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

8/31/2018

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

RE: **Notice of Exempt Modification for T-Mobile Crown Site BU: 826768**
T-Mobile Site ID: CT11417C
171 Town Hill Road, Plymouth, CT 06786
Latitude: 41° 40′ 6.20″ / Longitude: -73° 1′ 11.84″

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 165-foot level of the existing 169-foot monopole tower at 171 Town Hill Road, Plymouth, CT 06786. The tower is owned by Crown Castle. The property is owned by Terryville Country Fair Inc Terryville Lions Club. T-Mobile intends to replace (6) panel antennas for (6) proposed panel antennas, add (3) RRUs and replace (2) line coax lines. T-Mobile will also swap out (1) existing radio cabinet for a proposed radio cabinet in their existing leased area.

This facility was approved by the by the Town of Plymouth Zoning Board on June 22, 2000. This approval was given without conditions.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b) (2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to The Honorable David V. Merchant, Mayor, Town of Plymouth, Margus T. Laan, Director of Planning & Economic Development, as well as the property owner, and Crown Castle is the tower owner.

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

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

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

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

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

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

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

Sincerely,

William Stone
Real Estate Specialist
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
518-373-3543
William.stone@crowncastle.com

Attachments:

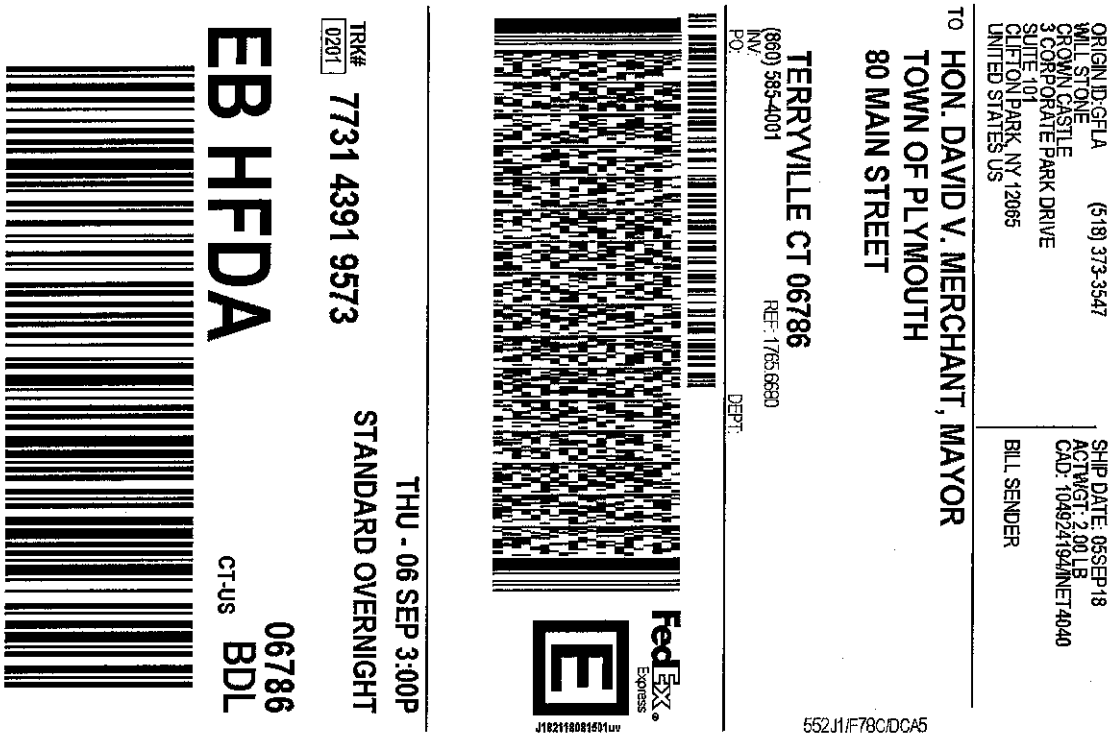
Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc:

The Honorable David V. Merchant, Mayor
Town Hall,
80 Main Street
Terryville, CT 06786

Margus T. Laan, Director of Planning & Economic Development
Town Hall,
80 Main Street
Terryville, CT 06786

Terryville Country Fair Inc Terryville Lions Club
Po Box 72
Terryville CT 06786



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

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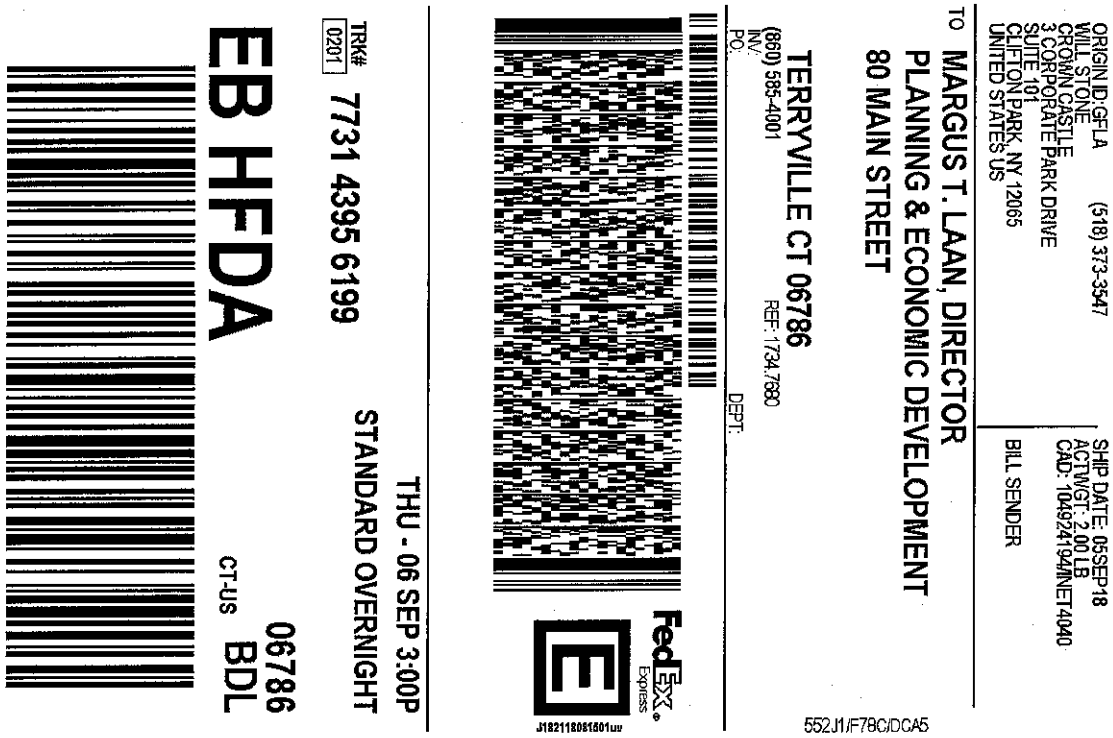

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Plymouth, CT : Commercial Property Record Card

[Back to Search Results] [Start a New Search][Help with Printing]

Search For Properties

Map-Block-Lot **Name** **Street Name**

TOWN HILL RD

Search Reset

Map-Block-Lot	Card	Account	Location	Zoning	State Class	Acres
00041600	1	048-073B-012	171 TOWN HILL RD	RA1	903 - City/Town Property	20.460

Living Units
0

Owner Information

Terryville Country Fair Inc Terryville Lions Club
Po Box 72
Terryville CT 06786

Property Picture

Deed Information

Book/Page: 152/643
Deed Date: n/a

Building Information

Building No: 0
Year Built: 0
No of Units: 0
Structure Type:
Grade:
Identical Units: 0

Valuation

Land: $855,400
Building: $240,140
Total: $1,095,540
Net Assessment: $766,880

Sales History

Book/Page	Date	Price	Type	Validity

Out Building Information

Structure Code	Width	Lgth/SqFt	Year	RCNLD
Garage Frame			1908	$9,860
Canopy Only			0	$6,730
Utility Frame			0	$4,110
Garage Masonry			1903	$50,470
Garage Masonry			1920	$28,390
Utility Frame			0	$11,550

Exterior/Interior Information

Levels	Size	Use Type	Ext. Walls	Const. Type	Partitions	Heating	A/C	Plumbing	Condition	Func. Utility	Unadj. RCNLD

Building Sketch

	Descriptor/Area

Notice

The information delivered through this on-line database is provided in the spirit of open access to government information and is intended as an enhanced service and convenience for citizens of Plymouth, CT.

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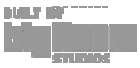
Currently All Values Have Not Been Finalized and Are Subject To Change.

Comments regarding this service should be directed to: rwalcott@plymouthct.us

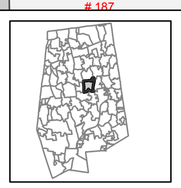


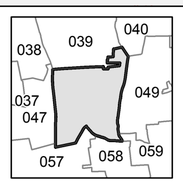
Map: 048

Disclaimer:
This map is for informational purposes only.
All information is subject to verification by any user.
The Town of Plymouth and its mapping contractors assume no legal responsibility for the information contained herein.

Print Date
October 2014

NEW ENGLAND GEOSYSTEMS
GEOGRAPHIC INFORMATION SYSTEM CONSULTANTS
1200 Boston Post Road • Suite 206
Guilford, CT • (203) 404 - 7129 • www.ne-geo.com





Town of Plymouth, Connecticut 2013
Assessment Parcel Map

0 100 200 400 600 800
Feet
1 inch = 200 feet

13 Parcel Lot
17 Address
2.4 Ac Acres
13 Block Number
Map 13 Map Number

Water
Wetlands
Intermittent Water
Inundated Area

Parcels
Intermittent Stream
Railroad

Map Coordinates based on NAD 83 Connecticut State Plane Feet.
Parcel Features based on areial photography dated 2012.

TOWN OF PLYMOUTH, CONNECTICUT

ZONING PERMIT NO. 00-201
Fee Paid: $ 100.00 # 058194
Date: July 5 19 2000

Permission is hereby granted to Terryville Lions Club & Omnipoint (fair grounds)
to erect a Telecommunication Tower on the east side of Town Hill Rd
as follows: Size ____ ft. long, ____ ft. wide, ____ stories high; distance from
road center line ____ ft; distance from each lot line: E ____ ft.; W ____ ft.; S ____ ft.;
N ____ ft.; for the use of the facility as a Telecommunication Tower
as approved by P+Z on 6/22/2000 with stipulations

PLANNING AND ZONING COMMISSION, TOWN OF PLYMOUTH
CONNECTICUT

Ronald J Morneau
Agent of the Planning and Zoning Commission

* see approved Site Plan
dated 3/2000 Received 6/22/2000
3/8/2000
3/16/2006

The recipient of this permit accepts this permit on the condition that he, as owner or as representing the owner, agrees to comply with all applicable ordinances and regulations of the Town of Plymouth and the State of Connecticut regarding the use, occupancy and type of activity to be instituted. It is furthermore understood that the facility can not be used until a Certificate of Occupancy has been issued by the Planning and Zoning Commission and that any change of use similarly does require a new Certificate of Occupancy. Before a Certificate of Occupancy will be issued a plot plan drawn to a scale of 1" - 50' prepared and certified by a licensed engineer or land surveyor must be submitted to the Planning and Zoning Commission showing all boundaries of the line of any public or private right-of-way, sanitary facilities and water supply. This permit shall be valid for one year.

MOTION: Gaye Zukauskas made a motion to add Town Hill Road/Lions back on the agenda. Steve Panasuk seconded. VOTE: S. Panasuk – Aye, G. Zukauskas – Aye, W. Radke – Aye and Chairman Herzing so voted.

MOTION: Patrick Herzing made a motion for a 5-minute recess at 9:23 p.m. VOTE: All in favor.

Chairman Patrick Herzing called the meeting back to order at 9:28 p.m.

Town Hill Road/Lions - Special Permit – Telecommunication Tower – Omnipoint – MOTION: Gaye Zukauskas made a motion to approve the application for the telecommunication tower-Town Hill Road-Lions Club and Omnipoint-State ID #CT-11417C consisting of 5 sheets, cover dated 6/20/00, vicinity plan dated 3/8/00, sheet C-1, C-2 and C-3 all dated 6/20/00 with the only stipulation that Plymouth emergency services to have free access as needed with no charge to the Town. Any additional carriers to come in for a special permit. Bond to be set by Public Works in the event of abandonment. Steve Panasuk seconded. VOTE: S. Panasuk - Aye, G. Zukauskas – Aye, W. Radke – Aye and Chairman Herzing so voted.

11. Town Hill/Washington Roads – Pines Subdivision – Bond Reduction – CT Water Co. – CT Water Co. has sold most of the lots in the subdivision to Mr. Zappone. Discussion was had. **MOTION:** Wayne Radke made a motion to reduce the bond as requested and get a new bond from Mr. Zappone before reduction of CT Water Co.'s bond. Gaye Zukauskas seconded. VOTE: S. Panasuk – Aye, G. Zukauskas – Aye, W. Radke – Aye and Chairman Herzing so voted.

16. Plymouth Housing Authority – Section 8-24 Review – Yefko Property – Mr. Kuehn read the memo dated 6/21 from Anthony A. Lorenzetti, PE into the record. He is in support of this proposal. It would be a solution to the parking situation at Gosinski Park. Half of it would be for off street parking and the other half for a minimum 20,000 sq. ft. residential parcel for a low/moderate income housing. The resolution should be 39,100 not 29,100. Mr. Kuehn read the resolution into the record. **MOTION:** Gaye Zukauskas made a motion to accept the resolution for an 8-24 review. Wayne Radke seconded. VOTE: S. Panasuk – Aye, G. Zukauskas – Aye, W. Radke – Aye and Chairman Herzing so voted.

18. Land Use Corner – Gaye strikes again. The final revision has been faxed to the Plymouth News. Gaye suggested that Mr. Kuehn do one next month on industrial property.

21. Correspondence from ZBA Chairman Mike Cole – Patrick Herzing will call Mike Cole and get a time set up – probably in September to get together to discuss the zoning regulations. It was suggested to have Mike come up with an agenda of issues to look at ahead of time.

22. Proposed ordinance for zoning violations – The Town Council tabled this item at their last meeting so no public hearing has been scheduled. It recommends a $150 fine per violation. Maybe we can not issue any permits to people who have not finished and cleaned up their last items.

STAFF COMMENTS –Mr. Kuehn informed the Commission that 36 signs will be going up in the industrial park for the public hearing.

SHEET INDEX

NO.	DESCRIPTION
T1	TITLE PAGE
N1	NOTES
C1	PLAN & ELEVATION
C2	RF CHART AND ORIENTATION
D1	EQUIPMENT DETAILS
E1	GROUNDING DIAGRAM
E2	RF PLUMBING DIAGRAM

TOWER OWNER NOTIFICATION

ONCE THE CONTRACTOR HAS RECEIVED AND ACCEPTED THE NOTICE TO PROCEED, CONTRACTOR WILL CONTACT THE CROWN CASTLE CONSTRUCTION MANAGER OF RECORD (NOTED ON THE FIRST PAGE ON THIS CONSTRUCTION DRAWING) A MINIMUM OF 48 HOURS PRIOR TO WORK START. UPON ARRIVAL TO THE JOB SITE, CONTRACTOR CREW IS REQUIRED CALL 1-800-788-7011 TO NOTIFY THE CROWN CASTLE NOC WORK HAS BEGUN.

T-Mobile

CROWN CASTLE

CBU

CBU # 826768

SITE ID

CT11417C

SITE NAME

PLYMOUTH/RT 6

SITE ADDRESS

171 TOWN HILL ROAD
PLYMOUTH, CT 06786

CONFIGURATION

L700 4X2 67D97DB3

PROJECT SITE INFORMATION

SITE ID:	CT11417C	
SITE NAME:	PLYMOUTH/RT 6	
SITE ADDRESS:	171 TOWN HILL ROAD PLYMOUTH, CT 06786	
PERMITTING JURISDICTION:	TOWN OF PLYMOUTH	
COUNTY:	LITCHFIELD COUNTY	
ZONING JURISDICTION:	CSC	
SITE COORDINATES: LATITUDE:	41.668389°	(NAD 83)
LONGITUDE:	-73.019956°	(NAD 83)
APPLICANT:	T-MOBILE NORTHEAST LLC 103 MONARCH DRIVE LIVERPOOL, NY 13088	

STRUCTURAL ANALYSIS INFORMATION

TOWER ANALYSIS

INFINIGY ENGINEERING HAS NOT EVALUATED THE EXISTING **TOWER** FOR THIS SITE, AND ASSUMES NO RESPONSIBILITY FOR ITS STRUCTURAL INTEGRITY. REFER TO STRUCTURAL ANALYSIS FROM TOWER OWNER PRIOR TO ANY CONSTRUCTION.

ANTENNA MOUNTS

BASED ON THE MOUNT ANALYSIS COMPLETED BY **INFINIGY ENGINEERING, PLLC** DATED **07/19/2018**. THE EXISTING **ANTENNA** MOUNTS ARE CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT CONFIGURATION

PROJECT TEAM INFORMATION

CLIENT REPRESENTATIVE:	CROWN CASTLE 3 CORPORATE PARK DRIVE SUITE 101 CLIFTON PARK, NY 12065
CLIENT REP. CONTACT:	WILL STONE (518) 373-3543
ENGINEER:	INFINIGY 6865 DEERPATH ROAD SUITE 152 ELKRIDGE, MD 21075
ENGINEER CONTACT:	MATTHEW LIVERETTE (518) 690-0790

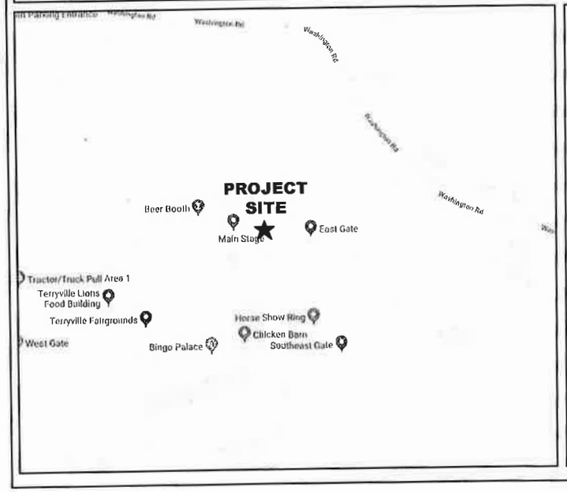
SCOPE OF WORK

SCOPE OF WORK:
TMO L700 4x2 67D97DB3 (UPSTATE NY MARKET)
REPLACING (6) EXISTING ANTENNAS.
ADD (2) HYBRID FIBER CABLES, (3) RRUs AND REPLACE (2) COAX CABLES.
REMOVE (3) BIAS Ts. ADD (6) NEW ANTENNAS. REPLACE EX. CABINET WITH NEW CABINET.

