April 9, 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# 876379; T-Mobile Site ID# CTNH454A
1440 Main Street North, Woodbury, CT 06798
Latitude: 41° 35′ 23.81″ / Longitude: -73° 10′ 11.52″

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 156-foot mount on the existing 160-foot Monopole Tower located at 1440 Main Street North in Woodbury. The property is owned by Tikva Wolff 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 – APXVTMI4-ALU-I20 Antennas **(REMOVE)** - (3) RFS – APX16DWV-16DWV-S-E-A20 Antennas **(REPLACE)**

(3) RFS – APXVAPP18-C-A20 Antennas **(REMOVE)** – (3) RFS – APXVAALL24_43-U-NA20 Antennas **(REPLACE)**

Install New:
(3) AIR6449 B41 Antennas
(3) Ericsson – Radio 4415 B66A
(3) Ericsson – Radio 4449 B71+B85A
(3) Ericsson – Radio 4424 B25
(4) 1 5/8'' hybrid cable

Remove:
(9) Sprint RRUs

Ground:

Install New:
(1) SSC 6160 cabinet
(1) B160 battery cabinet
(1) BB6648
(3) BB6630
(1) DUG20
(1) PSU 4813 voltage booster
(1) IXRe router

Remove:
(1) BBU equipment cabinet

The facility was approved by the Town of Woodbury Zoning Commission on August 10, 1999. The approval was given with conditions which this exempt modification complies with.

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 Barbara Perkinson, First Selectman for the Town of Woodbury, Maryellen Edwards, Town Planner, and Tikva Wolff, 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:

Barbara Perkinson, First Selectman *(via email only to barbaraperkinson@woodburyct.org)*
281 Main Street South
Woodbury, CT 06798
203-263-2141

Maryellen Edwards, Town Planner *(via email only to medwards@woodburyct.org)*
281 Main Street South
Woodbury, CT 06798
203-263-3467

Tikva Wolff *(via email only to tikvawolf@hotmail.com)*
1514 Main Street North
Woodbury, CT 06798

Exhibit A

Original Facility Approval

Zoning Commission

P.O. Box 369
Town of Woodbury - Woodbury, Connecticut 06798-0369

First land deed from the Indians
April 12th 1659

Telephone: (203) 263-3467
Fax: (203) 263-5076

VOICES
Middle Quarter Mall
Main Street South
Woodbury, CT 06798

Kindly publish the following legal notice in VOICES on Sunday, August 22, 1999. The invoice should be sent to the Accounting Office, 281 Main Street S. Box #369, Woodbury, CT 06798 with a tear-sheet copy for the Town Planner's Office.

LEGAL NOTICE

At its regular meeting held on Tuesday, August 10, 1999, the Woodbury Zoning Commission took the following actions:

X APPROVED: With conditions, Application #969 submitted by Sprint Spectrum, LP, d/b/a Sprint PCS to construct a radio · tower/wireless telecommunications facility at 1440 Main St. N., Richard Wolff, property owner. (Map 12/Lot 54)

APPROVED: With conditions, Application #973 submitted by Watertown Fire District for an Earth Materials Permit for gravel excavation from Nonnewaug River, Hart Farm Wellfield on Rte. 61. (Map 14/Lots 10, 32, 32A –B, 33)

DENIED: To deny without prejudice Application #971 for lack of information submitted by Woodbury Fire Dept. for Earth Materials Permit for a fire pond at 274 Grassy Hill Rd., Richard Wolff, property owner. (Map 64/Lot 12).

APPROVED: With conditions, Application #976 submitted by Flanders Nature Center, Inc. for a Special Permit to hold a fall festival at the Van Vleck Farm Sanctuary on Flanders Rd and Church Hill Rd on October 3, 1999. (Map 96/Lots 21, 22, 23)

Dated this 20th day of August, 1999.

Sue Bartlett

Sue Bartlett, Admin. Asst.

A letter of 8/10/99 from Ken Faroni of O & G was submitted granting a 65-day extension.

(Tietz unseated, Alt. Leach seated)
#969/Sprint Spectrum/Wolff/1440 Main St. N/Wireless TeleComm. Facility
MOTION:
WHEREAS, the WOODBURY ZONING COMMISSION has received Application #969 submitted by Sprint Spectrum, L.P., d/b/a Sprint PCS for a Special Permit pursuant to Section 5.2.4 of the Woodbury Zoning Regulations to construct a radio tower/wireless telecommunications facility and associated radio equipment on property owned by Richard Wolff at 1440 Main Street North (Tax Assessor's Map 12/Lot 54); and

WHEREAS, members of the Commission inspected the site at a duly noticed special meeting on July 6, 1999; and

WHEREAS, a duly called public hearing was held June 22, 1999 and July 13, 1999 to consider the application and to receive public comments; and

WHEREAS, the Commission has carefully considered all the information and testimony received during the duly called public hearing; and

WHEREAS, the Commission has determined that the proposed radio tower/telecommunications facility and associated radio equipment are in conformance with Section 5.2.4 of the Woodbury Zoning Regulations after conditions 6 and 7 below, are met;

NOW THEREFORE BE IT RESOLVED that the WOODBURY ZONING COMMISSION approves Application #969 submitted by Sprint Spectrum, L.P., d/b/a Sprint PCS for a Special Permit pursuant to Section 5.2.4 of the Woodbury Zoning Regulations to construct a radio tower/telecommunications facility and associated radio equipment on property owned by Richard Wolff at 1440 Main Street North (Tax Assessor's Map 12/Lot 54) as depicted on the site plans and accompanying materials dated June 17, 1999, with the following conditions:

1. A final site development plan, annotated with all conditions herein, shall be filed with the Town Planner prior to commencement of construction;
2. An itemized estimate of costs for soil erosion and sedimentation control, screening, landscaping, and tower removal and site restoration must be provided to the Woodbury Town Planner (Town Planner) for determination of an appropriate bond and such bond shall be posted in a form and amount determined by the Town Planner, prior to commencement of construction;
3. The Town Planner shall be notified 48 hours prior to commencement of construction to permit inspection of soil erosion and sedimentation control devices;

4. The tower and enclosure area shall be designed to accommodate up to six providers of telecommunications services, with all ground equipment enclosed in a single building and the enclosure secured and screened in manner that is architecturally compatible with surrounding farm;
5. All electric and telephone service to the tower and building shall be installed below ground.
6. The galvanized steel tower shall not exceed 160 feet above grade in height, shall have no lights above the height of the building, screening, or fence, and shall not be painted. Any future extension of the tower to accommodate additional antennas or addition of any facilities other than shown on the approved site plan shall require an amendment to this Special Permit as provided in Section 10.6 of the Woodbury Zoning Regulations, however, an extension of the tower from 160 feet to 190 feet shall be deemed to be of a minor nature;
7. The tower shall be located no closer than 190 feet from any property line along Main Street North and Swamp Road.
8. Sprint shall use best efforts to make the tower available to other telecommunications carriers and promote co-location on this tower on a commercially reasonable basis;
9. In the event the wireless telecommunications facility ceases to be used by Sprint PCS or any bona fide tenant providers of telecommunication services for a period of a year, the tower and all associated equipment and structures shall be removed by Sprint PCS within 90 days.;
10. Construction shall not commence until all applicable appeal periods have terminated and this permit will expire if construction is not completed by August 10, 2001; and
11. An A2, as-built survey shall be filed with the Town Planner upon completion of construction.

Made by Kelly, seconded by Alt. Leach.
Vote 5-0 in favor.

(Tietz unseated, Alt. Leach seated)

#973/Watertown Fire District/Hart Farm Wellfield/Rte 61/EM Permit

MOTION:

WHEREAS, the WOODBURY ZONING COMMISSION has received Application #973 submitted by the Watertown Fire District for an Earth Materials Permit pursuant to Section 15.3 of the Woodbury Zoning Regulations to excavate up to 4500 cubic yards of gravel from the Nonnewaug River (Tax Assessor's Map 14/Lots 10, 32, 32A, 32B, 33); and

WHEREAS, the Woodbury Inland Wetlands Agency approved the regulated activity on August 9, 1999; and

WHEREAS, a duly called public hearing was held July 27, 1999 and August 10, 1999 to consider the application and to receive public comments; and

Town of Woodbury, CT

Property Listing Report

Map Block Lot	Building #	Unique Identifier
012-054		390800

Property Information

Property Location	1440 MAIN ST NORTH
Mailing Address	1514 MAIN ST NORTH WOODBURY CT 067981812
Land Use	Barn
Zoning Code	OS60
Neighborhood	26

Owner	WOLFF TIKVA
Co-Owner	
Book / Page	0384/1171
Land Class	Vacant Land
Census Tract	3621
Acreage	38.62

Valuation Summary

(Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	0	0
Outbuildings	118586	83010
Land	426933	3790
Total	545519	0

Utility Information

Electric	No
Gas	No
Sewer	No
Public Water	No
Well	No

Primary Construction Details

Year Built	
Building Desc.	
Building Style	
Stories	
Exterior Walls	
Exterior Walls 2	
Interior Walls	
Interior Walls 2	
Interior Floors 1	
Interior Floors 2	

Heating Fuel	
Heating Type	
AC Type	
Bedrooms	
Full Bathrooms	
Half Bathrooms	
Extra Fixtures	
Total Rooms	
Bath Style	
Kitchen Style	
Occupancy	

Building Use	
Building Condition	
Frame Type	
Fireplaces	
Bsmt Gar	
Fin Bsmt Area	
Fin Bsmt Quality	
Building Grade	
Roof Style	
Roof Cover	

Report Created On 4/7/2021

Town of Woodbury, CT

Property Listing Report | Map Block Lot 012-054 | Building # | Unique Identifier 390800

Detached Outbuildings

Type	Description	Area (sq ft)	Condition	Year Built
Shed	Concrete Block/Frame	286	Average	1950
Shed	Average Shed	320	Average	1950
Barn	Frame	408	Average	1990
Shed	Average Shed	390	Average	1950
Barn	Frame	6120	Average	1950
Barn	Frame	2000	Average	2000
Barn	Frame	1152	Average	1990

Attached Extra Features

Type	Description	Area (sq ft)	Condition	Year Built

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
WOLFF TIKVA	0384_1171	9/26/2011	0
WOLFF RICHARD ESTATE OF	343_ 526	5/25/2006	0

Report Created On 4/7/2021

Exhibit C

Construction Drawings

T-Mobile

T-MOBILE SITE NUMBER: CTNH454A
T-MOBILE SITE NAME: CTNH454A
SITE TYPE: MONOPOLE
TOWER HEIGHT: 160'-0"

BUSINESS UNIT #: 876379
SITE ADDRESS: 1440 MAIN STREET NORTH WOODBURY, CT 06798
COUNTY: LITCHFIELD
JURISDICTION: LITCHFIELD COUNTY

T-MOBILE SPRINT RETAIN SITE CONFIGURATION: 67D5998C_1xAIR+1QP+1OP

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	N. WOODBURY / WOLFF PARCEL
SITE ADDRESS:	1440 MAIN STREET NORTH WOODBURY, CT 06798
COUNTY:	LITCHFIELD
MAP/PARCEL #:	168 012-054
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.58994293° (41° 35' 23.81")
LONGITUDE:	-73.16988373° (-73° 10' 11.52")
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	506.0 FT
CURRENT ZONING:	OS60
JURISDICTION:	LITCHFIELD COUNTY
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	WOLFF TIKVA 1514 MAIN STREET NORTH WOODBURY, CT 06798-1812
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 ANSI D (22"X34"). 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 (9) RRHs
- REMOVE (3) HYBRID CABLES
- INSTALL (9) ANTENNAS
- INSTALL (9) RRHs
- INSTALL (4) HYBRID CABLES

GROUND SCOPE OF WORK:
- REMOVE EXISTING CABINETS
- REMOVE (1) BBU EQUIPMENT CABINET
- 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 ENGINEERING AND ARCHITECTURE PROFESSIONAL CORPORATION
DATED:	02/03/2021
RFDS REVISION:	1
DATED:	01/11/2021
ORDER ID:	538772
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:
CTNH454A

BU #: **876379**
N. WOODBURY / WOLFF PARCEL

1440 MAIN STREET NORTH
WOODBURY, CT 06798

EXISTING 160'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	02/17/2021	RCD	PRELIMINARY	SS
0	03/10/2021	BMM	FINAL	SS

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

SHEET NUMBER: T-1
REVISION: 0

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.

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

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).

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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T-MOBILE SITE NUMBER:
CTNH454A

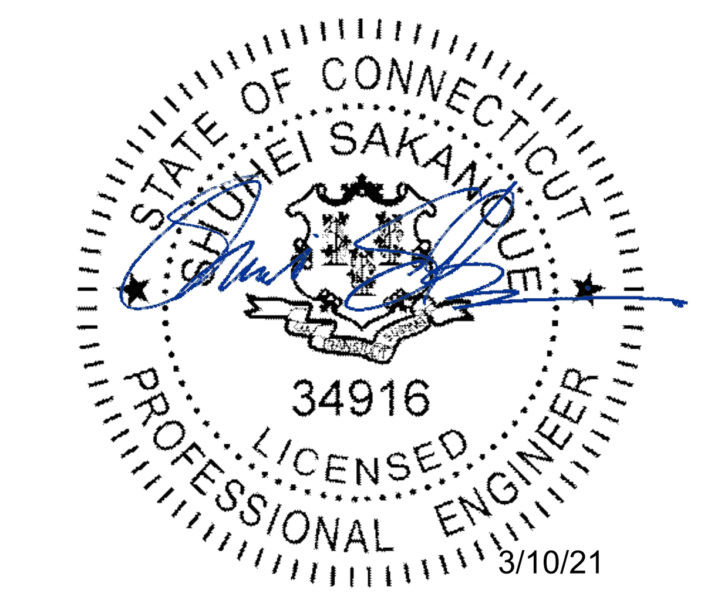
BU #: **876379**
N. WOODBURY / WOLFF PARCEL

1440 MAIN STREET NORTH
WOODBURY, CT 06798

EXISTING 160'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	02/17/2021	RCD	PRELIMINARY	SS
0	03/10/2021	BMM	FINAL	SS

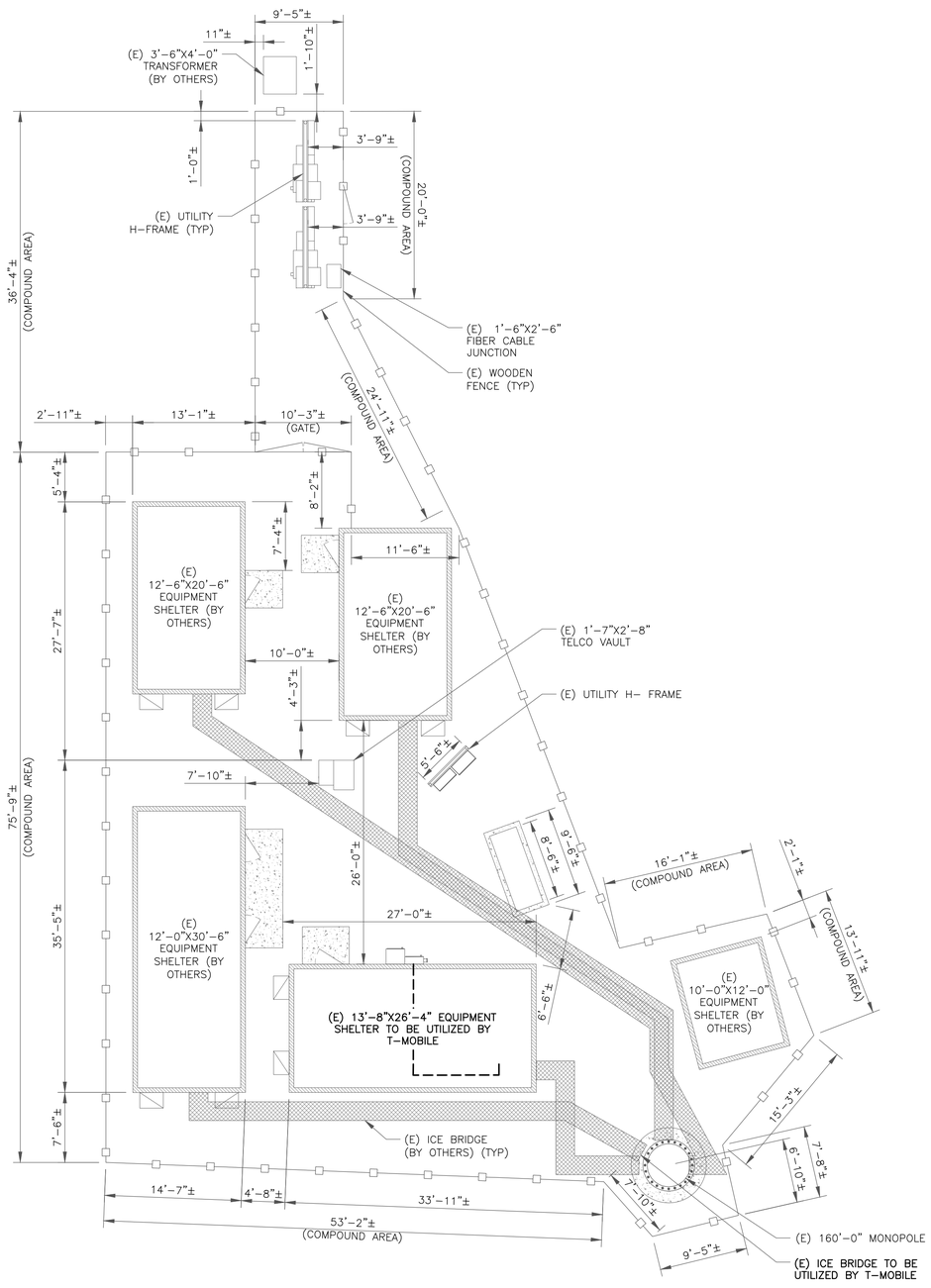


IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER:	REVISION:
T-2	0

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.



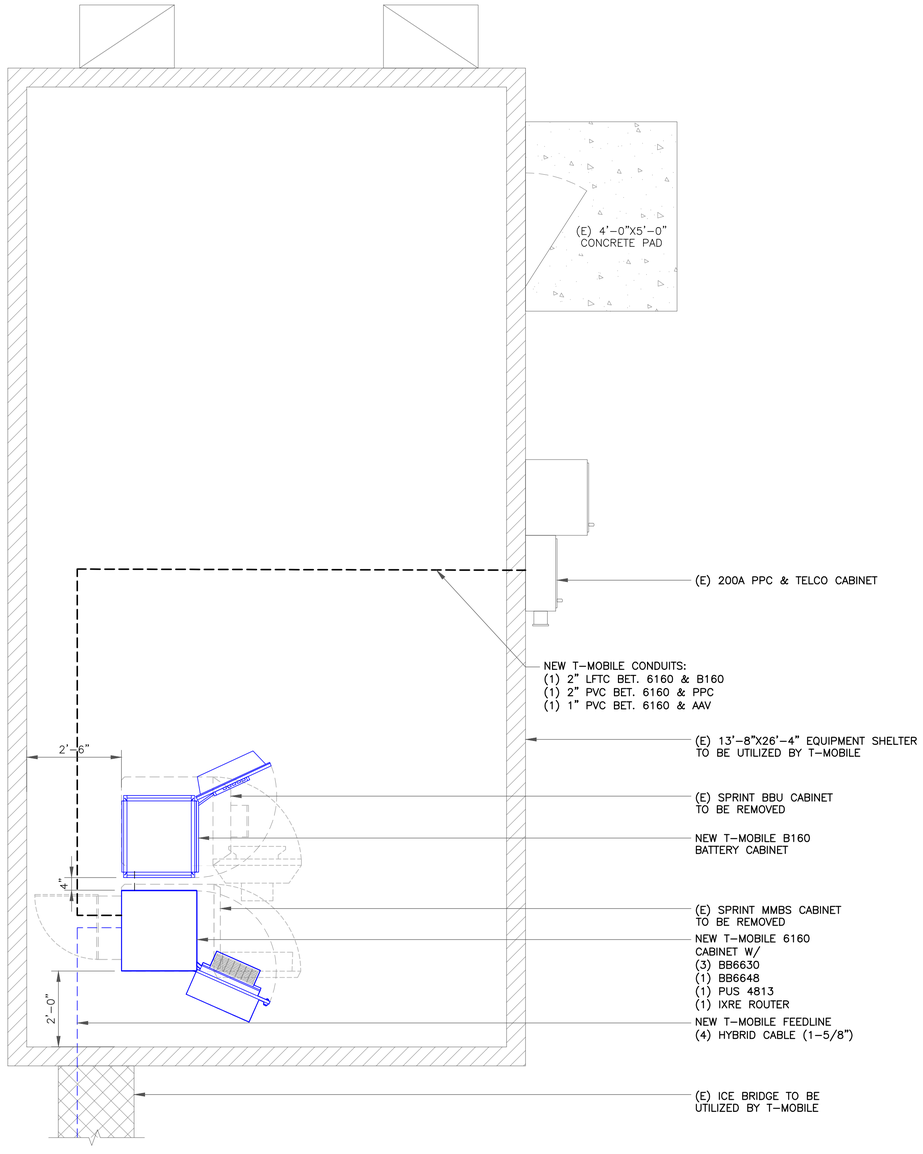
1 SITE PLAN

SCALE: 8' 6' 4' 2' 0 8' — 1/8"=1'-0" (FULL SIZE) 1/16"=1'-0" (11x17)

N

NOTES:

NO EXISTING EQUIPMENT INFORMATION IS AVAILABLE INSIDE SHELTER. CONTRACTOR SHALL VERIFY THE EQUIPMENT AT FIELD AND IDENTIFY AVAILABLE SPACE FOR NEW CABINET INSTALLATION. THE EXISTING SPRINT EQUIPMENT SHALL BE REMOVED FROM SHELTER.



