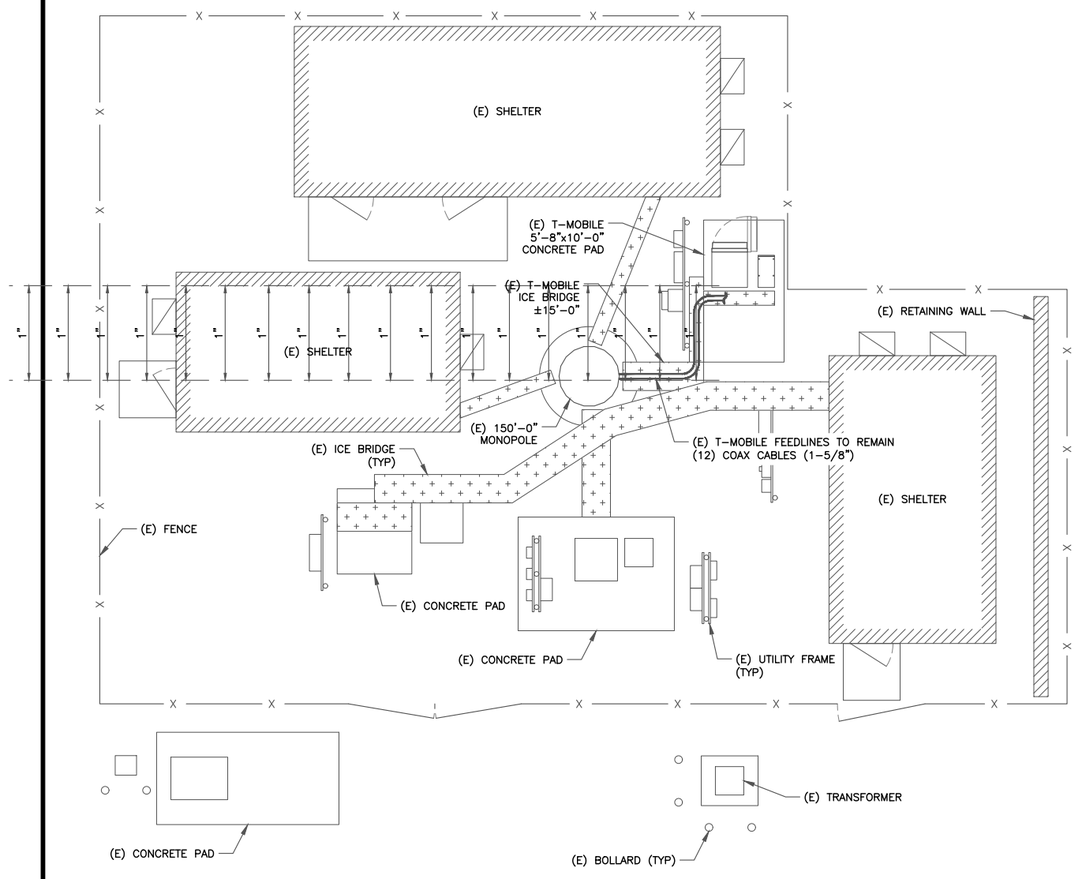
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	07/19/19	AJ	CONSTRUCTION	LR/AF
1	08/28/19	AJ	CONSTRUCTION	AF
2	12/11/20	MK	CONSTRUCTION	AF

STATE OF CONNECTICUT
BRIAN J. BREWER
29510
LICENSED
PROFESSIONAL ENGINEER

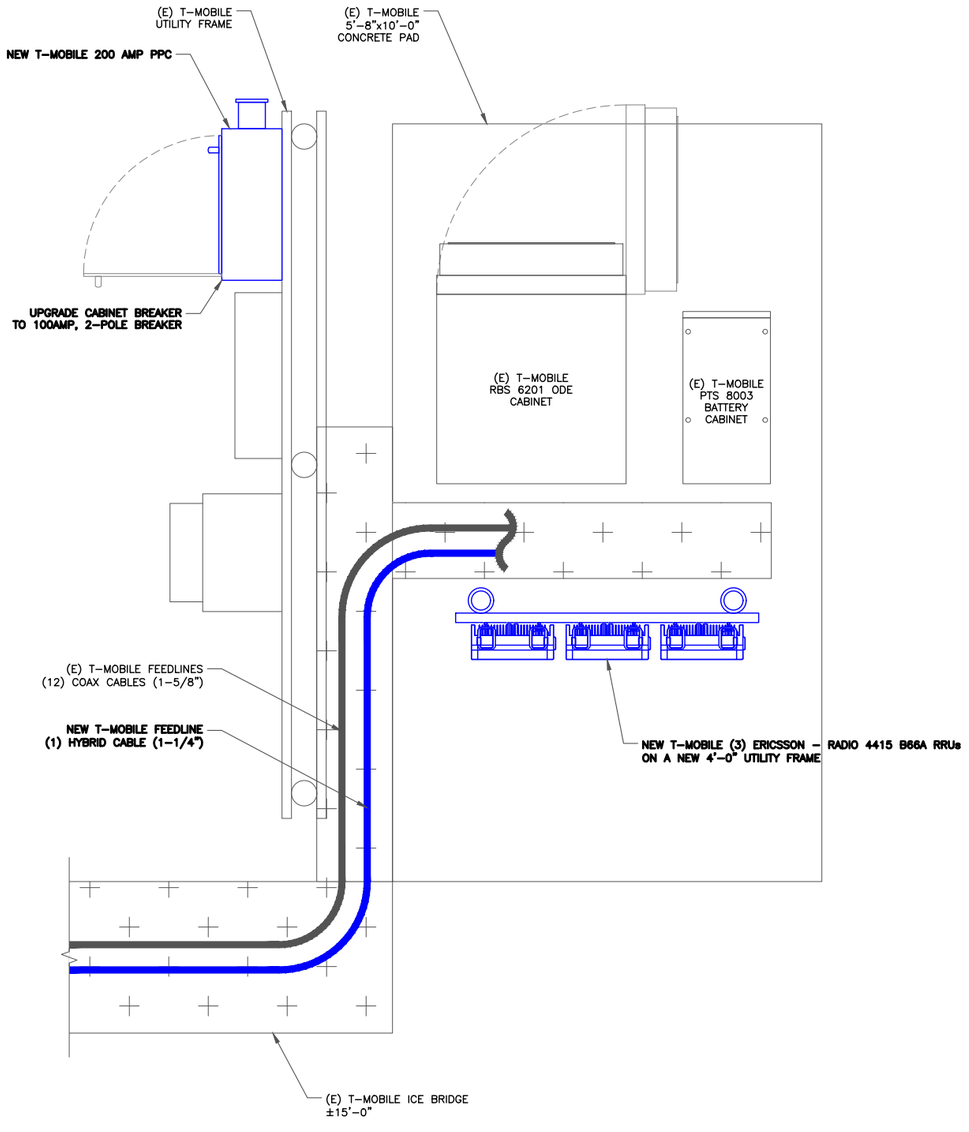
01/08/21
Exp. 01/31/21

SHEET NUMBER: T-2
REVISION: 2



1 SITE PLAN
SCALE: 4' 2' 0 4' 3/16"=1'-0" (FULL SIZE) 3/32"=1'-0" (11x17)

N



2 ENLARGED SITE PLAN
SCALE: 1' 6" 0 1' 1"=1'-0" (FULL SIZE) 1/2"=1'-0" (11x17)

N

T-Mobile
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BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

T-MOBILE SITE NUMBER:
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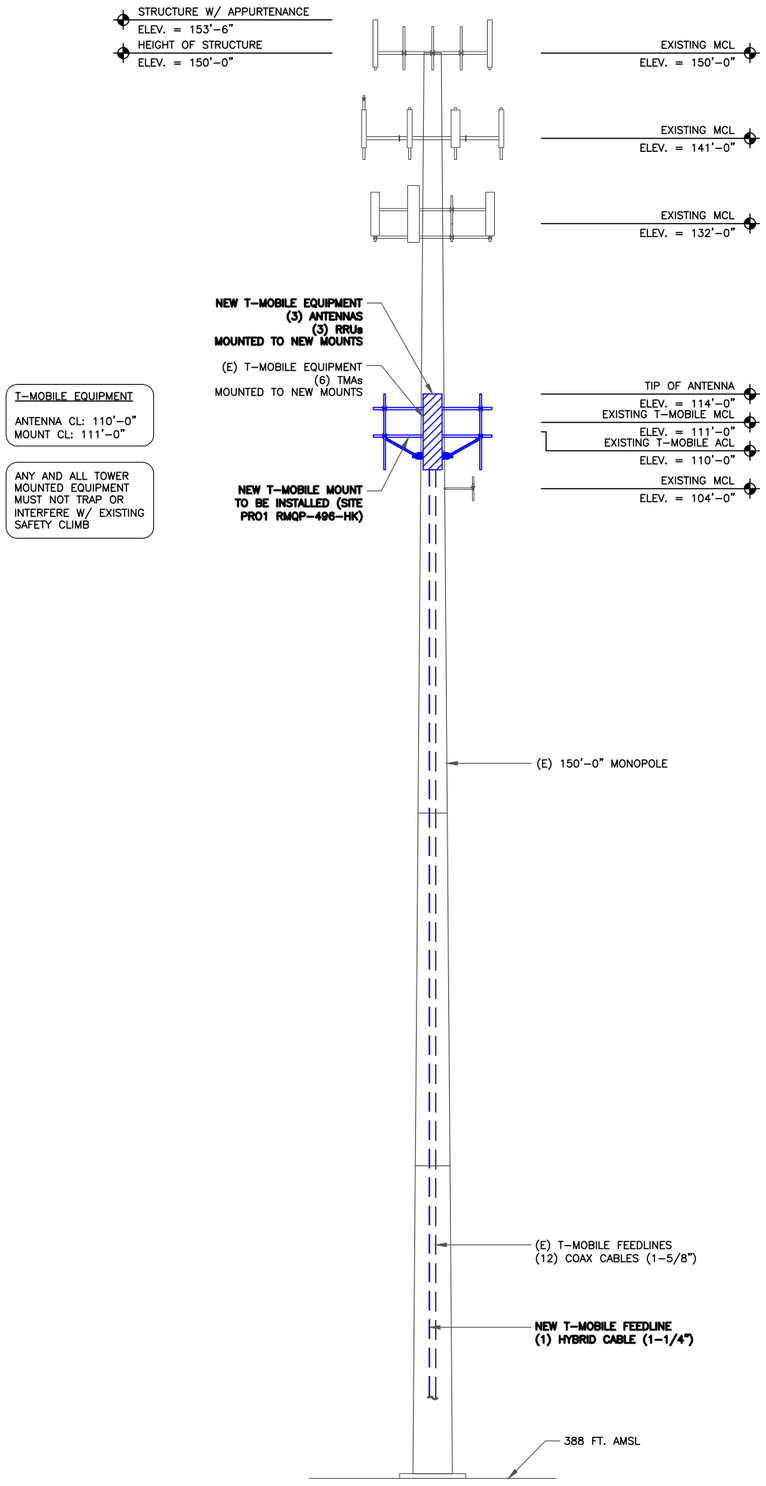
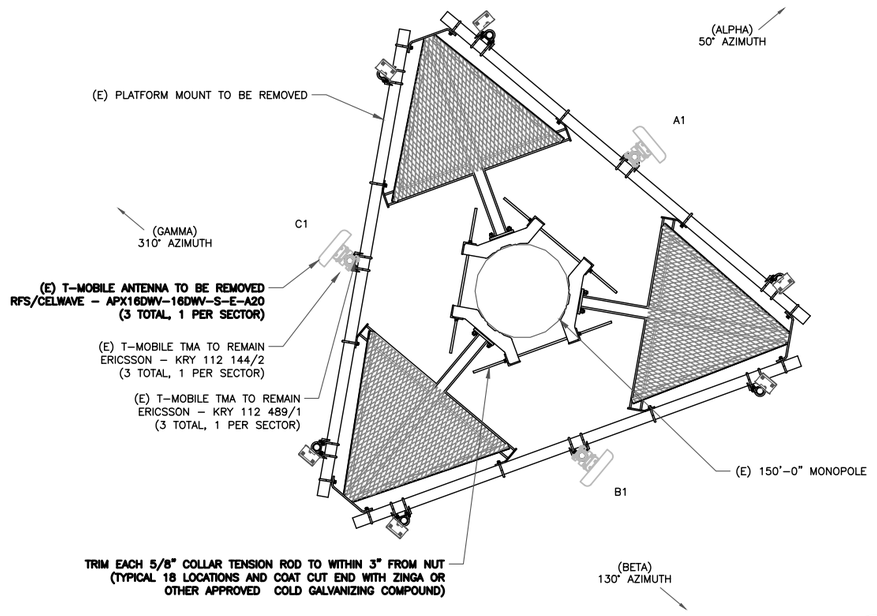
01/08/21
Exp. 01/31/21

SHEET NUMBER: C-1

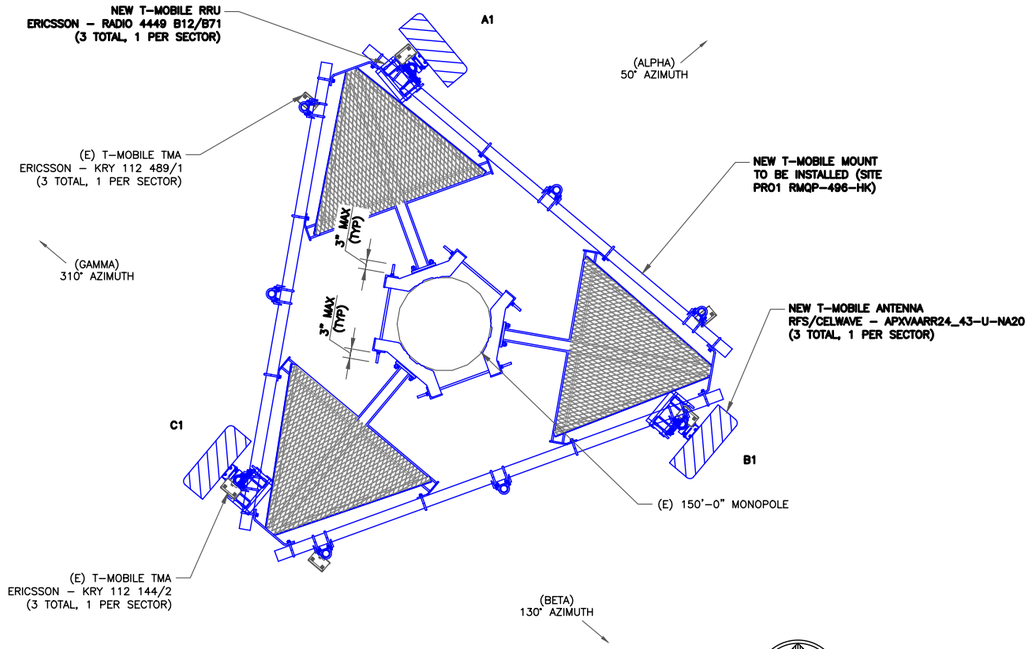
REVISION: 2



1 FINAL ELEVATION
SCALE: NOT TO SCALE



2 EXISTING ANTENNA LAYOUT
SCALE: NOT TO SCALE



3 FINAL ANTENNA LAYOUT
SCALE: NOT TO SCALE

T-Mobile
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BLOOMFIELD, CT 06002

CROWN CASTLE
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BU #: **876341**
MIDDLETOWN 2 - MARINO PROPERTY

1969 SAYBROOK RD
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EXISTING 150'-0" MONOPOLE

ISSUED FOR:

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01/08/21
Exp. 01/31/21

SHEET NUMBER: C-2
REVISION: 2

ANTENNA SCHEDULE

SECTOR	POS.	TECHNOLOGY	RAD CENTER	AZIMUTH	ANTENNA MANUFACTURER	ANTENNA MODEL	MECH. TILT	ELECT. TILT	TOWER MOUNTED EQUIPMENT	FEEDLINE TYPE
ALPHA	A1	–	–	–	–	–	–	–	–	–
ALPHA	**A2**	**LTE 600/700 LTE/GSM PCS LTE AWS**	**110'–0"**	**50°**	**RFS/CELWAVE**	**APXVAARR24_43–U–NA20**	**0°**	**2°/2°/2°/2°**	(1) ERICSSON – KRY 112 144/1 (1) ERICSSON – KRY 112 489/2 **(1) ERICSSON – RADIO 4449 B12/B71**	**HYBRID**/COAX
ALPHA	A3	–	–	–	–	–	–	–	–	–
BETA	B1	–	–	–	–	–	–	–	–	–
BETA	**B2**	**LTE 600/700 LTE/GSM PCS LTE AWS**	**110'–0"**	**130°**	**RFS/CELWAVE**	**APXVAARR24_43–U–NA20**	**0°**	**2°/2°/2°/2°**	(1) ERICSSON – KRY 112 144/1 (1) ERICSSON – KRY 112 489/2 **(1) ERICSSON – RADIO 4449 B12/B71**	**HYBRID**/COAX
BETA	B3	–	–	–	–	–	–	–	–	–
GAMMA	C1	–	–	–	–	–	–	–	–	–
GAMMA	**C2**	**LTE 600/700 LTE/GSM PCS LTE AWS**	**110'–0"**	**310°**	**RFS/CELWAVE**	**APXVAARR24_43–U–NA20**	**0°**	**2°/2°/2°/2°**	(1) ERICSSON – KRY 112 144/1 (1) ERICSSON – KRY 112 489/2 **(1) ERICSSON – RADIO 4449 B12/B71**	**HYBRID**/COAX
GAMMA	C3	–	–	–	–	–	–	–	–	–

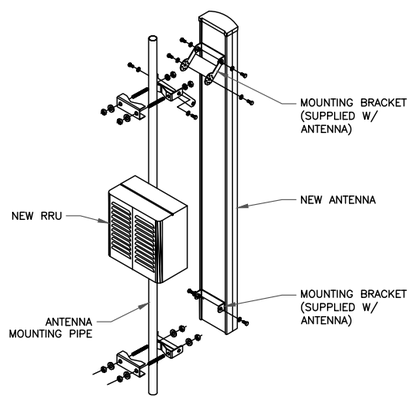
CABLE SCHEDULE

STATUS	CABLE TYPE	SIZE	QUANTITY
EXISTING	COAX	1–5/8"	12
NEW	**HYBRID**	**1–1/4"**	**1**
CABLE QUANTITY			**13**

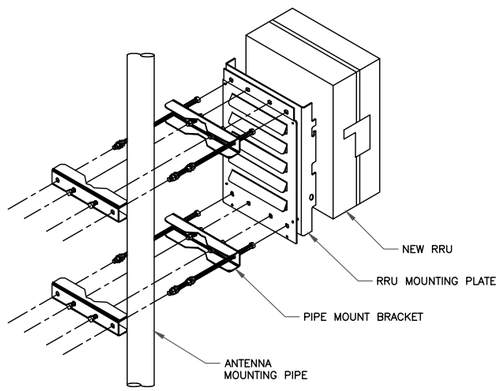
1 ANTENNA AND CABLE SCHEDULE
SCALE: NOT TO SCALE

INSTALLER NOTES:

1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRUs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRU PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.



NOTE:
ANTENNA NOT SHOWN FOR CLARITY



2 ANTENNA WITH RRH MOUNTING DETAIL
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

T-MOBILE SITE NUMBER:
CT11234C

BU #: **876341**
MIDDLETOWN 2 - MARINO PROPERTY

1969 SAYBROOK RD
MIDDLETOWN, CT 06457

EXISTING 150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
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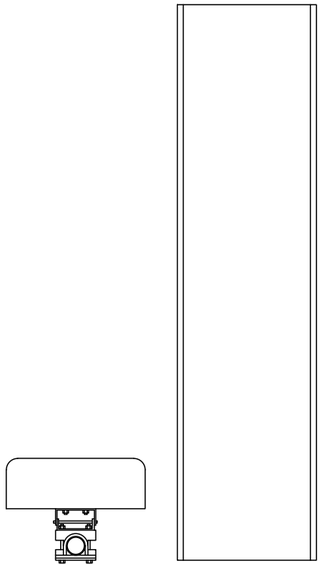
STATE OF CONNECTICUT · BRIAN J. BREWER · 29510 · LICENSED PROFESSIONAL ENGINEER

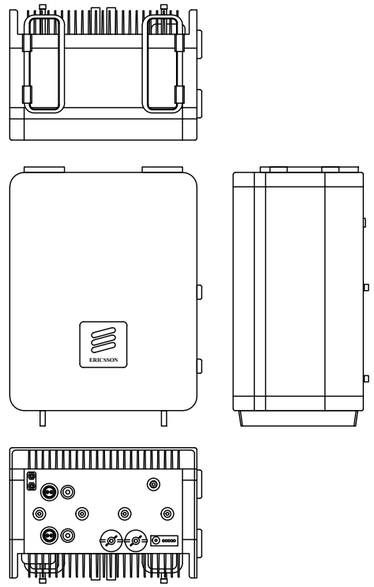
01/08/21
Exp. 01/31/21

SHEET NUMBER: C-3
REVISION: 2



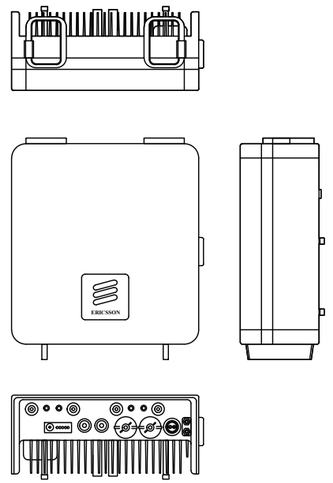
RFS/CELWAVE – APXVAARR24_43-U-NA20
WEIGHT (WITHOUT MOUNTING HARDWARE): 128.0 LBS
SIZE (HxWxD): 95.9x24.0x8.7 IN.

1 RFS/CELWAVE – APXVAARR24_43-U-NA20
SCALE: NOT TO SCALE



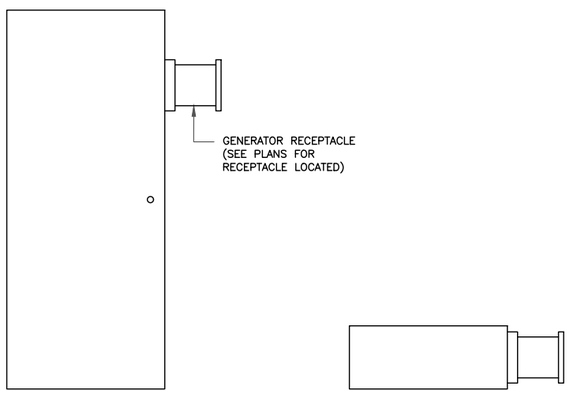
ERICSSON – RADIO 4449 B12/B71
WEIGHT: 75.0 LBS
SIZE (HxWxD): 15.0x13.2x10.4 IN.

2 ERICSSON – RADIO 4449 B12/B71
SCALE: NOT TO SCALE



ERICSSON – RADIO 4415 B25
WEIGHT: 60.0 LBS
SIZE (HxWxD): 15.0x13.0x8.0 IN.

3 ERICSSON – RADIO 4415 B66A
SCALE: NOT TO SCALE



EMERSON SPECIFICATIONS (CS7S2-W836 PPC)

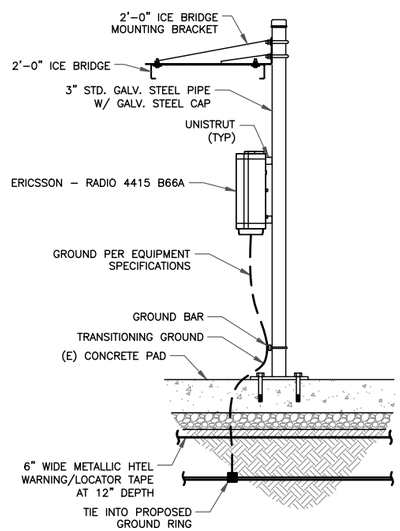
DIMENSIONS (WxHxD):	60" x 25" x 10"
WEIGHT:	APPROXIMATELY 150 LBS
VOLTAGE:	240/120 VAC, SINGLE PHASE
AMPERAGE:	200A
FAULT CURRENT RATING:	65kAIC
TRANSFER TYPE:	SLIDE BAR MECHANICAL INTERLOCK
DISTRIBUTION:	24 POSITION, 200A LOAD CENTER
GENERATOR RECEPTACLE:	200A APPLETON

4 EMERSON – CS7S2-W836 PPC
SCALE: NOT TO SCALE

5 NOT USED
SCALE: NOT TO SCALE

NOTES:

1. ALL EXPOSED ELECTRICAL CONDUIT MUST BE GALVANIZED STEEL RIGID CONDUIT.
2. THREADLESS CONNECTORS ARE NOT ALLOWED.
3. EMT CONDUIT CAN ONLY BE USED INSIDE.
4. USE ONLY COMPRESSION TYPE FITTINGS ON EMT CONDUIT.
5. USE ONLY STRANDED CONDUCTORS FOR ALL ELECTRICAL WIRING. (EXCEPT TELCO AND THERMOSTAT)
6. USE SCHEDULE 80 CONDUIT UNDER DRIVEWAYS AND/OR ANY VEHICLE CROSSING AREA.



6 UTILITY FRAME MOUNTING DETAIL
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

T-MOBILE SITE NUMBER:
CT11234C

BU #: **876341**
MIDDLETOWN 2 - MARINO PROPERTY

1969 SAYBROOK RD
MIDDLETOWN, CT 06457

EXISTING 150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	07/19/19	AJ	CONSTRUCTION	LR/AF
1	08/28/19	AJ	CONSTRUCTION	AF
2	12/11/20	MK	CONSTRUCTION	AF

STATE OF CONNECTICUT
BRIAN R. BREWER
29510
LICENSED
PROFESSIONAL ENGINEER

01/08/21
Exp. 01/31/21

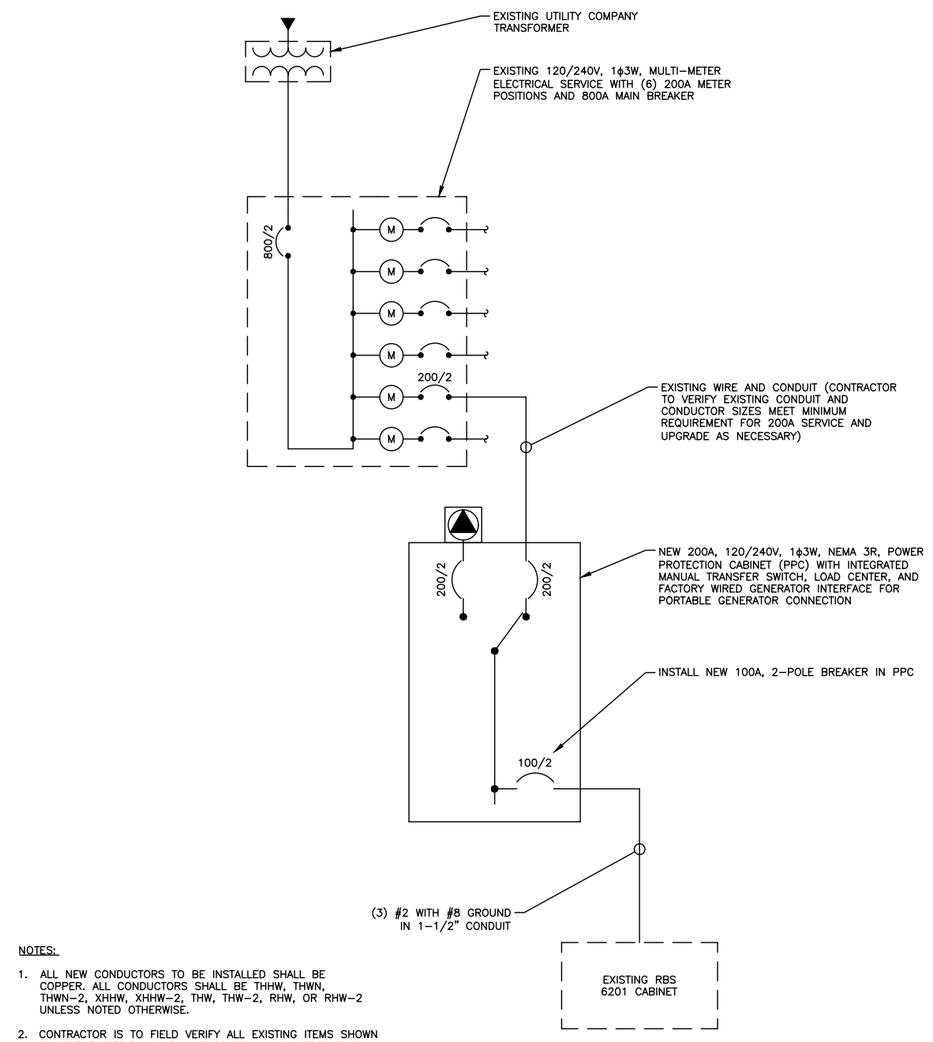
SHEET NUMBER: C-4
REVISION: 2

MAIN: 200 AMP MAIN BREAKER			**VOLTAGE/PHASE**: 120/240V, 1-PHASE, 3-WIRE						**SHORT CIRCUIT CURRENT RATING**: 65,000 AMPS		
MOUNTING: INSIDE PPC ENCLOSURE			**ENCLOSURE**: NEMA 3R						**SURGE PROTECTION DEVICE**: YES		
SERVICE FROM: N/A			**MANUFACTURER**: SCHNEIDER ELECTRIC (SQUARE D)						**MODEL NUMBER**: QO TYPE PANEL		
DESCRIPTION	LOAD (VA)	C or NC	C/B	CIR No.	LOAD (VA) A-PHASE	LOAD (VA) B-PHASE	CIR No.	C/B	C or NC	LOAD (VA)	DESCRIPTION
SURGE PROTECTION DEVICE	0	NC	60	1	0		2				BLANK
	0	NC		3		0	4				
RBS 6201*	4800	C	100	5	4800		6				
	4800	C		7		4800	8				
GFCI RECEPTICALE	180	NC	20	9	180		10				
	180	NC		11		180	12				
FIBER	960	NC	20	13	960		14				
BLANK				15		0	16				
				17	0		18				
				19		0	20				
				21	0		22				
				23		0	24				
BASE LOAD (VA) =					5940	4980					
25% OF CONTINUOUS LOAD (VA) =					1200	1200					
TOTAL LOAD (VA) =					7140	6180					
TOTAL LOAD (A) =					60	52					

C = CONTINUOUS LOAD, NC = NON-CONTINUOUS LOAD

* INSTALL NEW SQUARE D QO2150 BREAKER
CUSTOMER HAS NOT PROVIDED LOADS FOR EQUIPMNET CABINETS, THEREFORE THE CABINET LOADS SHOWN ARE EXTIMATED VALUES

1 AC PANEL SCHEDULE
SCALE: NOT TO SCALE



NOTES:

1. ALL NEW CONDUCTORS TO BE INSTALLED SHALL BE COPPER. ALL CONDUCTORS SHALL BE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 UNLESS NOTED OTHERWISE.
2. CONTRACTOR IS TO FIELD VERIFY ALL EXISTING ITEMS SHOWN ON THE ELECTRICAL ONE-LINE DIAGRAM AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
4. REMOVE WIRING TO EXISTING BREAKERS FROM EQUIPMENT TO BE REMOVED. RELABEL EMPTY BREAKERS AS SPARES.
5. ALL GROUNDING AND BONDING PER THE NEC.

2 ONE-LINE DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

T-MOBILE SITE NUMBER:
CT11234C

BU #: **876341**
MIDDLETOWN 2 - MARINO PROPERTY

1969 SAYBROOK RD
MIDDLETOWN, CT 06457

EXISTING 150'-0" MONOPOLE

ISSUED FOR:

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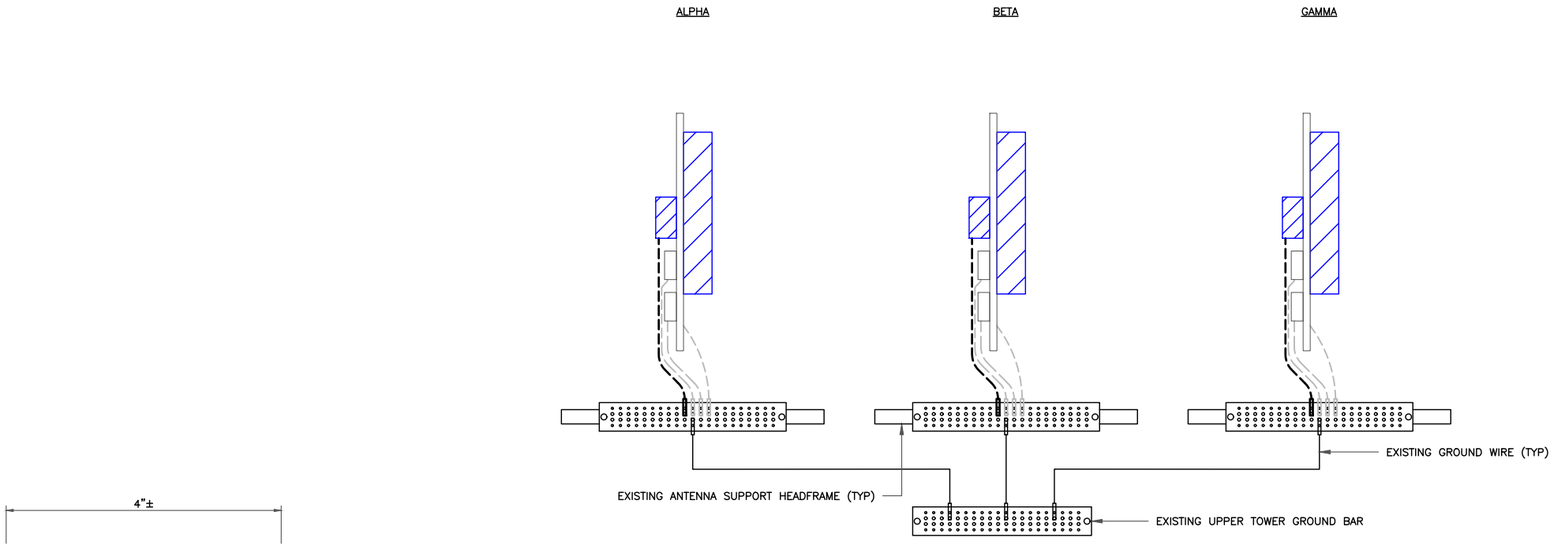
2	12/11/20	MK	CONSTRUCTION	AF

01/08/21
Exp. 01/31/21

SHEET NUMBER: E-1

REVISION: 2



1 ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

T-MOBILE SITE NUMBER:
CT11234C

BU #: **876341**
MIDDLETOWN 2 - MARINO PROPERTY

1969 SAYBROOK RD
MIDDLETOWN, CT 06457

EXISTING 150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
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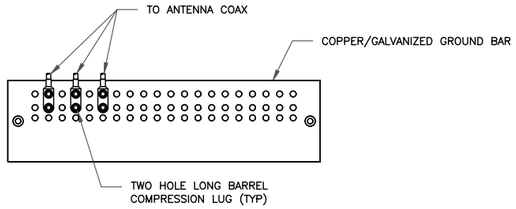
2	12/11/20	MK	CONSTRUCTION	AF

STATE OF CONNECTICUT
BRIAN J. BREWER
29510
LICENSED
PROFESSIONAL ENGINEER

01/08/21
Exp. 01/31/21

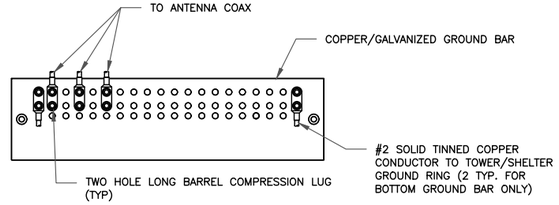
SHEET NUMBER: G-1
REVISION: 2



NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL.

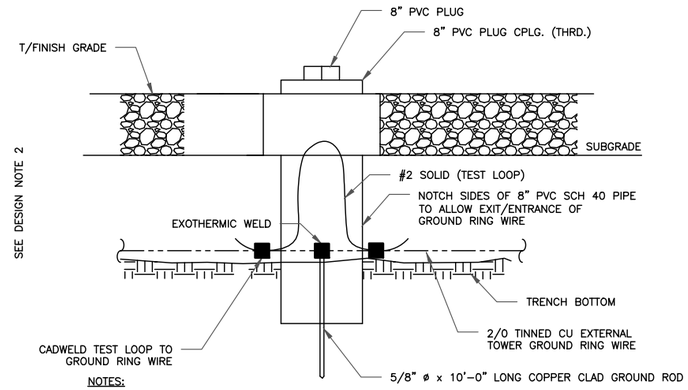
1 ANTENNA GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

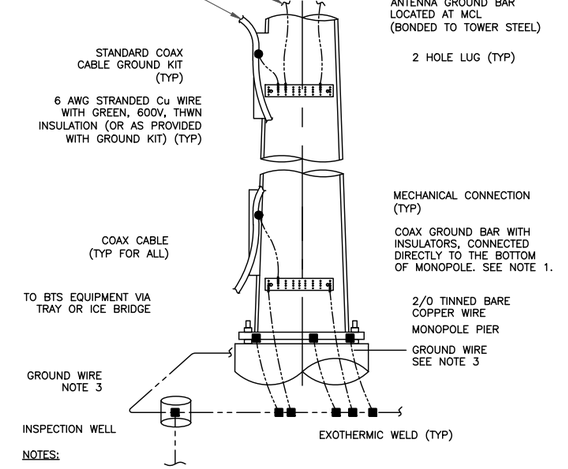
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

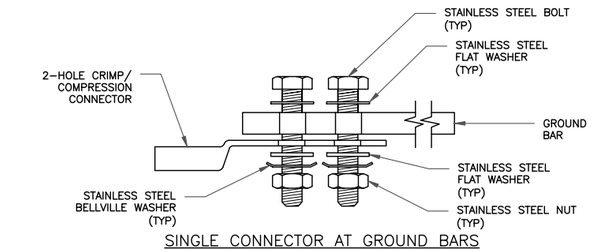
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



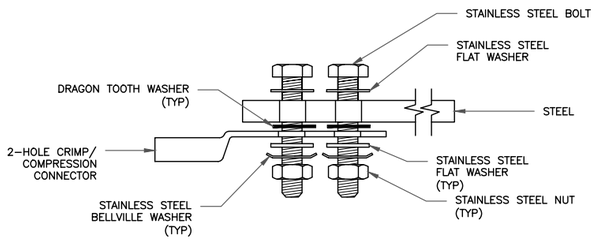
NOTES:

1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATIONS AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET ON THE TOWER SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE USA INC. TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE RECOGNIZED EDITION OF ANSI/TIA 222 AND NFPA 780.

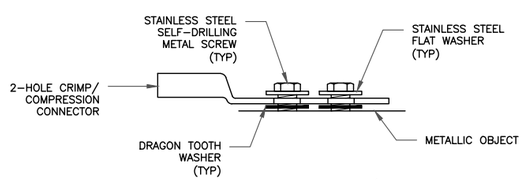
4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS

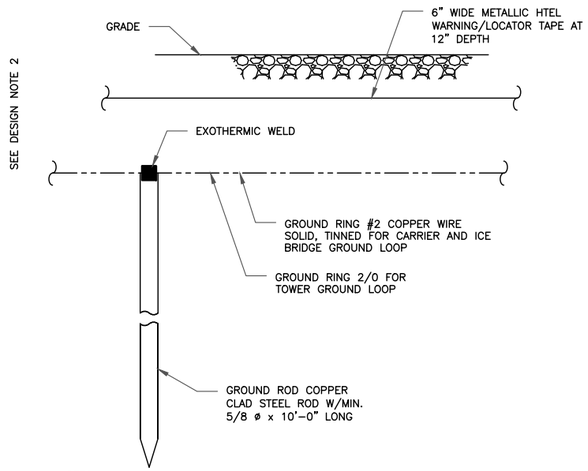


SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

T-MOBILE SITE NUMBER:
CT11234C

BU #: **876341**
MIDDLETOWN 2 - MARINO PROPERTY

1969 SAYBROOK RD
MIDDLETOWN, CT 06457

EXISTING 150'-0" MONOPOLE

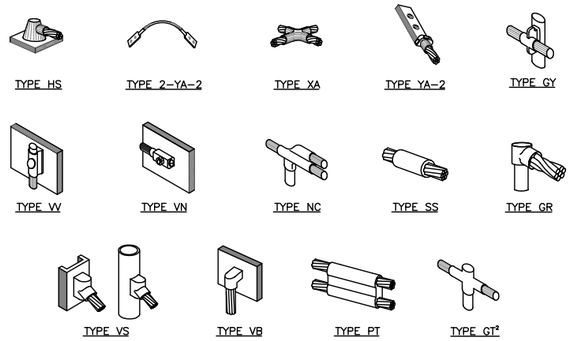
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	07/19/19	AJ	CONSTRUCTION	LR/AF
1	08/28/19	AJ	CONSTRUCTION	AF
2	12/11/20	MK	CONSTRUCTION	AF

01/08/21
Exp. 01/31/21

SHEET NUMBER: G-2

REVISION: 2

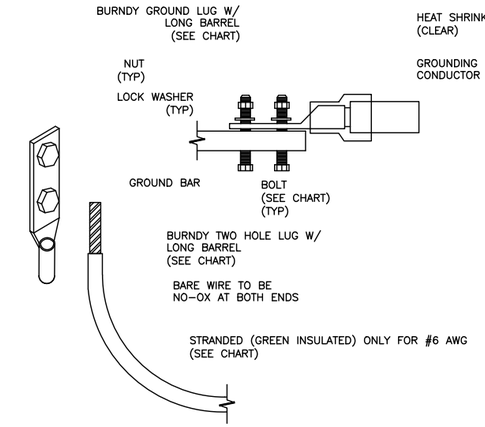


NOTE:

1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

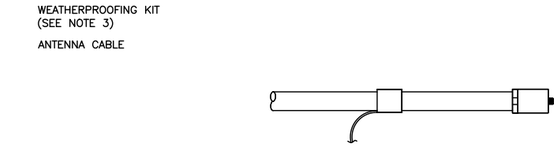
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER,GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

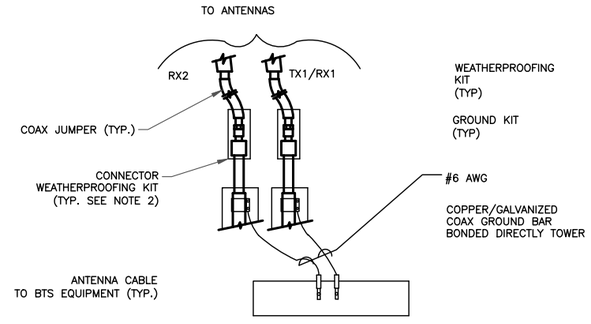
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

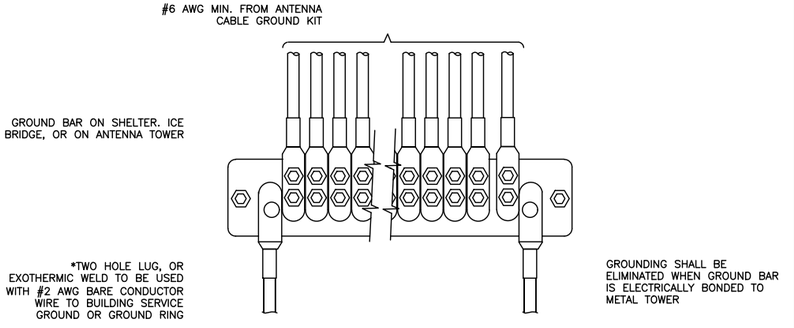
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



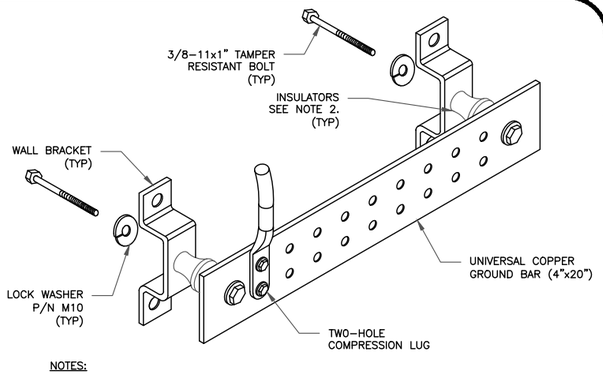
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



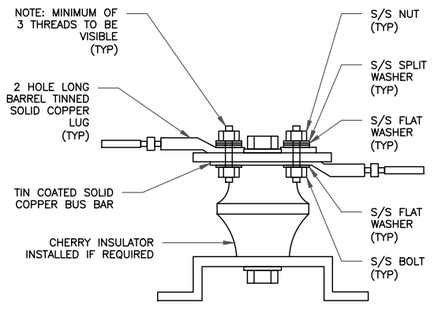
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



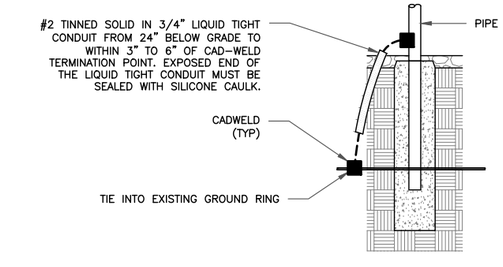
NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

T-MOBILE SITE NUMBER:
CT11234C

BU #: **876341**
MIDDLETOWN 2 - MARINO PROPERTY

1969 SAYBROOK RD
MIDDLETOWN, CT 06457

EXISTING 150'-0" MONOPOLE

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2	12/11/20	MK	CONSTRUCTION	AF

01/08/21
Exp. 01/31/21

SHEET NUMBER: G-3
REVISION: 2

Exhibit D

Structural Analysis Report

Date: **July 29, 2019**

Denice Nicholson
Crown Castle
3 Corporate Dr
Clifton Park, NY 12065

FDH Infrastructure Services, LLC
6521 Meridien Drive, Suite 107
Raleigh, North Carolina 27616
919.755.1012

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11234C
	Carrier Site Name:	Middletown/Rt9
Crown Castle Designation:	**Crown Castle BU Number:**	876341
	Crown Castle Site Name:	MIDDLETOWN 2 - MARINO PROPERTY
	Crown Castle JDE Job Number:	559328
	Crown Castle Work Order Number:	1749559
	Crown Castle Order Number:	479819 Rev. 0
Engineering Firm Designation:	**FDH-IS Project Number:**	19BNXE1400 (R1)
Site Data:	**1969 Saybrook Rd, MIDDLETOWN, Middlesex County, CT 06457** **Latitude *41° 30' 38.3"*, Longitude *-72° 35' 36.1"*** **150 Foot - Monopole Tower**	

Dear Denice Nicholson,

FDH Infrastructure Services, LLC 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:

LC7: Proposed Equipment Configuration **Sufficient Capacity - 95.6%**

This analysis utilizes an ultimate 3-second gust wind speed of 130 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Respectfully Submitted by:

Morgan Gebert
Project Engineer I

Reviewed by:

Dennis D. Abel, PE
Director, Engineering
CT PE License No. 23247

STATE OF CONNECTICUT
DENNIS D. ABEL
No. 23247
LICENSED
PROFESSIONAL ENGINEER

07-29-2019

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 150 ft Monopole tower designed by SUMMIT.