811 Know what's below. Call before you dig.

TO OBTAIN LOCATION OF PARTICIPANTS UNDERGROUND FACILITIES BEFORE YOU DIG IN CONNECTICUT, CONTACT CALL BEFORE YOU DIG
TOLL FREE: 1-800-922-4455 OR www.cbyd.com
CONNECTICUT STATUTE REQUIRES MIN OF 2 WORKING DAYS NOTICE BEFORE YOU EXCAVATE

LOCATION MAP



GENERAL NOTES

- HANDICAP ACCESS REQUIREMENTS ARE NOT REQUIRED.
- FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.
- FACILITY HAS NO PLUMBING OR REFRIGERANTS.
- THIS FACILITY SHALL MEET OR EXCEED ALL FAA AND FCC REGULATORY REQUIREMENTS.
- ALL NEW MATERIAL SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR UNLESS NOTED OTHERWISE. EQUIPMENT, ANTENNAS/RRH AND CABLES FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR.
- THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON STORMWATER DRAINAGE.
- NO SANITARY SEWER, POTABLE WATER, OR TRASH DISPOSAL SERVICE IS REQUIRED
- NO COMMERCIAL SIGNAGE IS PROPOSED

CODE COMPLIANCE

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED WITH ANY LOCAL AMENDMENTS BY THE LOCAL GOVERNING AUTHORITIES:

- INTERNATIONAL BUILDING CODE
- NATIONAL ELECTRICAL CODE
- NATIONAL FIRE PROTECTION ASSOCIATION 101
- NATIONAL FIRE PROTECTION ASSOCIATION 1
- LOCAL BUILDING CODES
- CITY/COUNTY ORDINANCES
- AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATIONS (AISC)
- UNDERWRITERS LABORATORIES APPROVED ELECTRICAL PRODUCTS.
- ANSI EIA/TIA 222 REV. G
- TIA 607
- INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS 81
- IEEE C2 (LATEST EDITION)
- TELCORDIA GR-1275
- ANSI T1.311

T-Mobile

T-MOBILE NORTHEAST LLC
103 MONARCH DRIVE
LIVERPOOL, NY 13088

INFINIGY

6865 DEERPATH ROAD SUITE 152
ELKRIDGE, MD 21075
TEL (443) 592-3143

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
AUG 15 2018

No.	Submittal / Revision	App'd	Date
1	CLIENT COMMENTS	RWF	08/14/18
0	ISSUED FOR CONSTRUCTION	RWF	08/07/18
A	ISSUED FOR REVIEW	SL	07/31/18

Drawn: RCD
Designed: MRL
Checked: AJD

Project Number: 600-007

Project Title:
CT11417C
PLYMOUTH/RT 6
171 TOWN HILL ROAD
PLYMOUTH, CT 06786

Prepared For: CROWN CASTLE

Drawing Title: TITLE PAGE

Drawing Number: T1

GENERAL NOTES

PART 1 – GENERAL REQUIREMENTS

1.1 THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
- A. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
- B. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
- C. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE – "NEC").
- D. AND NFPA 101 (LIFE SAFETY CODE).
- E. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM).
- F. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE).

1.2 DEFINITIONS:
A: WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
B: COMPANY: T-MOBILE CORPORATION
C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
D: CONTRACTOR: CONSTRUCTION CONTRACTOR; CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
E: THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.

1.3 POINT OF CONTACT: COMMUNICATION BETWEEN THE COMPANY AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE COMPANY SITE DEVELOPMENT SPECIALIST OR OTHER PROJECT COORDINATOR APPOINTED TO MANAGE THE PROJECT FOR THE COMPANY.

1.4 ON-SITE SUPERVISION: THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

1.5 DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE: THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS, STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES, AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.
A. THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS SHALL BE CLEARLY MARKED DAILY IN PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.

1.6 USE OF JOB SITE: THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

1.7 NOTICE TO PROCEED:
A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED.
B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE T-MOBILE WITH AN OPERATIONAL WIRELESS FACILITY.

PART 2 – EXECUTION

2.1 TEMPORARY UTILITIES AND FACILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE, POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSORS OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

2.2 ACCESS TO WORK: THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

2.3 TESTING: REQUIREMENTS FOR TESTING BY THIS CONTRACTOR SHALL BE AS INDICATED HEREWITH, ON THE CONSTRUCTION DRAWINGS, AND IN THE INDIVIDUAL SECTIONS OF THESE SPECIFICATIONS. SHOULD COMPANY CHOOSE TO ENGAGE ANY THIRD-PARTY TO CONDUCT ADDITIONAL TESTING, THE CONTRACTOR SHALL COOPERATE WITH AND PROVIDE A WORK AREA FOR COMPANY'S TEST AGENCY.

2.4 COMPANY FURNISHED MATERIAL AND EQUIPMENT: ALL HANDLING, STORAGE AND INSTALLATION OF COMPANY FURNISHED MATERIAL AND EQUIPMENT SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AND WITH THE MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
A. CONTRACTOR SHALL PROCURE ALL OTHER REQUIRED WORK RELATED MATERIALS NOT PROVIDED BY T-MOBILE TO SUCCESSFULLY CONSTRUCT A WIRELESS FACILITY.

2.5 DIMENSIONS: VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

2.6 EXISTING CONDITIONS: NOTIFY THE COMPANY REPRESENTATIVE OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

PART 3 – RECEIPT OF MATERIAL & EQUIPMENT

3.1 RECEIPT OF MATERIAL AND EQUIPMENT: CONTRACTOR IS RESPONSIBLE FOR T-MOBILE PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:
- A. ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.
- B. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.
- C. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.
- D. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO T-MOBILE OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
- E. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
- F. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

PART 4 – GENERAL REQUIREMENTS FOR CONSTRUCTION

4.1 CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.

4.2 EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.

4.3 CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
A. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
B. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.

4.4 CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION.

4.5 CONDUCT TESTING AS REQUIRED HEREIN.

PART 5 – TESTS AND INSPECTIONS

5.1 TESTS AND INSPECTIONS:
- A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.
- B. CONTRACTOR SHALL COORDINATE TEST AND INSPECTION SCHEDULES WITH COMPANY'S REPRESENTATIVE WHO MUST BE ON SITE TO WITNESS SUCH TESTS AND INSPECTIONS.
- C. WHEN THE USE OF A THIRD PARTY INDEPENDENT TESTING AGENCY IS REQUIRED, THE AGENCY THAT IS SELECTED MUST PERFORM SUCH WORK ON A REGULAR BASIS IN THE STATE WHERE THE PROJECT IS LOCATED AND HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
- D. THE THIRD PARTY TESTING AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
- E. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.
- F. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS.
- G. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

PART 6 – TRENCHING AND BACKFILLING

6.1 TRENCHING AND BACKFILLING: THE CONTRACTOR SHALL PERFORM ALL EXCAVATION OF EVERY DESCRIPTION AND OF WHATEVER SUBSTANCES ENCOUNTERED, TO THE DEPTHS INDICATED ON THE CONSTRUCTION DRAWINGS OR AS OTHERWISE SPECIFIED.

A. PROTECTION OF EXISTING UTILITIES: THE CONTRACTOR SHALL CHECK WITH THE LOCAL UTILITIES AND THE RESPECTIVE UTILITY LOCATOR COMPANIES PRIOR TO STARTING EXCAVATION OPERATIONS IN EACH RESPECTIVE AREA TO ASCERTAIN THE LOCATIONS OF KNOWN UTILITY LINES. THE LOCATIONS, NUMBER AND TYPES OF EXISTING UTILITY LINES DETAILED ON THE CONSTRUCTION DRAWINGS ARE APPROXIMATE AND DO NOT REPRESENT EXACT INFORMATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ALL LINES DAMAGED DURING EXCAVATION AND ALL ASSOCIATED OPERATIONS. ALL UTILITY LINES UNCOVERED DURING THE EXCAVATION OPERATIONS, SHALL BE PROTECTED FROM DAMAGE DURING EXCAVATION AND ASSOCIATED OPERATIONS. ALL REPAIRS SHALL BE APPROVED BY THE UTILITY COMPANY.

B. HAND DIGGING: UNLESS APPROVED IN WRITING OTHERWISE, ALL DIGGING WITHIN AN EXISTING CELL SITE COMPOUND IS TO BE DONE BY HAND.

C. DURING EXCAVATION, MATERIAL SUITABLE FOR BACKFILLING SHALL BE STOCKPILED IN AN ORDERLY MANNER A SUFFICIENT DISTANCE FROM THE BANKS OF THE TRENCH TO AVOID OVERLOADING AND TO PREVENT SLIDES OR CAVE-INS. ALL EXCAVATED MATERIALS NOT REQUIRED OR SUITABLE FOR BACKFILL SHALL BE REMOVED AND DISPOSED OF AT THE CONTRACTOR'S EXPENSE.

D. GRADING SHALL BE DONE AS MAY BE NECESSARY TO PREVENT SURFACE WATER FROM FLOWING INTO TRENCHES OR OTHER EXCAVATIONS, AND ANY WATER ACCUMULATING THEREIN SHALL BE REMOVED BY PUMPING OR BY OTHER APPROVED METHOD.

E. SHEETING AND SHORING SHALL BE DONE AS NECESSARY FOR THE PROTECTION OF THE WORK AND FOR THE SAFETY OF PERSONNEL. UNLESS OTHERWISE INDICATED, EXCAVATION SHALL BE BY OPEN CUT, EXCEPT THAT SHORT SECTIONS OF A TRENCH MAY BE TUNNELED IF, THE CONDUIT CAN BE SAFELY AND PROPERLY INSTALLED AND BACKFILL CAN BE PROPERLY TAMPED IN SUCH TUNNEL SECTIONS. EARTH EXCAVATION SHALL COMPRISE ALL MATERIALS AND SHALL INCLUDE CLAY, SILT, SAND, MUCK, GRAVEL, HARDPAN, LOOSE SHALE, AND LOOSE STONE.

F. TRENCHES SHALL BE OF NECESSARY WIDTH FOR THE PROPER LAYING OF THE CONDUIT OR CABLE, AND THE BANKS SHALL BE AS NEARLY VERTICAL AS PRACTICABLE. THE BOTTOM OF THE TRENCHES SHALL BE ACCURATELY GRADED TO PROVIDE UNIFORM BEARING AND SUPPORT FOR EACH SECTION OF THE CONDUIT OR CABLE ON UNDISTURBED SOIL AT EVERY POINT ALONG ITS ENTIRE LENGTH. EXCEPT WHERE ROCK IS ENCOUNTERED, CARE SHALL BE TAKEN NOT TO EXCAVATE BELOW THE DEPTHS INDICATED. WHERE ROCK EXCAVATIONS ARE NECESSARY, THE ROCK SHALL BE EXCAVATED TO A MINIMUM OVER DEPTH OF 6 INCHES BELOW THE TRENCH DEPTHS INDICATED ON THE CONSTRUCTION DRAWINGS OR SPECIFIED. OVER DEPTHS IN THE ROCK EXCAVATION AND UNAUTHORIZED OVER DEPTHS SHALL BE THOROUGHLY BACK FILLED AND TAMPED TO THE APPROPRIATE GRADE. WHENEVER WET OR OTHERWISE UNSTABLE SOIL THAT IS INCAPABLE OF PROPERLY SUPPORTING THE CONDUIT OR CABLE IS ENCOUNTERED IN THE BOTTOM OF THE TRENCH, SUCH SOLID SHALL BE REMOVED TO A MINIMUM OVER DEPTH OF 6 INCHES AND THE TRENCH BACKFILLED TO THE PROPER GRADE WITH EARTH OF OTHER SUITABLE MATERIAL, AS HEREINAFTER SPECIFIED.

G. BACKFILLING OF TRENCHES. TRENCHES SHALL NOT BE BACKFILLED UNTIL ALL SPECIFIED TESTS HAVE BEEN PERFORMED AND ACCEPTED. WHERE COMPACTED BACKFILL IS NOT INDICATED THE TRENCHES SHALL BE CAREFULLY BACKFILLED WITH SELECT MATERIAL SUCH AS EXCAVATED SOILS THAT ARE FREE OF ROOTS, SOD, RUBBISH OR STONES, DEPOSITED IN 6 INCH LAYERS AND THOROUGHLY AND CAREFULLY RAMMED UNTIL THE CONDUIT OR CABLE HAS A COVER OF NOT LESS THAN 1 FOOT. THE REMAINDER OF THE BACKFILL MATERIAL SHALL BE GRANULAR IN NATURE AND SHALL NOT CONTAIN ROOTS, SOD, RUBBING, OR STONES OF 2-1/2 INCH MAXIMUM DIMENSION. BACKFILL SHALL BE CAREFULLY PLACED IN THE TRENCH AND IN 1 FOOT LAYERS AND EACH LAYER TAMPED. SETTLING THE BACKFILL WITH WATER WILL BE PERMITTED. THE SURFACE SHALL BE GRADED TO A REASONABLE UNIFORMITY AND THE MOUNDING OVER THE TRENCHES LEFT IN A UNIFORM AND NEAT CONDITION.

SYMBOL	DESCRIPTION
	CIRCUIT BREAKER
	NON-FUSIBLE DISCONNECT SWITCH
F	FUSIBLE DISCONNECT SWITCH
	SURFACE MOUNTED PANEL BOARD
T	TRANSFORMER
M	KILOWATT HOUR METER
JB	JUNCTION BOX
PB	PULL BOX TO NEC/TELCO STANDARDS
	UNDERGROUND UTILITIES
	EXOTHERMIC WELD CONNECTION
	MECHANICAL CONNECTION
OR	GROUND ROD
OR	GROUND ROD WITH INSPECTION SLEEVE
	GROUND BAR
	120AC DUPLEX RECEPTACLE
G	GROUND CONDUCTOR
	DC POWER AND FIBER OPTIC TRUNK CABLES
E	DC POWER CABLES
# / #	REPRESENTS DETAIL NUMBER / REF. DRAWING NUMBER

ABBREVIATIONS

CIGBE	COAX ISOLATED GROUND BAR EXTERNAL
MIGB	MASTER ISOLATED GROUND BAR
SST	SELF SUPPORTING TOWER
GPS	GLOBAL POSITIONING SYSTEM
TYP.	TYPICAL
DWG	DRAWING
BCW	BARE COPPER WIRE
BFG	BELOW FINISH GRADE
PVC	POLYVINYL CHLORIDE
CAB	CABINET
C	CONDUIT
SS	STAINLESS STEEL
G	GROUND
AWG	AMERICAN WIRE GAUGE
RGS	RIGID GALVANIZED STEEL
AHJ	AUTHORITY HAVING JURISDICTION
TTLNA	TOWER TOP LOW NOISE AMPLIFIER
UNO	UNLESS NOTED OTHERWISE
EMT	ELECTRICAL METALLIC TUBING
AGL	ABOVE GROUND LEVEL

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AUG 15 2018

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A	ISSUED FOR REVIEW	SL	07/31/18

