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

May 2, 2021

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. This modification/proposal includes B2, B5, and B12 hardware that is both 4G(LTE) and 5GNR capable through remote software configuration and either or both services may be turned on or off at various times.

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

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

Attachments:

Compound Plan and Elevation Depicting the Planned Changes
Structural Modification Report
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 - 876328
Date: Sunday, May 2, 2021 3:12:00 PM
Attachments: EM-AT&T-29 SO MAIN STREET WEST HARTFORD-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 sent to the Connecticut Siting Council today for submission on Sunday, May 2, 2021, for a filing date of Monday, May 3, 2021.

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
Project Manager - Site Acquisition
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 of West Hartford
Subject:	Notice of Exempt Modification - AT&T - 29 South Main Street, West Hartford - 876328
Date:	Sunday, May 2, 2021 3:13:00 PM
Attachments:	EM-AT&T-29 SO MAIN STREET WEST HARTFORD-NOTICE.pdf

Dear Mayor Cantor:

Attached please find AT&T's exempt modification application that is being sent to the Connecticut Siting Council today for submission on Sunday, May 2, 2021, for a filing date of Monday, May 3, 2021.

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
Project Manager - Site Acquisition
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 - 876328
Date: Sunday, May 2, 2021 3:14:00 PM
Attachments: EM-AT&T-29 SO MAIN STREET WEST HARTFORD-NOTICE.pdf

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Dear Town Planner Dumais:

Attached please find AT&T's exempt modification application that is being sent to the Connecticut Siting Council today for submission on Sunday, May 2, 2021, for a filing date of Monday, May 3, 2021.

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
Project Manager - Site Acquisition
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

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

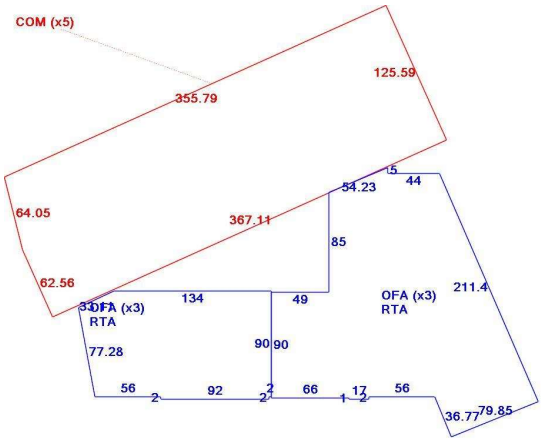
Year Built: 1990
Living Area: 182,816
Replacement Cost: $28,208,446
Building Percent Good: 79
Replacement Cost Less Depreciation: $22,284,700

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


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

AT&T

AT&T SITE NUMBER: CT5843
AT&T SITE NAME: WEST HARTFORD CENTRAL
AT&T FA CODE: 10071356
AT&T PACE NUMBER: MRCTB045379, MRCTB045370, MRCTB045376. MRCTB045373
AT&T PROJECT: LTE 7C, 4TX4RX, 5G NR UPGRADE, BWE TOWER TOP RRH ADD

BUSINESS UNIT #: 876328
SITE ADDRESS: 27-31 SOUTH MAIN ST. WEST HARTFORD, CT 06110
COUNTY: HARTFORD
SITE TYPE: SELF SUPPORT
TOWER HEIGHT: 40'-0"

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 #:	5095 1 29 0001
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:	CROWN CASTLE USA INC. 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:	LIGHTOWER (845) 458-7720

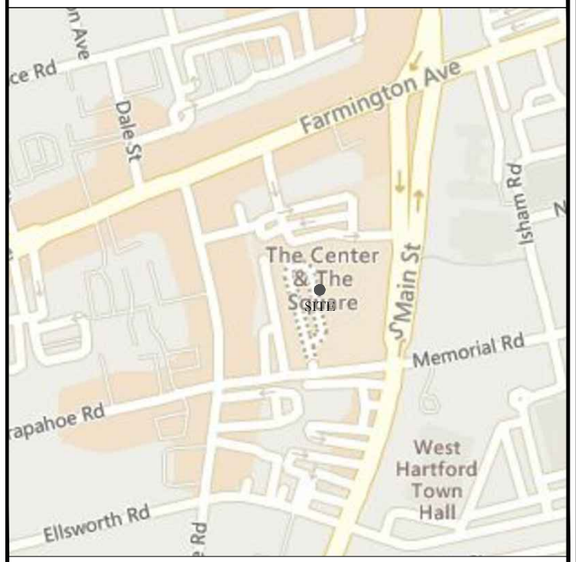
DRAWING INDEX

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 MOUNTING DETAILS
C-5	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.

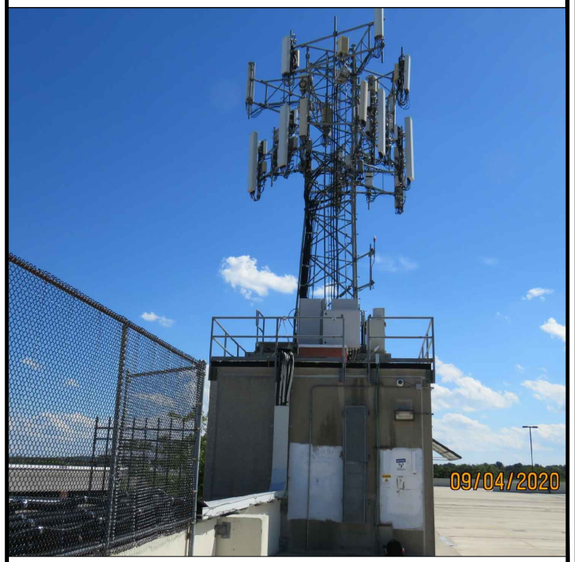
CALL CONNECTICUT ONE CALL
(800) 922-4455 CBYD.COM
CALL 2 WORKING DAYS BEFORE YOU DIG!

LOCATION MAP



NO SCALE

SITE PHOTO



PROJECT TEAM

A&E FIRM:	POD 11490 BLUEGRASS PARKWAY LOUISVILLE, KY 40299 (502) 437-5252
CROWN CASTLE USA INC. DISTRICT CONTACTS:	10300 ORMSBY PARK PLACE, SUITE 501 LOUISVILLE, KY 40223
	VERONICA DELIA - PROJECT MANAGER (610) 635-3222
	JASON D'AMICO - CONSTRUCTION MANAGER (860) 209-0104
	NICHOLAS ROMBACH - A&E SPECIALIST NICHOLAS.ROMBACH@CROWNCASTLE.COM

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
- REMOVE (6) CCI - DTMABP7819VG12A1900 TMAs
- REMOVE (1) RAYCAP - DC6-48-60-18-8F SQUID
- RELOCATE (3) ERICSSON - RRUS-E2 B29 RRHs
- INSTALL (3) CCI - OPA65R-BU8DA-K ANTENNAS
- INSTALL (3) CCI - DMP65R-BU8DA ANTENNAS
- INSTALL (3) ERICSSON - 4449 B5/B12 RRHs
- INSTALL (3) ERICSSON - 4478 B14 RRHs
- INSTALL (3) ERICSSON - RRUS-32 B2 RRHs
- INSTALL (1) RAYCAP - DC9-48-60-24-8C-EV SQUID
- INSTALL (6) B2B MOUNTS
- INSTALL MOUNT MODIFICATIONS PER MOUNT ANALYSIS BY GPD ENGINEERING AND ARCHITECTURE PROFESSIONAL CORPORATION , INC. DATED MARCH 26, 2021

INSTALLER NOTE:
NO PROPOSED LOADING TO BE ADDED UNTIL MOUNT MODIFICATIONS ARE INSTALLED PER MOUNT ANALYSIS BY GPD ENGINEERING AND ARCHITECTURE PROFESSIONAL CORPORATION DATED MARCH 26, 2021.

GROUND SCOPE OF WORK:
- INSTALL (1) 6630

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:	CROWN CASTLE
DATED:	DECEMBER 09, 2020
MOUNT ANALYSIS:	GPD ENGINEERING AND ARCHITECTURE PROFESSIONAL CORPORATION
DATED:	MARCH 26, 2021
RFDS REVISION:	6
DATED:	11/30/2020
ORDER ID:	509316
REVISION:	1

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
10300 ORMSBY PARK PLACE, SUITE 501
LOUISVILLE, KY 40223

POD
POWER OF DESIGN
11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

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

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
C	06/25/2020	TJ	PRELIMINARY	TJ
D	08/10/2020	TJ	PRELIMINARY	TJ
E	09/17/2020	EA	PRELIMINARY	XX
0	09/17/2020	EA	CONSTRUCTION	JL
1	12/18/2020	EW	CONSTRUCTION	MEP
2	12/23/2020	CPT	CONSTRUCTION	MEP
3	1/25/2021	EEW	CONSTRUCTION	MEP
4	3/30/2021	EEW	CONSTRUCTION	MEP
5	04/29/2021	CPT	CONSTRUCTION	MEP

STATE OF CONNECTICUT
MARK E. PATTERSON
No. 31284
LICENSED PROFESSIONAL ENGINEER

04/29/2021

SHEET NUMBER: T-1
REVISION: 5

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

ELECTRICAL INSTALLATION NOTES:

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

CONDUCTOR COLOR CODE

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

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

APWA UNIFORM COLOR CODE:

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

ABBREVIATIONS:

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

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

CROWN CASTLE
10300 ORMSBY PARK PLACE, SUITE 501
LOUISVILLE, KY 40223

POD
POWER OF DESIGN
11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

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

ISSUED FOR:

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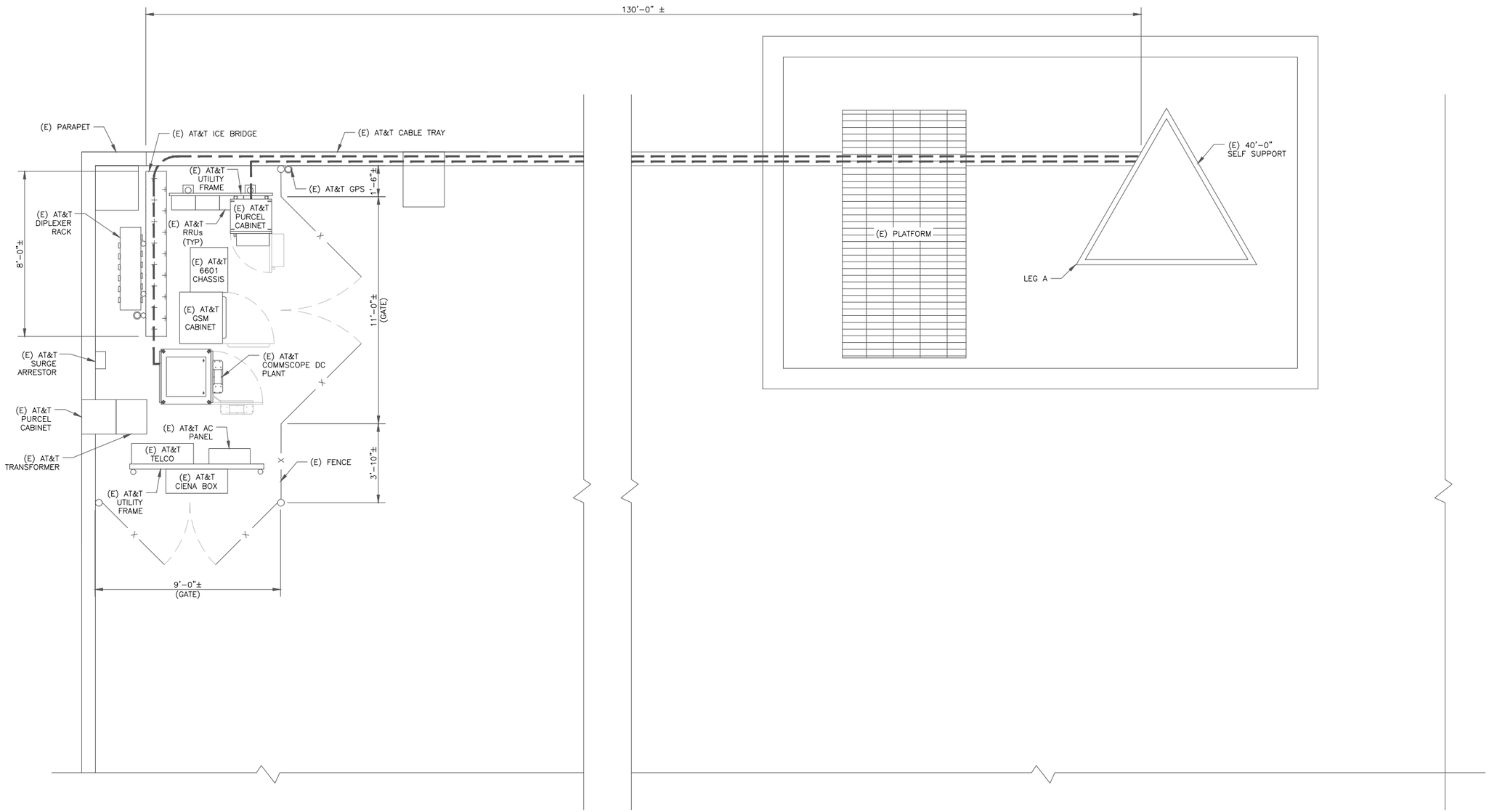
D	08/10/2020	TJ	PRELIMINARY	TJ
E	09/17/2020	EA	PRELIMINARY	XX
0	09/17/2020	EA	CONSTRUCTION	JL
1	12/18/2020	EW	CONSTRUCTION	MEP
2	12/23/2020	CPT	CONSTRUCTION	MEP
3	1/25/2021	EEW	CONSTRUCTION	MEP
4	3/30/2021	EEW	CONSTRUCTION	MEP
5	04/29/2021	CPT	CONSTRUCTION	MEP

STATE OF CONNECTICUT
MARK E. PATTERSON
No. 31284
LICENSED PROFESSIONAL ENGINEER

04/29/2021

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

SHEET NUMBER:	REVISION:
T-2	5



1 SITE PLAN

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

N

AT&T
575 MOROSGO DRIVE
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STATE OF CONNECTICUT
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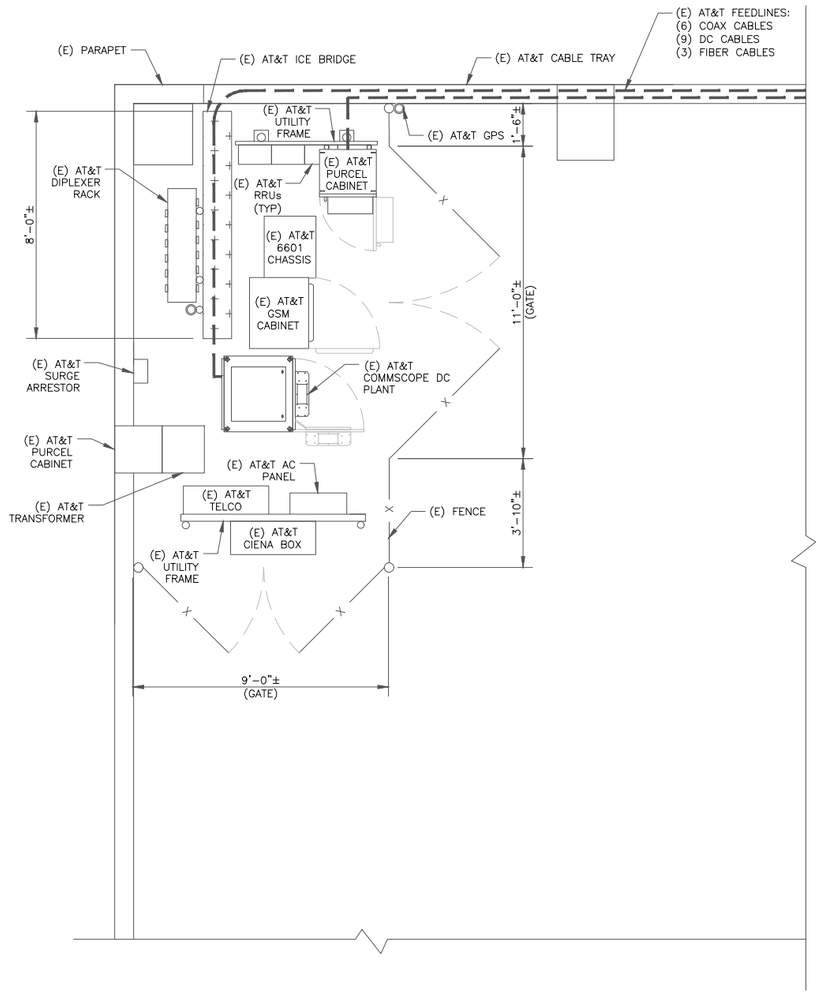
04/29/2021

SHEET NUMBER: C-1.1

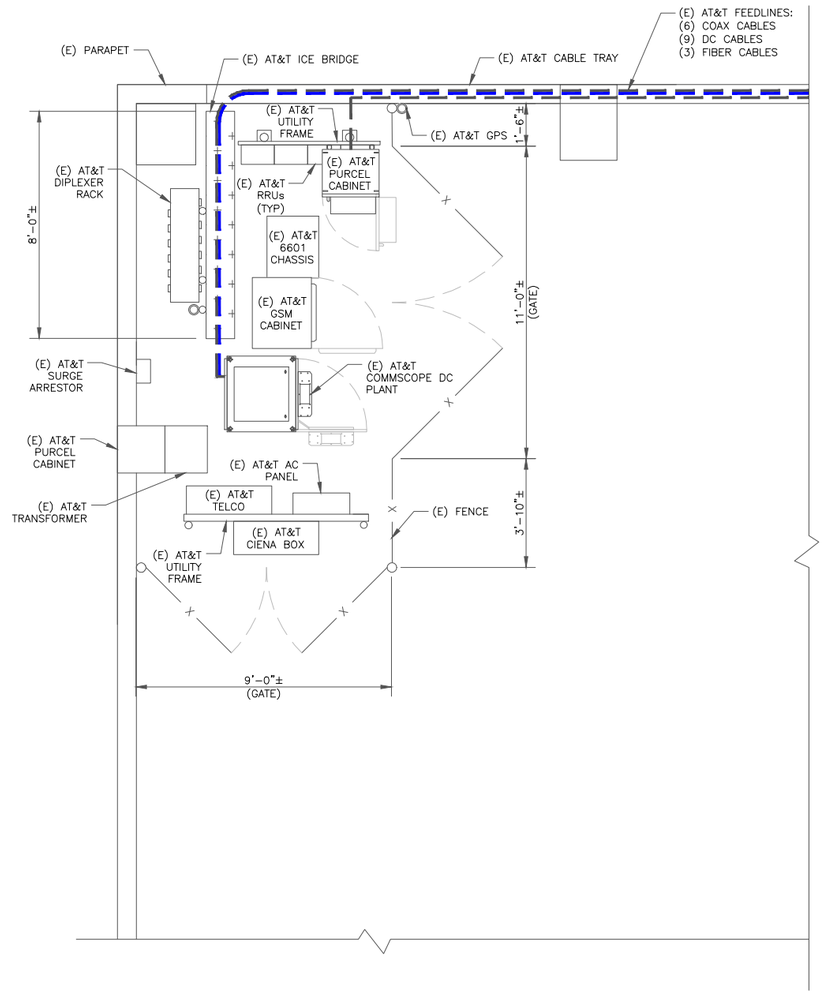
REVISION: 5



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
- INSTALL (2) DC CABLES
- INSTALL (1) FIBER CABLES

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STATE OF CONNECTICUT
MARK E. PATTERSON
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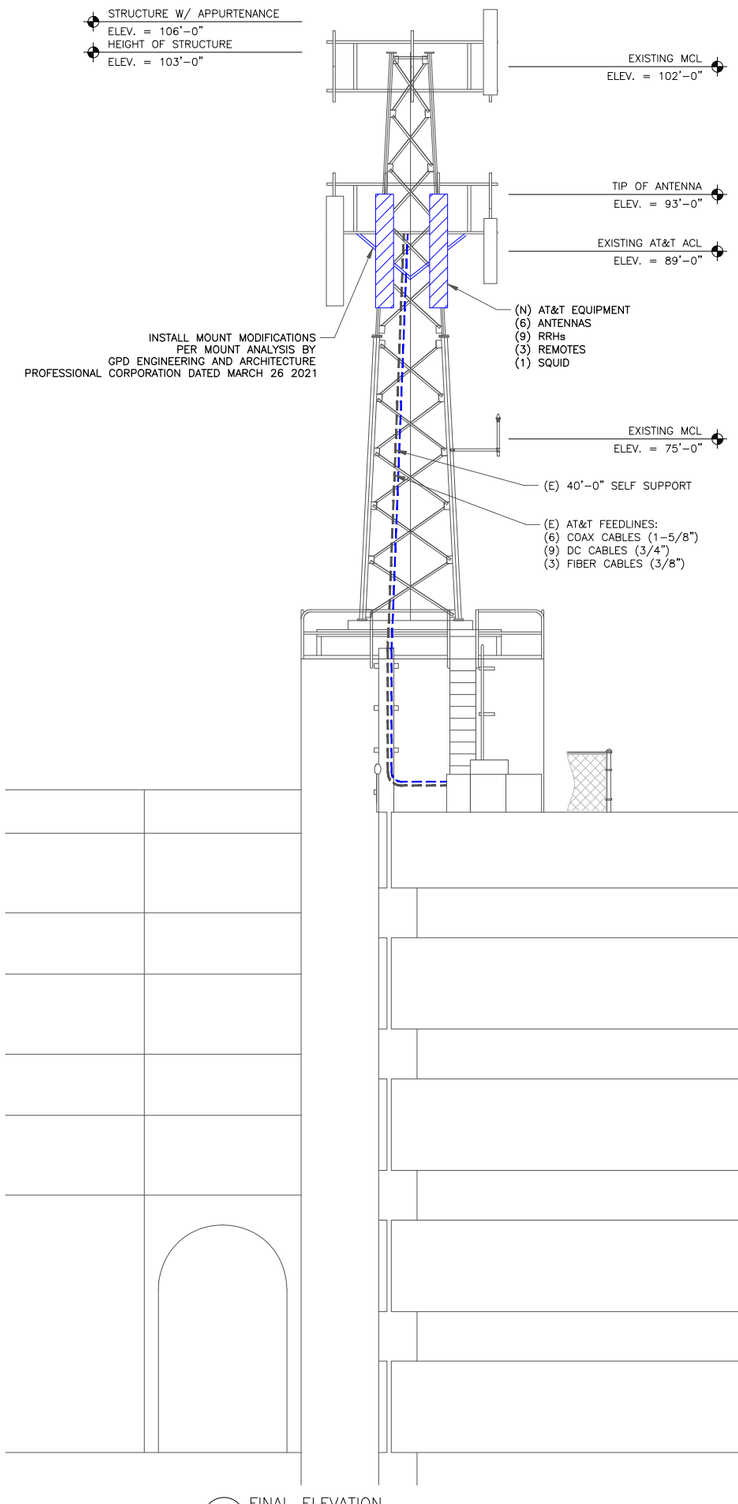
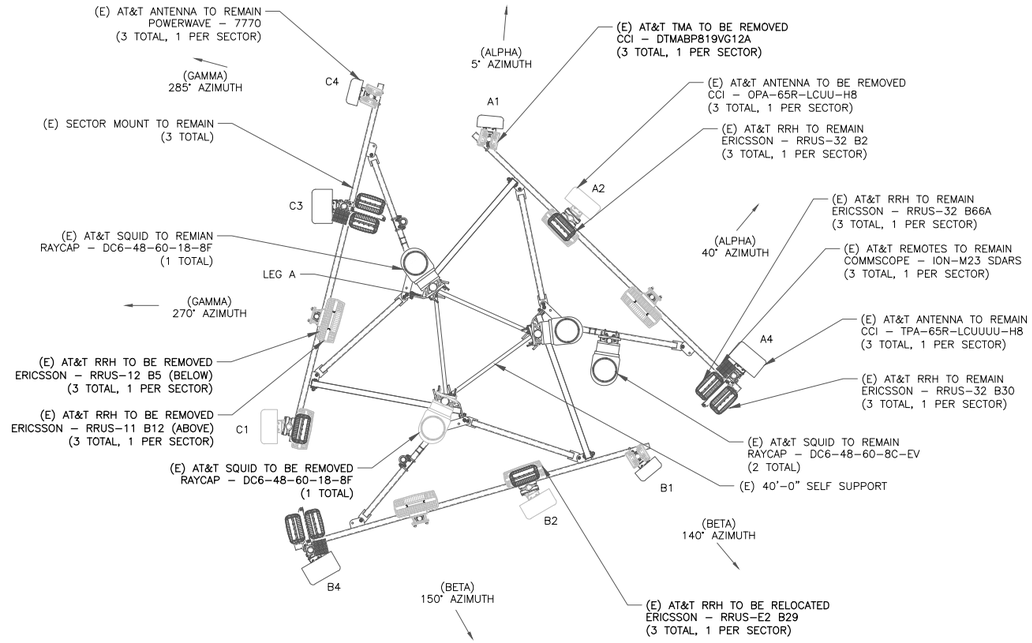
SHEET NUMBER: C-1.2

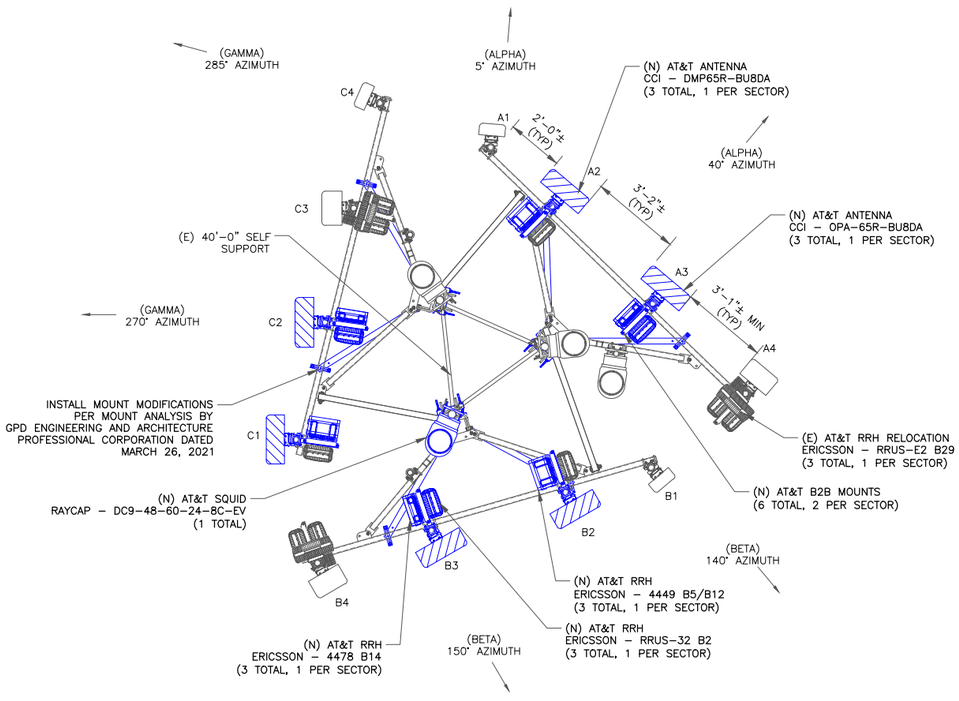
REVISION: 5



1 FINAL ELEVATION
SCALE: 4' 2' 0 4' 3/16"=1'-0" (FULL SIZE) 3/32"=1'-0" (11x17)



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



3 FINAL ANTENNA PLAN
SCALE: 2' 1' 0 2' 3/8"=1'-0" (FULL SIZE) 3/16"=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.
4. 6'-0" MINIMUM DISTANCE REQUIRED BETWEEN 700BC & 700DE ANTENNAS ON SAME SECTOR.
5. 4'-0" MINIMUM DISTANCE REQUIRED BETWEEN LTE 700 ANTENNAS ON OPPOSING SECTORS.
6. ALL ANTENNA MEASUREMENT DISTANCES MUST BE EDGE TO EDGE (RELOCATE ANTENNAS AS NEEDED).
7. 8" MINIMUM DISTANCE REQUIRED BETWEEN ANTENNA & RADIO. SEE GENERIC EXAMPLE DETAIL ON SHEET C-4.

