



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

RE: **Notice of Exempt Modification for T-Mobile:
827050 - T-Mobile Site ID: CT11058C
699 Old Main Street, Rocky Hill, CT 06067
Latitude: 41° 40' 5.77" / Longitude: -72° 38' 16.93"**

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 150-foot mount on the existing 151-foot Monopole Tower, located at 699 Old Main Street, Rocky Hill, CT. The tower is owned by Crown Castle and the property is owned by the Town of Rocky Hill. T-Mobile now intends to replace three (3) existing antennas with three (3) new 1900/2100 MHz antennas. The new antennas will be installed at the 150-ft level of the tower.

Planned Modifications:

Tower:

Remove and Replace:

(3) AIR21 KRC118023-1_B2P_B4A Antenna **(REMOVE)** – (3) AIR32_B66A_B2A Antenna 1900/2100 MHz **(REPLACE)**

(3) Radio 4449 B71+85 **(REMOVE)** – (3) Radio 4449 B71B85A **(REPLACE)**

(1) 9x18 HCS Cable **(REMOVE)** - (1) 6x12 HCS Cable **(REPLACE)**

Install New:

(3) Diplexers

(3) Radio 4415 B25

(1) SitePro1 HRK14 Handrail Kit

Existing to Remain:

(6) 1 5/8" Coax

(3) 6x12 HCS cables

(3) RFS-APXVAARR24_43-U-NA20 Antenna 600/700 MHz

(3) AIR32_B66A_B2A Antenna 1900/2100

(3) TMA

Ground:

Remove and Replace:

(1) S12000 Equipment cabinet (**REMOVE**) - (1) 6160 Equipment cabinet (**REPLACE**)

Install New:

(1) B160 Battery cabinet

(1) BB 6630

(1) BB 6648

(1) PSU 4813 Power Booster

The facility was approved by the Town of Rocky Hill Planning and Zoning Commission on December 16, 1998. in Application Number 98-9.3 on November 10, 1998. The approval was given without conditions.

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 John Mehr, Town Manager, as the municipality and property owner, Kim Ricci, Town Planner, and Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

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

Sincerely,



Richard Zajac
Site Acquisition Specialist
4545 East River Road, Suite 320
West Henrietta, NY 14586
(585) 445-5896
richard.zajac@crowncastle.com

Melanie A. Bachman

Page 3

cc:

John Mehr, Town Manager
Town of Rocky Hill
761 Old Main Street
Rocky Hill, CT 06067
860-258-2700

Kim Ricci, Town Planner
Town of Rocky Hill
761 Old Main Street
Rocky Hill, CT 06067
860-258-2761

Crown Castle, Tower Owner

From: [Zajac, Richard](#)
To: ["jmehr@rockyhillct.gov"](mailto:jmehr@rockyhillct.gov)
Subject: Connecticut Siting Council exempt modification application notification
Date: Monday, November 30, 2020 11:17:00 AM
Attachments: [CSC Exempt Modification Application - 699 Old Main St.pdf](#)

Good morning Mr. Mehr,

Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 699 Old Main Street in Rocky Hill.

Should you have any questions/comments/concerns regarding this application, please do not hesitate to contact me.

Thank you,

RICH ZAJAC

Site Acquisition Specialist

T: (585) 445-5896 M: (607) 346-7212

F: (724) 416-4461

CROWN CASTLE

[4545 East River Road, Suite 320](#)

[West Henrietta, NY 14586](#)

From: [Zajac, Richard](#)
To: ["kricci@rockyhillct.gov"](mailto:kricci@rockyhillct.gov)
Subject: Connecticut Siting Council exempt modification application notification
Date: Monday, November 30, 2020 11:27:00 AM
Attachments: [CSC Exempt Modification Application - 699 Old Main St.pdf](#)

Good morning Ms. Ricci,

Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 699 Old Main Street in Rocky Hill.

Should you have any questions/comments/concerns regarding this application, please do not hesitate to contact me.

Thank you,

RICH ZAJAC

Site Acquisition Specialist

T: (585) 445-5896 M: (607) 346-7212

F: (724) 416-4461

CROWN CASTLE

[4545 East River Road, Suite 320](#)

[West Henrietta, NY 14586](#)

Exhibit A

Original Facility Approval



Town of Rocky Hill

699 OLD MAIN STREET • PO BOX 657 • ROCKY HILL, CT 06067 • FAX (860) 258-7638

CERTIFIED

December 18, 1998

Mr. Thomas Gilligan
Omnipoint Communications, Inc.
100 Filley St.
Bloomfield, CT 06002

Ms. Barbara Gilbert Interim Town Manager
Town of Rocky Hill
699 Old Main St.
Rocky Hill, CT 06067

RE: Site Plan Application, 150' monopole Antenna, 699 Old Main Street

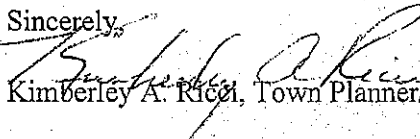
Dear Mr. Gilligan and Ms. Gilbert,

The Rocky Hill Planning and Zoning Commission at their regular meeting of December 16, 1998 voted to approve the aforementioned application. The applicants at the meeting indicated that the fenced-in area could be screened with shrubs and that the antenna could be painted, etc. to better blend with the environment. Please contact the undersigned with your intentions for screening.

Please prepare and submit two (2) sets of the final plans for the Commission's signature. One set of plans is to conform with the enclosed Map Requirements, and the other can be mylar for filing with the Planning and Engineering Departments. The plans are to have signature blocks for the Commission. In addition, there is a \$10.00 per sheet recording fee (one set only) due and payable to the Town of Rocky Hill. Upon receipt of the signed plans and the recording fee, Staff will gladly record the plans with the Town Clerk.

Should you have any questions, please do not hesitate to contact this office at 860-258-2761 or 860-258-2766.

Sincerely,


Kimberley A. Ricci, Town Planner/Assistant ZEO

KAR/mn

cc: Police Chief
Fire Chief

Exhibit B

Property Card

Situs : 761 OLD MAIN STREET

Map ID: 6852

Class: Municipal Comrc

Card: 1 of 7

Printed: April 22, 2019

CURRENT OWNER

ROCKY HILL TOWN OF
MUNICIPAL COMPLEX
761 OLD MAIN STREET
ROCKY HILL CT 06067

GENERAL INFORMATION

Living Units
Neighborhood C
Alternate Id 007389
Vol / Pg
District
Zoning R-20
Class EXEMPT



10-045-002 12/07/2012

Property Notes

Land Information

Type	Size	Influence Factors	Influence %	Value
Primary	AC 8.5600			3,046,000
Total Acres: 8.56 Spot: Location:				

Assessment Information

	Assessed	Appraised	Cost	Income	Market
Land	2,132,200	3,046,000	3,046,000	3,046,000	0
Building	6,736,520	9,623,600	9,623,600	2,670,400	0
Total	8,868,720	12,669,600	12,669,600	5,716,400	0
Manual Override Reason					
Base Date of Value				10/01/2018	
Effective Date of Value				10/01/2018	
Value Flag	COST APPROACH				
Gross Building:					

Entrance Information

Date	ID	Entry Code	Source
10/01/14	CL	Office Review Change	From Conversion
10/09/12	ST	Measured + 1visit	From Conversion
05/23/07	ST	Reval Inspection	Owner

Permit Information

Date Issued	Number	Price	Purpose	% Complete
01/29/19	2019-170	1,000	EL	Installing A Double Duplex Outlet /
01/16/19	2019-228	20,000	CM	Sprint To Replace Three (3) Anten
12/20/18	2019-214	20,000	CM	Verizon To Replace Six (6) Antenn
12/13/18	2019-207	5,000	MS	"Build Two Non Load Bearing Wall
11/19/18	2019-183	24,963	WIN	Replacement Of Windows On The

Sales/Ownership History

Transfer Date	Price	Type	Validity	Deed Reference	Deed Type	Grantee
			No Consideration		No Consideration	ROCKY HILL TOWN OF

Inspection Witnessed By _____

Quick Zooms

Find Properties

Owner:

Enter Owner

Parcel ID:

Enter Parcel ID

Address:

OLD MAIN STREET

000

Clear

Results Summary

Parcels

Parcel ID	Address	Owner
10-045	699 OLD MAIN STR	ROCKY HILL TOWN

Detail Information

Zoom To

CAMA_ID	10-045
Address	761 OLD MAIN STREET
Owner	ROCKY HILL TOWN OF
PID	6852
VISION_ID	6852
ST_NUM	OLD MAIN STREET
ST_NUM	761
UNIT_NUM	
MAP	10
ACCT_NUM	007389
BLOCK	
LOT	045
UNIT	
RE_USE_CODE	901
TOTAL_VAL	9857330
IMPRV_VAL	8538600
LAND_VAL	1318730
LAND_VAL	1555610
BLDG_VAL	8259720
BLDGX_VAL	8301720
SITE_IDX	C
USE_CODE	901
USE_DESC	Municipal Corrd
USE_CODE_2	
USE_CODE_2	
USE_CODE_3	
USE_CODE_3	
ZONE	R-20
ZONE_DESC	
ACREAGE	8.56
NBHD	0001
NBHD_AD3	
LAND_FRONTAGE	
LAND_ASSES	1318730
CO_OWNER	MUNICIPAL COMPLEX
MAIL_ADDR	761 OLD MAIN STREET
MATL_ADDR2	

Find Abutters

The map displays a street grid in Rocky Hill, CT. Key streets include JOINERS RD, HARBOR VIEW DR, SILAS DEANE HWY, CHURCH ST, OLD MAIN ST, RIVERVIEW RD, ESTHER RD, and WASHINGTON ST. A large area in the center is highlighted in yellow, containing the Police Department, Library, Post Office, Fire Museum, Community Center, and Town Hall. Numerous residential parcels are shown with red outlines and numbers. A sidebar on the left contains search and information panels. A bottom banner reads 'mapsonline.net wants to track your physical location.' with 'Allow once' and 'Options for this site' buttons.

699 Old Main St, Rocky Hill, CT 06067



699 Old Main St
Rocky Hill, CT 06067

Directions

SAVE

NEARBY

SEND TO YOUR PHONE

SHARE

Add a missing place



At this location

Rocky Hill Human Services Department

5.0 ★★★★★ (1)

Social Services Organization · 699 Old Main St

Rocky Hill Mini Bus Transportation

City Government Office · 699 Old Main St

Rocky Hill Police Department

5.0 ★★★★★ (1)

Police Department · 699 Old Main St

Exhibit C

Construction Drawings

T-Mobile

T-MOBILE SITE NUMBER:CT11058C

T-MOBILE SITE NAME: ROCKY HILL /RTE 160_1

SITE TYPE: MONOPOLE

TOWER HEIGHT: 150'-0"

BUSINESS UNIT #:827050

SITE ADDRESS: 699 OLD MAIN ST
ROCKY HILL CT 6067

COUNTY: HARTFORD

JURISDICTION: TOWN OF ROCKY HILL

T-MOBILE ANCHOR SITE CONFIGURATION: 67D5A997DB

T-Mobile

4 SYLVAN WAY
PARSIPPANY, NJ 07054



3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277



1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CT11058C

BU #: **827050**
ROCKY HILL /RTE 160_1

699 OLD MAIN ST
ROCKY HILL CT 6067

EXISTING
150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	11/3/20	JTS	CONSTRUCTION	MTJ
1	11/18/20	JTS	CONSTRUCTION	GEH

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.

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	2015 IBC
MECHANICAL	2015 IMC
ELECTRICAL	2017 NEC

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	CROWN CASTLE
DATED:	10/15/20
MOUNT ANALYSIS:	PJF & COMPANY
DATED:	10/6/20
RFDS REVISION:	9
DATED:	9/23/20
ORDER ID:	529708
REVISION:	0



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



DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1.1	OVERALL SITE PLAN
C-1.2	SITE PLAN & ENLARGED SITE PLAN
C-2	FINAL ELEVATION & ANTENNA PLANS
C-3	ANTENNA & CABLE SCHEDULE
C-4	PLUMBING DIAGRAM
C-5	EQUIPMENT SPECS
E-1	AC PANEL SCHEDULES & ONE LINE DIAGRAM
G-1	ANTENNA GROUNDING DIAGRAM
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 24X36. 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.

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
- REMOVE (3) RADIOS
- REMOVE (1) 9X18 HCS CABLES
- INSTALL (3) ANTENNAS
- INSTALL (6) RADIOS
- INSTALL (1) 6X12 HCS CABLE
- INSTALL (3) DIPLEXER

GROUND SCOPE OF WORK:

- REMOVE (1) S12000 CABINET
- INSTALL (1) 6160 CABINET
- INSTALL (1) B160 BATTERY CABINET
- INSTALL (1) BB 6630 IN 6160 CABINET
- INSTALL (1) BB 6648 IN 6160 CABINET
- PSU 4813 POWER BOOSTER

NOTE:

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

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	ROCKY HILL /RTE 160_1
SITE ADDRESS:	699 OLD MAIN ST ROCKY HILL CT 6067
COUNTY:	HARTFORD
MAP/PARCEL #:	10-045
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.668269°
LONGITUDE:	-72.638036°
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	100'
CURRENT ZONING:	R-20
JURISDICTION:	TOWN OF ROCKY HILL
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	ROCKY HILL TOWN OF MUNICIPAL COMPLEX 761 OLD MAIN STRET ROCKY HILL CT 06067
TOWER OWNER:	CROWN CASTLE USA INC 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE 35 GRIFFIN ROAD BLOOMFIELD, CT 06002
ELECTRIC PROVIDER:	NOT PROVIDED
TELCO PROVIDER:	NOT PROVIDED

PROJECT TEAM

A&E FIRM:	CROWN CASTLE USA INC. 2000 CORPORATE DRIVE CANONSBURG, PA 15317 CROWNAE.APPROVAL@CROWNCastle.COM
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3530 TORINGDON WAY, SUITE 300 CHARLOTTE, NC 28277



11/18/20

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

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

SHEET NUMBER:

T-1

REVISION:

1

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED— NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800–788–7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
2. "LOOK UP" – CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT:
THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. 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 CED–STD–10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).
5. 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 ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS".
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR 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.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. 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 CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR 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 E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE CLEAR FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. 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, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. 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 CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR 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.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR 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.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. 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.

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 CONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR 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 GROUNDDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 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 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE 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 THROUGH EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 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 OIL 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 RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING 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 CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., 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 BARE SOLID TINNED COPPER IN 3/4" NON–METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD–WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
CARRIER: T–MOBILE
TOWER OWNER: CROWN CASTLE USA INC.
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR 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 CROWN CASTLE.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR 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.
8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND CROWN CASTLE PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION AND IS TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF CROWN CASTLE USA INC.
13. CONTRACTOR 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.
14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

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. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE–THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER–TO–CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WFF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:
#4 BARS AND SMALLER 40 ksi
#5 BARS AND LARGER 60 ksi
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3"
CONCRETE EXPOSED TO EARTH OR WEATHER:
#6 BARS AND LARGER 2"
#5 BARS AND SMALLER 1–1/2"
CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
SLAB AND WALLS 3/4"
BEAMS AND COLUMNS 1–1/2"
7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

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. CONTRACTOR 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.
- 4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
- 4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR 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.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI–CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI–CONDUCTOR, TYPE TO CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION 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 NOT 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/IEEC AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT) OR METAL–CLAD CABLE (MC) 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/IEEC AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIEMOLD SPECIMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON–PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER–ACTUATED) 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 BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3R (OR BETTER) FOR EXTERIOR LOCATIONS.
25. 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 BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR CROWN CASTLE USA INC. BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "T–MOBILE".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

CONDUCTOR COLOR CODE		
SYSTEM	CONDUCTOR	COLOR
	A PHASE	BLACK
120/240V, 1Ø	B PHASE	RED
	NEUTRAL	WHITE
	GROUND	GREEN
	A PHASE	BLACK
120/208V, 3Ø	B PHASE	RED
	C PHASE	BLUE
	NEUTRAL	WHITE
	GROUND	GREEN
277/480V, 3Ø	A PHASE	BROWN
	B PHASE	ORANGE OR PURPLE
	C PHASE	YELLOW
	NEUTRAL	GREY
DC VOLTAGE	GROUND	GREEN
	POS (+)	RED**
	NEG (–)	BLACK**

* SEE NEC 210.5(C)(1) AND (2)
** POLARITY MARKED AT TERMINATION

ABBREVIATIONS:

ANT	ANTENNA
(E)	EXISTING
FIF	FACILITY INTERFACE FRAME
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GSM	GLOBAL SYSTEM FOR MOBILE
LTE	LONG TERM EVOLUTION
MGB	MASTER GROUND BAR
MW	MICROWAVE
(N)	NEW
NEC	NATIONAL ELECTRIC CODE
(P)	PROPOSED
PP	POWER PLANT
QTY	QUANTITY
RECT	RECTIFIER
RBS	RADIO BASE STATION
RET	REMOTE ELECTRIC TILT
RFDS	RADIO FREQUENCY DATA SHEET
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
SIAD	SMART INTEGRATED DEVICE
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
W.P.	WORK POINT

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CROWN
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B+T GRP

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T-MOBILE SITE NUMBER:
CT11058C

BU #: 827050
ROCKY HILL /RTE 160_1

699 OLD MAIN ST
ROCKY HILL CT 6067

EXISTING
150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	11/3/20	JTS	CONSTRUCTION	MTJ
1	11/18/20	JTS	CONSTRUCTION	GEH



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TO ALTER THIS DOCUMENT.

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T-2

REVISION:

1

SITE PLAN DISCLAIMER:

PROPERTY LINES AND STRUCTURES HAVE BEEN DIGITIZED FROM PREVIOUS PLAN SETS OR FROM ASSESSORS MAPS. CROWN CASTLE USA INC. HAS NOT COMPLETED A SITE SURVEY AND THEREFORE MAKES NO CLAIMS AS TO THE ACCURACY OF INFORMATION DEPICTED ON THIS SHEET

CHURCH STREET

PARCEL: 10-041
ZONING: R-20

PARCEL: 10-040
ZONING: R-20

PARCEL: 10-295
ZONING: R-20

PARCEL: 10-291
ZONING: R-20

PARCEL: 10-294
ZONING: R-20

PARCEL: 10-043
ZONING: R-20

PARCEL: 10-042
ZONING: R-20

PARCEL: 10-292
ZONING: R-20

PARCEL: 10-290
ZONING: R-20

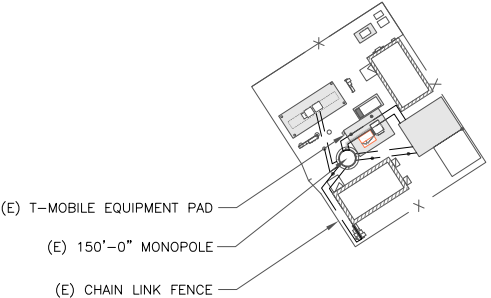
PARCEL: 10-289
ZONING: R-20

PARCEL: 10-243
ZONING: R-20

PARCEL: 10-045
ZONING: R-20

OLD MAIN STREET
APPROXIMATE LOCATION OF PROPERTY LINE

RIVERVIEW ROAD



1

OVERALL SITE PLAN

SCALE: 30' 15' 0' 30' 1"=30'-0" (FULL SIZE) 1"=60'-0" (11x17)



4 SYLVAN WAY
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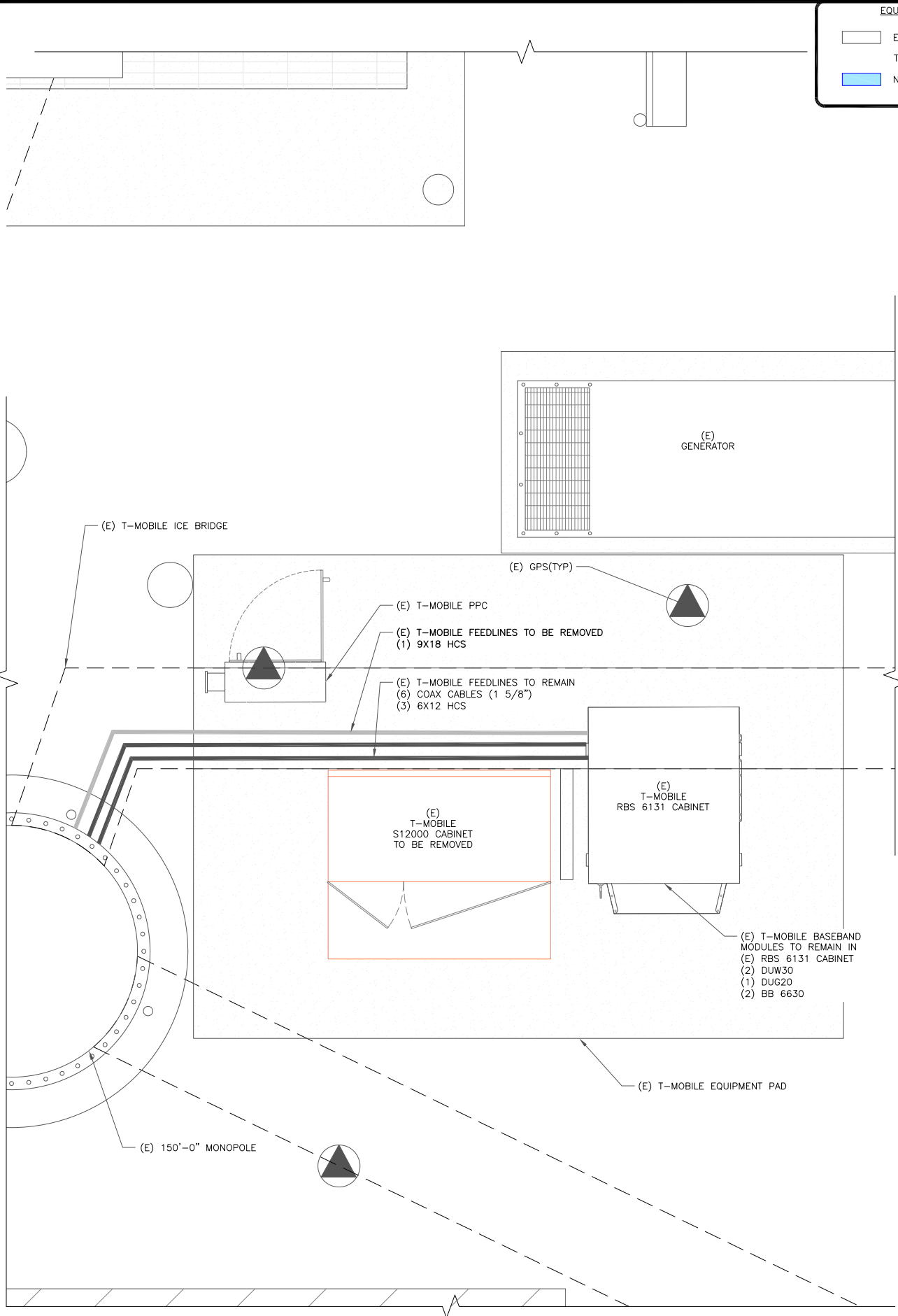
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C-1.1

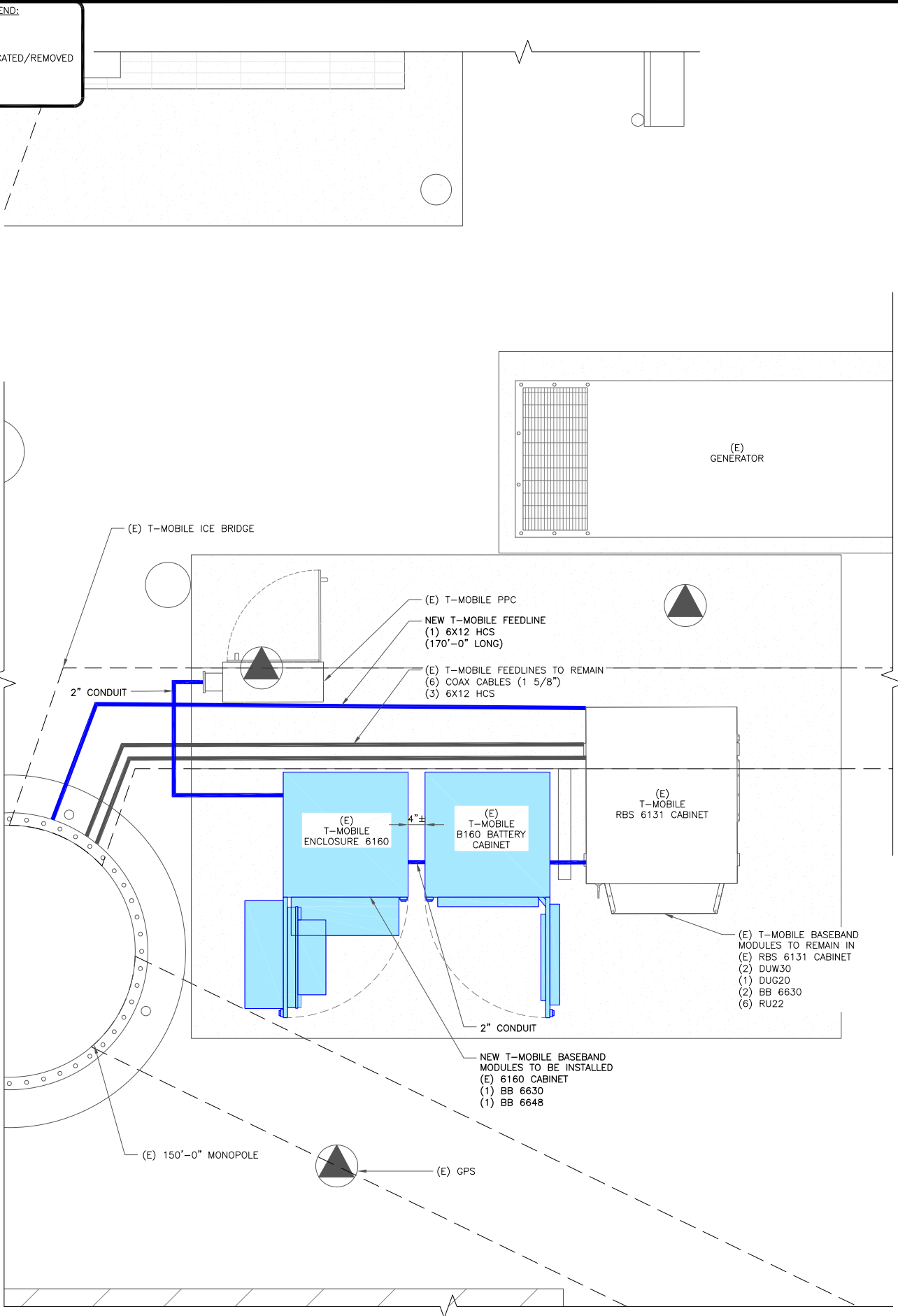
REVISION:

1

140124.002.01 Rocky Hill RT 160 CC TWO NE.dwg - Sheet:C-1.2 - User: ghayes - Nov 18, 2020 - 3:44pm



1 EXISTING EQUIPMENT PLAN
SCALE: 3/4"=1'-0" (FULL SIZE)
3/8"=1'-0" (11x17)



2 FINAL EQUIPMENT PLAN
SCALE: 3/4"=1'-0" (FULL SIZE)
3/8"=1'-0" (11x17)

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150'-0" MONOPOLE

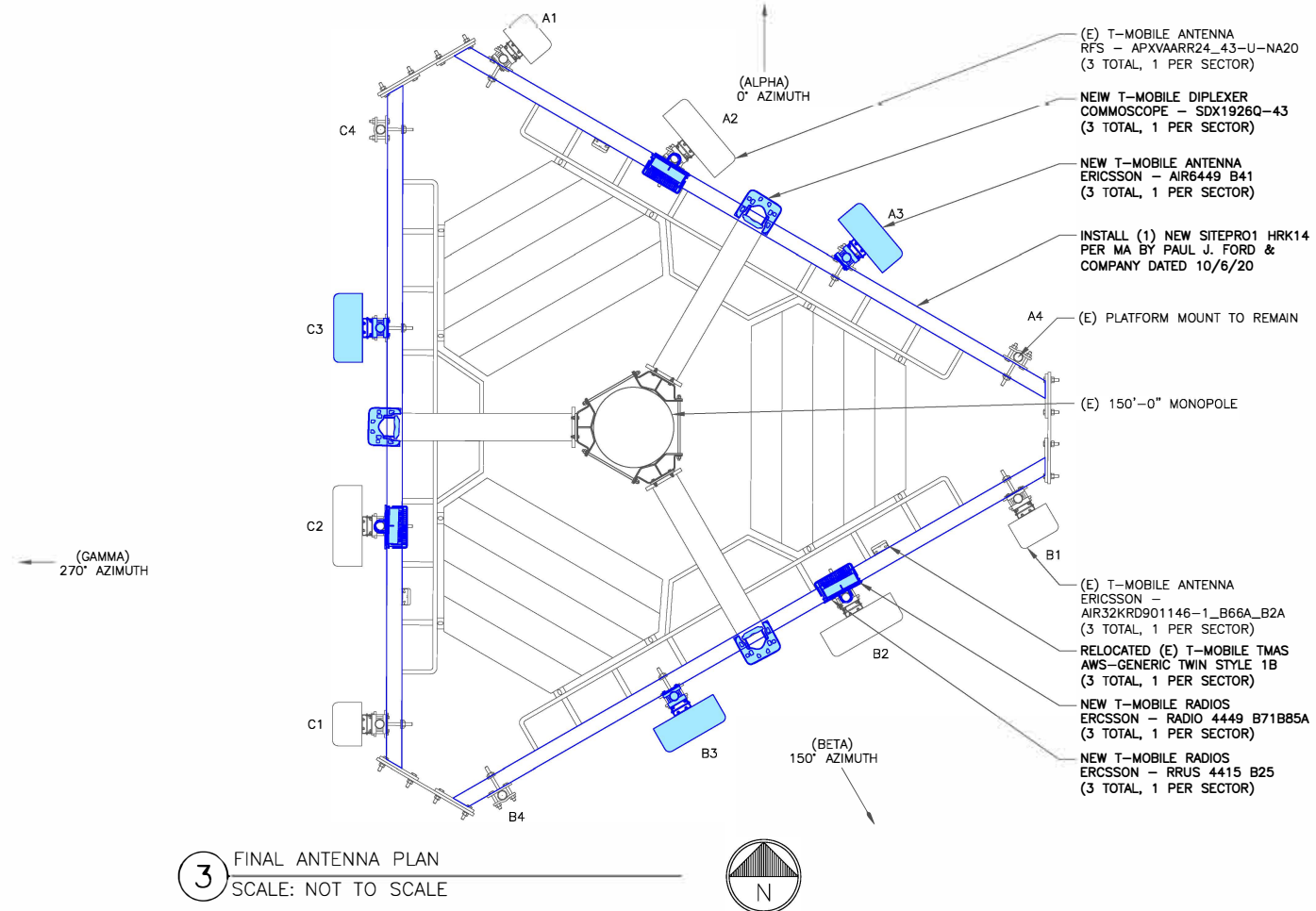
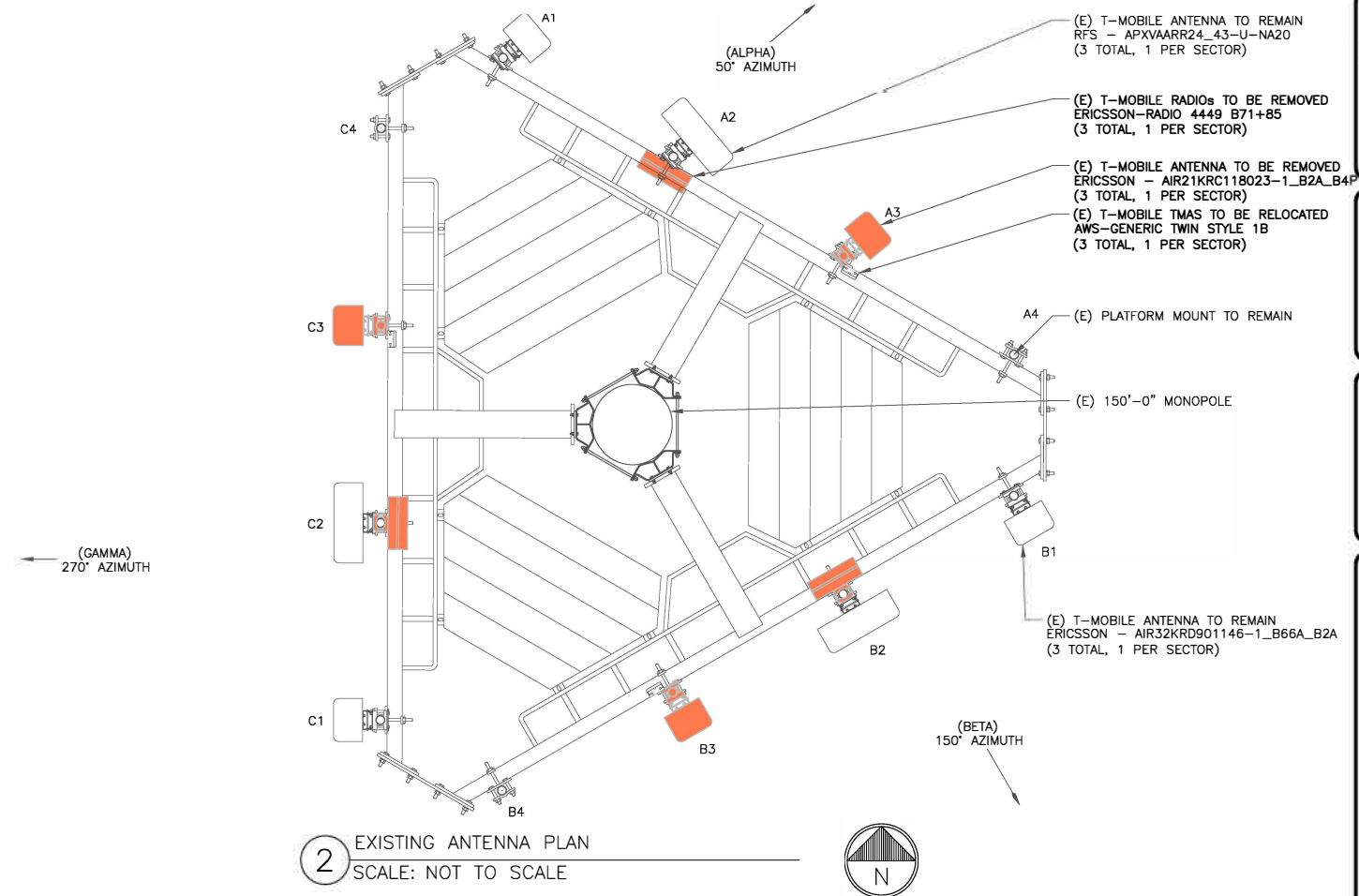
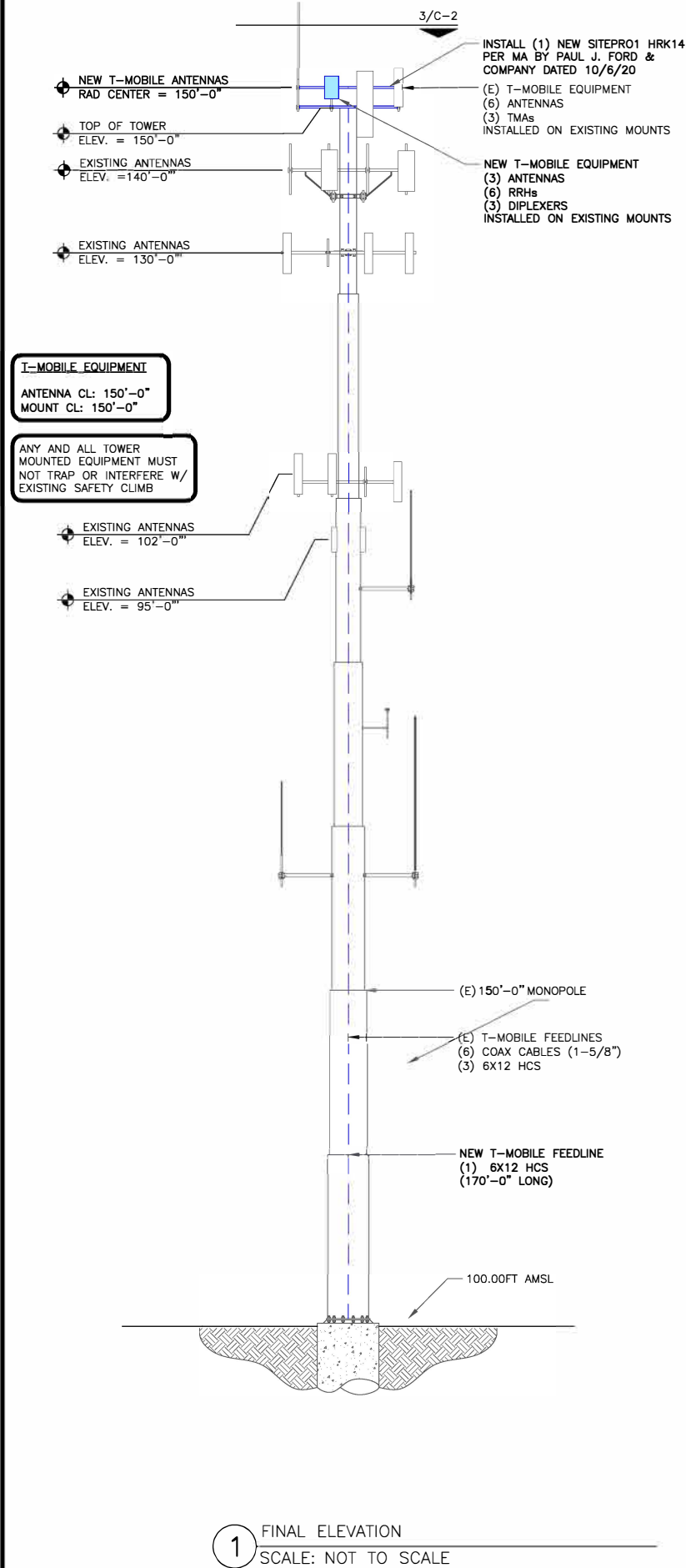
ISSUED FOR:				
REV	DATE	DRWN	DESCRIPTION	DES./QA
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CT11058C

BU #: **827050**
ROCKY HILL / RTE 160_1

699 OLD MAIN ST
ROCKY HILL CT 06067

EXISTING
150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	11/3/20	JTS	CONSTRUCTION	MTJ
1	11/18/20	JTS	CONSTRUCTION	GEH



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C-2

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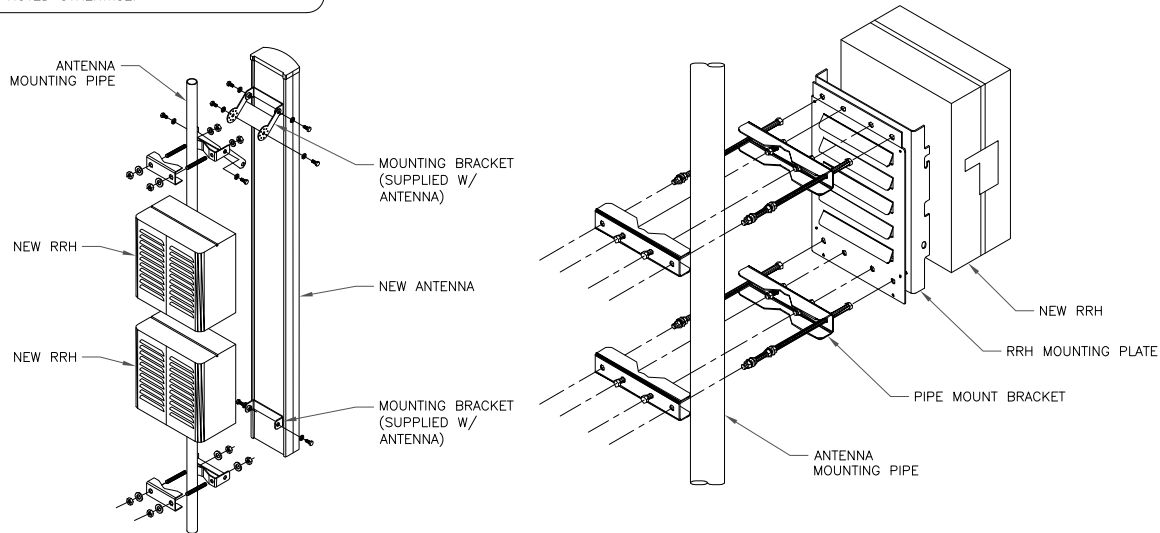
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140124.002.01 Rocky Hill RT 160 CC TWO NE.dwg - Sheet: C-3 - User: ghayes - Nov 18, 2020 - 3:44pm

RF SYSTEM SCHEDULE												
SECTOR	ANTENNA	TECH	MANUFACTURER	ANTENNA MODEL	AZIMUTH	M-TILT	E-TILT	RAD CENTER	TMA/RRU	CABLE TYPE	CABLE DIAMETER	CABLE LENGTH
ALPHA	A-1	L2100/L1900/G1900	ERICSSON	AIR32 KRD901146-1_B66A_B2A	50°	0°	2°/2°	150'-0"	-	-	-	-
	A-2	L700/L600/N600/L1900/U2100	RFS	APXVAARR24_43-U-NA20	50°	0°	5°/5°	150'-0"	(1)6X12 HCS (1)6X12 HCS	HYBRID	1 5/8"	170'
	A-3	L2500/N2500/L2500/N2500	ERICSSON	AIR6449 B41	50°	0°	5°/5°	150'-0"	-	-	-	-
	A-4	-	-	-	-	-	-	-	-	-	-	-
BETA	B-1	L2100 / L1900 / G1900	ERICSSON	AIR32 KRD901146-1_B66A_B2A	150°	0°	2°/2°	150'-0"	-	-	-	-
	B-2	L700/L600/N600/L1900/U2100	RFS	APXVAARR24_43-U-NA20	150°	0°	6°/6°	150'-0"	(1)6X12 HCS	HYBRID	1 5/8"	170'
	B-3	L2500/N2500/L2500/N2500	ERICSSON	AIR6449 B41	150°	0°	2°	150'-0"	-	-	-	-
	B-4	-	-	-	-	-	-	-	-	-	-	-
GAMMA	C-1	L2100 / L1900 / G1900	ERICSSON	AIR32 KRD901146-1_B66A_B2A	270°	0°	7°/2°	150'-0"	-	-	-	-
	C-2	L700/L600/N600/L1900/U2100	RFS	APXVAARR24_43-U-NA20	270°	0°	4°/4°	150'-0"	(1) 6X12 HCS	HYBRID	1 5/8"	170'
	C-3	L2500/N2500/L2500/N2500	ERICSSON	AIR6449 B41	270°	0°	2°	150'-0"	-	-	-	-
	C-4	-	-	-	-	-	-	-	-	-	-	-

1 ANTENNA & FEEDLINE SCHEDULE
SCALE: NOT TO SCALE

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



2 ANTENNA WITH RRHs MOUNTING DETAIL
SCALE: NOT TO SCALE

T

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CASTLE

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T-MOBILE SITE NUMBER:
CT11058C

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11/18/20

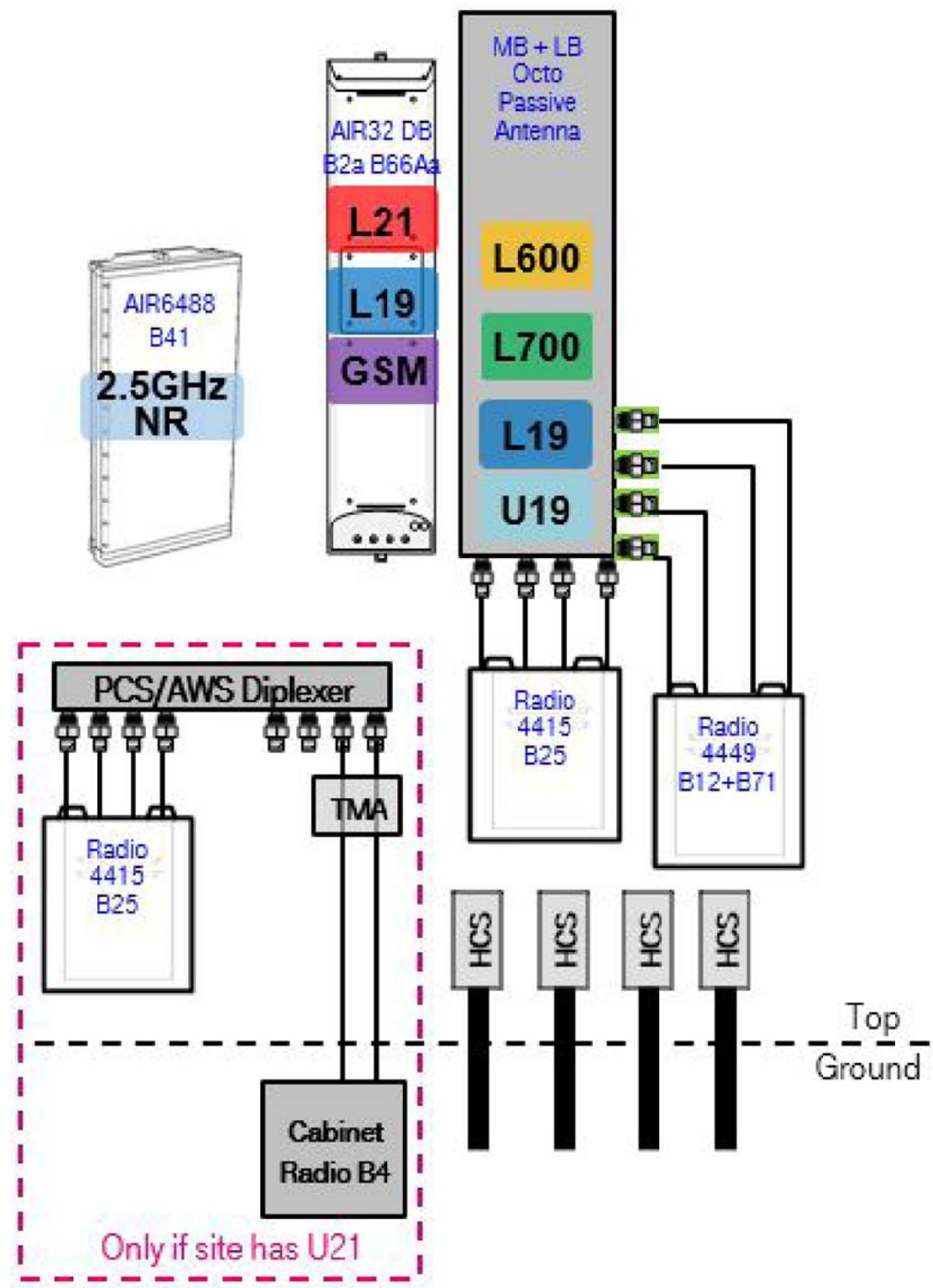
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C-3

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140124.002.01 Rocky Hill RT 160 CC TMO NE.dwg - Sheet: C-4 - User: ghoyes - Nov 18, 2020 - 3:44pm



1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

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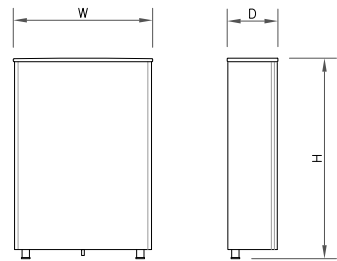
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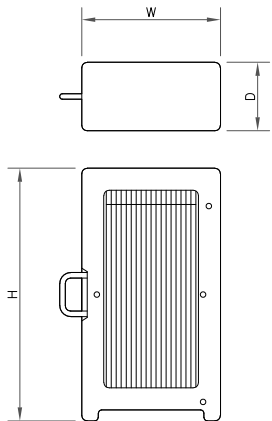
SHEET NUMBER:
C-4

REVISION:
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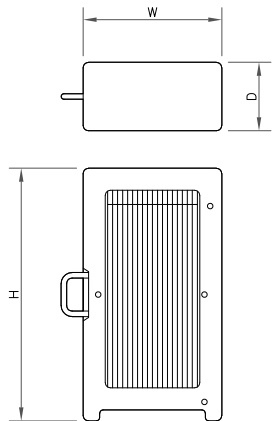
ANTENNA SPECS	
MANUFACTURER	ERICSSON
MODEL #	AIR6449 B41
WIDTH	20.51"
DEPTH	8.54"
HEIGHT	33.11"
WEIGHT	114.63 LBS

1 ANTENNA SPECS
SCALE: NOT TO SCALE



RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	RADIO 4449 B71 B85A
WIDTH	13.20"
DEPTH	10.63"
HEIGHT	17.91"
WEIGHT	73.21 LBS

2 RRU SPECS
SCALE: NOT TO SCALE



RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	RRUS 4415 B25
WIDTH	13.19"
DEPTH	5.39"
HEIGHT	14.96"
WEIGHT	44.00 LBS

3 RRU SPECS
SCALE: NOT TO SCALE

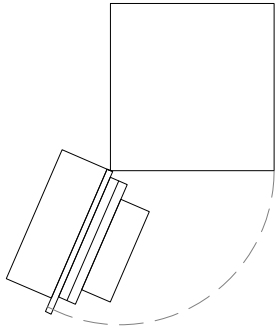


DIPLEXER SPECIFICATIONS	
MANUFACTURER	COMMSCOPE
MODEL #	SDX1926Q-43
WIDTH	6.93"
DEPTH	2.91"
HEIGHT	4.17"
WEIGHT	6.17 LBS

4 DIPLEXER SPECS
SCALE: NOT TO SCALE



ERICSSON B160 SSC
WEIGHT: 60.0 LBS
SIZE (HxWxD): 63"x25.6"x33.5" IN.



BATTERY CABINET SPECIFICATIONS	
MODEL #	B160
MANUF.	ERICSSON
HEIGHT	63"
WIDTH	26"
DEPTH	26"
WEIGHT	

6 ERICSSON B160 BATTERY CABINET
SCALE: NOT TO SCALE

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NINE O'CLOCK - HEALTH (BLUE BACKGROUND, BLACK LETTERING)
TWELVE O'CLOCK - FLAMMABILITY (RED BACKGROUND, BLACK LETTERING)
THREE O'CLOCK - INSTABILITY (YELLOW BACKGROUND, BLACK LETTERING)
SIX O'CLOCK - SPECIAL (WHITE BACKGROUND, BLACK LETTERING)

(WHITE LETTERING W/
RED & BLACK BACKGROUND)
6X10 REFLECTIVE ADHESIVE

(WHITE LETTERING W/
RED BACKGROUND)

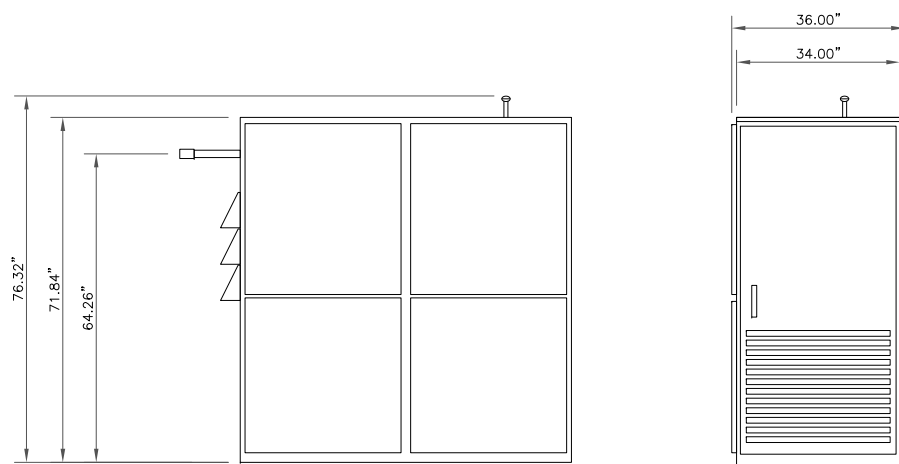
(BLACK LETTERING W/
WHITE BACKGROUND)

(BLACK LETTERING W/
WHITE BACKGROUND)

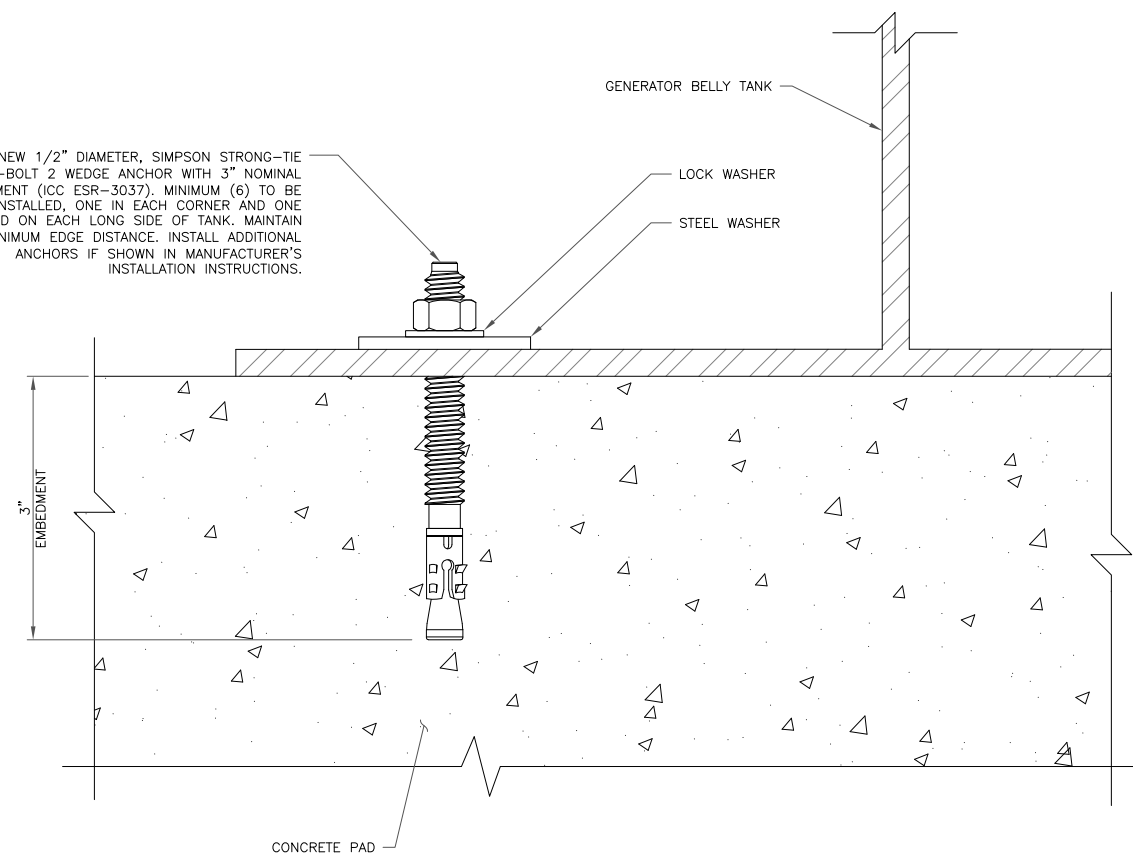
(BLACK LETTERING W/
WHITE BACKGROUND)

1. SIGNS MUST BE MADE OF DURABLE MATERIAL.
2. LETTERS SHALL NOT BE LESS THAN 1" (76.2mm) MIN. IN HEIGHT & 1/4" (12.7mm) IN STROKE.
3. SIGNS SHALL NOT BE OBSCURED OR REMOVED & SHALL BE IN ENGLISH AS A PRIMARY LANGUAGE.
4. SIGNS TO BE PLACED ON GENERATOR/FUEL TANK PER NEPA 704.
5. CONTRACTOR TO PROVIDE ALL REQUIRED SIGNAGE.

15KW DIESEL DC GENERATOR
54 GALLON FUEL TANK



NEW 1/2" DIAMETER, SIMPSON STRONG-TIE STRONG-BOLT 2 WEDGE ANCHOR WITH 3" NOMINAL EMBEDMENT (ICC ESR-3037). MINIMUM (6") TO BE INSTALLED, ONE IN EACH CORNER AND ONE CENTERED ON EACH LONG SIDE OF TANK. MAINTAIN 6.5" MINIMUM EDGE DISTANCE. INSTALL ADDITIONAL ANCHORS IF SHOWN IN MANUFACTURER'S INSTALLATION INSTRUCTIONS.



