

## Crown Castle

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

January 8, 2021

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

**RE:** Notice of Exempt Modification for T-Mobile:

842869 - T-Mobile Site ID: CT11733B 450 West Main Street, Meriden, CT 06451

Latitude: 41° 32′ 24.11″ / Longitude: -72° 49′ 8.47″

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 86-foot mount on the existing 100-foot Monopole Tower, located at 450 West Main Street, Meriden, CT. The tower is owned by Crown Castle and the property is owned by Hunter Family Limited Partnership. T-Mobile now intends to replace three (3) existing antennas with three (3) new 2500/2500 MHz antennas and three (3) new 600/700/1900 MHz antennas. The new antennas will be installed at the 86-ft mount level of the tower and are capable of providing 5G service. T-Mobile is also proposing tower mount modification pursuant to the enclosed Mount Analysis.

# **Planned Modifications:**

# Tower:

# Remove:

(2) 1 5/8" Coax

# Remove and Replace:

- (3) LNX 6515DS-A1M Antenna (REMOVE) (3) AIR6449 B41 Antenna 2500/2500 MHz (REPLACE)
- (3) RRUS11 B12 (REMOVE) (3) Radio 4449 B71/B12 (REPLACE)

# Install New:

- (2) 1 5/8" Hybrid Fiber Line
- (3) RFS-APXVAARR24 43-U-NA20 Antenna 600/700/1900 MHz
- (3) Radio 4415 B25

# **Existing to Remain:**

- (9) 1 5/8" Coax
- (2) Fiber line
- (3) AIR32 B66A B2A Antenna 1900/2100 MHz
- (3) AIR21 KRC118023-1 B2A B4P Antenna 1900/2100 MHz
- (3) TMA

# **Ground:**

Proposed 4'x6' concrete equipment pad for (2) proposed cabinets.

The Foundation for a Wireless World.

CrownCastle.com

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The facility was approved for a replacement tower by the Connecticut Siting Council in Petition No. 614 on March 11, 2013.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Kevin Scarpati, Mayor for the City of Meriden, Paul Dickson, Planning Director, Crown Castle as the tower owner, and the Hunter Family Limited Partnership as the property owner.

- 1. The proposed modifications will not result in an increase in the height of the existing tower.
- 2. The proposed modifications will not require the extension of the site boundary.
- 3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
- 4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
- 5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
- 6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Anne Marie Zsamba.

Sincerely,

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

Attachments

cc:

Kevin Scarpati, Mayor City of Meriden Office of the Mayor

# Melanie A. Bachman

# Page 3

142 East Main Street Meriden, CT 06450 203.630.4084

Paul Dickson, Planning Director City of Meriden Planning & Zoning 142 East Main Street Meriden, CT 06450 203.630.4084

Hunter Family Limited Partnership, Property Owner 450 West Main Street Meriden, CT 06451

Crown Castle, Tower Owner



# After printing this label:

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Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of \$100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of \$100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is \$1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

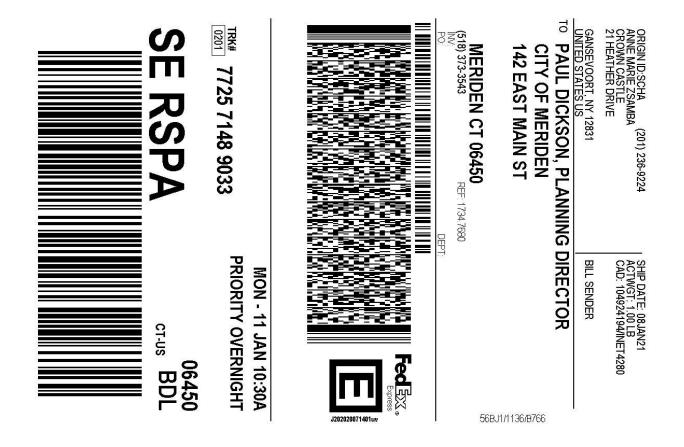


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# Exhibit A

**Original Facility Approval** 

# Petition No. 614 AT&T Wireless PCS, LLC Staff Report March 11, 2003

On March 5, 2003, Connecticut Siting Council (Council) member Philip T. Ashton and Christina Lepage of the Council staff met with AT&T Wireless PCS, LLC (AT&T) representatives Anthony Gioffre III, and Charisma King at 450-478 West Main Street, Meriden, Connecticut for the inspection of an existing tower site. The existing property and structure are owned by Hunters Family Limited Partnership. AT&T proposes to replace the existing structure and is petitioning the Council for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need (Certificate) is required for the modification.

The existing facility consists of a 100-foot guyed lattice tower, which is currently used by Hunter's Ambulance Company. AT&T proposes to replace the existing guyed lattice tower with a 100-foot monopole approximately 15 feet to the southeast. Existing antennas used by the ambulance company would be relocated to the top of the monopole. AT&T proposes to install 6 panel antennas at the 100-foot level of the proposed monopole. The proposed monopole would be designed to accommodate the antennas of two additional carriers.

The proposed equipment would be located at the base of the tower within 7-foot by 16-foot equipment pad. An 8-foot high stockade fence would surround the equipment compound. AT&T proposes to install a retaining wall along the southern portion of the equipment compound.

Access to the site would be via an existing driveway. AT&T proposes to provide utilities to the site overhead from an existing utility pole to the south. The utility corridor would cross over property recently purchased by Hunter's Ambulance Company. Two new poles would be necessary to install a utility line to the site. AT&T submits that the proposed overhead utility installation would cause the least amount of disturbance to the site and surrounding area, due to the presence of bedrock, sidewalks and a parking lot.

Surrounding land uses include a mix of residential and commercial uses. The proposed site is zoned Commercial. The calculated cumulative worst-case radio frequency power density would not exceed the applicable standard.

AT&T contends that it would not need to construct a telecommunications tower to provide coverage to this area of Meriden, and the proposed modification of the existing structure would not cause a substantial adverse environmental effect. Staff recommends approval, with the condition that the tower be situated so as to avoid the removal of an existing tree.

# Exhibit B

**Property Card** 

**PROPERTY** 

PROPERTY INFORMATION Location: 450 WEST MAIN ST

Map/Lot: 0612-0202-0001-0002

INFORMATION Owner(s):

HUNTER FAMILY LTD PRTSHP

Owner Address:

450 W MAIN ST

MERIDEN, CT 06451

# **BUILDING** INFORMATION

Card Number:

Total Units: 0

| OVERVIEW               |                 |  |  |  |
|------------------------|-----------------|--|--|--|
| Building ID            | 9661            |  |  |  |
| Finished Area          | 27,374          |  |  |  |
| Comm/Rental<br>Units   | 0               |  |  |  |
| Living Units           | 0               |  |  |  |
| Building Type          | Mixed Use-<br>M |  |  |  |
| Year Built             | 1980            |  |  |  |
| Effective Yr Built     |                 |  |  |  |
| <b>Building Number</b> | 1               |  |  |  |
| Condo Name             |                 |  |  |  |

| INTERIOR DETAIL  | .s |
|------------------|----|
| Rooms            |    |
| BedRooms         |    |
| Full Bath        | 0  |
| Full Bath Rating |    |
| Half Bath        | 0  |
| Half Bath Rating |    |
| Kitchens         | 0  |
| Kitchen Rating   |    |
| Fireplaces       | 0  |
|                  |    |

| CONSTRUCTION DETAILS |            |  |  |  |
|----------------------|------------|--|--|--|
| Exterior             | Brick      |  |  |  |
| Roof Structure       | Gable      |  |  |  |
| Roof Cover           | Asphalt    |  |  |  |
| Quality              | С          |  |  |  |
| Heat Fuel            | Oil        |  |  |  |
| Heat Type            | Forced Air |  |  |  |
| Prcnt. Heated        | 100.00     |  |  |  |
| Prcnt. AC            | 50.00      |  |  |  |
| Stories              | 2 story    |  |  |  |
| Foundation           | Concrete   |  |  |  |

Sub Area **Summary** 

| Building ID | Description | Total Area | Fin. Area | Perimeter |
|-------------|-------------|------------|-----------|-----------|
| 9661        | 1st FLOOR   | 4,980      | 4,980     | 388       |
| 9661        | 1st FLOOR   | 3,988      | 3,988     | 272       |
| 9661        | 2nd FLOOR   | 4,980      | 4,980     | 388       |
| 9661        | CARPORT     | 4,312      | 0         | 284       |
| 9661        | GARAGE      | 1,248      | 0         | 152       |
| 9661        | OPEN PORCH  | 160        | 0         | 74        |

No Special Features found.

APPRAISAL INFORMATION Tax District: 2 District Name: INNER DISTRICT District Mill Rate: 43.41

Grand List Year: 2019

| Land<br>Appraised | Building<br>Appraised | Yard<br>Appraised | Total<br>Appraised<br>Value | Land<br>Assessed | Building<br>Assessed | Yard<br>Assessed | Special<br>Land<br>Value | Total<br>Assessed<br>Value |
|-------------------|-----------------------|-------------------|-----------------------------|------------------|----------------------|------------------|--------------------------|----------------------------|
| \$487,100         | \$1,578,500           | \$42,800          | \$2,108,400                 | \$340,970        | \$1,104,950          | \$29,960         | \$0                      | \$1,475,880                |

Previous Year: 2018

| Lan<br>Valu |     | Building<br>Value | Yard<br>Items | Appraised<br>Value | Land<br>Value | Building<br>Value | Yard<br>Items | Assessed<br>Value |
|-------------|-----|-------------------|---------------|--------------------|---------------|-------------------|---------------|-------------------|
| \$487,      | 400 | \$1,578,400       | \$42,800      | \$2,108,600        | \$341,180     | \$1,104,880       | \$29,960      | \$1,476,020       |

LAND INFORMATION

| Land Use                              | Zoning       | Land Area | Neighborhood Description |  |  |  |
|---------------------------------------|--------------|-----------|--------------------------|--|--|--|
| Comm Bldg                             | C <b>-</b> 2 | 2.60069   | OUTER W. MAIN            |  |  |  |
| *Confirm zoning with Planning Office. |              |           |                          |  |  |  |

Zoning map is the official document to determine zone.

SALES INFORMATION

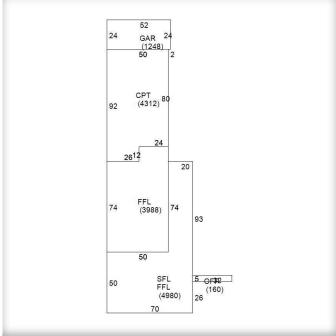
|                               | Sale Date  | e Sale Price | Book | Page | Grantor | Grantee | Deed Type |
|-------------------------------|------------|--------------|------|------|---------|---------|-----------|
| 12/31/1997 \$650,000 2322 336 | 12/31/1997 | \$650,000    | 2322 | 336  |         |         |           |

**ASSESSOR'S PERMIT HISTORY** 

| Date       | Permit#      | Description   | Permit<br>Type | Status | Cost      |
|------------|--------------|---|----------------|--------|-----------|
| 5/10/2017  | B-17-<br>334 | REPLACE ROOF.   |                | Closed | \$31,275  |
| 4/21/2017  | B-17-<br>267 | REPLACE ANTENNA PANELS.ADD REMOTE RADIO HEADS TO CELL TOWER.  |                | Closed | \$15,000  |
| 3/6/2017   | B-17-<br>109 | AT&T REPLACE 3 ANTENNA & 3 RRU`S TO EXISTING EQUIPMENT.   |                | Closed | \$20,000  |
| 7/15/2016  | B-16-<br>659 | REPLACE 3 ANTENNAI W/NEW.   |                | Closed | \$19,450  |
| 9/24/2015  | B-15-<br>743 | AT&T ADD 3 ANTENNAE/3 RRU`S/1 FIBER LINE TO EXISTING EQUIPMENT ON TOWER.  |                | Closed | \$20,000  |
| 6/22/2015  | E-15-<br>295 | INSTALL NEW 150A SERVICE<br>(VERIZON).aPPROVED BY BLDG DEPT.  |                | Closed | \$25,000  |
| 5/18/2015  | E-15-<br>210 | NEW 200A/3PH/4W/ SERVICE FROM MDP<br>TO SHELTER BLDG.   |                | Closed | \$5,000   |
| 4/6/2015   | P-15-64      |   |                | Closed | \$10,000  |
| 2/20/2015  | B-15-61      | INSTALL ANTENNAE & GROUND EQUIPMENT FOR VERIZON WIRELESS TELE.  |                | Closed | \$75,000  |
| 1/5/2015   | B-14-<br>285 | ADD ANTENNAE TO EXISTING TOWER  |                | Closed | \$15,000  |
| 7/21/2014  | 2157         |   |                | Closed | \$30,000  |
| 6/6/2014   | 1664         |   |                | Closed | \$8,000   |
| 6/6/2014   | 1665         |   |                | Closed | \$1,000   |
| 2/25/2013  | 473          | SPRINT - MODIF. TO TELEC. INSTALLATION ON MONOPOLE TOWER, REPL. 3 ANTENNA & CABLES AND ADD RRH'S AND NOTCH FILTERS BEHIND THE NEW ANTENNA ON TOWER, ADD CIENA EQUIP. ENCL. & FIBER JUNCTION BOX & EITHER RETROFIT OR REPLACE BTS CABINET WITHIN EQUIP. SHELTER. |                | Closed | \$30,000  |
| 12/21/2012 | 3950         | AT&T - REMOVE & REPLACE ONE D.C.<br>POWER CABINET, INSTALL NEW LTE<br>EQUIPMENT ON OPEN SLAB, CONDUITS,<br>AC & DC CIRCUITS, FIBER OPTICS,<br>GROUNDING & BONDING.  |                | Closed | \$3,800   |
| 11/1/2012  | 3422         | AT&T - ADD 3 LTE ANTENNAS, SURGE<br>ARRESTOR, RRU`S, PURCELL CABINET,<br>CONCRETE PAD & DC/FIBER LINES  |                | Closed | \$25,000  |
| 12/5/2003  | 4261         | 200 AMP SERV  | CA             | Closed | \$9,400   |
| 12/5/2003  | 4261         | AT&T WIRELESS CELLSITE  | CA             | Closed | \$9,400   |
| 8/28/2003  | 3042         | REP EX COMMUNI TOWER  | CA             | Closed | \$125,000 |
| 8/28/2003  | 3042         | INSTALL COMMUNICA EQUIPME   | CA             | Closed | \$125,000 |
| 1/1/1900   | 3042         | INSTALL COMMUNICA EQUIPME   | CA             | Closed | \$125,000 |
| 1/1/1900   | 4261         | 200 AMP SERV  | CA             | Closed | \$9,400   |
| 1/1/1900   | 3042         | REP EX COMMUNI TOWER  | CA             | Closed | \$125,000 |
| 1/1/1900   | 4261         | AT&T WIRELESS CELLSITE  | CA             | Closed | \$9,400   |

# PROPERTY IMAGES





9663 0612-0202-0001-0002

# Exhibit C

**Construction Drawings** 

# T-MOBILE NORTHEAST LLC

# T-MOBILE SITE NUMBER: CT11733B CT733/AT&THNTR AMBLNCE FT CROWN CASTLE BU NUMBER: 842869

**462 WEST MAIN STREET** MERIDEN, CT 06451

# (67D5A992DB OUTDOOR CONFIGURATION)

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

**2018 CT STATE BUILDING CODE** BUILDING MECHANICAL 2015 IMC

2017 NEC



# DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME



# "CALL BEFORE YOU DIG"

WWW.CBYD.COM CALL 811

CALL THREE WORKING DAYS PRIOR TO DIGGING SAFETY PRECAUTIONS SHALL BE IMPLEMENTED BY CONTRACTOR(S) AT ALL TRENCHING IN ACCORDANCE WITH CURRENT OSHA STANDARDS.

COLOR CODE FOR UTILITY LOCATIONS

ELECTRIC - RED SEWER GAS/OIL - YELLOW PROPOSED EXCAVATION - WHITE TEL/CATV - ORANGE

# GENERAL NOTES

- 1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES. RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK, THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES,
- THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SE FORTH IN THE CONSTRUCTION AND CONSTRUCT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE
- THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE T-MOBILE REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF THE CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK IN THE EVENT OF DISCREPANCIES. THE CONTRACTOR SHALL PRICE THE MORE COSTLY OR EXPENSIVE WORK, UNLESS DIRECTED IN WRITING OTHERWISE.
- THE SCOPE OF WORK SHALL INCLUDE FURNISHING OF ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT
- THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- 6. THE CONTRACTOR SHALL OBTAIN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWINGS/CONTRACT DOCUMENTS.
- 7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.

- CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUM OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH
- 9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER CONTRACT
- 10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY PERMITS AND INSPECTIONS WHICH ARE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY, OR LOCAL GOVERNMENT AUTHORITY
- 1. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, FASEMENTS, PAVING. CURBING, ETC., DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE
- 12. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON PROPERTY, PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE
- 13. THE CONTRACTOR SHALL COMPLY WITH ALL OSHA REQUIREMENTS, AS WELL AS THE LATEST EDITIONS OF ANY PERTINENT STATE SAFETY REGULATIONS.
- 14. THE CONTRACTOR SHALL NOTIFY THE T-MOBILE REPRESENTATIVE WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE T-MOBILE REPRESENTATIVE.
- 15. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC., ON THE JOB.
- 16. THE CONTRACTOR SHALL RETURN ALL DISTURBED AREAS TO THEIR ORIGINAL CONDITION AT THE COMPLETION OF WORK

# PROJECT SUMMARY

T-MOBILE NORTHEAST LLC SITE NUMBER: CT11733B 103 MONARCH DRIVE CT733/AT&THNTR AMBI NCF FT SITE NAME: LIVERPOOL, NY 13088 462 WEST MAIN STREET SITE ADDRESS MERIDEN, CT 06451 PROJECT MANAGER CROWN CASTLE

1200 MACARTHUR BLVD, SUITE 200 3 CORPORATE PARK DRIVE MAHWAH, NJ 07430 CLIFTON PARK, NY 12065

LORI DEGENOVA CROWN BU NUMBER: (865) 296-8988 N 41.53997700° / W -72.81906000°

ARCHITECT/ENGINEER: INFINIGY ENGINEERING CONSTRUCTION TYPE: ANCHOR 1033 WATERVLIET SHAKER ROAD

ALBANY, NY 12205 ALEX WELLER

☐ INDOOR

**EXISTING** 

STEEL PLATFORM

# PROJECT DESCRIPTION

EXISTING SELF SUPPORT TEXISTING GUYED TOWER ☐ EXISTING TRANSMISSION TOWER ☑ EXISTING RBS 6131 TEXISTING WATER TANK

TOWER OWNER:

LAT./LONG.:

☐ EXISTING RBS 2106

CROWN CASTLE

☐ EXISTNG RBS 6201 T EXISTING BUILDING FXISTING MONOPOLE ☐ EXISTING FORT WORTH

☐ EXISTING EXISTING BATTERY ☐ SITE SUPPORT CABINET ☐ EXISTING PPC Ø GPS ☐ PANELBOARD

-MOBILE NORTHEAST LLC PROPOSES THE MODIFICATION OF AN UNMANNED RELESS BROADBAND FACILITY, INCLUDING REMOVE (3) PANEL ANTENNAS, INSTALL (6) PANEL ANTENNAS, REMOVE (3)

RRUS, INSTALL (6) RRUS, ADD (2) 6x12 HYBRID CABLES, REMOVE (2) EXISTING COAX. MODIFY EXISTING PLATFORM

ADD (1) 66160 CABINET, ADD (1) B160 BATTERY CABINET, REMOVE EXISTING

# SHEET INDEX

SHEET T-1 TITLE SHEET C-1 SITE PLAN C-2 COMPOUND PLAN & ELEVATION C-3 RF SCHEDULE C-4 EQUIPMENT SPECIFICATIONS GROUNDING DIAGRAMS ONE LINE DIAGRAM & PANEL SCHEDUL COAX/FIBER PLUMBING DIAGRAM N-1 GENERAL AND ELECTRICAL NOTES

SHEET NUMBER



0 NENIG

|          | SL      | JBMI'   | TTALS        |          |
|----------|---------|---------|--------------|----------|
| DATE     |         | DESCR   | PTION        | REVISION |
| 07/28/20 |         | FOR R   | EVIEW        | A        |
| 08/11/20 | REVI    | SED PEF | COMMENT      | В        |
| 11/13/20 | FO      | R CONS  | TRUCTION     | 0        |
| 12/23/20 | REVISED | INNERO  | DNNECT DESIG | N 1      |
| 01/07/21 |         | CODE /  | ADDED        | 2        |
|          |         |         |              |          |
|          |         |         |              |          |
|          |         |         |              |          |
|          |         |         |              |          |
|          |         |         |              |          |
|          |         |         |              |          |
| DEPT.    | DATE    | APP'D   | REVI         | SIONS    |

|   | RFE      |        |     |              |
|---|----------|--------|-----|--------------|
| ı | RF MAN.  |        |     |              |
| ı | ZONING   |        |     |              |
| Ш | OPS      |        |     |              |
| ı | CONSTR.  |        |     |              |
| ı | SITE AC. |        |     |              |
| ш |          |        |     |              |
| Ш | PRO.     | JECT N | 10: | 1039-C0002-C |

| PROJECT NO: | 1039-C0002-C |
|-------------|--------------|
| DRAWN BY:   | BMM          |
| CHECKED BY: | ASW          |
|             | 1111         |



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PROFESSIONAL SEAL

IOTE: IF DRAWINGS ARE 22"x34", USI GRAPHICAL SCALE AND/OR 1/2 TIMES OF THE NOTED SCALE

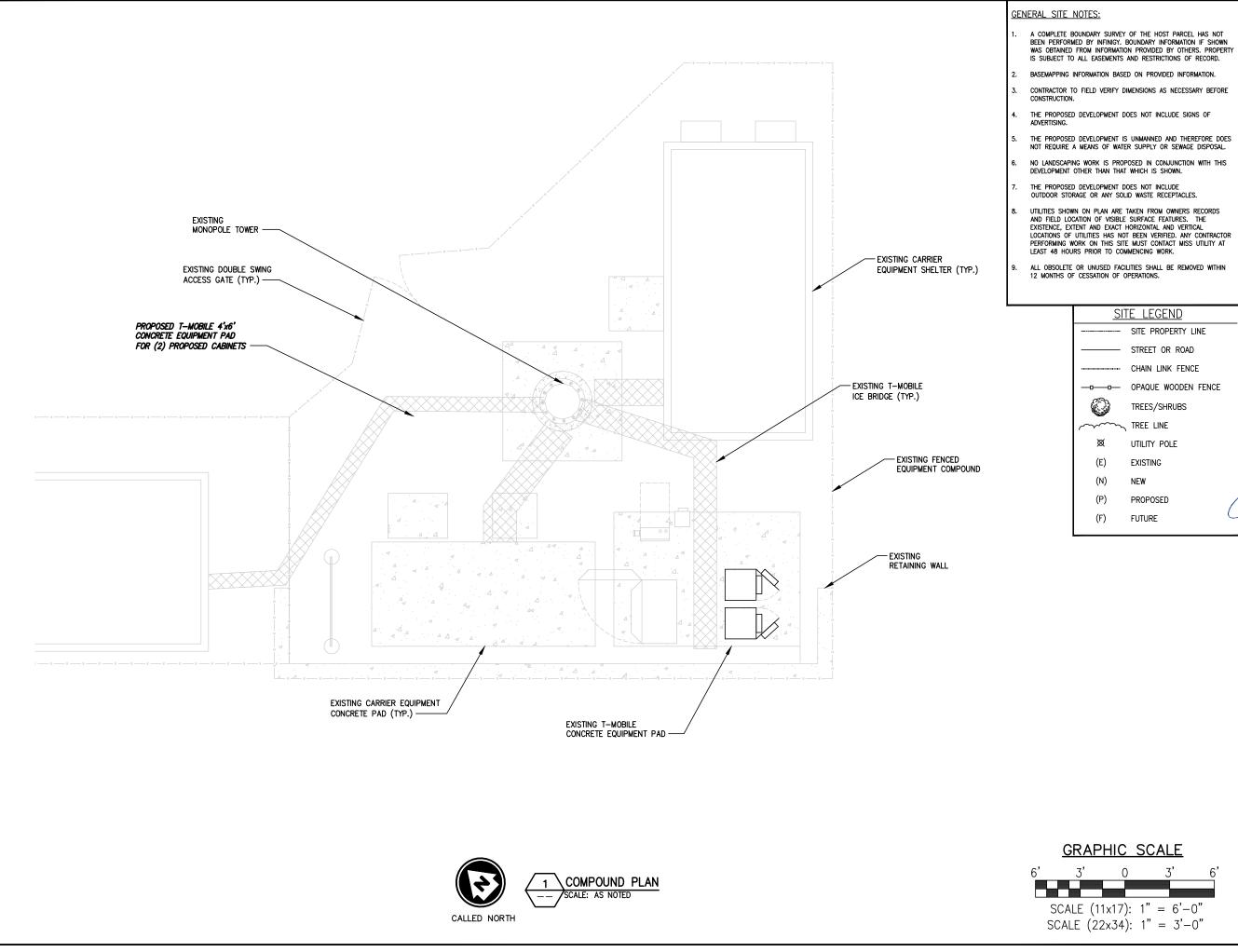
SITE NUMBER CT11733B SITE NAME

CT733/AT&THNTR AMBLNCE FT 462 WEST MAIN STREET MERIDEN, CT 06451

SHEET TITLE

TITLE SHEET

T-1





CROWN CASTLE 1200 MACARTHUR BLVD, SUITE 200 MAHWAH. NJ 07430

8 , PLLC INFINIGY

DESCRIPTION REVISION 07/28/20 FOR REVIEW
08/11/20 REVISED PER COMMEN 11/13/20 FOR CONSTRUCTION 12/23/20 REVISED INNERCONNECT DESIGN CODE ADDED

| DEPT.    | DATE | APP'D | REVISIONS |
|----------|------|-------|-----------|
| RFE      |      |       |           |
| RF MAN.  |      |       |           |
| ZONING   |      |       |           |
| OPS      |      |       |           |
| CONSTR.  |      |       |           |
| SITE AC. |      |       |           |

| PROJECT NO: | 1039-C0002-C |
|-------------|--------------|
| DRAWN BY:   | BMM          |
| CHECKED BY: | ASW          |
|             |              |

OF CONNE 34916 34916 SS17712 PROFESSIONAL SEAL

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SITE NUMBER CT11733B

**SITE NAME**CT733/AT&THNTR AMBLNCE FT

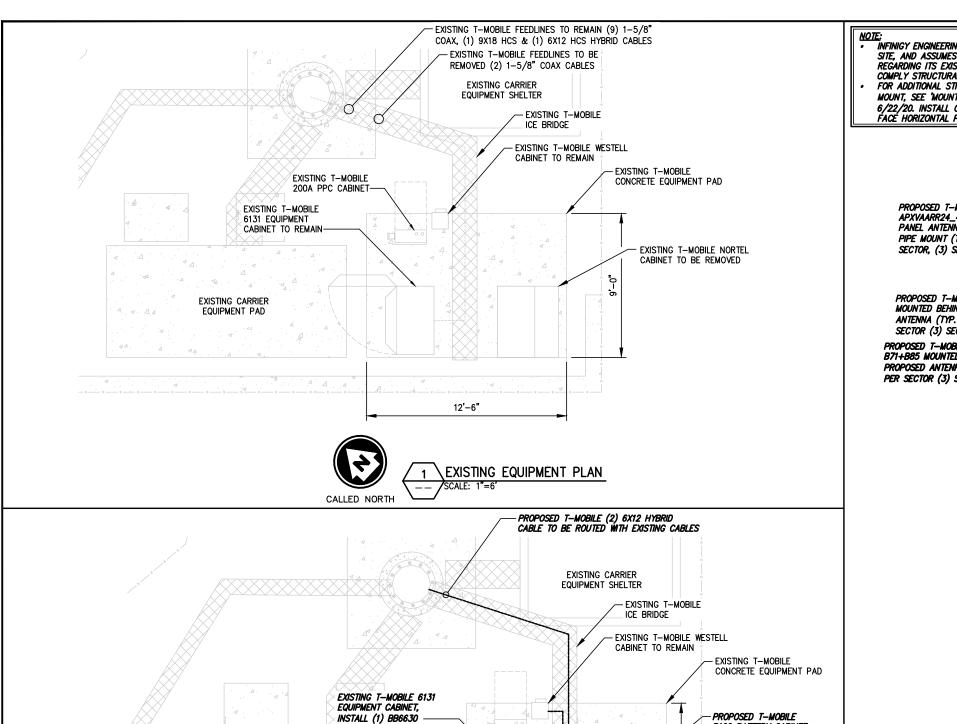
462 WEST MAIN STREET MERIDEN, CT 06451

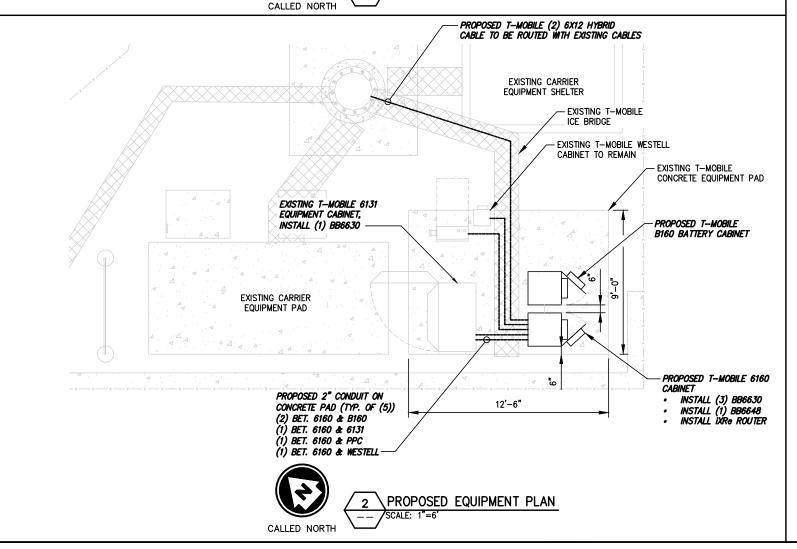
SHEET TITLE

**SITE PLAN** 

SHEET NUMBER

C-1

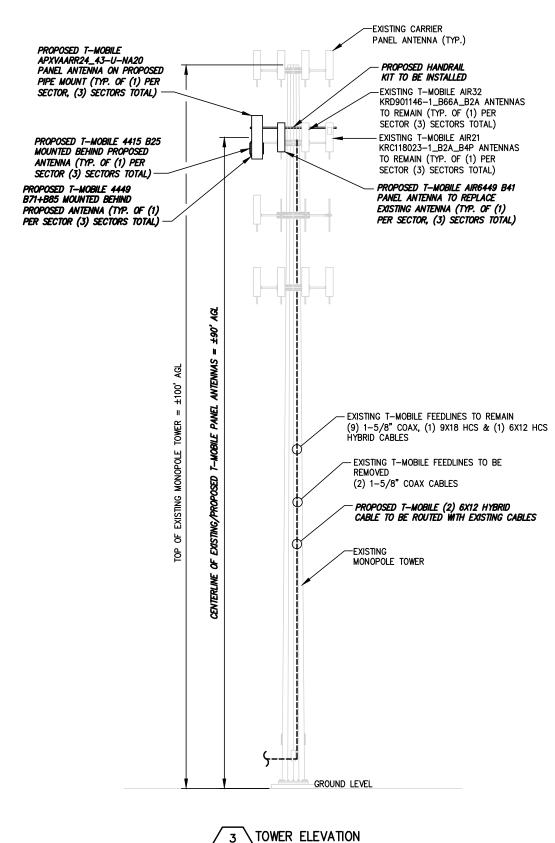




INFINIGY ENGINEERING HAS NOT EVALUATED THE TOWER LOADING FOR THIS SITE, AND ASSUMES NO RESPONSIBILITY FOR ITS STRUCTURAL INTEGRITY REGARDING ITS EXISTING OR PROPOSED LOADING. FINAL INSTALLATION TO

COMPLY STRUCTURAL ANALYSIS.

FOR ADDITIONAL STRUCTURAL INFORMATION PERTAINING TO THE ANTENNA
MOUNT, SEE 'MOUNT ANALYSIS REPORT' COMPLETED BY INFINIGY, DATED
6/22/20. INSTALL COMMSCOPE MT-195-12 HANDRAIL KIT 42" ABOVE MOUNT
FACE HORIZONTAL PRIOR TO INSTALLATION OF PROPOSED EQUIPMENT



**CROWN CASTLE** 

CROWN CASTLE 1200 MACARTHUR BLVD, SUITE 200 MAHWAH, NJ 07430

8 PLLC Rd NFINIGY

|          | SUBMITTALS                  |          |
|----------|-----------------------------|----------|
| DATE     | DESCRIPTION                 | REVISION |
| 07/28/20 | FOR REVIEW                  | A        |
| 08/11/20 | REVISED PER COMMENT         | 8        |
| 11/13/20 | FOR CONSTRUCTION            | 0        |
| 12/23/20 | REVISED INNERCONNECT DESIGN | 1        |
| 01/07/21 | CODE ADDED                  | 2        |
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| Ш | DEPT.    | DATE | APP'D | REVISIONS |
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| Ш | RFE      |      |       |           |
|   | RF MAN.  |      |       |           |
| Ш | ZONING   |      |       |           |
| Ш | OPS      |      |       |           |
|   | CONSTR.  |      |       |           |
|   | SITE AC. |      |       |           |

| ı | PROJECT NO: | 1039-C0002-C |
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| 1 | DRAWN BY:   | BMM          |
| 1 | CHECKED BY: | ASW          |



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SITE NUMBER CT11733B

SITE NAME CT733/AT&THNTR AMBLNCE FT

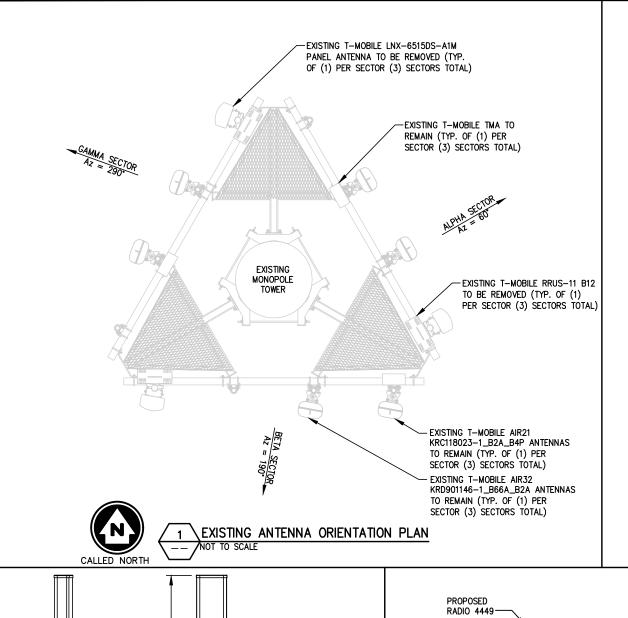
462 WEST MAIN STREET MERIDEN, CT 06451

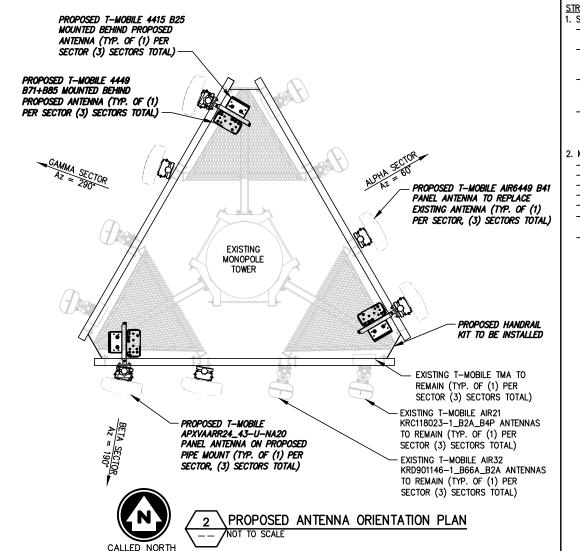
SHEET TITLE

**COMPOUND PLAN & ELEVATION** 

SHEET NUMBER

C-2





STRUCTURAL NOTES:

SPECIFICATIONS / CODES:

-CONCRETE WORK SHALL BE PERFORMED IN ACCORDANCE WITH LATEST EDITION OF THE ACI CODE -STEEL WORK SHALL BE PERFORMED IN ACCORDANCE

-SIEEL WORK SHALL BE PERFORMED IN ACCORDANC WITH AISC STEEL CONSTRUCTION MANUAL, 9th EDITION.
-WELDING SHALL BE PERFORMED IN ACCORDANCE WITH AMERICAN WELDING SOCIETY (AWS) D1.1–92 "STRUCTURAL WELDING" CODE-STEEL.
-REINFORCING STEEL SHALL BE PLACED IN ACCORDANCE WITH THE CONCRETE REINFORCING

STEEL INSTITUTE (CRSI), "MANUAL OF STANDARD

PRACTICE."

MATERIALS:

-CONCRETE: fc' - 3000psi. (MIN. U.N.O.)

-REINFORCING STEEL: ASTM A615, GRADE 60.

-WIRE MESH: ASTM A185.

-STRUCTURAL STEEL: ASTM A36.

-ELECTRODES FOR WELDING: E 70xx.

-GALVANIZING: ASTM A153 (BOLTS) OR ASTM A123 (SHAPES, PLATES). -EXPANSION BOLTS: HILTI KWIK BOLT II, STAINLESS

STEEL, 3/4" Øx43/4" EMBEDMENT OR AN APPROVED

**CROWN CASTLE** 

CROWN CASTLE 1200 MACARTHUR BLVD, SUITE 200 MAHWAH, NJ 07430

8 PLLC Rd 

|          | SUBMITTALS                  |          |
|----------|-----------------------------|----------|
| DATE     | DESCRIPTION                 | REVISION |
| 07/28/20 | FOR REVIEW                  | A        |
| 08/11/20 | REVISED PER COMMENT         | 8        |
| 11/13/20 | FOR CONSTRUCTION            | 0        |
| 12/23/20 | REVISED INNERCONNECT DESIGN | 1        |
| 01/07/21 | CODE ADDED                  | 2        |
|          |                             |          |
|          |                             |          |
|          |                             |          |
|          |                             |          |
|          |                             |          |

| DEPT.    | DATE | APP'D | REVISIONS |
|----------|------|-------|-----------|
| RFE      |      |       |           |
| RF MAN.  |      |       |           |
| ZONING   |      |       |           |
| OPS      |      |       |           |
| CONSTR.  |      |       |           |
| SITE AC. |      |       |           |

| PROJECT NO: | 1039-C0002-C |
|-------------|--------------|
| DRAWN BY:   | BMM          |
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SITE NUMBER CT11733B

SITE NAME CT733/AT&THNTR AMBLNCE FT

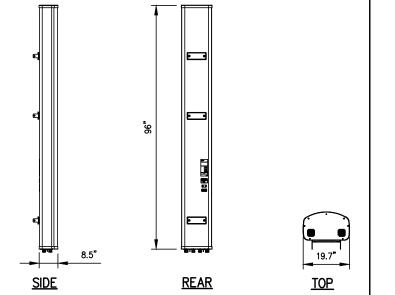
462 WEST MAIN STREET MERIDEN, CT 06451

SHEET TITLE

**ANTENNA DETAILS** 

SHEET NUMBER

**C-3** 



APXVAARR24\_43-U-NA20

96"x19.7"x8.5" (2438 x 500 x 216 mm)

FIBERGLASS, UV RESISTANT

60.5 LBS (133.4 kg) 7–16 DIN FEMALE

LIGHT GRAY

ANTENNA DETAIL

NOT TO SCALE

RFS MODEL NO .:

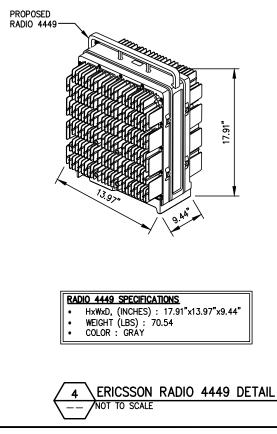
PRE-MOUNTED BRACKETS:

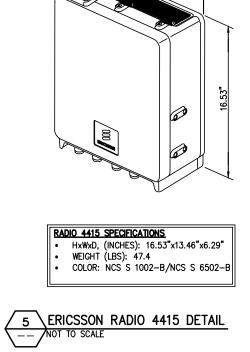
RADOME MATERIAL: RADOME COLOR:

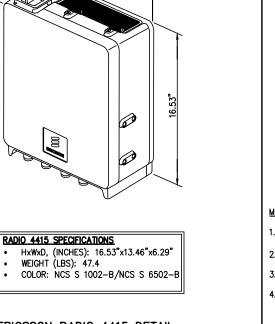
DIMENSIONS, HxWxD:

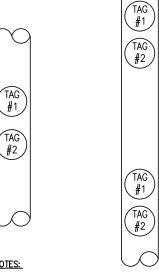
WEIGHT, W/

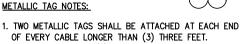
CONNECTOR:











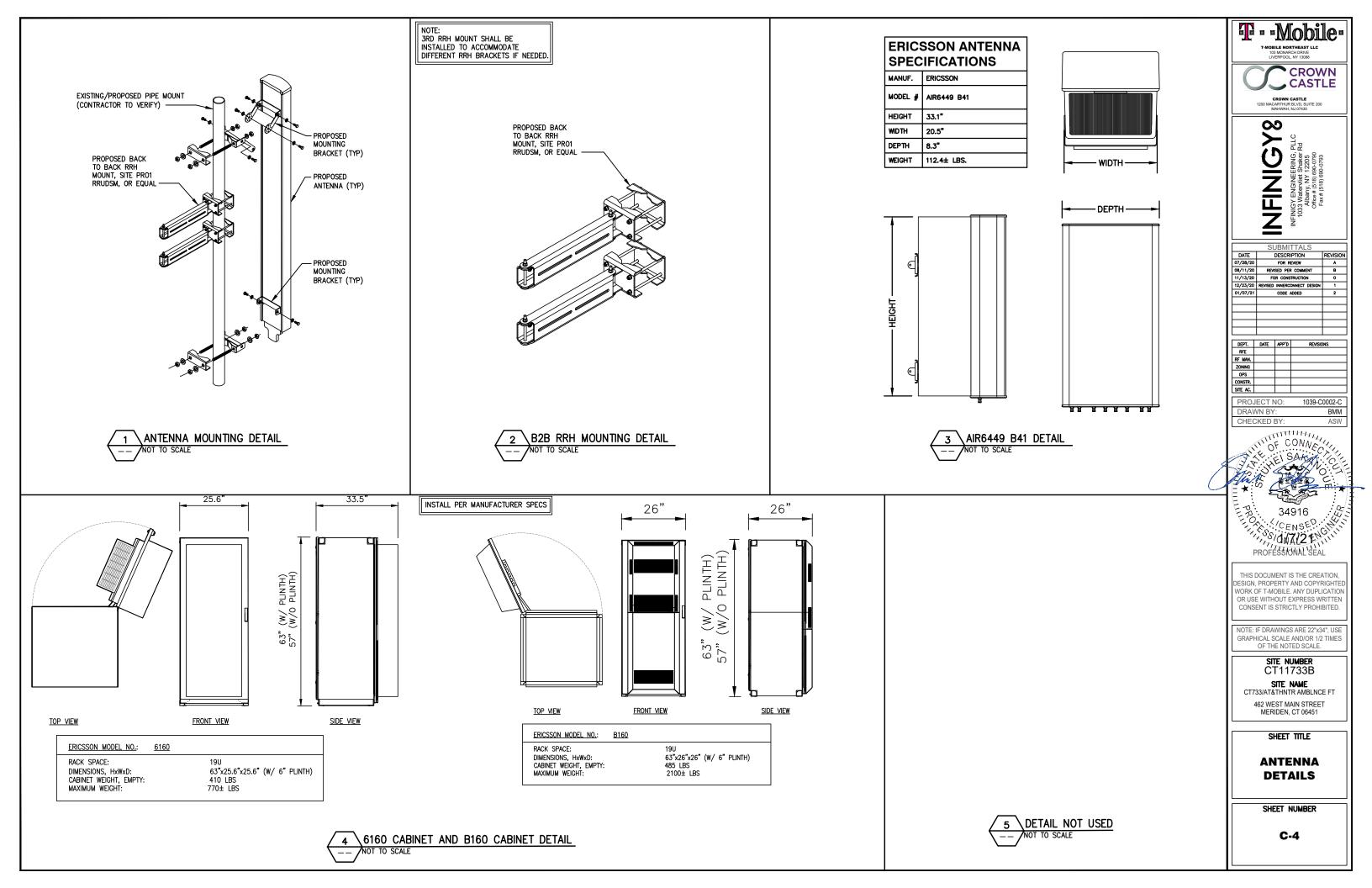
2. CABLES LESS THAN (3) THREE FEET WILL HAVE TWO METALLIC TAGS ATTACHED AT THE CENTER OF THE CABLE.