MOUNT ANALYSIS NOTES:

1. THE DESIGN DEPICTED IN THESE DRAWINGS IS VALID ONLY WHEN ACCOMPANIED BY A CORRESPONDING PASSING MOUNT ANALYSIS.
2. CONSTRUCTION MANAGER / GENERAL CONTRACTOR SHALL REVIEW THE MOUNT ANALYSIS FOR ANY CONDITIONS PRIOR TO INSTALLATION.
3. ANY REQUIRED MOUNT MODIFICATION DESIGN OR MOUNT REPLACEMENT SHALL BE APPROVED BY EOR.

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AT&T SITE NUMBER: **CT5843**

BU #: **876328**
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STATE OF CONNECTICUT
MARK E. PATTERSON
No. 31284
LICENSED
PROFESSIONAL ENGINEER

04/29/2021

SHEET NUMBER: C-2

REVISION: 5

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 850	(E) POWERWAVE TECH 7770	5°	89'-0"	–	–	–	2	(E)	GROUND	–	–	–	–	2	(E) COAX	1-5/8"	139'-0"
A2	LTE 700 LTE 850 LTE 1900 5G 850	(N) CCI DMP65R-BU8DA	40°	89'-0"	1	(N) 4449 B5/B12	TOWER	–	–	–	–	–	–	–	–	–	–	–
					1	(E) RRUS-32 B2	TOWER											
A3	LTE 700 LTE 1900 LTE 1900	(N) CCI OPA65R-BU8DA-K	40°	89'-0"	1	(N) 4478 B14	TOWER	–	–	–	–	–	1	(E) DC6-48-60-18-8F	2	(E) DC	3/4"	139'-0"
					1	(N) RRUS-32 B2	TOWER											
A4	LTE 700 LTE WCS LTE AWS	(E) CCI TPA-65R-LCUUUU-H8	40°	89'-0"	1	(E) RRUS-E2 B29	TOWER	1	(E)	GROUND	–	–	–	–	–	–	–	–
					1	(E) RRUS-32 B30	TOWER											
					1	(E) RRUS-32 B66A	TOWER											
					1	(E) ION-M23 SDARS	TOWER											
BETA																			
B1	UMTS 850	(E) POWERWAVE TECH 7770	140°	89'-0"	–	–	–	2	(E)	GROUND	2	(E)	–	–	2	(E) COAX	1-5/8"	139'-0"
B2	LTE 700 LTE 850 LTE 1900 5G 850	(N) CCI DMP65R-BU8DA	150°	89'-0"	1	(N) 4449 B5/B12	TOWER	–	–	–	–	–	–	–	–	–	–	–
					1	(E) RRUS-32 B2	TOWER											
B3	LTE 700 LTE 1900 LTE 1900	(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 700 LTE WCS LTE AWS	(E) CCI TPA-65R-LCUUUU-H8	150°	89'-0"	1	(E) RRUS-E2 B29	TOWER	1	(N)	TOWER	1	(E)	–	–	–	–	–	–
					1	(E) RRUS-32 B30	TOWER											
					1	(E) RRUS-32 B66A	TOWER											
					1	(E) ION-M23 SDARS	TOWER											
GAMMA																			
C1	LTE 700 LTE 850 LTE 1900 5G 850	(N) CCI DMP65R-BU8DA	270°	89'-0"	1	(N) 4449 B5/B12	TOWER	–	–	–	–	–	–	–	–	–	–	–
					1	(E) RRUS-32 B2	TOWER											
C2	LTE 700 LTE 1900 LTE 1900	(N) CCI OPA65R-BU8DA-K	270°	89'-0"	1	(N) 4478 B14	TOWER	–	–	–	–	–	1	(N) DC9-48-60-24-8C-EV	3	(E) DC	3/4"	139'-0"
					1	(N) RRUS-32 B2	TOWER								1	(E) FIBER	3/8"	139'-0"
C3	LTE 700 LTE WCS LTE AWS	(E) CCI TPA-65R-LCUUUU-H8	270°	89'-0"	1	(E) RRUS-E2 B29	TOWER	1	(N)	TOWER	1	(E)		–	–	–	–	–
					1	(E) RRUS-32 B30	TOWER											
					1	(E) RRUS-32 B66A	TOWER											
					1	(E) ION-M23 SDARS	TOWER											
C4	UMTS 850	(E) POWERWAVE TECH 7770	285°	89'-0"	–	–	–	2	(E)	GROUND	2	(E)	–	–	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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STATE OF CONNECTICUT
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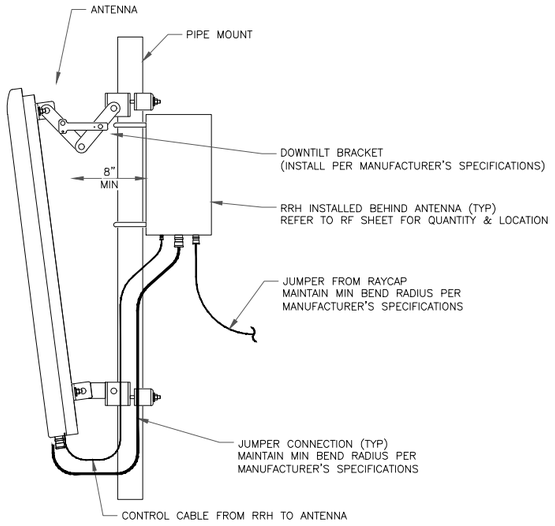
No. 31284
LICENSED PROFESSIONAL ENGINEER

04/29/2021

SHEET NUMBER: C-3

REVISION: 5



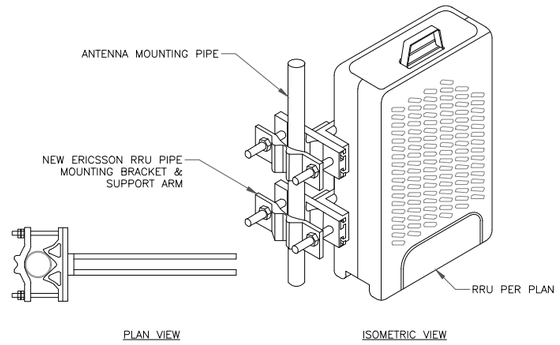
1 GENERIC ANTENNA MOUNTING ELEVATION
SCALE: NOT TO SCALE

ERICSSON RRU MOUNTING KIT:

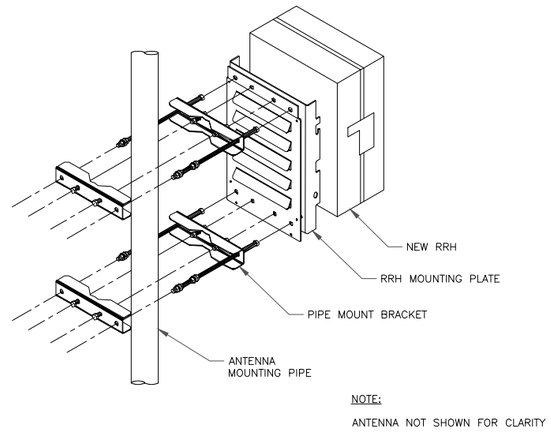
SXK 107 2839/1: SINGLE RRU SUPPORT KIT (PART # 5335) (OR ENGINEER APPROVED EQUIVALENT)
SXK 107 2839/2: EXPANSION KIT (PART # 5336) (OR ENGINEER APPROVED EQUIVALENT)

MOUNTING NOTES:

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



2 ERICSSON – SXK 107 2839
SCALE: NOT TO SCALE



NOTE:

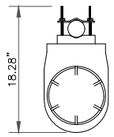
ANTENNA NOT SHOWN FOR CLARITY

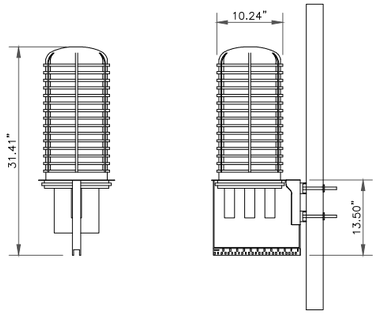
3 SINGLE RRH MOUNTING DETAIL
SCALE: NOT TO SCALE

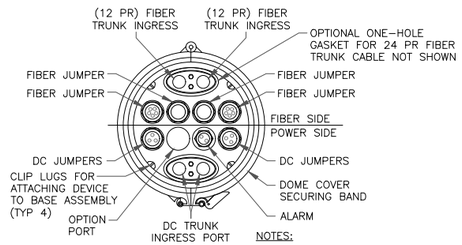
RAYCAP
DC9-48-60-24-8C-EV

RAYCAP – DC9-48-60-24-8C-EV
SIZE: 10.24x31.40 IN.
WEIGHT: 26.2 LBS
NOMINAL OPERATING VOLTAGE: 48 VDC
VOLTAGE PROTECTION RATING: 330 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







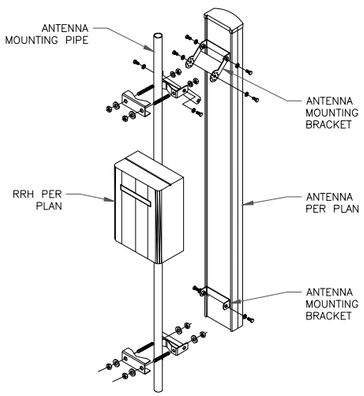
NOTES:

1. REMOVE CABLE SEALING GLAND AND INSTALL M32x1.5 METRIC-TO-1" NPT ADAPTER (COOPER CROUSE-HINES P/N CAP 740 994 OR EQUIVALENT MFR) WHEN CONNECTING CONDUIT TO OVP.

6 SQUID MOUNTING DETAIL
SCALE: NOT TO SCALE

INSTALLER NOTES:

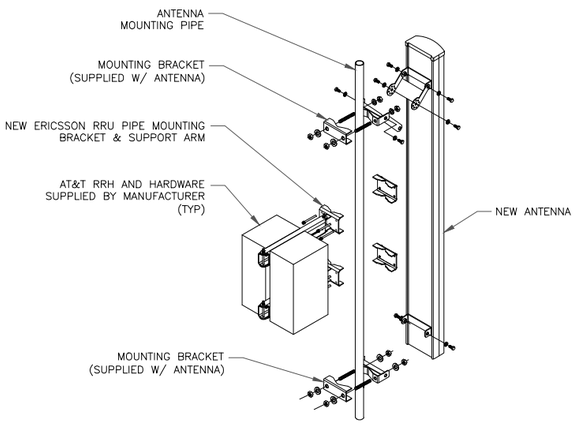
1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.



4 ANTENNA WITH RRH MOUNTING DETAIL
SCALE: NOT TO SCALE

INSTALLER NOTES:

1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.



5 ANTENNA WITH DUAL RRH MOUNTING DETAIL
SCALE: NOT TO SCALE

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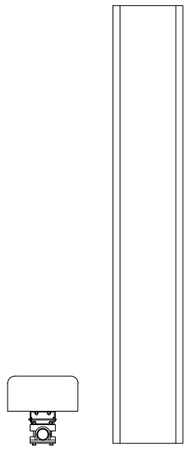
1	12/18/2020	EW	CONSTRUCTION	MEP
2	12/23/2020	CPT	CONSTRUCTION	MEP
3	1/25/2021	EEW	CONSTRUCTION	MEP
4	3/30/2021	EEW	CONSTRUCTION	MEP
5	04/29/2021	CPT	CONSTRUCTION	MEP

04/29/2021

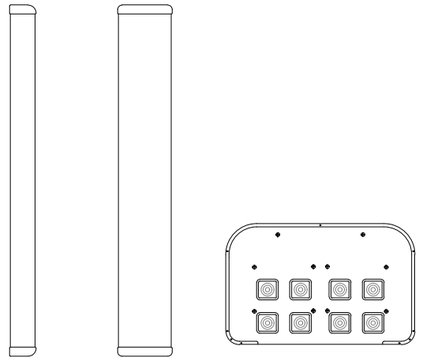
SHEET NUMBER: C-4

REVISION: 5



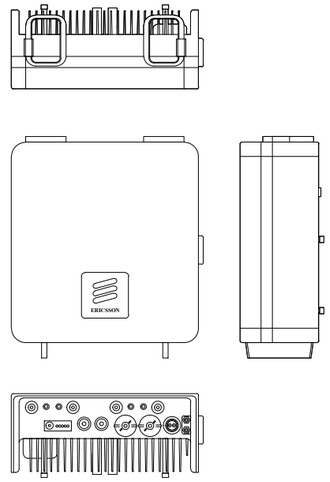
CCI ANTENNAS – DMP65R–BU8DA
WEIGHT (WITHOUT MOUNTING HARDWARE): 97.5 LBS
SIZE (HxWxD): 96.00x20.70x7.70 IN.
MOUNTING HARDWARE P/N: MBK–01
RATED WIND VELOCITY: 150.0 MPH

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



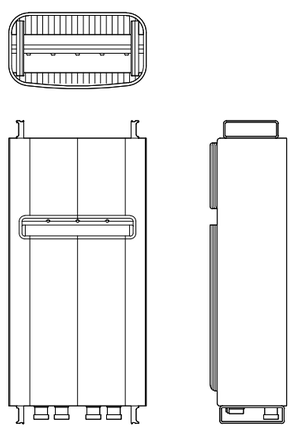
CCI ANTENNAS – OPA65R–BU8DA–K
WEIGHT (WITHOUT MOUNTING HARDWARE): 76.5 LBS
SIZE (HxWxD): 96.00x21.00x7.8 IN.

2 CCI ANTENNAS – OPA65R–BU8DA–K
SCALE: NOT TO SCALE



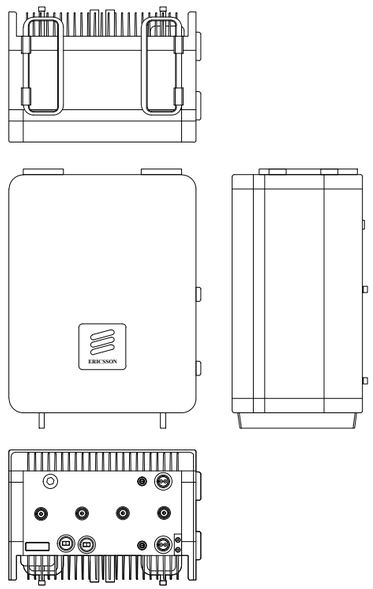
ERICSSON – RRUS 4478 B14
WEIGHT: 60.0 LBS
SIZE (HxWxD): 15.0x13.0x8.0 IN.

3 ERICSSON – RRUS 4478 B14
SCALE: NOT TO SCALE



ERICSSON – RRUS 32 B2
WEIGHT (WITHOUT MOUNTING HARDWARE): 52.9 LBS
SIZE (HxWxD): 27.20x12.05x7.00 IN.

4 ERICSSON – RRUS 32 B2
SCALE: NOT TO SCALE



ERICSSON – RADIO 4449 B5
WEIGHT: 70.0 LBS
SIZE (HxWxD): 18.0x13.2x9.4 IN.

5 ERICSSON – RADIO 4449 B5
SCALE: NOT TO SCALE

6 NOT USED
SCALE: NOT TO SCALE

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

CROWN CASTLE
10300 ORMSBY PARK PLACE, SUITE 501
LOUISVILLE, KY 40223

POD
POWER OF DESIGN
11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

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

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
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D	08/10/2020	TJ	PRELIMINARY	TJ
E	09/17/2020	EA	PRELIMINARY	XX
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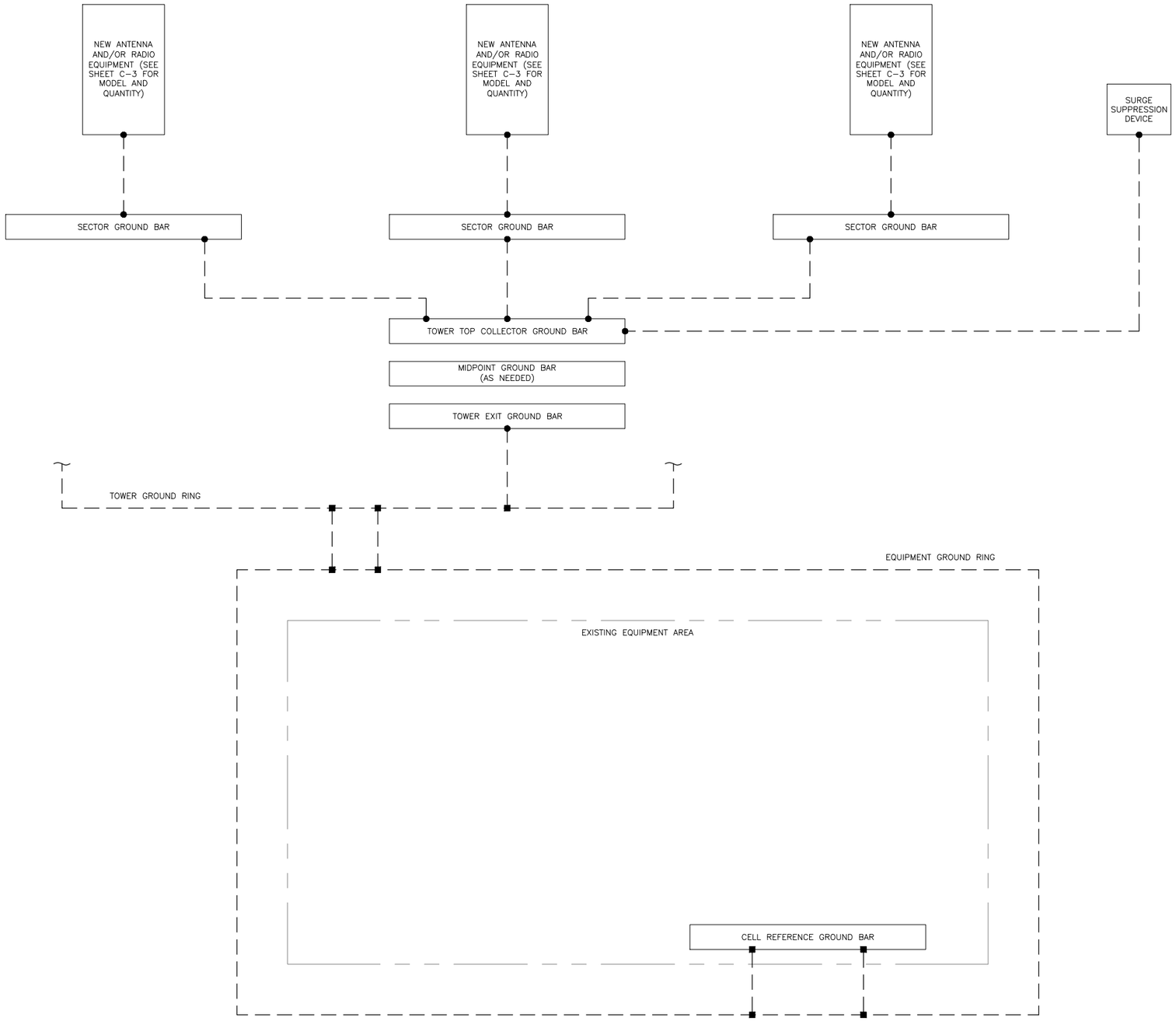
4	3/30/2021	EEW	CONSTRUCTION	MEP
5	04/29/2021	CPT	CONSTRUCTION	MEP

04/29/2021

SHEET NUMBER: C-5

REVISION: 5



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
10300 ORMSBY PARK PLACE, SUITE 501
LOUISVILLE, KY 40223

POD
POWER OF DESIGN
11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

AT&T SITE NUMBER: **CT5843**

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WEST HARTFORD PARKING GARAGE

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

EXISTING 40'-0" SELF SUPPORT

ISSUED FOR:

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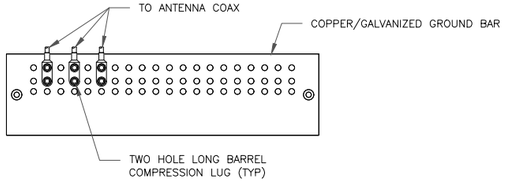
2	12/23/2020	CPT	CONSTRUCTION	MEP
3	1/25/2021	EEW	CONSTRUCTION	MEP
4	3/30/2021	EEW	CONSTRUCTION	MEP
5	04/29/2021	CPT	CONSTRUCTION	MEP

STATE OF CONNECTICUT
MARK E. PATTERSON
No. 31284
LICENSED PROFESSIONAL ENGINEER

04/29/2021

SHEET NUMBER: G-1

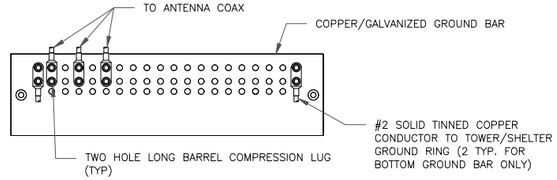
REVISION: 5



NOTES:

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

1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE

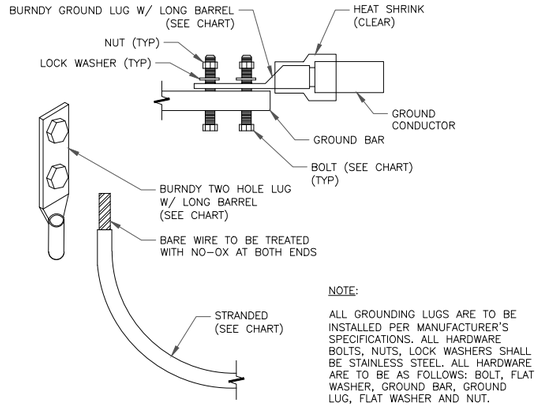


NOTES:

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

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

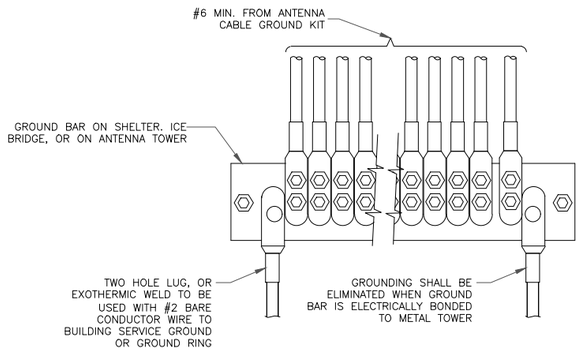
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 GREEN INSULATED	YA6C-2TC38	3/8" – 16 NC SS 2 BOLT
#2 SOLID TINNED	YA3C-2TC38	3/8" – 16 NC SS 2 BOLT
#2 STRANDED	YA2C-2TC38	3/8" – 16 NC SS 2 BOLT
#2/0 STRANDED	YA26-2TC38	3/8" – 16 NC SS 2 BOLT
#4/0 STRANDED	YA28-2N	1/2" – 16 NC SS 2 BOLT



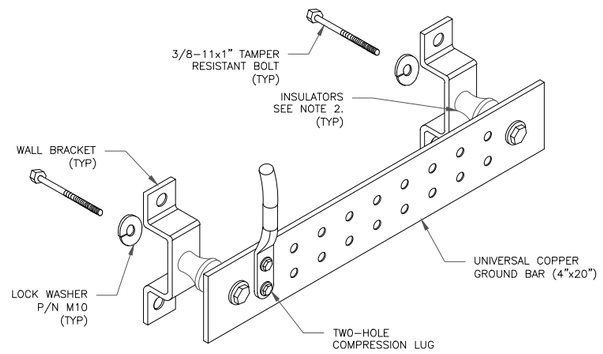
NOTE:

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

3 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



4 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE

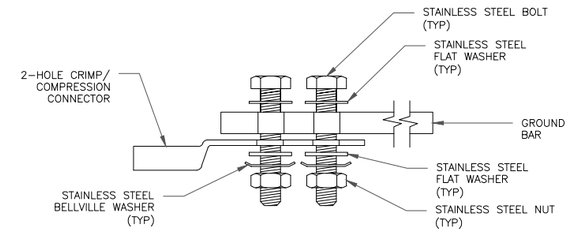


NOTES:

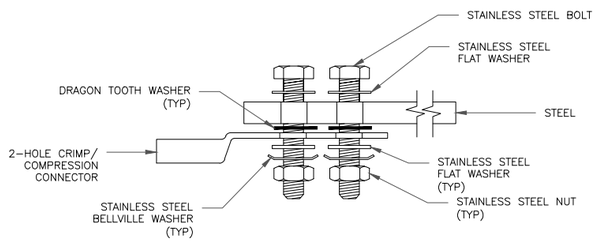
1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.

