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

9/6/18

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: 881536**
T-Mobile Site ID: CTNH037A
120 Universal Drive, North Haven, CT 06473
Latitude: 41° 20′ 40.01″/ Longitude: -72° 52′ 14.92″

Dear Ms. Bachman:

T-Mobile currently maintains (9) antennas at the 84-foot level of the existing 120-foot monopole at 120 Universal Drive in North Haven, CT. The tower is owned by Crown Castle. The property is owned by 120 Universal Drive Associates, LLC. T-Mobile intends to replace (3) panel antennas for (3) proposed panel antennas, swap out (3) RRUs as well as add (1) hybrid fiber line and remove (1) coax.

This facility was approved by the by the Town of North Haven Planning and Zoning Commission in Special Permit Application P2000-44 on November 13, 2000. This approval included the conditions that:

1. Submit three (3) revised plans which include:
   a.) Revised plans must address/include all comments/conditions of this approval and the related site plan approval #P200-45.
   b.) Live certification.

This modification complies with the aforementioned condition(s).

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 Mr. Michael J. Freda, First Selectman, Town of North Haven, Land Use Administrator, Alan Fredricksen, 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:

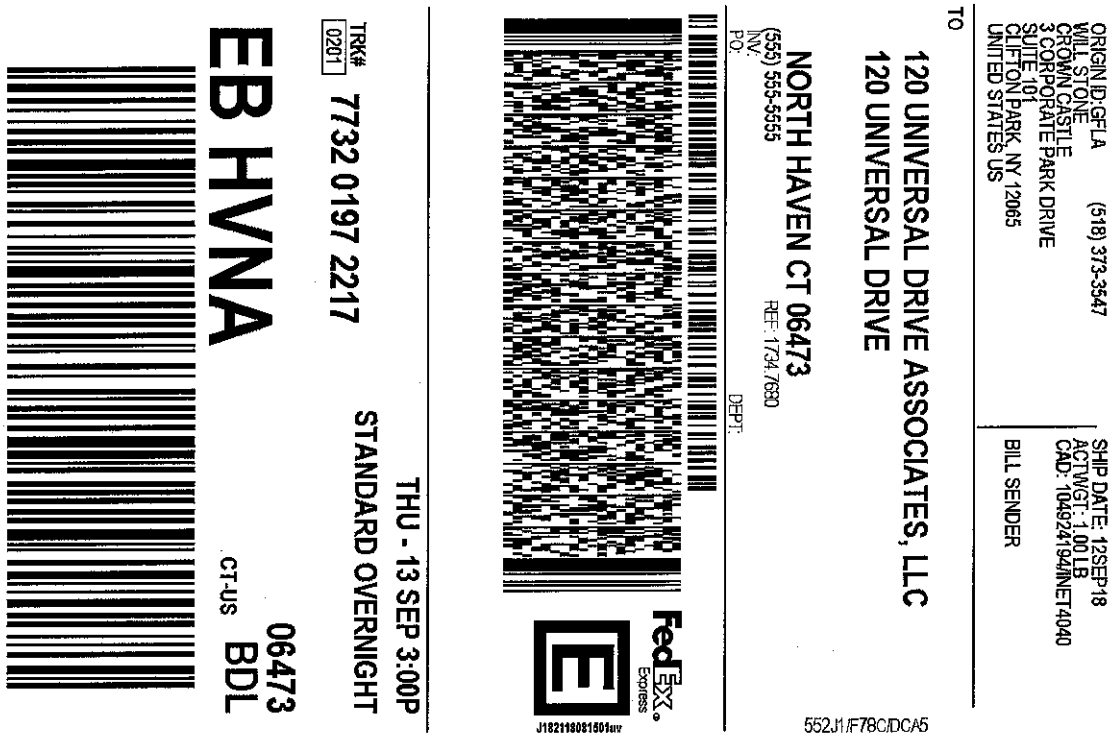
Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc:

Mr. Michael Freda, First Selectman
Town of North Haven
18 Church Street
North Haven, CT 06473

Alan Fredricksen
Land Use Administrator
18 Church Street
North Haven, CT 06473

120 Universal Drive Associates, LLC
120 Universal Drive
North Haven, CT 06473Clinton, CT 06413-1600



After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
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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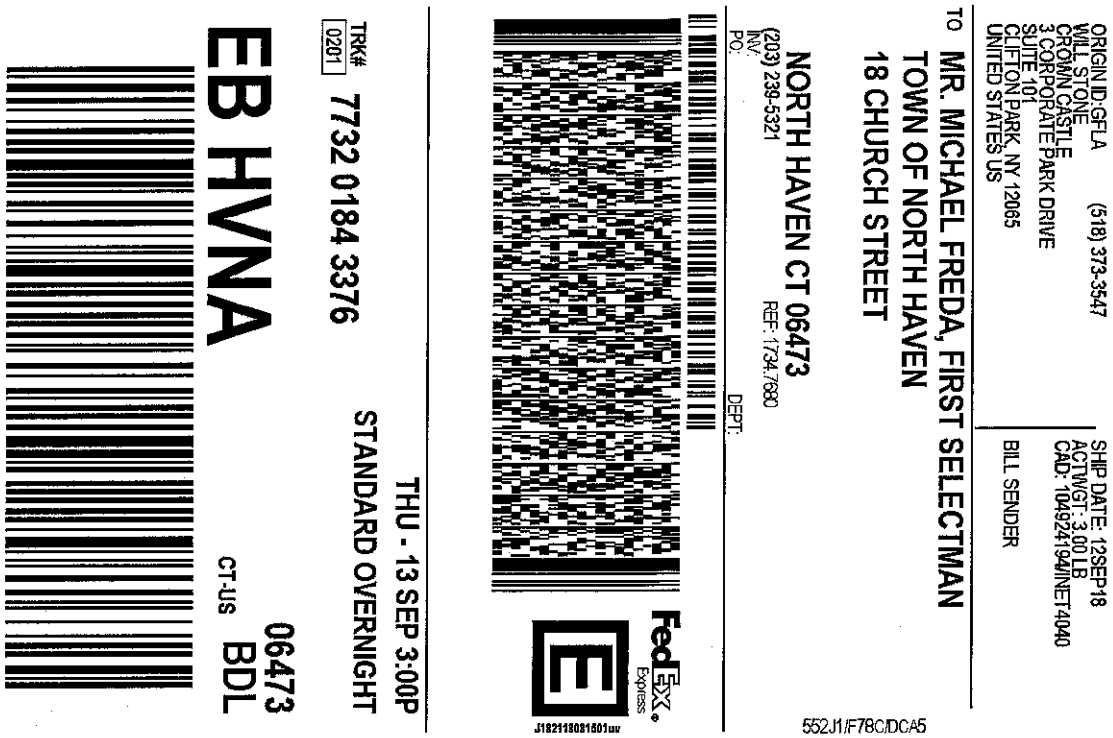

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TOWN OF NORTH HAVEN
MEMORIAL TOWN HALL / 18 CHURCH STREET
NORTH HAVEN, CONNECTICUT 06473

REPLY TO:
PLANNING & ZONING COMMISSION

Tel. (203) 239-5321
Fax (203) 234-2130

November 20, 2000

Mr. Stephen Longobardi
Candid Communications of North Haven, II LLC
110 Washington Avenue
North Haven, CT 06473

Re: #P2000-44 Special Permit application, (as authorized by Section 3A.6.), of Candid Communications of North Haven, II LLC, relative to 120 Universal Drive South, (Map 11, Route 1). Plan Entitled: Candid Communications, LLC, Multi-User Wireless Communications Facility, North Haven Tower Site, Universal Drive, North Haven, Connecticut, Prepared By URS Greiner Woodward Clyde A-E-S, Dated 9-8-00, Rev. 11-1-00 Scale l" = 30'. IL-30 Zoning District.

Dear Mr. Longobardi:

Please be advised that during the deliberation session of the Planning & Zoning Commission meeting held on Monday, November 13, 2000, the Commission unanimously voted to approve the above referenced application subject to the following conditions:

1. Submit three (3) revised plans which include:
   a.) Revised plans must address/include all comments and conditions of this approval and the related Site Plan approval #P2000-45.
   b.) Live certification.

In accordance with the Connecticut State Statutes, Section 8-3d, the Special Permit is not effective until a certified copy of the Commission's decision has been recorded on the Land Records, at the owner's expense. Accordingly, you must record this certified decision letter at the Town Clerk's Office, 18 Church Street, North Haven, CT. Immediately after filing with the Town Clerk, please submit a copy of the decision letter, stamped as recorded, to the Land Use Office, for our permanent record.

Please note that one (1) set of revised drawings should be submitted for review after <u>all</u> outstanding issues (conditions of approval as set forth above), are adequately addressed. If there are any questions relative to the conditions of approval, please call the Town prior to submitting the revised plans. This will avoid costly and time consuming revisions and reviews, therefore expediting the process for you as the applicant.

This approval is subject to compliance with any and all Zoning Regulations of the Town of North Haven.

You may not proceed with this approval until you have received a signed plan from the Land Use Office.

Very truly yours,

Jeanne Pulleyn

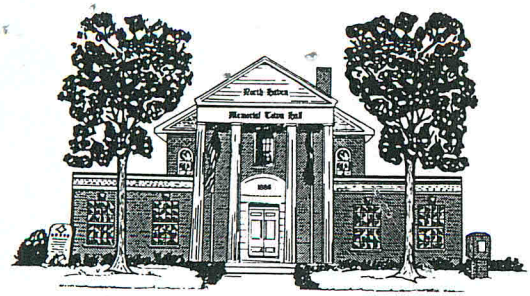
Jeanne Pulleyn, Secretary
Planning & Zoning Commission

JP/ts
cc: First Selectman
Engineering Dept.
Building Dept.
CERTIFIED MAIL R/R

RECEIVED AND FILED
TOWN CLERKS OFFICE
NORTH HAVEN, CONN.
MAR 20 2001 @ 1:15 PM

Elaine C. Rullo

TOWN CLERK



TOWN OF NORTH HAVEN

MEMORIAL TOWN HALL / 18 CHURCH STREET

NORTH HAVEN, CONNECTICUT 06473

REPLY TO: PLANNING & ZONING COMMISSION

Tel. (203) 239-5321
Fax (203) 234-2130

November 20, 2000

Mr. Stephen Longobardi
Candid Communications of North Haven, II LLC
110 Washington Avenue
North Haven, CT 06473

Re: #P2000-45 Site Plan application of Candid Communications of North Haven, II LLC, relative to 120 Universal Drive South, (Map 11, Route 1). Plan Entitled: Candid Communications, LLC, Multi-User Wireless Communications Facility, North Haven Tower Site, Universal Drive, North Haven, Connecticut, Prepared By URS Greiner Woodward Clyde A-E-S, Dated 9-8-00, Rev. 11-1-00 Scale l" = 30'. IL-30 Zoning District.

Dear Mr. Longobardi:

Please be advised that during the deliberation session of the Planning & Zoning Commission meeting held on Monday, November 13, 2000, the Commission unanimously voted to approve the above referenced application subject to the following conditions:

1. Submit eight (8) revised plans which include:
   a.) The zoning table must reference the following:

Minimum lot area (sq ft)	30,000	(req'd column),	130,929 (existing column)
Minimum lot width (ft.)	100	(req'd column)	
Building height	12'	(proposed column)	
Minimum side yard setback	30'	(existing column),	52' (proposed column)
Minimum rear yard setback	27'	(existing column)	
Minimum side yard tower setback	90'	(proposed column)	

   b.) Plans must be numbered to indicate a submission set of 5 sheets (1 of 5 through 5 of 5).
   c.) The boundary/survey plan must be referenced in the sheet index on Sheet T-1.
   d.) Provide all the information required by Section 3A.6. (b) (1) (iii) and (xi).
   e.) Siltation control must be provided along the rear property line.
   f.) The remaining access drive off the rear of the existing building must be marked as a fire lane.

g.) The proposed parking area must be permanently marked with signage and curbing/islands so that the area does not remain open for use as spillover storage of vehicles, etc.

h.) Limits of green (lawn or non-impervious) areas need to be more clearly indicated. Note, said areas must be protected by curbing.

i.) The relocated scrap metal recycle dumpster must include respective enclosure and island protection with landscaping.

j.) Curbing and grass/landscaped areas along the rear property line must be provided in order to discourage continuance of unapproved outside storage activities.

2. The property owner and/or applicant must remove all outside storage (several trailer bodies, steel hoist, debris) located at the west side of the property as well as on the railroad property. All outside storage must be removed from the site. No building permit will be issued until the cleanup of this area occurs.

3. Proposed contours and/or spot elevations must be provided.

4. Parking spaces must be line striped.

5. Proposed fencing must be reviewed by the Zoning Enforcement Officer prior to installation to insure zoning compliance.

6. Soil and erosion controls must be inspected by the Zoning Enforcement Officer before work may commence.

7. The property owner must maintain (repair/replace when necessary) the siltation control until all development activity is completed and all disturbed areas are permanently stabilized.

8. Submit an as-built prior to bond release.

9. Submit a bond in the amount of $15,000.00 (forms are enclosed). Note, two separate bonds (for $10,000.00 and $5,000.00) are recommended, considering that the $5,000.00 amount covering the required site cleanup work can be released prior to issuance of a building permit, contingent on completion and acceptance of said cleanup.

Please note that one (1) set of revised drawings should be submitted for review after <u>all</u> outstanding issues (conditions of approval as set forth above), are adequately addressed. If there are any questions relative to the conditions of approval, please call the Town prior to submitting the revised plans. This will avoid costly and time consuming revisions and reviews, therefore expediting the process for you as the applicant.

This approval is subject to compliance with any and all Zoning Regulations of the Town of North Haven.

You may not proceed with this approval until you have received a signed plan from the Land Use Office.

