CROWN CASTLE

1 Cityplace Dr, Suite 490
Creve Coeur, MO 63141

Phone: (314) 513-0147
www.crowncastle.com

February 15, 2022

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

RE: **Notice of Exempt Modification for AT&T**
Crown Site ID#876328; AT&T Site ID#CT5843
29 South Main Street, HARTFORD, CT 06107
Latitude: 41° 45′ 36.69084″/ Longitude: -72° 44′ 35.51604″

Dear Ms. Bachman:

AT&T currently maintains (12) antennas at the 92-foot mounts on the existing 40-foot Self Support Tower located at 29 South Main Street**, WEST HARTFORD.** The property is owned by Town Center West Associates LLC and the Tower by Crown Castle. AT&T now intends to replace six (9) 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) Powerwave – 7770 Antennas (**REMOVE**)
(3) CCI – DMP65R-BU8DA antennas (**REMOVE**), (3) Quintel – QD8616-7 Antennas (**REPLACE**)
(3) CCI- OPA65R-BU8DA-K (**REMOVE**), (3) Ericsson – AIR6449 N77D antennas stacked (**REPLACE**), (3) Ericsson – AIR6449 N77G antennas stacked (**REPLACE)**
(3) Ericsson – RRUS-32 B2 (**REMOVE**), (3) Ericsson – 4415 B25 (**REPLACE)**
(6) 782 10250 Diplexers (**REMOVE**)
INSTALL
Mount Modification

Ground:

REMOVE:
(1) 5216
INSTALL:
(3) 6VERTIV -48V Rectifiers
(2) FLX-16
(4) 19” Distribution shelves
(33) VERTIV up-converters
(1) 6673 Fronthaul Gateway

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This facility was approved by the Planning Department in the Town of West Hartford on April 10, 1997. This approval included no conditions according to an email communication from the Planning and Zoning Division.

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 Shari Cantor, Town of West Hartford Mayor, Todd Dumais, Town of West Hartford Town Planner, property owner, Town Center West Associates LLC, and Crown Castle the tower owner.

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

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

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

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

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

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

For the foregoing reasons, AT&T 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,

Ersilia Davis
Crown Castle, Agent for AT&T
edavis@nbcllc.com
(551)804-0667

CROWN CASTLE

1 Cityplace Dr, Suite 490
Creve Coeur, MO 63141

Phone: (314) 513-0147
www.crowncastle.com

cc:

Honorable Shari Cantor, Mayor
Town of West Hartford
50 South Main Street
West Hartford, CT 06107
(860) 561-7440
(Via Fedex)

Todd Dumais, Town Planner
Town of West Hartford
50 South Main Street
West Hartford, CT 06107
(860) 561-7556
(Via Fedex)

Town Center West Associates LLC, Property Owner
433 South Main Street
West Hartford, CT 06110
(Via Fedex)

Crown Castle, Property Owner

FedEx

FedEx Tracking

776053842999

ADD NICKNAME

ON TIME

Delivered
Wednesday, February 16, 2022 at 9:58 am

DELIVERED

Signed for by: P.PHIL

GET STATUS UPDATES

OBTAIN PROOF OF DELIVERY

FROM

Ersilia Davis

1777 Sentry Parkway
VEVA 17, Suite 210
Blue Bell, PA US 19422
551-804-0667

TO

Shari Cantor, Mayor
Town of West Hartford

50 S. Main Street
WEST HARTFORD, CT US 06107
860-561-7440

MANAGE DELIVERY

Travel History

TIME ZONE
Local Scan Time

Wednesday, February 16, 2022

9:58 AM	WEST HARTFORD, CT	Delivered
8:41 AM	WINDSOR LOCKS, CT	On FedEx vehicle for delivery
8:16 AM	WINDSOR LOCKS, CT	At local FedEx facility
5:34 AM	EAST GRANBY, CT	At destination sort facility

FedEx

FedEx Tracking

776053872498

ADD NICKNAME

ON TIME

Delivered
Wednesday, February 16, 2022 at 9:58 am

DELIVERED

Signed for by: P.PHIL

GET STATUS UPDATES

OBTAIN PROOF OF DELIVERY

FROM

Ersilia Davis

1777 Sentry Parkway
VEVA 17, Suite 210
Blue Bell, PA US 19422
551-804-0667

TO

Todd Dumais, Town Planner
Town of West Hartford

50 S. Main Street
WEST HARTFORD, CT US 06107
860-561-7556

MANAGE DELIVERY

Travel History

TIME ZONE
Local Scan Time

Wednesday, February 16, 2022

9:58 AM	WEST HARTFORD, CT	Delivered
8:41 AM	WINDSOR LOCKS, CT	On FedEx vehicle for delivery
8:16 AM	WINDSOR LOCKS, CT	At local FedEx facility
5:34 AM	EAST GRANBY, CT	At destination sort facility

FedEx

FedEx Tracking

776053899634

ADD NICKNAME

ON TIME

Delivered
Wednesday, February 16, 2022 at 9:16 am

DELIVERED

Signed for by: C.CAO

GET STATUS UPDATES

OBTAIN PROOF OF DELIVERY

FROM

Ersilia Davis

1777 Sentry Parkway
VEVA 17, Suite 210
Blue Bell, PA US 19422
551-804-0667

TO

Town Center West Associates LLC

433 South Main Street
WEST HARTFORD, CT US 06110
551-804-0667

MANAGE DELIVERY

Travel History

TIME ZONE
Local Scan Time

Wednesday, February 16, 2022		
9:16 AM	WEST HARTFORD, CT	Delivered
8:26 AM	WINDSOR LOCKS, CT	On FedEx vehicle for delivery
8:16 AM	WINDSOR LOCKS, CT	At local FedEx facility
5:34 AM	EAST GRANBY, CT	At destination sort facility
4:48 AM	NEWARK, NJ	Departed FedEx hub
Tuesday, February 15, 2022		

Exhibit A

Original Facility Approval

DEPARTMENT OF
COMMUNITY SERVICES

April 10, 1997

Thomas A. Cookingham, AICP
SBA, Inc.
300 Research Parkway
Meriden, CT 06450

Subject: 29 South Main St.

Dear Mr. Cookingham:

Approval has been granted for the site plan application for the subject property. The approval is for the construction of a forty (40) foot stub tower with associated equipment on the penthouse of the parking garage.

The "associated equipment" is detailed on the two (2) sheet plan set. Specifically, one sheet is entitled "Zoning Drawing - rev. date: 11-3-96" sheet 2 entitled, "zoning elevations - rev. date 3-3-87."

Please submit to the Planning Office as soon as possible two (2) blueprint copies and one (1) mylar set of the approved plans, all signed and sealed by the professional responsible for preparing the plans.

If we can be of further assistance, please call me at 523-3123.

Very truly yours,

Mila Limson
Acting Town Planner

c: Ron Van Winklle, Director of Community Services
Don Foster, Town Planner

29SMain

TOWN OF WEST HARTFORD

TOWN OF WEST HARTFORD 50 SOUTH MAIN STREET
WEST HARTFORD, CONNECTICUT 06107-2431
(860) 523-3123 FAX: (860) 523-3200

Hanlon, Dashanna

From: Holzschuh, Cymon <Cymon.Holzschuh@ct.gov>
Sent: Tuesday, January 12, 2016 1:13 PM
To: Terry, Dashanna; CSC-DL Siting Council
Cc: Barbadora, Jeff
Subject: RE: 29 Main St - Existing Telecommunication Tower located at 29 Main Street, West Hartford (Crown Castle 876328 / ATT CT5843 - CSC Requirement

I will note in our records that the West Hartford Planning and Zoning Division has no record of conditions of approval for this facility.

Thank you for your submission.

Cymon Holzschuh
Siting Analyst
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051
P: 860.827.2941 | F: 860.827.2950

Connecticut Department of ENERGY & ENVIRONMENTAL PROTECTION

www.ct.gov/deep

Conserving, improving and protecting our natural resources and environment;
Ensuring a clean, affordable, reliable, and sustainable energy supply.

From: Terry, Dashanna [mailto:Dashanna.Terry@crowncastle.com]
Sent: Tuesday, January 12, 2016 12:36 PM
To: CSC-DL Siting Council
Cc: Barbadora, Jeff
Subject: 29 Main St - Existing Telecommunication Tower located at 29 Main Street, West Hartford (Crown Castle 876328 / ATT CT5843 - CSC Requirement

To Whom It May Concern:

Please be advised both the township (see email below) and Crown Castle as the tower owner, do not have the original zoning resolution on file. Although this approval notice was supplied by the township, the docket number was not available. Please use this email as notification to waive this requirement as we will include this and the email from the township within our submission.

Please let me know if you have any questions or need additional information. Thank you in advance.

Dashanna

DASHANNA TERRY
Real Estate Project Coordinator
T: (781) 970-0067| M: (571) 241-0984

CROWN CASTLE
12 Gill Street, Suite 5800, Woburn, MA 01801
Crowncastle.com

From: Brittany Bermingham [mailto:Brittany.Bermingham@WestHartfordCT.gov]
Sent: Tuesday, January 12, 2016 11:15 AM
To: Terry, Dashanna
Subject: 29 South Main Street Permit Information

Hi Dashanna,

Attached please find the Site Plan approval letter for 29 South Main Street. On the phone you referenced 27 South Main but that property does not exist so we think this might be what you are looking for instead. Let me know!

Brittany

Brittany A. Bermingham
Planning Technician
Planning and Zoning Division, West Hartford Town Hall
860-561-7555

Exhibit B

Property Card

29 SOUTH MAIN STREET

Location	29 SOUTH MAIN STREET	**Mblu**	F9/ 5095/ 29/ /
Parcel ID	5095 1 29 0001	**Owner**	TOWN CENTER WEST ASSOCIATES LLC
Assessment	$28,065,520	**Appraisal**	$40,093,600
Vision Id #	18059	**Building Count**	2

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$33,405,900	$6,687,700	$40,093,600
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$23,384,130	$4,681,390	$28,065,520

Owner of Record

Owner	TOWN CENTER WEST ASSOCIATES LLC	**Sale Price**	$0
Co-Owner		**Certificate**	1
Address	433 SOUTH MAIN STREET WEST HARTFORD, CT 06110	**Book & Page**	2351/0010
		Sale Date	09/03/1998
		Instrument	U

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
TOWN CENTER WEST ASSOCIATES LLC	$0	1	2351/0010	U	09/03/1998
DOA 87 LIMITED PARTNERSHIP	$17,607,200	1	1753/0024	Q	12/23/1992
F P INC	$1	1	1572/0154	U	05/01/1991
SEYBURT ASSOCIATES LIMITED	$0	1	1122/0103	U	10/20/1986
FIRST NATIONAL STORES INC	$6,000,000	1	1122/0097	Q	10/20/1986

Building Information

Building 1 : Section 1

Building Photo

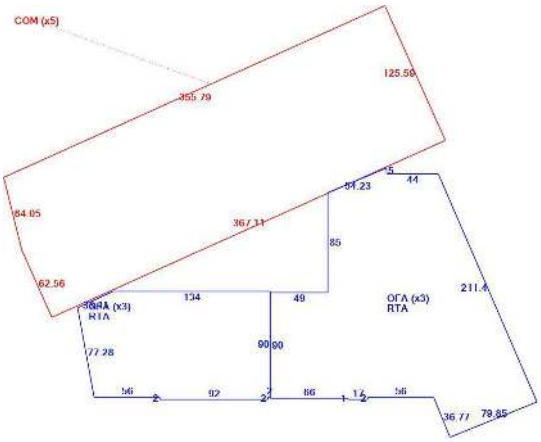
Year Built: 1990
Living Area: 182,816
Replacement Cost: $28,208,446
Building Percent Good: 79
Replacement Cost Less Depreciation: $22,284,700

Building Attributes	
Field	**Description**
Style:	Office General
Model	Comm/Ind
Grade	B 0.95
Stories:	1
Occupancy	
Exterior Wall 1	Precast Panel
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Built Up
Interior Wall 1	Typical
Interior Wall 2	
Floor Type	Concrete Slab
Floor Cover	None
Heating Fuel	Typical
Heating Type	None
AC Type	None
As Built Use	OFFG
Bldg Use	Commercial
Num of Bedrooms	
Total Baths	
Type	01
Wet Sprinkler	
Dry Sprinkler	
1st Floor Use:	
Class	Class B
Frame Type	Steel - Firepr
Plumbing	LIGHT
Ceiling	Not Applicable
Group1	OFF
Wall Height	0.00
Adjustment	

Building Photo

(http://images.vgsi.com/photos/WestHartfordCTPhotos//\00\01\66\76.JPG)

Building Layout



(ParcelSketch.ashx?pid=18059&bid=18059)

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
OFA	OFFICE MIXED USE	137,112	137,112
RTA	RETAIL AREA IN MIXED	45,704	45,704
COM	COMMERCIAL - NV	228,748	0
		411,564	182,816

Building 2 : Section 1

Year Built: 1990
Living Area: 228,890

Replacement Cost: $14,630,227
Building Percent Good: 74
Replacement Cost Less Depreciation: $10,826,400

Building Attributes : Bldg 2 of 2	
Field	**Description**
Style:	Parking Garage
Model	Comm/Ind
Grade	C 0.90
Stories:	5
Occupancy	
Exterior Wall 1	Precast Panel
Exterior Wall 2	
Roof Structure	None
Roof Cover	Asbestos
Interior Wall 1	Typical
Interior Wall 2	
Floor Type	Reinf Concrete
Floor Cover	None
Heating Fuel	Typical
Heating Type	Steam Boiler
AC Type	None
As Built Use	PGAR
Bldg Use	Commercial
Num of Bedrooms	
Total Baths	
Type	01
Wet Sprinkler	
Dry Sprinkler	
1st Floor Use:	
Class	Class C
Frame Type	Conc Reinf
Plumbing	LIGHT
Ceiling	Not Applicable
Group1	IND
Wall Height	12.00
Adjustment	

Building Photo

(http://images.vgsi.com/photos/WestHartfordCTPhotos//default.jpg)

Building Layout

(ParcelSketch.ashx?pid=18059&bid=30592)

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
PGB	PARKING GARAGE LA	228,890	228,890
		228,890	228,890

Extra Features

Extra Features	Legend

No Data for Extra Features

Land

Land Use

Use Code	201
Description	Commercial
Zone	BC
Neighborhood	
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	3.41
Frontage	
Depth	
Assessed Value	$4,681,390
Appraised Value	$6,687,700

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
CLP9	Patio - Brick comm			6600.00 SF	$30,000	1
C215	Elevator pass 1.5k lbs			1.00 UNIT	$62,600	1
C215	Elevator pass 1.5k lbs			1.00 UNIT	$62,600	1
CLP4	Paving, Asphalt			18680.00 SF	$48,600	1
CPL6	Light Pole - Steel			130.00 SF	$7,800	1
C215	Elevator pass 1.5k lbs			1.00 UNIT	$81,300	1
COH1	Overhead Door Commercial			98.00 SF	$700	1
COH1	Overhead Door Commercial			161.00 SF	$1,200	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$33,405,900	$6,687,700	$40,093,600
2019	$33,405,900	$6,687,700	$40,093,600
2018	$33,405,900	$6,687,700	$40,093,600

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$23,384,130	$4,681,390	$28,065,520
2019	$23,384,130	$4,681,390	$28,065,520
2018	$23,384,130	$4,681,390	$28,065,520

Exhibit C

Construction Drawings

AT&T

AT&T SITE NUMBER:	**CT5843**	**BUSINESS UNIT #:**	**876328**
AT&T SITE NAME:	**WEST HARTFORD CENTRAL**	**SITE ADDRESS:**	**29 SOUTH MAIN STREET WEST HARTFORD, CT 06107**
AT&T FA CODE:	**10071356**	**COUNTY:**	**HARTFORD**
AT&T PACE NUMBER:	**MRCTB052108, MRCTB051084, MRCTB050862, MRCTB051217**	**SITE TYPE:**	**SELF SUPPORT TOWER**
AT&T PROJECT:	**5G NR 1SR CBAND [CBAND 4 GHZ BAND N77, BUU RECONFIGURATION WITH NEW IDS [PCS MHZ A3 (5 MHZ) E-ULTRA BAND 2**	**TOWER HEIGHT:**	**40'-0"**

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	WEST HARTFORD PARKING GARAGE
SITE ADDRESS:	29 SOUTH MAIN STREET WEST HARTFORD, CT 06107
COUNTY:	HARTFORD
MAP/PARCEL #:	5095 1 29 0001
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41° 45' 36.69084"
LONGITUDE:	-72° 44' 35.51604"
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	125'±
CURRENT ZONING:	BC
JURISDICTION:	TOWN OF WEST HARTFORD
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	TOWN CENTER WEST ASSOCIATES LLC 433 SOUTH MAIN STREET WEST HARTFORD, CT 06110
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	AT&T TOWER ASSET GROUP 575 MOROSGO DRIVE ATLANTA, GA 30324-3300
ELECTRIC PROVIDER:	NORTHEAST UTILITIES
TELCO PROVIDER:	LIGHTOWER

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1.1	SITE PLAN
C-1.2	EXISTING & FINAL EQUIPMENT PLANS
C-2	FINAL ELEVATION & ANTENNA PLANS
C-3	FINAL EQUIPMENT SCHEDULE
C-4	EQUIPMENT MOUNTING DETAILS
C-5	EQUIPMENT SPECS
G-1	GROUNDING SCHEMATIC
G-2	GROUNDING DETAILS
ATTACHED	PLUMBING DIAGRAM

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 22X34. 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.

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

LOCATION MAP

NO SCALE

SITE PHOTO

PROJECT TEAM

A&E FIRM:	ENGINEERED TOWER SOLUTIONS, PLLC 3227 WELLINGTON COURT RALEIGH, NC 27615 CROWNAESERVICES@ETS-PLLC.COM
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3 CORPORATE PARK DRIVE, SUITE 101 CLIFTON PARK, NY 12065 PAUL PEDICONE - PROJECT MANAGER PAUL.PEDICONE@CROWNCASTLE.COM JASON D'AMICO - CONSTRUCTION MANAGER JASON.D'AMICO@CROWNCASTLE.COM

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

PROJECT DESCRIPTION

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

TOWER SCOPE OF WORK:

- REMOVE (3) POWERCAVE - 7770 ANTENNAs
- REMOVE (3) CCI-OPA65R-BU8DA-K ANTENNAs
- REMOVE (3) CCI-TPA-65R-LCUUUU-H8 ANTENNAs
- REMOVE (6) ERICSSON - RRUS-32 B2 RRHs
- REMOVE (6) 782 10250 DIPLEXERs
- REMOVE (12) LDF7-50A COAX CABLES
- INSTALL (3) ERICSSON - AIR 6449 B77D ANTENNAs
- INSTALL (3) ERICSSON - AIR 6419 B77G ANTENNAs
- INSTALL (3) QUINTEL - QD8616-7 ANTENNAs
- INSTALL (3) ERICSSON - 4415 B25
- INSTALL MOUNT MODIFICATION PER MOUNT ANALYSIS REPORT BY GPD ENGINEERING AND ARCHITECTURE PROFESSIONAL CORPORATION DATED SEMPTEMBER 07, 2021

GROUND SCOPE OF WORK:

- REMOVE (1) 5216
- INSTALL (3) VERTIV -48V RECTIFIERS
- INSTALL (1) FLX -16 CABINET
- INSTALL (2) 19" DISTRIBUTION SHELVES
- INSTALL (6) VERTIV UP-CONVERTERS
- INSTALL (1) 6673 FRONTHAUL GATEWAY

APPLICABLE CODES/REFERENCE DOCUMENTS

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

CODE TYPE	CODE
BUILDING	2015 IBC
MECHANICAL	2015 IMC
ELECTRICAL	2017 NEC

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	GPD ENGINEERING AND ARCHITECTURE PROFESSIONAL CORPORATION
DATED:	05/12/2021
MOUNT ANALYSIS:	GPD ENGINEERING AND ARCHITECTURE PROFESSIONAL CORPORATION
DATED:	09/07/2021
RFDS REVISION:	2
DATED:	08/05/2021
ORDER ID:	556518
REVISION:	0

AT&T
1025 LENOX PARK BOULEVARD NE
3RD FLOOR, ATLANTA, GA 30319

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

ENGINEERED TOWER SOLUTIONS
3227 WELLINGTON COURT
RALEIGH, NC 27615

AT&T SITE NUMBER: **CT5843**

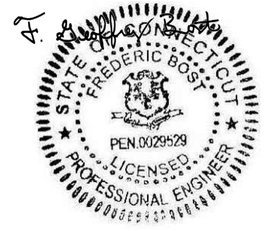
BU #: **876328**
WEST HARTFORD PARKING GARAGE

29 SOUTH MAIN STREET
WEST HARTFORD, CT 06107

EXISTING 40'-0" SELF SUPPORT TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	10/15/2021	AM	CONSTRUCTION	VA
1	11/02/2021	TCM	CONSTRUCTION	VA
2	02/07/2022	KR	REV. CONSTRUCTION	VA



02/07/2022

SHEET NUMBER: T-1

REVISION: 2

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED– NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800–788–7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
2. "LOOK UP" – CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT:
   THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED–STD–10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH QAS–STD–10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE," CED–STD–10294 "STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES," AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
   CARRIER: AT&T
   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 "AT&T".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

CONDUCTOR COLOR CODE

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

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

APWA UNIFORM COLOR CODE:

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

ABBREVIATIONS:

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

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3227 WELLINGTON COURT
RALEIGH, NC 27615

AT&T SITE NUMBER: **CT5843**

BU #: **876328**

WEST HARTFORD PARKING GARAGE

29 SOUTH MAIN STREET
WEST HARTFORD, CT 06107

EXISTING 40'-0" SELF SUPPORT TOWER

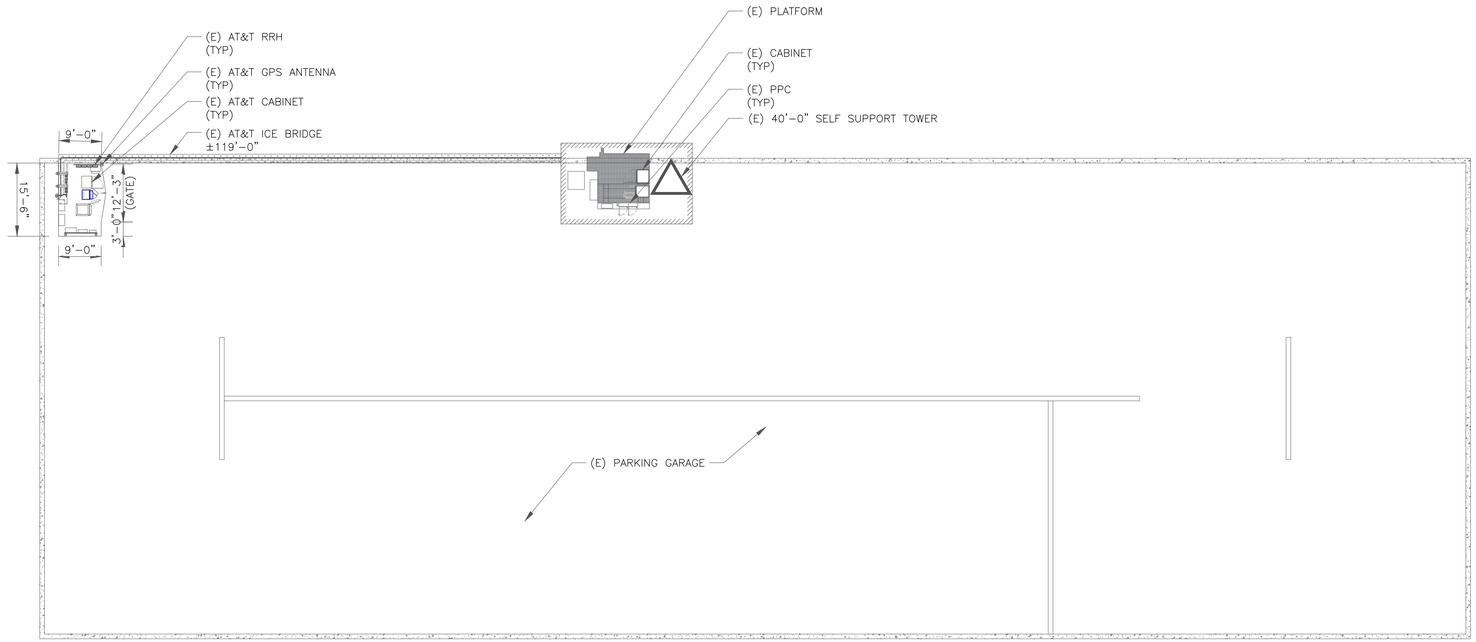
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	10/15/2021	AM	CONSTRUCTION	VA
1	11/02/2021	TCM	CONSTRUCTION	VA
2	02/07/2022	KR	REV. CONSTRUCTION	VA

F. Geoffrey Bost
STATE OF CONNECTICUT
FREDERIC BOST
PEN.0029529
LICENSED PROFESSIONAL ENGINEER

02/07/2022

SHEET NUMBER:	REVISION:
T-2	2



1 SITE PLAN

SCALE: 16' 12' 8' 4' 0 16' 1/16"=1'-0" (FULL SIZE) 1/32"=1'-0" (11x17)

N

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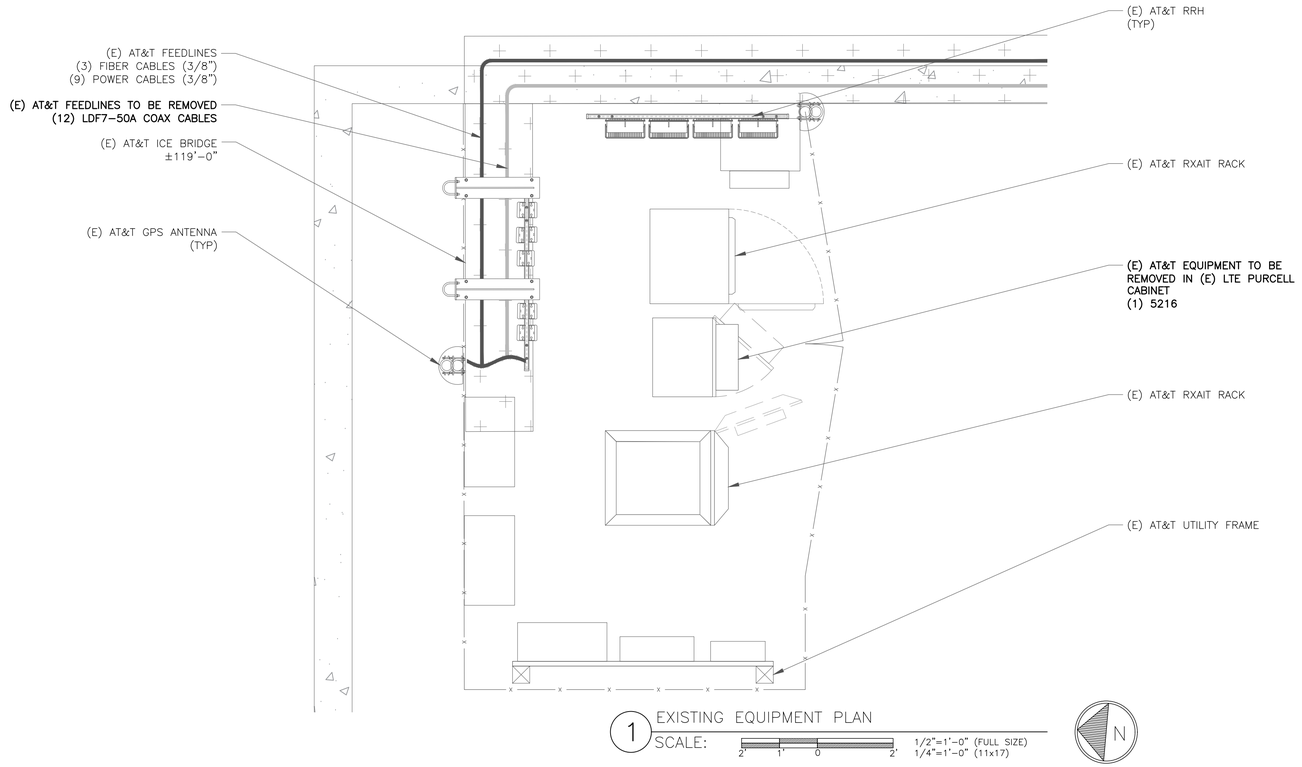
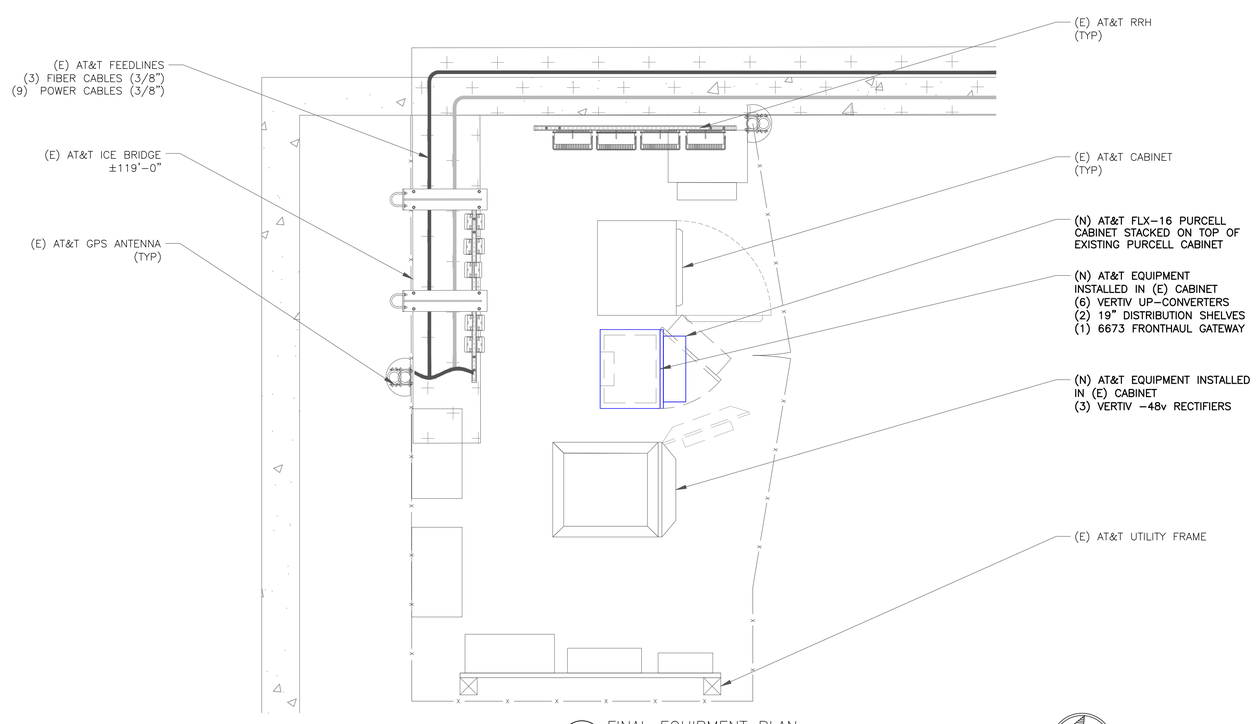
SHEET NUMBER: C-1.1