3. TAGS WILL BE FASTENED WITH STAINLESS STEEL ZIP TIES APPROPRIATE FOR CABLE DIAMETER.

4. STANDARDIZED METALLIC TAG KITS WILL BE ASSEMBLED

WITH TAGS ALREADY ENGRAVED TO ACCOMODATE ALL CONFIGURATIONS.

METALLIC TAG DETAIL NOT TO SCALE



|        | FINAL ANTENNA CONFIGURATION |                                |             |         |                    |                    |  |                                 |   |              |
|--------|-----------------------------|--------------------------------|-------------|---------|--------------------|--------------------|--|---------------------------------|---|--------------|
| SECTOR | BAND                        | ANTENNA MODEL                  | ANTENNA RAD | AZIMUTH | ELECTRICAL<br>TILT | MECHANICAL<br>TILT | RADIOS                                 | TMAS                            | CABLE FEED LINES                          | CABLE LENGTH |
|        | U1900/G1900/U2100           | (E) AIR21 KRC118023-1 B2A/B4P  | 90'-0"      | 60°     | 5*/5*              | 0.                 |  | (E) GENERIC TWIN STYLE 1B -     | (3) (E) COAX CABLES                       | ±110'        |
|        | L1900/L2100                 | (E) AIR32 KRD901146-1 B66A/B2A | 90'-0"      | 60°     | 5*/5*              | 0.                 |  |                                 | (1) (E) 9X18 HCS HYBRID<br>CABLE (SHARED) | ±110'        |
| Α      | L2500/N2500                 | (P) AIR6449 B41                | 90'-0"      | 60°     | 5°/5°              | O*                 |  |                                 | (1) (P) 6X12 HYBRID CABLE (SHARED)        | ±110'        |
|        | L600/L700/N600<br>/L1900    | (P) APXVAARR24_43-U-NA20       | 90'-0"      | 60°     | 5*                 | 0*                 | (P) RADIO 4449 B71+B85<br>(P) 4415 B25 |                                 | (1) (P) 6X12 HYBRID CABLE<br>(SHARED)     | ±110'        |
|        | U1900/G1900/U2100           | (E) AIR21 KRC118023-1 B2A/B4P  | 90'-0"      | 190°    | 5*/5*              | 0.                 |  | (E) GENERIC TWIN STYLE 1B -     | (3) (E) COAX CABLES                       | ±110'        |
| _      | L1900/L2100                 | (E) AIR32 KRD901146-1 B66A/B2A | 90'-0"      | 190°    | 5*/5*              | 0.                 |  |                                 | (1) (E) 9X18 HCS HYBRID<br>CABLE (SHARED) | ±110'        |
| В      | L2500/N2500                 | (P) AIR6449 B41                | 90'-0"      | 190°    | 5°/5°              | 0.                 |  |                                 | (1) (P) 6X12 HYBRID CABLE<br>(SHARED)     | ±110'        |
|        | L600/L700/N600<br>/L1900    | (P) APXVAARR24_43-U-NA20       | 90'-0"      | 190°    | 5*                 | 0.                 | (P) RADIO 4449 B71+B85<br>(P) 4415 B25 |                                 | (1) (P) 6X12 HYBRID CABLE<br>(SHARED)     | ±110'        |
|        | U1900/G1900/U2100           | (E) AIR21 KRC118023-1 B2A/B4P  | 90'-0"      | 290°    | 5*/5*              | 0.                 |  | (E) GENERIC TWIN STYLE 1B - AWS | (3) (E) COAX CABLES                       | ±110'        |
| 0      | L1900/L2100                 | (E) AIR32 KRD901146-1 B66A/B2A | 90'-0"      | 290°    | 5*/5*              | 0.                 |  |                                 | (1) (E) 9X18 HCS HYBRID<br>CABLE (SHARED) | ±110'        |
| С      | L2500/N2500                 | (P) AIR6449 B41                | 90'-0"      | 290°    | 5°/5°              | 0.                 |  |                                 | (1) (P) 6X12 HYBRID CABLE<br>(SHARED)     | ±110'        |
|        | L600/L700/N600<br>/L1900    | (P) APXVAARR24_43-U-NA20       | 90'-0"      | 290°    | 5°                 | 0.                 | (P) RADIO 4449 B71+B85<br>(P) 4415 B25 |                                 | (1) (P) 6X12 HYBRID CABLE<br>(SHARED)     | ±110'        |

<sup>\*</sup> PROPOSED CABLE LENGTH WAS DETERMINED USING THE SUM OF THE RAD CENTER OF ANTENNAS, AND DISTANCE FROM EXISTING EQUIPMENT AREA TO TOWER BASE WITH AN ADDITIONAL 20% BUFFER. LENGTH TO BE VERIFIED IN FIELD PRIOR TO ORDERING MATERIALS.







CROWN CASTLE 1200 MACARTHUR BLVD, SUITE 200 MAHWAH, NJ 07430

INFINIGY8 INFINIGY ENGINEERING, PLLC 1033 Watervier Shaker Rd Albary, NY 12205 Office # (518) 690-0793 Fax # (518) 690-0793

| 07/28/20 FOR REVIEW A 08/11/20 REVISED PER COMMENT B 11/13/20 FOR CONSTRUCTION 0 12/23/20 REVISED INNERCONNECT DESIGN 1 01/07/21 CODE ADDED 2 |                    |                  |
|---|--------------------|------------------|
| 11/13/20         FOR CONSTRUCTION         0           12/23/20         REVISED INNERCONNECT DESIGN         1                                  | JISED DER COMMENT  |                  |
| 12/23/20 REVISED INNERCONNECT DESIGN 1  | HOLD I LIK COMMENT | 8                |
| · · ·   | OR CONSTRUCTION    | 0                |
| 01/07/21 CODE ADDED 2   | INNERCONNECT DES   | IGN 1            |
|   | CODE ADDED         | 2                |
|   |                    |                  |
|   |                    | INNERCONNECT DES |

| DEPT.    | DATE | APP'D | REVISIONS |
|----------|------|-------|-----------|
| RFE      |      |       |           |
| RF MAN.  |      |       |           |
| ZONING   |      |       |           |
| OPS      |      |       |           |
| CONSTR.  |      |       |           |
| SITE AC. |      |       |           |

| 1 | PROJECT NO: | 1039-C0002-C |
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| 1 | CHECKED BY: | ASW          |



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SITE NUMBER CT11733B

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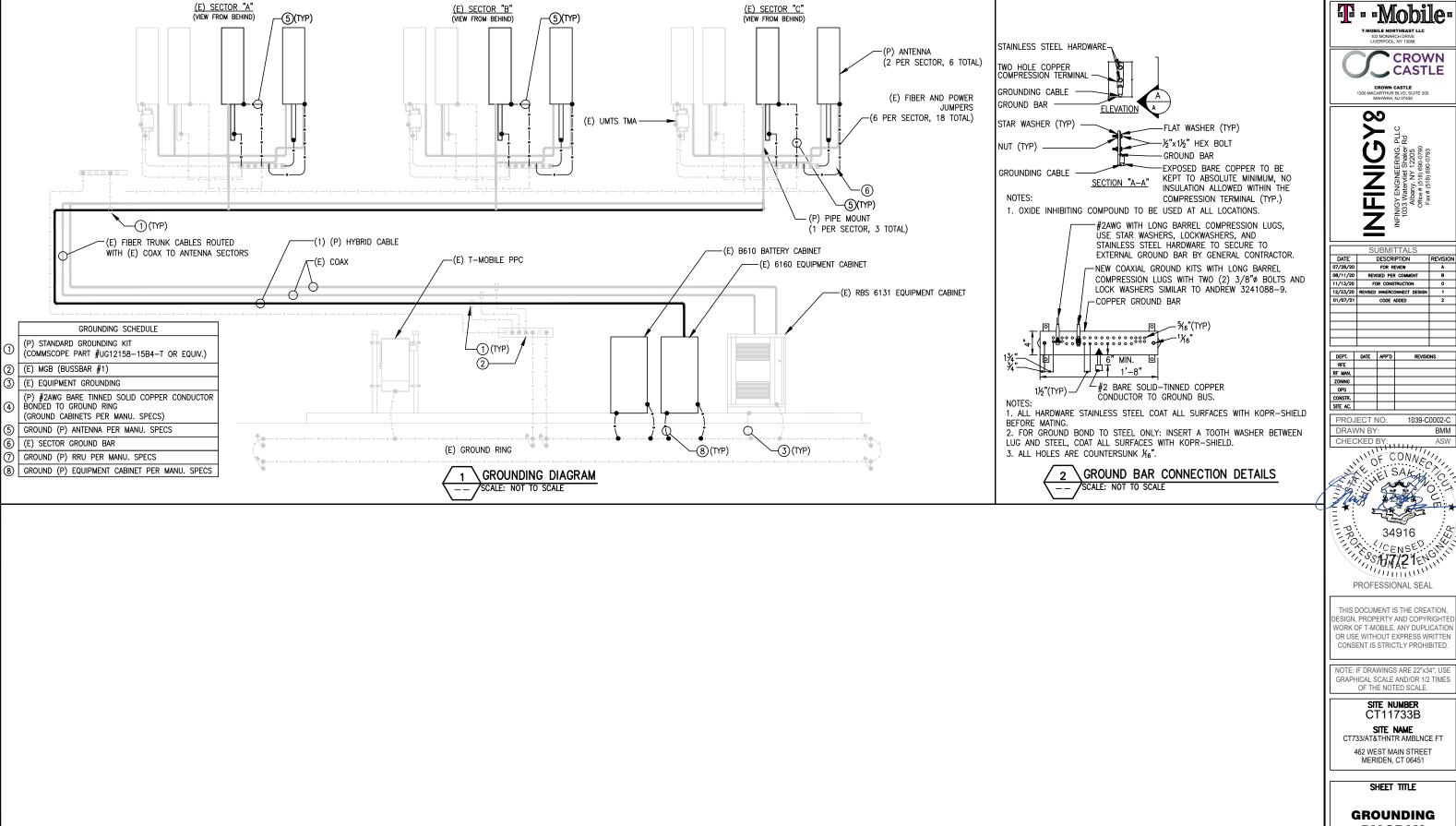
462 WEST MAIN STREET MERIDEN, CT 06451

SHEET TITLE

**ANTENNA DETAILS** 

SHEET NUMBER

C-5



CROWN **CASTLE** 

| SUBMITTALS |                             |          |  |  |  |  |  |
|------------|-----------------------------|----------|--|--|--|--|--|
| DATE       | DESCRIPTION                 | REVISION |  |  |  |  |  |
| 7/28/20    | FOR REVIEW                  | A        |  |  |  |  |  |
| 08/11/20   | REVISED PER COMMENT         | 8        |  |  |  |  |  |
| 1/13/20    | FOR CONSTRUCTION            | 0        |  |  |  |  |  |
| 2/23/20    | REVISED INNERCONNECT DESIGN | 1        |  |  |  |  |  |
| 01/07/21   | CODE ADDED                  | 2        |  |  |  |  |  |
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| RFE      |      |       |           |
| RF MAN.  |      |       |           |
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CT11733B

SHEET TITLE

**GROUNDING** DIAGRAM

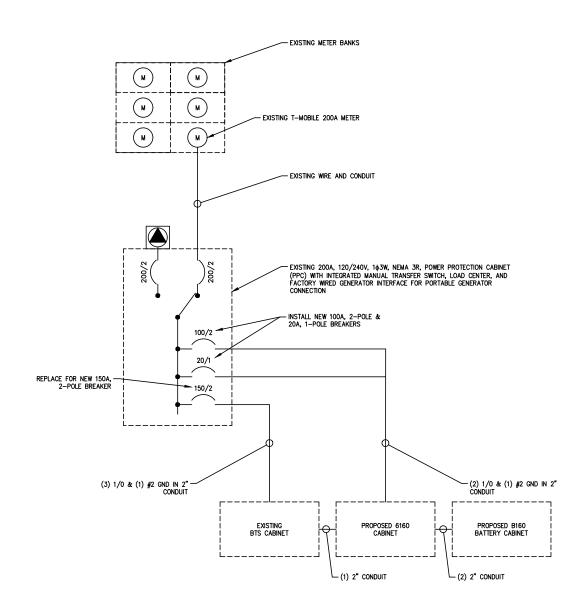
SHEET NUMBER

E-1

| T-MOBILE PANEL SCHEDULE                     |           |           |          |             |                       |          |  |   |                               |             |                             |
|---|-----------|-----------|----------|-------------|-----------------------|----------|--|---|-------------------------------|-------------|-----------------------------|
| MAIN: 200A MAIN BREAKER VOTAGE/PHASE: 120/2 |           |           |          |             | 240V, 1-PHASE, 3-WIRE |          |  |   | SHORT CIRCUIT CURRENT RATING: |             |                             |
| MOUNTING: INSIDE PPC ENCLO                  | SURE      |           | ENCLOSUR | E: NEMA 3R  |                       |          |  |   | SURGE PRO                     | DTECTION DI | EVICE: YES                  |
|   |           |           |          |             | PHASE LO              | ADS (VA) |  |   |                               |             |                             |
| DESCRIPTION                                 | LOAD (VA) | CorNC     | C/B      | CIR No.     | Α                     | В        | CIR No.  | C/B   | C or NC                       | LOAD (VA)   | DESCRIPTION                 |
| SURGE SUPPRESSOR                            | 0         | NC        | - 60     | 1           | 180                   |          | 2  | 20  | NC                            | 180         | GFCI                        |
| SUNGE SUFFRESSON                            | 0         | NC        | 00       | 3           |                       | 0        | 4  | 50  | С                             | 0           | MAIN BTS                    |
| 6301 (RENAME TO 6131)                       | 9000      | С         | 150      | 5           | 9000                  |          | 6  | 30  | С                             | 0           | IVIAIN 613                  |
| 0301 (RENAME 10 0131)                       | 9000      | С         | 130      | 7           |                       | 13500    | 8  | 100   | С                             | 4500        | 6160**                      |
| SAFETY LIGHT                                | 180       | NC        | 15       | 9           | 4680                  |          | 10   | 100   | С                             | 4500        | 0100                        |
|   |           |           |          | 11          |                       | 180      | 12   | 20  | NC                            | 180         | 6160 GFCI*                  |
|   |           |           |          | 13          | 0                     |          | 14   |   |                               |             |                             |
|   |           |           |          | 15          |                       | 0        | 16   |   |                               |             |                             |
| BLANK                                       |           |           |          | 17          | 0                     |          | 18   |   |                               |             | BLANK                       |
|   |           |           |          | 19          |                       | 0        | 20   |   |                               |             | BLAINK                      |
|   |           |           |          | 21          | 0                     |          | 22   |   |                               |             |                             |
|   |           |           |          | 23          |                       | 0        | 24   |   |                               |             |                             |
|   |           |           | BASE     | LOAD (VA) = | 13860                 | 13680    | C = CONTINUOUS LOAD; NC = NON-CONTINUOUS LOAD          |   |                               |             |                             |
|   |           | 25% OF CC | NTINUOUS | LOAD (VA) = | 3375                  | 3375     | * F  | REMOVE WI   | RE TO EXIST                   | ING BREAKEI | R AND MARK AS SPARE         |
| TOTAL LOAD (VA) =                           |           |           |          |             | 17235                 | 17055    | **   | **INDICATES NEW LOAD. ALL OTHER LOADS ARE EXISTING. |                               |             | LOADS ARE EXISTING.         |
| TOTAL LOAD (A) =                            |           |           |          |             | 144                   | 143      | NEW BREA   | AKER TO BE  | SAME TYPE                     | AND HAVE SA | AME AIC RATING AS EXISTING. |
|   |           |           |          |             |                       |          | CUSTOMER HAS NOT PROVIDED LOADS FOR EQUIPMENT CABINETS |   |                               |             |                             |
| THEREFORE THE CABINET LOA                   |           |           |          |             |                       |          | ADS SHOWN  | ARE ESTIMATED VALUES.                               |                               |             |                             |

## NOTES:

- ALL NEW CONDUCTORS TO BE INSTALLED SHALL BE COPPER. ALL CONDUCTORS SHALL BE THHW, THWN, THWN-2, XHHW, OR XHHW-2 UNLESS NOTED OTHERWISE.
- CONTRACTOR IS TO FIELD VERIFY ALL EXISTING ITEMS SHOWN ON THE ELECTRICAL ONE—LINE DIAGRAM AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
- 3. ALL GROUNDING AND BONDING PER THE NEC.







CROWN CASTLE

CROWN CASTLE 1200 MACARTHUR BLVD, SUITE 200 MAHWAH, NJ 07430

INFINIGY ENGINEERING, PLLC 1033 Waterviler Shaker Rd Albany, NY 12205 Office# (161) 690-0790

| SUBMITTALS |                             |          |  |  |  |  |  |  |
|------------|-----------------------------|----------|--|--|--|--|--|--|
| DATE       | DESCRIPTION                 | REVISION |  |  |  |  |  |  |
| 07/28/20   | FOR REVIEW                  | Α        |  |  |  |  |  |  |
| 08/11/20   | REVISED PER COMMENT         | 8        |  |  |  |  |  |  |
| 11/13/20   | FOR CONSTRUCTION            | 0        |  |  |  |  |  |  |
| 12/23/20   | REVISED INNERCONNECT DESIGN | 1        |  |  |  |  |  |  |
| 01/07/21   | CODE ADDED                  | 2        |  |  |  |  |  |  |
|            |                             |          |  |  |  |  |  |  |
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| RF MAN.  |      |       |           |
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SITE NAME CT733/AT&THNTR AMBLNCE FT

462 WEST MAIN STREET MERIDEN, CT 06451

SHEET TITLE

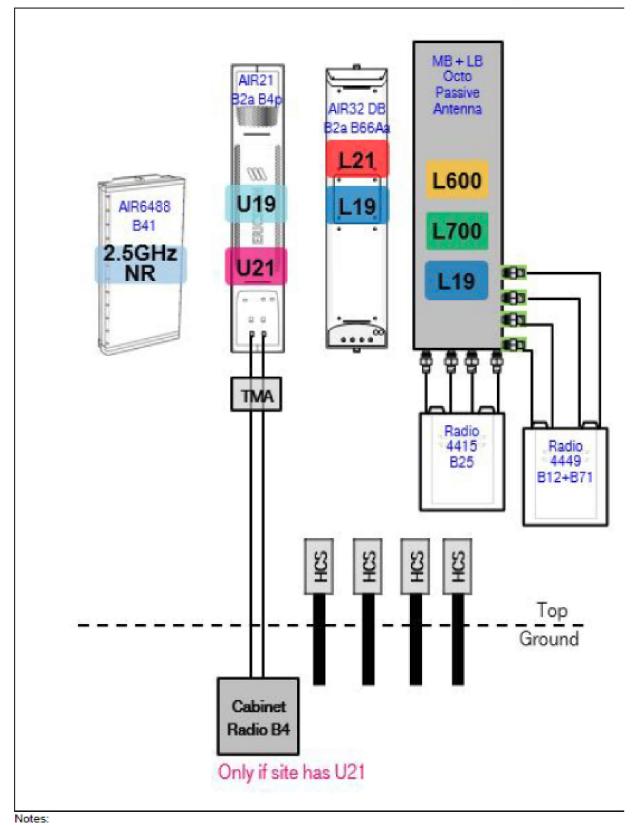
ONE LINE DIAGRAM & PANEL SCHEDULE

SHEET NUMBER

E-2



5/11/2020



1 COAX/FIBER PLUMBING DIAGRAM

-- NOT TO SCALE



CROWN

CROWN CASTLE 1200 MACARTHUR BLVD, SUITE 200 MAHWAH, NJ 07430

INFINICY ENGINEERING, PLC

INFINIGY ENGINEERING, PLLC 1033 Watervitet Shaker Rd Albany, INY 12205 Office # (518) 690-0790 Fax# (518) 690-0793

| SUBMITTALS |                             |          |  |  |  |  |
|------------|-----------------------------|----------|--|--|--|--|
| DATE       | DESCRIPTION                 | REVISION |  |  |  |  |
| 07/28/20   | FOR REVIEW                  | A        |  |  |  |  |
| 08/11/20   | REVISED PER COMMENT         | 8        |  |  |  |  |
| 11/13/20   | FOR CONSTRUCTION            | 0        |  |  |  |  |
| 12/23/20   | REVISED INNERCONNECT DESIGN | 1        |  |  |  |  |
| 01/07/21   | CODE ADDED                  | 2        |  |  |  |  |
|            |                             |          |  |  |  |  |
|            |                             |          |  |  |  |  |
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|            |                             |          |  |  |  |  |

| DEPT.    | DATE | APP'D | REVISIONS |
|----------|------|-------|-----------|
| RFE      |      |       |           |
| RF MAN.  |      |       |           |
| ZONING   |      |       |           |
| OPS      |      |       |           |
| CONSTR.  |      |       |           |
| SITE AC. |      |       |           |
|          |      |       |           |

| Ш | PROJECT NO: | 1039-C0002-C |
|---|-------------|--------------|
|   | DRAWN BY:   | BMM          |
| П | CHECKED BY: | ASW          |



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NOTE: IF DRAWINGS ARE 22"x34", USE GRAPHICAL SCALE AND/OR 1/2 TIMES OF THE NOTED SCALE.

> SITE NUMBER CT11733B

**SITE NAME**CT733/AT&THNTR AMBLNCE FT

462 WEST MAIN STREET MERIDEN, CT 06451

SHEET TITLE

COAX/FIBER PLUMBING DIAGRAM

SHEET NUMBER

E-3

1. INCLUDE ALL LABOR, MATERIALS, EQUIPMENT, PLANT SERVICES AND ADMINISTRATIVE TASKS REQUIRED TO COMPLETE AND MAKE OPERABLE THE ELECTRICAL WORK SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN, INCLUDING BUT NOT LIMITED TO THE

### FOLLOWING:

- A. PREPARE AND SUBMIT SHOP DRAWINGS, DIAGRAMS AND ILLUSTRATIONS.
- PAY ALL REQUIRED FEES AND CHARGES IN CONNECTION WITH THE WORK OF THIS CONTRACT
- C. SUBMIT AS-BUILT DRAWINGS, OPERATING AND MAINTENANCE INSTRUCTIONS AND MANUALS.
- D. EXECUTE ALL CUTTING, DRILLING, ROUGH AND FINISH PATCHING OF EXISTING OR NEWLY INSTALLED CONSTRUCTION PENETRATIONS THROUGH POST TENSION SLABS, X-RAY EXACT AREA OF PENETRATION PRIOR TO PERFORMING WORK.
  COORDINATE ALL X—RAY WORK WITH BUILDING ENGINEER.
- E. PROVIDE HANGERS, SUPPORTS, FOUNDATIONS, STRUCTURAL FRAMING SUPPORTS, AND BASES FOR CONDUIT AND EQUIPMENT PROVIDED OR INSTALLED UNDER THE WORK OF HIS CONTRACT. PROVIDE COUNTER FLASHING, SLEEVES AND
- SEALS FOR FLOOR AND WALL PENETRATIONS.

  MAINTAIN ALL EXISTING ELECTRICAL SERVICES IN THE BUILDING AREAS NOT AFFECTED BY THE ALTERATION DURING THE PROGRESS OF THE WORK INCLUDING PROVIDING ALL TEMPORARY JUMPERS, CONDUITS, CAPS, PROTECTIVE DEVICES. CONNECTIONS AND EQUIPMENT REQUIRED. PROVIDE TEMPORARY LIGHT AND POWER FOR CONSTRUCTION
- 2. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS TO CALL FOR AN INSTALLATION THAT IS COMPLETE IN EVERY RESPECT. IT IS NOT THE INTENT TO GIVE EVERY DETAIL ON THE DRAWINGS AND IN THE SPECIFICATIONS. IF AN ITEM OF WORK IS INDICATED IN THE DRAWINGS, IT IS CONSIDERED SUFFICIENT FOR INCLUSION IN THE CONTRACT, FURNISH AND INSTALL ALL MATERIAL AND EQUIPMENT USUALLY FURNISHED OR NEEDED TO MAKE A COMPLETE INSTALLATION WHETHER OR NOT SPECIFICALLY MENTIONED IN THE CONTRACT DOCUMENTS.

- 1. PROVIDE ALL WORK IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AND LOCAL AND STATE ELECTRICAL
- 2. THE ELECTRICAL PLANS ARE DIAGRAMMATIC ONLY. REFER TO THE ARCHITECTURAL PLANS FOR THE EXACT DIMENSIONS OF THE BUILDING
- 3. LOAD CALCULATIONS ARE BASED ON EXISTING BUILDING INFORMATION/ORAMINOS PROVIDED TO ENGINEERING.
  CONTRACTOR IS TO VERIFY ALL EXISTING RATINGS AND LOADS
  PRIOR TO PURCHASING OF SPECIFIED EQUIPMENT FOR ANY DISCREPANCIES AND REQUEST FURTHER DIRECTION BY
- 4. EXISTING BUILDING EQUIPMENT IS NOTED ON THE DRAWINGS. NEW OR RELOCATED EQUIPMENT IS SHOWN WITH SOLID LINES.
  FUTURE EQUIPMENT (NOT IN THIS CONTRACT) IS DEPICTED WITH SHADED LINES. REQUEST CLARIFICATION OF DRAWINGS OR OF SPECIFICATIONS PRIOR TO PRICING OR INSTALLATION.

- 5. GENERAL
  A. AFTER CAREFULLY STUDYING THE DRAWINGS AND SPECIFICATIONS, AND BEFORE SUBMITTING THE PROPOSAL, MAKE A MANDATORY SITE VISIT TO ASCERTAIN CONDITIONS OF THE SITE AND THE NATURE AND EXACT QUANTITY OF WORK TO BE PERFORMED. NO EXTRA COMPENSATION WILL BE ALLOWED FOR FAILURE TO NOTIFY THE OWNER. IN WRITING. BETWEEN THE EXISTING CONDITIONS AND THE DRAWINGS AND
- B. VERIFY ALL MEASUREMENTS AT THE SITE AND BE RESPONSIBLE FOR CORRECTNESS OF SAME.

  6. QUALITY, WORKMANSHIP, MATERIALS AND SAFETY
- A. PROVIDE NEW MATERIALS AND EQUIPMENT OF A DOMESTIC MANUFACTURER BY THOSE REGULARLY ENGAGED IN THE PRODUCTION AND MANUFACTURE OF SPECIFIED MATERIALS AND EQUIPMENT. WHERE UL, OR OTHER AGENCY, HAS ESTABLISHED STANDARDS FOR MATERIALS PROVIDE MATERIALS WHICH ARE LISTED AND LABELED ACCORDINGLY. THE COMMERCIALLY STANDARD ITEMS OF EQUIPMENT AND THE SPECIFIC NAMES MENTIONED HEREIN ARE INTENDED FOR THE PROPER FUNCTIONING OF THE WORK.
- 3. WORK SHALL BE PERFORMED BY WORKMEN SKILLED IN THE TRADE REQUIRED FOR THE WORK. INSTALL MATERIALS AND EQUIPMENT TO PRESENT A NEAT APPEARANCE WHEN COMPLETED AND IN ACCORDANCE WITH THE APPROVED RECOMMENDATIONS OF THE MANUFACTURER AND IN ACCORDANCE WITH CONTRACT DOCUMENTS.
- C. PROVIDE LABOR, MATERIALS, APPARATUS AND APPLIANCES ESSENTIAL TO THE FUNCTIONING OF THE SYSTEMS DESCRIBED OR INDICATED HEREIN, OR WHICH MAY BE REASONABLY IMPLIED AS ESSENTIAL WHENEVER MENTIONED IN THE CONTRACT DOCUMENT OR NOT.
- D. MAKE WRITTEN REQUESTS FOR SUPPLEMENTARY INSTRUCTIONS TO ARCHITECT/ENGINEER IN CASE OF DOUBT AS TO WORK INTENDED OR IN EVENT OF NEED FOR EXPLANATION THEREOF.
- E. PERFORMANCE AND MATERIAL REQUIREMENTS SCHEDULED OR SPECIFIED ARE MINIMUM STANDARD ACCEPTABLE. THE RIGHT TO JUDGE THE QUALITY OF EQUIPMENT THAT DEVIATES FROM THE CONTRACT DOCUMENT REMAINS SOLELY WITH ARCHITECT/ENGINEER. CONTRACT DOCUMENT OR NOT.

1. GUARANTEE MATERIALS. PARTS AND LABOR FOR WORK FOR ONE YEAR FROM THE DATE OF ISSUANCE OF OCCUPANCY PERMIT. DURING THAT PERIOD, MAKE GOOD FAULTS OR IMPEREFCTIONS THAT MAY ARISE DUE TO DEFECTS OR OMISSIONS IN MATERIALS OR WORKMANSHIP WITH NO ADDITIONAL COMPENSATION AND AS DIRECTED BY ARCHITECT.

### CI FANING

- 1. REMOVE ALL CONSTRUCTION DEBRIS RESULTING FROM THE
- 2. CLEAN EQUIPMENT AND SYSTEMS FOLLOWING THE COMPLETION OF THE PROJECT TO THE SATISFACTION OF THE ENGINEER. COORDINATION AND SUPERVISION
- 1. CAREFULLY LAY OUT ALL WORK IN ADVANCE TO AVOID UNNECESSARY CUTTING, CHANNELING, CHASING OR DRILLING OF FLOORS, WALLS, PARTITIONS, CEILINGS OR OTHER SURFACES. WHERE SUCH WORK IS NECESSARY, HOWEVER, PATCH AND REPAIR THE WORK IN AN APPROVED MANNER BY SKILLED MECHANICS AT NO ADDITIONAL COST TO THE OWNER, RENDER FULL COOPERATION TO OTHER TRADES WHERE WORK WILL BE INSTALLED IN CLOSE PROXIMITY TO WORK OF OTHER TRADES ASSIST IN WORKING OUT SPACE CONDITIONS. IF WORK IS INSTALLED BEFORE COORDINATION WITH OTHER TRADES, OR CORRECT CONDITIONS WITHOUT EXTRA CHARGE.

### SUBMITTALS

- 1. AS-BUILT DRAWINGS
- A. UPON COMPLETION OF THE WORK, FURNISH TO THE OWNER "AS-BUILT" DRAWINGS.
- 2. SERVICE MANUALS:
- A. UPON COMPLETION OF THE WORK, FULLY INSTRUCT T-MOBILE AS TO THE OPERATION AND MAINTENANCE OF ALL MATERIAL, FOUIPMENT AND SYSTEMS.
- B. PROVIDE 3 COMPLETE BOUND SETS OF INSTRUCTIONS FOR OPERATING AND MAINTAINING ALL SYSTEMS AND EQUIPMENT.

### CUTTING AND PATCHING

- 1. PROVIDE ALL CUTTING, DRILLING, ROUGH AND FINISH PATCHING REQUIRED TO COMPLETE THE WORK.
- 2. OBTAIN OWNER APPROVAL PRIOR TO CUTTING THROUGH FLOORS OR WALLS FOR PIPING OR CONDUIT.

# TESTS, INSPECTION AND APPROVAL

- BEFORE ENERGIZING ANY ELECTRICAL INSTALLATION, INSPECT
  EACH UNIT IN DETAIL. TIGHTEN ALL BOLTS AND CONNECTIONS (TOROUE-TIGHTEN WHERE REQUIRED) AND DETERMINE THAT ALL OMPONENTS ARE ALIGNED, AND THE EQUIPMENT IS IN SAFE, OPERATIONAL CONDITION.
- 2. PROVIDE THE COMPLETE ELECTRICAL SYSTEM FREE OF GROUND FAULTS AND SHORT CIRCUITS SUCH THAT THE SYSTEM WILL OPERATE SATISFACTORILY UNDER FULL LOAD CONDITIONS, WITHOUT EXCESSIVE HEATING AT ANY POINT IN THE SYSTEM.

## SPECIAL REQUIREMENTS

- DO NOT LEAVE ANY WORK INCOMPLETE NOR ANY HAZARDOUS SITUATIONS CREATED WHICH WILL AFFECT THE LIFE OR SAFETY OF THE PUBLIC AND/OR BUILDING OCCUPANTS. DO NOT INTERFERE WITH OR CUTOFF ANY OF THE EXISTING SERVICES WITHOUT THE OWNER'S WRITTEN PERMISSION
- 2. WHEN NECESSARY TO TEMPORARILY DISCONNECT ANY EXISTING BUILDING UTILITIES AND SERVICE SYSTEMS, INCLUDING FEEDER OR BRANCH CIRCUITING SUPPLYING EXISTING FACILITIES, CONFER WITH THE OWNER AND ARRANGE THE PERIOD OF INTERRUPTION FOR A TIME MUTUALLY AGREED UPON.
  SHUTDOWN NOTE: SCHEDULE AND NOTIFY OWNER 48 HOURS PRIOR TO SHUTDOWN, ALL SHUTDOWN WORK TO BE SCHEDULED AT A TIME CONVENIENT TO OWNER.

- 1. ROUTE ALL GROUNDING CONDUCTORS AS SHOWN ON
- 2. ROUTE 500 KCMII CU. THEN CONDUCTOR FROM THE MGB LOCATION TO BUILDING STEEL. VERIFY BUILDING STEEL IS EFFECTIVELY GROUNDED PER NEC TO THE MAIN SERVICE GROUNDING ELECTRODE CONDUCTOR (GEC).
- 3. MAKE ALL GROUND CONNECTIONS FROM MGB TO ELECTRICAL EQUIPMENT WITH 2 HOLE, CRIMP TYPE, BURNDY COMPRESSION TERMINATIONS, SIZED AS REQUIRED.
- 4. USE 1 HOLE, CRIMP TYPE, BURNDY COMPRESSIONS TERMINATIONS, SIZED AS REQUIRED, AT EQUIPMENT GROUND CONNECTIONS
- 5. HIRE AN INDEPENDENT LAB TO PERFORM THE SPECIFIED OHMS TESTING. PROVIDE 4 SETS OF THE CERTIFIED DOCUMENTS TO THE OWNER FOR VERIFICATION PRIOR TO THE PROJECT COMPLETION.

- 1. ALL WIRING TO BE INSTALLED IN CONDUIT SYSTEMS IN
- ACCORDANCE WITH THE FOLLOWING:
  A. EXTERIOR FEEDERS AND CONTROL, WHERE UNDERGROUND, TO BE IN SCH 40 PVC.

  B. EXTERIOR, ABOVE GROUND POWER CONDUITS TO BE GALVANIZED RIGID STEEL (RGS).
- C. ALL TELECOMMUNICATION CONDUITS, INTERIOR/EXTERIOR, TO
- D. INSTALL PULL ROPES IN ALL NEW EMPTY CONDUITS INSTALLED ON THIS PROJECT. E. ALL TELECOM CONDUITS AND PULL BOXES INSTALLED ON THIS PROJECT TO BE LABELED "T—MOBILE". OWNER WILL
- PROVIDE LABELS FOR CONTRACTOR TO INSTALL.
  F. INTERIOR FEEDERS TO BE INSTALLED IN E.M.T. WITH STEEL
- COMPRESSION FITTINGS.
  G. MINIMUM SIZE CONDUIT TO BE 3/2" TRADE SIZE
- UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
  H. FINAL CONNECTIONS TO MOTORS AND VIBRATING EQUIPMENT TO BE INSTALLED IN LIQUID—TIGHT FLEXIBLE METAL CONDUIT.

  I. CONDUIT TO BE RUN CONCEALED IN CEILINGS, FINISHED
- AREAS OR DRYWALL PARTITIONS, UNLESS OTHERWISE NOTED.
  THE ROUTING OF CONDUITS INDICATED ON THE DRAWINGS IS DIAGRAMMATIC. BEFORE INSTALLING ANY WORK. EXAMINE THE
- TRADES TO DETERMINE THE EXACT LOCATIONS AND K. ALL EXTERIOR MOUNTING HARDWARE TO BE GALVANIZED STEEL. COORDINATE WITH BUILDING ENGINEER PRIOR TO ATTACHING TO BUILDING STRUCTURE.

### RACEWAYS CONT'D

- L. PENETRATIONS OF WALLS, FLOORS AND ROOFS, FOR THE PASSAGE OF ELECTRICAL RACEWAYS, TO BE PROPERLY SEALED AFTER INSTALLATION OF RACEWAYS SO AS TO MAINTAIN THE STRUCTURAL OR WATERPROOF INTEGRITY OF THE WALL, FLOOR OR ROOF SYSTEM TO BE PENETRATED. SEAL ALL CONDUIT PENETRATIONS THROUGH FIRE OR SMOKE RATED WALLS, CEILINGS OR SMOKE TIGHT CORRIDOR PARTITIONS TO MAINTAIN PROPER RATING OF WALL OR
- M. PROVIDE ALL CONDUIT ENDS WITH INSULATED METALLIC GROUNDING BUSHINGS.
- CONDUIT TO BE SUPPORTED AT MAXIMUM DISTANCE OF 3'-0", OR AS REQUIRED BY NEC, IN HORIZONTAL AND VERTICAL DIRECTIONS.
- PROVIDE STAINLESS STEEL BLANK COVER PLATES FOR ALL JUNCTION BOXES AND/OR OUTLET BOXES NOT USED IN EXPOSED AREAS. PROVIDE ALL OTHER UNUSED BOXES WITH STANDARD STEEL COVER PLATES.
- P. WHERE APPLICABLE, PROVIDE ROOFTOP CONDUIT SUPPORT SYSTEM, CONFORMING TO ROOFTOP WARRANTY REQUIREMENTS,

## WIRES AND CABLES

- 1. CONTRACTOR TO COORDINATE WITH EQUIPMENT SUPPLIER AND VENDOR FOR EXACT EQUIPMENT OVER-CURRENT PROTECTION VOLTAGE, WIRE SIZE AND PLUG CONFIGURATION, IF APPLICABLE, PRIOR TO BID.
- 2. ALL EQUIPMENT/DEVICES TO BE PROVIDED WITH INSULATED GROUND CONDUCTOR.
- 3. ALL WIRE AND CABLE TO BE 600VOLT, COPPER, WITH THWN/ THHN INSULATION, EXCEPT AS NOTED.
- WIRE FOR POWER AND LIGHTING WILL NOT BE LESS THAN NO. 12AWG. ALL WIRE NO. 8 AND LARGER TO BE STRANDED.
- CONTROL WIRING IS NOT TO BE LESS THAN NO. 14AWG, FLEXIBLE IN SINGLE CONDUCTORS OR MULTI-CONDUCTOR CABLES. CONTROL WIRING WILL CONSIST OF MULTI-CONDUCTOR CABLES WHEREVER POSSIBLE. CABLES TO BE PROVIDED WITH AN OVERALL FLAME-RETARDANT, EXTRUDED JACKET AND RATED FOR PLENUM USE. ALL CONTROL WIRE TO BE 600VOLT RATED.
- 6. WIRE PREVIOUSLY PULLED INTO CONDUIT IS CONSIDERED USED
- 7. HOME RUNS AND BRANCH CIRCUIT WIRING FOR 20A, 120V

| CIRCUITS:<br>LENGTH (FT.) | HOME RUN WIRE SIZE |
|---------------------------|--------------------|
| 0 TO 50                   | NO. 12             |
| 51 TO 100                 | NO. 10             |
| 101 TO 150                | NO D               |

- 8. VOLTAGE DROP IS NOT TO EXCEED 3%. 9. MAKE ALL CONNECTIONS WITH UL APPROVED, SOLDERLESS, PRESSURE TYPE INSULATED CONNECTORS: SCOTCHLOK OR AND APPROVED EQUAL.
- 1 ALL RECEPTACLES INSTALLED IN THIS PROJECT TO BE GROUNDING TYPE, WITH GROUNDING PIN SLOT CONNECTED TO DEVICE GROUND SCREW FOR GROUND WIRE CONNECTION. DISCONNECT SWITCHES AND FUSES

  1. DISCONNECT SWITCHES TO BE VOLTAGE—RATED TO SUIT THE
- CHARACTERISTICS OF THE SYSTEM FROM WHICH THEY ARE
- 2. PROVIDE HEAVY-DUTY, METAL-ENCLOSED, EXTERNALLY-OPERATED DISCONNECT SWITCHES, FUSED OR UNFUSED, OF SUCH TYPE AND SIZE AS REQUIRED TO PROPERLY PROTECT OR DISCONNECT THE LOAD FOR WHICH THEY ARE INTENDED.
- 3 PROVIDE NEMA 1 DISCONNECT SWITCHES FOR INTERIOR INSTALLATION, NEMA 3R FOR EXTERIOR INSTALLATION.
- 4. DISCONNECT SWITCHES TO BE MANUFACTURED BY: GENERAL ELECTRIC COMPANY B. SQUARE-D
- PROVIDE RK-1 TYPE FUSES, UNLESS NOTED OTHERWISE. INSTALLATION
- . INSTALL DISCONNECT SWITCHES WHERE INDICATED ON DRAWINGS.
- 2. INSTALL FUSES IN FUSIBLE DISCONNECT SWITCHES. FUSES Z. INSTALL FUSES IN FUSIBLE DISCONNECT SWITCHES. FUSES
  MUST MATCH IN TYPE AND RATING.

  3. FUSES TO BE MOUNTED SO THAT THE LABELS SHOWING THEIR
  RATINGS CAN BE READ WITHOUT REQUIRING FUSE REMOVAL.
- 4. FURNISH AND DEPOSIT SPARE FUSES AT THE JOB SITE AS
- A. THREE SPARES FOR EACH TYPE AND SIZE, IN EXCESS OF
- 60A, USED FOR INITIAL FUSING.

