March 19, 2021

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

RE: **Notice of Exempt Modification for T-Mobile**
Crown Site ID# 876377; T-Mobile Site ID# CTNH573A
161 Pinney Street, Colebrook, CT 06021
Latitude: 41° 57′ 58.90″ / Longitude: -73° 7′ 18.10″

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 148-foot mount on the existing 148-foot Monopole Tower located at 161 Pinney Street in Colebrook. The property is owned by Fifth State Farm LLC and the Tower is owned by Crown Castle. T-Mobile now intends to replace six (6) existing antennas and add three (3) new antennas. This modification/proposal includes hardware that is both 4G(LTE) and 5G capable through remote software configuration and either or both services may be turned on or off at various times.

Planned Modifications:
Tower:

Remove and Replace:
(3) RFS – APXVTM14-C-120 Antennas **(REMOVE)** - (3) RFS – APX16DWV-16DWV-S-E-A20 Antennas **(REPLACE)**

(3) Commscope – NNVV-65B-R4 Antennas **(REMOVE)** – (3) RFS – APXVAALL24_43-U-NA20 Antennas **(REPLACE)**

Install New:
(3) AIR6449 B41 Antennas
(3) Ericsson Radio 4424 B25
(3) Ericsson Radio 4449 B71+B85
(3) Ericsson Radio 4415 B25
(4) 1 5/8'' hybrid cable

Remove:
(12) Sprint RRUs

Ground:

Install New:
(1) SSC 6160 cabinet

(1) B160 battery cabinet
(1) BB6648
(3) BB6630
(1) PSU 4813 voltage booster
(1) IXRe router

Remove:
(1) Sprint MMBS cabinet
(1) Sprint BBU cabinet

The facility was approved by the Town of Colebrook Planning & Zoning Commission by way of a Certificate of Special Permit on July 10, 2000, application number 00-01.

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 Thomas McKeon, First Selectman for the Town of Colebrook, as well as Marc Melanson, Building Official for the Town of Colebrook. A copy will also be sent to the property owner.

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

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

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

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

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

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

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

Sincerely,

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

cc:

Thomas McKeon, First Selectman *(via email only to tommckeon@colebrooktownhall.org)*
Town of Colebrook
Town Hall
562 Colebrook Road
Colebrook, CT 06021
860.379.3359 ext. 202

Marc Melanson, Building Official *(via email only to mmelanson@colebrooktownhall.org)*
Town of Colebrook
Town Hall – Land Use Department
562 Colebrook Road
Colebrook, CT 06021
860.379.3359 ext. 209

Fifth State Farm, LLC
70 North Old Stone Bridge Road
Cos Cob, CT 06807

Zajac, Richard

From: Zajac, Richard
Sent: Friday, March 19, 2021 12:11 PM
To: tommckeon@colebrooktownhall.org
Subject: Connecticut Siting Council exempt modification application notification
Attachments: CSC Exempt Modification Application - 161 Pinney St.pdf

Good afternoon Mr. McKeon,
Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 161 Pinney Street in Colebrook .

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

Zajac, Richard

From: Zajac, Richard
Sent: Friday, March 19, 2021 12:14 PM
To: mmelanson@colebrooktownhall.org
Subject: Connecticut Siting Council exempt modification application notification
Attachments: CSC Exempt Modification Application - 161 Pinney St.pdf

Good afternoon Mr. Melanson,
Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 161 Pinney Street in Colebrook .

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

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Exhibit A

Original Facility Approval

BROWN
RUDNICK
FREED &
GESMER

THOMAS J. REGAN
Direct Dial Telephone: (860) 509-6522
E-MAIL: treganr@brfg.com

(115)

Recorded certificate (copy)

Via FedEx

August 28, 2000

Karen J. Nielsen
Property Specialist
Sprint PCS
Crossroads Corporate Center
1 International Blvd., Suite 300
Mahwah, NJ 07495

Re: CT33XC115, 161 Pinney Street, Colebrook, CT
Property Owner: Fredsall, Ellen C.

Dear Karen:

In connection with the above-referenced matter, I enclose herewith a copy of the recorded *"Certificate of Special Permit"* which has been recorded on the Land Records of the Town of Colebrook on August 1, 2000 in Volume 63, Page 923.

If you have any questions, please do not hesitate to contact me.

Very truly yours,

BROWN, RUDNICK, FREED & GESMER

By: T. J. Regan
Thomas J. Regan

TJR/bh
Enclosures

#40128382 v\1 - regantj - w39@011.doc - 80563/1813

A Partnership of
Professional Corporations

CITYPLACE I
185 ASYLUM STREET
HARTFORD, CONNECTICUT 06103-3402
860-509-6500
Fax: 860-509-6501

Boston Providence London

PLANNING & ZONING COMMISSION

TOWN OF COLEBROOK

Colebrook, Connecticut 06021

CERTIFICATE OF SPECIAL PERMIT

At a meeting held on July 10, 2000, the Planning & Zoning Commission of the Town of Colebrook voted to approve the following Special Permit:

1. Application No. 00-01
2. Owner(s) of record Ellen Fredsall
3. Applicant(s) Sprint PCS
4. Description of premises Raw Land at 161 Pinney St. - Installation of wireless Telecommunication Facility & associated ground mounted Equipment.
5. The provisions of the Special Permit, including specific section(s) of the Regulations of the Planning & Zoning Commission are as follows:

See attached Letter to Sprint PCS dated July 21, 2000

By _____
Chairman, Colebrook Planning & Zoning Commission
PRO TEM

As per CGS 8-3d, all Special permits and/or Special Exceptions must be recorded by the applicant in the Land Records of the Town of Colebrook before they become effective.

As per Colebrook Zoning Regulations 6.14.7 all Special Exception and/or Special permits expire one year from the date of approval if no construction and/or use has commenced.

Any change in the use of this property from that stated above renders this permit null and void. A new permit is required for a change in use.

Exhibit B

Property Card

qPublic.net™ Town of Colebrook, CT

Summary

Account Number	100273
Parcel ID	27
Property Address	161 PINNEY STREET
Use Class/Description	2-2 Comm Bldg.
Map/Lot/Lot Cut	02/03
Zoning	R2
Acres	93

View Map

Owner

FIFTH STATE FARM LLC
70 NORTH OLD STONE BRIDGE RD
COS COB, CT 06807

Valuation

Assessed Year	**2020**	**2019**
Appraised Building Value	$94,900.00	$0.00
Appraised XF/OB Value	$439,100.00	$473,300.00
Appraised Land Value	$305,900.00	$273,700.00
Appraised Total Value	**$839,900.00**	**$747,000.00**
Assessed Building Value	$66,400.00	$0.00
Assessed XF/OB Value	$307,400.00	$331,400.00
Assessed Land Value	$117,940.00	$85,890.00
Assessed Total Value	**$491,740.00**	**$417,290.00**

Land

Building Number	1	**Land Units**	91 AC
Land Use	6-2 - Forest	**Value**	172,900

Building Number	1	**Land Units**	2 AC
Land Use	2-2 - Comm Bldg.	**Value**	133,000

Building Information

Building #	1	**Notes**	CELL TOWER SITE 19GL 490 FOREST ATTACHED=BRN4 20X12+ FCP 20X15 V82/P185 EASEMENT CROWN CASTLE TOWERS 09 LLC 2019 CORR ACREAGE PER SURVEY 370 BRN4 32X44, IMP 14X62+8X30 CERT#6406
Style	Tower Accsry Bldg		
Occupancy			
Actual Year Built	2005		
Effective Year Built	2008		
Living Area	480		
Stories	1		
Grade	03 Average		
Condition		**Fireplaces**	
Exterior Wall	Concrete Block	**Roof Cover**	Concrete Tile
Interior Wall	Minim/Masonry	**Roof Structure**	Flat
		Floor Type	Minimum/Plywd
		Heat Type	Electr Basebrd
		Fuel Type	Electric
		AC	Heat Pump
		Bdrms/Full Bth/Hlf Bth/Ttl Rm	///1
		Basement Finished Area	
		Basement Sq. Ft.	

Code	**Description**	**Living Area**	**Gross Area**	**Effective Area**
BAS	First Floor	480	480	480
	Totals	**480**	**480**	**480**

Out Buildings\Extra Features

Description	BARN W/LFT&BSMT	**Year Built**	1900
Sub Description		**Value**	$21,100
Area	1408 S.F.		

Description	CARPORT	**Year Built**	1900
Sub Description		**Value**	$2,400
Area	300 S.F.		

Description	BARN W/LFT&BSMT	**Year Built**	1900
Sub Description		**Value**	$3,600
Area	240 S.F.		

Description	CELL TOWER	**Year Built**	2001
Sub Description		**Value**	$400,000
Area	1 UNITS		

Description	FENCE CL 8'	**Year Built**	2020
Sub Description		**Value**	$2,000
Area	240 L.F.		

Description	FOUNDATION	**Year Built**	2020
Sub Description		**Value**	$10,000
Area	1 UNITS		

Sales History

Sales Date	Instrument Type	Grantor	Grantee	Book/Page	Sale Validity	Amount
6/27/2019	Use Assessment/490	FREDSALL JANET E SUCC TRUSTEE	FIFTH STATE FARM LLC	90-253	U	$200,000.00
10/7/2014	Transfer of Convenience	FREDSALL ELLEN C TRUSTEE	FREDSALL JANET E SUCC TRUSTEE REV TRUST AGMT FBO ELLEN C FREDSALL	0086-0055	U	$0.00
1/17/2008		FREDSALL ELLEN C	FREDSALL ELLEN C TRUSTEE ELLEN C FREDSALL REVOCABLE TRUST	0077-0768	U	$0.00
3/21/1997			FREDSALL ELLEN C	0059-0804	U	$0.00

Recent Sales In Area

Sale date range:

From:

03/18/2011

To:

03/18/2021

Sales by Neighborhood

1500

Feet

Sales by Distance

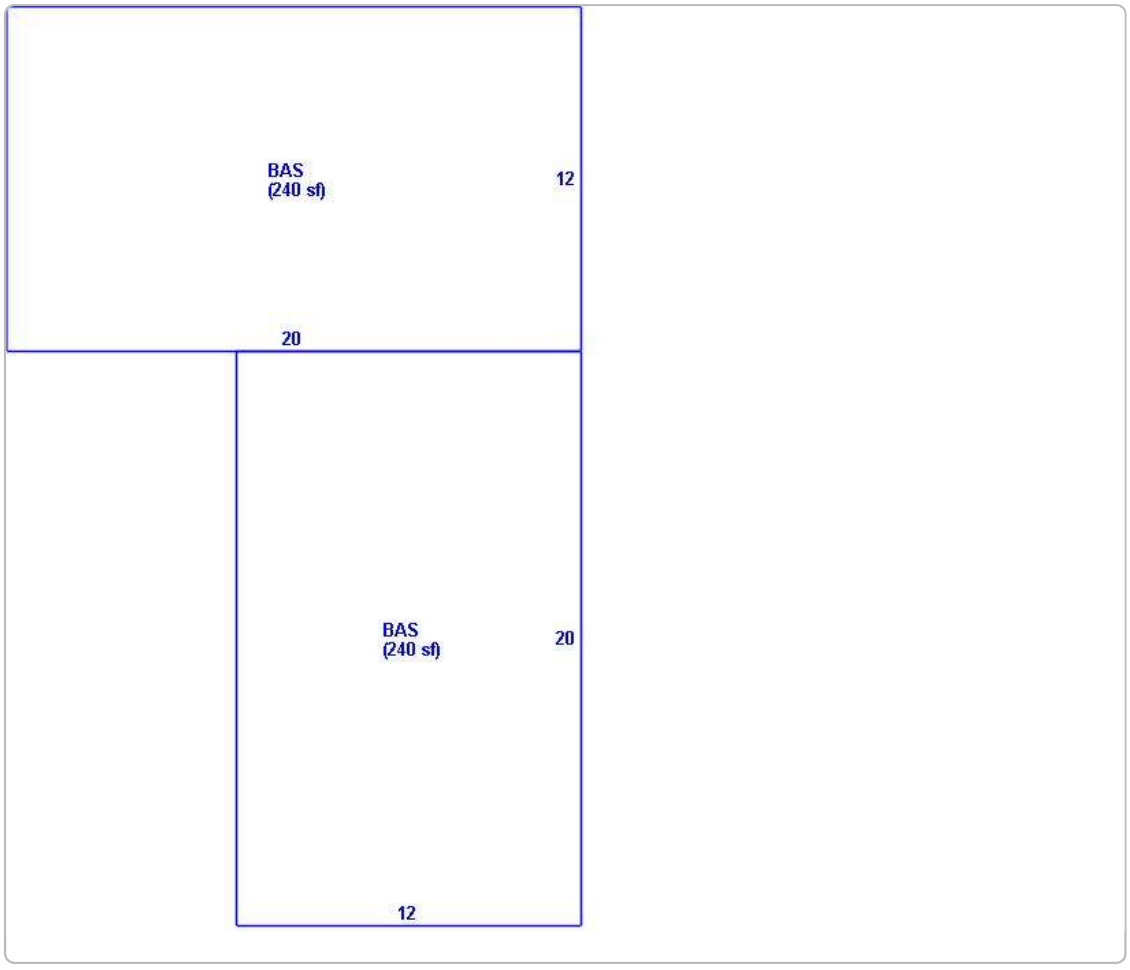
Permits

Permit ID	Issue Date	Type	Description	Amount	Inspection Date	% Complete	Date Complete	Comments
21-017	03-08-2021	PO	Pool	$50,000		0		15 X 30 GUNITE POOL
21-002	01-11-2021	DK	Deck	$9,800		0		12 X 28 DECK
20-108	10-13-2020	PL	Plumbing	$1,124		100		SET 1000GAL PROPANE TANK
20-109	10-13-2020	NC	New Construct	$130,000		0		NEW 1.5 STORY HOUSE 12X24 DECK
20-106	10-08-2020	PL	Plumbing	$5,000		100		UNDERGROUND PLUMBING
20-092	09-23-2020	EL	Electric	$4,000		100		RUN 200 AMP FROM BARN TO HOUSE
20-083	09-15-2020	NC	New Construct	$15,000		100		FOUNDATION FOR NEW HOUSE
19-106	11-13-2019	EL	Electric	$20,000		100		
19-047	06-24-2019	EL	Electric	$1,500		100		200 AMP SERVICE
17-022	05-11-2017	CM	Commercial	$15,000	1/24/2020 12:00:00 AM	100		VZW REPLACE EXISTING ANTENNAS

15-179	09-01-2015	EL	Electric	$15,000	1/24/2020 12:00:00 AM	100		UPDATE ANTENNAS
13-133	04-20-2014	RE	Remodel	$5,000	1/24/2020 12:00:00 AM	100		ANTENNAE SWAP
12-146	12-11-2012	CM	Commercial	$25,000		100		3 NEW ANTENNAS
12-136	11-20-2012	CM	Commercial	$12,000		100		
09-67	07-09-2009		Existing antenna rep	$15,000		100	04-23-2010	
06-133	12-18-2006		Verizon 12x30 equip	$100,000	9/28/2007 12:00:00 AM	100	10-01-2007	
04-05	02-02-2004		equip shed and anten	$50,000	9/13/2004 12:00:00 AM	100	10-01-2006	reck 2005
00-107	09-30-2000		tower	$130,000		100	10-01-2001	

Photos

Sketches



Developed by Schneider GEOSPATIAL

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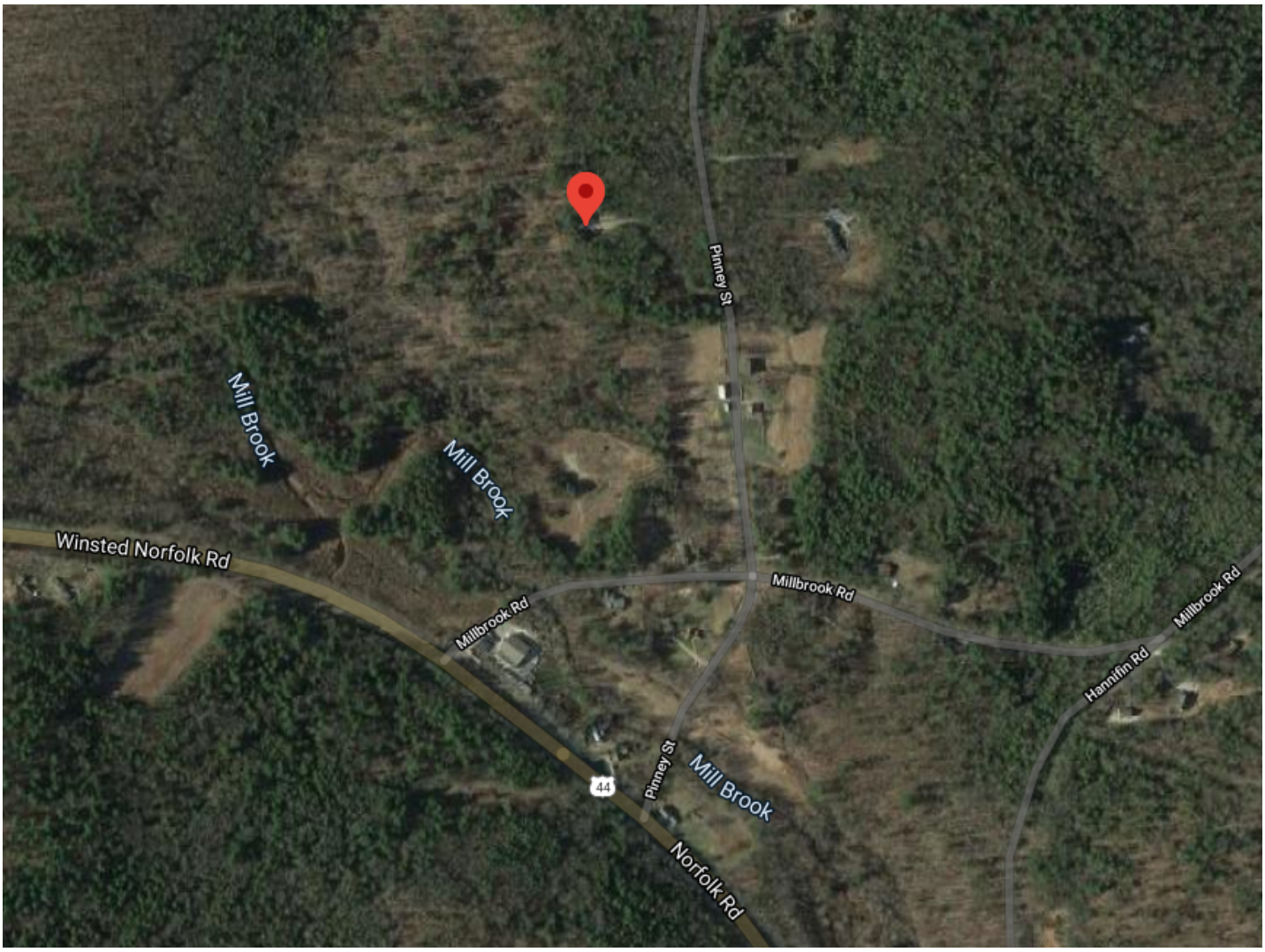


Exhibit C

Construction Drawings

T-Mobile

T-MOBILE SITE NUMBER: CTNH573A
T-MOBILE SITE NAME: CTNH573A
SITE TYPE: MONOPOLE
TOWER HEIGHT: 148'-0"

BUSINESS UNIT #: 876377
SITE ADDRESS: 161 PINNEY STREET, COLEBROOK, CT 06021
COUNTY: LITCHFIELD
JURISDICTION: TOWN OF COLEBROOK

T-MOBILE SPRINT RETAIN SITE CONFIGURATION: 67D5998C_1xAIR+1QP+1OP (GSM ONLY)

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	HORTON 2 / FREDSALL PROPERTY
SITE ADDRESS:	161 PINNEY STREET COLEBROOK, CT 06021
COUNTY:	LITCHFIELD
MAP/PARCEL #:	MAP 02, LOT 03
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.966361° (41° 57' 58.90")
LONGITUDE:	-73.121694° (-73° 7' 18.10")
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	1220.16 FT
CURRENT ZONING:	R2
JURISDICTION:	TOWN OF COLEBROOK
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	FIFTH STATE FARM LLC 70 NORTH OLD STONE BRIDGE RD COS COB, CT 06807
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE 35 GRIFFIN ROAD BLOOMFIELD, CT 06002
ELECTRIC PROVIDER:	TBD --
TELCO PROVIDER:	TBD --

PROJECT TEAM

A&E FIRM:	INFINIGY 1033 WATERVLIET SHAKER RD. ALBANY, NY 12205
CROWN CASTLE USA INC. DISTRICT CONTACTS:	1500 CORPORATE DRIVE CANONSBURG, PA 15317
	TRICIA PELON - PROJECT MANAGER (518) 373-3507
	JASON D'AMICO - CONSTRUCTION MANAGER (860) 209-0104

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1	SITE PLAN & ENLARGED SITE PLAN
C-2	FINAL ELEVATION & ANTENNA PLANS
C-3	ANTENNA & CABLE SCHEDULE
C-4	PLUMBING DIAGRAM
C-5	EQUIPMENT SPECS
C-6	EQUIPMENT SPECS
E-1	AC PANEL SCHEDULES & ONE LINE DIAGRAM
G-1	ANTENNA GROUNDING DIAGRAM
G-2	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR ----. 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

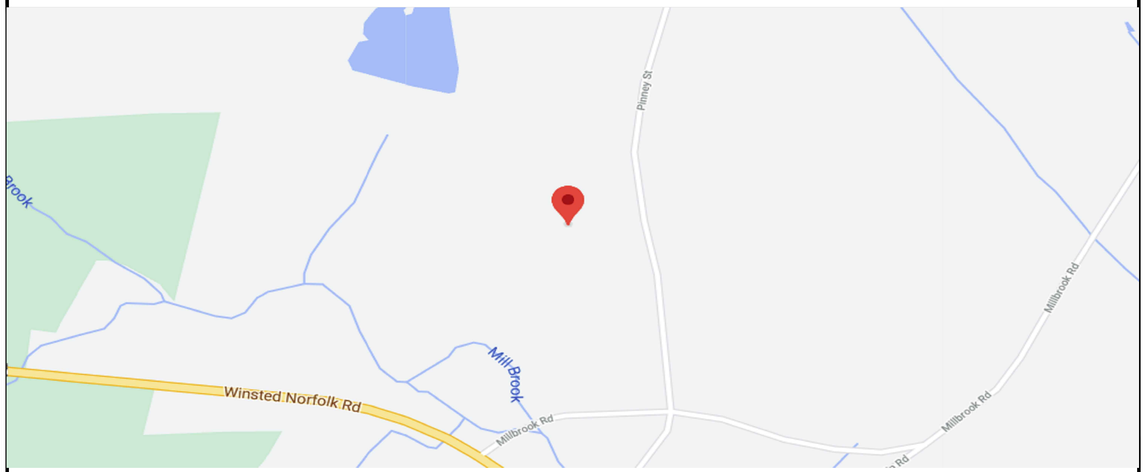
THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK:
- REMOVE (6) ANTENNAS
- REMOVE (12) RRHs
- REMOVE (4) HYBRID CABLES
- INSTALL (9) ANTENNAS
- INSTALL (9) RRHs
- INSTALL (4) HYBRID CABLES

GROUND SCOPE OF WORK:
- REMOVE EXISTING CABINETS
- INSTALL (1) 6160 & (1) B160 BATTERY CABINETS
- INSTALL (1) PSU4813 BOOSTER IN (P) CABINET
- INSTALL (3) BB6630 IN (P) CABINET
- INSTALL (1) BB6648 IN (P) CABINET
- INSTALL (1) IXRE ROUTER IN (P) CABINET

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

LOCATION MAP



NO SCALE

APPLICABLE CODES/REFERENCE DOCUMENTS

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

CODE TYPE	CODE
BUILDING	2018 CT STATE BUILDING CODE
MECHANICAL	2015 IMC
ELECTRICAL	2017 NEC

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	BY OTHERS
DATED:	
MOUNT ANALYSIS:	GPD REPORT DESIGNATION
DATED:	02/04/2021
RFDS REVISION:	1
DATED:	01/15/2021
ORDER ID:	538774
REVISION:	0

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

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.

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com

T-MOBILE SITE NUMBER:
CTNH573A

BU #: **876377**
HORTON 2 / FREDSALL PROPERTY

161 PINNEY STREET
COLEBROOK, CT 06021

EXISTING 148'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	02/22/21	RCD	PRELIMINARY	SS
0	02/24/21	BMM	FINAL	SS
1	03/04/21	BMM	FINAL	SS
2	03/10/21	JDM	FINAL	SS

STATE OF CONNECTICUT
RUHEI SAKAMOTO
34916
LICENSED PROFESSIONAL ENGINEER
3/10/21

SHEET NUMBER: T-1
REVISION: 2

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," CED–STD–10294 "STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES," 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 FREE 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.

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 (WWF) 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.

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–POTENTAL 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 GROUNDED 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 BETWEEN 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 GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND 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).

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. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY 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. VERYIFY 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 TC 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/IEEE 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/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE 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
120/240V, 1Ø	A PHASE	BLACK
	B PHASE	RED
	NEUTRAL	WHITE
	GROUND	GREEN
120/208V, 3Ø	A PHASE	BLACK
	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
	GROUND	GREEN
DC VOLTAGE	POS (+)	RED**
	NEG (–)	BLACK**

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

APWA UNIFORM COLOR CODE:

WHITE	PROPOSED EXCAVATION
PINK	TEMPORARY SURVEY MARKINGS
RED	ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
YELLOW	GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS
ORANGE	COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER, IRRIGATION, AND SLURRY LINES
GREEN	SEWERS AND DRAIN LINES

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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BU #: **876377**
HORTON 2 / FREDSALL PROPERTY

161 PINNEY STREET
COLEBROOK, CT 06021

EXISTING 148'-0" MONOPOLE

ISSUED FOR:

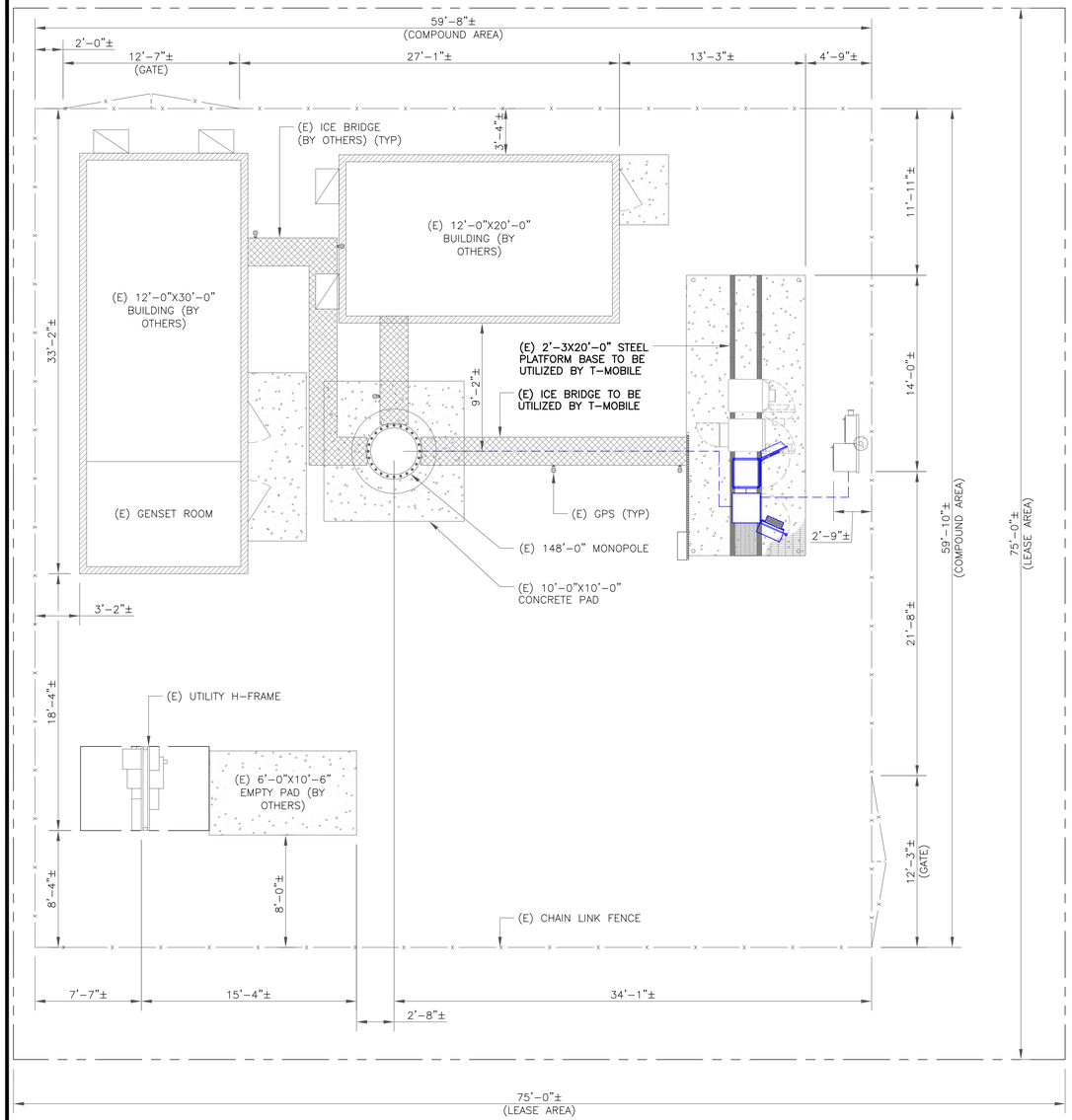
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	02/22/21	RCD	PRELIMINARY	SS
0	02/24/21	BMM	FINAL	SS
1	03/04/21	BMM	FINAL	SS
2	03/10/21	JDM	FINAL	SS

STATE OF CONNECTICUT
SHUHEI SAKANOUE
34916
LICENSED
PROFESSIONAL ENGINEER
3/10/21

SHEET NUMBER:	REVISION:
T-2	2

NOTE:

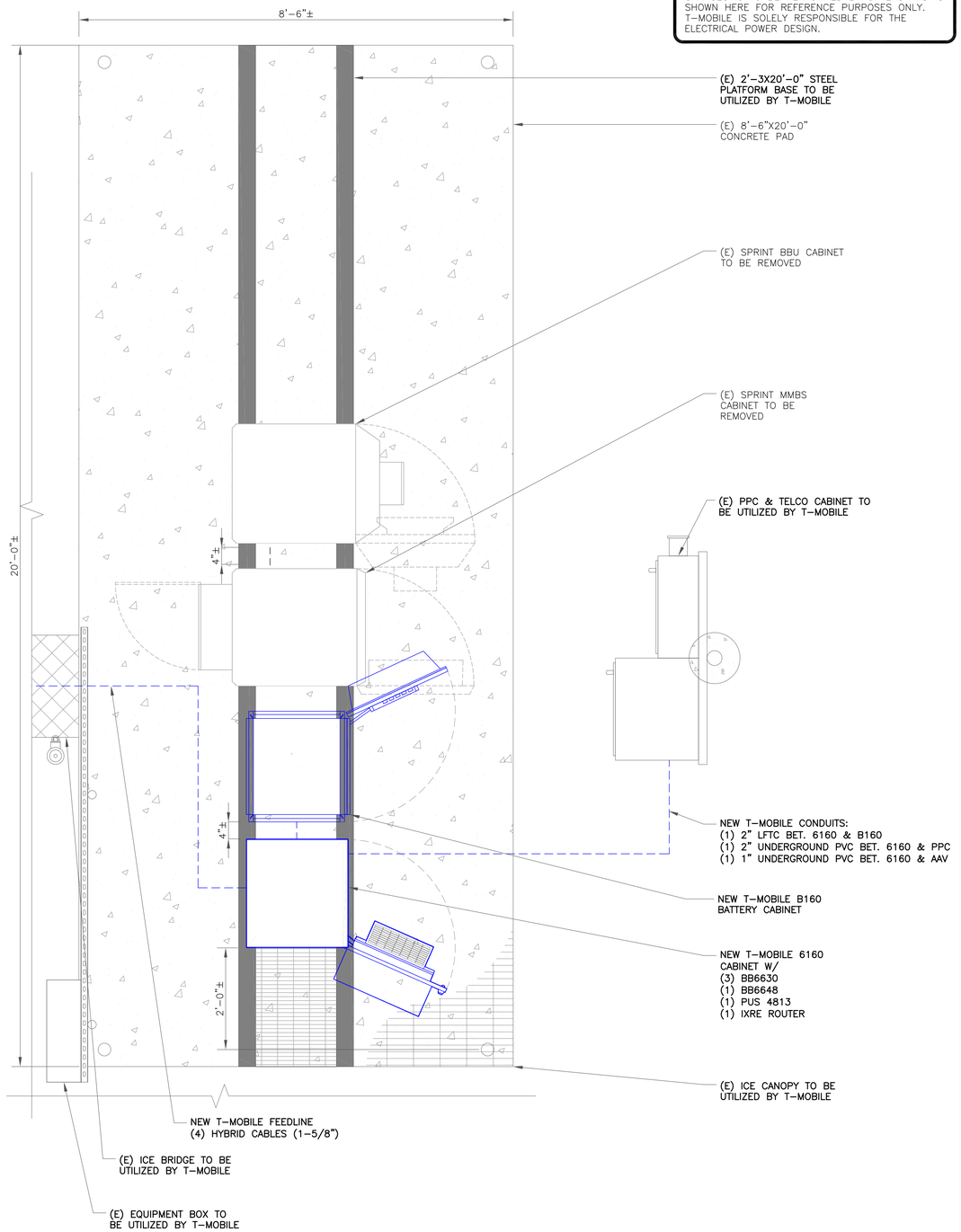
1. PLANS BASED ON SITE PLAN PROVIDED BY TOWER OWNER AND SITE VISIT PERFORMED BY INFINIGY. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND LOCATION/ORIENTATION OF EXISTING T–MOBILE EQUIPMENT.



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

NOTES:

THE POWER DESIGN FOR ANY AC ELECTRICAL POWER CHANGES IS TO BE PERFORMED BY OTHERS AND IS SHOWN HERE FOR REFERENCE PURPOSES ONLY. T–MOBILE IS SOLELY RESPONSIBLE FOR THE ELECTRICAL POWER DESIGN.



2 ENLARGED SITE PLAN
SCALE: 1' 6" 0 1' 3/4"=1'–0" (FULL SIZE) 3/8"=1'–0" (11x17)

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T-MOBILE SITE NUMBER:
CTNH573A

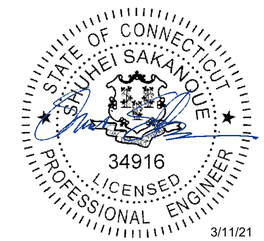
BU #: **876377**
HORTON 2 / FREDSALL PROPERTY

161 PINNEY STREET
COLEBROOK, CT 06021

EXISTING 148'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	02/22/21	RCD	PRELIMINARY	SS
0	02/24/21	BMM	FINAL	SS
1	03/04/21	BMM	FINAL	SS
2	03/10/21	JDM	FINAL	SS



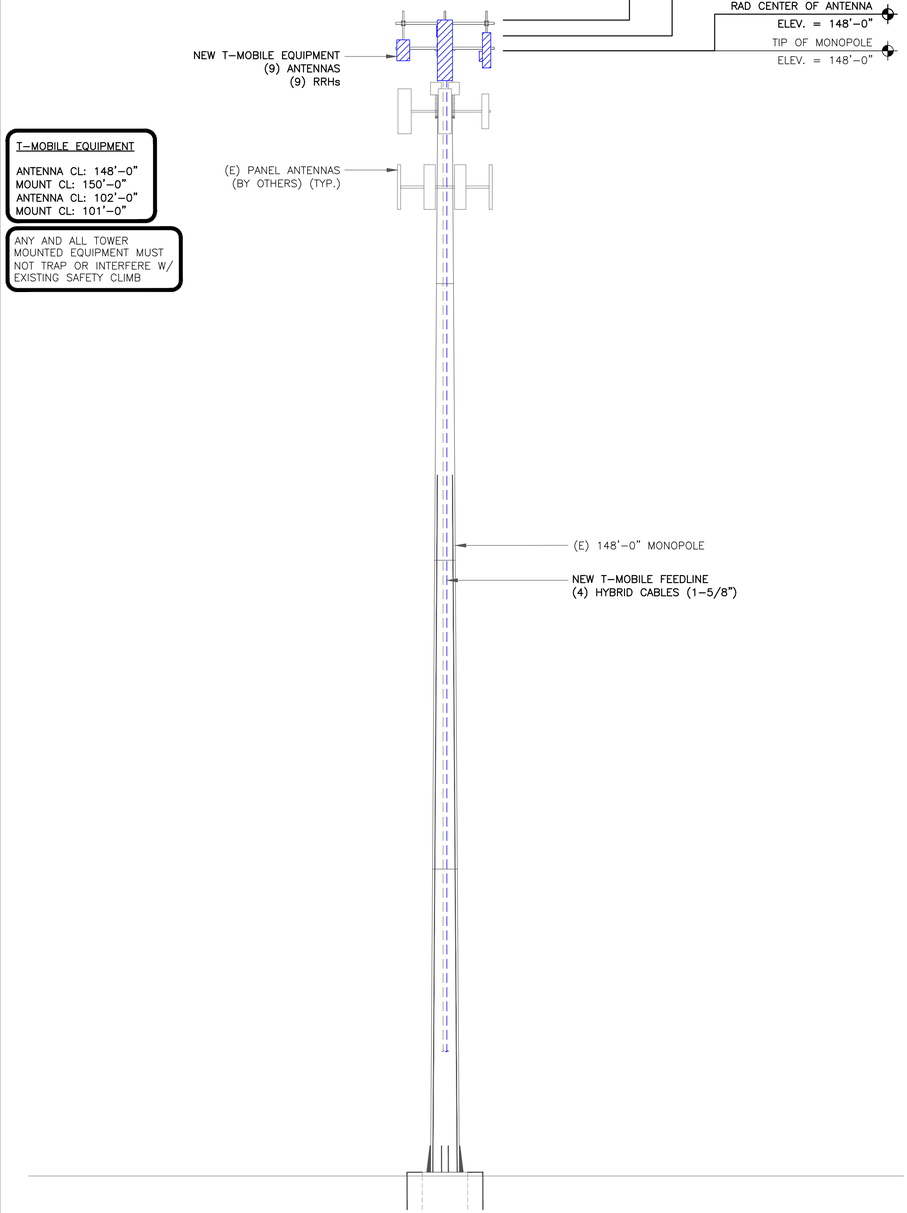
3/11/21

SHEET NUMBER: C-1

REVISION: 2

NOTES:

1. ELEVATION BASED ON DRAWING PROVIDED BY TOWER OWNER. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND LOCATION/ORIENTATION OF EXISTING EQUIPMENT.
2. INFINIGY HAS NOT EVALUATED THE TOWER OR MOUNT STRUCTURE AND ASSUMES NO RESPONSIBILITY FOR THEIR STRUCTURAL INTEGRITY REGARDING PROPOSED LOADINGS. FINAL INSTALLATION SHALL COMPLY WITH RESULTS OF PASSING STRUCTURAL ANALYSES PERFORMED BY OTHERS.