2 ENLARGED SITE PLAN

SCALE: 2' 1' 0 2' — 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

N

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WOODBURY, CT 06798

EXISTING 160'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	02/17/2021	RCD	PRELIMINARY	SS
0	03/10/2021	BMM	FINAL	SS

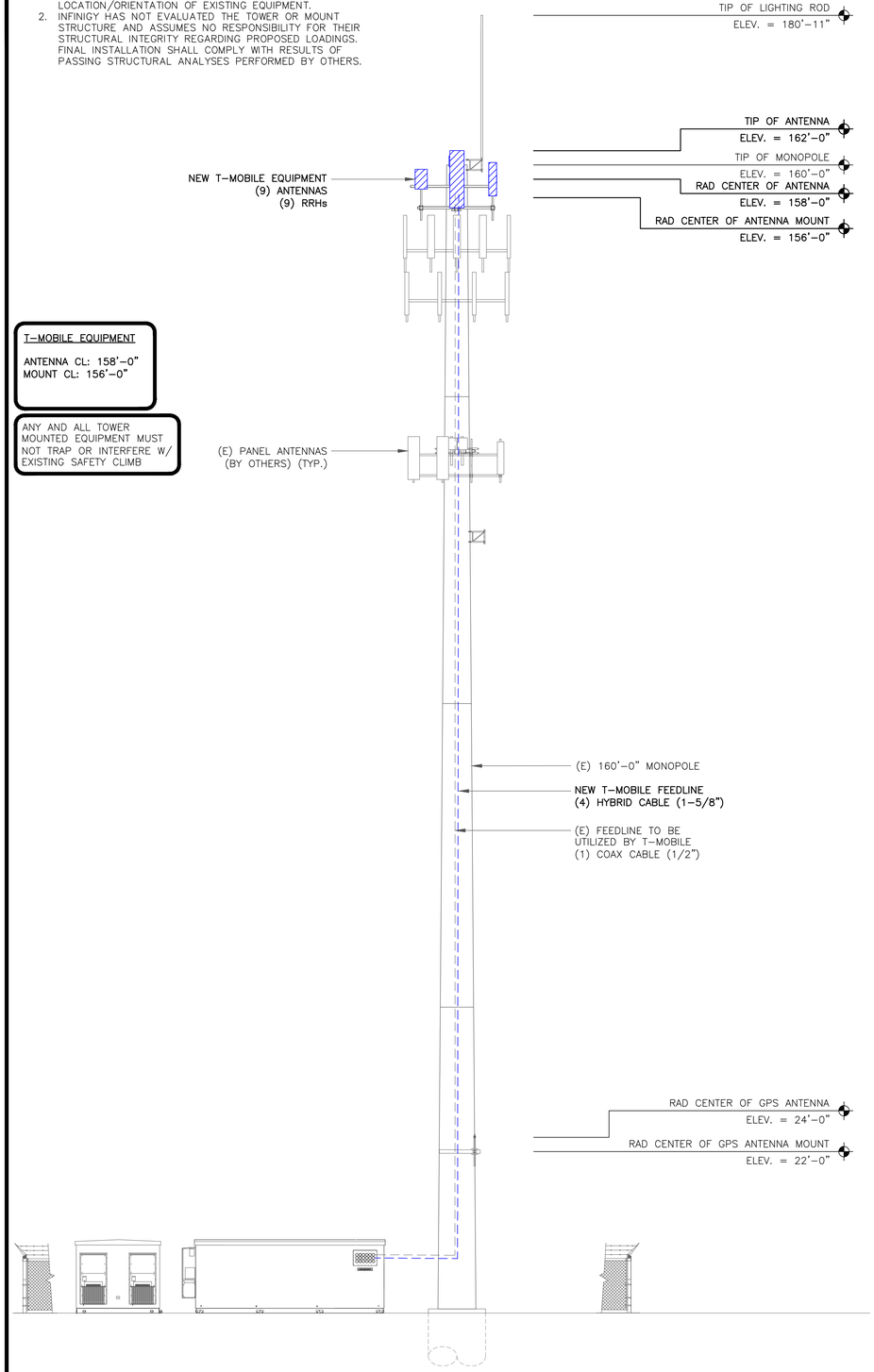
STATE OF CONNECTICUT
SHUHEI SAKAMOTO
34916
LICENSED PROFESSIONAL ENGINEER
3/10/21

SHEET NUMBER: C-1

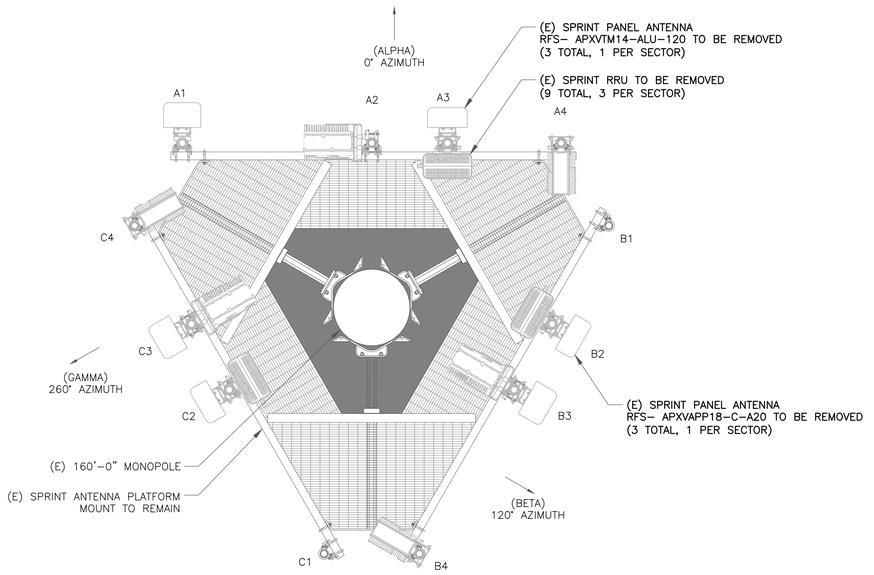
REVISION: 0

NOTES:

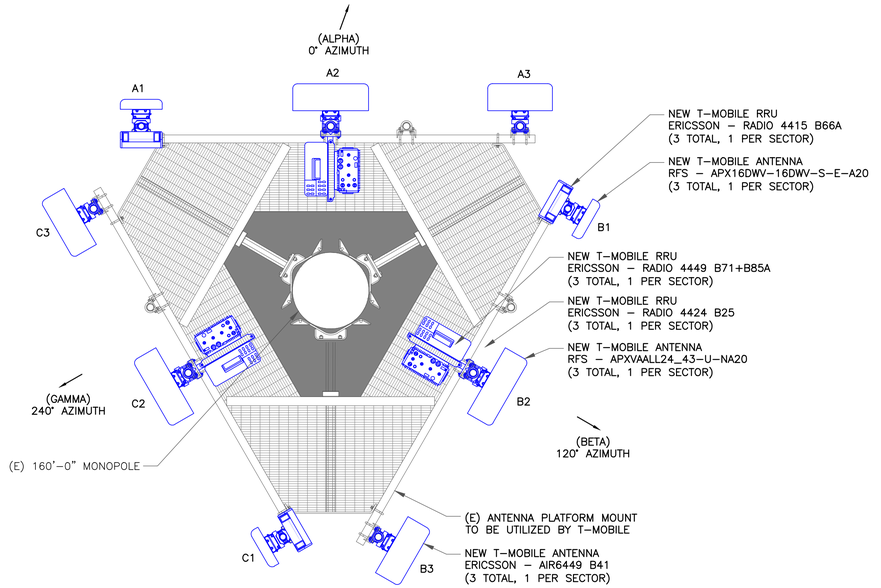
1. ELEVATION BASED ON DRAWING PROVIDED BY TOWER OWNER. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND LOCATION/ORIENTATION OF EXISTING EQUIPMENT.
2. INFINIGY HAS NOT EVALUATED THE TOWER OR MOUNT STRUCTURE AND ASSUMES NO RESPONSIBILITY FOR THEIR STRUCTURAL INTEGRITY REGARDING PROPOSED LOADINGS. FINAL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



1 FINAL ELEVATION
SCALE: NOT TO SCALE



2 EXISTING ANTENNA LAYOUT
SCALE: NOT TO SCALE



3 FINAL ANTENNA LAYOUT
SCALE: NOT TO SCALE

NOTE:
A STRUCTURAL EVALUATION OF THE T-MOBILE ANTENNA MOUNTS HAS BEEN PERFORMED BY GPD ENGINEERING AND ARCHITECTURE PROFESSIONAL CORPORATION. REFER TO ANTENNA MOUNT STRUCTURAL ANALYSIS DATED 02-03-2021 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.

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T-MOBILE SITE NUMBER:
CTNH454A

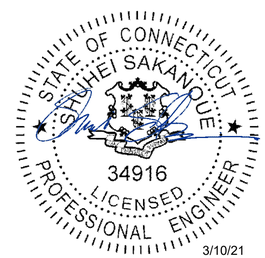
BU #: **876379**
N. WOODBURY / WOLFF PARCEL

1440 MAIN STREET NORTH
WOODBURY, CT 06798

EXISTING 160'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	02/17/2021	RCD	PRELIMINARY	SS
0	03/10/2021	BMM	FINAL	SS



SHEET NUMBER: C-2

REVISION: 0

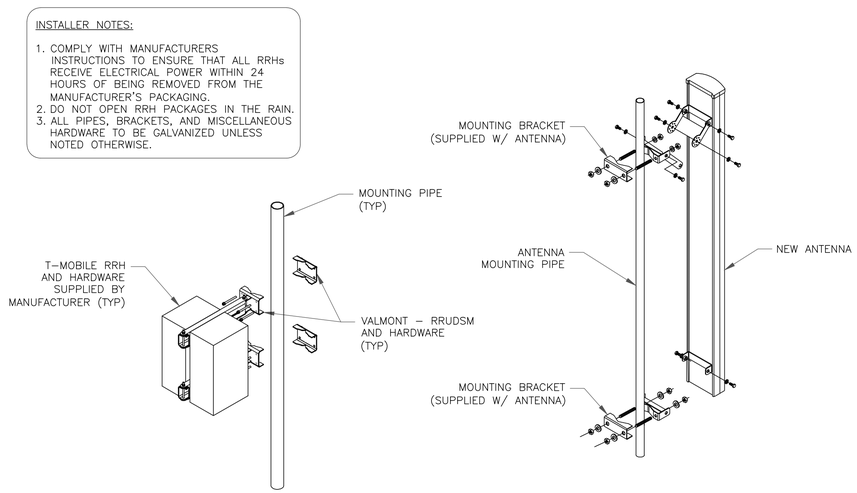
ANTENNA SCHEDULE

SECTOR	POS.	TECHNOLOGY	RAD CENTER	AZIMUTH	ANTENNA MANUFACTURER	ANTENNA MODEL	MECH. TILT	ELECT. TILT	TOWER MOUNTED EQUIPMENT	FEEDLINE TYPE
ALPHA	A1	L2100	158'-0"	0°	RFS	APX16DWV-16DWV-S-E-A20	0°	2/2	(1) ERICSSON - RRUS 4415 B66A	(1) 6X12 HCS HYBRID (SHARED)
ALPHA	A2	L700, L600, N600, L1900, G1900	158'-0"	0°	RFS	APXVAALL24_43-U-NA20	0°	2/2/2/2	(1) ERICSSON - RRUS 4449 B71+B85 (1) ERICSSON - RRUS 4424 B25	(2) 6X12 HCS HYBRID (SHARED)
ALPHA	A3	L2500, N2500	158'-0"	0°	ERICSSON	AIR6449 B41	0°	2/2	--	(1) 6X12 HCS HYBRID (SHARED)
BETA	B1	L2100	158'-0"	120°	RFS	APX16DWV-16DWV-S-E-A20	0°	2/2	(1) ERICSSON - RRUS 4415 B66A	(1) 6X12 HCS HYBRID (SHARED)
BETA	B2	L700, L600, N600, L1900, G1900	158'-0"	120°	RFS	APXVAALL24_43-U-NA20	0°	2/2/2/2	(1) ERICSSON - RRUS 4449 B71+B85 (1) ERICSSON - RRUS 4424 B25	(2) 6X12 HCS HYBRID (SHARED)
BETA	B3	L2500, N2500	158'-0"	120°	ERICSSON	AIR6449 B41	0°	2/2	--	(1) 6X12 HCS HYBRID (SHARED)
GAMMA	C1	L2100	158'-0"	240°	RFS	APX16DWV-16DWV-S-E-A20	0°	2/2	(1) ERICSSON - RRUS 4415 B66A	(1) 6X12 HCS HYBRID (SHARED)
GAMMA	C2	L700, L600, N600, L1900, G1900	158'-0"	240°	RFS	APXVAALL24_43-U-NA20	0°	2/2/2/2	(1) ERICSSON - RRUS 4449 B71+B85 (1) ERICSSON - RRUS 4424 B25	(2) 6X12 HCS HYBRID (SHARED)
GAMMA	C3	L2500, N2500	158'-0"	240°	ERICSSON	AIR6449 B41	0°	2/2	--	(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
TUHEI SAKANOUE
34916
LICENSED PROFESSIONAL ENGINEER
3/10/21

SHEET NUMBER: C-3

REVISION: 0

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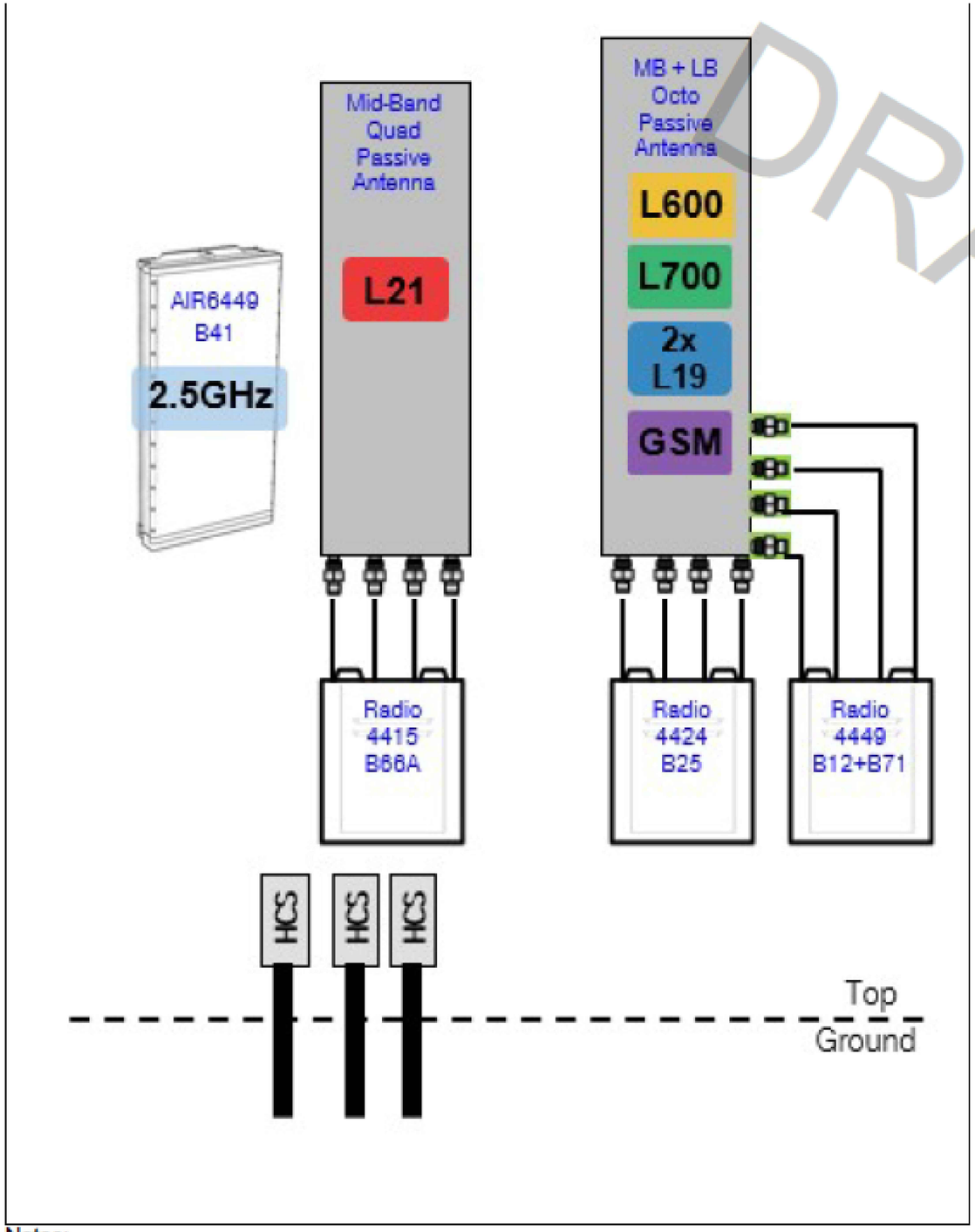

Notes:

1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

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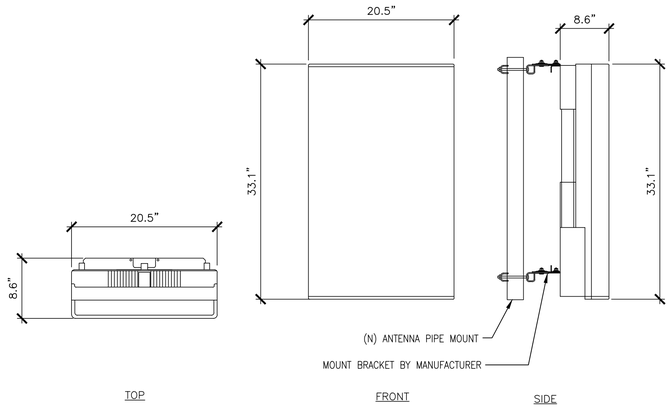
LICENSED PROFESSIONAL ENGINEER
3/10/21

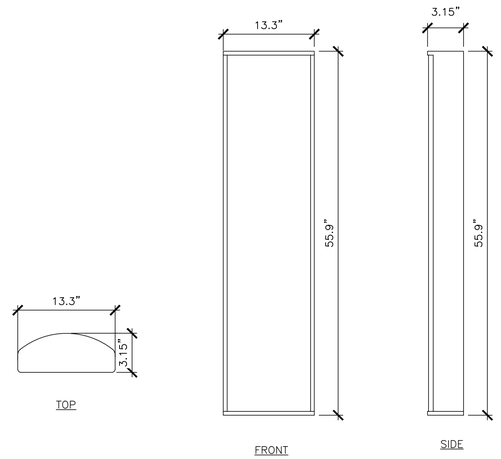
SHEET NUMBER: C-4
REVISION: 0

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

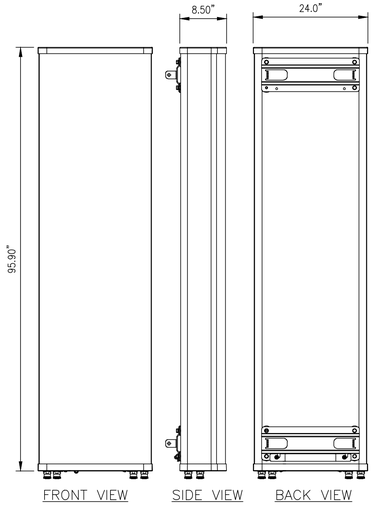


1 (N) AIR6449 B41 ANTENNA SPEC
SCALE: NOT TO SCALE

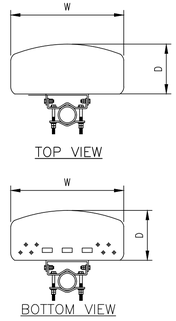
MANUFACTURER: RFS
MODEL: APX16DWV-16DWV-S-E-A20
WEIGHT: 40.7 LBS
DIMENSIONS: 55.9"H. X 13.3"W. X 3.15"D.
FREQUENCY: REFER TO RF DATA SHEET



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



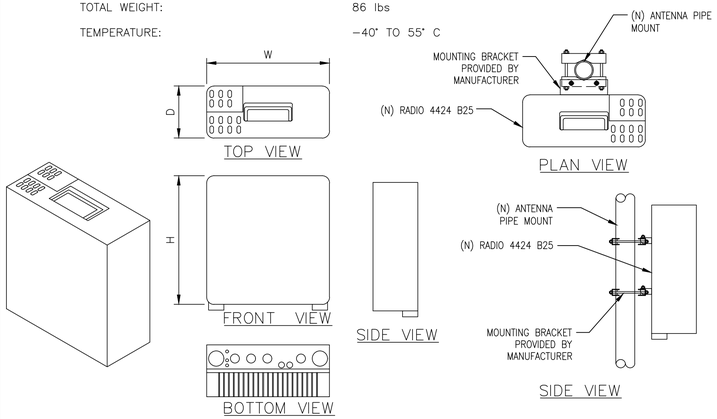
700MHz RFS ANTENNAS	
MODEL	WEIGHT (lb)
(8') APXVAALL24_43-UNA20	149.90
WEIGHT W/ MOUNTING BRACKET (lb):	154



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

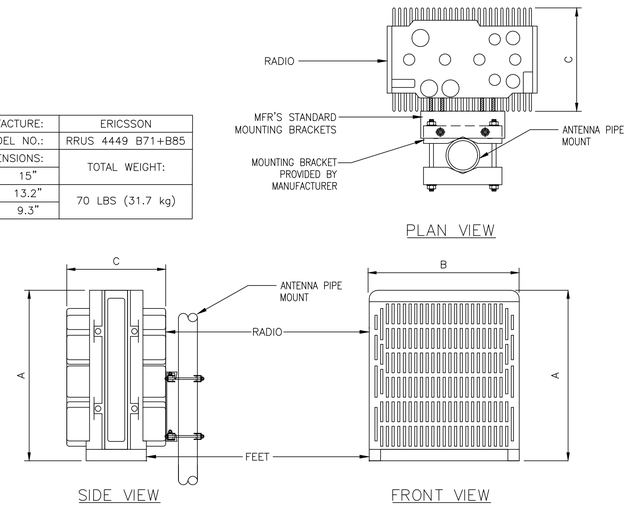
ERICSSON RADIO-4424 B25

DIMENSIONS, WxDxH:	17.10"x14.40"x11.30"
MAX OUTPUT POWER:	4x80W (2x(2x80W))
TOTAL WEIGHT:	86 lbs
TEMPERATURE:	-40° TO 55° C



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

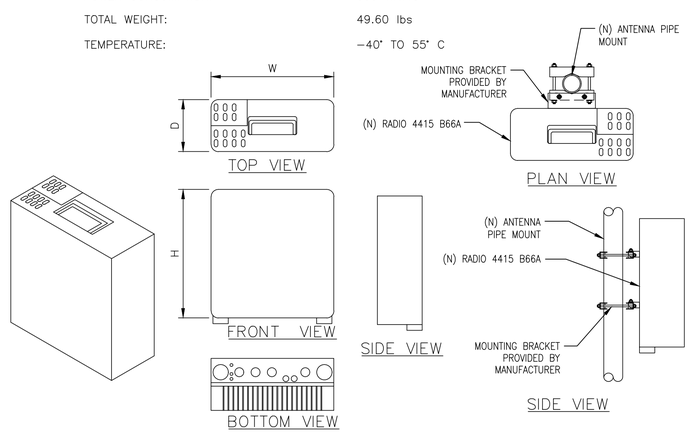
MANUFACTURE:	ERICSSON
MODEL NO.:	RRUS 4449 B71+B85
DIMENSIONS:	TOTAL WEIGHT:
A 15"	70 LBS (31.7 kg)
B 13.2"	
C 9.3"	



5 (N) RADIO 4449 B71+B85 SPEC
SCALE: NOT TO SCALE

ERICSSON RADIO-4415 B66A

DIMENSIONS, WxDxH:	16.50"x13.50"x6.30"
POWER CONSUMPTION:	660 WATTS
TOTAL WEIGHT:	49.60 lbs
TEMPERATURE:	-40° TO 55° C



6 (N) RADIO 4415 B66A SPEC
SCALE: NOT TO SCALE

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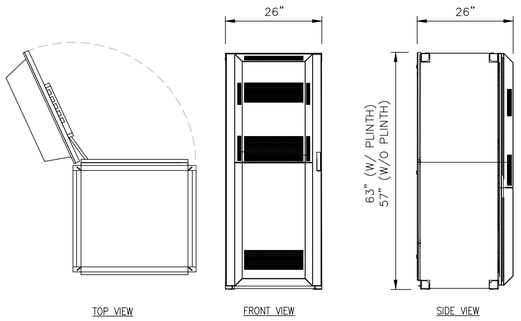
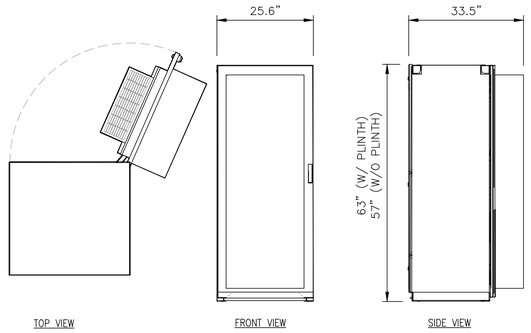
STATE OF CONNECTICUT
HUIHEI SAKAMOTO
34916
LICENSED PROFESSIONAL ENGINEER
3/10/21

SHEET NUMBER:	REVISION:
C-5	0



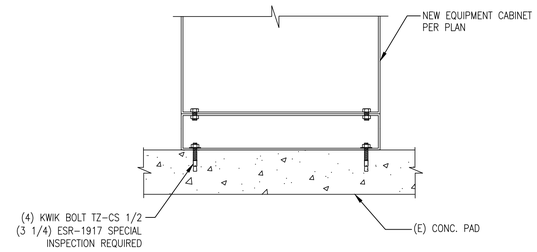
ERICSSON MODEL NO.:	B160
RACK SPACE:	19U
DIMENSIONS, HxWxD:	63"x26"x26" (W/ 6" PLINTH)
CABINET WEIGHT, EMPTY:	485 LBS
MAXIMUM WEIGHT:	2100± LBS