  B. TEN PERCENT SPARES FOR EACH TYPE AND SIZE. UP TO AND INCLUDING 60A, USED FOR INITIAL FUSING. IN NO CASE WILL LESS THAN THREE FUSES OF ONE PARTICULAR TYPE AND SIZE BE FURNISHED.

# **GENERAL NOTES:**

- 1. THESE SPECIFICATIONS AND CONSTRUCTION DRAWINGS ACCOMPANYING THEM DESCRIBE THE WORK TO BE DONE AND THE MATERIALS TO BE FURNISHED FOR CONSTRUCTION.
- THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO BE FULLY EXPLANATORY AND SUPPLEMENTARY. HOWEVER, SHOULD ANYTHING BE SHOWN, INDICATED, OR SPECIFIED ON ONE AND NOT THE OTHER, IT SHALL BE DONE THE SAME AS IF SHOWN, INDICATED OR SPECIFIED IN BOTH
  3. THE INTENTION OF THE DOCUMENTS IS TO INCLUDE ALL LABOR
- AND MATERIALS REASONABLY NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK AS STIPULATED IN THE CONTRACT 4. THE PURPOSE OF THE SPECIFICATIONS IS TO INTERPRET THE
- INTENT OF THE DRAWINGS AND TO DESIGNATE THE METHOD OF THE PROCEDURE, TYPE AND QUALITY OF MATERIALS REQUIRED TO COMPLETE THE WORK. 5. MINOR DEVIATIONS FROM THE DESIGN LAYOUT ARE ANTICIPATED AND SHALL BE CONSIDERED AS PART OF THE WORK. NO CHANGES THAT ALTER THE CHARACTER OF THE WORK WILL BE MADE OR PERMITTED BY THE OWNER WITHOUT ISSUING A

- 1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATIONS OF ALL MEASUREMENTS AT THE SITE BEFORE ORDERING ANY MATERIALS OR DOING ANY WORK. NO EXTRA CHARGE OR COMPENSATION SHALL BE ALLOWED DUE TO DIFFERENCE BETWEEN ACTUAL DIMENSIONS AND DIMENSIONS INDICATED ON THE CONSTRUCTION DRAWINGS. ANY SUCH DISCREPANCY IN DIMENSION WHICH MAY BE FOUND SHALL BE SUBMITTED TO THE OWNER FOR CONSIDERATION BEFORE THE CONTRACTOR PROCEEDS WITH THE WORK IN THE AFFECTED AREAS.
- THE BIDDER, IF AWARDED THE CONTRACT, WILL NOT BE ALLOWED ANY EXTRA COMPENSATION BY REASON OF ANY MATTER OR THING CONCERNING SUCH BIDDER MIGHT HAVE FULLY INFORMED THEMSELVES PRIOR TO THE BIDDING.
- 3. NO PLEA OF IGNORANCE OF CONDITIONS THAT EXIST. OR OF DIFFICULTIES OR CONDITIONS THAT MAY BE ENCOUNTERED, OR OF ANY OTHER RELEVANT MATTER CONCERNING THE WORK TO BE PERFORMED IN THE EXECUTION OF THE WORK WILL BE ACCEPTED AS AN EXCUSE FOR ANY FAILURE OR OMISSION ON THE PART OF THE CONTRACTOR TO FULFILL EVERY DETAIL OF ALL THE REQUIREMENTS OF THE CONTRACT DOCUMENTS

- CONTRACTS AND WARRANTIES

  1. CONTRACTOR IS RESPONSIBLE FOR APPLICATION AND PAYMENT OF CONTRACTOR LICENSES AND BONDS.

  2. SEE MASTER CONTRACTION SERVICES AGREEMENT FOR
  - ADDITIONAL DETAILS.

 ALL MATERIALS MUST BE STORED IN A LEVEL AND DRY FASHION
 AND IN A MANNER THAT DOES NOT NECESSARILY OBSTRUCT THE FLOW OF OTHER WORK. ANY STORAGE METHOD MUST MEET ALL RECOMMENDATIONS OF THE ASSOCIATED MANUFACTURER.

### CLEANUP

- 1. THE CONTRACTORS SHALL, AT ALL TIMES, KEEP THE SITE FREE FROM ACCUMULATION OF WASTE MATERIALS OR RUBBISH CAUSED BY THEIR EMPLOYEES AT WORK AND AT THE COMPLETION OF THE WORK. THEY SHALL REMOVE ALL RUBBISH FROM AND ABOUT THE BUILDING AREA. INCLUDING ALL THEIR TOOLS, SCAFFOLDING AND SURPLUS MATERIALS AND SHALL LEAVE THEIR WORK CLEAN AND READY TO USE.
- A. VISUALLY INSPECT EXTERIOR SURFACES AND REMOVE ALL TRACES OF SOIL, WASTE MATERIALS, SMUDGES AND OTHER FORFIGN MATTER.
- B. REMOVE ALL TRACES OF SPLASHED MATERIALS FROM ADJACENT SURFACES.
- AUJACENT SURFACES.

  C. IF NECESSARY, TO ACHIEVE A UNIFORM DEGREE OF CLEANLINESS, HOSE DOWN THE EXTERIOR OF THE STRUCTURE.
- 3. INTERIOR TRACES OF SOIL, WASTE MATERIALS, SMUDGES AND OTHER FOREIGN MATTER FROM WALLS, FLOOR, AND CEILING.
- B. REMOVE ALL TRACES OF SPLASHED MATERIALS FROM ADJACENT SURFACES.
  C. REMOVE PAINT DROPPINGS, SPOTS, STAINS, AND DIRT FROM

# CHANGE ORDER PROCEDURE:

FINISHED SURFACES.

1. REFER TO SECTION 17 OF SIGNED MCSA: SEE PROFESSIONAL SERVICE AGREEMENT FOR MCSA.

## RELATED DOCUMENTS AND COORDINATION

- GENERAL CARPENTRY, ELECTRICAL AND ANTENNA DRAWINGS ARE INTERRELATED. IN PERFORMANCE OF THE WORK, THE CONTRACTOR MUST REFER TO ALL DRAWINGS. ALL COORDINATION TO BE THE RESPONSIBILITY OF THE CONTRACTOR.
- 1. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AS REQUIRED AND LISTED IN THESE SPECIFICATIONS TO THE OWNER FOR
- 2. ALL SHOP DRAWINGS SHALL BE REVIEWED, CHECKED AND CORRECTED BY CONTRACTOR PRIOR TO SUBMITTAL TO THE

## PRODUCTS AND SUBSTITUTIONS

- 1. SUBMIT 3 COPIES OF EACH REQUEST FOR SUBSTITUTION. IN EACH REQUEST, IDENTIFY THE PRODUCT OR FABRICATION OF INCLUDE RELATED SPECIFICATION SECTION AND DRAWING NUMBERS AND COMPLETE DOCUMENTATION SHOWING COMPLIANCE WITH THE REQUIREMENTS FOR SUBSTITUTIONS.
- 2. SUBMIT ALL NECESSARY PRODUCT DATA AND CUT SHEETS WHICH PROPERLY INDICATE AND DESCRIBE THE ITEMS. PRODUCTS AND MATERIALS BEING INSTALLED. THE CONTRACTOR SHALL, IF DEEMED NECESSARY BY THE OWNER, SUBMIT ACTUAL SAMPLES TO THE OWNER FOR APPROVAL IN LIEU OF CUT

ARCHITECTURAL SYMBOLS

###

DETAIL REFERENCE KEY

DRAWING DETAIL NUMBER-

LSHEET NUMBER OF DETAIL-

RFFFR TO

RE: 2/A-3

### QUALITY ASSURANCE

1. ALL WORK SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL
STATE AND FEDERAL REGULATIONS, THESE SHALL INCLUDE, BUT NOT BE LIMITED TO THE APPLICABLE CODES SET FORTH BY THE LOCAL GOVERNING BODY. SEE "CODE COMPLIANCE" T-1.

### ADMINISTRATION

1. BEFORE THE COMMENCEMENT OF ANY WORK, THE CONTRACTOR
WILL ASSIGN A PROJECT MANAGER WHO WILL ACT AS A SINGLE POINT OF CONTACT FOR ALL PERSONNEL INVOLVED IN THIS PROJECT. THIS PROJECT MANAGER WILL DEVELOP A MASTER SCHEDULE FOR THE PROJECT WHICH WILL BE SUBMITTED TO THE OWNER PRIOR TO THE COMMENCEMENT OF ANY WORK.

- 2 SLIBMIT A BAR TYPE PROGRESS CHART NOT MORE THAN 3 DAYS AFTER THE DATE ESTABLISHED FOR COMMENCEMENT OF THE WORK ON THE SCHEDULE, INDICATING A TIME BAR FOR EACH MAJOR CATEGORY OR UNIT OF WORK TO BE PERFORMED AT THE SITE, PROPERLY SEQUENCED AND COORDINATED WITH OTHER ELEMENTS OF WORK AND SHOWING COMPLETION OF THE WORK SUFFICIENTLY IN ADVANCE OF THE DATE ESTABLISHED FOR SUBSTANTIAL COMPLETION OF THE WORK.

  3. PRIOR TO COMMENCING CONSTRUCTION, THE OWNER SHALL
- SCHEDULE AN ON-SITE MEETING WITH ALL MAJOR PARTIES. THIS WOULD INCLUDE, BUT NOT LIMITED TO, THE OWNER, PROJECT MANAGER. CONTRACTOR, LAND OWNER REPRESENTATIVE, LOCAL TELEPHONE COMPANY, TOWER ERECTION FOREMAN (IF SUBCONTRACTED)
- 4. CONTRACTOR SHALL BE EQUIPPED WITH SOME MEANS OF CONSTANT COMMUNICATIONS, SUCH AS A MOBILE PHONE OR A BEEPER. THIS EQUIPMENT WILL NOT BE SUPPLIED BY THE OWNER, NOR WILL WIRELESS SERVICE BE ARRANGED.
- DURING CONSTRUCTION, CONTRACTOR MUST ENSURE THAT EMPLOYEES AND SUBCONTRACTORS WEAR HARD HATS AT ALL TIMES. CONTRACTOR WILL COMPLY WITH ALL WPCS SAFETY REQUIREMENTS IN THEIR AGREEMENT.
- 6. PROVIDE WRITTEN DAILY UPDATES ON SITE PROGRESS TO THE 7 COMPLETE INVENTORY OF CONSTRUCTION MATERIALS AND
- EQUIPMENT IS REQUIRED PRIOR TO START OF CONSTRUCTION. 8. NOTIFY THE OWNER/PROJECT MANAGER IN WRITING NO LESS THAN 48 HOURS IN ADVANCE OF CONCRETE POURS, TOWER FRECTIONS, AND FOUIPMENT CABINET PLACEMENTS.

### INSURANCE AND BONDS

- CONTRACTOR, AT THEIR OWN EXPENSE, SHALL CARRY AND MAINTAIN, FOR THE DURATION OF THE PROJECT, ALL INSURANCE, AS REQUIRED AND LISTED, AND SHALL NOT COMMENCE WITH THEIR WORK UNTIL THEY HAVE PRESENTED AN ORIGINAL CERTIFICATE OF INSURANCE STATING ALL COVERAGES TO THE OWNER. REFER TO THE MASTER AGREEMENT FOR REQUIRED INSURANCE LIMITS.
  2. THE OWNER SHALL BE NAMED AS AN ADDITIONAL INSURED ON
- ALL POLICIES 3. CONTRACTOR MUST PROVIDE PROOF OF INSURANCE.

APPROX

BTS

CONC

CONT

DWG

**ELEC** 

FLFV

EQUIP

EGB

(E) EXT

GALV

GC GRND

MAX MECH

MW MFR

MGB

MIN

MTI

(N) NIC

NTS

OPP

(P) PCS PPC

SHT

STL TOC

TOM TYP VIF

UON

WWF

OC

DIA OR 9

### ABBREVIATIONS ADJUSTABLE AGL ABOVE GROUND LINE AND

CABINET

CEILING

DIAMETER

DRAWING

**EQUIPMENT** 

EXISTING

**FXTFRIOR** 

GAL VANIZED

GROUND

MAXIMUM

MINIMUM

METAL

MECHANICAL

MICROWAVE DISH

NOT IN CONTRACT

NOT TO SCALE

ON CENTER

OPPOSITE

SHEET

SIMILAR

TYPICAL

PROPOSED

SQUARE FOOT

STAINLESS STEEL

TOP OF CONCRETE

TOP OF MASONRY

VERIFY IN FIELD

MASTER GROUND BAR

PERSONAL COMMUNICATION SYSTEM

POWER PROTECTION CABINET

UNLESS OTHERWISE NOTED

WELDED WIRE FABRIC

MANUFACTURER

LONG

FINISHED FLOOR

EQUIPMENT GROUND BAR

GENERAL CONTRACTOR

APPROXIMATE BASE TRANSMISSION STATION \*:00 CONCRETE 34916 CONTINUOUS ELECTRICAL FI EVATION

RF MAN.

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NOTE: IF DRAWINGS ARE 22"x34", USE GRAPHICAL SCALE AND/OR 1/2 TIMES OF THE NOTED SCALE

# SITE NUMBER CT11733B

462 WEST MAIN STREET MERIDEN, CT 06451

# **GENERAL AND ELECTRICAL**

SHEET TITLE

SHEET NUMBER

N-1

**CROWN** CASTLE CROWN CASTLE 1200 MACARTHUR BLVD, SUITE 200 MAHWAH N I 07420 0

필요 NENIO OINIUM SUBMITTALS

DESCRIPTION REVISION FOR REVIEW 08/11/20 REVISED PER COMME 11/13/20 FOR CONSTRUCTION 12/23/20 REVISED INNERCONNECT DESIG CODE ADDED DEPT. DATE APP'D

OPS SITE AC. PROJECT NO 1039-C0002-C DRAWN BY CHECKED BY



WORK OF T-MOBILE ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN

SITE NAME CT733/AT&THNTR AMBLNCE FT

NOTES

# Exhibit D

**Structural Analysis Report** 



Date: June 24, 2020

Denice Nicholson Crown Castle 3 Corporate Dr Clifton Park, NY 12065 B+T Group 1717 S Boulder, Suite 300 Tulsa, OK 74119

(918) 587-4630

Subject: Structural Analysis Report

Carrier Designation: T-Mobile Co-Locate

Carrier Site Number: CT11733B

Carrier Site Name: CT733/AT&THntr Amblnce FT

Crown Castle Designation: Crown Castle BU Number: 842869

Crown Castle Site Name: Meriden West Central

Crown Castle JDE Job Number: 511473 Crown Castle Work Order Number: 1860739 Crown Castle Order Number: 445375 Rev. 5

Engineering Firm Designation: B+T Group Project Number: 92699.005.01

Site Data: 450-478 West Main Street, Meriden, New Haven County, CT

Latitude 41° 32' 24.11", Longitude -72° 49' 8.47"

100 Foot - Monopole Tower

Dear Denice Nicholson,

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

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

LC5: Proposed Equipment Configuration

Sufficient Capacity - 52.4%

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2018 Connecticut State Building Code (2015IBC). Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Kishore Machani

Respectfully submitted by: B+T Engineering, Inc. COA: PEC.0001564 Expires: 02/10/2021

31627 CENSEO CHI 6/24/20

Scott S. Vance, P.E.

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# 1) INTRODUCTION

This tower is a 100 ft. Monopole tower designed by Glen Martin Engineering, Inc.

# 2) ANALYSIS CRITERIA

TIA-222 Revision: TIA-222-H

Risk Category:

Wind Speed: 125 mph

Exposure Category:
Topographic Factor:
Ice Thickness:
Wind Speed with Ice:
Service Wind Speed:

B
1.5 in
50 mph
60 mph

**Table 1 - Proposed Equipment Configuration** 

| Mounting<br>Level (ft) | Center<br>Line<br>Elevation<br>(ft) | Number of Antennas | Antenna<br>Manufacturer | Antenna Model                  | Number<br>of Feed<br>Lines       | Feed<br>Line Size<br>(in) |     |
|------------------------|-------------------------------------|--------------------|-------------------------|--------------------------------|----------------------------------|---------------------------|-----|
|                        |                                     | 3                  | Ericsson                | AIR6449 B41                    |                                  |                           |     |
|                        | 90.0                                | 3                  | Ericsson                | AIR -32 B2A/B66AA              | 4                                | 1-5/8                     |     |
|                        |                                     | 3                  | Ericsson                | ERICSSON AIR 21 B2A B4P        |                                  |                           |     |
|                        |                                     | 3                  | Ericsson                | KRY 112 144/1                  |                                  |                           |     |
| 86.0                   |                                     |                    | 3                       | Ericsson                       | RADIO 4449 B71 B85A_T-<br>MOBILE | 6                         | 7/8 |
|                        |                                     |                    | 3                       | Ericsson                       | RRUS 4415 B25                    |                           |     |
|                        |                                     | 3                  | RFS Celwave             | APXVAARR24_43-U-NA20           |                                  |                           |     |
|                        | 86.0                                | 1                  |                         | Platform Mount [LP 305-1_HR-1] |                                  |                           |     |

**Table 2 - Other Considered Equipment** 

| Mounting<br>Level (ft) | Center<br>Line<br>Elevation<br>(ft) | Number<br>of<br>Antennas | Antenna<br>Manufacturer | Antenna Model         | Number<br>of Feed<br>Lines | Feed<br>Line Size<br>(in) |
|------------------------|-------------------------------------|--------------------------|-------------------------|-----------------------|----------------------------|---------------------------|
|                        | 112.0                               | 1                        | Decibel                 | ASP-3711              |                            |                           |
|                        | 106.0                               | 3                        | Decibel                 | DB201-A               |                            |                           |
|                        | 100.0                               | 1                        | KMW Comm.               | HB-X-AW-19-65-00T     |                            |                           |
|                        |                                     | 3                        | CCI Antennas            | DTMABP7819VG12A       |                            |                           |
|                        |                                     | 3                        | CCI Antennas            | OPA-65R-LCUU-H6       |                            |                           |
|                        |                                     | 4                        | Decibel                 | DB432-A               |                            |                           |
|                        |                                     | 3                        | Ericsson                | RRUS 11               | 6                          | 1-1/4                     |
| 100.0                  |                                     | 3                        | Ericsson                | RRUS 32               | 6                          | 3/4<br>3/8                |
|                        | 100.0                               | 3                        | Ericsson                | RRUS 32 B2            | 2                          |                           |
|                        | 100.0                               | 3                        | Ericsson                | RRUS 32 B66           |                            |                           |
|                        |                                     | Ericsson                 | RRUS 4478 B14           |                       |                            |                           |
|                        |                                     | 3 Ka                     | Kathrein                | 80010965              |                            |                           |
|                        |                                     | 3                        | KMW Comm.               | AM-X-CD-16-65-00T-RET | 1                          |                           |
|                        |                                     | 3                        | Quintel Tech.           | QS66512-2             | 1                          |                           |
|                        |                                     | 1                        | Raycap                  | DC6-48-60-0-8F        |                            |                           |

| Mounting<br>Level (ft) | Center<br>Line<br>Elevation<br>(ft) | Number<br>of<br>Antennas | Antenna<br>Manufacturer | Antenna Model                | Number<br>of Feed<br>Lines | Feed<br>Line Size<br>(in) |
|------------------------|-------------------------------------|--------------------------|-------------------------|------------------------------|----------------------------|---------------------------|
|                        |                                     | 2                        | Raycap                  | DC6-48-60-18-8F              |                            |                           |
|                        |                                     | 1                        |                         | Platform Mount [LP 1302-1]   |                            |                           |
|                        |                                     | 3                        | Alcatel Lucent          | 1900MHz RRH                  |                            |                           |
| 78.0                   | 80.0                                | 3                        | Alcatel Lucent          | 800 EXTERNAL NOTCH<br>FILTER |                            |                           |
|                        |                                     | 3                        | Alcatel Lucent          | TME-800MHZ RRH               |                            |                           |
|                        | 78.0                                | 1                        |                         | Side Arm Mount [SO 104-3]    |                            |                           |
|                        | 79.0                                | 3                        | Alcatel Lucent          | TD-RRH8x20-25                |                            |                           |
| 76.0                   |                                     | 3                        | RFS Celwave             | APXVSPP18-C-A20              | 3                          | 1-1/4<br>3/4              |
| 70.0                   |                                     | 3                        | RFS Celwave             | APXVTM14-C-120               | 1                          | 5/8                       |
|                        | 76.0                                | 1                        |                         | Platform Mount [LP 303-1]    |                            | 0,0                       |
|                        |                                     | 3                        | Alcatel Lucent          | B4 RRH2X60-4R                |                            |                           |
|                        | 67.0                                | 3                        | Alcatel Lucent          | RRH2x60-700                  |                            |                           |
|                        |                                     | 2                        | RFS Celwave             | DB-T1-6Z-8AB-0Z              |                            |                           |
| 65.0                   |                                     | 3                        | Antel                   | BXA-171063/12CF              | 2                          | 1-5/8                     |
|                        | 65.0                                | 3                        | Antel                   | BXA-70063/6CF                |                            |                           |
|                        | 05.0                                | 6                        | Commscope               | SBNHH-1D45B                  |                            |                           |
|                        |                                     | 1                        |                         | Platform Mount [LP 304-1]    |                            |                           |

# 3) ANALYSIS PROCEDURE

**Table 3 - Documents Provided** 

| Document                   | Remarks                                | Reference        | Source    |
|----------------------------|--|------------------|-----------|
| Online Order Information   | T-Mobile Co-Locate, Rev# 5             | 445375           | CCI Sites |
| Tower Manufacturer Drawing | GM Engineering, Inc., Dwg No: SP13462  | 4713237          | CCI Sites |
| Mount Analysis             | Infinigy Engineering, Date: 06/22/2020 | 9140041          | CCI Sites |
| Foundation Drawings        | GM Engineering, Inc., Date: 12/15/2003 | 4529387          | CCI Sites |
| Geotech Report             | Tectonic, Date: 08/28/2002             | 4529388          | CCI Sites |
| Antenna Configuration      | Crown CAD Package                      | Date: 06/23/2020 | CCI Sites |

# 3.1) Analysis Method

tnxTower (version 8.0.5.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

# 3.2) Assumptions

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

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

# 4) ANALYSIS RESULTS

**Table 4 - Section Capacity (Summary)** 

| Section<br>No. | Elevation (ft) | Component<br>Type | Size                 | Critical<br>Element | P (K)   | SF*P_allow<br>(K) | %<br>Capacity | Pass / Fail |
|----------------|----------------|-------------------|----------------------|---------------------|---------|-------------------|---------------|-------------|
| L1             | 100 - 47       | Pole              | TP40.72x28x0.313     | 1                   | -23.875 | 2386.104          | 29.8          | Pass        |
| L2             | 47 - 0         | Pole              | TP51.37x38.655x0.375 | 2                   | -38.564 | 3747.093          | 41.3          | Pass        |
|                |                |                   |                      |                     |         |                   | Summary       |             |
|                |                |                   |                      |                     |         | Pole (L2)         | 41.3          | Pass        |
|                |                |                   |                      |                     |         | Rating =          | 41.3          | Pass        |

Table 5 - Tower Component Stresses vs. Capacity - LC5

| Notes | Component                          | Elevation (ft.) | % Capacity | Pass / Fail |
|-------|------------------------------------|-----------------|------------|-------------|
| 1     | Anchor Rods                        | Base            | 31.8       | Pass        |
| 1     | Base Plate                         | Base            | 27.6       | Pass        |
| 1     | Base Foundation (Structure)        | Base            | 20.2       | Pass        |
| 1     | Base Foundation (Soil Interaction) | Base            | 52.4       | Pass        |

| Structure Rating (max from all components) = | 52.4% |
|--|-------|
|--|-------|

## Notes:

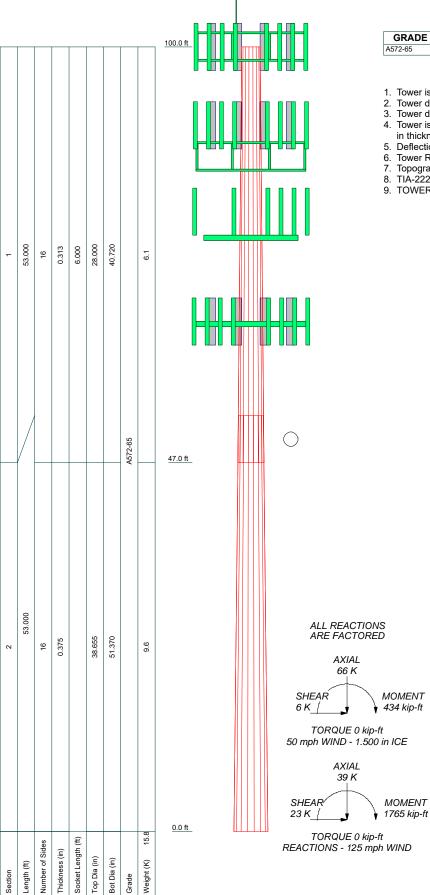
# 4.1) Recommendations

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

<sup>1)</sup> See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

<sup>2)</sup> Rating per TIA-222-H Section 15.5

# APPENDIX A TNXTOWER OUTPUT

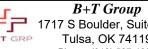


# **MATERIAL STRENGTH**

| GRADE   | Fy     | Fu     | GRADE | Fy | Fu |
|---------|--------|--------|-------|----|----|
| Δ572-65 | 65 ksi | 80 ksi |       |    |    |

# **TOWER DESIGN NOTES**

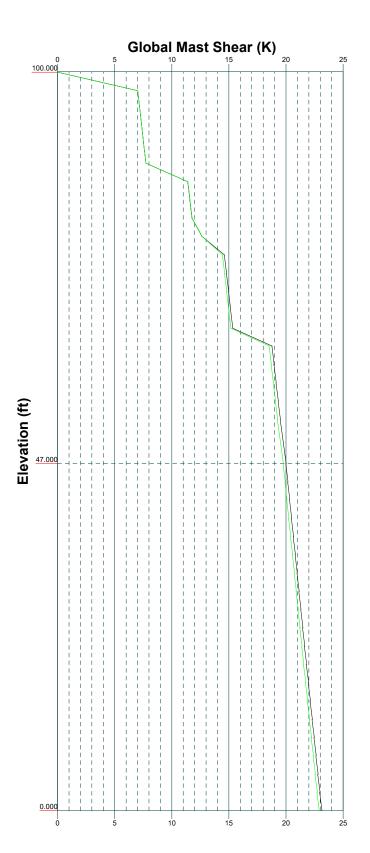
- Tower is located in New Haven County, Connecticut.
   Tower designed for Exposure B to the TIA-222-H Standard.
- Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
- 4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase lower is also designed for a 50 mph basic wind with a in thickness with height.
   Deflections are based upon a 60 mph wind.
   Tower Risk Category II.
   Topographic Category 1 with Crest Height of 0.000 ft
   TIA-222-H Annex S
   TOWER RATING: 41.3%

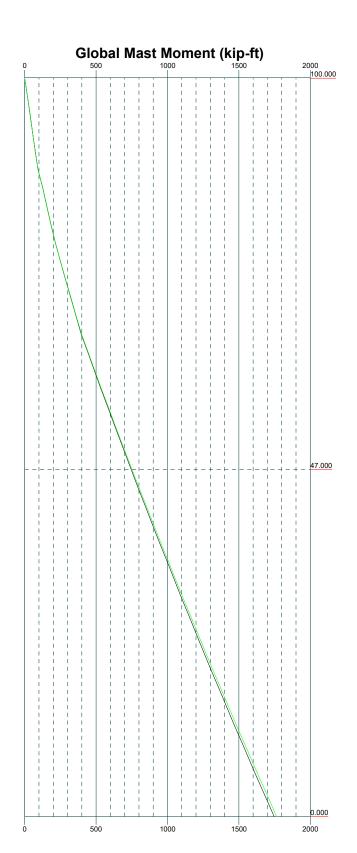


| D I Group                |
|--------------------------|
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| <sup>Job:</sup> <b>92699.005.01 - N</b> | MERIDEN WEST   | CENTRAL, CT (BU# 84286 |  |  |  |
|---|--|------------------------|--|--|--|
| Project:                                |  |                        |  |  |  |
| Client: Crown Castle                    | Drawn by: Regan  | App'd:                 |  |  |  |
| Code: TIA-222-H                         | Date: 06/24/20   | Scale: NTS             |  |  |  |
| Path:                                   | Recent — RecovaTrus 005 0160009 005 01 MERICEN WEST CENTRAL CT | Dwg No. E-1            |  |  |  |



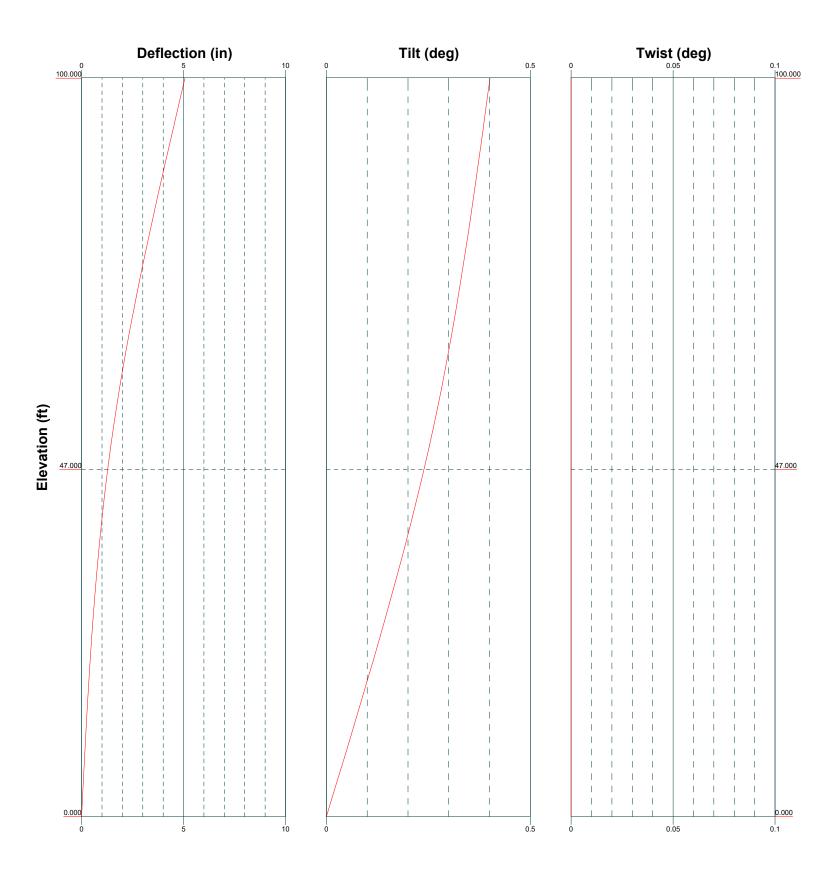


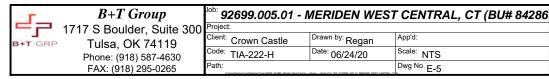




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|   | <sup>Job:</sup> 92699. <i>005.01 - N</i> | MERIDEN WEST    | CENTRAL, CT (BU# 84286 |
|---|--|-----------------|------------------------|
| n | Project:                                 |                 |                        |
|   | Client: Crown Castle                     | Drawn by: Regan | App'd:                 |
|   | Code: TIA-222-H                          | Date: 06/24/20  | Scale: NTS             |
|   | Path:                                    |                 | Dwg No. E-4            |





Face B

Face A

100.000

Elevation (ft)

0.000

86.000 86.000 76.000 76.000 65.000 65.000 (2) FB-L98B-034-XXXXXX(3/8) (E-Inside Conduit) (2) WR-VG86S<sup>†</sup>-BRD(3/4) (E-Inside Conduit) (2) WR-VG86ST-BRD(3/4) (E) (2) WR-VG86ST-BRD(3/4) (E) (6) LDF6-50A(1-1/4) (E) (2) 2-1//4" Rigid Conduit (E) (2) MLE HYBRID 9POWER/18FIBER RL 2(1-5/8) (E) Safety Line 3/8 (E) (2) HCS 6X12 4AWG(1-5/8) (P) 47.000 (6) LDF5-50A(7/8) (E) (3) HB114-13U3M12-XXXF(1-1/4) (E) (2) MLE HYBRID 9POWER/18FIBER RL 2(1-5/8) (E) WR-VG86ST-BRD(3/4) (E) LDF4.5-50(5/8) (E)

| ᆚ   |     |
|-----|-----|
|     | _   |
| B+T | GRI |

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| 🗠 92699.005.01 - MERIDEN WEST CENTRAL, CT (BU# 84286 |                 |             |  |  |  |  |  |
|--|-----------------|-------------|--|--|--|--|--|
| Project:   |                 |             |  |  |  |  |  |
| Client: Crown Castle                                 | Drawn by: Regan | App'd:      |  |  |  |  |  |
| Code: TIA-222-H                                      | Date: 06/24/20  | Scale: NTS  |  |  |  |  |  |
| Path:  |                 | Dwg No. E-7 |  |  |  |  |  |

Face C

100.000

# *tnxTower*

B+T Group

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| Job<br>92699.005.01 - MERIDEN WEST CENTRAL, CT (BU# 842869 | Page 1 of 19              |
|--|---------------------------|
| Project  | Date<br>16:33:49 06/24/20 |
| Client Crown Castle  | Designed by<br>Regan      |

# **Tower Input Data**

The tower is a monopole.

This tower is designed using the TIA-222-H standard.

The following design criteria apply:

Tower is located in New Haven County, Connecticut.

Tower base elevation above sea level: 165.000 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: 0.000 ft.

Nominal ice thickness of 1.500 in.

Ice thickness is considered to increase with height.

Ice density of 56.000 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50.000 °F.

Deflections calculated using a wind speed of 60 mph.

TIA-222-H Annex S.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.05.

Tower analysis based on target reliabilities in accordance with Annex S.

Load Modification Factors used:  $K_{es}(F_w) = 0.95$ ,  $K_{es}(t_i) = 0.85$ .

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

# **Options**

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification Use Code Stress Ratios

Use Code Safety Factors - Guys
Escalate Ice
Always Use Max Kz
Use Special Wind Profile
Include Bolts In Member Capacity
Leg Bolts Are At Top Of Section
Secondary Horizontal Braces Leg
Use Diamond Inner Bracing (4 Sided)
SR Members Have Cut Ends

SR Members Are Concentric

Distribute Leg Loads As Uniform Assume Legs Pinned

- √ Assume Rigid Index Plate
- √ Use Clear Spans For Wind Area
  Use Clear Spans For KL/r
  Retension Guys To Initial Tension
- √ Bypass Mast Stability Checks
- √ Use Azimuth Dish Coefficients
- Project Wind Area of Appurt.

  Autocalc Torque Arm Areas

  Add IBC .6D+W Combination

  Sort Capacity Reports By Component

  Triangulate Diamond Inner Bracing

  Treat Feed Line Bundles As Cylinder

  Ignore KL/ry For 60 Deg. Angle Legs

Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation

√ Consider Feed Line Torque
Include Angle Block Shear Check
Use TIA-222-H Bracing Resist. Exemption
Use TIA-222-H Tension Splice Exemption
Poles

√ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known

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| Јоь<br>92699.005.01 - MERIDEN WEST CENTRAL, CT (BU# 842869) | <b>Page</b> 2 of 19       |
|---|---------------------------|
| Project   | Date<br>16:33:49 06/24/20 |
| Client Crown Castle   | Designed by<br>Regan      |

| Tapered Pole Section Geometry |                |                   |                  |              |                 |                    |                   |                |                     |
|-------------------------------|----------------|-------------------|------------------|--------------|-----------------|--------------------|-------------------|----------------|---------------------|
| Section                       | Elevation      | Section<br>Length | Splice<br>Length | Number<br>of | Top<br>Diameter | Bottom<br>Diameter | Wall<br>Thickness | Bend<br>Radius | Pole Grade          |
|                               | ft             | ft                | ft               | Sides        | in              | in                 | in                | in             |                     |
| L1                            | 100.000-47.000 | 53.000            | 6.000            | 16           | 28.000          | 40.720             | 0.313             | 1.250          | A572-65<br>(65 ksi) |
| L2                            | 47.000-0.000   | 53.000            |                  | 16           | 38.655          | 51.370             | 0.375             | 1.500          | A572-65<br>(65 ksi) |

| Tapered Pole Properties |                   |                  |                      |              |                  |                        |                        |                         |                |                        |                        |
|-------------------------|-------------------|------------------|----------------------|--------------|------------------|------------------------|------------------------|-------------------------|----------------|------------------------|------------------------|
| Section                 | Tip Dia.          | Area<br>in²      | I<br>in <sup>4</sup> | r<br>in      | C<br>in          | I/C<br>in <sup>3</sup> | $J$ $in^4$             | It/Q<br>in <sup>2</sup> | w<br>in        | w/t                    | _                      |
| L1                      | 28.487<br>41.457  | 27.601<br>40.281 | 2673.04<br>8308.85   |              | 14.280<br>20.767 | 187.188<br>400.095     | 5386.564<br>16743.510  | 13.647<br>19.917        | 4.950<br>7.481 |                        |                        |
| L2                      | 40.806<br>52.303  | 45.792<br>61.003 | 8477.19<br>20040.98  |              | 19.714<br>26.199 | 430.008<br>764.961     | 17082.742<br>40385.419 | 22.642<br>30.163        | 6.946<br>9.476 |                        |                        |
| Tower                   | Guss              | et               | Gusset               | Gusset Grade | Adjust. Factor   | Adjust.                | Weight Mu              | ılt. Double             | Angle 1        | Double Angle           | Double Angle           |
| Elevation               | n Area<br>(per fa |                  | Thickness            |              | $A_f$            | $Factor$ $A_r$         | v                      | Stitch<br>Spac          | ing            | Stitch Bolt<br>Spacing | Stitch Bolt<br>Spacing |
| ft                      | ft <sup>2</sup>   |                  | in                   |              |                  |                        |                        | Diago<br>in             |                | Horizontals<br>in      | Redundants<br>in       |
| L1<br>00.000-47         | .00               |                  |                      |              | 1                | 1                      | 1                      |                         |                |                        |                        |
| 0<br>L2<br>47.000-0.0   | 00                |                  |                      |              | 1                | 1                      | 1                      |                         |                |                        |                        |

| Fee   | ea Li  | ne/Lin                | ear Ap               | purten             | ances           | s - En            | terea                 | AS K                 | ouna (    | Jr Fla |
|---|--------|-----------------------|----------------------|--------------------|-----------------|-------------------|-----------------------|----------------------|-----------|--------|
| Description   | Sector | Exclude<br>From       | Component<br>Type    | Placement          | Total<br>Number | Number<br>Per Row | Start/End<br>Position | Width or<br>Diameter | Perimeter | Weight |
|   |        | Torque<br>Calculation | J1                   | ft                 |                 |                   |                       | in                   | in        | klf    |
| *   |        |                       |                      |                    |                 |                   |                       |                      |           |        |
| MLE HYBRID<br>9POWER/18FIBER RL<br>2(1-5/8)<br>(E)<br>* | A      | No                    | Surface Ar<br>(CaAa) | 65.000 -<br>0.000  | 2               | 2                 | -0.450<br>-0.350      | 1.625                |           | 0.001  |
| Safety Line 3/8 (E) *                                   | С      | No                    | Surface Ar<br>(CaAa) | 100.000 -<br>0.000 | 1               | 1                 | 0.250<br>0.250        | 0.375                |           | 0.000  |

## Feed Line/Linear Appurtenances - Entered As Area

**B+T Group** 1717 S Boulder, Suite 300

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| Јо <b>ь</b><br>92699.005.01 - MERIDEN WEST CENTRAL, CT (BU# 842869) | Page<br>3 of 19           |
|---|---------------------------|
| Project   | Date<br>16:33:49 06/24/20 |
| Client Crown Castle   | Designed by<br>Regan      |

| Description         | Face<br>or | Allow<br>Shield | Exclude<br>From       | Component<br>Type | Placement       | Total<br>Number |          | $C_A A_A$ | Weight |
|---------------------|------------|-----------------|-----------------------|-------------------|-----------------|-----------------|----------|-----------|--------|
|                     | Leg        | smeia           | Torque<br>Calculation | Туре              | ft              | 14umoer         |          | ft²/ft    | klf    |
| LDF6-50A(1-1/4)     | A          | No              | No                    | Inside Pole       | 100.000 - 0.000 | 6               | No Ice   | 0.000     | 0.001  |
| (E)                 |            |                 |                       |                   |                 |                 | 1/2" Ice | 0.000     | 0.001  |
| ` '                 |            |                 |                       |                   |                 |                 | 1" Ice   | 0.000     | 0.001  |
|                     |            |                 |                       |                   |                 |                 | 2" Ice   | 0.000     | 0.001  |
| WR-VG86ST-BRD(      | Α          | No              | No                    | Inside Pole       | 100.000 - 0.000 | 2               | No Ice   | 0.000     | 0.001  |
| 3/4)                |            |                 |                       |                   |                 |                 | 1/2" Ice | 0.000     | 0.001  |
| (E)                 |            |                 |                       |                   |                 |                 | 1" Ice   | 0.000     | 0.001  |
| (L)                 |            |                 |                       |                   |                 |                 | 2" Ice   | 0.000     | 0.001  |
| -1/4" Rigid Conduit | Α          | No              | No                    | Inside Pole       | 100.000 - 0.000 | 2               | No Ice   | 0.000     | 0.003  |
| (E)                 | 2.         | 110             | 110                   | morae i ore       | 100.000 0.000   | -               | 1/2" Ice | 0.000     | 0.003  |
| (L)                 |            |                 |                       |                   |                 |                 | 1" Ice   | 0.000     | 0.003  |
|                     |            |                 |                       |                   |                 |                 | 2" Ice   | 0.000     | 0.003  |
| FB-L98B-034-XXX     | Α          | No              | No                    | Incida Dala       | 100.000 - 0.000 | 2               | No Ice   | 0.000     | 0.003  |
| XXX(3/8)            | A          | INO             | NO                    | iliside Fole      | 100.000 - 0.000 | 2               | 1/2" Ice | 0.000     | 0.000  |
| \ /                 |            |                 |                       |                   |                 |                 |          |           |        |
| (E-Inside Conduit)  |            |                 |                       |                   |                 |                 | 1" Ice   | 0.000     | 0.000  |
| UD MONOT DEED       |            | N.T.            | N.T.                  | T :1 D 1          | 100 000 0 000   | 2               | 2" Ice   | 0.000     | 0.000  |
| WR-VG86ST-BRD(      | A          | No              | No                    | Inside Pole       | 100.000 - 0.000 | 2               | No Ice   | 0.000     | 0.001  |
| 3/4)                |            |                 |                       |                   |                 |                 | 1/2" Ice | 0.000     | 0.001  |
| (E-Inside Conduit)  |            |                 |                       |                   |                 |                 | 1" Ice   | 0.000     | 0.001  |
|                     |            |                 |                       |                   |                 |                 | 2" Ice   | 0.000     | 0.001  |
| WR-VG86ST-BRD(      | Α          | No              | No                    | Inside Pole       | 100.000 - 0.000 | 2               | No Ice   | 0.000     | 0.001  |
| 3/4)                |            |                 |                       |                   |                 |                 | 1/2" Ice | 0.000     | 0.001  |
| (E)                 |            |                 |                       |                   |                 |                 | 1" Ice   | 0.000     | 0.001  |
|                     |            |                 |                       |                   |                 |                 | 2" Ice   | 0.000     | 0.001  |
| *                   |            |                 |                       |                   |                 |                 |          |           |        |
| LDF5-50A(7/8)       | C          | No              | No                    | Inside Pole       | 86.000 - 0.000  | 6               | No Ice   | 0.000     | 0.000  |
| (E)                 |            |                 |                       |                   |                 |                 | 1/2" Ice | 0.000     | 0.000  |
|                     |            |                 |                       |                   |                 |                 | 1" Ice   | 0.000     | 0.000  |
|                     |            |                 |                       |                   |                 |                 | 2" Ice   | 0.000     | 0.000  |
| MLE HYBRID          | C          | No              | No                    | Inside Pole       | 86.000 - 0.000  | 2               | No Ice   | 0.000     | 0.001  |
| POWER/18FIBER       |            |                 |                       |                   |                 |                 | 1/2" Ice | 0.000     | 0.001  |
| RL 2(1-5/8)         |            |                 |                       |                   |                 |                 | 1" Ice   | 0.000     | 0.001  |
| (E)                 |            |                 |                       |                   |                 |                 | 2" Ice   | 0.000     | 0.001  |
| HCS 6X12            | C          | No              | No                    | Inside Pole       | 86.000 - 0.000  | 2               | No Ice   | 0.000     | 0.002  |
| 4AWG(1-5/8)         |            |                 |                       |                   |                 |                 | 1/2" Ice | 0.000     | 0.002  |
| (P)                 |            |                 |                       |                   |                 |                 | 1" Ice   | 0.000     | 0.002  |
| ( )                 |            |                 |                       |                   |                 |                 | 2" Ice   | 0.000     | 0.002  |
| *                   |            |                 |                       |                   |                 |                 |          |           |        |
| LDF4.5-50(5/8)      | В          | No              | No                    | Inside Pole       | 76.000 - 0.000  | 1               | No Ice   | 0.000     | 0.000  |
| (E)                 |            |                 |                       |                   |                 |                 | 1/2" Ice | 0.000     | 0.000  |
| ` /                 |            |                 |                       |                   |                 |                 | 1" Ice   | 0.000     | 0.000  |
|                     |            |                 |                       |                   |                 |                 | 2" Ice   | 0.000     | 0.000  |
| VR-VG86ST-BRD(      | В          | No              | No                    | Inside Pole       | 76.000 - 0.000  | 1               | No Ice   | 0.000     | 0.001  |
| 3/4)                | ט          | 110             | 110                   | 1115160 1 010     | , 0.000 0.000   | 1               | 1/2" Ice | 0.000     | 0.001  |
| (E)                 |            |                 |                       |                   |                 |                 | 1" Ice   | 0.000     | 0.001  |
| (L)                 |            |                 |                       |                   |                 |                 | 2" Ice   | 0.000     | 0.001  |
| IB114-13U3M12-X     | В          | No              | No                    | Inside Pole       | 76.000 - 0.000  | 3               | No Ice   | 0.000     | 0.001  |
|                     | D          | INO             | INO                   | mside Pole        | /0.000 - 0.000  | 3               | 1/2" Ice |           |        |
| XXF(1-1/4)          |            |                 |                       |                   |                 |                 |          | 0.000     | 0.001  |
| (E)                 |            |                 |                       |                   |                 |                 | 1" Ice   | 0.000     | 0.001  |
|                     |            |                 |                       |                   |                 |                 | 2" Ice   | 0.000     | 0.001  |

