



Crown Castle
3530 Toringdon Way
Suite 300
Charlotte, NC 28277

Tel: 704-405-6600

www.crowncastle.com

April 10, 2014

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

RE: T-Mobile-Exempt Modification - Crown Site BU: 876321
T-Mobile Site ID: CTNH107A
Located at: 150 North Main Street, Branford, CT 06405

Dear Ms. Bachman:

This letter and exhibits are submitted on behalf of T-Mobile. T-Mobile is making modifications to certain existing sites in its Connecticut system in order to implement their Modernization technology. Please accept this letter and exhibits as notification, pursuant to § 16-50j-73 of the Regulations of Connecticut State Agencies (“R.C.S.A.”), of construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In compliance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Mr. James B. Cosgrove, First Selectman of the Town of Branford.

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at **150 North Main Street, Branford, CT 06405**. Attached are a compound plan and elevation depicting the planned changes (Exhibit-1), and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration (Exhibit-2). Also included is a power density table report reflecting the modification to T-Mobile’s operations at the site (Exhibit-3).

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes (“C.G.S.”) § 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in the R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing tower. T-Mobile’s replacement antennas will be located at the same elevation on the existing tower.
2. There will be no proposed modifications to the ground and no extension of boundaries.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

Melanie A. Bachman

April 10, 2014

Page 2

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative General Power Density table report for T-Mobile's modified facility is included as Exhibit-3.
5. A Structural Modification Report confirming that the tower and foundation can support Sprint's proposed modifications is included as Exhibit-2.

For the foregoing reasons, T-Mobile respectfully submits 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: Donna Neal.

Sincerely,



Jeff Barbadora
Real Estate Specialist

Enclosure

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. James B. Cosgrove, First Selectman
Town of Branford
1019 Main Street
Branford, CT 06405

..T..Mobile..

NORTHEAST LLC.

SITE NAME: NH107/GLOBAL/CHERRY HILL
 SITE ID NUMBER: CTNH107A
 SITE ADDRESS: 150 NORTH MAIN STREET
 BRANFORD, CT 06405

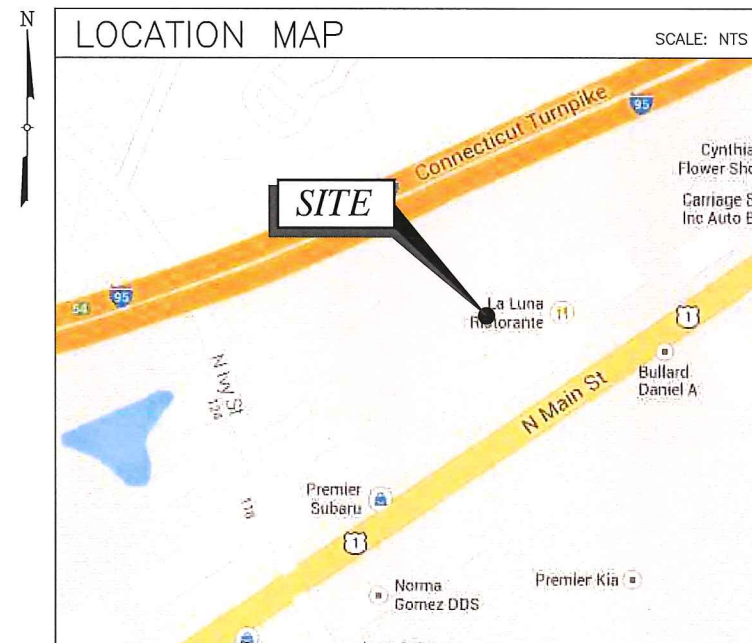
PROJECT SUMMARY

SITE ID NUMBER: CTNH107A
 SITE NAME: NH107/GLOBAL/CHERRY HILL
 CROWN BU#: 876321
 SITE ADDRESS: 150 NORTH MAIN STREET
 BRANFORD CT, 06405
 COUNTY: NEW HAVEN
 PROPERTY OWNER: CROWN CASTLE USA
 APPLICANT: T-MOBILE NORTHEAST, LLC.
 35 GRIFFIN ROAD SOUTH
 BLOOMFIELD, CT 0602
 PHONE: (800) 692-7100
 ENGINEER/
 SURVEYOR/
 STRUCTURAL ENG: TECTONIC ENGINEERING
 CONSULTANTS P.C.
 1279 ROUTE 300
 NEWBURGH, NY 12550
 TAMMY NOSEK
 CONTACT: (845) 567-6656 EXT. 2807
 SITE ACQUISITION: CROWN CASTLE
 1200 MACARTHUR BLVD
 SUITE 200
 MAHWAH, NJ 07430
 PAUL HUGHES
 CONTACT: (585) 259-7604
 PARCEL INFO: D06/E06/001/001.1
 LATITUDE: (NAD 83) 41.28851° N
 LONGITUDE: (NAD 83) 72.81380° W

SITE DIRECTIONS

HEAD NORTHEAST ON GRIFFIN RD S TOWARD W NEWBERRY RD. TAKE THE 1ST RIGHT ONTO W NEWBERRY RD. TURN LEFT ONTO WOODLAND AVE. TAKE THE 1ST RIGHT ONTO CT-187 S/BLUE HILLS AVE. TURN LEFT ONTO CT-178 E/E WINTONBURY AVE. CONTINUE TO FOLLOW CT-178 E. TURN RIGHT TO MERGE ONTO I-91 S TOWARD HARTFORD. TAKE THE EXIT ON THE LEFT ONTO I-95 N TOWARD NEW LONDON. TAKE EXIT 54 FOR CEDAR ST TOWARD BRANFORD. TURN RIGHT ONTO CEDAR ST. TAKE THE 1ST LEFT ONTO N MAIN ST. DESTINATION WILL BE ON THE LEFT.

