CROWN CASTLE

1 Cityplace Dr, Suite 490

Creve Coeur, MO 63141

Phone: (314) 513-0147

www.crowncastle.com

April 16, 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# 876359; T-Mobile Site ID# CTHA853A
954 Norwich Road, Plainfield, CT 06062
Latitude: 41.658737 / Longitude: -71.924934

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 130-foot mount on the existing 130-foot Monopole Tower located at 954 Norwich Rd. in Plainfield. The property is owned by CAYA Enterprises LLC and the Tower 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) Commscope – NNVV-65B-R4 Antennas **(REMOVE) -** (3) RFS APX16DWV-16DWV-S-E-A20 Antennas **(REPLACE)**

(3) RFS – APXVTM14-ALU-120 Antennas **(REMOVE) –** (3) RFS-APXVAALL24-43-U-NA20 Antennas – **(REPLACE)**

(3) Alcatel Lucent – PCS 1900MHZ 4X45W-65MHZ Radio **(REMOVE) –** (3) Ericsson 4415 B66A Radio **(REPLACE)**

(3) Alcatel Lucent – RRH2X50-800 Radio **(REMOVE) –** (3) Ericsson 4449 B71+B85 Radio **(REPLACE)**

(3) Nokia – FZHN Radio **(REMOVE) –** (3) Ericsson 4424 B25 Radio **(REPLACE)**

Install New:
(3) Ericson- AIR6449 B41 Antennas
(4) 6/24 4AWG Hybrid Trunks

CROWN CASTLE

1 Cityplace Dr, Suite 490

Creve Coeur, MO 63141

Phone: (314) 513-0147

www.crowncastle.com

(1) Site Pro RMQP-496-HK Platform Mount

Remove:
(3) Alcatel Lucent – RRH2X50-800 Radio
(1) Existing Platform Mount
(1) 7/8" Hybrid Cable
(3) 1 1/4" Hybrid Cables

Ground:

Remove and Replace:
(1) Sprint Cabinet **(REMOVE) -** (1) 6160 Site Support Cabinet (SSC) **(REPLACE)**
(1) Sprint Cabinet **(REMOVE)** – (1) B160 Cabinet **(REPLACE)**

Install New:
(1) BB 6648 in 6160 SSC
(3) BB 6630 in 6160 SSC
(1) DUG20 in 6160 SSC
(1) RBS 6601 in 6160 SSC
(1) PSU 4813 Voltage Booster in 6160 SSC
(1) CSR IXRE V2 (GEN2) in 6160 SSC

The facility was approved by the Town of Plainfield Planning and Zoning Commission by way of a Special Permit Application SP-99-08 on June 8th, 1999.

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 Kevin Cunningham, First Selectman for the Town of Plainfield and Mary Ann Chinatti, Planning & Zoning Supervisor for the Town of Plainfield. A copy will also be sent to the property owner.

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

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

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

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

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

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

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

Sincerely,

Colin Robinson

Colin Robinson
Project Manager
NETWORK BUILDING + CONSULTING
100 Apollo Drive Suite 303
Chelmsford, MA 01824
crobinson@nbcllc.com
(360) 561-3311

cc:

Kevin Cunningham, First Selectman *(via email only to kcunninghamselectman@plainfield.org)*
Town of Plainfield
8 Community Avenue
Plainfield, CT 06374
860-230-3001

Mary Ann Chinatti, Planning & Zoning Supervisor *(via email only to mchinatti@plainfield.org)*
Town of Plainfield
8 Community Avenue
Plainfield, CT 06374
860-230-3028

CAYA Enterprises LLC *(via email only to brian@mpwelding.com)*
306 Kenyon Road
Hampton, CT 06247

Colin Robinson

From: Colin Robinson
Sent: Friday, April 16, 2021 12:33 AM
To: mchinatti@plainfield.org
Cc: Colin Robinson
Subject: CSC Exempt Modification Application 954 Norwich Rd Plainfield CT 876359
Attachments: CSC Exempt Modification Application 954 Norwich Rd Plainfield CT 876359 041621.pdf

Good Morning Ms. Chinatti,

Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 954 Norwich Rd Plainfield CT.

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

Thank you,

Colin

Colin Robinson
Project Manager
NETWORK BUILDING + CONSULTING
100 Apollo Drive | Suite 303 | Chelmsford, MA | 01824
M 360.561.3311

Colin Robinson

From: Colin Robinson
Sent: Friday, April 16, 2021 12:33 AM
To: kcunninghamselectman@plainfield.org
Cc: Colin Robinson
Subject: CSC Exempt Modification Application 954 Norwich Rd Plainfield CT 876359
Attachments: CSC Exempt Modification Application 954 Norwich Rd Plainfield CT 876359 041621.pdf

Good Morning Mr. Cunningham,

Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 954 Norwich Rd Plainfield CT.

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

Thank you,

Colin

Colin Robinson
Project Manager
NETWORK BUILDING + CONSULTING
100 Apollo Drive | Suite 303 | Chelmsford, MA | 01824
M 360.561.3311

Colin Robinson

From: Colin Robinson
Sent: Friday, April 16, 2021 12:33 AM
To: brian@mpwelding.com
Cc: Colin Robinson
Subject: CSC Exempt Modification Application 954 Norwich Rd Plainfield CT 876359
Attachments: CSC Exempt Modification Application 954 Norwich Rd Plainfield CT 876359 041621.pdf

Good Morning Brian,

Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 954 Norwich Rd Plainfield CT.

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

Thank you,

Colin

Colin Robinson
Project Manager
NETWORK BUILDING + CONSULTING
100 Apollo Drive | Suite 303 | Chelmsford, MA | 01824
M 360.561.3311

Exhibit A

Original Facility Approval

THE PLAINFIELD TOWN HALL
PLAINFIELD • CENTRAL VILLAGE • MOOSUP • WAUREGAN

COPY

Town Hall
8 Community Avenue
Plainfield, CT 06374

Telephone (860) 564-4071
Fax (860) 564-0612

PLANNING AND ZONING COMMISSION

June 14, 1999

Sprint Spectrum L.P.
C/O Thomas J. Regan
Brown, Rudnick, Freed & Gesmer
185 Asylum St., 38th Fl.
Hartford, CT 06103-3402

Dear Applicant:

At its meeting on Tuesday, June 8, 1999, the Planning & Zoning Commission approved your request SP-99-08 for a Special Permit for property located at 954 Norwich Rd., Plainfield. Map 10, Block 133, Lot 15.

The Conditions are:

- A Zoning Permit, Building Permit and NDDH approval will need to be obtained prior to construction.
- Please file the enclosed notice on the Land Records of the town.

A copy of the Legal Notice is enclosed for your records and will appear in the Norwich Bulletin on Wednesday, June 16, 1999.

Yours Truly,

PLANNING & ZONING COMMISSION

Dennis Jolley, Chairman

Gloria Rizer, Secretary

CC: Stanley Chuddy, Owner

TOWN OF PLAINFIELD
SPECIAL PERMIT RECORD

CORRECTED

In accordance with Section 8-3d of the Connecticut General Statutes and the Plainfield Zoning Regulations, this Record must be filed in the Town Land Records. The Town Clerk shall index this record in the Grantor Index under the name of the owner of Record of such property at the time the Special Permit is granted. The Special Permit is not effective until the Record is filed.

1. *Grantor(s): ***Chudy*** (Last) ***Stanley*** (First) _____ (Middle)

2. Assessor's Information **10** (Map) **133** (Block) **15** (Parcel)

3. Location of Property: **954 Norwich Rd., Plainfield**

4. Zoning District in which property is located: **C-1**

5. Description of Project/Activity:
   Construction of 130 ft. telecommunications tower and related equipment for the provision of wireless telecommunications service.

6. Special Permit granted under the following Sections of the Plainfield Zoning Regulations: Section 6.35 Wireless Telecommunication Facilities

7. Date Special Permit Granted: **June 8, 1999**

8. Approval is granted subject to the following conditions:
   None

9 Reasons for granting Special Permit: None Stated.

The Planning and Zoning Commission finds that the proposed use or development satisfies all criteria identified within the Planning Zoning Regulations for the approval of a Special Permit.

I certify that this is a true Record of the Special Permit granted for the subject Property.

Dated at Plainfield, CT
this 27th day of July 1999

PLANNING AND ZONING COMMISSION

June A. Bissette
Secretary or Acting Clerk

* Correction made for the spelling of the Grantor.

Received For Record at Plainfield, CT
on 7/27/99 1:08 PM
Attest Helen Francis Coombs
Helen Francis Coombs, Town Clerk

Exhibit B

Property Card

954 NORWICH RD

Location	954 NORWICH RD	**Mblu**	010/ 013B/ 0015/ /
Acct#	00081500	**Owner**	CAYA ENTERPRISES LLC
Assessment	$239,570	**Appraisal**	$342,250
PID	893	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$123,500	$218,750	$342,250
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$86,440	$153,130	$239,570

Owner of Record

Owner	CAYA ENTERPRISES LLC	**Sale Price**	$300,000
Co-Owner		**Certificate**	
Address	306 KENYON RD HAMPTON, CT 06247	**Book & Page**	0483/0730
		Sale Date	12/29/2014
		Instrument	08

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
CAYA ENTERPRISES LLC	$300,000		0483/0730	08	12/29/2014
CHUDY CARL L	$0		0409/0144	29	04/02/2009
CHUDY GLADYS L	$0		0397/0022	10	05/21/2008
CHUDY STANLEY V + GLADYS L	$0		0189/0716		06/27/1989

Building Information

Building 1 : Section 1

Year Built:	1973
Living Area:	5,625
Replacement Cost:	$165,839

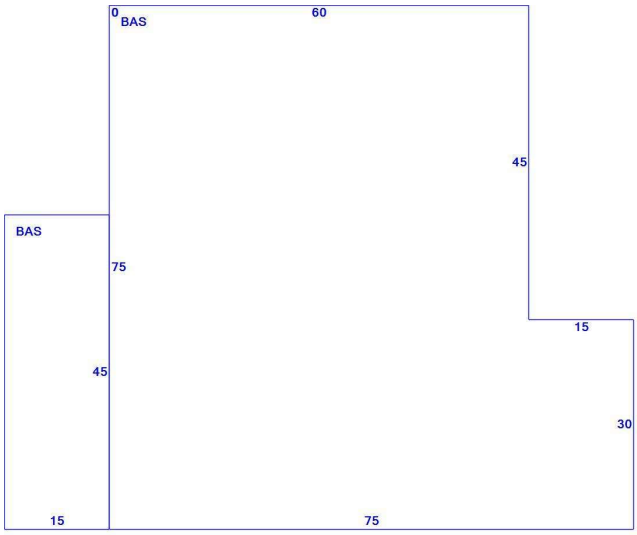
Building Percent Good: 73
Replacement Cost
Less Depreciation: $121,060

Building Attributes	
Field	**Description**
Style:	Light Indust
Model	Comm/Ind
Grade	D
Stories:	1
Occupancy	1.00
Exterior Wall 1	Pre-finsh Metl
Exterior Wall 2	
Roof Structure	Gable/Hip
Roof Cover	Metal/Tin
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Oil
Heating Type	Forced Air-Duc
AC Type	None
Struct Class	
Bldg Use	AUTO REPR
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	3030
Heat/AC	HEAT ONLY
Frame Type	STEEL
Baths/Plumbing	AVERAGE
Ceiling/Wall	NONE
Rooms/Prtns	AVERAGE
Wall Height	18.00
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos/PlainfieldCTPhotos//\00\00\63\91.jpg)

Building Layout



(ParcelSketch.ashx?pid=893&bid=893)

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	5,625	5,625
		5,625	5,625

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
OD1	Overhead Dr-Wood/Mtl	2.00 UNITS	$520	1
OD1	Overhead Dr-Wood/Mtl	2.00 UNITS	$720	1

Land

Land Use

Use Code	3320
Description	AUTO REPR
Zone	C
Neighborhood	1010
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	4.5
Frontage	
Depth	
Assessed Value	$153,130
Appraised Value	$218,750

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
FN1	Fence 4' Chain			600.00 L.F.	$1,200	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$123,500	$218,750	$342,250
2019	$123,500	$218,750	$342,250

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$86,440	$153,130	$239,570
2019	$86,440	$153,130	$239,570

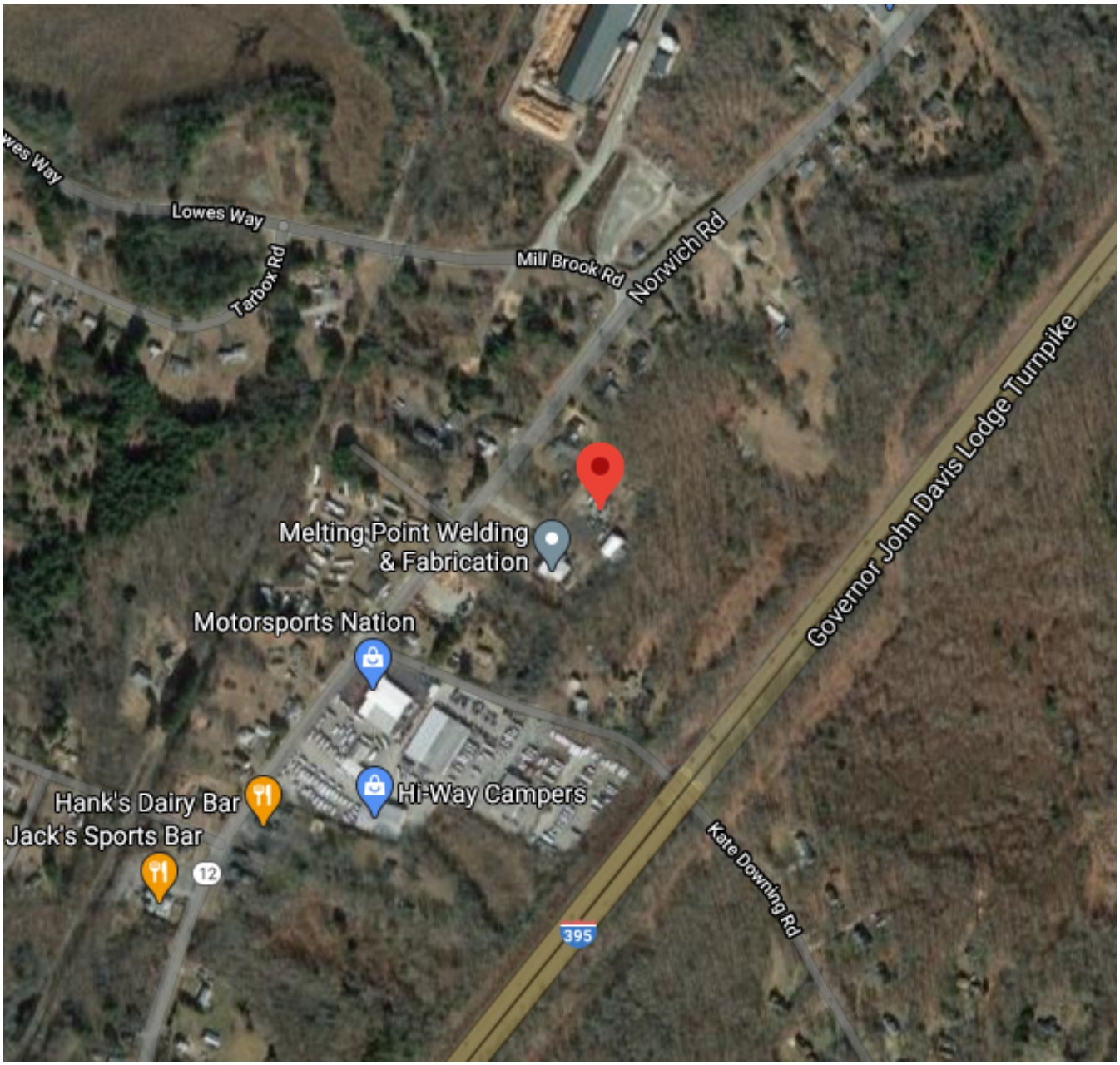

Lowes Way
Lowes Way
Tarbox Rd
Mill Brook Rd
Norwich Rd
Governor John Davis Lodge Turnpike
Melting Point Welding & Fabrication
Motorsports Nation
Hi-Way Campers
Hank's Dairy Bar
Jack's Sports Bar
12
395
Kate Downing Rd

Exhibit C

Construction Drawings

T-MOBILE SITE NUMBER: CTHA853A
T-MOBILE SITE NAME: CTHA853A
SITE TYPE: MONOPOLE
TOWER HEIGHT: 130'-0"
BUSINESS UNIT #: 876359
SITE ADDRESS: 954 NORWICH ROAD PLAINFIELD, CT, 06062
COUNTY: WINDHAM
JURISDICTION: TOWN OF PLAINFIELD

T-MOBILE SPRINT RETAIN SITE CONFIGURATION: 67D5A998C 6160 (GSM ONLY)

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	NORWICH
SITE ADDRESS:	954 NORWICH ROAD PLAINFIELD, CT, 06062
COUNTY:	WINDHAM
MAP/PARCEL #:	010-013B-0015
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.658737°
LONGITUDE:	-71.924934°
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	187 FT
CURRENT ZONING:	C
JURISDICTION:	TOWN OF PLAINFIELD
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	CAYA ENTERPRISES LLC 151 SOUTH MAIN ST BROOKLYN, CT 6234
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE 35 GRIFFIN ROAD BLOOMFIELD, CT 06002
ELECTRIC PROVIDER:	N/A
TELCO PROVIDER:	N/A

PROJECT TEAM

A&E FIRM:	B+T GROUP 1717 S. BOULDER AVE. TULSA, OK 74119 JENNY PAUL jpaul@btgrp.com
CROWN CASTLE USA INC. DISTRICT CONTACTS:	1500 CORPORATE DRIVE CANONSBURG, PA 15317

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

DRAWING INDEX

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

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 24X36. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

PROJECT DESCRIPTION

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

TOWER SCOPE OF WORK:
- REMOVE (6) ANTENNAS
- REMOVE (12) RADIOS
- REMOVE (1) 7/8" HYBRID CABLES
- REMOVE (3) 1-1/4" HYBRID CABLES
- INSTALL (9) ANTENNAS
- INSTALL (9) RADIOS
- INSTALL (4) 6/24 4AWG HYBRID TRUNKS

GROUND SCOPE OF WORK:
- REMOVE (2) EXISTING SPRINT CABINETS
- INSTALL (1) SSC 6160 CABINET
- INSTALL (1) B160 BATTERY CABINET
- INSTALL (1) BB 6648
- INSTALL (3) BB 6630
- INSTALL (1) DUG20
- INSTALL (1) RBS 6601
- INSTALL (1) PSU 4813 VOLTAGE BOOSTER
- INSTALL (1) CSR IXRe V2 (GEN 2)

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

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	IBC 2015 / 2018 CONNECTICUT STATE BUILDING CODE
MECHANICAL	IMC 2015 / 2018 CONNECTICUT STATE BUILDING CODE
ELECTRICAL	NEC 2017 / 2018 CONNECTICUT STATE BUILDING CODE

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	N/A
DATED:	N/A
MOUNT ANALYSIS:	GPD
DATED:	2/23/21
AC ELECTRICAL POWER DESIGN:	BY OTHERS
DATED:	
RFDS REVISION:	1
DATED:	1/15/21
ORDER ID:	538769
REVISION:	1

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
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

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

T-MOBILE SITE NUMBER:
CTHA853A

BU #: **876359**
NORWICH

954 NORWICH ROAD
PLAINFIELD, CT, 06062

EXISTING
130'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/10/21	JTS	CONSTRUCTION	MTJ

STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
3/10/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

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.

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON–METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON–METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD–WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
   - 4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
   - 4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERYIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI–CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT) OR METAL–CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON–PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER–ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3R (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR CROWN CASTLE USA INC. BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "T–MOBILE".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

CONDUCTOR COLOR CODE

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

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

APWA UNIFORM COLOR CODE:

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

ABBREVIATIONS:

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

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

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

T-MOBILE SITE NUMBER:
CTHA853A

BU #: **876359**
NORWICH

954 NORWICH ROAD
PLAINFIELD, CT, 06062

EXISTING
130'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/10/21	JTS	CONSTRUCTION	MTJ

CHAD TUTTLE
No. 23924
3/10/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

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

SHEET NUMBER: T-4

REVISION: 0

1 OVERALL SITE PLAN

SCALE: 50' 25' 0 50' 1" = 50'-0" (FULL SIZE) 1" = 100'-0" (11x17)

SITE PLAN DISCLAIMER:

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

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

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

T-MOBILE SITE NUMBER:
CTHA853A

BU #: **876359**
NORWICH

954 NORWICH ROAD
PLAINFIELD, CT, 06062

EXISTING
130'-0" MONOPOLE

ISSUED FOR:

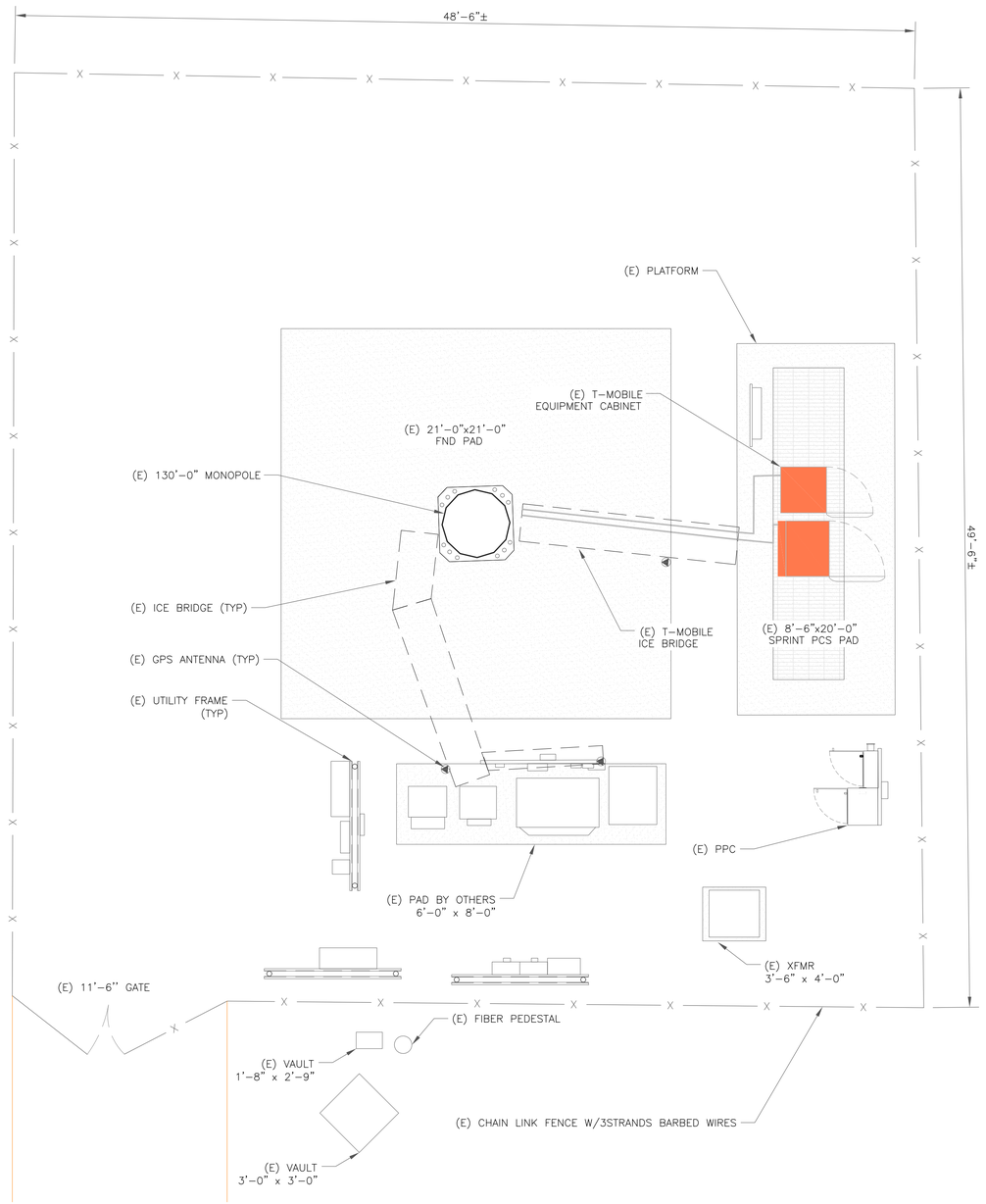
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/10/21	JTS	CONSTRUCTION	MTJ

STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
3/10/21

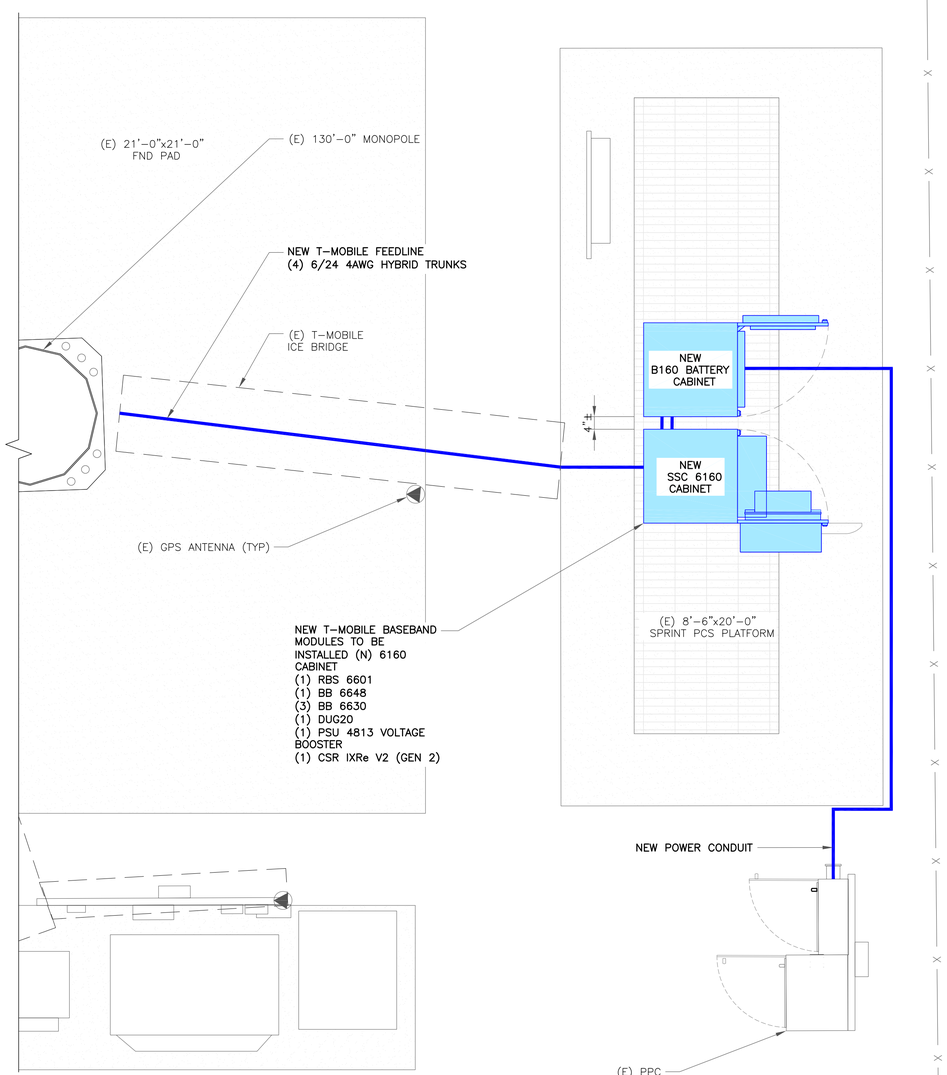
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: C-1.1