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

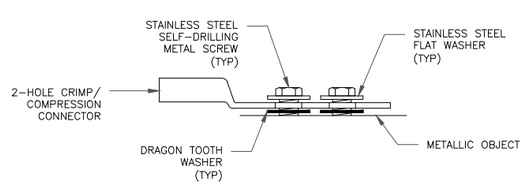
5 GROUND BAR DETAIL
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS

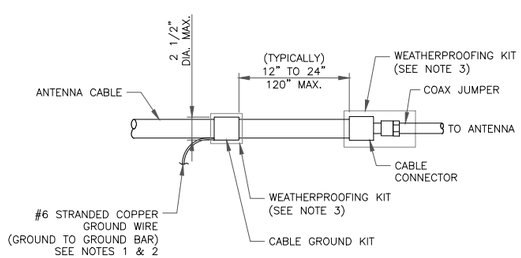


SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

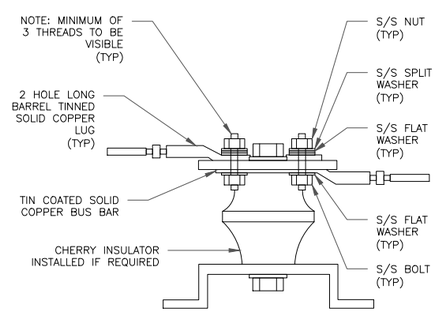
8 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

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

6 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE

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

CROWN CASTLE
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LOUISVILLE, KY 40223

POD
POWER OF DESIGN
11490 BLUEGRASS PKWY
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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

ISSUED FOR:

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5	04/29/2021	CPT	CONSTRUCTION	MEP

STATE OF CONNECTICUT
MARK E. PATTERSON
No. 31284
LICENSED PROFESSIONAL ENGINEER

04/29/2021

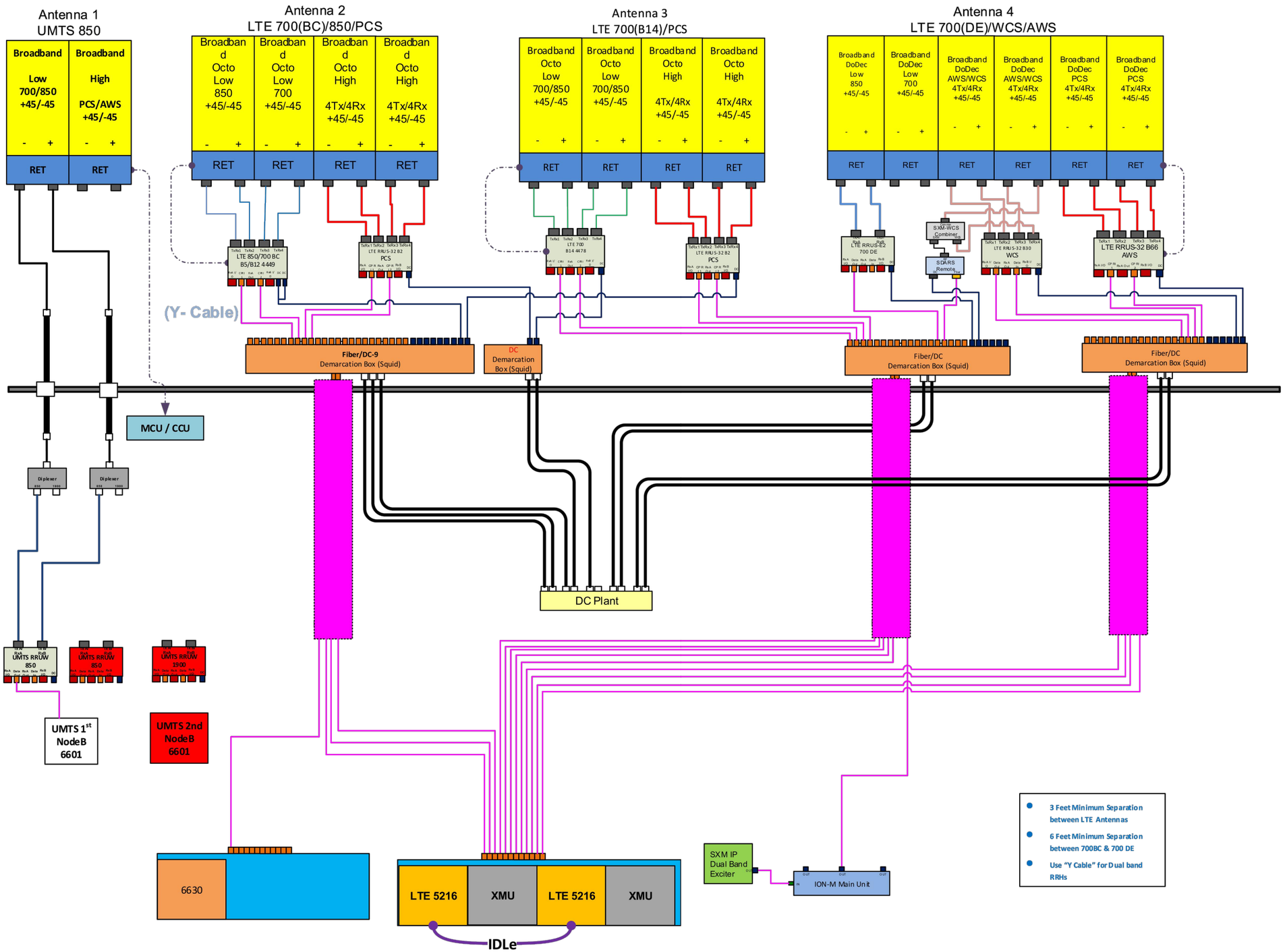
SHEET NUMBER: G-2

REVISION: 5

DigiSigner Document ID: 1be05c94-dca0-4913-86cc-6308363e8689

Diagram - Sector	A	Diagram File Name - CT5843_LTE_5G_A_B_Rev.2.vsd					
Atoll Site Name -	CT5843	Location Name -	WEST HARTFORD CENTRAL	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND

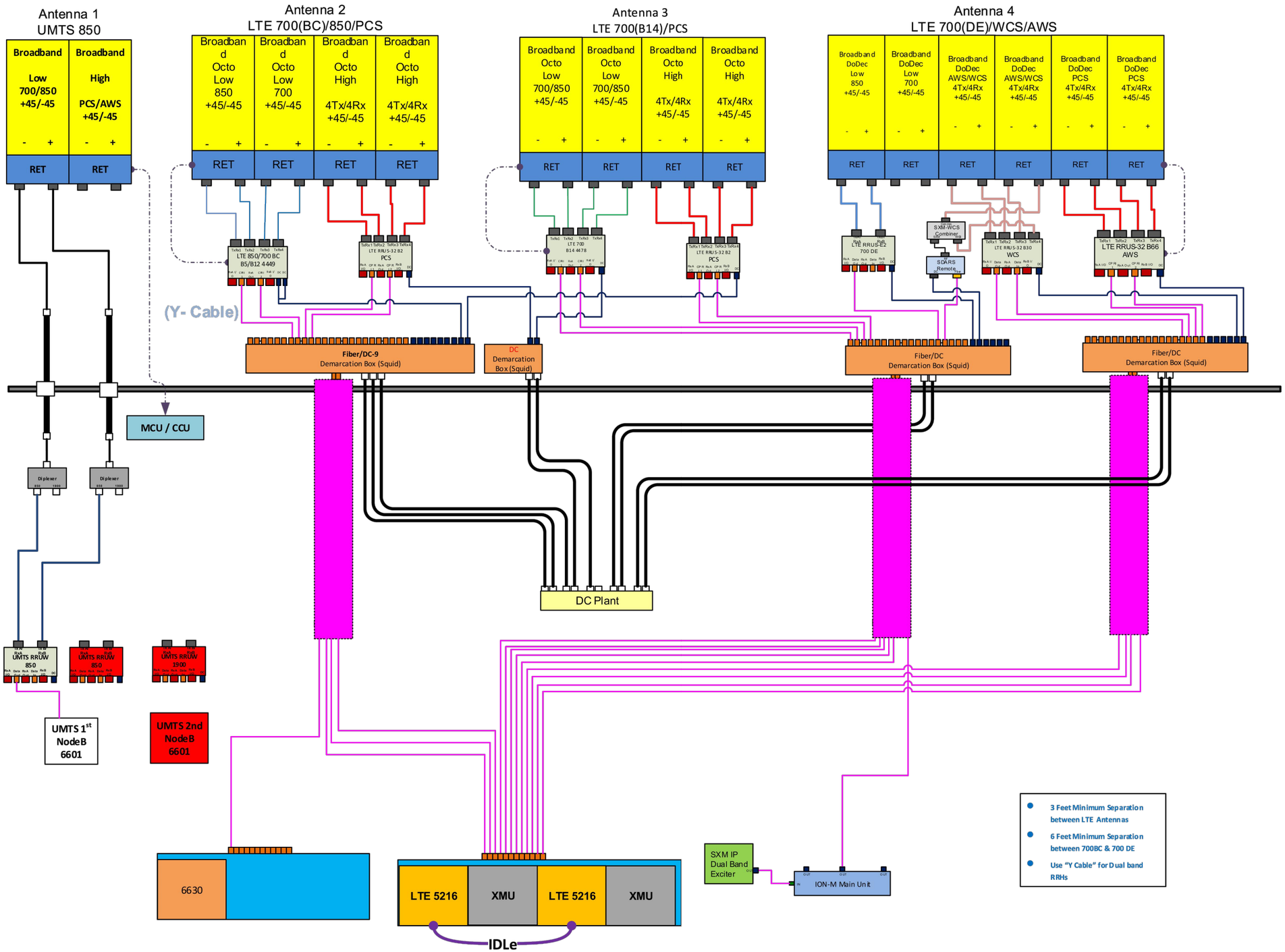
Comments: "Important Note: For detailed radio to antenna wiring refer to the latest field notice - Antenna_Radio Connection Drawings Playbook v6.0_Ericsson "



DigiSigner Document ID: 1be05c94-dca0-4913-86cc-6308363e8689

Diagram - Sector	B	Diagram File Name - CT5843_LTE_5G_A_B_Rev.2.vsd					
Atoll Site Name -	CT5843	Location Name -	WEST HARTFORD CENTRAL	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND

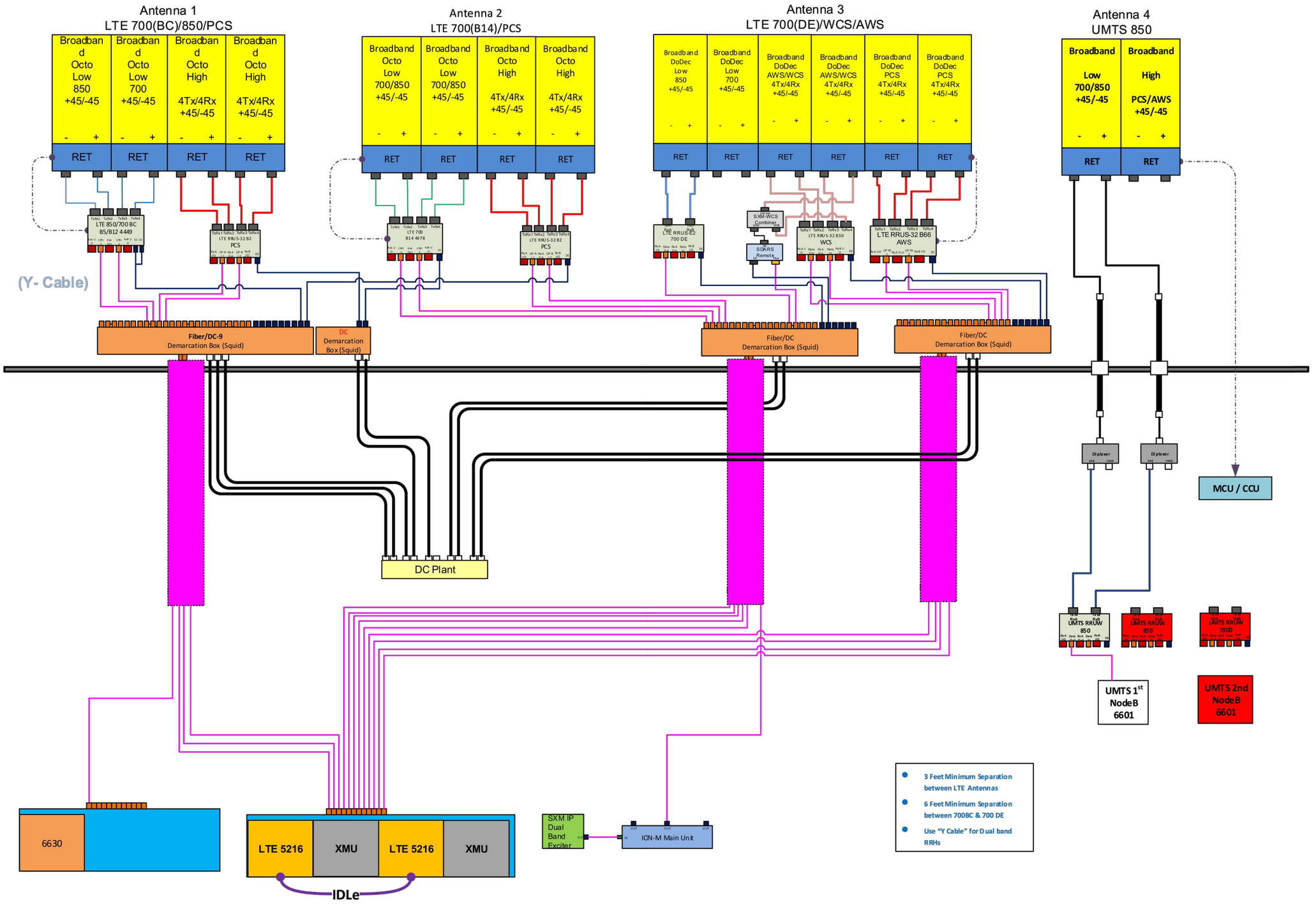
Comments: "Important Note: For detailed radio to antenna wiring refer to the latest field notice - Antenna_Radio Connection Drawings Playbook v6.0_Ericsson "



DigiSigner Document ID: 1be05c94-dca0-4913-86cc-6308363e8689

Diagram - Sector	C	Diagram File Name - CT5843_LTE_5G_C_Rev.2.vsd					
Atoll Site Name -	CT5843	Location Name -	WEST HARTFORD CENTRAL	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND

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



GENERAL NOTES

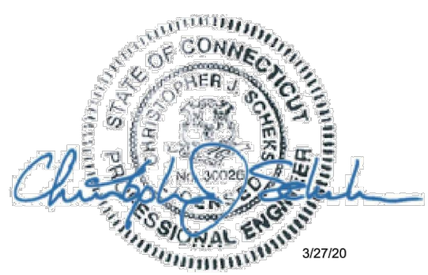
1. THESE MODIFICATIONS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE GOVERNING PROVISIONS OF TIA/EIA-222, AWS, ANSI TIA-322, AND AISC. MATERIALS, FABRICATION, INSTALLATION, AND ALL OTHER SERVICES PROVIDED BY THE CONTRACTOR SHALL CONFORM TO THE ABOVE MENTIONED CODES AND THE CONTRACT SPECIFICATIONS.
2. ALL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



3/27/20

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
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	-

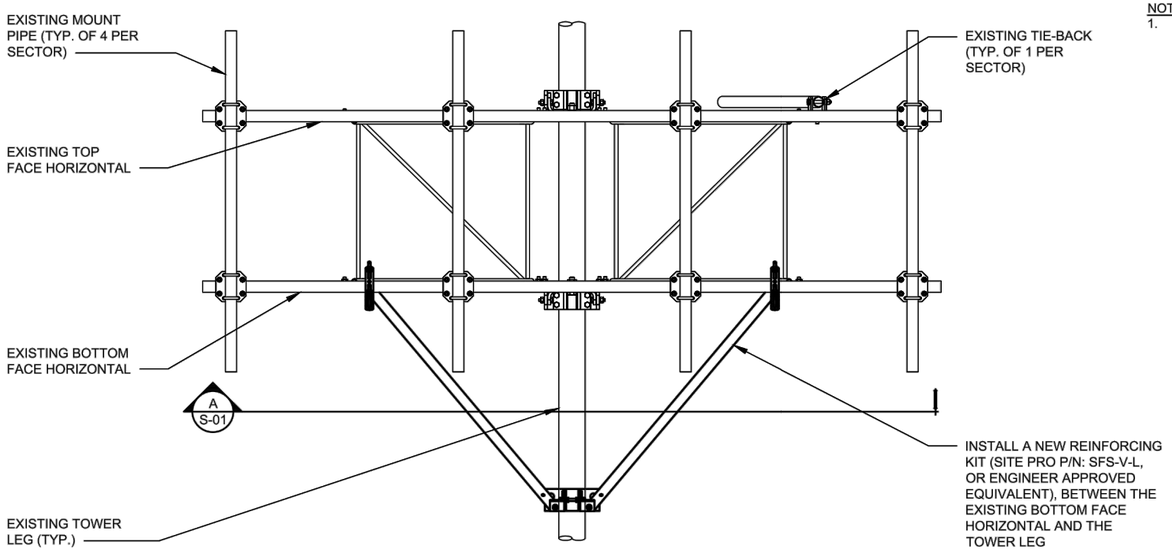
ENGINEER	DESIGNER
MAH	JMJ
PROJECT MANAGER	APPROVED BY
CB	CJS

JOB NO.
2020777.876328.20

N-01

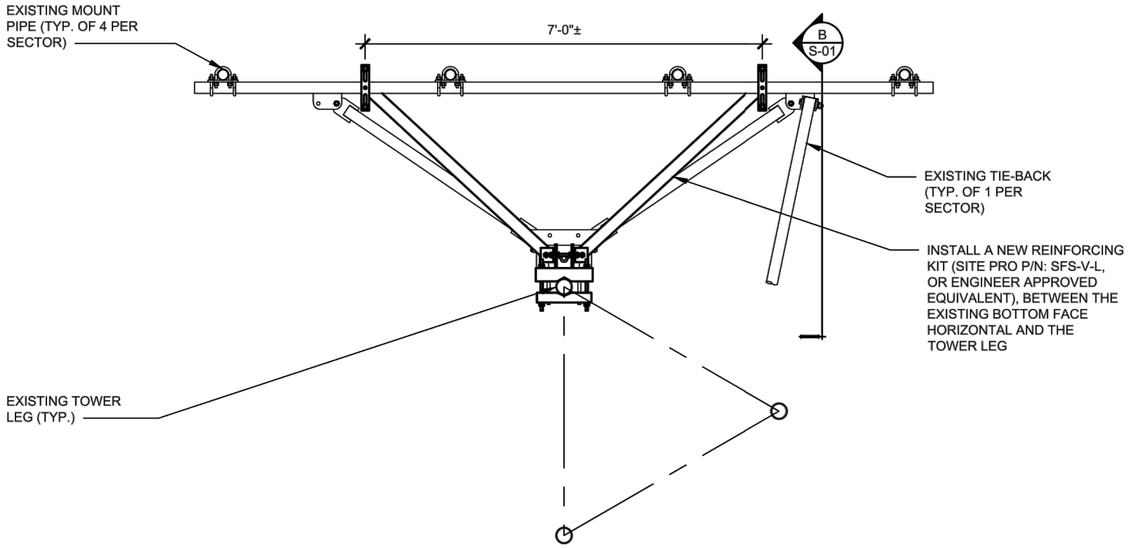
MODIFICATION SCHEDULE					
MEMBER TYPE	ELEVATION	EXISTING MEMBER	NEW MEMBER	REFERENCE DETAIL/SHEET	NOTES
REINFORCING KIT	92'-0"±	(3) 13'-0" SECTOR FRAMES	(1) REINFORCING KIT (PER SECTOR)	1/S-01	INSTALL A REINFORCING KIT BETWEEN THE EXISTING BOTTOM FACE HORIZONTAL AND THE TOWER LEG.

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



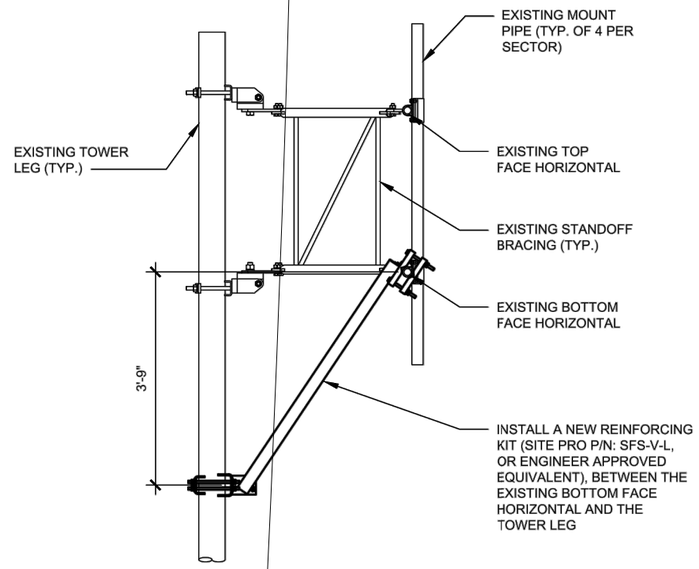
1 S-01 ELEVATION
SCALE: 3/8" = 1'-0"

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



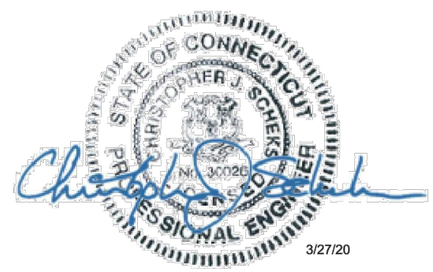
A S-01 SECTION
SCALE: 3/8" = 1'-0"

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

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

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

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

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

MODIFICATION SCHEDULE & DETAILS

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

ENGINEER	DESIGNER
MAH	JMJ
PROJECT MANAGER	APPROVED BY
CB	CJS

JOB NO.
2020777.876328.20

S-01

Exhibit D

Structural Analysis Report

Date: **April 19, 2021**

Crown Castle
2000 Corporate Drive
Canonsburg, PA
(724) 416-2000

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Site Number:	10071356
	Site Name:	WEST HARTFORD CENTRAL
Crown Castle Designation:	**BU Number:**	876328
	Site Name:	WEST HARTFORD PARKING GARAGE
	JDE Job Number:	596335
	Work Order Number:	1948296
	Order Number:	509316 Rev. 1
Engineering Firm Designation:	**Crown Castle Project Number:**	1948296
Site Data:	**27-31 South Main St., WEST HARTFORD, Hartford County, CT** **Latitude *41° 45' 36.41"*, Longitude *-72° 44' 35.25"*** **40.25 Foot - Self Support Tower**	

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

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

LC5: Proposed Equipment Configuration **Sufficient Capacity – 84.5%**

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

Structural analysis prepared by: Nicholas A. Palladino

Respectfully submitted by:

Digitally signed by Maham Barimani
Date: 2021.04.20 11:26:41 -04'00'

STATE OF CONNECTICUT
MAHAM BARIMANI
30501
LICENSED
PROFESSIONAL ENGINEER

Maham Barimani, P.E.
Senior Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 40.25 ft Self Support tower designed by ROHN. The tower has been modified per reinforcement drawings prepared by GPD, in July of 2015. Reinforcement consists of wall connection brackets and anchor extension plates.