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

| Јо <b>ь</b><br>92699.005.01 - MERIDEN WEST CENTRAL, С | T (BU# 842869) Page 4 of 19 |
|---|-----------------------------|
| Project   | Date<br>16:33:49 06/24/20   |
| Client Crown Castle                                   | Designed by Regan           |

| Tower<br>Section | Tower<br>Elevation | Face | $A_R$  | $A_F$ | C <sub>A</sub> A <sub>A</sub><br>In Face | C <sub>A</sub> A <sub>A</sub><br>Out Face | Weight |
|------------------|--------------------|------|--------|-------|--|---|--------|
|                  | ft                 |      | $ft^2$ | ft²   | ft <sup>2</sup>                          | $ft^2$                                    | K      |
| L1               | 100.000-47.000     | A    | 0.000  | 0.000 | 5.850                                    | 0.000                                     | 0.738  |
|                  |                    | В    | 0.000  | 0.000 | 0.000                                    | 0.000                                     | 0.108  |
|                  |                    | C    | 0.000  | 0.000 | 1.987                                    | 0.000                                     | 0.360  |
| L2               | 47.000-0.000       | A    | 0.000  | 0.000 | 15.275                                   | 0.000                                     | 0.721  |
|                  |                    | В    | 0.000  | 0.000 | 0.000                                    | 0.000                                     | 0.174  |
|                  |                    | C    | 0.000  | 0.000 | 1.763                                    | 0.000                                     | 0.430  |

## Feed Line/Linear Appurtenances Section Areas - With Ice

| Tower   | Tower          | Face | Ice       | $A_R$           | $A_F$  | $C_A A_A$ | $C_A A_A$       | Weight |
|---------|----------------|------|-----------|-----------------|--------|-----------|-----------------|--------|
| Section | Elevation      | or   | Thickness |                 |        | In Face   | Out Face        |        |
|         | ft             | Leg  | in        | ft <sup>2</sup> | $ft^2$ | $ft^2$    | ft <sup>2</sup> | K      |
| L1      | 100.000-47.000 | A    | 1.380     | 0.000           | 0.000  | 13.520    | 0.000           | 0.865  |
|         |                | В    |           | 0.000           | 0.000  | 0.000     | 0.000           | 0.108  |
|         |                | C    |           | 0.000           | 0.000  | 16.610    | 0.000           | 0.516  |
| L2      | 47.000-0.000   | A    | 1.229     | 0.000           | 0.000  | 35.303    | 0.000           | 1.051  |
|         |                | В    |           | 0.000           | 0.000  | 0.000     | 0.000           | 0.174  |
|         |                | C    |           | 0.000           | 0.000  | 14.730    | 0.000           | 0.569  |

## **Feed Line Center of Pressure**

| Section | Elevation      | $CP_X$ | $CP_Z$ | $CP_X$ | $CP_Z$ |
|---------|----------------|--------|--------|--------|--------|
|         |                |        |        | Ice    | Ice    |
|         | ft             | in     | in     | in     | in     |
| L1      | 100.000-47.000 | -1.043 | 0.535  | -1.678 | 1.391  |
| L2      | 47.000-0.000   | -2.369 | 0.956  | -3.137 | 1.796  |

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

## Shielding Factor Ka

| Tower   | Feed Line  | Description       | Feed Line      | $K_a$  | $K_a$  |
|---------|------------|-------------------|----------------|--------|--------|
| Section | Record No. |                   | Segment Elev.  | No Ice | Ice    |
| L1      | 18         | MLE HYBRID        | 47.00 - 65.00  | 1.0000 | 1.0000 |
|         |            | 9POWER/18FIBER RL |                |        |        |
|         |            | 2(1-5/8)          |                |        |        |
| L1      | 20         | Safety Line 3/8   | 47.00 - 100.00 | 1.0000 | 1.0000 |

#### **Discrete Tower Loads**

| Job  | Page                      |
|--|---------------------------|
| 92699.005.01 - MERIDEN WEST CENTRAL, CT (BU# 842869) | 5 of 19                   |
| Project  | Date<br>16:33:49 06/24/20 |
| Client Crown Castle                                  | Designed by<br>Regan      |

| Description             | Face<br>or<br>Leg | Offset<br>Type | Offsets:<br>Horz<br>Lateral | Azimuth<br>Adjustment | Placement |                    | $C_AA_A$<br>Front | $C_AA_A$<br>Side | Weight         |
|-------------------------|-------------------|----------------|-----------------------------|-----------------------|-----------|--------------------|-------------------|------------------|----------------|
|                         |                   |                | Vert<br>ft<br>ft<br>ft      | 0                     | ft        |                    | ft²               | ft²              | K              |
| Lightning Rod 5/8" x 8' | С                 | From Leg       | 1.000                       | 0.000                 | 100.000   | No Ice             | 0.500             | 0.500            | 0.031          |
| (E)                     |                   |                | 0.000                       |                       |           | 1/2" Ice           | 1.314             | 1.314            | 0.037          |
|                         |                   |                | 4.000                       |                       |           | 1" Ice             | 2.144             | 2.144            | 0.047          |
| *                       |                   |                |                             |                       |           | 2" Ice             | 3.613             | 3.613            | 0.084          |
| AM-X-CD-16-65-00T-RET   | Α                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 4.690             | 2.340            | 0.049          |
| (E)                     |                   | S              | 0.000                       |                       |           | 1/2" Ice           | 5.150             | 2.770            | 0.095          |
|                         |                   |                | 0.000                       |                       |           | 1" Ice             | 5.610             | 3.200            | 0.148          |
|                         |                   |                |                             |                       |           | 2" Ice             | 6.570             | 4.100            | 0.272          |
| AM-X-CD-16-65-00T-RET   | В                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 4.690             | 2.340            | 0.049          |
| (E)                     |                   |                | 0.000                       |                       |           | 1/2" Ice           | 5.150             | 2.770            | 0.095          |
|                         |                   |                | 0.000                       |                       |           | 1" Ice             | 5.610             | 3.200            | 0.148          |
| AM-X-CD-16-65-00T-RET   | С                 | From Leg       | 4.000                       | 0.000                 | 100.000   | 2" Ice<br>No Ice   | 6.570<br>4.690    | 4.100<br>2.340   | 0.272<br>0.049 |
| (E)                     | C                 | 110III Leg     | 0.000                       | 0.000                 | 100.000   | 1/2" Ice           | 5.150             | 2.770            | 0.049          |
| (2)                     |                   |                | 0.000                       |                       |           | 1" Ice             | 5.610             | 3.200            | 0.148          |
|                         |                   |                | 0.000                       |                       |           | 2" Ice             | 6.570             | 4.100            | 0.272          |
| OPA-65R-LCUU-H6         | A                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 9.200             | 4.630            | 0.080          |
| (E)                     |                   |                | 0.000                       |                       |           | 1/2" Ice           | 9.970             | 5.340            | 0.137          |
|                         |                   |                | 0.000                       |                       |           | 1" Ice             | 10.760            | 6.070            | 0.200          |
|                         | _                 |                |                             |                       |           | 2" Ice             | 12.390            | 7.570            | 0.347          |
| OPA-65R-LCUU-H6         | В                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 9.200             | 4.630            | 0.080          |
| (E)                     |                   |                | 0.000                       |                       |           | 1/2" Ice           | 9.970             | 5.340            | 0.137          |
|                         |                   |                | 0.000                       |                       |           | 1" Ice<br>2" Ice   | 10.760<br>12.390  | 6.070<br>7.570   | 0.200<br>0.347 |
| OPA-65R-LCUU-H6         | С                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 9.200             | 4.630            | 0.080          |
| (E)                     | C                 | Trom Leg       | 0.000                       | 0.000                 | 100.000   | 1/2" Ice           | 9.970             | 5.340            | 0.030          |
| (2)                     |                   |                | 0.000                       |                       |           | 1" Ice             | 10.760            | 6.070            | 0.200          |
|                         |                   |                |                             |                       |           | 2" Ice             | 12.390            | 7.570            | 0.347          |
| QS66512-2               | A                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 4.010             | 3.370            | 0.111          |
| (E)                     |                   |                | 0.000                       |                       |           | 1/2" Ice           | 4.410             | 3.760            | 0.168          |
|                         |                   |                | 0.000                       |                       |           | 1" Ice             | 4.810             | 4.150            | 0.232          |
| 0066512.2               | ъ                 | Б. Т           | 4.000                       | 0.000                 | 100 000   | 2" Ice             | 5.650             | 4.970            | 0.378          |
| QS66512-2               | В                 | From Leg       | 4.000<br>0.000              | 0.000                 | 100.000   | No Ice<br>1/2" Ice | 4.010<br>4.410    | 3.370<br>3.760   | 0.111          |
| (E)                     |                   |                | 0.000                       |                       |           | 1" Ice             | 4.410             | 4.150            | 0.168<br>0.232 |
|                         |                   |                | 0.000                       |                       |           | 2" Ice             | 5.650             | 4.130            | 0.232          |
| QS66512-2               | C                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 4.010             | 3.370            | 0.111          |
| (E)                     | _                 |                | 0.000                       |                       |           | 1/2" Ice           | 4.410             | 3.760            | 0.168          |
| . ,                     |                   |                | 0.000                       |                       |           | 1" Ice             | 4.810             | 4.150            | 0.232          |
|                         |                   |                |                             |                       |           | 2" Ice             | 5.650             | 4.970            | 0.378          |
| HB-X-AW-19-65-00T       | Α                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 2.083             | 2.083            | 0.029          |
| (E)                     |                   |                | 0.000                       |                       |           | 1/2" Ice           | 3.175             | 3.175            | 0.055          |
|                         |                   |                | 6.000                       |                       |           | 1" Ice             | 3.561             | 3.561            | 0.085          |
| 20010065                |                   | Enom Loo       | 4.000                       | 0.000                 | 100 000   | 2" Ice             | 4.361             | 4.361            | 0.159          |
| 80010965<br>(E)         | A                 | From Leg       | 4.000<br>0.000              | 0.000                 | 100.000   | No Ice<br>1/2" Ice | 12.230<br>13.000  | 4.210<br>4.880   | 0.109<br>0.185 |
| (L)                     |                   |                | 0.000                       |                       |           | 1" Ice             | 13.790            | 5.570            | 0.183          |
|                         |                   |                | 0.000                       |                       |           | 2" Ice             | 15.410            | 6.990            | 0.458          |
| 80010965                | В                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 12.230            | 4.210            | 0.109          |
| (E)                     |                   | 3              | 0.000                       |                       |           | 1/2" Ice           | 13.000            | 4.880            | 0.185          |
|                         |                   |                | 0.000                       |                       |           | 1" Ice             | 13.790            | 5.570            | 0.269          |
|                         |                   |                |                             |                       |           | 2" Ice             | 15.410            | 6.990            | 0.458          |
| 80010965                | C                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 12.230            | 4.210            | 0.109          |
| (E)                     |                   |                | 0.000                       |                       |           | 1/2" Ice           | 13.000            | 4.880            | 0.185          |
| (-)                     |                   |                | 0.000                       |                       |           | 1" Ice             | 13.790            | 5.570            | 0.269          |

| Јо <b>ь</b><br>92699.005.01 - MERIDEN WEST CENTRAL, CT (BU# 842869) | <b>Page</b> 6 of 19       |
|---|---------------------------|
| Project   | Date<br>16:33:49 06/24/20 |
| Client Crown Castle   | Designed by<br>Regan      |

| Description            | Face<br>or<br>Leg | Offset<br>Type | Offsets:<br>Horz<br>Lateral | Azimuth<br>Adjustment | Placement |  | $C_AA_A$<br>Front                         | $C_AA_A$<br>Side                          | Weight                                    |
|------------------------|-------------------|----------------|-----------------------------|-----------------------|-----------|--|---|---|---|
|                        |                   |                | Vert<br>ft<br>ft<br>ft      | ٥                     | ft        |  | ft²                                       | ft²                                       | K   |
| DB201-A<br>(E)         | A                 | From Leg       | 4.000<br>0.000              | 0.000                 | 100.000   | No Ice<br>1/2" Ice                               | 1.100<br>1.980                            | 1.100<br>1.980                            | 0.025<br>0.033                            |
| (-)                    |                   |                | 6.000                       |                       |           | 1" Ice<br>2" Ice                                 | 2.860<br>4.620                            | 2.860<br>4.620                            | 0.040<br>0.055                            |
| DB201-A<br>(E)         | В                 | From Leg       | 4.000<br>0.000<br>6.000     | 0.000                 | 100.000   | No Ice<br>1/2" Ice<br>1" Ice                     | 1.100<br>1.980<br>2.860                   | 1.100<br>1.980<br>2.860                   | 0.025<br>0.033<br>0.040                   |
| DB201-A                | C                 | From Leg       | 4.000                       | 0.000                 | 100.000   | 2" Ice<br>No Ice                                 | 4.620<br>1.100                            | 4.620<br>1.100                            | 0.055<br>0.025                            |
| (E)                    |                   |                | 0.000<br>6.000              |                       |           | 1/2" Ice<br>1" Ice<br>2" Ice                     | 1.980<br>2.860<br>4.620                   | 1.980<br>2.860<br>4.620                   | 0.033<br>0.040<br>0.055                   |
| (2) DB432-A<br>(E)     | В                 | From Leg       | 4.000<br>0.000<br>0.000     | 0.000                 | 100.000   | No Ice<br>1/2" Ice<br>1" Ice                     | 0.300<br>0.540<br>0.780                   | 0.300<br>0.540<br>0.780                   | 0.005<br>0.006<br>0.008                   |
| (2) DB432-A<br>(E)     | C                 | From Leg       | 4.000<br>0.000              | 0.000                 | 100.000   | 2" Ice<br>No Ice<br>1/2" Ice                     | 1.260<br>0.300<br>0.540                   | 1.260<br>0.300<br>0.540                   | 0.011<br>0.005<br>0.006                   |
| . ,                    |                   | Б. Т           | 0.000                       | 0.000                 | 100.000   | 1" Ice<br>2" Ice                                 | 0.780<br>1.260                            | 0.780<br>1.260                            | $0.008 \\ 0.011$                          |
| ASP-3711<br>(E)        | A                 | From Leg       | 4.000<br>0.000<br>12.000    | 0.000                 | 100.000   | No Ice<br>1/2" Ice<br>1" Ice<br>2" Ice           | 1.300<br>2.340<br>3.380<br>5.460          | 1.300<br>2.340<br>3.380<br>5.460          | 0.013<br>0.017<br>0.021<br>0.029          |
| DTMABP7819VG12A<br>(E) | A                 | From Leg       | 4.000<br>0.000<br>0.000     | 0.000                 | 100.000   | No Ice<br>1/2" Ice<br>1" Ice<br>2" Ice           | 0.976<br>1.100<br>1.232<br>1.517          | 0.339<br>0.419<br>0.510<br>0.714          | 0.029<br>0.019<br>0.026<br>0.036<br>0.060 |
| DTMABP7819VG12A<br>(E) | В                 | From Leg       | 4.000<br>0.000<br>0.000     | 0.000                 | 100.000   | No Ice<br>1/2" Ice<br>1" Ice<br>2" Ice           | 0.976<br>1.100<br>1.232<br>1.517          | 0.339<br>0.419<br>0.510<br>0.714          | 0.019<br>0.026<br>0.036<br>0.060          |
| DTMABP7819VG12A<br>(E) | С                 | From Leg       | 4.000<br>0.000<br>0.000     | 0.000                 | 100.000   | No Ice<br>1/2" Ice<br>1" Ice<br>2" Ice           | 0.976<br>1.100<br>1.232<br>1.517          | 0.339<br>0.419<br>0.510<br>0.714          | 0.019<br>0.026<br>0.036<br>0.060          |
| RRUS 32<br>(E)         | A                 | From Leg       | 4.000<br>0.000<br>0.000     | 0.000                 | 100.000   | No Ice 1/2" Ice 1" Ice 2" Ice                    | 2.857<br>3.083<br>3.316<br>3.805          | 1.777<br>1.968<br>2.166<br>2.583          | 0.060<br>0.055<br>0.077<br>0.103<br>0.165 |
| RRUS 32<br>(E)         | В                 | From Leg       | 4.000<br>0.000<br>0.000     | 0.000                 | 100.000   | No Ice<br>1/2" Ice<br>1" Ice                     | 2.857<br>3.083<br>3.316                   | 1.777<br>1.968<br>2.166                   | 0.055<br>0.077<br>0.103                   |
| RRUS 32<br>(E)         | С                 | From Leg       | 4.000<br>0.000<br>0.000     | 0.000                 | 100.000   | 2" Ice<br>No Ice<br>1/2" Ice<br>1" Ice<br>2" Ice | 3.805<br>2.857<br>3.083<br>3.316<br>3.805 | 2.583<br>1.777<br>1.968<br>2.166<br>2.583 | 0.165<br>0.055<br>0.077<br>0.103<br>0.165 |
| RRUS 4478 B14<br>(E)   | A                 | From Leg       | 4.000<br>0.000<br>0.000     | 0.000                 | 100.000   | No Ice 1/2" Ice 1" Ice 2" Ice                    | 1.843<br>2.012<br>2.190<br>2.566          | 1.059<br>1.197<br>1.342                   | 0.163<br>0.060<br>0.076<br>0.094<br>0.140 |
| RRUS 4478 B14<br>(E)   | В                 | From Leg       | 4.000<br>0.000<br>0.000     | 0.000                 | 100.000   | No Ice<br>1/2" Ice<br>1" Ice                     | 1.843<br>2.012<br>2.190                   | 1.656<br>1.059<br>1.197<br>1.342          | 0.060<br>0.076<br>0.094                   |
| RRUS 4478 B14          | C                 | From Leg       | 4.000                       | 0.000                 | 100.000   | 2" Ice<br>No Ice                                 | 2.566<br>1.843                            | 1.656<br>1.059                            | 0.140<br>0.060                            |

| <b>Job</b><br>92699.005.01 - MERIDEN WEST CENTRAL, CT (BU# 842869) | <b>Page</b> 7 of 19       |
|--|---------------------------|
| Project  | Date<br>16:33:49 06/24/20 |
| Client Crown Castle  | Designed by<br>Regan      |

| Description                  | Face<br>or<br>Leg | Offset<br>Type | Offsets:<br>Horz<br>Lateral | Azimuth<br>Adjustment | Placement |                    | $C_AA_A$<br>Front | $C_AA_A$<br>Side | Weight           |
|------------------------------|-------------------|----------------|-----------------------------|-----------------------|-----------|--------------------|-------------------|------------------|------------------|
|                              | -                 |                | Vert<br>ft<br>ft            | ٥                     | ft        |                    | ft <sup>2</sup>   | $ft^2$           | K                |
|                              |                   |                | ft                          |                       |           |                    |                   |                  |                  |
| (E)                          |                   |                | 0.000                       |                       |           | 1/2" Ice           | 2.012             | 1.197            | 0.076            |
|                              |                   |                | 0.000                       |                       |           | 1" Ice<br>2" Ice   | 2.190             | 1.342            | 0.094            |
| RRUS 32 B66                  | ۸                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 2.566<br>2.743    | 1.656<br>1.668   | 0.140<br>0.053   |
| (E)                          | Α                 | Fioni Leg      | 0.000                       | 0.000                 | 100.000   | 1/2" Ice           | 2.743             | 1.855            | 0.033            |
| (L)                          |                   |                | 0.000                       |                       |           | 1" Ice             | 3.194             | 2.049            | 0.074            |
|                              |                   |                | 0.000                       |                       |           | 2" Ice             | 3.675             | 2.458            | 0.157            |
| RRUS 32 B66                  | В                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 2.743             | 1.668            | 0.053            |
| (E)                          |                   | Ü              | 0.000                       |                       |           | 1/2" Ice           | 2.965             | 1.855            | 0.074            |
| ` '                          |                   |                | 0.000                       |                       |           | 1" Ice             | 3.194             | 2.049            | 0.098            |
|                              |                   |                |                             |                       |           | 2" Ice             | 3.675             | 2.458            | 0.157            |
| RRUS 32 B66                  | C                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 2.743             | 1.668            | 0.053            |
| (E)                          |                   |                | 0.000                       |                       |           | 1/2" Ice           | 2.965             | 1.855            | 0.074            |
|                              |                   |                | 0.000                       |                       |           | 1" Ice             | 3.194             | 2.049            | 0.098            |
|                              | _                 |                |                             |                       |           | 2" Ice             | 3.675             | 2.458            | 0.157            |
| RRUS 11                      | C                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 2.784             | 1.187            | 0.048            |
| (E)                          |                   |                | 0.000                       |                       |           | 1/2" Ice<br>1" Ice | 2.992             | 1.334            | 0.068            |
|                              |                   |                | 0.000                       |                       |           | 2" Ice             | 3.207             | 1.490            | 0.092            |
| RRUS 11                      | ۸                 | Erom I oa      | 4.000                       | 0.000                 | 100.000   | 2" Ice<br>No Ice   | 3.658             | 1.833<br>1.187   | 0.150            |
|                              | A                 | From Leg       | 0.000                       | 0.000                 | 100.000   | 1/2" Ice           | 2.784<br>2.992    | 1.187            | $0.048 \\ 0.068$ |
| (E)                          |                   |                | 0.000                       |                       |           | 1" Ice             | 3.207             | 1.490            | 0.008            |
|                              |                   |                | 0.000                       |                       |           | 2" Ice             | 3.658             | 1.833            | 0.052            |
| RRUS 11                      | В                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 2.784             | 1.187            | 0.048            |
| (E)                          | 2                 | 110111 208     | 0.000                       | 0.000                 | 100.000   | 1/2" Ice           | 2.992             | 1.334            | 0.068            |
| (2)                          |                   |                | 0.000                       |                       |           | 1" Ice             | 3.207             | 1.490            | 0.092            |
|                              |                   |                |                             |                       |           | 2" Ice             | 3.658             | 1.833            | 0.150            |
| RRUS 32 B2                   | A                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 2.731             | 1.668            | 0.053            |
| (E)                          |                   |                | 0.000                       |                       |           | 1/2" Ice           | 2.953             | 1.855            | 0.074            |
|                              |                   |                | 0.000                       |                       |           | 1" Ice             | 3.182             | 2.049            | 0.098            |
|                              |                   |                |                             |                       |           | 2" Ice             | 3.663             | 2.458            | 0.157            |
| RRUS 32 B2                   | В                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 2.731             | 1.668            | 0.053            |
| (E)                          |                   |                | 0.000                       |                       |           | 1/2" Ice           | 2.953             | 1.855            | 0.074            |
|                              |                   |                | 0.000                       |                       |           | 1" Ice             | 3.182             | 2.049            | 0.098            |
| DD11C 22 D2                  | C                 | F I            | 4.000                       | 0.000                 | 100.000   | 2" Ice             | 3.663             | 2.458            | 0.157            |
| RRUS 32 B2<br>(E)            | С                 | From Leg       | 4.000<br>0.000              | 0.000                 | 100.000   | No Ice<br>1/2" Ice | 2.731<br>2.953    | 1.668<br>1.855   | 0.053<br>0.074   |
| (E)                          |                   |                | 0.000                       |                       |           | 1" Ice             | 3.182             | 2.049            | 0.074            |
|                              |                   |                | 0.000                       |                       |           | 2" Ice             | 3.663             | 2.458            | 0.157            |
| (2) DC6-48-60-18-8F          | Α                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 1.212             | 1.212            | 0.033            |
| (E)                          |                   | 110111 208     | 0.000                       | 0.000                 | 100.000   | 1/2" Ice           | 1.892             | 1.892            | 0.055            |
| ,                            |                   |                | 0.000                       |                       |           | 1" Ice             | 2.105             | 2.105            | 0.080            |
|                              |                   |                |                             |                       |           | 2" Ice             | 2.570             | 2.570            | 0.138            |
| DC6-48-60-0-8F               | A                 | From Leg       | 4.000                       | 0.000                 | 100.000   | No Ice             | 0.917             | 0.917            | 0.033            |
| (E)                          |                   |                | 0.000                       |                       |           | 1/2" Ice           | 1.458             | 1.458            | 0.051            |
|                              |                   |                | 0.000                       |                       |           | 1" Ice             | 1.643             | 1.643            | 0.071            |
|                              |                   |                |                             |                       |           | 2" Ice             | 2.042             | 2.042            | 0.119            |
| Platform Mount [LP 1302-1]   | C                 | None           |                             | 0.000                 | 100.000   | No Ice             | 56.400            | 56.400           | 2.413            |
| (E-4MP Per Sector / 14' Per  |                   |                |                             |                       |           | 1/2" Ice           | 67.500            | 67.500           | 3.131            |
| TIA)                         |                   |                |                             |                       |           | 1" Ice             | 78.600            | 78.600           | 3.849            |
| (3) Miscellaneous [NA 509-1] | C                 | None           |                             | 0.000                 | 100.000   | 2" Ice             | 100.800           | 100.800          | 5.285            |
| (E-Per Photo)                | С                 | INOHE          |                             | 0.000                 | 100.000   | No Ice<br>1/2" Ice | 6.320<br>7.790    | 4.850<br>6.360   | 0.092<br>0.139   |
| (E-Lei Liiom)                |                   |                |                             |                       |           | 1" Ice             | 9.360             | 7.940            | 0.139            |
|                              |                   |                |                             |                       |           | 2" Ice             | 12.810            | 11.320           | 0.199            |
| 611 4 34 1500 100 01         |                   |                |                             | 0.000                 | 100.000   |                    |                   |                  |                  |
| Side Arm Mount [SO 102-3]    | C                 | None           |                             | 0.000                 | 100.000   | No Ice             | 3.600             | 3.600            | 0.075            |

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|---|---------------------------|
| Project   | Date<br>16:33:49 06/24/20 |
| Crown Castle  | Designed by<br>Regan      |

| Description                 | Face<br>or | Offset<br>Type | Offsets:<br>Horz<br>Lateral | Azimuth<br>Adjustment | Placement |                    | $C_AA_A$<br>Front | $C_A A_A$<br>Side | Weight         |
|-----------------------------|------------|----------------|-----------------------------|-----------------------|-----------|--------------------|-------------------|-------------------|----------------|
|                             | Leg        |                | Vert<br>ft                  | 0                     | ft        |                    | ft²               | ft²               | K              |
|                             |            |                | ft<br>ft                    |                       | j.        |                    | J.                | Ji                | A              |
|                             |            |                |                             |                       |           | 1" Ice<br>2" Ice   | 4.750<br>5.900    | 4.750<br>5.900    | 0.135<br>0.195 |
| *                           |            |                |                             |                       |           |                    |                   |                   |                |
| ERICSSON AIR 21 B2A         | A          | From Leg       | 4.000                       | 0.000                 | 86.000    | No Ice             | 6.329             | 5.642             | 0.112          |
| B4P w/ Mount Pipe           |            |                | 0.000                       |                       |           | 1/2" Ice           | 6.775             | 6.426             | 0.169          |
| (E-Installed)               |            |                | 4.000                       |                       |           | 1" Ice             | 7.214             | 7.131             | 0.233          |
|                             | _          |                |                             |                       | 0.5.000   | 2" Ice             | 8.117             | 8.591             | 0.383          |
| ERICSSON AIR 21 B2A         | В          | From Leg       | 4.000                       | 0.000                 | 86.000    | No Ice             | 6.329             | 5.642             | 0.112          |
| B4P w/ Mount Pipe           |            |                | 0.000                       |                       |           | 1/2" Ice           | 6.775             | 6.426             | 0.169          |
| (E-Installed)               |            |                | 4.000                       |                       |           | 1" Ice             | 7.214             | 7.131             | 0.233          |
| EDVGGGGOV AND ALD AL        |            |                | 4.000                       | 0.000                 | 06.000    | 2" Ice             | 8.117             | 8.591             | 0.383          |
| ERICSSON AIR 21 B2A         | С          | From Leg       | 4.000                       | 0.000                 | 86.000    | No Ice             | 6.329             | 5.642             | 0.112          |
| B4P w/ Mount Pipe           |            |                | 0.000                       |                       |           | 1/2" Ice           | 6.775             | 6.426             | 0.169          |
| (E-Installed)               |            |                | 4.000                       |                       |           | 1" Ice             | 7.214             | 7.131             | 0.233          |
| AIR -32 B2A/B66AA w/        |            | F I            | 4.000                       | 0.000                 | 96,000    | 2" Ice             | 8.117             | 8.591             | 0.383          |
|                             | Α          | From Leg       | 4.000                       | 0.000                 | 86.000    | No Ice<br>1/2" Ice | 6.747             | 6.070             | 0.153<br>0.214 |
| Mount Pipe<br>(E-Installed) |            |                | 0.000<br>4.000              |                       |           | 1" Ice             | 7.202<br>7.648    | 6.867<br>7.583    | 0.214          |
| (E-filstaffed)              |            |                | 4.000                       |                       |           | 2" Ice             | 8.565             | 9.063             | 0.282          |
| AIR -32 B2A/B66AA w/        | В          | From Leg       | 4.000                       | 0.000                 | 86.000    | No Ice             | 6.747             | 6.070             | 0.153          |
| Mount Pipe                  | ь          | 110III Leg     | 0.000                       | 0.000                 | 80.000    | 1/2" Ice           | 7.202             | 6.867             | 0.133          |
| (E-Installed)               |            |                | 4.000                       |                       |           | 1" Ice             | 7.648             | 7.583             | 0.214          |
| (L-Instance)                |            |                | 4.000                       |                       |           | 2" Ice             | 8.565             | 9.063             | 0.441          |
| AIR -32 B2A/B66AA w/        | C          | From Leg       | 4.000                       | 0.000                 | 86.000    | No Ice             | 6.747             | 6.070             | 0.153          |
| Mount Pipe                  | 0          | 1 Ioni Leg     | 0.000                       | 0.000                 | 00.000    | 1/2" Ice           | 7.202             | 6.867             | 0.214          |
| (E-Installed)               |            |                | 4.000                       |                       |           | 1" Ice             | 7.648             | 7.583             | 0.282          |
| (E mounta)                  |            |                |                             |                       |           | 2" Ice             | 8.565             | 9.063             | 0.441          |
| (3) KRY 112 144/1           | Α          | From Leg       | 4.000                       | 0.000                 | 86.000    | No Ice             | 0.350             | 0.175             | 0.011          |
| (E-Installed)               |            | 8              | 0.000                       |                       |           | 1/2" Ice           | 0.426             | 0.234             | 0.014          |
| ,                           |            |                | 4.000                       |                       |           | 1" Ice             | 0.509             | 0.301             | 0.019          |
|                             |            |                |                             |                       |           | 2" Ice             | 0.698             | 0.456             | 0.032          |
| AIR6449 B41 w/ Mount Pipe   | A          | From Leg       | 4.000                       | 0.000                 | 86.000    | No Ice             | 5.893             | 3.284             | 0.118          |
| (P)                         |            |                | 0.000                       |                       |           | 1/2" Ice           | 6.257             | 3.742             | 0.167          |
|                             |            |                | 4.000                       |                       |           | 1" Ice             | 6.630             | 4.217             | 0.221          |
|                             |            |                |                             |                       |           | 2" Ice             | 7.406             | 5.215             | 0.350          |
| AIR6449 B41 w/ Mount Pipe   | В          | From Leg       | 4.000                       | 0.000                 | 86.000    | No Ice             | 5.893             | 3.284             | 0.118          |
| (P)                         |            |                | 0.000                       |                       |           | 1/2" Ice           | 6.257             | 3.742             | 0.167          |
|                             |            |                | 4.000                       |                       |           | 1" Ice             | 6.630             | 4.217             | 0.221          |
|                             |            |                |                             |                       |           | 2" Ice             | 7.406             | 5.215             | 0.350          |
| AIR6449 B41 w/ Mount Pipe   | C          | From Leg       | 4.000                       | 0.000                 | 86.000    | No Ice             | 5.893             | 3.284             | 0.118          |
| (P)                         |            |                | 0.000                       |                       |           | 1/2" Ice           | 6.257             | 3.742             | 0.167          |
|                             |            |                | 4.000                       |                       |           | 1" Ice             | 6.630             | 4.217             | 0.221          |
|                             |            |                |                             |                       |           | 2" Ice             | 7.406             | 5.215             | 0.350          |
| APXVAARR24_43-U-NA20        | Α          | From Leg       | 4.000                       | 0.000                 | 86.000    | No Ice             | 14.690            | 6.870             | 0.186          |
| w/ Mount Pipe               |            |                | 0.000                       |                       |           | 1/2" Ice           | 15.460            | 7.550             | 0.315          |
| (P)                         |            |                | 4.000                       |                       |           | 1" Ice             | 16.230            | 8.250             | 0.458          |
| ADWALA ADDOL 10 HARLOS      | Б          | г т            | 4.000                       | 0.000                 | 06.000    | 2" Ice             | 17.820            | 9.670             | 0.788          |
| APXVAARR24_43-U-NA20        | В          | From Leg       | 4.000                       | 0.000                 | 86.000    | No Ice             | 14.690            | 6.870             | 0.186          |
| w/ Mount Pipe               |            |                | 0.000                       |                       |           | 1/2" Ice           | 15.460            | 7.550             | 0.315          |
| (P)                         |            |                | 4.000                       |                       |           | 1" Ice             | 16.230            | 8.250             | 0.458          |
| ADVI/A ADDOL 12 II NIA 20   | C          | Enoma I        | 4.000                       | 0.000                 | 96 000    | 2" Ice<br>No Ice   | 17.820            | 9.670             | 0.788          |
| APXVAARR24_43-U-NA20        | С          | From Leg       | 4.000                       | 0.000                 | 86.000    |                    | 14.690            | 6.870             | 0.186          |
| w/ Mount Pipe               |            |                | 0.000                       |                       |           | 1/2" Ice           | 15.460            | 7.550             | 0.315          |
| (P)                         |            |                | 4.000                       |                       |           | 1" Ice             | 16.230            | 8.250             | 0.458          |
| RADIO 4449 B71              | Α          | From Leg       | 4.000                       | 0.000                 | 86.000    | 2" Ice<br>No Ice   | 17.820<br>1.970   | 9.670<br>1.587    | 0.788<br>0.073 |
|                             | Α          | From Leg       | 0.000                       | 0.000                 | 00.000    |                    | 2.147             |                   |                |
| B85A_T-MOBILE               |            |                | 0.000                       |                       |           | 1/2" Ice           | 2.14/             | 1.749             | 0.093          |

**B+T Group** 1717 S Boulder, Suite 300

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|---|---------------------------|
| Project   | Date<br>16:33:49 06/24/20 |
| Client Crown Castle   | Designed by<br>Regan      |

| Description                           | Face<br>or<br>Leg | Offset<br>Type | Offsets:<br>Horz<br>Lateral | Azimuth<br>Adjustment | Placement |                    | $C_A A_A$<br>Front | $C_A A_A$<br>Side | Weight           |
|---------------------------------------|-------------------|----------------|-----------------------------|-----------------------|-----------|--------------------|--------------------|-------------------|------------------|
|                                       |                   |                | Vert<br>ft<br>ft<br>ft      | 0                     | ft        |                    | ft²                | ft²               | K                |
| (P)                                   |                   |                | 4.000                       |                       |           | 1" Ice             | 2.331              | 1.918             | 0.116            |
|                                       |                   |                |                             |                       |           | 2" Ice             | 2.721              | 2.280             | 0.170            |
| RADIO 4449 B71                        | В                 | From Leg       | 4.000                       | 0.000                 | 86.000    | No Ice             | 1.970              | 1.587             | 0.073            |
| B85A_T-MOBILE                         |                   |                | 0.000                       |                       |           | 1/2" Ice<br>1" Ice | 2.147              | 1.749             | 0.093            |
| (P)                                   |                   |                | 4.000                       |                       |           | 2" Ice             | 2.331              | 1.918             | 0.116            |
| RADIO 4449 B71                        | C                 | From Leg       | 4.000                       | 0.000                 | 86.000    | No Ice             | 2.721<br>1.970     | 2.280<br>1.587    | 0.170<br>0.073   |
| B85A T-MOBILE                         | C                 | From Leg       | 0.000                       | 0.000                 | 80.000    | 1/2" Ice           | 2.147              | 1.749             | 0.073            |
| (P)                                   |                   |                | 4.000                       |                       |           | 1" Ice             | 2.331              | 1.918             | 0.093            |
| (1)                                   |                   |                | 4.000                       |                       |           | 2" Ice             | 2.721              | 2.280             | 0.170            |
| RRUS 4415 B25                         | Α                 | From Leg       | 4.000                       | 0.000                 | 86.000    | No Ice             | 1.644              | 0.679             | 0.044            |
| (P)                                   | ••                | 110111 200     | 0.000                       | 0.000                 | 00.000    | 1/2" Ice           | 1.804              | 0.791             | 0.056            |
| ( )                                   |                   |                | 4.000                       |                       |           | 1" Ice             | 1.972              | 0.913             | 0.071            |
|                                       |                   |                |                             |                       |           | 2" Ice             | 2.329              | 1.183             | 0.109            |
| RRUS 4415 B25                         | В                 | From Leg       | 4.000                       | 0.000                 | 86.000    | No Ice             | 1.644              | 0.679             | 0.044            |
| (P)                                   |                   |                | 0.000                       |                       |           | 1/2" Ice           | 1.804              | 0.791             | 0.056            |
|                                       |                   |                | 4.000                       |                       |           | 1" Ice             | 1.972              | 0.913             | 0.071            |
|                                       |                   |                |                             |                       |           | 2" Ice             | 2.329              | 1.183             | 0.109            |
| RRUS 4415 B25                         | C                 | From Leg       | 4.000                       | 0.000                 | 86.000    | No Ice             | 1.644              | 0.679             | 0.044            |
| (P)                                   |                   |                | 0.000                       |                       |           | 1/2" Ice           | 1.804              | 0.791             | 0.056            |
|                                       |                   |                | 4.000                       |                       |           | 1" Ice             | 1.972              | 0.913             | 0.071            |
| DI (C. M. (FI.D.                      |                   | N              |                             | 0.000                 | 06.000    | 2" Ice             | 2.329              | 1.183             | 0.109            |
| Platform Mount [LP 305-1 HR-1]        | C                 | None           |                             | 0.000                 | 86.000    | No Ice<br>1/2" Ice | 19.590<br>24.480   | 19.590<br>24.480  | 1.366            |
| (P-12.5' Per MA)                      |                   |                |                             |                       |           | 1" Ice             | 29.240             | 29.240            | 1.782<br>2.286   |
| (1-12.5 1 CI WIA)                     |                   |                |                             |                       |           | 2" Ice             | 38.490             | 38.490            | 3.562            |
| *                                     |                   |                |                             |                       |           | 2 100              | 50.170             | 30.170            | 3.302            |
| TME-800MHZ RRH                        | Α                 | From Leg       | 2.000                       | 0.000                 | 78.000    | No Ice             | 2.134              | 1.773             | 0.053            |
| (E-CL Per Photos)                     |                   | Ü              | 0.000                       |                       |           | 1/2" Ice           | 2.320              | 1.946             | 0.074            |
| · · · · · · · · · · · · · · · · · · · |                   |                | 2.000                       |                       |           | 1" Ice             | 2.512              | 2.127             | 0.098            |
|                                       |                   |                |                             |                       |           | 2" Ice             | 2.920              | 2.510             | 0.157            |
| TME-800MHZ RRH                        | В                 | From Leg       | 2.000                       | 0.000                 | 78.000    | No Ice             | 2.134              | 1.773             | 0.053            |
| (E-CL Per Photos)                     |                   |                | 0.000                       |                       |           | 1/2" Ice           | 2.320              | 1.946             | 0.074            |
|                                       |                   |                | 2.000                       |                       |           | 1" Ice             | 2.512              | 2.127             | 0.098            |
| THE COOL GIZ DRIV                     | -                 | Б. Т           | 2 000                       | 0.000                 | 70.000    | 2" Ice             | 2.920              | 2.510             | 0.157            |
| TME-800MHZ RRH                        | C                 | From Leg       | 2.000                       | 0.000                 | 78.000    | No Ice             | 2.134              | 1.773             | 0.053            |
| (E-CL Per Photos)                     |                   |                | 0.000<br>2.000              |                       |           | 1/2" Ice<br>1" Ice | 2.320<br>2.512     | 1.946<br>2.127    | $0.074 \\ 0.098$ |
|                                       |                   |                | 2.000                       |                       |           | 2" Ice             | 2.920              | 2.510             | 0.098            |
| 1900MHz RRH                           | Α                 | From Leg       | 2.000                       | 0.000                 | 78.000    | No Ice             | 2.492              | 3.258             | 0.137            |
| (E-CL Per Photos)                     | 11                | Trom Leg       | 0.000                       | 0.000                 | 70.000    | 1/2" Ice           | 2.695              | 3.484             | 0.075            |
| (= -=)                                |                   |                | 2.000                       |                       |           | 1" Ice             | 2.906              | 3.718             | 0.110            |
|                                       |                   |                |                             |                       |           | 2" Ice             | 3.351              | 4.206             | 0.192            |
| 1900MHz RRH                           | В                 | From Leg       | 2.000                       | 0.000                 | 78.000    | No Ice             | 2.492              | 3.258             | 0.044            |
| (E-CL Per Photos)                     |                   |                | 0.000                       |                       |           | 1/2" Ice           | 2.695              | 3.484             | 0.075            |
|                                       |                   |                | 2.000                       |                       |           | 1" Ice             | 2.906              | 3.718             | 0.110            |
|                                       |                   |                |                             |                       |           | 2" Ice             | 3.351              | 4.206             | 0.192            |
| 1900MHz RRH                           | C                 | From Leg       | 2.000                       | 0.000                 | 78.000    | No Ice             | 2.492              | 3.258             | 0.044            |
| (E-CL Per Photos)                     |                   |                | 0.000                       |                       |           | 1/2" Ice           | 2.695              | 3.484             | 0.075            |
|                                       |                   |                | 2.000                       |                       |           | 1" Ice             | 2.906              | 3.718             | 0.110            |
|                                       | A                 | From Leg       | 2.000                       | 0.000                 | 78.000    | 2" Ice             | 3.351              | 4.206             | 0.192            |
| 200 EXTERNAL MOTOR                    | 4                 | rioni Leg      | 2.000                       | 0.000                 | / 8.000   | No Ice             | 0.660              | 0.321             | 0.011            |
| 800 EXTERNAL NOTCH                    | 11                | 8              |                             |                       |           | 1/2" Icc           | 0.762              | 0.200             | 0.017            |
| FILTER                                | 71                | 8              | 0.000                       |                       |           | 1/2" Ice           | 0.763              | 0.398             | 0.017            |
|                                       | 71                | 5              |                             |                       |           | 1" Ice             | 0.873              | 0.483             | 0.024            |
| FILTER                                | В                 | From Leg       | 0.000                       | 0.000                 | 78.000    |                    |                    |                   |                  |