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

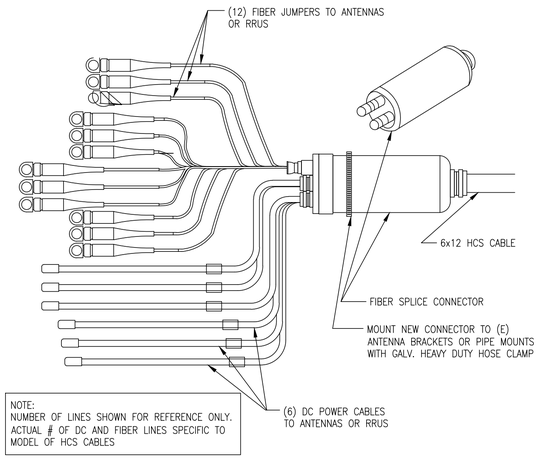


ERICSSON MODEL NO.:	6160
RACK SPACE:	19U
DIMENSIONS, HxWxD:	63"x25.6"x25.6" (W/ 6" PLINTH)
CABINET WEIGHT, EMPTY:	410 LBS
MAXIMUM WEIGHT:	770± LBS

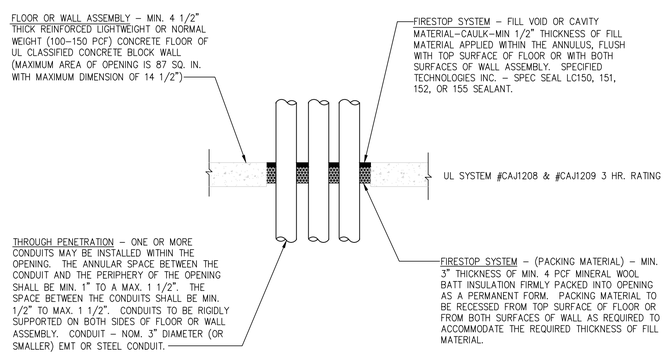
2 (N) 6160 CABINET DETAIL
SCALE: NOT TO SCALE



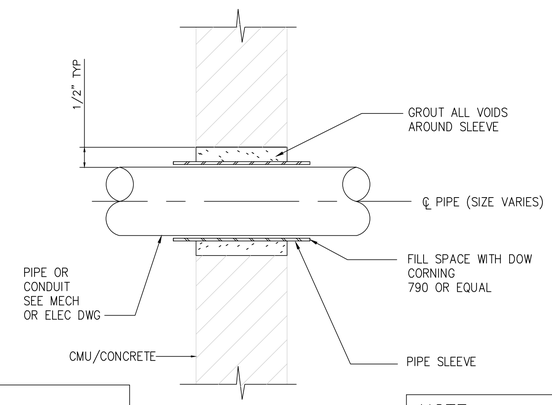
3 (N) EQUIPMENT CABINET MOUNTING DETAIL
SCALE: NOT TO SCALE



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



5 FIRE RATED PENETRATION – MULTIPLE METALLIC CONDUIT AT CONCRTE FLOOR AND UL CLASSIFIED CONCRETE BLOCK WALL
SCALE: NOT TO SCALE



NOTE:
IF PENTHOUSE WALL MATERIAL DIFFERS FROM SHOWN PLEASE CONTACT ENGINEER IMMEDIATELY

NOTE:
PIPE ANCHORAGE IS REQUIRED NEARBY TO PREVENT PIPE MOVEMENT THRU PENETRATION

6 CONCRTE CMU BLOCK WALL PENTRATION
SCALE: NOT TO SCALE

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

SHEET NUMBER: C-6
REVISION: 0

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

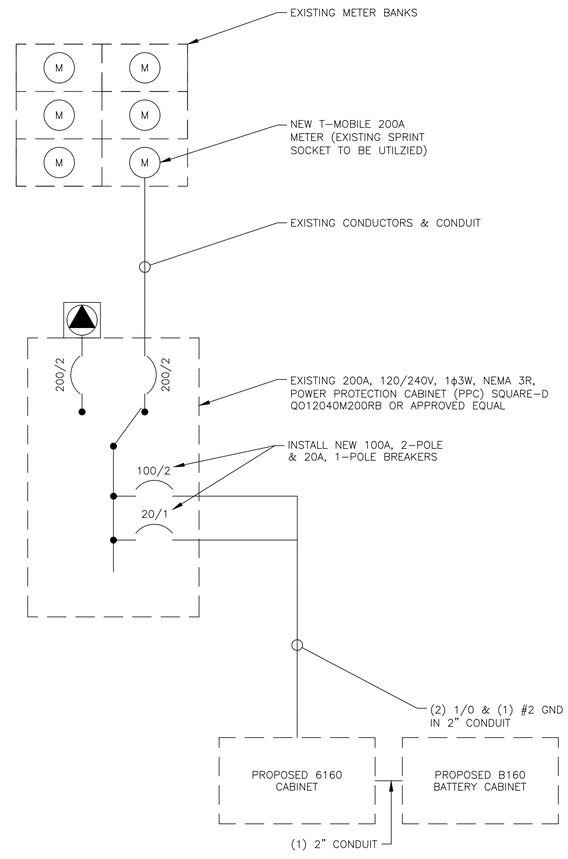
DESCRIPTION	LOAD (VA)	C or NC	C/B	CIR No.	PHASE LOADS (VA) A	PHASE LOADS (VA) B	CIR No.	C/B	C or NC	LOAD (VA)	DESCRIPTION
6160**	**7000**	**C**	**100**	**1**	7000		7	60	NC	0	TVSS
	7000	**C**		**2**		7000	8		NC	0	
100AMP SUB PANEL	2000	NC	100	3	2960		9	10	NC	960	UNKNOWN
	2000	NC		4		2180	10	15	NC	180	NID GFI
GFCI @ METER	180	NC	15	5	180		11	15	NC	0	FAN (OFF POSITION)
6160 GFI*	**180**	**NC**	**20**	**6**		180	12				BLANK
				BASE LOAD (VA) =	10140	9360					
				25% OF CONTINUOUS LOAD (VA) =	1750	1750					
				TOTAL LOAD (VA) =	11890	11110					
				TOTAL LOAD (A) =	99.1	92.6					

C = CONTINUOUS LOAD; NC = NON-CONTINUOUS LOAD
*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 AC PANEL SCHEDULE
SCALE: NOT TO SCALE

NOTES:

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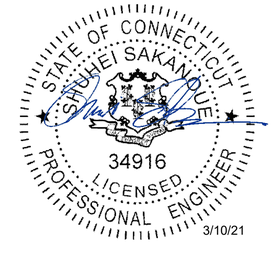
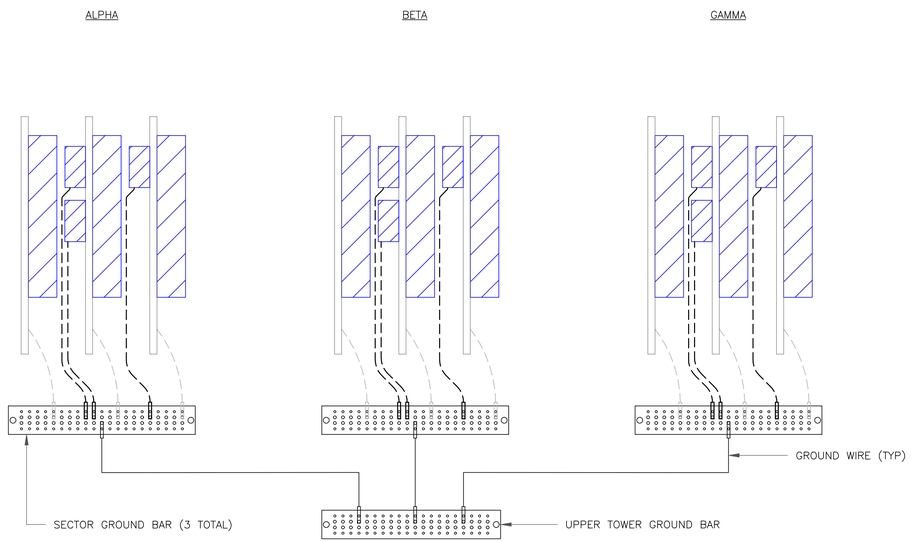


SHEET NUMBER: E-1
REVISION: 0



NOTE:

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

1 ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

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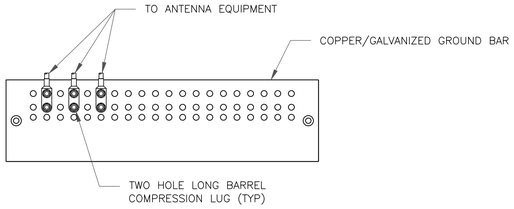
34916
LICENSED PROFESSIONAL ENGINEER
3/10/21

SHEET NUMBER: G-1

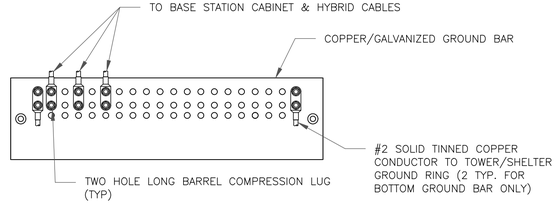
REVISION: 0



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.

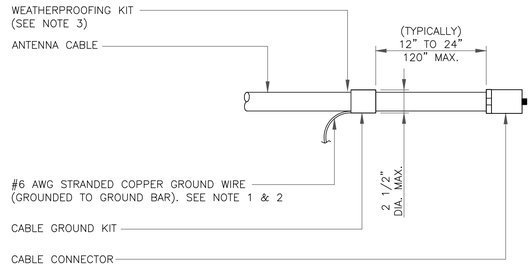
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



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.

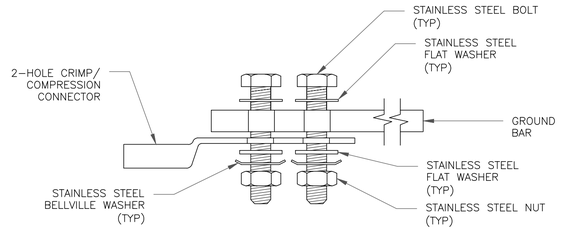
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



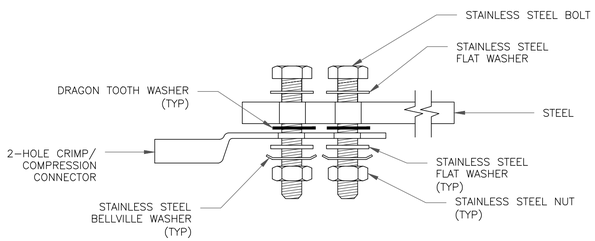
NOTES:

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.

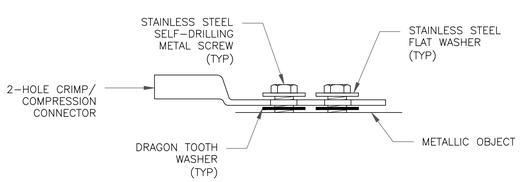
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS

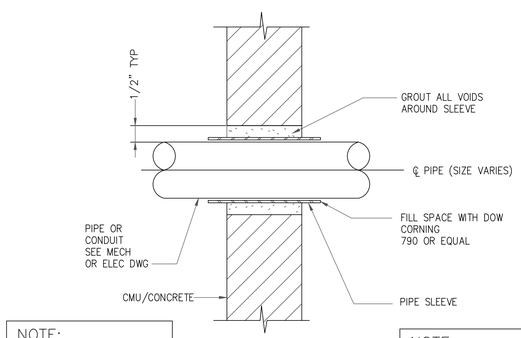


SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

4 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTE:
IF PENTHOUSE WALL MATERIAL DIFFERS FROM SHOWN PLEASE CONTACT ENGINEER IMMEDIATELY

NOTE:
PIPE ANCHORAGE IS REQUIRED NEARBY TO PREVENT PIPE MOVEMENT THRU PENETRATION

5 CONCRETE CMU BLOCK WALL PENETRATION
SCALE: NOT TO SCALE

6 NOT USED
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
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T-MOBILE SITE NUMBER:
CTNH454A

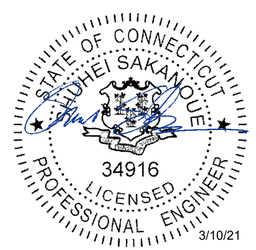
BU #: **876379**
N. WOODBURY / WOLFF PARCEL

1440 MAIN STREET NORTH
WOODBURY, CT 06798

EXISTING 160'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	02/17/2021	RCD	PRELIMINARY	SS
0	03/10/2021	BMM	FINAL	SS



SHEET NUMBER: G-2

REVISION: 0

Exhibit D

Structural Analysis Report

Date: **February 17, 2021**

MORRISON HERSHFIELD

Morrison Hershfield
1455 Lincoln Parkway, Suite 500
Atlanta, GA 30346
(770) 379-8500

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Sprint PCS* Co-Locate**	
	Site Number:	CTNH454A
	Site Name:	CTNH454A
Crown Castle Designation:	**BU Number:**	876379
	Site Name:	N. WOODBURY / WOLFF PARCEL
	JDE Job Number:	628856
	Work Order Number:	1918929
	Order Number:	538772 Rev. 1
Engineering Firm Designation:	**Morrison Hershfield Project Number:** CN7-279 / 2101398	
Site Data:	**1440 Main Street North, Woodbury, Litchfield County, CT 06798** **Latitude *41° 35' 23.81"*, Longitude *-73° 10' 11.52"*** **163 Foot - EEI Monopole Tower**	

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

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

LC5: Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code (2015 IBC). Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Respectfully submitted by:

G. Lance Cooke, P.E. (CT License No.PEN.0028133)
Senior Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 163 ft monopole tower designed by Engineered Endeavors, Inc.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
156.0	158.0	3	ericsson	AIR6449 B41_T-MOBILE w/ Mount Pipe	4	1-5/8
		3	ericsson	RADIO 4415 B66A_CCIV3		
		3	ericsson	RADIO 4424 B25_TMO		
		3	ericsson	RADIO 4449 B71 B85A_T-MOBILE		
		3	rfs celwave	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe		
		3	rfs celwave	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe		
	156.0	1	-	Platform Mount [LP 602-1]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
160.0	171.0	1	sinclair	SC229-SFXLDF	1	1/2
	160.0	1	-	Pipe Mount [PM 601-1]		
148.0	150.0	3	alcatel lucent	RRH2x60-700	13	1-5/8
		6	andrew	SBNHH-1D65B w/ Mount Pipe		
		3	antel	BXA-70063-6CF-2 w/ Mount Pipe		
		6	antel	LPA-80080/6CF w/ Mount Pipe		
		1	raycap	RXXDC-3315-PF-48		
	148.0	1	-	Platform Mount [LP 401-1]		
141.0	142.0	12	decibel	DB846G90A-XY w/ Mount Pipe	12	1-5/8
	141.0	1	-	Platform Mount [LP 303-1]		
120.0	121.0	6	ericsson	TME-RRUS-11	-	-
	120.0	1	-	Side Arm Mount [SO 104-3]		
118.0	119.0	6	commscope	NNHH-65B-R4 w/ Mount Pipe	12	1-5/8
		3	ericsson	RRUS 4449 B5/B12	4	7/8

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	ericsson	RRUS 4478 B14	2	3/8
		3	ericsson	RRUS 8843 B2/B66A		
		3	powerwave technologies	7770.00 w/ Mount Pipe		
		3	powerwave technologies	TT19-08BP111-001		
		1	raycap	DC6-48-60-0-8C-EV		
		1	raycap	DC6-48-60-18-8F		
	118.0	1	-	Platform Mount [LP 401-1_KCKR]		
108.0	110.0	1	telewave	ANT150D6-9	1	1/2
22.0	24.0	1	lucent	KS24019-L112A	1	1/2
	22.0	1	-	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	1531966	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	1614612	CCISITES
4-TOWER MANUFACTURER DRAWINGS	1613543	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were maintained in accordance with the TIA-222 Standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Morrison Hershfield 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	163 - 121.58	Pole	TP42.37x34.28x0.3125	1	-14.82	2492.98	17.9	Pass
L2	121.58 - 84.663	Pole	TP48.83x40.6057x0.375	2	-30.19	3448.83	34.7	Pass
L3	84.663 - 42.2	Pole	TP56.25x46.7974x0.4375	3	-46.25	4636.16	44.3	Pass
L4	42.2 - 0	Pole	TP63.5x53.916x0.5	4	-70.47	6141.33	49.3	Pass
							Summary	
						Pole (L4)	49.3	Pass
						Rating =	49.3	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	48.6	Pass
1	Base Plate		48.6	Pass
1	Base Foundation	0	49.4	Pass
1	Base Foundation Soil Interaction		27.0	Pass

Structure Rating (max from all components) =	49.4%*

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.

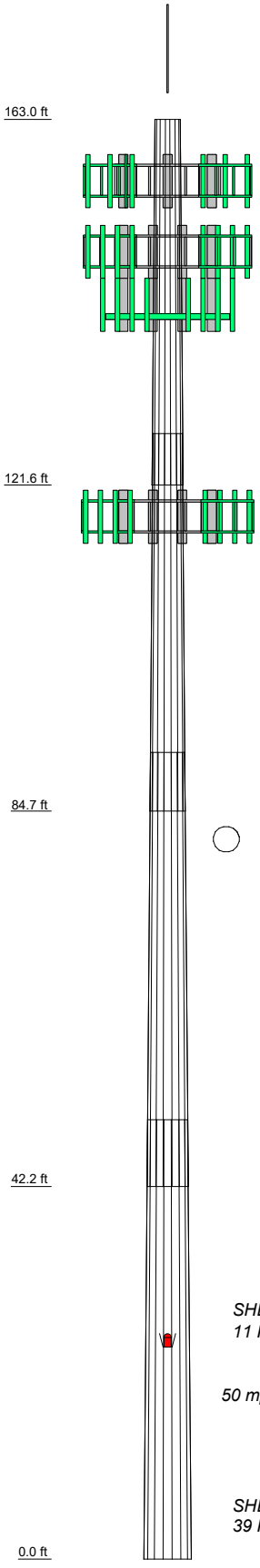
4.1) Recommendations

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

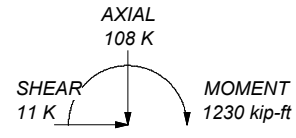
APPENDIX A

TNXTOWER OUTPUT

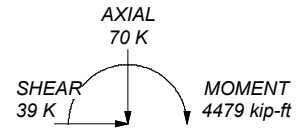
Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	41.42	18	0.3125	5.83	34.2800	42.3700		5.3
2	42.75	18	0.3750	6.67	40.6057	48.8300		7.7
3	49.13	18	0.4375	7.58	46.7974	56.2500	A572-65	11.9
4	49.78	18	0.5000		53.9160	63.5000		15.6
								40.5



ALL REACTIONS ARE FACTORED



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



TORQUE 1 kip-ft
REACTIONS - 120 mph WIND

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 49.3%

Morrison Hershfield
Consulting Engineers
1455 Lincoln Parkway, Suite 500
Atlanta, GA 30346
Phone: (770) 379-8500
FAX: (770) 379-8501

Job:	***CN7-279 / 2101398***		
Project:	***876379 / N. Woodbury / Wolff Parcel***		
Client: Crown Castle USA	Drawn by: MG		App'd:
Code: TIA-222-H	Date: 02/17/21		Scale: NTS
Path: C:\Users\MGoll\Desktop\Important\Jobs\2021\SA\CN7-279 Salkiran\Analysis\CN7-279 BU_876379_WO_1918926.eri			Dwg No. E-1

Tower Input Data

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

- Tower is located in Litchfield County, Connecticut.
- Tower base elevation above sea level: 490.00 ft.
- Basic wind speed of 120 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.5000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- 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	163.00-121.58	41.42	5.83	18	34.2800	42.3700	0.3125	1.2500	A572-65 (65 ksi)
L2	121.58-84.66	42.75	6.67	18	40.6057	48.8300	0.3750	1.5000	A572-65 (65 ksi)
L3	84.66-42.20	49.13	7.58	18	46.7974	56.2500	0.4375	1.7500	A572-65 (65 ksi)
L4	42.20-0.00	49.78		18	53.9160	63.5000	0.5000	2.0000	A572-65 (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	34.7606	33.6915	4911.1720	12.0585	17.4142	282.0205	9828.8063	16.8490	5.4833	17.546
	42.9754	41.7158	9322.3361	14.9304	21.5240	433.1144	18656.9387	20.8619	6.9071	22.103
L2	42.3137	47.8846	9791.4961	14.2819	20.6277	474.6769	19595.8761	23.9469	6.4866	17.298
	49.5254	57.6736	17107.6924	17.2015	24.8056	689.6695	34237.8956	28.8423	7.9341	21.158
L3	48.7543	64.3765	17480.3376	16.4578	23.7731	735.2997	34983.6764	32.1944	7.4663	17.066
	57.0503	77.5026	30501.1953	19.8134	28.5750	1067.4084	61042.5248	38.7587	9.1300	20.869
L4	56.1530	84.7712	30558.3040	18.9627	27.3893	1115.7005	61156.8174	42.3937	8.6092	17.218
	64.4025	99.9810	50134.4235	22.3650	32.2580	1554.1702	100334.8152	50.0000	10.2960	20.592

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 163.00-121.58				1	1	1			
L2 121.58-84.66				1	1	1			
L3 84.66-42.20				1	1	1			
L4 42.20-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
******										
Safety Line 3/8	A	No	Surface Ar (CaAa)	163.00 - 10.00	1	1	-0.450 -0.450	0.3750		0.22
Climbing Pegs	A	No	Surface Ar (CaAa)	163.00 - 10.00	1	1	-0.500 -0.400	0.7050		1.80
******										
LDF4-50A(1/2)	A	No	Surface Ar (CaAa)	22.00 - 0.00	1	1	-0.500 -0.480	0.6250		0.15
******										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
******									
LDF4-50A(1/2)	B	No	No	Inside Pole	160.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
******									
***									
HB158-21U6S24-xxM_TMO(1-5/8)	A	No	No	Inside Pole	156.00 - 4.00	4	No Ice	0.00	2.50
							1/2" Ice	0.00	2.50
							1" Ice	0.00	2.50
							2" Ice	0.00	2.50
******									
LDF7-50A(1-5/8)	A	No	No	Inside Pole	148.00 - 8.00	12	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
HB158-1-08U8-S8J18(1-5/8)	A	No	No	Inside Pole	148.00 - 8.00	1	No Ice	0.00	1.30
							1/2" Ice	0.00	1.30
							1" Ice	0.00	1.30
							2" Ice	0.00	1.30
******									
LDF7-50A(1-5/8)	A	No	No	Inside Pole	141.00 - 10.00	12	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
******									
FB-L98B-002-75000(3/8)	C	No	No	Inside Pole	118.00 - 10.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
FB-L98B-034-XXX(3/8")	C	No	No	Inside Pole	118.00 - 10.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-VG66ST-BRD(7/8)	C	No	No	Inside Pole	118.00 - 10.00	2	No Ice	0.00	0.91
							1/2" Ice	0.00	0.91
							1" Ice	0.00	0.91
							2" Ice	0.00	0.91
WR-VG86ST-BRDA(7/8)	C	No	No	Inside Pole	118.00 - 10.00	2	No Ice	0.00	0.68
							1/2" Ice	0.00	0.68
							1" Ice	0.00	0.68
							2" Ice	0.00	0.68
LCF158-50A(1-5/8)	C	No	No	Inside Pole	118.00 - 10.00	12	No Ice	0.00	0.80
							1/2" Ice	0.00	0.80
							1" Ice	0.00	0.80
							2" Ice	0.00	0.80
******									
LDF4-50A(1/2)	B	No	No	Inside Pole	108.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
******									

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	163.00-121.58	A	0.000	0.000	4.473	0.000	0.91
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.00
L2	121.58-84.66	A	0.000	0.000	3.987	0.000	1.22

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.43
L3	84.66-42.20	A	0.000	0.000	4.586	0.000	1.40
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.55
L4	42.20-0.00	A	0.000	0.000	4.853	0.000	1.15
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.42