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 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)
89.0	89.0	1	tower mounts	(3) C10-857-011C 12' Sector Frame	9 3 6	3/4 3/8 1-5/8
		3	cci antennas	DMP65R-BU8D w/ Mount Pipe		
		3	cci antennas	OPA65R-BU8D w/ Mount Pipe		
		3	cci antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe		
		1	raycap	DC9-48-60-24-8C-EV		
		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	powerwave technologies	7770.00 w/ Mount Pipe		
		3	raycap	DC6-48-60-0-8C-EV		
		3	site pro 1	SFS-V-L Stabilizer Kit (1)		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
102.0	103.0	3	alcatel lucent	1900MHz RRH (65MHz)	3	1-1/4
		3	alcatel lucent	800MHz 2X50W RRH W/FILTER		
		3	alcatel lucent	TD-RRH8x20-25		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		1	rfs celwave	APXV9ERR18-C-A20 w/ Mount Pipe		
		2	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe		
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe		
	102.0	1	tower mounts	Sector Mount [SM 502-3]		
75.0	77.0	1	lucent	KS24019-L112A	1	1/2
	75.0	1	tower mounts	Side Arm Mount [SO 302-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	5735691	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	5460756	CCISITES
4-TOWER MANUFACTURER DRAWINGS	1440544	CCISITES
4-POST-MODIFICATION INSPECTION	6076906	CCISITES
Mount Analysis Documents	9691980	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.9.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

3.2) Assumptions

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

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle 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	-13.37	63.41	21.1	Pass
T2	85.125 - 65	Leg	ROHN 2.5 STD	38	-36.86	57.07	64.6	Pass
T1	105.25 - 85.125	Diagonal	L1-1/2x1-1/2x1/8	9	-3.28	4.82	68.0 84.5 (b)	Pass
T2	85.125 - 65	Diagonal	L1-3/4x1-3/4x3/16	46	-3.06	6.45	47.4 48.9 (b)	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	105.25 - 85.125	Top Girt	L2x2x1/8	4	-0.31	4.07	7.5	Pass
T2	85.125 - 65	Top Girt	L2x2x1/8	40	-0.69	4.07	17.0	Pass
							Summary	
						Leg (T2)	64.6	Pass
						Diagonal (T1)	84.5	Pass
						Top Girt (T2)	17.0	Pass
						Bolt Checks	84.5	Pass
						Rating =	84.5	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Foundation	65	56.9	Pass

Structure Rating (max from all components) =	84.5%

Notes:
1) See additional documentation in “Appendix C - Additional Calculations” for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

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

105.3 ft

85.1 ft

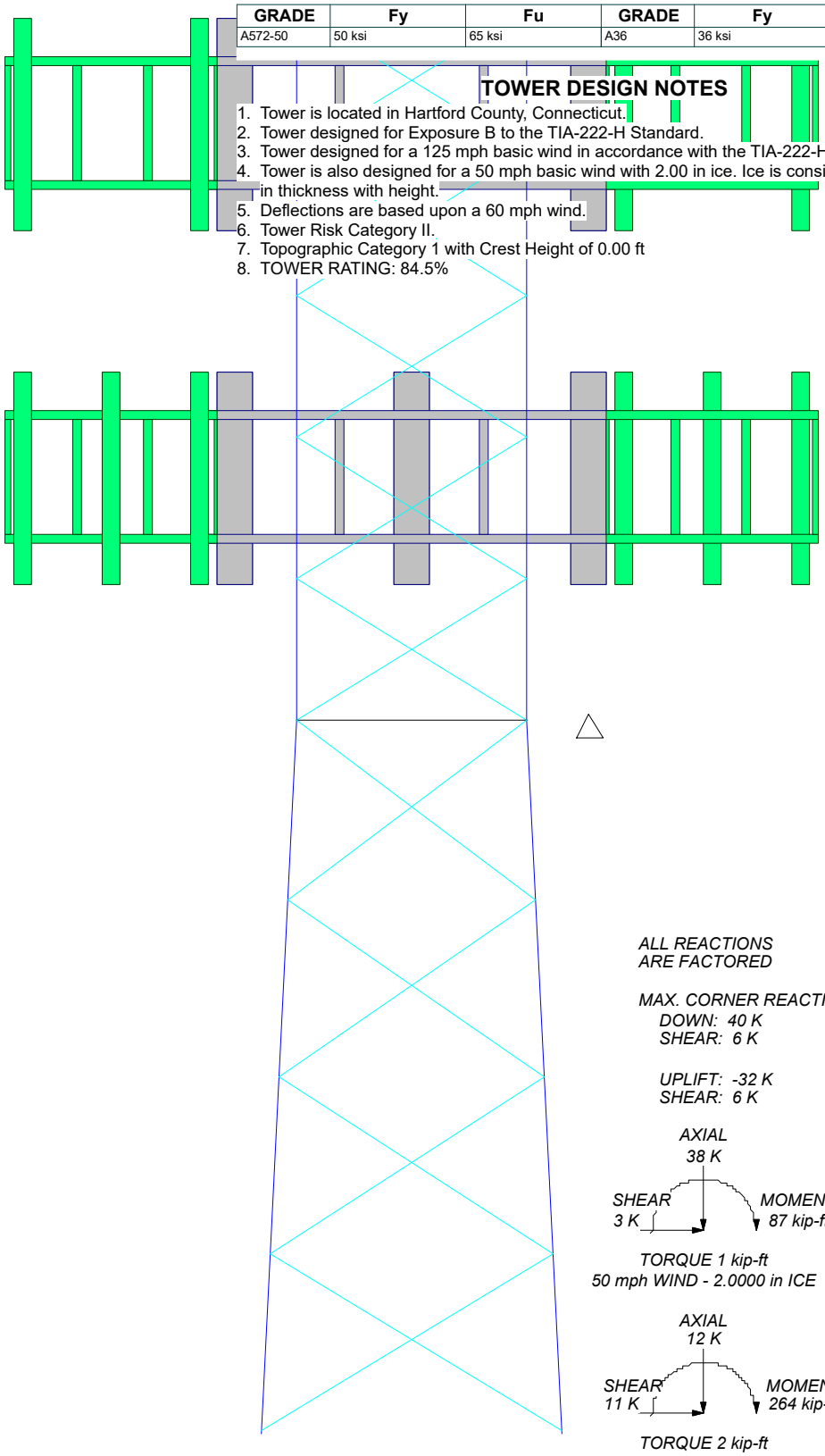
65.0 ft

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 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: 84.5%



ALL REACTIONS ARE FACTORED

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

UPLIFT: -32 K
SHEAR: 6 K

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

TORQUE 2 kip-ft
REACTIONS - 125 mph WIND

Crown Castle
2000 Corporate Drive
Canonsburg, PA
The Pathway to Possible
Phone: (724) 416-2000
FAX:

Job: 876328			
Project:			
Client: Crown Castle	Drawn by: NPalladino		App'd:
Code: TIA-222-H	Date: 04/19/21		Scale: NTS
Path: C:\Users\NPalladino\Desktop\Local SA Production\876328\WO 1948296 - SA\Prod\876328_RPA.er			Dwg No. E-1

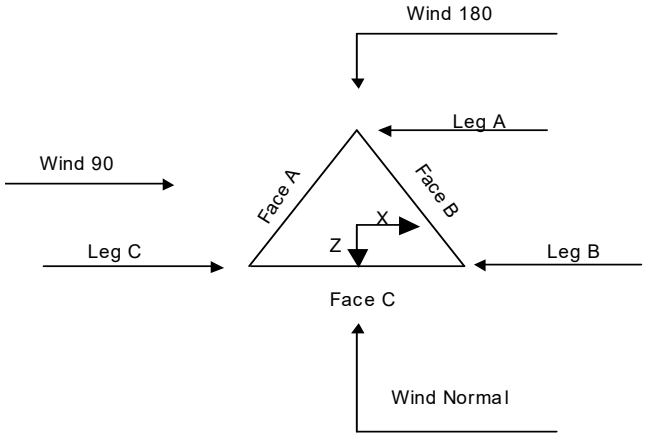
Tower Input Data

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.
- Stress ratio used in tower member design is 1.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- Maximum demand-capacity ratio is: 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

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

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 105.25-85.13	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	1	0.0000	1	0.0000	1
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 Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 105.25-85.13	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 85.13-65.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 105.25-85.13	Flange	0.6250 A325N	4	0.5000 A325X	1	0.5000 A325X	1	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0
T2 85.13-65.00	Flange	0.7500 A325N	0	0.5000 A325X	1	0.5000 A325X	1	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight 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	0.6300		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
***													
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	1	1	0.7950	0.0000		0.58
2" Flex Conduit	B	No	No	Ar (CaAa)	92.00 - 65.00	6.0000	0.37	1	1	1.0000	2.0000		0.36
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

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
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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Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C_AA_A ft^2/ft	Weight plf
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Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	105.25-85.13	A	0.000	0.000	6.441	0.000	0.08
		B	0.000	0.000	31.539	0.000	0.31
		C	0.000	0.000	13.635	0.000	0.10
T2	85.13-65.00	A	0.000	0.000	18.855	0.000	0.23
		B	0.000	0.000	64.793	0.000	0.57
		C	0.000	0.000	13.635	0.000	0.10

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	105.25-85.13	A	1.890	0.000	0.000	19.092	0.000	0.33
		B		0.000	0.000	78.047	0.000	1.36
		C		0.000	0.000	28.849	0.000	0.54
T2	85.13-65.00	A	1.846	0.000	0.000	55.239	0.000	0.93
		B		0.000	0.000	162.395	0.000	2.71
		C		0.000	0.000	28.492	0.000	0.52

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	105.25-85.13	4.7452	-1.1782	5.3102	-1.4695
T2	85.13-65.00	9.1771	-2.1033	10.2281	-3.3366

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	2	Climbing Ladder (Af)	85.13 - 105.25	0.6000	0.5950
T1	3	Safety Line (3/8")	85.13 - 105.25	0.6000	0.5950
T1	5	Feedline Ladder (Af)	85.13 - 102.00	0.6000	0.5950
T1	7	HB114-1-08U4-M5J(1-1/4)	85.13 - 102.00	0.6000	0.5950
T1	10	Feedline Ladder (Af)	85.13 - 92.00	0.6000	0.5950
T1	11	FLC 158-50J(1-5/8)	85.13 - 92.00	0.6000	0.5950
T1	12	WR-VG86ST-BRD(3/4)	85.13 - 92.00	0.6000	0.5950
T1	13	FB-L98B-002-75000(3/8)	85.13 - 92.00	0.0000	0.0000
T1	14	WR-VG86ST-BRD(3/4)	85.13 - 92.00	0.6000	0.5950
T1	15	2" Flex Conduit	85.13 - 92.00	0.6000	0.5950
T1	16	Feedline Ladder (Af)	85.13 - 92.00	0.6000	0.5950
T1	17	WR-VG86ST-BRD(3/4)	85.13 - 92.00	0.6000	0.5950
T1	18	FB-L98B-002-75000(3/8)	85.13 - 92.00	0.6000	0.5950
T2	2	Climbing Ladder (Af)	65.00 - 85.13	0.6000	0.6000
T2	3	Safety Line (3/8")	65.00 - 85.13	0.6000	0.6000
T2	5	Feedline Ladder (Af)	65.00 - 85.13	0.6000	0.6000
T2	6	LDF4-50A(1/2)	65.00 - 75.00	0.6000	0.6000
T2	7	HB114-1-08U4-M5J(1-1/4)	65.00 - 85.13	0.6000	0.6000
T2	10	Feedline Ladder (Af)	65.00 - 85.13	0.6000	0.6000
T2	11	FLC 158-50J(1-5/8)	65.00 - 85.13	0.6000	0.6000
T2	12	WR-VG86ST-BRD(3/4)	65.00 - 85.13	0.6000	0.6000
T2	13	FB-L98B-002-75000(3/8)	65.00 - 85.13	0.0000	0.0000
T2	14	WR-VG86ST-BRD(3/4)	65.00 - 85.13	0.6000	0.6000
T2	15	2" Flex Conduit	65.00 - 85.13	0.6000	0.6000
T2	16	Feedline Ladder (Af)	65.00 - 85.13	0.6000	0.6000
T2	17	WR-VG86ST-BRD(3/4)	65.00 - 85.13	0.6000	0.6000
T2	18	FB-L98B-002-75000(3/8)	65.00 - 85.13	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
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 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	C	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
TD-RRH8x20-25	A	From Leg	4.00 0.00 1.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56 5.10	1.53 1.71 1.90 2.30	0.07 0.10 0.13 0.20

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
TD-RRH8x20-25	B	From Leg	4.00 0.00 1.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.05 4.30 4.56 5.10	1.53 1.71 1.90 2.30	0.07 0.10 0.13 0.20
TD-RRH8x20-25	C	From Leg	4.00 0.00 1.00	0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.05 4.30 4.56 5.10	1.53 1.71 1.90 2.30	0.07 0.10 0.13 0.20
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 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 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 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 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 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 0.12
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 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 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 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 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 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 0.12
Sector Mount [SM 502-3]	B	None		0.0000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice	29.82 42.21 54.43 78.49	29.82 42.21 54.43 78.49	1.67 2.27 3.05 5.18
***									
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 2" Ice	15.89 16.81 17.76 19.70	7.89 8.74 9.60 11.37	0.14 0.25 0.38 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 2" Ice	15.89 16.81 17.76 19.70	7.89 8.74 9.60 11.37	0.14 0.25 0.38 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 2" Ice	15.89 16.81 17.76 19.70	7.89 8.74 9.60 11.37	0.14 0.25 0.38 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	17.46 18.46 19.48	8.58 9.49 10.42	0.11 0.22 0.35

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	21.58	12.33	0.66
						2" Ice			
OPA65R-BU8D w/ Mount Pipe	B	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice	17.46	8.58	0.11
						1/2" Ice	18.46	9.49	0.22
						1" Ice	19.48	10.42	0.35
						2" Ice	21.58	12.33	0.66
OPA65R-BU8D w/ Mount Pipe	C	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice	17.46	8.58	0.11
						1/2" Ice	18.46	9.49	0.22
						1" Ice	19.48	10.42	0.35
						2" Ice	21.58	12.33	0.66
TPA-65R-LCUUUU-H8 w/ Mount Pipe	A	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice	11.85	8.99	0.11
						1/2" Ice	12.77	9.88	0.21
						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 0.00 -3.00	0.0000	92.00	No Ice	11.85	8.99	0.11
						1/2" Ice	12.77	9.88	0.21
						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 0.00 -3.00	0.0000	92.00	No Ice	11.85	8.99	0.11
						1/2" Ice	12.77	9.88	0.21
						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 0.00 -3.00	0.0000	92.00	No Ice	5.75	4.25	0.06
						1/2" Ice	6.18	5.01	0.10
						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 0.00 -3.00	0.0000	92.00	No Ice	5.75	4.25	0.06
						1/2" Ice	6.18	5.01	0.10
						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 0.00 -3.00	0.0000	92.00	No Ice	5.75	4.25	0.06
						1/2" Ice	6.18	5.01	0.10
						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 0.00 -3.00	0.0000	92.00	No Ice	1.97	1.41	0.07
						1/2" Ice	2.14	1.56	0.09
						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 0.00 -3.00	0.0000	92.00	No Ice	1.97	1.41	0.07
						1/2" Ice	2.14	1.56	0.09
						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 0.00 -3.00	0.0000	92.00	No Ice	1.97	1.41	0.07
						1/2" Ice	2.14	1.56	0.09
						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 0.00 -3.00	0.0000	92.00	No Ice	2.02	1.25	0.06
						1/2" Ice	2.20	1.40	0.08
						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 0.00 -3.00	0.0000	92.00	No Ice	2.02	1.25	0.06
						1/2" Ice	2.20	1.40	0.08
						1" Ice	2.39	1.55	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	2.78	1.89	0.15
						2" Ice			
RRUS 4478 B14_CCIV2	C	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.02 2.20 2.39 2.78	1.25 1.40 1.55 1.89	0.06 0.08 0.10 0.15
CBC23SR-43	A	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.42 0.50 0.59 0.79	0.14 0.20 0.27 0.42	0.01 0.01 0.01 0.03
CBC23SR-43	B	From Leg	4.00 0.00 -3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.42 0.50 0.59 0.79	0.14 0.20 0.27 0.42	0.01 0.01 0.01 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	0.42 0.50 0.59 0.79	0.14 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	1.14 1.79 2.00 2.45	1.14 1.79 2.00 2.45	0.03 0.05 0.07 0.13
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	1.14 1.79 2.00 2.45	1.14 1.79 2.00 2.45	0.03 0.05 0.07 0.13
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	1.14 1.79 2.00 2.45	1.14 1.79 2.00 2.45	0.03 0.05 0.07 0.13
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
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 Ice	3.15 3.36 3.59	1.29 1.44 1.60	0.06 0.08 0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	4.07	1.95	0.17
						2" Ice			
RRUS 32 B2	A	From Leg	4.00	0.0000	92.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			-3.00			Ice	3.18	2.05	0.10
						1" Ice	3.66	2.46	0.16
						2" Ice			
RRUS 32 B2	B	From Leg	4.00	0.0000	92.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			-3.00			Ice	3.18	2.05	0.10
						1" Ice	3.66	2.46	0.16
						2" Ice			
RRUS 32 B2	C	From Leg	4.00	0.0000	92.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			-3.00			Ice	3.18	2.05	0.10
						1" Ice	3.66	2.46	0.16
						2" Ice			
RRUS 32 B66	A	From Leg	4.00	0.0000	92.00	No Ice	2.74	1.67	0.05
			0.00			1/2"	2.96	1.86	0.07
			-3.00			Ice	3.19	2.05	0.10
						1" Ice	3.68	2.46	0.16
						2" Ice			
RRUS 32 B66	B	From Leg	4.00	0.0000	92.00	No Ice	2.74	1.67	0.05
			0.00			1/2"	2.96	1.86	0.07
			-3.00			Ice	3.19	2.05	0.10
						1" Ice	3.68	2.46	0.16
						2" Ice			
RRUS 32 B66	C	From Leg	4.00	0.0000	92.00	No Ice	2.74	1.67	0.05
			0.00			1/2"	2.96	1.86	0.07
			-3.00			Ice	3.19	2.05	0.10
						1" Ice	3.68	2.46	0.16
						2" Ice			
ION-M23 SDARS	A	From Leg	4.00	0.0000	92.00	No Ice	1.84	1.76	0.05
			0.00			1/2"	2.05	1.98	0.06
			-3.00			Ice	2.27	2.19	0.08
						1" Ice	2.73	2.65	0.13
						2" Ice			
ION-M23 SDARS	B	From Leg	4.00	0.0000	92.00	No Ice	1.84	1.76	0.05
			0.00			1/2"	2.05	1.98	0.06
			-3.00			Ice	2.27	2.19	0.08
						1" Ice	2.73	2.65	0.13
						2" Ice			
ION-M23 SDARS	C	From Leg	4.00	0.0000	92.00	No Ice	1.84	1.76	0.05
			0.00			1/2"	2.05	1.98	0.06
			-3.00			Ice	2.27	2.19	0.08
						1" Ice	2.73	2.65	0.13
						2" Ice			
RRUS 32 B2_CCIV2	A	From Leg	4.00	0.0000	92.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.09	1.97	0.08
			-3.00			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.59	0.16
						2" Ice			
RRUS 32 B2_CCIV2	B	From Leg	4.00	0.0000	92.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.09	1.97	0.08
			-3.00			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.59	0.16
						2" Ice			
RRUS 32 B2_CCIV2	C	From Leg	4.00	0.0000	92.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.09	1.97	0.08
			-3.00			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.59	0.16
						2" Ice			
SFS-V-L Stabilizer Kit (1)	A	From Leg	2.00	0.0000	90.50	No Ice	2.92	2.92	0.07
			0.00			1/2"	3.57	3.57	0.09
			0.00			Ice	3.98	3.98	0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	4.80	4.80	0.14
						2" Ice			
SFS-V-L Stabilizer Kit (1)	B	From Leg	2.00	0.0000	90.50	No Ice	2.92	2.92	0.07
			0.00			1/2"	3.57	3.57	0.09
			0.00			Ice	3.98	3.98	0.11
						1" Ice	4.80	4.80	0.14
						2" Ice			
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"	3.57	3.57	0.09
			0.00			Ice	3.98	3.98	0.11
						1" Ice	4.80	4.80	0.14
						2" Ice			
(3) C10-857-011C 12' Sector Frame	B	None		0.0000	92.00	No Ice	16.14	16.14	1.39
						1/2"	20.18	20.18	1.52
						Ice	24.22	24.22	1.66
						1" Ice	32.30	32.30	1.94
						2" Ice			
***									
KS24019-L112A	A	From Leg	4.00	0.0000	75.00	No Ice	0.10	0.10	0.01
			0.00			1/2"	0.18	0.18	0.01
			2.00			Ice	0.26	0.26	0.01
						1" Ice	0.42	0.42	0.01
						2" Ice			
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"	1.30	5.00	0.08
			0.00			Ice	1.81	6.80	0.12
						1" Ice	2.91	10.99	0.23
						2" Ice			
***									
***									
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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

Comb. No.	Description
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	105.25 - 85.125	Leg	Max Tension	7	7.46	-0.23	0.13
			Max. Compression	10	-13.37	-0.05	-0.04
			Max. Mx	20	-3.31	-0.86	-0.02
			Max. My	2	-1.08	-0.06	-0.83
			Max. Vy	20	1.05	0.47	-0.11
			Max. Vx	2	1.08	0.00	0.53
		Diagonal	Max Tension	25	3.22	0.00	0.00
			Max. Compression	12	-3.28	0.00	0.00
			Max. Mx	30	0.42	0.02	0.00
			Max. My	12	-2.47	0.00	0.00
			Max. Vy	30	-0.02	0.02	0.00
			Max. Vx	12	-0.00	0.00	0.00
		Top Girt	Max Tension	15	0.30	0.00	0.00
			Max. Compression	2	-0.31	0.00	0.00
			Max. Mx	26	-0.04	-0.07	0.00
			Max. Vy	26	0.04	0.00	0.00
T2	85.125 - 65	Leg	Max Tension	7	32.36	-0.00	0.00
			Max. Compression	10	-39.92	0.00	-0.00
			Max. Mx	18	-39.76	-0.34	-0.00
			Max. My	4	-4.16	-0.02	-0.18
			Max. Vy	18	-4.02	0.00	-0.00
			Max. Vx	16	-1.27	0.00	0.00
		Diagonal	Max Tension	12	3.03	0.00	0.00
			Max. Compression	24	-3.06	0.00	0.00
			Max. Mx	30	0.35	0.04	0.00
			Max. My	32	-1.37	0.03	0.01
			Max. Vy	29	0.03	0.03	-0.00
			Max. Vx	32	-0.00	0.00	0.00
		Top Girt	Max Tension	31	0.18	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	6	-0.13	0.00	0.00
			Max. Mx	26	0.15	-0.07	0.00
			Max. My	27	0.14	0.00	0.00
			Max. Vy	26	0.04	0.00	0.00
			Max. Vx	27	0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	39.48	5.39	-3.05
	Max. H_x	18	39.48	5.39	-3.05
	Max. H_z	7	-32.08	-4.89	2.76
	Min. Vert	7	-32.08	-4.89	2.76
	Min. H_x	7	-32.08	-4.89	2.76
	Min. H_z	18	39.48	5.39	-3.05
Leg B	Max. Vert	10	39.64	-5.23	-3.18
	Max. H_x	23	-31.33	4.72	2.88
	Max. H_z	25	-26.52	3.74	2.95
	Min. Vert	23	-31.33	4.72	2.88
	Min. H_x	10	39.64	-5.23	-3.18
	Min. H_z	10	39.64	-5.23	-3.18
Leg A	Max. Vert	2	39.54	0.17	6.08
	Max. H_x	20	4.30	1.22	0.24
	Max. H_z	2	39.54	0.17	6.08
	Min. Vert	15	-31.15	-0.16	-5.48
	Min. H_x	9	3.22	-1.21	0.18
	Min. H_z	15	-31.15	-0.16	-5.48

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	10.24	0.00	0.00	-1.24	-1.86	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	12.29	-0.00	-10.45	-262.81	-2.24	2.41
0.9 Dead+1.0 Wind 0 deg - No Ice	9.21	-0.00	-10.45	-262.27	-1.68	2.41
1.2 Dead+1.0 Wind 30 deg - No Ice	12.29	5.17	-8.91	-224.98	-131.58	2.11
0.9 Dead+1.0 Wind 30 deg - No Ice	9.21	5.17	-8.91	-224.46	-130.94	2.11
1.2 Dead+1.0 Wind 60 deg - No Ice	12.29	9.00	-5.16	-130.67	-226.53	0.65
0.9 Dead+1.0 Wind 60 deg - No Ice	9.21	9.00	-5.16	-130.22	-225.83	0.65
1.2 Dead+1.0 Wind 90 deg - No Ice	12.29	10.47	0.00	-1.49	-262.82	-1.11
0.9 Dead+1.0 Wind 90 deg - No Ice	9.21	10.47	0.00	-1.12	-262.10	-1.11
1.2 Dead+1.0 Wind 120 deg - No Ice	12.29	9.13	5.24	129.48	-229.64	-2.14
0.9 Dead+1.0 Wind 120 deg - No Ice	9.21	9.13	5.24	129.77	-228.93	-2.14
1.2 Dead+1.0 Wind 150 deg - No Ice	12.29	5.07	8.73	218.69	-129.68	-2.24
0.9 Dead+1.0 Wind 150 deg - No Ice	9.21	5.07	8.73	218.93	-129.04	-2.24