Very truly yours,

Jeanne Pulleyn

Jeanne Pulleyn, Secretary
Planning & Zoning Commission

JP/ts
cc: First Selectman
Engineering Dept.
Building Dept.
CERTIFIED MAIL R/R
Enclosures

120 UNIVERSAL DR

Location	120 UNIVERSAL DR	**Mblu**	011/ / 001/ /
Acct#	027540	**Owner**	120 UNIVERSAL DRIVE ASSOCIATES LLC
Assessment	$996,030	**Appraisal**	$1,422,900
PID	8457	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$1,025,400	$397,500	$1,422,900

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$717,780	$278,250	$996,030

Owner of Record

Owner	120 UNIVERSAL DRIVE ASSOCIATES LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	120 UNIVERSAL DR NORTH HAVEN, CT 06473	**Book & Page**	799/ 46
		Sale Date	10/28/2008

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
120 UNIVERSAL DRIVE ASSOCIATES LLC	$0		799/ 46	10/28/2008
BERLUTI MARIO	$0	1	482/ 458	07/18/1995
BERLUTI, MARIO & HELEN	$0	3		09/01/1990
BERLUTI MARIO & HELEN & SURV	$0	4	305/ 427	12/06/1978

Building Information

Building 1 : Section 1

Year Built:	1985
Living Area:	19,180
Replacement Cost:	$1,089,079
Building Percent Good:	78
Replacement Cost Less Depreciation:	$849,500

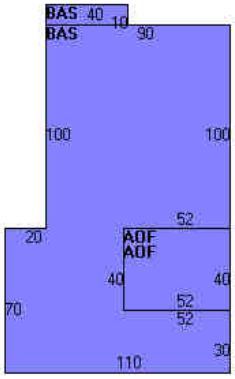
Building Attributes

Building Photo

Field	Description
STYLE	Service Shop
MODEL	Comm/Ind
Grade	C +
Stories:	1
Occupancy	1
Exterior Wall 1	Metal
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Metal/Tin
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Average
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Hot Air-no Duc
AC Type	None
Bldg Use	AUTO REPAIR
Total Rooms	
Total Bedrms	
Total Baths	
1st Floor Use:	
Heat/AC	NONE
Frame Type	WOOD FRAME
Baths/Plumbing	AVERAGE
Ceiling/Wall	SUS-CEIL/MN WL
Rooms/Prtns	AVERAGE
Wall Height	20
% Comn Wall	

(http://images.vgsi.com/photos/NorthHavenCTPhotos//\00\01\26/42.jpg)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	15,020	15,020
AOF	Office	4,160	4,160
		19,180	19,180

Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
A/C	AIR CONDITION	6612 S.F.	$10,300	1
SPR1	SPRINKLERS-WET	19220 S.F.	$13,500	1
MEZ1	MEZZANINE-UNF	2500 S.F.	$17,600	1

Land

Land Use

Use Code 3320
Description AUTO REPAIR
Zone IL30
Neighborhood 305

Land Line Valuation

Size (Acres) 3
Frontage
Depth
Assessed Value $278,250

Alt Land Appr Category No

Appraised Value $397,500

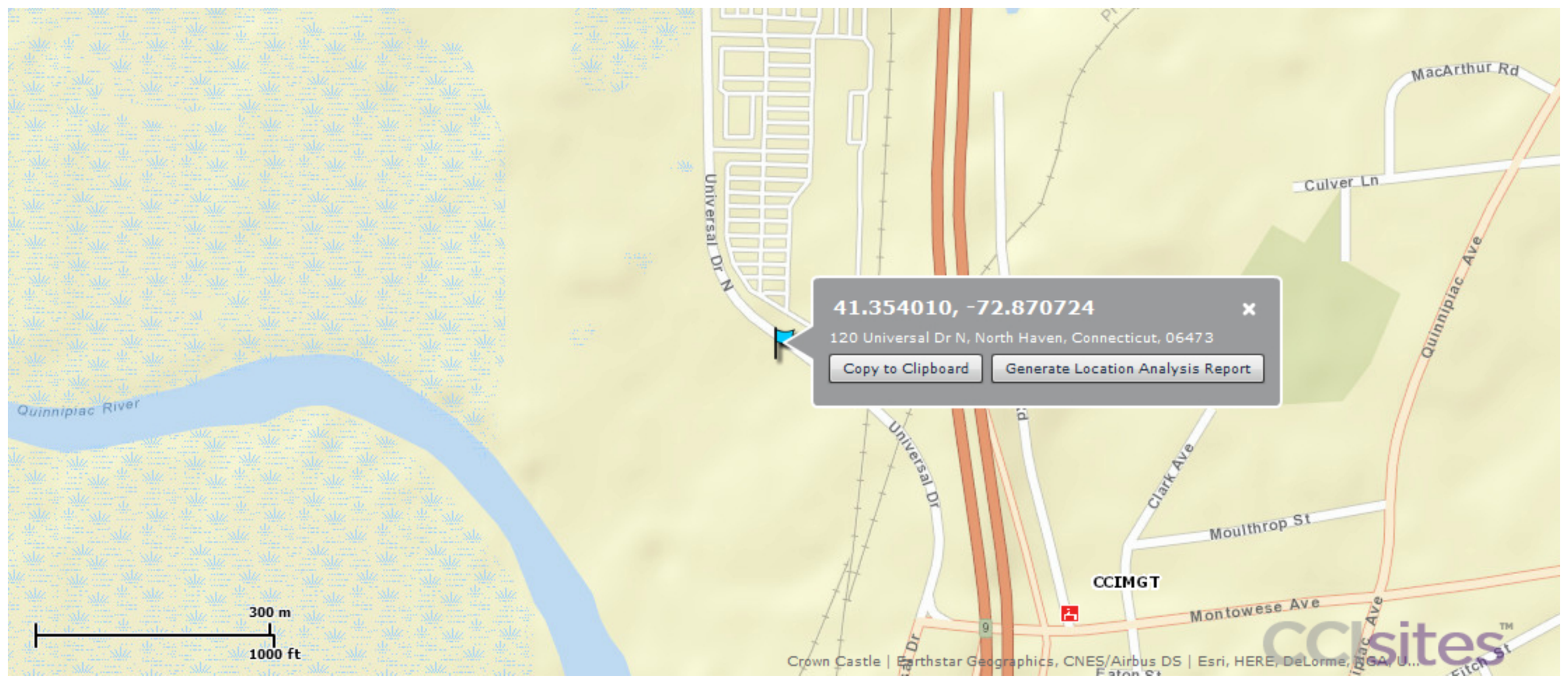
Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
FN3	FENCE-6' CHAIN			640 L.F.	$2,900	1
PAV1	PAVING-ASPHALT			52000 S.F.	$35,100	1
SHD7	COMM GOOD			240 S.F.	$9,900	1
TWR1	COMMU-TOWER			1 UNITS	$112,500	1
SHD7	COMM GOOD			240 S.F.	$9,900	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$1,238,100	$450,000	$1,688,100
2008	$733,900	$450,000	$1,183,900
2007		$315,000	$828,730

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$866,670	$315,000	$1,181,670
2008	$513,730	$315,000	$828,730
2007		$315,000	$828,730


41.354010, -72.870724
120 Universal Dr N, North Haven, Connecticut, 06473
Copy to Clipboard
Generate Location Analysis Report
MacArthur Rd
Culver Ln
Universal Dr N
Quinnipiac River
Quinnipiac Ave
Universal Dr
Clark Ave
Moulthrop St
CCIMGT
Montowese Ave
300 m
1000 ft
Crown Castle | Earthstar Geographics, CNES/Airbus DS | Esri, HERE, DeLorme, GA, U...
ccisites™

SHEET INDEX

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

881536

SITE ID

CTNH037A

SITE NAME

CTNH037/CANDID N. HAVEN

SITE ADDRESS

90 UNIVERSAL DRIVE
NORTH HAVEN, CT 06473

CONFIGURATION

67D92DB_2XAIR+1OP

PROJECT SITE INFORMATION

SITE ID:	CTNH037A	
SITE NAME:	CTNH037/CANDID N. HAVEN	
SITE ADDRESS:	90 UNIVERSAL DRIVE NORTH HAVEN, CT 06473	
PERMITTING JURISDICTION:	TOWN OF NEW HAVEN	
COUNTY:	NEW HAVEN COUNTY	
ZONING:	IL-30	
SITE COORDINATES: LATITUDE: LONGITUDE:	 41° 20' 40.0" N (41.344447°) 72° 52' 15.1" W (-72.870856°)	 (NAD 83) (NAD 83)
APPLICANT:	T-MOBILE NORTHEAST LLC 103 MONARCH DRIVE LIVERPOOL, NY 13088	

STRUCTURAL ANALYSIS INFORMATION

TOWER ANALYSIS

BASED ON THE STRUCTURAL ANALYSIS COMPLETED BY **PAUL J. FORD** DATED **07/29/2018.** THE EXISTING TOWER IS CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT CONFIGURATION.

ANTENNA MOUNTS

BASED ON THE MOUNT ANALYSIS COMPLETED BY **INFINIGY ENGINEERING, PLLC** DATED **07/23/2018.** 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

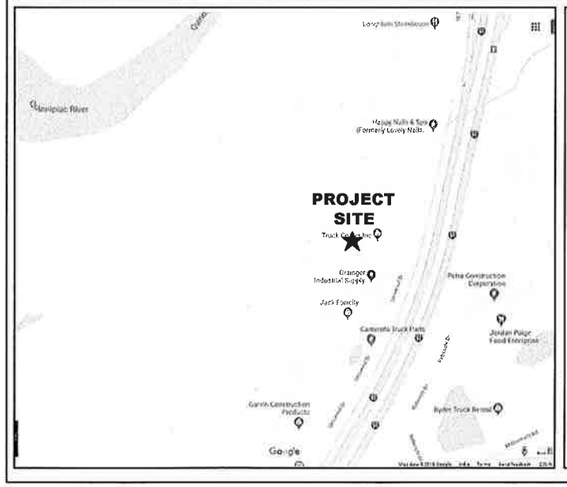
SCOPE OF WORK

SCOPE OF WORK:
L700 4X2 67D92DB OUTDOOR CONFIG: REPLACE (3) ANTENNAS AND (3) RRU'S. REPLACE (1) COAX WITH (1) NEW HYBRID. FINAL CONFIG: (9) ANTENNAS, (10) COAX, (3) HYBRIDS, (3) TMA'S, AND (3) RRU'S.

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
AUGUST 2, 2018
No. 24705
LICENSED PROFESSIONAL ENGINEER

No	Submittal / Revision	App'd	Date
0	ISSUED FOR CONSTRUCTION	SL	08/31/18
A	ISSUED FOR REVIEW	SL	08/02/18

Drawn: RCD
Designed: MRL
Checked: AJD

Project Number: 600-007

Project Title:
CTNH037A
CTNH037/CANDID N. HAVEN
90 UNIVERSAL DRIVE
NORTH HAVEN, CT 06473

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

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
MAY 31 2018

No	Submittal / Revision	App'd	Date
0	ISSUED FOR CONSTRUCTION	SL	08/31/18
A	ISSUED FOR REVIEW	SL	08/02/18

Drawn: RCD
Designed: MRL
Checked: AJD

Project Number:
600-007

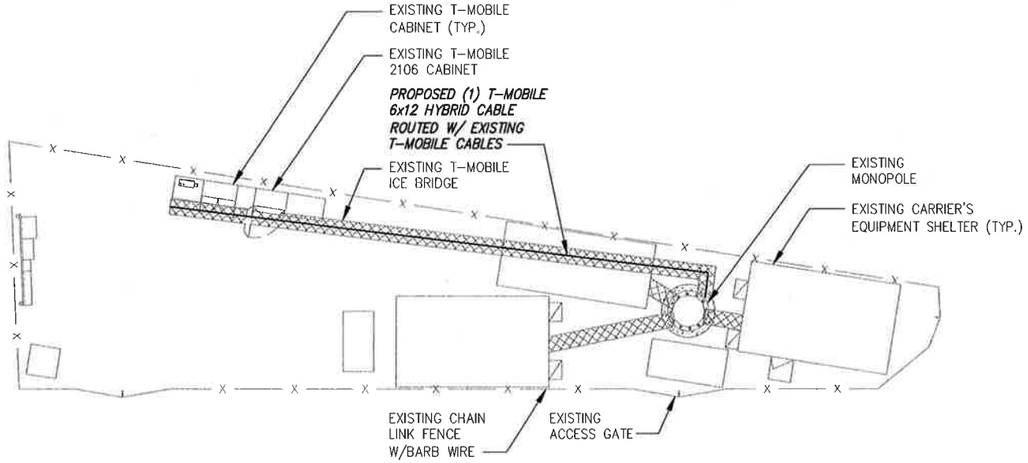
Project Title:
CTNH037A
CTNH037/CANDID N. HAVEN

90 UNIVERSAL DRIVE
NORTH HAVEN, CT 06473

Prepared For:
CROWN CASTLE

Drawing Title
NOTES

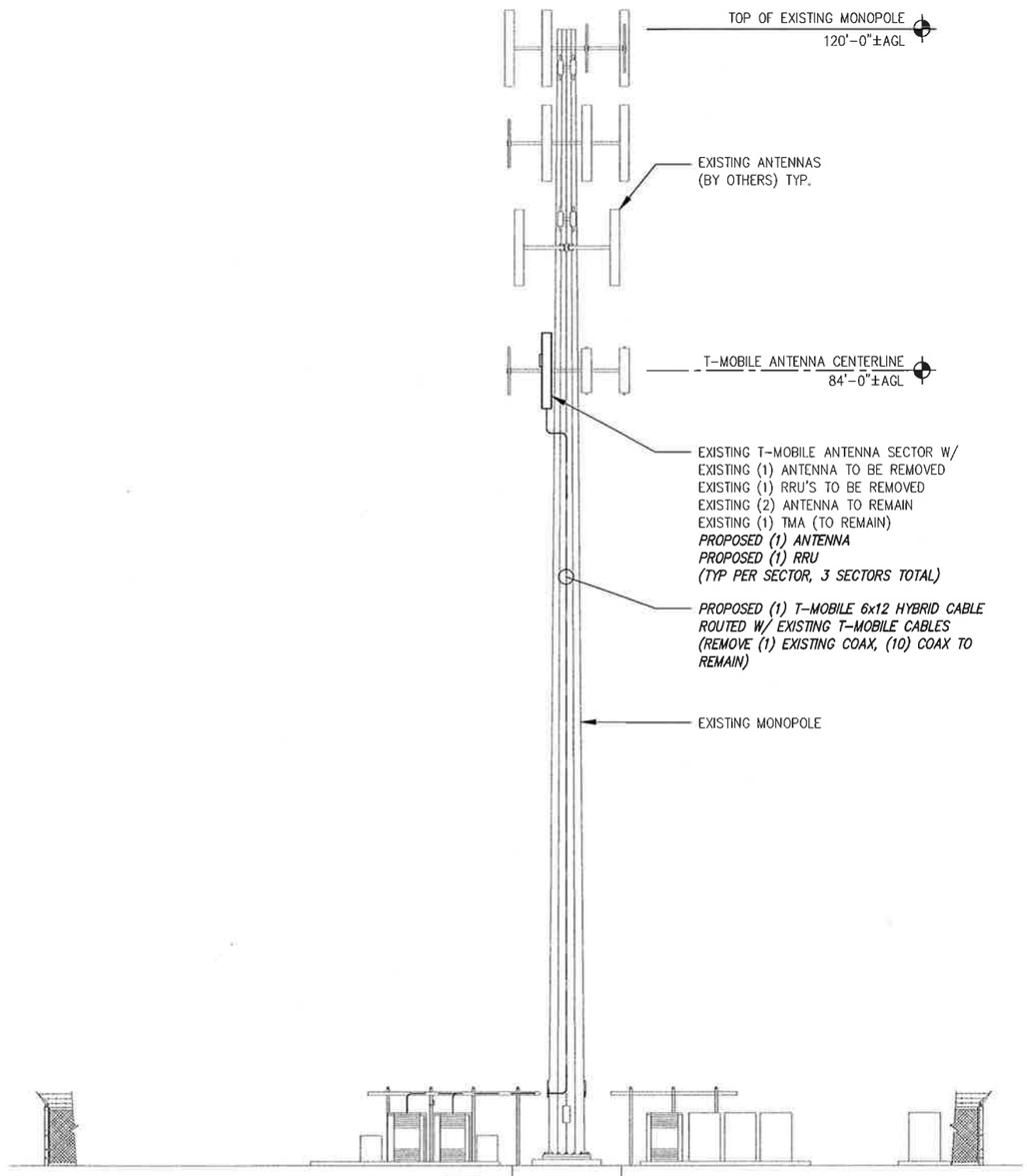
Drawing Number
N1



NORTH

1 C1 PLAN VIEW
SCALE: AS NOTED

GRAPHIC SCALE:
20' 10' 0 10' 20'
SCALE (11x17): 1" = 20'-0"
SCALE (22x34): 1" = 10'-0"



2 C1 ELEVATION
SCALE: NOT TO SCALE

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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 1 2018

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0	ISSUED FOR CONSTRUCTION	SL	08/31/18
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CTNH037/CANDID N. HAVEN