REVISION: 2



1 EXISTING EQUIPMENT PLAN

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



2 FINAL EQUIPMENT PLAN

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

GROUND SCOPE OF WORK:

- REMOVE (1) 5216
- INSTALL (3) VERTIV -48V RECTIFIERS
- INSTALL (1) FLX-16
- INSTALL (4) 19" DISTRIBUTION SHELVES
- INSTALL (6) VERTIV UP-CONVERTERS
- INSTALL (1) 6673 FRONTHAUL GATEWAY

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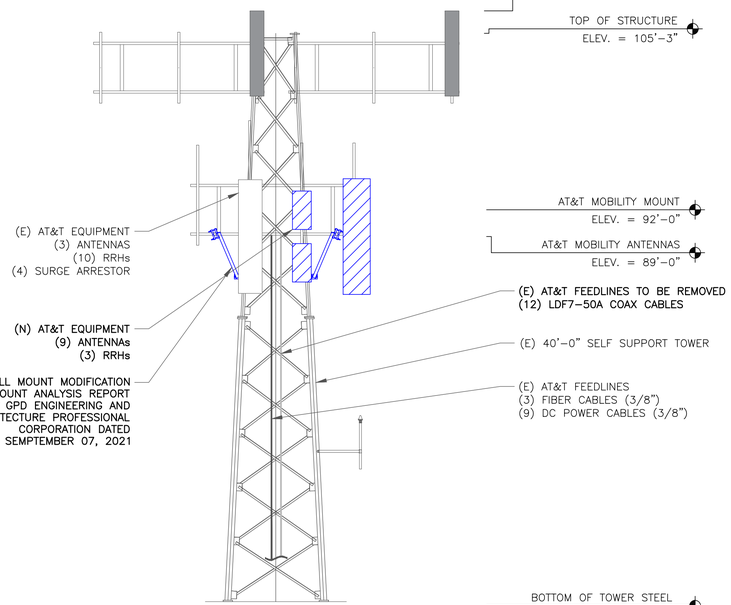
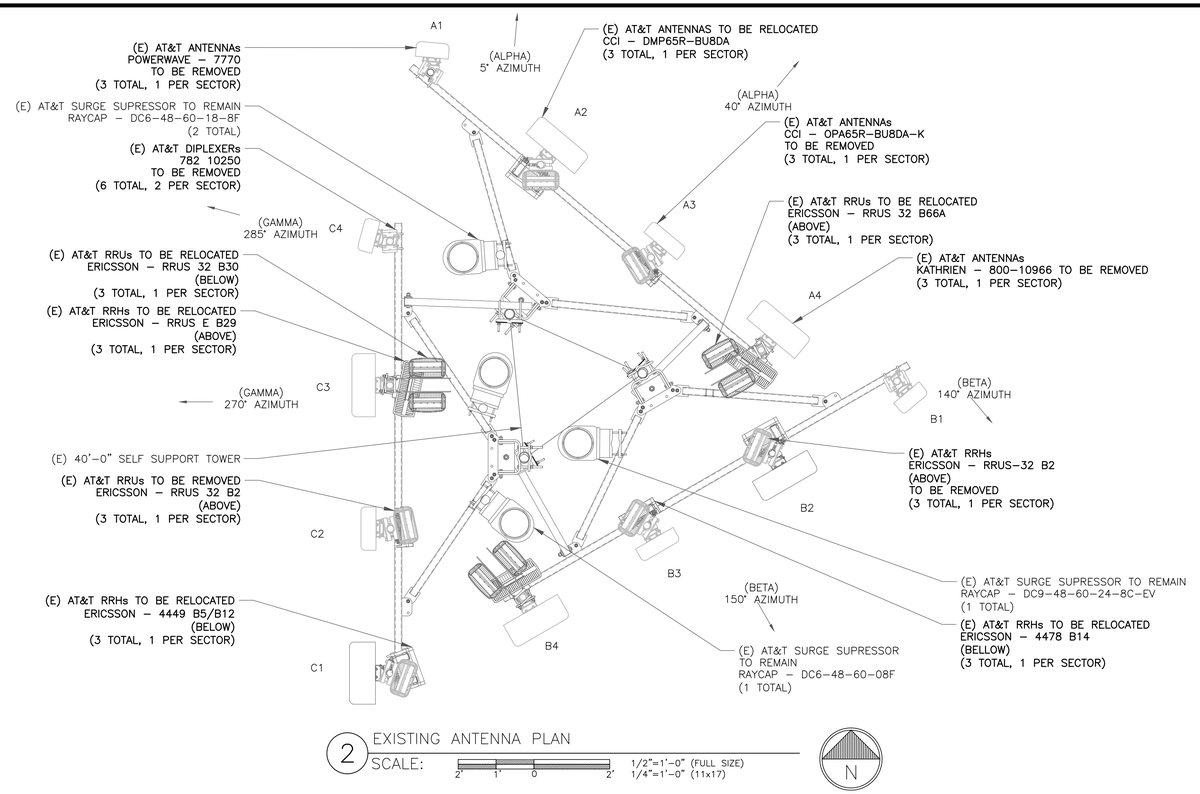
SHEET NUMBER: C-1.2

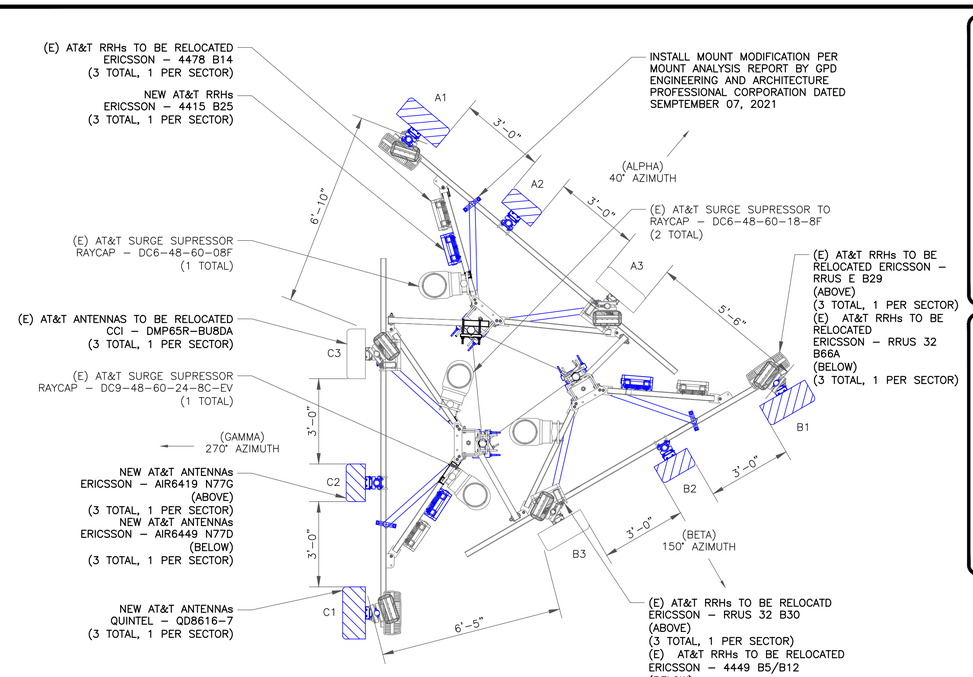
REVISION: 2



1 FINAL ELEVATION
SCALE: NOT TO SCALE



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



3 FINAL ANTENNA PLAN
SCALE: 1' 6" 0 1' 3/4"=1'-0" (FULL SIZE) 3/8"=1'-0" (11x17)

"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.

INSTALLER NOTES:

1. REFERENCE C-3 FOR FINAL EQUIPMENT SCHEDULE.
2. REFERENCE C-4 FOR NEW EQUIPMENT SPECIFICATIONS.
3. CONTRACTOR TO VERIFY ALL ANTENNA TIP HEIGHTS DO NOT EXCEED BEACON BASE HEIGHT.
4. 3'-0" MINIMUM DISTANCE REQUIRED BETWEEN LTE ANTENNAS ON SAME SECTOR.
5. 6'-0" MINIMUM DISTANCE REQUIRED BETWEEN 700BC & 700DE ANTENNAS ON SAME SECTOR.
6. 4'-0" MINIMUM DISTANCE REQUIRED BETWEEN LTE 700 ANTENNAS ON OPPOSING SECTORS.
7. ALL ANTENNA MEASUREMENT DISTANCES MUST BE EDGE TO EDGE (RELOCATE ANTENNAS AS NEEDED).
8. 8" MINIMUM DISTANCE REQUIRED BETWEEN ANTENNA & RADIO. SEE GENERIC EXAMPLE DETAIL ON SHEET C-4.

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02/07/2022

SHEET NUMBER: C-2

REVISION: 2

FINAL EQUIPMENT SCHEDULE
(VERIFY WITH CURRENT RFDS)

ALPHA

POSITION	ANTENNA				RADIO			DIPLEXER			TMA			SURGE PROTECTION		CABLES			
	TECH.	STATUS/MANUFACTURER MODEL	AZIMUTH	RAD CENTER	QTY.	STATUS/MODEL	LOCATION	QTY.	STATUS	LOCATION	QTY.	STATUS/MANUFACTURER MODEL	QTY.	STATUS/MODEL	QTY.	STATUS/TYPE	SIZE	LENGTH
A1	LTE 700/1900/AWS 5G AWS/5G1900	NEW QUINTEL – QD8616-7	40°	89'	1	NEW RRUS – 4415 B25	TOWER	–	–	–	1	(E) DC6-48-60-18-8F	–	–	2	(E) POWER	7/8"	139'-0"
					1	(E) RRUS – 4478 B14									1	(E) FIBER	3/8"	139'-0"
					1	(E) RRUS – 32 B66A												
					1	(E) RRUS – E2 B29												
A2	5G CBAND	NEW ERICSSON – AIR6419 N77G	40°	91'	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		NEW ERICSSON – AIR6449 N77D		87'														
A3	LTE 700/WCS 5G 850	(E) CCI – DMP65R-BU8DA	40°	89'	1	(E) RRUS – 32 B30	TOWER	–	–	–	–	–	–	–	–		–	–
					1	(E) RRUS – 4449 B5 B12												

BETA

B1	LTE 700/1900/AWS 5G AWS/5G1900	NEW QUINTEL – QD8616-7	150°	89'	1	NEW RRUS – 4415 B25	TOWER	–	–	–	1	(E) DC9-48-60-24-8C-EV	–	–	3	(E) POWER	7/8"	139'-0"
					1	(E) RRUS – 4478 B14									1	(E) FIBER	3/8"	139'-0"
					1	(E) RRUS – 32 B66A												
					1	(E) RRUS – E2 B29												
B2	5G CBAND	NEW ERICSSON – AIR6419 N77G	150°	91'	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		NEW ERICSSON – AIR6449 N77D		87'														
B3	LTE 700/WCS 5G 850	(E) CCI – DMP65R-BU8DA	150°	89'	1	(E) RRUS – 32 B30	TOWER	–	–	–	–	–	–	–	–		–	–
					1	(E) RRUS – 4449 B5 B12												

GAMMA

C2	LTE 700/1900/AWS 5G AWS/5G1900	NEW QUINTEL – QD8616-7	270°	89'	1	NEW RRUS – 4415 B25	TOWER	–	–	–	1	(E) DC6-48-60-08F	–	–	2	(E) POWER	7/8"	139'-0"
					1	(E) RRUS – 4478 B14												
					1	(E) RRUS – 32 B66A												
					1	(E) RRUS – E2 B29												
C3	5G CBAND	NEW ERICSSON – AIR6419 N77G	270°	91'	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		NEW ERICSSON – AIR6449 N77D		87'														
C3	LTE 700/WCS 5G 850	(E) CCI – DMP65R-BU8DA	270°	89'	1	(E) RRUS – 32 B30	TOWER	–	–	–	1	(E) DC6-48-60-18-8F	–	–	2	(E) POWER	7/8"	139'-0"
					1	(E) RRUS – 4449 B5 B12									1	(E) FIBER	3/8"	139'-0"

1 FINAL EQUIPMENT SCHEDULE
SCALE: NOT TO SCALE

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STATE OF CONNECTICUT
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LICENSED PROFESSIONAL ENGINEER

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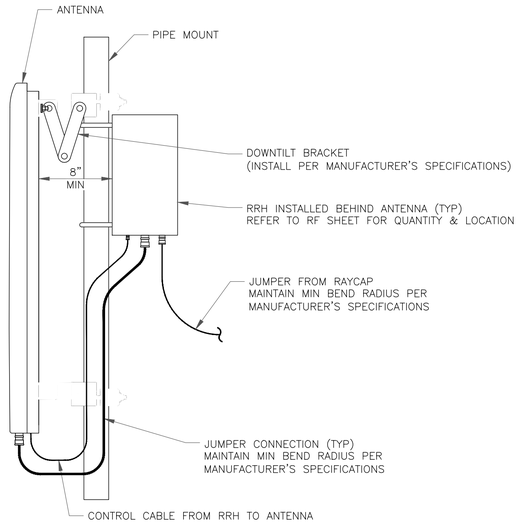
SHEET NUMBER: C-3

REVISION: 2



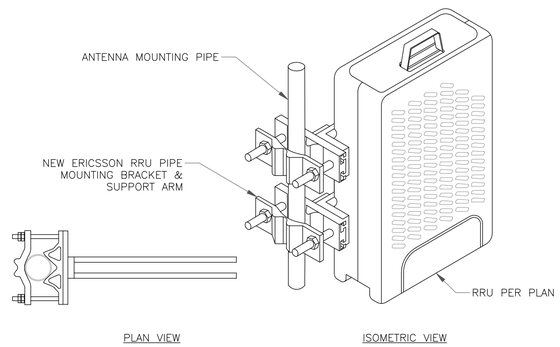
1 GENERIC ANTENNA MOUNTING ELEVATION
SCALE: NOT TO SCALE

ERICSSON RRU MOUNTING KIT:

SXK 107 2839/1: SINGLE RRU SUPPORT KIT (PART # 5335) (OR ENGINEER APPROVED EQUIVALENT)
SXK 107 2839/2: EXPANSION KIT (PART # 5336) (OR ENGINEER APPROVED EQUIVALENT)

MOUNTING NOTES:

REFER TO PRODUCT SPECS FOR BOLT SIZE & PIPE DIAMETER TOLERANCES. THE PART NO. SXK107-2839/2 IS REQUIRED FOR (2) RRUS.

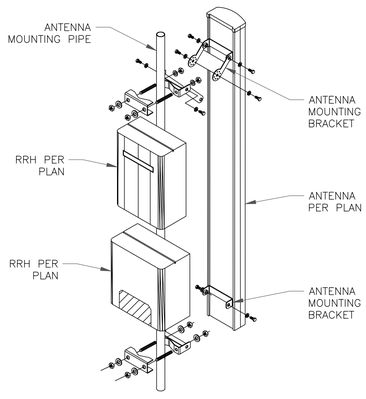


2 ERICSSON – SXK 107 2839
SCALE: NOT TO SCALE

3 NOT USED
SCALE: NOT TO SCALE

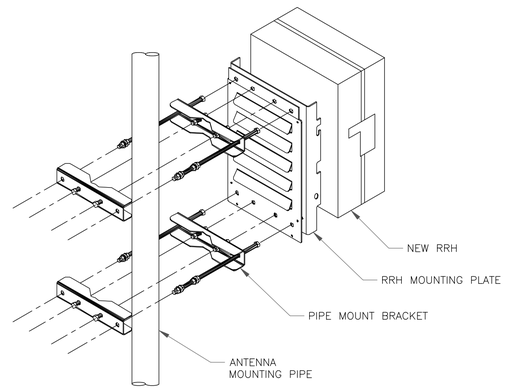
INSTALLER NOTES:

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.

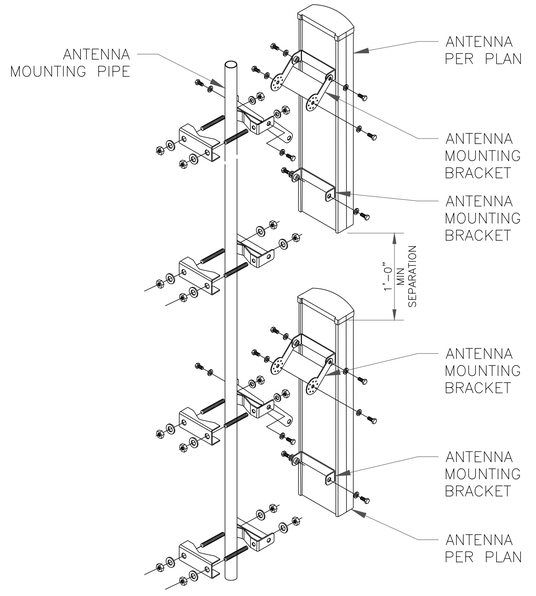


NOTE:

ANTENNA NOT SHOWN FOR CLARITY



4 ANTENNA WITH RRHs MOUNTING DETAIL
SCALE: NOT TO SCALE



5 DUAL ANTENNA MOUNTING DETAIL
SCALE: NOT TO SCALE

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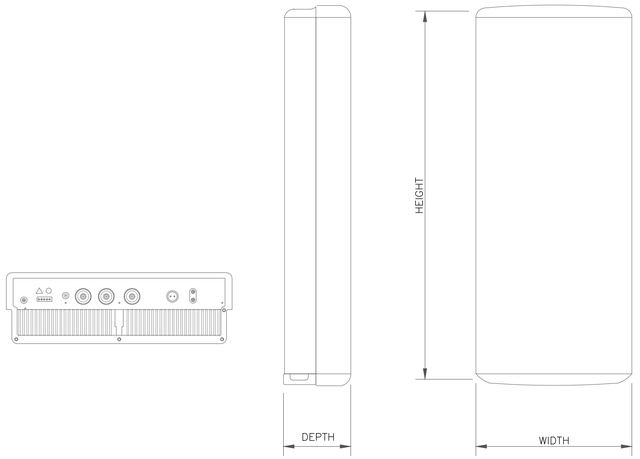
SHEET NUMBER: C-4

REVISION: 2

HEIGHT	WIDTH	DEPTH	WEIGHT
30.39"	15.87"	8.07"	81.60 LBS



1 ERICSSON – AIR 6449 B77D
SCALE: NOT TO SCALE

HEIGHT	WIDTH	DEPTH	WEIGHT
27.95"	15.75"	6.68"	66.20 LBS

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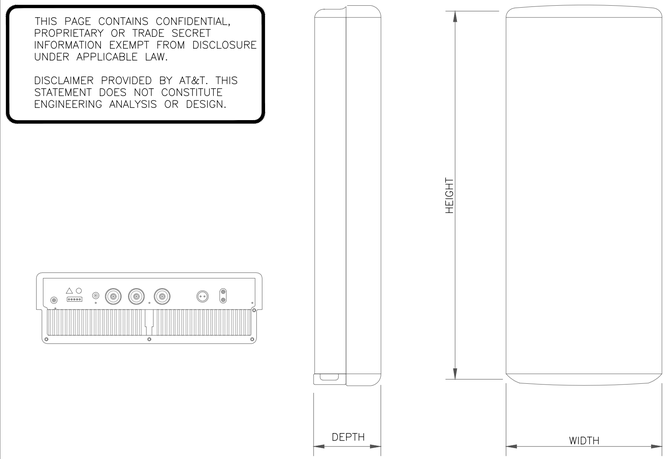
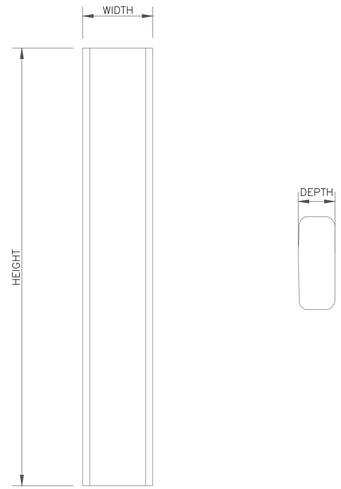


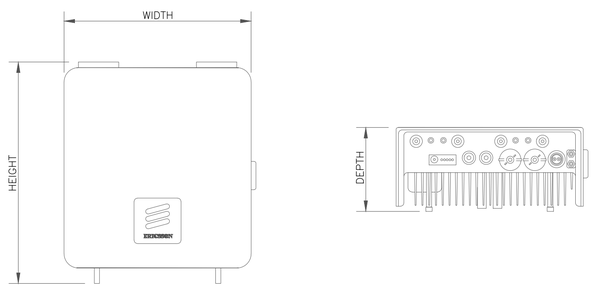
2 ERICSSON – AIR 6419 B77G
SCALE: NOT TO SCALE

HEIGHT	WIDTH	DEPTH	WEIGHT
96.00"	22.00"	09.60"	150.00 LBS



3 QUINTEL – QD8616-7
SCALE: NOT TO SCALE

HEIGHT	WIDTH	DEPTH	WEIGHT
16.50"	13.40"	5.90"	46.00 LBS



4 RADIO DETAIL: ERICSSON – 4415 B25
SCALE: NOT TO SCALE

5 NOT USED
SCALE: NOT TO SCALE

6 NOT USED
SCALE: NOT TO SCALE

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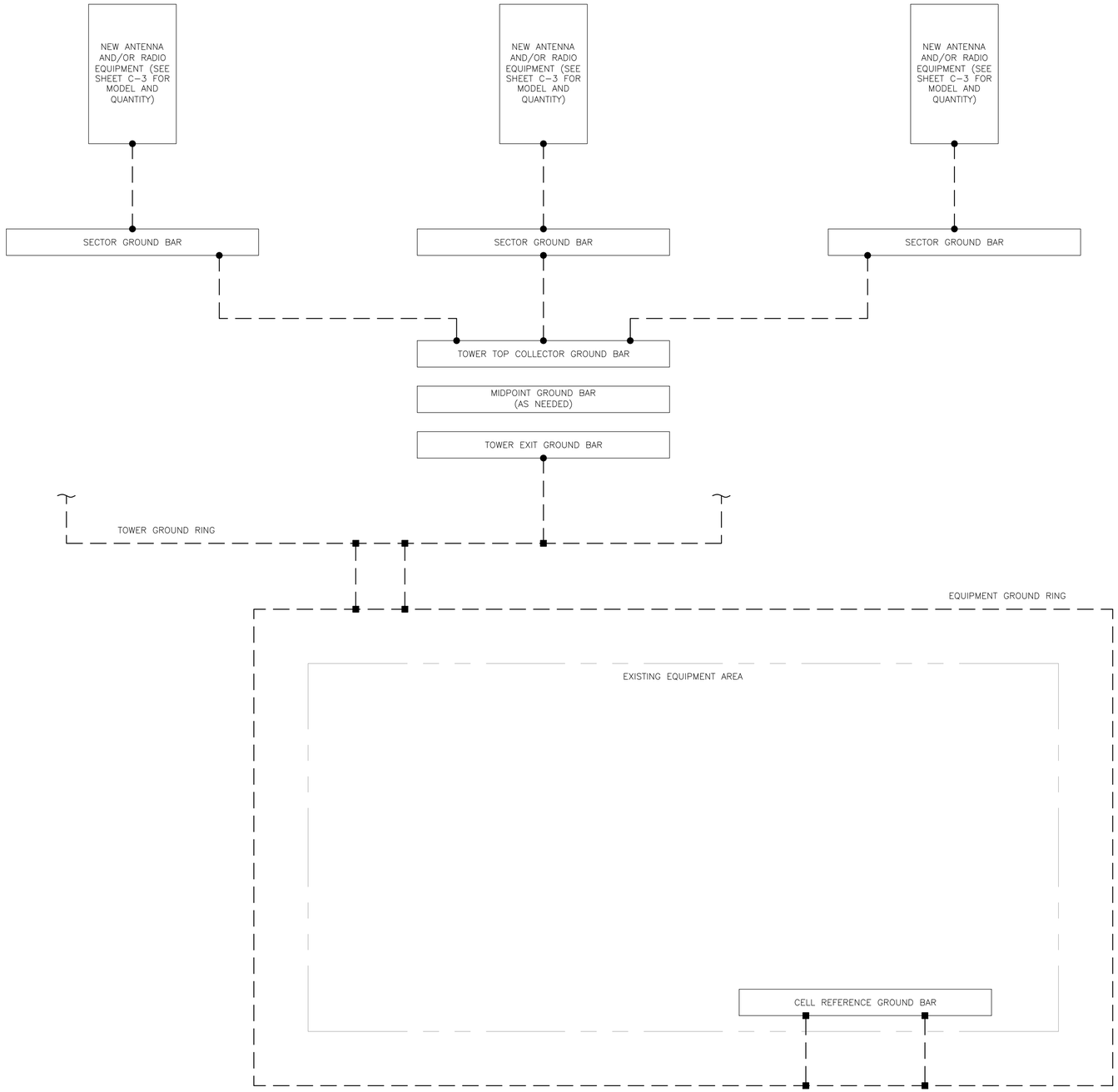
SHEET NUMBER: C-5

REVISION: 2



1 GROUNDING SCHEMATIC
SCALE: NOT TO SCALE

GROUNDING PLAN LEGEND:

--- GROUND WIRE
■ EXOTHERMIC WELD
● MECHANICAL CONNECTION
COPPER GROUND ROD
GROUND ROD W/ TEST WELL

CELL REFERENCE GROUND BAR: POINT OF GROUND REFERENCE FOR ALL COMMUNICATIONS EQUIPMENT FRAMES. ALL BONDS ARE MADE WITH #2 STRANDED GREEN INSULATED COPPER CONDUCTORS. BOND TO GROUND RING WITH (2) #2 SOLID TINNED COPPER CONDUITS (ATT-TP-76416 7.6.7).

HATCH PLATE GROUND BAR: BOND TO THE INTERIOR GROUND RING WITH (2) #2 STRANDED GREEN INSULATED COPPER CONDUCTORS. WHEN A HATCH-PLATE AND A CELL REFERENCE GROUND BAR ARE BOTH PRESENT, THE CELL SITE REFERENCE GROUND BAR MUST BE CONNECTED TO THE HATCH-PLATE AND TO THE INTERIOR GROUND RING USING (2) #2 STRANDED GREEN INSULATED COPPER CONDUCTORS.

EXTERIOR CABLE ENTRY PORT GROUND BARS: LOCATED AT THE ENTRANCE TO THE CELL SITE BUILDING. BOND TO GROUND RING WITH A #2 SOLID TINNED COPPER CONDUCTORS WITH AN EXOTHERMIC WELD AND INSPECTION SLEEVE (ATT-TP-76416 7.6.7.2).

DURING ALL DC POWER SYSTEM CHANGES INCLUDING DC SYSTEM CHANGE OUTS, RECTIFIER REPLACEMENTS OR ADDITIONS, BREAKER DISTRIBUTION CHANGES, BATTERY ADDITIONS, BATTERY REPLACEMENTS AND INSTALLATIONS OR CHANGES TO DC CONVERTER SYSTEMS IT SHALL BE REQUIRED THAT SERVICES CONTRACTORS VERIFY ALL DC POWER SYSTEMS ARE EQUIPPED WITH MASTER DC SYSTEM RETURN GROUND CONDUCTOR FROM THE DC POWER SYSTEM COMMON RETURN BUS DIRECTLY CONNECTED TO THE CELL SITE REFERENCE GROUND BAR PER TP76300 SECTION H 6 AND TP76416 FIGURE 7-11 REQUIREMENTS.