A cross-sectional diagram of a concrete pad. The pad is rectangular and sits on a layer of aggregate base. The aggregate base is shown with a hatched pattern. The concrete pad is shown with a stippled pattern. Inside the concrete pad, there are six horizontal reinforcement bars, labeled "#6 BARS AT 12" O.C. EACH WAY". The top surface of the concrete pad is labeled "4'-0" x 8'-0" x 6" THICK CONCRETE PAD". The right side of the pad is labeled "3/4" CHAMFER OR TOOLED EDGE (TYP)". The top surface of the pad is labeled "3" ABOVE GRADE".

- 1) MINIMUM CONCRETE STRENGTH (f'c) TO BE 4,500 psi UNLESS NOTED OTHERWISE. CONCRETE MIX SHALL BE DESIGNED BY A CERTIFIED LABORATORY. CONCRETE EXPOSED TO FREEZE-THAW CYCLES TO CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F2 CLASS EXPOSURE. CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A WATER-TO-CEMENT RATIO (W/C) NOT TO EXCEED 0.45.
- 2) CONCRETE PAD SHALL BEAR ON A MINIMUM OF 8" OF AGGREGATE BASE COURSE (ABC) MATERIAL COMPACTED TO 98% OF MAXIMUM DENSITY DETERMINED BY ASTM D1557 (MODIFIED PROCTOR). MATERIAL SHOULD BE WITHIN 3% OF OPTIMUM MOISTURE AT TIME OF COMPACTION.
- 3) ALL REINFORCING TO MAINTAIN 3" COVER WHEN CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH.

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E-1

1

REPLACE EXISTING BREAKER IN POSITION 8 AND 10 WITH A NEW 2P 100A BREAKER
REPLACE EXISTING BREAKER IN POSITION 12 AND 14 WITH A NEW 2P 20A BREAKER
REPLACE EXISTING WIRES FOR EXISTING 6131 CABINET WITH (3) 1/0 AWG THWN (COPPER) AND (1) #6 AWG. MINIMUM CONDUIT SIZE TO BE 2".
IF 100A BREAKER WILL NOT PROPERLY FIT IN EXISTING PANEL, REPLACE (E) PANEL WITH SQUARE D PANEL Q012040M200RB (OR APPROVED EQUAL).
UPGRADE FEEDER WIRES TO MEET AMPACITY IF NEW PANEL IS REQUIRED.
FINAL PANEL DESIGN AND CALCULATIONS FOR WIRE SIZE WERE BASED OFF OF EXISTING DOCUMENTS AND PHOTOS

SCALE: NOT TO SCALE



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.
3. ALL GROUNDING AND BONDING PER THE NEC.

SCALE: NOT TO SCALE



4 SYLVAN WAY
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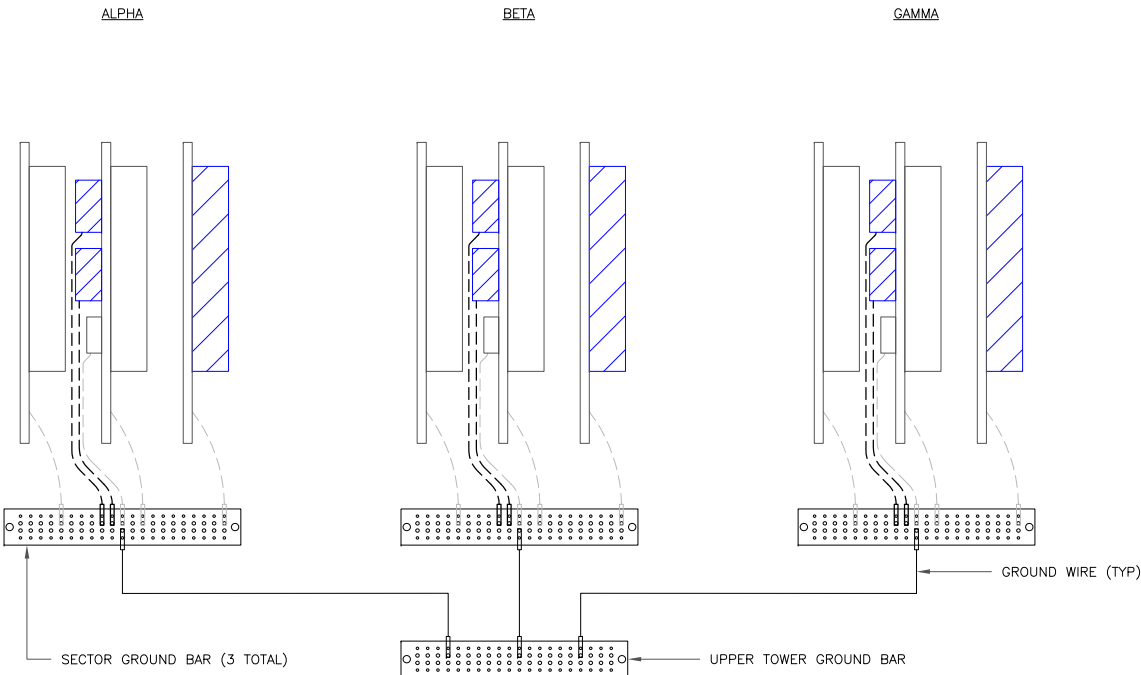
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G-1

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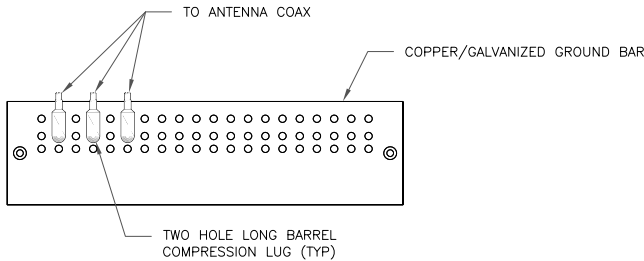
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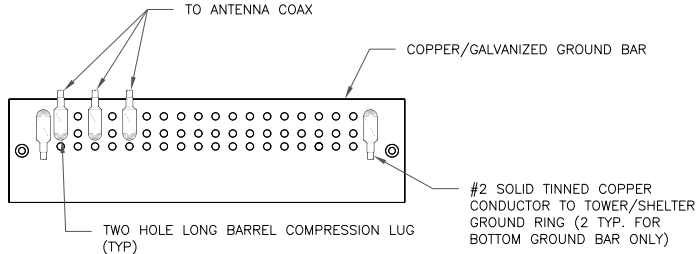
NOTE:

ALL NEW GROUNDS TO BE #6 STRANDED
COPPER WITH GREEN INSULATION UNLESS
NOTED OTHERWISE.

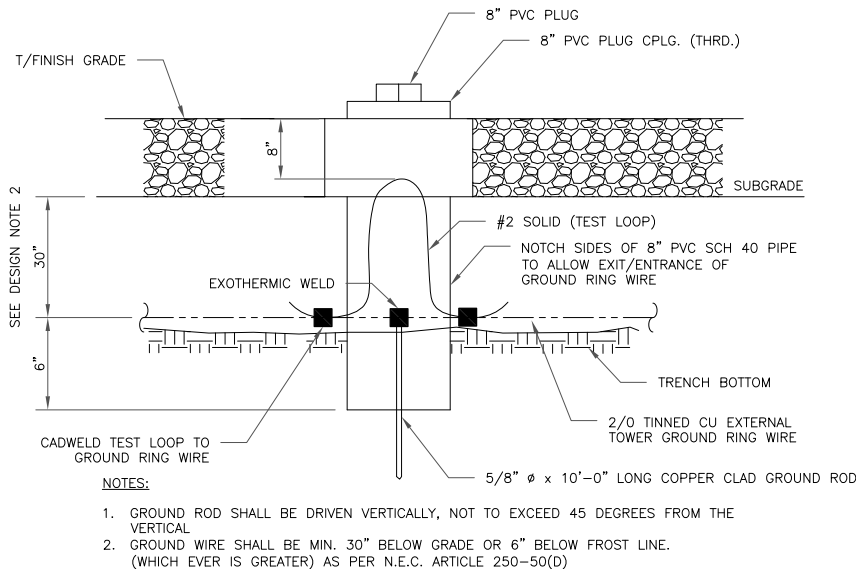
1 ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE



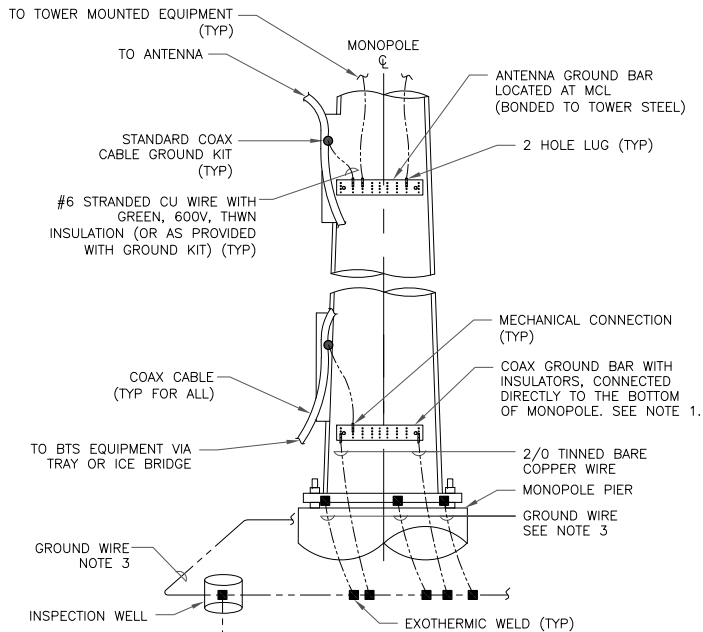
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



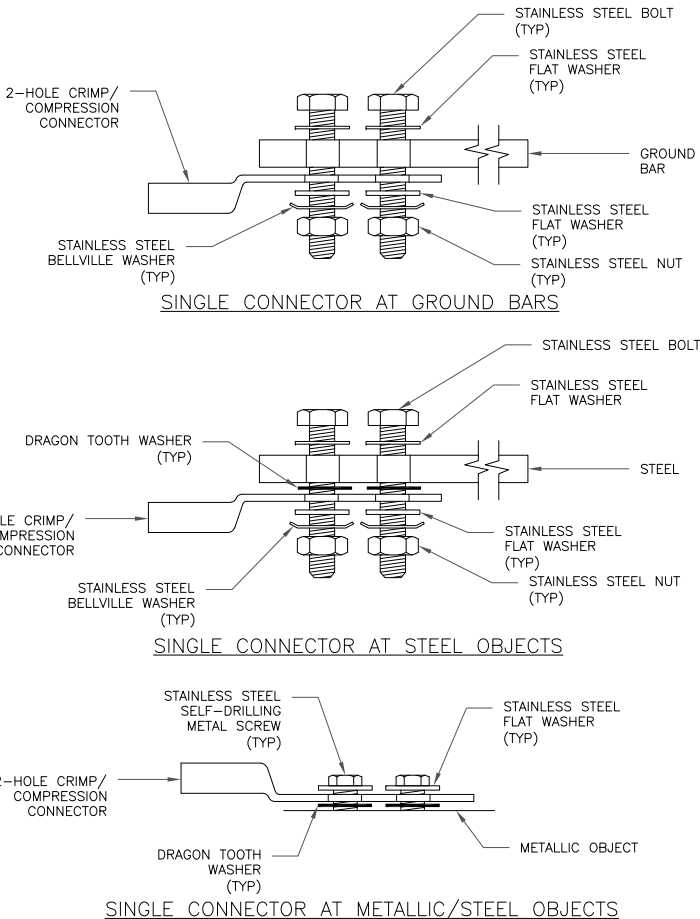
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



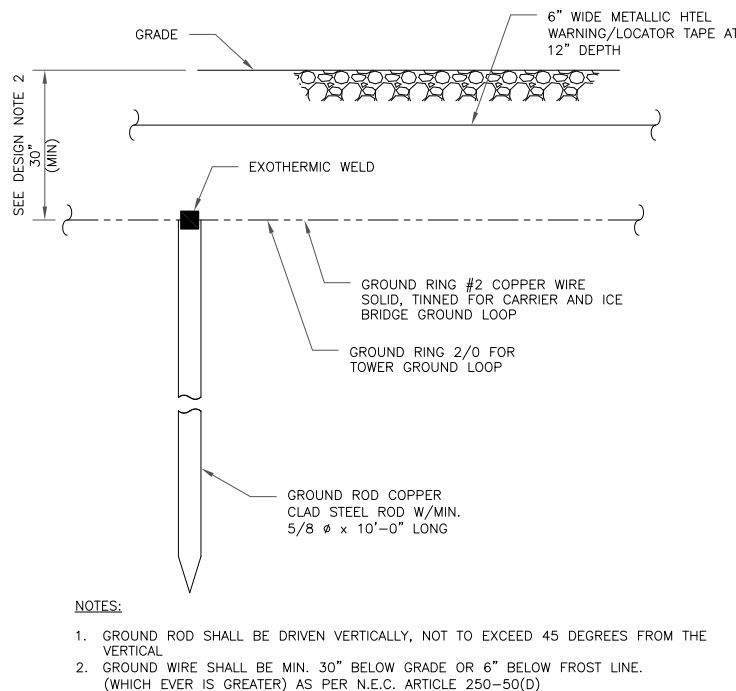
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

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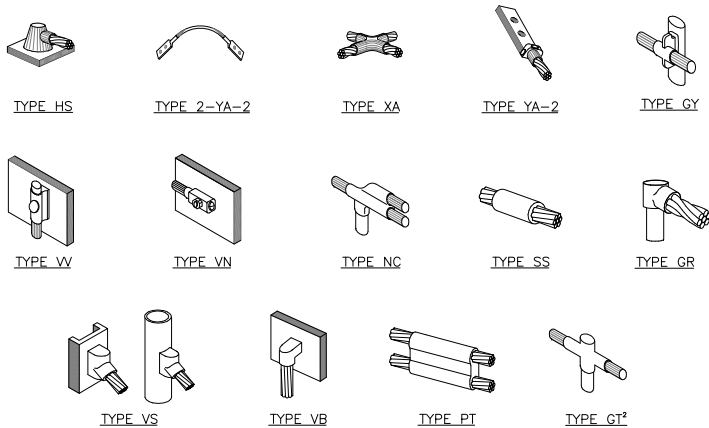
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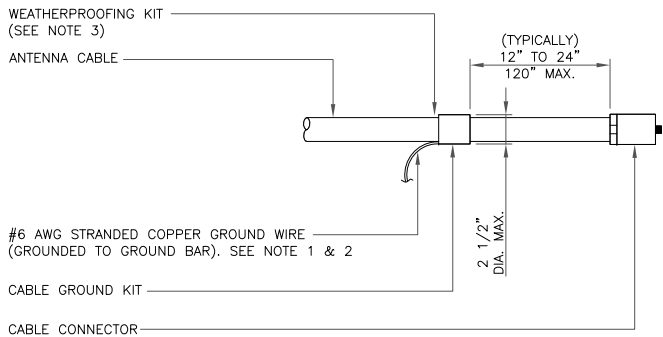
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NOTE:

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.

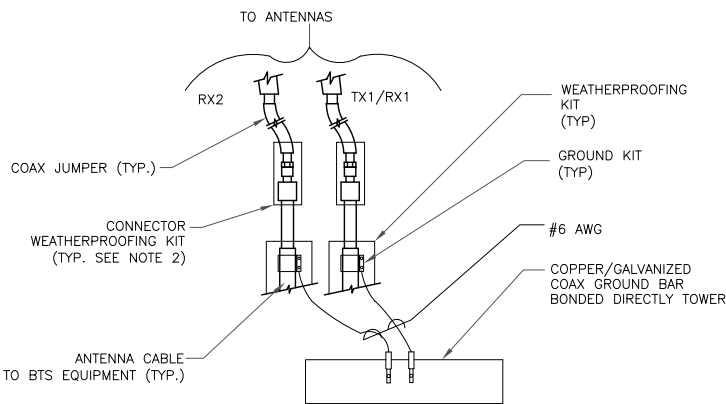
1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE



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.

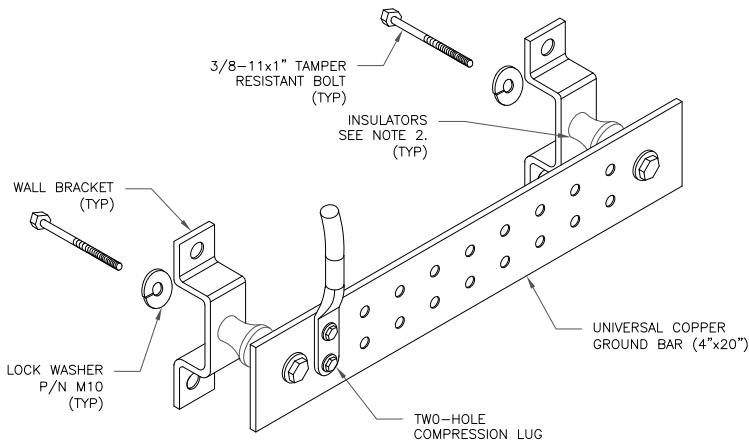
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



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.

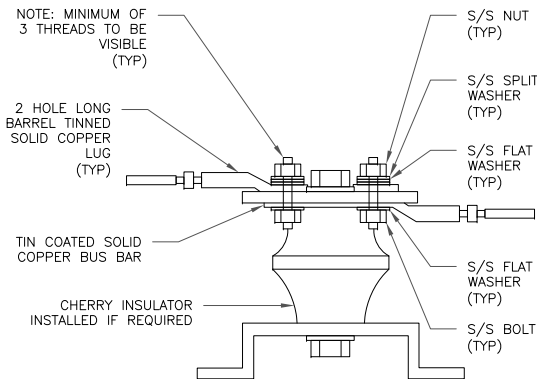
4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



NOTES:

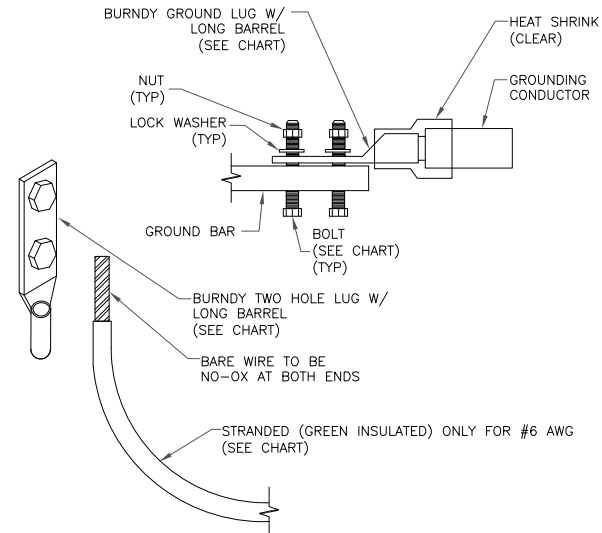
1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STG-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR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

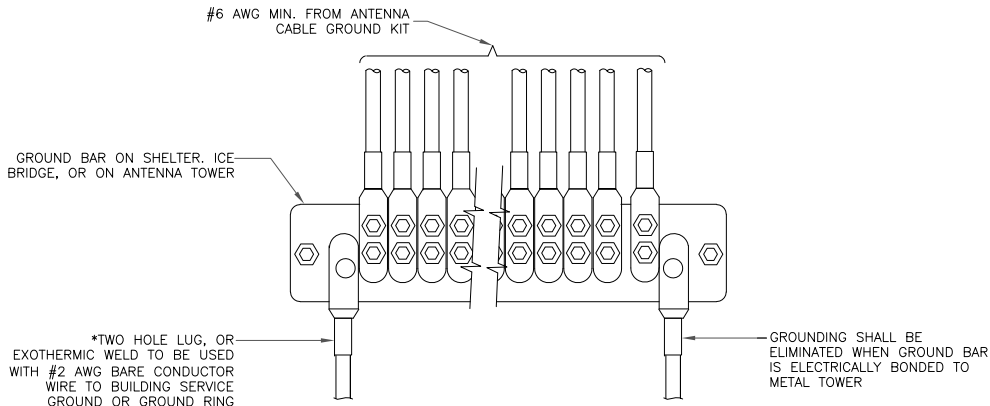
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



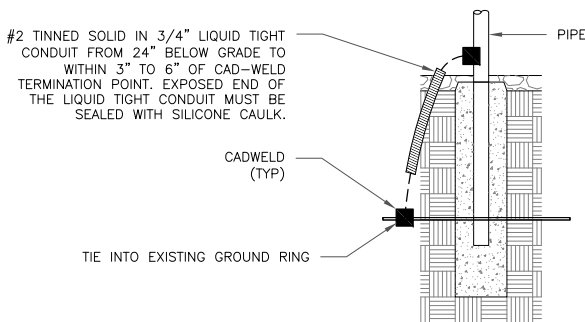
NOTES:

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



5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

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Exhibit D

Structural Analysis Report

Date: **October 15, 2020**

Cheryl Schultz
Crown Castle
6325 Ardrey Kell Rd Suite 600
Charlotte, NC 28277



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

Subject: **Structural Analysis Report**

Carrier Designation: **T-Mobile Co-Locate**
Carrier Site Number: CT11058C
Carrier Site Name: Rocky Hill/ Rte 160_1

Crown Castle Designation: **Crown Castle BU Number:** 827050
Crown Castle Site Name: Rocky Hill/ Rte 160_1
Crown Castle JDE Job Number: 620141
Crown Castle Work Order Number: 1890212
Crown Castle Order Number: 529708 Rev. 0

Engineering Firm Designation: **Crown Castle Project Number:** 1890212

Site Data: **699 Old Main St., Rocky Hill, Hartford County, CT**
Latitude 41° 40' 5.77", Longitude -72° 38' 16.93"
147.5 Foot - Monopole Tower

Dear Cheryl Schultz,

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

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

LC7: Proposed Equipment Configuration

Sufficient Capacity - 83.6%

This analysis has been performed in accordance with the 2018 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Steven Hu

Respectfully submitted by:

Maham Barimani, P.E.
Senior Project Engineer

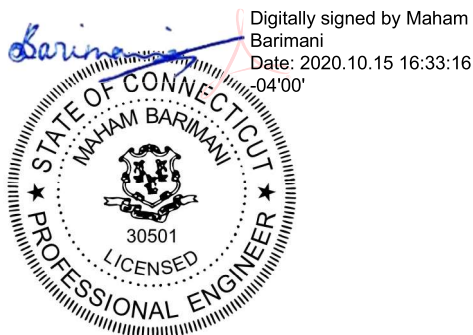


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1) INTRODUCTION

This tower is a 147.5 ft Monopole tower designed by PIROD MANUFACTURES INC. The tower has been modified multiple times to accommodate additional loading.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	2 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)
150.0	150.0	3	commscope	SDX1926Q-43	10	1-5/8
		3	ericsson	AIR 32 B2A/B66AA w/ Mount Pipe		
		3	ericsson	AIR6449 B41_T-MOBILE w/ Mount Pipe		
		3	ericsson	KRY 112 144/1		
		3	ericsson	RADIO 4449 B71 B85A_T-MOBILE		
		3	ericsson	RRUS 4415 B25		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
		3	sitepro1	HRK14 Support Rail Kit		
		1	tower mounts	Platform Mount [LP 405-1]		

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	167.0	2	dbspectra	DS4C06F36D-D	10	7/8
	154.0	1	rfs celwave	201-1N		
	152.0	1	radiowaves	HPD2-4.7		
140.0	140.0	1	andrew	LNx-6514DS-A1M w/ Mount Pipe	7	1-1/4 1-5/8
		2	commscope	LNx-6514DS-A1M w/ Mount Pipe		
		6	commscope	NNHH-65B-R4 w/ Mount Pipe		
		1	raycap	RVZDC-6627-PF-48		
		1	rfs celwave	DB-T1-6Z-8AB-0Z		
		3	samsung	20W CBRS		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
			telecommunications			
		3	samsung telecommunications	CBRS w/ Mount Pipe		
		3	samsung telecommunications	RFV01U-D1A		
		3	samsung telecommunications	RFV01U-D2A		
		1	tower mounts	Platform Mount [LP 303-1_KCKR]		
130.0	130.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz	3 1	1-1/4 1-1/2
		6	alcatel lucent	RRH2X50-800		
		3	commscope	NNVV-65B-R4 w/ Mount Pipe		
		3	nokia	AAHC w/ Mount Pipe		
		1	tower mounts	Platform Mount [LP 405-1]		
102.0	102.0	1	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe	4 4 12	3/8 5/8 1-5/8
		2	cci antennas	HPA-65R-BUU-H8 w/ Mount Pipe		
		2	cci antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe		
		3	ericsson	RRUS 11		
		3	ericsson	RRUS 32		
		3	ericsson	RRUS 32 B2		
		3	ericsson	RRUS 32 B66		
		3	powerwave technologies	7750.00 w/ Mount Pipe		
		6	powerwave technologies	LGP21401		
		6	powerwave technologies	LGP21903		
		1	quintel technology	QS66512-2 w/ Mount Pipe		
		2	raycap	DC6-48-60-18-8F		
		1	tower mounts	Platform Mount [LP 303-1]		
95.0	95.0	3	rfs celwave	APXV18-206516S-C	6	1-5/8
		1	tower mounts	Pipe Mount [PM 601-3]		
89.0	95.0	1	rfs celwave	1142-2C	1	1/2
	89.0	1	tower mounts	Side Arm Mount [SO 701-1]		
72.0	74.0	1	gps	GPS_A	-	-
	72.0	1	tower mounts	Side Arm Mount [SO 701-1]		
54.0	64.0	1	rfs celwave	220-8N	2	7/8
	61.0	1	rfs celwave	201-1N		
	54.0	2	tower mounts	Side Arm Mount [SO 701-1]		
49.0	49.0	1	tower mounts	Yagi Mount	1	7/8
		1	decibel	DB436-C		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
45.0	45.0	1	tower mounts	Yagi Mount	1	7/8
		1	decibel	DB436-C		
40.0	40.0	1	tower mounts	Yagi Mount	1	7/8
		1	decibel	DB436-C		
37.0	37.0	1	tower mounts	Yagi Mount	1	7/8
		1	decibel	DB436-C		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH Engineering	3464587	CCISITES
4-POST-MODIFICATION INSPECTION	ETS	3774967	CCISITES
4-POST-MODIFICATION INSPECTION	TEP	3774968	CCISITES
4-POST-MODIFICATION INSPECTION	ETS	5849862	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Pirod	3674483	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Pirod	3464619	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Pirod	6388740	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	TEP	4047725	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	TEP	4047808	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Paul J. Ford	4424839	CCISITES

3.1) Analysis Method

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

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

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
147.5 - 142.5	Pole	TP24x24x0.375	Pole	10.3%	Pass
142.5 - 137.5	Pole	TP24x24x0.375	Pole	18.2%	Pass
137.5 - 132.5	Pole	TP24x24x0.375	Pole	27.8%	Pass
132.5 - 127.5	Pole	TP24x24x0.375	Pole	39.5%	Pass
127.5 - 125	Pole	TP24x24x0.375	Pole	45.9%	Pass
125 - 120	Pole	TP30x30x0.375	Pole	39.0%	Pass
120 - 115	Pole	TP30x30x0.375	Pole	47.7%	Pass
115 - 110	Pole	TP30x30x0.375	Pole	56.7%	Pass
110 - 105	Pole	TP30x30x0.375	Pole	65.9%	Pass
105 - 100	Pole	TP30x30x0.375	Pole	78.2%	Pass
100 - 95	Pole	TP36x36x0.375	Pole	64.3%	Pass
95 - 94.25	Pole	TP36x36x0.375	Pole	65.6%	Pass
94.25 - 94	Pole + Reinf.	TP36x36x0.4938	Reinf. 5 Tension Rupture	54.3%	Pass
94 - 89	Pole + Reinf.	TP36x36x0.4938	Reinf. 5 Tension Rupture	61.7%	Pass
89 - 84	Pole + Reinf.	TP36x36x0.4938	Reinf. 5 Tension Rupture	69.5%	Pass
84 - 80	Pole + Reinf.	TP36x36x0.4938	Reinf. 5 Tension Rupture	75.9%	Pass
80 - 79.75	Pole + Reinf.	TP42x42x0.575	Pole	45.5%	Pass
79.75 - 74.75	Pole + Reinf.	TP42x42x0.575	Pole	50.4%	Pass
74.75 - 69.75	Pole + Reinf.	TP42x42x0.575	Pole	55.6%	Pass
69.75 - 64.75	Pole + Reinf.	TP42x42x0.575	Pole	61.0%	Pass
64.75 - 60	Pole + Reinf.	TP42x42x0.575	Pole	66.3%	Pass
60 - 59.75	Pole + Reinf.	TP48x48x0.6125	Pole	48.6%	Pass
59.75 - 54.75	Pole + Reinf.	TP48x48x0.6125	Pole	52.8%	Pass
54.75 - 49.75	Pole + Reinf.	TP48x48x0.6125	Pole	57.3%	Pass
49.75 - 44.75	Pole + Reinf.	TP48x48x0.6125	Pole	61.9%	Pass
44.75 - 40	Pole + Reinf.	TP48x48x0.6125	Pole	66.4%	Pass
40 - 39.75	Pole + Reinf.	TP54x54x0.65	Pole	50.3%	Pass
39.75 - 34.75	Pole + Reinf.	TP54x54x0.65	Pole	54.0%	Pass
34.75 - 29.75	Pole + Reinf.	TP54x54x0.65	Pole	57.8%	Pass
29.75 - 24.75	Pole + Reinf.	TP54x54x0.65	Pole	61.7%	Pass
24.75 - 20	Pole + Reinf.	TP54x54x0.65	Pole	65.5%	Pass
20 - 19.75	Pole + Reinf.	TP60x60x0.625	Pole	56.3%	Pass
19.75 - 14.75	Pole + Reinf.	TP60x60x0.625	Pole	59.8%	Pass

14.75 - 9.75	Pole + Reinf.	TP60x60x0.625	Pole	63.4%	Pass
9.75 - 4.75	Pole + Reinf.	TP60x60x0.625	Pole	67.1%	Pass
4.75 - 0	Pole + Reinf.	TP60x60x0.625	Pole	70.7%	Pass
				Summary	
			Pole	78.2%	Pass
			Reinforcement	75.9%	Pass
			Overall	78.2%	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Bolts	125	43.9	Pass
1,2	Flange Plate		45.9	Pass
1	Flange Bolts	100	78.8	Pass
1,2	Flange Plate		78.8	Pass
1	Flange Bolts	80	40.1	Pass
1	Flange Plate		44.1	Pass
1	Bridge Stiffener		73.5	Pass
1	Flange Bolts	60	40.4	Pass
1	Flange Plate		45.4	Pass
1	Bridge Stiffener		72.1	Pass
1	Flange Bolts	40	47.4	Pass
1	Flange Plate		52.7	Pass
1	Bridge Stiffener		83.6	Pass
1	Flange Bolts	20	42.3	Pass
1	Flange Plate		55.9	Pass
1	Bridge Stiffener		70.5	Pass
1	Anchor Rods	0	61.9	Pass
1	Base Plate		76.5	Pass
1	Base Foundation (Structure)		69.9	Pass
1	Base Foundation (Soil Interaction)		31.5	Pass

Structure Rating (max from all components) =	83.6%
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Notes:

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

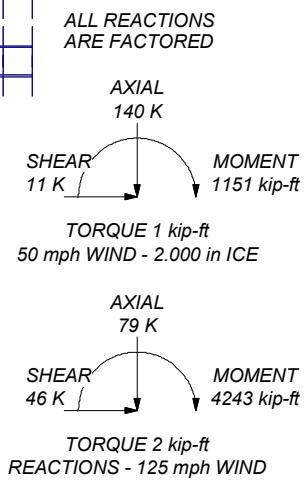
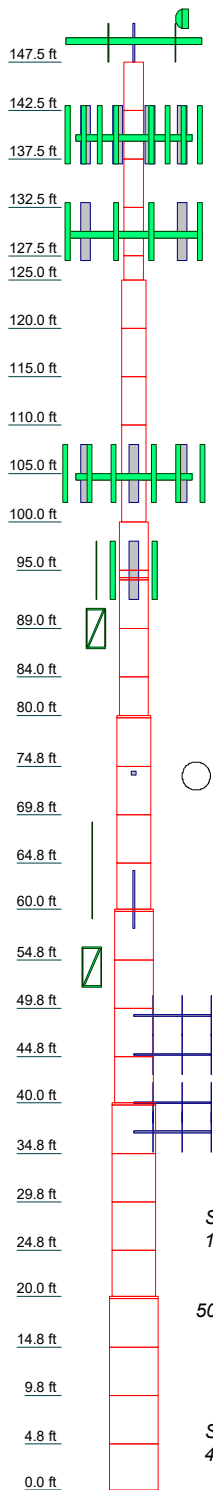
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Size	P50x0.375x0.022x0.018x0.015x0.012x0.010x0.008x0.006x0.005x0.004x0.003x0.002x0.001x0.0005x0.0002x0.0001x0.00005x0.00002x0.00001x0.000005x0.000002x0.000001x0.0000005x0.0000002x0.0000001x0.00000005x0.00000002x0.00000001x0.000000005x0.000000002x0.000000001x0.0000000005x0.0000000002x0.0000000001x0.00000000005x0.00000000002x0.00000000001x0.000000000005x0.000000000002x0.000000000001x0.0000000000005x0.0000000000002x0.0000000000001x0.00000000000005x0.00000000000002x0.00000000000001x0.000000000000005x0.000000000000002x0.000000000000001x0.0000000000000005x0.0000000000000002x0.0000000000000001x0.00000000000000005x0.00000000000000002x0.00000000000000001x0.000000000000000005x0.000000000000000002x0.000000000000000001x0.0000000000000000005x0.0000000000000000002x0.0000000000000000001x0.00000000000000000005x0.00000000000000000002x0.00000000000000000001x0.000000000000000000005x0.000000000000000000002x0.000000000000000000001x0.0000000000000000000005x0.0000000000000000000002x0.0000000000000000000001x0.00000000000000000000005x0.00000000000000000000002x0.00000000000000000000001x0.000000000000000000000005x0.000000000000000000000002x0.000000000000000000000001x0.0000000000000000000000005x0.0000000000000000000000002x0.0000000000000000000000001x0.00000000000000000000000005x0.00000000000000000000000002x0.00000000000000000000000001x0.000000000000000000000000005x0.000000000000000000000000002x0.000000000000000000000000001x0.0000000000000000000000000005x0.0000000000000000000000000002x0.0000000000000000000000000001x0.00000000000000000000000000005x0.00000000000000000000000000002x0.00000000000000000000000000001x0.000000000000000000000000000005x0.000000000000000000000000000002x0.000000000000000000000000000001x0.0000000000000000000000000000005x0.0000000000000000000000000000002x0.0000000000000000000000000000001x0.00000000000000000000000000000005x0.00000000000000000000000000000002x0.00000000000000000000000000000001x0.000000000000000000000000000000005x0.000000000000000000000000000000002x0.000000000000000000000000000000001x0.0000000000000000000000000000000005x0.0000000000000000000000000000000002x0.0000000000000000000000000000000001x0.00000000000000000000000000000000005x0.00000000000000000000000000000000002x0.00000000000000000000000000000000001x0.000000000000000000000000000000000005x0.000000000000000000000000000000000002x0.000000000000000000000000000000000001x0.0000000000000000000000000000000000005x0.0000000000000000000000000000000000002x0.0000000000000000000000000000000000001x0.00000000000000000000000000000000000005x0.00000000000000000000000000000000000002x0.00000000000000000000000000000000000001x0.000000000000000000000000000000000000005x0.000000000000000000000000000000000000002x0.000000000000000000000000000000000000001x0.0000000000000000000000000000000000000005x0.0000000000000000000000000000000000000002x0.0000000000000000000000000000000000000001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.0001x0.005x0.002x0.001x0.0005x0.0002x0.001x0.0005x0.0002x0.001x0.0005x0.0002x0.001x0.0005x0.0002x0.001x0.0005x0.002x0.0001x0.00																																			



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 2.00 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 0.000 ft
8. TOWER RATING: 78.2%

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Phone: (724) 416-2000
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Job: **827050**

Project: Crown Castle

Client: Crown Castle

Code: TIA-222-H

Path: C:\Users\SHU\Documents\WFH\827050\WO_1890212 - SAIProd\827050R.dwg

Drawn by: Steven Hu

Date: 10/15/20

Scale: NTS

Dwg No. E-1

Tower Input Data

The tower is a monopole.

This tower is designed using the TIA-222-H standard.

The following design criteria apply:

- 4) Tower is located in Hartford County, Connecticut.
- 5) Tower base elevation above sea level: 97.000 ft.
- 6) Basic wind speed of 125 mph.
- 7) Risk Category II.
- 8) Exposure Category C.
- 9) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- 10) Topographic Category: 1.
- 11) Crest Height: 0.000 ft.
- 12) Nominal ice thickness of 2.000 in.
- 13) Ice thickness is considered to increase with height.
- 14) Ice density of 56.000 pcf.
- 15) A wind speed of 50 mph is used in combination with ice.
- 16) Temperature drop of 50.000 °F.
- 17) Deflections calculated using a wind speed of 60 mph.
- 18) TOWER RATING: 78.2%.
- 19) A non-linear (P-delta) analysis was used.
- 20) Pressures are calculated at each section.
- 21) Stress ratio used in pole design is 1.05.
- 22) Tower analysis based on target reliabilities in accordance with Annex S.
- 23) Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- 24) 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	Retention 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.
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Use TIA-222-H Tension Splice
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Exemption
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	

Poles

- √ Include Shear-Torsion Interaction
- Always Use Sub-Critical Flow
- Use Top Mounted Sockets
- Pole Without Linear Attachments
- Pole With Shroud Or No
- Appurtenances
- Outside and Inside Corner Radii Are Known

Pole Section Geometry

Section	Elevation	Section Length	Pole Size	Pole Grade	Socket Length
	ft	ft			ft

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	147.500-142.500	5.000	P24x0.375	A53-B-42 (42 ksi)	
L2	142.500-137.500	5.000	P24x0.375	A53-B-42 (42 ksi)	
L3	137.500-132.500	5.000	P24x0.375	A53-B-42 (42 ksi)	
L4	132.500-127.500	5.000	P24x0.375	A53-B-42 (42 ksi)	
L5	127.500-125.000	2.500	P24x0.375	A53-B-42 (42 ksi)	
L6	125.000-120.000	5.000	P30x0.375	A53-B-42 (42 ksi)	
L7	120.000-115.000	5.000	P30x0.375	A53-B-42 (42 ksi)	
L8	115.000-110.000	5.000	P30x0.375	A53-B-42 (42 ksi)	
L9	110.000-105.000	5.000	P30x0.375	A53-B-42 (42 ksi)	
L10	105.000-100.000	5.000	P30x0.375	A53-B-42 (42 ksi)	
L11	100.000-95.000	5.000	P36x0.375	A53-B-42 (42 ksi)	
L12	95.000-94.250	0.750	P36x0.375	A53-B-42 (42 ksi)	
L13	94.250-94.000	0.250	P36x0.49375	A53-B-42 (42 ksi)	
L14	94.000-89.000	5.000	P36x0.49375	A53-B-42 (42 ksi)	
L15	89.000-84.000	5.000	P36x0.49375	A53-B-42 (42 ksi)	
L16	84.000-80.000	4.000	P36x0.49375	A53-B-42 (42 ksi)	
L17	80.000-79.750	0.250	P42x0.575	A53-B-42 (42 ksi)	
L18	79.750-74.750	5.000	P42x0.575	A53-B-42 (42 ksi)	
L19	74.750-69.750	5.000	P42x0.575	A53-B-42 (42 ksi)	
L20	69.750-64.750	5.000	P42x0.575	A53-B-42 (42 ksi)	
L21	64.750-60.000	4.750	P42x0.575	A53-B-42 (42 ksi)	
L22	60.000-59.750	0.250	P48x0.6125	A53-B-42 (42 ksi)	
L23	59.750-54.750	5.000	P48x0.6125	A53-B-42 (42 ksi)	
L24	54.750-49.750	5.000	P48x0.6125	A53-B-42 (42 ksi)	
L25	49.750-44.750	5.000	P48x0.6125	A53-B-42 (42 ksi)	
L26	44.750-40.000	4.750	P48x0.6125	A53-B-42 (42 ksi)	
L27	40.000-39.750	0.250	P54x0.65	A53-B-42 (42 ksi)	
L28	39.750-34.750	5.000	P54x0.65	A53-B-42 (42 ksi)	
L29	34.750-29.750	5.000	P54x0.65	A53-B-42 (42 ksi)	
L30	29.750-24.750	5.000	P54x0.65	A53-B-42 (42 ksi)	
L31	24.750-20.000	4.750	P54x0.65	A53-B-42 (42 ksi)	
L32	20.000-19.750	0.250	P60x0.625	A53-B-42 (42 ksi)	
L33	19.750-14.750	5.000	P60x0.625	A53-B-42 (42 ksi)	
L34	14.750-9.750	5.000	P60x0.625	A53-B-42 (42 ksi)	
L35	9.750-4.750	5.000	P60x0.625	A53-B-42	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L36	4.750-0.000	4.750	P60x0.625	(42 ksi) A53-B-42 (42 ksi)	

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
L1 147.500-142.500				1	1	1			
L2 142.500-137.500				1	1	1			
L3 137.500-132.500				1	1	1			
L4 132.500-127.500				1	1	1			
L5 127.500-125.000				1	1	1			
L6 125.000-120.000				1	1	1			
L7 120.000-115.000				1	1	1			
L8 115.000-110.000				1	1	1			
L9 110.000-105.000				1	1	1			
L10 105.000-100.000				1	1	1			
L11 100.000-95.000				1	1	1			
L12 95.000-94.250				1	1	1			
L13 94.250-94.000				1	1	0.979915			
L14 94.000-89.000				1	1	0.979915			
L15 89.000-84.000				1	1	0.979915			
L16 84.000-80.000				1	1	0.979915			
L17 80.000-79.750				1	1	0.976046			
L18 79.750-74.750				1	1	0.976046			
L19 74.750-69.750				1	1	0.976046			
L20 69.750-64.750				1	1	0.976046			
L21 64.750-60.000				1	1	0.976046			
L22 60.000-59.750				1	1	0.971735			
L23 59.750-54.750				1	1	0.971735			
L24 54.750-49.750				1	1	0.971735			
L25 49.750-44.750				1	1	0.971735			
L26 44.750-40.000				1	1	0.971735			
L27 40.000-39.750				1	1	0.970011			
L28 39.750-34.750				1	1	0.970011			
L29 34.750-29.750				1	1	0.970011			

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _r	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
ft	ft ²	in							
L30 29.750- 24.750				1	1	0.970011			
L31 24.750- 20.000				1	1	0.970011			
L32 20.000- 19.750				1	1	0.967075			
L33 19.750- 14.750				1	1	0.967075			
L34 14.750- 9.750				1	1	0.967075			
L35 9.750- 4.750				1	1	0.967075			
L36 4.750- 0.000				1	1	0.967075			

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 klf
AVA5-50(7/8)	C	No	Surface Ar (CaAa)	147.500 - 0.000	7	7	0.250 0.320	1.102		0.000
**										
2" Rigid Conduit	B	No	Surface Ar (CaAa)	102.000 - 0.000	2	2	0.250 0.300	2.000		0.003
LDF7-50A(1-5/8)	B	No	Surface Ar (CaAa)	102.000 - 0.000	12	6	0.250 0.400	1.980		0.001
*										
LDF7-50A(1-5/8)	C	No	Surface Ar (CaAa)	95.000 - 0.000	6	6	-0.300 -0.100	1.980		0.001
*										
CCI 8.5" x 1.25" Plate	A	No	Surface Af (CaAa)	26.958 - 14.042	1	1	0.000 0.030	8.500	19.500	0.036
CCI 8.5" x 1.25" Plate	A	No	Surface Af (CaAa)	26.958 - 14.042	1	1	0.000 0.030	8.500	19.500	0.036
CCI 8.5" x 1.25" Plate	B	No	Surface Af (CaAa)	26.958 - 14.042	1	1	0.000 0.030	8.500	19.500	0.036
CCI 8.5" x 1.25" Plate	C	No	Surface Af (CaAa)	26.958 - 14.042	1	1	0.000 0.030	8.500	19.500	0.036
*										
CCI 8.0" x 3.0" Plate	A	No	Surface Af (CaAa)	26.500 - 20.250	1	1	0.000 0.030	8.000	22.000	0.082
CCI 8.0" x 3.0" Plate	A	No	Surface Af (CaAa)	26.500 - 20.250	1	1	0.000 0.030	8.000	22.000	0.082
CCI 8.0" x 3.0" Plate	B	No	Surface Af (CaAa)	26.500 - 20.250	1	1	0.000 0.030	8.000	22.000	0.082
CCI 8.0" x 3.0" Plate	C	No	Surface Af (CaAa)	26.500 - 20.250	1	1	0.000 0.030	8.000	22.000	0.082
*										
CCI 6.5" x 1.25" Plate	A	No	Surface Af (CaAa)	46.042 - 35.458	1	1	0.000 0.030	6.500	15.500	0.028
CCI 6.5" x 1.25" Plate	A	No	Surface Af (CaAa)	46.042 - 35.458	1	1	0.000 0.030	6.500	15.500	0.028
CCI 6.5" x 1.25" Plate	B	No	Surface Af (CaAa)	46.042 - 35.458	1	1	0.000 0.030	6.500	15.500	0.028
CCI 6.5" x 1.25" Plate	C	No	Surface Af (CaAa)	46.042 - 35.458	1	1	0.000 0.030	6.500	15.500	0.028
*										
CCI 6.0" x 3.0" Plate	A	No	Surface Af (CaAa)	45.500 - 40.250	1	1	0.000 0.030	6.000	18.000	0.061
CCI 6.0" x 3.0" Plate	A	No	Surface Af (CaAa)	45.500 - 40.250	1	1	0.000 0.030	6.000	18.000	0.061

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 klf
CCI 6.0" x 3.0" Plate	B	No	Surface Af (CaAa)	45.500 - 40.250	1	1	0.000 0.030	6.000	18.000	0.061
CCI 6.0" x 3.0" Plate	C	No	Surface Af (CaAa)	45.500 - 40.250	1	1	0.000 0.030	6.000	18.000	0.061
*										
CCI 6.5" x 1.25" Plate	A	No	Surface Af (CaAa)	66.042 - 55.458	1	1	0.000 0.030	6.500	15.500	0.028
CCI 6.5" x 1.25" Plate	A	No	Surface Af (CaAa)	66.042 - 55.458	1	1	0.000 0.030	6.500	15.500	0.028
CCI 6.5" x 1.25" Plate	B	No	Surface Af (CaAa)	66.042 - 55.458	1	1	0.000 0.030	6.500	15.500	0.028
CCI 6.5" x 1.25" Plate	C	No	Surface Af (CaAa)	66.042 - 55.458	1	1	0.000 0.030	6.500	15.500	0.028
*										
CCI 6.0" x 3.0" Plate	A	No	Surface Af (CaAa)	65.500 - 60.250	1	1	0.000 0.030	6.000	18.000	0.061
CCI 6.0" x 3.0" Plate	A	No	Surface Af (CaAa)	65.500 - 60.250	1	1	0.000 0.030	6.000	18.000	0.061
CCI 6.0" x 3.0" Plate	B	No	Surface Af (CaAa)	65.500 - 60.250	1	1	0.000 0.030	6.000	18.000	0.061
CCI 6.0" x 3.0" Plate	C	No	Surface Af (CaAa)	65.500 - 60.250	1	1	0.000 0.030	6.000	18.000	0.061
*										
CCI 6.0" x 1.0" Plate	A	No	Surface Af (CaAa)	84.917 - 76.333	1	1	0.000 0.030	6.000	14.000	0.020
CCI 6.0" x 1.0" Plate	A	No	Surface Af (CaAa)	84.917 - 76.333	1	1	0.000 0.030	6.000	14.000	0.020
CCI 6.0" x 1.0" Plate	B	No	Surface Af (CaAa)	84.917 - 76.333	1	1	0.000 0.030	6.000	14.000	0.020
CCI 6.0" x 1.0" Plate	C	No	Surface Af (CaAa)	84.917 - 76.333	1	1	0.000 0.030	6.000	14.000	0.020
*										
CCI 5.0" x 3.0" Plate	A	No	Surface Af (CaAa)	84.500 - 80.250	1	1	0.000 0.030	5.000	16.000	0.051
CCI 5.0" x 3.0" Plate	A	No	Surface Af (CaAa)	84.500 - 80.250	1	1	0.000 0.030	5.000	16.000	0.051
CCI 5.0" x 3.0" Plate	B	No	Surface Af (CaAa)	84.500 - 80.250	1	1	0.000 0.030	5.000	16.000	0.051
CCI 5.0" x 3.0" Plate	C	No	Surface Af (CaAa)	84.500 - 80.250	1	1	0.000 0.030	5.000	16.000	0.051
*										
CCI 8.5" x 1.25" Plate	A	No	Surface Af (CaAa)	19.750 - 0.000	1	1	0.050 0.100	8.500	19.500	0.000
CCI 8.5" x 1.25" Plate	A	No	Surface Af (CaAa)	19.750 - 0.000	1	1	0.050 0.100	8.500	19.500	0.000
CCI 8.5" x 1.25" Plate	B	No	Surface Af (CaAa)	19.750 - 0.000	1	1	0.050 0.100	8.500	19.500	0.000
CCI 8.5" x 1.25" Plate	C	No	Surface Af (CaAa)	19.750 - 0.000	1	1	0.050 0.100	8.500	19.500	0.000
*										
CCI 8.5" x 1.25" Plate	A	No	Surface Af (CaAa)	39.750 - 20.250	1	1	0.050 0.100	8.500	19.500	0.000
CCI 8.5" x 1.25" Plate	A	No	Surface Af (CaAa)	39.750 - 20.250	1	1	0.050 0.100	8.500	19.500	0.000
CCI 8.5" x 1.25" Plate	B	No	Surface Af (CaAa)	39.750 - 20.250	1	1	0.050 0.100	8.500	19.500	0.000
CCI 8.5" x 1.25" Plate	C	No	Surface Af (CaAa)	39.750 - 20.250	1	1	0.050 0.100	8.500	19.500	0.000
*										
CCI 6.5" x 1.25" Plate	A	No	Surface Af (CaAa)	59.750 - 40.250	1	1	0.050 0.100	6.500	15.500	0.000
CCI 6.5" x 1.25" Plate	A	No	Surface Af (CaAa)	59.750 - 40.250	1	1	0.050 0.100	6.500	15.500	0.000
CCI 6.5" x 1.25" Plate	B	No	Surface Af (CaAa)	59.750 - 40.250	1	1	0.050 0.100	6.500	15.500	0.000
CCI 6.5" x 1.25" Plate	C	No	Surface Af (CaAa)	59.750 - 40.250	1	1	0.050 0.100	6.500	15.500	0.000
*										

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 klf
CCI 6" x 1" Plate	A	No	Surface Af (CaAa)	79.750 - 60.250	1	1	0.050 0.100	6.000	14.000	0.000
CCI 6" x 1" Plate	A	No	Surface Af (CaAa)	79.750 - 60.250	1	1	0.050 0.100	6.000	14.000	0.000
CCI 6" x 1" Plate	B	No	Surface Af (CaAa)	79.750 - 60.250	1	1	0.050 0.100	6.000	14.000	0.000
CCI 6" x 1" Plate	C	No	Surface Af (CaAa)	79.750 - 60.250	1	1	0.050 0.100	6.000	14.000	0.000
*										
CCI 4" x 0.75" Plate	A	No	Surface Af (CaAa)	95.250 - 80.250	1	1	0.050 0.100	4.000	9.500	0.000
CCI 4" x 0.75" Plate	A	No	Surface Af (CaAa)	95.250 - 80.250	1	1	0.050 0.100	4.000	9.500	0.000
CCI 4" x 0.75" Plate	B	No	Surface Af (CaAa)	95.250 - 80.250	1	1	0.050 0.100	4.000	9.500	0.000
CCI 4" x 0.75" Plate	C	No	Surface Af (CaAa)	95.250 - 80.250	1	1	0.050 0.100	4.000	9.500	0.000
*										
4.75" x 1.25" Plate	A	No	Surface Af (CaAa)	64.750 - 57.500	1	1	0.000 0.030	4.750	12.000	0.020
4.75" x 1.25" Plate	B	No	Surface Af (CaAa)	64.750 - 57.500	1	1	0.000 0.030	4.750	12.000	0.020
4.75" x 1.25" Plate	C	No	Surface Af (CaAa)	64.750 - 57.500	1	1	0.000 0.030	4.750	12.000	0.020
*										
4.75" x 3" Plate	A	No	Surface Af (CaAa)	64.750 - 60.250	1	1	0.000 0.030	4.750	15.500	0.048
4.75" x 3" Plate	B	No	Surface Af (CaAa)	64.750 - 60.250	1	1	0.000 0.030	4.750	15.500	0.048
4.75" x 3" Plate	C	No	Surface Af (CaAa)	64.750 - 60.250	1	1	0.000 0.030	4.750	15.500	0.048
**										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	CaAa ft ² /ft	Weight klf
FLC 158-50J(1-5/8)	B	No	No	Inside Pole	147.500 - 0.000	10	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000
**								
LDF7-50A(1-5/8)	B	No	No	Inside Pole	140.000 - 0.000	8	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000
**								
MLC6C-06C-008R-008R(1-1/2)	C	No	No	Inside Pole	130.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000
HB114-1-08U4-M5F(1-1/4)	C	No	No	Inside Pole	130.000 - 0.000	3	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000
WR-VG82ST-BRDA(5/8)	B	No	No	Inside Pole	102.000 - 0.000	8	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000
*								
LDF4-50A(1/2)	B	No	No	Inside Pole	89.000 - 0.000	1	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _{AA} ft ² /ft	Weight klf
							2" Ice	0.000	0.000
* LCF78-50A(7/8)	B	No	No	Inside Pole	54.000 - 0.000	2	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000
* LCF78-50A(7/8)	B	No	No	Inside Pole	49.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000
* LCF78-50A(7/8)	B	No	No	Inside Pole	45.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000
* LCF78-50A(7/8)	B	No	No	Inside Pole	40.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000
* LCF78-50A(7/8)	B	No	No	Inside Pole	37.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000
** 2" Solid Rod Reinforcing	C	No	No	CaAa (Out Of Face)	42.500 - 37.500	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.200 0.300 0.400 0.600	0.000 0.000 0.000 0.000
2" Solid Rod Reinforcing	C	No	No	CaAa (Out Of Face)	22.500 - 17.500	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.200 0.300 0.400 0.600	0.000 0.000 0.000 0.000

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	147.500-142.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.046
		C	0.000	0.000	3.857	0.000	0.011
L2	142.500-137.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.062
		C	0.000	0.000	3.857	0.000	0.011
L3	137.500-132.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.079
		C	0.000	0.000	3.857	0.000	0.011
L4	132.500-127.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.079
		C	0.000	0.000	3.857	0.000	0.024
L5	127.500-125.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.039
		C	0.000	0.000	1.929	0.000	0.019
L6	125.000-120.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.079
		C	0.000	0.000	3.857	0.000	0.038
L7	120.000-115.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.079

