Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

September 30, 2020

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

RE: **Notice of Exempt Modification for AT&T: 876328**
29 South Main Street, West Hartford, CT 06110
Latitude: 41° 45′ 36.41″/ Longitude: -72° 44′ 35.25″

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 92-foot mount of the existing 40-foot Self Support Tower located at 29 South Main Street in West Hartford, Connecticut. The tower is owned by Crown Castle. The property is owned by Town Center West Associates LLC. AT&T now intends to remove and replace three (3) existing antennas with three (3) new antennas and add three (3) new antennas at the 92-foot mount for a final antenna inventory of twelve (12) antennas. AT&T is also proposing tower mount modification pursuant to the enclosed Mount Analysis.

The facility was approved by the West Hartford Planning & Zoning Department on April 10, 1997. This approval included no conditions according to correspondence 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.S.C.A. § 16-50j-73, a copy of this letter is being sent to Shari Cantor, Mayor of the Town of West Hartford, Todd Dumais, Town Planner, as well as the property owner and Crown Castle is the tower owner.

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

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

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

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

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

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

For the foregoing reasons, 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). Please send approval/rejection letter to Attn: Anne Marie Zsamba.

Best,

Anne Marie Zsamba
Site Acquisition Specialist
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
(201) 236-9224
annemarie.zsamba@crowncastle.com

Attachments:

Exhibit-A: Compound Plan and Elevation Depicting the Planned Changes
Exhibit-B: Structural Modification Report
Exhibit-C: General Power Density Table Report (RF Emissions Analysis Report)

cc: Mayor Shari Cantor (*via email only to Mayor@WestHartfordCT.gov*)
Town of West Hartford
50 South Main Street
West Hartford, CT 06107

Todd Dumais, Town Planner (*via email only to Todd.Dumais@WestHartfordCT.gov*)
Town of West Hartford
Planning & Zoning Division
50 South Main Street
West Hartford, CT 06107

Town Center West Associates LLC (*via email only to tcmanagement@f8properties.com*)
433 South Main Street
West Hartford, CT 06110

From: Zsamba, Anne Marie
To: "tcmanagement@f8properties.com"
Subject: Notice of Exempt Modification - AT&T - 29 South Main Street, West Hartford
Date: Wednesday, September 30, 2020 5:58:00 AM
Attachments: EM-AT&T-29 SO MAIN STREET WEST HARTFORD-876328-notice.pdf

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Dear Town Center West Associates LLC as property owner:

Attached please find AT&T's exempt modification application that is being submitted to the Connecticut Siting Council today, September 30, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,
Anne Marie Zsamba

ANNE MARIE ZSAMBA
Site Acquisition Specialist
T: (201) 236-9224
M: (518) 350-3639
F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

From: Zsamba, Anne Marie
To: "Mayor@WestHartfordCT.gov"
Subject: Notice of Exempt Modification - AT&T - 29 South Main Street, West Hartford
Date: Wednesday, September 30, 2020 5:58:00 AM
Attachments: EM-AT&T-29 SO MAIN STREET WEST HARTFORD-876328-notice.pdf

---

Dear Mayor Cantor:

Attached please find AT&T's exempt modification application that is being submitted to the Connecticut Siting Council today, September 30, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,
Anne Marie Zsamba

ANNE MARIE ZSAMBA
Site Acquisition Specialist
T: (201) 236-9224
M: (518) 350-3639
F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

From: Zsamba, Anne Marie
To: "Todd.Dumais@WestHartfordCT.gov"
Subject: Notice of Exempt Modification - AT&T - 29 South Main Street, West Hartford
Date: Wednesday, September 30, 2020 5:58:00 AM
Attachments: EM-AT&T-29 SO MAIN STREET WEST HARTFORD-876328-notice.pdf

---

Dear Town Planner Dumais:

Attached please find AT&T's exempt modification application that is being submitted to the Connecticut Siting Council today, September 30, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,
Anne Marie Zsamba

ANNE MARIE ZSAMBA
Site Acquisition Specialist
T: (201) 236-9224
M: (518) 350-3639
F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

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

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
This email may contain confidential or privileged material. Use or disclosure of it by anyone other than the recipient is unauthorized. If you are not an intended recipient, please delete this email.

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

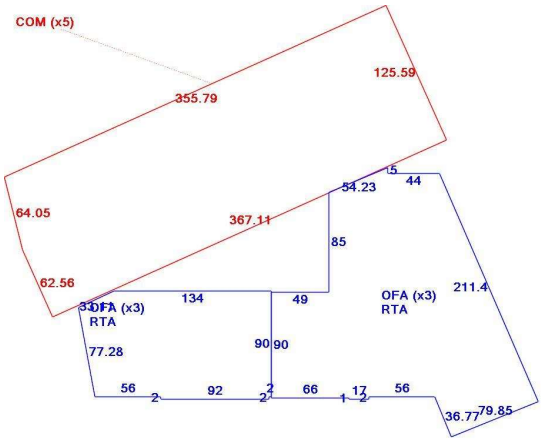
Year Built: 1990
Living Area: 182,816
Replacement Cost: $28,208,446
Building Percent Good: 79
Replacement Cost Less Depreciation: $22,284,700

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
# 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
Group	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
# 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
Group	IND
Wall Height	12.00
Adjustment	

Building Photo

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

Building Layout

PGB
(45,778 sf)

PGB
(183,112 sf)

(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**
2019	$33,405,900	$6,687,700	$40,093,600
2018	$33,405,900	$6,687,700	$40,093,600
2017	$33,405,900	$6,687,700	$40,093,600

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$23,384,130	$4,681,390	$28,065,520
2018	$23,384,130	$4,681,390	$28,065,520
2017	$23,384,130	$4,681,390	$28,065,520

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Noah Webster Library
S Main St
C 232
Town Center SHOPS
Shopping mall
Lux Bond & Green -
Official Rolex© Jeweler
Jewelry store
29 South Main Street
Barnes & Noble
Takeout • Delivery
Cookshop Plus
Kitchen supply store
Heidi Dreger - Keller
Williams Realty...
S Main St
Crate and Barrel
Furniture store
Restaurant Bricco
Takeout
Memorial Rd
Memorial Rd
Kennedy's
Aerus Electrolux
of West Hartford...
Harry's Pizza
Takeout • Delivery
United States
Postal Service
Wu Healing Center

Exhibit C

Construction Drawings

DocuSign Envelope ID: D7C7C118-4977-4DBD-9918-5ED1FE5384B1

AT&T

AT&T SITE NUMBER:	**CT5843**	**BUSINESS UNIT #:**	**876328**
AT&T SITE NAME:	**WEST HARTFORD CENTRAL**	**SITE ADDRESS:**	**27-31 SOUTH MAIN ST. WEST HARTFORD, CT 06110**
AT&T FA CODE:	**10071356**	**COUNTY:**	**HARTFORD**
AT&T PACE NUMBER:	**MRCTB045379, MRCTB045370, MRCTB045376. MRCTB045373**	**SITE TYPE:**	**SELF SUPPORT TOWER**
		TOWER HEIGHT:	**40'-0"**
AT&T PROJECT:	**LTE 7C, 4TX4RX, 5G NR UPGRADE, BWE TOWER TOP RRH ADD**		

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	WEST HARTFORD PARKING GARAGE
SITE ADDRESS:	27-31 SOUTH MAIN ST. WEST HARTFORD, CT 06110
COUNTY:	HARTFORD
MAP/PARCEL #:	WHAR-050951-000029-000001
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41° 45' 36.41"
LONGITUDE:	-72° 44' 35.25"
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	125 FT.
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 S MAIN ST STE 328 C/O FIGURE EIGHT PROPERTIES WEST HARTFORD, CT 06110
TOWER OWNER:	GLOBAL SIGNAL ACQUISITIONS III LLC 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	AT&T TOWER ASSET GROUP 575 MOROSGO DRIVE ATLANTA, GA 30324-3300
ELECTRIC PROVIDER:	NORTHEAST UTILITIES (800) 286-2000
TELCO PROVIDER:	LIGHTTOWER (845) 458-7720

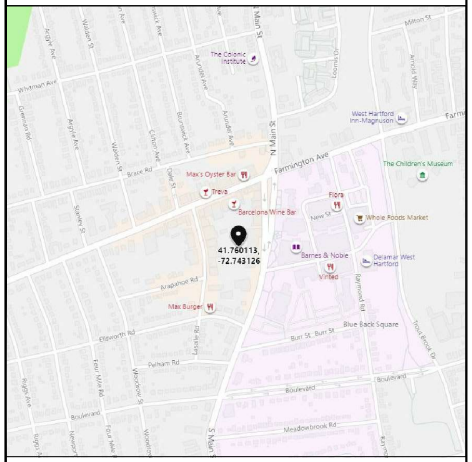
DRAWING INDEX

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 SPECS
G-1	GROUNDING SCHEMATIC
G-2	GROUNDING DETAILS
ATTACHED	PLUMBING DIAGRAM
ATTACHED	MOUNT MODIFICATION DESIGNS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11X17. 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:	CROWN CASTLE USA INC. 2000 CORPORATE DRIVE CANONSBURG, PA 15317 CROWNAE.APPROVAL@CROWNCASTLE.COM
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3 CORPORATE PARK DRIVE, SUITE 101 CLIFTON PARK, NY 12065
	VERONICA DELIA - PROJECT MANAGER (610) 635-3222
	JASON D'AMICO - CONSTRUCTION MANAGER (860) 209-0104

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) CCI-OPA-65R-LCUU-H8 ANTENNAS
- REMOVE (3) ERICSSON - RRUS-11 B12 RRHs
- REMOVE (3) ERICSSON - RRUS-12 B5 RRHs
- RELOCATE (3) ERICSSON - RRUS-E2 B29 RRHs
- INSTALL (3) CCI - OPA65R-BUDDA-K ANTENNAS
- INSTALL (3) CCI - DMP65R-BUDDA ANTENNAS
- INSTALL (3) ERICSSON - 4449 B5/B12 RRHs
- INSTALL (3) ERICSSON - 4478 B14 RRHs
- INSTALL (3) ERICSSON - RRUS-32 B2 RRHs
- INSTALL (3) COMMSCOPE - ION-M23 SDARS REMOTE
- INSTALL (3) COMMSCOPE - CBC23SR-43 DIPLEXERS
- INSTALL (1) RAYCAP - DC6-48-60-18-8C-EV SQUID
- INSTALL (1) 3" SCH 40 (3-1/2" O.D.) BY 6'-0" LONG GALV. PIPE W/ CROSSOVER HARDWARE
- INSTALL (1) DC TRUNK (3/4")

GROUND SCOPE OF WORK:
- INSTALL (1) 6630

INSTALLER NOTE:

NO PROPOSED LOADING TO BE ADDED UNTIL MOUNT MODIFICATIONS ARE INSTALLED PER MOUNT ANALYSIS BY GPD ENGINEERING AND ARCHITECTURE PROFESSIONAL CORPORATION DATED APRIL 24, 2020.

APPLICABLE CODES/REFERENCE DOCUMENTS

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

CODE TYPE	CODE
BUILDING	2018 CT STATE BUILDING CODE/2015 IBC W/ CT AMENDMENTS
MECHANICAL	2018 CT STATE BUILDING CODE/2015 IMC W/ CT AMENDMENTS
ELECTRICAL	2018 CT STATE BUILDING CODE/2017 NEC W/ CT AMENDMENTS

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	GPD ENGINEERING AND ARCHITECTURE PROFESSIONAL CORPORATION
DATED:	APRIL 28, 2020
MOUNT ANALYSIS:	GPD ENGINEERING AND ARCHITECTURE PROFESSIONAL CORPORATION
DATED:	APRIL 24, 2020
RFDS REVISION:	FINAL
DATED:	9/1/2020
ORDER ID:	509316
REVISION:	0

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

AT&T
575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

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

AT&T SITE NUMBER: **CT5843**

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

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

EXISTING 40'-0" SELF SUPPORT TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
B	06/05/20	TJ	PRELIMINARY	TJ
C	06/25/20	TJ	PRELIMINARY	TJ
D	08/10/20	TJ	PRELIMINARY	TJ
0	09/17/20	EA	CONSTRUCTION	JL

DocuSigned by:
Justin Lavelle
[illegible]

STATE OF CONNECTICUT
JUSTIN PETER LAVELLE
No. 31965
LICENSED PROFESSIONAL ENGINEER

9/17/2020 | 4:02:02 PM EDT

Crown Castle USA Inc. Certificate of Registration #PEC.0001101

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

SHEET NUMBER:	REVISION:
T-1	0

DocuSign Envelope ID: D7C7C118-4977-4DBD-9918-5ED1FE5384B1

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED– NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800–788–7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
2. "LOOK UP" – CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT:
THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED–STD–10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH QAS–STD–10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE" AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE 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 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

AT&T
575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

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

AT&T SITE NUMBER: **CT5843**

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

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

EXISTING 40'-0" SELF SUPPORT TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
B	06/05/20	TJ	PRELIMINARY	TJ
C	06/25/20	TJ	PRELIMINARY	TJ
D	08/10/20	TJ	PRELIMINARY	TJ
0	09/17/20	EA	CONSTRUCTION	JL

DocuSigned by: Justin P. Linette
STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED PROFESSIONAL ENGINEER
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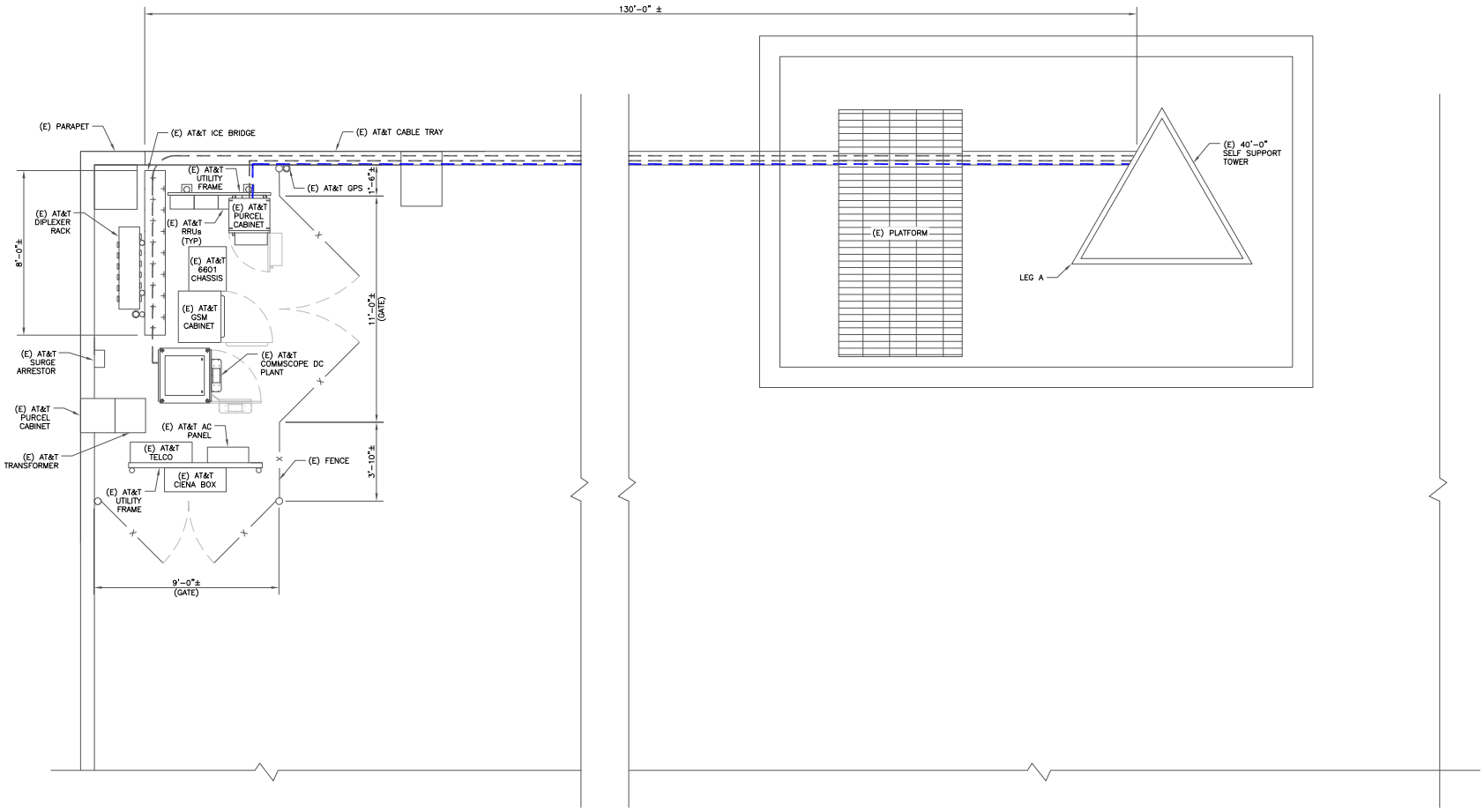

1 SITE PLAN
SCALE: 2" 1" 0 2" 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)

N

AT&T
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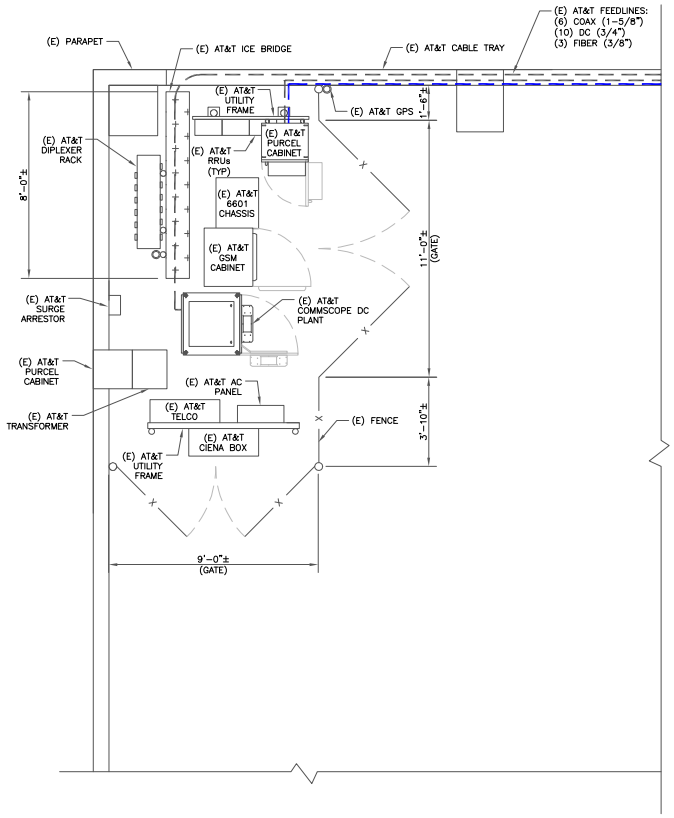
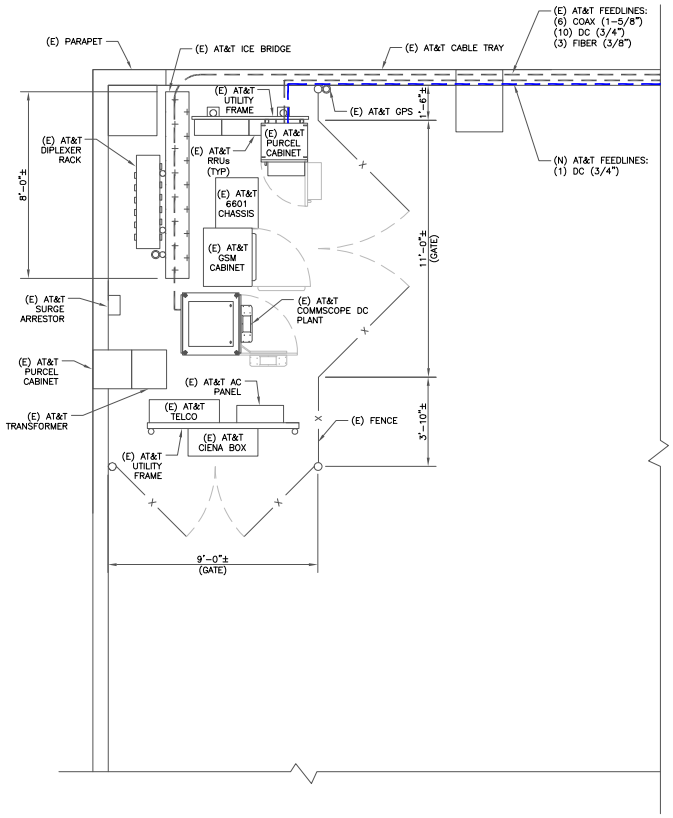


1 EXISTING EQUIPMENT PLAN
SCALE: 2' 1' 0 2' 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)

N



2 FINAL EQUIPMENT PLAN
SCALE: 2' 1' 0 2' 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)

N

GROUND SCOPE OF WORK:

- INSTALL (1) 6630

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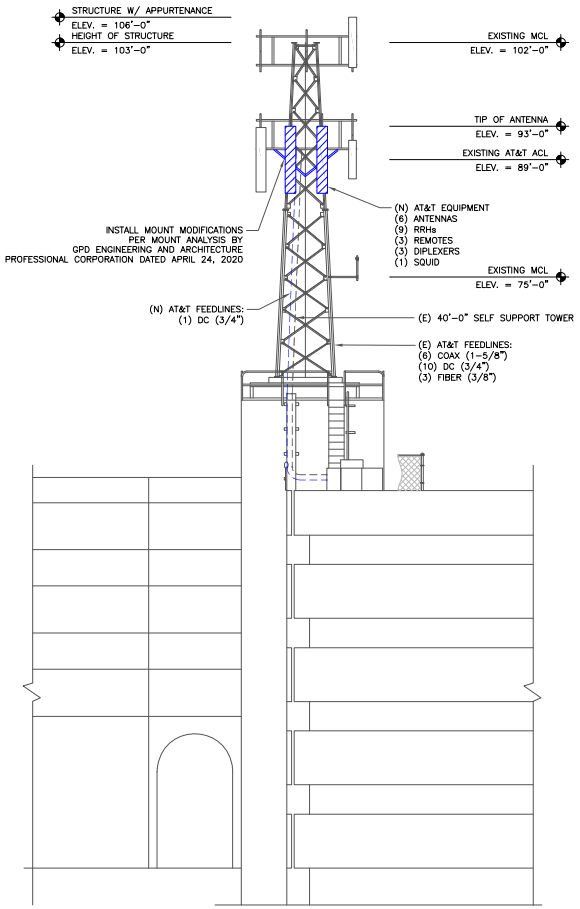
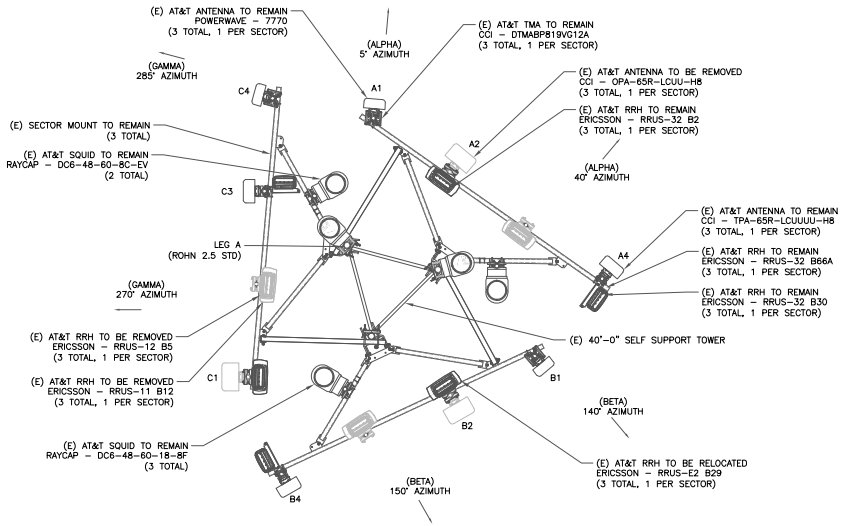
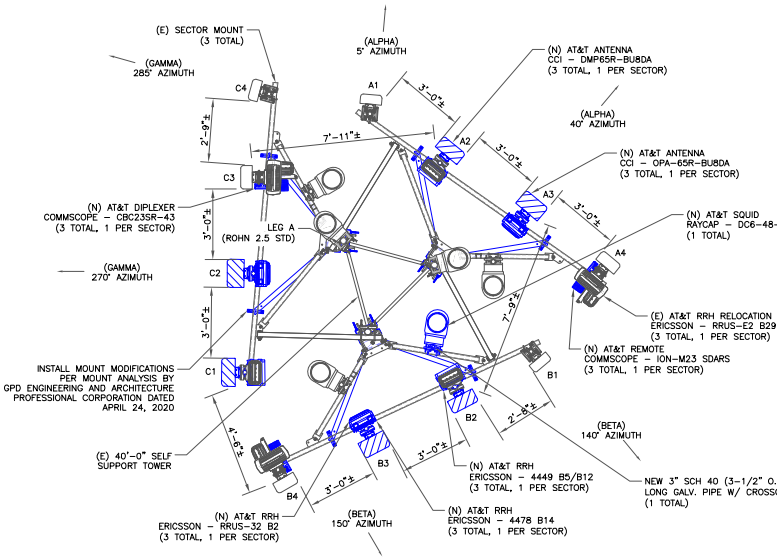


1 FINAL ELEVATION
SCALE: NOT TO SCALE



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



3 FINAL ANTENNA PLAN
SCALE: 1/2"=1'-0" (FULL SIZE) 1/4"=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.

AT&T
575 MOROSGO DRIVE
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CROWN CASTLE
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AT&T SITE NUMBER: **CT5843**

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

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EXISTING 40'-0" SELF SUPPORT TOWER

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DocuSigned by:
Justin Lavelle
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9/17/2020 | 4:02:02 PM EDT

STATE OF CONNECTICUT
JUSTIN PETER LAVELLE
No. 31965
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SHEET NUMBER: C-2
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FINAL EQUIPMENT SCHEDULE
(VERIFY WITH CURRENT RFDS)

POSITION	ANTENNA				RADIO			DIPLEXER			TMA/REMOTE			SURGE PROTECTION			CABLES			
	TECH.	STATUS/MANUFACTURER MODEL	AZIMUTH	RAD CENTER	QTY.	STATUS/MODEL	LOCATION	QTY.	STATUS	LOCATION	QTY.	STATUS/MODEL	QTY.	STATUS/MODEL	QTY.	STATUS/TYPE	SIZE	LENGTH
ALPHA																				
A1	UMTS	(E) POWERWAVE TECH 7770	5°	89'-0"	–	–	–	2	(E)	GROUND	2	(E) DTMABP819VG21A	–	–	2	(E) COAX	1-5/8"	139'-0"
A2	LTE	(N) CCI DMP65R-BU8DA	40°	89'-0"	1	(N) 4449 B5/B12	TOWER	–	–	–	–	–	–	–	–	–	–	–
					1	(E) RRUS-32 B2	TOWER											
A3	LTE/5G	(N) CCI OPA65R-BU8DA-K	40°	89'-0"	1	(N) 4478 B14	TOWER	–	–	–	–	–	3	(E) DC6-48-60-18-8F	6	(E) DC	3/4"	139'-0"
					1	(N) RRUS-32 B2	TOWER								1	(E) FIBER	3/8"	139'-0"
A4	LTE	(E) CCI TPA-65R-LCUUUU-H8	40°	89'-0"	1	(E) RRUS-E2 B29	TOWER	1	(N)	TOWER	1	(E) DTMABP819VG21A	–	–	–	–	–	–
					1	(E) RRUS-32 B30	TOWER											
					1	(E) RRUS-32 B66A	TOWER											
					1	(N) ION-M23 SDARS	TOWER											
BETA																		
B1	UMTS	(E) POWERWAVE TECH 7770	140°	89'-0"	–	–	–	2	(E)	GROUND	2	(E) DTMABP819VG21A	–	–	2	(E) COAX	1-5/8"	139'-0"
B2	LTE	(N) CCI DMP65R-BU8DA	150°	89'-0"	1	(N) 4449 B5/B12	TOWER	–	–	–	–	–	–	–	–	–	–	–
					1	(E) RRUS-32 B2	TOWER											
B3	LTE/5G	(N) CCI OPA65R-BU8DA-K	150°	89'-0"	1	(N) 4478 B14	TOWER	–	–	–	–	–	2	(E) DC6-48-60-0-8C-EV	4	(E) DC	3/4"	139'-0"
					1	(N) RRUS-32 B2	TOWER								2	(E) FIBER	3/8"	139'-0"
B4	LTE	(E) CCI TPA-65R-LCUUUU-H8	150°	89'-0"	1	(E) RRUS-E2 B29	TOWER	1	(N)	TOWER	1	(E) DTMABP819VG21A	–	–	–	–	–	–
					1	(E) RRUS-32 B30	TOWER											
					1	(E) RRUS-32 B66A	TOWER											
					1	(N) ION-M23 SDARS	TOWER											
GAMMA																		
C1	LTE	(N) CCI DMP65R-BU8DA	270°	89'-0"	1	(N) 4449 B5/B12	TOWER	–	–	–	–	–	–	–	–	–	–	–
					1	(E) RRUS-32 B2	TOWER											
C2	LTE/5G	(N) CCI OPA65R-BU8DA-K	270°	89'-0"	1	(N) 4478 B14	TOWER	–	–	–	–	–	1	(N) DC6-48-60-0-8C-EV	1	(N) DC	3/4"	139'-0"
					1	(N) RRUS-32 B2	TOWER											
C3	LTE	(E) CCI TPA-65R-LCUUUU-H8	270°	89'-0"	1	(E) RRUS-E2 B29	TOWER	1	(N)	TOWER	1	(E) DTMABP819VG21A		–	–	–	–	–
					1	(E) RRUS-32 B30	TOWER											
					1	(E) RRUS-32 B66A	TOWER											
					1	(N) ION-M23 SDARS	TOWER											
C4	UMTS	(E) POWERWAVE TECH 7770	285°	89'-0"	–	–	–	2	(E)	GROUND	2	(E) DTMABP819VG21A	–	–	2	(E) COAX	1-5/8"	139'-0"