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

ENGINEERED TOWER SOLUTIONS
3227 WELLINGTON COURT
RALEIGH, NC 27615

AT&T SITE NUMBER: **CT5843**

BU #: **876328**
WEST HARTFORD PARKING GARAGE

29 SOUTH MAIN STREET
WEST HARTFORD, CT 06107

EXISTING 40'-0" SELF SUPPORT TOWER

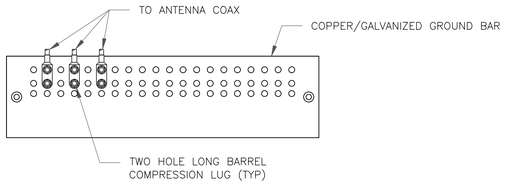
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	10/15/2021	AM	CONSTRUCTION	VA
1	11/02/2021	TCM	CONSTRUCTION	VA
2	02/07/2022	KR	REV. CONSTRUCTION	VA

STATE OF CONNECTICUT
FREDERIC BOST
PEN.0029529
LICENSED PROFESSIONAL ENGINEER

02/07/2022

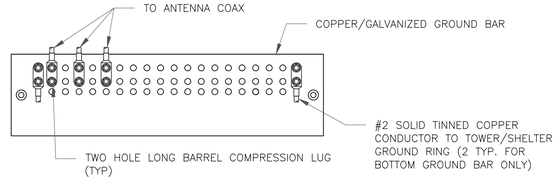
SHEET NUMBER: G-1
REVISION: 2



NOTES:

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

1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE

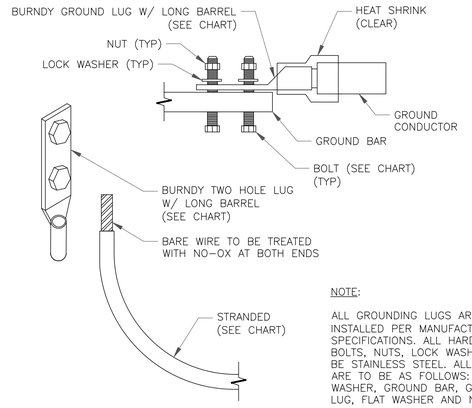


NOTES:

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

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

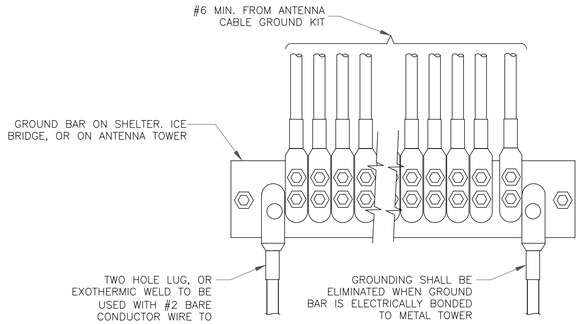
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC SS 2 BOLT
#2 SOLID TINNED	YA3C-2TC38	3/8" - 16 NC SS 2 BOLT
#2 STRANDED	YA2C-2TC38	3/8" - 16 NC SS 2 BOLT
#2/0 STRANDED	YA26-2TC38	3/8" - 16 NC SS 2 BOLT
#4/0 STRANDED	YA28-2N	1/2" - 16 NC SS 2 BOLT



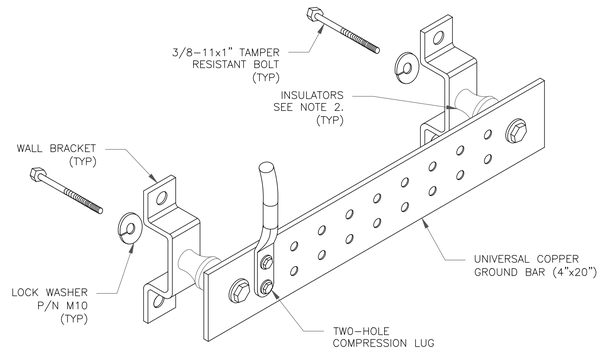
NOTE:

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.

3 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



4 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE

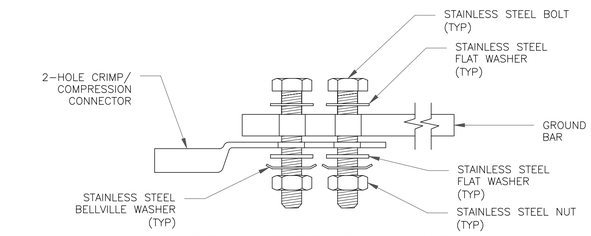


NOTES:

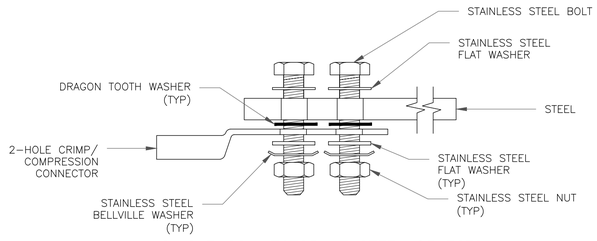
1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.

2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

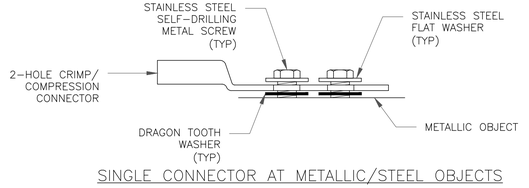
5 GROUND BAR DETAIL
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS

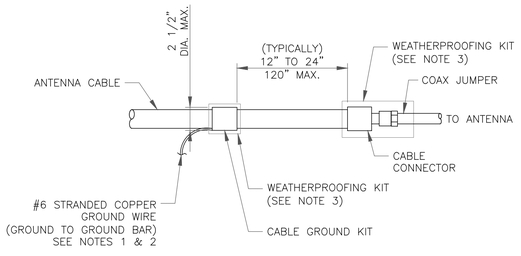


SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

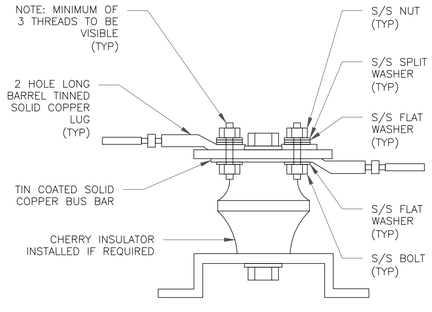
8 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

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

6 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE

AT&T
1025 LENOX PARK BOULEVARD NE
3RD FLOOR, ATLANTA, GA 30319

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

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ISSUED FOR:

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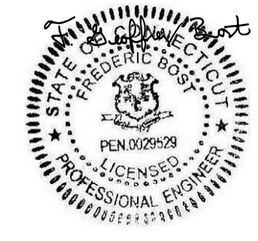


02/07/2022

SHEET NUMBER: G-2

REVISION: 2

Diagram - Sector	A	Diagram File Name - WCS_Filter_C_Band_DoD_700DE(Top)_PCS_4415_2xDCFiber_1xDCSquid_1xDC-9_2Coax_5216+2xXMU.vsd					
Atoll Site Name -	CT5843	Location Name -	WEST HARTFORD CENTRAL	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND

Comments: "Important Note: For detailed radio to antenna wiring refer to the latest field notice - Antenna_Radio Connection Drawings Playbook v6.0_Ericsson"

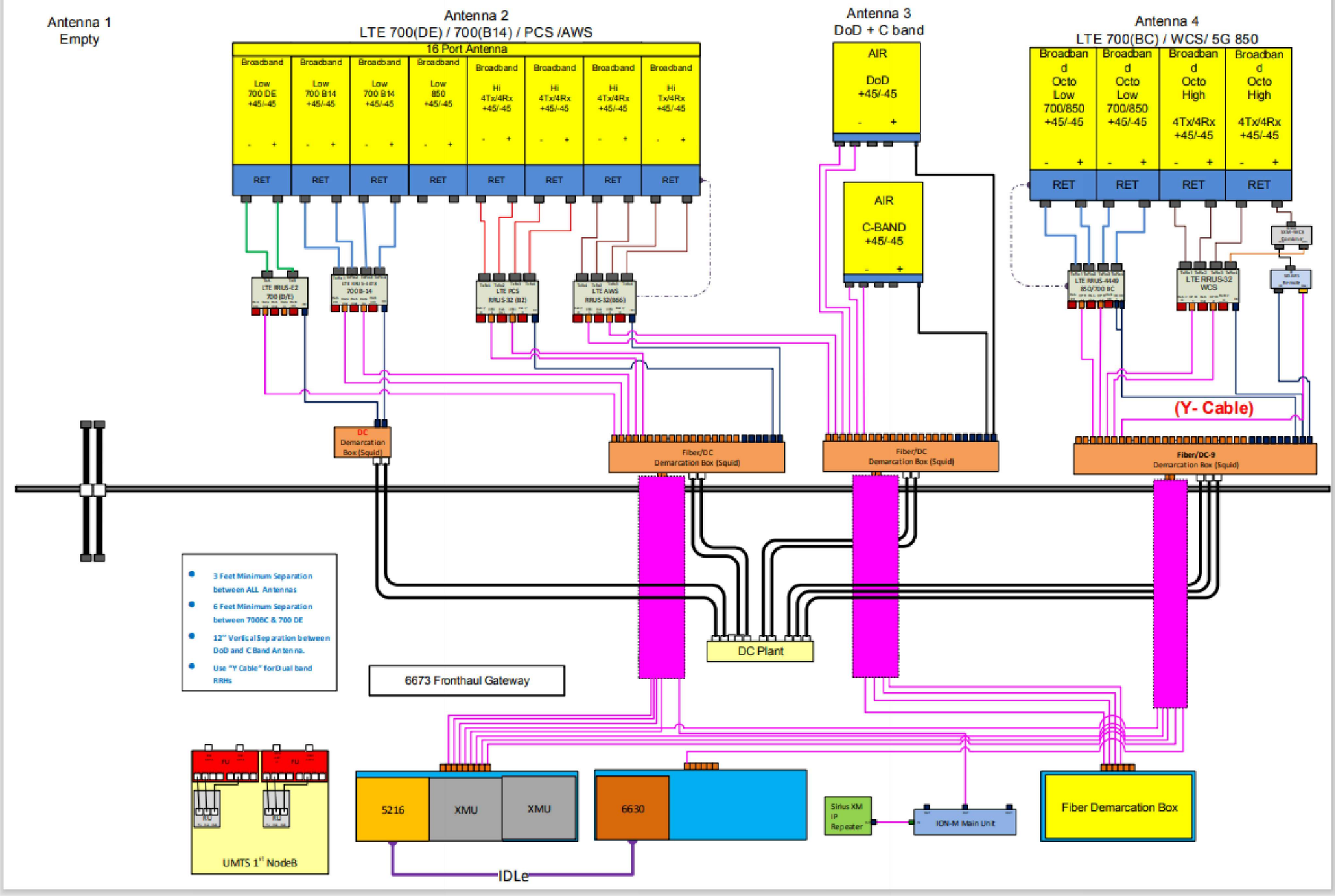


Exhibit D

Structural Analysis Report

Date: **November 23, 2021**

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Site Number:	CTL05843
	Site Name:	WEST HARTFORD CENTRAL
	FA Number:	10071356
Crown Castle Designation:	**BU Number:**	876328
	Site Name:	West Hartford Parking GARAGE
	JDE Job Number:	649410
	Work Order Number:	2017209
	Order Number:	556518 Rev. 1
Engineering Firm Designation:	**B+T Group Project Number:**	155853.002.01
Site Data:	**27-31 South Main St., West Hartford, Hartford County, CT** **Latitude *41° 45' 36.41"*, Longitude *-72° 44' 35.25"*** **40 Foot - Self Support Tower on Modified Parking Garage**	

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

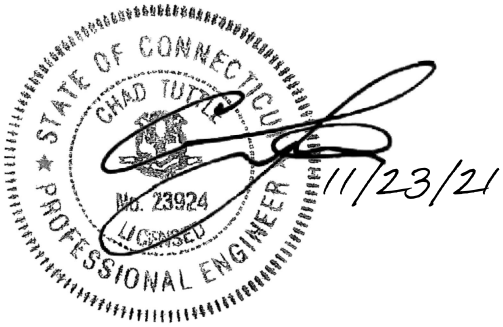
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Proposed Equipment Configuration **Sufficient Capacity-68.4%**

This analysis utilizes an ultimate 3-second gust wind speed of 117 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria

Structural analysis prepared by: Andrew Fisher

Respectfully submitted by: B+T Engineering, Inc.
COA: PEC.0001564; Expires: 02/10/2022



Chad E. Tuttle, P.E.

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 40 ft .Self Support tower designed by Rohn.

The tower has been modified per reinforcement drawings by GPD in June of 2015. Reinforcement consists of extension plates to the tower base frame connections and extension plates to the existing stair well walls.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	117 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)
92.0	92.0	1	--	Sector Mount [SM 503-3]	3 6 3	7/8 13/16 3/8
	91.0	3	Ericsson	AIR 6449 B77D		
	90.0	3	Site Pro 1	SFS-V-L Reinforcement Kit		
	89.0	3	Cci Antennas	DMP65R-BU8D		
		3	Ericsson	RRUS 32 B30		
		3	Ericsson	RRUS 32 B66A		
		3	Ericsson	RRUS 4415 B25_CCIV2		
		3	Ericsson	RRUS 4449 B5/B12		
		3	Ericsson	RRUS 4478 B14_CCIV2		
		3	Ericsson	RRUS E2 B29		
		3	Quintel Technology	QD8616-7		
		2	Raycap	DC6-48-60-0-8C-EV		
		1	Raycap	DC6-48-60-18-8F		
		1	Raycap	DC9-48-60-24-8C-EV		
	87.0	3	Ericsson	AIR 6419 B77G		

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)
102.0	103.0	3	Ericsson	AIR6449 B41_T-MOBILE	3	1-5/8
		3	Ericsson	RADIO 4460 B2/B25 B66_TMO		
		3	Ericsson	Radio 4480_TMOV2		
		3	RFS Celwave	APXVAALL24_43-U-NA20_TMO		
	102.0	1	--	Sector Mount [SM 502-3]		
75.0	77.0	1	Lucent	KS24019-L112A	1	1/2
	75.0	1	--	Side Arm Mount [SO 306-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Tower Manufacturer Drawing	1440544	CCI Sites
Tower Mapping		
Mount Analysis Report	9966973	CCI Sites
Parking Garage Modification	5735691	CCI Sites
Post Modification Inspection	6076906	CCI Sites
Base Frame & Parking Garage Design	5460756	CCI Sites
Crown CAD Package	Date: 11/17/2021	CCI Sites

3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. 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) The tower and structures were maintained in accordance with the - TIA-222 standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	105 - 85	Leg	ROHN 2.5 STD	3	-13.245	66.738	19.8	Pass
T2	85 - 65	Leg	ROHN 2.5 STD	39	-32.876	59.993	54.8	Pass
T1	105 - 85	Diagonal	L1 1/2x1 1/2x1/8	9	-2.796	5.082	55.0	Pass
T2	85 - 65	Diagonal	L1 3/4x1 3/4x3/16	45	-2.391	6.769	35.3	Pass
T1	105 - 85	Top Girt	L2x2x1/8	6	-0.268	4.273	6.3	Pass
T2	85 - 65	Top Girt	L2x2x1/8	41	-0.570	4.273	13.3	Pass
							Summary	
						Leg (T2)	54.8	Pass
						Diagonal (T1)	55.0	Pass
						Top Girt (T2)	13.3	Pass
						Bolt Checks	68.4	Pass
						Rating =	68.4	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2,3	Base Frame & Parking Garage	65.0	47.4	Pass

Structure Rating (max from all components) =	68.4%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Rating per TIA-222-H Section 15.5.
3) The base frame and parking garage capacity was determined based on reaction comparison from the previous modification design passing analysis (CCI Sites Doc ID# 5735731, dated 7/28/2015). See Appendix C for the reaction comparison.

4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section								
Legs	T1	ROHN 2.5 STD						
Leg Grade		A572-50						
Diagonals			L1 1/2x1 1/2x1/8					
Diagonal Grade				A36				
Top Girts					L2x2x1/8			
Face Width (ft)	8.5625					6.5625		
# Panels @ (ft)						5 @ 4		
Weight (K)	1.8	T2		L1 3/4x1 3/4x3/16			4 @ 5	0.9	0.7

105.0 ft

85.0 ft

65.0 ft

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 117 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'
8. TIA-222-H Annex S
9. TOWER RATING: 68.4%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 35 K
SHEAR: 5 K

UPLIFT: -27 K
SHEAR: 5 K

AXIAL 31 K
SHEAR 3 K
MOMENT 76 kip-ft

TORQUE 1 kip-ft
50 mph WIND - 1.500 in ICE

AXIAL 13 K
SHEAR 9 K
MOMENT 228 kip-ft

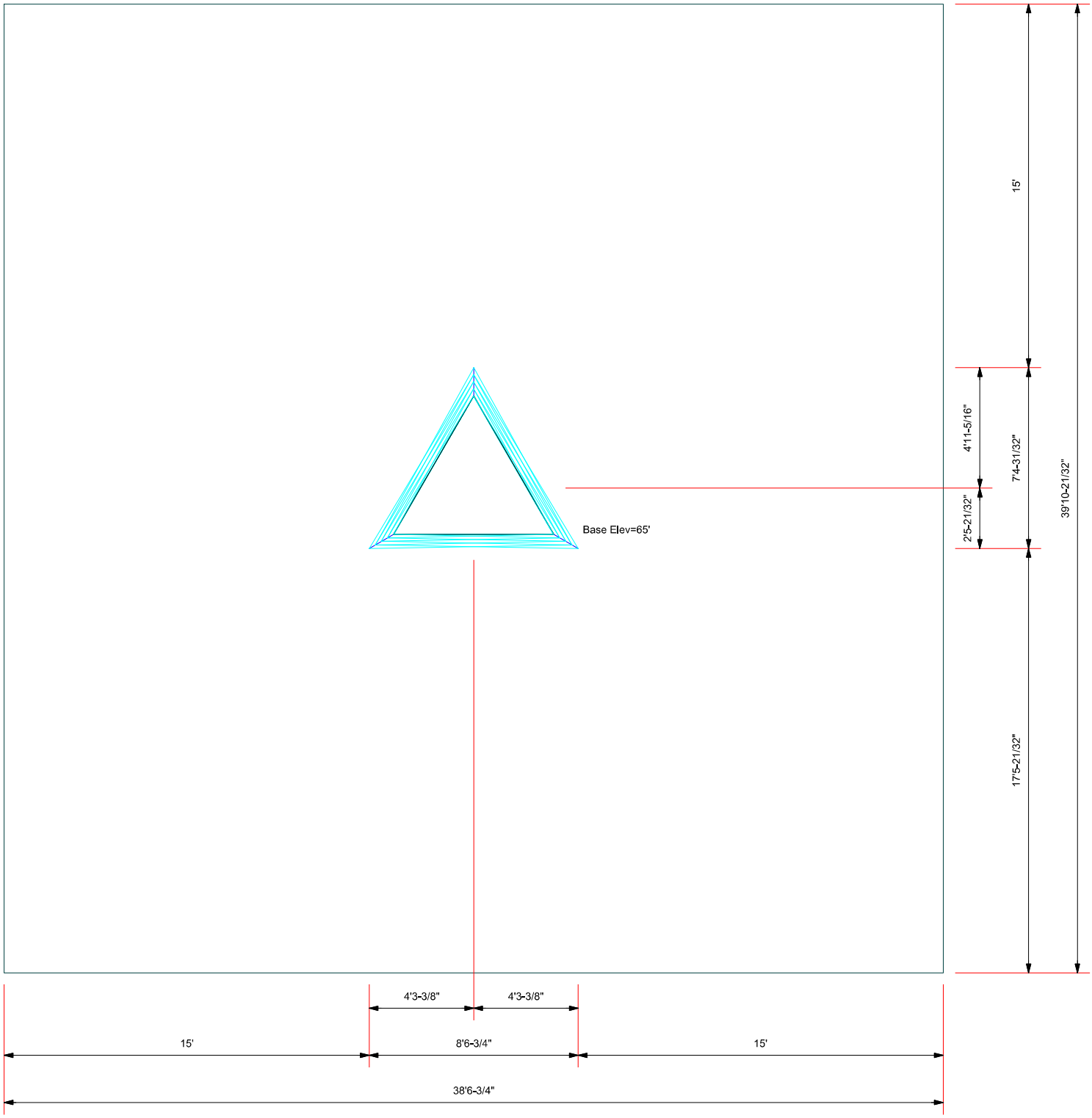
TORQUE 2 kip-ft
REACTIONS - 117 mph WIND

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

Job: ***155853.002.01 - WEST HARTFORD PARKING GARAGE, CT (BU# 87632***
Project:
Client: Crown Castle | Drawn by: Chinmaya | App'd:
Code: TIA-222-H | Date: 11/20/21 | Scale: NTS
Path: | Dwg No. E-1

Plot Plan

Total Area - 0.04 Acres



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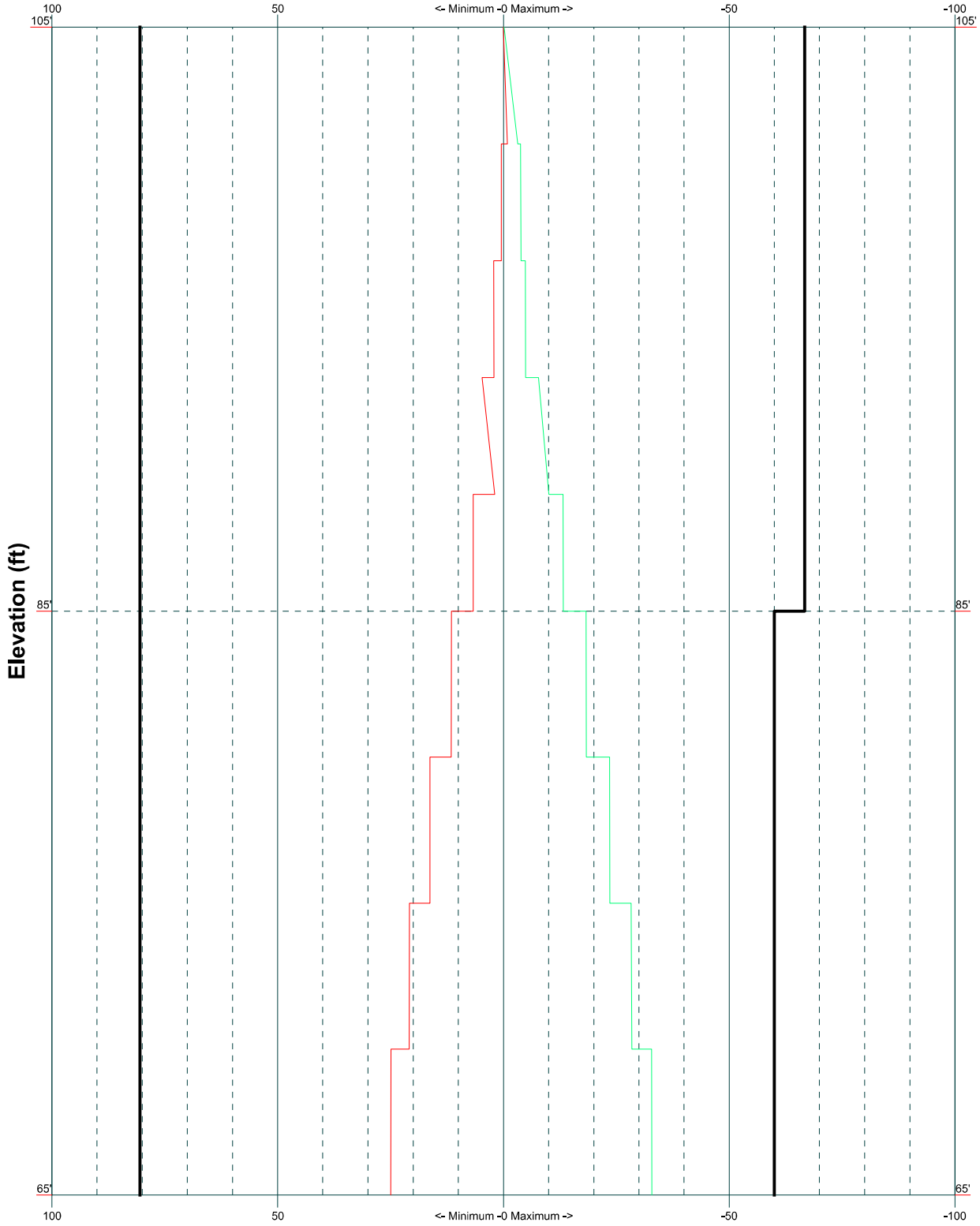
Job: 155853.002.01 - WEST HARTFORD PARKING GARAGE, CT (BU# 87632			
Project:			
Client: Crown Castle	Drawn by: Chinmaya	App'd:	
Code: TIA-222-H	Date: 11/20/21	Scale: NTS	
Path:		Dwg No. E-2	

TIA-222-H - 117 mph/50 mph 1.500 in Ice Exposure B

Leg Capacity ——— Leg Compression (K)



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Project:			
Client: Crown Castle	Drawn by: Chinmaya	App'd:	
Code: TIA-222-H	Date: 11/20/21	Scale: NTS	
Path:		Dwg No. E-3	

TIA-222-H - 117 mph/50 mph 1.500 in Ice Exposure B

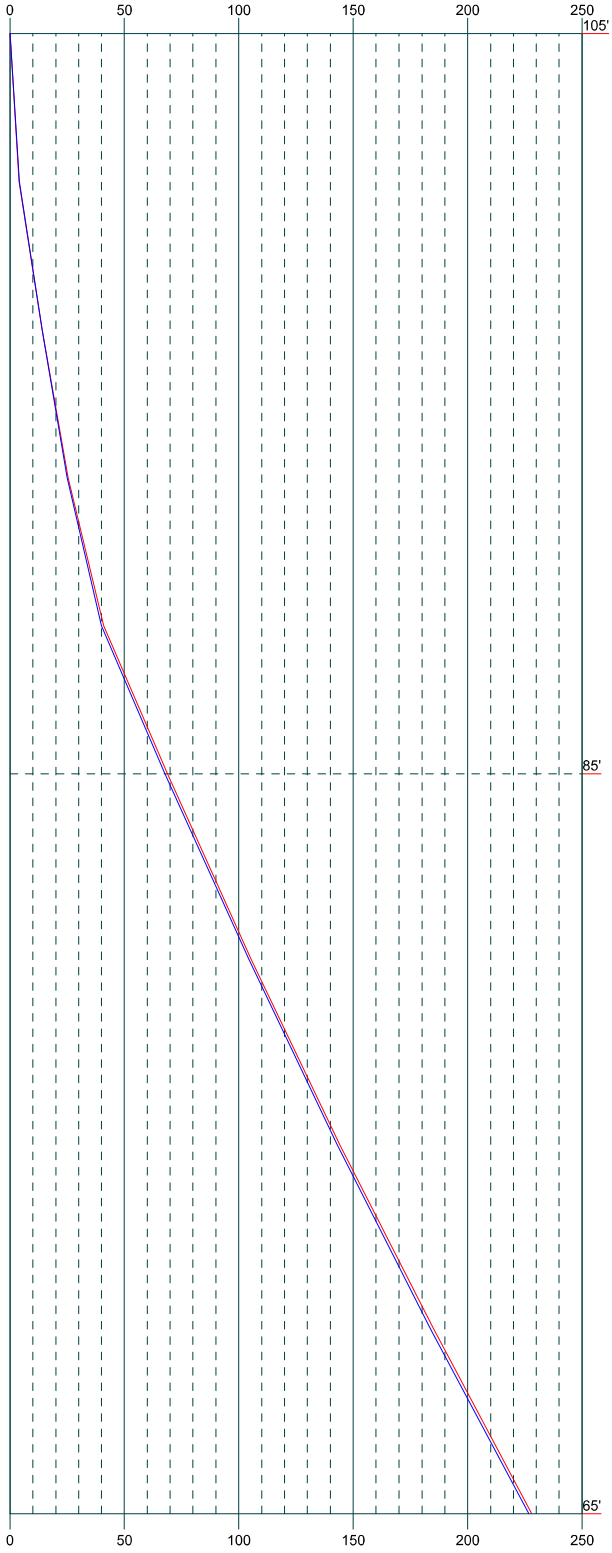
Vx Vz

Maximum Values

Mx Mz

Global Mast Shear (K)

Global Mast Moment (kip-ft)



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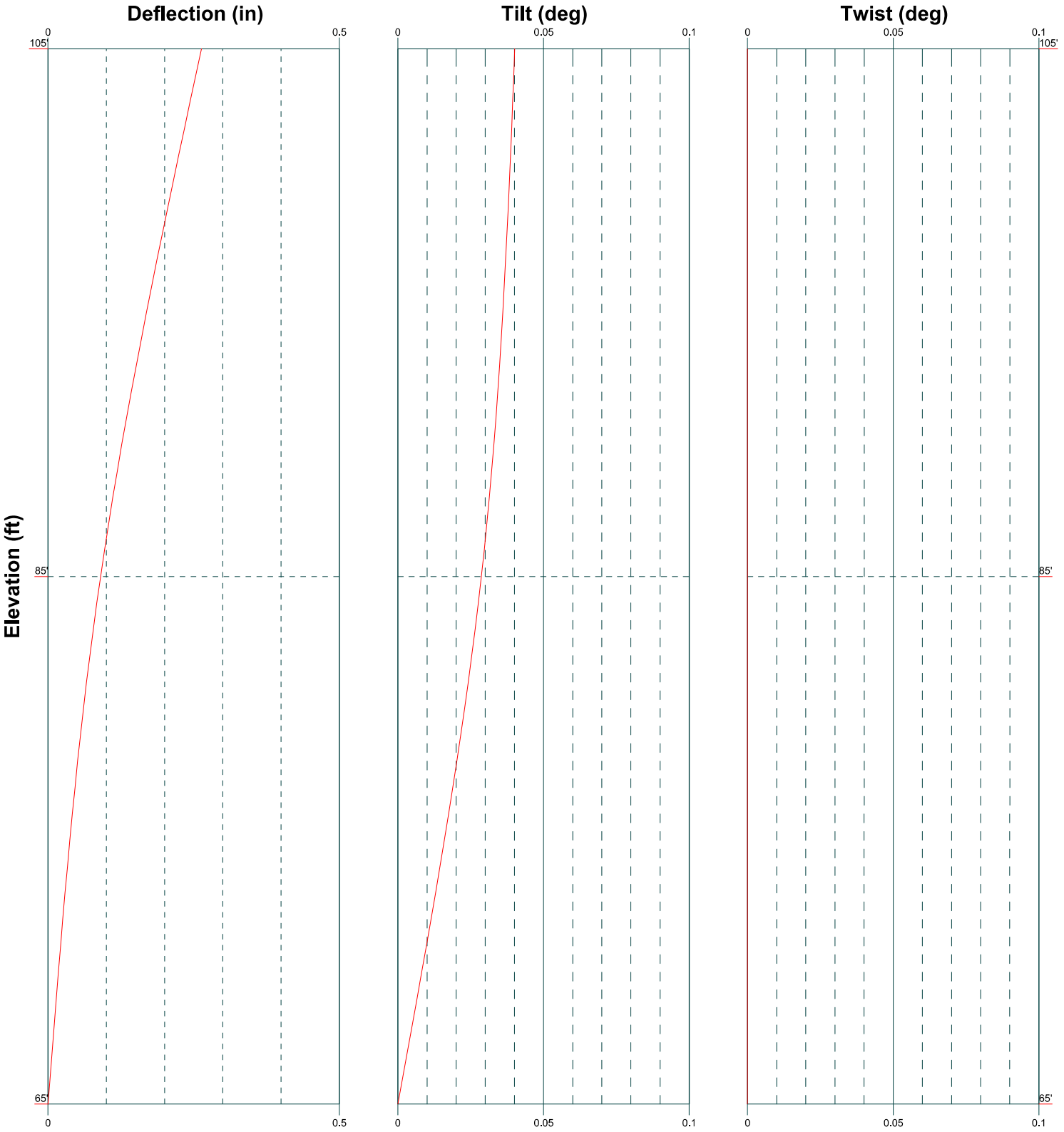
Project:			
Client: Crown Castle	Drawn by: Chinmaya	App'd:	
Code: TIA-222-H	Date: 11/20/21	Scale: NTS	
Path:		Dwg No. E-4	