This tower has been modified multiple times to accommodate additional loading. Modifications consist of additional anchor rods and flat plate reinforcement.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	130 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
111.0	111.0	1	site pro 1	Platform Mount [P/N:RMQP-496-HK]	12 1	1-5/8 1-1/4
	110.0	3	ericsson	KRY 112 144/1		
		3	ericsson	KRY 112 489/2		
		3	ericsson	RADIO 4449 B12/B71		
		3	rfs celwave	APXVAARR24_43-U-NA20		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
150.0	150.0	1	site pro 1	Handrail Kit [P/N:HRK14-HD]	3 1	1-1/4 7/8
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz		
		6	alcatel lucent	RRH2X50-800		
		3	alcatel lucent	TD-RRH8x20-25		
		3	commscope	NNVV-65B-R4		
		1	-	Platform Mount [LP 1201-1]		
		3	rfs celwave	APXVTM14-ALU-I20		
141.0	145.0	1	lucent	KS24019-L112A	13 1	1-5/8 1/2
	142.0	3	alcatel lucent	RRH2X60-AWS BAND 4		
		3	alcatel lucent	RRH2X60-PCS		
		6	andrew	HBXX-6517DS-A2M		
		3	antel	BXA-70063-6CF-EDIN-0		
		6	rfs celwave	APL868013-42T0		
		1	rfs celwave	DB-T1-6Z-8AB-0Z		
		6	rfs celwave	FD9R6004/2C-3L		
	141.0	1	-	Platform Mount [LP 1201-1]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
132.0	134.0	1	raycap	DC6-48-60-18-8F	12 2 1 1	1-5/8 3/4 3/8 Conduit
	133.0	3	cci antennas	OPA-65R-LCUU-H6		
		3	ericsson	RRUS 11		
		6	powerwave tech	7770.00		
		3	powerwave tech	LGP21401		
	132.0	1	-	Handrail Kit [NA 510-1]		
		1	-	Platform Mount [LP 1201-1]		
		3	ericsson	RRUS 12 B2		
	129.0	3	powerwave tech	LGP21401		
	128.0	3	ericsson	RRUS A2 B2		
104.0	104.0	1	-	Side Arm Mount [SO 701-1]	1	1/2
		1	lucent	KS24019-L112A		
88.0	95.0	2	sinclair	SC479-HF1LDF	2 1	7/8 1/2
	88.0	1	bird technologies group	428E-83I-01-T		
		2	-	Side Arm Mount [SO 306-1]		
82.0	92.0	1	rfi antennas	BA80-41-DIN	1	7/8
	82.0	1	-	Side Arm Mount [SO 306-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clough, Harbour & Associates LLP	1532967	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Paul J. Ford and Company	1613596	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Paul J. Ford and Company	1614554	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	IETS Engineering Services	1595639	CCISITES
4-POST-MODIFICATION INSPECTION	IETS Engineering Services	2504220	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	FDH Engineering, Inc.	5069317	CCISITES
4-POST-MODIFICATION INSPECTION	Sinnott Gering and Schmitt Towers, Inc.	5311239	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	B+T Group	5570674	CCISITES
4-POST-MODIFICATION INSPECTION	Engineered Tower Solutions, PLLC	5810606	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.5.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are presented in Appendix C.

3.2) Assumptions

1) Tower and structures were built and maintained in accordance with the manufacturer's specifications.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) The existing base plate grout was considered in this analysis. Grout must be maintained and inspected periodically and must be replaced if damaged or cracked. Refer to Crown Castle document ENG-STD-10323, Base Plate Grout

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity[2]	Pass / Fail
150 - 145	Pole	TP23x22x0.25	Pole	5.4%	Pass
145 - 140	Pole	TP24x23x0.25	Pole	11.4%	Pass
140 - 135	Pole	TP25x24x0.25	Pole	19.2%	Pass
135 - 130	Pole	TP26x25x0.25	Pole	28.2%	Pass
130 - 125	Pole	TP27.001x26x0.25	Pole	37.6%	Pass
125 - 120	Pole	TP28.001x27.001x0.25	Pole	46.3%	Pass
120 - 115	Pole	TP29.001x28.001x0.25	Pole	54.3%	Pass
115 - 111.75	Pole	TP30.401x29.001x0.25	Pole	59.2%	Pass
111.75 - 106.75	Pole	TP30.151x29.151x0.3125	Pole	51.5%	Pass
106.75 - 101.75	Pole	TP31.151x30.151x0.3125	Pole	57.7%	Pass
101.75 - 96.75	Pole	TP32.152x31.151x0.3125	Pole	63.3%	Pass
96.75 - 91.75	Pole	TP33.152x32.152x0.3125	Pole	68.6%	Pass
91.75 - 89.5	Pole	TP33.602x33.152x0.3125	Pole	70.8%	Pass
89.5 - 89.25	Pole + Reinf.	TP33.652x33.602x0.5	Reinf. 3 Tension Rupture	59.6%	Pass
89.25 - 84.25	Pole + Reinf.	TP34.652x33.652x0.4938	Reinf. 3 Tension Rupture	63.7%	Pass
84.25 - 79.25	Pole + Reinf.	TP35.653x34.652x0.4875	Reinf. 3 Tension Rupture	67.8%	Pass
79.25 - 74.5	Pole + Reinf.	TP37.553x35.653x0.4813	Reinf. 3 Tension Rupture	71.3%	Pass
74.5 - 68.75	Pole	TP37.128x35.978x0.375	Pole	67.7%	Pass
68.75 - 67.42	Pole	TP37.394x37.128x0.375	Pole	68.5%	Pass
67.42 - 67.17	Pole	TP37.444x37.394x0.375	Pole	68.6%	Pass
67.17 - 62.17	Pole	TP38.444x37.444x0.375	Pole	71.5%	Pass
62.17 - 57.58	Pole	TP39.362x38.444x0.375	Pole	74.0%	Pass
57.58 - 57.33	Pole + Reinf.	TP39.412x39.362x0.7	Reinf. 2 Tension Rupture	56.9%	Pass

Elevation (ft)	Component Type	Size	Critical Element	% Capacity[2]	Pass / Fail
57.33 - 56.42	Pole + Reinf.	TP39.594x39.412x0.7	Reinf. 2 Tension Rupture	57.3%	Pass
56.42 - 56.17	Pole + Reinf.	TP39.644x39.594x0.5875	Reinf. 2 Tension Rupture	68.7%	Pass
56.17 - 51.17	Pole + Reinf.	TP40.644x39.644x0.575	Reinf. 2 Tension Rupture	70.9%	Pass
51.17 - 46.17	Pole + Reinf.	TP41.645x40.644x0.575	Reinf. 2 Tension Rupture	73.1%	Pass
46.17 - 41.17	Pole + Reinf.	TP42.645x41.645x0.5625	Reinf. 2 Tension Rupture	75.1%	Pass
41.17 - 38	Pole + Reinf.	TP44.379x42.645x0.5625	Reinf. 2 Tension Rupture	76.4%	Pass
38 - 31.5	Pole	TP43.829x42.529x0.4375	Pole	71.9%	Pass
31.5 - 26.5	Pole	TP44.829x43.829x0.4375	Pole	73.5%	Pass
26.5 - 26.25	Pole + Reinf.	TP44.879x44.829x0.6875	Reinf. 1 Tension Rupture	66.5%	Pass
26.25 - 21.25	Pole + Reinf.	TP45.879x44.879x0.6875	Reinf. 1 Tension Rupture	67.9%	Pass
21.25 - 16.25	Pole + Reinf.	TP46.88x45.879x0.675	Reinf. 1 Tension Rupture	69.2%	Pass
16.25 - 11.25	Pole + Reinf.	TP47.88x46.88x0.675	Reinf. 1 Tension Rupture	70.4%	Pass
11.25 - 6.25	Pole + Reinf.	TP48.88x47.88x0.6625	Reinf. 1 Tension Rupture	71.6%	Pass
6.25 - 1.25	Pole + Reinf.	TP49.88x48.88x0.6625	Reinf. 1 Tension Rupture	72.7%	Pass
1.25 - 0	Pole + Reinf.	TP50.13x49.88x0.6625	Reinf. 1 Tension Rupture	73.0%	Pass
				Summary	
			Pole	74.0%	Pass
			Reinforcement	76.4%	Pass
			Overall	76.4%	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity[2]	Pass / Fail
1	Anchor Rods	0	65.1	Pass
1	Base Plate	0	61.9	Pass
1	Base Foundation Structural	0	52.4	Pass
1	Base Foundation Soil Interaction	0	47.0	Pass
1	Base Transfer Stiffeners	0	95.6	Pass

Structure Rating (max from all components) =	95.6%[2]

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity.
2) Rating per TIA-222-H Section 15.5

4.1) Recommendations

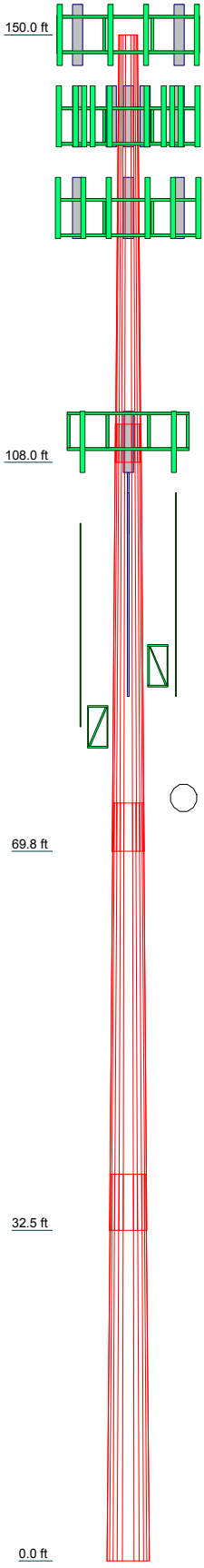
The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

The existing base plate grout was considered in this analysis. Grout must be maintained and inspected periodically and must be replaced if damaged or cracked. Refer to Crown Castle document ENG-STD-10323, Base Plate Grout

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	42.00	12	0.2500	3.75	22.0000	30.4010		3.0
2	42.00	12	0.3125	4.75	29.1509	37.5530	A607-60	4.8
3	42.00	12	0.3750	5.50	35.9778	44.3790		6.9
4	38.00	12	0.4375		42.5288	50.1300	A607-65	8.4
								23.0



MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	A607-65	65 ksi	80 ksi

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 130 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 0.00 ft
8. TIA-222-H Annex S

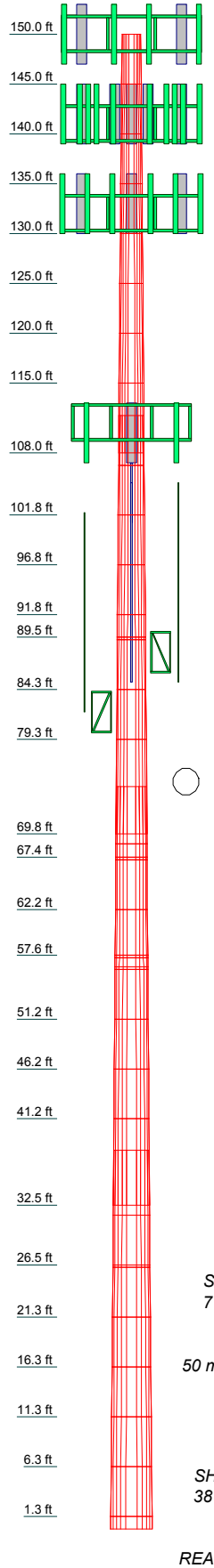
FDH INFRASTRUCTURE SERVICES ENGINEERING INNOVATION

FDH-IS

FDH Infrastructure Services, LLC
6521 Meridien Drive, Suite 107
Raleigh, North Carolina 27616
Phone: 919.755.1012
FAX: 919.755.1031

Job:	***876341 Middletown 2-Marino Property***		
Project:	***19BNXE1400 (R1)***		
Client: Crown Castle USA, Inc.	Drawn by: MGebert	App'd:	
Code: TIA-222-H	Date: 07/29/19	Scale: NTS	
Path:		Dwg No. E-1	

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
Length (ft)	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	9.50	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	6.50	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	1.25
Number of Sides	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.4875	0.4813	0.3750	0.3750	0.3750	0.3750	0.3750	0.3750	0.5750	0.5750	0.5750	0.5750	0.5625	0.5625	0.5625	0.5625	0.5625	0.6875	0.6750	0.6750	0.6625	0.6625	0.6625
Socket Length (ft)								3.75									4.75												5.50											
Top Dia (in)	22.0000	23.0001	24.0002	25.0004	26.0005	27.0006	28.0007	29.0008	30.1512	31.1539	32.1517	33.1519	34.1521	35.1525	36.1529	37.1514	38.1517	39.1520	40.1523	41.1525	42.1528	43.1530	44.1533	45.1535	46.1538	47.1540	48.1543	49.1545	50.1548	51.1550	52.1553	53.1555	54.1558	55.1560	56.1563	57.1565	58.1568	59.1570
Bot Dia (in)	23.0001	24.0002	25.0004	26.0005	27.0006	28.0007	29.0008	30.1512	31.1539	32.1517	33.1519	34.1521	35.1525	36.1529	37.1514	38.1517	39.1520	40.1523	41.1525	42.1528	43.1530	44.1533	45.1535	46.1538	47.1540	48.1543	49.1545	50.1548	51.1550	52.1553	53.1555	54.1558	55.1560	56.1563	57.1565	58.1568	59.1570	60.1573
Grade	A607-60																												A607-65										
Weight (K)	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.6	0.5	0.5	0.5	0.6	0.3	0.9	0.9	0.9	1.8	0.9	0.9	0.8	0.8	0.7	1.1	1.2	1.2	1.2	1.2	1.3	2.2	1.3	1.1	1.1	1.6	1.6	1.7	1.7	1.7	2.4



ALL REACTIONS ARE FACTORED

AXIAL 91 K

SHEAR 7 K *MOMENT 829 kip-ft*

TORQUE 1 kip-ft
50 mph WIND - 1.5000 in ICE

AXIAL 59 K

SHEAR 38 K *MOMENT 3910 kip-ft*

TORQUE 3 kip-ft
REACTIONS - 130 mph WIND

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	A607-65	65 ksi	80 ksi

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 130 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 0.00 ft
8. TIA-222-H Annex S

FDH Infrastructure Services, LLC
6521 Meridien Drive, Suite 107
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FDH-IS

Job: 876341 Middletown 2-Marino Property			
Project: 19BNXE1400 (R1)			
Client: Crown Castle USA, Inc.	Drawn by: MGebert		App'd:
Code: TIA-222-H	Date: 07/29/19		Scale: NTS
Path: C:\Users\MGebert\Desktop\876341_Middletown_Marino Property\19BNXE1400-STAMOD_TMO(R.1)\Analysis\ReportedTower\CCIpole(EQT)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:

Tower is located in Middlesex County, Connecticut.
Tower base elevation above sea level: 370.00 ft.
Basic wind speed of 130 mph.
Risk Category II.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 1.5000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
TIA-222-H Annex S.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.05.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	150.00-145.00	5.00	0.00	12	22.0000	23.0001	0.2500	1.0000	A607-60 (60 ksi)
L2	145.00-140.00	5.00	0.00	12	23.0001	24.0002	0.2500	1.0000	A607-60 (60 ksi)
L3	140.00-135.00	5.00	0.00	12	24.0002	25.0004	0.2500	1.0000	A607-60 (60 ksi)
L4	135.00-130.00	5.00	0.00	12	25.0004	26.0005	0.2500	1.0000	A607-60 (60 ksi)
L5	130.00-125.00	5.00	0.00	12	26.0005	27.0006	0.2500	1.0000	A607-60 (60 ksi)
L6	125.00-120.00	5.00	0.00	12	27.0006	28.0007	0.2500	1.0000	A607-60 (60 ksi)
L7	120.00-115.00	5.00	0.00	12	28.0007	29.0008	0.2500	1.0000	A607-60 (60 ksi)
L8	115.00-108.00	7.00	3.75	12	29.0008	30.4010	0.2500	1.0000	A607-60 (60 ksi)
L9	108.00-106.75	5.00	0.00	12	29.1509	30.1512	0.3125	1.2500	A607-60 (60 ksi)
L10	106.75-101.75	5.00	0.00	12	30.1512	31.1514	0.3125	1.2500	A607-60 (60 ksi)
L11	101.75-96.75	5.00	0.00	12	31.1514	32.1517	0.3125	1.2500	A607-60 (60 ksi)
L12	96.75-91.75	5.00	0.00	12	32.1517	33.1519	0.3125	1.2500	A607-60 (60 ksi)
L13	91.75-89.50	2.25	0.00	12	33.1519	33.6020	0.3125	1.2500	A607-60 (60 ksi)
L14	89.50-89.25	0.25	0.00	12	33.6020	33.6520	0.5000	2.0000	A607-60 (60 ksi)
L15	89.25-84.25	5.00	0.00	12	33.6520	34.6523	0.4938	1.9750	A607-60 (60 ksi)
L16	84.25-79.25	5.00	0.00	12	34.6523	35.6525	0.4875	1.9500	A607-60 (60 ksi)
L17	79.25-69.75	9.50	4.75	12	35.6525	37.5530	0.4813	1.9250	A607-60 (60 ksi)
L18	69.75-68.75	5.75	0.00	12	35.9778	37.1279	0.3750	1.5000	A607-65 (65 ksi)
L19	68.75-67.42	1.33	0.00	12	37.1279	37.3940	0.3750	1.5000	A607-65 (65 ksi)
L20	67.42-67.17	0.25	0.00	12	37.3940	37.4440	0.3750	1.5000	A607-65 (65 ksi)
L21	67.17-62.17	5.00	0.00	12	37.4440	38.4441	0.3750	1.5000	A607-65 (65 ksi)
L22	62.17-57.58	4.59	0.00	12	38.4441	39.3623	0.3750	1.5000	A607-65 (65 ksi)
L23	57.58-57.33	0.25	0.00	12	39.3623	39.4123	0.7000	2.8000	A607-65 (65 ksi)
L24	57.33-56.42	0.91	0.00	12	39.4123	39.5943	0.7000	2.8000	A607-65 (65 ksi)
L25	56.42-56.17	0.25	0.00	12	39.5943	39.6443	0.5875	2.3500	A607-65 (65 ksi)
L26	56.17-51.17	5.00	0.00	12	39.6443	40.6445	0.5750	2.3000	A607-65 (65 ksi)
L27	51.17-46.17	5.00	0.00	12	40.6445	41.6446	0.5750	2.3000	A607-65 (65 ksi)
L28	46.17-41.17	5.00	0.00	12	41.6446	42.6447	0.5625	2.2500	A607-65 (65 ksi)
L29	41.17-32.50	8.67	5.50	12	42.6447	44.3790	0.5625	2.2500	A607-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L30	32.50-31.50	6.50	0.00	12	42.5288	43.8290	0.4375	1.7500	A607-65 (65 ksi)
L31	31.50-26.50	5.00	0.00	12	43.8290	44.8292	0.4375	1.7500	A607-65 (65 ksi)
L32	26.50-26.25	0.25	0.00	12	44.8292	44.8792	0.6875	2.7500	A607-65 (65 ksi)
L33	26.25-21.25	5.00	0.00	12	44.8792	45.8794	0.6875	2.7500	A607-65 (65 ksi)
L34	21.25-16.25	5.00	0.00	12	45.8794	46.8795	0.6750	2.7000	A607-65 (65 ksi)
L35	16.25-11.25	5.00	0.00	12	46.8795	47.8797	0.6750	2.7000	A607-65 (65 ksi)
L36	11.25-6.25	5.00	0.00	12	47.8797	48.8798	0.6625	2.6500	A607-65 (65 ksi)
L37	6.25-1.25	5.00	0.00	12	48.8798	49.8800	0.6625	2.6500	A607-65 (65 ksi)
L38	1.25-0.00	1.25		12	49.8800	50.1300	0.6625	2.6500	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.6879	17.5087	1057.2060	7.7865	11.3960	92.7699	2142.1860	8.6173	5.2260	20.904
	23.7233	18.3138	1209.8537	8.1445	11.9141	101.5484	2451.4916	9.0135	5.4940	21.976
L2	23.7233	18.3138	1209.8537	8.1445	11.9141	101.5484	2451.4916	9.0135	5.4940	21.976
	24.7587	19.1189	1376.5302	8.5026	12.4321	110.7237	2789.2233	9.4098	5.7621	23.048
L3	24.7587	19.1189	1376.5302	8.5026	12.4321	110.7237	2789.2233	9.4098	5.7621	23.048
	25.7941	19.9240	1557.8522	8.8606	12.9502	120.2957	3156.6308	9.8060	6.0301	24.12
L4	25.7941	19.9240	1557.8522	8.8606	12.9502	120.2957	3156.6308	9.8060	6.0301	24.12
	26.8295	20.7291	1754.4364	9.2187	13.4682	130.2646	3554.9638	10.2022	6.2981	25.193
L5	26.8295	20.7291	1754.4364	9.2187	13.4682	130.2646	3554.9638	10.2022	6.2981	25.193
	27.8649	21.5342	1966.8995	9.5767	13.9863	140.6304	3985.4717	10.5985	6.5662	26.265
L6	27.8649	21.5342	1966.8995	9.5767	13.9863	140.6304	3985.4717	10.5985	6.5662	26.265
	28.9003	22.3393	2195.8584	9.9348	14.5044	151.3929	4449.4044	10.9947	6.8342	27.337
L7	28.9003	22.3393	2195.8584	9.9348	14.5044	151.3929	4449.4044	10.9947	6.8342	27.337
	29.9357	23.1444	2441.9296	10.2928	15.0224	162.5522	4948.0114	11.3910	7.1022	28.409
L8	29.9357	23.1444	2441.9296	10.2928	15.0224	162.5522	4948.0114	11.3910	7.1022	28.409
	31.3852	24.2716	2816.3524	10.7941	15.7477	178.8419	5706.6935	11.9457	7.4775	29.91
L9	30.8457	29.0187	3080.3908	10.3242	15.1002	203.9971	6241.7068	14.2821	6.9749	22.32
	31.1045	30.0252	3412.1630	10.6822	15.6183	218.4721	6913.9673	14.7775	7.2430	23.178
L10	31.1045	30.0252	3412.1630	10.6822	15.6183	218.4721	6913.9673	14.7775	7.2430	23.178
	32.1401	31.0317	3766.9411	11.0403	16.1364	233.4433	7632.8438	15.2728	7.5111	24.035
L11	32.1401	31.0317	3766.9411	11.0403	16.1364	233.4433	7632.8438	15.2728	7.5111	24.035
	33.1756	32.0382	4145.4962	11.3984	16.6546	248.9106	8399.8992	15.7682	7.7791	24.893
L12	33.1756	32.0382	4145.4962	11.3984	16.6546	248.9106	8399.8992	15.7682	7.7791	24.893
	34.2111	33.0447	4548.5996	11.7565	17.1727	264.8741	9216.6959	16.2636	8.0472	25.751
L13	34.2111	33.0447	4548.5996	11.7565	17.1727	264.8741	9216.6959	16.2636	8.0472	25.751
	34.6771	33.4976	4738.2105	11.9176	17.4058	272.2195	9600.8990	16.4865	8.1678	26.137
L14	34.6110	53.2942	7453.7568	11.8505	17.4058	428.2330	15103.3321	26.2298	7.6653	15.331
	34.6628	53.3748	7487.5926	11.8684	17.4318	429.5376	15171.8926	26.2694	7.6787	15.357
L15	34.6650	52.7175	7398.1803	11.8707	17.4318	424.4083	14990.7191	25.9460	7.6955	15.586
	35.7005	54.3078	8088.0979	12.2288	17.9499	450.5934	16388.6791	26.7286	7.9636	16.129
L16	35.7027	53.6302	7990.1012	12.2310	17.9499	445.1340	16190.1112	26.3951	7.9803	16.37
	36.7382	55.2003	8712.6310	12.5891	18.4680	471.7688	17654.1526	27.1679	8.2484	16.92
L17	36.7404	54.5023	8605.5175	12.5913	18.4680	465.9689	17437.1115	26.8244	8.2651	17.174

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
	38.7080	57.4473	10077.2452	13.2717	19.4525	518.0449	20419.2309	28.2738	8.7745	18.233
L18	38.0983	42.9903	6955.4339	12.7458	18.6365	373.2160	14093.5947	21.1585	8.6370	23.032
	38.3054	44.3792	7651.5443	13.1576	19.2323	397.8493	15504.1032	21.8421	8.9453	23.854
L19	38.3054	44.3792	7651.5443	13.1576	19.2323	397.8493	15504.1032	21.8421	8.9453	23.854
	38.5808	44.7004	7818.9090	13.2528	19.3701	403.6591	15843.2294	22.0002	9.0166	24.044
L20	38.5808	44.7004	7818.9090	13.2528	19.3701	403.6591	15843.2294	22.0002	9.0166	24.044
	38.6326	44.7608	7850.6385	13.2707	19.3960	404.7559	15907.5220	22.0299	9.0300	24.08
L21	38.6326	44.7608	7850.6385	13.2707	19.3960	404.7559	15907.5220	22.0299	9.0300	24.08
	39.6680	45.9685	8503.3848	13.6287	19.9141	427.0041	17230.1629	22.6243	9.2980	24.795
L22	39.6680	45.9685	8503.3848	13.6287	19.9141	427.0041	17230.1629	22.6243	9.2980	24.795
	40.6185	47.0771	9133.5853	13.9574	20.3897	447.9520	18507.1202	23.1699	9.5441	25.451
L23	40.5039	87.1447	16626.5305	13.8411	20.3897	815.4397	33689.8584	42.8900	8.6731	12.39
	40.5557	87.2575	16691.1303	13.8590	20.4156	817.5692	33820.7551	42.9455	8.6865	12.409
L24	40.5557	87.2575	16691.1303	13.8590	20.4156	817.5692	33820.7551	42.9455	8.6865	12.409
	40.7441	87.6677	16927.6864	13.9242	20.5098	825.3444	34300.0819	43.1474	8.7353	12.479
L25	40.7838	73.7911	14330.8030	13.9644	20.5098	698.7280	29038.0922	36.3177	9.0368	15.382
	40.8356	73.8857	14385.9907	13.9823	20.5357	700.5340	29149.9174	36.3643	9.0502	15.405
L26	40.8400	72.3368	14093.4288	13.9868	20.5357	686.2875	28557.1077	35.6020	9.0837	15.798
	41.8754	74.1886	15203.7187	14.3449	21.0538	722.1357	30806.8560	36.5134	9.3517	16.264
L27	41.8754	74.1886	15203.7187	14.3449	21.0538	722.1357	30806.8560	36.5134	9.3517	16.264
	42.9108	76.0404	16370.8417	14.7029	21.5719	758.8966	33171.7637	37.4248	9.6198	16.73
L28	42.9152	74.4099	16029.5813	14.7074	21.5719	743.0769	32480.2776	36.6223	9.6533	17.161
	43.9507	76.2215	17229.0386	15.0654	22.0900	779.9482	34910.7032	37.5139	9.9213	17.638
L29	43.9507	76.2215	17229.0386	15.0654	22.0900	779.9482	34910.7032	37.5139	9.9213	17.638
	45.7461	79.3626	19448.1099	15.6863	22.9883	845.9995	39407.1433	39.0599	10.3861	18.464
L30	45.0137	59.2962	13409.0520	15.0687	22.0299	608.6741	27170.3748	29.1838	10.2252	23.372
	45.2208	61.1278	14690.4458	15.5342	22.7034	647.0581	29766.8260	30.0853	10.5737	24.168
L31	45.2208	61.1278	14690.4458	15.5342	22.7034	647.0581	29766.8260	30.0853	10.5737	24.168
	46.2563	62.5368	15729.8619	15.8922	23.2215	677.3829	31872.9647	30.7787	10.8417	24.781
L32	46.1681	97.7187	24303.0839	15.8027	23.2215	1046.5759	49244.6368	48.0942	10.1717	14.795
	46.2198	97.8294	24385.7756	15.8206	23.2474	1048.9668	49412.1927	48.1486	10.1851	14.815
L33	46.2198	97.8294	24385.7756	15.8206	23.2474	1048.9668	49412.1927	48.1486	10.1851	14.815
	47.2553	100.0435	26079.2377	16.1787	23.7655	1097.3568	52843.6060	49.2383	10.4532	15.205
L34	47.2597	98.2517	25626.3226	16.1832	23.7655	1078.2992	51925.8772	48.3565	10.4867	15.536
	48.2951	100.4255	27365.1925	16.5412	24.2836	1126.9010	55449.2991	49.4264	10.7547	15.933
L35	48.2951	100.4255	27365.1925	16.5412	24.2836	1126.9010	55449.2991	49.4264	10.7547	15.933
	49.3306	102.5993	29180.9957	16.8993	24.8017	1176.5742	59128.6086	50.4963	11.0227	16.33
L36	49.3350	100.7260	28663.3654	16.9037	24.8017	1155.7034	58079.7493	49.5743	11.0562	16.689
	50.3704	102.8596	30523.6601	17.2618	25.3197	1205.5281	61849.2107	50.6244	11.3243	17.093
L37	50.3704	102.8596	30523.6601	17.2618	25.3197	1205.5281	61849.2107	50.6244	11.3243	17.093
	51.4058	104.9932	32462.7526	17.6199	25.8378	1256.4045	65778.3380	51.6744	11.5923	17.498
L38	51.4058	104.9932	32462.7526	17.6199	25.8378	1256.4045	65778.3380	51.6744	11.5923	17.498
	51.6647	105.5265	32960.0295	17.7094	25.9673	1269.2879	66785.9557	51.9370	11.6593	17.599

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 150.00-145.00				1	1	1			
L2 145.00-140.00				1	1	1			
L3 140.00-135.00				1	1	1			
L4 135.00-130.00				1	1	1			
L5 130.00-125.00				1	1	1			
L6 125.00-120.00				1	1	1			

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
L7 120.00-115.00				1	1	1			
L8 115.00-108.00				1	1	1			
L9 108.00-106.75				1	1	1			
L10 106.75-101.75				1	1	1			
L11 101.75-96.75				1	1	1			
L12 96.75-91.75				1	1	1			
L13 91.75-89.50				1	1	1			
L14 89.50-89.25				1	1	0.966256			
L15 89.25-84.25				1	1	0.968189			
L16 84.25-79.25				1	1	0.970768			
L17 79.25-69.75				1	1	0.974419			
L18 69.75-68.75				1	1	1			
L19 68.75-67.42				1	1	1			
L20 67.42-67.17				1	1	1			
L21 67.17-62.17				1	1	1			
L22 62.17-57.58				1	1	1			
L23 57.58-57.33				1	1	1.02224			
L24 57.33-56.42				1	1	1.01996			
L25 56.42-56.17				1	1	0.967062			
L26 56.17-51.17				1	1	0.979393			
L27 51.17-46.17				1	1	0.971424			
L28 46.17-41.17				1	1	0.98496			
L29 41.17-32.50				1	1	0.980236			
L30 32.50-31.50				1	1	1			
L31 31.50-26.50				1	1	1			
L32 26.50-26.25				1	1	0.972651			
L33 26.25-21.25				1	1	0.965209			
L34 21.25-16.25				1	1	0.975567			
L35 16.25-11.25				1	1	0.96863			
L36 11.25-6.25				1	1	0.979877			

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
L37 6.25-1.25				1	1	0.973384			
L38 1.25-0.00				1	1	0.971802			

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
**										
Safety Line 3/8	C	No	Surface Ar (CaAa)	149.00 - 0.00	1	1	0.000 0.000	0.3750		0.22
**										
AVA5-50(7/8")	C	No	Surface Ar (CaAa)	88.00 - 0.00	2	2	-0.500 -0.470	1.1020		0.30
LDF4-50A(1/2")	C	No	Surface Ar (CaAa)	88.00 - 0.00	1	1	-0.460 -0.460	0.6300		0.15
AVA5-50(7/8")	C	No	Surface Ar (CaAa)	82.00 - 0.00	1	1	-0.450 -0.450	1.1020		0.30
**										
Flat Plate										
**										
6.5" x 1.25" Flat Plate	C	No	Surface Af (CaAa)	30.00 - 0.00	1	1	-0.250 -0.250	6.5000	15.5000	0.00
6.5" x 1.25" Flat Plate	B	No	Surface Af (CaAa)	30.00 - 0.00	1	1	0.000 0.000	6.5000	15.5000	0.00
6.5" x 1.25" Flat Plate	A	No	Surface Af (CaAa)	30.00 - 0.00	1	1	0.250 0.250	6.5000	15.5000	0.00
6.5" x 1.25" Flat Plate	A	No	Surface Af (CaAa)	30.00 - 0.00	1	1	-0.500 -0.500	6.5000	15.5000	0.00
**										
6" x 1" Flat Plate	C	No	Surface Af (CaAa)	38.00 - 30.08	1	1	-0.250 -0.250	6.0000	14.0000	20.42
6" x 1" Flat Plate	B	No	Surface Af (CaAa)	38.00 - 30.08	1	1	0.000 0.000	6.0000	14.0000	20.42
6" x 1" Flat Plate	A	No	Surface Af (CaAa)	38.00 - 30.08	1	1	0.250 0.250	6.0000	14.0000	20.42
6" x 1" Flat Plate	A	No	Surface Af (CaAa)	38.00 - 30.08	1	1	-0.500 -0.500	6.0000	14.0000	20.42
**										
6" x 1" Flat Plate	C	No	Surface Af (CaAa)	60.08 - 38.00	1	1	-0.250 -0.250	6.0000	14.0000	0.00
6" x 1" Flat Plate	B	No	Surface Af (CaAa)	60.08 - 38.00	1	1	0.000 0.000	6.0000	14.0000	0.00
6" x 1" Flat Plate	A	No	Surface Af (CaAa)	60.08 - 38.00	1	1	0.250 0.250	6.0000	14.0000	0.00
6" x 1" Flat Plate	A	No	Surface Af (CaAa)	60.08 - 38.00	1	1	-0.500 -0.500	6.0000	14.0000	0.00
**										
6.5" x 1.25" Flat Plate	C	No	Surface Af (CaAa)	32.83 - 26.25	1	1	-0.250 -0.250	6.5000	15.5000	0.00
6.5" x 1.25" Flat Plate	B	No	Surface Af (CaAa)	32.83 - 26.25	1	1	0.000 0.000	6.5000	15.5000	0.00
6.5" x 1.25" Flat Plate	A	No	Surface Af (CaAa)	32.83 - 26.25	1	1	0.250 0.250	6.5000	15.5000	0.00

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
6.5" x 1.25" Flat Plate	A	No	Surface Af (CaAa)	32.83 - 26.25	1	1	-0.500 -0.500	6.5000	15.5000	0.00
**										
6" x 1" Flat Plate	C	No	Surface Af (CaAa)	92.00 - 72.00	1	1	-0.500 -0.500	6.0000	14.0000	0.00
6" x 1" Flat Plate	B	No	Surface Af (CaAa)	92.00 - 72.00	1	1	-0.500 -0.500	6.0000	14.0000	0.00
6" x 1" Flat Plate	A	No	Surface Af (CaAa)	92.00 - 72.00	1	1	-0.500 -0.500	6.0000	14.0000	0.00
**										
6" x 1" Flat Plate	C	No	Surface Af (CaAa)	57.58 - 54.42	1	1	-0.500 -0.500	6.0000	14.0000	0.00
6" x 1" Flat Plate	B	No	Surface Af (CaAa)	57.58 - 54.42	1	1	-0.500 -0.500	6.0000	14.0000	0.00
6" x 1" Flat Plate	A	No	Surface Af (CaAa)	57.58 - 54.42	1	1	-0.250 -0.250	6.0000	14.0000	0.00
6" x 1" Flat Plate	C	No	Surface Af (CaAa)	69.42 - 57.58	1	1	-0.500 -0.500	6.0000	14.0000	20.42
6" x 1" Flat Plate	B	No	Surface Af (CaAa)	69.42 - 57.58	1	1	-0.500 -0.500	6.0000	14.0000	20.42
6" x 1" Flat Plate	A	No	Surface Af (CaAa)	69.42 - 57.58	1	1	-0.250 -0.250	6.0000	14.0000	20.42
**										

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
**									
HB114-08U3M12-XXXF(7/8)	B	No	No	Inside Pole	150.00 - 0.00	1	No Ice	0.00	0.68
							1/2" Ice	0.00	0.68
							1" Ice	0.00	0.68
							2" Ice	0.00	0.68
HB114-1-0813U4-M5F(1-1/4)	B	No	No	Inside Pole	150.00 - 0.00	1	No Ice	0.00	1.20
							1/2" Ice	0.00	1.20
							1" Ice	0.00	1.20
							2" Ice	0.00	1.20
HB114-1-08U4-M5F(1-1/4)	B	No	No	Inside Pole	150.00 - 0.00	2	No Ice	0.00	1.30
							1/2" Ice	0.00	1.30
							1" Ice	0.00	1.30
							2" Ice	0.00	1.30
**									
HB158-1-08U8-S8J18(1-5/8)	A	No	No	Inside Pole	141.00 - 0.00	1	No Ice	0.00	1.30
							1/2" Ice	0.00	1.30
							1" Ice	0.00	1.30
							2" Ice	0.00	1.30
LDF4-50A(1/2)	A	No	No	Inside Pole	141.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
LDF7-50A(1-5/8)	A	No	No	Inside Pole	141.00 - 0.00	12	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
**									

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
FB-L98B-002-50000 (3/8)	C	No	No	Inside Pole	132.00 - 0.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	132.00 - 0.00	2	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
							2" Ice	0.00	0.58
FXL 1873 PE(1-5/8)	C	No	No	Inside Pole	132.00 - 0.00	12	No Ice	0.00	0.67
							1/2" Ice	0.00	0.67
							1" Ice	0.00	0.67
							2" Ice	0.00	0.67
2" Conduit	C	No	No	Inside Pole	132.00 - 0.00	1	No Ice	0.00	1.15
							1/2" Ice	0.00	1.15
							1" Ice	0.00	1.15
							2" Ice	0.00	1.15
**									
LDF7-50A(1-5/8)	A	No	No	Inside Pole	111.00 - 0.00	12	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
HB114-U6S12-xxx-LI(1-1/4")	A	No	No	Inside Pole	111.00 - 0.00	1	No Ice	0.00	1.70
							1/2" Ice	0.00	1.70
							1" Ice	0.00	1.70
							2" Ice	0.00	1.70
**									
LDF4-50A(1/2)	B	No	No	Inside Pole	104.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
**									
Flat Plate									
**									

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	150.00-145.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.150	0.000	0.00
L2	145.00-140.00	A	0.000	0.000	0.000	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.188	0.000	0.00
L3	140.00-135.00	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.188	0.000	0.00
L4	135.00-130.00	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.188	0.000	0.02
L5	130.00-125.00	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.188	0.000	0.05

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
L6	125.00-120.00	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.188	0.000	0.05
L7	120.00-115.00	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.188	0.000	0.05
L8	115.00-108.00	A	0.000	0.000	0.000	0.000	0.11
		B	0.000	0.000	0.000	0.000	0.03
		C	0.000	0.000	0.263	0.000	0.07
L9	108.00-106.75	A	0.000	0.000	0.000	0.000	0.03
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.047	0.000	0.01
L10	106.75-101.75	A	0.000	0.000	0.000	0.000	0.11
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.188	0.000	0.05
L11	101.75-96.75	A	0.000	0.000	0.000	0.000	0.11
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.188	0.000	0.05
L12	96.75-91.75	A	0.000	0.000	0.250	0.000	0.11
		B	0.000	0.000	0.250	0.000	0.02
		C	0.000	0.000	0.438	0.000	0.05
L13	91.75-89.50	A	0.000	0.000	2.250	0.000	0.05
		B	0.000	0.000	2.250	0.000	0.01
		C	0.000	0.000	2.334	0.000	0.02
L14	89.50-89.25	A	0.000	0.000	0.250	0.000	0.01
		B	0.000	0.000	0.250	0.000	0.00
		C	0.000	0.000	0.259	0.000	0.00
L15	89.25-84.25	A	0.000	0.000	5.000	0.000	0.11
		B	0.000	0.000	5.000	0.000	0.02
		C	0.000	0.000	6.250	0.000	0.06
L16	84.25-79.25	A	0.000	0.000	5.000	0.000	0.11
		B	0.000	0.000	5.000	0.000	0.02
		C	0.000	0.000	6.908	0.000	0.06
L17	79.25-69.75	A	0.000	0.000	7.250	0.000	0.22
		B	0.000	0.000	7.250	0.000	0.04
		C	0.000	0.000	11.345	0.000	0.11
L18	69.75-68.75	A	0.000	0.000	0.652	0.000	0.04
		B	0.000	0.000	0.652	0.000	0.02
		C	0.000	0.000	1.083	0.000	0.03
L19	68.75-67.42	A	0.000	0.000	1.294	0.000	0.06
		B	0.000	0.000	1.294	0.000	0.03
		C	0.000	0.000	1.867	0.000	0.04
L20	67.42-67.17	A	0.000	0.000	0.243	0.000	0.01
		B	0.000	0.000	0.243	0.000	0.01
		C	0.000	0.000	0.351	0.000	0.01
L21	67.17-62.17	A	0.000	0.000	4.863	0.000	0.22
		B	0.000	0.000	4.863	0.000	0.13
		C	0.000	0.000	7.019	0.000	0.16
L22	62.17-57.58	A	0.000	0.000	9.464	0.000	0.20
		B	0.000	0.000	6.964	0.000	0.11
		C	0.000	0.000	8.943	0.000	0.15
L23	57.58-57.33	A	0.000	0.000	0.671	0.000	0.01
		B	0.000	0.000	0.421	0.000	0.00
		C	0.000	0.000	0.529	0.000	0.00
L24	57.33-56.42	A	0.000	0.000	2.442	0.000	0.02
		B	0.000	0.000	1.532	0.000	0.00
		C	0.000	0.000	1.924	0.000	0.01
L25	56.42-56.17	A	0.000	0.000	0.671	0.000	0.01
		B	0.000	0.000	0.421	0.000	0.00
		C	0.000	0.000	0.529	0.000	0.00
L26	56.17-51.17	A	0.000	0.000	11.195	0.000	0.11