NOTE:
(E) – EXISTING
(N) – NEW

1 FINAL EQUIPMENT SCHEDULE
SCALE: NOT TO SCALE

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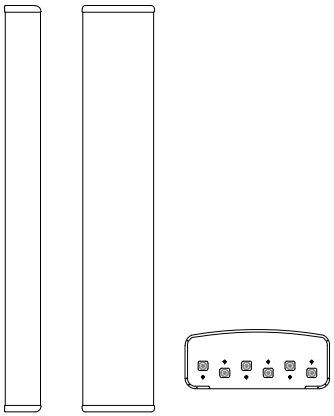
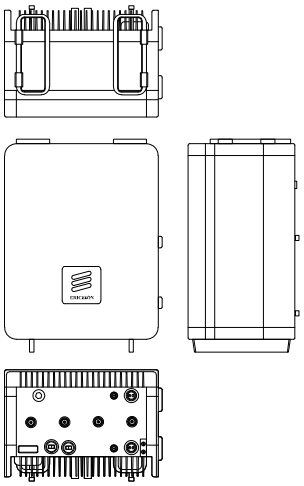


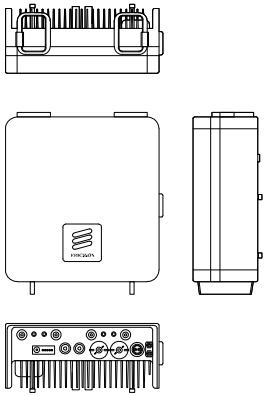
CCI ANTENNAS – DMP65R-BU8D
WEIGHT (WITHOUT MOUNTING HARDWARE): 95.7 LBS
SIZE (HxWxD): 96.0x20.7x7.7 IN.
MOUNTING HARDWARE P/N: MBK-16
RATED WIND VELOCITY: >150.0 MPH

1 CCI ANTENNAS – DMP65R-BU8DA
SCALE: NOT TO SCALE



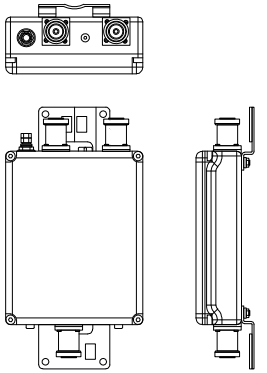
ERICSSON – RADIO 4449
WEIGHT: 70.0 LBS
SIZE (HxWxD): 18.0x13.2x9.4 IN.

2 ERICSSON – RADIO 4449
SCALE: NOT TO SCALE



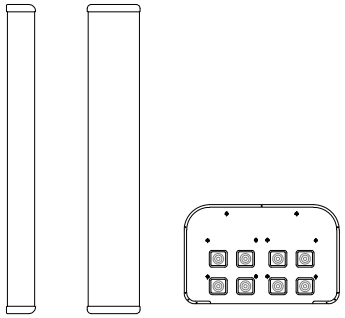
ERICSSON – RADIO 4478
WEIGHT: 60.0 LBS
SIZE (HxWxD): 15.0x13.0x8.0 IN.

3 ERICSSON – RADIO 4478
SCALE: NOT TO SCALE



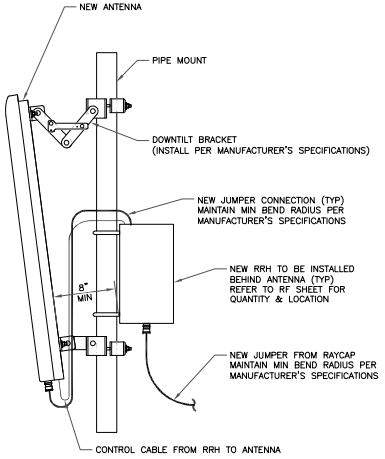
COMMSCOPE – CBC23SR-43
WEIGHT (FULLY EQUIPPED): 5.4 LBS
SIZE (HxWxD): 7.95x6.29x2.08 IN.

4 COMMSCOPE – CBC23SR-43
SCALE: NOT TO SCALE

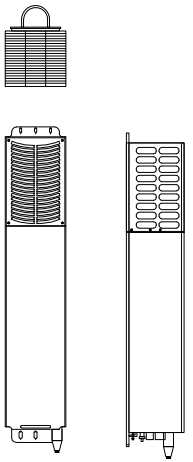


CCI ANTENNAS – OPA65R-BU8DA-K
WEIGHT (WITHOUT MOUNTING HARDWARE): 88.0 LBS
SIZE (HxWxD): 96.0x21.0x7.8 IN.
MOUNTING HARDWARE P/N: MBK-01
RATED WIND VELOCITY: 150.0 MPH

5 CCI ANTENNAS – OPA65R-BU8DA-K
SCALE: NOT TO SCALE

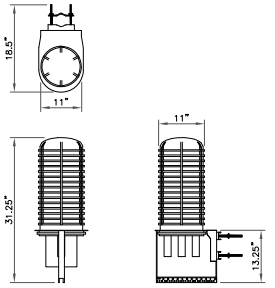


6 GENERIC ANTENNA MOUNTING ELEVATION
SCALE: NOT TO SCALE



COMMSCOPE – ION-M23 SDARS
WEIGHT (FULLY EQUIPPED): 48.0 LBS
SIZE (HxWxD): 32.7x6.1x5.8 IN.

7 COMMSCOPE – ION-M23 SDARS
SCALE: NOT TO SCALE



RAYCAP – DC6-48-60-18-8C-EV
SIZE: 11x31.25 IN.
WEIGHT: 32.8 LBS
NOMINAL OPERATING VOLTAGE: 48 VDC
VOLTAGE PROTECTION RATING: 400 V
WIND LOADING: 150 MPH SUSTAINED (105.7 LBS)
WIND LOADING: 195 MPH GUST (213.6 LBS)

CONTRACTOR TO USE "THREAD LUBRICANT" ON
MOUNTING BOLTS DURING INSTALLATION

8 RAYCAP – DC6-48-60-18-8C-EV
SCALE: NOT TO SCALE

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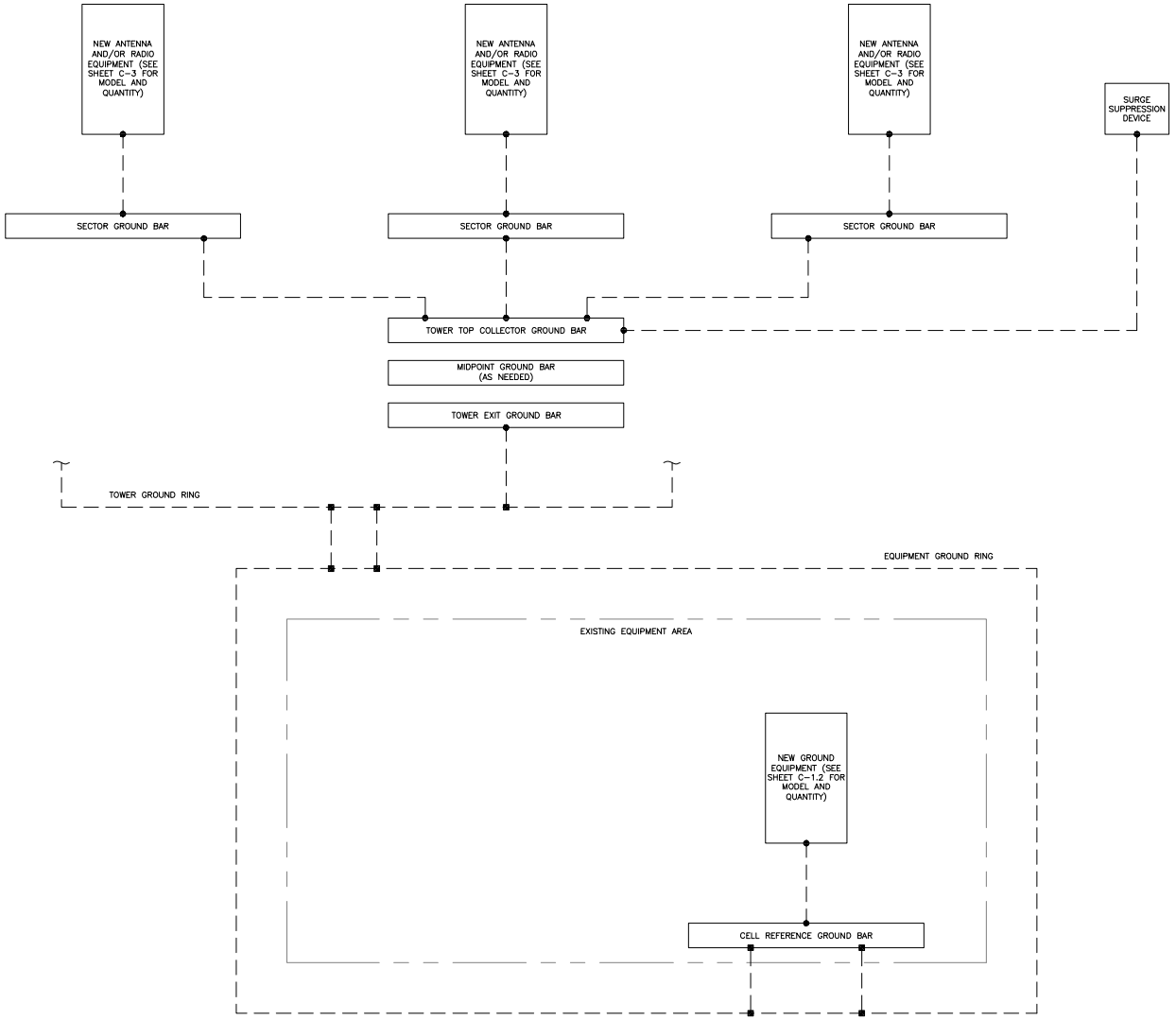

1 GROUNDING SCHEMATIC
SCALE: NOT TO SCALE

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.

AT&T
575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

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

AT&T SITE NUMBER: **CT5843**

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

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

EXISTING 40'-0" SELF SUPPORT TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
B	06/05/20	TJ	PRELIMINARY	TJ
C	06/25/20	TJ	PRELIMINARY	TJ
D	08/10/20	TJ	PRELIMINARY	TJ
0	09/17/20	EA	CONSTRUCTION	JL

DocuSigned by:
Justin Lanetti
F8F0D5B254C4D...

STATE OF CONNECTICUT
JUSTIN PETER LANETTE
No. 31965
LICENSED PROFESSIONAL ENGINEER

9/17/2020 | 4:52:02 PM EDT

Crown Castle USA Inc. Certificate of Registration #PEC.0001101

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SHEET NUMBER:	REVISION:
G-1	0

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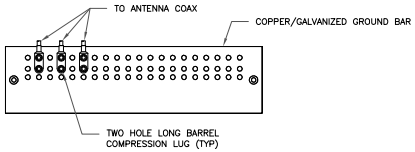
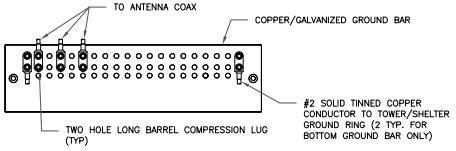


NOTES:

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

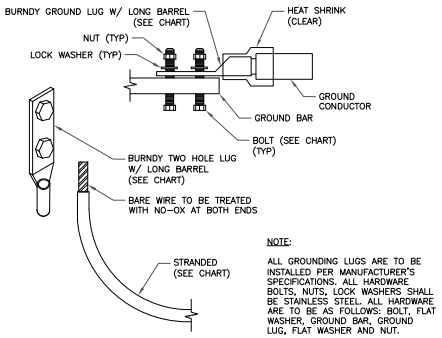


NOTES:

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.

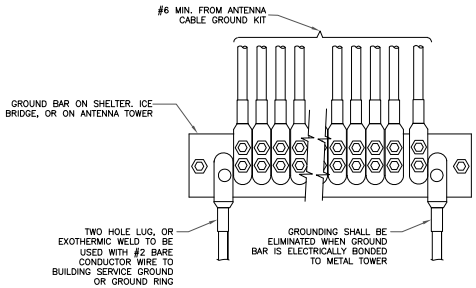
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE

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

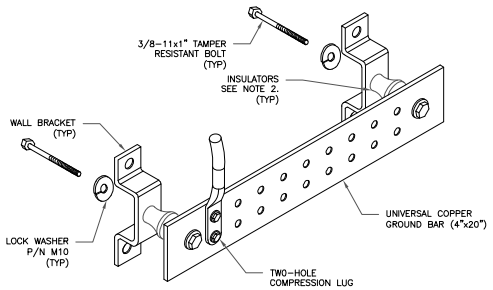


NOTE:
ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER, GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

3 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



4 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE

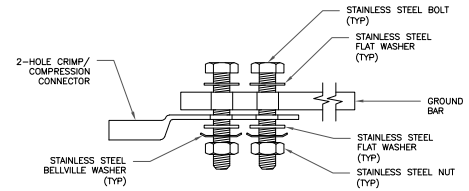


NOTES:

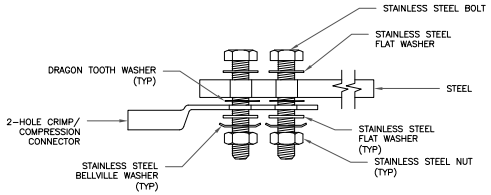
1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION. CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.

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

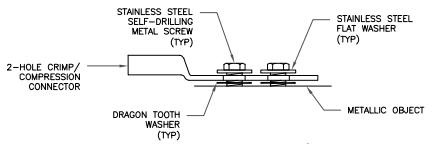
5 GROUND BAR DETAIL
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS

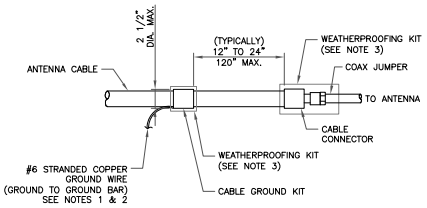


SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

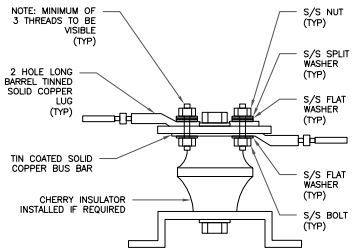
8 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



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

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DocuSigned by:
Justin Lavelle
E9400B5254C4D...

STATE OF CONNECTICUT
JUSTIN PETER LAVELLE
No. 31965
LICENSED PROFESSIONAL ENGINEER

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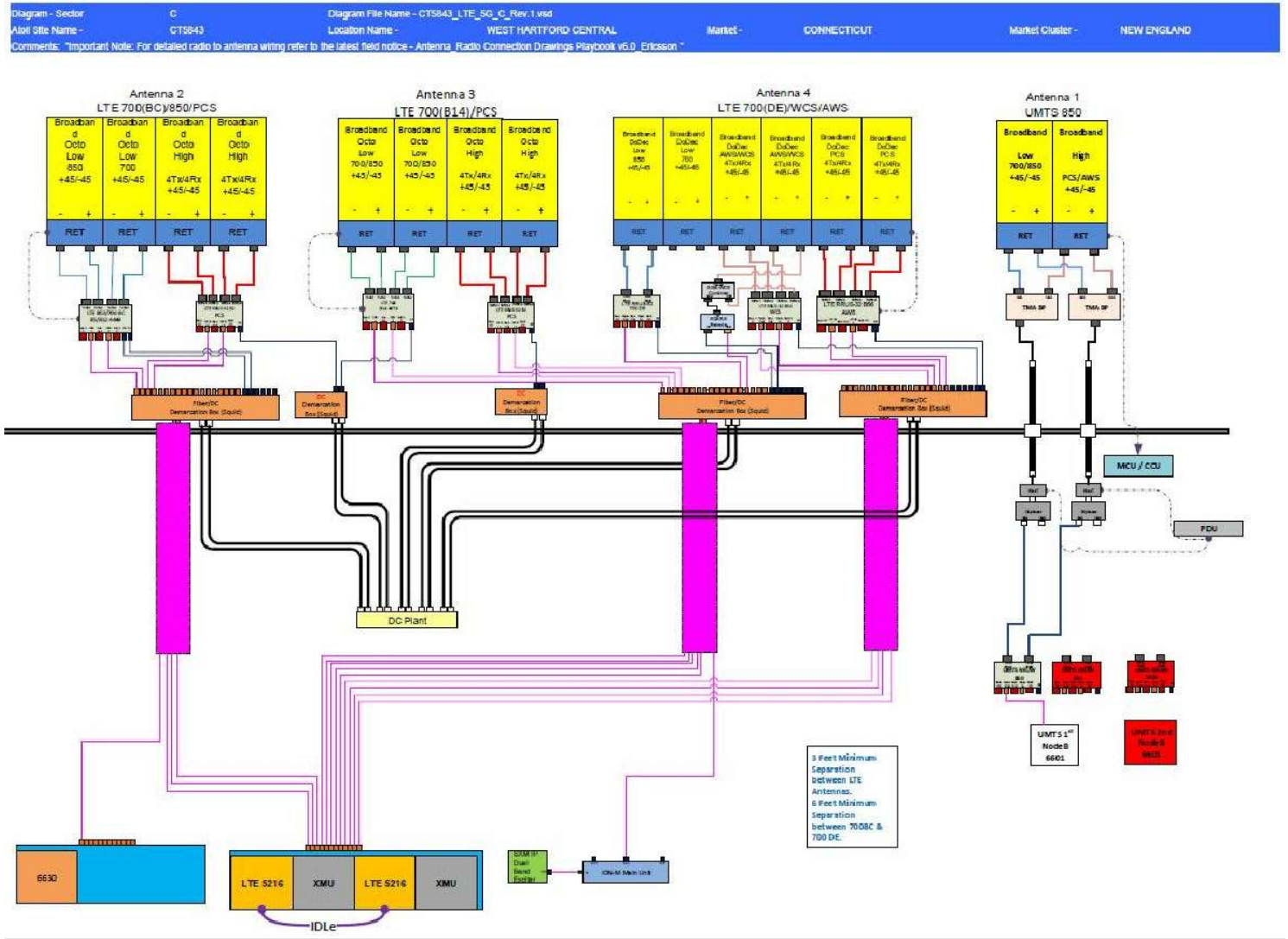

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GENERAL NOTES

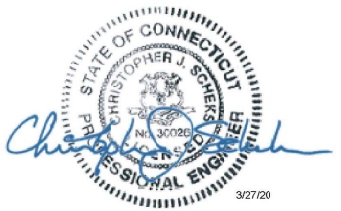
1. THESE MODIFICATIONS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE GOVERNING PROVISIONS OF TIA/EIA-222, AWS, ANSI TIA-322, AND AISC. MATERIALS, FABRICATION, INSTALLATION AND ALL OTHER SERVICES PROVIDED BY THE CONTRACTOR SHALL CONFORM TO THE ABOVE MENTIONED CODES AND THE CONTRACT SPECIFICATIONS.
2. ALL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



GPD Engineering and Architecture Professional Corporation
520 South Main Street
Akron, OH 44311
330.572.2100 Fax 330.572.2102

DESIGN DRAWINGS PREPARED FOR:

CROWN CASTLE

WEST HARTFORD PARKING GARAGE
SITE #: 870263

REV	DATE	DESCRIPTION
0	3/27/20	INITIAL RELEASE

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	JML
PROJECT MANAGER	APPROVED BY
CB	CJE

JOB NO.
2020777.876328.20

N-01

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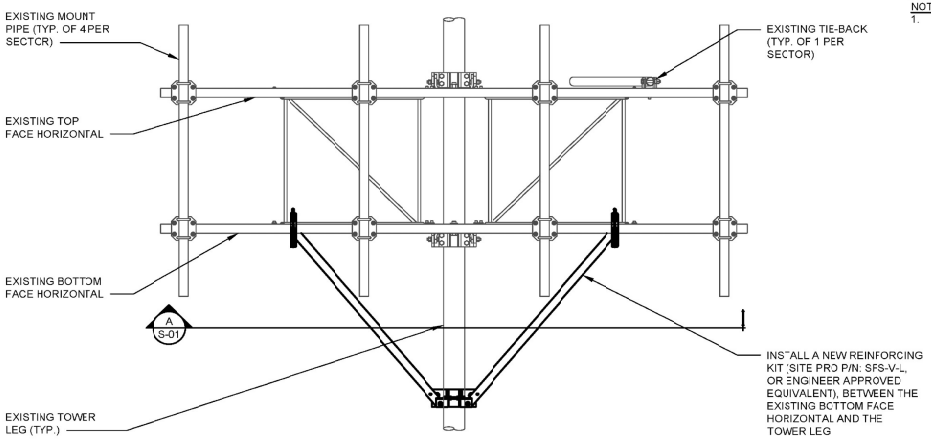
MODIFICATION SCHEDULE

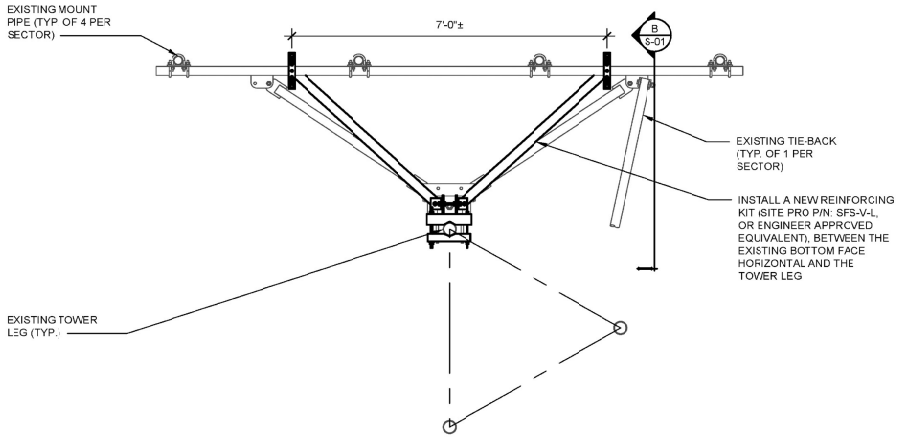
MEMBER TYPE	ELEVATION	EXISTING MEMBER	NEW MEMBER	REFERENCE DETAIL/SHEET	NOTES
REINFORCING KIT	92'-0"±	(3) 13'-0" SECTOR FRAMES	(1) REINFORCING KIT (PER SECTOR)	1/S-01	INSTALL A REINFORCING KIT BETWEEN THE EXISTING BOTTOM FACE HORIZONTAL AND THE TOWER LEG.

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



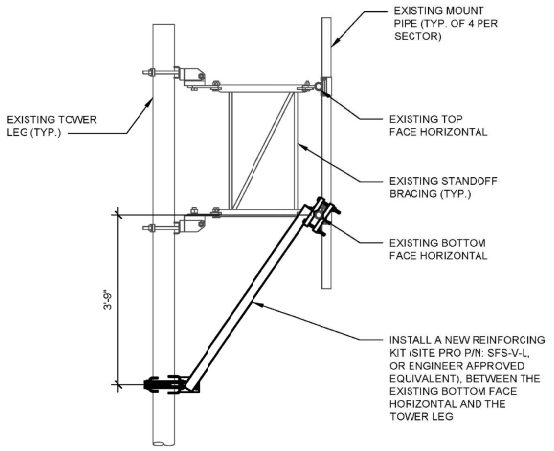
1 S-01 ELEVATION
SCALE: 3/8" = 1'-0"

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



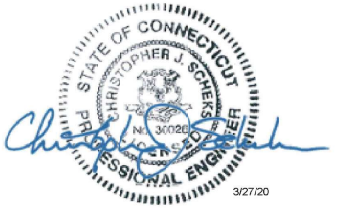
A S-01 SECTION
SCALE: 3/8" = 1'-0"

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.



3/27/20

GPD Engineering and Architecture Professional Corporation
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330.572.2100 Fax: 330.572.2102

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WEST HARTFORD PARKING GARAGE
BU #: 876328

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WEST HARTFORD, CT 06110

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RECORD	-

ENGINEER	DESIGNER
MAH	JML
PROJECT MANAGER	APPROVED BY
CB	CJS

JOB NO.
2020777.876328.20

S-01

Certificate Of Completion

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Document Pages: 12
Signatures: 9
Certificate Pages: 3
Initials: 0
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To contact us by email, send messages to: esignature@CrownCastle.com
To contact us by paper mail, send correspondence to
Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317

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Exhibit D

Structural Analysis Report

Date: **April 28, 2020**

GPD Engineering and Architecture
Professional Corporation

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

520 South Main Street, Suite 2531
Akron, Ohio 44311
(216) 927-8663

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	10071356
	Carrier Site Name:	WEST HARTFORD CENTRAL
Crown Castle Designation:	**Crown Castle BU Number:**	876328
	Crown Castle Site Name:	WEST HARTFORD PARKING GARAGE
	Crown Castle JDE Job Number:	596335
	Crown Castle Work Order Number:	1843212
	Crown Castle Order Number:	509316 Rev. 0
Engineering Firm Designation:	**GPD Project Number:**	2020777.876328.23
Site Data:	**27-31 South Main St., West Hartford, Hartford County, CT 06110**	
	Latitude *41° 45' 36.41"*, Longitude *-72° 44' 35.25"*	
	40.25 Foot - Self Support and Modified Parking Garage Structural Analysis	

Dear Cheryl Schultz,

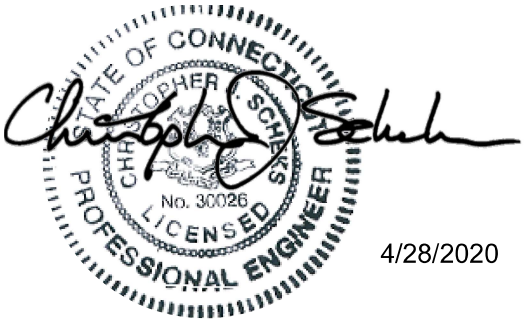
We are pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

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

LC7: Proposed Equipment Configuration **Sufficient Capacity – 83.0%**

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

Respectfully submitted by:



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

4/28/2020

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 40.25 ft self support tower designed by ROHN in April of 1997.