90 UNIVERSAL DRIVE
NORTH HAVEN, CT 06473

Prepared For:
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	AIR21 KRC118023-1_B2A_B4P	ERICSSON	40°	0	2/2	84'-0"	TWIN STYLE 1B -AWS	160'±	(4) 1-5/8" COAX (1) 6X12 HYBRID TRUNK CABLE (SHARED)
	A-2	AIR32 KRD901146-1_B66A_B2A	ERICSSON	40°	0	2/2/2/2	84'-0"	--	160'±	6x12 HYBRID TRUNK CABLE
	A-3	**APXVAARR24_43-U-NA20**	**RFS**	**40°**	0	**2/2**	84'-0"	**4449 B71+B12**	**160'±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
BETA	B-1	AIR21 KRC118023-1_B2A_B4P	ERICSSON	150°	0	2/2	84'-0"	TWIN STYLE 1B -AWS	160'±	(4) 1-5/8" COAX (1) 6X12 HYBRID TRUNK CABLE (SHARED)
	B-2	AIR32 KRD901146-1_B66A_B2A	ERICSSON	150°	0	2/2/2/2	84'-0"	--	160'±	6x12 HYBRID TRUNK CABLE
	B-3	**APXVAARR24_43-U-NA20**	**RFS**	**150°**	0	**2/2**	84'-0"	**4449 B71+B12**	**160'±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
GAMMA	C-1	AIR21 KRC118023-1_B2A_B4P	ERICSSON	270°	0	2/2	84'-0"	TWIN STYLE 1B -AWS	160'±	(2) 1-5/8" COAX (1) 6X12 HYBRID TRUNK CABLE (SHARED)
	C-2	AIR32 KRD901146-1_B66A_B2A	ERICSSON	270°	0	2/2/2/2	84'-0"	--	160'±	6x12 HYBRID TRUNK CABLE
	C-3	**APXVAARR24_43-U-NA20**	**RFS**	**270°**	0	**2/2**	84'-0"	**4449 B71+B12**	**160'±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**

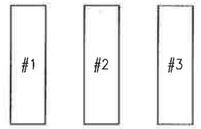
1 C2 RF SYSTEM CHART
SCALE: NOT TO SCALE

KEY

EXISTING
PROPOSED

ANTENNA LOCATION KEY

VIEWED FROM BEHIND

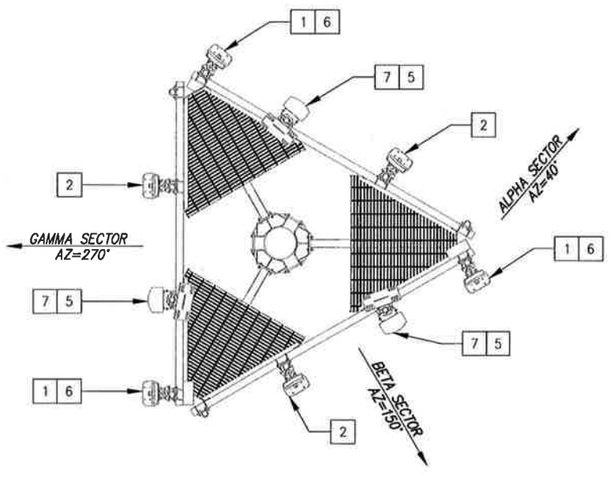


GENERAL NOTES:

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.

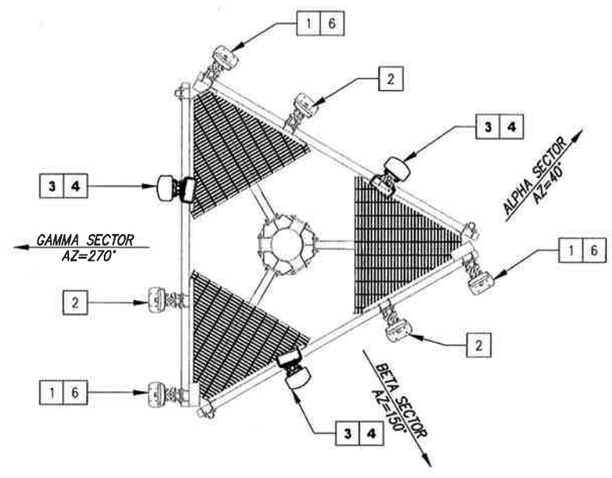
ORIENTATION PLAN KEY

KEY	DESCRIPTION	TYPE	QTY	STATUS
1	AIR21 KRC118023-1_B2A_B4P	ANTENNA	3	REMAIN
2	AIR32 KRD901146-1_B66A_B2A	ANTENNA	3	RELOCATE
3	**APXVAARR24_43-U-NA20**	**ANTENNA**	**3**	**PROPOSED**
4	**4449 B71+B1**	**RRU'S**	**3**	**PROPOSED**
5	RRUS11 B12	RRU'S	3	REMOVE
6	GENERIC TWIN AWS	TMA	3	REMAIN
7	LNX-6515DS-A1M	ANTENNA	3	REMOVE



NORTH

2 C2 EXISTING ANTENNA ORIENTATION
SCALE: NOT TO SCALE



NORTH

3 C2 PROPOSED ANTENNA ORIENTATION
SCALE: NOT TO SCALE

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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 24709
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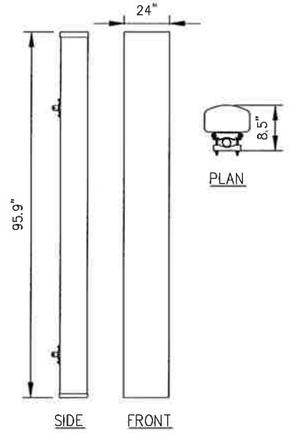
CTNH037/CANDID N. HAVEN

90 UNIVERSAL DRIVE
NORTH HAVEN, CT 06473

Prepared For:
CROWN CASTLE

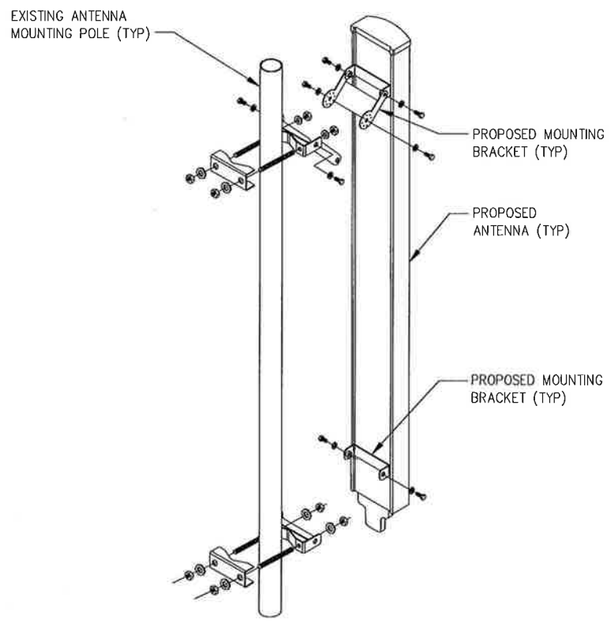
Drawing Title
RF CHART

Drawing Number
C2

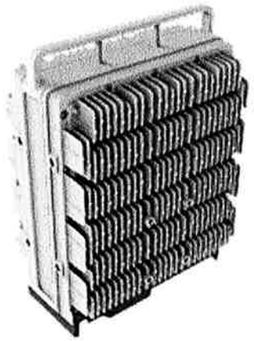


RFS MODEL NO.:	APXVAARR24_43-U-NA20
RADOME MATERIAL:	FIBERGLASS
RADOME COLOR:	LIGHT GREY
DIMENSIONS, HxWxD:	95.9"x24"x8.5"
WEIGHT, W/O MOUNTING KIT:	128 LBS

1 / D1 APX ANTENNA DETAIL
SCALE: NOT TO SCALE



2 / 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

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

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INFINIGY
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ELKRIDGE, MD 21075
TEL (443) 592-3143

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JOHN S. STEVENS
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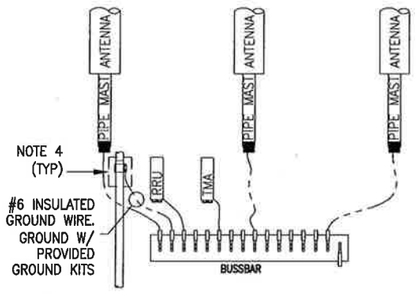
Prepared For:
CROWN CASTLE

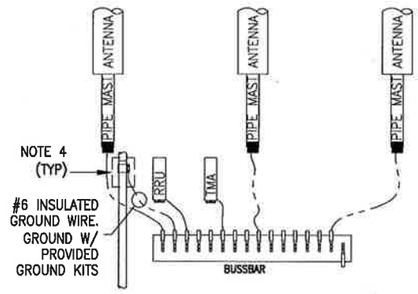
Drawing Title
EQUIPMENT DETAILS

Drawing Number
D1

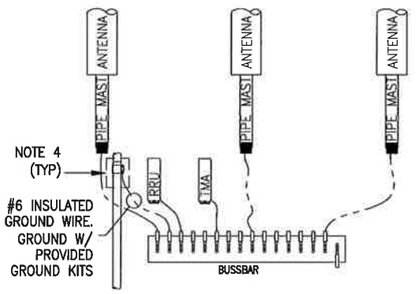
ALPHA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)



BETA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)

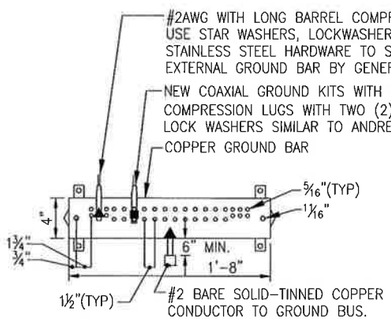


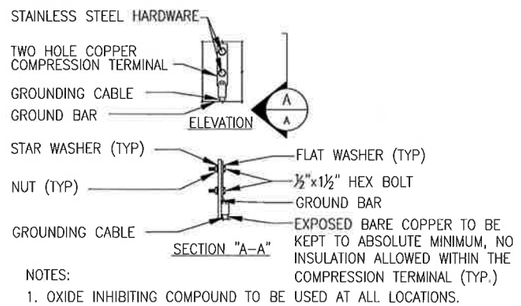
GAMMA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)



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

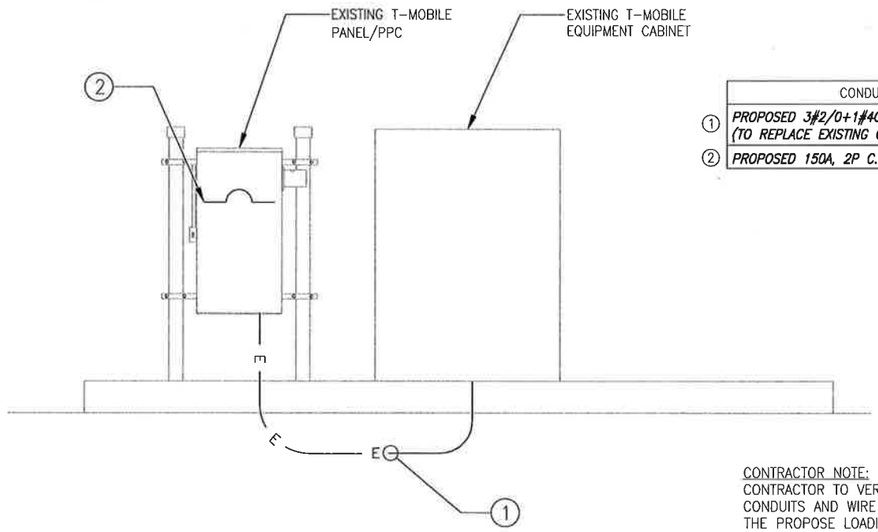




NOTES:
1. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

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 NORTHEAST LLC
103 MONARCH DRIVE
LIVERPOOL, NY 13088

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

STATE OF CONNECTICUT
ADAM S. STEVENS
No. 24102
LICENSED PROFESSIONAL ENGINEER
AUG 31 2018

No.	Submittal / Revision	Appd.	Date
0	ISSUED FOR CONSTRUCTION	SL	08/31/18
A	ISSUED FOR REVIEW	SL	08/02/18

Drawn: RCD
Designed: MRL
Checked: AJD

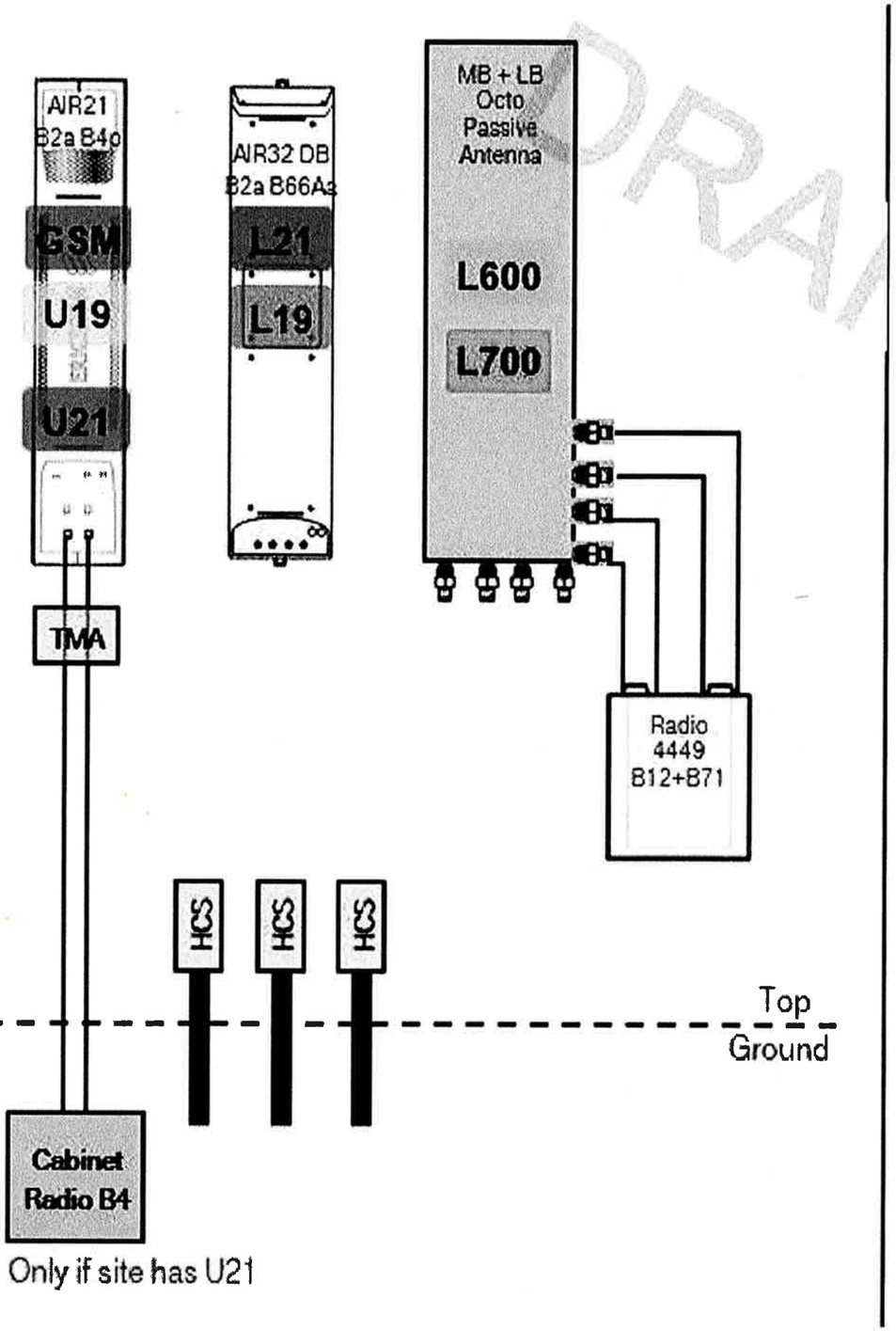
Project Number: 600-007

Project Title:
CTNH037A
CTNH037/CANDID N. HAVEN
90 UNIVERSAL DRIVE
NORTH HAVEN, CT 06473

Prepared For:
CROWN CASTLE

Drawing Title
GROUNDING & ELECTRICAL DETAILS

Drawing Number
E1



1 / E2 RF PLUMBING DIAGRAM
SCALE: AS NOTED

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 31 2018

No.	Submittal / Revision	App'd	Date
0	ISSUED FOR CONSTRUCTION	SL	08/31/18
A	ISSUED FOR REVIEW	SL	08/02/18

Drawn: RCD
Designed: MRL
Checked: AJD

Project Number: 600-007

Project Title:
CTNH037A
CTNH037/CANDID N. HAVEN
90 UNIVERSAL DRIVE
NORTH HAVEN, CT 06473

Prepared For: CROWN CASTLE

Drawing Title
RF PLUMBING DIAGRAM

Drawing Number
E2

PJF PAUL J. FORD & COMPANY

Date: **July 29, 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:	CTNH037A
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	881536
	Crown Castle Site Name:	NORTH HAVEN TOWER
	Crown Castle JDE Job Number:	512594
	Crown Castle Work Order Number:	1606934
	Crown Castle Order Number:	446143 Rev. 0
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37518-2646.001.7805
Site Data:	**120 Universal Drive, North Haven, New Haven County, CT** **Latitude *41° 20' 40.01"*, Longitude *-72° 52' 14.92"*** **120 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 1226960, in accordance with order 446143, 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 125 mph converted to a nominal 3-second gust wind speed of 97 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 with a maximum Topographic Factor, Kzt, of 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 other projects please give us a call.

