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1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   Customers with a Daily Pickup
   Your driver will pickup your shipment(s) as usual.

   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.
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CENTERLINE COMMUNICATIONS

at&t

January 30, 2020

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

Regarding: Notice of Exempt Modification – AT&T Site CT5448
Address: 239 Middle Turnpike East, Manchester, CT 06040

Dear Ms. Bachman:

New Cingular Wireless, PCS, LLC ("AT&T") currently maintains a wireless telecommunications facility ("Facility") at a 183' Monopole at the above-referenced address (the "Tower"), Latitude 41.784391, longitude 72.511698. The Tower is owned by the Town of Manchester, CT.

AT&T desires to modify its Facility by swapping (3) antennas and (9) remote radio units as well as add (6) remote radio units and (2) surge arrestor with accompanying DC power lines, as more particularly described and detailed in the enclosed Construction Drawings prepared by Hudson Design Group LLC, dated October 9, 2019 and last revised October 28, 2019. Enclosed please also find a Mount Analysis prepared by Hudson Design Group LLC, dated October 9, 2019. The centerline height of the existing and proposed antennas will be at 146 feet.

The Tower was approved by the Town of Manchester, CT Planning and Zoning Commission on March 18, 2002. Enclosed please find a copy of the memorandum to the then acting General Manager, memorializing the above-mentioned approval. Enclosed please also find a copy of the most recent Connecticut Siting Council decision for an AT&T Exempt Modification request which was issued on February 11, 2019 under file no. EM-AT&T-077-190117.

Please accept this letter as notification pursuant to R.C.S.A §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 the following individuals: The Honorable Jay Moran, Mayor of the Town of Manchester; Scott Shanley, General Manager of the Town of Manchester; and James Davis, Zoning Enforcement Officer of the Town of Manchester. Please note that the Town of Manchester is the property owner and Tower owner. Enclosed please find the property card and GIS map for the above-referenced address.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2). Specifically:

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

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

3. The proposed modifications 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 modified facility will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard. *Please see the RF Emissions Analysis Report for AT&T's modified facility enclosed herewith.*

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

6. The existing structure and its foundation can support the proposed loading. *Please see the Structural Analysis Report dated December 10, 2019 and prepared by Hudson Design Group, LLC*

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

Sincerely,

Patricia Nowak
Site Acquisition Consultant
Centerline Communications, LLC
750 West Center Street, Suite 301
West Bridgewater, MA 02379
pnowak@clinellc.com

Enclosures:
Exhibit 1 – Construction Drawings
Exhibit 2 – Mount Analysis Report
Exhibit 3 – Town Approval and CSC Decision
Exhibit 4 – Property Card and GIS Map
Exhibit 5 – RF Emissions Analysis Report
Exhibit 6 – Structural Analysis

cc: The Honorable Jay Moran, Mayor of Town of Manchester
Scott Shanley, General Manager of the Town of Manchester
James Davis, Zoning Enforcement Officer of the Town of Manchester

EXHIBIT 1

PROJECT INFORMATION

SCOPE OF WORK:

ITEMS TO BE MOUNTED ON THE EXISTING MONOPOLE:

- NEW AT&T ANTENNAS: NNH4-65B-R6 (TOTAL OF 1 FOR ALPHA SECTOR).
- NEW AT&T ANTENNAS: NNH4-65C-R6 (TYP. OF 1 PER BETA & GAMMA SECTOR, TOTAL OF 2).
- NEW AT&T RRUS: 4478 B14 (700) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- NEW AT&T RRUS: 4478 B5 (850) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- NEW AT&T RRUS: RRUS-E2 B29 (700) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- NEW AT&T RRUS: RRUS-12 B2 (PCS) (TYP. OF 1 PER SECTOR, TOTAL OF 3) AND RRUS-A2 B25 (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- NEW AT&T DC ONLY SURGE ARRESTOR DC6-48-60-0-8C-EV (TOTAL OF 2) WITH (4) DC POWER.
- PROPOSED MOUNT MODS (SEE S-1 SHEET).

ITEMS TO BE MOUNTED AT EQUIPMENT LOCATION:

- ADD (1) IDLe CABLE.

ITEMS TO BE REMOVED:

- EXISTING AT&T ANTENNAS: ANTENNAS (TYP. OF 1 PER SECTOR, TOTAL OF 3).

ITEMS TO REMAIN:

- (9) ANTENNAS, (9) RRU'S, (6) TMA'S, (6) DIPLEXERS, (2) SURGE ARRESTOR, (6) COAX CABLES, (4) DC POWER & (2) FIBER.

SITE ADDRESS:	239 MIDDLE TURNPIKE EAST MANCHESTER, CT 06040
LATITUDE:	41.784391° N, 41° 47' 3.81" N
LONGITUDE:	72.511698° W, 72° 30' 42.16" W
TYPE OF SITE:	MONOPOLE / OUTDOOR EQUIPMENT
STRUCTURE HEIGHT:	184'-0"±
RAD CENTER:	146'-0"±
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY

SITE NUMBER: CT5448

SITE NAME: MANCHESTER CENTRAL

FA CODE: 10071105

PACE ID: MRCTB042109 & MRCTB042106

PROJECT: LTE 6C_7C 2020 UPGRADE

DRAWING INDEX

VICINITY MAP

DIRECTIONS TO SITE:

HEAD SOUTH TOWARD ENTERPRISE DR. TURN LEFT ONTO ENTERPRISE DR. TURN LEFT ONTO CAPITAL BLVD. TURN LEFT ONTO STATE HWY 411. TURN LEFT TO MERGE ONTO I-91 N. MERGE ONTO I-91 N. TAKE EXIT 29 TO MERGE ONTO CT-15 N/US-5 N TOWARD I-84 E/E HARTFORD/BOSTON. CONTINUE ONTO CT-15 N, TAKE EXIT ON THE LEFT ONTO I-84 TOWARD BOSTON/ TAKE EXIT 60 FOR US-6/US-44/MIDDLE TURNPIKE W. TURN RIGHT TO STAY ON MIDDLE TURNPIKE W. CONTINUE STRAIGHT ONTO MIDDLE TURNPIKE E. TURN LEFT. TURN RIGHT.

GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T MOBILITY REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.
4. CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREIN.

72 HOURS

CALL
BEFORE YOU DIG
CALL TOLL FREE 1-800-922-4455
OR CALL 811

UNDERGROUND SERVICE ALERT

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
NORTH ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET, SUITE #301
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SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: MR

STATE OF CONNECTICUT · DANIEL P. HAMM · No. 24178 · LICENSED PROFESSIONAL ENGINEER

AT&T

TITLE SHEET
LTE 6C_7C 2020 UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CT5448	T-1	1

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81 STANDARDS) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS AND #2 AWG STRANDED COPPER FOR OUTDOOR BTS.

6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO GROUND BAR.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

   CONTRACTOR – CENTERLINE
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T MOBILITY

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.

7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.

10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

16. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T SITES."

17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

20. **APPLICABLE BUILDING CODES:**
    SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

    BUILDING CODE: IBC 2015 WITH 2018 CT STATE BUILDING CODE AMENDMENTS
    ELECTRICAL CODE: 2017 NATIONAL ELECTRICAL CODE (NFPA 70-2017)

    SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

    AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

    AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;

    TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-G, STRUCTURAL STANDARDS FOR STEEL

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	EQ	EQUAL	REQ	REQUIRED
AWG	AMERICAN WIRE GAUGE	GC	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
BBU	BATTERY BACKUP UNIT	GRC	GALVANIZED RIGID CONDUIT	TBD	TO BE DETERMINED
BTCW	BARE TINNED SOLID COPPER WIRE	MGB	MASTER GROUND BAR	TBR	TO BE REMOVED
BGR	BURIED GROUND RING	MIN	MINIMUM	TBRR	TO BE REMOVED AND REPLACED
BTS	BASE TRANSCEIVER STATION	P	PROPOSED	TYP	TYPICAL
E	EXISTING	NTS	NOT TO SCALE	UG	UNDER GROUND
EGB	EQUIPMENT GROUND BAR	RAD	RADIATION CENTER LINE (ANTENNA)	VIF	VERIFY IN FIELD
EGR	EQUIPMENT GROUND RING	REF	REFERENCE		

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
NORTH ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET, SUITE #301
WEST BRIDGEWATER, MA 02379

SITE NUMBER: CT5448
SITE NAME: MANCHESTER CENTRAL

239 MIDDLE TURNPIKE EAST
MANCHESTER, CT 06040
HARTFORD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
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SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: MR

STATE OF CONNECTICUT · DANIEL P. HAMM · No. 24178 · LICENSED PROFESSIONAL ENGINEER

AT&T

GENERAL NOTES

LTE 6C_7C 2020 UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CT5448	GN-1	1

NOTE:

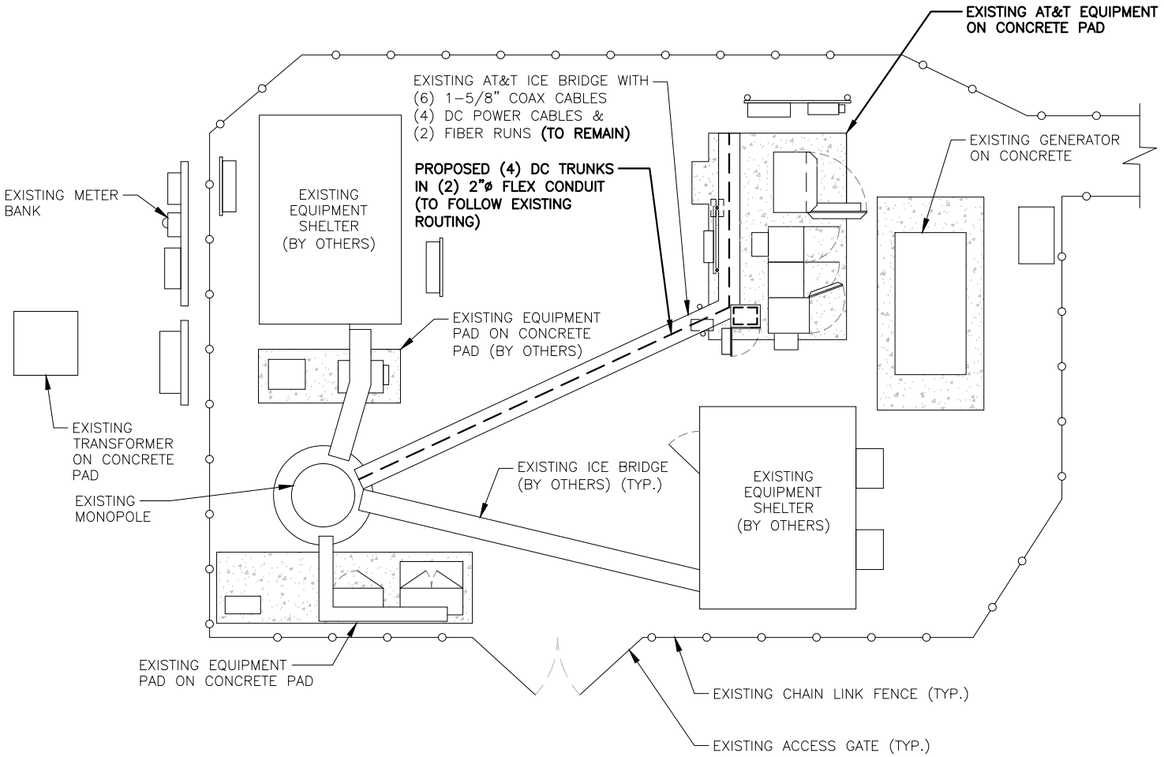
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

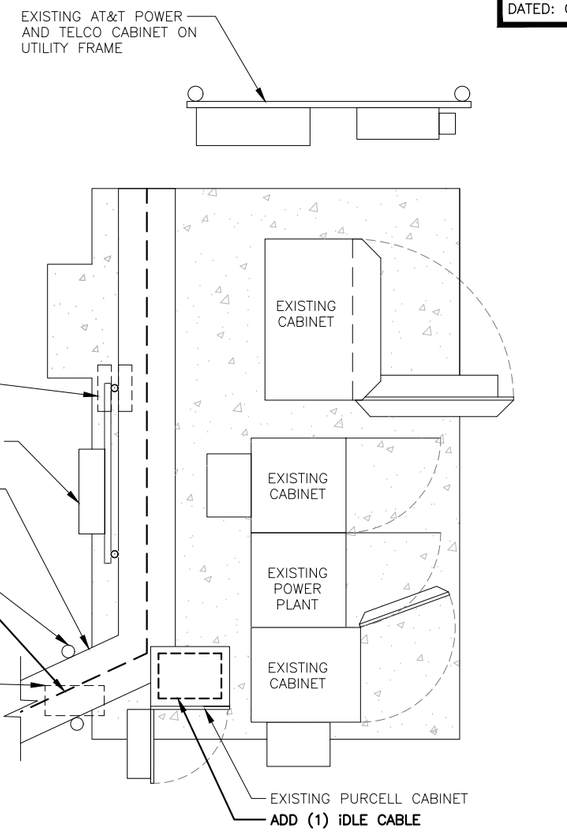
NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY:
HUDSON DESIGN GROUP, LLC.
DATED: OCTOBER 09, 2019



COMPOUND PLAN (1 / A-1)
22x34 SCALE: 3/16"=1'-0"
11x17 SCALE: 3/32"=1'-0"

0 2'-8" 5'-4" 10'-8" 16'-0"



EQUIPMENT PLAN (2 / A-1)
22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"

0 1'-0" 2'-0" 4'-0" 6'-0"

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
NORTH ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

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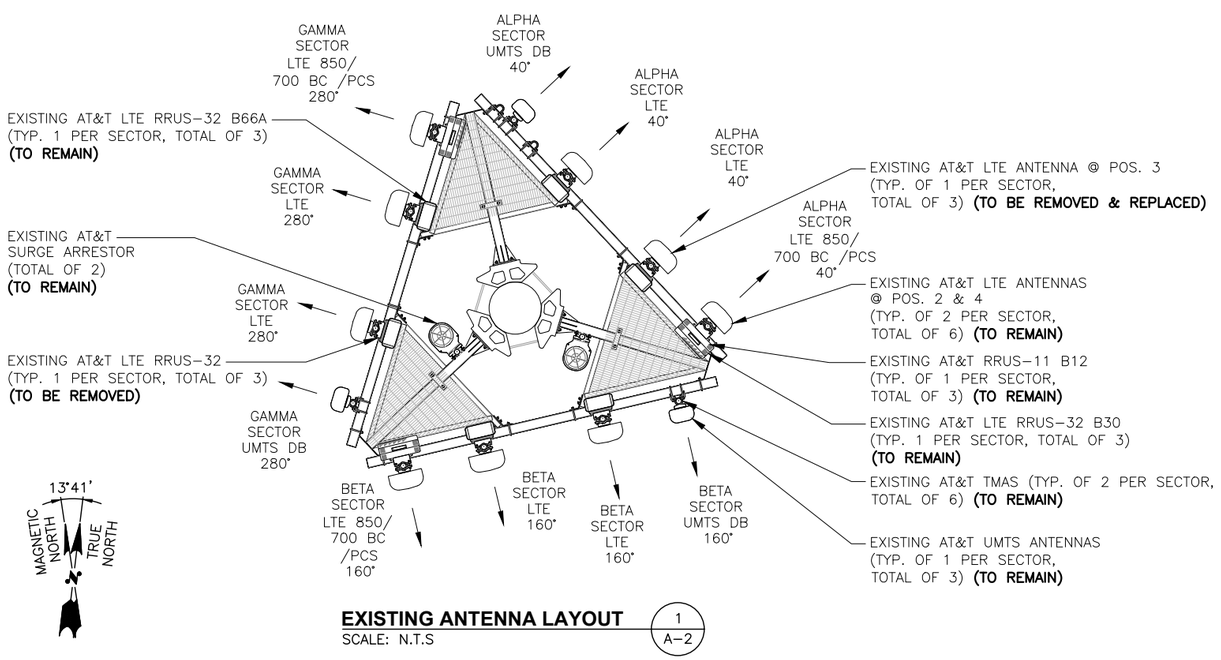
STATE OF CONNECTICUT · DANIEL P. HAMM · No. 24178 · LICENSED PROFESSIONAL ENGINEER

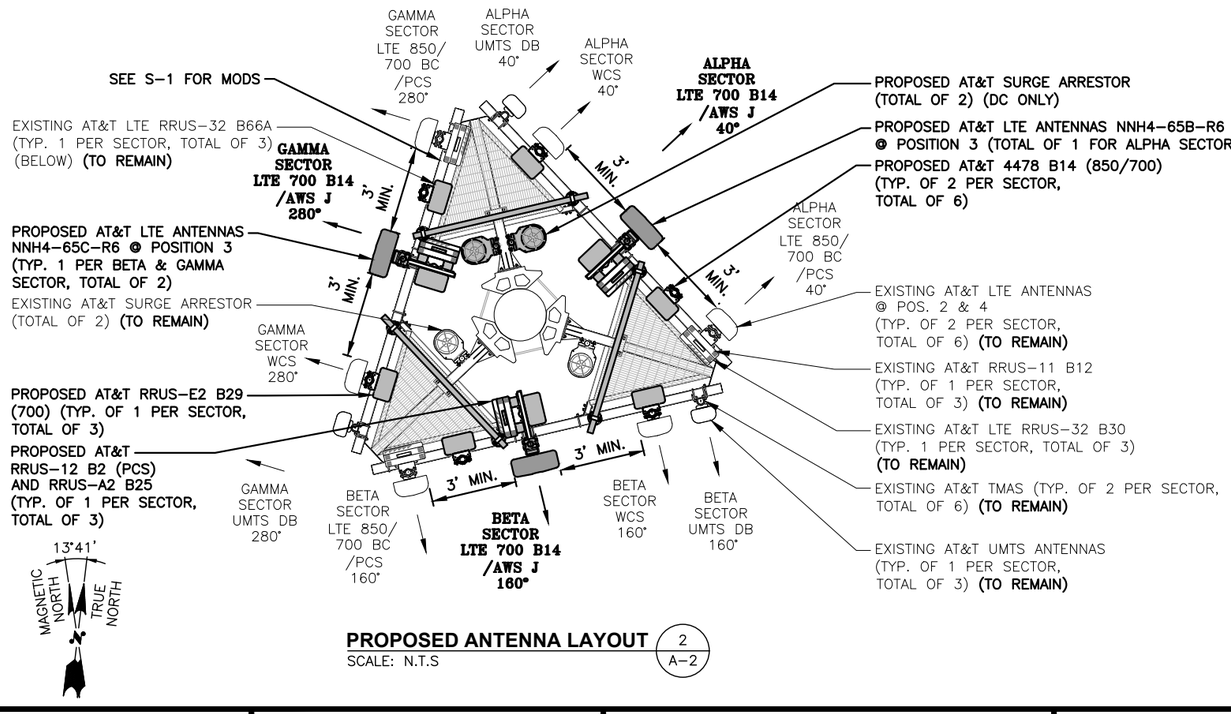
AT&T

COMPOUND & EQUIPMENT PLANS
LTE 6C_7C 2020 UPGRADE

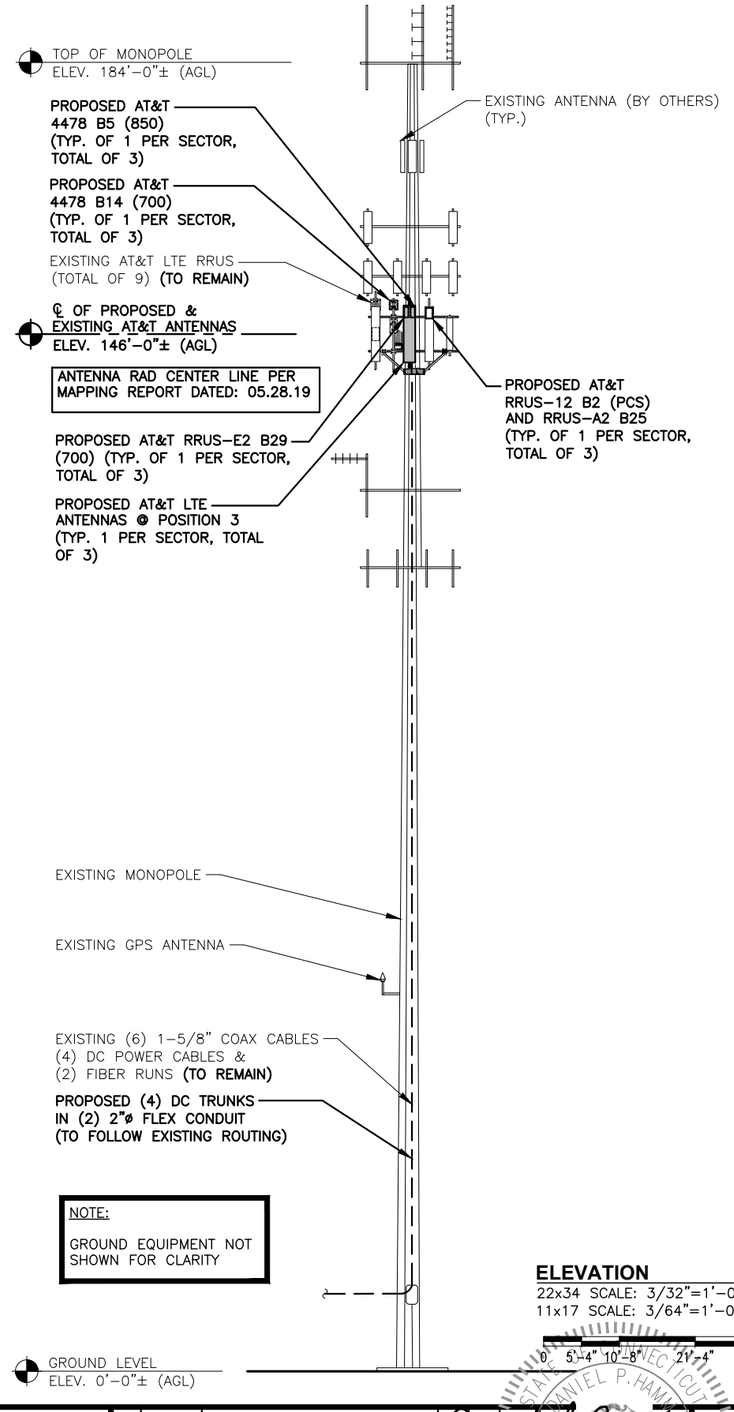
SITE NUMBER	DRAWING NUMBER	REV
CT5448	A-1	1



EXISTING ANTENNA LAYOUT (1 / A-2)
SCALE: N.T.S



PROPOSED ANTENNA LAYOUT (2 / A-2)
SCALE: N.T.S



ELEVATION (3 / A-2)
22x34 SCALE: 3/32"=1'-0"
11x17 SCALE: 3/64"=1'-0"

0 5'-4" 10'-8" 21'-4" 32'-0"

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:
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ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	10/28/19	ISSUED FOR CONSTRUCTION	MR	AT	DPH
A	10/09/19	ISSUED FOR REVIEW	MR	AT	DPH

SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: MR

STATE OF CONNECTICUT — DANIEL P. HAMM — No. 24178 — LICENSED PROFESSIONAL ENGINEER

AT&T
ANTENNA LAYOUTS & ELEVATION
LTE 6C_7C 2020 UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CT5448	A-2	1

ANTENNA SCHEDULE

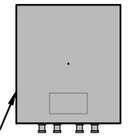
SECTOR	EXISTING/ PROPOSED	BAND	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	TMA/ DIPLEXER	RRU	SIZE (INCHES) (L x W x D)	FEEDER	RAYCAP
A1	EXISTING	UMTS DB	80010121	54.5X10.3X5.9	146'-0"±	40°	(2)(E) LGP21401 (2)(E) LGP21901	–	–	(2)1-5/8 COAX	(E) (1) RAYCAP DC6-48-60-18-8F
A2	EXISTING	WCS	OPA-65R-LCUU-H6	72x14.8x7.4	146'-0"±	40°	–	**(P)(1) RRUS-E2 B29 (700)** (E)(1) RRUS-32 B30 (WCS)	**20.4"X18.5"X7.5"** –	–	
A3	**PROPOSED**	**LTE 700 B14 /AWS J**	**NNH4-65B-R6**	**72x19.6x7.8**	**146'-0"±**	**40°**	–	**(P)(1) 4478 B14 (700)** (E)(1) RRUS-32 B66A (AWS)	**18.1"X13.4"X8.3"** –	–	
A4	EXISTING	LTE 850/ 700 BC /PCS	OPA-65R-LCUU-H6	72x14.8x7.4	146'-0"±	40°	–	(E)(1) RRUS-11 B12 (700) **(P)(1) 4478 B5 (850)** **(P)(1) RRUS-12 (PCS) & RRUS-A2 B25 (PCS)**	– **18.1"X13.4"X8.3"** **20.4"X18.5"X7.5"**	–	
B1	EXISTING	UMTS DB	80010121	54.5X10.3X5.9	146'-0"±	160°	(2)(E) LGP21401 (2)(E) LGP21901	–	–	(2)1-5/8 COAX	(E) (1) RAYCAP DC6-48-60-18-8F
B2	EXISTING	WCS	OPA-65R-LCUU-H8	92.7x14.4x7	146'-0"±	160°	–	**(P)(1) RRUS-E2 B29 (700)** (E)(1) RRUS-32 B30 (WCS)	**20.4"X18.5"X7.5"** –	–	
B3	**PROPOSED**	**LTE 700 B14 /AWS J**	**NNH4-65C-R6**	**96x19.6x7.8**	**146'-0"±**	**160°**	–	**(P)(1) 4478 B14 (700)** (E)(1) RRUS-32 B66A (AWS)	**18.1"X13.4"X8.3"** –	–	
B4	EXISTING	LTE 850/ 700 BC /PCS	OPA-65R-LCUU-H8	92.7x14.4x7	146'-0"±	160°	–	(E)(1) RRUS-11 B12 (700) **(P)(1) 4478 B5 (850)** **(P)(1) RRUS-12 (PCS) & RRUS-A2 B25 (PCS)**	– **18.1"X13.4"X8.3"** **20.4"X18.5"X7.5"**	–	
C1	EXISTING	UMTS DB	80010121	54.5X10.3X5.9	146'-0"±	280°	(2)(E) LGP21401 (2)(E) LGP21901	–	–	(2)1-5/8 COAX	(P) (2) RAYCAP DC6-48-60-0-8C-EV
C2	EXISTING	WCS	OPA-65R-LCUU-H8	92.7x14.4x7	146'-0"±	280°	–	**(P)(1) RRUS-E2 B29 (700)** (E)(1) RRUS-32 B30 (WCS)	**20.4"X18.5"X7.5"** –	–	
C3	**PROPOSED**	**LTE 700 B14 /AWS J**	**NNH4-65C-R6**	**96x19.6x7.8**	**146'-0"±**	**280°**	–	**(P)(1) 4478 B14 (700)** (E)(1) RRUS-32 B66A (AWS)	**18.1"X13.4"X8.3"** –	–	
C4	EXISTING	LTE 850/ 700 BC /PCS	OPA-65R-LCUU-H8	92.7x14.4x7	146'-0"±	280°	–	(E)(1) RRUS-11 B12 (700) **(P)(1) 4478 B5 (850)** **(P)(1) RRUS-12 (PCS) & RRUS-A2 B25 (PCS)**	– **18.1"X13.4"X8.3"** **20.4"X18.5"X7.5"**	–	

FINAL ANTENNA SCHEDULE (1 / A-3)
SCALE: N.T.S

RRU CHART

QUANTITY	MODEL	SIZE (L x W x D)
3(P)	**4478 B14 (700)**	**18.1"x13.4"x8.3"**
3(P)	**4478 B5 (850)**	**18.1"x13.4"x8.3"**
3(P)	**RRUS-E2 B29 (700)**	**20.4"x18.5"x7.5"**
3(P)	**RRUS-12 (PCS) & RRUS-A2 B25 (PCS)**	**20.4"x18.5"x7.5"**
3(E)	RRUS-32 B30 (WCS)	27.2"x12.1"x7.0"
3(E)	RRUS-32 B66A (AWS)	27.2"x12.1"x7.0"
3(E)	RRUS-11 B12 (700)	19.7"x17.0"x7.2"

NOTE:
SEE RFDS FOR RRH FREQUENCY AND MODEL NUMBER



PROPOSED RRU REFER TO THE FINAL RFDS AND CHART FOR QUANTITY, MODEL AND DIMENSIONS

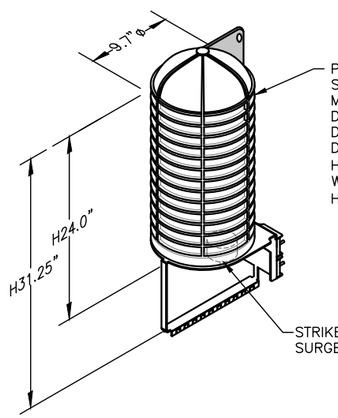
NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

PROPOSED RRUS DETAIL (2 / A-3)
SCALE: N.T.S

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

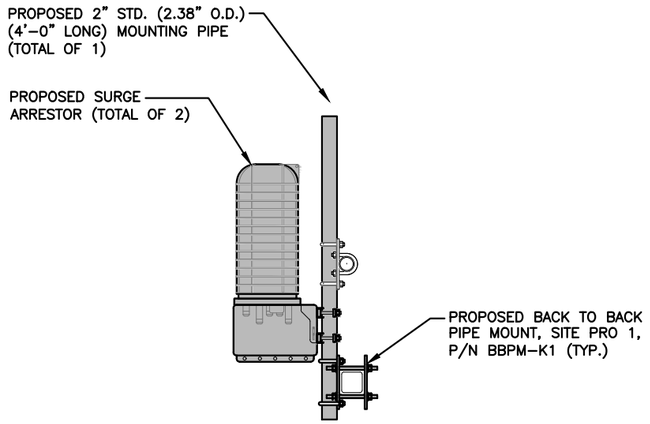
NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY:
HUDSON DESIGN GROUP, LLC.
DATED: OCTOBER 09, 2019

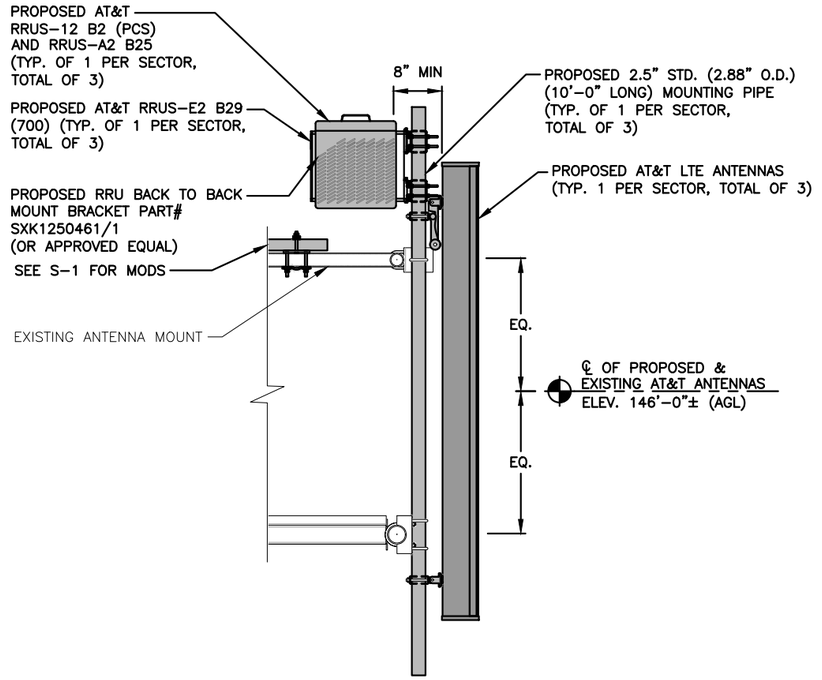


NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

DC SURGE SUPPRESSOR DETAIL (3 / A-3)
SCALE: N.T.S



SURGE ARRESTOR MOUNTING DETAIL (4 / A-3)
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"



PROPOSED LTE ANTENNA MOUNTING DETAIL (5 / A-3)
22x34 SCALE: 3/4"=1'-0"
11x17 SCALE: 3/8"=1'-0"

0 0'-6" 1'-0" 2'-0" 3'-0"

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FAX: (978) 336-5586

CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET, SUITE #301
WEST BRIDGEWATER, MA 02379

SITE NUMBER: CT5448
SITE NAME: MANCHESTER CENTRAL

239 MIDDLE TURNPIKE EAST
MANCHESTER, CT 06040
HARTFORD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

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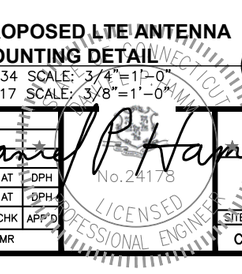

AT&T

DETAILS
LTE 6C_7C 2020 UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CT5448	A-3	1

STRUCTURAL NOTES:

1. DESIGN REQUIREMENTS ARE PER STATE BUILDING CODE AND APPLICABLE SUPPLEMENTS, INTERNATIONAL BUILDING CODE, EIA/TIA-222-G STRUCTURAL STANDARDS FOR STEEL ANTENNA, TOWERS AND ANTENNA SUPPORTING STRUCTURES.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. ANY UNUSUAL CONDITIONS SHALL BE REPORTED TO THE ATTENTION OF THE CONSTRUCTION MANAGER AND ENGINEER OF RECORD.
3. DESIGN AND CONSTRUCTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS".
4. STRUCTURAL STEEL SHALL CONFORM TO ASTM A992 (Fy=50 ksi), MISCELLANEOUS STEEL SHALL CONFORM TO ASTM A36 UNLESS OTHERWISE INDICATED.
5. STEEL PIPE SHALL CONFORM TO ASTM A500 "COLD-FORMED WELDED & SEAMLESS CARBON STEEL STRUCTURAL TUBING", GRADE B, OR ASTM A53 PIPE STEEL BLACK AND HOT-DIPPED ZINC-COATED WELDED AND SEAMLESS TYPE E OR S, GRADE B. PIPE SIZES INDICATED ARE NOMINAL. ACTUAL OUTSIDE DIAMETER IS LARGER.
6. STRUCTURAL CONNECTION BOLTS SHALL BE HIGH STRENGTH BOLTS (BEARING TYPE) AND CONFORM TO ASTM A325 TYPE-X "HIGH STRENGTH BOLTS FOR STRUCTURAL JOINTS, INCLUDING SUITABLE NUTS AND PLAIN HARDENED WASHERS". ALL BOLTS SHALL BE 3/4" DIA UON.
7. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS OTHERWISE NOTED.
8. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS OTHERWISE NOTED.
9. FIELD WELDS, DRILL HOLES, SAW CUTS AND ALL DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED WITH AN ORGANIC ZINC REPAIR PAINT COMPLYING WITH REQUIREMENTS OF ASTM A780. GALVANIZING REPAIR PAINT SHALL HAVE 65 PERCENT ZINC BY WEIGHT, ZIRP BY DUNCAN GALVANIZING, GALVA BRIGHT PREMIUM BY CROWN OR EQUAL. THICKNESS OF APPLIED GALVANIZING REPAIR PAINT SHALL BE NOT NOT LESS THAN 4 COATS (ALLOW TIME TO DRY BETWEEN COATS) WITH A RESULTING COATING THICKNESS REQUIRED BY ASTM A123 OR A153 AS APPLICABLE.
10. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND FOR METHODS USED IN CORRECTING WELDING. ALL WELDERS AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND DI.I. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "STEEL CONSTRUCTION MANUAL". 14TH EDITION.
11. INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON-CONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE CONSTRUCTION MANAGER PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE CONSTRUCTION MANAGER APPROVAL.
12. UNISTRUT SHALL BE FORMED STEEL CHANNEL STRUT FRAMING AS MANUFACTURED BY UNISTRUT CORP., WAYNE, MI OR EQUAL. STRUT MEMBERS SHALL BE 1 5/8"x1 5/8"x12GA, UNLESS OTHERWISE NOTED, AND SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
13. EPOXY ANCHOR ASSEMBLY SHALL CONSIST OF STAINLESS STEEL ANCHOR ROD WITH NUTS & WASHERS. AN INTERNALLY THREADED INSERT, A SCREEN TUBE AND A EPOXY ADHESIVE. THE ANCHORING SYSTEM SHALL BE THE HILTI-HIT HY-270 AND OR HY-200 SYSTEMS (AS SPECIFIED IN DWG.) OR ENGINEERS APPROVED EQUAL.
14. EXPANSION BOLTS SHALL CONFORM TO FEDERAL SPECIFICATION FF-S-325, GROUP II, TYPE 4, CLASS I, HILTI KWIK BOLT III OR APPROVED EQUAL. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
15. LUMBER SHALL COMPLY WITH THE REQUIREMENTS OF THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTION AND THE NATIONAL FOREST PRODUCTS ASSOCIATION'S NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION. ALL LUMBER SHALL BE PRESSURE TREATED AND SHALL BE STRUCTURAL GRADE NO. 2 OR BETTER.
16. WHERE ROOF PENETRATIONS ARE REQUIRED, THE CONTRACTOR SHALL CONTACT AND COORDINATE RELATED WORK WITH THE BUILDING OWNER AND THE EXISTING ROOF INSTALLER. WORK SHALL BE PERFORMED IN SUCH A MANNER AS TO NOT VOID THE EXISTING ROOF WARRANTY. ROOF SHALL BE WATERTIGHT.
17. ALL FIBERGLASS MEMBERS USED ARE AS MANUFACTURED BY STRONGWELL COMPANY OF BRISTOL, VA 24203. ALL DESIGN CRITERIA FOR THESE MEMBERS IS BASED ON INFORMATION PROVIDED IN THE DESIGN MANUAL. ALL REQUIREMENTS PUBLISHED IN SAID MANUAL MUST BE STRICTLY ADHERED TO.
18. NO MATERIALS TO BE ORDERED AND NO WORK TO BE COMPLETED UNTIL SHOP DRAWINGS HAVE BEEN REVIEWED AND APPROVED IN WRITING.
19. SUBCONTRACTOR SHALL FIREPROOF ALL STEEL TO PRE-EXISTING CONDITIONS.