**B+T Group** 1717 S Boulder, Suite 300

| Јо <b>ь</b><br>92699.005.01 - MERIDEN WEST CENTRAL, CT (BU# 842869) | <b>Page</b> 10 of 19      |
|---|---------------------------|
| Project   | Date<br>16:33:49 06/24/20 |
| Client Crown Castle   | Designed by<br>Regan      |

| Description                | Face<br>or<br>Leg | Offset<br>Type | Offsets:<br>Horz<br>Lateral | Azimuth<br>Adjustment | Placement     |                  | $C_A A_A$<br>Front | $C_AA_A$<br>Side | Weight         |
|----------------------------|-------------------|----------------|-----------------------------|-----------------------|---------------|------------------|--------------------|------------------|----------------|
|                            |                   |                | Vert<br>ft<br>ft<br>ft      | 0                     | ft            |                  | ft²                | ft²              | K              |
| (E-CL Per Photos)          |                   |                | 2.000                       |                       |               | 1" Ice<br>2" Ice | 0.873              | 0.483<br>0.674   | 0.024<br>0.045 |
| 800 EXTERNAL NOTCH         | С                 | From Leg       | 2.000                       | 0.000                 | 78.000        | No Ice           | 1.115<br>0.660     | 0.874            | 0.043          |
| FILTER                     | C                 | Fioni Leg      | 0.000                       | 0.000                 | 78.000        | 1/2" Ice         | 0.763              | 0.321            | 0.011          |
| (E-CL Per Photos)          |                   |                | 2.000                       |                       |               | 1" Ice           | 0.873              | 0.483            | 0.024          |
| (E CE i ci i notos)        |                   |                | 2.000                       |                       |               | 2" Ice           | 1.115              | 0.674            | 0.045          |
| 5' x 4" Std. Pipe          | Α                 | From Leg       | 2.000                       | 0.000                 | 78.000        | No Ice           | 1.606              | 1.606            | 0.054          |
| (E-Per Photos)             |                   | 8              | 0.000                       |                       |               | 1/2" Ice         | 2.076              | 2.076            | 0.070          |
| ,                          |                   |                | 2.000                       |                       |               | 1" Ice           | 2.397              | 2.397            | 0.090          |
|                            |                   |                |                             |                       |               | 2" Ice           | 3.067              | 3.067            | 0.141          |
| 5' x 4" Std. Pipe          | В                 | From Leg       | 2.000                       | 0.000                 | 78.000        | No Ice           | 1.606              | 1.606            | 0.054          |
| (E-Per Photos)             |                   |                | 0.000                       |                       |               | 1/2" Ice         | 2.076              | 2.076            | 0.070          |
| •                          |                   |                | 2.000                       |                       |               | 1" Ice           | 2.397              | 2.397            | 0.090          |
|                            |                   |                |                             |                       |               | 2" Ice           | 3.067              | 3.067            | 0.141          |
| 5' x 4" Std. Pipe          | C                 | From Leg       | 2.000                       | 0.000                 | 78.000        | No Ice           | 1.606              | 1.606            | 0.054          |
| (E-Per Photos)             |                   |                | 0.000                       |                       |               | 1/2" Ice         | 2.076              | 2.076            | 0.070          |
|                            |                   |                | 2.000                       |                       |               | 1" Ice           | 2.397              | 2.397            | 0.090          |
|                            |                   |                |                             |                       |               | 2" Ice           | 3.067              | 3.067            | 0.141          |
| Side Arm Mount [SO 104-3]  | C                 | None           |                             | 0.000                 | 78.000        | No Ice           | 2.620              | 2.620            | 0.288          |
| (E)                        |                   |                |                             |                       |               | 1/2" Ice         | 3.300              | 3.300            | 0.408          |
|                            |                   |                |                             |                       |               | 1" Ice           | 3.980              | 3.980            | 0.528          |
| *                          |                   |                |                             |                       |               | 2" Ice           | 5.350              | 5.350            | 0.768          |
| (2) APXVSPP18-C-A20 w/     | В                 | From Leg       | 4.000                       | 0.000                 | 76.000        | No Ice           | 4.600              | 4.010            | 0.095          |
| Mount Pipe                 | 2                 | 110111 208     | 0.000                       | 0.000                 | , 0.000       | 1/2" Ice         | 5.050              | 4.450            | 0.160          |
| (E)                        |                   |                | 3.000                       |                       |               | 1" Ice           | 5.500              | 4.890            | 0.235          |
| (-)                        |                   |                |                             |                       |               | 2" Ice           | 6.440              | 5.820            | 0.419          |
| APXVSPP18-C-A20 w/         | C                 | From Leg       | 4.000                       | 0.000                 | 76.000        | No Ice           | 4.600              | 4.010            | 0.095          |
| Mount Pipe                 |                   | 8              | 0.000                       |                       |               | 1/2" Ice         | 5.050              | 4.450            | 0.160          |
| (E) 1                      |                   |                | 3.000                       |                       |               | 1" Ice           | 5.500              | 4.890            | 0.235          |
| . ,                        |                   |                |                             |                       |               | 2" Ice           | 6.440              | 5.820            | 0.419          |
| (2) APXVTM14-C-120 w/      | В                 | From Leg       | 4.000                       | 0.000                 | 76.000        | No Ice           | 4.090              | 2.860            | 0.077          |
| Mount Pipe                 |                   |                | 0.000                       |                       |               | 1/2" Ice         | 4.480              | 3.230            | 0.127          |
| (E)                        |                   |                | 3.000                       |                       |               | 1" Ice           | 4.880              | 3.610            | 0.185          |
|                            |                   |                |                             |                       |               | 2" Ice           | 5.710              | 4.400            | 0.331          |
| APXVTM14-C-120 w/          | C                 | From Leg       | 4.000                       | 0.000                 | 76.000        | No Ice           | 4.090              | 2.860            | 0.077          |
| Mount Pipe                 |                   |                | 0.000                       |                       |               | 1/2" Ice         | 4.480              | 3.230            | 0.127          |
| (E)                        |                   |                | 3.000                       |                       |               | 1" Ice           | 4.880              | 3.610            | 0.185          |
|                            |                   |                |                             |                       |               | 2" Ice           | 5.710              | 4.400            | 0.331          |
| (2) TD-RRH8x20-25          | В                 | From Leg       | 4.000                       | 0.000                 | 76.000        | No Ice           | 4.045              | 1.535            | 0.070          |
| (E)                        |                   |                | 0.000                       |                       |               | 1/2" Ice         | 4.298              | 1.714            | 0.097          |
|                            |                   |                | 3.000                       |                       |               | 1" Ice           | 4.557              | 1.901            | 0.128          |
|                            |                   |                |                             |                       |               | 2" Ice           | 5.098              | 2.295            | 0.201          |
| TD-RRH8x20-25              | C                 | From Leg       | 4.000                       | 0.000                 | 76.000        | No Ice           | 4.045              | 1.535            | 0.070          |
| (E)                        |                   |                | 0.000                       |                       |               | 1/2" Ice         | 4.298              | 1.714            | 0.097          |
|                            |                   |                | 3.000                       |                       |               | 1" Ice           | 4.557              | 1.901            | 0.128          |
| (4) (1 - 21) (1 - 1)       |                   |                | 4.000                       | 0.000                 | <b>5</b> 6000 | 2" Ice           | 5.098              | 2.295            | 0.201          |
| (4) 6' x 2" Mount Pipe     | A                 | From Leg       | 4.000                       | 0.000                 | 76.000        | No Ice           | 1.425              | 1.425            | 0.022          |
| (E-Empty)                  |                   |                | 0.000                       |                       |               | 1/2" Ice         | 1.925              | 1.925            | 0.033          |
|                            |                   |                | 2.000                       |                       |               | 1" Ice           | 2.294              | 2.294            | 0.048          |
| (2) 61 - 211 M Di          | C                 | Emous I        | 4.000                       | 0.000                 | 76.000        | 2" Ice           | 3.060              | 3.060            | 0.090          |
| (2) 6' x 2" Mount Pipe     | C                 | From Leg       | 4.000                       | 0.000                 | 76.000        | No Ice           | 1.425              | 1.425            | 0.022          |
| (E-Empty)                  |                   |                | 0.000                       |                       |               | 1/2" Ice         | 1.925              | 1.925            | 0.033          |
|                            |                   |                | 2.000                       |                       |               | 1" Ice           | 2.294              | 2.294            | 0.048          |
| Platform Mount II P 202 13 | C                 | None           |                             | 0.000                 | 76,000        | 2" Ice           | 3.060              | 3.060            | 0.090          |
| Platform Mount [LP 303-1]  | C                 | None           |                             | 0.000                 | 76.000        | No Ice           | 14.690             | 14.690           | 1.250          |
| (E-12' Per TIA)            |                   |                |                             |                       |               | 1/2" Ice         | 18.010             | 18.010           | 1.569          |

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| Job  | Page                      |
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| Project  | Date<br>16:33:49 06/24/20 |
| Client Crown Castle                                  | Designed by  Regan        |

| Description                             | Face<br>or<br>Leg | Offset<br>Type | Offsets:<br>Horz<br>Lateral | Azimuth<br>Adjustment | Placement     |  | C <sub>A</sub> A <sub>A</sub><br>Front | $C_AA_A$<br>Side                 | Weight                           |
|---|-------------------|----------------|-----------------------------|-----------------------|---------------|--|--|----------------------------------|----------------------------------|
|   |                   |                | Vert<br>ft<br>ft<br>ft      | ٥                     | ft            |  | $ft^2$                                 | ft²                              | K                                |
|   |                   |                | J                           |                       |               | 1" Ice<br>2" Ice                       | 21.340<br>28.080                       | 21.340<br>28.080                 | 1.942<br>2.852                   |
| * (2) SBNHH-1D45B w/ Mount Pipe (E)     | A                 | From Leg       | 4.000<br>0.000<br>0.000     | 0.000                 | 65.000        | No Ice<br>1/2" Ice<br>1" Ice           | 8.260<br>8.830<br>9.410                | 4.390<br>4.910<br>5.430          | 0.090<br>0.168<br>0.257          |
| (2) SBNHH-1D45B w/                      | В                 | From Leg       | 4.000                       | 0.000                 | 65.000        | 2" Ice<br>No Ice                       | 10.610 8.260                           | 6.530<br>4.390                   | 0.470<br>0.090                   |
| Mount Pipe<br>(E)                       |                   | 5              | 0.000<br>0.000              |                       |               | 1/2" Ice<br>1" Ice<br>2" Ice           | 8.830<br>9.410<br>10.610               | 4.910<br>5.430<br>6.530          | 0.168<br>0.257<br>0.470          |
| (2) SBNHH-1D45B w/<br>Mount Pipe<br>(E) | C                 | From Leg       | 4.000<br>0.000<br>0.000     | 0.000                 | 65.000        | No Ice<br>1/2" Ice<br>1" Ice           | 8.260<br>8.830<br>9.410                | 4.390<br>4.910<br>5.430          | 0.470<br>0.090<br>0.168<br>0.257 |
| BXA-171063/12CF w/ Mount<br>Pipe        | A                 | From Leg       | 4.000<br>0.000              | 0.000                 | 65.000        | 2" Ice<br>No Ice<br>1/2" Ice           | 10.610<br>5.029<br>5.583               | 6.530<br>5.289<br>6.459          | 0.470<br>0.041<br>0.087          |
| (É)                                     | D                 | г. т           | 0.000                       | 0.000                 | <b>65.000</b> | 1" Ice<br>2" Ice                       | 6.103<br>7.166                         | 7.348<br>9.148                   | 0.140<br>0.273                   |
| BXA-171063/12CF w/ Mount<br>Pipe<br>(E) | В                 | From Leg       | 4.000<br>0.000<br>0.000     | 0.000                 | 65.000        | No Ice<br>1/2" Ice<br>1" Ice           | 5.029<br>5.583<br>6.103                | 5.289<br>6.459<br>7.348          | 0.041<br>0.087<br>0.140          |
| BXA-171063/12CF w/ Mount<br>Pipe<br>(E) | С                 | From Leg       | 4.000<br>0.000<br>0.000     | 0.000                 | 65.000        | 2" Ice<br>No Ice<br>1/2" Ice<br>1" Ice | 7.166<br>5.029<br>5.583<br>6.103       | 9.148<br>5.289<br>6.459<br>7.348 | 0.273<br>0.041<br>0.087<br>0.140 |
| BXA-70063/6CF w/ Mount<br>Pipe<br>(E)   | A                 | From Leg       | 4.000<br>0.000<br>0.000     | 0.000                 | 65.000        | 2" Ice<br>No Ice<br>1/2" Ice<br>1" Ice | 7.166<br>7.819<br>8.370<br>8.886       | 9.148<br>5.695<br>6.849<br>7.715 | 0.273<br>0.040<br>0.100<br>0.168 |
| BXA-70063/6CF w/ Mount<br>Pipe<br>(E)   | В                 | From Leg       | 4.000<br>0.000<br>0.000     | 0.000                 | 65.000        | 2" Ice<br>No Ice<br>1/2" Ice<br>1" Ice | 9.942<br>7.819<br>8.370<br>8.886       | 9.497<br>5.695<br>6.849<br>7.715 | 0.331<br>0.040<br>0.100<br>0.168 |
| BXA-70063/6CF w/ Mount<br>Pipe<br>(E)   | C                 | From Leg       | 4.000<br>0.000<br>0.000     | 0.000                 | 65.000        | 2" Ice<br>No Ice<br>1/2" Ice<br>1" Ice | 9.942<br>7.819<br>8.370<br>8.886       | 9.497<br>5.695<br>6.849<br>7.715 | 0.331<br>0.040<br>0.100<br>0.168 |
| B4 RRH2X60-4R<br>(E-CL Per Photos)      | A                 | From Leg       | 4.000<br>0.000              | 0.000                 | 65.000        | 2" Ice<br>No Ice<br>1/2" Ice           | 9.942<br>3.356<br>3.613                | 9.497<br>2.005<br>2.238          | 0.331<br>0.055<br>0.078          |
| B4 RRH2X60-4R<br>(E-CL Per Photos)      | В                 | From Leg       | 2.000<br>4.000<br>0.000     | 0.000                 | 65.000        | 1" Ice<br>2" Ice<br>No Ice<br>1/2" Ice | 3.877<br>4.425<br>3.356<br>3.613       | 2.477<br>2.976<br>2.005<br>2.238 | 0.105<br>0.170<br>0.055<br>0.078 |
| B4 RRH2X60-4R                           | C                 | From Leg       | 2.000                       | 0.000                 | 65.000        | 1" Ice<br>2" Ice<br>No Ice             | 3.877<br>4.425<br>3.356                | 2.477<br>2.976<br>2.005          | 0.105<br>0.170<br>0.055          |
| (E-CL Per Photos)                       |                   |                | 0.000<br>2.000              |                       |               | 1/2" Ice<br>1" Ice<br>2" Ice           | 3.613<br>3.877<br>4.425                | 2.238<br>2.477<br>2.976          | 0.078<br>0.105<br>0.170          |
| RRH2x60-700<br>(E-CL Per Photos)        | A                 | From Leg       | 4.000<br>0.000<br>2.000     | 0.000                 | 65.000        | No Ice<br>1/2" Ice<br>1" Ice<br>2" Ice | 3.500<br>3.761<br>4.029<br>4.585       | 1.816<br>2.052<br>2.289<br>2.785 | 0.060<br>0.083<br>0.109<br>0.173 |
| RRH2x60-700<br>(E-CL Per Photos)        | В                 | From Leg       | 4.000<br>0.000              | 0.000                 | 65.000        | No Ice<br>1/2" Ice                     | 3.500<br>3.761                         | 1.816<br>2.052                   | 0.060<br>0.083                   |

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| <b>Јо</b> в<br>92699.005.01 - MERIDEN WEST CENTRAL, CT (BU# 842869) | <b>Page</b> 12 of 19      |
|---|---------------------------|
| Project   | Date<br>16:33:49 06/24/20 |
| Crown Castle  | Designed by<br>Regan      |

| Description                                  | Face<br>or<br>Leg | Offset<br>Type | Offsets:<br>Horz<br>Lateral | Azimuth<br>Adjustment | Placement |                    | $C_A A_A$<br>Front | C <sub>A</sub> A <sub>A</sub><br>Side | Weight         |
|--|-------------------|----------------|-----------------------------|-----------------------|-----------|--------------------|--------------------|---------------------------------------|----------------|
|  |                   |                | Vert<br>ft<br>ft<br>ft      | 0                     | ft        |                    | ft²                | ft²                                   | K              |
|  |                   |                | 2.000                       |                       |           | 1" Ice<br>2" Ice   | 4.029<br>4.585     | 2.289<br>2.785                        | 0.109<br>0.173 |
| RRH2x60-700                                  | C                 | From Leg       | 4.000                       | 0.000                 | 65.000    | No Ice             | 3.500              | 1.816                                 | 0.173          |
| (E-CL Per Photos)                            | C                 | Trom Eeg       | 0.000                       | 0.000                 | 05.000    | 1/2" Ice           | 3.761              | 2.052                                 | 0.083          |
| (= -=  |                   |                | 2.000                       |                       |           | 1" Ice             | 4.029              | 2.289                                 | 0.109          |
|  |                   |                |                             |                       |           | 2" Ice             | 4.585              | 2.785                                 | 0.173          |
| (2) DB-T1-6Z-8AB-0Z                          | C                 | From Leg       | 1.000                       | 0.000                 | 65.000    | No Ice             | 4.800              | 2.000                                 | 0.044          |
| (E-CL & Hz Offset Per                        |                   |                | 0.000                       |                       |           | 1/2" Ice           | 5.070              | 2.193                                 | 0.080          |
| Photos)                                      |                   |                | 2.000                       |                       |           | 1" Ice             | 5.348              | 2.393                                 | 0.120          |
|  |                   |                |                             |                       |           | 2" Ice             | 5.926              | 2.815                                 | 0.213          |
| (2) 3' x 2" Pipe Mount                       | C                 | From Leg       | 1.000                       | 0.000                 | 65.000    | No Ice             | 0.583              | 0.583                                 | 0.011          |
| (E-For TME's Per Photos)                     |                   |                | 0.000                       |                       |           | 1/2" Ice           | 0.770              | 0.770                                 | 0.017          |
|  |                   |                | 1.000                       |                       |           | 1" Ice             | 0.967              | 0.967                                 | 0.024          |
| D1-46 M4 [I D 204 1]                         | C                 | N              |                             | 0.000                 | (5,000    | 2" Ice             | 1.388              | 1.388                                 | 0.047          |
| Platform Mount [LP 304-1]<br>(E-14' Per TIA) | С                 | None           |                             | 0.000                 | 65.000    | No Ice<br>1/2" Ice | 17.490<br>21.370   | 17.490<br>21.370                      | 1.349<br>1.709 |
| (E-14 FCI 11A)                               |                   |                |                             |                       |           | 1" Ice             | 25.280             | 25.280                                | 2.131          |
|  |                   |                |                             |                       |           | 2" Ice             | 33.170             | 33.170                                | 3.164          |
| *  |                   |                |                             |                       |           | 2 100              | 33.170             | 33.170                                | 2.104          |

## **Load Combinations**

| Comb. | Description                              |
|-------|--|
| No.   | -  |
| 1     | Dead Only                                |
| 2     | 1.2 Dead+1.0 Wind 0 deg - No Ice         |
| 3     | 0.9 Dead+1.0 Wind 0 deg - No Ice         |
| 4     | 1.2 Dead+1.0 Wind 30 deg - No Ice        |
| 5     | 0.9 Dead+1.0 Wind 30 deg - No Ice        |
| 6     | 1.2 Dead+1.0 Wind 60 deg - No Ice        |
| 7     | 0.9 Dead+1.0 Wind 60 deg - No Ice        |
| 8     | 1.2 Dead+1.0 Wind 90 deg - No Ice        |
| 9     | 0.9 Dead+1.0 Wind 90 deg - No Ice        |
| 10    | 1.2 Dead+1.0 Wind 120 deg - No Ice       |
| 11    | 0.9 Dead+1.0 Wind 120 deg - No Ice       |
| 12    | 1.2 Dead+1.0 Wind 150 deg - No Ice       |
| 13    | 0.9 Dead+1.0 Wind 150 deg - No Ice       |
| 14    | 1.2 Dead+1.0 Wind 180 deg - No Ice       |
| 15    | 0.9 Dead+1.0 Wind 180 deg - No Ice       |
| 16    | 1.2 Dead+1.0 Wind 210 deg - No Ice       |
| 17    | 0.9 Dead+1.0 Wind 210 deg - No Ice       |
| 18    | 1.2 Dead+1.0 Wind 240 deg - No Ice       |
| 19    | 0.9 Dead+1.0 Wind 240 deg - No Ice       |
| 20    | 1.2 Dead+1.0 Wind 270 deg - No Ice       |
| 21    | 0.9 Dead+1.0 Wind 270 deg - No Ice       |
| 22    | 1.2 Dead+1.0 Wind 300 deg - No Ice       |
| 23    | 0.9 Dead+1.0 Wind 300 deg - No Ice       |
| 24    | 1.2 Dead+1.0 Wind 330 deg - No Ice       |
| 25    | 0.9 Dead+1.0 Wind 330 deg - No Ice       |
| 26    | 1.2 Dead+1.0 Ice+1.0 Temp                |
| 27    | 1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp |
|       |  |

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| Client Crown Castle   | Designed by<br>Regan      |

| Comb. | Description                                |
|-------|--|
| No.   |  |
| 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 | Elevation | Component | Condition        | Gov.  | Axial   | Major Axis | Minor Axis |
|---------|-----------|-----------|------------------|-------|---------|------------|------------|
| No.     | ft        | Type      |                  | Load  |         | Moment     | Moment     |
|         |           |           |                  | Comb. | K       | kip-ft     | kip-ft     |
| L1      | 100 - 47  | Pole      | Max Tension      | 26    | 0.000   | 0.000      | 0.000      |
|         |           |           | Max. Compression | 26    | -46.570 | -1.703     | -2.973     |
|         |           |           | Max. Mx          | 8     | -23.875 | -633.549   | -1.574     |
|         |           |           | Max. My          | 14    | -23.884 | -1.168     | -628.627   |
|         |           |           | Max. Vy          | 8     | 19.510  | -633.549   | -1.574     |
|         |           |           | Max. Vx          | 14    | 19.266  | -1.168     | -628.627   |
|         |           |           | Max. Torque      | 8     |         |            | 1.176      |
| L2      | 47 - 0    | Pole      | Max Tension      | 1     | 0.000   | 0.000      | 0.000      |
|         |           |           | Max. Compression | 26    | -65.511 | -0.903     | -2.831     |
|         |           |           | Max. Mx          | 8     | -38.564 | -1764.813  | -0.850     |
|         |           |           | Max. My          | 14    | -38.564 | -0.322     | -1747.170  |
|         |           |           | Max. Vy          | 8     | 23.152  | -1764.813  | -0.850     |
|         |           |           | Max. Vx          | 14    | 22.913  | -0.322     | -1747.170  |
|         |           |           | Max. Torque      | 17    |         |            | 0.450      |

## **Maximum Reactions**

| Location | Condition           | Gov.          | Vertical<br>K | Horizontal, X<br>K | Horizontal, Z<br>K |
|----------|---------------------|---------------|---------------|--------------------|--------------------|
|          |                     | Load<br>Comb. | Λ             | Λ                  | Λ                  |
| Pole     | Max. Vert           | 31            | 65.511        | -4.881             | -2.796             |
|          | Max. H <sub>x</sub> | 20            | 38.577        | 23.131             | -0.012             |
|          | Max. H <sub>z</sub> | 2             | 38.577        | -0.012             | 22.892             |
|          | $Max. M_x$          | 2             | 1745.107      | -0.012             | 22.892             |
|          | Max. M <sub>z</sub> | 8             | 1764.813      | -23.131            | 0.012              |
|          | Max. Torsion        | 17            | 0.450         | 11.576             | -19.832            |

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| Location | Condition           | Gov.  | Vertical  | Horizontal, X | Horizontal, Z |
|----------|---------------------|-------|-----------|---------------|---------------|
|          |                     | Load  | K         | K             | K             |
|          |                     | Comb. |           |               |               |
|          | Min. Vert           | 25    | 28.932    | 11.555        | 19.819        |
|          | Min. H <sub>x</sub> | 8     | 38.577    | -23.131       | 0.012         |
|          | Min. H <sub>z</sub> | 14    | 38.577    | 0.012         | -22.892       |
|          | Min. M <sub>x</sub> | 14    | -1747.170 | 0.012         | -22.892       |
|          | Min. M <sub>z</sub> | 20    | -1763.805 | 23.131        | -0.012        |
|          | Min. Torsion        | 5     | -0.450    | -11.576       | 19.832        |

## **Tower Mast Reaction Summary**

| Load<br>Combination                   | Vertical | $Shear_x$ | $Shear_z$ | Overturning<br>Moment, M <sub>x</sub> | Overturning Moment, M <sub>2</sub> | Torque |
|---------------------------------------|----------|-----------|-----------|---------------------------------------|------------------------------------|--------|
| Combination                           | K        | K         | K         | kip-ft                                | kip-ft                             | kip-ft |
| Dead Only                             | 32.147   | 0.000     | 0.000     | 0.832                                 | -0.402                             | 0.000  |
| 1.2 Dead+1.0 Wind 0 deg - No          | 38.577   | 0.012     | -22.892   | -1745.107                             | -0.687                             | 0.378  |
| Ice<br>0.9 Dead+1.0 Wind 0 deg - No   | 28.932   | 0.012     | -22.892   | -1736.024                             | -0.558                             | 0.381  |
| Ice                                   | 26.932   | 0.012     | -22.892   | -1/30.024                             | -0.558                             | 0.381  |
| 1.2 Dead+1.0 Wind 30 deg - No<br>Ice  | 38.577   | 11.576    | -19.832   | -1511.259                             | -882.820                           | 0.442  |
| 0.9 Dead+1.0 Wind 30 deg - No         | 28.932   | 11.576    | -19.832   | -1503.429                             | -877.972                           | 0.450  |
| Ice                                   | 20.577   | 20.020    | 11 457    | 072 102                               | 1520 524                           | 0.200  |
| 1.2 Dead+1.0 Wind 60 deg - No<br>Ice  | 38.577   | 20.038    | -11.457   | -872.193                              | -1528.534                          | 0.388  |
| 0.9 Dead+1.0 Wind 60 deg - No<br>Ice  | 28.932   | 20.038    | -11.457   | -867.786                              | -1520.231                          | 0.398  |
| 1.2 Dead+1.0 Wind 90 deg - No         | 38.577   | 23.131    | -0.012    | 0.850                                 | -1764.813                          | 0.231  |
| Ice<br>0.9 Dead+1.0 Wind 90 deg - No  | 28.932   | 23.131    | -0.012    | 0.583                                 | -1755.245                          | 0.240  |
| Ice                                   | 26.932   | 23.131    | -0.012    | 0.383                                 | -1733.243                          | 0.240  |
| 1.2 Dead+1.0 Wind 120 deg -<br>No Ice | 38.577   | 20.026    | 11.436    | 873.941                               | -1528.350                          | 0.013  |
| 0.9 Dead+1.0 Wind 120 deg -           | 28.932   | 20.026    | 11.436    | 869.001                               | -1520.046                          | 0.019  |
| No Ice<br>1.2 Dead+1.0 Wind 150 deg - | 38.577   | 11.555    | 19.819    | 1513.139                              | -882.503                           | -0.209 |
| No Ice                                | 20.277   | 11.000    | 15.015    | 10101109                              | 002.00                             | 0.209  |
| 0.9 Dead+1.0 Wind 150 deg -<br>No Ice | 28.932   | 11.555    | 19.819    | 1504.779                              | -877.652                           | -0.207 |
| 1.2 Dead+1.0 Wind 180 deg -           | 38.577   | -0.012    | 22.892    | 1747.170                              | -0.322                             | -0.375 |
| No Ice<br>0.9 Dead+1.0 Wind 180 deg - | 28.932   | -0.012    | 22.892    | 1737.558                              | -0.189                             | -0.379 |
| No Ice                                | 28.932   | -0.012    |           | 1737.336                              |                                    |        |
| 1.2 Dead+1.0 Wind 210 deg -<br>No Ice | 38.577   | -11.576   | 19.832    | 1513.322                              | 881.811                            | -0.442 |
| 0.9 Dead+1.0 Wind 210 deg -           | 28.932   | -11.576   | 19.832    | 1504.963                              | 877.224                            | -0.450 |
| No Ice<br>1.2 Dead+1.0 Wind 240 deg - | 38.577   | -20.038   | 11.457    | 874.257                               | 1527.525                           | -0.391 |
| No Ice                                | 28.932   | -20.038   | 11.457    | 960 221                               | 1519.483                           | 0.400  |
| 0.9 Dead+1.0 Wind 240 deg -<br>No Ice | 28.932   | -20.038   | 11.43/    | 869.321                               | 1519.483                           | -0.400 |
| 1.2 Dead+1.0 Wind 270 deg -<br>No Ice | 38.577   | -23.131   | 0.012     | 1.215                                 | 1763.805                           | -0.233 |
| 0.9 Dead+1.0 Wind 270 deg -           | 28.932   | -23.131   | 0.012     | 0.952                                 | 1754.498                           | -0.243 |
| No Ice<br>1.2 Dead+1.0 Wind 300 deg - | 38.577   | -20.026   | -11.436   | -871.876                              | 1527.342                           | -0.013 |
| No Ice                                |          |           |           |                                       |                                    |        |
| 0.9 Dead+1.0 Wind 300 deg -<br>No Ice | 28.932   | -20.026   | -11.436   | -867.466                              | 1519.299                           | -0.019 |
| 1.0 100                               |          |           |           |                                       |                                    |        |

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| Crown Castle  | Designed by<br>Regan      |

| Load<br>Combination          | Vertical | $Shear_x$ | $Shear_z$ | Overturning<br>Moment, Mx | Overturning<br>Moment, M <sub>z</sub> | Torque |
|------------------------------|----------|-----------|-----------|---------------------------|---------------------------------------|--------|
|                              | K        | K         | K         | kip-ft                    | kip-ft                                | kip-ft |
| 1.2 Dead+1.0 Wind 330 deg -  | 38.577   | -11.555   | -19.819   | -1511.075                 | 881.494                               | 0.211  |
| No Ice                       |          |           |           |                           |                                       |        |
| 0.9 Dead+1.0 Wind 330 deg -  | 28.932   | -11.555   | -19.819   | -1503.244                 | 876.905                               | 0.210  |
| No Ice                       |          |           |           |                           |                                       |        |
| 1.2 Dead+1.0 Ice+1.0 Temp    | 65.511   | 0.000     | 0.000     | 2.831                     | -0.903                                | -0.000 |
| 1.2 Dead+1.0 Wind 0 deg+1.0  | 65.511   | 0.002     | -5.597    | -425.981                  | -1.011                                | 0.019  |
| Ice+1.0 Temp                 |          |           |           |                           |                                       |        |
| 1.2 Dead+1.0 Wind 30 deg+1.0 | 65.511   | 2.820     | -4.848    | -368.532                  | -217.037                              | -0.056 |
| Ice+1.0 Temp                 |          |           |           |                           |                                       |        |
| 1.2 Dead+1.0 Wind 60 deg+1.0 | 65.511   | 4.883     | -2.800    | -211.541                  | -375.169                              | -0.116 |
| Ice+1.0 Temp                 |          |           |           |                           |                                       |        |
| 1.2 Dead+1.0 Wind 90 deg+1.0 | 65.511   | 5.637     | -0.002    | 2.927                     | -433.035                              | -0.145 |
| Ice+1.0 Temp                 |          |           |           |                           |                                       |        |
| 1.2 Dead+1.0 Wind 120        | 65.511   | 4.881     | 2.796     | 217.405                   | -375.131                              | -0.135 |
| deg+1.0 Ice+1.0 Temp         |          |           |           |                           |                                       |        |
| 1.2 Dead+1.0 Wind 150        | 65.511   | 2.817     | 4.846     | 374.423                   | -216.971                              | -0.089 |
| deg+1.0 Ice+1.0 Temp         |          |           |           |                           |                                       |        |
| 1.2 Dead+1.0 Wind 180        | 65.511   | -0.002    | 5.597     | 431.910                   | -0.935                                | -0.019 |
| deg+1.0 Ice+1.0 Temp         |          |           |           |                           |                                       |        |
| 1.2 Dead+1.0 Wind 210        | 65.511   | -2.820    | 4.848     | 374.461                   | 215.091                               | 0.056  |
| deg+1.0 Ice+1.0 Temp         |          |           |           |                           |                                       |        |
| 1.2 Dead+1.0 Wind 240        | 65.511   | -4.883    | 2.800     | 217.470                   | 373.223                               | 0.116  |
| deg+1.0 Ice+1.0 Temp         |          |           |           |                           |                                       |        |
| 1.2 Dead+1.0 Wind 270        | 65.511   | -5.637    | 0.002     | 3.002                     | 431.089                               | 0.145  |
| deg+1.0 Ice+1.0 Temp         |          |           |           |                           |                                       |        |
| 1.2 Dead+1.0 Wind 300        | 65.511   | -4.881    | -2.796    | -211.475                  | 373.185                               | 0.135  |
| deg+1.0 Ice+1.0 Temp         |          |           |           |                           |                                       |        |
| 1.2 Dead+1.0 Wind 330        | 65.511   | -2.817    | -4.846    | -368.494                  | 215.026                               | 0.089  |
| deg+1.0 Ice+1.0 Temp         |          |           |           |                           |                                       |        |
| Dead+Wind 0 deg - Service    | 32.147   | 0.003     | -4.968    | -376.764                  | -0.458                                | 0.082  |
| Dead+Wind 30 deg - Service   | 32.147   | 2.512     | -4.303    | -326.192                  | -191.228                              | 0.097  |
| Dead+Wind 60 deg - Service   | 32.147   | 4.348     | -2.486    | -187.988                  | -330.871                              | 0.086  |
| Dead+Wind 90 deg - Service   | 32.147   | 5.019     | -0.003    | 0.816                     | -381.969                              | 0.052  |
| Dead+Wind 120 deg - Service  | 32.147   | 4.346     | 2.482     | 189.631                   | -330.831                              | 0.004  |
| Dead+Wind 150 deg - Service  | 32.147   | 2.507     | 4.301     | 327.865                   | -191.159                              | -0.045 |
| Dead+Wind 180 deg - Service  | 32.147   | -0.003    | 4.968     | 378.476                   | -0.378                                | -0.082 |
| Dead+Wind 210 deg - Service  | 32.147   | -2.512    | 4.303     | 327.904                   | 190.393                               | -0.097 |
| Dead+Wind 240 deg - Service  | 32.147   | -4.348    | 2.486     | 189.701                   | 330.036                               | -0.086 |
| Dead+Wind 270 deg - Service  | 32.147   | -5.019    | 0.003     | 0.896                     | 381.134                               | -0.052 |
| Dead+Wind 300 deg - Service  | 32.147   | -4.346    | -2.482    | -187.919                  | 329.996                               | -0.004 |
| Dead+Wind 330 deg - Service  | 32.147   | -2.507    | -4.301    | -326.152                  | 190.323                               | 0.045  |

## **Solution Summary**

|       | Sui    | m of Applied Force. | s       |         | Sum of Reaction | is      |         |
|-------|--------|---------------------|---------|---------|-----------------|---------|---------|
| Load  | PX     | PY                  | PZ      | PX      | PY              | PZ      | % Error |
| Comb. | K      | K                   | K       | K       | K               | K       |         |
| 1     | 0.000  | -32.147             | 0.000   | 0.000   | 32.147          | 0.000   | 0.000%  |
| 2     | 0.012  | -38.577             | -22.892 | -0.012  | 38.577          | 22.892  | 0.000%  |
| 3     | 0.012  | -28.932             | -22.892 | -0.012  | 28.932          | 22.892  | 0.000%  |
| 4     | 11.576 | -38.577             | -19.832 | -11.576 | 38.577          | 19.832  | 0.000%  |
| 5     | 11.576 | -28.932             | -19.832 | -11.576 | 28.932          | 19.832  | 0.000%  |
| 6     | 20.038 | -38.577             | -11.457 | -20.038 | 38.577          | 11.457  | 0.000%  |
| 7     | 20.038 | -28.932             | -11.457 | -20.038 | 28.932          | 11.457  | 0.000%  |
| 8     | 23.131 | -38.577             | -0.012  | -23.131 | 38.577          | 0.012   | 0.000%  |
| 9     | 23.131 | -28.932             | -0.012  | -23.131 | 28.932          | 0.012   | 0.000%  |
| 10    | 20.026 | -38.577             | 11.436  | -20.026 | 38.577          | -11.436 | 0.000%  |
| 11    | 20.026 | -28.932             | 11.436  | -20.026 | 28.932          | -11.436 | 0.000%  |

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| Crown Castle  | Designed by<br>Regan      |

|       | Sui     | n of Applied Force | S       |         | Sum of Reaction | ıs      |        |
|-------|---------|--------------------|---------|---------|-----------------|---------|--------|
| Load  | PX      | PY                 | PZ      | PX      | PY              | PZ      | % Erro |
| Comb. | K       | K                  | K       | K       | K               | K       |        |
| 12    | 11.555  | -38.577            | 19.819  | -11.555 | 38.577          | -19.819 | 0.000% |
| 13    | 11.555  | -28.932            | 19.819  | -11.555 | 28.932          | -19.819 | 0.000% |
| 14    | -0.012  | -38.577            | 22.892  | 0.012   | 38.577          | -22.892 | 0.000% |
| 15    | -0.012  | -28.932            | 22.892  | 0.012   | 28.932          | -22.892 | 0.000% |
| 16    | -11.576 | -38.577            | 19.832  | 11.576  | 38.577          | -19.832 | 0.000% |
| 17    | -11.576 | -28.932            | 19.832  | 11.576  | 28.932          | -19.832 | 0.000% |
| 18    | -20.038 | -38.577            | 11.457  | 20.038  | 38.577          | -11.457 | 0.000% |
| 19    | -20.038 | -28.932            | 11.457  | 20.038  | 28.932          | -11.457 | 0.000% |
| 20    | -23.131 | -38.577            | 0.012   | 23.131  | 38.577          | -0.012  | 0.000% |
| 21    | -23.131 | -28.932            | 0.012   | 23.131  | 28.932          | -0.012  | 0.000% |
| 22    | -20.026 | -38.577            | -11.436 | 20.026  | 38.577          | 11.436  | 0.000% |
| 23    | -20.026 | -28.932            | -11.436 | 20.026  | 28.932          | 11.436  | 0.000% |
| 24    | -11.555 | -38.577            | -19.819 | 11.555  | 38.577          | 19.819  | 0.000% |
| 25    | -11.555 | -28.932            | -19.819 | 11.555  | 28.932          | 19.819  | 0.000% |
| 26    | 0.000   | -65.511            | 0.000   | 0.000   | 65.511          | -0.000  | 0.000% |
| 27    | 0.002   | -65.511            | -5.597  | -0.002  | 65.511          | 5.597   | 0.000% |
| 28    | 2.820   | -65.511            | -4.848  | -2.820  | 65.511          | 4.848   | 0.000% |
| 29    | 4.883   | -65.511            | -2.800  | -4.883  | 65.511          | 2.800   | 0.000% |
| 30    | 5.637   | -65.511            | -0.002  | -5.637  | 65.511          | 0.002   | 0.000% |
| 31    | 4.881   | -65.511            | 2.796   | -4.881  | 65.511          | -2.796  | 0.000% |
| 32    | 2.817   | -65.511            | 4.846   | -2.817  | 65.511          | -4.846  | 0.000% |
| 33    | -0.002  | -65.511            | 5.597   | 0.002   | 65.511          | -5.597  | 0.000% |
| 34    | -2.820  | -65.511            | 4.848   | 2.820   | 65.511          | -4.848  | 0.000% |
| 35    | -4.883  | -65.511            | 2.800   | 4.883   | 65.511          | -2.800  | 0.000% |
| 36    | -5.637  | -65.511            | 0.002   | 5.637   | 65.511          | -0.002  | 0.000% |
| 37    | -4.881  | -65.511            | -2.796  | 4.881   | 65.511          | 2.796   | 0.000% |
| 38    | -2.817  | -65.511            | -4.846  | 2.817   | 65.511          | 4.846   | 0.000% |
| 39    | 0.003   | -32.147            | -4.968  | -0.003  | 32.147          | 4.968   | 0.000% |
| 40    | 2.512   | -32.147            | -4.303  | -2.512  | 32.147          | 4.303   | 0.000% |
| 41    | 4.348   | -32.147            | -2.486  | -4.348  | 32.147          | 2.486   | 0.000% |
| 42    | 5.019   | -32.147            | -0.003  | -5.019  | 32.147          | 0.003   | 0.000% |
| 43    | 4.346   | -32.147            | 2.482   | -4.346  | 32.147          | -2.482  | 0.000% |
| 44    | 2.507   | -32.147            | 4.301   | -2.507  | 32.147          | -4.301  | 0.000% |
| 45    | -0.003  | -32.147            | 4.968   | 0.003   | 32.147          | -4.968  | 0.000% |
| 46    | -2.512  | -32.147            | 4.303   | 2.512   | 32.147          | -4.303  | 0.000% |
| 47    | -4.348  | -32.147            | 2.486   | 4.348   | 32.147          | -2.486  | 0.000% |
| 48    | -5.019  | -32.147            | 0.003   | 5.019   | 32.147          | -0.003  | 0.000% |
| 49    | -4.346  | -32.147            | -2.482  | 4.346   | 32.147          | 2.482   | 0.000% |
| 50    | -2.507  | -32.147            | -4.301  | 2.507   | 32.147          | 4.301   | 0.000% |