LOCATION MAP



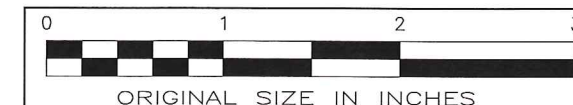
SHEET INDEX

SHEET NO	DESCRIPTION	REV NO
T-1	TITLE SHEET	1
A-1	SITE PLAN	1
A-2	EQUIPMENT LAYOUT PLANS	1
A-3	ELEVATION & DETAIL	1
A-4	ANTENNA LAYOUT PLANS & DETAILS	1
A-5	DETAILS	1
A-6	DETAILS	1
A-7	NOTES	1
A-8	NOTES	1

THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL ITEMS HAVE BEEN ADDRESSED AND EACH OF THE DRAWINGS HAS BEEN REVISED AND ISSUED "FOR CONSTRUCTION".



CONFIGURATION
 2C
 REFER TO LATEST T-MOBILE RF DATA SHEET FOR FINAL RF DESIGN & BOM.



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 35 GRIFFIN ROAD SOUTH
 BLOOMFIELD, CT 06002
 PHONE: (860) 692-7100

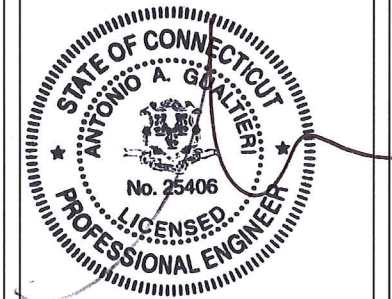


LANDLORD _____
 RF _____
 CONSTRUCTION _____
 OPERATIONS _____
 SITE ACQ. _____

PROJECT NUMBER 7061.CTNH107A DESIGNED BY JQ

REV	DATE	REVISION	DRAWN BY
Δ	04/07/14	FOR COMMENT	MP
Δ	04/09/14	FOR CONSTRUCTION	MP

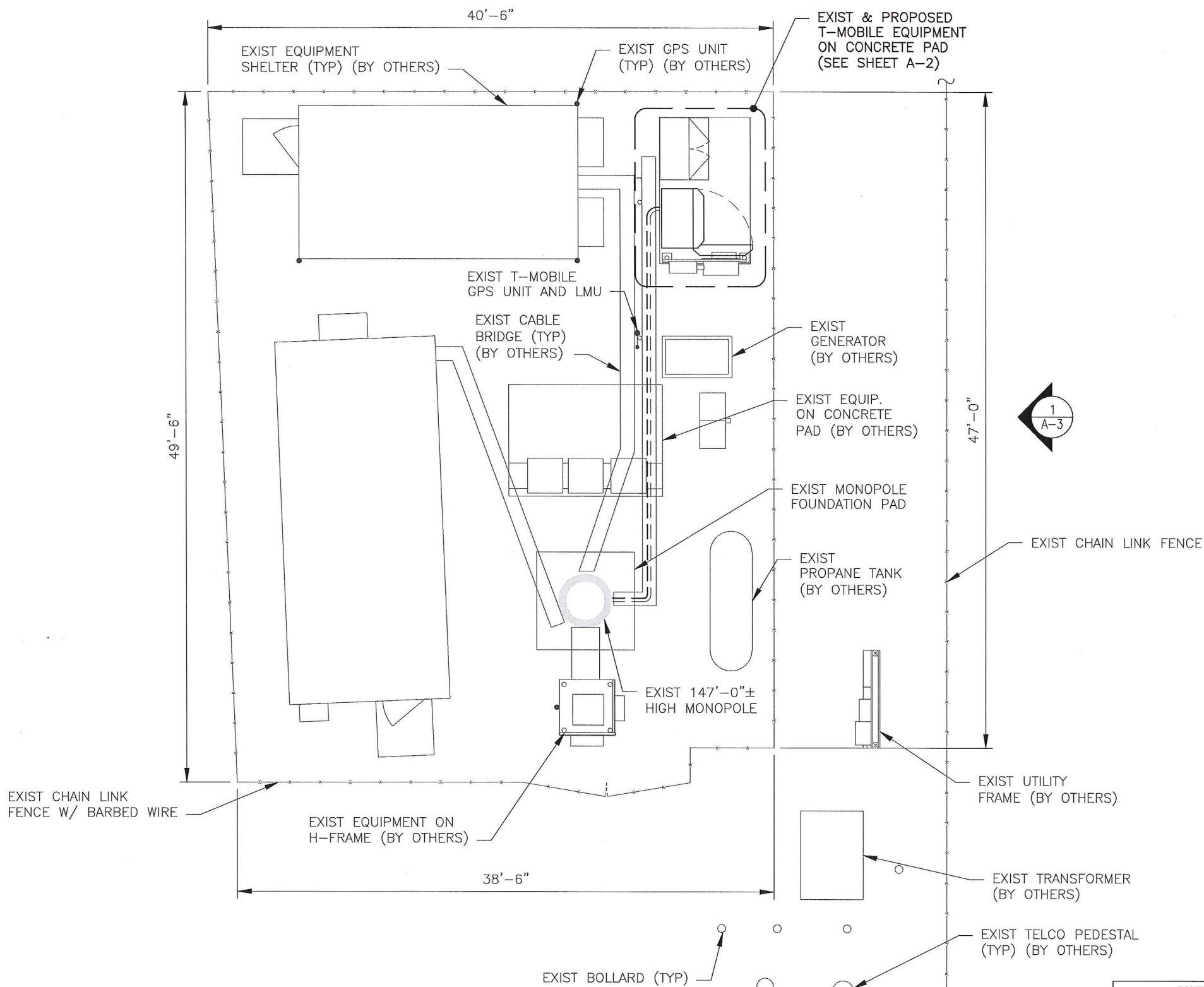
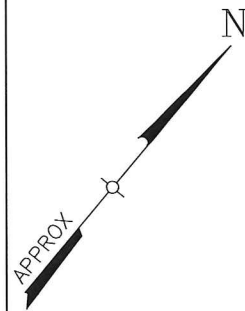
ISSUED BY _____ DATE _____