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	163.00-121.58	A	1.475	0.000	0.000	28.912	0.000	1.21
		B		0.000	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.000	0.000	0.00
L2	121.58-84.66	A	1.428	0.000	0.000	25.769	0.000	1.49
		B		0.000	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.000	0.000	0.43
L3	84.66-42.20	A	1.361	0.000	0.000	28.848	0.000	1.69
		B		0.000	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.000	0.000	0.55
L4	42.20-0.00	A	1.221	0.000	0.000	28.366	0.000	1.42
		B		0.000	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.000	0.000	0.42

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	163.00-121.58	-0.7765	0.3457	-2.5398	1.1308
L2	121.58-84.66	-0.7799	0.3472	-2.6205	1.1667
L3	84.66-42.20	-0.7824	0.3484	-2.6207	1.1668
L4	42.20-0.00	-0.8220	0.3904	-2.6149	1.2356

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	2	Safety Line 3/8	121.58 - 163.00	1.0000	1.0000
L1	3	Climbing Pegs	121.58 - 163.00	1.0000	1.0000
L2	2	Safety Line 3/8	84.66 - 121.58	1.0000	1.0000
L2	3	Climbing Pegs	84.66 - 121.58	1.0000	1.0000
L3	2	Safety Line 3/8	42.20 - 84.66	1.0000	1.0000
L3	3	Climbing Pegs	42.20 - 84.66	1.0000	1.0000
L4	2	Safety Line 3/8	10.00 - 42.20	1.0000	1.0000
L4	3	Climbing Pegs	10.00 - 42.20	1.0000	1.0000
L4	25	LDF4-50A(1/2)	0.00 - 22.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
******									
SC229-SFXLDF	A	From Leg	1.00 0.00 11.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.95 7.97 10.00 14.12	5.95 7.97 10.00 14.12	0.03 0.07 0.13 0.28
Pipe Mount [PM 601-1]	A	From Leg	0.50 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.32 1.58 1.84 2.40	1.32 1.58 1.84 2.40	0.07 0.08 0.09 0.13
******									
6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
Platform Mount [LP 602-1]	C	None		0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	31.07 34.82 38.48 45.60	31.07 34.82 38.48 45.60	1.34 1.97 2.67 4.31
***									
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.29 6.86 7.45 8.68	2.76 3.27 3.79 4.90	0.06 0.11 0.16 0.29
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.29 6.86 7.45 8.68	2.76 3.27 3.79 4.90	0.06 0.11 0.16 0.29
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.29 6.86 7.45 8.68	2.76 3.27 3.79 4.90	0.06 0.11 0.16 0.29
APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.69 15.46 16.23 17.82	6.87 7.55 8.25 9.67	0.18 0.31 0.45 0.78
APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.69 15.46 16.23 17.82	6.87 7.55 8.25 9.67	0.18 0.31 0.45 0.78
APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice 1/2" Ice Ice	14.69 15.46 16.23	6.87 7.55 8.25	0.18 0.31 0.45

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	17.82	9.67	0.78
						2" Ice			
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice	5.87	3.27	0.13
						1/2" Ice	6.23	3.73	0.18
						1" Ice	6.61	4.20	0.23
						2" Ice	7.38	5.20	0.36
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice	5.87	3.27	0.13
						1/2" Ice	6.23	3.73	0.18
						1" Ice	6.61	4.20	0.23
						2" Ice	7.38	5.20	0.36
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice	5.87	3.27	0.13
						1/2" Ice	6.23	3.73	0.18
						1" Ice	6.61	4.20	0.23
						2" Ice	7.38	5.20	0.36
RADIO 4415 B66A_CCIV3	A	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice	1.64	0.68	0.05
						1/2" Ice	1.80	0.79	0.06
						1" Ice	1.97	0.91	0.07
						2" Ice	2.32	1.18	0.11
RADIO 4415 B66A_CCIV3	B	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice	1.64	0.68	0.05
						1/2" Ice	1.80	0.79	0.06
						1" Ice	1.97	0.91	0.07
						2" Ice	2.32	1.18	0.11
RADIO 4415 B66A_CCIV3	C	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice	1.64	0.68	0.05
						1/2" Ice	1.80	0.79	0.06
						1" Ice	1.97	0.91	0.07
						2" Ice	2.32	1.18	0.11
RADIO 4449 B71 B85A_T-MOBILE	A	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice	1.97	1.59	0.07
						1/2" Ice	2.15	1.75	0.09
						1" Ice	2.33	1.92	0.12
						2" Ice	2.72	2.28	0.17
RADIO 4449 B71 B85A_T-MOBILE	B	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice	1.97	1.59	0.07
						1/2" Ice	2.15	1.75	0.09
						1" Ice	2.33	1.92	0.12
						2" Ice	2.72	2.28	0.17
RADIO 4449 B71 B85A_T-MOBILE	C	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice	1.97	1.59	0.07
						1/2" Ice	2.15	1.75	0.09
						1" Ice	2.33	1.92	0.12
						2" Ice	2.72	2.28	0.17
RADIO 4424 B25_TMO	A	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice	2.05	1.61	0.09
						1/2" Ice	2.23	1.77	0.11
						1" Ice	2.42	1.94	0.13
						2" Ice	2.81	2.30	0.19
RADIO 4424 B25_TMO	B	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice	2.05	1.61	0.09
						1/2" Ice	2.23	1.77	0.11
						1" Ice	2.42	1.94	0.13
						2" Ice	2.81	2.30	0.19
RADIO 4424 B25_TMO	C	From Leg	4.00 0.00 2.00	0.0000	156.00	No Ice	2.05	1.61	0.09
						1/2" Ice	2.23	1.77	0.11
						1" Ice	2.42	1.94	0.13
						2" Ice	2.81	2.30	0.19
******									
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.00 0.00	0.0000	148.00	No Ice	4.56	10.26	0.05
						1/2" Ice	5.11	11.43	0.11

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
			2.00			Ice	5.61	12.31	0.19
						1" Ice	6.65	14.13	0.36
						2" Ice			
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.56 5.11 5.61 6.65	10.26 11.43 12.31 14.13	0.05 0.11 0.19 0.36
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.56 5.11 5.61 6.65	10.26 11.43 12.31 14.13	0.05 0.11 0.19 0.36
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.09 4.49 4.89 5.72	3.30 3.68 4.07 4.87	0.07 0.13 0.20 0.39
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.09 4.49 4.89 5.72	3.30 3.68 4.07 4.87	0.07 0.13 0.20 0.39
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.09 4.49 4.89 5.72	3.30 3.68 4.07 4.87	0.07 0.13 0.20 0.39
BXA-70063-6CF-2 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.81 8.36 8.87 9.93	5.80 6.95 7.82 9.60	0.04 0.10 0.17 0.34
BXA-70063-6CF-2 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.81 8.36 8.87 9.93	5.80 6.95 7.82 9.60	0.04 0.10 0.17 0.34
BXA-70063-6CF-2 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.81 8.36 8.87 9.93	5.80 6.95 7.82 9.60	0.04 0.10 0.17 0.34
RRH2x60-700	B	From Leg	4.00 0.00 2.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.50 3.76 4.03 4.58	1.82 2.05 2.29 2.79	0.06 0.08 0.11 0.17
RRH2x60-700	A	From Leg	4.00 0.00 2.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.50 3.76 4.03 4.58	1.82 2.05 2.29 2.79	0.06 0.08 0.11 0.17
RRH2x60-700	C	From Leg	4.00 0.00 2.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.50 3.76 4.03 4.58	1.82 2.05 2.29 2.79	0.06 0.08 0.11 0.17
RXXDC-3315-PF-48	B	From Leg	4.00 0.00 2.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.71 3.95 4.20 4.72	2.19 2.39 2.61 3.05	0.02 0.05 0.09 0.17
Platform Mount [LP 401-1]	C	None		0.0000	148.00	No Ice 1/2"	24.04 28.93	24.04 28.93	1.65 2.17

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
						Ice	33.88	33.88	2.76
						1" Ice	43.93	43.93	4.16
						2" Ice			
******									
(4) DB846G90A-XY w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.50 4.05 4.62 5.81	5.30 5.88 6.48 7.71	0.05 0.10 0.16 0.32
(4) DB846G90A-XY w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.50 4.05 4.62 5.81	5.30 5.88 6.48 7.71	0.05 0.10 0.16 0.32
(4) DB846G90A-XY w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.50 4.05 4.62 5.81	5.30 5.88 6.48 7.71	0.05 0.10 0.16 0.32
Platform Mount [LP 303-1]	C	None		0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.69 18.01 21.34 28.08	14.69 18.01 21.34 28.08	1.25 1.57 1.94 2.85
******									
(2) TME-RRUS-11	A	From Leg	1.00 0.00 1.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.96 3.23 3.50 4.09	1.67 1.98 2.30 3.02	0.06 0.08 0.12 0.19
(2) TME-RRUS-11	B	From Leg	1.00 0.00 1.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.96 3.23 3.50 4.09	1.67 1.98 2.30 3.02	0.06 0.08 0.12 0.19
(2) TME-RRUS-11	C	From Leg	1.00 0.00 1.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.96 3.23 3.50 4.09	1.67 1.98 2.30 3.02	0.06 0.08 0.12 0.19
4' x 2" Pipe Mount	A	From Leg	0.50 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.79 1.03 1.28 1.81	0.79 1.03 1.28 1.81	0.03 0.04 0.04 0.07
4' x 2" Pipe Mount	B	From Leg	0.50 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.79 1.03 1.28 1.81	0.79 1.03 1.28 1.81	0.03 0.04 0.04 0.07
4' x 2" Pipe Mount	C	From Leg	0.50 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.79 1.03 1.28 1.81	0.79 1.03 1.28 1.81	0.03 0.04 0.04 0.07
Side Arm Mount [SO 104-3]	C	None		0.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.62 3.30 3.98 5.35	2.62 3.30 3.98 5.35	0.29 0.41 0.53 0.77
******									
7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29

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
						2" Ice			
7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
(2) NNHH-65B-R4 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.55 8.04 8.53 9.56	4.23 4.67 5.12 6.05	0.11 0.20 0.30 0.53
(2) NNHH-65B-R4 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.55 8.04 8.53 9.56	4.23 4.67 5.12 6.05	0.11 0.20 0.30 0.53
(2) NNHH-65B-R4 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.55 8.04 8.53 9.56	4.23 4.67 5.12 6.05	0.11 0.20 0.30 0.53
RRUS 4478 B14	A	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.01 2.19 2.57	1.06 1.20 1.34 1.66	0.06 0.08 0.09 0.14
RRUS 4478 B14	B	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.01 2.19 2.57	1.06 1.20 1.34 1.66	0.06 0.08 0.09 0.14
RRUS 4478 B14	C	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.01 2.19 2.57	1.06 1.20 1.34 1.66	0.06 0.08 0.09 0.14
TT19-08BP111-001	A	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.55 0.64 0.74 0.97	0.44 0.53 0.63 0.84	0.02 0.02 0.03 0.05
TT19-08BP111-001	B	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.55 0.64 0.74 0.97	0.44 0.53 0.63 0.84	0.02 0.02 0.03 0.05
TT19-08BP111-001	C	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.55 0.64 0.74 0.97	0.44 0.53 0.63 0.84	0.02 0.02 0.03 0.05
RRUS 4449 B5/B12	A	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RRUS 4449 B5/B12	B	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16

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
						2" Ice			
RRUS 4449 B5/B12	C	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RRUS 8843 B2/B66A	A	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
RRUS 8843 B2/B66A	B	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
RRUS 8843 B2/B66A	C	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
DC6-48-60-18-8F	B	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.92 1.46 1.64 2.04	0.92 1.46 1.64 2.04	0.02 0.04 0.06 0.11
DC6-48-60-0-8C-EV	C	From Leg	4.00 0.00 1.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.74 2.96 3.20 3.68	4.78 5.06 5.35 5.95	0.03 0.06 0.10 0.20
6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
Platform Mount [LP 401-1_KCKR]	C	None		0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	35.26 43.15 51.27 68.18	35.26 43.15 51.27 68.18	1.92 2.58 3.36 5.24
******									
ANT150D6-9	A	From Leg	2.00 0.00 2.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.84 6.42 9.00 14.16	3.84 6.42 9.00 14.16	0.00 0.00 0.00 0.00
******									
KS24019-L112A	A	From Leg	3.00 0.00 2.00	0.0000	22.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.14 0.20 0.26 0.41	0.14 0.20 0.26 0.41	0.01 0.01 0.01 0.02
Side Arm Mount [SO 701-1]	A	From Leg	1.50 0.00	0.0000	22.00	No Ice 1/2"	0.85 1.14	1.67 2.34	0.07 0.08

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
******			0.00			Ice 1" Ice 2" Ice	1.43 2.01	3.01 4.35	0.09 0.12

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
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	163 - 121.58	Pole	Max Tension	14	0.00	0.00	0.00
			Max. Compression	26	-32.65	-0.13	0.69
			Max. Mx	20	-14.82	416.47	0.84
			Max. My	2	-14.82	0.65	416.02
			Max. Vy	20	-18.48	416.47	0.84
			Max. Vx	2	-18.45	0.65	416.02
			Max. Torque	21			-0.87
L2	121.58 - 84.663	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.25	0.78	0.33
			Max. Mx	20	-30.19	1322.25	2.70
			Max. My	2	-30.19	2.77	1321.49
			Max. Vy	20	-28.82	1322.25	2.70
			Max. Vx	2	-28.82	2.77	1321.49
			Max. Torque	11			0.75
L3	84.663 - 42.2	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-78.52	1.51	0.75
			Max. Mx	20	-46.25	2632.62	5.39
			Max. My	2	-46.25	5.53	2632.13
			Max. Vy	20	-34.13	2632.62	5.39
			Max. Vx	2	-34.14	5.53	2632.13
			Max. Torque	19			-0.75
L4	42.2 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-107.67	2.41	1.79
			Max. Mx	20	-70.47	4471.82	8.87
			Max. My	2	-70.47	8.76	4471.42
			Max. Vy	20	-39.39	4471.82	8.87
			Max. Vx	2	-39.37	8.76	4471.42
			Max. Torque	19			-0.96

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	37	107.67	9.38	5.42
	Max. H_x	20	70.49	39.36	0.06
	Max. H_z	2	70.49	0.06	39.34
	Max. M_x	2	4471.42	0.06	39.34
	Max. M_z	8	4470.57	-39.36	-0.06
	Max. Torsion	7	0.96	-34.05	19.62
	Min. Vert	17	52.87	19.63	-34.04
	Min. H_x	8	70.49	-39.36	-0.06
	Min. H_z	14	70.49	-0.06	-39.34
	Min. M_x	14	-4469.93	-0.06	-39.34
	Min. M_z	20	-4471.82	39.36	0.06
	Min. Torsion	19	-0.96	34.05	-19.62

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	58.74	0.00	0.00	-0.61	0.51	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	70.49	-0.06	-39.34	-4471.42	8.76	-0.31
0.9 Dead+1.0 Wind 0 deg -	52.87	-0.06	-39.34	-4437.32	8.53	-0.31

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
No Ice						
1.2 Dead+1.0 Wind 30 deg - No Ice	70.49	19.63	-34.04	-3868.40	-2227.94	-0.73
0.9 Dead+1.0 Wind 30 deg - No Ice	52.87	19.63	-34.04	-3838.88	-2211.20	-0.73
1.2 Dead+1.0 Wind 60 deg - No Ice	70.49	34.05	-19.62	-2229.04	-3867.49	-0.96
0.9 Dead+1.0 Wind 60 deg - No Ice	52.87	34.05	-19.62	-2211.95	-3838.31	-0.96
1.2 Dead+1.0 Wind 90 deg - No Ice	70.49	39.36	0.06	7.39	-4470.57	-0.93
0.9 Dead+1.0 Wind 90 deg - No Ice	52.87	39.36	0.06	7.52	-4436.82	-0.93
1.2 Dead+1.0 Wind 120 deg - No Ice	70.49	34.11	19.72	2241.64	-3875.61	-0.65
0.9 Dead+1.0 Wind 120 deg - No Ice	52.87	34.11	19.72	2224.82	-3846.37	-0.65
1.2 Dead+1.0 Wind 150 deg - No Ice	70.49	19.73	34.10	3875.04	-2242.02	-0.20
0.9 Dead+1.0 Wind 150 deg - No Ice	52.87	19.73	34.10	3845.83	-2225.16	-0.20
1.2 Dead+1.0 Wind 180 deg - No Ice	70.49	0.06	39.34	4469.93	-7.51	0.30
0.9 Dead+1.0 Wind 180 deg - No Ice	52.87	0.06	39.34	4436.22	-7.60	0.31
1.2 Dead+1.0 Wind 210 deg - No Ice	70.49	-19.63	34.04	3866.92	2229.19	0.73
0.9 Dead+1.0 Wind 210 deg - No Ice	52.87	-19.63	34.04	3837.77	2212.13	0.73
1.2 Dead+1.0 Wind 240 deg - No Ice	70.49	-34.05	19.62	2227.56	3868.74	0.96
0.9 Dead+1.0 Wind 240 deg - No Ice	52.87	-34.05	19.62	2210.85	3839.24	0.96
1.2 Dead+1.0 Wind 270 deg - No Ice	70.49	-39.36	-0.06	-8.87	4471.82	0.93
0.9 Dead+1.0 Wind 270 deg - No Ice	52.87	-39.36	-0.06	-8.62	4437.76	0.93
1.2 Dead+1.0 Wind 300 deg - No Ice	70.49	-34.11	-19.72	-2243.12	3876.86	0.65
0.9 Dead+1.0 Wind 300 deg - No Ice	52.87	-34.11	-19.72	-2225.92	3847.30	0.65
1.2 Dead+1.0 Wind 330 deg - No Ice	70.49	-19.73	-34.10	-3876.52	2243.27	0.20
0.9 Dead+1.0 Wind 330 deg - No Ice	52.87	-19.73	-34.10	-3846.94	2226.10	0.20
1.2 Dead+1.0 Ice+1.0 Temp	107.67	0.00	0.00	-1.79	2.41	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	107.67	-0.01	-10.81	-1227.08	4.12	-0.02
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	107.67	5.40	-9.36	-1062.15	-608.80	-0.28
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	107.67	9.37	-5.40	-613.12	-1057.91	-0.47
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	107.67	10.82	0.01	-0.31	-1222.86	-0.53
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	107.67	9.38	5.42	612.08	-1059.47	-0.44
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	107.67	5.42	9.37	1059.96	-611.51	-0.24
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	107.67	0.01	10.81	1223.33	0.99	0.02
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	107.67	-5.40	9.36	1058.40	613.91	0.28
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	107.67	-9.37	5.40	609.37	1063.02	0.47
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	107.67	-10.82	-0.01	-3.44	1227.98	0.53
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	107.67	-9.38	-5.42	-615.83	1064.58	0.44
1.2 Dead+1.0 Wind 330	107.67	-5.42	-9.37	-1063.71	616.62	0.24

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	58.74	-0.01	-9.26	-1048.39	2.43	-0.07
Dead+Wind 30 deg - Service	58.74	4.62	-8.01	-907.06	-521.78	-0.17
Dead+Wind 60 deg - Service	58.74	8.02	-4.62	-522.85	-906.03	-0.23
Dead+Wind 90 deg - Service	58.74	9.27	0.01	1.29	-1047.37	-0.22
Dead+Wind 120 deg - Service	58.74	8.03	4.64	524.92	-907.93	-0.15
Dead+Wind 150 deg - Service	58.74	4.65	8.03	907.73	-525.08	-0.05
Dead+Wind 180 deg - Service	58.74	0.01	9.26	1047.15	-1.39	0.07
Dead+Wind 210 deg - Service	58.74	-4.62	8.01	905.82	522.82	0.17
Dead+Wind 240 deg - Service	58.74	-8.02	4.62	521.62	907.07	0.23
Dead+Wind 270 deg - Service	58.74	-9.27	-0.01	-2.52	1048.41	0.22
Dead+Wind 300 deg - Service	58.74	-8.03	-4.64	-526.15	908.97	0.15
Dead+Wind 330 deg - Service	58.74	-4.65	-8.03	-908.97	526.12	0.05

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	0.00	-58.74	0.00	0.00	58.74	0.00	0.000%
2	-0.06	-70.49	-39.34	0.06	70.49	39.34	0.000%
3	-0.06	-52.87	-39.34	0.06	52.87	39.34	0.000%
4	19.63	-70.49	-34.04	-19.63	70.49	34.04	0.000%
5	19.63	-52.87	-34.04	-19.63	52.87	34.04	0.000%
6	34.05	-70.49	-19.62	-34.05	70.49	19.62	0.000%
7	34.05	-52.87	-19.62	-34.05	52.87	19.62	0.000%
8	39.36	-70.49	0.06	-39.36	70.49	-0.06	0.000%
9	39.36	-52.87	0.06	-39.36	52.87	-0.06	0.000%
10	34.11	-70.49	19.72	-34.11	70.49	-19.72	0.000%
11	34.11	-52.87	19.72	-34.11	52.87	-19.72	0.000%
12	19.73	-70.49	34.10	-19.73	70.49	-34.10	0.000%
13	19.73	-52.87	34.10	-19.73	52.87	-34.10	0.000%
14	0.06	-70.49	39.34	-0.06	70.49	-39.34	0.000%
15	0.06	-52.87	39.34	-0.06	52.87	-39.34	0.000%
16	-19.63	-70.49	34.04	19.63	70.49	-34.04	0.000%
17	-19.63	-52.87	34.04	19.63	52.87	-34.04	0.000%
18	-34.05	-70.49	19.62	34.05	70.49	-19.62	0.000%
19	-34.05	-52.87	19.62	34.05	52.87	-19.62	0.000%
20	-39.36	-70.49	-0.06	39.36	70.49	0.06	0.000%
21	-39.36	-52.87	-0.06	39.36	52.87	0.06	0.000%
22	-34.11	-70.49	-19.72	34.11	70.49	19.72	0.000%
23	-34.11	-52.87	-19.72	34.11	52.87	19.72	0.000%
24	-19.73	-70.49	-34.10	19.73	70.49	34.10	0.000%
25	-19.73	-52.87	-34.10	19.73	52.87	34.10	0.000%
26	0.00	-107.67	0.00	0.00	107.67	0.00	0.000%
27	-0.01	-107.67	-10.81	0.01	107.67	10.81	0.000%
28	5.40	-107.67	-9.36	-5.40	107.67	9.36	0.000%
29	9.37	-107.67	-5.40	-9.37	107.67	5.40	0.000%
30	10.82	-107.67	0.01	-10.82	107.67	-0.01	0.000%
31	9.38	-107.67	5.42	-9.38	107.67	-5.42	0.000%
32	5.42	-107.67	9.37	-5.42	107.67	-9.37	0.000%
33	0.01	-107.67	10.81	-0.01	107.67	-10.81	0.000%
34	-5.40	-107.67	9.36	5.40	107.67	-9.36	0.000%
35	-9.37	-107.67	5.40	9.37	107.67	-5.40	0.000%
36	-10.82	-107.67	-0.01	10.82	107.67	0.01	0.000%
37	-9.38	-107.67	-5.42	9.38	107.67	5.42	0.000%
38	-5.42	-107.67	-9.37	5.42	107.67	9.37	0.000%
39	-0.01	-58.74	-9.26	0.01	58.74	9.26	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
40	4.62	-58.74	-8.01	-4.62	58.74	8.01	0.000%
41	8.02	-58.74	-4.62	-8.02	58.74	4.62	0.000%
42	9.27	-58.74	0.01	-9.27	58.74	-0.01	0.000%
43	8.03	-58.74	4.64	-8.03	58.74	-4.64	0.000%
44	4.65	-58.74	8.03	-4.65	58.74	-8.03	0.000%
45	0.01	-58.74	9.26	-0.01	58.74	-9.26	0.000%
46	-4.62	-58.74	8.01	4.62	58.74	-8.01	0.000%
47	-8.02	-58.74	4.62	8.02	58.74	-4.62	0.000%
48	-9.27	-58.74	-0.01	9.27	58.74	0.01	0.000%
49	-8.03	-58.74	-4.64	8.03	58.74	4.64	0.000%
50	-4.65	-58.74	-8.03	4.65	58.74	8.03	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00014941
3	Yes	4	0.00000001	0.00008097
4	Yes	5	0.00000001	0.00020184
5	Yes	5	0.00000001	0.00009587
6	Yes	5	0.00000001	0.00020659
7	Yes	5	0.00000001	0.00009827
8	Yes	4	0.00000001	0.00017490
9	Yes	4	0.00000001	0.00010165
10	Yes	5	0.00000001	0.00020402
11	Yes	5	0.00000001	0.00009685
12	Yes	5	0.00000001	0.00020631
13	Yes	5	0.00000001	0.00009801
14	Yes	4	0.00000001	0.00013125
15	Yes	4	0.00000001	0.00006599
16	Yes	5	0.00000001	0.00020591
17	Yes	5	0.00000001	0.00009792
18	Yes	5	0.00000001	0.00020127
19	Yes	5	0.00000001	0.00009558
20	Yes	4	0.00000001	0.00021386
21	Yes	4	0.00000001	0.00013007
22	Yes	5	0.00000001	0.00020786
23	Yes	5	0.00000001	0.00009875
24	Yes	5	0.00000001	0.00020544
25	Yes	5	0.00000001	0.00009753
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00014426
28	Yes	5	0.00000001	0.00016081
29	Yes	5	0.00000001	0.00016116
30	Yes	5	0.00000001	0.00014384
31	Yes	5	0.00000001	0.00016084
32	Yes	5	0.00000001	0.00016118
33	Yes	5	0.00000001	0.00014387
34	Yes	5	0.00000001	0.00016125
35	Yes	5	0.00000001	0.00016098
36	Yes	5	0.00000001	0.00014447
37	Yes	5	0.00000001	0.00016231
38	Yes	5	0.00000001	0.00016189
39	Yes	4	0.00000001	0.00002684
40	Yes	4	0.00000001	0.00009727
41	Yes	4	0.00000001	0.00010343
42	Yes	4	0.00000001	0.00002781
43	Yes	4	0.00000001	0.00009840
44	Yes	4	0.00000001	0.00010128
45	Yes	4	0.00000001	0.00002674
46	Yes	4	0.00000001	0.00010249
47	Yes	4	0.00000001	0.00009661
48	Yes	4	0.00000001	0.00002806
49	Yes	4	0.00000001	0.00010342
50	Yes	4	0.00000001	0.00010025