REVISION: 0



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



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

NOTES:

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

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

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

T-MOBILE SITE NUMBER:
CTHA853A

BU #: **876359**
NORWICH

954 NORWICH ROAD
PLAINFIELD, CT, 06062

EXISTING
130'-0" MONOPOLE

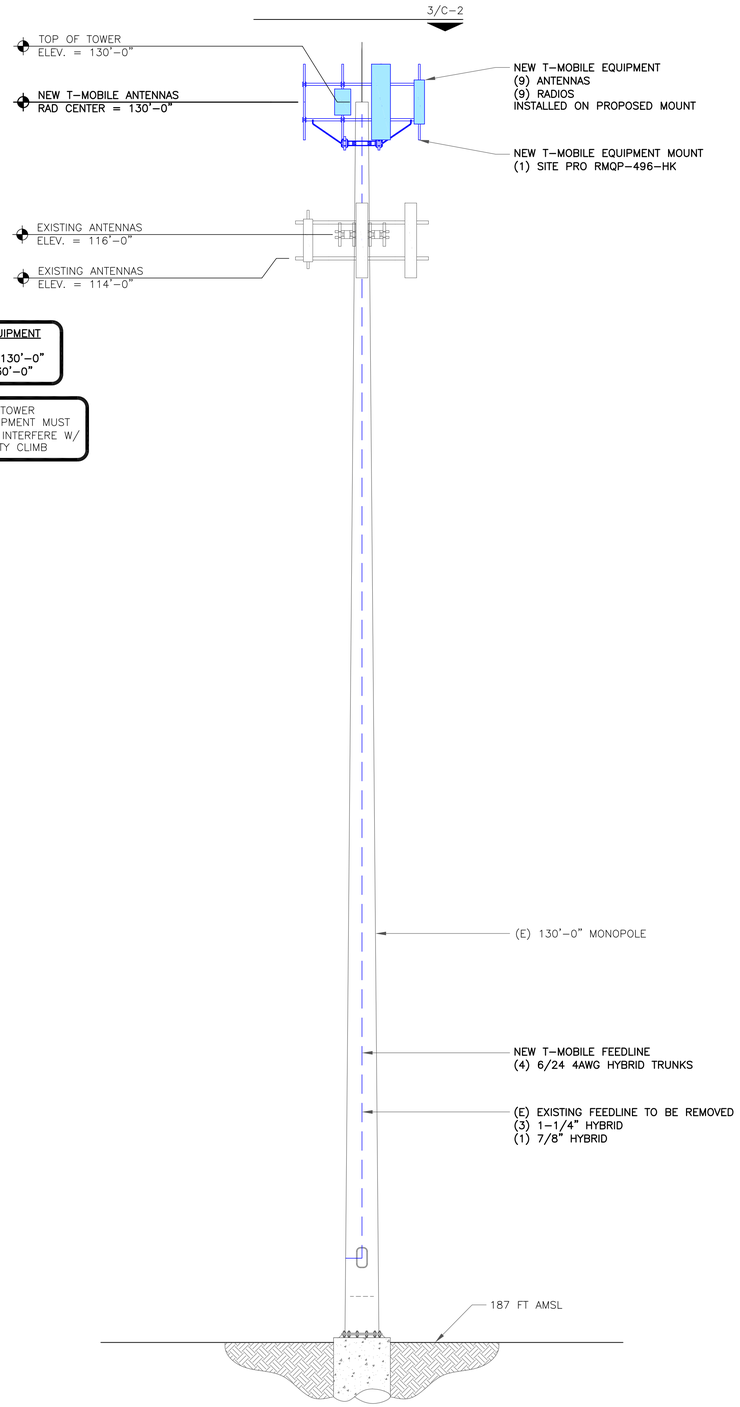
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/10/21	JTS	CONSTRUCTION	MTJ

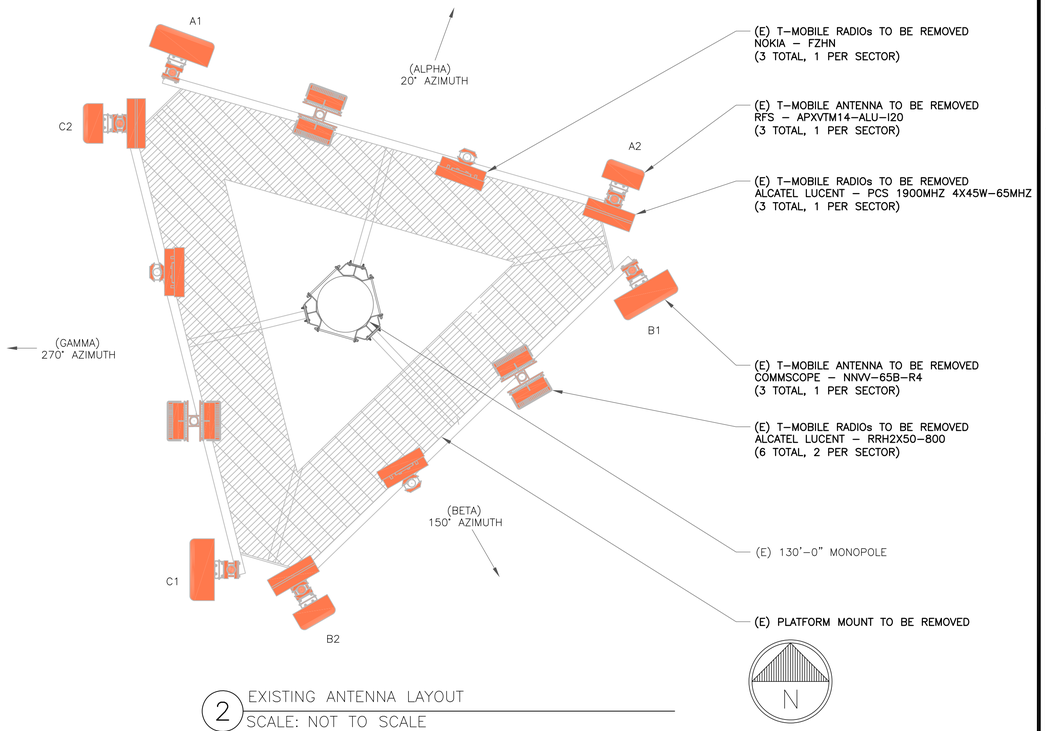
STATE OF CONNECTICUT
MICHAEL T. JONES
No. 23924
LICENSED PROFESSIONAL ENGINEER
3/10/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

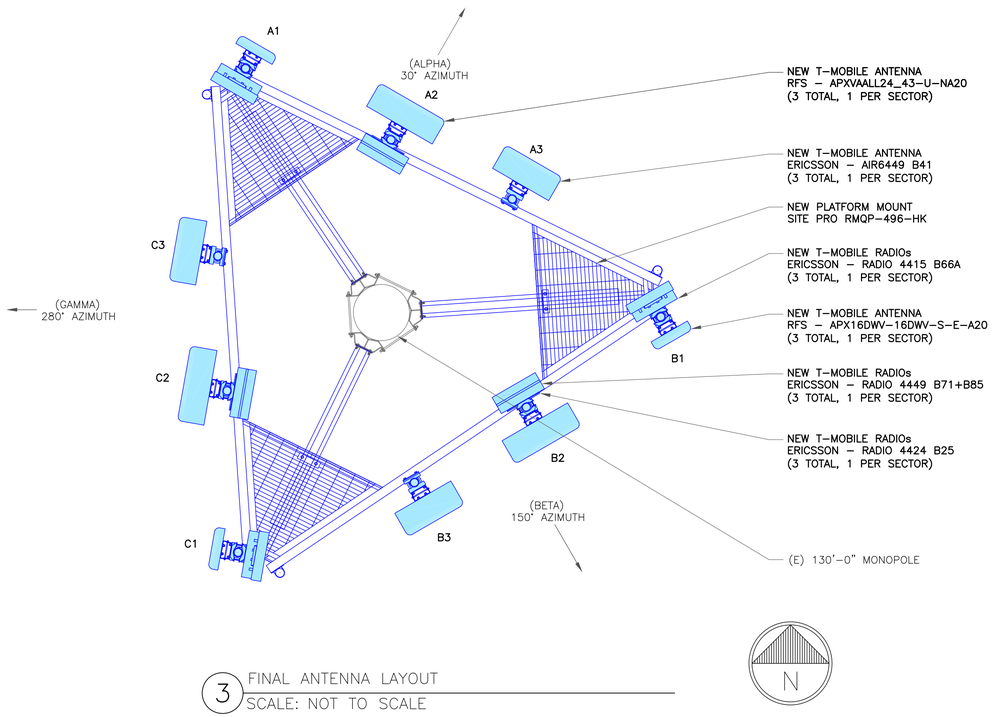
SHEET NUMBER: C-1.2
REVISION: 0



1 FINAL ELEVATION
SCALE: NOT TO SCALE



2 EXISTING ANTENNA LAYOUT
SCALE: NOT TO SCALE



3 FINAL ANTENNA LAYOUT
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

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

T-MOBILE SITE NUMBER:
CTHA853A

BU #: **876359**
NORWICH

954 NORWICH ROAD
PLAINFIELD, CT, 06062

EXISTING
130'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/10/21	JTS	CONSTRUCTION	MTJ

STATE OF CONNECTICUT
MICHAEL T. JONES
No. 23924
LICENSED
PROFESSIONAL ENGINEER
3/10/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: C-2

REVISION: 0

79791.002.01_NORWICH_ETA_T-MOBILE_10.21.2020.dwg - Sheet:C-2 - User: mjones - Mar 10, 2021 - 8:20am

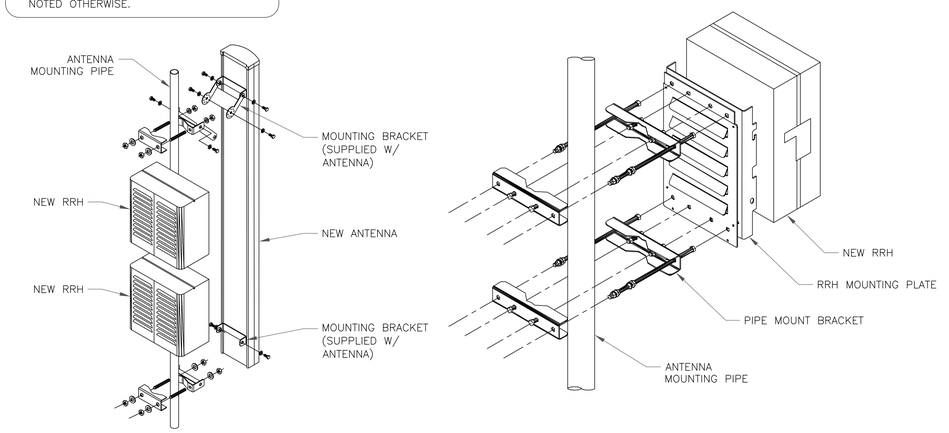
RF SYSTEM SCHEDULE

SECTOR	ANTENNA	TECH	MANUFACTURER	ANTENNA MODEL	AZIMUTH	M-TILT	E-TILT	RAD CENTER	TMA/RRU	FEEDLINE TYPE
ALPHA	A-1	L2100	RFS	APX16DWV-16DWV-S-E-A20	30°	0°	2°	130'-0"	RADIO 4415 B66A	–
	A-2	L700 / L600 / N600 / L1900 / G1900	RFS	APXVAALL24_43-U-NA20	30°	0°	2°/2°	130'-0"	RADIO 4449 B71+B85/ RADIO 4424 B25	(4) 6/24 4AWG HYBRID TRUNKS
	A-3	L2500 / N2500	ERICSSON	AIR6449 B41	30°	0°	2°	130'-0"	–	–
BETA	B-1	L2100	RFS	APX16DWV-16DWV-S-E-A20	150°	0°	2°	130'-0"	RADIO 4415 B66A	–
	B-2	L700 / L600 / N600 / L1900 / G1900	RFS	APXVAALL24_43-U-NA20	150°	0°	2°/2°	130'-0"	RADIO 4449 B71+B85/ RADIO 4424 B25	–
	B-3	L2500 / N2500	ERICSSON	AIR6449 B41	150°	0°	2°	130'-0"	–	–
GAMMA	C-1	L2100	RFS	APX16DWV-16DWV-S-E-A20	280°	0°	2°	130'-0"	RADIO 4415 B66A	–
	C-2	L700 / L600 / N600 / L1900 / G1900	RFS	APXVAALL24_43-U-NA20	280°	0°	2°/2°	130'-0"	RADIO 4449 B71+B85/ RADIO 4424 B25	–
	B-3	L2500 / N2500	ERICSSON	AIR6449 B41	280°	0°	2°	130'-0"	–	–

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

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

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

T-MOBILE SITE NUMBER:
CTHA853A

BU #: **876359**
NORWICH

954 NORWICH ROAD
PLAINFIELD, CT, 06062

EXISTING
130'-0" MONOPOLE

ISSUED FOR:

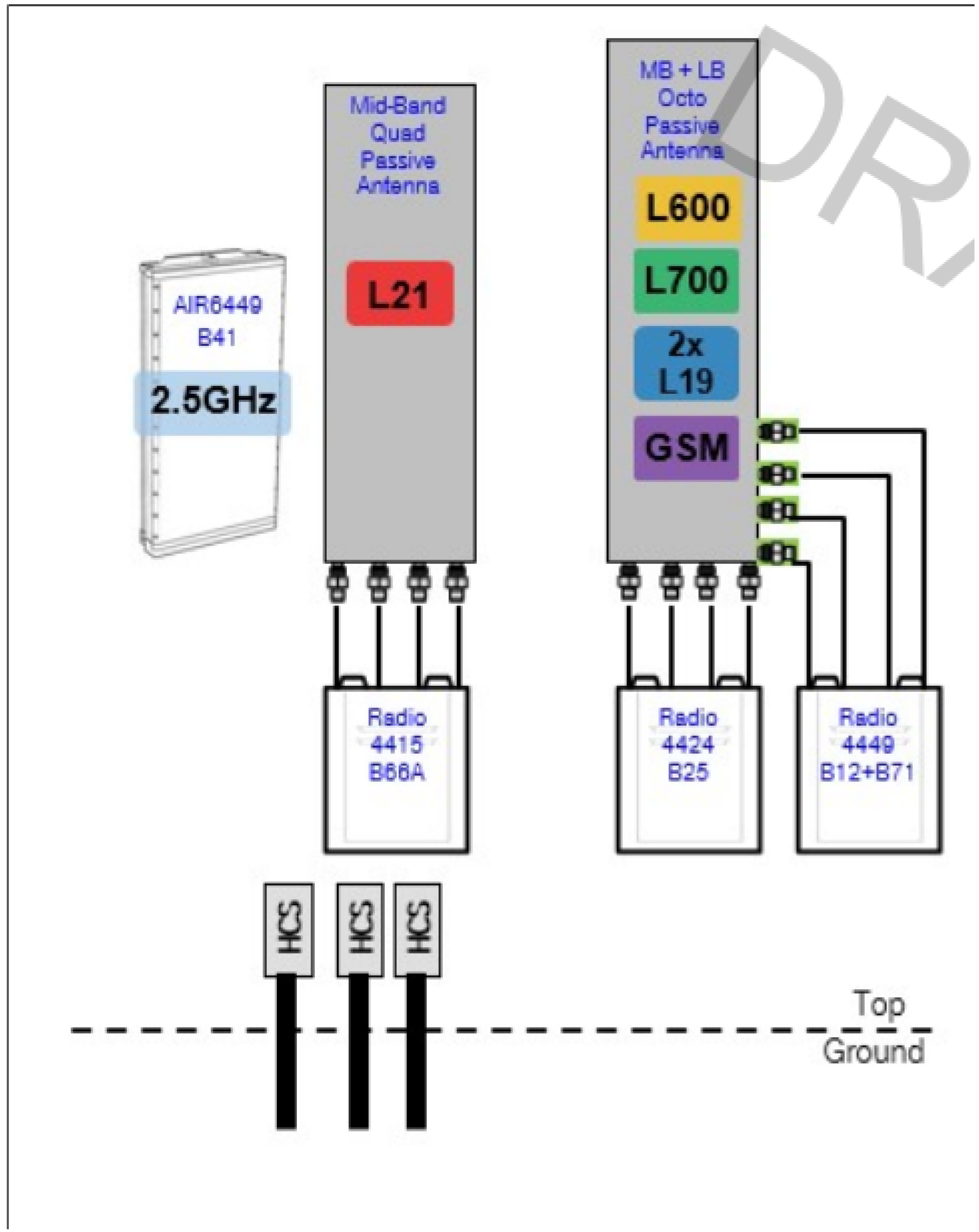
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/10/21	JTS	CONSTRUCTION	MTJ

STATE OF CONNECTICUT
MICHAEL T. JONES
No. 23924
LICENSED PROFESSIONAL ENGINEER
3/10/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: C-3

REVISION: 0



1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

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

T-MOBILE SITE NUMBER:
CTHA853A

BU #: **876359**
NORWICH

954 NORWICH ROAD
PLAINFIELD, CT, 06062

EXISTING
130'-0" MONOPOLE

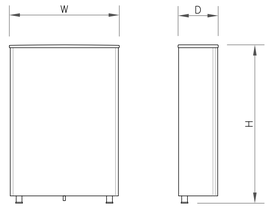
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/10/21	JTS	CONSTRUCTION	MTJ

3/10/21

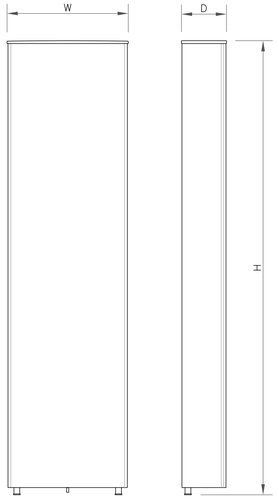
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: C-4
REVISION: 0



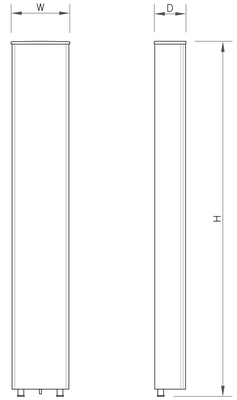
ANTENNA SPECS	
MANUFACTURER	ERICSSON
MODEL #	AIR6449 B41
WIDTH	20.51"
DEPTH	8.54"
HEIGHT	33.11"
WEIGHT	114.63 LBS

1 ANTENNA SPECS
SCALE: NOT TO SCALE



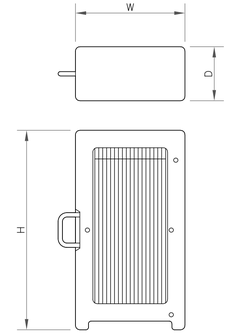
ANTENNA SPECS	
MANUFACTURER	RFS
MODEL #	APXVAALL24_43-U-NA20
WIDTH	24.00"
DEPTH	8.50"
HEIGHT	95.90"
WEIGHT	149.90 LBS

2 ANTENNA SPECS
SCALE: NOT TO SCALE



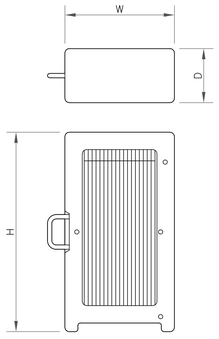
ANTENNA SPECS	
MANUFACTURER	RFS
MODEL #	APX16DWV-16DWV-S-E-A20
WIDTH	13.30"
DEPTH	3.15"
HEIGHT	55.90"
WEIGHT	40.70 LBS

3 ANTENNA SPECS
SCALE: NOT TO SCALE



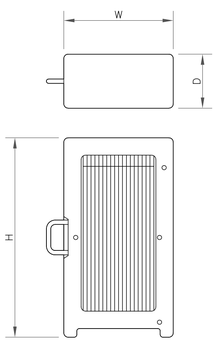
RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	RADIO 4449 B71+B85
WIDTH	13.20"
DEPTH	10.63"
HEIGHT	17.91"
WEIGHT	73.21 LBS

4 RRU SPECS
SCALE: NOT TO SCALE



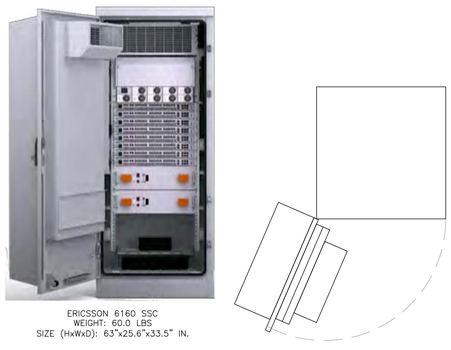
RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	RADIO 4415 B66A
WIDTH	13.20"
DEPTH	5.40"
HEIGHT	14.90"
WEIGHT	46.30 LBS

5 RRU SPECS
SCALE: NOT TO SCALE



RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	RADIO 4424 B25
WIDTH	14.40"
DEPTH	11.30"
HEIGHT	17.10"
WEIGHT	86.00 LBS

6 RRU SPECS
SCALE: NOT TO SCALE



ERICSSON 6160 SSC
WEIGHT: 60.0 LBS
SIZE (HxWxD): 63"x25.6"x33.5" IN.

7 ERICSSON 6160 SSC
SCALE: NOT TO SCALE

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

8 ERICSSON B160 BATTERY CABINET
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

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

T-MOBILE SITE NUMBER:
CTHA853A

BU #: **876359**
NORWICH

954 NORWICH ROAD
PLAINFIELD, CT, 06062

EXISTING
130'-0" MONOPOLE

ISSUED FOR:

REV.	DATE	DRWN	DESCRIPTION	DES./QA
0	3/10/21	JTS	CONSTRUCTION	MTJ

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: C-5

REVISION: 0

FINAL PANEL SCHEDULE							
LOAD	POLES	AMPS	BUS L1	BUS L2	AMPS	POLES	LOAD
			1	2	10A	1	SPARE
			3	4	15A	1	SPARE
6160 CABINET	2	200A	5	6	15A	2	BBU CABINET
			7	8			
			9	10	100A	2	MMBS CABINET
			11	12			
			13	14	20A	1	GFCI
SPARE	1	20A	15	16			
			17	18			
			19	20			
			21	22			
			23	24			

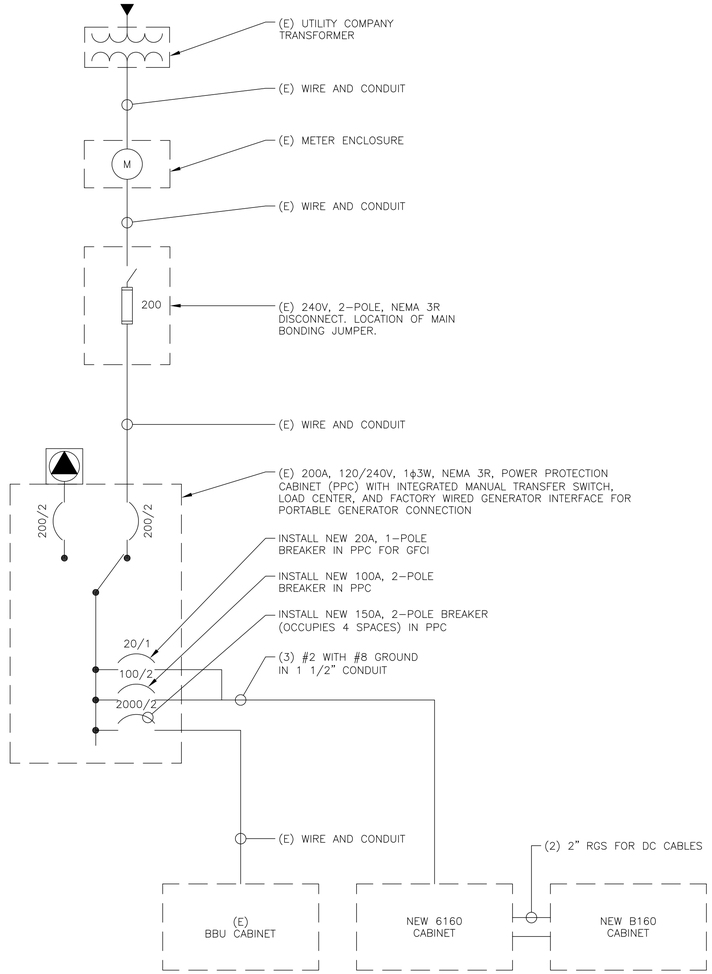
RATED VOLTAGE: ■120/240 □_____ 1 PHASE, 3 WIRE	BRANCH POLES: □12 □24 ■30 □42	APPROVED MF'RS
RATED AMPS: □100 ■200 □400 □_____	CABINET: ■SURFACE □FLUSH	NEMA □1 ■3R □4X
□MAIN LUGS ONLY ■MAIN 200 AMPS ■BREAKER □FUSED SWITCH	■HINGED DOOR	■KEYED DOOR LATCH
□FUSED ■CIRCUIT BREAKER BRANCH DEVICES	□_____ TO BE GFCI BREAKERS	FULL NEUTRAL BUS / GROUND BAR
ALL BREAKERS MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF 10,000 AMPS SYMMETRICAL		

REPLACE EXISTING BREAKER IN POSITION 3 AND 4 WITH A NEW 2P 200A BREAKER
REPLACE EXISTING BREAKER IN POSITION 9 WITH A NEW 1P 20A BREAKER
REPLACE EXISTING WIRES FOR EXISTING BBU CABINET WITH (3) 1/0 AWG THWN (COPPER) AND (1) #2G AWG. MINIMUM CONDUIT SIZE TO BE 2".
IF 200A BREAKER WILL NOT PROPERLY FIT IN EXISTING PANEL, REPLACE (E) PANEL WITH SQUARE D PANEL QO12040M200RB (OR APPROVED EQUAL).
UPGRADE FEEDER WIRES TO MEET AMPACITY IF NEW PANEL IS REQUIRED.
FINAL PANEL DESIGN AND CALCULATIONS FOR WIRE SIZE WERE BASED OFF OF EXISTING DOCUMENTS AND PHOTOS

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

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

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

T-MOBILE SITE NUMBER:
CTHA853A

BU #: **876359**
NORWICH

954 NORWICH ROAD
PLAINFIELD, CT, 06062

EXISTING
130'-0" MONOPOLE

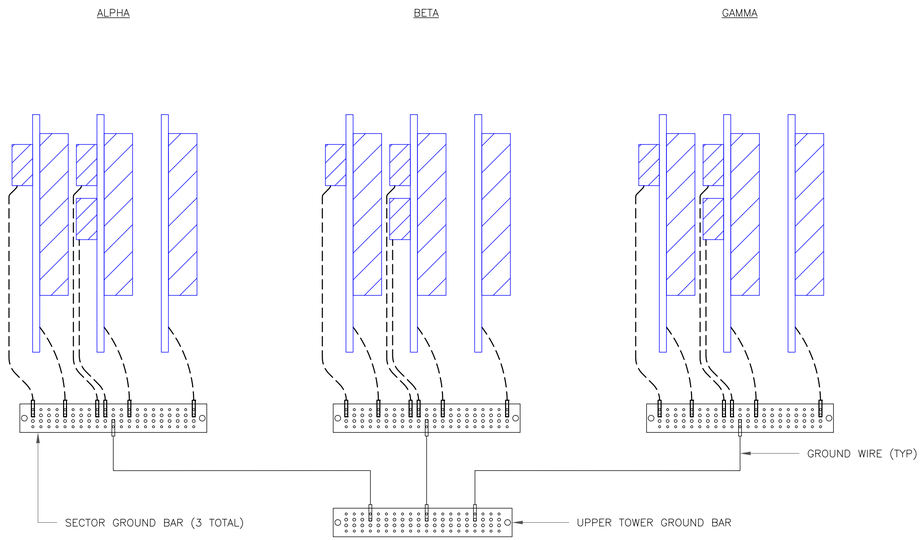
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/10/21	JTS	CONSTRUCTION	MTJ

STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
3/10/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

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

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

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

T-MOBILE SITE NUMBER:
CTHA853A

BU #: **876359**
NORWICH

954 NORWICH ROAD
PLAINFIELD, CT, 06062

EXISTING
130'-0" MONOPOLE

ISSUED FOR:

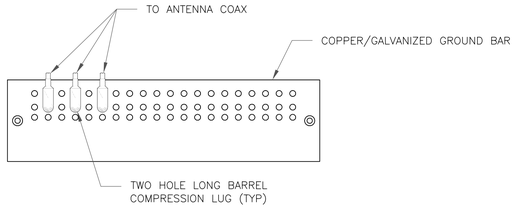
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/10/21	JTS	CONSTRUCTION	MTJ

STATE OF CONNECTICUT
MATTHEW T. JOHNSON
No. 23924
LICENSED PROFESSIONAL ENGINEER
3/10/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: G-1

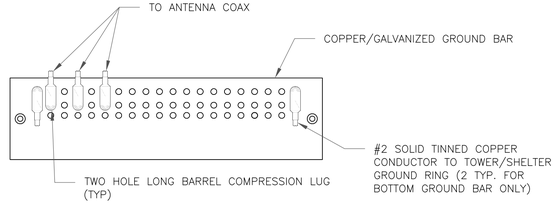
REVISION: 0



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.