SITE INFORMATION
 CTNH107A
 NH107/GLOBAL/CHERRY HILL
 150 NORTH MAIN STREET
 BRANFORD, CT 06405

SHEET TITLE
 TITLE SHEET

SHEET NUMBER
 T-1



- NOTES:**
1. CONTRACTOR SHALL FIELD VERIFY THE ADEQUACY TO ROUTE THE HCS 9x18 MLE (FIBER) CABLE ALONG THE INSIDE OF THE MONOPOLE PRIOR TO CONSTRUCTION.
 2. CONTRACTOR TO MATCH ANTENNA AZIMUTHS AND DOWNTILTS TO EXISTING CONDITION AND NOTIFY RF ENGINEER OF ANY DISCREPANCY.
 3. LOCK & TAG BREAKERS FOR ALL EQUIPMENT BEING TURNED OFF (WHEN APPLICABLE).
 4. CONTRACTOR TO RE-VERIFY CABLE LENGTHS PRIOR TO CONSTRUCTION.
 5. SEE RFDS FOR FINAL EQUIPMENT CONFIGURATION.

SITE PLAN
SCALE: 1/8" = 1'-0"



CONFIGURATION
2C
REFER TO LATEST T-MOBILE RF DATA SHEET FOR FINAL RF DESIGN & BOM.

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BLOOMFIELD, CT 06002
PHONE: (860) 692-7100

CROWN CASTLE
APPROVALS

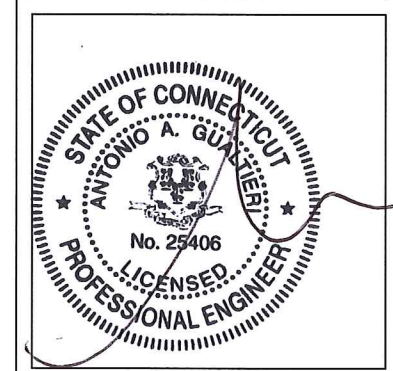
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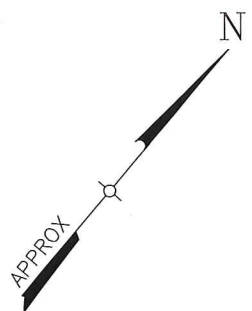
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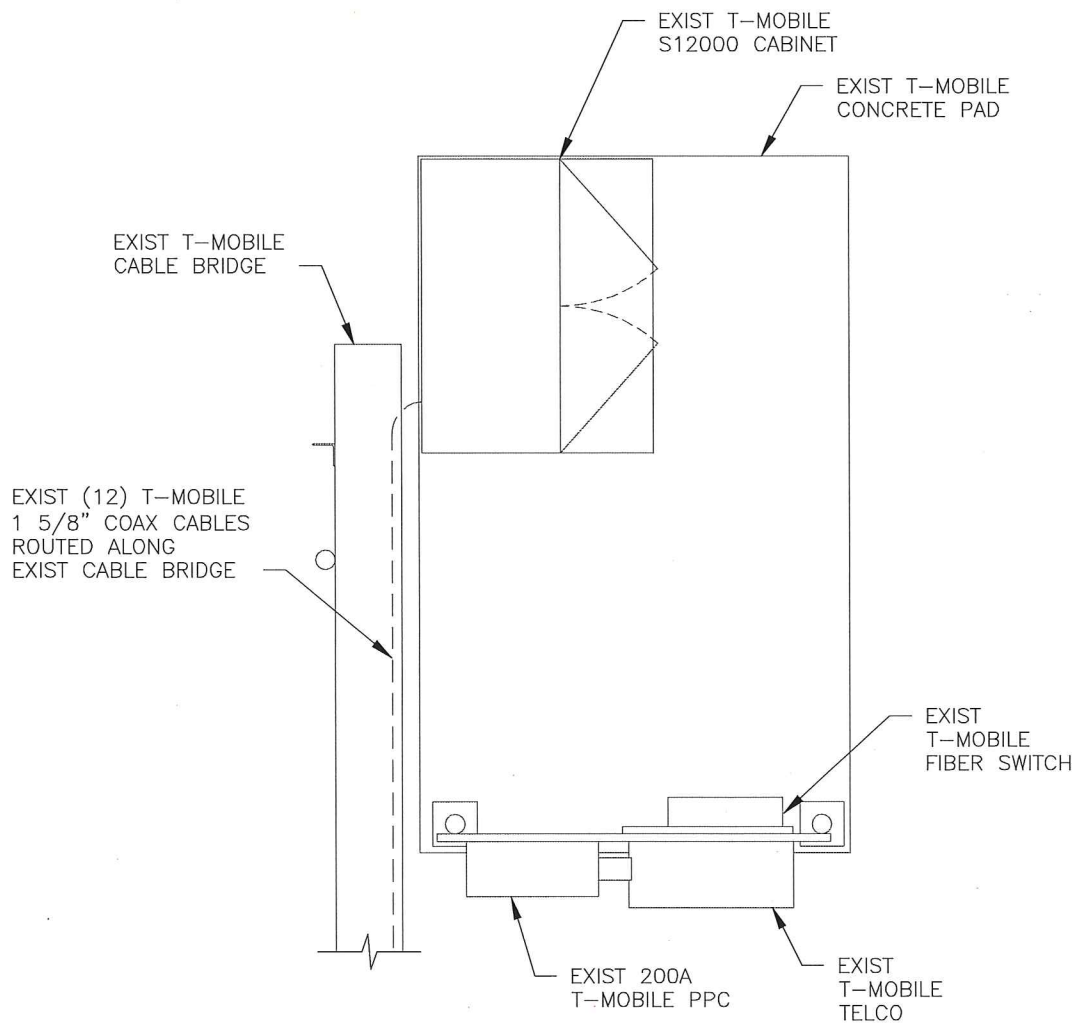
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SHEET TITLE
SITE PLAN