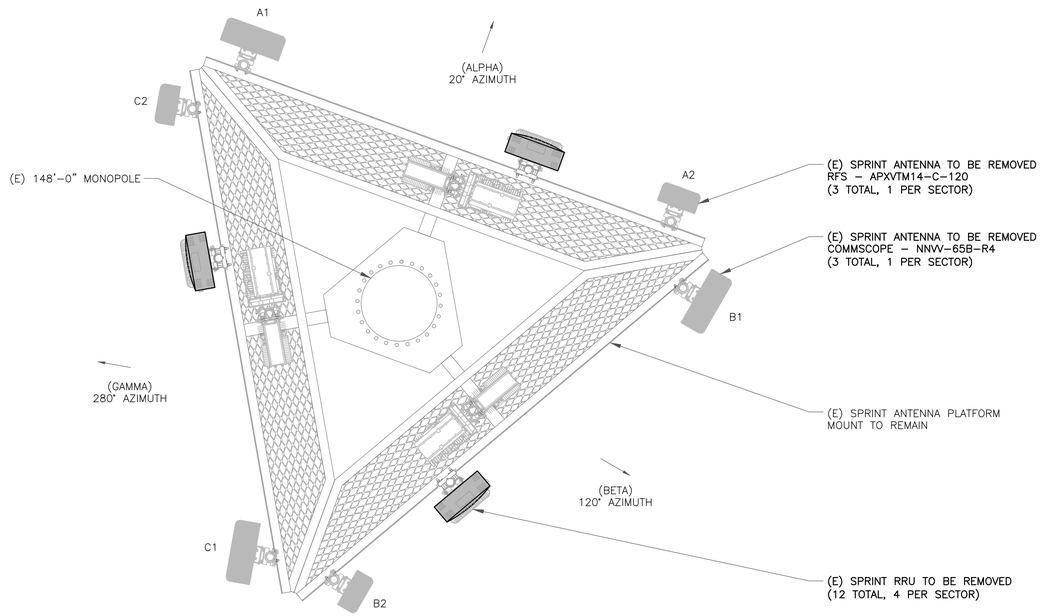


T-MOBILE EQUIPMENT

ANTENNA CL: 148'-0"
MOUNT CL: 150'-0"
ANTENNA CL: 102'-0"
MOUNT CL: 101'-0"

ANY AND ALL TOWER MOUNTED EQUIPMENT MUST NOT TRAP OR INTERFERE W/ EXISTING SAFETY CLIMB

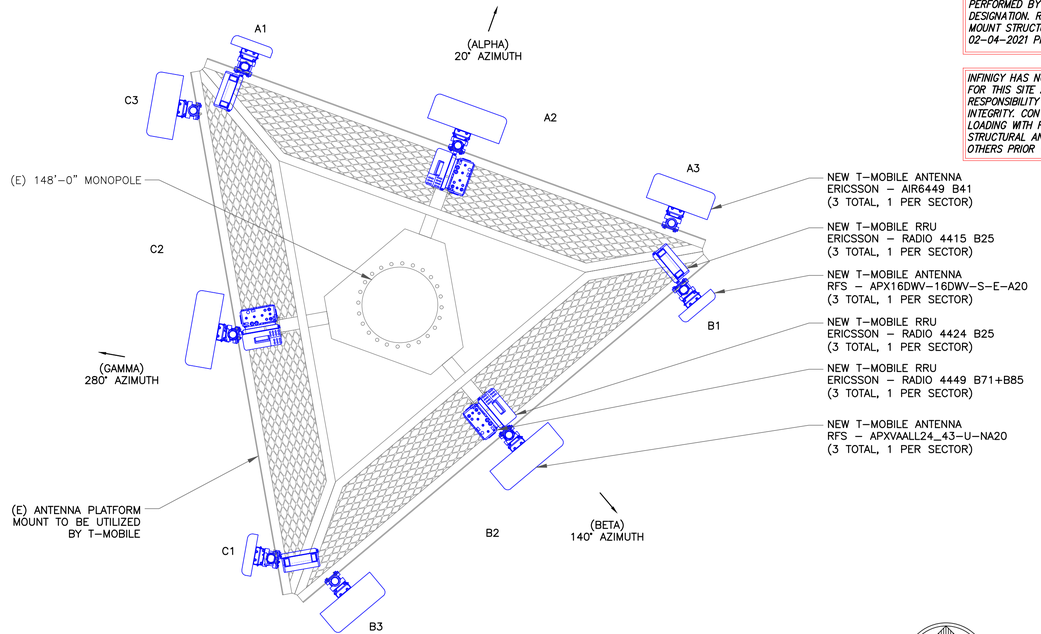
1 FINAL ELEVATION
SCALE: NOT TO SCALE



2 EXISTING ANTENNA LAYOUT
SCALE: NOT TO SCALE

NOTE:
A STRUCTURAL EVALUATION OF THE T-MOBILE ANTENNA MOUNTS HAS BEEN PERFORMED BY GPD REPORT DESIGNATION. REFER TO ANTENNA MOUNT STRUCTURAL ANALYSIS DATED 02-04-2021 PRIOR TO CONSTRUCTION.

INFINIGY HAS NOT EVALUATED THE TOWER FOR THIS SITE AND ASSUMES NO RESPONSIBILITY FOR ITS STRUCTURAL INTEGRITY. CONTRACTOR TO COORDINATE LOADING WITH RF ENGINEER. REFER TO STRUCTURAL ANALYSIS PERFORMED BY OTHERS PRIOR TO CONSTRUCTION.



3 FINAL ANTENNA LAYOUT
SCALE: NOT TO SCALE

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HORTON 2 / FREDSALL PROPERTY

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2	03/10/21	JDM	FINAL	SS

STATE OF CONNECTICUT
MUHEI SAKANOUE
34916
LICENSED PROFESSIONAL ENGINEER
3/10/21

SHEET NUMBER: C-2

REVISION: 2

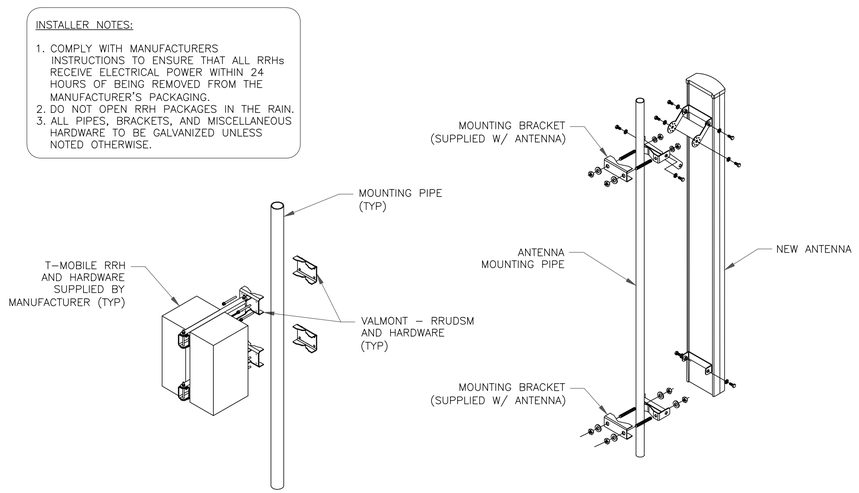
ANTENNA SCHEDULE

SECTOR	POS.	TECHNOLOGY	RAD CENTER	AZIMUTH	ANTENNA MANUFACTURER	ANTENNA MODEL	MECH. TILT	ELECT. TILT	TOWER MOUNTED EQUIPMENT	FEEDLINE TYPE
ALPHA	A1	L2100	148'-0"	20°	RFS	APX16DWV-16DWV-S-E-A20	--	--	(1) ERICSSON - RRUS 4415 B66A	(1) 6X12 HCS HYBRID (SHARED)
ALPHA	A2	L700, L600, N600, L1900, G1900	148'-0"	20°	RFS	APXVAALL24_43-U-NA20	--	--	(1) ERICSSON - RRUS 4449 B71+B85 (1) ERICSSON - RRUS 4424 B25	(2) 6X12 HCS HYBRID (SHARED)
ALPHA	A3	L2500, N2500	148'-0"	20°	ERICSSON	AIR6449 B41	--	--	--	(1) 6X12 HCS HYBRID (SHARED)
BETA	B1	L2100	148'-0"	140°	RFS	APX16DWV-16DWV-S-E-A20	--	--	(1) ERICSSON - RRUS 4415 B66A	(1) 6X12 HCS HYBRID (SHARED)
BETA	B2	L700, L600, N600, L1900, G1900	148'-0"	140°	RFS	APXVAALL24_43-U-NA20	--	--	(1) ERICSSON - RRUS 4449 B71+B85 (1) ERICSSON - RRUS 4424 B25	(2) 6X12 HCS HYBRID (SHARED)
BETA	B3	L2500, N2500	148'-0"	140°	ERICSSON	AIR6449 B41	--	--	--	(1) 6X12 HCS HYBRID (SHARED)
GAMMA	C1	L2100	148'-0"	280°	RFS	APX16DWV-16DWV-S-E-A20	--	--	(1) ERICSSON - RRUS 4415 B66A	(1) 6X12 HCS HYBRID (SHARED)
GAMMA	C2	L700, L600, N600, L1900, G1900	148'-0"	280°	RFS	APXVAALL24_43-U-NA20	--	--	(1) ERICSSON - RRUS 4449 B71+B85 (1) ERICSSON - RRUS 4424 B25	(2) 6X12 HCS HYBRID (SHARED)
GAMMA	C3	L2500, N2500	148'-0"	280°	ERICSSON	AIR6449 B41	--	--	--	(1) 6X12 HCS HYBRID (SHARED)

1 ANTENNA AND CABLE 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

NOTE:

1. CONTRACTOR SHALL INSTALL 3RD DUAL RRH MOUNT TO ACCOMMODATE ALL RRH BRACKETS HOLES IF NECESSARY.

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STATE OF CONNECTICUT
TSUHEI SAKANOUE
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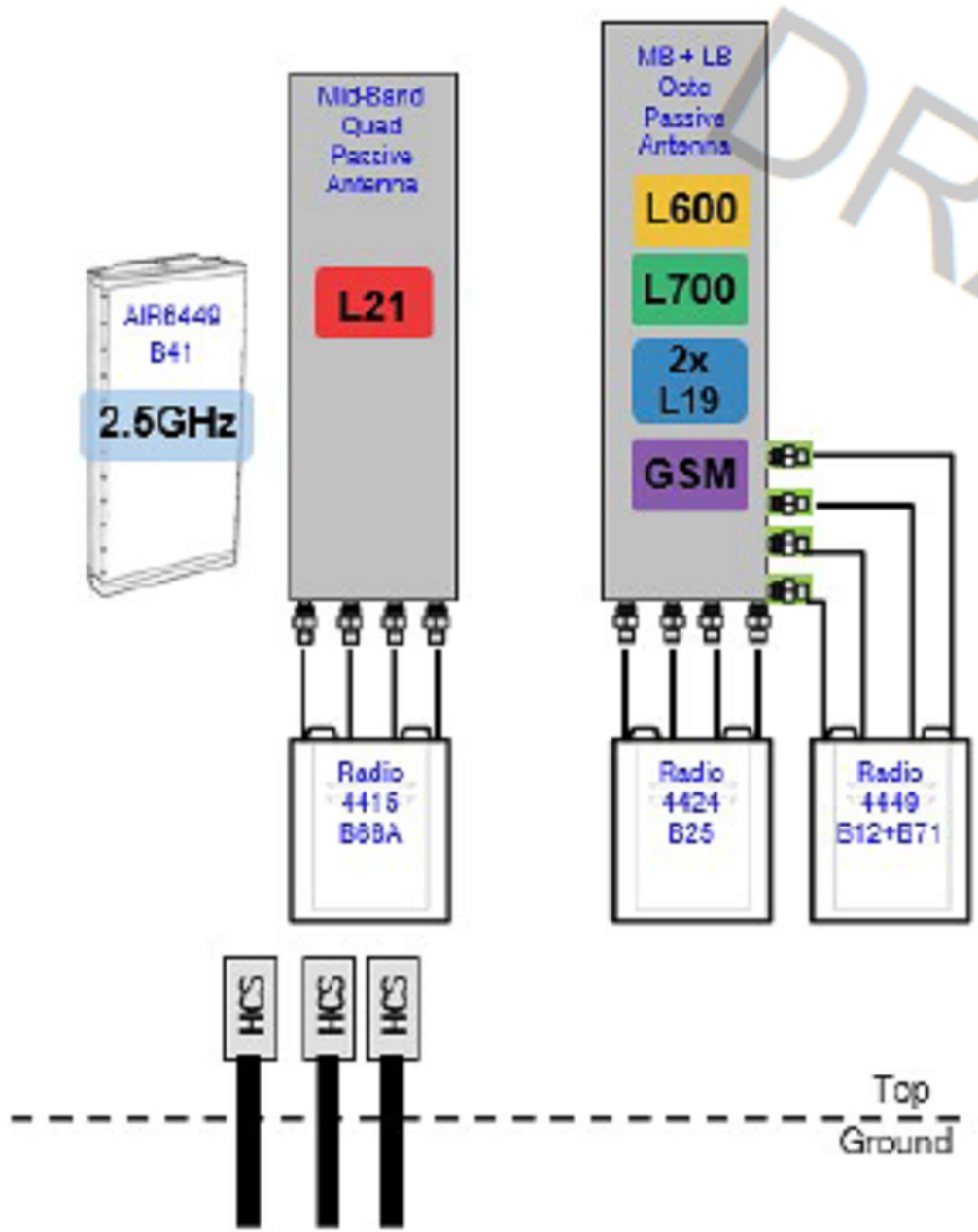
LICENSED PROFESSIONAL ENGINEER
3/10/21

SHEET NUMBER: C-3

REVISION: 2



1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

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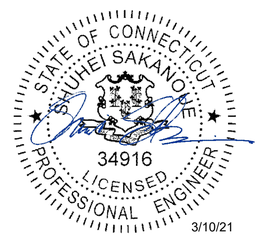
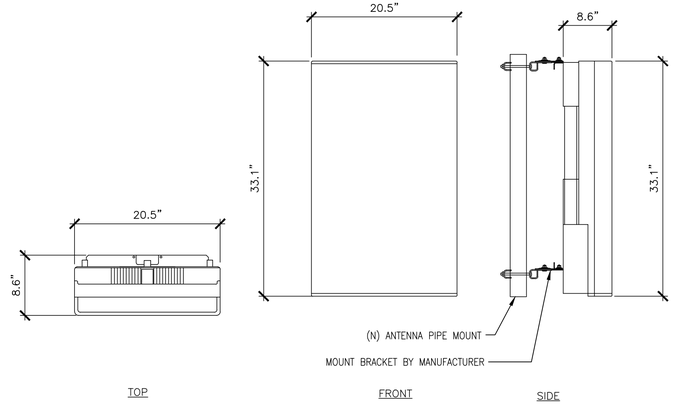


SHEET NUMBER: C-4

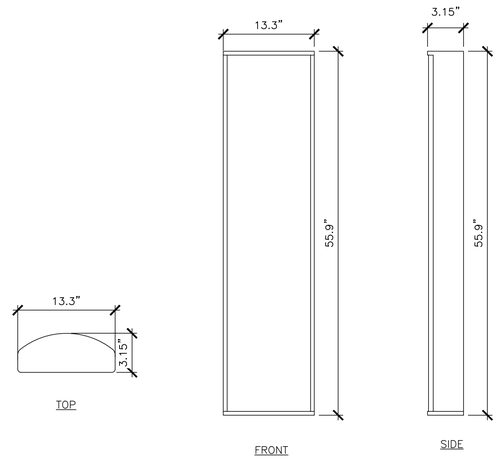
REVISION: 2

MANUFACTURER: ERICSSON
MODEL: AIR6449 B41
WEIGHT: 104 LBS (W/ MOUNT BRACKET 113)
DIMENSIONS: 33.1"H. X 20.5"W. X 8.6"D.
FREQUENCY: REFER TO RF DATA SHEET

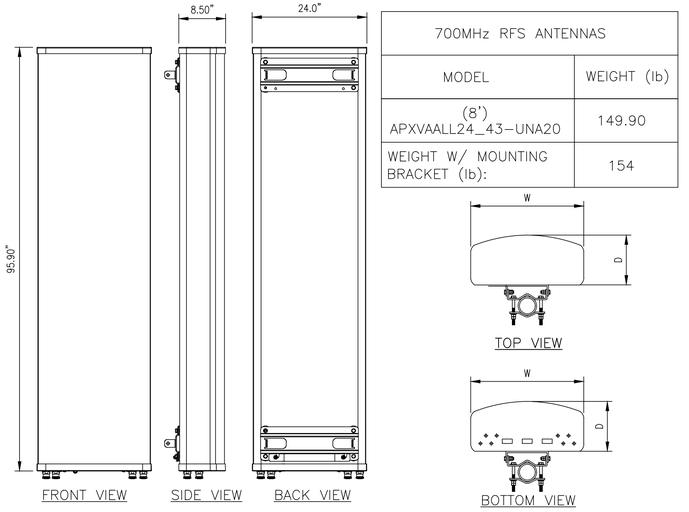


1 (N) AIR6449 B41 ANTENNA SPEC
SCALE: NOT TO SCALE

MANUFACTURER: RFS
MODEL: APX16DWV-16DWV-S-E-A20
WEIGHT: 40.7 LBS
DIMENSIONS: 55.9"H. X 13.3"W. X 3.15"D.
FREQUENCY: REFER TO RF DATA SHEET



2 (N) APX16DWV-16DWV-S-E-A20 ANTENNA SPEC
SCALE: NOT TO SCALE

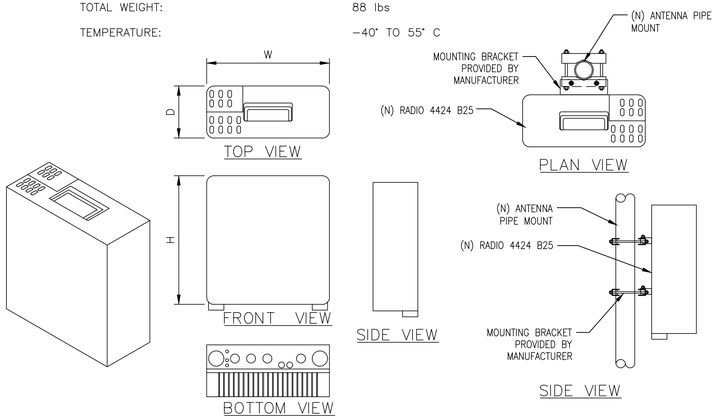


700MHz RFS ANTENNAS	
MODEL	WEIGHT (lb)
(8') APXVAALL24_43-UNA20	149.90
WEIGHT W/ MOUNTING BRACKET (lb):	154

3 (N) APXVAALL24_43-UNA20 ANTENNA SPEC
SCALE: NOT TO SCALE

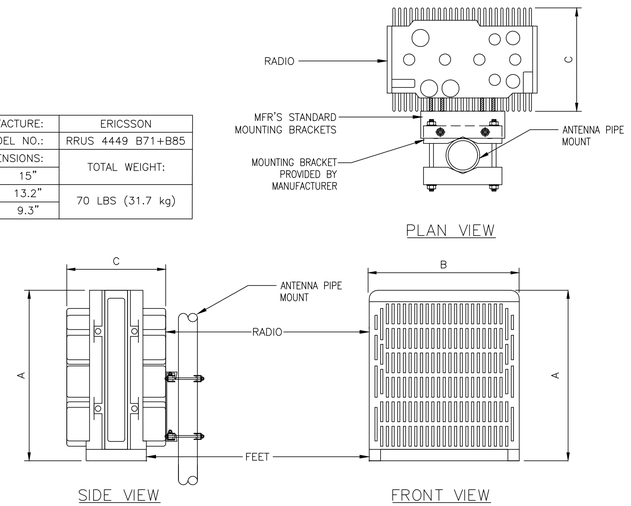
ERICSSON RADIO-4424 B25

DIMENSIONS, WxDxH:	13.5"x9.6"x16.5"
MAX OUTPUT POWER:	4x80W (2x(2x80W))
TOTAL WEIGHT:	88 lbs
TEMPERATURE:	-40° TO 55° C



4 (N) RADIO 4424 B25 SPEC
SCALE: NOT TO SCALE

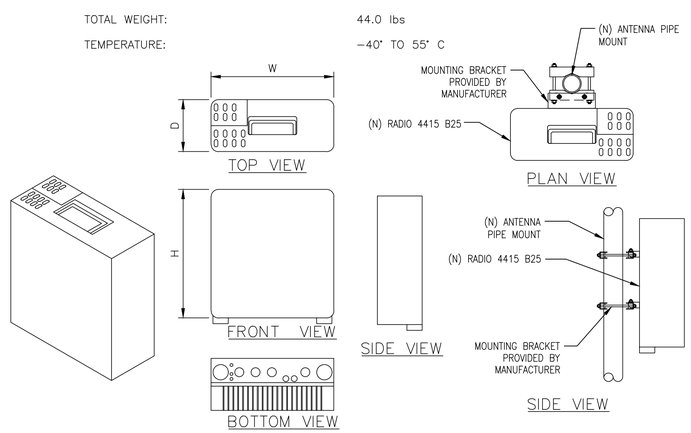
MANUFACTURE:	ERICSSON
MODEL NO.:	RRUS 4449 B71+B85
DIMENSIONS:	TOTAL WEIGHT:
A 15"	70 LBS (31.7 kg)
B 13.2"	
C 9.3"	



5 (N) RADIO 4449 B71+B885 SPEC
SCALE: NOT TO SCALE

ERICSSON RADIO-4415 B25

DIMENSIONS, WxDxH:	13.19"x5.39"x14.96"
POWER CONSUMPTION:	660 WATTS
TOTAL WEIGHT:	44.0 lbs
TEMPERATURE:	-40° TO 55° C



6 (N) RADIO 4415 B25 SPEC
SCALE: NOT TO SCALE

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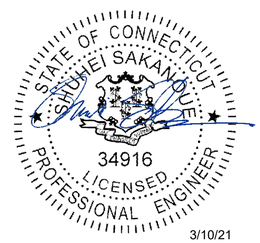
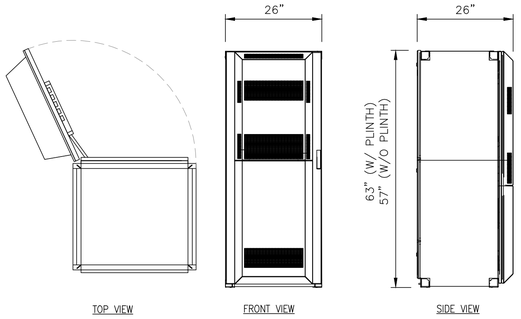
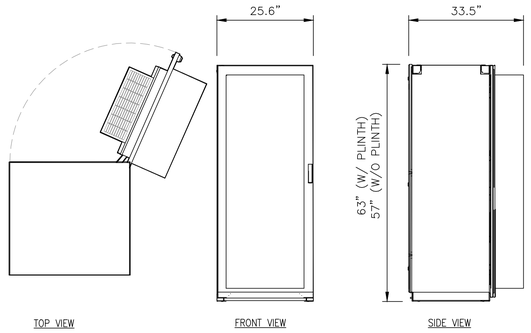


SHEET NUMBER:	REVISION:
C-5	2



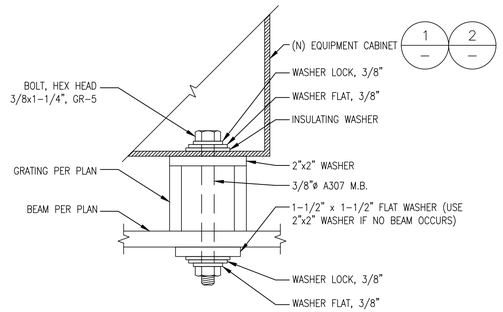
ERICSSON MODEL NO.:	B160
RACK SPACE:	19U
DIMENSIONS, HxWxD:	63"x26"x26" (W/ 6" PLINTH)
CABINET WEIGHT, EMPTY:	485 LBS
MAXIMUM WEIGHT:	2100± LBS

1 (N) B160 CABINET DETAIL
SCALE: NOT TO SCALE

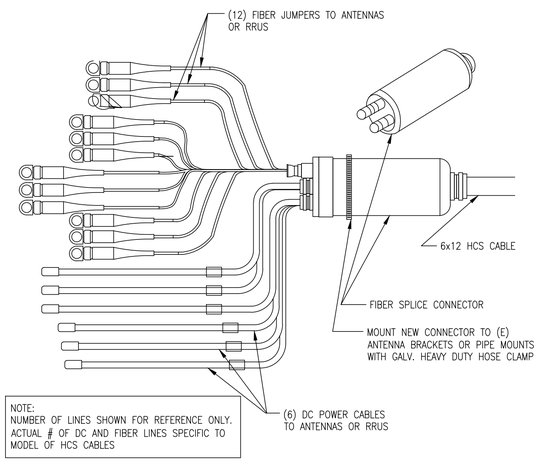


ERICSSON MODEL NO.:	6160
RACK SPACE:	19U
DIMENSIONS, HxWxD:	63"x25.6"x25.6" (W/ 6" PLINTH)
CABINET WEIGHT, EMPTY:	410 LBS
MAXIMUM WEIGHT:	770± LBS

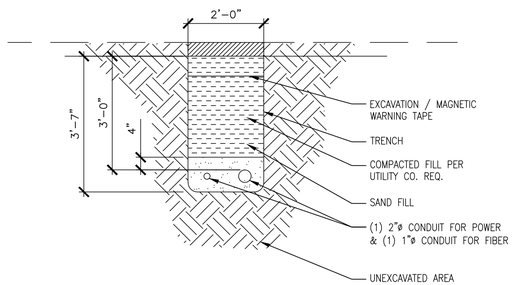
2 (N) 6160 CABINET DETAIL
SCALE: NOT TO SCALE



3 (N) EQUIPMENT CABINET MOUNTING DETAIL
SCALE: NOT TO SCALE



4 (N) 6X12 HCS CABLE DETAIL
SCALE: NOT TO SCALE



5 (N) CONDUIT TRENCH DETAIL
SCALE: NOT TO SCALE

6 NOT USED
SCALE:

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STATE OF CONNECTICUT
SHUHEI SAKANO
34916
LICENSED PROFESSIONAL ENGINEER
3/10/21

SHEET NUMBER: C-6
REVISION: 2

T-MOBILE PANEL SCHEDULE

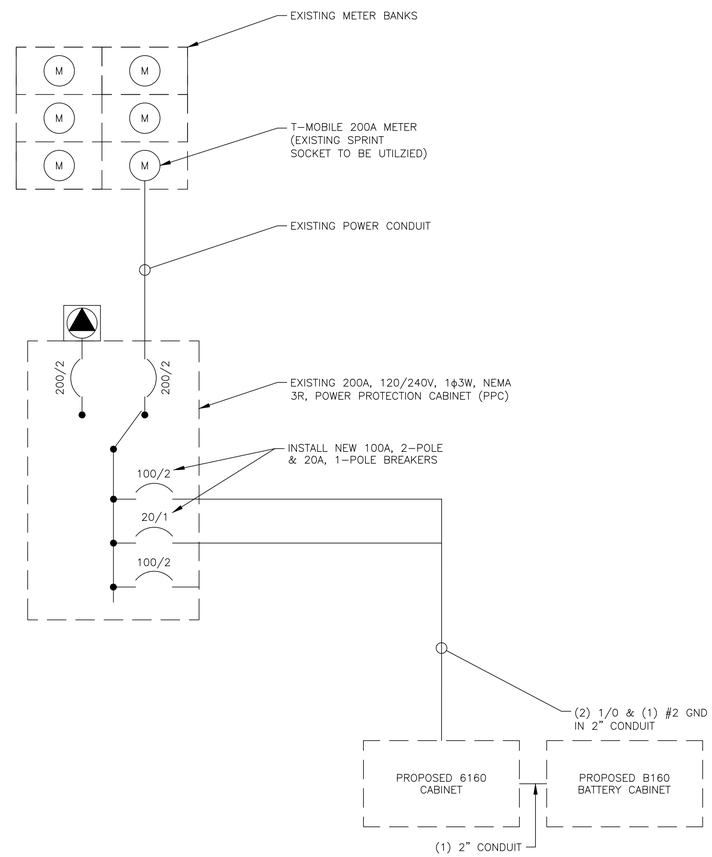
MAIN: 200A MAIN BREAKER			**VOTAGE/PHASE:** 120/240V, 1-PHASE, 3-WIRE						**SHORT CIRCUIT CURRENT RATING:** --		
MOUNTING: INSIDE PPC ENCLOSURE			**ENCLOSURE:** NEMA 3R						**SURGE PROTECTION DEVICE:** YES		
					PHASE LOADS (VA)						
DESCRIPTION	LOAD (VA)	C or NC	C/B	CIR No.	A	B	CIR No.	C/B	C or NC	LOAD (VA)	DESCRIPTION
BTS 1	1800	C	100	1	1800		2	0	NC	60	AC SURGE PROTECTION
	1800	C		3		1800	4	0	NC		
6160 GFI**	**180**	**NC**	**20**	**5**	7180		**6**	**100**	**C**	**7000**	**6160****
BLANK				7		7000	**8**		**C**	**7000**	
LIGHT	200	NC	15	9	380		10	15	NC	180	TELCO GFI
FAN (OFF POSITION)	0	NC	10	11		0	12				BLANK
BASE LOAD (VA) =					9360	8800					
25% OF CONTINUOUS LOAD (VA) =					2200	2200					
TOTAL LOAD (VA) =					11560	11000					
TOTAL LOAD (A) =					96.3	91.6					

C = CONTINUOUS LOAD; NC = NON-CONTINUOUS LOAD
* REMOVE WIRE TO EXISTING BREAKER AND MARK AS SPARE
**INDICATES NEW LOAD. ALL OTHER LOADS ARE EXISTING.
NEW BREAKER TO BE SAME TYPE AND HAVE SAME AIC RATING AS EXISTING. CUSTOMER HAS NOT PROVIDED LOADS FOR EQUIPMENT CABINETS THEREFORE THE CABINET LOADS SHOWN ARE ESTIMATED

1 PANEL SCHEDULE
SCALE: N.T.S.

NOTES:

1. ALL NEW CONDUCTORS TO BE INSTALLED SHALL BE COPPER. ALL CONDUCTORS SHALL BE THHW, THWN, THWN-2, XHHW, OR XHHW-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.



2 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

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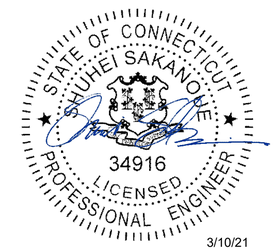
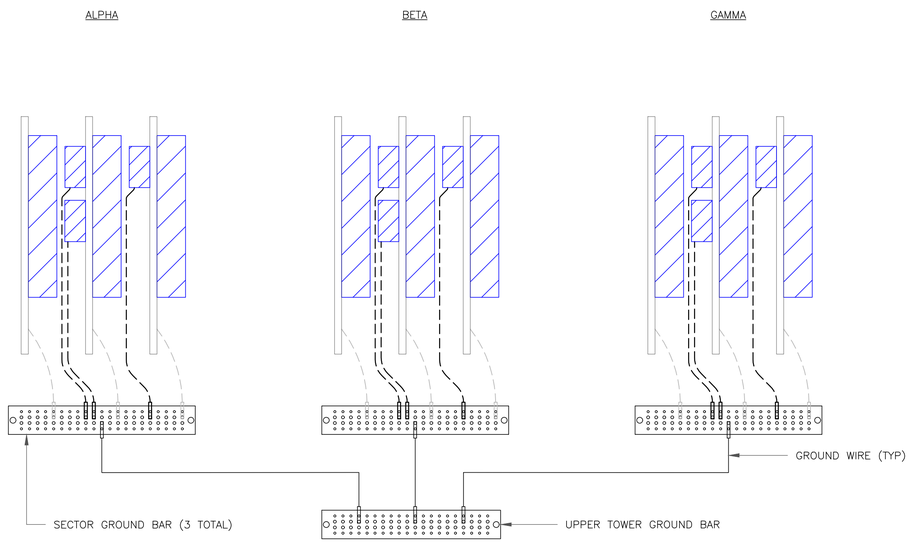


3/10/21

SHEET NUMBER: E-1

REVISION: 2



NOTE:

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

1 ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

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T-MOBILE SITE NUMBER:
CTNH573A

BU #: **876377**
HORTON 2 / FREDSALL PROPERTY

161 PINNEY STREET
COLEBROOK, CT 06021

EXISTING 148'-0" MONOPOLE

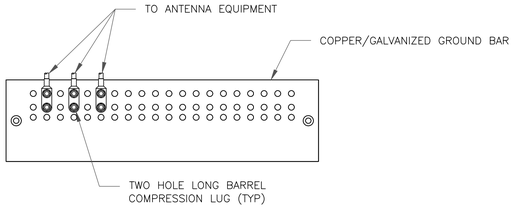
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	02/22/21	RCD	PRELIMINARY	SS
0	02/24/21	BMM	FINAL	SS
1	03/04/21	BMM	FINAL	SS
2	03/10/21	JDM	FINAL	SS

STATE OF CONNECTICUT
SHUHEI SAKAMOTO
34916
LICENSED PROFESSIONAL ENGINEER
3/10/21

SHEET NUMBER: G-1

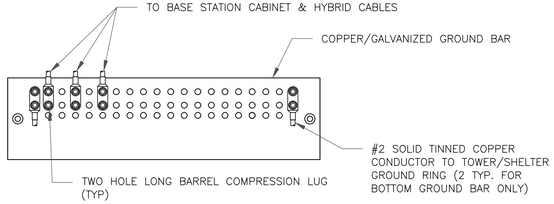
REVISION: 2



NOTES:

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

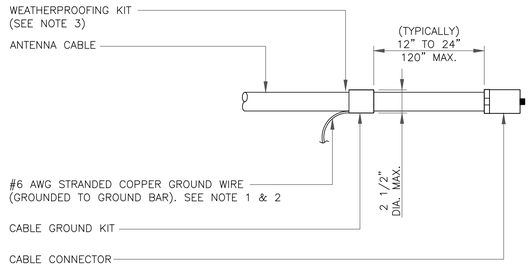
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

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

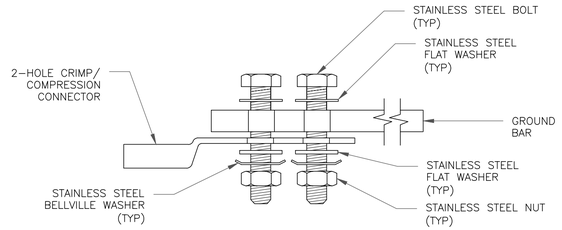
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



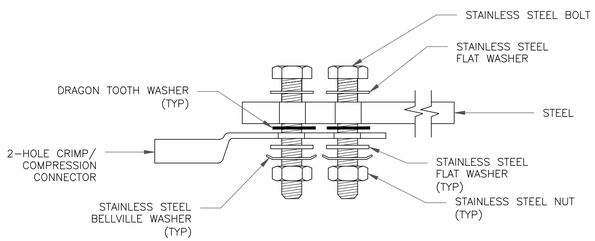
NOTES:

1. 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.