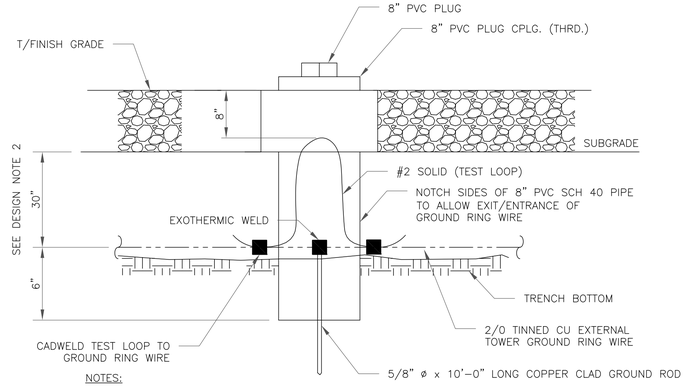
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



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.

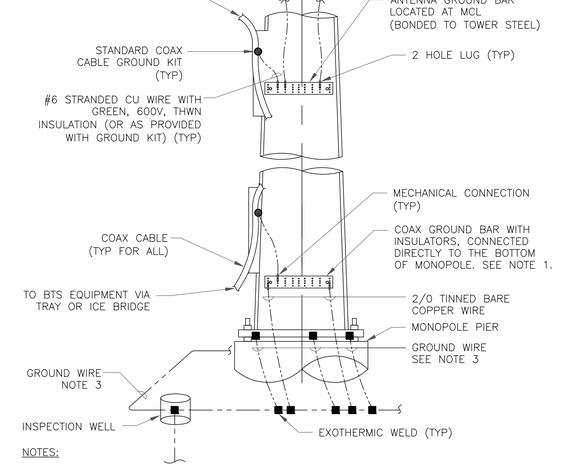
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

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

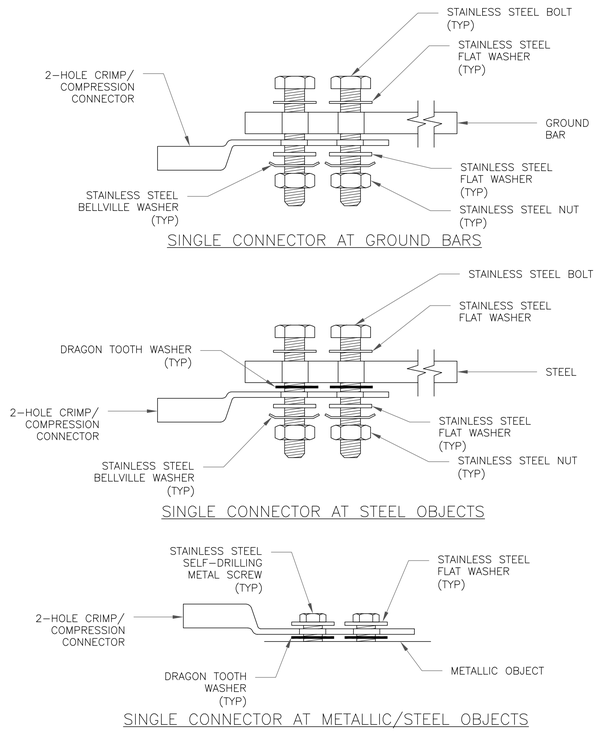
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



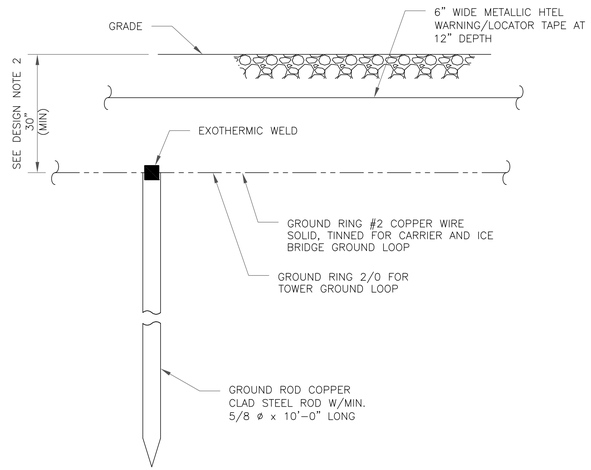
NOTES:

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

4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

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

6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

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

T-MOBILE SITE NUMBER:
CTHA853A

BU #: **876359**
NORWICH

954 NORWICH ROAD
PLAINFIELD, CT, 06062

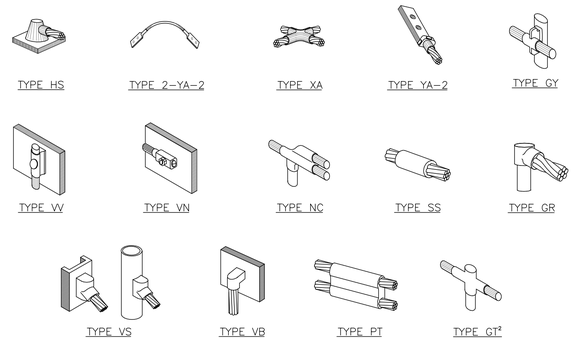
EXISTING
130'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/10/21	JTS	CONSTRUCTION	MTJ

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: G-2
REVISION: 0

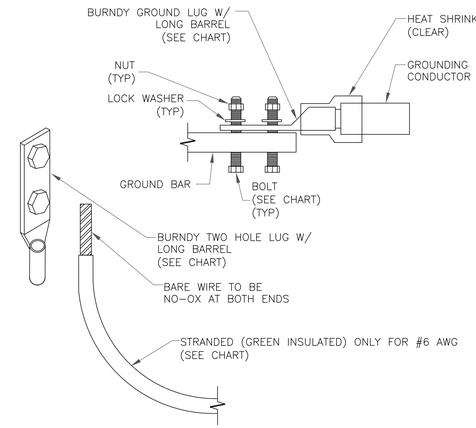


NOTE:

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

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

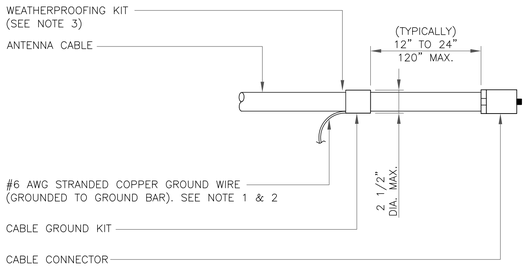
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

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

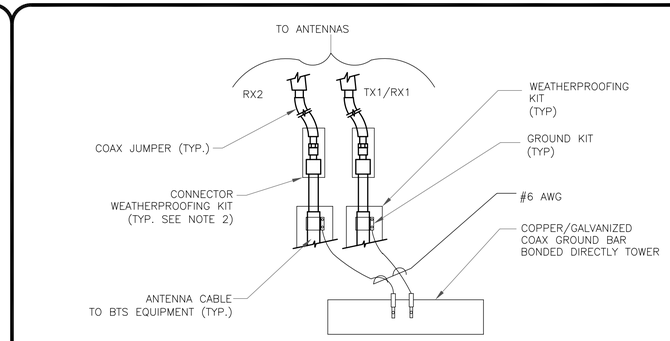
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

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

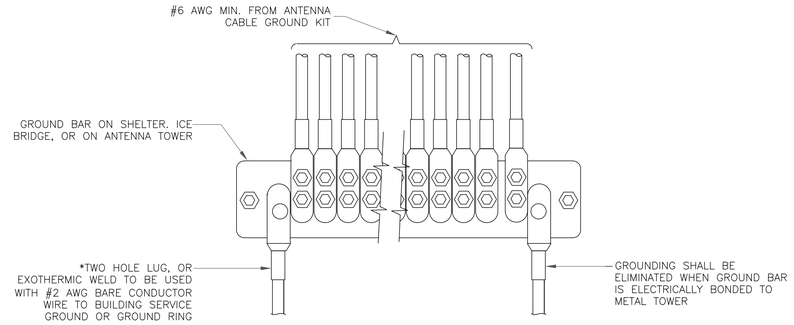
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



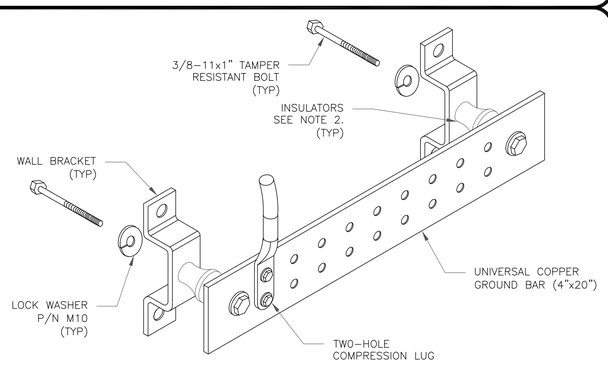
NOTES:

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

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



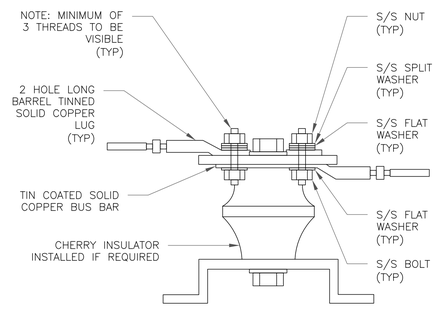
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



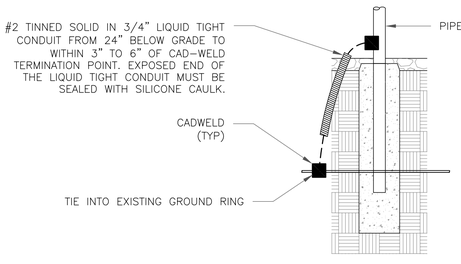
NOTES:

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

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

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

T-MOBILE SITE NUMBER:
CTHA853A

BU #: **876359**
NORWICH

954 NORWICH ROAD
PLAINFIELD, CT, 06062

EXISTING
130'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	3/10/21	JTS	CONSTRUCTION	MTJ

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: G-3
REVISION: 0

Exhibit D

Structural Analysis Report

Date: **March 03, 2021**

MORRISON HERSHFIELD

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

Subject:	**Structural Analysis Report**	
Carrier Designation:		
	Site Number:	CTHA853A
	Site Name:	CTHA853A
Crown Castle Designation:	**BU Number:**	876359
	Site Name:	Norwich
	JDE Job Number:	628844
	Work Order Number:	1918894
	Order Number:	538769 Rev. 1
Engineering Firm Designation:	**Morrison Hershfield Project Number:** CN7-449 / 2101398	
Site Data:	**954 Norwich Road, Plainfield, Windham County, CT 06062** **Latitude *41° 39' 31.46"*, Longitude *-71° 55' 29.75"*** **130 Foot – Summit 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-73.1%**

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

Respectfully submitted by:

STATE OF CONNECTICUT
G. LANCE COOKE
No. 28133
LICENSED
PROFESSIONAL ENGINEER

G. Lance Cooke
2021.03.03
10:49:56-08'00'

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

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 130 ft Summit Monopole tower designed by Paul J. Ford and Company.

2) ANALYSIS CRITERIA

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

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
130.0	130.0	3	rfs/celwave	APXVAALL24_43-U-NA20_TMO	4	1-5/8
		3	ericsson	AIR6449 B41_T-MOBILE		
		3	rfs/celwave	APX16DWV-16DWV-S-E-A20		
		3	ericsson	RADIO 4415 B66A_CCIV3		
		3	ericsson	RADIO 4424 B25_TMO		
		3	ericsson	RADIO 4449 B71 B85A_T-MOBILE		
		1	Site Pro 1	12.5' Platform Mount [#RMQP-496-HK]		

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)
116.0	116.0	3	ericsson	RRUS-11	-	-
		3	ericsson	RRUS12/RRUS A2		
		1	-	Side Arm Mount [SO 102-3]		
114.0	115.0	3	cci antennas	HPA-65R-BUU-H8 w/ Mount Pipe	12 4 2	1-1/4 3/4 3/8
		3	cci antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe		
		3	Powerwave technologies	7770.00 w/ Mount Pipe		
		6	Powerwave technologies	7020.00		
		3	ericsson	RRUS 32		
		3	Powerwave technologies	LGP21401		
		1	raycap	DC6-48-60-18-8C		
	114.0	1	raycap	DC6-48-60-18-8F		
		1	-	Platform Mount [LP 304-1_HR-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	1616503	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	1616546	CCISITES
4-TOWER MANUFACTURER DRAWINGS	1446983	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	130 - 83	Pole	TP26.06x16x0.25	1	-11.32	1241.83	66.3	Pass
L2	83 - 43.25	Pole	TP34.068x24.8644x0.3125	2	-17.68	2030.16	73.1	Pass
L3	43.25 - 0	Pole	TP42.7x32.5333x0.375	3	-28.82	3139.28	70.1	Pass
							Summary	
						Pole (L2)	73.1	Pass
						Rating =	73.1	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	60.3	Pass
1	Base Plate		59.3	Pass
1,2	Base Foundation (Compared w/ Design Loads)	0	65.4	Pass

Structure Rating (max from all components) =	73.1%*

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Foundation capacity determined by comparing analysis reactions to original design reactions.
3) *Rating per TIA-222-H, Section 15.5.

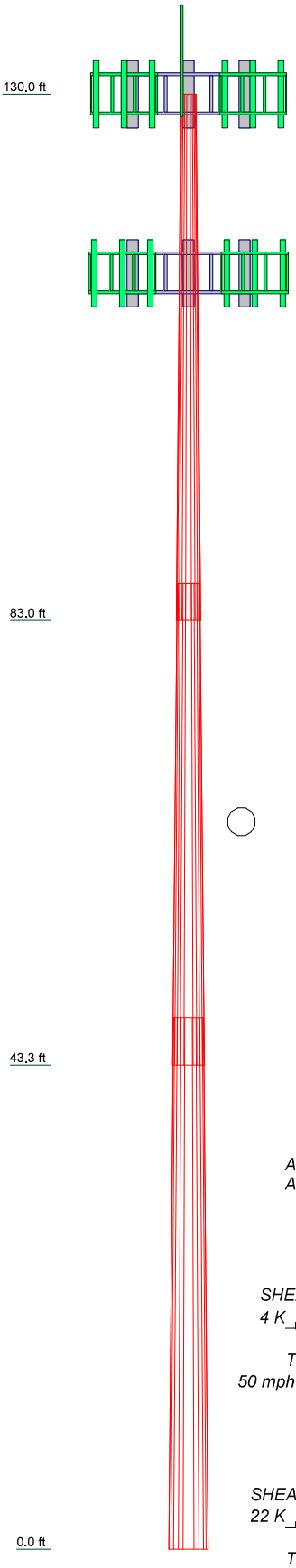
4.1) Recommendations

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	47.00	12	0.2500	3.25	16.0000	26.0600		2.7
2	43.00	12	0.3125	4.25	24.8644	34.0680	A607-65	4.3
3	47.50	12	0.3750		32.5333	42.7000		7.3
								14.2



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Windham County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 135 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 73.1%

ALL REACTIONS ARE FACTORED

AXIAL 46 K

SHEAR 4 K / *MOMENT 439 kip-ft*

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

AXIAL 29 K

SHEAR 22 K / *MOMENT 2095 kip-ft*

TORQUE 1 kip-ft
REACTIONS - 135 mph WIND

Consulting Engineers

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

Job: ***CN7-449 / 2101398***			
Project: ***876359 / Norwich***			
Client: Crown Castle USA	Drawn by: MO	App'd:	
Code: TIA-222-H	Date: 03/03/21	Scale: NTS	
Path: C:\Wadhurya\Structural Analysis\2021 Projects\CN7-449 - 876359 NORWICH\CN7-449 SIA\Analysis\CN7-449 BU_876359 WO_191889.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 Windham County, Connecticut.
Tower base elevation above sea level: 182.00 ft.
Basic wind speed of 135 mph.
Risk Category II.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 1.5000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
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*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	130.00-83.00	47.00	3.25	12	16.0000	26.0600	0.2500	1.0000	A607-65 (65 ksi)
L2	83.00-43.25	43.00	4.25	12	24.8644	34.0680	0.3125	1.2500	A607-65

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
L3	43.25-0.00	47.50		12	32.5333	42.7000	0.3750	1.5000	(65 ksi) A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	16.4762	12.6788	401.4426	5.6385	8.2880	48.4366	813.4316	6.2401	3.6180	14.472
	26.8911	20.7770	1766.6310	9.2400	13.4991	130.8705	3579.6733	10.2258	6.3141	25.256
L2	26.3514	24.7053	1900.8382	8.7896	12.8797	147.5836	3851.6135	12.1592	5.8261	18.644
	35.1596	33.9665	4939.9833	12.0845	17.6472	279.9298	10009.7454	16.7173	8.2927	26.537
L3	34.4904	38.8312	5125.7082	11.5127	16.8523	304.1554	10386.0744	19.1115	7.7139	20.57
	44.0740	51.1074	11685.9491	15.1524	22.1186	528.3313	23678.9011	25.1535	10.4386	27.836

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 130.00-83.00				1	1	1			
L2 83.00-43.25				1	1	1			
L3 43.25-0.00				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"	C	No	Surface Ar (CaAa)	130.00 - 8.00	1	1	-0.450 -0.450	0.3750		0.22
Climbing Rungs	C	No	Surface Ar (CaAa)	130.00 - 8.00	1	1	-0.500 -0.400	0.7050		1.80
******										

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
******									
***									
HB158-21U6S24-xxM_TMO(1-5/8)	C	No	No	Inside Pole	130.00 - 8.00	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
******									
LDF6-50A(1-1/4)	A	No	No	Inside Pole	114.00 - 8.00	12	No Ice	0.00	0.60
							1/2" Ice	0.00	0.60
							1" Ice	0.00	0.60
							2" Ice	0.00	0.60
FB-L98B-002-	A	No	No	Inside Pole	114.00 - 8.00	1	No Ice	0.00	0.06

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
75000(3/8)							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)	A	No	No	Inside Pole	114.00 - 8.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	A	No	No	Inside Pole	114.00 - 8.00	4	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
							2" Ice	0.00	0.58
******									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130.00-83.00	A	0.000	0.000	0.000	0.000	0.30
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	5.076	0.000	0.57
L2	83.00-43.25	A	0.000	0.000	0.000	0.000	0.38
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	4.293	0.000	0.48
L3	43.25-0.00	A	0.000	0.000	0.000	0.000	0.34
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	3.807	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	130.00-83.00	A	1.431	0.000	0.000	0.000	0.000	0.30
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	31.987	0.000	0.89
L2	83.00-43.25	A	1.359	0.000	0.000	0.000	0.000	0.38
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	27.053	0.000	0.75
L3	43.25-0.00	A	1.218	0.000	0.000	0.000	0.000	0.34
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	22.974	0.000	0.65

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	130.00-83.00	0.5177	0.3761	1.8947	1.3766
L2	83.00-43.25	0.5224	0.3795	2.0751	1.5077
L3	43.25-0.00	0.4209	0.3058	1.7254	1.2535

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"	83.00 - 130.00	1.0000	1.0000
L1	3	Climbing Rungs	83.00 - 130.00	1.0000	1.0000
L2	2	Safety Line 3/8"	43.25 - 83.00	1.0000	1.0000
L2	3	Climbing Rungs	43.25 - 83.00	1.0000	1.0000
L3	2	Safety Line 3/8"	8.00 - 43.25	1.0000	1.0000
L3	3	Climbing Rungs	8.00 - 43.25	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
******									
Lighting Rod 3/4" x 6'	C	From Leg	0.00 0.00 3.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00
****** ***									
AIR6449 B41_T-MOBILE	A	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.66 5.96 6.27 6.91	2.48 2.70 2.94 3.43	0.11 0.15 0.20 0.30
AIR6449 B41_T-MOBILE	B	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.66 5.96 6.27 6.91	2.48 2.70 2.94 3.43	0.11 0.15 0.20 0.30
AIR6449 B41_T-MOBILE	C	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.66 5.96 6.27 6.91	2.48 2.70 2.94 3.43	0.11 0.15 0.20 0.30
APX16DWV-16DWV-S-E-A20	A	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.26 6.85 7.46 8.72	1.50 2.00 2.52 3.62	0.04 0.07 0.11 0.20
APX16DWV-16DWV-S-E-A20	B	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.26 6.85 7.46 8.72	1.50 2.00 2.52 3.62	0.04 0.07 0.11 0.20
APX16DWV-16DWV-S-E-A20	C	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.26 6.85 7.46 8.72	1.50 2.00 2.52 3.62	0.04 0.07 0.11 0.20
APXVAALL24_43-U-NA20_TMO	A	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.67 15.43 16.21 17.81	5.32 5.99 6.68 8.08	0.15 0.26 0.38 0.65

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
APXVAALL24_43-U-NA20_TMO	B	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.67 15.43 16.21 17.81	5.32 5.99 6.68 8.08	0.15 0.26 0.38 0.65
APXVAALL24_43-U-NA20_TMO	C	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.67 15.43 16.21 17.81	5.32 5.99 6.68 8.08	0.15 0.26 0.38 0.65
RADIO 4415 B66A_CCIV3	A	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	0.68 0.79 0.91 1.18	0.05 0.06 0.07 0.11
RADIO 4415 B66A_CCIV3	B	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	0.68 0.79 0.91 1.18	0.05 0.06 0.07 0.11
RADIO 4415 B66A_CCIV3	C	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	0.68 0.79 0.91 1.18	0.05 0.06 0.07 0.11
RADIO 4424 B25_TMO	A	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.05 2.23 2.42 2.81	1.61 1.77 1.94 2.30	0.09 0.11 0.13 0.19
RADIO 4424 B25_TMO	B	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.05 2.23 2.42 2.81	1.61 1.77 1.94 2.30	0.09 0.11 0.13 0.19
RADIO 4424 B25_TMO	C	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.05 2.23 2.42 2.81	1.61 1.77 1.94 2.30	0.09 0.11 0.13 0.19
RADIO 4449 B71 B85A_T-MOBILE	A	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.15 2.33 2.72	1.59 1.75 1.92 2.28	0.07 0.09 0.12 0.17
RADIO 4449 B71 B85A_T-MOBILE	B	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.15 2.33 2.72	1.59 1.75 1.92 2.28	0.07 0.09 0.12 0.17
RADIO 4449 B71 B85A_T-MOBILE	C	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.15 2.33 2.72	1.59 1.75 1.92 2.28	0.07 0.09 0.12 0.17
12.5' Platform Mount [#RMQP-496-HK]	C	None		0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice	41.44 54.17 66.90 92.36	41.44 54.17 66.90 92.36	2.45 3.18 3.91 5.38
******									
RRUS-11	A	From Leg	2.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21 3.66	1.19 1.33 1.49 1.83	0.05 0.07 0.09 0.15

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-11	B	From Leg	2.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.78 2.99 3.21 3.66	1.19 1.33 1.49 1.83	0.05 0.07 0.09 0.15
RRUS-11	C	From Leg	2.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.78 2.99 3.21 3.66	1.19 1.33 1.49 1.83	0.05 0.07 0.09 0.15
RRUS12/RRUS A2	A	From Leg	2.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.14 3.36 3.59 4.07	1.84 2.01 2.20 2.59	0.07 0.10 0.13 0.20
RRUS12/RRUS A2	B	From Leg	2.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.14 3.36 3.59 4.07	1.84 2.01 2.20 2.59	0.07 0.10 0.13 0.20
RRUS12/RRUS A2	C	From Leg	2.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.14 3.36 3.59 4.07	1.84 2.01 2.20 2.59	0.07 0.10 0.13 0.20
(2) 4' x 2" Pipe Mount	A	From Leg	2.00 0.00 0.00	0.0000	116.00	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
(2) 4' x 2" Pipe Mount	B	From Leg	2.00 0.00 0.00	0.0000	116.00	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
(2) 4' x 2" Pipe Mount	C	From Leg	2.00 0.00 0.00	0.0000	116.00	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 102-3]	C	None		0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.60 4.18 4.75 5.90	3.60 4.18 4.75 5.90	0.07 0.11 0.14 0.20
******									
HPA-65R-BUU-H8 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	114.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.25 13.19 14.16 16.14	8.33 9.23 10.15 12.05	0.10 0.19 0.30 0.54
HPA-65R-BUU-H8 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	114.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.25 13.19 14.16 16.14	8.33 9.23 10.15 12.05	0.10 0.19 0.30 0.54
HPA-65R-BUU-H8 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	114.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.25 13.19 14.16 16.14	8.33 9.23 10.15 12.05	0.10 0.19 0.30 0.54
TPA-65R-LCUUUU-H8 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	114.00	No Ice 1/2" Ice	11.85 12.77 13.71	8.99 9.88 10.79	0.11 0.21 0.32