Tower Sectio n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L8	115.000-110.000	C	0.000	0.000	3.857	0.000	0.038
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.079
L9	110.000-105.000	C	0.000	0.000	3.857	0.000	0.038
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.079
L10	105.000-100.000	C	0.000	0.000	3.857	0.000	0.038
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	3.176	0.000	0.115
L11	100.000-95.000	C	0.000	0.000	3.857	0.000	0.038
		A	0.000	0.000	0.333	0.000	0.000
		B	0.000	0.000	8.107	0.000	0.168
L12	95.000-94.250	C	0.000	0.000	4.024	0.000	0.038
		A	0.000	0.000	1.000	0.000	0.000
		B	0.000	0.000	1.691	0.000	0.025
L13	94.250-94.000	C	0.000	0.000	1.970	0.000	0.009
		A	0.000	0.000	0.333	0.000	0.000
		B	0.000	0.000	0.564	0.000	0.008
L14	94.000-89.000	C	0.000	0.000	0.657	0.000	0.003
		A	0.000	0.000	6.667	0.000	0.000
		B	0.000	0.000	11.273	0.000	0.168
L15	89.000-84.000	C	0.000	0.000	13.130	0.000	0.062
		A	0.000	0.000	8.861	0.000	0.088
		B	0.000	0.000	12.371	0.000	0.213
L16	84.000-80.000	C	0.000	0.000	14.228	0.000	0.106
		A	0.000	0.000	16.481	0.000	0.546
		B	0.000	0.000	14.593	0.000	0.408
L17	80.000-79.750	C	0.000	0.000	16.078	0.000	0.323
		A	0.000	0.000	0.433	0.000	0.010
		B	0.000	0.000	0.613	0.000	0.014
L18	79.750-74.750	C	0.000	0.000	0.706	0.000	0.008
		A	0.000	0.000	15.914	0.000	0.139
		B	0.000	0.000	15.897	0.000	0.239
L19	74.750-69.750	C	0.000	0.000	17.754	0.000	0.132
		A	0.000	0.000	10.000	0.000	0.000
		B	0.000	0.000	12.940	0.000	0.169
L20	69.750-64.750	C	0.000	0.000	14.797	0.000	0.062
		A	0.000	0.000	13.637	0.000	0.163
		B	0.000	0.000	14.759	0.000	0.251
L21	64.750-60.000	C	0.000	0.000	16.616	0.000	0.144
		A	0.000	0.000	30.906	0.000	1.128
		B	0.000	0.000	25.972	0.000	0.882
L22	60.000-59.750	C	0.000	0.000	27.736	0.000	0.780
		A	0.000	0.000	0.663	0.000	0.019
		B	0.000	0.000	0.815	0.000	0.020
L23	59.750-54.750	C	0.000	0.000	0.908	0.000	0.015
		A	0.000	0.000	20.796	0.000	0.283
		B	0.000	0.000	19.120	0.000	0.333
L24	54.750-49.750	C	0.000	0.000	20.977	0.000	0.226
		A	0.000	0.000	10.833	0.000	0.000
		B	0.000	0.000	13.357	0.000	0.172
L25	49.750-44.750	C	0.000	0.000	15.214	0.000	0.062
		A	0.000	0.000	14.470	0.000	0.163
		B	0.000	0.000	15.175	0.000	0.256
L26	44.750-40.000	C	0.000	0.000	17.032	0.000	0.144
		A	0.000	0.000	25.703	0.000	0.814
		B	0.000	0.000	20.395	0.000	0.574
L27	40.000-39.750	C	0.000	0.000	22.159	0.500	0.466
		A	0.000	0.000	0.489	0.000	0.014
		B	0.000	0.000	0.642	0.000	0.016
L28	39.750-34.750	C	0.000	0.000	0.734	0.050	0.010
		A	0.000	0.000	22.564	0.000	0.237
		B	0.000	0.000	19.222	0.000	0.297
L29	34.750-29.750	C	0.000	0.000	21.079	0.450	0.181
		A	0.000	0.000	14.167	0.000	0.000
		B	0.000	0.000	15.023	0.000	0.179
L30	29.750-24.750	C	0.000	0.000	16.880	0.000	0.062
		A	0.000	0.000	23.103	0.000	0.446
		B	0.000	0.000	19.491	0.000	0.402

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L31	24.750-20.000	C	0.000	0.000	21.348	0.000	0.285
		A	0.000	0.000	33.403	0.000	1.079
		B	0.000	0.000	24.245	0.000	0.710
L32	20.000-19.750	C	0.000	0.000	26.009	0.500	0.598
		A	0.000	0.000	0.626	0.000	0.018
		B	0.000	0.000	0.710	0.000	0.018
L33	19.750-14.750	C	0.000	0.000	0.803	0.050	0.012
		A	0.000	0.000	26.690	0.000	0.362
		B	0.000	0.000	21.285	0.000	0.360
L34	14.750-9.750	C	0.000	0.000	23.142	0.450	0.243
		A	0.000	0.000	15.941	0.000	0.051
		B	0.000	0.000	15.910	0.000	0.205
L35	9.750-4.750	C	0.000	0.000	17.767	0.000	0.088
		A	0.000	0.000	14.167	0.000	0.000
		B	0.000	0.000	15.023	0.000	0.179
L36	4.750-0.000	C	0.000	0.000	16.880	0.000	0.062
		A	0.000	0.000	13.458	0.000	0.000
		B	0.000	0.000	14.272	0.000	0.170
		C	0.000	0.000	16.036	0.000	0.059

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 _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	147.500-142.500	A	1.971	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.046
		C		0.000	0.000	7.285	0.000	0.101
L2	142.500-137.500	A	1.964	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.062
		C		0.000	0.000	7.277	0.000	0.101
L3	137.500-132.500	A	1.957	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.079
		C		0.000	0.000	7.268	0.000	0.100
L4	132.500-127.500	A	1.950	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.079
		C		0.000	0.000	7.259	0.000	0.114
L5	127.500-125.000	A	1.944	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.039
		C		0.000	0.000	3.626	0.000	0.063
L6	125.000-120.000	A	1.938	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.079
		C		0.000	0.000	7.244	0.000	0.126
L7	120.000-115.000	A	1.930	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.079
		C		0.000	0.000	7.234	0.000	0.126
L8	115.000-110.000	A	1.922	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.079
		C		0.000	0.000	7.224	0.000	0.126
L9	110.000-105.000	A	1.913	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.079
		C		0.000	0.000	7.213	0.000	0.125
L10	105.000-100.000	A	1.904	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	5.874	0.000	0.200
		C		0.000	0.000	7.201	0.000	0.125
L11	100.000-95.000	A	1.895	0.000	0.000	0.517	0.000	0.006
		B		0.000	0.000	14.920	0.000	0.383
		C		0.000	0.000	7.448	0.000	0.127
L12	95.000-94.250	A	1.889	0.000	0.000	1.550	0.000	0.018
		B		0.000	0.000	2.972	0.000	0.066
		C		0.000	0.000	3.320	0.000	0.050
L13	94.250-94.000	A	1.888	0.000	0.000	0.517	0.000	0.006
		B		0.000	0.000	0.991	0.000	0.022
		C		0.000	0.000	1.107	0.000	0.017
L14	94.000-89.000	A	1.883	0.000	0.000	10.324	0.000	0.122
		B		0.000	0.000	19.793	0.000	0.439

Tower Sectio n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L15	89.000-84.000	C	1.872	0.000	0.000	22.115	0.000	0.334
		A		0.000	0.000	13.073	0.000	0.254
		B		0.000	0.000	21.141	0.000	0.505
L16	84.000-80.000	C	1.862	0.000	0.000	23.463	0.000	0.399
		A		0.000	0.000	22.321	0.000	0.883
		B		0.000	0.000	22.824	0.000	0.743
L17	80.000-79.750	C	1.857	0.000	0.000	24.681	0.000	0.658
		A		0.000	0.000	0.532	0.000	0.018
		B		0.000	0.000	0.994	0.000	0.028
L18	79.750-74.750	C	1.851	0.000	0.000	1.110	0.000	0.022
		A		0.000	0.000	20.913	0.000	0.394
		B		0.000	0.000	25.009	0.000	0.572
L19	74.750-69.750	C	1.839	0.000	0.000	27.330	0.000	0.466
		A		0.000	0.000	13.633	0.000	0.150
		B		0.000	0.000	21.338	0.000	0.449
L20	69.750-64.750	C	1.825	0.000	0.000	23.659	0.000	0.342
		A		0.000	0.000	18.053	0.000	0.379
		B		0.000	0.000	23.515	0.000	0.562
L21	64.750-60.000	C	1.812	0.000	0.000	25.836	0.000	0.455
		A		0.000	0.000	39.598	0.000	1.702
		B		0.000	0.000	37.421	0.000	1.427
L22	60.000-59.750	C	1.804	0.000	0.000	39.626	0.000	1.326
		A		0.000	0.000	0.807	0.000	0.030
		B		0.000	0.000	1.236	0.000	0.038
L23	59.750-54.750	C	1.796	0.000	0.000	1.352	0.000	0.032
		A		0.000	0.000	26.342	0.000	0.602
		B		0.000	0.000	28.584	0.000	0.707
L24	54.750-49.750	C	1.780	0.000	0.000	30.906	0.000	0.600
		A		0.000	0.000	14.284	0.000	0.154
		B		0.000	0.000	21.517	0.000	0.447
L25	49.750-44.750	C	1.762	0.000	0.000	23.838	0.000	0.337
		A		0.000	0.000	18.668	0.000	0.380
		B		0.000	0.000	23.664	0.000	0.559
L26	44.750-40.000	C	1.743	0.000	0.000	25.986	0.000	0.448
		A		0.000	0.000	32.253	0.000	1.241
		B		0.000	0.000	29.695	0.000	0.971
L27	40.000-39.750	C	1.732	0.000	0.000	31.900	1.372	0.863
		A		0.000	0.000	0.581	0.000	0.021
		B		0.000	0.000	1.003	0.000	0.029
L28	39.750-34.750	C	1.721	0.000	0.000	1.120	0.137	0.023
		A		0.000	0.000	26.463	0.000	0.538
		B		0.000	0.000	27.458	0.000	0.638
L29	34.750-29.750	C	1.696	0.000	0.000	29.779	1.224	0.521
		A		0.000	0.000	16.470	0.000	0.171
		B		0.000	0.000	22.400	0.000	0.452
L30	29.750-24.750	C	1.668	0.000	0.000	24.722	0.000	0.335
		A		0.000	0.000	26.810	0.000	0.751
		B		0.000	0.000	27.499	0.000	0.739
L31	24.750-20.000	C	1.635	0.000	0.000	29.821	0.000	0.621
		A		0.000	0.000	38.709	0.000	1.542
		B		0.000	0.000	32.667	0.000	1.113
L32	20.000-19.750	C	1.616	0.000	0.000	34.872	1.318	1.001
		A		0.000	0.000	0.713	0.000	0.026
		B		0.000	0.000	1.055	0.000	0.031
L33	19.750-14.750	C	1.593	0.000	0.000	1.171	0.131	0.025
		A		0.000	0.000	30.677	0.000	0.678
		B		0.000	0.000	29.247	0.000	0.694
L34	14.750-9.750	C	1.540	0.000	0.000	31.568	1.167	0.576
		A		0.000	0.000	18.401	0.000	0.224
		B		0.000	0.000	22.975	0.000	0.461
L35	9.750-4.750	C	1.461	0.000	0.000	25.296	0.000	0.342
		A		0.000	0.000	16.314	0.000	0.142
		B		0.000	0.000	21.734	0.000	0.410
L36	4.750-0.000	C	1.307	0.000	0.000	24.055	0.000	0.292
		A		0.000	0.000	15.349	0.000	0.118
		B		0.000	0.000	20.207	0.000	0.365
		C		0.000	0.000	22.412	0.000	0.252

Feed Line Center of Pressure

Section	Elevation	CP _x	CP _z	CP _x Ice	CP _z Ice
	ft	in	in	in	in
L1	147.500-142.500	-2.760	4.062	-2.106	3.098
L2	142.500-137.500	-2.760	4.062	-2.105	3.098
L3	137.500-132.500	-2.760	4.062	-2.105	3.097
L4	132.500-127.500	-2.760	4.062	-2.104	3.096
L5	127.500-125.000	-2.760	4.062	-2.104	3.096
L6	125.000-120.000	-2.969	4.368	-2.320	3.414
L7	120.000-115.000	-2.969	4.368	-2.319	3.412
L8	115.000-110.000	-2.969	4.368	-2.318	3.411
L9	110.000-105.000	-2.969	4.368	-2.317	3.410
L10	105.000-100.000	1.302	3.894	0.946	2.912
L11	100.000-95.000	4.857	3.334	3.909	2.680
L12	95.000-94.250	2.842	3.280	2.569	2.846
L13	94.250-94.000	2.842	3.280	2.569	2.846
L14	94.000-89.000	2.842	3.280	2.569	2.846
L15	89.000-84.000	2.196	2.718	2.176	2.517
L16	84.000-80.000	0.106	0.837	0.655	1.253
L17	80.000-79.750	2.294	3.422	2.603	3.367
L18	79.750-74.750	0.825	1.366	1.470	1.919
L19	74.750-69.750	2.251	2.660	2.382	2.669
L20	69.750-64.750	1.186	1.664	1.785	2.181
L21	64.750-60.000	-0.343	0.303	0.254	0.822
L22	60.000-59.750	1.514	2.420	2.305	3.079
L23	59.750-54.750	0.372	0.987	1.141	1.675
L24	54.750-49.750	2.259	2.708	2.491	2.817
L25	49.750-44.750	1.348	1.957	1.857	2.302
L26	44.750-40.000	-0.646	0.383	0.049	1.134
L27	40.000-39.750	1.871	3.993	2.110	4.086
L28	39.750-34.750	-0.082	0.729	0.830	1.770
L29	34.750-29.750	1.664	2.070	2.356	2.692
L30	29.750-24.750	-0.048	0.604	0.991	1.597
L31	24.750-20.000	-1.355	-0.245	-0.475	0.719
L32	20.000-19.750	1.228	3.534	1.799	3.921
L33	19.750-14.750	-0.606	0.373	0.390	1.478
L34	14.750-9.750	1.346	1.893	2.146	2.588
L35	9.750-4.750	1.796	2.248	2.446	2.825
L36	4.750-0.000	1.796	2.248	2.402	2.785

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	1	AVA5-50(7/8)	142.50 - 147.50	1.0000	1.0000
L2	1	AVA5-50(7/8)	137.50 - 142.50	1.0000	1.0000
L3	1	AVA5-50(7/8)	132.50 - 137.50	1.0000	1.0000
L4	1	AVA5-50(7/8)	127.50 - 132.50	1.0000	1.0000
L5	1	AVA5-50(7/8)	125.00 - 127.50	1.0000	1.0000
L6	1	AVA5-50(7/8)	120.00 - 125.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L7	1	AVA5-50(7/8)	115.00 - 120.00	1.0000	1.0000
L8	1	AVA5-50(7/8)	110.00 - 115.00	1.0000	1.0000
L9	1	AVA5-50(7/8)	105.00 - 110.00	1.0000	1.0000
L10	1	AVA5-50(7/8)	100.00 - 105.00	1.0000	1.0000
L10	10	2" Rigid Conduit	100.00 - 102.00	1.0000	1.0000
L10	11	LDF7-50A(1-5/8)	100.00 - 102.00	1.0000	1.0000
L11	1	AVA5-50(7/8)	95.00 - 100.00	1.0000	1.0000
L11	10	2" Rigid Conduit	95.00 - 100.00	1.0000	1.0000
L11	11	LDF7-50A(1-5/8)	95.00 - 100.00	1.0000	1.0000
L11	89	CCI 4" x 0.75" Plate	95.00 - 95.25	1.0000	1.0000
L11	90	CCI 4" x 0.75" Plate	95.00 - 95.25	1.0000	1.0000
L11	91	CCI 4" x 0.75" Plate	95.00 - 95.25	1.0000	1.0000
L11	92	CCI 4" x 0.75" Plate	95.00 - 95.25	1.0000	1.0000
L12	1	AVA5-50(7/8)	94.25 - 95.00	1.0000	1.0000
L12	10	2" Rigid Conduit	94.25 - 95.00	1.0000	1.0000
L12	11	LDF7-50A(1-5/8)	94.25 - 95.00	1.0000	1.0000
L12	15	LDF7-50A(1-5/8)	94.25 - 95.00	1.0000	1.0000
L12	89	CCI 4" x 0.75" Plate	94.25 - 95.00	1.0000	1.0000
L12	90	CCI 4" x 0.75" Plate	94.25 - 95.00	1.0000	1.0000
L12	91	CCI 4" x 0.75" Plate	94.25 - 95.00	1.0000	1.0000
L12	92	CCI 4" x 0.75" Plate	94.25 - 95.00	1.0000	1.0000
L13	1	AVA5-50(7/8)	94.00 - 94.25	1.0000	1.0000
L13	10	2" Rigid Conduit	94.00 - 94.25	1.0000	1.0000
L13	11	LDF7-50A(1-5/8)	94.00 - 94.25	1.0000	1.0000
L13	15	LDF7-50A(1-5/8)	94.00 - 94.25	1.0000	1.0000
L13	89	CCI 4" x 0.75" Plate	94.00 - 94.25	1.0000	1.0000
L13	90	CCI 4" x 0.75" Plate	94.00 - 94.25	1.0000	1.0000
L13	91	CCI 4" x 0.75" Plate	94.00 - 94.25	1.0000	1.0000
L13	92	CCI 4" x 0.75" Plate	94.00 - 94.25	1.0000	1.0000
L14	1	AVA5-50(7/8)	89.00 - 94.00	1.0000	1.0000
L14	10	2" Rigid Conduit	89.00 - 94.00	1.0000	1.0000
L14	11	LDF7-50A(1-5/8)	89.00 - 94.00	1.0000	1.0000
L14	15	LDF7-50A(1-5/8)	89.00 - 94.00	1.0000	1.0000
L14	89	CCI 4" x 0.75" Plate	89.00 - 94.00	1.0000	1.0000
L14	90	CCI 4" x 0.75" Plate	89.00 - 94.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L14	91	CCI 4" x 0.75" Plate	94.00 89.00 - 94.00	1.0000	1.0000
L14	92	CCI 4" x 0.75" Plate	94.00 89.00 - 94.00	1.0000	1.0000
L15	1	AVA5-50(7/8)	84.00 - 89.00	1.0000	1.0000
L15	10	2" Rigid Conduit	84.00 - 89.00	1.0000	1.0000
L15	11	LDF7-50A(1-5/8)	84.00 - 89.00	1.0000	1.0000
L15	15	LDF7-50A(1-5/8)	84.00 - 89.00	1.0000	1.0000
L15	59	CCI 6.0" x 1.0" Plate	84.00 - 84.92	1.0000	1.0000
L15	60	CCI 6.0" x 1.0" Plate	84.00 - 84.92	1.0000	1.0000
L15	61	CCI 6.0" x 1.0" Plate	84.00 - 84.92	1.0000	1.0000
L15	62	CCI 6.0" x 1.0" Plate	84.00 - 84.92	1.0000	1.0000
L15	64	CCI 5.0" x 3.0" Plate	84.00 - 84.50	1.0000	1.0000
L15	65	CCI 5.0" x 3.0" Plate	84.00 - 84.50	1.0000	1.0000
L15	66	CCI 5.0" x 3.0" Plate	84.00 - 84.50	1.0000	1.0000
L15	67	CCI 5.0" x 3.0" Plate	84.00 - 84.50	1.0000	1.0000
L15	89	CCI 4" x 0.75" Plate	84.00 - 89.00	1.0000	1.0000
L15	90	CCI 4" x 0.75" Plate	84.00 - 89.00	1.0000	1.0000
L15	91	CCI 4" x 0.75" Plate	84.00 - 89.00	1.0000	1.0000
L15	92	CCI 4" x 0.75" Plate	84.00 - 89.00	1.0000	1.0000
L16	1	AVA5-50(7/8)	80.00 - 84.00	1.0000	1.0000
L16	10	2" Rigid Conduit	80.00 - 84.00	1.0000	1.0000
L16	11	LDF7-50A(1-5/8)	80.00 - 84.00	1.0000	1.0000
L16	15	LDF7-50A(1-5/8)	80.00 - 84.00	1.0000	1.0000
L16	59	CCI 6.0" x 1.0" Plate	80.00 - 84.00	1.0000	1.0000
L16	60	CCI 6.0" x 1.0" Plate	80.00 - 84.00	1.0000	1.0000
L16	61	CCI 6.0" x 1.0" Plate	80.00 - 84.00	1.0000	1.0000
L16	62	CCI 6.0" x 1.0" Plate	80.00 - 84.00	1.0000	1.0000
L16	64	CCI 5.0" x 3.0" Plate	80.25 - 84.00	1.0000	1.0000
L16	65	CCI 5.0" x 3.0" Plate	80.25 - 84.00	1.0000	1.0000
L16	66	CCI 5.0" x 3.0" Plate	80.25 - 84.00	1.0000	1.0000
L16	67	CCI 5.0" x 3.0" Plate	80.25 - 84.00	1.0000	1.0000
L16	89	CCI 4" x 0.75" Plate	80.25 - 84.00	1.0000	1.0000
L16	90	CCI 4" x 0.75" Plate	80.25 - 84.00	1.0000	1.0000
L16	91	CCI 4" x 0.75" Plate	80.25 - 84.00	1.0000	1.0000
L16	92	CCI 4" x 0.75" Plate	80.25 - 84.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L17	1	AVA5-50(7/8)	79.75 - 80.00	1.0000	1.0000
L17	10	2" Rigid Conduit	79.75 - 80.00	1.0000	1.0000
L17	11	LDF7-50A(1-5/8)	79.75 - 80.00	1.0000	1.0000
L17	15	LDF7-50A(1-5/8)	79.75 - 80.00	1.0000	1.0000
L17	59	CCI 6.0" x 1.0" Plate	79.75 - 80.00	1.0000	1.0000
L17	60	CCI 6.0" x 1.0" Plate	79.75 - 80.00	1.0000	1.0000
L17	61	CCI 6.0" x 1.0" Plate	79.75 - 80.00	1.0000	1.0000
L17	62	CCI 6.0" x 1.0" Plate	79.75 - 80.00	1.0000	1.0000
L18	1	AVA5-50(7/8)	74.75 - 79.75	1.0000	1.0000
L18	10	2" Rigid Conduit	74.75 - 79.75	1.0000	1.0000
L18	11	LDF7-50A(1-5/8)	74.75 - 79.75	1.0000	1.0000
L18	15	LDF7-50A(1-5/8)	74.75 - 79.75	1.0000	1.0000
L18	59	CCI 6.0" x 1.0" Plate	76.33 - 79.75	1.0000	1.0000
L18	60	CCI 6.0" x 1.0" Plate	76.33 - 79.75	1.0000	1.0000
L18	61	CCI 6.0" x 1.0" Plate	76.33 - 79.75	1.0000	1.0000
L18	62	CCI 6.0" x 1.0" Plate	76.33 - 79.75	1.0000	1.0000
L18	84	CCI 6" x 1" Plate	74.75 - 79.75	1.0000	1.0000
L18	85	CCI 6" x 1" Plate	74.75 - 79.75	1.0000	1.0000
L18	86	CCI 6" x 1" Plate	74.75 - 79.75	1.0000	1.0000
L18	87	CCI 6" x 1" Plate	74.75 - 79.75	1.0000	1.0000
L19	1	AVA5-50(7/8)	69.75 - 74.75	1.0000	1.0000
L19	10	2" Rigid Conduit	69.75 - 74.75	1.0000	1.0000
L19	11	LDF7-50A(1-5/8)	69.75 - 74.75	1.0000	1.0000
L19	15	LDF7-50A(1-5/8)	69.75 - 74.75	1.0000	1.0000
L19	84	CCI 6" x 1" Plate	69.75 - 74.75	1.0000	1.0000
L19	85	CCI 6" x 1" Plate	69.75 - 74.75	1.0000	1.0000
L19	86	CCI 6" x 1" Plate	69.75 - 74.75	1.0000	1.0000
L19	87	CCI 6" x 1" Plate	69.75 - 74.75	1.0000	1.0000
L20	1	AVA5-50(7/8)	64.75 - 69.75	1.0000	1.0000
L20	10	2" Rigid Conduit	64.75 - 69.75	1.0000	1.0000
L20	11	LDF7-50A(1-5/8)	64.75 - 69.75	1.0000	1.0000
L20	15	LDF7-50A(1-5/8)	64.75 - 69.75	1.0000	1.0000
L20	49	CCI 6.5" x 1.25" Plate	64.75 - 66.04	1.0000	1.0000
L20	50	CCI 6.5" x 1.25" Plate	64.75 - 66.04	1.0000	1.0000
L20	51	CCI 6.5" x 1.25" Plate	64.75 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L20	52	CCI 6.5" x 1.25" Plate	66.04 64.75 - 66.04	1.0000	1.0000
L20	54	CCI 6.0" x 3.0" Plate	64.75 - 65.50	1.0000	1.0000
L20	55	CCI 6.0" x 3.0" Plate	64.75 - 65.50	1.0000	1.0000
L20	56	CCI 6.0" x 3.0" Plate	64.75 - 65.50	1.0000	1.0000
L20	57	CCI 6.0" x 3.0" Plate	64.75 - 65.50	1.0000	1.0000
L20	84	CCI 6" x 1" Plate	64.75 - 69.75	1.0000	1.0000
L20	85	CCI 6" x 1" Plate	64.75 - 69.75	1.0000	1.0000
L20	86	CCI 6" x 1" Plate	64.75 - 69.75	1.0000	1.0000
L20	87	CCI 6" x 1" Plate	64.75 - 69.75	1.0000	1.0000
L21	1	AVA5-50(7/8)	60.00 - 64.75	1.0000	1.0000
L21	10	2" Rigid Conduit	60.00 - 64.75	1.0000	1.0000
L21	11	LDF7-50A(1-5/8)	60.00 - 64.75	1.0000	1.0000
L21	15	LDF7-50A(1-5/8)	60.00 - 64.75	1.0000	1.0000
L21	49	CCI 6.5" x 1.25" Plate	60.00 - 64.75	1.0000	1.0000
L21	50	CCI 6.5" x 1.25" Plate	60.00 - 64.75	1.0000	1.0000
L21	51	CCI 6.5" x 1.25" Plate	60.00 - 64.75	1.0000	1.0000
L21	52	CCI 6.5" x 1.25" Plate	60.00 - 64.75	1.0000	1.0000
L21	54	CCI 6.0" x 3.0" Plate	60.25 - 64.75	1.0000	1.0000
L21	55	CCI 6.0" x 3.0" Plate	60.25 - 64.75	1.0000	1.0000
L21	56	CCI 6.0" x 3.0" Plate	60.25 - 64.75	1.0000	1.0000
L21	57	CCI 6.0" x 3.0" Plate	60.25 - 64.75	1.0000	1.0000
L21	84	CCI 6" x 1" Plate	60.25 - 64.75	1.0000	1.0000
L21	85	CCI 6" x 1" Plate	60.25 - 64.75	1.0000	1.0000
L21	86	CCI 6" x 1" Plate	60.25 - 64.75	1.0000	1.0000
L21	87	CCI 6" x 1" Plate	60.25 - 64.75	1.0000	1.0000
L21	94	4.75" x 1.25" Plate	60.00 - 64.75	1.0000	1.0000
L21	95	4.75" x 1.25" Plate	60.00 - 64.75	1.0000	1.0000
L21	96	4.75" x 1.25" Plate	60.00 - 64.75	1.0000	1.0000
L21	98	4.75" x 3" Plate	60.25 - 64.75	1.0000	1.0000
L21	99	4.75" x 3" Plate	60.25 - 64.75	1.0000	1.0000
L21	100	4.75" x 3" Plate	60.25 - 64.75	1.0000	1.0000
L22	1	AVA5-50(7/8)	59.75 - 60.00	1.0000	1.0000
L22	10	2" Rigid Conduit	59.75 - 60.00	1.0000	1.0000
L22	11	LDF7-50A(1-5/8)	59.75 - 60.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L22	15	LDF7-50A(1-5/8)	59.75 - 60.00	1.0000	1.0000
L22	49	CCI 6.5" x 1.25" Plate	59.75 - 60.00	1.0000	1.0000
L22	50	CCI 6.5" x 1.25" Plate	59.75 - 60.00	1.0000	1.0000
L22	51	CCI 6.5" x 1.25" Plate	59.75 - 60.00	1.0000	1.0000
L22	52	CCI 6.5" x 1.25" Plate	59.75 - 60.00	1.0000	1.0000
L22	94	4.75" x 1.25" Plate	59.75 - 60.00	1.0000	1.0000
L22	95	4.75" x 1.25" Plate	59.75 - 60.00	1.0000	1.0000
L22	96	4.75" x 1.25" Plate	59.75 - 60.00	1.0000	1.0000
L23	1	AVA5-50(7/8)	54.75 - 59.75	1.0000	1.0000
L23	10	2" Rigid Conduit	54.75 - 59.75	1.0000	1.0000
L23	11	LDF7-50A(1-5/8)	54.75 - 59.75	1.0000	1.0000
L23	15	LDF7-50A(1-5/8)	54.75 - 59.75	1.0000	1.0000
L23	49	CCI 6.5" x 1.25" Plate	55.46 - 59.75	1.0000	1.0000
L23	50	CCI 6.5" x 1.25" Plate	55.46 - 59.75	1.0000	1.0000
L23	51	CCI 6.5" x 1.25" Plate	55.46 - 59.75	1.0000	1.0000
L23	52	CCI 6.5" x 1.25" Plate	55.46 - 59.75	1.0000	1.0000
L23	79	CCI 6.5" x 1.25" Plate	54.75 - 59.75	1.0000	1.0000
L23	80	CCI 6.5" x 1.25" Plate	54.75 - 59.75	1.0000	1.0000
L23	81	CCI 6.5" x 1.25" Plate	54.75 - 59.75	1.0000	1.0000
L23	82	CCI 6.5" x 1.25" Plate	54.75 - 59.75	1.0000	1.0000
L23	94	4.75" x 1.25" Plate	57.50 - 59.75	1.0000	1.0000
L23	95	4.75" x 1.25" Plate	57.50 - 59.75	1.0000	1.0000
L23	96	4.75" x 1.25" Plate	57.50 - 59.75	1.0000	1.0000
L24	1	AVA5-50(7/8)	49.75 - 54.75	1.0000	1.0000
L24	10	2" Rigid Conduit	49.75 - 54.75	1.0000	1.0000
L24	11	LDF7-50A(1-5/8)	49.75 - 54.75	1.0000	1.0000
L24	15	LDF7-50A(1-5/8)	49.75 - 54.75	1.0000	1.0000
L24	79	CCI 6.5" x 1.25" Plate	49.75 - 54.75	1.0000	1.0000
L24	80	CCI 6.5" x 1.25" Plate	49.75 - 54.75	1.0000	1.0000
L24	81	CCI 6.5" x 1.25" Plate	49.75 - 54.75	1.0000	1.0000
L24	82	CCI 6.5" x 1.25" Plate	49.75 - 54.75	1.0000	1.0000
L25	1	AVA5-50(7/8)	44.75 - 49.75	1.0000	1.0000
L25	10	2" Rigid Conduit	44.75 - 49.75	1.0000	1.0000
L25	11	LDF7-50A(1-5/8)	44.75 - 49.75	1.0000	1.0000
L25	15	LDF7-50A(1-5/8)	44.75 - 49.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L25	39	CCI 6.5" x 1.25" Plate	49.75 44.75 - 46.04	1.0000	1.0000
L25	40	CCI 6.5" x 1.25" Plate	44.75 - 46.04	1.0000	1.0000
L25	41	CCI 6.5" x 1.25" Plate	44.75 - 46.04	1.0000	1.0000
L25	42	CCI 6.5" x 1.25" Plate	44.75 - 46.04	1.0000	1.0000
L25	44	CCI 6.0" x 3.0" Plate	44.75 - 45.50	1.0000	1.0000
L25	45	CCI 6.0" x 3.0" Plate	44.75 - 45.50	1.0000	1.0000
L25	46	CCI 6.0" x 3.0" Plate	44.75 - 45.50	1.0000	1.0000
L25	47	CCI 6.0" x 3.0" Plate	44.75 - 45.50	1.0000	1.0000
L25	79	CCI 6.5" x 1.25" Plate	44.75 - 49.75	1.0000	1.0000
L25	80	CCI 6.5" x 1.25" Plate	44.75 - 49.75	1.0000	1.0000
L25	81	CCI 6.5" x 1.25" Plate	44.75 - 49.75	1.0000	1.0000
L25	82	CCI 6.5" x 1.25" Plate	44.75 - 49.75	1.0000	1.0000
L26	1	AVA5-50(7/8)	40.00 - 44.75	1.0000	1.0000
L26	10	2" Rigid Conduit	40.00 - 44.75	1.0000	1.0000
L26	11	LDF7-50A(1-5/8)	40.00 - 44.75	1.0000	1.0000
L26	15	LDF7-50A(1-5/8)	40.00 - 44.75	1.0000	1.0000
L26	39	CCI 6.5" x 1.25" Plate	40.00 - 44.75	1.0000	1.0000
L26	40	CCI 6.5" x 1.25" Plate	40.00 - 44.75	1.0000	1.0000
L26	41	CCI 6.5" x 1.25" Plate	40.00 - 44.75	1.0000	1.0000
L26	42	CCI 6.5" x 1.25" Plate	40.00 - 44.75	1.0000	1.0000
L26	44	CCI 6.0" x 3.0" Plate	40.25 - 44.75	1.0000	1.0000
L26	45	CCI 6.0" x 3.0" Plate	40.25 - 44.75	1.0000	1.0000
L26	46	CCI 6.0" x 3.0" Plate	40.25 - 44.75	1.0000	1.0000
L26	47	CCI 6.0" x 3.0" Plate	40.25 - 44.75	1.0000	1.0000
L26	79	CCI 6.5" x 1.25" Plate	40.25 - 44.75	1.0000	1.0000
L26	80	CCI 6.5" x 1.25" Plate	40.25 - 44.75	1.0000	1.0000
L26	81	CCI 6.5" x 1.25" Plate	40.25 - 44.75	1.0000	1.0000
L26	82	CCI 6.5" x 1.25" Plate	40.25 - 44.75	1.0000	1.0000
L27	1	AVA5-50(7/8)	39.75 - 40.00	1.0000	1.0000
L27	10	2" Rigid Conduit	39.75 - 40.00	1.0000	1.0000
L27	11	LDF7-50A(1-5/8)	39.75 - 40.00	1.0000	1.0000
L27	15	LDF7-50A(1-5/8)	39.75 - 40.00	1.0000	1.0000
L27	39	CCI 6.5" x 1.25" Plate	39.75 - 40.00	1.0000	1.0000
L27	40	CCI 6.5" x 1.25" Plate	39.75 - 40.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L27	41	CCI 6.5" x 1.25" Plate	39.75 - 40.00	1.0000	1.0000
L27	42	CCI 6.5" x 1.25" Plate	39.75 - 40.00	1.0000	1.0000
L28	1	AVA5-50(7/8)	34.75 - 39.75	1.0000	1.0000
L28	10	2" Rigid Conduit	34.75 - 39.75	1.0000	1.0000
L28	11	LDF7-50A(1-5/8)	34.75 - 39.75	1.0000	1.0000
L28	15	LDF7-50A(1-5/8)	34.75 - 39.75	1.0000	1.0000
L28	39	CCI 6.5" x 1.25" Plate	35.46 - 39.75	1.0000	1.0000
L28	40	CCI 6.5" x 1.25" Plate	35.46 - 39.75	1.0000	1.0000
L28	41	CCI 6.5" x 1.25" Plate	35.46 - 39.75	1.0000	1.0000
L28	42	CCI 6.5" x 1.25" Plate	35.46 - 39.75	1.0000	1.0000
L28	74	CCI 8.5" x 1.25" Plate	34.75 - 39.75	1.0000	1.0000
L28	75	CCI 8.5" x 1.25" Plate	34.75 - 39.75	1.0000	1.0000
L28	76	CCI 8.5" x 1.25" Plate	34.75 - 39.75	1.0000	1.0000
L28	77	CCI 8.5" x 1.25" Plate	34.75 - 39.75	1.0000	1.0000
L29	1	AVA5-50(7/8)	29.75 - 34.75	1.0000	1.0000
L29	10	2" Rigid Conduit	29.75 - 34.75	1.0000	1.0000
L29	11	LDF7-50A(1-5/8)	29.75 - 34.75	1.0000	1.0000
L29	15	LDF7-50A(1-5/8)	29.75 - 34.75	1.0000	1.0000
L29	74	CCI 8.5" x 1.25" Plate	29.75 - 34.75	1.0000	1.0000
L29	75	CCI 8.5" x 1.25" Plate	29.75 - 34.75	1.0000	1.0000
L29	76	CCI 8.5" x 1.25" Plate	29.75 - 34.75	1.0000	1.0000
L29	77	CCI 8.5" x 1.25" Plate	29.75 - 34.75	1.0000	1.0000
L30	1	AVA5-50(7/8)	24.75 - 29.75	1.0000	1.0000
L30	10	2" Rigid Conduit	24.75 - 29.75	1.0000	1.0000
L30	11	LDF7-50A(1-5/8)	24.75 - 29.75	1.0000	1.0000
L30	15	LDF7-50A(1-5/8)	24.75 - 29.75	1.0000	1.0000
L30	29	CCI 8.5" x 1.25" Plate	24.75 - 26.96	1.0000	1.0000
L30	30	CCI 8.5" x 1.25" Plate	24.75 - 26.96	1.0000	1.0000
L30	31	CCI 8.5" x 1.25" Plate	24.75 - 26.96	1.0000	1.0000
L30	32	CCI 8.5" x 1.25" Plate	24.75 - 26.96	1.0000	1.0000
L30	34	CCI 8.0" x 3.0" Plate	24.75 - 26.50	1.0000	1.0000
L30	35	CCI 8.0" x 3.0" Plate	24.75 - 26.50	1.0000	1.0000
L30	36	CCI 8.0" x 3.0" Plate	24.75 - 26.50	1.0000	1.0000
L30	37	CCI 8.0" x 3.0" Plate	24.75 - 26.50	1.0000	1.0000
L30	74	CCI 8.5" x 1.25" Plate	24.75 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L30	75	CCI 8.5" x 1.25" Plate	29.75 24.75 - 29.75	1.0000	1.0000
L30	76	CCI 8.5" x 1.25" Plate	24.75 - 29.75	1.0000	1.0000
L30	77	CCI 8.5" x 1.25" Plate	24.75 - 29.75	1.0000	1.0000
L31	1	AVA5-50(7/8)	20.00 - 24.75	1.0000	1.0000
L31	10	2" Rigid Conduit	20.00 - 24.75	1.0000	1.0000
L31	11	LDF7-50A(1-5/8)	20.00 - 24.75	1.0000	1.0000
L31	15	LDF7-50A(1-5/8)	20.00 - 24.75	1.0000	1.0000
L31	29	CCI 8.5" x 1.25" Plate	20.00 - 24.75	1.0000	1.0000
L31	30	CCI 8.5" x 1.25" Plate	20.00 - 24.75	1.0000	1.0000
L31	31	CCI 8.5" x 1.25" Plate	20.00 - 24.75	1.0000	1.0000
L31	32	CCI 8.5" x 1.25" Plate	20.00 - 24.75	1.0000	1.0000
L31	34	CCI 8.0" x 3.0" Plate	20.25 - 24.75	1.0000	1.0000
L31	35	CCI 8.0" x 3.0" Plate	20.25 - 24.75	1.0000	1.0000
L31	36	CCI 8.0" x 3.0" Plate	20.25 - 24.75	1.0000	1.0000
L31	37	CCI 8.0" x 3.0" Plate	20.25 - 24.75	1.0000	1.0000
L31	74	CCI 8.5" x 1.25" Plate	20.25 - 24.75	1.0000	1.0000
L31	75	CCI 8.5" x 1.25" Plate	20.25 - 24.75	1.0000	1.0000
L31	76	CCI 8.5" x 1.25" Plate	20.25 - 24.75	1.0000	1.0000
L31	77	CCI 8.5" x 1.25" Plate	20.25 - 24.75	1.0000	1.0000
L32	1	AVA5-50(7/8)	19.75 - 20.00	1.0000	1.0000
L32	10	2" Rigid Conduit	19.75 - 20.00	1.0000	1.0000
L32	11	LDF7-50A(1-5/8)	19.75 - 20.00	1.0000	1.0000
L32	15	LDF7-50A(1-5/8)	19.75 - 20.00	1.0000	1.0000
L32	29	CCI 8.5" x 1.25" Plate	19.75 - 20.00	1.0000	1.0000
L32	30	CCI 8.5" x 1.25" Plate	19.75 - 20.00	1.0000	1.0000
L32	31	CCI 8.5" x 1.25" Plate	19.75 - 20.00	1.0000	1.0000
L32	32	CCI 8.5" x 1.25" Plate	19.75 - 20.00	1.0000	1.0000
L33	1	AVA5-50(7/8)	14.75 - 19.75	1.0000	1.0000
L33	10	2" Rigid Conduit	14.75 - 19.75	1.0000	1.0000
L33	11	LDF7-50A(1-5/8)	14.75 - 19.75	1.0000	1.0000
L33	15	LDF7-50A(1-5/8)	14.75 - 19.75	1.0000	1.0000
L33	29	CCI 8.5" x 1.25" Plate	14.75 - 19.75	1.0000	1.0000
L33	30	CCI 8.5" x 1.25" Plate	14.75 - 19.75	1.0000	1.0000
L33	31	CCI 8.5" x 1.25" Plate	14.75 - 19.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L33	32	CCI 8.5" x 1.25" Plate	14.75 - 19.75	1.0000	1.0000
L33	69	CCI 8.5" x 1.25" Plate	14.75 - 19.75	1.0000	1.0000
L33	70	CCI 8.5" x 1.25" Plate	14.75 - 19.75	1.0000	1.0000
L33	71	CCI 8.5" x 1.25" Plate	14.75 - 19.75	1.0000	1.0000
L33	72	CCI 8.5" x 1.25" Plate	14.75 - 19.75	1.0000	1.0000
L34	1	AVA5-50(7/8)	9.75 - 14.75	1.0000	1.0000
L34	10	2" Rigid Conduit	9.75 - 14.75	1.0000	1.0000
L34	11	LDF7-50A(1-5/8)	9.75 - 14.75	1.0000	1.0000
L34	15	LDF7-50A(1-5/8)	9.75 - 14.75	1.0000	1.0000
L34	29	CCI 8.5" x 1.25" Plate	14.04 - 14.75	1.0000	1.0000
L34	30	CCI 8.5" x 1.25" Plate	14.04 - 14.75	1.0000	1.0000
L34	31	CCI 8.5" x 1.25" Plate	14.04 - 14.75	1.0000	1.0000
L34	32	CCI 8.5" x 1.25" Plate	14.04 - 14.75	1.0000	1.0000
L34	69	CCI 8.5" x 1.25" Plate	9.75 - 14.75	1.0000	1.0000
L34	70	CCI 8.5" x 1.25" Plate	9.75 - 14.75	1.0000	1.0000
L34	71	CCI 8.5" x 1.25" Plate	9.75 - 14.75	1.0000	1.0000
L34	72	CCI 8.5" x 1.25" Plate	9.75 - 14.75	1.0000	1.0000
L35	1	AVA5-50(7/8)	4.75 - 9.75	1.0000	1.0000
L35	10	2" Rigid Conduit	4.75 - 9.75	1.0000	1.0000
L35	11	LDF7-50A(1-5/8)	4.75 - 9.75	1.0000	1.0000
L35	15	LDF7-50A(1-5/8)	4.75 - 9.75	1.0000	1.0000
L35	69	CCI 8.5" x 1.25" Plate	4.75 - 9.75	1.0000	1.0000
L35	70	CCI 8.5" x 1.25" Plate	4.75 - 9.75	1.0000	1.0000
L35	71	CCI 8.5" x 1.25" Plate	4.75 - 9.75	1.0000	1.0000
L35	72	CCI 8.5" x 1.25" Plate	4.75 - 9.75	1.0000	1.0000
L36	1	AVA5-50(7/8)	0.00 - 4.75	1.0000	1.0000
L36	10	2" Rigid Conduit	0.00 - 4.75	1.0000	1.0000
L36	11	LDF7-50A(1-5/8)	0.00 - 4.75	1.0000	1.0000
L36	15	LDF7-50A(1-5/8)	0.00 - 4.75	1.0000	1.0000
L36	69	CCI 8.5" x 1.25" Plate	0.00 - 4.75	1.0000	1.0000
L36	70	CCI 8.5" x 1.25" Plate	0.00 - 4.75	1.0000	1.0000
L36	71	CCI 8.5" x 1.25" Plate	0.00 - 4.75	1.0000	1.0000
L36	72	CCI 8.5" x 1.25" Plate	0.00 - 4.75	1.0000	1.0000

Effective Width of Flat Linear Attachments / Feed Lines

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L11	89	CCI 4" x 0.75" Plate	95.00 - 95.25	Auto	1.0000
L11	90	CCI 4" x 0.75" Plate	95.00 - 95.25	Auto	1.0000
L11	91	CCI 4" x 0.75" Plate	95.00 - 95.25	Auto	1.0000
L11	92	CCI 4" x 0.75" Plate	95.00 - 95.25	Auto	1.0000
L12	89	CCI 4" x 0.75" Plate	94.25 - 95.00	Auto	1.0000
L12	90	CCI 4" x 0.75" Plate	94.25 - 95.00	Auto	1.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L12	91	CCI 4" x 0.75" Plate	94.25 - 95.00	Auto	1.0000
L12	92	CCI 4" x 0.75" Plate	94.25 - 95.00	Auto	1.0000
L13	89	CCI 4" x 0.75" Plate	94.00 - 94.25	Auto	1.0000
L13	90	CCI 4" x 0.75" Plate	94.00 - 94.25	Auto	1.0000
L13	91	CCI 4" x 0.75" Plate	94.00 - 94.25	Auto	1.0000
L13	92	CCI 4" x 0.75" Plate	94.00 - 94.25	Auto	1.0000
L14	89	CCI 4" x 0.75" Plate	89.00 - 94.00	Auto	1.0000
L14	90	CCI 4" x 0.75" Plate	89.00 - 94.00	Auto	1.0000
L14	91	CCI 4" x 0.75" Plate	89.00 - 94.00	Auto	1.0000
L14	92	CCI 4" x 0.75" Plate	89.00 - 94.00	Auto	1.0000
L15	59	CCI 6.0" x 1.0" Plate	84.00 - 84.92	Auto	1.0000
L15	60	CCI 6.0" x 1.0" Plate	84.00 - 84.92	Auto	1.0000
L15	61	CCI 6.0" x 1.0" Plate	84.00 - 84.92	Auto	1.0000
L15	62	CCI 6.0" x 1.0" Plate	84.00 - 84.92	Auto	1.0000
L15	64	CCI 5.0" x 3.0" Plate	84.00 - 84.50	Auto	1.0000
L15	65	CCI 5.0" x 3.0" Plate	84.00 - 84.50	Auto	1.0000
L15	66	CCI 5.0" x 3.0" Plate	84.00 - 84.50	Auto	1.0000
L15	67	CCI 5.0" x 3.0" Plate	84.00 - 84.50	Auto	1.0000
L15	89	CCI 4" x 0.75" Plate	84.00 - 89.00	Auto	1.0000
L15	90	CCI 4" x 0.75" Plate	84.00 - 89.00	Auto	1.0000
L15	91	CCI 4" x 0.75" Plate	84.00 - 89.00	Auto	1.0000
L15	92	CCI 4" x 0.75" Plate	84.00 - 89.00	Auto	1.0000
L16	59	CCI 6.0" x 1.0" Plate	80.00 - 84.00	Auto	1.0000
L16	60	CCI 6.0" x 1.0" Plate	80.00 - 84.00	Auto	1.0000
L16	61	CCI 6.0" x 1.0" Plate	80.00 - 84.00	Auto	1.0000
L16	62	CCI 6.0" x 1.0" Plate	80.00 - 84.00	Auto	1.0000
L16	64	CCI 5.0" x 3.0" Plate	80.25 - 84.00	Auto	1.0000
L16	65	CCI 5.0" x 3.0" Plate	80.25 - 84.00	Auto	1.0000
L16	66	CCI 5.0" x 3.0" Plate	80.25 - 84.00	Auto	1.0000
L16	67	CCI 5.0" x 3.0" Plate	80.25 - 84.00	Auto	1.0000
L16	89	CCI 4" x 0.75" Plate	80.25 - 84.00	Auto	1.0000
L16	90	CCI 4" x 0.75" Plate	80.25 - 84.00	Auto	1.0000
L16	91	CCI 4" x 0.75" Plate	80.25 - 84.00	Auto	1.0000
L16	92	CCI 4" x 0.75" Plate	80.25 - 84.00	Auto	1.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L17	59	CCI 6.0" x 1.0" Plate	79.75 - 80.00	Auto	1.0000
L17	60	CCI 6.0" x 1.0" Plate	79.75 - 80.00	Auto	1.0000
L17	61	CCI 6.0" x 1.0" Plate	79.75 - 80.00	Auto	1.0000
L17	62	CCI 6.0" x 1.0" Plate	79.75 - 80.00	Auto	1.0000
L18	59	CCI 6.0" x 1.0" Plate	76.33 - 79.75	Auto	1.0000
L18	60	CCI 6.0" x 1.0" Plate	76.33 - 79.75	Auto	1.0000
L18	61	CCI 6.0" x 1.0" Plate	76.33 - 79.75	Auto	1.0000
L18	62	CCI 6.0" x 1.0" Plate	76.33 - 79.75	Auto	1.0000
L18	84	CCI 6" x 1" Plate	74.75 - 79.75	Auto	1.0000
L18	85	CCI 6" x 1" Plate	74.75 - 79.75	Auto	1.0000
L18	86	CCI 6" x 1" Plate	74.75 - 79.75	Auto	1.0000
L18	87	CCI 6" x 1" Plate	74.75 - 79.75	Auto	1.0000
L19	84	CCI 6" x 1" Plate	69.75 - 74.75	Auto	1.0000
L19	85	CCI 6" x 1" Plate	69.75 - 74.75	Auto	1.0000
L19	86	CCI 6" x 1" Plate	69.75 - 74.75	Auto	1.0000
L19	87	CCI 6" x 1" Plate	69.75 - 74.75	Auto	1.0000
L20	49	CCI 6.5" x 1.25" Plate	64.75 - 66.04	Auto	1.0000
L20	50	CCI 6.5" x 1.25" Plate	64.75 - 66.04	Auto	1.0000
L20	51	CCI 6.5" x 1.25" Plate	64.75 - 66.04	Auto	1.0000
L20	52	CCI 6.5" x 1.25" Plate	64.75 - 66.04	Auto	1.0000
L20	54	CCI 6.0" x 3.0" Plate	64.75 - 65.50	Auto	1.0000
L20	55	CCI 6.0" x 3.0" Plate	64.75 - 65.50	Auto	1.0000
L20	56	CCI 6.0" x 3.0" Plate	64.75 - 65.50	Auto	1.0000
L20	57	CCI 6.0" x 3.0" Plate	64.75 - 65.50	Auto	1.0000
L20	84	CCI 6" x 1" Plate	64.75 - 69.75	Auto	1.0000
L20	85	CCI 6" x 1" Plate	64.75 - 69.75	Auto	1.0000
L20	86	CCI 6" x 1" Plate	64.75 - 69.75	Auto	1.0000
L20	87	CCI 6" x 1" Plate	64.75 - 69.75	Auto	1.0000
L21	49	CCI 6.5" x 1.25" Plate	60.00 - 64.75	Auto	1.0000
L21	50	CCI 6.5" x 1.25" Plate	60.00 - 64.75	Auto	1.0000
L21	51	CCI 6.5" x 1.25" Plate	60.00 - 64.75	Auto	1.0000
L21	52	CCI 6.5" x 1.25" Plate	60.00 - 64.75	Auto	1.0000
L21	54	CCI 6.0" x 3.0" Plate	60.25 - 64.75	Auto	1.0000
L21	55	CCI 6.0" x 3.0" Plate	60.25 - 64.75	Auto	1.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L21	56	CCI 6.0" x 3.0" Plate	60.25 - 64.75	Auto	1.0000
L21	57	CCI 6.0" x 3.0" Plate	60.25 - 64.75	Auto	1.0000
L21	84	CCI 6" x 1" Plate	60.25 - 64.75	Auto	1.0000
L21	85	CCI 6" x 1" Plate	60.25 - 64.75	Auto	1.0000
L21	86	CCI 6" x 1" Plate	60.25 - 64.75	Auto	1.0000
L21	87	CCI 6" x 1" Plate	60.25 - 64.75	Auto	1.0000
L21	94	4.75" x 1.25" Plate	60.00 - 64.75	Auto	1.0000
L21	95	4.75" x 1.25" Plate	60.00 - 64.75	Auto	1.0000
L21	96	4.75" x 1.25" Plate	60.00 - 64.75	Auto	1.0000
L21	98	4.75" x 3" Plate	60.25 - 64.75	Auto	1.0000
L21	99	4.75" x 3" Plate	60.25 - 64.75	Auto	1.0000
L21	100	4.75" x 3" Plate	60.25 - 64.75	Auto	1.0000
L22	49	CCI 6.5" x 1.25" Plate	59.75 - 60.00	Auto	1.0000
L22	50	CCI 6.5" x 1.25" Plate	59.75 - 60.00	Auto	1.0000
L22	51	CCI 6.5" x 1.25" Plate	59.75 - 60.00	Auto	1.0000
L22	52	CCI 6.5" x 1.25" Plate	59.75 - 60.00	Auto	1.0000
L22	94	4.75" x 1.25" Plate	59.75 - 60.00	Auto	1.0000
L22	95	4.75" x 1.25" Plate	59.75 - 60.00	Auto	1.0000
L22	96	4.75" x 1.25" Plate	59.75 - 60.00	Auto	1.0000
L23	49	CCI 6.5" x 1.25" Plate	55.46 - 59.75	Auto	1.0000
L23	50	CCI 6.5" x 1.25" Plate	55.46 - 59.75	Auto	1.0000
L23	51	CCI 6.5" x 1.25" Plate	55.46 - 59.75	Auto	1.0000
L23	52	CCI 6.5" x 1.25" Plate	55.46 - 59.75	Auto	1.0000
L23	79	CCI 6.5" x 1.25" Plate	54.75 - 59.75	Auto	1.0000
L23	80	CCI 6.5" x 1.25" Plate	54.75 - 59.75	Auto	1.0000
L23	81	CCI 6.5" x 1.25" Plate	54.75 - 59.75	Auto	1.0000
L23	82	CCI 6.5" x 1.25" Plate	54.75 - 59.75	Auto	1.0000
L23	94	4.75" x 1.25" Plate	57.50 - 59.75	Auto	1.0000
L23	95	4.75" x 1.25" Plate	57.50 - 59.75	Auto	1.0000
L23	96	4.75" x 1.25" Plate	57.50 - 59.75	Auto	1.0000
L24	79	CCI 6.5" x 1.25" Plate	49.75 - 54.75	Auto	1.0000
L24	80	CCI 6.5" x 1.25" Plate	49.75 - 54.75	Auto	1.0000
L24	81	CCI 6.5" x 1.25" Plate	49.75 - 54.75	Auto	1.0000
L24	82	CCI 6.5" x 1.25" Plate	49.75 - 54.75	Auto	1.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L25	39	CCI 6.5" x 1.25" Plate	44.75 - 46.04	Auto	1.0000
L25	40	CCI 6.5" x 1.25" Plate	44.75 - 46.04	Auto	1.0000
L25	41	CCI 6.5" x 1.25" Plate	44.75 - 46.04	Auto	1.0000
L25	42	CCI 6.5" x 1.25" Plate	44.75 - 46.04	Auto	1.0000
L25	44	CCI 6.0" x 3.0" Plate	44.75 - 45.50	Auto	1.0000
L25	45	CCI 6.0" x 3.0" Plate	44.75 - 45.50	Auto	1.0000
L25	46	CCI 6.0" x 3.0" Plate	44.75 - 45.50	Auto	1.0000
L25	47	CCI 6.0" x 3.0" Plate	44.75 - 45.50	Auto	1.0000
L25	79	CCI 6.5" x 1.25" Plate	44.75 - 49.75	Auto	1.0000
L25	80	CCI 6.5" x 1.25" Plate	44.75 - 49.75	Auto	1.0000
L25	81	CCI 6.5" x 1.25" Plate	44.75 - 49.75	Auto	1.0000
L25	82	CCI 6.5" x 1.25" Plate	44.75 - 49.75	Auto	1.0000
L26	39	CCI 6.5" x 1.25" Plate	40.00 - 44.75	Auto	1.0000
L26	40	CCI 6.5" x 1.25" Plate	40.00 - 44.75	Auto	1.0000
L26	41	CCI 6.5" x 1.25" Plate	40.00 - 44.75	Auto	1.0000
L26	42	CCI 6.5" x 1.25" Plate	40.00 - 44.75	Auto	1.0000
L26	44	CCI 6.0" x 3.0" Plate	40.25 - 44.75	Auto	1.0000
L26	45	CCI 6.0" x 3.0" Plate	40.25 - 44.75	Auto	1.0000
L26	46	CCI 6.0" x 3.0" Plate	40.25 - 44.75	Auto	1.0000
L26	47	CCI 6.0" x 3.0" Plate	40.25 - 44.75	Auto	1.0000
L26	79	CCI 6.5" x 1.25" Plate	40.25 - 44.75	Auto	1.0000
L26	80	CCI 6.5" x 1.25" Plate	40.25 - 44.75	Auto	1.0000
L26	81	CCI 6.5" x 1.25" Plate	40.25 - 44.75	Auto	1.0000
L26	82	CCI 6.5" x 1.25" Plate	40.25 - 44.75	Auto	1.0000
L27	39	CCI 6.5" x 1.25" Plate	39.75 - 40.00	Auto	1.0000
L27	40	CCI 6.5" x 1.25" Plate	39.75 - 40.00	Auto	1.0000
L27	41	CCI 6.5" x 1.25" Plate	39.75 - 40.00	Auto	1.0000
L27	42	CCI 6.5" x 1.25" Plate	39.75 - 40.00	Auto	1.0000
L28	39	CCI 6.5" x 1.25" Plate	35.46 - 39.75	Auto	1.0000
L28	40	CCI 6.5" x 1.25" Plate	35.46 - 39.75	Auto	1.0000
L28	41	CCI 6.5" x 1.25" Plate	35.46 - 39.75	Auto	1.0000
L28	42	CCI 6.5" x 1.25" Plate	35.46 - 39.75	Auto	1.0000
L28	74	CCI 8.5" x 1.25" Plate	34.75 - 39.75	Auto	1.0000
L28	75	CCI 8.5" x 1.25" Plate	34.75 - 39.75	Auto	1.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L28	76	CCI 8.5" x 1.25" Plate	34.75 - 39.75	Auto	1.0000
L28	77	CCI 8.5" x 1.25" Plate	34.75 - 39.75	Auto	1.0000
L29	74	CCI 8.5" x 1.25" Plate	29.75 - 34.75	Auto	1.0000
L29	75	CCI 8.5" x 1.25" Plate	29.75 - 34.75	Auto	1.0000
L29	76	CCI 8.5" x 1.25" Plate	29.75 - 34.75	Auto	1.0000
L29	77	CCI 8.5" x 1.25" Plate	29.75 - 34.75	Auto	1.0000
L30	29	CCI 8.5" x 1.25" Plate	24.75 - 26.96	Auto	1.0000
L30	30	CCI 8.5" x 1.25" Plate	24.75 - 26.96	Auto	1.0000
L30	31	CCI 8.5" x 1.25" Plate	24.75 - 26.96	Auto	1.0000
L30	32	CCI 8.5" x 1.25" Plate	24.75 - 26.96	Auto	1.0000
L30	34	CCI 8.0" x 3.0" Plate	24.75 - 26.50	Auto	1.0000
L30	35	CCI 8.0" x 3.0" Plate	24.75 - 26.50	Auto	1.0000
L30	36	CCI 8.0" x 3.0" Plate	24.75 - 26.50	Auto	1.0000
L30	37	CCI 8.0" x 3.0" Plate	24.75 - 26.50	Auto	1.0000
L30	74	CCI 8.5" x 1.25" Plate	24.75 - 29.75	Auto	1.0000
L30	75	CCI 8.5" x 1.25" Plate	24.75 - 29.75	Auto	1.0000
L30	76	CCI 8.5" x 1.25" Plate	24.75 - 29.75	Auto	1.0000
L30	77	CCI 8.5" x 1.25" Plate	24.75 - 29.75	Auto	1.0000
L31	29	CCI 8.5" x 1.25" Plate	20.00 - 24.75	Auto	1.0000
L31	30	CCI 8.5" x 1.25" Plate	20.00 - 24.75	Auto	1.0000
L31	31	CCI 8.5" x 1.25" Plate	20.00 - 24.75	Auto	1.0000
L31	32	CCI 8.5" x 1.25" Plate	20.00 - 24.75	Auto	1.0000
L31	34	CCI 8.0" x 3.0" Plate	20.25 - 24.75	Auto	1.0000
L31	35	CCI 8.0" x 3.0" Plate	20.25 - 24.75	Auto	1.0000
L31	36	CCI 8.0" x 3.0" Plate	20.25 - 24.75	Auto	1.0000
L31	37	CCI 8.0" x 3.0" Plate	20.25 - 24.75	Auto	1.0000
L31	74	CCI 8.5" x 1.25" Plate	20.25 - 24.75	Auto	1.0000
L31	75	CCI 8.5" x 1.25" Plate	20.25 - 24.75	Auto	1.0000
L31	76	CCI 8.5" x 1.25" Plate	20.25 - 24.75	Auto	1.0000
L31	77	CCI 8.5" x 1.25" Plate	20.25 - 24.75	Auto	1.0000
L32	29	CCI 8.5" x 1.25" Plate	19.75 - 20.00	Auto	1.0000
L32	30	CCI 8.5" x 1.25" Plate	19.75 - 20.00	Auto	1.0000
L32	31	CCI 8.5" x 1.25" Plate	19.75 - 20.00	Auto	1.0000
L32	32	CCI 8.5" x 1.25" Plate	19.75 - 20.00	Auto	1.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L33	29	CCI 8.5" x 1.25" Plate	14.75 - 19.75	Auto	1.0000
L33	30	CCI 8.5" x 1.25" Plate	14.75 - 19.75	Auto	1.0000
L33	31	CCI 8.5" x 1.25" Plate	14.75 - 19.75	Auto	1.0000
L33	32	CCI 8.5" x 1.25" Plate	14.75 - 19.75	Auto	1.0000
L33	69	CCI 8.5" x 1.25" Plate	14.75 - 19.75	Auto	1.0000
L33	70	CCI 8.5" x 1.25" Plate	14.75 - 19.75	Auto	1.0000
L33	71	CCI 8.5" x 1.25" Plate	14.75 - 19.75	Auto	1.0000
L33	72	CCI 8.5" x 1.25" Plate	14.75 - 19.75	Auto	1.0000
L34	29	CCI 8.5" x 1.25" Plate	14.04 - 14.75	Auto	1.0000
L34	30	CCI 8.5" x 1.25" Plate	14.04 - 14.75	Auto	1.0000
L34	31	CCI 8.5" x 1.25" Plate	14.04 - 14.75	Auto	1.0000
L34	32	CCI 8.5" x 1.25" Plate	14.04 - 14.75	Auto	1.0000
L34	69	CCI 8.5" x 1.25" Plate	9.75 - 14.75	Auto	1.0000
L34	70	CCI 8.5" x 1.25" Plate	9.75 - 14.75	Auto	1.0000
L34	71	CCI 8.5" x 1.25" Plate	9.75 - 14.75	Auto	1.0000
L34	72	CCI 8.5" x 1.25" Plate	9.75 - 14.75	Auto	1.0000
L35	69	CCI 8.5" x 1.25" Plate	4.75 - 9.75	Auto	1.0000
L35	70	CCI 8.5" x 1.25" Plate	4.75 - 9.75	Auto	1.0000
L35	71	CCI 8.5" x 1.25" Plate	4.75 - 9.75	Auto	1.0000
L35	72	CCI 8.5" x 1.25" Plate	4.75 - 9.75	Auto	1.0000
L36	69	CCI 8.5" x 1.25" Plate	0.00 - 4.75	Auto	1.0000
L36	70	CCI 8.5" x 1.25" Plate	0.00 - 4.75	Auto	1.0000
L36	71	CCI 8.5" x 1.25" Plate	0.00 - 4.75	Auto	1.0000
L36	72	CCI 8.5" x 1.25" Plate	0.00 - 4.75	Auto	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
Lightning Rod 5/8" x 4'	A	From Leg	2.000	0.000	149.500	No Ice	0.250	0.250	0.031
			0.000			1/2" Ice	0.664	0.664	0.034
			0.000			1" Ice	0.973	0.973	0.039
						2" Ice	1.494	1.494	0.059
Lightning Rod 5/8" x 4'	B	From Leg	4.000	0.000	149.500	No Ice	0.250	0.250	0.031
			0.000			1/2" Ice	0.664	0.664	0.034
			0.000			1" Ice	0.973	0.973	0.039
						2" Ice	1.494	1.494	0.059
Lightning Rod 5/8" x 4'	C	From Leg	2.000	0.000	149.500	No Ice	0.250	0.250	0.031
			0.000			1/2" Ice	0.664	0.664	0.034
			0.000			1" Ice	0.973	0.973	0.039
						2" Ice	1.494	1.494	0.059