Modifications designed by GPD (Project #: 2015777.876328.08, dated 6/3/2015) consist of installing extension plates to the tower base frame connections and extension plates to the existing stair well walls at varying elevations. These modifications have been installed and were considered in this analysis.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	2.00 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	3	Sabre	C10-857-011C 12' Sector Frame	6 3 10	1-5/8 3/8 3/4
	90.5	3	Site Pro 1	SFS-V-L Reinforcement Kit		
	89.0	3	CCI Antennas	DMP65R-BU8D		
		3	CCI Antennas	OPA65R-BU8D		
		3	CCI Antennas	TPA-65R-LCUUUU-H8		
		3	Powerwave Technologies	7770.00		
		3	CCI Antennas	DTMABP7819VG12A		
		3	Commscope	CBC23SR-43		
		3	Commscope	ION-M23 SDARS		
		3	Ericsson	RRUS 32 B2		
		3	Ericsson	RRUS 32 B2_CCIV2		
		3	Ericsson	RRUS 32 B30		
		3	Ericsson	RRUS 32 B66		
		3	Ericsson	RRUS 4449 B5/B12		
		3	Ericsson	RRUS 4478 B14_CCIV2		
		3	Ericsson	RRUS E2 B29		
		3	Raycap	DC6-48-60-0-8C-EV		
		2	Raycap	DC6-48-60-18-8F		

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	2	RFS/Celwave	APXVSPP18-C-A20	3 1	1-1/4 5/8
		1	RFS/Celwave	APXV9ERR18-C-A20		
		3	Alcatel Lucent	1900MHz RRH (65MHz)		
		3	RFS/Celwave	APXVTM14-C-120		
		3	Alcatel Lucent	TD-RRH8x20-25		
		3	Alcatel Lucent	800MHz 2X50W RRH W/FILTER		
	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 302-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Tower Manufacturer Drawings	Rohn Eng. File#: 345895W, Dated: 4/15/1997	1440544	CCISITES
Tower Mapping Report	GPD Project #: 2014777.876328.03, Dated: 3/04/2014	1440544	CCISITES
Base Frame Design	Greiner Project #: F101508.60, Dated: 2/20/1997	5460756	CCISITES
Parking Garage Design	Unistress Project: Towne Center Garage, Rev. 4, Dated: 10/31/1988	5460756	CCISITES
Parking Garage Modifications	GPD Project #: 2015777.876328.08, Dated: 6/3/2015	5735691	CCISITES
Modifications Passing Analysis	GPD Project #: 2015777.876328.08, Dated: 6/3/2015	5735731	CCISITES
Post Modification Inspection	GPD Project #: 2015777.876328.10, Dated 1/27/2016	6076906	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.5.0), 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 Caste has calculated and provided the effective area for panel antennas using approved methods following the intent of the 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 or items in Table 3 are not valid or have been made in error. GPD 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	105.25 - 85.125	Leg	ROHN 2.5 STD	2	-13.20	66.58	19.8	Pass
T2	85.125 - 65	Leg	ROHN 2.5 STD	38	-37.21	59.92	62.1	Pass
T1	105.25 - 85.125	Diagonal	L1-1/2x1-1/2x1/8	9	-3.38	5.06	66.7 83.0 (b)	Pass
T2	85.125 - 65	Diagonal	L1-3/4x1-3/4x3/16	46	-3.15	6.77	46.5 48.0 (b)	Pass
T1	105.25 - 85.125	Top Girt	L2x2x1/8	4	-0.30	4.27	7.1	Pass
T2	85.125 - 65	Top Girt	L2x2x1/8	41	-0.13	4.27	3.1 4.2 (b)	Pass
						Summary	ELC:	Load Case 7
						Leg (T2)	62.1	Pass
						Diagonal (T1)	83.0	Pass
						Top Girt (T1)	7.1	Pass
						Bolt Checks	83.0	Pass
						Rating =	83.0	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1, 2, 3	Base Frame & Parking Garage	65	54.2	Pass

Structure Rating (max from all components) =	83.0%

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity consumed.
2) Tower capacities adjusted 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 (GPD Project #: 2015777.876328.08, dated 6/3/2015). See Appendix C for the reaction comparison.

4.1) Recommendations

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

APPENDIX A

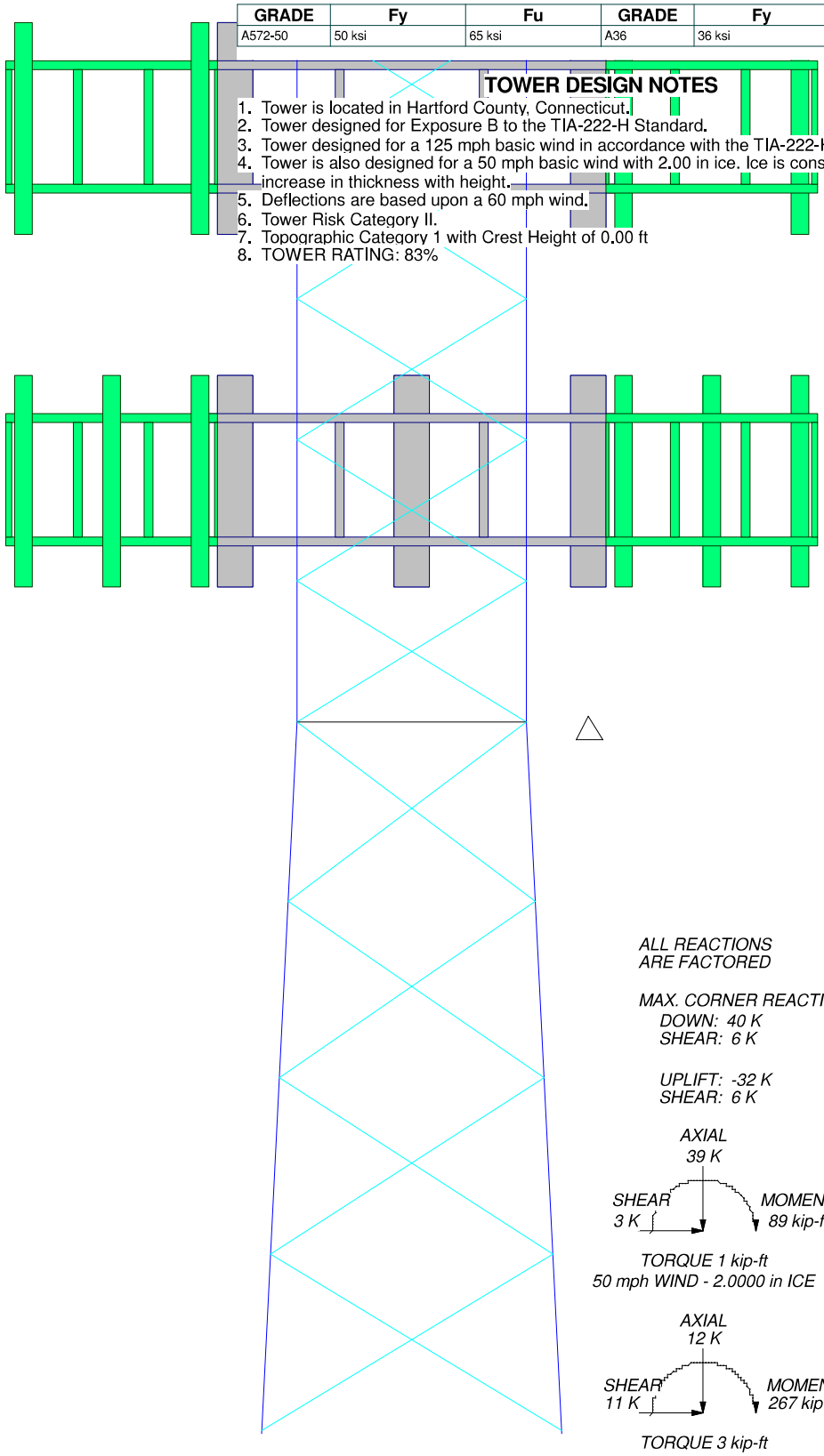
TNXTOWER OUTPUT

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 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 2.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 83%



105.3 ft

85.1 ft

65.0 ft

Section								
Legs	ROHN 2.5 STD							
Leg Grade	A572-50							
Diagonals	L1-3/4x1-3/4x3/16							L1-1/2x1-1/2x1/8
Diagonal Grade	A36							
Top Girts	L2x2x1/8							
Face Width (ft)	8.5625							6.5625
# Panels @ (ft)	4 @ 5.01042							5 @ 4.025
Weight (K)	1.5	0.8	T2		T1	0.7		

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 40 K
SHEAR: 6 K

UPLIFT: -32 K
SHEAR: 6 K

AXIAL 39 K
SHEAR 3 K
MOMENT 89 kip-ft

TORQUE 1 kip-ft
50 mph WIND - 2.0000 in ICE

AXIAL 12 K
SHEAR 11 K
MOMENT 267 kip-ft

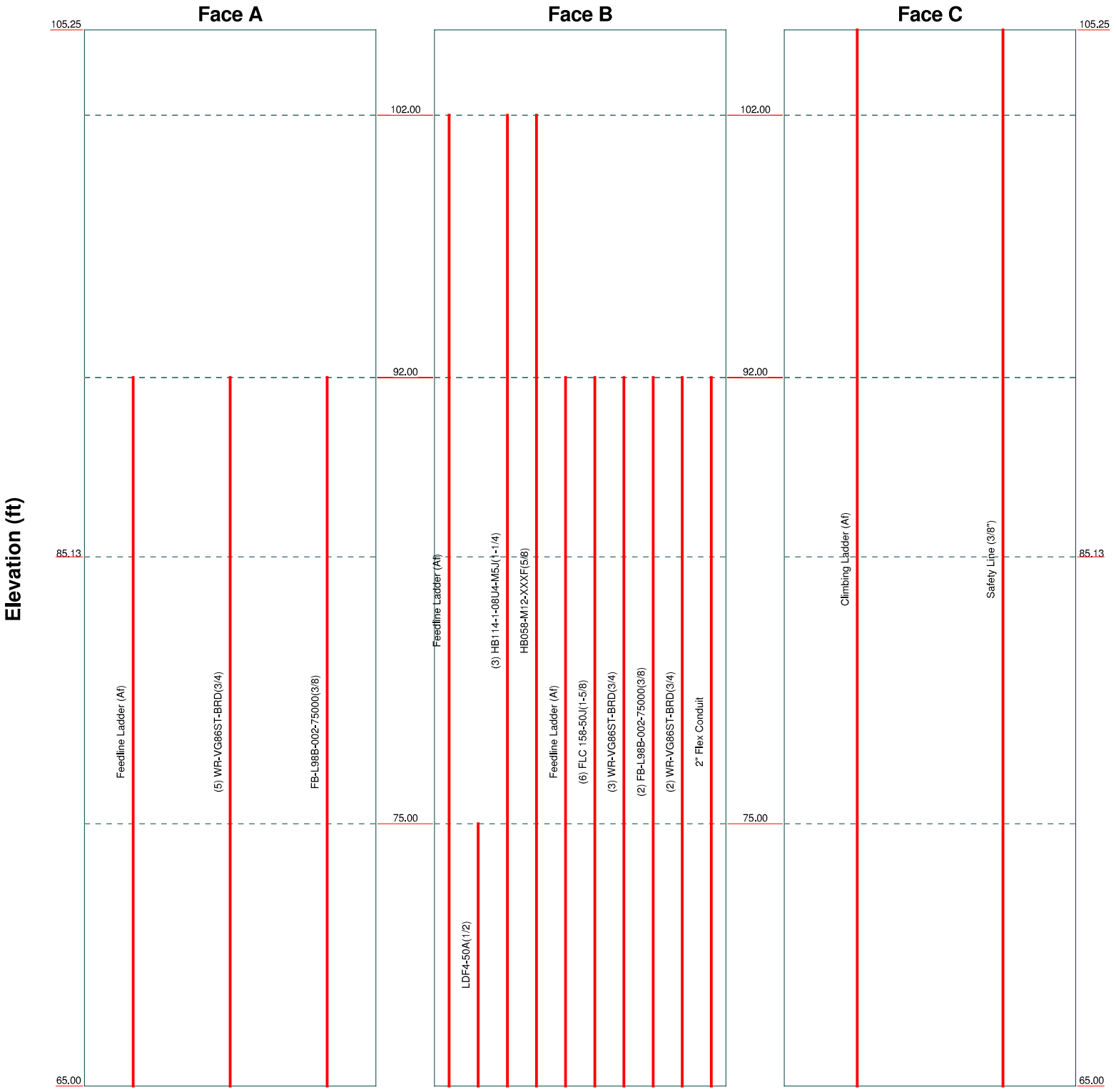
TORQUE 3 kip-ft
REACTIONS - 125 mph WIND

GPD
520 South Main Street Suite 2531
Akron, Ohio 44311
Phone: (317) 295-3172
FAX: (317) 293-1331

Job:	**BU #: 876328, WEST HARTFORD PARKING GARAGE**		
Project:	***2020777.876328.23***		
Client: Crown Castle International, Inc.	Drawn by: cdobay	App'd:	
Code: TIA-222-H	Date: 04/28/20	Scale: NTS	
Path: \\gpdco.com\telecom\Crown\876328.23\5_Structural\00_Structure\00_Rev 0\03_Modeling\876328.eri		Dwg No. E-1	

Feed Line Distribution Chart
65' - 105'3"

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



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520 South Main Street Suite 2531
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Project:	***2020777.876328.23***		
Client: Crown Castle International, Inc.		Drawn by: cdobay	App'd:
Code: TIA-222-H		Date: 04/28/20	Scale: NTS
Path: \\gpdoc.com\telecom\Crown\876328.23\5_Structural\00_Structure\00_Rev 0\03_Modeling\876328.eri			Dwg No. E-7

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 105.25 ft above the ground line.
The base of the tower is set at an elevation of 65.00 ft above the ground line.
The face width of the tower is 6.56 ft at the top and 8.56 ft 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: 190.00 ft.
Basic wind speed of 125 mph.
Risk Category II.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 2.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
Stress ratio used in tower member design 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

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	105.25-85.13			6.56	1	20.13
T2	85.13-65.00			6.56	1	20.13

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	105.25-85.13	4.03	X Brace	No	No	0.0000	0.0000
T2	85.13-65.00	5.01	X Brace	No	No	0.0000	1.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 105.25-85.13	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Equal Angle	L1-1/2x1-1/2x1/8	A36 (36 ksi)
T2 85.13-65.00	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 105.25-85.13	Equal Angle	L2x2x1/8	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T2 85.13-65.00	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 105.25-85.13	0.00	0.1875	A36 (36 ksi)	1	1	1	0.0000	0.0000	0.0000
T2 85.13-65.00	0.00	0.1875	A36 (36 ksi)	1	1	1	0.0000	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	Yes	1	1	1	1	1	1	1	1
105.25-85.13				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
85.13-65.00				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	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	1	0.0000	1	0.0000	1
105.25-85.13														
T2 85.13-65.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	1	0.0000	1	0.0000	1

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	Flange	0.6250	4	0.5000	1	0.5000	1	0.0000	0	0.0000	0	0.0000	0	0.0000	0
105.25-85.13		A325N		A325X		A325X		A325N		A325N		A325N		A325N	
T2 85.13-65.00	Flange	0.0000	0	0.5000	1	0.5000	1	0.0000	0	0.0000	0	0.0000	0	0.0000	0
		A325N		A325X		A325X		A325N		A325N		A325N		A325N	

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 plf
***													
Climbing Ladder (Af)	C	No	No	Af (CaAa)	105.25 - 65.00	-3.0000	0	1	1	3.8400	3.8400		4.81
Safety Line (3/8")	C	No	No	Ar (CaAa)	105.25 - 65.00	-3.0000	0	1	1	0.3750	0.3750		0.22
Feedline Ladder (Af)	B	No	No	Af (CaAa)	102.00 - 65.00	0.0000	-0.1	1	1	3.0000	3.0000		8.40
LDF4-50A(1/2)	B	No	No	Ar (CaAa)	75.00 - 65.00	0.0000	-0.15	1	1	0.6250	0.6250		0.15
HB114-1-08U4-M5J(1-1/4)	B	No	No	Ar (CaAa)	102.00 - 65.00	0.0000	-0.1	3	3	1.0000	1.5400		1.08
HB058-M12-XXXF(5/8)	B	No	No	Ar (CaAa)	102.00 - 65.00	0.0000	-0.025	1	1	0.8400	0.8400		0.24
Feedline Ladder (Af)	B	No	No	Af (CaAa)	92.00 - 65.00	0.0000	0.35	1	1	3.0000	3.0000		8.40
FLC 158-50J(1-5/8)	B	No	No	Ar (CaAa)	92.00 - 65.00	0.0000	0.35	6	3	1.0000	2.0150		0.92
WR-VG86ST-BRD(3/4)	B	No	No	Ar (CaAa)	92.00 - 65.00	0.0000	0.3	3	3	0.7950	0.7950		0.58
FB-L98B-002-75000(3/8)	B	No	No	Ar (CaAa)	92.00 - 65.00	1.0000	0.3	2	2	0.3937	0.3937		0.06
WR-VG86ST-BRD(3/4)	B	No	No	Ar (CaAa)	92.00 - 65.00	6.0000	0.37	2	1	0.7950	0.0000		0.58

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 plf
2" Flex Conduit	B	No	No	Ar (CaAa)	92.00 - 65.00	6.0000	0.37	1	1	1.0000	2.0000		0.32
Feedline Ladder (Af)	A	No	No	Af (CaAa)	92.00 - 65.00	0.0000	0.3	1	1	3.0000	3.0000		8.40
WR-VG86ST-BRD(3/4)	A	No	No	Ar (CaAa)	92.00 - 65.00	0.0000	0.3	5	5	0.7950	0.7950		0.58
FB-L98B-002-75000(3/8)	A	No	No	Ar (CaAa)	92.00 - 65.00	0.0000	0.25	1	1	0.3937	0.3937		0.06
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Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
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APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.60 5.05 5.50 6.44	4.01 4.45 4.89 5.82	0.10 0.16 0.23 0.42
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.60 5.05 5.50 6.44	4.01 4.45 4.89 5.82	0.10 0.16 0.23 0.42
APXV9ERR18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.60 5.05 5.50 6.44	4.01 4.45 4.89 5.82	0.10 0.16 0.23 0.42
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.09 4.48 4.88 5.71	2.86 3.23 3.61 4.40	0.08 0.13 0.19 0.33
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.09 4.48 4.88 5.71	2.86 3.23 3.61 4.40	0.08 0.13 0.19 0.33
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.09 4.48 4.88 5.71	2.86 3.23 3.61 4.40	0.08 0.13 0.19 0.33
1900MHz RRH (65MHz)	A	From Leg	2.00 0.00 1.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.31 2.52 2.73 3.17	2.38 2.58 2.79 3.24	0.06 0.08 0.11 0.18
1900MHz RRH (65MHz)	B	From Leg	2.00 0.00 1.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.31 2.52 2.73 3.17	2.38 2.58 2.79 3.24	0.06 0.08 0.11 0.18
1900MHz RRH (65MHz)	C	From Leg	2.00 0.00 1.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.31 2.52 2.73 3.17	2.38 2.58 2.79 3.24	0.06 0.08 0.11 0.18
800MHz 2X50W RRH W/FILTER	A	From Leg	2.00 0.00 1.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.06 2.24 2.43 2.83	1.93 2.11 2.29 2.68	0.06 0.09 0.11 0.17
800MHz 2X50W RRH W/FILTER	B	From Leg	2.00 0.00	0.0000	102.00	No Ice 1/2" Ice	2.06 2.24	1.93 2.11	0.06 0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.00			1" Ice	2.43	2.29	0.11
						2" Ice	2.83	2.68	0.17
800MHz 2X50W RRH W/FILTER	C	From Leg	2.00 0.00 1.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
						2" Ice	2.83	2.68	0.17
TD-RRH8x20-25	A	From Leg	4.00 0.00 1.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice	3.70 3.95 4.20	1.29 1.46 1.64	0.07 0.09 0.12
						2" Ice	4.72	2.02	0.18
TD-RRH8x20-25	B	From Leg	4.00 0.00 1.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice	3.70 3.95 4.20	1.29 1.46 1.64	0.07 0.09 0.12
						2" Ice	4.72	2.02	0.18
TD-RRH8x20-25	C	From Leg	4.00 0.00 1.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice	3.70 3.95 4.20	1.29 1.46 1.64	0.07 0.09 0.12
						2" Ice	4.72	2.02	0.18
8' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
						2" Ice	4.40	4.40	0.12
8' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
						2" Ice	4.40	4.40	0.12
8' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
						2" Ice	4.40	4.40	0.12
Sector Mount [SM 502-3]	B	None		0.0000	102.00	No Ice 1/2" Ice 1" Ice	29.82 42.21 54.43	29.82 42.21 54.43	1.67 2.27 3.05
						2" Ice	78.49	78.49	5.18
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DMP65R-BU8D w/ Mount Pipe	A	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice	15.89 16.81 17.76	7.89 8.74 9.60	0.14 0.25 0.38
						2" Ice	19.70	11.37	0.68
DMP65R-BU8D w/ Mount Pipe	B	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice	15.89 16.81 17.76	7.89 8.74 9.60	0.14 0.25 0.38
						2" Ice	19.70	11.37	0.68
DMP65R-BU8D w/ Mount Pipe	C	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice	15.89 16.81 17.76	7.89 8.74 9.60	0.14 0.25 0.38
						2" Ice	19.70	11.37	0.68
OPA65R-BU8D w/ Mount Pipe	A	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice	18.33 19.06 19.81	10.34 11.86 13.41	0.11 0.23 0.37
						2" Ice	21.23	15.75	0.67
OPA65R-BU8D w/ Mount Pipe	B	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice	18.33 19.06 19.81	10.34 11.86 13.41	0.11 0.23 0.37
						2" Ice	21.23	15.75	0.67
OPA65R-BU8D w/ Mount Pipe	C	From Leg	4.00 0.00	0.0000	92.00	No Ice 1/2" Ice	18.33 19.06	10.34 11.86	0.11 0.23

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
			-3.00			1" Ice	19.81	13.41	0.37
						2" Ice	21.23	15.75	0.67
TPA-65R-LCUUUU-H8 w/ Mount Pipe	A	From Leg	4.00	0.0000	92.00	No Ice	11.85	8.99	0.11
			0.00			1/2" Ice	12.77	9.88	0.21
			-3.00			1" Ice	13.71	10.79	0.32
						2" Ice	15.64	12.66	0.58
TPA-65R-LCUUUU-H8 w/ Mount Pipe	B	From Leg	4.00	0.0000	92.00	No Ice	11.85	8.99	0.11
			0.00			1/2" Ice	12.77	9.88	0.21
			-3.00			1" Ice	13.71	10.79	0.32
						2" Ice	15.64	12.66	0.58
TPA-65R-LCUUUU-H8 w/ Mount Pipe	C	From Leg	4.00	0.0000	92.00	No Ice	11.85	8.99	0.11
			0.00			1/2" Ice	12.77	9.88	0.21
			-3.00			1" Ice	13.71	10.79	0.32
						2" Ice	15.64	12.66	0.58
7770.00 w/ Mount Pipe	A	From Leg	4.00	0.0000	92.00	No Ice	5.75	4.25	0.06
			0.00			1/2" Ice	6.18	5.01	0.10
			-3.00			1" Ice	6.61	5.71	0.16
						2" Ice	7.49	7.16	0.29
7770.00 w/ Mount Pipe	B	From Leg	4.00	0.0000	92.00	No Ice	5.75	4.25	0.06
			0.00			1/2" Ice	6.18	5.01	0.10
			-3.00			1" Ice	6.61	5.71	0.16
						2" Ice	7.49	7.16	0.29
7770.00 w/ Mount Pipe	C	From Leg	4.00	0.0000	92.00	No Ice	5.75	4.25	0.06
			0.00			1/2" Ice	6.18	5.01	0.10
			-3.00			1" Ice	6.61	5.71	0.16
						2" Ice	7.49	7.16	0.29
RRUS 4449 B5/B12	A	From Leg	4.00	0.0000	92.00	No Ice	1.97	1.41	0.07
			0.00			1/2" Ice	2.14	1.56	0.09
			-3.00			1" Ice	2.33	1.73	0.11
						2" Ice	2.72	2.07	0.16
RRUS 4449 B5/B12	B	From Leg	4.00	0.0000	92.00	No Ice	1.97	1.41	0.07
			0.00			1/2" Ice	2.14	1.56	0.09
			-3.00			1" Ice	2.33	1.73	0.11
						2" Ice	2.72	2.07	0.16
RRUS 4449 B5/B12	C	From Leg	4.00	0.0000	92.00	No Ice	1.97	1.41	0.07
			0.00			1/2" Ice	2.14	1.56	0.09
			-3.00			1" Ice	2.33	1.73	0.11
						2" Ice	2.72	2.07	0.16
RRUS 4478 B14_CCIV2	A	From Leg	4.00	0.0000	92.00	No Ice	2.02	1.25	0.06
			0.00			1/2" Ice	2.20	1.40	0.08
			-3.00			1" Ice	2.39	1.55	0.10
						2" Ice	2.78	1.89	0.15
RRUS 4478 B14_CCIV2	B	From Leg	4.00	0.0000	92.00	No Ice	2.02	1.25	0.06
			0.00			1/2" Ice	2.20	1.40	0.08
			-3.00			1" Ice	2.39	1.55	0.10
						2" Ice	2.78	1.89	0.15
RRUS 4478 B14_CCIV2	C	From Leg	4.00	0.0000	92.00	No Ice	2.02	1.25	0.06
			0.00			1/2" Ice	2.20	1.40	0.08
			-3.00			1" Ice	2.39	1.55	0.10
						2" Ice	2.78	1.89	0.15
CBC23SR-43	A	From Leg	4.00	0.0000	92.00	No Ice	0.40	0.15	0.01
			0.00			1/2" Ice	0.49	0.20	0.01
			-3.00			1" Ice	0.58	0.27	0.01
						2" Ice	0.78	0.42	0.03
CBC23SR-43	B	From Leg	4.00	0.0000	92.00	No Ice	0.40	0.15	0.01
			0.00			1/2" Ice	0.49	0.20	0.01
			-3.00			1" Ice	0.58	0.27	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	0.78	0.42	0.03
CBC23SR-43	C	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.40 0.49 0.58 0.78	0.15 0.20 0.27 0.42	0.01 0.01 0.01 0.03
DC6-48-60-0-8C-EV	A	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.74 2.96 3.20 3.68	4.79 5.07 5.35 5.95	0.03 0.06 0.10 0.20
DC6-48-60-0-8C-EV	B	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.74 2.96 3.20 3.68	4.79 5.07 5.35 5.95	0.03 0.06 0.10 0.20
DC6-48-60-0-8C-EV	C	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.74 2.96 3.20 3.68	4.79 5.07 5.35 5.95	0.03 0.06 0.10 0.20
RRUS 32 B30	A	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.69 2.91 3.14 3.61	1.57 1.76 1.95 2.35	0.06 0.08 0.10 0.16
RRUS 32 B30	B	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.69 2.91 3.14 3.61	1.57 1.76 1.95 2.35	0.06 0.08 0.10 0.16
RRUS 32 B30	C	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.69 2.91 3.14 3.61	1.57 1.76 1.95 2.35	0.06 0.08 0.10 0.16
DC6-48-60-18-8F Surge Suppression Unit	A	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.92 1.46 1.64 2.04	0.92 1.46 1.64 2.04	0.02 0.04 0.06 0.11
DC6-48-60-18-8F Surge Suppression Unit	B	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.92 1.46 1.64 2.04	0.92 1.46 1.64 2.04	0.02 0.04 0.06 0.11
RRUS E2 B29	A	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.15 3.36 3.59 4.07	1.29 1.44 1.60 1.95	0.06 0.08 0.11 0.17
RRUS E2 B29	B	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.15 3.36 3.59 4.07	1.29 1.44 1.60 1.95	0.06 0.08 0.11 0.17
RRUS E2 B29	C	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.15 3.36 3.59 4.07	1.29 1.44 1.60 1.95	0.06 0.08 0.11 0.17
DTMABP7819VG12A	A	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.98 1.10 1.23 1.52	0.34 0.42 0.51 0.71	0.02 0.03 0.04 0.06
DTMABP7819VG12A	B	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.98 1.10 1.23 1.52	0.34 0.42 0.51 0.71	0.02 0.03 0.04 0.06