TIA-222-H - Service - 60 mph

Maximum Values



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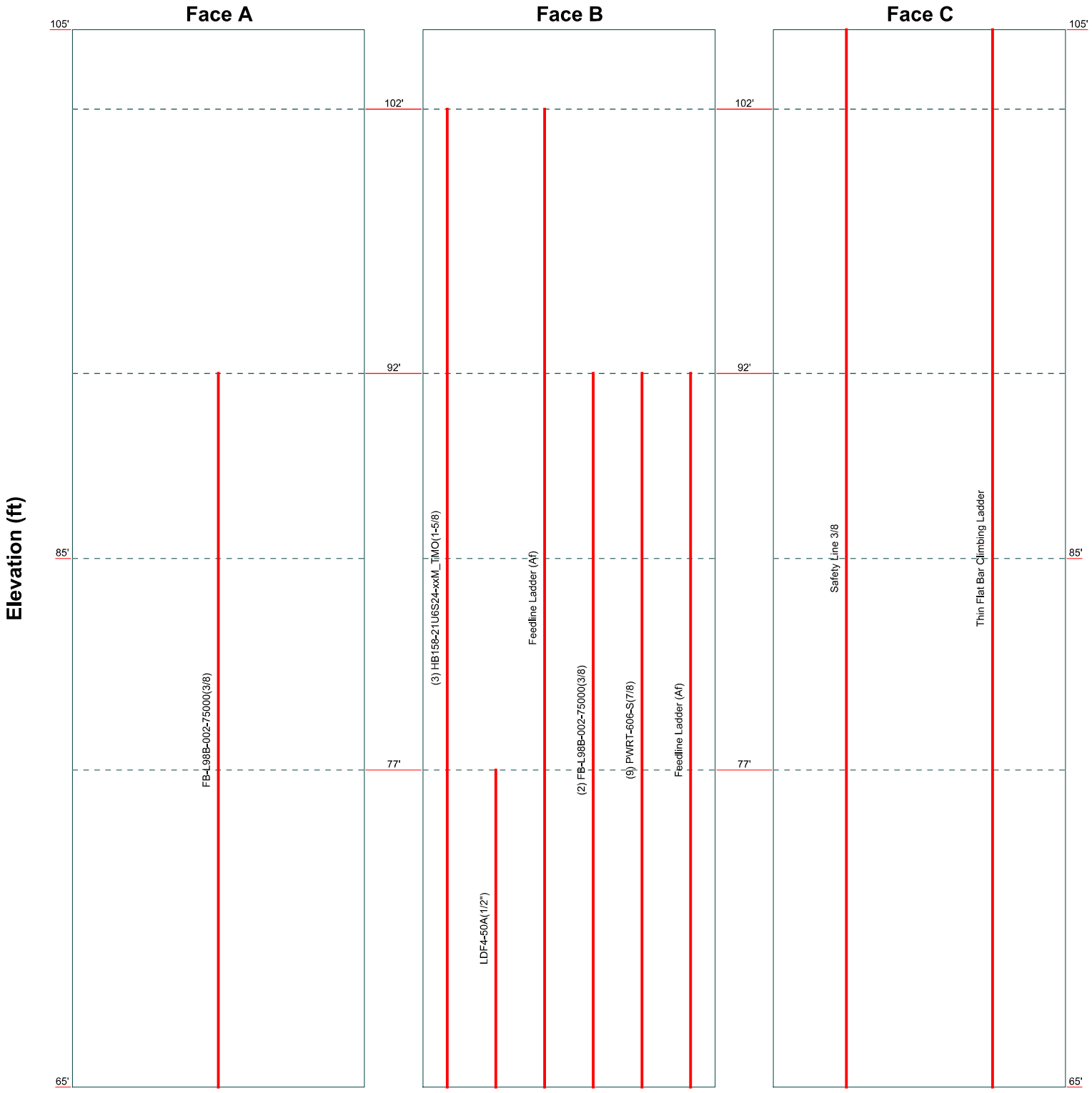
Project:			
Client: Crown Castle	Drawn by: Chinmaya	App'd:	
Code: TIA-222-H	Date: 11/20/21	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
65' - 105'

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



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Job: 155853.002.01 - WEST HARTFORD PARKING GARAGE, CT (BU# 87632			
Project:			
Client: Crown Castle	Drawn by: Chinmaya	App'd:	
Code: TIA-222-H	Date: 11/20/21	Scale: NTS	
Path:		Dwg No. E-7	

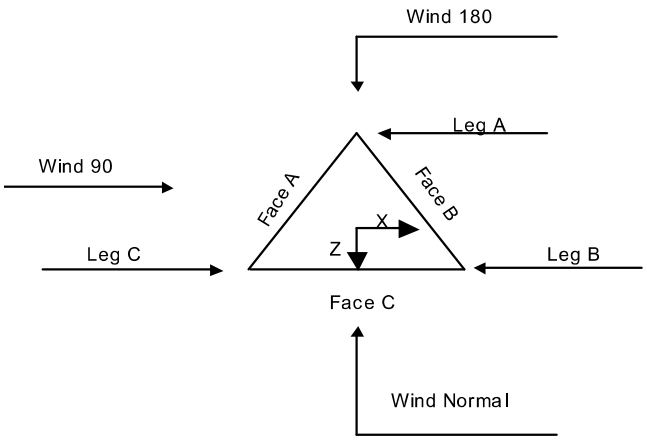
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 105' above the ground line.
The base of the tower is set at an elevation of 65' above the ground line.
The face width of the tower is 6'6-3/4" at the top and 8'6-3/4" at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Tower base elevation above sea level: 191'.
Basic wind speed of 117 mph.
Risk Category II.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0'.
Nominal ice thickness of 1.500 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
TIA-222-H Annex S.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
Maximum demand-capacity ratio is: 1.05.
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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	105'-85'			6'6-3/4"	1	20'
T2	85'-65'			6'6-3/4"	1	20'

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	105'-85'	4'	X Brace	No	No	0.000	0.000
T2	85'-65'	5'	X Brace	No	No	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 105'-85'	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Equal Angle	L1 1/2x1 1/2x1/8	A36 (36 ksi)
T2 85'-65'	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 105'-85'	Equal Angle	L2x2x1/8	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T2 85'-65'	Equal Angle	L2x2x1/8	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

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
T1 105'-85'	0.000	0.188	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T2 85'-65'	0.000	0.188	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T1 105'-85'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
T2 85'-65'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 105'-85'	0.000	1	0.000	0.75	0.000	0.75	0.000	1	0.000	1	0.000	1	0.000	1
T2 85'-65'	0.000	1	0.000	0.75	0.000	0.75	0.000	1	0.000	1	0.000	1	0.000	1

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 105'-85'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 85'-65'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 105'-85'	Flange	0.625 A325N	4	0.500 A325N	1	0.500 A325N	1	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0
T2 85'-65'	Flange	0.000 A325N	0	0.500 A325N	1	0.500 A325N	1	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
HB158-21U6S24-xxM_TMO (1-5/8)	B	No	No	Ar (CaAa)	102' - 65'	0.000	-0.2	3	3	0.850 0.750	1.996		0.003
LDF4-50A(1/2")	B	No	No	Ar (CaAa)	77' - 65'	0.000	-0.25	1	1	0.500	0.630		0.000
Feedline Ladder (Af) *	B	No	No	Af (CaAa)	102' - 65'	0.000	-0.2	1	1	3.000	3.000		0.008
FB-L98B-002-75000(3/8)	B	No	No	Ar (CaAa)	92' - 65'	0.000	0.125	2	2	0.850 0.750	0.394		0.000
FB-L98B-002-75000(3/8)	A	No	No	Ar (CaAa)	92' - 65'	0.000	0.35	1	1	0.500	0.394		0.000
PWRT-606-S(7/8)	B	No	No	Ar (CaAa)	92' - 65'	0.000	0.2	9	8	0.850 0.750	0.920		0.001
Feedline	B	No	No	Af (CaAa)	92' - 65'	0.000	0.2	1	1	3.000	3.000		0.008

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
Ladder (Af) *													
Safety Line 3/8	C	No	No	Ar (CaAa)	105' - 65'	-1.000	0	1	1	0.375	0.375		0.000
Thin Flat Bar Climbing Ladder *	C	No	No	Af (CaAa)	105' - 65'	-0.500	0	1	1	2.000	2.000		0.004

Feed Line/Linear Appurtenances - Entered As Area

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

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
T1	105'-85'	A	0.000	0.000	0.276	0.000	0.000
		B	0.000	0.000	28.527	0.000	0.386
		C	0.000	0.000	7.417	0.000	0.084
T2	85'-65'	A	0.000	0.000	0.787	0.000	0.001
		B	0.000	0.000	50.867	0.000	0.650
		C	0.000	0.000	7.417	0.000	0.084

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
T1	105'-85'	A	1.417	0.000	0.000	2.260	0.000	0.022
		B		0.000	0.000	63.134	0.000	1.045
		C		0.000	0.000	18.754	0.000	0.294
T2	85'-65'	A	1.384	0.000	0.000	6.324	0.000	0.061
		B		0.000	0.000	119.802	0.000	1.863
		C		0.000	0.000	18.489	0.000	0.286

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	105'-85'	3.858	-3.019	4.006	-2.515
T2	85'-65'	7.611	-3.571	7.933	-3.972

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	2	HB158-21U6S24-xxM_TMO (1-5/8)	85.00 - 102.00	0.6000	0.6000
T1	4	Feedline Ladder (Af)	85.00 - 102.00	0.6000	0.6000
T1	7	FB-L98B-002-75000(3/8)	85.00 - 92.00	0.6000	0.6000
T1	8	FB-L98B-002-75000(3/8)	85.00 - 92.00	0.6000	0.6000
T1	10	PWRT-606-S(7/8)	85.00 - 92.00	0.6000	0.6000
T1	12	Feedline Ladder (Af)	85.00 - 92.00	0.6000	0.6000
T1	14	Safety Line 3/8	85.00 - 105.00	0.6000	0.6000
T1	15	Thin Flat Bar Climbing Ladder	85.00 - 105.00	0.6000	0.6000
T2	2	HB158-21U6S24-xxM_TMO (1-5/8)	65.00 - 85.00	0.6000	0.6000
T2	3	LDF4-50A(1/2")	65.00 - 77.00	0.6000	0.6000
T2	4	Feedline Ladder (Af)	65.00 - 85.00	0.6000	0.6000
T2	7	FB-L98B-002-75000(3/8)	65.00 - 85.00	0.6000	0.6000
T2	8	FB-L98B-002-75000(3/8)	65.00 - 85.00	0.6000	0.6000
T2	10	PWRT-606-S(7/8)	65.00 - 85.00	0.6000	0.6000
T2	12	Feedline Ladder (Af)	65.00 - 85.00	0.6000	0.6000
T2	14	Safety Line 3/8	65.00 - 85.00	0.6000	0.6000
T2	15	Thin Flat Bar Climbing Ladder	65.00 - 85.00	0.6000	0.6000

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
AIR6449 B41_T-MOBILE	A	From Leg	4.000 0' 1'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice	5.270 5.700 6.140 7.060	2.030 2.360 2.700 3.430	0.115 0.154 0.197 0.296
AIR6449 B41_T-MOBILE	B	From Leg	4.000 0' 1'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice	5.270 5.700 6.140 7.060	2.030 2.360 2.700 3.430	0.115 0.154 0.197 0.296
AIR6449 B41_T-MOBILE	C	From Leg	4.000 0'	0.000	102'	No Ice 1/2" Ice	5.270 5.700	2.030 2.360	0.115 0.154

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1'			1" Ice	6.140	2.700	0.197
						2" Ice	7.060	3.430	0.296
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	A	From Leg	4.000 0' 1'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice	14.690 15.460 16.230 17.820	6.870 7.550 8.250 9.670	0.183 0.311 0.453 0.782
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	B	From Leg	4.000 0' 1'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice	14.690 15.460 16.230 17.820	6.870 7.550 8.250 9.670	0.183 0.311 0.453 0.782
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	C	From Leg	4.000 0' 1'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice	14.690 15.460 16.230 17.820	6.870 7.550 8.250 9.670	0.183 0.311 0.453 0.782
RADIO 4460 B2/B25 B66_TMO	A	From Leg	4.000 0' 1'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice	2.139 2.321 2.511 2.912	1.686 1.850 2.022 2.387	0.109 0.131 0.156 0.217
(2) RADIO 4460 B2/B25 B66_TMO	C	From Leg	4.000 0' 1'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice	2.139 2.321 2.511 2.912	1.686 1.850 2.022 2.387	0.109 0.131 0.156 0.217
Radio 4480_TMOV2	A	From Leg	4.000 0' 1'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice	2.878 3.091 3.312 3.775	1.397 1.558 1.727 2.090	0.081 0.103 0.128 0.188
(2) Radio 4480_TMOV2	B	From Leg	4.000 0' 1'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice	2.878 3.091 3.312 3.775	1.397 1.558 1.727 2.090	0.081 0.103 0.128 0.188
(2) 8' x 2" Mount Pipe	A	From Leg	4.000 0' 0'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice	1.900 2.728 3.401 4.396	1.900 2.728 3.401 4.396	0.029 0.044 0.063 0.119
(2) 8' x 2" Mount Pipe	B	From Leg	4.000 0' 0'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice	1.900 2.728 3.401 4.396	1.900 2.728 3.401 4.396	0.029 0.044 0.063 0.119
(2) 8' x 2" Mount Pipe	C	From Leg	4.000 0' 0'	0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice	1.900 2.728 3.401 4.396	1.900 2.728 3.401 4.396	0.029 0.044 0.063 0.119
Sector Mount [SM 502-3]	C	None		0.000	102'	No Ice 1/2" Ice 1" Ice 2" Ice	29.820 42.210 54.430 78.490	29.820 42.210 54.430 78.490	1.673 2.266 3.052 5.180
*									
RRUS 32 B30	A	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	2.692 2.912 3.138 3.614	1.573 1.756 1.945 2.346	0.060 0.080 0.104 0.161
RRUS 32 B30	B	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	2.692 2.912 3.138 3.614	1.573 1.756 1.945 2.346	0.060 0.080 0.104 0.161
RRUS 32 B30	C	From Leg	4.000 0'	0.000	92'	No Ice 1/2" Ice	2.692 2.912	1.573 1.756	0.060 0.080

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
			-3'			1" Ice	3.138	1.945	0.104
						2" Ice	3.614	2.346	0.161
RRUS 32 B66A	A	From Leg	4.000	0.000	92'	No Ice	2.864	1.782	0.055
			0'			1/2" Ice	3.090	1.973	0.077
			-3'			1" Ice	3.323	2.171	0.103
						2" Ice	3.813	2.589	0.165
RRUS 32 B66A	B	From Leg	4.000	0.000	92'	No Ice	2.864	1.782	0.055
			0'			1/2" Ice	3.090	1.973	0.077
			-3'			1" Ice	3.323	2.171	0.103
						2" Ice	3.813	2.589	0.165
RRUS 32 B66A	C	From Leg	4.000	0.000	92'	No Ice	2.864	1.782	0.055
			0'			1/2" Ice	3.090	1.973	0.077
			-3'			1" Ice	3.323	2.171	0.103
						2" Ice	3.813	2.589	0.165
RRUS E2 B29	A	From Leg	4.000	0.000	92'	No Ice	3.145	1.285	0.060
			0'			1/2" Ice	3.365	1.438	0.083
			-3'			1" Ice	3.592	1.600	0.110
						2" Ice	4.069	1.954	0.173
RRUS E2 B29	B	From Leg	4.000	0.000	92'	No Ice	3.145	1.285	0.060
			0'			1/2" Ice	3.365	1.438	0.083
			-3'			1" Ice	3.592	1.600	0.110
						2" Ice	4.069	1.954	0.173
RRUS E2 B29	C	From Leg	4.000	0.000	92'	No Ice	3.145	1.285	0.060
			0'			1/2" Ice	3.365	1.438	0.083
			-3'			1" Ice	3.592	1.600	0.110
						2" Ice	4.069	1.954	0.173
AIR 6419 B77G	A	From Leg	4.000	0.000	92'	No Ice	4.640	1.870	0.066
			0'			1/2" Ice	5.110	2.230	0.092
			-5'			1" Ice	5.590	2.620	0.120
						2" Ice	6.620	3.450	0.189
AIR 6419 B77G	B	From Leg	4.000	0.000	92'	No Ice	4.640	1.870	0.066
			0'			1/2" Ice	5.110	2.230	0.092
			-5'			1" Ice	5.590	2.620	0.120
						2" Ice	6.620	3.450	0.189
AIR 6419 B77G	C	From Leg	4.000	0.000	92'	No Ice	4.640	1.870	0.066
			0'			1/2" Ice	5.110	2.230	0.092
			-5'			1" Ice	5.590	2.620	0.120
						2" Ice	6.620	3.450	0.189
QD8616-7 w/ Mount Pipe	A	From Leg	4.000	0.000	92'	No Ice	16.930	9.310	0.183
			0'			1/2" Ice	17.870	10.170	0.308
			-3'			1" Ice	18.830	11.050	0.448
						2" Ice	20.790	12.860	0.772
QD8616-7 w/ Mount Pipe	B	From Leg	4.000	0.000	92'	No Ice	16.930	9.310	0.183
			0'			1/2" Ice	17.870	10.170	0.308
			-3'			1" Ice	18.830	11.050	0.448
						2" Ice	20.790	12.860	0.772
QD8616-7 w/ Mount Pipe	C	From Leg	4.000	0.000	92'	No Ice	16.930	9.310	0.183
			0'			1/2" Ice	17.870	10.170	0.308
			-3'			1" Ice	18.830	11.050	0.448
						2" Ice	20.790	12.860	0.772
AIR 6449 B77D	A	From Leg	4.000	0.000	92'	No Ice	3.640	1.720	0.082
			0'			1/2" Ice	4.000	2.020	0.111
			-1'			1" Ice	4.370	2.330	0.145
						2" Ice	5.160	2.990	0.223
AIR 6449 B77D	B	From Leg	4.000	0.000	92'	No Ice	3.640	1.720	0.082
			0'			1/2" Ice	4.000	2.020	0.111
			-1'			1" Ice	4.370	2.330	0.145

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
AIR 6449 B77D	C	From Leg	4.000 0' -1'	0.000	92'	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	5.160 3.640 4.000 4.370 5.160	2.990 1.720 2.020 2.330 2.990	0.223 0.082 0.111 0.145 0.223
DMP65R-BU8D w/ Mount Pipe	A	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	15.890 16.810 17.760 19.700	7.890 8.740 9.600 11.370	0.139 0.252 0.380 0.679
DMP65R-BU8D w/ Mount Pipe	B	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	15.890 16.810 17.760 19.700	7.890 8.740 9.600 11.370	0.139 0.252 0.380 0.679
DMP65R-BU8D w/ Mount Pipe	C	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	15.890 16.810 17.760 19.700	7.890 8.740 9.600 11.370	0.139 0.252 0.380 0.679
RRUS 4478 B14_CCIV2	A	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	2.021 2.200 2.386 2.780	1.246 1.396 1.554 1.891	0.059 0.077 0.097 0.147
RRUS 4478 B14_CCIV2	B	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	2.021 2.200 2.386 2.780	1.246 1.396 1.554 1.891	0.059 0.077 0.097 0.147
RRUS 4478 B14_CCIV2	C	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	2.021 2.200 2.386 2.780	1.246 1.396 1.554 1.891	0.059 0.077 0.097 0.147
RRUS 4449 B5/B12	A	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	1.968 2.144 2.328 2.718	1.408 1.564 1.727 2.075	0.071 0.090 0.111 0.163
RRUS 4449 B5/B12	B	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	1.968 2.144 2.328 2.718	1.408 1.564 1.727 2.075	0.071 0.090 0.111 0.163
RRUS 4449 B5/B12	C	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	1.968 2.144 2.328 2.718	1.408 1.564 1.727 2.075	0.071 0.090 0.111 0.163
RRUS 4415 B25_CCIV2	A	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	0.820 0.943 1.075 1.368	0.046 0.060 0.077 0.118
RRUS 4415 B25_CCIV2	B	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	0.820 0.943 1.075 1.368	0.046 0.060 0.077 0.118
RRUS 4415 B25_CCIV2	C	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	0.820 0.943 1.075 1.368	0.046 0.060 0.077 0.118
DC6-48-60-18-8F	A	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	1.212 1.892 2.105 2.570	1.212 1.892 2.105 2.570	0.033 0.055 0.080 0.138

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
DC9-48-60-24-8C-EV	A	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	2.737 2.963 3.196 3.684	4.785 5.065 5.352 5.948	0.026 0.063 0.104 0.200
DC6-48-60-0-8C-EV	B	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	2.736 2.962 3.195 3.683	4.783 5.063 5.350 5.947	0.026 0.063 0.104 0.200
DC6-48-60-0-8C-EV	C	From Leg	4.000 0' -3'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	2.736 2.962 3.195 3.683	4.783 5.063 5.350 5.947	0.026 0.063 0.104 0.200
(2) L 2 1/2x2 1/2x1/4x6'	A	From Leg	2.000 0' -2'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	1.500 1.918 2.343 3.215	0.007 0.025 0.051 0.126	0.053 0.062 0.076 0.119
(2) L 2 1/2x2 1/2x1/4x6'	B	From Leg	2.000 0' -2'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	1.500 1.918 2.343 3.215	0.007 0.025 0.051 0.126	0.053 0.062 0.076 0.119
(2) L 2 1/2x2 1/2x1/4x6'	C	From Leg	2.000 0' -2'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	1.500 1.918 2.343 3.215	0.007 0.025 0.051 0.126	0.053 0.062 0.076 0.119
(2) 8' x 2" Mount Pipe	A	From Leg	4.000 0' 0'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	1.900 2.728 3.401 4.396	1.900 2.728 3.401 4.396	0.029 0.044 0.063 0.119
(2) 8' x 2" Mount Pipe	B	From Leg	4.000 0' 0'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	1.900 2.728 3.401 4.396	1.900 2.728 3.401 4.396	0.029 0.044 0.063 0.119
(2) 8' x 2" Mount Pipe	C	From Leg	4.000 0' 0'	0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	1.900 2.728 3.401 4.396	1.900 2.728 3.401 4.396	0.029 0.044 0.063 0.119
Sector Mount [SM 503-3]	C	None		0.000	92'	No Ice 1/2" Ice 1" Ice 2" Ice	30.430 43.020 55.430 79.890	30.430 43.020 55.430 79.890	1.690 2.296 3.097 5.269
*									
KS24019-L112A	A	From Leg	4.000 0' 2'	0.000	75'	No Ice 1/2" Ice 1" Ice 2" Ice	0.141 0.198 0.262 0.415	0.141 0.198 0.262 0.415	0.005 0.007 0.009 0.018
Side Arm Mount [SO 306-1]	A	From Leg	2.000 0' 0'	0.000	75'	No Ice 1/2" Ice 1" Ice 2" Ice	0.410 0.810 1.230 2.080	2.260 3.830 5.480 9.370	0.042 0.062 0.094 0.187
*									

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	105 - 85	Leg	Max Tension	7	6.678	-0.029	0.016
			Max. Compression	2	-13.245	0.007	0.076
			Max. Mx	8	-3.679	0.681	-0.020
			Max. My	2	-1.173	-0.054	-0.643
			Max. Vy	8	-0.942	-0.373	-0.111
			Max. Vx	2	0.977	0.002	0.436
		Diagonal	Max Tension	25	2.734	0.000	0.000
			Max. Compression	12	-2.796	0.000	0.000
			Max. Mx	28	0.396	0.015	0.000
			Max. My	20	0.953	0.003	-0.002
			Max. Vy	28	-0.016	0.015	0.000
			Max. Vx	20	-0.000	0.000	0.000
		Top Girt	Max Tension	23	0.261	0.000	0.000
			Max. Compression	10	-0.268	0.000	0.000
			Max. Mx	26	-0.028	-0.051	0.000
			Max. Vy	26	0.031	0.000	0.000
T2	85 - 65	Leg	Max Tension	7	24.932	0.000	0.000
			Max. Compression	2	-32.876	0.000	0.000
			Max. Mx	35	-18.624	0.089	0.002
			Max. My	4	-4.139	-0.018	-0.131
			Max. Vy	33	-0.049	-0.073	0.002
			Max. Vx	4	0.059	-0.024	-0.117
		Diagonal	Max Tension	12	2.453	0.000	0.000
			Max. Compression	12	-2.521	0.000	0.000
			Max. Mx	28	0.243	0.029	-0.002
			Max. My	30	1.155	0.019	0.004
			Max. Vy	28	0.024	0.028	0.003
			Max. Vx	30	-0.001	0.000	0.000
		Top Girt	Max Tension	31	0.215	0.000	0.000
			Max. Compression	6	-0.162	0.000	0.000
			Max. Mx	26	0.179	-0.050	0.000
			Max. My	26	0.181	0.000	0.001
			Max. Vy	26	-0.030	0.000	0.000
			Max. Vx	26	0.001	0.000	0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	34.834	4.558	-2.653
	Max. H_x	18	34.834	4.558	-2.653
	Max. H_z	5	-23.134	-3.291	2.354
	Min. Vert	7	-27.028	-4.018	2.339
	Min. H_x	7	-27.028	-4.018	2.339
	Min. H_z	18	34.834	4.558	-2.653
Leg B	Max. Vert	10	35.049	-4.461	-2.713
	Max. H_x	23	-26.514	3.913	2.385
	Max. H_z	23	-26.514	3.913	2.385
	Min. Vert	23	-26.514	3.913	2.385
	Min. H_x	10	35.049	-4.461	-2.713
	Min. H_z	10	35.049	-4.461	-2.713
Leg A	Max. Vert	2	35.100	0.103	5.199
	Max. H_x	20	4.695	1.004	0.287
	Max. H_z	2	35.100	0.103	5.199
	Min. Vert	15	-26.273	-0.095	-4.557
	Min. H_x	9	3.369	-0.995	0.198

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. H_z	15	-26.273	-0.095	-4.557

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	10.896	0.000	0.000	-1.544	-1.488	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	13.075	-0.017	-8.742	-227.957	-1.140	1.439
0.9 Dead+1.0 Wind 0 deg - No Ice	9.806	-0.017	-8.742	-227.494	-0.694	1.439
1.2 Dead+1.0 Wind 30 deg - No Ice	13.075	4.343	-7.504	-195.931	-113.665	0.795
0.9 Dead+1.0 Wind 30 deg - No Ice	9.806	4.343	-7.504	-195.467	-113.219	0.795
1.2 Dead+1.0 Wind 60 deg - No Ice	13.075	7.477	-4.287	-112.824	-194.988	-0.320
0.9 Dead+1.0 Wind 60 deg - No Ice	9.806	7.477	-4.287	-112.361	-194.542	-0.320
1.2 Dead+1.0 Wind 90 deg - No Ice	13.075	8.715	0.017	-1.208	-226.663	-1.349
0.9 Dead+1.0 Wind 90 deg - No Ice	9.806	8.715	0.017	-0.744	-226.217	-1.349
1.2 Dead+1.0 Wind 120 deg - No Ice	13.075	7.615	4.386	111.758	-198.270	-1.726
0.9 Dead+1.0 Wind 120 deg - No Ice	9.806	7.615	4.386	112.221	-197.823	-1.726
1.2 Dead+1.0 Wind 150 deg - No Ice	13.075	4.189	7.204	187.353	-111.599	-1.349
0.9 Dead+1.0 Wind 150 deg - No Ice	9.806	4.189	7.204	187.816	-111.152	-1.349
1.2 Dead+1.0 Wind 180 deg - No Ice	13.075	0.017	8.457	218.595	-2.432	-1.439
0.9 Dead+1.0 Wind 180 deg - No Ice	9.806	0.017	8.457	219.059	-1.985	-1.439
1.2 Dead+1.0 Wind 210 deg - No Ice	13.075	-4.343	7.504	192.224	110.094	-0.795
0.9 Dead+1.0 Wind 210 deg - No Ice	9.806	-4.343	7.504	192.687	110.540	-0.795
1.2 Dead+1.0 Wind 240 deg - No Ice	13.075	-7.724	4.430	111.945	196.314	0.320
0.9 Dead+1.0 Wind 240 deg - No Ice	9.806	-7.724	4.430	112.408	196.760	0.320
1.2 Dead+1.0 Wind 270 deg - No Ice	13.075	-8.715	-0.017	-2.499	223.091	1.349
0.9 Dead+1.0 Wind 270 deg - No Ice	9.806	-8.715	-0.017	-2.036	223.538	1.349
1.2 Dead+1.0 Wind 300 deg - No Ice	13.075	-7.367	-4.243	-112.637	189.801	1.726
0.9 Dead+1.0 Wind 300 deg - No Ice	9.806	-7.367	-4.243	-112.174	190.247	1.726
1.2 Dead+1.0 Wind 330 deg - No Ice	13.075	-4.189	-7.204	-191.060	108.027	1.349
0.9 Dead+1.0 Wind 330 deg - No Ice	9.806	-4.189	-7.204	-190.596	108.473	1.349
1.2 Dead+1.0 Ice+1.0 Temp	31.487	0.000	0.000	-4.518	-5.284	0.000