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
4' x 2" Pipe Mount	A	From Leg	2.000 0.000 0.000	0.000	147.500	No Ice 1/2" Ice 1" Ice 2" Ice	0.785 1.028 1.281 1.814	0.785 1.028 1.281 1.814	0.029 0.035 0.044 0.072
4' x 2" Pipe Mount	C	From Leg	2.000 0.000 0.000	0.000	147.500	No Ice 1/2" Ice 1" Ice 2" Ice	0.785 1.028 1.281 1.814	0.785 1.028 1.281 1.814	0.029 0.035 0.044 0.072
*									
AIR 32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	6.747 7.202 7.648 8.565	6.070 6.867 7.583 9.063	0.153 0.214 0.282 0.441
AIR 32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	6.747 7.202 7.648 8.565	6.070 6.867 7.583 9.063	0.153 0.214 0.282 0.441
AIR 32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	6.747 7.202 7.648 8.565	6.070 6.867 7.583 9.063	0.153 0.214 0.282 0.441
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.690 15.460 16.230 17.820	6.870 7.550 8.250 9.670	0.186 0.315 0.458 0.788
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.690 15.460 16.230 17.820	6.870 7.550 8.250 9.670	0.186 0.315 0.458 0.788
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.690 15.460 16.230 17.820	6.870 7.550 8.250 9.670	0.186 0.315 0.458 0.788
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.870 6.233 6.606 7.382	3.270 3.728 4.203 5.200	0.128 0.177 0.232 0.359
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.870 6.233 6.606 7.382	3.270 3.728 4.203 5.200	0.128 0.177 0.232 0.359
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.870 6.233 6.606 7.382	3.270 3.728 4.203 5.200	0.128 0.177 0.232 0.359
RADIO 4449 B71 B85A_T- MOBILE	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.970 2.147 2.331 2.721	1.587 1.749 1.918 2.280	0.073 0.093 0.116 0.170
RADIO 4449 B71 B85A_T- MOBILE	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.970 2.147 2.331 2.721	1.587 1.749 1.918 2.280	0.073 0.093 0.116 0.170

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
RADIO 4449 B71 B85A_T-MOBILE	C	From Leg	4.000 0.000 0.000	0.000	150.000	2" Ice No Ice 1/2" Ice 1" Ice	1.970 2.147 2.331 2.721	1.587 1.749 1.918 2.280	0.073 0.093 0.116 0.170
KRY 112 144/1	A	From Leg	4.000 0.000 0.000	0.000	150.000	2" Ice No Ice 1/2" Ice 1" Ice	0.350 0.426 0.509 0.698	0.175 0.234 0.301 0.456	0.011 0.014 0.019 0.032
KRY 112 144/1	B	From Leg	4.000 0.000 0.000	0.000	150.000	2" Ice No Ice 1/2" Ice 1" Ice	0.350 0.426 0.509 0.698	0.175 0.234 0.301 0.456	0.011 0.014 0.019 0.032
KRY 112 144/1	C	From Leg	4.000 0.000 0.000	0.000	150.000	2" Ice No Ice 1/2" Ice 1" Ice	0.350 0.426 0.509 0.698	0.175 0.234 0.301 0.456	0.011 0.014 0.019 0.032
RRUS 4415 B25	A	From Leg	4.000 0.000 0.000	0.000	150.000	2" Ice No Ice 1/2" Ice 1" Ice	1.644 1.804 1.972 2.329	0.679 0.791 0.913 1.183	0.044 0.056 0.071 0.109
RRUS 4415 B25	B	From Leg	4.000 0.000 0.000	0.000	150.000	2" Ice No Ice 1/2" Ice 1" Ice	1.644 1.804 1.972 2.329	0.679 0.791 0.913 1.183	0.044 0.056 0.071 0.109
RRUS 4415 B25	C	From Leg	4.000 0.000 0.000	0.000	150.000	2" Ice No Ice 1/2" Ice 1" Ice	1.644 1.804 1.972 2.329	0.679 0.791 0.913 1.183	0.044 0.056 0.071 0.109
SDX1926Q-43	A	From Leg	4.000 0.000 0.000	0.000	150.000	2" Ice No Ice 1/2" Ice 1" Ice	0.241 0.306 0.379 0.547	0.101 0.144 0.195 0.318	0.006 0.009 0.012 0.023
SDX1926Q-43	B	From Leg	4.000 0.000 0.000	0.000	150.000	2" Ice No Ice 1/2" Ice 1" Ice	0.241 0.306 0.379 0.547	0.101 0.144 0.195 0.318	0.006 0.009 0.012 0.023
SDX1926Q-43	C	From Leg	4.000 0.000 0.000	0.000	150.000	2" Ice No Ice 1/2" Ice 1" Ice	0.241 0.306 0.379 0.547	0.101 0.144 0.195 0.318	0.006 0.009 0.012 0.023
Platform Mount [LP 405-1_HR-1]	C	None		0.000	150.000	2" Ice No Ice 1/2" Ice 1" Ice	25.330 33.790 42.160 58.770	25.330 33.790 42.160 58.770	2.056 2.634 3.360 5.254
*									
DS4C06F36D-D	A	From Leg	4.000 0.000 17.000	0.000	150.000	2" Ice No Ice 1/2" Ice 1" Ice	5.820 7.793 9.783 13.813	5.820 7.793 9.783 13.813	0.050 0.092 0.146 0.292
DS4C06F36D-D	C	From Leg	4.000 0.000 17.000	0.000	150.000	2" Ice No Ice 1/2" Ice	5.820 7.793 9.783	5.820 7.793 9.783	0.050 0.092 0.146

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
						1" Ice	13.813	13.813	0.292
						2" Ice			
201-1N	B	From Leg	4.000	0.000	150.000	No Ice	1.489	1.489	0.006
			0.000			1/2"	2.408	2.408	0.018
			4.000			Ice	3.344	3.344	0.036
						1" Ice	4.751	4.751	0.089
						2" Ice			
4' x 2" Pipe Mount	A	From Leg	4.000	0.000	150.000	No Ice	0.785	0.785	0.029
			0.000			1/2"	1.028	1.028	0.035
			0.000			Ice	1.281	1.281	0.044
						1" Ice	1.814	1.814	0.072
						2" Ice			
4' x 2" Pipe Mount	B	From Leg	4.000	0.000	150.000	No Ice	0.785	0.785	0.029
			0.000			1/2"	1.028	1.028	0.035
			0.000			Ice	1.281	1.281	0.044
						1" Ice	1.814	1.814	0.072
						2" Ice			
4' x 2" Pipe Mount	C	From Leg	4.000	0.000	150.000	No Ice	0.785	0.785	0.029
			0.000			1/2"	1.028	1.028	0.035
			0.000			Ice	1.281	1.281	0.044
						1" Ice	1.814	1.814	0.072
						2" Ice			
*									
LNx-6514DS-A1M w/ Mount Pipe	A	From Leg	4.000	0.000	140.000	No Ice	4.090	3.300	0.065
			0.000			1/2"	4.490	3.680	0.128
			0.000			Ice	4.890	4.060	0.202
						1" Ice	5.710	4.870	0.383
						2" Ice			
LNx-6514DS-A1M w/ Mount Pipe	B	From Leg	4.000	0.000	140.000	No Ice	4.090	3.300	0.065
			0.000			1/2"	4.490	3.680	0.128
			0.000			Ice	4.890	4.060	0.202
						1" Ice	5.710	4.870	0.383
						2" Ice			
LNx-6514DS-A1M w/ Mount Pipe	C	From Leg	4.000	0.000	140.000	No Ice	4.090	3.300	0.065
			0.000			1/2"	4.490	3.680	0.128
			0.000			Ice	4.890	4.060	0.202
						1" Ice	5.710	4.870	0.383
						2" Ice			
(2) NNHH-65B-R4 w/ Mount Pipe	A	From Leg	4.000	0.000	140.000	No Ice	7.550	4.230	0.110
			0.000			1/2"	8.040	4.670	0.197
			0.000			Ice	8.530	5.120	0.296
						1" Ice	9.560	6.050	0.529
						2" Ice			
(2) NNHH-65B-R4 w/ Mount Pipe	B	From Leg	4.000	0.000	140.000	No Ice	7.550	4.230	0.110
			0.000			1/2"	8.040	4.670	0.197
			0.000			Ice	8.530	5.120	0.296
						1" Ice	9.560	6.050	0.529
						2" Ice			
(2) NNHH-65B-R4 w/ Mount Pipe	C	From Leg	4.000	0.000	140.000	No Ice	7.550	4.230	0.110
			0.000			1/2"	8.040	4.670	0.197
			0.000			Ice	8.530	5.120	0.296
						1" Ice	9.560	6.050	0.529
						2" Ice			
CBRS w/ Mount Pipe	A	From Leg	4.000	0.000	140.000	No Ice	1.714	1.168	0.032
			0.000			1/2"	1.934	1.437	0.050
			0.000			Ice	2.166	1.723	0.072
						1" Ice	2.664	2.351	0.127
						2" Ice			
CBRS w/ Mount Pipe	B	From Leg	4.000	0.000	140.000	No Ice	1.714	1.168	0.032
			0.000			1/2"	1.934	1.437	0.050
			0.000			Ice	2.166	1.723	0.072
						1" Ice	2.664	2.351	0.127
						2" Ice			
CBRS w/ Mount Pipe	C	From Leg	4.000	0.000	140.000	No Ice	1.714	1.168	0.032
			0.000			1/2"	1.934	1.437	0.050

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
			0.000			Ice	2.166	1.723	0.072
						1" Ice	2.664	2.351	0.127
						2" Ice			
DB-T1-6Z-8AB-0Z	B	From Leg	4.000	0.000	140.000	No Ice	4.800	2.000	0.044
			0.000			1/2"	5.070	2.193	0.080
			0.000			Ice	5.348	2.393	0.120
						1" Ice	5.926	2.815	0.213
						2" Ice			
RFV01U-D1A	B	From Leg	4.000	0.000	140.000	No Ice	1.875	1.250	0.084
			0.000			1/2"	2.045	1.393	0.103
			0.000			Ice	2.223	1.543	0.124
						1" Ice	2.601	1.865	0.175
						2" Ice			
(2) RFV01U-D1A	C	From Leg	4.000	0.000	140.000	No Ice	1.875	1.250	0.084
			0.000			1/2"	2.045	1.393	0.103
			0.000			Ice	2.223	1.543	0.124
						1" Ice	2.601	1.865	0.175
						2" Ice			
(2) RFV01U-D2A	A	From Leg	4.000	0.000	140.000	No Ice	1.875	1.013	0.070
			0.000			1/2"	2.045	1.145	0.087
			0.000			Ice	2.223	1.284	0.106
						1" Ice	2.601	1.585	0.153
						2" Ice			
RFV01U-D2A	B	From Leg	4.000	0.000	140.000	No Ice	1.875	1.013	0.070
			0.000			1/2"	2.045	1.145	0.087
			0.000			Ice	2.223	1.284	0.106
						1" Ice	2.601	1.585	0.153
						2" Ice			
RVZDC-6627-PF-48	A	From Leg	4.000	0.000	140.000	No Ice	3.792	2.514	0.032
			0.000			1/2"	4.044	2.727	0.063
			0.000			Ice	4.303	2.947	0.099
						1" Ice	4.844	3.417	0.181
						2" Ice			
20W CBRS	B	From Leg	4.000	0.000	140.000	No Ice	0.857	0.420	0.019
			0.000			1/2"	0.975	0.510	0.026
			0.000			Ice	1.101	0.608	0.034
						1" Ice	1.374	0.833	0.058
						2" Ice			
(2) 20W CBRS	C	From Leg	4.000	0.000	140.000	No Ice	0.857	0.420	0.019
			0.000			1/2"	0.975	0.510	0.026
			0.000			Ice	1.101	0.608	0.034
						1" Ice	1.374	0.833	0.058
						2" Ice			
Platform Mount [LP 303-1_KCKR]	C	None		0.000	140.000	No Ice	25.910	25.910	1.525
						1/2"	32.230	32.230	1.986
						Ice	38.730	38.730	2.540
						1" Ice	52.330	52.330	3.937
						2" Ice			
*									
NNVV-65B-R4 w/ Mount Pipe	A	From Leg	4.000	0.000	130.000	No Ice	7.550	4.230	0.110
			0.000			1/2"	8.040	4.670	0.197
			0.000			Ice	8.530	5.120	0.296
						1" Ice	9.560	6.050	0.529
						2" Ice			
NNVV-65B-R4 w/ Mount Pipe	B	From Leg	4.000	0.000	130.000	No Ice	7.550	4.230	0.110
			0.000			1/2"	8.040	4.670	0.197
			0.000			Ice	8.530	5.120	0.296
						1" Ice	9.560	6.050	0.529
						2" Ice			
NNVV-65B-R4 w/ Mount Pipe	C	From Leg	4.000	0.000	130.000	No Ice	7.550	4.230	0.110
			0.000			1/2"	8.040	4.670	0.197
			0.000			Ice	8.530	5.120	0.296
						1" Ice	9.560	6.050	0.529
						2" Ice			
AAHC w/ Mount Pipe	A	From Leg	4.000	0.000	130.000	No Ice	4.409	2.691	0.115

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
			0.000			1/2"	4.727	3.079	0.156
			0.000			Ice	5.055	3.486	0.202
						1" Ice	5.743	4.359	0.310
						2" Ice			
AAHC w/ Mount Pipe	B	From Leg	4.000	0.000	130.000	No Ice	4.409	2.691	0.115
			0.000			1/2"	4.727	3.079	0.156
			0.000			Ice	5.055	3.486	0.202
						1" Ice	5.743	4.359	0.310
						2" Ice			
AAHC w/ Mount Pipe	C	From Leg	4.000	0.000	130.000	No Ice	4.409	2.691	0.115
			0.000			1/2"	4.727	3.079	0.156
			0.000			Ice	5.055	3.486	0.202
						1" Ice	5.743	4.359	0.310
						2" Ice			
(2) RRH2X50-800	A	From Leg	4.000	0.000	130.000	No Ice	1.701	1.282	0.053
			0.000			1/2"	1.864	1.428	0.070
			0.000			Ice	2.035	1.580	0.090
						1" Ice	2.398	1.908	0.138
						2" Ice			
(2) RRH2X50-800	B	From Leg	4.000	0.000	130.000	No Ice	1.701	1.282	0.053
			0.000			1/2"	1.864	1.428	0.070
			0.000			Ice	2.035	1.580	0.090
						1" Ice	2.398	1.908	0.138
						2" Ice			
(2) RRH2X50-800	A	From Leg	4.000	0.000	130.000	No Ice	1.701	1.282	0.053
			0.000			1/2"	1.864	1.428	0.070
			0.000			Ice	2.035	1.580	0.090
						1" Ice	2.398	1.908	0.138
						2" Ice			
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.000	0.000	130.000	No Ice	2.322	2.238	0.060
			0.000			1/2"	2.527	2.441	0.083
			0.000			Ice	2.739	2.651	0.110
						1" Ice	3.185	3.093	0.173
						2" Ice			
PCS 1900MHz 4x45W-65MHz	B	From Leg	4.000	0.000	130.000	No Ice	2.322	2.238	0.060
			0.000			1/2"	2.527	2.441	0.083
			0.000			Ice	2.739	2.651	0.110
						1" Ice	3.185	3.093	0.173
						2" Ice			
PCS 1900MHz 4x45W-65MHz	C	From Leg	4.000	0.000	130.000	No Ice	2.322	2.238	0.060
			0.000			1/2"	2.527	2.441	0.083
			0.000			Ice	2.739	2.651	0.110
						1" Ice	3.185	3.093	0.173
						2" Ice			
(2) 4' x 2" Pipe Mount	A	From Leg	4.000	0.000	130.000	No Ice	0.785	0.785	0.029
			0.000			1/2"	1.028	1.028	0.035
			0.000			Ice	1.281	1.281	0.044
						1" Ice	1.814	1.814	0.072
						2" Ice			
(2) 4' x 2" Pipe Mount	B	From Leg	4.000	0.000	130.000	No Ice	0.785	0.785	0.029
			0.000			1/2"	1.028	1.028	0.035
			0.000			Ice	1.281	1.281	0.044
						1" Ice	1.814	1.814	0.072
						2" Ice			
(2) 4' x 2" Pipe Mount	C	From Leg	4.000	0.000	130.000	No Ice	0.785	0.785	0.029
			0.000			1/2"	1.028	1.028	0.035
			0.000			Ice	1.281	1.281	0.044
						1" Ice	1.814	1.814	0.072
						2" Ice			
Platform Mount [LP 405-1]	C	None		0.000	130.000	No Ice	20.880	20.880	1.800
						1/2"	28.890	28.890	2.277
						Ice	37.040	37.040	2.868
						1" Ice	53.730	53.730	4.394
						2" Ice			

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
Ice Shields	C	From Leg	0.500 0.000 0.000	0.000	128.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.700 2.904 3.115 3.559	3.600 3.837 4.081 4.593	0.020 0.060 0.105 0.207
*									
7750.00 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.746 6.179 6.607 7.488	4.254 5.014 5.711 7.155	0.055 0.103 0.157 0.287
7750.00 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.746 6.179 6.607 7.488	4.254 5.014 5.711 7.155	0.055 0.103 0.157 0.287
7750.00 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.746 6.179 6.607 7.488	4.254 5.014 5.711 7.155	0.055 0.103 0.157 0.287
HPA-65R-BUU-H6 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice	9.220 9.980 10.760 12.360	6.250 6.960 7.700 9.220	0.074 0.143 0.224 0.420
HPA-65R-BUU-H8 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice	12.250 13.190 14.160 16.140	8.330 9.230 10.150 12.050	0.105 0.194 0.297 0.543
HPA-65R-BUU-H8 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice	12.250 13.190 14.160 16.140	8.330 9.230 10.150 12.050	0.105 0.194 0.297 0.543
QS66512-2 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.040 4.420 4.820 5.630	4.180 4.570 4.970 5.790	0.137 0.206 0.287 0.482
TPA-65R-LCUUUU-H8 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice	11.850 12.770 13.710 15.640	8.990 9.880 10.790 12.660	0.115 0.210 0.319 0.580
TPA-65R-LCUUUU-H8 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice	11.850 12.770 13.710 15.640	8.990 9.880 10.790 12.660	0.115 0.210 0.319 0.580
RRUS 11	A	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.784 2.992 3.207 3.658	1.187 1.334 1.490 1.833	0.048 0.068 0.092 0.150
RRUS 11	B	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.784 2.992 3.207 3.658	1.187 1.334 1.490 1.833	0.048 0.068 0.092 0.150
RRUS 11	C	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice	2.784 2.992 3.207 3.658	1.187 1.334 1.490 1.833	0.048 0.068 0.092 0.150

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
(2) LGP21401	A	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	1.104 1.239 1.381 1.688	0.207 0.274 0.348 0.521	0.014 0.021 0.030 0.055
(2) LGP21401	C	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	1.104 1.239 1.381 1.688	0.207 0.274 0.348 0.521	0.014 0.021 0.030 0.055
(2) LGP21401	B	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	1.104 1.239 1.381 1.688	0.207 0.274 0.348 0.521	0.014 0.021 0.030 0.055
(2) LGP21903	A	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	0.231 0.294 0.365 0.528	0.158 0.213 0.276 0.423	0.011 0.013 0.017 0.028
(2) LGP21903	B	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	0.231 0.294 0.365 0.528	0.158 0.213 0.276 0.423	0.011 0.013 0.017 0.028
(2) LGP21903	C	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	0.231 0.294 0.365 0.528	0.158 0.213 0.276 0.423	0.011 0.013 0.017 0.028
DC6-48-60-18-8F	A	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	1.212 1.892 2.105 2.570	1.212 1.892 2.105 2.570	0.020 0.042 0.067 0.126
RRUS 32	A	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	2.857 3.083 3.316 3.805	1.777 1.968 2.166 2.583	0.055 0.077 0.103 0.165
RRUS 32	B	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	2.857 3.083 3.316 3.805	1.777 1.968 2.166 2.583	0.055 0.077 0.103 0.165
RRUS 32	C	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	2.857 3.083 3.316 3.805	1.777 1.968 2.166 2.583	0.055 0.077 0.103 0.165
RRUS 32 B2	A	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	2.731 2.953 3.182 3.663	1.668 1.855 2.049 2.458	0.053 0.074 0.098 0.157
RRUS 32 B2	B	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	2.731 2.953 3.182 3.663	1.668 1.855 2.049 2.458	0.053 0.074 0.098 0.157
RRUS 32 B2	C	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	2.731 2.953 3.182 3.663	1.668 1.855 2.049 2.458	0.053 0.074 0.098 0.157

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
RRUS 32 B66	A	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	2.743 2.965 3.194 3.675	1.668 1.855 2.049 2.458	0.053 0.074 0.098 0.157
RRUS 32 B66	B	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	2.743 2.965 3.194 3.675	1.668 1.855 2.049 2.458	0.053 0.074 0.098 0.157
RRUS 32 B66	C	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	2.743 2.965 3.194 3.675	1.668 1.855 2.049 2.458	0.053 0.074 0.098 0.157
DC6-48-60-18-8F	A	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	1.212 1.892 2.105 2.570	1.212 1.892 2.105 2.570	0.020 0.042 0.067 0.126
4' x 2" Pipe Mount	A	From Leg	2.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	0.785 1.028 1.281 1.814	0.785 1.028 1.281 1.814	0.029 0.035 0.044 0.072
4' x 2" Pipe Mount	B	From Leg	2.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	0.785 1.028 1.281 1.814	0.785 1.028 1.281 1.814	0.029 0.035 0.044 0.072
4' x 2" Pipe Mount	C	From Leg	2.000 0.000 0.000	0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	0.785 1.028 1.281 1.814	0.785 1.028 1.281 1.814	0.029 0.035 0.044 0.072
Side Arm Mount [SO 102-3]	C	None		0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	3.600 4.180 4.750 5.900	3.600 4.180 4.750 5.900	0.075 0.105 0.135 0.195
Platform Mount [LP 303-1]	C	None		0.000	105.000	2" Ice No Ice 1/2" Ice 1" Ice	14.690 18.010 21.340 28.080	14.690 18.010 21.340 28.080	1.250 1.569 1.942 2.852
*						2" Ice			
APXV18-206516S-C	A	From Leg	1.000 0.000 0.000	0.000	95.000	No Ice 1/2" Ice 1" Ice	2.560 3.000 3.460 4.410	1.210 1.630 2.050 2.960	0.019 0.039 0.063 0.126
APXV18-206516S-C	B	From Leg	1.000 0.000 0.000	0.000	95.000	2" Ice No Ice 1/2" Ice 1" Ice	2.560 3.000 3.460 4.410	1.210 1.630 2.050 2.960	0.019 0.039 0.063 0.126
APXV18-206516S-C	C	From Leg	1.000 0.000 0.000	0.000	95.000	2" Ice No Ice 1/2" Ice 1" Ice	2.560 3.000 3.460 4.410	1.210 1.630 2.050 2.960	0.019 0.039 0.063 0.126
Pipe Mount [PM 601-3]	C	None		0.000	95.000	2" Ice No Ice 1/2" Ice	3.170 3.790 4.420	3.170 3.790 4.420	0.195 0.232 0.279

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
						1" Ice 2" Ice	5.760 5.760	5.760 5.760	0.401
* 1142-2C	C	From Leg	3.000 0.000 6.000	0.000	89.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.092 3.374 4.673 7.320	2.092 3.374 4.673 7.320	0.024 0.041 0.066 0.140
4' x 2" Pipe Mount	C	From Leg	3.000 0.000 0.000	0.000	89.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.785 1.028 1.281 1.814	0.785 1.028 1.281 1.814	0.029 0.035 0.044 0.072
Side Arm Mount [SO 701-1]	C	From Leg	3.000 0.000 0.000	0.000	89.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.850 1.140 1.430 2.010	1.670 2.340 3.010 4.350	0.065 0.079 0.093 0.121
* GPS_A	A	From Leg	1.500 0.000 2.000	0.000	72.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.255 0.320 0.393 0.561	0.255 0.320 0.393 0.561	0.001 0.005 0.010 0.025
Side Arm Mount [SO 701-1]	A	From Leg	1.500 0.000 0.000	0.000	72.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.850 1.140 1.430 2.010	1.670 2.340 3.010 4.350	0.065 0.079 0.093 0.121
* 201-1N	A	From Leg	3.000 0.000 7.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.489 2.408 3.344 4.751	1.489 2.408 3.344 4.751	0.006 0.018 0.036 0.089
220-8N	C	From Leg	3.000 0.000 10.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.179 7.094 9.025 12.938	5.179 7.094 9.025 12.938	0.021 0.059 0.108 0.244
Side Arm Mount [SO 701-1]	A	From Leg	3.000 0.000 0.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.850 1.140 1.430 2.010	1.670 2.340 3.010 4.350	0.065 0.079 0.093 0.121
Side Arm Mount [SO 701-1]	C	From Leg	3.000 0.000 0.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.850 1.140 1.430 2.010	1.670 2.340 3.010 4.350	0.065 0.079 0.093 0.121
* DB436-C	A	From Leg	4.000 0.000 0.000	0.000	49.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.450 0.810 1.170 1.890	0.450 0.810 1.170 1.890	0.007 0.009 0.011 0.015
Yagi Mount	A	From Leg	0.500 0.000 0.000	0.000	49.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.320 1.580 1.840 2.400	1.320 1.580 1.840 2.400	0.065 0.077 0.093 0.134
* DB436-C	A	From Leg	4.000 0.000 0.000	0.000	45.000	No Ice 1/2" Ice	0.450 0.810 1.170	0.450 0.810 1.170	0.007 0.009 0.011

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
						1" Ice	1.890	1.890	0.015
						2" Ice			
Yagi Mount	A	From Leg	0.500	0.000	45.000	No Ice	1.320	1.320	0.065
			0.000			1/2" Ice	1.580	1.580	0.077
			0.000			Ice	1.840	1.840	0.093
						1" Ice	2.400	2.400	0.134
						2" Ice			
*									
DB436-C	A	From Leg	4.000	0.000	40.000	No Ice	0.450	0.450	0.007
			0.000			1/2" Ice	0.810	0.810	0.009
			0.000			Ice	1.170	1.170	0.011
						1" Ice	1.890	1.890	0.015
						2" Ice			
Yagi Mount	A	From Leg	0.500	0.000	40.000	No Ice	1.320	1.320	0.065
			0.000			1/2" Ice	1.580	1.580	0.077
			0.000			Ice	1.840	1.840	0.093
						1" Ice	2.400	2.400	0.134
						2" Ice			
*									
DB436-C	A	From Leg	4.000	0.000	37.000	No Ice	0.450	0.450	0.007
			0.000			1/2" Ice	0.810	0.810	0.009
			0.000			Ice	1.170	1.170	0.011
						1" Ice	1.890	1.890	0.015
						2" Ice			
Yagi Mount	A	From Leg	0.500	0.000	37.000	No Ice	1.320	1.320	0.065
			0.000			1/2" Ice	1.580	1.580	0.077
			0.000			Ice	1.840	1.840	0.093
						1" Ice	2.400	2.400	0.134
						2" Ice			
*									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight K
HPD2-4.7	B	Paraboloid w/Shroud (HP)	From Leg	4.000	90.000		148.000	2.042	No Ice	3.274
				0.000					1/2" Ice	3.547
				4.000					1" Ice	3.819
									2" Ice	4.365
*										

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	147.5 - 142.5	Pole	Max Tension	26	0.000	0.000	-0.000
			Max. Compression	26	-14.121	0.549	0.219
			Max. Mx	20	-5.228	63.669	-0.618
			Max. My	2	-5.218	-0.575	64.354
			Max. Vy	8	7.326	-63.568	1.154
			Max. Vx	2	-7.389	-0.575	64.354
			Max. Torque	16			-0.417
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-25.840	-0.032	-0.143
			Max. Mx	8	-9.238	-112.601	1.356
L2	142.5 - 137.5	Pole	Max. My	2	-9.244	-0.858	113.343
			Max. Vy	8	12.265	-112.601	1.356
			Max. Vx	2	-12.306	-0.858	113.343
			Max. Torque	25			-0.486
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-26.916	-0.041	-0.235
			Max. Mx	8	-9.238	-112.601	1.356
			Max. My	2	-9.244	-0.858	113.343
			Max. Vy	8	12.265	-112.601	1.356
			Max. Vx	2	-12.306	-0.858	113.343
L3	137.5 - 132.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-26.916	-0.041	-0.235

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L4	132.5 - 127.5	Pole	Max. Mx	8	-9.912	-174.791	1.686
			Max. My	2	-9.918	-0.980	175.726
			Max. Vy	8	12.613	-174.791	1.686
			Max. Vx	2	-12.654	-0.980	175.726
			Max. Torque	25			-0.485
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-37.367	-1.049	1.713
			Max. Mx	8	-14.196	-247.737	2.862
			Max. My	2	-14.202	-1.558	249.415
			Max. Vy	8	16.484	-247.737	2.862
L5	127.5 - 125	Pole	Max. Vx	2	-16.599	-1.558	249.415
			Max. Torque	25			-1.276
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-37.920	-1.054	1.670
			Max. Mx	8	-14.566	-289.132	2.939
			Max. My	2	-14.572	-1.529	291.088
			Max. Vy	8	16.642	-289.132	2.939
			Max. Vx	2	-16.755	-1.529	291.088
			Max. Torque	25			-0.992
			Max Tension	1	0.000	0.000	0.000
L6	125 - 120	Pole	Max. Compression	26	-39.239	-1.064	1.557
			Max. Mx	8	-15.432	-373.339	3.088
			Max. My	2	-15.439	-1.469	375.846
			Max. Vy	8	17.050	-373.339	3.088
			Max. Vx	2	-17.163	-1.469	375.846
			Max. Torque	25			-0.992
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-40.556	-1.064	1.426
			Max. Mx	8	-16.306	-459.562	3.236
			Max. My	2	-16.314	-1.408	462.615
L7	120 - 115	Pole	Max. Vy	8	17.446	-459.562	3.236
			Max. Vx	2	-17.558	-1.408	462.615
			Max. Torque	25			-0.992
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-41.871	-1.064	1.295
			Max. Mx	8	-17.192	-547.716	3.383
			Max. My	2	-17.201	-1.346	551.308
			Max. Vy	8	17.824	-547.716	3.383
			Max. Vx	2	-17.935	-1.346	551.308
			Max. Torque	25			-0.992
L8	115 - 110	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-43.184	-1.064	1.166
			Max. Mx	8	-18.091	-637.706	3.529
			Max. My	2	-18.101	-1.283	641.833
			Max. Vy	8	18.183	-637.706	3.529
			Max. Vx	2	-18.292	-1.283	641.833
			Max. Torque	25			-0.992
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-54.781	-1.211	1.312
			Max. Mx	8	-22.456	-756.448	3.943
L9	110 - 105	Pole	Max. My	2	-22.480	-1.263	760.464
			Max. Vy	8	23.909	-756.448	3.943
			Max. Vx	2	-23.854	-1.263	760.464
			Max. Torque	25			-0.992
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-56.634	-1.639	1.411
			Max. Mx	8	-23.616	-877.141	4.162
			Max. My	2	-23.637	-1.329	881.025
			Max. Vy	8	24.332	-877.141	4.162
			Max. Vx	2	-24.364	-1.329	881.025
L10	105 - 100	Pole	Max. Torque	25			-0.521
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-57.764	-1.693	1.398
			Max. Mx	8	-24.079	-895.748	4.187
			Max. My	2	-24.103	-1.338	899.617
			Max. Vy	8	24.854	-895.748	4.187
			Max. Vx	14	24.861	-0.728	-895.881
			Max. Torque	25			-0.521
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-57.764	-1.693	1.398
L11	100 - 95	Pole	Max. Mx	8	-24.079	-895.748	4.187
			Max. My	2	-24.103	-1.338	899.617
			Max. Vy	8	24.854	-895.748	4.187
			Max. Vx	14	24.861	-0.728	-895.881
			Max. Torque	25			-0.521
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-57.764	-1.693	1.398
			Max. Mx	8	-24.079	-895.748	4.187
			Max. My	2	-24.103	-1.338	899.617
			Max. Vy	8	24.854	-895.748	4.187
L12	95 - 94.25	Pole	Max. Vx	14	24.861	-0.728	-895.881
			Max. Torque	25			-0.521
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-57.764	-1.693	1.398
			Max. Mx	8	-24.079	-895.748	4.187
			Max. My	2	-24.103	-1.338	899.617
			Max. Vy	8	24.854	-895.748	4.187
			Max. Vx	14	24.861	-0.728	-895.881
			Max. Torque	25			-0.521
			Max Tension	1	0.000	0.000	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L13	94.25 - 94	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-57.888	-1.711	1.393
			Max. Mx	8	-24.154	-901.972	4.196
			Max. My	2	-24.178	-1.341	905.827
			Max. Vy	8	24.895	-901.972	4.196
			Max. Vx	14	24.902	-0.741	-902.100
L14	94 - 89	Pole	Max. Torque	25			-0.521
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-60.367	-2.067	1.303
			Max. Mx	8	-25.559	-1028.777	4.367
			Max. My	2	-25.599	-1.406	1031.382
			Max. Vy	8	25.782	-1028.777	4.367
L15	89 - 84	Pole	Max. Vx	14	25.786	-1.001	-1028.795
			Max. Torque	25			-0.521
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-63.483	-0.990	0.509
			Max. Mx	8	-27.331	-1161.003	4.196
			Max. My	14	-27.332	-0.758	-1161.893
L16	84 - 80	Pole	Max. Vy	8	26.872	-1161.003	4.196
			Max. Vx	14	26.893	-0.758	-1161.893
			Max. Torque	22			0.960
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-67.248	-0.663	0.812
			Max. Mx	8	-29.788	-1269.840	4.539
L17	80 - 79.75	Pole	Max. My	14	-29.790	-0.589	-1270.860
			Max. Vy	8	27.734	-1269.840	4.539
			Max. Vx	14	27.748	-0.589	-1270.860
			Max. Torque	22			0.960
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-67.422	-0.673	0.813
L18	79.75 - 74.75	Pole	Max. Mx	8	-29.911	-1276.775	4.549
			Max. My	14	-29.913	-0.598	-1277.795
			Max. Vy	8	27.778	-1276.775	4.549
			Max. Vx	14	27.792	-0.598	-1277.795
			Max. Torque	22			0.960
			Max Tension	1	0.000	0.000	0.000
L19	74.75 - 69.75	Pole	Max. Compression	26	-70.943	-0.848	0.856
			Max. Mx	8	-32.032	-1418.418	4.713
			Max. My	14	-32.035	-0.838	-1419.368
			Max. Vy	8	28.876	-1418.418	4.713
			Max. Vx	14	28.880	-0.838	-1419.368
			Max. Torque	22			0.960
L20	69.75 - 64.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-74.066	-1.229	1.265
			Max. Mx	8	-33.913	-1565.624	5.046
			Max. My	14	-33.917	-1.205	-1566.080
			Max. Vy	8	29.958	-1565.624	5.046
			Max. Vx	14	29.920	-1.205	-1566.080
L21	64.75 - 60	Pole	Max. Torque	22			0.960
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-77.554	-1.401	1.309
			Max. Mx	8	-36.121	-1717.907	5.225
			Max. My	14	-36.125	-1.418	-1718.056
			Max. Vy	8	30.971	-1717.907	5.225
L22	60 - 59.75	Pole	Max. Vx	14	30.927	-1.418	-1718.056
			Max. Torque	14			-0.768
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-84.444	-0.754	1.848
			Max. Mx	8	-40.930	-1867.751	5.779
			Max. My	14	-40.940	-0.997	-1867.166
L22	60 - 59.75	Pole	Max. Vy	8	32.403	-1867.751	5.779
			Max. Vx	14	32.078	-0.997	-1867.166
			Max. Torque	14			-0.768
L22	60 - 59.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-84.673	-0.760	1.852
			Max. Mx	8	-41.097	-1875.850	5.793

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L23	59.75 - 54.75	Pole	Max. My	14	-41.107	-1.002	-1875.180
			Max. Vy	8	32.449	-1875.850	5.793
			Max. Vx	14	32.124	-1.002	-1875.180
			Max. Torque	14			-0.768
			Max Tension	1	0.000	0.000	0.000
L24	54.75 - 49.75	Pole	Max. Compression	26	-89.106	-0.809	1.990
			Max. Mx	8	-43.946	-2040.977	6.031
			Max. My	14	-43.956	-1.140	-2038.572
			Max. Vy	8	33.641	-2040.977	6.031
			Max. Vx	14	33.307	-1.140	-2038.572
L25	49.75 - 44.75	Pole	Max. Torque	14			-0.768
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-93.000	0.300	2.067
			Max. Mx	8	-46.263	-2216.082	6.219
			Max. My	14	-46.273	-1.176	-2212.020
L26	44.75 - 40	Pole	Max. Vy	8	35.096	-2216.082	6.219
			Max. Vx	14	34.741	-1.176	-2212.020
			Max. Torque	14			-2.107
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-97.150	0.122	2.999
L27	40 - 39.75	Pole	Max. Mx	8	-48.976	-2394.457	6.814
			Max. My	14	-48.985	-1.467	-2388.002
			Max. Vy	8	36.287	-2394.457	6.814
			Max. Vx	14	35.927	-1.467	-2388.002
			Max. Torque	14			-2.107
L28	39.75 - 34.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-102.818	0.863	3.613
			Max. Mx	8	-52.982	-2568.749	7.358
			Max. My	14	-52.990	-1.037	-2560.723
			Max. Vy	8	37.421	-2568.749	7.358
L29	34.75 - 29.75	Pole	Max. Vx	14	37.051	-1.037	-2560.723
			Max. Torque	14			-2.142
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-103.189	0.857	4.051
			Max. Mx	8	-53.234	-2578.120	7.610
L30	29.75 - 24.75	Pole	Max. My	14	-53.242	-1.045	-2569.751
			Max. Vy	8	37.539	-2578.120	7.610
			Max. Vx	14	37.169	-1.045	-2569.751
			Max. Torque	14			-2.146
			Max Tension	1	0.000	0.000	0.000
L31	24.75 - 20	Pole	Max. Compression	26	-107.923	0.832	4.695
			Max. Mx	8	-56.378	-2768.845	8.051
			Max. My	14	-56.385	-1.253	-2758.235
			Max. Vy	8	38.803	-2768.845	8.051
			Max. Vx	14	38.422	-1.253	-2758.235
L32	20 - 19.75	Pole	Max. Torque	16			-2.276
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-111.664	0.408	4.622
			Max. Mx	8	-58.883	-2965.584	8.055
			Max. My	14	-58.889	-1.739	-2952.854
L33	19.75 - 14.75	Pole	Max. Vy	8	39.834	-2965.584	8.055
			Max. Vx	14	39.449	-1.739	-2952.854
			Max. Torque	16			-2.276
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-116.727	0.660	4.964
L34	14.75 - 10	Pole	Max. Mx	8	-62.466	-3167.050	8.387
			Max. My	14	-62.472	-1.691	-3152.370
			Max. Vy	8	40.909	-3167.050	8.387
			Max. Vx	14	40.514	-1.691	-3152.370
			Max. Torque	16			-2.276
L35	10 - 9.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-123.437	1.869	5.885
			Max. Mx	8	-67.449	-3362.815	9.188

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L32	20 - 19.75	Pole	Max. My	14	-67.454	-0.858	-3346.525
			Max. Vy	8	42.013	-3362.815	9.188
			Max. Vx	14	41.602	-0.858	-3346.525
			Max. Torque	16			-2.337
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-123.675	1.871	5.894
			Max. Mx	8	-67.634	-3373.308	9.203
			Max. My	14	-67.639	-0.859	-3356.912
			Max. Vy	8	42.051	-3373.308	9.203
			Max. Vx	14	41.640	-0.859	-3356.912
L33	19.75 - 14.75	Pole	Max. Torque	16			-2.339
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-128.716	2.061	6.215
			Max. Mx	8	-71.152	-3586.006	9.495
			Max. My	14	-71.155	-0.895	-3567.476
			Max. Vy	8	43.144	-3586.006	9.495
			Max. Vx	14	42.720	-0.895	-3567.476
			Max. Torque	16			-2.358
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-132.693	1.706	6.198
L34	14.75 - 9.75	Pole	Max. Mx	8	-73.938	-3804.152	9.536
			Max. My	14	-73.941	-1.335	-3783.289
			Max. Vy	8	44.079	-3804.152	9.536
			Max. Vx	14	43.650	-1.335	-3783.289
			Max. Torque	16			-2.358
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-136.436	1.272	6.130
			Max. Mx	8	-76.611	-4026.955	9.534
			Max. My	14	-76.612	-1.842	-4003.713
			Max. Vy	8	44.983	-4026.955	9.534
L35	9.75 - 4.75	Pole	Max. Vx	14	44.550	-1.842	-4003.713
			Max. Torque	16			-2.358
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-139.868	0.880	6.074
			Max. Mx	8	-79.155	-4242.754	9.531
			Max. My	14	-79.156	-2.324	-4217.238
			Max. Vy	8	45.827	-4242.754	9.531
			Max. Vx	14	45.392	-2.324	-4217.238
			Max. Torque	16			-2.358
			Max Tension	1	0.000	0.000	0.000
L36	4.75 - 0	Pole	Max. Compression	26	-139.868	0.880	6.074
			Max. Mx	8	-79.155	-4242.754	9.531
			Max. My	14	-79.156	-2.324	-4217.238
			Max. Vy	8	45.827	-4242.754	9.531
			Max. Vx	14	45.392	-2.324	-4217.238
			Max. Torque	16			-2.358
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-139.868	0.880	6.074
			Max. Mx	8	-79.155	-4242.754	9.531
			Max. My	14	-79.156	-2.324	-4217.238

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	139.868	-0.000	0.000
	Max. H _x	21	59.375	39.780	0.046
	Max. H _z	2	79.167	0.045	39.889
	Max. M _x	2	3993.273	0.045	39.889
	Max. M _z	8	4242.754	-45.808	-0.004
	Max. Torsion	4	2.133	-20.520	35.540
	Min. Vert	19	59.375	34.154	-19.650
	Min. H _x	9	59.375	-45.808	-0.004
	Min. H _z	14	79.167	-0.059	-45.373
	Min. M _x	14	-4217.238	-0.059	-45.373
	Min. M _z	20	-3971.401	39.780	0.046
	Min. Torsion	16	-2.358	22.215	-38.476

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	65.972	0.000	0.000	-4.727	2.204	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	79.167	-0.045	-39.889	-3993.273	5.540	-1.949
0.9 Dead+1.0 Wind 0 deg - No Ice	59.375	-0.045	-39.889	-3962.489	4.858	-1.937
1.2 Dead+1.0 Wind 30 deg - No Ice	79.167	20.520	-35.540	-3504.119	-2014.619	-2.133
0.9 Dead+1.0 Wind 30 deg - No Ice	59.375	20.520	-35.540	-3477.139	-2000.613	-2.126
1.2 Dead+1.0 Wind 60 deg - No Ice	79.167	39.171	-22.562	-2111.203	-3645.429	-1.464
0.9 Dead+1.0 Wind 60 deg - No Ice	59.375	39.171	-22.562	-2094.643	-3620.050	-1.462
1.2 Dead+1.0 Wind 90 deg - No Ice	79.167	45.808	0.004	-9.531	-4242.754	-0.303
0.9 Dead+1.0 Wind 90 deg - No Ice	59.375	45.808	0.004	-7.989	-4213.211	-0.309
1.2 Dead+1.0 Wind 120 deg - No Ice	79.167	39.280	22.700	2109.744	-3651.171	0.500
0.9 Dead+1.0 Wind 120 deg - No Ice	59.375	39.280	22.700	2096.098	-3625.767	0.489
1.2 Dead+1.0 Wind 150 deg - No Ice	79.167	22.797	39.392	3659.869	-2114.738	1.528
0.9 Dead+1.0 Wind 150 deg - No Ice	59.375	22.797	39.392	3635.179	-2100.335	1.515
1.2 Dead+1.0 Wind 180 deg - No Ice	79.167	0.059	45.373	4217.238	-2.324	2.255
0.9 Dead+1.0 Wind 180 deg - No Ice	59.375	0.059	45.373	4188.556	-2.979	2.242
1.2 Dead+1.0 Wind 210 deg - No Ice	79.167	-22.215	38.476	3633.143	2101.196	2.358
0.9 Dead+1.0 Wind 210 deg - No Ice	59.375	-22.215	38.476	3608.654	2085.558	2.351
1.2 Dead+1.0 Wind 240 deg - No Ice	79.167	-34.154	19.650	1962.159	3417.104	1.616
0.9 Dead+1.0 Wind 240 deg - No Ice	59.375	-34.154	19.650	1949.136	3391.314	1.615
1.2 Dead+1.0 Wind 270 deg - No Ice	79.167	-39.780	-0.046	-8.832	3971.401	0.423
0.9 Dead+1.0 Wind 270 deg - No Ice	59.375	-39.780	-0.046	-7.343	3941.592	0.429
1.2 Dead+1.0 Wind 300 deg - No Ice	79.167	-35.896	-20.701	-2029.393	3509.561	-0.700
0.9 Dead+1.0 Wind 300 deg - No Ice	59.375	-35.896	-20.701	-2013.173	3483.363	-0.689
1.2 Dead+1.0 Wind 330 deg - No Ice	79.167	-20.290	-35.135	-3483.234	2003.645	-1.236
0.9 Dead+1.0 Wind 330 deg - No Ice	59.375	-20.290	-35.135	-3456.319	1988.386	-1.223
1.2 Dead+1.0 Ice+1.0 Temp	139.868	0.000	-0.000	-6.074	0.880	-0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	139.868	-0.014	-10.378	-1127.890	1.605	-1.038
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	139.868	5.413	-9.379	-999.009	-571.507	-1.085
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	139.868	9.165	-5.276	-571.354	-977.929	-0.852
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	139.868	10.728	0.005	-7.106	-1138.092	-0.324
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	139.868	9.190	5.312	561.027	-979.276	0.183
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	139.868	5.353	9.246	978.667	-568.022	0.724
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	139.868	0.017	10.589	1124.267	-0.355	1.097
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	139.868	-5.462	9.463	989.624	575.184	1.132
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	139.868	-8.986	5.170	552.536	970.121	0.889
1.2 Dead+1.0 Wind 270	139.868	-10.482	-0.014	-7.153	1127.805	0.356

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
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300	139.868	-9.077	-5.237	-569.628	976.569	-0.225
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 330	139.868	-5.272	-9.124	-986.616	565.243	-0.668
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	65.972	-0.010	-8.656	-866.252	2.851	-0.425
Dead+Wind 30 deg - Service	65.972	4.453	-7.712	-760.606	-433.590	-0.463
Dead+Wind 60 deg - Service	65.972	8.500	-4.896	-459.720	-785.987	-0.315
Dead+Wind 90 deg - Service	65.972	9.940	0.001	-5.629	-915.061	-0.062
Dead+Wind 120 deg - Service	65.972	8.524	4.926	452.260	-787.230	0.107
Dead+Wind 150 deg - Service	65.972	4.947	8.548	787.188	-455.269	0.327
Dead+Wind 180 deg - Service	65.972	0.013	9.846	907.612	1.148	0.485
Dead+Wind 210 deg - Service	65.972	-4.821	8.349	781.409	455.642	0.511
Dead+Wind 240 deg - Service	65.972	-7.411	4.264	420.307	739.848	0.354
Dead+Wind 270 deg - Service	65.972	-8.632	-0.010	-5.484	859.603	0.096
Dead+Wind 300 deg - Service	65.972	-7.789	-4.492	-442.007	759.865	-0.150
Dead+Wind 330 deg - Service	65.972	-4.403	-7.624	-756.081	434.520	-0.271