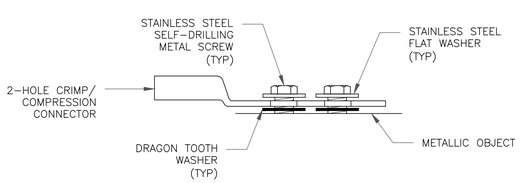
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS

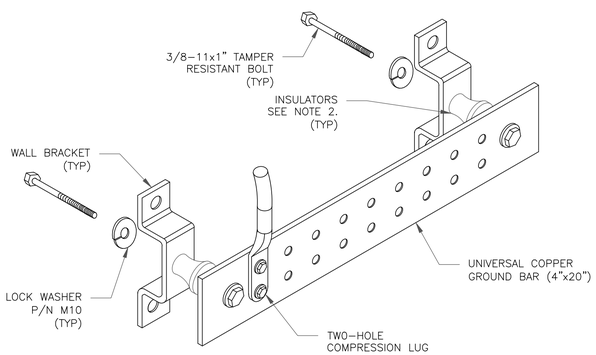


SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

4 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

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

5 GROUND BAR DETAIL
SCALE: NOT TO SCALE

6 NOT USED
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

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T-MOBILE SITE NUMBER:
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BU #: **876377**
HORTON 2 / FREDSALL PROPERTY

161 PINNEY STREET
COLEBROOK, CT 06021

EXISTING 148'-0" MONOPOLE

ISSUED FOR:

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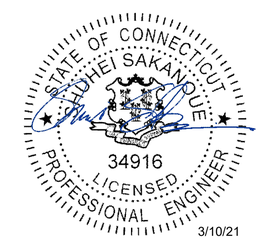


SHEET NUMBER: G-2

REVISION: 2

Exhibit D

Structural Analysis Report

Date: **February 18, 2021**

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Sprint PCS* Co-Locate**	
	Site Number:	CTNH573A
	Site Name:	CTNH573A
Crown Castle Designation:	**BU Number:**	876377
	Site Name:	Horton 2 / Fredsall Property
	JDE Job Number:	628855
	Work Order Number:	1919053
	Order Number:	538774 Rev. 1
Engineering Firm Designation:	**B+T Group Project Number:**	112179.007.01
Site Data:	**161 Pinney Street, Colebrook, Litchfield County, CT** **Latitude *41° 57' 58.9"*, Longitude *-73° 7' 18.1"*** **148 Foot - Monopole Tower**	

B+T Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

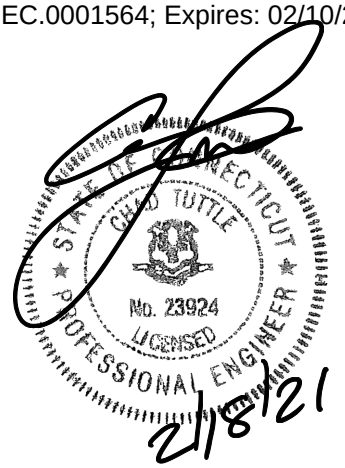
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC5: Proposed Equipment Configuration **Sufficient Capacity- 80.9%**

This analysis has been performed in accordance with the 2018 International Building Code based upon an ultimate 3-second gust wind speed of 115 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: John Landon

Respectfully submitted by: B+T Engineering, Inc.
COA: PEC.0001564; Expires: 02/10/2021



Chad E. Tuttle, P.E.

tnxTower Report - version 8.0.7.5

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 148 ft. Monopole tower designed by Summit Manufacturer in September of 2000. The tower has been modified per reinforcement drawings prepared by PJF in February of 2009. Reinforcement consists of addition of new shaft reinforcement from 0' to 99'-5" and foundation modification.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	115 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	40 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	1	--	Platform Mount [LP 1201-1_KCKR-HR-1]	4	1-5/8
	148.0	3	Ericsson	AIR6449 B41_T-MOBILE		
		3	Ericsson	RADIO 4415 B66A		
		3	Ericsson	RADIO 4424 B25_TMO		
		3	Ericsson	RADIO 4449 B71 B85A_T-MOBILE		
		3	RFS Celwave	APX16DWV-16DWV-S-E-A20		
		3	RFS Celwave	APXVAALL24_43-U-NA20_TMO		

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)
141.0	143.0	3	Ericsson	RRUS 11 B12	--	--
	141.0	1	--	Side Arm Mount [SO 102-3]		
140.0	142.0	3	Ericsson	RRUS 4449 B5/B12	6 4 2 2	1-5/8 7/8 7/16 3/8
		3	Ericsson	RRUS 4478 B14		
		3	Ericsson	RRUS 8843 B2/B66A		
		3	Powerwave Tech	TT08-19DB111-001		
		2	Raycap	DC6-48-60-0-8C-EV		
	140.0	2	CCI Antennas	OPA65R-BU4D		
		4	CCI Antennas	TPA65R-BU6D		
		3	Powerwave Tech.	7770.00		
		1	Raycap	DC6-48-60-18-8F		
		1	--	Side Arm Mount [SO 102-3]		
		1	--	T-Arm Mount [TA 602-3]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
130.0	130.0	3	Alcatel Lucent	RRH2X60-AWS	13	1-5/8
		3	Alcatel Lucent	RRH2x60-700		
		2	Antel	LPA-80080-6CF-EDIN-6		
		4	Antel	LPA-80080/6CF		
		6	Commscope	SBNHH-1D65B		
		1	--	Platform Mount [LP 303-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Tower Manufacturer Drawing	1883532	CCI Sites
Mount Analysis Report	9566975	CCI Sites
Tower Modification Drawing	2293404	CCI Sites
Post Modification Inspection	2385953	CCI Sites
Foundation Drawing	1629428	CCI Sites
Geotech Report	1532992	CCI Sites
Crown CAD Package	Date: 02/10/2021	CCI Sites

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) The 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.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	148 - 143	Pole	TP22.85x22x0.1875	1	-5.498	--	6.8	Pass
L2	143 - 138	Pole	TP23.7x22.85x0.1875	2	-8.709	--	14.4	Pass
L3	138 - 133	Pole	TP24.55x23.7x0.1875	3	-9.125	--	23.0	Pass
L4	133 - 128	Pole	TP25.4x24.55x0.1875	4	-12.069	--	32.3	Pass
L5	128 - 123	Pole	TP26.25x25.4x0.1875	5	-12.599	--	42.4	Pass
L6	123 - 120.75	Pole	TP27.227x26.25x0.1875	6	-12.844	--	46.6	Pass
L7	120.75 - 115.75	Pole	TP27.107x26.257x0.25	7	-13.705	--	39.0	Pass
L8	115.75 - 110.75	Pole	TP27.957x27.107x0.25	8	-14.379	--	44.7	Pass
L9	110.75 - 105.75	Pole	TP28.807x27.957x0.25	9	-15.072	--	49.8	Pass
L10	105.75 - 100.75	Pole	TP29.657x28.807x0.25	10	-15.785	--	54.6	Pass
L11	100.75 - 97	Pole	TP30.294x29.657x0.25	11	-16.331	--	57.9	Pass
L12	97 - 96.75	Pole + Reinf.	TP30.336x30.294x0.4625	12	-16.392	--	42.0	Pass
L13	96.75 - 91.75	Pole + Reinf.	TP31.186x30.336x0.45	13	-17.445	--	45.2	Pass
L14	91.75 - 86.75	Pole + Reinf.	TP32.036x31.186x0.4438	14	-18.518	--	48.2	Pass
L15	86.75 - 85	Pole + Reinf.	TP33.056x32.036x0.4438	15	-18.896	--	49.2	Pass
L16	85 - 80	Pole + Reinf.	TP32.684x31.834x0.4688	16	-20.775	--	49.7	Pass
L17	80 - 75	Pole + Reinf.	TP33.533x32.684x0.4688	17	-21.945	--	52.1	Pass
L18	75 - 70	Pole + Reinf.	TP34.383x33.533x0.4625	18	-23.134	--	54.4	Pass
L19	70 - 65	Pole + Reinf.	TP35.233x34.383x0.4563	19	-24.342	--	56.5	Pass
L20	65 - 60	Pole + Reinf.	TP36.083x35.233x0.4563	20	-25.567	--	58.5	Pass
L21	60 - 55	Pole + Reinf.	TP36.933x36.083x0.4438	21	-26.812	--	60.3	Pass
L22	55 - 50	Pole + Reinf.	TP37.783x36.933x0.4438	22	-28.075	--	62.1	Pass
L23	50 - 45	Pole + Reinf.	TP39.483x37.783x0.4375	23	-29.356	--	63.7	Pass
L24	45 - 39	Pole + Reinf.	TP39.09x38.071x0.4688	24	-32.020	--	62.7	Pass
L25	39 - 34	Pole + Reinf.	TP39.94x39.09x0.4625	25	-33.407	--	64.0	Pass
L26	34 - 29	Pole + Reinf.	TP40.79x39.94x0.4625	26	-34.812	--	65.2	Pass
L27	29 - 24	Pole + Reinf.	TP41.64x40.79x0.4563	27	-36.237	--	66.4	Pass
L28	24 - 19	Pole + Reinf.	TP42.49x41.64x0.45	28	-37.680	--	67.4	Pass
L29	19 - 14	Pole + Reinf.	TP43.34x42.49x0.45	29	-39.142	--	68.4	Pass
L30	14 - 12.08	Pole + Reinf.	TP43.666x43.34x0.45	30	-39.702	--	68.8	Pass
L31	12.08 - 11.83	Pole + Reinf.	TP43.709x43.666x0.425	31	-39.790	--	70.5	Pass
L32	11.83 - 6.83	Pole + Reinf.	TP44.558x43.709x0.425	32	-41.333	--	71.4	Pass
L33	6.83 - 4.92	Pole + Reinf.	TP44.884x44.558x0.425	33	-41.926	--	71.7	Pass
L34	4.92 - 4.67	Pole + Reinf.	TP44.927x44.884x0.45	34	-42.013	--	70.1	Pass
L35	4.67 - 0	Pole + Reinf.	TP45.72x44.927x0.4438	35	-43.420	--	70.8	Pass
							Summary	
						Pole	57.9	Pass
						Reinforcement	71.7	Pass
						Rating =	71.7	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rod	Base	61.4	Pass
1,2	Base Plate	Base	52.7	Pass
1,2	Base Foundation (Structure)	Base	80.9	Pass
1,2	Base Foundation (Soil Interaction)	Base	62.5	Pass

Structure Rating (max from all components) =	80.9%

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

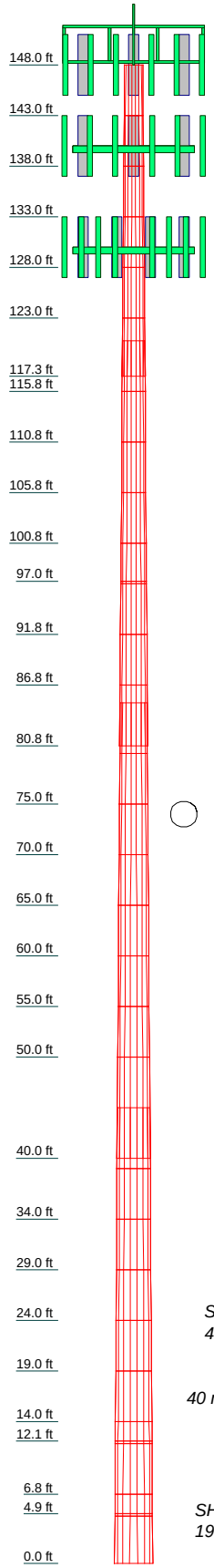
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	32	33	35
Length (ft)	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	10.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	4.666
Number of Sides	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.188	0.188	0.188	0.188	0.188	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.450	0.444	0.444	0.469	0.469	0.463	0.456	0.456	0.444	0.444	0.438	0.469	0.463	0.463	0.456	0.450	0.450	0.450	0.425	0.425	0.449
Socket Length (ft)						3.500									4.250								5.000										
Top Dia (in)	22.000	22.850	23.700	24.550	25.400	26.250	27.107	27.957	28.807	29.657	30.507	31.357	32.207	33.057	33.907	34.757	35.607	36.457	37.307	38.157	39.007	39.857	40.707	41.557	42.407	43.257	44.107	44.957	45.807	46.657	47.507	48.357	49.207
Bot Dia (in)	22.850	23.700	24.550	25.400	26.250	27.107	27.957	28.807	29.657	30.507	31.357	32.207	33.057	33.907	34.757	35.607	36.457	37.307	38.157	39.007	39.857	40.707	41.557	42.407	43.257	44.107	44.957	45.807	46.657	47.507	48.357	49.207	50.057
Grade	A607-60																						A607-65										
Weight (K)	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.0	0.7	0.7	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	1.7	1.1	0.9	1.0	1.0	1.0	1.0	0.4	1.1	0.4	1.0



ALL REACTIONS ARE FACTORED

AXIAL 71 K

SHEAR 4 K *MOMENT 429 kip-ft*

TORQUE 0 kip-ft

40 mph WIND - 1.500 in ICE

AXIAL 43 K

SHEAR 19 K *MOMENT 2202 kip-ft*

TORQUE 1 kip-ft

REACTIONS - 115 mph WIND

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 115 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 40 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TIA-222-H Annex S
9. TOWER RATING: 71.7%

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

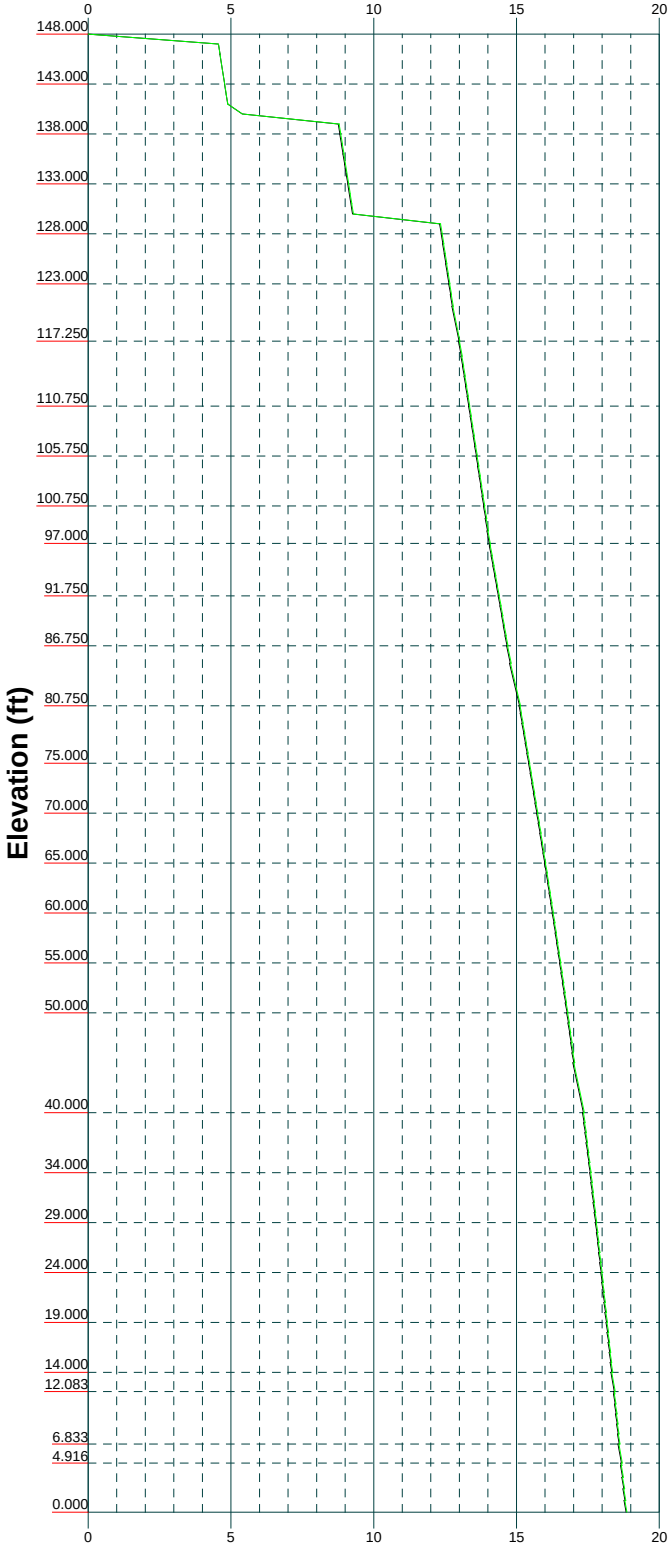
Job:	***112179.007.01 - HORTON 2 FREDSALL PROPERTY, CT (BU# 876377***		
Project:			
Client: Crown Castle	Drawn by: GURUPRASAD	App'd:	
Code: TIA-222-H	Date: 02/15/21	Scale: NTS	
Path:		Dwg No. E-1	

TIA-222-H - 115 mph/40 mph 1.500 in Ice Exposure B

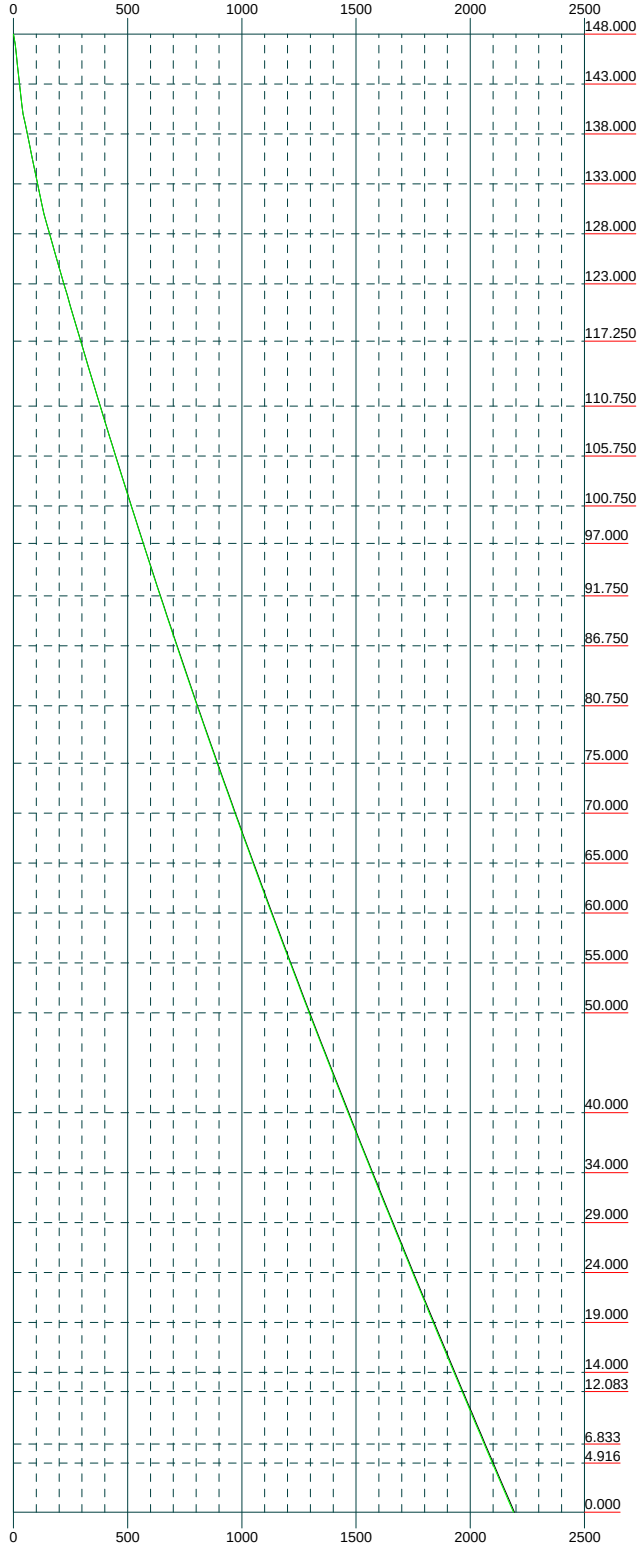
Maximum Values

Vx Vz Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)

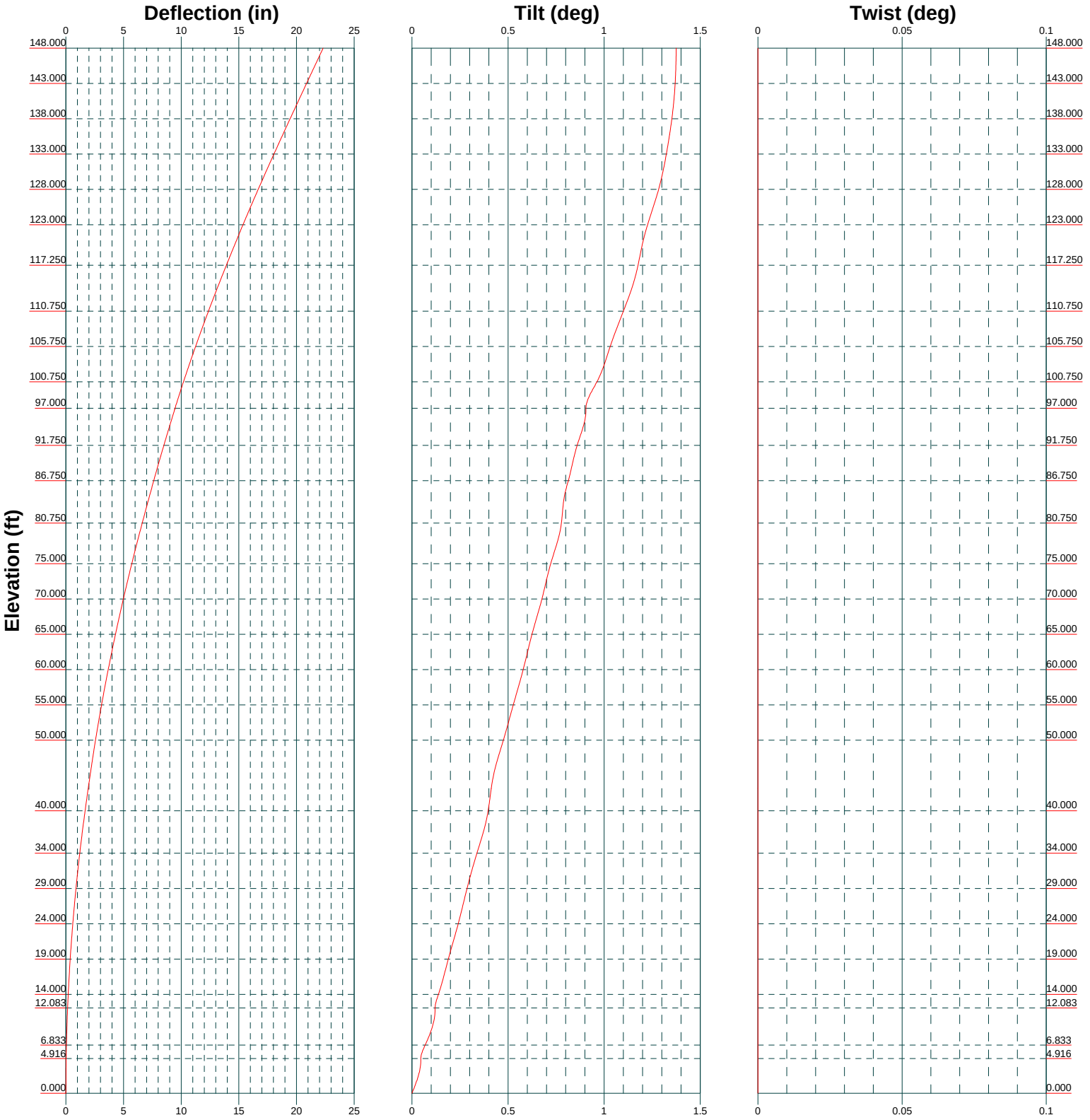


B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 112179.007.01 - HORTON 2 FREDSALL PROPERTY, CT (BU# 876377			
Project:			
Client: Crown Castle	Drawn by: GURUPRASAD	App'd:	
Code: TIA-222-H	Date: 02/15/21	Scale: NTS	
Path:		Dwg No. E-4	

TIA-222-H - Service - 60 mph

Maximum Values

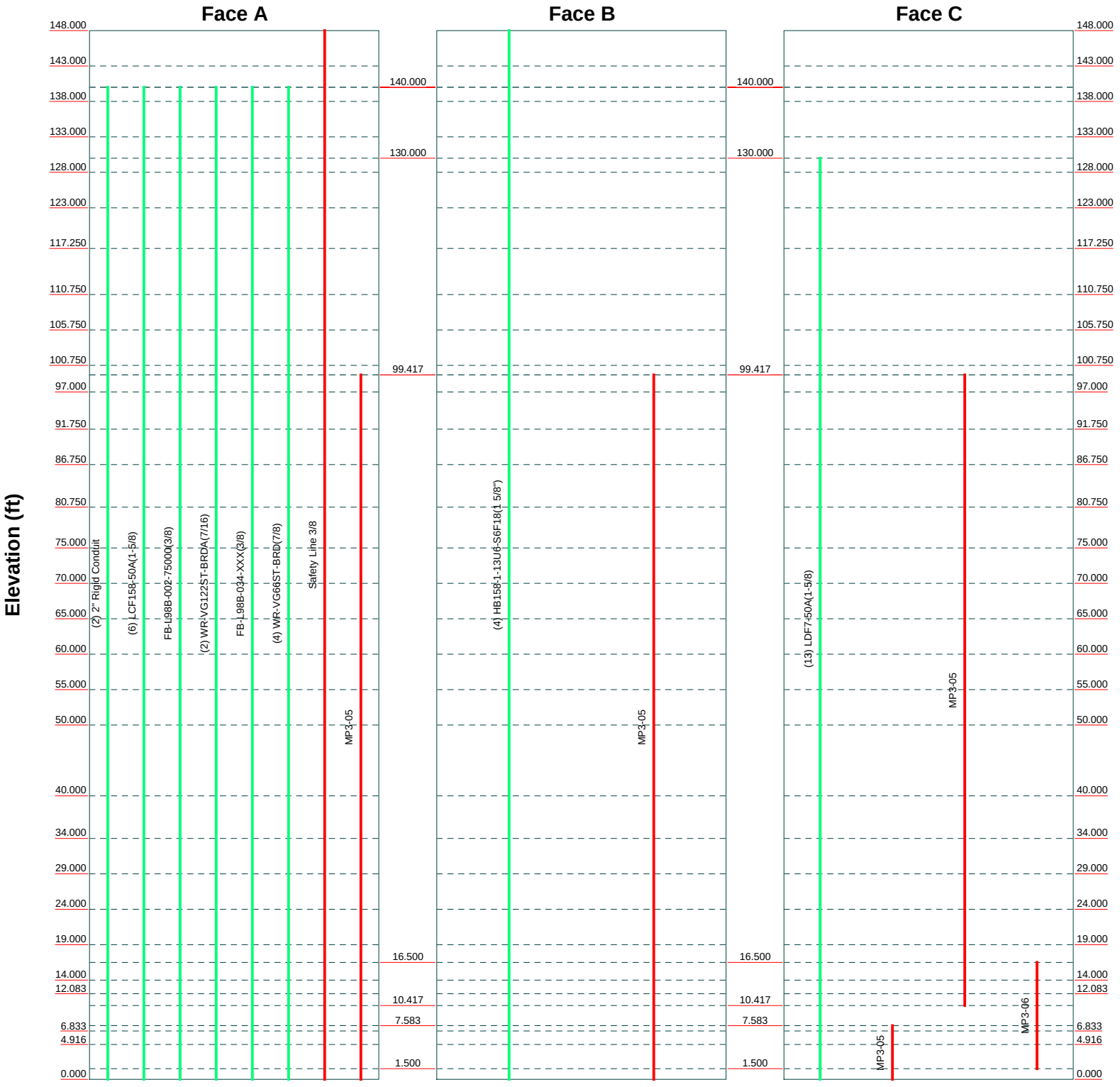


B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job:	***112179.007.01 - HORTON 2 FREDSALL PROPERTY, CT (BU# 876377***		
Project:			
Client: Crown Castle		Drawn by: GURUPRASAD	App'd:
Code: TIA-222-H		Date: 02/15/21	Scale: NTS
Path:			Dwg No. E-5

Feed Line Distribution Chart
0' - 148'

Round | Flat | App In Face | App Out Face | Truss Leg



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Job:	***112179.007.01 - HORTON 2 FREDSALL PROPERTY, CT (BU# 876377***		
Project:			
Client: Crown Castle	Drawn by: GURUPRASAD	App'd:	
Code: TIA-222-H	Date: 02/15/21	Scale: NTS	
Path:		Dwg No. E-7	

Tower Input Data

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

Tower is located in Litchfield County, Connecticut.
Tower base elevation above sea level: 1223.000 ft.
Basic wind speed of 115 mph.
Risk Category II.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.000 ft.
Nominal ice thickness of 1.500 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
TIA-222-H Annex S.
TOWER RATING: 71.7%.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.05.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	148.000-143.000	5.000	0.000	18	22.000	22.850	0.188	0.750	A607-60 (60 ksi)
L2	143.000-138.000	5.000	0.000	18	22.850	23.700	0.188	0.750	A607-60 (60 ksi)
L3	138.000-133.000	5.000	0.000	18	23.700	24.550	0.188	0.750	A607-60 (60 ksi)
L4	133.000-128.000	5.000	0.000	18	24.550	25.400	0.188	0.750	A607-60 (60 ksi)
L5	128.000-123.000	5.000	0.000	18	25.400	26.250	0.188	0.750	A607-60 (60 ksi)
L6	123.000-117.250	5.750	3.500	18	26.250	27.227	0.188	0.750	A607-60 (60 ksi)
L7	117.250-115.750	5.000	0.000	18	26.257	27.107	0.250	1.000	A607-60 (60 ksi)
L8	115.750-110.750	5.000	0.000	18	27.107	27.957	0.250	1.000	A607-60 (60 ksi)
L9	110.750-105.750	5.000	0.000	18	27.957	28.807	0.250	1.000	A607-60 (60 ksi)
L10	105.750-100.750	5.000	0.000	18	28.807	29.657	0.250	1.000	A607-60 (60 ksi)
L11	100.750-97.000	3.750	0.000	18	29.657	30.294	0.250	1.000	A607-60 (60 ksi)
L12	97.000-96.750	0.250	0.000	18	30.294	30.336	0.463	1.850	A607-60 (60 ksi)
L13	96.750-91.750	5.000	0.000	18	30.336	31.186	0.450	1.800	A607-60 (60 ksi)
L14	91.750-86.750	5.000	0.000	18	31.186	32.036	0.444	1.775	A607-60 (60 ksi)
L15	86.750-80.750	6.000	4.250	18	32.036	33.056	0.444	1.775	A607-60 (60 ksi)
L16	80.750-80.000	5.000	0.000	18	31.834	32.684	0.469	1.875	A607-65 (65 ksi)
L17	80.000-75.000	5.000	0.000	18	32.684	33.533	0.469	1.875	A607-65 (65 ksi)
L18	75.000-70.000	5.000	0.000	18	33.533	34.383	0.463	1.850	A607-65 (65 ksi)
L19	70.000-65.000	5.000	0.000	18	34.383	35.233	0.456	1.825	A607-65 (65 ksi)
L20	65.000-60.000	5.000	0.000	18	35.233	36.083	0.456	1.825	A607-65 (65 ksi)
L21	60.000-55.000	5.000	0.000	18	36.083	36.933	0.444	1.775	A607-65 (65 ksi)
L22	55.000-50.000	5.000	0.000	18	36.933	37.783	0.444	1.775	A607-65 (65 ksi)
L23	50.000-40.000	10.000	5.000	18	37.783	39.483	0.438	1.750	A607-65 (65 ksi)
L24	40.000-39.000	6.000	0.000	18	38.071	39.090	0.469	1.875	A607-65 (65 ksi)
L25	39.000-34.000	5.000	0.000	18	39.090	39.940	0.463	1.850	A607-65 (65 ksi)
L26	34.000-29.000	5.000	0.000	18	39.940	40.790	0.463	1.850	A607-65 (65 ksi)
L27	29.000-24.000	5.000	0.000	18	40.790	41.640	0.456	1.825	A607-65 (65 ksi)
L28	24.000-19.000	5.000	0.000	18	41.640	42.490	0.450	1.800	A607-65 (65 ksi)
L29	19.000-14.000	5.000	0.000	18	42.490	43.340	0.450	1.800	A607-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L30	14.000-12.083	1.917	0.000	18	43.340	43.666	0.450	1.800	A607-65 (65 ksi)
L31	12.083-11.833	0.250	0.000	18	43.666	43.709	0.425	1.700	A607-65 (65 ksi)
L32	11.833-6.833	5.000	0.000	18	43.709	44.558	0.425	1.700	A607-65 (65 ksi)
L33	6.833-4.916	1.917	0.000	18	44.558	44.884	0.425	1.700	A607-65 (65 ksi)
L34	4.916-4.666	0.250	0.000	18	44.884	44.927	0.450	1.800	A607-65 (65 ksi)
L35	4.666-0.000	4.666		18	44.927	45.720	0.444	1.775	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.310	12.981	780.301	7.743	11.176	69.819	1561.628	6.492	3.542	18.891
	23.173	13.487	875.114	8.045	11.608	75.390	1751.379	6.745	3.692	19.688
L2	23.173	13.487	875.114	8.045	11.608	75.390	1751.379	6.745	3.692	19.688
	24.037	13.993	977.312	8.347	12.040	81.175	1955.909	6.998	3.841	20.486
L3	24.037	13.993	977.312	8.347	12.040	81.175	1955.909	6.998	3.841	20.486
	24.900	14.499	1087.172	8.649	12.471	87.174	2175.774	7.251	3.991	21.284
L4	24.900	14.499	1087.172	8.649	12.471	87.174	2175.774	7.251	3.991	21.284
	25.763	15.004	1204.971	8.950	12.903	93.387	2411.527	7.504	4.140	22.082
L5	25.763	15.004	1204.971	8.950	12.903	93.387	2411.527	7.504	4.140	22.082
	26.626	15.510	1330.986	9.252	13.335	99.813	2663.724	7.757	4.290	22.88
L6	26.626	15.510	1330.986	9.252	13.335	99.813	2663.724	7.757	4.290	22.88
	27.618	16.092	1486.420	9.599	13.831	107.468	2974.796	8.047	4.462	23.797
L7	27.228	20.637	1763.429	9.233	13.339	132.205	3529.179	10.320	4.181	16.725
	27.487	21.311	1942.018	9.534	13.770	141.029	3886.591	10.658	4.331	17.323
L8	27.487	21.311	1942.018	9.534	13.770	141.029	3886.591	10.658	4.331	17.323
	28.350	21.985	2132.275	9.836	14.202	150.139	4267.355	10.995	4.480	17.922
L9	28.350	21.985	2132.275	9.836	14.202	150.139	4267.355	10.995	4.480	17.922
	29.212	22.660	2334.569	10.138	14.634	159.533	4672.209	11.332	4.630	18.52
L10	29.212	22.660	2334.569	10.138	14.634	159.533	4672.209	11.332	4.630	18.52
	30.075	23.334	2549.269	10.439	15.066	169.212	5101.892	11.669	4.780	19.118
L11	30.075	23.334	2549.269	10.439	15.066	169.212	5101.892	11.669	4.780	19.118
	30.723	23.840	2718.658	10.666	15.389	176.659	5440.893	11.922	4.892	19.567
L12	30.690	43.792	4923.549	10.590	15.389	319.933	9853.577	21.900	4.518	9.768
	30.733	43.854	4944.619	10.605	15.411	320.852	9895.745	21.931	4.525	9.784
L13	30.735	42.687	4817.023	10.610	15.411	312.572	9640.384	21.347	4.547	10.105
	31.598	43.901	5239.758	10.911	15.843	330.738	10486.411	21.954	4.697	10.437
L14	31.599	43.300	5170.136	10.914	15.843	326.343	10347.076	21.654	4.708	10.609
	32.462	44.497	5610.880	11.215	16.274	344.768	11229.142	22.253	4.857	10.946
L15	32.462	44.497	5610.880	11.215	16.274	344.768	11229.142	22.253	4.857	10.946
	33.497	45.933	6171.987	11.577	16.792	367.545	12352.096	22.971	5.037	11.351
L16	32.986	46.665	5799.837	11.135	16.171	358.646	11607.306	23.337	4.778	10.192
	33.115	47.930	6284.225	11.436	16.603	378.494	12576.719	23.969	4.927	10.512
L17	33.115	47.930	6284.225	11.436	16.603	378.494	12576.719	23.969	4.927	10.512
	33.978	49.194	6794.859	11.738	17.035	398.876	13598.659	24.602	5.077	10.831
L18	33.979	48.547	6708.063	11.740	17.035	393.781	13424.953	24.278	5.088	11.001
	34.842	49.795	7238.666	12.042	17.467	414.425	14486.856	24.902	5.237	11.324
L19	34.843	49.131	7144.794	12.044	17.467	409.051	14298.989	24.570	5.248	11.504
	35.706	50.362	7695.325	12.346	17.899	429.942	15400.776	25.186	5.398	11.831
L20	35.706	50.362	7695.325	12.346	17.899	429.942	15400.776	25.186	5.398	11.831

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
	36.570	51.593	8273.434	12.648	18.330	451.353	16557.755	25.801	5.548	12.159
L21	36.571	50.197	8055.238	12.652	18.330	439.449	16121.075	25.103	5.570	12.551
	37.435	51.394	8645.395	12.954	18.762	460.791	17302.166	25.702	5.719	12.888
L22	37.435	51.394	8645.395	12.954	18.762	460.791	17302.166	25.702	5.719	12.888
	38.298	52.591	9263.695	13.255	19.194	482.639	18539.580	26.301	5.869	13.226
L23	38.299	51.859	9137.808	13.258	19.194	476.080	18287.639	25.934	5.880	13.44
	40.025	54.220	10443.243	13.861	20.057	520.669	20900.228	27.115	6.179	14.123
L24	39.449	55.944	9993.375	13.349	19.340	516.725	19999.899	27.978	5.875	12.534
	39.621	57.462	10828.823	13.711	19.858	545.314	21671.894	28.736	6.055	12.917
L25	39.622	56.705	10689.626	13.713	19.858	538.304	21393.318	28.358	6.066	13.116
	40.485	57.953	11410.882	14.015	20.290	562.397	22836.778	28.982	6.216	13.439
L26	40.485	57.953	11410.882	14.015	20.290	562.397	22836.778	28.982	6.216	13.439
	41.348	59.200	12163.872	14.316	20.722	587.017	24343.749	29.606	6.365	13.762
L27	41.349	58.409	12005.075	14.319	20.722	579.353	24025.947	29.210	6.376	13.975
	42.212	59.640	12780.107	14.620	21.153	604.167	25577.031	29.826	6.526	14.303
L28	42.213	58.832	12610.777	14.623	21.153	596.162	25238.148	29.422	6.537	14.526
	43.076	60.046	13407.643	14.924	21.585	621.154	26832.928	30.029	6.686	14.858
L29	43.076	60.046	13407.643	14.924	21.585	621.154	26832.928	30.029	6.686	14.858
	43.939	61.260	14237.390	15.226	22.017	646.660	28493.515	30.636	6.836	15.191
L30	43.939	61.260	14237.390	15.226	22.017	646.660	28493.515	30.636	6.836	15.191
	44.270	61.725	14564.376	15.342	22.182	656.575	29147.915	30.869	6.893	15.318
L31	44.274	58.330	13779.129	15.351	22.182	621.175	27576.389	29.171	6.937	16.323
	44.317	58.387	13819.795	15.366	22.204	622.403	27657.775	29.199	6.945	16.34
L32	44.317	58.387	13819.795	15.366	22.204	622.403	27657.775	29.199	6.945	16.34
	45.180	59.534	14650.003	15.667	22.636	647.208	29319.283	29.773	7.094	16.692
L33	45.180	59.534	14650.003	15.667	22.636	647.208	29319.283	29.773	7.094	16.692
	45.511	59.973	14976.916	15.783	22.801	656.846	29973.539	29.992	7.152	16.827
L34	45.507	63.466	15831.175	15.774	22.801	694.312	31683.181	31.739	7.108	15.795
	45.550	63.526	15876.641	15.789	22.823	695.647	31774.173	31.769	7.115	15.811
L35	45.551	62.653	15662.733	15.791	22.823	686.275	31346.076	31.332	7.126	16.059
	46.357	63.770	16515.590	16.073	23.226	711.089	33052.911	31.891	7.266	16.373

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 148.000-143.000				1	1	1			
L2 143.000-138.000				1	1	1			
L3 138.000-133.000				1	1	1			
L4 133.000-128.000				1	1	1			
L5 128.000-123.000				1	1	1			
L6 123.000-117.250				1	1	1			
L7 117.250-115.750				1	1	1			
L8 115.750-110.750				1	1	1			

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L9 110.750-105.750				1	1	1			
L10 105.750-100.750				1	1	1			
L11 100.750-97.000				1	1	1			
L12 97.000-96.750				1	1	0.930908			
L13 96.750-91.750				1	1	0.945284			
L14 91.750-86.750				1	1	0.947776			
L15 86.750-80.750				1	1	0.944191			
L16 80.750-80.000				1	1	0.957149			
L17 80.000-75.000				1	1	0.947968			
L18 75.000-70.000				1	1	0.951765			
L19 70.000-65.000				1	1	0.956116			
L20 65.000-60.000				1	1	0.948012			
L21 60.000-55.000				1	1	0.966442			
L22 55.000-50.000				1	1	0.95887			
L23 50.000-40.000				1	1	0.965073			
L24 40.000-39.000				1	1	0.964352			
L25 39.000-34.000				1	1	0.970734			
L26 34.000-29.000				1	1	0.964515			
L27 29.000-24.000				1	1	0.971537			
L28 24.000-19.000				1	1	0.979009			
L29 19.000-14.000				1	1	0.97337			
L30 14.000-12.083				1	1	0.971267			
L31 12.083-11.833				1	1	1.07582			
L32 11.833-6.833				1	1	1.06926			
L33 6.833-4.916				1	1	1.06681			
L34 4.916-4.666				1	1	0.96342			
L35 4.666-0.000				1	1	0.972076			

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
*										
Safety Line 3/8	A	No	Surface Ar (CaAa)	148.000 - 0.000	1	1	-0.210 -0.200	0.375		0.000
*										
MP3-05	A	No	Surface Af (CaAa)	99.417 - 0.000	1	1	0.000 0.000	5.330	14.840	0.000
MP3-05	B	No	Surface Af (CaAa)	99.417 - 0.000	1	1	0.000 0.000	5.330	14.840	0.000
MP3-05	C	No	Surface Af (CaAa)	7.583 - 0.000	1	1	0.000 0.000	5.330	14.840	0.000
MP3-05	C	No	Surface Af (CaAa)	99.417 - 10.417	1	1	0.000 0.000	5.330	14.840	0.000
MP3-06	C	No	Surface Af (CaAa)	16.500 - 1.500	1	1	0.000 0.000	6.890	18.992	0.000
*										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
HB158-1-13U6-S6F 18(1 5/8")	B	No	No	Inside Pole	148.000 - 0.000	4	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
							2" Ice	0.000	0.002
*									
2" Rigid Conduit	A	No	No	Inside Pole	140.000 - 0.000	2	No Ice	0.000	0.003
							1/2" Ice	0.000	0.003
							1" Ice	0.000	0.003
							2" Ice	0.000	0.003
LCF158-50A(1-5/8)	A	No	No	Inside Pole	140.000 - 0.000	6	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
FB-L98B-002-75000 (3/8)	A	No	No	Inside Pole	140.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
WR-VG122ST-BRD A(7/16)	A	No	No	Inside Pole	140.000 - 0.000	2	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
FB-L98B-034-XXX(3/8)	A	No	No	Inside Pole	140.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
WR-VG66ST-BRD(7/8)	A	No	No	Inside Pole	140.000 - 0.000	4	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
*									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	130.000 - 0.000	13	No Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
*									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	148.000-143.000	A	0.000	0.000	0.188	0.000	0.001
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.000
L2	143.000-138.000	A	0.000	0.000	0.188	0.000	0.030
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.000
L3	138.000-133.000	A	0.000	0.000	0.188	0.000	0.073
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.000
L4	133.000-128.000	A	0.000	0.000	0.188	0.000	0.073
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.021
L5	128.000-123.000	A	0.000	0.000	0.188	0.000	0.073
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.053
L6	123.000-117.250	A	0.000	0.000	0.216	0.000	0.084
		B	0.000	0.000	0.000	0.000	0.044
		C	0.000	0.000	0.000	0.000	0.061
L7	117.250-115.750	A	0.000	0.000	0.056	0.000	0.022
		B	0.000	0.000	0.000	0.000	0.011
		C	0.000	0.000	0.000	0.000	0.016
L8	115.750-110.750	A	0.000	0.000	0.188	0.000	0.073
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.053
L9	110.750-105.750	A	0.000	0.000	0.188	0.000	0.073
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.053
L10	105.750-100.750	A	0.000	0.000	0.188	0.000	0.073
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.053
L11	100.750-97.000	A	0.000	0.000	2.288	0.000	0.055
		B	0.000	0.000	2.147	0.000	0.029
		C	0.000	0.000	2.147	0.000	0.040
L12	97.000-96.750	A	0.000	0.000	0.231	0.000	0.004
		B	0.000	0.000	0.222	0.000	0.002
		C	0.000	0.000	0.222	0.000	0.003
L13	96.750-91.750	A	0.000	0.000	4.629	0.000	0.073
		B	0.000	0.000	4.442	0.000	0.038
		C	0.000	0.000	4.442	0.000	0.053
L14	91.750-86.750	A	0.000	0.000	4.629	0.000	0.073
		B	0.000	0.000	4.442	0.000	0.038
		C	0.000	0.000	4.442	0.000	0.053
L15	86.750-80.750	A	0.000	0.000	5.555	0.000	0.088
		B	0.000	0.000	5.330	0.000	0.046