Respectfully submitted by:

Gowtham

Gowtham Penumatsa
Structural Designer

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER

7.30.18

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 120 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in February of 2001. The tower was originally designed for a wind speed of 85 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 125 mph converted to a nominal 3-second gust wind speed of 97 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 with a maximum Topographic Factor, Kzt, of 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
83.0	84.0	3	ericsson	RADIO 4449 B12/B71	1	1-3/8	-
		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
118.0	121.0	3	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe	1 2	3/8 3/4	2
		6	cci antennas	TPX-070821			
		3	ericsson	RRUS 11			
		3	ericsson	RRUS 32			
		3	ericsson	RRUS 32 B2			
		6	powerwave technologies	7020.00			
		6	powerwave technologies	LGP21401			
		3	quintel technology	QS66512-2 w/ Mount Pipe			
		2	raycap	DC6-48-60-18-8F			
		3	powerwave technologies	7770.00 w/ Mount Pipe	1 2 12 1	3/8 3/4 1-5/8 2" Cond	1
	118.0	1	tower mounts	Platform Mount [LP 712-1]			
116.0	117.0	3	ericsson	TME-RRUS-12	-	-	2
		3	ericsson	TME-RRUS-11	-	-	1
		1	raycap	DC6-48-60-18-8F			
	116.0	1	tower mounts	Pipe Mount [PM 601-3]			
		1	tower mounts	Side Arm Mount [SO 104-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
108.0	110.0	12	decibel	844G65VTZASX w/ Mount Pipe	12	1-1/4	1
	108.0	1	tower mounts	Platform Mount [LP 303-1]			
100.0	100.0	3	alcatel lucent	TME-1900MHz RRH (65 MHz)	-	-	1
		1	tower mounts	Pipe Mount [PM 601-3]			
	99.0	3	alcatel lucent	TME-800MHZ RRH			
97.0	98.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	1 3	1-5/8 1-1/4	1
		3	alcatel lucent	TD-RRH8x20-25			
		2	powerwave technologies	P40-16-XLPP-RR-A w/ Mount Pipe			
		9	rfs celwave	ACU-A20-N			
		1	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
	97.0	1	tower mounts	Platform Mount [LP 712-1]			
		1	tower mounts	8’ Ladder			
83.0	84.0	3	commscope	LNX-6515DS-A1M w/ Mount Pipe	1	1-5/8	3
		3	ericsson	RRUS 11 B12			
		3	ericsson	AIR -32 B2A/B66AA w/ Mount Pipe	2 10	1-1/4 1-5/8	1
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
	83.0	3	rfs celwave	ATMAA1412D-1A20			
		1	tower mounts	Platform Mount [LP 303-1]			
51.0	51.0	1	lucent	KS24019-L112A	1	1/2	1
		1	tower mounts	Side Arm Mount [SO 301-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, 1/30/2001	1405753	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI, 2/28/2001	1405795	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI, 2/7/2000	1405788	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.

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 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	120 - 84.71	Pole	TP32.56x24.09x0.375	1	-13.46	2748.84	22.0	Pass
L2	84.71 - 41.583	Pole	TP42.03x30.71x0.438	2	-27.86	4148.23	41.1	Pass
L3	41.583 - 0	Pole	TP51x39.771x0.5	3	-45.74	5940.26	45.3	Pass
							Summary	
						Pole (L3)	45.3	Pass
						Rating =	45.3	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	44.2	Pass
1	Base Plate	0	53.7	Pass
1	Base Foundation Structural Steel	0	43.8	Pass
1	Base Foundation Soil Interaction	0	18.6	Pass

Structure Rating (max from all components) =	**53.7%**

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

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:

Tower is located in New Haven County, Connecticut.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 97.00 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56.00 pcf.
A wind speed of 50.00 mph is used in combination with ice.
Temperature drop of 50.00 °F.
Deflections calculated using a wind speed of 60.00 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

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	120.00-84.71	35.29	4.58	18	24.090	32.560	0.375	1.500	A572-65 (65 ksi)
L2	84.71-41.58	47.71	5.83	18	30.710	42.030	0.438	1.750	A572-65 (65 ksi)
L3	41.58-0.00	47.42		18	39.771	51.000	0.500	2.000	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
									(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	24.404	28.227	2005.603	8.419	12.238	163.887	4013.846	14.116	3.580	9.546
	33.004	38.308	5013.444	11.426	16.540	303.101	10033.485	19.158	5.071	13.521
L2	32.220	42.037	4867.080	10.747	15.601	311.978	9740.565	21.023	4.635	10.594
	42.611	57.756	12623.143	14.765	21.351	591.214	25262.896	28.884	6.627	15.148
L3	41.710	62.323	12143.143	13.941	20.204	601.036	24302.265	31.167	6.120	12.239
	51.710	80.144	25821.919	17.927	25.908	996.677	51677.815	40.079	8.096	16.192

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 120.00-84.71				1	1	1			
L2 84.71-41.58				1	1	1			
L3 41.58-0.00				1	1	1			

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
LDF7-50A(1-5/8)	C	No	Inside Pole	118.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
FB-L98B-002-75000(3/8)	C	No	Inside Pole	118.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	118.00 - 0.00	2	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
FB-L98B-002-75000(3/8)	C	No	Inside Pole	118.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	118.00 - 0.00	2	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
2" (Nominal) Conduit	C	No	Inside Pole	118.00 - 0.00	1	No Ice	0.00	0.72
						1/2" Ice	0.00	0.72
						1" Ice	0.00	0.72
***								
LDF6-50A(1-1/4)	C	No	Inside Pole	108.00 - 0.00	12	No Ice	0.00	0.60
						1/2" Ice	0.00	0.60
						1" Ice	0.00	0.60
***								
HB114-1-0813U4-M5F(1-1/4)	C	No	Inside Pole	97.00 - 0.00	3	No Ice	0.00	1.20
						1/2" Ice	0.00	1.20
						1" Ice	0.00	1.20
HB158-1-08U8-S8F18(1-5/8)	C	No	Inside Pole	97.00 - 0.00	1	No Ice	0.00	1.70
						1/2" Ice	0.00	1.70
						1" Ice	0.00	1.70
****								
MLE HYBRID	C	No	Inside Pole	83.00 - 0.00	2	No Ice	0.00	0.46

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
3POWER/6FIBER RL 2 10AWG(1-1/4)						1/2" Ice	0.00	0.46
						1" Ice	0.00	0.46
HCC 158-50J(1-5/8)	C	No	Inside Pole	83.00 - 0.00	10	No Ice	0.00	0.86
						1/2" Ice	0.00	0.86
						1" Ice	0.00	0.86
HCS 6X12 6AWG(1-3/8)	C	No	Inside Pole	83.00 - 0.00	1	No Ice	0.00	1.70
						1/2" Ice	0.00	1.70
						1" Ice	0.00	1.70
***								
LDF4-50A(1/2)	C	No	CaAa (Out Of Face)	51.00 - 0.00	1	No Ice	0.06	0.15
						1/2" Ice	0.16	0.84
						1" Ice	0.26	2.14

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	120.00-84.71	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	0.67
L2	84.71-41.58	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	0.589	1.57
L3	41.58-0.00	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	2.599	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	120.00-84.71	A	1.679	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	0.67
L2	84.71-41.58	A	1.599	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	3.750	1.61
L3	41.58-0.00	A	1.433	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	15.897	1.73

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	120.00-84.71	0.000	0.000	0.000	0.000
L2	84.71-41.58	-0.118	0.068	-0.370	0.214
L3	41.58-0.00	-0.481	0.278	-1.420	0.820

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
7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 3.00	0.000	118.00	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 3.00	0.000	118.00	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 3.00	0.000	118.00	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
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	9.90 10.47 11.01	7.18 8.36 9.26	0.10 0.18 0.26
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	9.90 10.47 11.01	7.18 8.36 9.26	0.10 0.18 0.26
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	9.90 10.47 11.01	7.18 8.36 9.26	0.10 0.18 0.26
QS66512-2 w/ Mount Pipe	A	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	3.83 9.29 9.91	6.22 9.66 10.62	0.14 0.21 0.30
QS66512-2 w/ Mount Pipe	B	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	3.83 9.29 9.91	6.22 9.66 10.62	0.14 0.21 0.30
QS66512-2 w/ Mount Pipe	C	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	3.83 9.29 9.91	6.22 9.66 10.62	0.14 0.21 0.30
(2) TPX-070821	A	From Leg	4.00 0.00 3.00	0.000	118.00	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 3.00	0.000	118.00	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 3.00	0.000	118.00	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
RRUS 11	A	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	0.05 0.07 0.10
RRUS 11	B	From Leg	4.00	0.000	118.00	No Ice	2.79	1.19	0.05

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	3.00	1.34	0.07
			3.00			1" Ice	3.21	1.50	0.10
RRUS 11	C	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	0.05 0.07 0.10
RRUS 32	A	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	2.86 3.08 3.32	1.78 1.97 2.17	0.06 0.08 0.10
RRUS 32	B	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	2.86 3.08 3.32	1.78 1.97 2.17	0.06 0.08 0.10
RRUS 32	C	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	2.86 3.08 3.32	1.78 1.97 2.17	0.06 0.08 0.10
RRUS 32 B2	A	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	2.73 2.95 3.18	1.67 1.86 2.05	0.05 0.07 0.10
RRUS 32 B2	B	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	2.73 2.95 3.18	1.67 1.86 2.05	0.05 0.07 0.10
RRUS 32 B2	C	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	2.73 2.95 3.18	1.67 1.86 2.05	0.05 0.07 0.10
(2) 7020.00	A	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.17 0.24 0.31	0.00 0.01 0.01
(2) 7020.00	B	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.17 0.24 0.31	0.00 0.01 0.01
(2) 7020.00	C	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.17 0.24 0.31	0.00 0.01 0.01
(2) LGP21401	A	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.35 0.44 0.54	0.01 0.02 0.03
(2) LGP21401	B	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.35 0.44 0.54	0.01 0.02 0.03
(2) LGP21401	C	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.35 0.44 0.54	0.01 0.02 0.03
DC6-48-60-18-8F	A	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	0.92 1.46 1.64	0.92 1.46 1.64	0.02 0.04 0.06
DC6-48-60-18-8F	B	From Leg	4.00 0.00 3.00	0.000	118.00	No Ice 1/2" Ice 1" Ice	0.92 1.46 1.64	0.92 1.46 1.64	0.02 0.04 0.06
Platform Mount [LP 712-1]	C	None		0.000	118.00	No Ice 1/2"	24.53 29.94	24.53 29.94	1.34 1.65

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
						Ice	35.35	35.35	1.96
						1" Ice			
8' x 2" Sch 40 Pipe Mount	A	From Leg	4.00	0.000	118.00	No Ice	1.90	1.90	0.03
			0.00			1/2"	2.73	2.73	0.04
			0.00			Ice	3.40	3.40	0.06
						1" Ice			
8' x 2" Sch 40 Pipe Mount	B	From Leg	4.00	0.000	118.00	No Ice	1.90	1.90	0.03
			0.00			1/2"	2.73	2.73	0.04
			0.00			Ice	3.40	3.40	0.06
						1" Ice			
8' x 2" Sch 40 Pipe Mount	C	From Leg	4.00	0.000	118.00	No Ice	1.90	1.90	0.03
			0.00			1/2"	2.73	2.73	0.04
			0.00			Ice	3.40	3.40	0.06
						1" Ice			
8-ft Ladder	C	None		0.000	118.00	No Ice	7.07	7.07	0.04
						1/2"	9.73	9.73	0.07
						Ice	11.19	11.19	0.08
						1" Ice			
****									
TME-RRUS-11	A	From Leg	4.00	0.000	116.00	No Ice	2.78	1.19	0.05
			0.00			1/2"	2.99	1.33	0.07
			1.00			Ice	3.21	1.49	0.09
						1" Ice			
TME-RRUS-11	B	From Leg	4.00	0.000	116.00	No Ice	2.78	1.19	0.05
			0.00			1/2"	2.99	1.33	0.07
			1.00			Ice	3.21	1.49	0.09
						1" Ice			
TME-RRUS-11	C	From Leg	4.00	0.000	116.00	No Ice	2.78	1.19	0.05
			0.00			1/2"	2.99	1.33	0.07
			1.00			Ice	3.21	1.49	0.09
						1" Ice			
DC6-48-60-18-8F	B	From Leg	4.00	0.000	116.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			1.00			Ice	1.64	1.64	0.06
						1" Ice			
TME-RRUS-12	A	From Leg	4.00	0.000	116.00	No Ice	3.15	1.29	0.06
			0.00			1/2"	3.36	1.44	0.08
			1.00			Ice	3.59	1.60	0.11
						1" Ice			
TME-RRUS-12	B	From Leg	4.00	0.000	116.00	No Ice	3.15	1.29	0.06
			0.00			1/2"	3.36	1.44	0.08
			1.00			Ice	3.59	1.60	0.11
						1" Ice			
TME-RRUS-12	C	From Leg	4.00	0.000	116.00	No Ice	3.15	1.29	0.06
			0.00			1/2"	3.36	1.44	0.08
			1.00			Ice	3.59	1.60	0.11
						1" Ice			
Pipe Mount [PM 601-3]	C	None		0.000	116.00	No Ice	4.39	4.39	0.20
						1/2"	5.48	5.48	0.24
						Ice	6.57	6.57	0.28
						1" Ice			
Side Arm Mount [SO 104-1]	C	None		0.000	116.00	No Ice	1.51	0.67	0.10
						1/2"	1.82	0.93	0.14
						Ice	2.13	1.19	0.18
						1" Ice			
****									
(4) 844G65VTZASX w/ Mount Pipe	A	From Leg	4.00	0.000	108.00	No Ice	5.55	5.04	0.03
			0.00			1/2"	5.94	5.67	0.09
			2.00			Ice	6.34	6.30	0.14
						1" Ice			
(4) 844G65VTZASX w/ Mount Pipe	B	From Leg	4.00	0.000	108.00	No Ice	5.55	5.04	0.03
			0.00			1/2"	5.94	5.67	0.09
			2.00			Ice	6.34	6.30	0.14
						1" Ice			
(4) 844G65VTZASX w/	C	From Leg	4.00	0.000	108.00	No Ice	5.55	5.04	0.03