## **Non-Linear Convergence Results**

| Load        | Converged? | Number    | Displacement | Force      |
|-------------|------------|-----------|--------------|------------|
| Combination |            | of Cycles | Tolerance    | Tolerance  |
| 1           | Yes        | 4         | 0.00000001   | 0.00000001 |
| 2           | Yes        | 4         | 0.00000001   | 0.00001976 |
| 3           | Yes        | 4         | 0.00000001   | 0.00001227 |
| 4           | Yes        | 4         | 0.00000001   | 0.00029493 |
| 5           | Yes        | 4         | 0.00000001   | 0.00019323 |
| 6           | Yes        | 4         | 0.00000001   | 0.00028534 |
| 7           | Yes        | 4         | 0.00000001   | 0.00018638 |
| 8           | Yes        | 4         | 0.00000001   | 0.00001624 |
| 9           | Yes        | 4         | 0.00000001   | 0.00000962 |
| 10          | Yes        | 4         | 0.00000001   | 0.00028720 |
| 11          | Yes        | 4         | 0.00000001   | 0.00018758 |
| 12          | Yes        | 4         | 0.00000001   | 0.00029655 |

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| Јо <b>ь</b><br>92699.005.01 - MERIDEN WEST CENTRAL, CT (BU# 842869) | <b>Page</b> 17 of 19      |
|---|---------------------------|
| Project   | Date<br>16:33:49 06/24/20 |
| Client Crown Castle   | Designed by<br>Regan      |

| 13 | Yes | 4 | 0.00000001 | 0.00019397 |
|----|-----|---|------------|------------|
| 14 | Yes | 4 | 0.00000001 | 0.00001987 |
| 15 | Yes | 4 | 0.00000001 | 0.00001234 |
| 16 | Yes | 4 | 0.0000001  | 0.00028266 |
| 17 | Yes | 4 | 0.0000001  | 0.00018470 |
| 18 | Yes | 4 | 0.0000001  | 0.00029318 |
| 19 | Yes | 4 | 0.0000001  | 0.00019186 |
| 20 | Yes | 4 | 0.0000001  | 0.00001625 |
| 21 | Yes | 4 | 0.0000001  | 0.00000963 |
| 22 | Yes | 4 | 0.00000001 | 0.00029232 |
| 23 | Yes | 4 | 0.0000001  | 0.00019130 |
| 24 | Yes | 4 | 0.00000001 | 0.00028208 |
| 25 | Yes | 4 | 0.0000001  | 0.00018462 |
| 26 | Yes | 4 | 0.0000001  | 0.00000001 |
| 27 | Yes | 4 | 0.00000001 | 0.00021697 |
| 28 | Yes | 4 | 0.0000001  | 0.00022588 |
| 29 | Yes | 4 | 0.0000001  | 0.00022789 |
| 30 | Yes | 4 | 0.00000001 | 0.00022240 |
| 31 | Yes | 4 | 0.00000001 | 0.00023083 |
| 32 | Yes | 4 | 0.00000001 | 0.00023056 |
| 33 | Yes | 4 | 0.00000001 | 0.00022189 |
| 34 | Yes | 4 | 0.00000001 | 0.00022860 |
| 35 | Yes | 4 | 0.00000001 | 0.00022803 |
| 36 | Yes | 4 | 0.00000001 | 0.00021942 |
| 37 | Yes | 4 | 0.00000001 | 0.00022524 |
| 38 | Yes | 4 | 0.00000001 | 0.00022408 |
| 39 | Yes | 4 | 0.00000001 | 0.00000001 |
| 40 | Yes | 4 | 0.00000001 | 0.00000001 |
| 41 | Yes | 4 | 0.00000001 | 0.00000001 |
| 42 | Yes | 4 | 0.00000001 | 0.00000001 |
| 43 | Yes | 4 | 0.00000001 | 0.00000001 |
| 44 | Yes | 4 | 0.00000001 | 0.00000001 |
| 45 | Yes | 4 | 0.00000001 | 0.00000001 |
| 46 | Yes | 4 | 0.00000001 | 0.00000001 |
| 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 | Elevation | Horz.      | Gov.  | Tilt  | Twist |
|---------|-----------|------------|-------|-------|-------|
| No.     |           | Deflection | Load  |       |       |
|         | ft        | in         | Comb. | 0     | 0     |
| L1      | 100 - 47  | 5.069      | 42    | 0.402 | 0.001 |
| L2      | 53 - 0    | 1.576      | 42    | 0.266 | 0.000 |

## **Critical Deflections and Radius of Curvature - Service Wind**

| Elevation | Appurtenance                 | Gov.  | Deflection | Tilt  | Twist | Radius of |
|-----------|------------------------------|-------|------------|-------|-------|-----------|
|           |                              | Load  |            |       |       | Curvature |
| ft        |                              | Comb. | in         | ٥     | 0     | ft        |
| 100.000   | Lightning Rod 5/8" x 8'      | 42    | 5.069      | 0.402 | 0.001 | 84340     |
| 86.000    | ERICSSON AIR 21 B2A B4P w/   | 42    | 3.895      | 0.368 | 0.000 | 30121     |
| 78.000    | Mount Pipe<br>TME-800MHZ RRH | 42    | 3.254      | 0.347 | 0.000 | 19168     |

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| Јо <b>ь</b><br>92699.005.01 - MERIDEN WEST CENTRAL, CT (BU# 84286 | Page 18 of 19             |
|---|---------------------------|
| Project   | Date<br>16:33:49 06/24/20 |
| Client Crown Castle   | Designed by<br>Regan      |

| Elevation | Appurtenance                  | Gov.  | Deflection | Tilt  | Twist | Radius of |
|-----------|-------------------------------|-------|------------|-------|-------|-----------|
|           |                               | Load  |            |       |       | Curvature |
| ft        |                               | Comb. | in         | 0     | 0     | ft        |
| 76.000    | (2) APXVSPP18-C-A20 w/ Mount  | 42    | 3.099      | 0.341 | 0.000 | 17571     |
|           | Pipe                          |       |            |       |       |           |
| 65.000    | (2) SBNHH-1D45B w/ Mount Pipe | 42    | 2.304      | 0.308 | 0.000 | 12048     |

| Maximum Tower Deflections - Design Wind |           |                     |              |       |       |  |
|---|-----------|---------------------|--------------|-------|-------|--|
| Section<br>No.                          | Elevation | Horz.<br>Deflection | Gov.<br>Load | Tilt  | Twist |  |
|   | ft        | in                  | Comb.        | 0     | 0     |  |
| L1                                      | 100 - 47  | 23.410              | 8            | 1.858 | 0.002 |  |
| L2                                      | 53 - 0    | 7.282               | 8            | 1.228 | 0.001 |  |

|           | Critical Deflection                      | ns and       | Radius o   | of Curvat | ture - Des | sign Wind              |
|-----------|--|--------------|------------|-----------|------------|------------------------|
| Elevation | Appurtenance                             | Gov.<br>Load | Deflection | Tilt      | Twist      | Radius of<br>Curvature |
| ft        |  | Comb.        | in         | 0         | 0          | ft                     |
| 100.000   | Lightning Rod 5/8" x 8'                  | 8            | 23.410     | 1.858     | 0.003      | 18305                  |
| 86.000    | ERICSSON AIR 21 B2A B4P w/<br>Mount Pipe | 8            | 17.989     | 1.700     | 0.002      | 6537                   |
| 78.000    | TME-800MHZ RRH                           | 8            | 15.030     | 1.602     | 0.001      | 4159                   |
| 76.000    | (2) APXVSPP18-C-A20 w/ Mount<br>Pipe     | 8            | 14.317     | 1.577     | 0.001      | 3812                   |
| 65.000    | (2) SBNHH-1D45B w/ Mount Pipe            | 8            | 10.646     | 1.424     | 0.001      | 2614                   |

|                |              |                      | Po     | le Des | sign l | Data   |         |            |                         |
|----------------|--------------|----------------------|--------|--------|--------|--------|---------|------------|-------------------------|
| Section<br>No. | Elevation    | Size                 | L      | $L_u$  | Kl/r   | A      | $P_u$   | $\phi P_n$ | Ratio<br>P <sub>u</sub> |
|                | ft           |                      | ft     | ft     |        | $in^2$ | K       | K          | $\phi P_n$              |
| L1             | 100 - 47 (1) | TP40.72x28x0.313     | 53.000 | 0.000  | 0.0    | 38.846 | -23.875 | 2272.480   | 0.011                   |
| L2             | 47 - 0 (2)   | TP51.37x38.655x0.375 | 53.000 | 0.000  | 0.0    | 61.003 | -38.564 | 3568.660   | 0.011                   |

Compression Checks

|                |              | P                | ole Ben  | ding De       | sign l                       | Data     |               |               |
|----------------|--------------|------------------|----------|---------------|------------------------------|----------|---------------|---------------|
| Section<br>No. | Elevation    | Size             | $M_{ux}$ | $\phi M_{nx}$ | Ratio<br>Mux                 | $M_{uy}$ | $\phi M_{ny}$ | Ratio<br>Muy  |
|                | ft           |                  | kip-ft   | kip-ft        | $\frac{M_{ux}}{\phi M_{nx}}$ | kip-ft   | kip-ft        | $\phi M_{ny}$ |
| L1             | 100 - 47 (1) | TP40.72x28x0.313 | 633.551  | 2103.400      | 0.301                        | 0.000    | 2103.400      | 0.000         |

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| Job<br>92699.005.01 - MERIDEN WEST CENTRAL, CT (BU# 842869) | <b>Page</b> 19 of 19      |
|---|---------------------------|
| Project   | Date<br>16:33:49 06/24/20 |
| Client Crown Castle   | Designed by<br>Regan      |

| Section<br>No. | Elevation  | Size                 | $M_{ux}$ | $\phi M_{nx}$ | Ratio                        | $M_{uy}$ | $\phi M_{ny}$ | Ratio                        |
|----------------|------------|----------------------|----------|---------------|------------------------------|----------|---------------|------------------------------|
| NO.            | ft         |                      | kip-ft   | kip-ft        | $\frac{M_{ux}}{\phi M_{nx}}$ | kip-ft   | kip-ft        | $\frac{M_{uy}}{\phi M_{ny}}$ |
| L2             | 47 - 0 (2) | TP51.37x38.655x0.375 | 1764.817 | 4179.683      | 0.422                        | 0.000    | 4179.683      | 0.000                        |

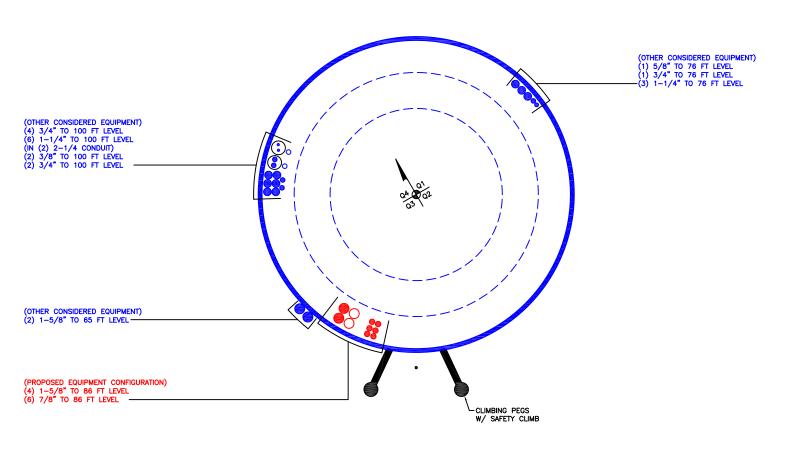
| Pole Shear Design Data |              |                      |                          |            |              |                          |            |                         |
|------------------------|--------------|----------------------|--------------------------|------------|--------------|--------------------------|------------|-------------------------|
| Section<br>No.         | Elevation    | Size                 | Actual<br>V <sub>u</sub> | $\phi V_n$ | Ratio<br>V., | Actual<br>T <sub>u</sub> | $\phi T_n$ | Ratio<br>T <sub>"</sub> |
|                        | ft           |                      | ĸ.                       | K          | $\phi V_n$   | kip-ft                   | kip-ft     | $\phi T_n$              |
| L1                     | 100 - 47 (1) | TP40.72x28x0.313     | 19.510                   | 681.743    | 0.029        | 0.231                    | 2329.483   | 0.000                   |
| L2                     | 47 - 0 (2)   | TP51.37x38.655x0.375 | 23.152                   | 1070.600   | 0.022        | 0.231                    | 4787.300   | 0.000                   |

|                |              |                         | F                        | ole Int                  | teraction     | on Des                  | ign Da          | ta               |          |
|----------------|--------------|-------------------------|--------------------------|--------------------------|---------------|-------------------------|-----------------|------------------|----------|
| Section<br>No. | Elevation    | Ratio<br>P <sub>u</sub> | Ratio<br>M <sub>ux</sub> | Ratio<br>M <sub>uy</sub> | $Ratio$ $V_u$ | Ratio<br>T <sub>u</sub> | Comb.<br>Stress | Allow.<br>Stress | Criteria |
|                | ft           | $\phi P_n$              | $\phi M_{nx}$            | $\phi M_{nv}$            | $\phi V_n$    | $\phi T_n$              | Ratio           | Ratio            |          |
| L1             | 100 - 47 (1) | 0.011                   | 0.301                    | 0.000                    | 0.029         | 0.000                   | 0.313           | 1.050            | 4.8.2    |
| L2             | 47 - 0 (2)   | 0.011                   | 0.422                    | 0.000                    | 0.022         | 0.000                   | 0.434           | 1.050            | 4.8.2    |

| Section Capacity Table |                 |                   |                      |                     |         |                      |               |              |
|------------------------|-----------------|-------------------|----------------------|---------------------|---------|----------------------|---------------|--------------|
| Section<br>No.         | Elevation<br>ft | Component<br>Type | Size                 | Critical<br>Element | P<br>K  | $\phi P_{allow} \ K$ | %<br>Capacity | Pass<br>Fail |
| L1                     | 100 - 47        | Pole              | TP40.72x28x0.313     | 1                   | -23.875 | 2386.104             | 29.8          | Pass         |
| L2                     | 47 - 0          | Pole              | TP51.37x38.655x0.375 | 2                   | -38.564 | 3747.093             | 41.3          | Pass         |
|                        |                 |                   |                      |                     |         |                      | Summary       |              |
|                        |                 |                   |                      |                     |         | Pole (L2)            | 41.3          | Pass         |
|                        |                 |                   |                      |                     |         | RATING =             | 41.3          | Pass         |

Program Version 8.0.5.0.eri

# APPENDIX B BASE LEVEL DRAWING



BUSINESS UNIT:842869

# APPENDIX C ADDITIONAL CALCULATIONS

## **Monopole Base Plate Connection**

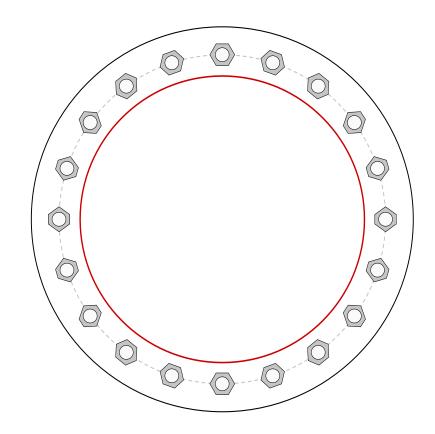


| Site Info |           |                     |
|-----------|-----------|---------------------|
|           | BU#       | 842869              |
|           | Site Name | RIDEN WEST CENTRAL, |
|           | Order#    | 445375, Rev.5       |

| <b>Analysis Considerations</b> |    |
|--------------------------------|----|
| TIA-222 Revision               | Н  |
| Grout Considered:              | No |
| l <sub>ar</sub> (in)           | 0  |

| Applied Loads      |         |
|--------------------|---------|
| Moment (kip-ft)    | 1764.81 |
| Axial Force (kips) | 38.56   |
| Shear Force (kips) | 23.15   |

51.37" x 0.375" 16-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)



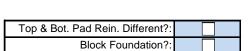
#### **Analysis Results Connection Properties Anchor Rod Summary** (units of kips, kip-in) **Anchor Rod Data** (20) 2-1/2" ø bolts (A572-50 N; Fy=50 ksi, Fu=65 ksi) on 59" BC Pu\_c = 73.66 φPn\_c = 220.89 **Stress Rating** Vu = 1.16 φVn = 99.4 31.8% **Base Plate Data** Mu = n/a $\phi$ Mn = n/a **Pass** 69" OD x 3" Plate (A36; Fy=36 ksi, Fu=58 ksi) **Base Plate Summary** (Flexural) Max Stress (ksi): 9.4 **Stiffener Data** N/A Allowable Stress (ksi): 32.4 Stress Rating: 27.6% **Pass Pole Data**

CCIplate - version 3.6.1 Analysis Date: 24-06-2020

<sup>\*</sup>TIA-222-H Section 15.5 Applied

## Pier and Pad Foundation

BU # : 842869
Site Name: MERIDEN WEST 0
App. Number: 445375, Rev.5



| TIA-222 Revision: | Н        |
|-------------------|----------|
| Tower Type:       | Monopole |

| Superstructure Analysis Reactions |                  |  |  |
|-----------------------------------|------------------|--|--|
| 39                                | kips             |  |  |
| 23                                | kips             |  |  |
|                                   |                  |  |  |
|                                   |                  |  |  |
| 1765                              | ft-kips          |  |  |
| 100                               | ft               |  |  |
|                                   |                  |  |  |
| 0                                 | in               |  |  |
|                                   | 39<br>23<br>1765 |  |  |

| Pier Properties                               | S      |    |
|---|--------|----|
| Pier Shape:                                   | Square |    |
| Pier Diameter, <b>dpier</b> :                 | 8      | ft |
| Ext. Above Grade, E:                          | 1      | ft |
| Pier Rebar Size, <b>Sc</b> :                  | 11     |    |
| Pier Rebar Quantity, <b>mc</b> :              | 60     |    |
| Pier Tie/Spiral Size, <b>St</b> :             | 4      |    |
| Pier Tie/Spiral Quantity, mt:                 | 7      |    |
| Pier Reinforcement Type:                      | Tie    |    |
| Pier Clear Cover, <b>cc</b> <sub>pier</sub> : | 3      | in |

| Pad Properties                            | S   |    |
|---|-----|----|
| Depth, <b>D</b> :                         | 7.5 | ft |
| Pad Width, <b>W</b> :                     | 20  | ft |
| Pad Thickness, <b>T</b> :                 | 2.5 | ft |
| Pad Rebar Size (Bottom), Sp:              | 9   |    |
| Pad Rebar Quantity (Bottom), mp:          | 32  |    |
| Pad Clear Cover, <b>cc<sub>pad</sub>:</b> | 3   | in |

| Material Properties                 |     |     |  |
|-------------------------------------|-----|-----|--|
| Rebar Grade, <b>Fy</b> :            | 60  | ksi |  |
| Concrete Compressive Strength, F'c: | 4   | ksi |  |
| Dry Concrete Density, δ <b>c</b> :  | 150 | pcf |  |

| Soil Properties                      | S     |         |
|--------------------------------------|-------|---------|
| Total Soil Unit Weight, $\gamma$ :   | 110   | pcf     |
| Ultimate Net Bearing, Qnet:          | 8.000 | ksf     |
| Cohesion, <b>Cu</b> :                | 0.000 | ksf     |
| Friction Angle, $oldsymbol{arphi}$ : | 30    | degrees |
| SPT Blow Count, Noblows:             |       |         |
| Base Friction, $\mu$ :               | 0.35  |         |
| Neglected Depth, N:                  | 3.50  | ft      |
| Foundation Bearing on Rock?          | No    |         |
| Groundwater Depth, gw:               | N/A   | ft      |

| Found                          | lation Anal | lysis Chec | ks      |       |
|--------------------------------|-------------|------------|---------|-------|
|                                | Capacity    | Demand     | Rating* | Check |
|                                |             |            |         |       |
| Lateral (Sliding) (kips)       | 190.35      | 23.00      | 11.5%   | Pass  |
| Bearing Pressure (ksf)         | 6.62        | 2.32       | 35.1%   | Pass  |
| Overturning (kip*ft)           | 3744.34     | 1960.50    | 52.4%   | Pass  |
| Pier Flexure (Comp.) (kip*ft)  | 16122.68    | 1903.00    | 11.2%   | Pass  |
|                                |             |            |         |       |
| Pier Compression (kip)         | 40734.72    | 108.12     | 0.3%    | Pass  |
| Pad Flexure (kip*ft)           | 3474.94     | 513.13     | 14.1%   | Pass  |
| Pad Shear - 1-way (kips)       | 576.22      | 111.68     | 18.5%   | Pass  |
| Pad Shear - 2-way (Comp) (ksi) | 0.190       | 0.026      | 13.2%   | Pass  |
| Flexural 2-way (Comp) (kip*ft) | 5377.97     | 1141.80    | 20.2%   | Pass  |

\*Rating per TIA-222-H Section 15.5

| Soil Rating*:       | 52.4% |
|---------------------|-------|
| Structural Rating*: | 20.2% |

CROWN

<--Toggle between Gross and Net



#### Address:

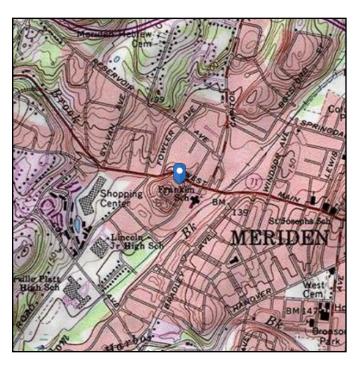
No Address at This Location

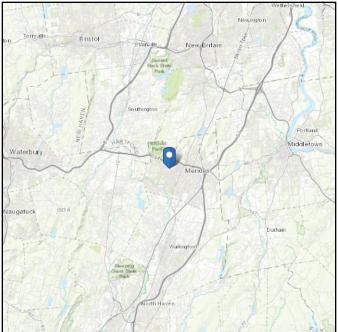
## ASCE 7 Hazards Report

Standard: ASCE/SEI 7-10 Elevation: 165.37 ft (NAVD 88)

Risk Category: || Latitude: 41.540031

Soil Class: D - Stiff Soil Longitude: -72.819019



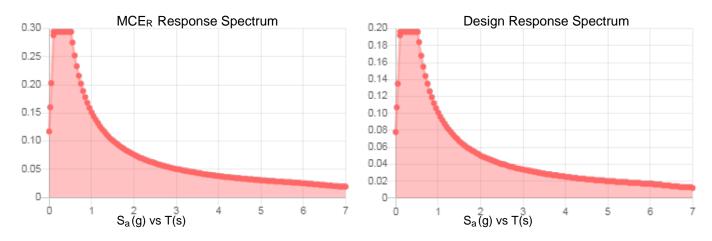




#### **Seismic**

| Site Soil Class:<br>Results: | D - Stiff Soil |                    |       |  |
|------------------------------|----------------|--------------------|-------|--|
| S <sub>S</sub> :             | 0.184          | S <sub>DS</sub> :  | 0.196 |  |
| $S_1$ :                      | 0.063          | S <sub>D1</sub> :  | 0.101 |  |
| Fa:                          | 1.6            | $T_L$ :            | 6     |  |
| F <sub>v</sub> :             | 2.4            | PGA:               | 0.094 |  |
| $S_{MS}$ :                   | 0.294          | PGA <sub>M</sub> : | 0.151 |  |
| S <sub>M1</sub> :            | 0.151          | F <sub>PGA</sub> : | 1.6   |  |
|                              |                | l. ·               | 1     |  |

#### Seismic Design Category B



Data Accessed: Tue Jun 23 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: 0.75 in.

Concurrent Temperature: 15 F

Gust Speed: 50 mph

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

Date Accessed: Tue Jun 23 2020

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

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

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

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# Exhibit E

**Mount Analysis** 

Date: June 22, 2020

Darcy Tarr Crown Castle 3530 Toringdon Way, Suite 300 Charlotte, NC 28277 (704) 405-6589 Subject: the solutions are endless
Infinigy Engineering, PLLC
1033 Watervliet Shaker Road
Albany, NY 12205
518-690-0790
structural@infinigy.com

Mount Analysis Report

Carrier Designation: T-Mobile Anchor

Carrier Site Number: CT11733B

Carrier Site Name: CT733/AT&THntr Amblnce FT

Crown Castle BU Number: 842869

Crown Castle Site Name: Meriden West Central

Crown Castle JDE Job Number: 511473

Crown Castle Order Number: 445375 Rev. 5

Engineering Firm Designation: Infinigy Engineering, PLLC Report Designation: 1039-Z0001-B

Site Data: 450-478 West Main Street, Meriden, New Haven County, CT 06451

Latitude 41°32'24.11" Longitude -72°49'8.47"

Structure Information: Tower Height & Type: 100.0 ft Monopole

Mount Elevation: 86.0 ft

Mount Type: 12.5 ft Platform

Dear Darcy Tarr,

Infinigy Engineering, PLLC is pleased to submit this "Mount Analysis Report" to determine the structural integrity of T-Mobile's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

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

Platform Sufficient
\*Sufficient upon completion of the changes listed in the 'Recommendations' section of this report.

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

Mount analysis prepared by: Jacques Grimaldi, M.S., E.I.T.

Respectfully Submitted by: John Stevens, P.E. 518-690-0790 jstevens@infinigy.com CT PE License No. PEN.0024705

6-22-2020

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- 3.2) Assumptions

#### 4) ANALYSIS RESULTS

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Wire Frame and Rendered Models

#### 6) APPENDIX B

Software Input Calculations

#### 7) APPENDIX C

Software Analysis Output

#### 8) APPENDIX D

**Additional Calculations** 

#### 1) INTRODUCTION

This is an existing 3 sector 12.5 ft Platform, designed by Commscope.

#### 2) ANALYSIS CRITERIA

Building Code: 2018 Connecticut State Building Code / 2015 IBC

TIA-222 Revision: TIA-222-H

Risk Category:

Ultimate Wind Speed: 125 mph

**Exposure Category:** В Topographic Factor at Base: 1.0 **Topographic Factor at Mount:** 1.0 Ice Thickness: 1.5 in Wind Speed with Ice: 50 mph Seismic S<sub>s</sub>: 0.186 Seismic S<sub>1</sub>: 0.062 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<br>Centerline<br>(ft) | Antenna<br>Centerline<br>(ft) | Number<br>of<br>Antennas | Antenna<br>Manufacturer | Antenna Model                | Mount /<br>Modification<br>Details |
|-----------------------------|-------------------------------|--------------------------|-------------------------|------------------------------|------------------------------------|
|                             |                               | 3                        | Ericsson                | AIR-32 B2A/B66AA             |                                    |
|                             |                               | 3                        | Ericsson                | AIR6449 B41                  |                                    |
|                             |                               | 3                        | Ericsson                | Ericsson AIR 21 B2A B4P      | 12.5 ft Platform                   |
| 86.0                        | 90.0                          | 3                        | RFS/Celwave             | APXVAARR24_43-U-NA20         | {Commscope                         |
|                             |                               | 3                        | Ericsson                | KRY 112 144/1                | MC-PA12S}                          |
|                             |                               | 3                        | Ericsson                | Radio 4449 B71 B85A_T-Mobile |                                    |
|                             |                               | 3                        | Ericsson                | RRUS 4415 B25                |                                    |

#### 3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

| Document                    | Remarks                 | Reference         | Source    |
|-----------------------------|-------------------------|-------------------|-----------|
| Crown Application           | T-Mobile<br>Application | 445375 Revision 5 | CCI Sites |
| Mount Manufacturer Drawings | Commscope               | MC-PA12S          | Infinigy  |

#### 3.1) Analysis Method

RISA-3D (Version 18), 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.

Infinigy Mount Analysis Tool V2.1.4, a tool internally developed by Infinigy, was used to calculate wind loading on all appurtenances, dishes and mount members for various loading cases. Selected output from the analysis is included in Appendix B "Software Input Calculations".

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

#### 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) The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.
- 5) Prior structural modifications to the tower mounting system are assumed to be installed as shown per available data.
- 6) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate

HSS (Rectangular)

ASTM A529 (GR 50)

ASTM A500 (GR C-46)

ASTM A500 (GR C-46)

Connection Bolts ASTM A325

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

#### 4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform, All Sectors)

| Notes | Component           | Critical<br>Member | Centerline (ft) | % Capacity | Pass / Fail |
|-------|---------------------|--------------------|-----------------|------------|-------------|
|       | Mount Pipe(s)       | MP11               |                 | 76.2       | Pass        |
|       | Corner Plate(s)     | M5                 |                 | 54.5       | Pass        |
| ] , [ | Standoff(s)         | M43                | 96.0            | 44.5       | Pass        |
| ] ' [ | Handrail(s)         | M28                | 86.0            | 40.5       | Pass        |
|       | Horizontal(s)       | M3                 |                 | 36.1       | Pass        |
|       | Mount Connection(s) |                    | 1               | 34.9       | Pass        |

| Structure Rating (max from all components) = 76.2% | Structure Rating (max from all components) |
|--|--|
|--|--|

Notes:

#### 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 Commscope MT-195-12 handrail kit at a height of 42" from the mount face horizontals.

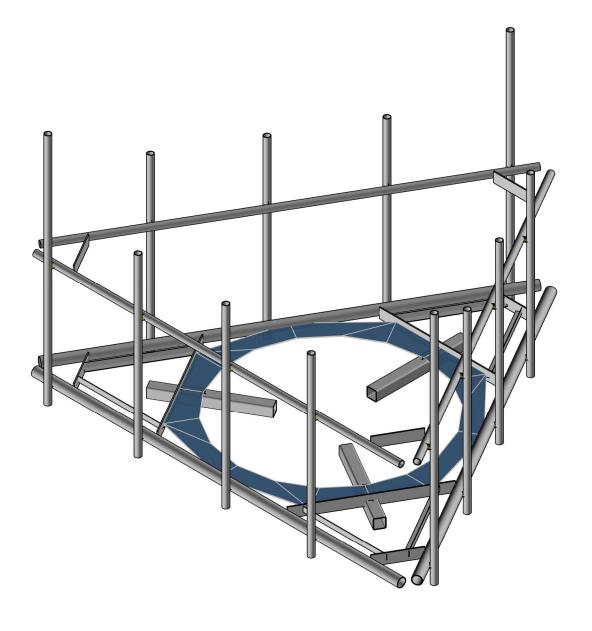
No structural modifications are required at this time, provided that the above-listed changes are implemented.

<sup>1)</sup> See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity

## APPENDIX A

**WIRE FRAME AND RENDERED MODELS** 

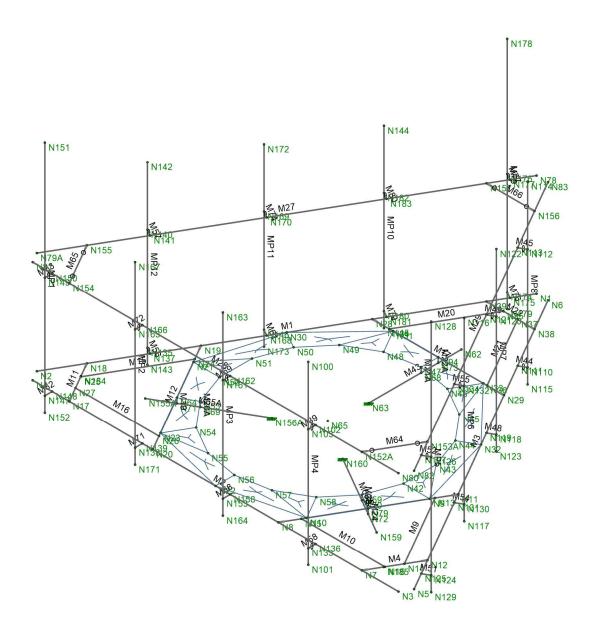




Envelope Only Solution

| Infinigy Engineering, PLLC | 842869 | Rendered1         |
|----------------------------|--------|-------------------|
| JG                         |        | Jun 22, 2020      |
| 1039-Z0001-B               |        | 842869_loaded.r3d |





Envelope Only Solution

| Infinigy Engineering, PLLC | 842869 | Wire Frame1       |
|----------------------------|--------|-------------------|
| JG                         |        | Jun 22, 2020      |
| 1039-Z0001-B               |        | 842869_loaded.r3d |

## APPENDIX B SOFTWARE INPUT CALCULATIONS

# **Program Inputs**

| PROJECT INFORMATION |
|---------------------|
| Client:             |
| Carrier:            |
| Engineer:           |

| SITE INFORMATION       | RMATION                    |                      |
|------------------------|----------------------------|----------------------|
| Risk Category:         | Ш                          |                      |
| Exposure Category:     | В                          |                      |
| Topo Factor Procedure: |                            | Method 1, Category 1 |
| Site Class:            | Site Class: D - Stiff Soil |                      |
| Ground Elevation:      | 166                        | ft *Rev H            |

|                   | Platform    |              | tt              | ft                |  |
|-------------------|-------------|--------------|-----------------|-------------------|--|
| ORMATION          | Plati       | 3            | 86.0            | 100.0             |  |
| MOUNT INFORMATION | Mount Type: | Num Sectors: | Centerline AGL: | Tower Height AGL: |  |

| Topo Fe<br>Slope Dis<br>Crest Dis<br>Crest H | TOPOGRAPHIC DATA | Topo Feature: N/A | Slope Distance: N/A ft | Crest Distance: N/A ft | Crest Height: N/A ft |
|--|------------------|-------------------|------------------------|------------------------|----------------------|
|--|------------------|-------------------|------------------------|------------------------|----------------------|

| FACT                                  | FACTORS |             |
|---------------------------------------|---------|-------------|
| Directionality Fact. $(K_d)$ :        | 0.95    |             |
| Ground Ele. Factor $(K_{\rm e})$ :    | 0.99    | *Rev H Only |
| Rooftop Speed-Up (K <sub>s</sub> ):   | 1.00    | *Rev H Only |
| Topographic Factor $(K_{zt})$ :       | 1.00    |             |
| Gust Effect Factor (G <sub>h</sub> ): | 1.0     |             |

| CODE STANDARDS | NDARDS    |  |
|----------------|-----------|--|
| Building Code: | 2015 IBC  |  |
| TIA Standard:  | TIA-222-H |  |
| ASCE Standard: | ASCE 7-10 |  |

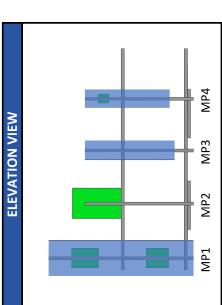
| WIND AND ICE DATA                     | ICE DATA |     |
|---------------------------------------|----------|-----|
| Ultimate Wind $(V_{ult})$ :           | 125      | ydw |
| Design Wind (V):                      | N/A      | mph |
| Ice Wind (V <sub>ice</sub> ):         | 50       | hdm |
| Base Ice Thickness (t <sub>i</sub> ): | 1.5      | in  |
| Flat Pressure:                        | 71.51    | psf |
| Round Pressure:                       | 42.90    | psf |
| ice Wind Pressure:                    | 98'9     | psf |

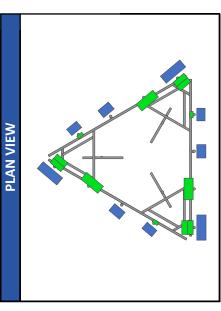
| SEISMIC DATA                            | C DATA |   |
|---|--------|---|
| Short-Period Accel. (S <sub>s</sub> ):  | 0.19   | g |
| 1-Second Accel. $(S_1)$ :               | 90.0   | g |
| Short-Period Design (S <sub>DS</sub> ): | 0.20   |   |
| 1-Second Design (S <sub>D1</sub> ):     | 01.0   |   |
| Short-Period Coeff. (F <sub>a</sub> ):  | 1.60   |   |
| 1-Second Coeff. (F <sub>v</sub> ):      | 2.40   |   |
| Amplification Factor (a <sub>p</sub> ): | 1.00   |   |
| Response Mod. (R <sub>p</sub> ):        | 2.50   |   |
| Overstrength ( $\Omega_{\rm o}$ ):      | 1.00   |   |



Infinigy Load Calculator V2.1.4

## **Program Inputs**







Infinigy Load Calculator V2.1.4

|   |                          |                                     | _                         |                      |                                  |                                  |                            |                                  |                        |  |
|---|--------------------------|-------------------------------------|---------------------------|----------------------|----------------------------------|----------------------------------|----------------------------|----------------------------------|------------------------|--|
|   |                          | Member<br>(α sector)                | MP3                       | MP2                  | MP4                              | MP1                              | MP4                        | MP1                              | MP1                    |  |
|   |                          | Seismic<br>F (lbs)                  | 14.19                     | 10.32                | 9.08                             | 9.60                             | 1.09                       | 7.26                             | 4.36                   |  |
|   |                          | Weight (lbs)                        | 143.00                    | 104.00               | 91.50                            | 96.80                            | 11.00                      | 73.21                            | 44.00                  |  |
|   |                          | Wind $F_z$ Wind $F_x$ (lbs)         | 161.80                    | 81.19                | 140.06                           | 224.07                           | 5.70                       | 51.72                            | 22.13                  |  |
| _ |                          | Wind F <sub>z</sub> (lbs)           | 223.29                    | 185.23               | 198.58                           | 478.99                           | 11.41                      | 64.22                            | 53.60                  |  |
|   |                          | EPA <sub>T</sub> (ft <sup>2</sup> ) | 4.96                      | 2.49                 | 4.30                             | 6.87                             | 0.18                       | 1.59                             | 0.68                   |  |
|   | APPURTENANCE INFORMATION | EPA <sub>N</sub> (ft²)              | 6.85                      | 5.68                 | 60.9                             | 14.69                            | 0.35                       | 1.97                             | 1.64                   |  |
|   | ENANCE INI               | (bst)                               | 36.22                     | 36.22                | 36.22                            | 36.22                            | 36.22                      | 36.22                            | 36.22                  |  |
|   | APPURT                   | , K                                 | 0.90                      | 06.0                 | 06.0                             | 06.0                             | 06.0                       | 06.0                             | 06.0                   |  |
|   |                          | Qty.                                | 33                        | က                    | n                                | æ                                | ĸ                          | m                                | ĸ                      |  |
|   |                          | Elevation                           | 90.0                      | 90.0                 | 90.0                             | 90.0                             | 90.0                       | 90.0                             | 90.0                   |  |
|   |                          | Appurtenance Name                   | ERICSSON AIR 32 B2A B66AA | ERICSSON AIR6449 B41 | ERICSSON ERICSSON AIR 21 B2A B4P | RFS/CELWAVE APXVAARR24_43-U-NA2C | ERICSSON TME-KRY 112 144/1 | CSSON RADIO 4449 B71 B85A_T-MOBI | ERICSSON RRUS 4415 B25 |  |

## APPENDIX C SOFTWARE ANALYSIS OUTPUT



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#### **Primary Member Properties**

|          | ary member in |            |            |        |             |                         |              |                    |                |                    |
|----------|---------------|------------|------------|--------|-------------|-------------------------|--------------|--------------------|----------------|--------------------|
|          | Label         | I Node     | J Node     | K Node | Rotate(deg) | Section/Shape           | Туре         | Design List        |                | Design Rule        |
| 1        | M1            | N1         | N2         |        |             | Horizontals             | Beam         |                    | A500 Gr        | Typical            |
| 2        | M2            | N3         | N4         |        |             | Horizontals             | Beam         |                    | A500 Gr        |                    |
| 3        | M3            | N5         | N6         |        |             | Horizontals             | Beam         |                    | A500 Gr        |                    |
| 4        | M4            | N7         | N12        |        |             | Bracing Plate           | Beam         |                    | A529 Gr        |                    |
| 5        | M5            | N11        | N8         |        |             | Bracing Plate           | Beam         |                    | A529 Gr        | Typical            |
| 6        | M9            | N13        | N14        |        |             | Angles                  | Beam         | Single Angle       |                |                    |
| 7        | M10           | N15        | N16        |        | 270         | Angles                  | Beam         | Single Angle       |                |                    |
| 8        | M11           | N17        | N18        |        |             | Bracing Plate           | Beam         |                    | A529 Gr        |                    |
| 9        | M12           | N19        | N20        |        | 070         | Bracing Plate           | Beam         |                    | A529 Gr        | Typical            |
| 10       | M15           | N24        | N25        |        | 270         | Angles                  | Beam         | Single Angle       |                |                    |
| 11       | M16           | N26        | N27        |        |             | Angles                  | Beam         | Single Angle       |                |                    |
| 12       | M17           | N28        | N29        |        |             | Bracing Plate           | Beam         | RECT               | A529 Gr        |                    |
| 13       | M20<br>M21    | N34        | N35        |        | 070         | Angles                  | Beam         | Single Angle       |                | Typical            |
| 14<br>15 | M22           | N36<br>N38 | N37        |        | 270         | Angles                  | Beam         | Single Angle       |                | Typical            |
| 16       | M43           | N62        | N39<br>N63 |        |             | Bracing Plate Standoffs | Beam         |                    | A529 Gr        | Typical            |
| 17       | M19           | N64        | N71        |        |             | RIGID                   | Beam<br>None | SquareTube<br>None | RIGID          | Typical            |
| 18       | M20A          | N53        | N69        |        |             | RIGID                   | None         |                    | RIGID          | Typical            |
| 19       |               | N47        | N68        |        |             |                         |              | None               |                | Typical            |
| 20       | M21A<br>M22A  | N47<br>N94 | N73        |        |             | RIGID<br>RIGID          | None<br>None | None<br>None       | RIGID<br>RIGID | Typical<br>Typical |
| 21       | M23A          | N59        | N70        |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 22       | M24           | N79        | N70        |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 23       | M27           | N78        | N79A       |        |             | Handrails               | Beam         |                    | A500 Gr        | Typical            |
| 24       | M28           | N80        | N81        |        |             | Handrails               | Beam         | Pipe               | A500 Gr        | Typical            |
| 25       | M29           | N82        | N83        |        |             | Handrails               | Beam         |                    | A500 Gr        | Typical            |
| 26       | MP4           | N100       | N101       |        |             | Pipe Mounts             | Beam         |                    | A500 Gr        |                    |
| 27       | M39           | N103       | N102       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 28       | M64           | N152A      | N153A      |        |             | Corner Plates           | Beam         |                    | A529 Gr        | Typical            |
| 29       | M65           | N154       | N155       |        |             | Corner Plates           | Beam         |                    | A529 Gr        |                    |
| 30       | M66           | N156       | N157       |        |             | Corner Plates           | Beam         |                    | A529 Gr        |                    |
| 31       | M65A          | N155A      | N156A      |        |             | Standoffs               | Beam         | SquareTube         |                | Typical            |
| 32       | M66A          | N159       | N160       |        |             | Standoffs               | Beam         | SquareTube         |                | Typical            |
| 33       | M58           | N133       | N136       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 34       | M62           | N147       | N148       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 35       | M63           | N149       | N150       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 36       | MP1           | N151       | N152       |        |             | Pipe Mounts             | Beam         |                    | A500 Gr        | Typical            |
| 37       | M68           | N153       | N158       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 38       | M69           | N161       | N162       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 39       | MP3           | N163       | N164       |        |             | Pipe Mounts             | Beam         |                    | A500 Gr        | Typical            |
| 40       | M71           | N138       | N139       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 41       | M72           | N165       | N166       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 42       | MP2           | N167       | N171       |        |             | Pipe Mounts             | Beam         |                    | A500 Gr        |                    |
| 43       | M44           | N110       | N111       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 44       | M45           | N112       | N113       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 45       | MP8           | N114       | N115       |        |             | Pipe Mounts             | Beam         | Pipe               | A500 Gr        | Typical            |
| 46       | MP6           | N116       | N117       |        |             | Pipe Mounts             | Beam         |                    | A500 Gr        | Typical            |
| 47       | M48           | N118       | N119       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 48       | M49           | N120       | N121       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 49       | MP7           | N122       | N123       |        |             | Pipe Mounts             | Beam         |                    | A500 Gr        | Typical            |
| 50       | M51           | N124       | N125       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 51       | M52           | N126       | N127       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 52       | MP5           | N128       | N129       |        |             | Pipe Mounts             | Beam         |                    | A500 Gr        | Typical            |
| 53       | M54           | N130       | N131       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 54       | M55           | N132       | N134       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 55       | M56           | N135       | N137       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 56       | M57           | N140       | N141       |        |             | RIGID                   | None         | None               | RIGID          | Typical            |
| 57       | MP12          | N142       | N143       |        |             | Pipe Mounts             | Beam         |                    | A500 Gr        | Typical            |
| 58       | MP10          | N144       | N145       |        |             | Pipe Mounts             | Beam         | Pipe               | A500 Gr        | Typical            |