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	163 - 121.58	14.412	49	0.6902	0.0006
L2	127.413 - 84.663	9.364	49	0.6430	0.0003
L3	91.33 - 42.2	4.970	49	0.4959	0.0002
L4	49.783 - 0	1.527	49	0.2733	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	SC229-SFXLDF	49	13.976	0.6882	0.0006	143299
156.00	6' x 2" Mount Pipe	49	13.395	0.6853	0.0005	102356
148.00	(2) LPA-80080/6CF w/ Mount Pipe	49	12.241	0.6783	0.0004	47766
141.00	(4) DB846G90A-XY w/ Mount Pipe	49	11.243	0.6698	0.0004	32567
120.00	(2) TME-RRUS-11	49	8.382	0.6208	0.0003	17856
118.00	7770.00 w/ Mount Pipe	49	8.123	0.6139	0.0003	17327
108.00	ANT150D6-9	49	6.873	0.5745	0.0002	15090
22.00	KS24019-L112A	49	0.455	0.1206	0.0000	18175

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	163 - 121.58	61.495	22	2.9464	0.0025
L2	127.413 - 84.663	39.960	22	2.7453	0.0013
L3	91.33 - 42.2	21.207	22	2.1173	0.0008
L4	49.783 - 0	6.516	22	1.1666	0.0004

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	SC229-SFXLDF	22	59.635	2.9376	0.0024	33797
156.00	6' x 2" Mount Pipe	22	57.158	2.9254	0.0022	24140
148.00	(2) LPA-80080/6CF w/ Mount Pipe	22	52.233	2.8957	0.0019	11265
141.00	(4) DB846G90A-XY w/ Mount Pipe	22	47.978	2.8596	0.0016	7680
120.00	(2) TME-RRUS-11	22	35.770	2.6504	0.0012	4205
118.00	7770.00 w/ Mount Pipe	22	34.666	2.6209	0.0011	4079
108.00	ANT150D6-9	22	29.329	2.4529	0.0010	3549
22.00	KS24019-L112A	22	1.943	0.5147	0.0001	4258

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	163 - 121.58 (1)	TP42.37x34.28x0.3125	41.42	0.00	0.0	40.5858	-14.82	2374.27	0.006
L2	121.58 - 84.663 (2)	TP48.83x40.6057x0.375	42.75	0.00	0.0	56.1469	-30.19	3284.60	0.009
L3	84.663 - 42.2 (3)	TP56.25x46.7974x0.4375	49.13	0.00	0.0	75.4767	-46.25	4415.39	0.010
L4	42.2 - 0 (4)	TP63.5x53.916x0.5	49.78	0.00	0.0	99.9810	-70.47	5848.89	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	163 - 121.58 (1)	TP42.37x34.28x0.3125	416.95	2309.39	0.181	0.00	2309.39	0.000
L2	121.58 - 84.663 (2)	TP48.83x40.6057x0.375	1324.33	3734.22	0.355	0.00	3734.22	0.000
L3	84.663 - 42.2 (3)	TP56.25x46.7974x0.4375	2637.04	5807.87	0.454	0.00	5807.87	0.000
L4	42.2 - 0 (4)	TP63.5x53.916x0.5	4479.02	8875.75	0.505	0.00	8875.75	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	163 - 121.58 (1)	TP42.37x34.28x0.3125	18.49	712.28	0.026	0.75	2552.39	0.000
L2	121.58 - 84.663 (2)	TP48.83x40.6057x0.375	28.87	985.38	0.029	0.44	4070.72	0.000
L3	84.663 - 42.2 (3)	TP56.25x46.7974x0.4375	34.18	1324.62	0.026	0.44	6305.18	0.000
L4	42.2 - 0 (4)	TP63.5x53.916x0.5	39.44	1754.67	0.022	0.65	9680.92	0.000

Pole Interaction Design Data

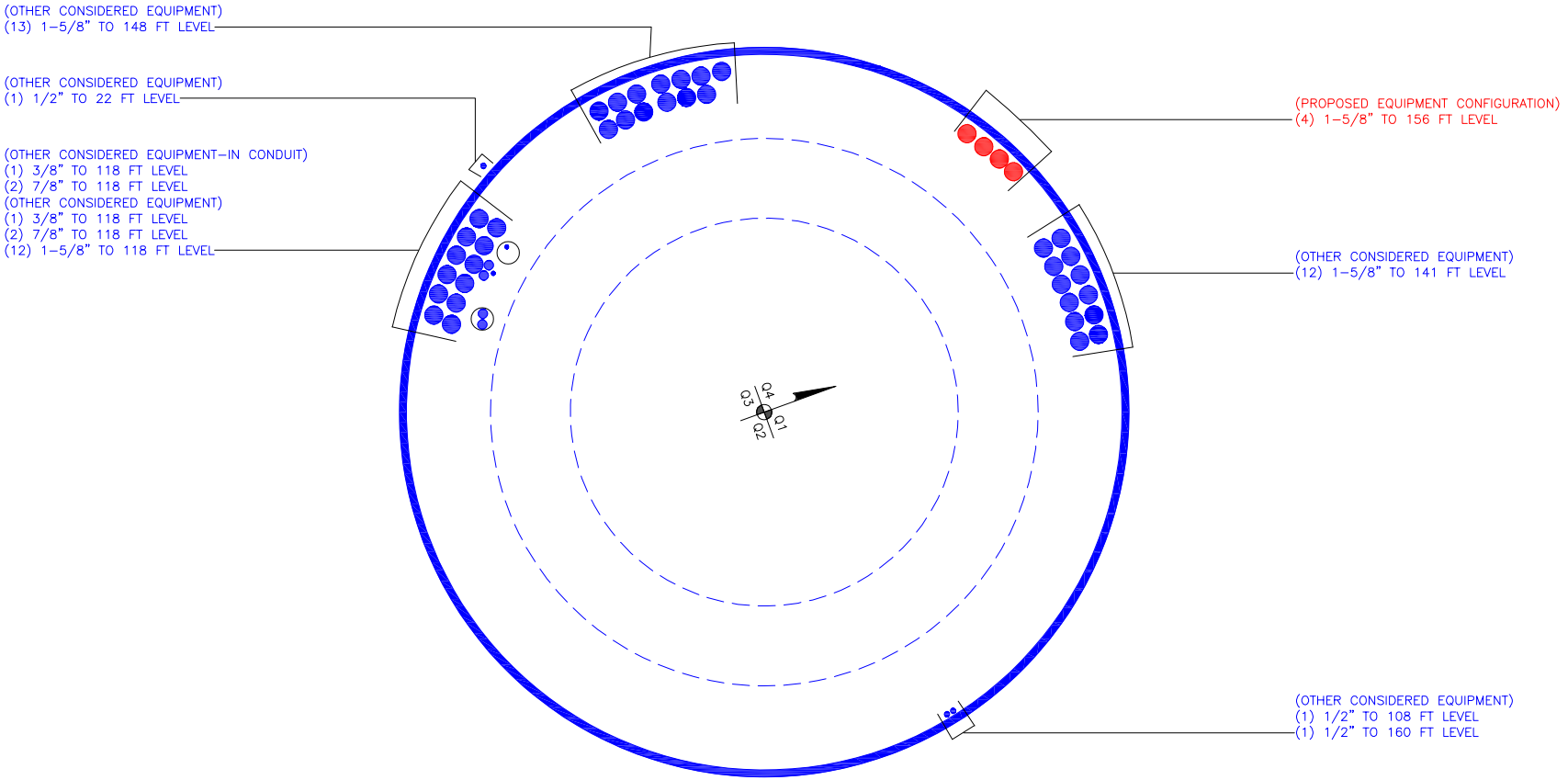
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	163 - 121.58 (1)	0.006	0.181	0.000	0.026	0.000	0.187	1.050	4.8.2
L2	121.58 - 84.663 (2)	0.009	0.355	0.000	0.029	0.000	0.365	1.050	4.8.2
L3	84.663 - 42.2 (3)	0.010	0.454	0.000	0.026	0.000	0.465	1.050	4.8.2
L4	42.2 - 0 (4)	0.012	0.505	0.000	0.022	0.000	0.517	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	163 - 121.58	Pole	TP42.37x34.28x0.3125	1	-14.82	2492.98	17.9	Pass
L2	121.58 - 84.663	Pole	TP48.83x40.6057x0.375	2	-30.19	3448.83	34.7	Pass
L3	84.663 - 42.2	Pole	TP56.25x46.7974x0.4375	3	-46.25	4636.16	44.3	Pass
L4	42.2 - 0	Pole	TP63.5x53.916x0.5	4	-70.47	6141.33	49.3	Pass
							Summary	
						Pole (L4)	49.3	Pass
						RATING =	**49.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876379 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

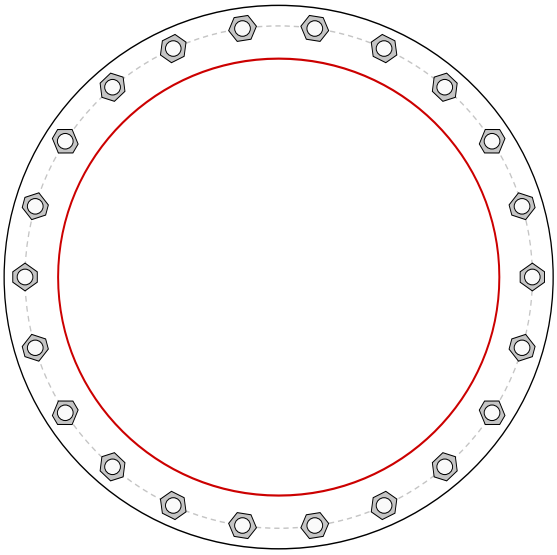
Monopole Base Plate Connection

Site Info	
BU #	876379
Site Name	Woodbury / Wolff Parc
Order #	538772 Rev. 1

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0.5

Applied Loads	
Moment (kip-ft)	4479.02
Axial Force (kips)	70.47
Shear Force (kips)	39.44

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(22) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 73" BC

Base Plate Data

79" OD x 2.5" Plate (A817 GR60; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

N/A

Pole Data

63.5" x 0.5" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

Pu_c = 137.02	ϕPn_c = 268.39	**Stress Rating**
Vu = 1.79	ϕVn = 120.77	**48.6%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	27.56	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**48.6%**	**Pass**

Drilled Pier Foundation

BU # :	876379
Site Name:	N Woodbury / Wolff Pa
Order Number:	538772 Rev.1

TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	4479.02	
Axial Force (kips)	70.49	
Shear Force (kips)	39.4	

Material Properties		
Concrete Strength, f'c:	4	ksi
Rebar Strength, Fy:	60	ksi
Tie Yield Strength, Fyt:	60	ksi

Pier Design Data		
Depth	28	ft
Ext. Above Grade	1	ft
Pier Section 1		
From 1' above grade to 28' below grade		
Pier Diameter	8	ft
Rebar Quantity	32	
Rebar Size	11	
Rebar Cage Diameter	85	in
Tie Size	5	
Tie Spacing	12	in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	7.69	-
Soil Safety Factor	4.68	-
Max Moment (kip-ft)	4737.90	-
Rating*	*27.0%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	555.43	-
End Bearing (kips)	1206.37	-
Weight of Concrete (kips)	211.52	-
Total Capacity (kips)	1761.80	-
Axial (kips)	282.01	-
Rating*	*15.2%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	7.37	-
Critical Moment (kip-ft)	4736.97	-
Critical Moment Capacity	9246.37	-
Rating*	*48.8%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	20.63	-
Critical Shear (kip)	474.96	-
Critical Shear Capacity	914.77	-
Rating*	*49.4%*	-

Soil Interaction Rating*	**27.0%**
Structural Foundation Rating*	**49.4%**

*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	14.5	# of Layers	4

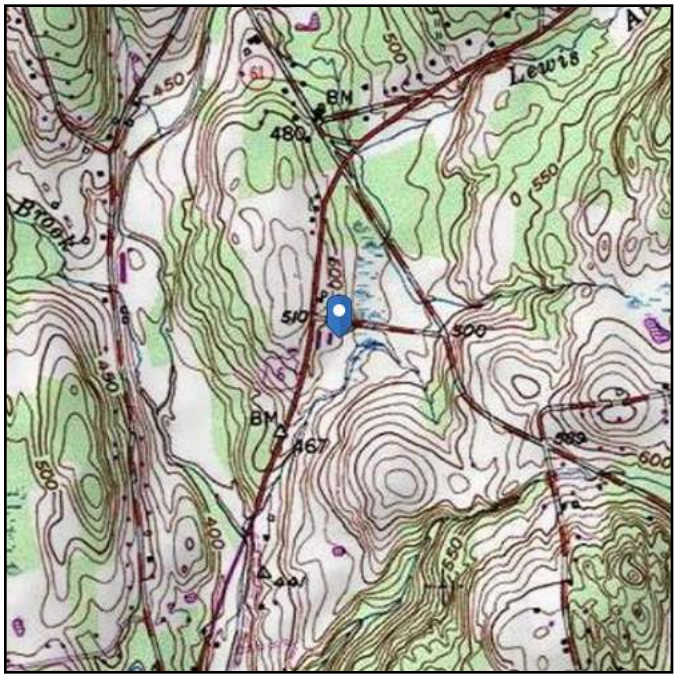
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	4.167	4.167	135	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	4.167	14.5	10.333	135	150	0	38	0.000	0.000	0.80	0.80			Cohesionless
3	14.5	15	0.5	75	87.6	0	38	0.000	0.000	0.80	0.80			Cohesionless
4	15	28	13	75	87.6	0	38	0.000	0.000	1.60	1.60	32		Cohesionless

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 490.19 ft (NAVD 88)
Latitude: 41.589947
Longitude: -73.169867



Wind

Results:

Wind Speed:	118 Vmph	120 mph Ultimate Wind Speed per Woodbury City Exception
10-year MRI	76 Vmph	
25-year MRI	85 Vmph	
50-year MRI	90 Vmph	
100-year MRI	97 Vmph	

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, and Section 26.5.2, incorporating errata of March 12, 2014

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

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

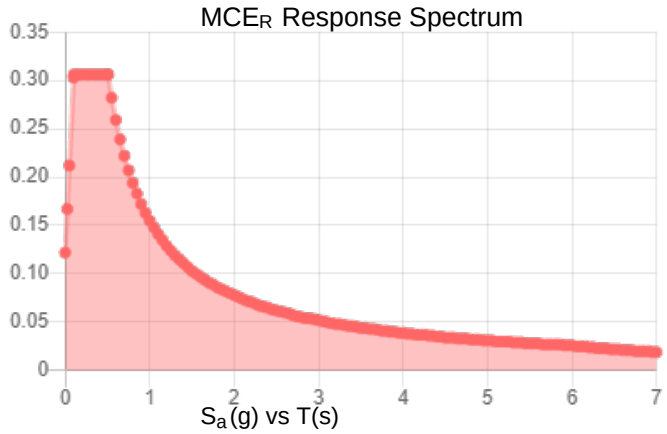
Seismic

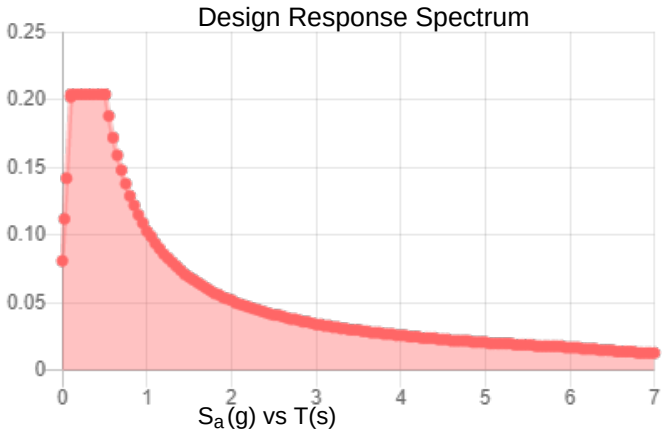
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.191	S_{DS} :	0.204
S_1 :	0.065	S_{D1} :	0.103
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.099
S_{MS} :	0.306	PGA_M :	0.159
S_{M1} :	0.155	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Mon Feb 15 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.	Ice Thickness = 2*0.75 = 1.5 in
Concurrent Temperature:	5 F	
Gust Speed:	50 mph	

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

Date Accessed: Mon Feb 15 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 E

Mount Analysis

Date: **February 3, 2021**

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

GPD Engineering and Architecture
Professional Corporation
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:	CTNH454A
	Carrier Site Name:	CTNH454A
Crown Castle Designation:	**Crown Castle BU Number:**	876379
	Crown Castle Site Name:	N. WOODBURY / WOLFF PARCEL
	Crown Castle JDE Job Number:	628856
	Crown Castle Order Number:	538772 Rev. 0
Engineering Firm Designation:	**GPD Report Designation:**	2021777.876379.01
Site Data:	**1440 Main Street North, Woodbury, Litchfield County, CT 06798** **Latitude 41° 35' 23.81" Longitude -73° 10' 11.52"**	
Structure Information:	**Tower Height & Type:**	**160.0 ft Monopole Tower**
	Mount Elevation:	**156.0 ft**
	Mount Type:	**10.7 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.

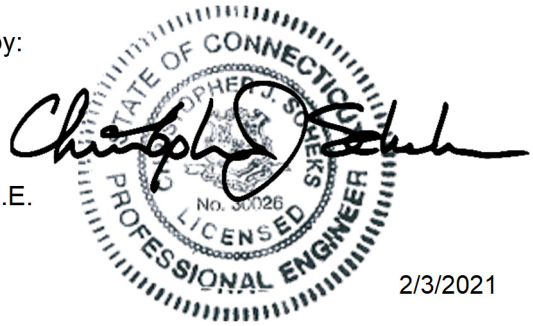
The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

Platform Mount **Sufficient – 87.1%**

This analysis utilizes an ultimate 3-second gust wind speed of 120 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: Eric Nieto

Respectfully Submitted by:



Christopher J. Scheks, P.E.
Connecticut #: 0030026

2/3/2021

TABLE OF CONTENTS

1) INTRODUCTION

This is a 10.7' Platform Mount. Mount geometry was obtained from site photos and experience with similar mounts.

New mount pipes have been assumed for the APXVAALL24_43-U-NA20_TMO panel.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	120 mph
Exposure Category:	C
Topographic Factor at Base:	1
Topographic Factor at Mount:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount Details
156.0	158.0	3	Ericsson	AIR6449 B41_T-MOBILE	10.7 ft. Platform Mount
		3	RFS/Celwave	APX16DWV-16DWV-S-E-A20	
		3	RFS/Celwave	APXVAALL24_43-U-NA20_TMO	
		3	Ericsson	RADIO 4415 B66A_CCIV3	
		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 538772 Rev. 0	-	CCI
RF Data Sheet	Site ID: CTNH454A, Draft Rev. 1, dated 1/11/2021	-	CCI
Mount Analysis	Tectonic Engineering and Surveying Consultants P.C. Work Order #: 7225.CT33XC518, dated 1/5/2015	9506787	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:

Channel, Solid Round, 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	Toe Rail	M83	156.0	81.4	Pass
	Platform Inner Bracing	M64		49.4	Pass
	Support Rail	M45A		59.5	Pass
	Support Rail Corner	M56A		31.8	Pass
	Pipe Mount	A2		87.1	Pass
	Ladder Support Bracing	M94		31.4	Pass
2,3	Mount to Tower Connection	-		52.8	Pass

Structure Rating (max from all components) =	**87.1%[3]**

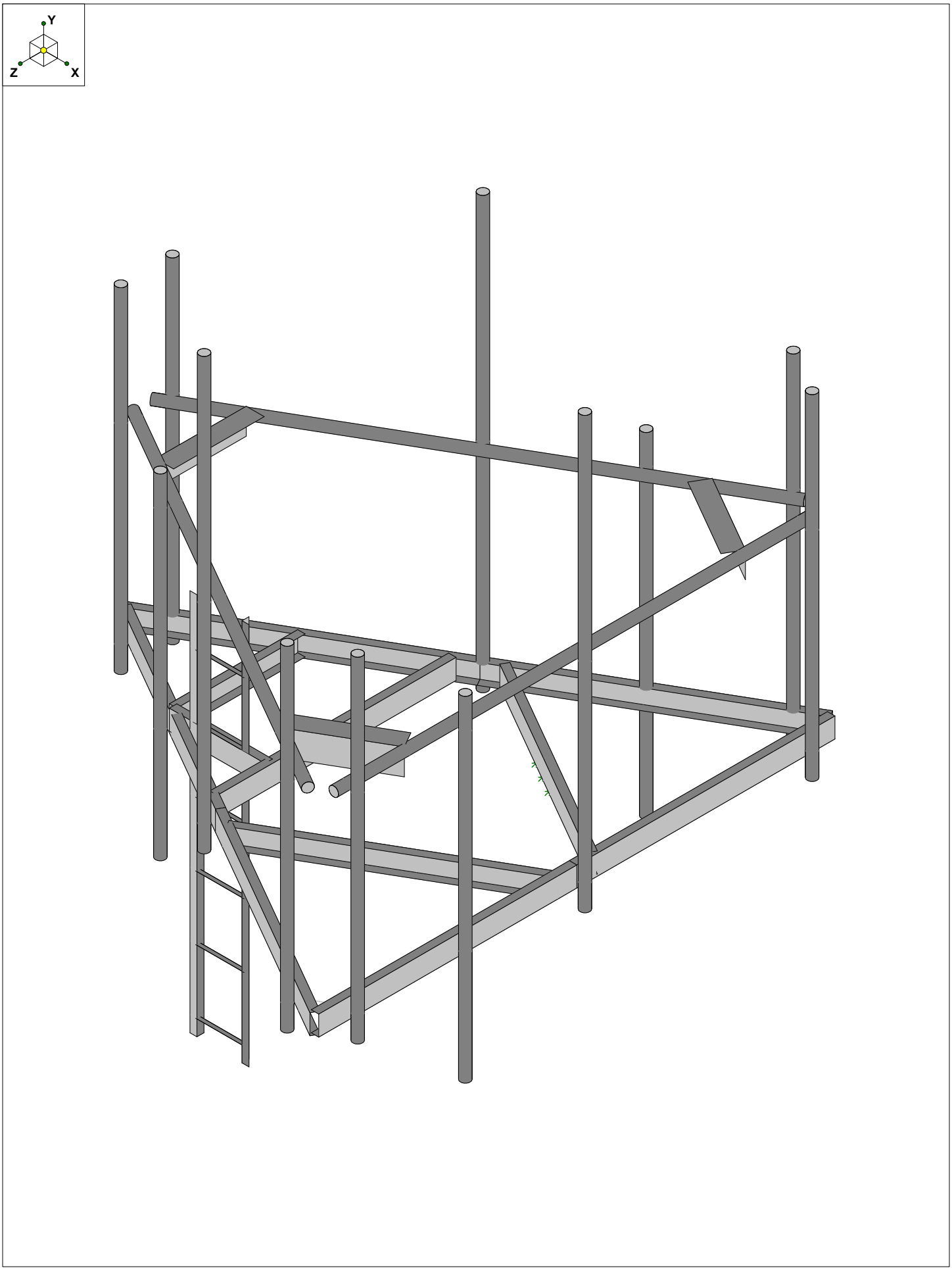
Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in "Appendix D - Additional Calculations" for calculations supporting the % capacity consumed.
3) Ratings per TIA-222-H section 15.5.