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.000	-65.972	0.000	0.000	65.972	0.000	0.000%
2	-0.045	-79.167	-39.889	0.045	79.167	39.889	0.000%
3	-0.045	-59.375	-39.889	0.045	59.375	39.889	0.000%
4	20.520	-79.167	-35.540	-20.520	79.167	35.540	0.000%
5	20.520	-59.375	-35.540	-20.520	59.375	35.540	0.000%
6	39.171	-79.167	-22.562	-39.171	79.167	22.562	0.000%
7	39.171	-59.375	-22.562	-39.171	59.375	22.562	0.000%
8	45.808	-79.167	0.004	-45.808	79.167	-0.004	0.000%
9	45.808	-59.375	0.004	-45.808	59.375	-0.004	0.000%
10	39.280	-79.167	22.700	-39.280	79.167	-22.700	0.000%
11	39.280	-59.375	22.700	-39.280	59.375	-22.700	0.000%
12	22.797	-79.167	39.392	-22.797	79.167	-39.392	0.000%
13	22.797	-59.375	39.392	-22.797	59.375	-39.392	0.000%
14	0.059	-79.167	45.373	-0.059	79.167	-45.373	0.000%
15	0.059	-59.375	45.373	-0.059	59.375	-45.373	0.000%
16	-22.215	-79.167	38.476	22.215	79.167	-38.476	0.000%
17	-22.215	-59.375	38.476	22.215	59.375	-38.476	0.000%
18	-34.154	-79.167	19.650	34.154	79.167	-19.650	0.000%
19	-34.154	-59.375	19.650	34.154	59.375	-19.650	0.000%
20	-39.780	-79.167	-0.046	39.780	79.167	0.046	0.000%
21	-39.780	-59.375	-0.046	39.780	59.375	0.046	0.000%
22	-35.896	-79.167	-20.701	35.896	79.167	20.701	0.000%
23	-35.896	-59.375	-20.701	35.896	59.375	20.701	0.000%
24	-20.290	-79.167	-35.135	20.290	79.167	35.135	0.000%
25	-20.290	-59.375	-35.135	20.290	59.375	35.135	0.000%
26	0.000	-139.868	0.000	-0.000	139.868	0.000	0.000%
27	-0.014	-139.868	-10.378	0.014	139.868	10.378	0.000%
28	5.413	-139.868	-9.379	-5.413	139.868	9.379	0.000%
29	9.165	-139.868	-5.276	-9.165	139.868	5.276	0.000%
30	10.728	-139.868	0.005	-10.728	139.868	-0.005	0.000%
31	9.190	-139.868	5.312	-9.190	139.868	-5.312	0.000%
32	5.353	-139.868	9.246	-5.353	139.868	-9.246	0.000%
33	0.017	-139.868	10.589	-0.017	139.868	-10.589	0.000%
34	-5.462	-139.868	9.463	5.462	139.868	-9.463	0.000%
35	-8.986	-139.868	5.170	8.986	139.868	-5.170	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
36	-10.482	-139.868	-0.014	10.482	139.868	0.014	0.000%
37	-9.077	-139.868	-5.237	9.077	139.868	5.237	0.000%
38	-5.272	-139.868	-9.124	5.272	139.868	9.124	0.000%
39	-0.010	-65.972	-8.656	0.010	65.972	8.656	0.000%
40	4.453	-65.972	-7.712	-4.453	65.972	7.712	0.000%
41	8.500	-65.972	-4.896	-8.500	65.972	4.896	0.000%
42	9.940	-65.972	0.001	-9.940	65.972	-0.001	0.000%
43	8.524	-65.972	4.926	-8.524	65.972	-4.926	0.000%
44	4.947	-65.972	8.548	-4.947	65.972	-8.548	0.000%
45	0.013	-65.972	9.846	-0.013	65.972	-9.846	0.000%
46	-4.821	-65.972	8.349	4.821	65.972	-8.349	0.000%
47	-7.411	-65.972	4.264	7.411	65.972	-4.264	0.000%
48	-8.632	-65.972	-0.010	8.632	65.972	0.010	0.000%
49	-7.789	-65.972	-4.492	7.789	65.972	4.492	0.000%
50	-4.403	-65.972	-7.624	4.403	65.972	7.624	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00008532
3	Yes	5	0.00000001	0.00003794
4	Yes	6	0.00000001	0.00005213
5	Yes	5	0.00000001	0.00064076
6	Yes	6	0.00000001	0.00005597
7	Yes	5	0.00000001	0.00068407
8	Yes	5	0.00000001	0.00005562
9	Yes	4	0.00000001	0.00072127
10	Yes	6	0.00000001	0.00005601
11	Yes	5	0.00000001	0.00068505
12	Yes	6	0.00000001	0.00005435
13	Yes	5	0.00000001	0.00066445
14	Yes	5	0.00000001	0.00009479
15	Yes	5	0.00000001	0.00004269
16	Yes	6	0.00000001	0.00005598
17	Yes	5	0.00000001	0.00068469
18	Yes	6	0.00000001	0.00005104
19	Yes	5	0.00000001	0.00062969
20	Yes	5	0.00000001	0.00005536
21	Yes	4	0.00000001	0.00072009
22	Yes	6	0.00000001	0.00005272
23	Yes	5	0.00000001	0.00064748
24	Yes	6	0.00000001	0.00005371
25	Yes	5	0.00000001	0.00066056
26	Yes	4	0.00000001	0.00006679
27	Yes	6	0.00000001	0.00025505
28	Yes	6	0.00000001	0.00027447
29	Yes	6	0.00000001	0.00027309
30	Yes	6	0.00000001	0.00025485
31	Yes	6	0.00000001	0.00027124
32	Yes	6	0.00000001	0.00027101
33	Yes	6	0.00000001	0.00025275
34	Yes	6	0.00000001	0.00027207
35	Yes	6	0.00000001	0.00026840
36	Yes	6	0.00000001	0.00025299
37	Yes	6	0.00000001	0.00027151
38	Yes	6	0.00000001	0.00027300
39	Yes	4	0.00000001	0.00027436
40	Yes	4	0.00000001	0.00055951
41	Yes	4	0.00000001	0.00061676
42	Yes	4	0.00000001	0.00026754
43	Yes	4	0.00000001	0.00061044
44	Yes	4	0.00000001	0.00058045
45	Yes	4	0.00000001	0.00028324

46	Yes	4	0.00000001	0.00062392
47	Yes	4	0.00000001	0.00054274
48	Yes	4	0.00000001	0.00026019
49	Yes	4	0.00000001	0.00056868
50	Yes	4	0.00000001	0.00059289

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147.5 - 142.5	12.776	42	0.865	0.001
L2	142.5 - 137.5	11.876	42	0.857	0.001
L3	137.5 - 132.5	10.985	42	0.844	0.001
L4	132.5 - 127.5	10.114	42	0.821	0.001
L5	127.5 - 125	9.272	42	0.788	0.001
L6	125 - 120	8.865	42	0.766	0.001
L7	120 - 115	8.077	42	0.740	0.000
L8	115 - 110	7.320	42	0.706	0.000
L9	110 - 105	6.601	42	0.665	0.000
L10	105 - 100	5.929	42	0.618	0.000
L11	100 - 95	5.311	42	0.562	0.000
L12	95 - 94.25	4.742	42	0.524	0.000
L13	94.25 - 94	4.660	42	0.518	0.000
L14	94 - 89	4.633	42	0.516	0.000
L15	89 - 84	4.109	42	0.482	0.000
L16	84 - 80	3.624	42	0.444	0.000
L17	80 - 79.75	3.267	42	0.409	0.000
L18	79.75 - 74.75	3.245	42	0.408	0.000
L19	74.75 - 69.75	2.831	42	0.382	0.000
L20	69.75 - 64.75	2.445	42	0.354	0.000
L21	64.75 - 60	2.091	42	0.323	0.000
L22	60 - 59.75	1.786	42	0.290	0.000
L23	59.75 - 54.75	1.771	42	0.289	0.000
L24	54.75 - 49.75	1.481	42	0.265	0.000
L25	49.75 - 44.75	1.216	42	0.240	0.000
L26	44.75 - 40	0.979	42	0.212	0.000
L27	40 - 39.75	0.781	42	0.184	0.000
L28	39.75 - 34.75	0.772	42	0.183	0.000
L29	34.75 - 29.75	0.591	42	0.162	0.000
L30	29.75 - 24.75	0.433	42	0.139	0.000
L31	24.75 - 20	0.300	42	0.115	0.000
L32	20 - 19.75	0.197	42	0.091	0.000
L33	19.75 - 14.75	0.192	42	0.090	0.000
L34	14.75 - 9.75	0.109	42	0.069	0.000
L35	9.75 - 4.75	0.049	42	0.047	0.000
L36	4.75 - 0	0.012	42	0.023	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.000	HPD2-4.7	42	12.776	0.865	0.001	27833
150.000	AIR 32 B2A/B66AA w/ Mount Pipe	42	12.776	0.865	0.001	27833
149.500	Lightning Rod 5/8" x 4'	42	12.776	0.865	0.001	27833
147.500	4' x 2" Pipe Mount	42	12.776	0.865	0.001	27833
140.000	LNK-6514DS-A1M w/ Mount Pipe	42	11.429	0.852	0.001	20091
130.000	NNVV-65B-R4 w/ Mount Pipe	42	9.688	0.806	0.001	8458
128.000	Ice Shields	42	9.354	0.792	0.001	7877
105.000	7750.00 w/ Mount Pipe	42	5.929	0.618	0.000	5521
95.000	APXV18-206516S-C	42	4.742	0.524	0.000	7730

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
89.000	1142-2C	42	4.109	0.482	0.000	7847
72.000	GPS_A	42	2.615	0.367	0.000	9987
54.000	201-1N	42	1.439	0.262	0.000	11565
49.000	DB436-C	42	1.178	0.236	0.000	10667
45.000	DB436-C	42	0.990	0.214	0.000	10029
40.000	DB436-C	42	0.781	0.184	0.000	11278
37.000	DB436-C	42	0.670	0.172	0.000	13003

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	147.5 - 142.5	59.240	8	4.003	0.004
L2	142.5 - 137.5	55.068	8	3.969	0.003
L3	137.5 - 132.5	50.944	8	3.907	0.003
L4	132.5 - 127.5	46.907	8	3.802	0.003
L5	127.5 - 125	43.005	8	3.649	0.003
L6	125 - 120	41.120	8	3.550	0.002
L7	120 - 115	37.467	8	3.428	0.002
L8	115 - 110	33.958	8	3.273	0.002
L9	110 - 105	30.628	8	3.086	0.002
L10	105 - 100	27.510	8	2.865	0.002
L11	100 - 95	24.642	8	2.607	0.002
L12	95 - 94.25	22.003	8	2.432	0.002
L13	94.25 - 94	21.623	8	2.404	0.002
L14	94 - 89	21.498	8	2.396	0.002
L15	89 - 84	19.070	8	2.238	0.002
L16	84 - 80	16.819	8	2.059	0.002
L17	80 - 79.75	15.160	8	1.900	0.002
L18	79.75 - 74.75	15.061	8	1.894	0.002
L19	74.75 - 69.75	13.139	8	1.775	0.001
L20	69.75 - 64.75	11.349	8	1.642	0.001
L21	64.75 - 60	9.704	8	1.497	0.001
L22	60 - 59.75	8.289	8	1.346	0.001
L23	59.75 - 54.75	8.219	8	1.341	0.001
L24	54.75 - 49.75	6.871	8	1.232	0.001
L25	49.75 - 44.75	5.642	8	1.114	0.001
L26	44.75 - 40	4.542	8	0.986	0.001
L27	40 - 39.75	3.626	8	0.855	0.001
L28	39.75 - 34.75	3.581	8	0.850	0.001
L29	34.75 - 29.75	2.742	8	0.752	0.001
L30	29.75 - 24.75	2.009	8	0.647	0.001
L31	24.75 - 20	1.390	8	0.534	0.000
L32	20 - 19.75	0.915	8	0.420	0.000
L33	19.75 - 14.75	0.893	8	0.416	0.000
L34	14.75 - 9.75	0.507	8	0.319	0.000
L35	9.75 - 4.75	0.226	8	0.217	0.000
L36	4.75 - 0	0.055	8	0.109	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
152.000	HPD2-4.7	8	59.240	4.003	0.004	6077
150.000	AIR 32 B2A/B66AA w/ Mount Pipe	8	59.240	4.003	0.004	6077
149.500	Lightning Rod 5/8" x 4'	8	59.240	4.003	0.004	6077
147.500	4' x 2" Pipe Mount	8	59.240	4.003	0.004	6077
140.000	LNx-6514DS-A1M w/ Mount	8	52.997	3.943	0.003	4381

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
	Pipe					
130.000	NNVV-65B-R4 w/ Mount Pipe	8	44.935	3.734	0.003	1847
128.000	Ice Shields	8	43.387	3.668	0.003	1725
105.000	7750.00 w/ Mount Pipe	8	27.510	2.865	0.002	1199
95.000	APXV18-206516S-C	8	22.003	2.432	0.002	1676
89.000	1142-2C	8	19.070	2.238	0.002	1699
72.000	GPS_A	8	12.137	1.703	0.001	2158
54.000	201-1N	8	6.679	1.215	0.001	2493
49.000	DB436-C	8	5.469	1.096	0.001	2299
45.000	DB436-C	8	4.594	0.993	0.001	2162
40.000	DB436-C	8	3.626	0.855	0.001	2430
37.000	DB436-C	8	3.107	0.797	0.001	2802

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L _u	Kl/r	A	P _u	φP _n	Ratio P _u φP _n
	ft		ft	ft		in ²	K	K	
L1	147.5 - 142.5 (1)	P24x0.375	5.000	0.000	0.0	27.833	-5.217	1052.070	0.005
L2	142.5 - 137.5 (2)	P24x0.375	5.000	0.000	0.0	27.833	-9.245	1052.070	0.009
L3	137.5 - 132.5 (3)	P24x0.375	5.000	0.000	0.0	27.833	-9.919	1052.070	0.009
L4	132.5 - 127.5 (4)	P24x0.375	5.000	0.000	0.0	27.833	-14.202	1052.070	0.013
L5	127.5 - 125 (5)	P24x0.375	2.500	0.000	0.0	27.833	-14.572	1052.070	0.014
L6	125 - 120 (6)	P30x0.375	5.000	0.000	0.0	34.901	-15.439	1311.060	0.012
L7	120 - 115 (7)	P30x0.375	5.000	0.000	0.0	34.901	-16.314	1311.060	0.012
L8	115 - 110 (8)	P30x0.375	5.000	0.000	0.0	34.901	-17.201	1311.060	0.013
L9	110 - 105 (9)	P30x0.375	5.000	0.000	0.0	34.901	-18.101	1311.060	0.014
L10	105 - 100 (10)	P30x0.375	5.000	0.000	0.0	34.901	-22.480	1311.060	0.017
L11	100 - 95 (11)	P36x0.375	5.000	0.000	0.0	41.970	-23.637	1490.100	0.016
L12	95 - 94.25 (12)	P36x0.375	0.750	0.000	0.0	41.970	-24.103	1490.100	0.016
L13	94.25 - 94 (13)	P36x0.49375	0.250	0.000	0.0	55.076	-24.178	2081.870	0.012
L14	94 - 89 (14)	P36x0.49375	5.000	0.000	0.0	55.076	-25.599	2081.870	0.012
L15	89 - 84 (15)	P36x0.49375	5.000	0.000	0.0	55.076	-27.332	2081.870	0.013
L16	84 - 80 (16)	P36x0.49375	4.000	0.000	0.0	55.076	-29.791	2081.870	0.014
L17	80 - 79.75 (17)	P42x0.575	0.250	0.000	0.0	74.831	-29.913	2828.600	0.011
L18	79.75 - 74.75 (18)	P42x0.575	5.000	0.000	0.0	74.831	-32.035	2828.600	0.011
L19	74.75 - 69.75 (19)	P42x0.575	5.000	0.000	0.0	74.831	-33.917	2828.600	0.012
L20	69.75 - 64.75 (20)	P42x0.575	5.000	0.000	0.0	74.831	-36.125	2828.600	0.013
L21	64.75 - 60 (21)	P42x0.575	4.750	0.000	0.0	74.831	-40.930	2828.600	0.014
L22	60 - 59.75 (22)	P48x0.6125	0.250	0.000	0.0	91.184	-41.096	3446.760	0.012
L23	59.75 - 54.75 (23)	P48x0.6125	5.000	0.000	0.0	91.184	-43.946	3446.760	0.013
L24	54.75 - 49.75 (24)	P48x0.6125	5.000	0.000	0.0	91.184	-46.263	3446.760	0.013
L25	49.75 - 44.75 (25)	P48x0.6125	5.000	0.000	0.0	91.184	-48.976	3446.760	0.014
L26	44.75 - 40	P48x0.6125	4.750	0.000	0.0	91.184	-52.982	3446.760	0.015

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
L27	(26) 40 - 39.75	P54x0.65	0.250	0.000	0.0	108.94 3	-53.234	4042.520	0.013
L28	(27) 39.75 - 34.75	P54x0.65	5.000	0.000	0.0	108.94 3	-56.378	4042.520	0.014
L29	(28) 34.75 - 29.75	P54x0.65	5.000	0.000	0.0	108.94 3	-58.883	4042.520	0.015
L30	(29) 29.75 - 24.75	P54x0.65	5.000	0.000	0.0	108.94 3	-62.466	4042.520	0.015
L31	(30) 24.75 - 20	P54x0.65	4.750	0.000	0.0	108.94 3	-67.449	4042.520	0.017
L32	(31) 20 - 19.75	P60x0.625	0.250	0.000	0.0	116.58 3	-67.634	4139.150	0.016
L33	(32) 19.75 - 14.75	P60x0.625	5.000	0.000	0.0	116.58 3	-71.152	4139.150	0.017
L34	(33) 14.75 - 9.75	P60x0.625	5.000	0.000	0.0	116.58 3	-73.938	4139.150	0.018
L35	(34) 9.75 - 4.75	P60x0.625	5.000	0.000	0.0	116.58 3	-76.611	4139.150	0.019
L36	(35) 4.75 - 0 (36)	P60x0.625	4.750	0.000	0.0	116.58 3	-79.155	4139.150	0.019

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	147.5 - 142.5 (1)	P24x0.375	64.454	623.717	0.103	0.000	623.717	0.000
L2	142.5 - 137.5 (2)	P24x0.375	113.498	623.717	0.182	0.000	623.717	0.000
L3	137.5 - 132.5 (3)	P24x0.375	175.783	623.717	0.282	0.000	623.717	0.000
L4	132.5 - 127.5 (4)	P24x0.375	249.420	623.717	0.400	0.000	623.717	0.000
L5	127.5 - 125 (5)	P24x0.375	291.092	623.717	0.467	0.000	623.717	0.000
L6	125 - 120 (6)	P30x0.375	375.849	947.858	0.397	0.000	947.858	0.000
L7	120 - 115 (7)	P30x0.375	462.617	947.858	0.488	0.000	947.858	0.000
L8	115 - 110 (8)	P30x0.375	551.310	947.858	0.582	0.000	947.858	0.000
L9	110 - 105 (9)	P30x0.375	641.834	947.858	0.677	0.000	947.858	0.000
L10	105 - 100 (10)	P30x0.375	760.466	947.858	0.802	0.000	947.858	0.000
L11	100 - 95 (11)	P36x0.375	881.025	1338.808	0.658	0.000	1338.808	0.000
L12	95 - 94.25 (12)	P36x0.375	899.617	1338.808	0.672	0.000	1338.808	0.000
L13	94.25 - 94 (13)	P36x0.49375	905.825	1816.958	0.499	0.000	1816.958	0.000
L14	94 - 89 (14)	P36x0.49375	1031.383	1816.958	0.568	0.000	1816.958	0.000
L15	89 - 84 (15)	P36x0.49375	1162.758	1816.958	0.640	0.000	1816.958	0.000
L16	84 - 80 (16)	P36x0.49375	1271.467	1816.958	0.700	0.000	1816.958	0.000
L17	80 - 79.75 (17)	P42x0.575	1278.392	2879.408	0.444	0.000	2879.408	0.000
L18	79.75 - 74.75 (18)	P42x0.575	1419.767	2879.408	0.493	0.000	2879.408	0.000
L19	74.75 - 69.75 (19)	P42x0.575	1566.375	2879.408	0.544	0.000	2879.408	0.000
L20	69.75 - 64.75 (20)	P42x0.575	1718.325	2879.408	0.597	0.000	2879.408	0.000
L21	64.75 - 60 (21)	P42x0.575	1867.758	2879.408	0.649	0.000	2879.408	0.000
L22	60 - 59.75 (22)	P48x0.6125	1875.858	3972.717	0.472	0.000	3972.717	0.000
L23	59.75 - 54.75 (23)	P48x0.6125	2040.983	3972.717	0.514	0.000	3972.717	0.000
L24	54.75 - 49.75	P48x0.6125	2216.092	3972.717	0.558	0.000	3972.717	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 $\frac{M_{uy}}{\phi M_{ny}}$
L25	(24) 49.75 - 44.75	P48x0.6125	2394.467	3972.717	0.603	0.000	3972.717	0.000
L26	(25) 44.75 - 40	P48x0.6125	2568.758	3972.717	0.647	0.000	3972.717	0.000
L27	(26) 40 - 39.75	P54x0.65	2578.133	5300.683	0.486	0.000	5300.683	0.000
L28	(27) 39.75 - 34.75	P54x0.65	2768.858	5300.683	0.522	0.000	5300.683	0.000
L29	(28) 34.75 - 29.75	P54x0.65	2965.592	5300.683	0.559	0.000	5300.683	0.000
L30	(29) 29.75 - 24.75	P54x0.65	3167.058	5300.683	0.597	0.000	5300.683	0.000
L31	(30) 24.75 - 20	P54x0.65	3362.825	5300.683	0.634	0.000	5300.683	0.000
L32	(31) 20 - 19.75	P60x0.625	3373.317	6198.183	0.544	0.000	6198.183	0.000
L33	(32) 19.75 - 14.75	P60x0.625	3586.017	6198.183	0.579	0.000	6198.183	0.000
L34	(33) 14.75 - 9.75	P60x0.625	3804.167	6198.183	0.614	0.000	6198.183	0.000
L35	(34) 9.75 - 4.75	P60x0.625	4026.967	6198.183	0.650	0.000	6198.183	0.000
L36	(35) 4.75 - 0 (36)	P60x0.625	4242.767	6198.183	0.685	0.000	6198.183	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	147.5 - 142.5 (1)	P24x0.375	7.406	315.621	0.023	0.191	655.568	0.000
L2	142.5 - 137.5 (2)	P24x0.375	12.287	315.621	0.039	0.037	655.568	0.000
L3	137.5 - 132.5 (3)	P24x0.375	12.634	315.621	0.040	0.037	655.568	0.000
L4	132.5 - 127.5 (4)	P24x0.375	16.599	315.621	0.053	0.675	655.568	0.001
L5	127.5 - 125 (5)	P24x0.375	16.756	315.621	0.053	0.429	655.568	0.001
L6	125 - 120 (6)	P30x0.375	17.163	395.779	0.043	0.429	994.725	0.000
L7	120 - 115 (7)	P30x0.375	17.558	395.779	0.044	0.429	994.725	0.000
L8	115 - 110 (8)	P30x0.375	17.935	395.779	0.045	0.429	994.725	0.000
L9	110 - 105 (9)	P30x0.375	18.292	395.779	0.046	0.429	994.725	0.000
L10	105 - 100 (10)	P30x0.375	23.854	395.779	0.060	0.429	994.725	0.000
L11	100 - 95 (11)	P36x0.375	24.364	454.187	0.054	0.429	1094.275	0.000
L12	95 - 94.25 (12)	P36x0.375	24.830	454.187	0.055	0.429	1094.275	0.000
L13	94.25 - 94 (13)	P36x0.49375	24.853	624.561	0.040	0.429	1949.658	0.000
L14	94 - 89 (14)	P36x0.49375	25.372	624.561	0.041	0.429	1949.658	0.000
L15	89 - 84 (15)	P36x0.49375	26.873	624.561	0.043	0.809	1949.658	0.000
L16	84 - 80 (16)	P36x0.49375	27.705	624.561	0.044	0.809	1949.658	0.000
L17	80 - 79.75 (17)	P42x0.575	27.749	848.581	0.033	0.809	3090.550	0.000
L18	79.75 - 74.75 (18)	P42x0.575	28.834	848.581	0.034	0.808	3090.550	0.000
L19	74.75 - 69.75 (19)	P42x0.575	29.882	848.581	0.035	0.663	3090.550	0.000
L20	69.75 - 64.75 (20)	P42x0.575	30.930	848.581	0.036	0.507	3090.550	0.000
L21	64.75 - 60 (21)	P42x0.575	32.403	848.581	0.038	0.563	3090.550	0.000
L22	60 - 59.75 (22)	P48x0.6125	32.449	1034.030	0.031	0.563	4306.692	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 $\frac{T_u}{\phi T_n}$
L23	59.75 - 54.75 (23)	P48x0.6125	33.641	1034.030	0.033	0.563	4306.692	0.000
L24	54.75 - 49.75 (24)	P48x0.6125	35.096	1034.030	0.034	0.635	4306.692	0.000
L25	49.75 - 44.75 (25)	P48x0.6125	36.287	1034.030	0.035	0.377	4306.692	0.000
L26	44.75 - 40 (26)	P48x0.6125	37.421	1034.030	0.036	0.144	4306.692	0.000
L27	40 - 39.75 (27)	P54x0.65	37.539	1235.410	0.030	0.144	5711.983	0.000
L28	39.75 - 34.75 (28)	P54x0.65	38.803	1235.410	0.031	0.350	5711.983	0.000
L29	34.75 - 29.75 (29)	P54x0.65	39.834	1235.410	0.032	0.345	5711.983	0.000
L30	29.75 - 24.75 (30)	P54x0.65	40.909	1235.410	0.033	0.345	5711.983	0.000
L31	24.75 - 20 (31)	P54x0.65	42.013	1235.410	0.034	0.330	5711.983	0.000
L32	20 - 19.75 (32)	P60x0.625	42.051	1322.050	0.032	0.325	5985.250	0.000
L33	19.75 - 14.75 (33)	P60x0.625	43.144	1322.050	0.033	0.307	5985.250	0.000
L34	14.75 - 9.75 (34)	P60x0.625	44.079	1322.050	0.033	0.303	5985.250	0.000
L35	9.75 - 4.75 (35)	P60x0.625	44.983	1322.050	0.034	0.303	5985.250	0.000
L36	4.75 - 0 (36)	P60x0.625	45.827	1322.050	0.035	0.303	5985.250	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	147.5 - 142.5 (1)	0.005	0.103	0.000	0.023	0.000	0.109	1.050	4.8.2
L2	142.5 - 137.5 (2)	0.009	0.182	0.000	0.039	0.000	0.192	1.050	4.8.2
L3	137.5 - 132.5 (3)	0.009	0.282	0.000	0.040	0.000	0.293	1.050	4.8.2
L4	132.5 - 127.5 (4)	0.013	0.400	0.000	0.053	0.001	0.416	1.050	4.8.2
L5	127.5 - 125 (5)	0.014	0.467	0.000	0.053	0.001	0.483	1.050	4.8.2
L6	125 - 120 (6)	0.012	0.397	0.000	0.043	0.000	0.410	1.050	4.8.2
L7	120 - 115 (7)	0.012	0.488	0.000	0.044	0.000	0.503	1.050	4.8.2
L8	115 - 110 (8)	0.013	0.582	0.000	0.045	0.000	0.597	1.050	4.8.2
L9	110 - 105 (9)	0.014	0.677	0.000	0.046	0.000	0.693	1.050	4.8.2
L10	105 - 100 (10)	0.017	0.802	0.000	0.060	0.000	0.823	1.050	4.8.2
L11	100 - 95 (11)	0.016	0.658	0.000	0.054	0.000	0.677	1.050	4.8.2
L12	95 - 94.25 (12)	0.016	0.672	0.000	0.055	0.000	0.691	1.050	4.8.2
L13	94.25 - 94 (13)	0.012	0.499	0.000	0.040	0.000	0.512	1.050	4.8.2
L14	94 - 89 (14)	0.012	0.568	0.000	0.041	0.000	0.582	1.050	4.8.2
L15	89 - 84 (15)	0.013	0.640	0.000	0.043	0.000	0.655	1.050	4.8.2
L16	84 - 80 (16)	0.014	0.700	0.000	0.044	0.000	0.716	1.050	4.8.2
L17	80 - 79.75 (17)	0.011	0.444	0.000	0.033	0.000	0.456	1.050	4.8.2
L18	79.75 - 74.75 (18)	0.011	0.493	0.000	0.034	0.000	0.506	1.050	4.8.2
L19	74.75 - 69.75 (19)	0.012	0.544	0.000	0.035	0.000	0.557	1.050	4.8.2
L20	69.75 - 64.75	0.013	0.597	0.000	0.036	0.000	0.611	1.050	4.8.2

Section No.	Elevation ft	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Ratio V_u ϕV_n	Ratio T_u ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L21	(20) 64.75 - 60	0.014	0.649	0.000	0.038	0.000	0.665	1.050	4.8.2
L22	(21) 60 - 59.75	0.012	0.472	0.000	0.031	0.000	0.485	1.050	4.8.2
L23	(22) 59.75 - 54.75	0.013	0.514	0.000	0.033	0.000	0.528	1.050	4.8.2
L24	(23) 54.75 - 49.75	0.013	0.558	0.000	0.034	0.000	0.572	1.050	4.8.2
L25	(24) 49.75 - 44.75	0.014	0.603	0.000	0.035	0.000	0.618	1.050	4.8.2
L26	(25) 44.75 - 40	0.015	0.647	0.000	0.036	0.000	0.663	1.050	4.8.2
L27	(26) 40 - 39.75	0.013	0.486	0.000	0.030	0.000	0.500	1.050	4.8.2
L28	(27) 39.75 - 34.75	0.014	0.522	0.000	0.031	0.000	0.537	1.050	4.8.2
L29	(28) 34.75 - 29.75	0.015	0.559	0.000	0.032	0.000	0.575	1.050	4.8.2
L30	(29) 29.75 - 24.75	0.015	0.597	0.000	0.033	0.000	0.614	1.050	4.8.2
L31	(30) 24.75 - 20	0.017	0.634	0.000	0.034	0.000	0.652	1.050	4.8.2
L32	(31) 20 - 19.75	0.016	0.544	0.000	0.032	0.000	0.562	1.050	4.8.2
L33	(32) 19.75 - 14.75	0.017	0.579	0.000	0.033	0.000	0.597	1.050	4.8.2
L34	(33) 14.75 - 9.75	0.018	0.614	0.000	0.033	0.000	0.633	1.050	4.8.2
L35	(34) 9.75 - 4.75	0.019	0.650	0.000	0.034	0.000	0.669	1.050	4.8.2
L36	(35) 4.75 - 0 (36)	0.019	0.685	0.000	0.035	0.000	0.705	1.050	4.8.2

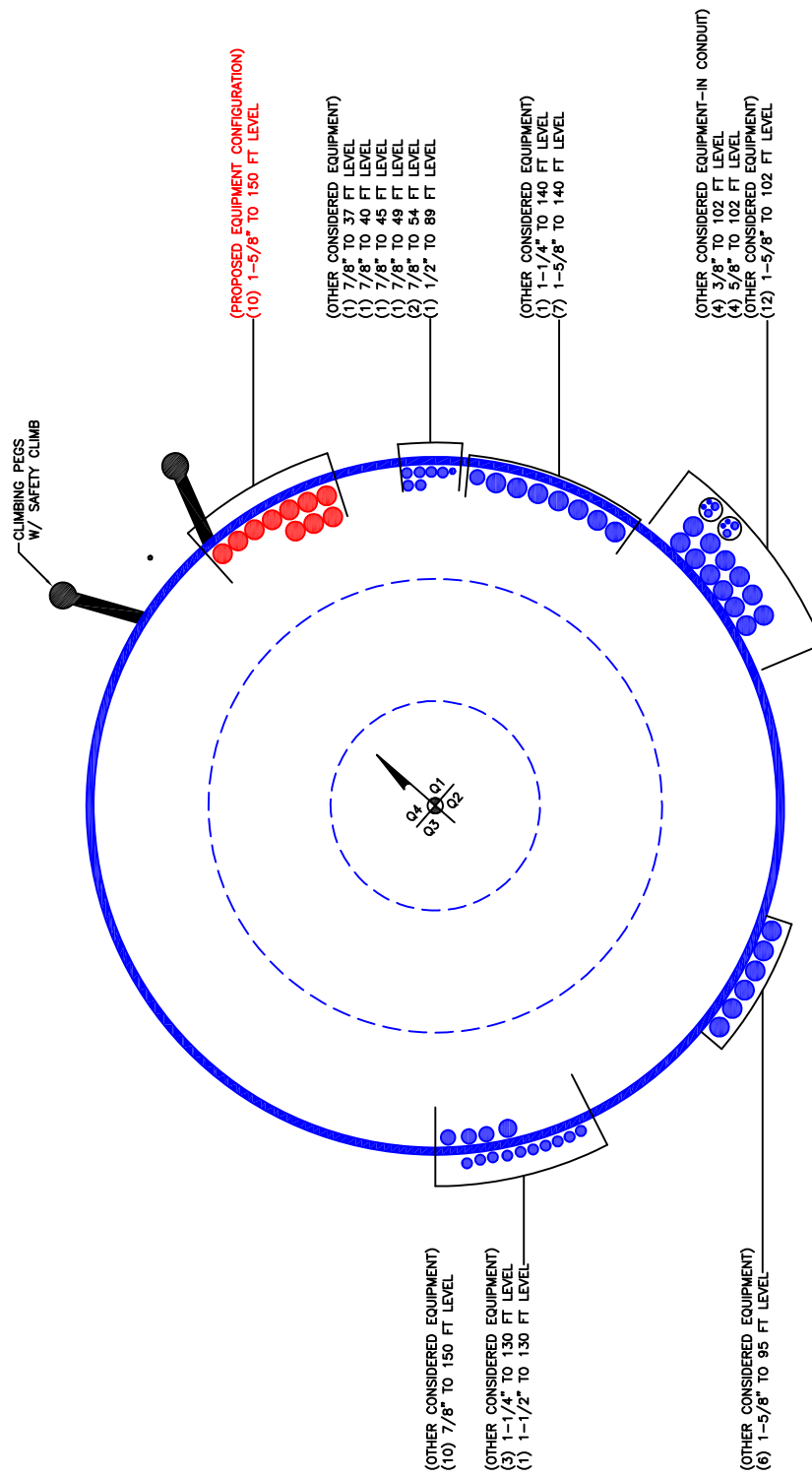
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	147.5 - 142.5	Pole	P24x0.375	1	-5.217	1104.673	10.4	Pass
L2	142.5 - 137.5	Pole	P24x0.375	2	-9.245	1104.673	18.3	Pass
L3	137.5 - 132.5	Pole	P24x0.375	3	-9.919	1104.673	27.9	Pass
L4	132.5 - 127.5	Pole	P24x0.375	4	-14.202	1104.673	39.6	Pass
L5	127.5 - 125	Pole	P24x0.375	5	-14.572	1104.673	46.0	Pass
L6	125 - 120	Pole	P30x0.375	6	-15.439	1376.613	39.1	Pass
L7	120 - 115	Pole	P30x0.375	7	-16.314	1376.613	47.9	Pass
L8	115 - 110	Pole	P30x0.375	8	-17.201	1376.613	56.8	Pass
L9	110 - 105	Pole	P30x0.375	9	-18.101	1376.613	66.0	Pass
L10	105 - 100	Pole	P30x0.375	10	-22.480	1376.613	78.4	Pass
L11	100 - 95	Pole	P36x0.375	11	-23.637	1564.605	64.5	Pass
L12	95 - 94.25	Pole	P36x0.375	12	-24.103	1564.605	65.8	Pass
L13	94.25 - 94	Pole	P36x0.49375	13	-24.178	2185.963	48.7	Pass
L14	94 - 89	Pole	P36x0.49375	14	-25.599	2185.963	55.4	Pass
L15	89 - 84	Pole	P36x0.49375	15	-27.332	2185.963	62.4	Pass
L16	84 - 80	Pole	P36x0.49375	16	-29.791	2185.963	68.2	Pass
L17	80 - 79.75	Pole	P42x0.575	17	-29.913	2970.030	43.4	Pass
L18	79.75 - 74.75	Pole	P42x0.575	18	-32.035	2970.030	48.1	Pass
L19	74.75 - 69.75	Pole	P42x0.575	19	-33.917	2970.030	53.1	Pass
L20	69.75 - 64.75	Pole	P42x0.575	20	-36.125	2970.030	58.2	Pass
L21	64.75 - 60	Pole	P42x0.575	21	-40.930	2970.030	63.3	Pass
L22	60 - 59.75	Pole	P48x0.6125	22	-41.096	3619.098	46.2	Pass
L23	59.75 - 54.75	Pole	P48x0.6125	23	-43.946	3619.098	50.2	Pass
L24	54.75 - 49.75	Pole	P48x0.6125	24	-46.263	3619.098	54.5	Pass
L25	49.75 - 44.75	Pole	P48x0.6125	25	-48.976	3619.098	58.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L26	44.75 - 40	Pole	P48x0.6125	26	-52.982	3619.098	63.2	Pass
L27	40 - 39.75	Pole	P54x0.65	27	-53.234	4244.646	47.7	Pass
L28	39.75 - 34.75	Pole	P54x0.65	28	-56.378	4244.646	51.2	Pass
L29	34.75 - 29.75	Pole	P54x0.65	29	-58.883	4244.646	54.8	Pass
L30	29.75 - 24.75	Pole	P54x0.65	30	-62.466	4244.646	58.5	Pass
L31	24.75 - 20	Pole	P54x0.65	31	-67.449	4244.646	62.1	Pass
L32	20 - 19.75	Pole	P60x0.625	32	-67.634	4346.107	53.5	Pass
L33	19.75 - 14.75	Pole	P60x0.625	33	-71.152	4346.107	56.8	Pass
L34	14.75 - 9.75	Pole	P60x0.625	34	-73.938	4346.107	60.3	Pass
L35	9.75 - 4.75	Pole	P60x0.625	35	-76.611	4346.107	63.7	Pass
L36	4.75 - 0	Pole	P60x0.625	36	-79.155	4346.107	67.1	Pass
							Summary	
							Pole (L10)	Pass
							RATING =	78.4 Pass

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

APPENDIX B
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Site BU: 827050
Work Order: 1890212

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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	147.5	22.5		0	24	24	0.375		A53-B-42
2	125	25		0	30.00	30	0.375		A53-B-42
3	100	20		0	36.00	36	0.375		A53-B-42
4	80	20		0	42.00	42	0.375		A53-B-42
5	60	20		0	48.00	48	0.375		A53-B-42
6	40	20		0	54.00	54	0.375		A53-B-42
7	20	20		0	60.00	60	0.375		A53-B-42

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	13	14	15	16	17	18
1	0	20	plate	CCI-AFP-085125	4	60	150	240	330														
2	20	40	plate	CCI-AFP-085125	4	50	140	230	320														
3	40	60	plate	CCI-SFP-065125	4	50	140	230	320														
4	60	80	plate	CCI-SFP-060100	4	50	140	230	320														
5	80	94.25	plate	CCI-SFP-040075	4	50	140	230	320														
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 _w (in)	Net Area (in ²)	Bolt Hole Size (in)	Reinforcement Material
1	8.5	1.25	10.625	0.625	51.000	51.000	17.000	9.063	1.1875	A572-65
2	8.5	1.25	10.625	0.625	51.000	51.000	17.000	9.063	1.1875	A572-65
3	6.5	1.25	8.125	0.625	33.000	33.000	19.000	6.563	1.1875	A572-65
4	6	1	6	0.5	24.000	24.000	16.000	4.750	1.1875	A572-65
5	4	0.75	3	0.375	12.000	12.000	16.000	2.063	1.1875	A572-65

TNX Geometry Input

Increment (ft): 5 [Export to TNX](#)

	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	147.5 - 142.5	5		0	24.000	24.000	0.375	A53-B-42	1.000
2	142.5 - 137.5	5		0	24.000	24.000	0.375	A53-B-42	1.000
3	137.5 - 132.5	5		0	24.000	24.000	0.375	A53-B-42	1.000
4	132.5 - 127.5	5		0	24.000	24.000	0.375	A53-B-42	1.000
5	127.5 - 125	2.5	0	0	24.000	24.000	0.375	A53-B-42	1.000
6	125 - 120	5		0	30.000	30.000	0.375	A53-B-42	1.000
7	120 - 115	5		0	30.000	30.000	0.375	A53-B-42	1.000
8	115 - 110	5		0	30.000	30.000	0.375	A53-B-42	1.000
9	110 - 105	5		0	30.000	30.000	0.375	A53-B-42	1.000
10	105 - 100	5	0	0	30.000	30.000	0.375	A53-B-42	1.000
11	100 - 95	5		0	36.000	36.000	0.375	A53-B-42	1.000
12	95 - 94.25	0.75		0	36.000	36.000	0.375	A53-B-42	1.000
13	94.25 - 94	0.25		0	36.000	36.000	0.49375	A53-B-42	0.980
14	94 - 89	5		0	36.000	36.000	0.49375	A53-B-42	0.980
15	89 - 84	5		0	36.000	36.000	0.49375	A53-B-42	0.980
16	84 - 80	4	0	0	36.000	36.000	0.49375	A53-B-42	0.980
17	80 - 79.75	0.25		0	42.000	42.000	0.575	A53-B-42	0.976
18	79.75 - 74.75	5		0	42.000	42.000	0.575	A53-B-42	0.976
19	74.75 - 69.75	5		0	42.000	42.000	0.575	A53-B-42	0.976
20	69.75 - 64.75	5		0	42.000	42.000	0.575	A53-B-42	0.976
21	64.75 - 60	4.75	0	0	42.000	42.000	0.575	A53-B-42	0.976
22	60 - 59.75	0.25		0	48.000	48.000	0.6125	A53-B-42	0.972
23	59.75 - 54.75	5		0	48.000	48.000	0.6125	A53-B-42	0.972
24	54.75 - 49.75	5		0	48.000	48.000	0.6125	A53-B-42	0.972
25	49.75 - 44.75	5		0	48.000	48.000	0.6125	A53-B-42	0.972
26	44.75 - 40	4.75	0	0	48.000	48.000	0.6125	A53-B-42	0.972
27	40 - 39.75	0.25		0	54.000	54.000	0.65	A53-B-42	0.970
28	39.75 - 34.75	5		0	54.000	54.000	0.65	A53-B-42	0.970
29	34.75 - 29.75	5		0	54.000	54.000	0.65	A53-B-42	0.970
30	29.75 - 24.75	5		0	54.000	54.000	0.65	A53-B-42	0.970
31	24.75 - 20	4.75	0	0	54.000	54.000	0.65	A53-B-42	0.970
32	20 - 19.75	0.25		0	60.000	60.000	0.625	A53-B-42	0.967
33	19.75 - 14.75	5		0	60.000	60.000	0.625	A53-B-42	0.967
34	14.75 - 9.75	5		0	60.000	60.000	0.625	A53-B-42	0.967
35	9.75 - 4.75	5		0	60.000	60.000	0.625	A53-B-42	0.967
36	4.75 - 0	4.75		0	60.000	60.000	0.625	A53-B-42	0.967

TNX Section Forces

Increment (ft):		TNX Output		
	Section Height (ft)	P _u (K)	M _{ux} (kip-ft)	V _u (K)
1	147.5 - 142.5	5.22	64.45	7.41
2	142.5 - 137.5	9.24	113.50	12.29
3	137.5 - 132.5	9.92	175.78	12.63
4	132.5 - 127.5	14.21	249.43	16.53
5	127.5 - 125	14.57	291.09	16.76
6	125 - 120	15.44	375.85	17.16
7	120 - 115	16.31	462.62	17.56
8	115 - 110	17.20	551.31	17.93
9	110 - 105	18.10	641.83	18.29
10	105 - 100	22.48	760.47	23.85
11	100 - 95	23.64	881.03	24.36
12	95 - 94.25	24.10	899.62	24.83
13	94.25 - 94	24.18	905.83	24.85
14	94 - 89	25.60	1031.38	25.37
15	89 - 84	27.33	1162.76	26.87
16	84 - 80	29.79	1271.47	27.71
17	80 - 79.75	29.91	1278.39	27.75
18	79.75 - 74.75	32.04	1419.76	28.83
19	74.75 - 69.75	33.92	1566.37	29.88
20	69.75 - 64.75	36.12	1718.33	30.93
21	64.75 - 60	40.93	1867.76	32.40
22	60 - 59.75	41.10	1875.86	32.45
23	59.75 - 54.75	43.95	2040.99	33.64
24	54.75 - 49.75	46.26	2216.09	35.10
25	49.75 - 44.75	48.98	2394.47	36.29
26	44.75 - 40	52.98	2568.76	37.42
27	40 - 39.75	53.23	2578.13	37.54
28	39.75 - 34.75	56.38	2768.86	38.80
29	34.75 - 29.75	58.88	2965.60	39.83
30	29.75 - 24.75	62.47	3167.06	40.91
31	24.75 - 20	67.45	3362.83	42.01
32	20 - 19.75	67.63	3373.32	42.05
33	19.75 - 14.75	71.15	3586.02	43.14
34	14.75 - 9.75	73.94	3804.16	44.08
35	9.75 - 4.75	76.61	4026.97	44.98
36	4.75 - 0	79.16	4242.76	45.83

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
147.5 - 142.5	Pole	TP24x24x0.375	Pole	10.3%	Pass
142.5 - 137.5	Pole	TP24x24x0.375	Pole	18.2%	Pass
137.5 - 132.5	Pole	TP24x24x0.375	Pole	27.8%	Pass
132.5 - 127.5	Pole	TP24x24x0.375	Pole	39.5%	Pass
127.5 - 125	Pole	TP24x24x0.375	Pole	45.9%	Pass
125 - 120	Pole	TP30x30x0.375	Pole	39.0%	Pass
120 - 115	Pole	TP30x30x0.375	Pole	47.7%	Pass
115 - 110	Pole	TP30x30x0.375	Pole	56.7%	Pass
110 - 105	Pole	TP30x30x0.375	Pole	65.9%	Pass
105 - 100	Pole	TP30x30x0.375	Pole	78.2%	Pass
100 - 95	Pole	TP36x36x0.375	Pole	64.3%	Pass
95 - 94.25	Pole	TP36x36x0.375	Pole	65.6%	Pass
94.25 - 94	Pole + Reinf.	TP36x36x0.4938	Reinf. 5 Tension Rupture	54.3%	Pass
94 - 89	Pole + Reinf.	TP36x36x0.4938	Reinf. 5 Tension Rupture	61.7%	Pass
89 - 84	Pole + Reinf.	TP36x36x0.4938	Reinf. 5 Tension Rupture	69.5%	Pass
84 - 80	Pole + Reinf.	TP36x36x0.4938	Reinf. 5 Tension Rupture	75.9%	Pass
80 - 79.75	Pole + Reinf.	TP42x42x0.575	Pole	45.5%	Pass
79.75 - 74.75	Pole + Reinf.	TP42x42x0.575	Pole	50.4%	Pass
74.75 - 69.75	Pole + Reinf.	TP42x42x0.575	Pole	55.6%	Pass
69.75 - 64.75	Pole + Reinf.	TP42x42x0.575	Pole	61.0%	Pass
64.75 - 60	Pole + Reinf.	TP42x42x0.575	Pole	66.3%	Pass
60 - 59.75	Pole + Reinf.	TP48x48x0.6125	Pole	48.6%	Pass
59.75 - 54.75	Pole + Reinf.	TP48x48x0.6125	Pole	52.8%	Pass
54.75 - 49.75	Pole + Reinf.	TP48x48x0.6125	Pole	57.3%	Pass
49.75 - 44.75	Pole + Reinf.	TP48x48x0.6125	Pole	61.9%	Pass
44.75 - 40	Pole + Reinf.	TP48x48x0.6125	Pole	66.4%	Pass
40 - 39.75	Pole + Reinf.	TP54x54x0.65	Pole	50.3%	Pass
39.75 - 34.75	Pole + Reinf.	TP54x54x0.65	Pole	54.0%	Pass
34.75 - 29.75	Pole + Reinf.	TP54x54x0.65	Pole	57.8%	Pass
29.75 - 24.75	Pole + Reinf.	TP54x54x0.65	Pole	61.7%	Pass
24.75 - 20	Pole + Reinf.	TP54x54x0.65	Pole	65.5%	Pass
20 - 19.75	Pole + Reinf.	TP60x60x0.625	Pole	56.3%	Pass
19.75 - 14.75	Pole + Reinf.	TP60x60x0.625	Pole	59.8%	Pass
14.75 - 9.75	Pole + Reinf.	TP60x60x0.625	Pole	63.4%	Pass
9.75 - 4.75	Pole + Reinf.	TP60x60x0.625	Pole	67.1%	Pass
4.75 - 0	Pole + Reinf.	TP60x60x0.625	Pole	70.7%	Pass
				Summary	
			Pole	78.2%	Pass
			Reinforcement	75.9%	Pass
			Overall	78.2%	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	R5
147.5 - 142.5	1942	n/a	1942	27.83	n/a	27.83	10.3%					
142.5 - 137.5	1942	n/a	1942	27.83	n/a	27.83	18.2%					
137.5 - 132.5	1942	n/a	1942	27.83	n/a	27.83	27.8%					
132.5 - 127.5	1942	n/a	1942	27.83	n/a	27.83	39.5%					
127.5 - 125	1942	n/a	1942	27.83	n/a	27.83	45.9%					
125 - 120	3829	n/a	3829	34.90	n/a	34.90	39.0%					
120 - 115	3829	n/a	3829	34.90	n/a	34.90	47.7%					
115 - 110	3829	n/a	3829	34.90	n/a	34.90	56.7%					
110 - 105	3829	n/a	3829	34.90	n/a	34.90	65.9%					
105 - 100	3829	n/a	3829	34.90	n/a	34.90	78.2%					
100 - 95	6659	n/a	6659	41.97	n/a	41.97	64.3%					
95 - 94.25	6659	n/a	6659	41.97	n/a	41.97	65.6%					
94.25 - 94	6659	2034	8693	41.97	12.00	53.97	50.6%					54.3%
94 - 89	6659	2034	8693	41.97	12.00	53.97	57.5%					61.7%
89 - 84	6659	2034	8693	41.97	12.00	53.97	64.7%					69.5%
84 - 80	6659	2034	8693	41.97	12.00	53.97	70.8%					75.9%
80 - 79.75	10622	5584	16206	49.04	24.00	73.04	45.5%				41.8%	
79.75 - 74.75	10622	5584	16206	49.04	24.00	73.04	50.4%				46.4%	
74.75 - 69.75	10622	5584	16206	49.04	24.00	73.04	55.6%				51.2%	
69.75 - 64.75	10622	5584	16206	49.04	24.00	73.04	61.0%				56.1%	
64.75 - 60	10622	5584	16206	49.04	24.00	73.04	66.3%				61.0%	
60 - 59.75	15908	9913	25821	56.11	32.50	88.61	48.6%			43.3%		
59.75 - 54.75	15908	9913	25821	56.11	32.50	88.61	52.8%			47.1%		
54.75 - 49.75	15908	9913	25821	56.11	32.50	88.61	57.3%			51.1%		
49.75 - 44.75	15908	9913	25821	56.11	32.50	88.61	61.9%			55.2%		
44.75 - 40	15908	9913	25821	56.11	32.50	88.61	66.4%			59.3%		
40 - 39.75	22710	16347	39057	63.18	42.50	105.68	50.3%		42.0%			
39.75 - 34.75	22710	16347	39057	63.18	42.50	105.68	54.0%		45.1%			
34.75 - 29.75	22710	16347	39057	63.18	42.50	105.68	57.8%		48.3%			
29.75 - 24.75	22710	16347	39057	63.18	42.50	105.68	61.7%		51.5%			
24.75 - 20	22710	16347	39057	63.18	42.50	105.68	65.5%		54.7%			
20 - 19.75	31217	20061	51278	70.24	42.50	112.74	56.3%	46.6%				
19.75 - 14.75	31217	20061	51278	70.24	42.50	112.74	59.8%	49.5%				
14.75 - 9.75	31217	20061	51278	70.24	42.50	112.74	63.4%	52.4%				
9.75 - 4.75	31217	20061	51278	70.24	42.50	112.74	67.1%	55.5%				
4.75 - 0	31217	20061	51278	70.24	42.50	112.74	70.7%	58.4%				

Note: Section capacity checked in 5 degree increments.

Rating per TIA-222-H Section 15.5.

Monopole Flange Plate Connection

Elevation = 125 ft.



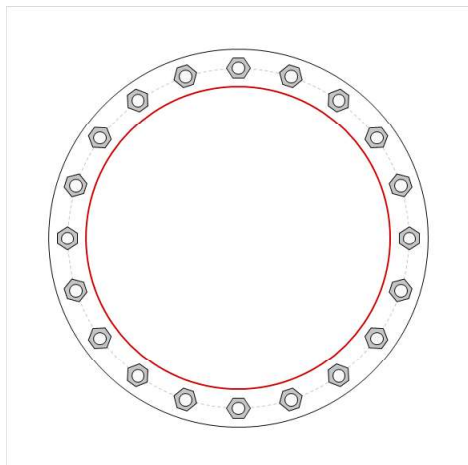
BU #	827050
Site Name	Rocky Hill/ Rte 160_1
Order #	529708 Rev. 0

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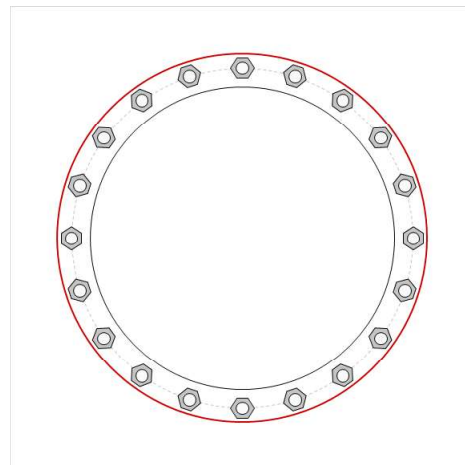
Applied Loads	
Moment (kip-ft)	291.09
Axial Force (kips)	14.57
Shear Force (kips)	16.76

*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(20) 1" $\emptyset$ bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 27" BC

Top Plate Data

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

Top Stiffener Data

N/A

Top Pole Data

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

Bottom Plate Data

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

Bottom Stiffener Data

N/A

Bottom Pole Data

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

Analysis Results

Bolt Capacity

Max Load (kips)	25.13
Allowable (kips)	54.52
Stress Rating:	43.9% Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	N/A
Tension Side Stress Rating:	N/A

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	N/A
Tension Side Stress Rating:	N/A

Monopole Flange Plate Connection

Elevation = 100 ft.



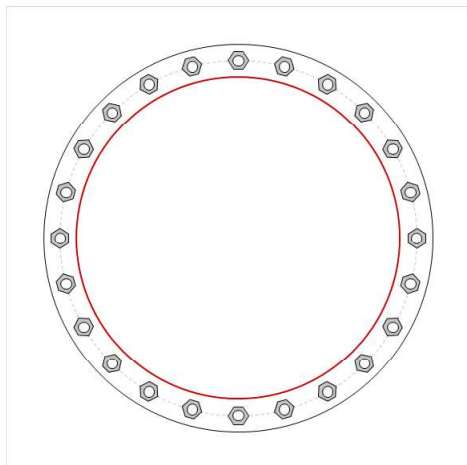
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Site Name	Rocky Hill/ Rte 160_1
Order #	529708 Rev. 0

TIA-222 Revision	H
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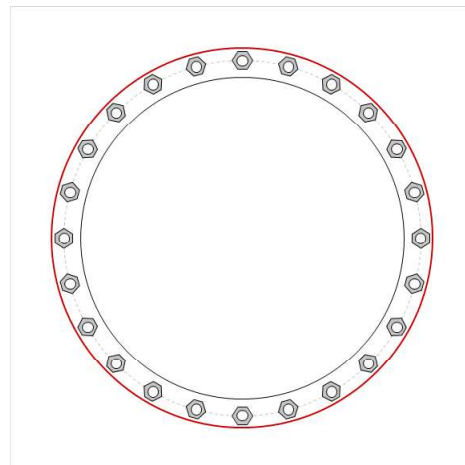
Applied Loads	
Moment (kip-ft)	760.47
Axial Force (kips)	22.48
Shear Force (kips)	23.85

*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

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

Top Plate Data

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

Top Stiffener Data

N/A

Top Pole Data

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

Bottom Plate Data

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

Bottom Stiffener Data

N/A

Bottom Pole Data

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

Analysis Results

Bolt Capacity

Max Load (kips)	45.14
Allowable (kips)	54.52
Stress Rating:	78.8% Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	N/A
Tension Side Stress Rating:	N/A

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	N/A
Tension Side Stress Rating:	N/A

Bolted Bridge Stiffeners Reinforcement Check

TIA Rev. H



Description:

This sheet is for the analysis of a reinforced flange connection using existing bolted bridge stiffeners.

Assumptions / Notes:

- 1. For analysis purposes, load is distributed between flange bolts and existing bridge stiffeners.*
- 2. The plastification of the pole is not considered.*
- 3. All shear and axial loads are taken by the flange bolts.*

1. PARAMETERS

Flange Elevation: 80' - 0"

1.1 tnxTower Reactions

Apply TIA-222-H Section 15.5?