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	5.330	0.000	0.064
L16	80.750-80.000	A	0.000	0.000	0.694	0.000	0.011
		B	0.000	0.000	0.666	0.000	0.006
		C	0.000	0.000	0.666	0.000	0.008
L17	80.000-75.000	A	0.000	0.000	4.629	0.000	0.073
		B	0.000	0.000	4.442	0.000	0.038
		C	0.000	0.000	4.442	0.000	0.053
L18	75.000-70.000	A	0.000	0.000	4.629	0.000	0.073
		B	0.000	0.000	4.442	0.000	0.038
		C	0.000	0.000	4.442	0.000	0.053
L19	70.000-65.000	A	0.000	0.000	4.629	0.000	0.073
		B	0.000	0.000	4.442	0.000	0.038
		C	0.000	0.000	4.442	0.000	0.053
L20	65.000-60.000	A	0.000	0.000	4.629	0.000	0.073
		B	0.000	0.000	4.442	0.000	0.038
		C	0.000	0.000	4.442	0.000	0.053
L21	60.000-55.000	A	0.000	0.000	4.629	0.000	0.073
		B	0.000	0.000	4.442	0.000	0.038
		C	0.000	0.000	4.442	0.000	0.053
L22	55.000-50.000	A	0.000	0.000	4.629	0.000	0.073
		B	0.000	0.000	4.442	0.000	0.038
		C	0.000	0.000	4.442	0.000	0.053
L23	50.000-40.000	A	0.000	0.000	9.258	0.000	0.147
		B	0.000	0.000	8.883	0.000	0.076
		C	0.000	0.000	8.883	0.000	0.107
L24	40.000-39.000	A	0.000	0.000	0.926	0.000	0.015
		B	0.000	0.000	0.888	0.000	0.008
		C	0.000	0.000	0.888	0.000	0.011
L25	39.000-34.000	A	0.000	0.000	4.629	0.000	0.073
		B	0.000	0.000	4.442	0.000	0.038
		C	0.000	0.000	4.442	0.000	0.053
L26	34.000-29.000	A	0.000	0.000	4.629	0.000	0.073
		B	0.000	0.000	4.442	0.000	0.038
		C	0.000	0.000	4.442	0.000	0.053
L27	29.000-24.000	A	0.000	0.000	4.629	0.000	0.073
		B	0.000	0.000	4.442	0.000	0.038
		C	0.000	0.000	4.442	0.000	0.053
L28	24.000-19.000	A	0.000	0.000	4.629	0.000	0.073
		B	0.000	0.000	4.442	0.000	0.038
		C	0.000	0.000	4.442	0.000	0.053
L29	19.000-14.000	A	0.000	0.000	4.629	0.000	0.073
		B	0.000	0.000	4.442	0.000	0.038
		C	0.000	0.000	7.285	0.000	0.053
L30	14.000-12.083	A	0.000	0.000	1.775	0.000	0.028
		B	0.000	0.000	1.703	0.000	0.015
		C	0.000	0.000	3.884	0.000	0.020
L31	12.083-11.833	A	0.000	0.000	0.231	0.000	0.004
		B	0.000	0.000	0.222	0.000	0.002
		C	0.000	0.000	0.506	0.000	0.003
L32	11.833-6.833	A	0.000	0.000	4.629	0.000	0.073
		B	0.000	0.000	4.442	0.000	0.038
		C	0.000	0.000	7.511	0.000	0.053
L33	6.833-4.916	A	0.000	0.000	1.775	0.000	0.028
		B	0.000	0.000	1.703	0.000	0.015
		C	0.000	0.000	3.625	0.000	0.020
L34	4.916-4.666	A	0.000	0.000	0.231	0.000	0.004
		B	0.000	0.000	0.222	0.000	0.002
		C	0.000	0.000	0.473	0.000	0.003
L35	4.666-0.000	A	0.000	0.000	4.320	0.000	0.068
		B	0.000	0.000	4.145	0.000	0.035
		C	0.000	0.000	7.117	0.000	0.050

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	148.000-143.000	A	1.479	0.000	0.000	1.666	0.000	0.018
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.000
L2	143.000-138.000	A	1.474	0.000	0.000	1.661	0.000	0.047
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.000
L3	138.000-133.000	A	1.468	0.000	0.000	1.656	0.000	0.090
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.000
L4	133.000-128.000	A	1.463	0.000	0.000	1.650	0.000	0.090
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.021
L5	128.000-123.000	A	1.457	0.000	0.000	1.645	0.000	0.090
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.053
L6	123.000-117.250	A	1.451	0.000	0.000	1.884	0.000	0.103
		B		0.000	0.000	0.000	0.000	0.044
		C		0.000	0.000	0.000	0.000	0.061
L7	117.250-115.750	A	1.446	0.000	0.000	0.491	0.000	0.027
		B		0.000	0.000	0.000	0.000	0.011
		C		0.000	0.000	0.000	0.000	0.016
L8	115.750-110.750	A	1.442	0.000	0.000	1.630	0.000	0.089
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.053
L9	110.750-105.750	A	1.436	0.000	0.000	1.623	0.000	0.089
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.053
L10	105.750-100.750	A	1.429	0.000	0.000	1.617	0.000	0.089
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.053
L11	100.750-97.000	A	1.423	0.000	0.000	4.043	0.000	0.094
		B		0.000	0.000	2.835	0.000	0.056
		C		0.000	0.000	2.835	0.000	0.067
L12	97.000-96.750	A	1.420	0.000	0.000	0.373	0.000	0.007
		B		0.000	0.000	0.293	0.000	0.005
		C		0.000	0.000	0.293	0.000	0.005
L13	96.750-91.750	A	1.416	0.000	0.000	7.461	0.000	0.144
		B		0.000	0.000	5.858	0.000	0.094
		C		0.000	0.000	5.858	0.000	0.109
L14	91.750-86.750	A	1.408	0.000	0.000	7.446	0.000	0.144
		B		0.000	0.000	5.850	0.000	0.093
		C		0.000	0.000	5.850	0.000	0.109
L15	86.750-80.750	A	1.399	0.000	0.000	8.914	0.000	0.172
		B		0.000	0.000	7.009	0.000	0.111
		C		0.000	0.000	7.009	0.000	0.130
L16	80.750-80.000	A	1.394	0.000	0.000	1.114	0.000	0.021
		B		0.000	0.000	0.876	0.000	0.014
		C		0.000	0.000	0.876	0.000	0.016
L17	80.000-75.000	A	1.389	0.000	0.000	7.406	0.000	0.143
		B		0.000	0.000	5.830	0.000	0.092
		C		0.000	0.000	5.830	0.000	0.108
L18	75.000-70.000	A	1.379	0.000	0.000	7.388	0.000	0.142
		B		0.000	0.000	5.821	0.000	0.092
		C		0.000	0.000	5.821	0.000	0.107
L19	70.000-65.000	A	1.370	0.000	0.000	7.368	0.000	0.141

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	5.811	0.000	0.091
		C		0.000	0.000	5.811	0.000	0.107
L20	65.000-60.000	A	1.359	0.000	0.000	7.347	0.000	0.141
		B		0.000	0.000	5.801	0.000	0.091
		C		0.000	0.000	5.801	0.000	0.106
L21	60.000-55.000	A	1.348	0.000	0.000	7.325	0.000	0.140
		B		0.000	0.000	5.789	0.000	0.090
		C		0.000	0.000	5.789	0.000	0.106
L22	55.000-50.000	A	1.336	0.000	0.000	7.300	0.000	0.139
		B		0.000	0.000	5.777	0.000	0.090
		C		0.000	0.000	5.777	0.000	0.105
L23	50.000-40.000	A	1.315	0.000	0.000	14.519	0.000	0.275
		B		0.000	0.000	11.513	0.000	0.177
		C		0.000	0.000	11.513	0.000	0.208
L24	40.000-39.000	A	1.298	0.000	0.000	1.452	0.000	0.028
		B		0.000	0.000	1.151	0.000	0.018
		C		0.000	0.000	1.151	0.000	0.021
L25	39.000-34.000	A	1.288	0.000	0.000	7.205	0.000	0.136
		B		0.000	0.000	5.730	0.000	0.087
		C		0.000	0.000	5.730	0.000	0.103
L26	34.000-29.000	A	1.269	0.000	0.000	7.167	0.000	0.135
		B		0.000	0.000	5.711	0.000	0.086
		C		0.000	0.000	5.711	0.000	0.102
L27	29.000-24.000	A	1.247	0.000	0.000	7.124	0.000	0.133
		B		0.000	0.000	5.689	0.000	0.085
		C		0.000	0.000	5.689	0.000	0.101
L28	24.000-19.000	A	1.221	0.000	0.000	7.072	0.000	0.131
		B		0.000	0.000	5.663	0.000	0.084
		C		0.000	0.000	5.663	0.000	0.100
L29	19.000-14.000	A	1.190	0.000	0.000	7.008	0.000	0.129
		B		0.000	0.000	5.631	0.000	0.083
		C		0.000	0.000	8.802	0.000	0.125
L30	14.000-12.083	A	1.162	0.000	0.000	2.666	0.000	0.049
		B		0.000	0.000	2.148	0.000	0.031
		C		0.000	0.000	4.574	0.000	0.057
L31	12.083-11.833	A	1.152	0.000	0.000	0.347	0.000	0.006
		B		0.000	0.000	0.280	0.000	0.004
		C		0.000	0.000	0.596	0.000	0.007
L32	11.833-6.833	A	1.124	0.000	0.000	6.876	0.000	0.125
		B		0.000	0.000	5.565	0.000	0.080
		C		0.000	0.000	8.541	0.000	0.122
L33	6.833-4.916	A	1.073	0.000	0.000	2.597	0.000	0.047
		B		0.000	0.000	2.114	0.000	0.030
		C		0.000	0.000	4.079	0.000	0.054
L34	4.916-4.666	A	1.051	0.000	0.000	0.337	0.000	0.006
		B		0.000	0.000	0.275	0.000	0.004
		C		0.000	0.000	0.531	0.000	0.007
L35	4.666-0.000	A	0.978	0.000	0.000	6.145	0.000	0.109
		B		0.000	0.000	5.058	0.000	0.068
		C		0.000	0.000	7.964	0.000	0.110

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	148.000-143.000	-0.300	-0.028	-1.303	-0.123

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L2	143.000-138.000	-0.300	-0.028	-1.309	-0.124
L3	138.000-133.000	-0.300	-0.028	-1.315	-0.124
L4	133.000-128.000	-0.300	-0.028	-1.320	-0.125
L5	128.000-123.000	-0.300	-0.028	-1.324	-0.125
L6	123.000-117.250	-0.300	-0.028	-1.328	-0.126
L7	117.250-115.750	-0.300	-0.028	-1.331	-0.126
L8	115.750-110.750	-0.300	-0.028	-1.329	-0.126
L9	110.750-105.750	-0.300	-0.028	-1.332	-0.126
L10	105.750-100.750	-0.300	-0.028	-1.333	-0.126
L11	100.750-97.000	-0.157	-0.015	-0.823	-0.078
L12	97.000-96.750	-0.125	-0.012	-0.683	-0.065
L13	96.750-91.750	-0.126	-0.012	-0.687	-0.065
L14	91.750-86.750	-0.128	-0.012	-0.695	-0.066
L15	86.750-80.750	-0.131	-0.012	-0.703	-0.066
L16	80.750-80.000	-0.131	-0.012	-0.704	-0.067
L17	80.000-75.000	-0.132	-0.012	-0.706	-0.067
L18	75.000-70.000	-0.134	-0.013	-0.712	-0.067
L19	70.000-65.000	-0.135	-0.013	-0.718	-0.068
L20	65.000-60.000	-0.137	-0.013	-0.723	-0.068
L21	60.000-55.000	-0.139	-0.013	-0.727	-0.069
L22	55.000-50.000	-0.141	-0.013	-0.731	-0.069
L23	50.000-40.000	-0.143	-0.014	-0.735	-0.070
L24	40.000-39.000	-0.144	-0.014	-0.739	-0.070
L25	39.000-34.000	-0.145	-0.014	-0.733	-0.069
L26	34.000-29.000	-0.146	-0.014	-0.733	-0.069
L27	29.000-24.000	-0.148	-0.014	-0.731	-0.069
L28	24.000-19.000	-0.150	-0.014	-0.727	-0.069
L29	19.000-14.000	-0.137	2.185	-0.669	1.570
L30	14.000-12.083	-0.126	4.009	-0.618	2.999
L31	12.083-11.833	-0.126	4.017	-0.615	3.007
L32	11.833-6.833	-0.138	2.382	-0.653	1.518
L33	6.833-4.916	-0.130	3.664	-0.606	2.547
L34	4.916-4.666	-0.131	3.672	-0.598	2.558
L35	4.666-0.000	-0.139	2.473	-0.596	1.622

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	14	Safety Line 3/8	143.00 - 148.00	1.0000	1.0000
L2	14	Safety Line 3/8	138.00 - 143.00	1.0000	1.0000
L3	14	Safety Line 3/8	133.00 - 138.00	1.0000	1.0000
L4	14	Safety Line 3/8	128.00 - 133.00	1.0000	1.0000
L5	14	Safety Line 3/8	123.00 - 128.00	1.0000	1.0000
L6	14	Safety Line 3/8	117.25 - 123.00	1.0000	1.0000
L7	14	Safety Line 3/8	115.75 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			117.25		
L8	14	Safety Line 3/8	110.75 - 115.75	1.0000	1.0000
L9	14	Safety Line 3/8	105.75 - 110.75	1.0000	1.0000
L10	14	Safety Line 3/8	100.75 - 105.75	1.0000	1.0000
L11	14	Safety Line 3/8	97.00 - 100.75	1.0000	1.0000
L11	16	MP3-05	97.00 - 99.42	1.0000	1.0000
L11	17	MP3-05	97.00 - 99.42	1.0000	1.0000
L11	19	MP3-05	97.00 - 99.42	1.0000	1.0000
L12	14	Safety Line 3/8	96.75 - 97.00	1.0000	1.0000
L12	16	MP3-05	96.75 - 97.00	1.0000	1.0000
L12	17	MP3-05	96.75 - 97.00	1.0000	1.0000
L12	19	MP3-05	96.75 - 97.00	1.0000	1.0000
L13	14	Safety Line 3/8	91.75 - 96.75	1.0000	1.0000
L13	16	MP3-05	91.75 - 96.75	1.0000	1.0000
L13	17	MP3-05	91.75 - 96.75	1.0000	1.0000
L13	19	MP3-05	91.75 - 96.75	1.0000	1.0000
L14	14	Safety Line 3/8	86.75 - 91.75	1.0000	1.0000
L14	16	MP3-05	86.75 - 91.75	1.0000	1.0000
L14	17	MP3-05	86.75 - 91.75	1.0000	1.0000
L14	19	MP3-05	86.75 - 91.75	1.0000	1.0000
L15	14	Safety Line 3/8	80.75 - 86.75	1.0000	1.0000
L15	16	MP3-05	80.75 - 86.75	1.0000	1.0000
L15	17	MP3-05	80.75 - 86.75	1.0000	1.0000
L15	19	MP3-05	80.75 - 86.75	1.0000	1.0000
L16	14	Safety Line 3/8	80.00 - 80.75	1.0000	1.0000
L16	16	MP3-05	80.00 - 80.75	1.0000	1.0000
L16	17	MP3-05	80.00 - 80.75	1.0000	1.0000
L16	19	MP3-05	80.00 - 80.75	1.0000	1.0000
L17	14	Safety Line 3/8	75.00 - 80.00	1.0000	1.0000
L17	16	MP3-05	75.00 - 80.00	1.0000	1.0000
L17	17	MP3-05	75.00 - 80.00	1.0000	1.0000
L17	19	MP3-05	75.00 - 80.00	1.0000	1.0000
L18	14	Safety Line 3/8	70.00 - 75.00	1.0000	1.0000
L18	16	MP3-05	70.00 - 75.00	1.0000	1.0000
L18	17	MP3-05	70.00 - 75.00	1.0000	1.0000
L18	19	MP3-05	70.00 - 75.00	1.0000	1.0000
L19	14	Safety Line 3/8	65.00 - 70.00	1.0000	1.0000
L19	16	MP3-05	65.00 - 70.00	1.0000	1.0000
L19	17	MP3-05	65.00 - 70.00	1.0000	1.0000
L19	19	MP3-05	65.00 - 70.00	1.0000	1.0000
L20	14	Safety Line 3/8	60.00 - 65.00	1.0000	1.0000
L20	16	MP3-05	60.00 - 65.00	1.0000	1.0000
L20	17	MP3-05	60.00 - 65.00	1.0000	1.0000
L20	19	MP3-05	60.00 - 65.00	1.0000	1.0000
L21	14	Safety Line 3/8	55.00 - 60.00	1.0000	1.0000
L21	16	MP3-05	55.00 - 60.00	1.0000	1.0000
L21	17	MP3-05	55.00 - 60.00	1.0000	1.0000
L21	19	MP3-05	55.00 - 60.00	1.0000	1.0000
L22	14	Safety Line 3/8	50.00 - 55.00	1.0000	1.0000
L22	16	MP3-05	50.00 - 55.00	1.0000	1.0000
L22	17	MP3-05	50.00 - 55.00	1.0000	1.0000
L22	19	MP3-05	50.00 - 55.00	1.0000	1.0000
L23	14	Safety Line 3/8	40.00 - 50.00	1.0000	1.0000
L23	16	MP3-05	40.00 - 50.00	1.0000	1.0000
L23	17	MP3-05	40.00 - 50.00	1.0000	1.0000
L23	19	MP3-05	40.00 - 50.00	1.0000	1.0000
L24	14	Safety Line 3/8	39.00 - 40.00	1.0000	1.0000
L24	16	MP3-05	39.00 - 40.00	1.0000	1.0000
L24	17	MP3-05	39.00 - 40.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L24	19	MP3-05	39.00 - 40.00	1.0000	1.0000
L25	14	Safety Line 3/8	34.00 - 39.00	1.0000	1.0000
L25	16	MP3-05	34.00 - 39.00	1.0000	1.0000
L25	17	MP3-05	34.00 - 39.00	1.0000	1.0000
L25	19	MP3-05	34.00 - 39.00	1.0000	1.0000
L26	14	Safety Line 3/8	29.00 - 34.00	1.0000	1.0000
L26	16	MP3-05	29.00 - 34.00	1.0000	1.0000
L26	17	MP3-05	29.00 - 34.00	1.0000	1.0000
L26	19	MP3-05	29.00 - 34.00	1.0000	1.0000
L27	14	Safety Line 3/8	24.00 - 29.00	1.0000	1.0000
L27	16	MP3-05	24.00 - 29.00	1.0000	1.0000
L27	17	MP3-05	24.00 - 29.00	1.0000	1.0000
L27	19	MP3-05	24.00 - 29.00	1.0000	1.0000
L28	14	Safety Line 3/8	19.00 - 24.00	1.0000	1.0000
L28	16	MP3-05	19.00 - 24.00	1.0000	1.0000
L28	17	MP3-05	19.00 - 24.00	1.0000	1.0000
L28	19	MP3-05	19.00 - 24.00	1.0000	1.0000
L29	14	Safety Line 3/8	14.00 - 19.00	1.0000	1.0000
L29	16	MP3-05	14.00 - 19.00	1.0000	1.0000
L29	17	MP3-05	14.00 - 19.00	1.0000	1.0000
L29	19	MP3-05	14.00 - 19.00	1.0000	1.0000
L29	20	MP3-06	14.00 - 16.50	1.0000	1.0000
L30	14	Safety Line 3/8	12.08 - 14.00	1.0000	1.0000
L30	16	MP3-05	12.08 - 14.00	1.0000	1.0000
L30	17	MP3-05	12.08 - 14.00	1.0000	1.0000
L30	19	MP3-05	12.08 - 14.00	1.0000	1.0000
L30	20	MP3-06	12.08 - 14.00	1.0000	1.0000
L31	14	Safety Line 3/8	11.83 - 12.08	1.0000	1.0000
L31	16	MP3-05	11.83 - 12.08	1.0000	1.0000
L31	17	MP3-05	11.83 - 12.08	1.0000	1.0000
L31	19	MP3-05	11.83 - 12.08	1.0000	1.0000
L31	20	MP3-06	11.83 - 12.08	1.0000	1.0000
L32	14	Safety Line 3/8	6.83 - 11.83	1.0000	1.0000
L32	16	MP3-05	6.83 - 11.83	1.0000	1.0000
L32	17	MP3-05	6.83 - 11.83	1.0000	1.0000
L32	18	MP3-05	6.83 - 7.58	1.0000	1.0000
L32	19	MP3-05	10.42 - 11.83	1.0000	1.0000
L32	20	MP3-06	6.83 - 11.83	1.0000	1.0000
L33	14	Safety Line 3/8	4.92 - 6.83	1.0000	1.0000
L33	16	MP3-05	4.92 - 6.83	1.0000	1.0000
L33	17	MP3-05	4.92 - 6.83	1.0000	1.0000
L33	18	MP3-05	4.92 - 6.83	1.0000	1.0000
L33	20	MP3-06	4.92 - 6.83	1.0000	1.0000
L34	14	Safety Line 3/8	4.67 - 4.92	1.0000	1.0000
L34	16	MP3-05	4.67 - 4.92	1.0000	1.0000
L34	17	MP3-05	4.67 - 4.92	1.0000	1.0000
L34	18	MP3-05	4.67 - 4.92	1.0000	1.0000
L34	20	MP3-06	4.67 - 4.92	1.0000	1.0000
L35	14	Safety Line 3/8	0.00 - 4.67	1.0000	1.0000
L35	16	MP3-05	0.00 - 4.67	1.0000	1.0000
L35	17	MP3-05	0.00 - 4.67	1.0000	1.0000
L35	18	MP3-05	0.00 - 4.67	1.0000	1.0000
L35	20	MP3-06	1.50 - 4.67	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	16	MP3-05	97.00 - 99.42	Auto	0.0890
L11	17	MP3-05	97.00 - 99.42	Auto	0.0890
L11	19	MP3-05	97.00 - 99.42	Auto	0.0890
L12	16	MP3-05	96.75 - 97.00	Auto	0.1517
L12	17	MP3-05	96.75 - 97.00	Auto	0.1517
L12	19	MP3-05	96.75 - 97.00	Auto	0.1517
L13	16	MP3-05	91.75 - 96.75	Auto	0.1328
L13	17	MP3-05	91.75 - 96.75	Auto	0.1328
L13	19	MP3-05	91.75 - 96.75	Auto	0.1328
L14	16	MP3-05	86.75 - 91.75	Auto	0.1027
L14	17	MP3-05	86.75 - 91.75	Auto	0.1027
L14	19	MP3-05	86.75 - 91.75	Auto	0.1027
L15	16	MP3-05	80.75 - 86.75	Auto	0.0718
L15	17	MP3-05	80.75 - 86.75	Auto	0.0718
L15	19	MP3-05	80.75 - 86.75	Auto	0.0718
L16	16	MP3-05	80.00 - 80.75	Auto	0.0777
L16	17	MP3-05	80.00 - 80.75	Auto	0.0777
L16	19	MP3-05	80.00 - 80.75	Auto	0.0777
L17	16	MP3-05	75.00 - 80.00	Auto	0.0615
L17	17	MP3-05	75.00 - 80.00	Auto	0.0615
L17	19	MP3-05	75.00 - 80.00	Auto	0.0615
L18	16	MP3-05	70.00 - 75.00	Auto	0.0314
L18	17	MP3-05	70.00 - 75.00	Auto	0.0314
L18	19	MP3-05	70.00 - 75.00	Auto	0.0314
L19	16	MP3-05	65.00 - 70.00	Auto	0.0042
L19	17	MP3-05	65.00 - 70.00	Auto	0.0042
L19	19	MP3-05	65.00 - 70.00	Auto	0.0042
L20	16	MP3-05	60.00 - 65.00	Auto	0.0000
L20	17	MP3-05	60.00 - 65.00	Auto	0.0000
L20	19	MP3-05	60.00 - 65.00	Auto	0.0000
L21	16	MP3-05	55.00 - 60.00	Auto	0.0000
L21	17	MP3-05	55.00 - 60.00	Auto	0.0000
L21	19	MP3-05	55.00 - 60.00	Auto	0.0000
L22	16	MP3-05	50.00 - 55.00	Auto	0.0000
L22	17	MP3-05	50.00 - 55.00	Auto	0.0000
L22	19	MP3-05	50.00 - 55.00	Auto	0.0000
L23	16	MP3-05	40.00 - 50.00	Auto	0.0000
L23	17	MP3-05	40.00 - 50.00	Auto	0.0000
L23	19	MP3-05	40.00 - 50.00	Auto	0.0000
L24	16	MP3-05	39.00 - 40.00	Auto	0.0000
L24	17	MP3-05	39.00 - 40.00	Auto	0.0000
L24	19	MP3-05	39.00 - 40.00	Auto	0.0000
L25	16	MP3-05	34.00 - 39.00	Auto	0.0000
L25	17	MP3-05	34.00 - 39.00	Auto	0.0000
L25	19	MP3-05	34.00 - 39.00	Auto	0.0000
L26	16	MP3-05	29.00 - 34.00	Auto	0.0000
L26	17	MP3-05	29.00 - 34.00	Auto	0.0000
L26	19	MP3-05	29.00 - 34.00	Auto	0.0000
L27	16	MP3-05	24.00 - 29.00	Auto	0.0000
L27	17	MP3-05	24.00 - 29.00	Auto	0.0000
L27	19	MP3-05	24.00 - 29.00	Auto	0.0000
L28	16	MP3-05	19.00 - 24.00	Auto	0.0000
L28	17	MP3-05	19.00 - 24.00	Auto	0.0000
L28	19	MP3-05	19.00 - 24.00	Auto	0.0000
L29	16	MP3-05	14.00 - 19.00	Auto	0.0000
L29	17	MP3-05	14.00 - 19.00	Auto	0.0000
L29	19	MP3-05	14.00 - 19.00	Auto	0.0000
L29	20	MP3-06	14.00 - 16.50	Auto	0.0133

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L30	16	MP3-05	12.08 - 14.00	Auto	0.0000
L30	17	MP3-05	12.08 - 14.00	Auto	0.0000
L30	19	MP3-05	12.08 - 14.00	Auto	0.0000
L30	20	MP3-06	12.08 - 14.00	Auto	0.0037
L31	16	MP3-05	11.83 - 12.08	Auto	0.0000
L31	17	MP3-05	11.83 - 12.08	Auto	0.0000
L31	19	MP3-05	11.83 - 12.08	Auto	0.0000
L31	20	MP3-06	11.83 - 12.08	Auto	0.0000
L32	16	MP3-05	6.83 - 11.83	Auto	0.0000
L32	17	MP3-05	6.83 - 11.83	Auto	0.0000
L32	18	MP3-05	6.83 - 7.58	Auto	0.0000
L32	19	MP3-05	10.42 - 11.83	Auto	0.0000
L32	20	MP3-06	6.83 - 11.83	Auto	0.0000
L33	16	MP3-05	4.92 - 6.83	Auto	0.0000
L33	17	MP3-05	4.92 - 6.83	Auto	0.0000
L33	18	MP3-05	4.92 - 6.83	Auto	0.0000
L33	20	MP3-06	4.92 - 6.83	Auto	0.0000
L34	16	MP3-05	4.67 - 4.92	Auto	0.0000
L34	17	MP3-05	4.67 - 4.92	Auto	0.0000
L34	18	MP3-05	4.67 - 4.92	Auto	0.0000
L34	20	MP3-06	4.67 - 4.92	Auto	0.0000
L35	16	MP3-05	0.00 - 4.67	Auto	0.0000
L35	17	MP3-05	0.00 - 4.67	Auto	0.0000
L35	18	MP3-05	0.00 - 4.67	Auto	0.0000
L35	20	MP3-06	1.50 - 4.67	Auto	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Top Hat	C	None		0.000	149.000	No Ice	3.000	3.000	0.081
						1/2" Ice	3.480	3.480	0.111
						1" Ice	3.960	3.960	0.141
						2" Ice	4.920	4.920	0.201
6' x 2" Mount Pipe	C	From Leg	0.000 0.000 3.000	0.000	148.000	No Ice	1.425	1.425	0.022
						1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
*									
APX16DWV-16DWV-S-E-A 20 w/ Mount Pipe	A	From Leg	4.000 0.000 -2.000	0.000	150.000	No Ice	6.290	2.760	0.061
						1/2" Ice	6.860	3.270	0.105
						1" Ice	7.450	3.790	0.157
						2" Ice	8.680	4.900	0.290
APX16DWV-16DWV-S-E-A 20 w/ Mount Pipe	B	From Leg	4.000 0.000 -2.000	0.000	150.000	No Ice	6.290	2.760	0.061
						1/2" Ice	6.860	3.270	0.105
						1" Ice	7.450	3.790	0.157
						2" Ice	8.680	4.900	0.290
APX16DWV-16DWV-S-E-A 20 w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	150.000	No Ice	6.290	2.760	0.061
						1/2" Ice	6.860	3.270	0.105

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			-2.000			1" Ice	7.450	3.790	0.157
						2" Ice	8.680	4.900	0.290
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	A	From Leg	4.000 0.000 -2.000	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	0.183 0.311 0.453 0.782
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	B	From Leg	4.000 0.000 -2.000	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	0.183 0.311 0.453 0.782
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	C	From Leg	4.000 0.000 -2.000	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	0.183 0.311 0.453 0.782
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Leg	4.000 0.000 -2.000	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 -2.000	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 -2.000	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 4415 B66A	A	From Leg	4.000 0.000 -2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.856 2.027 2.204 2.582	0.870 0.997 1.134 1.432	0.050 0.064 0.081 0.124
RADIO 4415 B66A	B	From Leg	4.000 0.000 -2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.856 2.027 2.204 2.582	0.870 0.997 1.134 1.432	0.050 0.064 0.081 0.124
RADIO 4415 B66A	C	From Leg	4.000 0.000 -2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.856 2.027 2.204 2.582	0.870 0.997 1.134 1.432	0.050 0.064 0.081 0.124
RADIO 4449 B71 B85A_T-MOBILE	A	From Leg	4.000 0.000 -2.000	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 -2.000	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	C	From Leg	4.000 0.000 -2.000	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 4424 B25_TMO	A	From Leg	4.000 0.000 -2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.052 2.231 2.417 2.811	1.610 1.772 1.941 2.301	0.086 0.107 0.131 0.188
RADIO 4424 B25_TMO	B	From Leg	4.000 0.000 -2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	2.052 2.231 2.417	1.610 1.772 1.941	0.086 0.107 0.131

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	2.811	2.301	0.188
RADIO 4424 B25_TMO	C	From Leg	4.000 0.000 -2.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.052 2.231 2.417 2.811	1.610 1.772 1.941 2.301	0.086 0.107 0.131 0.188
Pipe Mount [PM 601-3]	C	None		0.000	151.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.170 3.790 4.420 5.760	3.170 3.790 4.420 5.760	0.195 0.232 0.279 0.401
Platform Mount [LP 1201-1_KCKR-HR-1]	C	None		0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	37.610 45.620 53.590 69.650	37.610 45.620 53.590 69.650	2.631 3.478 4.462 6.848
*									
RRUS 11 B12	A	From Leg	1.000 0.000 2.000	0.000	141.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.833 3.043 3.259 3.715	1.182 1.330 1.485 1.826	0.051 0.072 0.095 0.153
RRUS 11 B12	B	From Leg	1.000 0.000 2.000	0.000	141.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.833 3.043 3.259 3.715	1.182 1.330 1.485 1.826	0.051 0.072 0.095 0.153
RRUS 11 B12	C	From Leg	1.000 0.000 2.000	0.000	141.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.833 3.043 3.259 3.715	1.182 1.330 1.485 1.826	0.051 0.072 0.095 0.153
6' x 2.375" Mount Pipe	A	From Leg	1.000 0.000 1.000	0.000	141.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.041 0.051 0.066 0.109
6' x 2.375" Mount Pipe	B	From Leg	1.000 0.000 1.000	0.000	141.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.041 0.051 0.066 0.109
6' x 2.375" Mount Pipe	C	From Leg	1.000 0.000 1.000	0.000	141.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.041 0.051 0.066 0.109
Side Arm Mount [SO 102-3]	C	None		0.000	141.000	No Ice 1/2" Ice 1" Ice 2" 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
*									
7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	140.000	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
7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	140.000	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
7770.00 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	140.000	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
(2) TPA65R-BU6D w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	140.000	No Ice 1/2" Ice	12.250 13.000	6.050 6.710	0.098 0.185

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	13.760	7.390	0.284
						2" Ice	15.340	8.790	0.517
(2) OPA65R-BU4D w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	8.100 8.650 9.210	4.030 4.500 4.980	0.081 0.142 0.212
						2" Ice	10.390	5.980	0.380
(2) TPA65R-BU6D w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	12.250 13.000 13.760	6.050 6.710 7.390	0.098 0.185 0.284
						2" Ice	15.340	8.790	0.517
TT08-19DB111-001	A	From Leg	4.000 0.000 2.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	0.785 0.905 1.031	0.640 0.749 0.869	0.022 0.030 0.039
						2" Ice	1.307	1.130	0.064
TT08-19DB111-001	B	From Leg	4.000 0.000 2.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	0.785 0.905 1.031	0.640 0.749 0.869	0.022 0.030 0.039
						2" Ice	1.307	1.130	0.064
TT08-19DB111-001	C	From Leg	4.000 0.000 2.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	0.785 0.905 1.031	0.640 0.749 0.869	0.022 0.030 0.039
						2" Ice	1.307	1.130	0.064
RRUS 4478 B14	A	From Leg	4.000 0.000 2.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	1.843 2.012 2.190	1.059 1.197 1.342	0.060 0.076 0.094
						2" Ice	2.566	1.656	0.140
RRUS 4478 B14	B	From Leg	4.000 0.000 2.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	1.843 2.012 2.190	1.059 1.197 1.342	0.060 0.076 0.094
						2" Ice	2.566	1.656	0.140
RRUS 4478 B14	C	From Leg	4.000 0.000 2.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	1.843 2.012 2.190	1.059 1.197 1.342	0.060 0.076 0.094
						2" Ice	2.566	1.656	0.140
RRUS 4449 B5/B12	A	From Leg	4.000 0.000 2.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	1.968 2.144 2.328	1.408 1.564 1.727	0.071 0.090 0.111
						2" Ice	2.718	2.075	0.163
RRUS 4449 B5/B12	B	From Leg	4.000 0.000 2.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	1.968 2.144 2.328	1.408 1.564 1.727	0.071 0.090 0.111
						2" Ice	2.718	2.075	0.163
RRUS 4449 B5/B12	C	From Leg	4.000 0.000 2.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	1.968 2.144 2.328	1.408 1.564 1.727	0.071 0.090 0.111
						2" Ice	2.718	2.075	0.163
RRUS 8843 B2/B66A	A	From Leg	4.000 0.000 2.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	1.639 1.799 1.966	1.353 1.500 1.655	0.072 0.090 0.110
						2" Ice	2.323	1.986	0.159
RRUS 8843 B2/B66A	B	From Leg	4.000 0.000 2.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	1.639 1.799 1.966	1.353 1.500 1.655	0.072 0.090 0.110
						2" Ice	2.323	1.986	0.159
RRUS 8843 B2/B66A	C	From Leg	4.000 0.000 2.000	0.000	140.000	No Ice 1/2" Ice 1" Ice	1.639 1.799 1.966	1.353 1.500 1.655	0.072 0.090 0.110

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	2.323	1.986	0.159
DC6-48-60-0-8C-EV	A	From Leg	4.000 0.000 2.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.736 2.962 3.195 3.683	4.783 5.063 5.350 5.947	0.026 0.063 0.104 0.200
DC6-48-60-0-8C-EV	B	From Leg	4.000 0.000 2.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.736 2.962 3.195 3.683	4.783 5.063 5.350 5.947	0.026 0.063 0.104 0.200
DC6-48-60-18-8F	C	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.212 1.892 2.105 2.570	1.212 1.892 2.105 2.570	0.033 0.055 0.080 0.138
T-Arm Mount [TA 602-3]	C	None		0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice	13.400 16.440 19.700 25.860	13.400 16.440 19.700 25.860	0.774 1.004 1.292 2.053
Side Arm Mount [SO 102-3]	C	None		0.000	140.000	No Ice 1/2" Ice 1" Ice 2" 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
*									
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.564 5.105 5.612 6.651	10.259 11.427 12.312 14.129	0.046 0.113 0.187 0.363
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.564 5.105 5.612 6.651	10.259 11.427 12.312 14.129	0.046 0.113 0.187 0.363
(2) LPA-80080-6CF-EDIN-6 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.564 5.105 5.612 6.651	10.259 11.427 12.312 14.129	0.046 0.113 0.187 0.363
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.090 4.490 4.890 5.720	3.300 3.680 4.070 4.870	0.066 0.130 0.204 0.386
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.090 4.490 4.890 5.720	3.300 3.680 4.070 4.870	0.066 0.130 0.204 0.386
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.090 4.490 4.890 5.720	3.300 3.680 4.070 4.870	0.066 0.130 0.204 0.386
RRH2x60-700	A	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.500 3.761 4.029 4.585	1.816 2.052 2.289 2.785	0.060 0.083 0.109 0.173
RRH2x60-700	B	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.500 3.761 4.029 4.585	1.816 2.052 2.289 2.785	0.060 0.083 0.109 0.173
RRH2x60-700	C	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice	3.500 3.761 4.029	1.816 2.052 2.289	0.060 0.083 0.109

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	4.585	2.785	0.173
RRH2X60-AWS	A	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.500 3.761 4.029 4.585	1.816 2.052 2.289 2.785	0.060 0.083 0.109 0.173
RRH2X60-AWS	B	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.500 3.761 4.029 4.585	1.816 2.052 2.289 2.785	0.060 0.083 0.109 0.173
RRH2X60-AWS	C	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.500 3.761 4.029 4.585	1.816 2.052 2.289 2.785	0.060 0.083 0.109 0.173
Platform Mount [LP 303-1]	C	None		0.000	130.000	No Ice 1/2" Ice 1" Ice 2" 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
*									

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
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

Comb. No.	Description
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	148 - 143	Pole	Max Tension	39	0.000	-0.000	-0.000
			Max. Compression	26	-12.261	0.085	-0.016
			Max. Mx	20	-5.501	26.514	-0.021
			Max. My	14	-5.500	0.036	-26.508
			Max. Vy	20	-4.778	26.514	-0.021
			Max. Vx	2	-4.779	0.004	26.485
			Max. Torque	24			0.050
L2	143 - 138	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-20.536	0.850	0.631
			Max. Mx	20	-8.721	61.092	-0.207
			Max. My	2	-8.716	-0.006	60.940
			Max. Vy	20	-8.814	61.092	-0.207
			Max. Vx	2	-8.846	-0.006	60.940
			Max. Torque	8			0.514
L3	138 - 133	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-21.209	0.884	0.653
			Max. Mx	20	-9.137	105.850	-0.610
			Max. My	2	-9.132	-0.410	105.859
			Max. Vy	20	-9.093	105.850	-0.610
			Max. Vx	2	-9.125	-0.410	105.859
			Max. Torque	8			0.514
L4	133 - 128	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-28.915	0.919	0.676
			Max. Mx	20	-12.085	157.992	-1.017
			Max. My	2	-12.080	-0.818	158.164
			Max. Vy	20	-12.368	157.992	-1.017
			Max. Vx	2	-12.401	-0.818	158.164
			Max. Torque	8			0.514
L5	128 - 123	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-29.686	0.955	0.699
			Max. Mx	20	-12.614	220.482	-1.427