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**Primary Member Properties (Continued)** 

|    | Label | I Node | J Node | K Node | Rotate(deg) | Section/Shape | Type | Design List | Material | Design Rule |
|----|-------|--------|--------|--------|-------------|---------------|------|-------------|----------|-------------|
| 59 | M61   | N146   | N168   |        |             | RIGID         | None | None        | RIGID    | Typical     |
| 60 | M74   | N169   | N170   |        |             | RIGID         | None | None        | RIGID    | Typical     |
| 61 | MP11  | N172   | N173   |        |             | Pipe Mounts   | Beam | Pipe        | A500 Gr  | . Typical   |
| 62 | M76   | N174   | N175   |        |             | RIGID         | None | None        | RIGID    | Typical     |
| 63 | M77   | N176   | N177   |        |             | RIGID         | None | None        | RIGID    | Typical     |
| 64 | MP9   | N178   | N179   |        |             | Pipe Mounts   | Beam | Pipe        | A500 Gr  | . Typical   |
| 65 | M79   | N180   | N181   |        |             | RIGID         | None | None        | RIGID    | Typical     |
| 66 | M80   | N182   | N183   |        |             | RIGID         | None | None        | RIGID    | Typical     |

#### Material Take-Off

|    | Material         | Size           | Pieces | Length [in]    | Weight [lb] |
|----|------------------|----------------|--------|----------------|-------------|
| 1  | General          |                |        |                |             |
| 2  | RIGID            |                | 30     | 84             | 0           |
| 3  | Total General    |                | 30     | 84             | 0           |
| 4  |                  |                |        |                |             |
| 5  | Hot Rolled Steel |                |        |                |             |
| 6  | A500 Gr. C - 46  | HSS4X4X4       | 3      | 114            | 108.94      |
| 7  | A500 Gr. C - 46  | PIPE_2.0       | 15     | 1386           | 400.881     |
| 8  | A500 Gr. C - 46  | PIPE_3.0       | 3      | 450            | 264.141     |
| 9  | A529 Gr. 50      | L2x2x2         | 6      | 205.5          | 28.611      |
| 10 | A529 Gr. 50      | PL4x3/8        | 9      | 248.5          | 105.703     |
| 11 | Total HR Steel   |                | 36     | 2404           | 908.275     |
| 12 |                  |                |        |                |             |
| 13 | Plate Elements   | Thickness (in) |        | Volume (yds^3) |             |
| 14 | gen_Steel        | 0.3            | 18     | 0              | 151.364     |
| 15 | Total Plates     |                | 18     | 0              | 151.364     |

#### **Basic Load Cases**

|    | <b>BLC Description</b> | Category | X Gra | Y Gra | Z Gra | Nodal | Point | Distributed | Area(Mem | Surface(Plate/ |
|----|------------------------|----------|-------|-------|-------|-------|-------|-------------|----------|----------------|
| 1  | Self Weight            | DĹ       |       | -1    |       |       | 33    |             | 3        |                |
| 2  | Wind Load AZI 0        | WLZ      |       |       |       |       | 66    |             |          |                |
| 3  | Wind Load AZI 30       | None     |       |       |       |       | 66    |             |          |                |
| 4  | Wind Load AZI 60       | None     |       |       |       |       | 66    |             |          |                |
| 5  | Wind Load AZI 90       | WLX      |       |       |       |       | 66    |             |          |                |
| 6  | Wind Load AZI 120      | None     |       |       |       |       | 66    |             |          |                |
| 7  | Wind Load AZI 150      | None     |       |       |       |       | 66    |             |          |                |
| 8  | Wind Load AZI 180      | None     |       |       |       |       | 66    |             |          |                |
| 9  | Wind Load AZI 210      | None     |       |       |       |       | 66    |             |          |                |
| 10 | Wind Load AZI 240      | None     |       |       |       |       | 66    |             |          |                |
| 11 | Wind Load AZI 270      | None     |       |       |       |       | 66    |             |          |                |
| 12 | Wind Load AZI 300      | None     |       |       |       |       | 66    |             |          |                |
| 13 | Wind Load AZI 330      | None     |       |       |       |       | 66    |             |          |                |
| 14 | Distr. Wind Load Z     | WLZ      |       |       |       |       |       | 66          |          |                |
| 15 | Distr. Wind Load X     | WLX      |       |       |       |       |       | 66          |          |                |
| 16 | Ice Weight             | OL1      |       |       |       |       | 33    | 66          | 3        | 18             |
| 17 | Ice Wind Load AZI      | OL2      |       |       |       |       | 66    |             |          |                |
| 18 | Ice Wind Load AZI      | None     |       |       |       |       | 66    |             |          |                |
| 19 | Ice Wind Load AZI      | None     |       |       |       |       | 66    |             |          |                |
| 20 | Ice Wind Load AZI      | OL3      |       |       |       |       | 66    |             |          |                |
| 21 | Ice Wind Load AZI      | None     |       |       |       |       | 66    |             |          |                |
| 22 | Ice Wind Load AZI      | None     |       |       |       |       | 66    |             |          |                |
| 23 | Ice Wind Load AZI      | None     |       |       |       |       | 66    |             |          |                |
| 24 | Ice Wind Load AZI      | None     |       |       |       |       | 66    |             |          |                |
| 25 | Ice Wind Load AZI      | None     |       |       |       |       | 66    |             |          |                |
| 26 | Ice Wind Load AZI      | None     |       |       |       |       | 66    |             |          |                |
| 27 | Ice Wind Load AZI      | None     |       |       |       |       | 66    |             |          |                |
| 28 | Ice Wind Load AZI      | None     |       |       |       |       | 66    |             |          |                |



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#### Basic Load Cases (Continued)

|    | BLC Description     | Category | X Gra  | Y Gra | Z Gra  | Nodal | Point | Distributed | Area(Mem | . Surface(Plate/ |
|----|---------------------|----------|--------|-------|--------|-------|-------|-------------|----------|------------------|
| 29 | Distr. Ice Wind Lo  | OL2      |        |       |        |       |       | 66          |          |                  |
| 30 | Distr. Ice Wind Lo  | OL3      |        |       |        |       |       | 66          |          |                  |
| 31 | Seismic Load Z      | ELZ      |        |       | -0.099 |       | 33    |             |          |                  |
| 32 | Seismic Load X      | ELX      | -0.099 |       |        |       | 33    |             |          |                  |
| 33 | Service Live Load 1 | LL       |        |       |        | 1     |       |             |          |                  |
| 34 | Maintenance Load 1  | LL       |        |       |        | 1     |       |             |          |                  |
| 35 | Maintenance Load 2  | LL       |        |       |        | 1     |       |             |          |                  |
| 36 | Maintenance Load 3  | LL       |        |       |        | 1     |       |             |          |                  |
| 37 | Maintenance Load 4  | LL       |        |       |        | 1     |       |             |          |                  |
| 38 | Maintenance Load 5  | LL       |        |       |        | 1     |       |             |          |                  |
| 39 | Maintenance Load 6  | LL       |        |       |        | 1     |       |             |          |                  |
| 40 | Maintenance Load 7  | LL       |        |       |        | 1     |       |             |          |                  |
| 41 | Maintenance Load 8  | LL       |        |       |        | 1     |       |             |          |                  |
| 42 | Maintenance Load 9  | LL       |        |       |        | 1     |       |             |          |                  |
| 43 | Maintenance Load    | LL       |        |       |        | 1     |       |             |          |                  |
| 44 | Maintenance Load    | LL       |        |       |        | 1     |       |             |          |                  |
| 45 | Maintenance Load    | LL       |        |       |        | 1     |       |             |          |                  |
| 46 | Service Live Load 2 | LL       |        |       |        | 1     |       |             |          |                  |
| 47 | Service Live Load 3 | LL       |        |       |        | 1     |       |             |          |                  |
| 48 | Service Live Load 4 | LL       |        |       |        | 1     |       |             |          |                  |
| 49 | Service Live Load 5 | LL       |        |       |        | 1     |       |             |          |                  |
| 50 | Service Live Load 6 | LL       |        |       |        | 1     |       |             |          |                  |
| 51 | Service Live Load 7 | LL       |        |       |        |       | 1     |             |          |                  |
| 52 | Service Live Load 8 | LL       |        |       |        |       | 1     |             |          |                  |
| 53 | Service Live Load 9 | LL       |        |       |        |       | 1     |             |          |                  |
| 54 | BLC 1 Transient A   | None     |        |       |        |       |       | 36          |          |                  |
| 55 | BLC 16 Transient    | None     |        |       |        |       |       | 36          |          |                  |

#### **Load Combinations**

|    | Description           | Solve | PD | S | BLC | Factor | BLC | Factor  | BLC | Factor  | BLC | Factor  | BLC | Factor |
|----|-----------------------|-------|----|---|-----|--------|-----|---------|-----|---------|-----|---------|-----|--------|
| 1  | 1.4DL                 | Yes   | Y  |   | 1   | 1.4    |     | , deter |     | l deter |     | - Goto. |     | 1 0000 |
| 2  | 1.2DL + 1WL AZI 0     | Yes   | Υ  |   | 1   | 1.2    | 2   | 1       | 14  | 1       | 15  |         |     |        |
| 3  | 1.2DL + 1WL AZI 30    | Yes   | Υ  |   | 1   | 1.2    | 3   | 1       | 14  | 0.866   | 15  | 0.5     |     |        |
| 4  | 1.2DL + 1WL AZI 60    | Yes   | Υ  |   | 1   | 1.2    | 4   | 1       | 14  | 0.5     | 15  | 0.866   |     |        |
| 5  | 1.2DL + 1WL AZI 90    | Yes   | Y  |   | 1   | 1.2    | 5   | 1       | 14  |         | 15  | 1       |     |        |
| 6  | 1.2DL + 1WL AZI 120   | Yes   | Υ  |   | 1   | 1.2    | 6   | 1       | 14  | -0.5    | 15  | 0.866   |     |        |
| 7  | 1.2DL + 1WL AZI 150   | Yes   | Υ  |   | 1   | 1.2    | 7   | 1       | 14  | -0.8    | 15  | 0.5     |     |        |
| 8  | 1.2DL + 1WL AZI 180   | Yes   | Υ  |   | 1   | 1.2    | 8   | 1       | 14  | -1      | 15  |         |     |        |
| 9  | 1.2DL + 1WL AZI 210   | Yes   | Υ  |   | 1   | 1.2    | 9   | 1       | 14  | -0.8    | 15  | -0.5    |     |        |
| 10 | 1.2DL + 1WL AZI 240   | Yes   | Υ  |   | 1   | 1.2    | 10  | 1       | 14  | -0.5    | 15  | -0.8    |     |        |
| 11 | 1.2DL + 1WL AZI 270   | Yes   | Υ  |   | 1   | 1.2    | 11  | 1       | 14  |         | 15  | -1      |     |        |
| 12 | 1.2DL + 1WL AZI 300   | Yes   | Υ  |   | 1   | 1.2    | 12  | 1       | 14  | 0.5     | 15  | -0.8    |     |        |
| 13 | 1.2DL + 1WL AZI 330   | Yes   | Υ  |   | 1   | 1.2    | 13  | 1       | 14  | 0.866   | 15  | -0.5    |     |        |
| 14 | 0.9DL + 1WL AZI 0     | Yes   | Υ  |   | 1   | 0.9    | 2   | 1       | 14  | 1       | 15  |         |     |        |
| 15 | 0.9DL + 1WL AZI 30    | Yes   | Υ  |   | 1   | 0.9    | 3   | 1       | 14  | 0.866   | 15  | 0.5     |     |        |
| 16 | 0.9DL + 1WL AZI 60    | Yes   | Υ  |   | 1   | 0.9    | 4   | 1       | 14  | 0.5     | 15  | 0.866   |     |        |
| 17 | 0.9DL + 1WL AZI 90    | Yes   | Υ  |   | 1   | 0.9    | 5   | 1       | 14  |         | 15  | 1       |     |        |
| 18 | 0.9DL + 1WL AZI 120   | Yes   | Υ  |   | 1   | 0.9    | 6   | 1       | 14  | -0.5    | 15  | 0.866   |     |        |
| 19 | 0.9DL + 1WL AZI 150   | Yes   | Υ  |   | 1   | 0.9    | 7   | 1       | 14  | -0.8    | 15  | 0.5     |     |        |
| 20 | 0.9DL + 1WL AZI 180   | Yes   | Υ  |   | 1   | 0.9    | 8   | 1       | 14  | -1      | 15  |         |     |        |
| 21 | 0.9DL + 1WL AZI 210   | Yes   | Υ  |   | 1   | 0.9    | 9   | 1       | 14  | -0.8    | 15  | -0.5    |     |        |
| 22 | 0.9DL + 1WL AZI 240   | Yes   | Υ  |   | 1   | 0.9    | 10  | 1       | 14  | -0.5    | 15  | -0.8    |     |        |
| 23 | 0.9DL + 1WL AZI 270   | Yes   | Υ  |   | 1   | 0.9    | 11  | 1       | 14  |         | 15  | -1      |     |        |
| 24 | 0.9DL + 1WL AZI 300   | Yes   | Υ  |   | 1   | 0.9    | 12  | 1       | 14  | 0.5     | 15  | -0.8    |     |        |
| 25 | 0.9DL + 1WL AZI 330   | Yes   | Υ  |   | 1   | 0.9    | 13  | 1       | 14  | 0.866   | 15  | -0.5    |     |        |
| 26 | 1.2D + 1.0Di          | Yes   | Υ  |   | 1   | 1.2    | 16  | 1       |     |         |     |         |     |        |
| 27 | 1.2D + 1.0Di +1.0Wi A | Yes   | Υ  |   | 1   | 1.2    | 16  | 1       | 17  | 1       | 29  | 1       | 30  |        |
| 28 | 1.2D + 1.0Di +1.0Wi A | Yes   | Υ  |   | 1   | 1.2    | 16  | 1       | 18  | 1       | 29  | 0.866   | 30  | 0.5    |



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#### Load Combinations (Continued)

| Description  | Load Compinations (Continued) |                        |             |    |   |     |               |      |        |       |        |     |        |     |       |
|--|-------------------------------|------------------------|-------------|----|---|-----|---------------|------|--------|-------|--------|-----|--------|-----|-------|
| 12D + 1.0Di + 1.0WA   Yes   Y  |                               | Description            | Solve       | PD | S | BLC | Factor        | BLC  | Factor | BLC   | Factor | BLC | Factor |     |       |
| 1.2D + 1.0D + 1.0W A   Yes   Y   |                               | 1.2D + 1.0Di +1.0Wi A  | 7 / / / / / |    |   | 1   |               |      | 1      |       | 1      |     | 0.5    |     | 0.866 |
| 1.2D + 1.0D + 1.0WiA   Yes   Y   |                               | 1.2D + 1.0Di +1.0Wi A  | Yes         |    |   | 1   |               | 16   | 1      |       | 1      | 29  |        | 30  | 1     |
| 33   | 31                            | 1.2D + 1.0Di +1.0Wi A  | Yes         |    |   | 1   | 1.2           | 16   | 1      | 21    | 1      | 29  | -0.5   | 30  | 0.866 |
| 1.2D + 1.0D + 1.0W A   Yes   Y   |                               | 1.2D + 1.0Di +1.0Wi A  | Yes         |    |   | 1   | 1.2           | 16   | 1      | 22    | 1      | 29  | -0.8   | 30  | 0.5   |
| 35   | 33                            | 1.2D + 1.0Di +1.0Wi A  | Yes         |    |   | 1   | 1.2           | 16   | 1      | 23    | 1      | 29  | -1     | 30  |       |
| 37   |                               | 1.2D + 1.0Di +1.0Wi A  | Yes         |    |   | 1   | 1.2           | 16   | 1      |       | 1      | 29  | -0.8   | 30  | -0.5  |
| 38   | 35                            | 1.2D + 1.0Di +1.0Wi A  | Yes         | Υ  |   | 1   | 1.2           | 16   | 1      | 25    | 1      | 29  | -0.5   | 30  | -0.8  |
| 38   | 36                            | 1.2D + 1.0Di +1.0Wi A  | Yes         | Y  |   | 1   | 1.2           | 16   | 1      | 26    | 1      | 29  |        | 30  | -1    |
| 38   | 37                            | 1.2D + 1.0Di +1.0Wi A  | Yes         | Υ  |   | 1   | 1.2           | 16   | 1      | 27    | 1      | 29  | 0.5    | 30  | -0.8  |
| 39   | 38                            |                        | Yes         | Υ  |   | 1   | 1.2           | 16   | 1      | 28    | 1      | 29  |        | 30  | -0.5  |
| 40   |                               |                        |             |    |   | 1   |               | 31   |        |       |        |     |        |     |       |
| 41   |                               |                        |             |    |   | 1   |               |      | 0.866  |       | 0.5    |     |        |     |       |
| 42   |                               |                        | Yes         |    |   |     |               |      |        |       |        |     |        |     |       |
| 43   |                               |                        |             |    |   |     |               |      | 0.0    |       |        |     |        |     |       |
| 444  |                               |                        | _           |    |   |     | _             |      | -0.5   |       | 0.866  |     |        |     |       |
| 46   |                               |                        |             |    |   | -   |               |      |        |       |        |     |        |     |       |
| 46   |                               |                        |             |    |   |     |               |      |        |       | 0.0    |     |        |     |       |
| 47   |                               |                        |             |    |   |     |               |      |        |       | -0.5   |     |        |     |       |
| 48   |                               |                        | 10, 170,170 |    |   |     |               |      |        |       |        |     |        |     |       |
| 49   |                               |                        |             |    |   |     |               |      | 0.0    |       |        |     |        |     |       |
| 50   |                               |                        |             |    |   |     |               |      | 0.5    |       |        |     |        |     |       |
| 52   |                               |                        |             |    |   |     |               |      |        |       |        |     |        |     |       |
| 52   |                               |                        |             |    |   |     | -             |      |        |       | 0.0    |     |        |     |       |
| 53   |                               |                        |             |    |   |     |               |      | -      |       | 0.5    |     |        |     |       |
| 54         (0.9 - 0.28ds)DL + 1.0         Yes         Y         1         0.86         31         -0.5         32         0.866           55         (0.9 - 0.28ds)DL + 1.0         Yes         Y         1         0.86         31         -0.5         32         0.86           57         (0.9 - 0.28ds)DL + 1.0         Yes         Y         1         0.86         31         -1         32         0.5           58         (0.9 - 0.28ds)DL + 1.0         Yes         Y         1         0.86         31         -1         32         -0.5         -0.8           60         (0.9 - 0.28ds)DL + 1.0         Yes         Y         1         0.86         31         -0.5         32         -0.8           61         (0.9 - 0.28ds)DL + 1.0         Yes         Y         1         0.86         31         0.5         32         -0.8           62         (0.9 - 0.28ds)DL + 1.0         Yes         Y         1         0.86         31         0.5         32         -0.8           63         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         2         0.23         14         0.23         15         0.33         1.  |                               |                        | _           |    |   | _   |               |      |        |       |        |     |        |     |       |
| 55   |                               |                        | 7           |    |   |     |               |      | 0.0    |       |        |     |        |     |       |
| 56   |                               |                        | _           |    |   |     | _             |      | -0.5   |       |        |     |        |     |       |
| 57   |                               |                        |             |    |   |     |               |      |        |       |        |     |        |     |       |
| S8   |                               | (0.9 - 0.25ds)DL + 1.0 |             |    |   |     |               |      |        |       | 0.5    |     |        |     |       |
| 59         (0.9 - 0.28ds)DL + 1.0         Yes         Y         1         0.86         31         -0.5         32         -0.8         B           60         (0.9 - 0.28ds)DL + 1.0         Yes         Y         1         0.86         31         32         -1   |                               |                        |             |    |   |     |               |      | -      |       | 0.5    |     |        |     |       |
| 60   |                               |                        |             |    |   |     |               |      |        |       |        |     |        |     |       |
| 61   |                               |                        | _           |    |   |     |               |      | -0.5   |       |        |     |        |     |       |
| 62         (0.9 - 0.2Sds)DL + 1.0         Yes         Y         1         0.86         31         0.866         32         -0.5         33         1.5           63         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         2         0.23         14         0.23         15         0.33         1.5           64         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         3         0.23         14         0.2         15         0.115         33         1.5           65         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         4         0.23         14         0.115         15         0.2         33         1.5           66         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         6         0.23         14         0.115         15         0.2         33         1.5           67         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         7         0.23         14         -0.2         15         0.115         33         1.5           69         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1   |                               |                        |             |    |   |     | _             |      | 0.5    |       |        |     |        |     |       |
| 63         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         2         0.23         14         0.23         15         0.33         1.5           64         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         3         0.23         14         0.2         15         0.115         33         1.5           65         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         4         0.23         14         0.15         0.2         33         1.5           66         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         6         0.23         14         -0.115         15         0.2         33         1.5           67         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         6         0.23         14         -0.2         15         0.115         33         1.5           68         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         8         0.23         14         -0.2         15         0.115         33         1.5           70         1.0DL + 1.5LL + 1.0S         Yes         Y         1         <  |                               |                        |             |    |   |     |               |      |        |       |        |     |        |     |       |
| 64         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         3         0.23         14         0.2         15         0.115         33         1.5           65         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         4         0.23         14         0.115         15         0.2         33         1.5           66         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         6         0.23         14         0.115         15         0.2         33         1.5           67         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         6         0.23         14         -0.115         15         0.2         33         1.5           68         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         8         0.23         14         -0.2         15         0.115         33         1.5           69         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         9         0.23         14         -0.2         15         0.115         33         1.5           70         1.0DL + 1.5LL + 1.0S         Yes   |                               |                        |             |    |   |     |               |      |        |       |        | 15  |        | 22  | 1.5   |
| 65         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         4         0.23         14         0.115         15         0.2         33         1.5           66         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         5         0.23         14         -0.115         15         0.23         33         1.5           67         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         6         0.23         14         -0.115         15         0.2         33         1.5           68         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         8         0.23         14         -0.2         15         0.115         33         1.5           69         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         8         0.23         14         -0.2         15         -0.115         33         1.5           70         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         1         0.23         14         -0.15         15         -0.2         33         1.5           72         1.0DL + 1.5LL + 1.0S         Yes   |                               |                        |             |    |   | -   | 150           |      |        |       |        |     | 0.115  |     |       |
| 66         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         5         0.23         14  |                               |                        | _           |    |   |     |               |      |        |       |        |     |        |     |       |
| 67         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         6         0.23         14         -0.115         15         0.2         33         1.5           68         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         7         0.23         14         -0.2         15         0.115         33         1.5           69         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         8         0.23         14         -0.2         15         0.115         33         1.5           70         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         9         0.23         14         -0.2         15         -0.115         33         1.5           71         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         10         0.23         14         -0.2         33         1.5           72         1.0DL + 1.5LL + 1.0S         Yes         Y         1         1         12         0.23         14         0.115         15         -0.2         33         1.5           73         1.0DL + 1.5LL + 1.0S         Yes         Y         1  |                               |                        |             |    |   |     |               |      |        |       | 0.115  |     |        |     |       |
| 68       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       7       0.23       14       -0.2       15       0.115       33       1.5         69       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       8       0.23       14       -0.2       15       -0.115       33       1.5         70       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       9       0.23       14       -0.2       15       -0.115       33       1.5         71       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       10       0.23       14       -0.115       15       -0.2       33       1.5         72       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       11       0.23       14       0.115       15       -0.2       33       1.5         73       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       12       0.23       14       0.115       15       -0.2       33       1.5         74       1.0DL + 1.5LL       Yes       Y       1       1       13       0.23       14       0.015       33       1.5 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td>0.445</td> <td></td> <td></td> <td></td> <td></td>  |                               |                        |             |    |   | -   |               |      |        |       | 0.445  |     |        |     |       |
| 69       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       8       0.23       14       -0.23       15       33       1.5         70       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       9       0.23       14       -0.2       15       -0.115       33       1.5         71       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       10       0.23       14       -0.115       15       -0.2       33       1.5         72       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       11       0.23       14       -0.115       15       -0.2       33       1.5         73       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       12       0.23       14       0.115       15       -0.2       33       1.5         74       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       13       0.23       14       0.115       15       -0.2       33       1.5         75       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       2       0.058       14       0.058       15 </td <td></td> |                               |                        |             |    |   |     |               |      |        |       |        |     |        |     |       |
| 70       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       9       0.23       14       -0.2       15       -0.115       33       1.5         71       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       10       0.23       14       -0.115       15       -0.2       33       1.5         72       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       11       0.23       14       -0.115       15       -0.2       33       1.5         73       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       12       0.23       14       0.115       15       -0.2       33       1.5         74       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       13       0.23       14       0.115       15       -0.2       33       1.5         75       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       2       0.058       14       0.058       15         76       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       2       0.058       14       0.05       15<  |                               |                        |             |    |   |     | (8)           | - // |        |       |        |     | 0.113  |     |       |
| 71       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       10       0.23       14       -0.115       15       -0.2       33       1.5         72       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       11       0.23       14       0.115       15       -0.23       33       1.5         73       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       12       0.23       14       0.115       15       -0.2       33       1.5         74       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       12       0.23       14       0.115       15       -0.2       33       1.5         75       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       2       0.058       14       0.058       15         76       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       2       0.058       14       0.058       15         77       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       3       0.058       14       0.05       15       0.02  |                               |                        |             |    |   |     |               |      |        |       |        |     | 0.115  |     |       |
| 72       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       11       0.23       14       15       -0.23       33       1.5         73       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       12       0.23       14       0.115       15       -0.2       33       1.5         74       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       13       0.23       14       0.2       15       -0.115       33       1.5         75       1.2DL + 1.5LM - MP1 +       Yes       Y       1       1.2       34       1.5       2       0.058       14       0.058       15         76       1.2DL + 1.5LM - MP1 +       Yes       Y       1       1.2       34       1.5       2       0.058       14       0.058       15         77       1.2DL + 1.5LM - MP1 +       Yes       Y       1       1.2       34       1.5       3       0.058       14       0.05       15       0.029         78       1.2DL + 1.5LM - MP1 +       Yes       Y       1       1.2       34       1.5       4       0.058       14       0.05       15       0.05  |                               |                        | _           |    |   |     | $\overline{}$ |      |        |       |        |     |        |     |       |
| 73       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       12       0.23       14       0.115       15       -0.2       33       1.5         74       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       13       0.23       14       0.2       15       -0.115       33       1.5         75       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       33       1.5  |                               |                        |             |    |   |     | -             |      |        | 15.5  | -0.115 |     |        |     |       |
| 74       1.0DL + 1.5LL + 1.0S       Yes       Y       1       1       13       0.23       14       0.2       15       -0.115       33       1.5         75       1.2DL + 1.5LL       Yes       Y       1       1.2       33       1.5  |                               |                        | _           |    |   |     |               |      |        |       | 0.445  |     |        |     |       |
| 75         1.2DL + 1.5LL         Yes         Y         1         1.2         33         1.5         S  |                               |                        |             |    |   |     |               |      |        |       |        |     |        |     |       |
| 76       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       2       0.058       14       0.058       15         77       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       3       0.058       14       0.05       15       0.029         78       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       4       0.058       14       0.029       15       0.05         79       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       5       0.058       14       0.029       15       0.058         80       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       6       0.058       14       -0.0       15       0.058         81       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       7       0.058       14       -0.0       15       0.029         82       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       8       0.058       14       -0.0  |                               |                        |             |    |   |     |               |      |        | 14    | 0.2    | 15  | -0.115 | 33  | 1.5   |
| 77       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       3       0.058       14       0.05       15       0.029         78       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       4       0.058       14       0.029       15       0.05         79       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       5       0.058       14       0.058       15       0.058         80       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       6       0.058       14       -0.0       15       0.058         81       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       7       0.058       14       -0.0       15       0.029         82       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       8       0.058       14       -0.0       15       0.029         83       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       9       0.058       14  |                               |                        |             |    |   |     |               |      |        |       | 0.050  | 4.4 | 0.050  | 4.5 |       |
| 78       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       4       0.058       14       0.029       15       0.05         79       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       5       0.058       14       15       0.058         80       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       6       0.058       14       -0.0       15       0.058         81       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       7       0.058       14       -0.05       15       0.029         82       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       8       0.058       14       -0.0       15       0.029         83       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       9       0.058       14       -0.0       15       -0.0         84       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       10       0.058       14       -0.0  |                               |                        |             |    |   |     |               |      |        |       |        |     |        |     | 0.000 |
| 79       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       5       0.058       14       15       0.058         80       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       6       0.058       14       -0.0       15       0.05         81       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       7       0.058       14       -0.05       15       0.029         82       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       8       0.058       14       -0.0       15       0.029         83       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       9       0.058       14       -0.0       15       -0.0         84       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       10       0.058       14       -0.0       15       -0.05.         85       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       11       0.058       14       -0.  |                               |                        |             |    |   |     |               |      |        |       |        |     |        |     |       |
| 80       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       6       0.058       14       -0.0       15       0.05         81       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       7       0.058       14       -0.05       15       0.029         82       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       8       0.058       14       -0.0       15         83       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       9       0.058       14       -0.05       15       -0.0         84       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       10       0.058       14       -0.0       15       -0.05         85       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       11       0.058       14       -0.0       15       -0.0   |                               |                        |             |    |   |     |               |      |        |       |        |     | 0.029  |     |       |
| 81     1.2DL + 1.5LM-MP1 +     Yes     Y     1     1.2     34     1.5     7     0.058     14     -0.05     15     0.029       82     1.2DL + 1.5LM-MP1 +     Yes     Y     1     1.2     34     1.5     8     0.058     14     -0.0     15       83     1.2DL + 1.5LM-MP1 +     Yes     Y     1     1.2     34     1.5     9     0.058     14     -0.05     15     -0.0       84     1.2DL + 1.5LM-MP1 +     Yes     Y     1     1.2     34     1.5     10     0.058     14     -0.0     15     -0.05       85     1.2DL + 1.5LM-MP1 +     Yes     Y     1     1.2     34     1.5     11     0.058     14     -0.0     15     -0.0   |                               |                        | _           |    |   | -   |               |      |        |       |        |     | 0.0    |     |       |
| 82       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       8       0.058       14       -0.0       15         83       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       9       0.058       14       -0.05       15       -0.0         84       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       10       0.058       14       -0.0       15       -0.05         85       1.2DL + 1.5LM-MP1 +       Yes       Y       1       1.2       34       1.5       11       0.058       14       -0.0       15       -0.0   |                               |                        | _           |    |   |     |               |      |        |       |        |     |        |     |       |
| 83     1.2DL + 1.5LM-MP1 +     Yes     Y     1     1.2     34     1.5     9     0.058     14     -0.05     15     -0.0       84     1.2DL + 1.5LM-MP1 +     Yes     Y     1     1.2     34     1.5     10     0.058     14     -0.0     15     -0.05       85     1.2DL + 1.5LM-MP1 +     Yes     Y     1     1.2     34     1.5     11     0.058     14     -0.0     15     -0.0  |                               |                        |             |    |   |     |               |      |        |       |        |     |        |     | 0.029 |
| 84     1.2DL + 1.5LM-MP1 +     Yes     Y     1     1.2     34     1.5     10     0.058     14     -0.0     15     -0.05       85     1.2DL + 1.5LM-MP1 +     Yes     Y     1     1.2     34     1.5     11     0.058     14     -0.0     15     -0.0   |                               |                        |             |    |   |     |               |      |        |       |        |     |        |     | 10.5  |
| 85 1.2DL + 1.5LM-MP1 + Yes Y 1 1.2 34 1.5 11 0.058 14 15 -0.0  |                               |                        |             |    |   |     |               |      |        |       |        |     |        |     |       |
|  |                               |                        |             |    |   |     |               |      |        |       |        |     | -0.0   |     | _     |
| 86   1.2DL + 1.5LM-MP1 +   Yes   Y     1   1.2   34   1.5   12   0.058   14   0.029   15   -0.05   |                               |                        |             |    |   |     |               |      |        | 20.22 |        |     | 0.000  |     |       |
|  | 86                            | 1.2UL + 1.5LM-MP1 +    | Yes         | Y  |   | 1   | 1.2           | 34   | 1.5    | 12    | 0.058  | 14  | 0.029  | 15  | -0.05 |



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#### Load Combinations (Continued)

| Loa | d Combinations (Continued) |       |    |   |     |        |     |        |     |        |     |        |     |        |
|-----|----------------------------|-------|----|---|-----|--------|-----|--------|-----|--------|-----|--------|-----|--------|
|     | Description                | Solve | PD | S | BLC | Factor |
| 87  | 1.2DL + 1.5LM-MP1 +        | Yes   | Y  |   | 1   | 1.2    | 34  | 1.5    | 13  | 0.058  | 14  | 0.05   | 15  | -0.0   |
| 88  | 1.2DL + 1.5LM-MP2 +        | Yes   | Y  |   | 1   | 1.2    | 35  | 1.5    | 2   | 0.058  | 14  | 0.058  | 15  |        |
| 89  | 1.2DL + 1.5LM-MP2 +        | Yes   | Y  |   | 1   | 1.2    | 35  | 1.5    | 3   | 0.058  | 14  | 0.05   | 15  | 0.029  |
| 90  | 1.2DL + 1.5LM-MP2 +        | Yes   | Y  |   | 1   | 1.2    | 35  | 1.5    | 4   | 0.058  | 14  | 0.029  | 15  | 0.05   |
| 91  | 1.2DL + 1.5LM-MP2 +        | Yes   | Y  |   | 1   | 1.2    | 35  | 1.5    | 5   | 0.058  | 14  |        | 15  | 0.058  |
| 92  | 1.2DL + 1.5LM-MP2 +        | Yes   | Υ  |   | 1   | 1.2    | 35  | 1.5    | 6   | 0.058  | 14  | -0.0   | 15  | 0.05   |
| 93  | 1.2DL + 1.5LM-MP2 +        | Yes   | Υ  |   | 1   | 1.2    | 35  | 1.5    | 7   | 0.058  | 14  | -0.05  | 15  | 0.029  |
| 94  | 1.2DL + 1.5LM-MP2 +        | Yes   | Υ  |   | 1   | 1.2    | 35  | 1.5    | 8   | 0.058  | 14  | -0.0   | 15  |        |
| 95  | 1.2DL + 1.5LM-MP2 +        | Yes   | Υ  |   | 1   | 1.2    | 35  | 1.5    | 9   | 0.058  | 14  | -0.05  | 15  | -0.0   |
| 96  | 1.2DL + 1.5LM-MP2 +        | Yes   | Υ  |   | 1   | 1.2    | 35  | 1.5    | 10  | 0.058  | 14  | -0.0   | 15  | -0.05  |
| 97  | 1.2DL + 1.5LM-MP2 +        | Yes   | Υ  |   | 1   | 1.2    | 35  | 1.5    | 11  | 0.058  | 14  |        | 15  | -0.0   |
| 98  | 1.2DL + 1.5LM-MP2 +        | Yes   | Y  |   | 1   | 1.2    | 35  | 1.5    | 12  | 0.058  | 14  | 0.029  | 15  | -0.05  |
| 99  | 1.2DL + 1.5LM-MP2 +        | Yes   | Υ  |   | 1   | 1.2    | 35  | 1.5    | 13  | 0.058  | 14  | 0.05   | 15  | -0.0   |
| 100 | 1.2DL + 1.5LM-MP3 +        | Yes   | Υ  |   | 1   | 1.2    | 36  | 1.5    | 2   | 0.058  | 14  | 0.058  | 15  |        |
| 101 | 1.2DL + 1.5LM-MP3 +        | Yes   | Y  |   | 1   | 1.2    | 36  | 1.5    | 3   | 0.058  | 14  | 0.05   | 15  | 0.029  |
| 102 | 1.2DL + 1.5LM-MP3 +        | Yes   | Y  |   | 1   | 1.2    | 36  | 1.5    | 4   | 0.058  | 14  | 0.029  | 15  | 0.05   |
| 103 | 1.2DL + 1.5LM-MP3 +        | Yes   | Y  |   | 1   | 1.2    | 36  | 1.5    | 5   | 0.058  | 14  |        | 15  | 0.058  |
| 104 | 1.2DL + 1.5LM-MP3 +        | Yes   | Y  |   | 1   | 1.2    | 36  | 1.5    | 6   | 0.058  | 14  | -0.0   | 15  | 0.05   |
| 105 | 1.2DL + 1.5LM-MP3 +        | Yes   | Υ  |   | 1   | 1.2    | 36  | 1.5    | 7   | 0.058  | 14  | -0.05  | 15  | 0.029  |
| 106 | 1.2DL + 1.5LM-MP3 +        | Yes   | Y  |   | 1   | 1.2    | 36  | 1.5    | 8   | 0.058  | 14  | -0.0   | 15  |        |
| 107 | 1.2DL + 1.5LM-MP3 +        | Yes   | Y  |   | 1   | 1.2    | 36  | 1.5    | 9   | 0.058  | 14  | -0.05  | 15  | -0.0   |
| 108 | 1.2DL + 1.5LM-MP3 +        | Yes   | Υ  |   | 1   | 1.2    | 36  | 1.5    | 10  | 0.058  | 14  | -0.0   | 15  | -0.05  |
| 109 | 1.2DL + 1.5LM-MP3 +        | Yes   | Y  |   | 1   | 1.2    | 36  | 1.5    | 11  | 0.058  | 14  |        | 15  | -0.0   |
| 110 | 1.2DL + 1.5LM-MP3 +        | Yes   | Υ  |   | 1   | 1.2    | 36  | 1.5    | 12  | 0.058  | 14  | 0.029  | 15  | -0.05  |
| 111 | 1.2DL + 1.5LM-MP3 +        | Yes   | Y  |   | 1   | 1.2    | 36  | 1.5    | 13  | 0.058  | 14  | 0.05   | 15  | -0.0   |
| 112 | 1.2DL + 1.5LM-MP4 +        | Yes   | Y  |   | 1   | 1.2    | 37  | 1.5    | 2   | 0.058  | 14  | 0.058  | 15  |        |
| 113 | 1.2DL + 1.5LM-MP4 +        | Yes   | Y  |   | 1   | 1.2    | 37  | 1.5    | 3   | 0.058  | 14  | 0.05   | 15  | 0.029  |
| 114 | 1.2DL + 1.5LM-MP4 +        | Yes   | Y  |   | 1   | 1.2    | 37  | 1.5    | 4   | 0.058  | 14  | 0.029  | 15  | 0.05   |
| 115 | 1.2DL + 1.5LM-MP4 +        | Yes   | Y  |   | 1   | 1.2    | 37  | 1.5    | 5   | 0.058  | 14  |        | 15  | 0.058  |
| 116 | 1.2DL + 1.5LM-MP4 +        | Yes   | Y  |   | 1   | 1.2    | 37  | 1.5    | 6   | 0.058  | 14  | -0.0   | 15  | 0.05   |
| 117 | 1.2DL + 1.5LM-MP4 +        | Yes   | Y  |   | 1   | 1.2    | 37  | 1.5    | 7   | 0.058  | 14  | -0.05  | 15  | 0.029  |
| 118 | 1.2DL + 1.5LM-MP4 +        | Yes   | Υ  |   | 1   | 1.2    | 37  | 1.5    | 8   | 0.058  | 14  | -0.0   | 15  |        |
| 119 | 1.2DL + 1.5LM-MP4 +        | Yes   | Υ  |   | 1   | 1.2    | 37  | 1.5    | 9   | 0.058  | 14  | -0.05  | 15  | -0.0   |
| 120 | 1.2DL + 1.5LM-MP4 +        | Yes   | Υ  |   | 1   | 1.2    | 37  | 1.5    | 10  | 0.058  | 14  | -0.0   | 15  | -0.05  |
| 121 | 1.2DL + 1.5LM-MP4 +        | Yes   | Y  |   | 1   | 1.2    | 37  | 1.5    | 11  | 0.058  | 14  |        | 15  | -0.0   |
| 122 | 1.2DL + 1.5LM-MP4 +        | Yes   | Υ  |   | 1   | 1.2    | 37  | 1.5    | 12  | 0.058  | 14  | 0.029  | 15  | -0.05  |
| 123 | 1.2DL + 1.5LM-MP4 +        | Yes   | Υ  |   | 1   | 1.2    | 37  | 1.5    | 13  | 0.058  | 14  | 0.05   | 15  | -0.0   |
| 124 | 1.2DL + 1.5LM-MP5 +        | Yes   | Υ  |   | 1   | 1.2    | 38  | 1.5    | 2   | 0.058  | 14  | 0.058  | 15  |        |
| 125 | 1.2DL + 1.5LM-MP5 +        | Yes   | Υ  |   | 1   | 1.2    | 38  | 1.5    | 3   | 0.058  | 14  | 0.05   | 15  | 0.029  |
| 126 | 1.2DL + 1.5LM-MP5 +        | Yes   | Υ  |   | 1   | 1.2    | 38  | 1.5    | 4   | 0.058  | 14  | 0.029  | 15  | 0.05   |
| 127 | 1.2DL + 1.5LM-MP5 +        | Yes   | Y  |   | 1   | 1.2    | 38  | 1.5    | 5   | 0.058  | 14  |        | 15  | 0.058  |
| 128 | 1.2DL + 1.5LM-MP5 +        | Yes   | Υ  |   | 1   | 1.2    | 38  | 1.5    | 6   | 0.058  | 14  | -0.0   | 15  | 0.05   |
| 129 | 1.2DL + 1.5LM-MP5 +        | Yes   | Υ  |   | 1   | 1.2    | 38  | 1.5    | 7   | 0.058  | 14  | -0.05  | 15  | 0.029  |
| 130 | 1.2DL + 1.5LM-MP5 +        | Yes   | Υ  |   | 1   | 1.2    | 38  | 1.5    | 8   | 0.058  | 14  | -0.0   | 15  |        |
| 131 | 1.2DL + 1.5LM-MP5 +        | Yes   | Υ  |   | 1   | 1.2    | 38  | 1.5    | 9   | 0.058  | 14  | -0.05  | 15  | -0.0   |
| 132 | 1.2DL + 1.5LM-MP5 +        | Yes   | Υ  |   | 1   | 1.2    | 38  | 1.5    | 10  | 0.058  | 14  | -0.0   | 15  | -0.05  |
| 133 | 1.2DL + 1.5LM-MP5 +        | Yes   | Υ  |   | 1   | 1.2    | 38  | 1.5    | 11  | 0.058  | 14  |        | 15  | -0.0   |
| 134 | 1.2DL + 1.5LM-MP5 +        | Yes   | Υ  |   | 1   | 1.2    | 38  | 1.5    | 12  | 0.058  | 14  | 0.029  | 15  | -0.05  |
| 135 | 1.2DL + 1.5LM-MP5 +        | Yes   | Y  |   | 1   | 1.2    | 38  | 1.5    | 13  | 0.058  | 14  | 0.05   | 15  | -0.0   |
| 136 | 1.2DL + 1.5LM-MP6 +        | Yes   | Υ  |   | 1   | 1.2    | 39  | 1.5    | 2   | 0.058  | 14  | 0.058  | 15  |        |
| 137 | 1.2DL + 1.5LM-MP6 +        | Yes   | Υ  |   | 1   | 1.2    | 39  | 1.5    | 3   | 0.058  | 14  | 0.05   | 15  | 0.029  |
| 138 | 1.2DL + 1.5LM-MP6 +        | Yes   | Υ  |   | 1   | 1.2    | 39  | 1.5    | 4   | 0.058  | 14  | 0.029  | 15  | 0.05   |
| 139 | 1.2DL + 1.5LM-MP6 +        | Yes   | Υ  |   | 1   | 1.2    | 39  | 1.5    | 5   | 0.058  | 14  |        | 15  | 0.058  |
| 140 | 1.2DL + 1.5LM-MP6 +        | Yes   | Υ  |   | 1   | 1.2    | 39  | 1.5    | 6   | 0.058  | 14  | -0.0   | 15  | 0.05   |
| 141 | 1.2DL + 1.5LM-MP6 +        | Yes   | Υ  |   | 1   | 1.2    | 39  | 1.5    | 7   | 0.058  | 14  | -0.05  | 15  | 0.029  |
| 142 | 1.2DL + 1.5LM-MP6 +        | Yes   | Υ  |   | 1   | 1.2    | 39  | 1.5    | 8   | 0.058  | 14  | -0.0   | 15  |        |
| 143 | 1.2DL + 1.5LM-MP6 +        | Yes   | Υ  |   | 1   | 1.2    | 39  | 1.5    | 9   | 0.058  | 14  | -0.05  | 15  | -0.0   |
| 144 | 1.2DL + 1.5LM-MP6 +        | Yes   | Υ  |   | 1   | 1.2    | 39  | 1.5    | 10  | 0.058  | 14  | -0.0   | 15  | -0.05  |