Drawn: RCD
Designed: MRL
Checked: AJD

Project Number: 600-007

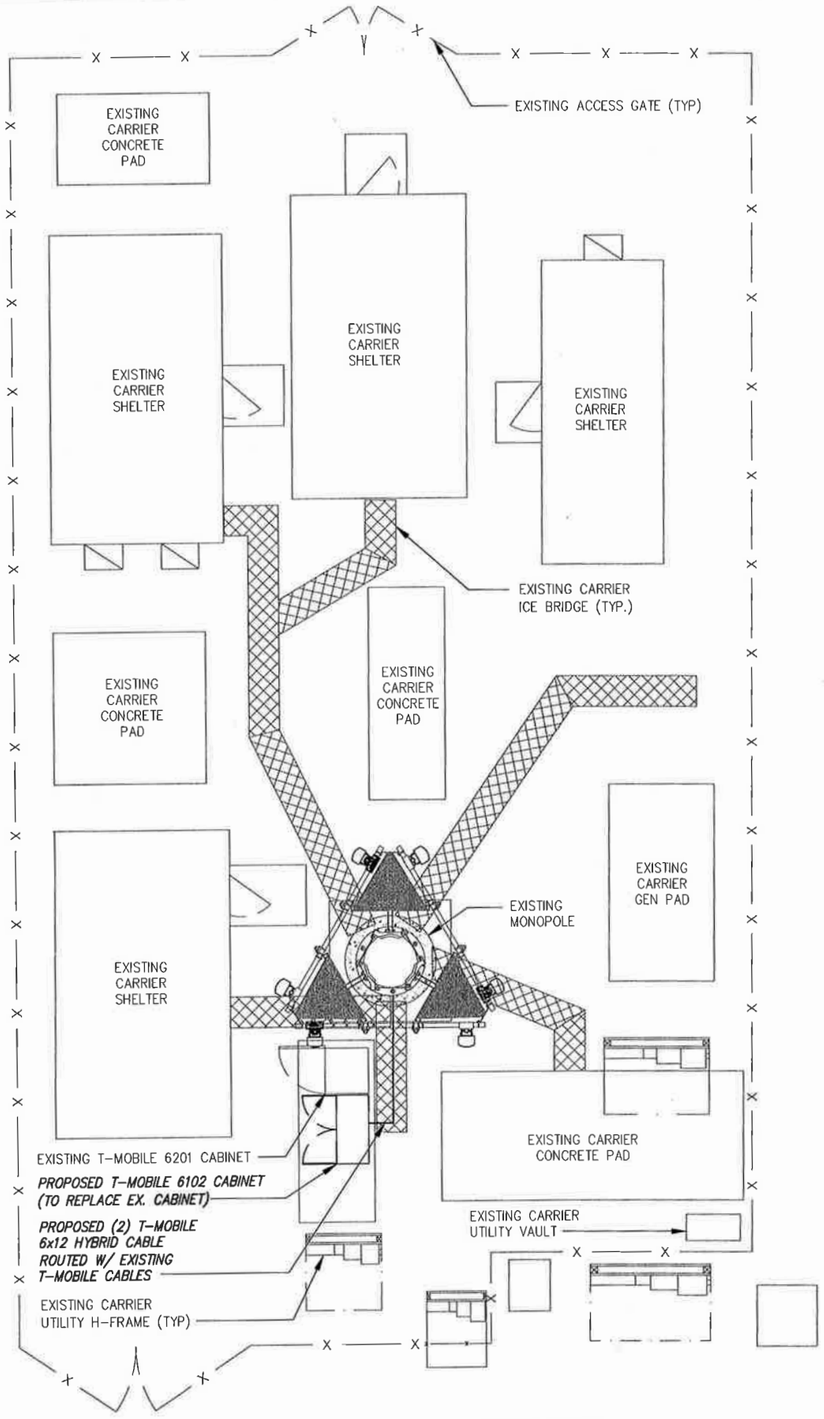
Project Title:
CT11417C
PLYMOUTH/RT 6

171 TOWN HILL ROAD
PLYMOUTH, CT 06786

Prepared For:
CROWN CASTLE

Drawing Title
NOTES

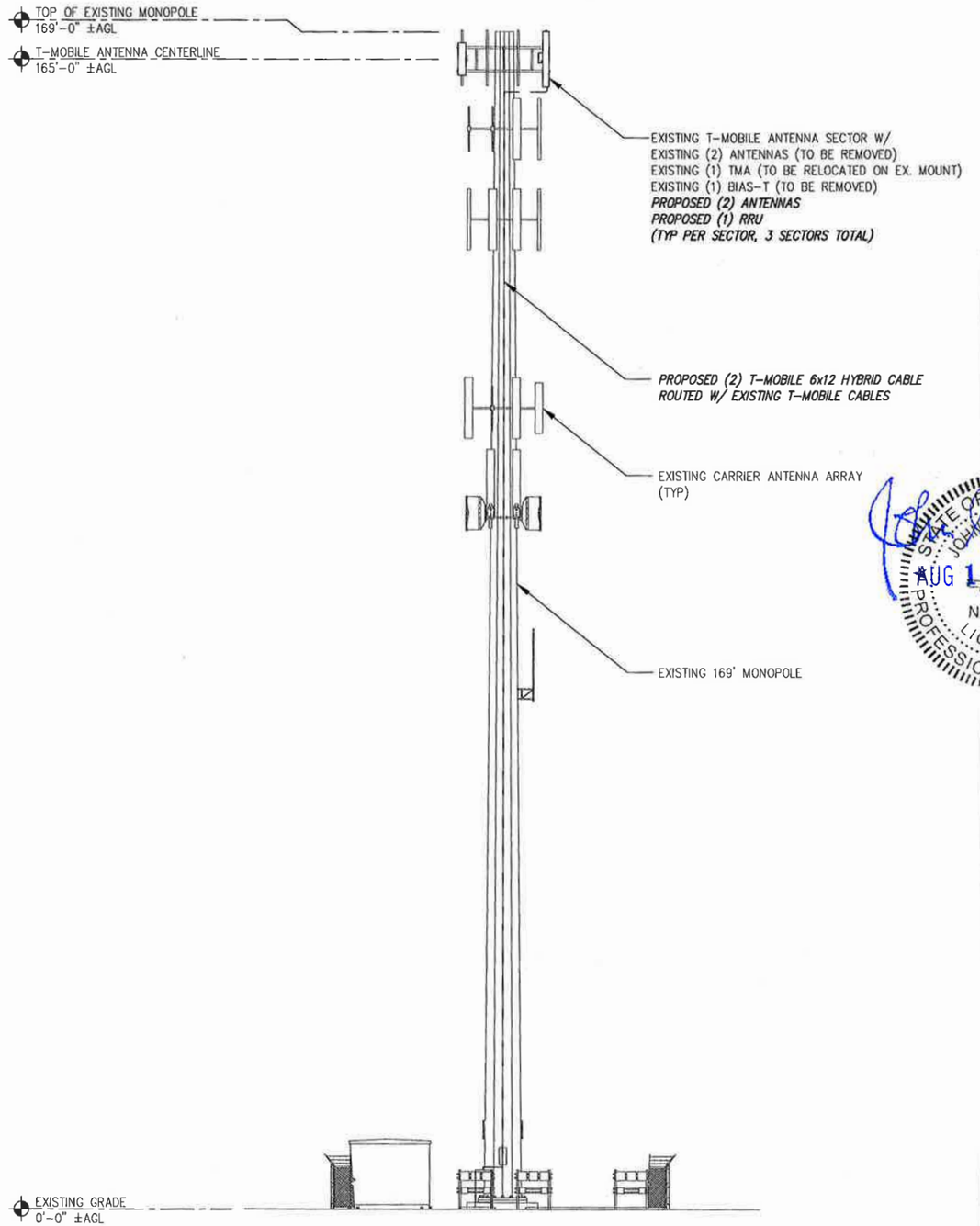
Drawing Number
N1



NORTH

1 / C1 PLAN VIEW
SCALE: AS NOTED

GRAPHIC SCALE:
10' 5' 0 5' 10'
SCALE (11x17): 1" = 10'-0"
SCALE (22x34): 1" = 5'-0"



2 / C1 ELEVATION
SCALE: NOT TO SCALE

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LICENSED
No. 24705
AUG 15 2018

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CROWN CASTLE

Drawing Title
PLAN AND ELEVATION

Drawing Number
C1

SECTOR	ANTENNA POSITION	ANTENNA MODEL #	VENDOR	AZIMUTH	M-TILT	E-TILT	ANTENNA CENTERLINE	TMA/RRU MODEL #	CABLE LENGTH	CABLE TYPE AND QUANTITY
ALPHA	A-1	**AIR 32 B2A/B66AA**	**ERICSSON**	**60°**	0	TBD	165'-0"	-	**215'±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
	A-2	-	-	-	-	-	-	-	-	-
	A-3	**APXVAARR24_43-UNA20**	**RFS**	**60°**	0	TBD	165'-0"	**(1) RRU 4449 B12/B71** (1) ATMAA1412D-1A20	**215'±**	**(1) 6X12 HYBRID TRUNK CABLE** (2) 1-5/8" COAX
BETA	B-1	**AIR 32 B2A/B66AA**	**ERICSSON**	**180°**	0	TBD	165'-0"	-	**215'±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
	B-2	-	-	-	-	-	-	-	-	-
	B-3	**APXVAARR24_43-UNA20**	**RFS**	**180°**	0	TBD	165'-0"	**(1) RRU 4449 B12/B71** (1) ATMAA1412D-1A20	**215'±**	**(1) 6X12 HYBRID TRUNK CABLE** (2) 1-5/8" COAX
GAMMA	C-1	**AIR 32 B2A/B66AA**	**ERICSSON**	**300°**	0	TBD	165'-0"	-	**215'±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
	C-2	-	-	-	-	-	-	-	-	-
	C-3	**APXVAARR24_43-UNA20**	**RFS**	**300°**	0	TBD	165'-0"	**(1) RRU 4449 B12/B71** (1) ATMAA1412D-1A20	**215'±**	**(1) 6X12 HYBRID TRUNK CABLE** (2) 1-5/8" COAX

1 C2 RF SYSTEM CHART
SCALE: NOT TO SCALE

KEY

EXISTING
PROPOSED

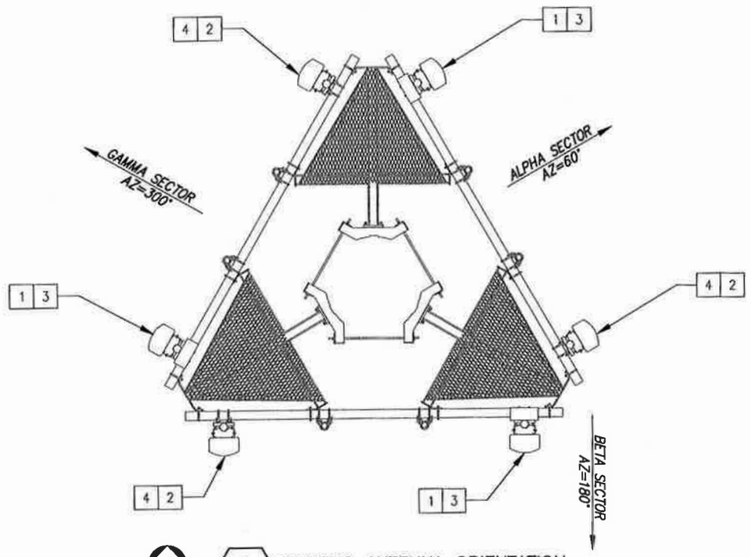
ANTENNA LOCATION KEY

VIEWED FROM BEHIND

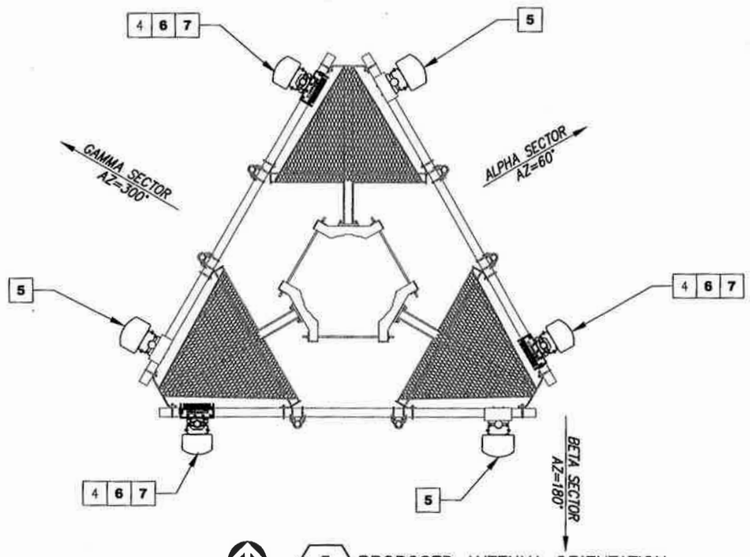
GENERAL NOTES:

1. CONTRACTOR TO VERIFY PROPOSED ANTENNA INFORMATION IS THE MOST CURRENT AT TIME OF CONSTRUCTION.
2. CONTRACTOR TO CONFIRM CABLE LENGTHS FOR ANY PROPOSED CABLES/JUMPERS PRIOR TO CONSTRUCTION.

ORIENTATION PLAN KEY				
KEY	DESCRIPTION	TYPE	QTY	STATUS
1	RR90-07-02DP	ANTENNA	3	REMOVED
2	LNX-6515DS-A1M	ANTENNA	3	REMOVED
3	ATMAA1412D-1A20	TMA	3	RELOCATED
4	ATBT-BOTTOM-24V	BIAS-T	3	REMOVED
5	**AIR32 B2A/B66AA**	**ANTENNA**	**3**	**PROPOSED**
6	**APXVAARR24_43-U-N20**	**ANTENNA**	**3**	**PROPOSED**
7	**RRU 4449 B12/B71**	**RRU**	**3**	**PROPOSED**



2 C2 EXISTING ANTENNA ORIENTATION
SCALE: NOT TO SCALE



3 C2 PROPOSED ANTENNA ORIENTATION
SCALE: NOT TO SCALE

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Project Number: 600-007

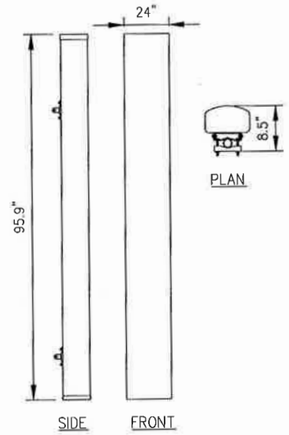
Project Title: CT11417C
PLYMOUTH/RT 6

171 TOWN HILL ROAD
PLYMOUTH, CT 06786

Prepared For: CROWN CASTLE

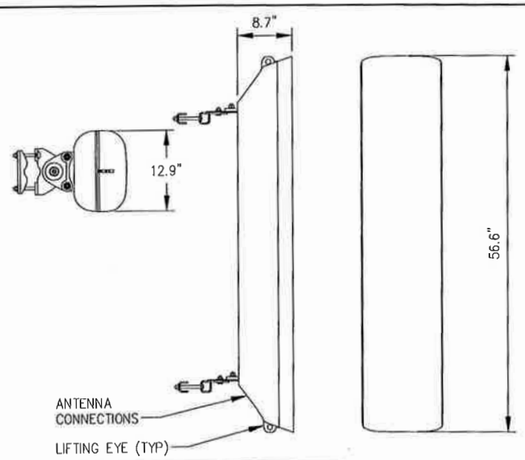
Drawing Title: **RF CHART**

Drawing Number: **C2**



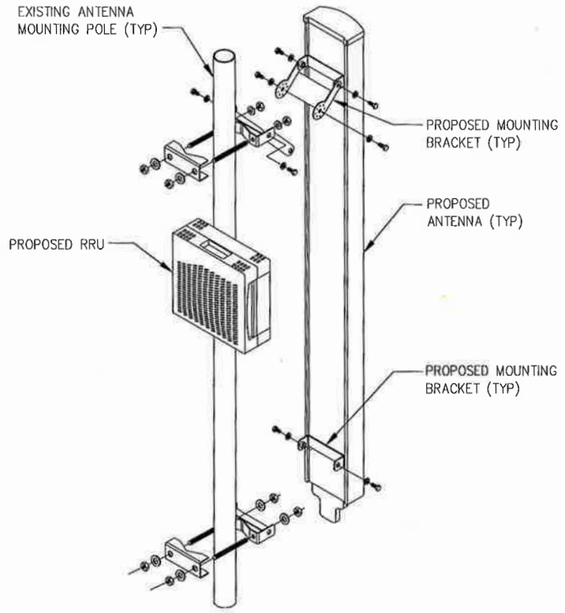
RFS MODEL NO.:	APXVAARR24_43-U-NA20
RADOME MATERIAL:	FIBERGLASS
RADOME COLOR:	LIGHT GREY
DIMENSIONS, HxWxD:	95.9"x24"x8.5"
WEIGHT, W/O MOUNTING KIT:	128 LBS

1/D1 APX ANTENNA DETAIL
SCALE: NOT TO SCALE

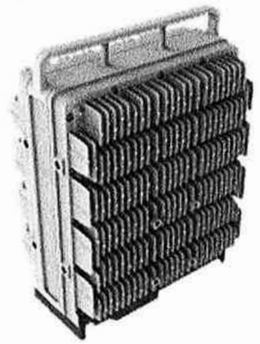


ERICSSON MODEL NO.:	AIR32 B66 B2
RADOME MATERIAL:	FIBERGLASS, UV RESISTANT
RADOME COLOR:	LIGHT GRAY
DIMENSIONS, HxWxD:	56.6"x12.9"x8.7"
WEIGHT, W/ PRE-MOUNTED BRACKETS:	132.2 LBS

2/D1 AIR32 B66 B2 ANTENNA DETAIL
SCALE: NOT TO SCALE

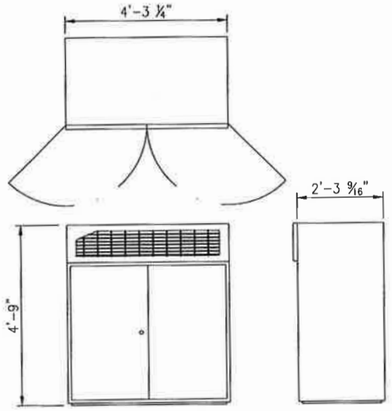


3/D1 ANTENNA/RRU MOUNTING DETAIL
SCALE: NOT TO SCALE



ERICSSON 4449 B71+B12 SPECIFICATIONS
- HxWxD, (INCHES) : 17.91"x13.19"x10.63"
- WEIGHT (LBS) : 74.96
- COLOR : GRAY

4/D1 4449 B71+B12 RRU DETAIL
SCALE: NOT TO SCALE



ERICSSON MODEL NO.:	RBS 6102
DIMENSIONS, HxWxD:	4'-9"x4'-3 ¼"x2'-3 9/16"
WEIGHT:	772 LBs (W/O BATTERIES)

5/D1 RBS 6102 DETAIL
SCALE: NOT TO SCALE

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PLYMOUTH/RT 6

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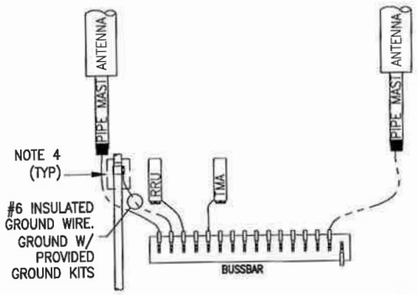
Prepared For: CROWN CASTLE

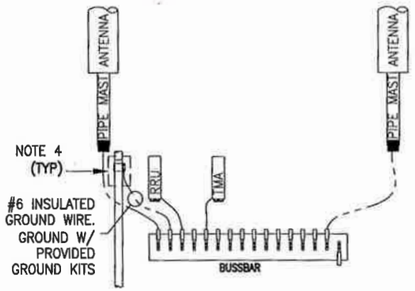
Drawing Title
EQUIPMENT DETAILS

Drawing Number
D1

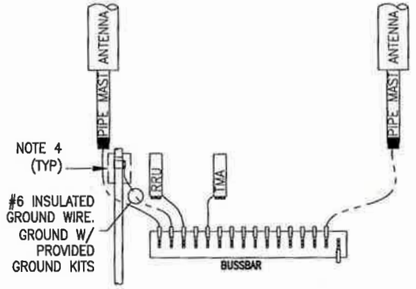
ALPHA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)



BETA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)

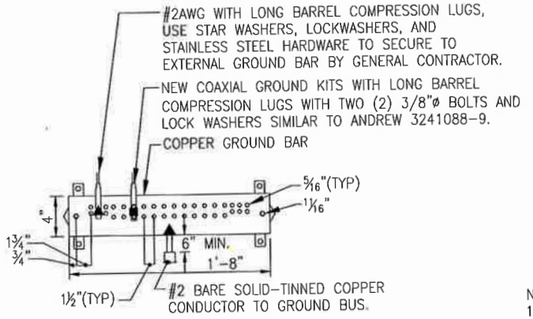


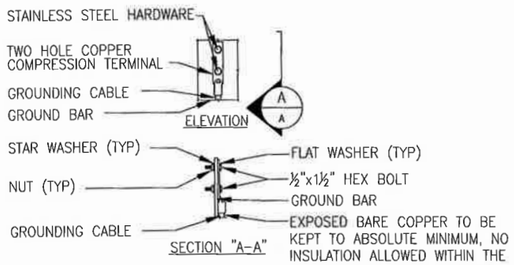
GAMMA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)



NOTES:
1. PROVIDE #2AWG GROUNDING CONDUCTOR, U.O.N.
2. PROVIDE BONDING AND GROUNDING CONDUCTORS WITH GREEN TYPE THWN INSULATION, U.O.N.
3. PROVIDE SOLID TINNED BARE COPPER WIRE (BCW) GROUNDING CONDUCTOR.
4. PROVIDE STANDARD COAX OR HYBRID CABLE GROUNDING KIT OR FIELD FABRICATE TO SUIT CONDITIONS. TOTAL LENGTH OF GROUNDING CONDUCTOR SHALL NOT EXCEED 10'–0".
5. PROVIDE GROUNDING ELECTRODES QUANTITY, TYPE AND SIZE AS INDICATED ON SITE GROUNDING PLAN.
6. LEAVE GROUND WIRE COILED UP ABOVE GRADE. CAP END OF CONDUIT.
7. ADD COAX OR HYBRID CABLE GROUND KIT CONNECTION TO BUSSBAR WHEN LENGTH OF CABLE TRAY (FROM TOWER OR MONOPOLE TO EQUIPMENT) IS GREATER THAN 20'–0".
8. ADD #2/0 GREEN INSULATED CONDUCTOR BETWEEN CABLE TRAY AND GRIPSTRUT/COVER.
9. BUSSBARS ARE TO BE TINNED COPPER BARS (¼"X2"X12") MOUNTED ON INSULATORS, U.O.N.
10. GROUND ALL PROPOSED ANTENNAS, DIPLEXERS, TMAS, AND RRUS PER MANU. SPECS.

1 E1 GROUNDING DIAGRAM
SCALE: NOT TO SCALE

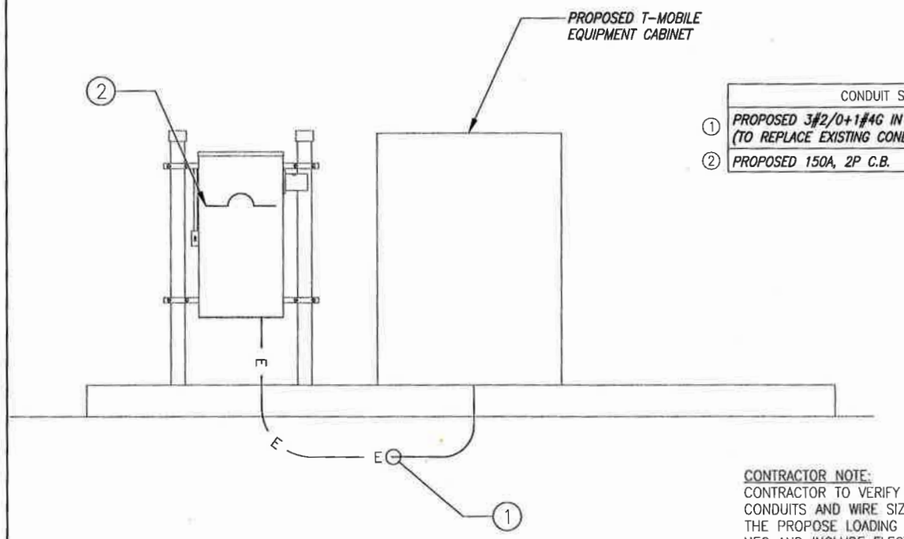




NOTES:
1. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

NOTES:
1. ALL HARDWARE STAINLESS STEEL COAT ALL SURFACES WITH KOPR–SHIELD BEFORE MATING.
2. FOR GROUND BOND TO STEEL ONLY: INSERT A TOOTH WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH KOPR–SHIELD.
3. ALL HOLES ARE COUNTERSUNK 1/16".