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
		B	0.000	0.000	6.195	0.000	0.02
		C	0.000	0.000	8.351	0.000	0.06
L27	51.17-46.17	A	0.000	0.000	10.000	0.000	0.11
		B	0.000	0.000	5.000	0.000	0.02
		C	0.000	0.000	7.156	0.000	0.06
L28	46.17-41.17	A	0.000	0.000	10.000	0.000	0.11
		B	0.000	0.000	5.000	0.000	0.02
		C	0.000	0.000	7.156	0.000	0.06
L29	41.17-32.50	A	0.000	0.000	16.180	0.000	0.42
		B	0.000	0.000	8.090	0.000	0.15
		C	0.000	0.000	11.828	0.000	0.21
L30	32.50-31.50	A	0.000	0.000	3.382	0.000	0.06
		B	0.000	0.000	1.691	0.000	0.03
		C	0.000	0.000	2.122	0.000	0.03
L31	31.50-26.50	A	0.000	0.000	18.453	0.000	0.17
		B	0.000	0.000	9.226	0.000	0.05
		C	0.000	0.000	11.382	0.000	0.09
L32	26.50-26.25	A	0.000	0.000	0.965	0.000	0.01
		B	0.000	0.000	0.483	0.000	0.00
		C	0.000	0.000	0.590	0.000	0.00
L33	26.25-21.25	A	0.000	0.000	10.833	0.000	0.11
		B	0.000	0.000	5.417	0.000	0.02
		C	0.000	0.000	7.572	0.000	0.06
L34	21.25-16.25	A	0.000	0.000	10.833	0.000	0.11
		B	0.000	0.000	5.417	0.000	0.02
		C	0.000	0.000	7.572	0.000	0.06
L35	16.25-11.25	A	0.000	0.000	10.833	0.000	0.11
		B	0.000	0.000	5.417	0.000	0.02
		C	0.000	0.000	7.572	0.000	0.06
L36	11.25-6.25	A	0.000	0.000	10.833	0.000	0.11
		B	0.000	0.000	5.417	0.000	0.02
		C	0.000	0.000	7.572	0.000	0.06
L37	6.25-1.25	A	0.000	0.000	10.833	0.000	0.11
		B	0.000	0.000	5.417	0.000	0.02
		C	0.000	0.000	7.572	0.000	0.06
L38	1.25-0.00	A	0.000	0.000	2.708	0.000	0.03
		B	0.000	0.000	1.354	0.000	0.01
		C	0.000	0.000	1.893	0.000	0.01

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	150.00-145.00	A	1.481	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	1.335	0.000	0.01
L2	145.00-140.00	A	1.476	0.000	0.000	0.000	0.000	0.01
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	1.663	0.000	0.02
L3	140.00-135.00	A	1.471	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	1.658	0.000	0.02
L4	135.00-130.00	A	1.465	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	1.653	0.000	0.04
L5	130.00-125.00	A	1.460	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	0.000	0.000	0.02

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
		C		0.000	0.000	1.647	0.000	0.07
L6	125.00-120.00	A	1.454	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	1.641	0.000	0.07
L7	120.00-115.00	A	1.448	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	1.635	0.000	0.07
L8	115.00-108.00	A	1.440	0.000	0.000	0.000	0.000	0.11
		B		0.000	0.000	0.000	0.000	0.03
		C		0.000	0.000	2.279	0.000	0.10
L9	108.00-106.75	A	1.435	0.000	0.000	0.000	0.000	0.03
		B		0.000	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.407	0.000	0.02
L10	106.75-101.75	A	1.430	0.000	0.000	0.000	0.000	0.11
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	1.618	0.000	0.07
L11	101.75-96.75	A	1.423	0.000	0.000	0.000	0.000	0.11
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	1.611	0.000	0.07
L12	96.75-91.75	A	1.416	0.000	0.000	0.321	0.000	0.12
		B		0.000	0.000	0.321	0.000	0.03
		C		0.000	0.000	1.924	0.000	0.07
L13	91.75-89.50	A	1.411	0.000	0.000	2.885	0.000	0.08
		B		0.000	0.000	2.885	0.000	0.03
		C		0.000	0.000	3.604	0.000	0.05
L14	89.50-89.25	A	1.409	0.000	0.000	0.320	0.000	0.01
		B		0.000	0.000	0.320	0.000	0.00
		C		0.000	0.000	0.400	0.000	0.01
L15	89.25-84.25	A	1.404	0.000	0.000	6.404	0.000	0.17
		B		0.000	0.000	6.404	0.000	0.08
		C		0.000	0.000	11.635	0.000	0.16
L16	84.25-79.25	A	1.396	0.000	0.000	6.396	0.000	0.17
		B		0.000	0.000	6.396	0.000	0.08
		C		0.000	0.000	13.884	0.000	0.18
L17	79.25-69.75	A	1.383	0.000	0.000	9.255	0.000	0.29
		B		0.000	0.000	9.255	0.000	0.12
		C		0.000	0.000	25.043	0.000	0.34
L18	69.75-68.75	A	1.373	0.000	0.000	0.750	0.000	0.04
		B		0.000	0.000	0.750	0.000	0.03
		C		0.000	0.000	2.412	0.000	0.05
L19	68.75-67.42	A	1.371	0.000	0.000	1.486	0.000	0.07
		B		0.000	0.000	1.486	0.000	0.05
		C		0.000	0.000	3.682	0.000	0.08
L20	67.42-67.17	A	1.369	0.000	0.000	0.279	0.000	0.01
		B		0.000	0.000	0.279	0.000	0.01
		C		0.000	0.000	0.692	0.000	0.01
L21	67.17-62.17	A	1.364	0.000	0.000	5.582	0.000	0.27
		B		0.000	0.000	5.582	0.000	0.18
		C		0.000	0.000	13.809	0.000	0.29
L22	62.17-57.58	A	1.353	0.000	0.000	11.472	0.000	0.30
		B		0.000	0.000	8.296	0.000	0.19
		C		0.000	0.000	15.807	0.000	0.29
L23	57.58-57.33	A	1.348	0.000	0.000	0.841	0.000	0.01
		B		0.000	0.000	0.523	0.000	0.01
		C		0.000	0.000	0.931	0.000	0.01
L24	57.33-56.42	A	1.346	0.000	0.000	3.060	0.000	0.05
		B		0.000	0.000	1.905	0.000	0.02
		C		0.000	0.000	3.389	0.000	0.04
L25	56.42-56.17	A	1.345	0.000	0.000	0.840	0.000	0.01
		B		0.000	0.000	0.523	0.000	0.01
		C		0.000	0.000	0.931	0.000	0.01

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
L26	56.17-51.17	A	1.339	0.000	0.000	14.118	0.000	0.23
		B		0.000	0.000	7.779	0.000	0.09
		C		0.000	0.000	15.899	0.000	0.20
L27	51.17-46.17	A	1.325	0.000	0.000	12.651	0.000	0.21
		B		0.000	0.000	6.325	0.000	0.07
		C		0.000	0.000	14.390	0.000	0.18
L28	46.17-41.17	A	1.311	0.000	0.000	12.622	0.000	0.21
		B		0.000	0.000	6.311	0.000	0.07
		C		0.000	0.000	14.315	0.000	0.18
L29	41.17-32.50	A	1.289	0.000	0.000	19.431	0.000	0.59
		B		0.000	0.000	9.716	0.000	0.24
		C		0.000	0.000	23.430	0.000	0.42
L30	32.50-31.50	A	1.271	0.000	0.000	3.942	0.000	0.10
		B		0.000	0.000	1.971	0.000	0.04
		C		0.000	0.000	3.553	0.000	0.07
L31	31.50-26.50	A	1.259	0.000	0.000	21.968	0.000	0.37
		B		0.000	0.000	10.984	0.000	0.15
		C		0.000	0.000	18.764	0.000	0.25
L32	26.50-26.25	A	1.247	0.000	0.000	1.158	0.000	0.02
		B		0.000	0.000	0.579	0.000	0.01
		C		0.000	0.000	0.965	0.000	0.01
L33	26.25-21.25	A	1.234	0.000	0.000	13.301	0.000	0.21
		B		0.000	0.000	6.650	0.000	0.07
		C		0.000	0.000	14.325	0.000	0.17
L34	21.25-16.25	A	1.205	0.000	0.000	13.243	0.000	0.21
		B		0.000	0.000	6.622	0.000	0.07
		C		0.000	0.000	14.173	0.000	0.17
L35	16.25-11.25	A	1.168	0.000	0.000	13.169	0.000	0.20
		B		0.000	0.000	6.585	0.000	0.07
		C		0.000	0.000	13.980	0.000	0.17
L36	11.25-6.25	A	1.116	0.000	0.000	13.066	0.000	0.20
		B		0.000	0.000	6.533	0.000	0.07
		C		0.000	0.000	13.709	0.000	0.16
L37	6.25-1.25	A	1.026	0.000	0.000	12.884	0.000	0.19
		B		0.000	0.000	6.442	0.000	0.06
		C		0.000	0.000	13.232	0.000	0.15
L38	1.25-0.00	A	0.857	0.000	0.000	3.137	0.000	0.04
		B		0.000	0.000	1.569	0.000	0.01
		C		0.000	0.000	3.087	0.000	0.03

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	150.00-145.00	0.0000	0.1846	0.0000	1.0634
L2	145.00-140.00	0.0000	0.2288	0.0000	1.3012
L3	140.00-135.00	0.0000	0.2288	0.0000	1.3080
L4	135.00-130.00	0.0000	0.2288	0.0000	1.3139
L5	130.00-125.00	0.0000	0.2288	0.0000	1.3189
L6	125.00-120.00	0.0000	0.2288	0.0000	1.3233
L7	120.00-115.00	0.0000	0.2288	0.0000	1.3269
L8	115.00-108.00	0.0000	0.2288	0.0000	1.3303
L9	108.00-106.75	0.0000	0.2290	0.0000	1.3333
L10	106.75-101.75	0.0000	0.2289	0.0000	1.3308
L11	101.75-96.75	0.0000	0.2289	0.0000	1.3322
L12	96.75-91.75	0.0000	0.2169	0.0000	1.2713

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L13	91.75-89.50	0.0000	0.0953	0.0000	0.6688
L14	89.50-89.25	0.0000	0.0957	0.0000	0.6716
L15	89.25-84.25	0.4568	0.3840	1.1669	1.3496
L16	84.25-79.25	0.7292	0.5683	1.8020	1.7587
L17	79.25-69.75	0.9437	0.7295	2.2947	2.1670
L18	69.75-68.75	-0.2688	-1.0708	1.4633	0.9281
L19	68.75-67.42	-0.8244	-1.7331	0.8351	0.1864
L20	67.42-67.17	-0.8263	-1.7369	0.8357	0.1853
L21	67.17-62.17	-0.8325	-1.7492	0.8376	0.1816
L22	62.17-57.58	0.9340	-0.7914	2.1066	0.5252
L23	57.58-57.33	2.3022	0.0477	3.2165	1.1070
L24	57.33-56.42	2.3066	0.0478	3.2226	1.1085
L25	56.42-56.17	2.3101	0.0479	3.2280	1.1098
L26	56.17-51.17	3.2899	0.8862	4.2472	2.0204
L27	51.17-46.17	3.9887	1.4670	4.9719	2.6466
L28	46.17-41.17	4.0403	1.4858	5.0419	2.6783
L29	41.17-32.50	4.0004	1.4936	5.0139	2.7489
L30	32.50-31.50	4.7395	1.5740	5.4373	2.5130
L31	31.50-26.50	4.9105	1.6074	5.5935	2.4893
L32	26.50-26.25	5.0145	1.6298	5.6914	2.4892
L33	26.25-21.25	4.3123	1.5584	5.2926	2.7259
L34	21.25-16.25	4.3625	1.5764	5.3480	2.7422
L35	16.25-11.25	4.4118	1.5941	5.3961	2.7509
L36	11.25-6.25	4.4600	1.6114	5.4314	2.7458
L37	6.25-1.25	4.5074	1.6284	5.4354	2.7058
L38	1.25-0.00	4.5365	1.6389	5.3502	2.5806

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
L1	2	Safety Line 3/8	145.00 - 149.00	1.0000	1.0000
L2	2	Safety Line 3/8	140.00 - 145.00	1.0000	1.0000
L3	2	Safety Line 3/8	135.00 - 140.00	1.0000	1.0000
L4	2	Safety Line 3/8	130.00 - 135.00	1.0000	1.0000
L5	2	Safety Line 3/8	125.00 - 130.00	1.0000	1.0000
L6	2	Safety Line 3/8	120.00 - 125.00	1.0000	1.0000
L7	2	Safety Line 3/8	115.00 - 120.00	1.0000	1.0000
L8	2	Safety Line 3/8	108.00 - 115.00	1.0000	1.0000
L10	2	Safety Line 3/8	101.75 - 106.75	1.0000	1.0000
L11	2	Safety Line 3/8	96.75 - 101.75	1.0000	1.0000
L12	2	Safety Line 3/8	91.75 - 96.75	1.0000	1.0000
L12	49	6" x 1" Flat Plate	91.75 - 92.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L12	50	6" x 1" Flat Plate	91.75 - 92.00	1.0000	1.0000
L12	51	6" x 1" Flat Plate	91.75 - 92.00	1.0000	1.0000
L13	2	Safety Line 3/8	89.50 - 91.75	1.0000	1.0000
L13	49	6" x 1" Flat Plate	89.50 - 91.75	1.0000	1.0000
L13	50	6" x 1" Flat Plate	89.50 - 91.75	1.0000	1.0000
L13	51	6" x 1" Flat Plate	89.50 - 91.75	1.0000	1.0000
L14	2	Safety Line 3/8	89.25 - 89.50	1.0000	1.0000
L14	49	6" x 1" Flat Plate	89.25 - 89.50	1.0000	1.0000
L14	50	6" x 1" Flat Plate	89.25 - 89.50	1.0000	1.0000
L14	51	6" x 1" Flat Plate	89.25 - 89.50	1.0000	1.0000
L15	2	Safety Line 3/8	84.25 - 89.25	1.0000	1.0000
L15	23	AVA5-50(7/8")	84.25 - 88.00	1.0000	1.0000
L15	24	LDF4-50A(1/2")	84.25 - 88.00	1.0000	1.0000
L15	49	6" x 1" Flat Plate	84.25 - 89.25	1.0000	1.0000
L15	50	6" x 1" Flat Plate	84.25 - 89.25	1.0000	1.0000
L15	51	6" x 1" Flat Plate	84.25 - 89.25	1.0000	1.0000
L16	2	Safety Line 3/8	79.25 - 84.25	1.0000	1.0000
L16	23	AVA5-50(7/8")	79.25 - 84.25	1.0000	1.0000
L16	24	LDF4-50A(1/2")	79.25 - 84.25	1.0000	1.0000
L16	25	AVA5-50(7/8")	79.25 - 82.00	1.0000	1.0000
L16	49	6" x 1" Flat Plate	79.25 - 84.25	1.0000	1.0000
L16	50	6" x 1" Flat Plate	79.25 - 84.25	1.0000	1.0000
L16	51	6" x 1" Flat Plate	79.25 - 84.25	1.0000	1.0000
L17	2	Safety Line 3/8	69.75 - 79.25	1.0000	1.0000
L17	23	AVA5-50(7/8")	69.75 - 79.25	1.0000	1.0000
L17	24	LDF4-50A(1/2")	69.75 - 79.25	1.0000	1.0000
L17	25	AVA5-50(7/8")	69.75 - 79.25	1.0000	1.0000
L17	49	6" x 1" Flat Plate	72.00 - 79.25	1.0000	1.0000
L17	50	6" x 1" Flat Plate	72.00 - 79.25	1.0000	1.0000
L17	51	6" x 1" Flat Plate	72.00 - 79.25	1.0000	1.0000
L17	56	6" x 1" Flat Plate	69.75 - 69.42	1.0000	1.0000
L17	57	6" x 1" Flat Plate	69.75 - 69.42	1.0000	1.0000
L17	58	6" x 1" Flat Plate	69.75 - 69.42	1.0000	1.0000
L19	2	Safety Line 3/8	67.42 - 68.75	1.0000	1.0000
L19	23	AVA5-50(7/8")	67.42 - 68.75	1.0000	1.0000
L19	24	LDF4-50A(1/2")	67.42 - 68.75	1.0000	1.0000
L19	25	AVA5-50(7/8")	67.42 - 68.75	1.0000	1.0000
L19	56	6" x 1" Flat Plate	67.42 - 68.75	1.0000	1.0000
L19	57	6" x 1" Flat Plate	67.42 - 68.75	1.0000	1.0000
L19	58	6" x 1" Flat Plate	67.42 - 68.75	1.0000	1.0000
L20	2	Safety Line 3/8	67.17 - 67.42	1.0000	1.0000
L20	23	AVA5-50(7/8")	67.17 - 67.42	1.0000	1.0000
L20	24	LDF4-50A(1/2")	67.17 - 67.42	1.0000	1.0000
L20	25	AVA5-50(7/8")	67.17 - 67.42	1.0000	1.0000
L20	56	6" x 1" Flat Plate	67.17 - 67.42	1.0000	1.0000
L20	57	6" x 1" Flat Plate	67.17 - 67.42	1.0000	1.0000
L20	58	6" x 1" Flat Plate	67.17 - 67.42	1.0000	1.0000
L21	2	Safety Line 3/8	62.17 - 67.17	1.0000	1.0000
L21	23	AVA5-50(7/8")	62.17 - 67.17	1.0000	1.0000
L21	24	LDF4-50A(1/2")	62.17 - 67.17	1.0000	1.0000
L21	25	AVA5-50(7/8")	62.17 - 67.17	1.0000	1.0000
L21	56	6" x 1" Flat Plate	62.17 - 67.17	1.0000	1.0000
L21	57	6" x 1" Flat Plate	62.17 - 67.17	1.0000	1.0000
L21	58	6" x 1" Flat Plate	62.17 - 67.17	1.0000	1.0000
L22	2	Safety Line 3/8	57.58 - 62.17	1.0000	1.0000
L22	23	AVA5-50(7/8")	57.58 - 62.17	1.0000	1.0000
L22	24	LDF4-50A(1/2")	57.58 - 62.17	1.0000	1.0000
L22	25	AVA5-50(7/8")	57.58 - 62.17	1.0000	1.0000
L22	39	6" x 1" Flat Plate	57.58 - 60.08	1.0000	1.0000
L22	40	6" x 1" Flat Plate	57.58 - 60.08	1.0000	1.0000
L22	41	6" x 1" Flat Plate	57.58 - 60.08	1.0000	1.0000
L22	42	6" x 1" Flat Plate	57.58 - 60.08	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L22	56	6" x 1" Flat Plate	57.58 - 62.17	1.0000	1.0000
L22	57	6" x 1" Flat Plate	57.58 - 62.17	1.0000	1.0000
L22	58	6" x 1" Flat Plate	57.58 - 62.17	1.0000	1.0000
L23	2	Safety Line 3/8	57.33 - 57.58	1.0000	1.0000
L23	23	AVA5-50(7/8")	57.33 - 57.58	1.0000	1.0000
L23	24	LDF4-50A(1/2")	57.33 - 57.58	1.0000	1.0000
L23	25	AVA5-50(7/8")	57.33 - 57.58	1.0000	1.0000
L23	39	6" x 1" Flat Plate	57.33 - 57.58	1.0000	1.0000
L23	40	6" x 1" Flat Plate	57.33 - 57.58	1.0000	1.0000
L23	41	6" x 1" Flat Plate	57.33 - 57.58	1.0000	1.0000
L23	42	6" x 1" Flat Plate	57.33 - 57.58	1.0000	1.0000
L23	53	6" x 1" Flat Plate	57.33 - 57.58	1.0000	1.0000
L23	54	6" x 1" Flat Plate	57.33 - 57.58	1.0000	1.0000
L23	55	6" x 1" Flat Plate	57.33 - 57.58	1.0000	1.0000
L24	2	Safety Line 3/8	56.42 - 57.33	1.0000	1.0000
L24	23	AVA5-50(7/8")	56.42 - 57.33	1.0000	1.0000
L24	24	LDF4-50A(1/2")	56.42 - 57.33	1.0000	1.0000
L24	25	AVA5-50(7/8")	56.42 - 57.33	1.0000	1.0000
L24	39	6" x 1" Flat Plate	56.42 - 57.33	1.0000	1.0000
L24	40	6" x 1" Flat Plate	56.42 - 57.33	1.0000	1.0000
L24	41	6" x 1" Flat Plate	56.42 - 57.33	1.0000	1.0000
L24	42	6" x 1" Flat Plate	56.42 - 57.33	1.0000	1.0000
L24	53	6" x 1" Flat Plate	56.42 - 57.33	1.0000	1.0000
L24	54	6" x 1" Flat Plate	56.42 - 57.33	1.0000	1.0000
L24	55	6" x 1" Flat Plate	56.42 - 57.33	1.0000	1.0000
L25	2	Safety Line 3/8	56.17 - 56.42	1.0000	1.0000
L25	23	AVA5-50(7/8")	56.17 - 56.42	1.0000	1.0000
L25	24	LDF4-50A(1/2")	56.17 - 56.42	1.0000	1.0000
L25	25	AVA5-50(7/8")	56.17 - 56.42	1.0000	1.0000
L25	39	6" x 1" Flat Plate	56.17 - 56.42	1.0000	1.0000
L25	40	6" x 1" Flat Plate	56.17 - 56.42	1.0000	1.0000
L25	41	6" x 1" Flat Plate	56.17 - 56.42	1.0000	1.0000
L25	42	6" x 1" Flat Plate	56.17 - 56.42	1.0000	1.0000
L25	53	6" x 1" Flat Plate	56.17 - 56.42	1.0000	1.0000
L25	54	6" x 1" Flat Plate	56.17 - 56.42	1.0000	1.0000
L25	55	6" x 1" Flat Plate	56.17 - 56.42	1.0000	1.0000
L26	2	Safety Line 3/8	51.17 - 56.17	1.0000	1.0000
L26	23	AVA5-50(7/8")	51.17 - 56.17	1.0000	1.0000
L26	24	LDF4-50A(1/2")	51.17 - 56.17	1.0000	1.0000
L26	25	AVA5-50(7/8")	51.17 - 56.17	1.0000	1.0000
L26	39	6" x 1" Flat Plate	51.17 - 56.17	1.0000	1.0000
L26	40	6" x 1" Flat Plate	51.17 - 56.17	1.0000	1.0000
L26	41	6" x 1" Flat Plate	51.17 - 56.17	1.0000	1.0000
L26	42	6" x 1" Flat Plate	51.17 - 56.17	1.0000	1.0000
L26	53	6" x 1" Flat Plate	54.42 - 56.17	1.0000	1.0000
L26	54	6" x 1" Flat Plate	54.42 - 56.17	1.0000	1.0000
L26	55	6" x 1" Flat Plate	54.42 - 56.17	1.0000	1.0000
L27	2	Safety Line 3/8	46.17 - 51.17	1.0000	1.0000
L27	23	AVA5-50(7/8")	46.17 - 51.17	1.0000	1.0000
L27	24	LDF4-50A(1/2")	46.17 - 51.17	1.0000	1.0000
L27	25	AVA5-50(7/8")	46.17 - 51.17	1.0000	1.0000
L27	39	6" x 1" Flat Plate	46.17 - 51.17	1.0000	1.0000
L27	40	6" x 1" Flat Plate	46.17 - 51.17	1.0000	1.0000
L27	41	6" x 1" Flat Plate	46.17 - 51.17	1.0000	1.0000
L27	42	6" x 1" Flat Plate	46.17 - 51.17	1.0000	1.0000
L28	2	Safety Line 3/8	41.17 - 46.17	1.0000	1.0000
L28	23	AVA5-50(7/8")	41.17 - 46.17	1.0000	1.0000
L28	24	LDF4-50A(1/2")	41.17 - 46.17	1.0000	1.0000
L28	25	AVA5-50(7/8")	41.17 - 46.17	1.0000	1.0000
L28	39	6" x 1" Flat Plate	41.17 - 46.17	1.0000	1.0000
L28	40	6" x 1" Flat Plate	41.17 - 46.17	1.0000	1.0000
L28	41	6" x 1" Flat Plate	41.17 - 46.17	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L28	42	6" x 1" Flat Plate	41.17 - 46.17	1.0000	1.0000
L29	2	Safety Line 3/8	32.50 - 41.17	1.0000	1.0000
L29	23	AVA5-50(7/8")	32.50 - 41.17	1.0000	1.0000
L29	24	LDF4-50A(1/2")	32.50 - 41.17	1.0000	1.0000
L29	25	AVA5-50(7/8")	32.50 - 41.17	1.0000	1.0000
L29	34	6" x 1" Flat Plate	32.50 - 38.00	1.0000	1.0000
L29	35	6" x 1" Flat Plate	32.50 - 38.00	1.0000	1.0000
L29	36	6" x 1" Flat Plate	32.50 - 38.00	1.0000	1.0000
L29	37	6" x 1" Flat Plate	32.50 - 38.00	1.0000	1.0000
L29	39	6" x 1" Flat Plate	38.00 - 41.17	1.0000	1.0000
L29	40	6" x 1" Flat Plate	38.00 - 41.17	1.0000	1.0000
L29	41	6" x 1" Flat Plate	38.00 - 41.17	1.0000	1.0000
L29	42	6" x 1" Flat Plate	38.00 - 41.17	1.0000	1.0000
L29	44	6.5" x 1.25" Flat Plate	32.50 - 32.83	1.0000	1.0000
L29	45	6.5" x 1.25" Flat Plate	32.50 - 32.83	1.0000	1.0000
L29	46	6.5" x 1.25" Flat Plate	32.50 - 32.83	1.0000	1.0000
L29	47	6.5" x 1.25" Flat Plate	32.50 - 32.83	1.0000	1.0000
L31	2	Safety Line 3/8	26.50 - 31.50	1.0000	1.0000
L31	23	AVA5-50(7/8")	26.50 - 31.50	1.0000	1.0000
L31	24	LDF4-50A(1/2")	26.50 - 31.50	1.0000	1.0000
L31	25	AVA5-50(7/8")	26.50 - 31.50	1.0000	1.0000
L31	29	6.5" x 1.25" Flat Plate	26.50 - 30.00	1.0000	1.0000
L31	30	6.5" x 1.25" Flat Plate	26.50 - 30.00	1.0000	1.0000
L31	31	6.5" x 1.25" Flat Plate	26.50 - 30.00	1.0000	1.0000
L31	32	6.5" x 1.25" Flat Plate	26.50 - 30.00	1.0000	1.0000
L31	34	6" x 1" Flat Plate	30.08 - 31.50	1.0000	1.0000
L31	35	6" x 1" Flat Plate	30.08 - 31.50	1.0000	1.0000
L31	36	6" x 1" Flat Plate	30.08 - 31.50	1.0000	1.0000
L31	37	6" x 1" Flat Plate	30.08 - 31.50	1.0000	1.0000
L31	44	6.5" x 1.25" Flat Plate	26.50 - 31.50	1.0000	1.0000
L31	45	6.5" x 1.25" Flat Plate	26.50 - 31.50	1.0000	1.0000
L31	46	6.5" x 1.25" Flat Plate	26.50 - 31.50	1.0000	1.0000
L31	47	6.5" x 1.25" Flat Plate	26.50 - 31.50	1.0000	1.0000
L32	2	Safety Line 3/8	26.25 - 26.50	1.0000	1.0000
L32	23	AVA5-50(7/8")	26.25 - 26.50	1.0000	1.0000
L32	24	LDF4-50A(1/2")	26.25 - 26.50	1.0000	1.0000
L32	25	AVA5-50(7/8")	26.25 - 26.50	1.0000	1.0000
L32	29	6.5" x 1.25" Flat Plate	26.25 - 26.50	1.0000	1.0000
L32	30	6.5" x 1.25" Flat Plate	26.25 - 26.50	1.0000	1.0000
L32	31	6.5" x 1.25" Flat Plate	26.25 - 26.50	1.0000	1.0000
L32	32	6.5" x 1.25" Flat Plate	26.25 - 26.50	1.0000	1.0000
L32	44	6.5" x 1.25" Flat Plate	26.25 - 26.50	1.0000	1.0000
L32	45	6.5" x 1.25" Flat Plate	26.25 - 26.50	1.0000	1.0000
L32	46	6.5" x 1.25" Flat Plate	26.25 - 26.50	1.0000	1.0000
L32	47	6.5" x 1.25" Flat Plate	26.25 - 26.50	1.0000	1.0000
L33	2	Safety Line 3/8	21.25 - 26.25	1.0000	1.0000
L33	23	AVA5-50(7/8")	21.25 - 26.25	1.0000	1.0000
L33	24	LDF4-50A(1/2")	21.25 - 26.25	1.0000	1.0000
L33	25	AVA5-50(7/8")	21.25 - 26.25	1.0000	1.0000
L33	29	6.5" x 1.25" Flat Plate	21.25 - 26.25	1.0000	1.0000
L33	30	6.5" x 1.25" Flat Plate	21.25 - 26.25	1.0000	1.0000
L33	31	6.5" x 1.25" Flat Plate	21.25 - 26.25	1.0000	1.0000
L33	32	6.5" x 1.25" Flat Plate	21.25 - 26.25	1.0000	1.0000
L34	2	Safety Line 3/8	16.25 - 21.25	1.0000	1.0000
L34	23	AVA5-50(7/8")	16.25 - 21.25	1.0000	1.0000
L34	24	LDF4-50A(1/2")	16.25 - 21.25	1.0000	1.0000
L34	25	AVA5-50(7/8")	16.25 - 21.25	1.0000	1.0000
L34	29	6.5" x 1.25" Flat Plate	16.25 - 21.25	1.0000	1.0000
L34	30	6.5" x 1.25" Flat Plate	16.25 - 21.25	1.0000	1.0000
L34	31	6.5" x 1.25" Flat Plate	16.25 - 21.25	1.0000	1.0000
L34	32	6.5" x 1.25" Flat Plate	16.25 - 21.25	1.0000	1.0000
L35	2	Safety Line 3/8	11.25 - 16.25	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L35	23	AVA5-50(7/8")	11.25 - 16.25	1.0000	1.0000
L35	24	LDF4-50A(1/2")	11.25 - 16.25	1.0000	1.0000
L35	25	AVA5-50(7/8")	11.25 - 16.25	1.0000	1.0000
L35	29	6.5" x 1.25" Flat Plate	11.25 - 16.25	1.0000	1.0000
L35	30	6.5" x 1.25" Flat Plate	11.25 - 16.25	1.0000	1.0000
L35	31	6.5" x 1.25" Flat Plate	11.25 - 16.25	1.0000	1.0000
L35	32	6.5" x 1.25" Flat Plate	11.25 - 16.25	1.0000	1.0000
L36	2	Safety Line 3/8	6.25 - 11.25	1.0000	1.0000
L36	23	AVA5-50(7/8")	6.25 - 11.25	1.0000	1.0000
L36	24	LDF4-50A(1/2")	6.25 - 11.25	1.0000	1.0000
L36	25	AVA5-50(7/8")	6.25 - 11.25	1.0000	1.0000
L36	29	6.5" x 1.25" Flat Plate	6.25 - 11.25	1.0000	1.0000
L36	30	6.5" x 1.25" Flat Plate	6.25 - 11.25	1.0000	1.0000
L36	31	6.5" x 1.25" Flat Plate	6.25 - 11.25	1.0000	1.0000
L36	32	6.5" x 1.25" Flat Plate	6.25 - 11.25	1.0000	1.0000
L37	2	Safety Line 3/8	1.25 - 6.25	1.0000	1.0000
L37	23	AVA5-50(7/8")	1.25 - 6.25	1.0000	1.0000
L37	24	LDF4-50A(1/2")	1.25 - 6.25	1.0000	1.0000
L37	25	AVA5-50(7/8")	1.25 - 6.25	1.0000	1.0000
L37	29	6.5" x 1.25" Flat Plate	1.25 - 6.25	1.0000	1.0000
L37	30	6.5" x 1.25" Flat Plate	1.25 - 6.25	1.0000	1.0000
L37	31	6.5" x 1.25" Flat Plate	1.25 - 6.25	1.0000	1.0000
L37	32	6.5" x 1.25" Flat Plate	1.25 - 6.25	1.0000	1.0000
L38	2	Safety Line 3/8	0.00 - 1.25	1.0000	1.0000
L38	23	AVA5-50(7/8")	0.00 - 1.25	1.0000	1.0000
L38	24	LDF4-50A(1/2")	0.00 - 1.25	1.0000	1.0000
L38	25	AVA5-50(7/8")	0.00 - 1.25	1.0000	1.0000
L38	29	6.5" x 1.25" Flat Plate	0.00 - 1.25	1.0000	1.0000
L38	30	6.5" x 1.25" Flat Plate	0.00 - 1.25	1.0000	1.0000
L38	31	6.5" x 1.25" Flat Plate	0.00 - 1.25	1.0000	1.0000
L38	32	6.5" x 1.25" Flat Plate	0.00 - 1.25	1.0000	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
**									
Top Hat 18" Diameter x 2' 6" Tall	C	None		0.0000	150.00	No Ice	1.88	1.88	0.10
						1/2" Ice	2.86	2.86	0.14
						1" Ice	3.11	3.11	0.18
						2" Ice	3.64	3.64	0.27
150									
NNVV-65B-R4 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice	12.56	7.76	0.12
						1/2" Ice	13.14	8.80	0.21
						1" Ice	13.70	9.69	0.32
						2" Ice	14.85	11.52	0.55
NNVV-65B-R4 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice	12.56	7.76	0.12
						1/2" Ice	13.14	8.80	0.21
						1" Ice	13.70	9.69	0.32
						2" Ice	14.85	11.52	0.55

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
NNVV-65B-R4 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.56 13.14 13.70 14.85	7.76 8.80 9.69 11.52	0.12 0.21 0.32 0.55
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.09 4.48 4.88 5.71	2.86 3.23 3.61 4.40	0.08 0.13 0.19 0.33
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.09 4.48 4.88 5.71	2.86 3.23 3.61 4.40	0.08 0.13 0.19 0.33
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.09 4.48 4.88 5.71	2.86 3.23 3.61 4.40	0.08 0.13 0.19 0.33
(2) TD-RRH8x20-25	A	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.70 3.95 4.20 4.72	1.29 1.46 1.64 2.02	0.07 0.09 0.12 0.18
TD-RRH8x20-25	B	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.70 3.95 4.20 4.72	1.29 1.46 1.64 2.02	0.07 0.09 0.12 0.18
(4) RRH2X50-800	A	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.13 2.32 2.51 2.92	1.79 1.96 2.14 2.53	0.05 0.07 0.10 0.15
(2) RRH2X50-800	B	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.13 2.32 2.51 2.92	1.79 1.96 2.14 2.53	0.05 0.07 0.10 0.15
(2) PCS 1900MHz 4x45W-65MHz	A	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.32 2.53 2.74 3.19	2.24 2.44 2.65 3.09	0.06 0.08 0.11 0.17
PCS 1900MHz 4x45W-65MHz	B	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.32 2.53 2.74 3.19	2.24 2.44 2.65 3.09	0.06 0.08 0.11 0.17
(3) Pipe Mount	A	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.20 1.50 1.81 2.47	1.20 1.50 1.81 2.47	0.02 0.03 0.04 0.08
(3) Pipe Mount	B	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.20 1.50 1.81 2.47	1.20 1.50 1.81 2.47	0.02 0.03 0.04 0.08
(3) Pipe Mount	C	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.20 1.50 1.81 2.47	1.20 1.50 1.81 2.47	0.02 0.03 0.04 0.08
Site Pro 1 HRK14-HD Handrail Kit	C	None		0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.00 8.50 11.00 16.00	6.00 8.50 11.00 16.00	0.26 0.34 0.42 0.59
Platform Mount [LP 1201-1]	C	None		0.0000	150.00	No Ice	23.10	23.10	2.10

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
							1/2" Ice	26.80	26.80	2.50
							1" Ice	30.50	30.50	2.90
							2" Ice	37.90	37.90	3.70
141 ***Verizon*** *P*										
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	141.00	No Ice	7.97	5.99	0.08
			0.00				1/2" Ice	8.73	6.72	0.14
			1.00				1" Ice	9.51	7.47	0.21
							2" Ice	11.11	9.02	0.40
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	141.00	No Ice	7.97	5.99	0.08
			0.00				1/2" Ice	8.73	6.72	0.14
			1.00				1" Ice	9.51	7.47	0.21
							2" Ice	11.11	9.02	0.40
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	141.00	No Ice	7.97	5.99	0.08
			0.00				1/2" Ice	8.73	6.72	0.14
			1.00				1" Ice	9.51	7.47	0.21
							2" Ice	11.11	9.02	0.40
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	141.00	No Ice	7.81	5.80	0.04
			0.00				1/2" Ice	8.36	6.95	0.10
			1.00				1" Ice	8.87	7.82	0.17
							2" Ice	9.93	9.60	0.34
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	141.00	No Ice	7.81	5.80	0.04
			0.00				1/2" Ice	8.36	6.95	0.10
			1.00				1" Ice	8.87	7.82	0.17
							2" Ice	9.93	9.60	0.34
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	141.00	No Ice	7.81	5.80	0.04
			0.00				1/2" Ice	8.36	6.95	0.10
			1.00				1" Ice	8.87	7.82	0.17
							2" Ice	9.93	9.60	0.34
RRH2X60-PCS	A	From Leg	4.00	0.00	0.0000	141.00	No Ice	2.20	1.65	0.05
			0.00				1/2" Ice	2.39	1.83	0.07
			1.00				1" Ice	2.59	2.01	0.09
							2" Ice	3.01	2.40	0.14
RRH2X60-PCS	B	From Leg	4.00	0.00	0.0000	141.00	No Ice	2.20	1.65	0.05
			0.00				1/2" Ice	2.39	1.83	0.07
			1.00				1" Ice	2.59	2.01	0.09
							2" Ice	3.01	2.40	0.14
RRH2X60-PCS	C	From Leg	4.00	0.00	0.0000	141.00	No Ice	2.20	1.65	0.05
			0.00				1/2" Ice	2.39	1.83	0.07
			1.00				1" Ice	2.59	2.01	0.09
							2" Ice	3.01	2.40	0.14
RRH2X60-AWS BAND 4	A	From Leg	4.00	0.00	0.0000	141.00	No Ice	1.88	1.28	0.04
			0.00				1/2" Ice	2.05	1.43	0.06
			1.00				1" Ice	2.24	1.60	0.08
							2" Ice	2.63	1.95	0.13
RRH2X60-AWS BAND 4	B	From Leg	4.00	0.00	0.0000	141.00	No Ice	1.88	1.28	0.04
			0.00				1/2" Ice	2.05	1.43	0.06
			1.00				1" Ice	2.24	1.60	0.08
							2" Ice	2.63	1.95	0.13
RRH2X60-AWS BAND 4	C	From Leg	4.00	0.00	0.0000	141.00	No Ice	1.88	1.28	0.04
			0.00				1/2" Ice	2.05	1.43	0.06
			1.00				1" Ice	2.24	1.60	0.08
							2" Ice	2.63	1.95	0.13
DB-T1-6Z-8AB-0Z	B	From Leg	4.00	0.00	0.0000	141.00	No Ice	4.80	2.00	0.04
			0.00				1/2" Ice	5.07	2.19	0.08
			1.00				1" Ice	5.35	2.39	0.12

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
						2" Ice	5.93	2.81	0.21
E									
(2) APL868013-42T0 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.10 3.48 3.85 4.60	4.80 5.42 6.04 7.34	0.02 0.06 0.11 0.22
(2) APL868013-42T0 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.10 3.48 3.85 4.60	4.80 5.42 6.04 7.34	0.02 0.06 0.11 0.22
(2) APL868013-42T0 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.10 3.48 3.85 4.60	4.80 5.42 6.04 7.34	0.02 0.06 0.11 0.22
KS24019-L112A	A	From Leg	4.00 0.00 4.00	0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.14 0.20 0.26 0.41	0.14 0.20 0.26 0.41	0.01 0.01 0.01 0.02
(2) FD9R6004/2C-3L	A	From Leg	4.00 0.00 1.00	0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.31 0.39 0.47 0.65	0.08 0.12 0.17 0.29	0.00 0.01 0.01 0.02
(2) FD9R6004/2C-3L	B	From Leg	4.00 0.00 1.00	0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.31 0.39 0.47 0.65	0.08 0.12 0.17 0.29	0.00 0.01 0.01 0.02
(2) FD9R6004/2C-3L	C	From Leg	4.00 0.00 1.00	0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.31 0.39 0.47 0.65	0.08 0.12 0.17 0.29	0.00 0.01 0.01 0.02
Platform Mount [LP 1201-1]	C	None		0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice	23.10 26.80 30.50 37.90	23.10 26.80 30.50 37.90	2.10 2.50 2.90 3.70
132									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice 2" Ice	9.90 10.47 11.01 12.11	7.18 8.36 9.26 11.09	0.10 0.18 0.26 0.46
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice 2" Ice	9.90 10.47 11.01 12.11	7.18 8.36 9.26 11.09	0.10 0.18 0.26 0.46
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Leg	4.00 0.00	0.0000	132.00	No Ice 1/2" Ice	9.90 10.47	7.18 8.36	0.10 0.18