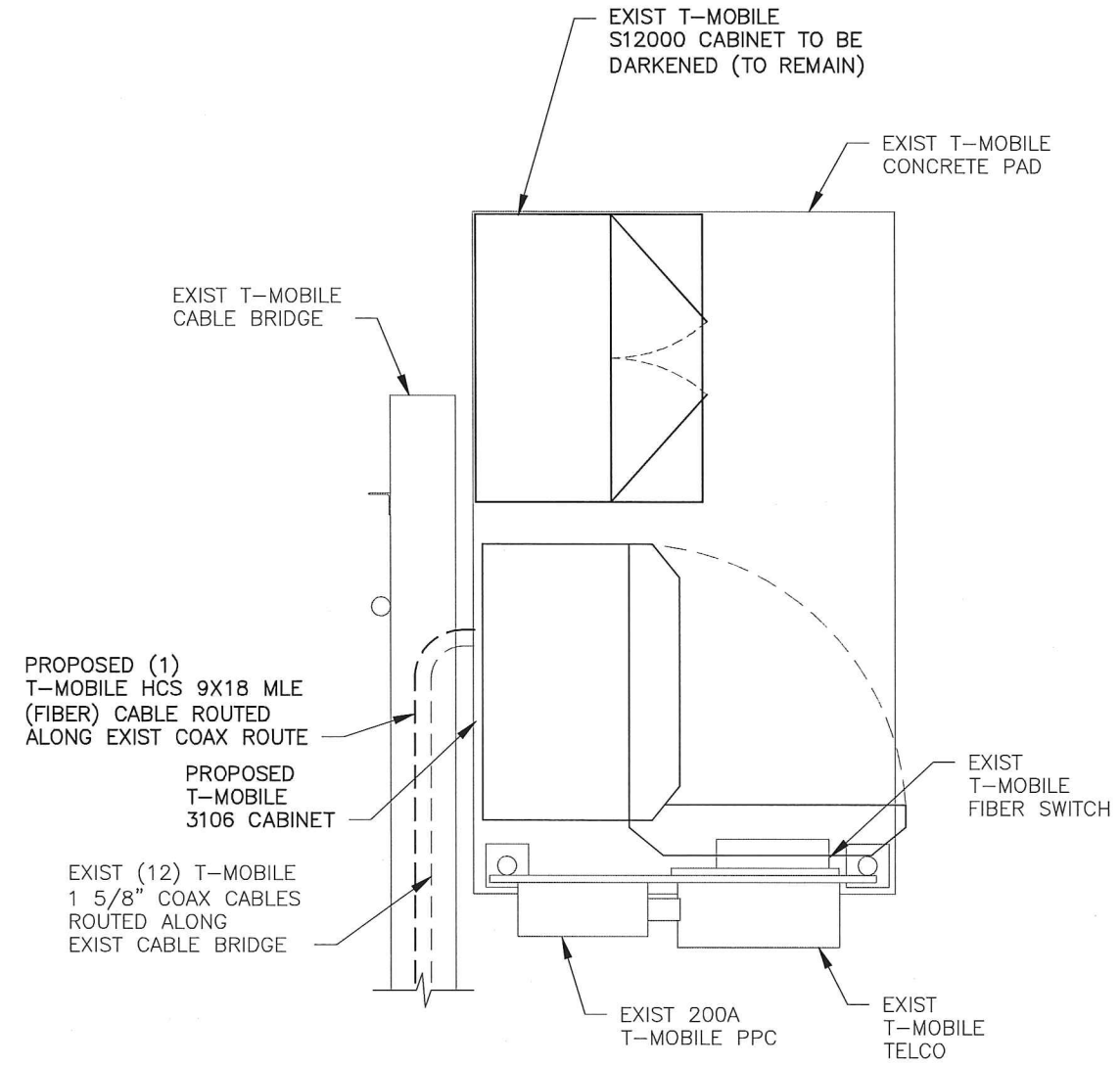
SHEET NUMBER
A-1



HCS LENGTH			
FROM EQUIPMENT CABINET TO ANTENNA			
SECTOR	ALPHA	BETA	GAMMA
LENGTH	200'±	200'±	200'±
SIZE	1-5/8"		
HCS 9x18 MLE			



1
A-2
EXIST EQUIPMENT PLAN
SCALE: 3/8" = 1'-0"



2
A-2
PROPOSED EQUIPMENT PLAN
SCALE: 3/8" = 1'-0"

CONFIGURATION
2C
REFER TO LATEST T-MOBILE RF DATA SHEET FOR FINAL RF DESIGN & BOM.