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#### Load Combinations (Continued)

| Description Solve PD S BLC Factor BLC |                     |       |    |   |     |        |     |        |     |        |     |        |     |        |
|---|---------------------|-------|----|---|-----|--------|-----|--------|-----|--------|-----|--------|-----|--------|
|   | Description         | Solve | PD | S | BLC | Factor |
| 145   | 1.2DL + 1.5LM-MP6 + | Yes   | Y  |   | 1   | 1.2    | 39  | 1.5    | 11  | 0.058  | 14  |        | 15  | -0.0   |
| 146   | 1.2DL + 1.5LM-MP6 + | Yes   | Y  |   | 1   | 1.2    | 39  | 1.5    | 12  | 0.058  | 14  | 0.029  | 15  | -0.05  |
| 147   | 1.2DL + 1.5LM-MP6 + | Yes   | Y  |   | 1   | 1.2    | 39  | 1.5    | 13  | 0.058  | 14  | 0.05   | 15  | -0.0   |
| 148   | 1.2DL + 1.5LM-MP7 + | Yes   | Y  |   | 1   | 1.2    | 40  | 1.5    | 2   | 0.058  | 14  | 0.058  | 15  |        |
| 149   | 1.2DL + 1.5LM-MP7 + | Yes   | Υ  |   | 1   | 1.2    | 40  | 1.5    | 3   | 0.058  | 14  | 0.05   | 15  | 0.029  |
| 150   | 1.2DL + 1.5LM-MP7 + | Yes   | Υ  |   | 1   | 1.2    | 40  | 1.5    | 4   | 0.058  | 14  | 0.029  | 15  | 0.05   |
| 151   | 1.2DL + 1.5LM-MP7 + | Yes   | Υ  |   | 1   | 1.2    | 40  | 1.5    | 5   | 0.058  | 14  |        | 15  | 0.058  |
| 152   | 1.2DL + 1.5LM-MP7 + | Yes   | Υ  |   | 1   | 1.2    | 40  | 1.5    | 6   | 0.058  | 14  | -0.0   | 15  | 0.05   |
| 153   | 1.2DL + 1.5LM-MP7 + | Yes   | Υ  |   | 1   | 1.2    | 40  | 1.5    | 7   | 0.058  | 14  | -0.05  | 15  | 0.029  |
| 154   | 1.2DL + 1.5LM-MP7 + | Yes   | Υ  |   | 1   | 1.2    | 40  | 1.5    | 8   | 0.058  | 14  | -0.0   | 15  |        |
| 155   | 1.2DL + 1.5LM-MP7 + | Yes   | Υ  |   | 1   | 1.2    | 40  | 1.5    | 9   | 0.058  | 14  | -0.05  | 15  | -0.0   |
| 156   | 1.2DL + 1.5LM-MP7 + | Yes   | Υ  |   | 1   | 1.2    | 40  | 1.5    | 10  | 0.058  | 14  | -0.0   | 15  | -0.05  |
| 157   | 1.2DL + 1.5LM-MP7 + | Yes   | Y  |   | 1   | 1.2    | 40  | 1.5    | 11  | 0.058  | 14  |        | 15  | -0.0   |
| 158   | 1.2DL + 1.5LM-MP7 + | Yes   | Y  |   | 1   | 1.2    | 40  | 1.5    | 12  | 0.058  | 14  | 0.029  | 15  | -0.05  |
| 159   | 1.2DL + 1.5LM-MP7 + | Yes   | Y  |   | 1   | 1.2    | 40  | 1.5    | 13  | 0.058  | 14  | 0.05   | 15  | -0.0   |
| 160   | 1.2DL + 1.5LM-MP8 + | Yes   | Υ  |   | 1   | 1.2    | 41  | 1.5    | 2   | 0.058  | 14  | 0.058  | 15  |        |
| 161   | 1.2DL + 1.5LM-MP8 + | Yes   | Y  |   | 1   | 1.2    | 41  | 1.5    | 3   | 0.058  | 14  | 0.05   | 15  | 0.029  |
| 162   | 1.2DL + 1.5LM-MP8 + | Yes   | Y  |   | 1   | 1.2    | 41  | 1.5    | 4   | 0.058  | 14  | 0.029  | 15  | 0.05   |
| 163   | 1.2DL + 1.5LM-MP8 + | Yes   | Υ  |   | 1   | 1.2    | 41  | 1.5    | 5   | 0.058  | 14  |        | 15  | 0.058  |
| 164   | 1.2DL + 1.5LM-MP8 + | Yes   | Υ  |   | 1   | 1.2    | 41  | 1.5    | 6   | 0.058  | 14  | -0.0   | 15  | 0.05   |
| 165   | 1.2DL + 1.5LM-MP8 + | Yes   | Y  |   | 1   | 1.2    | 41  | 1.5    | 7   | 0.058  | 14  | -0.05  | 15  | 0.029  |
| 166   | 1.2DL + 1.5LM-MP8 + | Yes   | Υ  |   | 1   | 1.2    | 41  | 1.5    | 8   | 0.058  | 14  | -0.0   | 15  |        |
| 167   | 1.2DL + 1.5LM-MP8 + | Yes   | Y  |   | 1   | 1.2    | 41  | 1.5    | 9   | 0.058  | 14  | -0.05  | 15  | -0.0   |
| 168   | 1.2DL + 1.5LM-MP8 + | Yes   | Υ  |   | 1   | 1.2    | 41  | 1.5    | 10  | 0.058  | 14  | -0.0   | 15  | -0.05  |
| 169   | 1.2DL + 1.5LM-MP8 + | Yes   | Y  |   | 1   | 1.2    | 41  | 1.5    | 11  | 0.058  | 14  |        | 15  | -0.0   |
| 170   | 1.2DL + 1.5LM-MP8 + | Yes   | Υ  |   | 1   | 1.2    | 41  | 1.5    | 12  | 0.058  | 14  | 0.029  | 15  | -0.05  |
| 171   | 1.2DL + 1.5LM-MP8 + | Yes   | Y  |   | 1   | 1.2    | 41  | 1.5    | 13  | 0.058  | 14  | 0.05   | 15  | -0.0   |
| 172   | 1.2DL + 1.5LM-MP9 + | Yes   | Υ  |   | 1   | 1.2    | 42  | 1.5    | 2   | 0.058  | 14  | 0.058  | 15  |        |
| 173   | 1.2DL + 1.5LM-MP9 + | Yes   | Υ  |   | 1   | 1.2    | 42  | 1.5    | 3   | 0.058  | 14  | 0.05   | 15  | 0.029  |
| 174   | 1.2DL + 1.5LM-MP9 + | Yes   | Y  |   | 1   | 1.2    | 42  | 1.5    | 4   | 0.058  | 14  | 0.029  | 15  | 0.05   |
| 175   | 1.2DL + 1.5LM-MP9 + | Yes   | Y  |   | 1   | 1.2    | 42  | 1.5    | 5   | 0.058  | 14  |        | 15  | 0.058  |
| 176   | 1.2DL + 1.5LM-MP9 + | Yes   | Y  |   | 1   | 1.2    | 42  | 1.5    | 6   | 0.058  | 14  | -0.0   | 15  | 0.05   |
| 177   | 1.2DL + 1.5LM-MP9 + | Yes   | Y  |   | 1   | 1.2    | 42  | 1.5    | 7   | 0.058  | 14  | -0.05  | 15  | 0.029  |
| 178   | 1.2DL + 1.5LM-MP9 + | Yes   | Υ  |   | 1   | 1.2    | 42  | 1.5    | 8   | 0.058  | 14  | -0.0   | 15  |        |
| 179   | 1.2DL + 1.5LM-MP9 + | Yes   | Y  |   | 1   | 1.2    | 42  | 1.5    | 9   | 0.058  | 14  | -0.05  | 15  | -0.0   |
| 180   | 1.2DL + 1.5LM-MP9 + | Yes   | Y  |   | 1   | 1.2    | 42  | 1.5    | 10  | 0.058  | 14  | -0.0   | 15  | -0.05  |
| 181   | 1.2DL + 1.5LM-MP9 + | Yes   | Y  |   | 1   | 1.2    | 42  | 1.5    | 11  | 0.058  | 14  |        | 15  | -0.0   |
| 182   | 1.2DL + 1.5LM-MP9 + | Yes   | Y  |   | 1   | 1.2    | 42  | 1.5    | 12  | 0.058  | 14  | 0.029  | 15  | -0.05  |
| 183   | 1.2DL + 1.5LM-MP9 + | Yes   | Υ  |   | 1   | 1.2    | 42  | 1.5    | 13  | 0.058  | 14  | 0.05   | 15  | -0.0   |
| 184   | 1.2DL + 1.5LM-MP10  | Yes   | Y  |   | 1   | 1.2    | 43  | 1.5    | 2   | 0.058  | 14  | 0.058  | 15  |        |
| 185   | 1.2DL + 1.5LM-MP10  | Yes   | Y  |   | 1   | 1.2    | 43  | 1.5    | 3   | 0.058  | 14  | 0.05   | 15  | 0.029  |
| 186   | 1.2DL + 1.5LM-MP10  | Yes   | Y  |   | 1   | 1.2    | 43  | 1.5    | 4   | 0.058  | 14  | 0.029  | 15  | 0.05   |
| 187   | 1.2DL + 1.5LM-MP10  | Yes   | Y  |   | 1   | 1.2    | 43  | 1.5    | 5   | 0.058  | 14  |        | 15  | 0.058  |
| 188   | 1.2DL + 1.5LM-MP10  | Yes   | Υ  |   | 1   | 1.2    | 43  | 1.5    | 6   | 0.058  | 14  | -0.0   | 15  | 0.05   |
| 189   | 1.2DL + 1.5LM-MP10  | Yes   | Y  |   | 1   | 1.2    | 43  | 1.5    | 7   | 0.058  | 14  | -0.05  | 15  | 0.029  |
| 190   | 1.2DL + 1.5LM-MP10  | Yes   | Y  |   | 1   | 1.2    | 43  | 1.5    | 8   | 0.058  | 14  | -0.0   | 15  |        |
| 191   | 1.2DL + 1.5LM-MP10  | Yes   | Y  |   | 1   | 1.2    | 43  | 1.5    | 9   | 0.058  | 14  | -0.05  | 15  | -0.0   |
| 192   | 1.2DL + 1.5LM-MP10  | Yes   | Y  |   | 1   | 1.2    | 43  | 1.5    | 10  | 0.058  | 14  | -0.0   | 15  | -0.05  |
| 193   | 1.2DL + 1.5LM-MP10  | Yes   | Υ  |   | 1   | 1.2    | 43  | 1.5    | 11  | 0.058  | 14  |        | 15  | -0.0   |
| 194   | 1.2DL + 1.5LM-MP10  | Yes   | Y  |   | 1   | 1.2    | 43  | 1.5    | 12  | 0.058  | 14  | 0.029  | 15  | -0.05  |
| 195   | 1.2DL + 1.5LM-MP10  | Yes   | Y  |   | 1   | 1.2    | 43  | 1.5    | 13  | 0.058  | 14  | 0.05   | 15  | -0.0   |
| 196   | 1.2DL + 1.5LM-MP11  | Yes   | Y  |   | 1   | 1.2    | 44  | 1.5    | 2   | 0.058  | 14  | 0.058  | 15  |        |
| 197   | 1.2DL + 1.5LM-MP11  | Yes   | Υ  |   | 1   | 1.2    | 44  | 1.5    | 3   | 0.058  | 14  | 0.05   | 15  | 0.029  |
| 198   | 1.2DL + 1.5LM-MP11  | Yes   | Υ  |   | 1   | 1.2    | 44  | 1.5    | 4   | 0.058  | 14  | 0.029  | 15  | 0.05   |
| 199   | 1.2DL + 1.5LM-MP11  | Yes   | Y  |   | 1   | 1.2    | 44  | 1.5    | 5   | 0.058  | 14  |        | 15  | 0.058  |
| 200   | 1.2DL + 1.5LM-MP11  | Yes   | Y  |   | 1   | 1.2    | 44  | 1.5    | 6   | 0.058  | 14  | -0.0   | 15  | 0.05   |
| 201   | 1.2DL + 1.5LM-MP11  | Yes   | Y  |   | 1   | 1.2    | 44  | 1.5    | 7   | 0.058  | 14  | -0.05  | 15  | 0.029  |
| 202   | 1.2DL + 1.5LM-MP11  | Yes   | Υ  |   | 1   | 1.2    | 44  | 1.5    | 8   | 0.058  | 14  | -0.0   | 15  |        |
|   |                     |       |    |   |     |        |     |        |     |        |     |        |     |        |



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#### Load Combinations (Continued)

|     | Description        | Solve | PD | S | BLC | Factor | BLC | Factor | BLC | Factor | BLC | Factor | <b>BLC</b> | Factor |
|-----|--------------------|-------|----|---|-----|--------|-----|--------|-----|--------|-----|--------|------------|--------|
| 203 | 1.2DL + 1.5LM-MP11 | Yes   | Y  |   | 1   | 1.2    | 44  | 1.5    | 9   | 0.058  | 14  | -0.05  | 15         | -0.0   |
| 204 | 1.2DL + 1.5LM-MP11 | Yes   | Υ  |   | 1   | 1.2    | 44  | 1.5    | 10  | 0.058  | 14  | -0.0   | 15         | -0.05  |
| 205 | 1.2DL + 1.5LM-MP11 | Yes   | Y  |   | 1   | 1.2    | 44  | 1.5    | 11  | 0.058  | 14  |        | 15         | -0.0   |
| 206 | 1.2DL + 1.5LM-MP11 | Yes   | Υ  |   | 1   | 1.2    | 44  | 1.5    | 12  | 0.058  | 14  | 0.029  | 15         | -0.05  |
| 207 | 1.2DL + 1.5LM-MP11 | Yes   | Υ  |   | 1   | 1.2    | 44  | 1.5    | 13  | 0.058  | 14  | 0.05   | 15         | -0.0   |
| 208 | 1.2DL + 1.5LM-MP12 | Yes   | Υ  |   | 1   | 1.2    | 45  | 1.5    | 2   | 0.058  | 14  | 0.058  | 15         |        |
| 209 | 1.2DL + 1.5LM-MP12 | Yes   | Υ  |   | 1   | 1.2    | 45  | 1.5    | 3   | 0.058  | 14  | 0.05   | 15         | 0.029  |
| 210 | 1.2DL + 1.5LM-MP12 | Yes   | Υ  |   | 1   | 1.2    | 45  | 1.5    | 4   | 0.058  | 14  | 0.029  | 15         | 0.05   |
| 211 | 1.2DL + 1.5LM-MP12 | Yes   | Υ  |   | 1   | 1.2    | 45  | 1.5    | 5   | 0.058  | 14  |        | 15         | 0.058  |
| 212 | 1.2DL + 1.5LM-MP12 | Yes   | Υ  |   | 1   | 1.2    | 45  | 1.5    | 6   | 0.058  | 14  | -0.0   | 15         | 0.05   |
| 213 | 1.2DL + 1.5LM-MP12 | Yes   | Υ  |   | 1   | 1.2    | 45  | 1.5    | 7   | 0.058  | 14  | -0.05  | 15         | 0.029  |
| 214 | 1.2DL + 1.5LM-MP12 | Yes   | Υ  |   | 1   | 1.2    | 45  | 1.5    | 8   | 0.058  | 14  | -0.0   | 15         |        |
| 215 | 1.2DL + 1.5LM-MP12 | Yes   | Y  |   | 1   | 1.2    | 45  | 1.5    | 9   | 0.058  | 14  | -0.05  | 15         | -0.0   |
| 216 | 1.2DL + 1.5LM-MP12 | Yes   | Υ  |   | 1   | 1.2    | 45  | 1.5    | 10  | 0.058  | 14  | -0.0   | 15         | -0.05  |
| 217 | 1.2DL + 1.5LM-MP12 | Yes   | Y  |   | 1   | 1.2    | 45  | 1.5    | 11  | 0.058  | 14  |        | 15         | -0.0   |
| 218 | 1.2DL + 1.5LM-MP12 | Yes   | Υ  |   | 1   | 1.2    | 45  | 1.5    | 12  | 0.058  | 14  | 0.029  | 15         | -0.05  |

#### **Node Reactions**

|   | Node Label |     | X [lbs]  | LC | Y [lbs]  | LC | Z [lbs]  | LC | MX [lb-ft] | LC | MY [lb-ft] | LC | MZ [lb-ft] | LC |
|---|------------|-----|----------|----|----------|----|----------|----|------------|----|------------|----|------------|----|
| 1 | N63        | max | 1240.384 | 5  | 3242.108 | 27 | 265.251  | 14 | 7014.913   | 2  | 1201.497   | 11 | 1732.097   | 23 |
| 2 |            | min | -1237    | 11 | -973.295 | 20 | -6637    | 33 | -3035.787  | 20 | -1198.685  | 5  | -1837.289  | 5  |
| 3 | N156A      | max | 186.875  | 18 | 3226.104 | 31 | 3380.948 | 27 | 1977.81    | 25 | 1153.607   | 3  | 2291.559   | 24 |
| 4 |            | min | -5730    | 37 | -823.574 | 24 | -558.885 | 20 | -4061.347  | 7  | -1150.434  | 9  | -5728.922  | 31 |
| 5 | N160       | max | 5712.116 | 29 | 3225.688 | 35 | 3387.114 | 28 | 1921.001   | 15 | 1204.043   | 7  | 5890.846   | 35 |
| 6 |            | min | -21.252  | 22 | -818.01  | 16 | -343.194 | 20 | -3820.406  | 9  | -1202.141  | 13 | -2253.526  | 16 |
| 7 | Totals:    | max | 4295.629 | 5  | 8783.93  | 28 | 4744.573 | 14 |            |    |            |    |            |    |
| 8 |            | min | -4295    | 23 | 2427.201 | 58 | -4744    | 8  |            |    |            |    |            |    |

#### LRFD

|    | Mem  | Shape    | Code  | Loc    | LC | Shear | Loc    | Dir | LC | phi*Pnc  | phi*Pnt | phi*Mny | .phi*Mnz | Cb    | Eqn   |
|----|------|----------|-------|--------|----|-------|--------|-----|----|----------|---------|---------|----------|-------|-------|
| 1  | MP11 | PIPE_2.0 | 0.762 | 66     | 2  | 0.095 | 66     |     | 7  | 23945.8  | 42228   | 2459.85 | 2459.85  | 2.176 | H1-1b |
| 2  | MP7  | PIPE 2.0 | 0.693 | 66     | 10 | 0.096 | 66     |     | 3  | 23945.8  | 42228   | 2459.85 | 2459.85  | 1.921 | H1-1b |
| 3  | MP3  | PIPE_2.0 | 0.693 | 66     | 6  | 0.088 | 66     |     | 11 | 23945.8  | 42228   | 2459.85 | 2459.85  | 1.987 | H1-1b |
| 4  | MP6  | PIPE_2.0 | 0.607 | 66     | 8  | 0.096 | 66     |     | 7  | 23945.8  | 42228   | 2459.85 | 2459.85  | 1.957 | H1-1b |
| 5  | MP10 | PIPE_2.0 | 0.575 | 66     | 8  | 0.085 | 66     |     | 11 | 23945.8  | 42228   | 2459.85 | 2459.85  | 1.789 | H1-1b |
| 6  | MP2  | PIPE_2.0 | 0.555 | 66     | 3  | 0.095 | 66     |     | 3  | 23945.8  | 42228   | 2459.85 | 2459.85  | 2.093 | H1-1b |
| 7  | M5   | PL4x3/8  | 0.545 | 50.443 | 13 | 0.295 | 44.137 | У   | 11 | 57101.2  | 67500   | 527.344 | 5625     | 1.072 | H1-1b |
| 8  | M12  | PL4x3/8  | 0.542 | 0      | 9  | 0.309 | 6.306  | У   | 7  | 57092.0  | 67500   | 527.344 | 5625     | 1.058 | H1-1b |
| 9  | M17  | PL4x3/8  | 0.514 | 50.445 | 4  | 0.316 | 44.14  | У   | 3  | 57101.2  | 67500   | 527.344 | 5625     |       | H1-1b |
| 10 | MP1  | PIPE_2.0 | 0.5   | 48     | 8  | 0.086 | 48     |     | 3  | 15369.6  | 42228   | 2459.85 | 2459.85  | 2.947 | H1-1b |
| 11 | MP5  | PIPE_2.0 | 0.493 | 48     | 12 | 0.089 | 48     |     | 7  | 15369.6  | 42228   | 2459.85 | 2459.85  | 1.446 | H1-1b |
| 12 | MP9  | PIPE_2.0 | 0.493 | 48     | 4  | 0.077 | 90     |     | 11 | 15369.6  | 42228   | 2459.85 | 2459.85  | 1.388 | H1-1b |
| 13 | M43  | HSS4X4X4 | 0.445 | 38     | 2  | 0.181 | 38     | У   | 4  | 133783   | 139518  | 16180.5 | 16180.5  | 2.128 | H1-1b |
| 14 | M66A | HSS4X4X4 | 0.44  | 38     | 35 | 0.181 | 38     | У   | 12 | 133783   | 139518  | 16180.5 | 16180.5  | 2.349 | H1-1b |
| 15 | M65A | HSS4X4X4 | 0.438 | 38     | 31 | 0.185 | 38     | У   | 8  | 133783   | 139518  | 16180.5 | 16180.5  | 2.349 | H1-1b |
| 16 | M28  | PIPE_2.0 | 0.405 | 135    | 2  | 0.554 | 135    |     | 2  | 6295.422 | 42228   | 2459.85 | 2459.85  | 2.265 | H3-6  |
| 17 | M29  | PIPE_2.0 | 0.389 | 14.063 | 6  | 0.541 | 14.063 |     | 6  | 6295.422 | 42228   | 2459.85 | 2459.85  | 2.288 | H3-6  |
| 18 | M27  | PIPE_2.0 | 0.386 | 14.063 | 10 | 0.539 | 14.063 |     | 10 | 6295.422 | 42228   | 2459.85 | 2459.85  | 2.326 | H3-6  |
| 19 | MP4  | PIPE_2.0 | 0.38  | 66     | 2  | 0.141 | 66     |     | 37 | 23945.8  | 42228   | 2459.85 | 2459.85  | 1.475 | H1-1b |
| 20 | MP12 | PIPE_2.0 | 0.365 | 66     | 10 | 0.14  | 66     |     | 33 | 23945.8  | 42228   | 2459.85 | 2459.85  | 2.11  | H1-1b |
| 21 | M3   | PIPE_3.0 | 0.361 | 101    | 3  | 0.318 | 48.438 |     | 6  | 28615.5  | 85698   | 7555.5  | 7555.5   | 1.924 | H3-6  |
| 22 | M1   | PIPE_3.0 | 0.354 | 101    | 8  | 0.314 | 48.438 |     | 10 | 28615.5  | 85698   | 7555.5  | 7555.5   | 2.06  | H3-6  |
| 23 | MP8  | PIPE_2.0 | 0.353 | 66     | 6  | 0.14  | 66     |     | 29 | 23945.8  | 42228   | 2459.85 | 2459.85  | 2.09  | H1-1b |
| 24 | M2   | PIPE_3.0 | 0.347 | 48.437 | 12 | 0.324 | 101    |     | 2  | 28615.5  | 85698   | 7555.5  | 7555.5   | 2.086 | H3-6  |
| 25 | M11  | PL4x3/8  | 0.328 | 10.967 | 8  | 0.259 | 10.967 | У   | 8  | 15137.3  | 67500   | 527.344 | 5625     | 1.503 | H1-1b |
| 26 | M4   | PL4x3/8  | 0.319 | 5.229  | 12 | 0.251 | 5.229  | У   | 12 | 15141.9  | 67500   | 527.344 | 5625     |       | H1-1b |
| 27 | M22  | PL4x3/8  | 0.315 | 5.23   | 4  | 0.249 | 5.23   | У   | 4  | 15137.3  | 67500   | 527.344 | 5625     | 1.515 | H1-1b |



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#### LRFD (Continued)

|    | Mem | Shape   | Code  | Loc    | LC | Shear | Loc    | Dir | LC | phi*Pnc | phi*Pnt | phi*Mny | phi*Mnz | Cb    | Eqn   |
|----|-----|---------|-------|--------|----|-------|--------|-----|----|---------|---------|---------|---------|-------|-------|
| 28 | M21 | L2x2x2  | 0.28  | 0      | 3  | 0.026 | 0      | у   | 4  | 11484.3 | 22095   | 559.115 | 1017.04 | 1.5   | H2-1  |
| 29 | M15 | L2x2x2  | 0.275 | 0      | 7  | 0.026 | 0      | у   | 8  | 11484.3 | 22095   | 559.115 | 1017.04 | 1.5   | H2-1  |
| 30 | M10 | L2x2x2  | 0.26  | 0      | 12 | 0.026 | 0      | У   | 12 | 11484.3 | 22095   | 559.115 | 1017.04 | 1.5   | H2-1  |
| 31 | M9  | L2x2x2  | 0.237 | 34.248 | 6  | 0.024 | 0      | Z   | 7  | 11484.3 | 22095   | 559.115 | 1017.04 | 1.5   | H2-1  |
| 32 | M16 | L2x2x2  | 0.236 | 34.248 | 2  | 0.024 | 0      | Z   | 3  | 11484.3 | 22095   | 559.115 | 1017.04 | 1.5   | H2-1  |
| 33 | M20 | L2x2x2  | 0.233 | 34.248 | 10 | 0.023 | 0      | Z   | 10 | 11484.3 | 22095   | 559.115 | 1017.04 | 1.5   | H2-1  |
| 34 | M65 | PL4x3/8 | 0.226 | 0      | 2  | 0.417 | 0      | у   | 8  | 15137.3 | 67500   | 527.344 | 5625    | 1.282 | H1-1b |
| 35 | M66 | PL4x3/8 | 0.219 | 16.197 | 10 | 0.404 | 16.197 | у   | 4  | 15137.3 | 67500   | 527.344 | 5625    | 1.284 | H1-1b |
| 36 | M64 | PL4x3/8 | 0.218 | 16.194 | 6  | 0.407 | 16.194 | у   | 12 | 15141.9 | 67500   | 527.344 | 5625    | 1.285 | H1-1b |

## APPENDIX D ADDITIONAL CALCUATIONS

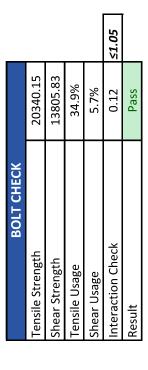


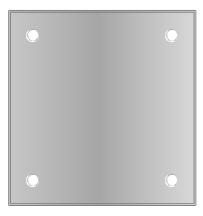
# **Bolt Calculation Tool, V1.4**

| PROJECT DATA            | T DATA               |
|-------------------------|----------------------|
| Site Name:              | Meriden West Central |
| Site Number:            | 842869               |
| Job Code:               | 1039-Z0001-B         |
| Connection Description: | Standoff Connection  |

| APPLIED LOADS | LOADS   |     |
|---------------|---------|-----|
| Bolt Tension: | 7095.98 | sql |
| Bolt Shear:   | 782.04  | sql |
|               |         |     |

| H                 | CHETTE          |    |
|-------------------|-----------------|----|
| BULI PR           | BOLI PROPERIIES |    |
| Bolt Type:        | Bolt            | _  |
| Bolt Diameter:    | 0.625           | in |
| Bolt Grade:       | A325            | -  |
| # of Bolts:       | 7               | _  |
| Threads Excluded? | oN              | -  |





## Exhibit F

**Power Density/RF Emissions Report** 



#### RADIO FREQUENCY EMISSIONS ANALYSIS REPORT EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11733B

CT733/AT&THntr Amblnce FT 462 West Main Street Meriden, Connecticut 0645 I

July 10, 2020

EBI Project Number: 6220002989

| Site Compliance Summary                                    |           |  |  |  |  |
|--|-----------|--|--|--|--|
| Compliance Status:   | COMPLIANT |  |  |  |  |
| Site total MPE% of FCC general population allowable limit: | 84.30%    |  |  |  |  |



July 10, 2020

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

Emissions Analysis for Site: CT11733B - CT733/AT&THntr Amblnce FT

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **462 West Main Street** in **Meriden, Connecticut** for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu$ W/cm²). The number of  $\mu$ W/cm² calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits; therefore, it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) - (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu$ W/cm²). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400  $\mu$ W/cm² and 467  $\mu$ W/cm², respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is 1000  $\mu$ W/cm². Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.



Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

#### **CALCULATIONS**

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 462 West Main Street in Meriden, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

- 1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) I NR channel (600 MHz Band) was considered for each sector of the proposed installation. This Channel has a transmit power of 80 Watts.
- 3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 4) 4 GSM channels (PCS Band 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 5) 2 UMTS channels (PCS Band 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.



- 6) 4 LTE channels (PCS Band 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 7) 2 UMTS channels (AWS Band 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 8) 2 LTE channels (AWS Band 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 9) 2 LTE channels (BRS Band 2500 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 10) 2 NR channels (BRS Band 2500 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 11) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 12) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 13) The antennas used in this modeling are the Ericsson AIR 21 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24\_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz channel(s) in Sector A, the Ericsson AIR 21 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24\_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz channel(s) in Sector B, the Ericsson AIR 21 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24\_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz channel(s) in Sector C. This is based on feedback



from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

- 14) The antenna mounting height centerline of the proposed antennas is 90 feet above ground level (AGL).
- 15) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.
- 16) All calculations were done with respect to uncontrolled / general population threshold limits.



#### **T-Mobile Site Inventory and Power Data**

| Sector:             | A   | Sector:             | В  | Sector:             | С  |
|---------------------|---|---------------------|--|---------------------|--|
| Antenna #:          | I   | Antenna #:          | I  | Antenna #:          | l  |
| Make / Model:       | Ericsson AIR 21                           | Make / Model:       | Ericsson AIR 21                                  | Make / Model:       | Ericsson AIR 21                                  |
| Frequency Bands:    | 1900 MHz / 1900 MHz /<br>2100 MHz         | Frequency Bands:    | 1900 MHz / 1900 MHz /<br>2100 MHz                | Frequency Bands:    | 1900 MHz / 1900 MHz /<br>2100 MHz                |
| Gain:               | 15.35 dBd / 15.35 dBd /<br>15.35 dBd      | Gain:               | 15.35 dBd / 15.35 dBd /<br>15.35 dBd             | Gain:               | 15.35 dBd / 15.35 dBd /<br>15.35 dBd             |
| Height (AGL):       | 90 feet                                   | Height (AGL):       | 90 feet  | Height (AGL):       | 90 feet  |
| Channel Count:      | 8   | Channel Count:      | 8  | Channel Count:      | 8  |
| Total TX Power (W): | 240 Watts                                 | Total TX Power (W): | 240 Watts  | Total TX Power (W): | 240 Watts  |
| ERP (W):            | 8,226.43                                  | ERP (W):            | 8,226.43   | ERP (W):            | 8,226.43   |
| Antenna A1 MPE %:   | 3.65%                                     | Antenna B1 MPE %:   | 3.65%  | Antenna C1 MPE %:   | 3.65%  |
| Antenna #:          | 2   | Antenna #:          | 2  | Antenna #:          | 2  |
| Make / Model:       | Ericsson AIR 32                           | Make / Model:       | Ericsson AIR 32                                  | Make / Model:       | Ericsson AIR 32                                  |
| Frequency Bands:    | 1900 MHz / 2100 MHz                       | Frequency Bands:    | 1900 MHz / 2100 MHz                              | Frequency Bands:    | 1900 MHz / 2100 MHz                              |
| Gain:               | 15.35 dBd / 15.85 dBd                     | Gain:               | 15.35 dBd / 15.85 dBd                            | Gain:               | 15.35 dBd / 15.85 dBd                            |
| Height (AGL):       | 90 feet                                   | Height (AGL):       | 90 feet  | Height (AGL):       | 90 feet  |
| Channel Count:      | 4   | Channel Count:      | 4  | Channel Count:      | 4  |
| Total TX Power (W): | 240 Watts                                 | Total TX Power (W): | 240 Watts  | Total TX Power (W): | 240 Watts  |
| ERP (W):            | 8,728.31                                  | ERP (W):            | 8,728.31   | ERP (W):            | 8,728.31   |
| Antenna A2 MPE %:   | 3.87%                                     | Antenna B2 MPE %:   | 3.87%  | Antenna C2 MPE %:   | 3.87%  |
| Antenna #:          | 3   | Antenna #:          | 3  | Antenna #:          | 3  |
| Make / Model:       | Ericsson AIR 6449                         | Make / Model:       | Ericsson AIR 6449                                | Make / Model:       | Ericsson AIR 6449                                |
| Frequency Bands:    | 2500 MHz / 2500 MHz                       | Frequency Bands:    | 2500 MHz / 2500 MHz                              | Frequency Bands:    | 2500 MHz / 2500 MHz                              |
| Gain:               | 22.05 dBd / 22.05 dBd                     | Gain:               | 22.05 dBd / 22.05 dBd                            | Gain:               | 22.05 dBd / 22.05 dBd                            |
| Height (AGL):       | 90 feet                                   | Height (AGL):       | 90 feet  | Height (AGL):       | 90 feet  |
| Channel Count:      | 4   | Channel Count:      | 4  | Channel Count:      | 4  |
| Total TX Power (W): | 160 Watts                                 | Total TX Power (W): | 160 Watts  | Total TX Power (W): | 160 Watts  |
| ERP (W):            | 25,651.93                                 | ERP (W):            | 25,651.93  | ERP (W):            | 25,651.93  |
| Antenna A3 MPE %:   | 11.39%                                    | Antenna B3 MPE %:   | 11.39%   | Antenna C3 MPE %:   | 11.39%   |
| Antenna #:          | 4   | Antenna #:          | 4  | Antenna #:          | 4  |
| Make / Model:       | RFS APXVAARR24_43-U-<br>NA20              | Make / Model:       | RFS APXVAARR24_43-U-<br>NA20                     | Make / Model:       | RFS APXVAARR24_43-U-<br>NA20                     |
| Frequency Bands:    | 600 MHz / 600 MHz / 700<br>MHz / 1900 MHz | Frequency Bands:    | 600 MHz / 600 MHz / 700<br>MHz / 1900 MHz        | Frequency Bands:    | 600 MHz / 600 MHz / 700<br>MHz / 1900 MHz        |
| Gain:               | 12.95 dBd / 12.95 dBd /                   | Gain:               | 12.95 dBd / 12.95 dBd /<br>13.35 dBd / 15.65 dBd | Gain:               | 12.95 dBd / 12.95 dBd /<br>13.35 dBd / 15.65 dBd |
| Height (AGL):       | 90 feet                                   | Height (AGL):       | 90 feet  | Height (AGL):       | 90 feet  |
| Channel Count:      | 7   | Channel Count:      | 7  | Channel Count:      | 7  |
| Total TX Power (W): | 320 Watts                                 | Total TX Power (W): | 320 Watts  | Total TX Power (W): | 320 Watts  |
| ERP (W):            | 8,466.41                                  | ERP (W):            | 8,466.41   | ERP (W):            | 8,466.41   |
| Antenna A4 MPE %:   | 6.25%                                     | Antenna B4 MPE %:   | 6.25%  | Antenna C4 MPE %:   | 6.25%  |

| environmental   engineering   due diliger | environmental | engineering | due diligence |
|---|---------------|-------------|---------------|
|---|---------------|-------------|---------------|

| Site Composite MPE %        |        |  |  |  |  |  |
|-----------------------------|--------|--|--|--|--|--|
| Carrier                     | MPE %  |  |  |  |  |  |
| T-Mobile (Max at Sector A): | 25.16% |  |  |  |  |  |
| Hunters Whip & Yagis        | 37.97% |  |  |  |  |  |
| AT&T                        | 9.77%  |  |  |  |  |  |
| Sprint                      | 1.27%  |  |  |  |  |  |
| Verizon                     | 10.13% |  |  |  |  |  |
| Site Total MPE %:           | 84.30% |  |  |  |  |  |

| T-Mobile MPE % Per Sector |        |  |  |  |  |  |
|---------------------------|--------|--|--|--|--|--|
| T-Mobile Sector A Total:  | 25.16% |  |  |  |  |  |
| T-Mobile Sector B Total:  | 25.16% |  |  |  |  |  |
| T-Mobile Sector C Total:  | 25.16% |  |  |  |  |  |
|                           |        |  |  |  |  |  |
| Site Total MPE % :        | 84.30% |  |  |  |  |  |

| T-Mobile Frequency Band / Technology (Sector A) | #<br>Channels | Watts ERP<br>(Per<br>Channel) | Height<br>(feet) | Total Power Density (µW/cm²) | Frequency<br>(MHz) | Allowable MPE (μW/cm²) | Calculated % MPE |
|---|---------------|-------------------------------|------------------|------------------------------|--------------------|------------------------|------------------|
| T-Mobile 1900 MHz GSM                           | 4             | 1028.30                       | 90.0             | 18.26                        | 1900 MHz GSM       | 1000                   | 1.83%            |
| T-Mobile 1900 MHz UMTS                          | 2             | 1028.30                       | 90.0             | 9.13                         | 1900 MHz UMTS      | 1000                   | 0.91%            |
| T-Mobile 2100 MHz UMTS                          | 2             | 1028.30                       | 90.0             | 9.13                         | 2100 MHz UMTS      | 1000                   | 0.91%            |
| T-Mobile 1900 MHz LTE                           | 2             | 2056.61                       | 90.0             | 18.26                        | 1900 MHz LTE       | 1000                   | 1.83%            |
| T-Mobile 2100 MHz LTE                           | 2             | 2307.55                       | 90.0             | 20.48                        | 2100 MHz LTE       | 1000                   | 2.05%            |
| T-Mobile 2500 MHz LTE                           | 2             | 6412.98                       | 90.0             | 56.93                        | 2500 MHz LTE       | 1000                   | 5.69%            |
| T-Mobile 2500 MHz NR                            | 2             | 6412.98                       | 90.0             | 56.93                        | 2500 MHz NR        | 1000                   | 5.69%            |
| T-Mobile 600 MHz LTE                            | 2             | 591.73                        | 90.0             | 5.25                         | 600 MHz LTE        | 400                    | 1.31%            |
| T-Mobile 600 MHz NR                             | 1             | 1577.94                       | 90.0             | 7.00                         | 600 MHz NR         | 400                    | 1.75%            |
| T-Mobile 700 MHz LTE                            | 2             | 648.82                        | 90.0             | 5.76                         | 700 MHz LTE        | 467                    | 1.23%            |
| T-Mobile 1900 MHz LTE                           | 2             | 2203.69                       | 90.0             | 19.56                        | 1900 MHz LTE       | 1000                   | 1.96%            |
|   |               |                               |                  |                              |                    | Total:                 | 25.16%           |

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



#### **Summary**

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

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

| T-Mobile Sector                    | Power Density Value (%) |
|------------------------------------|-------------------------|
| Sector A:                          | 25.16%                  |
| Sector B:                          | 25.16%                  |
| Sector C:                          | 25.16%                  |
| T-Mobile Maximum MPE % (Sector A): | 25.16%                  |
|                                    |                         |
| Site Total:                        | 84.30%                  |
|                                    |                         |
| Site Compliance Status:            | COMPLIANT               |

The anticipated composite MPE value for this site assuming all carriers present is **84.30**% of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.