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-12.609	-1.230	220.818
			Max. Vy	20	-12.636	220.482	-1.427
			Max. Vx	2	-12.669	-1.230	220.818
			Max. Torque	8			0.514
L6	123 - 117.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-30.039	0.971	0.710
			Max. Mx	20	-12.858	249.035	-1.612
			Max. My	2	-12.854	-1.415	249.444
			Max. Vy	20	-12.755	249.035	-1.612
			Max. Vx	2	-12.788	-1.415	249.444
			Max. Torque	8			0.513
L7	117.25 - 115.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-31.339	1.006	0.732
			Max. Mx	20	-13.719	313.583	-2.024
			Max. My	2	-13.714	-1.827	314.156
			Max. Vy	20	-13.067	313.583	-2.024
			Max. Vx	2	-13.100	-1.827	314.156
			Max. Torque	8			0.513
L8	115.75 - 110.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-32.252	1.040	0.753
			Max. Mx	20	-14.392	379.552	-2.436
			Max. My	2	-14.388	-2.239	380.289
			Max. Vy	20	-13.334	379.552	-2.436
			Max. Vx	2	-13.367	-2.239	380.289
			Max. Torque	8			0.513
L9	110.75 - 105.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-33.186	1.072	0.774
			Max. Mx	20	-15.084	446.852	-2.848
			Max. My	2	-15.080	-2.651	447.754
			Max. Vy	20	-13.599	446.852	-2.848
			Max. Vx	2	-13.632	-2.651	447.754
			Max. Torque	8			0.513
L10	105.75 - 100.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-34.139	1.093	0.786
			Max. Mx	20	-15.797	515.457	-3.259
			Max. My	2	-15.793	-3.062	516.524
			Max. Vy	20	-13.858	515.457	-3.259
			Max. Vx	2	-13.891	-3.062	516.524
			Max. Torque	8			0.513
L11	100.75 - 97	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-34.948	1.107	0.794
			Max. Mx	20	-16.342	567.752	-3.567
			Max. My	2	-16.339	-3.370	568.942
			Max. Vy	20	-14.051	567.752	-3.567
			Max. Vx	2	-14.084	-3.370	568.942
			Max. Torque	8			0.513
L12	97 - 96.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-35.023	1.110	0.796
			Max. Mx	20	-16.403	571.265	-3.587
			Max. My	2	-16.399	-3.391	572.463
			Max. Vy	20	-14.061	571.265	-3.587
			Max. Vx	2	-14.094	-3.391	572.463
			Max. Torque	8			0.512
L13	96.75 - 91.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-36.519	1.127	0.806
			Max. Mx	20	-17.455	642.311	-3.997
			Max. My	2	-17.452	-3.800	643.673

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	20	-14.368	642.311	-3.997
			Max. Vx	2	-14.401	-3.800	643.673
			Max. Torque	8			0.512
L14	91.75 - 86.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-38.034	1.147	0.817
			Max. Mx	20	-18.529	714.884	-4.408
			Max. My	2	-18.525	-4.210	716.409
			Max. Vy	20	-14.672	714.884	-4.408
			Max. Vx	2	-14.705	-4.210	716.409
			Max. Torque	8			0.512
L15	86.75 - 80.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-38.571	1.153	0.821
			Max. Mx	20	-18.906	740.641	-4.551
			Max. My	2	-18.902	-4.353	742.224
			Max. Vy	20	-14.781	740.641	-4.551
			Max. Vx	2	-14.814	-4.353	742.224
			Max. Torque	8			0.512
L16	80.75 - 80	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-41.158	1.173	0.832
			Max. Mx	20	-20.785	815.438	-4.962
			Max. My	2	-20.782	-4.764	817.186
			Max. Vy	20	-15.143	815.438	-4.962
			Max. Vx	2	-15.176	-4.764	817.186
			Max. Torque	8			0.512
L17	80 - 75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-42.769	1.193	0.844
			Max. Mx	20	-21.954	891.849	-5.374
			Max. My	2	-21.951	-5.175	893.761
			Max. Vy	20	-15.434	891.849	-5.374
			Max. Vx	2	-15.467	-5.175	893.761
			Max. Torque	8			0.512
L18	75 - 70	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-44.399	1.213	0.855
			Max. Mx	20	-23.143	969.694	-5.785
			Max. My	2	-23.140	-5.586	971.770
			Max. Vy	20	-15.718	969.694	-5.785
			Max. Vx	2	-15.751	-5.586	971.770
			Max. Torque	8			0.512
L19	70 - 65	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-46.048	1.233	0.867
			Max. Mx	20	-24.350	1048.938	-6.196
			Max. My	2	-24.347	-5.996	1051.179
			Max. Vy	20	-15.995	1048.938	-6.196
			Max. Vx	2	-16.028	-5.996	1051.179
			Max. Torque	8			0.512
L20	65 - 60	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-47.716	1.253	0.879
			Max. Mx	20	-25.575	1129.545	-6.606
			Max. My	2	-25.572	-6.405	1131.950
			Max. Vy	20	-16.265	1129.545	-6.606
			Max. Vx	2	-16.298	-6.405	1131.950
			Max. Torque	8			0.511
L21	60 - 55	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-49.401	1.274	0.891
			Max. Mx	20	-26.819	1211.475	-7.014
			Max. My	2	-26.817	-6.812	1214.043
			Max. Vy	20	-16.525	1211.475	-7.014
			Max. Vx	2	-16.557	-6.812	1214.043
			Max. Torque	8			0.511
L22	55 - 50	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-51.105	1.295	0.903

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	20	-28.081	1294.678	-7.421
			Max. My	2	-28.079	-7.219	1297.409
			Max. Vy	20	-16.776	1294.678	-7.421
			Max. Vx	2	-16.808	-7.219	1297.409
			Max. Torque	8			0.511
L23	50 - 40	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-52.825	1.316	0.915
			Max. Mx	20	-29.362	1379.094	-7.827
			Max. My	2	-29.360	-7.623	1381.988
			Max. Vy	20	-17.011	1379.094	-7.827
			Max. Vx	2	-17.043	-7.623	1381.988
			Max. Torque	8			0.511
L24	40 - 39	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-56.369	1.341	0.929
			Max. Mx	20	-32.025	1482.237	-8.312
			Max. My	2	-32.024	-8.107	1485.325
			Max. Vy	20	-17.374	1482.237	-8.312
			Max. Vx	2	-17.406	-8.107	1485.325
			Max. Torque	8			0.511
L25	39 - 34	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-58.189	1.361	0.941
			Max. Mx	20	-33.411	1569.580	-8.716
			Max. My	2	-33.410	-8.510	1572.830
			Max. Vy	20	-17.585	1569.580	-8.716
			Max. Vx	2	-17.618	-8.510	1572.830
			Max. Torque	8			0.511
L26	34 - 29	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-60.024	1.382	0.953
			Max. Mx	20	-34.816	1657.944	-9.117
			Max. My	2	-34.815	-8.910	1661.354
			Max. Vy	20	-17.783	1657.944	-9.117
			Max. Vx	2	-17.815	-8.910	1661.354
			Max. Torque	8			0.511
L27	29 - 24	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-61.874	1.403	0.965
			Max. Mx	20	-36.240	1747.275	-9.516
			Max. My	2	-36.239	-9.307	1750.845
			Max. Vy	20	-17.973	1747.275	-9.516
			Max. Vx	2	-18.005	-9.307	1750.845
			Max. Torque	8			0.511
L28	24 - 19	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-63.736	1.423	0.977
			Max. Mx	20	-37.683	1837.543	-9.912
			Max. My	2	-37.682	-9.702	1841.272
			Max. Vy	20	-18.159	1837.543	-9.912
			Max. Vx	2	-18.191	-9.702	1841.272
			Max. Torque	8			0.511
L29	19 - 14	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-65.636	1.443	0.936
			Max. Mx	20	-39.144	1928.735	-10.305
			Max. My	2	-39.143	-10.094	1932.622
			Max. Vy	20	-18.343	1928.735	-10.305
			Max. Vx	2	-18.375	-10.094	1932.622
			Max. Torque	8			0.511
L30	14 - 12.083	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-66.376	1.450	0.901
			Max. Mx	20	-39.704	1963.944	-10.455
			Max. My	2	-39.703	-10.243	1967.889
			Max. Vy	20	-18.428	1963.944	-10.455
			Max. Vx	2	-18.457	-10.243	1967.889
			Max. Torque	8			0.511

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L31	12.083 - 11.833	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-66.476	1.451	0.897
			Max. Mx	20	-39.791	1968.546	-10.474
			Max. My	2	-39.791	-10.263	1972.498
			Max. Vy	20	-18.417	1968.546	-10.474
			Max. Vx	2	-18.446	-10.263	1972.498
			Max. Torque	8			0.511
L32	11.833 - 6.833	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-68.437	1.469	0.854
			Max. Mx	20	-41.334	2061.039	-10.863
			Max. My	2	-41.334	-10.650	2065.134
			Max. Vy	20	-18.599	2061.039	-10.863
			Max. Vx	2	-18.628	-10.650	2065.134
			Max. Torque	8			0.511
L33	6.833 - 4.916	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-69.195	1.476	0.822
			Max. Mx	20	-41.927	2096.731	-11.011
			Max. My	2	-41.927	-10.798	2100.880
			Max. Vy	20	-18.680	2096.731	-11.011
			Max. Vx	2	-18.707	-10.798	2100.880
			Max. Torque	8			0.511
L34	4.916 - 4.666	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-69.291	1.477	0.818
			Max. Mx	20	-42.013	2101.396	-11.030
			Max. My	2	-42.013	-10.817	2105.551
			Max. Vy	20	-18.665	2101.396	-11.030
			Max. Vx	2	-18.693	-10.817	2105.551
			Max. Torque	8			0.511
L35	4.666 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-71.041	1.491	0.772
			Max. Mx	20	-43.420	2188.853	-11.388
			Max. My	2	-43.420	-11.174	2193.134
			Max. Vy	20	-18.842	2188.853	-11.388
			Max. Vx	2	-18.868	-11.174	2193.134
			Max. Torque	8			0.511

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	71.041	0.000	0.000
	Max. H_x	20	43.427	18.825	-0.077
	Max. H_z	2	43.427	-0.077	18.852
	Max. M_x	2	2193.134	-0.077	18.852
	Max. M_z	8	2188.223	-18.825	0.077
	Max. Torsion	8	0.511	-18.825	0.077
	Min. Vert	11	32.570	-16.261	-9.360
	Min. H_x	8	43.427	-18.825	0.077
	Min. H_z	14	43.427	0.077	-18.852
	Min. M_x	14	-2192.918	0.077	-18.852
	Min. M_z	20	-2188.853	18.825	-0.077
	Min. Torsion	20	-0.507	18.825	-0.077

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	36.189	0.000	0.000	-0.082	0.237	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	43.427	0.077	-18.852	-2193.134	-11.174	-0.113
0.9 Dead+1.0 Wind 0 deg - No Ice	32.570	0.077	-18.852	-2158.872	-11.064	-0.108
1.2 Dead+1.0 Wind 30 deg - No Ice	43.427	9.477	-16.364	-1905.047	-1103.868	-0.350
0.9 Dead+1.0 Wind 30 deg - No Ice	32.570	9.477	-16.364	-1875.273	-1086.704	-0.345
1.2 Dead+1.0 Wind 60 deg - No Ice	43.427	16.338	-9.492	-1106.558	-1900.700	-0.496
0.9 Dead+1.0 Wind 60 deg - No Ice	32.570	16.338	-9.492	-1089.244	-1871.105	-0.492
1.2 Dead+1.0 Wind 90 deg - No Ice	43.427	18.825	-0.077	-11.591	-2188.223	-0.511
0.9 Dead+1.0 Wind 90 deg - No Ice	32.570	18.825	-0.077	-11.368	-2154.150	-0.509
1.2 Dead+1.0 Wind 120 deg - No Ice	43.427	16.261	9.360	1086.482	-1889.257	-0.387
0.9 Dead+1.0 Wind 120 deg - No Ice	32.570	16.261	9.360	1069.559	-1859.855	-0.388
1.2 Dead+1.0 Wind 150 deg - No Ice	43.427	9.344	16.288	1893.397	-1083.991	-0.156
0.9 Dead+1.0 Wind 150 deg - No Ice	32.570	9.344	16.288	1863.872	-1067.166	-0.161
1.2 Dead+1.0 Wind 180 deg - No Ice	43.427	-0.077	18.852	2192.918	11.805	0.117
0.9 Dead+1.0 Wind 180 deg - No Ice	32.570	-0.077	18.852	2158.714	11.524	0.111
1.2 Dead+1.0 Wind 210 deg - No Ice	43.427	-9.477	16.364	1904.834	1104.493	0.358
0.9 Dead+1.0 Wind 210 deg - No Ice	32.570	-9.477	16.364	1875.118	1087.160	0.352
1.2 Dead+1.0 Wind 240 deg - No Ice	43.427	-16.338	9.492	1106.352	1901.325	0.500
0.9 Dead+1.0 Wind 240 deg - No Ice	32.570	-16.338	9.492	1089.093	1871.561	0.496
1.2 Dead+1.0 Wind 270 deg - No Ice	43.427	-18.825	0.077	11.388	2188.853	0.507
0.9 Dead+1.0 Wind 270 deg - No Ice	32.570	-18.825	0.077	11.220	2154.610	0.505
1.2 Dead+1.0 Wind 300 deg - No Ice	43.427	-16.261	-9.360	-1086.687	1889.894	0.379
0.9 Dead+1.0 Wind 300 deg - No Ice	32.570	-16.261	-9.360	-1069.709	1860.319	0.381
1.2 Dead+1.0 Wind 330 deg - No Ice	43.427	-9.344	-16.288	-1893.609	1084.629	0.153
0.9 Dead+1.0 Wind 330 deg - No Ice	32.570	-9.344	-16.288	-1864.027	1067.630	0.157
1.2 Dead+1.0 Ice+1.0 Temp	71.041	-0.000	-0.000	-0.772	1.491	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	71.041	0.010	-3.567	-427.747	0.121	-0.051
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	71.041	1.790	-3.094	-371.326	-212.830	-0.083
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	71.041	3.091	-1.792	-215.645	-368.309	-0.092

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	71.041	3.563	-0.010	-2.418	-424.657	-0.077
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	71.041	3.081	1.775	211.220	-366.773	-0.042
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	71.041	1.773	3.084	368.025	-210.169	0.005
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	71.041	-0.010	3.567	425.982	3.193	0.051
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	71.041	-1.790	3.094	369.561	216.144	0.083
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	71.041	-3.091	1.792	213.880	371.623	0.092
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	71.041	-3.563	0.010	0.654	427.971	0.077
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	71.041	-3.081	-1.775	-212.984	370.088	0.041
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	71.041	-1.773	-3.084	-369.790	213.484	-0.005
Dead+Wind 0 deg - Service	36.189	0.020	-4.833	-557.105	-2.657	-0.029
Dead+Wind 30 deg - Service	36.189	2.430	-4.195	-483.943	-280.201	-0.090
Dead+Wind 60 deg - Service	36.189	4.189	-2.434	-281.125	-482.596	-0.128
Dead+Wind 90 deg - Service	36.189	4.826	-0.020	-3.005	-555.615	-0.132
Dead+Wind 120 deg - Service	36.189	4.169	2.400	275.898	-479.680	-0.100
Dead+Wind 150 deg - Service	36.189	2.396	4.176	480.850	-275.150	-0.041
Dead+Wind 180 deg - Service	36.189	-0.020	4.833	556.928	3.175	0.029
Dead+Wind 210 deg - Service	36.189	-2.430	4.195	483.765	280.719	0.091
Dead+Wind 240 deg - Service	36.189	-4.189	2.434	280.948	483.114	0.128
Dead+Wind 270 deg - Service	36.189	-4.826	0.020	2.827	556.134	0.131
Dead+Wind 300 deg - Service	36.189	-4.169	-2.400	-276.075	480.200	0.099
Dead+Wind 330 deg - Service	36.189	-2.396	-4.176	-481.027	275.669	0.041

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-36.189	0.000	0.000	36.189	0.000	0.000%
2	0.077	-43.427	-18.852	-0.077	43.427	18.852	0.000%
3	0.077	-32.570	-18.852	-0.077	32.570	18.852	0.000%
4	9.477	-43.427	-16.364	-9.477	43.427	16.364	0.000%
5	9.477	-32.570	-16.364	-9.477	32.570	16.364	0.000%
6	16.338	-43.427	-9.492	-16.338	43.427	9.492	0.000%
7	16.338	-32.570	-9.492	-16.338	32.570	9.492	0.000%
8	18.825	-43.427	-0.077	-18.825	43.427	0.077	0.000%
9	18.825	-32.570	-0.077	-18.825	32.570	0.077	0.000%
10	16.261	-43.427	9.360	-16.261	43.427	-9.360	0.000%
11	16.261	-32.570	9.360	-16.261	32.570	-9.360	0.000%
12	9.344	-43.427	16.288	-9.344	43.427	-16.288	0.000%
13	9.344	-32.570	16.288	-9.344	32.570	-16.288	0.000%
14	-0.077	-43.427	18.852	0.077	43.427	-18.852	0.000%
15	-0.077	-32.570	18.852	0.077	32.570	-18.852	0.000%
16	-9.477	-43.427	16.364	9.477	43.427	-16.364	0.000%
17	-9.477	-32.570	16.364	9.477	32.570	-16.364	0.000%
18	-16.338	-43.427	9.492	16.338	43.427	-9.492	0.000%
19	-16.338	-32.570	9.492	16.338	32.570	-9.492	0.000%
20	-18.825	-43.427	0.077	18.825	43.427	-0.077	0.000%
21	-18.825	-32.570	0.077	18.825	32.570	-0.077	0.000%
22	-16.261	-43.427	-9.360	16.261	43.427	9.360	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
23	-16.261	-32.570	-9.360	16.261	32.570	9.360	0.000%
24	-9.344	-43.427	-16.288	9.344	43.427	16.288	0.000%
25	-9.344	-32.570	-16.288	9.344	32.570	16.288	0.000%
26	0.000	-71.041	0.000	0.000	71.041	0.000	0.000%
27	0.010	-71.041	-3.567	-0.010	71.041	3.567	0.000%
28	1.790	-71.041	-3.094	-1.790	71.041	3.094	0.000%
29	3.091	-71.041	-1.792	-3.091	71.041	1.792	0.000%
30	3.563	-71.041	-0.010	-3.563	71.041	0.010	0.000%
31	3.081	-71.041	1.775	-3.081	71.041	-1.775	0.000%
32	1.773	-71.041	3.084	-1.773	71.041	-3.084	0.000%
33	-0.010	-71.041	3.567	0.010	71.041	-3.567	0.000%
34	-1.790	-71.041	3.094	1.790	71.041	-3.094	0.000%
35	-3.091	-71.041	1.792	3.091	71.041	-1.792	0.000%
36	-3.563	-71.041	0.010	3.563	71.041	-0.010	0.000%
37	-3.081	-71.041	-1.775	3.081	71.041	1.775	0.000%
38	-1.773	-71.041	-3.084	1.773	71.041	3.084	0.000%
39	0.020	-36.189	-4.833	-0.020	36.189	4.833	0.000%
40	2.430	-36.189	-4.195	-2.430	36.189	4.195	0.000%
41	4.189	-36.189	-2.434	-4.189	36.189	2.434	0.000%
42	4.826	-36.189	-0.020	-4.826	36.189	0.020	0.000%
43	4.169	-36.189	2.400	-4.169	36.189	-2.400	0.000%
44	2.396	-36.189	4.176	-2.396	36.189	-4.176	0.000%
45	-0.020	-36.189	4.833	0.020	36.189	-4.833	0.000%
46	-2.430	-36.189	4.195	2.430	36.189	-4.195	0.000%
47	-4.189	-36.189	2.434	4.189	36.189	-2.434	0.000%
48	-4.826	-36.189	0.020	4.826	36.189	-0.020	0.000%
49	-4.169	-36.189	-2.400	4.169	36.189	2.400	0.000%
50	-2.396	-36.189	-4.176	2.396	36.189	4.176	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	0.00026006
3	Yes	5	0.00000001	0.00011230
4	Yes	7	0.00000001	0.00010340
5	Yes	6	0.00000001	0.00051121
6	Yes	7	0.00000001	0.00010549
7	Yes	6	0.00000001	0.00052193
8	Yes	5	0.00000001	0.00074954
9	Yes	5	0.00000001	0.00036951
10	Yes	7	0.00000001	0.00010051
11	Yes	6	0.00000001	0.00049743
12	Yes	7	0.00000001	0.00010196
13	Yes	6	0.00000001	0.00050489
14	Yes	5	0.00000001	0.00043486
15	Yes	5	0.00000001	0.00020189
16	Yes	7	0.00000001	0.00010526
17	Yes	6	0.00000001	0.00052058
18	Yes	7	0.00000001	0.00010304
19	Yes	6	0.00000001	0.00050934
20	Yes	5	0.00000001	0.00026963
21	Yes	5	0.00000001	0.00012259
22	Yes	7	0.00000001	0.00010261
23	Yes	6	0.00000001	0.00050809

24	Yes	7	0.00000001	0.00010129
25	Yes	6	0.00000001	0.00050113
26	Yes	4	0.00000001	0.00014236
27	Yes	6	0.00000001	0.00074175
28	Yes	6	0.00000001	0.00084288
29	Yes	6	0.00000001	0.00084294
30	Yes	6	0.00000001	0.00073193
31	Yes	6	0.00000001	0.00082669
32	Yes	6	0.00000001	0.00082770
33	Yes	6	0.00000001	0.00073455
34	Yes	6	0.00000001	0.00084649
35	Yes	6	0.00000001	0.00084550
36	Yes	6	0.00000001	0.00074234
37	Yes	6	0.00000001	0.00084528
38	Yes	6	0.00000001	0.00084517
39	Yes	4	0.00000001	0.00060941
40	Yes	5	0.00000001	0.00033159
41	Yes	5	0.00000001	0.00035127
42	Yes	4	0.00000001	0.00076727
43	Yes	5	0.00000001	0.00031885
44	Yes	5	0.00000001	0.00033141
45	Yes	4	0.00000001	0.00062863
46	Yes	5	0.00000001	0.00034882
47	Yes	5	0.00000001	0.00032917
48	Yes	4	0.00000001	0.00070018
49	Yes	5	0.00000001	0.00033830
50	Yes	5	0.00000001	0.00032562

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 143	22.306	46	1.375	0.002
L2	143 - 138	20.869	46	1.369	0.002
L3	138 - 133	19.443	46	1.353	0.002
L4	133 - 128	18.041	46	1.324	0.001
L5	128 - 123	16.676	46	1.283	0.001
L6	123 - 117.25	15.360	46	1.229	0.001
L7	120.75 - 115.75	14.788	46	1.200	0.001
L8	115.75 - 110.75	13.548	46	1.162	0.001
L9	110.75 - 105.75	12.363	46	1.100	0.001
L10	105.75 - 100.75	11.245	46	1.033	0.001
L11	100.75 - 97	10.200	46	0.962	0.001
L12	97 - 96.75	9.466	46	0.906	0.001
L13	96.75 - 91.75	9.419	46	0.904	0.001
L14	91.75 - 86.75	8.495	46	0.860	0.000
L15	86.75 - 80.75	7.618	46	0.815	0.000
L16	85 - 80	7.323	46	0.798	0.000
L17	80 - 75	6.499	46	0.771	0.000
L18	75 - 70	5.716	46	0.724	0.000
L19	70 - 65	4.983	46	0.676	0.000
L20	65 - 60	4.301	46	0.626	0.000
L21	60 - 55	3.671	46	0.577	0.000
L22	55 - 50	3.094	46	0.526	0.000
L23	50 - 40	2.569	46	0.475	0.000
L24	45 - 39	2.099	46	0.424	0.000
L25	39 - 34	1.585	46	0.389	0.000
L26	34 - 29	1.204	46	0.339	0.000
L27	29 - 24	0.876	46	0.289	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L28	24 - 19	0.599	46	0.239	0.000
L29	19 - 14	0.375	46	0.189	0.000
L30	14 - 12.083	0.203	46	0.140	0.000
L31	12.083 - 11.833	0.151	46	0.121	0.000
L32	11.833 - 6.833	0.145	46	0.118	0.000
L33	6.833 - 4.916	0.048	46	0.067	0.000
L34	4.916 - 4.666	0.024	46	0.048	0.000
L35	4.666 - 0	0.022	46	0.045	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
151.000	Pipe Mount [PM 601-3]	46	22.306	1.375	0.002	26107
150.000	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	46	22.306	1.375	0.002	26107
149.000	Top Hat	46	22.306	1.375	0.002	26107
148.000	6' x 2" Mount Pipe	46	22.306	1.375	0.002	26107
141.000	RRUS 11 B12	46	20.297	1.364	0.002	18549
140.000	7770.00 w/ Mount Pipe	46	20.011	1.360	0.002	16151
130.000	(2) LPA-80080/6CF w/ Mount Pipe	46	17.217	1.300	0.001	6805

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 143	87.891	16	5.428	0.007
L2	143 - 138	82.232	16	5.403	0.007
L3	138 - 133	76.618	16	5.340	0.007
L4	133 - 128	71.096	16	5.225	0.006
L5	128 - 123	65.718	16	5.063	0.005
L6	123 - 117.25	60.535	16	4.849	0.004
L7	120.75 - 115.75	58.280	16	4.738	0.004
L8	115.75 - 110.75	53.394	16	4.587	0.004
L9	110.75 - 105.75	48.725	16	4.343	0.003
L10	105.75 - 100.75	44.321	16	4.078	0.003
L11	100.75 - 97	40.202	16	3.796	0.002
L12	97 - 96.75	37.311	16	3.575	0.002
L13	96.75 - 91.75	37.124	16	3.567	0.002
L14	91.75 - 86.75	33.482	16	3.394	0.002
L15	86.75 - 80.75	30.026	16	3.214	0.002
L16	85 - 80	28.860	16	3.150	0.002
L17	80 - 75	25.614	16	3.043	0.001
L18	75 - 70	22.527	16	2.856	0.001
L19	70 - 65	19.638	16	2.665	0.001
L20	65 - 60	16.950	16	2.470	0.001
L21	60 - 55	14.467	16	2.275	0.001
L22	55 - 50	12.191	16	2.074	0.001
L23	50 - 40	10.125	16	1.874	0.001
L24	45 - 39	8.269	16	1.671	0.001

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L25	39 - 34	6.246	16	1.533	0.001
L26	34 - 29	4.745	16	1.335	0.000
L27	29 - 24	3.450	16	1.139	0.000
L28	24 - 19	2.361	16	0.942	0.000
L29	19 - 14	1.478	16	0.745	0.000
L30	14 - 12.083	0.800	16	0.550	0.000
L31	12.083 - 11.833	0.594	16	0.476	0.000
L32	11.833 - 6.833	0.569	16	0.466	0.000
L33	6.833 - 4.916	0.187	16	0.264	0.000
L34	4.916 - 4.666	0.096	16	0.188	0.000
L35	4.666 - 0	0.087	16	0.178	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
151.000	Pipe Mount [PM 601-3]	16	87.891	5.428	0.007	6727
150.000	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	16	87.891	5.428	0.007	6727
149.000	Top Hat	16	87.891	5.428	0.007	6727
148.000	6' x 2" Mount Pipe	16	87.891	5.428	0.007	6727
141.000	RRUS 11 B12	16	79.978	5.383	0.007	4790
140.000	7770.00 w/ Mount Pipe	16	78.855	5.371	0.007	4174
130.000	(2) LPA-80080/6CF w/ Mount Pipe	16	67.849	5.133	0.005	1756

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	148 - 143 (1)	TP22.85x22x0.188	5.000	0.000	0.0	13.487	-5.498	728.297	0.008
L2	143 - 138 (2)	TP23.7x22.85x0.188	5.000	0.000	0.0	13.993	-8.709	755.610	0.012
L3	138 - 133 (3)	TP24.55x23.7x0.188	5.000	0.000	0.0	14.499	-9.125	782.924	0.012
L4	133 - 128 (4)	TP25.4x24.55x0.188	5.000	0.000	0.0	15.004	-12.069	810.237	0.015
L5	128 - 123 (5)	TP26.25x25.4x0.188	5.000	0.000	0.0	15.510	-12.599	837.551	0.015
L6	123 - 117.25 (6)	TP27.227x26.25x0.188	5.750	0.000	0.0	15.738	-12.844	849.842	0.015
L7	117.25 - 115.75 (7)	TP27.107x26.257x0.25	5.000	0.000	0.0	21.311	-13.705	1150.790	0.012
L8	115.75 - 110.75 (8)	TP27.957x27.107x0.25	5.000	0.000	0.0	21.985	-14.379	1187.210	0.012
L9	110.75 - 105.75 (9)	TP28.807x27.957x0.25	5.000	0.000	0.0	22.660	-15.072	1223.620	0.012
L10	105.75 - 100.75 (10)	TP29.657x28.807x0.25	5.000	0.000	0.0	23.334	-15.785	1260.040	0.013
L11	100.75 - 97 (11)	TP30.294x29.657x0.25	3.750	0.000	0.0	23.840	-16.331	1287.350	0.013

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L12	97 - 96.75 (12)	TP30.336x30.294x0.463	0.250	0.000	0.0	43.854	-16.392	2368.130	0.007
L13	96.75 - 91.75 (13)	TP31.186x30.336x0.45	5.000	0.000	0.0	43.901	-17.445	2370.630	0.007
L14	91.75 - 86.75 (14)	TP32.036x31.186x0.444	5.000	0.000	0.0	44.497	-18.518	2402.820	0.008
L15	86.75 - 80.75 (15)	TP33.056x32.036x0.444	6.000	0.000	0.0	44.916	-18.896	2425.450	0.008
L16	80.75 - 80 (16)	TP32.684x31.834x0.469	5.000	0.000	0.0	47.930	-20.775	2803.880	0.007
L17	80 - 75 (17)	TP33.533x32.684x0.469	5.000	0.000	0.0	49.194	-21.945	2877.860	0.008
L18	75 - 70 (18)	TP34.383x33.533x0.463	5.000	0.000	0.0	49.795	-23.134	2913.010	0.008
L19	70 - 65 (19)	TP35.233x34.383x0.456	5.000	0.000	0.0	50.362	-24.342	2946.180	0.008
L20	65 - 60 (20)	TP36.083x35.233x0.456	5.000	0.000	0.0	51.593	-25.567	3018.180	0.008
L21	60 - 55 (21)	TP36.933x36.083x0.444	5.000	0.000	0.0	51.394	-26.812	3006.550	0.009
L22	55 - 50 (22)	TP37.783x36.933x0.444	5.000	0.000	0.0	52.591	-28.075	3076.580	0.009
L23	50 - 40 (23)	TP39.483x37.783x0.438	10.000	0.000	0.0	53.039	-29.356	3102.800	0.009
L24	40 - 39 (24)	TP39.09x38.071x0.469	6.000	0.000	0.0	57.462	-32.020	3361.520	0.010
L25	39 - 34 (25)	TP39.94x39.09x0.463	5.000	0.000	0.0	57.953	-33.407	3390.230	0.010
L26	34 - 29 (26)	TP40.79x39.94x0.463	5.000	0.000	0.0	59.200	-34.812	3463.220	0.010
L27	29 - 24 (27)	TP41.64x40.79x0.456	5.000	0.000	0.0	59.640	-36.237	3488.950	0.010
L28	24 - 19 (28)	TP42.49x41.64x0.45	5.000	0.000	0.0	60.046	-37.680	3512.700	0.011
L29	19 - 14 (29)	TP43.34x42.49x0.45	5.000	0.000	0.0	61.260	-39.142	3583.710	0.011
L30	14 - 12.083 (30)	TP43.666x43.34x0.45	1.917	0.000	0.0	61.725	-39.702	3610.940	0.011
L31	12.083 - 11.833 (31)	TP43.709x43.666x0.425	0.250	0.000	0.0	58.387	-39.790	3415.660	0.012
L32	11.833 - 6.833 (32)	TP44.558x43.709x0.425	5.000	0.000	0.0	59.534	-41.333	3482.730	0.012
L33	6.833 - 4.916 (33)	TP44.884x44.558x0.425	1.917	0.000	0.0	59.973	-41.926	3508.450	0.012
L34	4.916 - 4.666 (34)	TP44.927x44.884x0.45	0.250	0.000	0.0	63.526	-42.013	3716.290	0.011
L35	4.666 - 0 (35)	TP45.72x44.927x0.444	4.666	0.000	0.0	63.770	-43.420	3730.540	0.012

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	148 - 143 (1)	TP22.85x22x0.188	26.531	407.930	0.065	0.000	407.930	0.000
L2	143 - 138 (2)	TP23.7x22.85x0.188	61.233	434.166	0.141	0.000	434.166	0.000
L3	138 - 133 (3)	TP24.55x23.7x0.188	106.382	460.809	0.231	0.000	460.809	0.000
L4	133 - 128 (4)	TP25.4x24.55x0.188	158.973	487.821	0.326	0.000	487.821	0.000
L5	128 - 123 (5)	TP26.25x25.4x0.188	221.943	515.161	0.431	0.000	515.161	0.000
L6	123 - 117.25 (6)	TP27.227x26.25x0.188	250.711	527.560	0.475	0.000	527.560	0.000
L7	117.25 - 115.75 (7)	TP27.107x26.257x0.25	315.739	789.191	0.400	0.000	789.191	0.000
L8	115.75 - 110.75 (8)	TP27.957x27.107x0.25	382.188	833.138	0.459	0.000	833.138	0.000
L9	110.75 - 105.75 (9)	TP28.807x27.957x0.25	449.968	877.800	0.513	0.000	877.800	0.000
L10	105.75 - 100.75 (10)	TP29.657x28.807x0.25	519.053	923.142	0.562	0.000	923.142	0.000
L11	100.75 - 97 (11)	TP30.294x29.657x0.25	571.707	957.567	0.597	0.000	957.567	0.000
L12	97 - 96.75 (12)	TP30.336x30.294x0.463	575.243	1833.667	0.314	0.000	1833.667	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 $\frac{M_{uy}}{\phi M_{ny}}$
L13	96.75 - 91.75 (13)	TP31.186x30.336x0.45	646.768	1890.167	0.342	0.000	1890.167	0.000
L14	91.75 - 86.75 (14)	TP32.036x31.186x0.444	719.819	1970.350	0.365	0.000	1970.350	0.000
L15	86.75 - 80.75 (15)	TP33.056x32.036x0.444	745.743	2007.883	0.371	0.000	2007.883	0.000
L16	80.75 - 80 (16)	TP32.684x31.834x0.469	821.020	2343.350	0.350	0.000	2343.350	0.000
L17	80 - 75 (17)	TP33.533x32.684x0.469	897.908	2469.542	0.364	0.000	2469.542	0.000
L18	75 - 70 (18)	TP34.383x33.533x0.463	976.233	2565.808	0.380	0.000	2565.808	0.000
L19	70 - 65 (19)	TP35.233x34.383x0.456	1055.958	2661.875	0.397	0.000	2661.875	0.000
L20	65 - 60 (20)	TP36.083x35.233x0.456	1137.042	2794.442	0.407	0.000	2794.442	0.000
L21	60 - 55 (21)	TP36.933x36.083x0.444	1219.450	2852.875	0.427	0.000	2852.875	0.000
L22	55 - 50 (22)	TP37.783x36.933x0.444	1303.125	2988.142	0.436	0.000	2988.142	0.000
L23	50 - 40 (23)	TP39.483x37.783x0.438	1388.017	3084.017	0.450	0.000	3084.017	0.000
L24	40 - 39 (24)	TP39.09x38.071x0.469	1491.725	3376.175	0.442	0.000	3376.175	0.000
L25	39 - 34 (25)	TP39.94x39.09x0.463	1579.542	3481.942	0.454	0.000	3481.942	0.000
L26	34 - 29 (26)	TP40.79x39.94x0.463	1668.367	3634.367	0.459	0.000	3634.367	0.000
L27	29 - 24 (27)	TP41.64x40.79x0.456	1758.167	3740.550	0.470	0.000	3740.550	0.000
L28	24 - 19 (28)	TP42.49x41.64x0.45	1848.892	3845.725	0.481	0.000	3845.725	0.000
L29	19 - 14 (29)	TP43.34x42.49x0.45	1940.542	4001.125	0.485	0.000	4001.125	0.000
L30	14 - 12.083 (30)	TP43.666x43.34x0.45	1975.925	4055.092	0.487	0.000	4055.092	0.000
L31	12.083 - 11.833 (31)	TP43.709x43.666x0.425	1980.550	3787.925	0.523	0.000	3787.925	0.000
L32	11.833 - 6.833 (32)	TP44.558x43.709x0.425	2073.483	3918.792	0.529	0.000	3918.792	0.000
L33	6.833 - 4.916 (33)	TP44.884x44.558x0.425	2109.342	3969.333	0.531	0.000	3969.333	0.000
L34	4.916 - 4.666 (34)	TP44.927x44.884x0.45	2114.025	4266.150	0.496	0.000	4266.150	0.000
L35	4.666 - 0 (35)	TP45.72x44.927x0.444	2201.883	4325.592	0.509	0.000	4325.592	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	148 - 143 (1)	TP22.85x22x0.188	4.781	218.489	0.022	0.001	433.627	0.000
L2	143 - 138 (2)	TP23.7x22.85x0.188	8.892	226.683	0.039	0.503	466.762	0.001
L3	138 - 133 (3)	TP24.55x23.7x0.188	9.171	234.877	0.039	0.503	501.116	0.001
L4	133 - 128 (4)	TP25.4x24.55x0.188	12.464	243.071	0.051	0.360	536.691	0.001
L5	128 - 123 (5)	TP26.25x25.4x0.188	12.732	251.265	0.051	0.360	573.485	0.001
L6	123 - 117.25 (6)	TP27.227x26.25x0.188	12.851	254.953	0.050	0.360	590.440	0.001
L7	117.25 - 115.75 (7)	TP27.107x26.257x0.25	13.164	345.238	0.038	0.360	811.997	0.000
L8	115.75 - 110.75 (8)	TP27.957x27.107x0.25	13.431	356.163	0.038	0.360	864.200	0.000
L9	110.75 - 105.75 (9)	TP28.807x27.957x0.25	13.695	367.087	0.037	0.359	918.033	0.000
L10	105.75 - 100.75 (10)	TP29.657x28.807x0.25	13.954	378.012	0.037	0.359	973.483	0.000
L11	100.75 - 97 (11)	TP30.294x29.657x0.25	14.147	386.206	0.037	0.359	1016.142	0.000
L12	97 - 96.75 (12)	TP30.336x30.294x0.463	14.155	710.438	0.020	0.359	1858.650	0.000
L13	96.75 - 91.75	TP31.186x30.336x0.45	14.464	711.190	0.020	0.359	1914.333	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 $\frac{T_u}{\phi T_n}$
L14	91.75 - 86.75 (13)	TP32.036x31.186x0.444	14.768	720.847	0.020	0.359	1994.367	0.000
L15	86.75 - 80.75 (14)	TP33.056x32.036x0.444	14.877	727.634	0.020	0.359	2032.100	0.000
L16	80.75 - 80 (15)	TP32.684x31.834x0.469	15.239	841.164	0.018	0.359	2373.100	0.000
L17	80 - 75 (16)	TP33.533x32.684x0.469	15.531	863.357	0.018	0.359	2499.975	0.000
L18	75 - 70 (17)	TP34.383x33.533x0.463	15.814	873.903	0.018	0.359	2596.033	0.000
L19	70 - 65 (18)	TP35.233x34.383x0.456	16.091	883.853	0.018	0.358	2691.867	0.000
L20	65 - 60 (19)	TP36.083x35.233x0.456	16.360	905.454	0.018	0.358	2825.050	0.000
L21	60 - 55 (20)	TP36.933x36.083x0.444	16.620	901.965	0.018	0.358	2882.283	0.000
L22	55 - 50 (21)	TP37.783x36.933x0.444	16.870	922.974	0.018	0.358	3018.125	0.000
L23	50 - 40 (22)	TP39.483x37.783x0.438	17.105	930.840	0.018	0.358	3113.642	0.000
L24	40 - 39 (23)	TP39.09x38.071x0.469	17.468	1008.460	0.017	0.358	3410.900	0.000
L25	39 - 34 (24)	TP39.94x39.09x0.463	17.679	1017.070	0.017	0.358	3516.292	0.000
L26	34 - 29 (25)	TP40.79x39.94x0.463	17.876	1038.970	0.017	0.358	3669.325	0.000
L27	29 - 24 (26)	TP41.64x40.79x0.456	18.066	1046.690	0.017	0.358	3775.067	0.000
L28	24 - 19 (27)	TP42.49x41.64x0.45	18.251	1053.810	0.017	0.358	3879.775	0.000
L29	19 - 14 (28)	TP43.34x42.49x0.45	18.435	1075.110	0.017	0.358	4038.242	0.000
L30	14 - 12.083 (29)	TP43.666x43.34x0.45	18.517	1083.280	0.017	0.358	4099.833	0.000
L31	12.083 - 11.833 (30)	TP43.709x43.666x0.425	18.504	1024.700	0.018	0.358	3884.175	0.000
L32	11.833 - 6.833 (31)	TP44.558x43.709x0.425	18.687	1044.820	0.018	0.358	4038.217	0.000
L33	6.833 - 4.916 (32)	TP44.884x44.558x0.425	18.767	1052.530	0.018	0.358	4098.067	0.000
L34	4.916 - 4.666 (33)	TP44.927x44.884x0.45	18.751	1114.890	0.017	0.358	4342.542	0.000
L35	4.666 - 0 (34)	TP45.72x44.927x0.444	18.927	1119.160	0.017	0.358	4437.550	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	148 - 143 (1)	0.008	0.065	0.000	0.022	0.000	0.073 ✔	1.050	4.8.2 ✔
L2	143 - 138 (2)	0.012	0.141	0.000	0.039	0.001	0.154 ✔	1.050	4.8.2 ✔
L3	138 - 133 (3)	0.012	0.231	0.000	0.039	0.001	0.244 ✔	1.050	4.8.2 ✔
L4	133 - 128 (4)	0.015	0.326	0.000	0.051	0.001	0.343 ✔	1.050	4.8.2 ✔
L5	128 - 123 (5)	0.015	0.431	0.000	0.051	0.001	0.448 ✔	1.050	4.8.2 ✔
L6	123 - 117.25 (6)	0.015	0.475	0.000	0.050	0.001	0.493 ✔	1.050	4.8.2 ✔
L7	117.25 - 115.75 (7)	0.012	0.400	0.000	0.038	0.000	0.413 ✔	1.050	4.8.2 ✔
L8	115.75 - 110.75 (8)	0.012	0.459	0.000	0.038	0.000	0.472 ✔	1.050	4.8.2 ✔