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 180 deg - No Ice	12.29	-0.00	10.13	253.57	-2.25	-2.41
0.9 Dead+1.0 Wind 180 deg - No Ice	9.21	-0.00	10.13	253.79	-1.68	-2.41
1.2 Dead+1.0 Wind 210 deg - No Ice	12.29	-5.17	8.91	221.99	127.09	-2.11
0.9 Dead+1.0 Wind 210 deg - No Ice	9.21	-5.17	8.91	222.23	127.58	-2.11
1.2 Dead+1.0 Wind 240 deg - No Ice	12.29	-9.27	5.32	130.81	227.45	-0.64
0.9 Dead+1.0 Wind 240 deg - No Ice	9.21	-9.27	5.32	131.10	227.87	-0.64
1.2 Dead+1.0 Wind 270 deg - No Ice	12.29	-10.47	0.00	-1.50	258.33	1.11
0.9 Dead+1.0 Wind 270 deg - No Ice	9.21	-10.47	0.00	-1.12	258.74	1.11
1.2 Dead+1.0 Wind 300 deg - No Ice	12.29	-8.86	-5.09	-129.35	219.74	2.14
0.9 Dead+1.0 Wind 300 deg - No Ice	9.21	-8.86	-5.09	-128.89	220.16	2.14
1.2 Dead+1.0 Wind 330 deg - No Ice	12.29	-5.07	-8.73	-221.68	125.19	2.24
0.9 Dead+1.0 Wind 330 deg - No Ice	9.21	-5.07	-8.73	-221.17	125.67	2.24
1.2 Dead+1.0 Ice+1.0 Temp	38.15	-0.00	0.00	-3.98	-9.81	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	38.15	-0.00	-3.02	-79.08	-9.82	0.92
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	38.15	1.53	-2.62	-69.19	-47.61	0.68
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	38.15	2.68	-1.53	-41.88	-75.71	0.11
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	38.15	3.10	0.00	-3.99	-86.02	-0.58
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	38.15	2.67	1.53	33.86	-75.64	-0.96
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	38.15	1.51	2.59	60.49	-47.19	-1.00
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	38.15	0.00	2.98	70.36	-9.82	-0.92
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	38.15	-1.53	2.62	61.22	27.98	-0.68
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	38.15	-2.71	1.55	34.28	56.73	-0.11
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	38.15	-3.10	0.00	-3.99	66.38	0.58
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	38.15	-2.64	-1.51	-41.46	55.35	0.96
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	38.15	-1.51	-2.59	-68.46	27.56	1.00
Dead+Wind 0 deg - Service	10.24	0.00	-2.54	-64.73	-1.87	0.58
Dead+Wind 30 deg - Service	10.24	1.26	-2.17	-55.54	-33.29	0.51
Dead+Wind 60 deg - Service	10.24	2.19	-1.26	-32.63	-56.36	0.16
Dead+Wind 90 deg - Service	10.24	2.55	0.00	-1.24	-65.18	-0.27
Dead+Wind 120 deg - Service	10.24	2.22	1.27	30.58	-57.11	-0.52
Dead+Wind 150 deg - Service	10.24	1.23	2.12	52.25	-32.83	-0.54
Dead+Wind 180 deg - Service	10.24	0.00	2.46	60.73	-1.87	-0.58
Dead+Wind 210 deg - Service	10.24	-1.26	2.17	53.05	29.56	-0.51
Dead+Wind 240 deg - Service	10.24	-2.25	1.29	30.90	53.94	-0.16
Dead+Wind 270 deg - Service	10.24	-2.55	0.00	-1.24	61.44	0.27
Dead+Wind 300 deg - Service	10.24	-2.15	-1.24	-32.31	52.07	0.52
Dead+Wind 330 deg - Service	10.24	-1.23	-2.12	-54.74	29.10	0.54

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-10.24	0.00	0.00	10.24	0.00	0.000%
2	0.00	-12.29	-10.45	0.00	12.29	10.45	0.000%
3	0.00	-9.21	-10.45	0.00	9.21	10.45	0.000%
4	5.17	-12.29	-8.91	-5.17	12.29	8.91	0.000%
5	5.17	-9.21	-8.91	-5.17	9.21	8.91	0.000%
6	9.00	-12.29	-5.16	-9.00	12.29	5.16	0.000%
7	9.00	-9.21	-5.16	-9.00	9.21	5.16	0.000%
8	10.47	-12.29	0.00	-10.47	12.29	-0.00	0.000%
9	10.47	-9.21	0.00	-10.47	9.21	-0.00	0.000%
10	9.13	-12.29	5.24	-9.13	12.29	-5.24	0.000%
11	9.13	-9.21	5.24	-9.13	9.21	-5.24	0.000%
12	5.07	-12.29	8.73	-5.07	12.29	-8.73	0.000%
13	5.07	-9.21	8.73	-5.07	9.21	-8.73	0.000%
14	0.00	-12.29	10.13	0.00	12.29	-10.13	0.000%
15	0.00	-9.21	10.13	0.00	9.21	-10.13	0.000%
16	-5.17	-12.29	8.91	5.17	12.29	-8.91	0.000%
17	-5.17	-9.21	8.91	5.17	9.21	-8.91	0.000%
18	-9.27	-12.29	5.32	9.27	12.29	-5.32	0.000%
19	-9.27	-9.21	5.32	9.27	9.21	-5.32	0.000%
20	-10.47	-12.29	0.00	10.47	12.29	-0.00	0.000%
21	-10.47	-9.21	0.00	10.47	9.21	-0.00	0.000%
22	-8.86	-12.29	-5.09	8.86	12.29	5.09	0.000%
23	-8.86	-9.21	-5.09	8.86	9.21	5.09	0.000%
24	-5.07	-12.29	-8.73	5.07	12.29	8.73	0.000%
25	-5.07	-9.21	-8.73	5.07	9.21	8.73	0.000%
26	0.00	-38.15	0.00	0.00	38.15	-0.00	0.000%
27	0.00	-38.15	-3.02	0.00	38.15	3.02	0.000%
28	1.53	-38.15	-2.62	-1.53	38.15	2.62	0.000%
29	2.68	-38.15	-1.53	-2.68	38.15	1.53	0.000%
30	3.10	-38.15	0.00	-3.10	38.15	-0.00	0.000%
31	2.67	-38.15	1.53	-2.67	38.15	-1.53	0.000%
32	1.51	-38.15	2.59	-1.51	38.15	-2.59	0.000%
33	0.00	-38.15	2.98	0.00	38.15	-2.98	0.000%
34	-1.53	-38.15	2.62	1.53	38.15	-2.62	0.000%
35	-2.71	-38.15	1.55	2.71	38.15	-1.55	0.000%
36	-3.10	-38.15	0.00	3.10	38.15	-0.00	0.000%
37	-2.64	-38.15	-1.51	2.64	38.15	1.51	0.000%
38	-1.51	-38.15	-2.59	1.51	38.15	2.59	0.000%
39	0.00	-10.24	-2.54	0.00	10.24	2.54	0.000%
40	1.26	-10.24	-2.17	-1.26	10.24	2.17	0.000%
41	2.19	-10.24	-1.26	-2.19	10.24	1.26	0.000%
42	2.55	-10.24	0.00	-2.55	10.24	0.00	0.000%
43	2.22	-10.24	1.27	-2.22	10.24	-1.27	0.000%
44	1.23	-10.24	2.12	-1.23	10.24	-2.12	0.000%
45	0.00	-10.24	2.46	0.00	10.24	-2.46	0.000%
46	-1.26	-10.24	2.17	1.26	10.24	-2.17	0.000%
47	-2.25	-10.24	1.29	2.25	10.24	-1.29	0.000%
48	-2.55	-10.24	0.00	2.55	10.24	0.00	0.000%
49	-2.15	-10.24	-1.24	2.15	10.24	1.24	0.000%
50	-1.23	-10.24	-2.12	1.23	10.24	2.12	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00000001
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
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27	Yes	4	0.00000001	0.00000001
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39	Yes	4	0.00000001	0.00000001
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47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	105.25 - 85.125	0.262	42	0.0371	0.0033
T2	85.125 - 65	0.093	42	0.0309	0.0021

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	0.232	0.0371	0.0031	169419
92.00	DMP65R-BU8D w/ Mount Pipe	42	0.143	0.0353	0.0026	63932
90.50	SFS-V-L Stabilizer Kit (1)	42	0.131	0.0346	0.0025	57430
75.00	KS24019-L112A	42	0.039	0.0177	0.0012	84709

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	105.25 - 85.125	1.063	10	0.1496	0.0135
T2	85.125 - 65	0.377	10	0.1248	0.0088

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
102.00	APXVSPP18-C-A20 w/ Mount Pipe	10	0.940	0.1495	0.0129	42082
92.00	DMP65R-BU8D w/ Mount Pipe	10	0.582	0.1426	0.0108	15880
90.50	SFS-V-L Stabilizer Kit (1)	10	0.534	0.1399	0.0104	14265
75.00	KS24019-L112A	19	0.158	0.0714	0.0048	21041

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	1.87	20.34	0.092	1	Bolt Tension
		Diagonal	A325X	0.5000	1	3.22	3.81	0.845	1	Member Block Shear
		Top Girt	A325X	0.5000	1	0.30	4.13	0.073	1	Member Bearing
T2	85.125	Diagonal	A325X	0.5000	1	3.03	6.20	0.489	1	Gusset Bearing
		Top Girt	A325X	0.5000	1	0.69	4.13	0.168	1	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	-13.37	63.41	0.211 [1]

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T2	85.125 - 65	ROHN 2.5 STD	20.16	5.02	63.6 K=1.00	1.7040	-36.86	57.07	0.646 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	105.25 - 85.125	L1-1/2x1-1/2x1/8	7.70	3.60	146.0 K=1.00	0.3594	-3.28	4.82	0.680 [1]
T2	85.125 - 65	L1-3/4x1-3/4x3/16	9.70	4.75	166.0 K=1.00	0.6211	-3.06	6.45	0.474 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	105.25 - 85.125	L2x2x1/8	6.56	6.11	184.6 K=1.00	0.4844	-0.31	4.07	0.075 [1]
T2	85.125 - 65	L2x2x1/8	6.56	6.11	184.6 K=1.00	0.4844	-0.69	4.07	0.170 [1]

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	105.25 - 85.125	ROHN 2.5 STD	20.13	4.02	51.0	1.7040	7.46	76.68	0.097 [1]
T2	85.125 - 65	ROHN 2.5 STD	20.16	0.08	1.1	1.7040	32.36	76.68	0.422 [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	3.22	9.18	0.351 [1]
T2	85.125 - 65	L1-3/4x1-3/4x3/16	9.70	4.75	108.5	0.3779	3.03	16.44	0.185 [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	0.023 [1]
T2	85.125 - 65	L2x2x1/8	6.56	6.11	121.2	0.3047	0.69	13.25	0.052 [1]

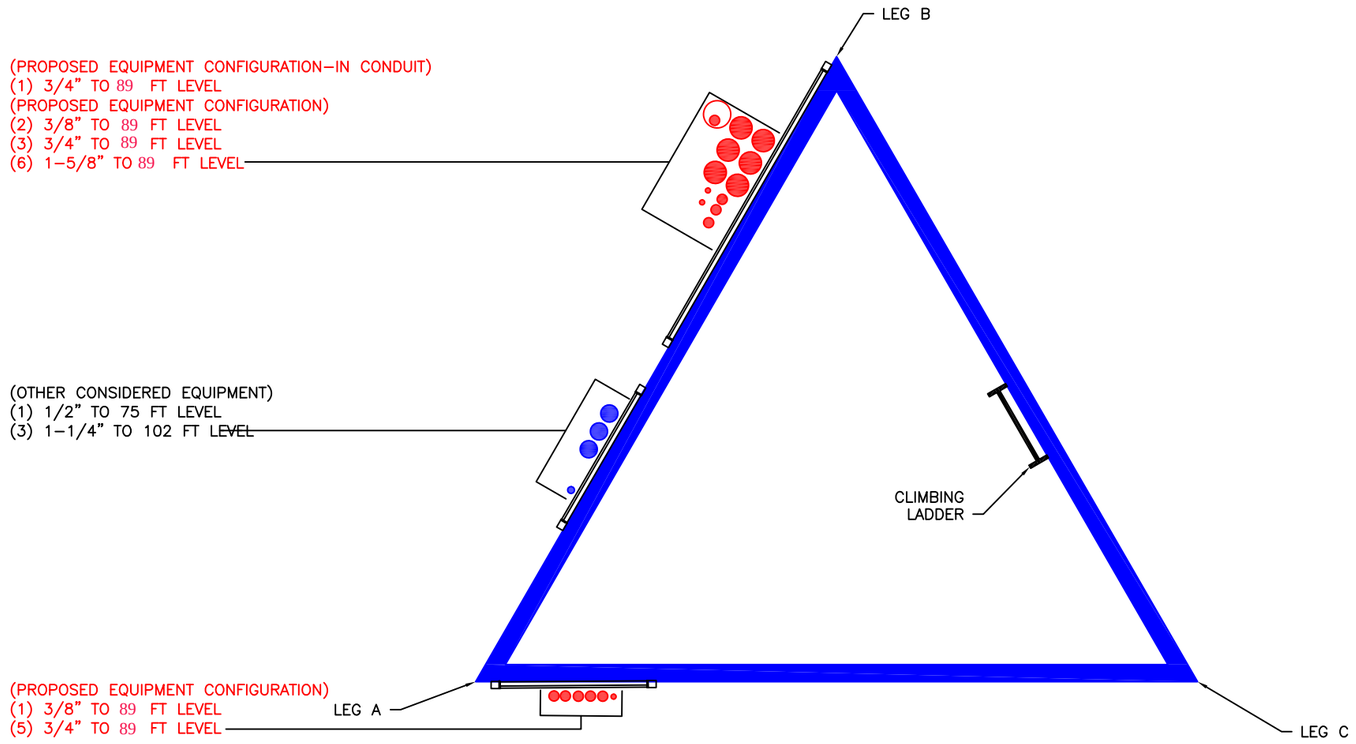
[1] P_u / ϕP_n controls

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	-13.37	63.41	21.1	Pass
T2	85.125 - 65	Leg	ROHN 2.5 STD	38	-36.86	57.07	64.6	Pass
T1	105.25 - 85.125	Diagonal	L1-1/2x1-1/2x1/8	9	-3.28	4.82	68.0 84.5 (b)	Pass
T2	85.125 - 65	Diagonal	L1-3/4x1-3/4x3/16	46	-3.06	6.45	47.4 48.9 (b)	Pass
T1	105.25 - 85.125	Top Girt	L2x2x1/8	4	-0.31	4.07	7.5	Pass
T2	85.125 - 65	Top Girt	L2x2x1/8	40	-0.69	4.07	17.0	Pass
							Summary	
							Leg (T2) 64.6	Pass
							Diagonal (T1) 84.5	Pass
							Top Girt (T2) 17.0	Pass
							Bolt Checks 84.5	Pass
							RATING = 84.5	**Pass**

APPENDIX B

BASE LEVEL DRAWING


LEG B
(PROPOSED EQUIPMENT CONFIGURATION–IN CONDUIT)
(1) 3/4" TO 89 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(2) 3/8" TO 89 FT LEVEL
(3) 3/4" TO 89 FT LEVEL
(6) 1–5/8" TO 89 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 75 FT LEVEL
(3) 1–1/4" TO 102 FT LEVEL
CLIMBING LADDER
(PROPOSED EQUIPMENT CONFIGURATION)
(1) 3/8" TO 89 FT LEVEL
(5) 3/4" TO 89 FT LEVEL
LEG A
LEG C

APPENDIX C

ADDITIONAL CALCULATIONS

Self Support Base Reaction Comparison Test

BU # :	876328
Site Name:	WEST HARTFORD PARKING GARAGE
Order Number:	509316 Rev. 1
Design TIA:	TIA-222-F
Current TIA:	TIA-222-H
Component:	Self Support Base
Reference Doc ID:	5735731

TIA-222-F Compared To TIA-222-H

SST BASE FOUNDATION REACTION COMPARISON

REACTIONS PER LEG	DESIGN REACTIONS	*MODIFIED DESIGN REACTIONS	CURRENT REACTIONS	% CAPACITY
UPLIFT (kips)	44.0	59.4	32.0	53.9%
COMPRESSION (kips)	52.0	70.3	40.0	56.9%
SHEAR (kips)	7.9	10.7	6.0	56.0%

Deisgn loads from: CCIsites Doc #5735731

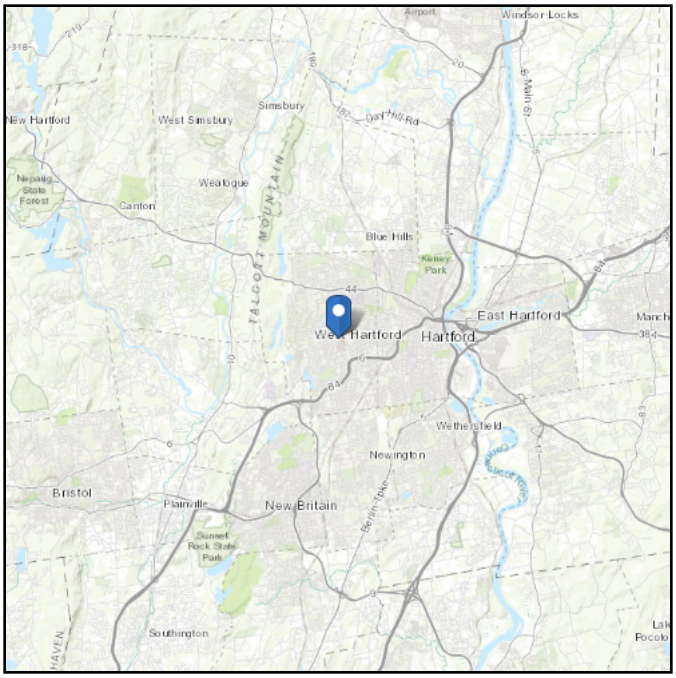
*Design loads were multiplied by 1.35 for comparison as allowed by TIA-222-H, Section 15.6.

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:	125 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 Dec 03 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.

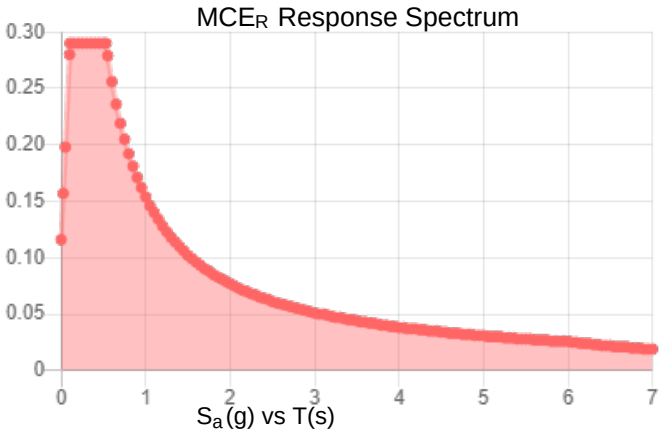
Seismic

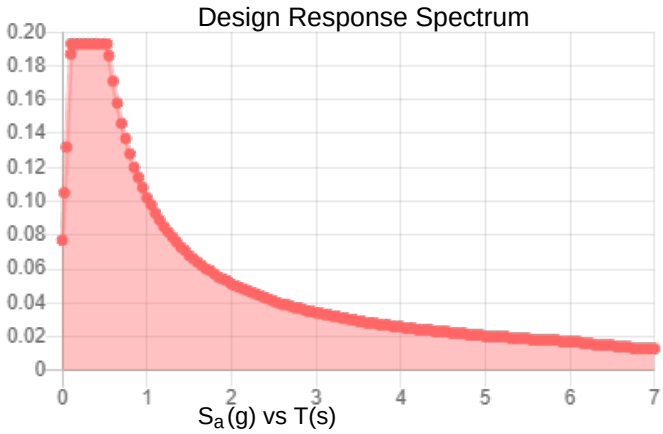
Site Soil Class: D - Stiff Soil

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 Dec 03 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 Dec 03 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.

Exhibit E

Mount Analysis

Date: **March 26, 2021**

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

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

Subject:	**Mount Analysis Report**	
Carrier Designation:	***AT&T Mobility* Loading Modification**	
	Carrier Site Number:	10071356
	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:	596335
	Crown Castle Order Number:	509316 Rev. 1
Engineering Firm Designation:	**GPD Report Designation:**	2021777.876328.25
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:

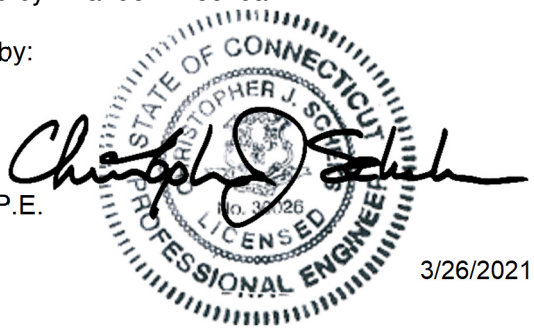
Sector Mount **Sufficient Capacity – 96.6%***

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

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

Mount analysis prepared by: Brandon Brookbank

Respectfully Submitted by:



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

3/26/2021

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	89.0	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	
		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	
		1	Raycap	DC9-48-60-24-8C-EV	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
CCI Application	Crown Order Number 509316 Rev. 1	-	CCI
RF Data Sheet	AT&T RFDS #: CT5843, dated 11/30/2020	-	CCI
Mount Design	Sabre Drawing #: C10857011C Rev. 2, dated 10/19/2016	-	Sabre
Mount Modification Design Drawings	GPD Project #: 2020777.876328.20, dated 03/27/2020	9006356	CCI

3.1) Analysis Method

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

A tool internally developed by GPD, using Microsoft Excel, was used to calculate wind loading on all appurtenances, dishes, and mount members for various load cases. Selected output from the analysis is included in Appendix B.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision C).

3.2) Assumptions

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

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	Face Horizontal	M1	92.0	30.8	Pass
	V-Boom Horizontal	M9		19.3	Pass
	V-Boom Bracing	M20		15.8	Pass
	Stiff Arm	M32		5.2	Pass
	Mount Pipe	A4		34.9	Pass
	Mod Stabilizer	M77		26.4	Pass
2	Mount to Tower Connection	-		21.9	Pass
	Tieback to Tower Connection	-		6.6	Pass
	Reinforcement to Tower Connection	-		11.4	Pass

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

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontal	M36	92.0	30.7	Pass
	V-Boom Horizontal	M37		18.5	Pass
	V-Boom Bracing	M42		96.6	Pass
	Stiff Arm	M44		5.4	Pass
	Mount Pipe	B4		34.6	Pass
	Mod Stabilizer	M79		26.4	Pass
2	Mount to Tower Connection	-		18.4	Pass
	Tieback to Tower Connection	-		6.7	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	Face Horizontal	M57	92.0	28.2	Pass
	V-Boom Horizontal	M63		16.5	Pass
	V-Boom Bracing	M66		14.0	Pass
	Stiff Arm	M69		5.2	Pass
	Mount Pipe	C1		32.5	Pass
	Mod Stabilizer	M80		25.1	Pass
2	Mount to Tower Connection	-		20.0	Pass
	Tieback to Tower Connection	-		6.1	Pass
	Reinforcement to Tower Connection	-		12.1	Pass

Structure Rating (max from all components) =	96.6%

Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in "Appendix D - Additional Calculations" for calculations supporting the % capacity consumed.