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APPROVALS

LANDLORD _____
RF _____
CONSTRUCTION _____
OPERATIONS _____
SITE ACQ. _____

PROJECT NUMBER: 7061.CTNH107A DESIGNED BY: JQ

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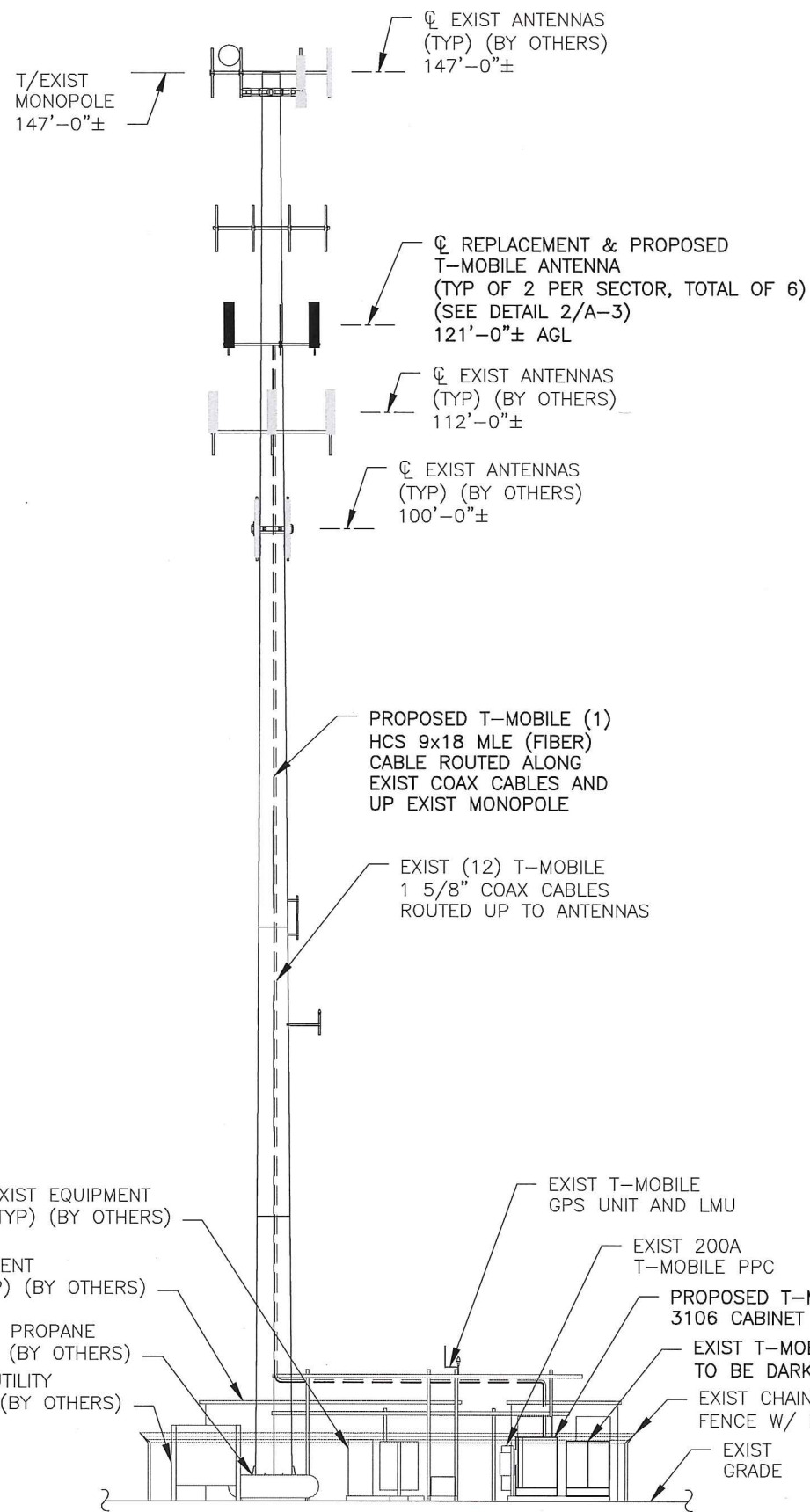
STATE OF CONNECTICUT
ANTONIO A. GULLIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

SITE INFORMATION

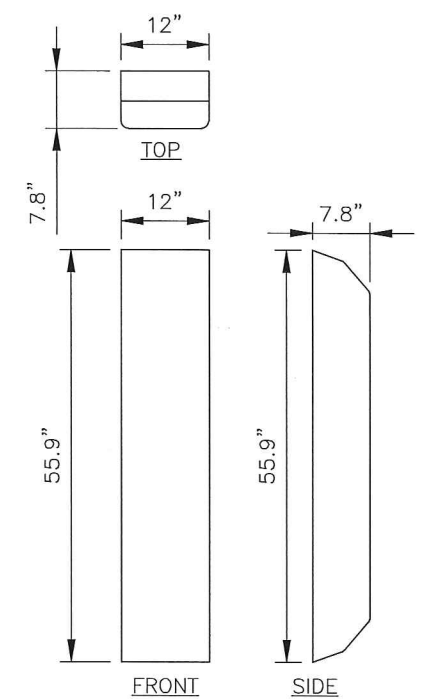
CTNH107A
NH107/GLOBAL/CHERRY HILL
150 NORTH MAIN STREET
BRANFORD, CT 06405

SHEET TITLE
EQUIPMENT LAYOUT PLANS

SHEET NUMBER
A-2



THE PROPOSED INSTALLATION, EXISTING MOUNTS & EXISTING MONOPOLE SHALL BE STRUCTURALLY ANALYZED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT (TO BE COORDINATED BY OTHERS).