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
Mount Pipe			0.00 2.00			1/2" Ice 1" Ice	5.94 6.34	5.67 6.30	0.09 0.14
Platform Mount [LP 303-1]	C	None		0.000	108.00	No Ice 1/2" Ice 1" Ice	14.66 18.87 23.08	14.66 18.87 23.08	1.25 1.48 1.71
****									
TME-1900MHz RRH (65 MHz)	A	From Leg	4.00 0.00 0.00	0.000	100.00	No Ice 1/2" Ice 1" Ice	2.31 2.52 2.73	2.38 2.58 2.79	0.06 0.08 0.11
TME-1900MHz RRH (65 MHz)	B	From Leg	4.00 0.00 0.00	0.000	100.00	No Ice 1/2" Ice 1" Ice	2.31 2.52 2.73	2.38 2.58 2.79	0.06 0.08 0.11
TME-1900MHz RRH (65 MHz)	C	From Leg	4.00 0.00 0.00	0.000	100.00	No Ice 1/2" Ice 1" Ice	2.31 2.52 2.73	2.38 2.58 2.79	0.06 0.08 0.11
TME-800MHZ RRH	A	From Leg	4.00 0.00 -1.00	0.000	100.00	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
TME-800MHZ RRH	B	From Leg	4.00 0.00 -1.00	0.000	100.00	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
TME-800MHZ RRH	C	From Leg	4.00 0.00 -1.00	0.000	100.00	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
Pipe Mount [PM 601-3]	C	None		0.000	100.00	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
*****									
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.000	97.00	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 1.00	0.000	97.00	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 1.00	0.000	97.00	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
P40-16-XLPP-RR-A w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.000	97.00	No Ice 1/2" Ice 1" Ice	8.24 8.70 9.16	4.83 5.57 6.27	0.07 0.14 0.21
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.000	97.00	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
P40-16-XLPP-RR-A w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.000	97.00	No Ice 1/2" Ice 1" Ice	8.24 8.70 9.16	4.83 5.57 6.27	0.07 0.14 0.21
800 EXTERNAL NOTCH FILTER	A	From Leg	4.00 0.00 1.00	0.000	97.00	No Ice 1/2" Ice 1" Ice	0.66 0.76 0.87	0.32 0.40 0.48	0.01 0.02 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
800 EXTERNAL NOTCH FILTER	B	From Leg	4.00 0.00 1.00	0.000	97.00	No Ice 1/2" Ice 1" Ice	0.66 0.76 0.87	0.32 0.40 0.48	0.01 0.02 0.02
800 EXTERNAL NOTCH FILTER	C	From Leg	4.00 0.00 1.00	0.000	97.00	No Ice 1/2" Ice 1" Ice	0.66 0.76 0.87	0.32 0.40 0.48	0.01 0.02 0.02
TD-RRH8x20-25	A	From Leg	4.00 0.00 1.00	0.000	97.00	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 1.00	0.000	97.00	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 1.00	0.000	97.00	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
(3) ACU-A20-N	A	From Leg	4.00 0.00 1.00	0.000	97.00	No Ice 1/2" Ice 1" Ice	0.07 0.10 0.15	0.12 0.16 0.21	0.00 0.00 0.00
(3) ACU-A20-N	B	From Leg	4.00 0.00 1.00	0.000	97.00	No Ice 1/2" Ice 1" Ice	0.07 0.10 0.15	0.12 0.16 0.21	0.00 0.00 0.00
(3) ACU-A20-N	C	From Leg	4.00 0.00 1.00	0.000	97.00	No Ice 1/2" Ice 1" Ice	0.07 0.10 0.15	0.12 0.16 0.21	0.00 0.00 0.00
Platform Mount [LP 712-1]	C	None		0.000	97.00	No Ice 1/2" Ice 1" Ice	24.53 29.94 35.35	24.53 29.94 35.35	1.34 1.65 1.96
8' x 2" Sch 40 Pipe Mount	A	From Leg	4.00 0.00 0.00	0.000	97.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
8' x 2" Sch 40 Pipe Mount	B	From Leg	4.00 0.00 0.00	0.000	97.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
8' x 2" Sch 40 Pipe Mount	C	From Leg	4.00 0.00 0.00	0.000	97.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
***** ***									
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.000	83.00	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	0.000	83.00	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	0.000	83.00	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
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.000	83.00	No Ice 1/2" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		C_AA_A *Front* ft^2	C_AA_A *Side* ft^2	*Weight* K
						1" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.000	83.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.000	83.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.000	83.00	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	0.000	83.00	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	0.000	83.00	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
RADIO 4449 B12/B71	A	From Leg	4.00 0.00 1.00	0.000	83.00	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	0.000	83.00	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	0.000	83.00	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
ATMAA1412D-1A20	A	From Leg	4.00 0.00 0.00	0.000	83.00	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 0.00	0.000	83.00	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 0.00	0.000	83.00	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
Platform Mount [LP 303-1]	C	None		0.000	83.00	No Ice 1/2" Ice 1" Ice	14.66 18.87 23.08	14.66 18.87 23.08	1.25 1.48 1.71
8' x 2" Sch 40 Pipe Mount	A	From Leg	4.00 0.00 0.00	0.000	83.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
8' x 2" Sch 40 Pipe Mount	B	From Leg	4.00 0.00 0.00	0.000	83.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
8' x 2" Sch 40 Pipe Mount	C	From Leg	4.00 0.00 0.00	0.000	83.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
****									
KS24019-L112A	B	From Leg	4.00 0.00 0.00	0.000	51.00	No Ice 1/2" Ice	0.14 0.20 0.26	0.14 0.20 0.26	0.01 0.01 0.01

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
Side Arm Mount [SO 301-1]	B	From Leg	2.00 0.00 0.00	0.000	51.00	1" Ice No Ice 1/2" Ice 1" Ice	1.00 1.39 1.78	0.90 1.42 1.94	0.02 0.03 0.04
****									

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
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

Comb. No.	Description
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	120 - 84.71	Pole	Max Tension	14	0.00	0.00	0.00
			Max. Compression	26	-29.23	-0.99	-0.09
			Max. Mx	8	-13.46	-375.31	0.31
			Max. My	14	-13.46	0.09	-375.46
			Max. Vy	8	17.98	-375.31	0.31
			Max. Vx	14	18.02	0.09	-375.46
			Max. Torque	15			0.77
L2	84.71 - 41.583	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-51.17	-1.18	-0.28
			Max. Mx	8	-27.86	-1379.32	1.82
			Max. My	14	-27.86	1.54	-1381.25
			Max. Vy	8	26.53	-1379.32	1.82
			Max. Vx	14	26.57	1.54	-1381.25
			Max. Torque	5			-0.92
L3	41.583 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-73.04	-0.84	-0.47
			Max. Mx	8	-45.74	-2733.37	3.50
			Max. My	14	-45.74	3.23	-2737.27
			Max. Vy	8	30.41	-2733.37	3.50
			Max. Vx	14	30.45	3.23	-2737.27
			Max. Torque	5			-0.92

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	73.04	-0.00	-0.00
	Max. H_x	21	34.32	30.38	-0.04
	Max. H_z	3	34.32	-0.04	30.42
	Max. M_x	2	2737.05	-0.04	30.42
	Max. M_z	8	2733.37	-30.38	0.04
	Max. Torsion	17	0.83	15.22	-26.36
	Min. Vert	15	34.32	0.04	-30.42
	Min. H_x	9	34.32	-30.38	0.04
	Min. H_z	15	34.32	0.04	-30.42
	Min. M_x	14	-2737.27	0.04	-30.42
	Min. M_z	20	-2732.61	30.38	-0.04
	Min. Torsion	5	-0.83	-15.22	26.36

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	38.13	0.00	0.00	0.09	-0.30	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	45.76	0.04	-30.42	-2737.05	-3.99	0.72
0.9 Dead+1.6 Wind 0 deg - No Ice	34.32	0.04	-30.42	-2719.92	-3.87	0.72

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.6 Wind 30 deg - No Ice	45.76	15.22	-26.36	-2372.32	-1370.10	0.83
0.9 Dead+1.6 Wind 30 deg - No Ice	34.32	15.22	-26.36	-2357.42	-1361.38	0.83
1.2 Dead+1.6 Wind 60 deg - No Ice	45.76	26.33	-15.24	-1371.70	-2369.19	0.71
0.9 Dead+1.6 Wind 60 deg - No Ice	34.32	26.33	-15.24	-1363.09	-2354.19	0.71
1.2 Dead+1.6 Wind 90 deg - No Ice	45.76	30.38	-0.04	-3.50	-2733.37	0.40
0.9 Dead+1.6 Wind 90 deg - No Ice	34.32	30.38	-0.04	-3.51	-2716.14	0.40
1.2 Dead+1.6 Wind 120 deg - No Ice	45.76	26.29	15.18	1365.67	-2365.59	-0.01
0.9 Dead+1.6 Wind 120 deg - No Ice	34.32	26.29	15.18	1357.05	-2350.61	-0.01
1.2 Dead+1.6 Wind 150 deg - No Ice	45.76	15.16	26.33	2368.93	-1363.85	-0.42
0.9 Dead+1.6 Wind 150 deg - No Ice	34.32	15.16	26.33	2354.00	-1355.17	-0.42
1.2 Dead+1.6 Wind 180 deg - No Ice	45.76	-0.04	30.42	2737.27	3.23	-0.72
0.9 Dead+1.6 Wind 180 deg - No Ice	34.32	-0.04	30.42	2720.08	3.31	-0.72
1.2 Dead+1.6 Wind 210 deg - No Ice	45.76	-15.22	26.36	2372.54	1369.34	-0.83
0.9 Dead+1.6 Wind 210 deg - No Ice	34.32	-15.22	26.36	2357.58	1360.82	-0.83
1.2 Dead+1.6 Wind 240 deg - No Ice	45.76	-26.33	15.24	1371.92	2368.44	-0.71
0.9 Dead+1.6 Wind 240 deg - No Ice	34.32	-26.33	15.24	1363.26	2353.63	-0.71
1.2 Dead+1.6 Wind 270 deg - No Ice	45.76	-30.38	0.04	3.72	2732.61	-0.40
0.9 Dead+1.6 Wind 270 deg - No Ice	34.32	-30.38	0.04	3.67	2715.58	-0.40
1.2 Dead+1.6 Wind 300 deg - No Ice	45.76	-26.29	-15.18	-1365.44	2364.83	0.01
0.9 Dead+1.6 Wind 300 deg - No Ice	34.32	-26.29	-15.18	-1356.88	2350.05	0.01
1.2 Dead+1.6 Wind 330 deg - No Ice	45.76	-15.16	-26.33	-2368.71	1363.09	0.42
0.9 Dead+1.6 Wind 330 deg - No Ice	34.32	-15.16	-26.33	-2353.83	1354.61	0.42
1.2 Dead+1.0 Ice+1.0 Temp	73.04	0.00	0.00	0.47	-0.84	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	73.04	0.01	-8.71	-773.52	-1.81	0.09
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	73.04	4.36	-7.55	-670.26	-388.19	0.18
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	73.04	7.54	-4.36	-387.27	-670.81	0.22
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	73.04	8.70	-0.01	-0.38	-773.93	0.20
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	73.04	7.53	4.35	386.74	-669.93	0.13
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	73.04	4.34	7.54	670.37	-386.67	0.02
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	73.04	-0.01	8.71	774.51	-0.05	-0.09
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	73.04	-4.36	7.55	671.25	386.33	-0.18
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	73.04	-7.54	4.36	388.26	668.95	-0.22
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	73.04	-8.70	0.01	1.37	772.07	-0.20
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	73.04	-7.53	-4.35	-385.75	668.07	-0.13
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	73.04	-4.34	-7.54	-669.38	384.81	-0.02

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
Dead+Wind 0 deg - Service	38.13	0.01	-6.51	-583.25	-1.08	0.16
Dead+Wind 30 deg - Service	38.13	3.26	-5.64	-505.48	-292.21	0.18
Dead+Wind 60 deg - Service	38.13	5.63	-3.26	-292.25	-505.12	0.15
Dead+Wind 90 deg - Service	38.13	6.50	-0.01	-0.68	-582.77	0.09
Dead+Wind 120 deg - Service	38.13	5.62	3.25	291.10	-504.35	-0.00
Dead+Wind 150 deg - Service	38.13	3.24	5.63	504.90	-290.88	-0.09
Dead+Wind 180 deg - Service	38.13	-0.01	6.51	583.44	0.45	-0.16
Dead+Wind 210 deg - Service	38.13	-3.26	5.64	505.67	291.58	-0.18
Dead+Wind 240 deg - Service	38.13	-5.63	3.26	292.43	504.49	-0.15
Dead+Wind 270 deg - Service	38.13	-6.50	0.01	0.86	582.14	-0.09
Dead+Wind 300 deg - Service	38.13	-5.62	-3.25	-290.91	503.72	0.00
Dead+Wind 330 deg - Service	38.13	-3.24	-5.63	-504.72	290.25	0.09