Table 4 - Tieback Connection Data Table

Tower Connection Node No.	Existing / Proposed	Resultant End Reaction (lb)	Connected Member Type	Connected Member Size	Member Compressive Capacity (lb)[3]	Notes
N61	Existing	1169.8	Leg	Rohn 2.5 STD	3170.7	1
N92A	Existing	1190.0	Leg	Rohn 2.5 STD	3170.7	
N139	Existing	1071.5	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

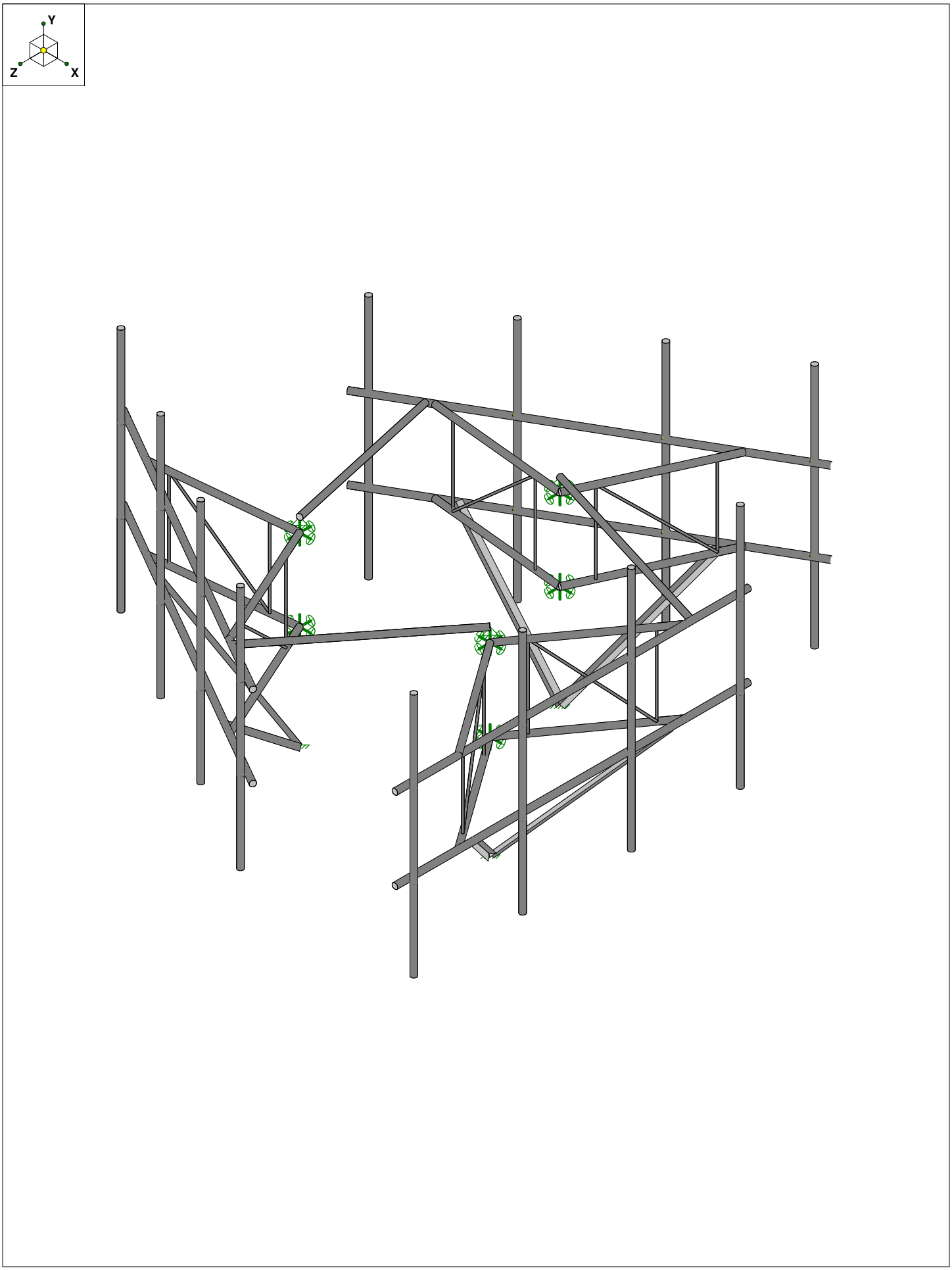
The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the structural modifications listed below must be completed.

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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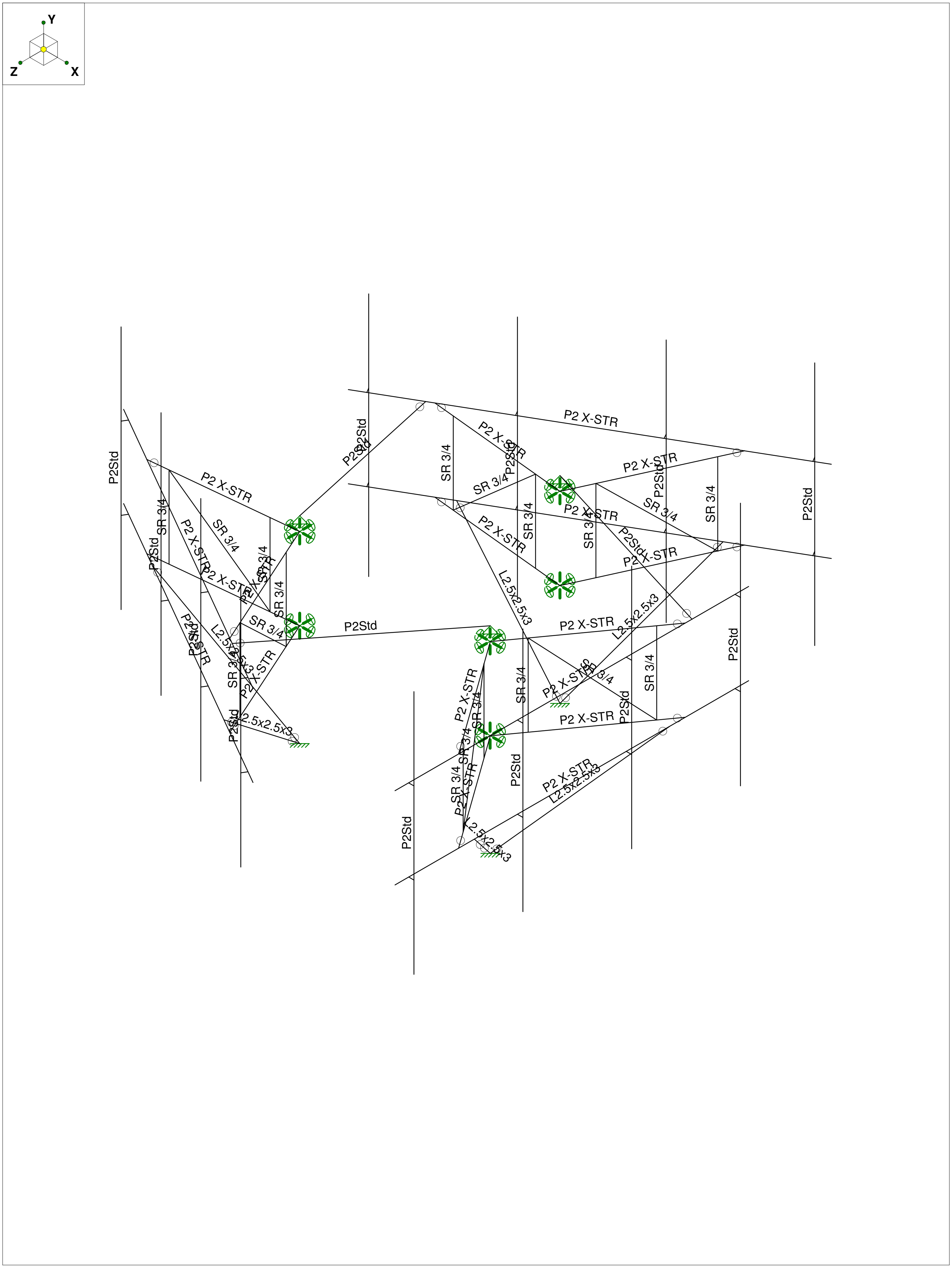
X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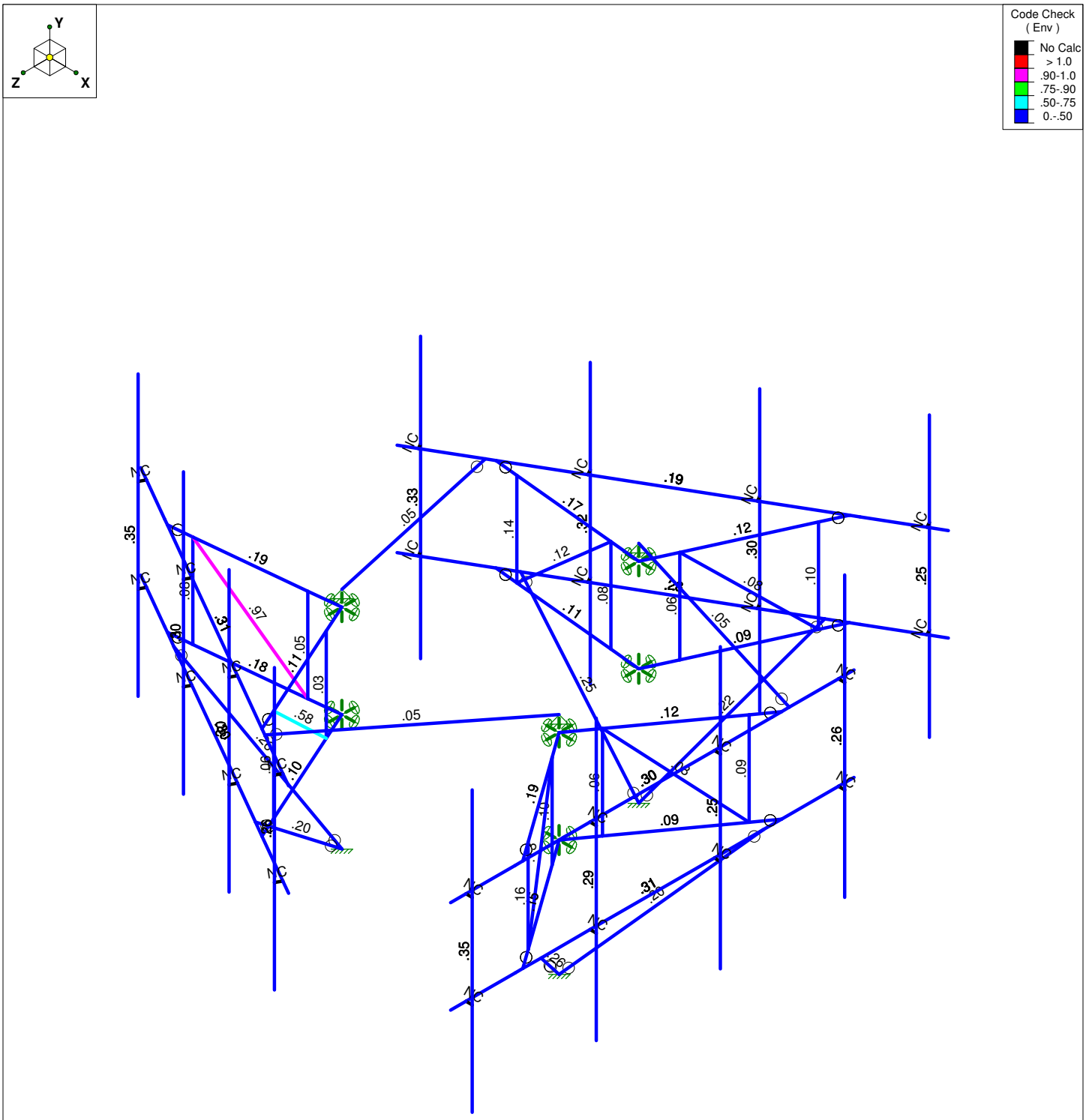
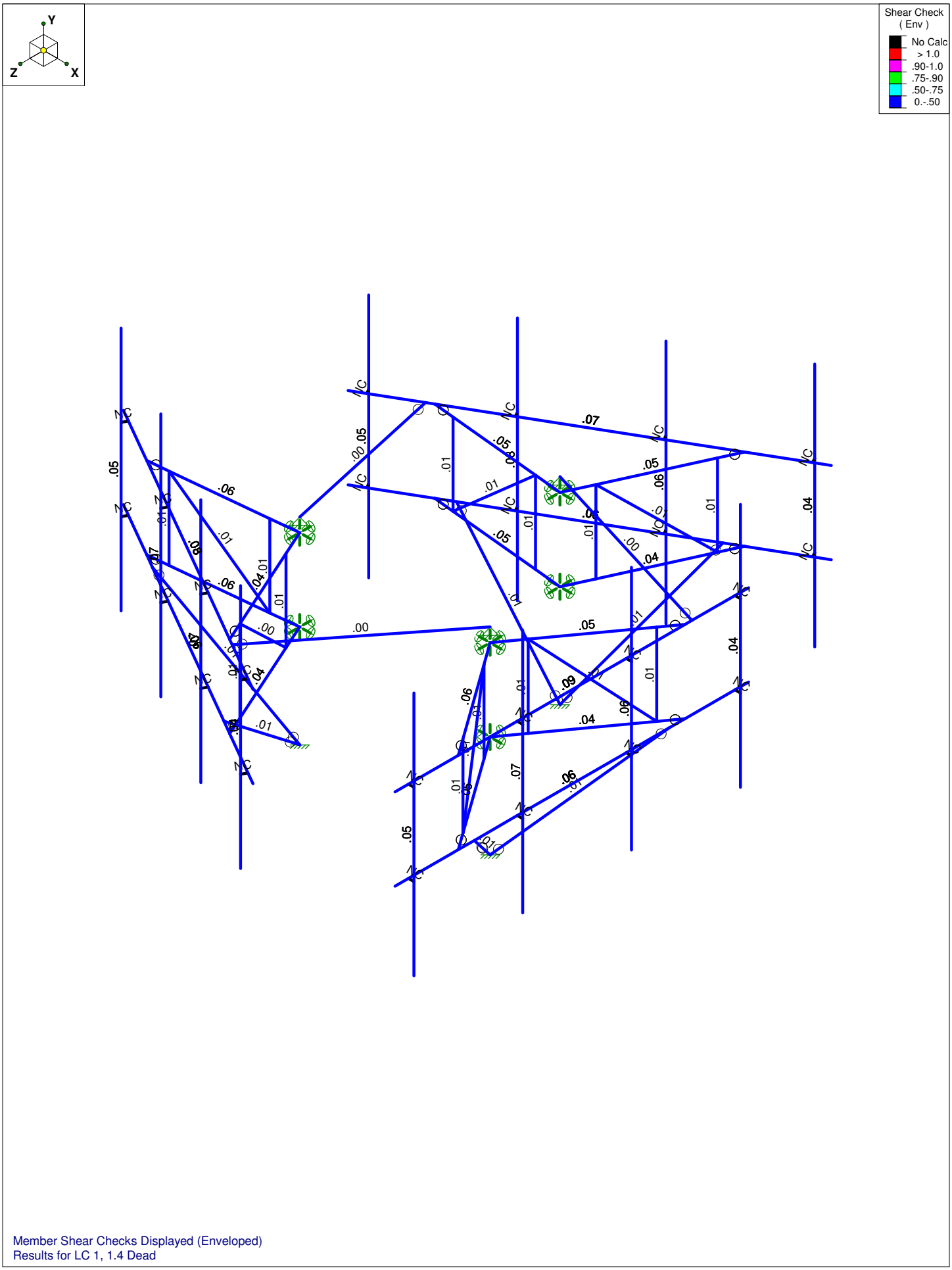
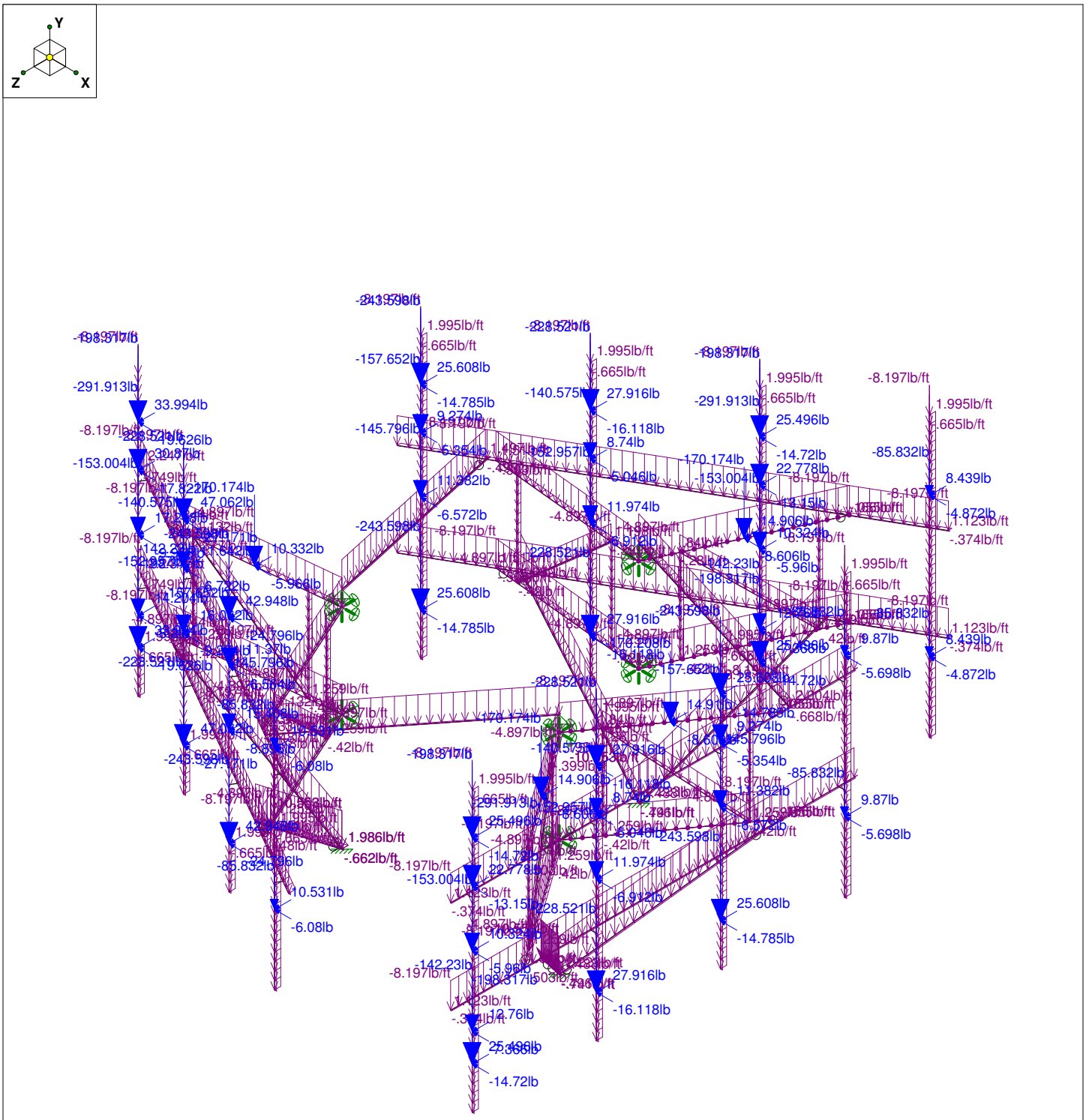


Member Code Checks Displayed (Enveloped)
Results for LC 1, 1.4 Dead



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



Loads: LC 30, 1.2 Dead + 1.0 Ice Wind @ 120°+ 1.0 Ice + 1.0 Temp

APPENDIX B

SOFTWARE INPUT CALCULATIONS

TIA-222-H: Mount Analysis Wind Loading
876328 - WEST HARTFORD PARKING GARAGE
2021777.876328.25

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	89	96	20.7	7.7	105.6	CFD	0%	0%	0.90	452.18	105.60	99.18	360.48
(3) OPA65R-BU8D	89	96	21	7.8	76.5	CFD	0%	0%	0.90	496.66	76.50	108.69	365.24
(3) TPA-65R-LCUUUU-H8	89	96	14.4	8.6	81.6	CFD	0%	0%	0.90	338.51	81.60	78.51	298.71
(3) 7770.00	89	55	11	5	35	CFD	0%	0%	0.90	97.59	35.00	24.63	129.66
(3) CBC23SR-43	89	7.95	6.29	2.08	5.4	Flat	0%	0%	0.90	11.88	5.40	3.64	15.53
(3) ION-M23 SDARS	89	32.7	6.1	5.8	48	Flat	0%	0%	0.90	52.41	48.00	12.76	62.62
(3) RRUS 32 B2	89	27.2	12.05	7	52.9	Flat	0%	0%	0.90	77.87	52.90	17.79	82.32
(3) RRUS 32 B2_CCIV2	89	27.6	12.45	7.41	55.12	Flat	0%	0%	0.90	81.64	55.12	18.55	86.81
(3) RRUS 32 B30	89	27.2	12.05	7	52.9	Flat	0%	0%	0.90	77.87	52.90	17.79	82.32
(3) RRUS 32 B66	89	27.2	12.1	7	53	Flat	0%	0%	0.90	78.20	53.00	17.85	82.52
(3) RRUS 4449 B5/B12	89	17.9	13.19	9.44	71	Flat	0%	0%	0.90	56.10	71.00	13.13	72.45
(3) RRUS 4478 B14_CCIV2	89	18.1	13.4	8.26	59.4	Flat	0%	0%	0.90	57.63	59.40	13.44	69.29
(3) RRUS E2 B29	89	20.4	18.5	7.5	52.9	Flat	0%	0%	0.90	89.67	52.90	19.92	89.52
(3) DC6-48-60-0-8C-EV	89	31.4	10.24	18.28	26.2	Round	0%	0%	0.90	45.36	26.20	11.93	138.73
(1) DC9-48-60-24-8C-EV	89	31.41	10.24	18.28	26.2	Round	0%	0%	0.90	45.38	26.20	11.93	138.77

*All forces are unfactored.

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

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

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	DL		-1			80			
2	No Ice Wind 0 deg	None					80	57		
3	No Ice Wind 30 deg	None					160	110		
4	No Ice Wind 60 deg	None					160	114		
5	No Ice Wind 90 deg	None					80	55		
6	No Ice Wind 120 deg	None					160	114		
7	No Ice Wind 150 deg	None					160	110		
8	No Ice Wind 180 deg	None					80	57		
9	No Ice Wind 210 deg	None					160	110		
10	No Ice Wind 240 deg	None					160	114		
11	No Ice Wind 270 deg	None					80	55		
12	No Ice Wind 300 deg	None					160	114		
13	No Ice Wind 330 deg	None					160	110		
14	Ice Weight	None					80	57		
15	Ice Wind 0 deg	None					80	57		
16	Ice Wind 30 deg	None					160	110		
17	Ice Wind 60 deg	None					160	114		
18	Ice Wind 90 deg	None					80	55		
19	Ice Wind 120 deg	None					160	114		
20	Ice Wind 150 deg	None					160	110		
21	Ice Wind 180 deg	None					80	57		
22	Ice Wind 210 deg	None					160	110		
23	Ice Wind 240 deg	None					160	114		
24	Ice Wind 270 deg	None					80	55		
25	Ice Wind 300 deg	None					160	114		
26	Ice Wind 330 deg	None					160	110		
27	Live Load - A1	None					1			
28	Live Load - A2	None					1			
29	Live Load - A3	None					1			
30	Live Load - A4	None					1			
31	Live Load - B1	None					1			
32	Live Load - B2	None					1			
33	Live Load - B3	None					1			
34	Live Load - B4	None					1			

Basic Load Cases (Continued)

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

Basic Load Cases (Continued)

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

Load Combinations

	Description	Sol...	PD...	SR...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
1	1.4 Dead	Yes	Y		1	1.4	0		0		0		0		0		0		0					
2	1.2 Dead ...	Yes	Y		1	1.2	2	1	0		0		0		0		0		0					
3	0.9 Dead ...	Yes	Y		1	.9	2	1	0		0		0		0		0		0					
4	1.2 Dead ...	Yes	Y		1	1.2	3	1	0		0		0		0		0		0					
5	0.9 Dead ...	Yes	Y		1	.9	3	1	0		0		0		0		0		0					
6	1.2 Dead ...	Yes	Y		1	1.2	4	1	0		0		0		0		0		0					
7	0.9 Dead ...	Yes	Y		1	.9	4	1	0		0		0		0		0		0					
8	1.2 Dead ...	Yes	Y		1	1.2	5	1	0		0		0		0		0		0					
9	0.9 Dead ...	Yes	Y		1	.9	5	1	0		0		0		0		0		0					
10	1.2 Dead ...	Yes	Y		1	1.2	6	1	0		0		0		0		0		0					
11	0.9 Dead ...	Yes	Y		1	.9	6	1	0		0		0		0		0		0					
12	1.2 Dead ...	Yes	Y		1	1.2	7	1	0		0		0		0		0		0					
13	0.9 Dead ...	Yes	Y		1	.9	7	1	0		0		0		0		0		0					
14	1.2 Dead ...	Yes	Y		1	1.2	8	1	0		0		0		0		0		0					
15	0.9 Dead ...	Yes	Y		1	.9	8	1	0		0		0		0		0		0					
16	1.2 Dead ...	Yes	Y		1	1.2	9	1	0		0		0		0		0		0					
17	0.9 Dead ...	Yes	Y		1	.9	9	1	0		0		0		0		0		0					
18	1.2 Dead ...	Yes	Y		1	1.2	10	1	0		0		0		0		0		0					
19	0.9 Dead ...	Yes	Y		1	.9	10	1	0		0		0		0		0		0					
20	1.2 Dead ...	Yes	Y		1	1.2	11	1	0		0		0		0		0		0					
21	0.9 Dead ...	Yes	Y		1	.9	11	1	0		0		0		0		0		0					
22	1.2 Dead ...	Yes	Y		1	1.2	12	1	0		0		0		0		0		0					
23	0.9 Dead ...	Yes	Y		1	.9	12	1	0		0		0		0		0		0					
24	1.2 Dead ...	Yes	Y		1	1.2	13	1	0		0		0		0		0		0					
25	0.9 Dead ...	Yes	Y		1	.9	13	1	0		0		0		0		0		0					
26	1.2 Dead ...	Yes	Y		1	1.2	15	1	14	1		1	0		0		0		0					
27	1.2 Dead ...	Yes	Y		1	1.2	16	1	14	1		1	0		0		0		0					
28	1.2 Dead ...	Yes	Y		1	1.2	17	1	14	1		1	0		0		0		0					
29	1.2 Dead ...	Yes	Y		1	1.2	18	1	14	1		1	0		0		0		0					
30	1.2 Dead ...	Yes	Y		1	1.2	19	1	14	1		1	0		0		0		0					
31	1.2 Dead ...	Yes	Y		1	1.2	20	1	14	1		1	0		0		0		0					
32	1.2 Dead ...	Yes	Y		1	1.2	21	1	14	1		1	0		0		0		0					
33	1.2 Dead ...	Yes	Y		1	1.2	22	1	14	1		1	0		0		0		0					
34	1.2 Dead ...	Yes	Y		1	1.2	23	1	14	1		1	0		0		0		0					
35	1.2 Dead ...	Yes	Y		1	1.2	24	1	14	1		1	0		0		0		0					
36	1.2 Dead ...	Yes	Y		1	1.2	25	1	14	1		1	0		0		0		0					
37	1.2 Dead ...	Yes	Y		1	1.2	26	1	14	1		1	0		0		0		0					
38	1.2 Dead ...	Yes	Y		1	1.2	27	1.5	2	.066	0		0		0		0		0					
39	1.2 Dead ...	Yes	Y		1	1.2	27	1.5	3	.066	0		0		0		0		0					
40	1.2 Dead ...	Yes	Y		1	1.2	27	1.5	4	.066	0		0		0		0		0					
41	1.2 Dead ...	Yes	Y		1	1.2	27	1.5	5	.066	0		0		0		0		0					
42	1.2 Dead ...	Yes	Y		1	1.2	27	1.5	6	.066	0		0		0		0		0					
43	1.2 Dead ...	Yes	Y		1	1.2	27	1.5	7	.066	0		0		0		0		0					
44	1.2 Dead ...	Yes	Y		1	1.2	27	1.5	8	.066	0		0		0		0		0					
45	1.2 Dead ...	Yes	Y		1	1.2	27	1.5	9	.066	0		0		0		0		0					
46	1.2 Dead ...	Yes	Y		1	1.2	27	1.5	10	.066	0		0		0		0		0					
47	1.2 Dead ...	Yes	Y		1	1.2	27	1.5	11	.066	0		0		0		0		0					
48	1.2 Dead ...	Yes	Y		1	1.2	27	1.5	12	.066	0		0		0		0		0					
49	1.2 Dead ...	Yes	Y		1	1.2	27	1.5	13	.066	0		0		0		0		0					
50	1.2 Dead ...	Yes	Y		1	1.2	28	1.5	2	.066	0		0		0		0		0					
51	1.2 Dead ...	Yes	Y		1	1.2	28	1.5	3	.066	0		0		0		0		0					