2 E1 GROUND BAR CONNECTION DETAIL
SCALE: NOT TO SCALE



CONDUIT SCHEDULE	
①	PROPOSED 3#2/0+1#4G IN 2" CONDUIT (TO REPLACE EXISTING CONDUCTOR AND CONDUIT)
②	PROPOSED 150A, 2P C.B.

CONTRACTOR NOTE:
CONTRACTOR TO VERIFY THAT THE EXISTING CONDUITS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSE LOADING IN ACCORDANCE WITH NEC AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORK AS REQUIRED.

3 E1 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

T-Mobile

T-MOBILE NORTHEAST LLC
103 MONARCH DRIVE
LIVERPOOL, NY 13088

INFINIGY

6865 DEERPATH ROAD SUITE 152
ELKRIDGE, MD 21075
TEL (443) 592-3143

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 25005
LICENSED PROFESSIONAL ENGINEER
AUG 15 2018

No	Submittal / Revision	App'd	Date
1	CLIENT COMMENTS	RMF	08/14/18
0	ISSUED FOR CONSTRUCTION	RMF	08/07/18
A	ISSUED FOR REVIEW	SL	07/31/18

Drawn: RCD
Designed: MSL
Checked: AJD

Project Number: 600-007

Project Title:
CT11417C
PLYMOUTH/RT 6

171 TOWN HILL ROAD
PLYMOUTH, CT 06786

Prepared For:
CROWN CASTLE

Drawing Title
RISER AND ONE-LINE DIAGRAMS

Drawing Number
E1

PENDING

1 / E2 NOT USED
SCALE: AS NOTED

T-MOBILE NORTHEAST LLC
103 MONARCH DRIVE
LIVERPOOL, NY 13088

INFINIGY
6865 DEERPATH ROAD SUITE 152
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No. 21705
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PLYMOUTH/RT 6

171 TOWN HILL ROAD
PLYMOUTH, CT 06786

Prepared For:
CROWN CASTLE

Drawing Title
RF PLUMBING DIAGRAM

Drawing Number
E2

PJF PAUL J. FORD & COMPANY

Date: **August 01, 2018**

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

Paul J. Ford and Company
250 East Broad St., Suite 600
Columbus, OH 43215
(614) 221-6679

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11417C
	Carrier Site Name:	--
Crown Castle Designation:	**Crown Castle BU Number:**	826768
	Crown Castle Site Name:	PLYMOUTH/RT 6
	Crown Castle JDE Job Number:	512703
	Crown Castle Work Order Number:	1601322
	Crown Castle Order Number:	446172 Rev. 0
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37518-2650.001.7805
Site Data:	**171 Town Hill Road, Plymouth, Litchfield County, CT**	
	Latitude *41° 40' 6.197"*, Longitude *-73° 1' 11.842"*	
	169 Foot - Monopole Tower	

Dear Denice Nicholson,

Paul J. Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1227179, in accordance with order 446172, revision 0.

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

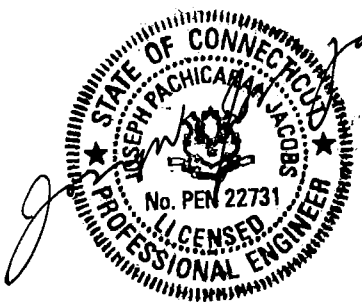
LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 were used in this analysis.

We at *Paul J. Ford and Company* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Allen R Bonham, E
Structural Designer



tnxTower Report - version 8.0.2.1

AUG 01 2018

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 169 ft Monopole tower designed by PIROD MANUFACTURES INC. in September of 2000. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, “Structural Standard for Antenna Supporting Structures and Antennas”, with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 were used in this analysis.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
164.0	165.0	3	ericsson	AIR 32 B2A/B66AA w/ Mount Pipe	2	1 3/8	
		3		RADIO 4449 B12/B71			
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
164.0	186.0	1	rfi antennas	COL45-70	7	7/8	1
	168.0	2		COL45-70			
	166.0	3	commscope	ATBT-BOTTOM-24V	2	1 5/8	2
		3		LNX-6515DS-VTM w/ Mount Pipe			
	165.0	3	rfs celwave	ATMAA1412D-1A20	10	1 5/8	1
	164.0	3	ems wireless	RR90-17-02DP w/ Mount Pipe			2
		1	tower mounts	Platform Mount [LP 403-1]			1
155.0	155.0	3	alcatel lucent	1900MHz RRH	4	1 1/4	1
		3		800MHZ RRH			
		3		TD-RRH8x20-25			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3		APXVTM14-C-120 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 305-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
142.0	142.0	3	alcatel lucent	B4 RRH2X60-4R	14	1 5/8	1
		3	alcatel lucent	RRH2X60-AWS			
		3	alcatel lucent	RRH2x60-700			
		6	antel	LPA-80080/6CF w/ Mount Pipe			
		6	commscope	SBNHH-1D65B w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Platform Mount [LP 403-1]			
121.0	125.0	1	rfs celwave	201-4	2	1/2	1
	121.0	1	tower mounts	Pipe Mount [PM 601-1]			
115.0	115.0	3	ericsson	RRUS 12 B2	2 4 12	3/8 5/8 1 5/8	2
		3	cci antennas	DTMABP7819VG12A			1
		6		TPX-070821			
		3	ericsson	RRUS 11			
		3		WCS RRUS-32-B30			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		3	quintel technology	QS66512-3 w/ Mount Pipe			
		2	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 305-1]			
105.0	105.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1 5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			
74.0	83.0	1	decibel	DB810T3E-XT	1	7/8	1
	74.0	1	tower mounts	Side Arm Mount [SO 306-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
--	--	--	--	--	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clarence Welti Assoc.' 8/14/2000	3491991	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Pirod; A-117464; 9/1/2000	3678682	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Pirod; A-117464; 9/1/2000	3491992	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.2.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) In accordance with discussions with CCI Corporate Engineering: Based on the assumption that the monopole manufacturer (ROHN/PiRod) has designed the flange plates at splices to adequately develop the full capacity of the unreinforced shaft section using unpublished and/or proprietary methodologies, we are assuming that if our analysis shows that both the existing shaft and the existing flange bolts are at a usage capacity of 100% or less, then the existing flange plates are at a usage capacity of 100% or less and no additional analysis of the flange plate is required.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J. Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	169 - 164.25	Pole	TP26x18x0.25	1	-0.24	1506.86	0.1	Pass
L2	164.25 - 129.75	Pole	TP34.0625x21.5x0.3125	2	-12.58	2368.37	23.1	Pass
L3	129.75 - 96.08	Pole	TP41.75x32.1327x0.375	3	-23.75	3489.81	38.8	Pass
L4	96.08 - 63.25	Pole	TP49.0625x39.8023x0.375	4	-33.62	3910.87	55.7	Pass
L5	63.25 - 31.25	Pole	TP56.125x46.9543x0.375	5	-44.91	4259.40	68.9	Pass
L6	31.25 - 0	Pole	TP62.9375x53.8466x0.375	6	-60.23	4606.06	81.8	Pass
							Summary	
						Pole (L6)	81.8	Pass
						Rating =	81.8	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods		67.2	Pass
1, 2	Base Plate		81.8	Pass
1	Base Foundation		73.9	Pass
1	Base Foundation Soil Interaction		45.7	Pass

Structure Rating (max from all components) =	81.8%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) See assumption #4.

4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in Litchfield County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 93 mph.
4) Structure Class II.
5) Exposure Category C.
6) Topographic Category 1.
7) Crest Height 0.00 ft.
8) Nominal ice thickness of 1.0000 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56 pcf.
11) A wind speed of 40 mph is used in combination with ice.
12) Temperature drop of 50 °F.
13) Deflections calculated using a wind speed of 60 mph.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.
17) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	169.00-164.25	4.75	2.38	18	18.0000	26.0000	0.2500	1.0000	A572-65 (65 ksi)
L2	164.25-129.75	36.88	3.83	18	21.5000	34.0625	0.3125	1.2500	A572-65

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
L3	129.75-96.08	37.50	4.67	18	32.1327	41.7500	0.3750	1.5000	(65 ksi) A572-65 (65 ksi)
L4	96.08-63.25	37.50	5.50	18	39.8023	49.0625	0.3750	1.5000	A572-65 (65 ksi)
L5	63.25-31.25	37.50	6.25	18	46.9543	56.1250	0.3750	1.5000	A572-65 (65 ksi)
L6	31.25-0.00	37.50		18	53.8466	62.9375	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	18.2391	14.0846	560.6340	6.3012	9.1440	61.3117	1122.0058	7.0437	2.7280	10.912
	26.3625	20.4326	1711.6544	9.1412	13.2080	129.5922	3425.5610	10.2183	4.1360	16.544
L2	22.6051	21.0154	1191.8828	7.5216	10.9220	109.1268	2385.3338	10.5097	3.2340	10.349
	34.5398	33.4758	4817.4335	11.9812	17.3038	278.4040	9641.2058	16.7411	5.4450	17.424
L3	33.5680	37.7996	4816.4038	11.2740	16.3234	295.0611	9639.1451	18.9034	4.9954	13.321
	42.3362	49.2466	10650.9822	14.6881	21.2090	502.1916	21315.9793	24.6280	6.6880	17.835
L4	41.5295	46.9284	9216.5336	13.9967	20.2196	455.8222	18445.1946	23.4686	6.3452	16.921
	49.7615	57.9503	17355.1378	17.2841	24.9238	696.3293	34733.1119	28.9807	7.9750	21.267
L5	48.9866	55.4411	15196.9229	16.5357	23.8528	637.1126	30413.8423	27.7258	7.6040	20.277
	56.9330	66.3564	26056.1506	19.7913	28.5115	913.8821	52146.5865	33.1845	9.2180	24.581
L6	56.1579	63.6445	22990.2731	18.9824	27.3541	840.4705	46010.7975	31.8283	8.8170	23.512
	63.8506	74.4650	36822.8946	22.2097	31.9722	1151.7142	73694.2417	37.2396	10.4170	27.779

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 169.00-164.25				1	1	1			
L2 164.25-129.75				1	1	1			
L3 129.75-96.08				1	1	1			
L4 96.08-63.25				1	1	1			
L5 63.25-31.25				1	1	1			
L6 31.25-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
***										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
810921-701(7/8)	C	No	Inside Pole	164.00 - 0.00	7	No Ice	0.00	0.34
						1/2" Ice	0.00	0.34
						1" Ice	0.00	0.34
AVA7-50(1-5/8)	C	No	Inside Pole	164.00 - 0.00	6	No Ice	0.00	0.70
						1/2" Ice	0.00	0.70
						1" Ice	0.00	0.70
LDF7-50A(1-5/8)	C	No	Inside Pole	164.00 - 0.00	4	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
MLCH HYBRID 6X12(1-3/8)	C	No	Inside Pole	164.00 - 0.00	2	No Ice	0.00	1.72
						1/2" Ice	0.00	1.72
						1" Ice	0.00	1.72
Coax for LC8								
***								
HB114-1-08U4-M6F(1-1/4)	C	No	Inside Pole	155.00 - 0.00	3	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
HB114-21U3M12-XXXF(1-1/4)	C	No	Inside Pole	155.00 - 0.00	1	No Ice	0.00	1.22
						1/2" Ice	0.00	1.22
						1" Ice	0.00	1.22
***								
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	142.00 - 0.00	2	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
LDF7-50A(1-5/8)	C	No	Inside Pole	142.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
***								
LDF4-50A(1/2)	C	No	CaAa (Out Of Face)	121.00 - 0.00	2	No Ice	0.06	0.15
						1/2" Ice	0.16	0.84
						1" Ice	0.26	2.14
LDF5-50A(7/8)	C	No	CaAa (Out Of Face)	74.00 - 0.00	1	No Ice	0.10	0.33
						1/2" Ice	0.20	1.26
						1" Ice	0.30	2.81
***								
LDF7-50A(1-5/8)	C	No	CaAa (Out Of Face)	115.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
FB-L98B-034-XXX(3/8)	C	No	CaAa (Out Of Face)	115.00 - 0.00	2	No Ice	0.00	0.06
						1/2" Ice	0.00	0.60
						1" Ice	0.00	1.76
WR-VG82ST-BRDA(5/8)	C	No	CaAa (Out Of Face)	115.00 - 0.00	4	No Ice	0.00	0.31
						1/2" Ice	0.00	1.01
						1" Ice	0.00	2.32
2" (Nominal) Conduit	C	No	CaAa (Out Of Face)	115.00 - 0.00	2	No Ice	0.24	0.72
						1/2" Ice	0.34	2.48
						1" Ice	0.44	4.84
***								
LDF7-50A(1-5/8)	C	No	CaAa (Out Of Face)	105.00 - 0.00	1	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
LDF7-50A(1-5/8)	C	No	CaAa (Out Of Face)	105.00 - 0.00	5	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	169.00-164.25	A	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	164.25-129.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.74
L3	129.75-96.08	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	13.868	1.33
L4	96.08-63.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	27.306	1.60
L5	63.25-31.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	28.832	1.57
L6	31.25-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	28.157	1.53

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	169.00-164.25	A	2.351	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	164.25-129.75	A	2.321	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.74
L3	129.75-96.08	A	2.261	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	58.701	6.91
L4	96.08-63.25	A	2.183	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	106.387	12.04
L5	63.25-31.25	A	2.073	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	112.675	11.28
L6	31.25-0.00	A	1.856	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	105.879	10.09

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	169.00-164.25	0.0000	0.0000	0.0000	0.0000
L2	164.25-129.75	0.0000	0.0000	0.0000	0.0000
L3	129.75-96.08	-2.7822	1.6063	-4.9184	2.8397
L4	96.08-63.25	-4.1517	2.3970	-7.6746	4.4309
L5	63.25-31.25	-4.6580	2.6893	-8.6026	4.9667
L6	31.25-0.00	-4.9732	2.8713	-8.8522	5.1108