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
			1.00			1" Ice	11.01	9.26	0.26
						2" Ice	12.11	11.09	0.46
DC6-48-60-18-8F	A	From Leg	4.00	0.0000	132.00	No Ice	1.21	1.21	0.03
			0.00			1/2" Ice	1.89	1.89	0.05
			2.00			1" Ice	2.11	2.11	0.08
						2" Ice	2.57	2.57	0.14
LGP21401	A	From Leg	4.00	0.0000	132.00	No Ice	1.10	0.35	0.01
			0.00			1/2" Ice	1.24	0.44	0.02
			1.00			1" Ice	1.38	0.54	0.03
						2" Ice	1.69	0.77	0.05
LGP21401	B	From Leg	4.00	0.0000	132.00	No Ice	1.10	0.35	0.01
			0.00			1/2" Ice	1.24	0.44	0.02
			1.00			1" Ice	1.38	0.54	0.03
						2" Ice	1.69	0.77	0.05
LGP21401	C	From Leg	4.00	0.0000	132.00	No Ice	1.10	0.35	0.01
			0.00			1/2" Ice	1.24	0.44	0.02
			1.00			1" Ice	1.38	0.54	0.03
						2" Ice	1.69	0.77	0.05
LGP21401	A	From Leg	4.00	0.0000	132.00	No Ice	1.10	0.35	0.01
			0.00			1/2" Ice	1.24	0.44	0.02
			-3.00			1" Ice	1.38	0.54	0.03
						2" Ice	1.69	0.77	0.05
LGP21401	B	From Leg	4.00	0.0000	132.00	No Ice	1.10	0.35	0.01
			0.00			1/2" Ice	1.24	0.44	0.02
			-3.00			1" Ice	1.38	0.54	0.03
						2" Ice	1.69	0.77	0.05
LGP21401	C	From Leg	4.00	0.0000	132.00	No Ice	1.10	0.35	0.01
			0.00			1/2" Ice	1.24	0.44	0.02
			-3.00			1" Ice	1.38	0.54	0.03
						2" Ice	1.69	0.77	0.05
RRUS 11	A	From Leg	4.00	0.0000	132.00	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			1.00			1" Ice	3.21	1.49	0.10
						2" Ice	3.66	1.83	0.15
RRUS 11	B	From Leg	4.00	0.0000	132.00	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			1.00			1" Ice	3.21	1.49	0.10
						2" Ice	3.66	1.83	0.15
RRUS 11	C	From Leg	4.00	0.0000	132.00	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			1.00			1" Ice	3.21	1.49	0.10
						2" Ice	3.66	1.83	0.15
RRUS 12 B2	A	From Leg	4.00	0.0000	132.00	No Ice	3.14	1.28	0.05
			0.00			1/2" Ice	3.36	1.43	0.07
			0.00			1" Ice	3.59	1.60	0.10
						2" Ice	4.07	1.95	0.16
RRUS 12 B2	B	From Leg	4.00	0.0000	132.00	No Ice	3.14	1.28	0.05
			0.00			1/2" Ice	3.36	1.43	0.07
			0.00			1" Ice	3.59	1.60	0.10
						2" Ice	4.07	1.95	0.16
RRUS 12 B2	C	From Leg	4.00	0.0000	132.00	No Ice	3.14	1.28	0.05
			0.00			1/2" Ice	3.36	1.43	0.07
			0.00			1" Ice	3.59	1.60	0.10
						2" Ice	4.07	1.95	0.16
RRUS A2 B2	A	From Leg	4.00	0.0000	132.00	No Ice	2.20	0.54	0.02
			0.00			1/2" Ice	2.38	0.65	0.04
			-4.00			1" Ice	2.57	0.77	0.05

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
						2" Ice	2.98	1.04	0.09
RRUS A2 B2	B	From Leg	4.00 0.00 -4.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.20 2.38 2.57 2.98	0.54 0.65 0.77 1.04	0.02 0.04 0.05 0.09
RRUS A2 B2	C	From Leg	4.00 0.00 -4.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.20 2.38 2.57 2.98	0.54 0.65 0.77 1.04	0.02 0.04 0.05 0.09
Miscellaneous [NA 510-1]	C	None		0.0000	132.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.00 8.50 11.00 16.00	6.00 8.50 11.00 16.00	0.26 0.34 0.42 0.59
Platform Mount [LP 1201-1]	C	None		0.0000	132.00	No Ice 1/2" Ice 1" Ice 2" Ice	23.10 26.80 30.50 37.90	23.10 26.80 30.50 37.90	2.10 2.50 2.90 3.70
111 ***T-Mobile*** *P*									
APXVAARR24_43-U-NA20	A	From Leg	4.00 0.00 -1.00	0.0000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.67 15.43 16.21 17.81	5.32 5.99 6.68 8.08	0.15 0.27 0.39 0.66
APXVAARR24_43-U-NA20	B	From Leg	4.00 0.00 -1.00	0.0000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.67 15.43 16.21 17.81	5.32 5.99 6.68 8.08	0.15 0.27 0.39 0.66
APXVAARR24_43-U-NA20	C	From Leg	4.00 0.00 -1.00	0.0000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.67 15.43 16.21 17.81	5.32 5.99 6.68 8.08	0.15 0.27 0.39 0.66
(2) RADIO 4449 B12/B71	A	From Leg	4.00 0.00 -1.00	0.0000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.65 1.81 1.98 2.34	1.30 1.44 1.60 1.92	0.08 0.09 0.11 0.16
RADIO 4449 B12/B71	B	From Leg	4.00 0.00 -1.00	0.0000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.65 1.81 1.98 2.34	1.30 1.44 1.60 1.92	0.08 0.09 0.11 0.16
(2) KRY 112 144/1	A	From Leg	4.00 0.00 -1.00	0.0000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.35 0.43 0.51 0.70	0.16 0.22 0.28 0.44	0.01 0.01 0.02 0.03
KRY 112 144/1	B	From Leg	4.00 0.00 -1.00	0.0000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.35 0.43 0.51 0.70	0.16 0.22 0.28 0.44	0.01 0.01 0.02 0.03
KRY 112 489/2	B	From Leg	4.00 0.00 -1.00	0.0000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.56 0.66 0.76 1.00	0.37 0.45 0.54 0.75	0.02 0.02 0.03 0.05
(2) KRY 112 489/2	C	From Leg	4.00 0.00 -1.00	0.0000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.56 0.66 0.76 1.00	0.37 0.45 0.54 0.75	0.02 0.02 0.03 0.05
Site Pro 1 - (1) Platform	C	None		0.0000	111.00	No Ice	51.70	51.70	2.26

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
Mount [P/N:RMQP-496-HK]						1/2" Ice	62.70	62.70	2.94
						1" Ice	73.70	73.70	3.61
						2" Ice	95.70	95.70	4.95
E									
TBR									
***									
104									
KS24019-L112A	A	From Leg	3.00	0.0000	104.00	No Ice	0.14	0.14	0.01
			0.00			1/2" Ice	0.20	0.20	0.01
			0.00			1" Ice	0.26	0.26	0.01
						2" Ice	0.41	0.41	0.02
Side Arm Mount [SO 701-1]	A	From Leg	1.50	0.0000	104.00	No Ice	0.85	1.67	0.07
			0.00			1/2" Ice	1.14	2.34	0.08
			0.00			1" Ice	1.43	3.01	0.09
						2" Ice	2.01	4.35	0.12
88									
SC479-HF1LDF	A	From Leg	4.00	0.0000	88.00	No Ice	5.03	5.03	0.03
			0.00			1/2" Ice	6.51	6.51	0.07
			7.00			1" Ice	8.00	8.00	0.11
						2" Ice	10.73	10.73	0.23
SC479-HF1LDF	B	From Leg	4.00	0.0000	88.00	No Ice	5.03	5.03	0.03
			0.00			1/2" Ice	6.51	6.51	0.07
			7.00			1" Ice	8.00	8.00	0.11
						2" Ice	10.73	10.73	0.23
428E-83I-01-T	B	From Leg	4.00	0.0000	88.00	No Ice	0.40	0.46	0.01
			0.00			1/2" Ice	0.48	0.55	0.01
			0.00			1" Ice	0.57	0.65	0.02
						2" Ice	0.77	0.86	0.04
Side Arm Mount [SO 306-1]	A	From Leg	2.00	0.0000	88.00	No Ice	0.98	2.18	0.04
			0.00			1/2" Ice	1.70	3.80	0.06
			0.00			1" Ice	2.42	5.42	0.08
						2" Ice	3.86	8.66	0.12
Side Arm Mount [SO 306-1]	B	From Leg	2.00	0.0000	88.00	No Ice	0.98	2.18	0.04
			0.00			1/2" Ice	1.70	3.80	0.06
			0.00			1" Ice	2.42	5.42	0.08
						2" Ice	3.86	8.66	0.12
82									
BA80-41-DIN	C	From Leg	4.00	0.0000	82.00	No Ice	8.16	8.16	0.07
			0.00			1/2" Ice	11.00	11.00	0.13
			10.00			1" Ice	13.13	13.13	0.20
						2" Ice	17.43	17.43	0.39
Side Arm Mount [SO 306-1]	C	From Leg	2.00	0.0000	82.00	No Ice	0.98	2.18	0.04
			0.00			1/2" Ice	1.70	3.80	0.06
			0.00			1" Ice	2.42	5.42	0.08
						2" Ice	3.86	8.66	0.12
***									

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	29.18					
Bracing Weight	0.00					
Total Member Self-Weight	29.18			-2.4	-1.2	
Total Weight	49.51			-2.4	-1.2	
Wind 0 deg - No Ice		-0.11	-37.34	-3728.5	14.2	1.3
Wind 30 deg - No Ice		18.13	-31.63	-3168.8	-1809.9	-0.1
Wind 60 deg - No Ice		29.98	-17.31	-1796.2	-3105.3	-1.5
Wind 90 deg - No Ice		36.45	0.11	13.1	-3645.2	-2.4
Wind 120 deg - No Ice		32.55	18.92	1884.2	-3235.0	-2.8
Wind 150 deg - No Ice		17.66	30.60	3160.0	-1825.3	-2.4
Wind 180 deg - No Ice		0.11	36.59	3662.9	-16.7	-1.3
Wind 210 deg - No Ice		-18.13	31.63	3164.1	1807.4	0.1
Wind 240 deg - No Ice		-31.03	17.92	1836.0	3180.0	1.5
Wind 270 deg - No Ice		-36.45	-0.11	-17.8	3642.8	2.4
Wind 300 deg - No Ice		-31.62	-18.39	-1848.4	3162.3	2.8
Wind 330 deg - No Ice		-17.43	-30.20	-3140.2	1808.7	2.4
Member Ice	9.35					
Total Weight Ice	80.68			-2.8	-2.3	
Wind 0 deg - Ice		-0.02	-7.23	-760.3	0.1	0.2
Wind 30 deg - Ice		3.59	-6.24	-656.5	-376.9	-0.1
Wind 60 deg - Ice		6.19	-3.57	-378.1	-652.4	-0.3
Wind 90 deg - Ice		7.20	0.02	-0.4	-755.8	-0.5
Wind 120 deg - Ice		6.27	3.64	378.4	-657.9	-0.5
Wind 150 deg - Ice		3.60	6.23	652.7	-380.8	-0.4
Wind 180 deg - Ice		0.02	7.22	753.3	-4.8	-0.2
Wind 210 deg - Ice		-3.59	6.24	650.8	372.3	0.1
Wind 240 deg - Ice		-6.22	3.59	373.5	649.4	0.3
Wind 270 deg - Ice		-7.20	-0.02	-5.3	751.1	0.5
Wind 300 deg - Ice		-6.25	-3.62	-383.0	651.4	0.5
Wind 330 deg - Ice		-3.59	-6.22	-657.6	375.7	0.4
Total Weight	49.51			-2.4	-1.2	
Wind 0 deg - Service		-0.02	-7.49	-750.0	1.8	0.3
Wind 30 deg - Service		3.64	-6.35	-637.7	-364.2	-0.0
Wind 60 deg - Service		6.01	-3.47	-362.3	-624.1	-0.3
Wind 90 deg - Service		7.31	0.02	0.7	-732.4	-0.5
Wind 120 deg - Service		6.53	3.80	376.1	-650.1	-0.6
Wind 150 deg - Service		3.54	6.14	632.1	-367.3	-0.5
Wind 180 deg - Service		0.02	7.34	732.9	-4.4	-0.3
Wind 210 deg - Service		-3.64	6.35	632.9	361.5	0.0
Wind 240 deg - Service		-6.23	3.60	366.4	636.9	0.3
Wind 270 deg - Service		-7.31	-0.02	-5.5	729.8	0.5
Wind 300 deg - Service		-6.34	-3.69	-372.7	633.4	0.6
Wind 330 deg - Service		-3.50	-6.06	-631.9	361.8	0.5

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	150 - 145	Pole	Max Tension	1	0.00	0.0	-0.0
			Max. Compression	26	-9.62	-2.5	4.3
			Max. Mx	8	-4.55	-27.9	1.5
			Max. My	2	-4.52	-0.7	29.8
			Max. Vy	8	5.57	-27.9	1.5
			Max. Vx	2	-5.78	-0.7	29.8
			Max. Torque	10			2.8
L2	145 - 140	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-18.62	-3.3	4.0
			Max. Mx	8	-8.18	-66.1	1.1
			Max. My	2	-8.14	-0.5	68.7

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	11.25	-66.1	1.1
			Max. Vx	2	-11.41	-0.5	68.7
			Max. Torque	10			2.8
L3	140 - 135	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-19.37	-3.3	4.0
			Max. Mx	8	-8.64	-123.6	0.6
			Max. My	2	-8.61	-0.0	126.9
			Max. Vy	8	11.74	-123.6	0.6
			Max. Vx	2	-11.91	-0.0	126.9
			Max. Torque	10			2.8
L4	135 - 130	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-28.31	-3.4	4.6
			Max. Mx	8	-12.89	-194.2	0.2
			Max. My	2	-12.85	0.5	198.6
			Max. Vy	8	16.78	-194.2	0.2
			Max. Vx	2	-16.95	0.5	198.6
			Max. Torque	10			3.0
L5	130 - 125	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-29.18	-3.4	4.7
			Max. Mx	8	-13.48	-279.3	-0.3
			Max. My	2	-13.44	1.0	284.5
			Max. Vy	8	17.28	-279.3	-0.3
			Max. Vx	2	-17.45	1.0	284.5
			Max. Torque	10			3.0
L6	125 - 120	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-30.06	-3.5	4.7
			Max. Mx	8	-14.11	-366.9	-0.8
			Max. My	2	-14.07	1.6	373.0
			Max. Vy	8	17.78	-366.9	-0.8
			Max. Vx	2	-17.95	1.6	373.0
			Max. Torque	10			3.0
L7	120 - 115	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-30.97	-3.5	4.8
			Max. Mx	8	-14.76	-457.0	-1.4
			Max. My	2	-14.72	2.1	463.9
			Max. Vy	8	18.28	-457.0	-1.4
			Max. Vx	2	-18.45	2.1	463.9
			Max. Torque	10			3.0
L8	115 - 108	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-31.60	-3.5	4.8
			Max. Mx	8	-15.22	-516.9	-1.7
			Max. My	2	-15.18	2.5	524.4
			Max. Vy	8	18.60	-516.9	-1.7
			Max. Vx	2	-18.78	2.5	524.4
			Max. Torque	10			3.0
L9	108 - 106.75	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-40.18	-4.2	5.9
			Max. Mx	8	-19.77	-626.5	-1.6
			Max. My	2	-19.72	2.6	635.2
			Max. Vy	8	22.95	-626.5	-1.6
			Max. Vx	2	-23.14	2.6	635.2
			Max. Torque	10			3.4
L10	106.75 - 101.75	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-41.46	-4.2	6.3
			Max. Mx	8	-20.76	-742.6	-1.9
			Max. My	2	-20.72	3.2	752.4
			Max. Vy	8	23.53	-742.6	-1.9
			Max. Vx	2	-23.69	3.2	752.4
			Max. Torque	10			3.6
L11	101.75 - 96.75	Pole	Max Tension	1	0.00	0.0	0.0

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-42.65	-4.3	6.4
			Max. Mx	8	-21.71	-861.4	-2.5
			Max. My	2	-21.67	3.8	872.1
			Max. Vy	8	24.02	-861.4	-2.5
			Max. Vx	2	-24.18	3.8	872.1
			Max. Torque	10			3.6
L12	96.75 - 91.75	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-43.87	-4.3	6.4
			Max. Mx	8	-22.69	-982.7	-3.1
			Max. My	2	-22.66	4.3	994.1
			Max. Vy	8	24.51	-982.7	-3.1
			Max. Vx	2	-24.67	4.3	994.1
			Max. Torque	10			3.5
L13	91.75 - 89.5	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-44.49	-4.3	6.4
			Max. Mx	8	-23.14	-1038.1	-3.3
			Max. My	2	-23.10	4.6	1050.0
			Max. Vy	8	24.73	-1038.1	-3.3
			Max. Vx	2	-24.97	4.6	1050.0
			Max. Torque	10			3.5
L14	89.5 - 89.25	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-44.58	-4.3	6.4
			Max. Mx	8	-23.22	-1044.2	-3.3
			Max. My	2	-23.18	4.6	1056.2
			Max. Vy	8	24.75	-1044.2	-3.3
			Max. Vx	2	-25.00	4.6	1056.2
			Max. Torque	10			3.5
L15	89.25 - 84.25	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-46.97	-5.6	6.9
			Max. Mx	8	-24.71	-1174.4	-3.7
			Max. My	2	-24.66	4.8	1187.7
			Max. Vy	8	25.85	-1174.4	-3.7
			Max. Vx	2	-26.25	4.8	1187.7
			Max. Torque	10			4.7
L16	84.25 - 79.25	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-49.24	-3.9	5.8
			Max. Mx	8	-26.20	-1308.3	-4.5
			Max. My	2	-26.14	5.8	1324.4
			Max. Vy	8	26.75	-1308.3	-4.5
			Max. Vx	2	-27.36	5.8	1324.4
			Max. Torque	10			4.7
L17	79.25 - 69.75	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-51.01	-3.9	5.7
			Max. Mx	8	-27.53	-1436.6	-5.0
			Max. My	2	-27.47	6.3	1455.9
			Max. Vy	8	27.26	-1436.6	-5.0
			Max. Vx	2	-28.02	6.3	1455.9
			Max. Torque	10			3.0
L18	69.75 - 68.75	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-54.34	-4.0	5.6
			Max. Mx	8	-30.00	-1595.3	-5.7
			Max. My	2	-29.93	7.0	1619.5
			Max. Vy	8	27.96	-1595.3	-5.7
			Max. Vx	2	-28.88	7.0	1619.5
			Max. Torque	10			3.0
L19	68.75 - 67.42	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-54.89	-4.0	5.6
			Max. Mx	8	-30.42	-1632.6	-5.8
			Max. My	2	-30.35	7.1	1658.0
			Max. Vy	8	28.10	-1632.6	-5.8
			Max. Vx	2	-29.01	7.1	1658.0

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	10			3.0
L20	67.42 - 67.17	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-55.00	-4.0	5.6
			Max. Mx	8	-30.52	-1639.6	-5.8
			Max. My	2	-30.45	7.1	1665.3
			Max. Vy	8	28.11	-1639.6	-5.8
			Max. Vx	2	-29.02	7.1	1665.3
			Max. Torque	10			3.0
L21	67.17 - 62.17	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-57.09	-4.1	5.6
			Max. Mx	8	-32.16	-1781.4	-6.3
			Max. My	2	-32.10	7.6	1811.6
			Max. Vy	8	28.59	-1781.4	-6.3
			Max. Vx	2	-29.51	7.6	1811.6
			Max. Torque	10			3.0
L22	62.17 - 57.58	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-59.14	-4.1	5.6
			Max. Mx	8	-33.69	-1914.0	-6.7
			Max. My	2	-33.64	8.1	1948.4
			Max. Vy	8	29.19	-1914.0	-6.7
			Max. Vx	2	-30.10	8.1	1948.4
			Max. Torque	10			3.0
L23	57.58 - 57.33	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-59.28	-4.1	5.6
			Max. Mx	8	-33.81	-1921.2	-6.8
			Max. My	2	-33.76	8.1	1955.9
			Max. Vy	8	29.21	-1921.2	-6.8
			Max. Vx	2	-30.12	8.1	1955.9
			Max. Torque	10			3.0
L24	57.33 - 56.42	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-59.80	-4.1	5.6
			Max. Mx	8	-34.19	-1947.9	-6.9
			Max. My	2	-34.14	8.2	1983.4
			Max. Vy	8	29.35	-1947.9	-6.9
			Max. Vx	2	-30.26	8.2	1983.4
			Max. Torque	10			3.0
L25	56.42 - 56.17	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-59.92	-4.1	5.6
			Max. Mx	8	-34.28	-1955.2	-6.9
			Max. My	2	-34.23	8.3	1991.0
			Max. Vy	8	29.38	-1955.2	-6.9
			Max. Vx	2	-30.29	8.3	1991.0
			Max. Torque	10			3.0
L26	56.17 - 51.17	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-62.30	-4.1	5.5
			Max. Mx	8	-36.05	-2103.8	-7.5
			Max. My	2	-36.00	8.8	2144.1
			Max. Vy	8	30.08	-2103.8	-7.5
			Max. Vx	2	-30.99	8.8	2144.1
			Max. Torque	10			3.0
L27	51.17 - 46.17	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-64.64	-4.0	5.3
			Max. Mx	8	-37.86	-2255.9	-8.0
			Max. My	2	-37.81	9.4	2300.7
			Max. Vy	8	30.75	-2255.9	-8.0
			Max. Vx	2	-31.66	9.4	2300.7
			Max. Torque	10			3.0
L28	46.17 - 41.17	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-67.02	-4.0	5.2
			Max. Mx	8	-39.69	-2411.2	-8.6
			Max. My	2	-39.65	9.9	2460.5

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	31.40	-2411.2	-8.6
			Max. Vx	2	-32.31	9.9	2460.5
			Max. Torque	10			3.0
L29	41.17 - 32.5	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-68.74	-3.9	5.1
			Max. Mx	8	-41.07	-2511.2	-8.9
			Max. My	2	-41.03	10.3	2563.5
			Max. Vy	8	31.79	-2511.2	-8.9
			Max. Vx	2	-32.70	10.3	2563.5
			Max. Torque	10			3.0
L30	32.5 - 31.5	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-74.06	-3.7	4.9
			Max. Mx	8	-45.21	-2720.7	-9.7
			Max. My	2	-45.18	11.2	2779.0
			Max. Vy	8	32.71	-2720.7	-9.7
			Max. Vx	2	-33.61	11.2	2779.0
			Max. Torque	10			3.0
L31	31.5 - 26.5	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-76.51	-3.5	4.8
			Max. Mx	8	-46.99	-2885.5	-10.2
			Max. My	2	-46.96	11.8	2948.3
			Max. Vy	8	33.28	-2885.5	-10.2
			Max. Vx	2	-34.18	11.8	2948.3
			Max. Torque	10			3.0
L32	26.5 - 26.25	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-76.66	-3.5	4.8
			Max. Mx	8	-47.11	-2893.8	-10.2
			Max. My	2	-47.09	11.8	2956.9
			Max. Vy	8	33.30	-2893.8	-10.2
			Max. Vx	2	-34.20	11.8	2956.9
			Max. Torque	10			3.0
L33	26.25 - 21.25	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-79.47	-3.4	4.7
			Max. Mx	8	-49.38	-3061.8	-10.8
			Max. My	2	-49.36	12.3	3129.3
			Max. Vy	8	33.91	-3061.8	-10.8
			Max. Vx	2	-34.81	12.3	3129.3
			Max. Torque	10			3.0
L34	21.25 - 16.25	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-82.29	-3.4	4.5
			Max. Mx	8	-51.69	-3232.7	-11.4
			Max. My	2	-51.67	12.9	3304.8
			Max. Vy	8	34.51	-3232.7	-11.4
			Max. Vx	2	-35.40	12.9	3304.8
			Max. Torque	10			3.0
L35	16.25 - 11.25	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-85.13	-3.3	4.4
			Max. Mx	8	-54.02	-3406.7	-11.9
			Max. My	2	-54.01	13.4	3483.2
			Max. Vy	8	35.11	-3406.7	-11.9
			Max. Vx	2	-36.00	13.4	3483.2
			Max. Torque	10			3.0
L36	11.25 - 6.25	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-87.98	-3.3	4.3
			Max. Mx	8	-56.39	-3583.7	-12.5
			Max. My	2	-56.39	14.0	3664.6
			Max. Vy	8	35.71	-3583.7	-12.5
			Max. Vx	2	-36.60	14.0	3664.6
			Max. Torque	10			3.0
L37	6.25 - 1.25	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-90.81	-3.2	4.2

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	8	-58.80	-3763.6	-13.0
			Max. My	2	-58.80	14.5	3849.0
			Max. Vy	8	36.32	-3763.6	-13.0
			Max. Vx	2	-37.21	14.5	3849.0
			Max. Torque	10			3.0
L38	1.25 - 0	Pole	Max Tension	1	0.00	0.0	0.0
			Max. Compression	26	-91.50	-3.2	4.1
			Max. Mx	8	-59.40	-3809.1	-13.2
			Max. My	2	-59.40	14.7	3895.6
			Max. Vy	8	36.48	-3809.1	-13.2
			Max. Vx	2	-37.36	14.7	3895.6
			Max. Torque	10			3.0

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	91.50	0.00	-0.00
	Max. H_x	21	44.56	36.45	0.11
	Max. H_z	3	44.56	0.11	37.34
	Max. M_x	2	3895.6	0.11	37.34
	Max. M_z	8	3809.1	-36.45	-0.11
	Max. Torsion	10	3.0	-32.55	-18.92
	Min. Vert	3	44.56	0.11	37.34
	Min. H_x	8	59.41	-36.45	-0.11
	Min. H_z	15	44.56	-0.11	-36.59
	Min. M_x	14	-3826.7	-0.11	-36.59
	Min. M_z	20	-3805.9	36.45	0.11
	Min. Torsion	22	-3.0	31.62	18.39

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	49.51	-0.00	0.00	-2.3	-1.2	0.0
1.2 Dead+1.0 Wind 0 deg - No Ice	59.41	-0.11	-37.34	-3895.6	14.7	1.4
0.9 Dead+1.0 Wind 0 deg - No Ice	44.56	-0.11	-37.34	-3850.1	14.9	1.4
1.2 Dead+1.0 Wind 30 deg - No Ice	59.41	18.13	-31.63	-3311.8	-1891.3	-0.1
0.9 Dead+1.0 Wind 30 deg - No Ice	44.56	18.13	-31.63	-3272.8	-1869.1	-0.1
1.2 Dead+1.0 Wind 60 deg - No Ice	59.41	29.98	-17.31	-1878.2	-3246.3	-1.6
0.9 Dead+1.0 Wind 60 deg - No Ice	44.56	29.98	-17.31	-1855.6	-3208.1	-1.5
1.2 Dead+1.0 Wind 90 deg - No Ice	59.41	36.45	0.11	13.2	-3809.1	-2.6
0.9 Dead+1.0 Wind 90 deg - No Ice	44.56	36.45	0.11	13.8	-3764.8	-2.6

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
1.2 Dead+1.0 Wind 120 deg - No Ice	59.41	32.55	18.92	1967.6	-3379.2	-3.0
0.9 Dead+1.0 Wind 120 deg - No Ice	44.56	32.55	18.92	1945.8	-3340.1	-2.9
1.2 Dead+1.0 Wind 150 deg - No Ice	59.41	17.66	30.60	3302.1	-1908.1	-2.6
0.9 Dead+1.0 Wind 150 deg - No Ice	44.56	17.66	30.60	3264.6	-1885.5	-2.5
1.2 Dead+1.0 Wind 180 deg - No Ice	59.41	0.11	36.59	3826.7	-17.9	-1.4
0.9 Dead+1.0 Wind 180 deg - No Ice	44.56	0.11	36.59	3783.3	-17.2	-1.4
1.2 Dead+1.0 Wind 210 deg - No Ice	59.41	-18.13	31.63	3305.6	1888.0	0.1
0.9 Dead+1.0 Wind 210 deg - No Ice	44.56	-18.13	31.63	3268.2	1866.7	0.1
1.2 Dead+1.0 Wind 240 deg - No Ice	59.41	-31.03	17.92	1917.8	3322.3	1.6
0.9 Dead+1.0 Wind 240 deg - No Ice	44.56	-31.03	17.92	1896.5	3284.4	1.5
1.2 Dead+1.0 Wind 270 deg - No Ice	59.41	-36.45	-0.11	-19.4	3805.9	2.6
0.9 Dead+1.0 Wind 270 deg - No Ice	44.56	-36.45	-0.11	-18.3	3762.4	2.6
1.2 Dead+1.0 Wind 300 deg - No Ice	59.41	-31.62	-18.39	-1932.1	3303.8	3.0
0.9 Dead+1.0 Wind 300 deg - No Ice	44.56	-31.62	-18.39	-1909.0	3266.1	2.9
1.2 Dead+1.0 Wind 330 deg - No Ice	59.41	-17.43	-30.20	-3283.3	1890.4	2.5
0.9 Dead+1.0 Wind 330 deg - No Ice	44.56	-17.43	-30.20	-3244.2	1868.8	2.5
1.2 Dead+1.0 Ice+1.0 Temp	91.50	-0.00	0.00	-4.1	-3.2	0.0
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	91.50	-0.02	-7.23	-828.9	-0.6	0.3
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	91.50	3.59	-6.24	-715.9	-411.1	-0.1
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	91.50	6.19	-3.57	-412.8	-711.0	-0.4
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	91.50	7.20	0.02	-1.6	-823.5	-0.6
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	91.50	6.27	3.64	410.8	-716.9	-0.7
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	91.50	3.60	6.23	709.5	-415.4	-0.6
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	91.50	0.02	7.22	819.0	-6.0	-0.3
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	91.50	-3.59	6.24	707.4	404.5	0.1
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	91.50	-6.22	3.59	405.4	706.3	0.4
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	91.50	-7.20	-0.02	-7.0	816.9	0.6
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	91.50	-6.25	-3.62	-418.2	708.4	0.7
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	91.50	-3.59	-6.22	-717.3	408.4	0.6
Dead+Wind 0 deg - Service	49.51	-0.02	-7.49	-778.5	1.9	0.3
Dead+Wind 30 deg - Service	49.51	3.64	-6.35	-662.1	-378.0	-0.0
Dead+Wind 60 deg - Service	49.51	6.01	-3.47	-376.3	-648.1	-0.3
Dead+Wind 90 deg - Service	49.51	7.31	0.02	0.7	-760.3	-0.5

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 120 deg - Service	49.51	6.53	3.80	390.3	-674.7	-0.6
Dead+Wind 150 deg - Service	49.51	3.54	6.14	656.3	-381.4	-0.5
Dead+Wind 180 deg - Service	49.51	0.02	7.34	760.8	-4.6	-0.3
Dead+Wind 210 deg - Service	49.51	-3.64	6.35	657.0	375.3	0.0
Dead+Wind 240 deg - Service	49.51	-6.23	3.60	380.3	661.2	0.3
Dead+Wind 270 deg - Service	49.51	-7.31	-0.02	-5.8	757.6	0.5
Dead+Wind 300 deg - Service	49.51	-6.34	-3.69	-387.1	657.6	0.6
Dead+Wind 330 deg - Service	49.51	-3.50	-6.06	-656.4	375.8	0.5

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-49.51	0.00	0.00	49.51	-0.00	0.003%
2	-0.11	-59.41	-37.34	0.11	59.41	37.34	0.000%
3	-0.11	-44.56	-37.34	0.11	44.56	37.34	0.000%
4	18.13	-59.41	-31.63	-18.13	59.41	31.63	0.000%
5	18.13	-44.56	-31.63	-18.13	44.56	31.63	0.000%
6	29.98	-59.41	-17.31	-29.98	59.41	17.31	0.000%
7	29.98	-44.56	-17.31	-29.98	44.56	17.31	0.000%
8	36.45	-59.41	0.11	-36.45	59.41	-0.11	0.000%
9	36.45	-44.56	0.11	-36.45	44.56	-0.11	0.000%
10	32.55	-59.41	18.92	-32.55	59.41	-18.92	0.000%
11	32.55	-44.56	18.92	-32.55	44.56	-18.92	0.000%
12	17.66	-59.41	30.60	-17.66	59.41	-30.60	0.000%
13	17.66	-44.56	30.60	-17.66	44.56	-30.60	0.000%
14	0.11	-59.41	36.59	-0.11	59.41	-36.59	0.000%
15	0.11	-44.56	36.59	-0.11	44.56	-36.59	0.000%
16	-18.13	-59.41	31.63	18.13	59.41	-31.63	0.000%
17	-18.13	-44.56	31.63	18.13	44.56	-31.63	0.000%
18	-31.03	-59.41	17.92	31.03	59.41	-17.92	0.000%
19	-31.03	-44.56	17.92	31.03	44.56	-17.92	0.000%
20	-36.45	-59.41	-0.11	36.45	59.41	0.11	0.000%
21	-36.45	-44.56	-0.11	36.45	44.56	0.11	0.000%
22	-31.62	-59.41	-18.39	31.62	59.41	18.39	0.000%
23	-31.62	-44.56	-18.39	31.62	44.56	18.39	0.000%
24	-17.43	-59.41	-30.20	17.43	59.41	30.20	0.000%
25	-17.43	-44.56	-30.20	17.43	44.56	30.20	0.000%
26	0.00	-91.50	0.00	0.00	91.50	-0.00	0.000%
27	-0.02	-91.50	-7.23	0.02	91.50	7.23	0.000%
28	3.59	-91.50	-6.24	-3.59	91.50	6.24	0.000%
29	6.19	-91.50	-3.57	-6.19	91.50	3.57	0.000%
30	7.20	-91.50	0.02	-7.20	91.50	-0.02	0.000%
31	6.27	-91.50	3.64	-6.27	91.50	-3.64	0.000%
32	3.60	-91.50	6.23	-3.60	91.50	-6.23	0.000%
33	0.02	-91.50	7.22	-0.02	91.50	-7.22	0.000%
34	-3.59	-91.50	6.24	3.59	91.50	-6.24	0.000%
35	-6.22	-91.50	3.59	6.22	91.50	-3.59	0.000%
36	-7.20	-91.50	-0.02	7.20	91.50	0.02	0.000%
37	-6.25	-91.50	-3.62	6.25	91.50	3.62	0.000%
38	-3.59	-91.50	-6.22	3.59	91.50	6.22	0.000%
39	-0.02	-49.51	-7.49	0.02	49.51	7.49	0.000%
40	3.64	-49.51	-6.35	-3.64	49.51	6.35	0.000%
41	6.01	-49.51	-3.47	-6.01	49.51	3.47	0.000%
42	7.31	-49.51	0.02	-7.31	49.51	-0.02	0.000%
43	6.53	-49.51	3.80	-6.53	49.51	-3.80	0.000%
44	3.54	-49.51	6.14	-3.54	49.51	-6.14	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
45	0.02	-49.51	7.34	-0.02	49.51	-7.34	0.000%
46	-3.64	-49.51	6.35	3.64	49.51	-6.35	0.000%
47	-6.23	-49.51	3.60	6.23	49.51	-3.60	0.000%
48	-7.31	-49.51	-0.02	7.31	49.51	0.02	0.000%
49	-6.34	-49.51	-3.69	6.34	49.51	3.69	0.000%
50	-3.50	-49.51	-6.06	3.50	49.51	6.06	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00002050
2	Yes	15	0.00000001	0.00009303
3	Yes	15	0.00000001	0.00006224
4	Yes	17	0.00000001	0.00009903
5	Yes	17	0.00000001	0.00005991
6	Yes	17	0.00000001	0.00010053
7	Yes	17	0.00000001	0.00006103
8	Yes	16	0.00000001	0.00003559
9	Yes	15	0.00000001	0.00011599
10	Yes	17	0.00000001	0.00009948
11	Yes	17	0.00000001	0.00005999
12	Yes	17	0.00000001	0.00010506
13	Yes	17	0.00000001	0.00006374
14	Yes	15	0.00000001	0.00014572
15	Yes	15	0.00000001	0.00010067
16	Yes	17	0.00000001	0.00009795
17	Yes	17	0.00000001	0.00005942
18	Yes	17	0.00000001	0.00009817
19	Yes	17	0.00000001	0.00005947
20	Yes	16	0.00000001	0.00004727
21	Yes	16	0.00000001	0.00003097
22	Yes	17	0.00000001	0.00010531
23	Yes	17	0.00000001	0.00006380
24	Yes	17	0.00000001	0.00009729
25	Yes	17	0.00000001	0.00005895
26	Yes	13	0.00000001	0.00009801
27	Yes	16	0.00000001	0.00014162
28	Yes	17	0.00000001	0.00003662
29	Yes	17	0.00000001	0.00003655
30	Yes	16	0.00000001	0.00014020
31	Yes	17	0.00000001	0.00003595
32	Yes	17	0.00000001	0.00003594
33	Yes	16	0.00000001	0.00013674
34	Yes	16	0.00000001	0.00014845
35	Yes	16	0.00000001	0.00014824
36	Yes	16	0.00000001	0.00013679
37	Yes	17	0.00000001	0.00003616
38	Yes	17	0.00000001	0.00003623
39	Yes	13	0.00000001	0.00013356
40	Yes	14	0.00000001	0.00012548
41	Yes	14	0.00000001	0.00013290
42	Yes	14	0.00000001	0.00004885
43	Yes	14	0.00000001	0.00011892
44	Yes	14	0.00000001	0.00014252
45	Yes	13	0.00000001	0.00013394

46	Yes	14	0.00000001	0.00012023
47	Yes	14	0.00000001	0.00011666
48	Yes	14	0.00000001	0.00004992
49	Yes	14	0.00000001	0.00014627
50	Yes	14	0.00000001	0.00011603

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 145	19.415	39	1.2002	0.0074
L2	145 - 140	18.161	39	1.1948	0.0065
L3	140 - 135	16.915	39	1.1834	0.0058
L4	135 - 130	15.686	39	1.1635	0.0051
L5	130 - 125	14.481	39	1.1352	0.0045
L6	125 - 120	13.312	39	1.0975	0.0040
L7	120 - 115	12.186	39	1.0520	0.0035
L8	115 - 108	11.111	39	1.0002	0.0030
L9	111.75 - 106.75	10.442	39	0.9638	0.0027
L10	106.75 - 101.75	9.448	39	0.9301	0.0025
L11	101.75 - 96.75	8.503	39	0.8747	0.0022
L12	96.75 - 91.75	7.617	39	0.8160	0.0019
L13	91.75 - 89.5	6.795	39	0.7547	0.0016
L14	89.5 - 89.25	6.446	39	0.7265	0.0015
L15	89.25 - 84.25	6.408	39	0.7244	0.0014
L16	84.25 - 79.25	5.671	39	0.6831	0.0012
L17	79.25 - 69.75	4.978	39	0.6403	0.0011
L18	74.5 - 68.75	4.361	39	0.5983	0.0010
L19	68.75 - 67.42	3.659	39	0.5620	0.0009
L20	67.42 - 67.17	3.505	39	0.5461	0.0008
L21	67.17 - 62.17	3.476	39	0.5431	0.0008
L22	62.17 - 57.58	2.939	39	0.4827	0.0007
L23	57.58 - 57.33	2.502	39	0.4270	0.0006
L24	57.33 - 56.42	2.480	39	0.4254	0.0006
L25	56.42 - 56.17	2.399	39	0.4193	0.0006
L26	56.17 - 51.17	2.377	39	0.4174	0.0006
L27	51.17 - 46.17	1.961	39	0.3772	0.0005
L28	46.17 - 41.17	1.587	39	0.3372	0.0004
L29	41.17 - 32.5	1.255	39	0.2965	0.0004
L30	38 - 31.5	1.067	39	0.2709	0.0003
L31	31.5 - 26.5	0.719	43	0.2347	0.0003
L32	26.5 - 26.25	0.501	43	0.1812	0.0002
L33	26.25 - 21.25	0.492	43	0.1795	0.0002
L34	21.25 - 16.25	0.322	43	0.1453	0.0002
L35	16.25 - 11.25	0.188	43	0.1108	0.0001
L36	11.25 - 6.25	0.090	43	0.0766	0.0001
L37	6.25 - 1.25	0.028	43	0.0423	0.0000
L38	1.25 - 0	0.001	43	0.0084	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	Top Hat 18" Diameter x 2' 6" Tall	39	19.415	1.2002	0.0074	33372

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
141.00	(2) HBXX-6517DS-A2M w/ Mount Pipe	39	17.163	1.1863	0.0060	20323
132.00	(2) 7770.00 w/ Mount Pipe	39	14.960	1.1476	0.0048	9753
111.00	APXVAARR24_43-U-NA20	39	10.291	0.9576	0.0027	7009
104.00	KS24019-L112A	39	8.921	0.9021	0.0024	5378
88.00	SC479-HF1LDF	39	6.219	0.7145	0.0014	6185
82.00	BA80-41-DIN	39	5.353	0.6644	0.0012	6539

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 145	96.861	2	5.9610	0.0361
L2	145 - 140	90.638	2	5.9416	0.0319
L3	140 - 135	84.450	2	5.8915	0.0283
L4	135 - 130	78.337	2	5.7972	0.0251
L5	130 - 125	72.344	2	5.6604	0.0222
L6	125 - 120	66.518	2	5.4762	0.0194
L7	120 - 115	60.906	2	5.2518	0.0170
L8	115 - 108	55.545	2	4.9953	0.0148
L9	111.75 - 106.75	52.210	2	4.8145	0.0135
L10	106.75 - 101.75	47.256	10	4.6473	0.0123
L11	101.75 - 96.75	42.547	10	4.3725	0.0107
L12	96.75 - 91.75	38.131	10	4.0804	0.0092
L13	91.75 - 89.5	34.025	10	3.7751	0.0078
L14	89.5 - 89.25	32.282	10	3.6342	0.0072
L15	89.25 - 84.25	32.092	10	3.6242	0.0071
L16	84.25 - 79.25	28.409	10	3.4180	0.0061
L17	79.25 - 69.75	24.945	10	3.2047	0.0053
L18	74.5 - 68.75	21.863	10	2.9959	0.0048
L19	68.75 - 67.42	18.349	10	2.8148	0.0044
L20	67.42 - 67.17	17.576	10	2.7357	0.0042
L21	67.17 - 62.17	17.433	10	2.7207	0.0041
L22	62.17 - 57.58	14.744	10	2.4190	0.0035
L23	57.58 - 57.33	12.553	10	2.1411	0.0029
L24	57.33 - 56.42	12.441	10	2.1328	0.0029
L25	56.42 - 56.17	12.037	10	2.1027	0.0029
L26	56.17 - 51.17	11.928	10	2.0929	0.0028
L27	51.17 - 46.17	9.842	10	1.8922	0.0025
L28	46.17 - 41.17	7.966	10	1.6920	0.0021
L29	41.17 - 32.5	6.301	10	1.4882	0.0018
L30	38 - 31.5	5.356	10	1.3595	0.0016
L31	31.5 - 26.5	3.610	10	1.1783	0.0014
L32	26.5 - 26.25	2.517	10	0.9099	0.0010
L33	26.25 - 21.25	2.470	10	0.9012	0.0010
L34	21.25 - 16.25	1.616	10	0.7292	0.0008
L35	16.25 - 11.25	0.943	10	0.5560	0.0006
L36	11.25 - 6.25	0.451	10	0.3847	0.0004
L37	6.25 - 1.25	0.138	10	0.2123	0.0002
L38	1.25 - 0	0.006	10	0.0419	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	Top Hat 18" Diameter x 2' 6" Tall	2	96.861	5.9610	0.0378	8444
141.00	(2) HBXX-6517DS-A2M w/ Mount Pipe	2	85.683	5.9049	0.0305	4620
132.00	(2) 7770.00 w/ Mount Pipe	2	74.723	5.7205	0.0245	2053
111.00	APXVAARR24_43-U-NA20	2	51.453	4.7838	0.0138	1432
104.00	KS24019-L112A	10	44.632	4.5085	0.0119	1096
88.00	SC479-HF1LDF	10	31.152	3.5744	0.0071	1250
82.00	BA80-41-DIN	10	26.822	3.3249	0.0059	1318