2 ANTENNA DETAIL
 A-3 SCALE: 1/2" = 1'-0"

1 ELEVATION
 A-3 SCALE: 1/16" = 1'-0"

ELEVATION NOTE:
 ELEVATION OF EXIST MONOPOLE HAS BEEN ARBITRARILY ASSIGNED AS EL 207'-0"±. THIS IS APPROXIMATELY 147'-0"± ABOVE GRADE WHICH WAS ESTIMATED AS EL 60'-0"± TAKEN FROM U.S.G.S. QUAD MAP, AND DOES NOT NECESSARILY CORRESPOND TO ACTUAL ELEVATION ABOVE SEA LEVEL. ALL OTHER ELEVATIONS INDICATED WERE DETERMINED ON THIS BASIS.



CONFIGURATION
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• T • Mobile •
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 35 GRIFFIN ROAD SOUTH
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 PHONE: (860) 692-7100

CROWN CASTLE
 APPROVALS

LANDLORD _____
 RF _____
 CONSTRUCTION _____
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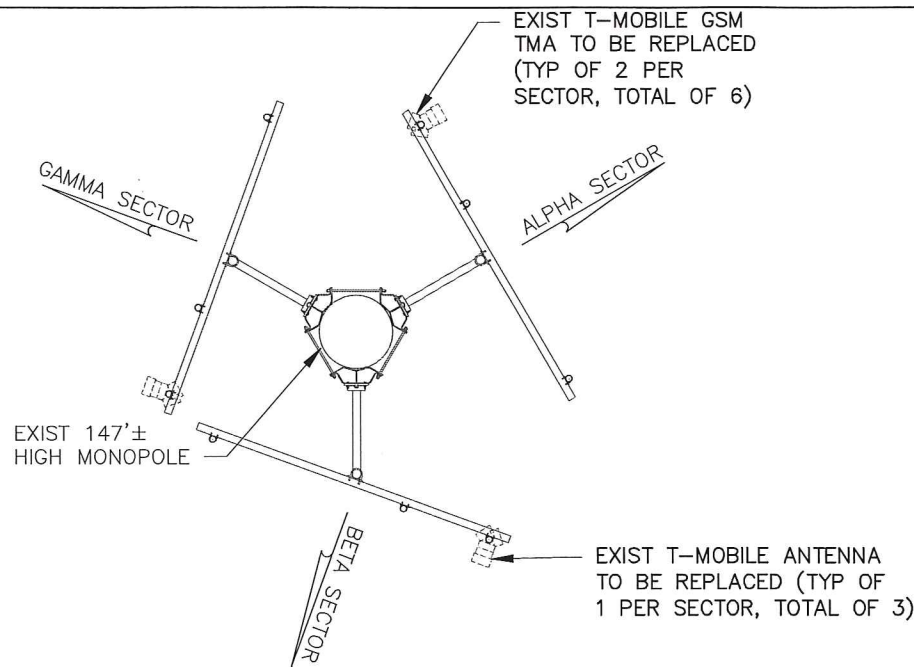
STATE OF CONNECTICUT
 ANTONIO A. QUALIERI
 No. 25406
 LICENSED PROFESSIONAL ENGINEER