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
DTMABP7819VG12A	C	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.98 1.10 1.23 1.52	0.34 0.42 0.51 0.71	0.02 0.03 0.04 0.06
RRUS 32 B2	A	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.73 2.95 3.18 3.66	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
RRUS 32 B2	B	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.73 2.95 3.18 3.66	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
RRUS 32 B2	C	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.73 2.95 3.18 3.66	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
RRUS 32 B66	A	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.74 2.96 3.19 3.68	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
RRUS 32 B66	B	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.74 2.96 3.19 3.68	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
RRUS 32 B66	C	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.74 2.96 3.19 3.68	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
ION-M23 SDARS	A	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.05 2.27 2.73	1.76 1.98 2.19 2.65	0.05 0.06 0.08 0.13
ION-M23 SDARS	B	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.05 2.27 2.73	1.76 1.98 2.19 2.65	0.05 0.06 0.08 0.13
ION-M23 SDARS	C	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.05 2.27 2.73	1.76 1.98 2.19 2.65	0.05 0.06 0.08 0.13
RRUS 32 B2_CCIV2	A	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.86 3.09 3.32 3.81	1.78 1.97 2.17 2.59	0.06 0.08 0.10 0.16
RRUS 32 B2_CCIV2	B	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.86 3.09 3.32 3.81	1.78 1.97 2.17 2.59	0.06 0.08 0.10 0.16
RRUS 32 B2_CCIV2	C	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.86 3.09 3.32 3.81	1.78 1.97 2.17 2.59	0.06 0.08 0.10 0.16
SFS-V-L Stabilizer Kit (1)	A	From Leg	2.00 0.00 0.00	0.0000	90.50	No Ice 1/2" Ice 1" Ice 2" Ice	2.92 3.57 3.98 4.80	2.92 3.57 3.98 4.80	0.07 0.09 0.11 0.14
SFS-V-L Stabilizer Kit (1)	B	From Leg	2.00	0.0000	90.50	No Ice	2.92	2.92	0.07

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
			0.00			1/2" Ice	3.57	3.57	0.09
			0.00			1" Ice	3.98	3.98	0.11
						2" Ice	4.80	4.80	0.14
SFS-V-L Stabilizer Kit (1)	C	From Leg	2.00	0.0000	90.50	No Ice	2.92	2.92	0.07
			0.00			1/2" Ice	3.57	3.57	0.09
			0.00			1" Ice	3.98	3.98	0.11
						2" Ice	4.80	4.80	0.14
(3) C10-857-011C 12' Sector Frame	B	None		0.0000	92.00	No Ice	16.14	16.14	1.39
						1/2" Ice	20.18	20.18	1.52
						1" Ice	24.22	24.22	1.66
						2" Ice	32.30	32.30	1.94
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KS24019-L112A	A	From Leg	4.00	0.0000	75.00	No Ice	0.14	0.14	0.01
			0.00			1/2" Ice	0.20	0.20	0.01
			2.00			1" Ice	0.26	0.26	0.01
						2" Ice	0.41	0.41	0.02
Side Arm Mount [SO 302-1]	A	From Leg	2.00	0.0000	75.00	No Ice	0.81	3.31	0.06
			0.00			1/2" Ice	1.30	5.00	0.08
			0.00			1" Ice	1.81	6.80	0.12
						2" Ice	2.91	10.99	0.23
***									

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

Comb. No.	Description
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 Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	105.25 - 85.125	0.263	42	0.0371	0.0038
T2	85.125 - 65	0.094	42	0.0311	0.0024

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
102.00	APXVSPP18-C-A20 w/ Mount Pipe	42	0.233	0.0371	0.0036	171480
92.00	DMP65R-BU8D w/ Mount Pipe	42	0.144	0.0355	0.0030	64709
90.50	SFS-V-L Stabilizer Kit (1)	42	0.132	0.0348	0.0029	58129
75.00	KS24019-L112A	42	0.039	0.0178	0.0013	85740

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	105.25 - 85.125	1.066	10	0.1490	0.0155
T2	85.125 - 65	0.381	10	0.1253	0.0100

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
102.00	APXVSPP18-C-A20 w/ Mount Pipe	10	0.943	0.1491	0.0148	42849
92.00	DMP65R-BU8D w/ Mount Pipe	10	0.587	0.1428	0.0123	16169
90.50	SFS-V-L Stabilizer Kit (1)	10	0.538	0.1402	0.0118	14525
75.00	KS24019-L112A	19	0.161	0.0717	0.0054	21424

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	105.25	Leg	A325N	0.6250	4	1.80	20.34	0.089	1.05	Bolt Tension
		Diagonal	A325X	0.5000	1	3.32	3.81	0.872	1.05	Member Block Shear
		Top Girt	A325X	0.5000	1	0.30	4.13	0.072	1.05	Member Bearing
T2	85.125	Diagonal	A325X	0.5000	1	3.13	6.20	0.504	1.05	Member Bearing
		Top Girt	A325X	0.5000	1	0.18	4.13	0.044	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	105.25 - 85.125	ROHN 2.5 STD	20.13	4.02	51.0 K=1.00	1.7040	-13.20	63.41	0.208 [1]
T2	85.125 - 65	ROHN 2.5 STD	20.16	5.02	63.6 K=1.00	1.7040	-37.21	57.07	0.652 [1]

[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	105.25 - 85.125	L1-1/2x1-1/2x1/8	7.70	3.60	146.0 K=1.00	0.3594	-3.38	4.82	0.701 [1]
T2	85.125 - 65	L1-3/4x1-3/4x3/16	9.70	4.75	166.0 K=1.00	0.6211	-3.15	6.45	0.489 [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	105.25 - 85.125	L2x2x1/8	6.56	6.11	184.6 K=1.00	0.4844	-0.30	4.07	0.074 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	85.125 - 65	L2x2x1/8	6.56	6.11	184.6 K=1.00	0.4844	-0.13	4.07	0.032 [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	105.25 - 85.125	ROHN 2.5 STD	20.13	4.02	51.0	1.7040	7.20	76.68	0.094 [1]
T2	85.125 - 65	ROHN 2.5 STD	20.16	0.08	1.1	1.7040	32.77	76.68	0.427 [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	105.25 - 85.125	L1-1/2x1-1/2x1/8	7.70	3.60	95.7	0.2109	3.32	9.18	0.362 [1]
T2	85.125 - 65	L1-3/4x1-3/4x3/16	9.70	4.75	108.5	0.3779	3.13	16.44	0.190 [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	105.25 - 85.125	L2x2x1/8	6.56	6.11	121.2	0.3047	0.30	13.25	0.022 [1]
T2	85.125 - 65	L2x2x1/8	6.56	6.11	121.2	0.3047	0.18	13.25	0.014 [1]

[1] P_u / ϕP_n controls

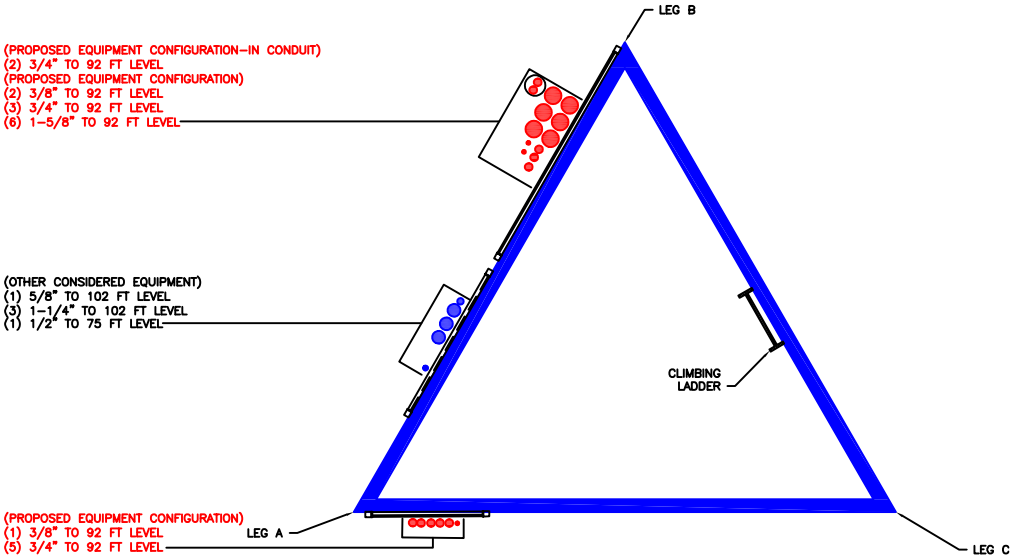
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	105.25 - 85.125	Leg	ROHN 2.5 STD	2	-13.20	66.58	19.8	Pass
T2	85.125 - 65	Leg	ROHN 2.5 STD	38	-37.21	59.92	62.1	Pass
T1	105.25 - 85.125	Diagonal	L1-1/2x1-1/2x1/8	9	-3.38	5.06	66.7 83.0 (b)	Pass
T2	85.125 - 65	Diagonal	L1-3/4x1-3/4x3/16	46	-3.15	6.77	46.5 48.0 (b)	Pass
T1	105.25 - 85.125	Top Girt	L2x2x1/8	4	-0.30	4.27	7.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T2	85.125 - 65	Top Girt	L2x2x1/8	41	-0.13	4.27	3.1 4.2 (b)	Pass
						Summary	ELC:	Load Case 7
						Leg (T2)	62.1	Pass
						Diagonal (T1)	83.0	Pass
						Top Girt (T1)	7.1	Pass
						Bolt Checks	83.0	Pass
						Rating =	83.0	Pass

APPENDIX B

BASE LEVEL DRAWING



CROWN REGION ADDRESS

USA

10/09/17	UPDATED PER WORK ORDER 1443087	CJR
30/08/17	UPDATED PER WORK ORDER 1448282	RAJ
02/09/17	UPDATED PER WORK ORDER 1454306	SLS
30/03/18	UPDATED PER WORK ORDER 1541349	BMT
11/04/19	UPDATED PER WORK ORDER 1707886	SB
02/12/19	UPDATED PER WORK ORDER 1811791	NJ
04/03/20	UPDATED PER WORK ORDER 1834344	RS
04/04/20	UPDATED PER WORK ORDER 1840447	AE
17/04/20	UPDATED PER WORK ORDER 1846324	MK

DRAWN BY: RMK
CHECKED BY: LWW
DRAWING DATE: 18/1/08

SITE NUMBER:
SITE NAME:

SITE NAME

WEST HARTFORD PARKING GARAGE

BUSINESS UNIT NUMBER

876328

SITE ADDRESS

27-31 SOUTH MAIN ST
WEST HARTFORD, CT 06110
HARTFORD COUNTY
USA

SHEET TITLE

BASE LEVEL DRAWING

SHEET NUMBER

A1-0

N.T.S.

PLOT DATE: 4/27/2016
Xref U:\AutoCAD\Border\BASELEVEL_BORDER.dwg

FILE NAME: 876328_BASELEVEL.dwg

APPENDIX C

ADDITIONAL CALCULATIONS

GPD Engineering and Architecture Professional Corporation

FOUNDATION ANALYSIS WORKSHEET

Client:	Crown Castle International, Inc.	Job No.:	2020777.876328.23		
Site Name:	WEST HARTFORD PARKING GARAGE	Sheet No:	1	Of	1
Site BU #:	876328	Made By:	CD	Date:	4/28/2020
Location:	Hartford County, Connecticut				
Loading Type:	Wind	Code:	H		

Sources

The modified tnxTower design reactions were obtained from the design by GPD (Project #: 2015777.876328.08, dated 6/3/2015)

Modified tnxTower Design Reactions (F-Code)		
Uplift:	44.01	K
Compression:	52.04	K
Shear	7.94	K

H-Code Conversion Factor:	1.35

Modified tnxTower Design Reactions (Converted to H-Code)		
Uplift:	59.41	K
Compression:	70.26	K
Shear	10.72	K

TNX Output Reactions (H-Code)		
Uplift:	32.00	K
Compression:	40.00	K
Shear	6.00	K

FOUNDATION CAPACITY

Uplift Capacity =	TNX Output / Modified Design Reactions	=	51.3%
Compression Capacity =	TNX Output / Modified Design Reactions	=	54.2%
Shear Capacity =	TNX Output / Modified Design Reactions	=	53.3%

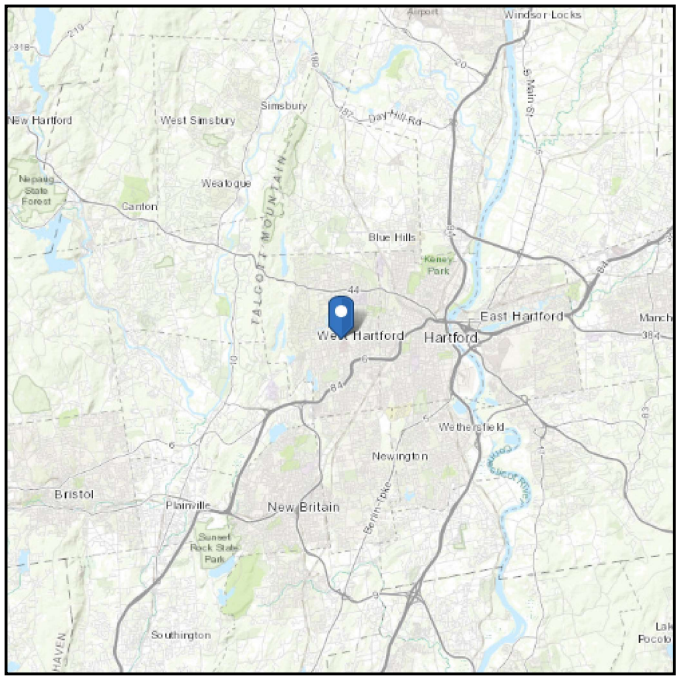
*Capacities per TIA-222-H Section 15.5

ASCE 7 Hazards Report

Address:
No Address at This Location

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

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



Wind

Results:

Wind Speed:	122 Vmph
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	92 Vmph
100-year MRI	99 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Thu Apr 16 2020

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

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

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

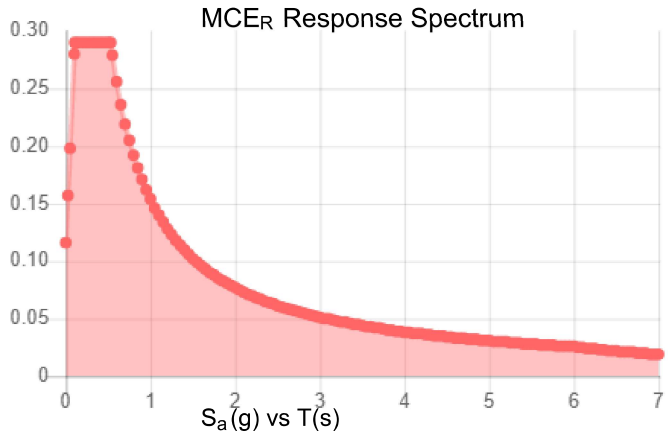
Seismic

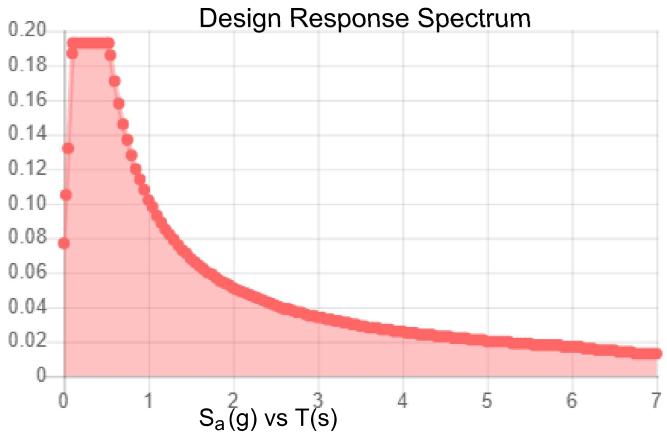
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.181	S_{DS} :	0.193
S_1 :	0.064	S_{D1} :	0.102
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.091
S_{MS} :	0.29	PGA_M :	0.146
S_{M1} :	0.154	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Thu Apr 16 2020

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

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Thu Apr 16 2020

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

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

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

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In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

Exhibit E

Mount Analysis

Date: **April 24, 2020**

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

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

Subject:	**Mount Analysis Report**	
Carrier Designation:	***AT&T Mobility* Loading Modification**	
	Carrier Site Number:	CT5843
	Carrier Site Name:	WEST HARTFORD CENTRAL
	FA Number:	10071356
Crown Castle Designation:	**Crown Castle BU Number:**	876328
	Crown Castle Site Name:	WEST HARTFORD PARKING GARAGE
	Crown Castle JDE Job Number:	603410
	Crown Castle Order Number:	509316 Rev. 0
Engineering Firm Designation:	**GPD Report Designation:**	2020777.876328.22
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**

Dear Darcy Tarr,

GPD is pleased to submit this **"Mount Analysis 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***

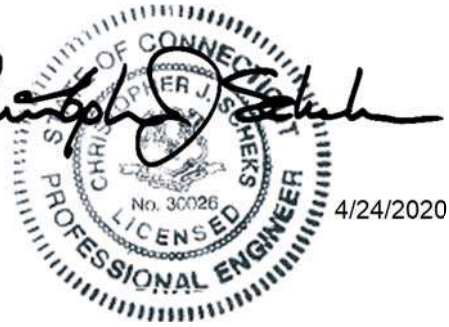
***See Section 4.1 of this report for the loading and structural modifications required in order for the mount to support the loading listed in Table 1.**

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: Michael Hlava

Respectfully Submitted by:

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



4/24/2020

TABLE OF CONTENTS

1) INTRODUCTION

This is a 13.0' Sector Mount designed by Sabre Drawing #: C10857011C Rev. 2, dated 10/19/2016.

2) ANALYSIS CRITERIA

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 Details
92.0	92.0	3	CCI Antennas	DMP65R-BU8D	(3) 13.0 ft. Sector Mounts
		3	CCI Antennas	OPA65R-BU8D	
		3	CCI Antennas	TPA-65R-LCUUUU-H8	
		3	Powerwave Technologies	7770.00	
		3	CCI Antennas	DTMABP7819VG12A	
		3	Commscope	CBC23SR-43	
		3	Commscope	ION-M23 SDARS	
		3	Ericsson	RRUS 32 B2	
		3	Ericsson	RRUS 32 B2_CCIV2	
		3	Ericsson	RRUS 32 B30	
		3	Ericsson	RRUS 32 B66	
		3	Ericsson	RRUS 4449 B5/B12	
		3	Ericsson	RRUS 4478 14_CCIV2	
		3	Ericsson	RRUS E2 B29	
		3	Raycap	DC6-48-60-0-8C-EV	Tower Mounted
		2	Raycap	DC6-48-60-18-8F	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
CCI Application	Crown Order Number 509316 Rev. 0	-	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	-	GPD

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 *Tower Mount Analysis* (Revision C).

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) This analysis assumes all information reference in Table 2 is current and correct.
5) Steel grades have been assumed as follows, unless noted otherwise:

Plate, Solid Round	ASTM A572 (GR 50)
Pipe	ASTM A500 (GR C-50) & ASTM A53 (GR B-35)
Connection Bolts	ASTM A325 & ASTM A307

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

4) ANALYSIS RESULTS

Table 3(a) - Mount Component Stresses vs. Capacity (Sector Mount, Alpha Sector)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,3	Face Horizontal	M1	92.0	27.2	Pass
	V-Boom Horizontal	M10		16.7	Pass
	V-Boom Bracing	M17		14.3	Pass
	Stiff Arm	M32		4.8	Pass
	Mount Pipe	A1		32.4	Pass
	Mod Stabilizer	M76		23.0	Pass
2,3	Mount to Tower Connection	-		20.1	Pass
	Tieback to Tower Connection	-		5.8	Pass
	Reinforcement to Tower Connection			11.3	Pass

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

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,3	Face Horizontal	M32A	92.0	26.8	Pass
	V-Boom Horizontal	M38		17.2	Pass
	V-Boom Bracing	M40		93.9	Pass
	Stiff Arm	M44		5.1	Pass
	Mount Pipe	B2		33.6	Pass
	Mod Stabilizer	M78		22.9	Pass
2,3	Mount to Tower Connection	-		17.6	Pass
	Tieback to Tower Connection	-		6.5	Pass
	Reinforcement to Tower Connection			11.2	Pass

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

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,3	Face Horizontal	M57	92.0	26.3	Pass
	V-Boom Horizontal	M63		16.0	Pass
	V-Boom Bracing	M66		13.5	Pass
	Stiff Arm	M69		4.6	Pass
	Mount Pipe	C4		33.3	Pass
	Mod Stabilizer	M80		23.1	Pass
2,3	Mount to Tower Connection	-		20.0	Pass
	Tieback to Tower Connection	-		6.5	Pass
	Reinforcement to Tower Connection			9.6	Pass

Structure Rating (max from all components) =	93.9%[3]

Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in "Appendix D - Additional Calculations" for calculations supporting the % capacity consumed.
3) A structure rating of 105% or less is within engineering tolerances and considered acceptable.

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	1076.1	Leg	Rohn 2.5 STD	3170.7	1
N92A	Existing	1146.3	Leg	Rohn 2.5 STD	3170.7	
N139	Existing	1029.7	Leg	Rohn 2.5 STD	3170.7	

Notes:
1) Tieback connection point is within 25% of either end of the connected tower member
2) Reduced member compressive capacity according to CED-STD-10294 Standard for Installation of Mounts and Appurtenances

4.1) Recommendations

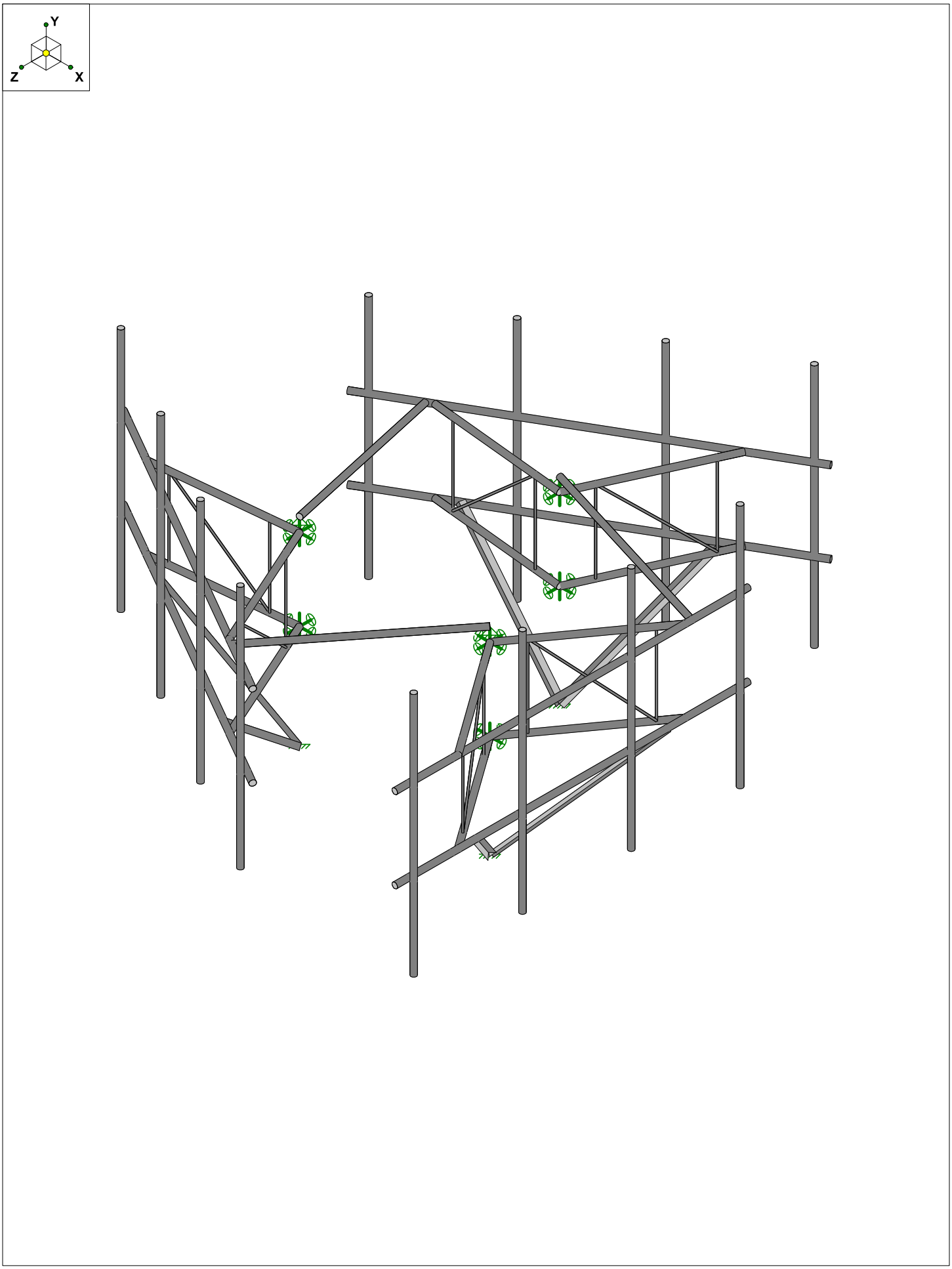
The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the structural modifications listed below must be completed.