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	150 - 149	TP23.0001x22x0.25	5.00	0.00	0.0	17.6698	-9.09	954.17	0.010
	149 - 148					17.8308	-4.33	962.86	0.004
	148 - 147					17.9918	-4.38	971.56	0.005
	147 - 146					18.1528	-4.45	980.25	0.005
	146 - 145					18.3138	-4.52	988.95	0.005
L2	145 - 144	TP24.0002x23.0001x0.25	5.00	0.00	0.0	18.4749	-4.59	997.64	0.005
	144 - 143					18.6359	-4.67	1006.34	0.005
	143 - 142					18.7969	-4.75	1015.03	0.005
	142 - 141					18.9579	-4.82	1023.73	0.005
	141 - 140					19.1189	-8.14	1032.42	0.008
L3	140 - 139	TP25.0004x24.0002x0.25	5.00	0.00	0.0	19.2800	-8.23	1041.12	0.008
	139 - 138					19.4410	-8.32	1049.81	0.008
	138 - 137					19.6020	-8.42	1058.51	0.008
	137 - 136					19.7630	-8.51	1067.20	0.008
	136 - 135					19.9240	-8.61	1075.90	0.008
L4	135 - 134	TP26.0005x25.0004x0.25	5.00	0.00	0.0	20.0851	-8.71	1084.59	0.008
	134 - 133					20.2461	-8.81	1093.29	0.008
	133 - 132					20.4071	-8.91	1101.98	0.008
	132 - 131					20.5681	-12.74	1110.68	0.011
	131 - 130					20.7291	-12.85	1119.37	0.011
L5	130 - 129	TP27.0006x26.0005x0.25	5.00	0.00	0.0	20.8902	-12.96	1128.07	0.011
	129 - 128					21.0512	-13.08	1136.76	0.012
	128 - 127					21.2122	-13.20	1145.46	0.012
	127 - 126					21.3732	-13.32	1154.15	0.012
	126 - 125					21.5342	-13.44	1162.85	0.012
L6	125 - 124	TP28.0007x27.0006x0.25	5.00	0.00	0.0	21.6952	-13.56	1171.54	0.012
	124 - 123					21.8563	-13.69	1180.24	0.012
	123 - 122					22.0173	-13.81	1188.93	0.012
	122 - 121					22.1783	-13.95	1197.63	0.012
	121 - 120					22.3393	-14.07	1206.32	0.012
L7	120 - 119	TP29.0008x28.0007x0.25	5.00	0.00	0.0	22.5003	-14.20	1215.02	0.012
	119 - 118					22.6614	-14.33	1223.71	0.012
	118 - 117					22.8224	-14.46	1232.41	0.012
	117 - 116					22.9834	-14.60	1241.10	0.012
	116 - 115					23.1444	-14.73	1249.80	0.012
L8	115 - 113.917	TP30.401x29.0008x0.25	7.00	0.00	0.0	23.3189	-14.88	1259.22	0.012
	113.917 -					23.4933	-15.04	1268.64	0.012

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
	112.833								
	112.833 - 111.75					23.6677	-15.19	1278.06	0.012
	111.75 - 108					24.2716	-9.16	1310.66	0.007
L9	111.75 - 108	TP30.1512x29.1509x0.3125	5.00	0.00	0.0	29.7735	-10.34	1607.77	0.006
	108 - 106.75					30.0252	-19.73	1621.36	0.012
L10	106.75 - 105.75	TP31.1514x30.1512x0.3125	5.00	0.00	0.0	30.2265	-19.92	1632.23	0.012
	105.75 - 104.75					30.4278	-20.10	1643.10	0.012
	104.75 - 103.75					30.6291	-20.36	1653.97	0.012
	103.75 - 102.75					30.8304	-20.55	1664.84	0.012
	102.75 - 101.75					31.0317	-20.73	1675.71	0.012
L11	101.75 - 100.75	TP32.1517x31.1514x0.3125	5.00	0.00	0.0	31.2330	-20.92	1686.58	0.012
	100.75 - 99.75					31.4343	-21.11	1697.45	0.012
	99.75 - 98.75					31.6356	-21.30	1708.32	0.012
	98.75 - 97.75					31.8369	-21.49	1719.19	0.013
	97.75 - 96.75					32.0382	-21.69	1730.06	0.013
L12	96.75 - 95.75	TP33.1519x32.1517x0.3125	5.00	0.00	0.0	32.2395	-21.88	1740.93	0.013
	95.75 - 94.75					32.4408	-22.08	1751.80	0.013
	94.75 - 93.75					32.6421	-22.27	1762.67	0.013
	93.75 - 92.75					32.8434	-22.47	1773.54	0.013
	92.75 - 91.75					33.0447	-22.67	1784.41	0.013
L13	91.75 - 90.625	TP33.602x33.1519x0.3125	2.25	0.00	0.0	33.2711	-22.89	1796.64	0.013
	90.625 - 89.5					33.4976	-23.12	1808.87	0.013
L14	89.5 - 89.25 (14)	TP33.652x33.602x0.5	0.25	0.00	0.0	53.3748	-23.20	2882.24	0.008
L15	89.25 - 88.25	TP34.6523x33.652x0.4938	5.00	0.00	0.0	53.0356	-23.46	2863.92	0.008
	88.25 - 87.25					53.3536	-23.88	2881.10	0.008
	87.25 - 86.25					53.6717	-24.15	2898.27	0.008
	86.25 - 85.25					53.9897	-24.42	2915.45	0.008
	85.25 - 84.25					54.3078	-24.66	2932.62	0.008
L16	84.25 - 83.25	TP35.6525x34.6523x0.4875	5.00	0.00	0.0	53.9442	-24.93	2912.99	0.009
	83.25 - 82.25					54.2582	-25.20	2929.94	0.009
	82.25 - 81.25					54.5722	-25.59	2946.90	0.009
	81.25 - 80.25					54.8863	-25.86	2963.86	0.009
	80.25 - 79.25					55.2003	-26.14	2980.82	0.009
L17	79.25 - 78.0625	TP37.553x35.6525x0.4813	9.50	0.00	0.0	54.8704	-26.47	2963.00	0.009
	78.0625 - 76.875					55.2385	-26.80	2982.88	0.009
	76.875 - 75.6875					55.6067	-27.13	3002.76	0.009
	75.6875 - 74.5					55.9748	-27.47	3022.64	0.009
	74.5 - 69.75					57.4473	-16.78	3102.15	0.005
L18	74.5 - 69.75	TP37.1279x35.9778x0.375	5.75	0.00	0.0	44.1376	-12.83	2582.05	0.005
	69.75 - 68.75					44.3792	-29.93	2596.18	0.012
L19	68.75 - 67.42 (19)	TP37.394x37.1279x0.375	1.33	0.00	0.0	44.7004	-30.35	2614.97	0.012
L20	67.42 - 67.17 (20)	TP37.444x37.394x0.375	0.25	0.00	0.0	44.7608	-30.45	2618.51	0.012
L21	67.17 - 66.17	TP38.4441x37.444x0.375	5.00	0.00	0.0	45.0023	-30.77	2632.64	0.012
	66.17 - 65.17					45.2439	-31.10	2646.77	0.012
	65.17 - 64.17					45.4854	-31.43	2660.90	0.012
	64.17 - 63.17					45.7269	-31.76	2675.03	0.012
	63.17 - 62.17					45.9685	-32.10	2689.16	0.012

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L22	62.17 - 61.0225	TP39.3623x38.4441x0.375	4.59	0.00	0.0	46.2456	-32.48	2705.37	0.012
	61.0225 - 59.875					46.5228	-32.86	2721.58	0.012
	59.875 - 58.7275					46.8000	-33.25	2737.80	0.012
	58.7275 - 57.58					47.0771	-33.64	2754.01	0.012
L23	57.58 - 57.33 (23)	TP39.4123x39.3623x0.7	0.25	0.00	0.0	87.2575	-33.76	5104.56	0.007
L24	57.33 - 56.42 (24)	TP39.5943x39.4123x0.7	0.91	0.00	0.0	87.6677	-34.14	5128.56	0.007
L25	56.42 - 56.17 (25)	TP39.6443x39.5943x0.5875	0.25	0.00	0.0	73.8857	-34.23	4322.31	0.008
L26	56.17 - 55.17	TP40.6445x39.6443x0.575	5.00	0.00	0.0	72.7072	-34.57	4253.37	0.008
	55.17 - 54.17					73.0775	-34.93	4275.04	0.008
	54.17 - 53.17					73.4479	-35.28	4296.70	0.008
	53.17 - 52.17					73.8182	-35.64	4318.37	0.008
	52.17 - 51.17					74.1886	-36.00	4340.03	0.008
L27	51.17 - 50.17	TP41.6446x40.6445x0.575	5.00	0.00	0.0	74.5589	-36.36	4361.70	0.008
	50.17 - 49.17					74.9293	-36.72	4383.36	0.008
	49.17 - 48.17					75.2997	-37.07	4405.03	0.008
	48.17 - 47.17					75.6700	-37.43	4426.70	0.008
	47.17 - 46.17					76.0404	-37.80	4448.36	0.008
L28	46.17 - 45.17	TP42.6447x41.6446x0.5625	5.00	0.00	0.0	74.7723	-38.17	4374.18	0.009
	45.17 - 44.17					75.1346	-38.53	4395.37	0.009
	44.17 - 43.17					75.4969	-38.90	4416.57	0.009
	43.17 - 42.17					75.8592	-39.27	4437.76	0.009
	42.17 - 41.17					76.2215	-39.64	4458.96	0.009
L29	41.17 - 40.1133	TP44.379x42.6447x0.5625	8.67	0.00	0.0	76.6043	-40.10	4481.35	0.009
	40.1133 - 39.0567					76.9871	-40.56	4503.75	0.009
	39.0567 - 38					77.3700	-41.02	4526.14	0.009
	38 - 32.5					79.3626	-25.44	4642.71	0.005
L30	38 - 32.5	TP43.829x42.5288x0.4375	6.50	0.00	0.0	60.8460	-19.29	3559.49	0.005
	32.5 - 31.5					61.1278	-45.17	3575.98	0.013
L31	31.5 - 30.5	TP44.8292x43.829x0.4375	5.00	0.00	0.0	61.4096	-45.53	3592.46	0.013
	30.5 - 29.5					61.6914	-45.88	3608.95	0.013
	29.5 - 28.5					61.9732	-46.24	3625.43	0.013
	28.5 - 27.5					62.2550	-46.60	3641.92	0.013
	27.5 - 26.5					62.5368	-46.96	3658.40	0.013
L32	26.5 - 26.25 (32)	TP44.8792x44.8292x0.6875	0.25	0.00	0.0	97.8294	-47.08	5723.02	0.008
L33	26.25 - 25.25	TP45.8794x44.8792x0.6875	5.00	0.00	0.0	98.2722	-47.53	5748.92	0.008
	25.25 - 24.25					98.7150	-47.98	5774.83	0.008
	24.25 - 23.25					99.1578	-48.44	5800.73	0.008
	23.25 - 22.25					99.6006	-48.89	5826.64	0.008
	22.25 - 21.25					100.0430	-49.35	5852.54	0.008
L34	21.25 - 20.25	TP46.8795x45.8794x0.675	5.00	0.00	0.0	98.6864	-49.81	5773.16	0.009
	20.25 - 19.25					99.1212	-50.27	5798.59	0.009
	19.25 - 18.25					99.5560	-50.73	5824.02	0.009
	18.25 - 17.25					99.9907	-51.20	5849.46	0.009
	17.25 - 16.25					100.4250	-51.67	5874.89	0.009
L35	16.25 - 15.25	TP47.8797x46.8795x0.675	5.00	0.00	0.0	100.8600	-52.13	5900.33	0.009
	15.25 - 14.25					101.2950	-52.60	5925.76	0.009

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
	14.25 - 13.25					101.7300	-53.07	5951.19	0.009
	13.25 - 12.25					102.1650	-53.54	5976.63	0.009
	12.25 - 11.25					102.5990	-54.01	6002.06	0.009
L36	11.25 - 10.25	TP48.8798x47.8797x0.6625	5.00	0.00	0.0	101.1530	-54.48	5917.43	0.009
	10.25 - 9.25					101.5790	-54.95	5942.40	0.009
	9.25 - 8.25					102.0060	-55.43	5967.36	0.009
	8.25 - 7.25					102.4330	-55.91	5992.32	0.009
	7.25 - 6.25					102.8600	-56.39	6017.29	0.009
L37	6.25 - 5.25	TP49.88x48.8798x0.6625	5.00	0.00	0.0	103.2860	-56.86	6042.25	0.009
	5.25 - 4.25					103.7130	-57.34	6067.21	0.009
	4.25 - 3.25					104.1400	-57.83	6092.17	0.009
	3.25 - 2.25					104.5660	-58.31	6117.14	0.010
	2.25 - 1.25					104.9930	-58.80	6142.10	0.010
L38	1.25 - 0 (38)	TP50.13x49.88x0.6625	1.25	0.00	0.0	105.5270	-59.40	6173.30	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	150 - 149	TP23.0001x22x0.25	6.2	531.1	0.012	0.0	531.1	0.000
	149 - 148		12.9	539.4	0.024	0.0	539.4	0.000
	148 - 147		18.4	547.7	0.034	0.0	547.7	0.000
	147 - 146		24.0	556.0	0.043	0.0	556.0	0.000
	146 - 145		29.8	564.4	0.053	0.0	564.4	0.000
L2	145 - 144	TP24.0002x23.0001x0.25	35.6	572.8	0.062	0.0	572.8	0.000
	144 - 143		41.5	581.3	0.071	0.0	581.3	0.000
	143 - 142		47.5	589.7	0.081	0.0	589.7	0.000
	142 - 141		53.6	598.3	0.090	0.0	598.3	0.000
	141 - 140		68.7	606.8	0.113	0.0	606.8	0.000
L3	140 - 139	TP25.0004x24.0002x0.25	80.1	615.4	0.130	0.0	615.4	0.000
	139 - 138		91.7	624.0	0.147	0.0	624.0	0.000
	138 - 137		103.3	632.6	0.163	0.0	632.6	0.000
	137 - 136		115.1	641.2	0.179	0.0	641.2	0.000
	136 - 135		126.9	649.9	0.195	0.0	649.9	0.000
L4	135 - 134	TP26.0005x25.0004x0.25	138.9	658.6	0.211	0.0	658.6	0.000
	134 - 133		150.9	667.3	0.226	0.0	667.3	0.000
	133 - 132		163.1	676.1	0.241	0.0	676.1	0.000
	132 - 131		181.7	684.8	0.265	0.0	684.8	0.000
	131 - 130		198.6	693.6	0.286	0.0	693.6	0.000
L5	130 - 129	TP27.0006x26.0005x0.25	215.5	702.4	0.307	0.0	702.4	0.000
	129 - 128		232.6	711.3	0.327	0.0	711.3	0.000

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 $\frac{M_{uy}}{\phi M_{ny}}$
	128 - 127		249.8	720.1	0.347	0.0	720.1	0.000
	127 - 126		267.1	729.0	0.366	0.0	729.0	0.000
	126 - 125		284.5	737.9	0.386	0.0	737.9	0.000
L6	125 - 124	TP28.0007x27.0006x0.25	302.0	746.8	0.404	0.0	746.8	0.000
	124 - 123		319.6	755.7	0.423	0.0	755.7	0.000
	123 - 122		337.3	764.6	0.441	0.0	764.6	0.000
	122 - 121		355.0	773.6	0.459	0.0	773.6	0.000
	121 - 120		373.0	782.6	0.477	0.0	782.6	0.000
L7	120 - 119	TP29.0008x28.0007x0.25	391.0	791.6	0.494	0.0	791.6	0.000
	119 - 118		409.1	800.6	0.511	0.0	800.6	0.000
	118 - 117		427.4	809.6	0.528	0.0	809.6	0.000
	117 - 116		445.7	818.6	0.544	0.0	818.6	0.000
	116 - 115		464.1	827.6	0.561	0.0	827.6	0.000
L8	115 - 113.917	TP30.401x29.0008x0.25	484.2	837.4	0.578	0.0	837.4	0.000
	113.917 - 112.833		504.4	847.2	0.595	0.0	847.2	0.000
	112.833 - 111.75		524.7	857.0	0.612	0.0	857.0	0.000
	111.75 - 108		278.6	891.1	0.313	0.0	891.1	0.000
L9	111.75 - 108	TP30.1512x29.1509x0.3125	328.0	1178.5	0.278	0.0	1178.5	0.000
	108 - 106.75		635.4	1195.2	0.532	0.0	1195.2	0.000
L10	106.75 - 105.75	TP31.1514x30.1512x0.3125	658.7	1208.6	0.545	0.0	1208.6	0.000
	105.75 - 104.75		682.0	1222.1	0.558	0.0	1222.1	0.000
	104.75 - 103.75		705.6	1235.6	0.571	0.0	1235.6	0.000
	103.75 - 102.75		729.2	1249.1	0.584	0.0	1249.1	0.000
	102.75 - 101.75		752.8	1262.6	0.596	0.0	1262.6	0.000
L11	101.75 - 100.75	TP32.1517x31.1514x0.3125	776.6	1276.2	0.609	0.0	1276.2	0.000
	100.75 - 99.75		800.5	1289.8	0.621	0.0	1289.8	0.000
	99.75 - 98.75		824.4	1303.4	0.633	0.0	1303.4	0.000
	98.75 - 97.75		848.5	1317.1	0.644	0.0	1317.1	0.000
	97.75 - 96.75		872.7	1330.8	0.656	0.0	1330.8	0.000
L12	96.75 - 95.75	TP33.1519x32.1517x0.3125	896.9	1344.5	0.667	0.0	1344.5	0.000
	95.75 - 94.75		921.3	1358.2	0.678	0.0	1358.2	0.000
	94.75 - 93.75		945.8	1372.0	0.689	0.0	1372.0	0.000
	93.75 - 92.75		970.3	1385.8	0.700	0.0	1385.8	0.000
	92.75 - 91.75		995.0	1399.6	0.711	0.0	1399.6	0.000
L13	91.75 - 90.625	TP33.602x33.1519x0.3125	1022.8	1415.2	0.723	0.0	1415.2	0.000
	90.625 - 89.5		1050.8	1430.8	0.734	0.0	1430.8	0.000
L14	89.5 - 89.25 (14)	TP33.652x33.602x0.5	1057.0	2435.5	0.434	0.0	2435.5	0.000
L15	89.25 - 88.25	TP34.6523x33.652x0.4938	1082.0	2435.7	0.444	0.0	2435.7	0.000
	88.25 - 87.25		1110.1	2465.3	0.450	0.0	2465.3	0.000
	87.25 - 86.25		1135.8	2494.9	0.455	0.0	2494.9	0.000
	86.25 - 85.25		1161.7	2524.8	0.460	0.0	2524.8	0.000
	85.25 - 84.25		1187.7	2554.9	0.465	0.0	2554.9	0.000
L16	84.25 - 83.25	TP35.6525x34.6523x0.4875	1214.0	2553.8	0.475	0.0	2553.8	0.000
	83.25 - 82.25		1240.5	2583.8	0.480	0.0	2583.8	0.000
	82.25 - 81.25		1270.0	2614.0	0.486	0.0	2614.0	0.000
	81.25 - 80.25		1297.2	2644.4	0.491	0.0	2644.4	0.000
	80.25 - 79.25		1324.5	2674.9	0.495	0.0	2674.9	0.000
L17	79.25 - 78.0625	TP37.553x35.6525x0.4813	1357.0	2678.1	0.507	0.0	2678.1	0.000
	78.0625 - 76.875		1389.8	2714.4	0.512	0.0	2714.4	0.000

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 $\frac{M_{uy}}{\phi M_{ny}}$
	76.875 - 75.6875		1422.8	2750.9	0.517	0.0	2750.9	0.000
	75.6875 - 74.5		1455.9	2787.7	0.522	0.0	2787.7	0.000
	74.5 - 69.75		910.9	2937.3	0.310	0.0	2937.3	0.000
L18	74.5 - 69.75	TP37.1279x35.9778x0.375	679.8	2284.1	0.298	0.0	2284.1	0.000
	69.75 - 68.75		1619.6	2304.7	0.703	0.0	2304.7	0.000
L19	68.75 - 67.42 (19)	TP37.394x37.1279x0.375	1658.1	2332.0	0.711	0.0	2332.0	0.000
L20	67.42 - 67.17 (20)	TP37.444x37.394x0.375	1665.3	2337.2	0.713	0.0	2337.2	0.000
L21	67.17 - 66.17	TP38.4441x37.444x0.375	1694.4	2357.8	0.719	0.0	2357.8	0.000
	66.17 - 65.17		1723.6	2378.5	0.725	0.0	2378.5	0.000
	65.17 - 64.17		1752.8	2399.2	0.731	0.0	2399.2	0.000
	64.17 - 63.17		1782.2	2419.9	0.736	0.0	2419.9	0.000
	63.17 - 62.17		1811.6	2440.7	0.742	0.0	2440.7	0.000
L22	62.17 - 61.0225	TP39.3623x38.4441x0.375	1845.6	2464.5	0.749	0.0	2464.5	0.000
	61.0225 - 59.875		1879.7	2488.4	0.755	0.0	2488.4	0.000
	59.875 - 58.7275		1914.0	2512.4	0.762	0.0	2512.4	0.000
	58.7275 - 57.58		1948.4	2536.4	0.768	0.0	2536.4	0.000
L23	57.58 - 57.33 (23)	TP39.4123x39.3623x0.7	1955.9	5021.9	0.389	0.0	5021.9	0.000
L24	57.33 - 56.42 (24)	TP39.5943x39.4123x0.7	1983.4	5069.7	0.391	0.0	5069.7	0.000
L25	56.42 - 56.17 (25)	TP39.6443x39.5943x0.5875	1991.0	4303.0	0.463	0.0	4303.0	0.000
L26	56.17 - 55.17	TP40.6445x39.6443x0.575	2021.3	4259.1	0.475	0.0	4259.1	0.000
	55.17 - 54.17		2051.8	4302.9	0.477	0.0	4302.9	0.000
	54.17 - 53.17		2082.5	4347.0	0.479	0.0	4347.0	0.000
	53.17 - 52.17		2113.2	4391.2	0.481	0.0	4391.2	0.000
	52.17 - 51.17		2144.1	4435.7	0.483	0.0	4435.7	0.000
L27	51.17 - 50.17	TP41.6446x40.6445x0.575	2175.2	4480.4	0.485	0.0	4480.4	0.000
	50.17 - 49.17		2206.4	4525.4	0.488	0.0	4525.4	0.000
	49.17 - 48.17		2237.6	4570.5	0.490	0.0	4570.5	0.000
	48.17 - 47.17		2269.3	4615.9	0.492	0.0	4615.9	0.000
	47.17 - 46.17		2301.2	4661.5	0.494	0.0	4661.5	0.000
L28	46.17 - 45.17	TP42.6447x41.6446x0.5625	2333.3	4609.2	0.506	0.0	4609.2	0.000
	45.17 - 44.17		2365.4	4654.3	0.508	0.0	4654.3	0.000
	44.17 - 43.17		2397.7	4699.6	0.510	0.0	4699.6	0.000
	43.17 - 42.17		2430.1	4745.1	0.512	0.0	4745.1	0.000
	42.17 - 41.17		2462.6	4790.8	0.514	0.0	4790.8	0.000
L29	41.17 - 40.1133	TP44.379x42.6447x0.5625	2497.1	4839.4	0.516	0.0	4839.4	0.000
	40.1133 - 39.0567		2531.8	4888.2	0.518	0.0	4888.2	0.000
	39.0567 - 38		2566.5	4937.3	0.520	0.0	4937.3	0.000
	38 - 32.5		1576.5	5196.6	0.303	0.0	5196.6	0.000
L30	38 - 32.5	TP43.829x42.5288x0.4375	1173.6	3703.5	0.317	0.0	3703.5	0.000
	32.5 - 31.5		2783.9	3731.6	0.746	0.0	3731.6	0.000
L31	31.5 - 30.5	TP44.8292x43.829x0.4375	2817.9	3759.7	0.749	0.0	3759.7	0.000
	30.5 - 29.5		2851.9	3787.9	0.753	0.0	3787.9	0.000
	29.5 - 28.5		2886.1	3816.1	0.756	0.0	3816.1	0.000
	28.5 - 27.5		2920.4	3844.3	0.760	0.0	3844.3	0.000
	27.5 - 26.5		2954.8	3872.6	0.763	0.0	3872.6	0.000
L32	26.5 - 26.25 (32)	TP44.8792x44.8292x0.6875	2963.4	6443.3	0.460	0.0	6443.3	0.000
L33	26.25 - 25.25	TP45.8794x44.8792x0.6875	2998.0	6502.2	0.461	0.0	6502.2	0.000

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 $\frac{M_{uy}}{\phi M_{ny}}$
	25.25 - 24.25		3032.7	6561.4	0.462	0.0	6561.4	0.000
	24.25 - 23.25		3067.5	6620.8	0.463	0.0	6620.8	0.000
	23.25 - 22.25		3102.4	6680.5	0.464	0.0	6680.5	0.000
	22.25 - 21.25		3137.4	6740.5	0.465	0.0	6740.5	0.000
L34	21.25 - 20.25	TP46.8795x45.8794x0.675	3172.6	6682.6	0.475	0.0	6682.6	0.000
	20.25 - 19.25		3207.9	6742.1	0.476	0.0	6742.1	0.000
	19.25 - 18.25		3243.3	6801.8	0.477	0.0	6801.8	0.000
	18.25 - 17.25		3278.8	6861.8	0.478	0.0	6861.8	0.000
	17.25 - 16.25		3314.4	6922.0	0.479	0.0	6922.0	0.000
L35	16.25 - 15.25	TP47.8797x46.8795x0.675	3350.2	6982.5	0.480	0.0	6982.5	0.000
	15.25 - 14.25		3386.1	7043.3	0.481	0.0	7043.3	0.000
	14.25 - 13.25		3422.1	7104.3	0.482	0.0	7104.3	0.000
	13.25 - 12.25		3458.2	7165.6	0.483	0.0	7165.6	0.000
	12.25 - 11.25		3494.4	7227.1	0.484	0.0	7227.1	0.000
L36	11.25 - 10.25	TP48.8798x47.8797x0.6625	3530.8	7159.6	0.493	0.0	7159.6	0.000
	10.25 - 9.25		3567.2	7220.6	0.494	0.0	7220.6	0.000
	9.25 - 8.25		3603.8	7281.8	0.495	0.0	7281.8	0.000
	8.25 - 7.25		3640.5	7343.2	0.496	0.0	7343.2	0.000
	7.25 - 6.25		3677.4	7405.0	0.497	0.0	7405.0	0.000
L37	6.25 - 5.25	TP49.88x48.8798x0.6625	3714.3	7466.9	0.497	0.0	7466.9	0.000
	5.25 - 4.25		3751.4	7529.2	0.498	0.0	7529.2	0.000
	4.25 - 3.25		3788.6	7591.7	0.499	0.0	7591.7	0.000
	3.25 - 2.25		3825.9	7654.4	0.500	0.0	7654.4	0.000
	2.25 - 1.25		3863.3	7717.5	0.501	0.0	7717.5	0.000
L38	1.25 - 0 (38)	TP50.13x49.88x0.6625	3910.3	7796.6	0.502	0.0	7796.6	0.000

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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	150 - 149	TP23.0001x22x0.25	1.24	286.25	0.004	0.0	552.7	0.000
	149 - 148		5.39	288.86	0.019	0.0	562.8	0.000
	148 - 147		5.59	288.86	0.019	1.4	573.0	0.002
	147 - 146		5.69	291.47	0.020	1.4	583.3	0.002
	146 - 145		5.78	296.68	0.019	1.4	593.7	0.002
L2	145 - 144	TP24.0002x23.0001x0.25	5.88	299.29	0.020	1.4	604.2	0.002
	144 - 143		5.97	301.90	0.020	1.4	614.8	0.002
	143 - 142		6.07	304.51	0.020	1.4	625.4	0.002
	142 - 141		6.16	307.12	0.020	1.4	636.2	0.002
	141 - 140		11.41	309.73	0.037	1.7	647.1	0.003
L3	140 - 139	TP25.0004x24.0002x0.25	11.51	312.33	0.037	1.7	658.0	0.003
	139 - 138		11.61	314.94	0.037	1.7	669.0	0.003
	138 - 137		11.71	317.55	0.037	1.7	680.2	0.003
	137 - 136		11.81	320.16	0.037	1.7	691.4	0.003
	136 - 135		11.91	322.77	0.037	1.7	702.7	0.002
L4	135 - 134	TP26.0005x25.0004x0.25	12.01	325.38	0.037	1.7	714.1	0.002
	134 - 133		12.11	327.99	0.037	1.7	725.6	0.002
	133 - 132		12.21	330.60	0.037	1.7	737.2	0.002
	132 - 131		16.85	333.20	0.051	1.7	748.9	0.002
	131 - 130		16.95	335.81	0.050	1.7	760.6	0.002
L5	130 - 129	TP27.0006x26.0005x0.25	17.05	338.42	0.050	1.7	772.5	0.002
	129 - 128		17.15	341.03	0.050	1.7	784.5	0.002
	128 - 127		17.25	343.64	0.050	1.7	796.5	0.002
	127 - 126		17.35	346.25	0.050	1.7	808.6	0.002
	126 - 125		17.45	348.86	0.050	1.7	820.9	0.002

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 $\frac{T_u}{\phi T_n}$
L6	125 - 124	TP28.0007x27.0006x0.25	17.55	351.46	0.050	1.7	833.2	0.002
	124 - 123		17.65	354.07	0.050	1.7	845.6	0.002
	123 - 122		17.75	356.68	0.050	1.7	858.1	0.002
	122 - 121		17.89	359.29	0.050	2.7	870.7	0.003
	121 - 120		17.99	361.90	0.050	2.7	883.4	0.003
L7	120 - 119	TP29.0008x28.0007x0.25	18.09	364.51	0.050	2.7	896.2	0.003
	119 - 118		18.19	367.11	0.050	2.7	909.1	0.003
	118 - 117		18.29	369.72	0.049	2.7	922.0	0.003
	117 - 116		18.39	372.33	0.049	2.7	935.1	0.003
	116 - 115		18.49	374.94	0.049	2.7	948.2	0.003
L8	115 - 113.917	TP30.401x29.0008x0.25	18.60	377.77	0.049	2.7	962.6	0.003
	113.917 - 112.833		18.71	380.59	0.049	2.7	977.0	0.003
	112.833 - 111.75		18.82	383.42	0.049	2.7	991.6	0.003
	111.75 - 108		11.04	393.20	0.028	1.4	1042.8	0.001
L9	111.75 - 108	TP30.1512x29.1509x0.3125	12.02	482.33	0.025	1.6	1255.4	0.001
	108 - 106.75		23.18	486.41	0.048	3.0	1276.7	0.002
L10	106.75 - 105.75	TP31.1514x30.1512x0.3125	23.27	489.67	0.048	3.0	1293.8	0.002
	105.75 - 104.75		23.37	492.93	0.047	3.0	1311.1	0.002
	104.75 - 103.75		23.53	496.19	0.047	3.1	1328.5	0.002
	103.75 - 102.75		23.63	499.45	0.047	3.1	1346.1	0.002
	102.75 - 101.75		23.73	502.71	0.047	3.1	1363.7	0.002
L11	101.75 - 100.75	TP32.1517x31.1514x0.3125	23.83	505.97	0.047	3.1	1381.5	0.002
	100.75 - 99.75		23.93	509.24	0.047	3.1	1399.3	0.002
	99.75 - 98.75		24.03	512.50	0.047	3.1	1417.3	0.002
	98.75 - 97.75		24.13	515.76	0.047	3.1	1435.4	0.002
	97.75 - 96.75		24.23	519.02	0.047	3.1	1453.6	0.002
L12	96.75 - 95.75	TP33.1519x32.1517x0.3125	24.32	522.28	0.047	3.1	1471.9	0.002
	95.75 - 94.75		24.42	525.54	0.046	3.1	1490.4	0.002
	94.75 - 93.75		24.52	528.80	0.046	3.1	1508.9	0.002
	93.75 - 92.75		24.62	532.06	0.046	3.1	1527.6	0.002
	92.75 - 91.75		24.72	535.32	0.046	3.1	1546.4	0.002
L13	91.75 - 90.625	TP33.602x33.1519x0.3125	24.83	538.99	0.046	3.1	1567.6	0.002
	90.625 - 89.5		24.94	542.66	0.046	3.1	1589.0	0.002
L14	89.5 - 89.25 (14)	TP33.652x33.602x0.5	24.96	864.67	0.029	3.1	2521.5	0.001
L15	89.25 - 88.25	TP34.6523x33.652x0.4938	25.07	859.18	0.029	3.1	2521.1	0.001
	88.25 - 87.25		25.68	864.33	0.030	4.5	2551.4	0.002
	87.25 - 86.25		25.79	869.48	0.030	4.5	2581.9	0.002
	86.25 - 85.25		25.90	874.63	0.030	4.5	2612.6	0.002
	85.25 - 84.25		26.25	879.79	0.030	3.1	2643.5	0.001
L16	84.25 - 83.25	TP35.6525x34.6523x0.4875	26.40	873.90	0.030	3.1	2641.6	0.001
	83.25 - 82.25		26.54	878.98	0.030	3.1	2672.5	0.001
	82.25 - 81.25		27.07	884.07	0.031	3.1	2703.5	0.001
	81.25 - 80.25		27.21	889.16	0.031	1.4	2734.7	0.001
	80.25 - 79.25		27.36	894.25	0.031	1.4	2766.1	0.001
L17	79.25 - 78.0625	TP37.553x35.6525x0.4813	27.53	888.90	0.031	1.4	2768.6	0.001
	78.0625 - 76.875		27.69	894.86	0.031	1.4	2805.9	0.001
	76.875 - 75.6875		27.86	900.83	0.031	1.4	2843.4	0.001
	75.6875 - 74.5		28.02	906.79	0.031	1.4	2881.2	0.000

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 $\frac{T_u}{\phi T_n}$
	74.5 - 69.75		16.64	930.65	0.018	0.8	3034.8	0.000
L18	74.5 - 69.75	TP37.1279x35.9778x0.375	12.15	774.62	0.016	0.6	2490.6	0.000
	69.75 - 68.75		28.88	778.85	0.037	1.4	2518.0	0.001
L19	68.75 - 67.42 (19)	TP37.394x37.1279x0.375	29.01	784.49	0.037	1.4	2554.5	0.001
L20	67.42 - 67.17 (20)	TP37.444x37.394x0.375	29.02	785.55	0.037	1.4	2561.4	0.001
L21	67.17 - 66.17	TP38.4441x37.444x0.375	29.13	789.79	0.037	1.4	2589.2	0.001
	66.17 - 65.17		29.22	794.03	0.037	1.4	2617.0	0.001
	65.17 - 64.17		29.32	798.27	0.037	1.4	2645.1	0.001
	64.17 - 63.17		29.41	802.51	0.037	1.4	2673.2	0.001
	63.17 - 62.17		29.51	806.75	0.037	1.4	2701.5	0.001
L22	62.17 - 61.0225	TP39.3623x38.4441x0.375	29.66	811.61	0.037	1.4	2734.2	0.001
	61.0225 - 59.875		29.80	816.48	0.037	1.4	2767.1	0.001
	59.875 - 58.7275		29.95	821.34	0.036	1.4	2800.2	0.001
	58.7275 - 57.58		30.10	826.20	0.036	1.4	2833.4	0.001
L23	57.58 - 57.33 (23)	TP39.4123x39.3623x0.7	30.12	1531.37	0.020	1.4	5214.7	0.000
L24	57.33 - 56.42 (24)	TP39.5943x39.4123x0.7	30.26	1538.57	0.020	1.4	5263.8	0.000
L25	56.42 - 56.17 (25)	TP39.6443x39.5943x0.5875	30.29	1296.69	0.023	1.4	4454.9	0.000
L26	56.17 - 55.17	TP40.6445x39.6443x0.575	30.44	1276.01	0.024	1.4	4407.7	0.000
	55.17 - 54.17		30.58	1282.51	0.024	1.4	4452.7	0.000
	54.17 - 53.17		30.72	1289.01	0.024	1.4	4497.9	0.000
	53.17 - 52.17		30.85	1295.51	0.024	1.4	4543.4	0.000
	52.17 - 51.17		30.99	1302.01	0.024	1.4	4589.1	0.000
L27	51.17 - 50.17	TP41.6446x40.6445x0.575	31.13	1308.51	0.024	1.4	4635.0	0.000
	50.17 - 49.17		31.26	1315.01	0.024	1.4	4681.2	0.000
	49.17 - 48.17		31.70	1321.51	0.024	3.0	4727.6	0.001
	48.17 - 47.17		31.83	1328.01	0.024	3.0	4774.2	0.001
	47.17 - 46.17		31.97	1334.51	0.024	3.0	4821.1	0.001
L28	46.17 - 45.17	TP42.6447x41.6446x0.5625	32.10	1312.25	0.024	3.0	4765.2	0.001
	45.17 - 44.17		32.23	1318.61	0.024	3.0	4811.5	0.001
	44.17 - 43.17		32.35	1324.97	0.024	3.0	4858.0	0.001
	43.17 - 42.17		32.48	1331.33	0.024	3.0	4904.7	0.001
	42.17 - 41.17		32.61	1337.69	0.024	3.0	4951.7	0.001
L29	41.17 - 40.1133	TP44.379x42.6447x0.5625	32.75	1344.41	0.024	3.0	5001.6	0.001
	40.1133 - 39.0567		32.88	1351.12	0.024	3.0	5051.7	0.001
	39.0567 - 38		33.01	1357.84	0.024	3.0	5102.0	0.001
	38 - 32.5		19.57	1392.81	0.014	1.7	5368.2	0.000
L30	38 - 32.5	TP43.829x42.5288x0.4375	14.26	1067.85	0.013	1.3	4057.0	0.000
	32.5 - 31.5		33.92	1072.79	0.032	3.0	4094.7	0.001
L31	31.5 - 30.5	TP44.8292x43.829x0.4375	34.04	1077.74	0.032	3.0	4132.5	0.001
	30.5 - 29.5		34.15	1082.68	0.032	3.0	4170.5	0.001
	29.5 - 28.5		34.26	1087.63	0.032	3.0	4208.7	0.001
	28.5 - 27.5		34.38	1092.58	0.031	3.0	4247.1	0.001
	27.5 - 26.5		34.49	1097.52	0.031	3.0	4285.6	0.001
L32	26.5 - 26.25 (32)	TP44.8792x44.8292x0.6875	34.51	1716.91	0.020	3.0	6674.0	0.000
L33	26.25 - 25.25	TP45.8794x44.8792x0.6875	34.63	1724.68	0.020	3.0	6734.6	0.000
	25.25 - 24.25		34.75	1732.45	0.020	3.0	6795.4	0.000
	24.25 - 23.25		34.87	1740.22	0.020	3.0	6856.5	0.000
	23.25 - 22.25		34.99	1747.99	0.020	3.0	6917.9	0.000

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 $\frac{T_u}{\phi T_n}$
	22.25 - 21.25		35.11	1755.76	0.020	3.0	6979.5	0.000
L34	21.25 - 20.25	TP46.8795x45.8794x0.675	35.23	1731.95	0.020	3.0	6917.2	0.000
	20.25 - 19.25		35.35	1739.58	0.020	3.0	6978.3	0.000
	19.25 - 18.25		35.47	1747.21	0.020	3.0	7039.7	0.000
	18.25 - 17.25		35.59	1754.84	0.020	3.0	7101.3	0.000
	17.25 - 16.25		35.71	1762.47	0.020	3.0	7163.2	0.000
L35	16.25 - 15.25	TP47.8797x46.8795x0.675	35.83	1770.10	0.020	3.0	7225.3	0.000
	15.25 - 14.25		35.95	1777.73	0.020	3.0	7287.8	0.000
	14.25 - 13.25		36.07	1785.36	0.020	3.0	7350.4	0.000
	13.25 - 12.25		36.19	1792.99	0.020	3.0	7413.4	0.000
	12.25 - 11.25		36.31	1800.62	0.020	3.0	7476.6	0.000
L36	11.25 - 10.25	TP48.8798x47.8797x0.6625	36.43	1775.23	0.021	3.0	7404.4	0.000
	10.25 - 9.25		36.55	1782.72	0.021	3.0	7467.0	0.000
	9.25 - 8.25		36.67	1790.21	0.020	3.0	7529.9	0.000
	8.25 - 7.25		36.79	1797.70	0.020	3.0	7593.0	0.000
	7.25 - 6.25		36.91	1805.19	0.020	3.0	7656.4	0.000
L37	6.25 - 5.25	TP49.88x48.8798x0.6625	37.03	1812.67	0.020	3.0	7720.1	0.000
	5.25 - 4.25		37.15	1820.16	0.020	3.0	7784.0	0.000
	4.25 - 3.25		37.27	1827.65	0.020	3.0	7848.2	0.000
	3.25 - 2.25		37.39	1835.14	0.020	3.0	7912.6	0.000
	2.25 - 1.25		37.51	1842.63	0.020	3.0	7977.3	0.000
L38	1.25 - 0 (38)	TP50.13x49.88x0.6625	37.67	1851.99	0.020	3.0	8058.6	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	150 - 149	0.010	0.012	0.000	0.004	0.000	0.021	1.050	4.8.2
	149 - 148	0.004	0.024	0.000	0.019	0.000	0.029	1.050	4.8.2
	148 - 147	0.005	0.034	0.000	0.019	0.002	0.039	1.050	4.8.2
	147 - 146	0.005	0.043	0.000	0.020	0.002	0.048	1.050	4.8.2
	146 - 145	0.005	0.053	0.000	0.019	0.002	0.058	1.050	4.8.2
L2	145 - 144	0.005	0.062	0.000	0.020	0.002	0.067	1.050	4.8.2
	144 - 143	0.005	0.071	0.000	0.020	0.002	0.077	1.050	4.8.2
	143 - 142	0.005	0.081	0.000	0.020	0.002	0.086	1.050	4.8.2
	142 - 141	0.005	0.090	0.000	0.020	0.002	0.095	1.050	4.8.2
	141 - 140	0.008	0.113	0.000	0.037	0.003	0.123	1.050	4.8.2
L3	140 - 139	0.008	0.130	0.000	0.037	0.003	0.140	1.050	4.8.2
	139 - 138	0.008	0.147	0.000	0.037	0.003	0.156	1.050	4.8.2
	138 - 137	0.008	0.163	0.000	0.037	0.003	0.173	1.050	4.8.2
	137 - 136	0.008	0.179	0.000	0.037	0.003	0.189	1.050	4.8.2
	136 - 135	0.008	0.195	0.000	0.037	0.002	0.205	1.050	4.8.2
L4	135 - 134	0.008	0.211	0.000	0.037	0.002	0.220	1.050	4.8.2
	134 - 133	0.008	0.226	0.000	0.037	0.002	0.236	1.050	4.8.2
	133 - 132	0.008	0.241	0.000	0.037	0.002	0.251	1.050	4.8.2
	132 - 131	0.011	0.265	0.000	0.051	0.002	0.280	1.050	4.8.2
	131 - 130	0.011	0.286	0.000	0.050	0.002	0.301	1.050	4.8.2
L5	130 - 129	0.011	0.307	0.000	0.050	0.002	0.321	1.050	4.8.2
	129 - 128	0.012	0.327	0.000	0.050	0.002	0.341	1.050	4.8.2
	128 - 127	0.012	0.347	0.000	0.050	0.002	0.361	1.050	4.8.2
	127 - 126	0.012	0.366	0.000	0.050	0.002	0.381	1.050	4.8.2
	126 - 125	0.012	0.386	0.000	0.050	0.002	0.400	1.050	4.8.2
L6	125 - 124	0.012	0.404	0.000	0.050	0.002	0.419	1.050	4.8.2
	124 - 123	0.012	0.423	0.000	0.050	0.002	0.437	1.050	4.8.2