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	15.64	12.66	0.58
						2" Ice			
TPA-65R-LCUUUU-H8 w/ Mount Pipe	B	From Leg	4.00	0.0000	114.00	No Ice	11.85	8.99	0.11
			0.00			1/2"	12.77	9.88	0.21
			1.00			Ice	13.71	10.79	0.32
						1" Ice	15.64	12.66	0.58
						2" Ice			
TPA-65R-LCUUUU-H8 w/ Mount Pipe	C	From Leg	4.00	0.0000	114.00	No Ice	11.85	8.99	0.11
			0.00			1/2"	12.77	9.88	0.21
			1.00			Ice	13.71	10.79	0.32
						1" Ice	15.64	12.66	0.58
						2" Ice			
7770.00 w/ Mount Pipe	A	From Leg	4.00	0.0000	114.00	No Ice	5.75	4.25	0.06
			0.00			1/2"	6.18	5.01	0.10
			1.00			Ice	6.61	5.71	0.16
						1" Ice	7.49	7.16	0.29
						2" Ice			
7770.00 w/ Mount Pipe	B	From Leg	4.00	0.0000	114.00	No Ice	5.75	4.25	0.06
			0.00			1/2"	6.18	5.01	0.10
			1.00			Ice	6.61	5.71	0.16
						1" Ice	7.49	7.16	0.29
						2" Ice			
7770.00 w/ Mount Pipe	C	From Leg	4.00	0.0000	114.00	No Ice	5.75	4.25	0.06
			0.00			1/2"	6.18	5.01	0.10
			1.00			Ice	6.61	5.71	0.16
						1" Ice	7.49	7.16	0.29
						2" Ice			
RRUS 32	A	From Leg	4.00	0.0000	114.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.08	1.97	0.08
			1.00			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.58	0.16
						2" Ice			
RRUS 32	B	From Leg	4.00	0.0000	114.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.08	1.97	0.08
			1.00			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.58	0.16
						2" Ice			
RRUS 32	C	From Leg	4.00	0.0000	114.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.08	1.97	0.08
			1.00			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.58	0.16
						2" Ice			
LGP21401	A	From Leg	4.00	0.0000	114.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			1.00			Ice	1.38	0.35	0.03
						1" Ice	1.69	0.52	0.05
						2" Ice			
LGP21401	B	From Leg	4.00	0.0000	114.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			1.00			Ice	1.38	0.35	0.03
						1" Ice	1.69	0.52	0.05
						2" Ice			
LGP21401	C	From Leg	4.00	0.0000	114.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			1.00			Ice	1.38	0.35	0.03
						1" Ice	1.69	0.52	0.05
						2" Ice			
(2) 7020.00	A	From Leg	4.00	0.0000	114.00	No Ice	0.10	0.17	0.00
			0.00			1/2"	0.15	0.24	0.01
			1.00			Ice	0.20	0.31	0.01
						1" Ice	0.33	0.48	0.02
						2" Ice			
(2) 7020.00	B	From Leg	4.00	0.0000	114.00	No Ice	0.10	0.17	0.00
			0.00			1/2"	0.15	0.24	0.01
			1.00			Ice	0.20	0.31	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	0.33	0.48	0.02
						2" Ice			
(2) 7020.00	C	From Leg	4.00	0.0000	114.00	No Ice	0.10	0.17	0.00
			0.00			1/2"	0.15	0.24	0.01
			1.00			Ice	0.20	0.31	0.01
						1" Ice	0.33	0.48	0.02
						2" Ice			
DC6-48-60-18-8F	B	From Leg	4.00	0.0000	114.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			0.00			Ice	1.64	1.64	0.06
						1" Ice	2.04	2.04	0.11
						2" Ice			
DC6-48-60-18-8C	C	From Leg	4.00	0.0000	114.00	No Ice	2.74	2.74	0.03
			0.00			1/2"	2.96	2.96	0.05
			1.00			Ice	3.20	3.20	0.08
						1" Ice	3.68	3.68	0.15
						2" Ice			
Platform Mount [LP 304-1_HR-1]	C	None		0.0000	114.00	No Ice	21.41	21.41	1.60
						1/2"	26.62	26.62	2.06
						Ice	31.66	31.66	2.60
						1" Ice	41.38	41.38	3.96
						2" Ice			
******									

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

Comb. No.	Description
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	130 - 83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-24.41	0.17	-1.00
			Max. Mx	20	-11.32	486.68	-0.24
			Max. My	14	-11.32	0.04	-486.89
			Max. Vy	20	-14.91	486.68	-0.24
			Max. Vx	14	14.91	0.04	-486.89
			Max. Torque	10			-0.55
L2	83 - 43.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-32.70	0.18	-1.48
			Max. Mx	20	-17.68	1130.31	-0.38
			Max. My	14	-17.68	0.05	-1130.64
			Max. Vy	20	-18.31	1130.31	-0.38
			Max. Vx	14	18.31	0.05	-1130.64
			Max. Torque	10			-0.55
L3	43.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46.35	0.18	-2.02
			Max. Mx	20	-28.82	2094.90	-0.54
			Max. My	14	-28.82	0.05	-2095.38
			Max. Vy	20	-22.32	2094.90	-0.54
			Max. Vx	14	22.32	0.05	-2095.38
			Max. Torque	10			-0.54

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	33	46.35	0.00	-4.33
	Max. H_x	21	21.63	22.29	-0.00
	Max. H_z	3	21.63	0.00	22.29
	Max. M_x	2	2094.30	0.00	22.29
	Max. M_z	8	2094.79	-22.29	-0.00
	Max. Torsion	22	0.54	19.30	11.14
	Min. Vert	13	21.63	-11.14	-19.30
	Min. H_x	9	21.63	-22.29	-0.00
	Min. H_z	15	21.63	0.00	-22.29
	Min. M_x	14	-2095.38	0.00	-22.29
	Min. M_z	20	-2094.90	22.29	-0.00
	Min. Torsion	10	-0.54	-19.30	-11.14

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	24.03	0.00	0.00	0.42	0.04	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	28.84	-0.00	-22.29	-2094.30	0.05	-0.36
0.9 Dead+1.0 Wind 0 deg - No Ice	21.63	-0.00	-22.29	-2065.30	0.04	-0.36
1.2 Dead+1.0 Wind 30 deg - No Ice	28.84	11.14	-19.30	-1813.65	-1047.37	-0.10
0.9 Dead+1.0 Wind 30 deg - No Ice	21.63	11.14	-19.30	-1788.56	-1032.82	-0.10
1.2 Dead+1.0 Wind 60 deg - No Ice	28.84	19.30	-11.14	-1046.88	-1814.13	0.19
0.9 Dead+1.0 Wind 60 deg - No Ice	21.63	19.30	-11.14	-1032.46	-1788.91	0.18
1.2 Dead+1.0 Wind 90 deg - No Ice	28.84	22.29	0.00	0.54	-2094.79	0.42
0.9 Dead+1.0 Wind 90 deg - No Ice	21.63	22.29	0.00	0.39	-2065.66	0.42
1.2 Dead+1.0 Wind 120 deg - No Ice	28.84	19.30	11.14	1047.96	-1814.14	0.54
0.9 Dead+1.0 Wind 120 deg - No Ice	21.63	19.30	11.14	1033.25	-1788.92	0.54
1.2 Dead+1.0 Wind 150 deg - No Ice	28.84	11.14	19.30	1814.73	-1047.37	0.52
0.9 Dead+1.0 Wind 150 deg - No Ice	21.63	11.14	19.30	1789.35	-1032.82	0.52
1.2 Dead+1.0 Wind 180 deg - No Ice	28.84	-0.00	22.29	2095.38	0.05	0.36
0.9 Dead+1.0 Wind 180 deg - No Ice	21.63	-0.00	22.29	2066.09	0.04	0.36
1.2 Dead+1.0 Wind 210 deg - No Ice	28.84	-11.14	19.30	1814.73	1047.48	0.10
0.9 Dead+1.0 Wind 210 deg - No Ice	21.63	-11.14	19.30	1789.35	1032.89	0.10
1.2 Dead+1.0 Wind 240 deg - No Ice	28.84	-19.30	11.14	1047.96	1814.25	-0.19
0.9 Dead+1.0 Wind 240 deg - No Ice	21.63	-19.30	11.14	1033.25	1789.00	-0.18
1.2 Dead+1.0 Wind 270 deg - No Ice	28.84	-22.29	0.00	0.54	2094.90	-0.42
0.9 Dead+1.0 Wind 270 deg - No Ice	21.63	-22.29	0.00	0.39	2065.74	-0.42
1.2 Dead+1.0 Wind 300 deg - No Ice	28.84	-19.30	-11.14	-1046.89	1814.24	-0.54
0.9 Dead+1.0 Wind 300 deg - No Ice	21.63	-19.30	-11.14	-1032.46	1788.99	-0.54
1.2 Dead+1.0 Wind 330 deg - No Ice	28.84	-11.14	-19.30	-1813.65	1047.47	-0.52
0.9 Dead+1.0 Wind 330 deg - No Ice	21.63	-11.14	-19.30	-1788.56	1032.89	-0.52
1.2 Dead+1.0 Ice+1.0 Temp	46.35	-0.00	0.00	2.02	0.18	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	46.35	-0.00	-4.33	-434.47	0.19	-0.05
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	46.35	2.16	-3.75	-375.98	-218.11	0.01
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	46.35	3.75	-2.16	-216.17	-377.91	0.06
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	46.35	4.33	0.00	2.13	-436.41	0.09
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	46.35	3.75	2.16	220.42	-377.91	0.10
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	46.35	2.16	3.75	380.23	-218.11	0.09
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	46.35	-0.00	4.33	438.72	0.19	0.05
1.2 Dead+1.0 Wind 210	46.35	-2.16	3.75	380.23	218.49	-0.01

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	46.35	-3.75	2.16	220.42	378.30	-0.06
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	46.35	-4.33	0.00	2.13	436.79	-0.09
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	46.35	-3.75	-2.16	-216.17	378.30	-0.10
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	46.35	-2.16	-3.75	-375.98	218.49	-0.09
Dead+Wind 0 deg - Service	24.03	0.00	-4.15	-386.55	0.05	-0.07
Dead+Wind 30 deg - Service	24.03	2.07	-3.59	-334.70	-193.45	-0.02
Dead+Wind 60 deg - Service	24.03	3.59	-2.07	-193.05	-335.10	0.03
Dead+Wind 90 deg - Service	24.03	4.15	0.00	0.45	-386.95	0.08
Dead+Wind 120 deg - Service	24.03	3.59	2.07	193.95	-335.10	0.10
Dead+Wind 150 deg - Service	24.03	2.07	3.59	335.60	-193.45	0.10
Dead+Wind 180 deg - Service	24.03	0.00	4.15	387.45	0.05	0.07
Dead+Wind 210 deg - Service	24.03	-2.07	3.59	335.60	193.54	0.02
Dead+Wind 240 deg - Service	24.03	-3.59	2.07	193.95	335.20	-0.03
Dead+Wind 270 deg - Service	24.03	-4.15	0.00	0.45	387.04	-0.08
Dead+Wind 300 deg - Service	24.03	-3.59	-2.07	-193.05	335.19	-0.10
Dead+Wind 330 deg - Service	24.03	-2.07	-3.59	-334.70	193.54	-0.10

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-24.03	0.00	0.00	24.03	0.00	0.000%
2	0.00	-28.84	-22.29	0.00	28.84	22.29	0.000%
3	0.00	-21.63	-22.29	0.00	21.63	22.29	0.000%
4	11.14	-28.84	-19.30	-11.14	28.84	19.30	0.000%
5	11.14	-21.63	-19.30	-11.14	21.63	19.30	0.000%
6	19.30	-28.84	-11.14	-19.30	28.84	11.14	0.000%
7	19.30	-21.63	-11.14	-19.30	21.63	11.14	0.000%
8	22.29	-28.84	0.00	-22.29	28.84	-0.00	0.000%
9	22.29	-21.63	0.00	-22.29	21.63	-0.00	0.000%
10	19.30	-28.84	11.14	-19.30	28.84	-11.14	0.000%
11	19.30	-21.63	11.14	-19.30	21.63	-11.14	0.000%
12	11.14	-28.84	19.30	-11.14	28.84	-19.30	0.000%
13	11.14	-21.63	19.30	-11.14	21.63	-19.30	0.000%
14	0.00	-28.84	22.29	0.00	28.84	-22.29	0.000%
15	0.00	-21.63	22.29	0.00	21.63	-22.29	0.000%
16	-11.14	-28.84	19.30	11.14	28.84	-19.30	0.000%
17	-11.14	-21.63	19.30	11.14	21.63	-19.30	0.000%
18	-19.30	-28.84	11.14	19.30	28.84	-11.14	0.000%
19	-19.30	-21.63	11.14	19.30	21.63	-11.14	0.000%
20	-22.29	-28.84	0.00	22.29	28.84	-0.00	0.000%
21	-22.29	-21.63	0.00	22.29	21.63	-0.00	0.000%
22	-19.30	-28.84	-11.14	19.30	28.84	11.14	0.000%
23	-19.30	-21.63	-11.14	19.30	21.63	11.14	0.000%
24	-11.14	-28.84	-19.30	11.14	28.84	19.30	0.000%
25	-11.14	-21.63	-19.30	11.14	21.63	19.30	0.000%
26	0.00	-46.35	0.00	0.00	46.35	-0.00	0.000%
27	0.00	-46.35	-4.33	0.00	46.35	4.33	0.000%
28	2.16	-46.35	-3.75	-2.16	46.35	3.75	0.000%
29	3.75	-46.35	-2.16	-3.75	46.35	2.16	0.000%
30	4.33	-46.35	0.00	-4.33	46.35	-0.00	0.000%
31	3.75	-46.35	2.16	-3.75	46.35	-2.16	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
32	2.16	-46.35	3.75	-2.16	46.35	-3.75	0.000%
33	0.00	-46.35	4.33	0.00	46.35	-4.33	0.000%
34	-2.16	-46.35	3.75	2.16	46.35	-3.75	0.000%
35	-3.75	-46.35	2.16	3.75	46.35	-2.16	0.000%
36	-4.33	-46.35	0.00	4.33	46.35	-0.00	0.000%
37	-3.75	-46.35	-2.16	3.75	46.35	2.16	0.000%
38	-2.16	-46.35	-3.75	2.16	46.35	3.75	0.000%
39	0.00	-24.03	-4.15	0.00	24.03	4.15	0.000%
40	2.07	-24.03	-3.59	-2.07	24.03	3.59	0.000%
41	3.59	-24.03	-2.07	-3.59	24.03	2.07	0.000%
42	4.15	-24.03	0.00	-4.15	24.03	-0.00	0.000%
43	3.59	-24.03	2.07	-3.59	24.03	-2.07	0.000%
44	2.07	-24.03	3.59	-2.07	24.03	-3.59	0.000%
45	0.00	-24.03	4.15	0.00	24.03	-4.15	0.000%
46	-2.07	-24.03	3.59	2.07	24.03	-3.59	0.000%
47	-3.59	-24.03	2.07	3.59	24.03	-2.07	0.000%
48	-4.15	-24.03	0.00	4.15	24.03	-0.00	0.000%
49	-3.59	-24.03	-2.07	3.59	24.03	2.07	0.000%
50	-2.07	-24.03	-3.59	2.07	24.03	3.59	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00003792
3	Yes	4	0.00000001	0.00077029
4	Yes	6	0.00000001	0.00016987
5	Yes	6	0.00000001	0.00005088
6	Yes	6	0.00000001	0.00016951
7	Yes	6	0.00000001	0.00005076
8	Yes	5	0.00000001	0.00004594
9	Yes	4	0.00000001	0.00080337
10	Yes	6	0.00000001	0.00017277
11	Yes	6	0.00000001	0.00005187
12	Yes	6	0.00000001	0.00016834
13	Yes	6	0.00000001	0.00005031
14	Yes	5	0.00000001	0.00003793
15	Yes	4	0.00000001	0.00077081
16	Yes	6	0.00000001	0.00017091
17	Yes	6	0.00000001	0.00005121
18	Yes	6	0.00000001	0.00017128
19	Yes	6	0.00000001	0.00005134
20	Yes	5	0.00000001	0.00004595
21	Yes	4	0.00000001	0.00080347
22	Yes	6	0.00000001	0.00016809
23	Yes	6	0.00000001	0.00005025
24	Yes	6	0.00000001	0.00017252
25	Yes	6	0.00000001	0.00005181
26	Yes	4	0.00000001	0.00001770
27	Yes	5	0.00000001	0.00042942
28	Yes	5	0.00000001	0.00055787
29	Yes	5	0.00000001	0.00055650
30	Yes	5	0.00000001	0.00043227
31	Yes	5	0.00000001	0.00056855
32	Yes	5	0.00000001	0.00056458
33	Yes	5	0.00000001	0.00043554
34	Yes	5	0.00000001	0.00056729
35	Yes	5	0.00000001	0.00056877
36	Yes	5	0.00000001	0.00043314
37	Yes	5	0.00000001	0.00055686
38	Yes	5	0.00000001	0.00056068
39	Yes	4	0.00000001	0.00008244
40	Yes	4	0.00000001	0.00034909
41	Yes	4	0.00000001	0.00034642
42	Yes	4	0.00000001	0.00008423

43	Yes	4	0.00000001	0.00037272
44	Yes	4	0.00000001	0.00033979
45	Yes	4	0.00000001	0.00008297
46	Yes	4	0.00000001	0.00035819
47	Yes	4	0.00000001	0.00036101
48	Yes	4	0.00000001	0.00008432
49	Yes	4	0.00000001	0.00033700
50	Yes	4	0.00000001	0.00036971

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 83	19.833	45	1.4075	0.0016
L2	86.25 - 43.25	8.355	45	0.9803	0.0007
L3	47.5 - 0	2.385	45	0.4756	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	Lighting Rod 3/4" x 6'	45	19.833	1.4075	0.0016	32211
116.00	RRUS-11	45	15.861	1.2846	0.0013	11503
114.00	HPA-65R-BUU-H8 w/ Mount Pipe	45	15.306	1.2665	0.0012	10065

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 83	107.283	14	7.6280	0.0086
L2	86.25 - 43.25	45.222	14	5.3123	0.0036
L3	47.5 - 0	12.909	14	2.5755	0.0011

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	Lighting Rod 3/4" x 6'	14	107.283	7.6280	0.0086	6115
116.00	RRUS-11	14	85.811	6.9622	0.0069	2182
114.00	HPA-65R-BUU-H8 w/ Mount Pipe	14	82.808	6.8641	0.0066	1908

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	130 - 83 (1)	TP26.06x16x0.25	47.00	0.00	0.0	20.2171	-11.32	1182.70	0.010
L2	83 - 43.25 (2)	TP34.068x24.8644x0.3125	43.00	0.00	0.0	33.0511	-17.68	1933.49	0.009
L3	43.25 - 0 (3)	TP42.7x32.5333x0.375	47.50	0.00	0.0	51.1074	-28.82	2989.79	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	130 - 83 (1)	TP26.06x16x0.25	486.88	710.94	0.685	0.00	710.94	0.000
L2	83 - 43.25 (2)	TP34.068x24.8644x0.3125	1130.63	1493.72	0.757	0.00	1493.72	0.000
L3	43.25 - 0 (3)	TP42.7x32.5333x0.375	2095.38	2888.40	0.725	0.00	2888.40	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	130 - 83 (1)	TP26.06x16x0.25	14.91	354.81	0.042	0.36	783.82	0.000
L2	83 - 43.25 (2)	TP34.068x24.8644x0.3125	18.31	580.05	0.032	0.36	1675.88	0.000
L3	43.25 - 0 (3)	TP42.7x32.5333x0.375	22.32	896.94	0.025	0.36	3339.32	0.000

Pole Interaction Design Data

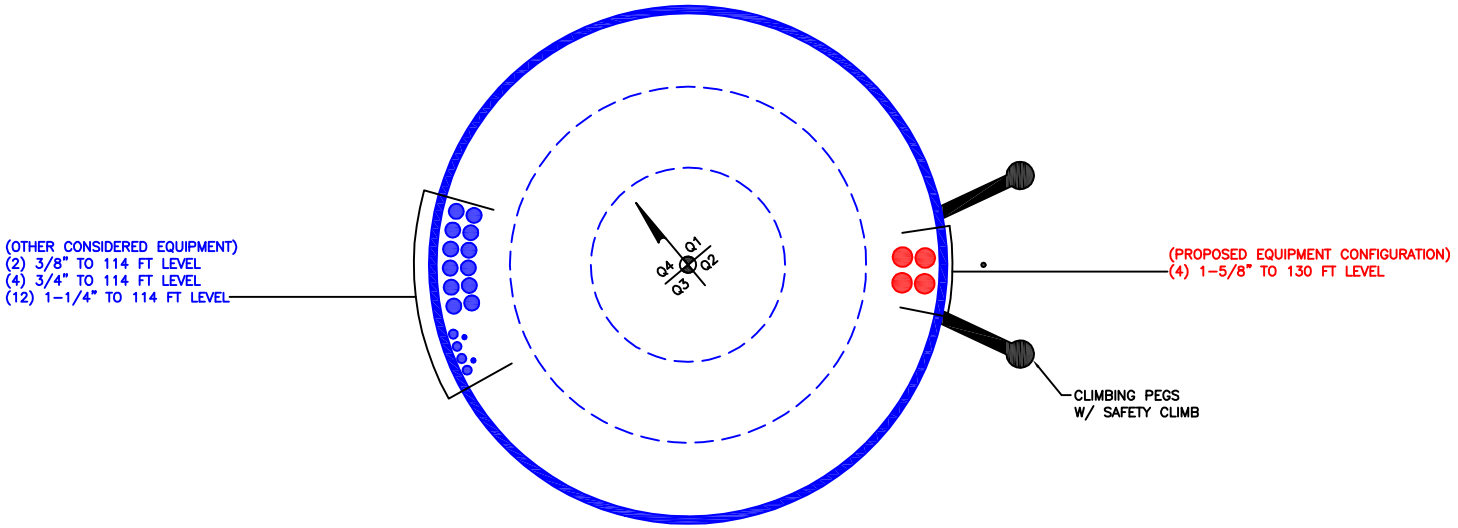
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	130 - 83 (1)	0.010	0.685	0.000	0.042	0.000	0.696	1.050	4.8.2
L2	83 - 43.25 (2)	0.009	0.757	0.000	0.032	0.000	0.767	1.050	4.8.2
L3	43.25 - 0 (3)	0.010	0.725	0.000	0.025	0.000	0.736	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	130 - 83	Pole	TP26.06x16x0.25	1	-11.32	1241.83	66.3	Pass
L2	83 - 43.25	Pole	TP34.068x24.8644x0.3125	2	-17.68	2030.16	73.1	Pass
L3	43.25 - 0	Pole	TP42.7x32.5333x0.375	3	-28.82	3139.28	70.1	Pass
							Summary	
						Pole (L2)	73.1	Pass
						RATING =	**73.1**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876359 TOWER ID:C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

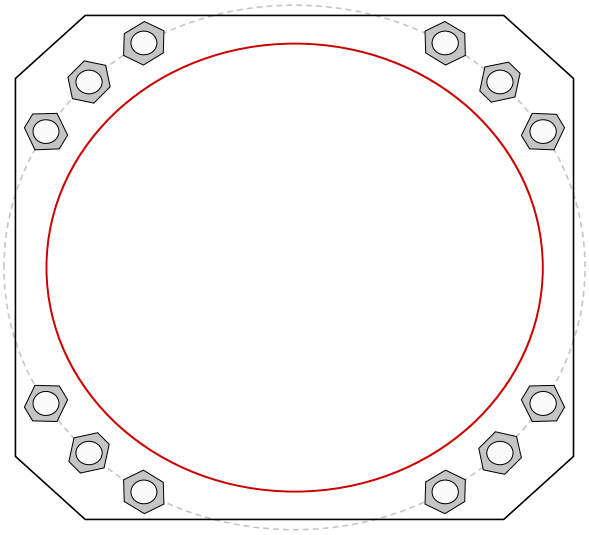
Monopole Base Plate Connection

Site Info	
BU #	876359
Site Name	Norwich
Order #	538769 Rev.1

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

Applied Loads	
Moment (kip-ft)	2095.38
Axial Force (kips)	28.82
Shear Force (kips)	22.32

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(12) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 50" BC

Anchor Spacing: 6 in

Base Plate Data

48" W x 3" Plate (A572-50; Fy=50 ksi, Fu=65 ksi); Clip: 6 in

Stiffener Data

N/A

Pole Data

42.7" x 0.375" 12-sided pole (A607-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

Pu_c = 169.89	ϕPn_c = 268.39	**Stress Rating**
Vu = 1.86	ϕVn = 120.77	**60.3%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	28.02	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	**59.3%**	**Pass**

Job No.	CN7-449
Project No.	2101398
BU#:	876359
Site Name:	Norwich
App#:	538769 Rev.1
Date:	3/3/2021

MORRISON HERSHFIELD

Foundation Reaction Comparison - Rev. H					
Reactions	**Original Design Reactions**	**Modified Design Reactions***	**Current Analysis Reactions**	**% Capacity**	**Pass / Fail**
MOMENT (kip-ft)	2260.0	3051.0	2095.4	65.4%	***Pass***
SHEAR (kips)	26.0	35.1	22.3	60.6%	***Pass***

*Original design reactions were multiplied by 1.35 for comparison to the current reactions as allowed by ANSI/TIA-222-H, Section 15.6.2.

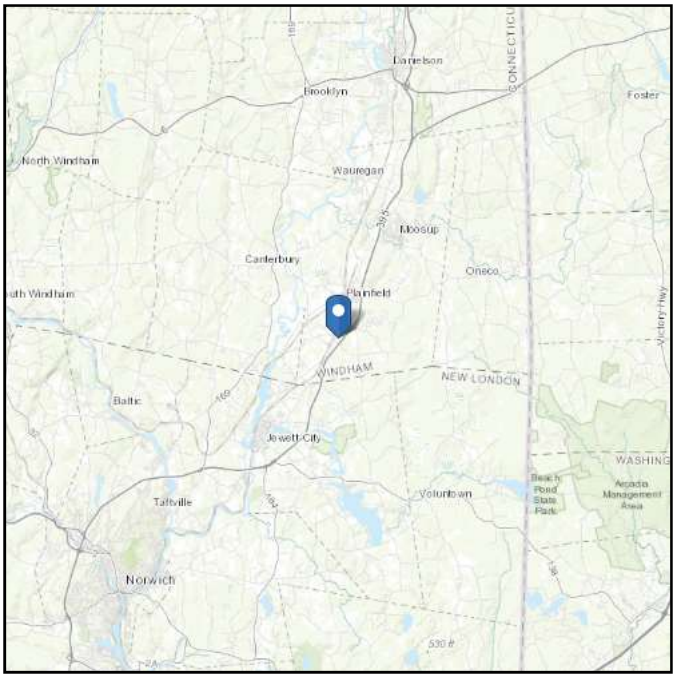
Design reactions were taken from the tower drawings by Summit Manufacturing, LLC., CCIsites document # 1446983

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 181.69 ft (NAVD 88)
Latitude: 41.658739
Longitude: -71.924931



Wind

Results:

Wind Speed:	131 Vmph
10-year MRI	79 Vmph
25-year MRI	89 Vmph
50-year MRI	98 Vmph
100-year MRI	107 Vmph

135 mph Ultimate Wind Speed per Plainfield City Exception.

Data Accessed: Wed Mar 03 2021

Date 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.