SPECIAL INSPECTIONS (REFERENCE IBC CHAPTER 17):

GENERAL: WHERE APPLICATION IS MADE FOR CONSTRUCTION, THE OWNER OR THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE ACTING AS THE OWNER'S AGENT SHALL EMPLOY ONE OR MORE APPROVED AGENCIES TO PERFORM INSPECTIONS DURING CONSTRUCTION ON THE TYPES OF WORK LISTED IN THE INSPECTION CHECKLIST ABOVE.

THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE AND ENGINEERS OF RECORD INVOLVED IN THE DESIGN OF THE PROJECT ARE PERMITTED TO ACT AS THE APPROVED AGENCY AND THEIR PERSONNEL ARE PERMITTED TO ACT AS THE SPECIAL INSPECTOR FOR THE WORK DESIGNED BY THEM, PROVIDED THOSE PERSONNEL MEET THE QUALIFICATION REQUIREMENTS.

STATEMENT OF SPECIAL INSPECTIONS: THE APPLICANT SHALL SUBMIT A STATEMENT OF SPECIAL INSPECTIONS PREPARED BY THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE IN ACCORDANCE WITH SECTION 107.1 AS A CONDITION FOR ISSUANCE. THIS STATEMENT SHALL BE IN ACCORDANCE WITH SECTION 1705.

REPORT REQUIREMENT: SPECIAL INSPECTORS SHALL KEEP RECORDS OF INSPECTIONS. THE SPECIAL INSPECTOR SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL, AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. REPORTS SHALL INDICATE THAT WORK INSPECTED WAS OR WAS NOT COMPLETED IN CONFORMANCE TO APPROVED CONSTRUCTION DOCUMENTS. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THEY ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. A FINAL REPORT DOCUMENTING REQUIRED SPECIAL INSPECTIONS SHALL BE SUBMITTED.

NOTES:

1. REQUIRED FOR ANY NEW SHOP FABRICATED FRP OR STEEL.
2. PROVIDED BY MANUFACTURER, REQUIRED IF HIGH STRENGTH BOLTS OR STEEL.
3. PROVIDED BY GENERAL CONTRACTOR; PROOF OF MATERIALS.
4. HIGH WIND ZONE INSPECTION CATB 120MPH OR CAT C,D 110MPH INSPECT FRAMING OF WALLS, ANCHORING, FASTENING SCHEDULE.
5. ADHESIVE FOR REBAR AND ANCHORS SHALL HAVE BEEN TESTED IN ACCORDANCE WITH ACI 355.4 AND ICC-ES AC308 FOR CRACKED CONCRETE AND SEISMIC APPLICATIONS. DESIGN ADHESIVE BOND STRENGTH HAS BEEN BASED ON ACI 355.4 TEMPERATURE CATEGORY B WITH INSTALLATIONS INTO DRY HOLES DRILLED USING A CARBIDE BIT INTO CRACKED CONCRETE THAT HAS CURED FOR AT LEAST 21 DAYS. ADHESIVE ANCHORS REQUIRING CERTIFIED INSTALLATIONS SHALL BE INSTALLED BY A CERTIFIED ADHESIVE ANCHOR INSTALLER PER ACI 318-11 D.9.2.2. INSTALLATIONS REQUIRING CERTIFIED INSTALLERS SHALL BE INSPECTED PER ACI 318-11 D.8.2.4.
6. AS REQUIRED; FOR ANY FIELD CHANGES TO THE ITEMS IN THIS TABLE.

SPECIAL INSPECTION CHECKLIST

BEFORE CONSTRUCTION	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM
REQUIRED	ENGINEER OF RECORD APPROVED SHOP DRAWINGS [1]
REQUIRED	MATERIAL SPECIFICATIONS REPORT [2]
N/A	FABRICATOR NDE INSPECTION
REQUIRED	PACKING SLIPS [3]
ADDITIONAL TESTING AND INSPECTIONS:	
DURING CONSTRUCTION	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM
REQUIRED	STEEL INSPECTIONS
N/A	HIGH STRENGTH BOLT INSPECTIONS
N/A	HIGH WIND ZONE INSPECTIONS [4]
N/A	FOUNDATION INSPECTIONS
N/A	CONCRETE COMP. STRENGTH, SLUMP TESTS AND PLACEMENT
N/A	POST INSTALLED ANCHOR VERIFICATION [5]
N/A	GROUT VERIFICATION
N/A	CERTIFIED WELD INSPECTION
N/A	EARTHWORK: LIFT AND DENSITY
N/A	ON SITE COLD GALVANIZING VERIFICATION
N/A	GUY WIRE TENSION REPORT
ADDITIONAL TESTING AND INSPECTIONS:	
AFTER CONSTRUCTION	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM
REQUIRED	MODIFICATION INSPECTOR REDLINE OR RECORD DRAWINGS [6]
N/A	POST INSTALLED ANCHOR PULL-OUT TESTING
REQUIRED	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
NORTH ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

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WEST BRIDGEWATER, MA 02379

SITE NUMBER: CT5448
SITE NAME: MANCHESTER CENTRAL

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HARTFORD COUNTY

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STATE OF CONNECTICUT · DANIEL P. HAMM · No. 24178 · LICENSED PROFESSIONAL ENGINEER

AT&T

STRUCTURAL NOTES
LTE 6C_7C 2020 UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CT5448	SN-1	1

NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

NOTE:

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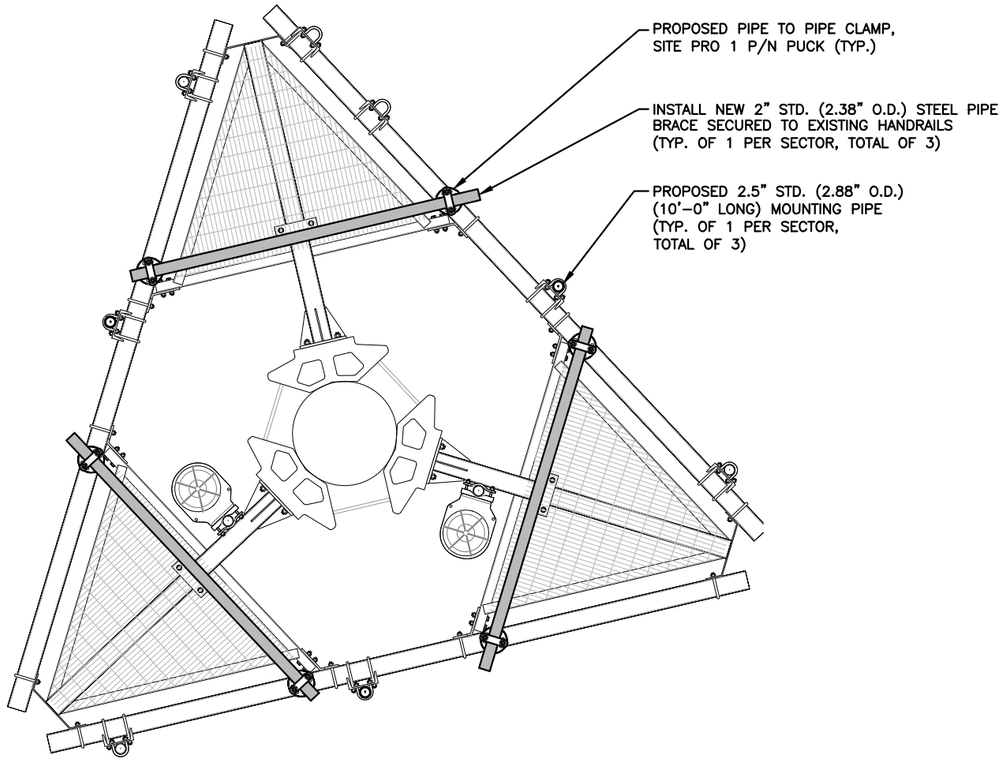
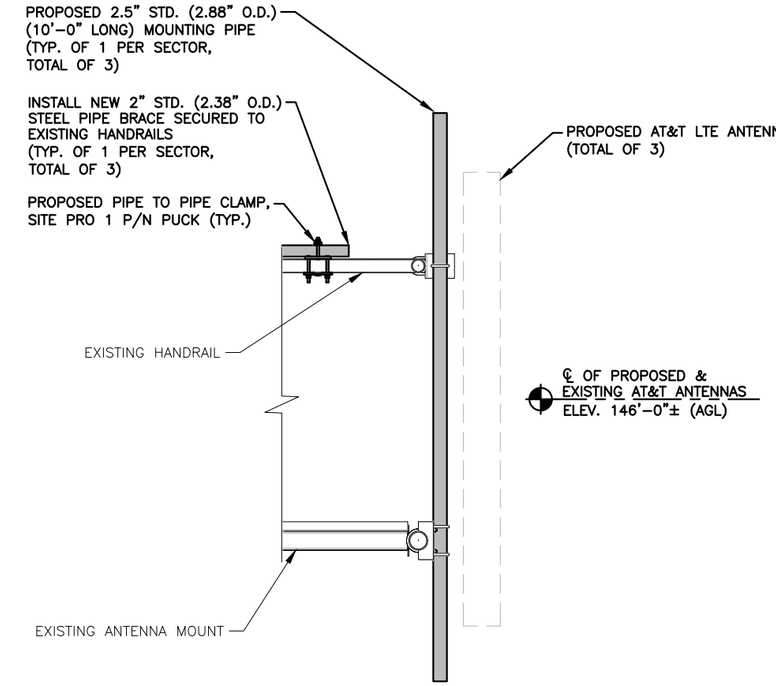
DATED: OCTOBER 09, 2019



PROPOSED MOUNT MODIFICATIONS PLAN (1 / S-1)
22x34 SCALE: 3/4"=1'-0"
11x17 SCALE: 3/8"=1'-0"

0 8" 1'-4" 2'-8" 4'-0"



PROPOSED MOUNT MODIFICATIONS DETAIL (3 / S-1)
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"

0 0'-6" 1'-0" 2'-0" 3'-0"

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STATE OF CONNECTICUT DANIEL P. HAMM No.24178 LICENSED PROFESSIONAL ENGINEER

AT&T

MOUNT MODIFICATION DESIGN
LTE 6C_7C 2020 UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
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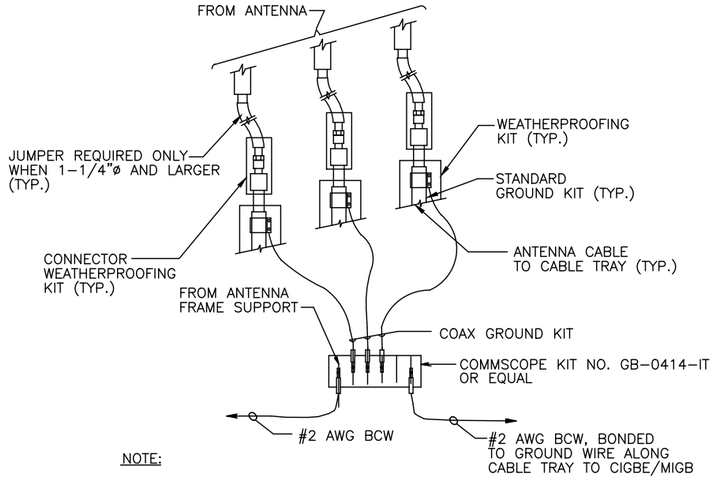


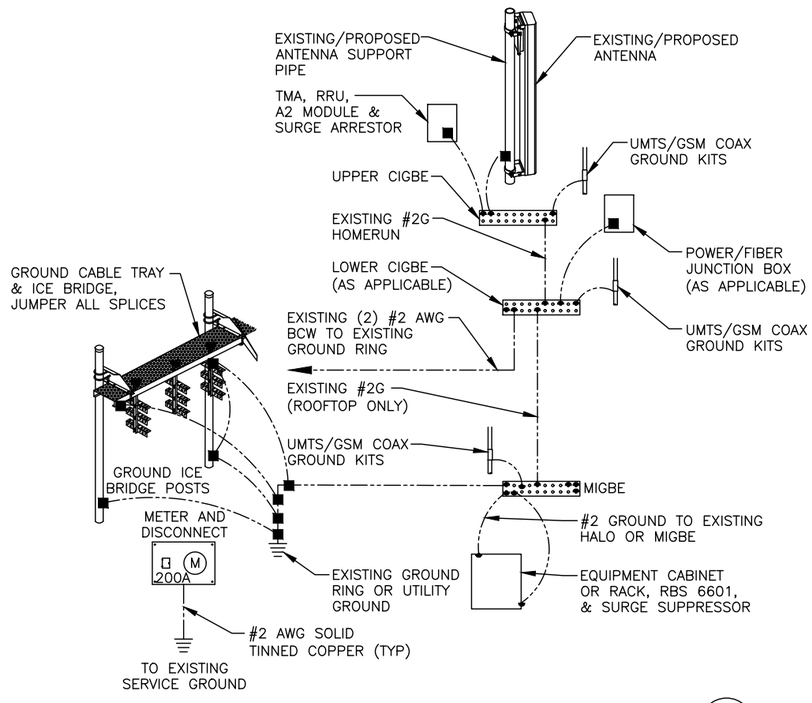
NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

GROUND WIRE TO GROUND BAR CONNECTION DETAIL

SCALE: N.T.S

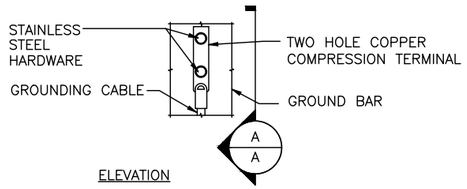
1 / G-1



GROUNDING RISER DIAGRAM

SCALE: N.T.S

2 / G-1



NOTES:

1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATION.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB

TYPICAL GROUND BAR CONNECTION DETAIL

SCALE: N.T.S

3 / G-1

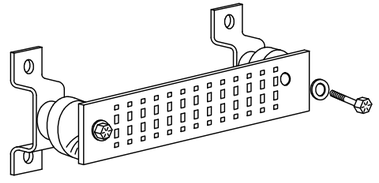
EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

SECTION "P" – SURGE PRODUCERS

CABLE ENTRY PORTS (HATCH PLATES) (#2 AWG)
GENERATOR FRAMEWORK (IF AVAILABLE) (#2 AWG)
TELCO GROUND BAR
COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2 AWG)
+24V POWER SUPPLY RETURN BAR (#2 AWG)
-48V POWER SUPPLY RETURN BAR (#2 AWG)
RECTIFIER FRAMES.

SECTION "A" – SURGE ABSORBERS

INTERIOR GROUND RING (#2 AWG)
EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2 AWG)
METALLIC COLD WATER PIPE (IF AVAILABLE) (#2 AWG)
BUILDING STEEL (IF AVAILABLE) (#2 AWG)



GROUND BAR - DETAIL

SCALE: N.T.S

4 / G-1

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
NORTH ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET, SUITE #301
WEST BRIDGEWATER, MA 02379

SITE NUMBER: CT5448
SITE NAME: MANCHESTER CENTRAL

239 MIDDLE TURNPIKE EAST
MANCHESTER, CT 06040
HARTFORD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	10/28/19	ISSUED FOR CONSTRUCTION	MR	AT	DPH
A	10/09/19	ISSUED FOR REVIEW	MR	AT	DPH

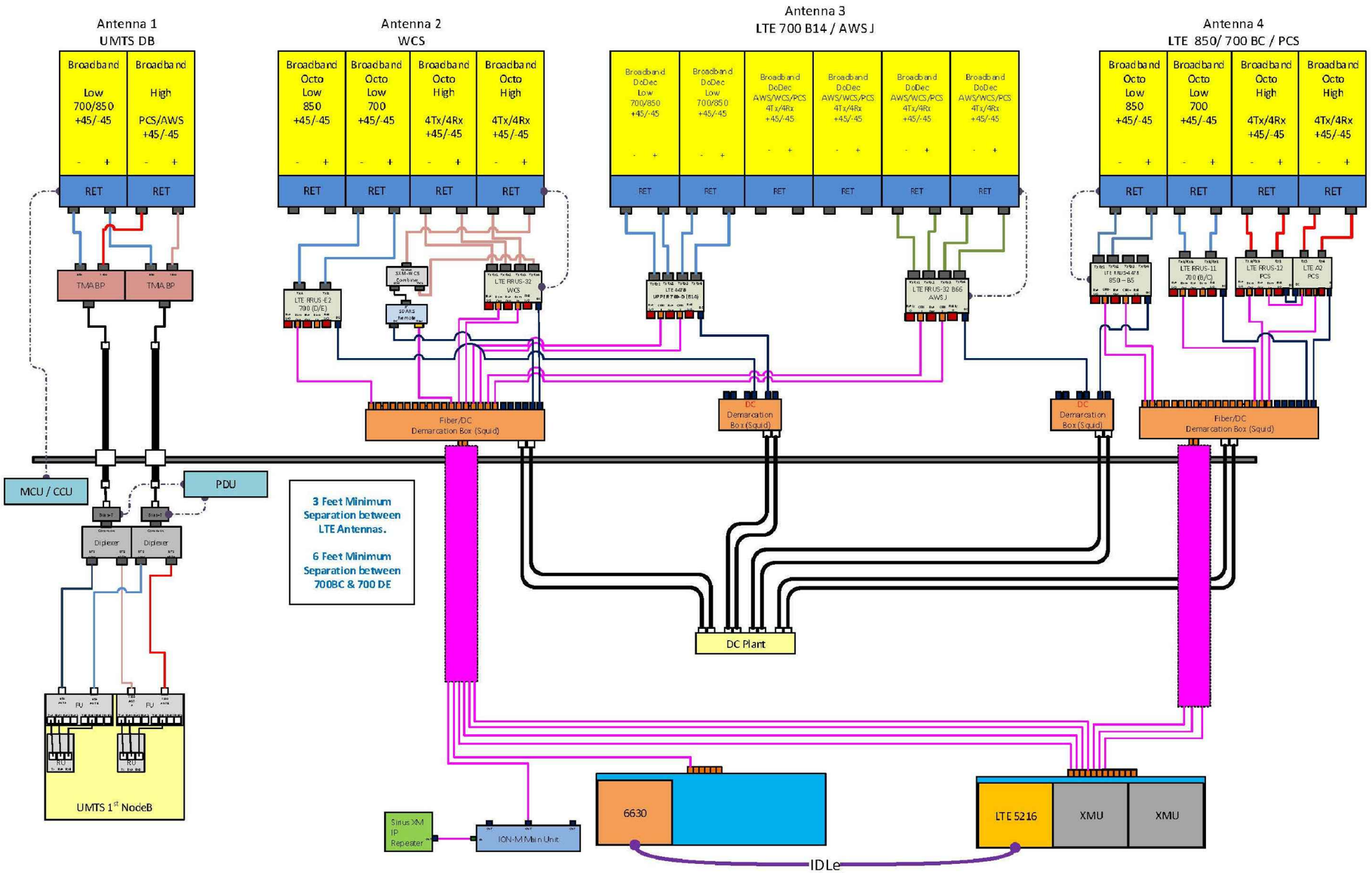
SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: MR

STATE OF CONNECTICUT · DANIEL P. HAMM · No. 24178 · LICENSED PROFESSIONAL ENGINEER

AT&T

GROUNDING DETAILS
LTE 6C_7C 2020 UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CT5448	G-1	1



NOTE:
1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS

NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

RF PLUMBING DIAGRAM

SCALE: N.T.S

1 / RF–1

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
NORTH ANDOVER, MA 01845
TEL: (978) 557-5553
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CENTERLINE COMMUNICATIONS
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SITE NUMBER: CT5448
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NO.	DATE	REVISIONS	BY	CHK	APP'D
1	10/28/19	ISSUED FOR CONSTRUCTION	MR	AT	DPH
A	10/09/19	ISSUED FOR REVIEW	MR	AT	DPH

SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: MR

AT&T

RF PLUMBING DIAGRAM
LTE 6C_7C 2020 UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CT5448	RF–1	1

EXHIBIT 2

October 9, 2019

CENTERLINE COMMUNICATIONS at&t

Centerline Communications
750 West Center Street, Suite #301
West Bridgewater, MA 02379

RE:		
	Site Number:	CT5448 (LTE 6C/7C)
	FA Number:	10071105
	PACE Number:	MRCTB042109
	PT Number:	2051A0Q8QD
	Site Name:	MANCHESTER CENTRAL
	Site Address:	239 Middle Turnpike East Manchester, CT 06040

To Whom It May Concern:

Hudson Design Group LLC (HDG) has been authorized by Centerline Communications to perform a mount analysis on the existing AT&T antenna/RRH mounts to determine their capability of supporting the following additional loading:

- (3) 800-10121 Antennas (54.5"x10.3"x5.9"– Wt. = 47 lbs. /each)
- (2) OPA-65R-LCUU-H6 Antennas (72.0"x14.8"x7.4" – Wt. = 73 lbs. /each)
- (4) OPA-65R-LCUU-H8 Antennas (92.7"x14.4"x7.0" – Wt. = 88 lbs. /each)
- (3) RRUS-32 B30 RRH's (27.2"x12.1"x7.0" – Wt. = 60 lbs. /each)
- (3) RRUS-32 B66 RRH's (27.2"x12.1"x7.0" – Wt. = 60 lbs. /each)
- (3) RRUS-11 B12 RRH's (19.7"x17.0"x7.2" – Wt. = 51 lbs. /each)
- (6) LGP21401 TMA's (14.4"x9.0"x2.7" – Wt. = 19 lbs. /each)
- (6) LGP 21901 Diplexers (6.3"x4.4"x3.0" – Wt. = 6 lbs. /each) (Ground)
- (2) Squid Surge Arrestors (24.0"x9.7" Φ – Wt. = 33 lbs. /each)
- **(1) NNH4-65B-R6 Antenna (72.0"x19.6"x7.8"– Wt. = 82 lbs.)**
- **(2) NNH4-65C-R6 Antennas (96.0"x19.6"x7.8"– Wt. = 102 lbs. /each)**
- **(3) RRUS-E2 B29 RRH's (20.4"x18.5"x7.5"– Wt. = 53 lbs. /each)**
- **(3) 4478 B5 RRH's (18.1"x13.4"x8.3" – Wt. = 60 lbs. /each)**
- **(3) RRUS-12 B2 RRH's (20.4"x18.5"x7.5" – Wt. = 58 lbs. /each)**
- **(3) B14 4478 RRH's (18.1"x13.4"x8.3" – Wt. = 60 lbs. /each)**
- **(3) A2 Modules (16.4"x15.2"x3.4" – Wt. = 22 lbs. /each)**
- **(2) Squid Surge Arrestors (24.0"x9.7" Φ – Wt. = 33 lbs. /each)**

**Proposed equipment shown in bold*

No original structural design documents or fabrication drawings were available for the existing mounts. HDG's subconsultant, ProVertic LLC, conducted a survey climb and mapping of the existing AT&T antenna mounts on May 15, 2019.

Mount Analysis Methods:

- This analysis was conducted in accordance with EIA/TIA-222-H, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, the International Building Code 2015 with 2018 Connecticut State Building Code, and AT&T Mount Technical Directive – R13.
- HDG considers this mount to be asymmetrical and has applied wind loads in 30 degree increments all around the mount. Per TIA-222-H and Appendix N of the Connecticut State Building Code, the max basic wind speed for this site is equal to 125 mph with a max basic wind speed with ice of 50 mph and a max ice thickness of 1.5 in. An escalated ice thickness of 1.74 in was used for this analysis.
- HDG considers this site to be exposure category B; tower is located in an urban/suburban or wooded area with numerous closely spaced obstructions.
- HDG considers this site to be topographic category 1; tower is located on flat terrain or the bottom of a hill or ridge.
- The mount has been analyzed with load combinations consisting of 250 lbs live load using a service wind speed of 30 mph wind on the worst case antenna. Analysis performed on each antenna pipe to determine worst case location; worst case location was antenna position 3.
- The mount has been analyzed with load combinations consisting of a 250 lbs live load in a worst case location on the mount.
- The existing mount is secured to the existing monopole with ring mount. The connection is considered OK by visual inspection.

Based on our evaluation, we have determined that the existing mounts **ARE NOT CAPABLE** of supporting the proposed installation. HDG recommends the following modifications:

- **Install new 2" std. (2.38" O.D.) steel pipe brace secured to existing handrails (typ. of 1 per sector, total of 3)**

	Component	Controlling Load Case	Stress Ratio	Pass/Fail
Existing (LTE 6C/7C) Mount Rating	66	LC1	111%	**FAIL**
Modified (LTE 6C/7C) Mount Rating	82	LC1	90%	**PASS**

Reference Documents:

- Mount mapping report prepared by ProVertic LLC.

This determination was based on the following limitations and assumptions:

1. HDG is not responsible for any modifications completed prior to and hereafter which HDG was not directly involved.
2. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
3. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer's requirements.
4. The existing mount has been adequately secured to the tower structure per the mount manufacturer's specifications.
5. All components pertaining to AT&T's mounts must be tightened and re-plumbed prior to the installation of new appurtenances.
6. HDG performed a localized analysis on the mount itself and not on the supporting tower structure.

Please feel free to contact our office should you have any questions.

Respectfully Submitted,
Hudson Design Group LLC

Michael Cabral
Vice President

Daniel P. Hamm, PE
Principal

FIELD PHOTOS:






p: 978.557.5553 f: 978.336.5586 a: 45 Beechwood Drive, N. Andover, MA 01845
p: 203.208.3919 f: 203.234.6398 a: 110 Washington Avenue, 4th Floor, North Haven CT 06473

HUDSON
Design Group LLC

Wind & Ice
Calculations

Date: 10/8/2019
Project Name: MANCHESTER CENTRAL
Project No.: CT5448
Designed By: RL **Checked By:** MSC

HUDSON Design Group LLC

2.6.5.2 Velocity Pressure Coeff:

$K_z = 2.01\ (z/z_g)^{2/\alpha}$

	z=	146 (ft)
	z_g=	1200 (ft)
K_z= 1.101	α=	7.0

Kzmin ≤ Kz ≤ 2.01

Table 2-4

Exposure	Z_g	α	K_{zmin}	K_c
B	1200 ft	7.0	0.70	0.9
C	900 ft	9.5	0.85	1.0
D	700 ft	11.5	1.03	1.1

2.6.6.2 Topographic Factor:

Table 2-5

Topo. Category	K_t	f
2	0.43	1.25
3	0.53	2.0
4	0.72	1.5

$K_{zt} = [1+(K_c K_t/K_h)]^2$ $K_h = e^{(f*z/H)}$

K_{zt}= #DIV/0!

(If Category 1 then K_{zt} =1.0)

Category= **1**

K_h=	#DIV/0!	
K_c=	0.9	(from Table 2-4)
K_t=	0	(from Table 2-5)
f=	0	(from Table 2-5)
z=	146	
z_s=	300	(Mean elevation of base of structure above sea level)
H=	0	(Ht. of the crest above surrounding terrain)
K_{zt}=	1.00	(from 2.6.6.2.1)
K_e=	0.99	(from 2.6.8)

2.6.10 Design Ice Thickness

Max Ice Thickness =	t_i =	**1.50** in
Importance Factor =	I=	**1.0** (from Table 2-3)
	K_{iz} =	**1.16** (from Sec. 2.6.10)

$t_{iz} = t_i * I * K_{iz} * (K_{zt})^{0.35}$ t_{iz} = **1.74** in

Date: 10/8/2019
Project Name: MANCHESTER CENTRAL
Project No.: CT5448
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

2.6.9 Gust Effect Factor

2.6.9.1 Self Supporting Lattice Structures

G_h = 1.0 Latticed Structures > 600 ft

G_h = 0.85 Latticed Structures 450 ft or less

G_h = 0.85 + 0.15 [h/150 - 3.0] h= ht. of structure

h=	184	G_h=	0.85

2.6.9.2 Guyed Masts G_h= 0.85

2.6.9.3 Pole Structures G_h= 1.1

2.6.9 Appurtenances G_h= 1.0

2.6.9.4 Structures Supported on Other Structures

(Cantilivered tubular or latticed spines, pole, structures on buildings (ht. : width ratio > 5)

G_h=	1.35	**Gh=**	**1.00**

2.6.11.2 Design Wind Force on Appurtenances

$$F = q_z * G_h * (EPA)_A$$

$$q_z = 0.00256 * K_z * K_{zt} * K_s * K_e * K_d * V_{max}^2$$

		K_z=	1.101	(from 2.6.5.2)
		K_{zt}=	1.0	(from 2.6.6.2.1)
		K_s=	1.0	(from 2.6.7)
q_z=	**41.39**	K_e=	0.99	(from 2.6.8)
$q_{z\ (ice)}$=	**6.62**	K_d=	0.95	(from Table 2-2)
$q_{z\ (30)}$=	**2.38**	V_{max}=	125	mph (Ultimate Wind Speed)
		$V_{max\ (ice)}$=	50	mph
		V_{30}=	30	mph

Table 2-2

Structure Type	Wind Direction Probability Factor, Kd
Latticed structures with triangular, square or rectangular cross sections	0.85
Tubular pole structures, latticed structures with other cross sections, appurtenances	0.95
Tubular pole structures supporting antennas enclosed within a cylindrical shroud	1.00

Date: 10/9/2019
Project Name: MANCHESTER CENTRAL
Project No.: CT5448
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

Determine Ca:

Table 2-9

Force Coefficients (Ca) for Appurtenances				
Member Type		Aspect Ratio ≤ 2.5	Aspect Ratio = 7	Aspect Ratio ≥ 25
		Ca	Ca	Ca
Flat		1.2	1.4	2.0
Square/Rectangular HSS		1.2 - 2.8(r_s) ≥ 0.85	1.4 - 4.0(r_s) ≥ 0.90	2.0 - 6.0(r_s) ≥ 1.25
Round	C < 39 (Subcritical)	0.7	0.8	1.2
	39 ≤ C ≤ 78 (Transitional)	$4.14/(C^{0.485})$	$3.66/(C^{0.415})$	$46.8/(C^{1.0})$
	C > 78 (Supercritical)	0.5	0.6	0.6

Aspect Ratio is the overall length/width ratio in the plane normal to the wind direction.
(Aspect ratio is independent of the spacing between support points of a linear appurtenance,

Note: Linear interpolation may be used for aspect ratios other than those shown.