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
AIR 32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	6.75 7.20 7.65	6.07 6.87 7.58	0.15 0.21 0.28
AIR 32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	6.75 7.20 7.65	6.07 6.87 7.58	0.15 0.21 0.28
AIR 32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	6.75 7.20 7.65	6.07 6.87 7.58	0.15 0.21 0.28
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	0.16 0.30 0.44
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	0.16 0.30 0.44
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	0.16 0.30 0.44
RADIO 4449 B12/B71	A	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.16 1.30 1.45	0.07 0.09 0.11
RADIO 4449 B12/B71	B	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.16 1.30 1.45	0.07 0.09 0.11
RADIO 4449 B12/B71	C	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.16 1.30 1.45	0.07 0.09 0.11
(2) COL45-70	A	From Leg	4.00 0.00 4.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.38 2.32 3.27	1.38 2.32 3.27	0.01 0.02 0.03
COL45-70	C	From Leg	4.00 0.00 22.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.38 2.32 3.27	1.38 2.32 3.27	0.01 0.02 0.03
ATMAA1412D-1A20	A	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.00 1.13 1.26	0.41 0.50 0.59	0.01 0.02 0.03
ATMAA1412D-1A20	B	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.00 1.13 1.26	0.41 0.50 0.59	0.01 0.02 0.03
ATMAA1412D-1A20	C	From Leg	4.00 0.00	0.0000	164.00	No Ice 1/2"	1.00 1.13	0.41 0.50	0.01 0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.00			Ice 1" Ice	1.26	0.59	0.03
Platform Mount [LP 403-1]	C	None		0.0000	164.00	No Ice 1/2" Ice 1" Ice	18.85 24.30 29.75	18.85 24.30 29.75	1.50 1.80 2.09
(2) 2.375" OD x 6' Mount Pipe	B	None		0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.03 0.04 0.05
2.375" OD x 6' Mount Pipe	C	None		0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.03 0.04 0.05
***									
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
TD-RRH8x20-25	A	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25	B	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25	C	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
800MHZ RRH	A	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10
800MHZ RRH	B	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10
800MHZ RRH	C	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10
1900MHz RRH	A	From Leg	4.00 0.00	0.0000	155.00	No Ice 1/2"	2.49 2.70	3.26 3.48	0.04 0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice 1" Ice	2.91	3.72	0.11
1900MHz RRH	B	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	2.49 2.70 2.91	3.26 3.48 3.72	0.04 0.08 0.11
1900MHz RRH	C	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	2.49 2.70 2.91	3.26 3.48 3.72	0.04 0.08 0.11
Platform Mount [LP 305-1]	C	None		0.0000	155.00	No Ice 1/2" Ice 1" Ice	18.01 23.33 28.65	18.01 23.33 28.65	1.12 1.35 1.58
2.375" OD x 6' Mount Pipe	A	None		0.0000	155.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.03 0.04 0.05
2.375" OD x 6' Mount Pipe	B	None		0.0000	155.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.03 0.04 0.05
2.375" OD x 6' Mount Pipe	C	None		0.0000	155.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.03 0.04 0.05
***									
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice	4.56 5.11 5.61	10.26 11.43 12.31	0.05 0.11 0.19
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice	4.56 5.11 5.61	10.26 11.43 12.31	0.05 0.11 0.19
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice	4.56 5.11 5.61	10.26 11.43 12.31	0.05 0.11 0.19
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice	8.40 8.96 9.49	7.07 8.26 9.18	0.07 0.14 0.21
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice	8.40 8.96 9.49	7.07 8.26 9.18	0.07 0.14 0.21
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice	8.40 8.96 9.49	7.07 8.26 9.18	0.07 0.14 0.21
B4 RRH2X60-4R	A	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice	3.36 3.61 3.88	2.00 2.24 2.48	0.06 0.08 0.11
B4 RRH2X60-4R	B	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice	3.36 3.61 3.88	2.00 2.24 2.48	0.06 0.08 0.11
B4 RRH2X60-4R	C	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice	3.36 3.61 3.88	2.00 2.24 2.48	0.06 0.08 0.11
RRH2x60-700	A	From Leg	4.00 0.00	0.0000	142.00	No Ice 1/2"	3.50 3.76	1.82 2.05	0.06 0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice 1" Ice	4.03	2.29	0.11
RRH2x60-700	B	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2x60-700	C	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2X60-AWS	A	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice	1.88 2.06 2.24	1.24 1.39 1.54	0.04 0.06 0.08
RRH2X60-AWS	B	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice	1.88 2.06 2.24	1.24 1.39 1.54	0.04 0.06 0.08
RRH2X60-AWS	C	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice	1.88 2.06 2.24	1.24 1.39 1.54	0.04 0.06 0.08
DB-T1-6Z-8AB-0Z	C	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice	4.80 5.07 5.35	2.00 2.19 2.39	0.04 0.08 0.12
Platform Mount [LP 403-1]	C	None		0.0000	142.00	No Ice 1/2" Ice 1" Ice	18.85 24.30 29.75	18.85 24.30 29.75	1.50 1.80 2.09
***									
201-4	A	From Leg	1.00 0.00 4.00	0.0000	121.00	No Ice 1/2" Ice 1" Ice	1.13 2.00 2.90	1.13 2.00 2.90	0.00 0.01 0.03
Pipe Mount [PM 601-1]	C	None		0.0000	121.00	No Ice 1/2" Ice 1" Ice	3.00 3.74 4.48	0.90 1.12 1.34	0.07 0.08 0.09
***									
7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
7770.00 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.30 7.48 8.37	0.07 0.14 0.21
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.30 7.48 8.37	0.07 0.14 0.21
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.30 7.48 8.37	0.07 0.14 0.21
QS66512-3 w/ Mount Pipe	A	From Leg	4.00	0.0000	115.00	No Ice	8.37	8.46	0.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	8.93	9.66	0.21
			0.00			1" Ice	9.46	10.55	0.29
QS66512-3 w/ Mount Pipe	B	From Leg	4.00	0.0000	115.00	No Ice	8.37	8.46	0.13
			0.00			1/2" Ice	8.93	9.66	0.21
			0.00			1" Ice	9.46	10.55	0.29
QS66512-3 w/ Mount Pipe	C	From Leg	4.00	0.0000	115.00	No Ice	8.37	8.46	0.13
			0.00			1/2" Ice	8.93	9.66	0.21
			0.00			1" Ice	9.46	10.55	0.29
DTMABP7819VG12A	A	From Leg	4.00	0.0000	115.00	No Ice	0.98	0.34	0.02
			0.00			1/2" Ice	1.10	0.42	0.03
			0.00			1" Ice	1.23	0.51	0.04
DTMABP7819VG12A	B	From Leg	4.00	0.0000	115.00	No Ice	0.98	0.34	0.02
			0.00			1/2" Ice	1.10	0.42	0.03
			0.00			1" Ice	1.23	0.51	0.04
DTMABP7819VG12A	C	From Leg	4.00	0.0000	115.00	No Ice	0.98	0.34	0.02
			0.00			1/2" Ice	1.10	0.42	0.03
			0.00			1" Ice	1.23	0.51	0.04
DC6-48-60-18-8F	A	From Leg	4.00	0.0000	115.00	No Ice	0.92	0.92	0.02
			0.00			1/2" Ice	1.46	1.46	0.04
			0.00			1" Ice	1.64	1.64	0.06
DC6-48-60-18-8F	B	From Leg	4.00	0.0000	115.00	No Ice	0.92	0.92	0.02
			0.00			1/2" Ice	1.46	1.46	0.04
			0.00			1" Ice	1.64	1.64	0.06
RRUS 11	A	From Leg	4.00	0.0000	115.00	No Ice	2.79	1.19	0.05
			0.00			1/2" Ice	3.00	1.34	0.07
			0.00			1" Ice	3.21	1.50	0.10
RRUS 11	B	From Leg	4.00	0.0000	115.00	No Ice	2.79	1.19	0.05
			0.00			1/2" Ice	3.00	1.34	0.07
			0.00			1" Ice	3.21	1.50	0.10
RRUS 11	C	From Leg	4.00	0.0000	115.00	No Ice	2.79	1.19	0.05
			0.00			1/2" Ice	3.00	1.34	0.07
			0.00			1" Ice	3.21	1.50	0.10
RRUS 12 B2	A	From Leg	4.00	0.0000	115.00	No Ice	3.14	1.28	0.05
			0.00			1/2" Ice	3.36	1.43	0.07
			0.00			1" Ice	3.59	1.60	0.10
RRUS 12 B2	B	From Leg	4.00	0.0000	115.00	No Ice	3.14	1.28	0.05
			0.00			1/2" Ice	3.36	1.43	0.07
			0.00			1" Ice	3.59	1.60	0.10
RRUS 12 B2	C	From Leg	4.00	0.0000	115.00	No Ice	3.14	1.28	0.05
			0.00			1/2" Ice	3.36	1.43	0.07
			0.00			1" Ice	3.59	1.60	0.10
WCS RRUS-32-B30	A	From Leg	4.00	0.0000	115.00	No Ice	3.31	2.42	0.08
			0.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
WCS RRUS-32-B30	B	From Leg	4.00	0.0000	115.00	No Ice	3.31	2.42	0.08
			0.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
WCS RRUS-32-B30	C	From Leg	4.00	0.0000	115.00	No Ice	3.31	2.42	0.08
			0.00			1/2"	3.56	2.64	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice 1" Ice	3.81	2.86	0.14
(2) TPX-070821	A	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
(2) TPX-070821	B	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
(2) TPX-070821	C	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
Platform Mount [LP 305-1]	C	None		0.0000	115.00	No Ice 1/2" Ice 1" Ice	18.01 23.33 28.65	18.01 23.33 28.65	1.12 1.35 1.58
2.375" OD x 6' Mount Pipe	A	None		0.0000	115.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.03 0.04 0.05
2.375" OD x 6' Mount Pipe	B	None		0.0000	115.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.03 0.04 0.05
2.375" OD x 6' Mount Pipe	C	None		0.0000	115.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.03 0.04 0.05
***									
APXV18-206517S-C w/ Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice	5.40 5.96 6.48	4.70 5.86 6.73	0.05 0.10 0.15
APXV18-206517S-C w/ Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice	5.40 5.96 6.48	4.70 5.86 6.73	0.05 0.10 0.15
APXV18-206517S-C w/ Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice	5.40 5.96 6.48	4.70 5.86 6.73	0.05 0.10 0.15
Pipe Mount [PM 601-3]	C	None		0.0000	105.00	No Ice 1/2" Ice 1" Ice	4.39 5.48 6.57	4.39 5.48 6.57	0.20 0.24 0.28
***									
DB810T3E-XT	A	From Leg	4.00 0.00 9.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	4.53 6.07 7.63	4.53 6.07 7.63	0.05 0.08 0.12
Side Arm Mount [SO 306-1]	C	None		0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.98 1.70 2.42	2.18 3.80 5.42	0.04 0.06 0.08
****									
RRUS 12 B2	A	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	3.14 3.36 3.59	1.28 1.43 1.60	0.05 0.07 0.10

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 169.00-164.25	166.48	1.409	29.64	8.827	A	0.000	8.827	8.827	100.00	0.000	0.000
					B	0.000	8.827		100.00	0.000	0.000
					C	0.000	8.827		100.00	0.000	0.000
L2 164.25-129.75	145.90	1.37	28.81	82.146	A	0.000	82.146	82.146	100.00	0.000	0.000
					B	0.000	82.146		100.00	0.000	0.000
					C	0.000	82.146		100.00	0.000	0.000
L3 129.75-96.08	112.40	1.297	27.27	106.487	A	0.000	106.487	106.487	100.00	0.000	0.000
					B	0.000	106.487		100.00	0.000	0.000
					C	0.000	106.487		100.00	0.000	13.868
L4 96.08-63.25	79.35	1.205	25.32	124.878	A	0.000	124.878	124.878	100.00	0.000	0.000
					B	0.000	124.878		100.00	0.000	0.000
					C	0.000	124.878		100.00	0.000	27.306
L5 63.25-31.25	47.14	1.08	22.64	141.226	A	0.000	141.226	141.226	100.00	0.000	0.000
					B	0.000	141.226		100.00	0.000	0.000
					C	0.000	141.226		100.00	0.000	28.832
L6 31.25-0.00	15.65	0.856	18.71	156.261	A	0.000	156.261	156.261	100.00	0.000	0.000
					B	0.000	156.261		100.00	0.000	0.000
					C	0.000	156.261		100.00	0.000	28.157

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 169.00-164.25	166.48	1.409	5.48	2.3513	10.689	A	0.000	10.689	10.689	100.00	0.000	0.000
						B	0.000	10.689		100.00	0.000	0.000
						C	0.000	10.689		100.00	0.000	0.000
L2 164.25-129.75	145.90	1.37	5.33	2.3205	95.666	A	0.000	95.666	95.666	100.00	0.000	0.000
						B	0.000	95.666		100.00	0.000	0.000
						C	0.000	95.666		100.00	0.000	0.000
L3 129.75-96.08	112.40	1.297	5.04	2.2608	119.509	A	0.000	119.509	119.509	100.00	0.000	0.000
						B	0.000	119.509		100.00	0.000	0.000
						C	0.000	119.509		100.00	0.000	58.701
L4 96.08-63.25	79.35	1.205	4.68	2.1834	137.249	A	0.000	137.249	137.249	100.00	0.000	0.000
						B	0.000	137.249		100.00	0.000	0.000
						C	0.000	137.249		100.00	0.000	106.387
L5 63.25-31.25	47.14	1.08	4.19	2.0726	152.871	A	0.000	152.871	152.871	100.00	0.000	0.000
						B	0.000	152.871		100.00	0.000	0.000
						C	0.000	152.871		100.00	0.000	112.675
L6 31.25-0.00	15.65	0.856	3.46	1.8562	167.056	A	0.000	167.056	167.056	100.00	0.000	0.000
						B	0.000	167.056		100.00	0.000	0.000
						C	0.000	167.056		100.00	0.000	105.879

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 169.00-164.25	166.48	1.409	11.04	8.827	A	0.000	8.827	8.827	100.00	0.000	0.000
					B	0.000	8.827		100.00	0.000	0.000
					C	0.000	8.827		100.00	0.000	0.000
L2 164.25-129.75	145.90	1.37	10.73	82.146	A	0.000	82.146	82.146	100.00	0.000	0.000
					B	0.000	82.146		100.00	0.000	0.000
					C	0.000	82.146		100.00	0.000	0.000
L3 129.75-96.08	112.40	1.297	10.15	106.487	A	0.000	106.487	106.487	100.00	0.000	0.000
					B	0.000	106.487		100.00	0.000	0.000
					C	0.000	106.487		100.00	0.000	13.868
L4 96.08-63.25	79.35	1.205	9.43	124.878	A	0.000	124.878	124.878	100.00	0.000	0.000
					B	0.000	124.878		100.00	0.000	0.000
					C	0.000	124.878		100.00	0.000	27.306
L5 63.25-31.25	47.14	1.08	8.43	141.226	A	0.000	141.226	141.226	100.00	0.000	0.000
					B	0.000	141.226		100.00	0.000	0.000
					C	0.000	141.226		100.00	0.000	28.832
L6 31.25-0.00	15.65	0.856	6.97	156.261	A	0.000	156.261	156.261	100.00	0.000	0.000
					B	0.000	156.261		100.00	0.000	0.000
					C	0.000	156.261		100.00	0.000	28.157

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service

Comb. No.	Description
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	169 - 164.25	Pole	Max Tension	20	0.00	-0.00	-0.00
			Max. Compression	26	-0.51	0.00	-0.00
			Max. Mx	20	-0.24	0.40	0.00
			Max. My	14	-0.24	0.00	-0.40
			Max. Vy	20	-0.22	0.40	0.00
			Max. Vx	14	0.22	0.00	-0.40
			Max. Torque	32			0.00
L2	164.25 - 129.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.60	2.37	-0.07
			Max. Mx	20	-12.59	355.67	-0.55
			Max. My	14	-12.59	0.71	-355.08
			Max. Vy	20	-18.22	355.67	-0.55
			Max. Vx	14	18.17	0.71	-355.08
			Max. Torque	4			0.75
L3	129.75 - 96.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-63.53	10.48	-3.23
			Max. Mx	20	-23.75	1095.30	-2.09
			Max. My	2	-23.75	-1.47	1093.94
			Max. Vy	20	-28.09	1095.30	-2.09
			Max. Vx	14	28.12	2.77	-1093.79
			Max. Torque	16			-1.36
L4	96.08 - 63.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-87.49	28.53	-11.78
			Max. Mx	20	-33.63	2080.86	-3.99
			Max. My	14	-33.62	5.48	-2079.80
			Max. Vy	20	-33.67	2080.86	-3.99
			Max. Vx	14	33.71	5.48	-2079.80
			Max. Torque	2			3.08
L5	63.25 - 31.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-112.87	48.89	-23.40
			Max. Mx	20	-44.91	3215.72	-6.30
			Max. My	14	-44.91	8.35	-3215.38
			Max. Vy	20	-38.75	3215.72	-6.30
			Max. Vx	14	38.78	8.35	-3215.38
			Max. Torque	2			5.16
L6	31.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-143.88	73.23	-37.40
			Max. Mx	20	-60.23	4766.60	-9.14
			Max. My	14	-60.23	11.92	-4767.03
			Max. Vy	20	-43.59	4766.60	-9.14
			Max. Vx	14	43.63	11.92	-4767.03
			Max. Torque	2			7.56

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	143.88	-0.00	0.00
	Max. H_x	21	45.19	43.56	-0.05
	Max. H_z	3	45.19	-0.05	43.60
	Max. M_x	2	4763.22	-0.05	43.60
	Max. M_z	8	4757.22	-43.56	0.05
	Max. Torsion	2	7.56	-0.05	43.60
	Min. Vert	21	45.19	43.56	-0.05
	Min. H_x	9	45.19	-43.56	0.05
	Min. H_z	15	45.19	0.05	-43.60
	Min. M_x	14	-4767.03	0.05	-43.60
	Min. M_z	20	-4766.60	43.56	-0.05
	Min. Torsion	14	-7.56	0.05	-43.60

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	50.21	-0.00	0.00	1.55	3.79	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	60.26	0.05	-43.60	-4763.22	-2.56	-7.56
0.9 Dead+1.6 Wind 0 deg - No Ice	45.19	0.05	-43.60	-4717.16	-3.69	-7.56
1.2 Dead+1.6 Wind 30 deg - No Ice	60.26	21.83	-37.79	-4128.56	-2383.06	-5.56
0.9 Dead+1.6 Wind 30 deg - No Ice	45.19	21.83	-37.79	-4088.64	-2360.89	-5.56
1.2 Dead+1.6 Wind 60 deg - No Ice	60.26	37.76	-21.84	-2387.00	-4123.75	-2.06
0.9 Dead+1.6 Wind 60 deg - No Ice	45.19	37.76	-21.84	-2364.11	-4084.55	-2.06
1.2 Dead+1.6 Wind 90 deg - No Ice	60.26	43.56	-0.05	-5.34	-4757.22	1.98
0.9 Dead+1.6 Wind 90 deg - No Ice	45.19	43.56	-0.05	-5.74	-4712.16	1.98
1.2 Dead+1.6 Wind 120 deg - No Ice	60.26	37.71	21.76	2378.28	-4116.54	5.50
0.9 Dead+1.6 Wind 120 deg - No Ice	45.19	37.71	21.76	2354.55	-4077.42	5.50
1.2 Dead+1.6 Wind 150 deg - No Ice	60.26	21.74	37.74	4125.15	-2370.53	7.54
0.9 Dead+1.6 Wind 150 deg - No Ice	45.19	21.74	37.74	4084.33	-2348.49	7.54
1.2 Dead+1.6 Wind 180 deg - No Ice	60.26	-0.05	43.60	4767.03	11.92	7.56
0.9 Dead+1.6 Wind 180 deg - No Ice	45.19	-0.05	43.60	4720.00	10.64	7.56
1.2 Dead+1.6 Wind 210 deg - No Ice	60.26	-21.83	37.79	4132.38	2392.42	5.56
0.9 Dead+1.6 Wind 210 deg - No Ice	45.19	-21.83	37.79	4091.48	2367.85	5.56
1.2 Dead+1.6 Wind 240 deg - No Ice	60.26	-37.76	21.84	2390.82	4133.13	2.06
0.9 Dead+1.6 Wind 240 deg - No Ice	45.19	-37.76	21.84	2366.96	4091.53	2.06
1.2 Dead+1.6 Wind 270 deg - No Ice	60.26	-43.56	0.05	9.14	4766.60	-1.98
0.9 Dead+1.6 Wind 270 deg - No Ice	45.19	-43.56	0.05	8.58	4719.14	-1.98
1.2 Dead+1.6 Wind 300 deg - No Ice	60.26	-37.71	-21.76	-2374.48	4125.92	-5.50
0.9 Dead+1.6 Wind 300 deg - No Ice	45.19	-37.71	-21.76	-2351.73	4084.39	-5.50
1.2 Dead+1.6 Wind 330 deg - No Ice	60.26	-21.74	-37.74	-4121.36	2379.89	-7.54

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.6 Wind 330 deg - No Ice	45.19	-21.74	-37.74	-4081.51	2355.45	-7.54
1.2 Dead+1.0 Ice+1.0 Temp	143.88	0.00	-0.00	37.40	73.23	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	143.88	0.01	-9.84	-1066.15	72.38	-3.36
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	143.88	4.92	-8.53	-918.80	-479.13	-2.33
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	143.88	8.52	-4.93	-515.22	-882.59	-0.68
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	143.88	9.84	-0.01	36.46	-1029.89	1.16
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	143.88	8.52	4.91	588.48	-881.67	2.68
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	143.88	4.91	8.52	992.84	-477.42	3.49
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	143.88	-0.01	9.84	1141.10	74.40	3.36
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	143.88	-4.92	8.53	993.86	625.97	2.33
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	143.88	-8.52	4.93	590.23	1029.48	0.68
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	143.88	-9.84	0.01	38.49	1176.67	-1.16
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	143.88	-8.52	-4.91	-513.52	1028.47	-2.68
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	143.88	-4.91	-8.52	-917.89	624.22	-3.49
Dead+Wind 0 deg - Service	50.21	0.01	-10.15	-1101.23	2.22	-1.77
Dead+Wind 30 deg - Service	50.21	5.08	-8.79	-954.32	-548.69	-1.30
Dead+Wind 60 deg - Service	50.21	8.79	-5.08	-551.27	-951.53	-0.48
Dead+Wind 90 deg - Service	50.21	10.14	-0.01	-0.09	-1098.37	0.46
Dead+Wind 120 deg - Service	50.21	8.78	5.06	551.54	-949.86	1.28
Dead+Wind 150 deg - Service	50.21	5.06	8.78	955.81	-545.79	1.76
Dead+Wind 180 deg - Service	50.21	-0.01	10.15	1104.39	5.57	1.77
Dead+Wind 210 deg - Service	50.21	-5.08	8.79	957.48	556.48	1.30
Dead+Wind 240 deg - Service	50.21	-8.79	5.08	554.44	959.33	0.48
Dead+Wind 270 deg - Service	50.21	-10.14	0.01	3.26	1106.17	-0.46
Dead+Wind 300 deg - Service	50.21	-8.78	-5.06	-548.37	957.65	-1.28
Dead+Wind 330 deg - Service	50.21	-5.06	-8.78	-952.64	553.58	-1.76