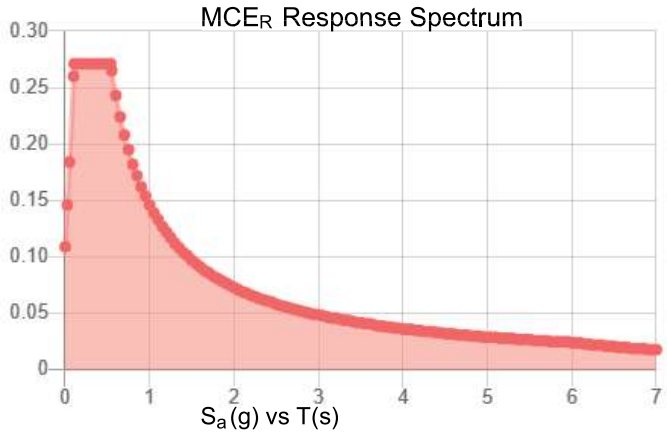
Seismic

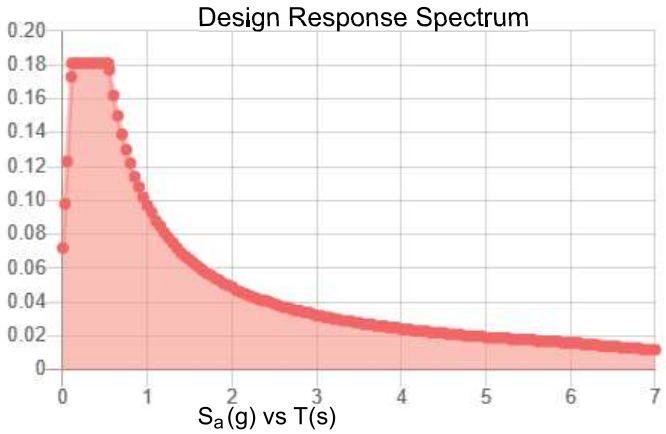
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.17	S_{DS} :	0.181
S_1 :	0.061	S_{D1} :	0.097
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.085
S_{MS} :	0.271	PGA_M :	0.136
S_{M1} :	0.146	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Wed Mar 03 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:	15 F	
Gust Speed:	50 mph	

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

Date Accessed: Wed Mar 03 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 23, 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 Replacement Analysis Report**	
Carrier Designation:	***Sprint PCS* Loading Modification**	
	Carrier Site Number:	CTHA853A
	Carrier Site Name:	CTHA853A
Crown Castle Designation:	**Crown Castle BU Number:**	876359
	Crown Castle Site Name:	NORWICH
	Crown Castle JDE Job Number:	628844
	Crown Castle Order Number:	538769 Rev. 1
Engineering Firm Designation:	**GPD Report Designation:**	2021777.876359.02
Site Data:	**954 Norwich Road, Plainfield, Windham County, CT 06062** **Latitude 41° 39' 31.46" Longitude -71° 55' 29.75"**	
Structure Information:	**Tower Height & Type:**	**130.0 ft Monopole Tower**
	Mount Elevation:	**130.0 ft**
	Mount Type:	**12.5 ft Platform Mount**

Dear Darcy Tarr,

GPD is pleased to submit this **"Mount Replacement Analysis Report"** to determine the structural integrity of Sprint PCS's antenna mounting system with the proposed appurtenance and equipment addition on the above mentioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

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

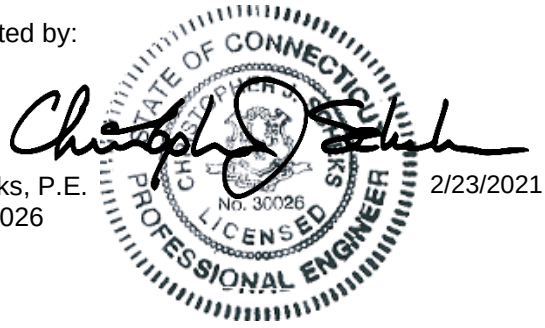
Platform Mount **Sufficient Capacity – 39.7%***

***See Section 4.1 of this report for the loading and structural modifications required in order for the mount to support the loading listed in Table 1.**

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

Mount analysis prepared by: Matt Steward

Respectfully Submitted by:



Christopher J. Scheks, P.E. 2/23/2021
Connecticut #: 0030026

TABLE OF CONTENTS

1) INTRODUCTION

This is a proposed 12.5' Platform Mount designed by Site Pro 1 (Part #: RMQP-496-HK, dated 7/14/2014).

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	135 mph
Exposure Category:	B
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
130.0	130.0	3	Ericsson	AIR6449 B41_T-MOBILE	12.5 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 538769 Rev. 1	-	CCI
Mount Design	Site Pro 1 Part #: RMQP-496-HK, dated 7/14/2014	-	Site Pro 1
RF Data Sheet	Sprint Retain RFDS: CTHA853A, dated 1/15/2021	-	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) Steel grades have been assumed as follows, unless noted otherwise:

Angle, Plate	ASTM A36 (GR 36)
HSS (Square)	ASTM 500 (GR B-46)
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	Standoff Arm	M91	130.0	17.1	Pass
	Cross Arm	M47		15.2	Pass
	Grating Angle	M49		39.7	Pass
	Toe Rail	M16		10.8	Pass
	Connection Plate (End)	M51A		21.4	Pass
	Connection Plate (Mid)	M55A		29.9	Pass
	Pipe Mount	A3		37.0	Pass
	Support Rail	M85		27.5	Pass
	Support Rail Corner	M84		39.6	Pass
	Platform Reinforcement Kicker	M92A		9.0	Pass
	Reinforcement Connection Plate	M91A		7.7	Pass
2,3	Mount to Tower Connection	-		15.1	Pass
	Kicker to Tower Connection	-		3.4	Pass

Structure Rating (max from all components) =	39.7%[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.

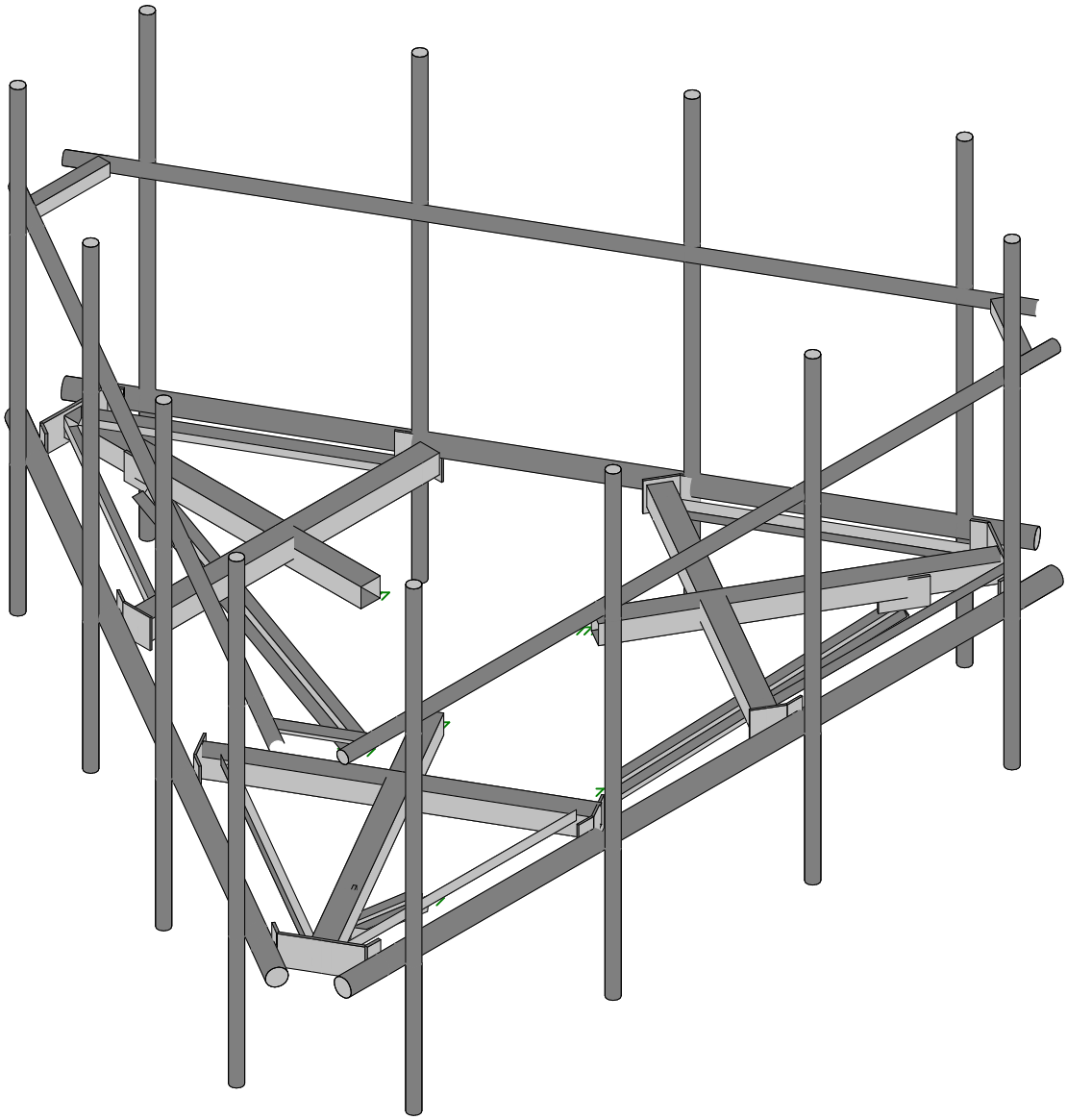
4.1) Recommendations

The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the mount listed below shall be installed to support the proposed loading configuration.

Site Por 1 RMQP-496-HK

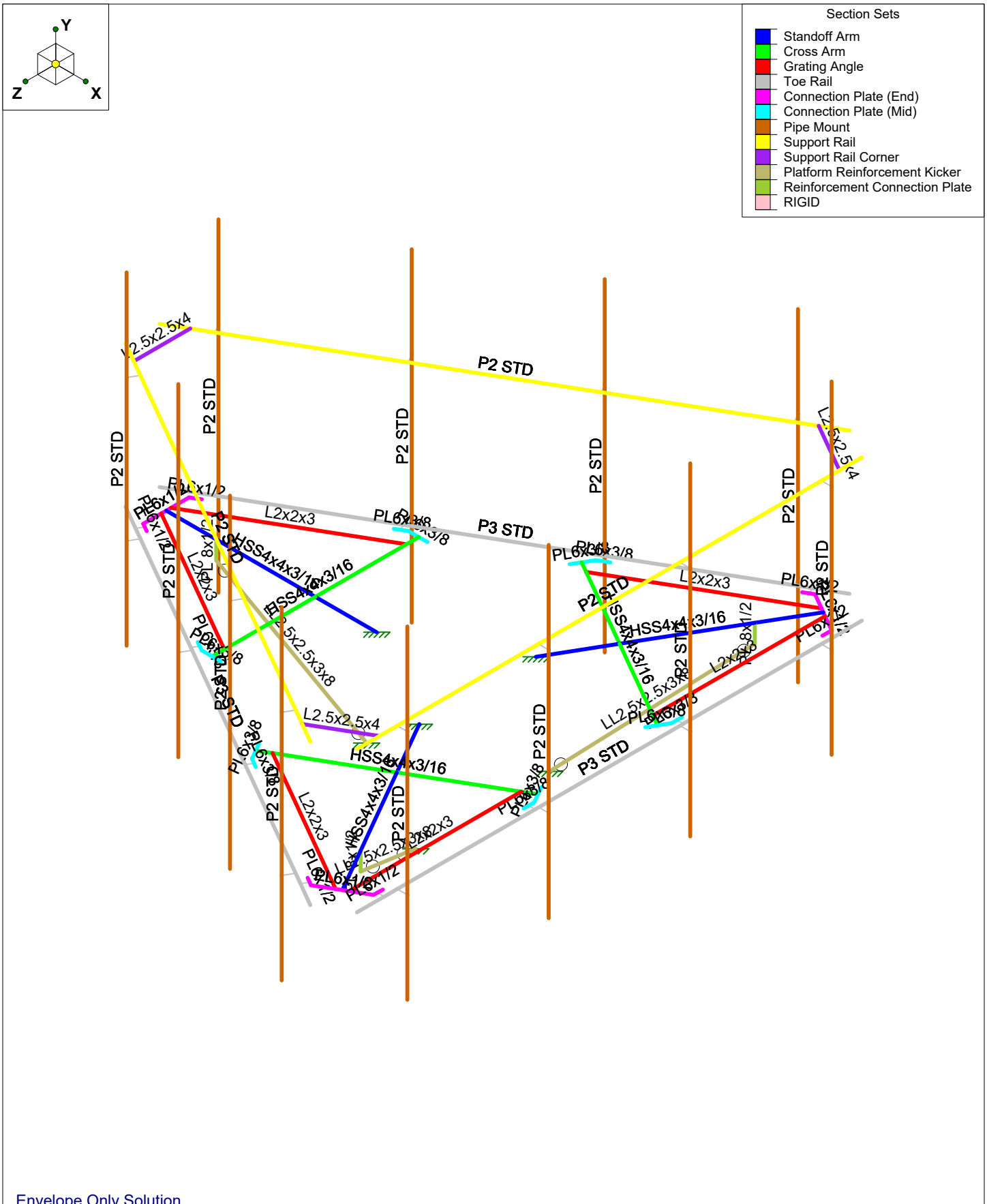
APPENDIX A

WIRE FRAME AND RENDERED MODELS



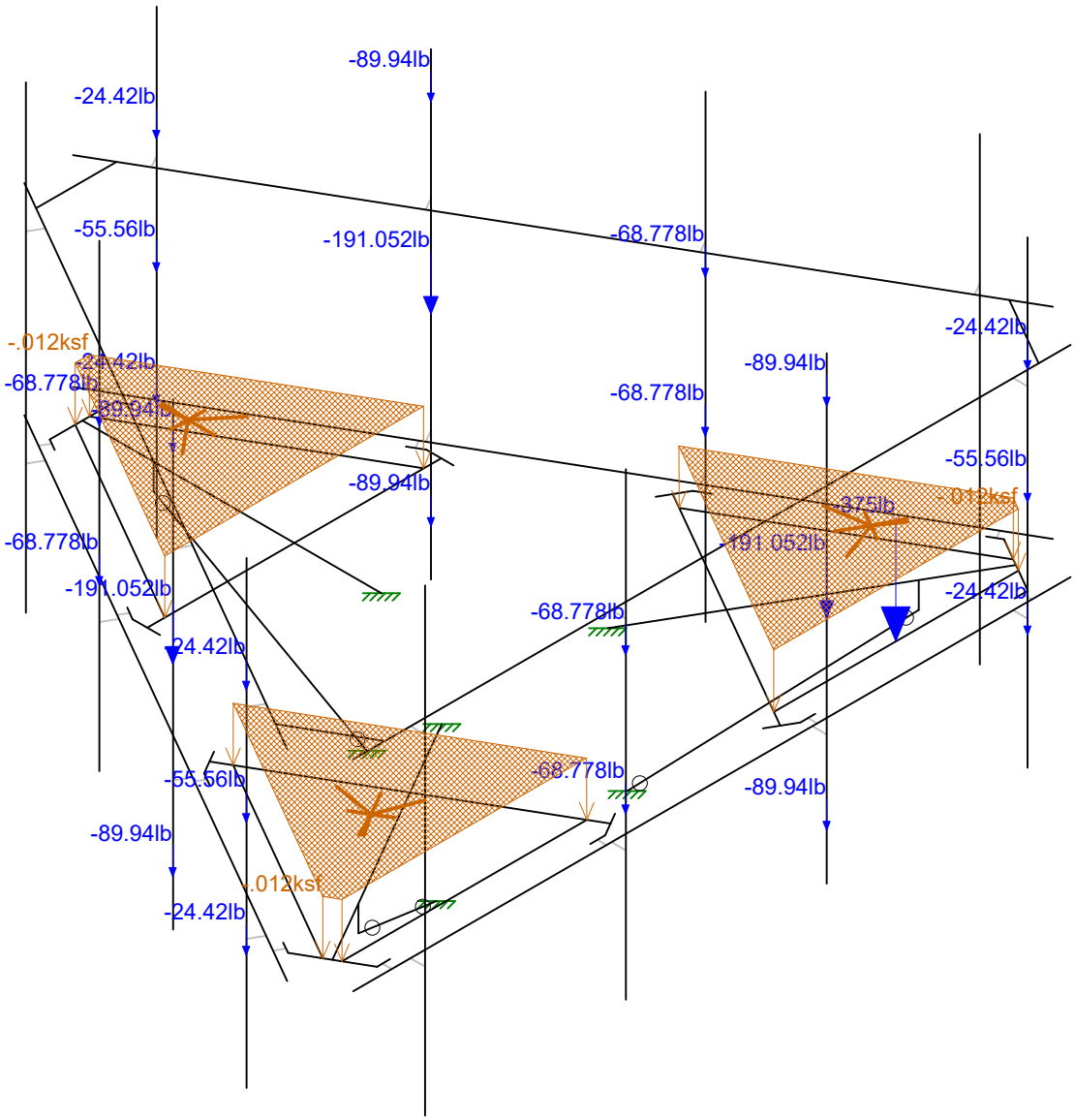
Envelope Only Solution

GPD	876359 - NORWICH	SK - 1
Steward, Matthew		Feb 22, 2021 at 8:25 AM
2021777.876359.02		Site Pro 1 - RMQP-496-HK.Loaded...



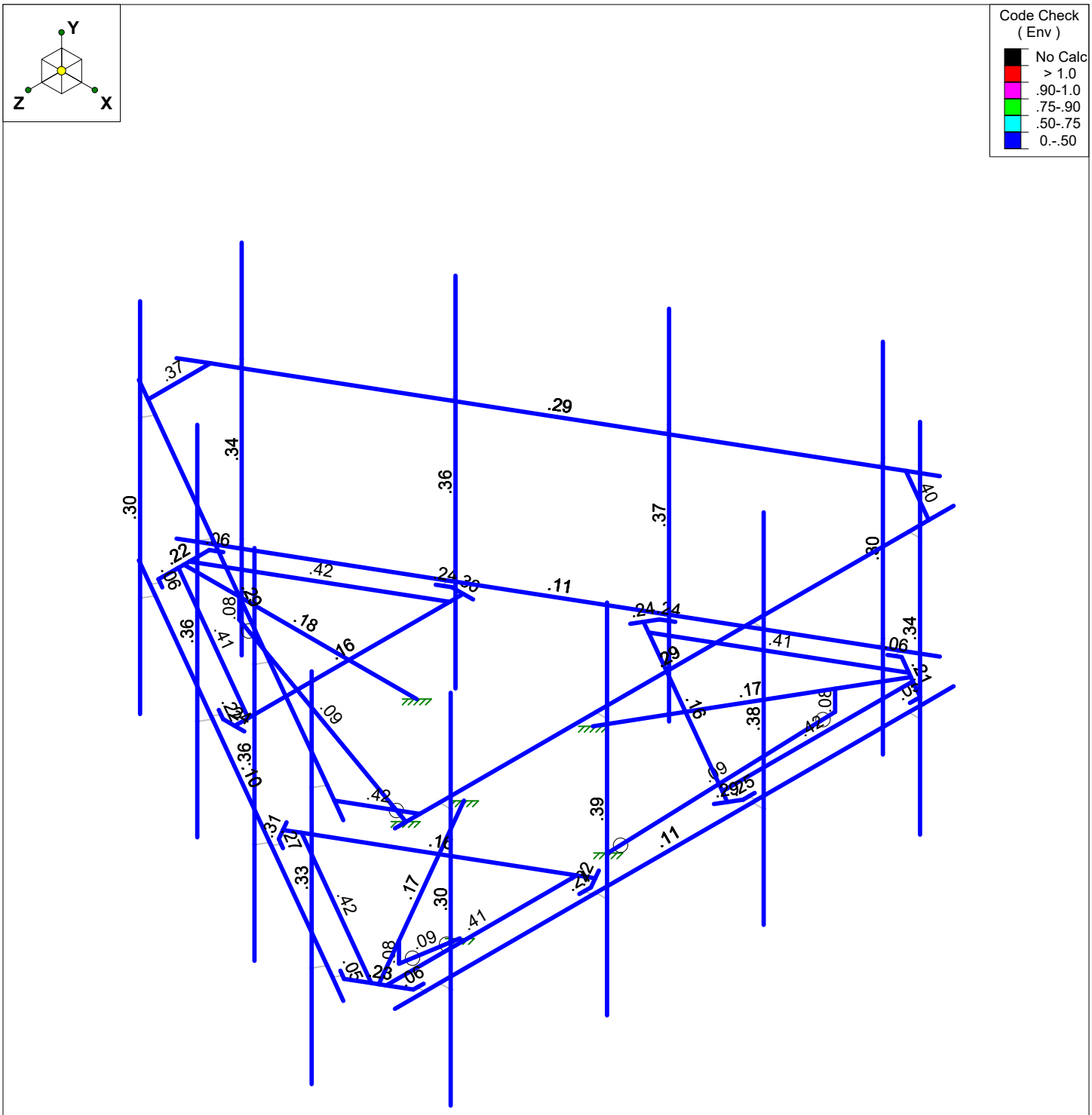
Envelope Only Solution

GPD	876359 - NORWICH	SK - 2
Steward, Matthew		Feb 22, 2021 at 8:26 AM
2021777.876359.02		Site Pro 1 - RMQP-496-HK.Loaded...



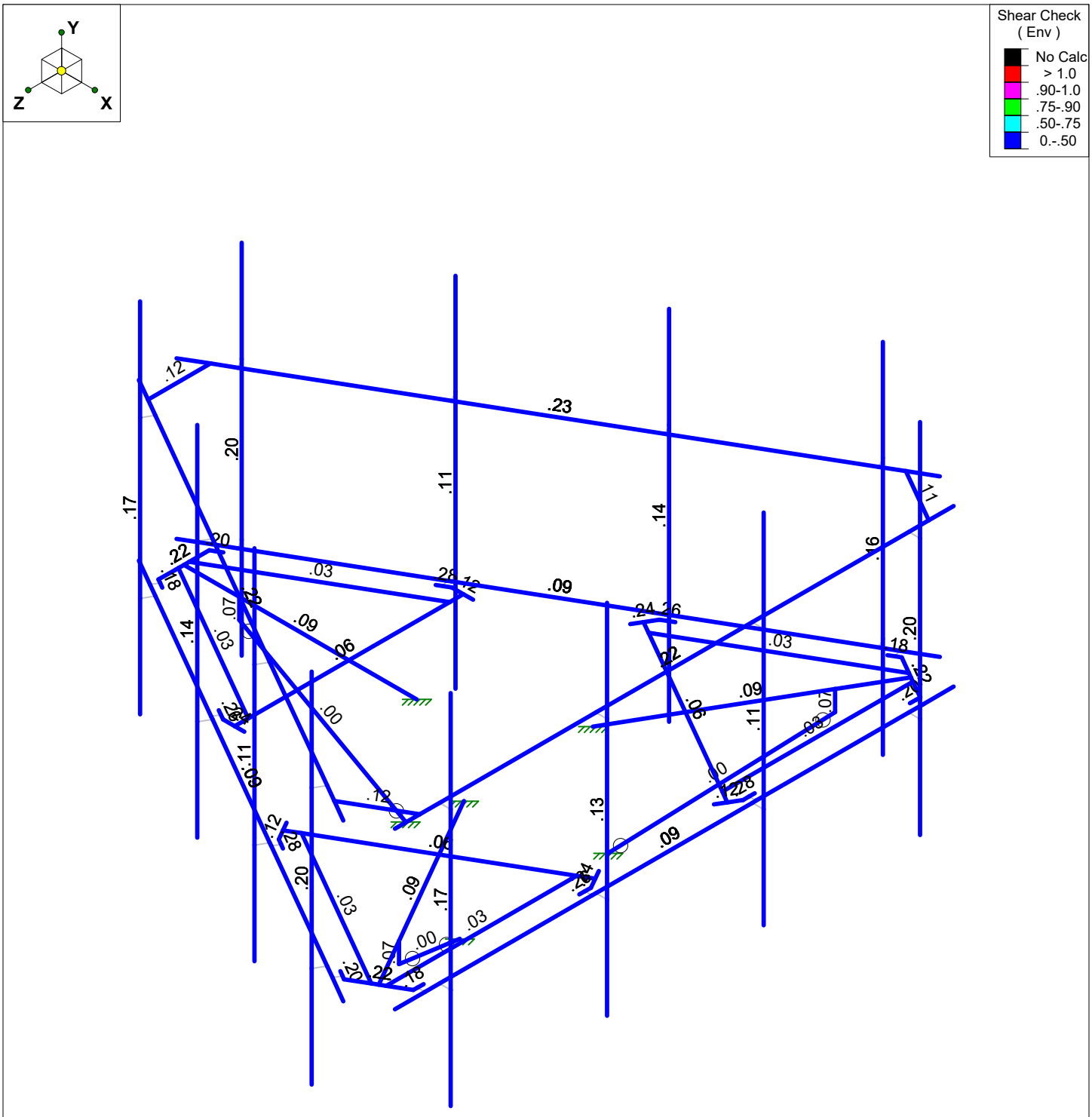
Loads: LC 192, 1.2 Dead + 1.5 Live_V - M49 (Middle)
Envelope Only Solution

GPD	876359 - NORWICH	SK - 1
Steward, Matthew		Feb 22, 2021 at 9:02 AM
2021777.876359.02		Site Pro 1 - RMQP-496-HK.Loaded...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

GPD	876359 - NORWICH	SK - 2
Steward, Matthew		Feb 22, 2021 at 9:02 AM
2021777.876359.02		Site Pro 1 - RMQP-496-HK.Loaded...



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

GPD	876359 - NORWICH	SK - 3
Steward, Matthew		Feb 22, 2021 at 9:03 AM
2021777.876359.02		Site Pro 1 - RMQP-496-HK.Loaded...

APPENDIX B

SOFTWARE INPUT CALCULATIONS

TIA-222-H: Mount Analysis Wind Loading
876359 - NORWICH
2021777.876359.02

Structure Information		
Structure Type:	Monopole	
Structure Height:	130	ft
z (Mount Centerline) =	130	ft
Gh (Mount Gust Effect Factor) =	1.00	
Risk Category:	II	

Code Specifications		
TIA/EIA Code:	H	
Ultimate Wind Speed (No Ice) =	135	mph (3-s gust)
Ultimate Wind Speed (With Ice) =	50	mph (3-s gust)
Ice Thickness	1.5	in
Exposure Category	B	
Tower Base Elevation (AMSL)	182	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)*
Standoff Arm	Square/Rect.	62.500	4	4		5.66	Flat	0.90	1.00	26.38	4.64	15.51
Cross Arm	Square/Rect.	61.000	4	4		5.66	Flat	0.90	1.00	26.19	4.61	15.51
Grating Angle	Angle	52.000	2	2		2.83	Flat	0.90	1.00	15.63	3.17	9.56
Toe Rail	Pipe	150.000	3.5	3.5		3.50	Round	0.90	1.00	16.42	4.19	10.97
Connection Plate (End)	Square/Rect.	19.000	6	0.5		6.02	Flat	0.90	1.00	28.84	5.15	16.27
Connection Plate (Mid)	Square/Rect.	8.500	6	0.375		6.01	Flat	0.90	1.00	28.14	5.15	16.25
Pipe Mount	Pipe	96.000	2.375	2.375		2.38	Round	0.90	1.00	11.14	3.15	8.61
Support Rail	Pipe	150.000	2.375	2.375		2.38	Round	0.90	1.00	11.14	3.74	8.61
Support Rail Corner	Angle	15.000	2.5	2.5		3.54	Flat	0.90	1.00	13.25	2.90	11.05
Platform Reinforcement Kicker	Other	5.000	2.5	5.5	5.5	5.50	Flat	0.90	1.00	11.73	2.90	15.18
Reinforcement Connection Plate	Square/Rect.	4.000	8	0.5		8.02	Flat	0.90	1.00	37.52	6.44	20.46

*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	130	33.11	20.51	8.54	114.63	Flat	0%	0%	0.90	238.87	114.63	38.29	151.96
(3) APX16DWV-16DWV-S-E-A20	130	55.9	13.3	3.15	40.7	CFD	0%	0%	0.90	264.24	40.70	48.45	138.38
(3) APXVAALL24_43-U-NA20_TMO	130	95.9	24	8.5	149.9	CFD	0%	0%	0.90	619.24	149.90	100.53	424.37
(3) RADIO 4415 B66A_CCIV3	130	14.9	13.2	5.4	46.3	Flat	0%	0%	0.90	69.18	46.30	12.54	53.03
(3) RADIO 4424 B25_TMO	130	17.1	14.4	11.3	86	Flat	0%	0%	0.90	86.62	86.00	15.27	84.89
(3) RADIO 4449 B71 B85A_T-MOBILE	130	17.91	13.2	10.63	73.21	Flat	0%	0%	0.90	83.16	73.21	14.75	80.57

*All forces are unfactored.