Ice Thickness = **1.74** in **Angle = 0 (deg)** **Equivalent Angle = 180 (deg)**

Appurtenances	Height	Width	Depth	Flat Area	Aspect Ratio	Ca	Force (lbs)	Force (lbs) (w/ Ice)	Force (lbs) (30 mph)
800-10121 Antenna	54.5	10.3	5.9	3.90	5.29	1.32	214	49	12
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	4.86	1.31	400	83	23
NNH4-65B-R6 Antenna	72.0	19.6	7.8	9.80	3.67	1.25	508	100	29
OPA-65R-LCUU-H8 Antenna	92.7	14.4	7.0	9.27	6.44	1.38	528	109	30
NNH4-65C-R6 Antenna	96.0	19.6	7.8	13.07	4.90	1.31	707	138	41
RRUS-E2 B29 RRH	20.4	18.5	7.5	2.62	1.10	1.20	130	29	7
RRUS-E2 B29 RRH (Shielded)	20.4	3.7	7.5	0.52	5.51	1.33	29	11	2
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	2.25	1.20	114	26	7
RRUS-32 B30 RRH (Shielded)	27.2	0.0	7.0	0.00	0.00	1.20	0	6	0
4478 B5 RRH (Side)	18.1	8.3	13.4	1.04	2.18	1.20	52	14	3
4478 B5 RRH (Shielded)	18.1	4.2	13.4	0.52	4.36	1.28	28	10	2
RRUS-12 B2 RRH (Side)	20.4	7.5	18.5	1.06	2.72	1.21	53	15	3
RRUS-12 B2 RRH (Shielded)	20.4	3.8	18.5	0.53	5.44	1.33	29	11	2
B14 4478 RRH	18.1	13.4	8.3	1.68	1.35	1.20	84	20	5
RRUS-32 B66 RRH	27.2	12.1	7.0	2.29	2.25	1.20	114	26	7
RRUS-11 B12 RRH	19.7	17.0	7.2	2.33	1.16	1.20	116	26	7
RRUS-11 B12 RRH (Shielded)	19.7	0.0	7.2	0.00	0.00	1.20	0	4	0
A2 Modules	16.4	15.2	3.4	1.73	1.08	1.20	86	20	5
LGP 21901 Diplexer	6.3	4.4	3.0	0.19	1.43	1.20	10	4	1
LGP21401 TMA	14.4	2.7	9.0	0.27	5.33	1.33	15	7	1
Surge Arrestor	24.0	9.7	9.7	1.62	2.47	0.70	47	12	3
PL 6x3/8	6.0	3.5		0.15	1.71	1.20	7	4	0
C 3-3/8x3/16	3.4	12.0		0.28	0.28	2.00	23	10	1
L 3x3 Angles	3.0	12.0		0.25	0.25	2.00	21	9	1
L 2x2 Angles	2.0	12.0		0.17	0.17	2.00	14	8	1
3-1/2" Pipe	4.0	12.0		0.33	0.33	1.20	17	6	1
2" Pipe	2.4	12.0		0.20	0.20	1.20	10	5	1

Date: 10/9/2019
Project Name: MANCHESTER CENTRAL
Project No: CTS448
Designed By: EI Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle = 30 (deg) | Ice Thickness = 1.74 in. | Equivalent Angle = 210 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Aspect Ratio	Aspect Ratio	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	214	136	194
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	400	228	357
NNH4-65B-R6 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	508	238	440
OPA-65R-LCUU-H8 Antenna	92.7	14.4	7.0	9.27	4.51	6.44	13.24	1.38	1.61	528	300	471
NNH4-65C-R6 Antenna	96.0	19.6	7.8	13.07	5.20	4.90	12.31	1.31	1.58	707	339	615
RRUS-E2 B29 RRH	20.4	18.5	7.5	2.62	1.06	1.10	2.72	1.20	1.21	130	53	111
RRUS-E2 B29 RRH (Shielded)	20.4	9.3	7.5	1.31	1.06	2.21	2.72	1.20	1.21	65	53	62
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	114	69	102
RRUS-32 B30 RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	4.50	3.89	1.29	1.26	61	69	63
4478 B5 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	52	84	60
4478 B5 RRH (Shielded)	18.1	4.2	13.4	0.52	1.68	4.36	1.35	1.28	1.20	28	84	42
RRUS-12 B2 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	53	130	72
RRUS-12 B2 RRH (Shielded)	20.4	3.8	18.5	0.53	2.62	5.44	1.10	1.33	1.20	29	130	54
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	84	52	76
RRUS-32 B66 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	114	69	102
RRUS-11 B12 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	116	49	99
RRUS-11 B12 RRH (Shielded)	19.7	8.5	7.2	1.16	0.99	2.32	2.74	1.20	1.21	58	49	56
A2 Modules	16.4	15.2	3.4	1.73	0.39	1.08	4.82	1.20	1.30	86	21	70
LGP 21901 Diplexer	6.3	4.4	3.0	0.19	0.13	1.43	2.10	1.20	1.20	10	7	9
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	15	45	22

WIND LOADS WITH ICE:

800-10121 Antenna	58.0	13.8	9.4	5.55	3.78	4.21	6.18	1.28	1.36	47	34	44
OPA-65R-LCUU-H6 Antenna	75.5	18.3	10.9	9.58	5.70	4.13	6.94	1.27	1.40	81	53	74
NNH4-65B-R6 Antenna	75.5	23.1	11.3	12.10	5.91	3.27	6.69	1.23	1.39	99	54	88
OPA-65R-LCUU-H8 Antenna	96.2	17.9	10.5	11.94	7.00	5.38	9.18	1.33	1.47	105	68	96
NNH4-65C-R6 Antenna	99.5	23.1	11.3	15.95	7.79	4.31	8.82	1.28	1.46	135	75	120
RRUS-E2 B29 RRH	23.9	22.0	11.0	3.65	1.82	1.09	2.17	1.20	1.20	29	14	25
RRUS-E2 B29 RRH (Shielded)	23.9	11.0	11.0	1.82	1.82	2.17	2.17	1.20	1.20	14	14	14
RRUS-32 B30 RRH	30.7	15.6	10.5	3.32	2.23	1.97	2.93	1.20	1.22	26	18	24
RRUS-32 B30 RRH (Shielded)	30.7	7.8	10.5	1.66	2.23	3.94	2.93	1.26	1.22	14	18	15
4478 B5 RRH (Side)	21.6	11.8	16.9	1.77	2.53	1.83	1.28	1.20	1.20	14	20	16
4478 B5 RRH (Shielded)	21.6	5.9	16.9	0.88	2.53	3.66	1.28	1.25	1.20	7	20	11
RRUS-12 B2 RRH (Side)	23.9	11.0	22.0	1.82	3.65	2.17	1.09	1.20	1.20	14	29	18
RRUS-12 B2 RRH (Shielded)	23.9	5.5	22.0	0.91	3.65	4.35	1.09	1.28	1.20	8	29	13
B14 4478 RRH	21.6	16.9	11.8	2.53	1.77	1.28	1.83	1.20	1.20	20	14	19
RRUS-32 B66 RRH	30.7	15.6	10.5	3.32	2.23	1.97	2.93	1.20	1.22	26	18	24
RRUS-11 B12 RRH	23.2	20.5	10.7	3.30	1.72	1.13	2.17	1.20	1.20	26	14	23
RRUS-11 B12 RRH (Shielded)	23.2	10.2	10.7	1.65	1.72	2.26	2.17	1.20	1.20	13	14	13
A2 Modules	19.9	18.7	6.9	2.58	0.95	1.06	2.89	1.20	1.22	20	6	17
LGP 21901 Diplexer	9.8	7.9	6.5	0.54	0.44	1.24	1.51	1.20	1.20	4	3	4
LGP21401 TMA	17.9	6.2	12.5	0.77	1.55	2.89	1.43	1.22	1.20	6	12	8

WIND LOADS AT 30 MPH:

800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	12	8	11
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	23	13	21
NNH4-65B-R6 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	29	14	25
OPA-65R-LCUU-H8 Antenna	92.7	14.4	7.0	9.27	4.51	6.44	13.24	1.38	1.61	30	17	27
NNH4-65C-R6 Antenna	96.0	19.6	7.8	13.07	5.20	4.90	12.31	1.31	1.58	41	20	35
RRUS-E2 B29 RRH	20.4	18.5	7.5	2.62	1.06	1.10	2.72	1.20	1.21	7	3	6
RRUS-E2 B29 RRH (Shielded)	20.4	9.3	7.5	1.31	1.06	2.21	2.72	1.20	1.21	4	3	4
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	6
RRUS-32 B30 RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	4.50	3.89	1.29	1.26	4	4	4
4478 B5 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	3
4478 B5 RRH (Shielded)	18.1	4.2	13.4	0.52	1.68	4.36	1.35	1.28	1.20	2	5	2
RRUS-12 B2 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	3	7	4
RRUS-12 B2 RRH (Shielded)	20.4	3.8	18.5	0.53	2.62	5.44	1.10	1.33	1.20	2	7	3
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	5	3	4
RRUS-32 B66 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	6
RRUS-11 B12 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	7	3	6
RRUS-11 B12 RRH (Shielded)	19.7	8.5	7.2	1.16	0.99	2.32	2.74	1.20	1.21	3	3	3
A2 Modules	16.4	15.2	3.4	1.73	0.39	1.08	4.82	1.20	1.30	5	1	4
LGP 21901 Diplexer	6.3	4.4	3.0	0.19	0.13	1.43	2.10	1.20	1.20	1	0	1
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	1

Date: 10/9/2019
Project Name: MANCHESTER CENTRAL
Project No.: C15448
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle = 60 (deg) | Ice Thickness = 1.74 in. | Equivalent Angle = 240 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	214	136	156
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	400	228	271
NNH4-65B-R6 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	508	238	305
OPA-65R-LCUU-H8 Antenna	92.7	14.4	7.0	9.27	4.51	6.44	13.24	1.38	1.61	528	300	357
NNH4-65C-R6 Antenna	96.0	19.6	7.8	13.07	5.20	4.90	12.31	1.31	1.58	707	339	431
RRUS-E2 B29 RRH	20.4	18.5	7.5	2.62	1.06	1.10	2.72	1.20	1.21	130	53	72
RRUS-E2 B29 RRH (Shielded)	20.4	13.9	7.5	1.97	1.06	1.47	2.72	1.20	1.21	98	53	64
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	114	69	88
RRUS-32 B30 RRH (Shielded)	27.2	9.1	7.0	1.71	1.32	3.00	3.89	1.22	1.26	87	69	73
4478 B5 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	52	84	76
4478 B5 RRH (Shielded)	18.1	6.2	13.4	0.78	1.68	2.91	1.35	1.22	1.20	39	84	73
RRUS-12 B2 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	53	130	111
RRUS-12 B2 RRH (Shielded)	20.4	5.6	18.5	0.80	2.62	3.63	1.10	1.25	1.20	41	130	108
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	84	52	60
RRUS-32 B66 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	114	69	88
RRUS-11 B12 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	116	49	66
RRUS-11 B12 RRH (Shielded)	19.7	12.8	7.2	1.74	0.99	1.55	2.74	1.20	1.21	87	49	59
A2 Modules	16.4	15.2	3.4	1.73	0.39	1.08	4.82	1.20	1.30	86	21	37
LGP 21901 Diplexer	6.3	4.4	3.0	0.19	0.13	1.43	2.10	1.20	1.20	10	7	7
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	13	45	37

WIND LOADS WITH ICE:

800-10121 Antenna	58.0	13.8	9.4	5.55	3.78	4.21	6.18	1.28	1.36	47	94	87
OPA-65R-LCUU-H6 Antenna	75.5	18.3	10.9	9.58	5.70	4.13	6.94	1.27	1.40	81	53	60
NNH4-65B-R6 Antenna	75.5	23.1	11.3	12.10	5.91	3.27	6.69	1.23	1.39	99	54	65
OPA-65R-LCUU-H8 Antenna	96.2	17.9	10.5	11.94	7.00	5.38	9.18	1.33	1.47	105	68	77
NNH4-65C-R6 Antenna	99.5	23.1	11.3	15.95	7.79	4.31	8.82	1.28	1.46	135	75	90
RRUS-E2 B29 RRH	23.9	22.0	11.0	3.65	1.82	1.09	2.17	1.20	1.20	28	14	18
RRUS-E2 B29 RRH (Shielded)	23.9	16.5	11.0	2.73	1.82	1.45	2.17	1.20	1.20	22	14	16
RRUS-32 B30 RRH	30.7	15.6	10.5	3.32	2.23	1.97	2.93	1.20	1.22	26	18	20
RRUS-32 B30 RRH (Shielded)	30.7	11.7	10.5	2.49	2.23	2.63	2.93	1.21	1.22	20	18	18
4478 B5 RRH (Side)	21.6	11.8	16.9	1.77	2.53	1.83	1.28	1.20	1.20	14	20	19
4478 B5 RRH (Shielded)	21.6	8.8	16.9	1.32	2.53	2.44	1.28	1.20	1.20	11	20	18
RRUS-12 B2 RRH (Side)	23.9	11.0	22.0	1.82	3.65	2.17	1.09	1.20	1.20	14	28	25
RRUS-12 B2 RRH (Shielded)	23.9	8.2	22.0	1.37	3.65	2.90	1.09	1.22	1.20	11	29	24
B14 4478 RRH	21.6	16.9	11.8	2.53	1.77	1.28	1.83	1.20	1.20	20	14	16
RRUS-32 B66 RRH	30.7	15.6	10.5	3.32	2.23	1.97	2.93	1.20	1.22	26	18	20
RRUS-11 B12 RRH	23.2	20.5	10.7	3.30	1.72	1.13	2.17	1.20	1.20	26	14	17
RRUS-11 B12 RRH (Shielded)	23.2	15.4	10.7	2.47	1.72	1.51	2.17	1.20	1.20	20	14	15
A2 Modules	19.9	18.7	6.9	2.58	0.95	1.06	2.89	1.20	1.22	20	8	11
LGP 21901 Diplexer	9.8	7.9	6.5	0.54	0.44	1.24	1.51	1.20	1.20	4	3	4
LGP21401 TMA	17.9	6.2	12.5	0.77	1.55	2.89	1.43	1.22	1.20	8	12	11

WIND LOADS AT 30 MPH:

800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	12	8	9
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	23	13	16
NNH4-65B-R6 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	29	14	18
OPA-65R-LCUU-H8 Antenna	92.7	14.4	7.0	9.27	4.51	6.44	13.24	1.38	1.61	30	17	21
NNH4-65C-R6 Antenna	96.0	19.6	7.8	13.07	5.20	4.90	12.31	1.31	1.58	41	20	25
RRUS-E2 B29 RRH	20.4	18.5	7.5	2.62	1.06	1.10	2.72	1.20	1.21	7	3	4
RRUS-E2 B29 RRH (Shielded)	20.4	13.9	7.5	1.97	1.06	1.47	2.72	1.20	1.21	6	3	4
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	5
RRUS-32 B30 RRH (Shielded)	27.2	9.1	7.0	1.71	1.32	3.00	3.89	1.22	1.26	5	4	4
4478 B5 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	4
4478 B5 RRH (Shielded)	18.1	6.2	13.4	0.78	1.68	2.91	1.35	1.22	1.20	2	5	4
RRUS-12 B2 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	3	7	6
RRUS-12 B2 RRH (Shielded)	20.4	5.6	18.5	0.80	2.62	3.63	1.10	1.25	1.20	2	7	6
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	5	3	3
RRUS-32 B66 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	5
RRUS-11 B12 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	7	3	4
RRUS-11 B12 RRH (Shielded)	19.7	12.8	7.2	1.74	0.99	1.55	2.74	1.20	1.21	5	3	3
A2 Modules	16.4	15.2	3.4	1.73	0.39	1.08	4.82	1.20	1.30	5	2	2
LGP 21901 Diplexer	6.3	4.4	3.0	0.19	0.13	1.43	2.10	1.20	1.20	1	0	0
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	2

Date: 10/9/2019
Project Name: MANCHESTER CENTRAL
Project No.: CT5448
Designed By: RI Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle = 90 (deg) | Ice Thickness = 1.74 in. | Equivalent Angle = 270 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	214	136	136
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	400	228	228
NNH4-65B-R6 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	508	238	238
OPA-65R-LCUU-H8 Antenna	92.7	14.4	7.0	9.27	4.51	6.44	13.24	1.38	1.61	528	300	300
NNH4-65C-R6 Antenna	96.0	19.6	7.8	13.07	5.20	4.90	12.31	1.31	1.58	707	339	339
RRUS-E2 B29 RRH	20.4	18.5	7.5	2.62	1.06	1.10	2.72	1.20	1.21	130	53	53
RRUS-E2 B29 RRH (Shielded)	20.4	3.7	7.5	0.52	1.06	5.51	2.72	1.33	1.21	29	53	53
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	114	69	69
RRUS-32 B30 RRH (Shielded)	27.2	0.0	7.0	0.00	1.32	0.00	3.89	1.20	1.26	0	69	69
4478 B5 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	52	84	84
4478 B5 RRH (Shielded)	18.1	4.2	13.4	0.52	1.68	4.36	1.35	1.28	1.20	28	84	84
RRUS-12 B2 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	53	130	130
RRUS-12 B2 RRH (Shielded)	20.4	3.8	18.5	0.53	2.62	5.44	1.10	1.33	1.20	29	130	130
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	84	52	52
RRUS-32 B66 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	114	69	69
RRUS-11 B12 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	116	49	49
RRUS-11 B12 RRH (Shielded)	19.7	0.0	7.2	0.00	0.99	0.00	2.74	1.20	1.21	0	49	49
A2 Modules	16.4	15.2	3.4	1.73	0.39	1.08	4.82	1.20	1.30	86	21	21
LGP 21901 Diplexer	6.3	4.4	3.0	0.19	0.13	1.43	2.10	1.20	1.20	10	7	7
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	15	45	45

WIND LOADS WITH ICE:

800-10121 Antenna	58.0	13.8	9.4	5.55	3.78	4.21	6.18	1.28	1.36	47	34	34
OPA-65R-LCUU-H6 Antenna	75.5	18.3	10.9	9.58	5.70	4.13	6.94	1.27	1.40	81	53	53
NNH4-65B-R6 Antenna	75.5	23.1	11.3	12.10	5.91	3.27	6.69	1.23	1.39	99	54	54
OPA-65R-LCUU-H8 Antenna	96.2	17.9	10.5	11.94	7.00	5.38	9.18	1.33	1.47	105	68	68
NNH4-65C-R6 Antenna	99.5	23.1	11.3	15.95	7.79	4.31	8.82	1.28	1.46	135	75	75
RRUS-E2 B29 RRH	23.9	22.0	11.0	3.65	1.82	1.09	2.17	1.20	1.20	29	14	14
RRUS-E2 B29 RRH (Shielded)	23.9	7.2	11.0	1.19	1.82	3.33	2.17	1.24	1.20	10	14	14
RRUS-32 B30 RRH	30.7	15.6	10.5	3.32	2.23	1.97	2.93	1.20	1.22	26	18	18
RRUS-32 B30 RRH (Shielded)	30.7	3.5	10.5	0.74	2.23	8.81	2.93	1.46	1.22	7	18	18
4478 B5 RRH (Side)	21.6	11.8	16.9	1.77	2.53	1.83	1.28	1.20	1.20	14	20	20
4478 B5 RRH (Shielded)	21.6	7.6	16.9	1.14	2.53	2.83	1.28	1.21	1.20	9	20	20
RRUS-12 B2 RRH (Side)	23.9	11.0	22.0	1.82	3.65	2.17	1.09	1.20	1.20	14	29	29
RRUS-12 B2 RRH (Shielded)	23.9	7.2	22.0	1.20	3.65	3.30	1.09	1.24	1.20	10	29	29
B14 4478 RRH	21.6	16.9	11.8	2.53	1.77	1.28	1.83	1.20	1.20	20	14	14
RRUS-32 B66 RRH	30.7	15.6	10.5	3.32	2.23	1.97	2.93	1.20	1.22	26	18	18
RRUS-11 B12 RRH	23.2	20.5	10.7	3.30	1.72	1.13	2.17	1.20	1.20	26	14	14
RRUS-11 B12 RRH (Shielded)	23.2	3.5	10.7	0.56	1.72	6.66	2.17	1.38	1.20	5	14	14
A2 Modules	19.9	18.7	6.9	2.58	0.95	1.06	2.89	1.20	1.22	20	8	8
LGP 21901 Diplexer	9.8	7.9	6.5	0.54	0.44	1.24	1.51	1.20	1.20	4	3	3
LGP21401 TMA	17.9	6.2	12.5	0.77	1.55	2.89	1.43	1.22	1.20	6	12	12

WIND LOADS AT 30 MPH:

800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	12	8	8
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	23	13	13
NNH4-65B-R6 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	28	14	14
OPA-65R-LCUU-H8 Antenna	92.7	14.4	7.0	9.27	4.51	6.44	13.24	1.38	1.61	30	17	17
NNH4-65C-R6 Antenna	96.0	19.6	7.8	13.07	5.20	4.90	12.31	1.31	1.58	41	20	20
RRUS-E2 B29 RRH	20.4	18.5	7.5	2.62	1.06	1.10	2.72	1.20	1.21	7	3	3
RRUS-E2 B29 RRH (Shielded)	20.4	3.7	7.5	0.52	1.06	5.51	2.72	1.33	1.21	2	3	3
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	4
RRUS-32 B30 RRH (Shielded)	27.2	0.0	7.0	0.00	1.32	0.00	3.89	1.20	1.26	0	4	4
4478 B5 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	5
4478 B5 RRH (Shielded)	18.1	4.2	13.4	0.52	1.68	4.36	1.35	1.28	1.20	2	5	5
RRUS-12 B2 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	3	7	7
RRUS-12 B2 RRH (Shielded)	20.4	3.8	18.5	0.53	2.62	5.44	1.10	1.33	1.20	2	7	7
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	4	3	3
RRUS-32 B66 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	4
RRUS-11 B12 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	7	3	3
RRUS-11 B12 RRH (Shielded)	19.7	0.0	7.2	0.00	0.99	0.00	2.74	1.20	1.21	0	3	3
A2 Modules	16.4	15.2	3.4	1.73	0.39	1.08	4.82	1.20	1.30	5	1	1
LGP 21901 Diplexer	6.3	4.4	3.0	0.19	0.13	1.43	2.10	1.20	1.20	1	0	0
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	3

Date: 10/9/2019
Project Name: MANCHESTER CENTRAL
Project No.: CT5448
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle = 120 (deg) | Ice Thickness = 1.74 in. | Equivalent Angle = 300 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	214	136	156
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	400	228	271
NNH4-65B-R6 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	508	238	305
OPA-65R-LCUU-H8 Antenna	92.7	14.4	7.0	9.27	4.51	6.44	13.24	1.38	1.61	528	300	357
NNH4-65C-R6 Antenna	96.0	19.6	7.8	13.07	5.20	4.90	12.31	1.31	1.58	707	339	431
RRUS-E2 B29 RRH	20.4	18.5	7.5	2.62	1.06	1.10	2.72	1.20	1.21	130	53	72
RRUS-E2 B29 RRH (Shielded)	20.4	13.9	7.5	1.97	1.06	1.47	2.72	1.20	1.21	98	53	64
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	114	69	80
RRUS-32 B30 RRH (Shielded)	27.2	9.1	7.0	1.71	1.32	3.00	3.89	1.22	1.26	87	69	78
4478 B5 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	52	84	76
4478 B5 RRH (Shielded)	18.1	6.2	13.4	0.78	1.68	2.91	1.35	1.22	1.20	39	84	73
RRUS-12 B2 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	53	130	111
RRUS-12 B2 RRH (Shielded)	20.4	5.6	18.5	0.80	2.62	3.63	1.10	1.25	1.20	41	130	108
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	84	52	60
RRUS-32 B66 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	114	69	80
RRUS-11 B12 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	116	49	68
RRUS-11 B12 RRH (Shielded)	19.7	12.8	7.2	1.74	0.99	1.55	2.74	1.20	1.21	87	49	59
A2 Modules	16.4	15.2	3.4	1.73	0.39	1.08	4.82	1.20	1.30	86	21	37
LGP 21901 Diplexer	6.3	4.4	3.0	0.19	0.13	1.43	2.10	1.20	1.20	10	7	7
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	15	45	37

WIND LOADS WITH ICE:

800-10121 Antenna	58.0	13.8	9.4	5.55	3.78	4.21	6.18	1.28	1.36	47	34	37
OPA-65R-LCUU-H6 Antenna	75.5	18.3	10.9	9.58	5.70	4.13	6.94	1.27	1.40	81	53	60
NNH4-65B-R6 Antenna	75.5	23.1	11.3	12.10	5.91	3.27	6.69	1.23	1.39	99	54	65
OPA-65R-LCUU-H8 Antenna	96.2	17.9	10.5	11.94	7.00	5.38	9.18	1.33	1.47	105	68	77
NNH4-65C-R6 Antenna	99.5	23.1	11.3	15.95	7.79	4.31	8.82	1.28	1.46	135	75	90
RRUS-E2 B29 RRH	23.9	22.0	11.0	3.65	1.82	1.09	2.17	1.20	1.20	29	14	18
RRUS-E2 B29 RRH (Shielded)	23.9	16.5	11.0	2.73	1.82	1.45	2.17	1.20	1.20	22	14	16
RRUS-32 B30 RRH	30.7	15.6	10.5	3.32	2.23	1.97	2.93	1.20	1.22	26	18	20
RRUS-32 B30 RRH (Shielded)	30.7	11.7	10.5	2.49	2.23	2.63	2.93	1.21	1.22	20	18	18
4478 B5 RRH (Side)	21.6	11.8	16.9	1.77	2.53	1.83	1.28	1.20	1.20	14	20	19
4478 B5 RRH (Shielded)	21.6	8.8	16.9	1.32	2.53	2.44	1.28	1.20	1.20	11	20	18
RRUS-12 B2 RRH (Side)	23.9	11.0	22.0	1.82	3.65	2.17	1.09	1.20	1.20	14	29	25
RRUS-12 B2 RRH (Shielded)	23.9	8.2	22.0	1.37	3.65	2.90	1.09	1.22	1.20	11	29	24
B14 4478 RRH	21.6	16.9	11.8	2.53	1.77	1.28	1.83	1.20	1.20	20	14	16
RRUS-32 B66 RRH	30.7	15.6	10.5	3.32	2.23	1.97	2.93	1.20	1.22	26	18	20
RRUS-11 B12 RRH	23.2	20.5	10.7	3.30	1.72	1.13	2.17	1.20	1.20	26	14	17
RRUS-11 B12 RRH (Shielded)	23.2	15.4	10.7	2.47	1.72	1.51	2.17	1.20	1.20	20	14	15
A2 Modules	19.9	18.7	6.9	2.58	0.95	1.06	2.89	1.20	1.22	20	8	11
LGP 21901 Diplexer	9.8	7.9	6.5	0.54	0.44	1.24	1.51	1.20	1.20	4	3	4
LGP21401 TMA	17.9	6.2	12.5	0.77	1.55	2.89	1.43	1.22	1.20	6	12	11

WIND LOADS AT 30 MPH:

800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	12	8	9
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	23	13	16
NNH4-65B-R6 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	29	14	18
OPA-65R-LCUU-H8 Antenna	92.7	14.4	7.0	9.27	4.51	6.44	13.24	1.38	1.61	30	17	21
NNH4-65C-R6 Antenna	96.0	19.6	7.8	13.07	5.20	4.90	12.31	1.31	1.58	41	20	25
RRUS-E2 B29 RRH	20.4	18.5	7.5	2.62	1.06	1.10	2.72	1.20	1.21	7	3	4
RRUS-E2 B29 RRH (Shielded)	20.4	13.9	7.5	1.97	1.06	1.47	2.72	1.20	1.21	6	3	4
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	5
RRUS-32 B30 RRH (Shielded)	27.2	9.1	7.0	1.71	1.32	3.00	3.89	1.22	1.26	5	4	4
4478 B5 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	4
4478 B5 RRH (Shielded)	18.1	6.2	13.4	0.78	1.68	2.91	1.35	1.22	1.20	2	5	4
RRUS-12 B2 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	3	7	6
RRUS-12 B2 RRH (Shielded)	20.4	5.6	18.5	0.80	2.62	3.63	1.10	1.25	1.20	2	7	6
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	5	3	3
RRUS-32 B66 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	5
RRUS-11 B12 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	7	3	4
RRUS-11 B12 RRH (Shielded)	19.7	12.8	7.2	1.74	0.99	1.55	2.74	1.20	1.21	5	3	3
A2 Modules	16.4	15.2	3.4	1.73	0.39	1.08	4.82	1.20	1.30	5	1	2
LGP 21901 Diplexer	6.3	4.4	3.0	0.19	0.13	1.43	2.10	1.20	1.20	1	0	0
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	2

Date: 10/9/2019
Project Name: MANCHESTER CENTRAL
Project No.: CT5448
Designed By: RI Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	150	(deg)	Ice Thickness =	1.74	in.	Equivalent Angle =	330	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	214	136	194
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	400	228	357
NNH4-65B-R6 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	508	238	440
OPA-65R-LCUU-H8 Antenna	92.7	14.4	7.0	9.27	4.51	6.44	13.24	1.38	1.61	528	300	471
NNH4-65C-R6 Antenna	96.0	19.6	7.8	13.07	5.20	4.90	12.31	1.31	1.58	707	339	615
RRUS-E2 B29 RRH	20.4	18.5	7.5	2.62	1.06	1.10	2.72	1.20	1.21	130	53	111
RRUS-E2 B29 RRH (Shielded)	20.4	9.3	7.5	1.31	1.06	2.21	2.72	1.20	1.21	65	53	62
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	114	69	102
RRUS-32 B30 RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	4.50	3.89	1.29	1.26	61	69	63
4478 B5 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	52	84	60
4478 B5 RRH (Shielded)	18.1	4.2	13.4	0.52	1.68	4.36	1.35	1.28	1.20	28	84	42
RRUS-12 B2 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	53	130	72
RRUS-12 B2 RRH (Shielded)	20.4	3.8	18.5	0.53	2.62	5.44	1.10	1.33	1.20	29	130	54
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	84	52	76
RRUS-32 B66 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	114	69	102
RRUS-11 B12 RRH	19.7	17.0	7.2	2.83	0.99	1.16	2.74	1.20	1.21	116	49	99
RRUS-11 B12 RRH (Shielded)	19.7	8.5	7.2	1.16	0.99	2.32	2.74	1.20	1.21	58	49	56
A2 Modules	16.4	15.2	3.4	1.73	0.39	1.08	4.82	1.20	1.30	85	21	70
LGP 21901 Diplexer	6.3	4.4	3.0	0.19	0.13	1.43	2.10	1.20	1.20	10	7	9
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	15	45	22

WIND LOADS WITH ICE:

800-10121 Antenna	58.0	13.8	9.4	5.55	3.78	4.21	6.18	1.28	1.36	47	34	44
OPA-65R-LCUU-H6 Antenna	75.5	18.3	10.9	9.58	5.70	4.13	6.94	1.27	1.40	81	53	74
NNH4-65B-R6 Antenna	75.5	23.1	11.3	12.10	5.91	3.27	6.69	1.23	1.39	99	54	88
OPA-65R-LCUU-H8 Antenna	96.2	17.9	10.5	11.94	7.00	5.38	9.18	1.33	1.47	105	68	96
NNH4-65C-R6 Antenna	99.5	23.1	11.3	15.95	7.79	4.31	8.82	1.28	1.46	135	75	120
RRUS-E2 B29 RRH	23.9	22.0	11.0	3.65	1.82	1.09	2.17	1.20	1.20	29	14	25
RRUS-E2 B29 RRH (Shielded)	23.9	11.0	11.0	1.82	1.82	2.17	2.17	1.20	1.20	14	14	14
RRUS-32 B30 RRH	30.7	15.6	10.5	3.32	2.23	1.97	2.93	1.20	1.22	26	18	24
RRUS-32 B30 RRH (Shielded)	30.7	7.8	10.5	1.66	2.23	3.94	2.93	1.26	1.22	14	18	15
4478 B5 RRH (Side)	21.6	11.8	16.9	1.77	2.53	1.83	1.28	1.20	1.20	14	20	16
4478 B5 RRH (Shielded)	21.6	5.9	16.9	0.88	2.53	3.66	1.28	1.25	1.20	7	20	11
RRUS-12 B2 RRH (Side)	23.9	11.0	22.0	1.82	3.65	2.17	1.09	1.20	1.20	14	29	18
RRUS-12 B2 RRH (Shielded)	23.9	5.5	22.0	0.91	3.65	4.35	1.09	1.28	1.20	8	29	19
B14 4478 RRH	21.6	16.9	11.8	2.53	1.77	1.28	1.83	1.20	1.20	20	14	19
RRUS-32 B66 RRH	30.7	15.6	10.5	3.32	2.23	1.97	2.93	1.20	1.22	26	18	24
RRUS-11 B12 RRH	23.2	20.5	10.7	3.30	1.71	1.13	2.17	1.20	1.20	26	14	23
RRUS-11 B12 RRH (Shielded)	23.2	10.2	10.7	1.65	1.72	2.26	2.17	1.20	1.20	13	14	13
A2 Modules	19.9	18.7	6.9	2.58	0.95	1.06	2.89	1.20	1.22	20	8	17
LGP 21901 Diplexer	9.8	7.9	6.5	0.54	0.44	1.24	1.51	1.20	1.20	4	3	4
LGP21401 TMA	17.9	6.2	12.5	0.77	1.55	2.89	1.43	1.22	1.20	8	12	8

WIND LOADS AT 30 MPH:

800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	12	8	11
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	23	13	21
NNH4-65B-R6 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	29	14	25
OPA-65R-LCUU-H8 Antenna	92.7	14.4	7.0	9.27	4.51	6.44	13.24	1.38	1.61	30	17	27
NNH4-65C-R6 Antenna	96.0	19.6	7.8	13.07	5.20	4.90	12.31	1.31	1.58	41	20	35
RRUS-E2 B29 RRH	20.4	18.5	7.5	2.62	1.06	1.10	2.72	1.20	1.21	7	3	6
RRUS-E2 B29 RRH (Shielded)	20.4	9.3	7.5	1.31	1.06	2.21	2.72	1.20	1.21	4	3	4
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	6
RRUS-32 B30 RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	4.50	3.89	1.29	1.26	4	4	4
4478 B5 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	3
4478 B5 RRH (Shielded)	18.1	4.2	13.4	0.52	1.68	4.36	1.35	1.28	1.20	2	5	2
RRUS-12 B2 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	3	7	4
RRUS-12 B2 RRH (Shielded)	20.4	3.8	18.5	0.53	2.62	5.44	1.10	1.33	1.20	2	7	3
B14 4478 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	5	3	4
RRUS-32 B66 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	6
RRUS-11 B12 RRH	19.7	17.0	7.2	2.83	0.99	1.16	2.74	1.20	1.21	7	2	6
RRUS-11 B12 RRH (Shielded)	19.7	8.5	7.2	1.16	0.99	2.32	2.74	1.20	1.21	3	2	3
A2 Modules	16.4	15.2	3.4	1.73	0.39	1.08	4.82	1.20	1.30	5	1	4
LGP 21901 Diplexer	6.3	4.4	3.0	0.19	0.13	1.43	2.10	1.20	1.20	1	0	1
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	1

Date: 10/9/2019
Project Name: MANCHESTER CENTRAL
Project No.: CT5448
Designed By: RL **Checked By:** MSC

HUDSON Design Group LLC

ICE WEIGHT CALCULATIONS

Thickness of ice: 1.74 in.
Density of ice: 56 pcf

800-10121 Antenna
Weight of ice based on total radial SF area:

Height (in):	54.5	
Width (in):	10.3	
Depth (in):	5.9	
Total weight of ice on object:		131 lbs
Weight of object:	47.0 lbs	
Combined weight of ice and object:		178 lbs

OPA-65R-LCUU-H6 Antenna
Weight of ice based on total radial SF area:

Height (in):	72.0	
Width (in):	14.8	
Depth (in):	7.4	
Total weight of ice on object:		233 lbs
Weight of object:	73.0 lbs	
Combined weight of ice and object:		306 lbs

NNH4-65B-R6 Antenna
Weight of ice based on total radial SF area:

Height (in):	72.0	
Width (in):	19.6	
Depth (in):	7.8	
Total weight of ice on object:		291 lbs
Weight of object:	82.0 lbs	
Combined weight of ice and object:		373 lbs

OPA-65R-LCUU-H8 Antenna
Weight of ice based on total radial SF area:

Height (in):	92.7	
Width (in):	14.4	
Depth (in):	7.0	
Total weight of ice on object:		292 lbs
Weight of object:	88.0 lbs	
Combined weight of ice and object:		380 lbs

NNH4-65C-R6 Antenna
Weight of ice based on total radial SF area:

Height (in):	96.0	
Width (in):	19.6	
Depth (in):	7.8	
Total weight of ice on object:		388 lbs
Weight of object:	102.0 lbs	
Combined weight of ice and object:		490 lbs

RRUS-E2 B29 RRH
Weight of ice based on total radial SF area:

Height (in):	20.4	
Width (in):	18.5	
Depth (in):	7.5	
Total weight of ice on object:		78 lbs
Weight of object:	53.0 lbs	
Combined weight of ice and object:		131 lbs

RRUS-32 B30 RRH
Weight of ice based on total radial SF area:

Height (in):	27.2	
Width (in):	12.1	
Depth (in):	7.0	
Total weight of ice on object:		76 lbs
Weight of object:	60.0 lbs	
Combined weight of ice and object:		136 lbs

4478 B5 RRH
Weight of ice based on total radial SF area:

Height (in):	18.1	
Width (in):	13.4	
Depth (in):	8.3	
Total weight of ice on object:		56 lbs
Weight of object:	60.0 lbs	
Combined weight of ice and object:		116 lbs

RRUS-12 B2 RRH
Weight of ice based on total radial SF area:

Height (in):	20.4	
Width (in):	18.5	
Depth (in):	7.5	
Total weight of ice on object:		78 lbs
Weight of object:	53.0 lbs	
Combined weight of ice and object:		131 lbs

B14 4478 RRH
Weight of ice based on total radial SF area:

Height (in):	18.1	
Width (in):	13.4	
Depth (in):	8.3	
Total weight of ice on object:		56 lbs
Weight of object:	60.0 lbs	
Combined weight of ice and object:		116 lbs

RRUS-32 B66 RRH
Weight of ice based on total radial SF area:

Height (in):	27.2	
Width (in):	12.1	
Depth (in):	7.0	
Total weight of ice on object:		76 lbs
Weight of object:	60.0 lbs	
Combined weight of ice and object:		136 lbs

RRUS-11 B12 RRH
Weight of ice based on total radial SF area:

Height (in):	19.7	
Width (in):	17.0	
Depth (in):	7.2	
Total weight of ice on object:		71 lbs
Weight of object:	51.0 lbs	
Combined weight of ice and object:		122 lbs

A2 Modules
Weight of ice based on total radial SF area:

Height (in):	16.4	
Width (in):	15.2	
Depth (in):	3.4	
Total weight of ice on object:		50 lbs
Weight of object:	22.0 lbs	
Combined weight of ice and object:		72 lbs

LGP21401 TMA
Weight of ice based on total radial SF area:

Height (in):	14.4	
Width (in):	2.7	
Depth (in):	9.0	
Total weight of ice on object:		28 lbs
Weight of object:	19.0 lbs	
Combined weight of ice and object:		47 lbs

LGP 21901 Diplexer
Weight of ice based on total radial SF area:

Height (in):	6.3	
Width (in):	4.4	
Depth (in):	3.3	
Total weight of ice on object:		8 lbs
Weight of object:	6.0 lbs	
Combined weight of ice and object:		14 lbs

Squid Surge Arrestor
Weight of ice based on total radial SF area:

Depth (in):	24.0	
Diameter(in):	9.7	
Total weight of ice on object:		49 lbs
Weight of object:	33 lbs	
Combined weight of ice and object:		82 lbs

PL 6x3/8
Weight of ice based on total radial SF area:

Height (in):	6	
Width (in):	0.375	
Per foot weight of ice on object:		16 plf

C 3-3/8x3/16
Weight of ice based on total radial SF area:

Height (in):	3.375	
Width (in):	0.1875	
Per foot weight of ice on object:		11 plf

L 3x3 Angles
Weight of ice based on total radial SF area:

Height (in):	3	
Width (in):	3	
Per foot weight of ice on object:		13 plf

L 2x2 Angles
Weight of ice based on total radial SF area:

Height (in):	2	
Width (in):	2	
Per foot weight of ice on object:		10 plf

2" pipe
Per foot weight of ice:

diameter (in):	2.38	
Per foot weight of ice on object:		9 plf

3-1/2" Pipe
Per foot weight of ice:

diameter (in):	4	
Per foot weight of ice on object:		12 plf

HUDSON
Design Group LLC

Mount Calculations
(Existing Conditions)

Bentley

Current Date: 10/8/2019 10:04 AM
Units system: English
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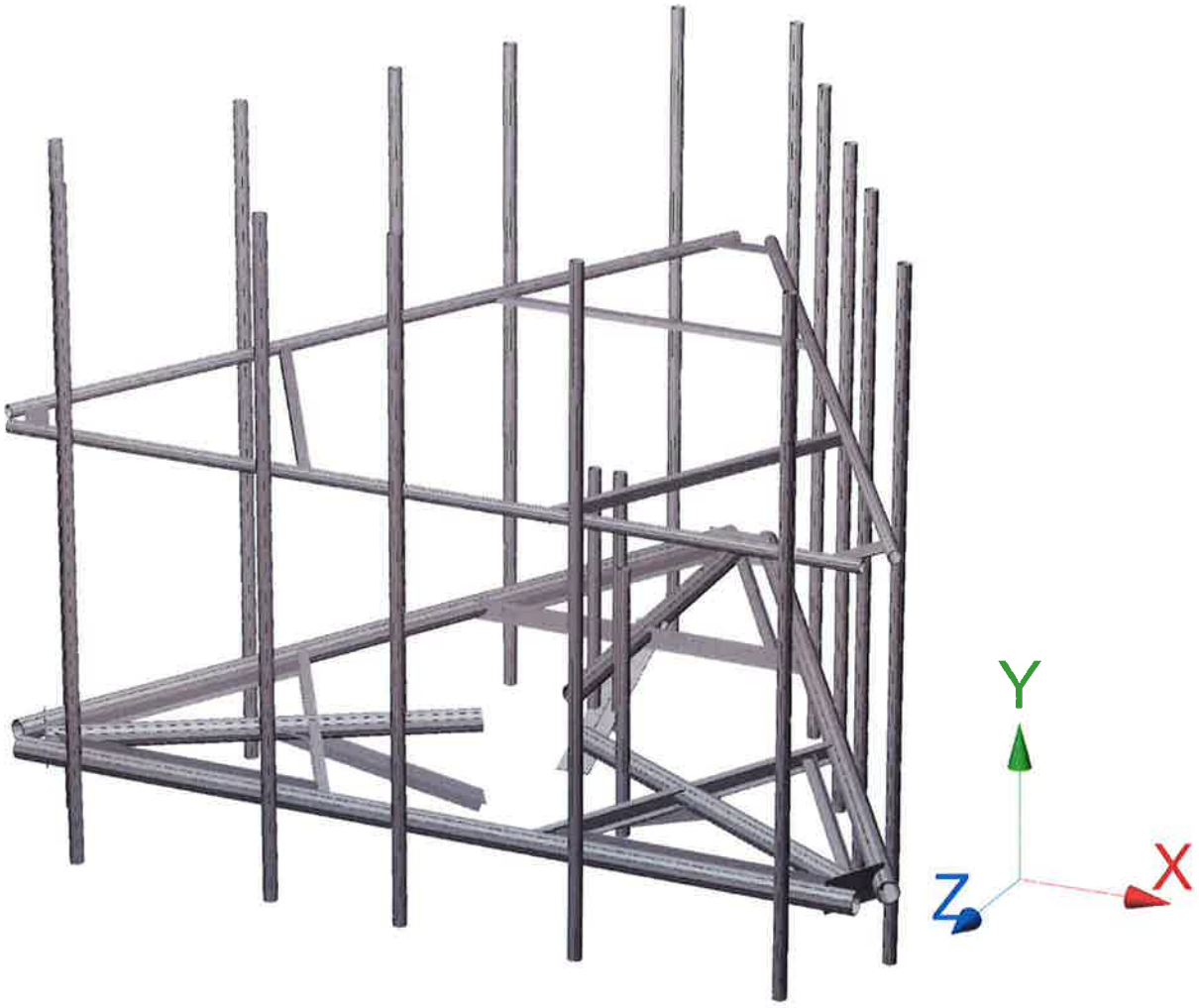

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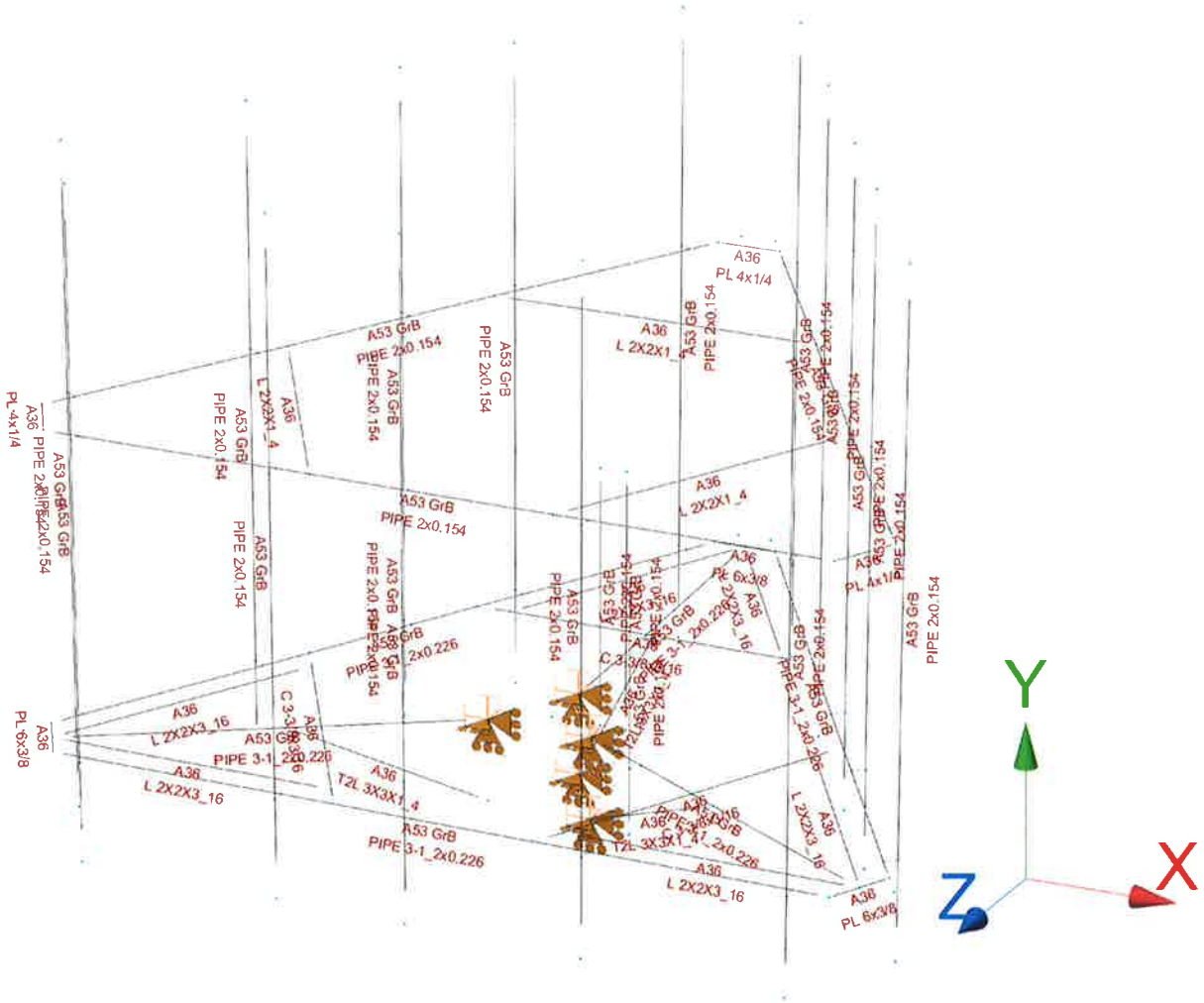

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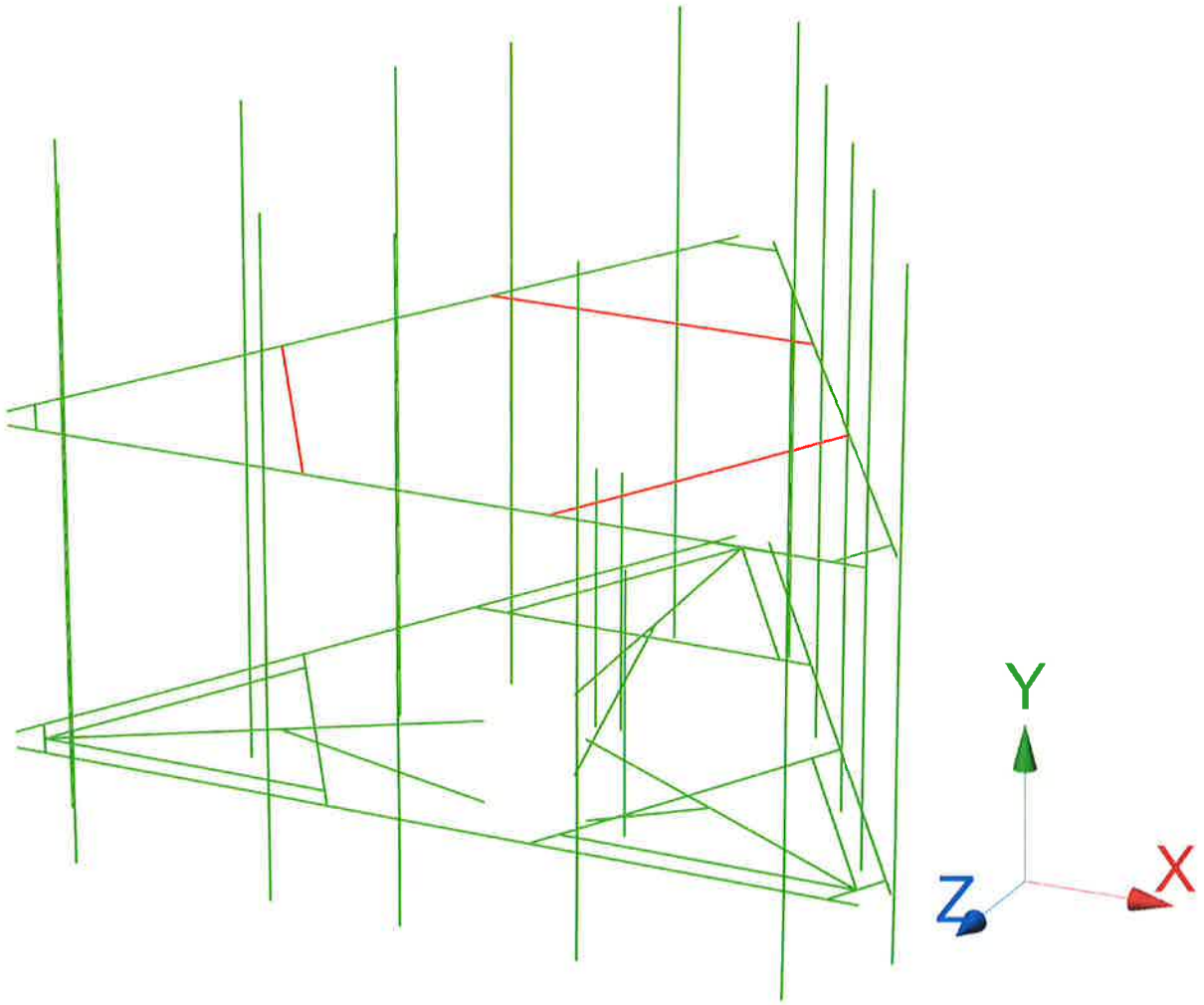

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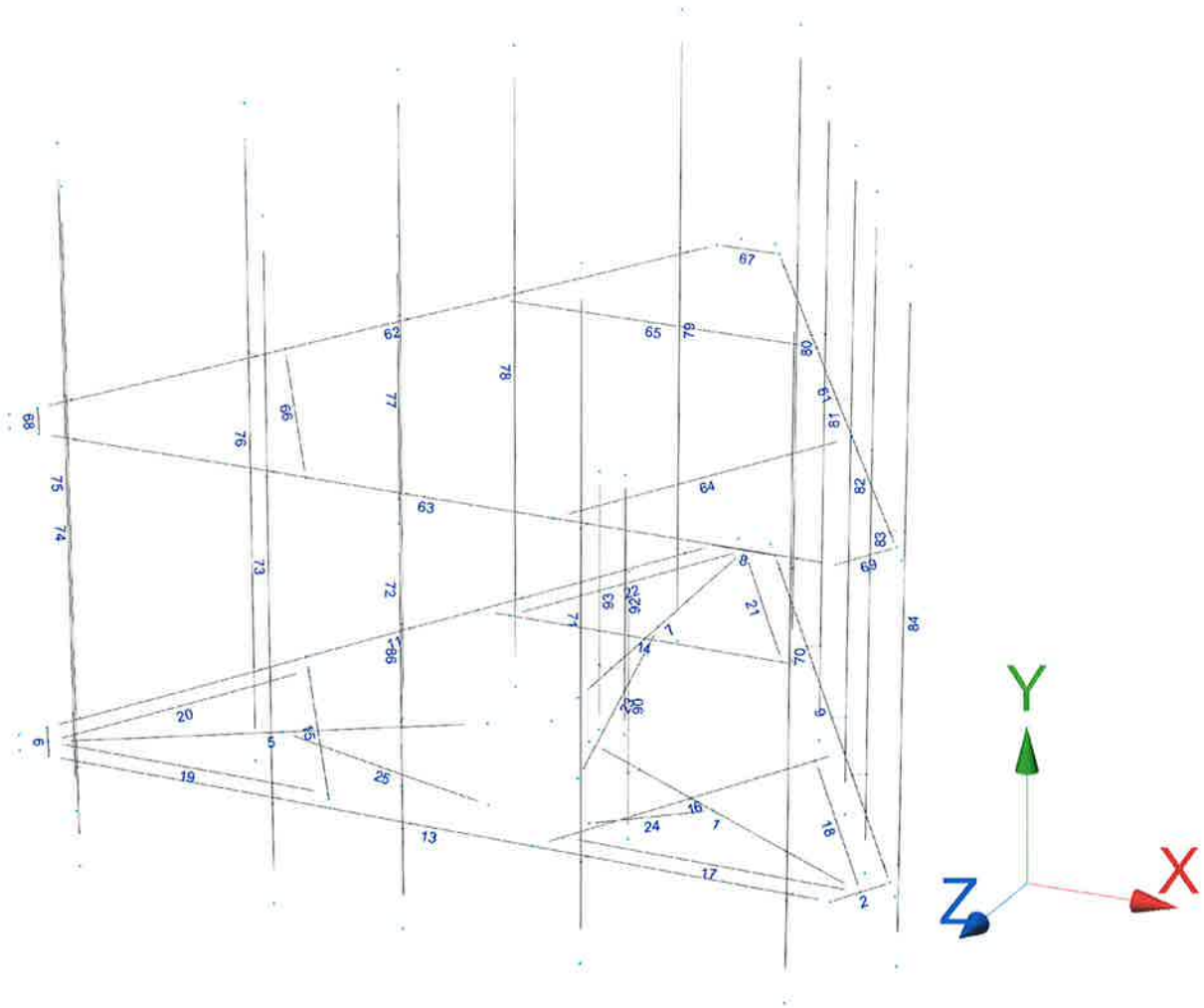

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Units system: English
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Load data

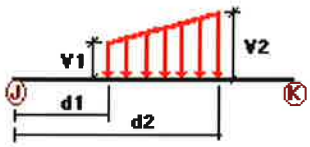
GLOSSARY

Comb : Indicates if load condition is a load combination

Load Conditions

Condition	Description	Comb.	Category
DL	Dead Load	No	DL
W0	Wind Load 0/60/120 deg	No	WIND
W30	Wind Load 30/90/150 deg	No	WIND
Di	Ice Load	No	LL
Wi0	Ice Wind Load 0/60/120 deg	No	WIND
Wi30	Ice Wind Load 30/90/150 deg	No	WIND
WL0	WL 30 mph 0/60/120 deg	No	WIND
WL30	WL 30 mph 30/90/150 deg	No	WIND
LL1	250 lb Live Load Center of Mount	No	LL
LL2	250 lb Live Load End of Mount	No	LL
LLa1	250 lb Live Load Antenna 1	No	LL
LLa2	250 lb Live Load Antenna 2	No	LL
LLa3	250 lb Live Load Antenna 3	No	LL
LLa4	250 lb Live Load Antenna 4	No	LL

Distributed force on members

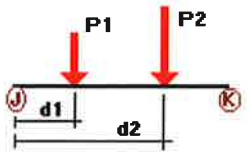


Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%
DL	14	y	-0.01	-0.01	10.00	Yes	90.00	Yes
	15	y	-0.01	-0.01	10.00	Yes	90.00	Yes
	16	y	-0.01	-0.01	10.00	Yes	90.00	Yes
	17	y	-0.01	-0.01	0.00	No	100.00	Yes
	18	y	-0.01	-0.01	0.00	No	100.00	Yes
	19	y	-0.01	-0.01	0.00	No	100.00	Yes
	20	y	-0.01	-0.01	0.00	No	100.00	Yes
	21	y	-0.01	-0.01	0.00	No	100.00	Yes
	22	y	-0.01	-0.01	0.00	No	100.00	Yes
W0	1	z	-0.017	-0.017	0.00	No	100.00	Yes
	2	z	-0.007	-0.007	0.00	No	100.00	Yes
	5	z	-0.017	-0.017	0.00	No	100.00	Yes
	6	z	-0.007	-0.007	0.00	No	100.00	Yes
	8	z	-0.007	-0.007	0.00	No	100.00	Yes

	9	z	-0.017	-0.017	0.00	No	100.00	Yes
	11	z	-0.017	-0.017	0.00	No	100.00	Yes
	13	z	-0.017	-0.017	0.00	No	100.00	Yes
	14	z	-0.023	-0.023	0.00	No	100.00	Yes
	15	z	-0.023	-0.023	0.00	No	100.00	Yes
	16	z	-0.023	-0.023	0.00	No	100.00	Yes
	17	z	-0.014	-0.014	0.00	No	100.00	Yes
	18	z	-0.014	-0.014	0.00	No	100.00	Yes
	19	z	-0.014	-0.014	0.00	No	100.00	Yes
	20	z	-0.014	-0.014	0.00	No	100.00	Yes
	21	z	-0.014	-0.014	0.00	No	100.00	Yes
	22	z	-0.014	-0.014	0.00	No	100.00	Yes
	24	z	-0.017	-0.017	0.00	No	100.00	Yes
	25	z	-0.017	-0.017	0.00	No	100.00	Yes
	61	z	-0.01	-0.01	0.00	No	100.00	Yes
	62	z	-0.01	-0.01	0.00	No	100.00	Yes
	63	z	-0.01	-0.01	0.00	No	100.00	Yes
	64	z	-0.014	-0.014	0.00	No	100.00	Yes
	65	z	-0.014	-0.014	0.00	No	100.00	Yes
	66	z	-0.014	-0.014	0.00	No	100.00	Yes
	67	z	-0.007	-0.007	0.00	No	100.00	Yes
	68	z	-0.007	-0.007	0.00	No	100.00	Yes
	69	z	-0.007	-0.007	0.00	No	100.00	Yes
	73	z	-0.01	-0.01	0.00	No	100.00	Yes
	75	z	-0.01	-0.01	0.00	No	100.00	Yes
	76	z	-0.01	-0.01	0.00	No	100.00	Yes
	77	z	-0.01	-0.01	0.00	No	100.00	Yes
	78	z	-0.01	-0.01	0.00	No	100.00	Yes
	79	z	-0.01	-0.01	0.00	No	100.00	Yes
	80	z	-0.01	-0.01	0.00	No	100.00	Yes
	81	z	-0.01	-0.01	0.00	No	100.00	Yes
	82	z	-0.01	-0.01	0.00	No	100.00	Yes
	83	z	-0.01	-0.01	0.00	No	100.00	Yes
	84	z	-0.01	-0.01	0.00	No	100.00	Yes
	86	z	-0.01	-0.01	0.00	No	100.00	Yes
	90	z	-0.01	-0.01	0.00	No	100.00	Yes
	92	z	-0.01	-0.01	0.00	No	100.00	Yes
	93	z	-0.01	-0.01	0.00	No	100.00	Yes
W30	1	x	-0.017	-0.017	0.00	No	100.00	Yes
	5	x	-0.017	-0.017	0.00	No	100.00	Yes
	7	x	-0.017	-0.017	0.00	No	100.00	Yes
	9	x	-0.017	-0.017	0.00	No	100.00	Yes
	11	x	-0.017	-0.017	0.00	No	100.00	Yes
	15	x	-0.023	-0.023	0.00	No	100.00	Yes
	16	x	-0.023	-0.023	0.00	No	100.00	Yes
	18	x	-0.014	-0.014	0.00	No	100.00	Yes
	20	x	-0.014	-0.014	0.00	No	100.00	Yes
	21	x	-0.014	-0.014	0.00	No	100.00	Yes
	22	x	-0.014	-0.014	0.00	No	100.00	Yes
	23	x	-0.021	-0.021	0.00	No	100.00	Yes
	24	x	-0.021	-0.021	0.00	No	100.00	Yes
	25	x	-0.021	-0.021	0.00	No	100.00	Yes
	61	x	-0.01	-0.01	0.00	No	100.00	Yes
	62	x	-0.01	-0.01	0.00	No	100.00	Yes
	64	x	-0.014	-0.014	0.00	No	100.00	Yes
	66	x	-0.014	-0.014	0.00	No	100.00	Yes
	70	x	-0.01	-0.01	0.00	No	100.00	Yes
	71	x	-0.01	-0.01	0.00	No	100.00	Yes
	72	x	-0.01	-0.01	0.00	No	100.00	Yes
	73	x	-0.01	-0.01	0.00	No	100.00	Yes

	74	x	-0.01	-0.01	0.00	No	100.00	Yes
	75	x	-0.01	-0.01	0.00	No	100.00	Yes
	76	x	-0.01	-0.01	0.00	No	100.00	Yes
	77	x	-0.01	-0.01	0.00	No	100.00	Yes
	78	x	-0.01	-0.01	0.00	No	100.00	Yes
	79	x	-0.01	-0.01	0.00	No	100.00	Yes
	83	x	-0.01	-0.01	0.00	No	100.00	Yes
Di	1	y	-0.012	-0.012	0.00	No	100.00	Yes
	2	y	-0.016	-0.016	0.00	No	100.00	Yes
	5	y	-0.012	-0.012	0.00	No	100.00	Yes
	6	y	-0.016	-0.016	0.00	No	100.00	Yes
	7	y	-0.012	-0.012	0.00	No	100.00	Yes
	8	y	-0.016	-0.016	0.00	No	100.00	Yes
	9	y	-0.012	-0.012	0.00	No	100.00	Yes
	11	y	-0.012	-0.012	0.00	No	100.00	Yes
	13	y	-0.012	-0.012	0.00	No	100.00	Yes
	14	y	-0.011	-0.011	0.00	No	100.00	Yes
	15	y	-0.011	-0.011	0.00	No	100.00	Yes
	16	y	-0.011	-0.011	0.00	No	100.00	Yes
	17	y	-0.01	-0.01	0.00	No	100.00	Yes
	18	y	-0.01	-0.01	0.00	No	100.00	Yes
	19	y	-0.01	-0.01	0.00	No	100.00	Yes
	20	y	-0.01	-0.01	0.00	No	100.00	Yes
	21	y	-0.01	-0.01	0.00	No	100.00	Yes
	22	y	-0.01	-0.01	0.00	No	100.00	Yes
	23	y	-0.013	-0.013	0.00	No	100.00	Yes
	24	y	-0.013	-0.013	0.00	No	100.00	Yes
	25	y	-0.013	-0.013	0.00	No	100.00	Yes
	61	y	-0.009	-0.009	0.00	No	100.00	Yes
	62	y	-0.009	-0.009	0.00	No	100.00	Yes
	63	y	-0.009	-0.009	0.00	No	100.00	Yes
	64	y	-0.01	-0.01	0.00	No	100.00	Yes
	65	y	-0.01	-0.01	0.00	No	100.00	Yes
	66	y	-0.01	-0.01	0.00	No	100.00	Yes
	67	y	-0.016	-0.016	0.00	No	100.00	Yes
	68	y	-0.016	-0.016	0.00	No	100.00	Yes
	69	y	-0.016	-0.016	0.00	No	100.00	Yes
	70	y	-0.009	-0.009	0.00	No	100.00	Yes
	71	y	-0.009	-0.009	0.00	No	100.00	Yes
	72	y	-0.009	-0.009	0.00	No	100.00	Yes
	73	y	-0.009	-0.009	0.00	No	100.00	Yes
	74	y	-0.009	-0.009	0.00	No	100.00	Yes
	75	y	-0.009	-0.009	0.00	No	100.00	Yes
	76	y	-0.009	-0.009	0.00	No	100.00	Yes
	77	y	-0.009	-0.009	0.00	No	100.00	Yes
	78	y	-0.009	-0.009	0.00	No	100.00	Yes
	79	y	-0.009	-0.009	0.00	No	100.00	Yes
	80	y	-0.009	-0.009	0.00	No	100.00	Yes
	81	y	-0.009	-0.009	0.00	No	100.00	Yes
	82	y	-0.009	-0.009	0.00	No	100.00	Yes
	83	y	-0.009	-0.009	0.00	No	100.00	Yes
	84	y	-0.009	-0.009	0.00	No	100.00	Yes
	86	y	-0.009	-0.009	0.00	No	100.00	Yes
	90	y	-0.009	-0.009	0.00	No	100.00	Yes
	92	y	-0.009	-0.009	0.00	No	100.00	Yes
	93	y	-0.009	-0.009	0.00	No	100.00	Yes

Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%
DL	70	y	-0.024	2.50	No
		y	-0.024	5.00	No
		y	-0.038	4.50	No
	71	y	-0.044	1.00	No
		y	-0.044	8.00	No
		y	-0.053	6.50	No
		y	-0.06	2.50	No
	72	y	-0.051	1.00	No
		y	-0.051	8.00	No
		y	-0.113	2.50	No
	73	y	-0.06	2.50	No
		y	-0.06	6.50	No
	74	y	-0.044	1.00	No
		y	-0.044	8.00	No
		y	-0.051	2.50	No
		y	-0.022	2.00	No
	75	y	-0.024	2.50	No
		y	-0.024	5.00	No
		y	-0.038	4.50	No
	76	y	-0.044	1.00	No
		y	-0.044	8.00	No
		y	-0.053	6.50	No
		y	-0.06	2.50	No
	77	y	-0.051	1.00	No
		y	-0.051	8.00	No
		y	-0.113	2.50	No
	78	y	-0.06	2.50	No
		y	-0.06	6.50	No
	79	y	-0.044	1.00	No
		y	-0.044	8.00	No
		y	-0.051	2.50	No
		y	-0.022	2.00	No
	80	y	-0.024	2.50	No
		y	-0.024	5.00	No
		y	-0.038	4.50	No
	81	y	-0.037	1.50	No
		y	-0.037	7.50	No
		y	-0.053	6.50	No
		y	-0.06	2.50	No
	82	y	-0.041	1.50	No
		y	-0.041	7.50	No
		y	-0.113	2.50	No
	83	y	-0.06	2.50	No
		y	-0.06	6.50	No
	84	y	-0.037	1.50	No
		y	-0.037	7.50	No
		y	-0.051	2.50	No
		y	-0.022	2.00	No
	86	y	-0.033	2.00	No
	90	y	-0.033	2.00	No
	92	y	-0.033	2.00	No
	93	y	-0.033	2.00	No
W0	70	z	-0.107	2.50	No
		z	-0.107	5.00	No