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	31.487	-0.003	-2.623	-71.981	-5.155	0.509
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	31.487	1.345	-2.314	-63.552	-39.401	0.311
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	31.487	2.359	-1.349	-38.772	-64.930	-0.123
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	31.487	2.695	0.003	-4.389	-73.740	-0.544
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	31.487	2.292	1.315	29.325	-63.960	-0.666
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	31.487	1.289	2.211	52.836	-38.580	-0.590
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	31.487	0.003	2.582	62.126	-5.413	-0.509
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	31.487	-1.345	2.314	54.515	28.832	-0.311
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	31.487	-2.395	1.370	30.145	55.071	0.123
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	31.487	-2.695	-0.003	-4.647	63.172	0.544
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	31.487	-2.256	-1.294	-37.952	52.682	0.666
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	31.487	-1.289	-2.211	-61.873	28.012	0.590
Dead+Wind 0 deg - Service	10.896	-0.005	-2.422	-64.179	-1.309	0.398
Dead+Wind 30 deg - Service	10.896	1.203	-2.079	-55.307	-32.481	0.213
Dead+Wind 60 deg - Service	10.896	2.071	-1.188	-32.285	-55.009	-0.101
Dead+Wind 90 deg - Service	10.896	2.414	0.005	-1.366	-63.783	-0.387
Dead+Wind 120 deg - Service	10.896	2.109	1.215	29.927	-55.917	-0.490
Dead+Wind 150 deg - Service	10.896	1.161	1.996	50.870	-31.909	-0.381
Dead+Wind 180 deg - Service	10.896	0.005	2.343	59.524	-1.667	-0.398
Dead+Wind 210 deg - Service	10.896	-1.203	2.079	52.218	29.504	-0.213
Dead+Wind 240 deg - Service	10.896	-2.140	1.227	29.979	53.388	0.101
Dead+Wind 270 deg - Service	10.896	-2.414	-0.005	-1.723	60.806	0.387
Dead+Wind 300 deg - Service	10.896	-2.041	-1.175	-32.234	51.585	0.490
Dead+Wind 330 deg - Service	10.896	-1.161	-1.996	-53.959	28.932	0.381

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-10.896	0.000	0.000	10.896	0.000	0.000%
2	-0.017	-13.075	-8.742	0.017	13.075	8.742	0.000%
3	-0.017	-9.806	-8.742	0.017	9.806	8.742	0.000%
4	4.343	-13.075	-7.504	-4.343	13.075	7.504	0.000%
5	4.343	-9.806	-7.504	-4.343	9.806	7.504	0.000%
6	7.477	-13.075	-4.287	-7.477	13.075	4.287	0.000%
7	7.477	-9.806	-4.287	-7.477	9.806	4.287	0.000%
8	8.715	-13.075	0.017	-8.715	13.075	-0.017	0.000%
9	8.715	-9.806	0.017	-8.715	9.806	-0.017	0.000%
10	7.615	-13.075	4.386	-7.615	13.075	-4.386	0.000%
11	7.615	-9.806	4.386	-7.615	9.806	-4.386	0.000%
12	4.189	-13.075	7.204	-4.189	13.075	-7.204	0.000%
13	4.189	-9.806	7.204	-4.189	9.806	-7.204	0.000%
14	0.017	-13.075	8.457	-0.017	13.075	-8.457	0.000%
15	0.017	-9.806	8.457	-0.017	9.806	-8.457	0.000%
16	-4.343	-13.075	7.504	4.343	13.075	-7.504	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
17	-4.343	-9.806	7.504	4.343	9.806	-7.504	0.000%
18	-7.724	-13.075	4.430	7.724	13.075	-4.430	0.000%
19	-7.724	-9.806	4.430	7.724	9.806	-4.430	0.000%
20	-8.715	-13.075	-0.017	8.715	13.075	0.017	0.000%
21	-8.715	-9.806	-0.017	8.715	9.806	0.017	0.000%
22	-7.367	-13.075	-4.243	7.367	13.075	4.243	0.000%
23	-7.367	-9.806	-4.243	7.367	9.806	4.243	0.000%
24	-4.189	-13.075	-7.204	4.189	13.075	7.204	0.000%
25	-4.189	-9.806	-7.204	4.189	9.806	7.204	0.000%
26	0.000	-31.487	0.000	0.000	31.487	0.000	0.000%
27	-0.003	-31.487	-2.623	0.003	31.487	2.623	0.000%
28	1.345	-31.487	-2.314	-1.345	31.487	2.314	0.000%
29	2.359	-31.487	-1.349	-2.359	31.487	1.349	0.000%
30	2.695	-31.487	0.003	-2.695	31.487	-0.003	0.000%
31	2.292	-31.487	1.315	-2.292	31.487	-1.315	0.000%
32	1.289	-31.487	2.211	-1.289	31.487	-2.211	0.000%
33	0.003	-31.487	2.582	-0.003	31.487	-2.582	0.000%
34	-1.345	-31.487	2.314	1.345	31.487	-2.314	0.000%
35	-2.395	-31.487	1.370	2.395	31.487	-1.370	0.000%
36	-2.695	-31.487	-0.003	2.695	31.487	0.003	0.000%
37	-2.256	-31.487	-1.294	2.256	31.487	1.294	0.000%
38	-1.289	-31.487	-2.211	1.289	31.487	2.211	0.000%
39	-0.005	-10.896	-2.422	0.005	10.896	2.422	0.000%
40	1.203	-10.896	-2.079	-1.203	10.896	2.079	0.000%
41	2.071	-10.896	-1.188	-2.071	10.896	1.188	0.000%
42	2.414	-10.896	0.005	-2.414	10.896	-0.005	0.000%
43	2.109	-10.896	1.215	-2.109	10.896	-1.215	0.000%
44	1.161	-10.896	1.996	-1.161	10.896	-1.996	0.000%
45	0.005	-10.896	2.343	-0.005	10.896	-2.343	0.000%
46	-1.203	-10.896	2.079	1.203	10.896	-2.079	0.000%
47	-2.140	-10.896	1.227	2.140	10.896	-1.227	0.000%
48	-2.414	-10.896	-0.005	2.414	10.896	0.005	0.000%
49	-2.041	-10.896	-1.175	2.041	10.896	1.175	0.000%
50	-1.161	-10.896	-1.996	1.161	10.896	1.996	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	105 - 85	0.263	39	0.038	0.003
T2	85 - 65	0.090	39	0.031	0.002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
102'	AIR6449 B41_T-MOBILE	39	0.234	0.038	0.003	156679
92'	RRUS 32 B30	39	0.143	0.036	0.002	60261
75'	KS24019-L112A	39	0.038	0.018	0.001	78340

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	105 - 85	0.932	2	0.134	0.010
T2	85 - 65	0.322	2	0.110	0.006

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
102'	AIR6449 B41_T-MOBILE	2	0.830	0.134	0.009	44421
92'	RRUS 32 B30	2	0.509	0.127	0.008	17085
75'	KS24019-L112A	2	0.134	0.063	0.003	22210

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	105	Leg	A325N	0.625	4	1.669	20.340	0.082 ✔	1.05	Bolt Tension
		Diagonal	A325N	0.500	1	2.734	3.806	0.718 ✔	1.05	Member Block Shear
		Top Girt	A325N	0.500	1	0.261	4.133	0.063 ✔	1.05	Member Bearing
T2	85	Diagonal	A325N	0.500	1	2.453	6.199	0.396 ✔	1.05	Member Bearing
		Top Girt	A325N	0.500	1	0.570	4.133	0.138 ✔	1.05	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	105 - 85	ROHN 2.5 STD	20'	4'	50.7 K=1.00	1.704	-13.245	63.560	0.208 [1] ✔
T2	85 - 65	ROHN 2.5 STD	20'13/32"	5'3/32"	63.4 K=1.00	1.704	-32.876	57.136	0.575 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	105 - 85	L1 1/2x1 1/2x1/8	7'8-7/32"	3'7-3/16"	145.8 K=1.00	0.359	-2.796	4.840	0.578 [1] ✔
T2	85 - 65	L1 3/4x1 3/4x3/16	9'8-13/32"	4'9-1/32"	166.1 K=1.00	0.621	-2.391	6.447	0.371 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	105 - 85	L2x2x1/8	6'6-3/4"	6'1-3/8"	184.6 K=1.00	0.484	-0.268	4.070	0.066 [1] ✔
T2	85 - 65	L2x2x1/8	6'6-3/4"	6'1-3/8"	184.6 K=1.00	0.484	-0.570	4.070	0.140 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	105 - 85	ROHN 2.5 STD	20'	4'	50.7	1.704	6.678	76.682	0.087 [1] ✔
T2	85 - 65	ROHN 2.5 STD	20'13/32"	5'3/32"	63.4	1.704	24.932	76.682	0.325 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	105 - 85	L1 1/2x1 1/2x1/8	7'8-7/32"	3'7-3/16"	95.5	0.211	2.734	9.176	0.298 [1] ✔
T2	85 - 65	L1 3/4x1 3/4x3/16	8'10-5/16"	4'4-1/32"	99.3	0.378	2.453	16.440	0.149 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	105 - 85	L2x2x1/8	6'6-3/4"	6'1-3/8"	121.2	0.305	0.261	13.254	0.020 [1] ✔
T2	85 - 65	L2x2x1/8	6'6-3/4"	6'1-3/8"	121.2	0.305	0.570	13.254	0.043 [1] ✔

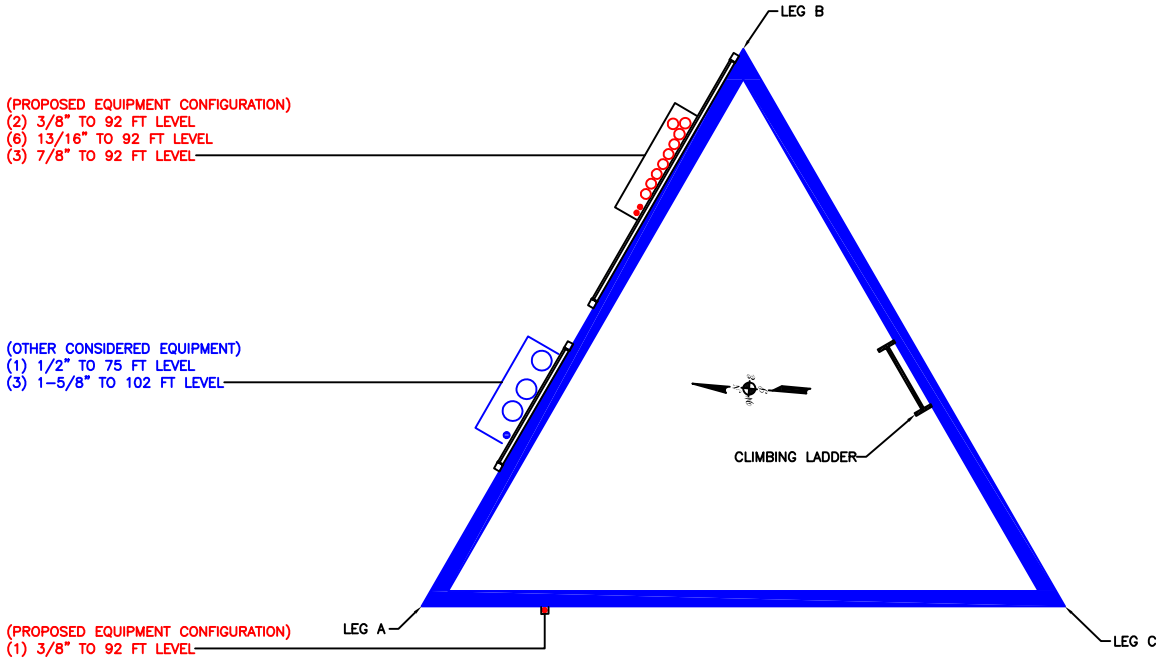
[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	105 - 85	Leg	ROHN 2.5 STD	3	-13.245	66.738	19.8	Pass
T2	85 - 65	Leg	ROHN 2.5 STD	39	-32.876	59.993	54.8	Pass
T1	105 - 85	Diagonal	L1 1/2x1 1/2x1/8	9	-2.796	5.082	55.0	Pass
T2	85 - 65	Diagonal	L1 3/4x1 3/4x3/16	45	-2.391	6.769	35.3	Pass
T1	105 - 85	Top Girt	L2x2x1/8	6	-0.268	4.273	6.3	Pass
T2	85 - 65	Top Girt	L2x2x1/8	41	-0.570	4.273	13.3	Pass
							Summary	
						Leg (T2)	54.8	Pass
						Diagonal (T1)	55.0	Pass
						Top Girt (T2)	13.3	Pass
						Bolt Checks	68.4	Pass
						RATING =	**68.4**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876328

APPENDIX C

ADDITIONAL CALCULATIONS

PROJECT	**155853.002.01 - West Hartford Parkir**
SUBJECT	**Foundation Reaction Comparison**
DATE	**11-20-21**

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

v1.3.2

TIA Rev. H - Self Support

Base Reaction Type	Unfactored Modified Design Reactions		Factored Reactions		Rating % with TIA-222-H Seciton 15.5 applied	
SST Leg Uplift	44.01	kips	27.00	kips	**43.3%**	Pass
SST Leg Compression	52.04	kips	35.00	kips	**47.4%**	Pass
SST Leg Uplift Shear	7.94	kips	5.00	kips	**44.4%**	Pass

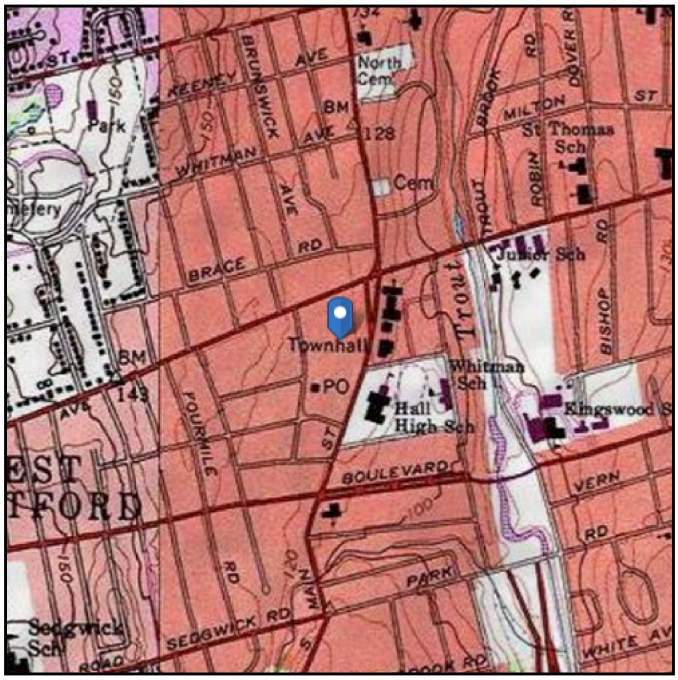
The modified tnxTower design reactions were obtained from the design by GPD (CCIsites Doc ID# 5735731, dated 7/28/2015)

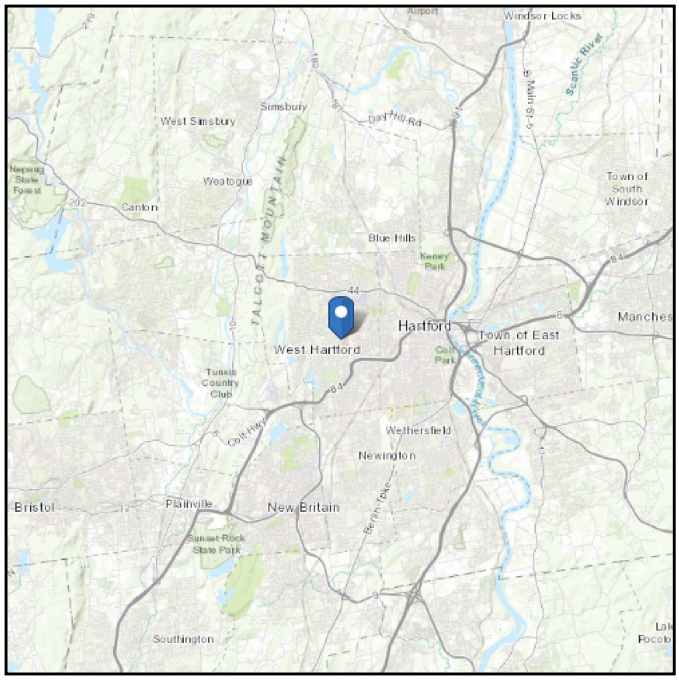
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Elevation: 126.05 ft (NAVD 88)
Latitude: 41.760114
Longitude: -72.743125





Wind

Results:

Wind Speed:	117 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	97 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Sat Nov 20 2021

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 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 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

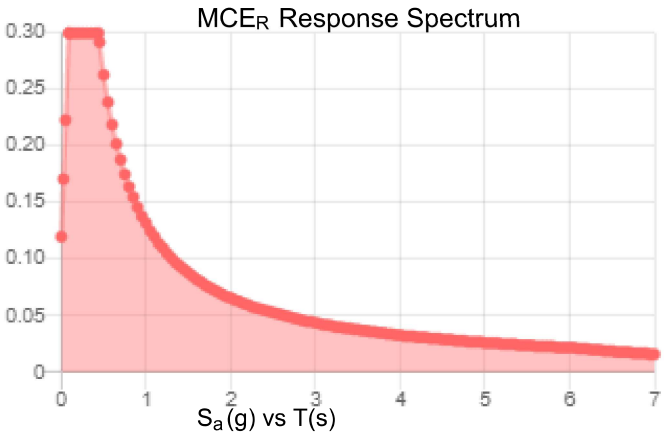
Seismic

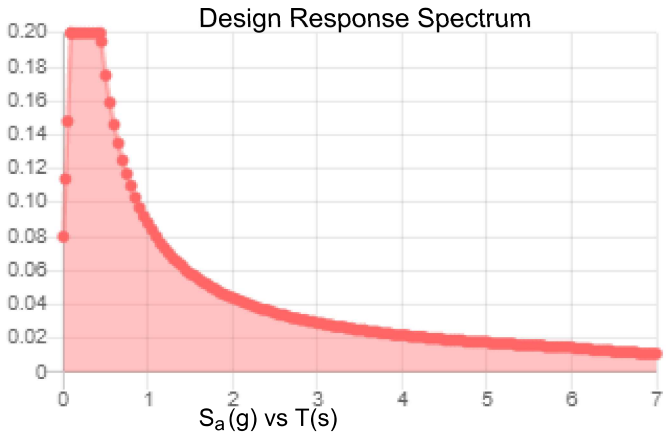
Site Soil Class: D - Default (see Section 11.4.3)

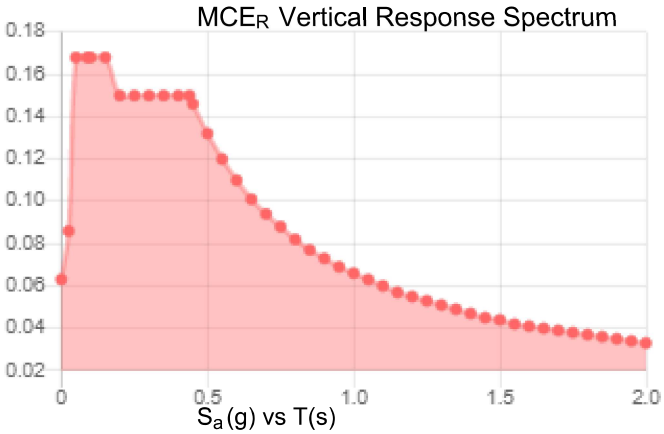
Results:

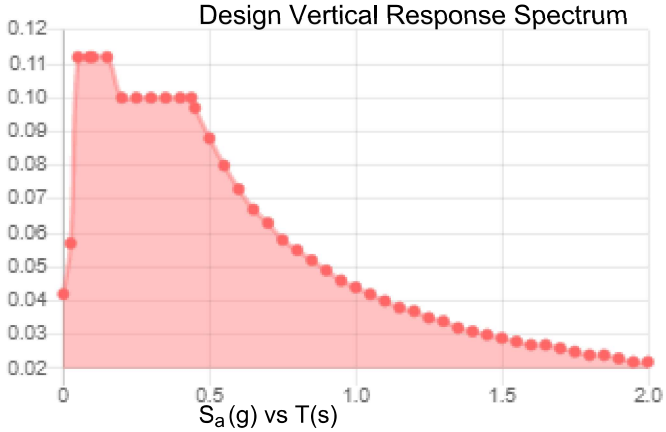
S_S :	0.187	S_{D1} :	0.088
S_1 :	0.055	T_L :	6
F_a :	1.6	PGA :	0.101
F_v :	2.4	PGA_M :	0.161
S_{MS} :	0.3	F_{PGA} :	1.598
S_{M1} :	0.132	I_e :	1
S_{DS} :	0.2	C_v :	0.7

Seismic Design Category B









Data Accessed: Sat Nov 20 2021

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.50 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Sat Nov 20 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 500-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: **September 7, 2021**

GPD Engineering and Architecture
Professional Corporation
520 South Main Street, Suite 2531
Akron, Ohio 44311
(216) 927-8663
CrownMA@gpdgroup.com

Subject:	**Mount Analysis – Conditional Passing Report**	
Carrier Designation:	***AT&T Mobility* Equipment Change-Out**	
	Carrier Site Number:	CTL05843
	Carrier Site Name:	WEST HARTFORD CENTRAL
	Carrier FA Number:	10071356
Crown Castle Designation:	**BU Number:**	876328
	Site Name:	WEST HARTFORD PARKING GARAGE
	JDE Job Number:	649410
	Order Number:	556518 Rev. 0
Engineering Firm Designation:	**GPD Report Designation:**	2021777.876328.29
Site Data:	**27-31 South Main St., West Hartford, Hartford County, CT 06110 Latitude 41° 45' 36.41" Longitude -72° 44' 35.25"**	
Structure Information:	**Tower Height & Type:**	**40.25 ft Self Support Tower on 65.0 ft Rooftop**
	Mount Elevation:	**92.0 ft**
	Mount Type:	**13.0 ft Sector Mount**

GPD is pleased to submit this **"Mount Analysis – Conditional passing Report"** to determine the structural integrity of AT&T Mobility'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:

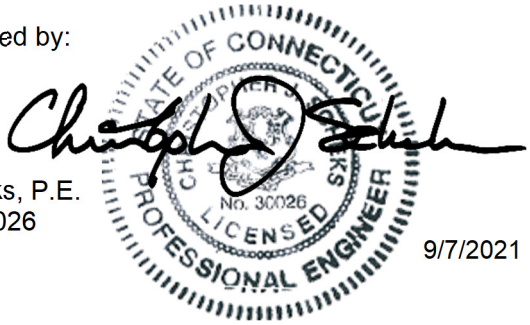
Sector Mount **Sufficient – 82.5%***

***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.**

The analysis has been performed in accordance with the TIA-222-H Standard based upon an ultimate 3-second gust wind speed of 117 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Brandon Brookbank

Respectfully Submitted by:



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

9/7/2021

TABLE OF CONTENTS

1) INTRODUCTION

This is an existing 3-sector 13.0' Sector Mount designed by Sabre (Drawing #: C10857011C Rev. 2, dated 10/19/2016).

2) ANALYSIS CRITERIA

Building Code: 2015 IBC
TIA-222 Revision: TIA-222-H
Risk Category: II
Ultimate Wind Speed: 117 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 / Modification Details
92.0	91.0	3	Ericsson	AIR 6449 B77D	(3) 13.0 ft. Sector Mounts
	89.0	3	CCI Antennas	DMP65R-BU8D	
		3	Quintel Technology	QD8616-7	
		3	Ericsson	RRUS 32 B30	
		3	Ericsson	RRUS 32 B66A	
		3	Ericsson	RRUS 4415 B25_CCIV2	
		3	Ericsson	RRUS 4449 B5/B12	
		3	Ericsson	RRUS 4478 B14_CCIV2	
		3	Ericsson	RRUS E2 B29	
		2	Raycap	DC6-48-60-0-8C-EV	
		1	Raycap	DC6-48-60-18-8F	
		1	Raycap	DC9-48-60-24-8C-EV	
	87.0	3	Ericsson	AIR 6419 B77G	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
CCI Application	Crown Order Number 556518 Rev. 0	-	CCI
RF Data Sheet	AT&T RFDS #: CT5843, dated 7/28/2021	-	CCI
Mount Design	Sabre Drawing #: C10857011C Rev. 2, dated 10/19/2016	-	Sabre
Mount Modification Design Drawings	GPD Project #: 2020777.876328.20, dated 03/27/2020	9006356	CCI

3.1) Analysis Method

RISA-3D Edition (Version 17.0.4), 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 Mount Analysis (Revision D). In addition, this analysis is in accordance with AT&T's Mount Technical Directive – v15.

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) This analysis assumes all information reference in Table 2 is current and correct.
5) The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.
6) Steel grades have been assumed as follows, unless noted otherwise:

Solid Round, Plate	ASTM A572 (GR 50)
Angle	ASTM A36
Pipe	ASTM A500 (GR C-50) & ASTM A53 (GR B-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 3a - Mount Component Stresses vs. Capacity (Sector Mount, Alpha Sector)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontal	M8	92.0	31.7	Pass
	V-Boom Horizontal	M9		19.2	Pass
	V-Boom Bracing	M20		14.7	Pass
	Stiff Arm	M32		3.9	Pass
	Mount Pipe	A2		35.7	Pass
	Mod Stabilizer	M77		23.0	Pass
2	Mount to Tower Connection	-		20.2	Pass
	Tieback to Tower Connection	-		5.0	Pass
	Reinforcement to Tower Connection	-		10.8	Pass

Table 3b - Mount Component Stresses vs. Capacity (Sector Mount, Beta Sector)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontal	M36	92.0	34.7	Pass
	V-Boom Horizontal	M37		15.7	Pass
	V-Boom Bracing	M42		82.5	Pass
	Stiff Arm	M44		4.4	Pass
	Mount Pipe	B2		35.6	Pass
	Mod Stabilizer	M79		22.5	Pass
2	Mount to Tower Connection	-		16.5	Pass
	Tieback to Tower Connection	-		5.5	Pass
	Reinforcement to Tower Connection	-		10.6	Pass

Table 3c - Mount Component Stresses vs. Capacity (Sector Mount, Gamma Sector)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontal	M61	92.0	34.1	Pass
	V-Boom Horizontal	M62		17.0	Pass
	V-Boom Bracing	M68		13.7	Pass
	Stiff Arm	M69		4.5	Pass
	Mount Pipe	C2		34.7	Pass
	Mod Stabilizer	M81		22.6	Pass
2	Mount to Tower Connection	-		18.8	Pass
	Tieback to Tower Connection	-		5.6	Pass
	Reinforcement to Tower Connection	-		10.7	Pass

Structure Rating (max from all components) =	82.5%

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.

Table 4 - Tieback Connection Data Table

Tower Connection Node No.	Existing / Proposed	Resultant End Reaction (lb)	Connected Member Type	Connected Member Size	Member Compressive Capacity (lb)[3]	Notes
N61	Existing	882.0	Leg	Rohn 2.5 STD	3170.7	1
N92A	Existing	972.9	Leg	Rohn 2.5 STD	3170.7	1
N139	Existing	991.0	Leg	Rohn 2.5 STD	3170.7	1

Notes:
1) Tieback connection point is within 25% of either end of the connected tower member
2) Tieback connection point is NOT within 25% of either end of the connected tower member
3) Reduced member compressive capacity according to CED-STD-10294 Standard for Installation of Mounts and Appurtenances

4.1) Recommendations

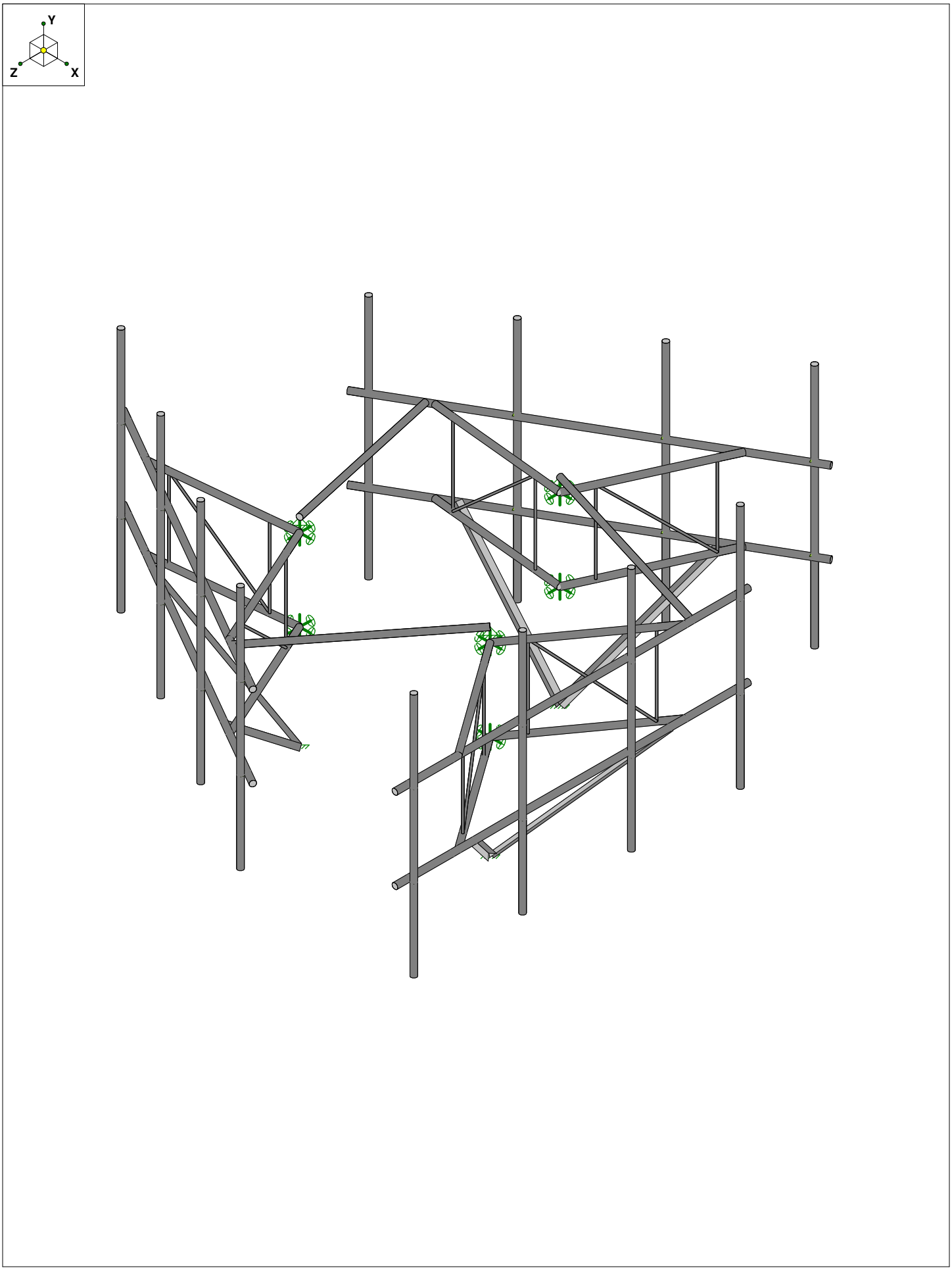
The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the structural modifications listed below must be completed.