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-50.21	0.00	0.00	50.21	-0.00	0.000%
2	0.05	-60.26	-43.60	-0.05	60.26	43.60	0.002%
3	0.05	-45.19	-43.60	-0.05	45.19	43.60	0.001%
4	21.83	-60.26	-37.79	-21.83	60.26	37.79	0.000%
5	21.83	-45.19	-37.79	-21.83	45.19	37.79	0.000%
6	37.76	-60.26	-21.84	-37.76	60.26	21.84	0.000%
7	37.76	-45.19	-21.84	-37.76	45.19	21.84	0.000%
8	43.57	-60.26	-0.05	-43.56	60.26	0.05	0.010%
9	43.57	-45.19	-0.05	-43.56	45.19	0.05	0.008%
10	37.71	-60.26	21.76	-37.71	60.26	-21.76	0.000%
11	37.71	-45.19	21.76	-37.71	45.19	-21.76	0.000%
12	21.74	-60.26	37.74	-21.74	60.26	-37.74	0.000%
13	21.74	-45.19	37.74	-21.74	45.19	-37.74	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
14	-0.05	-60.26	43.60	0.05	60.26	-43.60	0.002%
15	-0.05	-45.19	43.60	0.05	45.19	-43.60	0.001%
16	-21.83	-60.26	37.79	21.83	60.26	-37.79	0.000%
17	-21.83	-45.19	37.79	21.83	45.19	-37.79	0.000%
18	-37.76	-60.26	21.84	37.76	60.26	-21.84	0.000%
19	-37.76	-45.19	21.84	37.76	45.19	-21.84	0.000%
20	-43.57	-60.26	0.05	43.56	60.26	-0.05	0.010%
21	-43.57	-45.19	0.05	43.56	45.19	-0.05	0.008%
22	-37.71	-60.26	-21.76	37.71	60.26	21.76	0.000%
23	-37.71	-45.19	-21.76	37.71	45.19	21.76	0.000%
24	-21.74	-60.26	-37.74	21.74	60.26	37.74	0.000%
25	-21.74	-45.19	-37.74	21.74	45.19	37.74	0.000%
26	0.00	-143.88	0.00	-0.00	143.88	0.00	0.000%
27	0.01	-143.88	-9.84	-0.01	143.88	9.84	0.001%
28	4.92	-143.88	-8.53	-4.92	143.88	8.53	0.001%
29	8.52	-143.88	-4.93	-8.52	143.88	4.93	0.001%
30	9.84	-143.88	-0.01	-9.84	143.88	0.01	0.001%
31	8.52	-143.88	4.92	-8.52	143.88	-4.91	0.000%
32	4.91	-143.88	8.52	-4.91	143.88	-8.52	0.000%
33	-0.01	-143.88	9.84	0.01	143.88	-9.84	0.001%
34	-4.92	-143.88	8.53	4.92	143.88	-8.53	0.000%
35	-8.52	-143.88	4.93	8.52	143.88	-4.93	0.000%
36	-9.84	-143.88	0.01	9.84	143.88	-0.01	0.001%
37	-8.52	-143.88	-4.92	8.52	143.88	4.91	0.000%
38	-4.91	-143.88	-8.52	4.91	143.88	8.52	0.000%
39	0.01	-50.21	-10.15	-0.01	50.21	10.15	0.003%
40	5.08	-50.21	-8.80	-5.08	50.21	8.79	0.003%
41	8.79	-50.21	-5.08	-8.79	50.21	5.08	0.003%
42	10.14	-50.21	-0.01	-10.14	50.21	0.01	0.003%
43	8.78	-50.21	5.06	-8.78	50.21	-5.06	0.003%
44	5.06	-50.21	8.78	-5.06	50.21	-8.78	0.003%
45	-0.01	-50.21	10.15	0.01	50.21	-10.15	0.003%
46	-5.08	-50.21	8.80	5.08	50.21	-8.79	0.003%
47	-8.79	-50.21	5.08	8.79	50.21	-5.08	0.003%
48	-10.14	-50.21	0.01	10.14	50.21	-0.01	0.003%
49	-8.78	-50.21	-5.06	8.78	50.21	5.06	0.003%
50	-5.06	-50.21	-8.78	5.06	50.21	8.78	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	15	0.00002323	0.00008435
3	Yes	15	0.00000001	0.00006723
4	Yes	18	0.00000001	0.00006804
5	Yes	17	0.00000001	0.00012648
6	Yes	18	0.00000001	0.00007170
7	Yes	17	0.00000001	0.00013350
8	Yes	13	0.00013891	0.00012610
9	Yes	13	0.00009525	0.00011511
10	Yes	18	0.00000001	0.00007141
11	Yes	17	0.00000001	0.00013299
12	Yes	18	0.00000001	0.00006733
13	Yes	17	0.00000001	0.00012516
14	Yes	15	0.00002322	0.00009185
15	Yes	15	0.00000001	0.00007299
16	Yes	18	0.00000001	0.00007320
17	Yes	17	0.00000001	0.00013622
18	Yes	18	0.00000001	0.00006939
19	Yes	17	0.00000001	0.00012890
20	Yes	13	0.00013889	0.00013275
21	Yes	13	0.00009524	0.00011973
22	Yes	18	0.00000001	0.00006844
23	Yes	17	0.00000001	0.00012720

24	Yes	18	0.00000001	0.00007266
25	Yes	17	0.00000001	0.00013531
26	Yes	12	0.00000001	0.00006384
27	Yes	15	0.00012137	0.00013759
28	Yes	15	0.00012135	0.00014677
29	Yes	15	0.00012136	0.00014709
30	Yes	15	0.00012140	0.00013103
31	Yes	16	0.00000001	0.00007346
32	Yes	16	0.00000001	0.00007336
33	Yes	15	0.00012119	0.00014546
34	Yes	16	0.00000001	0.00008269
35	Yes	16	0.00000001	0.00008178
36	Yes	15	0.00012119	0.00014793
37	Yes	16	0.00000001	0.00007775
38	Yes	16	0.00000001	0.00007850
39	Yes	13	0.00011346	0.00004708
40	Yes	13	0.00011335	0.00005333
41	Yes	13	0.00011336	0.00007223
42	Yes	13	0.00011347	0.00003774
43	Yes	13	0.00011335	0.00007365
44	Yes	13	0.00011334	0.00005267
45	Yes	13	0.00011345	0.00004750
46	Yes	13	0.00011334	0.00008123
47	Yes	13	0.00011334	0.00005839
48	Yes	13	0.00011345	0.00003799
49	Yes	13	0.00011335	0.00005663
50	Yes	13	0.00011335	0.00008151

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	169 - 164.25	23.093	47	1.1018	0.0024
L2	166.625 - 129.75	22.545	47	1.1018	0.0024
L3	133.58 - 96.08	15.145	47	1.0059	0.0020
L4	100.75 - 63.25	8.833	47	0.8085	0.0016
L5	68.75 - 31.25	4.177	47	0.5606	0.0012
L6	37.5 - 0	1.278	47	0.3052	0.0006

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
164.00	AIR 32 B2A/B66AA w/ Mount Pipe	47	21.940	1.1006	0.0024	73396
155.00	APXVTM14-C-120 w/ Mount Pipe	47	19.877	1.0866	0.0023	28311
142.00	(2) LPA-80080/6CF w/ Mount Pipe	47	16.964	1.0440	0.0021	14975
121.00	201-4	47	12.566	0.9389	0.0018	9807
115.00	7770.00 w/ Mount Pipe	47	11.402	0.9030	0.0017	9172
105.00	APXV18-206517S-C w/ Mount Pipe	47	9.569	0.8380	0.0016	8280
74.00	DB810T3E-XT	47	4.832	0.6032	0.0012	7674

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	169 - 164.25	99.587	18	4.7588	0.0102
L2	166.625 - 129.75	97.225	18	4.7588	0.0102
L3	133.58 - 96.08	65.318	18	4.3446	0.0084
L4	100.75 - 63.25	38.097	18	3.4910	0.0068
L5	68.75 - 31.25	18.014	18	2.4193	0.0049
L6	37.5 - 0	5.511	16	1.3162	0.0027

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
164.00	AIR 32 B2A/B66AA w/ Mount Pipe	18	94.616	4.7537	0.0102	17331
155.00	APXVTM14-C-120 w/ Mount Pipe	18	85.722	4.6933	0.0098	6640
142.00	(2) LPA-80080/6CF w/ Mount Pipe	18	73.160	4.5089	0.0090	3508
121.00	201-4	18	54.196	4.0547	0.0077	2293
115.00	7770.00 w/ Mount Pipe	18	49.178	3.8997	0.0075	2143
105.00	APXV18-206517S-C w/ Mount Pipe	18	41.272	3.6187	0.0070	1932
74.00	DB810T3E-XT	18	20.840	2.6033	0.0053	1784

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	169 - 164.25 (1)	TP26x18x0.25	4.75	0.00	0.0	20.4326	-0.24	1506.86	0.000
L2	164.25 - 129.75 (2)	TP34.0625x21.5x0.3125	36.88	0.00	0.0	32.1816	-12.58	2368.37	0.005
L3	129.75 - 96.08 (3)	TP41.75x32.1327x0.375	37.50	0.00	0.0	47.8211	-23.75	3489.81	0.007
L4	96.08 - 63.25 (4)	TP49.0625x39.8023x0.375	37.50	0.00	0.0	56.3337	-33.62	3910.87	0.009
L5	63.25 - 31.25 (5)	TP56.125x46.9543x0.375	37.50	0.00	0.0	64.5372	-44.91	4259.40	0.011
L6	31.25 - 0 (6)	TP62.9375x53.8466x0.375	37.50	0.00	0.0	74.4650	-60.23	4606.06	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	169 - 164.25 (1)	TP26x18x0.25	0.41	796.43	0.001	0.00	796.43	0.000
L2	164.25 - 129.75 (2)	TP34.0625x21.5x0.3125	356.02	1577.36	0.226	0.00	1577.36	0.000
L3	129.75 -	TP41.75x32.1327x0.375	1097.02	2878.99	0.381	0.00	2878.99	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	96.08 (3)							
L4	96.08 - 63.25 (4)	TP49.0625x39.8023x0.375	2084.48	3806.01	0.548	0.00	3806.01	0.000
L5	63.25 - 31.25 (5)	TP56.125x46.9543x0.375	3221.43	4753.57	0.678	0.00	4753.57	0.000
L6	31.25 - 0 (6)	TP62.9375x53.8466x0.375	4774.96	5936.64	0.804	0.00	5936.64	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	169 - 164.25 (1)	TP26x18x0.25	0.22	753.43	0.000	0.00	1597.13	0.000
L2	164.25 - 129.75 (2)	TP34.0625x21.5x0.3125	18.26	1184.19	0.015	0.61	3163.16	0.000
L3	129.75 - 96.08 (3)	TP41.75x32.1327x0.375	28.15	1744.91	0.016	1.03	5773.14	0.000
L4	96.08 - 63.25 (4)	TP49.0625x39.8023x0.375	33.73	1955.44	0.017	2.07	7630.43	0.000
L5	63.25 - 31.25 (5)	TP56.125x46.9543x0.375	38.80	2129.70	0.018	2.06	9528.75	0.000
L6	31.25 - 0 (6)	TP62.9375x53.8466x0.375	43.67	2303.03	0.019	5.56	11898.58	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	169 - 164.25 (1)	0.000	0.001	0.000	0.000	0.000	0.001 ✔	1.000	4.8.2 ✔
L2	164.25 - 129.75 (2)	0.005	0.226	0.000	0.015	0.000	0.231 ✔	1.000	4.8.2 ✔
L3	129.75 - 96.08 (3)	0.007	0.381	0.000	0.016	0.000	0.388 ✔	1.000	4.8.2 ✔
L4	96.08 - 63.25 (4)	0.009	0.548	0.000	0.017	0.000	0.557 ✔	1.000	4.8.2 ✔
L5	63.25 - 31.25 (5)	0.011	0.678	0.000	0.018	0.000	0.689 ✔	1.000	4.8.2 ✔
L6	31.25 - 0 (6)	0.013	0.804	0.000	0.019	0.000	0.818 ✔	1.000	4.8.2 ✔

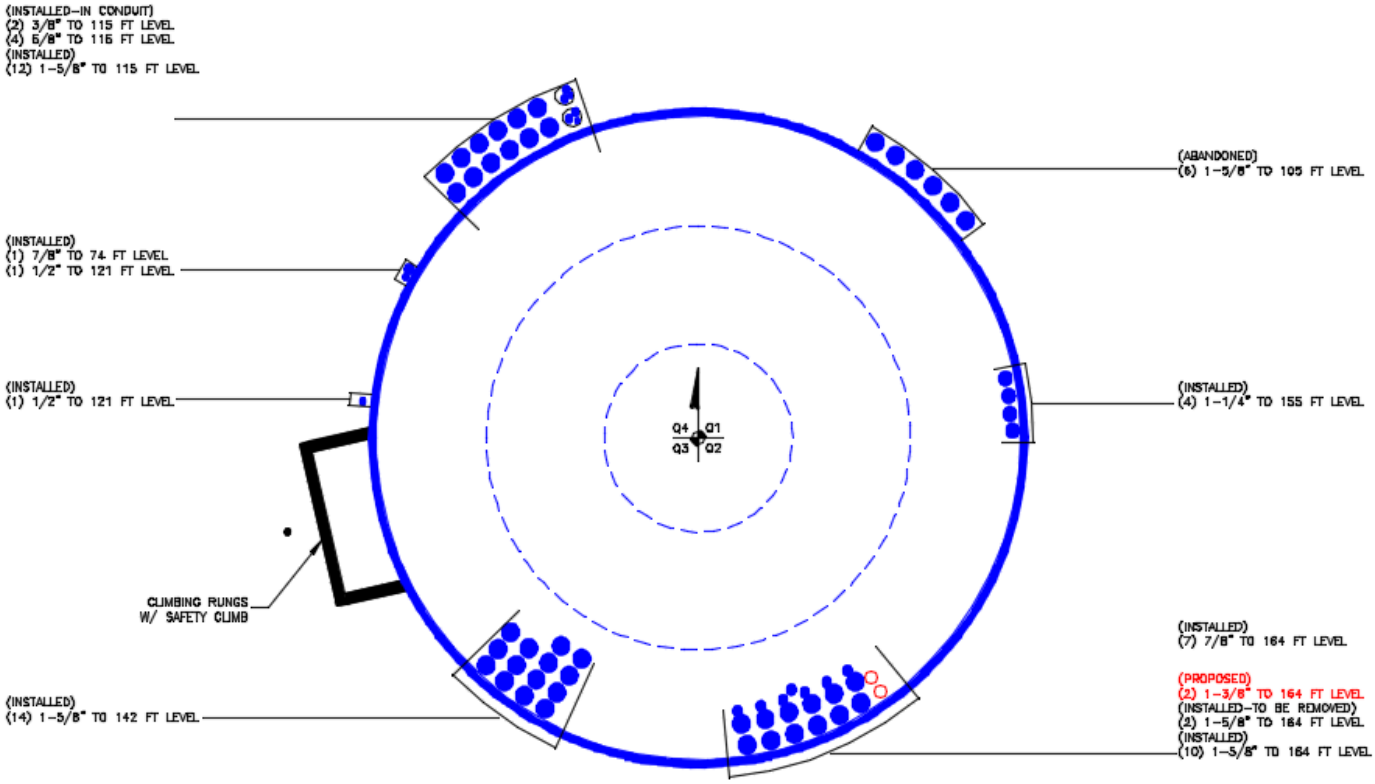
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	169 - 164.25	Pole	TP26x18x0.25	1	-0.24	1506.86	0.1	Pass
L2	164.25 - 129.75	Pole	TP34.0625x21.5x0.3125	2	-12.58	2368.37	23.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L3	129.75 - 96.08	Pole	TP41.75x32.1327x0.375	3	-23.75	3489.81	38.8	Pass
L4	96.08 - 63.25	Pole	TP49.0625x39.8023x0.375	4	-33.62	3910.87	55.7	Pass
L5	63.25 - 31.25	Pole	TP56.125x46.9543x0.375	5	-44.91	4259.40	68.9	Pass
L6	31.25 - 0	Pole	TP62.9375x53.8466x0.375	6	-60.23	4606.06	81.8	Pass
							Summary	
						Pole (L6)	81.8	Pass
						RATING =	**81.8**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



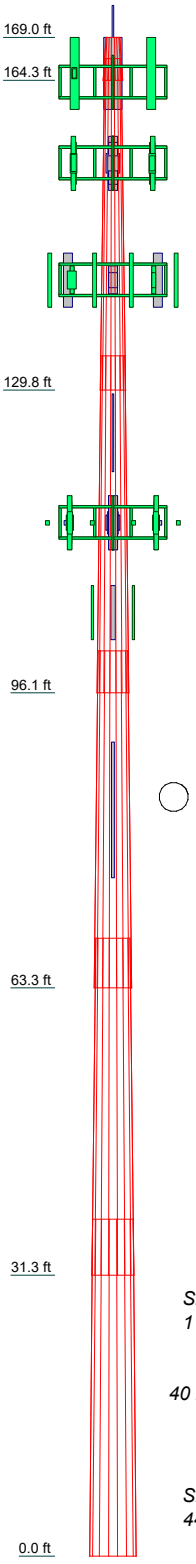
APPENDIX C

ADDITIONAL CALCULATIONS

Program Version 8.0.2.1 - 5/2/2018 File:G:/TOWER/375_Crown_Castle/2018/37518-2650_826768_PLYMOUTH-RT 6/37518-2650.001.7805_SA_1601322/37518-2650.001.7805.eri

Program Version 8.0.2.1 - 5/2/2018 File:G:/TOWER/375_Crown_Castle/2018/37518-2650_826768_PLYMOUTH-RT 6/37518-2650.001.7805_SA_1601322/37518-2650.001.7805.eri

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	4.75	18	0.2500	2.38	18.0000	26.0000	A572-65	0.3
2	36.88	18	0.3125	3.83	21.5000	34.0625		3.4
3	37.50	18	0.3750	4.67	32.1327	41.7500		5.6
4	37.50	18	0.3750	5.50	39.8023	49.0625		6.7
5	37.50	18	0.3750	6.25	46.9543	56.1250		7.8
6	37.50	18	0.3750		53.8466	62.9375		8.8
								32.5