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	123 - 122	0.012	0.441	0.000	0.050	0.002	0.455	1.050	4.8.2
	122 - 121	0.012	0.459	0.000	0.050	0.003	0.473	1.050	4.8.2
	121 - 120	0.012	0.477	0.000	0.050	0.003	0.491	1.050	4.8.2
L7	120 - 119	0.012	0.494	0.000	0.050	0.003	0.508	1.050	4.8.2
	119 - 118	0.012	0.511	0.000	0.050	0.003	0.526	1.050	4.8.2
	118 - 117	0.012	0.528	0.000	0.049	0.003	0.542	1.050	4.8.2
	117 - 116	0.012	0.544	0.000	0.049	0.003	0.559	1.050	4.8.2
	116 - 115	0.012	0.561	0.000	0.049	0.003	0.575	1.050	4.8.2
L8	115 - 113.917	0.012	0.578	0.000	0.049	0.003	0.593	1.050	4.8.2
	113.917 - 112.833	0.012	0.595	0.000	0.049	0.003	0.610	1.050	4.8.2
	112.833 - 111.75	0.012	0.612	0.000	0.049	0.003	0.627	1.050	4.8.2
	111.75 - 108	0.007	0.313	0.000	0.028	0.001	0.321	1.050	4.8.2
L9	111.75 - 108	0.006	0.278	0.000	0.025	0.001	0.285	1.050	4.8.2
	108 - 106.75	0.012	0.532	0.000	0.048	0.002	0.546	1.050	4.8.2
L10	106.75 - 105.75	0.012	0.545	0.000	0.048	0.002	0.560	1.050	4.8.2
	105.75 - 104.75	0.012	0.558	0.000	0.047	0.002	0.573	1.050	4.8.2
	104.75 - 103.75	0.012	0.571	0.000	0.047	0.002	0.586	1.050	4.8.2
	103.75 - 102.75	0.012	0.584	0.000	0.047	0.002	0.599	1.050	4.8.2
	102.75 - 101.75	0.012	0.596	0.000	0.047	0.002	0.611	1.050	4.8.2
L11	101.75 - 100.75	0.012	0.609	0.000	0.047	0.002	0.623	1.050	4.8.2
	100.75 - 99.75	0.012	0.621	0.000	0.047	0.002	0.635	1.050	4.8.2
	99.75 - 98.75	0.012	0.633	0.000	0.047	0.002	0.647	1.050	4.8.2
	98.75 - 97.75	0.013	0.644	0.000	0.047	0.002	0.659	1.050	4.8.2
	97.75 - 96.75	0.013	0.656	0.000	0.047	0.002	0.671	1.050	4.8.2
L12	96.75 - 95.75	0.013	0.667	0.000	0.047	0.002	0.682	1.050	4.8.2
	95.75 - 94.75	0.013	0.678	0.000	0.046	0.002	0.693	1.050	4.8.2
	94.75 - 93.75	0.013	0.689	0.000	0.046	0.002	0.704	1.050	4.8.2
	93.75 - 92.75	0.013	0.700	0.000	0.046	0.002	0.715	1.050	4.8.2
	92.75 - 91.75	0.013	0.711	0.000	0.046	0.002	0.726	1.050	4.8.2
L13	91.75 - 90.625	0.013	0.723	0.000	0.046	0.002	0.738	1.050	4.8.2
	90.625 - 89.5	0.013	0.734	0.000	0.046	0.002	0.749	1.050	4.8.2
L14	89.5 - 89.25 (14)	0.008	0.434	0.000	0.029	0.001	0.443	1.050	4.8.2
L15	89.25 - 88.25	0.008	0.444	0.000	0.029	0.001	0.453	1.050	4.8.2
	88.25 - 87.25	0.008	0.450	0.000	0.030	0.002	0.460	1.050	4.8.2
	87.25 - 86.25	0.008	0.455	0.000	0.030	0.002	0.465	1.050	4.8.2
	86.25 - 85.25	0.008	0.460	0.000	0.030	0.002	0.469	1.050	4.8.2
	85.25 - 84.25	0.008	0.465	0.000	0.030	0.001	0.474	1.050	4.8.2
L16	84.25 - 83.25	0.009	0.475	0.000	0.030	0.001	0.485	1.050	4.8.2
	83.25 - 82.25	0.009	0.480	0.000	0.030	0.001	0.490	1.050	4.8.2
	82.25 - 81.25	0.009	0.486	0.000	0.031	0.001	0.496	1.050	4.8.2
	81.25 - 80.25	0.009	0.491	0.000	0.031	0.001	0.500	1.050	4.8.2
	80.25 - 79.25	0.009	0.495	0.000	0.031	0.001	0.505	1.050	4.8.2
L17	79.25 - 78.0625	0.009	0.507	0.000	0.031	0.001	0.517	1.050	4.8.2
	78.0625 - 76.875	0.009	0.512	0.000	0.031	0.001	0.522	1.050	4.8.2
	76.875 - 75.6875	0.009	0.517	0.000	0.031	0.001	0.527	1.050	4.8.2
	75.6875 - 74.5	0.009	0.522	0.000	0.031	0.000	0.532	1.050	4.8.2
	74.5 - 69.75	0.005	0.310	0.000	0.018	0.000	0.316	1.050	4.8.2
L18	74.5 - 69.75	0.005	0.298	0.000	0.016	0.000	0.303	1.050	4.8.2

Section No.	Elevation ft	Ratio $P_u/\phi P_n$	Ratio $M_{ux}/\phi M_{nx}$	Ratio $M_{uy}/\phi M_{ny}$	Ratio $V_u/\phi V_n$	Ratio $T_u/\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	69.75 - 68.75	0.012	0.703	0.000	0.037	0.001	0.716	1.050	4.8.2
L19	68.75 - 67.42 (19)	0.012	0.711	0.000	0.037	0.001	0.724	1.050	4.8.2
L20	67.42 - 67.17 (20)	0.012	0.713	0.000	0.037	0.001	0.726	1.050	4.8.2
L21	67.17 - 66.17	0.012	0.719	0.000	0.037	0.001	0.732	1.050	4.8.2
	66.17 - 65.17	0.012	0.725	0.000	0.037	0.001	0.738	1.050	4.8.2
	65.17 - 64.17	0.012	0.731	0.000	0.037	0.001	0.744	1.050	4.8.2
	64.17 - 63.17	0.012	0.736	0.000	0.037	0.001	0.750	1.050	4.8.2
	63.17 - 62.17	0.012	0.742	0.000	0.037	0.001	0.756	1.050	4.8.2
L22	62.17 - 61.0225	0.012	0.749	0.000	0.037	0.001	0.762	1.050	4.8.2
	61.0225 - 59.875	0.012	0.755	0.000	0.037	0.001	0.769	1.050	4.8.2
	59.875 - 58.7275	0.012	0.762	0.000	0.036	0.001	0.775	1.050	4.8.2
	58.7275 - 57.58	0.012	0.768	0.000	0.036	0.001	0.782	1.050	4.8.2
L23	57.58 - 57.33 (23)	0.007	0.389	0.000	0.020	0.000	0.396	1.050	4.8.2
L24	57.33 - 56.42 (24)	0.007	0.391	0.000	0.020	0.000	0.398	1.050	4.8.2
L25	56.42 - 56.17 (25)	0.008	0.463	0.000	0.023	0.000	0.471	1.050	4.8.2
L26	56.17 - 55.17	0.008	0.475	0.000	0.024	0.000	0.483	1.050	4.8.2
	55.17 - 54.17	0.008	0.477	0.000	0.024	0.000	0.486	1.050	4.8.2
	54.17 - 53.17	0.008	0.479	0.000	0.024	0.000	0.488	1.050	4.8.2
	53.17 - 52.17	0.008	0.481	0.000	0.024	0.000	0.490	1.050	4.8.2
	52.17 - 51.17	0.008	0.483	0.000	0.024	0.000	0.492	1.050	4.8.2
L27	51.17 - 50.17	0.008	0.485	0.000	0.024	0.000	0.494	1.050	4.8.2
	50.17 - 49.17	0.008	0.488	0.000	0.024	0.000	0.497	1.050	4.8.2
	49.17 - 48.17	0.008	0.490	0.000	0.024	0.001	0.499	1.050	4.8.2
	48.17 - 47.17	0.008	0.492	0.000	0.024	0.001	0.501	1.050	4.8.2
	47.17 - 46.17	0.008	0.494	0.000	0.024	0.001	0.503	1.050	4.8.2
L28	46.17 - 45.17	0.009	0.506	0.000	0.024	0.001	0.516	1.050	4.8.2
	45.17 - 44.17	0.009	0.508	0.000	0.024	0.001	0.518	1.050	4.8.2
	44.17 - 43.17	0.009	0.510	0.000	0.024	0.001	0.520	1.050	4.8.2
	43.17 - 42.17	0.009	0.512	0.000	0.024	0.001	0.522	1.050	4.8.2
	42.17 - 41.17	0.009	0.514	0.000	0.024	0.001	0.524	1.050	4.8.2
L29	41.17 - 40.1133	0.009	0.516	0.000	0.024	0.001	0.526	1.050	4.8.2
	40.1133 - 39.0567	0.009	0.518	0.000	0.024	0.001	0.528	1.050	4.8.2
	39.0567 - 38	0.009	0.520	0.000	0.024	0.001	0.530	1.050	4.8.2
	38 - 32.5	0.005	0.303	0.000	0.014	0.000	0.309	1.050	4.8.2
L30	38 - 32.5	0.005	0.317	0.000	0.013	0.000	0.322	1.050	4.8.2
	32.5 - 31.5	0.013	0.746	0.000	0.032	0.001	0.760	1.050	4.8.2
L31	31.5 - 30.5	0.013	0.749	0.000	0.032	0.001	0.763	1.050	4.8.2
	30.5 - 29.5	0.013	0.753	0.000	0.032	0.001	0.767	1.050	4.8.2
	29.5 - 28.5	0.013	0.756	0.000	0.032	0.001	0.770	1.050	4.8.2
	28.5 - 27.5	0.013	0.760	0.000	0.031	0.001	0.774	1.050	4.8.2
	27.5 - 26.5	0.013	0.763	0.000	0.031	0.001	0.777	1.050	4.8.2
L32	26.5 - 26.25 (32)	0.008	0.460	0.000	0.020	0.000	0.469	1.050	4.8.2
L33	26.25 - 25.25	0.008	0.461	0.000	0.020	0.000	0.470	1.050	4.8.2
	25.25 - 24.25	0.008	0.462	0.000	0.020	0.000	0.471	1.050	4.8.2
	24.25 - 23.25	0.008	0.463	0.000	0.020	0.000	0.472	1.050	4.8.2
	23.25 - 22.25	0.008	0.464	0.000	0.020	0.000	0.473	1.050	4.8.2
	22.25 - 21.25	0.008	0.465	0.000	0.020	0.000	0.474	1.050	4.8.2
L34	21.25 - 20.25	0.009	0.475	0.000	0.020	0.000	0.484	1.050	4.8.2

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	20.25 - 19.25	0.009	0.476	0.000	0.020	0.000	0.485	1.050	4.8.2
	19.25 - 18.25	0.009	0.477	0.000	0.020	0.000	0.486	1.050	4.8.2
	18.25 - 17.25	0.009	0.478	0.000	0.020	0.000	0.487	1.050	4.8.2
	17.25 - 16.25	0.009	0.479	0.000	0.020	0.000	0.488	1.050	4.8.2
L35	16.25 - 15.25	0.009	0.480	0.000	0.020	0.000	0.489	1.050	4.8.2
	15.25 - 14.25	0.009	0.481	0.000	0.020	0.000	0.490	1.050	4.8.2
	14.25 - 13.25	0.009	0.482	0.000	0.020	0.000	0.491	1.050	4.8.2
	13.25 - 12.25	0.009	0.483	0.000	0.020	0.000	0.492	1.050	4.8.2
	12.25 - 11.25	0.009	0.484	0.000	0.020	0.000	0.493	1.050	4.8.2
L36	11.25 - 10.25	0.009	0.493	0.000	0.021	0.000	0.503	1.050	4.8.2
	10.25 - 9.25	0.009	0.494	0.000	0.021	0.000	0.504	1.050	4.8.2
	9.25 - 8.25	0.009	0.495	0.000	0.020	0.000	0.505	1.050	4.8.2
	8.25 - 7.25	0.009	0.496	0.000	0.020	0.000	0.506	1.050	4.8.2
	7.25 - 6.25	0.009	0.497	0.000	0.020	0.000	0.506	1.050	4.8.2
L37	6.25 - 5.25	0.009	0.497	0.000	0.020	0.000	0.507	1.050	4.8.2
	5.25 - 4.25	0.009	0.498	0.000	0.020	0.000	0.508	1.050	4.8.2
	4.25 - 3.25	0.009	0.499	0.000	0.020	0.000	0.509	1.050	4.8.2
	3.25 - 2.25	0.010	0.500	0.000	0.020	0.000	0.510	1.050	4.8.2
	2.25 - 1.25	0.010	0.501	0.000	0.020	0.000	0.511	1.050	4.8.2
L38	1.25 - 0 (38)	0.010	0.502	0.000	0.020	0.000	0.512	1.050	4.8.2

Section Capacity Table

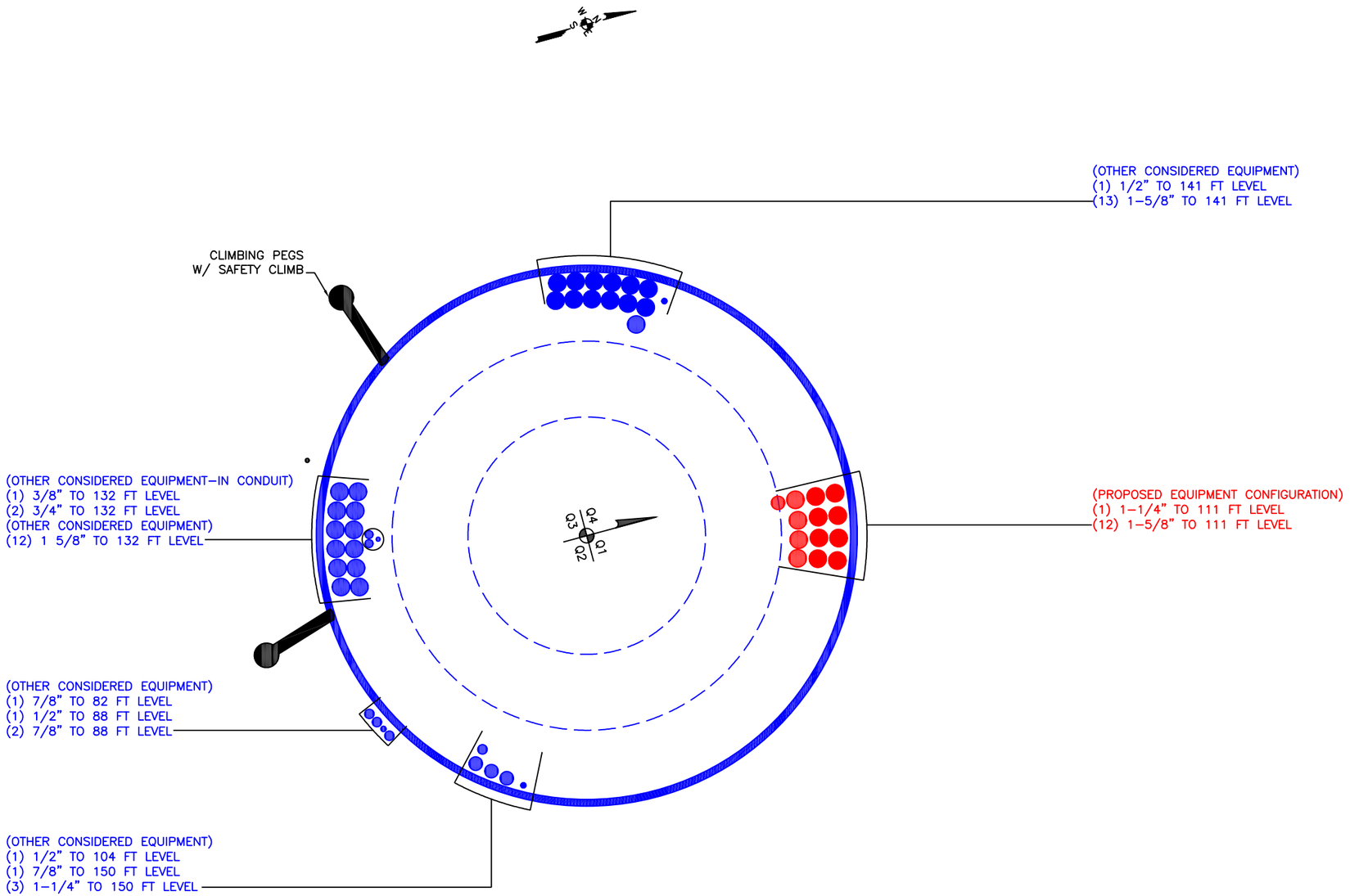
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	150 - 145	Pole	TP23.0001x22x0.25	1	-4.52	1038.40	5.5	Pass
L2	145 - 140	Pole	TP24.0002x23.0001x0.25	2	-8.14	1084.04	11.7	Pass
L3	140 - 135	Pole	TP25.0004x24.0002x0.25	3	-8.61	1129.69	19.5	Pass
L4	135 - 130	Pole	TP26.0005x25.0004x0.25	4	-12.85	1175.34	28.6	Pass
L5	130 - 125	Pole	TP27.0006x26.0005x0.25	5	-13.44	1220.99	38.1	Pass
L6	125 - 120	Pole	TP28.0007x27.0006x0.25	6	-14.07	1266.64	46.8	Pass
L7	120 - 115	Pole	TP29.0008x28.0007x0.25	7	-14.73	1312.29	54.8	Pass
L8	115 - 108	Pole	TP30.401x29.0008x0.25	8	-15.19	1341.96	59.7	Pass
L9	108 - 106.75	Pole	TP30.1512x29.1509x0.3125	9	-19.73	1702.43	52.0	Pass
L10	106.75 - 101.75	Pole	TP31.1514x30.1512x0.3125	10	-20.73	1759.50	58.2	Pass
L11	101.75 - 96.75	Pole	TP32.1517x31.1514x0.3125	11	-21.69	1816.56	63.9	Pass
L12	96.75 - 91.75	Pole	TP33.1519x32.1517x0.3125	12	-22.67	1873.63	69.1	Pass
L13	91.75 - 89.5	Pole	TP33.602x33.1519x0.3125	13	-23.12	1899.31	71.4	Pass
L14	89.5 - 89.25	Pole	TP33.652x33.602x0.5	14	-23.20	3026.35	42.2	Pass
L15	89.25 - 84.25	Pole	TP34.6523x33.652x0.4938	15	-24.66	3079.25	45.2	Pass
L16	84.25 - 79.25	Pole	TP35.6525x34.6523x0.4875	16	-26.14	3129.86	48.1	Pass
L17	79.25 - 69.75	Pole	TP37.553x35.6525x0.4813	17	-27.47	3173.77	50.7	Pass
L18	69.75 - 68.75	Pole	TP37.1279x35.9778x0.375	18	-29.93	2725.99	68.2	Pass
L19	68.75 - 67.42	Pole	TP37.394x37.1279x0.375	19	-30.35	2745.72	69.0	Pass
L20	67.42 - 67.17	Pole	TP37.444x37.394x0.375	20	-30.45	2749.44	69.1	Pass
L21	67.17 - 62.17	Pole	TP38.4441x37.444x0.375	21	-32.10	2823.62	72.0	Pass
L22	62.17 - 57.58	Pole	TP39.3623x38.4441x0.375	22	-33.64	2891.71	74.5	Pass
L23	57.58 - 57.33	Pole	TP39.4123x39.3623x0.7	23	-33.76	5359.79	37.8	Pass
L24	57.33 - 56.42	Pole	TP39.5943x39.4123x0.7	24	-34.14	5384.99	37.9	Pass
L25	56.42 - 56.17	Pole	TP39.6443x39.5943x0.5875	25	-34.23	4538.43	44.9	Pass
L26	56.17 - 51.17	Pole	TP40.6445x39.6443x0.575	26	-36.00	4557.03	46.9	Pass
L27	51.17 - 46.17	Pole	TP41.6446x40.6445x0.575	27	-37.80	4670.78	47.9	Pass
L28	46.17 - 41.17	Pole	TP42.6447x41.6446x0.5625	28	-39.64	4681.91	49.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L29	41.17 - 32.5	Pole	TP44.379x42.6447x0.5625	29	-41.02	4752.45	50.4	Pass
L30	32.5 - 31.5	Pole	TP43.829x42.5288x0.4375	30	-45.17	3754.78	72.4	Pass
L31	31.5 - 26.5	Pole	TP44.8292x43.829x0.4375	31	-46.96	3841.32	74.0	Pass
L32	26.5 - 26.25	Pole	TP44.8792x44.8292x0.6875	32	-47.08	6009.17	44.6	Pass
L33	26.25 - 21.25	Pole	TP45.8794x44.8792x0.6875	33	-49.35	6145.17	45.2	Pass
L34	21.25 - 16.25	Pole	TP46.8795x45.8794x0.675	34	-51.67	6168.63	46.5	Pass
L35	16.25 - 11.25	Pole	TP47.8797x46.8795x0.675	35	-54.01	6302.16	46.9	Pass
L36	11.25 - 6.25	Pole	TP48.8798x47.8797x0.6625	36	-56.39	6318.15	48.2	Pass
L37	6.25 - 1.25	Pole	TP49.88x48.8798x0.6625	37	-58.80	6449.20	48.6	Pass
L38	1.25 - 0	Pole	TP50.13x49.88x0.6625	38	-59.40	6481.96	48.7	Pass
							Summary	
						Pole (L22)	74.5	Pass
						RATING =	**74.5**	**Pass**

***NOTE: Above stress ratios for reinforced sections are approximate. More exact calculations are presented in Appendix C.**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876341 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- H

Site BU: 876341

Work Order: 1749559

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	150	42	3.75	12	22	30.401	0.25	Auto	A607-60
2	111.75	42	4.75	12	29.15	37.553	0.3125	Auto	A607-60
3	74.5	42	5.5	12	35.98	44.379	0.375	Auto	A607-65
4	38	38	0	12	42.53	50.13	0.4375	Auto	A607-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12
1	0	26.5	plate	CCI-WAFP-065125	4		x			x			x			x	
2	26.5	57.58	plate	CCI-AFP-060100	4		x			x			x			x	
3	74.5	89.5	plate	CCI-AFP-060100	3			x				x				x	
4	56.42	67.42	plate	CCI-SFP-060100	3			x				x			x		
5																	
6																	
7																	
8																	
9																	
10																	

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L_u (in)	Net Area (in^2)	Bolt Hole Size (in)	Reinforcement Material
1	6.5	1.25	8.125	0.625	n/a	42.000	19.000	6.563	1.1875	A572-65
2	6	1	6	0.5	30.000	30.000	16.000	4.750	1.1875	A572-65
3	6	1	6	0.5	30.000	30.000	16.000	4.750	1.1875	A572-65
4	6	1	6	0.5	24.000	24.000	16.000	4.750	1.1875	A572-65

TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	150 - 145	5		12	22.000	23.000	0.25	A607-60	1.000
2	145 - 140	5		12	23.000	24.000	0.25	A607-60	1.000
3	140 - 135	5		12	24.000	25.000	0.25	A607-60	1.000
4	135 - 130	5		12	25.000	26.000	0.25	A607-60	1.000
5	130 - 125	5		12	26.000	27.001	0.25	A607-60	1.000
6	125 - 120	5		12	27.001	28.001	0.25	A607-60	1.000
7	120 - 115	5		12	28.001	29.001	0.25	A607-60	1.000
8	115 - 111.75	7	3.75	12	29.001	30.401	0.25	A607-60	1.000
9	111.75 - 106.75	5		12	29.151	30.151	0.3125	A607-60	1.000
10	106.75 - 101.75	5		12	30.151	31.151	0.3125	A607-60	1.000
11	101.75 - 96.75	5		12	31.151	32.152	0.3125	A607-60	1.000
12	96.75 - 91.75	5		12	32.152	33.152	0.3125	A607-60	1.000
13	91.75 - 89.5	2.25		12	33.152	33.602	0.3125	A607-60	1.000
14	89.5 - 89.25	0.25		12	33.602	33.652	0.5	A607-60	0.966
15	89.25 - 84.25	5		12	33.652	34.652	0.49375	A607-60	0.968
16	84.25 - 79.25	5		12	34.652	35.653	0.4875	A607-60	0.971
17	79.25 - 74.5	9.5	4.75	12	35.653	37.553	0.48125	A607-60	0.974
18	74.5 - 68.75	5.75		12	35.978	37.128	0.375	A607-65	1.000
19	68.75 - 67.42	1.33		12	37.128	37.394	0.375	A607-65	1.000
20	67.42 - 67.17	0.25		12	37.394	37.444	0.375	A607-65	1.000
21	67.17 - 62.17	5		12	37.444	38.444	0.375	A607-65	1.000
22	62.17 - 57.58	4.59		12	38.444	39.362	0.375	A607-65	1.000
23	57.58 - 57.33	0.25		12	39.362	39.412	0.7	A607-65	1.022
24	57.33 - 56.42	0.91		12	39.412	39.594	0.7	A607-65	1.020
25	56.42 - 56.17	0.25		12	39.594	39.644	0.5875	A607-65	0.967
26	56.17 - 51.17	5		12	39.644	40.644	0.575	A607-65	0.979
27	51.17 - 46.17	5		12	40.644	41.645	0.575	A607-65	0.971
28	46.17 - 41.17	5		12	41.645	42.645	0.5625	A607-65	0.985
29	41.17 - 38	8.67	5.5	12	42.645	44.379	0.5625	A607-65	0.980
30	38 - 31.5	6.5		12	42.529	43.829	0.4375	A607-65	1.000
31	31.5 - 26.5	5		12	43.829	44.829	0.4375	A607-65	1.000
32	26.5 - 26.25	0.25		12	44.829	44.879	0.6875	A607-65	0.973
33	26.25 - 21.25	5		12	44.879	45.879	0.6875	A607-65	0.965
34	21.25 - 16.25	5		12	45.879	46.880	0.675	A607-65	0.976
35	16.25 - 11.25	5		12	46.880	47.880	0.675	A607-65	0.969
36	11.25 - 6.25	5		12	47.880	48.880	0.6625	A607-65	0.980
37	6.25 - 1.25	5		12	48.880	49.880	0.6625	A607-65	0.973
38	1.25 - 0	1.25		12	49.880	50.130	0.6625	A607-65	0.972

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	150 - 145	4.52	29.77	5.78
2	145 - 140	8.14	68.65	11.41
3	140 - 135	8.61	126.94	11.91
4	135 - 130	12.85	198.55	16.95
5	130 - 125	13.44	284.52	17.45
6	125 - 120	14.07	372.98	17.95
7	120 - 115	14.73	464.12	18.49
8	115 - 111.75	15.19	524.71	18.82
9	111.75 - 106.75	19.73	635.44	23.18
10	106.75 - 101.75	20.73	752.85	23.73
11	101.75 - 96.75	21.69	872.68	24.23
12	96.75 - 91.75	22.67	994.97	24.72
13	91.75 - 89.5	23.12	1050.80	24.94
14	89.5 - 89.25	23.20	1057.04	24.96
15	89.25 - 84.25	24.66	1187.70	26.25
16	84.25 - 79.25	26.14	1324.45	27.36
17	79.25 - 74.5	27.47	1455.91	28.02
18	74.5 - 68.75	29.93	1619.56	28.88
19	68.75 - 67.42	30.35	1658.05	29.01
20	67.42 - 67.17	30.45	1665.31	29.02
21	67.17 - 62.17	32.10	1811.64	29.51
22	62.17 - 57.58	33.64	1948.42	30.10
23	57.58 - 57.33	33.76	1955.94	30.12
24	57.33 - 56.42	34.14	1983.41	30.26
25	56.42 - 56.17	34.23	1990.98	30.29
26	56.17 - 51.17	36.00	2144.13	30.99
27	51.17 - 46.17	37.80	2301.23	31.97
28	46.17 - 41.17	39.64	2462.62	32.61
29	41.17 - 38	41.02	2566.54	33.01
30	38 - 31.5	45.17	2783.91	33.92
31	31.5 - 26.5	46.96	2954.81	34.49
32	26.5 - 26.25	47.08	2963.43	34.51
33	26.25 - 21.25	49.35	3137.43	35.11
34	21.25 - 16.25	51.67	3314.42	35.71
35	16.25 - 11.25	54.01	3494.40	36.31
36	11.25 - 6.25	56.39	3677.37	36.91
37	6.25 - 1.25	58.80	3863.35	37.51
38	1.25 - 0	59.40	3910.32	37.67

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
150 - 145	Pole	TP23x22x0.25	Pole	5.4%	Pass
145 - 140	Pole	TP24x23x0.25	Pole	11.4%	Pass
140 - 135	Pole	TP25x24x0.25	Pole	19.2%	Pass
135 - 130	Pole	TP26x25x0.25	Pole	28.2%	Pass
130 - 125	Pole	TP27.001x26x0.25	Pole	37.6%	Pass
125 - 120	Pole	TP28.001x27.001x0.25	Pole	46.3%	Pass
120 - 115	Pole	TP29.001x28.001x0.25	Pole	54.3%	Pass
115 - 111.75	Pole	TP30.401x29.001x0.25	Pole	59.2%	Pass
111.75 - 106.75	Pole	TP30.151x29.151x0.3125	Pole	51.5%	Pass
106.75 - 101.75	Pole	TP31.151x30.151x0.3125	Pole	57.7%	Pass
101.75 - 96.75	Pole	TP32.152x31.151x0.3125	Pole	63.3%	Pass
96.75 - 91.75	Pole	TP33.152x32.152x0.3125	Pole	68.6%	Pass
91.75 - 89.5	Pole	TP33.602x33.152x0.3125	Pole	70.8%	Pass
89.5 - 89.25	Pole + Reinf.	TP33.652x33.602x0.5	Reinf. 3 Tension Rupture	59.6%	Pass
89.25 - 84.25	Pole + Reinf.	TP34.652x33.652x0.4938	Reinf. 3 Tension Rupture	63.7%	Pass
84.25 - 79.25	Pole + Reinf.	TP35.653x34.652x0.4875	Reinf. 3 Tension Rupture	67.8%	Pass
79.25 - 74.5	Pole + Reinf.	TP37.553x35.653x0.4813	Reinf. 3 Tension Rupture	71.3%	Pass
74.5 - 68.75	Pole	TP37.128x35.978x0.375	Pole	67.7%	Pass
68.75 - 67.42	Pole	TP37.394x37.128x0.375	Pole	68.5%	Pass
67.42 - 67.17	Pole	TP37.444x37.394x0.375	Pole	68.6%	Pass
67.17 - 62.17	Pole	TP38.444x37.444x0.375	Pole	71.5%	Pass
62.17 - 57.58	Pole	TP39.362x38.444x0.375	Pole	74.0%	Pass
57.58 - 57.33	Pole + Reinf.	TP39.412x39.362x0.7	Reinf. 2 Tension Rupture	56.9%	Pass
57.33 - 56.42	Pole + Reinf.	TP39.594x39.412x0.7	Reinf. 2 Tension Rupture	57.3%	Pass
56.42 - 56.17	Pole + Reinf.	TP39.644x39.594x0.5875	Reinf. 2 Tension Rupture	68.7%	Pass
56.17 - 51.17	Pole + Reinf.	TP40.644x39.644x0.575	Reinf. 2 Tension Rupture	70.9%	Pass
51.17 - 46.17	Pole + Reinf.	TP41.645x40.644x0.575	Reinf. 2 Tension Rupture	73.1%	Pass
46.17 - 41.17	Pole + Reinf.	TP42.645x41.645x0.5625	Reinf. 2 Tension Rupture	75.1%	Pass
41.17 - 38	Pole + Reinf.	TP44.379x42.645x0.5625	Reinf. 2 Tension Rupture	76.4%	Pass
38 - 31.5	Pole	TP43.829x42.529x0.4375	Pole	71.9%	Pass
31.5 - 26.5	Pole	TP44.829x43.829x0.4375	Pole	73.5%	Pass
26.5 - 26.25	Pole + Reinf.	TP44.879x44.829x0.6875	Reinf. 1 Tension Rupture	66.5%	Pass
26.25 - 21.25	Pole + Reinf.	TP45.879x44.879x0.6875	Reinf. 1 Tension Rupture	67.9%	Pass
21.25 - 16.25	Pole + Reinf.	TP46.88x45.879x0.675	Reinf. 1 Tension Rupture	69.2%	Pass
16.25 - 11.25	Pole + Reinf.	TP47.88x46.88x0.675	Reinf. 1 Tension Rupture	70.4%	Pass
11.25 - 6.25	Pole + Reinf.	TP48.88x47.88x0.6625	Reinf. 1 Tension Rupture	71.6%	Pass
6.25 - 1.25	Pole + Reinf.	TP49.88x48.88x0.6625	Reinf. 1 Tension Rupture	72.7%	Pass
1.25 - 0	Pole + Reinf.	TP50.13x49.88x0.6625	Reinf. 1 Tension Rupture	73.0%	Pass
				Summary	
			Pole	74.0%	Pass
			Reinforcement	76.4%	Pass
			Overall	76.4%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity*				
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4
150 - 145	1211	n/a	1211	18.29	n/a	18.29	5.4%				
145 - 140	1378	n/a	1378	19.09	n/a	19.09	11.4%				
140 - 135	1560	n/a	1560	19.90	n/a	19.90	19.2%				
135 - 130	1757	n/a	1757	20.70	n/a	20.70	28.2%				
130 - 125	1970	n/a	1970	21.50	n/a	21.50	37.6%				
125 - 120	2199	n/a	2199	22.31	n/a	22.31	46.3%				
120 - 115	2445	n/a	2445	23.11	n/a	23.11	54.3%				
115 - 111.75	2615	n/a	2615	23.63	n/a	23.63	59.2%				
111.75 - 106.75	3417	n/a	3417	29.98	n/a	29.98	51.5%				
106.75 - 101.75	3772	n/a	3772	30.99	n/a	30.99	57.7%				
101.75 - 96.75	4151	n/a	4151	31.99	n/a	31.99	63.3%				
96.75 - 91.75	4555	n/a	4555	33.00	n/a	33.00	68.6%				
91.75 - 89.5	4745	n/a	4745	33.45	n/a	33.45	70.8%				
89.5 - 89.25	4766	2729	7495	33.50	18.00	51.50	43.8%			59.6%	
89.25 - 84.25	5208	2888	8096	34.50	18.00	52.50	47.4%			63.7%	
84.25 - 79.25	5676	3050	8727	35.51	18.00	53.51	51.1%			67.8%	
79.25 - 74.5	6147	3209	9356	36.46	18.00	54.46	54.4%			71.3%	
74.5 - 68.75	7662	n/a	7662	44.32	n/a	44.32	67.7%				
68.75 - 67.42	7829	n/a	7829	44.64	n/a	44.64	68.5%				
67.42 - 67.17	7861	n/a	7861	44.70	n/a	44.70	68.6%				
67.17 - 62.17	8515	n/a	8515	45.90	n/a	45.90	71.5%				
62.17 - 57.58	9146	n/a	9146	47.01	n/a	47.01	74.0%				
57.58 - 57.33	9185	7695	16880	47.07	42.00	89.07	40.8%		56.9%		54.5%
57.33 - 56.42	9314	7764	17078	47.29	42.00	89.29	41.2%		57.3%		54.9%
56.42 - 56.17	9346	4993	14339	47.35	24.00	71.35	47.2%		68.7%		
56.17 - 51.17	10078	5240	15318	48.56	24.00	72.56	49.3%		70.9%		
51.17 - 46.17	10848	5493	16341	49.76	24.00	73.76	51.3%		73.1%		
46.17 - 41.17	11656	5752	17408	50.97	24.00	74.97	53.4%		75.1%		
41.17 - 38	12188	5919	18107	51.73	24.00	75.73	54.6%		76.4%		
38 - 31.5	14710	n/a	14710	61.04	n/a	61.04	71.9%				
31.5 - 26.5	15751	n/a	15751	62.45	n/a	62.45	73.5%				
26.5 - 26.25	15804	8704	24508	62.52	32.50	95.02	46.0%	66.5%			
26.25 - 21.25	16896	9083	25978	63.92	32.50	96.42	47.4%	67.9%			
21.25 - 16.25	18036	9470	27506	65.33	32.50	97.83	48.7%	69.2%			
16.25 - 11.25	19226	9865	29091	66.74	32.50	99.24	50.1%	70.4%			
11.25 - 6.25	20468	10268	30737	68.15	32.50	100.65	51.4%	71.6%			
6.25 - 1.25	21762	10680	32442	69.55	32.50	102.05	52.7%	72.7%			
1.25 - 0	22094	10784	32878	69.90	32.50	102.40	53.0%	73.0%			

Note: Section capacity checked in 5 degree increments.
Rating per TIA-222-H Section 15.5.

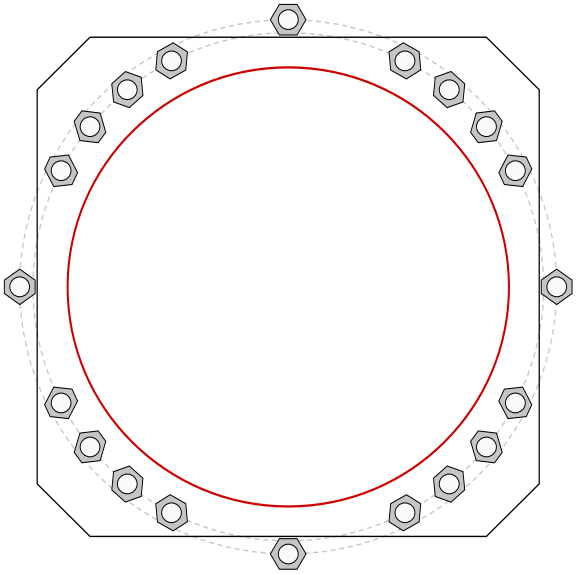
Monopole Base Plate Connection

Site Info	
BU #	876341
Site Name	dletown 2 - Marino Prop
Order #	479819 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	Yes
l_{ar} (in)	0

Applied Loads	
Moment (kip-ft)	3910.32
Axial Force (kips)	59.40
Shear Force (kips)	37.67

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

GROUP 1: (16) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 58" BC

Anchor Spacing: 6 in

GROUP 2: (4) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 61" BC

Base Plate Data

57" OD x 3" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Stiffener Data

N/A

Pole Data

50.13" x 0.4375" 12-sided pole (A607-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

GROUP 1:		
Pu_c = 162.04	ϕPn_c = 243.75	**Stress Rating**
Vu = 2.35	ϕVn = 73.13	**63.4%**
Mu = n/a	ϕMn = n/a	**Pass**
GROUP 2:		
Pu_c = 166.54	ϕPn_c = 243.75	**Stress Rating**
Vu = 0	ϕVn = 73.13	**65.1%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	29.23	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	**61.9%**	**Pass**

Drilled Pier Foundation

BU # :	876341
Site Name:	Middletown 2 - Marino
Order Number:	479819 Rev. 0

TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	3910	
Axial Force (kips)	59	
Shear Force (kips)	38	

Material Properties		
Concrete Strength, f'c:	3	ksi
Rebar Strength, Fy:	60	ksi

Pier Design Data		
Depth	18.5	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 18.5' below grade		
Pier Diameter	7	ft
Rebar Quantity	32	
Rebar Size	11	
Clear Cover to Ties	4	in
Tie Size	5	

Analysis Results		
Soil Lateral Capacity	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	4.88	-
Soil Safety Factor	2.70	-
Max Moment (kip-ft)	4140.18	-
Rating*	*47.0%*	-
Soil Vertical Capacity	*Compression*	*Uplift*
Skin Friction (kips)	493.73	-
End Bearing (kips)	758.82	-
Weight of Concrete (kips)	131.62	-
Total Capacity (kips)	1252.55	-
Axial (kips)	190.62	-
Rating*	*14.5%*	-
Reinforced Concrete Capacity	*Compression*	*Uplift*
Critical Depth (ft from TOC)	4.88	-
Critical Moment (kip-ft)	4140.18	-
Critical Moment Capacity	7529.29	-
Rating*	*52.4%*	-

Soil Interaction Rating*	**47.0%**
Structural Foundation Rating*	**52.4%**

*Rating per TIA-222-H Section 15.5

Check Limitation	
Apply TIA-222-H Section 15.5:	☑
N/A	☐

Soil Profile				
Groundwater Depth	n/a	ft	# of Layers	3

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.5	3.5	120	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.5	4	0.5	120	150	0	32	0.557	0.557				38	Cohesionless
3	4	18.5	14.5	125	150	4	0	2.045	2.045			26.29		Cohesive

FDH INFRASTRUCTURE SERVICES
ENGINEERING INNOVATION

FDH-IS -- 6521 Meridien Drive, Raleigh, NC 27616 -- Ph. 919.755.1012 -- Fax 919.755.1031

Version: 2.4
Version Date: 10/31/2016

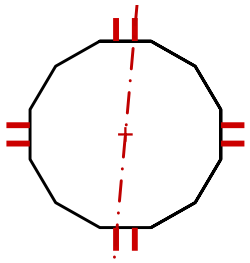
Base Transfer Stiffener

Project & Site Details	
Project No.	19BNXE1400 (R1)
Project Name	Middletown 2 - Marino Property
Site ID	876341
Date	July 29, 2019
Code	ANSI/TIA-222-H
Maximum Stress Ratio	100%

Pole Properties		
Pole Diameter	50.13	in
Pole Thickness	0.4375	in
Pole Grade	A607-65	
Number of Sides	12	Sided

Stiffener Properties		
Stiffener Quantity	8	Stiffeners
Any Symmetric Plates?	N	(Y/N)

Tower Reactions		
Moment	3910	k-ft
Axial	59	kips
Shear	38	kips



Optional Inputs	
Axis Angle to 0° (°)	175
Additional Inertia (in^4)	

Centroid		
x	0.0000	in
y	0.0000	in

Moment of Inertia		
	I (in^4)	Angle (°)
Min.	39469.9	0
Max.	39469.9	43
Current	**39469.9**	**175**

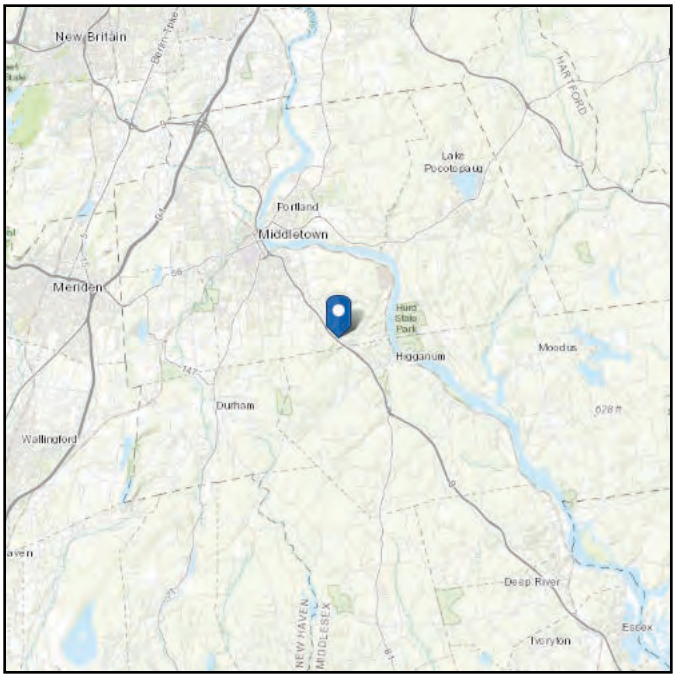
Individual Stiffener Input					
Stiffener Name	Angle to 0° (°)	Axis Angle of Max (°)	Controlling Case	Percentage	Pass/Fail
1. PL 10x0.5	5	95	Horizontal Weld	95.6%	Pass
1. PL 10x0.5	85	175	Horizontal Weld	95.6%	Pass
1. PL 10x0.5	95	5	Horizontal Weld	95.6%	Pass
1. PL 10x0.5	175	85	Horizontal Weld	95.6%	Pass
1. PL 10x0.5	185	95	Horizontal Weld	95.6%	Pass
1. PL 10x0.5	265	175	Horizontal Weld	95.6%	Pass
1. PL 10x0.5	275	5	Horizontal Weld	95.6%	Pass
1. PL 10x0.5	355	85	Horizontal Weld	95.6%	Pass
Pole		0	Stress	44.8%	Pass
			Overall	**95.6%**	**Pass**

Stiffener Input													
Stiffener Name	Width (in)	Thickness (in)	Considering Plate Capacity (Y/N)	Height (in)	Notch (in)	Offset from Pole (in)	Grade	Weld Electrode (ksi)	Vertical Weld Size (in)	Horizontal Weld Type	Groove Angle (°)	Horizontal Groove Size (in)	Horizontal Fillet Size (in)
1. PL 10x0.5	10	0.5	Y	30	0.75	0	A572-50	70	1/4	Double Sided	0	0	0.25

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-10	**Elevation:**	369.73 ft (NAVD 88)
Risk Category:	II	**Latitude:**	41.510639
Soil Class:	D - Stiff Soil	**Longitude:**	-72.593361



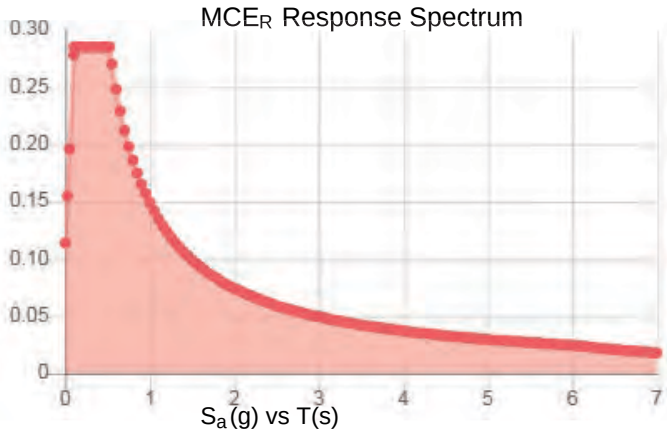
Seismic

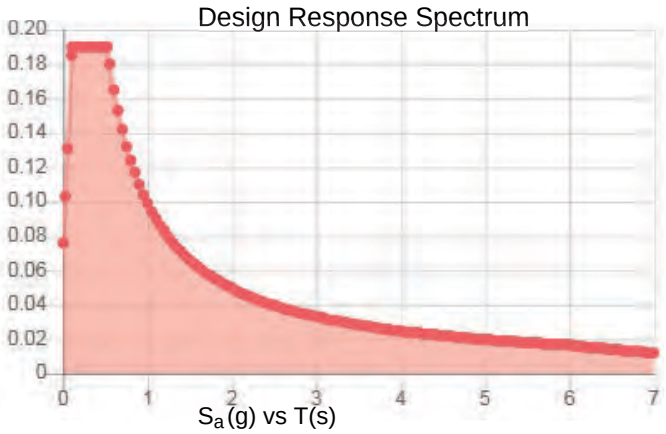
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.178	S_{DS} :	0.19
S_1 :	0.062	S_{D1} :	0.099
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.091
S_{MS} :	0.285	PGA_M :	0.145
S_{M1} :	0.149	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Mon Jul 22 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:	Mon Jul 22 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.