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	-38.13	0.00	-0.00	38.13	0.00	0.000%
2	0.04	-45.76	-30.42	-0.04	45.76	30.42	0.004%
3	0.04	-34.32	-30.42	-0.04	34.32	30.42	0.003%
4	15.22	-45.76	-26.36	-15.22	45.76	26.36	0.000%
5	15.22	-34.32	-26.36	-15.22	34.32	26.36	0.000%
6	26.33	-45.76	-15.24	-26.33	45.76	15.24	0.000%
7	26.33	-34.32	-15.24	-26.33	34.32	15.24	0.000%
8	30.38	-45.76	-0.04	-30.38	45.76	0.04	0.004%
9	30.38	-34.32	-0.04	-30.38	34.32	0.04	0.003%
10	26.29	-45.76	15.18	-26.29	45.76	-15.18	0.000%
11	26.29	-34.32	15.18	-26.29	34.32	-15.18	0.000%
12	15.16	-45.76	26.33	-15.16	45.76	-26.33	0.000%
13	15.16	-34.32	26.33	-15.16	34.32	-26.33	0.000%
14	-0.04	-45.76	30.42	0.04	45.76	-30.42	0.004%
15	-0.04	-34.32	30.42	0.04	34.32	-30.42	0.003%
16	-15.22	-45.76	26.36	15.22	45.76	-26.36	0.000%
17	-15.22	-34.32	26.36	15.22	34.32	-26.36	0.000%
18	-26.33	-45.76	15.24	26.33	45.76	-15.24	0.000%
19	-26.33	-34.32	15.24	26.33	34.32	-15.24	0.000%
20	-30.38	-45.76	0.04	30.38	45.76	-0.04	0.004%
21	-30.38	-34.32	0.04	30.38	34.32	-0.04	0.003%
22	-26.29	-45.76	-15.18	26.29	45.76	15.18	0.000%
23	-26.29	-34.32	-15.18	26.29	34.32	15.18	0.000%
24	-15.16	-45.76	-26.33	15.16	45.76	26.33	0.000%
25	-15.16	-34.32	-26.33	15.16	34.32	26.33	0.000%
26	0.00	-73.04	0.00	-0.00	73.04	-0.00	0.000%
27	0.01	-73.04	-8.71	-0.01	73.04	8.71	0.000%
28	4.36	-73.04	-7.55	-4.36	73.04	7.55	0.000%
29	7.54	-73.04	-4.36	-7.54	73.04	4.36	0.000%
30	8.70	-73.04	-0.01	-8.70	73.04	0.01	0.000%
31	7.53	-73.04	4.35	-7.53	73.04	-4.35	0.000%
32	4.34	-73.04	7.54	-4.34	73.04	-7.54	0.000%
33	-0.01	-73.04	8.71	0.01	73.04	-8.71	0.000%
34	-4.36	-73.04	7.55	4.36	73.04	-7.55	0.000%
35	-7.54	-73.04	4.36	7.54	73.04	-4.36	0.000%
36	-8.70	-73.04	0.01	8.70	73.04	-0.01	0.000%
37	-7.53	-73.04	-4.35	7.53	73.04	4.35	0.000%
38	-4.34	-73.04	-7.54	4.34	73.04	7.54	0.000%
39	0.01	-38.13	-6.51	-0.01	38.13	6.51	0.004%
40	3.26	-38.13	-5.64	-3.26	38.13	5.64	0.004%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
41	5.63	-38.13	-3.26	-5.63	38.13	3.26	0.004%
42	6.50	-38.13	-0.01	-6.50	38.13	0.01	0.004%
43	5.63	-38.13	3.25	-5.62	38.13	-3.25	0.004%
44	3.24	-38.13	5.63	-3.24	38.13	-5.63	0.004%
45	-0.01	-38.13	6.51	0.01	38.13	-6.51	0.004%
46	-3.26	-38.13	5.64	3.26	38.13	-5.64	0.004%
47	-5.63	-38.13	3.26	5.63	38.13	-3.26	0.004%
48	-6.50	-38.13	0.01	6.50	38.13	-0.01	0.004%
49	-5.63	-38.13	-3.25	5.62	38.13	3.25	0.004%
50	-3.24	-38.13	-5.63	3.24	38.13	5.63	0.004%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	10	0.00005908	0.00014092
3	Yes	10	0.00000001	0.00012068
4	Yes	12	0.00000001	0.00013085
5	Yes	12	0.00000001	0.00010296
6	Yes	12	0.00000001	0.00012513
7	Yes	12	0.00000001	0.00009836
8	Yes	10	0.00005909	0.00012056
9	Yes	10	0.00000001	0.00010417
10	Yes	12	0.00000001	0.00012581
11	Yes	12	0.00000001	0.00009895
12	Yes	12	0.00000001	0.00012896
13	Yes	12	0.00000001	0.00010148
14	Yes	10	0.00005908	0.00013627
15	Yes	10	0.00000001	0.00011694
16	Yes	12	0.00000001	0.00012429
17	Yes	12	0.00000001	0.00009769
18	Yes	12	0.00000001	0.00012980
19	Yes	12	0.00000001	0.00010215
20	Yes	10	0.00005909	0.00012209
21	Yes	10	0.00000001	0.00010540
22	Yes	12	0.00000001	0.00012716
23	Yes	12	0.00000001	0.00010007
24	Yes	12	0.00000001	0.00012422
25	Yes	12	0.00000001	0.00009769
26	Yes	6	0.00000001	0.00000001
27	Yes	11	0.00000001	0.00009099
28	Yes	11	0.00000001	0.00010652
29	Yes	11	0.00000001	0.00010600
30	Yes	11	0.00000001	0.00009115
31	Yes	11	0.00000001	0.00010597
32	Yes	11	0.00000001	0.00010624
33	Yes	11	0.00000001	0.00009110
34	Yes	11	0.00000001	0.00010553
35	Yes	11	0.00000001	0.00010591
36	Yes	11	0.00000001	0.00009063
37	Yes	11	0.00000001	0.00010532
38	Yes	11	0.00000001	0.00010518
39	Yes	9	0.00000001	0.00011525
40	Yes	9	0.00000001	0.00010364
41	Yes	9	0.00000001	0.00009920
42	Yes	9	0.00000001	0.00011477
43	Yes	9	0.00000001	0.00010003
44	Yes	9	0.00000001	0.00010256
45	Yes	9	0.00000001	0.00011527
46	Yes	9	0.00000001	0.00009884
47	Yes	9	0.00000001	0.00010259
48	Yes	9	0.00000001	0.00011456
49	Yes	9	0.00000001	0.00010096
50	Yes	9	0.00000001	0.00009911

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 84.71	9.40	40	0.640	0.001
L2	89.293 - 41.583	5.46	40	0.560	0.000
L3	47.416 - 0	1.56	40	0.301	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118.00	7770.00 w/ Mount Pipe	40	9.14	0.637	0.001	78532
116.00	TME-RRUS-11	40	8.87	0.633	0.001	78532
108.00	(4) 844G65VTZASX w/ Mount Pipe	40	7.81	0.617	0.001	32722
100.00	TME-1900MHz RRH (65 MHz)	40	6.78	0.597	0.001	19633
97.00	APXVTM14-C-120 w/ Mount Pipe	40	6.40	0.588	0.001	17072
83.00	APXVAARR24_43-U-NA20 w/ Mount Pipe	40	4.73	0.530	0.000	11235
51.00	KS24019-L112A	40	1.79	0.326	0.000	6947

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 84.71	44.13	4	3.005	0.004
L2	89.293 - 41.583	25.63	4	2.628	0.002
L3	47.416 - 0	7.33	4	1.414	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118.00	7770.00 w/ Mount Pipe	4	42.88	2.988	0.004	16857
116.00	TME-RRUS-11	4	41.63	2.971	0.004	16857
108.00	(4) 844G65VTZASX w/ Mount Pipe	4	36.67	2.896	0.003	7023
100.00	TME-1900MHz RRH (65 MHz)	4	31.82	2.802	0.003	4213
97.00	APXVTM14-C-120 w/ Mount Pipe	4	30.05	2.760	0.003	3663
83.00	APXVAARR24_43-U-NA20 w/ Mount Pipe	4	22.21	2.490	0.002	2407
51.00	KS24019-L112A	4	8.42	1.530	0.001	1482

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	120 - 84.71 (1)	TP32.56x24.09x0.375	35.29	0.00	0.0	36.999	-13.46	2748.84	0.005
L2	84.71 - 41.583 (2)	TP42.03x30.71x0.438	47.71	0.00	0.0	55.835	-27.86	4148.23	0.007
L3	41.583 - 0 (3)	TP51x39.771x0.5	47.42	0.00	0.0	80.144	-45.74	5940.26	0.008

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	120 - 84.71 (1)	TP32.56x24.09x0.375	375.75	1749.78	0.215	0.00	1749.78	0.000
L2	84.71 - 41.583 (2)	TP42.03x30.71x0.438	1382.47	3419.58	0.404	0.00	3419.58	0.000
L3	41.583 - 0 (3)	TP51x39.771x0.5	2739.53	6156.17	0.445	0.00	6156.17	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	120 - 84.71 (1)	TP32.56x24.09x0.375	18.05	1374.42	0.013	0.76	3510.21	0.000
L2	84.71 - 41.583 (2)	TP42.03x30.71x0.438	26.59	2074.11	0.013	0.92	6858.75	0.000
L3	41.583 - 0 (3)	TP51x39.771x0.5	30.47	2970.13	0.010	0.83	12345.75	0.000

Pole Interaction Design Data

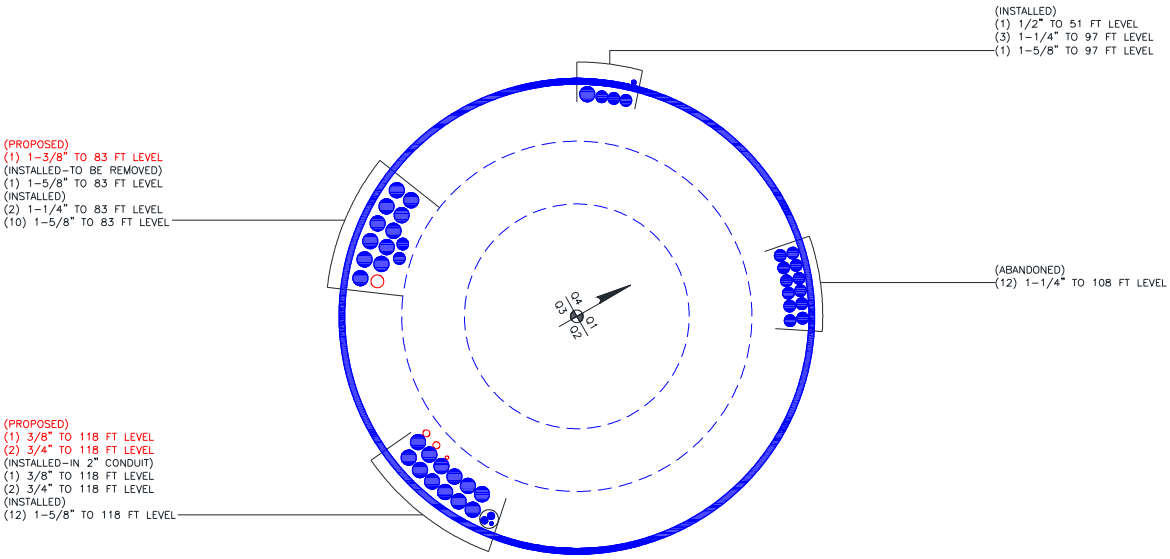
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	120 - 84.71 (1)	0.005	0.215	0.000	0.013	0.000	0.220 ✔	1.000	4.8.2 ✔
L2	84.71 - 41.583 (2)	0.007	0.404	0.000	0.013	0.000	0.411 ✔	1.000	4.8.2 ✔
L3	41.583 - 0 (3)	0.008	0.445	0.000	0.010	0.000	0.453 ✔	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	120 - 84.71	Pole	TP32.56x24.09x0.375	1	-13.46	2748.84	22.0	Pass
L2	84.71 - 41.583	Pole	TP42.03x30.71x0.438	2	-27.86	4148.23	41.1	Pass
L3	41.583 - 0	Pole	TP51x39.771x0.5	3	-45.74	5940.26	45.3	Pass
							Summary	
						Pole (L3)	45.3	Pass
						RATING =	**45.3**	**Pass**

APPENDIX B

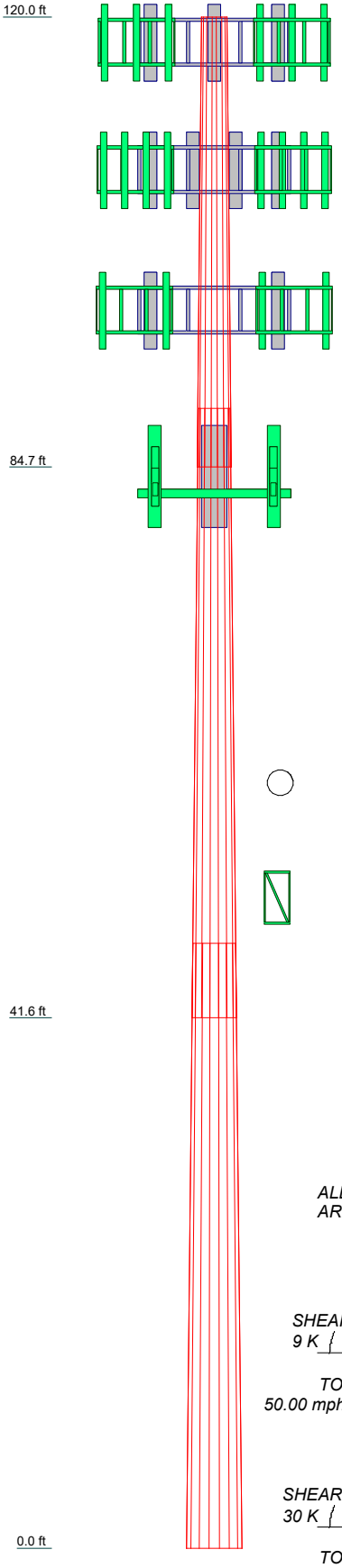
BASE LEVEL DRAWING


(INSTALLED)
(1) 1/2" TO 51 FT LEVEL
(3) 1-1/4" TO 97 FT LEVEL
(1) 1-5/8" TO 97 FT LEVEL
(PROPOSED)
(1) 1-3/8" TO 83 FT LEVEL
(INSTALLED-TO BE REMOVED)
(1) 1-5/8" TO 83 FT LEVEL
(INSTALLED)
(2) 1-1/4" TO 83 FT LEVEL
(10) 1-5/8" TO 83 FT LEVEL
(ABANDONED)
(12) 1-1/4" TO 108 FT LEVEL
(PROPOSED)
(1) 3/8" TO 118 FT LEVEL
(2) 3/4" TO 118 FT LEVEL
(INSTALLED-IN 2" CONDUIT)
(1) 3/8" TO 118 FT LEVEL
(2) 3/4" TO 118 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 118 FT LEVEL
C1
C2
C3
C4

APPENDIX C

ADDITIONAL CALCULATIONS

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	35.29	18	0.375	4.58	24.090	32.560		4.0
2	47.71	18	0.438	5.83	30.710	42.030	A572-65	8.1
3	47.42	18	0.500		39.771	51.000		11.5
								23.6



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
7770.00 w/ Mount Pipe	118	TME-800MHZ RRH	100
7770.00 w/ Mount Pipe	118	TME-800MHZ RRH	100
7770.00 w/ Mount Pipe	118	TME-800MHZ RRH	100
OPA-65R-LCUU-H6 w/ Mount Pipe	118	Pipe Mount [PM 601-3]	100
OPA-65R-LCUU-H6 w/ Mount Pipe	118	APXVTM14-C-120 w/ Mount Pipe	97
OPA-65R-LCUU-H6 w/ Mount Pipe	118	APXVTM14-C-120 w/ Mount Pipe	97
QS66512-2 w/ Mount Pipe	118	APXVTM14-C-120 w/ Mount Pipe	97
QS66512-2 w/ Mount Pipe	118	P40-16-XLPP-RR-A w/ Mount Pipe	97
QS66512-2 w/ Mount Pipe	118	APXVSPP18-C-A20 w/ Mount Pipe	97
(2) TPX-070821	118	P40-16-XLPP-RR-A w/ Mount Pipe	97
(2) TPX-070821	118	800 EXTERNAL NOTCH FILTER	97
(2) TPX-070821	118	800 EXTERNAL NOTCH FILTER	97
RRUS 11	118	800 EXTERNAL NOTCH FILTER	97
RRUS 11	118	TD-RRH8x20-25	97
RRUS 11	118	TD-RRH8x20-25	97
RRUS 32	118	TD-RRH8x20-25	97
RRUS 32	118	(3) ACU-A20-N	97
RRUS 32	118	(3) ACU-A20-N	97
RRUS 32 B2	118	(3) ACU-A20-N	97
RRUS 32 B2	118	Platform Mount [LP 712-1]	97
RRUS 32 B2	118	8' x 2" Sch 40 Pipe Mount	97
(2) 7020.00	118	8' x 2" Sch 40 Pipe Mount	97
(2) 7020.00	118	8' x 2" Sch 40 Pipe Mount	97
(2) 7020.00	118	APXVAARR24_43-U-NA20 w/ Mount Pipe	83
(2) LGP21401	118		
(2) LGP21401	118	APXVAARR24_43-U-NA20 w/ Mount Pipe	83
(2) LGP21401	118		
DC6-48-60-18-8F	118	APXVAARR24_43-U-NA20 w/ Mount Pipe	83
DC6-48-60-18-8F	118		
Platform Mount [LP 712-1]	118	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	83
8' x 2" Sch 40 Pipe Mount	118	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	83
8' x 2" Sch 40 Pipe Mount	118		
8' x 2" Sch 40 Pipe Mount	118	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	83
8-ft Ladder	118		
TME-RRUS-11	116	AIR -32 B2A/B66AA w/ Mount Pipe	83
TME-RRUS-11	116	AIR -32 B2A/B66AA w/ Mount Pipe	83
TME-RRUS-11	116	AIR -32 B2A/B66AA w/ Mount Pipe	83
DC6-48-60-18-8F	116	RADIO 4449 B12/B71	83
TME-RRUS-12	116	RADIO 4449 B12/B71	83
TME-RRUS-12	116	RADIO 4449 B12/B71	83
TME-RRUS-12	116	ATMAA1412D-1A20	83
Pipe Mount [PM 601-3]	116	ATMAA1412D-1A20	83
Side Arm Mount [SO 104-1]	116	ATMAA1412D-1A20	83
(4) 844G65VTZASX w/ Mount Pipe	108	Platform Mount [LP 303-1]	83
(4) 844G65VTZASX w/ Mount Pipe	108	8' x 2" Sch 40 Pipe Mount	83
(4) 844G65VTZASX w/ Mount Pipe	108	8' x 2" Sch 40 Pipe Mount	83
Platform Mount [LP 303-1]	108	8' x 2" Sch 40 Pipe Mount	83
TME-1900MHz RRH (65 MHz)	100	KS24019-L112A	51
TME-1900MHz RRH (65 MHz)	100	Side Arm Mount [SO 301-1]	51
TME-1900MHz RRH (65 MHz)	100		