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Standoff Arm	HSS4x4x3/16	None	None	A500 Gr.B Rect	Typical	2.859	6.944	6.944	10.39
2	Cross Arm	HSS4x4x3/16	None	None	A500 Gr.B Rect	Typical	2.859	6.944	6.944	10.39
3	Grating Angle	L2x2x3	None	None	A36 Gr.36	Typical	.722	.271	.271	.009
4	Toe Rail	P3 STD	None	None	A53 Gr.B	Typical	2.228	3.017	3.017	6.034
5	Connection Plate (End)	PL6x1/2	None	None	A36 Gr.36	Typical	3	.063	9	.237
6	Connection Plate (Mid)	PL6x3/8	None	None	A36 Gr.36	Typical	2.25	.026	6.75	.101
7	Pipe Mount	P2 STD	None	None	A53 Gr.B	Typical	1.075	.666	.666	1.331
8	Support Rail	P2 STD	None	None	A53 Gr.B	Typical	1.075	.666	.666	1.331
9	Support Rail Corner	L2.5x2.5x4	None	None	A36 Gr.36	Typical	1.19	.692	.692	.026
10	Platform Reinforcement ...	LL2.5x2.5x3x8	None	None	A36 Gr.36	Typical	1.805	2.703	1.093	.02
11	Reinforcement Connecti...	PL 8x1/2	None	None	A36 Gr.36	Typical	4	.083	21.333	.32

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M46	SA	N88			Standoff Arm	None	None	A500 Gr.B...	Typical
2	M47	N89	N90			Cross Arm	None	None	A500 Gr.B...	Typical
3	M48	N92	N93			Grating Angle	None	None	A36 Gr.36	Typical
4	M49	N94	N95		270	Grating Angle	None	None	A36 Gr.36	Typical
5	M50	N96	N97			Connection Pl...	None	None	A36 Gr.36	Typical
6	M51	N97	N98			Connection Pl...	None	None	A36 Gr.36	Typical
7	M52	N98	N99			Connection Pl...	None	None	A36 Gr.36	Typical
8	M53	N100	N101			Connection Pl...	None	None	A36 Gr.36	Typical
9	M54	N101	N102			Connection Pl...	None	None	A36 Gr.36	Typical
10	M55	N103	N104			Connection Pl...	None	None	A36 Gr.36	Typical
11	M56	N104	N105			Connection Pl...	None	None	A36 Gr.36	Typical
12	M57	N106	N107			RIGID	None	None	RIGID	Typical
13	M58	N108	N109			RIGID	None	None	RIGID	Typical
14	M59	N110	N111			RIGID	None	None	RIGID	Typical
15	M60	N112	N113			RIGID	None	None	RIGID	Typical
16	M16	N29	N30			Toe Rail	None	None	A53 Gr.B	Typical
17	M46A	SB	N93A			Standoff Arm	None	None	A500 Gr.B...	Typical
18	M47A	N94A	N95A			Cross Arm	None	None	A500 Gr.B...	Typical
19	M48A	N97A	N98A			Grating Angle	None	None	A36 Gr.36	Typical
20	M49A	N99A	N100A		270	Grating Angle	None	None	A36 Gr.36	Typical
21	M50A	N101A	N102A			Connection Pl...	None	None	A36 Gr.36	Typical
22	M51A	N102A	N103A			Connection Pl...	None	None	A36 Gr.36	Typical
23	M52A	N103A	N104A			Connection Pl...	None	None	A36 Gr.36	Typical
24	M53A	N105A	N106A			Connection Pl...	None	None	A36 Gr.36	Typical
25	M54A	N106A	N107A			Connection Pl...	None	None	A36 Gr.36	Typical
26	M55A	N108A	N109A			Connection Pl...	None	None	A36 Gr.36	Typical
27	M56A	N109A	N110A			Connection Pl...	None	None	A36 Gr.36	Typical
28	M57A	N111A	N112A			RIGID	None	None	RIGID	Typical
29	M58A	N113A	N114			RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
30	M59A	N115	N116			RIGID	None	None	RIGID	Typical
31	M60A	N117	N118			RIGID	None	None	RIGID	Typical
32	M61	N119	N120			Toe Rail	None	None	A53 Gr.B	Typical
33	M91	SC	N183			Standoff Arm	None	None	A500 Gr.B...	Typical
34	M92	N184	N185			Cross Arm	None	None	A500 Gr.B...	Typical
35	M93	N187	N188			Grating Angle	None	None	A36 Gr.36	Typical
36	M94	N189	N190		270	Grating Angle	None	None	A36 Gr.36	Typical
37	M95	N191	N192			Connection Pl...	None	None	A36 Gr.36	Typical
38	M96	N192	N193			Connection Pl...	None	None	A36 Gr.36	Typical
39	M97	N193	N194			Connection Pl...	None	None	A36 Gr.36	Typical
40	M98	N195	N196			Connection Pl...	None	None	A36 Gr.36	Typical
41	M99	N196	N197			Connection Pl...	None	None	A36 Gr.36	Typical
42	M100	N198	N199			Connection Pl...	None	None	A36 Gr.36	Typical
43	M101	N199	N200			Connection Pl...	None	None	A36 Gr.36	Typical
44	M102	N201	N202			RIGID	None	None	RIGID	Typical
45	M103	N203	N204			RIGID	None	None	RIGID	Typical
46	M104	N205	N206			RIGID	None	None	RIGID	Typical
47	M105	N207	N208			RIGID	None	None	RIGID	Typical
48	M106	N209	N210			Toe Rail	None	None	A53 Gr.B	Typical
49	M49B	N89A	N90A			RIGID	None	None	RIGID	Typical
50	M50B	N91A	N92A			RIGID	None	None	RIGID	Typical
51	M51B	N93B	N94B			RIGID	None	None	RIGID	Typical
52	M52B	N95B	N96B			RIGID	None	None	RIGID	Typical
53	A1	N97B	N101B			Pipe Mount	None	None	A53 Gr.B	Typical
54	A2	N98B	N102B			Pipe Mount	None	None	A53 Gr.B	Typical
55	A3	N99B	N103B			Pipe Mount	None	None	A53 Gr.B	Typical
56	A4	N100B	N104B			Pipe Mount	None	None	A53 Gr.B	Typical
57	M57B	N105B	N106B			RIGID	None	None	RIGID	Typical
58	M58B	N107B	N108B			RIGID	None	None	RIGID	Typical
59	M59B	N109B	N110B			RIGID	None	None	RIGID	Typical
60	M60B	N111B	N112B			RIGID	None	None	RIGID	Typical
61	B1	N113B	N117A			Pipe Mount	None	None	A53 Gr.B	Typical
62	B2	N114A	N118A			Pipe Mount	None	None	A53 Gr.B	Typical
63	B3	N115A	N119A			Pipe Mount	None	None	A53 Gr.B	Typical
64	B4	N116A	N120A			Pipe Mount	None	None	A53 Gr.B	Typical
65	M65	N121	N122			RIGID	None	None	RIGID	Typical
66	M66	N123	N124			RIGID	None	None	RIGID	Typical
67	M67	N125	N126			RIGID	None	None	RIGID	Typical
68	M68	N127	N128			RIGID	None	None	RIGID	Typical
69	C1	N129	N133			Pipe Mount	None	None	A53 Gr.B	Typical
70	C2	N130	N134			Pipe Mount	None	None	A53 Gr.B	Typical
71	C3	N131	N135			Pipe Mount	None	None	A53 Gr.B	Typical
72	C4	N132	N136			Pipe Mount	None	None	A53 Gr.B	Typical
73	M73	N137	N138			Support Rail	None	None	A53 Gr.B	Typical
74	M74	N139	N140			RIGID	None	None	RIGID	Typical
75	M75	N141	N142			RIGID	None	None	RIGID	Typical
76	M76	N143	N144			RIGID	None	None	RIGID	Typical
77	M77	N145	N146			RIGID	None	None	RIGID	Typical
78	M78	N147	N148		180	Support Rail C...	None	None	A36 Gr.36	Typical
79	M79	N149	N150			Support Rail	None	None	A53 Gr.B	Typical
80	M80	N151	N152			RIGID	None	None	RIGID	Typical
81	M81	N153	N154			RIGID	None	None	RIGID	Typical
82	M82	N155	N156			RIGID	None	None	RIGID	Typical
83	M83	N157	N158			RIGID	None	None	RIGID	Typical
84	M84	N159	N160		180	Support Rail C...	None	None	A36 Gr.36	Typical
85	M85	N161	N162			Support Rail	None	None	A53 Gr.B	Typical
86	M86	N163	N164			RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
87	M87	N165	N166			RIGID	None	None	RIGID	Typical
88	M88	N167	N168			RIGID	None	None	RIGID	Typical
89	M89	N169	N170			RIGID	None	None	RIGID	Typical
90	M90	N171	N172		180	Support Rail C...	None	None	A36 Gr.36	Typical
91	M91A	N173	N174			Reinforcement...	None	None	A36 Gr.36	Typical
92	M92A	N174	RC			Platform Reinf...	None	None	A36 Gr.36	Typical
93	M93A	N177	N178		120	Reinforcement...	None	None	A36 Gr.36	Typical
94	M94A	N178	RA			Platform Reinf...	None	None	A36 Gr.36	Typical
95	M95A	N181	N182		240	Reinforcement...	None	None	A36 Gr.36	Typical
96	M96A	N182	RB			Platform Reinf...	None	None	A36 Gr.36	Typical

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	SA	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	SB	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	SC	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	RC	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
5	RA	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
6	RB	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4 Dead	Yes	Y		1	1.4	0		0		0		0		0		0		0					
2	1.2 Dead + 1.0 Wind @ 0° - ...	Yes	Y		1	1.2	2	1	0		0		0		0		0		0					
3	0.9 Dead + 1.0 Wind @ 0° - ...	Yes	Y		1	.9	2	1	0		0		0		0		0		0					
4	1.2 Dead + 1.0 Wind @ 30° ...	Yes	Y		1	1.2	3	1	0		0		0		0		0		0					
5	0.9 Dead + 1.0 Wind @ 30° ...	Yes	Y		1	.9	3	1	0		0		0		0		0		0					
6	1.2 Dead + 1.0 Wind @ 60° ...	Yes	Y		1	1.2	4	1	0		0		0		0		0		0					
7	0.9 Dead + 1.0 Wind @ 60° ...	Yes	Y		1	.9	4	1	0		0		0		0		0		0					
8	1.2 Dead + 1.0 Wind @ 90° ...	Yes	Y		1	1.2	5	1	0		0		0		0		0		0					
9	0.9 Dead + 1.0 Wind @ 90° ...	Yes	Y		1	.9	5	1	0		0		0		0		0		0					
10	1.2 Dead + 1.0 Wind @ 120...	Yes	Y		1	1.2	6	1	0		0		0		0		0		0					
11	0.9 Dead + 1.0 Wind @ 120...	Yes	Y		1	.9	6	1	0		0		0		0		0		0					
12	1.2 Dead + 1.0 Wind @ 150...	Yes	Y		1	1.2	7	1	0		0		0		0		0		0					
13	0.9 Dead + 1.0 Wind @ 150...	Yes	Y		1	.9	7	1	0		0		0		0		0		0					
14	1.2 Dead + 1.0 Wind @ 180...	Yes	Y		1	1.2	8	1	0		0		0		0		0		0					
15	0.9 Dead + 1.0 Wind @ 180...	Yes	Y		1	.9	8	1	0		0		0		0		0		0					
16	1.2 Dead + 1.0 Wind @ 210...	Yes	Y		1	1.2	9	1	0		0		0		0		0		0					
17	0.9 Dead + 1.0 Wind @ 210...	Yes	Y		1	.9	9	1	0		0		0		0		0		0					
18	1.2 Dead + 1.0 Wind @ 240...	Yes	Y		1	1.2	10	1	0		0		0		0		0		0					
19	0.9 Dead + 1.0 Wind @ 240...	Yes	Y		1	.9	10	1	0		0		0		0		0		0					
20	1.2 Dead + 1.0 Wind @ 270...	Yes	Y		1	1.2	11	1	0		0		0		0		0		0					
21	0.9 Dead + 1.0 Wind @ 270...	Yes	Y		1	.9	11	1	0		0		0		0		0		0					
22	1.2 Dead + 1.0 Wind @ 300...	Yes	Y		1	1.2	12	1	0		0		0		0		0		0					
23	0.9 Dead + 1.0 Wind @ 300...	Yes	Y		1	.9	12	1	0		0		0		0		0		0					
24	1.2 Dead + 1.0 Wind @ 330...	Yes	Y		1	1.2	13	1	0		0		0		0		0		0					
25	0.9 Dead + 1.0 Wind @ 330...	Yes	Y		1	.9	13	1	0		0		0		0		0		0					
26	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	15	1	14	1		1	0		0		0		0					
27	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	16	1	14	1		1	0		0		0		0					
28	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	17	1	14	1		1	0		0		0		0					
29	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	18	1	14	1		1	0		0		0		0					
30	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	19	1	14	1		1	0		0		0		0					
31	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	20	1	14	1		1	0		0		0		0					
32	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	21	1	14	1		1	0		0		0		0					

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
33	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	22	1	14	1		1	0		0		0		0					
34	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	23	1	14	1		1	0		0		0		0					
35	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	24	1	14	1		1	0		0		0		0					
36	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	25	1	14	1		1	0		0		0		0					
37	1.2 Dead + 1.0 Ice Wind @ ...	Yes	Y		1	1.2	26	1	14	1		1	0		0		0		0					
38	1.2 Dead + 1.5 Live_M - A1 ...	Yes	Y		1	1.2	27	1.5	2	.049	0		0		0		0		0					
39	1.2 Dead + 1.5 Live_M - A1 ...	Yes	Y		1	1.2	27	1.5	3	.049	0		0		0		0		0					
40	1.2 Dead + 1.5 Live_M - A1 ...	Yes	Y		1	1.2	27	1.5	4	.049	0		0		0		0		0					
41	1.2 Dead + 1.5 Live_M - A1 ...	Yes	Y		1	1.2	27	1.5	5	.049	0		0		0		0		0					
42	1.2 Dead + 1.5 Live_M - A1 ...	Yes	Y		1	1.2	27	1.5	6	.049	0		0		0		0		0					
43	1.2 Dead + 1.5 Live_M - A1 ...	Yes	Y		1	1.2	27	1.5	7	.049	0		0		0		0		0					
44	1.2 Dead + 1.5 Live_M - A1 ...	Yes	Y		1	1.2	27	1.5	8	.049	0		0		0		0		0					
45	1.2 Dead + 1.5 Live_M - A1 ...	Yes	Y		1	1.2	27	1.5	9	.049	0		0		0		0		0					
46	1.2 Dead + 1.5 Live_M - A1 ...	Yes	Y		1	1.2	27	1.5	10	.049	0		0		0		0		0					
47	1.2 Dead + 1.5 Live_M - A1 ...	Yes	Y		1	1.2	27	1.5	11	.049	0		0		0		0		0					
48	1.2 Dead + 1.5 Live_M - A1 ...	Yes	Y		1	1.2	27	1.5	12	.049	0		0		0		0		0					
49	1.2 Dead + 1.5 Live_M - A1 ...	Yes	Y		1	1.2	27	1.5	13	.049	0		0		0		0		0					
50	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	28	1.5	2	.049	0		0		0		0		0					
51	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	28	1.5	3	.049	0		0		0		0		0					
52	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	28	1.5	4	.049	0		0		0		0		0					
53	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	28	1.5	5	.049	0		0		0		0		0					
54	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	28	1.5	6	.049	0		0		0		0		0					
55	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	28	1.5	7	.049	0		0		0		0		0					
56	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	28	1.5	8	.049	0		0		0		0		0					
57	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	28	1.5	9	.049	0		0		0		0		0					
58	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	28	1.5	10	.049	0		0		0		0		0					
59	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	28	1.5	11	.049	0		0		0		0		0					
60	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	28	1.5	12	.049	0		0		0		0		0					
61	1.2 Dead + 1.5 Live_M - A2 ...	Yes	Y		1	1.2	28	1.5	13	.049	0		0		0		0		0					
62	1.2 Dead + 1.5 Live_M - A3 ...	Yes	Y		1	1.2	29	1.5	2	.049	0		0		0		0		0					
63	1.2 Dead + 1.5 Live_M - A3 ...	Yes	Y		1	1.2	29	1.5	3	.049	0		0		0		0		0					
64	1.2 Dead + 1.5 Live_M - A3 ...	Yes	Y		1	1.2	29	1.5	4	.049	0		0		0		0		0					
65	1.2 Dead + 1.5 Live_M - A3 ...	Yes	Y		1	1.2	29	1.5	5	.049	0		0		0		0		0					
66	1.2 Dead + 1.5 Live_M - A3 ...	Yes	Y		1	1.2	29	1.5	6	.049	0		0		0		0		0					
67	1.2 Dead + 1.5 Live_M - A3 ...	Yes	Y		1	1.2	29	1.5	7	.049	0		0		0		0		0					
68	1.2 Dead + 1.5 Live_M - A3 ...	Yes	Y		1	1.2	29	1.5	8	.049	0		0		0		0		0					
69	1.2 Dead + 1.5 Live_M - A3 ...	Yes	Y		1	1.2	29	1.5	9	.049	0		0		0		0		0					
70	1.2 Dead + 1.5 Live_M - A3 ...	Yes	Y		1	1.2	29	1.5	10	.049	0		0		0		0		0					
71	1.2 Dead + 1.5 Live_M - A3 ...	Yes	Y		1	1.2	29	1.5	11	.049	0		0		0		0		0					
72	1.2 Dead + 1.5 Live_M - A3 ...	Yes	Y		1	1.2	29	1.5	12	.049	0		0		0		0		0					
73	1.2 Dead + 1.5 Live_M - A3 ...	Yes	Y		1	1.2	29	1.5	13	.049	0		0		0		0		0					
74	1.2 Dead + 1.5 Live_M - A4 ...	Yes	Y		1	1.2	30	1.5	2	.049	0		0		0		0		0					
75	1.2 Dead + 1.5 Live_M - A4 ...	Yes	Y		1	1.2	30	1.5	3	.049	0		0		0		0		0					
76	1.2 Dead + 1.5 Live_M - A4 ...	Yes	Y		1	1.2	30	1.5	4	.049	0		0		0		0		0					
77	1.2 Dead + 1.5 Live_M - A4 ...	Yes	Y		1	1.2	30	1.5	5	.049	0		0		0		0		0					
78	1.2 Dead + 1.5 Live_M - A4 ...	Yes	Y		1	1.2	30	1.5	6	.049	0		0		0		0		0					
79	1.2 Dead + 1.5 Live_M - A4 ...	Yes	Y		1	1.2	30	1.5	7	.049	0		0		0		0		0					
80	1.2 Dead + 1.5 Live_M - A4 ...	Yes	Y		1	1.2	30	1.5	8	.049	0		0		0		0		0					
81	1.2 Dead + 1.5 Live_M - A4 ...	Yes	Y		1	1.2	30	1.5	9	.049	0		0		0		0		0					
82	1.2 Dead + 1.5 Live_M - A4 ...	Yes	Y		1	1.2	30	1.5	10	.049	0		0		0		0		0					
83	1.2 Dead + 1.5 Live_M - A4 ...	Yes	Y		1	1.2	30	1.5	11	.049	0		0		0		0		0					
84	1.2 Dead + 1.5 Live_M - A4 ...	Yes	Y		1	1.2	30	1.5	12	.049	0		0		0		0		0					
85	1.2 Dead + 1.5 Live_M - A4 ...	Yes	Y		1	1.2	30	1.5	13	.049	0		0		0		0		0					
86	1.2 Dead + 1.5 Live_M - B1 ...	Yes	Y		1	1.2	31	1.5	2	.049	0		0		0		0		0					
87	1.2 Dead + 1.5 Live_M - B1 ...	Yes	Y		1	1.2	31	1.5	3	.049	0		0		0		0		0					
88	1.2 Dead + 1.5 Live_M - B1 ...	Yes	Y		1	1.2	31	1.5	4	.049	0		0		0		0		0					
89	1.2 Dead + 1.5 Live_M - B1 ...	Yes	Y		1	1.2	31	1.5	5	.049	0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
90	1.2 Dead + 1.5 Live_M - B1 ..	Yes	Y		1	1.2	31	1.5	6	.049	0		0		0		0		0					
91	1.2 Dead + 1.5 Live_M - B1 ..	Yes	Y		1	1.2	31	1.5	7	.049	0		0		0		0		0					
92	1.2 Dead + 1.5 Live_M - B1 ..	Yes	Y		1	1.2	31	1.5	8	.049	0		0		0		0		0					
93	1.2 Dead + 1.5 Live_M - B1 ..	Yes	Y		1	1.2	31	1.5	9	.049	0		0		0		0		0					
94	1.2 Dead + 1.5 Live_M - B1 ..	Yes	Y		1	1.2	31	1.5	10	.049	0		0		0		0		0					
95	1.2 Dead + 1.5 Live_M - B1 ..	Yes	Y		1	1.2	31	1.5	11	.049	0		0		0		0		0					
96	1.2 Dead + 1.5 Live_M - B1 ..	Yes	Y		1	1.2	31	1.5	12	.049	0		0		0		0		0					
97	1.2 Dead + 1.5 Live_M - B1 ..	Yes	Y		1	1.2	31	1.5	13	.049	0		0		0		0		0					
98	1.2 Dead + 1.5 Live_M - B2 ..	Yes	Y		1	1.2	32	1.5	2	.049	0		0		0		0		0					
99	1.2 Dead + 1.5 Live_M - B2 ..	Yes	Y		1	1.2	32	1.5	3	.049	0		0		0		0		0					
100	1.2 Dead + 1.5 Live_M - B2 ..	Yes	Y		1	1.2	32	1.5	4	.049	0		0		0		0		0					
101	1.2 Dead + 1.5 Live_M - B2 ..	Yes	Y		1	1.2	32	1.5	5	.049	0		0		0		0		0					
102	1.2 Dead + 1.5 Live_M - B2 ..	Yes	Y		1	1.2	32	1.5	6	.049	0		0		0		0		0					
103	1.2 Dead + 1.5 Live_M - B2 ..	Yes	Y		1	1.2	32	1.5	7	.049	0		0		0		0		0					
104	1.2 Dead + 1.5 Live_M - B2 ..	Yes	Y		1	1.2	32	1.5	8	.049	0		0		0		0		0					
105	1.2 Dead + 1.5 Live_M - B2 ..	Yes	Y		1	1.2	32	1.5	9	.049	0		0		0		0		0					
106	1.2 Dead + 1.5 Live_M - B2 ..	Yes	Y		1	1.2	32	1.5	10	.049	0		0		0		0		0					
107	1.2 Dead + 1.5 Live_M - B2 ..	Yes	Y		1	1.2	32	1.5	11	.049	0		0		0		0		0					
108	1.2 Dead + 1.5 Live_M - B2 ..	Yes	Y		1	1.2	32	1.5	12	.049	0		0		0		0		0					
109	1.2 Dead + 1.5 Live_M - B2 ..	Yes	Y		1	1.2	32	1.5	13	.049	0		0		0		0		0					
110	1.2 Dead + 1.5 Live_M - B3 ..	Yes	Y		1	1.2	33	1.5	2	.049	0		0		0		0		0					
111	1.2 Dead + 1.5 Live_M - B3 ..	Yes	Y		1	1.2	33	1.5	3	.049	0		0		0		0		0					
112	1.2 Dead + 1.5 Live_M - B3 ..	Yes	Y		1	1.2	33	1.5	4	.049	0		0		0		0		0					
113	1.2 Dead + 1.5 Live_M - B3 ..	Yes	Y		1	1.2	33	1.5	5	.049	0		0		0		0		0					
114	1.2 Dead + 1.5 Live_M - B3 ..	Yes	Y		1	1.2	33	1.5	6	.049	0		0		0		0		0					
115	1.2 Dead + 1.5 Live_M - B3 ..	Yes	Y		1	1.2	33	1.5	7	.049	0		0		0		0		0					
116	1.2 Dead + 1.5 Live_M - B3 ..	Yes	Y		1	1.2	33	1.5	8	.049	0		0		0		0		0					
117	1.2 Dead + 1.5 Live_M - B3 ..	Yes	Y		1	1.2	33	1.5	9	.049	0		0		0		0		0					
118	1.2 Dead + 1.5 Live_M - B3 ..	Yes	Y		1	1.2	33	1.5	10	.049	0		0		0		0		0					
119	1.2 Dead + 1.5 Live_M - B3 ..	Yes	Y		1	1.2	33	1.5	11	.049	0		0		0		0		0					
120	1.2 Dead + 1.5 Live_M - B3 ..	Yes	Y		1	1.2	33	1.5	12	.049	0		0		0		0		0					
121	1.2 Dead + 1.5 Live_M - B3 ..	Yes	Y		1	1.2	33	1.5	13	.049	0		0		0		0		0					
122	1.2 Dead + 1.5 Live_M - B4 ..	Yes	Y		1	1.2	34	1.5	2	.049	0		0		0		0		0					
123	1.2 Dead + 1.5 Live_M - B4 ..	Yes	Y		1	1.2	34	1.5	3	.049	0		0		0		0		0					
124	1.2 Dead + 1.5 Live_M - B4 ..	Yes	Y		1	1.2	34	1.5	4	.049	0		0		0		0		0					
125	1.2 Dead + 1.5 Live_M - B4 ..	Yes	Y		1	1.2	34	1.5	5	.049	0		0		0		0		0					
126	1.2 Dead + 1.5 Live_M - B4 ..	Yes	Y		1	1.2	34	1.5	6	.049	0		0		0		0		0					
127	1.2 Dead + 1.5 Live_M - B4 ..	Yes	Y		1	1.2	34	1.5	7	.049	0		0		0		0		0					
128	1.2 Dead + 1.5 Live_M - B4 ..	Yes	Y		1	1.2	34	1.5	8	.049	0		0		0		0		0					
129	1.2 Dead + 1.5 Live_M - B4 ..	Yes	Y		1	1.2	34	1.5	9	.049	0		0		0		0		0					
130	1.2 Dead + 1.5 Live_M - B4 ..	Yes	Y		1	1.2	34	1.5	10	.049	0		0		0		0		0					
131	1.2 Dead + 1.5 Live_M - B4 ..	Yes	Y		1	1.2	34	1.5	11	.049	0		0		0		0		0					
132	1.2 Dead + 1.5 Live_M - B4 ..	Yes	Y		1	1.2	34	1.5	12	.049	0		0		0		0		0					
133	1.2 Dead + 1.5 Live_M - B4 ..	Yes	Y		1	1.2	34	1.5	13	.049	0		0		0		0		0					
134	1.2 Dead + 1.5 Live_M - C1 ..	Yes	Y		1	1.2	35	1.5	2	.049	0		0		0		0		0					
135	1.2 Dead + 1.5 Live_M - C1 ..	Yes	Y		1	1.2	35	1.5	3	.049	0		0		0		0		0					
136	1.2 Dead + 1.5 Live_M - C1 ..	Yes	Y		1	1.2	35	1.5	4	.049	0		0		0		0		0					
137	1.2 Dead + 1.5 Live_M - C1 ..	Yes	Y		1	1.2	35	1.5	5	.049	0		0		0		0		0					
138	1.2 Dead + 1.5 Live_M - C1 ..	Yes	Y		1	1.2	35	1.5	6	.049	0		0		0		0		0					
139	1.2 Dead + 1.5 Live_M - C1 ..	Yes	Y		1	1.2	35	1.5	7	.049	0		0		0		0		0					
140	1.2 Dead + 1.5 Live_M - C1 ..	Yes	Y		1	1.2	35	1.5	8	.049	0		0		0		0		0					
141	1.2 Dead + 1.5 Live_M - C1 ..	Yes	Y		1	1.2	35	1.5	9	.049	0		0		0		0		0					
142	1.2 Dead + 1.5 Live_M - C1 ..	Yes	Y		1	1.2	35	1.5	10	.049	0		0		0		0		0					
143	1.2 Dead + 1.5 Live_M - C1 ..	Yes	Y		1	1.2	35	1.5	11	.049	0		0		0		0		0					
144	1.2 Dead + 1.5 Live_M - C1 ..	Yes	Y		1	1.2	35	1.5	12	.049	0		0		0		0		0					
145	1.2 Dead + 1.5 Live_M - C1 ..	Yes	Y		1	1.2	35	1.5	13	.049	0		0		0		0		0					
146	1.2 Dead + 1.5 Live_M - C2 ..	Yes	Y		1	1.2	36	1.5	2	.049	0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
147	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	36	1.5	3	.049	0		0		0		0		0					
148	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	36	1.5	4	.049	0		0		0		0		0					
149	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	36	1.5	5	.049	0		0		0		0		0					
150	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	36	1.5	6	.049	0		0		0		0		0					
151	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	36	1.5	7	.049	0		0		0		0		0					
152	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	36	1.5	8	.049	0		0		0		0		0					
153	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	36	1.5	9	.049	0		0		0		0		0					
154	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	36	1.5	10	.049	0		0		0		0		0					
155	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	36	1.5	11	.049	0		0		0		0		0					
156	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	36	1.5	12	.049	0		0		0		0		0					
157	1.2 Dead + 1.5 Live_M - C2 ...	Yes	Y		1	1.2	36	1.5	13	.049	0		0		0		0		0					
158	1.2 Dead + 1.5 Live_M - C3 ...	Yes	Y		1	1.2	37	1.5	2	.049	0		0		0		0		0					
159	1.2 Dead + 1.5 Live_M - C3 ...	Yes	Y		1	1.2	37	1.5	3	.049	0		0		0		0		0					
160	1.2 Dead + 1.5 Live_M - C3 ...	Yes	Y		1	1.2	37	1.5	4	.049	0		0		0		0		0					
161	1.2 Dead + 1.5 Live_M - C3 ...	Yes	Y		1	1.2	37	1.5	5	.049	0		0		0		0		0					
162	1.2 Dead + 1.5 Live_M - C3 ...	Yes	Y		1	1.2	37	1.5	6	.049	0		0		0		0		0					
163	1.2 Dead + 1.5 Live_M - C3 ...	Yes	Y		1	1.2	37	1.5	7	.049	0		0		0		0		0					
164	1.2 Dead + 1.5 Live_M - C3 ...	Yes	Y		1	1.2	37	1.5	8	.049	0		0		0		0		0					
165	1.2 Dead + 1.5 Live_M - C3 ...	Yes	Y		1	1.2	37	1.5	9	.049	0		0		0		0		0					
166	1.2 Dead + 1.5 Live_M - C3 ...	Yes	Y		1	1.2	37	1.5	10	.049	0		0		0		0		0					
167	1.2 Dead + 1.5 Live_M - C3 ...	Yes	Y		1	1.2	37	1.5	11	.049	0		0		0		0		0					
168	1.2 Dead + 1.5 Live_M - C3 ...	Yes	Y		1	1.2	37	1.5	12	.049	0		0		0		0		0					
169	1.2 Dead + 1.5 Live_M - C3 ...	Yes	Y		1	1.2	37	1.5	13	.049	0		0		0		0		0					
170	1.2 Dead + 1.5 Live_M - C4 ...	Yes	Y		1	1.2	38	1.5	2	.049	0		0		0		0		0					
171	1.2 Dead + 1.5 Live_M - C4 ...	Yes	Y		1	1.2	38	1.5	3	.049	0		0		0		0		0					
172	1.2 Dead + 1.5 Live_M - C4 ...	Yes	Y		1	1.2	38	1.5	4	.049	0		0		0		0		0					
173	1.2 Dead + 1.5 Live_M - C4 ...	Yes	Y		1	1.2	38	1.5	5	.049	0		0		0		0		0					
174	1.2 Dead + 1.5 Live_M - C4 ...	Yes	Y		1	1.2	38	1.5	6	.049	0		0		0		0		0					
175	1.2 Dead + 1.5 Live_M - C4 ...	Yes	Y		1	1.2	38	1.5	7	.049	0		0		0		0		0					
176	1.2 Dead + 1.5 Live_M - C4 ...	Yes	Y		1	1.2	38	1.5	8	.049	0		0		0		0		0					
177	1.2 Dead + 1.5 Live_M - C4 ...	Yes	Y		1	1.2	38	1.5	9	.049	0		0		0		0		0					
178	1.2 Dead + 1.5 Live_M - C4 ...	Yes	Y		1	1.2	38	1.5	10	.049	0		0		0		0		0					
179	1.2 Dead + 1.5 Live_M - C4 ...	Yes	Y		1	1.2	38	1.5	11	.049	0		0		0		0		0					
180	1.2 Dead + 1.5 Live_M - C4 ...	Yes	Y		1	1.2	38	1.5	12	.049	0		0		0		0		0					
181	1.2 Dead + 1.5 Live_M - C4 ...	Yes	Y		1	1.2	38	1.5	13	.049	0		0		0		0		0					
182	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	39	1.5	0		0		0		0		0		0					
183	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	40	1.5	0		0		0		0		0		0					
184	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	41	1.5	0		0		0		0		0		0					
185	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	42	1.5	0		0		0		0		0		0					
186	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	43	1.5	0		0		0		0		0		0					
187	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	44	1.5	0		0		0		0		0		0					
188	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	45	1.5	0		0		0		0		0		0					
189	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	46	1.5	0		0		0		0		0		0					
190	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	47	1.5	0		0		0		0		0		0					
191	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	48	1.5	0		0		0		0		0		0					
192	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	49	1.5	0		0		0		0		0		0					
193	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	50	1.5	0		0		0		0		0		0					
194	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	51	1.5	0		0		0		0		0		0					
195	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	52	1.5	0		0		0		0		0		0					
196	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	53	1.5	0		0		0		0		0		0					
197	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	54	1.5	0		0		0		0		0		0					
198	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	55	1.5	0		0		0		0		0		0					
199	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	56	1.5	0		0		0		0		0		0					
200	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	57	1.5	0		0		0		0		0		0					
201	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	58	1.5	0		0		0		0		0		0					
202	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	59	1.5	0		0		0		0		0		0					
203	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	60	1.5	0		0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
204	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	61	1.5	0		0		0		0		0		0					
205	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	62	1.5	0		0		0		0		0		0					
206	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	63	1.5	0		0		0		0		0		0					
207	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	64	1.5	0		0		0		0		0		0					
208	1.2 Dead + 1.5 Live_V - M4...	Yes	Y		1	1.2	65	1.5	0		0		0		0		0		0					
209	1.2 Dead + 1.5 Live_V - M6...	Yes	Y		1	1.2	66	1.5	0		0		0		0		0		0					
210	1.2 Dead + 1.5 Live_V - M6...	Yes	Y		1	1.2	67	1.5	0		0		0		0		0		0					
211	1.2 Dead + 1.5 Live_V - M6...	Yes	Y		1	1.2	68	1.5	0		0		0		0		0		0					
212	1.2 Dead + 1.5 Live_V - M9...	Yes	Y		1	1.2	69	1.5	0		0		0		0		0		0					
213	1.2 Dead + 1.5 Live_V - M9...	Yes	Y		1	1.2	70	1.5	0		0		0		0		0		0					
214	1.2 Dead + 1.5 Live_V - M9...	Yes	Y		1	1.2	71	1.5	0		0		0		0		0		0					
215	1.2 Dead + 1.5 Live_V - M9...	Yes	Y		1	1.2	72	1.5	0		0		0		0		0		0					
216	1.2 Dead + 1.5 Live_V - M9...	Yes	Y		1	1.2	73	1.5	0		0		0		0		0		0					
217	1.2 Dead + 1.5 Live_V - M9...	Yes	Y		1	1.2	74	1.5	0		0		0		0		0		0					
218	1.2 Dead + 1.5 Live_V - M9...	Yes	Y		1	1.2	75	1.5	0		0		0		0		0		0					
219	1.2 Dead + 1.5 Live_V - M9...	Yes	Y		1	1.2	76	1.5	0		0		0		0		0		0					
220	1.2 Dead + 1.5 Live_V - M9...	Yes	Y		1	1.2	77	1.5	0		0		0		0		0		0					
221	1.2 Dead + 1.5 Live_V - M9...	Yes	Y		1	1.2	78	1.5	0		0		0		0		0		0					
222	1.2 Dead + 1.5 Live_V - M9...	Yes	Y		1	1.2	79	1.5	0		0		0		0		0		0					
223	1.2 Dead + 1.5 Live_V - M9...	Yes	Y		1	1.2	80	1.5	0		0		0		0		0		0					
224	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	81	1.5	0		0		0		0		0		0					
225	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	82	1.5	0		0		0		0		0		0					
226	1.2 Dead + 1.5 Live_V - M1...	Yes	Y		1	1.2	83	1.5	0		0		0		0		0		0					