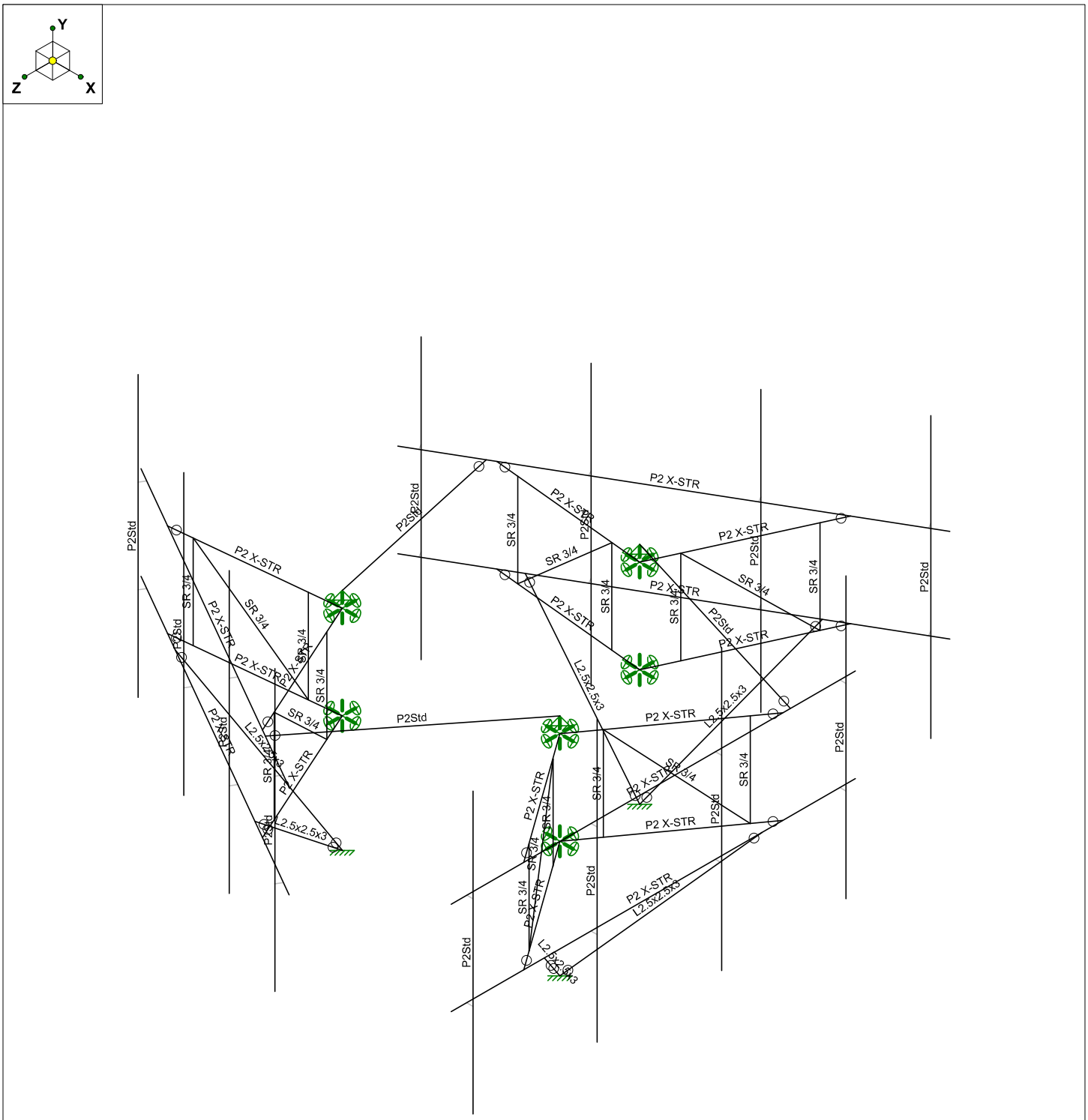
1. Install (3) reinforcement kits, Site Pro 1 Part #: SFS-V-L

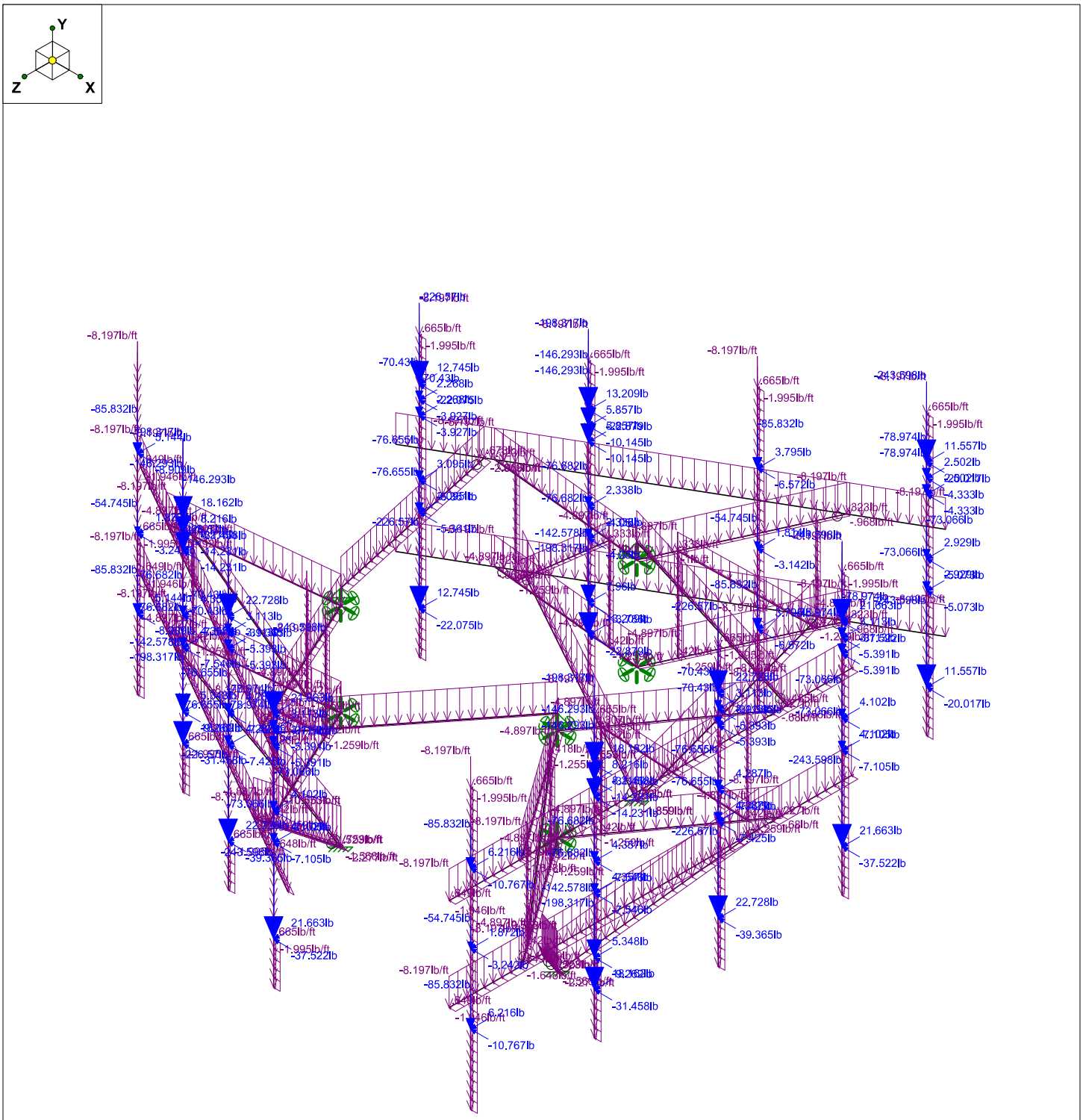
Engineering detail drawings have been provided in Appendix E – Mount Modification Design Drawings (MDD). Connection from the mount to the tower and local stresses on the tower are sufficient.

APPENDIX A

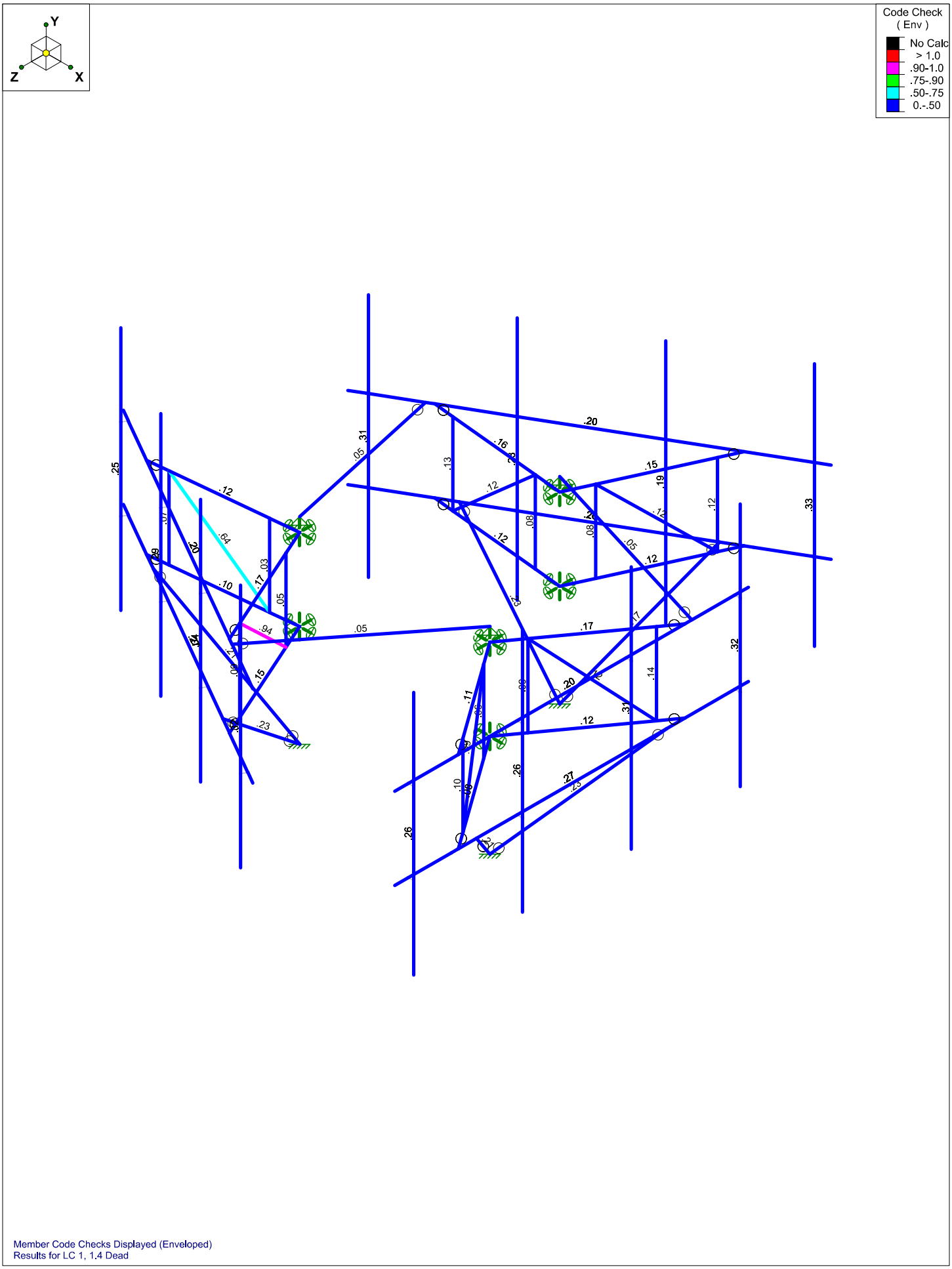
WIRE FRAME AND RENDERED MODELS

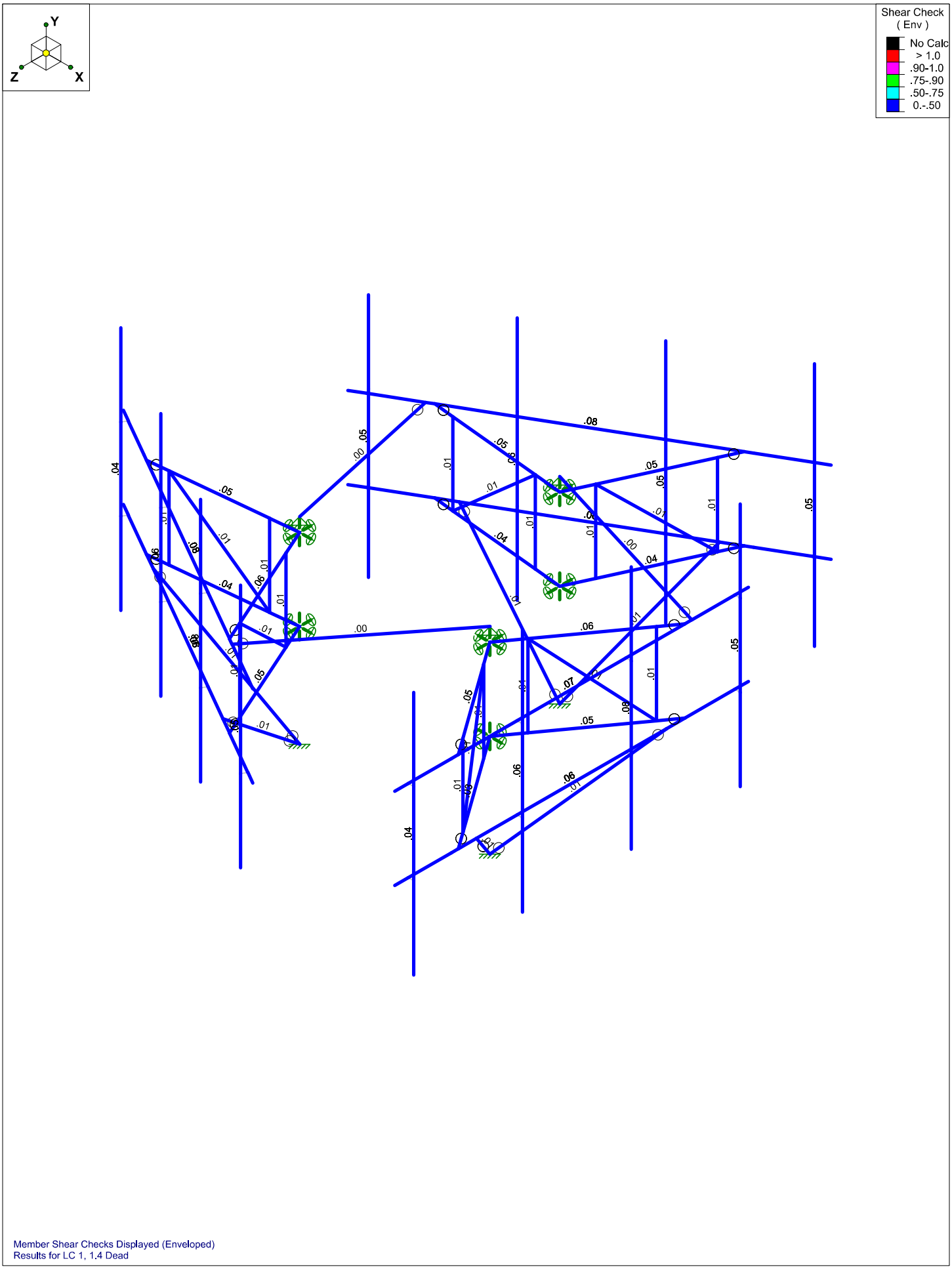

Y
Z
X


Y
Z
X
P2Std
P2 X-STR
SR 3/4
L2.5x2.5x3



Loads: LC 31, 1.2 Dead + 1.0 Ice Wind @ 150°+ 1.0 Ice + 1.0 Temp


Y
Z
X
Code Check
(Env)
No Calc
> 1.0
.90-1.0
.75-.90
.50-.75
0.-.50
Member Code Checks Displayed (Enveloped)
Results for LC 1, 1.4 Dead


Y
Z
X
Shear Check
(Env)
No Calc
> 1.0
.90-1.0
.75-.90
.50-.75
0.-.50
Member Shear Checks Displayed (Enveloped)
Results for LC 1, 1.4 Dead

APPENDIX B

SOFTWARE INPUT CALCULATIONS

TIA-222-H: Mount Analysis Wind Loading
876328 - WEST HARTFORD PARKING GARAGE
2020777.876328.22

Structure Information		
Structure Type:	Self Support	
Structure Height:	40	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	61.600	2.375	2.375		2.38	Round	0.90	1.00	7.60	2.45	8.20
V-Boom Bracing	Pipe	54.270	0.75	0.75		0.75	Round	0.90	1.00	2.40	1.86	4.90
Stiff Arm	Pipe	120.000	2.375	2.375		2.38	Round	0.90	1.00	7.60	3.09	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	72.000	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) DMP65R-BU8D	92	96	20.7	7.7	105.6	CFD	0%	0%	0.90	456.49	105.60	100.13	360.48
(3) OPA65R-BU8D	92	96	21	7.8	76.5	Flat	0%	0%	0.90	520.64	76.50	104.22	361.34
(3) TPA-65R-LCUUUU-H8	92	96	14.4	8.6	81.6	CFD	0%	0%	0.90	341.73	81.60	79.25	298.71
(3) 7770.00	92	55	11	5	35	CFD	0%	0%	0.90	98.52	35.00	24.87	129.66
(3) DTMABP7819VG12A	92	10.63	11.02	3.78	19.18	Flat	75%	0%	1.00	7.80	19.18	3.78	31.73
(3) CBC23SR-43	92	7.95	6.29	2.08	5.4	Flat	75%	0%	1.00	3.33	5.40	2.27	15.61
(3) ION-M23 SDARS	92	32.7	6.1	5.8	48	Flat	75%	0%	1.00	14.70	48.00	6.69	62.89
(3) RRUS 32 B2	92	27.2	12.05	7	52.9	Flat	0%	0%	0.90	78.61	52.90	17.97	82.65
(3) RRUS 32 B2_CCIV2	92	27.6	12.45	7.41	55.12	Flat	0%	0%	0.90	82.42	55.12	18.74	87.17
(3) RRUS 32 B30	92	27.2	12.05	7	52.9	Flat	0%	0%	0.90	78.61	52.90	17.97	82.65
(3) RRUS 32 B66	92	27.2	12.1	7	53	Flat	0%	0%	0.90	78.94	53.00	18.04	82.85
(3) RRUS 4449 B5/B12	92	17.9	13.19	9.44	71	Flat	0%	0%	0.90	56.63	71.00	13.27	72.75
(3) RRUS 4478 14_CCIV2	92	18.1	13.4	8.26	59.4	Flat	0%	0%	0.90	58.17	59.40	13.58	69.58
(3) RRUS E2 B29	92	20.4	18.5	7.5	52.9	Flat	0%	0%	0.90	90.52	52.90	20.12	89.88

Note: Surge Supression units are considered to be tower mounted. Therefore they have not been considered in this mount analysis

*All forces are unfactored.

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	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

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotat...	Section/Shape	Type	Design ...	Material	Design Rules
1	A1	N50A	N54			Mount Pipe	None	None	A53 Gr.B	Typical
2	A2	N95	N96			Mount Pipe	None	None	A53 Gr.B	Typical
3	A3	N101	N102			Mount Pipe	None	None	A53 Gr.B	Typical
4	A4	N113A	N114			Mount Pipe	None	None	A53 Gr.B	Typical
5	AS1	N8	N25			V-Boom Bracing	None	None	A572 Gr.50	Typical
6	AS2	N7	N24			V-Boom Bracing	None	None	A572 Gr.50	Typical
7	M1	N1	N2			Face Horizontal	None	None	A572 Gr.50	Typical
8	M2	N3	N4			V-Boom Horizontal	None	None	A572 Gr.50	Typical
9	M3	N5	N4			V-Boom Horizontal	None	None	A572 Gr.50	Typical
10	M7	N16	N17			RIGID	None	None	RIGID	Typical
11	M8	N18	N19			Face Horizontal	None	None	A572 Gr.50	Typical
12	M9	N20	N21			V-Boom Horizontal	None	None	A572 Gr.50	Typical
13	M10	N22	N21			V-Boom Horizontal	None	None	A572 Gr.50	Typical
14	M14	N33	N34			RIGID	None	None	RIGID	Typical
15	M16	N25	N9			V-Boom Bracing	None	None	A572 Gr.50	Typical
16	M17	N9	N26			V-Boom Bracing	None	None	A572 Gr.50	Typical
17	M19	N24	N6			V-Boom Bracing	None	None	A572 Gr.50	Typical
18	M20	N6	N23			V-Boom Bracing	None	None	A572 Gr.50	Typical
19	M32	N61A	N61			Stiff Arm	None	None	A572 Gr.50	Typical
20	M56A	N91	N92			RIGID	None	None	RIGID	Typical
21	M57A	N93	N94			RIGID	None	None	RIGID	Typical
22	M59	N97	N98			RIGID	None	None	RIGID	Typical
23	M60	N99	N100			RIGID	None	None	RIGID	Typical
24	M65A	N109	N110			RIGID	None	None	RIGID	Typical
25	M66A	N111	N112			RIGID	None	None	RIGID	Typical
26	B1	N70	N71			Mount Pipe	None	None	A53 Gr.B	Typical
27	B2	N78	N79			Mount Pipe	None	None	A53 Gr.B	Typical
28	B3	N84	N85			Mount Pipe	None	None	A53 Gr.B	Typical
29	B4	N90	N91A			Mount Pipe	None	None	A53 Gr.B	Typical
30	M30	N55	N66			V-Boom Bracing	None	None	A572 Gr.50	Typical
31	M31	N54B	N65			V-Boom Bracing	None	None	A572 Gr.50	Typical
32	M32A	N48	N49			Face Horizontal	None	None	A572 Gr.50	Typical
33	M33	N50	N51			V-Boom Horizontal	None	None	A572 Gr.50	Typical
34	M34	N52	N51			V-Boom Horizontal	None	None	A572 Gr.50	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotat...	Section/Shape	Type	Design ...	Material	Design Rules
35	M35	N57	N58			RIGID	None	None	RIGID	Typical
36	M36	N59	N60			Face Horizontal	None	None	A572 Gr.50	Typical
37	M37	N61B	N62			V-Boom Horizontal	None	None	A572 Gr.50	Typical
38	M38	N63	N62			V-Boom Horizontal	None	None	A572 Gr.50	Typical
39	M39	N68	N69			RIGID	None	None	RIGID	Typical
40	M40	N67	N55			V-Boom Bracing	None	None	A572 Gr.50	Typical
41	M41	N56	N67			V-Boom Bracing	None	None	A572 Gr.50	Typical
42	M42	N64	N54B			V-Boom Bracing	None	None	A572 Gr.50	Typical
43	M43	N53	N64			V-Boom Bracing	None	None	A572 Gr.50	Typical
44	M44	N94A	N92A			Stiff Arm	None	None	A572 Gr.50	Typical
45	M45	N74	N75			RIGID	None	None	RIGID	Typical
46	M46	N76	N77			RIGID	None	None	RIGID	Typical
47	M47	N80	N81			RIGID	None	None	RIGID	Typical
48	M48	N82	N83			RIGID	None	None	RIGID	Typical
49	M49	N86	N87			RIGID	None	None	RIGID	Typical
50	M50	N88	N89			RIGID	None	None	RIGID	Typical
51	C1	N117	N118			Mount Pipe	None	None	A53 Gr.B	Typical
52	C2	N125	N126			Mount Pipe	None	None	A53 Gr.B	Typical
53	C3	N131	N132			Mount Pipe	None	None	A53 Gr.B	Typical
54	C4	N137	N138			Mount Pipe	None	None	A53 Gr.B	Typical
55	M55	N102A	N113			V-Boom Bracing	None	None	A572 Gr.50	Typical
56	M56	N101A	N112A			V-Boom Bracing	None	None	A572 Gr.50	Typical
57	M57	N95A	N96A			Face Horizontal	None	None	A572 Gr.50	Typical
58	M58	N97A	N98A			V-Boom Horizontal	None	None	A572 Gr.50	Typical
59	M59A	N99A	N98A			V-Boom Horizontal	None	None	A572 Gr.50	Typical
60	M60A	N104	N105			RIGID	None	None	RIGID	Typical
61	M61	N106	N107			Face Horizontal	None	None	A572 Gr.50	Typical
62	M62	N108	N109A			V-Boom Horizontal	None	None	A572 Gr.50	Typical
63	M63	N110A	N109A			V-Boom Horizontal	None	None	A572 Gr.50	Typical
64	M64	N115	N116			RIGID	None	None	RIGID	Typical
65	M65	N113	N103			V-Boom Bracing	None	None	A572 Gr.50	Typical
66	M66	N103	N114A			V-Boom Bracing	None	None	A572 Gr.50	Typical
67	M67	N112A	N100A			V-Boom Bracing	None	None	A572 Gr.50	Typical
68	M68	N100A	N111A			V-Boom Bracing	None	None	A572 Gr.50	Typical
69	M69	N141	N139			Stiff Arm	None	None	A572 Gr.50	Typical
70	M70	N121	N122			RIGID	None	None	RIGID	Typical
71	M71	N123	N124			RIGID	None	None	RIGID	Typical
72	M72	N127	N128			RIGID	None	None	RIGID	Typical
73	M73	N129	N130			RIGID	None	None	RIGID	Typical
74	M74	N133	N134			RIGID	None	None	RIGID	Typical
75	M75	N135	N136			RIGID	None	None	RIGID	Typical
76	M76	N140	N141A		90	Mod Stabilizer	None	None	A36 Gr.36	Typical
77	M77	N140	N142		180	Mod Stabilizer	None	None	A36 Gr.36	Typical
78	M78	N144	N145		90	Mod Stabilizer	None	None	A36 Gr.36	Typical
79	M79	N144	N146		180	Mod Stabilizer	None	None	A36 Gr.36	Typical
80	M80	N148	N149		90	Mod Stabilizer	None	None	A36 Gr.36	Typical
81	M81	N148	N150		180	Mod Stabilizer	None	None	A36 Gr.36	Typical

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N21	Reaction	Reaction	Reaction	Reaction		Reaction
2	N4	Reaction	Reaction	Reaction	Reaction		Reaction
3	N61	Reaction	Reaction	Reaction			
4	N51	Reaction	Reaction	Reaction	Reaction		Reaction
5	N62	Reaction	Reaction	Reaction	Reaction		Reaction

Joint Boundary Conditions (Continued)

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
6	N92A	Reaction	Reaction	Reaction			
7	N98A	Reaction	Reaction	Reaction	Reaction		Reaction
8	N109A	Reaction	Reaction	Reaction	Reaction		Reaction
9	N139	Reaction	Reaction	Reaction			
10	N140	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
11	N144	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
12	N148	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Load Combinations

	Description	Sol...	PDelta	SR...	B...	Fa...	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									
2	1.2 Dead + 1.0 Wind @ 0° - No Ice	Yes	Y		1	1.2	2	1	0		0		0		0		0									
3	0.9 Dead + 1.0 Wind @ 0° - No Ice	Yes	Y		1	.9	2	1	0		0		0		0		0									
4	1.2 Dead + 1.0 Wind @ 30° - No ...	Yes	Y		1	1.2	3	1	0		0		0		0		0									
5	0.9 Dead + 1.0 Wind @ 30° - No ...	Yes	Y		1	.9	3	1	0		0		0		0		0									
6	1.2 Dead + 1.0 Wind @ 60° - No ...	Yes	Y		1	1.2	4	1	0		0		0		0		0									
7	0.9 Dead + 1.0 Wind @ 60° - No ...	Yes	Y		1	.9	4	1	0		0		0		0		0									
8	1.2 Dead + 1.0 Wind @ 90° - No ...	Yes	Y		1	1.2	5	1	0		0		0		0		0									
9	0.9 Dead + 1.0 Wind @ 90° - No ...	Yes	Y		1	.9	5	1	0		0		0		0		0									
10	1.2 Dead + 1.0 Wind @ 120° - N...	Yes	Y		1	1.2	6	1	0		0		0		0		0									
11	0.9 Dead + 1.0 Wind @ 120° - N...	Yes	Y		1	.9	6	1	0		0		0		0		0									
12	1.2 Dead + 1.0 Wind @ 150° - N...	Yes	Y		1	1.2	7	1	0		0		0		0		0									
13	0.9 Dead + 1.0 Wind @ 150° - N...	Yes	Y		1	.9	7	1	0		0		0		0		0									
14	1.2 Dead + 1.0 Wind @ 180° - N...	Yes	Y		1	1.2	8	1	0		0		0		0		0									
15	0.9 Dead + 1.0 Wind @ 180° - N...	Yes	Y		1	.9	8	1	0		0		0		0		0									
16	1.2 Dead + 1.0 Wind @ 210° - N...	Yes	Y		1	1.2	9	1	0		0		0		0		0									
17	0.9 Dead + 1.0 Wind @ 210° - N...	Yes	Y		1	.9	9	1	0		0		0		0		0									
18	1.2 Dead + 1.0 Wind @ 240° - N...	Yes	Y		1	1.2	10	1	0		0		0		0		0									
19	0.9 Dead + 1.0 Wind @ 240° - N...	Yes	Y		1	.9	10	1	0		0		0		0		0									
20	1.2 Dead + 1.0 Wind @ 270° - N...	Yes	Y		1	1.2	11	1	0		0		0		0		0									
21	0.9 Dead + 1.0 Wind @ 270° - N...	Yes	Y		1	.9	11	1	0		0		0		0		0									
22	1.2 Dead + 1.0 Wind @ 300° - N...	Yes	Y		1	1.2	12	1	0		0		0		0		0									
23	0.9 Dead + 1.0 Wind @ 300° - N...	Yes	Y		1	.9	12	1	0		0		0		0		0									
24	1.2 Dead + 1.0 Wind @ 330° - N...	Yes	Y		1	1.2	13	1	0		0		0		0		0									
25	0.9 Dead + 1.0 Wind @ 330° - N...	Yes	Y		1	.9	13	1	0		0		0		0		0									
26	1.2 Dead + 1.0 Ice Wind @ 0°+ 1...	Yes	Y		1	1.2	15	1	14	1		1	0		0		0									
27	1.2 Dead + 1.0 Ice Wind @ 30°+ ...	Yes	Y		1	1.2	16	1	14	1		1	0		0		0									
28	1.2 Dead + 1.0 Ice Wind @ 60°+ ...	Yes	Y		1	1.2	17	1	14	1		1	0		0		0									
29	1.2 Dead + 1.0 Ice Wind @ 90°+ ...	Yes	Y		1	1.2	18	1	14	1		1	0		0		0									
30	1.2 Dead + 1.0 Ice Wind @ 120°...	Yes	Y		1	1.2	19	1	14	1		1	0		0		0									
31	1.2 Dead + 1.0 Ice Wind @ 150°...	Yes	Y		1	1.2	20	1	14	1		1	0		0		0									
32	1.2 Dead + 1.0 Ice Wind @ 180°...	Yes	Y		1	1.2	21	1	14	1		1	0		0		0									
33	1.2 Dead + 1.0 Ice Wind @ 210°...	Yes	Y		1	1.2	22	1	14	1		1	0		0		0									
34	1.2 Dead + 1.0 Ice Wind @ 240°...	Yes	Y		1	1.2	23	1	14	1		1	0		0		0									
35	1.2 Dead + 1.0 Ice Wind @ 270°...	Yes	Y		1	1.2	24	1	14	1		1	0		0		0									
36	1.2 Dead + 1.0 Ice Wind @ 300°...	Yes	Y		1	1.2	25	1	14	1		1	0		0		0									
37	1.2 Dead + 1.0 Ice Wind @ 330°...	Yes	Y		1	1.2	26	1	14	1		1	0		0		0									
38	1.2 Dead + 1.5 Live_M - A1 + 1.0...	Yes	Y		1	1.2	27	1.5	2	.066	0		0		0		0									
39	1.2 Dead + 1.5 Live_M - A1 + 1.0...	Yes	Y		1	1.2	27	1.5	3	.066	0		0		0		0									
40	1.2 Dead + 1.5 Live_M - A1 + 1.0...	Yes	Y		1	1.2	27	1.5	4	.066	0		0		0		0									
41	1.2 Dead + 1.5 Live_M - A1 + 1.0...	Yes	Y		1	1.2	27	1.5	5	.066	0		0		0		0									
42	1.2 Dead + 1.5 Live_M - A1 + 1.0...	Yes	Y		1	1.2	27	1.5	6	.066	0		0		0		0									
43	1.2 Dead + 1.5 Live_M - A1 + 1.0...	Yes	Y		1	1.2	27	1.5	7	.066	0		0		0		0									
44	1.2 Dead + 1.5 Live_M - A1 + 1.0...	Yes	Y		1	1.2	27	1.5	8	.066	0		0		0		0									
45	1.2 Dead + 1.5 Live_M - A1 + 1.0...	Yes	Y		1	1.2	27	1.5	9	.066	0		0		0		0									