MATERIAL STRENGTH

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

ALL REAC
ARE FAC

AXIA
73 K

SHEAR
9 K

TORQUE
50.00 mph WIND

AXIA
46 K

SHEAR
30 K

MOMENT
2740 kip-ft

TORQUE 1 kip-ft
REACTIONS - 97.00 mph WIND

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97.00 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.00 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.00 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 45.3%

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

Job: 120-ft Monopole / North Haven, CT			
Project: BU 881536 / PJF 37518-2646			
Client: Crown Castle	Drawn by: gpenumatsa		App'd:
Code: TIA-222-G	Date: 07/30/18		Scale: NTS
Path:			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#:	*881536*
Site Name:	
App #:	
Pole Manufacturer:	*Other*

Reactions		
Mu:	2740	ft-kips
Axial, Pu:	46	kips
Shear, Vu:	30	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	60	in

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

Anchor Rod Results

Max Rod (Cu+ Vu/ή):	114.9	Kips
Allowable Axial, Φ*Fu*Anet:	260.0	Kips
Anchor Rod Stress Ratio:	44.2%	**Pass**

Rigid
AISC LRFD
φ*Tn

Plate Data		
Diam:	66	in
Thick:	2.25	in
Grade:	60	ksi
Single-Rod B-eff:	8.09	in

Base Plate Results Flexural Check

Base Plate Stress:	29.0	ksi
Allowable Plate Stress:	54.0	ksi
Base Plate Stress Ratio:	53.7%	**Pass**

Rigid
AISC LRFD
φ*Fy
Y.L. Length: 31.61

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

n/a

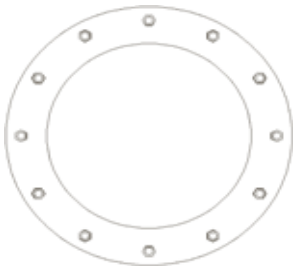
Stiffener Results

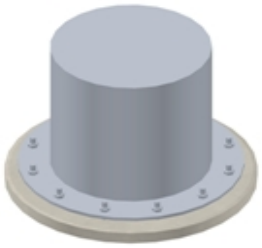
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check:	n/a

Pole Data		
Diam:	51	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None





* 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

Drilled Pier Foundation

BU # :	881536
Site Name:	
App. Number:	

TIA-222 Revison:	G
Tower Type:	Monopole

Applied Loads	**Comp.**	**Uplift**
Moment (kip-ft)	2740	
Axial Force (kips)	46	
Shear Force (kips)	30	

Material Properties		
Concrete Strength, f'c:	4	ksi
Rebar Strength, Fy:	60	ksi

Pier Design Data		
Depth	39	ft
Ext. Above Grade	1	ft
Pier Section 1		
From 1' above grade to 39' below grade		
Pier Diameter	7.5	ft
Rebar Quantity	25	
Rebar Size	11	
Clear Cover to Ties	4	in
Tie Size	5	

Analysis Results		
Soil Lateral Capacity	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	10.00	-
Soil Safety Factor	9.48	-
Max Moment (kip-ft)	2990.49	-
Rating	*14.0%*	-
Soil Vertical Capacity	*Compression*	*Uplift*
Skin Friction (kips)	861.02	-
End Bearing (kips)	530.14	-
Weight of Concrete (kips)	212.23	-
Total Capacity (kips)	1391.16	-
Axial (kips)	258.23	-
Rating	*18.6%*	-
Reinforced Concrete Capacity	*Compression*	*Uplift*
Critical Depth (ft from TOC)	10.20	-
Critical Moment (kip-ft)	2990.33	-
Critical Moment Capacity	6828.04	-
Rating	*43.8%*	-

Soil Interaction Rating	**18.6%**
Structural Foundation Rating	**43.8%**

Soil Profile

Groundwater Depth	7	ft	
# of Layers	3		

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.75	3.75	120	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.75	7	3.25	120	150	0	32	0.204	0.204				4	Cohesionless
3	7	39	32	57.6	87.6	0	32	1.502	1.502			16	50	Cohesionless

Date: **July 23, 2018**

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the solutions are endless
Infinigy Engineering, PLLC
1033 Watervliet Shaker Road
Albany, NY 12205
518-690-0790
structural@infinigy.com

Christine Trotta
Crown Castle
3 Corporate Dr., St 101
Clifton Park, NY 12065

Subject:	**Mount Structural Analysis**	
Carrier Designation:	***T-Mobile Change-Out***	
	Carrier Site Number:	CTNH037A
	Carrier Site Name:	CTNH037A
Crown Castle Designation:	**Crown Castle BU Number:**	881536
	Crown Castle Site Name:	North Haven Tower
	Crown Castle JDE Job Number:	512594
	Crown Castle Application Number:	446143, Rev.0
Engineering Firm Designation:	**Infinigy Report Designation:**	600-005
Site Data:	**120 Universal Drive, North Haven, New Haven County, CT 06473**	
	Latitude 41° 20' 40.01" Longitude -72° 52' 14.92"	
Structure Information:	**Tower Height & Type:**	**120 ft Monopole**
	Mount Elevation:	**83 ft**
	Mount Type:	**12 ft Platform**

Dear Christine Trotta,

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 and 2016 Connecticut State Building Code and the Infinigy Engineering, PLLC wind speed requirement of a 98 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

STATE OF CONNECTICUT
JOSEPH R. JOHNSTON
JULY 23 2018
29460
LICENSED PROFESSIONAL ENGINEER

Joe Johnston, P.E.
VP Structural Engineering / Principal

TABLE OF CONTENTS

1) INTRODUCTION

The mount consists of a 12 ft wide Platform at the 83 ft elevation**.** The existing and proposed antenna loading was obtained from the Application provided by CCI, Application Number 446143, Revision 0 and the Mount Photos, dated 01/06/2016.

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 98 mph with no ice, 50 mph with 0.75 inch escalated ice thickness, Exposure Category C and Topographic Category 1. In addition, the Platform been analyzed for various live loading conditions consisting of a 250-pound man live load applied individually at the midpoint and cantilevered ends of horizontal members as well as 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
83.0	84.0	3	RFS/Celwave	APXVAARR24_43-U-NA20	-	-
		3	Ericsson	Radio 4449 B12/B71		

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
83.0	84.0	3	Ericsson	AIR-32 B2A/B66AA	12 ft Platform	1
		3	Ericsson	AIR 21 B2A B4P		
		3	RFS/Celwave	ATMAA1412D-1A20		
		3	Commscope	LNX-6515DS-A1M	-	2
		3	Ericsson	RRUS-11 B12		

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	446143, Rev.0	CCI Sites
Site Visit	Mount Photos	881536	CCI Sites
Design Drawings	Mount Drawings	MT-196	Andrew

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 (Platform)

Notes	Component	Mount Centerline (ft)	% Capacity	Pass / Fail
1,2	Mount Pipe	83.0	64.9%	Pass
	Arm		47.7%	Pass
	Frame Rail		18.6%	Pass
	Bolts		3.4%	Pass

Structure Rating (max from all components) =	64.9%

Notes:

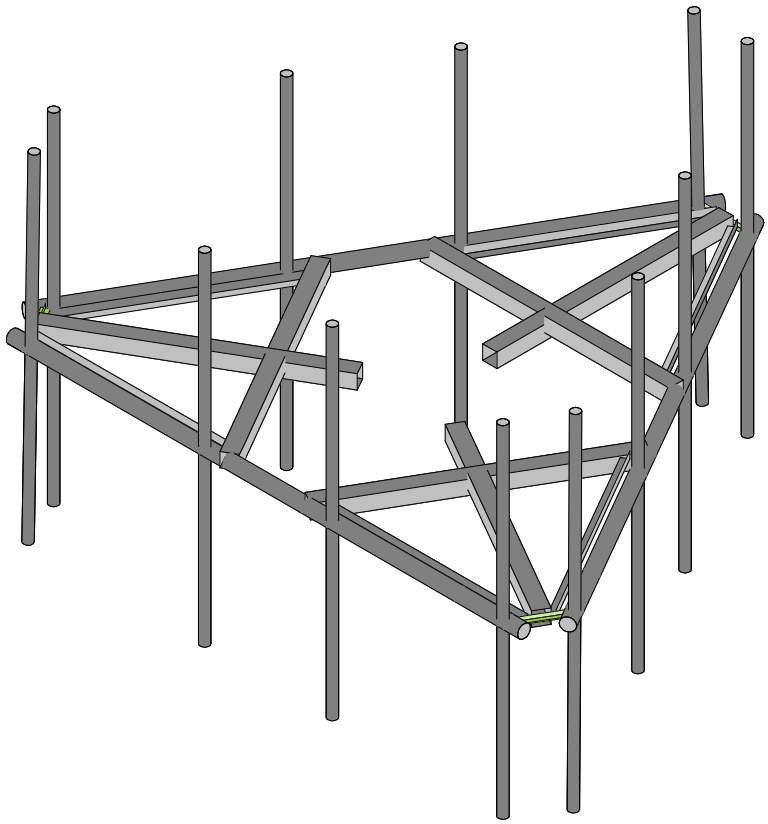
1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity consumed.
2) All sectors are typical

4.1) Recommendations

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

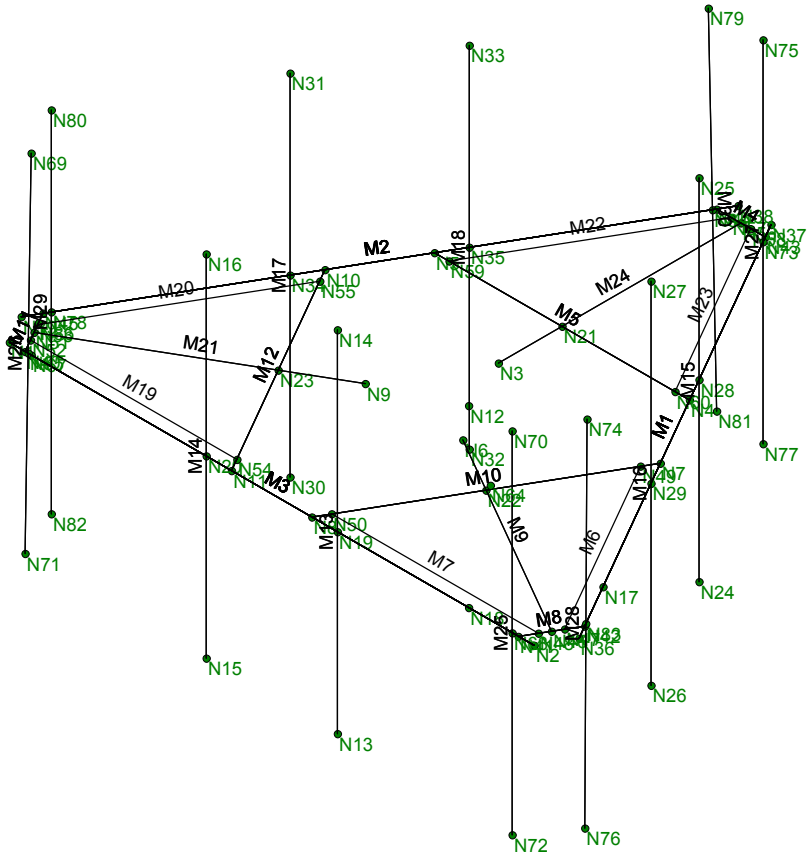
APPENDIX A

WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

Infinigy Engineering, PLLC	North Haven Tower	Rendered Model
DVA		July 20, 2018 at 11:20 AM
600-005		881536.R3D



Envelope Only Solution

Infinigy Engineering, PLLC	North Haven Tower	Wire Frame Model
DVA		July 20, 2018 at 11:21 AM
600-005		881536.R3D

APPENDIX B

SOFTWARE INPUT CALCULATIONS

Site Name:	North Haven Tower
Client:	Crown Castle
Carrier:	T-Mobile
Engineer:	DVA
Date:	7/20/2018

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INFINIGY WIND LOAD CALCULATOR 3.0.2

Site Information Inputs:

Adopted Building Code:	2015 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:	Flat

Rooftop Inputs:

Rooftop Wind Speed-Up?:	No

Wind Loading Inputs:

Design Wind Velocity:	98	mph (nominal 3-second gust)
Wind Centerline 1 (z_1):	84.0	ft
Side Face Angle (θ):	60	degrees
Exposure Category:	C	
Topographic Category:	1	

Wind with No Ice		
q_z (psf)	Gh	F_{ST} (psf)
28.50	1.00	**56.99**

Wind with Ice		
q_z (psf)	Gh	F_{ST} (psf)
7.42	1.00	**19.46**

Ice Loading Inputs:

Is Ice Loading Needed?:	Yes	
Ice Wind Velocity:	50	mph (nominal 3-second gust)
Base Ice Thickness:	0.75	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	84.0	3	1.00	Flat	Flat	28.50	6.51	185.50	134.28	147.09	172.70
Ericsson AIR 21 B2A B4P	84.0	3	1.00	Flat	Flat	28.50	6.09	173.59	122.43	135.22	160.80
RFS/Celwave APXVAARR24_43-U-NA20	84.0	3	1.00	Flat	Flat	28.50	20.24	576.82	253.28	334.17	495.94
Ericsson Radio 4449 B12/B71	84.0	3	1.00	Flat	Flat	28.50	1.64	46.83	32.84	36.34	43.33
RFS/Celwave ATMAA1412D-1A20	84.0	3	1.00	Flat	Flat	28.50	1.00	28.50	11.61	15.83	24.27

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	N36	N37			Frame Rail	Beam	Pipe	A53 Gr.B	Typical
2	M2	N39	N38			Frame Rail	Beam	Pipe	A53 Gr.B	Typical
3	M3	N1	N2			Frame Rail	Beam	Pipe	A53 Gr.B	Typical
4	M4	N44	N43			RIGID	None	None	RIGID	Typical
5	M5	N4	N5			Arm	Beam	Single Angle	A36 Gr.36	Typical
6	M6	N49	N47			Angle	Beam	Single Angle	A36 Gr.36	Typical
7	M7	N50	N48		270	Angle	Beam	Single Angle	A36 Gr.36	Typical
8	M8	N42	N41			RIGID	None	None	RIGID	Typical
9	M9	N46	N6			Arm	Beam	Single Angle	A36 Gr.36	Typical
10	M10	N7	N8			Arm	Beam	Single Angle	A36 Gr.36	Typical
11	M11	N45	N40			RIGID	None	None	RIGID	Typical
12	M12	N10	N11			Arm	Beam	Single Angle	A36 Gr.36	Typical
13	M13	N13	N14			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
14	M14	N15	N16			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
15	M15	N24	N25			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
16	M16	N26	N27			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
17	M17	N30	N31			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
18	M18	N32	N33			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
19	M19	N54	N52			Angle	Beam	Single Angle	A36 Gr.36	Typical
20	M20	N55	N53		270	Angle	Beam	Single Angle	A36 Gr.36	Typical
21	M21	N51	N9			Arm	Beam	Single Angle	A36 Gr.36	Typical
22	M22	N59	N57			Angle	Beam	Single Angle	A36 Gr.36	Typical
23	M23	N60	N58		270	Angle	Beam	Single Angle	A36 Gr.36	Typical
24	M24	N56	N3			Arm	Beam	Single Angle	A36 Gr.36	Typical
25	M25	N72	N70			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
26	M26	N69	N71			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
27	M27	N77	N75			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
28	M28	N74	N76			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
29	M29	N82	N80			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
30	M30	N79	N81			Mount Pipe	Column	Pipe	A53 Gr.B	Typical

Material Takeoff

	Material	Size	Pieces	Length[in]	Weight[K]
1	General				
2	RIGID		3	40	0
3	Total General		3	40	0
4					
5	Hot Rolled Steel				
6	A36 Gr.36	L2x2x4	6	340.1	0
7	A36 Gr.36	HSS4x4x4	6	409.7	.4
8	A53 Gr.B	PIPE_2.0	12	1152	.3
9	A53 Gr.B	PIPE_3.0	3	432	.3
10	Total HR Steel		27	2333.8	1.1

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut..	Area(M...	Surface...
1	Self Weight	DL		-1			29		3	
2	Wind Load AZI 000	WLZ					29		1	
3	Wind Load AZI 090	WLX					29		1	
4	Ice Weight	OL1					29	24	3	
5	Wind + Ice Load AZI 000	OL2					29		1	
6	Wind + Ice Load AZI 090	OL3					29		1	
7	Service Live 1	LL					2			

Load Combinations (Continued)

	Description	Solve	PDe...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
47	1.2D + 1.5L + 1.0WL (...	Yes	Y		DL	1.2	LL	1.5	W...	-.0...	W...	-.0...														
48	1.2D + 1.5L + 1.0WL (...	Yes	Y		DL	1.2	LL	1.5			W...	-.0...														
49	1.2D + 1.5L + 1.0WL (...	Yes	Y		DL	1.2	LL	1.5	W...	.028	W...	-.0...														
50	1.2D + 1.5L + 1.0WL (...	Yes	Y		DL	1.2	LL	1.5	W...	.048	W...	-.0...														