Exhibit E

Mount Analysis

PAUL J. FORD & COMPANY

Date: June 19, 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 Replacement Report**	
Carrier Designation:	***T-Mobile* Equipment Change-out**	
	Carrier Site Number:	CT11234C
	Carrier Site Name:	Middletown/Rt9
Crown Castle Designation:	**Crown Castle BU Number:**	876341
	Crown Castle Site Name:	Middletown 2 - Marino Property
	Crown Castle JDE Job Number:	559328
	Crown Castle Purchase Order Number:	1400303
	Crown Castle Order Number:	479819 Rev. 0
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	A37519-1583.003.7190
Site Data:	**1969 Saybrook Rd, Middletown, Middlesex County, CT** **Latitude 41.510639°, Longitude -72.593361°**	
Structure Information:	**Tower Height & Type:**	**150 Foot Monopole**
	Mount Elevation:	**111 Foot**
	Mount Type:	**(1) 12.5 Foot Platform**

Dear Charles Mcguirt,

Paul J Ford and Company is pleased to submit this "Mount Replacement 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:

12.5' Platform **94.1%** **SUFFICIENT***

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

This analysis utilizes an ultimate 3-second gust wind speed of 130 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.

Mount analysis prepared by: Burak Gul

Respectfully submitted by:

Anthony Pelino, E.I.
Structural Designer
APelino@pauljford.com

D.S.

STATE OF CONNECTICUT
KRISTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER

2019.06.27
16:17:27-04'00'

TABLE OF CONTENTS

1) INTRODUCTION

The proposed mount under consideration is (1) 12.5' Platform mount designated as a SitePro1 RMQP-496-HK.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	130 mph
Exposure Category:	B
Topographic Factor at Base:	1.00
Topographic Factor at Mount:	1.00
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
111	110	3	RFS CELWAVE	APXVAARR24_43-U-NA20	(1) 12.5' Platform
		3	ERICSSON	KRY 112 144/1	
		3	ERICSSON	KRY 112 489/2	
		3	ERICSSON	RADIO 4449 B12/B71	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Mount Manufacturer Drawings	SitePro1 Model #: RMQP-496-HK Dated: 7/14/2014	-	SitePro1
Order	ID: 479819 Rev. 0 Dated: 5/29/2019	-	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	111	19.0	Pass
1	Support Rails		9.9	Pass
1	Grating Support Members		23.7	Pass
1	Standoff Members		41.6	Pass
1	Corner Plates		19.8	Pass
1	Mount Pipes		94.1	Pass
1	Mount to Tower Connection		56.3	Pass

Mount Rating (max from all components) =	94.1%

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

4.1) Recommendations

The existing mount does not have sufficient capacity to support the existing and proposed loading. In order for the results of the analysis to be considered valid, the mount listed below shall be installed to support the proposed loading configuration.

- SitePro1 – RMQP-496-HK

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.

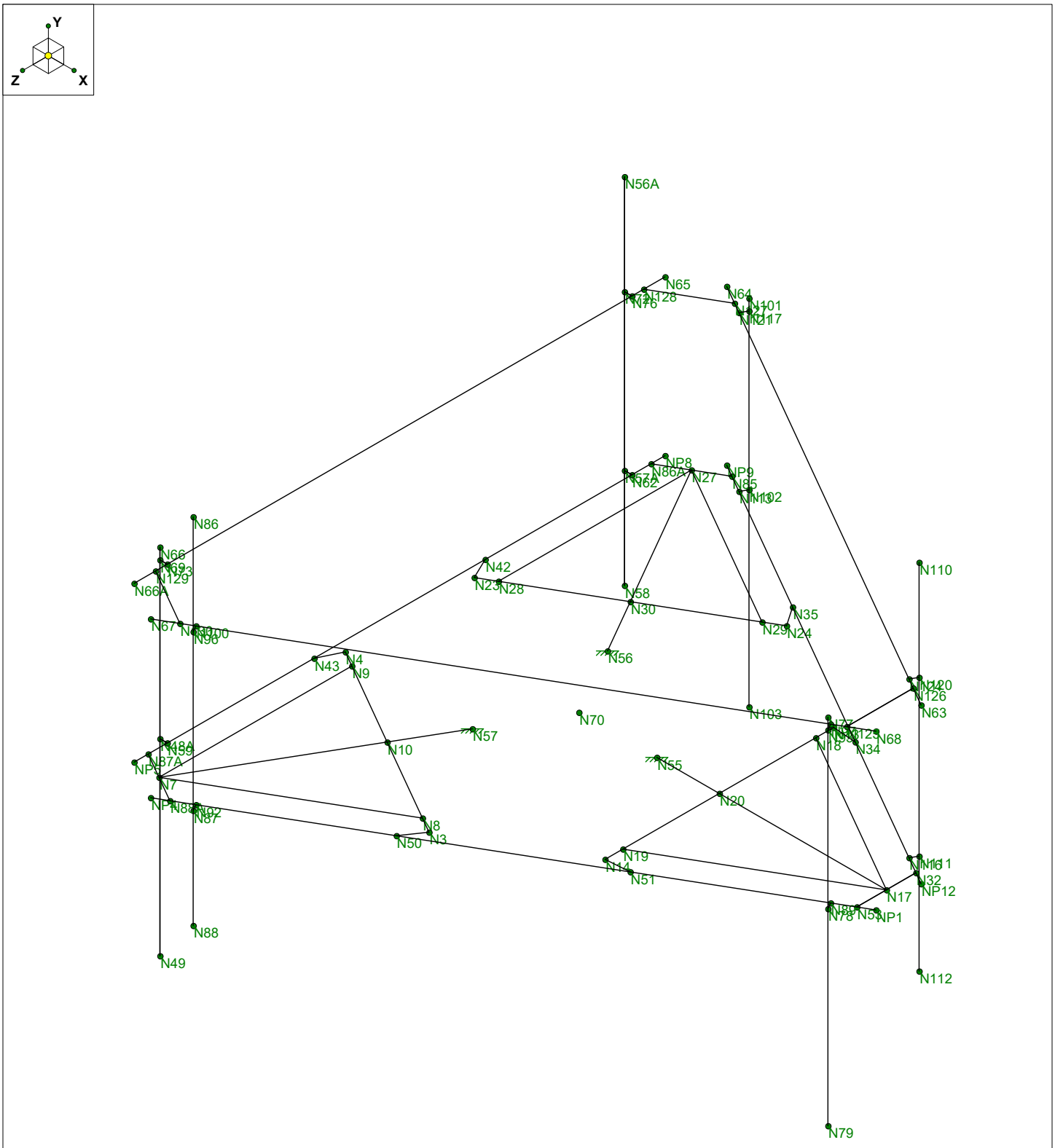
4) The standard of care for all Professional Engineering Services performed or furnished by Paul J. Ford and Company under this project will be the skill and care used by members of the Consultant's profession practicing under similar circumstances at the same time and in the same locality.

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

PJF	876341 / MIDDLETOWN 2 - MARINO PROPERTY	SK - 1
DBG		June 19, 2019 at 3:43 PM
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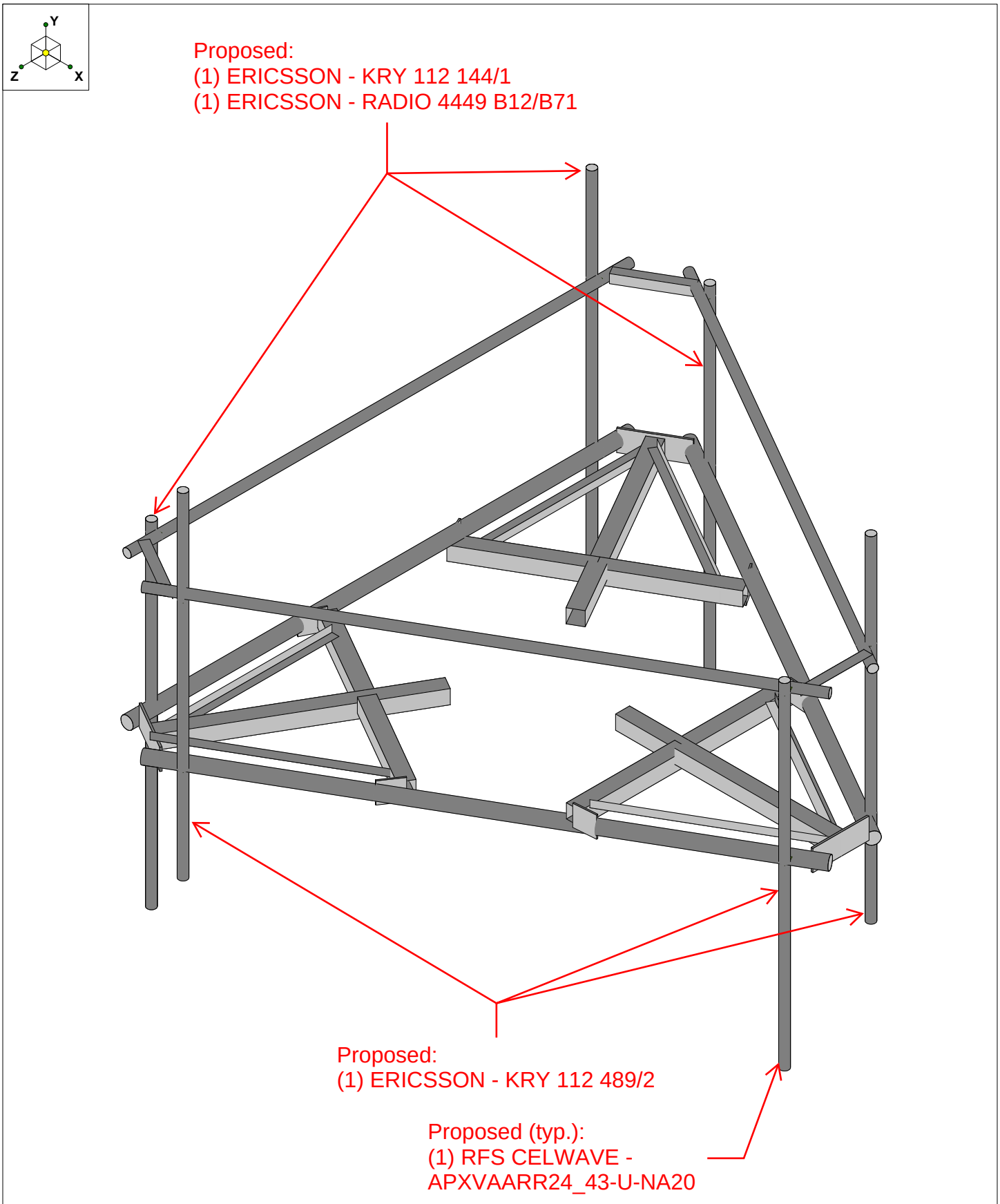


Envelope Only Solution

PJF	876341 / MIDDLETOWN 2 - MARINO PROPERTY	SK - 2
DBG		June 19, 2019 at 3:43 PM
37519-1583.003.7190		37519-1583.003.7190_Wind Load....

APPENDIX B

SOFTWARE INPUT CALCULATION

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Project # A37519-1538.003.7190
By DBG

Analysis 30 degrees

Date: 06/18/19

v1.2, Effective 4/18/19

Mount Loading per TIA-222-H

Structure Information

Mount Type =	3 Sectors	
Mount Elev, z =	111	ft
Ground Elev, z_s =	369	ft
Wind Speed =	130	mph
Ice Wind Speed =	50	mph
Ice Thickness =	1.5	in
Exposure Cat =	B	
Structure Class =	II	
Topographic Cat =	1	
Crest Height =	0	ft

Velocity Pressure Coefficients

z_g =	1200	ft	
a =	7.00		
K_{zmin} =	0.70		
K_z =	1.02		Calculated Value
Ke =	0.99		Ground Elevation Factor
K_z =	1.02		Velocity Press Coef (Section 2.6.5.2)
K_{zt} =	1.00		Topographic Factor (Section 2.6.6.4)
Gh =	1.00		Gust Effect Factor (Section 2.6.7)
K_d =	0.95		Wind Dir Probability Factor (Table 2-2)
K_a =	0.90		Shielding factor (Section 16.6)
q_z=	37.16	psf	Velocity Pressure (Section 2.6.9.6)

Ice Loading

Ii =	1.00		Ice Importance Factor (Table 2-3)
Iwi =	1.00		Wind Ice Importance Factor (Table 2-3)
q_z=	6.19	psf	Ice Velocity Pressure (Section 2.6.9.6)
K_{iz} =	1.13		Ice Escalation Factor (Section 2.6.8)
T_{iz} =	1.69	in	Factored Ice Thickness (Section 2.6.8)
h =	1.00	in	Bar Grating Height
W_i =	12.57	psf	Grating Ice Weight

Wind Pressures

Pressure =	37.162	psf
Ice Pressure =	6.190	psf

Antenna Attachment Labels & Elevations (inches with Respect to Bottom of Member)

Face	Label	Top Elev (in)	Bot Elev (in)	Length, in	Face	Label	Top Elev (in)	Bot Elev (in)	Length, in	Face	Label	Top Elev (in)	Bot Elev (in)	Length, in	Face	Label	Top Elev (in)	Bot Elev (in)
A	A1	75.0	3.05	96.0	B	B1	75.0	3.05	96.0	C	C1	75.0	3.05	96.0	D			
A (2)	A1	39.0	39	96.0	B (2)	B1	39.0	39	96.0	C (2)	C1	39.0	39	96.0	D			
A	A2	15.0	15	96.0	B	B2	15.0	15	96.0	C	C2	15.0	15	96.0	D			
A (3)	A1	39.0	39	96.0	B (3)	B1	39.0	39	96.0	C					D			
A (2)	A2	15	15	96.0	B					C					D			
A					B					C					D			
A					B					C					D			
A					B					C					D			
A					B					C					D			
A					B					C					D			

Antennas

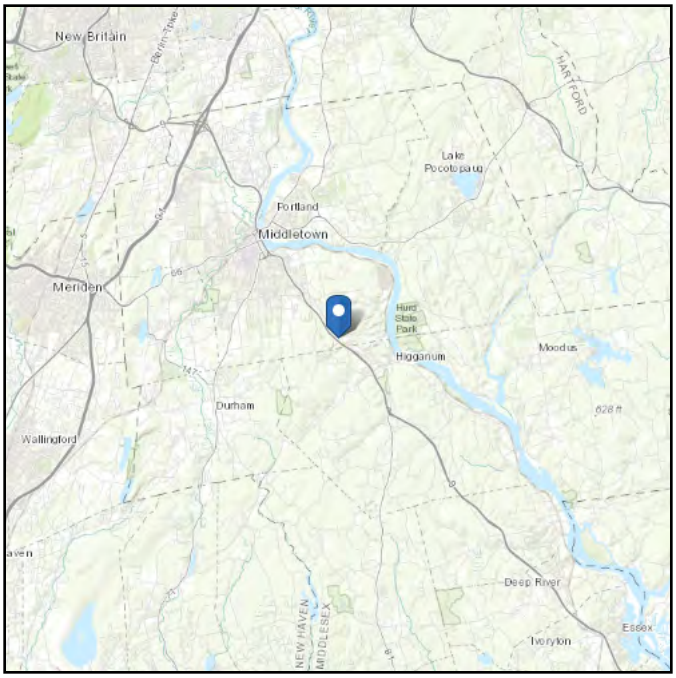
Item	Manufacturer	Antenna	Height (in)	Width (in)	Depth (in)	Flat or Round	Weight (lbs)	Antenna Attachment Locations					
								Label	Label	Label	Label	Label	Label
1	RFS CELWAVE	APXVAARR24_43-U-NA20	95.9	24	8.7	Flat	128	A1	B1	C1			
2	ERICSSON	KRY 112 144/1	7	6	3	Flat	11	A1(2)	A2	B1(2)			
3	ERICSSON	KRY 112 489/2	11	6.1	3.94	Flat	15.4	B2	C1(2)	C2			
4	ERICSSON	RADIO 4449 B12/B71	15	13.2	9.3	Flat	74	A1(3)	A2(2)	B1(3)			

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 369.73 ft (NAVD 88)
Latitude: 41.510639
Longitude: -72.593361



Wind

Results:

Wind Speed:	126 Vmph
10-year MRI	78 Vmph
25-year MRI	87 Vmph
50-year MRI	95 Vmph
100-year MRI	103 Vmph

130 mph per jurisdiction requirements

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

Date Accessed: Mon May 20 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.

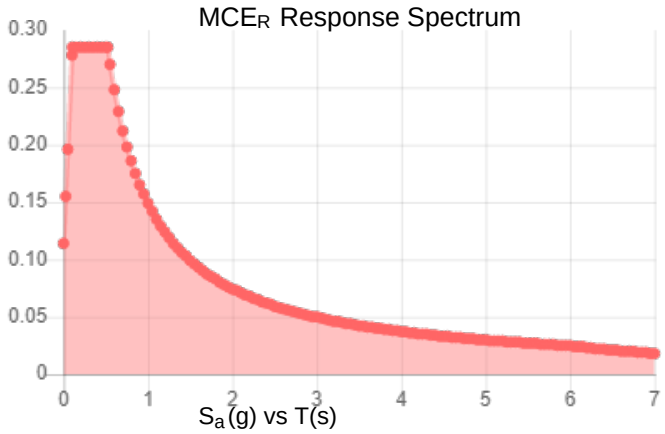
Seismic

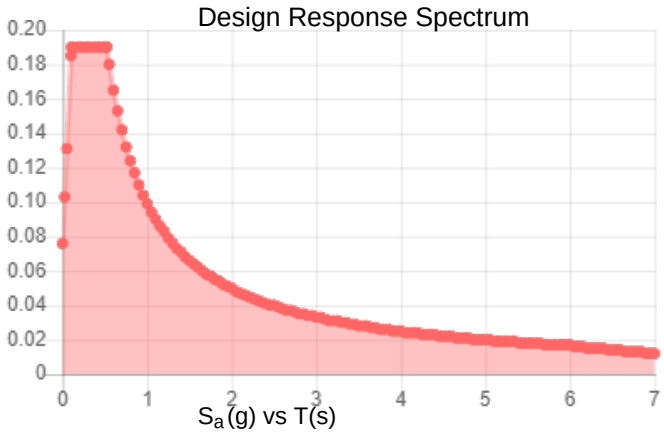
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.178	S_{DS} :	0.19
S_1 :	0.062	S_{D1} :	0.099
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.091
S_{MS} :	0.285	PGA_M :	0.145
S_{M1} :	0.149	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Mon May 20 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:

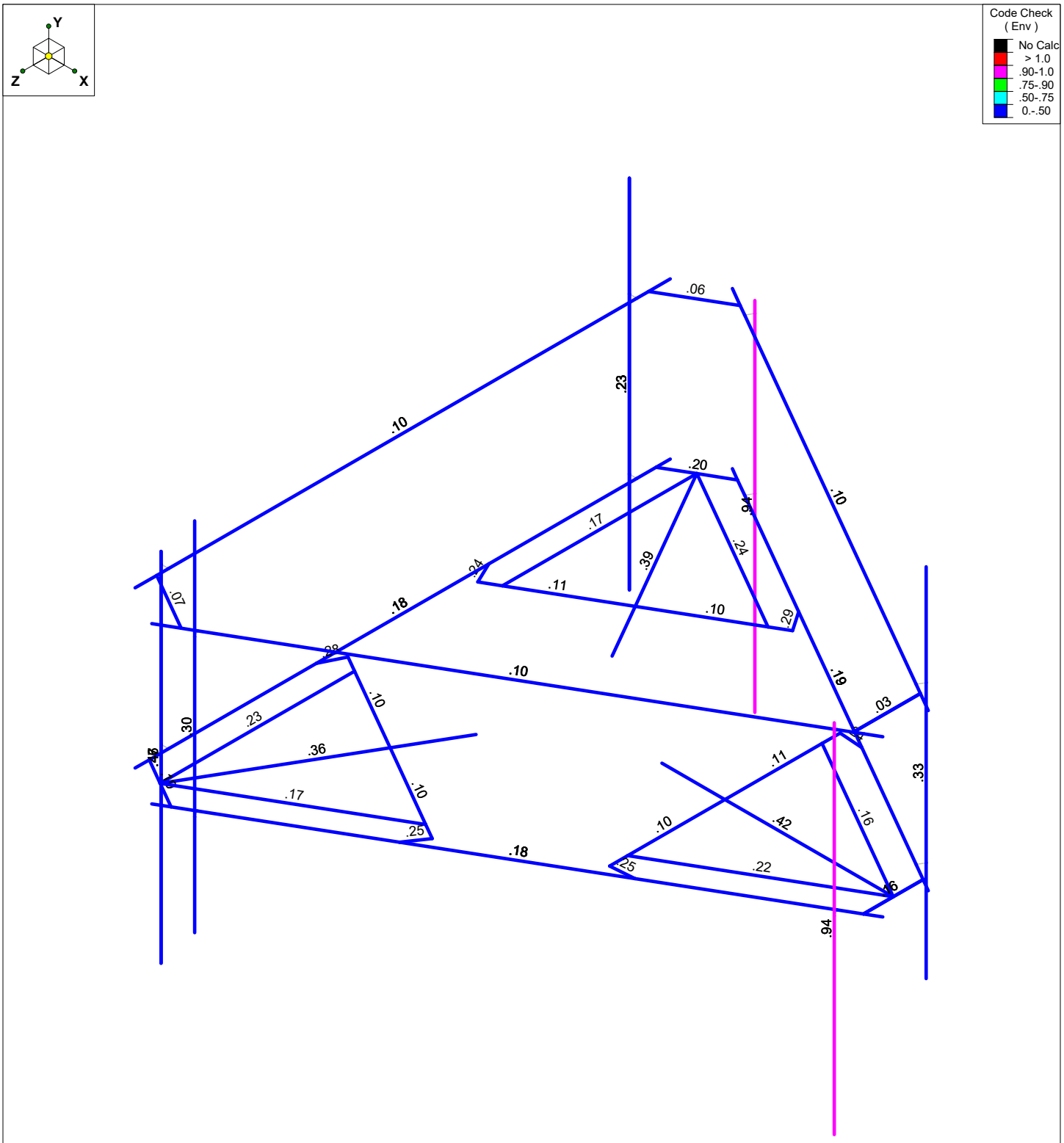
Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Mon May 20 2019

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.

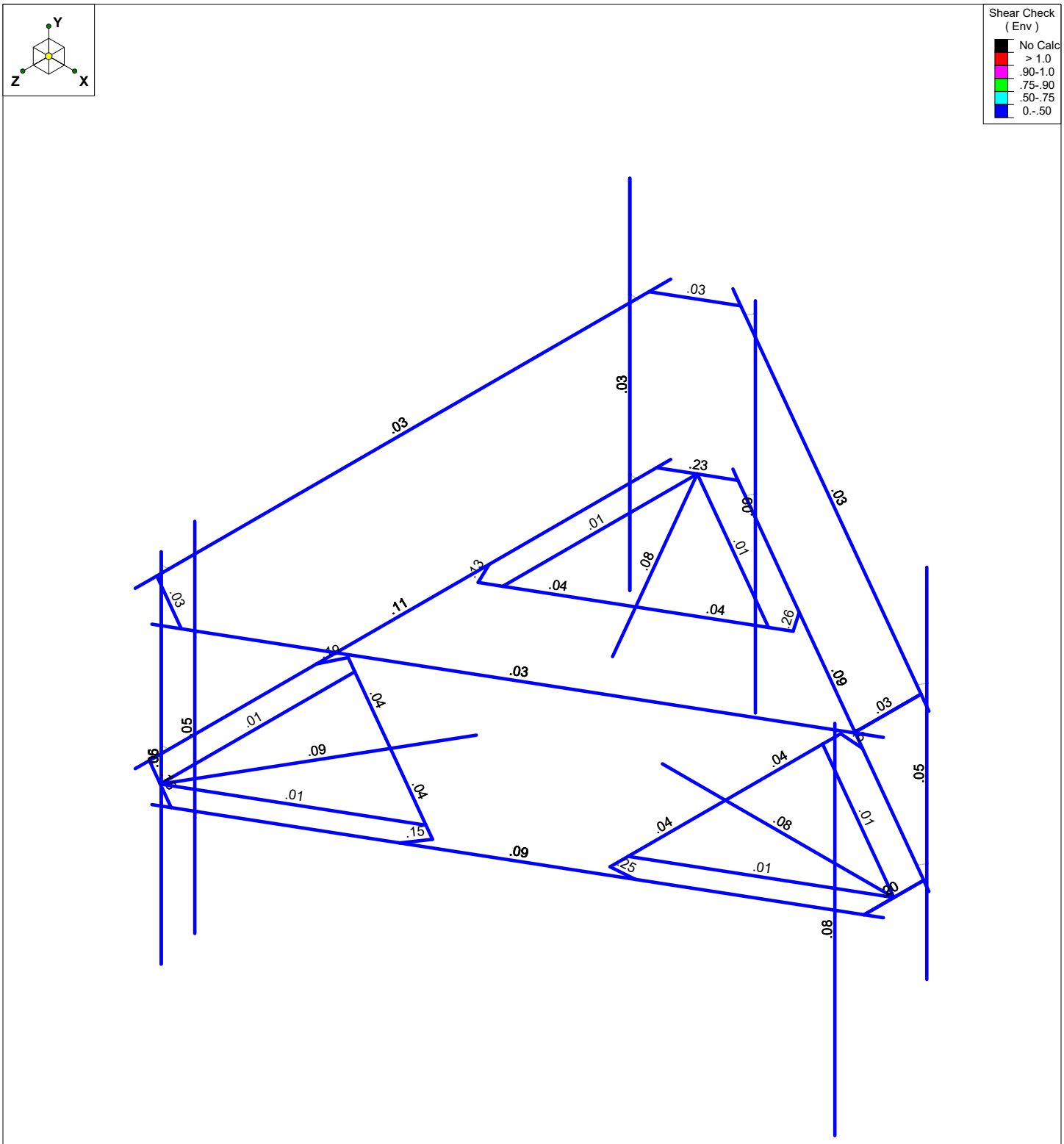
APPENDIX C

SOFTWARE ANALYSIS OUTPUT



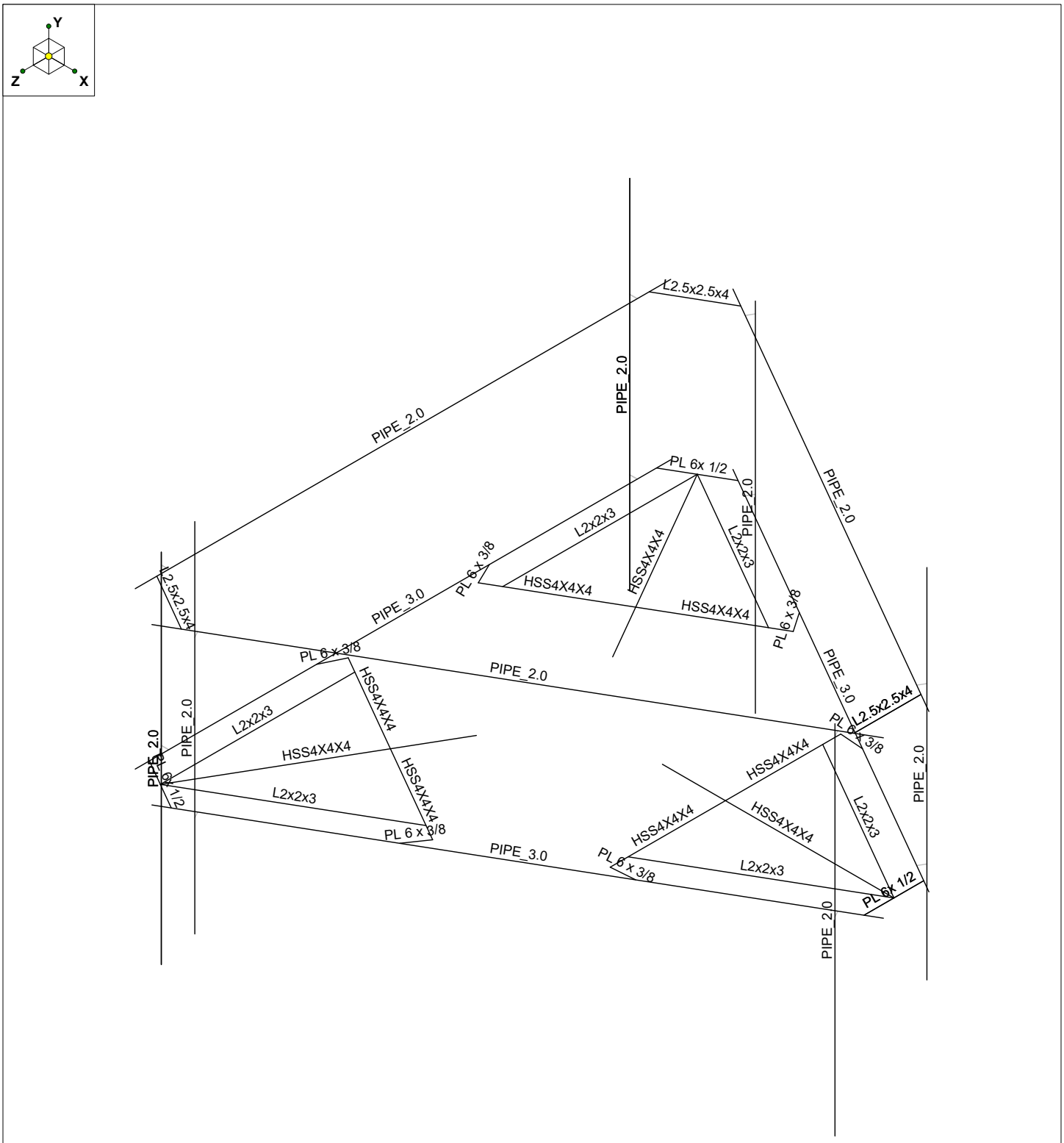
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

PJF	876341 / MIDDLETOWN 2 - MARINO PROPERTY	SK - 3
DBG		June 19, 2019 at 3:44 PM
37519-1583.003.7190		37519-1583.003.7190_Wind Load....



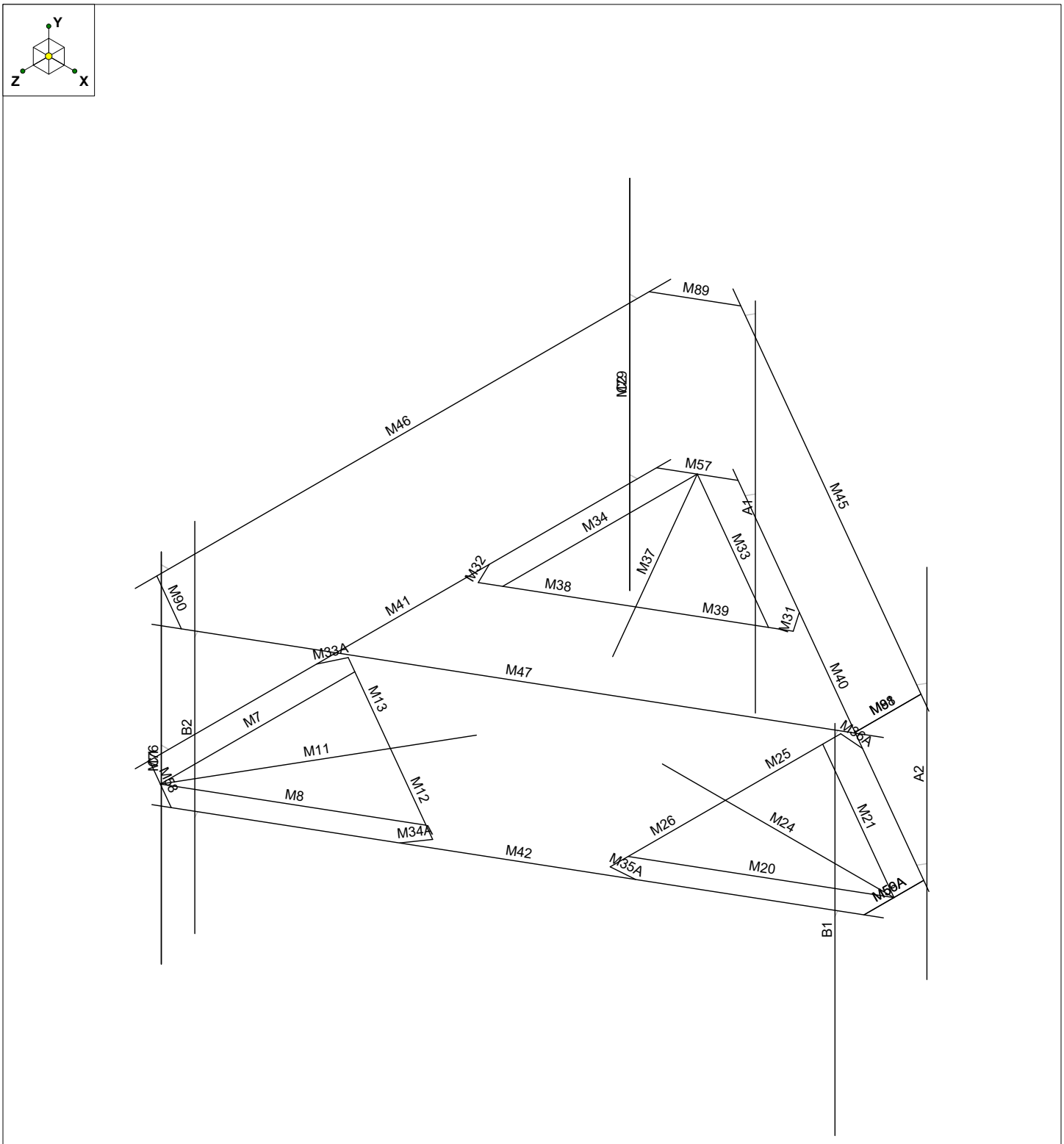
Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

PJF	876341 / MIDDLETOWN 2 - MARINO PROPERTY	SK - 4
DBG		June 19, 2019 at 3:44 PM
37519-1583.003.7190		37519-1583.003.7190_Wind Load....



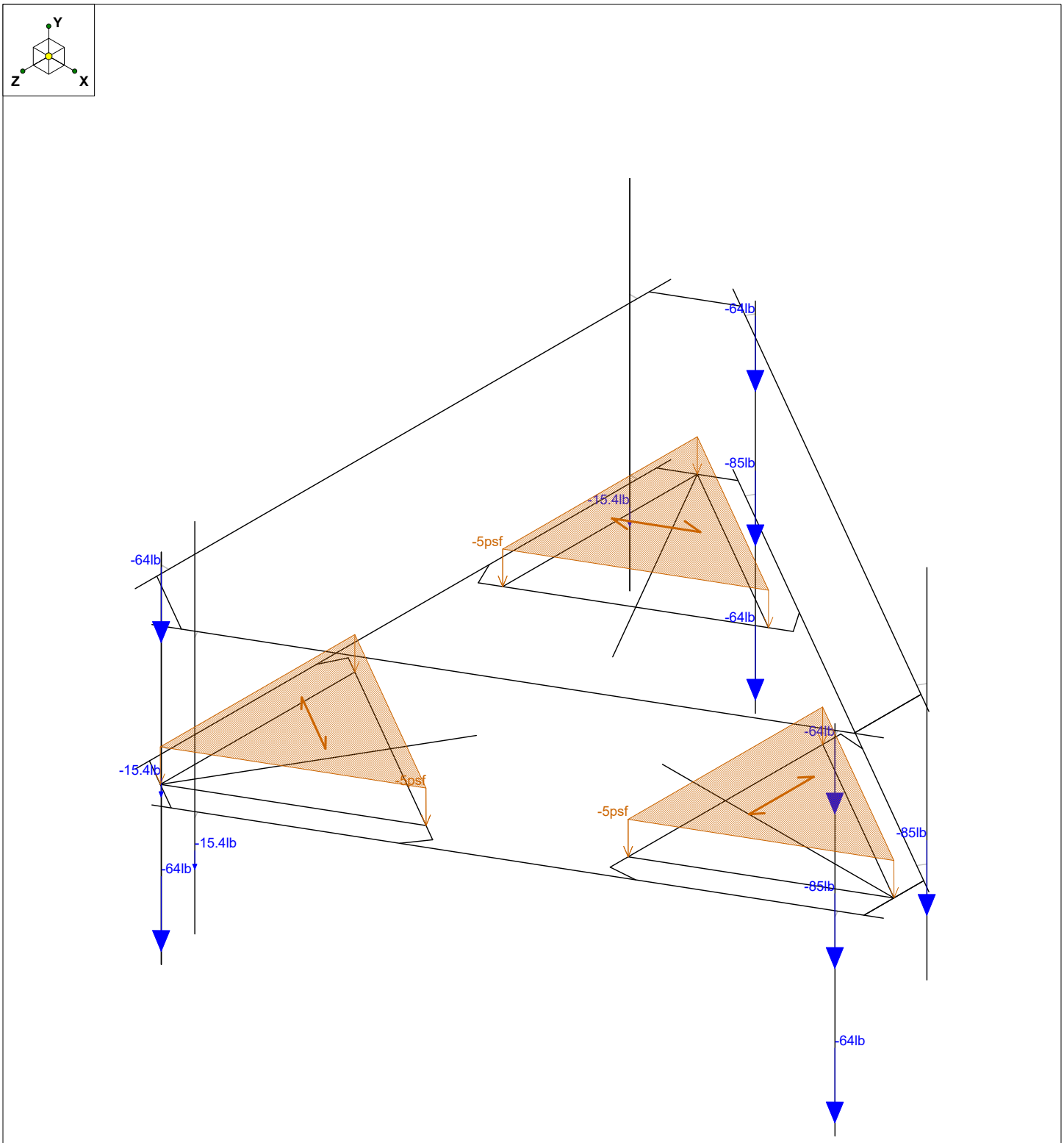
Envelope Only Solution

PJF	876341 / MIDDLETOWN 2 - MARINO PROPERTY	SK - 5
DBG		June 19, 2019 at 3:45 PM
37519-1583.003.7190		37519-1583.003.7190_Wind Load....



Envelope Only Solution

PJF	876341 / MIDDLETOWN 2 - MARINO PROPERTY	SK - 6
DBG		June 19, 2019 at 3:45 PM
37519-1583.003.7190		37519-1583.003.7190_Wind Load....



Loads: BLC 1, Dead
Envelope Only Solution

PJF	876341 / MIDDLETOWN 2 - MARINO PROPERTY	SK - 7
DBG		June 19, 2019 at 3:45 PM
37519-1583.003.7190		37519-1583.003.7190_Wind Load....