1. Install (3) reinforcement kits, Site Pro 1 Part #: SFS-V-L

Engineering detail drawings have been provided in Appendix E – Supplemental Drawings. Connection from the mount to the tower and local stresses on the tower are sufficient.

APPENDIX A

WIRE FRAME AND RENDERED MODELS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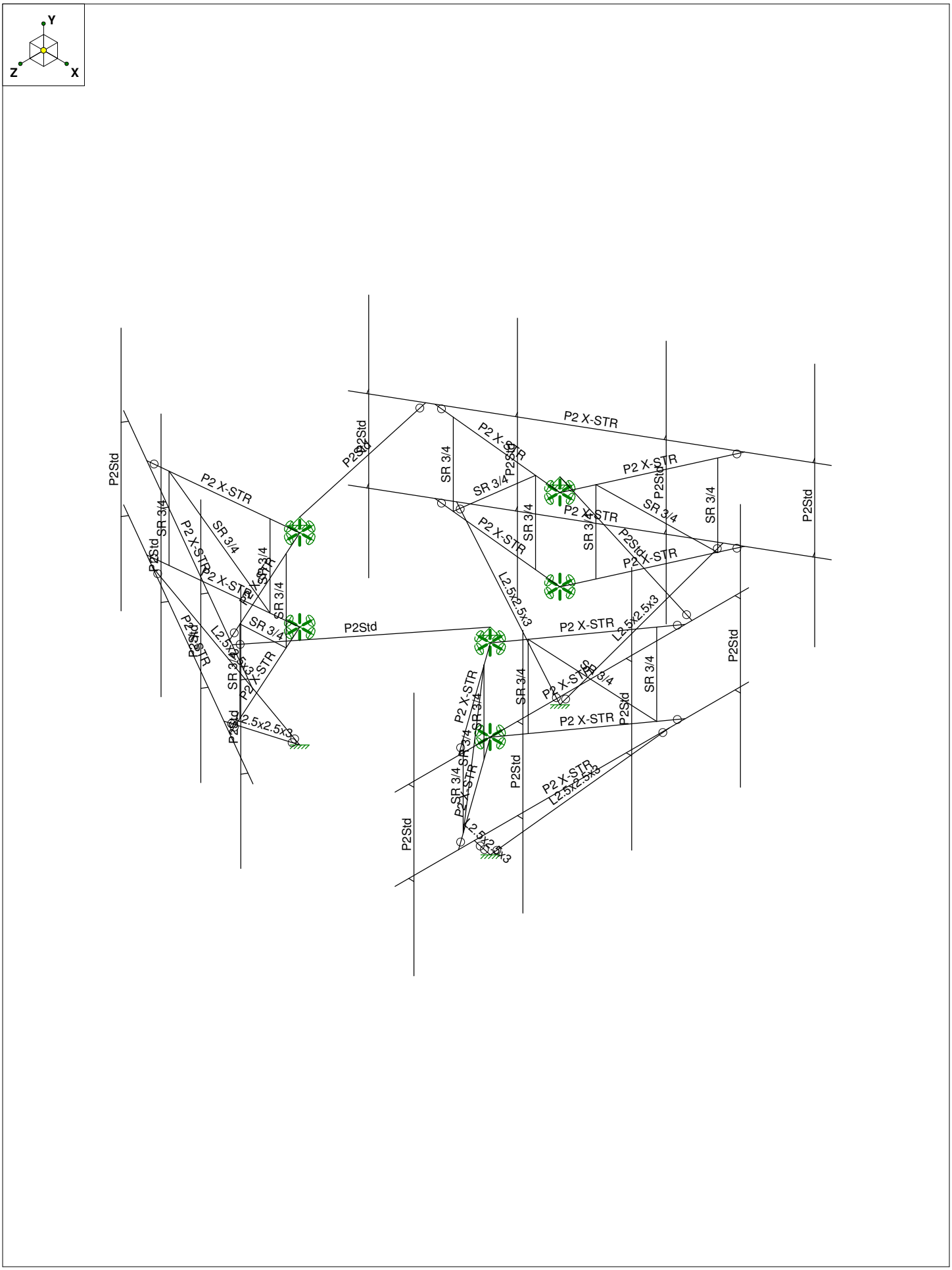
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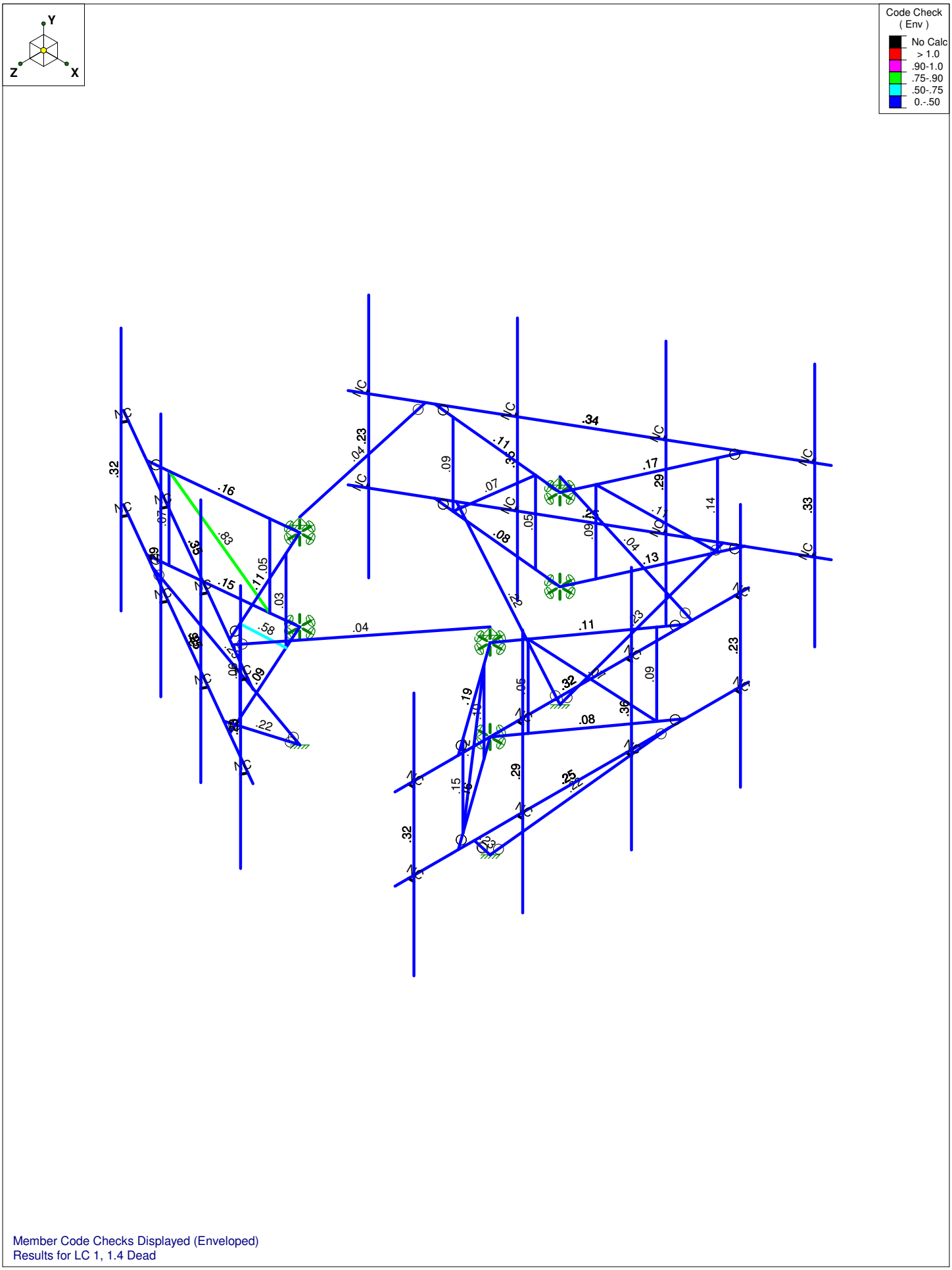
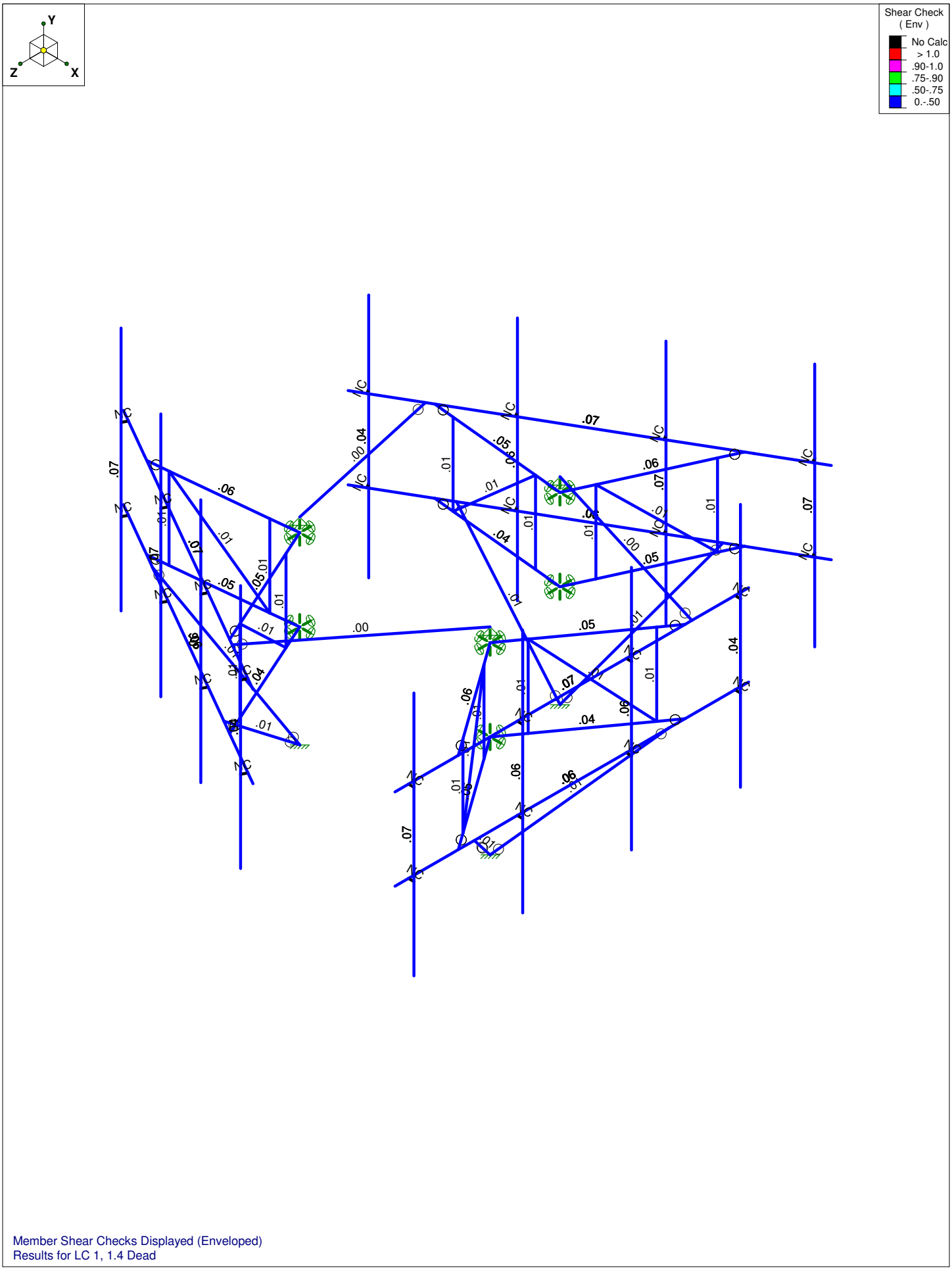
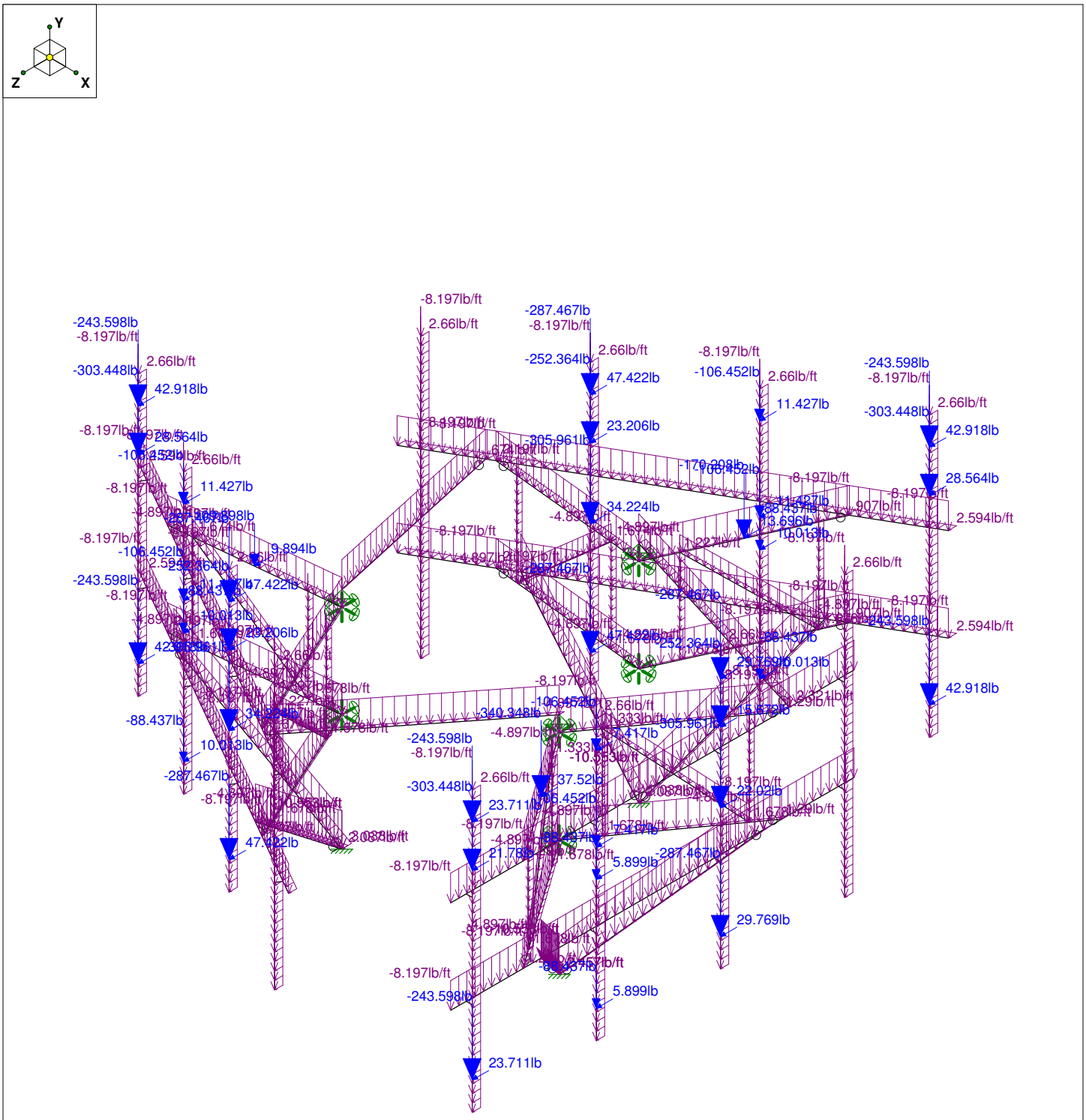


Member Code Checks Displayed (Enveloped)
Results for LC 1, 1.4 Dead



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



Loads: LC 29, 1.2 Dead + 1.0 Ice Wind @ 90°+ 1.0 Ice + 1.0 Temp

APPENDIX B

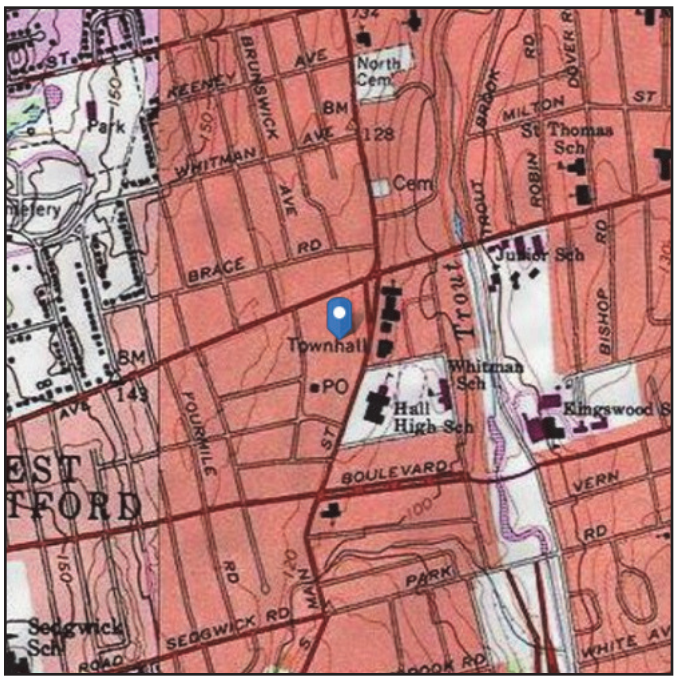
SOFTWARE INPUT CALCULATIONS

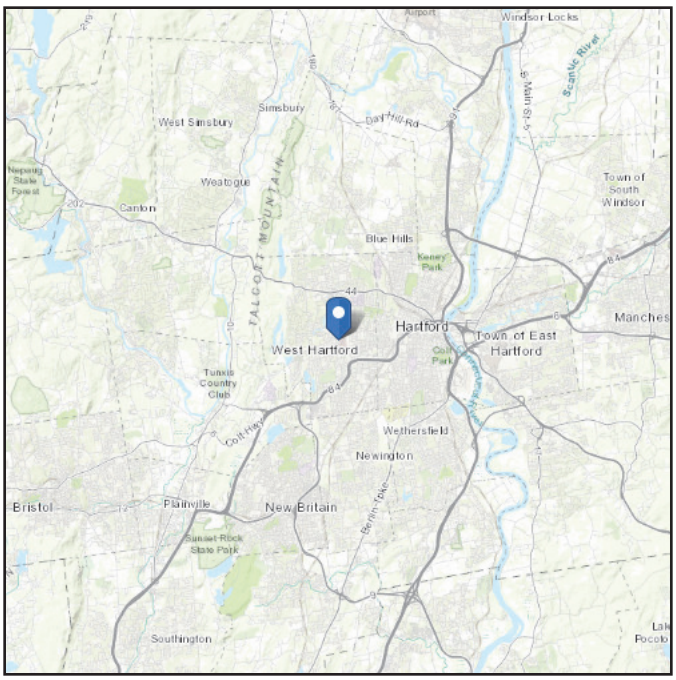
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Elevation: 126.05 ft (NAVD 88)
Latitude: 41.760114
Longitude: -72.743125





Wind

Results:

Wind Speed:	117 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	97 Vmph

Data Source:	ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed:	Tue Sep 07 2021

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 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 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

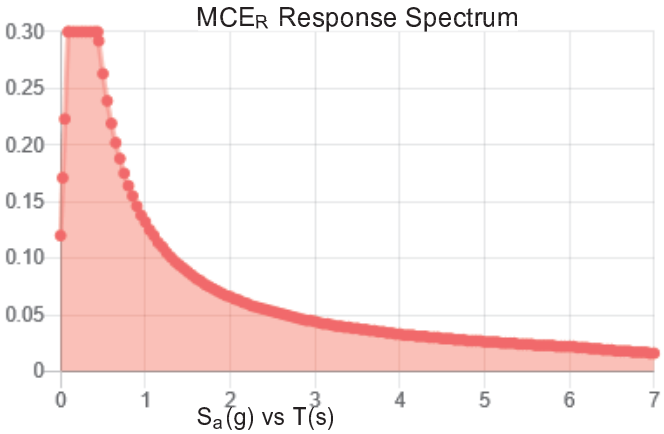
Seismic

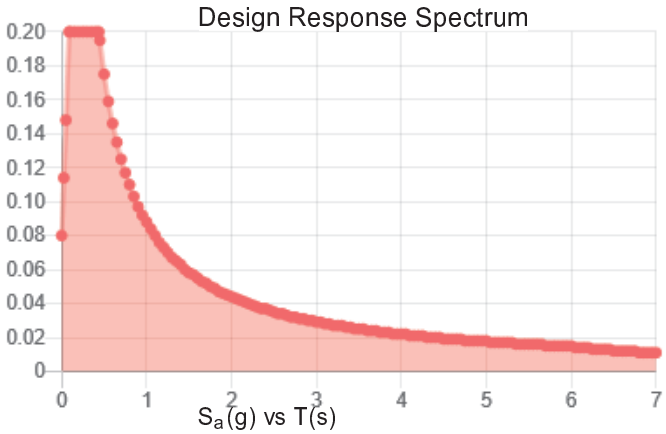
Site Soil Class: D - Default (see Section 11.4.3)

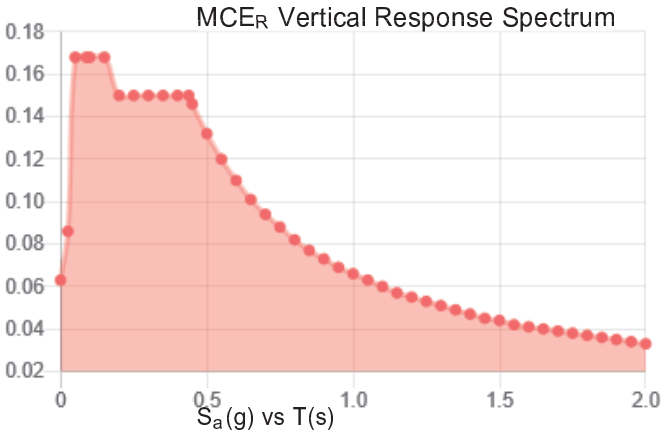
Results:

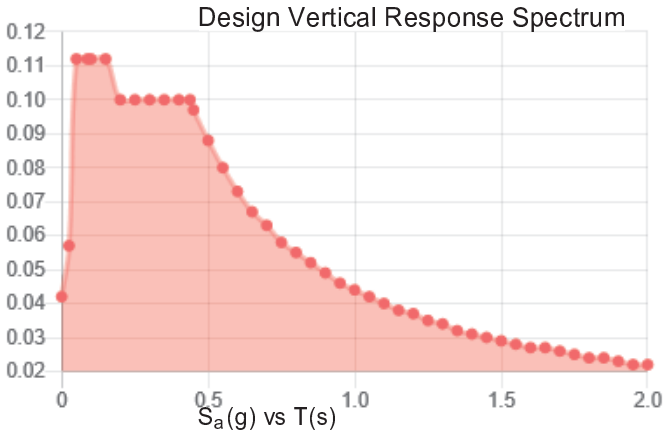
S_S :	0.187	S_{D1} :	0.088
S_1 :	0.055	T_L :	6
F_a :	1.6	PGA :	0.101
F_v :	2.4	PGA_M :	0.161
S_{MS} :	0.3	F_{PGA} :	1.598
S_{M1} :	0.132	I_e :	1
S_{DS} :	0.2	C_v :	0.7

Seismic Design Category B









Data Accessed: Tue Sep 07 2021

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.50 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Tue Sep 07 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 500-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.

TIA-222-H: Mount Analysis Wind Loading
876328 - WEST HARTFORD PARKING GARAGE
2021777.876328.29

Structure Information		
Structure Type:	Self Support	
Structure Height:	105.25	ft
z (Mount Centerline) =	92	ft
Gh (Mount Gust Effect Factor) =	1.00	
Risk Category:	II	

Code Specifications		
TIA/EIA Code:	H	
Ultimate Wind Speed (No Ice) =	117	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)	125	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)*
Face Horizontal	Pipe	156.000	2.375	2.375		2.38	Round	0.90	1.00	7.60	3.33	8.20
V-Boom Horizontal	Pipe	61.612	2.375	2.375		2.38	Round	0.90	1.00	7.60	2.45	8.20
V-Boom Bracing	Pipe	54.271	0.75	0.75		0.75	Round	0.90	1.00	2.40	1.86	4.90
Stiff Arm	Pipe	80.684	2.375	2.375		2.38	Round	0.90	1.00	7.60	2.66	8.20
Mount Pipe	Pipe	108.000	2.375	2.375		2.38	Round	0.90	1.00	7.60	2.96	8.20
Mod Stabilizer	Angle	71.903	2.5	2.5		3.54	Flat	0.90	1.00	13.33	3.41	10.55

*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) AIR 6449 B77D	91	30.39	15.87	8.07	81.6	CFD	0%	0%	0.90	104.44	81.60	25.64	114.98
(3) DMP65R-BU8D	89	96	20.7	7.7	105.6	CFD	0%	0%	0.90	452.18	105.60	99.18	360.48
(3) QD8616-7	89	96	22	9.6	150	Flat	0%	0%	0.90	536.43	150.00	107.10	394.93
(3) RRUS 32 B30	89	27.2	12.05	7	52.9	Flat	0%	0%	0.90	77.87	52.90	17.79	82.32
(3) RRUS 32 B66A	89	27.6	12.45	7.41	55.12	Flat	0%	0%	0.90	81.64	55.12	18.55	86.81
(3) RRUS 4415 B25_CCIV2	89	16.5	13.4	5.9	46	Flat	0%	0%	0.90	52.53	46.00	12.38	56.59
(3) RRUS 4449 B5/B12	89	17.9	13.19	9.44	71	Flat	0%	0%	0.90	56.10	71.00	13.13	72.45
(3) RRUS 4478 B14_CCIV2	89	18.1	13.4	8.26	59.4	Flat	0%	0%	0.90	57.63	59.40	13.44	69.29
(3) RRUS E2 B29	89	20.4	18.5	7.5	52.9	Flat	0%	0%	0.90	89.67	52.90	19.92	89.52
(2) DC6-48-60-0-8C-EV	89	31.4	10.24	18.28	26.2	Round	0%	0%	0.90	45.36	26.20	11.93	138.73
(1) DC6-48-60-18-8F	89	24	11	11	18.9	Round	0%	0%	0.90	36.59	18.90	9.89	87.22
(1) DC9-48-60-24-8C-EV	89	31.41	10.24	18.28	26.2	Round	0%	0%	0.90	45.38	26.20	11.93	138.77
(3) AIR 6419 B77G	87	27.95	15.75	6.68	66.2	Flat	0%	0%	0.90	103.91	66.20	22.88	97.43

*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 ...	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Face Horizontal	P2 X-STR	None	None	A572 Gr.50	Typical	1.477	.868	.868	1.736
2	V-Boom Horizontal	P2 X-STR	None	None	A572 Gr.50	Typical	1.477	.868	.868	1.736
3	V-Boom Bracing	SR 3/4	None	None	A572 Gr.50	Typical	.442	.016	.016	.031
4	Stiff Arm	P2Std	None	None	A572 Gr.50	Typical	1.075	.666	.666	1.331
5	Mount Pipe	P2Std	None	None	A53 Gr.B	Typical	1.075	.666	.666	1.331
6	Mod Stabilizer	L2.5x2.5x3	None	None	A36 Gr.36	Typical	.901	.535	.535	.011

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	DL		-1			48			
2	No Ice Wind 0 deg	None					48	57		
3	No Ice Wind 30 deg	None					96	110		
4	No Ice Wind 60 deg	None					96	114		
5	No Ice Wind 90 deg	None					48	55		
6	No Ice Wind 120 deg	None					96	114		
7	No Ice Wind 150 deg	None					96	110		
8	No Ice Wind 180 deg	None					48	57		
9	No Ice Wind 210 deg	None					96	110		
10	No Ice Wind 240 deg	None					96	114		
11	No Ice Wind 270 deg	None					48	55		
12	No Ice Wind 300 deg	None					96	114		
13	No Ice Wind 330 deg	None					96	110		
14	Ice Weight	None					48	57		
15	Ice Wind 0 deg	None					48	57		
16	Ice Wind 30 deg	None					96	110		
17	Ice Wind 60 deg	None					96	114		
18	Ice Wind 90 deg	None					48	55		
19	Ice Wind 120 deg	None					96	114		
20	Ice Wind 150 deg	None					96	110		
21	Ice Wind 180 deg	None					48	57		
22	Ice Wind 210 deg	None					96	110		
23	Ice Wind 240 deg	None					96	114		
24	Ice Wind 270 deg	None					48	55		
25	Ice Wind 300 deg	None					96	114		
26	Ice Wind 330 deg	None					96	110		
27	Live Load - A1	None					1			
28	Live Load - A2	None					1			
29	Live Load - A3	None					1			
30	Live Load - A4	None					1			
31	Live Load - B1	None					1			
32	Live Load - B2	None					1			
33	Live Load - B3	None					1			
34	Live Load - B4	None					1			