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N6	max	2136.073	4	2393.405	35	1982.327	3	-.741	16	.752	20	4.509	35
2		min	-2114.259	22	593.575	16	-1970.893	21	-2.608	35	-.752	2	1.293	16
3	N9	max	2347.287	18	2644.972	31	1978.514	13	-.708	14	1.041	14	-1.235	24
4		min	-2369.382	12	718.995	24	-1964.936	19	-2.505	32	-1.04	8	-4.98	31
5	N3	max	1810.233	5	2696.734	27	2806.182	14	5.661	27	1.706	23	.046	22
6		min	-1810.099	23	762.953	20	-2831.769	8	1.572	20	-1.707	5	-.482	41
7	Totals:	max	6112.414	17	7613.069	31	6150.462	14						
8		min	-6112.414	11	2483.307	24	-6150.462	8						

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Che...	Loc.....		L...	phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
1	M17	PIPE_2.0	.649	48	5	.057	48		5	14916...	32130	1.872	1.872	1...	H1-1b
2	M13	PIPE_2.0	.479	48	8	.043	48		8	14916...	32130	1.872	1.872	1...	H1-1b
3	M24	HSS4x4x4	.477	66.553	37	.109	66....	y	29	98723...	109188	12.663	12.663	2...	H1-1b
4	M21	HSS4x4x4	.458	66.553	32	.120	66....	y	30	98723...	109188	12.663	12.663	2...	H1-1b
5	M18	PIPE_2.0	.431	48	5	.038	48		5	14916...	32130	1.872	1.872	1...	H1-1b
6	M9	HSS4x4x4	.429	66.553	34	.080	66....	y	35	98723...	109188	12.663	12.663	2...	H1-1b
7	M15	PIPE_2.0	.426	48	11	.038	48		11	14916...	32130	1.872	1.872	1...	H1-1b
8	M5	HSS4x4x4	.230	35	30	.050	66....	y	34	97672...	109188	12.663	12.663	1...	H1-1b
9	M12	HSS4x4x4	.227	35	29	.055	35	y	29	97672...	109188	12.663	12.663	1...	H1-1b
10	M14	PIPE_2.0	.220	48	8	.020	48		8	14916...	32130	1.872	1.872	1...	H1-1b
11	M16	PIPE_2.0	.208	48	11	.019	48		11	14916...	32130	1.872	1.872	1...	H1-1b
12	M3	PIPE_3.0	.205	61.5	31	.066	90		33	30165...	65205	5.749	5.749	1...	H1-1b
13	M26	PIPE_2.0	.203	48.007	8	.018	48....		8	14912...	32130	1.872	1.872	1...	H1-1b
14	M30	PIPE_2.0	.196	48.007	5	.017	48....		5	14912...	32130	1.872	1.872	1...	H1-1b
15	M28	PIPE_2.0	.195	48.007	5	.017	48....		5	14912...	32130	1.872	1.872	1...	H1-1b
16	M10	HSS4x4x4	.186	35	33	.043	3.6...	y	31	97672...	109188	12.663	12.663	1...	H1-1b
17	M1	PIPE_3.0	.186	61.5	36	.073	84		30	30165...	65205	5.749	5.749	1...	H1-1b
18	M2	PIPE_3.0	.180	82.5	27	.124	84		10	30165...	65205	5.749	5.749	1...	H1-1b
19	M19	L2x2x4	.156	0	33	.008	0	y	31	9942....	30585.6	.691	1.577	1...	H2-1
20	M6	L2x2x4	.152	0	37	.008	0	y	36	9942....	30585.6	.691	1.577	1...	H2-1
21	M22	L2x2x4	.144	0	29	.008	0	y	29	9942....	30585.6	.691	1.577	1...	H2-1
22	M23	L2x2x4	.137	0	37	.009	0	z	28	9942....	30585.6	.691	1.564	1...	H2-1
23	M7	L2x2x4	.136	0	33	.008	0	z	35	9942....	30585.6	.691	1.568	1...	H2-1
24	M20	L2x2x4	.131	0	29	.008	0	z	30	9942....	30585.6	.691	1.564	1...	H2-1
25	M27	PIPE_2.0	.081	48	2	.008	48		2	14916...	32130	1.872	1.872	1...	H1-1b
26	M29	PIPE_2.0	.081	48	5	.008	48		5	14916...	32130	1.872	1.872	1...	H1-1b
27	M25	PIPE_2.0	.081	48	10	.008	48		10	14916...	32130	1.872	1.872	1...	H1-1b

APPENDIX D

REFERENCE DOCUMENTS

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut..	Area(M...	Surface...
8	BLC 1 Transient Area Loads	None						75		
9	BLC 2 Transient Area Loads	None						29		
10	BLC 3 Transient Area Loads	None						25		
11	BLC 4 Transient Area Loads	None						74		
12	BLC 5 Transient Area Loads	None						29		
13	BLC 6 Transient Area Loads	None						25		

Load Combinations

	Description	Solve	PDe...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4D	Yes	Y		DL	1.4																		
2	1.2D + 1W AZI 000	Yes	Y		DL	1.2	W...	1																
3	1.2D + 1W AZI 030	Yes	Y		DL	1.2	W...	.866	W...	.5														
4	1.2D + 1W AZI 060	Yes	Y		DL	1.2	W...	.5	W...	.866														
5	1.2D + 1W AZI 090	Yes	Y		DL	1.2			W...	1														
6	1.2D + 1W AZI 120	Yes	Y		DL	1.2	W...	-.5	W...	.866														
7	1.2D + 1W AZI 150	Yes	Y		DL	1.2	W...	-.8...	W...	.5														
8	1.2D + 1W AZI 180	Yes	Y		DL	1.2	W...	-1																
9	1.2D + 1W AZI 210	Yes	Y		DL	1.2	W...	-.8...	W...	-.5														
10	1.2D + 1W AZI 240	Yes	Y		DL	1.2	W...	-.5	W...	-.8...														
11	1.2D + 1W AZI 270	Yes	Y		DL	1.2			W...	-1														
12	1.2D + 1W AZI 300	Yes	Y		DL	1.2	W...	.5	W...	-.8...														
13	1.2D + 1W AZI 330	Yes	Y		DL	1.2	W...	.866	W...	-.5														
14	0.9D + 1W AZI 000	Yes	Y		DL	.9	W...	1																
15	0.9D + 1W AZI 030	Yes	Y		DL	.9	W...	.866	W...	.5														
16	0.9D + 1W AZI 060	Yes	Y		DL	.9	W...	.5	W...	.866														
17	0.9D + 1W AZI 090	Yes	Y		DL	.9			W...	1														
18	0.9D + 1W AZI 120	Yes	Y		DL	.9	W...	-.5	W...	.866														
19	0.9D + 1W AZI 150	Yes	Y		DL	.9	W...	-.8...	W...	.5														
20	0.9D + 1W AZI 180	Yes	Y		DL	.9	W...	-1																
21	0.9D + 1W AZI 210	Yes	Y		DL	.9	W...	-.8...	W...	-.5														
22	0.9D + 1W AZI 240	Yes	Y		DL	.9	W...	-.5	W...	-.8...														
23	0.9D + 1W AZI 270	Yes	Y		DL	.9			W...	-1														
24	0.9D + 1W AZI 300	Yes	Y		DL	.9	W...	.5	W...	-.8...														
25	0.9D + 1W AZI 330	Yes	Y		DL	.9	W...	.866	W...	-.5														
26	1.2D + 1.0Di	Yes	Y		DL	1.2	O...	1																
27	1.2D + 1.0Di + 1.0Wi ...	Yes	Y		DL	1.2	O...	1	O...	1														
28	1.2D + 1.0Di + 1.0Wi ...	Yes	Y		DL	1.2	O...	1	O...	.866	O...	.5												
29	1.2D + 1.0Di + 1.0Wi ...	Yes	Y		DL	1.2	O...	1	O...	.5	O...	.866												
30	1.2D + 1.0Di + 1.0Wi ...	Yes	Y		DL	1.2	O...	1			O...	1												
31	1.2D + 1.0Di + 1.0Wi ...	Yes	Y		DL	1.2	O...	1	O...	-.5	O...	.866												
32	1.2D + 1.0Di + 1.0Wi ...	Yes	Y		DL	1.2	O...	1	O...	-.8...	O...	.5												
33	1.2D + 1.0Di + 1.0Wi ...	Yes	Y		DL	1.2	O...	1	O...	-1														
34	1.2D + 1.0Di + 1.0Wi ...	Yes	Y		DL	1.2	O...	1	O...	-.8...	O...	-.5												
35	1.2D + 1.0Di + 1.0Wi ...	Yes	Y		DL	1.2	O...	1	O...	-.5	O...	-.8...												
36	1.2D + 1.0Di + 1.0Wi ...	Yes	Y		DL	1.2	O...	1			O...	-1												
37	1.2D + 1.0Di + 1.0Wi ...	Yes	Y		DL	1.2	O...	1	O...	.5	O...	-.8...												
38	1.2D + 1.0Di + 1.0Wi ...	Yes	Y		DL	1.2	O...	1	O...	.866	O...	-.5												
39	1.2D + 1.5L + 1.0WL (...	Yes	Y		DL	1.2	LL	1.5	W...	.056														
40	1.2D + 1.5L + 1.0WL (...	Yes	Y		DL	1.2	LL	1.5	W...	.048	W...	.028												
41	1.2D + 1.5L + 1.0WL (...	Yes	Y		DL	1.2	LL	1.5	W...	.028	W...	.048												
42	1.2D + 1.5L + 1.0WL (...	Yes	Y		DL	1.2	LL	1.5			W...	.056												
43	1.2D + 1.5L + 1.0WL (...	Yes	Y		DL	1.2	LL	1.5	W...	-.0...	W...	.048												
44	1.2D + 1.5L + 1.0WL (...	Yes	Y		DL	1.2	LL	1.5	W...	-.0...	W...	.028												
45	1.2D + 1.5L + 1.0WL (...	Yes	Y		DL	1.2	LL	1.5	W...	-.0...														
46	1.2D + 1.5L + 1.0WL (...	Yes	Y		DL	1.2	LL	1.5	W...	-.0...	W...	-.0...												

Date:	7/20/2018
Client	Crown Castle
Carrier	T-Mobile
Engineer:	DVA
Site:	North Haven Tower
Job #:	600-005

Code:	LRFD	
Axial:	0.20	lbs
Shear:	1394.00	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	
$T/\phi T_n$	0.0%
$V/\phi Vn$	3.4%
≤1.0	0.1%
	OK

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CTNH037A

CTNH037/Candid N. Haven
90 Universal Drive
North Haven, CT 06473

August 15, 2018

EBI Project Number: 6218005610

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	23.51 %

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

EBI Consulting
environmental | engineering | due diligence

August 15, 2018

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

Emissions Analysis for Site: **CTNH037A – CTNH037/Candid N. Haven**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **90 Universal Drive, North Haven, 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 **90 Universal Drive, North Haven, 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) 1 UMTS channel (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 1 UMTS channel (AWS Band – 2100 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

4) 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.

5) 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.

6) 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.

7) 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.

8) 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.

9) 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.

10) The antennas used in this modeling are the **Ericsson AIR32 B2A / B66AA** & **Ericsson AIR21 B2A / B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **RFS APXVAARR24_43-U-NA20** for 600 MHz and 700 MHz 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.

11) The antenna mounting height centerline of the proposed antennas is **84 feet** above ground level (AGL).

12) 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.

13) 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):	84 feet	Height (AGL):	84 feet	Height (AGL):	84 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%	**4.60**	Antenna B1 MPE%	**4.60**	Antenna C1 MPE%	**4.60**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A / B4P	Make / Model:	Ericsson AIR21 B2A / B4P	Make / Model:	Ericsson AIR21 B2A / B4P
Gain:	dBd	Gain:	dBd	Gain:	dBd
Height (AGL):	84 feet	Height (AGL):	84 feet	Height (AGL):	84 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	3	Channel Count	3	Channel Count	3
Total TX Power(W):	95	Total TX Power(W):	95	Total TX Power(W):	95
ERP (W):	3,695.93	ERP (W):	3,695.93	ERP (W):	3,695.93
Antenna A2 MPE%	**2.18**	Antenna B2 MPE%	**2.18**	Antenna C2 MPE%	**2.18**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd
Height (AGL):	84 feet	Height (AGL):	84 feet	Height (AGL):	84 feet
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,443.03	ERP (W):	2,443.03	ERP (W):	2,443.03
Antenna A3 MPE%	**3.43**	Antenna B3 MPE%	**3.43**	Antenna C3 MPE%	**3.43**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**10.21 %**
Verizon Wireless	**7.65**
Sprint	**0.90**
Nextel	**0.70**
AT&T	**4.05**
Site Total MPE %:	**23.51 %**

T-Mobile Sector A Total:	10.21 %
T-Mobile Sector B Total:	10.21 %
T-Mobile Sector C Total:	10.21 %
Site Total:	23.51 %

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	84	18.39	PCS - 1900 MHz	1000.00	1.84%
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	84	27.59	AWS - 2100 MHz	1000.00	2.76%
T-Mobile PCS - 1900 MHz GSM	1	583.57	84	3.45	PCS - 1900 MHz	1000.00	0.35%
T-Mobile PCS - 1900 MHz UMTS	1	1,556.18	84	9.20	PCS - 1900 MHz	1000.00	0.92%
T-Mobile AWS - 2100 MHz UMTS	1	1,556.18	84	9.20	AWS - 2100 MHz	1000.00	0.92%
T-Mobile 600 MHz LTE	2	788.97	84	9.32	600 MHz	400.00	2.33%
T-Mobile 700 MHz LTE	2	432.54	84	5.11	700 MHz	467.00	1.09%
						Total:	**10.21%**

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:	10.21 %
Sector B:	10.21 %
Sector C:	10.21 %
T-Mobile Maximum MPE % (Per Sector):	10.21 %
Site Total:	23.51 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **23.51%** 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.