ALL REACTIONS ARE FACTORED

AXIAL 176 K

SHEAR 11 K

MOMENT 1351 kip

TORQUE 4 kip-ft

40 mph WIND - 1.0000 in ICE

AXIAL 60 K

SHEAR 44 K

MOMENT 4775 kip-ft

TORQUE 8 kip-ft

REACTIONS - 93 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
AIR 32 B2A/B66AA w/ Mount Pipe	164	RRH2x60-700	142
AIR 32 B2A/B66AA w/ Mount Pipe	164	RRH2x60-700	142
AIR 32 B2A/B66AA w/ Mount Pipe	164	RRH2X60-AWS	142
APXVAARR24_43-U-NA20 w/ Mount Pipe	164	RRH2X60-AWS	142
		RRH2X60-AWS	142
APXVAARR24_43-U-NA20 w/ Mount Pipe	164	DB-T1-6Z-8AB-0Z	142
APXVAARR24_43-U-NA20 w/ Mount Pipe	164	Platform Mount [LP 403-1]	142
RADIO 4449 B12/B71	164	201-4	121
RADIO 4449 B12/B71	164	Pipe Mount [PM 601-1]	121
RADIO 4449 B12/B71	164	7770.00 w/ Mount Pipe	115
(2) COL45-70	164	7770.00 w/ Mount Pipe	115
COL45-70	164	7770.00 w/ Mount Pipe	115
ATMAA1412D-1A20	164	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
ATMAA1412D-1A20	164	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
ATMAA1412D-1A20	164	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
Platform Mount [LP 403-1]	164		
(2) 2.375" OD x 6' Mount Pipe	164	QS66512-3 w/ Mount Pipe	115
2.375" OD x 6' Mount Pipe	164	QS66512-3 w/ Mount Pipe	115
APXVTM14-C-120 w/ Mount Pipe	155	QS66512-3 w/ Mount Pipe	115
APXVTM14-C-120 w/ Mount Pipe	155	DTMABP7819VG12A	115
APXVTM14-C-120 w/ Mount Pipe	155	DTMABP7819VG12A	115
APXVSPP18-C-A20 w/ Mount Pipe	155	DTMABP7819VG12A	115
APXVSPP18-C-A20 w/ Mount Pipe	155	DC6-48-60-18-8F	115
APXVSPP18-C-A20 w/ Mount Pipe	155	DC6-48-60-18-8F	115
TD-RRH8x20-25	155	RRUS 11	115
TD-RRH8x20-25	155	RRUS 11	115
TD-RRH8x20-25	155	RRUS 11	115
800MHZ RRH	155	RRUS 12 B2	115
800MHZ RRH	155	RRUS 12 B2	115
800MHZ RRH	155	RRUS 12 B2	115
1900MHz RRH	155	WCS RRUS-32-B30	115
1900MHz RRH	155	WCS RRUS-32-B30	115
1900MHz RRH	155	WCS RRUS-32-B30	115
Platform Mount [LP 305-1]	155	(2) TPX-070821	115
2.375" OD x 6' Mount Pipe	155	(2) TPX-070821	115
2.375" OD x 6' Mount Pipe	155	(2) TPX-070821	115
2.375" OD x 6' Mount Pipe	155	Platform Mount [LP 305-1]	115
(2) LPA-80080/6CF w/ Mount Pipe	142	2.375" OD x 6' Mount Pipe	115
(2) LPA-80080/6CF w/ Mount Pipe	142	2.375" OD x 6' Mount Pipe	115
(2) LPA-80080/6CF w/ Mount Pipe	142	2.375" OD x 6' Mount Pipe	115
(2) SBNHH-1D65B w/ Mount Pipe	142	RRUS 12 B2	115
(2) SBNHH-1D65B w/ Mount Pipe	142	APXV18-206517S-C w/ Mount Pipe	105
(2) SBNHH-1D65B w/ Mount Pipe	142	APXV18-206517S-C w/ Mount Pipe	105
B4 RRH2X60-4R	142	Pipe Mount [PM 601-3]	105
B4 RRH2X60-4R	142	APXV18-206517S-C w/ Mount Pipe	105
B4 RRH2X60-4R	142	Side Arm Mount [SO 306-1]	74
RRH2x60-700	142	DB810T3E-XT	74

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class III.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 81.8%

Paul J. Ford and Company
250 East Broad st., Suite 600
Columbus, OH 43215
Phone: (614) 221-6679
FAX:

Job: 169-Ft. Monopole / Plymouth/Rt.6			
Project: 37518-2650.001.7805 / BU# 826768			
Client: Crown Castle	Drawn by: Allen R. Bonham, EI	App'd:	
Code: TIA-222-G	Date: 08/01/18	Scale: NTS	
Path: G:\TOWER\375_Crown_Castle\2018\37518-2650_826768_PLYMOUTH-RT.6\37518-2650.001.7805_SA_160122\37518-2650.001.7805.eri		Dwg No. E-1	

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *826768*
Site Name: *Plymouth/Rt.6*
App #: *300807*

Pole Manufacturer:	*Pirod*

Anchor Rod Data		
Qty:	45	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	105	ksi
Bolt Circle:	68	in

Plate Data		
Diam:	73	in
Thick:	1.75	in
Grade:	50	ksi
Single-Rod B-eff:	4.44	in

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	62.9375	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Reactions		
Mu:	4775	ft-kips
Axial, Pu:	60	kips
Shear, Vu:	44	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

If No stiffeners, Criteria:	AISC LRFD	<-Only Applcable to Unstiffened Cases

Anchor Rod Results

			Rigid
Max Rod (Cu+ Vu/ή):	78.2	Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	116.3	Kips	φ*Tn
Anchor Rod Stress Ratio:	67.2%	**Pass**	

Base Plate Results Flexural Check

			Rigid
Base Plate Stress:	Rohn/Pirod,	OK	AISC LRFD
Allowable Plate Stress:	45.0	ksi	φ*Fy
Base Plate Stress Ratio:	Rohn/Pirod,	OK	Y.L. Length: 25.75

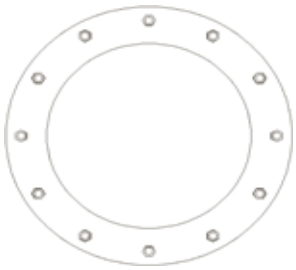
n/a

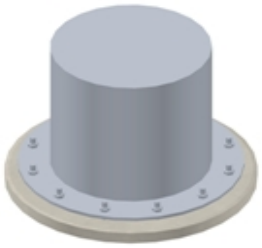
Stiffener Results N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Pier and Pad Foundation

BU # :	826322
Site Name:	Plymouth/Rt 6
App. Number:	

TIA-222 Revision:	G
Tower Type:	Monopole

Block Foundation?:	☐

Superstructure Analysis Reactions		
Compression, P_{comp}:	60	kips
Base Shear, Vu_comp:	44	kips
Moment, M_u:	4775	ft-kips
Tower Height, **H**:	169	ft
BP Dist. Above Fdn, bp_{dist}:	6	in

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, **dpier**:	7.5	ft
Ext. Above Grade, **E**:	0.50	ft
Pier Rebar Size, **Sc**:	9	
Pier Rebar Quantity, **mc**:	39	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	11	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties		
Depth, **D**:	8.5	ft
Pad Width, **W**:	27.0	ft
Pad Thickness, **T**:	2.5	ft
Pad Rebar Size, **Sp**:	9	
Pad Rebar Quantity, **mp**:	36	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60000	psi
Concrete Compressive Strength, **F'c**:	4000	psi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	125	pcf
Ultimate Gross Bearing, Qult:	12.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	34	degrees
SPT Blow Count, N_{blows}:	1	
Base Friction, μ:		
Neglected Depth, **N**:	3.75	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	14	ft

<--Toggle between Gross and Net

Foundation Analysis Checks	Capacity	Demand	Rating	Check
Lateral (Sliding) (kips)	437.65	44.00	**10.1%**	**Pass**
Bearing Pressure (ksf)	9.00	2.59	**28.7%**	**Pass**
*Overturning (kip*ft)*	11362.17	5193.00	**45.7%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	6846.54	5061.00	**73.9%**	**Pass**
Pier Compression (kip)	28118.83	111.69	**0.4%**	**Pass**
*Pad Flexure (kip*ft)*	3941.07	1751.25	**44.4%**	**Pass**
Pad Shear - 1-way (kips)	777.90	265.61	**34.1%**	**Pass**
Pad Shear - 2-way (ksi)	0.19	0.06	**33.6%**	**Pass**

Soil Rating:	**45.7%**
Structural Rating:	**73.9%**

Date: **July 19, 2018**

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Patricia Pelon
Crown Castle
3 Corporate Dr., St 101
Clifton Park, NY 12065

Subject:	**Mount Structural Analysis**	
Carrier Designation:	***T-Mobile Change-Out***	
	Carrier Site Number:	CT11417C
	Carrier Site Name:	CT11417C
Crown Castle Designation:	**Crown Castle BU Number:**	826768
	Crown Castle Site Name:	Plymouth/RT 6
	Crown Castle JDE Job Number:	512703
	Crown Castle Application Number:	446172, Rev. 0
Engineering Firm Designation:	**Infinigy Report Designation:**	600-005
Site Data:	**171 Town Hill Road Plymouth, Litchfield County, CT 06786**	
	Latitude 41°40'6.20" Longitude -73°1'11.84"	
Structure Information:	**Tower Height & Type:**	**169 Monopole Tower**
	Mount Elevation:	**164 ft**
	Mount Type:	**15 ft Platform**

Dear Patricia Pelon,

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

Based upon our analysis, we have determined the adequacy of the antenna mounting system that will support the existing and proposed loading to be:

Platform **Sufficient**

This analysis has been performed in accordance with the 2012 International Building Code, 2016 Connecticut State Building Code and the Infinigy Engineering, PLLC wind speed requirement of a 93 mph nominal 3-second gust wind speed as required for use in the ANSI/TIA-222-G Standard per Exception #5 of Section 1609.1. Exposure Category C and Risk Category II were used in this analysis.

We at Infinigy Engineering, PLLC appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects, please give us a call.

Mount structural analysis prepared by: Dmitriy Albul, P.E.

Respectfully Submitted by:

Joseph R Johnston, P.E
VP Structural Engineering / Principal

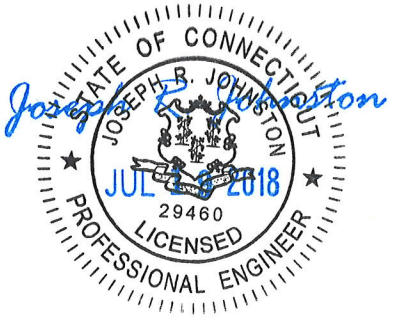


TABLE OF CONTENTS

1) INTRODUCTION

The mount consists of a 15 ft Platform at the 164 ft elevation**.** The existing and proposed antenna loading was obtained from the Application provided by CCI, Application Number 446172, Revision 0 and the Mount Mapping performed by Infinigy.

2) ANALYSIS CRITERIA

The structural analysis was performed in accordance with the requirements of TIA 222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 93 mph with no ice, 40 mph with 1 inch escalated ice thickness, Exposure Category C and Topographic Category 1. In addition, the mount has been analyzed for various live load condition consisting of a 500-pound man live load applied individually at mount pipe locations using a 3-second gust wind speed of 30 mph.

Table 1 - Proposed Equipment Loading Information

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Proposed Mount Type	Note
164.0	165.0	3	Ericsson	AIR 32 B2A/B66AA	-	1
		3	Ericsson	RADIO 4449 B12/B71		
		3	RFS Celwave	APXVAARR24_43-UNA20		

Notes:
1) Proposed equipment

Table 2 - Existing Antenna and Cable Information

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Existing Mount Type	Note
164	165	3	RFS Celwave	ATMAA1412D-1A20	15ft Platform	1
		3	CommScope	ATBT-BOTTOM-24V		2
		3	CommScope	LNX-6515DS-VTM w/ Mount Pipe		
		3	EMS Wireless	RR90-17-02DP w/ Mount Pipe		

Notes:
1) Existing equipment to remain
2) Existing equipment to be removed, not considered in this analysis

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	T-Mobile Application	446172, Rev. 0	CCI Sites
Design Drawings	SitePro1 QMSP	QMSP-NP	Valmont

3.1) Analysis Method

RISA-3D (Version 16.0.5), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

Infinigy Mount Analysis Tool 3.0.2, a tool internally developed by Infinigy, was used to calculate member loading for various load cases. Selected output from the analysis is included in Appendix B.

3.2) Assumptions

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

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM A500 (GR B-46)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

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

4) ANALYSIS RESULTS

Table 4 - Mount Component Stresses vs. Capacity

Notes	Component	Mount Centerline (ft)	% Capacity	Pass / Fail
1,2	Frame Rail	164	43.0%	Pass
	Mount Pipe		76.7%	Pass
	Arm		90.5%	Pass
	Angle		95.2%	Pass
	Bolts		14.9%	Pass

Structure Rating (max from all components) =	95.2%

Notes:

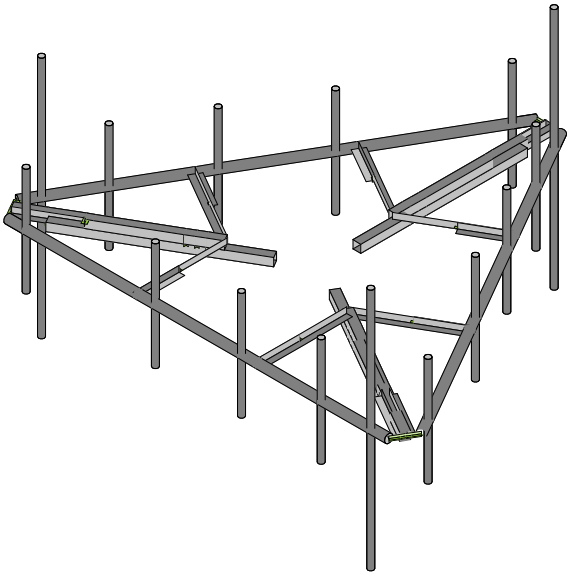
1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity consumed.

4.1) Recommendations

The mount has sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

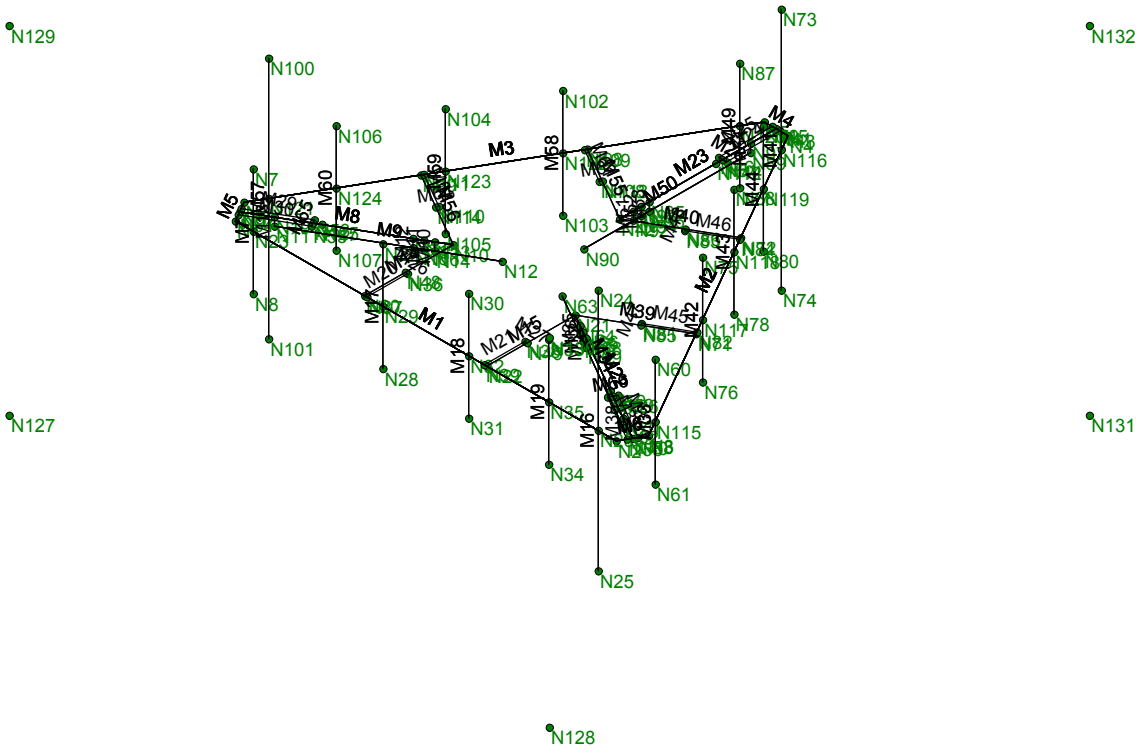
APPENDIX A

WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

Infinigy Engineering PLLC	Plymouth/RT 6	Rendered Model
DVA		July 17, 2018 at 4:59 PM
600-005		806362.r3d



Envelope Only Solution

Infinigy Engineering PLLC	Plymouth/RT 6	Wire Frame Model
DVA		July 17, 2018 at 5:00 PM
600-005		806362.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

Site Name:	Plymouth/RT 6
Client:	Crown Castle
Carrier:	T-Mobile
Engineer:	DVA
Date:	7/17/2018

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INFINIGY WIND LOAD CALCULATOR 3.0.2

Site Information Inputs:

Adopted Building Code:	2012 IBC
Structure Load Standard:	TIA-222-G
Antenna Load Standard:	TIA-222-G
Structure Risk Category:	II
Structure Type:	Mount - Platform
Number of Sectors:	3
Structure Shape 1:	Round

Rooftop Inputs:

Rooftop Wind Speed-Up?:	No

Wind Loading Inputs:

Design Wind Velocity:	93	mph (nominal 3-second gust)
Wind Centerline 1 (z_1):	165.0	ft
Side Face Angle (θ):	60	degrees
Exposure Category:	C	
Topographic Category:	1	

Wind with No Ice		
q_z (psf)	Gh	F_{ST} (psf)
29.58	1.00	**35.50**

Wind with Ice		
q_z (psf)	Gh	F_{ST} (psf)
5.47	1.00	**17.57**

Ice Loading Inputs:

Is Ice Loading Needed?:	Yes	
Ice Wind Velocity:	40	mph (nominal 3-second gust)
Base Ice Thickness:	1.00	in

Input Appurtenance Information and Load Placements:

Appurtenance Name	Elevation (ft)	Total Quantity	Ka	Front Shape	Side Shape	q_z (psf)	EPA (ft^2)	Fz (lbs)	Fx (lbs)	Fz(60) (lbs)	Fx(30) (lbs)
Ericsson AIR 32 B2A/B66Aa	165.0	3	1.00	Flat	Flat	29.58	6.51	192.57	139.40	152.69	179.28
RFS APXVAARR24_43-UNA20	165.0	3	1.00	Flat	Flat	29.58	20.24	598.80	262.93	346.90	514.84
Ericsson RADIO 4449 B12/B71	165.0	3	1.00	Flat	Flat	29.58	1.64	48.61	34.09	37.72	44.98
RFS ATMAA1412D-1A20	165.0	3	1.00	Flat	Flat	29.58	1.00	29.58	12.05	16.43	25.20