	71	z	-0.264	1.00	No
		z	-0.264	8.00	No
		z	-0.029	6.50	No
	72	z	-0.354	1.00	No
		z	-0.354	8.00	No
		z	-0.057	2.50	No
	73	z	-0.084	2.50	No
		z	-0.114	6.50	No
	74	z	-0.264	1.00	No
		z	-0.264	8.00	No
	75	z	-0.078	2.50	No
		z	-0.078	5.00	No
		z	-0.037	4.50	No
	76	z	-0.179	1.00	No
		z	-0.179	8.00	No
		z	-0.064	6.50	No
		z	-0.073	2.50	No
	77	z	-0.216	1.00	No
		z	-0.216	8.00	No
		z	-0.108	2.50	No
	78	z	-0.06	2.50	No
		z	-0.08	6.50	No
	79	z	-0.179	1.00	No
		z	-0.179	8.00	No
		z	-0.059	2.50	No
		z	-0.037	2.00	No
	80	z	-0.078	2.50	No
		z	-0.078	5.00	No
		z	-0.037	4.50	No
	81	z	-0.136	1.50	No
		z	-0.136	7.50	No
		z	-0.064	6.50	No
		z	-0.073	2.50	No
	82	z	-0.153	1.50	No
		z	-0.153	7.50	No
		z	-0.108	2.50	No
	83	z	-0.06	2.50	No
		z	-0.08	6.50	No
	84	z	-0.136	1.50	No
		z	-0.136	7.50	No
		z	-0.059	2.50	No
		z	-0.037	2.00	No
	86	z	-0.047	2.00	No
	90	z	-0.047	2.00	No
	92	z	-0.047	2.00	No
	93	z	-0.047	2.00	No
W30	70	x	-0.069	2.50	No
		x	-0.069	5.00	No
		x	-0.045	4.50	No
	71	x	-0.15	1.00	No
		x	-0.15	8.00	No
		x	-0.053	6.50	No
		x	-0.069	2.50	No
	72	x	-0.17	1.00	No
		x	-0.17	8.00	No
		x	-0.13	2.50	No
	73	x	-0.052	2.50	No
		x	-0.069	6.50	No
	74	x	-0.15	1.00	No
		x	-0.15	8.00	No

		x	-0.049	2.50	No
		x	-0.021	2.00	No
	75	x	-0.098	2.50	No
		x	-0.098	5.00	No
		x	-0.022	4.50	No
	76	x	-0.236	1.00	No
		x	-0.236	8.00	No
		x	-0.062	6.50	No
		x	-0.063	2.50	No
	77	x	-0.308	1.00	No
		x	-0.308	8.00	No
		x	-0.054	2.50	No
	78	x	-0.076	2.50	No
		x	-0.102	6.50	No
	79	x	-0.236	1.00	No
		x	-0.236	8.00	No
		x	-0.056	2.50	No
		x	-0.07	2.00	No
	80	x	-0.098	2.50	No
		x	-0.098	5.00	No
		x	-0.022	4.50	No
	81	x	-0.179	1.50	No
		x	-0.179	7.50	No
		x	-0.062	6.50	No
		x	-0.063	2.50	No
	82	x	-0.221	1.50	No
		x	-0.221	7.50	No
		x	-0.054	2.50	No
	83	x	-0.076	2.50	No
		x	-0.102	6.50	No
	84	x	-0.179	1.50	No
		x	-0.179	7.50	No
		x	-0.056	2.50	No
		x	-0.07	2.00	No
	86	x	-0.047	2.00	No
	90	x	-0.047	2.00	No
	92	x	-0.047	2.00	No
	93	x	-0.047	2.00	No
Di	70	y	-0.066	2.50	No
		y	-0.066	5.00	No
		y	-0.057	4.50	No
	71	y	-0.146	1.00	No
		y	-0.146	8.00	No
		y	-0.078	6.50	No
		y	-0.076	2.50	No
	72	y	-0.194	1.00	No
		y	-0.194	8.00	No
		y	-0.135	2.50	No
	73	y	-0.056	2.50	No
		y	-0.076	6.50	No
	74	y	-0.146	1.00	No
		y	-0.146	8.00	No
		y	-0.071	2.50	No
		y	-0.05	2.00	No
	75	y	-0.066	2.50	No
		y	-0.066	5.00	No
		y	-0.057	4.50	No
	76	y	-0.146	1.00	No
		y	-0.146	8.00	No
		y	-0.078	6.50	No

		y	-0.076	2.50	No
	77	y	-0.194	1.00	No
		y	-0.194	8.00	No
		y	-0.135	2.50	No
	78	y	-0.056	2.50	No
		y	-0.076	6.50	No
	79	y	-0.146	1.00	No
		y	-0.146	8.00	No
		y	-0.071	2.50	No
		y	-0.05	2.00	No
	80	y	-0.066	2.50	No
		y	-0.066	5.00	No
		y	-0.057	4.50	No
	81	y	-0.117	1.50	No
		y	-0.117	7.50	No
		y	-0.078	6.50	No
		y	-0.076	2.50	No
	82	y	-0.146	1.50	No
		y	-0.146	7.50	No
		y	-0.135	2.50	No
	83	y	-0.056	2.50	No
		y	-0.076	6.50	No
	84	y	-0.117	1.50	No
		y	-0.117	7.50	No
		y	-0.071	2.50	No
		y	-0.05	2.00	No
	86	y	-0.049	2.00	No
	90	y	-0.049	2.00	No
	92	y	-0.049	2.00	No
	93	y	-0.049	2.00	No
Wi0	70	z	-0.025	2.50	No
		z	-0.025	5.00	No
	71	z	-0.055	1.00	No
		z	-0.055	8.00	No
		z	-0.011	6.50	No
	72	z	-0.069	1.00	No
		z	-0.069	8.00	No
		z	-0.02	2.50	No
	73	z	-0.02	2.50	No
		z	-0.026	6.50	No
	74	z	-0.055	1.00	No
		z	-0.055	8.00	No
	75	z	-0.019	2.50	No
		z	-0.019	5.00	No
		z	-0.011	4.50	No
	76	z	-0.039	1.00	No
		z	-0.039	8.00	No
		z	-0.016	6.50	No
		z	-0.018	2.50	No
	77	z	-0.046	1.00	No
		z	-0.046	8.00	No
		z	-0.024	2.50	No
	78	z	-0.016	2.50	No
		z	-0.02	6.50	No
	79	z	-0.039	1.00	No
		z	-0.039	8.00	No
		z	-0.015	2.50	No
		x	-0.011	2.00	No
	80	z	-0.019	2.50	No
		z	-0.019	5.00	No

		z	-0.011	4.50	No
	81	z	-0.03	1.50	No
		z	-0.03	7.50	No
		z	-0.016	6.50	No
		z	-0.018	2.50	No
	82	z	-0.033	1.50	No
		z	-0.033	7.50	No
		z	-0.024	2.50	No
	83	z	-0.016	2.50	No
		z	-0.02	6.50	No
	84	z	-0.03	1.50	No
		z	-0.03	7.50	No
		z	-0.015	2.50	No
		x	-0.011	2.00	No
	86	z	-0.012	2.00	No
		z	0.00	0.00	No
	90	z	-0.012	2.00	No
		z	0.00	0.00	No
	92	z	-0.012	2.00	No
		z	0.00	0.00	No
	93	z	-0.012	2.00	No
		z	0.00	0.00	No
Wi30	70	x	-0.018	2.50	No
		x	-0.018	5.00	No
		x	-0.012	4.50	No
	71	x	-0.035	1.00	No
		x	-0.035	8.00	No
		x	-0.014	6.50	No
		x	-0.018	2.50	No
	72	x	-0.038	1.00	No
		x	-0.038	8.00	No
		x	-0.029	2.50	No
	73	x	-0.014	2.50	No
		x	-0.018	6.50	No
	74	x	-0.035	1.00	No
		x	-0.035	8.00	No
		x	-0.014	2.50	No
		x	-0.008	2.00	No
	75	x	-0.022	2.50	No
		x	-0.022	5.00	No
		x	-0.008	4.50	No
	76	x	-0.048	1.00	No
		x	-0.048	8.00	No
		x	-0.014	6.50	No
		x	-0.015	2.50	No
	77	x	-0.061	1.00	No
		x	-0.061	8.00	No
		x	-0.013	2.50	No
	78	x	-0.019	2.50	No
		x	-0.024	6.50	No
	79	x	-0.048	1.00	No
		x	-0.048	8.00	No
		x	-0.013	2.50	No
		x	-0.017	2.00	No
	80	x	-0.022	2.50	No
		x	-0.022	5.00	No
		x	-0.008	4.50	No
	81	x	-0.037	1.50	No
		x	-0.037	7.50	No
		x	-0.014	6.50	No

		x	-0.015	2.50	No
	82	x	-0.044	1.50	No
		x	-0.044	7.50	No
		x	-0.013	2.50	No
	83	x	-0.019	2.50	No
		x	-0.024	6.50	No
	84	x	-0.037	1.50	No
		x	-0.037	7.50	No
		x	-0.013	2.50	No
		x	-0.017	2.00	No
	86	x	-0.012	2.00	No
	90	x	-0.012	2.00	No
	92	x	-0.012	2.00	No
	93	x	-0.012	2.00	No
WL0	70	z	-0.007	2.50	No
		z	-0.007	5.00	No
	71	z	-0.016	1.00	No
		z	-0.016	8.00	No
		z	-0.002	6.50	No
	72	z	-0.021	1.00	No
		z	-0.021	8.00	No
		z	-0.003	2.50	No
	73	z	-0.005	2.50	No
		z	-0.007	6.50	No
	74	z	-0.016	1.00	No
		z	-0.016	8.00	No
	75	z	-0.005	2.50	No
		z	-0.005	5.00	No
		z	-0.002	4.50	No
	76	z	-0.011	1.00	No
		z	-0.011	8.00	No
		z	-0.004	6.50	No
		z	-0.004	2.50	No
	77	z	-0.013	1.00	No
		z	-0.013	8.00	No
		z	-0.006	2.50	No
	78	z	-0.003	2.50	No
		z	-0.005	6.50	No
	79	z	-0.011	1.00	No
		z	-0.011	8.00	No
		z	-0.003	2.50	No
		z	-0.002	2.00	No
	80	z	-0.005	2.50	No
		z	-0.005	5.00	No
		z	-0.002	4.50	No
	81	z	-0.008	1.50	No
		z	-0.008	7.50	No
		z	-0.004	6.50	No
		z	-0.004	2.50	No
	82	z	-0.009	1.50	No
		z	-0.009	7.50	No
		z	-0.006	2.50	No
	83	z	-0.003	2.50	No
		z	-0.005	6.50	No
	84	z	-0.008	1.50	No
		z	-0.008	7.50	No
		z	-0.003	2.50	No
		z	-0.002	2.00	No
	86	z	-0.003	2.00	No
	90	z	-0.003	2.00	No

	92	z	-0.003	2.00	No
	93	z	-0.003	2.00	No
WL30	70	x	-0.004	2.50	No
		x	-0.004	5.00	No
		x	-0.003	4.50	No
	71	x	-0.009	1.00	No
		x	-0.009	8.00	No
		x	-0.003	6.50	No
		x	-0.004	2.50	No
	72	x	-0.01	1.00	No
		x	-0.01	8.00	No
		x	-0.007	2.50	No
	73	x	-0.003	2.50	No
		x	-0.004	6.50	No
	74	x	-0.009	1.00	No
		x	-0.009	8.00	No
		x	-0.003	2.50	No
		x	-0.001	2.00	No
	75	x	-0.006	2.50	No
		x	-0.006	5.00	No
		x	-0.001	4.50	No
	76	x	-0.014	1.00	No
		x	-0.014	8.00	No
		x	-0.004	6.50	No
		x	-0.004	2.50	No
	77	x	-0.018	1.00	No
		x	-0.018	8.00	No
		x	-0.003	2.50	No
	78	x	-0.004	2.50	No
		x	-0.006	6.50	No
	79	x	-0.014	1.00	No
		x	-0.014	8.00	No
		x	-0.003	2.50	No
		x	-0.004	2.00	No
	80	x	-0.006	2.50	No
		x	-0.006	5.00	No
		x	-0.001	4.50	No
	81	x	-0.011	1.50	No
		x	-0.011	7.50	No
		x	-0.004	6.50	No
		x	-0.004	2.50	No
	82	x	-0.013	1.50	No
		x	-0.013	7.50	No
		x	-0.003	2.50	No
	83	x	-0.004	2.50	No
		x	-0.006	6.50	No
	84	x	-0.011	1.50	No
		x	-0.011	7.50	No
		x	-0.003	2.50	No
		x	-0.004	2.00	No
	86	x	-0.003	2.00	No
	90	x	-0.003	2.00	No
	92	x	-0.003	2.00	No
	93	x	-0.003	2.00	No
LL1	63	y	-0.25	50.00	Yes
LL2	63	y	-0.25	0.00	Yes
LLa1	70	y	-0.25	50.00	Yes
LLa2	71	y	-0.25	50.00	Yes
LLa3	72	y	-0.25	50.00	Yes
LLa4	74	y	-0.25	50.00	Yes

Self weight multipliers for load conditions

Condition	Description	Self weight multiplier			
		Comb.	MultX	MultY	MultZ
DL	Dead Load	No	0.00	-1.00	0.00
W0	Wind Load 0/60/120 deg	No	0.00	0.00	0.00
W30	Wind Load 30/90/150 deg	No	0.00	0.00	0.00
Di	Ice Load	No	0.00	0.00	0.00
Wi0	Ice Wind Load 0/60/120 deg	No	0.00	0.00	0.00
Wi30	Ice Wind Load 30/90/150 deg	No	0.00	0.00	0.00
WL0	WL 30 mph 0/60/120 deg	No	0.00	0.00	0.00
WL30	WL 30 mph 30/90/150 deg	No	0.00	0.00	0.00
LL1	250 lb Live Load Center of Mount	No	0.00	0.00	0.00
LL2	250 lb Live Load End of Mount	No	0.00	0.00	0.00
LLa1	250 lb Live Load Antenna 1	No	0.00	0.00	0.00
LLa2	250 lb Live Load Antenna 2	No	0.00	0.00	0.00
LLa3	250 lb Live Load Antenna 3	No	0.00	0.00	0.00
LLa4	250 lb Live Load Antenna 4	No	0.00	0.00	0.00

Earthquake (Dynamic analysis only)

Condition	a/g	Ang. [Deg]	Damp. [%]
DL	0.00	0.00	0.00
W0	0.00	0.00	0.00
W30	0.00	0.00	0.00
Di	0.00	0.00	0.00
Wi0	0.00	0.00	0.00
Wi30	0.00	0.00	0.00
WL0	0.00	0.00	0.00
WL30	0.00	0.00	0.00
LL1	0.00	0.00	0.00
LL2	0.00	0.00	0.00
LLa1	0.00	0.00	0.00
LLa2	0.00	0.00	0.00
LLa3	0.00	0.00	0.00
LLa4	0.00	0.00	0.00

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Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

LC1=1.2DL+W0
LC2=1.2DL+W30
LC3=1.2DL-W0
LC4=1.2DL-W30
LC5=0.9DL+W0
LC6=0.9DL+W30
LC7=0.9DL-W0
LC8=0.9DL-W30
LC9=1.2DL+Di+Wi0
LC10=1.2DL+Di+Wi30
LC11=1.2DL+Di-Wi0
LC12=1.2DL+Di-Wi30
LC13=1.2DL
LC15=1.2DL+1.5LL1
LC16=1.2DL+1.5LL2
LC17=1.2DL+WL0+1.5LLa1
LC18=1.2DL+WL30+1.5LLa1
LC19=1.2DL-WL0+1.5LLa1
LC20=1.2DL-WL30+1.5LLa1
LC21=1.2DL+WL0+1.5LLa2
LC22=1.2DL+WL30+1.5LLa2
LC23=1.2DL-WL0+1.5LLa2
LC24=1.2DL-WL30+1.5LLa2
LC25=1.2DL+WL0+1.5LLa3
LC26=1.2DL+WL30+1.5LLa3
LC27=1.2DL-WL0+1.5LLa3
LC28=1.2DL-WL30+1.5LLa3
LC29=1.2DL+WL0+1.5LLa4
LC30=1.2DL+WL30+1.5LLa4
LC31=1.2DL-WL0+1.5LLa4
LC32=1.2DL-WL30+1.5LLa4

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	C 3-3/8x3/16	**14**	LC1 at 50.00%	**0.80**	**OK**	
		15	LC2 at 48.44%	0.78	OK	
		16	LC4 at 50.00%	0.78	OK	
	L 2X2X1_4	**64**	LC1 at 100.00%	1.10	N.G.	
		65	LC4 at 0.00%	1.08	N.G.	
		66	LC1 at 0.00%	**1.11**	**N.G.**	
	L 2X2X3_16	**17**	LC4 at 0.00%	0.51	OK	
		18	LC4 at 100.00%	0.45	OK	
		19	LC2 at 100.00%	0.51	OK	
		20	LC2 at 0.00%	0.46	OK	
		21	LC1 at 0.00%	0.54	OK	
		22	LC1 at 100.00%	**0.54**	**OK**	
	PIPE 2x0.154	**61**	LC3 at 68.13%	0.72	OK	
		62	LC3 at 31.87%	0.82	OK	

	63	LC4 at 31.87%	0.80	OK
	70	LC2 at 83.33%	0.64	OK
	71	LC4 at 83.33%	0.89	OK
	72	LC2 at 83.33%	0.89	OK
	73	LC2 at 83.33%	0.90	OK
	74	LC4 at 83.33%	0.60	OK
	75	LC1 at 83.33%	0.70	OK
	76	LC1 at 83.33%	0.83	OK
	77	LC1 at 83.33%	0.91	OK
	78	LC1 at 83.33%	0.85	OK
	79	LC3 at 83.33%	0.61	OK
	80	LC3 at 83.33%	0.63	OK
	81	LC1 at 83.33%	0.84	OK
	82	LC1 at 83.33%	**0.92**	**OK**
	83	LC1 at 83.33%	0.82	OK
	84	LC1 at 83.33%	0.65	OK
	86	LC1 at 71.88%	0.06	OK
	90	LC1 at 71.88%	0.06	OK
	92	LC1 at 71.88%	0.05	OK
	93	LC1 at 71.88%	0.05	OK
PIPE 3-1_2x0.226	**1**	LC4 at 46.88%	0.70	OK
	5	LC2 at 46.88%	0.72	OK
	7	LC1 at 48.44%	**0.76**	**OK**
	9	LC1 at 37.50%	0.32	OK
	11	LC3 at 37.50%	0.31	OK
	13	LC2 at 62.50%	0.35	OK
PL 4x1/4	**67**	LC4 at 100.00%	**0.94**	**OK**
	68	LC1 at 100.00%	0.82	OK
	69	LC1 at 0.00%	0.70	OK
PL 6x3/8	**2**	LC4 at 50.00%	0.39	OK
	6	LC2 at 46.88%	0.36	OK
	8	LC1 at 50.00%	**0.42**	**OK**
RndBar 1-1_2	**91**	LC4 at 0.00%	0.04	OK
	94	LC2 at 0.00%	**0.04**	**OK**
T2L 3X3X1_4	**23**	LC1 at 100.00%	**0.61**	**OK**
	24	LC4 at 100.00%	0.59	OK
	25	LC2 at 100.00%	0.61	OK

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Geometry data

GLOSSARY

Cb22, Cb33	: Moment gradient coefficients
Cm22, Cm33	: Coefficients applied to bending term in interaction formula
d0	: Tapered member section depth at J end of member
DJX	: Rigid end offset distance measured from J node in axis X
DJY	: Rigid end offset distance measured from J node in axis Y
DJZ	: Rigid end offset distance measured from J node in axis Z
DKX	: Rigid end offset distance measured from K node in axis X
DKY	: Rigid end offset distance measured from K node in axis Y
DKZ	: Rigid end offset distance measured from K node in axis Z
dL	: Tapered member section depth at K end of member
Ig factor	: Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
K22	: Effective length factor about axis 2
K33	: Effective length factor about axis 3
L22	: Member length for calculation of axial capacity
L33	: Member length for calculation of axial capacity
LB pos	: Lateral unbraced length of the compression flange in the positive side of local axis 2
LB neg	: Lateral unbraced length of the compression flange in the negative side of local axis 2
RX	: Rotation about X
RY	: Rotation about Y
RZ	: Rotation about Z
TO	: 1 = Tension only member 0 = Normal member
TX	: Translation in X
TY	: Translation in Y
TZ	: Translation in Z

Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
1	0.00	0.00	0.00	0
2	0.7794	0.00	0.45	0
3	6.1055	0.00	3.525	0
4	5.8555	0.00	3.958	0
5	6.3555	0.00	3.092	0
10	-0.7794	0.00	0.45	0
11	-6.1055	0.00	3.525	0
12	-6.3555	0.00	3.092	0
14	0.00	0.00	-0.90	0
15	0.00	0.00	-7.05	0
16	0.50	0.00	-7.05	0
17	-0.50	0.00	-7.05	0
19	0.2715	0.00	-7.4458	0
20	6.584	0.00	3.4878	0
23	-6.584	0.00	3.4878	0
24	-0.2715	0.00	-7.4458	0
27	6.3125	0.00	3.958	0
28	-6.3125	0.00	3.958	0
29	-2.6715	0.00	-3.2889	0
30	-4.184	0.00	-0.6691	0
33	4.184	0.00	-0.6691	0

37	-1.5125	0.00	3.958	0
38	1.5125	0.00	3.958	0
39	-1.7625	0.00	3.525	0
40	-3.934	0.00	-0.2361	0
43	3.934	0.00	-0.2361	0
44	1.7625	0.00	3.525	0
47	-2.1715	0.00	-3.2889	0
49	0.7794	-1.25	0.45	0
50	0.00	-1.25	-0.90	0
52	2.8482	0.00	1.6444	0
53	3.2813	0.00	1.8944	0
58	-2.8482	0.00	1.6444	0
59	-3.2813	0.00	1.8944	0
60	0.00	0.00	-3.2889	0
61	0.00	0.00	-3.7889	0
132	0.2715	4.80	-7.4458	0
133	6.584	4.80	3.4878	0
134	-6.584	4.80	3.4878	0
135	-0.2715	4.80	-7.4458	0
136	6.3125	4.80	3.958	0
137	-6.3125	4.80	3.958	0
142	4.334	4.80	-0.4093	0
145	1.8125	4.80	3.958	0
146	0.50	4.80	-7.05	0
147	-0.50	4.80	-7.05	0
148	-6.3555	4.80	3.092	0
149	-5.8555	4.80	3.958	0
150	5.8555	4.80	3.958	0
151	6.3555	4.80	3.092	0
152	6.2572	-1.50	2.5218	0
153	4.7572	-1.50	-0.0763	0
154	3.7572	-1.50	-1.8084	0
155	2.4447	-1.50	-4.0817	0
156	0.9447	-1.50	-6.6798	0
157	-0.9447	-1.50	-6.6798	0
158	-2.4447	-1.50	-4.0817	0
159	-3.4447	-1.50	-2.3496	0
160	-4.7572	-1.50	-0.0763	0
161	-6.2572	-1.50	2.5218	0
162	-5.3125	-1.50	4.158	0
163	-2.3125	-1.50	4.158	0
164	-0.3125	-1.50	4.158	0
165	2.3125	-1.50	4.158	0
166	5.3125	-1.50	4.158	0
167	-2.4447	8.50	-4.0817	0
168	-3.4447	8.50	-2.3496	0
169	-4.7572	8.50	-0.0763	0
170	-6.2572	8.50	2.5218	0
171	-5.3125	8.50	4.158	0
172	-2.3125	8.50	4.158	0
173	-0.3125	8.50	4.158	0
174	6.2572	8.50	2.5218	0
175	4.7572	8.50	-0.0763	0
176	3.7572	8.50	-1.8084	0
178	0.9447	8.50	-6.6798	0
179	-0.9447	8.50	-6.6798	0
180	2.3125	8.50	4.158	0
181	5.3125	8.50	4.158	0
184	-1.9138	-1.00	0.874	0
185	-1.9138	3.00	0.874	0

192	1.7138	-1.00	1.2204	0
197	0.20	3.00	-2.0944	0
199	-0.20	3.00	-2.0944	0
200	-0.20	-1.00	-2.0944	0
88	-2.2715	0.00	-3.9817	0
115	3.7572	4.80	-1.8084	0
67	3.7572	0.00	-1.8084	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
2	1	1	1	1	1	1
10	1	1	1	1	1	1
14	1	1	1	1	1	1
49	1	1	1	1	1	1
50	1	1	1	1	1	1

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	lg factor
1	2	3		PIPE 3-1_2x0.226	A53 GrB	0.00	0.00	0.00
2	4	5		PL 6x3/8	A36	0.00	0.00	0.00
5	10	11		PIPE 3-1_2x0.226	A53 GrB	0.00	0.00	0.00
6	12	13		PL 6x3/8	A36	0.00	0.00	0.00
7	14	15		PIPE 3-1_2x0.226	A53 GrB	0.00	0.00	0.00
8	16	17		PL 6x3/8	A36	0.00	0.00	0.00
9	19	20		PIPE 3-1_2x0.226	A53 GrB	0.00	0.00	0.00
11	23	24		PIPE 3-1_2x0.226	A53 GrB	0.00	0.00	0.00
13	27	28		PIPE 3-1_2x0.226	A53 GrB	0.00	0.00	0.00
14	29	34		C 3-3/8x3/16	A36	0.00	0.00	0.00
15	30	37		C 3-3/8x3/16	A36	0.00	0.00	0.00
16	38	33		C 3-3/8x3/16	A36	0.00	0.00	0.00
17	3	44		L 2X2X3_16	A36	0.00	0.00	0.00
18	43	3		L 2X2X3_16	A36	0.00	0.00	0.00
19	39	11		L 2X2X3_16	A36	0.00	0.00	0.00
20	11	40		L 2X2X3_16	A36	0.00	0.00	0.00
21	15	48		L 2X2X3_16	A36	0.00	0.00	0.00
22	47	15		L 2X2X3_16	A36	0.00	0.00	0.00
23	50	61		T2L 3X3X1_4	A36	0.00	0.00	0.00
24	49	53		T2L 3X3X1_4	A36	0.00	0.00	0.00
25	51	59		T2L 3X3X1_4	A36	0.00	0.00	0.00
61	132	133		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
62	134	135		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
63	136	137		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
64	142	145		L 2X2X1_4	A36	0.00	0.00	0.00
65	138	143		L 2X2X1_4	A36	0.00	0.00	0.00
66	144	139		L 2X2X1_4	A36	0.00	0.00	0.00
67	146	147		PL 4x1/4	A36	0.00	0.00	0.00
68	148	149		PL 4x1/4	A36	0.00	0.00	0.00
69	150	151		PL 4x1/4	A36	0.00	0.00	0.00

70	181	166	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
71	180	165	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
72	173	164	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
73	172	163	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
74	171	162	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
75	170	161	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
76	169	160	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
77	168	159	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
78	167	158	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
79	179	157	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
80	178	156	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
81	177	155	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
82	176	154	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
83	175	153	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
84	174	152	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
86	185	184	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
90	193	192	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
92	197	196	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
93	199	200	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00

Orientation of local axes

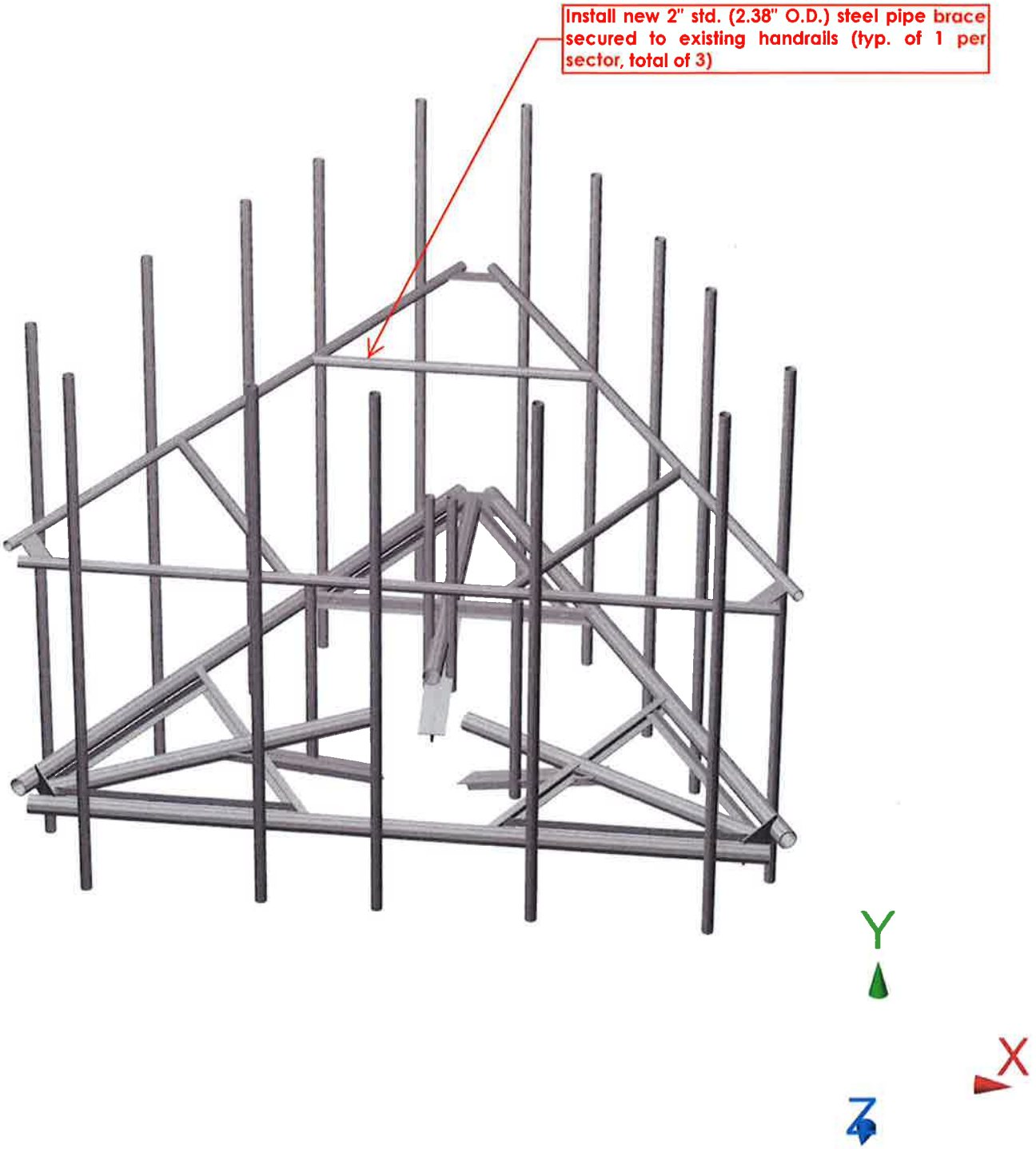
Member	Rotation [Deg]	Axes23	NX	NY	NZ
64	90.00	0	0.00	0.00	0.00
65	90.00	0	0.00	0.00	0.00
66	90.00	0	0.00	0.00	0.00
67	90.00	0	0.00	0.00	0.00
68	90.00	0	0.00	0.00	0.00
69	90.00	0	0.00	0.00	0.00
86	0.00	2	0.50	0.00	0.866
90	0.00	2	0.50	0.00	-0.866

HUDSON
Design Group LLC

Mount Calculations
(Modified Conditions)

Bentley

Current Date: 10/9/2019 10:17 AM
Units system: English
File name: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\AT&T\CT\CT5448\LTE (6C 7C)\CT5448 (LTE 6C 7C)(MOD).retx\



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Units system: English
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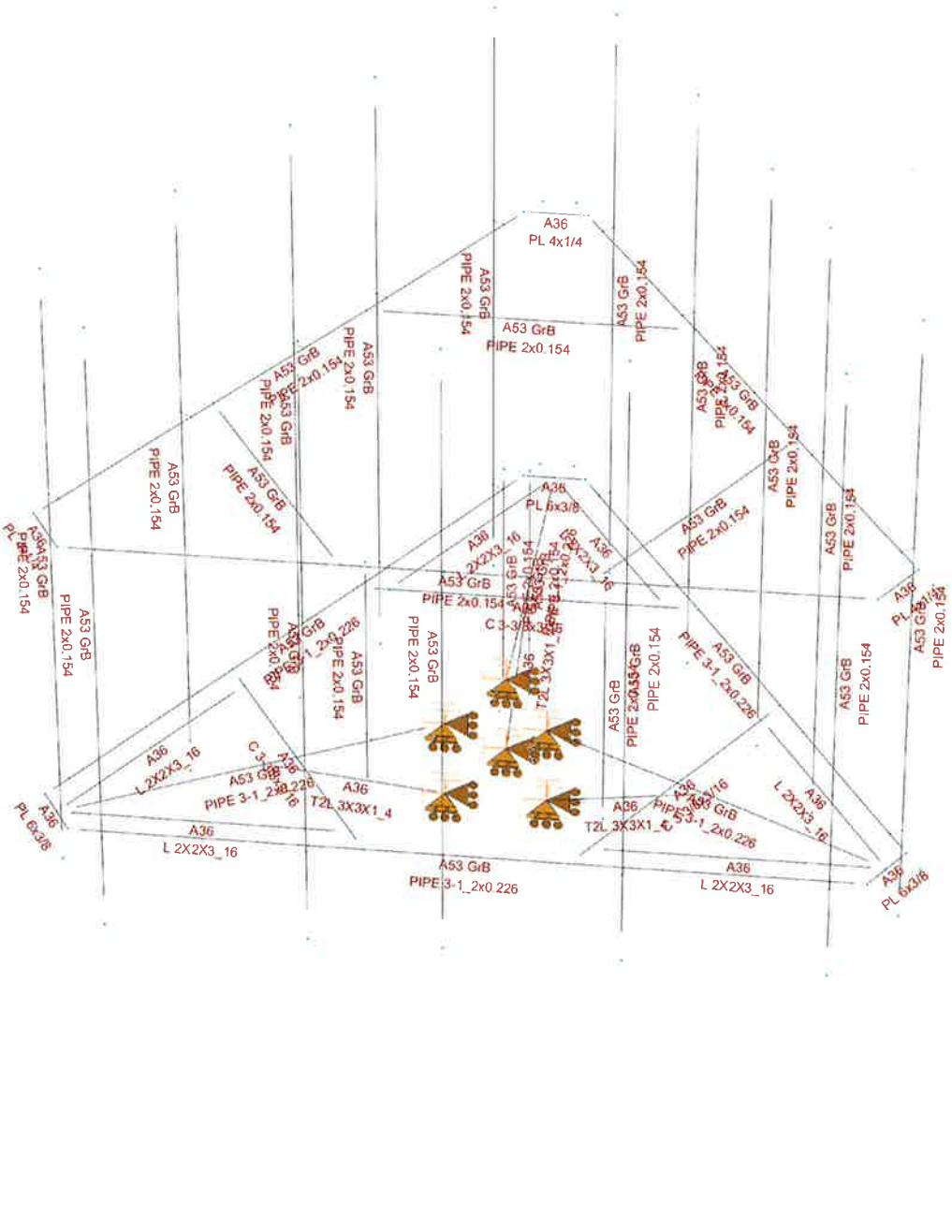
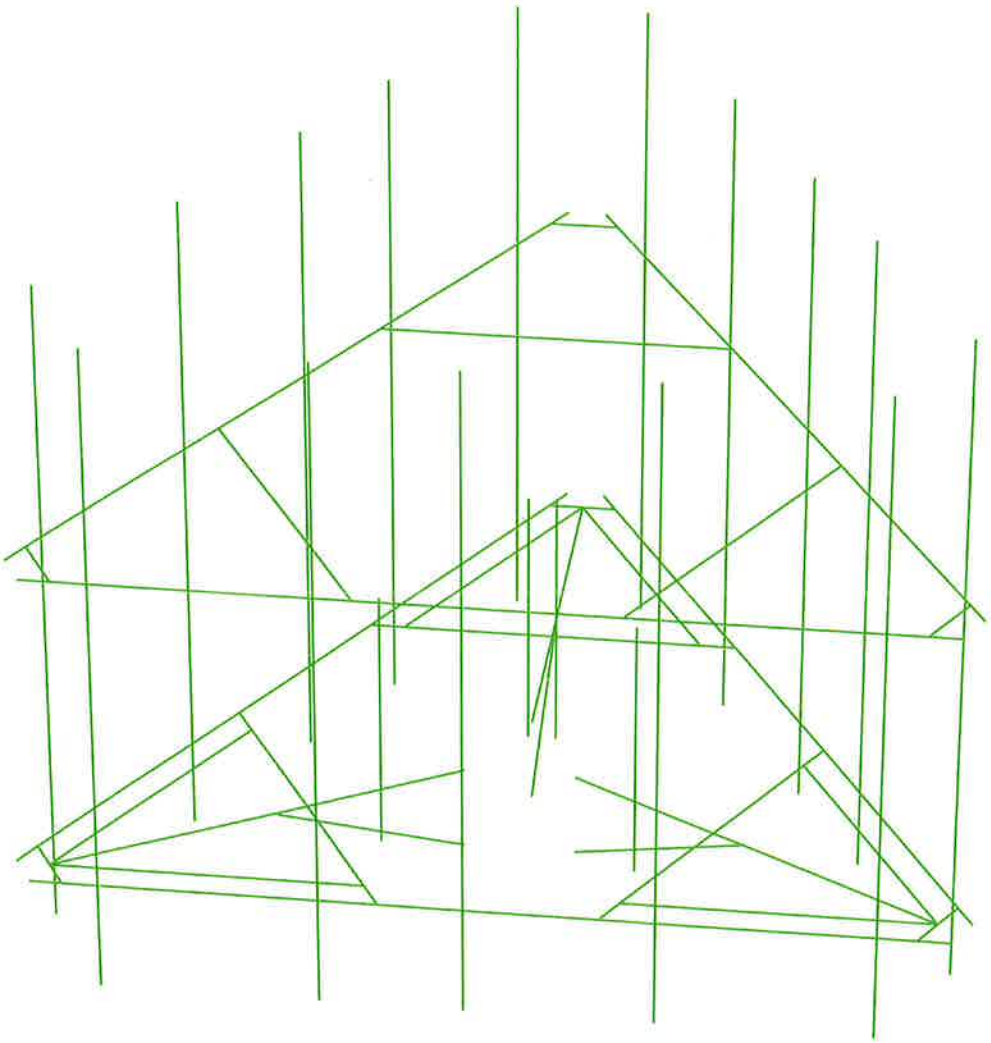
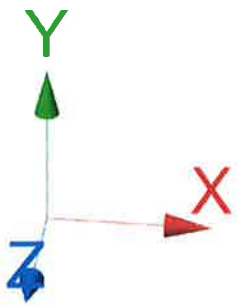