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
35	Live Load - C1	None					1			
36	Live Load - C2	None					1			
37	Live Load - C3	None					1			
38	Live Load - C4	None					1			
39	Live Load - M1 (Start)	None					1			
40	Live Load - M1 (Midd...	None					1			
41	Live Load - M1 (End)	None					1			
42	Live Load - M2 (Start)	None					1			
43	Live Load - M2 (Midd...	None					1			
44	Live Load - M2 (End)	None					1			
45	Live Load - M3 (Start)	None					1			
46	Live Load - M3 (Midd...	None					1			
47	Live Load - M3 (End)	None					1			
48	Live Load - M8 (Start)	None					1			
49	Live Load - M8 (Midd...	None					1			
50	Live Load - M8 (End)	None					1			
51	Live Load - M9 (Start)	None					1			
52	Live Load - M9 (Midd...	None					1			
53	Live Load - M9 (End)	None					1			
54	Live Load - M10 (Start)	None					1			
55	Live Load - M10 (Mid...	None					1			
56	Live Load - M10 (End)	None					1			
57	Live Load - M32A (St...	None					1			
58	Live Load - M32A (Mi...	None					1			
59	Live Load - M32A (E...	None					1			
60	Live Load - M33 (Start)	None					1			
61	Live Load - M33 (Mid...	None					1			
62	Live Load - M33 (End)	None					1			
63	Live Load - M34 (Start)	None					1			
64	Live Load - M34 (Mid...	None					1			
65	Live Load - M34 (End)	None					1			
66	Live Load - M36 (Start)	None					1			
67	Live Load - M36 (Mid...	None					1			
68	Live Load - M36 (End)	None					1			
69	Live Load - M37 (Start)	None					1			
70	Live Load - M37 (Mid...	None					1			
71	Live Load - M37 (End)	None					1			
72	Live Load - M38 (Start)	None					1			
73	Live Load - M38 (Mid...	None					1			
74	Live Load - M38 (End)	None					1			
75	Live Load - M57 (Start)	None					1			
76	Live Load - M57 (Mid...	None					1			
77	Live Load - M57 (End)	None					1			
78	Live Load - M58 (Start)	None					1			
79	Live Load - M58 (Mid...	None					1			
80	Live Load - M58 (End)	None					1			
81	Live Load - M59A (St...	None					1			
82	Live Load - M59A (Mi...	None					1			
83	Live Load - M59A (E...	None					1			
84	Live Load - M61 (Start)	None					1			
85	Live Load - M61 (Mid...	None					1			
86	Live Load - M61 (End)	None					1			
87	Live Load - M62 (Start)	None					1			
88	Live Load - M62 (Mid...	None					1			
89	Live Load - M62 (End)	None					1			
90	Live Load - M63 (Start)	None					1			
91	Live Load - M63 (Mid...	None					1			

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
92	Live Load - M63 (End)	None					1			

Load Combinations

	Description	S...	PDelta	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 ...	Yes	Y		1	1.2	2	1	0		0		0		0		0		0					
3	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	2	1	0		0		0		0		0		0					
4	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	3	1	0		0		0		0		0		0					
5	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	3	1	0		0		0		0		0		0					
6	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	4	1	0		0		0		0		0		0					
7	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	4	1	0		0		0		0		0		0					
8	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	5	1	0		0		0		0		0		0					
9	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	5	1	0		0		0		0		0		0					
10	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	6	1	0		0		0		0		0		0					
11	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	6	1	0		0		0		0		0		0					
12	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	7	1	0		0		0		0		0		0					
13	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	7	1	0		0		0		0		0		0					
14	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	8	1	0		0		0		0		0		0					
15	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	8	1	0		0		0		0		0		0					
16	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	9	1	0		0		0		0		0		0					
17	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	9	1	0		0		0		0		0		0					
18	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	10	1	0		0		0		0		0		0					
19	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	10	1	0		0		0		0		0		0					
20	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	11	1	0		0		0		0		0		0					
21	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	11	1	0		0		0		0		0		0					
22	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	12	1	0		0		0		0		0		0					
23	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	12	1	0		0		0		0		0		0					
24	1.2 Dead + 1.0 Wind ...	Yes	Y		1	1.2	13	1	0		0		0		0		0		0					
25	0.9 Dead + 1.0 Wind ...	Yes	Y		1	.9	13	1	0		0		0		0		0		0					
26	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	15	1	14	1		1	0		0		0		0					
27	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	16	1	14	1		1	0		0		0		0					
28	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	17	1	14	1		1	0		0		0		0					
29	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	18	1	14	1		1	0		0		0		0					
30	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	19	1	14	1		1	0		0		0		0					
31	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	20	1	14	1		1	0		0		0		0					
32	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	21	1	14	1		1	0		0		0		0					
33	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	22	1	14	1		1	0		0		0		0					
34	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	23	1	14	1		1	0		0		0		0					
35	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	24	1	14	1		1	0		0		0		0					
36	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	25	1	14	1		1	0		0		0		0					
37	1.2 Dead + 1.0 Ice Wi...	Yes	Y		1	1.2	26	1	14	1		1	0		0		0		0					
38	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	2	.066	0		0		0		0		0					
39	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	3	.066	0		0		0		0		0					
40	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	4	.066	0		0		0		0		0					
41	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	5	.066	0		0		0		0		0					
42	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	6	.066	0		0		0		0		0					
43	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	7	.066	0		0		0		0		0					
44	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	8	.066	0		0		0		0		0					
45	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	9	.066	0		0		0		0		0					
46	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	10	.066	0		0		0		0		0					
47	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	11	.066	0		0		0		0		0					
48	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	12	.066	0		0		0		0		0					
49	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	27	1.5	13	.066	0		0		0		0		0					
50	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	2	.066	0		0		0		0		0					
51	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	3	.066	0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
52	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	4	.066	0		0		0		0		0					
53	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	5	.066	0		0		0		0		0					
54	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	6	.066	0		0		0		0		0					
55	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	7	.066	0		0		0		0		0					
56	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	8	.066	0		0		0		0		0					
57	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	9	.066	0		0		0		0		0					
58	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	10	.066	0		0		0		0		0					
59	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	11	.066	0		0		0		0		0					
60	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	12	.066	0		0		0		0		0					
61	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	28	1.5	13	.066	0		0		0		0		0					
62	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	2	.066	0		0		0		0		0					
63	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	3	.066	0		0		0		0		0					
64	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	4	.066	0		0		0		0		0					
65	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	5	.066	0		0		0		0		0					
66	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	6	.066	0		0		0		0		0					
67	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	7	.066	0		0		0		0		0					
68	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	8	.066	0		0		0		0		0					
69	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	9	.066	0		0		0		0		0					
70	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	10	.066	0		0		0		0		0					
71	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	11	.066	0		0		0		0		0					
72	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	12	.066	0		0		0		0		0					
73	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	29	1.5	13	.066	0		0		0		0		0					
74	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	2	.066	0		0		0		0		0					
75	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	3	.066	0		0		0		0		0					
76	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	4	.066	0		0		0		0		0					
77	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	5	.066	0		0		0		0		0					
78	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	6	.066	0		0		0		0		0					
79	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	7	.066	0		0		0		0		0					
80	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	8	.066	0		0		0		0		0					
81	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	9	.066	0		0		0		0		0					
82	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	10	.066	0		0		0		0		0					
83	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	11	.066	0		0		0		0		0					
84	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	12	.066	0		0		0		0		0					
85	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	30	1.5	13	.066	0		0		0		0		0					
86	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	2	.066	0		0		0		0		0					
87	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	3	.066	0		0		0		0		0					
88	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	4	.066	0		0		0		0		0					
89	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	5	.066	0		0		0		0		0					
90	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	6	.066	0		0		0		0		0					
91	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	7	.066	0		0		0		0		0					
92	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	8	.066	0		0		0		0		0					
93	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	9	.066	0		0		0		0		0					
94	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	10	.066	0		0		0		0		0					
95	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	11	.066	0		0		0		0		0					
96	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	12	.066	0		0		0		0		0					
97	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	31	1.5	13	.066	0		0		0		0		0					
98	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	2	.066	0		0		0		0		0					
99	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	3	.066	0		0		0		0		0					
100	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	4	.066	0		0		0		0		0					
101	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	5	.066	0		0		0		0		0					
102	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	6	.066	0		0		0		0		0					
103	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	7	.066	0		0		0		0		0					
104	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	8	.066	0		0		0		0		0					
105	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	9	.066	0		0		0		0		0					
106	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	10	.066	0		0		0		0		0					
107	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	11	.066	0		0		0		0		0					
108	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	12	.066	0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
109	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	32	1.5	13	.066	0		0		0		0		0					
110	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	2	.066	0		0		0		0		0					
111	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	3	.066	0		0		0		0		0					
112	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	4	.066	0		0		0		0		0					
113	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	5	.066	0		0		0		0		0					
114	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	6	.066	0		0		0		0		0					
115	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	7	.066	0		0		0		0		0					
116	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	8	.066	0		0		0		0		0					
117	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	9	.066	0		0		0		0		0					
118	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	10	.066	0		0		0		0		0					
119	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	11	.066	0		0		0		0		0					
120	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	12	.066	0		0		0		0		0					
121	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	33	1.5	13	.066	0		0		0		0		0					
122	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	2	.066	0		0		0		0		0					
123	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	3	.066	0		0		0		0		0					
124	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	4	.066	0		0		0		0		0					
125	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	5	.066	0		0		0		0		0					
126	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	6	.066	0		0		0		0		0					
127	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	7	.066	0		0		0		0		0					
128	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	8	.066	0		0		0		0		0					
129	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	9	.066	0		0		0		0		0					
130	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	10	.066	0		0		0		0		0					
131	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	11	.066	0		0		0		0		0					
132	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	12	.066	0		0		0		0		0					
133	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	34	1.5	13	.066	0		0		0		0		0					
134	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	2	.066	0		0		0		0		0					
135	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	3	.066	0		0		0		0		0					
136	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	4	.066	0		0		0		0		0					
137	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	5	.066	0		0		0		0		0					
138	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	6	.066	0		0		0		0		0					
139	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	7	.066	0		0		0		0		0					
140	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	8	.066	0		0		0		0		0					
141	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	9	.066	0		0		0		0		0					
142	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	10	.066	0		0		0		0		0					
143	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	11	.066	0		0		0		0		0					
144	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	12	.066	0		0		0		0		0					
145	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	35	1.5	13	.066	0		0		0		0		0					
146	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	2	.066	0		0		0		0		0					
147	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	3	.066	0		0		0		0		0					
148	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	4	.066	0		0		0		0		0					
149	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	5	.066	0		0		0		0		0					
150	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	6	.066	0		0		0		0		0					
151	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	7	.066	0		0		0		0		0					
152	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	8	.066	0		0		0		0		0					
153	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	9	.066	0		0		0		0		0					
154	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	10	.066	0		0		0		0		0					
155	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	11	.066	0		0		0		0		0					
156	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	12	.066	0		0		0		0		0					
157	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	36	1.5	13	.066	0		0		0		0		0					
158	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	2	.066	0		0		0		0		0					
159	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	3	.066	0		0		0		0		0					
160	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	4	.066	0		0		0		0		0					
161	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	5	.066	0		0		0		0		0					
162	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	6	.066	0		0		0		0		0					
163	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	7	.066	0		0		0		0		0					
164	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	8	.066	0		0		0		0		0					
165	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	9	.066	0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
166	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	10	.066	0		0		0		0		0					
167	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	11	.066	0		0		0		0							
168	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	12	.066	0		0		0		0							
169	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	37	1.5	13	.066	0		0		0		0							
170	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	2	.066	0		0		0		0							
171	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	3	.066	0		0		0		0							
172	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	4	.066	0		0		0		0							
173	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	5	.066	0		0		0		0							
174	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	6	.066	0		0		0		0							
175	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	7	.066	0		0		0		0							
176	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	8	.066	0		0		0		0							
177	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	9	.066	0		0		0		0							
178	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	10	.066	0		0		0		0							
179	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	11	.066	0		0		0		0							
180	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	12	.066	0		0		0		0							
181	1.2 Dead + 1.5 Live_...	Yes	Y		1	1.2	38	1.5	13	.066	0		0		0		0							
182	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	39	1.5	0		0		0		0		0							
183	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	40	1.5	0		0		0		0		0							
184	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	41	1.5	0		0		0		0		0							
185	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	42	1.5	0		0		0		0		0							
186	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	43	1.5	0		0		0		0		0							
187	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	44	1.5	0		0		0		0		0							
188	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	45	1.5	0		0		0		0		0							
189	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	46	1.5	0		0		0		0		0							
190	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	47	1.5	0		0		0		0		0							
191	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	48	1.5	0		0		0		0		0							
192	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	49	1.5	0		0		0		0		0							
193	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	50	1.5	0		0		0		0		0							
194	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	51	1.5	0		0		0		0		0							
195	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	52	1.5	0		0		0		0		0							
196	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	53	1.5	0		0		0		0		0							
197	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	54	1.5	0		0		0		0		0							
198	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	55	1.5	0		0		0		0		0							
199	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	56	1.5	0		0		0		0		0							
200	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	57	1.5	0		0		0		0		0							
201	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	58	1.5	0		0		0		0		0							
202	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	59	1.5	0		0		0		0		0							
203	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	60	1.5	0		0		0		0		0							
204	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	61	1.5	0		0		0		0		0							
205	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	62	1.5	0		0		0		0		0							
206	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	63	1.5	0		0		0		0		0							
207	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	64	1.5	0		0		0		0		0							
208	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	65	1.5	0		0		0		0		0							
209	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	66	1.5	0		0		0		0		0							
210	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	67	1.5	0		0		0		0		0							
211	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	68	1.5	0		0		0		0		0							
212	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	69	1.5	0		0		0		0		0							
213	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	70	1.5	0		0		0		0		0							
214	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	71	1.5	0		0		0		0		0							
215	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	72	1.5	0		0		0		0		0							
216	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	73	1.5	0		0		0		0		0							
217	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	74	1.5	0		0		0		0		0							
218	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	75	1.5	0		0		0		0		0							
219	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	76	1.5	0		0		0		0		0							
220	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	77	1.5	0		0		0		0		0							
221	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	78	1.5	0		0		0		0		0							
222	1.2 Dead + 1.5 Live_V...	Yes	Y		1	1.2	79	1.5	0		0		0		0		0							

Load Combinations (Continued)

	Description	S...	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
223	1.2 Dead + 1.5 Live_V..	Yes	Y		1	1.2	80	1.5	0		0		0		0		0							
224	1.2 Dead + 1.5 Live_V..	Yes	Y		1	1.2	81	1.5	0		0		0		0		0							
225	1.2 Dead + 1.5 Live_V..	Yes	Y		1	1.2	82	1.5	0		0		0		0		0							
226	1.2 Dead + 1.5 Live_V..	Yes	Y		1	1.2	83	1.5	0		0		0		0		0							
227	1.2 Dead + 1.5 Live_V..	Yes	Y		1	1.2	84	1.5	0		0		0		0		0							
228	1.2 Dead + 1.5 Live_V..	Yes	Y		1	1.2	85	1.5	0		0		0		0		0							
229	1.2 Dead + 1.5 Live_V..	Yes	Y		1	1.2	86	1.5	0		0		0		0		0							
230	1.2 Dead + 1.5 Live_V..	Yes	Y		1	1.2	87	1.5	0		0		0		0		0							
231	1.2 Dead + 1.5 Live_V..	Yes	Y		1	1.2	88	1.5	0		0		0		0		0							
232	1.2 Dead + 1.5 Live_V..	Yes	Y		1	1.2	89	1.5	0		0		0		0		0							
233	1.2 Dead + 1.5 Live_V..	Yes	Y		1	1.2	90	1.5	0		0		0		0		0							
234	1.2 Dead + 1.5 Live_V..	Yes	Y		1	1.2	91	1.5	0		0		0		0		0							
235	1.2 Dead + 1.5 Live_V..	Yes	Y		1	1.2	92	1.5	0		0		0		0		0							

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N21	max	1659.928	15	1318.466	26	681.277	47	.136	39	0	235	.618	26
2		min	-2783.312	2	218.981	13	-1319.481	77	-.38	34	0	1	-.04	15
3	N4	max	592.308	80	1054.995	27	1074.828	33	.089	40	0	235	.479	31
4		min	-314.885	3	13.013	17	-535.686	5	-.359	34	0	1	.104	3
5	N61	max	847.462	22	80.44	10	232.515	22	0	235	0	235	0	235
6		min	-847.032	10	-54.68	23	-232.499	10	0	1	0	1	0	1
7	N51	max	602.048	11	1073.326	31	657.729	94	-.029	3	0	235	-.014	91
8		min	-1157	22	42.199	25	-390.656	100	-.31	216	0	1	-.499	26
9	N62	max	1835.716	31	1085.556	29	2007.663	21	.091	23	0	235	-.006	95
10		min	-313.707	25	197.902	21	-2690.43	8	-.305	207	0	1	-.433	29
11	N92A	max	683.565	20	87.9	20	687.234	9	0	235	0	235	0	235
12		min	-684.139	8	-62.33	9	-686.664	20	0	1	0	1	0	1
13	N98A	max	735.536	8	937.448	35	496.848	19	.504	29	0	235	.12	174
14		min	-576.581	143	.371	9	-984.849	172	.089	21	0	1	-.218	234
15	N109A	max	1864.421	16	1283.06	33	2329.348	34	.633	33	0	235	.149	9
16		min	-1781.74	5	210.805	5	-1052.04	7	.016	5	0	1	-.275	143
17	N139	max	258.488	4	88.963	4	952.565	4	0	235	0	235	0	235
18		min	-258.719	17	-63.323	17	-953.419	16	0	1	0	1	0	1
19	N140	max	1478.788	32	1910.22	32	371.207	74	0	13	0	13	0	27
20		min	80.023	3	193.96	3	-345.141	44	0	24	0	24	0	17
21	N144	max	-28.626	21	1873.89	37	1275.829	36	0	3	0	21	0	21
22		min	-782.665	113	253.166	13	-46.505	11	0	32	0	8	0	29
23	N148	max	217.652	19	1892.724	29	-170.875	21	0	34	0	5	0	17
24		min	-783.32	148	196.633	19	-1267.854	29	0	7	0	16	0	4
25	Totals:	max	5674.569	14	12096.021	30	5749.319	20						
26		min	-5674.566	3	3325.895	25	-5749.309	9						

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

	Member	Shape	Code ...	Loc[...	LC	Shear...	Loc[in]	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	M42	SR 3/4	.825	0	29	.010	0		10	3086.797	19880.37	.249	.249	2...	H1-1a
2	M40	SR 3/4	.580	0	90	.006	0		12	3086.797	19880.37	.249	.249	2...	H1-1a
3	A2	P2Std	.357	36	14	.062	36		18	12899....	33862.5	1.998	1.998	1...	H1-1b
4	B2	P2Std	.356	72	20	.064	36		8	12899....	33862.5	1.998	1.998	3...	H1-1b
5	M36	P2 X-STR	.347	102...	8	.069	27.625		10	8056.953	66476....	3.816	3.816	3...	H1-1a
6	C2	P2Std	.347	36	6	.064	36		16	12899....	33862.5	1.998	1.998	1...	H1-1b
7	M61	P2 X-STR	.341	102...	16	.070	27.625		18	8056.953	66476....	3.816	3.816	3...	H1-1a
8	C4	P2Std	.327	36	6	.072	36		18	12899....	33862.5	1.998	1.998	1...	H1-1b
9	A4	P2Std	.322	72	80	.072	36		2	12899....	33862.5	1.998	1.998	2...	H1-1b

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

	Member	Shape	Code ...	Loc[...	LC	Shear...	Loc[in]	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn ...	phi*Mn ...	Cb	Eqn
10	B4	P2Std	.319	72	132	.073	36		10	12899....	33862.5	1.998	1.998	4...	H1-1b
11	M8	P2 X-STR	.317	102....	24	.071	130		18	8056.953	66476....	3.816	3.816	3...	H1-1a
12	C3	P2Std	.294	72	32	.069	36		16	12899....	33862.5	1.998	1.998	4...	H1-1b
13	A3	P2Std	.289	72	36	.059	36		24	12899....	33862.5	1.998	1.998	4...	H1-1b
14	B3	P2Std	.288	72	29	.068	36		8	12899....	33862.5	1.998	1.998	4...	H1-1b
15	M1	P2 X-STR	.254	34.1...	36	.060	120.25		14	8056.953	66476....	3.816	3.816	1...	H1-1b
16	M57	P2 X-STR	.253	34.1...	33	.064	120.25		4	8056.953	66476....	3.816	3.816	1...	H1-1b
17	M32A	P2 X-STR	.250	34.1...	29	.064	120.25		20	8056.953	66476....	3.816	3.816	2...	H1-1b
18	A1	P2Std	.235	72	46	.038	36		46	12899....	33862.5	1.998	1.998	3...	H1-1b
19	C1	P2Std	.235	72	137	.038	36		138	12899....	33862.5	1.998	1.998	4...	H1-1b
20	B1	P2Std	.233	72	86	.038	36		86	12899....	33862.5	1.998	1.998	4...	H1-1b
21	M77	L2.5x2.5x3	.230	35.2...	26	.009	71.903	y	29	9146.779	29192.4	.873	1.532	1...	H2-1
22	M81	L2.5x2.5x3	.226	35.2...	34	.009	0	y	26	9146.779	29192.4	.873	1.532	1...	H2-1
23	M79	L2.5x2.5x3	.225	35.2...	29	.009	0	y	32	9146.779	29192.4	.873	1.532	1...	H2-1
24	M78	L2.5x2.5x3	.219	35.2...	37	.014	0	z	29	9146.779	29192.4	.873	1.532	1...	H2-1
25	M80	L2.5x2.5x3	.217	35.2...	28	.013	0	z	33	9146.779	29192.4	.873	1.532	1...	H2-1
26	M76	L2.5x2.5x3	.217	35.2...	34	.013	0	z	26	9146.779	29192.4	.873	1.532	1...	H2-1
27	M9	P2 X-STR	.192	61.6...	37	.058	61.612		33	41447.89	66476....	3.816	3.816	2...	H1-1b
28	M62	P2 X-STR	.170	61.6...	33	.056	61.612		29	41447.89	66476....	3.816	3.816	2...	H1-1b
29	M2	P2 X-STR	.159	61.6...	34	.052	61.612		26	41447.89	66476....	3.816	3.816	3...	H1-1b
30	M37	P2 X-STR	.157	9.627	26	.056	8.985		133	41447.89	66476....	3.816	3.816	2...	H1-1b
31	M33	P2 X-STR	.150	61.6...	37	.051	61.612		29	41447.89	66476....	3.816	3.816	3...	H1-1b
32	M20	SR 3/4	.147	0	34	.012	36		22	8255.901	19880.37	.249	.249	1	H1-1b*
33	M68	SR 3/4	.137	0	30	.010	36		14	8255.901	19880.37	.249	.249	1	H1-1b*
34	M58	P2 X-STR	.133	61.6...	29	.047	61.612		33	41447.89	66476....	3.816	3.816	3...	H1-1b
35	M19	SR 3/4	.115	54.2...	35	.008	54.271		14	3086.797	19880.37	.249	.249	2...	H1-1b
36	M67	SR 3/4	.113	54.2...	32	.007	54.271		6	3086.797	19880.37	.249	.249	2...	H1-1b
37	M38	P2 X-STR	.112	9.627	89	.051	8.985		29	41447.89	66476....	3.816	3.816	1...	H1-1b
38	M63	P2 X-STR	.108	8.985	141	.050	8.985		33	41447.89	66476....	3.816	3.816	1...	H1-1b
39	M10	P2 X-STR	.108	8.985	49	.049	8.985		37	41447.89	66476....	3.816	3.816	1...	H1-1b
40	AS2	SR 3/4	.102	0	27	.006	0		18	8255.901	19880.37	.249	.249	1	H1-1b*
41	M34	P2 X-STR	.093	61.6...	91	.037	61.612		29	41447.89	66476....	3.816	3.816	2...	H1-1b
42	M66	SR 3/4	.092	36	140	.010	36		16	8255.901	19880.37	.249	.249	1	H1-1b
43	M17	SR 3/4	.092	36	49	.009	36		22	8255.901	19880.37	.249	.249	2...	H1-1b
44	M56	SR 3/4	.088	0	35	.006	36		16	8255.901	19880.37	.249	.249	1	H1-1b*
45	M3	P2 X-STR	.077	61.6...	198	.037	0		16	41447.89	66476....	3.816	3.816	2...	H1-1b
46	M59A	P2 X-STR	.077	61.6...	234	.037	0		8	41447.89	66476....	3.816	3.816	2...	H1-1b
47	M16	SR 3/4	.072	54.2...	28	.006	0		14	3086.797	19880.37	.249	.249	2...	H1-1b
48	M43	SR 3/4	.072	36	29	.010	36		8	8255.901	19880.37	.249	.249	1	H1-1b
49	M65	SR 3/4	.071	54.2...	37	.006	0		6	3086.797	19880.37	.249	.249	2...	H1-1b
50	M41	SR 3/4	.059	36	90	.010	36		8	8255.901	19880.37	.249	.249	2...	H1-1b
51	AS1	SR 3/4	.053	0	39	.007	36		18	8255.901	19880.37	.249	.249	1	H1-1b*
52	M55	SR 3/4	.053	0	143	.008	36		16	8255.901	19880.37	.249	.249	2...	H1-1b*
53	M31	SR 3/4	.047	0	26	.007	0		2	8255.901	19880.37	.249	.249	2...	H1-1b
54	M69	P2Std	.045	0	16	.003	0		26	22436....	48375	2.854	2.854	1...	H1-1b*
55	M44	P2Std	.044	0	8	.003	80.684		27	22436....	48375	2.854	2.854	1...	H1-1b*
56	M32	P2Std	.039	0	22	.003	80.684		35	22436....	48375	2.854	2.854	1...	H1-1b*
57	M30	SR 3/4	.034	0	207	.008	36		8	8255.901	19880.37	.249	.249	1	H1-1b

APPENDIX D

ADDITIONAL CALCULATIONS

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Alpha Sector
2021777.876328.29

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	2.5	in
Bolt Distance Left-Right	6.5	in
Bolt Grade	A307	
Bolt Tensile Strength (F_{ub})	60	ksi

RISA 3D Reactions (Up-Down)		
Moment (M)	0.62	k-ft
Axial (T)	2.29	kips
Shear (V)	1.59	kips

RISA 3D Reactions (Left -Right)		
Moment (M)	0.00	k-ft
Axial (T)	2.78	kips
Shear (V)	0.60	kips

Bolt Capacity (Up-Down)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	2.05	kips
Bolt Shear Force (V_{ub})	0.398	kips
$T_{ub}/\phi R_{nt}$	0.20201	
$V_{ub}/\phi R_{nv}$	0.05770	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.04414	
Bolt Capacity =	20.2%	OK

Bolt Capacity (Left-Right)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	0.70	kips
Bolt Shear Force (V_{ub})	0.150	kips
$T_{ub}/\phi R_{nt}$	0.06842	
$V_{ub}/\phi R_{nv}$	0.02170	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00515	
Bolt Capacity =	6.8%	OK

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Beta Sector
2021777.876328.29

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	2.5	in
Bolt Distance Left-Right	6.5	in
Bolt Grade	A307	
Bolt Tensile Strength (F_{ub})	60	ksi

RISA 3D Reactions (Up-Down)		
Moment (M)	0.46	k-ft
Axial (T)	2.26	kips
Shear (V)	1.29	kips

RISA 3D Reactions (Left -Right)		
Moment (M)	0.00	k-ft
Axial (T)	2.81	kips
Shear (V)	0.72	kips

Bolt Capacity (Up-Down)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	1.68	kips
Bolt Shear Force (V_{ub})	0.323	kips
$T_{ub}/\phi R_{nt}$	0.16514	
$V_{ub}/\phi R_{nv}$	0.04680	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.02946	
Bolt Capacity =	16.5%	OK

Bolt Capacity (Left-Right)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	0.70	kips
Bolt Shear Force (V_{ub})	0.179	kips
$T_{ub}/\phi R_{nt}$	0.06905	
$V_{ub}/\phi R_{nv}$	0.02593	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00544	
Bolt Capacity =	6.9%	OK

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Gamma Sector
2021777.876328.29

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	2.5	in
Bolt Distance Left-Right	6.5	in
Bolt Grade	A307	
Bolt Tensile Strength (F_{ub})	60	ksi

RISA 3D Reactions (Up-Down)		
Moment (M)	0.57	k-ft
Axial (T)	2.19	kips
Shear (V)	1.55	kips

RISA 3D Reactions (Left -Right)		
Moment (M)	0.00	k-ft
Axial (T)	2.79	kips
Shear (V)	0.81	kips

Bolt Capacity (Up-Down)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	1.91	kips
Bolt Shear Force (V_{ub})	0.387	kips
$T_{ub}/\phi R_{nt}$	0.18811	
$V_{ub}/\phi R_{nv}$	0.05613	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.03854	
Bolt Capacity =	18.8%	OK

Bolt Capacity (Left-Right)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	0.70	kips
Bolt Shear Force (V_{ub})	0.203	kips
$T_{ub}/\phi R_{nt}$	0.06853	
$V_{ub}/\phi R_{nv}$	0.02941	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00556	
Bolt Capacity =	6.9%	OK

TIA-222-H CONNECTION CHECK
Tieback to Tower Connection - Alpha Sector
2021777.876328.29

Bolt Information		
Bolt Diameter (d)	0.5	in
Net Tensile Area (An)	0.142	in^2
# of Bolts Total (n)	4	
Bolt Grade	A307	
Bolt Tensile Strength (F_{ub})	60	ksi

RISA 3D Reactions		
Moment (M)	0.00	k-ft
Axial (T)	0.02	kips
Shear (V)	0.88	kips

Bolt Capacity		
Nominal Tensile Strength (R_{nt})	8.514	kips
Nominal Shear Strength (R_{nv})	5.89	kips
Bolt Tensile Force (T_{ub})	0.00	kips
Bolt Shear Force (V_{ub})	0.220	kips
$T_{ub}/\phi R_{nt}$	0.00068	
$V_{ub}/\phi R_{nv}$	0.04990	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00249	
Bolt Capacity =	5.0%	OK

TIA-222-H CONNECTION CHECK
Tieback to Tower Connection - Beta Sector
2021777.876328.29

Bolt Information		
Bolt Diameter (d)	0.5	in
Net Tensile Area (An)	0.142	in^2
# of Bolts Total (n)	4	
Bolt Grade	A307	
Bolt Tensile Strength (F_{ub})	60	ksi

RISA 3D Reactions		
Moment (M)	0.00	k-ft
Axial (T)	0.01	kips
Shear (V)	0.97	kips

Bolt Capacity		
Nominal Tensile Strength (R_{nt})	8.514	kips
Nominal Shear Strength (R_{nv})	5.89	kips
Bolt Tensile Force (T_{ub})	0.00	kips
Bolt Shear Force (V_{ub})	0.243	kips
$T_{ub}/\phi R_{nt}$	0.00044	
$V_{ub}/\phi R_{nv}$	0.05505	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00303	
Bolt Capacity =	5.5%	OK

TIA-222-H CONNECTION CHECK
Tieback to Tower Connection - Gamma Sector
2021777.876328.29

Bolt Information		
Bolt Diameter (d)	0.5	in
Net Tensile Area (An)	0.142	in^2
# of Bolts Total (n)	4	
Bolt Grade	A307	
Bolt Tensile Strength (F_{ub})	60	ksi

RISA 3D Reactions		
Moment (M)	0.00	k-ft
Axial (T)	0.01	kips
Shear (V)	0.99	kips

Bolt Capacity		
Nominal Tensile Strength (R_{nt})	8.514	kips
Nominal Shear Strength (R_{nv})	5.89	kips
Bolt Tensile Force (T_{ub})	0.00	kips
Bolt Shear Force (V_{ub})	0.248	kips
$T_{ub}/\phi R_{nt}$	0.00041	
$V_{ub}/\phi R_{nv}$	0.05608	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00314	
Bolt Capacity =	5.6%	OK

TIA-222-H CONNECTION CHECK
Reinforcement to Tower Connection - Alpha Sector
2021777.876328.29

Bolt Information		
Bolt Diameter (d)	0.5	in
Net Tensile Area (An)	0.142	in^2
# of Bolts Total (n)	4	
Bolt Distance Up-Down	1.375	in
Bolt Distance Left-Right	9.5	in
Bolt Grade	A307	
Bolt Tensile Strength (F_{ub})	60	ksi

RISA 3D Reactions		
Moment (M)	0.00	k-ft
Axial (T)	-1.48	kips
Shear (V)	1.91	kips

Bolt Capacity		
Nominal Tensile Strength (R_{nt})	8.514	kips
Nominal Shear Strength (R_{nv})	5.89	kips
Bolt Tensile Force (T_{ub})	-0.37	kips
Bolt Shear Force (V_{ub})	0.478	kips
$T_{ub}/\phi R_{nt}$	-0.05790	
$V_{ub}/\phi R_{nv}$	0.10810	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.01504	
Bolt Capacity =	10.8%	OK

TIA-222-H CONNECTION CHECK
Reinforcement to Tower Connection - Beta Sector
2021777.876328.29

Bolt Information		
Bolt Diameter (d)	0.5	in
Net Tensile Area (An)	0.142	in^2
# of Bolts Total (n)	4	
Bolt Distance Up-Down	1.375	in
Bolt Distance Left-Right	9.5	in
Bolt Grade	A307	
Bolt Tensile Strength (F_{ub})	60	ksi

RISA 3D Reactions		
Moment (M)	0.00	k-ft
Axial (T)	-1.44	kips
Shear (V)	1.87	kips

Bolt Capacity		
Nominal Tensile Strength (R_{nt})	8.514	kips
Nominal Shear Strength (R_{nv})	5.89	kips
Bolt Tensile Force (T_{ub})	-0.36	kips
Bolt Shear Force (V_{ub})	0.469	kips
$T_{ub}/\phi R_{nt}$	-0.05649	
$V_{ub}/\phi R_{nv}$	0.10605	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.01444	
Bolt Capacity =	10.6%	OK

TIA-222-H CONNECTION CHECK
Reinforcement to Tower Connection - Gamma Sector
2021777.876328.29

Bolt Information		
Bolt Diameter (d)	0.5	in
Net Tensile Area (An)	0.142	in^2
# of Bolts Total (n)	4	
Bolt Distance Up-Down	1.375	in
Bolt Distance Left-Right	9.5	in
Bolt Grade	A307	
Bolt Tensile Strength (F_{ub})	60	ksi

RISA 3D Reactions		
Moment (M)	0.00	k-ft
Axial (T)	-1.46	kips
Shear (V)	1.89	kips

Bolt Capacity		
Nominal Tensile Strength (R_{nt})	8.514	kips
Nominal Shear Strength (R_{nv})	5.89	kips
Bolt Tensile Force (T_{ub})	-0.37	kips
Bolt Shear Force (V_{ub})	0.473	kips
$T_{ub}/\phi R_{nt}$	-0.05724	
$V_{ub}/\phi R_{nv}$	0.10711	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.01475	
Bolt Capacity =	10.7%	OK

APPENDIX E

SUPPLEMENTAL DRAWINGS

GENERAL NOTES

1. THESE MODIFICATIONS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE GOVERNING PROVISIONS OF TIA/EIA-222, AWS, ANSI TIA-322, AND AISC. MATERIALS, FABRICATION, INSTALLATION, AND ALL OTHER SERVICES PROVIDED BY THE CONTRACTOR SHALL CONFORM TO THE ABOVE MENTIONED CODES AND THE CONTRACT SPECIFICATIONS.