Load Combinations (Continued)

	Description	Sol...	PDelta	SR...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
46	1.2 Dead + 1.5 Live_M - A1 + 1.0..	Yes	Y		1	1.2	27	1.5	10	.066	0		0		0		0		0					
47	1.2 Dead + 1.5 Live_M - A1 + 1.0..	Yes	Y		1	1.2	27	1.5	11	.066	0		0		0		0		0					
48	1.2 Dead + 1.5 Live_M - A1 + 1.0..	Yes	Y		1	1.2	27	1.5	12	.066	0		0		0		0		0					
49	1.2 Dead + 1.5 Live_M - A1 + 1.0..	Yes	Y		1	1.2	27	1.5	13	.066	0		0		0		0		0					
50	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	2	.066	0		0		0		0		0					
51	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	3	.066	0		0		0		0		0					
52	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	4	.066	0		0		0		0		0					
53	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	5	.066	0		0		0		0		0					
54	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	6	.066	0		0		0		0		0					
55	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	7	.066	0		0		0		0		0					
56	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	8	.066	0		0		0		0		0					
57	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	9	.066	0		0		0		0		0					
58	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	10	.066	0		0		0		0		0					
59	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	11	.066	0		0		0		0		0					
60	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	12	.066	0		0		0		0		0					
61	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	13	.066	0		0		0		0		0					
62	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	2	.066	0		0		0		0		0					
63	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	3	.066	0		0		0		0		0					
64	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	4	.066	0		0		0		0		0					
65	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	5	.066	0		0		0		0		0					
66	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	6	.066	0		0		0		0		0					
67	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	7	.066	0		0		0		0		0					
68	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	8	.066	0		0		0		0		0					
69	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	9	.066	0		0		0		0		0					
70	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	10	.066	0		0		0		0		0					
71	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	11	.066	0		0		0		0		0					
72	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	12	.066	0		0		0		0		0					
73	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	13	.066	0		0		0		0		0					
74	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	2	.066	0		0		0		0		0					
75	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	3	.066	0		0		0		0		0					
76	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	4	.066	0		0		0		0		0					
77	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	5	.066	0		0		0		0		0					
78	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	6	.066	0		0		0		0		0					
79	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	7	.066	0		0		0		0		0					
80	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	8	.066	0		0		0		0		0					
81	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	9	.066	0		0		0		0		0					
82	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	10	.066	0		0		0		0		0					
83	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	11	.066	0		0		0		0		0					
84	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	12	.066	0		0		0		0		0					
85	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	13	.066	0		0		0		0		0					
86	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	2	.066	0		0		0		0		0					
87	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	3	.066	0		0		0		0		0					
88	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	4	.066	0		0		0		0		0					
89	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	5	.066	0		0		0		0		0					
90	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	6	.066	0		0		0		0		0					
91	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	7	.066	0		0		0		0		0					
92	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	8	.066	0		0		0		0		0					
93	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	9	.066	0		0		0		0		0					
94	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	10	.066	0		0		0		0		0					
95	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	11	.066	0		0		0		0		0					
96	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	12	.066	0		0		0		0		0					
97	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	13	.066	0		0		0		0		0					
98	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	2	.066	0		0		0		0		0					
99	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	3	.066	0		0		0		0		0					
100	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	4	.066	0		0		0		0		0					
101	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	5	.066	0		0		0		0		0					
102	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	6	.066	0		0		0		0		0					

Load Combinations (Continued)

	Description	Sol...	PDelta	SR...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
103	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	7	.066	0		0		0		0		0						
104	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	8	.066	0		0		0		0		0						
105	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	9	.066	0		0		0		0		0						
106	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	10	.066	0		0		0		0		0						
107	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	11	.066	0		0		0		0		0						
108	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	12	.066	0		0		0		0		0						
109	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	13	.066	0		0		0		0		0						
110	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	2	.066	0		0		0		0		0						
111	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	3	.066	0		0		0		0		0						
112	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	4	.066	0		0		0		0		0						
113	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	5	.066	0		0		0		0		0						
114	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	6	.066	0		0		0		0		0						
115	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	7	.066	0		0		0		0		0						
116	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	8	.066	0		0		0		0		0						
117	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	9	.066	0		0		0		0		0						
118	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	10	.066	0		0		0		0		0						
119	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	11	.066	0		0		0		0		0						
120	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	12	.066	0		0		0		0		0						
121	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	13	.066	0		0		0		0		0						
122	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	2	.066	0		0		0		0		0						
123	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	3	.066	0		0		0		0		0						
124	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	4	.066	0		0		0		0		0						
125	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	5	.066	0		0		0		0		0						
126	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	6	.066	0		0		0		0		0						
127	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	7	.066	0		0		0		0		0						
128	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	8	.066	0		0		0		0		0						
129	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	9	.066	0		0		0		0		0						
130	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	10	.066	0		0		0		0		0						
131	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	11	.066	0		0		0		0		0						
132	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	12	.066	0		0		0		0		0						
133	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	13	.066	0		0		0		0		0						
134	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	2	.066	0		0		0		0		0						
135	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	3	.066	0		0		0		0		0						
136	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	4	.066	0		0		0		0		0						
137	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	5	.066	0		0		0		0		0						
138	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	6	.066	0		0		0		0		0						
139	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	7	.066	0		0		0		0		0						
140	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	8	.066	0		0		0		0		0						
141	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	9	.066	0		0		0		0		0						
142	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	10	.066	0		0		0		0		0						
143	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	11	.066	0		0		0		0		0						
144	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	12	.066	0		0		0		0		0						
145	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	13	.066	0		0		0		0		0						
146	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	2	.066	0		0		0		0		0						
147	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	3	.066	0		0		0		0		0						
148	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	4	.066	0		0		0		0		0						
149	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	5	.066	0		0		0		0		0						
150	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	6	.066	0		0		0		0		0						
151	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	7	.066	0		0		0		0		0						
152	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	8	.066	0		0		0		0		0						
153	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	9	.066	0		0		0		0		0						
154	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	10	.066	0		0		0		0		0						
155	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	11	.066	0		0		0		0		0						
156	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	12	.066	0		0		0		0		0						
157	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	13	.066	0		0		0		0		0						
158	1.2 Dead + 1.5 Live_M - C3 + 1.0..	Yes	Y		1	1.2	37	1.5	2	.066	0		0		0		0		0						
159	1.2 Dead + 1.5 Live_M - C3 + 1.0..	Yes	Y		1	1.2	37	1.5	3	.066	0		0		0		0		0						

Load Combinations (Continued)

	Description	Sol...	PDelta	SR...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
160	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	4	.066	0		0		0		0		0					
161	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	5	.066	0		0		0		0		0					
162	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	6	.066	0		0		0		0		0					
163	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	7	.066	0		0		0		0		0					
164	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	8	.066	0		0		0		0		0					
165	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	9	.066	0		0		0		0		0					
166	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	10	.066	0		0		0		0		0					
167	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	11	.066	0		0		0		0		0					
168	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	12	.066	0		0		0		0		0					
169	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	13	.066	0		0		0		0		0					
170	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	2	.066	0		0		0		0		0					
171	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	3	.066	0		0		0		0		0					
172	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	4	.066	0		0		0		0		0					
173	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	5	.066	0		0		0		0		0					
174	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	6	.066	0		0		0		0		0					
175	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	7	.066	0		0		0		0		0					
176	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	8	.066	0		0		0		0		0					
177	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	9	.066	0		0		0		0		0					
178	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	10	.066	0		0		0		0		0					
179	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	11	.066	0		0		0		0		0					
180	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	12	.066	0		0		0		0		0					
181	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	13	.066	0		0		0		0		0					
182	1.2 Dead + 1.5 Live_V - M1 (Start)	Yes	Y		1	1.2	39	1.5	0		0		0		0		0		0					
183	1.2 Dead + 1.5 Live_V - M1 (Mid...	Yes	Y		1	1.2	40	1.5	0		0		0		0		0		0					
184	1.2 Dead + 1.5 Live_V - M1 (End)	Yes	Y		1	1.2	41	1.5	0		0		0		0		0		0					
185	1.2 Dead + 1.5 Live_V - M2 (Start)	Yes	Y		1	1.2	42	1.5	0		0		0		0		0		0					
186	1.2 Dead + 1.5 Live_V - M2 (Mid...	Yes	Y		1	1.2	43	1.5	0		0		0		0		0		0					
187	1.2 Dead + 1.5 Live_V - M2 (End)	Yes	Y		1	1.2	44	1.5	0		0		0		0		0		0					
188	1.2 Dead + 1.5 Live_V - M3 (Start)	Yes	Y		1	1.2	45	1.5	0		0		0		0		0		0					
189	1.2 Dead + 1.5 Live_V - M3 (Mid...	Yes	Y		1	1.2	46	1.5	0		0		0		0		0		0					
190	1.2 Dead + 1.5 Live_V - M3 (End)	Yes	Y		1	1.2	47	1.5	0		0		0		0		0		0					
191	1.2 Dead + 1.5 Live_V - M8 (Start)	Yes	Y		1	1.2	48	1.5	0		0		0		0		0		0					
192	1.2 Dead + 1.5 Live_V - M8 (Mid...	Yes	Y		1	1.2	49	1.5	0		0		0		0		0		0					
193	1.2 Dead + 1.5 Live_V - M8 (End)	Yes	Y		1	1.2	50	1.5	0		0		0		0		0		0					
194	1.2 Dead + 1.5 Live_V - M9 (Start)	Yes	Y		1	1.2	51	1.5	0		0		0		0		0		0					
195	1.2 Dead + 1.5 Live_V - M9 (Mid...	Yes	Y		1	1.2	52	1.5	0		0		0		0		0		0					
196	1.2 Dead + 1.5 Live_V - M9 (End)	Yes	Y		1	1.2	53	1.5	0		0		0		0		0		0					
197	1.2 Dead + 1.5 Live_V - M10 (Sta...	Yes	Y		1	1.2	54	1.5	0		0		0		0		0		0					
198	1.2 Dead + 1.5 Live_V - M10 (Mi...	Yes	Y		1	1.2	55	1.5	0		0		0		0		0		0					

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Dead	DL		-1			78			
2	No Ice Wind 0 deg	None					78	57		
3	No Ice Wind 30 deg	None					156	110		
4	No Ice Wind 60 deg	None					156	114		
5	No Ice Wind 90 deg	None					78	55		
6	No Ice Wind 120 deg	None					156	114		
7	No Ice Wind 150 deg	None					156	110		
8	No Ice Wind 180 deg	None					78	57		
9	No Ice Wind 210 deg	None					156	110		
10	No Ice Wind 240 deg	None					156	114		
11	No Ice Wind 270 deg	None					78	55		
12	No Ice Wind 300 deg	None					156	114		
13	No Ice Wind 330 deg	None					156	110		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu..	Area(M...	Surface...
14	Ice Weight	None					78	57		
15	Ice Wind 0 deg	None					78	57		
16	Ice Wind 30 deg	None					156	110		
17	Ice Wind 60 deg	None					156	114		
18	Ice Wind 90 deg	None					78	55		
19	Ice Wind 120 deg	None					156	114		
20	Ice Wind 150 deg	None					156	110		
21	Ice Wind 180 deg	None					78	57		
22	Ice Wind 210 deg	None					156	110		
23	Ice Wind 240 deg	None					156	114		
24	Ice Wind 270 deg	None					78	55		
25	Ice Wind 300 deg	None					156	114		
26	Ice Wind 330 deg	None					156	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			
35	Live Load - C1	None					1			
36	Live Load - C2	None					1			
37	Live Load - C3	None					1			
38	Live Load - C4	None					1			
39	Live Load - M1 (Start)	None					1			
40	Live Load - M1 (Middle)	None					1			
41	Live Load - M1 (End)	None					1			
42	Live Load - M2 (Start)	None					1			
43	Live Load - M2 (Middle)	None					1			
44	Live Load - M2 (End)	None					1			
45	Live Load - M3 (Start)	None					1			
46	Live Load - M3 (Middle)	None					1			
47	Live Load - M3 (End)	None					1			
48	Live Load - M8 (Start)	None					1			
49	Live Load - M8 (Middle)	None					1			
50	Live Load - M8 (End)	None					1			
51	Live Load - M9 (Start)	None					1			
52	Live Load - M9 (Middle)	None					1			
53	Live Load - M9 (End)	None					1			
54	Live Load - M10 (Start)	None					1			
55	Live Load - M10 (Middle)	None					1			
56	Live Load - M10 (End)	None					1			
57	Live Load - M32A (Start)	None					1			
58	Live Load - M32A (Middle)	None					1			
59	Live Load - M32A (End)	None					1			
60	Live Load - M33 (Start)	None					1			
61	Live Load - M33 (Middle)	None					1			
62	Live Load - M33 (End)	None					1			
63	Live Load - M34 (Start)	None					1			
64	Live Load - M34 (Middle)	None					1			
65	Live Load - M34 (End)	None					1			
66	Live Load - M36 (Start)	None					1			
67	Live Load - M36 (Middle)	None					1			
68	Live Load - M36 (End)	None					1			
69	Live Load - M37 (Start)	None					1			
70	Live Load - M37 (Middle)	None					1			

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
71	Live Load - M37 (End)	None					1			
72	Live Load - M38 (Start)	None					1			
73	Live Load - M38 (Middle)	None					1			
74	Live Load - M38 (End)	None					1			
75	Live Load - M57 (Start)	None					1			
76	Live Load - M57 (Middle)	None					1			
77	Live Load - M57 (End)	None					1			
78	Live Load - M58 (Start)	None					1			
79	Live Load - M58 (Middle)	None					1			
80	Live Load - M58 (End)	None					1			
81	Live Load - M59A (Start)	None					1			
82	Live Load - M59A (Middle)	None					1			
83	Live Load - M59A (End)	None					1			
84	Live Load - M61 (Start)	None					1			
85	Live Load - M61 (Middle)	None					1			
86	Live Load - M61 (End)	None					1			
87	Live Load - M62 (Start)	None					1			
88	Live Load - M62 (Middle)	None					1			
89	Live Load - M62 (End)	None					1			
90	Live Load - M63 (Start)	None					1			
91	Live Load - M63 (Middle)	None					1			
92	Live Load - M63 (End)	None					1			

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	m...	1134.06	13	1473.412	26	1323.908	47	.316	42	0	198	.604	26
2		min	-2476.149	37	186.461	15	-770.71	77	-.178	84	0	1	-.072	15
3	N4	m...	752.546	43	1007.469	26	492.246	85	.248	39	0	198	.428	27
4		min	-69.278	25	-76.463	15	-977.599	43	-.137	81	0	1	.092	17
5	N61	m...	1038.344	16	94.826	4	263.144	16	0	198	0	198	0	198
6		min	-1038.954	4	-68.652	17	-263.567	4	0	1	0	1	0	1
7	N51	m...	503.694	20	1227.326	30	1160.375	95	-.065	25	0	198	.126	94
8		min	-797.378	125	-41.431	23	-344.068	9	-.566	32	0	1	-.289	124
9	N62	m...	1334.878	127	1240.073	30	1034.522	21	.035	25	0	198	.113	95
10		min	-687.477	25	200.209	25	-2561.442	29	-.513	31	0	1	-.246	125
11	N92A	m...	804.769	14	99.594	14	809.484	2	0	198	0	198	0	198
12		min	-803.725	2	-73.372	3	-810.199	14	0	1	0	1	0	1
13	N98A	m...	877.316	17	1096.719	28	1311.829	19	.406	28	0	198	.069	177
14		min	-998.004	135	71.478	19	-1943.222	6	-.091	19	0	1	-.268	135
15	N109A	m...	1759.73	14	1595.518	28	2144.428	33	.505	32	0	198	.072	174
16		min	-1096.67	3	118.435	19	-126.667	5	.065	3	0	1	-.358	144
17	N139	m...	272.021	22	90.817	22	988.954	22	0	198	0	198	0	198
18		min	-272.034	10	-64.824	11	-988.648	10	0	1	0	1	0	1
19	N140	m...	1541.713	32	1987.242	32	308.013	69	0	4	0	4	.001	26
20		min	-150.082	3	-94.364	3	-374.89	51	0	17	0	17	0	15
21	N144	m...	255.993	13	1973.606	37	1364.312	36	0	25	0	12	0	13
22		min	-732.542	121	-40.088	11	24.442	11	-.001	31	0	25	0	26
23	N148	m...	-85.981	7	1657.285	34	45.065	7	0	6	0	23	0	17
24		min	-908.823	26	-38.062	7	-933.828	33	0	19	0	10	0	4
25	Totals:	m...	6203.283	15	12780.769	32	6053.211	20						
26		min	-6203.29	2	3312.326	3	-6053.177	9						

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

	Member	Shape	Code C...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc [l...	phi*Pnt [lb]	phi*Mn...	phi*Mn ...	Cb	Eqn
1	A1	P2Std	.324	72	44	.050	36		48	12899.313	33862.5	1.998	1.998	3.0...	H1-1b
2	A2	P2Std	.314	36	4	.082	36		4	12899.313	33862.5	1.998	1.998	1.5...	H1-1b
3	A3	P2Std	.263	72	16	.058	36		10	12899.313	33862.5	1.998	1.998	1.75	H1-1b
4	A4	P2Std	.255	72	78	.041	72		80	12899.313	33862.5	1.998	1.998	4.0...	H1-1b
5	AS1	SR 3/4	.087	0	26	.009	36		4	8255.694	19880.391	.249	.249	1	H1-1b*
6	AS2	SR 3/4	.061	0	74	.009	36		4	8255.694	19880.391	.249	.249	1	H1-1b*
7	M1	P2 X-STR	.272	120.25	31	.056	128.375		16	8056.956	66476.635	3.816	3.816	1.8...	H1-1b
8	M2	P2 X-STR	.084	61.612	74	.034	61.612		28	41447.891	66476.635	3.816	3.816	2.03	H1-1b
9	M3	P2 X-STR	.123	61.612	27	.053	8.985		2	41447.891	66476.635	3.816	3.816	2.3...	H1-1b
10	M8	P2 X-STR	.200	126.75	24	.071	128.375		20	8056.956	66476.635	3.816	3.816	3.2...	H1-1b
11	M9	P2 X-STR	.112	61.612	26	.048	61.612		27	41447.891	66476.635	3.816	3.816	1.97	H1-1b
12	M10	P2 X-STR	.167	61.612	26	.055	8.985		43	41447.891	66476.635	3.816	3.816	1.9...	H1-1b
13	M16	SR 3/4	.125	54.271	28	.007	0		14	3086.708	19880.391	.249	.249	2.7...	H1-1b
14	M17	SR 3/4	.143	36	27	.011	36		4	8255.694	19880.391	.249	.249	2.3...	H1-1b
15	M19	SR 3/4	.088	54.271	36	.005	0		14	3086.708	19880.391	.249	.249	2.7...	H1-1b
16	M20	SR 3/4	.097	36	75	.010	36		4	8255.694	19880.391	.249	.249	2.2...	H1-1b
17	M32	P2Std	.048	80.684	17	.003	80.684		35	22436.432	48375	2.854	2.854	1.1...	H1-1b*
18	B1	P2Std	.321	72	96	.050	36		88	12899.313	33862.5	1.998	1.998	4.8...	H1-1b
19	B2	P2Std	.336	36	12	.085	36		12	12899.313	33862.5	1.998	1.998	2.4...	H1-1b
20	B3	P2Std	.291	72	24	.056	36		14	12899.313	33862.5	1.998	1.998	2.2...	H1-1b
21	B4	P2Std	.253	72	130	.041	54		132	12899.313	33862.5	1.998	1.998	4.6...	H1-1b
22	M30	SR 3/4	.048	0	35	.010	36		14	8255.694	19880.391	.249	.249	1	H1-1b
23	M31	SR 3/4	.034	0	26	.010	36		12	8255.694	19880.391	.249	.249	2.6...	H1-1b
24	M32A	P2 X-STR	.268	120.25	36	.057	128.375		24	8056.956	66476.635	3.816	3.816	1.7...	H1-1b
25	M33	P2 X-STR	.105	61.612	126	.039	61.612		32	41447.891	66476.635	3.816	3.816	2.3...	H1-1b
26	M34	P2 X-STR	.153	61.612	31	.054	61.612		12	41447.891	66476.635	3.816	3.816	2.6...	H1-1b
27	M36	P2 X-STR	.197	55.25	10	.078	130		2	8056.956	66476.635	3.816	3.816	3.0...	H1-1b
28	M37	P2 X-STR	.116	9.627	125	.049	8.985		31	41447.891	66476.635	3.816	3.816	1.9...	H1-1b
29	M38	P2 X-STR	.172	8.985	34	.056	8.985		95	41447.891	66476.635	3.816	3.816	1.9...	H1-1b
30	M40	SR 3/4	.939	0	31	.010	0		10	3086.708	19880.391	.249	.249	2.8...	H1-1a
31	M41	SR 3/4	.092	36	30	.011	36		12	8255.694	19880.391	.249	.249	2.3...	H1-1b
32	M42	SR 3/4	.636	0	126	.005	0		8	3086.708	19880.391	.249	.249	2.9...	H1-1a
33	M43	SR 3/4	.065	36	127	.010	36		12	8255.694	19880.391	.249	.249	1	H1-1b
34	M44	P2Std	.051	80.684	3	.003	80.684		27	22436.432	48375	2.854	2.854	1.1...	H1-1b*
35	C1	P2Std	.314	72	138	.049	36		32	12899.313	33862.5	1.998	1.998	4.5...	H1-1b
36	C2	P2Std	.226	36	6	.063	36		8	12899.313	33862.5	1.998	1.998	1.7...	H1-1b
37	C3	P2Std	.186	72	10	.047	36		10	12899.313	33862.5	1.998	1.998	4.0...	H1-1b
38	C4	P2Std	.333	72	178	.050	36		178	12899.313	33862.5	1.998	1.998	4.5...	H1-1b
39	M55	SR 3/4	.076	0	36	.009	36		10	8255.694	19880.391	.249	.249	2.3...	H1-1b*
40	M56	SR 3/4	.079	0	28	.008	0		10	8255.694	19880.391	.249	.249	1	H1-1b*
41	M57	P2 X-STR	.263	120.25	34	.059	128.375		8	8056.956	66476.635	3.816	3.816	1.7...	H1-1b
42	M58	P2 X-STR	.119	61.612	28	.045	8.985		177	41447.891	66476.635	3.816	3.816	2.2...	H1-1b
43	M59A	P2 X-STR	.117	61.612	27	.041	61.612		6	41447.891	66476.635	3.816	3.816	2.5...	H1-1b
44	M61	P2 X-STR	.197	126.75	17	.080	128.375		14	8056.956	66476.635	3.816	3.816	3.1...	H1-1b
45	M62	P2 X-STR	.146	61.612	29	.054	8.985		173	41447.891	66476.635	3.816	3.816	1.9...	H1-1b
46	M63	P2 X-STR	.160	8.985	27	.052	8.985		135	41447.891	66476.635	3.816	3.816	1.9...	H1-1b
47	M65	SR 3/4	.118	54.271	26	.007	54.271		6	3086.708	19880.391	.249	.249	2.78	H1-1b
48	M66	SR 3/4	.135	0	27	.010	36		10	8255.694	19880.391	.249	.249	2.1...	H1-1b*
49	M67	SR 3/4	.117	54.271	29	.006	54.271		18	3086.708	19880.391	.249	.249	2.7...	H1-1b
50	M68	SR 3/4	.117	0	29	.009	0		10	8255.694	19880.391	.249	.249	1	H1-1b*
51	M69	P2Std	.046	80.684	11	.003	0		26	22436.432	48375	2.854	2.854	1.1...	H1-1b*
52	M76	L2.5x2.5x3	.230	34.912	35	.011	71.309	z	35	9299.675	29192.4	.873	1.536	1.1...	H2-1
53	M77	L2.5x2.5x3	.209	34.912	33	.014	0	y	27	9299.675	29192.4	.873	1.536	1.1...	H2-1
54	M78	L2.5x2.5x3	.229	34.912	28	.011	0	z	28	9299.675	29192.4	.873	1.536	1.1...	H2-1
55	M79	L2.5x2.5x3	.210	34.912	37	.014	71.309	y	31	9299.675	29192.4	.873	1.536	1.1...	H2-1
56	M80	L2.5x2.5x3	.231	34.912	34	.011	0	y	8	9299.675	29192.4	.873	1.536	1.1...	H2-1

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

	Member	Shape	Code C...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc [l...	phi*Pnt [lb]	phi*Mn...	phi*Mn ...	Cb	Eqn
57	M81	L2.5x2.5x3	.175	34.912	34	.010	71.309	z	4	9299.675	29192.4	.873	1.536	1.1...	H2-1

APPENDIX D

ADDITIONAL CALCULATIONS

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Alpha Sector
2020777.876328.22

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)	0.60	k-ft
Axial (T)	2.48	kips
Shear (V)	1.70	kips

RISA 3D Reactions (Left -Right)		
Moment (M)	0.00	k-ft
Axial (T)	2.39	kips
Shear (V)	1.74	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})	0.426	kips
$T_{ub}/\phi R_{nt}$	0.20128	
$V_{ub}/\phi R_{nv}$	0.06167	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.04432	
Bolt Capacity =	20.1%	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})	0.60	kips
Bolt Shear Force (V_{ub})	0.436	kips
$T_{ub}/\phi R_{nt}$	0.05880	
$V_{ub}/\phi R_{nv}$	0.06313	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00744	
Bolt Capacity =	6.3%	OK

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Beta Sector
2020777.876328.22

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)	0.49	k-ft
Axial (T)	2.44	kips
Shear (V)	1.52	kips

RISA 3D Reactions (Left -Right)		
Moment (M)	0.00	k-ft
Axial (T)	2.44	kips
Shear (V)	1.52	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})	1.79	kips
Bolt Shear Force (V_{ub})	0.379	kips
$T_{ub}/\phi R_{nt}$	0.17619	
$V_{ub}/\phi R_{nv}$	0.05497	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.03407	
Bolt Capacity =	17.6%	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})	0.61	kips
Bolt Shear Force (V_{ub})	0.379	kips
$T_{ub}/\phi R_{nt}$	0.06010	
$V_{ub}/\phi R_{nv}$	0.05497	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00663	
Bolt Capacity =	6.0%	OK

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Gamma Sector
2020777.876328.22

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)	2.66	kips
Shear (V)	1.58	kips

RISA 3D Reactions (Left -Right)		
Moment (M)	0.00	k-ft
Axial (T)	2.66	kips
Shear (V)	1.58	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})	2.04	kips
Bolt Shear Force (V_{ub})	0.396	kips
$T_{ub}/\phi R_{nt}$	0.20015	
$V_{ub}/\phi R_{nv}$	0.05730	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.04334	
Bolt Capacity =	20.0%	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})	0.66	kips
Bolt Shear Force (V_{ub})	0.396	kips
$T_{ub}/\phi R_{nt}$	0.06532	
$V_{ub}/\phi R_{nv}$	0.05730	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00755	
Bolt Capacity =	6.5%	OK