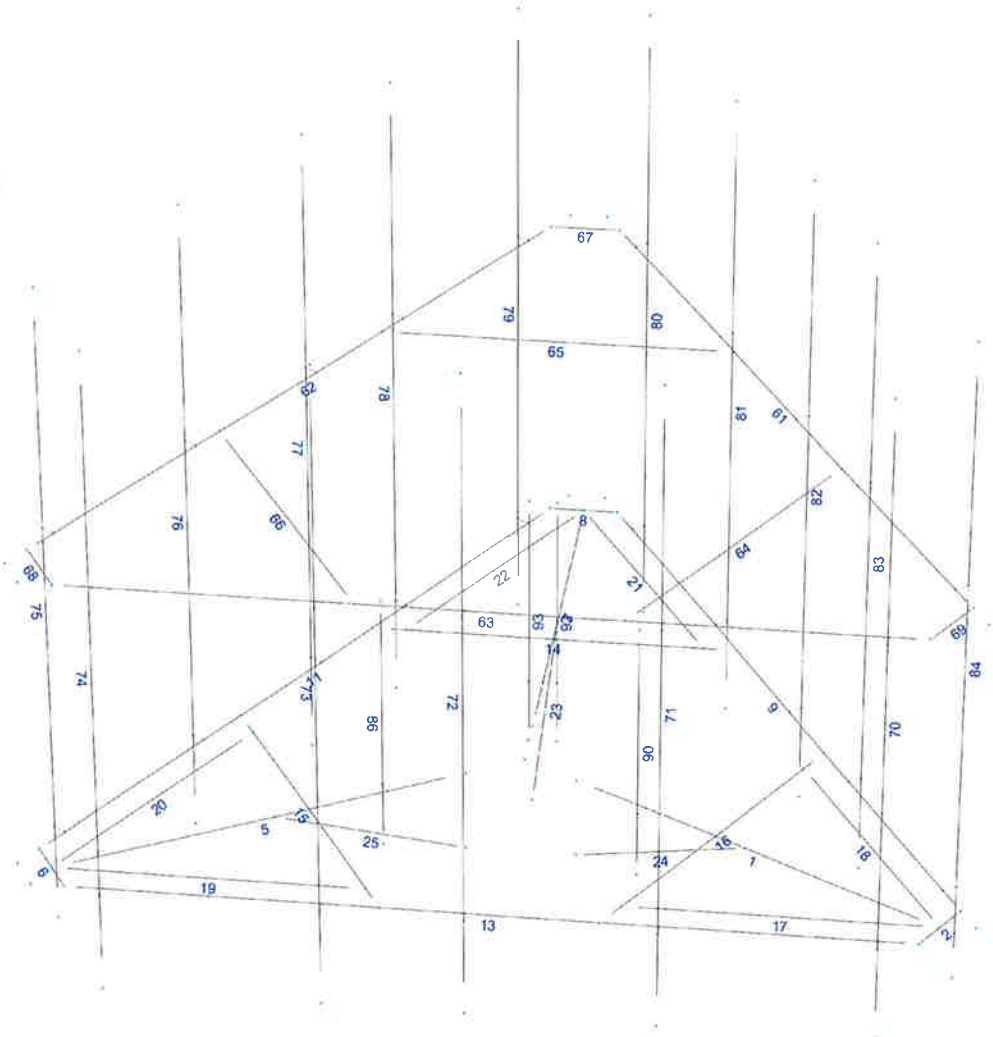
Not designed
Error on design
Design O.K.
With warnings





Bentley

Current Date: 10/9/2019 10:19 AM
Units system: English
File name: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\AT&T\CT\CT5448\LTE (6C 7C)\CT5448 (LTE 6C 7C)(M(



Bentley

Current Date: 10/9/2019 10:19 AM
Units system: English
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Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

LC1=1.2DL+W0
LC2=1.2DL+W30
LC3=1.2DL-W0
LC4=1.2DL-W30
LC5=0.9DL+W0
LC6=0.9DL+W30
LC7=0.9DL-W0
LC8=0.9DL-W30
LC9=1.2DL+Di+Wi0
LC10=1.2DL+Di+Wi30
LC11=1.2DL+Di-Wi0
LC12=1.2DL+Di-Wi30
LC13=1.2DL
LC15=1.2DL+1.5LL1
LC16=1.2DL+1.5LL2
LC17=1.2DL+WL0+1.5LLa1
LC18=1.2DL+WL30+1.5LLa1
LC19=1.2DL-WL0+1.5LLa1
LC20=1.2DL-WL30+1.5LLa1
LC21=1.2DL+WL0+1.5LLa2
LC22=1.2DL+WL30+1.5LLa2
LC23=1.2DL-WL0+1.5LLa2
LC24=1.2DL-WL30+1.5LLa2
LC25=1.2DL+WL0+1.5LLa3
LC26=1.2DL+WL30+1.5LLa3
LC27=1.2DL-WL0+1.5LLa3
LC28=1.2DL-WL30+1.5LLa3
LC29=1.2DL+WL0+1.5LLa4
LC30=1.2DL+WL30+1.5LLa4
LC31=1.2DL-WL0+1.5LLa4
LC32=1.2DL-WL30+1.5LLa4

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	C 3-3/8x3/16	**14**	LC1 at 50.00%	**0.81**	**OK**	
		15	LC2 at 48.44%	0.79	OK	
		16	LC4 at 50.00%	0.79	OK	
	L 2X2X3_16	**17**	LC4 at 0.00%	0.50	OK	
		18	LC4 at 100.00%	0.46	OK	
		19	LC2 at 100.00%	0.50	OK	
		20	LC2 at 0.00%	0.47	OK	
		21	LC1 at 0.00%	0.54	OK	
		22	LC1 at 100.00%	**0.54**	**OK**	
	PIPE 2x0.154	**61**	LC1 at 31.87%	0.55	OK	
		62	LC3 at 91.88%	0.66	OK	
		63	LC4 at 31.87%	0.68	OK	
		64	LC1 at 100.00%	0.69	OK	
		65	LC2 at 100.00%	0.71	OK	
		66	LC1 at 0.00%	0.71	OK	

	70	LC2 at 83.33%	0.64	OK
	71	LC4 at 83.33%	0.84	OK
	72	LC2 at 83.33%	0.86	OK
	73	LC2 at 83.33%	0.85	OK
	74	LC4 at 83.33%	0.59	OK
	75	LC1 at 83.33%	0.68	OK
	76	LC1 at 83.33%	0.82	OK
	77	LC1 at 83.33%	0.89	OK
	78	LC1 at 83.33%	0.83	OK
	79	LC3 at 83.33%	0.60	OK
	80	LC3 at 83.33%	0.62	OK
	81	LC1 at 83.33%	0.81	OK
	82	LC1 at 83.33%	**0.90**	**OK**
	83	LC1 at 83.33%	0.80	OK
	84	LC1 at 83.33%	0.63	OK
	86	LC1 at 71.88%	0.06	OK
	90	LC3 at 71.88%	0.06	OK
	92	LC1 at 71.88%	0.05	OK
	93	LC1 at 71.88%	0.05	OK
PIPE 3-1_2x0.226	**1**	LC4 at 46.88%	0.70	OK
	5	LC2 at 46.88%	0.72	OK
	7	LC1 at 48.44%	**0.74**	**OK**
	9	LC1 at 37.50%	0.32	OK
	11	LC3 at 37.50%	0.30	OK
	13	LC2 at 62.50%	0.35	OK
PL 4x1/4	**67**	LC4 at 100.00%	**0.80**	**OK**
	68	LC1 at 100.00%	0.70	OK
	69	LC1 at 0.00%	0.58	OK
PL 6x3/8	**2**	LC4 at 50.00%	0.39	OK
	6	LC2 at 46.88%	0.36	OK
	8	LC1 at 50.00%	**0.42**	**OK**
T2L 3X3X1_4	**23**	LC1 at 100.00%	0.60	OK
	24	LC4 at 100.00%	0.59	OK
	25	LC2 at 100.00%	**0.61**	**OK**

Bentley

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Units system: English
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Geometry data

GLOSSARY

Cb22, Cb33	: Moment gradient coefficients
Cm22, Cm33	: Coefficients applied to bending term in interaction formula
d0	: Tapered member section depth at J end of member
DJX	: Rigid end offset distance measured from J node in axis X
DJY	: Rigid end offset distance measured from J node in axis Y
DJZ	: Rigid end offset distance measured from J node in axis Z
DKX	: Rigid end offset distance measured from K node in axis X
DKY	: Rigid end offset distance measured from K node in axis Y
DKZ	: Rigid end offset distance measured from K node in axis Z
dL	: Tapered member section depth at K end of member
Ig factor	: Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
K22	: Effective length factor about axis 2
K33	: Effective length factor about axis 3
L22	: Member length for calculation of axial capacity
L33	: Member length for calculation of axial capacity
LB pos	: Lateral unbraced length of the compression flange in the positive side of local axis 2
LB neg	: Lateral unbraced length of the compression flange in the negative side of local axis 2
RX	: Rotation about X
RY	: Rotation about Y
RZ	: Rotation about Z
TO	: 1 = Tension only member 0 = Normal member
TX	: Translation in X
TY	: Translation in Y
TZ	: Translation in Z

Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
1	0.00	0.00	0.00	0
2	0.7794	0.00	0.45	0
3	6.1055	0.00	3.525	0
4	5.8555	0.00	3.958	0
5	6.3555	0.00	3.092	0
10	-0.7794	0.00	0.45	0
11	-6.1055	0.00	3.525	0
12	-6.3555	0.00	3.092	0
14	0.00	0.00	-0.90	0
15	0.00	0.00	-7.05	0
16	0.50	0.00	-7.05	0
17	-0.50	0.00	-7.05	0
19	0.2715	0.00	-7.4458	0
20	6.584	0.00	3.4878	0
23	-6.584	0.00	3.4878	0
24	-0.2715	0.00	-7.4458	0
27	6.3125	0.00	3.958	0
28	-6.3125	0.00	3.958	0
30	-4.184	0.00	-0.6691	0
33	4.184	0.00	-0.6691	0
34	2.6715	0.00	-3.2889	0

37	-1.5125	0.00	3.958	0
38	1.5125	0.00	3.958	0
39	-1.7625	0.00	3.525	0
40	-3.934	0.00	-0.2361	0
43	3.934	0.00	-0.2361	0
44	1.7625	0.00	3.525	0
47	-2.1715	0.00	-3.2889	0
48	2.1715	0.00	-3.2889	0
49	0.7794	-1.25	0.45	0
50	0.00	-1.25	-0.90	0
51	-0.7794	-1.25	0.45	0
52	2.8482	0.00	1.6444	0
53	3.2813	0.00	1.8944	0
58	-2.8482	0.00	1.6444	0
59	-3.2813	0.00	1.8944	0
60	0.00	0.00	-3.2889	0
61	0.00	0.00	-3.7889	0
132	0.2715	4.80	-7.4458	0
133	6.584	4.80	3.4878	0
134	-6.584	4.80	3.4878	0
135	-0.2715	4.80	-7.4458	0
136	6.3125	4.80	3.958	0
137	-6.3125	4.80	3.958	0
138	-2.5215	4.80	-3.5487	0
139	-4.334	4.80	-0.4093	0
143	2.5215	4.80	-3.5487	0
145	1.8125	4.80	3.958	0
146	0.50	4.80	-7.05	0
147	-0.50	4.80	-7.05	0
148	-6.3555	4.80	3.092	0
149	-5.8555	4.80	3.958	0
150	5.8555	4.80	3.958	0
151	6.3555	4.80	3.092	0
152	6.2572	-1.50	2.5218	0
154	3.7572	-1.50	-1.8084	0
155	2.4447	-1.50	-4.0817	0
156	0.9447	-1.50	-6.6798	0
157	-0.9447	-1.50	-6.6798	0
158	-2.4447	-1.50	-4.0817	0
160	-4.7572	-1.50	-0.0763	0
161	-6.2572	-1.50	2.5218	0
162	-5.3125	-1.50	4.158	0
163	-2.3125	-1.50	4.158	0
164	-0.3125	-1.50	4.158	0
165	2.3125	-1.50	4.158	0
166	5.3125	-1.50	4.158	0
167	-2.4447	8.50	-4.0817	0
168	-3.4447	8.50	-2.3496	0
169	-4.7572	8.50	-0.0763	0
170	-6.2572	8.50	2.5218	0
171	-5.3125	8.50	4.158	0
172	-2.3125	8.50	4.158	0
173	-0.3125	8.50	4.158	0
174	6.2572	8.50	2.5218	0
176	3.7572	8.50	-1.8084	0
177	2.4447	8.50	-4.0817	0
178	0.9447	8.50	-6.6798	0
180	2.3125	8.50	4.158	0
181	5.3125	8.50	4.158	0
184	-1.9138	-1.00	0.874	0

185	-1.9138	3.00	0.874	0
192	1.7138	-1.00	1.2204	0
193	1.7138	3.00	1.2204	0
196	0.20	-1.00	-2.0944	0
197	0.20	3.00	-2.0944	0
199	-0.20	3.00	-2.0944	0
200	-0.20	-1.00	-2.0944	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
2	1	1	1	1	1	1
10	1	1	1	1	1	1
14	1	1	1	1	1	1
49	1	1	1	1	1	1
50	1	1	1	1	1	1
51	1	1	1	1	1	1

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	lg factor
1	2	3		PIPE 3-1_2x0.226	A53 GrB	0.00	0.00	0.00
2	4	5		PL 6x3/8	A36	0.00	0.00	0.00
5	10	11		PIPE 3-1_2x0.226	A53 GrB	0.00	0.00	0.00
6	12	13		PL 6x3/8	A36	0.00	0.00	0.00
7	14	15		PIPE 3-1_2x0.226	A53 GrB	0.00	0.00	0.00
8	16	17		PL 6x3/8	A36	0.00	0.00	0.00
9	19	20		PIPE 3-1_2x0.226	A53 GrB	0.00	0.00	0.00
11	23	24		PIPE 3-1_2x0.226	A53 GrB	0.00	0.00	0.00
13	27	28		PIPE 3-1_2x0.226	A53 GrB	0.00	0.00	0.00
14	29	34		C 3-3/8x3/16	A36	0.00	0.00	0.00
15	30	37		C 3-3/8x3/16	A36	0.00	0.00	0.00
16	38	33		C 3-3/8x3/16	A36	0.00	0.00	0.00
17	3	44		L 2X2X3_16	A36	0.00	0.00	0.00
18	43	3		L 2X2X3_16	A36	0.00	0.00	0.00
19	39	11		L 2X2X3_16	A36	0.00	0.00	0.00
20	11	40		L 2X2X3_16	A36	0.00	0.00	0.00
21	15	48		L 2X2X3_16	A36	0.00	0.00	0.00
22	47	15		L 2X2X3_16	A36	0.00	0.00	0.00
23	50	61		T2L 3X3X1_4	A36	0.00	0.00	0.00
24	49	53		T2L 3X3X1_4	A36	0.00	0.00	0.00
25	51	59		T2L 3X3X1_4	A36	0.00	0.00	0.00
61	132	133		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
62	134	135		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
63	136	137		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
64	142	145		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
65	138	143		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
66	144	139		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
67	146	147		PL 4x1/4	A36	0.00	0.00	0.00
68	148	149		PL 4x1/4	A36	0.00	0.00	0.00

69	150	151	PL 4x1/4	A36	0.00	0.00	0.00
70	181	166	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
71	180	165	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
72	173	164	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
73	172	163	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
74	171	162	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
75	170	161	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
76	169	160	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
77	168	159	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
78	167	158	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
79	179	157	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
80	178	156	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
81	177	155	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
82	176	154	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
83	175	153	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
84	174	152	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
86	185	184	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
90	193	192	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
92	197	196	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
93	199	200	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00

Orientation of local axes

Member	Rotation [Deg]	Axes23	NX	NY	NZ
64	90.00	0	0.00	0.00	0.00
65	90.00	0	0.00	0.00	0.00
66	90.00	0	0.00	0.00	0.00
67	90.00	0	0.00	0.00	0.00
68	90.00	0	0.00	0.00	0.00
69	90.00	0	0.00	0.00	0.00
86	0.00	2	0.50	0.00	0.866
90	0.00	2	0.50	0.00	-0.866

EXHIBIT 3

TOWN OF MANCHESTER
PLANNING DEPARTMENT

TO: Steven R. Werbner, General Manager

FROM: Mark Pellegrini, Director of Neighborhood Services and Economic Development

DATE: March 21, 2002

RE: Mandatory Referral Report
Police Station Radio Tower and Parking Lot Expansion (MR-0201)

At its meeting of March 18, 2002 the Planning and Zoning Commission voted unanimously to endorse the proposal to construct a monopole tower at the Manchester Police Headquarters, dismantle the existing tower, and build a new parking lot as shown on plans submitted by the Manchester Police Department dated September 11, 2001 and amended to September 26, 2001. In making this decision the Planning and Zoning Commission considered my memorandum of March 14, 2002 (copy attached) as well as a review of the site plan and photo simulations of the proposed new tower presented by Lt. Marc Montminy at their meeting.

MP/s
R:\SHARON09\MARK\MEMOS\Werbner-MR0102.doc

Attach.

TOWN OF MANCHESTER
PLANNING DEPARTMENT

TO: Planning and Zoning Commission

FROM: Mark Pellegrini, Director of Neighborhood Services And Economic Development

DATE: March 14, 2002

RE: Mandatory Referral Report
Police Station Radio Tower and Parking Lot Expansion (MR-0201)

The Planning and Zoning Commission is being asked to report on a proposal developed by the Manchester Police Department to replace its current radio tower and build a new parking lot in the location of the current tower at the Police Headquarters.

Description of Project

The police department has an existing 190' high lattice-type radio tower to serve its radio communications needs. The department wishes to replace this tower and equipment. They also have experienced parking problems, especially on Princeton Street, during daytime hours. The activity at the department's headquarters has created a greater demand for daytime parking than originally anticipated. Relocating the tower would provide room to add parking in front of the garage along Middle Turnpike. Attached is a site plan showing the proposed new tower location and the new parking lot, as well as a series of photo simulations showing the potential visual impact of the new monopole tower proposed to be constructed here.

There is no PZC approval aside from this mandatory referral report required for this project. The parking lot is less than one-half acre and therefore no erosion control plan will be needed. The new monopole tower is a permitted accessory structure and will only require a building permit and zoning permit from the Zoning Enforcement Officer.

Construction and Other Uses

The Police Department, through the Town, issued a request for proposals for the construction of the replacement tower. The proposal favored by the department was received from Sprint PCS. Under this proposal Sprint would pay for the construction of the new tower, provide new radio and related equipment to allow for a "hot" transfer so there will be no interruption in police communication during the switch-over from one tower to the other. Sprint PCS will also construct the parking lot and landscaping as proposed on the attached plans. In exchange for

these services, the police department will allow Sprint to locate a personal communications system antenna array on the tower and related hardware on the ground near the tower. The tower will also be capable of holding additional PCS arrays at the discretion of the Town.

Recommendation

The proposed improvements to the police department's headquarters site would be generally consistent with our Plan of Conservation and Development. The police department does require a tall communications antenna for its communication needs, which has become more sophisticated as communications and computing technology have evolved. It would also be beneficial to have more on-site parking at the police department to relive the traffic problems experienced on Princeton Street and to a lesser extent on Middle Turnpike during certain times of the day.

The construction of a 190±' monopole in this location will have some visual impact. It is possible through the proposed planting around the base of the unit and equipment cabinets to minimize the view of the lowest portions of the tower from passing motorists, but this area would primarily be visible to people driving into the Illing Middle School. The upper portions of the tower will be visible from various locations in the vicinity as shown on the attached photo simulations. The only alternative to a monopole tower would be a lattice-type tower, which in some respects is less intrusive since there is so much open air around the structure itself. However, we have been advised that such towers may become less attractive if multiple antenna arrays are placed on them and increased cabling is run up to the arrays. Lattice towers also require a larger footprint.

MP/s
R:\SHARON09\PZCMEMOS\18MAR02-PZC memos\MR-0201.doc

Attach.

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

February 11, 2019

Jack Andrews
Zoning Manager
Empire Telecom
10130 Donleigh Drive
Columbia, MD 21046

RE: **EM-AT&T-077-190117** – AT&T notice of intent to modify an existing telecommunications facility located at 239 Middle Turnpike Road, Manchester, Connecticut.

Dear Mr. Andrews:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

1. Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;

2. Any material changes to this modification as proposed shall require the filing of a new notice with the Council;

3. Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;

4. Any nonfunctioning antenna and associated antenna mounting equipment on this facility owned and operated by AT&T shall be removed within 60 days of the date the antenna ceased to function;

5. The validity of this action shall expire one year from the date of this letter; and

6. The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration.

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated January 8, 2019. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site by any dimension, increase noise levels at the tower site boundary by six decibels or more, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standards adopted by the Federal Communications Commission pursuant to Section 704 of the Telecommunications Act of 1996 and by the state Department of Energy and Environmental Protection pursuant to Connecticut General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below state and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require

explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/FOC/emr

c: The Honorable Jay Moran, Mayor, Town of Manchester
Scott A. Shanley, General Manager, Town of Manchester
James Davis, Zoning Enforcement Officer, Town of Manchester

EXHIBIT 4

239 MIDDLE TURNPIKE EAST

Location	239 MIDDLE TURNPIKE EAST	**Mblu**	92/ 3950/ 239/ /
Acct#	395000239	**Owner**	MANCHESTER TOWN OF
Assessment	$4,243,700	**Appraisal**	$6,062,100
PID	10705	**Building Count**	2
DISTRICT	X	**CONCRETE**	

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$5,573,900	$488,200	$6,062,100
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$3,901,900	$341,800	$4,243,700

Owner of Record

Owner MANCHESTER TOWN OF
Address 41 CENTER ST
MANCHESTER, CT 06040-5096

Sale Price $0
Certificate C
Book & Page
Sale Date

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
MANCHESTER TOWN OF	$0	C		

Building Information

Building 1 : Section 1

Year Built: 1995
Living Area: 46,701
Replacement Cost: $6,306,043
Replacement Cost Less Depreciation: $5,044,800

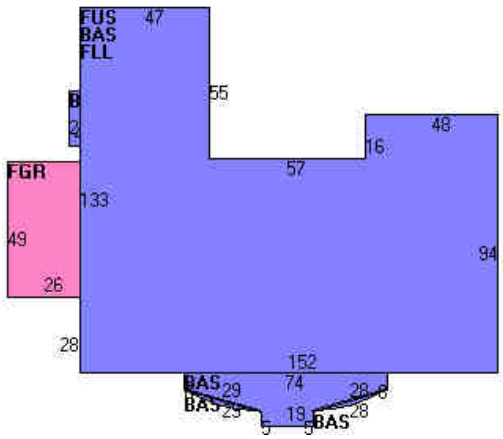
Building Attributes	
Field	**Description**

STYLE	Other Municip
MODEL	Ind/Comm
Grade	Average +10
Stories:	2
Occupancy	1
Exterior Wall 1	Brick Veneer
Exterior Wall 2	Stucco/Masonry
Roof Structure	Flat
Roof Cover	Tar + Gravel
Interior Wall 1	Minim/Masonry
Interior Wall 2	Drywall/Sheetr
Interior Floor 1	Carpet
Interior Floor 2	Tile/Vinyl Cmp
Heating Fuel	Gas
Heating Type	Forced Air-Duc
AC Type	Central
Bldg Use	Municipal 96
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	901I
Heat/AC	Heat/AC Packag
Frame Type	Steel
Baths/Plumbing	Average
Ceiling/Wall	Susp Ceil & Wl
Rooms/Prtns	Average
Wall Height	10
% Comn Wall	0

Building Photo

(http://images.vgsi.com/photos2/ManchesterCTPhotos//\00\03\2

Building Layout



(http://images.vgsi.com/photos2/ManchesterCTPhotos//Sketches

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	16,283	16,283
FLL	Finished Lower Level	15,209	15,209
FUS	Upper Story, Finished	15,209	15,209
FGR	Garage	1,274	0
		47,975	46,701

Building 2 : Section 1

Year Built: 1975
Living Area: 7,000
Replacement Cost: $506,690
Replacement Cost Less Depreciation: $309,100

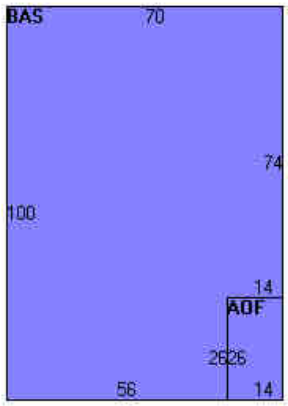
Building Attributes : Bldg 2 of 2	
Field	**Description**
STYLE	Service Shop

MODEL	Ind/Comm
Grade	Average
Stories:	1
Occupancy	1
Exterior Wall 1	Brick Veneer
Exterior Wall 2	
Roof Structure	Gable/Hip
Roof Cover	Asphalt Shingl
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Forced Air-Duc
AC Type	None
Bldg Use	Municipal 96
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	901I
Heat/AC	Heat/AC Packag
Frame Type	Masonry
Baths/Plumbing	Average
Ceiling/Wall	Ceil & Min Wl
Rooms/Prtns	Average
Wall Height	19
% Comn Wall	0

Building Photo

(http://images.vgsi.com/photos2/ManchesterCTPhotos//\00\03\2

Building Layout



(http://images.vgsi.com/photos2/ManchesterCTPhotos//Sketches

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	6,636	6,636
AOF	Office, (Average)	364	364
		7,000	7,000

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
MEZ1	Mezzanine-Unfin	1900 S.F.	$13,300	2
SPR1	Sprinklers-Wet	47975 S.F.	$54,000	1

Land

Land Use

Use Code 901I

Land Line Valuation

Size (Acres) 3.97

Description	Municipal 96	**Frontage**	0
Zone	RA	**Depth**	0
Neighborhood	4000	**Assessed Value**	$341,800
Alt Land Appr	No	**Appraised Value**	$488,200
Category			

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV1	Paving Asphalt			97700 S.F.	$122,100	1
FN4	Fence 8' Chain			128 L.F.	$1,900	1
LT1	Lights 1Fix			15 UNITS	$12,900	1
CNP1	Canopy Ave			360 S.F.	$7,800	1
SHD2	Shed W/Imp			120 S.F.	$1,300	1
SHD1	Shed			168 S.F.	$1,500	1
FN3	Fence 6' Chain			160 L.F.	$3,700	1
SHD2	Shed W/Imp			140 S.F.	$1,500	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$4,365,100	$488,200	$4,853,300
2010	$4,125,100	$423,400	$4,548,500
2005	$3,622,600	$380,200	$4,002,800

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$3,055,600	$341,800	$3,397,400
2010	$2,887,500	$296,400	$3,183,900
2005	$2,535,800	$266,200	$2,802,000

Town of Manchester, CT

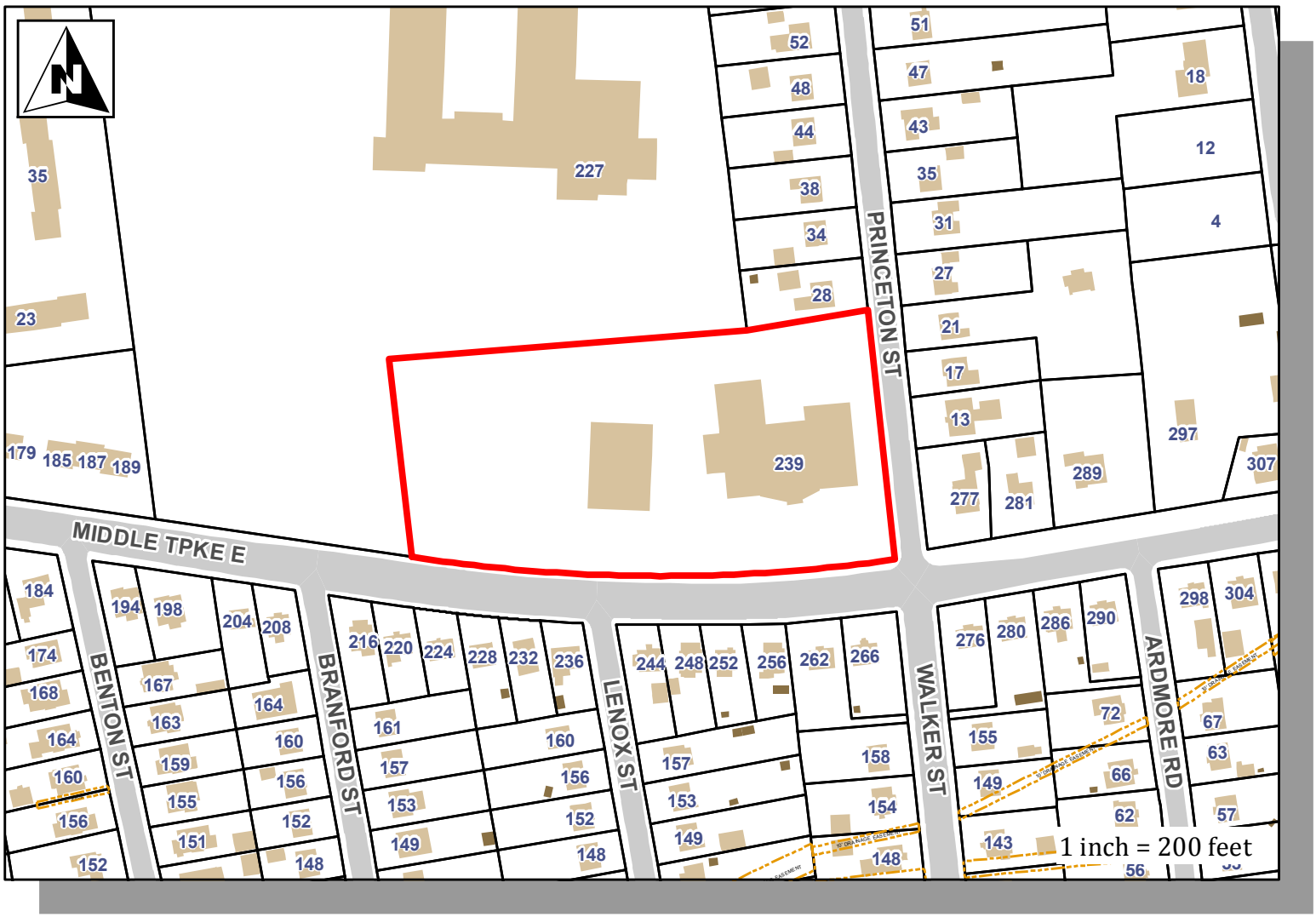
Address: 239 MIDDLE TURNPIKE EAST

RPKEY: 395000239

Property Information:

Mailing Address:	239 MIDDLE TPKE E MANCHESTER, CT
Owner Name:	TOWN OF MANCHESTER
Owner Address:	41 CENTER ST MANCHESTER, CT 06040-5096
Land Class:	Municipal 94
Land Use Code:	901
Zoning:	RA

Acreage:	3.97
Year Built:	1995
Appraisal:	6062100
Assessment:	4243700
Sale Price:	$0.00
Sale Date:	00/00/0000
Book/Page:	0/0



Report Created: 4/5/2019

EXHIBIT 5

Radio Frequency Emissions Analysis Report

Site Name: **CT5448**

239 Middle Turnpike East
Manchester, Connecticut 06040

January 28, 2020

Centerline Communications Project Number: 950012-350

Site Compliance Summary	
Compliance Status:	**Compliant**
Site total MPE% of FCC general population allowable limit:	**19.05%**
AT&T total MPE% of FCC general population allowable limit:	**15.67%**

750 West Center St. Suite 301 | West Bridgewater, MA 02379

January 28, 2020

AT&T Mobility – New England
Attn: John Benedetto, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 01701

Emissions Analysis for Site: **CT5448**

Centerline Communications, LLC ("Centerline") was directed to analyze the proposed AT&T facility to be located on **a monopole** at **239 Middle Turnpike East, Manchester Connecticut 06040** for the purpose of determining whether the emissions from the proposed facility are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (∝W/cm2). The number of ∝W/cm^2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter (μW/cm^2). The general population exposure limits for the 1900 MHz (PCS) and 5 GHz (B46) bands is 1000 μW/cm^2.