Load Combinations (Continued)

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

Load Combinations (Continued)

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

Load Combinations (Continued)

	Description	Sol...	PD...	SR...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
166	1.2 Dead ...	Yes	Y		1	1.2	37	1.5	10	.066	0		0		0		0		0					
167	1.2 Dead ...	Yes	Y		1	1.2	37	1.5	11	.066	0		0		0		0		0					
168	1.2 Dead ...	Yes	Y		1	1.2	37	1.5	12	.066	0		0		0		0		0					
169	1.2 Dead ...	Yes	Y		1	1.2	37	1.5	13	.066	0		0		0		0		0					
170	1.2 Dead ...	Yes	Y		1	1.2	38	1.5	2	.066	0		0		0		0		0					
171	1.2 Dead ...	Yes	Y		1	1.2	38	1.5	3	.066	0		0		0		0		0					
172	1.2 Dead ...	Yes	Y		1	1.2	38	1.5	4	.066	0		0		0		0		0					
173	1.2 Dead ...	Yes	Y		1	1.2	38	1.5	5	.066	0		0		0		0		0					
174	1.2 Dead ...	Yes	Y		1	1.2	38	1.5	6	.066	0		0		0		0		0					
175	1.2 Dead ...	Yes	Y		1	1.2	38	1.5	7	.066	0		0		0		0		0					
176	1.2 Dead ...	Yes	Y		1	1.2	38	1.5	8	.066	0		0		0		0		0					
177	1.2 Dead ...	Yes	Y		1	1.2	38	1.5	9	.066	0		0		0		0		0					
178	1.2 Dead ...	Yes	Y		1	1.2	38	1.5	10	.066	0		0		0		0		0					
179	1.2 Dead ...	Yes	Y		1	1.2	38	1.5	11	.066	0		0		0		0		0					
180	1.2 Dead ...	Yes	Y		1	1.2	38	1.5	12	.066	0		0		0		0		0					
181	1.2 Dead ...	Yes	Y		1	1.2	38	1.5	13	.066	0		0		0		0		0					
182	1.2 Dead ...	Yes	Y		1	1.2	39	1.5	0		0		0		0		0		0					
183	1.2 Dead ...	Yes	Y		1	1.2	40	1.5	0		0		0		0		0		0					
184	1.2 Dead ...	Yes	Y		1	1.2	41	1.5	0		0		0		0		0		0					
185	1.2 Dead ...	Yes	Y		1	1.2	42	1.5	0		0		0		0		0		0					
186	1.2 Dead ...	Yes	Y		1	1.2	43	1.5	0		0		0		0		0		0					
187	1.2 Dead ...	Yes	Y		1	1.2	44	1.5	0		0		0		0		0		0					
188	1.2 Dead ...	Yes	Y		1	1.2	45	1.5	0		0		0		0		0		0					
189	1.2 Dead ...	Yes	Y		1	1.2	46	1.5	0		0		0		0		0		0					
190	1.2 Dead ...	Yes	Y		1	1.2	47	1.5	0		0		0		0		0		0					
191	1.2 Dead ...	Yes	Y		1	1.2	48	1.5	0		0		0		0		0		0					
192	1.2 Dead ...	Yes	Y		1	1.2	49	1.5	0		0		0		0		0		0					
193	1.2 Dead ...	Yes	Y		1	1.2	50	1.5	0		0		0		0		0		0					
194	1.2 Dead ...	Yes	Y		1	1.2	51	1.5	0		0		0		0		0		0					
195	1.2 Dead ...	Yes	Y		1	1.2	52	1.5	0		0		0		0		0		0					
196	1.2 Dead ...	Yes	Y		1	1.2	53	1.5	0		0		0		0		0		0					
197	1.2 Dead ...	Yes	Y		1	1.2	54	1.5	0		0		0		0		0		0					
198	1.2 Dead ...	Yes	Y		1	1.2	55	1.5	0		0		0		0		0		0					

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N21	max	1767.837	15	1493.583	26	745.46	23	.145	42	0	198	.66	26
2		min	-3002.368	2	235.331	15	-1395.579	10	-.327	84	0	1	-.02	15
3	N4	max	852.264	12	1180.892	26	921.617	16	.112	42	0	198	.516	30
4		min	-496.262	25	40.054	15	-470.444	5	-.254	84	0	1	.088	23
5	N61	max	1125.862	22	102	10	302.921	22	0	198	0	198	0	198
6		min	-1125.246	10	-76.042	23	-303.009	10	0	1	0	1	0	1
7	N51	max	586.727	13	1272.074	30	793.706	95	-.005	7	0	198	-.031	95
8		min	-1168.104	24	93.529	23	-542.637	9	-.34	34	0	1	-.566	28
9	N62	max	2114.85	31	1232.429	30	2033.325	21	.059	25	0	198	-.012	21
10		min	-391.864	25	245.511	23	-2749.139	8	-.319	31	0	1	-.491	29
11	N92A	max	834.613	20	104.166	20	841.559	8	0	198	0	198	0	198
12		min	-834.172	8	-78.353	9	-841.876	20	0	1	0	1	0	1
13	N98A	max	472.555	17	1038.306	34	310.573	159	.367	32	0	198	.016	173
14		min	-1066.637	135	-88.812	7	-714.015	177	.038	3	0	1	-.312	35
15	N109A	max	2016.39	32	1429.617	34	1565.832	33	.474	33	0	198	.02	9
16		min	-1001.127	3	160.411	7	-788.496	5	-.08	7	0	1	-.434	35
17	N139	max	288.658	20	94.392	20	1027.55	20	0	198	0	198	0	198
18		min	-288.881	8	-68.255	9	-1027.396	8	0	1	0	1	0	1
19	N140	max	1546.576	32	1994.456	32	468.452	85	0	13	0	13	0	27

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
20		min	35.387	3	137.695	3	-240.613	43	0	24	0	24	0	17
21	N144	max	-65.937	19	1960.884	37	1160.424	36	0	7	0	21	0	21
22		min	-1073.68	28	199.456	13	-63.056	11	0	34	0	8	0	29
23	N148	max	-68.305	176	2136.145	28	240.033	19	0	33	0	20	0	9
24		min	-944.392	27	-73.179	19	-1375.63	28	0	5	0	9	0	20
25	Totals:	max	6323.445	15	13305.252	33	6215.314	21						
26		min	-6323.466	2	3355.686	5	-6215.333	8						

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

	Member	Shape	Code ...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc ...	phi*Pnt [...	phi*Mn y...	phi*Mn z...	Cb	Eqn
1	M42	SR 3/4	.966	0	30	.009	0		22	3086.797	19880.37	.249	.249	2....	H1-1a
2	M40	SR 3/4	.582	0	91	.004	0		12	3086.797	19880.37	.249	.249	2....	H1-1a
3	A4	P2Std	.349	72	80	.054	72		36	12899.3...	33862.5	1.998	1.998	3....	H1-1b
4	B4	P2Std	.346	72	132	.054	72		28	12899.3...	33862.5	1.998	1.998	4....	H1-1b
5	C1	P2Std	.325	72	136	.050	36		140	12899.3...	33862.5	1.998	1.998	4....	H1-1b
6	C2	P2Std	.316	72	20	.077	36		20	12899.3...	33862.5	1.998	1.998	3....	H1-1b
7	M1	P2 X-STR	.308	34.125	36	.060	34.125		26	8056.953	66476.6...	3.816	3.816	2....	H1-1b
8	M36	P2 X-STR	.307	100.75	8	.084	128....		6	8056.953	66476.6...	3.816	3.816	2....	H1-1a
9	M32A	P2 X-STR	.305	34.125	29	.060	34.125		30	8056.953	66476.6...	3.816	3.816	2....	H1-1b
10	B3	P2Std	.303	36	8	.073	36		8	12899.3...	33862.5	1.998	1.998	3....	H1-1b
11	C3	P2Std	.302	72	8	.061	36		20	12899.3...	33862.5	1.998	1.998	3....	H1-1b
12	M8	P2 X-STR	.297	100.75	24	.087	128....		22	8056.953	66476.6...	3.816	3.816	2....	H1-1a
13	B2	P2Std	.296	72	20	.067	36		8	12899.3...	33862.5	1.998	1.998	3....	H1-1b
14	A3	P2Std	.294	36	24	.070	36		24	12899.3...	33862.5	1.998	1.998	1....	H1-1b
15	M57	P2 X-STR	.282	121....	27	.057	121....		32	8056.953	66476.6...	3.816	3.816	1....	H1-1b
16	M79	L2.5x2.5x3	.264	35.202	29	.010	71.903	y	33	9146.779	29192.4	.873	1.532	1....	H2-1
17	M77	L2.5x2.5x3	.264	35.202	37	.011	0	y	30	9146.779	29192.4	.873	1.532	1....	H2-1
18	A1	P2Std	.257	72	48	.040	36		48	12899.3...	33862.5	1.998	1.998	4....	H1-1b
19	B1	P2Std	.256	72	88	.040	36		88	12899.3...	33862.5	1.998	1.998	4....	H1-1b
20	A2	P2Std	.252	36	12	.064	36		24	12899.3...	33862.5	1.998	1.998	1....	H1-1b
21	M80	L2.5x2.5x3	.251	35.202	31	.011	0	z	32	9146.779	29192.4	.873	1.532	1....	H2-1
22	C4	P2Std	.249	72	170	.040	72		172	12899.3...	33862.5	1.998	1.998	4....	H1-1b
23	M81	L2.5x2.5x3	.224	35.202	28	.014	0	y	35	9146.779	29192.4	.873	1.532	1....	H2-1
24	M76	L2.5x2.5x3	.199	35.202	35	.012	71.903	z	26	9146.779	29192.4	.873	1.532	1....	H2-1
25	M78	L2.5x2.5x3	.195	35.202	28	.013	0	z	29	9146.779	29192.4	.873	1.532	1....	H2-1
26	M61	P2 X-STR	.195	55.25	18	.071	128....		14	8056.953	66476.6...	3.816	3.816	3....	H1-1b
27	M9	P2 X-STR	.193	61.612	26	.061	61.612		34	41447.89	66476.6...	3.816	3.816	2....	H1-1b
28	M37	P2 X-STR	.185	9.627	27	.061	8.985		37	41447.89	66476.6...	3.816	3.816	2....	H1-1b
29	M33	P2 X-STR	.178	61.612	26	.059	61.612		29	41447.89	66476.6...	3.816	3.816	3....	H1-1b
30	M63	P2 X-STR	.165	8.985	26	.054	8.985		135	41447.89	66476.6...	3.816	3.816	1....	H1-1b
31	M20	SR 3/4	.158	0	34	.013	36		22	8255.901	19880.37	.249	.249	1	H1-1b*
32	M2	P2 X-STR	.147	61.612	34	.051	61.612		37	41447.89	66476.6...	3.816	3.816	2....	H1-1b
33	M66	SR 3/4	.140	36	35	.011	36		20	8255.901	19880.37	.249	.249	1	H1-1b
34	M19	SR 3/4	.126	54.271	35	.006	54.271		2	3086.797	19880.37	.249	.249	2....	H1-1b
35	M62	P2 X-STR	.124	61.612	33	.049	61.612		35	41447.89	66476.6...	3.816	3.816	2....	H1-1b
36	M10	P2 X-STR	.122	61.612	26	.046	61.612		37	41447.89	66476.6...	3.816	3.816	2....	H1-1b
37	M65	SR 3/4	.117	54.271	35	.006	0		6	3086.797	19880.37	.249	.249	2....	H1-1b
38	M59A	P2 X-STR	.114	61.612	35	.051	8.985		18	41447.89	66476.6...	3.816	3.816	2....	H1-1b
39	M38	P2 X-STR	.109	9.627	89	.044	8.985		29	41447.89	66476.6...	3.816	3.816	1....	H1-1b
40	AS2	SR 3/4	.100	0	26	.008	36		24	8255.901	19880.37	.249	.249	1	H1-1b*
41	M68	SR 3/4	.097	0	33	.010	36		2	8255.901	19880.37	.249	.249	2....	H1-1b*
42	M34	P2 X-STR	.095	61.612	91	.036	61.612		91	41447.89	66476.6...	3.816	3.816	2....	H1-1b
43	M58	P2 X-STR	.095	61.612	34	.039	61.612		36	41447.89	66476.6...	3.816	3.816	3....	H1-1b
44	M3	P2 X-STR	.094	61.612	27	.037	61.612		36	41447.89	66476.6...	3.816	3.816	3....	H1-1b
45	M17	SR 3/4	.093	0	30	.013	36		22	8255.901	19880.37	.249	.249	1	H1-1b*

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

	Member	Shape	Code ...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc ...	phi*Pnt [...	phi*Mn y...	phi*Mn z...	Cb	Eqn
46	M16	SR 3/4	.083	54.271	29	.006	54.271		14	3086.797	19880.37	.249	.249	2....	H1-1b
47	M67	SR 3/4	.082	54.271	33	.005	0		6	3086.797	19880.37	.249	.249	2....	H1-1b
48	M43	SR 3/4	.082	36	30	.013	36		8	8255.901	19880.37	.249	.249	1	H1-1b
49	M55	SR 3/4	.079	0	34	.010	36		20	8255.901	19880.37	.249	.249	2....	H1-1b*
50	M41	SR 3/4	.060	36	90	.012	0		8	8255.901	19880.37	.249	.249	2....	H1-1b
51	M56	SR 3/4	.060	0	34	.010	36		20	8255.901	19880.37	.249	.249	1	H1-1b*
52	AS1	SR 3/4	.058	0	27	.010	36		24	8255.901	19880.37	.249	.249	1	H1-1b*
53	M31	SR 3/4	.055	0	26	.009	36		8	8255.901	19880.37	.249	.249	2....	H1-1b
54	M44	P2Std	.054	0	8	.003	80.684		27	22436.4...	48375	2.854	2.854	1....	H1-1b*
55	M32	P2Std	.052	0	22	.003	80.684		35	22436.4...	48375	2.854	2.854	1....	H1-1b*
56	M69	P2Std	.048	80.684	9	.003	0		26	22436.4...	48375	2.854	2.854	1....	H1-1b*
57	M30	SR 3/4	.031	0	35	.010	36		8	8255.901	19880.37	.249	.249	1	H1-1b

APPENDIX D

ADDITIONAL CALCULATIONS

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Alpha Sector
2021777.876328.25

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)	0.66	k-ft
Axial (T)	2.58	kips
Shear (V)	1.76	kips

RISA 3D Reactions (Left -Right)		
Moment (M)	0.00	k-ft
Axial (T)	3.00	kips
Shear (V)	0.67	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})	2.23	kips
Bolt Shear Force (V_{ub})	0.441	kips
$T_{ub}/\phi R_{nt}$	0.21929	
$V_{ub}/\phi R_{nv}$	0.06384	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.05216	
Bolt Capacity =	21.9%	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})	0.75	kips
Bolt Shear Force (V_{ub})	0.168	kips
$T_{ub}/\phi R_{nt}$	0.07380	
$V_{ub}/\phi R_{nv}$	0.02439	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00604	
Bolt Capacity =	7.4%	OK

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Beta Sector
2021777.876328.25

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)	0.51	k-ft
Axial (T)	2.53	kips
Shear (V)	1.57	kips

RISA 3D Reactions (Left -Right)		
Moment (M)	0.00	k-ft
Axial (T)	2.96	kips
Shear (V)	0.60	kips

Bolt Capacity (Up-Down)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	1.87	kips
Bolt Shear Force (V_{ub})	0.393	kips
$T_{ub}/\phi R_{nt}$	0.18356	
$V_{ub}/\phi R_{nv}$	0.05695	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.03694	
Bolt Capacity =	18.4%	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})	0.74	kips
Bolt Shear Force (V_{ub})	0.150	kips
$T_{ub}/\phi R_{nt}$	0.07269	
$V_{ub}/\phi R_{nv}$	0.02167	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00575	
Bolt Capacity =	7.3%	OK

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Gamma Sector
2021777.876328.25

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)	0.61	k-ft
Axial (T)	2.31	kips
Shear (V)	1.66	kips

RISA 3D Reactions (Left -Right)		
Moment (M)	0.00	k-ft
Axial (T)	2.31	kips
Shear (V)	1.71	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})	0.416	kips
$T_{ub}/\phi R_{nt}$	0.20047	
$V_{ub}/\phi R_{nv}$	0.06026	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.04382	
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})	0.58	kips
Bolt Shear Force (V_{ub})	0.428	kips
$T_{ub}/\phi R_{nt}$	0.05678	
$V_{ub}/\phi R_{nv}$	0.06197	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00706	
Bolt Capacity =	6.2%	OK

TIA-222-H CONNECTION CHECK
Tieback to Tower Connection - Alpha Sector
2021777.876328.25

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

RISA 3D Reactions		
Moment (M)	0.00	k-ft
Axial (T)	0.02	kips
Shear (V)	1.17	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})	0.292	kips
$T_{ub}/\phi R_{nt}$	0.00068	
$V_{ub}/\phi R_{nv}$	0.06619	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00438	
Bolt Capacity =	6.6%	OK

TIA-222-H CONNECTION CHECK
Tieback to Tower Connection - Beta Sector
2021777.876328.25

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)	1.19	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})	0.297	kips
$T_{ub}/\phi R_{nt}$	0.00044	
$V_{ub}/\phi R_{nv}$	0.06734	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00453	
Bolt Capacity =	6.7%	OK

TIA-222-H CONNECTION CHECK
Tieback to Tower Connection - Gamma Sector
2021777.876328.25

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)	1.07	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})	0.268	kips
$T_{ub}/\phi R_{nt}$	0.00007	
$V_{ub}/\phi R_{nv}$	0.06063	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00368	
Bolt Capacity =	6.1%	OK

TIA-222-H CONNECTION CHECK
Reinforcement to Tower Connection - Alpha Sector
2021777.876328.25

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)	2.02	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})	0.504	kips
$T_{ub}/\phi R_{nt}$	-0.06035	
$V_{ub}/\phi R_{nv}$	0.11417	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.01668	
Bolt Capacity =	11.4%	OK

TIA-222-H CONNECTION CHECK
Reinforcement to Tower Connection - Beta Sector
2021777.876328.25

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)	-1.51	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})	-0.38	kips
Bolt Shear Force (V_{ub})	0.497	kips
$T_{ub}/\phi R_{nt}$	-0.05925	
$V_{ub}/\phi R_{nv}$	0.11249	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.01617	
Bolt Capacity =	11.2%	OK

TIA-222-H CONNECTION CHECK
Reinforcement to Tower Connection - Gamma Sector
2021777.876328.25

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)	-1.66	kips
Shear (V)	2.14	kips

Bolt Capacity		
Nominal Tensile Strength (R_{nt})	8.514	kips
Nominal Shear Strength (R_{nv})	5.89	kips
Bolt Tensile Force (T_{ub})	-0.41	kips
Bolt Shear Force (V_{ub})	0.535	kips
$T_{ub}/\phi R_{nt}$	-0.06485	
$V_{ub}/\phi R_{nv}$	0.12106	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.01886	
Bolt Capacity =	12.1%	OK

APPENDIX E

MOUNT MODIFICATION DESIGN DRAWINGS (MDD)

GENERAL NOTES

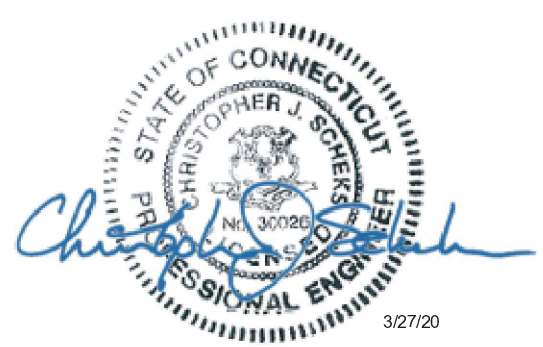
1. THESE MODIFICATIONS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE GOVERNING PROVISIONS OF TIA/EIA-222, AWS, ANSI TIA-322, AND AISC. MATERIALS, FABRICATION, INSTALLATION, AND ALL OTHER SERVICES PROVIDED BY THE CONTRACTOR SHALL CONFORM TO THE ABOVE MENTIONED CODES AND THE CONTRACT SPECIFICATIONS.
2. ALL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



3/27/20

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
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