SITE INFORMATION
 CTNH107A
 NH107/GLOBAL/CHERRY HILL
 150 NORTH MAIN STREET
 BRANFORD, CT 06405

SHEET TITLE
 ELEVATION & DETAIL

SHEET NUMBER
 A-3

N
APPROX



1
A-4
EXIST ANTENNA PLAN
SCALE: 3/16" = 1'-0"

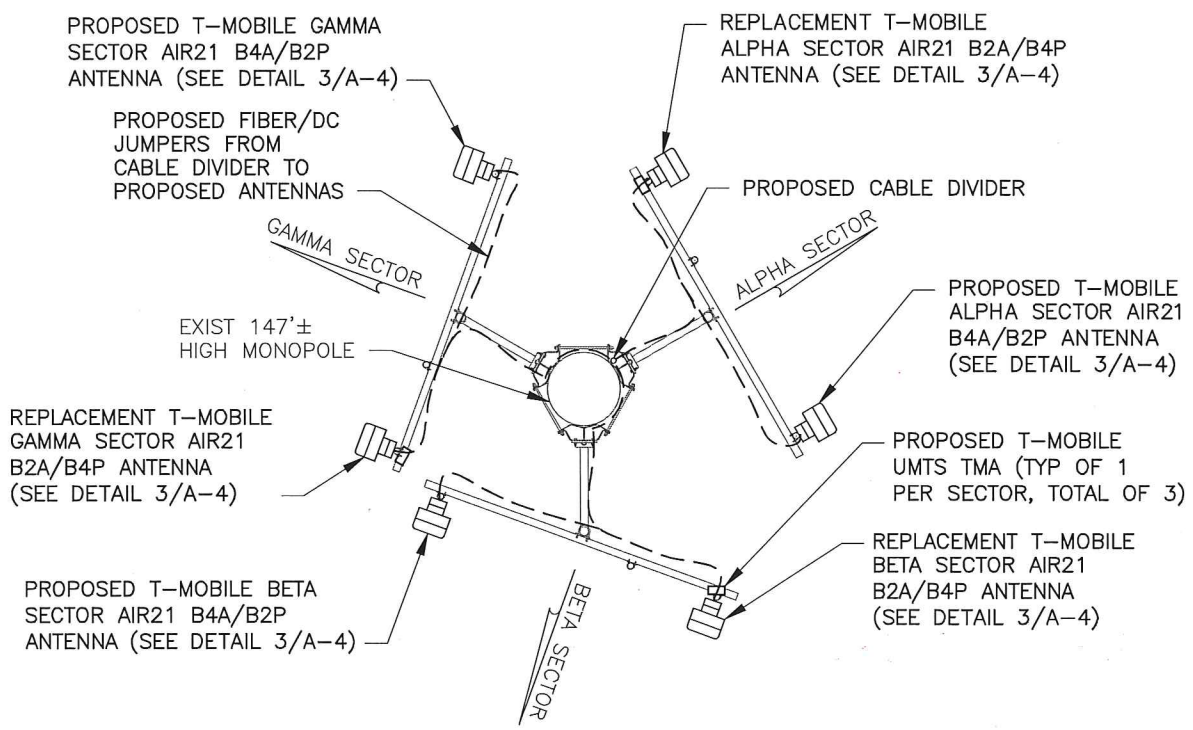
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EXIST ANTENNA SCHEDULE

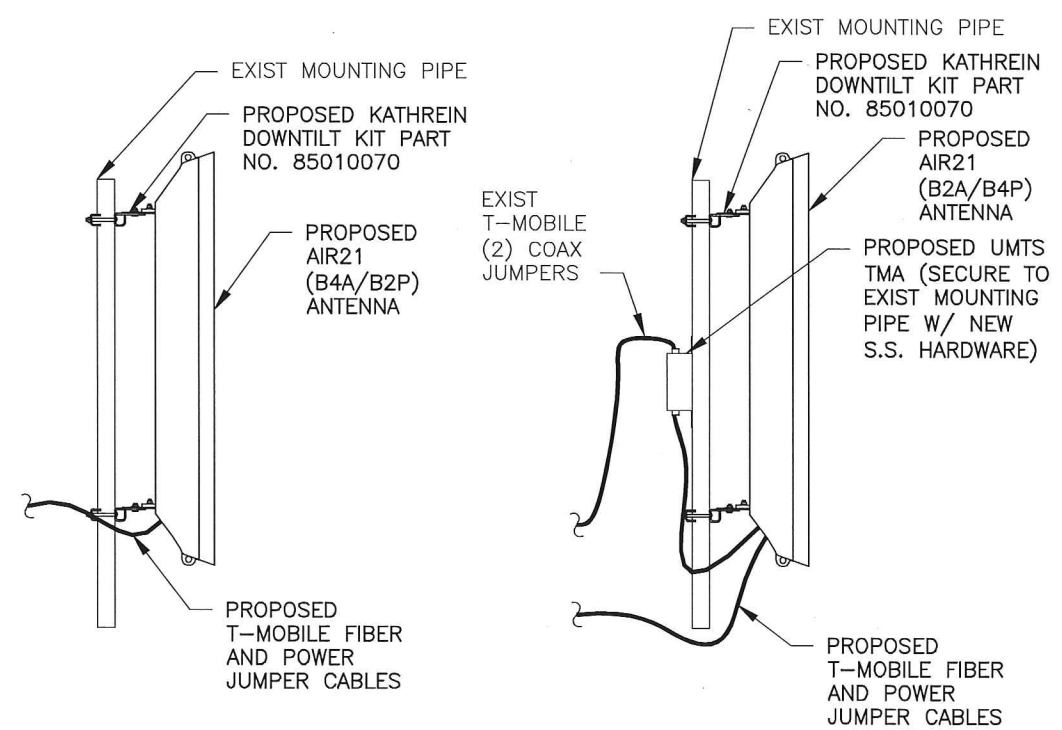
SECTOR	MAKE	QUANTITY	MODEL#	SIZE
ALPHA	RFS	1	APX16DWW_16DWS	55.9x13x3.15
BETA	RFS	1	APX16DWW_16DWS	55.9x13x3.15
GAMMA	RFS	1	APX16DWW_16DWS	55.9x13x3.15

PROPOSED ANTENNA SCHEDULE

SECTOR	MAKE	QUANTITY	MODEL#	SIZE
ALPHA	ERICSSON	1	AIR21 B2A/B4P	12x8x56
	ERICSSON	1	AIR21 B4A/B2P	12x8x56
BETA	ERICSSON	1	AIR21 B2A/B4P	12x8x56
	ERICSSON	1	AIR21 B4A/B2P	12x8x56
GAMMA	ERICSSON	1	AIR21 B2A/B4P	12x8x56
	ERICSSON	1	AIR21 B4A/B2P	12x8x56