Section No.	Elevation ft	Ratio $P_u/\phi P_n$	Ratio $M_{ux}/\phi M_{nx}$	Ratio $M_{uy}/\phi M_{ny}$	Ratio $V_u/\phi V_n$	Ratio $T_u/\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L9	110.75 - 105.75 (9)	0.012	0.513	0.000	0.037	0.000	0.526 ✔	1.050	4.8.2 ✔
L10	105.75 - 100.75 (10)	0.013	0.562	0.000	0.037	0.000	0.576 ✔	1.050	4.8.2 ✔
L11	100.75 - 97 (11)	0.013	0.597	0.000	0.037	0.000	0.611 ✔	1.050	4.8.2 ✔
L12	97 - 96.75 (12)	0.007	0.314	0.000	0.020	0.000	0.321 ✔	1.050	4.8.2 ✔
L13	96.75 - 91.75 (13)	0.007	0.342	0.000	0.020	0.000	0.350 ✔	1.050	4.8.2 ✔
L14	91.75 - 86.75 (14)	0.008	0.365	0.000	0.020	0.000	0.373 ✔	1.050	4.8.2 ✔
L15	86.75 - 80.75 (15)	0.008	0.371	0.000	0.020	0.000	0.380 ✔	1.050	4.8.2 ✔
L16	80.75 - 80 (16)	0.007	0.350	0.000	0.018	0.000	0.358 ✔	1.050	4.8.2 ✔
L17	80 - 75 (17)	0.008	0.364	0.000	0.018	0.000	0.372 ✔	1.050	4.8.2 ✔
L18	75 - 70 (18)	0.008	0.380	0.000	0.018	0.000	0.389 ✔	1.050	4.8.2 ✔
L19	70 - 65 (19)	0.008	0.397	0.000	0.018	0.000	0.405 ✔	1.050	4.8.2 ✔
L20	65 - 60 (20)	0.008	0.407	0.000	0.018	0.000	0.416 ✔	1.050	4.8.2 ✔
L21	60 - 55 (21)	0.009	0.427	0.000	0.018	0.000	0.437 ✔	1.050	4.8.2 ✔
L22	55 - 50 (22)	0.009	0.436	0.000	0.018	0.000	0.446 ✔	1.050	4.8.2 ✔
L23	50 - 40 (23)	0.009	0.450	0.000	0.018	0.000	0.460 ✔	1.050	4.8.2 ✔
L24	40 - 39 (24)	0.010	0.442	0.000	0.017	0.000	0.452 ✔	1.050	4.8.2 ✔
L25	39 - 34 (25)	0.010	0.454	0.000	0.017	0.000	0.464 ✔	1.050	4.8.2 ✔
L26	34 - 29 (26)	0.010	0.459	0.000	0.017	0.000	0.469 ✔	1.050	4.8.2 ✔
L27	29 - 24 (27)	0.010	0.470	0.000	0.017	0.000	0.481 ✔	1.050	4.8.2 ✔
L28	24 - 19 (28)	0.011	0.481	0.000	0.017	0.000	0.492 ✔	1.050	4.8.2 ✔
L29	19 - 14 (29)	0.011	0.485	0.000	0.017	0.000	0.496 ✔	1.050	4.8.2 ✔
L30	14 - 12.083 (30)	0.011	0.487	0.000	0.017	0.000	0.499 ✔	1.050	4.8.2 ✔
L31	12.083 - 11.833 (31)	0.012	0.523	0.000	0.018	0.000	0.535 ✔	1.050	4.8.2 ✔
L32	11.833 - 6.833 (32)	0.012	0.529	0.000	0.018	0.000	0.541 ✔	1.050	4.8.2 ✔
L33	6.833 - 4.916 (33)	0.012	0.531	0.000	0.018	0.000	0.544 ✔	1.050	4.8.2 ✔
L34	4.916 - 4.666 (34)	0.011	0.496	0.000	0.017	0.000	0.507 ✔	1.050	4.8.2 ✔

Section No.	Elevation ft	Ratio $P_u/\phi P_n$	Ratio $M_{ux}/\phi M_{nx}$	Ratio $M_{uy}/\phi M_{ny}$	Ratio $V_u/\phi V_n$	Ratio $T_u/\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L35	4.666 - 0 (35)	0.012	0.509	0.000	0.017	0.000	0.521 ✔	1.050	4.8.2 ✔

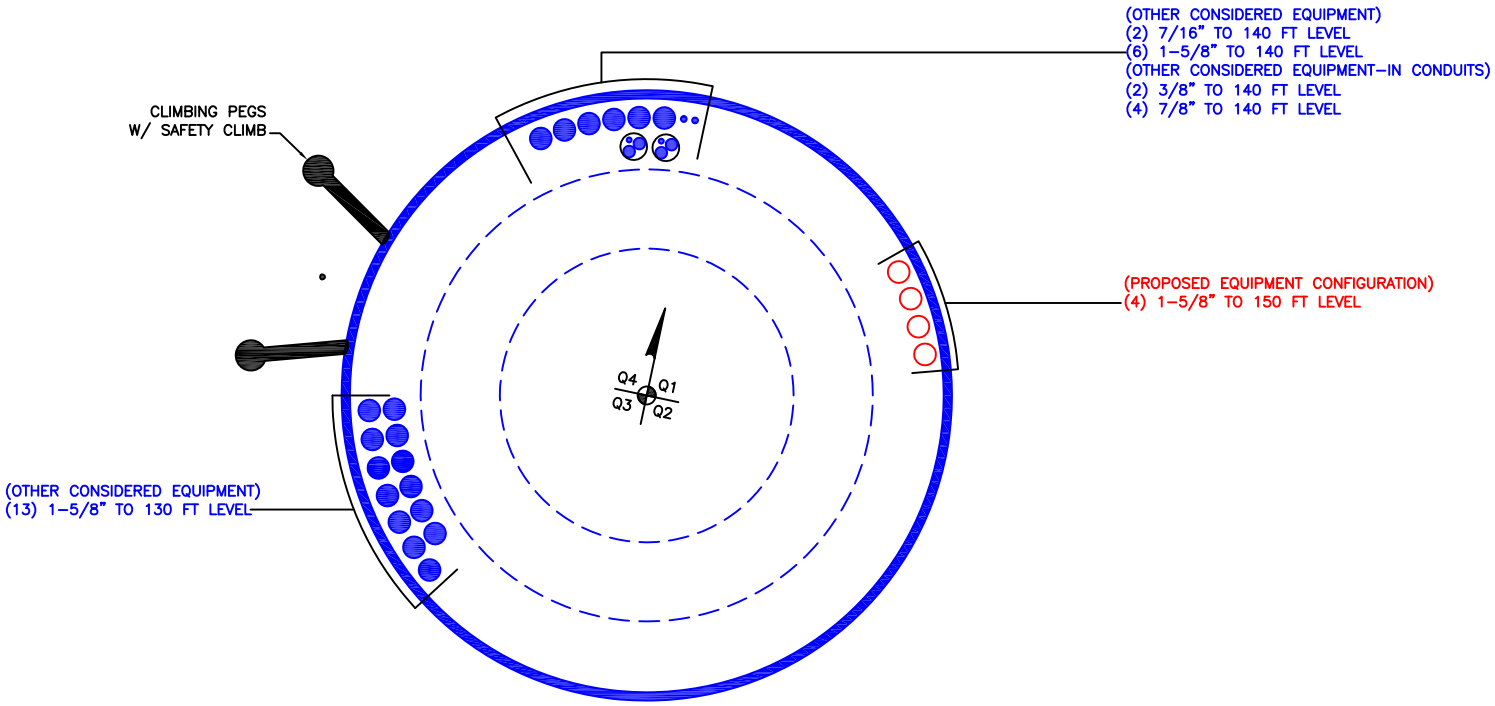
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	148 - 143	Pole	TP22.85x22x0.188	1	-5.498	764.712	**	**
L2	143 - 138	Pole	TP23.7x22.85x0.188	2	-8.709	793.390	**	**
L3	138 - 133	Pole	TP24.55x23.7x0.188	3	-9.125	822.070	**	**
L4	133 - 128	Pole	TP25.4x24.55x0.188	4	-12.069	850.749	**	**
L5	128 - 123	Pole	TP26.25x25.4x0.188	5	-12.599	879.429	**	**
L6	123 - 117.25	Pole	TP27.227x26.25x0.188	6	-12.844	892.334	**	**
L7	117.25 - 115.75	Pole	TP27.107x26.257x0.25	7	-13.705	1208.329	**	**
L8	115.75 - 110.75	Pole	TP27.957x27.107x0.25	8	-14.379	1246.570	**	**
L9	110.75 - 105.75	Pole	TP28.807x27.957x0.25	9	-15.072	1284.801	**	**
L10	105.75 - 100.75	Pole	TP29.657x28.807x0.25	10	-15.785	1323.042	**	**
L11	100.75 - 97	Pole	TP30.294x29.657x0.25	11	-16.331	1351.717	**	**
L12	97 - 96.75	Pole	TP30.336x30.294x0.463	12	-16.392	2486.536	**	**
L13	96.75 - 91.75	Pole	TP31.186x30.336x0.45	13	-17.445	2489.161	**	**
L14	91.75 - 86.75	Pole	TP32.036x31.186x0.444	14	-18.518	2522.961	**	**
L15	86.75 - 80.75	Pole	TP33.056x32.036x0.444	15	-18.896	2546.722	**	**
L16	80.75 - 80	Pole	TP32.684x31.834x0.469	16	-20.775	2944.074	**	**
L17	80 - 75	Pole	TP33.533x32.684x0.469	17	-21.945	3021.753	**	**
L18	75 - 70	Pole	TP34.383x33.533x0.463	18	-23.134	3058.660	**	**
L19	70 - 65	Pole	TP35.233x34.383x0.456	19	-24.342	3093.489	**	**
L20	65 - 60	Pole	TP36.083x35.233x0.456	20	-25.567	3169.089	**	**
L21	60 - 55	Pole	TP36.933x36.083x0.444	21	-26.812	3156.877	**	**
L22	55 - 50	Pole	TP37.783x36.933x0.444	22	-28.075	3230.409	**	**
L23	50 - 40	Pole	TP39.483x37.783x0.438	23	-29.356	3257.940	**	**
L24	40 - 39	Pole	TP39.09x38.071x0.469	24	-32.020	3529.596	**	**
L25	39 - 34	Pole	TP39.94x39.09x0.463	25	-33.407	3559.741	**	**
L26	34 - 29	Pole	TP40.79x39.94x0.463	26	-34.812	3636.381	**	**
L27	29 - 24	Pole	TP41.64x40.79x0.456	27	-36.237	3663.397	**	**
L28	24 - 19	Pole	TP42.49x41.64x0.45	28	-37.680	3688.335	**	**
L29	19 - 14	Pole	TP43.34x42.49x0.45	29	-39.142	3762.895	**	**
L30	14 - 12.083	Pole	TP43.666x43.34x0.45	30	-39.702	3791.487	**	**
L31	12.083 - 11.833	Pole	TP43.709x43.666x0.425	31	-39.790	3586.443	**	**
L32	11.833 - 6.833	Pole	TP44.558x43.709x0.425	32	-41.333	3656.866	**	**
L33	6.833 - 4.916	Pole	TP44.884x44.558x0.425	33	-41.926	3683.872	**	**
L34	4.916 - 4.666	Pole	TP44.927x44.884x0.45	34	-42.013	3902.104	**	**
L35	4.666 - 0	Pole	TP45.72x44.927x0.444	35	-43.420	3917.067	**	**
							Summary	
						Pole	**	**
						RATING =	**	**

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

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876377

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- H

Site BU: 876377

Work Order: 1919053

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	148	30.75	3.5	18	22	27.227	0.1875	Auto	A607-60
2	120.75	40	4.25	18	26.26	33.056	0.25	Auto	A607-60
3	85	45	5	18	31.83	39.483	0.28125	Auto	A607-65
4	45	45	0	18	38.07	45.72	0.3125	Auto	A607-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	0	97	channel	MP3-05 (1.1875in) - BW	2				E1												E1		
2	4.916	12.083	channel	MP3-06 (1.1875in)	1									E1									
3	0	4.916	channel	05 (1.1875in) - BW (0'	1										E1								
4	12.083	97	channel	MP3-05 (1.1875in)	1										E1								
5																							
6																							
7																							
8																							
9																							
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Type	Bottom Termination Length (in)	Top Termination Type	Top Termination Length (in)	Lu (in)	Net Area (in2)	Bolt Hole Size (in)	Reinforcement Material
1	5.33	2.09	5.65	0.79	Welded	n/a	PC 8.8 - M20 (100)	29.000	18.000	5.025	1.1875	A572-65
2	6.89	2.61	8.47	0.93	PC 8.8 - M20 (100)	41	PC 8.8 - M20 (100)	41.000	24.000	7.670	1.1875	A572-65
3	5.33	2.09	5.65	0.79	Welded	n/a	PC 8.8 - M20 (100)	29.000	18.000	5.025	1.1875	A572-65
4	5.33	2.09	5.65	0.79	PC 8.8 - M20 (100)	29	PC 8.8 - M20 (100)	29.000	18.000	5.025	1.1875	A572-65

Connection Details for Custom Reinforcements

Reinforcement	End	# Bolts	N or X	Bolt Spacing (in)	Edge Dist (in)	Weld Grade (ksi)	Transverse (Horiz.) Weld Type	Horiz. Weld Length (in)	Horiz. Groove Depth (in)	Horiz. Groove Angle (deg)	Horiz. Fillet Size (in)	Vertical Weld Length (in)	Vertical Fillet Size (in)	Rev H Connection Capacity (kip)
MP3-05 (1.1875in) - BW	Top	10	N	3	2	-	-	-	-	-	-	-	-	-
	Bottom	-	-	-	-	70	None	-	-	-	-	24	0.375	-
MP3-05 (1.1875in) - BW (0' - 7'7")	Top	10	N	3	2	-	-	-	-	-	-	-	-	-
	Bottom	-	-	-	-	70	None	-	-	-	-	18	0.375	-

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	148 - 143	5		18	22.000	22.850	0.1875	A607-60	1.000
2	143 - 138	5		18	22.850	23.700	0.1875	A607-60	1.000
3	138 - 133	5		18	23.700	24.550	0.1875	A607-60	1.000
4	133 - 128	5		18	24.550	25.400	0.1875	A607-60	1.000
5	128 - 123	5		18	25.400	26.250	0.1875	A607-60	1.000
6	123 - 120.75	5.75	3.5	18	26.250	27.227	0.1875	A607-60	1.000
7	120.75 - 115.75	5		18	26.257	27.107	0.25	A607-60	1.000
8	115.75 - 110.75	5		18	27.107	27.957	0.25	A607-60	1.000
9	110.75 - 105.75	5		18	27.957	28.807	0.25	A607-60	1.000
10	105.75 - 100.75	5		18	28.807	29.657	0.25	A607-60	1.000
11	100.75 - 97	3.75		18	29.657	30.294	0.25	A607-60	1.000
12	97 - 96.75	0.25		18	30.294	30.336	0.4625	A607-60	0.931
13	96.75 - 91.75	5		18	30.336	31.186	0.45	A607-60	0.945
14	91.75 - 86.75	5		18	31.186	32.036	0.44375	A607-60	0.948
15	86.75 - 85	6	4.25	18	32.036	33.056	0.44375	A607-60	0.944
16	85 - 80	5		18	31.834	32.684	0.46875	A607-65	0.957
17	80 - 75	5		18	32.684	33.533	0.46875	A607-65	0.948
18	75 - 70	5		18	33.533	34.383	0.4625	A607-65	0.952
19	70 - 65	5		18	34.383	35.233	0.45625	A607-65	0.956
20	65 - 60	5		18	35.233	36.083	0.45625	A607-65	0.948
21	60 - 55	5		18	36.083	36.933	0.44375	A607-65	0.966
22	55 - 50	5		18	36.933	37.783	0.44375	A607-65	0.959
23	50 - 45	10	5	18	37.783	39.483	0.4375	A607-65	0.965
24	45 - 39	6		18	38.071	39.090	0.46875	A607-65	0.964
25	39 - 34	5		18	39.090	39.940	0.4625	A607-65	0.971
26	34 - 29	5		18	39.940	40.790	0.4625	A607-65	0.965
27	29 - 24	5		18	40.790	41.640	0.45625	A607-65	0.972
28	24 - 19	5		18	41.640	42.490	0.45	A607-65	0.979
29	19 - 14	5		18	42.490	43.340	0.45	A607-65	0.973
30	14 - 12.083	1.917		18	43.340	43.666	0.45	A607-65	0.971
31	12.083 - 11.833	0.25		18	43.666	43.709	0.425	A607-65	1.076
32	11.833 - 6.833	5		18	43.709	44.558	0.425	A607-65	1.069
33	6.833 - 4.916	1.917		18	44.558	44.884	0.425	A607-65	1.067
34	4.916 - 4.666	0.25		18	44.884	44.927	0.45	A607-65	0.963
35	4.666 - 0	4.666		18	44.927	45.720	0.44375	A607-65	0.972

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	148 - 143	5.50	26.53	4.78
2	143 - 138	8.71	61.23	8.89
3	138 - 133	9.13	106.38	9.17
4	133 - 128	12.07	158.97	12.46
5	128 - 123	12.60	221.94	12.73
6	123 - 120.75	12.84	250.71	12.85
7	120.75 - 115.75	13.70	315.74	13.16
8	115.75 - 110.75	14.38	382.19	13.43
9	110.75 - 105.75	15.07	449.97	13.69
10	105.75 - 100.75	15.78	519.05	13.95
11	100.75 - 97	16.33	571.71	14.15
12	97 - 96.75	16.39	575.24	14.15
13	96.75 - 91.75	17.44	646.77	14.46
14	91.75 - 86.75	18.52	719.82	14.77
15	86.75 - 85	18.90	745.74	14.88
16	85 - 80	20.78	821.02	15.24
17	80 - 75	21.94	897.91	15.53
18	75 - 70	23.13	976.24	15.81
19	70 - 65	24.34	1055.96	16.09
20	65 - 60	25.57	1137.04	16.36
21	60 - 55	26.81	1219.45	16.62
22	55 - 50	28.07	1303.13	16.87
23	50 - 45	29.36	1388.02	17.11
24	45 - 39	32.02	1491.72	17.47
25	39 - 34	33.41	1579.54	17.68
26	34 - 29	34.81	1668.37	17.88
27	29 - 24	36.24	1758.16	18.07
28	24 - 19	37.68	1848.90	18.25
29	19 - 14	39.14	1940.55	18.43
30	14 - 12.083	39.70	1975.93	18.52
31	12.083 - 11.833	39.79	1980.55	18.50
32	11.833 - 6.833	41.33	2073.48	18.69
33	6.833 - 4.916	41.93	2109.34	18.77
34	4.916 - 4.666	42.01	2114.03	18.75
35	4.666 - 0	43.42	2201.89	18.93

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
148 - 143	Pole	TP22.85x22x0.1875	Pole	6.8%	Pass
143 - 138	Pole	TP23.7x22.85x0.1875	Pole	14.4%	Pass
138 - 133	Pole	TP24.55x23.7x0.1875	Pole	23.0%	Pass
133 - 128	Pole	TP25.4x24.55x0.1875	Pole	32.3%	Pass
128 - 123	Pole	TP26.25x25.4x0.1875	Pole	42.4%	Pass
123 - 120.75	Pole	TP27.227x26.25x0.1875	Pole	46.6%	Pass
120.75 - 115.75	Pole	TP27.107x26.257x0.25	Pole	39.0%	Pass
115.75 - 110.75	Pole	TP27.957x27.107x0.25	Pole	44.7%	Pass
110.75 - 105.75	Pole	TP28.807x27.957x0.25	Pole	49.8%	Pass
105.75 - 100.75	Pole	TP29.657x28.807x0.25	Pole	54.6%	Pass
100.75 - 97	Pole	TP30.294x29.657x0.25	Pole	57.9%	Pass
97 - 96.75	Pole + Reinf.	TP30.336x30.294x0.4625	Reinf. 1 Tension Rupture	42.0%	Pass
96.75 - 91.75	Pole + Reinf.	TP31.186x30.336x0.45	Reinf. 1 Tension Rupture	45.2%	Pass
91.75 - 86.75	Pole + Reinf.	TP32.036x31.186x0.4438	Reinf. 1 Tension Rupture	48.2%	Pass
86.75 - 85	Pole + Reinf.	TP33.056x32.036x0.4438	Reinf. 1 Tension Rupture	49.2%	Pass
85 - 80	Pole + Reinf.	TP32.684x31.834x0.4688	Reinf. 1 Tension Rupture	49.7%	Pass
80 - 75	Pole + Reinf.	TP33.533x32.684x0.4688	Reinf. 1 Tension Rupture	52.1%	Pass
75 - 70	Pole + Reinf.	TP34.383x33.533x0.4625	Reinf. 1 Tension Rupture	54.4%	Pass
70 - 65	Pole + Reinf.	TP35.233x34.383x0.4563	Reinf. 4 Tension Rupture	56.5%	Pass
65 - 60	Pole + Reinf.	TP36.083x35.233x0.4563	Reinf. 1 Tension Rupture	58.5%	Pass
60 - 55	Pole + Reinf.	TP36.933x36.083x0.4438	Reinf. 1 Tension Rupture	60.3%	Pass
55 - 50	Pole + Reinf.	TP37.783x36.933x0.4438	Reinf. 1 Tension Rupture	62.1%	Pass
50 - 45	Pole + Reinf.	TP39.483x37.783x0.4375	Reinf. 1 Tension Rupture	63.7%	Pass
45 - 39	Pole + Reinf.	TP39.09x38.071x0.4688	Reinf. 1 Tension Rupture	62.7%	Pass
39 - 34	Pole + Reinf.	TP39.94x39.09x0.4625	Reinf. 1 Tension Rupture	64.0%	Pass
34 - 29	Pole + Reinf.	TP40.79x39.94x0.4625	Reinf. 1 Tension Rupture	65.2%	Pass
29 - 24	Pole + Reinf.	TP41.64x40.79x0.4563	Reinf. 1 Tension Rupture	66.4%	Pass
24 - 19	Pole + Reinf.	TP42.49x41.64x0.45	Reinf. 1 Tension Rupture	67.4%	Pass
19 - 14	Pole + Reinf.	TP43.34x42.49x0.45	Reinf. 1 Tension Rupture	68.4%	Pass
14 - 12.08	Pole + Reinf.	TP43.666x43.34x0.45	Reinf. 1 Tension Rupture	68.8%	Pass
12.08 - 11.83	Pole + Reinf.	TP43.709x43.666x0.425	Reinf. 1 Tension Rupture	70.5%	Pass
11.83 - 6.83	Pole + Reinf.	TP44.558x43.709x0.425	Reinf. 1 Tension Rupture	71.4%	Pass
6.83 - 4.92	Pole + Reinf.	TP44.884x44.558x0.425	Reinf. 1 Tension Rupture	71.7%	Pass
4.92 - 4.67	Pole + Reinf.	TP44.927x44.884x0.45	Reinf. 1 Tension Rupture	70.1%	Pass
4.67 - 0	Pole + Reinf.	TP45.72x44.927x0.4438	Reinf. 1 Tension Rupture	70.8%	Pass
				Summary	
			Pole	57.9%	Pass
			Reinforcement	71.7%	Pass
			Overall	71.7%	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
148 - 143	875	n/a	875	13.49	n/a	13.49	6.8%				
143 - 138	977	n/a	977	13.99	n/a	13.99	14.4%				
138 - 133	1087	n/a	1087	14.50	n/a	14.50	23.0%				
133 - 128	1205	n/a	1205	15.00	n/a	15.00	32.3%				
128 - 123	1331	n/a	1331	15.51	n/a	15.51	42.4%				
123 - 120.75	1390	n/a	1390	15.74	n/a	15.74	46.6%				
120.75 - 115.75	1941	n/a	1941	21.31	n/a	21.31	39.0%				
115.75 - 110.75	2132	n/a	2132	21.98	n/a	21.98	44.7%				
110.75 - 105.75	2334	n/a	2334	22.66	n/a	22.66	49.8%				
105.75 - 100.75	2548	n/a	2548	23.33	n/a	23.33	54.6%				
100.75 - 97	2718	n/a	2718	23.84	n/a	23.84	57.9%				
97 - 96.75	2729	2169	4898	23.87	16.95	40.82	32.0%	42.0%			42.0%
96.75 - 91.75	2967	2286	5253	24.55	16.95	41.50	34.7%	45.2%			45.2%
91.75 - 86.75	3218	2405	5623	25.22	16.95	42.17	37.4%	48.2%			48.2%
86.75 - 85	3310	2448	5757	25.46	16.95	42.41	38.3%	49.2%			49.2%
85 - 80	3835	2498	6334	28.92	16.95	45.87	35.0%	49.7%			49.7%
80 - 75	4145	2623	6768	29.68	16.95	46.63	37.1%	52.1%			52.1%
75 - 70	4471	2751	7222	30.44	16.95	47.39	39.0%	54.4%			54.4%
70 - 65	4814	2882	7696	31.20	16.95	48.15	40.9%	56.5%			56.5%
65 - 60	5174	3016	8190	31.96	16.95	48.91	42.7%	58.5%			58.5%
60 - 55	5551	3153	8704	32.72	16.95	49.67	44.5%	60.3%			60.3%
55 - 50	5946	3294	9240	33.48	16.95	50.43	46.2%	62.1%			62.1%
50 - 45	6360	3437	9797	34.23	16.95	51.18	47.9%	63.7%			63.7%
45 - 39	7305	3515	10820	38.46	16.95	55.41	45.6%	62.7%			62.7%
39 - 34	7795	3663	11459	39.30	16.95	56.25	46.9%	64.0%			64.0%
34 - 29	8308	3814	12122	40.15	16.95	57.10	48.2%	65.2%			65.2%
29 - 24	8842	3969	12811	40.99	16.95	57.94	49.5%	66.4%			66.4%
24 - 19	9399	4126	13525	41.83	16.95	58.78	50.7%	67.4%			67.4%
19 - 14	9979	4286	14265	42.68	16.95	59.63	51.8%	68.4%			68.4%
14 - 12.08	10207	4348	14556	43.00	16.95	59.95	52.3%	68.8%			68.8%
12.08 - 11.83	10243	3693	13936	43.04	19.77	62.81	56.2%	70.5%	58.2%		
11.83 - 6.83	10857	3832	14689	43.88	19.77	63.65	57.4%	71.4%	59.0%		
6.83 - 4.92	11098	3886	14984	44.21	19.77	63.98	57.8%	71.7%	59.3%		
4.92 - 4.67	11124	4593	15717	44.25	16.95	61.20	53.9%	70.1%		70.1%	
4.67 - 0	11728	4751	16479	45.04	16.95	61.99	54.9%	70.8%		70.8%	

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

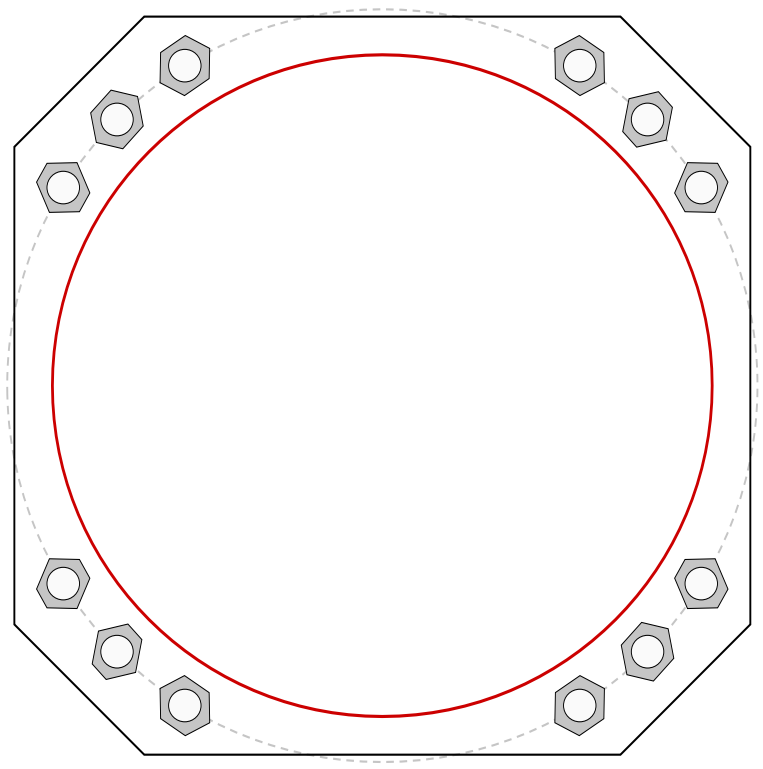
Monopole Base Plate Connection

Site Info	
BU #	876377
Site Name	N 2 / FREDSALLEPROPEF
Order #	538774 Rev#1

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	Yes
l_{ar} (in)	1.5

Applied Loads	
Moment (kip-ft)	2201.89
Axial Force (kips)	43.42
Shear Force (kips)	18.93

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(12) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 52" BC

Anchor Spacing: 6 in

Base Plate Data

51" W x 2.75" Plate (A572-55; Fy=55 ksi, Fu=70 ksi); Clip: 9 in

Stiffener Data

N/A

Pole Data

45.72" x 0.3125" 18-sided pole (A607-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

Pu_c = 172.86	ϕPn_c = 268.39	**Stress Rating**
Vu = 1.58	ϕVn = 120.77	**61.4%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	27.38	(Flexural)
Allowable Stress (ksi):	49.5	
Stress Rating:	**52.7%**	**Pass**

Drilled Pier Foundation

BU # :	876377
Site Name:	Horton 2 / Fredsall Prop
Order Number:	538774 Rev#1

TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	2202	
Axial Force (kips)	43	
Shear Force (kips)	19	

Material Properties		
Concrete Strength, f'c:	3	ksi
Rebar Strength, Fy:	60	ksi
Tie Yield Strength, Fyt:	40	ksi

Pier Design Data		
Depth	18.5	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 5' below grade		
Pier Diameter	10	ft
Rebar Quantity	16	
Rebar Size	11	
Clear Cover to Ties	27	in
Tie Size	5	
Tie Spacing	18	in

Pier Section 2		
From 5' below grade to 18.5' below grade		
Pier Diameter	6	ft
Rebar Quantity	16	
Rebar Size	11	
Clear Cover to Ties	3	in
Tie Size	5	
Tie Spacing	18	in

Rebar & Pier Options
Embedded Pole Inputs
Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	5.04	-
Soil Safety Factor	2.03	-
Max Moment (kip-ft)	2349.93	-
Rating*	*62.5%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	302.11	-
End Bearing (kips)	254.47	-
Weight of Concrete (kips)	130.49	-
Total Capacity (kips)	556.58	-
Axial (kips)	173.49	-
Rating*	*29.7%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	5.50	-
Critical Moment (kip-ft)	2347.91	-
Critical Moment Capacity	3458.31	-
Rating*	*64.7%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	14.01	-
Critical Shear (kip)	371.21	-
Critical Shear Capacity	437.01	-
Rating*	*80.9%*	-

Soil Interaction Rating*	**62.5%**
Structural Foundation Rating*	**80.9%**

*Rating per TIA-222-H Section 15.5

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

Go to Soil Calculations

Soil Profile

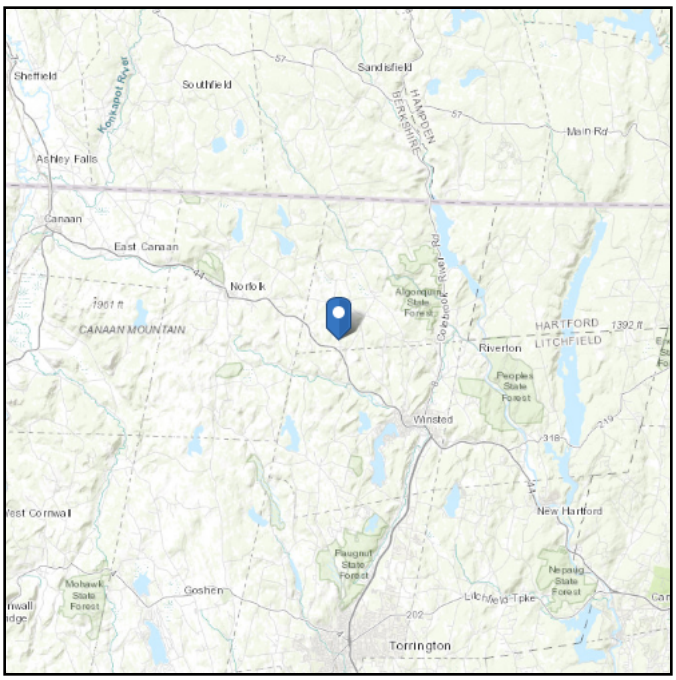
Groundwater Depth	11	# of Layers	4

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.33	3.33	100	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.33	11	7.67	140	150	0	38	0.991	0.991				33	Cohesionless
3	11	14	3	77.6	87.6	0	38	1.558	1.558				33	Cohesionless
4	14	18.5	4.5	97.6	87.6	0	40	1.777	1.777			12	50	Cohesionless

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-10	**Elevation:**	1223.1 ft (NAVD 88)
Risk Category:	II	**Latitude:**	41.966361
Soil Class:	D - Stiff Soil	**Longitude:**	-73.121694



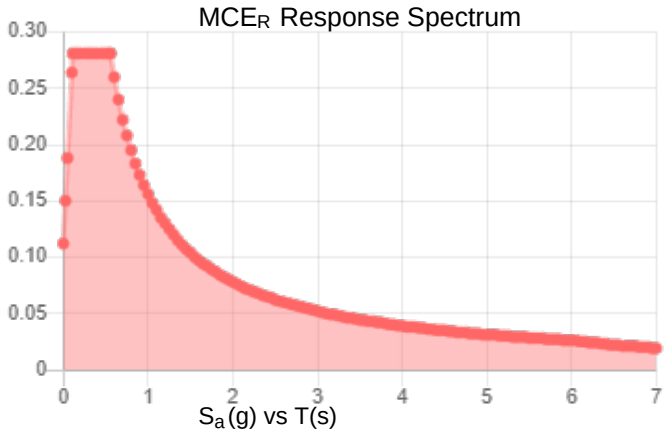
Seismic

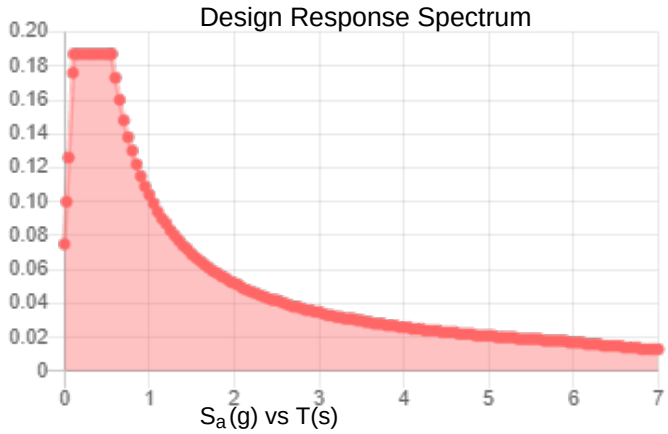
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.176	S_{DS} :	0.187
S_1 :	0.065	S_{D1} :	0.104
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.086
S_{MS} :	0.281	PGA_M :	0.138
S_{M1} :	0.156	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Sat Feb 13 2021

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

Ice

Results:

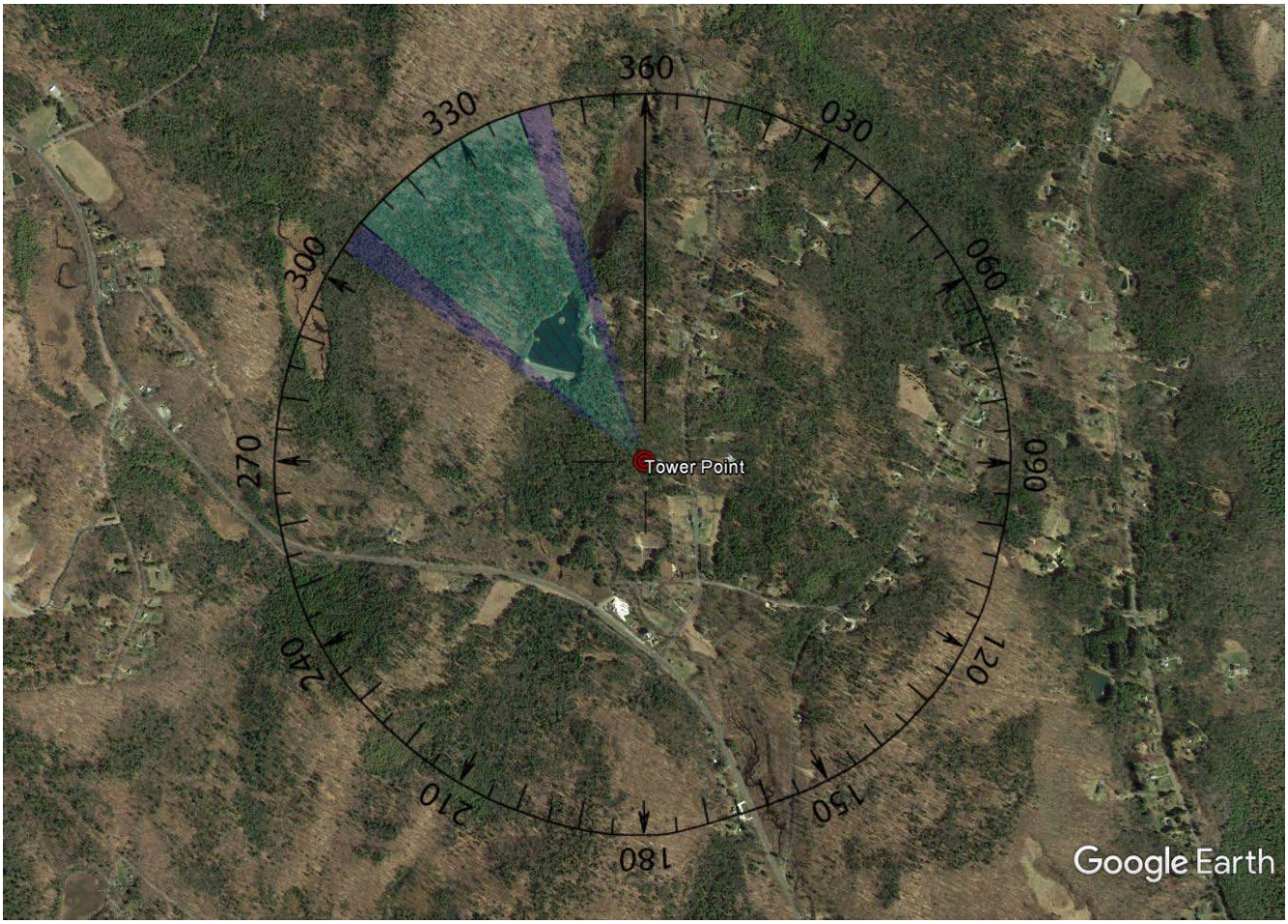
Ice Thickness:	0.75 in.
Concurrent Temperature:	5 F
Gust Speed:	40 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Sat Feb 13 2021

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.