No
Yes

Moment: $M := 1271.47 \text{ kip}\cdot\text{ft}$

Axial Load: $P := 29.79 \text{ kip}$

Shear Load: $V := 27.71 \text{ kip}$

1.2 Shaft Properties at the Flange

Upper Shaft Diameter: $D_{\text{shaft1}} := 36 \text{ in}$

Upper Shaft Thickness: $t_1 := 0.375 \text{ in}$

Lower Shaft Diameter: $D_{\text{shaft2}} := 42 \text{ in}$

Lower Shaft Thickness: $t_2 := 0.375 \text{ in}$

Shaft Grade: $F_{y_{\text{shaft}}} := 42 \text{ ksi}$ $F_{u_{\text{shaft}}} := 60 \text{ ksi}$

1.3 Existing Bridge Stiffener Properties

(Verify existing bolted connection for reduced moment.)

Number of Existing Bridge Stiffeners: $N_{\text{exist}} := 4$

Existing Bridge Stiffener Grade: $F_{y_{\text{Ex}}} := 65 \text{ ksi}$ $F_{u_{\text{Ex}}} := 80 \text{ ksi}$

Diameter to the centroid of Existing Bridge Stiffeners: $BC_{\text{exist}} := 43 \text{ in}$

Thickness of Existing Bridge Stiffeners: $t_{\text{exist}} := 1 \text{ in}$

Width of Existing Bridge Stiffeners: $w_{\text{exist}} := 6 \text{ in}$

Gross Area of One Existing Bridge Stiffener: $A_{g_{\text{exist}}} := w_{\text{exist}} \cdot t_{\text{exist}} = 6 \cdot \text{in}^2$

Moment of Inertia of Existing Bridge Stiffeners: $I_{\text{exist}} := \frac{N_{\text{exist}} \cdot BC_{\text{exist}}^2 \cdot A_{g_{\text{exist}}}}{8} = 5547 \cdot \text{in}^4$

Radius of Gyration about x-axis: $r_{x2} := \frac{t_{\text{exist}}}{\sqrt{12}} = 0.29 \cdot \text{in}$

1.4 Flange Bolt Properties

Number of Flange Bolts:

$$N_{\text{bolts}} := 28$$

Diameter of Flange Bolts:

Bolt Circle of Flange Bolts:

$$BC_{\text{bolts}} := 39\text{in}$$

Gross Area of One Flange Bolt:

$$A_{g_bolts} := \frac{\pi}{4} \cdot D_{\text{bolts}}^2 = 0.79 \cdot \text{in}^2$$

Moment of Inertia of Flange Bolts:

$$I_{\text{bolts}} := \frac{N_{\text{bolts}} \cdot BC_{\text{bolts}}^2 \cdot A_{g_bolts}}{8} = 4181.07 \cdot \text{in}^4$$

1.5 Division of Forces

Total Gross Area:

$$A_{g_total} := N_{\text{exist}} \cdot A_{g_exist} + N_{\text{bolts}} \cdot A_{g_bolts} = 45.99 \cdot \text{in}^2$$

Total Moment of Inertia:

$$I_{\text{total}} := I_{\text{exist}} + I_{\text{bolts}} = 9728.07 \cdot \text{in}^4$$

1.6 Reactions to Existing Bridge Stiffeners

Moment Reaction to
Existing Bridge Stiffeners:

$$M_{\text{exist}} := M \cdot \left(\frac{I_{\text{exist}}}{I_{\text{total}}} \right) = 725 \cdot \text{kip} \cdot \text{ft}$$

Axial Reaction to Existing
Bridge Stiffeners:

$$P_{\text{exist}} := 0\text{kip}$$

Shear Reaction to Existing
Bridge Stiffeners:

$$V_{\text{exist}} := 0\text{kip}$$

1.7 Reactions to Flange Bolts

(It is assumed that all shear and axial loads are taken by the flange bolts)

Moment Reaction to Flange Bolts:

$$M_{\text{bolts}} := M \cdot \left(\frac{I_{\text{bolts}}}{I_{\text{total}}} \right) = 546.47 \cdot \text{kip} \cdot \text{ft}$$

Axial Reaction to Flange Bolts:

$$P_{\text{bolts}} := P = 29.79 \cdot \text{kip}$$

Shear Reaction to Flange Bolts:

$$V_{\text{bolts}} := V = 27.71 \cdot \text{kip}$$

Check Flange Connection in CCplate with these Reactions

2. Existing Bridge Stiffener Checks

2.1 Maximum Axial Forces in Single Existing Bridge Stiffener

Outer Radius of Bolt Circle: $C := \frac{BC_{\text{exist}}}{2} = 21.5 \cdot \text{in}$

Critical Compression Bending Stress: $P_{\text{comp}} := \frac{M_{\text{exist}} \cdot C}{I_{\text{exist}}} \cdot A_{g_ \text{exist}} + \frac{P_{\text{exist}}}{N_{\text{exist}}} = 202.33 \cdot \text{kip}$

Critical Tension Bending Stress: $P_{\text{tens}} := \frac{M_{\text{exist}} \cdot C}{I_{\text{exist}}} \cdot A_{g_ \text{exist}} - \frac{P_{\text{exist}}}{N_{\text{exist}}} = 202.33 \cdot \text{kip}$

2.2 Available Compression Strength

[AISC 15th Edition E3-1]

Resistance Factor: $\phi_c := 0.9$

Unbraced Length: $L_u := 16 \text{ in}$

Effective Length Factor: $K := 1.0$

Effective Length of Member: $L_c := K \cdot L_u = 16 \cdot \text{in}$

[AISC 15th Edition E3-2]

Strength of Bridge Stiffener: $F_{y_{Ex}} = 65 \cdot \text{ksi} \quad F_{u_{Ex}} = 80 \cdot \text{ksi}$

Elastic Buckling Stress:
[AISC 15th Ed., Eq. E3-4] $F_e := \frac{\pi^2 \cdot 29000 \text{ ksi}}{\left(\frac{L_c}{r_{x2}}\right)^2} = 93.17 \cdot \text{ksi}$

Determination of Critical Stress:
[AISC 15th Ed., Eqs. E3-2 and E3-3] $F_{cr} := \begin{cases} \left(0.658^{\frac{F_{y_{Ex}}}{F_e}} \cdot F_{y_{Ex}}\right) & \text{if } 4.71 \cdot \sqrt{\frac{E}{F_{y_{Ex}}}} \geq \frac{L_c}{r_{x2}} \\ (0.877 \cdot F_e) & \text{otherwise} \end{cases}$

$F_{cr} = 48.54 \cdot \text{ksi}$

Allowable Compressive Strength:
[AISC 15th Ed., Eqs. J4-6 and E3-1] $\phi P_n := \begin{cases} \left(\phi_c \cdot F_{y_{Ex}} \cdot A_{g_ \text{exist}}\right) & \text{if } \frac{L_c}{r_{x2}} \leq 25 \\ \left(\phi_c \cdot F_{cr} \cdot A_{g_ \text{exist}}\right) & \text{otherwise} \end{cases}$

$\phi P_n = 262.12 \cdot \text{kip}$

Check Compressive Strength:

$$\text{Check}_{\text{comp}} := \begin{cases} \text{"OK"} & \text{if } \frac{P_{\text{comp}}}{\phi P_n} \leq 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$\text{Check}_{\text{comp}} = \text{"OK"}$$

$$\text{Capacity}_{\text{comp}} = 73.51\%$$

2.3 Available Tension Strength

Gross Section Yield

[AISC 15th Edition Ch. D2]

Available Tension Yield Strength:

$$\phi P_{ty} := 0.9 \cdot F_y \cdot A_{g_exist} = 351 \cdot \text{kip}$$

Net Section Fracture

Bolt Hole Diameter:

$$\text{BH} := 1.1875 \text{ in}$$

Thickness:

$$T := t_{\text{exist}} = 1 \cdot \text{in}$$

Net Area:

$$A_{\text{net}} := A_{g_exist} - \left(\text{BH} + \frac{1}{16} \text{ in} \right) \cdot T = 4.75 \cdot \text{in}^2$$

Net Area Limitation:

$$A_e := A_{\text{net}} = 4.75 \cdot \text{in}^2$$

Available Fractile Strength:

$$\phi P_{tr} := 0.75 \cdot F_u \cdot A_e = 285 \cdot \text{kip}$$

Tension Check

Controlling Mode of Failure:

$$\text{Check}_{\text{mode}} := \begin{cases} \text{"Fracture Controls"} & \text{if } \frac{P_{\text{tens}}}{\phi P_{tr}} > \frac{P_{\text{tens}}}{\phi P_{ty}} \\ \text{"Yield Controls"} & \text{otherwise} \end{cases}$$

$$\text{Check}_{\text{mode}} = \text{"Fracture Controls"}$$

$$\phi P_{nt} := \begin{cases} \phi P_{tr} & \text{if } \text{Check}_{\text{mode}} = \text{"Fracture Controls"} \\ \phi P_{ty} & \text{otherwise} \end{cases}$$

Controlling Tension Mode Check:

$$\text{Check}_{\text{tension}} := \begin{cases} \text{"OK"} & \text{if } \frac{P_{\text{tens}}}{\phi P_{nt}} \leq 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$\text{Check}_{\text{tension}} = \text{"OK"}$$

$$\text{Capacity}_{\text{tension}} = 67.61\%$$

SUMMARY

tnxTower Reactions:

$$M = 1271.47 \cdot \text{kip} \cdot \text{ft}$$

$$P = 29.79 \cdot \text{kip}$$

$$V = 27.71 \cdot \text{kip}$$

Flange Bolts:

Diameter of Flange Bolts:

$$D_{\text{bolts}} = 1 \cdot \text{in}$$

Bolt Circle of Flange Bolts:

$$BC_{\text{bolts}} = 39 \cdot \text{in}$$

Loads to Flange Bolts:

$$M_{\text{bolts}} = 546.47 \cdot \text{ft} \cdot \text{kip}$$

$$P = 29.79 \cdot \text{kip}$$

$$V = 27.71 \cdot \text{kip}$$

See CCIPlate for Flange Bolt and Plate Capacities

Existing Jump Plates:

Moment to Proposed Bridge
Stiffeners:

$$M_{\text{exist}} = 725 \cdot \text{ft} \cdot \text{kip}$$

Number of Existing Bridge
Stiffeners:

$$N_{\text{exist}} = 4$$

Thickness:

$$t_{\text{exist}} = 1 \cdot \text{in}$$

Width:

$$w_{\text{exist}} = 6 \cdot \text{in}$$

Controlling Capacity of Existing
Bridge Stiffeners:

$$\text{Capacity}_{\text{exist}} = 73.5\%$$

Monopole Flange Plate Connection

Elevation = 80 ft.



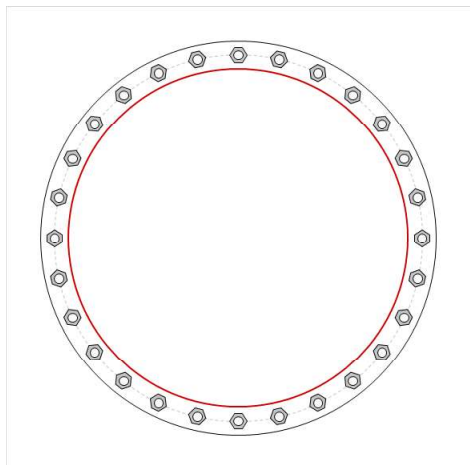
BU #	827050
Site Name	Rocky Hill/ Rte 160_1
Order #	529708 Rev. 0

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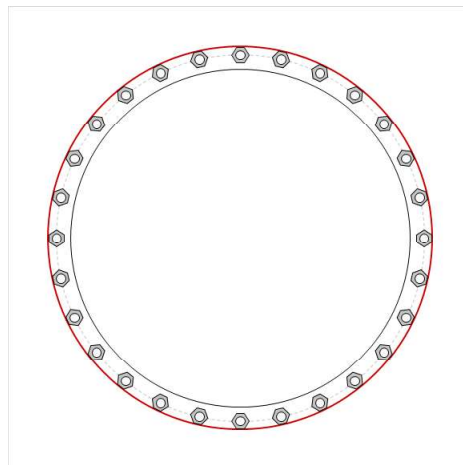
Applied Loads	
Moment (kip-ft)	546.47
Axial Force (kips)	29.79
Shear Force (kips)	27.71

*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

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

Top Plate Data

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

Top Stiffener Data

N/A

Top Pole Data

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

Bottom Plate Data

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

Bottom Stiffener Data

N/A

Bottom Pole Data

42" x 0.575" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	22.95
Allowable (kips)	54.52
Stress Rating:	40.1% Pass

Top Plate Capacity

Max Stress (ksi):	15.01	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	44.1%	Pass
Tension Side Stress Rating:	15.3%	Pass

Bottom Plate Capacity

Max Stress (ksi):	12.96	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	38.1%	Pass
Tension Side Stress Rating:	N/A	

Bolted Bridge Stiffeners Reinforcement Check

TIA Rev. H



Description:

This sheet is for the analysis of a reinforced flange connection using existing bolted bridge stiffeners.

Assumptions / Notes:

- 1. For analysis purposes, load is distributed between flange bolts and existing bridge stiffeners.*
- 2. The plastification of the pole is not considered.*
- 3. All shear and axial loads are taken by the flange bolts.*

1. PARAMETERS

Flange Elevation: 60' - 0"

1.1 tnxTower Reactions

Apply TIA-222-H Section 15.5?

No
Yes

Moment: $M := 1867.76 \text{ kip} \cdot \text{ft}$
Axial Load: $P := 40.93 \text{ kip}$
Shear Load: $V := 32.4 \text{ kip}$

1.2 Shaft Properties at the Flange

Upper Shaft Diameter: $D_{\text{shaft1}} := 42 \text{ in}$
Upper Shaft Thickness: $t_1 := 0.375 \text{ in}$
Lower Shaft Diameter: $D_{\text{shaft2}} := 48 \text{ in}$
Lower Shaft Thickness: $t_2 := 0.375 \text{ in}$
Shaft Grade: $F_{y\text{shaft}} := 42 \text{ ksi}$ $F_{u\text{shaft}} := 60 \text{ ksi}$

1.3 Existing Bridge Stiffener Properties

(Verify existing bolted connection for reduced moment.)

Number of Existing Bridge Stiffeners: $N_{\text{exist}} := 4$
Existing Bridge Stiffener Grade: $F_{y\text{Ex}} := 65 \text{ ksi}$ $F_{u\text{Ex}} := 80 \text{ ksi}$
Diameter to the centroid of Existing Bridge Stiffeners: $BC_{\text{exist}} := 49.25 \text{ in}$
Thickness of Existing Bridge Stiffeners: $t_{\text{exist}} := 1.25 \text{ in}$
Width of Existing Bridge Stiffeners: $w_{\text{exist}} := 6.5 \text{ in}$
Gross Area of One Existing Bridge Stiffener: $A_{g_exist} := w_{\text{exist}} \cdot t_{\text{exist}} = 8.13 \cdot \text{in}^2$
Moment of Inertia of Existing Bridge Stiffeners: $I_{\text{exist}} := \frac{N_{\text{exist}} \cdot BC_{\text{exist}}^2 \cdot A_{g_exist}}{8} = 9853.85 \cdot \text{in}^4$
Radius of Gyration about x-axis: $r_{x2} := \frac{t_{\text{exist}}}{\sqrt{12}} = 0.36 \cdot \text{in}$

1.4 Flange Bolt Properties

Number of Flange Bolts:

$$N_{bolts} := 32$$

Diameter of Flange Bolts:

Bolt Circle of Flange Bolts:

$$BC_{bolts} := 45\text{in}$$

Gross Area of One Flange Bolt:

$$A_{g_bolts} := \frac{\pi}{4} \cdot D_{bolts}^2 = 0.79 \cdot \text{in}^2$$

Moment of Inertia of Flange Bolts:

$$I_{bolts} := \frac{N_{bolts} \cdot BC_{bolts}^2 \cdot A_{g_bolts}}{8} = 6361.73 \cdot \text{in}^4$$

1.5 Division of Forces

Total Gross Area:

$$A_{g_total} := N_{exist} \cdot A_{g_exist} + N_{bolts} \cdot A_{g_bolts} = 57.63 \cdot \text{in}^2$$

Total Moment of Inertia:

$$I_{total} := I_{exist} + I_{bolts} = 16215.57 \cdot \text{in}^4$$

1.6 Reactions to Existing Bridge Stiffeners

Moment Reaction to Existing Bridge Stiffeners:

$$M_{exist} := M \cdot \left(\frac{I_{exist}}{I_{total}} \right) = 1135 \cdot \text{kip} \cdot \text{ft}$$

Axial Reaction to Existing Bridge Stiffeners:

$$P_{exist} := 0\text{kip}$$

Shear Reaction to Existing Bridge Stiffeners:

$$V_{exist} := 0\text{kip}$$

1.7 Reactions to Flange Bolts

(It is assumed that all shear and axial loads are taken by the flange bolts)

Moment Reaction to Flange Bolts:

$$M_{bolts} := M \cdot \left(\frac{I_{bolts}}{I_{total}} \right) = 732.76 \cdot \text{kip} \cdot \text{ft}$$

Axial Reaction to Flange Bolts:

$$P_{bolts} := P = 40.93 \cdot \text{kip}$$

Shear Reaction to Flange Bolts:

$$V_{bolts} := V = 32.4 \cdot \text{kip}$$

Check Flange Connection in CCplate with these Reactions

2. Existing Bridge Stiffener Checks

2.1 Maximum Axial Forces in Single Existing Bridge Stiffener

Outer Radius of Bolt Circle: $C := \frac{BC_{\text{exist}}}{2} = 24.63 \cdot \text{in}$

Critical Compression Bending Stress: $P_{\text{comp}} := \frac{M_{\text{exist}} \cdot C}{I_{\text{exist}}} \cdot A_{g_{\text{exist}}} + \frac{P_{\text{exist}}}{N_{\text{exist}}} = 276.55 \cdot \text{kip}$

Critical Tension Bending Stress: $P_{\text{tens}} := \frac{M_{\text{exist}} \cdot C}{I_{\text{exist}}} \cdot A_{g_{\text{exist}}} - \frac{P_{\text{exist}}}{N_{\text{exist}}} = 276.55 \cdot \text{kip}$

2.2 Available Compression Strength

[AISC 15th Edition E3-1]

Resistance Factor: $\phi_c := 0.9$

Unbraced Length: $L_u := 19 \text{ in}$

Effective Length Factor: $K := 1.0$

Effective Length of Member: $L_c := K \cdot L_u = 19 \cdot \text{in}$ [AISC 15th Edition E3-2]

Strength of Bridge Stiffener: $F_{y_{Ex}} = 65 \cdot \text{ksi}$ $F_{u_{Ex}} = 80 \cdot \text{ksi}$

Elastic Buckling Stress:
[AISC 15th Ed., Eq. E3-4] $F_e := \frac{\pi^2 \cdot 29000 \text{ ksi}}{\left(\frac{L_c}{r_{x2}}\right)^2} = 103.24 \cdot \text{ksi}$

Determination of Critical Stress:
[AISC 15th Ed., Eqs. E3-2 and E3-3] $F_{cr} := \begin{cases} \left(0.658^{\frac{F_{y_{Ex}}}{F_e}} \cdot F_{y_{Ex}}\right) & \text{if } 4.71 \cdot \sqrt{\frac{E}{F_{y_{Ex}}}} \geq \frac{L_c}{r_{x2}} \\ (0.877 \cdot F_e) & \text{otherwise} \end{cases}$

$F_{cr} = 49.94 \cdot \text{ksi}$

Allowable Compressive Strength:
[AISC 15th Ed., Eqs. J4-6 and E3-1] $\phi P_n := \begin{cases} (\phi_c \cdot F_{y_{Ex}} \cdot A_{g_{\text{exist}}}) & \text{if } \frac{L_c}{r_{x2}} \leq 25 \\ (\phi_c \cdot F_{cr} \cdot A_{g_{\text{exist}}}) & \text{otherwise} \end{cases}$

$\phi P_n = 365.2 \cdot \text{kip}$

Check Compressive Strength:

$$\text{Check}_{\text{comp}} := \begin{cases} \text{"OK"} & \text{if } \frac{P_{\text{comp}}}{\phi P_n} \leq 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$\text{Check}_{\text{comp}} = \text{"OK"}$$

$$\text{Capacity}_{\text{comp}} = 72.12\%$$

2.3 Available Tension Strength

Gross Section Yield

[AISC 15th Edition Ch. D2]

Available Tension Yield Strength:

$$\phi P_{ty} := 0.9 \cdot F_y \cdot A_{g_exist} = 475.31 \cdot \text{kip}$$

Net Section Fracture

Bolt Hole Diameter:

$$\text{BH} := 1.1875 \text{ in}$$

Thickness:

$$T := t_{\text{exist}} = 1.25 \cdot \text{in}$$

Net Area:

$$A_{\text{net}} := A_{g_exist} - \left(\text{BH} + \frac{1}{16} \text{ in} \right) \cdot T = 6.56 \cdot \text{in}^2$$

Net Area Limitation:

$$A_e := A_{\text{net}} = 6.56 \cdot \text{in}^2$$

Available Fractile Strength:

$$\phi P_{tr} := 0.75 \cdot F_u \cdot A_e = 393.75 \cdot \text{kip}$$

Tension Check

Controlling Mode of Failure:

$$\text{Check}_{\text{mode}} := \begin{cases} \text{"Fracture Controls"} & \text{if } \frac{P_{\text{tens}}}{\phi P_{tr}} > \frac{P_{\text{tens}}}{\phi P_{ty}} \\ \text{"Yield Controls"} & \text{otherwise} \end{cases}$$

$$\text{Check}_{\text{mode}} = \text{"Fracture Controls"}$$

$$\phi P_{nt} := \begin{cases} \phi P_{tr} & \text{if } \text{Check}_{\text{mode}} = \text{"Fracture Controls"} \\ \phi P_{ty} & \text{otherwise} \end{cases}$$

Controlling Tension Mode Check:

$$\text{Check}_{\text{tension}} := \begin{cases} \text{"OK"} & \text{if } \frac{P_{\text{tens}}}{\phi P_{nt}} \leq 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$\text{Check}_{\text{tension}} = \text{"OK"}$$

$$\text{Capacity}_{\text{tension}} = 66.89\%$$

SUMMARY

tnxTower Reactions:

$$M = 1867.76 \cdot \text{kip} \cdot \text{ft}$$

$$P = 40.93 \cdot \text{kip}$$

$$V = 32.4 \cdot \text{kip}$$

Flange Bolts:

Diameter of Flange Bolts:

$$D_{\text{bolts}} = 1 \cdot \text{in}$$

Bolt Circle of Flange Bolts:

$$BC_{\text{bolts}} = 45 \cdot \text{in}$$

Loads to Flange Bolts:

$$M_{\text{bolts}} = 732.76 \cdot \text{ft} \cdot \text{kip}$$

$$P = 40.93 \cdot \text{kip}$$

$$V = 32.4 \cdot \text{kip}$$

See CCIPlate for Flange Bolt and Plate Capacities

Existing Jump Plates:

Moment to Proposed Bridge
Stiffeners:

$$M_{\text{exist}} = 1135 \cdot \text{ft} \cdot \text{kip}$$

Number of Existing Bridge
Stiffeners:

$$N_{\text{exist}} = 4$$

Thickness:

$$t_{\text{exist}} = 1.25 \cdot \text{in}$$

Width:

$$w_{\text{exist}} = 6.5 \cdot \text{in}$$

Controlling Capacity of Existing
Bridge Stiffeners:

$$\text{Capacity}_{\text{exist}} = 72.1 \cdot \%$$

Monopole Flange Plate Connection

Elevation = 60 ft.

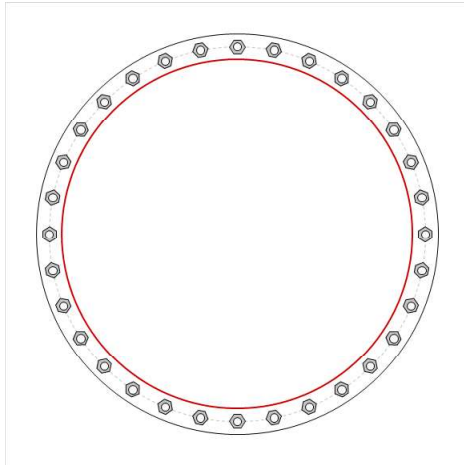


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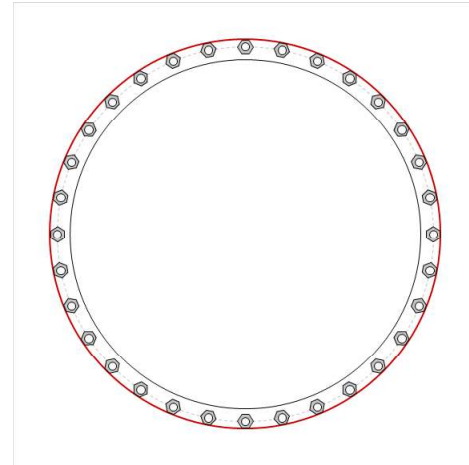
Applied Loads	
Moment (kip-ft)	732.76
Axial Force (kips)	40.93
Shear Force (kips)	32.40

*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

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

Top Plate Data

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

Top Stiffener Data

N/A

Top Pole Data

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

Bottom Plate Data

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

Bottom Stiffener Data

N/A

Bottom Pole Data

48" x 0.6125" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	23.14
Allowable (kips)	54.52
Stress Rating:	40.4% Pass

Top Plate Capacity

Max Stress (ksi):	15.43	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	45.4%	Pass
Tension Side Stress Rating:	15.0%	Pass

Bottom Plate Capacity

Max Stress (ksi):	12.83	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	37.7%	Pass
Tension Side Stress Rating:	N/A	

Bolted Bridge Stiffeners Reinforcement Check

TIA Rev. H



Description:

This sheet is for the analysis of a reinforced flange connection using existing bolted bridge stiffeners.

Assumptions / Notes:

- 1. For analysis purposes, load is distributed between flange bolts and existing bridge stiffeners.*
- 2. The plastification of the pole is not considered.*
- 3. All shear and axial loads are taken by the flange bolts.*

1. PARAMETERS

Flange Elevation: 40' - 0"

1.1 tnxTower Reactions

Apply TIA-222-H Section 15.5?

No
Yes

Moment: $M := 2568.76 \text{ kip} \cdot \text{ft}$
Axial Load: $P := 52.98 \text{ kip}$
Shear Load: $V := 37.42 \text{ kip}$

1.2 Shaft Properties at the Flange

Upper Shaft Diameter: $D_{\text{shaft1}} := 48 \text{ in}$
Upper Shaft Thickness: $t_1 := 0.375 \text{ in}$
Lower Shaft Diameter: $D_{\text{shaft2}} := 54 \text{ in}$
Lower Shaft Thickness: $t_2 := 0.375 \text{ in}$
Shaft Grade: $F_{y\text{shaft}} := 42 \text{ ksi}$ $F_{u\text{shaft}} := 60 \text{ ksi}$

1.3 Existing Bridge Stiffener Properties

(Verify existing bolted connection for reduced moment.)

Number of Existing Bridge Stiffeners: $N_{\text{exist}} := 4$
Existing Bridge Stiffener Grade: $F_{y\text{Ex}} := 65 \text{ ksi}$ $F_{u\text{Ex}} := 80 \text{ ksi}$
Diameter to the centroid of Existing Bridge Stiffeners: $BC_{\text{exist}} := 55.25 \text{ in}$
Thickness of Existing Bridge Stiffeners: $t_{\text{exist}} := 1.25 \text{ in}$
Width of Existing Bridge Stiffeners: $w_{\text{exist}} := 6.5 \text{ in}$
Gross Area of One Existing Bridge Stiffener: $A_{g_exist} := w_{\text{exist}} \cdot t_{\text{exist}} = 8.13 \cdot \text{in}^2$
Moment of Inertia of Existing Bridge Stiffeners: $I_{\text{exist}} := \frac{N_{\text{exist}} \cdot BC_{\text{exist}}^2 \cdot A_{g_exist}}{8} = 12401.04 \cdot \text{in}^4$
Radius of Gyration about x-axis: $r_{x2} := \frac{t_{\text{exist}}}{\sqrt{12}} = 0.36 \cdot \text{in}$

1.4 Flange Bolt Properties

Number of Flange Bolts:

$$N_{\text{bolts}} := 36$$

Diameter of Flange Bolts:

Bolt Circle of Flange Bolts:

$$BC_{\text{bolts}} := 51 \text{ in}$$

Gross Area of One Flange Bolt:

$$A_{g_bolts} := \frac{\pi}{4} \cdot D_{\text{bolts}}^2 = 0.79 \cdot \text{in}^2$$

Moment of Inertia of Flange Bolts:

$$I_{\text{bolts}} := \frac{N_{\text{bolts}} \cdot BC_{\text{bolts}}^2 \cdot A_{g_bolts}}{8} = 9192.69 \cdot \text{in}^4$$

1.5 Division of Forces

Total Gross Area:

$$A_{g_total} := N_{\text{exist}} \cdot A_{g_exist} + N_{\text{bolts}} \cdot A_{g_bolts} = 60.77 \cdot \text{in}^2$$

Total Moment of Inertia:

$$I_{\text{total}} := I_{\text{exist}} + I_{\text{bolts}} = 21593.73 \cdot \text{in}^4$$

1.6 Reactions to Existing Bridge Stiffeners

Moment Reaction to
Existing Bridge Stiffeners:

$$M_{\text{exist}} := M \cdot \left(\frac{I_{\text{exist}}}{I_{\text{total}}} \right) = 1475.21 \cdot \text{kip} \cdot \text{ft}$$

Axial Reaction to Existing
Bridge Stiffeners:

$$P_{\text{exist}} := 0 \text{ kip}$$

Shear Reaction to Existing
Bridge Stiffeners:

$$V_{\text{exist}} := 0 \text{ kip}$$

1.7 Reactions to Flange Bolts

(It is assumed that all shear and axial loads are taken by the flange bolts)

Moment Reaction to Flange Bolts:

$$M_{\text{bolts}} := M \cdot \left(\frac{I_{\text{bolts}}}{I_{\text{total}}} \right) = 1093.55 \cdot \text{kip} \cdot \text{ft}$$

Axial Reaction to Flange Bolts:

$$P_{\text{bolts}} := P = 52.98 \cdot \text{kip}$$

Shear Reaction to Flange Bolts:

$$V_{\text{bolts}} := V = 37.42 \cdot \text{kip}$$

Check Flange Connection in CCplate with these Reactions

2. Existing Bridge Stiffener Checks

2.1 Maximum Axial Forces in Single Existing Bridge Stiffener

Outer Radius of Bolt Circle: $C := \frac{BC_{\text{exist}}}{2} = 27.63 \cdot \text{in}$

Critical Compression Bending Stress: $P_{\text{comp}} := \frac{M_{\text{exist}} \cdot C}{I_{\text{exist}}} \cdot A_{g_{\text{exist}}} + \frac{P_{\text{exist}}}{N_{\text{exist}}} = 320.41 \cdot \text{kip}$

Critical Tension Bending Stress: $P_{\text{tens}} := \frac{M_{\text{exist}} \cdot C}{I_{\text{exist}}} \cdot A_{g_{\text{exist}}} - \frac{P_{\text{exist}}}{N_{\text{exist}}} = 320.41 \cdot \text{kip}$

2.2 Available Compression Strength

[AISC 15th Edition E3-1]

Resistance Factor: $\phi_c := 0.9$

Unbraced Length: $L_u := 19 \text{ in}$

Effective Length Factor: $K := 1.0$

Effective Length of Member: $L_c := K \cdot L_u = 19 \cdot \text{in}$ [AISC 15th Edition E3-2]

Strength of Bridge Stiffener: $F_{y_{Ex}} = 65 \cdot \text{ksi}$ $F_{u_{Ex}} = 80 \cdot \text{ksi}$

Elastic Buckling Stress:
[AISC 15th Ed., Eq. E3-4] $F_e := \frac{\pi^2 \cdot 29000 \text{ ksi}}{\left(\frac{L_c}{r_{x2}}\right)^2} = 103.24 \cdot \text{ksi}$

Determination of Critical Stress:
[AISC 15th Ed., Eqs. E3-2 and E3-3] $F_{cr} := \begin{cases} \left(0.658^{\frac{F_{y_{Ex}}}{F_e}} \cdot F_{y_{Ex}}\right) & \text{if } 4.71 \cdot \sqrt{\frac{E}{F_{y_{Ex}}}} \geq \frac{L_c}{r_{x2}} \\ (0.877 \cdot F_e) & \text{otherwise} \end{cases}$

$F_{cr} = 49.94 \cdot \text{ksi}$

Allowable Compressive Strength:
[AISC 15th Ed., Eqs. J4-6 and E3-1] $\phi P_n := \begin{cases} (\phi_c \cdot F_{y_{Ex}} \cdot A_{g_{\text{exist}}}) & \text{if } \frac{L_c}{r_{x2}} \leq 25 \\ (\phi_c \cdot F_{cr} \cdot A_{g_{\text{exist}}}) & \text{otherwise} \end{cases}$

$\phi P_n = 365.2 \cdot \text{kip}$

Check Compressive Strength:

$$\text{Check}_{\text{comp}} := \begin{cases} \text{"OK"} & \text{if } \frac{P_{\text{comp}}}{\phi P_n} \leq 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$\text{Check}_{\text{comp}} = \text{"OK"}$$

$$\text{Capacity}_{\text{comp}} = 83.56\%$$

2.3 Available Tension Strength

Gross Section Yield

[AISC 15th Edition Ch. D2]

Available Tension Yield Strength:

$$\phi P_{ty} := 0.9 \cdot F_y \cdot A_{g_exist} = 475.31 \cdot \text{kip}$$

Net Section Fracture

Bolt Hole Diameter:

$$\text{BH} := 1.1875 \text{ in}$$

Thickness:

$$T := t_{\text{exist}} = 1.25 \cdot \text{in}$$

Net Area:

$$A_{\text{net}} := A_{g_exist} - \left(\text{BH} + \frac{1}{16} \text{ in} \right) \cdot T = 6.56 \cdot \text{in}^2$$

Net Area Limitation:

$$A_e := A_{\text{net}} = 6.56 \cdot \text{in}^2$$

Available Fractile Strength:

$$\phi P_{tr} := 0.75 \cdot F_u \cdot A_e = 393.75 \cdot \text{kip}$$

Tension Check

Controlling Mode of Failure:

$$\text{Check}_{\text{mode}} := \begin{cases} \text{"Fracture Controls"} & \text{if } \frac{P_{\text{tens}}}{\phi P_{tr}} > \frac{P_{\text{tens}}}{\phi P_{ty}} \\ \text{"Yield Controls"} & \text{otherwise} \end{cases}$$

$$\text{Check}_{\text{mode}} = \text{"Fracture Controls"}$$

$$\phi P_{nt} := \begin{cases} \phi P_{tr} & \text{if } \text{Check}_{\text{mode}} = \text{"Fracture Controls"} \\ \phi P_{ty} & \text{otherwise} \end{cases}$$

Controlling Tension Mode Check:

$$\text{Check}_{\text{tension}} := \begin{cases} \text{"OK"} & \text{if } \frac{P_{\text{tens}}}{\phi P_{nt}} \leq 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$\text{Check}_{\text{tension}} = \text{"OK"}$$

$$\text{Capacity}_{\text{tension}} = 77.5\%$$

SUMMARY

tnxTower Reactions:

$$M = 2568.76 \cdot \text{kip} \cdot \text{ft}$$

$$P = 52.98 \cdot \text{kip}$$

$$V = 37.42 \cdot \text{kip}$$

Flange Bolts:

Diameter of Flange Bolts:

$$D_{\text{bolts}} = 1 \cdot \text{in}$$

Bolt Circle of Flange Bolts:

$$BC_{\text{bolts}} = 51 \cdot \text{in}$$

Loads to Flange Bolts:

$$M_{\text{bolts}} = 1093.55 \cdot \text{ft} \cdot \text{kip}$$

$$P = 52.98 \cdot \text{kip}$$

$$V = 37.42 \cdot \text{kip}$$

See CCIPlate for Flange Bolt and Plate Capacities

Existing Jump Plates:

Moment to Proposed Bridge
Stiffeners:

$$M_{\text{exist}} = 1475.21 \cdot \text{ft} \cdot \text{kip}$$

Number of Existing Bridge
Stiffeners:

$$N_{\text{exist}} = 4$$

Thickness:

$$t_{\text{exist}} = 1.25 \cdot \text{in}$$

Width:

$$w_{\text{exist}} = 6.5 \cdot \text{in}$$

Controlling Capacity of Existing
Bridge Stiffeners:

$$\text{Capacity}_{\text{exist}} = 83.6\%$$

Monopole Flange Plate Connection

Elevation = 40 ft.



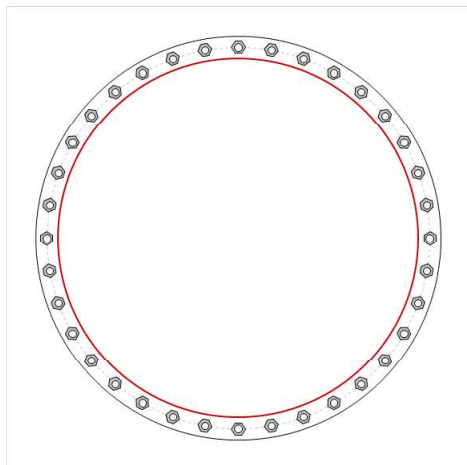
BU #	827050
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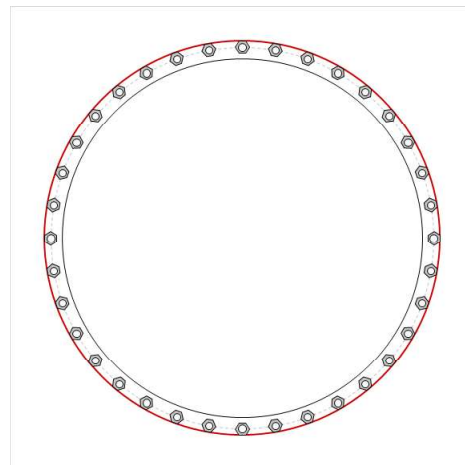
Applied Loads	
Moment (kip-ft)	1093.55
Axial Force (kips)	52.98
Shear Force (kips)	37.42

*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

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

Top Plate Data

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

Top Stiffener Data

N/A

Top Pole Data

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

Bottom Plate Data

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

Bottom Stiffener Data

N/A

Bottom Pole Data

54" x 0.65" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	27.11
Allowable (kips)	54.52
Stress Rating:	47.4% Pass

Top Plate Capacity

Max Stress (ksi):	17.94	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	52.7%	Pass
Tension Side Stress Rating:	17.3%	Pass

Bottom Plate Capacity

Max Stress (ksi):	14.86	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	43.7%	Pass
Tension Side Stress Rating:	N/A	

Bolted Bridge Stiffeners Reinforcement Check

TIA Rev. H



Description:

This sheet is for the analysis of a reinforced flange connection using existing bolted bridge stiffeners.

Assumptions / Notes:

- 1. For analysis purposes, load is distributed between flange bolts and existing bridge stiffeners.*
- 2. The plastification of the pole is not considered.*
- 3. All shear and axial loads are taken by the flange bolts.*

1. PARAMETERS

Flange Elevation: 20' - 0"

1.1 tnxTower Reactions

Apply TIA-222-H Section 15.5?

No
Yes

Moment: $M := 3362.83 \text{ kip} \cdot \text{ft}$
Axial Load: $P := 67.45 \text{ kip}$
Shear Load: $V := 42.01 \text{ kip}$

1.2 Shaft Properties at the Flange

Upper Shaft Diameter: $D_{\text{shaft1}} := 54 \text{ in}$
Upper Shaft Thickness: $t_1 := 0.375 \text{ in}$
Lower Shaft Diameter: $D_{\text{shaft2}} := 60 \text{ in}$
Lower Shaft Thickness: $t_2 := 0.375 \text{ in}$
Shaft Grade: $F_{y\text{shaft}} := 42 \text{ ksi}$ $F_{u\text{shaft}} := 60 \text{ ksi}$

1.3 Existing Bridge Stiffener Properties

(Verify existing bolted connection for reduced moment.)

Number of Existing Bridge Stiffeners: $N_{\text{exist}} := 4$
Existing Bridge Stiffener Grade: $F_{y\text{Ex}} := 65 \text{ ksi}$ $F_{u\text{Ex}} := 80 \text{ ksi}$
Diameter to the centroid of Existing Bridge Stiffeners: $BC_{\text{exist}} := 61.25 \text{ in}$
Thickness of Existing Bridge Stiffeners: $t_{\text{exist}} := 1.25 \text{ in}$
Width of Existing Bridge Stiffeners: $w_{\text{exist}} := 8.5 \text{ in}$
Gross Area of One Existing Bridge Stiffener: $A_{g_exist} := w_{\text{exist}} \cdot t_{\text{exist}} = 10.63 \cdot \text{in}^2$
Moment of Inertia of Existing Bridge Stiffeners: $I_{\text{exist}} := \frac{N_{\text{exist}} \cdot BC_{\text{exist}}^2 \cdot A_{g_exist}}{8} = 19930.18 \cdot \text{in}^4$
Radius of Gyration about x-axis: $r_{x2} := \frac{t_{\text{exist}}}{\sqrt{12}} = 0.36 \cdot \text{in}$

1.4 Flange Bolt Properties

Number of Flange Bolts:

$$N_{\text{bolts}} := 48$$

Diameter of Flange Bolts:

Bolt Circle of Flange Bolts:

$$BC_{\text{bolts}} := 57\text{in}$$

Gross Area of One Flange Bolt:

$$A_{g_bolts} := \frac{\pi}{4} \cdot D_{\text{bolts}}^2 = 0.79 \cdot \text{in}^2$$

Moment of Inertia of Flange Bolts:

$$I_{\text{bolts}} := \frac{N_{\text{bolts}} \cdot BC_{\text{bolts}}^2 \cdot A_{g_bolts}}{8} = 15310.55 \cdot \text{in}^4$$

1.5 Division of Forces

Total Gross Area:

$$A_{g_total} := N_{\text{exist}} \cdot A_{g_exist} + N_{\text{bolts}} \cdot A_{g_bolts} = 80.2 \cdot \text{in}^2$$

Total Moment of Inertia:

$$I_{\text{total}} := I_{\text{exist}} + I_{\text{bolts}} = 35240.73 \cdot \text{in}^4$$

1.6 Reactions to Existing Bridge Stiffeners

Moment Reaction to
Existing Bridge Stiffeners:

$$M_{\text{exist}} := M \cdot \left(\frac{I_{\text{exist}}}{I_{\text{total}}} \right) = 1901.83 \cdot \text{kip} \cdot \text{ft}$$

Axial Reaction to Existing
Bridge Stiffeners:

$$P_{\text{exist}} := 0\text{kip}$$

Shear Reaction to Existing
Bridge Stiffeners:

$$V_{\text{exist}} := 0\text{kip}$$

1.7 Reactions to Flange Bolts

(It is assumed that all shear and axial loads are taken by the flange bolts)

Moment Reaction to Flange Bolts:

$$M_{\text{bolts}} := M \cdot \left(\frac{I_{\text{bolts}}}{I_{\text{total}}} \right) = 1461 \cdot \text{kip} \cdot \text{ft}$$

Axial Reaction to Flange Bolts:

$$P_{\text{bolts}} := P = 67.45 \cdot \text{kip}$$

Shear Reaction to Flange Bolts:

$$V_{\text{bolts}} := V = 42.01 \cdot \text{kip}$$

Check Flange Connection in CCplate with these Reactions

2. Existing Bridge Stiffener Checks

2.1 Maximum Axial Forces in Single Existing Bridge Stiffener

Outer Radius of Bolt Circle: $C := \frac{BC_{\text{exist}}}{2} = 30.63 \cdot \text{in}$

Critical Compression Bending Stress: $P_{\text{comp}} := \frac{M_{\text{exist}} \cdot C}{I_{\text{exist}}} \cdot A_{g_{\text{exist}}} + \frac{P_{\text{exist}}}{N_{\text{exist}}} = 372.6 \cdot \text{kip}$

Critical Tension Bending Stress: $P_{\text{tens}} := \frac{M_{\text{exist}} \cdot C}{I_{\text{exist}}} \cdot A_{g_{\text{exist}}} - \frac{P_{\text{exist}}}{N_{\text{exist}}} = 372.6 \cdot \text{kip}$

2.2 Available Compression Strength

[AISC 15th Edition E3-1]

Resistance Factor: $\phi_c := 0.9$

Unbraced Length: $L_u := 17 \text{ in}$

Effective Length Factor: $K := 1.0$

Effective Length of Member: $L_c := K \cdot L_u = 17 \cdot \text{in}$ [AISC 15th Edition E3-2]

Strength of Bridge Stiffener: $F_{y_{Ex}} = 65 \cdot \text{ksi}$ $F_{u_{Ex}} = 80 \cdot \text{ksi}$

Elastic Buckling Stress:
[AISC 15th Ed., Eq. E3-4] $F_e := \frac{\pi^2 \cdot 29000 \text{ ksi}}{\left(\frac{L_c}{r_{x2}}\right)^2} = 128.96 \cdot \text{ksi}$

Determination of Critical Stress:
[AISC 15th Ed., Eqs. E3-2 and E3-3] $F_{cr} := \begin{cases} \left(0.658^{\frac{F_{y_{Ex}}}{F_e}} \cdot F_{y_{Ex}}\right) & \text{if } 4.71 \cdot \sqrt{\frac{E}{F_{y_{Ex}}}} \geq \frac{L_c}{r_{x2}} \\ (0.877 \cdot F_e) & \text{otherwise} \end{cases}$

$F_{cr} = 52.64 \cdot \text{ksi}$

Allowable Compressive Strength:
[AISC 15th Ed., Eqs. J4-6 and E3-1] $\phi P_n := \begin{cases} (\phi_c \cdot F_{y_{Ex}} \cdot A_{g_{\text{exist}}}) & \text{if } \frac{L_c}{r_{x2}} \leq 25 \\ (\phi_c \cdot F_{cr} \cdot A_{g_{\text{exist}}}) & \text{otherwise} \end{cases}$

$\phi P_n = 503.34 \cdot \text{kip}$

Check Compressive Strength:

$$\text{Check}_{\text{comp}} := \begin{cases} \text{"OK"} & \text{if } \frac{P_{\text{comp}}}{\phi P_n} \leq 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$\text{Check}_{\text{comp}} = \text{"OK"}$$

$$\text{Capacity}_{\text{comp}} = 70.5\%$$

2.3 Available Tension Strength

Gross Section Yield

[AISC 15th Edition Ch. D2]

Available Tension Yield Strength:

$$\phi P_{ty} := 0.9 \cdot F_y \cdot A_{g_exist} = 621.56 \cdot \text{kip}$$

Net Section Fracture

Bolt Hole Diameter:

$$\text{BH} := 1.1875 \text{ in}$$

Thickness:

$$T := t_{\text{exist}} = 1.25 \cdot \text{in}$$

Net Area:

$$A_{\text{net}} := A_{g_exist} - \left(\text{BH} + \frac{1}{16} \text{ in} \right) \cdot T = 9.06 \cdot \text{in}^2$$

Net Area Limitation:

$$A_e := A_{\text{net}} = 9.06 \cdot \text{in}^2$$

Available Fractile Strength:

$$\phi P_{tr} := 0.75 \cdot F_u \cdot A_e = 543.75 \cdot \text{kip}$$

Tension Check

Controlling Mode of Failure:

$$\text{Check}_{\text{mode}} := \begin{cases} \text{"Fracture Controls"} & \text{if } \frac{P_{\text{tens}}}{\phi P_{tr}} > \frac{P_{\text{tens}}}{\phi P_{ty}} \\ \text{"Yield Controls"} & \text{otherwise} \end{cases}$$

$$\text{Check}_{\text{mode}} = \text{"Fracture Controls"}$$

$$\phi P_{nt} := \begin{cases} \phi P_{tr} & \text{if } \text{Check}_{\text{mode}} = \text{"Fracture Controls"} \\ \phi P_{ty} & \text{otherwise} \end{cases}$$

Controlling Tension Mode Check:

$$\text{Check}_{\text{tension}} := \begin{cases} \text{"OK"} & \text{if } \frac{P_{\text{tens}}}{\phi P_{nt}} \leq 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$\text{Check}_{\text{tension}} = \text{"OK"}$$

$$\text{Capacity}_{\text{tension}} = 65.26\%$$

SUMMARY

tnxTower Reactions:

$$M = 3362.83 \cdot \text{kip} \cdot \text{ft}$$

$$P = 67.45 \cdot \text{kip}$$

$$V = 42.01 \cdot \text{kip}$$

Flange Bolts:

Diameter of Flange Bolts:

$$D_{\text{bolts}} = 1 \cdot \text{in}$$

Bolt Circle of Flange Bolts:

$$BC_{\text{bolts}} = 57 \cdot \text{in}$$

Loads to Flange Bolts:

$$M_{\text{bolts}} = 1461 \cdot \text{ft} \cdot \text{kip}$$

$$P = 67.45 \cdot \text{kip}$$

$$V = 42.01 \cdot \text{kip}$$

See CCIPlate for Flange Bolt and Plate Capacities

Existing Jump Plates:

Moment to Proposed Bridge
Stiffeners:

$$M_{\text{exist}} = 1901.83 \cdot \text{ft} \cdot \text{kip}$$

Number of Existing Bridge
Stiffeners:

$$N_{\text{exist}} = 4$$

Thickness:

$$t_{\text{exist}} = 1.25 \cdot \text{in}$$

Width:

$$w_{\text{exist}} = 8.5 \cdot \text{in}$$

Controlling Capacity of Existing
Bridge Stiffeners:

$$\text{Capacity}_{\text{exist}} = 70.5 \cdot \%$$

Monopole Flange Plate Connection

Elevation = 20 ft.

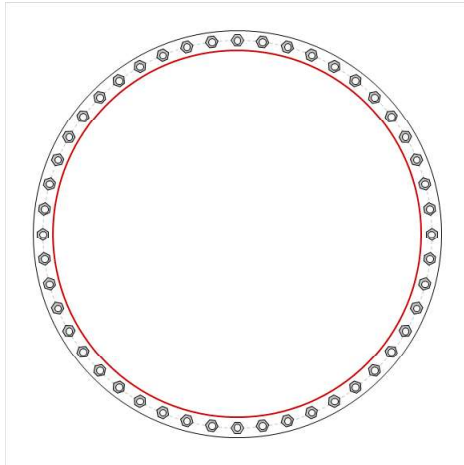


BU #	827050
Site Name	Rocky Hill/ Rte 160_1
Order #	529708 Rev. 0
TIA-222 Revision	H

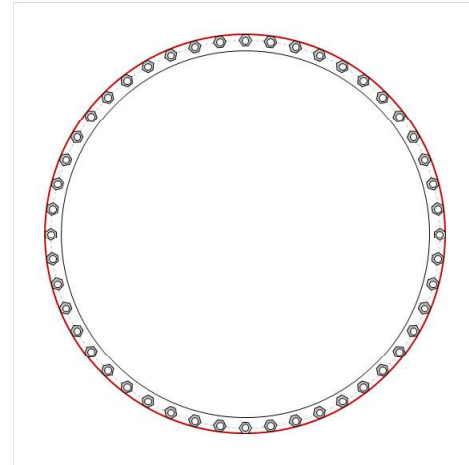
Applied Loads	
Moment (kip-ft)	1461.00
Axial Force (kips)	67.45
Shear Force (kips)	42.01

*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

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

Top Plate Data

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

Top Stiffener Data

N/A

Top Pole Data

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

Bottom Plate Data

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

Bottom Stiffener Data

N/A

Bottom Pole Data

60" x 0.625" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	24.22
Allowable (kips)	54.52
Stress Rating:	42.3% Pass

Top Plate Capacity

Max Stress (ksi):	19.02	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	55.9%	Pass
Tension Side Stress Rating:	18.8%	Pass

Bottom Plate Capacity

Max Stress (ksi):	15.75	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	46.3%	Pass
Tension Side Stress Rating:	N/A	

Monopole Base Plate Connection

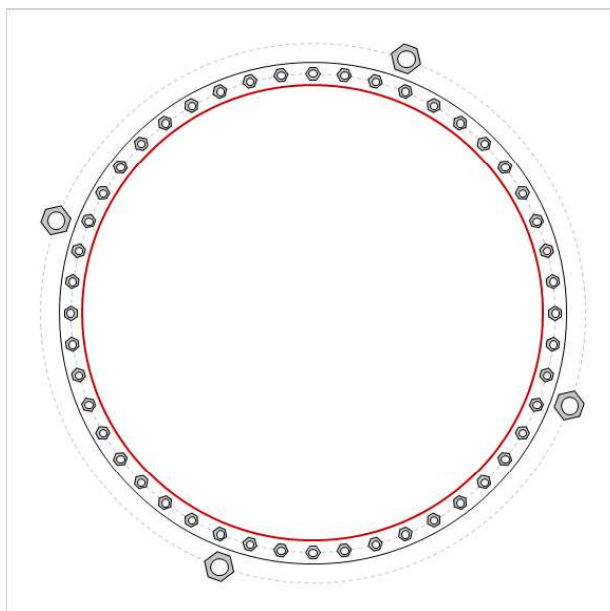


Site Info	
BU #	827050
Site Name	Rocky Hill/ Rte 160_1
Order #	529708 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
I_{ar} (in)	1.5

Applied Loads	
Moment (kip-ft)	4242.76
Axial Force (kips)	79.16
Shear Force (kips)	45.83

*TIA-222-H Section 15.5 Applied



Connection Properties

Anchor Rod Data

GROUP 1: (48) 1" ϕ bolts (A687 N; $F_y=105$ ksi, $F_u=125$ ksi) on 63" BC
 GROUP 2: (4) 2-1/4" ϕ bolts (Williams N; $F_y=125$ ksi, $F_u=125$ ksi) on 71" BC

Base Plate Data

66" OD x 1.25" Plate (A36; $F_y=36$ ksi, $F_u=58$ ksi)

Stiffener Data

N/A

Pole Data

60" x 0.375" round pole (A53-B-42; $F_y=42$ ksi, $F_u=63$ ksi)

Analysis Results

Anchor Rod Summary

(units of kips, kip-in)

GROUP 1:

$Pu_c = 40.96$	$\phi Pn_c = 74.22$	Stress Rating
$Vu = 0.95$	$\phi Vn = 33.4$	58.3%
$Mu = 0.93$	$\phi Mn = 15.75$	Pass

GROUP 2:

$Pu_c = 298.29$	$\phi Pn_c = 459$	Stress Rating
$Vu = 0$	$\phi Vn = 206.55$	61.9%
$Mu = n/a$	$\phi Mn = n/a$	Pass

Base Plate Summary

Max Stress (ksi):	26.02	(Flexural)
Allowable Stress (ksi):	32.4	
Stress Rating:	76.5%	Pass

Drilled Pier Foundation

BU # : 827050
Site Name : Rocky Hill/ Rte 160_1
Order Number: 529708 Rev. 0

TIA-222 Revision: H
Tower Type: Monopole

Applied Loads		
	Comp.	Uplift
Moment (kip-ft)	4242.76	
Axial Force (kips)	79.17	
Shear Force (kips)	45.81	

Material Properties	
Concrete Strength, f _c :	3 ksi
Rebar Strength, F _y :	60 ksi
Tie Yield Strength, F _y :	60 ksi

Pier Design Data	
Depth	36 ft
Ext. Above Grade	0.5 ft
Pier Section 1	
From 0.5' above grade to 19.9' below grade	
Pier Diameter	7 ft
Rebar Quantity	28
Rebar Size	9
Clear Cover to Ties	3 in
Tie Size	4
Tie Spacing	18 in
Rebar Quantity	4
Rebar Size	18
Rebar Cage Diameter	71 in
Pier Section 2	
From 19.9' below grade to 36' below grade	
Pier Diameter	7 ft
Rebar Quantity	28
Rebar Size	9
Clear Cover to Ties	3 in
Tie Size	4
Tie Spacing	18 in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

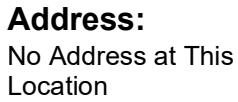


Check Limitation	
Apply TIA-222-H Section 15.5:	☒ N/A
Shear Design Options	
Check Shear along Depth of Pier:	☒
Utilize Shear-Friction Methodology:	☐

[Go to Soil Calculations](#)

Analysis Results			
Soil Lateral Check		Compression	Uplift
D _{req} (ft from TOC)		8.18	-
Soil Safety Factor		4.02	-
Max Moment (kip-ft)		4555.64	-
Rating*		31.5%	-
Soil Vertical Check		Compression	Uplift
Skin Friction (kips)		543.46	-
End Bearing (kips)		5157.89	-
Weight of Concrete (kips)		165.23	-
Total Capacity (kips)		5701.34	-
Axial (kips)		244.40	-
Rating*		4.1%	-
Reinforced Concrete Flexure		Compression	Uplift
Critical Depth (ft from TOC)		20.40	-
Critical Moment (kip-ft)		3504.78	-
Critical Moment Capacity		4775.93	-
Rating*		69.9%	-
Reinforced Concrete Shear		Compression	Uplift
Critical Depth (ft from TOC)		34.88	-
Critical Shear (kip)		416.55	-
Critical Shear Capacity		772.77	-
Rating*		51.3%	-
Soil Interaction Rating*		31.5%	
Structural Foundation Rating*		69.9%	
*Rating per TIA-222-H Section 15.5			

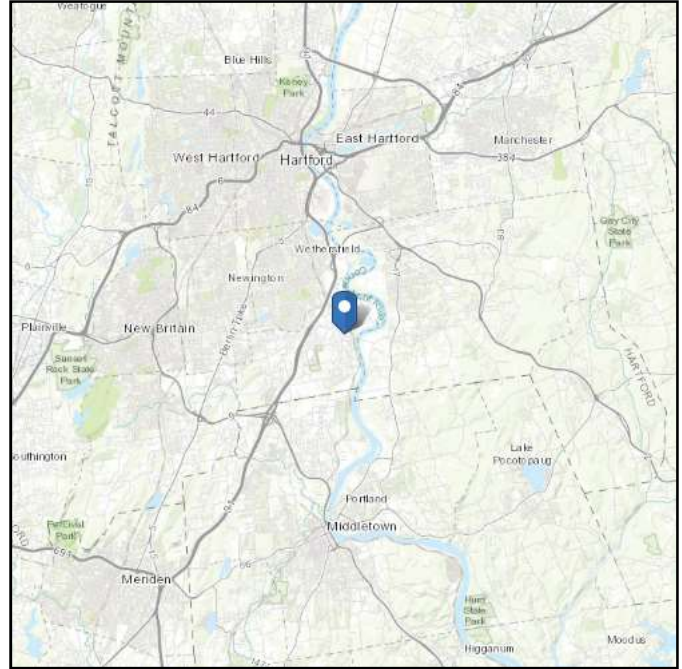
Groundwater Depth		5.6		# of Layers		11		Soil Profile						
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ _{soil} (pcf)	γ _{concrete} (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	2	2	126	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	2	3.5	1.5	117	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
3	3.5	4	0.5	117	150	0	31	0.000	0.000	0.00	0.00			Cohesionless
4	4	5.6	1.6	124	150	0	35	0.000	0.000	0.88	0.88			Cohesionless
5	5.6	6	0.4	61.5	87.6	0	35	0.000	0.000	0.88	0.88			Cohesionless
6	6	8	2	57.5	87.6	0	33	0.000	0.000	0.88	0.88			Cohesionless
7	8	10	2	55.5	87.6	0	32	0.000	0.000	0.88	0.88			Cohesionless
8	10	15	5	52.5	87.6	0	29	0.000	0.000	0.49	0.49			Cohesionless
9	15	30	15	42.5	87.6	0.5	0	0.28	0.28	0.50	0.50			Cohesive
10	30	34	4	53.5	87.6	0	31	0.000	0.000	0.83	0.83			Cohesionless
11	34	36	2	92.5	87.6	20	0	9.00	9.00	7.20	7.20	178.7		Cohesive



ASCE 7 Hazards Report

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

Elevation: 97.46 ft (NAVD 88)
Latitude: 41.668269
Longitude: -72.638036

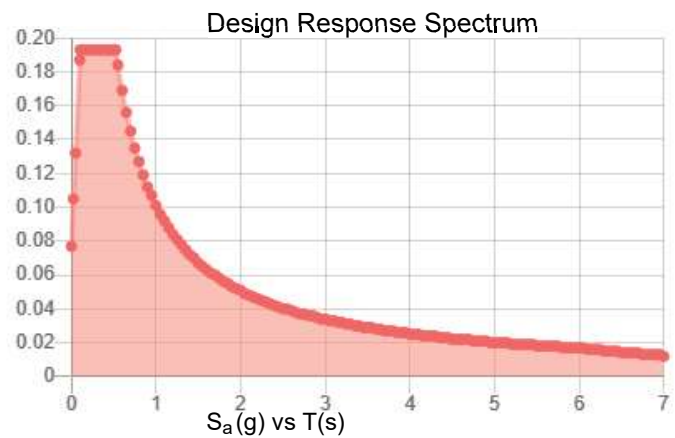
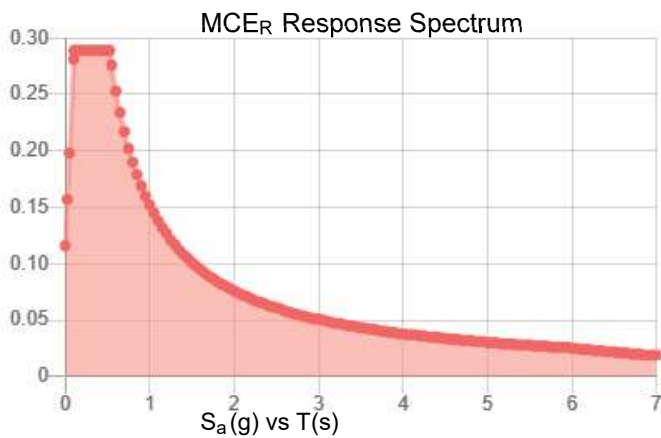


Site Soil Class: D - Stiff Soil

Results:

S_s :	0.181	S_{DS} :	0.193
S_1 :	0.063	S_{D1} :	0.101
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.091
S_{MS} :	0.289	PGA_M :	0.146
S_{M1} :	0.152	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B



Data Accessed:

Wed Oct 07 2020

Date Source:

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

Ice

Results:

Ice Thickness: 1.00 in.