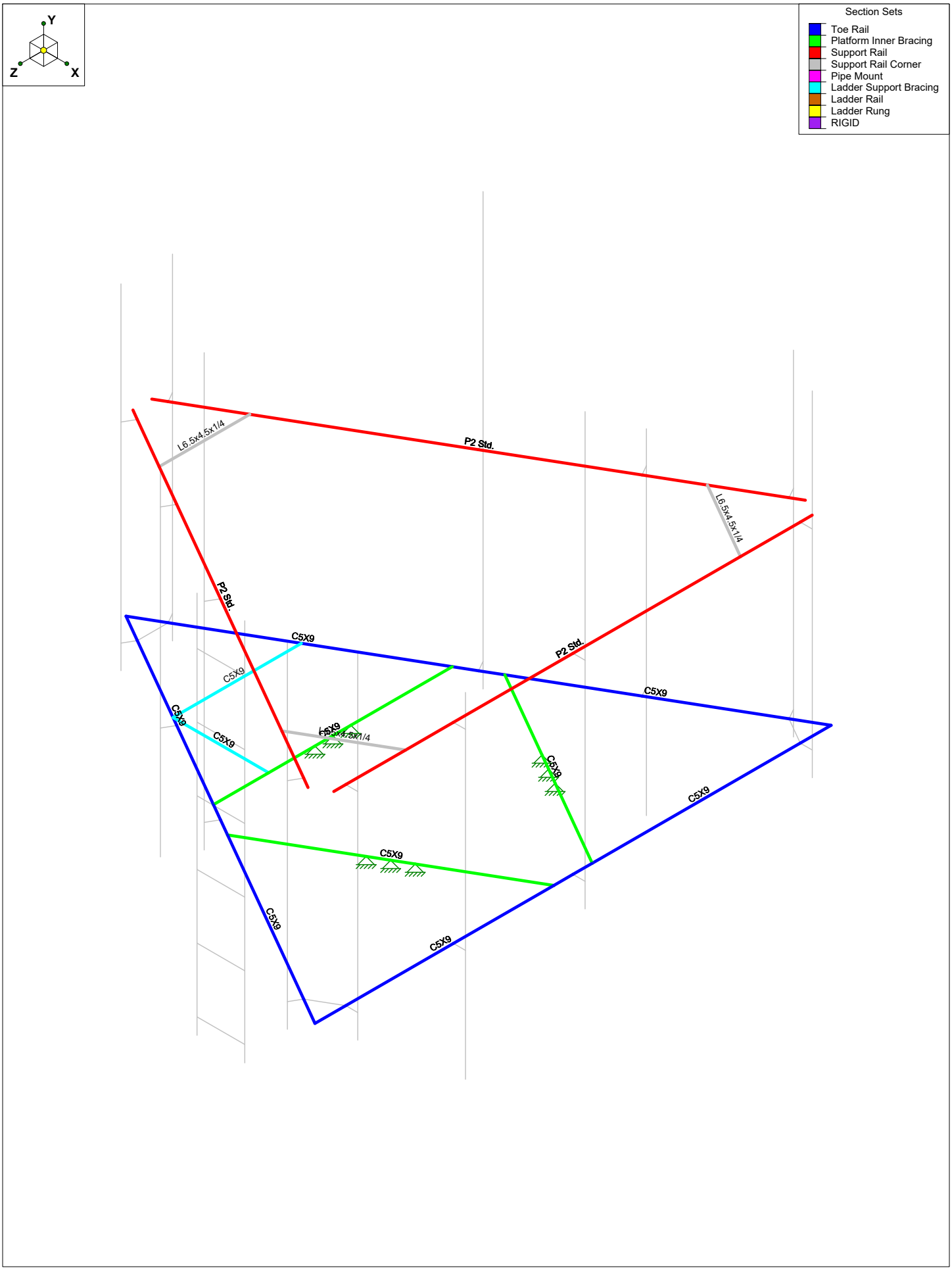
4.1) Recommendations

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


Y
Z
X


Y
Z
X
Section Sets
Toe Rail
Platform Inner Bracing
Support Rail
Support Rail Corner
Pipe Mount
Ladder Support Bracing
Ladder Rail
Ladder Rung
RIGID
L6.5x4.5x1/4
P2 Std.
L6.5x4.5x1/4
P2 Std.
C5X9
P2 Std.
C5X9
C5X9
C5X9
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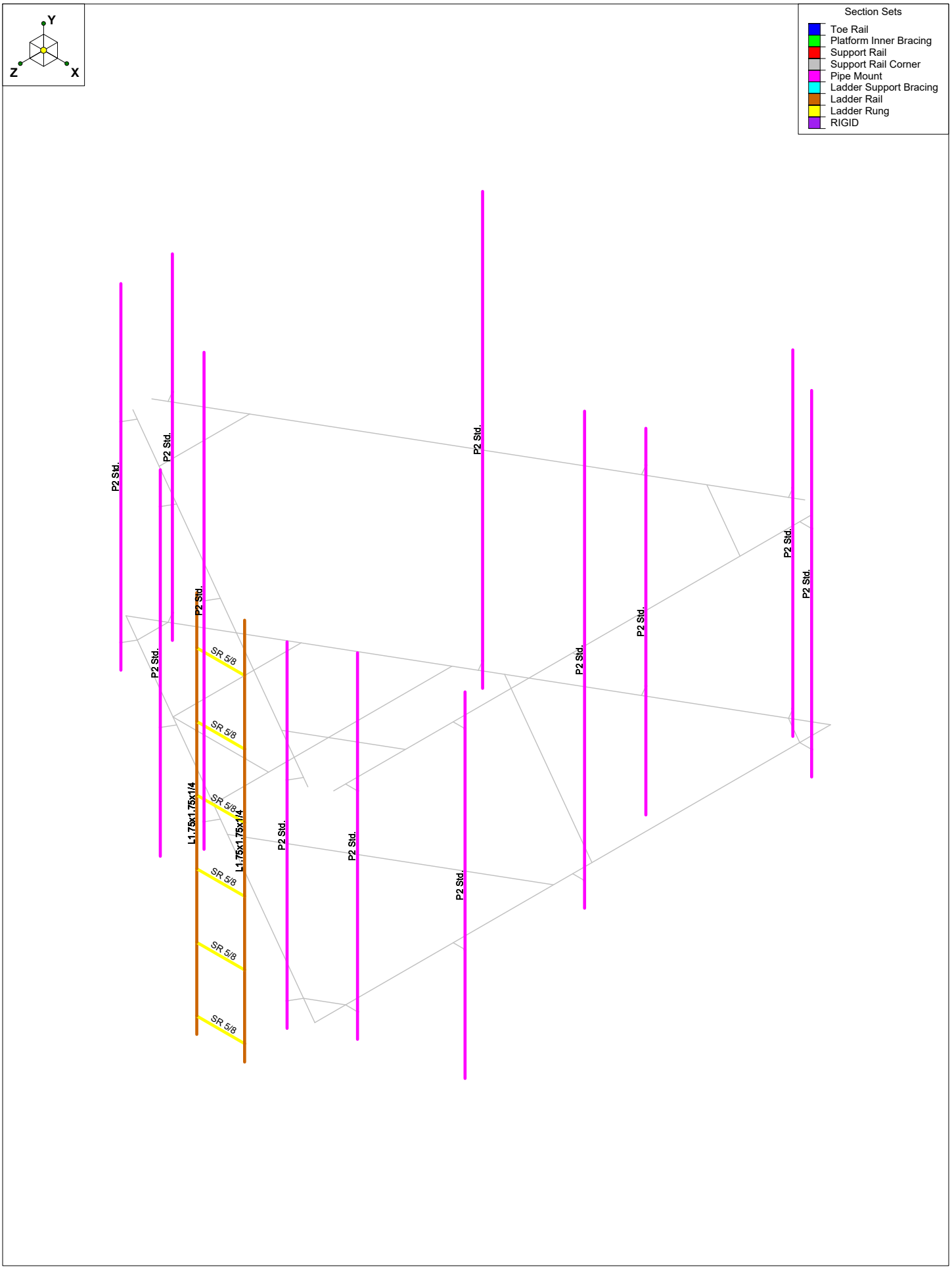
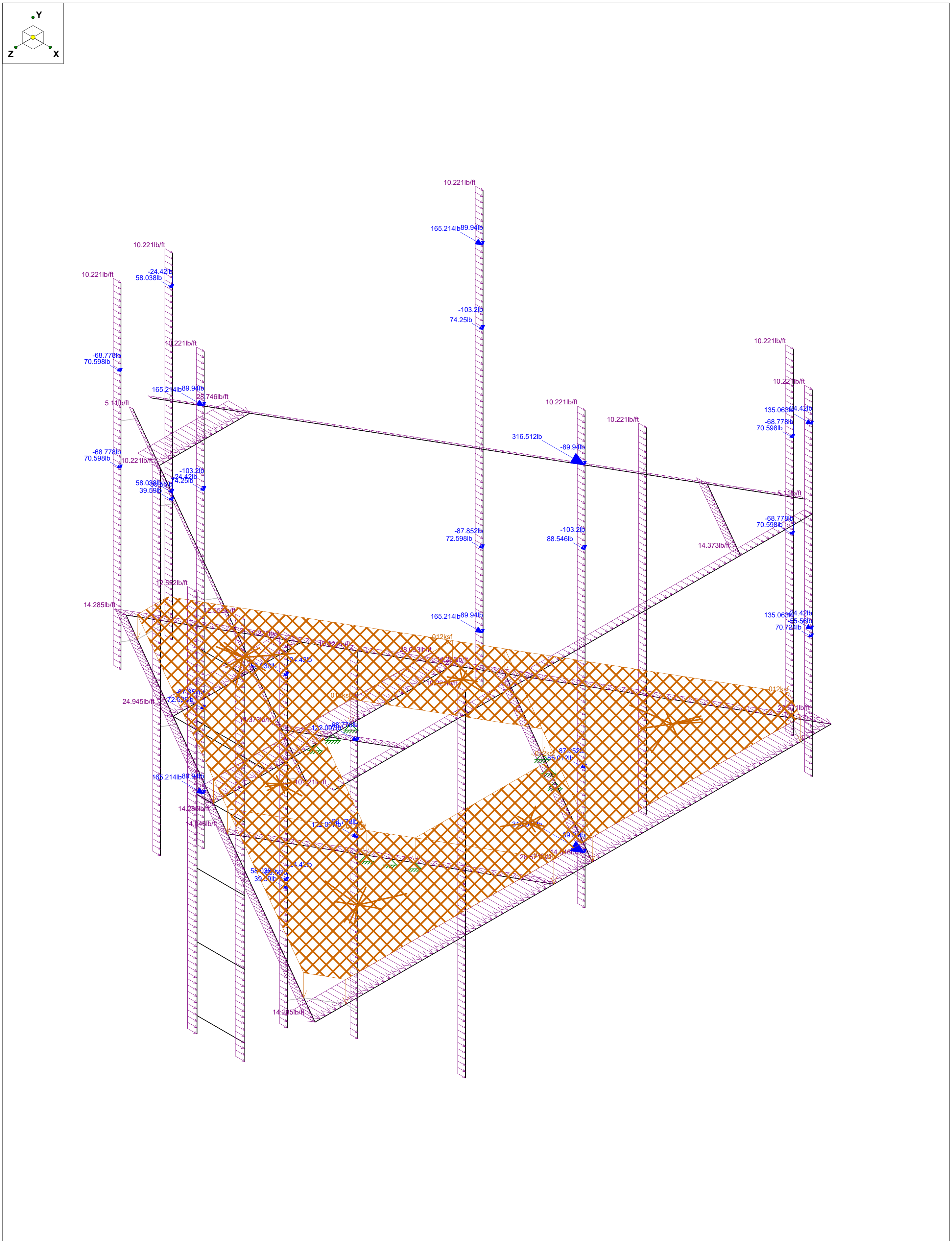
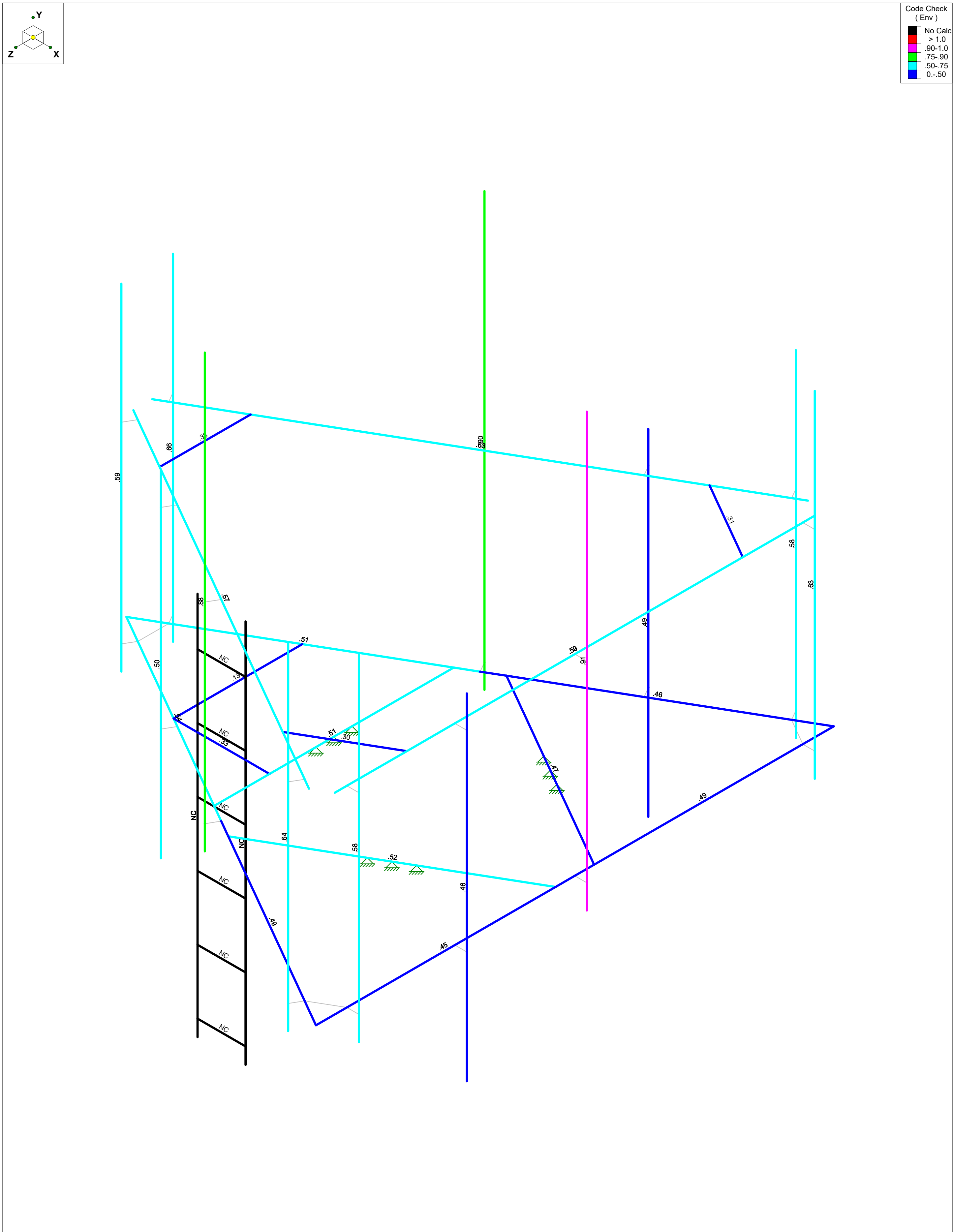
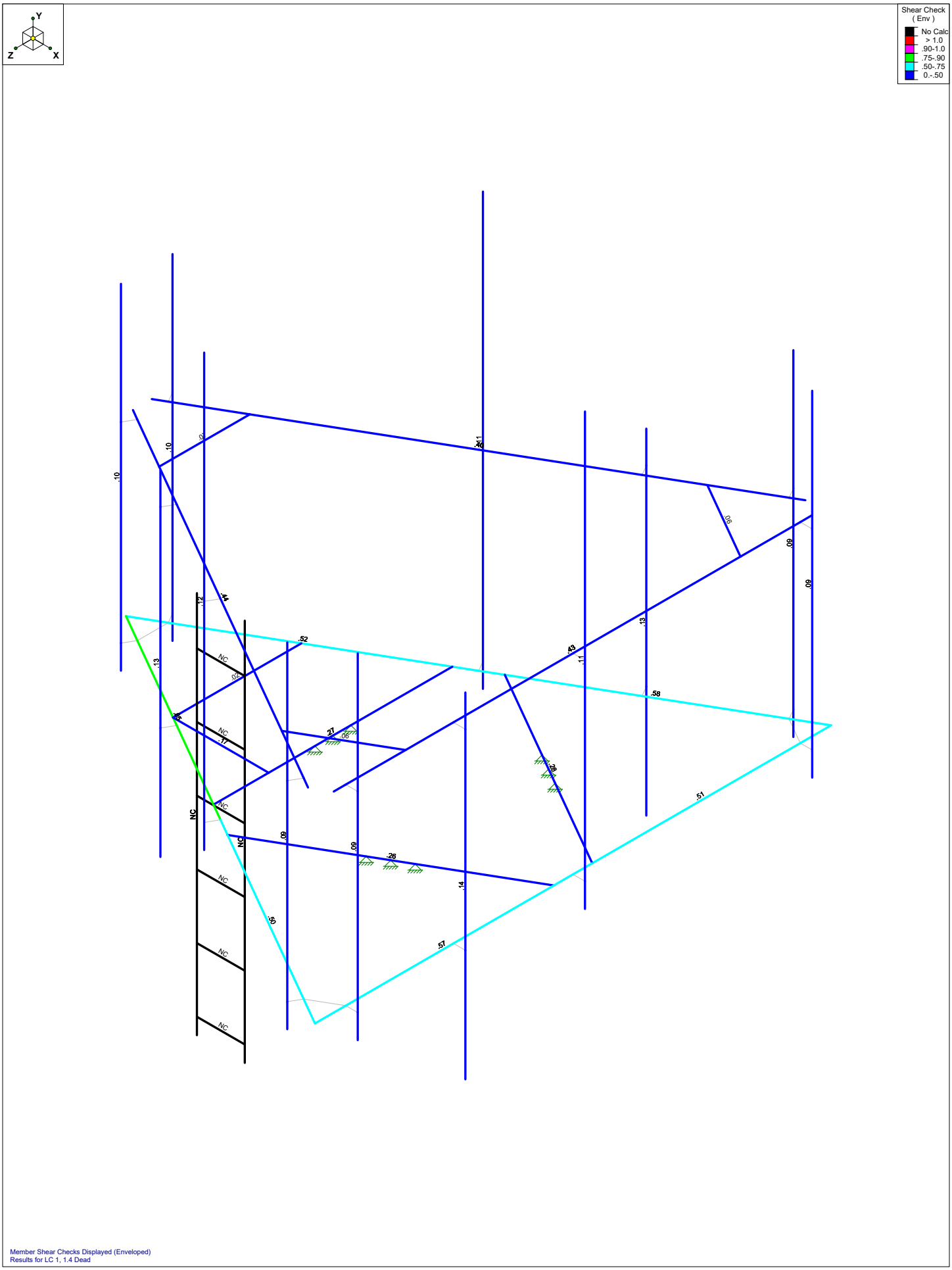

Y
Z
X
Section Sets
Toe Rail
Platform Inner Bracing
Support Rail
Support Rail Corner
Pipe Mount
Ladder Support Bracing
Ladder Rail
Ladder Rung
RIGID
P2 Std.
SR 5/8
L1.75x1.75x1/4



Loads: LC 14, 1.2 Dead + 1.0 Wind @ 180° - No Ice



Member Code Checks Displayed (Enveloped)
Results for LC 1, 1.4 Dead



Member Shear Checks Displayed (Enveloped)
Results for LC 1, 1.4 Dead

APPENDIX B

SOFTWARE INPUT CALCULATIONS

TIA-222-H: Mount Analysis Wind Loading
876379 - N. WOODBURY / WOLFF PARCEL
2021777.876379.01

Structure Information		
Structure Type:	Monopole	
Structure Height:	160	ft
z (Mount Centerline) =	156	ft
Gh (Mount Gust Effect Factor) =	1.00	
Risk Category:	II	

Code Specifications		
TIA/EIA Code:	H	
Ultimate Wind Speed (No Ice) =	120	mph (3-s gust)
Ultimate Wind Speed (With Ice) =	50	mph (3-s gust)
Ice Thickness	1.5	in
Exposure Category	C	
Tower Base Elevation (AMSL)	490	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)*
Toe Rail	Square/Rect.	64.000	5	1.89		5.35	Flat	0.90	1.00	31.75	6.87	15.19
Platform Inner Bracing	Square/Rect.	60.000	5	1.89		5.35	Flat	0.90	1.00	31.21	6.79	15.19
Support Rail	Pipe	120.000	2.375	2.375		2.38	Round	0.90	1.00	11.36	4.47	8.83
Support Rail Corner	Angle	21.100	6.5	4.5		7.91	Flat	0.90	1.00	31.94	7.09	20.67
Pipe Mount	Pipe	108.000	2.375	2.375		2.38	Round	0.90	1.00	11.36	4.28	8.83
Ladder Support Bracing	Square/Rect.	34.000	5	1.89		5.35	Flat	0.90	1.00	27.72	6.16	15.19
Ladder Rail	Angle	96.000	1.75	1.75		2.47	Flat	0.90	1.00	13.95	4.70	9.05
Ladder Rung	Pipe	12.000	0.625	0.625		0.63	Round	0.90	1.00	2.67	2.03	5.09

*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	158	33.11	20.51	8.54	114.63	Flat	0%	0%	0.90	244.19	114.63	49.69	155.48
(3) APX16DWV-16DWV-S-E-A20	158	55.9	13.3	3.15	40.7	CFD	0%	0%	0.90	270.13	40.70	62.99	141.34
(3) APXVAALL24_43-U-NA20_TMO	158	95.9	24	8.5	149.9	CFD	0%	0%	0.90	633.02	149.90	130.45	432.91
(3) RADIO 4415 B66A_CCIV3	158	14.9	13.2	5.4	46.3	Flat	0%	0%	0.90	70.72	46.30	16.32	54.38
(3) RADIO 4424 B25_TMO	158	17.1	14.4	11.3	86	Flat	0%	0%	0.90	88.55	86.00	19.85	86.95
(3) RADIO 4449 B71 B85A_T-MOBILE	158	17.91	13.2	10.63	73.21	Flat	0%	0%	0.90	85.01	73.21	19.18	82.54

*All forces are unfactored.