Exposure Category Determination
BU#876377

- Latitude/Longitude = 41° 57' 58.9", -73° 7' 18.1"
- Tower Height = 148 ft
- Upwind Fetch Radius = Greater of 25 x Tower Height or 3250 ft = 3700 ft
- Minimum Open Patch = 164 ft x 164 ft
- Maximum continuous surface roughness category C arc angle = 0 degrees
- Kmz file saved in folder … R:\SA Models - Letters\Work Area\Exposure_Topo_KMZ



Exposure Category for this site is B.

The determination is based on Crown Castle standard ENG-PRC-10202, Determination of Exposure Category, revision C.

Completed by: Andy Dykstra

Date: 03/03/17

Approved by: Kayla Weimert

Date: 03/03/2017

Unmitigated Percentage (B/C)

Inputs

Tower Height (ft):	148'
Starting Azimuth:	310°
Upwind Fetch Radius (ft):	3700'
20% Unmitigated Limit (ft):	740'
Overlay Size Selected:	30°

Subsector (Degrees)	Total Unmitigated Length (ft)	Percentage of Subsector Unmitigated
295°		0.0%
300°		0.0%
305°	185'	5.0%
310°	430'	11.6%
315°	540'	14.6%
320°	665'	18.0%
325°	600'	16.2%
330°	425'	11.5%
335°	185'	5.0%
340°	250'	6.8%
345°		0.0%
350°		0.0%
355°		0.0%
360°		0.0%

THIS SITE IS EXPOSURE:	B

Length measurements should be taken to the nearest 5' increment.

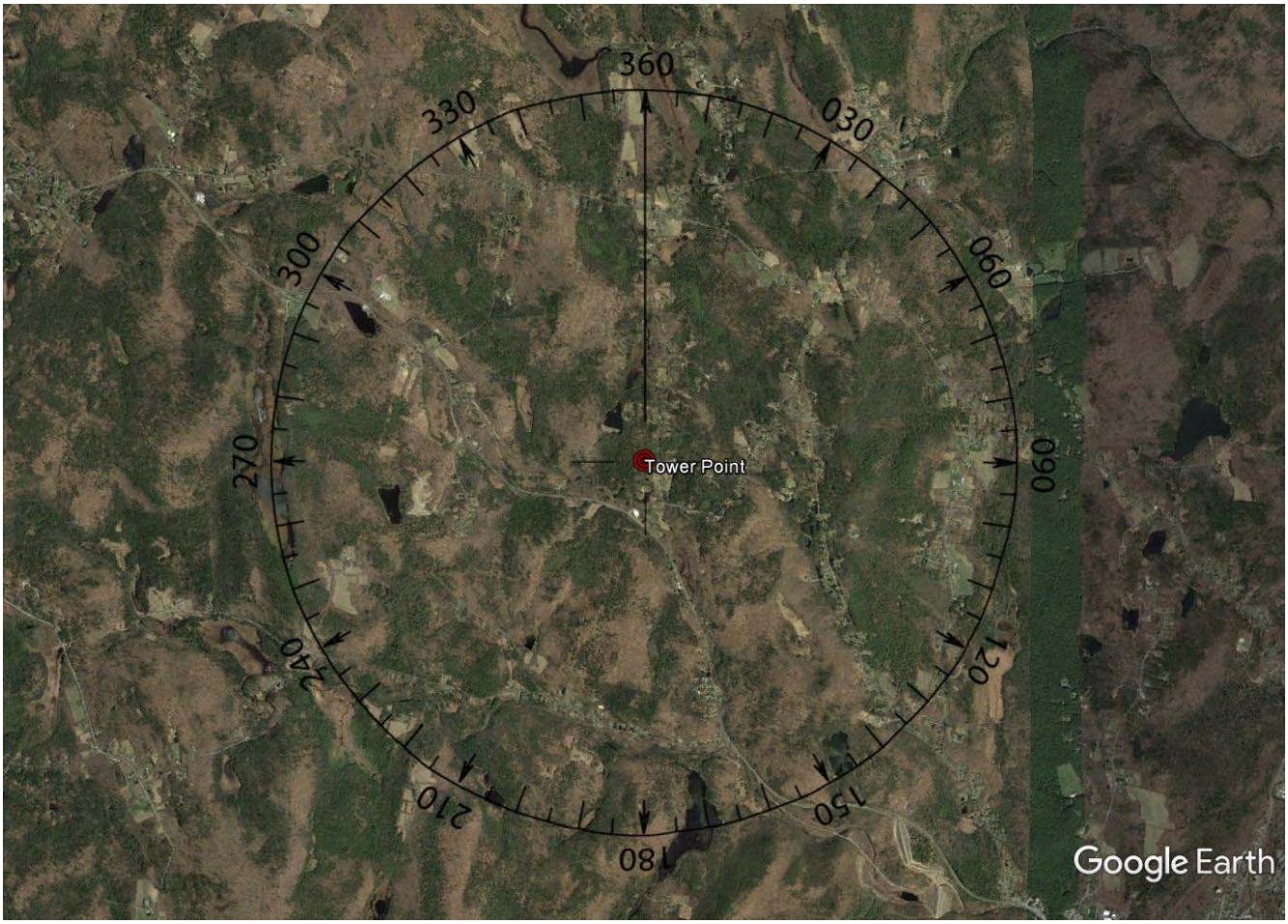
The determination is based on Crown Castle standard ENG-PRC-10202, Determination of Exposure Category, revision C.

This chart is intended only for use with Exposures B and C and is <u>Not</u> applicable for Exposure D.

LEGEND	
	Considered Subsector
	Bookending Subsector

Topographic Factor Determination
BU#876377

- Latitude/Longitude = 41° 57' 58.9", -73° 7' 18.1"
- Tower Height = 148 ft
- Topo Radius = 10,560 ft
- Maximum continuous effective topo arc angle = 0 degrees
- Critical wind azimuth used in topo tool = 0
- Kmz file saved in folder … R:\SA Models - Letters\Work Area\Exposure_Topo_KMZ



Exposure Category for this site is B.
No topo feature.
Topographic Factor (K_{ZT}) at base is 1.00.

The determination is based on Crown Castle standard ENG-PRC-10040, Determination of Topographic Factor, initial release.

Completed by: Andy Dykstra

Date: 03/03/17

Approved by: Kayla Weimert

Date: 03/03/2017

Exhibit E

Mount Analysis

Date: **February 4, 2021**

GPD Engineering and Architecture
Professional Corporation

Darcy Tarr
Crown Castle
6325 Ardrey Kell Road, Suite 600
Charlotte, NC 28277
(704) 405-6589

520 South Main Street, Suite 2531
Akron, Ohio 44311
(216) 927-8663
CrownMA@gpdgroup.com

Subject:	**Mount Analysis Report**	
Carrier Designation:	***Sprint PCS* Loading Modification**	
	Carrier Site Number:	CTNH573A
	Carrier Site Name:	CTNH573A
Crown Castle Designation:	**Crown Castle BU Number:**	876377
	Crown Castle Site Name:	HORTON 2 / FREDSALL PROPERTY
	Crown Castle JDE Job Number:	628855
	Crown Castle Order Number:	538774 Rev. 0
Engineering Firm Designation:	**GPD Report Designation:**	2021777.876377.01
Site Data:	**161 Pinney Street, Colebrook, Litchfield County, CT 06021** **Latitude 41° 57' 58.90" Longitude -73° 7' 18.10"**	
Structure Information:	**Tower Height & Type:**	**148.0 ft Monopole Tower**
	Mount Elevation:	**150.0 ft**
	Mount Type:	**14.0 ft Platform Mount**

Dear Darcy Tarr,

GPD is pleased to submit this **"Mount Analysis Report"** to determine the structural integrity of Sprint PCS's antenna mounting system with the proposed appurtenance and equipment addition on the above mentioned 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 for fall protection or rigging is not part of this document.

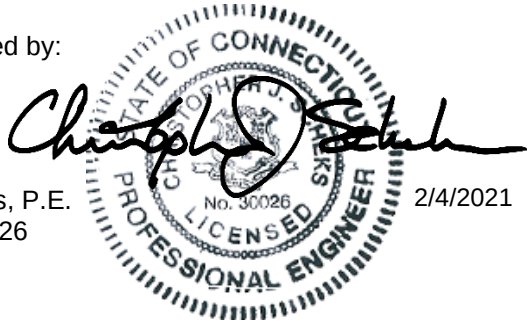
The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

Platform Mount **Sufficient Capacity – 53.6%**

This analysis utilizes an ultimate 3-second gust wind speed of 115 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Matt Steward

Respectfully Submitted by:



Christopher J. Scheks, P.E. 2/4/2021
Connecticut #: 0030026

TABLE OF CONTENTS

1) INTRODUCTION

This is a 14.0' Platform Mount. Mount geometry was obtained from site photos and experience with similar mounts.

2) ANALYSIS CRITERIA

TIA-222 Revision: H
Risk Category: II
Ultimate Wind Speed: 115 mph
Exposure Category: B
Topographic Factor at Base: 1
Topographic Factor at Mount: 1
Ice Thickness: 1.5
Wind Speed with Ice: 40 mph
Live Loading Wind Speed: 30 mph
Man Live Load at Mid/End-Points: 250 lb
Man Live Load at Mount Pipes: 500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount Details
150.0	148.0	3	Ericsson	AIR6449 B41_T-MOBILE	14.0 ft. Platform Mount
		3	RFS/Celwave	APX16DWV-16DWV-S-E-A20	
		3	RFS/Celwave	APXVAALL24_43-U-NA20_TMO	
		3	Ericsson	RADIO 4415 B66A	
		3	Ericsson	RADIO 4424 B25_TMO	
		3	Ericsson	RADIO 4449 B71 B85A_T-MOBILE	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
CCI Application	Crown Order Number 538774 Rev. 0	-	CCI
RF Data Sheet	Sprint Retain RFDS File: CTNH573A_Sprint_Retain_1_draft, dated 1/15/2021	-	CCI
Mount Analysis	HDG #: 112179.004.01, dated 7/17/2018	-	CCI

3.1) Analysis Method

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

A tool internally developed by GPD, using Microsoft Excel, 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 antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) This analysis assumes all information reference in Table 2 is current and correct.
5) The mount was modeled from site photos. Member information and dimensions not provided have been assumed based on previous experience with similar mounts. No guarantee can be made as to the accuracy of these assumptions without a complete mount mapping.
6) Steel grades have been assumed as follows, unless noted otherwise:

Bent Channel, Angle	ASTM A36 (GR 36)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

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

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform Mount)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,3	Inside Horizontal	M2	150.0	53.6	Pass
	Corner Angle	M5		36.0	Pass
	Support Rail	M32A		10.2	Pass
	Support Rail End Connection	M36A		11.3	Pass
	Pipe Mount	M49B		39.4	Pass
	Kicker	M36A		11.3	Pass
	Platform Channel	M13		43.9	Pass
2,3	Mount to Tower Connection	-		34.9	Pass
	Kicker to Tower Connection	-		4.1	Pass

Structure Rating (max from all components) =	**53.6%[3]**

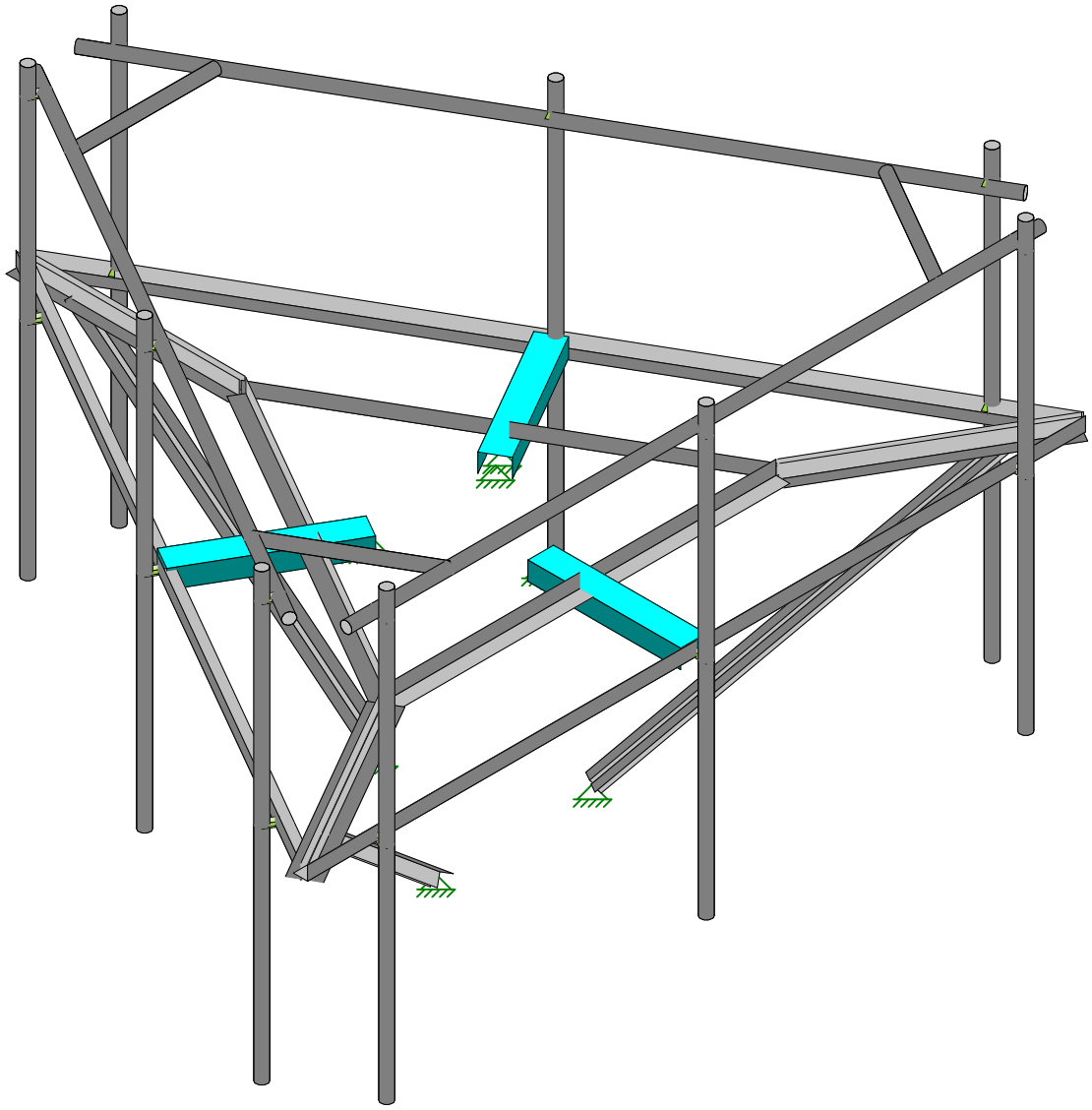
Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in "Appendix D - Additional Calculations" for calculations supporting the % capacity consumed.
3) Ratings per TIA-222-H section 15.5.

4.1) Recommendations

The mount has sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

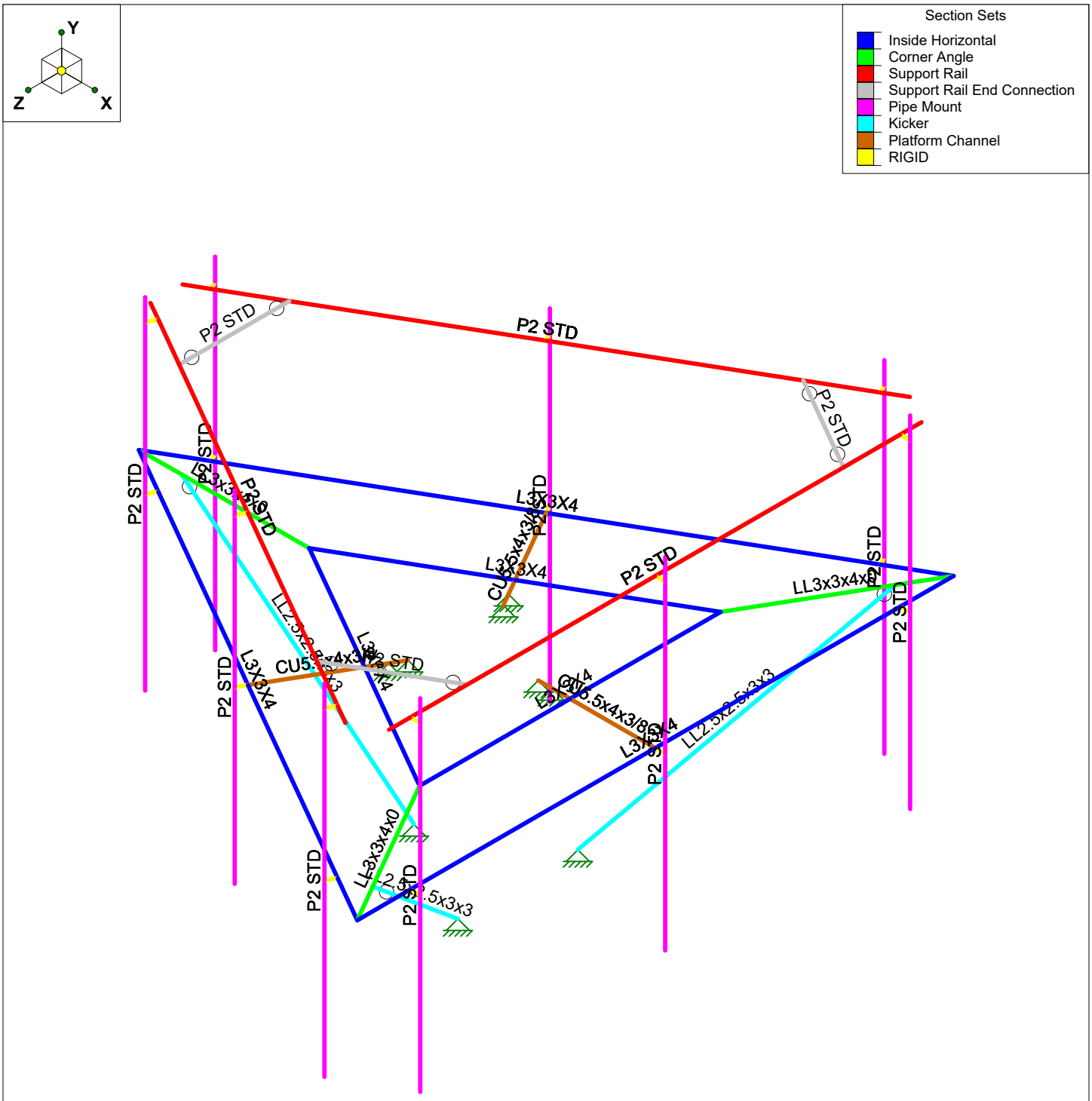
APPENDIX A

WIRE FRAME AND RENDERED MODELS



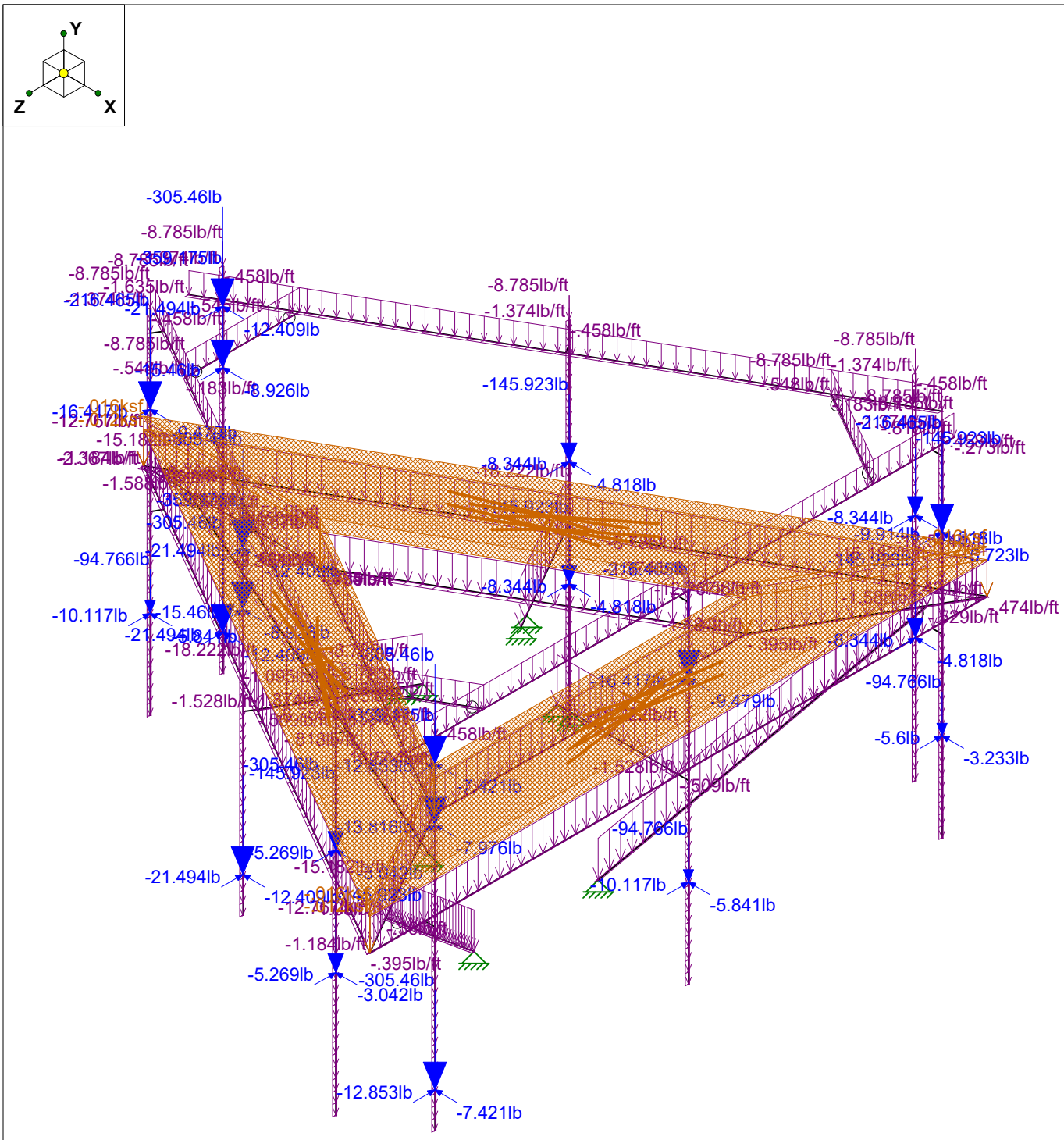
Envelope Only Solution

GPD	876377 - HORTON 2 / FREDSALL PROPERTY	SK - 1
Steward, Matthew		Feb 4, 2021 at 8:25 PM
2021777.876377.01		876377.Loaded.r3d



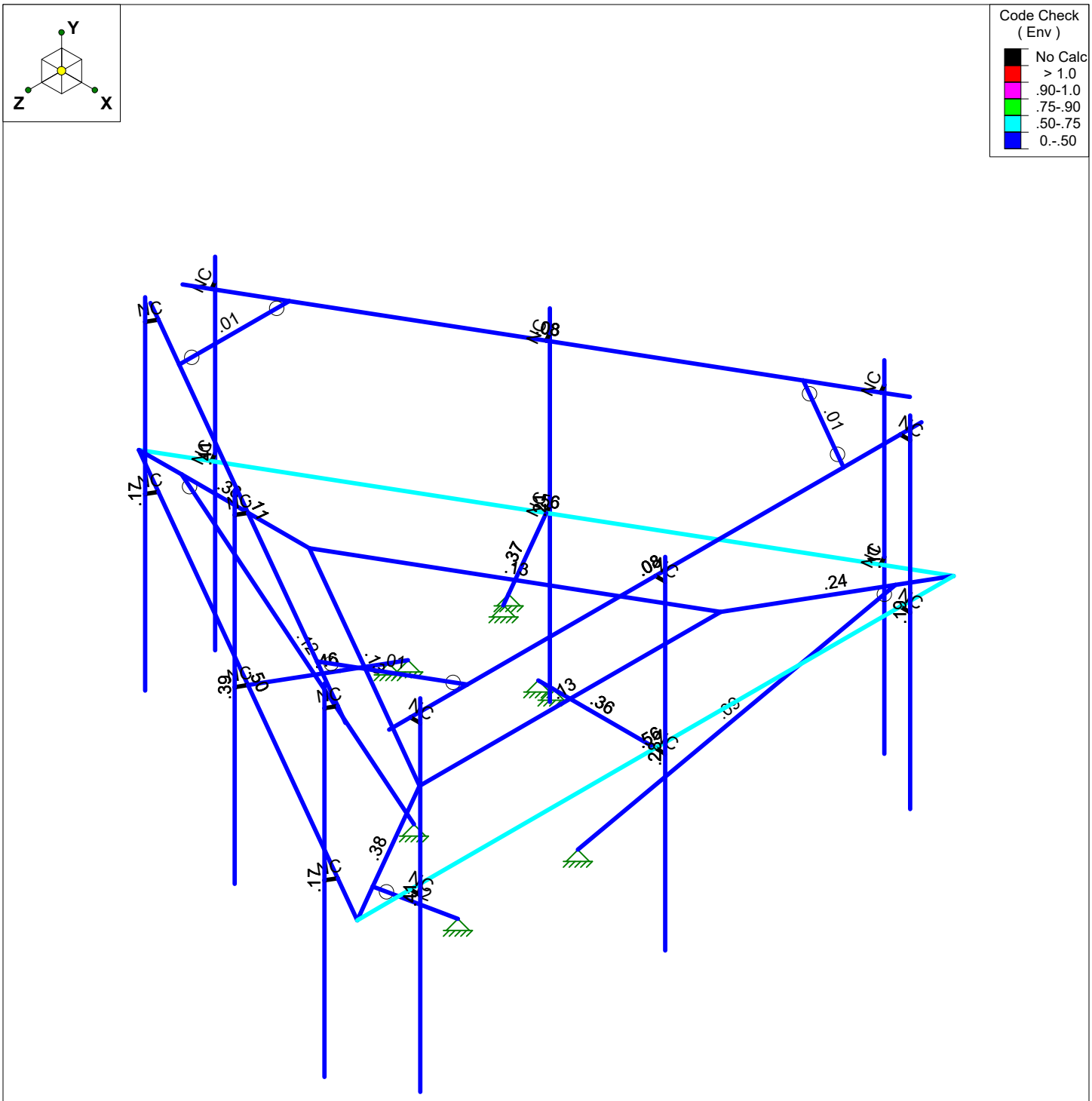
Envelope Only Solution

GPD	876377 - HORTON 2 / FREDSALL PROPERTY	SK - 2
Steward, Matthew		Feb 4, 2021 at 8:28 PM
2021777.876377.01		876377.Loaded.r3d



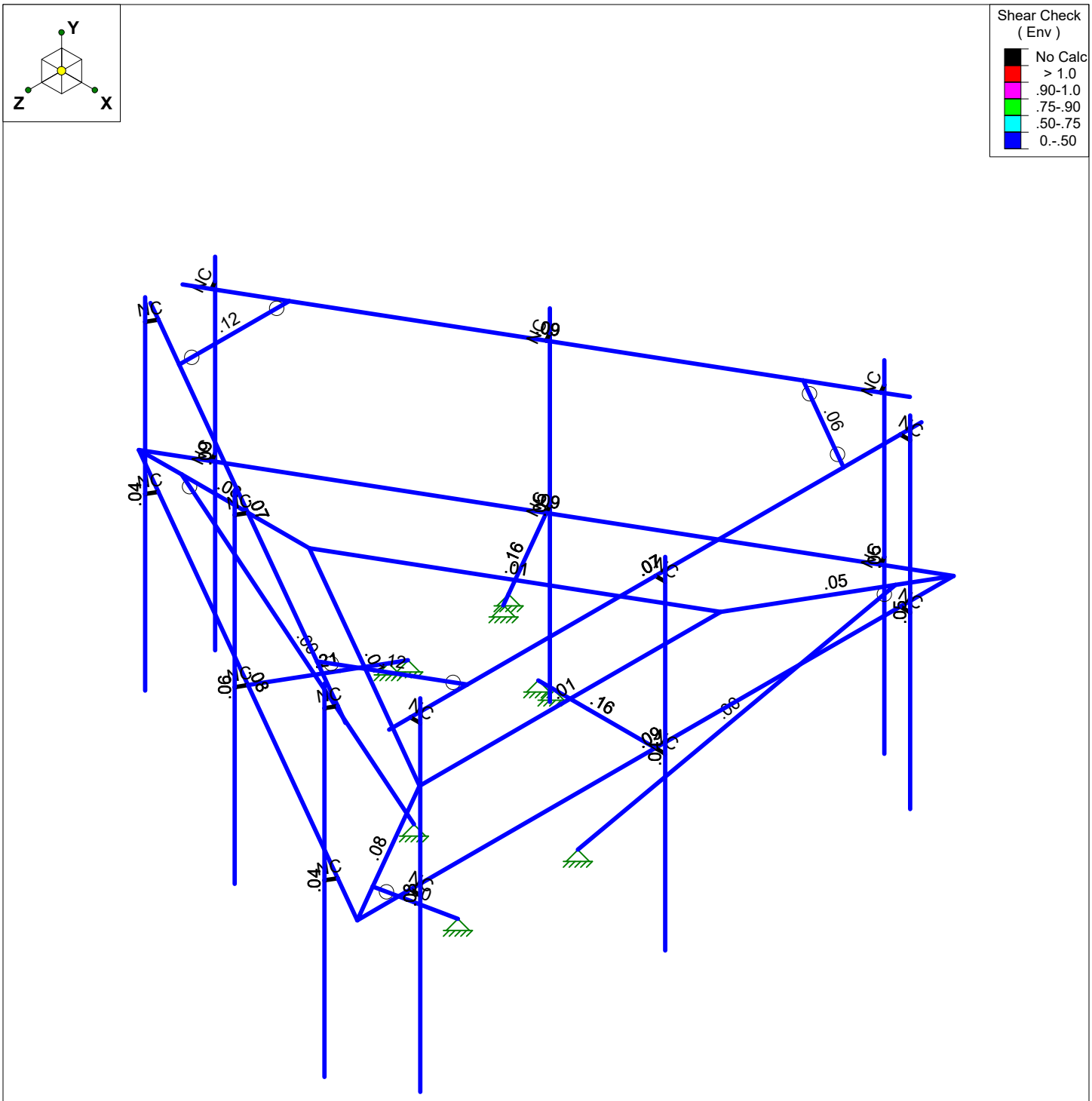
Loads: LC 34, 1.2 Dead + 1.0 Ice Wind @ 240°+ 1.0 Ice + 1.0 Temp
Envelope Only Solution

GPD	876377 - HORTON 2 / FREDSALL PROPERTY	SK - 3
Steward, Matthew		Feb 4, 2021 at 8:29 PM
2021777.876377.01		876377.Loaded.r3d



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

GPD	876377 - HORTON 2 / FREDSALL PROPERTY	SK - 4
Steward, Matthew		Feb 4, 2021 at 8:31 PM
2021777.876377.01		876377.Loaded.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

GPD	876377 - HORTON 2 / FREDSALL PROPERTY	SK - 5
Steward, Matthew		Feb 4, 2021 at 8:31 PM
2021777.876377.01		876377.Loaded.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

TIA-222-H: Mount Analysis Wind Loading
876377 - HORTON 2 / FREDSALL PROPERTY
2021777.876377.01

Structure Information		
Structure Type:	Monopole	
Structure Height:	148	ft
z (Mount Centerline) =	150	ft
Gh (Mount Gust Effect Factor) =	1.00	
Risk Category:	II	

Code Specifications		
TIA/EIA Code:	H	
Ultimate Wind Speed (No Ice) =	115	mph (3-s gust)
Ultimate Wind Speed (With Ice) =	40	mph (3-s gust)
Ice Thickness	1.5	in
Exposure Category	B	
Tower Base Elevation (AMSL)	1223	ft

Topographic Inputs	
Topographic Feature:	N/A

Section Sets										No Ice	Ice Output	
Mount Components	Member Type	Length (in)	Side (Longest seeing wind) (in)	Other Side (in)	Calculated Dc, for ice weight (in)	Dc, for ice weight (in)	Area Type (Round or Flat)	K_a	User's Wind Multiplier	Normal Wind Force (lb/ft)*	Normal Ice Wind Force (lb/ft)*	Ice Weight (lb/ft)*
Inside Horizontal	Angle	168.000	3	3		4.24	Flat	0.90	1.00	17.07	3.51	12.77
Corner Angle	Other	48.000	3	6	6	6.00	Flat	0.90	1.00	14.51	2.43	16.51
Support Rail	Pipe	150.000	2.375	2.375		2.38	Round	0.90	1.00	8.11	2.42	8.79
Support Rail End Connection	Pipe	42.000	2.375	2.375		2.38	Round	0.90	1.00	7.01	1.62	8.79
Pipe Mount	Pipe	96.000	2.375	2.375		2.38	Round	0.90	1.00	8.11	2.04	8.79
Kicker	Other	84.000	2.5	5.375	5.375	5.38	Flat	0.90	1.00	14.23	2.55	15.18
Platform Channel	Square/Rect.	29.000	4	5.5		6.80	Flat	0.90	1.00	16.03	2.61	18.22

*All forces are unfactored.

Appurtenances							Shielding			No Ice		Ice Output	
Appurtenance Model	Loading Elevation (ft)	Height (in)	Front Width (in)	Side Depth (in)	Wt (lbs)	Type for Area	Front Shielding (%)	Side Shielding (%)	K_a and/or block shielding	Normal Wind Force (lbs)*	Wt (lbs) (no ice)*	Normal Wind Force (lbs) (w/ ice)*	Wt (lbs) (only ice)*
(3) AIR6449 B41_T-MOBILE	148	33.11	20.51	8.54	114.63	Flat	0%	0%	0.90	173.23	114.63	24.54	154.29
(3) APX16DWV-16DWV-S-E-A20	148	55.9	13.3	3.15	40.7	CFD	0%	0%	0.90	191.63	40.70	31.10	140.69
(3) APXVAALL24_43-U-NA20_TMO	148	95.9	24	8.5	149.9	CFD	0%	0%	0.90	449.07	149.90	64.45	431.04
(3) RADIO 4415 B66A	148	16.5	13.5	6.3	49.6	Flat	0%	0%	0.90	56.82	49.60	8.98	62.18
(3) RADIO 4424 B25_TMO	148	17.1	14.4	11.3	86	Flat	0%	0%	0.90	62.81	86.00	9.79	86.25
(3) RADIO 4449 B71 B85A_T-MOBILE	148	17.91	13.2	10.63	73.21	Flat	0%	0%	0.90	60.31	73.21	9.47	81.87

*All forces are unfactored.