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, 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 performed for the proposed facility using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing focused omnidirectional 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 manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. This is a very conservative estimate since the gain reduction in actual applications is typically greater than 10 dB in the direction of ground immediately surrounding the facility. Real world emissions values from this facility are expected to be lower than values listed in this report at ground level. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Antenna	Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
ATT A1	LTE	850	1	40
ATT A2	LTE	700	2	40
ATT A2	LTE	2300	4	25
ATT A3	LTE	700	4	40
ATT A3	LTE	2100	4	40
ATT A4	LTE	850	4	40
ATT A4	LTE	700	2	30
ATT A4	LTE	1900	2	60
ATT B1	LTE	850	1	40
ATT B2	LTE	700	2	40
ATT B2	LTE	2300	4	25
ATT B3	LTE	700	4	40
ATT B3	LTE	2100	4	40
ATT B4	LTE	850	4	40
ATT B4	LTE	700	2	30
ATT B4	LTE	1900	2	60
ATT C1	LTE	850	1	40
ATT C2	LTE	700	2	40
ATT C2	LTE	2300	4	25
ATT C3	LTE	700	4	40

ATT C3	LTE	2100	4	40
ATT C4	LTE	850	4	40
ATT C4	LTE	700	2	30
ATT C4	LTE	1900	2	60

Table 1: Channel Data Table

The following antennas listed in *Table 2* were used in the modeling for transmission in the 1900 MHz (PCS), 2100 MHz (AWS) and 5 GHz (Band 46) frequency bands. This is based on information from the carrier with regard to anticipated antenna selection. Maximum gain values for all antennas are listed in the AT&T Antenna Inventory & Power Levels table (Table 3) below in the Results section. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, 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.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Kathein 80010121	146
A	2	CCI OPA-65R-LCUU-H6	146
A	3	Commscope NNH4-65B-R6	146
A	4	CCI OPA-65R-LCUU-H6	146
B	5	Kathein 80010121	146
B	6	CCI OPA-65R-LCUU-H8	146
B	7	Commscope NNH4-65C-R6	146
B	8	CCI OPA-65R-LCUU-H8	146
C	9	Kathein 80010121	146
C	10	CCI OPA-65R-LCUU-H8	146
C	11	Commscope NNH4-65C-R6	146
C	12	CCI OPA-65R-LCUU-H8	146

Table 2: Antenna Data

All calculations were done with respect to uncontrolled / general population threshold limits.

RESULTS

Per the calculations completed for the proposed AT&T configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Antenna Height (ft)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
ATT A1	Kathein 80010121	850	10.95	146	1	40	497.81	0.1481%
ATT A2	CCI OPA-65R-LCUU-H6	700	12.55	146	2	40	1439.10	0.5197%
ATT A2	CCI OPA-65R-LCUU-H6	2300	15.45	146	4	25	3507.52	0.5916%
ATT A3	Commscope NNH4-65B-R6	700	11.65	146	4	40	2339.48	0.8449%
ATT A3	Commscope NNH4-65B-R6	2100	14.55	146	4	40	4561.63	0.7694%
ATT A4	CCI OPA-65R-LCUU-H6	850	12.45	146	4	40	2812.68	0.8367%
ATT A4	CCI OPA-65R-LCUU-H6	700	11.65	146	2	30	877.31	0.3168%
ATT A4	CCI OPA-65R-LCUU-H6	1900	14.85	146	2	60	3665.91	0.6183%
ATT B1	Kathein 80010121	850	10.95	146	1	40	497.81	0.1481%
ATT B2	CCI OPA-65R-LCUU-H8	700	12.55	146	2	40	1439.10	0.5197%
ATT B2	CCI OPA-65R-LCUU-H8	2300	14.95	146	4	25	3126.08	0.5272%
ATT B3	Commscope NNH4-65C-R6	700	13.55	146	4	40	3623.43	1.3086%
ATT B3	Commscope NNH4-65C-R6	2100	15.55	146	4	40	5742.75	0.9686%
ATT B4	CCI OPA-65R-LCUU-H8	850	13.35	146	4	40	3460.35	1.0293%
ATT B4	CCI OPA-65R-LCUU-H8	700	12.55	146	2	30	1079.32	0.3898%
ATT B4	CCI OPA-65R-LCUU-H8	1900	14.85	146	2	60	3665.91	0.6183%
ATT C1	Kathein 80010121	850	10.95	146	1	40	497.81	0.1481%
ATT C2	CCI OPA-65R-LCUU-H8	700	12.55	146	2	40	1439.10	0.5197%
ATT C2	CCI OPA-65R-LCUU-H8	2300	14.95	146	4	25	3126.08	0.5272%
ATT C3	Commscope NNH4-65C-R6	700	13.55	146	4	40	3623.43	1.3086%
ATT C3	Commscope NNH4-65C-R6	2100	15.55	146	4	40	5742.75	0.9686%
ATT C4	CCI OPA-65R-LCUU-H8	850	13.35	146	4	40	3460.35	1.0293%

ATT C4	CCI OPA-65R-LCUU-H8	700	12.55	146	2	30	1079.32	0.3898%
ATT C4	CCI OPA-65R-LCUU-H8	1900	14.85	146	2	60	3665.91	0.6183%
	All Sectors Composite MPE%							**15.67 %**

FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated AT&T sector(s). Since this proposed facility is utilizing an omnidirectional antenna there is only one sector for this site (Sector A).

AT&T _ Frequency Band / Technology	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (□W/cm²)	Frequency (MHz)	Allowable MPE (□W/cm²)	Calculated % MPE
AT&T 850 MHz	1	497.81	146	0.8396	850 MHz	1000	0.1481%
AT&T 700 MHz	2	1439.10	146	2.4272	700 MHz	1000	0.5197%
AT&T 2300 MHz	4	3507.52	146	5.9158	2300 MHz	1000	0.5916%
AT&T 700 MHz	4	2339.48	146	3.9458	700 MHz	1000	0.8449%
AT&T 2100 MHz	4	4561.63	146	7.6936	2100 MHz	1000	0.7694%
AT&T 850 MHz	4	2812.68	146	4.7438	850 MHz	1000	0.8367%
AT&T 700 MHz	2	877.31	146	1.4797	700 MHz	1000	0.3168%
AT&T 1900MHz	2	3665.91	146	6.1829	1900 MHz	1000	0.6183%
AT&T 850 MHz	1	497.81	146	0.8396	850 MHz	1000	0.1481%
AT&T 700 MHz	2	1439.10	146	2.4272	700 MHz	1000	0.5197%
AT&T 2300 MHz	4	3126.08	146	5.2724	2300 MHz	1000	0.5272%
AT&T 700 MHz	4	3623.43	146	6.1113	700 MHz	1000	1.3086%
AT&T 2100 MHz	4	5742.75	146	9.6857	2100 MHz	1000	0.9686%
AT&T 850 MHz	4	3460.35	146	5.8362	850 MHz	1000	1.0293%
AT&T 700 MHz	2	1079.32	146	1.8204	700 MHz	1000	0.3898%
AT&T 1900MHz	2	3665.91	146	6.1829	1900 MHz	1000	0.6183%
AT&T 850 MHz	1	497.81	146	0.8396	850 MHz	1000	0.1481%
AT&T 700 MHz	2	1439.10	146	2.4272	700 MHz	1000	0.5197%
AT&T 2300 MHz	4	3126.08	146	5.2724	2300 MHz	1000	0.5272%
AT&T 700 MHz	4	3623.43	146	6.1113	700 MHz	1000	1.3086%
AT&T 2100 MHz	4	5742.75	146	9.6857	2100 MHz	1000	0.9686%
AT&T 850 MHz	4	3460.35	146	5.8362	850 MHz	1000	1.0293%
AT&T 700 MHz	2	1079.32	146	1.8204	700 MHz	1000	0.3898%
AT&T 1900MHz	2	3665.91	146	6.1829	1900 MHz	1000	0.6183%
All Sectors						**Total:**	**15.67%**

Table 6: AT&T Maximum Sector MPE Power Values

Summary

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

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

AT&T Sector	Power Density Value (%)
Sector A:	4.65%
Sector B:	5.51%
Sector C:	5.51%
AT&T Maximum Site Total:	15.67%
AT&T Site Total:	**15.67%**
Composite Site Total:	19.05%
Site Compliance Status:	**Compliant**

The anticipated composite MPE value for this site assuming all carriers present is **19.05%** of the allowable FCC established general population limit sampled at the ground level.

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.

Michelle L. Stone
RF Compliance Consultant
Centerline Communications, LLC
750 West Center St. Suite 301
West Bridgewater, MA 02379

EXHIBIT 6

STRUCTURAL ANALYSIS REPORT

For

SITE NUMBER: CT5448

SITE NAME: MANCHESTER CENTRAL

239 Middle Turnpike East
Manchester, CT 06040

Antennas Mounted to the Monopole

Prepared for:

CENTERLINE COMMUNICATIONS

at&t

Dated: December 10, 2019

Prepared by:

HUDSON Design Group LLC

45 Beechwood Drive
North Andover, MA 01845
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www.hudsondesigngroupllc.com

STATE OF CONNECTICUT
GI KAI WANG
No. 28220
LICENSED PROFESSIONAL ENGINEER
12/10/2019

SCOPE OF WORK:

Hudson Design Group LLC (HDG) has been authorized by AT&T to conduct a structural evaluation of the 183' monopole supporting the proposed AT&T's antennas located at elevation 146' above the ground level.

This report represents this office's findings, conclusions and recommendations pertaining to the support of AT&T's existing and proposed antennas listed below.

Record drawings of the existing monopole prepared by Engineered Endeavors Inc., dated September 17, 2002, were available for our use. Structural analysis with monopole modification report prepared by this office, dated September 25, 2015, was used for monopole analysis.

Tower mapping report prepared by ProVertic LLC, dated October 15, 2019, was provided to this office.

CONCLUSION SUMMARY:

Based on our evaluation, we have determined that the existing monopole and foundation **are in conformance** with the ANSI/TIA-222-G Standard for the loading considered under the criteria listed in this report. The monopole structure is rated at **96.9%** - (Foundation Controlling).

HUDSON Design Group LLC

APPURTENANCES CONFIGURATION:

Tenant	Appurtenances	Elev.	Mount
	Lightning Rod	191’	Low Profile Platform
	(2) 2’ Dishes	190’	Low Profile Platform
	(2) SODU 48VDC XALT	188’	Low Profile Platform
	(2) 20’ Dipole	185’	Low Profile Platform
T-MOBILE	(3) AIR3246 Antennas	162’	Low Profile Platform
T-MOBILE	(3) AIR 32 Antennas	162’	Low Profile Platform
T-MOBILE	(3) APXVAA24-43-U-A20 Antennas	162’	Low Profile Platform
T-MOBILE	(3) KRY 112 144/1	162’	Low Profile Platform
T-MOBILE	(3) Radio 4449	163’	Low Profile Platform
Sprint	(3) APXVSPP18 Antennas	156’	Low Profile Platform
Sprint	(3) APXVTM14-C-120 Antennas	156’	Low Profile Platform
Sprint	(3) RRH8x20-25	159’	Low Profile Platform
Sprint	(3) RRH-800	156’	Low Profile Platform
Sprint	(3) RRH-1900	157’	Ring Mount
Sprint	(3) RRH-1900	156’	Ring Mount
	Panel Antenna	154’	Low Profile Platform
	(2) 2’ Dishes	152’	Low Profile Platform
	3’ Dish	151’	Low Profile Platform
AT&T	(3) 800-10121 Antennas	146’	Platform w/handrails
AT&T	(2) OPA-65R-LCUU-H6 Antennas	146’	Platform w/handrails
AT&T	(4) OPA-65R-LCUU-H8 Antennas	146’	Platform w/handrails
AT&T	(6) LGP21401	146’	Platform w/handrails
AT&T	(6) LGP21901	146’	Platform w/handrails
AT&T	(3) RRUS-11	146’	Platform w/handrails
AT&T	(6) RRUS-32	146’	Platform w/handrails
AT&T	(2) DC6-48-60-18-8F	146’	Platform w/handrails
AT&T	***(1) NNH4-65B-R6 Antenna***	146’	Platform w/handrails
AT&T	***(2) NNH4-65C-R6 Antennas***	146’	Platform w/handrails
AT&T	***(3) RRUS-12***	146’	Platform w/handrails
AT&T	***(3) A2 Module***	146’	Platform w/handrails
AT&T	***(3) RRUS-E2***	146’	Platform w/handrails
AT&T	***(3) RRUS 4478 B14***	146’	Platform w/handrails
AT&T	***(3) RRUS 4478 B5***	146’	Platform w/handrails
AT&T	***(2) DC6-48-60-0-8C-EV***	146’	Platform w/handrails
	6’ Omni	135’	Low Profile Platform
	6’ Omni	129.5’	Low Profile Platform
	Dipole	128.5’	Low Profile Platform
	24” Yagi	128.5’	Low Profile Platform
	15” Yagi	125.5’	Low Profile Platform
	2.5’ Yagi	121.5’	Low Profile Platform

APPURTENANCES CONFIGURATION (continued):

VERIZON	(6) LNX 6514DS-VTM Antennas	113’	Platform w/handrails
VERIZON	(2) RxxDC-3315-PF-48	113’	Platform w/handrails
VERIZON	(6) NNHH-65B-R4 Antennas	113’	Platform w/handrails
VERIZON	(3) B5/B13 RRH-BRO4C	113’	Platform w/handrails
VERIZON	(3) B2/B66A RRH-BRO49	113’	Platform w/handrails
	GPS	54.5’	Side Mount Standoff

Proposed AT&T Appurtenances shown in Bold.

AT&T EXISTING/PROPOSED COAX CABLES:

Tenant	Coax Cables	Elev.	Mount
AT&T	(6) 1 5/8” Cables	146’	Inside Monopole
AT&T	(4) DC Power Cables	146’	Inside Monopole
AT&T	(2) Fiber Cables	146’	Inside Monopole
AT&T	***(4) DC Power Cables***	146’	Inside Monopole

Proposed AT&T Coax Cables shown in Bold.

ANALYSIS RESULTS SUMMARY:

Component	Max. Stress Ratio	Elev. of Component (ft)	Pass/Fail	Comments
Pole Section-L1	14.8 %	166.5 – 184.0	PASS	
Pole Section-L2	73.8 %	133.1 – 166.5	PASS	
Pole Section-L3	80.9 %	113.0 – 133.1	PASS	
Pole Section-L4	90.2 %	88.0 – 113.0	PASS	
Pole Section-L5	92.6 %	43.9 – 88.0	PASS	
Pole Section-L6	87.9 %	1.0 – 43.9	PASS	
Base Plate	92.0 %	1.0	PASS	
Foundation	**96.9 %**	-	PASS	**Controlling**

HUDSON Design Group LLC

DESIGN CRITERIA:

1. EIA/TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures

2. 2018 Connecticut State Building Code

   County: Hartford
   City/Town: Manchester
   Wind Load: 97 mph (3 second gust)
   Structural Class: III
   Exposure Category: B
   Topographic Category: 1
   Crest Height: 0 ft.
   Ice Thickness: 1.0 inch

3. Approximate height above grade to proposed antennas: 146'

ASSUMPTIONS:

1. The monopole dimensions, member sizes and strength of material are as indicated in the record drawings prepared by Engineered Endeavors Inc., dated September 17, 2002.

2. The appurtenances configuration is as stated in this report. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer's requirements.

3. The monopole and foundation are properly constructed and maintained. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.

4. All prior structural modification, if any, are assumed to be as per the data supplied (if available), and installed properly.

SUPPORT RECOMMENDATIONS:

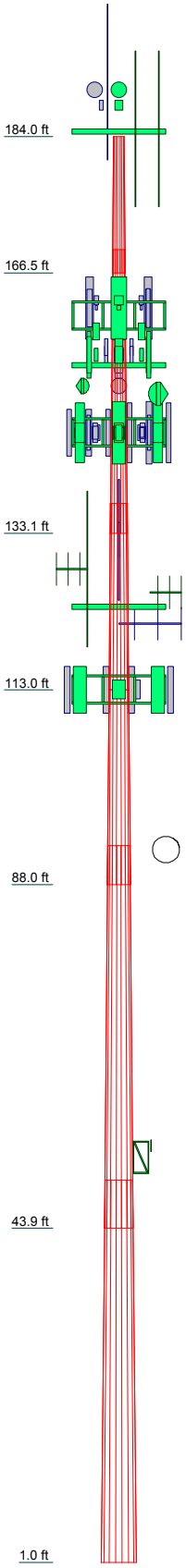
HDG recommends that the proposed antennas, RRHs and surge arrestors be mounted on the existing steel platform supported by the monopole.

Photo 1: Photo illustrating the Monopole with Appurtenances shown.

HUDSON
Design Group LLC

CALCULATIONS

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (lb)
1	17.50	18	0.1875	3.00	15.5000	19.3990		611.7
2	36.42	18	0.2500	3.83	18.3556	26.4010		2176.1
3	23.92	18	0.3750		25.0549	30.2850		2644.3
4	25.00	18	0.4150	5.00	30.2850	35.8920	A572-65	3661.2
5	49.08	18	0.4850	6.17	33.9406	44.9030		10010.3
6	49.08	18	0.5400		42.5549	53.5000		13593.1
								32696.8



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
HP2-102	190	(2) Powerwave TMA LGP21401	146
HP2-102	190	(2) Powerwave TMA LGP21401	146
SODU 48VDC XALT	188	(2) Powerwave LGP21900	146
SODU 48VDC XALT	188	(2) Powerwave LGP21900	146
20'-4 Bay Dipole	185	(2) Powerwave LGP21900	146
20'-4 Bay Dipole	185	Ericsson RRUS-11	146
Lightning Rod w/Pipe Extension	185	Ericsson RRUS-11	146
PiROD 13' Low Profile Platform	185	Ericsson RRUS-11	146
4449 B71+B12	163	(2) Ericsson RRUS-32	146
4449 B71+B12	163	(2) Ericsson RRUS-32	146
4449 B71+B12	163	(2) Ericsson RRUS-32	146
AIR 32 B66AA/B2P w/mount pipe	162	DC6-48-60-18-8F	146
AIR 32 B66AA/B2P w/mount pipe	162	DC6-48-60-18-8F	146
APXVAA24-43-U-A20 w/mount pipe	162	NNH4-65B-R6 w/ Mount Pipe (ATI - proposed)	146
APXVAA24-43-U-A20 w/mount pipe	162		
APXVAA24-43-U-A20 w/mount pipe	162	NNH4-65C-R6 w/ Mount Pipe	146
KRY 112 144/1	162	NNH4-65C-R6 w/ Mount Pipe	146
KRY 112 144/1	162	Ericsson RRUS-12	146
KRY 112 144/1	162	Ericsson RRUS-12	146
AIR3246 B66 w/mount pipe	162	Ericsson RRUS-12	146
AIR3246 B66 w/mount pipe	162	Ericsson A2 Module	146
AIR 32 B66AA/B2P w/mount pipe	162	Ericsson A2 Module	146
AIR3246 B66 w/mount pipe	162	Ericsson A2 Module	146
PiROD 12' Platform w / handrails (T-Mobile)	161	Ericsson RRUS-E2	146
		Ericsson RRUS-E2	146
Ring Mount	160	Ericsson RRUS-E2	146
RRH 8x20-25	159	RRUS 4478 B14	146
RRH 8x20-25	159	RRUS 4478 B14	146
RRH 8x20-25	159	RRUS 4478 B14	146
RRH-1900	157	RRUS 4478 B5	146
RRH-1900	157	RRUS 4478 B5	146
RRH-1900	157	RRUS 4478 B5	146
APXVTM14-C-120 w/mount pipe	156	(2) DC6-48-60-0-8C-EV	146
RRH-800	156	Omni 2"x6'	135
RRH-800	156	Omni 2"x6'	129.5
RRH-800	156	20'-4 Bay Dipole	128.5
APXVTM14-C-120 w/mount pipe	156	24" Yagi	128.5
APXVSPP18-C w/mount pipe	156	15" Yagi	125.5
APXVTM14-C-120 w/mount pipe	156	PiROD 13' Low Profile Platform	124
RRH-1900	156	2'-6" Yagi	121.5
RRH-1900	156	RMQP 12' Platform w/handrails (Verizon - proposed)	113
RRH-1900	156		
APXVSPP18-C w/mount pipe	156	(2) NNHH-65B-R4 w/ Mount Pipe	113
APXVSPP18-C w/mount pipe	156	(2) NNHH-65B-R4 w/ Mount Pipe	113
PiROD 13' Low Profile Platform (SPRINT)	155	(2) NNHH-65B-R4 w/ Mount Pipe	113
		B5/B13 RRH-BRO4C	113
Panel Antenna 1'X1'	154.3	B5/B13 RRH-BRO4C	113
Andrew VHLP2-11	152	B5/B13 RRH-BRO4C	113
Andrew VHLP2-11	152	B2/B66A RRH-BRO49	113
3' Dish w/Radome	151	B2/B66A RRH-BRO49	113
RMQP 12' Platform w/handrail (ATI - existing)	146	B2/B66A RRH-BRO49	113
		(2) LNX 6514DS-VTM w/mount pipe (Verizon - existing)	113
Kathrein 800 10121 w/mount pipe	146		
Kathrein 800 10121 w/mount pipe	146	RxxDC-3315-PF-48	113
Kathrein 800 10121 w/mount pipe	146	(2) LNX 6514DS-VTM w/mount pipe	113
(2) OPA-65R-LCUU-H6 w/mount pipe	146	(2) LNX 6514DS-VTM w/mount pipe	113
(2) OPA-65R-LCUU-H8 w/mount pipe	146	RxxDC-3315-PF-48	113
(2) OPA-65R-LCUU-H8 w/mount pipe	146	GPS	54.5
(2) Powerwave TMA LGP21401	146	3' Side Mount Standoff	53

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 97.0 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.0 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.0 mph wind.
6. Tower Structure Class III.
7. Topographic Category 1 with Crest Height of 0.00 ft

Hudson Design Group LLC
45 Beechwood Drive
North Andover, MA 01845
Phone: (978) 557-5553
FAX: (978) 336-5586

Job: ***CT5448***			
Project: ***183 ft Monopole***			
Client: AT&tT	Drawn by: kw	App'd:	
Code: TIA-222-G	Date: 12/10/19	Scale: NTS	
Path: D:\CT5448 - MP (AT&T - Centerline) 2019\CT5448\CT5448.eri		Dwg No. E-1	

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Basic wind speed of 97.0 mph.
Structure Class III.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56.0 pcf.
A wind speed of 50.0 mph is used in combination with ice.
Temperature drop of 50.0 °F.
Deflections calculated using a wind speed of 60.0 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Tapered Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	184.00-166.50	17.50	3.00	18	15.5000	19.3990	0.1875	0.7500	A572-65 (65 ksi)
L2	166.50-133.08	36.42	3.83	18	18.3556	26.4010	0.2500	1.0000	A572-65 (65 ksi)
L3	133.08-112.99	23.92	0.00	18	25.0549	30.2850	0.3750	1.5000	A572-65 (65 ksi)
L4	112.99-87.99	25.00	5.00	18	30.2850	35.8920	0.4150	1.6600	A572-65 (65 ksi)
L5	87.99-43.91	49.08	6.17	18	33.9406	44.9030	0.4850	1.9400	A572-65 (65 ksi)
L6	43.91-1.00	49.08		18	42.5549	53.5000	0.5400	2.1600	A572-65 (65 ksi)

Monopole Base Plate Data

Base Plate Data	
Base plate is square	
Base plate is grouted	√
Anchor bolt grade	A615-75
Anchor bolt size	2.2500 in
Number of bolts	18
Embedment length	84.0000 in

Base Plate Data	
f'_c	4.0 ksi
Grout space	3.0000 in
Base plate grade	A572-60
Base plate thickness	2.0000 in
Bolt circle diameter	62.0000 in
Outer diameter	68.0000 in
Inner diameter	43.0000 in
Base plate type	Stiffened Plate
Bolts per stiffener	1
Stiffener thickness	0.7500 in
Stiffener height	12.0000 in

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	*Sector*	*Exclude From Torque Calculation*	*Component Type*	*Placement* *ft*	*Total Number*	*Number Per Row*	*Start/End Position*	*Width or Diameter* *in*	*Perimeter* *in*	*Weight* *plf*
1/2 (CLEARWIRE)	A	No	Surface Ar (CaAa)	156.00 - 6.00	3	3	0.000 0.000	0.5800		0.25
2 1/2 (CLEARWIRE)	A	No	Surface Af (CaAa)	156.00 - 6.00	2	1	0.000 0.000	2.3800	7.4770	1.16
**********										
1 5/8 Fiber Cable (VERIZON)	B	No	Surface Ar (CaAa)	113.00 - 6.00	2	2	0.000 0.000	1.9800		1.04

Feed Line/Linear Appurtenances - Entered As Area

Description	*Face or Leg*	*Allow Shield*	*Exclude From Torque Calculation*	*Component Type*	*Placement* *ft*	*Total Number*		*C_AA_A* *ft^2/ft*	*Weight* *plf*
7/8	B	No	No	Inside Pole	184.00 - 6.00	4	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.54 0.54 0.54
3/8	B	No	No	Inside Pole	184.00 - 6.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.25 0.25 0.25
**********									
1 5/8 (T-MOBILE)	C	No	No	Inside Pole	162.00 - 6.00	15	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.04 1.04 1.04
2 (T-MOBILE)	C	No	No	Inside Pole	162.00 - 6.00	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.16 1.16 1.16
1 1/2 (T-MOBILE)	C	No	No	Inside Pole	162.00 - 6.00	3	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.04 1.04 1.04
Cat 5 (T-MOBILE)	C	No	No	Inside Pole	162.00 - 6.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.21 0.21 0.21
**********									
1 1/4 (SPRINT)	A	No	No	Inside Pole	156.00 - 6.00	4	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.66 0.66 0.66
1/2	A	No	No	Inside Pole	156.00 - 1.00	1	No Ice	0.00	0.25

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
(SPRINT)							1/2" Ice	0.00	0.25
							1" Ice	0.00	0.25
**********									
1 5/8	B	No	No	Inside Pole	146.00 - 6.00	6	No Ice	0.00	1.04
(AT&T - existing)							1/2" Ice	0.00	1.04
							1" Ice	0.00	1.04
WR-VG122ST-BRD A	B	No	No	Inside Pole	146.00 - 6.00	4	No Ice	0.00	0.25
							1/2" Ice	0.00	0.25
							1" Ice	0.00	0.25
FB-L98B-002	B	No	No	Inside Pole	146.00 - 6.00	2	No Ice	0.00	0.25
							1/2" Ice	0.00	0.25
							1" Ice	0.00	0.25
**********									
WR-VG122ST-BRD A	B	No	No	Inside Pole	146.00 - 6.00	4	No Ice	0.00	0.25
(AT&T - proposed)							1/2" Ice	0.00	0.25
							1" Ice	0.00	0.25
**********									
1/2	B	No	No	Inside Pole	125.00 - 6.00	8	No Ice	0.00	0.25
							1/2" Ice	0.00	0.25
							1" Ice	0.00	0.25
3/8	B	No	No	Inside Pole	125.00 - 6.00	2	No Ice	0.00	0.25
							1/2" Ice	0.00	0.25
							1" Ice	0.00	0.25
Cat 5	B	No	No	Inside Pole	125.00 - 6.00	2	No Ice	0.00	0.21
							1/2" Ice	0.00	0.21
							1" Ice	0.00	0.21
7/8	B	No	No	Inside Pole	125.00 - 6.00	4	No Ice	0.00	0.54
							1/2" Ice	0.00	0.54
							1" Ice	0.00	0.54
**********									
1/2	A	No	No	Inside Pole	54.00 - 1.00	1	No Ice	0.00	0.25
							1/2" Ice	0.00	0.25
							1" Ice	0.00	0.25