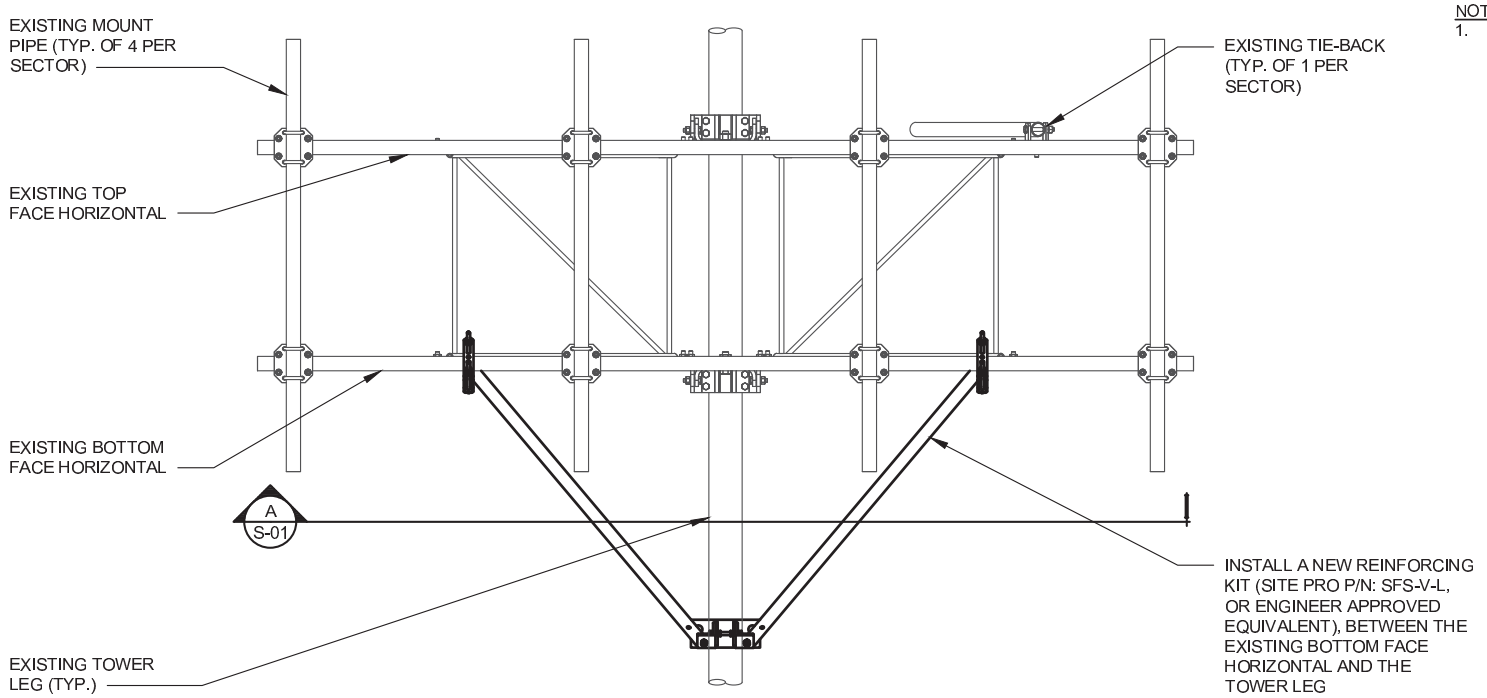
JOB NO.
2020777.876328.20

N-01

MODIFICATION SCHEDULE

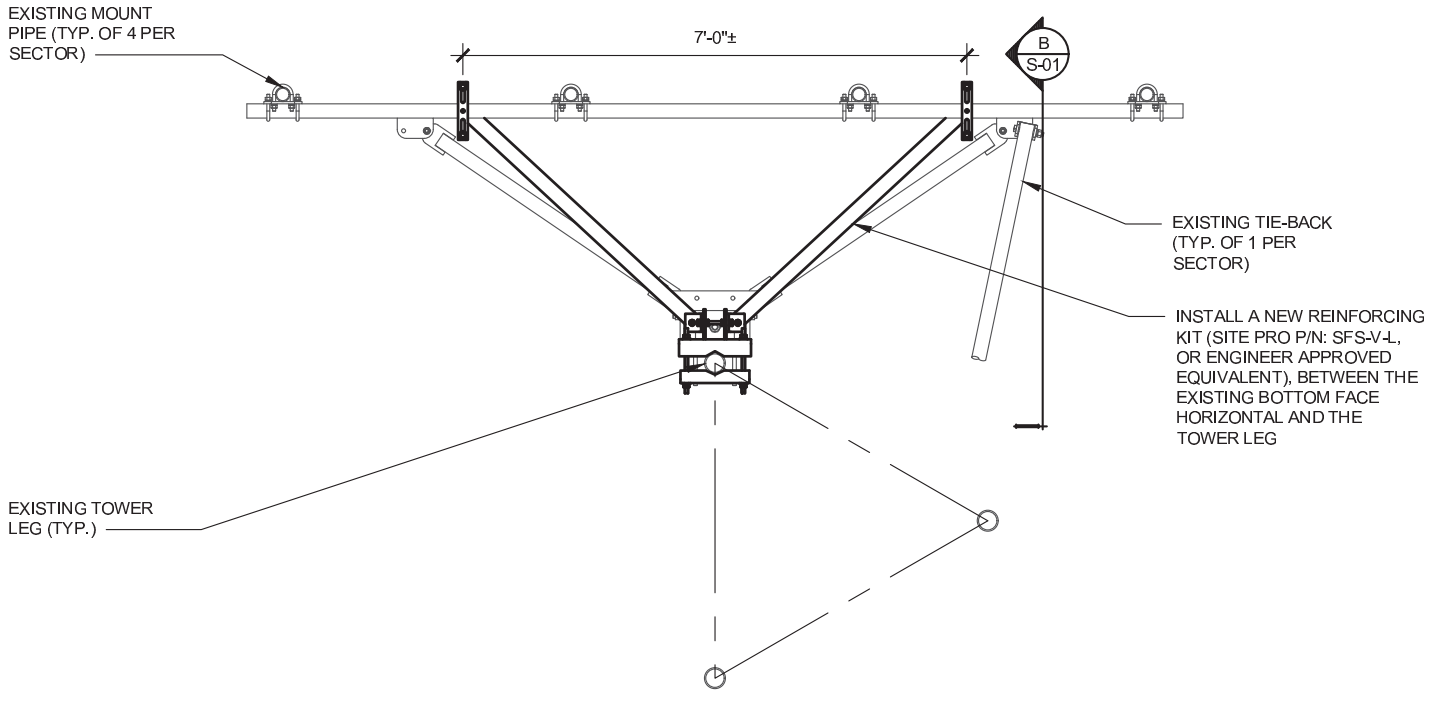
MEMBER TYPE	ELEVATION	EXISTING MEMBER	NEW MEMBER	REFERENCE DETAIL/SHEET	NOTES
REINFORCING KIT	92'-0"±	(3) 13'-0" SECTOR FRAMES	(1) REINFORCING KIT (PER SECTOR)	1/S-01	INSTALL A REINFORCING KIT BETWEEN THE EXISTING BOTTOM FACE HORIZONTAL AND THE TOWER LEG.

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



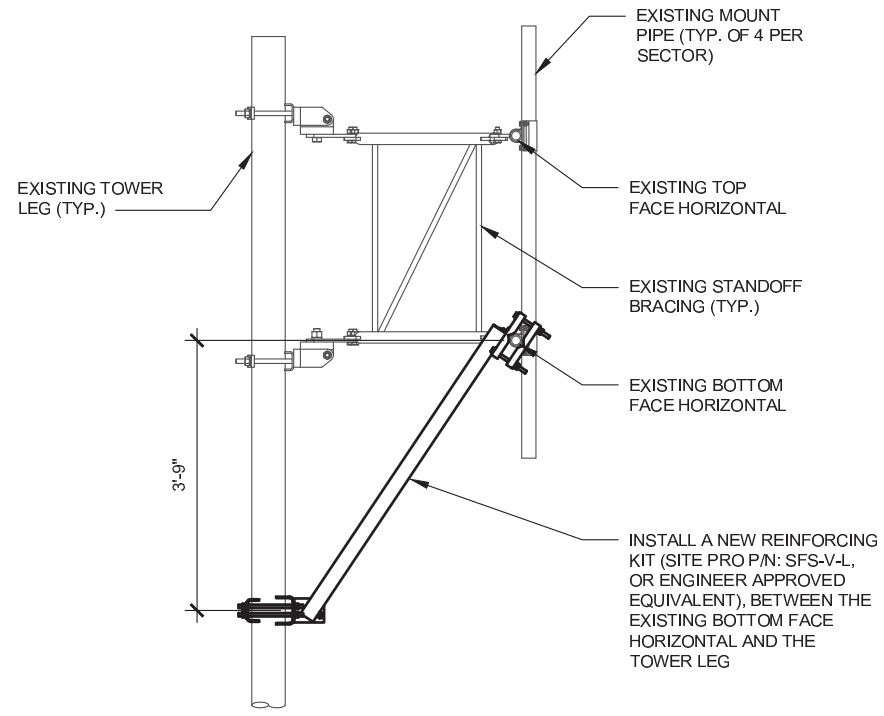
1 S-01 ELEVATION
SCALE: 3/8" = 1'-0"

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



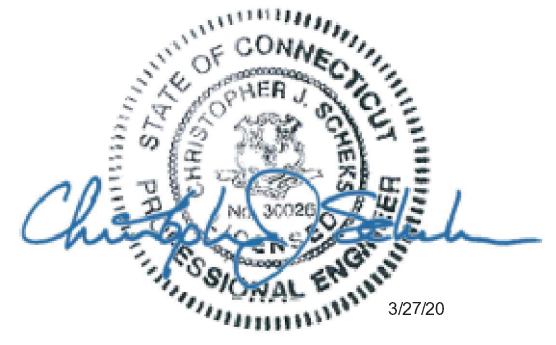
A S-01 SECTION
SCALE: 3/8" = 1'-0"

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

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
BU #: 876328

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

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

MODIFICATION SCHEDULE & DETAILS

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

ENGINEER	DESIGNER
MAH	JMJ
PROJECT MANAGER	APPROVED BY
CB	CJS

JOB NO.
2020777.876328.20

S-01

Exhibit F

Power Density/RF Emissions Report

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: November 19, 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.

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

Signed 19 November 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.

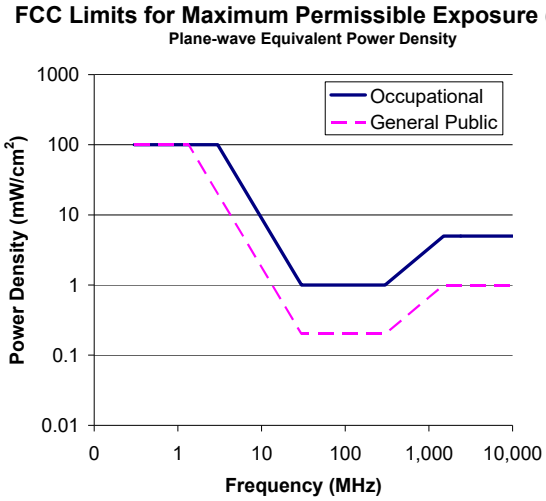
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to *accessible* 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 exist 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.

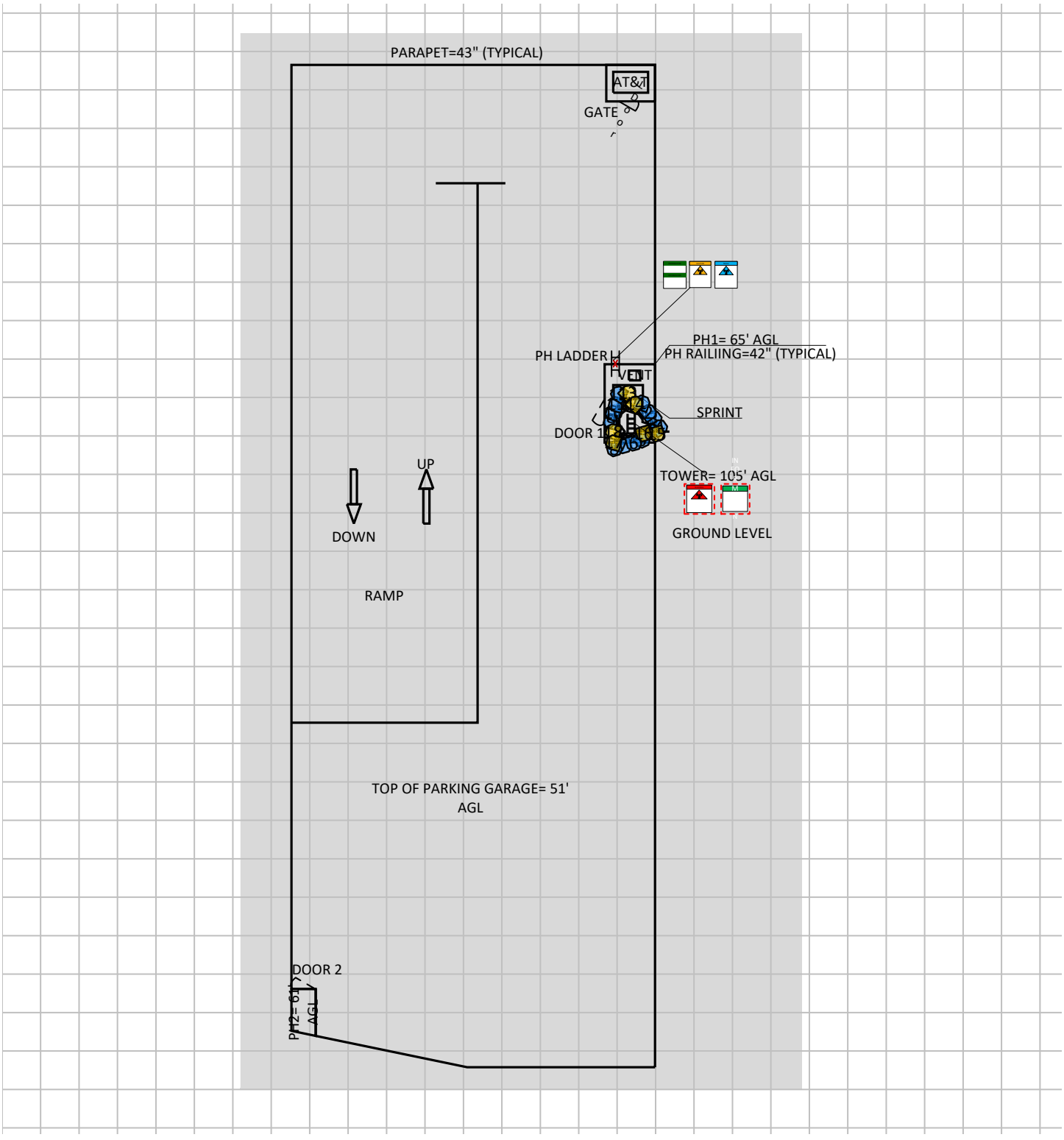
The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC **General Public** Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

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

	General Public Levels:		
Exposure Type:	**Maximum**	**Spatial Average**	**Spatial Average**
Reference Level:	**At Antenna Level**	**Top Level of Parking Garage**	**Ground**
AT&T Mobility, LLC:	10,955.0%	0.02%	0.001%
Composite:	10,955.0%	0.02%	0.001%

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

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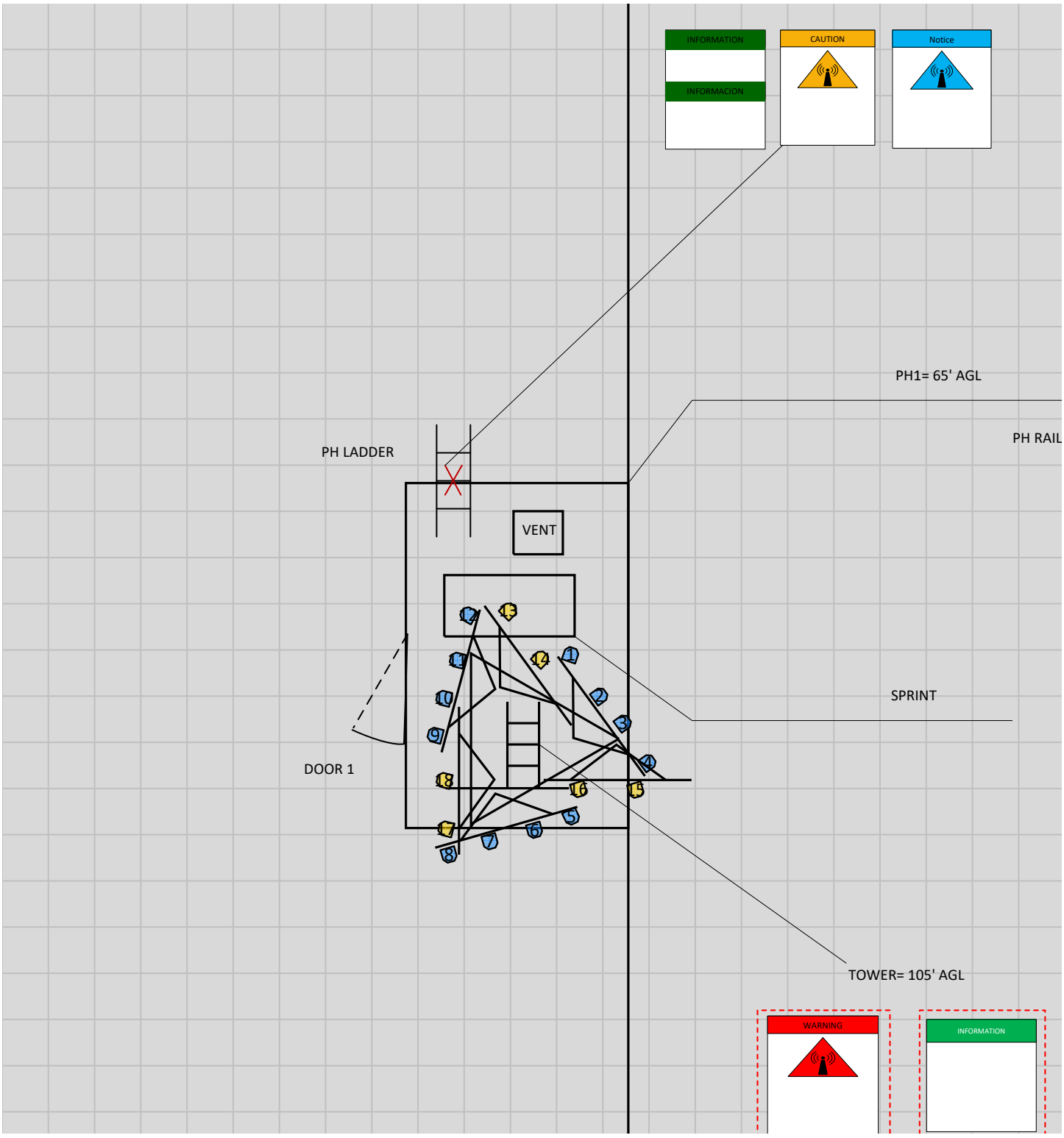
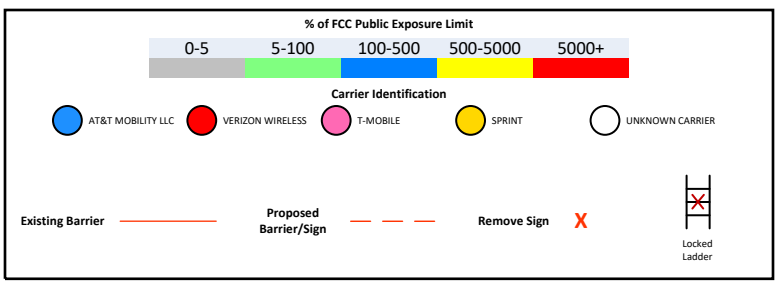
6/8/2020 7:08:54 PM

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

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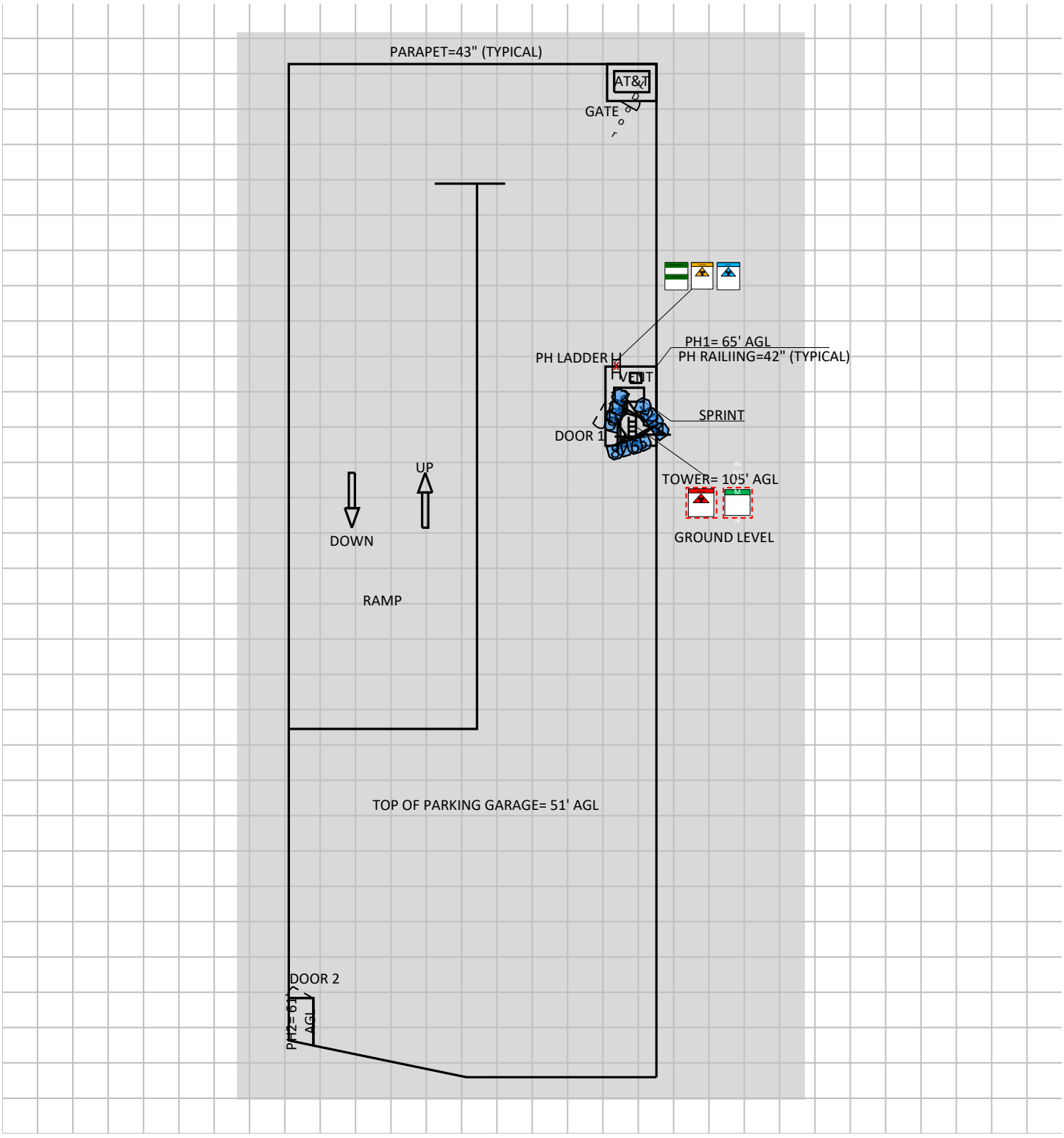
6/8/2020 7:10:00 PM

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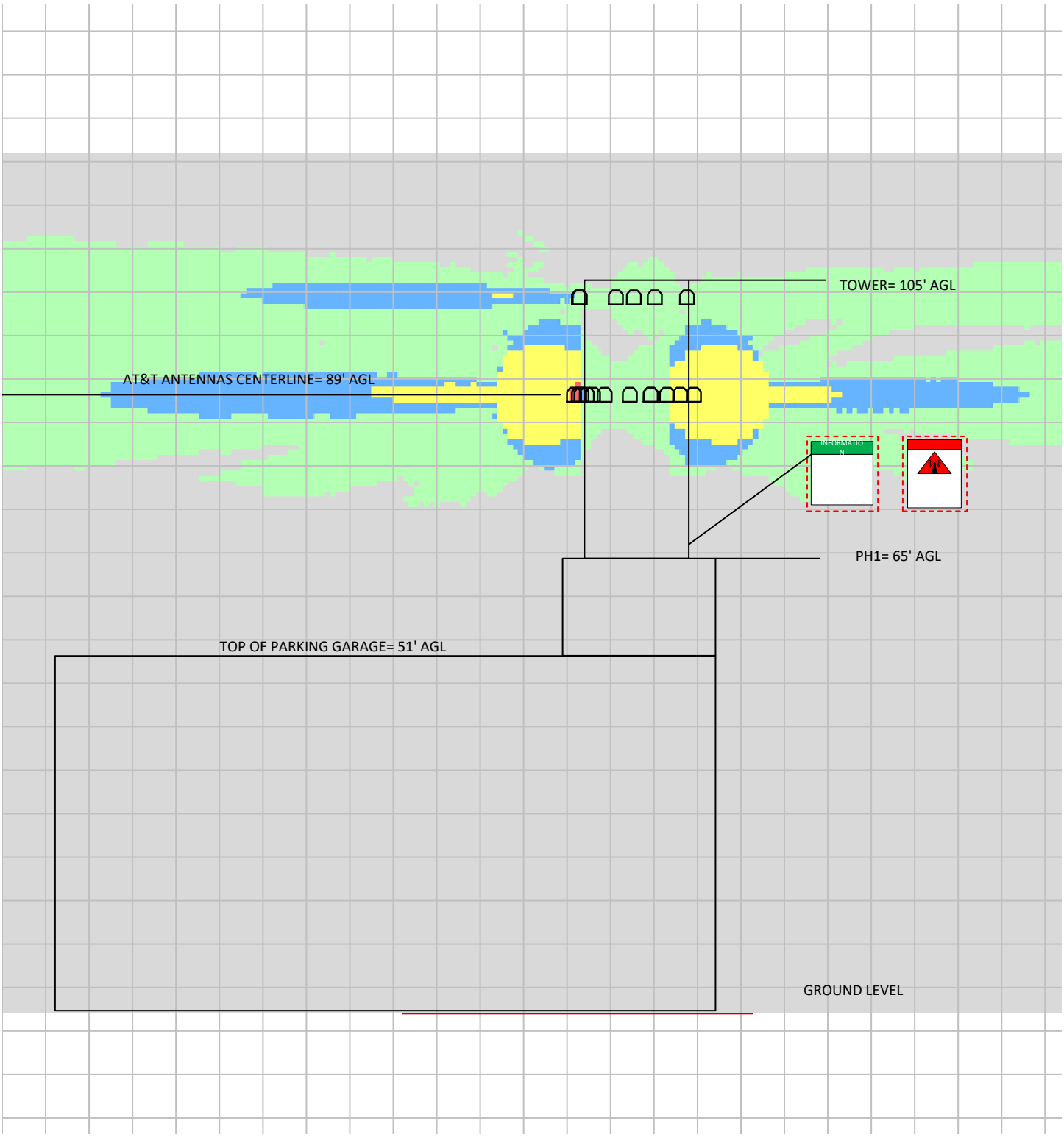
Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

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.

November 19, 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.

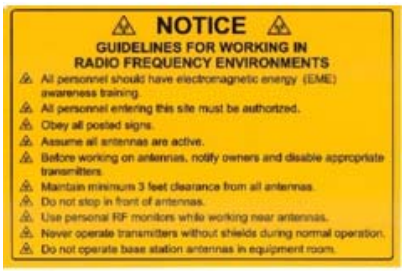
1. All individuals needing access to the main site (or the area indicated to be in excess of General Public MPE) should wear a personal protective monitor (PPM), successfully complete proper RF Safety Awareness training, and have and be trained in the use of appropriate personal protective equipment.

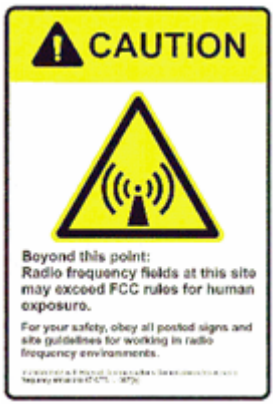
2. All individuals needing access to the main site should be instructed to read and obey all posted placards and signs.

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