2. ALL MATERIAL SPECIFIED FOR THIS PROJECT MUST BE NEW AND FREE OF ANY DEFECTS. ANY MATERIAL SUBSTITUTIONS, INCLUDING BUT NOT LIMITED TO ALTERED SIZES AND/OR STRENGTHS, MUST BE APPROVED BY THE OWNER AND ENGINEER IN WRITING. CONTRACTOR SHALL PROVIDE DOCUMENTATION TO ENGINEER FOR DETERMINING IF SUBSTITUTE IS SUITABLE FOR USE AND MEETS THE ORIGINAL DESIGN CRITERIA. DIFFERENCES FROM THE ORIGINAL DESIGN, INCLUDING MAINTENANCE, REPAIR AND REPLACEMENT, SHALL BE NOTED. ESTIMATES OF COSTS/CREDITS ASSOCIATED WITH THE SUBSTITUTION (INCLUDING RE-DESIGN COSTS AND COSTS TO SUB-CONTRACTORS) SHALL BE PROVIDED TO THE ENGINEER.

3. ALL CONTRACTORS AND LOWER TIER CONTRACTORS MUST ACKNOWLEDGE IN WRITING TO TOWER OWNER THAT THEY HAVE OBTAINED, UNDERSTAND, AND WILL FOLLOW TOWER OWNER STANDARDS OF PRACTICE, CONSTRUCTION GUIDELINES, ALL SITE AND TOWER SAFETY PROCEDURES, ALL PRODUCT LIMITATIONS AND INSTALLATION PROCEDURES USED ON SITE, AND PROPOSED INSTALLATION DESCRIBED PRIOR TO BEGINNING CONSTRUCTION OR CLIMBING.

4. IT IS ASSUMED THAT ANY STRUCTURAL MODIFICATION WORK SPECIFIED ON THESE PLANS WILL BE ACCOMPLISHED BY KNOWLEDGEABLE WORKMEN WITH TOWER CONSTRUCTION EXPERIENCE. THIS INCLUDES PROVIDING THE NECESSARY CERTIFICATIONS TO THE TOWER OWNER AND ENGINEER.

5. THESE DRAWINGS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION METHODS, MEANS, TECHNIQUES, SEQUENCES, AND PROCEDURES.

6. CONSTRUCTION WORK PRESENTS UNIQUE THREATS TO HEALTH AND SAFETY. THE CONTRACTOR IS RESPONSIBLE TO EDUCATE THEIR WORK FORCE OF THESE DANGERS AND LIMIT THEIR EXPOSURE TO HAZARDS. THIS EDUCATION SHALL INCLUDE BUT NOT BE LIMITED TO APPLICABLE TRAINING COURSES AND CERTIFICATIONS, PROPER PERSONAL PROTECTIVE EQUIPMENT USAGE, DAILY TAILGATE MEETINGS AND ANY OTHER PREVENTATIVE MEASURES WHICH MAY BE REASONABLY EXPECTED. THE CONTRACTOR AND ALL SUB-CONTRACTORS SHALL BE RESPONSIBLE FOR THE SAFETY OF THE WORK AREA, ADJACENT AREAS AND ANY PROPERTY OCCUPANTS WHO MAY BE AFFECTED BY THE WORK UNDER CONTRACT. THE CONTRACTOR SHALL REVIEW ALL LANDOWNER, PRIME CONTRACTOR, CARRIER, OSHA, AND LOCAL SAFETY GUIDELINES AND AT ALL TIMES SHALL CONFORM TO THE MOST RESTRICTIVE OF THESE STANDARDS TO ENSURE A SAFE WORKPLACE.

7. TOWER WORK PRESENTS ADDITIONAL THREATS TO HEALTH AND SAFETY. ALL TOWER WORKERS WORKING ON A TOWER MUST BE ADEQUATELY TRAINED AND MONITORED TO ENSURE THAT SAFE WORK PRACTICES ARE LEARNED AND FOLLOWED. AS REQUIRED BY OSHA, WHEN WORKING ON EXISTING COMMUNICATION TOWERS, EMPLOYEES MUST BE PROVIDED WITH APPROPRIATE FALL PROTECTION, TRAINED TO USE THIS FALL PROTECTION PROPERLY, AND THE USE OF FALL PROTECTION MUST BE CONSISTENTLY SUPERVISED AND ENFORCED BY THE CONTRACTOR.

8. ALL SAFETY EQUIPMENT SHALL BE INSPECTED ACCORDING TO ALL OSHA AND INDUSTRY SCHEDULED INTERVALS AND ALL INSPECTIONS SHALL BE DOCUMENTED PER APPLICABLE CODES AND STANDARDS.

9. CONTRACTOR IS RESPONSIBLE FOR TEMPORARILY REMOVING ALL COAX, T-BRACKETS, ANTENNA MOUNTS, AND ANY OTHER TOWER APPURTENANCE THAT MAY INTERFERE WITH THE TOWER MODIFICATIONS. ALL TOWER APPURTENANCES MUST BE REPLACED AND/OR RESTORED TO ITS ORIGINAL LOCATION. SOME ATTACHMENTS MAY REQUIRE CUSTOM MODIFICATIONS TO PROPERLY FIT THE MODIFIED REGION OF THE STRUCTURE. THESE CUSTOMIZATIONS ARE DESIGNED BY OTHERS AND MUST BE APPROVED BY THE ENGINEER PRIOR TO REMOVING SUCH ATTACHMENTS. ANY CARRIER DOWNTIME MUST BE COORDINATED WITH THE TOWER OWNER IN WRITING.

10. CONTRACTOR SHALL ONLY WORK WITHIN THE LIMITS OF THE TOWER OWNER'S PROPERTY OR LEASE AREA AND APPROVED EASEMENTS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY WORK IS WITHIN THESE BOUNDARIES. CONTRACTOR SHALL EMPLOY A SURVEYOR AS REQUIRED. ANY WORK OUTSIDE THESE BOUNDARIES SHALL BE APPROVED IN WRITING BY THE LAND OWNER PRIOR TO MOBILIZATION. CONSTRUCTION STAKING AND BOUNDARY MARKING IS THE RESPONSIBILITY OF THE CONTRACTOR.

11. WORK SHALL ONLY BE PERFORMED DURING CALM DRY DAYS (WINDS LESS THAN 10-MPH). CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY LOCAL TOWER SHORING, TEMPORARY GLOBAL TOWER SHORING, AND ALL SHORING OF SURROUNDING BUILDINGS, PADS, AND OTHER OUTDOOR SITE OBSTRUCTIONS. ALL SHORING, TEMPORARY BRACING, AND TEMPORARY SUPPORTS ARE THE RESPONSIBILITY OF THE CONTRACTOR.

12. ABSOLUTELY NO WELDING, TORCH CUTTING, OR OPEN FLAME OF ANY TYPE IS PERMITTED ON THIS STRUCTURE AND ON THIS CONSTRUCTION SITE UNLESS DIRECTLY SPECIFIED WITHIN THESE DRAWINGS.

13. VERIFY IF THIS STRUCTURE IS AN FM TOWER AND TAKE NECESSARY ACTIONS TO PROVIDE SAFE WORKING CONDITIONS INCLUDING, BUT NOT LIMITED TO, HAVING FM SIGNAL TURNED OFF. CONTRACTOR SHALL HAVE PROPER RADIMAN FOR NOTIFICATION OF EXCESSIVE RF EXPOSURE FOR ALL INDIVIDUALS WORKING ON SITE IF FM ANTENNAS ARE PRESENT.

14. ALL MANUFACTURERS HARDWARE AND ASSEMBLY INSTRUCTIONS SHALL BE FOLLOWED EXACTLY. DEVIATION FROM THE INSTRUCTIONS IS UNACCEPTABLE AND REQUIRES WRITTEN APPROVAL FROM ENGINEER.

15. DO NOT SCALE DRAWINGS.

16. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL ASSOCIATED HARDWARE SHALL NOT BE IMPEDED OR MODIFIED WITHOUT THE WRITTEN CONSENT OF GPD GROUP.

17. **QUALIFIED ENGINEERING SERVICES ARE AVAILABLE FROM GPD TO ASSIST CONTRACTORS IN CLASS IV RIGGING PLAN REVIEWS. FOR REQUESTING QUALIFIED ENGINEERING SERVICES PLEASE CONTACT GPD AT GPDMODS@GPDGROUP.COM.**

INSPECTION NOTES

1. ALL INSPECTION REQUIREMENTS SET FORTH IN THIS DESIGN PACKAGE, AS SEEN ON SHEET MI-01, SHALL BE FOLLOWED WHERE APPLICABLE. COORDINATION OF THESE INSPECTIONS IS THE RESPONSIBILITY OF THE CONTRACTOR. ADDITIONALLY, COLLECTION OF CLOSEOUT DOCUMENTS, APPLICABLE PHOTOS, AND OTHER PERTINENT INFORMATION IS THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE SUPPLIED TO THE INSPECTION COMPANY UPON REQUEST.

2. ANY INSPECTION WHICH IS PERFORMED SHALL BE DONE TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE DESIGN ITSELF. THE INSPECTOR DOES NOT TAKE OWNERSHIP OF THE DESIGN'S EFFECTIVENESS OR INTENT.

3. DEVIATIONS FROM THE DESIGN DRAWINGS DISCOVERED DURING THE INSPECTION PROCESS SHALL BE COMMUNICATED TO GPD FOR APPROVAL.

4. INSTALLATION OF THE REINFORCEMENT SPECIFIED IN THIS DESIGN PACKAGE WITHOUT PROPER INSPECTION IS DONE AT THE RISK OF THE CONTRACTOR. GPD TAKES NO RESPONSIBILITY FOR THE EFFECTIVENESS OF THE REINFORCEMENT IN THE CASE THAT INSPECTIONS ARE NOT PERFORMED AS DESCRIBED ABOVE.

STRUCTURAL STEEL NOTES

1. ALL NEW STEEL SHALL BE HOT-DIPPED GALVANIZED PER ASTM A123, ASTM A153/A153M, OR ASTM A653 G90, AS APPLICABLE FOR FULL WEATHER PROTECTION. FOR HIGH STRENGTH STEEL FASTENERS WHERE HOT-DIPPED GALVANIZING IS NOT PERMITTED MAGNI 565 COATING (OR ENGINEER APPROVED EQUIVALENT) SHALL BE USED. IN ADDITION ALL NEW STEEL SHALL BE PAINTED TO MATCH EXISTING TOWER STEEL. CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION TO PROTECT STEEL BY ANY OTHER MEANS.

2. ALL EXISTING PAINTED/GALVANIZED SURFACES DAMAGED DURING INSTALLATION SHALL BE WIRE BRUSHED CLEAN, REPAIRED BY COLD GALVANIZING BRUSH APPLIED PAINT (ZRC OR EQUAL), AND REPAINTED TO MATCH THE EXISTING FINISH (IF APPLICABLE).

3. ALL BOLT ASSEMBLIES FOR STRUCTURAL MEMBERS REPRESENTED IN THIS DRAWING REQUIRE LOCKING DEVICES TO BE INSTALLED IN ACCORDANCE WITH THE GOVERNING PROVISIONS OF TIA/EIA-222 REQUIREMENTS.

4. ALL BOLTS, INCLUDING U-BOLTS, SHALL BE TIGHTENED IN ACCORDANCE WITH AISC "SNUG TIGHT" REQUIREMENTS, U.N.O.

STATE OF CONNECTICUT
CHRISTOPHER J. SCHWEKS
No. 30020
PROFESSIONAL ENGINEER

3/27/20

500 South Main Street
Akron, OH 44311
330.572.2100 Fax 330.572.2101

CROWN CASTLE

WEST HARTFORD PARKING GARAGE
BU#: 876328

REV.	DATE	DESCRIPTION
0	3/27/20	INITIAL RELEASE

DESIGN DRAWINGS PREPARED FOR:

WEST HARTFORD PARKING GARAGE
27-31 SOUTH MAIN ST.
WEST HARTFORD, CT 06110

PROJECT NOTES

ISSUED FOR:	
PERMIT	3/27/2020
BID	-
CONSTRUCTION	-
RECORD	-

ENGINEER	DESIGNER
MAH	JMJ
PROJECT MANAGER	APPROVED BY
CB	CJS

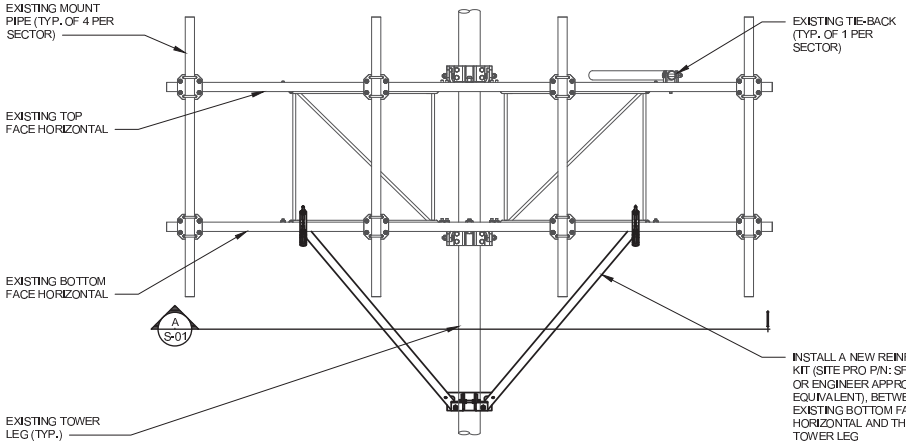
JOB NO.
2020777.876328.20

N-01

MODIFICATION SCHEDULE

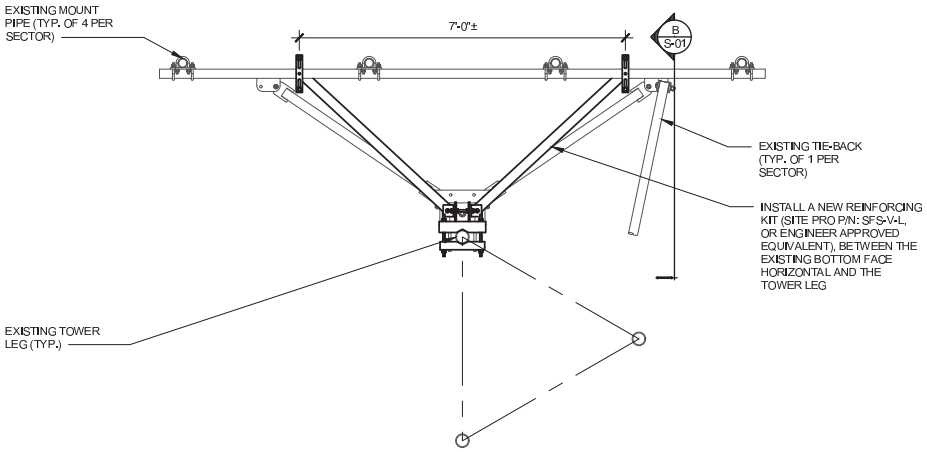
MEMBER TYPE	ELEVATION	EXISTING MEMBER	NEW MEMBER	REFERENCE DETAIL/SHEET	NOTES
REINFORCING KIT	92'-0"±	(3) 13'-0" SECTOR FRAMES	(1) REINFORCING KIT (PER SECTOR)	1/S-01	INSTALL A REINFORCING KIT BETWEEN THE EXISTING BOTTOM FACE HORIZONTAL AND THE TOWER LEG.

NOTES:
1. THE REINFORCING KITS SHALL BE ORDERED FROM SITE PRO OR ENGINEER APPROVED EQUIVALENT.



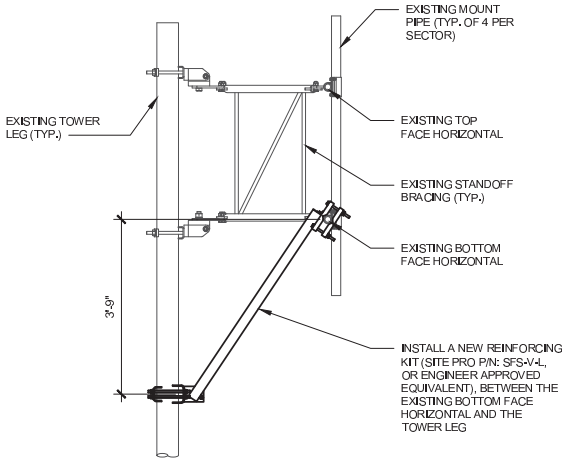
1 S-01 ELEVATION
SCALE: 3/8" = 1'-0"

NOTES:
1. DETAIL IS TYPICAL OF ALL THREE SECTORS, ONLY ONE SECTOR SHOWN FOR CLARITY.



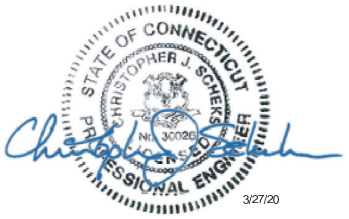
A S-01 SECTION
SCALE: 3/8" = 1'-0"

NOTES:
1. DETAIL IS TYPICAL OF ALL THREE SECTORS, ONLY ONE SECTOR SHOWN FOR CLARITY.



B S-01 SECTION
SCALE: 3/8" = 1'-0"

NOTES:
1. DETAIL IS TYPICAL OF ALL THREE SECTORS, ONLY ONE SECTOR SHOWN FOR CLARITY.
2. EXISTING TIE-BACKS NOT SHOWN FOR CLARITY.



500 South Main Street
Akron, OH 44311
330.572.2100 Fax 330.572.2101

DESIGN DRAWINGS PREPARED FOR:
CROWN CASTLE
WEST HARTFORD PARKING GARAGE
BU #: 876328

REV.	DATE	DESCRIPTION
0	3/27/20	INITIAL RELEASE

WEST HARTFORD PARKING GARAGE
27-31 SOUTH MAIN ST.
WEST HARTFORD, CT 06110

MODIFICATION SCHEDULE & DETAILS

ISSUED FOR:	
PERMIT	3/27/2020
BID	-
CONSTRUCTION	-
RECORD	-

ENGINEER	DESIGNER
MAH	JMJ
PROJECT MANAGER	APPROVED BY
CB	CJS

JOB NO.
2020777.876328.20

S-01

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

AT&T Existing Facility

Site ID: CTL05843 - 876328

West Hartford Central
27-31 South Main Street
West Hartford, Connecticut 06107

January 26, 2022

EBI Project Number: 6222000340

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**79.43%**

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

January 26, 2022

AT&T

Emissions Analysis for Site: CTL05843 - 876328 - West Hartford Central

EBI Consulting was directed to analyze the proposed AT&T facility located at **27-31 South Main Street** in **West Hartford, Connecticut** for the purpose of determining whether the emissions from the Proposed AT&T 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 AT&T Wireless antenna facility located at 27-31 South Main Street in West Hartford, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T 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) 4 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

2) 2 LTE DE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 4 LTE FN channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

4) 4 5G channels (850 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

5) 4 LTE / 5G channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

6) 4 LTE / 5G channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

7) 4 LTE channels (WCS Band – 2300 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 25 Watts per Channel.

8) 2 C-Band Channels (3700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 144.58 Watts per Channel.

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 Quintel QD8616-7 for the 700 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6419 for the 3700 MHz channel(s), the Ericsson AIR 6449 for the 3700 MHz channel(s), the CCI DMP65R-BU8DA for the 700 MHz / 850 MHz / 2300 MHz channel(s) in Sector A, the Quintel QD8616-7 for the 700 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6419 for the 3700 MHz channel(s), the Ericsson AIR 6449 for the 3700 MHz channel(s), the CCI DMP65R-BU8DA for the 700 MHz / 850 MHz / 2300 MHz channel(s) in Sector B, the Quintel QD8616-7 for the 700 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6419 for the 3700 MHz channel(s), the Ericsson AIR 6449 for the 3700 MHz channel(s), the CCI DMP65R-BU8DA for the 700 MHz / 850 MHz / 2300 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 89 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.

AT&T Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Quintel QD8616-7	Make / Model:	Quintel QD8616-7	Make / Model:	Quintel QD8616-7
Frequency Bands:	700 MHz / 700 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	700 MHz / 700 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	700 MHz / 700 MHz / 1900 MHz / 2100 MHz
Gain:	12.55 dBd / 13.05 dBd / 15.05 dBd / 14.45 dBd	Gain:	12.55 dBd / 13.05 dBd / 15.05 dBd / 14.45 dBd	Gain:	12.55 dBd / 13.05 dBd / 15.05 dBd / 14.45 dBd
Height (AGL):	89 feet	Height (AGL):	89 feet	Height (AGL):	89 feet
Channel Count:	14	Channel Count:	14	Channel Count:	14
Total TX Power (W):	560 Watts	Total TX Power (W):	560 Watts	Total TX Power (W):	560 Watts
ERP (W):	14,068.91	ERP (W):	14,068.91	ERP (W):	14,068.91
Antenna A1 MPE %:	**10.02%**	Antenna B1 MPE %:	**10.02%**	Antenna C1 MPE %:	**10.02%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR 6419	Make / Model:	Ericsson AIR 6419	Make / Model:	Ericsson AIR 6419
Frequency Bands:	3700 MHz	Frequency Bands:	3700 MHz	Frequency Bands:	3700 MHz
Gain:	23.45 dBd	Gain:	23.45 dBd	Gain:	23.45 dBd
Height (AGL):	87 feet	Height (AGL):	87 feet	Height (AGL):	87 feet
Channel Count:	1	Channel Count:	1	Channel Count:	1
Total TX Power (W):	144.580000000000001 Watts	Total TX Power (W):	144.580000000000001 Watts	Total TX Power (W):	144.580000000000001 Watts
ERP (W):	31,996.92	ERP (W):	31,996.92	ERP (W):	31,996.92
Antenna A2 MPE %:	**17.53%**	Antenna B2 MPE %:	**17.53%**	Antenna C2 MPE %:	**17.53%**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	3700 MHz	Frequency Bands:	3700 MHz	Frequency Bands:	3700 MHz
Gain:	23.45 dBd	Gain:	23.45 dBd	Gain:	23.45 dBd
Height (AGL):	91 feet	Height (AGL):	91 feet	Height (AGL):	91 feet
Channel Count:	1	Channel Count:	1	Channel Count:	1
Total TX Power (W):	144.580000000000001 Watts	Total TX Power (W):	144.580000000000001 Watts	Total TX Power (W):	144.580000000000001 Watts
ERP (W):	31,996.92	ERP (W):	31,996.92	ERP (W):	31,996.92
Antenna A3 MPE %:	**15.92%**	Antenna B3 MPE %:	**15.92%**	Antenna C3 MPE %:	**15.92%**
Antenna #:	**4**	Antenna #:	**4**	Antenna #:	**4**
Make / Model:	CCI DMP65R-BU8DA	Make / Model:	CCI DMP65R-BU8DA	Make / Model:	CCI DMP65R-BU8DA
Frequency Bands:	700 MHz / 850 MHz / 2300 MHz	Frequency Bands:	700 MHz / 850 MHz / 2300 MHz	Frequency Bands:	700 MHz / 850 MHz / 2300 MHz
Gain:	11.85 dBd / 12.45 dBd / 15.95 dBd	Gain:	11.85 dBd / 12.45 dBd / 15.95 dBd	Gain:	11.85 dBd / 12.45 dBd / 15.95 dBd
Height (AGL):	89 feet	Height (AGL):	89 feet	Height (AGL):	89 feet
Channel Count:	12	Channel Count:	12	Channel Count:	12
Total TX Power (W):	420 Watts	Total TX Power (W):	420 Watts	Total TX Power (W):	420 Watts
ERP (W):	9,197.92	ERP (W):	9,197.92	ERP (W):	9,197.92
Antenna A4 MPE %:	**7.38%**	Antenna B4 MPE %:	**7.38%**	Antenna C4 MPE %:	**7.38%**

• An adjusted power reduction factor of 0.32 was applied to the AIR 6449 antennas per guidance from AT&T.
• Specifications were not available for the Ericsson AIR 6419 antenna. Per AT&T, specifications for the AIR 6449 antenna were used to model the 6419 due to its similarity.

Site Composite MPE %	
Carrier	**MPE %**
AT&T (Max at Sector A):	50.85%
Sprint	28.58%
Site Total MPE % :	79.43%

AT&T MPE % Per Sector	
AT&T Sector A Total:	50.85%
AT&T Sector B Total:	50.85%
AT&T Sector C Total:	50.85%
Site Total MPE % :	79.43%

AT&T Maximum MPE Power Values (Sector A)

AT&T 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
AT&T 700 MHz LTE FN	4	719.55	89.0	15.02	700 MHz LTE FN	467	3.22%
AT&T 700 MHz LTE DE	2	807.35	89.0	8.43	700 MHz LTE DE	467	1.80%
AT&T 1900 MHz LTE/5G	4	1279.56	89.0	26.71	1900 MHz LTE/5G	1000	2.67%
AT&T 2100 MHz LTE/5G	4	1114.45	89.0	23.26	2100 MHz LTE/5G	1000	2.33%
AT&T 3700 MHz C-Band	1	31996.92	87.0	175.33	3700 MHz C-Band	1000	17.53%
AT&T 3700 MHz C-Band	1	31996.92	91.0	159.22	3700 MHz C-Band	1000	15.92%
AT&T 700 MHz LTE	4	612.43	89.0	12.78	700 MHz LTE	467	2.74%
AT&T 850 MHz 5G	4	703.17	89.0	14.68	850 MHz 5G	567	2.59%
AT&T 2300 MHz LTE	4	983.88	89.0	20.54	2300 MHz LTE	1000	2.05%
						Total:	**50.85%**

• 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 AT&T 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:

AT&T Sector	Power Density Value (%)
Sector A:	50.85%
Sector B:	50.85%
Sector C:	50.85%
AT&T Maximum MPE % (Sector A):	50.85%
Site Total:	79.43%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **79.43%** 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.

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