Concurrent Temperature: 5 F

Gust Speed: 50 mph

Data Source: Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

Date Accessed: Wed Oct 07 2020

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

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

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Exhibit E

Mount Analysis

Date: October 6, 2020

Darcy Tarr
Crown Castle
6325 Ardrey Kell Road
Charlotte, NC 28277

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

Subject: Mount Analysis Report

Carrier Designation: T-Mobile Equipment Change-out
Carrier Site Number: CT11058C
Carrier Site Name: Rocky Hill / Rte 160_1

Crown Castle Designation:
Crown Castle BU Number: 827050
Crown Castle Site Name: Rocky Hill / Rte 160_1
Crown Castle JDE Job Number: 620141
Crown Castle Purchase Order Number: 1575413
Crown Castle Order Number: 529708 Rev. 0

Engineering Firm Designation: Paul J Ford and Company Project Number: A37520-2212.001.7190

Site Data: 699 Old Main St., Rocky Hill, Hartford County, CT 06067
Latitude 41.668269°, Longitude -72.638036°

Structure Information:
Tower Height & Type: 148.5 Foot Monopole
Mount Elevation: 150 Foot
Mount Type: (3)-Sector 16.5 Foot Platform

Dear Darcy Tarr,

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

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

16.5' Platform (typical)

SUFFICIENT*

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

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2018 Connecticut Building Code. Applicable standard references and design criteria are listed in Section 2 – Analysis Criteria.

Respectfully submitted by:



Michael Timas, EI
Structural Designer
mtimas@pauljford.com

BKK

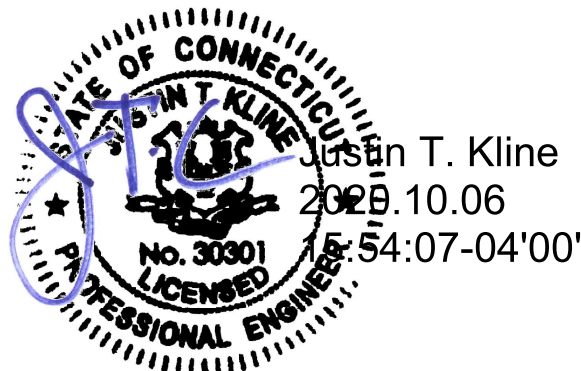


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MANUFACTURER DRAWINGS (FOR REFERENCE ONLY)

1) INTRODUCTION

The existing mount under consideration is a (3)-Sector 16.5' Platform mount, mapped by RKS on 4/3/2019.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor at Base:	1.00
Topographic Factor at Mount:	1.00
Ice Thickness:	2.0 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.181
Seismic S_1:	0.063
Maintenance Loading Wind Speed:	30 mph
Maintenance Load at Mid/End-Points, L_v:	250 lb
Maintenance Load at Mount Pipes, L_m:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
150	150	3	ERICSSON	AIR 32 B2A B66AA	(3)-SECTOR MOUNT (16.5')
		3	ERICSSON	AIR6449 B41_T-MOBILE	
		3	RFS CELWAVE	APXVAARR24_43-U-NA20	
		3	COMMSCOPE	SDX1926Q-43	
		3	ERICSSON	KRY 112 144/1	
		3	ERICSSON	RADIO 4449 B71 B85A_T-MOBILE	
		3	ERICSSON	RRUS 4415 B25	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Mount Mapping	File #: 37519-1569 Dated: 4/3/2019	8352877	CCISites
Photos	Dated: 3/5/2020	-	CCISites
Order	ID: 529708 Rev. 0 Dated: 9/30/2020	-	CCISites
Radio Frequency Data Sheet	RFDS ID #: CT11058C Version 9, Dated: 9/18/2020	-	Crown Castle
Mount Modification Manufacturer Drawings	Model #: SitePro1 HRK14 Rev. 0 Dated: 7/11/2014	-	MNF

3.1) Analysis Method

RISA-3D (version 17.0.3), 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.

A tool internally developed, using Microsoft Excel, by Paul J. Ford and Company was used to calculate wind loading on all appurtenances, dishes, and mount members for various load cases. Selected output from the analysis is included in Appendix B.

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 A36 (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
1,2	Face Horizontals	150	55.9	Pass
1,2	Support Rails		49.0	Pass
1,2	Grating Support Members		25.0	Pass
1,2	Standoff Members		51.9	Pass
1,2	Corner Plates		42.9	Pass
1,2	Mount Pipes		87.1	Pass
1,2	Mount to Tower Connection		86.2	Pass

Mount Rating (max from all components) =	87.1 %
---	---------------

Notes:

- 1) See additional documentation in "Appendix B – Software Analysis Output" for calculations supporting the % capacity consumed.
- 2) Rating per TIA-222-H, Section 15.5

4.1) Recommendations

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

- Install SitePro1 HRK14 Support Rail Kit or EOR approved equivalent as indicated in "Appendix D – Supplemental Modification Information" and in conformance with the attached manufacturer drawings. Field verify required face member length.

No structural modifications are required at this time, provided that the above-listed changes are implemented.

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

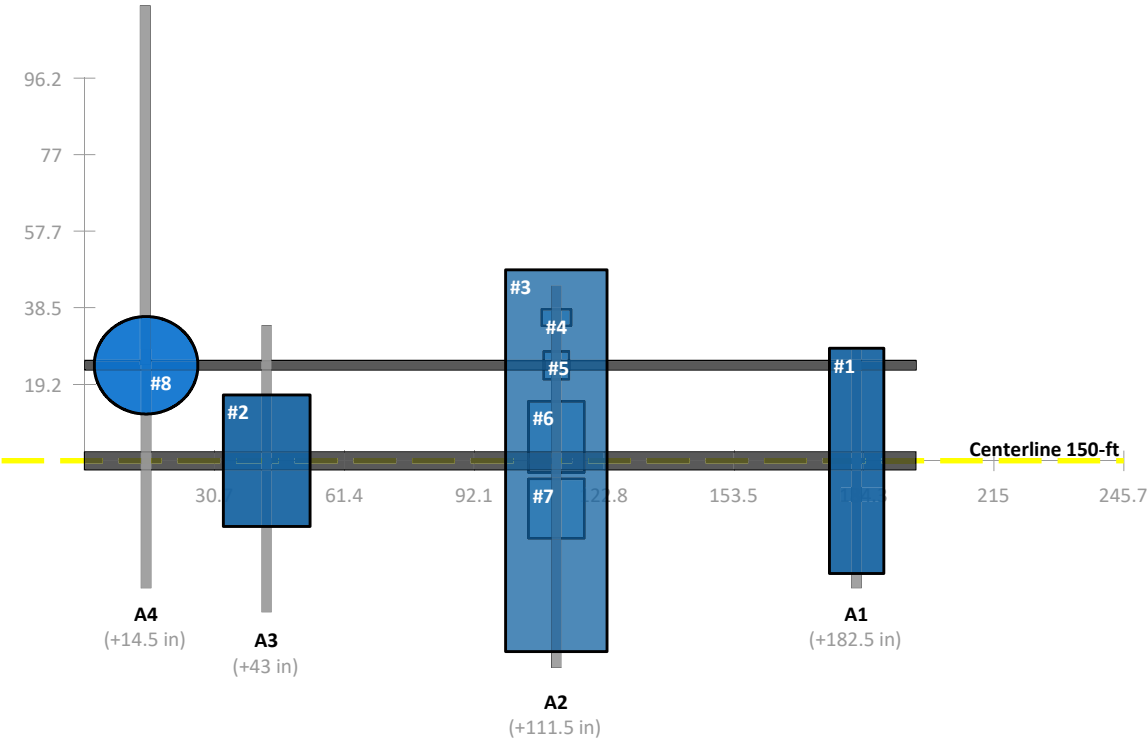
- 1) It is the responsibility of the client to ensure that the information provided to Paul J. Ford and Company is accurate and complete. Paul J. Ford and Company will rely on the accuracy and completeness of such information in performing or furnishing services under this project.
- 2) If the existing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

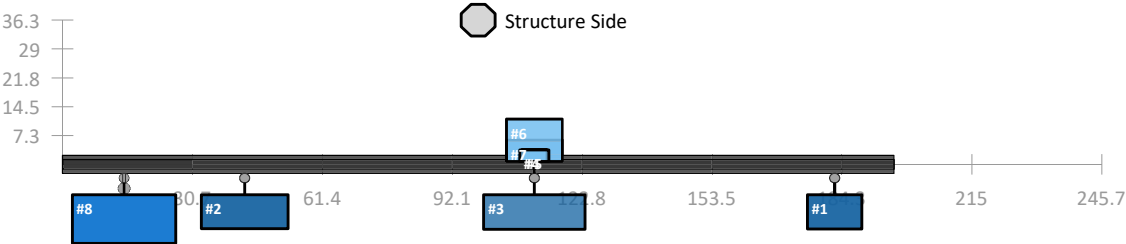
SOFTWARE INPUT CALCULATION

Sector A

Profile View



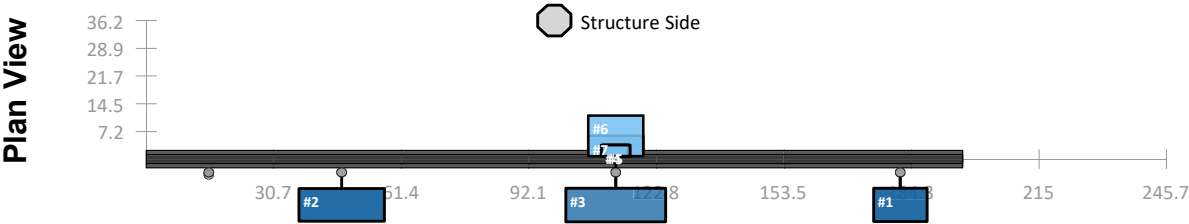
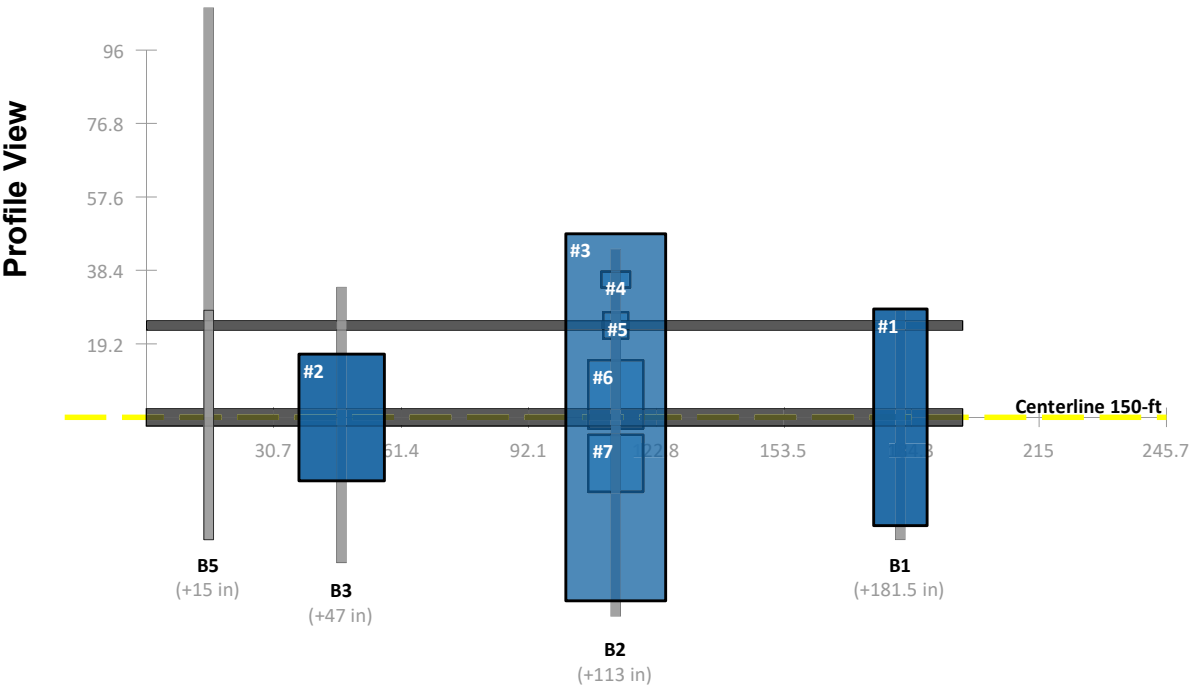
Plan View



Ref ID	Type	Manufacturer	Model	Height (in)	Width (in)	Depth (in)	Center Line (ft)	Mount Pipe	Tangential Offset (in)	Normal Offset (in)
#1	Antenna	ERICSSON	AIR 32 B2A B66AA	56.60	12.87	8.66	150.00	A1	0.00	3.00
#2	Antenna	ERICSSON	AIR6449 B41_T-MOBILE	33.11	20.51	8.54	150.00	A3	0.00	3.00
#3	Antenna	RFS CELWAVE	APXVAARR24_43-U-NA20	95.90	24.00	8.70	150.00	A2	0.00	3.00
#4	TME/RRH	COMMSCOPE	SDX1926Q-43	4.17	6.93	2.91	153.00	A2	0.00	-3.00
#5	TME/RRH	ERICSSON	KRY 112 144/1	7.00	6.00	3.00	152.00	A2	0.00	-3.00
#6	TME/RRH	ERICSSON	RADIO 4449 B71 B85A_T-MOBILE	17.91	13.20	10.63	150.50	A2	0.00	-3.00
#7	TME/RRH	ERICSSON	RRUS 4415 B25	14.96	13.19	5.39	149.00	A2	0.00	-3.00
#8	Dish	RADIOWAVES	HPD2-4.7	24.50	24.50	12.25	152.00	A4	0.00	3.00

- 1. A 6" tolerance for proposed equipment is acceptable.
- 2. Contractor to verify location of existing equipment prior to installation of proposed equipment. Notify for any deviations.
- 3. Install shall not cause harm to the structure, climbing facility, safety climb, or any system installed on the structure

Sector B

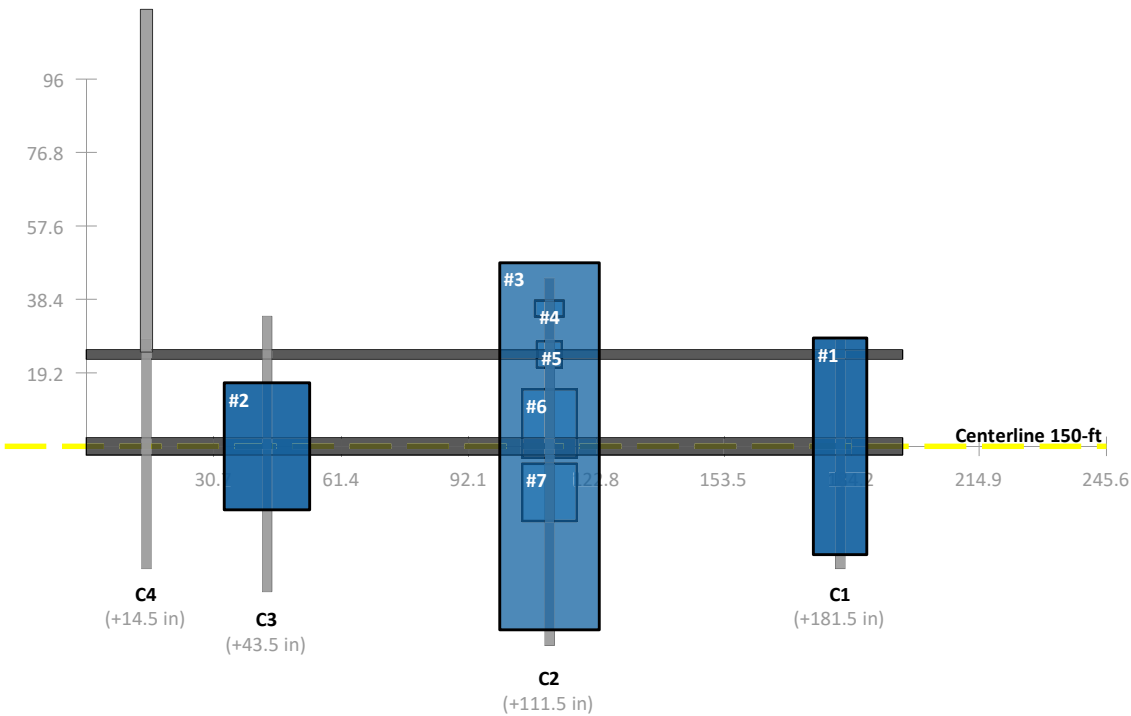


Ref ID	Type	Manufacturer	Model	Height (in)	Width (in)	Depth (in)	Center Line (ft)	Mount Pipe	Horizontal Offset (in)	Lateral Offset (in)
#1	Antenna	ERICSSON	AIR 32 B2A B66AA	56.60	12.87	8.66	150.00	B1	0.00	3.00
#2	Antenna	ERICSSON	AIR6449 B41_T-MOBILE	33.11	20.51	8.54	150.00	B3	0.00	3.00
#3	Antenna	RFS CELWAVE	APXVAARR24_43-U-NA20	95.90	24.00	8.70	150.00	B2	0.00	3.00
#4	TME/RRH	COMMSCOPE	SDX1926Q-43	4.17	6.93	2.91	153.00	B2	0.00	-3.00
#5	TME/RRH	ERICSSON	KRY 112 144/1	7.00	6.00	3.00	152.00	B2	0.00	-3.00
#6	TME/RRH	ERICSSON	RADIO 4449 B71 B85A_T-MOBILE	17.91	13.20	10.63	150.50	B2	0.00	-3.00
#7	TME/RRH	ERICSSON	RRUS 4415 B25	14.96	13.19	5.39	149.00	B2	0.00	-3.00

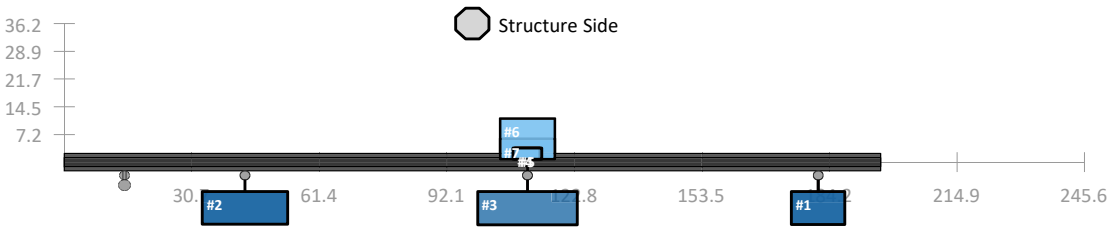
1. A 6" tolerance for proposed equipment is acceptable.
2. Contractor to verify location of existing equipment prior to installation of proposed equipment. Notify for any deviations.
3. Install shall not cause harm to the structure, climbing facility, safety climb, or any system installed on the structure

Sector C

Profile View



Plan View



Ref ID	Type	Manufacturer	Model	Height (in)	Width (in)	Depth (in)	Center Line (ft)	Mount Pipe	Horizontal Offset (in)	Lateral Offset (in)
#1	Antenna	ERICSSON	AIR 32 B2A B66AA	56.60	12.87	8.66	150.00	C1	0.00	3.00
#2	Antenna	ERICSSON	AIR6449 B41_T-MOBILE	33.11	20.51	8.54	150.00	C3	0.00	3.00
#3	Antenna	RFS CELWAVE	APXVAARR24_43-U-NA20	95.90	24.00	8.70	150.00	C2	0.00	3.00
#4	TME/RRH	COMMSCOPE	SDX1926Q-43	4.17	6.93	2.91	153.00	C2	0.00	-3.00
#5	TME/RRH	ERICSSON	KRY 112 144/1	7.00	6.00	3.00	152.00	C2	0.00	-3.00
#6	TME/RRH	ERICSSON	RADIO 4449 B71 B85A_T-MOBILE	17.91	13.20	10.63	150.50	C2	0.00	-3.00
#7	TME/RRH	ERICSSON	RRUS 4415 B25	14.96	13.19	5.39	149.00	C2	0.00	-3.00

- 1. A 6" tolerance for proposed equipment is acceptable.
- 2. Contractor to verify location of existing equipment prior to installation of proposed equipment. Notify for any deviations.
- 3. Install shall not cause harm to the structure, climbing facility, safety climb, or any system installed on the structure

Mount Loading per TIA-222-H (Version v3.0 - Effective 9/14/2020)

Structure & Wind Speed

Structure Type = Ultimate Wind Speed = mph
Ice Wind Speed = mph
Service Wind Speed = mph
Non-Op Wind Speed = mph
Op Wind Speed = mph
Ice Thickness = in

Topography

Risk Category = Exposure Category =
Topographic Category =
Structure Base Height (H_{sb}) = ft
Crest Height (H) = ft

Velocity Pressure Coefficients

Z₀ = ft (Table 2-4-I)
α = (Table 2-4-I)
K_z = (Section 2.6.5.2)
K_{zt} = (Section 2.6.5.2)
K_z = (Section 2.6.5.2)
K_{zt} = (Section 2.6.5.2)

Ice Loading

h = in (Bar Grating Height)
I = (Table 2-3)
K_{ice} = (Annex S - Ice)
q_{ice} = psf (Section 2.6.11.6)
K_z = (Section 2.6.10)
q_z = in (Section 2.6.10)
W_i = psf (Grating Ice Weight)
Wind Pressure
K_z = (on all Appurt / Member Forces)
(a) (G_z) (K_z) = psf
(b) (G_z) (K_z) = psf (Ice)

Analysis Settings

Analysis Scope =
Analysis Wind Direction Increment =
EPA Calculation Method =
Construction Duration =

Maintenance Point Loads

Load	Label	Node #	Node #
L ₁	500 lbs	91	1
L ₂	500 lbs	92	2
L ₃	500 lbs	93	3
L ₄	500 lbs	94	4

Override

K_z = (Section 2.6.5.2.1)
K_{zt} = (Section 2.6.5.2)
K_z = (Section 2.6.5.2)
K_{zt} = (Section 2.6.5.2)
G_z = (Section 2.6.5.2)
G_z = (Annex S - Wind Force)
q_z = psf (Section 2.6.11.6)

Risa3D Source: G:\TOVER975_Crown_GasM\2020\37520-2212_827050_Rocky Hill - Rte 160_137520-2212.001.7190_MARisa3D\37520-2212.001.7190_Modified.r3d

Antennas

Item	Include Loading	Status	Mounting Location	Manufacturer	Antenna	Height (in)	Width (in)	Depth (in)	Flat or Round	Weight (lbs)	Sector / Face	Position	Quantity	Orientation	Use Tower Mounting (CFD)	Top/Bottom Mounting Point Spacing	Override Spacing (in)	Max Antenna CL (ft)	Min Antenna CL (ft)	Antenna C/L (ft)	Antenna Top	Antenna Bottom	Override Top	Override Bottom	Normal Wind Force per Antenna (lbs)	Transverse Wind Force per Antenna (lbs)
																					Mount Location Bottom (in)	Mount Location Bottom (in)	Top Antenna Mounting Location (in)	Bottom Antenna Mounting Location (in)		
1	Yes	Existing	Mount	ERICSSON	AIR 32 B2A B66AA	56.6	12.87	8.66	Flat	143	A	1	1	Normal	No	50.60		150.225	149.442	150	57.30	6.70			305.199	220.557
2	Yes	Proposed	Mount	ERICSSON	AIR6449 B4T_1-MOBILE	33.11	20.51	8.54	Flat	114.83	A	3	1	Normal	No	27.11		151.704	147.963	150	51.56	24.45			265.835	116.334
3	Yes	Existing	Mount	RFS CELWAVE	APXVAARR24_43-JA490_CCI CFD	95.9	24	8.7	Flat	153.3	A	2	1	Normal	Yes	89.90	72	150.667	148.667	150	88.00	16.00			680.125	249.908
4	Yes	Proposed	Mount	COMMSCOPE	SDX1980-43	4.173	6.929	2.913	Flat	6.17	A	2	1	Normal	No	1.00		153.625	145.708	150	52.50	51.50			11.319	4.759
5	Yes	Existing	Mount	ERICSSON	KRY 112 144F1	7.00	6.00	3.00	Flat	11	A	2	1	Normal	No	1.00		153.625	145.708	150	52.50	51.50			16.441	8.221
6	Yes	Proposed	Mount	ERICSSON	RADIO 4449 B71 B85A_T-MOBILE	17.91	13.2	10.63	Flat	73.21	A	2	1	Normal	No	11.91		153.170	146.163	150	57.96	46.05			92.546	74.527
7	Yes	Existing	Mount	ERICSSON	RRUS 4415 B25	14.96	13.19	5.39	Flat	44	A	2	1	Normal	No	8.96		153.293	146.040	150	56.48	47.52			77.244	31.887
8	Yes	Existing	Mount	ERICSSON	AIR 32 B2A B66AA	56.6	12.87	8.66	Flat	143	B	1	1	Normal	No	50.60		150.225	149.442	150	57.30	6.70			305.199	220.557
9	Yes	Proposed	Mount	ERICSSON	AIR6449 B4T_1-MOBILE	33.11	20.51	8.54	Flat	114.83	B	3	1	Normal	No	27.11		151.704	147.963	150	51.56	24.45			265.835	116.334
10	Yes	Existing	Mount	RFS CELWAVE	APXVAARR24_43-JA490_CCI CFD	95.9	24	8.7	Flat	153.3	B	2	1	Normal	Yes	89.90	72	150.667	148.667	150	88.00	16.00			680.125	249.908
11	Yes	Proposed	Mount	COMMSCOPE	SDX1980-43	4.173	6.929	2.913	Flat	6.17	B	2	1	Normal	No	1.00		153.625	145.708	150	52.50	51.50			11.319	4.759
12	Yes	Existing	Mount	ERICSSON	KRY 112 144F1	7.00	6.00	3.00	Flat	11	B	2	1	Normal	No	1.00		153.625	145.708	150	52.50	51.50			16.441	8.221
13	Yes	Proposed	Mount	ERICSSON	RADIO 4449 B71 B85A_T-MOBILE	17.91	13.2	10.63	Flat	73.21	B	2	1	Normal	No	11.91		153.170	146.163	150	57.96	46.05			92.546	74.527
14	Yes	Proposed	Mount	ERICSSON	RRUS 4415 B25	14.96	13.19	5.39	Flat	44	B	2	1	Normal	No	8.96		153.293	146.040	150	56.48	47.52			77.244	31.887
15	Yes	Existing	Mount	ERICSSON	AIR 32 B2A B66AA	56.6	12.87	8.66	Flat	143	C	1	1	Normal	No	50.60		150.225	149.442	150	57.30	6.70			305.199	220.557
16	Yes	Proposed	Mount	ERICSSON	AIR6449 B4T_1-MOBILE	33.11	20.51	8.54	Flat	114.83	C	3	1	Normal	No	27.11		151.704	147.963	150	51.56	24.45			265.835	116.334
17	Yes	Existing	Mount	RFS CELWAVE	APXVAARR24_43-JA490_CCI CFD	95.9	24	8.7	Flat	153.3	C	2	1	Normal	Yes	89.90	72	150.667	148.667	150	88.00	16.00			680.125	249.908
18	Yes	Proposed	Mount	COMMSCOPE	SDX1980-43	4.173	6.929	2.913	Flat	6.17	C	2	1	Normal	No	1.00		153.625	145.708	150	52.50	51.50			11.319	4.759
19	Yes	Existing	Mount	ERICSSON	KRY 112 144F1	7.00	6.00	3.00	Flat	11	C	2	1	Normal	No	1.00		153.625	145.708	150	52.50	51.50			16.441	8.221
20	Yes	Proposed	Mount	ERICSSON	RADIO 4449 B71 B85A_T-MOBILE	17.91	13.2	10.63	Flat	73.21	C	2	1	Normal	No	11.91		153.170	146.163	150	57.96	46.05			92.546	74.527
21	Yes	Proposed	Mount	ERICSSON	RRUS 4415 B25	14.96	13.19	5.39	Flat	44	C	2	1	Normal	No	8.96		153.293	146.040	150	56.48	47.52			77.244	31.887
22	No	Existing	Mount	DBSPCTRA	DS4C06F3BD-D	201'-N	232.8	3.2	3.2	Round	50	A	4	1	Normal	No	226.80		140.550	159.450	167					
23	No	Existing	Mount	RFS CELWAVE	201'-N	107.64	1.66	1.66	Round	6	B	4	1	Normal	No	101.64		145.765	154.235	154						
24	No	Existing	Mount	DBSPCTRA	DS4C06F3BD-D	232.8	3.2	3.2	Round	50	C	4	1	Normal	No	226.80		140.550	159.450	167						

Dishes

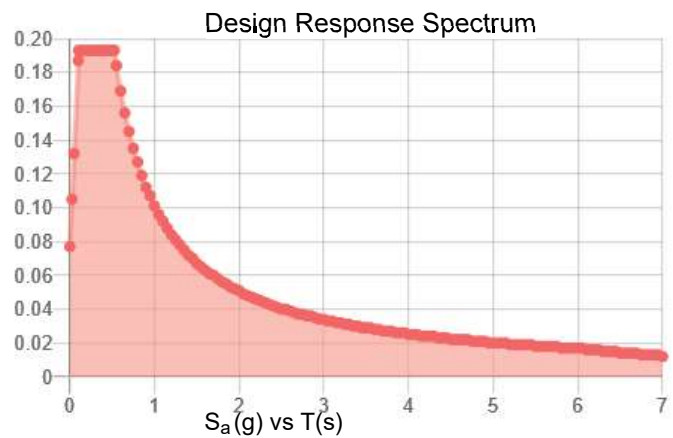
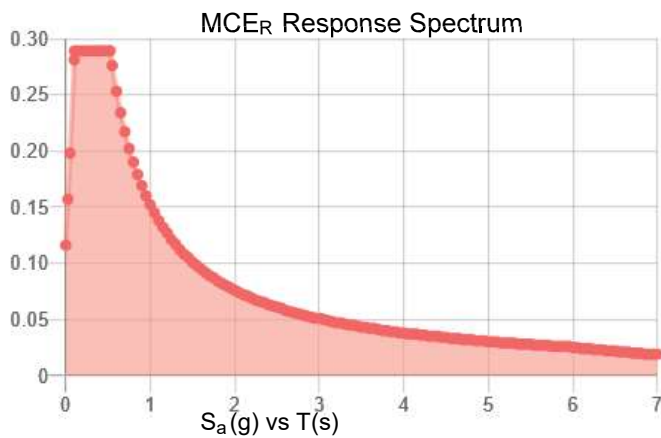
Item	Include Loading	Status	Mounting Location	Manufacturer	Microwave Dish	Dia (in)	Dish Type	Weight (lbs)	Sector / Face	Position	Top/Bottom Mounting Spacing	Override Spacing	Max. Dish CL (ft)	Min. Dish CL (ft)	Dish Bottom Mount Location (ft) Bottom	Dish Top Mount Location (ft) Bottom	Override Top Dish Mounting Location (in)	Override Bottom Dish Mounting Location (in)
1	Yes	Existing	Mount	RADIONAVES	HPD2-4.7	24.5	Paraboloid w/o Radome	27.00	A	4	18.50	6	152.083	147.893	53.00	59.00	53.00	

Site Soil Class: D - Stiff Soil

Results:

S_s :	0.181	S_{DS} :	0.193
S_1 :	0.063	S_{D1} :	0.101
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.091
S_{MS} :	0.289	PGA_M :	0.146
S_{M1} :	0.152	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B



Data Accessed:

Fri Oct 02 2020

Date Source:

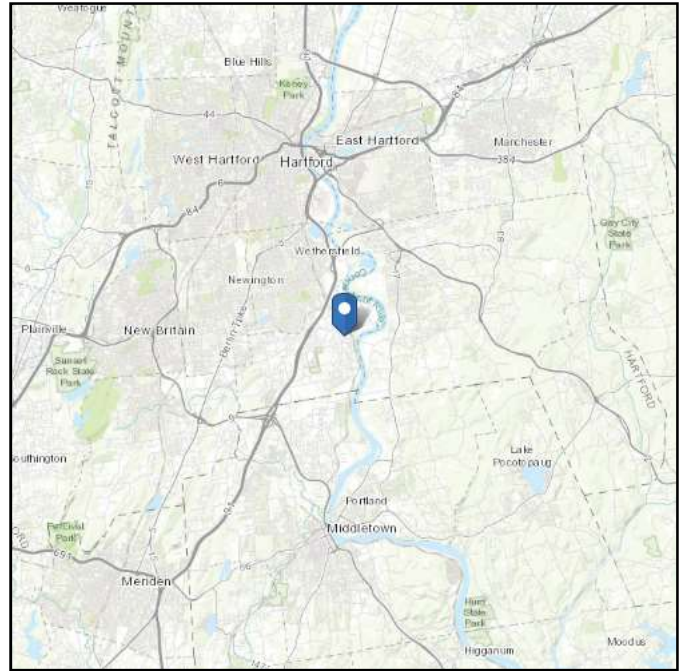
USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

ASCE 7 Hazards Report

Address:
No Address at This
Location

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

Elevation: 97.46 ft (NAVD 88)
Latitude: 41.668269
Longitude: -72.638036



Wind

Results:

Wind Speed:	124 Vmph (125 minimum required by jurisdiction)
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	93 Vmph
100-year MRI	101 Vmph

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

Date Accessed: Fri Oct 02 2020

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

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

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

Ice

Results:

Ice Thickness: 1.00 in.

Concurrent Temperature: 5 F

Gust Speed: 50 mph

Data Source: Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

Date Accessed: Fri Oct 02 2020

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

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

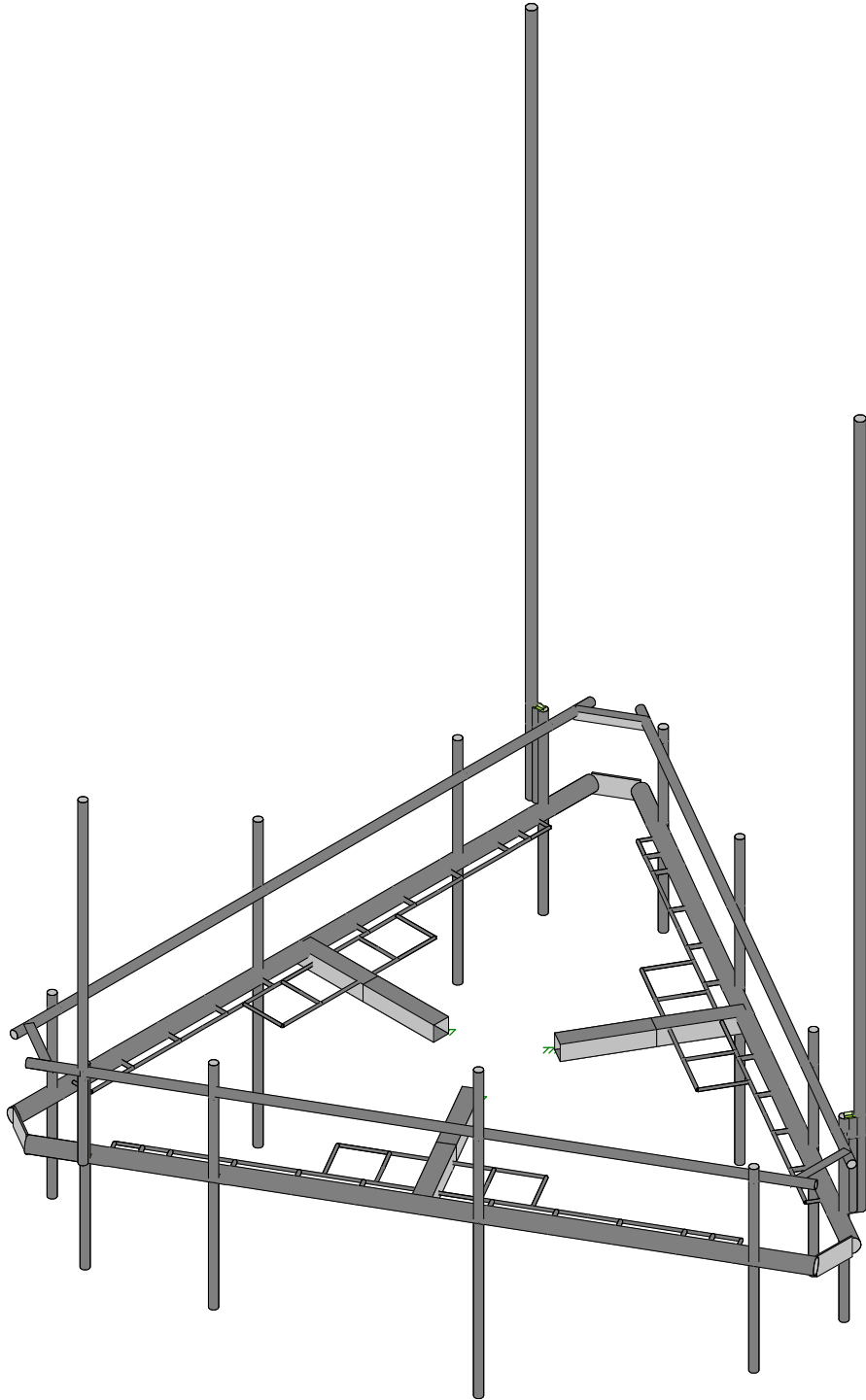
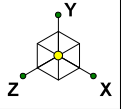
The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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APPENDIX B

SOFTWARE ANALYSIS OUTPUT



Envelope Only Solution

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MJT

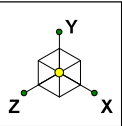
37520-2212.001.7190

BU 827050 | Rocky Hill / Route 160_1

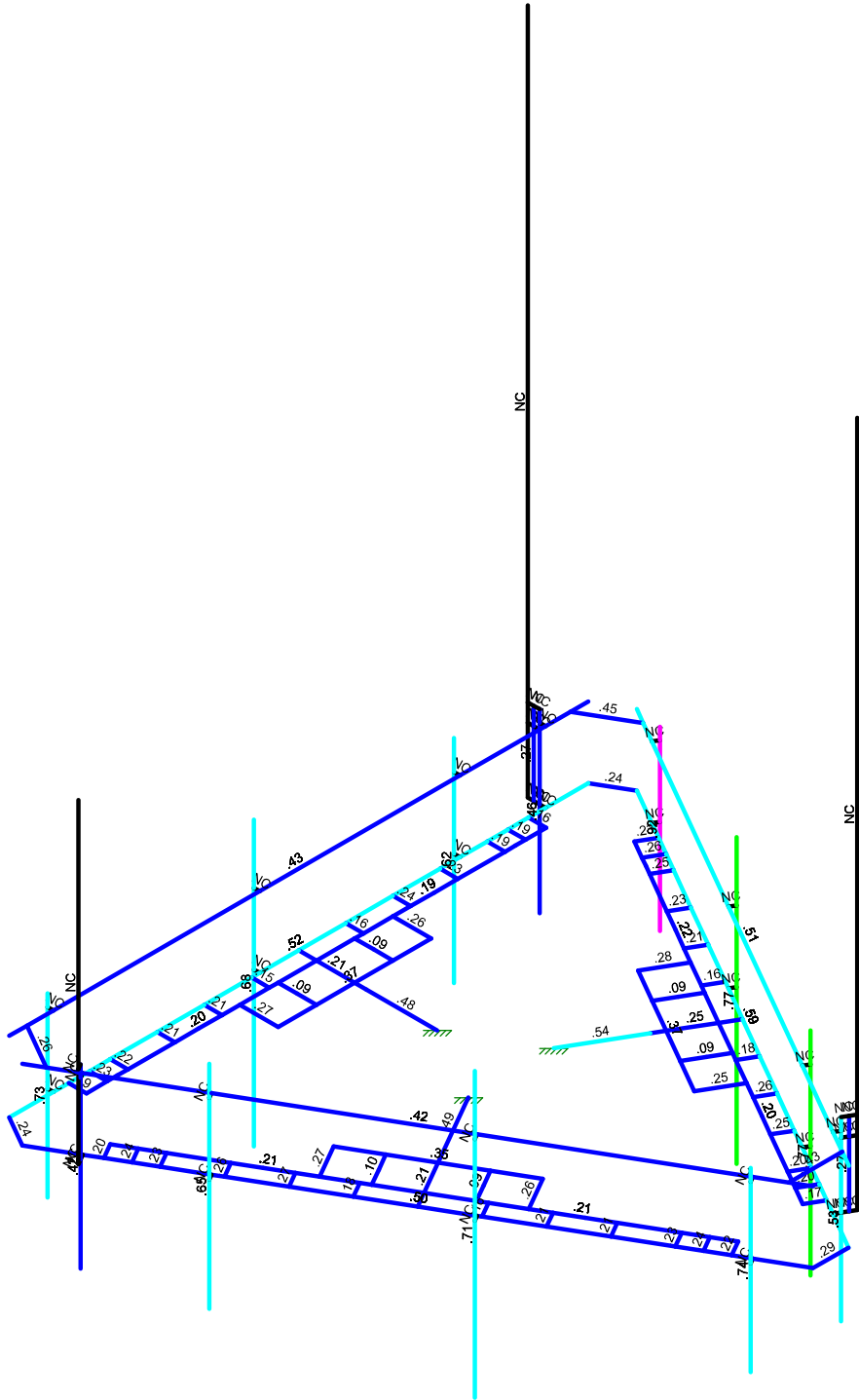
SK - 1

Oct 6, 2020 at 11:33 AM

37520-2212.001.7190_Modified_C...



Code Check (Env)	
No Calc	> 1.0
	.90-1.0
	.75-.90
	.50-.75
	0-.50

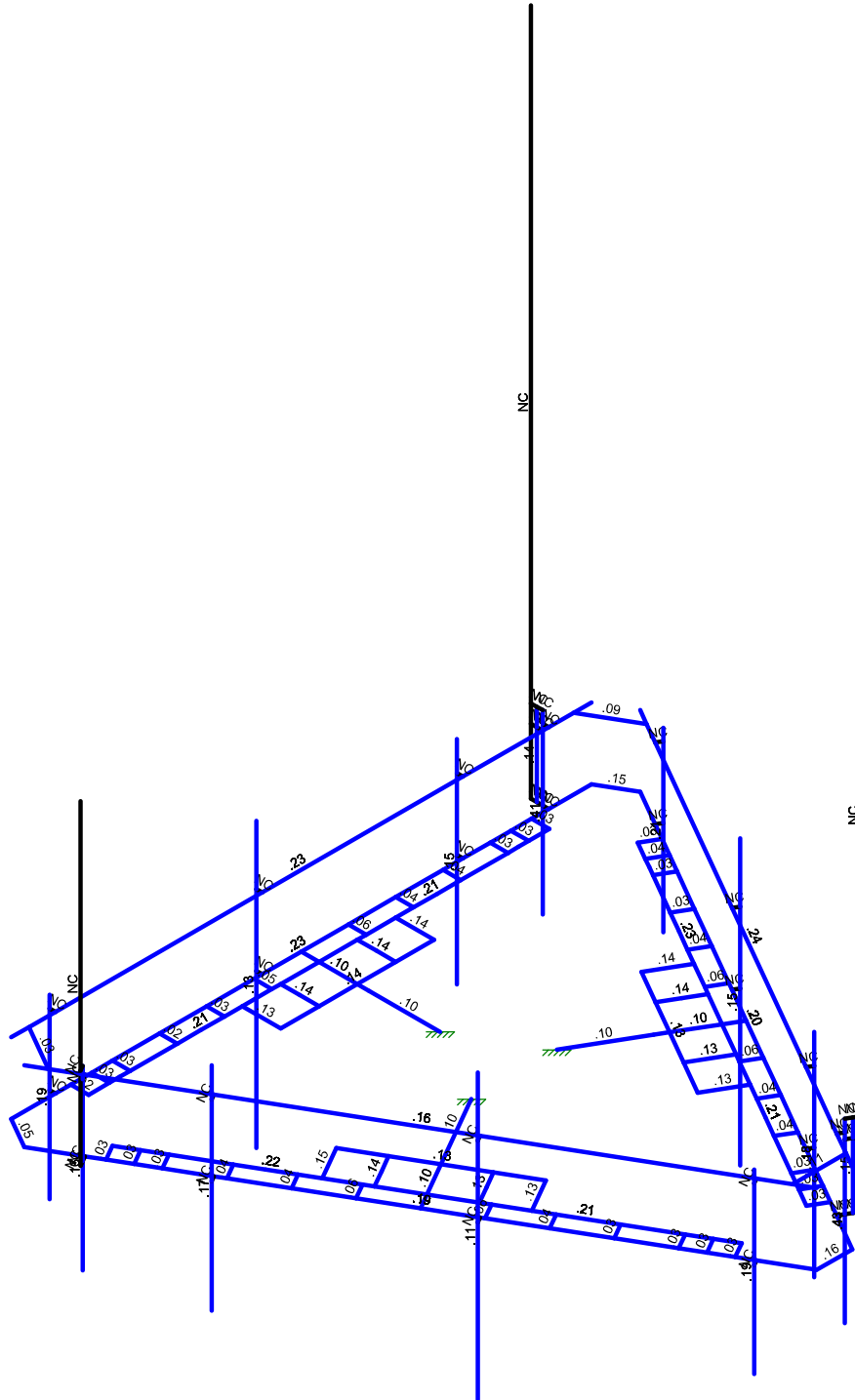
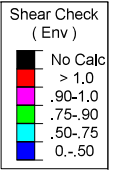
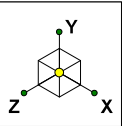


Member Code Checks Displayed (Enveloped)
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37520-2212.001.7190

BU 827050 | Rocky Hill / Route 160_1

SK - 2
Oct 6, 2020 at 11:33 AM
37520-2212.001.7190_Modified_C...



Member Shear Checks Displayed (Enveloped)
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37520-2212.001.7190

BU 827050 | Rocky Hill / Route 160_1

SK - 3

Oct 6, 2020 at 11:33 AM

37520-2212.001.7190_Modified_C...