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Standard Skyline
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	None
Cold Formed Steel Code	None
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	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/f...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.5	58	1.2
7	Q235	29000	11154	.3	.65	.49	34	1.5	58	1.2
8	J429-Gr5	29000	11154	.3	.65	.49	92	1.5	120	1.2

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(de...	Section/Shape	Type	Design List	Material	Design Rules
1	M41A	N62	N57A			RIGID	None	None	RIGID	Typical
2	M44	N59	N48A			RIGID	None	None	RIGID	Typical
3	M48	N76	N72			RIGID	None	None	RIGID	Typical
4	M51	N73	N69			RIGID	None	None	RIGID	Typical
5	M56	N92	N87			RIGID	None	None	RIGID	Typical
6	M59	N89	N78			RIGID	None	None	RIGID	Typical
7	M60	N100	N96			RIGID	None	None	RIGID	Typical
8	M63	N97	N93			RIGID	None	None	RIGID	Typical
9	M68	N116	N111			RIGID	None	None	RIGID	Typical
10	M71	N113	N102			RIGID	None	None	RIGID	Typical
11	M72	N124	N120			RIGID	None	None	RIGID	Typical
12	M75	N121	N117			RIGID	None	None	RIGID	Typical
13	M80	N62	N57A			RIGID	None	None	RIGID	Typical
14	M83	N59	N48A			RIGID	None	None	RIGID	Typical
15	M84	N76	N72			RIGID	None	None	RIGID	Typical
16	M87	N73	N69			RIGID	None	None	RIGID	Typical
17	M56A	N32	N53			PL 6x 1/2	None	None	A36 Gr.36	Typical
18	M57	N86A	N85			PL 6x 1/2	None	None	A36 Gr.36	Typical
19	M58	N88A	N87A			PL 6x 1/2	None	None	A36 Gr.36	Typical
20	M59A	N32	N53			PL 6x 1/2	None	None	A36 Gr.36	Typical
21	M31	N35	N24			PL 6 x 3/8	None	None	A36 Gr.36	Typical
22	M32	N42	N23			PL 6 x 3/8	None	None	A36 Gr.36	Typical
23	M33A	N43	N4			PL 6 x 3/8	None	None	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(de...	Section/Shape	Type	Design List	Material	Design Rules
24	M34A	N50	N3			PL 6 x 3/8	None	None	A36 Gr.36	Typical
25	M35A	N51	N14			PL 6 x 3/8	None	None	A36 Gr.36	Typical
26	M36A	N34	N13			PL 6 x 3/8	None	None	A36 Gr.36	Typical
27	M40	NP12	NP9			PIPE_3.0	None	None	A53 Gr.B	Typical
28	M41	NP8	NP5			PIPE_3.0	None	None	A53 Gr.B	Typical
29	M42	NP4	NP1			PIPE_3.0	None	None	A53 Gr.B	Typical
30	C1	N49	N66			PIPE_2.0	None	None	A53 Gr.B	Typical
31	C2	N58	N56A			PIPE_2.0	None	None	A53 Gr.B	Typical
32	M45	N63	N64			PIPE_2.0	None	None	A53 Gr.B	Typical
33	M46	N65	N66A			PIPE_2.0	None	None	A53 Gr.B	Typical
34	M47	N67	N68			PIPE_2.0	None	None	A53 Gr.B	Typical
35	B1	N79	N77			PIPE_2.0	None	None	A53 Gr.B	Typical
36	B2	N88	N86			PIPE_2.0	None	None	A53 Gr.B	Typical
37	A1	N103	N101			PIPE_2.0	None	None	A53 Gr.B	Typical
38	A2	N112	N110			PIPE_2.0	None	None	A53 Gr.B	Typical
39	M76	N49	N66			PIPE_2.0	None	None	A53 Gr.B	Typical
40	M79	N58	N56A			PIPE_2.0	None	None	A53 Gr.B	Typical
41	M7	N7	N9			L2x2x3	None	None	A36 Gr.36	Typical
42	M8	N7	N8		270	L2x2x3	None	None	A36 Gr.36	Typical
43	M20	N17	N19			L2x2x3	None	None	A36 Gr.36	Typical
44	M21	N17	N18		270	L2x2x3	None	None	A36 Gr.36	Typical
45	M33	N27	N29			L2x2x3	None	None	A36 Gr.36	Typical
46	M34	N27	N28		270	L2x2x3	None	None	A36 Gr.36	Typical
47	M88	N126	N125		180	L2.5x2.5x4	None	None	A36 Gr.36	Typical
48	M89	N128	N127		180	L2.5x2.5x4	None	None	A36 Gr.36	Typical
49	M90	N130	N129		180	L2.5x2.5x4	None	None	A36 Gr.36	Typical
50	M91	N126	N125		180	L2.5x2.5x4	None	None	A36 Gr.36	Typical
51	M11	N7	N57			HSS4X4X4	None	None	A500 Gr.46	Typical
52	M12	N3	N10			HSS4X4X4	None	None	A500 Gr.46	Typical
53	M13	N10	N4			HSS4X4X4	None	None	A500 Gr.46	Typical
54	M24	N17	N55			HSS4X4X4	None	None	A500 Gr.46	Typical
55	M25	N13	N20			HSS4X4X4	None	None	A500 Gr.46	Typical
56	M26	N20	N14			HSS4X4X4	None	None	A500 Gr.46	Typical
57	M37	N27	N56			HSS4X4X4	None	None	A500 Gr.46	Typical
58	M38	N23	N30			HSS4X4X4	None	None	A500 Gr.46	Typical
59	M39	N30	N24			HSS4X4X4	None	None	A500 Gr.46	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	M41A						Yes	** NA **			None
2	M44						Yes	** NA **			None
3	M48	OOOXOX					Yes	** NA **			None
4	M51	OOOXOX					Yes	** NA **			None
5	M56						Yes	** NA **			None
6	M59						Yes	** NA **			None
7	M60	OOOXOX					Yes	** NA **			None
8	M63	OOOXOX					Yes	** NA **			None
9	M68						Yes	** NA **			None
10	M71						Yes	** NA **			None
11	M72	OOOXOX					Yes	** NA **			None
12	M75	OOOXOX					Yes	** NA **			None
13	M80						Yes	** NA **			None
14	M83						Yes	** NA **			None
15	M84	OOOXOX					Yes	** NA **			None
16	M87	OOOXOX					Yes	** NA **			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...
17	M56A	BenPIN	BenPIN				Yes	** NA **			None
18	M57	BenPIN	BenPIN				Yes	** NA **			None
19	M58	BenPIN	BenPIN				Yes	** NA **			None
20	M59A	BenPIN	BenPIN				Yes	** NA **			None
21	M31	BenPIN					Yes	** NA **			None
22	M32	BenPIN					Yes	** NA **			None
23	M33A	BenPIN					Yes	** NA **			None
24	M34A	BenPIN					Yes	** NA **			None
25	M35A	BenPIN					Yes	** NA **			None
26	M36A	BenPIN					Yes	** NA **			None
27	M40						Yes	** NA **			None
28	M41						Yes	** NA **			None
29	M42						Yes	** NA **			None
30	C1						Yes	** NA **			None
31	C2						Yes	** NA **			None
32	M45						Yes	** NA **			None
33	M46						Yes	** NA **			None
34	M47						Yes	** NA **			None
35	B1						Yes	** NA **			None
36	B2						Yes	** NA **			None
37	A1						Yes	** NA **			None
38	A2						Yes	** NA **			None
39	M76						Yes	** NA **			None
40	M79						Yes	** NA **			None
41	M7	BenPIN	BenPIN				Yes	** NA **			None
42	M8	BenPIN	BenPIN				Yes	** NA **			None
43	M20	BenPIN	BenPIN				Yes	** NA **			None
44	M21	BenPIN	BenPIN				Yes	** NA **			None
45	M33	BenPIN	BenPIN				Yes	** NA **			None
46	M34	BenPIN	BenPIN				Yes	** NA **			None
47	M88	OOOOOX	OOOOOX				Yes	** NA **			None
48	M89	OOOOOX	OOOOOX				Yes	** NA **			None
49	M90	OOOOOX	OOOOOX				Yes	** NA **			None
50	M91	OOOOOX	OOOOOX				Yes	** NA **			None
51	M11						Yes	** NA **			None
52	M12						Yes	** NA **			None
53	M13						Yes	** NA **			None
54	M24						Yes	** NA **			None
55	M25						Yes	** NA **			None
56	M26						Yes	** NA **			None
57	M37						Yes	** NA **			None
58	M38						Yes	** NA **			None
59	M39						Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torq...	Kyy	Kzz	Cb	Function
1	M56A	PL 6x 1/2	16.041									Lateral
2	M57	PL 6x 1/2	16.041									Lateral
3	M58	PL 6x 1/2	16.041									Lateral
4	M59A	PL 6x 1/2	16.041									Lateral
5	M31	PL 6 x 3/8	6.358									Lateral
6	M32	PL 6 x 3/8	6.358									Lateral
7	M33A	PL 6 x 3/8	6.358									Lateral
8	M34A	PL 6 x 3/8	6.358									Lateral
9	M35A	PL 6 x 3/8	6.358									Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torq...	Kyy	Kzz	Cb	Function
10	M36A	PL 6 x 3/8	6.358									Lateral
11	M40	PIPE_3.0	144			Lbyy						Lateral
12	M41	PIPE_3.0	144			Lbyy						Lateral
13	M42	PIPE_3.0	144			Lbyy						Lateral
14	C1	PIPE_2.0	96									Lateral
15	C2	PIPE_2.0	96									Lateral
16	M45	PIPE_2.0	144			Lbyy						Lateral
17	M46	PIPE_2.0	144			Lbyy						Lateral
18	M47	PIPE_2.0	144			Lbyy						Lateral
19	B1	PIPE_2.0	96									Lateral
20	B2	PIPE_2.0	96									Lateral
21	A1	PIPE_2.0	96									Lateral
22	A2	PIPE_2.0	96									Lateral
23	M76	PIPE_2.0	96									Lateral
24	M79	PIPE_2.0	96									Lateral
25	M7	L2x2x3	52.309			Lbyy						Lateral
26	M8	L2x2x3	52.309			Lbyy						Lateral
27	M20	L2x2x3	52.311	Segment	Segment	Lbyy						Lateral
28	M21	L2x2x3	52.307	Segment	Segment	Lbyy						Lateral
29	M33	L2x2x3	52.315	Segment	Segment	Lbyy						Lateral
30	M34	L2x2x3	52.309	Segment	Segment	Lbyy						Lateral
31	M88	L2.5x2.5x4	18.031									Lateral
32	M89	L2.5x2.5x4	18.031									Lateral
33	M90	L2.5x2.5x4	18.031									Lateral
34	M91	L2.5x2.5x4	18.031									Lateral
35	M11	HSS4X4X4	62.222	Segment	Segment	Lbyy						Lateral
36	M12	HSS4X4X4	31			Lbyy						Lateral
37	M13	HSS4X4X4	31			Lbyy						Lateral
38	M24	HSS4X4X4	62.254	Segment	Segment	Lbyy						Lateral
39	M25	HSS4X4X4	30.996	Segment	Segment	Lbyy						Lateral
40	M26	HSS4X4X4	31.004	Segment	Segment	Lbyy						Lateral
41	M37	HSS4X4X4	62.254	Segment	Segment	Lbyy						Lateral
42	M38	HSS4X4X4	31	Segment	Segment	Lbyy						Lateral
43	M39	HSS4X4X4	31	Segment	Segment	Lbyy						Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	None		-1.1			24		3	
2	Live	None								
3	Wind 0	None					48	78		
4	Wind 30	None					48	78		
5	Wind 60	None					48	78		
6	Wind 90	None					48	78		
7	Wind 120	None					48	78		
8	Wind 150	None					48	78		
9	Ice Load	None					24	39	3	
10	Ice 0	None					48	78		
11	Ice 30	None					48	78		
12	Ice 60	None					48	78		
13	Ice 90	None					48	78		
14	Ice 120	None					48	78		
15	Ice 150	None					48	78		
16	Lm	None				1				
17	Lv	None					1			
18	BLC 1 Transient Area...	None						12		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
19	BLC 9 Transient Area..	None						12		

Load Combinations

	Description	Solve	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..
1	1.4 D	Yes	Y		1	1.4																		
2	1.2 D + 1.6 L	Yes	Y		1	1.2	2	1.6																
3	1.2 D + 1.0 Wo @ 0	Yes	Y		1	1.2	3	1																
4	1.2 D + 1.0 Wo @ ...	Yes	Y		1	1.2	4	1																
5	1.2 D + 1.0 Wo @ ...	Yes	Y		1	1.2	5	1																
6	1.2 D + 1.0 Wo @ ...	Yes	Y		1	1.2	6	1																
7	1.2 D + 1.0 Wo @ ...	Yes	Y		1	1.2	7	1																
8	1.2 D + 1.0 Wo @ ...	Yes	Y		1	1.2	8	1																
9	1.2 D + 1.0 Wo @ ...	Yes	Y		1	1.2	3	-1																
10	1.2 D + 1.0 Wo @ ...	Yes	Y		1	1.2	4	-1																
11	1.2 D + 1.0 Wo @ ...	Yes	Y		1	1.2	5	-1																
12	1.2 D + 1.0 Wo @ ...	Yes	Y		1	1.2	6	-1																
13	1.2 D + 1.0 Wo @ ...	Yes	Y		1	1.2	7	-1																
14	1.2 D + 1.0 Wo @ ...	Yes	Y		1	1.2	8	-1																
15	1.2 D + 1.0 Di + 1....	Yes	Y		1	1.2	9	1	10	1														
16	1.2 D + 1.0 Di + 1....	Yes	Y		1	1.2	9	1	11	1														
17	1.2 D + 1.0 Di + 1....	Yes	Y		1	1.2	9	1	12	1														
18	1.2 D + 1.0 Di + 1....	Yes	Y		1	1.2	9	1	13	1														
19	1.2 D + 1.0 Di + 1....	Yes	Y		1	1.2	9	1	14	1														
20	1.2 D + 1.0 Di + 1....	Yes	Y		1	1.2	9	1	15	1														
21	1.2 D + 1.0 Di + 1....	Yes	Y		1	1.2	9	1	10	-1														
22	1.2 D + 1.0 Di + 1....	Yes	Y		1	1.2	9	1	11	-1														
23	1.2 D + 1.0 Di + 1....	Yes	Y		1	1.2	9	1	12	-1														
24	1.2 D + 1.0 Di + 1....	Yes	Y		1	1.2	9	1	13	-1														
25	1.2 D + 1.0 Di + 1....	Yes	Y		1	1.2	9	1	14	-1														
26	1.2 D + 1.0 Di + 1....	Yes	Y		1	1.2	9	1	15	-1														
27	1.2 D + 1.5 Lm + 1....	Yes	Y		1	1.2	3	.053	16	1.5														
28	1.2 D + 1.5 Lm + 1....	Yes	Y		1	1.2	4	.053	16	1.5														
29	1.2 D + 1.5 Lm + 1....	Yes	Y		1	1.2	5	.053	16	1.5														
30	1.2 D + 1.5 Lm + 1....	Yes	Y		1	1.2	6	.053	16	1.5														
31	1.2 D + 1.5 Lm + 1....	Yes	Y		1	1.2	7	.053	16	1.5														
32	1.2 D + 1.5 Lm + 1....	Yes	Y		1	1.2	8	.053	16	1.5														
33	1.2 D + 1.5 Lm + 1....	Yes	Y		1	1.2	3	-.053	16	1.5														
34	1.2 D + 1.5 Lm + 1....	Yes	Y		1	1.2	4	-.053	16	1.5														
35	1.2 D + 1.5 Lm + 1....	Yes	Y		1	1.2	5	-.053	16	1.5														
36	1.2 D + 1.5 Lm + 1....	Yes	Y		1	1.2	6	-.053	16	1.5														
37	1.2 D + 1.5 Lm + 1....	Yes	Y		1	1.2	7	-.053	16	1.5														
38	1.2 D + 1.5 Lm + 1....	Yes	Y		1	1.2	8	-.053	16	1.5														
39	1.2 D + 1.5 Lv	Yes	Y		1	1.2	17	1.5																

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	N56	max	863.184	14	2164.611	25	1747.362	14	61.839	16	22.706	5	-6.986	14
2		min	-866.785	8	754.613	14	-1758.065	8	19.552	36	-22.526	11	-33.021	18
3	N55	max	2052.563	12	2230.128	18	884.782	3	2.664	10	21.916	9	75.203	21
4		min	-2036.801	6	797.473	30	-882.786	9	-4.243	4	-21.786	3	24.721	4
5	N57	max	1208.15	12	2003.235	22	1584.115	4	-12.431	8	20.597	13	-11.094	6
6		min	-1218.844	6	644.403	10	-1578.408	10	-52.406	25	-20.546	7	-36.985	22
7	Totals:	max	4090.997	12	6394.224	23	3902.403	3						
8		min	-4090.839	6	2453.668	5	-3902.417	9						

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

	Member	Shape	Code Check	Loc[in]	LC	She...	Loc[in]	...	LC	phi*Pnc [l...	phi*Pnt [lb]	phi*Mn y-...	phi*Mn ...	Cb	Eqn
1	B1	PIPE_2.0	.941	51	3	.081	51		8	14916.096	32130	22.459	22.459	3....	H1-1b
2	A1	PIPE_2.0	.939	51	3	.087	51		4	14916.096	32130	22.459	22.459	3....	H1-1b
3	C1	PIPE_2.0	.475	51	13	.061	51		12	14916.096	32130	22.459	22.459	1....	H1-1b
4	M76	PIPE_2.0	.463	51	13	.048	51		12	14916.096	32130	22.459	22.459	1....	H1-1b
5	M24	HSS4X...	.416	62.254	21	.083	62.2...	y	18	138357.5...	139518	194.166	194.166	2....	H1-1b
6	M37	HSS4X...	.391	62.254	17	.076	62.2...	y	26	138357.5...	139518	194.166	194.166	2....	H1-1b
7	M11	HSS4X...	.356	62.222	25	.090	62.2...	y	22	138361.8...	139518	194.166	194.166	2....	H1-1b
8	A2	PIPE_2.0	.334	27	24	.046	27		4	14916.096	32130	22.459	22.459	2....	H1-1b
9	B2	PIPE_2.0	.297	27	16	.052	27		8	14916.096	32130	22.459	22.459	2....	H1-1b
10	M31	PL 6 x ...	.286	6.358	9	.258	6.358	y	3	60795.299	72900	6.834	109.35	1....	H1-1b
11	M33A	PL 6 x ...	.281	6.358	5	.191	6.358	y	11	60795.299	72900	6.834	109.35	1....	H1-1b
12	M34A	PL 6 x ...	.250	6.358	3	.150	6.358	y	7	60795.301	72900	6.834	109.35	1....	H1-1b
13	M35A	PL 6 x ...	.247	6.358	13	.254	6.358	y	7	60795.301	72900	6.834	109.35	1....	H1-1b
14	M32	PL 6 x ...	.239	6.358	7	.135	6.358	y	18	60795.299	72900	6.834	109.35	1....	H1-1b
15	M36A	PL 6 x ...	.238	6.358	11	.160	6.358	y	3	60795.3	72900	6.834	109.35	1....	H1-1b
16	M33	L2x2x3	.237	26.703	4	.010	52.3...	y	20	9018.244	23392.8	6.693	12.766	1....	H2-1
17	C2	PIPE_2.0	.229	27	20	.029	69		24	14916.096	32130	22.459	22.459	2....	H1-1b
18	M79	PIPE_2.0	.229	27	20	.029	69		24	14916.096	32130	22.459	22.459	2....	H1-1b
19	M7	L2x2x3	.227	26.155	12	.008	52.3...	y	25	9020.212	23392.8	6.693	12.725	1....	H2-1
20	M20	L2x2x3	.216	26.701	8	.010	52.3...	y	21	9019.529	23392.8	6.693	12.766	1....	H2-1
21	M57	PL 6x 1/2	.198	8.021	9	.225	8.021	y	3	50730.132	97200	12.15	145.8	1....	H1-1b
22	M40	PIPE_3.0	.190	49.5	17	.095	96		10	30165.191	65205	68.985	68.985	1.4	H1-1b
23	M58	PL 6x 1/2	.188	8.188	5	.177	8.188	y	11	50730.132	97200	12.15	145.8	2....	H1-1b
24	M41	PIPE_3.0	.180	49.5	25	.108	135		12	30165.191	65205	68.985	68.985	1....	H1-1b
25	M42	PIPE_3.0	.176	49.5	21	.092	96		14	30165.191	65205	68.985	68.985	1....	H1-1b
26	M8	L2x2x3	.174	26.155	8	.009	52.3...	z	18	9020.212	23392.8	6.693	12.725	1....	H2-1
27	M34	L2x2x3	.169	26.7	12	.010	52.3...	z	22	9020.212	23392.8	6.693	12.766	1....	H2-1
28	M21	L2x2x3	.158	26.699	4	.010	52.3...	z	25	9020.895	23392.8	6.693	12.767	1....	H2-1
29	M56A	PL 6x 1/2	.156	8.021	13	.204	8.021	y	7	50730.132	97200	12.15	145.8	1....	H1-1b
30	M59A	PL 6x 1/2	.156	8.021	13	.204	8.021	y	7	50730.132	97200	12.15	145.8	1....	H1-1b
31	M38	HSS4X...	.113	31	19	.044	31	y	22	136769.2...	139518	194.166	194.166	1....	H1-1b
32	M25	HSS4X...	.106	30.996	23	.040	30.9...	y	26	136772.43	139518	194.166	194.166	1....	H1-1b
33	M13	HSS4X...	.104	0	23	.039	0	y	20	135675.2...	139518	194.166	194.166	1....	H1-1b
34	M39	HSS4X...	.101	0	15	.040	26.1...	z	3	136771.5...	139518	194.166	194.166	1....	H1-1b
35	M26	HSS4X...	.101	0	19	.039	0	y	16	136770.7...	139518	194.166	194.166	1....	H1-1b
36	M46	PIPE_2.0	.099	72	24	.034	135		7	6830.97	32130	22.459	22.459	1....	H1-1b
37	M12	HSS4X...	.097	31	15	.037	31	y	16	135675.2...	139518	194.166	194.166	1....	H1-1b
38	M45	PIPE_2.0	.096	72	16	.028	135		11	6830.97	32130	22.459	22.459	1....	H1-1b
39	M47	PIPE_2.0	.096	73.5	20	.031	135		3	6830.97	32130	22.459	22.459	1....	H1-1b
40	M90	L2.5x2....	.065	18.031	7	.035	0	y	7	35817.613	38556	13.363	30.449	1....	H2-1
41	M89	L2.5x2....	.060	0	7	.026	18.0...	y	5	35817.613	38556	13.363	30.449	1....	H2-1
42	M88	L2.5x2....	.032	18.031	3	.029	0	y	3	35817.613	38556	13.363	30.449	1....	H2-1
43	M91	L2.5x2....	.032	18.031	3	.029	0	y	3	35817.613	38556	13.363	30.449	1....	H2-1

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Project # A37518-2053.001.7190
By CEO
Date: 06/19/19
v0.1, Effective 07/10/18

MOUNT TO TOWER CONNECTION CHECKS

REACTIONS

Px=	0.885	Kip
Py=	2.23	Kip
(Axial)Pz=	2.053	Kip
Mx=	75.203	Kip-in
My=	21.916	Kip-in
(Torque)Mz=	4.243	Kip-in

Number of Bolts	=	4	
Plate Size	b=	9	in
	d=	9	in
Edge distance for Bolts	=	1.5	in
Bolt group centroid y-coordinate, Yc		4.5	in
Bolt group centroid x-coordinate, Xc		4.5	in
Load eccentricity in x-direction, ex		0	in
Load eccentricity in y-direction, ey		0	in
Total Moment including load eccentricity ΣMx=		75.203	Kips-in
Total Moment including load eccentricity ΣMy=		21.916	Kips-in
Total Moment including load eccentricity ΣMz=		4.243	Kips-in

WELD CHECKS

Standoff Member Type		Square	
Width	=	4	in
Depth (only for square members)	=	4	in
Assumed Weld Size	=	0.3750	
Total Forces in X direction	=	0.210	kips
Total Forces in Y direction	=	0.378	kips
Total Forces in Z direction	=	4.68	kips
Resultant	=	4.70	kips
Φ*Fw (Kip/in)/16" weld	=	1.392	
Capacity used		56.28%	

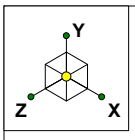
BOLT CHECKS

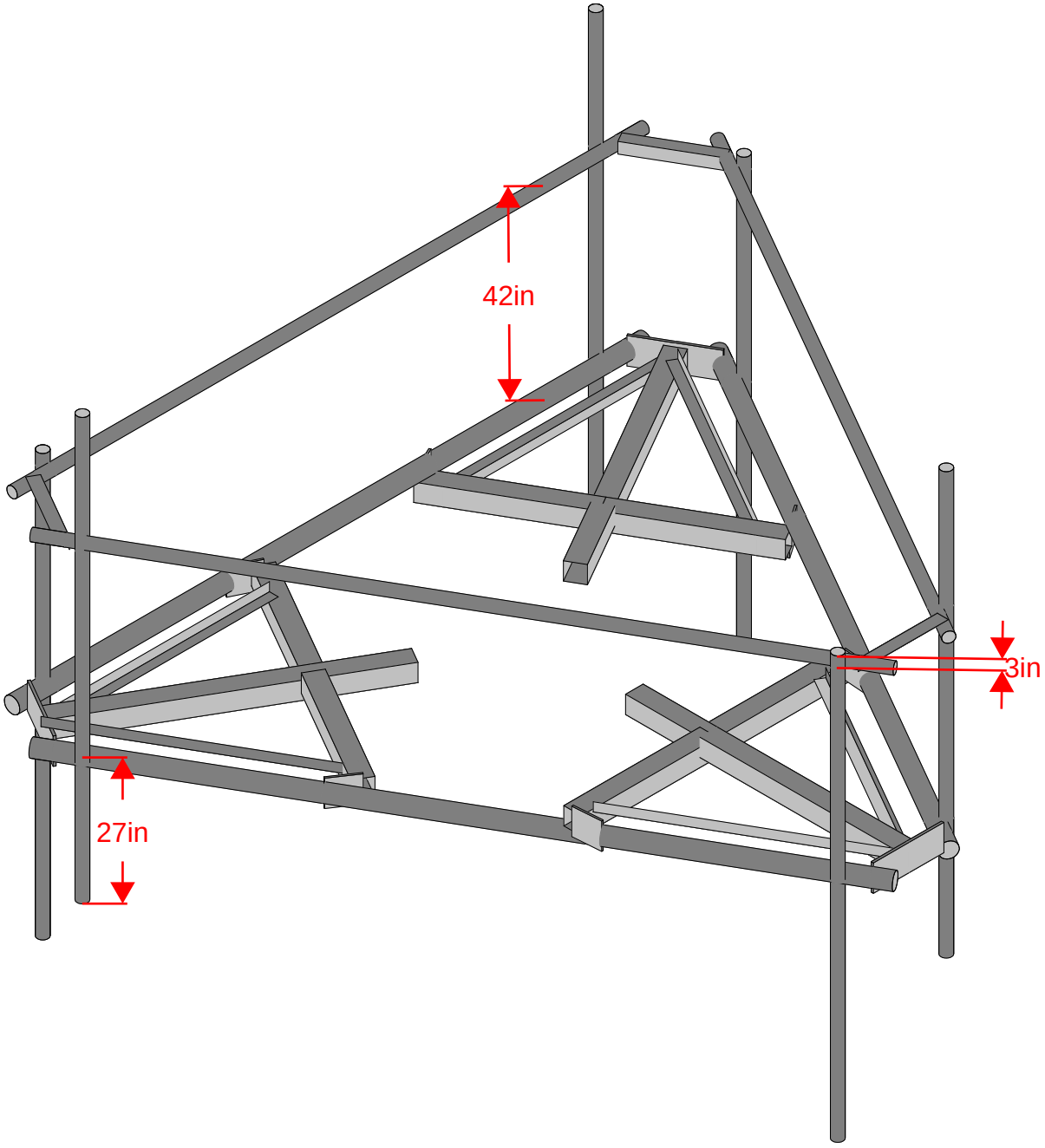
Tension Reaction	8.61	kip
Shear Reaction	0.84	kip
Bolt Type	A325N	
Bolt Diameter	0.625	in
Tensile Strength	20.7	kips
Shear Strength	12.4	kips
Reduced Tensile Strength	-	kips
Tensile Capacity Used	41.6%	
Shear Capacity Used	6.7%	

Note: Tension reduction not required if tension or shear capacity < 30%

APPENDIX D

SUPPLEMENTAL MODIFICATION INFORMATION



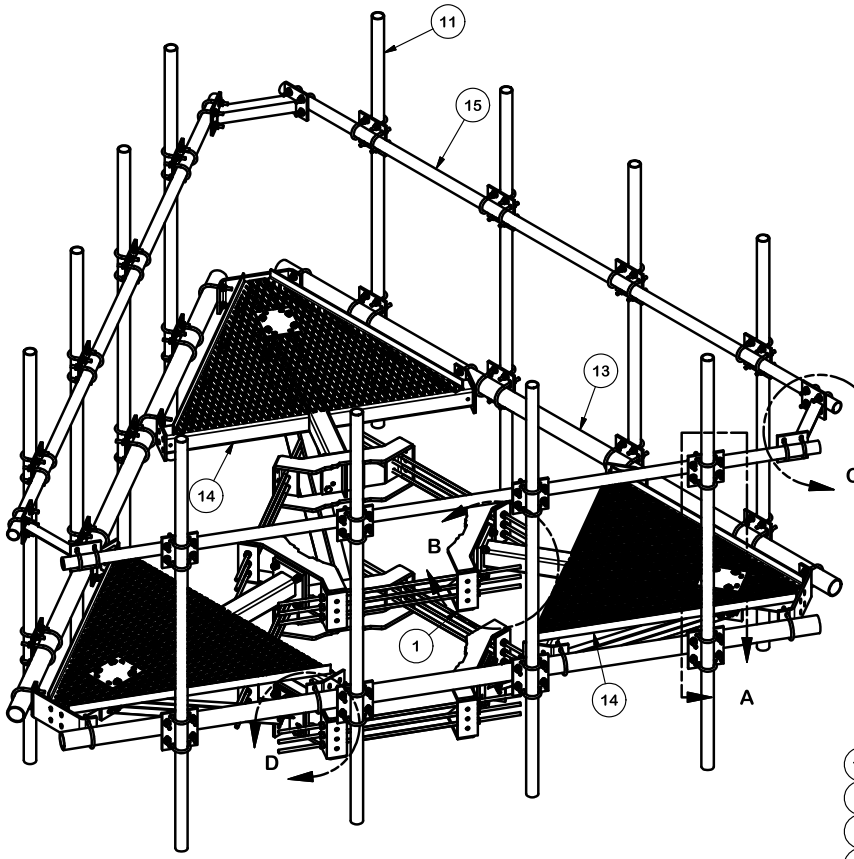


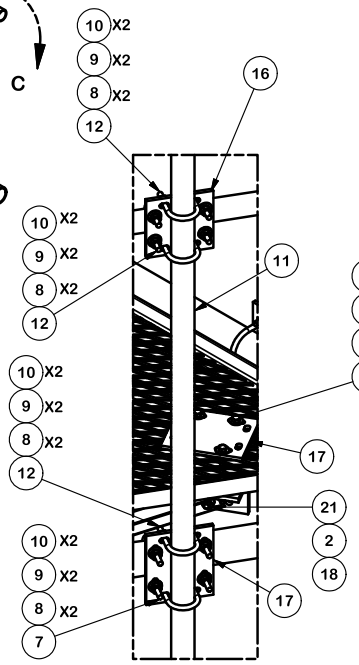
Envelope Only Solution

PJF	876341 / MIDDLETOWN 2 - MARINO PROPERTY	SK - 8
DBG		June 19, 2019 at 3:46 PM
37519-1583.003.7190		37519-1583.003.7190_Wind Load....

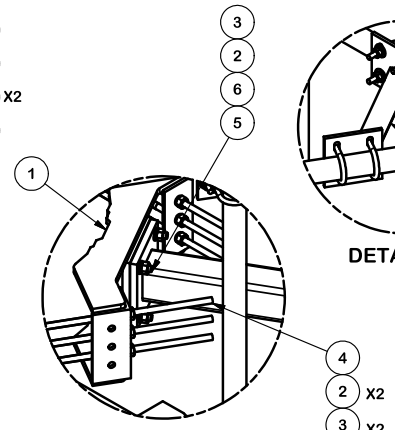
APPENDIX E

MANUFACTURER DRAWINGS (FOR REFERENCE ONLY)

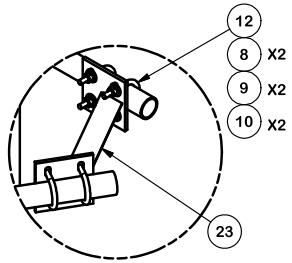




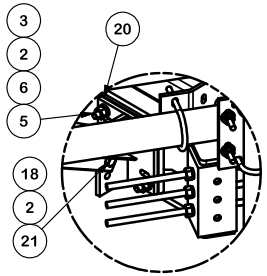
DETAIL A



DETAIL B



DETAIL C



DETAIL D

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	6	X-LWRM	RING MOUNT WELDMENT		68.16	408.95
2	66	G58LW	5/8" HDG LOCKWASHER		0.03	1.72
3	60	A58NUT	5/8" HDG A325 HEX NUT		0.13	7.78
4	18	G58R-24	5/8" x 24" THREADED ROD (HDG.)		0.55	9.88
4	18	G58R-48	5/8" x 48" THREADED ROD (HDG.)		0.55	9.88
5	24	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT	2 3/4 in	0.36	8.53
6	24	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.82
7	36	X-UB1306	1/2" X 3-5/8" X 6" X 3" U-BOLT (HDG.)		0.73	26.34
8	264	G12FW	1/2" HDG USS FLATWASHER		0.03	8.99
9	252	G12LW	1/2" HDG LOCKWASHER		0.01	3.50
10	252	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	18.03
11	12	P296	2-3/8" X 96" SCH. 40 GALVANIZED PIPE	96 in	30.76	369.08
12	84	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.73	61.46
13	3	P3150	3-1/2" X 150" SCH 40 GALVANIZED PIPE	150 in	94.80	284.40
14	3	X-SV196	LOW PROFILE PLATFORM CORNER		212.10	636.31
15	3	P2150	2-3/8" OD X 150" SCH 40 GALVANIZED PIPE	150 in	48.06	144.17
16	12	SCX2	CROSSOVER PLATE	7 in	4.80	57.56
17	15	SCX4	CROSSOVER PLATE	8 1/2 in	6.02	90.32
18	6	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	0.78
19	6	X-253993	PLATFORM REINFORCEMENT KIT ANGLE	52 25/32 in	14.33	85.99
20	6	X-253992	T-BRACKET FOR REINFORCEMENT KIT		13.55	81.27
21	6	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	1.62
22	12	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	6 1/2 in	0.41	4.91
23	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
					TOTAL WT. #	2448.72

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")*

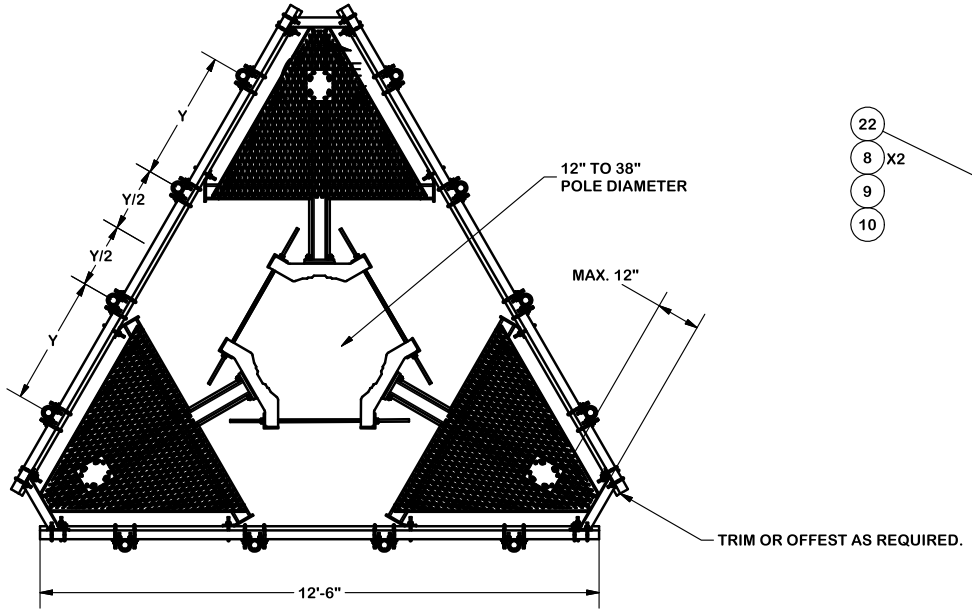
DESCRIPTION
12' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-3/8" ANTENNA MOUTING
PIPES, AND HANDRAIL

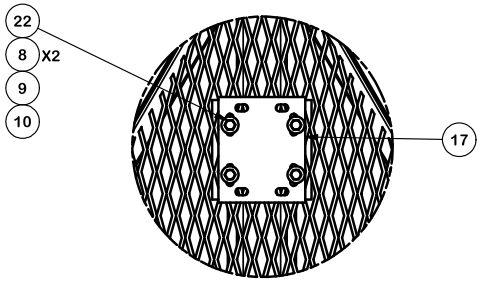
SITE PRO 1 — A valmont COMPANY

Engineering Support Team: 1-888-753-7446

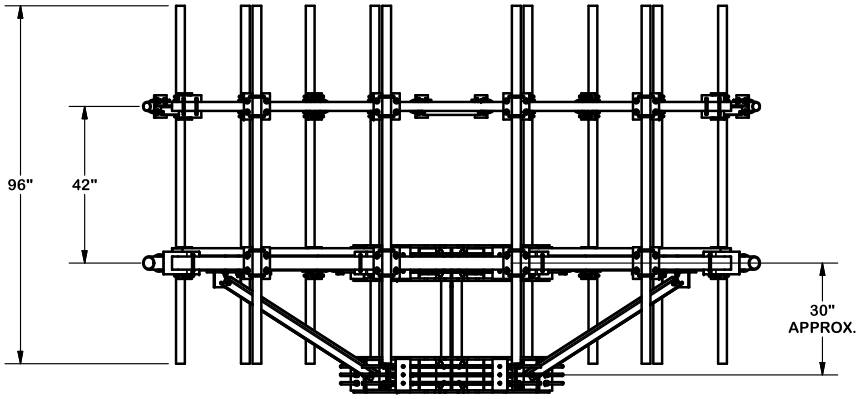
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

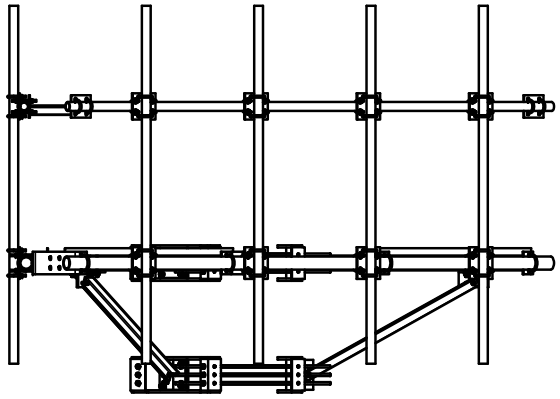
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
4488	CEK 7/14/2014		RMQP-496-HK	1 OF 3
CLASS / SUB: 81 / 02	DRAWING USAGE: CUSTOMER	CHECKED BY: BMC 7/14/2014	DWG. NO.: RMQP-496-HK	





DETAIL E





TOLERANCE NOTES

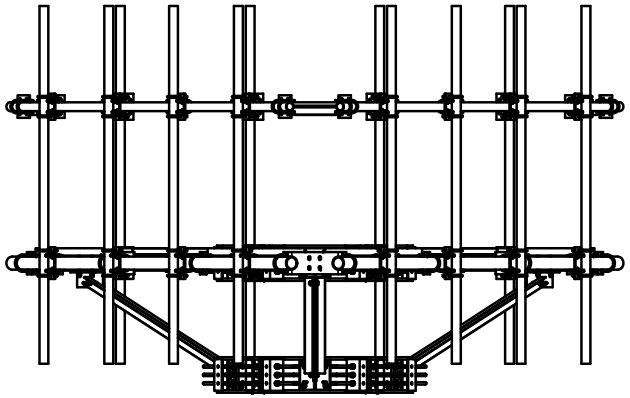
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

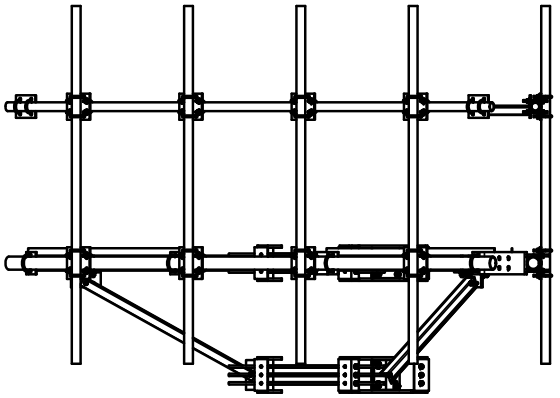
DESCRIPTION
12' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-3/8" ANTENNA MOUTING
PIPES, AND HANDRAIL

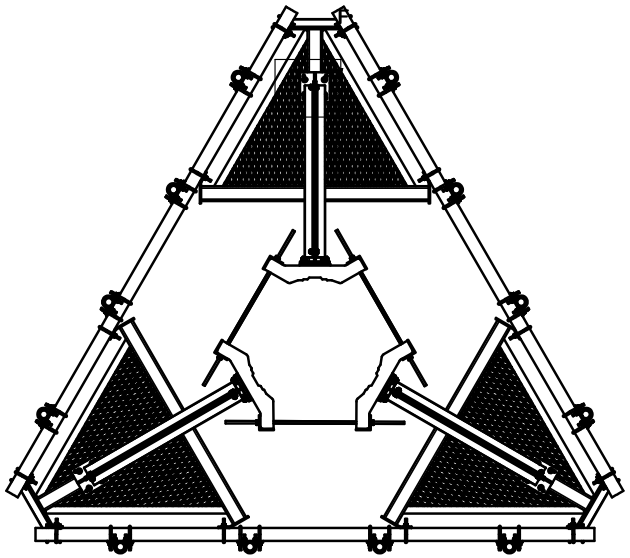
SITE PRO 1
A valmont COMPANY
Engineering Support Team:
1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

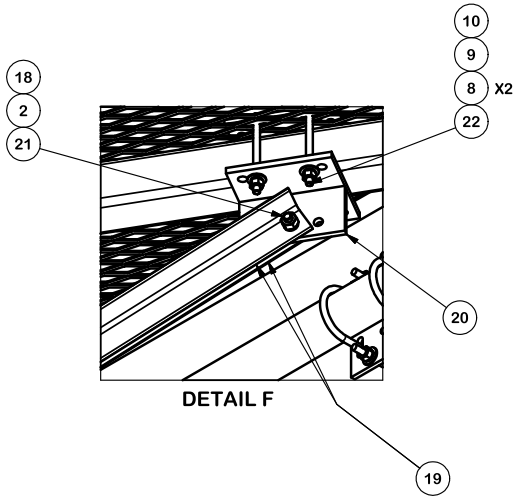
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4488	CEK 7/14/2014		RMQP-496-HK

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 7/14/2014	RMQP-496-HK









DETAIL F

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
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CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
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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: CT11234C

Middletown/Rt9
1969 Old Saybrook Rd
Middletown, CT 06457

June 5, 2019

Transcom Engineering Project Number: 737001-0126

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**14.92 %**

June 5, 2019

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

Emissions Analysis for Site: **CT11234C – Middletown/Rt9**

Transcom Engineering, Inc ("Transcom") was directed to analyze the proposed upgrades to the T-MOBILE facility located at **1969 Old Saybrook Rd, Middletown, 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 **1969 Old Saybrook Rd, Middletown, 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)
LTE	1900 MHz (PCS)	4	40
LTE	2100 MHz (AWS)	2	60
GSM	1900 MHz (PCS)	1	15
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	RFS APXVAARR24_43-U-NA20	110
B	1	RFS APXVAARR24_43-U-NA20	110
C	1	RFS APXVAARR24_43-U-NA20	110

Table 2: Antenna Data

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

Cable losses were factored in the calculations for this site. Since all **1900 MHz (PCS)** & **2100 MHz (AWS)** radios are ground mounted the following cable loss values were used. For each ground mounted **1900 MHz (PCS)** radio there was **1.65 dB** of cable loss calculated into the system gains / losses for this site. For each ground mounted **2100 MHz (AWS)** radio there was **1.70 dB** of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for **160 feet** of **1-1/4"** coax.

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	RFS APXVAARR24_43-U-NA20	1900 MHz (PCS) / 2100 MHz (AWS) / 600 MHz / 700 MHz	15.65 / 16.35 / 12.95 / 13.35	11	415	10,339.74	4.56
						Sector A Composite MPE%	**4.56**
Antenna B1	RFS APXVAARR24_43-U-NA20	1900 MHz (PCS) / 2100 MHz (AWS) / 600 MHz / 700 MHz	15.65 / 16.35 / 12.95 / 13.35	11	415	10,339.74	4.56
						Sector B Composite MPE%	**4.56**
Antenna C1	RFS APXVAARR24_43-U-NA20	1900 MHz (PCS) / 2100 MHz (AWS) / 600 MHz / 700 MHz	15.65 / 16.35 / 12.95 / 13.35	11	415	10,339.74	4.56
						Sector C Composite MPE%	**4.56**

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	**4.56 %**
AT&T	4.69 %
MetroPCS	0.51 %
Verizon Wireless	2.50 %
Sprint	2.66 %
Site Total MPE %:	**14.92 %**

Table 4: All Carrier MPE Contributions

T-MOBILE Sector A Total:	4.56 %
T-MOBILE Sector B Total:	4.56 %
T-MOBILE Sector C Total:	4.56 %
Site Total:	14.92 %

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) LTE	4	1,004.75	110	13.36	1900 MHz (PCS)	1000	1.34%
T-Mobile 2100 MHz (AWS) LTE	2	1,750.46	110	11.64	2100 MHz (AWS)	1000	1.16%
T-Mobile 1900 MHz (PCS) GSM	1	376.78	110	1.25	1900 MHz (PCS)	1000	0.13%
T-Mobile 600 MHz LTE / 5G NR	2	788.97	110	5.24	600 MHz	400	1.31%
T-Mobile 700 MHz LTE	2	432.54	110	2.88	700 MHz	467	0.62%
						Total:	**4.56%**

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:	4.56 %
Sector B:	4.56 %
Sector C:	4.56 %
T-MOBILE Maximum Total (per sector):	4.56 %
Site Total:	14.92 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **14.92 %** 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
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