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[k/ft^3]	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	Desig...	A [in2]	Iyy [i...	Izz [i...	J [in4]
1	Toe Rail	C5X9	None	None	A36 Gr.36	Typical	2.64	.624	8.89	.109
2	Platform Inner Bracing	C5X9	None	None	A36 Gr.36	Typical	2.64	.624	8.89	.109
3	Support Rail	P2 Std.	None	None	A53 Gr.B	Typical	1.077	.67	.67	1.34
4	Support Rail Corner	L6.5x4.5x1/4	None	None	A36 Gr.36	Typical	2.688	4.86	12.0...	.054
5	Pipe Mount	P2 Std.	None	None	A53 Gr.B	Typical	1.077	.67	.67	1.34
6	Ladder Support Bracing	C5X9	None	None	A36 Gr.36	Typical	2.64	.624	8.89	.109
7	Ladder Rail	L1.75x1.75x1/4	None	None	A36 Gr.36	Typical	.813	.227	.227	.015
8	Ladder Rung	SR 5/8	None	None	A36 Gr.36	Typical	.307	.007	.007	.015

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Grav...	Joint	Point	Distrib...	Area(Member)	Surface(Plate/W...
1	Dead	DL		-1			36		6	
2	No Ice Wind 0 deg	None					36	30		
3	No Ice Wind 30 deg	None					72	64		
4	No Ice Wind 60 deg	None					72	74		
5	No Ice Wind 90 deg	None					36	31		
6	No Ice Wind 120 deg	None					72	74		
7	No Ice Wind 150 deg	None					72	64		
8	No Ice Wind 180 deg	None					36	30		
9	No Ice Wind 210 deg	None					72	64		
10	No Ice Wind 240 deg	None					72	74		
11	No Ice Wind 270 deg	None					36	31		
12	No Ice Wind 300 deg	None					72	74		
13	No Ice Wind 330 deg	None					72	64		
14	Ice Weight	None					36	37	6	
15	Ice Wind 0 deg	None					36	30		
16	Ice Wind 30 deg	None					72	64		
17	Ice Wind 60 deg	None					72	74		
18	Ice Wind 90 deg	None					36	31		
19	Ice Wind 120 deg	None					72	74		
20	Ice Wind 150 deg	None					72	64		
21	Ice Wind 180 deg	None					36	30		
22	Ice Wind 210 deg	None					72	64		
23	Ice Wind 240 deg	None					72	74		
24	Ice Wind 270 deg	None					36	31		
25	Ice Wind 300 deg	None					72	74		
26	Ice Wind 330 deg	None					72	64		
27	Live Load - A1	None					1			
28	Live Load - A2	None					1			
29	Live Load - A3	None					1			
30	Live Load - A4	None					1			
31	Live Load - B1	None					1			
32	Live Load - B2	None					1			

Basic Load Cases (Continued)

	BLC Description	Category	X Gra...	Y Gra...	Z Grav...	Joint	Point	Distrib...	Area(Member)	Surface(Plate/W...
33	Live Load - B3	None					1			
34	Live Load - B4	None					1			
35	Live Load - C1	None					1			
36	Live Load - C2	None					1			
37	Live Load - C3	None					1			
38	Live Load - C4	None					1			
39	Live Load - M1 (Start)	None					1			
40	Live Load - M1 (Middle)	None					1			
41	Live Load - M1 (End)	None					1			
42	Live Load - M2 (Start)	None					1			
43	Live Load - M2 (Middle)	None					1			
44	Live Load - M2 (End)	None					1			
45	Live Load - M21 (Start)	None					1			
46	Live Load - M21 (Middle)	None					1			
47	Live Load - M21 (End)	None					1			
48	Live Load - M32 (Start)	None					1			
49	Live Load - M32 (Middle)	None					1			
50	Live Load - M32 (End)	None					1			
51	Live Load - M33 (Start)	None					1			
52	Live Load - M33 (Middle)	None					1			
53	Live Load - M33 (End)	None					1			
54	Live Load - M52 (Start)	None					1			
55	Live Load - M52 (Middle)	None					1			
56	Live Load - M52 (End)	None					1			
57	Live Load - M63 (Start)	None					1			
58	Live Load - M63 (Middle)	None					1			
59	Live Load - M63 (End)	None					1			
60	Live Load - M64 (Start)	None					1			
61	Live Load - M64 (Middle)	None					1			
62	Live Load - M64 (End)	None					1			
63	Live Load - M83 (Start)	None					1			
64	Live Load - M83 (Middle)	None					1			
65	Live Load - M83 (End)	None					1			
66	Live Load - M94 (Start)	None					1			
67	Live Load - M94 (Middle)	None					1			
68	Live Load - M94 (End)	None					1			
69	Live Load - M95 (Start)	None					1			
70	Live Load - M95 (Middle)	None					1			
71	Live Load - M95 (End)	None					1			
72	BLC 1 Transient Area Loads	None						85		
73	BLC 14 Transient Area Loads	None						85		

Load Combinations

	Description	S...	PDel...	SRSS	B...	Fa...	B...	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4 Dead	Y...	Y		1	1.4	0		0		0		0		0		0		0					
2	1.2 Dead + 1.0 Wind @ 0° - No Ice	Y...	Y		1	1.2	2	1	0		0		0		0		0		0					
3	0.9 Dead + 1.0 Wind @ 0° - No Ice	Y...	Y		1	.9	2	1	0		0		0		0		0		0					
4	1.2 Dead + 1.0 Wind @ 30° - No Ice	Y...	Y		1	1.2	3	1	0		0		0		0		0		0					
5	0.9 Dead + 1.0 Wind @ 30° - No Ice	Y...	Y		1	.9	3	1	0		0		0		0		0		0					
6	1.2 Dead + 1.0 Wind @ 60° - No Ice	Y...	Y		1	1.2	4	1	0		0		0		0		0		0					
7	0.9 Dead + 1.0 Wind @ 60° - No Ice	Y...	Y		1	.9	4	1	0		0		0		0		0		0					
8	1.2 Dead + 1.0 Wind @ 90° - No Ice	Y...	Y		1	1.2	5	1	0		0		0		0		0		0					
9	0.9 Dead + 1.0 Wind @ 90° - No Ice	Y...	Y		1	.9	5	1	0		0		0		0		0		0					
10	1.2 Dead + 1.0 Wind @ 120° - No I...	Y...	Y		1	1.2	6	1	0		0		0		0		0		0					
11	0.9 Dead + 1.0 Wind @ 120° - No I...	Y...	Y		1	.9	6	1	0		0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	PDel...	SRSS	B...	Fa...	B...	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
12	1.2 Dead + 1.0 Wind @ 150° - No I...	Y...	Y		1	1.2	7	1	0		0		0		0		0		0					
13	0.9 Dead + 1.0 Wind @ 150° - No I...	Y...	Y		1	.9	7	1	0		0		0		0		0		0					
14	1.2 Dead + 1.0 Wind @ 180° - No I...	Y...	Y		1	1.2	8	1	0		0		0		0		0		0					
15	0.9 Dead + 1.0 Wind @ 180° - No I...	Y...	Y		1	.9	8	1	0		0		0		0		0		0					
16	1.2 Dead + 1.0 Wind @ 210° - No I...	Y...	Y		1	1.2	9	1	0		0		0		0		0		0					
17	0.9 Dead + 1.0 Wind @ 210° - No I...	Y...	Y		1	.9	9	1	0		0		0		0		0		0					
18	1.2 Dead + 1.0 Wind @ 240° - No I...	Y...	Y		1	1.2	10	1	0		0		0		0		0		0					
19	0.9 Dead + 1.0 Wind @ 240° - No I...	Y...	Y		1	.9	10	1	0		0		0		0		0		0					
20	1.2 Dead + 1.0 Wind @ 270° - No I...	Y...	Y		1	1.2	11	1	0		0		0		0		0		0					
21	0.9 Dead + 1.0 Wind @ 270° - No I...	Y...	Y		1	.9	11	1	0		0		0		0		0		0					
22	1.2 Dead + 1.0 Wind @ 300° - No I...	Y...	Y		1	1.2	12	1	0		0		0		0		0		0					
23	0.9 Dead + 1.0 Wind @ 300° - No I...	Y...	Y		1	.9	12	1	0		0		0		0		0		0					
24	1.2 Dead + 1.0 Wind @ 330° - No I...	Y...	Y		1	1.2	13	1	0		0		0		0		0		0					
25	0.9 Dead + 1.0 Wind @ 330° - No I...	Y...	Y		1	.9	13	1	0		0		0		0		0		0					
26	1.2 Dead + 1.0 Ice Wind @ 0°+ 1.0...	Y...	Y		1	1.2	15	1	14	1		1	0		0		0		0					
27	1.2 Dead + 1.0 Ice Wind @ 30°+ 1...	Y...	Y		1	1.2	16	1	14	1		1	0		0		0		0					
28	1.2 Dead + 1.0 Ice Wind @ 60°+ 1...	Y...	Y		1	1.2	17	1	14	1		1	0		0		0		0					
29	1.2 Dead + 1.0 Ice Wind @ 90°+ 1...	Y...	Y		1	1.2	18	1	14	1		1	0		0		0		0					
30	1.2 Dead + 1.0 Ice Wind @ 120°+ ...	Y...	Y		1	1.2	19	1	14	1		1	0		0		0		0					
31	1.2 Dead + 1.0 Ice Wind @ 150°+ ...	Y...	Y		1	1.2	20	1	14	1		1	0		0		0		0					
32	1.2 Dead + 1.0 Ice Wind @ 180°+ ...	Y...	Y		1	1.2	21	1	14	1		1	0		0		0		0					
33	1.2 Dead + 1.0 Ice Wind @ 210°+ ...	Y...	Y		1	1.2	22	1	14	1		1	0		0		0		0					
34	1.2 Dead + 1.0 Ice Wind @ 240°+ ...	Y...	Y		1	1.2	23	1	14	1		1	0		0		0		0					
35	1.2 Dead + 1.0 Ice Wind @ 270°+ ...	Y...	Y		1	1.2	24	1	14	1		1	0		0		0		0					
36	1.2 Dead + 1.0 Ice Wind @ 300°+ ...	Y...	Y		1	1.2	25	1	14	1		1	0		0		0		0					
37	1.2 Dead + 1.0 Ice Wind @ 330°+ ...	Y...	Y		1	1.2	26	1	14	1		1	0		0		0		0					
38	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Y...	Y		1	1.2	27	1.5	2	.063	0		0		0		0		0					
39	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Y...	Y		1	1.2	27	1.5	3	.063	0		0		0		0		0					
40	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Y...	Y		1	1.2	27	1.5	4	.063	0		0		0		0		0					
41	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Y...	Y		1	1.2	27	1.5	5	.063	0		0		0		0		0					
42	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Y...	Y		1	1.2	27	1.5	6	.063	0		0		0		0		0					
43	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Y...	Y		1	1.2	27	1.5	7	.063	0		0		0		0		0					
44	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Y...	Y		1	1.2	27	1.5	8	.063	0		0		0		0		0					
45	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Y...	Y		1	1.2	27	1.5	9	.063	0		0		0		0		0					
46	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Y...	Y		1	1.2	27	1.5	10	.063	0		0		0		0		0					
47	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Y...	Y		1	1.2	27	1.5	11	.063	0		0		0		0		0					
48	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Y...	Y		1	1.2	27	1.5	12	.063	0		0		0		0		0					
49	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Y...	Y		1	1.2	27	1.5	13	.063	0		0		0		0		0					
50	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Y...	Y		1	1.2	28	1.5	2	.063	0		0		0		0		0					
51	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Y...	Y		1	1.2	28	1.5	3	.063	0		0		0		0		0					
52	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Y...	Y		1	1.2	28	1.5	4	.063	0		0		0		0		0					
53	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Y...	Y		1	1.2	28	1.5	5	.063	0		0		0		0		0					
54	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Y...	Y		1	1.2	28	1.5	6	.063	0		0		0		0		0					
55	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Y...	Y		1	1.2	28	1.5	7	.063	0		0		0		0		0					
56	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Y...	Y		1	1.2	28	1.5	8	.063	0		0		0		0		0					
57	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Y...	Y		1	1.2	28	1.5	9	.063	0		0		0		0		0					
58	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Y...	Y		1	1.2	28	1.5	10	.063	0		0		0		0		0					
59	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Y...	Y		1	1.2	28	1.5	11	.063	0		0		0		0		0					
60	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Y...	Y		1	1.2	28	1.5	12	.063	0		0		0		0		0					
61	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Y...	Y		1	1.2	28	1.5	13	.063	0		0		0		0		0					
62	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Y...	Y		1	1.2	29	1.5	2	.063	0		0		0		0		0					
63	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Y...	Y		1	1.2	29	1.5	3	.063	0		0		0		0		0					
64	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Y...	Y		1	1.2	29	1.5	4	.063	0		0		0		0		0					
65	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Y...	Y		1	1.2	29	1.5	5	.063	0		0		0		0		0					
66	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Y...	Y		1	1.2	29	1.5	6	.063	0		0		0		0		0					
67	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Y...	Y		1	1.2	29	1.5	7	.063	0		0		0		0		0					
68	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Y...	Y		1	1.2	29	1.5	8	.063	0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	PDel...	SRSS	B...	Fa...	B...	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
69	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Y...	Y		1	1.2	29	1.5	9	.063	0		0		0		0					
70	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Y...	Y		1	1.2	29	1.5	10	.063	0		0		0		0					
71	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Y...	Y		1	1.2	29	1.5	11	.063	0		0		0		0					
72	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Y...	Y		1	1.2	29	1.5	12	.063	0		0		0		0					
73	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Y...	Y		1	1.2	29	1.5	13	.063	0		0		0		0					
74	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Y...	Y		1	1.2	30	1.5	2	.063	0		0		0		0					
75	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Y...	Y		1	1.2	30	1.5	3	.063	0		0		0		0					
76	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Y...	Y		1	1.2	30	1.5	4	.063	0		0		0		0					
77	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Y...	Y		1	1.2	30	1.5	5	.063	0		0		0		0					
78	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Y...	Y		1	1.2	30	1.5	6	.063	0		0		0		0					
79	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Y...	Y		1	1.2	30	1.5	7	.063	0		0		0		0					
80	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Y...	Y		1	1.2	30	1.5	8	.063	0		0		0		0					
81	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Y...	Y		1	1.2	30	1.5	9	.063	0		0		0		0					
82	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Y...	Y		1	1.2	30	1.5	10	.063	0		0		0		0					
83	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Y...	Y		1	1.2	30	1.5	11	.063	0		0		0		0					
84	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Y...	Y		1	1.2	30	1.5	12	.063	0		0		0		0					
85	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Y...	Y		1	1.2	30	1.5	13	.063	0		0		0		0					
86	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Y...	Y		1	1.2	31	1.5	2	.063	0		0		0		0					
87	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Y...	Y		1	1.2	31	1.5	3	.063	0		0		0		0					
88	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Y...	Y		1	1.2	31	1.5	4	.063	0		0		0		0					
89	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Y...	Y		1	1.2	31	1.5	5	.063	0		0		0		0					
90	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Y...	Y		1	1.2	31	1.5	6	.063	0		0		0		0					
91	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Y...	Y		1	1.2	31	1.5	7	.063	0		0		0		0					
92	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Y...	Y		1	1.2	31	1.5	8	.063	0		0		0		0					
93	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Y...	Y		1	1.2	31	1.5	9	.063	0		0		0		0					
94	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Y...	Y		1	1.2	31	1.5	10	.063	0		0		0		0					
95	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Y...	Y		1	1.2	31	1.5	11	.063	0		0		0		0					
96	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Y...	Y		1	1.2	31	1.5	12	.063	0		0		0		0					
97	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Y...	Y		1	1.2	31	1.5	13	.063	0		0		0		0					
98	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Y...	Y		1	1.2	32	1.5	2	.063	0		0		0		0					
99	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Y...	Y		1	1.2	32	1.5	3	.063	0		0		0		0					
100	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Y...	Y		1	1.2	32	1.5	4	.063	0		0		0		0					
101	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Y...	Y		1	1.2	32	1.5	5	.063	0		0		0		0					
102	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Y...	Y		1	1.2	32	1.5	6	.063	0		0		0		0					
103	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Y...	Y		1	1.2	32	1.5	7	.063	0		0		0		0					
104	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Y...	Y		1	1.2	32	1.5	8	.063	0		0		0		0					
105	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Y...	Y		1	1.2	32	1.5	9	.063	0		0		0		0					
106	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Y...	Y		1	1.2	32	1.5	10	.063	0		0		0		0					
107	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Y...	Y		1	1.2	32	1.5	11	.063	0		0		0		0					
108	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Y...	Y		1	1.2	32	1.5	12	.063	0		0		0		0					
109	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Y...	Y		1	1.2	32	1.5	13	.063	0		0		0		0					
110	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Y...	Y		1	1.2	33	1.5	2	.063	0		0		0		0					
111	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Y...	Y		1	1.2	33	1.5	3	.063	0		0		0		0					
112	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Y...	Y		1	1.2	33	1.5	4	.063	0		0		0		0					
113	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Y...	Y		1	1.2	33	1.5	5	.063	0		0		0		0					
114	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Y...	Y		1	1.2	33	1.5	6	.063	0		0		0		0					
115	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Y...	Y		1	1.2	33	1.5	7	.063	0		0		0		0					
116	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Y...	Y		1	1.2	33	1.5	8	.063	0		0		0		0					
117	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Y...	Y		1	1.2	33	1.5	9	.063	0		0		0		0					
118	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Y...	Y		1	1.2	33	1.5	10	.063	0		0		0		0					
119	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Y...	Y		1	1.2	33	1.5	11	.063	0		0		0		0					
120	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Y...	Y		1	1.2	33	1.5	12	.063	0		0		0		0					
121	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Y...	Y		1	1.2	33	1.5	13	.063	0		0		0		0					
122	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Y...	Y		1	1.2	34	1.5	2	.063	0		0		0		0					
123	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Y...	Y		1	1.2	34	1.5	3	.063	0		0		0		0					
124	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Y...	Y		1	1.2	34	1.5	4	.063	0		0		0		0					
125	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Y...	Y		1	1.2	34	1.5	5	.063	0		0		0		0					

Load Combinations (Continued)

	Description	S...	PDel...	SRSS	B...	Fa...	B...	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
126	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Y...	Y		1	1.2	34	1.5	6	.063	0		0		0		0					
127	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Y...	Y		1	1.2	34	1.5	7	.063	0		0		0		0					
128	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Y...	Y		1	1.2	34	1.5	8	.063	0		0		0		0					
129	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Y...	Y		1	1.2	34	1.5	9	.063	0		0		0		0					
130	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Y...	Y		1	1.2	34	1.5	10	.063	0		0		0		0					
131	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Y...	Y		1	1.2	34	1.5	11	.063	0		0		0		0					
132	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Y...	Y		1	1.2	34	1.5	12	.063	0		0		0		0					
133	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Y...	Y		1	1.2	34	1.5	13	.063	0		0		0		0					
134	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Y...	Y		1	1.2	35	1.5	2	.063	0		0		0		0					
135	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Y...	Y		1	1.2	35	1.5	3	.063	0		0		0		0					
136	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Y...	Y		1	1.2	35	1.5	4	.063	0		0		0		0					
137	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Y...	Y		1	1.2	35	1.5	5	.063	0		0		0		0					
138	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Y...	Y		1	1.2	35	1.5	6	.063	0		0		0		0					
139	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Y...	Y		1	1.2	35	1.5	7	.063	0		0		0		0					
140	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Y...	Y		1	1.2	35	1.5	8	.063	0		0		0		0					
141	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Y...	Y		1	1.2	35	1.5	9	.063	0		0		0		0					
142	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Y...	Y		1	1.2	35	1.5	10	.063	0		0		0		0					
143	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Y...	Y		1	1.2	35	1.5	11	.063	0		0		0		0					
144	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Y...	Y		1	1.2	35	1.5	12	.063	0		0		0		0					
145	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Y...	Y		1	1.2	35	1.5	13	.063	0		0		0		0					
146	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Y...	Y		1	1.2	36	1.5	2	.063	0		0		0		0					
147	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Y...	Y		1	1.2	36	1.5	3	.063	0		0		0		0					
148	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Y...	Y		1	1.2	36	1.5	4	.063	0		0		0		0					
149	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Y...	Y		1	1.2	36	1.5	5	.063	0		0		0		0					
150	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Y...	Y		1	1.2	36	1.5	6	.063	0		0		0		0					
151	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Y...	Y		1	1.2	36	1.5	7	.063	0		0		0		0					
152	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Y...	Y		1	1.2	36	1.5	8	.063	0		0		0		0					
153	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Y...	Y		1	1.2	36	1.5	9	.063	0		0		0		0					
154	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Y...	Y		1	1.2	36	1.5	10	.063	0		0		0		0					
155	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Y...	Y		1	1.2	36	1.5	11	.063	0		0		0		0					
156	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Y...	Y		1	1.2	36	1.5	12	.063	0		0		0		0					
157	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Y...	Y		1	1.2	36	1.5	13	.063	0		0		0		0					
158	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Y...	Y		1	1.2	37	1.5	2	.063	0		0		0		0					
159	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Y...	Y		1	1.2	37	1.5	3	.063	0		0		0		0					
160	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Y...	Y		1	1.2	37	1.5	4	.063	0		0		0		0					
161	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Y...	Y		1	1.2	37	1.5	5	.063	0		0		0		0					
162	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Y...	Y		1	1.2	37	1.5	6	.063	0		0		0		0					
163	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Y...	Y		1	1.2	37	1.5	7	.063	0		0		0		0					
164	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Y...	Y		1	1.2	37	1.5	8	.063	0		0		0		0					
165	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Y...	Y		1	1.2	37	1.5	9	.063	0		0		0		0					
166	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Y...	Y		1	1.2	37	1.5	10	.063	0		0		0		0					
167	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Y...	Y		1	1.2	37	1.5	11	.063	0		0		0		0					
168	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Y...	Y		1	1.2	37	1.5	12	.063	0		0		0		0					
169	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Y...	Y		1	1.2	37	1.5	13	.063	0		0		0		0					
170	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Y...	Y		1	1.2	38	1.5	2	.063	0		0		0		0					
171	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Y...	Y		1	1.2	38	1.5	3	.063	0		0		0		0					
172	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Y...	Y		1	1.2	38	1.5	4	.063	0		0		0		0					
173	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Y...	Y		1	1.2	38	1.5	5	.063	0		0		0		0					
174	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Y...	Y		1	1.2	38	1.5	6	.063	0		0		0		0					
175	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Y...	Y		1	1.2	38	1.5	7	.063	0		0		0		0					
176	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Y...	Y		1	1.2	38	1.5	8	.063	0		0		0		0					
177	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Y...	Y		1	1.2	38	1.5	9	.063	0		0		0		0					
178	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Y...	Y		1	1.2	38	1.5	10	.063	0		0		0		0					
179	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Y...	Y		1	1.2	38	1.5	11	.063	0		0		0		0					
180	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Y...	Y		1	1.2	38	1.5	12	.063	0		0		0		0					
181	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Y...	Y		1	1.2	38	1.5	13	.063	0		0		0		0					
182	1.2 Dead + 1.5 Live_V - M1 (Start)	Y...	Y		1	1.2	39	1.5	0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	PDel...	SRSS	B...	Fa...	B...	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
183	1.2 Dead + 1.5 Live_V - M1 (Middle)	Y...	Y		1	1.2	40	1.5	0		0		0		0		0					
184	1.2 Dead + 1.5 Live_V - M1 (End)	Y...	Y		1	1.2	41	1.5	0		0		0		0		0					
185	1.2 Dead + 1.5 Live_V - M2 (Start)	Y...	Y		1	1.2	42	1.5	0		0		0		0		0					
186	1.2 Dead + 1.5 Live_V - M2 (Middle)	Y...	Y		1	1.2	43	1.5	0		0		0		0		0					
187	1.2 Dead + 1.5 Live_V - M2 (End)	Y...	Y		1	1.2	44	1.5	0		0		0		0		0					
188	1.2 Dead + 1.5 Live_V - M21 (Start)	Y...	Y		1	1.2	45	1.5	0		0		0		0		0					
189	1.2 Dead + 1.5 Live_V - M21 (Midd...	Y...	Y		1	1.2	46	1.5	0		0		0		0		0					
190	1.2 Dead + 1.5 Live_V - M21 (End)	Y...	Y		1	1.2	47	1.5	0		0		0		0		0					
191	1.2 Dead + 1.5 Live_V - M32 (Start)	Y...	Y		1	1.2	48	1.5	0		0		0		0		0					
192	1.2 Dead + 1.5 Live_V - M32 (Midd...	Y...	Y		1	1.2	49	1.5	0		0		0		0		0					
193	1.2 Dead + 1.5 Live_V - M32 (End)	Y...	Y		1	1.2	50	1.5	0		0		0		0		0					
194	1.2 Dead + 1.5 Live_V - M33 (Start)	Y...	Y		1	1.2	51	1.5	0		0		0		0		0					
195	1.2 Dead + 1.5 Live_V - M33 (Midd...	Y...	Y		1	1.2	52	1.5	0		0		0		0		0					
196	1.2 Dead + 1.5 Live_V - M33 (End)	Y...	Y		1	1.2	53	1.5	0		0		0		0		0					
197	1.2 Dead + 1.5 Live_V - M52 (Start)	Y...	Y		1	1.2	54	1.5	0		0		0		0		0					
198	1.2 Dead + 1.5 Live_V - M52 (Midd...	Y...	Y		1	1.2	55	1.5	0		0		0		0		0					
199	1.2 Dead + 1.5 Live_V - M52 (End)	Y...	Y		1	1.2	56	1.5	0		0		0		0		0					
200	1.2 Dead + 1.5 Live_V - M63 (Start)	Y...	Y		1	1.2	57	1.5	0		0		0		0		0					
201	1.2 Dead + 1.5 Live_V - M63 (Midd...	Y...	Y		1	1.2	58	1.5	0		0		0		0		0					
202	1.2 Dead + 1.5 Live_V - M63 (End)	Y...	Y		1	1.2	59	1.5	0		0		0		0		0					
203	1.2 Dead + 1.5 Live_V - M64 (Start)	Y...	Y		1	1.2	60	1.5	0		0		0		0		0					
204	1.2 Dead + 1.5 Live_V - M64 (Midd...	Y...	Y		1	1.2	61	1.5	0		0		0		0		0					
205	1.2 Dead + 1.5 Live_V - M64 (End)	Y...	Y		1	1.2	62	1.5	0		0		0		0		0					
206	1.2 Dead + 1.5 Live_V - M83 (Start)	Y...	Y		1	1.2	63	1.5	0		0		0		0		0					
207	1.2 Dead + 1.5 Live_V - M83 (Midd...	Y...	Y		1	1.2	64	1.5	0		0		0		0		0					
208	1.2 Dead + 1.5 Live_V - M83 (End)	Y...	Y		1	1.2	65	1.5	0		0		0		0		0					
209	1.2 Dead + 1.5 Live_V - M94 (Start)	Y...	Y		1	1.2	66	1.5	0		0		0		0		0					
210	1.2 Dead + 1.5 Live_V - M94 (Midd...	Y...	Y		1	1.2	67	1.5	0		0		0		0		0					
211	1.2 Dead + 1.5 Live_V - M94 (End)	Y...	Y		1	1.2	68	1.5	0		0		0		0		0					
212	1.2 Dead + 1.5 Live_V - M95 (Start)	Y...	Y		1	1.2	69	1.5	0		0		0		0		0					
213	1.2 Dead + 1.5 Live_V - M95 (Midd...	Y...	Y		1	1.2	70	1.5	0		0		0		0		0					
214	1.2 Dead + 1.5 Live_V - M95 (End)	Y...	Y		1	1.2	71	1.5	0		0		0		0		0					