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	DL		-1			30		3	
2	No Ice Wind 0 deg	None					30	57		
3	No Ice Wind 30 deg	None					60	98		
4	No Ice Wind 60 deg	None					60	114		
5	No Ice Wind 90 deg	None					30	49		
6	No Ice Wind 120 deg	None					60	114		
7	No Ice Wind 150 deg	None					60	98		
8	No Ice Wind 180 deg	None					30	57		
9	No Ice Wind 210 deg	None					60	98		
10	No Ice Wind 240 deg	None					60	114		
11	No Ice Wind 270 deg	None					30	49		
12	No Ice Wind 300 deg	None					60	114		
13	No Ice Wind 330 deg	None					60	98		
14	Ice Weight	None					30	60	3	
15	Ice Wind 0 deg	None					30	57		
16	Ice Wind 30 deg	None					60	98		
17	Ice Wind 60 deg	None					60	114		
18	Ice Wind 90 deg	None					30	49		
19	Ice Wind 120 deg	None					60	114		
20	Ice Wind 150 deg	None					60	98		
21	Ice Wind 180 deg	None					30	57		
22	Ice Wind 210 deg	None					60	98		
23	Ice Wind 240 deg	None					60	114		
24	Ice Wind 270 deg	None					30	49		
25	Ice Wind 300 deg	None					60	114		
26	Ice Wind 330 deg	None					60	98		
27	Live Load - A1	None					1			
28	Live Load - A2	None					1			
29	Live Load - A3	None					1			

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
30	Live Load - A4	None					1			
31	Live Load - B1	None					1			
32	Live Load - B2	None					1			
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 - M46 (Start)	None					1			
40	Live Load - M46 (Mid...	None					1			
41	Live Load - M46 (End)	None					1			
42	Live Load - M47 (Start)	None					1			
43	Live Load - M47 (Mid...	None					1			
44	Live Load - M47 (End)	None					1			
45	Live Load - M48 (Start)	None					1			
46	Live Load - M48 (Mid...	None					1			
47	Live Load - M48 (End)	None					1			
48	Live Load - M49 (Start)	None					1			
49	Live Load - M49 (Mid...	None					1			
50	Live Load - M49 (End)	None					1			
51	Live Load - M16 (Start)	None					1			
52	Live Load - M16 (Mid...	None					1			
53	Live Load - M16 (End)	None					1			
54	Live Load - M46A (St...	None					1			
55	Live Load - M46A (Mi...	None					1			
56	Live Load - M46A (E...	None					1			
57	Live Load - M47A (St...	None					1			
58	Live Load - M47A (Mi...	None					1			
59	Live Load - M47A (E...	None					1			
60	Live Load - M48A (St...	None					1			
61	Live Load - M48A (Mi...	None					1			
62	Live Load - M48A (E...	None					1			
63	Live Load - M49A (St...	None					1			
64	Live Load - M49A (Mi...	None					1			
65	Live Load - M49A (E...	None					1			
66	Live Load - M61 (Start)	None					1			
67	Live Load - M61 (Mid...	None					1			
68	Live Load - M61 (End)	None					1			
69	Live Load - M91 (Start)	None					1			
70	Live Load - M91 (Mid...	None					1			
71	Live Load - M91 (End)	None					1			
72	Live Load - M92 (Start)	None					1			
73	Live Load - M92 (Mid...	None					1			
74	Live Load - M92 (End)	None					1			
75	Live Load - M93 (Start)	None					1			
76	Live Load - M93 (Mid...	None					1			
77	Live Load - M93 (End)	None					1			
78	Live Load - M94 (Start)	None					1			
79	Live Load - M94 (Mid...	None					1			
80	Live Load - M94 (End)	None					1			
81	Live Load - M106 (St...	None					1			
82	Live Load - M106 (Mi...	None					1			
83	Live Load - M106 (En...	None					1			
84	BLC 1 Transient Area...	None						51		
85	BLC 14 Transient Are...	None						51		

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	SA	max	1479.511	15	1418.256	30	4002.19	22	1.372	33	1.593	4	1.146	27
2		min	-2514.206	2	413.663	23	-2203.056	11	.285	5	-1.579	17	.087	17
3	SB	max	1137.016	15	1418.023	34	2338.416	21	-.33	23	1.605	12	.965	73
4		min	-2178.862	2	415.351	7	-4129.069	8	-1.653	30	-1.591	25	-.047	103
5	SC	max	4728.184	14	1418.268	26	1270.587	21	.681	155	1.775	20	-.463	3
6		min	-2653.269	3	414.916	15	-1273.752	8	-.487	113	-1.76	9	-1.726	32
7	RC	max	321.967	3	1972.071	32	21.565	21	0	141	0	123	0	226
8		min	-3487.333	32	-171.906	3	-21.555	9	0	123	0	141	0	1
9	RA	max	1735.843	36	1963.083	36	267.847	11	0	175	0	175	0	49
10		min	-156.639	11	-164.11	11	-3006.494	36	0	49	0	49	0	175
11	RB	max	1732.933	28	1959.113	28	2999.854	28	0	83	0	83	0	83
12		min	-131.788	19	-136.728	19	-224.899	19	0	89	0	89	0	89
13	Totals:	max	5224.053	15	9704.836	31	5312.189	21						
14		min	-5224.054	2	2836.085	25	-5312.19	9						

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

	Member	Shape	Code Check	Loc[...	LC	Shear...	Loc[...	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	M46	HSS4x4x3...	.169	0	4	.088	0	y	51	106237...	118378...	14.115	14.115	2...	H1-1b
2	M47	HSS4x4x3...	.160	30.6...	35	.057	30.6...	y	27	106648...	118378...	14.115	14.115	1...	H1-1b
3	M48	L2x2x3	.411	25.5...	1...	.031	51.1...	y	1...	15920....	23392.8	.558	1.169	1...	H2-1
4	M49	L2x2x3	.417	25.5...	1...	.030	0	z	1...	15920....	23392.8	.558	1.166	1...	H2-1
5	M50	PL6x1/2	.059	1.642	22	.179	2.765	y	1...	95340....	97200	1.012	12.15	3...	H1-1b
6	M51	PL6x1/2	.214	6.81	22	.222	6.81	y	1...	60829....	97200	1.012	12.15	1...	H1-1b
7	M52	PL6x1/2	.054	1.123	22	.203	0	y	49	95340....	97200	1.012	12.15	3...	H1-1b
8	M53	PL6x3/8	.235	2.627	16	.243	2.627	y	29	62895....	72900	.57	9.113	1...	H1-1b
9	M54	PL6x3/8	.237	1.595	8	.260	0	y	36	69770.62	72900	.57	9.113	1...	H1-1b
10	M55	PL6x3/8	.290	2.627	4	.124	2.627	y	33	62895....	72900	.57	9.113	1...	H1-1b
11	M56	PL6x3/8	.248	1.595	12	.281	0	y	36	69770.62	72900	.57	9.113	1...	H1-1b
12	M16	P3 STD	.113	53.1...	20	.089	96.8...		4	29986.1	70196....	6.124	6.124	3...	H1-1b
13	M46A	HSS4x4x3...	.167	0	12	.088	0	y	1...	106237...	118378...	14.115	14.115	2...	H1-1b
14	M47A	HSS4x4x3...	.160	30.6...	29	.057	30.6...	y	31	106648...	118378...	14.115	14.115	1...	H1-1b
15	M48A	L2x2x3	.411	25.5...	2...	.031	51.1...	y	2...	15920....	23392.8	.558	1.169	1...	H2-1
16	M49A	L2x2x3	.417	25.5...	2...	.030	0	z	2...	15920....	23392.8	.558	1.166	1...	H2-1
17	M50A	PL6x1/2	.056	1.642	6	.179	2.765	y	75	95340....	97200	1.012	12.15	2...	H1-1b
18	M51A	PL6x1/2	.225	6.81	8	.222	6.81	y	2...	60829....	97200	1.012	12.15	1...	H1-1b
19	M52A	PL6x1/2	.052	1.123	6	.204	0	y	89	95340....	97200	1.012	12.15	3...	H1-1b
20	M53A	PL6x3/8	.224	2.627	24	.243	2.627	y	33	62895....	72900	.57	9.113	1...	H1-1b
21	M54A	PL6x3/8	.210	1.595	16	.260	0	y	28	69770.62	72900	.57	9.113	1...	H1-1b
22	M55A	PL6x3/8	.314	2.627	12	.124	2.627	y	73	62895....	72900	.57	9.113	1...	H1-1b
23	M56A	PL6x3/8	.272	1.595	20	.281	0	y	28	69770.62	72900	.57	9.113	1...	H1-1b
24	M61	P3 STD	.103	53.1...	4	.090	96.8...		12	29986.1	70196....	6.124	6.124	3...	H1-1b
25	M91	HSS4x4x3...	.180	0	20	.088	0	y	1...	106237...	118378...	14.115	14.115	2...	H1-1b
26	M92	HSS4x4x3...	.160	30.6...	31	.057	30.6...	y	35	106648...	118378...	14.115	14.115	1...	H1-1b
27	M93	L2x2x3	.411	25.5...	2...	.031	51.1...	y	2...	15920....	23392.8	.558	1.169	1...	H2-1
28	M94	L2x2x3	.417	25.5...	2...	.030	0	z	2...	15920....	23392.8	.558	1.166	1...	H2-1
29	M95	PL6x1/2	.059	1.642	14	.179	2.765	y	1...	95340....	97200	1.012	12.15	3...	H1-1b
30	M96	PL6x1/2	.217	6.81	14	.222	6.81	y	2...	60829....	97200	1.012	12.15	1...	H1-1b
31	M97	PL6x1/2	.055	1.123	14	.203	0	y	1...	95340....	97200	1.012	12.15	3...	H1-1b
32	M98	PL6x3/8	.244	2.627	8	.243	2.627	y	37	62895....	72900	.57	9.113	1...	H1-1b
33	M99	PL6x3/8	.221	1.595	2	.260	0	y	32	69770.62	72900	.57	9.113	1...	H1-1b
34	M100	PL6x3/8	.303	2.627	20	.124	2.627	y	29	62895....	72900	.57	9.113	1...	H1-1b
35	M101	PL6x3/8	.241	1.595	4	.281	0	y	32	69770.62	72900	.57	9.113	1...	H1-1b
36	M106	P3 STD	.111	53.1...	12	.091	96.8...		20	29986.1	70196....	6.124	6.124	3...	H1-1b
37	A1	P2 STD	.342	69	22	.204	69		2	15808....	33847....	1.997	1.997	3...	H1-1b

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

	Member	Shape	Code Check	Loc[...	LC	Shear...	Loc[...	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn ...	phi*Mn ...	Cb	Eqn
38	A2	P2 STD	.376	69	20	.109	69		24	15808....	33847....	1.997	1.997	3...	H1-1b
39	A3	P2 STD	.389	69	8	.134	69		4	15808....	33847....	1.997	1.997	3...	H1-1b
40	A4	P2 STD	.299	69	8	.171	27		2	15808....	33847....	1.997	1.997	4...	H1-1b
41	B1	P2 STD	.328	69	6	.200	27		8	15808....	33847....	1.997	1.997	3...	H1-1b
42	B2	P2 STD	.356	69	2	.114	69		8	15808....	33847....	1.997	1.997	2...	H1-1b
43	B3	P2 STD	.359	69	16	.137	69		12	15808....	33847....	1.997	1.997	4...	H1-1b
44	B4	P2 STD	.304	69	14	.174	69		20	15808....	33847....	1.997	1.997	4...	H1-1b
45	C1	P2 STD	.342	69	14	.195	69		18	15808....	33847....	1.997	1.997	4...	H1-1b
46	C2	P2 STD	.359	69	12	.105	69		16	15808....	33847....	1.997	1.997	3...	H1-1b
47	C3	P2 STD	.374	69	24	.140	69		20	15808....	33847....	1.997	1.997	4...	H1-1b
48	C4	P2 STD	.298	69	22	.161	27		18	15808....	33847....	1.997	1.997	3...	H1-1b
49	M73	P2 STD	.288	53.1...	2	.223	12.5		2	6684.464	33847....	1.997	1.997	3...	H1-1b
50	M78	L2.5x2.5x4	.404	0	24	.112	0	y	16	36167....	38556	1.114	2.537	1...	H2-1
51	M79	P2 STD	.285	53.1...	10	.220	7.813		24	6684.464	33847....	1.997	1.997	3...	H1-1b
52	M84	L2.5x2.5x4	.416	0	8	.115	0	y	24	36167....	38556	1.114	2.537	1...	H2-1
53	M85	P2 STD	.289	139....	15	.225	7.813		8	6684.464	33847....	1.997	1.997	3...	H1-1b
54	M90	L2.5x2.5x4	.368	0	16	.119	0	y	8	36167....	38556	1.114	2.537	1...	H2-1
55	M91A	PL 8x1/2	.081	0	32	.068	0	y	32	120475...	129600	1.35	21.6	1...	H1-1b
56	M92A	LL2.5x2.5x...	.094	50.9...	32	.004	0	y	33	42543....	58482	4.246	2.614	1	H1-1b*
57	M93A	PL 8x1/2	.081	0	36	.067	0	y	36	120475...	129600	1.35	21.6	1...	H1-1b
58	M94A	LL2.5x2.5x...	.094	50.9...	36	.004	50.9...	y	37	42543....	58482	4.246	2.614	1...	H1-1b*
59	M95A	PL 8x1/2	.080	0	28	.067	0	y	28	120475...	129600	1.35	21.6	1...	H1-1b
60	M96A	LL2.5x2.5x...	.094	50.9...	28	.004	50.9...	y	29	42543....	58482	4.246	2.614	1...	H1-1b*