TIA-222-H CONNECTION CHECK
Tieback to Tower Connection - Alpha Sector
2020777.876328.22

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)	1.03	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})	0.257	kips
$T_{ub}/\phi R_{nt}$	0.00029	
$V_{ub}/\phi R_{nv}$	0.05827	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00340	
Bolt Capacity =	5.8%	OK

TIA-222-H CONNECTION CHECK
Tieback to Tower Connection - Beta Sector
2020777.876328.22

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)	1.15	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})	0.287	kips
$T_{ub}/\phi R_{nt}$	0.00046	
$V_{ub}/\phi R_{nv}$	0.06486	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00421	
Bolt Capacity =	6.5%	OK

TIA-222-H CONNECTION CHECK
Tieback to Tower Connection - Gamma Sector
2020777.876328.22

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)	0.00	kips
Shear (V)	1.08	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})	0.269	kips
$T_{ub}/\phi R_{nt}$	0.00001	
$V_{ub}/\phi R_{nv}$	0.06089	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00371	
Bolt Capacity =	6.1%	OK

TIA-222-H CONNECTION CHECK
Reinforcement to Tower Connection - Alpha Sector
2020777.876328.22

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)	-1.54	kips
Shear (V)	1.99	kips

Bolt Capacity		
Nominal Tensile Strength (R_{nt})	8.514	kips
Nominal Shear Strength (R_{nv})	5.89	kips
Bolt Tensile Force (T_{ub})	-0.39	kips
Bolt Shear Force (V_{ub})	0.497	kips
$T_{ub}/\phi R_{nt}$	-0.06036	
$V_{ub}/\phi R_{nv}$	0.11257	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.01632	
Bolt Capacity =	11.3%	OK

TIA-222-H CONNECTION CHECK
Reinforcement to Tower Connection - Beta Sector
2020777.876328.22

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)	-1.52	kips
Shear (V)	1.97	kips

Bolt Capacity		
Nominal Tensile Strength (R_{nt})	8.514	kips
Nominal Shear Strength (R_{nv})	5.89	kips
Bolt Tensile Force (T_{ub})	-0.38	kips
Bolt Shear Force (V_{ub})	0.494	kips
$T_{ub}/\phi R_{nt}$	-0.05968	
$V_{ub}/\phi R_{nv}$	0.11176	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.01605	
Bolt Capacity =	11.2%	OK

TIA-222-H CONNECTION CHECK
Reinforcement to Tower Connection - Gamma Sector
2020777.876328.22

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)	-1.25	kips
Shear (V)	1.69	kips

Bolt Capacity		
Nominal Tensile Strength (R_{nt})	8.514	kips
Nominal Shear Strength (R_{nv})	5.89	kips
Bolt Tensile Force (T_{ub})	-0.31	kips
Bolt Shear Force (V_{ub})	0.422	kips
$T_{ub}/\phi R_{nt}$	-0.04890	
$V_{ub}/\phi R_{nv}$	0.09552	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.01151	
Bolt Capacity =	9.6%	OK

APPENDIX E

MOUNT MODIFICATION DESIGN DRAWINGS (MDD)

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 RADMAN 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. SCHERER
No. 30026
REGISTERED
PROFESSIONAL ENGINEER
3/27/20

520 South Main Street
Akron, OH 44311
330.572.2100 Fax 330.572.2102

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

PROJECT NOTES

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

ENGINEER	DESIGNER
MAH	JMJ
PROJECT MANAGER	APPROVED BY
CB	CJS

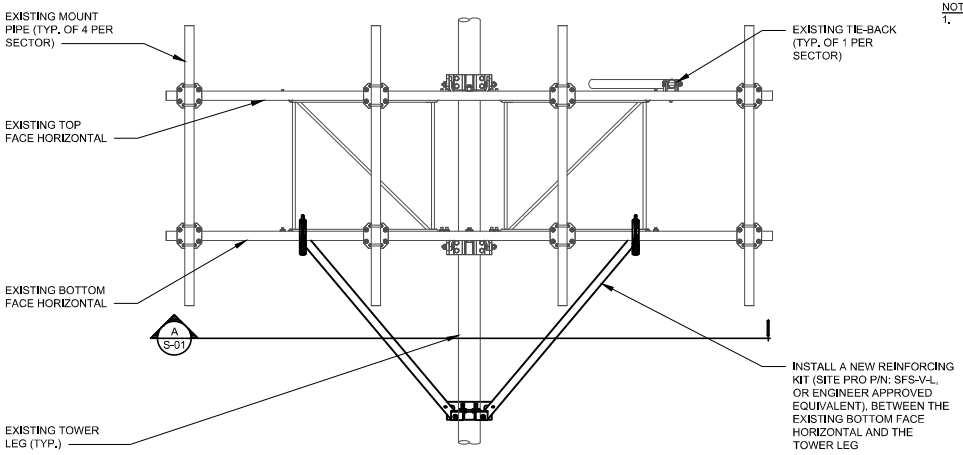
JOB NO.
2020777.876328.20

N-01

MODIFICATION SCHEDULE

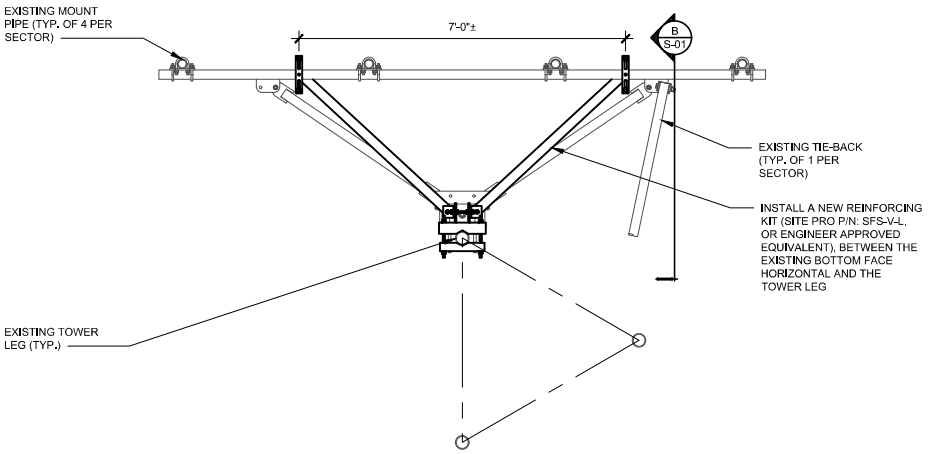
MEMBER TYPE	ELEVATION	EXISTING MEMBER	NEW MEMBER	REFERENCE DETAIL/SHEET	NOTES
REINFORCING KIT	92'-0"±	(3) 13'-0" SECTOR FRAMES	(1) REINFORCING KIT (PER SECTOR)	1/S-01	INSTALL A REINFORCING KIT BETWEEN THE EXISTING BOTTOM FACE HORIZONTAL AND THE TOWER LEG.

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



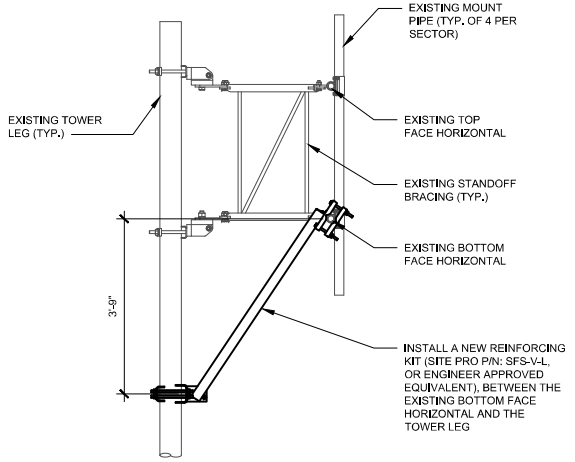
1 S-01 ELEVATION
SCALE: 3/8" = 1'-0"

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



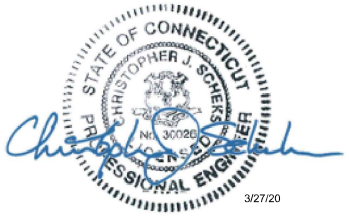
A S-01 SECTION
SCALE: 3/8" = 1'-0"

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.



3/27/20

520 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

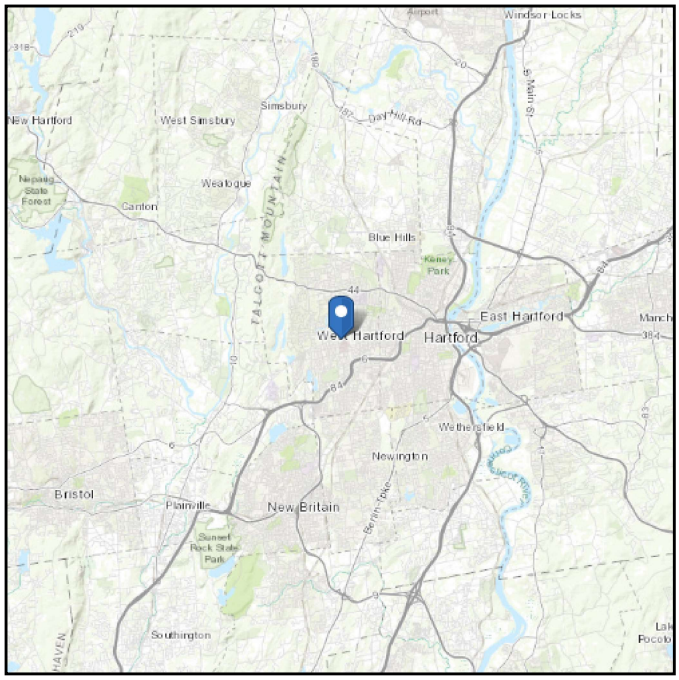
S-01

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class:

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
Date Accessed:	Fri Mar 20 2020

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 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.

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

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:	Fri Mar 20 2020

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

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 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.

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

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

Exhibit F

Power Density/RF Emissions Report

SITESAFE
RF COMPLIANCE EXPERTS

8618 Westwood Center Drive, Suite 315, Vienna, VA 22182
703.276.1100 • 703.276.1169 fax
info@sitesafe.com • www.sitesafe.com

Crown Castle on behalf of AT&T Mobility, LLC
Site BU – 876328
Application ID – ATT order 509316
Site Name – WEST HARTFORD PARKING GARAGE
Site Compliance Report

27-31 S. Main Street
West Hartford, CT 06110

Latitude: N41-45-36.41
Longitude: W72-44-35.25
Structure Type: Self-Support

Report generated date: June 9, 2020
Report by: Leo Romero
Customer Contact: Anne Marie Zsamba

AT&T Mobility, LLC will be compliant upon completion of the remediation identified in Section 3.2.

© 2020 Site Safe, LLC, Vienna, VA

Michael Fischer, P.E.
Registered Professional Engineer (Electrical)
Connecticut License Number 33928
Expires January 31, 2021

Signed 09 June 2020

Crown Castle on behalf of AT&T Mobility, LLC
WEST HARTFORD PARKING GARAGE - 876328
Radio Frequency (RF) Site Compliance Report

27-31 S. Main Street, West Hartford, CT 06110

8618 Westwood Center Drive • Suite 315 • Vienna, VA 22182
703.276.1100 • info@sitesafe.com

Table of Contents

1 Executive Summary

Crown Castle on behalf of AT&T Mobility, LLC has contracted with Site Safe, LLC (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine whether the proposed communications site, 876328 - WEST HARTFORD PARKING GARAGE, located at 27-31 S. Main Street, West Hartford, CT, is in compliance with the Federal Communication Commission (FCC) Rules and Regulations for RF emissions.

This report contains a detailed summary of the RF environment at the site including:

- Diagram of the site
- Inventory of the make / model of all antennas
- Theoretical MPE based on modeling

This report addresses exposure to radio frequency electromagnetic fields in accordance with the FCC Rules and Regulations for all individuals, classified in two groups, "Occupational or Controlled" and "General Public or Uncontrolled."

AT&T Mobility, LLC will be compliant with the FCC Rules and Regulations, as described in OET Bulletin 65, **upon implementation of the proposed remediation.** The corrective actions needed to make this site compliant are located in Section 3.2.

AT&T Mobility, LLC proposes to make modifications to an existing site. The proposed antennas are noted as "proposed" in the antenna table under Section 6.

This document and the conclusions herein are based on the information provided by Crown Castle.

If you have any questions regarding RF safety and regulatory compliance, please do not hesitate to contact Sitesafe's Customer Support Department at (703) 276-1100.

2 Regulatory Basis

2.1 FCC Rules and Regulations

In 1996, the Federal Communications Commission (FCC) adopted regulations for evaluating the effects of RF emissions in 47 CFR § 1.1307 and 1.1310. The guideline from the FCC Office of Engineering and Technology is Bulletin 65 ("OET Bulletin 65"), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields*, Edition 97-01, published August 1997. Since 1996, the FCC periodically reviews these rules and regulations as per their congressional mandate.

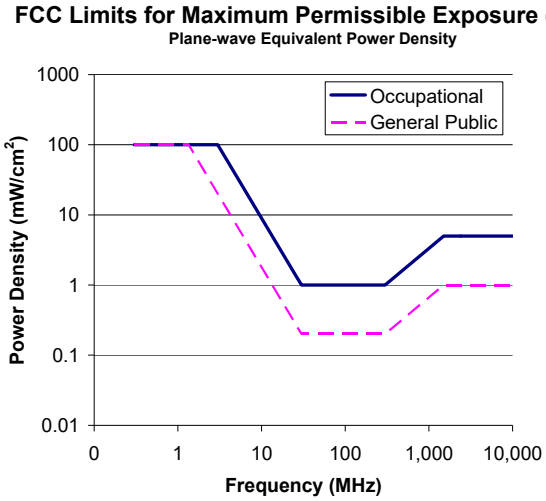
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to *accessible* areas where workers or the general public may be exposed to Radio Frequency (RF) electromagnetic fields.

Occupational or Controlled limits apply in situations in which persons are exposed as a consequence of their employment and where those persons exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

An area is considered a Controlled environment when access is limited to these aware personnel. Typical criteria are restricted access (i.e. locked or alarmed doors, barriers, etc.) to the areas where antennas are located coupled with proper RF warning signage. A site with Controlled environments is evaluated with Occupational limits.

All other areas are considered Uncontrolled environments. If a site has no access controls or no RF warning signage it is evaluated with General Public limits.

The theoretical modeling of the RF electromagnetic fields has been performed in accordance with OET Bulletin 65. The Maximum Permissible Exposure (MPE) limits utilized in this analysis are outlined in the following diagram:



Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz *Plane-wave equivalent power density

2.2 OSHA Statement

The General Duty clause of the OSHA Act (Section 5) outlines the occupational safety and health responsibilities of the employer and employee. The General Duty clause in Section 5 states:

(a) Each employer –

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;

(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA has defined Radiofrequency and Microwave Radiation safety standards for workers who may enter hazardous RF areas. Regulation Standards 29 CFR § 1910.147 identify a generic lockout/tagout procedure aimed to control the unexpected energization or startup of machines when maintenance or service is being performed.

3 Site Compliance

3.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, Sitesafe has determined that:

AT&T Mobility, LLC will be compliant with the FCC Rules and Regulations, as described in OET Bulletin 65, **upon implementation of the proposed remediation.** The corrective actions needed to make this site compliant are located in Section 3.2.

The compliance determination is based on theoretical modeling, RF signage placement recommendations, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the proposed AT&T Mobility, LLC deployment plan could result in the site being rendered non-compliant.

3.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on theoretical analysis of MPE levels. Where applicable, barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

AT&T Mobility, LLC will be made compliant if the following changes are implemented:

Base of the Tower

Ensure that a Warning sign is installed.
Ensure that a NOC Information sign is installed.

Note: The penthouse 1 ladder or the tower access must be locked or restricted for the site to be in compliance.

Note: Ensure all existing signage documented in this report still exists on site unless otherwise indicated.

4 Safety Plan and Procedures

The following items are general safety recommendations that should be administered on a site by site basis as needed by the carrier.

General Maintenance Work: Any maintenance personnel required to work immediately in front of antennas and / or in areas indicated as above 100% of the Occupational MPE limits should coordinate with the wireless operators to disable transmitters during their work activities.

Training and Qualification Verification: All personnel accessing areas indicated as exceeding the General Population MPE limits should have a basic understanding of EME awareness and RF Safety procedures when working around transmitting antennas. Awareness training increases a worker's understanding to potential RF exposure scenarios. Awareness can be achieved in a number of ways (e.g. videos, formal classroom lecture or internet-based courses).

Physical Access Control: Access restrictions to transmitting antennas locations is the primary element in a site safety plan. Examples of access restrictions are as follows:

- Locked door or gate
- Alarmed door
- Locked ladder access
- Restrictive Barrier at antenna (e.g. Chain link with posted RF Sign)

RF Signage: Everyone should obey all posted signs at all times. RF signs play an important role in properly warning a worker prior to entering into a potential RF Exposure area.

Assume all antennas are active: Due to the nature of telecommunications transmissions, an antenna transmits intermittently. Always assume an antenna is transmitting. Never stop in front of an antenna. If you have to pass by an antenna, move through as quickly and safely as possible thereby reducing any exposure to a minimum.

Maintain a 3-foot clearance from all antennas: There is a direct correlation between the strength of an EME field and the distance from the transmitting antenna. The farther away from an antenna, the lower the corresponding EME field is.

Site RF Emissions Diagram(s): Section 5 of this report contains RF Diagram(s) that outline various theoretical Maximum Permissible Exposure (MPE) areas at the site. The modeling is a worst-case scenario assuming a duty cycle of 100% for each transmitting antenna at full power. This analysis is based on one of two access control criteria: General Public criteria means the access to the site is uncontrolled and anyone can gain access. Occupational criteria means the access is restricted and only properly trained individuals can gain access to the antenna locations.

5 Analysis

5.1 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

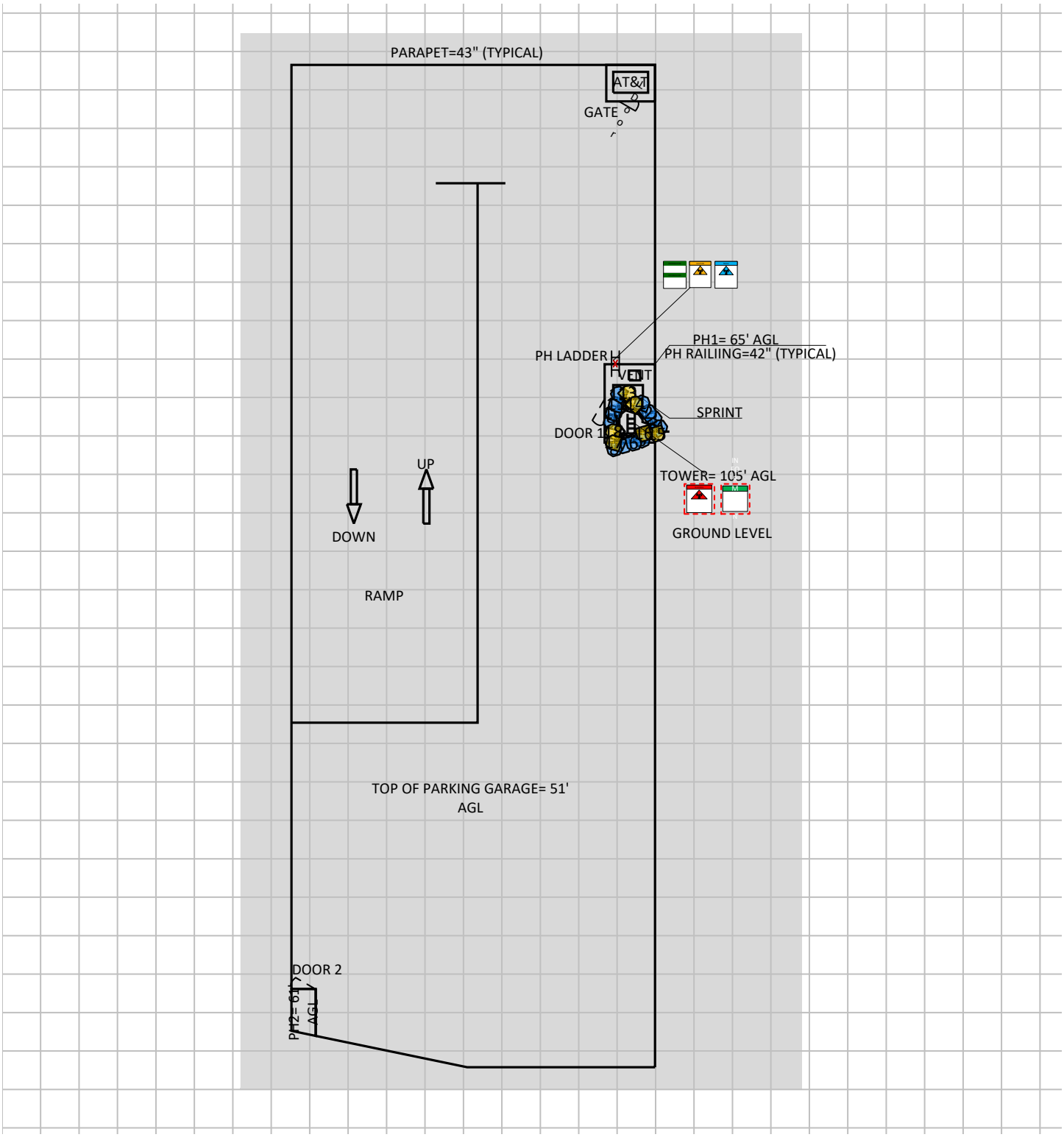
The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC **General Public** Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

This table displays the maximum theoretical percentage of the FCC's General Public MPE limits:

	General Public Levels:	
Exposure Type:	**Maximum**	**Spatial Average**
Reference Level:	**At Antenna Level**	**Ground**
AT&T Mobility, LLC:	10,955.0%	<1%
Composite:	10,955.0%	<1%

Note: On the diagrams shown below, each level is marked with a height. For all diagrams that are marked as *Spatial Average 0' – 6'*, the modeling program will spatially average the emissions within the area six feet above each set level. This provides an accurate spatial average of the percentage of the FCC's MPE limits within an accessible area.

RF Exposure Simulation For: WEST HARTFORD PARKING GARAGE
Composite Diagram



% of FCC Public Exposure Limit
Spatial Average 0' - 6'

% of FCC Public Exposure Limit

0-5	5-100	100-500	500-5000	5000+

Carrier Identification

AT&T MOBILITY LLC | VERIZON WIRELESS | T-MOBILE | SPRINT | UNKNOWN CARRIER

Existing Barrier ——— Proposed Barrier/Sign — — — Remove Sign X

Locked Ladder

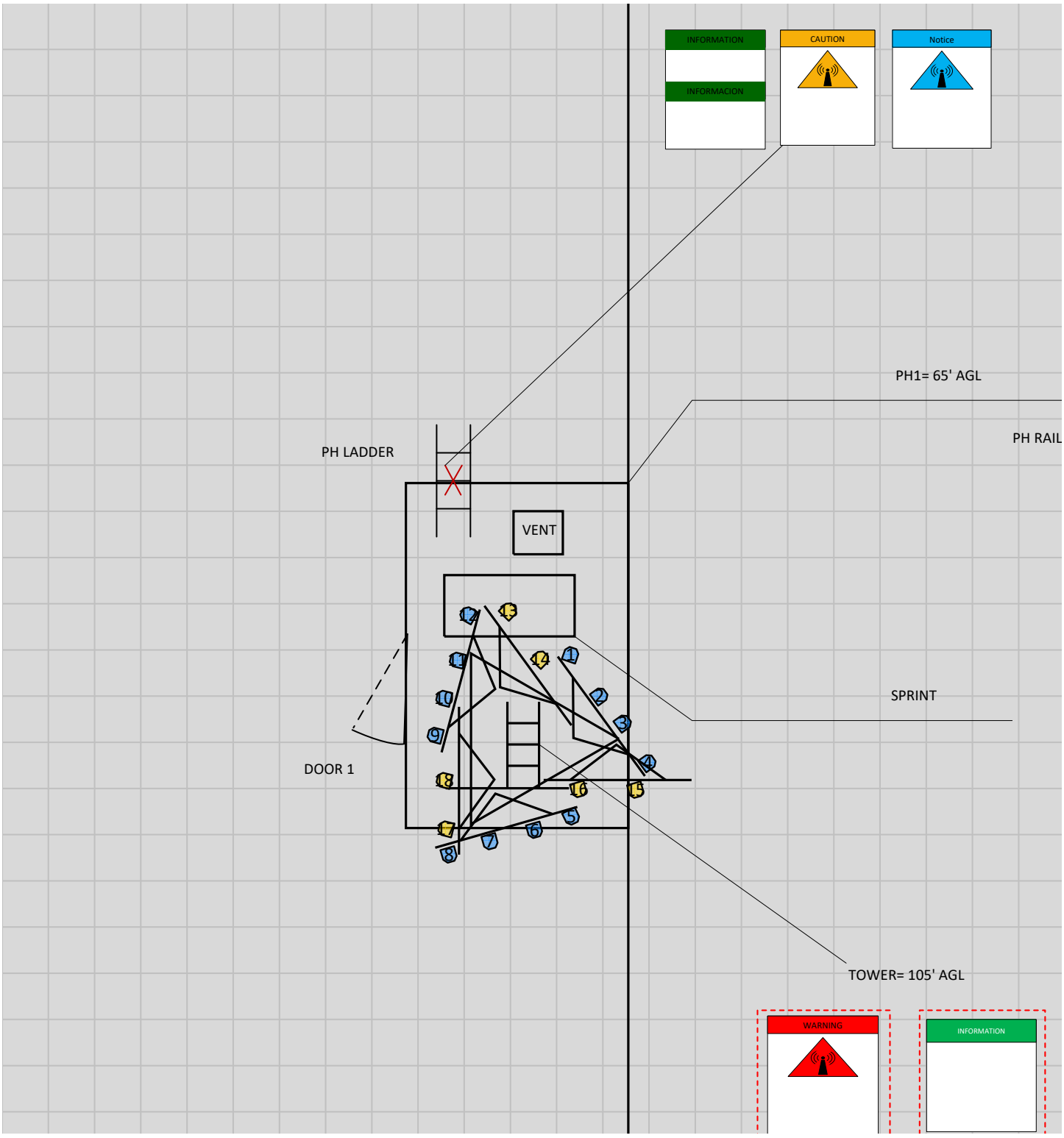
(Feet)

0 26.9 53.8

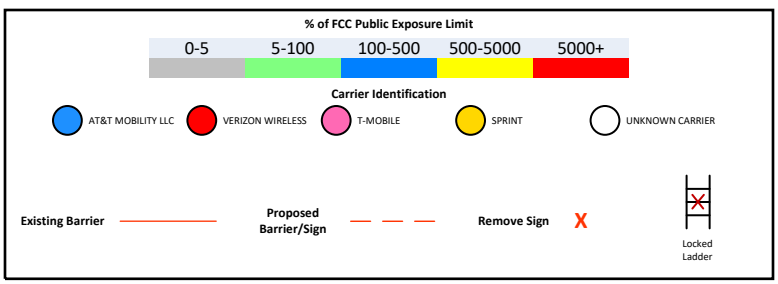
www.sitesafe.com
6/8/2020 7:08:54 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: WEST HARTFORD PARKING GARAGE
Detailed View



% of FCC Public Exposure Limit
Spatial Average 0' - 6'