(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	Sparse Accelerated
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	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

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

(Global) Model Settings, Continued

Seismic Code	ASCE 7-05
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Occupancy Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1...	Density[k/...	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	65	1.1
3	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.4	58	1.3
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.4	58	1.3
6	A53 Gr. B (35 ksi)	29000	11154	.3	.65	.49	35	1.5	60	1.2

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design Rules
1	CROSSC1	N6	N1			PIPE 4.0	None	None	A53 Gr...	Typical
2	M2	N1	N2			PL 6" x 1/2"	None	None	A36 Gr...	Typical
3	M3	N7	N54A			HSS5X5X6	None	None	A500 G...	Typical
4	M4	N49	N50			SR 3/4"	None	None	A36 Gr...	Typical
5	M5	N29	N40			SR 3/4"	None	None	A36 Gr...	Typical
6	M6	N30	N31			SR 1"	None	None	A36 Gr...	Typical
7	M7	N32	N33			SR 1"	None	None	A36 Gr...	Typical
8	M8	N34	N35			SR 1"	None	None	A36 Gr...	Typical
9	M9	N36	N37			SR 1"	None	None	A36 Gr...	Typical
10	M10	N38	N39			SR 1"	None	None	A36 Gr...	Typical
11	M11	N40	N256			SR 3/4"	None	None	A36 Gr...	Typical
12	M12	N41	N42			SR 3/4"	None	None	A36 Gr...	Typical
13	M13	N43	N48			SR 3/4"	None	None	A36 Gr...	Typical
14	M14	N44	N45			SR 3/4"	None	None	A36 Gr...	Typical
15	M15	N46	N47			SR 3/4"	None	None	A36 Gr...	Typical
16	M16	N47	N48			SR 3/4"	None	None	A36 Gr...	Typical
17	M17	N51	N52			SR 1"	None	None	A36 Gr...	Typical
18	M18	N53	N54			SR 1"	None	None	A36 Gr...	Typical
19	M19	N55	N56			SR 1"	None	None	A36 Gr...	Typical
20	M20	N57	N58			SR 1"	None	None	A36 Gr...	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...)	Section/Shape	Type	Design List	Material	Design Rules
21	M21	N59	N60			SR 1"	None	None	A36 Gr...	Typical
22	M22	N240	N241A			RIGID	None	None	RIGID	Typical
23	M23	N256	N50			SR 3/4"	None	None	A36 Gr...	Typical
24	M24	N54A	N8			HSS5X5X6	None	None	A500 G...	Typical
25	CROSSB1	N2	N56B			PIPE 4.0	None	None	A53 Gr...	Typical
26	M26	N56B	N57A			PL 6" x 1/2"	None	None	A36 Gr...	Typical
27	M27	N59A	N109			HSS5X5X6	None	None	A500 G...	Typical
28	M29	N83	N84			SR 3/4"	None	None	A36 Gr...	Typical
29	M30	N63	N74			SR 3/4"	None	None	A36 Gr...	Typical
30	M31	N64	N65			SR 1"	None	None	A36 Gr...	Typical
31	M32	N66	N67			SR 1"	None	None	A36 Gr...	Typical
32	M33	N68	N69			SR 1"	None	None	A36 Gr...	Typical
33	M34	N70	N71			SR 1"	None	None	A36 Gr...	Typical
34	M35	N72	N73			SR 1"	None	None	A36 Gr...	Typical
35	M36	N74	N99			SR 3/4"	None	None	A36 Gr...	Typical
36	M37	N75	N76			SR 3/4"	None	None	A36 Gr...	Typical
37	M38	N77	N82			SR 3/4"	None	None	A36 Gr...	Typical
38	M39	N78	N79			SR 3/4"	None	None	A36 Gr...	Typical
39	M40	N80	N81			SR 3/4"	None	None	A36 Gr...	Typical
40	M41	N81	N82			SR 3/4"	None	None	A36 Gr...	Typical
41	M42	N85	N86			SR 1"	None	None	A36 Gr...	Typical
42	M43	N87	N88			SR 1"	None	None	A36 Gr...	Typical
43	M44	N89	N90			SR 1"	None	None	A36 Gr...	Typical
44	M45	N91	N92			SR 1"	None	None	A36 Gr...	Typical
45	M46	N93	N94			SR 1"	None	None	A36 Gr...	Typical
46	M51	N99	N84			SR 3/4"	None	None	A36 Gr...	Typical
47	M52	N109	N60A			HSS5X5X6	None	None	A500 G...	Typical
48	CROSSA1	N57A	N110			PIPE 4.0	None	None	A53 Gr...	Typical
49	M54	N110	N6			PL 6" x 1/2"	None	None	A36 Gr...	Typical
50	M55	N112	N162			HSS5X5X6	None	None	A500 G...	Typical
51	M57	N136	N137			SR 3/4"	None	None	A36 Gr...	Typical
52	M58	N116	N127			SR 3/4"	None	None	A36 Gr...	Typical
53	M59	N117	N118			SR 1"	None	None	A36 Gr...	Typical
54	M60	N119	N120			SR 1"	None	None	A36 Gr...	Typical
55	M61	N121	N122			SR 1"	None	None	A36 Gr...	Typical
56	M62	N123	N124			SR 1"	None	None	A36 Gr...	Typical
57	M63	N125	N126			SR 1"	None	None	A36 Gr...	Typical
58	M64	N127	N152			SR 3/4"	None	None	A36 Gr...	Typical
59	M65	N128	N129			SR 3/4"	None	None	A36 Gr...	Typical
60	M66	N130	N135			SR 3/4"	None	None	A36 Gr...	Typical
61	M67	N131	N132			SR 3/4"	None	None	A36 Gr...	Typical
62	M68	N133	N134			SR 3/4"	None	None	A36 Gr...	Typical
63	M69	N134	N135			SR 3/4"	None	None	A36 Gr...	Typical
64	M70	N138	N139			SR 1"	None	None	A36 Gr...	Typical
65	M71	N140	N141			SR 1"	None	None	A36 Gr...	Typical
66	M72	N142	N143			SR 1"	None	None	A36 Gr...	Typical
67	M73	N144	N145			SR 1"	None	None	A36 Gr...	Typical
68	M74	N146	N147			SR 1"	None	None	A36 Gr...	Typical
69	M79	N152	N137			SR 3/4"	None	None	A36 Gr...	Typical
70	M80	N162	N113			HSS5X5X6	None	None	A500 G...	Typical
71	M81	N153A	N154A			RIGID	None	None	RIGID	Typical
72	M82	N155A	N156A			RIGID	None	None	RIGID	Typical
73	M83	N157A	N158A			RIGID	None	None	RIGID	Typical
74	C4	N162A	N160A			PIPE 2.0	None	None	A53 Gr...	Typical
75	C3	N166	N165			PIPE 2.0	None	None	A53 Gr...	Typical
76	C2	N164	N163			PIPE 2.0	None	None	A53 Gr...	Typical
77	C1	N161A	N159A			PIPE 2.0	None	None	A53 Gr...	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...)	Section/Shape	Type	Design List	Material	Design Rules
78	M79A	N160A	N194			RIGID	None	None	RIGID	Typical
79	M80A	N158A	N195			RIGID	None	None	RIGID	Typical
80	M81A	N149A	N150A			RIGID	None	None	RIGID	Typical
81	M82A	N151A	N152A			RIGID	None	None	RIGID	Typical
82	M83A	N153B	N154			RIGID	None	None	RIGID	Typical
83	M84	N155	N156			RIGID	None	None	RIGID	Typical
84	B5	N160	N158			PIPE 2.0	None	None	A53 Gr...	Typical
85	B3	N164A	N163A			PIPE 2.0	None	None	A53 Gr...	Typical
86	B2	N162B	N161			PIPE 2.0	None	None	A53 Gr...	Typical
87	B1	N159	N157			PIPE 2.0	None	None	A53 Gr...	Typical
88	M90	N158	N166A			RIGID	None	None	RIGID	Typical
89	M91	N156	N165A			RIGID	None	None	RIGID	Typical
90	M92	N167	N168			RIGID	None	None	RIGID	Typical
91	M93	N169	N170			RIGID	None	None	RIGID	Typical
92	M94	N171	N172			RIGID	None	None	RIGID	Typical
93	M95	N173	N174			RIGID	None	None	RIGID	Typical
94	A4	N178	N176			PIPE 2.0	None	None	A53 Gr...	Typical
95	A3	N182	N181			PIPE 2.0	None	None	A53 Gr...	Typical
96	A2	N180	N179			PIPE 2.0	None	None	A53 Gr...	Typical
97	A1	N177	N175			PIPE 2.0	None	None	A53 Gr...	Typical
98	M101	N176	N199			RIGID	None	None	RIGID	Typical
99	M102	N174	N200			RIGID	None	None	RIGID	Typical
100	A5	N183	N189			PIPE 2.5	None	None	A53 Gr...	Typical
101	C5	N147A	N191			PIPE 2.5	None	None	A53 Gr...	Typical
102	B4	N165A	N191A			PIPE 2.0	None	None	A36 Gr...	Typical
103	M103	N194	N148A			RIGID	None	None	RIGID	Typical
104	M104	N195	N147A			RIGID	None	None	RIGID	Typical
105	M105	N195	N194			PIPE 2.0	None	None	A53 Gr...	Typical
106	M106	N196	N198			RIGID	None	None	RIGID	Typical
107	M107	N198	N197			RIGID	None	None	RIGID	Typical
108	M108	N199	N184			RIGID	None	None	RIGID	Typical
109	M109	N200	N183			RIGID	None	None	RIGID	Typical
110	M110	N200	N199			PIPE 2.0	None	None	A53 Gr...	Typical
111	M111	N201	N203			RIGID	None	None	RIGID	Typical
112	M112	N203	N202			RIGID	None	None	RIGID	Typical
113	CROSSC2	N205	N204			PIPE 2.0	None	None	A53 Gr...	Typical
114	M114	N206	N207			RIGID	None	None	RIGID	Typical
115	M115	N208	N209			RIGID	None	None	RIGID	Typical
116	M116	N210	N211			RIGID	None	None	RIGID	Typical
117	M117	N212	N213			RIGID	None	None	RIGID	Typical
118	CROSSB2	N217	N216			PIPE 2.0	None	None	A53 Gr...	Typical
119	CROSSA2	N221	N220			PIPE 2.0	None	None	A53 Gr...	Typical
120	M120	N224	N225			RIGID	None	None	RIGID	Typical
121	M121	N226	N227			RIGID	None	None	RIGID	Typical
122	M122	N228	N229			RIGID	None	None	RIGID	Typical
123	M123	N230	N231			RIGID	None	None	RIGID	Typical
124	M124	N232	N233			RIGID	None	None	RIGID	Typical
125	M125	N234	N235			RIGID	None	None	RIGID	Typical
126	M126	N236	N237			RIGID	None	None	RIGID	Typical
127	M127	N238	N239			RIGID	None	None	RIGID	Typical
128	M128	N218	N215		180	L2.5x2.5x4	None	None	A36 Gr...	Typical
129	M129	N222	N219		180	L2.5x2.5x4	None	None	A36 Gr...	Typical
130	M130	N214	N223		180	L2.5x2.5x4	None	None	A36 Gr...	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	CROSSC1						Yes	** NA **			None
2	M2						Yes	** NA **			None
3	M3						Yes	** NA **			None
4	M4						Yes	** NA **			None
5	M5						Yes	** NA **			None
6	M6						Yes	** NA **			None
7	M7						Yes	** NA **			None
8	M8						Yes	** NA **			None
9	M9						Yes	** NA **			None
10	M10						Yes	** NA **			None
11	M11						Yes	** NA **			None
12	M12						Yes	** NA **			None
13	M13						Yes	** NA **			None
14	M14						Yes	** NA **			None
15	M15						Yes	** NA **			None
16	M16						Yes	** NA **			None
17	M17						Yes	** NA **			None
18	M18						Yes	** NA **			None
19	M19						Yes	** NA **			None
20	M20						Yes	** NA **			None
21	M21						Yes	** NA **			None
22	M22						Yes	** NA **			None
23	M23						Yes	** NA **			None
24	M24						Yes	** NA **			None
25	CROSSB1						Yes	** NA **			None
26	M26						Yes	** NA **			None
27	M27						Yes	** NA **			None
28	M29						Yes	** NA **			None
29	M30						Yes	** NA **			None
30	M31						Yes	** NA **			None
31	M32						Yes	** NA **			None
32	M33						Yes	** NA **			None
33	M34						Yes	** NA **			None
34	M35						Yes	** NA **			None
35	M36						Yes	** NA **			None
36	M37						Yes	** NA **			None
37	M38						Yes	** NA **			None
38	M39						Yes	** NA **			None
39	M40						Yes	** NA **			None
40	M41						Yes	** NA **			None
41	M42						Yes	** NA **			None
42	M43						Yes	** NA **			None
43	M44						Yes	** NA **			None
44	M45						Yes	** NA **			None
45	M46						Yes	** NA **			None
46	M51						Yes	** NA **			None
47	M52						Yes	** NA **			None
48	CROSSA1						Yes	** NA **			None
49	M54						Yes	** NA **			None
50	M55						Yes	** NA **			None
51	M57						Yes	** NA **			None
52	M58						Yes	** NA **			None
53	M59						Yes	** NA **			None
54	M60						Yes	** NA **			None
55	M61						Yes	** NA **			None
56	M62						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...
57	M63						Yes	** NA **			None
58	M64						Yes	** NA **			None
59	M65						Yes	** NA **			None
60	M66						Yes	** NA **			None
61	M67						Yes	** NA **			None
62	M68						Yes	** NA **			None
63	M69						Yes	** NA **			None
64	M70						Yes	** NA **			None
65	M71						Yes	** NA **			None
66	M72						Yes	** NA **			None
67	M73						Yes	** NA **			None
68	M74						Yes	** NA **			None
69	M79						Yes	** NA **			None
70	M80						Yes	** NA **			None
71	M81						Yes	** NA **			None
72	M82						Yes	** NA **			None
73	M83						Yes	** NA **			None
74	C4						Yes	** NA **			None
75	C3						Yes	** NA **			None
76	C2						Yes	** NA **			None
77	C1						Yes	** NA **			None
78	M79A						Yes	** NA **			None
79	M80A						Yes	** NA **			None
80	M81A						Yes	** NA **			None
81	M82A						Yes	** NA **			None
82	M83A						Yes	** NA **			None
83	M84						Yes	** NA **			None
84	B5						Yes	** NA **			None
85	B3						Yes	** NA **			None
86	B2						Yes	** NA **			None
87	B1						Yes	** NA **			None
88	M90						Yes	** NA **			None
89	M91						Yes	** NA **			None
90	M92						Yes	** NA **			None
91	M93						Yes	** NA **			None
92	M94						Yes	** NA **			None
93	M95						Yes	** NA **			None
94	A4						Yes	** NA **			None
95	A3						Yes	** NA **			None
96	A2						Yes	** NA **			None
97	A1						Yes	** NA **			None
98	M101						Yes	** NA **			None
99	M102						Yes	** NA **			None
100	A5						Yes	** NA **		Exclude	None
101	C5						Yes	** NA **		Exclude	None
102	B4						Yes	** NA **		Exclude	None
103	M103						Yes	** NA **			None
104	M104						Yes	** NA **			None
105	M105						Yes	** NA **			None
106	M106						Yes	** NA **			None
107	M107						Yes	** NA **			None
108	M108						Yes	** NA **			None
109	M109						Yes	** NA **			None
110	M110						Yes	** NA **			None
111	M111						Yes	** NA **			None
112	M112						Yes	** NA **			None
113	CROSSC2						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...
114	M114						Yes	** NA **			None
115	M115						Yes	** NA **			None
116	M116						Yes	** NA **			None
117	M117						Yes	** NA **			None
118	CROSSB2						Yes	** NA **			None
119	CROSSA2						Yes	** NA **			None
120	M120						Yes	** NA **			None
121	M121						Yes	** NA **			None
122	M122						Yes	** NA **			None
123	M123						Yes	** NA **			None
124	M124						Yes	** NA **			None
125	M125						Yes	** NA **			None
126	M126						Yes	** NA **			None
127	M127						Yes	** NA **			None
128	M128						Yes	** NA **			None
129	M129						Yes	** NA **			None
130	M130						Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	CROSSC1	PIPE 4.0	196.5			Lbyy						Lateral
2	M2	PL 6" x 1/2"	12			Lbyy						Lateral
3	M3	HSS5X5X6	23			Lbyy						Lateral
4	M4	SR 3/4"	6			Lbyy						Lateral
5	M5	SR 3/4"	6			Lbyy						Lateral
6	M6	SR 1"	6			Lbyy						Lateral
7	M7	SR 1"	6			Lbyy						Lateral
8	M8	SR 1"	6			Lbyy						Lateral
9	M9	SR 1"	6			Lbyy						Lateral
10	M10	SR 1"	6			Lbyy						Lateral
11	M11	SR 3/4"	78	16	16	Lbyy						Lateral
12	M12	SR 3/4"	13			Lbyy						Lateral
13	M13	SR 3/4"	13			Lbyy						Lateral
14	M14	SR 3/4"	13			Lbyy						Lateral
15	M15	SR 3/4"	13			Lbyy						Lateral
16	M16	SR 3/4"	52			Lbyy						Lateral
17	M17	SR 1"	6			Lbyy						Lateral
18	M18	SR 1"	6			Lbyy						Lateral
19	M19	SR 1"	6			Lbyy						Lateral
20	M20	SR 1"	6			Lbyy						Lateral
21	M21	SR 1"	6			Lbyy						Lateral
22	M23	SR 3/4"	78	16	16	Lbyy						Lateral
23	M24	HSS5X5X6	24			Lbyy						Lateral
24	CROSSB1	PIPE 4.0	196.541			Lbyy						Lateral
25	M26	PL 6" x 1/2"	12			Lbyy						Lateral
26	M27	HSS5X5X6	22.965			Lbyy						Lateral
27	M29	SR 3/4"	5.993			Lbyy						Lateral
28	M30	SR 3/4"	5.937			Lbyy						Lateral
29	M31	SR 1"	5.939			Lbyy						Lateral
30	M32	SR 1"	5.942			Lbyy						Lateral
31	M33	SR 1"	5.947			Lbyy						Lateral
32	M34	SR 1"	5.953			Lbyy						Lateral
33	M35	SR 1"	5.959			Lbyy						Lateral
34	M36	SR 3/4"	78	16	16	Lbyy						Lateral
35	M37	SR 3/4"	13			Lbyy						Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbvy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
36	M38	SR 3/4"	13			Lbyy						Lateral
37	M39	SR 3/4"	13			Lbyy						Lateral
38	M40	SR 3/4"	13			Lbyy						Lateral
39	M41	SR 3/4"	52			Lbyy						Lateral
40	M42	SR 1"	5.99			Lbyy						Lateral
41	M43	SR 1"	5.988			Lbyy						Lateral
42	M44	SR 1"	5.982			Lbyy						Lateral
43	M45	SR 1"	5.976			Lbyy						Lateral
44	M46	SR 1"	5.97			Lbyy						Lateral
45	M51	SR 3/4"	78	16	16	Lbyy						Lateral
46	M52	HSS5X5X6	24			Lbyy						Lateral
47	CROSSA1	PIPE 4.0	196.541			Lbyy						Lateral
48	M54	PL 6" x 1/2"	12.082			Lbyy						Lateral
49	M55	HSS5X5X6	22.965			Lbyy						Lateral
50	M57	SR 3/4"	5.993			Lbyy						Lateral
51	M58	SR 3/4"	5.937			Lbyy						Lateral
52	M59	SR 1"	5.939			Lbyy						Lateral
53	M60	SR 1"	5.942			Lbyy						Lateral
54	M61	SR 1"	5.947			Lbyy						Lateral
55	M62	SR 1"	5.953			Lbyy						Lateral
56	M63	SR 1"	5.959			Lbyy						Lateral
57	M64	SR 3/4"	78	16	16	Lbyy						Lateral
58	M65	SR 3/4"	13			Lbyy						Lateral
59	M66	SR 3/4"	13			Lbyy						Lateral
60	M67	SR 3/4"	13			Lbyy						Lateral
61	M68	SR 3/4"	13			Lbyy						Lateral
62	M69	SR 3/4"	52			Lbyy						Lateral
63	M70	SR 1"	5.99			Lbyy						Lateral
64	M71	SR 1"	5.988			Lbyy						Lateral
65	M72	SR 1"	5.982			Lbyy						Lateral
66	M73	SR 1"	5.976			Lbyy						Lateral
67	M74	SR 1"	5.97			Lbyy						Lateral
68	M79	SR 3/4"	78	16	16	Lbyy						Lateral
69	M80	HSS5X5X6	24			Lbyy						Lateral
70	C4	PIPE 2.0	60									Lateral
71	C3	PIPE 2.0	72									Lateral
72	C2	PIPE 2.0	96									Lateral
73	C1	PIPE 2.0	60									Lateral
74	B5	PIPE 2.0	60									Lateral
75	B3	PIPE 2.0	72									Lateral
76	B2	PIPE 2.0	96									Lateral
77	B1	PIPE 2.0	60									Lateral
78	A4	PIPE 2.0	60									Lateral
79	A3	PIPE 2.0	72									Lateral
80	A2	PIPE 2.0	96									Lateral
81	A1	PIPE 2.0	60									Lateral
82	A5	PIPE 2.5	232.8									Lateral
83	C5	PIPE 2.5	232.8									Lateral
84	B4	PIPE 2.0	107									Lateral
85	M105	PIPE 2.0	28									Lateral
86	M110	PIPE 2.0	28									Lateral
87	CROSSC2	PIPE 2.0	196.5			Lbyy						Lateral
88	CROSSB2	PIPE 2.0	196.5			Lbyy						Lateral
89	CROSSA2	PIPE 2.0	196.5			Lbyy						Lateral
90	M128	L2.5x2.5x4	18.082									Lateral
91	M129	L2.5x2.5x4	18.082									Lateral
92	M130	L2.5x2.5x4	18.082									Lateral

Basic Load Cases

	BLC Description	Category	X Grav...	Y Grav...	Z Grav...	Joint	Point	Distrib...	Area(Member)	Surfac...
1	Dead	None		-1.1			38		6	
2	Wind 0	None					76	184		
3	Wind 30	None					76	184		
4	Wind 60	None					76	184		
5	Wind 90	None					76	184		
6	Wind 120	None					76	184		
7	Wind 150	None					76	184		
8	Ice Load	None					38	92	6	
9	Ice 0	None					76	184		
10	Ice 30	None					76	184		
11	Ice 60	None					76	184		
12	Ice 90	None					76	184		
13	Ice 120	None					76	184		
14	Ice 150	None					76	184		
15	Lm1	None				1				
16	Lm2	None				1				
17	Lm3	None				1				
18	Lm4	None				1				
19	Lv1	None				1				
20	Lv2	None				1				
21	Lv3	None				1				
22	Lv4	None				1				
23	BLC 1 Transient Area Loads	None						100		
24	BLC 8 Transient Area Loads	None						100		

Load Combinations

	Description	Solve	PDe...	SRSS B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...
1	1.4 D	Yes	Y		1	1.4											
2	1.2 D + 1.0 Wo @ 0	Yes	Y		1	1.2	2	1									
3	1.2 D + 1.0 Wo @ 30	Yes	Y		1	1.2	3	1									
4	1.2 D + 1.0 Wo @ 60	Yes	Y		1	1.2	4	1									
5	1.2 D + 1.0 Wo @ 90	Yes	Y		1	1.2	5	1									
6	1.2 D + 1.0 Wo @ 120	Yes	Y		1	1.2	6	1									
7	1.2 D + 1.0 Wo @ 150	Yes	Y		1	1.2	7	1									
8	1.2 D + 1.0 Wo @ 180	Yes	Y		1	1.2	2	-1									
9	1.2 D + 1.0 Wo @ 210	Yes	Y		1	1.2	3	-1									
10	1.2 D + 1.0 Wo @ 240	Yes	Y		1	1.2	4	-1									
11	1.2 D + 1.0 Wo @ 270	Yes	Y		1	1.2	5	-1									
12	1.2 D + 1.0 Wo @ 300	Yes	Y		1	1.2	6	-1									
13	1.2 D + 1.0 Wo @ 330	Yes	Y		1	1.2	7	-1									
14	1.2 D + 1.0 Di + 1.0 Wi @ 0	Yes	Y		1	1.2	8	1	9	1							
15	1.2 D + 1.0 Di + 1.0 Wi @ 30	Yes	Y		1	1.2	8	1	10	1							
16	1.2 D + 1.0 Di + 1.0 Wi @ 60	Yes	Y		1	1.2	8	1	11	1							
17	1.2 D + 1.0 Di + 1.0 Wi @ 90	Yes	Y		1	1.2	8	1	12	1							
18	1.2 D + 1.0 Di + 1.0 Wi @ 120	Yes	Y		1	1.2	8	1	13	1							
19	1.2 D + 1.0 Di + 1.0 Wi @ 150	Yes	Y		1	1.2	8	1	14	1							
20	1.2 D + 1.0 Di + 1.0 Wi @ 180	Yes	Y		1	1.2	8	1	9	-1							
21	1.2 D + 1.0 Di + 1.0 Wi @ 210	Yes	Y		1	1.2	8	1	10	-1							
22	1.2 D + 1.0 Di + 1.0 Wi @ 240	Yes	Y		1	1.2	8	1	11	-1							
23	1.2 D + 1.0 Di + 1.0 Wi @ 270	Yes	Y		1	1.2	8	1	12	-1							
24	1.2 D + 1.0 Di + 1.0 Wi @ 300	Yes	Y		1	1.2	8	1	13	-1							
25	1.2 D + 1.0 Di + 1.0 Wi @ 330	Yes	Y		1	1.2	8	1	14	-1							
26	1.2 D + 1.5 Lm1 + 1.0 Wm @ 0	Yes	Y		1	1.2	15	1.5	2	.058							
27	1.2 D + 1.5 Lm1 + 1.0 Wm @ 30	Yes	Y		1	1.2	15	1.5	3	.058							

Load Combinations (Continued)

	Description	Solve	PDe	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...
28	1.2 D + 1.5 Lm1 + 1.0 Wm @ 60	Yes	Y		1	1.2	15	1.5	4	.058									
29	1.2 D + 1.5 Lm1 + 1.0 Wm @ 90	Yes	Y		1	1.2	15	1.5	5	.058									
30	1.2 D + 1.5 Lm1 + 1.0 Wm @ 120	Yes	Y		1	1.2	15	1.5	6	.058									
31	1.2 D + 1.5 Lm1 + 1.0 Wm @ 150	Yes	Y		1	1.2	15	1.5	7	.058									
32	1.2 D + 1.5 Lm1 + 1.0 Wm @ 180	Yes	Y		1	1.2	15	1.5	2	.058									
33	1.2 D + 1.5 Lm1 + 1.0 Wm @ 210	Yes	Y		1	1.2	15	1.5	3	.058									
34	1.2 D + 1.5 Lm1 + 1.0 Wm @ 240	Yes	Y		1	1.2	15	1.5	4	.058									
35	1.2 D + 1.5 Lm1 + 1.0 Wm @ 270	Yes	Y		1	1.2	15	1.5	5	.058									
36	1.2 D + 1.5 Lm1 + 1.0 Wm @ 300	Yes	Y		1	1.2	15	1.5	6	.058									
37	1.2 D + 1.5 Lm1 + 1.0 Wm @ 330	Yes	Y		1	1.2	15	1.5	7	.058									
38	1.2 D + 1.5 Lm2 + 1.0 Wm @ 0	Yes	Y		1	1.2	16	1.5	2	.058									
39	1.2 D + 1.5 Lm2 + 1.0 Wm @ 30	Yes	Y		1	1.2	16	1.5	3	.058									
40	1.2 D + 1.5 Lm2 + 1.0 Wm @ 60	Yes	Y		1	1.2	16	1.5	4	.058									
41	1.2 D + 1.5 Lm2 + 1.0 Wm @ 90	Yes	Y		1	1.2	16	1.5	5	.058									
42	1.2 D + 1.5 Lm2 + 1.0 Wm @ 120	Yes	Y		1	1.2	16	1.5	6	.058									
43	1.2 D + 1.5 Lm2 + 1.0 Wm @ 150	Yes	Y		1	1.2	16	1.5	7	.058									
44	1.2 D + 1.5 Lm2 + 1.0 Wm @ 180	Yes	Y		1	1.2	16	1.5	2	.058									
45	1.2 D + 1.5 Lm2 + 1.0 Wm @ 210	Yes	Y		1	1.2	16	1.5	3	.058									
46	1.2 D + 1.5 Lm2 + 1.0 Wm @ 240	Yes	Y		1	1.2	16	1.5	4	.058									
47	1.2 D + 1.5 Lm2 + 1.0 Wm @ 270	Yes	Y		1	1.2	16	1.5	5	.058									
48	1.2 D + 1.5 Lm2 + 1.0 Wm @ 300	Yes	Y		1	1.2	16	1.5	6	.058									
49	1.2 D + 1.5 Lm2 + 1.0 Wm @ 330	Yes	Y		1	1.2	16	1.5	7	.058									
50	1.2 D + 1.5 Lm3 + 1.0 Wm @ 0	Yes	Y		1	1.2	17	1.5	2	.058									
51	1.2 D + 1.5 Lm3 + 1.0 Wm @ 30	Yes	Y		1	1.2	17	1.5	3	.058									
52	1.2 D + 1.5 Lm3 + 1.0 Wm @ 60	Yes	Y		1	1.2	17	1.5	4	.058									
53	1.2 D + 1.5 Lm3 + 1.0 Wm @ 90	Yes	Y		1	1.2	17	1.5	5	.058									
54	1.2 D + 1.5 Lm3 + 1.0 Wm @ 120	Yes	Y		1	1.2	17	1.5	6	.058									
55	1.2 D + 1.5 Lm3 + 1.0 Wm @ 150	Yes	Y		1	1.2	17	1.5	7	.058									
56	1.2 D + 1.5 Lm3 + 1.0 Wm @ 180	Yes	Y		1	1.2	17	1.5	2	.058									
57	1.2 D + 1.5 Lm3 + 1.0 Wm @ 210	Yes	Y		1	1.2	17	1.5	3	.058									
58	1.2 D + 1.5 Lm3 + 1.0 Wm @ 240	Yes	Y		1	1.2	17	1.5	4	.058									
59	1.2 D + 1.5 Lm3 + 1.0 Wm @ 270	Yes	Y		1	1.2	17	1.5	5	.058									
60	1.2 D + 1.5 Lm3 + 1.0 Wm @ 300	Yes	Y		1	1.2	17	1.5	6	.058									
61	1.2 D + 1.5 Lm3 + 1.0 Wm @ 330	Yes	Y		1	1.2	17	1.5	7	.058									
62	1.2 D + 1.5 Lm4 + 1.0 Wm @ 0	Yes	Y		1	1.2	18	1.5	2	.058									
63	1.2 D + 1.5 Lm4 + 1.0 Wm @ 30	Yes	Y		1	1.2	18	1.5	3	.058									
64	1.2 D + 1.5 Lm4 + 1.0 Wm @ 60	Yes	Y		1	1.2	18	1.5	4	.058									
65	1.2 D + 1.5 Lm4 + 1.0 Wm @ 90	Yes	Y		1	1.2	18	1.5	5	.058									
66	1.2 D + 1.5 Lm4 + 1.0 Wm @ 120	Yes	Y		1	1.2	18	1.5	6	.058									
67	1.2 D + 1.5 Lm4 + 1.0 Wm @ 150	Yes	Y		1	1.2	18	1.5	7	.058									
68	1.2 D + 1.5 Lm4 + 1.0 Wm @ 180	Yes	Y		1	1.2	18	1.5	2	-0.0...									
69	1.2 D + 1.5 Lm4 + 1.0 Wm @ 210	Yes	Y		1	1.2	18	1.5	3	-0.0...									
70	1.2 D + 1.5 Lm4 + 1.0 Wm @ 240	Yes	Y		1	1.2	18	1.5	4	-0.0...									
71	1.2 D + 1.5 Lm4 + 1.0 Wm @ 270	Yes	Y		1	1.2	18	1.5	5	-0.0...									
72	1.2 D + 1.5 Lm4 + 1.0 Wm @ 300	Yes	Y		1	1.2	18	1.5	6	-0.0...									
73	1.2 D + 1.5 Lm4 + 1.0 Wm @ 330	Yes	Y		1	1.2	18	1.5	7	-0.0...									
74	1.2 D + 1.5 Lv1	Yes	Y		1	1.2	19	1.5											
75	1.2 D + 1.5 Lv2	Yes	Y		1	1.2	20	1.5											
76	1.2 D + 1.5 Lv3	Yes	Y		1	1.2	21	1.5											
77	1.2 D + 1.5 Lv4	Yes	Y		1	1.2	22	1.5											
78	1.0 D	Yes	Y		1	1													

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	N8	max	1834.398	11	4660.539	23	1811.093	3	19.549	44	56.856	3	-24.974	5
2		min	-1960.357	5	1010.133	5	-1825.11	9	-11.563	31	-56.257	9	-198.79	23
3	N60A	max	2031.418	11	4705.64	19	2199.187	2	-23.093	13	66.119	9	106.994	18
4		min	-1986.732	5	960.127	13	-2096.608	8	-166.922	19	-65.946	3	13.359	13
5	N113	max	2020.26	11	5138.521	14	2058.454	2	191.115	15	69.504	7	117.093	16
6		min	-1938.984	5	1148.552	8	-2146.425	8	23.156	9	-69.183	13	15.056	10
7	Totals:	max	5886.076	11	13916.957	24	5942.471	2						
8		min	-5886.073	5	3784.02	78	-5942.466	8						

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

	Member	Shape	Code C...	Loc[in]	LC	Shear Che...	Loc[in]	Dir	LC	phi*Pn...	phi*Pnt [L...	phi*Mn ...	phi*Mn z...	Cb	Eqn
1	A1	PIPE_...	.915	32.5	17	.212	32.5		16	23808....	32130	22.459	22.459	4.126	H1-...
2	A2	PIPE_...	.771	52	3	.151	52		17	14916....	32130	22.459	22.459	2.512	H1-...
3	A3	PIPE_...	.768	38.25	25	.180	38.25		24	20866....	32130	22.459	22.459	4.231	H1-...
4	B1	PIPE_...	.742	32.5	20	.193	32.5		20	23808....	32130	22.459	22.459	4.135	H1-...
5	C1	PIPE_...	.726	32.5	25	.190	32.5		24	23808....	32130	22.459	22.459	3.136	H1-...
6	B2	PIPE_...	.705	52	7	.108	52		20	14916....	32130	22.459	22.459	1.593	H1-...
7	C2	PIPE_...	.679	52	11	.135	52		25	14916....	32130	22.459	22.459	1.726	H1-...
8	B3	PIPE_...	.648	38.25	17	.169	38.25		18	20866....	32130	22.459	22.459	3.891	H1-...
9	C3	PIPE_...	.621	38.25	21	.153	38.25		20	20866....	32130	22.459	22.459	2.563	H1-...
10	CROS...	PIPE_...	.587	98.27	16	.196	100....		23	39531....	93240	127.575	127.575	1.742	H1-...
11	M80	HSS5X...	.545	24	16	.097	24	y	18	253044...	255852	438.84	438.84	1.28	H1-...
12	A4	PIPE_...	.528	55.625	16	.428	55.625		15	23808....	32130	22.459	22.459	4.782	H3-6
13	CROS...	PIPE_...	.519	98.25	24	.234	98.25		17	39545....	93240	127.575	127.575	1.768	H1-...
14	CROS...	PIPE_...	.514	112.578	17	.240	6.141		8	3668.4...	32130	22.459	22.459	3.737	H1-...
15	CROS...	PIPE_...	.496	100.318	18	.189	100....		15	39531....	93240	127.575	127.575	1.742	H1-...
16	M52	HSS5X...	.491	24	20	.100	24	y	17	253044...	255852	438.84	438.84	1.292	H1-...
17	M24	HSS5X...	.482	24	22	.097	24	y	25	253044...	255852	438.84	438.84	1.291	H1-...
18	C4	PIPE_...	.463	55.625	23	.409	55.625		23	23808....	32130	22.459	22.459	3.404	H3-6
19	M130	L2.5x2...	.450	18.082	23	.089	18.082	z	11	35802....	38556	13.363	30.449	1.784	H2-1
20	M129	L2.5x2...	.432	18.082	4	.111	18.082	z	3	35802....	38556	13.363	30.449	2.222	H2-1
21	CROS...	PIPE_...	.428	112.578	25	.233	6.141		4	3668.4...	32130	22.459	22.459	3.82	H1-...
22	B5	PIPE_...	.423	32.5	17	.163	55.625		19	23808....	32130	22.459	22.459	4.228	H1-...
23	CROS...	PIPE_...	.423	114.625	20	.165	182....		13	3668.4...	32130	22.459	22.459	3.528	H1-...
24	M16	SR 3/4"	.368	26	16	.136	13		18	1297.6...	14313.866	2.147	2.147	1.46	H1-...
25	M69	SR 3/4"	.366	26	22	.131	39		21	1297.6...	14313.866	2.147	2.147	1.436	H1-...
26	M41	SR 3/4"	.351	26	15	.134	13		14	1297.6...	14313.866	2.147	2.147	1.435	H1-...
27	M26	PL 6" x...	.285	0	7	.165	12	y	9	67747....	97200	12.15	145.8	1.057	H1-...
28	M66	SR 3/4"	.280	0	18	.141	0		21	11113....	14313.866	2.147	2.147	2.358	H1-...
29	M40	SR 3/4"	.274	0	14	.145	0		14	11113....	14313.866	2.147	2.147	2.375	H1-...
30	M34	SR 1"	.271	0	2	.036	5.953		8	24698....	25446.895	5.089	5.089	1.412	H1-...
31	M110	PIPE_...	.270	28	6	.151	21.875		16	30099....	32130	22.459	22.459	1.948	H1-...
32	M105	PIPE_...	.269	28	2	.141	21.875		24	30099....	32130	22.459	22.459	1.685	H1-...
33	M13	SR 3/4"	.266	0	15	.135	0		16	11113....	14313.866	2.147	2.147	2.243	H1-...
34	M62	SR 1"	.263	0	10	.044	5.953		4	24698....	25446.895	5.089	5.089	1.48	H1-...
35	M70	SR 1"	.259	0	13	.035	5.99		13	24689....	25446.895	5.089	5.089	1.768	H1-...
36	M38	SR 3/4"	.259	0	22	.133	0		25	11113....	14313.866	2.147	2.147	2.365	H1-...
37	M33	SR 1"	.258	0	2	.036	5.947		2	24699....	25446.895	5.089	5.089	1.608	H1-...
38	M128	L2.5x2...	.258	18.082	24	.035	0	y	6	35802....	38556	13.363	30.449	1.08	H2-1
39	M15	SR 3/4"	.258	0	23	.136	0		18	11113....	14313.866	2.147	2.147	2.24	H1-...
40	M68	SR 3/4"	.249	0	16	.127	0		22	11113....	14313.866	2.147	2.147	2.244	H1-...
41	M71	SR 1"	.248	0	7	.031	5.988		7	24689....	25446.895	5.089	5.089	1.723	H1-...
42	M55	HSS5X...	.246	22.965	16	.096	22.965	y	18	253280...	255852	438.84	438.84	1.783	H1-...
43	M61	SR 1"	.246	0	10	.043	5.947		10	24699....	25446.895	5.089	5.089	1.699	H1-...
44	M9	SR 1"	.244	0	6	.041	6		12	24686....	25446.895	5.089	5.089	1.463	H1-...

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

	Member	Shape	Code C...	Loc[in]	LC	Shear Che...	Loc[in]	Dir	LC	phi*Pn...	phi*Pnt [L...	phi*Mn...	phi*Mn z...	Cb	Eqn
45	M2	PL 6" x...	.244	0	12	.053	12	y	13	67747....	97200	12.15	145.8	1.108	H1-...
46	M42	SR 1"	.243	0	11	.034	5.99		4	24689....	25446.895	5.089	5.089	1.758	H1-...
47	M31	SR 1"	.238	0	3	.034	5.939		3	24701....	25446.895	5.089	5.089	1.723	H1-...
48	M54	PL 6" x...	.235	0	4	.150	12.082	y	5	67413....	97200	12.15	145.526	1.053	H1-...
49	M32	SR 1"	.232	0	3	.030	5.942		2	24701....	25446.895	5.089	5.089	1.78	H1-...
50	M43	SR 1"	.232	0	11	.031	5.988		11	24689....	25446.895	5.089	5.089	1.705	H1-...
51	M57	SR 3/4"	.230	0	13	.027	5.993		13	13564....	14313.866	2.147	2.147	1.107	H1-...
52	M8	SR 1"	.229	0	6	.041	6		6	24686....	25446.895	5.089	5.089	1.639	H1-...
53	M17	SR 1"	.228	0	3	.029	6		3	24686....	25446.895	5.089	5.089	1.644	H1-...
54	M72	SR 1"	.226	0	7	.027	5.982		13	24691....	25446.895	5.089	5.089	1.586	H1-...
55	M18	SR 1"	.224	0	3	.026	6		3	24686....	25446.895	5.089	5.089	1.733	H1-...
56	M79	SR 3/4"	.224	64.188	7	.228	31.688		17	9756.1...	14313.866	2.147	2.147	1	H1-...
57	M29	SR 3/4"	.218	0	5	.026	5.993		5	13564....	14313.866	2.147	2.147	1.048	H1-...
58	M73	SR 1"	.215	0	8	.040	0		19	24692....	25446.895	5.089	5.089	1.385	H1-...
59	M36	SR 3/4"	.213	61.75	2	.216	46.313		19	9756.1...	14313.866	2.147	2.147	2.91	H1-...
60	M20	SR 1"	.212	0	4	.032	0		16	24686....	25446.895	5.089	5.089	1.384	H1-...
61	M27	HSS5X...	.212	22.965	20	.098	22.965	y	17	253280...	255852	438.84	438.84	1.889	H1-...
62	M19	SR 1"	.211	0	4	.024	6		4	24686....	25446.895	5.089	5.089	1.598	H1-...
63	M3	HSS5X...	.211	23	24	.096	23	y	25	253272...	255852	438.84	438.84	1.86	H1-...
64	M51	SR 3/4"	.210	64.188	11	.210	31.688		21	9756.1...	14313.866	2.147	2.147	1	H1-...
65	M44	SR 1"	.209	0	11	.026	5.982		5	24691....	25446.895	5.089	5.089	1.601	H1-...
66	M45	SR 1"	.209	0	12	.037	0		22	24692....	25446.895	5.089	5.089	1.392	H1-...
67	M30	SR 3/4"	.204	0	3	.026	5.937		3	13578....	14313.866	2.147	2.147	1.549	H1-...
68	M60	SR 1"	.204	0	11	.035	5.942		10	24701....	25446.895	5.089	5.089	1.826	H1-...
69	M64	SR 3/4"	.201	61.75	10	.206	46.313		15	9756.1...	14313.866	2.147	2.147	2.296	H1-...
70	M23	SR 3/4"	.200	64.187	3	.209	31.687		25	9756.1...	14313.866	2.147	2.147	3.071	H1-...
71	M59	SR 1"	.195	0	11	.035	5.939		11	24701....	25446.895	5.089	5.089	1.968	H1-...
72	M4	SR 3/4"	.194	0	9	.023	6		3	13562....	14313.866	2.147	2.147	2.472	H1-...
73	M7	SR 1"	.194	0	7	.034	6		6	24686....	25446.895	5.089	5.089	1.815	H1-...
74	M6	SR 1"	.192	0	7	.033	6		7	24686....	25446.895	5.089	5.089	1.939	H1-...
75	M11	SR 3/4"	.188	61.75	6	.212	46.313		23	9756.1...	14313.866	2.147	2.147	2.448	H1-...
76	M35	SR 1"	.180	0	2	.061	0		14	24697....	25446.895	5.089	5.089	1.284	H1-...
77	M63	SR 1"	.177	0	10	.059	0		22	24697....	25446.895	5.089	5.089	1.294	H1-...
78	M58	SR 3/4"	.165	0	12	.027	5.937		11	13578....	14313.866	2.147	2.147	2.339	H1-...
79	M10	SR 1"	.162	0	6	.061	0		18	24686....	25446.895	5.089	5.089	1.278	H1-...
80	M5	SR 3/4"	.162	0	7	.026	6		7	13562....	14313.866	2.147	2.147	1.142	H1-...
81	M46	SR 1"	.158	0	12	.057	0		25	24694....	25446.895	5.089	5.089	1.26	H1-...
82	M74	SR 1"	.155	0	8	.058	0		21	24694....	25446.895	5.089	5.089	1.266	H1-...
83	M21	SR 1"	.154	0	4	.052	0		16	24686....	25446.895	5.089	5.089	1.249	H1-...
84	M39	SR 3/4"	.097	13	2	.142	0		14	11113....	14313.866	2.147	2.147	1.703	H1-...
85	M67	SR 3/4"	.094	13	10	.134	0		22	11113....	14313.866	2.147	2.147	2.369	H1-...
86	M65	SR 3/4"	.090	0	17	.139	0		22	11113....	14313.866	2.147	2.147	1.782	H1-...
87	M12	SR 3/4"	.090	13	4	.137	0		16	11113....	14313.866	2.147	2.147	1.782	H1-...
88	M37	SR 3/4"	.090	13	12	.130	0		14	11113....	14313.866	2.147	2.147	1.741	H1-...
89	M14	SR 3/4"	.088	13	6	.140	0		18	11113....	14313.866	2.147	2.147	2.748	H1-...

APPENDIX C

ADDITIONAL CALCULATIONS

MOUNT TO TOWER CONNECTION CHECKS-LRFD

TIA Rev.	H-15.5	AISC	15th
Mount Type	3-Sector	Checks	Bolts & Welds

REACTIONS FROM RISA-3D

NODE	LC	Horizontal Shear (k)	Vertical Shear (k)	Axial along member(k)	Moment about horizontal axis (ft-k)	Moment about Vertical axis (ft-k)	Torque (ft-k)
N8	ENVELOPE	1.81	4.66	1.96	16.56	4.74	1.63

Bolt Information	Type	Dia (in)	Quantity	Vertical Bolt spacing (D) (in)	Horizontal Bolt spacing (B) (in)
	A325N	0.625	4	7	7

CHECKS	Forces	Strength	Rating
TENSION (K)	18.75	20.7	90.5%
	Reduced Tensile Rating		-
SHEAR (k)	2.24	12.4	18.0%

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

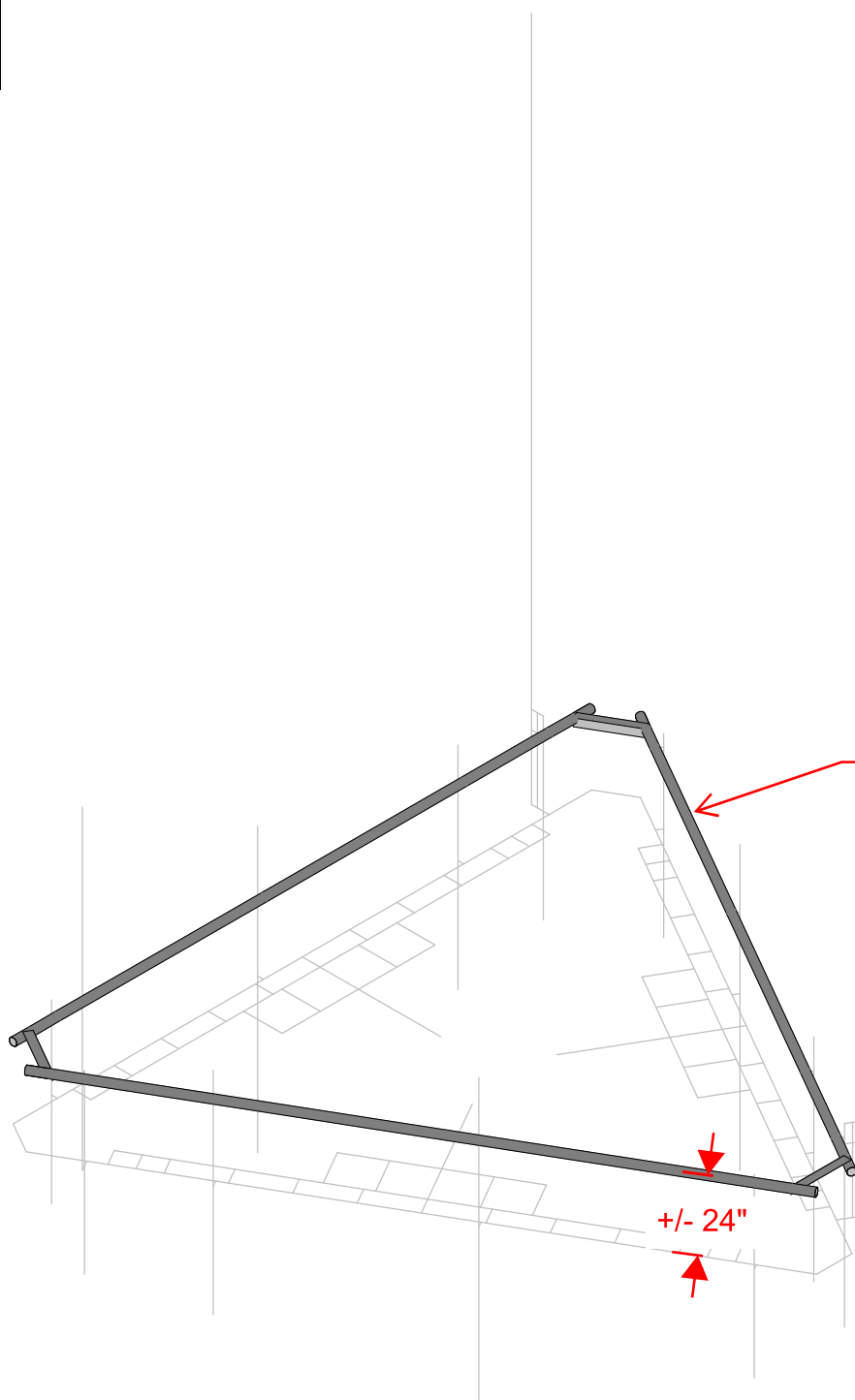
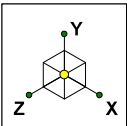
Standoff Member	Type	Width (b) (in)	Depth (d) (in)	thickness (in)	Weld Size	Weld Assumed?	Stiffeners present
	Rectangle	5	5	0.375	0.375	No	No

WELDS CHECKS	Resultant (k)	Strength (k)	Rating
	5.28	8.35	63.3%

Controlling Rating per TIA-222-H Section 15.5:	86.2%
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APPENDIX D

SUPPLEMENTAL MODIFICATION INFORMATION



Install SitePro1
HRK14

+/- 24"

Envelope Only Solution

Paul J. Ford and Company	BU 827050 Rocky Hill / Route 160_1	SK - 4
MJT		Oct 6, 2020 at 11:44 AM
37520-2212.001.7190		37520-2212.001.7190_Modified_C...

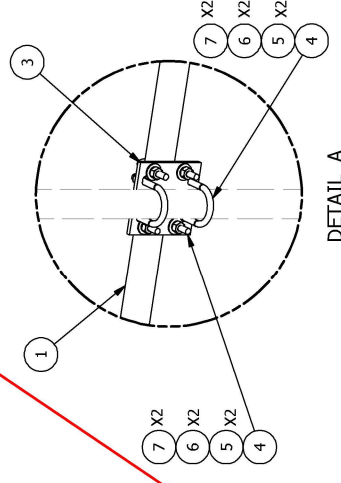
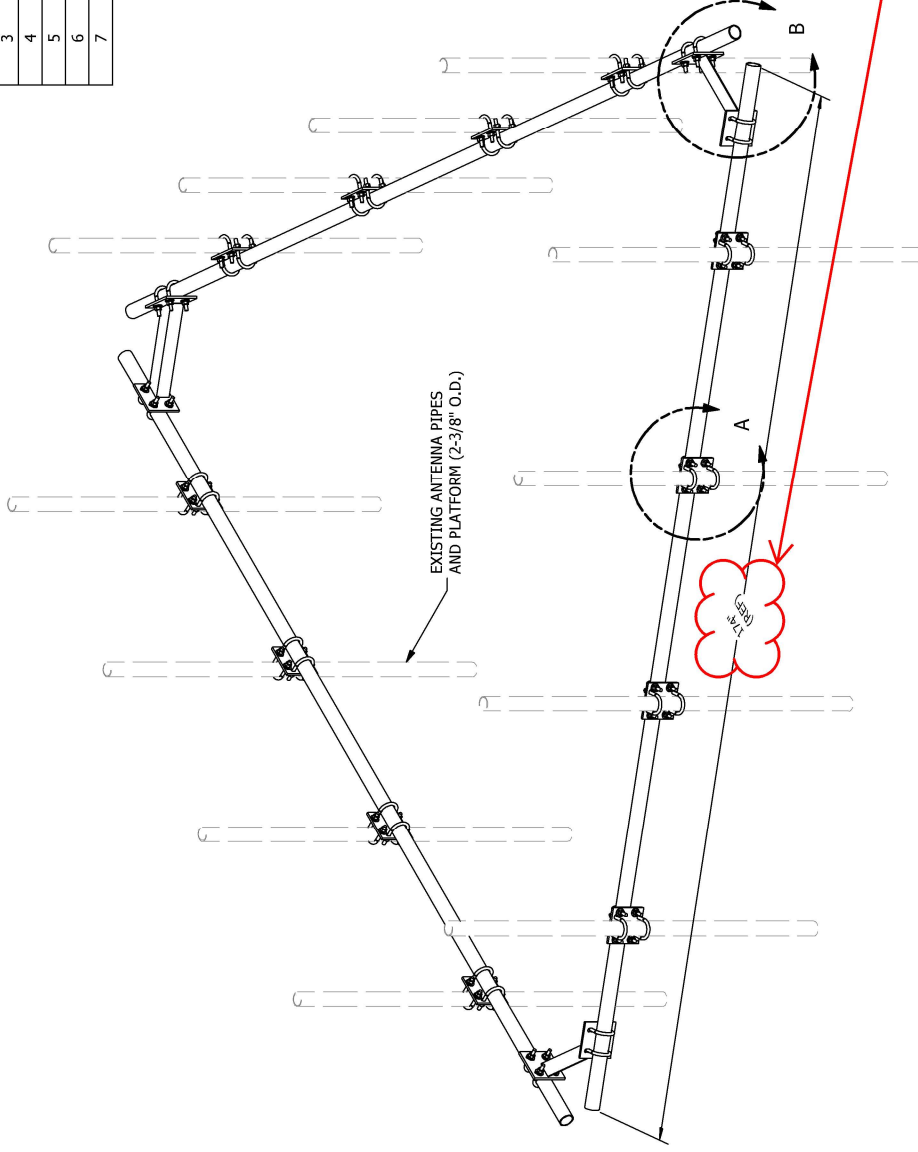
APPENDIX E

MANUFACTURER DRAWINGS (FOR REFERENCE ONLY)

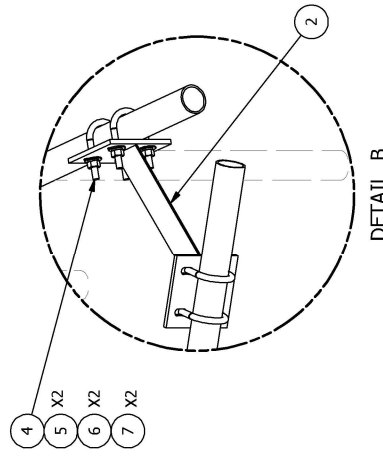


PARTS LIST

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	P2174	2-3/8" OD X 174" SCH 40 GALVANIZED PIPE	174 in	55.75	167.24
2	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
3	12	SCX1	CROSSOVER PLATE 2-3/8" X 2-3/8"	6 in	3.71	44.50
4	60	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.63	37.51
5	120	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	4.09
6	120	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	1.67
7	120	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	8.60
TOTAL WT. #						302.36



DETAIL A



DETAIL B

FIELD VERIFY
REQUIRED LENGTH

TOLERANCE NOTES

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

PROPRIETARY NOTE:
TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

HANDRAIL KIT
FOR 14'-6" FACE

DESCRIPTION

CPD NO. 81
CLASS 81
SUB 01DRAWN BY KC8
DRAWING USAGE

CUSTOMER

ENG. APPROVAL

CHECKED BY BMC

7/13/2014

PART NO.

DWG. NO.

HRK14

HRK14



A valmont COMPANY

Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Phoenix, AZ
Salem, OR
Dallas, TXEngineering
Support Team:
1-888-753-7446

1 OF 1

A REPLACED HCP WITH X-AHCP

DESCRIPTION OF REVISIONS

REVISION HISTORY

CEK 7/11/2014

BY DATE

CPD

BY DATE

Exhibit F

Power Density/RF Emissions Report

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL
TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11058C

Rocky Hill/ Rte 160_I
699 Old Main Street
Rocky Hill, Connecticut 06067

November 4, 2020

EBI Project Number: 6220005730

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	28.23%



November 4, 2020

T-Mobile

Attn: Jason Overbey, RF Manager

35 Griffin Road South

Bloomfield, Connecticut 06002

Emissions Analysis for Site: CT11058C - Rocky Hill/ Rte 160_I

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **699 Old Main Street in Rocky Hill, Connecticut** 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits; therefore, it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately $400 \mu\text{W}/\text{cm}^2$ and $467 \mu\text{W}/\text{cm}^2$, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is $1000 \mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.



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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 699 Old Main Street in Rocky Hill, Connecticut 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 manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

- 1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 1 NR channel (600 MHz Band) was considered for each sector of the proposed installation. This Channel has a transmit power of 80 Watts.
- 3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 4) 4 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 5) 4 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.



- 6) 2 UMTS channels (AWS Band - 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 7) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 8) 2 LTE channels (BRS Band - 2500 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 9) 2 NR channels (BRS Band - 2500 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 10) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 11) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 12) The antennas used in this modeling are the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector A, the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector B, the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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.

- 13) The antenna mounting height centerline of the proposed antennas is 150 feet above ground level (AGL).
- 14) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.
- 15) All calculations were done with respect to uncontrolled / general population threshold limits.



T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32
Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz
Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd
Height (AGL):	150 feet	Height (AGL):	150 feet	Height (AGL):	150 feet
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power (W):	360 Watts	Total TX Power (W):	360 Watts	Total TX Power (W):	360 Watts
ERP (W):	12,841.53	ERP (W):	12,841.53	ERP (W):	12,841.53
Antenna A1 MPE %:	2.05%	Antenna B1 MPE %:	2.05%	Antenna C1 MPE %:	2.05%
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd
Height (AGL):	150 feet	Height (AGL):	150 feet	Height (AGL):	150 feet
Channel Count:	9	Channel Count:	9	Channel Count:	9
Total TX Power (W):	380 Watts	Total TX Power (W):	380 Watts	Total TX Power (W):	380 Watts
ERP (W):	11,055.53	ERP (W):	11,055.53	ERP (W):	11,055.53
Antenna A2 MPE %:	2.66%	Antenna B2 MPE %:	2.66%	Antenna C2 MPE %:	2.66%
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz
Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd
Height (AGL):	150 feet	Height (AGL):	150 feet	Height (AGL):	150 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	160 Watts	Total TX Power (W):	160 Watts	Total TX Power (W):	160 Watts
ERP (W):	25,651.93	ERP (W):	25,651.93	ERP (W):	25,651.93
Antenna A3 MPE %:	4.10%	Antenna B3 MPE %:	4.10%	Antenna C3 MPE %:	4.10%

Site Composite MPE %	
Carrier	MPE %
T-Mobile (Max at Sector A):	8.82%
Rocky Hill/RAFS/Wethersfield	2.85%
Sprint	3.33%
Metro PCS	1.54%
AT&T	6.33%
Verizon	4.72%
Nextel	0.64%
Site Total MPE % :	28.23%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	8.82%
T-Mobile Sector B Total:	8.82%
T-Mobile Sector C Total:	8.82%
Site Total MPE % :	28.23%

T-Mobile Maximum MPE Power Values (Sector A)							
T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
T-Mobile 1900 MHz GSM	4	1028.30	150.0	6.57	1900 MHz GSM	1000	0.66%
T-Mobile 1900 MHz LTE	2	2056.61	150.0	6.57	1900 MHz LTE	1000	0.66%
T-Mobile 2100 MHz LTE	2	2307.55	150.0	7.37	2100 MHz LTE	1000	0.74%
T-Mobile 600 MHz LTE	2	591.73	150.0	1.89	600 MHz LTE	400	0.47%
T-Mobile 600 MHz NR	1	1577.94	150.0	2.52	600 MHz NR	400	0.63%
T-Mobile 700 MHz LTE	2	648.82	150.0	2.07	700 MHz LTE	467	0.44%
T-Mobile 1900 MHz LTE	2	2203.69	150.0	7.04	1900 MHz LTE	1000	0.70%
T-Mobile 2100 MHz UMTS	2	1294.56	150.0	4.14	2100 MHz UMTS	1000	0.41%
T-Mobile 2500 MHz LTE	2	6412.98	150.0	20.49	2500 MHz LTE	1000	2.05%
T-Mobile 2500 MHz NR	2	6412.98	150.0	20.49	2500 MHz NR	1000	2.05%
						Total:	8.82%

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.



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:	8.82%
Sector B:	8.82%
Sector C:	8.82%
T-Mobile Maximum MPE % (Sector A):	8.82%
Site Total:	28.23%
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **28.23%** 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.