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	M46	HSS4x4x3/16	0.169	1.05	0.161*	0	4	0.088	1.05	0.084*	0	106237.62	118378.13	14.115	14.115	2.977	H1-1b
2	M47	HSS4x4x3/16	0.16	1.05	0.152*	30.69	35	0.057	1.05	0.054*	30.69	106648.52	118378.13	14.115	14.115	1.329	H1-1b
3	M48	L2x2x3	0.411	1.05	0.391*	25.58	189	0.031	1.05	0.03*	51.17	15920.319	23392.8	0.558	1.169	1.757	H2-1
4	M49	L2x2x3	0.417	1.05	0.397*	25.58	192	0.03	1.05	0.029*	0	15920.319	23392.8	0.558	1.166	1.728	H2-1
5	M50	PL6x1/2	0.059	1.05	0.056*	1.642	22	0.179	1.05	0.17*	2.765	95340.363	97200	1.012	12.15	3.012	H1-1b
6	M51	PL6x1/2	0.214	1.05	0.204*	6.81	22	0.222	1.05	0.211*	6.81	60829.391	97200	1.012	12.15	1.299	H1-1b
7	M52	PL6x1/2	0.054	1.05	0.051*	1.123	22	0.203	1.05	0.193*	0	95340.363	97200	1.012	12.15	3.519	H1-1b
8	M53	PL6x3/8	0.235	1.05	0.224*	2.627	16	0.243	1.05	0.231*	2.627	62895.756	72900	0.57	9.113	1.52	H1-1b
9	M54	PL6x3/8	0.237	1.05	0.226*	1.595	8	0.26	1.05	0.248*	0	69770.62	72900	0.57	9.113	1.417	H1-1b
10	M55	PL6x3/8	0.29	1.05	0.276*	2.627	4	0.124	1.05	0.118*	2.627	62895.756	72900	0.57	9.113	1.441	H1-1b
11	M56	PL6x3/8	0.248	1.05	0.236*	1.595	12	0.281	1.05	0.268*	0	69770.62	72900	0.57	9.113	1.771	H1-1b
12	M16	P3 STD	0.113	1.05	0.108*	53.13	20	0.089	1.05	0.085*	96.88	29986.1	70196.802	6.124	6.124	3.134	H1-1b
13	M46A	HSS4x4x3/16	0.167	1.05	0.159*	0	12	0.088	1.05	0.084*	0	106237.62	118378.13	14.115	14.115	2.843	H1-1b
14	M47A	HSS4x4x3/16	0.16	1.05	0.152*	30.69	29	0.057	1.05	0.054*	30.69	106648.52	118378.13	14.115	14.115	1.328	H1-1b
15	M48A	L2x2x3	0.411	1.05	0.391*	25.58	204	0.031	1.05	0.03*	51.17	15920.319	23392.8	0.558	1.169	1.757	H2-1
16	M49A	L2x2x3	0.417	1.05	0.397*	25.58	207	0.03	1.05	0.029*	0	15920.319	23392.8	0.558	1.166	1.728	H2-1
17	M50A	PL6x1/2	0.056	1.05	0.053*	1.642	6	0.179	1.05	0.17*	2.765	95340.363	97200	1.012	12.15	2.953	H1-1b
18	M51A	PL6x1/2	0.225	1.05	0.214*	6.81	8	0.222	1.05	0.211*	6.81	60829.391	97200	1.012	12.15	1.372	H1-1b
19	M52A	PL6x1/2	0.052	1.05	0.05*	1.123	6	0.204	1.05	0.194*	0	95340.363	97200	1.012	12.15	3.56	H1-1b
20	M53A	PL6x3/8	0.224	1.05	0.213*	2.627	24	0.243	1.05	0.231*	2.627	62895.756	72900	0.57	9.113	1.514	H1-1b
21	M54A	PL6x3/8	0.21	1.05	0.2*	1.595	16	0.26	1.05	0.248*	0	69770.62	72900	0.57	9.113	1.423	H1-1b
22	M55A	PL6x3/8	0.314	1.05	0.299*	2.627	12	0.124	1.05	0.118*	2.627	62895.756	72900	0.57	9.113	1.442	H1-1b
23	M56A	PL6x3/8	0.272	1.05	0.259*	1.595	20	0.281	1.05	0.268*	0	69770.62	72900	0.57	9.113	1.714	H1-1b
24	M61	P3 STD	0.103	1.05	0.098*	53.13	4	0.09	1.05	0.086*	96.88	29986.1	70196.802	6.124	6.124	3.048	H1-1b
25	M91	HSS4x4x3/16	0.18	1.05	0.171*	0	20	0.088	1.05	0.084*	0	106237.62	118378.13	14.115	14.115	2.909	H1-1b
26	M92	HSS4x4x3/16	0.16	1.05	0.152*	30.69	31	0.057	1.05	0.054*	30.69	106648.52	118378.13	14.115	14.115	1.329	H1-1b
27	M93	L2x2x3	0.411	1.05	0.391*	25.58	219	0.031	1.05	0.03*	51.17	15920.319	23392.8	0.558	1.169	1.757	H2-1
28	M94	L2x2x3	0.417	1.05	0.397*	25.58	222	0.03	1.05	0.029*	0	15920.319	23392.8	0.558	1.166	1.728	H2-1
29	M95	PL6x1/2	0.059	1.05	0.056*	1.642	14	0.179	1.05	0.17*	2.765	95340.363	97200	1.012	12.15	3.015	H1-1b
30	M96	PL6x1/2	0.217	1.05	0.207*	6.81	14	0.222	1.05	0.211*	6.81	60829.391	97200	1.012	12.15	1.303	H1-1b
31	M97	PL6x1/2	0.055	1.05	0.052*	1.123	14	0.203	1.05	0.193*	0	95340.363	97200	1.012	12.15	3.514	H1-1b
32	M98	PL6x3/8	0.244	1.05	0.232*	2.627	8	0.243	1.05	0.231*	2.627	62895.756	72900	0.57	9.113	1.516	H1-1b
33	M99	PL6x3/8	0.221	1.05	0.21*	1.595	2	0.26	1.05	0.248*	0	69770.62	72900	0.57	9.113	1.427	H1-1b
34	M100	PL6x3/8	0.303	1.05	0.289*	2.627	20	0.124	1.05	0.118*	2.627	62895.756	72900	0.57	9.113	1.439	H1-1b
35	M101	PL6x3/8	0.241	1.05	0.23*	1.595	4	0.281	1.05	0.268*	0	69770.62	72900	0.57	9.113	1.795	H1-1b
36	M106	P3 STD	0.111	1.05	0.106*	53.13	12	0.091	1.05	0.087*	96.88	29986.1	70196.802	6.124	6.124	3.088	H1-1b
37	A1	P2 STD	0.342	1.05	0.326*	69	22	0.204	1.05	0.194*	69	15808.485	33847.742	1.997	1.997	3.279	H1-1b
38	A2	P2 STD	0.376	1.05	0.358*	69	20	0.109	1.05	0.104*	69	15808.485	33847.742	1.997	1.997	3.13	H1-1b
39	A3	P2 STD	0.389	1.05	0.37*	69	8	0.134	1.05	0.128*	69	15808.485	33847.742	1.997	1.997	3.434	H1-1b
40	A4	P2 STD	0.299	1.05	0.285*	69	8	0.171	1.05	0.163*	27	15808.485	33847.742	1.997	1.997	4.969	H1-1b
41	B1	P2 STD	0.328	1.05	0.312*	69	6	0.2	1.05	0.19*	27	15808.485	33847.742	1.997	1.997	3.95	H1-1b
42	B2	P2 STD	0.356	1.05	0.339*	69	2	0.114	1.05	0.109*	69	15808.485	33847.742	1.997	1.997	2.786	H1-1b
43	B3	P2 STD	0.359	1.05	0.342*	69	16	0.137	1.05	0.13*	69	15808.485	33847.742	1.997	1.997	4.623	H1-1b
44	B4	P2 STD	0.304	1.05	0.29*	69	14	0.174	1.05	0.166*	69	15808.485	33847.742	1.997	1.997	4.194	H1-1b
45	C1	P2 STD	0.342	1.05	0.326*	69	14	0.195	1.05	0.186*	69	15808.485	33847.742	1.997	1.997	4.151	H1-1b
46	C2	P2 STD	0.359	1.05	0.342*	69	12	0.105	1.05	0.1*	69	15808.485	33847.742	1.997	1.997	3.027	H1-1b
47	C3	P2 STD	0.374	1.05	0.356*	69	24	0.14	1.05	0.133*	69	15808.485	33847.742	1.997	1.997	4.369	H1-1b
48	C4	P2 STD	0.298	1.05	0.284*	69	22	0.161	1.05	0.153*	27	15808.485	33847.742	1.997	1.997	3.815	H1-1b
49	M73	P2 STD	0.288	1.05	0.274*	53.13	2	0.223	1.05	0.212*	12.5	6684.464	33847.742	1.997	1.997	3.69	H1-1b
50	M78	L2.5x2.5x4	0.404	1.05	0.385*	0	24	0.112	1.05	0.107*	0	36167.335	38556	1.114	2.537	1.748	H2-1
51	M79	P2 STD	0.285	1.05	0.271*	53.13	10	0.22	1.05	0.21*	7.813	6684.464	33847.742	1.997	1.997	3.735	H1-1b
52	M84	L2.5x2.5x4	0.416	1.05	0.396*	0	8	0.115	1.05	0.11*	0	36167.335	38556	1.114	2.537	1.726	H2-1
53	M85	P2 STD	0.289	1.05	0.275*	139.1	15	0.225	1.05	0.214*	7.813	6684.464	33847.742	1.997	1.997	3.595	H1-1b
54	M90	L2.5x2.5x4	0.368	1.05	0.35*	0	16	0.119	1.05	0.113*	0	36167.335	38556	1.114	2.537	1.65	H2-1
55	M91A	PL 8x1/2	0.081	1.05	0.077*	0	32	0.068	1.05	0.065*	0	120475.67	129600	1.35	21.6	1.667	H1-1b
56	M92A	LL2.5x2.5x3x8	0.094	1.05	0.09*	50.97	32	0.004	1.05	0.004*	0	42543.862	58482	4.246	2.614	1	H1-1b*
57	M93A	PL 8x1/2	0.081	1.05	0.077*	0	36	0.067	1.05	0.064*	0	120475.67	129600	1.35	21.6	1.667	H1-1b
58	M94A	LL2.5x2.5x3x8	0.094	1.05	0.09*	50.97	36	0.004	1.05	0.004*	50.97	42543.862	58482	4.246	2.614	1.136	H1-1b*
59	M95A	PL 8x1/2	0.08	1.05	0.076*	0	28	0.067	1.05	0.064*	0	120475.67	129600	1.35	21.6	1.667	H1-1b
60	M96A	LL2.5x2.5x3x8	0.094	1.05	0.09*	50.97	28	0.004	1.05	0.004*	50.97	42543.862	58482	4.246	2.614	1.136	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
2021777.876359.02

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

Flange Information		
Height (h)	8	in
Width (w)	8	in
Thickness (t)	0.75	in
Steel Grade	A36	
Plate Yield Strength (Fy)	36	ksi
Support Arm Height	4	in
Support Arm Width	4	in

RISA 3D Reactions (Up-Down)		
Moment (M)	1.73	k-ft
Axial (T)	3.88	kips
Shear (V)	1.41	kips

RISA 3D Reactions (Left -Right)		
Moment (M)	1.78	k-ft
Axial (T)	1.35	kips
Shear (V)	1.39	kips

Bolt Capacity (Up-Down)		
Nominal Tensile Strength (R_{nt})	27.120	kips
Nominal Shear Strength (R_{nv})	18.41	kips
Bolt Tensile Force (T_{ub})	2.70	kips
Bolt Shear Force (V_{ub})	0.353	kips
$T_{ub}/\phi R_{nt}$	0.12629	
$V_{ub}/\phi R_{nv}$	0.02437	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.01737	
Bolt Capacity =	12.6%	OK

*Rating per TIA-222-H, Section 15.5

Bolt Capacity (Left-Right)		
Nominal Tensile Strength (R_{nt})	27.120	kips
Nominal Shear Strength (R_{nv})	18.41	kips
Bolt Tensile Force (T_{ub})	2.11	kips
Bolt Shear Force (V_{ub})	0.347	kips
$T_{ub}/\phi R_{nt}$	0.09887	
$V_{ub}/\phi R_{nv}$	0.02395	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.01087	
Bolt Capacity =	9.9%	OK

*Rating per TIA-222-H, Section 15.5

Plate Capacity (Up-Down)		
Bolt Circle (D_{BC})	8.485	in
Effective Width (B_{eff})	7.48	in
Flexural Moment (M_u)	5.39	k-in
Flexural Strength ($\emptyset M_n$)	34.10	k-in
Plate Capacity=	15.1%	OK

*Rating per TIA-222-H, Section 15.5

Plate Capacity (Left-Right)		
Bolt Circle (D_{BC})	8.485	in
Effective Width (B_{eff})	7.48	in
Flexural Moment (M_u)	4.22	k-in
Flexural Strength ($\emptyset M_n$)	34.10	k-in
Plate Capacity=	11.8%	OK

*Rating per TIA-222-H, Section 15.5

TIA-222-H CONNECTION CHECK
Kicker to Tower Connection - Typ. All Sectors
2021777.876359.02

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

RISA 3D Reactions		
Moment (M)	0.00	k-ft
Axial (T)	-3.49	kips
Shear (V)	1.97	kips

Bolt Capacity		
Nominal Tensile Strength (R_{nt})	27.120	kips
Nominal Shear Strength (R_{nv})	18.41	kips
Bolt Tensile Force (T_{ub})	-0.87	kips
Bolt Shear Force (V_{ub})	0.493	kips
$T_{ub}/\phi R_{nt}$	-0.04082	
$V_{ub}/\phi R_{nv}$	0.03401	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00296	
Bolt Capacity =	3.4%	OK

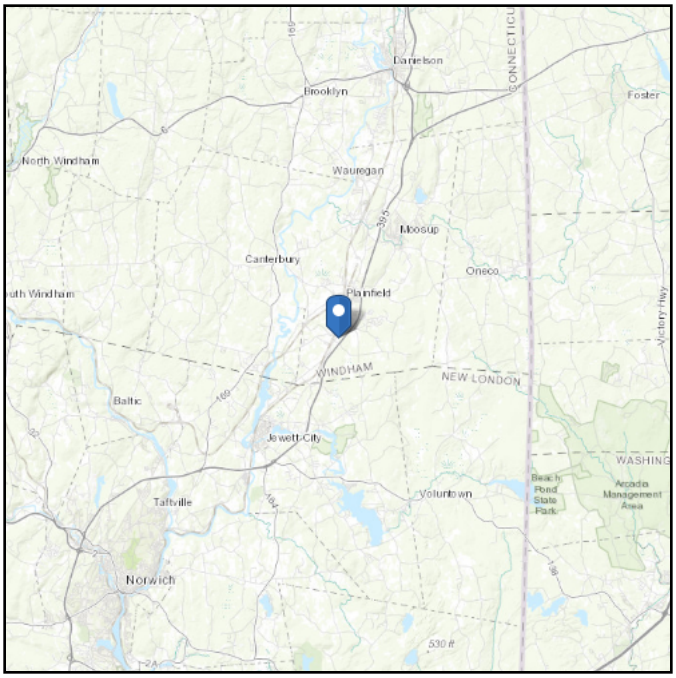
*Rating per TIA-222-H, Section 15.5

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 181.69 ft (NAVD 88)
Latitude: 41.658739
Longitude: -71.924931



Wind

Results:

Wind Speed:	~~131 Vmph~~	135 mph per jurisdiction requirement
10-year MRI	79 Vmph	
25-year MRI	89 Vmph	
50-year MRI	98 Vmph	
100-year MRI	107 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.

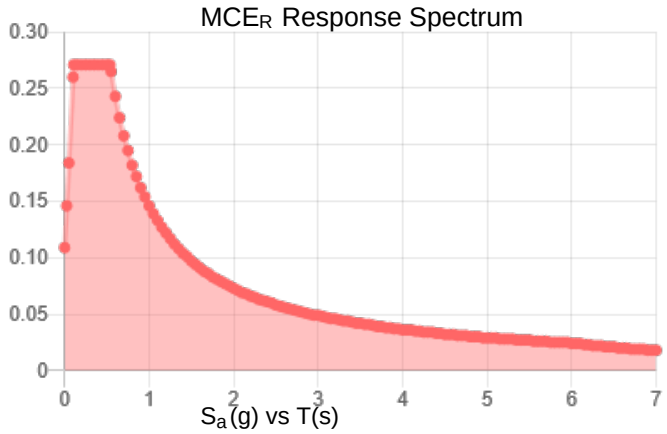
Seismic

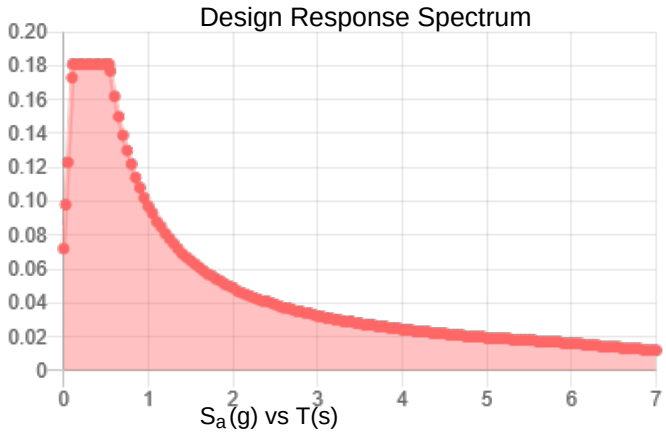
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.17	S_{DS} :	0.181
S_1 :	0.061	S_{D1} :	0.097
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.085
S_{MS} :	0.271	PGA_M :	0.136
S_{M1} :	0.146	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Mon Feb 22 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:

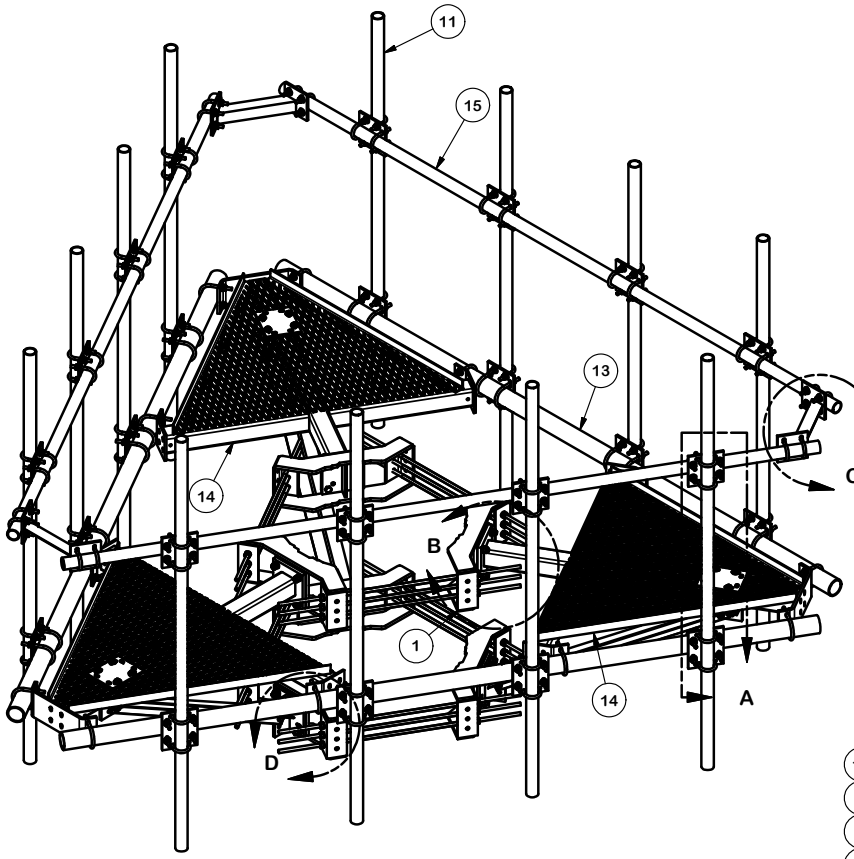
Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Mon Feb 22 2021

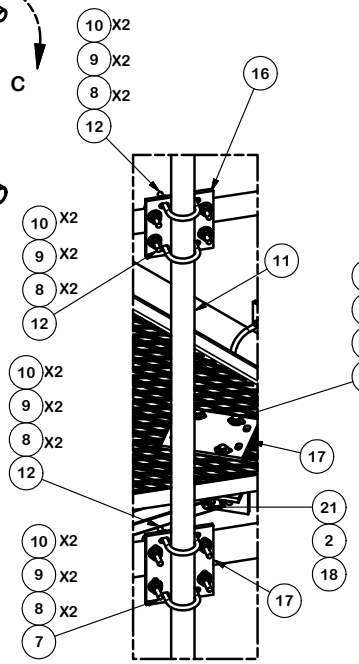
Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

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.

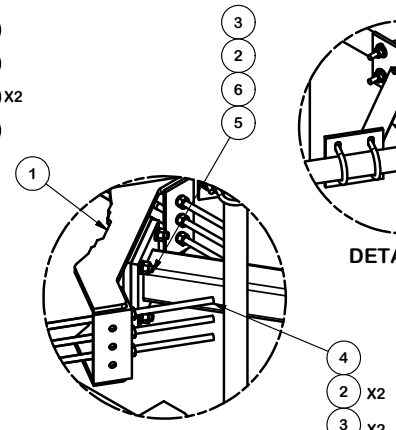
APPENDIX E

SUPPLEMENTAL DRAWINGS

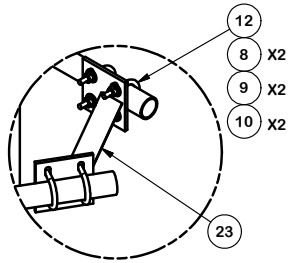




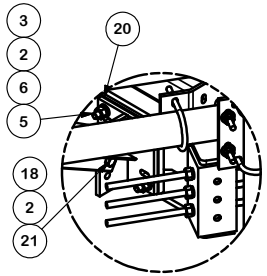
DETAIL A



DETAIL B



DETAIL C



DETAIL D

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

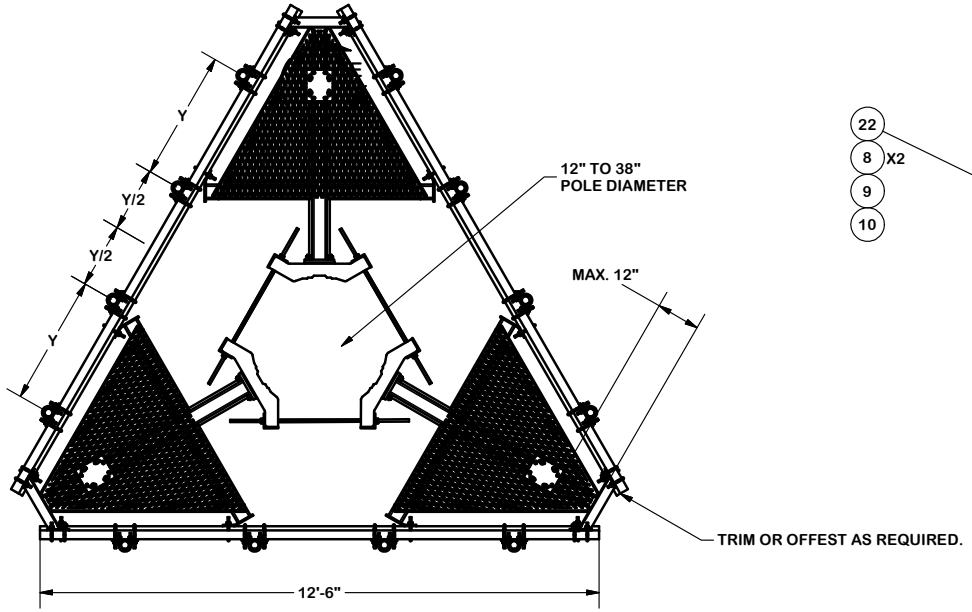
TOLERANCE NOTES

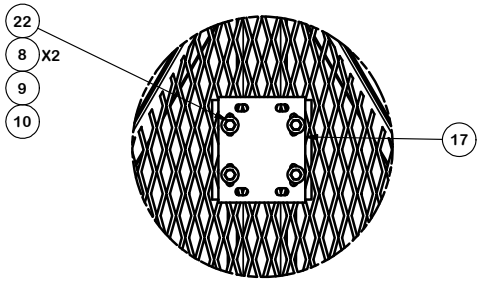
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

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

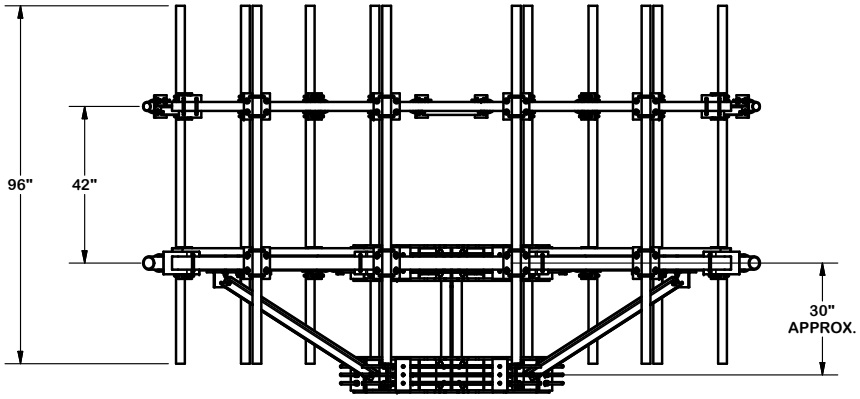
SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

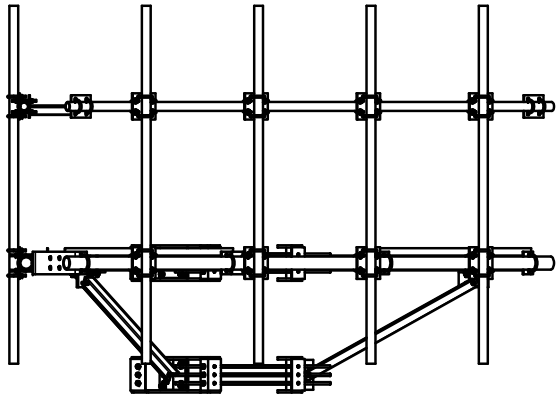
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
4488	CEK 7/14/2014		RMQP-496-HK	1 OF 3
CLASS / SUB	DRAWING USAGE	CHECKED BY	DWG. NO.	
81 / 02	CUSTOMER	BMC 7/14/2014	RMQP-496-HK	





DETAIL E





TOLERANCE NOTES

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

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

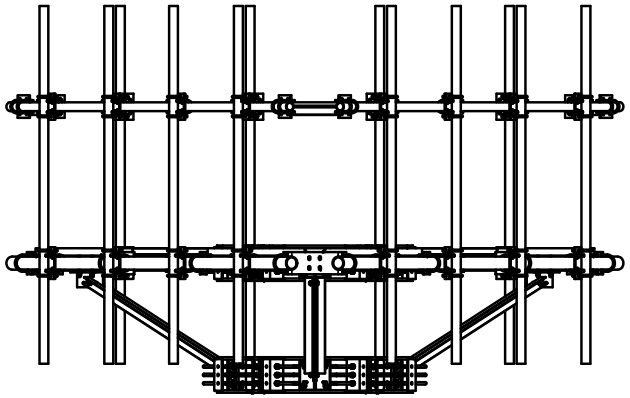
SITE PRO 1
A valmont COMPANY

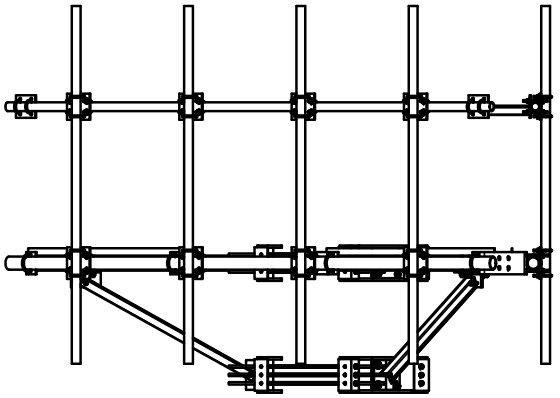
Engineering Support Team:
1-888-753-7446

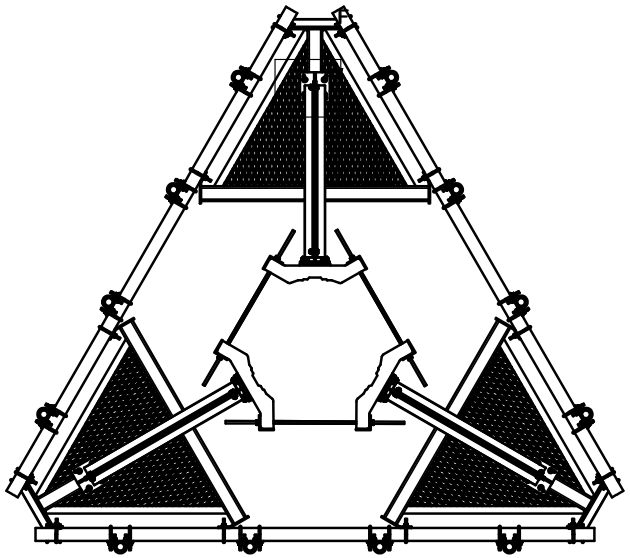
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

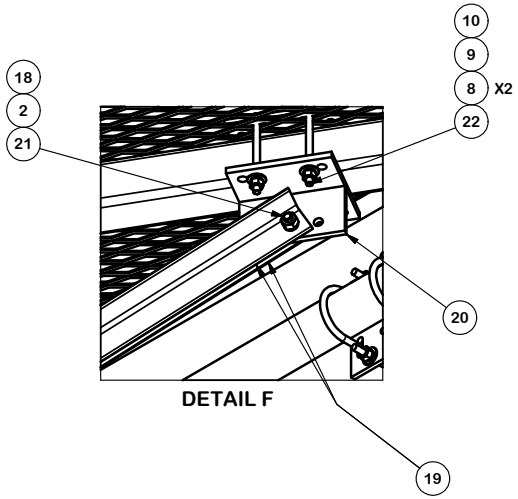
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4488	CEK 7/14/2014		RMQP-496-HK

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









DETAIL F

TOLERANCE NOTES

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

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

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

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

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

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: CTHA853A

954 Norwich Road
Plainfield, Connecticut 06062

March 24, 2021

EBI Project Number: 6221001417

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**18.86%**

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

March 24, 2021

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

Emissions Analysis for Site: CTHA853A

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **954 Norwich Road** in **Plainfield, 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 954 Norwich Road in Plainfield, 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 130 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):	130 feet	Height (AGL):	130 feet	Height (AGL):	130 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 %:	**1.09%**	Antenna B1 MPE %:	**1.09%**	Antenna C1 MPE %:	**1.09%**
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):	130 feet	Height (AGL):	130 feet	Height (AGL):	130 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 %:	**4.28%**	Antenna B2 MPE %:	**4.28%**	Antenna C2 MPE %:	**4.28%**
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):	130 feet	Height (AGL):	130 feet	Height (AGL):	130 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 %:	**3.01%**	Antenna B3 MPE %:	**3.01%**	Antenna C3 MPE %:	**3.01%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	8.38%
AT&T	6.71%
Sprint	3.77%
Site Total MPE % :	18.86%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	8.38%
T-Mobile Sector B Total:	8.38%
T-Mobile Sector C Total:	8.38%
Site Total MPE % :	18.86%

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	130.0	10.92	2100 MHz LTE	1000	1.09%
T-Mobile 600 MHz LTE	2	591.73	130.0	2.77	600 MHz LTE	400	0.69%
T-Mobile 600 MHz NR	1	1577.94	130.0	3.69	600 MHz NR	400	0.92%
T-Mobile 700 MHz LTE	2	695.22	130.0	3.25	700 MHz LTE	467	0.70%
T-Mobile 1900 MHz GSM	4	1052.26	130.0	9.84	1900 MHz GSM	1000	0.98%
T-Mobile 1900 MHz LTE	2	2104.51	130.0	9.84	1900 MHz LTE	1000	0.98%
T-Mobile 2500 MHz LTE	1	6444.38	130.0	15.07	2500 MHz LTE	1000	1.51%
T-Mobile 2500 MHz NR	1	6444.38	130.0	15.07	2500 MHz NR	1000	1.51%
						Total:	**8.38%**

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

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	8.38%
Sector B:	8.38%
Sector C:	8.38%
T-Mobile Maximum MPE % (Sector A):	8.38%
Site Total:	18.86%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **18.86%** 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.