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Lightning Rod w/Pipe Extension	A	From Face	1.00 0.00 6.00	0.0000	185.00	No Ice 1/2" Ice 1" Ice	2.58 4.02 5.39	2.58 4.02 5.39	51.50 80.31 114.25
PiROD 13' Low Profile Platform	A	None		0.0000	185.00	No Ice 1/2" Ice 1" Ice	15.70 20.10 24.50	15.70 20.10 24.50	1300.00 1765.00 2230.00
20'-4 Bay Dipole	B	From Leg	3.50 3.00 0.00	0.0000	185.00	No Ice 1/2" Ice 1" Ice	4.75 6.25 7.75	4.75 6.25 7.75	50.00 80.00 110.00
20'-4 Bay Dipole	B	From Leg	3.50 -3.00 0.00	0.0000	185.00	No Ice 1/2" Ice 1" Ice	4.75 6.25 7.75	4.75 6.25 7.75	50.00 80.00 110.00
SODU 48VDC XALT	A	From Face	2.00	0.0000	188.00	No Ice	1.50	1.13	15.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00				1/2" Ice	1.65	1.26	29.91
			0.00				1" Ice	1.81	1.41	47.34
SODU 48VDC XALT	C	From Face	2.00		0.0000	188.00	No Ice	1.50	1.13	15.00
			0.00				1/2" Ice	1.65	1.26	29.91
			0.00				1" Ice	1.81	1.41	47.34
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PiROD 12' Platform w / handrails (T-Mobile)	A	None			0.0000	161.00	No Ice	26.30	26.30	1920.00
							1/2" Ice	35.60	35.60	2340.00
							1" Ice	44.90	44.90	2760.00
AIR3246 B66 w/mount pipe	A	From Face	3.50		0.0000	162.00	No Ice	8.21	6.60	201.90
			0.00				1/2" Ice	8.71	7.46	272.56
			0.00				1" Ice	9.19	8.21	350.48
AIR3246 B66 w/mount pipe	B	From Face	3.50		0.0000	162.00	No Ice	8.21	6.60	201.90
			0.00				1/2" Ice	8.71	7.46	272.56
			0.00				1" Ice	9.19	8.21	350.48
AIR3246 B66 w/mount pipe	C	From Face	3.50		0.0000	162.00	No Ice	8.21	6.60	201.90
			0.00				1/2" Ice	8.71	7.46	272.56
			0.00				1" Ice	9.19	8.21	350.48
AIR 32 B66AA/B2P w/mount pipe	A	From Face	3.50		0.0000	162.00	No Ice	7.12	6.41	153.90
			0.00				1/2" Ice	7.60	7.28	217.59
			0.00				1" Ice	8.07	8.03	288.39
AIR 32 B66AA/B2P w/mount pipe	B	From Face	3.50		0.0000	162.00	No Ice	7.12	6.41	153.90
			0.00				1/2" Ice	7.60	7.28	217.59
			0.00				1" Ice	8.07	8.03	288.39
AIR 32 B66AA/B2P w/mount pipe	C	From Face	3.50		0.0000	162.00	No Ice	7.12	6.41	153.90
			0.00				1/2" Ice	7.60	7.28	217.59
			0.00				1" Ice	8.07	8.03	288.39
APXVAA24-43-U-A20 w/mount pipe	A	From Face	3.50		0.0000	162.00	No Ice	20.50	10.88	134.25
			0.00				1/2" Ice	21.26	12.41	269.87
			0.00				1" Ice	22.02	13.96	416.30
APXVAA24-43-U-A20 w/mount pipe	B	From Face	3.50		0.0000	162.00	No Ice	20.50	10.88	134.25
			0.00				1/2" Ice	21.26	12.41	269.87
			0.00				1" Ice	22.02	13.96	416.30
APXVAA24-43-U-A20 w/mount pipe	C	From Face	3.50		0.0000	162.00	No Ice	20.50	10.88	134.25
			0.00				1/2" Ice	21.26	12.41	269.87
			0.00				1" Ice	22.02	13.96	416.30
KRY 112 144/1	A	From Face	2.50		0.0000	162.00	No Ice	0.35	0.17	15.00
			0.00				1/2" Ice	0.43	0.23	18.18
			0.00				1" Ice	0.51	0.30	22.58
KRY 112 144/1	B	From Face	2.50		0.0000	162.00	No Ice	0.35	0.17	15.00
			0.00				1/2" Ice	0.43	0.23	18.18
			0.00				1" Ice	0.51	0.30	22.58
KRY 112 144/1	C	From Face	2.50		0.0000	162.00	No Ice	0.35	0.17	15.00
			0.00				1/2" Ice	0.43	0.23	18.18
			0.00				1" Ice	0.51	0.30	22.58
4449 B71+B12	A	From Face	2.50		0.0000	163.00	No Ice	1.64	1.14	74.00
			0.00				1/2" Ice	1.80	1.28	89.99
			0.00				1" Ice	1.97	1.42	108.60
4449 B71+B12	B	From Face	2.50		0.0000	163.00	No Ice	1.64	1.14	74.00
			0.00				1/2" Ice	1.80	1.28	89.99
			0.00				1" Ice	1.97	1.42	108.60
4449 B71+B12	C	From Face	2.50		0.0000	163.00	No Ice	1.64	1.14	74.00
			0.00				1/2" Ice	1.80	1.28	89.99
			0.00				1" Ice	1.97	1.42	108.60
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PiROD 13' Low Profile Platform	A	None			0.0000	155.00	No Ice	15.70	15.70	1300.00
							1/2" Ice	20.10	20.10	1765.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(SPRINT)						1" Ice	24.50	24.50	2230.00
APXVSPP18-C w/mount pipe	A	From Leg	3.50 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	7.47 8.66 9.56	87.55 158.03 236.54
APXVSPP18-C w/mount pipe	B	From Leg	3.50 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	7.47 8.66 9.56	87.55 158.03 236.54
APXVSPP18-C w/mount pipe	C	From Leg	3.50 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	7.47 8.66 9.56	87.55 158.03 236.54
APXVTM14-C-120 w/mount pipe	A	From Leg	3.50 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	6.65 7.14 7.60	5.03 5.89 6.63	91.90 147.31 209.47
APXVTM14-C-120 w/mount pipe	B	From Leg	3.50 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	6.65 7.14 7.60	5.03 5.89 6.63	91.90 147.31 209.47
APXVTM14-C-120 w/mount pipe	C	From Leg	3.50 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	6.65 7.14 7.60	5.03 5.89 6.63	91.90 147.31 209.47
RRH 8x20-25	A	From Leg	2.50 0.00 0.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	70.00 97.14 127.80
RRH 8x20-25	B	From Leg	2.50 0.00 0.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	70.00 97.14 127.80
RRH 8x20-25	C	From Leg	2.50 0.00 0.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	70.00 97.14 127.80
RRH-800	A	From Leg	2.50 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	2.76 2.96 3.18	64.00 91.74 122.88
RRH-800	B	From Leg	2.50 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	2.76 2.96 3.18	64.00 91.74 122.88
RRH-800	C	From Leg	2.50 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	2.76 2.96 3.18	64.00 91.74 122.88
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RRH-1900	A	From Face	1.00 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	3.14 3.36 3.60	60.00 88.32 120.15
RRH-1900	B	From Face	1.00 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	3.14 3.36 3.60	60.00 88.32 120.15
RRH-1900	C	From Face	1.00 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	3.14 3.36 3.60	60.00 88.32 120.15
RRH-1900	A	From Face	1.00 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	3.14 3.36 3.60	60.00 88.32 120.15
RRH-1900	B	From Face	1.00 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	3.14 3.36 3.60	60.00 88.32 120.15
RRH-1900	C	From Face	1.00 0.00 0.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	3.14 3.36 3.60	60.00 88.32 120.15
Ring Mount	C	None		0.0000	160.00	No Ice	1.40	1.40	90.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						1/2" Ice	2.40	2.40	130.00
						1" Ice	3.40	3.40	170.00
**********									
Panel Antenna 1'X1'	A	From Leg	3.50 0.00 0.00	0.0000	154.30	No Ice 1/2" Ice 1" Ice	1.20 1.34 1.48	0.32 0.40 0.49	10.00 17.91 27.76
**********									
PiROD 13' Low Profile Platform	A	None		0.0000	124.00	No Ice 1/2" Ice 1" Ice	15.70 20.10 24.50	15.70 20.10 24.50	1300.00 1765.00 2230.00
20'-4 Bay Dipole	C	From Leg	3.50 0.00 0.00	0.0000	128.50	No Ice 1/2" Ice 1" Ice	4.75 6.25 7.75	4.75 6.25 7.75	50.00 80.00 110.00
Omni 2"x6'	A	From Leg	3.50 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	1.20 1.80 2.17	1.20 1.80 2.17	25.00 34.39 47.81
Omni 2"x6'	A	From Leg	3.50 0.00 0.00	0.0000	129.50	No Ice 1/2" Ice 1" Ice	1.20 1.80 2.17	1.20 1.80 2.17	25.00 34.39 47.81
24" Yagi	C	From Leg	3.50 0.00 0.00	0.0000	128.50	No Ice 1/2" Ice 1" Ice	1.50 2.25 3.00	1.50 2.25 3.00	10.00 20.00 30.00
15" Yagi	B	From Leg	3.50 0.00 0.00	0.0000	125.50	No Ice 1/2" Ice 1" Ice	0.75 1.25 1.75	0.75 1.25 1.75	5.00 8.00 11.00
2'-6" Yagi	A	From Leg	3.50 0.00 0.00	0.0000	121.50	No Ice 1/2" Ice 1" Ice	1.50 2.25 3.00	1.50 2.25 3.00	12.00 22.00 32.00
**********									
RMQP 12' Platform w/handrail (AT&T - existing)	A	None		0.0000	146.00	No Ice 1/2" Ice 1" Ice	32.00 38.70 45.40	32.00 38.70 45.40	1343.00 1800.00 2257.00
Kathrein 800 10121 w/mount pipe	A	From Face	3.50 0.00 0.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice	5.40 5.78 6.17	4.77 5.43 6.10	64.55 112.69 167.17
Kathrein 800 10121 w/mount pipe	B	From Face	3.50 0.00 0.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice	5.40 5.78 6.17	4.77 5.43 6.10	64.55 112.69 167.17
Kathrein 800 10121 w/mount pipe	C	From Face	3.50 0.00 0.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice	5.40 5.78 6.17	4.77 5.43 6.10	64.55 112.69 167.17
(2) OPA-65R-LCUU-H6 w/mount pipe	A	From Face	3.50 0.00 0.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice	9.95 10.50 11.04	7.53 8.56 9.45	112.53 192.76 282.09
(2) OPA-65R-LCUU-H8 w/mount pipe	B	From Face	3.50 0.00 0.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice	13.11 13.83 14.52	9.83 11.34 12.66	140.11 239.33 349.58
(2) OPA-65R-LCUU-H8 w/mount pipe	C	From Face	3.50 0.00 0.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice	13.11 13.83 14.52	9.83 11.34 12.66	140.11 239.33 349.58
(2) Powerwave TMA LGP21401	A	From Face	2.50 0.00 0.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice	1.05 1.18 1.32	0.38 0.47 0.57	14.10 21.29 30.37
(2) Powerwave TMA LGP21401	B	From Face	2.50 0.00 0.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice	1.05 1.18 1.32	0.38 0.47 0.57	14.10 21.29 30.37
(2) Powerwave TMA	C	From Face	2.50	0.0000	146.00	No Ice	1.05	0.38	14.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
LGP21401			0.00			1/2" Ice	1.18	0.47	21.29
			0.00			1" Ice	1.32	0.57	30.37
(2) Powerwave LGP21900	A	From Face	2.50	0.0000	146.00	No Ice	0.20	0.10	5.50
			0.00			1/2" Ice	0.26	0.14	7.70
			0.00			1" Ice	0.33	0.19	10.94
(2) Powerwave LGP21900	B	From Face	2.50	0.0000	146.00	No Ice	0.20	0.10	5.50
			0.00			1/2" Ice	0.26	0.14	7.70
			0.00			1" Ice	0.33	0.19	10.94
(2) Powerwave LGP21900	C	From Face	2.50	0.0000	146.00	No Ice	0.20	0.10	5.50
			0.00			1/2" Ice	0.26	0.14	7.70
			0.00			1" Ice	0.33	0.19	10.94
Ericsson RRUS-11	A	From Face	2.50	0.0000	146.00	No Ice	2.79	1.19	50.70
			0.00			1/2" Ice	3.00	1.34	71.57
			0.00			1" Ice	3.21	1.50	95.48
Ericsson RRUS-11	B	From Face	2.50	0.0000	146.00	No Ice	2.79	1.19	50.70
			0.00			1/2" Ice	3.00	1.34	71.57
			0.00			1" Ice	3.21	1.50	95.48
Ericsson RRUS-11	C	From Face	2.50	0.0000	146.00	No Ice	2.79	1.19	50.70
			0.00			1/2" Ice	3.00	1.34	71.57
			0.00			1" Ice	3.21	1.50	95.48
(2) Ericsson RRUS-32	A	From Face	2.50	0.0000	146.00	No Ice	3.31	2.42	77.00
			0.00			1/2" Ice	3.56	2.64	104.93
			0.00			1" Ice	3.81	2.86	136.47
(2) Ericsson RRUS-32	B	From Face	2.50	0.0000	146.00	No Ice	3.31	2.42	77.00
			0.00			1/2" Ice	3.56	2.64	104.93
			0.00			1" Ice	3.81	2.86	136.47
(2) Ericsson RRUS-32	C	From Face	2.50	0.0000	146.00	No Ice	3.31	2.42	77.00
			0.00			1/2" Ice	3.56	2.64	104.93
			0.00			1" Ice	3.81	2.86	136.47
DC6-48-60-18-8F	A	From Face	2.00	0.0000	146.00	No Ice	0.79	0.79	20.00
			0.00			1/2" Ice	1.27	1.27	35.12
			0.00			1" Ice	1.45	1.45	52.57
DC6-48-60-18-8F	B	From Face	2.00	0.0000	146.00	No Ice	0.79	0.79	20.00
			0.00			1/2" Ice	1.27	1.27	35.12
			0.00			1" Ice	1.45	1.45	52.57
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NNH4-65B-R6 w/ Mount Pipe	A	From Face	3.50	0.0000	146.00	No Ice	12.51	7.41	107.55
			0.00			1/2" Ice	13.11	8.60	198.18
(AT&T - proposed)			0.00			1" Ice	13.67	9.50	297.34
NNH4-65C-R6 w/ Mount Pipe	B	From Face	3.50	0.0000	146.00	No Ice	17.07	10.10	131.30
			0.00			1/2" Ice	17.70	11.52	246.63
			0.00			1" Ice	18.33	12.80	372.23
NNH4-65C-R6 w/ Mount Pipe	C	From Face	3.50	0.0000	146.00	No Ice	17.07	10.10	131.30
			0.00			1/2" Ice	17.70	11.52	246.63
			0.00			1" Ice	18.33	12.80	372.23
Ericsson RRUS-12	A	From Face	2.50	0.0000	146.00	No Ice	3.15	1.29	58.00
			0.00			1/2" Ice	3.36	1.44	81.22
			0.00			1" Ice	3.59	1.60	107.64
Ericsson RRUS-12	B	From Face	2.50	0.0000	146.00	No Ice	3.15	1.29	58.00
			0.00			1/2" Ice	3.36	1.44	81.22
			0.00			1" Ice	3.59	1.60	107.64
Ericsson RRUS-12	C	From Face	2.50	0.0000	146.00	No Ice	3.15	1.29	58.00
			0.00			1/2" Ice	3.36	1.44	81.22
			0.00			1" Ice	3.59	1.60	107.64
Ericsson A2 Module	A	From Face	2.50	0.0000	146.00	No Ice	2.08	0.50	22.00
			0.00			1/2" Ice	2.26	0.61	34.73
			0.00			1" Ice	2.44	0.73	49.92

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Ericsson A2 Module	B	From Face	2.50	0.0000	146.00	No Ice	2.08	0.50	22.00
			0.00			1/2" Ice	2.26	0.61	34.73
			0.00			1" Ice	2.44	0.73	49.92
Ericsson A2 Module	C	From Face	2.50	0.0000	146.00	No Ice	2.08	0.50	22.00
			0.00			1/2" Ice	2.26	0.61	34.73
			0.00			1" Ice	2.44	0.73	49.92
Ericsson RRUS-E2	A	From Face	2.50	0.0000	146.00	No Ice	3.31	2.42	77.00
			0.00			1/2" Ice	3.56	2.64	104.93
			0.00			1" Ice	3.81	2.86	136.47
Ericsson RRUS-E2	B	From Face	2.50	0.0000	146.00	No Ice	3.31	2.42	77.00
			0.00			1/2" Ice	3.56	2.64	104.93
			0.00			1" Ice	3.81	2.86	136.47
Ericsson RRUS-E2	C	From Face	2.50	0.0000	146.00	No Ice	3.31	2.42	77.00
			0.00			1/2" Ice	3.56	2.64	104.93
			0.00			1" Ice	3.81	2.86	136.47
RRUS 4478 B14	A	From Face	2.50	0.0000	146.00	No Ice	2.02	1.25	59.40
			0.00			1/2" Ice	2.20	1.40	77.06
			0.00			1" Ice	2.39	1.56	97.48
RRUS 4478 B14	B	From Face	2.50	0.0000	146.00	No Ice	2.02	1.25	59.40
			0.00			1/2" Ice	2.20	1.40	77.06
			0.00			1" Ice	2.39	1.56	97.48
RRUS 4478 B14	C	From Face	2.50	0.0000	146.00	No Ice	2.02	1.25	59.40
			0.00			1/2" Ice	2.20	1.40	77.06
			0.00			1" Ice	2.39	1.56	97.48
RRUS 4478 B5	A	From Face	2.50	0.0000	146.00	No Ice	1.65	0.93	59.90
			0.00			1/2" Ice	1.81	1.05	74.27
			0.00			1" Ice	1.98	1.19	91.13
RRUS 4478 B5	B	From Face	2.50	0.0000	146.00	No Ice	1.65	0.93	59.90
			0.00			1/2" Ice	1.81	1.05	74.27
			0.00			1" Ice	1.98	1.19	91.13
RRUS 4478 B5	C	From Face	2.50	0.0000	146.00	No Ice	1.65	0.93	59.90
			0.00			1/2" Ice	1.81	1.05	74.27
			0.00			1" Ice	1.98	1.19	91.13
(2) DC6-48-60-0-8C-EV	C	From Face	2.00	0.0000	146.00	No Ice	0.81	0.81	33.00
			0.00			1/2" Ice	1.30	1.30	48.38
			0.00			1" Ice	1.48	1.48	66.11
**********									
(2) LNX 6514DS-VTM	A	From Face	3.50	0.0000	113.00	No Ice	8.63	7.07	64.55
w/mount pipe			0.00			1/2" Ice	9.29	8.25	133.55
(Verizon - existing)			0.00			1" Ice	9.90	9.15	210.57
(2) LNX 6514DS-VTM	B	From Face	3.50	0.0000	113.00	No Ice	8.63	7.07	64.55
w/mount pipe			0.00			1/2" Ice	9.29	8.25	133.55
			0.00			1" Ice	9.90	9.15	210.57
(2) LNX 6514DS-VTM	C	From Face	3.50	0.0000	113.00	No Ice	8.63	7.07	64.55
w/mount pipe			0.00			1/2" Ice	9.29	8.25	133.55
			0.00			1" Ice	9.90	9.15	210.57
RxxDC-3315-PF-48	B	From Face	1.50	0.0000	113.00	No Ice	4.59	2.52	32.00
			0.00			1/2" Ice	4.86	2.73	67.82
			0.00			1" Ice	5.14	2.95	107.61
RxxDC-3315-PF-48	C	From Face	1.50	0.0000	113.00	No Ice	4.59	2.52	32.00
			0.00			1/2" Ice	4.86	2.73	67.82
			0.00			1" Ice	5.14	2.95	107.61
**********									
RMQP 12' Platform	A	None		0.0000	113.00	No Ice	26.30	26.30	1920.00
w/handrails						1/2" Ice	35.60	35.60	2340.00
(Verizon - proposed)						1" Ice	44.90	44.90	2760.00
(2) NNHH-65B-R4 w/ Mount	A	From Face	3.50	0.0000	113.00	No Ice	12.75	7.65	106.60

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Pipe			0.00			1/2" Ice	13.45	8.94	199.84
			0.00			1" Ice	14.12	10.07	301.80
(2) NNHH-65B-R4 w/ Mount Pipe	B	From Face	3.50 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	12.75 13.45 14.12	7.65 8.94 10.07	106.60 199.84 301.80
(2) NNHH-65B-R4 w/ Mount Pipe	C	From Face	3.50 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	12.75 13.45 14.12	7.65 8.94 10.07	106.60 199.84 301.80
B5/B13 RRH-BRO4C	A	From Face	2.50 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	82.00 98.43 117.53
B5/B13 RRH-BRO4C	B	From Face	2.50 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	82.00 98.43 117.53
B5/B13 RRH-BRO4C	C	From Face	2.50 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	82.00 98.43 117.53
B2/B66A RRH-BRO49	A	From Face	2.50 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	97.50 115.84 136.97
B2/B66A RRH-BRO49	B	From Face	2.50 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	97.50 115.84 136.97
B2/B66A RRH-BRO49	C	From Face	2.50 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	97.50 115.84 136.97
**********									
3' Side Mount Standoff	B	From Leg	1.50 0.00 0.00	0.0000	53.00	No Ice 1/2" Ice 1" Ice	1.50 2.20 2.90	1.50 2.20 2.90	45.00 70.00 95.00
GPS	B	From Leg	3.00 0.00 0.00	0.0000	54.50	No Ice 1/2" Ice 1" Ice	0.21 0.31 0.42	0.21 0.31 0.42	5.00 7.52 11.31

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
HP2-102	A	Paraboloid w/Shroud (HP)	From Face	3.00 0.00 0.00	0.0000		190.00	2.00	No Ice 1/2" Ice 1" Ice	3.14 3.41 3.67	25.00 42.49 59.98
HP2-102	C	Paraboloid w/Shroud (HP)	From Face	3.00 0.00 0.00	0.0000		190.00	2.00	No Ice 1/2" Ice 1" Ice	3.14 3.41 3.67	25.00 42.49 59.98
3' Dish w/Radome	B	Paraboloid w/Radome	From Leg	3.50 0.00 0.00	0.0000		151.00	3.00	No Ice 1/2" Ice 1" Ice	7.10 7.90 8.70	50.00 80.00 110.00
Andrew VHLP2-11	A	Paraboloid w/Radome	From Leg	3.50 0.00 0.00	0.0000		152.00	2.00	No Ice 1/2" Ice 1" Ice	3.14 3.41 3.69	31.00 41.00 51.00

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
Andrew VHLP2-11	C	Paraboloid w/Radome	From Leg	3.50 0.00 0.00	0.0000		152.00	2.00	No Ice 1/2" Ice 1" Ice	3.14 3.41 3.69	31.00 41.00 51.00

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	56682.60	0.00	0.00	-53.75	-227.35	-0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	68019.12	21.82	-45365.28	-6060264.65	1983.78	2415.97
0.9 Dead+1.6 Wind 0 deg - No Ice	51014.34	21.82	-45365.28	-5948606.87	1902.08	2422.30
1.2 Dead+1.6 Wind 30 deg - No Ice	68019.12	23418.23	-40891.97	-5429884.36	-3099243.22	3045.00
0.9 Dead+1.6 Wind 30 deg - No Ice	51014.34	23418.23	-40891.97	-5330429.92	-3042579.53	3050.89
1.2 Dead+1.6 Wind 60 deg - No Ice	68019.12	39014.06	-22696.05	-3028737.22	-5202535.97	3430.74
0.9 Dead+1.6 Wind 60 deg - No Ice	51014.34	39014.06	-22696.05	-2972959.50	-5106698.39	3432.11
1.2 Dead+1.6 Wind 90 deg - No Ice	68019.12	45102.54	0.98	6689.61	-6019048.27	2899.95
0.9 Dead+1.6 Wind 90 deg - No Ice	51014.34	45102.54	0.98	6463.38	-5908096.18	2897.11
1.2 Dead+1.6 Wind 120 deg - No Ice	68019.12	39034.78	22649.03	3029770.68	-5209703.35	1019.14
0.9 Dead+1.6 Wind 120 deg - No Ice	51014.34	39034.78	22649.03	2973857.88	-5113652.32	1014.71
1.2 Dead+1.6 Wind 150 deg - No Ice	68019.12	22512.16	39198.11	5235661.32	-3007177.33	-1168.48
0.9 Dead+1.6 Wind 150 deg - No Ice	51014.34	22512.16	39198.11	5139171.46	-2951659.14	-1171.55
1.2 Dead+1.6 Wind 180 deg - No Ice	68019.12	-9.97	45223.77	6036175.25	-6218.18	-2703.56
0.9 Dead+1.6 Wind 180 deg - No Ice	51014.34	-9.97	45223.77	5925001.04	-5900.58	-2703.16
1.2 Dead+1.6 Wind 210 deg - No Ice	68019.12	-23524.16	40781.13	5409136.22	3116970.81	-3207.15
0.9 Dead+1.6 Wind 210 deg - No Ice	51014.34	-23524.16	40781.13	5310165.42	3060044.50	-3208.06
1.2 Dead+1.6 Wind 240 deg - No Ice	68019.12	-39106.02	22715.36	3031110.75	5215991.33	-3437.81
0.9 Dead+1.6 Wind 240 deg - No Ice	51014.34	-39106.02	22715.36	2975350.54	5120041.68	-3439.55
1.2 Dead+1.6 Wind 270 deg - No Ice	68019.12	-45116.14	91.55	10315.03	6018663.49	-2736.01
0.9 Dead+1.6 Wind 270 deg - No Ice	51014.34	-45116.14	91.55	10209.15	5907917.51	-2738.22
1.2 Dead+1.6 Wind 300 deg - No Ice	68019.12	-38967.63	-22657.73	-3032178.28	5196057.61	-726.32
0.9 Dead+1.6 Wind 300 deg - No Ice	51014.34	-38967.63	-22657.73	-2976184.94	5100482.26	-728.24
1.2 Dead+1.6 Wind 330 deg -	68019.12	-22481.65	-39281.11	-5249558.75	3000568.74	1160.35

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
No Ice 0.9 Dead+1.6 Wind 330 deg - No Ice	51014.34	-22481.65	-39281.11	-5152801.13	2945348.43	1163.74
1.2 Dead+1.0 Ice+1.0 Temp	155709.33	-0.05	-0.05	-7469.31	5932.04	0.04
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	155709.33	-12.11	-12730.33	-2019447.06	10154.15	770.98
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	155709.33	6846.18	-11925.97	-1862887.25	-1055465.23	1024.00
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	155709.33	10976.27	-6353.37	-1010527.27	-1725572.54	1109.29
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	155709.33	12695.77	16.31	-3028.03	-1998414.90	901.34
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	155709.33	10998.17	6372.19	1000571.65	-1730763.22	342.21
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	155709.33	6353.83	11014.05	1732555.80	-998175.54	-308.49
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	155709.33	13.70	12699.93	1997376.91	1705.75	-799.60
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	155709.33	-6869.12	11902.64	1841727.35	1072975.97	-1036.58
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	155709.33	-10996.80	6357.42	995353.10	1742033.01	-1113.34
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	155709.33	-12700.11	2.62	-8424.43	2011296.54	-889.86
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	155709.33	-10985.19	-6374.34	-1016987.70	1740173.50	-309.41
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	155709.33	-6348.30	-11032.33	-1751982.42	1009434.87	308.97
Dead+Wind 0 deg - Service	56682.60	4.06	-8440.36	-1118754.98	143.61	482.75
Dead+Wind 30 deg - Service	56682.60	4357.03	-7608.07	-1002649.15	-572508.06	608.47
Dead+Wind 60 deg - Service	56682.60	7258.68	-4222.67	-559084.44	-960564.40	663.58
Dead+Wind 90 deg - Service	56682.60	8391.46	0.18	1226.87	-1111283.94	543.81
Dead+Wind 120 deg - Service	56682.60	7262.54	4213.92	559270.15	-961901.57	183.45
Dead+Wind 150 deg - Service	56682.60	4188.45	7292.93	966486.29	-555337.42	-224.11
Dead+Wind 180 deg - Service	56682.60	-1.85	8414.03	1114224.66	-1361.09	-502.68
Dead+Wind 210 deg - Service	56682.60	-4376.74	7587.45	998782.31	575327.70	-614.20
Dead+Wind 240 deg - Service	56682.60	-7275.79	4226.26	559530.22	962639.32	-666.23
Dead+Wind 270 deg - Service	56682.60	-8393.99	17.03	1903.21	1110798.46	-538.05
Dead+Wind 300 deg - Service	56682.60	-7250.04	-4215.54	-559729.02	958958.49	-160.86
Dead+Wind 330 deg - Service	56682.60	-4182.78	-7308.37	-969106.93	553705.55	223.94

Maximum Tower Deflections - Service Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	184 - 166.5	43.7304	40	2.1382	0.0130
L2	169.5 - 133.08	37.2929	40	2.0938	0.0083
L3	136.91 - 112.99	23.7563	40	1.7849	0.0038
L4	112.99 - 87.99	15.6049	40	1.4369	0.0022
L5	92.99 - 43.91	10.2526	40	1.1154	0.0014
L6	50.08 - 1	2.7769	40	0.5290	0.0005

Critical Deflections and Radius of Curvature - Service Wind

Elevation *ft*	*Appurtenance*	*Gov. Load Comb.*	*Deflection* *in*	*Tilt* °	*Twist* °	*Radius of Curvature* *ft*
190.00	HP2-102	40	43.7304	2.1382	0.0130	39997
188.00	SODU 48VDC XALT	40	43.7304	2.1382	0.0130	39997
185.00	Lightning Rod w/Pipe Extension	40	43.7304	2.1382	0.0130	39997
163.00	4449 B71+B12	40	34.4518	2.0554	0.0069	9304
162.00	AIR3246 B66 w/mount pipe	40	34.0188	2.0482	0.0067	8860
161.00	PiROD 12' Platform w / handrails	40	33.5871	2.0408	0.0065	8457
160.00	Ring Mount	40	33.1568	2.0330	0.0064	8089
159.00	RRH 8x20-25	40	32.7280	2.0250	0.0062	7751
157.00	RRH-1900	40	31.8748	2.0080	0.0059	7154
156.00	APXVSPP18-C w/mount pipe	40	31.4506	1.9991	0.0057	6889
155.00	PiROD 13' Low Profile Platform	40	31.0281	1.9900	0.0056	6643
154.30	Panel Antenna 1'X1'	40	30.7334	1.9834	0.0055	6480
152.00	Andrew VHLP2-11	40	29.7716	1.9609	0.0052	5999
151.00	3' Dish w/Radome	40	29.3565	1.9507	0.0051	5811
146.00	RMQP 12' Platform w/handrail	40	27.3133	1.8963	0.0046	5025
135.00	Omni 2"x6'	40	23.0385	1.7597	0.0037	3983
129.50	Omni 2"x6'	40	21.0337	1.6845	0.0033	3807
128.50	20'-4 Bay Dipole	40	20.6793	1.6704	0.0032	3779
125.50	15" Yagi	40	19.6354	1.6274	0.0030	3696
124.00	PiROD 13' Low Profile Platform	40	19.1244	1.6054	0.0029	3656
121.50	2'-6" Yagi	40	18.2891	1.5683	0.0027	3591
113.00	(2) LNX 6514DS-VTM w/mount pipe	40	15.6079	1.4371	0.0022	3435
54.50	GPS	40	3.2881	0.5824	0.0005	3818
53.00	3' Side Mount Standoff	40	3.1077	0.5641	0.0005	3807

Section Capacity Table

Section No.	*Elevation ft*	*Component Type*	*Size*	*Critical Element*	*P lb*	*øP$_{allow}$ lb*	*% Capacity*	*Pass Fail*
L1	184 - 166.5	Pole	TP19.399x15.5x0.1875	1	-1899.72	819880.00	14.8	Pass
L2	166.5 - 133.08	Pole	TP26.401x18.3556x0.25	2	-14249.60	1487470.00	73.8	Pass
L3	133.08 - 112.99	Pole	TP30.285x25.0549x0.375	3	-24231.60	2644930.00	80.9	Pass
L4	112.99 - 87.99	Pole	TP35.892x30.285x0.415	4	-29734.90	3362110.00	90.2	Pass
L5	87.99 - 43.91	Pole	TP44.903x33.9406x0.485	5	-45369.20	4922430.00	92.6	Pass
L6	43.91 - 1	Pole	TP53.5x42.5549x0.54	6	-53189.30	5781860.00	87.9	Pass
							Summary	
						Pole (L5)	92.6	Pass
						Base Plate	92.0	Pass
						RATING =	**92.6**	**Pass**

CCI Foundation Tool Suite - Monopole Pier

CCIFTS 1.1.103.14128 - Phase 1 Date: 12/10/2019

BU:	CT5448
Site Name:	
App Number:	N/A
Work Order:	

Monopole Drilled Pier

Input

Criteria

TIA Revision:	G
ACI 318 Revision:	2008
Seismic Category:	B

Forces

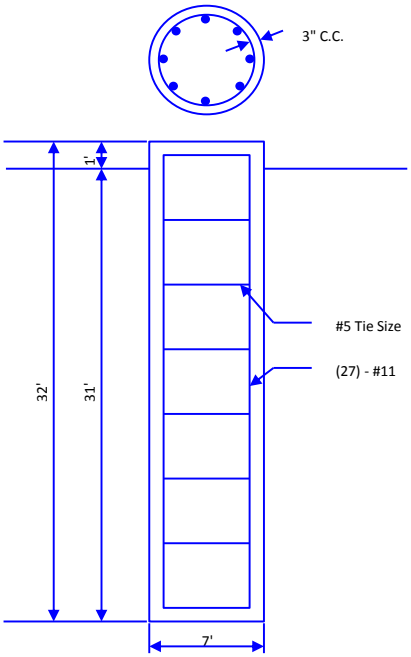
Compression	68	kips
Shear	47.1	kips
Moment	6252	k-ft
Swelling Force	0	kips

Foundation Dimensions

Pier Diameter:	7	ft
Ext. above grade:	1	ft
Depth below grade:	31	ft

Material Properties

Number of Rebar:	27	
Rebar Size:	11	
Tie Size	5	
Rebar tensile strength:	60	ksi
Concrete Strength:	4000	psi
Ultimate Concrete Strain	0.003	in/in
Clear Cover to Ties:	3	in



Soil Profile: Profile 1

Layer	Thickness (ft)	From (ft)	To (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)	Ultimate Uplift Skin Friction (ksf)	Ultimate Comp. Skin Friction (ksf)	Ultimate Bearing Capacity (ksf)	SPT 'N' Counts
1	3.5	0	3.5	130	0	0				
2	1.5	3.5	5	130	0	38				
3	10	5	15	70	0	38				
4	16	15	31	70	0	38				

Analysis Results

Soil Lateral Capacity

Depth to Zero Shear:	5.98	ft
Max Moment, Mu:	6545.33	k-ft
Soil Safety Factor:	3.20	
Safety Factor Req'd:	1.33	
RATING:	41.6%	

Soil Axial Capacity

Skin Friction (k):	320.00	kips
End Bearing (k):	0.00	kips
Comp. Capacity (k), ϕCn:	320.00	kips
Comp. (k), Cu:	68.00	kips
RATING:	21.2%	

Concrete/Steel Check

Mu (from soil analysis)	6545.33	k-ft
ϕMn	6752.88	k-ft
RATING:	96.9%	

rho provided	0.76	
rho required	0.33	OK

Rebar Spacing	7.36	
Spacing required	22.56	OK

Dev. Length required	24.77	
Dev. Length provided	53.51	OK

Overall Foundation Rating: 96.9%

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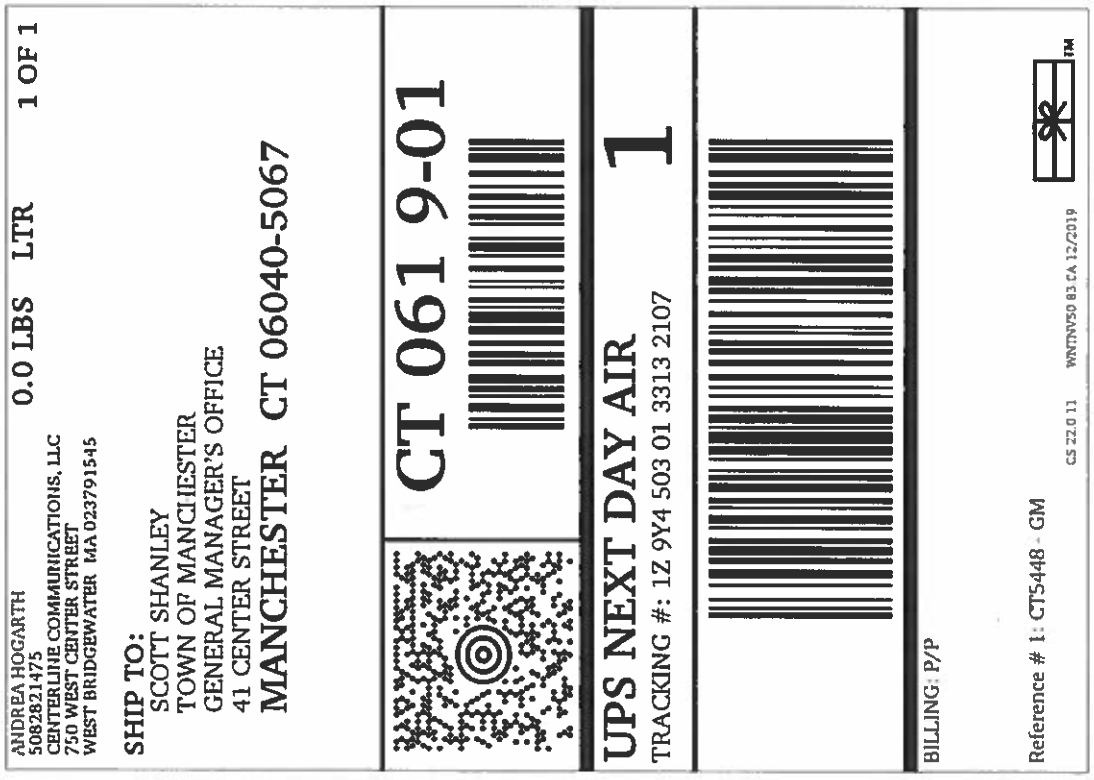

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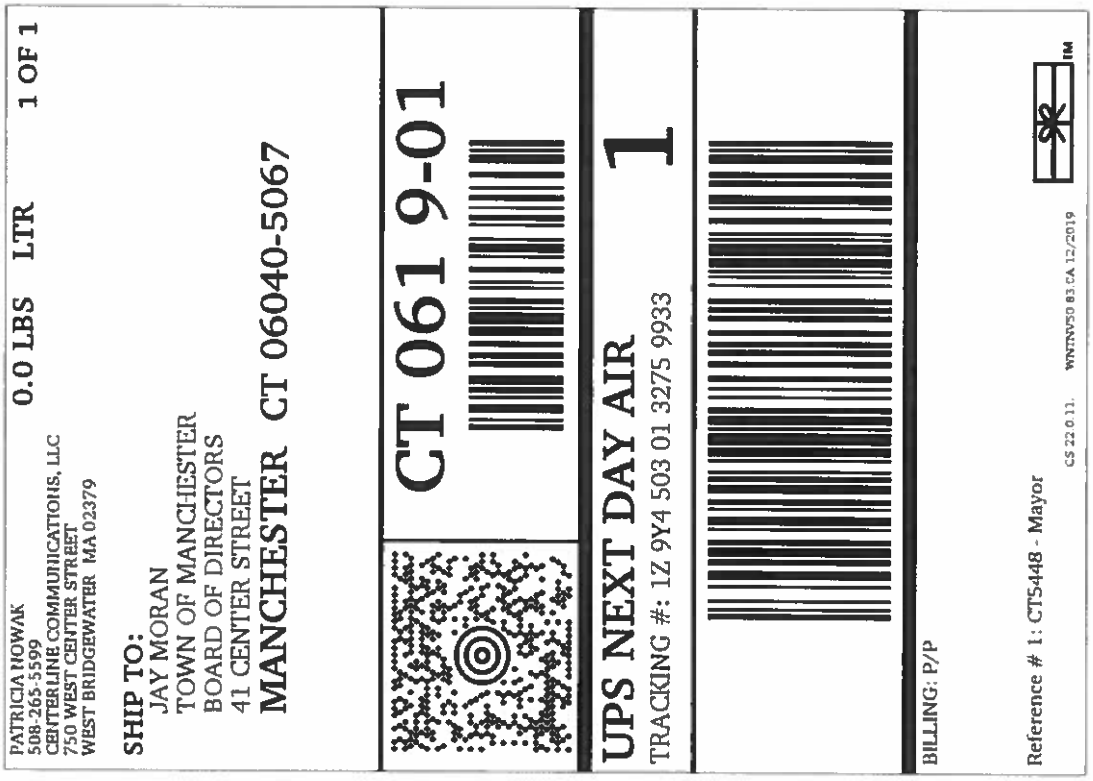

UPS CampusShip: View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   Customers with a Daily Pickup
   Your driver will pickup your shipment(s) as usual.

   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.
   Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
   Hand the package to any UPS driver in your area.

UPS Access Point™
CVS STORE # 972
555 WASHINGTON ST
SOUTH EASTON ,MA 02375

UPS Access Point™
CVS STORE # 7232
689 DEPOT ST
NORTH EASTON ,MA 02356

UPS Access Point™
TOWN LINE GENERAL STORE
450 E CENTER ST
WEST BRIDGEWATER ,MA 02379

FOLD HERE