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2			Frame Rail	Beam	Pipe	A53 Gr.B	Typical
2	M2	N3	N4			Frame Rail	Beam	Pipe	A53 Gr.B	Typical
3	M3	N5	N6			Frame Rail	Beam	Pipe	A53 Gr.B	Typical
4	M4	N5	N4			RIGID	None	None	RIGID	Typical
5	M5	N6	N1			RIGID	None	None	RIGID	Typical
6	M6	N2	N3			RIGID	None	None	RIGID	Typical
7	M7	N8	N7			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
8	M8	N9	N10			Arm	Beam	Tube	A500 Gr.B...	Typical
9	M9	N11	N12			Arm	Beam	Tube	A500 Gr.B...	Typical
10	M10	N13	N14			RIGID	None	None	RIGID	Typical
11	M11	N15	N16			RIGID	None	None	RIGID	Typical
12	M12	N17	N18			RIGID	None	None	RIGID	Typical
13	M13	N11	N19			RIGID	None	None	RIGID	Typical
14	M14	N10	N20			Angle	HBrace	Single Angle	A36 Gr.36	Typical
15	M15	N22	N21			Angle	HBrace	Single Angle	A36 Gr.36	Typical
16	M16	N25	N24			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
17	M17	N28	N27			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
18	M18	N31	N30			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
19	M19	N34	N33			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
20	M20	N36	N37		270	Angle	HBrace	Single Angle	A36 Gr.36	Typical
21	M21	N38	N39			Angle	HBrace	Single Angle	A36 Gr.36	Typical
22	M22	N40	N21			Arm	Beam	Tube	A500 Gr.B...	Typical
23	M23	N41	N42			Arm	Beam	Tube	A500 Gr.B...	Typical
24	M24	N43	N44		270	Angle	HBrace	Single Angle	A36 Gr.36	Typical
25	M25	N45	N46			Angle	HBrace	Single Angle	A36 Gr.36	Typical
26	M26	N48	N36			RIGID	None	None	RIGID	Typical
27	M27	N38	N49			RIGID	None	None	RIGID	Typical
28	M28	N46	N44			RIGID	None	None	RIGID	Typical
29	M29	N52	N53		270	Angle	HBrace	Single Angle	A36 Gr.36	Typical
30	M30	N54	N55			Angle	HBrace	Single Angle	A36 Gr.36	Typical
31	M31	N56	N57		270	Angle	HBrace	Single Angle	A36 Gr.36	Typical
32	M32	N58	N59			Angle	HBrace	Single Angle	A36 Gr.36	Typical
33	M33	N61	N60			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
34	M34	N62	N63			Arm	Beam	Tube	A500 Gr.B...	Typical
35	M35	N64	N65			RIGID	None	None	RIGID	Typical
36	M36	N66	N67			RIGID	None	None	RIGID	Typical
37	M37	N68	N69			RIGID	None	None	RIGID	Typical
38	M38	N62	N70			RIGID	None	None	RIGID	Typical
39	M39	N21	N71			Angle	HBrace	Single Angle	A36 Gr.36	Typical
40	M40	N72	N42			Angle	HBrace	Single Angle	A36 Gr.36	Typical
41	M41	N74	N73			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
42	M42	N76	N75			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
43	M43	N78	N77			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
44	M44	N80	N79			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
45	M45	N81	N82		270	Angle	HBrace	Single Angle	A36 Gr.36	Typical
46	M46	N83	N84			Angle	HBrace	Single Angle	A36 Gr.36	Typical
47	M47	N85	N81			RIGID	None	None	RIGID	Typical
48	M48	N83	N86			RIGID	None	None	RIGID	Typical
49	M49	N88	N87			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
50	M50	N89	N90			Arm	Beam	Tube	A500 Gr.B...	Typical
51	M51	N91	N92			RIGID	None	None	RIGID	Typical
52	M52	N93	N94			RIGID	None	None	RIGID	Typical
53	M53	N95	N96			RIGID	None	None	RIGID	Typical
54	M54	N89	N97			RIGID	None	None	RIGID	Typical
55	M55	N42	N98			Angle	HBrace	Single Angle	A36 Gr.36	Typical
56	M56	N99	N10			Angle	HBrace	Single Angle	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
57	M57	N101	N100			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
58	M58	N103	N102			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
59	M59	N105	N104			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
60	M60	N107	N106			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
61	M61	N108	N109		270	Angle	HBrace	Single Angle	A36 Gr.36	Typical
62	M62	N110	N111			Angle	HBrace	Single Angle	A36 Gr.36	Typical
63	M63	N113	N108			RIGID	None	None	RIGID	Typical
64	M64	N110	N114			RIGID	None	None	RIGID	Typical
65	M65	N55	N53			RIGID	None	None	RIGID	Typical
66	M66	N59	N57			RIGID	None	None	RIGID	Typical

Material Takeoff

	Material	Size	Pieces	Length[in]	Weight[K]
1	General				
2	RIGID		24	90.2	0
3	Total General		24	90.2	0
4					
5	Hot Rolled Steel				
6	A36 Gr.36	L2.5x2.5x4	18	486.7	.2
7	A500 Gr.B Rect	HSS3.5x3.5x4	6	430.7	.4
8	A53 Gr.B	PIPE_2.0	15	900	.3
9	A53 Gr.B	PIPE_3.0	3	507.6	.3
10	Total HR Steel		42	2325	1.1

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
1	Self Weight	DL		-1			24		3	
2	Wind Load AZI 000	WLZ					24		1	
3	Wind Load AZI 090	WLX					24		1	
4	Ice Weight	OL1					24	66	3	
5	Wind + Ice Load AZI 000	OL2					24		1	
6	Wind + Ice Load AZI 090	OL3					24		1	
7	Service Live 1	LL				2				
8	BLC 1 Transient Area Loads	None						53		
9	BLC 2 Transient Area Loads	None						46		
10	BLC 3 Transient Area Loads	None						43		
11	BLC 4 Transient Area Loads	None						53		
12	BLC 5 Transient Area Loads	None						46		
13	BLC 6 Transient Area Loads	None						43		

Load Combinations

	Description	So...	PDelta	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..
1	1.4D	Yes	Y		DL	1.4																				
2	1.2D + 1.6W AZI ...	Yes	Y		DL	1.2	W...	1.6																		
3	1.2D + 1.6W AZI ...	Yes	Y		DL	1.2	W...	1.3...	W...	.8																
4	1.2D + 1.6W AZI ...	Yes	Y		DL	1.2	W...	.8	W...	1.3...																
5	1.2D + 1.6W AZI ...	Yes	Y		DL	1.2			W...	1.6																
6	1.2D + 1.6W AZI ...	Yes	Y		DL	1.2	W...	-.8	W...	1.3...																
7	1.2D + 1.6W AZI ...	Yes	Y		DL	1.2	W...	-1.3...	W...	.8																
8	1.2D + 1.6W AZI ...	Yes	Y		DL	1.2	W...	-1.6																		
9	1.2D + 1.6W AZI ...	Yes	Y		DL	1.2	W...	-1.3...	W...	-.8																
10	1.2D + 1.6W AZI ...	Yes	Y		DL	1.2	W...	-.8	W...	-1.3...																

Load Combinations (Continued)

	Description	So...	PDelta	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..
11	1.2D + 1.6W AZI ...	Yes	Y		DL	1.2			W...	-1.6																
12	1.2D + 1.6W AZI ...	Yes	Y		DL	1.2	W...	.8	W...	-1.3...																
13	1.2D + 1.6W AZI ...	Yes	Y		DL	1.2	W...	1.3...	W...	-.8																
14	0.9D + 1.6W AZI ...	Yes	Y		DL	.9	W...	1.6																		
15	0.9D + 1.6W AZI ...	Yes	Y		DL	.9	W...	1.3...	W...	.8																
16	0.9D + 1.6W AZI ...	Yes	Y		DL	.9	W...	.8	W...	1.3...																
17	0.9D + 1.6W AZI ...	Yes	Y		DL	.9			W...	1.6																
18	0.9D + 1.6W AZI ...	Yes	Y		DL	.9	W...	-.8	W...	1.3...																
19	0.9D + 1.6W AZI ...	Yes	Y		DL	.9	W...	-1.3...	W...	.8																
20	0.9D + 1.6W AZI ...	Yes	Y		DL	.9	W...	-1.6																		
21	0.9D + 1.6W AZI ...	Yes	Y		DL	.9	W...	-1.3...	W...	-.8																
22	0.9D + 1.6W AZI ...	Yes	Y		DL	.9	W...	-.8	W...	-1.3...																
23	0.9D + 1.6W AZI ...	Yes	Y		DL	.9			W...	-1.6																
24	0.9D + 1.6W AZI ...	Yes	Y		DL	.9	W...	.8	W...	-1.3...																
25	0.9D + 1.6W AZI ...	Yes	Y		DL	.9	W...	1.3...	W...	-.8																
26	1.2D + 1.0Di	Yes	Y		DL	1.2	OL1	1																		
27	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	OL1	1	OL2	1																
28	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	OL1	1	OL2	.866	OL3	.5														
29	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	OL1	1	OL2	.5	OL3	.866														
30	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	OL1	1			OL3	1														
31	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	OL1	1	OL2	-.5	OL3	.866														
32	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	OL1	1	OL2	-.866	OL3	.5														
33	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	OL1	1	OL2	-1																
34	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	OL1	1	OL2	-.866	OL3	-.5														
35	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	OL1	1	OL2	-.5	OL3	-.866														
36	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	OL1	1			OL3	-1														
37	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	OL1	1	OL2	.5	OL3	-.866														
38	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	OL1	1	OL2	.866	OL3	-.5														
39	1.2D + 1.5L + 1.0...	Yes	Y		DL	1.2	LL	1.5	W...	.104																
40	1.2D + 1.5L + 1.0...	Yes	Y		DL	1.2	LL	1.5	W...	.09	W...	.052														
41	1.2D + 1.5L + 1.0...	Yes	Y		DL	1.2	LL	1.5	W...	.052	W...	.09														
42	1.2D + 1.5L + 1.0...	Yes	Y		DL	1.2	LL	1.5			W...	.104														
43	1.2D + 1.5L + 1.0...	Yes	Y		DL	1.2	LL	1.5	W...	-.052	W...	.09														
44	1.2D + 1.5L + 1.0...	Yes	Y		DL	1.2	LL	1.5	W...	-.09	W...	.052														
45	1.2D + 1.5L + 1.0...	Yes	Y		DL	1.2	LL	1.5	W...	-.104																
46	1.2D + 1.5L + 1.0...	Yes	Y		DL	1.2	LL	1.5	W...	-.09	W...	-.052														
47	1.2D + 1.5L + 1.0...	Yes	Y		DL	1.2	LL	1.5	W...	-.052	W...	-.09														
48	1.2D + 1.5L + 1.0...	Yes	Y		DL	1.2	LL	1.5			W...	-.104														
49	1.2D + 1.5L + 1.0...	Yes	Y		DL	1.2	LL	1.5	W...	.052	W...	-.09														
50	1.2D + 1.5L + 1.0...	Yes	Y		DL	1.2	LL	1.5	W...	.09	W...	-.052														

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N12	max	-2363.26	18	3207.36	31	13618.981	38	-.502	25	.334	12	-.89	24
2		min	-23522.907	37	692.907	24	1210.148	18	-4.089	32	-.334	6	-7.276	31
3	N63	max	23489.246	29	3207.306	35	13688.303	28	-.406	15	1.293	9	7.165	35
4		min	2586.952	22	693.115	16	819.705	21	-4.28	34	-1.296	3	.943	16
5	N90	max	1014.458	17	3207.29	27	-2773.612	14	8.339	27	1.595	11	.231	23
6		min	-1015.65	23	693.003	20	-27152.713	33	1.044	20	-1.594	5	-.249	5
7	Totals:	max	4809.162	5	9618.657	31	4818.716	14						
8		min	-4809.162	11	2153.117	24	-4818.718	8						

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[i..	Dir	LC	phi*Pnc..	phi*Pnt ..	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	M39	L2.5x2.5x4	.952	0	33	.111	0	y	34	27168....	38556	1.114	2.537	2...	H2-1
2	M55	L2.5x2.5x4	.952	0	37	.112	0	y	38	27168....	38556	1.114	2.537	2...	H2-1
3	M14	L2.5x2.5x4	.951	0	30	.112	0	y	30	27168....	38556	1.114	2.537	2...	H2-1
4	M40	L2.5x2.5x4	.921	39.303	29	.105	39.3...	y	28	27168....	38556	1.114	2.537	2...	H2-1
5	M15	L2.5x2.5x4	.920	39.303	37	.105	39.3...	y	36	27168....	38556	1.114	2.537	2...	H2-1
6	M56	L2.5x2.5x4	.920	39.303	33	.105	39.3...	y	33	27168....	38556	1.114	2.537	2...	H2-1
7	M50	HSS3.5x3.5x4	.905	74.124	36	.120	74.1...	y	36	97323....	120474	12.075	12.075	2...	H1-1a
8	M34	HSS3.5x3.5x4	.899	74.124	34	.119	74.1...	y	33	97323....	120474	12.075	12.075	2...	H1-1a
9	M9	HSS3.5x3.5x4	.890	74.124	32	.118	74.1...	y	28	97323....	120474	12.075	12.075	2...	H1-1a
10	M16	PIPE_2.0	.767	54	8	.058	54		8	12143....	32130	1.872	1.872	1...	H1-1b
11	M57	PIPE_2.0	.669	54	5	.050	54		5	12143....	32130	1.872	1.872	1...	H1-1b
12	M41	PIPE_2.0	.668	54	11	.050	54		11	12143....	32130	1.872	1.872	1...	H1-1b
13	M3	PIPE_3.0	.430	169.2	36	.176	169.2		29	22489....	65205	5.749	5.749	1...	H1-1a
14	M2	PIPE_3.0	.430	169.2	32	.175	169.2		36	22489....	65205	5.749	5.749	1...	H1-1a
15	M1	PIPE_3.0	.429	169.2	28	.176	169.2		32	22489....	65205	5.749	5.749	1...	H1-1a
16	M8	HSS3.5x3.5x4	.237	55.703	36	.070	10.8...	y	37	99894....	120474	12.075	12.075	1...	H1-1b
17	M32	L2.5x2.5x4	.237	21.578	31	.005	0	y	31	33907....	38556	1.114	2.537	1...	H2-1
18	M23	HSS3.5x3.5x4	.236	55.703	33	.071	10.8...	y	31	99894....	120474	12.075	12.075	1...	H1-1b
19	M30	L2.5x2.5x4	.236	21.33	28	.005	0	y	28	33907....	38556	1.114	2.537	1...	H2-1
20	M20	L2.5x2.5x4	.236	18	29	.036	0	z	29	35826....	38556	1.114	2.537	1...	H2-1
21	M22	HSS3.5x3.5x4	.236	55.703	28	.071	10.8...	y	28	99894....	120474	12.075	12.075	1...	H1-1b
22	M25	L2.5x2.5x4	.236	21.33	35	.005	0	y	35	33907....	38556	1.114	2.537	1...	H2-1
23	M61	L2.5x2.5x4	.233	18	38	.035	0	z	27	35826....	38556	1.114	2.537	1...	H2-1
24	M45	L2.5x2.5x4	.233	18	33	.035	0	z	32	35826....	38556	1.114	2.537	1...	H2-1
25	M29	L2.5x2.5x4	.231	14.882	35	.004	0	z	35	33907....	38556	1.114	2.537	1...	H2-1
26	M31	L2.5x2.5x4	.231	14.882	27	.004	0	z	27	33907....	38556	1.114	2.537	1...	H2-1
27	M24	L2.5x2.5x4	.230	14.882	31	.004	0	z	31	33907....	38556	1.114	2.537	1...	H2-1
28	M21	L2.5x2.5x4	.221	18	36	.035	0	y	37	35826....	38556	1.114	2.537	1...	H2-1
29	M62	L2.5x2.5x4	.221	18	34	.035	0	y	34	35826....	38556	1.114	2.537	1...	H2-1
30	M46	L2.5x2.5x4	.217	18	29	.034	0	y	30	35826....	38556	1.114	2.537	1...	H2-1
31	M7	PIPE_2.0	.112	24	8	.018	24		8	26521....	32130	1.872	1.872	1...	H1-1b
32	M33	PIPE_2.0	.106	24	11	.017	24		11	26521....	32130	1.872	1.872	1...	H1-1b
33	M49	PIPE_2.0	.105	24	5	.017	24		5	26521....	32130	1.872	1.872	1...	H1-1b
34	M17	PIPE_2.0	.022	24	8	.006	24		8	26521....	32130	1.872	1.872	1...	H1-1b
35	M42	PIPE_2.0	.021	24	11	.006	24		11	26521....	32130	1.872	1.872	1...	H1-1b
36	M58	PIPE_2.0	.021	24	5	.006	24		5	26521....	32130	1.872	1.872	1...	H1-1b
37	M59	PIPE_2.0	.012	24	4	.002	24		4	26521....	32130	1.872	1.872	1...	H1-1b
38	M19	PIPE_2.0	.012	24	9	.002	24		9	26521....	32130	1.872	1.872	1...	H1-1b
39	M18	PIPE_2.0	.012	24	9	.002	24		9	26521....	32130	1.872	1.872	1...	H1-1b
40	M43	PIPE_2.0	.012	24	12	.002	24		12	26521....	32130	1.872	1.872	1...	H1-1b
41	M44	PIPE_2.0	.012	24	13	.002	24		13	26521....	32130	1.872	1.872	1...	H1-1b
42	M60	PIPE_2.0	.012	24	6	.002	24		6	26521....	32130	1.872	1.872	1...	H1-1b

APPENDIX D

REFERENCE MATERIAL

Date:	7/17/2018
Client	Crown Castle
Carrier	T-Mobile
Engineer:	DVA
Site:	Plymouth/RT 6
Job #:	600-005

Code:	LRFD	
Axial:	9567.00	lbs
Shear:	934.30	lbs

Bolt Capacity (5/8" A307 Thru Bolt)				
	Ult Load / Bolt	Factored Load (ϕ=0.75)	# of Bolts	Factor Joint Capacity
Axial (lb)	8284.0	6213.0	4	24852
Shear(lb)	13560.0	10170.0	4	40680

Interaction Check	
$T / \phi T_n$	38.5%
$V / \phi Vn$	2.3%
≤1.0	14.9%
	OK

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

T-Mobile Existing Facility

Site ID: CT11417C

Plymouth/RT 6
171 Town Hill Road
Plymouth, CT 06786

August 23, 2018

EBI Project Number: 6218005836

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	13.27 %

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

EBI Consulting
environmental | engineering | due diligence

August 23, 2018

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

Emissions Analysis for Site: **CT11417C – Plymouth/RT 6**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **171 Town Hill Road, Plymouth, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **171 Town Hill Road, Plymouth, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 1 GSM channels (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 15 Watts per Channel.

2) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

5) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

6) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

7) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antennas used in this modeling are the **Ericsson AIR32 B2A/B66AA** & **RFS APXVAARR24_43-U-NA20** for 600 MHz, 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) channels. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, 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.

9) The antenna mounting height centerline of the proposed antennas is **165 feet** above ground level (AGL).

10) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 B2A/B66AA	Make / Model:	Ericsson AIR32 B2A/B66AA	Make / Model:	Ericsson AIR32 B2A/B66AA
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	165 feet	Height (AGL):	165 feet	Height (AGL):	165 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	200	Total TX Power(W):	200	Total TX Power(W):	200
ERP (W):	7,780.90	ERP (W):	7,780.90	ERP (W):	7,780.90
Antenna A1 MPE%	**1.11**	Antenna B1 MPE%	**1.11**	Antenna C1 MPE%	**1.11**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	165 feet	Height (AGL):	165 feet	Height (AGL):	165 feet
Frequency Bands	1900 MHz (PCS) / 600 MHz / 700 MHz	Frequency Bands	1900 MHz (PCS) / 600 MHz / 700 MHz	Frequency Bands	1900 MHz (PCS) / 600 MHz / 700 MHz
Channel Count	5	Channel Count	5	Channel Count	5
Total TX Power(W):	135	Total TX Power(W):	135	Total TX Power(W):	135
ERP (W):	2,993.95	ERP (W):	2,993.95	ERP (W):	2,993.95
Antenna A2 MPE%	**0.90**	Antenna B2 MPE%	**0.90**	Antenna C2 MPE%	**0.90**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**2.01 %**
Sprint	**0.79** %
Town	**2.28** %
Verizon Wireless	**3.46** %
Nextel	**0.54** %
AT&T	**4.19** %
Site Total MPE %:	**13.27 %**

T-Mobile Sector A Total:	2.01 %
T-Mobile Sector B Total:	2.01 %
T-Mobile Sector C Total:	2.01 %
Site Total:	13.27 %

T-Mobile Maximum MPE Power Values (Per Sector)

T-Mobile _Frequency Band / Technology (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile PCS - 1900 MHz LTE	2	1,556.18	165	4.43	PCS - 1900 MHz	1000.00	0.44%
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	165	6.64	AWS - 2100 MHz	1000.00	0.67%
T-Mobile PCS - 1900 MHz GSM	1	550.92	165	0.78	PCS - 1900 MHz	1000.00	0.08%
T-Mobile 600 MHz LTE	2	788.97	165	2.24	600 MHz	400.00	0.56%
T-Mobile 700 MHz LTE	2	432.54	165	1.23	700 MHz	467.00	0.26%
						Total:	**2.01%**

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	2.01 %
Sector B:	2.01 %
Sector C:	2.01 %
T-Mobile Maximum MPE % (Per Sector):	2.01 %
Site Total:	13.27 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **13.27%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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