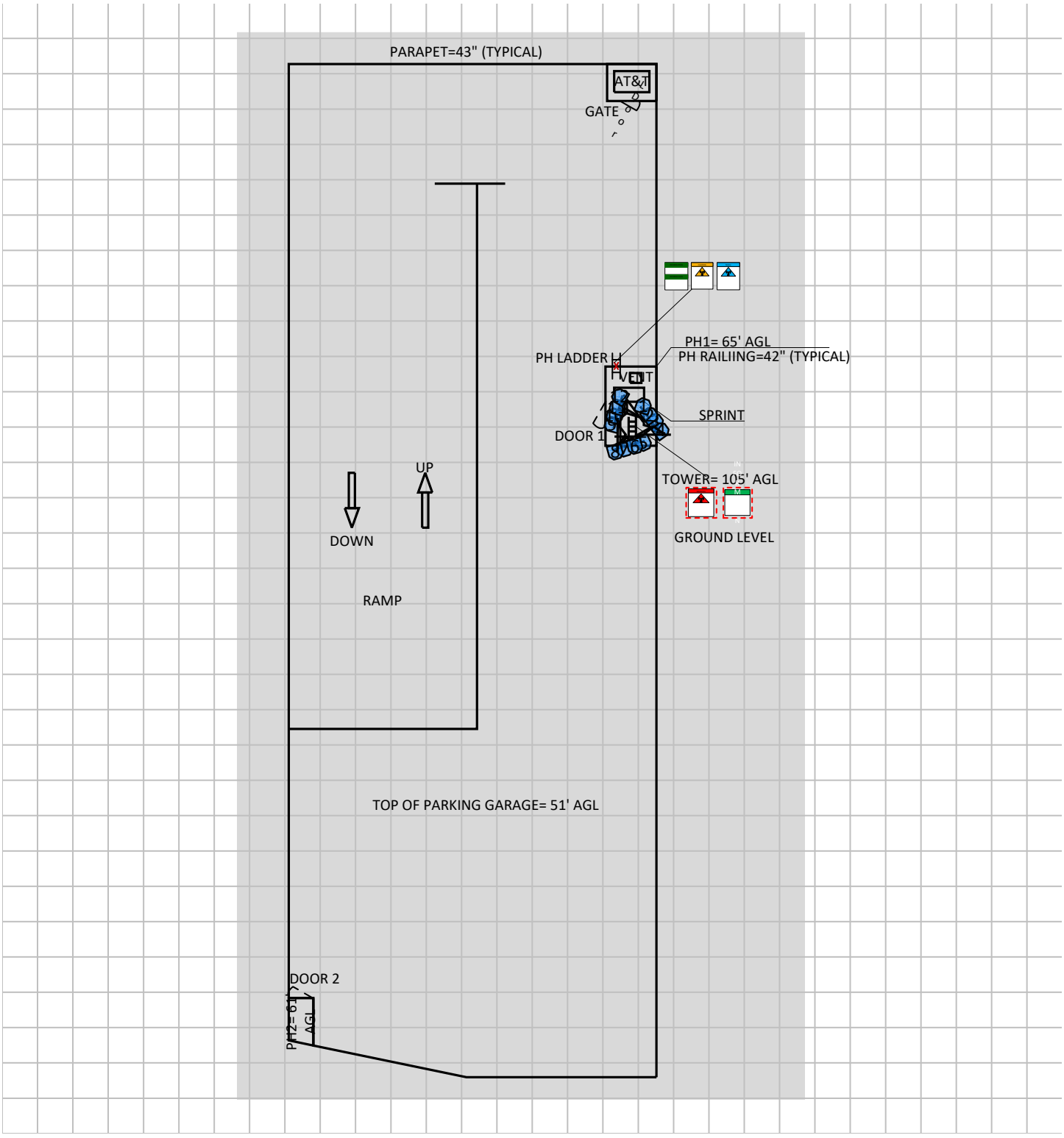
(Feet)

0 5.7 11.4

www.sitesafe.com
6/8/2020 7:10:00 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: WEST HARTFORD PARKING GARAGE
AT&T Mobility, LLC Contribution



% of FCC Public Exposure Limit
Spatial Average 0' - 6'

% of FCC Public Exposure Limit

0-5	5-100	100-500	500-5000	5000+

Carrier Identification

AT&T MOBILITY LLC | VERIZON WIRELESS | T-MOBILE | SPRINT | UNKNOWN CARRIER

Existing Barrier | Proposed Barrier/Sign | Remove Sign X | Locked Ladder

(Feet)

0 26.5 53

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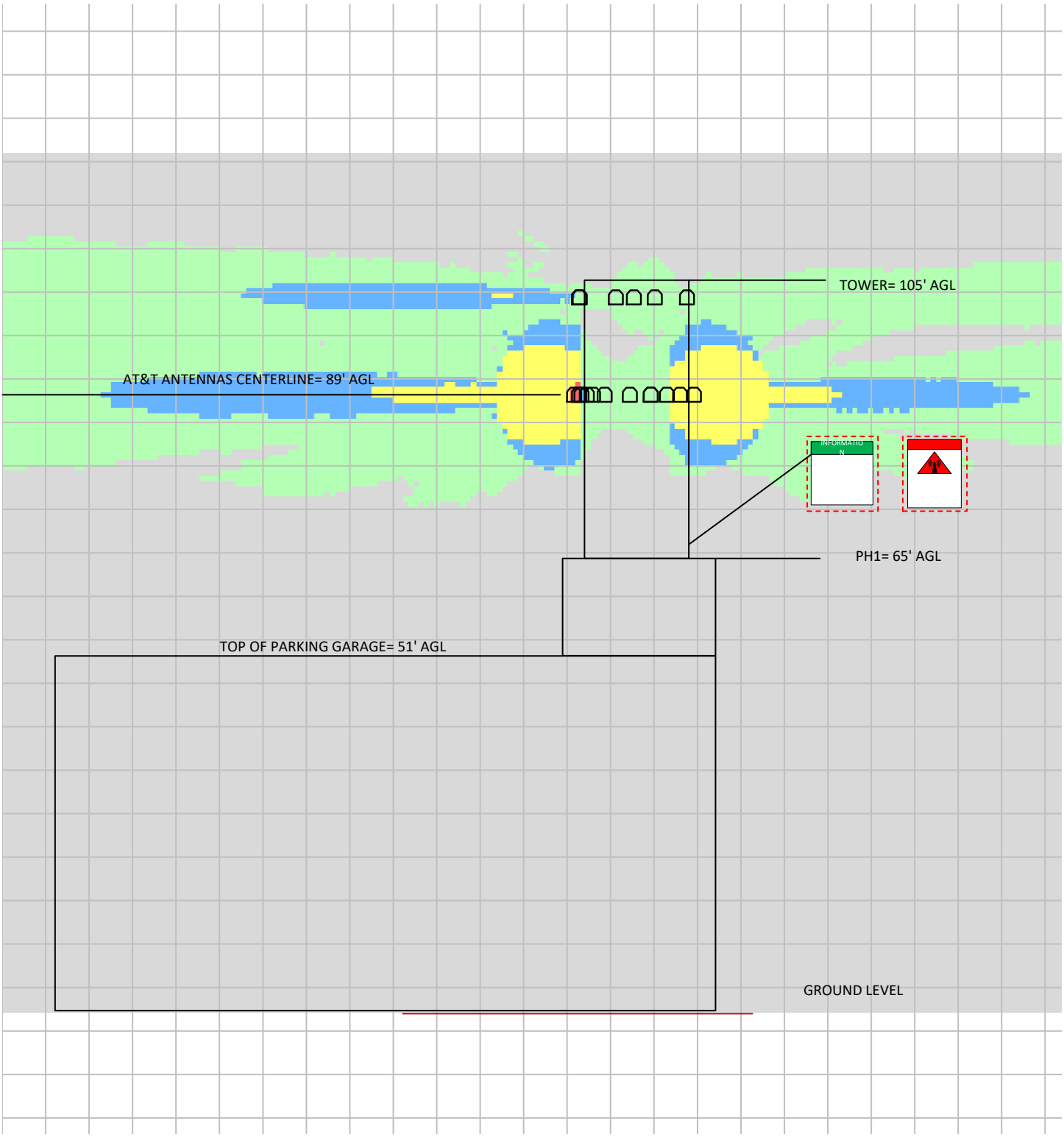
6/8/2020 7:11:26 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: WEST HARTFORD PARKING GARAGE
Elevation View



% of FCC Public Exposure Limit

% of FCC Public Exposure Limit

0-5	5-100	100-500	500-5000	5000+

Carrier Identification

AT&T MOBILITY LLC | VERIZON WIRELESS | T-MOBILE | SPRINT | UNKNOWN CARRIER

(Feet)

0 10.2 20.4

www.sitesafe.com
6/8/2020 7:04:42 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Single Level (0)

6 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was provided by the customer and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 876328 - WEST HARTFORD PARKING GARAGE. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Transmitter Power Output ("TPO"), Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP")
- Antenna manufacturer make, model, and gain

For other carriers at this site, equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers or provided data.

The following antenna inventory was provided by the customer and was utilized to create the site model diagrams:

Antenna Inventory																	
Ant #	Operator	Antenna Make and Model	Ant Type	Len (ft)	TX Freq (MHz)	Tech	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power BW (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z(ft) (AGL)	MDT	EDT
1	AT&T MOBILITY LLC	Powerwave 7770	Panel	4.6	850	UMTS	5	11.51	82	40	TPO	Watt	1	566.3	89	0	0
2	AT&T MOBILITY LLC	CCI Antennas TPA-65R-LCUUUU-H8	Panel	8	737	LTE	40	13.56	61.9	160	TPO	Watt	1	3631.8	89	0	0
2	AT&T MOBILITY LLC	CCI Antennas TPA-65R-LCUUUU-H8	Panel	8	2100	LTE	40	13.96	65.2	160	TPO	Watt	1	3982.2	89	0	0
2	AT&T MOBILITY LLC	CCI Antennas TPA-65R-LCUUUU-H8	Panel	8	2300	LTE	40	14.36	65	100	TPO	Watt	1	2729	89	0	0
3	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU8D	Panel	8	763	LTE	40	12.26	70.6	160	TPO	Watt	1	2692.3	89	0	0
3	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU8D	Panel	8	1900	LTE	40	14.16	67	160	TPO	Watt	1	4169.8	89	0	0
4	AT&T MOBILITY LLC (Proposed)	Cci OPA65R-BU8D	Panel	8	722	LTE	40	13.05	65.9	80	TPO	Watt	1	1614.7	89	0	0
4	AT&T MOBILITY LLC (Proposed)	Cci OPA65R-BU8D	Panel	8	850	LTE	40	13.35	66.3	160	TPO	Watt	1	3460.3	89	0	0
4	AT&T MOBILITY LLC (Proposed)	Cci OPA65R-BU8D	Panel	8	1900	LTE	40	14.45	66.8	160	TPO	Watt	1	4457.8	89	0	0
5	AT&T MOBILITY LLC	Powerwave 7770	Panel	4.6	850	UMTS	140	11.51	82	40	TPO	Watt	1	566.3	89	0	0
6	AT&T MOBILITY LLC	CCI Antennas TPA-65R-LCUUUU-H8	Panel	8	737	LTE	150	13.56	61.9	160	TPO	Watt	1	3631.8	89	0	0
6	AT&T MOBILITY LLC	CCI Antennas TPA-65R-LCUUUU-H8	Panel	8	2100	LTE	150	13.96	65.2	160	TPO	Watt	1	3982.2	89	0	0
6	AT&T MOBILITY LLC	CCI Antennas TPA-65R-LCUUUU-H8	Panel	8	2300	LTE	150	14.36	65	100	TPO	Watt	1	2729	89	0	0
7	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU8D	Panel	8	763	LTE	150	12.26	70.6	160	TPO	Watt	1	2692.3	89	0	0
7	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU8D	Panel	8	1900	LTE	150	14.16	67	160	TPO	Watt	1	4169.8	89	0	0
8	AT&T MOBILITY LLC (Proposed)	Cci OPA65R-BU8D	Panel	8	722	LTE	150	13.05	65.9	80	TPO	Watt	1	1614.7	89	0	0

Antenna Inventory																	
Ant #	Operator	Antenna Make and Model	Ant Type	Len (ft)	TX Freq (MHz)	Tech	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power BW (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z(ft) (AGL)	MDT	EDT
8	AT&T MOBILITY LLC (Proposed)	Cci OPA65R-BU8D	Panel	8	850	LTE	150	13.35	66.3	160	TPO	Watt	1	3460.3	89	0	0
8	AT&T MOBILITY LLC (Proposed)	Cci OPA65R-BU8D	Panel	8	1900	LTE	150	14.45	66.8	160	TPO	Watt	1	4457.8	89	0	0
9	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU8D	Panel	8	763	LTE	270	12.26	70.6	160	TPO	Watt	1	2692.3	89	0	0
9	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU8D	Panel	8	1900	LTE	270	14.16	67	160	TPO	Watt	1	4169.8	89	0	0
10	AT&T MOBILITY LLC (Proposed)	Cci OPA65R-BU8D	Panel	8	1900	LTE	270	14.45	66.8	160	TPO	Watt	1	4457.8	89	0	0
10	AT&T MOBILITY LLC (Proposed)	Cci OPA65R-BU8D	Panel	8	722	LTE	270	13.05	65.9	80	TPO	Watt	1	1614.7	89	0	0
10	AT&T MOBILITY LLC (Proposed)	Cci OPA65R-BU8D	Panel	8	850	LTE	270	13.35	66.3	160	TPO	Watt	1	3460.3	89	0	0
11	AT&T MOBILITY LLC	CCI Antennas TPA-65R-LCUUUU-H8	Panel	8	737	LTE	270	13.56	61.9	160	TPO	Watt	1	3631.8	89	0	0
11	AT&T MOBILITY LLC	CCI Antennas TPA-65R-LCUUUU-H8	Panel	8	2100	LTE	270	13.96	65.2	160	TPO	Watt	1	3982.2	89	0	0
11	AT&T MOBILITY LLC	CCI Antennas TPA-65R-LCUUUU-H8	Panel	8	2300	LTE	270	14.36	65	100	TPO	Watt	1	2729	89	0	0
12	AT&T MOBILITY LLC	Powerwave 7770	Panel	4.6	850	UMTS	285	11.51	82	40	TPO	Watt	1	566.3	89	0	0
13	SPRINT	RFS APXVSPP18-C-A20	Panel	6	862		30	13.37	65	100	TPO	Watt	1	2172.7	103	0	0
13	SPRINT	RFS APXVSPP18-C-A20	Panel	6	1900		30	16.27	65	90	TPO	Watt	1	3812.8	103	0	0
13	SPRINT	RFS APXVSPP18-C-A20	Panel	6	1990		30	16.27	65	90	TPO	Watt	1	3812.8	103	0	0
14	SPRINT	RFS APXVTM14-C-I20	Panel	4.7	2500		30	15.86	68	160	TPO	Watt	1	6167.7	103	0	0
15	SPRINT	RFS APXVSPP18-C-A20	Panel	6	862		150	13.37	65	100	TPO	Watt	1	2172.7	103	0	0
15	SPRINT	RFS APXVSPP18-C-A20	Panel	6	1900		150	16.27	65	90	TPO	Watt	1	3812.8	103	0	0
15	SPRINT	RFS APXVSPP18-C-A20	Panel	6	1990		150	16.27	65	90	TPO	Watt	1	3812.8	103	0	0
16	SPRINT	RFS APXVTM14-C-I20	Panel	4.7	2500		150	15.86	68	160	TPO	Watt	1	6167.7	103	0	0
17	SPRINT	RFS APXVSPP18-C-A20	Panel	6	862		270	13.37	65	100	TPO	Watt	1	2172.7	103	0	0
17	SPRINT	RFS APXVSPP18-C-A20	Panel	6	1900		270	16.27	65	90	TPO	Watt	1	3812.8	103	0	0

Antenna Inventory																	
Ant #	Operator	Antenna Make and Model	Ant Type	Len (ft)	TX Freq (MHz)	Tech	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power BW (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z(ft) (AGL)	MDT	EDT
17	SPRINT	RFS APXVSPP18-C-A20	Panel	6	1990		270	16.27	65	90	TPO	Watt	1	3812.8	103	0	0
18	SPRINT	RFS APXVTM14-C-I20	Panel	4.7	2500		270	15.86	68	160	TPO	Watt	1	6167.7	103	0	0

Note: The Z reference indicates antenna height **above the ground level (AGL).** ERP values provided by the client and used in the modeling may be greater than are currently deployed. For additional modeling information, refer to Appendix B. Proposed equipment is tagged as *(Proposed)* under *Operator* or *Antenna Make and Model*.

7 Engineer Certification

The professional engineer whose seal appears on the cover of this document hereby certifies and affirms:

That I am registered as a Professional Engineer in the jurisdiction indicated in the professional engineering stamp on the cover of this document; and

That I am an employee of Site Safe, LLC, in Vienna, Virginia, at which place the staff and I provide RF compliance services to clients in the wireless communications industry; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission (FCC) as well as the regulations of the Occupational Safety and Health Administration (OSHA), both in general and specifically as they apply to the FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields; and

That I have thoroughly reviewed this Site Compliance Report and believe it to be true and accurate to the best of my knowledge as assembled by and attested to by Leo Romero.

June 9, 2020

Appendix A – Statement of Limiting Conditions

Sitesafe will not be responsible for matters of a legal nature that affect the site or property.

Due to the complexity of some wireless sites, Sitesafe performed this analysis and created this report utilizing best industry practices and due diligence. Sitesafe cannot be held accountable or responsible for anomalies or discrepancies due to actual site conditions (i.e. mislabeling of antennas or equipment, inaccessible cable runs, inaccessible antennas or equipment, etc.) or information or data supplied by AT&T Mobility, LLC, the site manager, or their affiliates, subcontractors or assigns.

Sitesafe has provided computer generated model(s) in this Site Compliance Report to show approximate dimensions of the site, and the model is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Sitesafe's recommendations.

Sitesafe may note in the Site Compliance Report any adverse physical conditions, such as needed repairs, observed during the survey of the subject property or that Sitesafe became aware of during the normal research involved in performing this survey. Sitesafe will not be responsible for any such conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. Because Sitesafe is not an expert in the field of mechanical engineering or building maintenance, the Site Compliance Report must not be considered a structural or physical engineering report.

Sitesafe obtained information used in this Site Compliance Report from sources that Sitesafe considers reliable and believes them to be true and correct. Sitesafe does not assume any responsibility for the accuracy of such items that were furnished by other parties. When conflicts in information occur between data provided by a second party and physical data collected by Sitesafe, the physical data will be used.

Appendix B – Assumptions and Definitions

General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at **full power at all times**. Software modeling was performed for all transmitting antennas located on the site. Sitesafe has further assumed a 100% duty cycle and maximum radiated power.

The site has been modeled with these assumptions to show the maximum RF energy density. Sitesafe believes this to be a *worst-case* analysis, based on best available data. Areas modeled to predict emissions greater than 100% of the applicable MPE level may not actually occur but are shown as a *worst-case* prediction that could be realized real time. Sitesafe believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor).

Thus, at any time, if power density measurements were made, we believe the real-time measurements would indicate levels below those depicted in the RF emission diagram(s) in this report. By modeling in this way, Sitesafe has conservatively shown exclusion areas – areas that should not be entered without the use of a personal monitor, carriers reducing power, or performing real-time measurements to indicate real-time exposure levels.

Definitions

5% Rule – The rules adopted by the FCC specify that, in general, at multiple transmitter sites actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 5% of the exposure limits. In other words, any wireless operator that contributes 5% or greater of the MPE limit in an area that is identified to be greater than 100% of the MPE limit is responsible for taking corrective actions to bring the site into compliance.

Compliance – The determination of whether a site complies with FCC standards with regards to Human Exposure to Radio Frequency Electromagnetic Fields from transmitting antennas.

Decibel (dB) – A unit for measuring power or strength of a signal.

Duty Cycle – The percent of pulse duration to the pulse period of a periodic pulse train. Also, may be a measure of the temporal transmission characteristic of an intermittently transmitting RF source such as a paging antenna by dividing average transmission duration by the average period for transmission. A duty cycle of 100% corresponds to continuous operation.

Effective (or Equivalent) Isotropic Radiated Power (EIRP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

Effective Radiated Power (ERP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to a half-wave dipole antenna.

Gain (of an antenna) – The ratio, usually expressed in decibels, of the power required at the input of a loss-free reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field strength or the same power density at the same distance. When not specified otherwise, the gain refers to the direction of maximum radiation. Gain may be considered for a specified polarization. Gain may be referenced to an isotropic antenna (dBi) or a half-wave dipole (dBd) antenna.

General Population/Uncontrolled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are ***unaware*** of the potential for exposure and who have no control over their exposure. General Population is also referenced as General Public.

Generic Antenna – For the purposes of this report, the use of "Generic" as an antenna model means the antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use its industry specific knowledge of antenna models to select a worst-case scenario antenna to model the site.

Isotropic Antenna – An antenna that is completely non-directional. In other words, an antenna that radiates energy equally in all directions.

Maximum Measurement – This measurement represents the single largest measurement recorded when performing a spatial average measurement.

Maximum Permissible Exposure (MPE) – The rms and peak electric and magnetic field strength, their squares, or the plane-wave equivalent power densities associated with these fields to which a person may be exposed without harmful effect and with acceptable safety factor.

Occupational/Controlled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are **aware** of the potential for exposure as a condition of employment or specific activity and can exercise control over their exposure.

OET Bulletin 65 – Technical guideline developed by the FCC's Office of Engineering and Technology to determine the impact of RF exposure on humans. The guideline was published in August 1997.

OSHA (Occupational Safety and Health Administration) – Under the Occupational Safety and Health Act of 1970, employers are responsible for providing a safe and healthy workplace for their employees. OSHA's role is to promote the safety and health of America's working men and women by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health. For more information, visit www.osha.gov.

Radio Frequency Exposure or Electromagnetic Fields – Electromagnetic waves that are propagated from antennas through space.

Spatial Average Measurement – A technique used to average a minimum of ten (10) measurements taken in a ten (10) second interval from zero (0) to six (6) feet. This measurement is intended to model the average energy a 6-foot tall human body will absorb while present in an electromagnetic field of energy.

Transmitter Power Output (TPO) – The radio frequency output power of a transmitter's final radio frequency stage as measured at the output terminal while connected to a load.

Appendix C – Rules & Regulations

Explanation of Applicable Rules and Regulations

The FCC has set forth guidelines in OET Bulletin 65 for human exposure to radio frequency electromagnetic fields. Specific regulations regarding this topic are listed in Part 1, Subpart I, of Title 47 in the Code of Federal Regulations. Currently, there are two different levels of MPE - General Public MPE and Occupational MPE. An individual classified as Occupational can be defined as an individual who has received appropriate RF training and meets the conditions outlined below. General Public is defined as anyone who does not meet the conditions of being Occupational. FCC and OSHA Rules and Regulations define compliance in terms of total exposure to total RF energy, regardless of location of or proximity to the sources of energy.

It is the responsibility of all licensees to ensure these guidelines are maintained at all times. It is the ongoing responsibility of all licensees composing the site to maintain ongoing compliance with the FCC Rules and Regulations. Individual licensees that contribute less than 5% MPE to any total area out of compliance are not responsible for corrective actions.

OSHA has adopted and enforces the FCC's exposure guidelines. A building owner or site manager can use this report as part of an overall RF Health and Safety Policy. It is important for building owners/site managers to identify areas in excess of the General Population MPE and ensure that only persons qualified as Occupational are granted access to those areas.

Occupational Environment Explained

The FCC definition of Occupational exposure limits apply to persons who:

- are exposed to RF energy as a consequence of their employment;
- have been made aware of the possibility of exposure; and
- can exercise control over their exposure.

OSHA guidelines go further to state that persons must complete RF Safety Awareness training and must be trained in the use of appropriate personal protective equipment.

In order to consider this site an Occupational Environment, the site must be controlled to prevent access by any individuals classified as the General Public. Compliance is also maintained when any non-occupational individuals (the General Public) are prevented from accessing areas indicated as Red or Yellow in the attached RF Emissions diagram. In addition, a person must be aware of the RF environment into which they are entering. This can be accomplished by an RF Safety Awareness class, and by appropriate written documentation such as this Site Compliance Report.

All AT&T Mobility, LLC employees who require access to this site must complete RF Safety Awareness training and must be trained in the use of appropriate personal protective equipment.

Appendix D – General Safety Recommendations

The following are *general recommendations* appropriate for any site with accessible areas in excess of 100% General Public MPE. These recommendations are not specific to this site. These are safety recommendations appropriate for typical site management, building management, and other tenant operations.

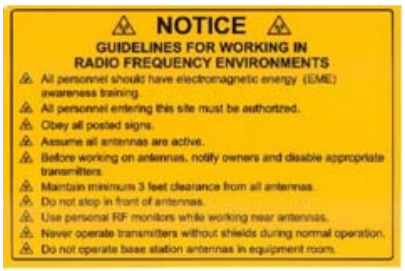
1. All individuals needing access to the main site (or the area indicated to be in excess of General Public MPE) should wear a personal protective monitor (PPM), successfully complete proper RF Safety Awareness training, and have and be trained in the use of appropriate personal protective equipment.

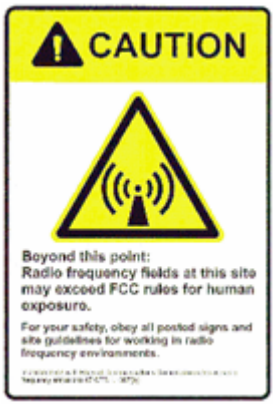
2. All individuals needing access to the main site should be instructed to read and obey all posted placards and signs.

3. The site should be routinely inspected and this or similar report updated with the addition of any antennas or upon any changes to the RF environment including:

- adding new antennas that may have been located on the site
- removing of any existing antennas
- changes in the radiating power or number of RF emitters

4. Post the appropriate **NOTICE**, **CAUTION,** or **WARNING** sign at the main site access point(s) and other locations as required. Note: Please refer to RF Exposure Diagrams in Section 5.1 to inform <u>everyone</u> who has access to this site that beyond posted signs there may be levels in excess of the limits prescribed by the FCC. In addition to RF Advisory Signage, a RF Guideline Signage is recommended to be posted at the main site access point(s). The signs below are examples of signs meeting FCC guidelines.





5. Ensure that the site door remains locked (or appropriately controlled) to deny access to the general public if deemed as policy by the building/site owner.

6. For a General Public environment the five color levels identified in this analysis can be interpreted in the following manner:

- Gray represents areas predicted to be at 5% or less of the General Public MPE limits. *The General Public can access these areas with no restrictions.*

- Green represents areas predicted to be between 5% and 100% of the General Public MPE limits. *The General Public can access these areas with no restrictions.*
- Blue represents areas predicted to be between 100% and 500% of the General Public MPE limits. *The General Public should be restricted from accessing these areas.*
- Yellow represents areas predicted to be between 500% and 5000% of the General Public MPE limits. *The General Public should be restricted from accessing these areas.*
- Red represents areas predicted to be greater than 5000% of the General Public MPE limits. *The General Public should be restricted from accessing these areas.*

7. For an Occupational environment the five color levels identified in this analysis can be interpreted in the following manner:

- Gray represents areas predicted to be at 1% or less of the Occupational MPE limits. *Workers can access these areas with no restrictions.*
- Green represents areas predicted to be between 1% and 20% of the Occupational MPE limits. *Workers can access these areas with no restrictions.*
- Blue represents areas predicted to be between 20% and 100% of the Occupational MPE limits. *Workers can access these areas assuming they have basic understanding of EME awareness and RF safety procedures and understand how to limit their exposure.*
- Yellow represents areas predicted to be between 100% and 1000% of the Occupational MPE limits. *Workers can access these areas assuming they have basic understanding of EME awareness and RF safety procedures and understand how to limit their exposure. Transmitter power reduction and/or time-averaging may be required.*
- Red represents areas predicted to be greater than 1000% of the Occupational MPE limits. *These areas are not safe for workers to be in for prolonged periods of time. Special procedures must be adhered to, such as lockout/tagout or transmitter power reduction, to minimize worker exposure to EME.*

8. Use of a Personal Protective Monitor (PPM): When working around antennas, Sitesafe strongly recommends the use of a PPM. Wearing a PPM will properly forewarn the individual prior to entering an RF exposure area.

Keep a copy of this report available for all persons who must access the site. They should read this report and be aware of the potential hazards with regards to RF and MPE limits.

Additional Information

Additional RF information is available at the following sites:
https://www.fcc.gov/general/radio-frequency-safety-0
https://www.fcc.gov/engineering-technology/electromagnetic-compatibility-division/radio-frequency-safety/faq/rf-safety

OSHA has additional information available at:
https://www.osha.gov/SLTC/radiofrequencyradiation/index.html