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Inside Horizontal	L3X3X4	Beam	Single An...	A36 Gr.36	Typical	1.44	1.23	1.23	.031
2	Corner Angle	LL3x3x4x0	Beam	Double A...	A36 Gr.36	Typical	2.88	4.5	2.46	.063
3	Support Rail	P2 STD	Beam	Pipe	A53 Gr.B	Typical	1.075	.666	.666	1.331
4	Support Rail End Conne...	P2 STD	Beam	Pipe	A53 Gr.B	Typical	1.075	.666	.666	1.331
5	Pipe Mount	P2 STD	Beam	Pipe	A53 Gr.B	Typical	1.075	.666	.666	1.331
6	Kicker	LL2.5x2.5x3x3	Beam	Pipe	A53 Gr.B	Typical	1.8	2.46	1.07	.023

Cold Formed Steel Section Sets

	Label	Shape	Type	Design ...	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Platform Channel	CU5.5x4x3/8	Beam	None	A36	Typical	4.56	7.284	21.409	.214

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	A2	N69	N70			Pipe Mount	Beam	Pipe	A53 Gr.B	Typical
2	B2	N78	N79B			Pipe Mount	Beam	Pipe	A53 Gr.B	Typical
3	C2	N89B	N90A			Pipe Mount	Beam	Pipe	A53 Gr.B	Typical
4	M1	N2	N1		270	Inside Horizont...	Beam	Single Angle	A36 Gr.36	Typical
5	M2	N2	N11			Inside Horizont...	Beam	Single Angle	A36 Gr.36	Typical
6	M3	N10	N1		180	Corner Angle	Beam	Double Angle (...	A36 Gr.36	Typical
7	M4	N1	N11		270	Inside Horizont...	Beam	Single Angle	A36 Gr.36	Typical
8	M5	N9	N2		180	Corner Angle	Beam	Double Angle (...	A36 Gr.36	Typical
9	M13	N79	N94F		90	Platform Chan...	Beam	None	A36	Typical
10	M14	N9	N10			Inside Horizont...	Beam	Single Angle	A36 Gr.36	Typical
11	M15	N87	N93F		90	Platform Chan...	Beam	None	A36	Typical
12	M16	N9	N12		270	Inside Horizont...	Beam	Single Angle	A36 Gr.36	Typical
13	M17	N86	N92F		90	Platform Chan...	Beam	None	A36	Typical
14	M18	N12	N10		270	Inside Horizont...	Beam	Single Angle	A36 Gr.36	Typical
15	M19	N11	N12		180	Corner Angle	Beam	Double Angle (...	A36 Gr.36	Typical
16	M31	N50	N51			Support Rail	Beam	Pipe	A53 Gr.B	Typical
17	M32A	N52	N53			Support Rail	Beam	Pipe	A53 Gr.B	Typical
18	M33A	N54	N55			Support Rail	Beam	Pipe	A53 Gr.B	Typical
19	M34	N88D	N83A			Support Rail E...	Beam	Pipe	A53 Gr.B	Typical
20	M35A	N84	N86C			Support Rail E...	Beam	Pipe	A53 Gr.B	Typical
21	M36A	N87A	N85B			Support Rail E...	Beam	Pipe	A53 Gr.B	Typical
22	M37B	N66A	N86			RIGID	None	None	RIGID	Typical
23	M38A	N68A	N65			RIGID	None	None	RIGID	Typical
24	M43A	N75B	N79			RIGID	None	None	RIGID	Typical
25	M44A	N77	N74B			RIGID	None	None	RIGID	Typical
26	M52A	N86B	N87			RIGID	None	None	RIGID	Typical
27	M53A	N88A	N84B			RIGID	None	None	RIGID	Typical
28	M70	N130	N128			Kicker	Beam	Pipe	A53 Gr.B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
29	M71	N131	N126			Kicker	Beam	Pipe	A53 Gr.B	Typical
30	M72	N129	N127			Kicker	Beam	Pipe	A53 Gr.B	Typical
31	M49A	N93	N94			Pipe Mount	Beam	Pipe	A53 Gr.B	Typical
32	M50	N90B	N91A			RIGID	None	None	RIGID	Typical
33	M51	N92	N83B			RIGID	None	None	RIGID	Typical
34	M49B	N93A	N94A			Pipe Mount	Beam	Pipe	A53 Gr.B	Typical
35	M50B	N90C	N91B			RIGID	None	None	RIGID	Typical
36	M51A	N92A	N86D			RIGID	None	None	RIGID	Typical
37	M49C	N93B	N94B			Pipe Mount	Beam	Pipe	A53 Gr.B	Typical
38	M50C	N91C	N90D			RIGID	None	None	RIGID	Typical
39	M51B	N92B	N85C			RIGID	None	None	RIGID	Typical
40	M49	N93C	N94C			Pipe Mount	Beam	Pipe	A53 Gr.B	Typical
41	M50A	N90	N91			RIGID	None	None	RIGID	Typical
42	M51C	N92C	N88E			RIGID	None	None	RIGID	Typical
43	M49D	N93D	N94D			Pipe Mount	Beam	Pipe	A53 Gr.B	Typical
44	M50D	N91D	N90E			RIGID	None	None	RIGID	Typical
45	M51D	N92D	N84C			RIGID	None	None	RIGID	Typical
46	M49E	N93E	N94E			Pipe Mount	Beam	Pipe	A53 Gr.B	Typical
47	M50E	N90F	N91E			RIGID	None	None	RIGID	Typical
48	M51E	N92E	N87B			RIGID	None	None	RIGID	Typical

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N121	Reaction	Reaction	Reaction			
2	N122	Reaction	Reaction	Reaction			
3	N123	Reaction	Reaction	Reaction			
4	N128	Reaction	Reaction	Reaction			
5	N126	Reaction	Reaction	Reaction			
6	N127	Reaction	Reaction	Reaction			
7	N92F	Reaction	Reaction	Reaction			
8	N93F	Reaction	Reaction	Reaction			
9	N94F	Reaction	Reaction	Reaction			

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4 Dead	Yes	Y		1	1.4	0		0		0		0		0		0		0					
2	1.2 Dead + 1.0 Wind @ 0° - ..	Yes	Y		1	1.2	2	1	0		0		0		0		0		0					
3	0.9 Dead + 1.0 Wind @ 0° - ..	Yes	Y		1	.9	2	1	0		0		0		0		0		0					
4	1.2 Dead + 1.0 Wind @ 30° ..	Yes	Y		1	1.2	3	1	0		0		0		0		0		0					
5	0.9 Dead + 1.0 Wind @ 30° ..	Yes	Y		1	.9	3	1	0		0		0		0		0		0					
6	1.2 Dead + 1.0 Wind @ 60° ..	Yes	Y		1	1.2	4	1	0		0		0		0		0		0					
7	0.9 Dead + 1.0 Wind @ 60° ..	Yes	Y		1	.9	4	1	0		0		0		0		0		0					
8	1.2 Dead + 1.0 Wind @ 90° ..	Yes	Y		1	1.2	5	1	0		0		0		0		0		0					
9	0.9 Dead + 1.0 Wind @ 90° ..	Yes	Y		1	.9	5	1	0		0		0		0		0		0					
10	1.2 Dead + 1.0 Wind @ 120..	Yes	Y		1	1.2	6	1	0		0		0		0		0		0					
11	0.9 Dead + 1.0 Wind @ 120..	Yes	Y		1	.9	6	1	0		0		0		0		0		0					
12	1.2 Dead + 1.0 Wind @ 150..	Yes	Y		1	1.2	7	1	0		0		0		0		0		0					
13	0.9 Dead + 1.0 Wind @ 150..	Yes	Y		1	.9	7	1	0		0		0		0		0		0					
14	1.2 Dead + 1.0 Wind @ 180..	Yes	Y		1	1.2	8	1	0		0		0		0		0		0					
15	0.9 Dead + 1.0 Wind @ 180..	Yes	Y		1	.9	8	1	0		0		0		0		0		0					
16	1.2 Dead + 1.0 Wind @ 210..	Yes	Y		1	1.2	9	1	0		0		0		0		0		0					
17	0.9 Dead + 1.0 Wind @ 210..	Yes	Y		1	.9	9	1	0		0		0		0		0		0					
18	1.2 Dead + 1.0 Wind @ 240..	Yes	Y		1	1.2	10	1	0		0		0		0		0		0					
19	0.9 Dead + 1.0 Wind @ 240..	Yes	Y		1	.9	10	1	0		0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
20	1.2 Dead + 1.0 Wind @ 270...	Yes	Y		1	1.2	11	1	0		0		0		0		0		0					
21	0.9 Dead + 1.0 Wind @ 270...	Yes	Y		1	.9	11	1	0		0		0		0		0		0					
22	1.2 Dead + 1.0 Wind @ 300...	Yes	Y		1	1.2	12	1	0		0		0		0		0		0					
23	0.9 Dead + 1.0 Wind @ 300...	Yes	Y		1	.9	12	1	0		0		0		0		0		0					
24	1.2 Dead + 1.0 Wind @ 330...	Yes	Y		1	1.2	13	1	0		0		0		0		0		0					
25	0.9 Dead + 1.0 Wind @ 330...	Yes	Y		1	.9	13	1	0		0		0		0		0		0					
26	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	15	1	14	1		1	0		0		0		0					
27	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	16	1	14	1		1	0		0		0		0					
28	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	17	1	14	1		1	0		0		0		0					
29	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	18	1	14	1		1	0		0		0		0					
30	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	19	1	14	1		1	0		0		0		0					
31	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	20	1	14	1		1	0		0		0		0					
32	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	21	1	14	1		1	0		0		0		0					
33	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	22	1	14	1		1	0		0		0		0					
34	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	23	1	14	1		1	0		0		0		0					
35	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	24	1	14	1		1	0		0		0		0					
36	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	25	1	14	1		1	0		0		0		0					
37	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	26	1	14	1		1	0		0		0		0					
38	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	27	1.5	2	.068	0		0		0		0		0					
39	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	27	1.5	3	.068	0		0		0		0		0					
40	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	27	1.5	4	.068	0		0		0		0		0					
41	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	27	1.5	5	.068	0		0		0		0		0					
42	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	27	1.5	6	.068	0		0		0		0		0					
43	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	27	1.5	7	.068	0		0		0		0		0					
44	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	27	1.5	8	.068	0		0		0		0		0					
45	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	27	1.5	9	.068	0		0		0		0		0					
46	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	27	1.5	10	.068	0		0		0		0		0					
47	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	27	1.5	11	.068	0		0		0		0		0					
48	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	27	1.5	12	.068	0		0		0		0		0					
49	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	27	1.5	13	.068	0		0		0		0		0					
50	1.2 Dead + 1.5 Live_M - B2 ...	Yes	Y		1	1.2	28	1.5	2	.068	0		0		0		0		0					
51	1.2 Dead + 1.5 Live_M - B2 ...	Yes	Y		1	1.2	28	1.5	3	.068	0		0		0		0		0					
52	1.2 Dead + 1.5 Live_M - B2 ...	Yes	Y		1	1.2	28	1.5	4	.068	0		0		0		0		0					
53	1.2 Dead + 1.5 Live_M - B2 ...	Yes	Y		1	1.2	28	1.5	5	.068	0		0		0		0		0					
54	1.2 Dead + 1.5 Live_M - B2 ...	Yes	Y		1	1.2	28	1.5	6	.068	0		0		0		0		0					
55	1.2 Dead + 1.5 Live_M - B2 ...	Yes	Y		1	1.2	28	1.5	7	.068	0		0		0		0		0					
56	1.2 Dead + 1.5 Live_M - B2 ...	Yes	Y		1	1.2	28	1.5	8	.068	0		0		0		0		0					
57	1.2 Dead + 1.5 Live_M - B2 ...	Yes	Y		1	1.2	28	1.5	9	.068	0		0		0		0		0					
58	1.2 Dead + 1.5 Live_M - B2 ...	Yes	Y		1	1.2	28	1.5	10	.068	0		0		0		0		0					
59	1.2 Dead + 1.5 Live_M - B2 ...	Yes	Y		1	1.2	28	1.5	11	.068	0		0		0		0		0					
60	1.2 Dead + 1.5 Live_M - B2 ...	Yes	Y		1	1.2	28	1.5	12	.068	0		0		0		0		0					
61	1.2 Dead + 1.5 Live_M - B2 ...	Yes	Y		1	1.2	28	1.5	13	.068	0		0		0		0		0					
62	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	29	1.5	2	.068	0		0		0		0		0					
63	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	29	1.5	3	.068	0		0		0		0		0					
64	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	29	1.5	4	.068	0		0		0		0		0					
65	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	29	1.5	5	.068	0		0		0		0		0					
66	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	29	1.5	6	.068	0		0		0		0		0					
67	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	29	1.5	7	.068	0		0		0		0		0					
68	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	29	1.5	8	.068	0		0		0		0		0					
69	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	29	1.5	9	.068	0		0		0		0		0					
70	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	29	1.5	10	.068	0		0		0		0		0					
71	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	29	1.5	11	.068	0		0		0		0		0					
72	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	29	1.5	12	.068	0		0		0		0		0					
73	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	29	1.5	13	.068	0		0		0		0		0					
74	1.2 Dead + 1.5 Live_M - M4...	Yes	Y		1	1.2	30	1.5	2	.068	0		0		0		0		0					
75	1.2 Dead + 1.5 Live_M - M4...	Yes	Y		1	1.2	30	1.5	3	.068	0		0		0		0		0					
76	1.2 Dead + 1.5 Live_M - M4...	Yes	Y		1	1.2	30	1.5	4	.068	0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
77	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	30	1.5	5	.068	0		0		0		0		0					
78	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	30	1.5	6	.068	0		0		0		0		0					
79	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	30	1.5	7	.068	0		0		0		0		0					
80	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	30	1.5	8	.068	0		0		0		0		0					
81	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	30	1.5	9	.068	0		0		0		0		0					
82	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	30	1.5	10	.068	0		0		0		0		0					
83	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	30	1.5	11	.068	0		0		0		0		0					
84	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	30	1.5	12	.068	0		0		0		0		0					
85	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	30	1.5	13	.068	0		0		0		0		0					
86	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	31	1.5	2	.068	0		0		0		0		0					
87	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	31	1.5	3	.068	0		0		0		0		0					
88	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	31	1.5	4	.068	0		0		0		0		0					
89	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	31	1.5	5	.068	0		0		0		0		0					
90	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	31	1.5	6	.068	0		0		0		0		0					
91	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	31	1.5	7	.068	0		0		0		0		0					
92	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	31	1.5	8	.068	0		0		0		0		0					
93	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	31	1.5	9	.068	0		0		0		0		0					
94	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	31	1.5	10	.068	0		0		0		0		0					
95	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	31	1.5	11	.068	0		0		0		0		0					
96	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	31	1.5	12	.068	0		0		0		0		0					
97	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	31	1.5	13	.068	0		0		0		0		0					
98	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	32	1.5	2	.068	0		0		0		0		0					
99	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	32	1.5	3	.068	0		0		0		0		0					
100	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	32	1.5	4	.068	0		0		0		0		0					
101	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	32	1.5	5	.068	0		0		0		0		0					
102	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	32	1.5	6	.068	0		0		0		0		0					
103	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	32	1.5	7	.068	0		0		0		0		0					
104	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	32	1.5	8	.068	0		0		0		0		0					
105	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	32	1.5	9	.068	0		0		0		0		0					
106	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	32	1.5	10	.068	0		0		0		0		0					
107	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	32	1.5	11	.068	0		0		0		0		0					
108	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	32	1.5	12	.068	0		0		0		0		0					
109	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	32	1.5	13	.068	0		0		0		0		0					
110	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	33	1.5	2	.068	0		0		0		0		0					
111	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	33	1.5	3	.068	0		0		0		0		0					
112	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	33	1.5	4	.068	0		0		0		0		0					
113	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	33	1.5	5	.068	0		0		0		0		0					
114	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	33	1.5	6	.068	0		0		0		0		0					
115	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	33	1.5	7	.068	0		0		0		0		0					
116	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	33	1.5	8	.068	0		0		0		0		0					
117	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	33	1.5	9	.068	0		0		0		0		0					
118	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	33	1.5	10	.068	0		0		0		0		0					
119	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	33	1.5	11	.068	0		0		0		0		0					
120	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	33	1.5	12	.068	0		0		0		0		0					
121	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	33	1.5	13	.068	0		0		0		0		0					
122	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	34	1.5	2	.068	0		0		0		0		0					
123	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	34	1.5	3	.068	0		0		0		0		0					
124	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	34	1.5	4	.068	0		0		0		0		0					
125	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	34	1.5	5	.068	0		0		0		0		0					
126	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	34	1.5	6	.068	0		0		0		0		0					
127	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	34	1.5	7	.068	0		0		0		0		0					
128	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	34	1.5	8	.068	0		0		0		0		0					
129	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	34	1.5	9	.068	0		0		0		0		0					
130	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	34	1.5	10	.068	0		0		0		0		0					
131	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	34	1.5	11	.068	0		0		0		0		0					
132	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	34	1.5	12	.068	0		0		0		0		0					
133	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	34	1.5	13	.068	0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
134	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	35	1.5	2	.068	0		0		0		0		0					
135	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	35	1.5	3	.068	0		0		0		0		0					
136	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	35	1.5	4	.068	0		0		0		0		0					
137	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	35	1.5	5	.068	0		0		0		0		0					
138	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	35	1.5	6	.068	0		0		0		0		0					
139	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	35	1.5	7	.068	0		0		0		0		0					
140	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	35	1.5	8	.068	0		0		0		0		0					
141	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	35	1.5	9	.068	0		0		0		0		0					
142	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	35	1.5	10	.068	0		0		0		0		0					
143	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	35	1.5	11	.068	0		0		0		0		0					
144	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	35	1.5	12	.068	0		0		0		0		0					
145	1.2 Dead + 1.5 Live_M - M4..	Yes	Y		1	1.2	35	1.5	13	.068	0		0		0		0		0					
146	1.2 Dead + 1.5 Live_V - M1 ..	Yes	Y		1	1.2	36	1.5	0		0		0		0		0		0					
147	1.2 Dead + 1.5 Live_V - M1 ..	Yes	Y		1	1.2	37	1.5	0		0		0		0		0		0					
148	1.2 Dead + 1.5 Live_V - M1 ..	Yes	Y		1	1.2	38	1.5	0		0		0		0		0		0					
149	1.2 Dead + 1.5 Live_V - M2 ..	Yes	Y		1	1.2	39	1.5	0		0		0		0		0		0					
150	1.2 Dead + 1.5 Live_V - M2 ..	Yes	Y		1	1.2	40	1.5	0		0		0		0		0		0					
151	1.2 Dead + 1.5 Live_V - M2 ..	Yes	Y		1	1.2	41	1.5	0		0		0		0		0		0					
152	1.2 Dead + 1.5 Live_V - M3 ..	Yes	Y		1	1.2	42	1.5	0		0		0		0		0		0					
153	1.2 Dead + 1.5 Live_V - M3 ..	Yes	Y		1	1.2	43	1.5	0		0		0		0		0		0					
154	1.2 Dead + 1.5 Live_V - M3 ..	Yes	Y		1	1.2	44	1.5	0		0		0		0		0		0					
155	1.2 Dead + 1.5 Live_V - M4 ..	Yes	Y		1	1.2	45	1.5	0		0		0		0		0		0					
156	1.2 Dead + 1.5 Live_V - M4 ..	Yes	Y		1	1.2	46	1.5	0		0		0		0		0		0					
157	1.2 Dead + 1.5 Live_V - M4 ..	Yes	Y		1	1.2	47	1.5	0		0		0		0		0		0					
158	1.2 Dead + 1.5 Live_V - M5 ..	Yes	Y		1	1.2	48	1.5	0		0		0		0		0		0					
159	1.2 Dead + 1.5 Live_V - M5 ..	Yes	Y		1	1.2	49	1.5	0		0		0		0		0		0					
160	1.2 Dead + 1.5 Live_V - M5 ..	Yes	Y		1	1.2	50	1.5	0		0		0		0		0		0					
161	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	51	1.5	0		0		0		0		0		0					
162	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	52	1.5	0		0		0		0		0		0					
163	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	53	1.5	0		0		0		0		0		0					
164	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	54	1.5	0		0		0		0		0		0					
165	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	55	1.5	0		0		0		0		0		0					
166	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	56	1.5	0		0		0		0		0		0					
167	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	57	1.5	0		0		0		0		0		0					
168	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	58	1.5	0		0		0		0		0		0					
169	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	59	1.5	0		0		0		0		0		0					
170	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	60	1.5	0		0		0		0		0		0					
171	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	61	1.5	0		0		0		0		0		0					
172	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	62	1.5	0		0		0		0		0		0					
173	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	63	1.5	0		0		0		0		0		0					
174	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	64	1.5	0		0		0		0		0		0					
175	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	65	1.5	0		0		0		0		0		0					
176	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	66	1.5	0		0		0		0		0		0					
177	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	67	1.5	0		0		0		0		0		0					
178	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	68	1.5	0		0		0		0		0		0					
179	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	69	1.5	0		0		0		0		0		0					
180	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	70	1.5	0		0		0		0		0		0					
181	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	71	1.5	0		0		0		0		0		0					

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	DL		-1			30		3	
2	No Ice Wind 0 deg	None					30	28		
3	No Ice Wind 30 deg	None					60	52		
4	No Ice Wind 60 deg	None					60	56		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
5	No Ice Wind 90 deg	None					30	26		
6	No Ice Wind 120 deg	None					60	56		
7	No Ice Wind 150 deg	None					60	52		
8	No Ice Wind 180 deg	None					30	28		
9	No Ice Wind 210 deg	None					60	52		
10	No Ice Wind 240 deg	None					60	56		
11	No Ice Wind 270 deg	None					30	26		
12	No Ice Wind 300 deg	None					60	56		
13	No Ice Wind 330 deg	None					60	52		
14	Ice Weight	None					30	30	3	
15	Ice Wind 0 deg	None					30	28		
16	Ice Wind 30 deg	None					60	52		
17	Ice Wind 60 deg	None					60	56		
18	Ice Wind 90 deg	None					30	26		
19	Ice Wind 120 deg	None					60	56		
20	Ice Wind 150 deg	None					60	52		
21	Ice Wind 180 deg	None					30	28		
22	Ice Wind 210 deg	None					60	52		
23	Ice Wind 240 deg	None					60	56		
24	Ice Wind 270 deg	None					30	26		
25	Ice Wind 300 deg	None					60	56		
26	Ice Wind 330 deg	None					60	52		
27	Live Load - A2	None					1			
28	Live Load - B2	None					1			
29	Live Load - C2	None					1			
30	Live Load - M49A	None					1			
31	Live Load - M49B	None					1			
32	Live Load - M49C	None					1			
33	Live Load - M49	None					1			
34	Live Load - M49D	None					1			
35	Live Load - M49E	None					1			
36	Live Load - M1 (Start)	None					1			
37	Live Load - M1 (Midd...	None					1			
38	Live Load - M1 (End)	None					1			
39	Live Load - M2 (Start)	None					1			
40	Live Load - M2 (Midd...	None					1			
41	Live Load - M2 (End)	None					1			
42	Live Load - M3 (Start)	None					1			
43	Live Load - M3 (Midd...	None					1			
44	Live Load - M3 (End)	None					1			
45	Live Load - M4 (Start)	None					1			
46	Live Load - M4 (Midd...	None					1			
47	Live Load - M4 (End)	None					1			
48	Live Load - M5 (Start)	None					1			
49	Live Load - M5 (Midd...	None					1			
50	Live Load - M5 (End)	None					1			
51	Live Load - M13 (Start)	None					1			
52	Live Load - M13 (Mid...	None					1			
53	Live Load - M13 (End)	None					1			
54	Live Load - M14 (Start)	None					1			
55	Live Load - M14 (Mid...	None					1			
56	Live Load - M14 (End)	None					1			
57	Live Load - M15 (Start)	None					1			
58	Live Load - M15 (Mid...	None					1			
59	Live Load - M15 (End)	None					1			
60	Live Load - M16 (Start)	None					1			
61	Live Load - M16 (Mid...	None					1			

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
62	Live Load - M16 (End)	None					1			
63	Live Load - M17 (Start)	None					1			
64	Live Load - M17 (Mid...	None					1			
65	Live Load - M17 (End)	None					1			
66	Live Load - M18 (Start)	None					1			
67	Live Load - M18 (Mid...	None					1			
68	Live Load - M18 (End)	None					1			
69	Live Load - M19 (Start)	None					1			
70	Live Load - M19 (Mid...	None					1			
71	Live Load - M19 (End)	None					1			
72	BLC 1 Transient Area...	None						30		
73	BLC 14 Transient Are...	None						30		

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N121	max	537.573	14	8735.859	38	3137.61	25	0	181	0	181	0	181
2		min	-536.067	3	1258.035	15	-3787.807	12	0	1	0	1	0	1
3	N122	max	4732.973	15	11480.386	29	2784.75	19	0	181	0	181	0	181
4		min	-4774.207	2	2390.508	23	-2839.89	6	0	1	0	1	0	1
5	N123	max	3586.781	8	9041.54	70	2221.047	21	0	181	0	181	0	181
6		min	-3080.921	21	1612.941	7	-2518.913	8	0	1	0	1	0	1
7	N128	max	963.888	36	1628.792	36	-340.52	11	0	181	0	181	0	181
8		min	191.463	11	315.607	11	-1667.822	36	0	1	0	1	0	1
9	N126	max	1404.225	28	2335.422	28	2430.223	28	0	181	0	181	0	181
10		min	354.752	19	578.068	19	623.592	19	0	1	0	1	0	1
11	N127	max	-701.369	3	2354.262	32	44.469	21	0	181	0	181	0	181
12		min	-2829.188	32	560.084	3	-44.503	9	0	1	0	1	0	1
13	N92F	max	.902	17	-920.827	15	2457.846	12	0	181	0	181	0	181
14		min	-.902	4	-7608.582	38	-2142.915	25	0	1	0	1	0	1
15	N93F	max	2196.206	21	-1244.666	7	1408.572	8	0	181	0	181	0	181
16		min	-2441.801	8	-7879.506	70	-1266.778	21	0	1	0	1	0	1
17	N94F	max	2762.191	2	-1939.159	23	1595.954	2	0	181	0	181	0	181
18		min	-2734.885	15	-9862.982	29	-1580.189	15	0	1	0	1	0	1
19	Totals:	max	3760.352	14	10348.182	32	3670.102	20						
20		min	-3760.35	3	2958.278	3	-3670.098	9						

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

	Member	Shape	Code Check	Loc[...	LC	Shear...	Loc[...	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	A2	P2 STD	.281	48	14	.037	25		2	15808....	33847....	1.997	1.997	1...	H1-1b
2	B2	P2 STD	.387	48	24	.063	25		16	15808....	33847....	1.997	1.997	1...	H1-1b
3	C2	P2 STD	.214	48	6	.047	48		24	15808....	33847....	1.997	1.997	1...	H1-1b
4	M1	L3X3X4	.497	0	30	.080	0	z	29	3944.532	46656	1.688	3.446	3...	H2-1
5	M2	L3X3X4	.563	0	34	.094	0	y	36	3944.532	46656	1.688	3.144	2...	H2-1
6	M3	LL3x3x4x0	.375	48	26	.076	36	y	28	76288....	93312	6.48	4.357	1...	H1-1b
7	M4	L3X3X4	.560	0	26	.092	0	z	35	3944.532	46656	1.688	3.138	2...	H2-1
8	M5	LL3x3x4x0	.378	48	35	.076	36	y	32	76288....	93312	6.48	4.357	1...	H1-1b
9	M14	L3X3X4	.127	84.8...	1...	.012	42.4...	y	1...	15459....	46656	1.688	3.469	1...	H2-1
10	M16	L3X3X4	.131	84.8...	1...	.012	42.4...	z	1...	15459....	46656	1.688	3.464	1...	H2-1
11	M18	L3X3X4	.130	0	1...	.012	42.4...	z	1...	15459....	46656	1.688	3.464	1...	H2-1
12	M19	LL3x3x4x0	.238	0	1...	.054	12	y	1...	76288....	93312	6.48	4.357	1...	H1-1b
13	M31	P2 STD	.082	75	22	.075	128....		24	6684.464	33847....	1.997	1.997	1...	H1-1b
14	M32A	P2 STD	.107	75	2	.069	143....		18	6684.464	33847....	1.997	1.997	1...	H1-1b
15	M33A	P2 STD	.084	75	20	.089	21.8...		20	6684.464	33847....	1.997	1.997	1...	H1-1b
16	M34	P2 STD	.007	15.5	26	.065	0		14	31264....	33847....	1.997	1.997	1...	H1-1b

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

	Member	Shape	Code Check	Loc[...	LC	Shear...	Loc[...	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn ...	phi*Mn ...	Cb	Eqn
17	M35A	P2 STD	.007	15.5	27	.115	0		2	31264....	33847....	1.997	1.997	1...	H1-1b
18	M36A	P2 STD	.007	15.5	32	.119	0		20	31264....	33847....	1.997	1.997	1...	H1-1b
19	M70	LL2.5x2.5x...	.088	42	26	.004	0	y	35	30884....	56700	3.844	2.443	1...	H1-1b
20	M71	LL2.5x2.5x...	.118	84	28	.004	84	y	29	30884....	56700	3.844	2.443	1...	H1-1b*
21	M72	LL2.5x2.5x...	.119	84.0...	32	.004	0	y	32	30883....	56700	3.844	2.443	1	H1-1b*
22	M49A	P2 STD	.194	48	22	.045	25		84	15808....	33847....	1.997	1.997	1...	H1-1b
23	M49B	P2 STD	.414	48	12	.085	48		2	15808....	33847....	1.997	1.997	1...	H1-1b
24	M49C	P2 STD	.175	48	98	.043	48		1...	15808....	33847....	1.997	1.997	1...	H1-1b
25	M49	P2 STD	.174	48	20	.042	6		1...	15808....	33847....	1.997	1.997	2...	H1-1b
26	M49D	P2 STD	.414	48	8	.088	25		20	15808....	33847....	1.997	1.997	1...	H1-1b
27	M49E	P2 STD	.174	48	1...	.046	6		1...	15808....	33847....	1.997	1.997	1...	H1-1b

Envelope AISI S100-16: LRFD Cold Formed Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	She...	Loc[...	Dir	LC	phi*Pn[lb]	phi*T...	phi*M...	phi*M...	phi*...	phi*...	Cb	Eqn
1	M13	CU5.5...	.461	29.219	29	.205	29.2...	z	29	127831.604	147744	7.53	21.017	288...	480...	2.269	H2-1
2	M15	CU5.5...	.368	29.219	70	.164	29.2...	z	70	127831.604	147744	7.53	21.017	288...	480...	1.35	H2-1
3	M17	CU5.5...	.356	29.219	38	.158	29.2...	z	38	127831.604	147744	7.53	21.017	288...	480...	1.348	H2-1

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

	Member	Shape	Code Check Actual	Code Check Allowable	Ratio (Act./Allow.)	Loc[in]	LC	Shear Check	Shear Check Allowable	Ratio (Act./Allow.)	Loc[in]	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	A2	P2 STD	0.281	1.05	0.268*	48	14	0.037	1.05	0.035*	25	15808.485	33847.742	1.997	1.997	1.751	H1-1b
2	B2	P2 STD	0.387	1.05	0.369*	48	24	0.063	1.05	0.06*	25	15808.485	33847.742	1.997	1.997	1.661	H1-1b
3	C2	P2 STD	0.214	1.05	0.204*	48	6	0.047	1.05	0.045*	48	15808.485	33847.742	1.997	1.997	1.65	H1-1b
4	M1	L3X3X4	0.497	1.05	0.473*	0	30	0.08	1.05	0.076*	0	3944.532	46656	1.688	3.446	3.778	H2-1
5	M2	L3X3X4	0.563	1.05	0.536*	0	34	0.094	1.05	0.09*	0	3944.532	46656	1.688	3.144	2.531	H2-1
6	M3	LL3x3x4x0	0.375	1.05	0.357*	48	26	0.076	1.05	0.072*	36	76288.155	93312	6.48	4.357	1.849	H1-1b
7	M4	L3X3X4	0.56	1.05	0.533*	0	26	0.092	1.05	0.088*	0	3944.532	46656	1.688	3.138	2.514	H2-1
8	M5	LL3x3x4x0	0.378	1.05	0.36*	48	35	0.076	1.05	0.072*	36	76288.155	93312	6.48	4.357	1.855	H1-1b
9	M14	L3X3X4	0.127	1.05	0.121*	84.86	178	0.012	1.05	0.011*	42.43	15459.379	46656	1.688	3.469	1.975	H2-1
10	M16	L3X3X4	0.131	1.05	0.125*	84.86	181	0.012	1.05	0.011*	42.43	15459.379	46656	1.688	3.464	1.962	H2-1
11	M18	L3X3X4	0.13	1.05	0.124*	0	181	0.012	1.05	0.011*	42.43	15459.379	46656	1.688	3.464	1.96	H2-1
12	M19	LL3x3x4x0	0.238	1.05	0.227*	0	140	0.054	1.05	0.051*	12	76288.155	93312	6.48	4.357	1.764	H1-1b
13	M31	P2 STD	0.082	1.05	0.078*	75	22	0.075	1.05	0.071*	128.1	6684.464	33847.742	1.997	1.997	1.525	H1-1b
14	M32A	P2 STD	0.107	1.05	0.102*	75	2	0.069	1.05	0.066*	143.8	6684.464	33847.742	1.997	1.997	1.579	H1-1b
15	M33A	P2 STD	0.084	1.05	0.08*	75	20	0.089	1.05	0.085*	21.88	6684.464	33847.742	1.997	1.997	1.644	H1-1b
16	M34	P2 STD	0.007	1.05	0.007*	15.5	26	0.065	1.05	0.062*	0	31264.553	33847.742	1.997	1.997	1.136	H1-1b
17	M35A	P2 STD	0.007	1.05	0.007*	15.5	27	0.115	1.05	0.11*	0	31264.553	33847.742	1.997	1.997	1.136	H1-1b
18	M36A	P2 STD	0.007	1.05	0.007*	15.5	32	0.119	1.05	0.113*	0	31264.553	33847.742	1.997	1.997	1.136	H1-1b
19	M70	LL2.5x2.5x3x3	0.088	1.05	0.084*	42	26	0.004	1.05	0.004*	0	30884.154	56700	3.844	2.443	1.136	H1-1b
20	M71	LL2.5x2.5x3x3	0.118	1.05	0.112*	84	28	0.004	1.05	0.004*	84	30884.154	56700	3.844	2.443	1.136	H1-1b*
21	M72	LL2.5x2.5x3x3	0.119	1.05	0.113*	84	32	0.004	1.05	0.004*	0	30883.399	56700	3.844	2.443	1	H1-1b*
22	M49A	P2 STD	0.194	1.05	0.185*	48	22	0.045	1.05	0.043*	25	15808.485	33847.742	1.997	1.997	1.657	H1-1b
23	M49B	P2 STD	0.414	1.05	0.394*	48	12	0.085	1.05	0.081*	48	15808.485	33847.742	1.997	1.997	1.56	H1-1b
24	M49C	P2 STD	0.175	1.05	0.167*	48	98	0.043	1.05	0.041*	48	15808.485	33847.742	1.997	1.997	1.642	H1-1b
25	M49	P2 STD	0.174	1.05	0.166*	48	20	0.042	1.05	0.04*	6	15808.485	33847.742	1.997	1.997	2.053	H1-1b
26	M49D	P2 STD	0.414	1.05	0.394*	48	8	0.088	1.05	0.084*	25	15808.485	33847.742	1.997	1.997	1.574	H1-1b
27	M49E	P2 STD	0.174	1.05	0.166*	48	134	0.046	1.05	0.044*	6	15808.485	33847.742	1.997	1.997	1.622	H1-1b
28	M13	CU5.5x4x3/8	0.461	1.05	0.439*	29.22	29	0.205	1.05	0.195*	29.22	127831.6	147744	7.53	21.017	2.269	H2-1
29	M15	CU5.5x4x3/8	0.368	1.05	0.35*	29.22	70	0.164	1.05	0.156*	29.22	127831.6	147744	7.53	21.017	1.35	H2-1
30	M17	CU5.5x4x3/8	0.356	1.05	0.339*	29.22	38	0.158	1.05	0.15*	29.22	127831.6	147744	7.53	21.017	1.348	H2-1

*Rating per TIA-222-H, Section 15.5

APPENDIX D

ADDITIONAL CALCULATIONS

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Typ. All Sectors
2021777.876377.01

Bolt Information		
Bolt Diameter (d)	0.625	in
Net Tensile Area (An)	0.226	in^2
# of Bolts Total (n)	2	
Bolt Distance Up-Down	4	in
Bolt Distance Left-Right	1	in
Bolt Grade	A325N	
Bolt Tensile Strength (F_{ub})	120	ksi

RISA 3D Reactions		
Moment (M)	0.00	k-ft
Axial (T)	5.38	kips
Shear (V)	10.10	kips

Bolt Capacity		
Nominal Tensile Strength (R_{nt})	27.120	kips
Nominal Shear Strength (R_{nv})	18.41	kips
Bolt Tensile Force (T_{ub})	2.69	kips
Bolt Shear Force (V_{ub})	5.052	kips
$T_{ub}/\phi R_{nt}$	0.12600	
$V_{ub}/\phi R_{nv}$	0.34851	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.14420	
Bolt Capacity =	34.9%	OK

*Rating per TIA-222-H, Section 15.5

TIA-222-H CONNECTION CHECK
Kicker to Tower Connection - Typ. All Sectors
2021777.876377.01

Bolt Information		
Bolt Diameter (d)	0.625	in
Net Tensile Area (An)	0.226	in^2
# of Bolts Total (n)	4	
Bolt Distance Up-Down	6	in
Bolt Distance Left-Right	6	in
Bolt Grade	A325N	
Bolt Tensile Strength (F_{ub})	120	ksi

RISA 3D Reactions		
Moment (M)	0.00	k-ft
Axial (T)	-2.83	kips
Shear (V)	2.35	kips

Bolt Capacity		
Nominal Tensile Strength (R_{nt})	27.120	kips
Nominal Shear Strength (R_{nv})	18.41	kips
Bolt Tensile Force (T_{ub})	-0.71	kips
Bolt Shear Force (V_{ub})	0.589	kips
$T_{ub}/\phi R_{nt}$	-0.03312	
$V_{ub}/\phi R_{nv}$	0.04060	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00288	
Bolt Capacity =	4.1%	OK

*Rating per TIA-222-H, Section 15.5

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 1223.1 ft (NAVD 88)
Latitude: 41.966361
Longitude: -73.121694

Wind

Results:

Wind Speed:	115 Vmph
10-year MRI	76 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	96 Vmph

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

Date Accessed: Thu Feb 04 2021

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 not in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2.

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

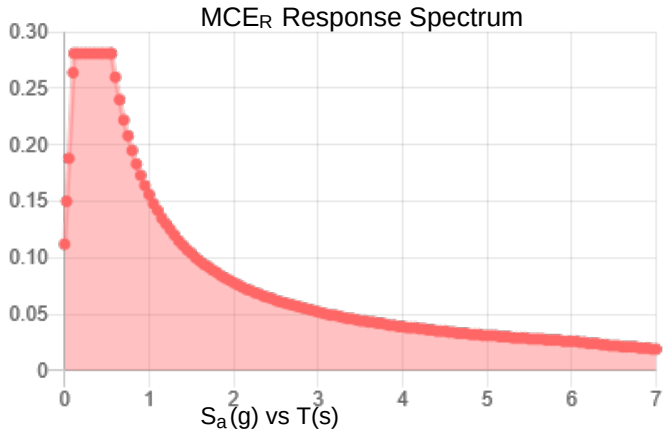
Seismic

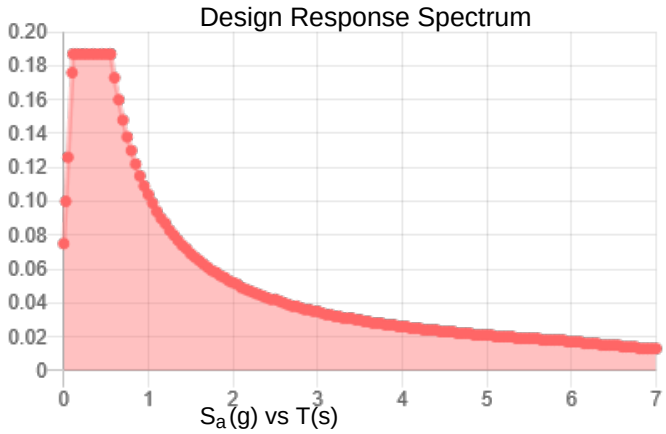
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.176	S_{DS} :	0.187
S_1 :	0.065	S_{D1} :	0.104
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.086
S_{MS} :	0.281	PGA_M :	0.138
S_{M1} :	0.156	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Thu Feb 04 2021

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

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	5 F
Gust Speed:	40 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Thu Feb 04 2021

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

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

Exhibit F

Power Density/RF Emissions Report

EBI Consulting

environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CTNH573A

161 Pinney Street
Colebrook, Connecticut 06021

March 12, 2021

EBI Project Number: 6221001149

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**22.51%**

21 B Street, Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

March 12, 2021

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

Emissions Analysis for Site: CTNH573A

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **161 Pinney Street** in **Colebrook, 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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu W/cm^2$). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits; therefore, it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 161 Pinney Street in Colebrook, 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 power density calculations, the broadcast footprint of the AIR6449 antenna has been considered. Due to the beamforming nature of this antenna, the actual beam locations vary depending on demand and are narrow in nature. Using the broadcast footprint accounts for the potential location of beams at any given time.

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) 2 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 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.

7) 1 LTE channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 120 Watts.

8) 1 NR channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 120 Watts.

9) 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.

10) 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.

11) The antennas used in this modeling are the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector A, the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector B, the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 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.

12) The antenna mounting height centerline of the proposed antennas is 148 feet above ground level (AGL).

13) 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.

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20
Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	148 feet	Height (AGL):	148 feet	Height (AGL):	148 feet
Channel Count:	2	Channel Count:	2	Channel Count:	2
Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE %:	**0.83%**	Antenna B1 MPE %:	**0.83%**	Antenna C1 MPE %:	**0.83%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd
Height (AGL):	148 feet	Height (AGL):	148 feet	Height (AGL):	148 feet
Channel Count:	11	Channel Count:	11	Channel Count:	11
Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts
ERP (W):	12,569.87	ERP (W):	12,569.87	ERP (W):	12,569.87
Antenna A2 MPE %:	**3.26%**	Antenna B2 MPE %:	**3.26%**	Antenna C2 MPE %:	**3.26%**
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:	17.3 dBd / 17.3 dBd	Gain:	17.3 dBd / 17.3 dBd	Gain:	17.3 dBd / 17.3 dBd
Height (AGL):	148 feet	Height (AGL):	148 feet	Height (AGL):	148 feet
Channel Count:	2	Channel Count:	2	Channel Count:	2
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	12,888.76	ERP (W):	12,888.76	ERP (W):	12,888.76
Antenna A3 MPE %:	**2.30%**	Antenna B3 MPE %:	**2.30%**	Antenna C3 MPE %:	**2.30%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	6.39%
AT&T	8.38%
Sprint	2.77%
Verizon	4.97%
Site Total MPE % :	22.51%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	6.39%
T-Mobile Sector B Total:	6.39%
T-Mobile Sector C Total:	6.39%
Site Total MPE % :	22.51%

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 (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 2100 MHz LTE	2	2334.27	148.0	8.32	2100 MHz LTE	1000	0.83%
T-Mobile 600 MHz LTE	2	591.73	148.0	2.11	600 MHz LTE	400	0.53%
T-Mobile 600 MHz NR	1	1577.94	148.0	2.81	600 MHz NR	400	0.70%
T-Mobile 700 MHz LTE	2	695.22	148.0	2.48	700 MHz LTE	467	0.53%
T-Mobile 1900 MHz GSM	4	1052.26	148.0	7.50	1900 MHz GSM	1000	0.75%
T-Mobile 1900 MHz LTE	2	2104.51	148.0	7.50	1900 MHz LTE	1000	0.75%
T-Mobile 2500 MHz LTE	1	6444.38	148.0	11.49	2500 MHz LTE	1000	1.15%
T-Mobile 2500 MHz NR	1	6444.38	148.0	11.49	2500 MHz NR	1000	1.15%
						Total:	**6.39%**

• 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:	6.39%
Sector B:	6.39%
Sector C:	6.39%
T-Mobile Maximum MPE % (Sector A):	6.39%
Site Total:	22.51%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **22.51%** 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.