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	N7	m...	951.553	2	10157.516	6	1639.564	15	0	214	0	214	0	214
2		min	-938.666	15	-6582.231	19	-1678.083	2	0	1	0	1	0	1
3	N6	m...	1609.467	14	5523.151	15	3.951	11	0	214	0	214	0	214
4		min	-1587.7	3	-11031.797	2	-3.951	18	0	1	0	1	0	1
5	N5	m...	1454.385	25	9601.624	22	2245.799	6	0	214	0	214	0	214
6		min	-1511.3...	12	-5412.691	11	-2185.208	19	0	1	0	1	0	1
7	N62	m...	2070.098	3	9342.756	6	517.109	5	0	214	0	214	0	214
8		min	-2102.5...	14	-5663.195	19	-553.96	16	0	1	0	1	0	1
9	N63	m...	596.158	10	5429.655	23	1033.302	22	0	214	0	214	0	214
10		min	-598.505	22	-10615.622	10	-1029.237	10	0	1	0	1	0	1
11	N64	m...	1219.167	6	10599.707	14	1595.155	8	0	214	0	214	0	214
12		min	-1194.0...	19	-7149.006	3	-1564.203	21	0	1	0	1	0	1
13	N119	m...	1332.875	22	9627.189	14	1568.301	8	0	214	0	214	0	214
14		min	-1278.1...	11	-6013.474	3	-1573.815	20	0	1	0	1	0	1
15	N120	m...	655.003	18	5438.017	7	1131.159	18	0	214	0	214	0	214
16		min	-658.819	6	-10650.67	18	-1137.769	6	0	1	0	1	0	1
17	N121	m...	2053.46	3	10277.817	20	417.654	12	0	214	0	214	0	214
18		min	-2088.2...	14	-6717.385	9	-411.017	25	0	1	0	1	0	1
19	Totals:	m...	5337.717	3	9248.299	28	5172.853	9						
20		min	-5337.7...	15	2666.659	19	-5172.859	20						

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

	Member	Shape	Code Che...	Loc[in]	LC	Shear Che...	Loc[in]	Dir	LC	phi*...	phi*...	phi*...	phi*...	...	Eqn
1	A2	P2 Std.	.915	54	14	.115	101.25		20	2942..	3392..	2.006	2.006	...	H1-...
2	C2	P2 Std.	.895	54	6	.114	101.25		14	2942..	3392..	2.006	2.006	...	H1-...
3	B2	P2 Std.	.881	54	22	.121	101.25		2	2942..	3392..	2.006	2.006	...	H1-...
4	C1	P2 Std.	.655	77.875	8	.102	77.875		20	4864..	3392..	2.006	2.006	...	H1-...
5	B1	P2 Std.	.640	77.875	24	.091	77.875		14	4864..	3392..	2.006	2.006	...	H1-...
6	A1	P2 Std.	.631	77.875	16	.093	77.875		4	4864..	3392..	2.006	2.006	...	H1-...
7	M45A	P2 Std.	.625	102.5	8	.399	30		18	1051..	3392..	2.006	2.006	...	H3-6
8	B4	P2 Std.	.591	77.875	21	.096	77.875		20	4864..	3392..	2.006	2.006	...	H1-...
9	M24	P2 Std.	.589	60	14	.428	30		2	1051..	3392..	2.006	2.006	...	H3-6
10	C4	P2 Std.	.581	77.875	4	.088	77.875		4	4864..	3392..	2.006	2.006	...	H1-...
11	A4	P2 Std.	.577	77.875	13	.088	77.875		12	4864..	3392..	2.006	2.006	...	H1-...
12	M36	P2 Std.	.575	102.5	13	.441	30		8	1051..	3392..	2.006	2.006	...	H3-6
13	M83	C5X9	.542	4.72	20	.855	30.343	y	8	3363..	85536	1.909	11.8...	...	H1-...
14	M64	C5X9	.519	24.963	20	.265	25.587	y	22	3845..	85536	1.909	11.8...	...	H1-...
15	M1	C5X9	.510	60.012	8	.524	60.012	z	8	3363..	85536	1.909	11.8...	...	H1-...
16	M2	C5X9	.508	34.948	24	.268	25.587	y	6	3845..	85536	1.909	11.8...	...	H1-...
17	B3	P2 Std.	.504	56	18	.129	56		22	4864..	3392..	2.006	2.006	...	H1-...
18	C3	P2 Std.	.491	56	2	.133	56		4	4864..	3392..	2.006	2.006	...	H1-...
19	M63	C5X9	.491	60.012	24	.502	60.012	z	24	3363..	85536	1.909	11.8...	...	H1-...
20	M32	C5X9	.490	60.012	16	.512	60.012	z	16	3363..	85536	1.909	11.8...	...	H1-...
21	M33	C5X9	.470	34.948	8	.276	25.587	y	14	3845..	85536	1.909	11.8...	...	H1-...
22	A3	P2 Std.	.460	56	10	.141	56		14	4864..	3392..	2.006	2.006	...	H1-...
23	M21	C5X9	.460	4.72	4	.581	4.72	z	4	3363..	85536	1.909	11.8...	...	H1-...
24	M52	C5X9	.446	4.72	12	.574	4.72	z	12	3363..	85536	1.909	11.8...	...	H1-...
25	M56A	L6.5x4.5x1/4	.334	22.732	21	.067	22.732	y	20	5226..	87075	2.578	7.236	...	H2-1
26	M94	C5X9	.330	24	8	.172	18	z	8	7523..	85536	1.909	11.8...	...	H1-...
27	M55	L6.5x4.5x1/4	.310	22.732	5	.062	22.732	y	4	5226..	87075	2.578	7.236	...	H2-1
28	M56	L6.5x4.5x1/4	.304	22.732	13	.062	22.732	y	12	5226..	87075	2.578	7.236	...	H2-1
29	M95	C5X9	.128	0	20	.021	16.099	z	20	6790..	85536	1.909	11.8...	...	H1-...

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.	0.915	1.05	0.871*	54	14	0.115	1.05	0.11*	101.3	2942.582	33925.5	2.006	2.006	1.624	H1-1a
2	C2	P2 Std.	0.895	1.05	0.852*	54	6	0.114	1.05	0.109*	101.3	2942.582	33925.5	2.006	2.006	1.639	H1-1a
3	B2	P2 Std.	0.881	1.05	0.839*	54	22	0.121	1.05	0.115*	101.3	2942.582	33925.5	2.006	2.006	1.613	H1-1a
4	C1	P2 Std.	0.655	1.05	0.624*	77.88	8	0.102	1.05	0.097*	77.88	4864.268	33925.5	2.006	2.006	1.831	H1-1b
5	B1	P2 Std.	0.64	1.05	0.61*	77.88	24	0.091	1.05	0.087*	77.88	4864.268	33925.5	2.006	2.006	2.72	H1-1b
6	A1	P2 Std.	0.631	1.05	0.601*	77.88	16	0.093	1.05	0.089*	77.88	4864.268	33925.5	2.006	2.006	2.608	H1-1b
7	M45A	P2 Std.	0.625	1.05	0.595*	102.5	8	0.399	1.05	0.38*	30	10511.197	33925.5	2.006	2.006	1.726	H3-6
8	B4	P2 Std.	0.591	1.05	0.563*	77.88	21	0.096	1.05	0.091*	77.88	4864.268	33925.5	2.006	2.006	2.572	H1-1b
9	M24	P2 Std.	0.589	1.05	0.561*	60	14	0.428	1.05	0.408*	30	10511.197	33925.5	2.006	2.006	1.824	H3-6
10	C4	P2 Std.	0.581	1.05	0.553*	77.88	4	0.088	1.05	0.084*	77.88	4864.268	33925.5	2.006	2.006	2.657	H1-1b
11	A4	P2 Std.	0.577	1.05	0.55*	77.88	13	0.088	1.05	0.084*	77.88	4864.268	33925.5	2.006	2.006	2.623	H1-1b
12	M36	P2 Std.	0.575	1.05	0.548*	102.5	13	0.441	1.05	0.42*	30	10511.197	33925.5	2.006	2.006	1.782	H3-6
13	M83	C5X9	0.542	1.05	0.516*	4.72	20	0.855	1.05	0.814*	30.34	33638.136	85536	1.909	11.853	2.228	H1-1b
14	M64	C5X9	0.519	1.05	0.494*	24.96	20	0.265	1.05	0.252*	25.59	38455.723	85536	1.909	11.853	1.826	H1-1b
15	M1	C5X9	0.51	1.05	0.486*	60.01	8	0.524	1.05	0.499*	60.01	33638.135	85536	1.909	11.853	2.153	H1-1b
16	M2	C5X9	0.508	1.05	0.484*	34.95	24	0.268	1.05	0.255*	25.59	38455.723	85536	1.909	11.853	1.789	H1-1b
17	B3	P2 Std.	0.504	1.05	0.48*	56	18	0.129	1.05	0.123*	56	4864.268	33925.5	2.006	2.006	2.272	H1-1b
18	C3	P2 Std.	0.491	1.05	0.468*	56	2	0.133	1.05	0.127*	56	4864.268	33925.5	2.006	2.006	2.265	H1-1b
19	M63	C5X9	0.491	1.05	0.468*	60.01	24	0.502	1.05	0.478*	60.01	33638.135	85536	1.909	11.853	2.155	H1-1b
20	M32	C5X9	0.49	1.05	0.467*	60.01	16	0.512	1.05	0.488*	60.01	33638.136	85536	1.909	11.853	2.132	H1-1b
21	M33	C5X9	0.47	1.05	0.448*	34.95	8	0.276	1.05	0.263*	25.59	38455.722	85536	1.909	11.853	1.775	H1-1b
22	A3	P2 Std.	0.46	1.05	0.438*	56	10	0.141	1.05	0.134*	56	4864.268	33925.5	2.006	2.006	2.378	H1-1b
23	M21	C5X9	0.46	1.05	0.438*	4.72	4	0.581	1.05	0.553*	4.72	33638.135	85536	1.909	11.853	2.232	H1-1b
24	M52	C5X9	0.446	1.05	0.425*	4.72	12	0.574	1.05	0.547*	4.72	33638.135	85536	1.909	11.853	2.205	H1-1b
25	M56A	L6.5x4.5x1/4	0.334	1.05	0.318*	22.73	21	0.067	1.05	0.064*	22.73	52268.167	87075	2.578	7.236	2.239	H2-1
26	M94	C5X9	0.33	1.05	0.314*	24	8	0.172	1.05	0.164*	18	75237.284	85536	1.909	11.853	1.757	H1-1b
27	M55	L6.5x4.5x1/4	0.31	1.05	0.295*	22.73	5	0.062	1.05	0.059*	22.73	52268.167	87075	2.578	7.236	2.247	H2-1
28	M56	L6.5x4.5x1/4	0.304	1.05	0.29*	22.73	13	0.062	1.05	0.059*	22.73	52268.167	87075	2.578	7.236	2.232	H2-1
29	M95	C5X9	0.128	1.05	0.122*	0	20	0.021	1.05	0.02*	16.1	67900.01	85536	1.909	11.853	1.783	H1-1b

*Rating per TIA-222-H, Section 15.5

APPENDIX D

ADDITIONAL CALCULATIONS

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Typ. All Sectors
2021777.876379.01

Bolt Information		
Bolt Diameter (d)	0.75	in
Net Tensile Area (An)	0.334	in^2
# of Bolts Total (n)	1	
Bolt Grade	A325N	
Bolt Tensile Strength (F_{ub})	120	ksi

RISA 3D Reactions		
Moment (M)	0.00	k-ft
Axial (T)	-1.59	kips
Shear (V)	11.03	kips

Bolt Capacity		
Nominal Tensile Strength (R_{nt})	40.135	kips
Nominal Shear Strength (R_{nv})	26.51	kips
Bolt Tensile Force (T_{ub})	-1.59	kips
Bolt Shear Force (V_{ub})	11.032	kips
$T_{ub}/\phi R_{nt}$	-0.05017	
$V_{ub}/\phi R_{nv}$	0.52848	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.29590	
Bolt Capacity =	52.8%	OK

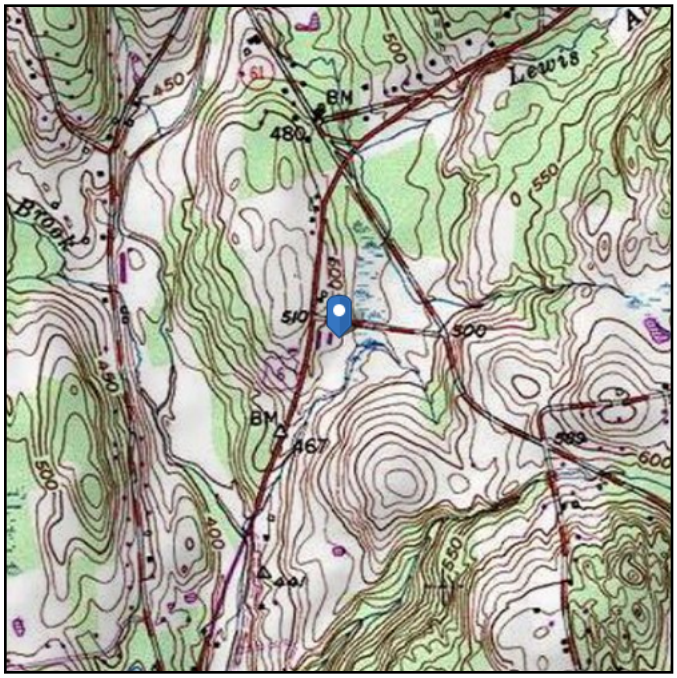
*Rating per TIA-222-H, Section 15.5

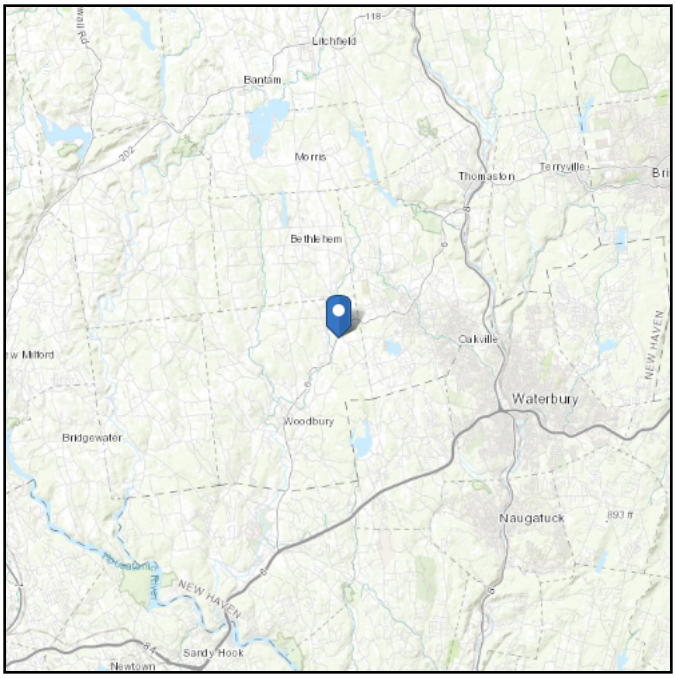
ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 490.19 ft (NAVD 88)
Latitude: 41.589947
Longitude: -73.169867





Wind

Results:

Wind Speed:	~~118 Vmph~~ 120 Vmph per 2018 Connecticut Building Code Appendix N
10-year MRI	76 Vmph
25-year MRI	85 Vmph
50-year MRI	90 Vmph
100-year MRI	97 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: Tue Feb 02 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 in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

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

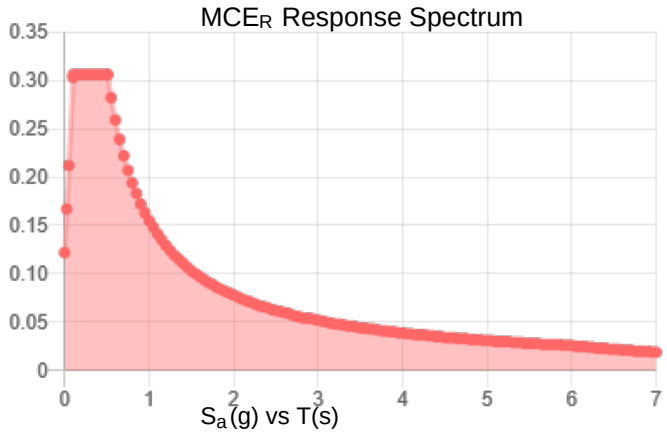
Seismic

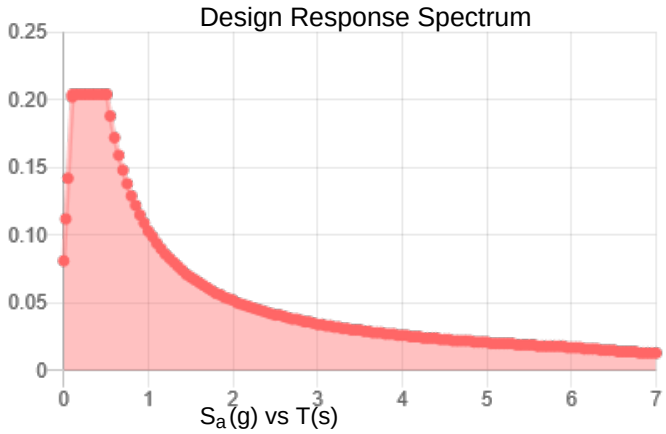
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.191	S_{DS} :	0.204
S_1 :	0.065	S_{D1} :	0.103
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.099
S_{MS} :	0.306	PGA_M :	0.159
S_{M1} :	0.155	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Tue Feb 02 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:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Tue Feb 02 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: CTNH454A

1440 Main Street North
Woodbury, Connecticut 06798

March 22, 2021

EBI Project Number: 6221001351

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**18.07%**

March 22, 2021

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

Emissions Analysis for Site: CTNH454A

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **1440 Main Street North** in **Woodbury, 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 1440 Main Street North in Woodbury, 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 158 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):	158 feet	Height (AGL):	158 feet	Height (AGL):	158 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 %:	**0.73%**	Antenna B1 MPE %:	**0.73%**	Antenna C1 MPE %:	**0.73%**
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):	158 feet	Height (AGL):	158 feet	Height (AGL):	158 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 %:	**2.85%**	Antenna B2 MPE %:	**2.85%**	Antenna C2 MPE %:	**2.85%**
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):	158 feet	Height (AGL):	158 feet	Height (AGL):	158 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 %:	**2.01%**	Antenna B3 MPE %:	**2.01%**	Antenna C3 MPE %:	**2.01%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	5.58%
Sprint	2.3%
Verizon	2.87%
AT&T	7.32%
Site Total MPE % :	18.07%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	5.58%
T-Mobile Sector B Total:	5.58%
T-Mobile Sector C Total:	5.58%
Site Total MPE % :	18.07%

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	158.0	7.26	2100 MHz LTE	1000	0.73%
T-Mobile 600 MHz LTE	2	591.73	158.0	1.84	600 MHz LTE	400	0.46%
T-Mobile 600 MHz NR	1	1577.94	158.0	2.46	600 MHz NR	400	0.61%
T-Mobile 700 MHz LTE	2	695.22	158.0	2.16	700 MHz LTE	467	0.46%
T-Mobile 1900 MHz GSM	4	1052.26	158.0	6.55	1900 MHz GSM	1000	0.65%
T-Mobile 1900 MHz LTE	2	2104.51	158.0	6.55	1900 MHz LTE	1000	0.65%
T-Mobile 2500 MHz LTE	1	6444.38	158.0	10.03	2500 MHz LTE	1000	1.00%
T-Mobile 2500 MHz NR	1	6444.38	158.0	10.03	2500 MHz NR	1000	1.00%
						Total:	**5.58%**

• 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:	5.58%
Sector B:	5.58%
Sector C:	5.58%
T-Mobile Maximum MPE % (Sector A):	5.58%
Site Total:	18.07%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **18.07%** 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.