2
A-4
PROPOSED ANTENNA PLAN
SCALE: 3/16" = 1'-0"



3
A-4
ANTENNA DETAIL
SCALE: 1/2" = 1'-0"

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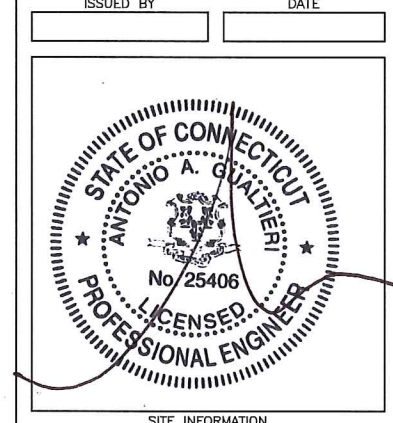
CROWN CASTLE
APPROVALS

LANDLORD _____
RF _____
CONSTRUCTION _____
OPERATIONS _____
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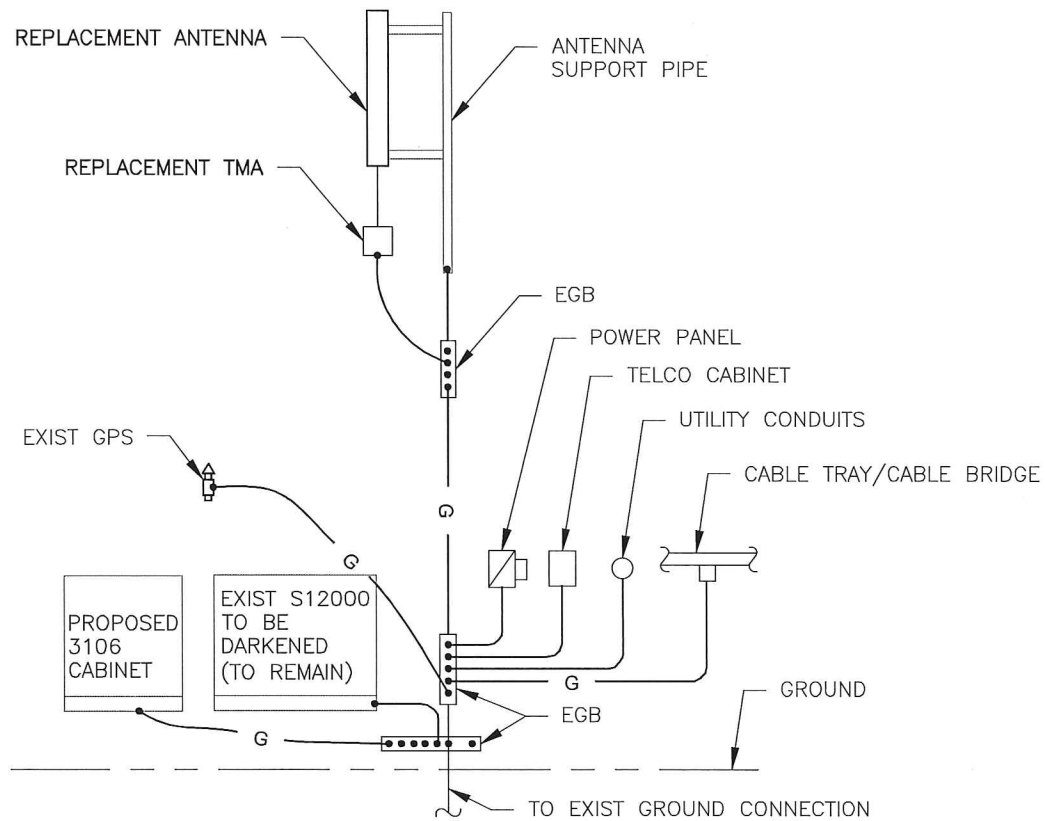
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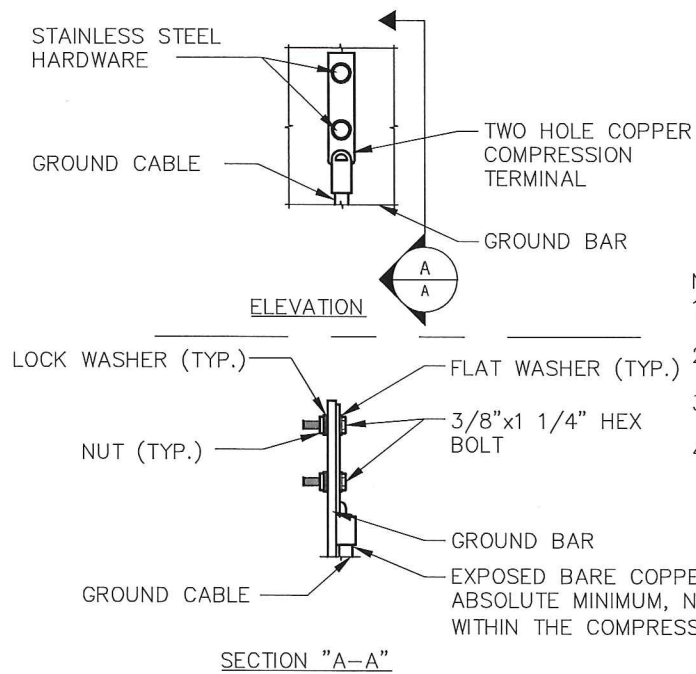
SITE INFORMATION
CTNH107A
NH107/GLOBAL/CHERRY HILL
150 NORTH MAIN STREET
BRANFORD, CT 06405

SHEET TITLE
ANTENNA LAYOUT PLANS & DETAILS

SHEET NUMBER
A-4

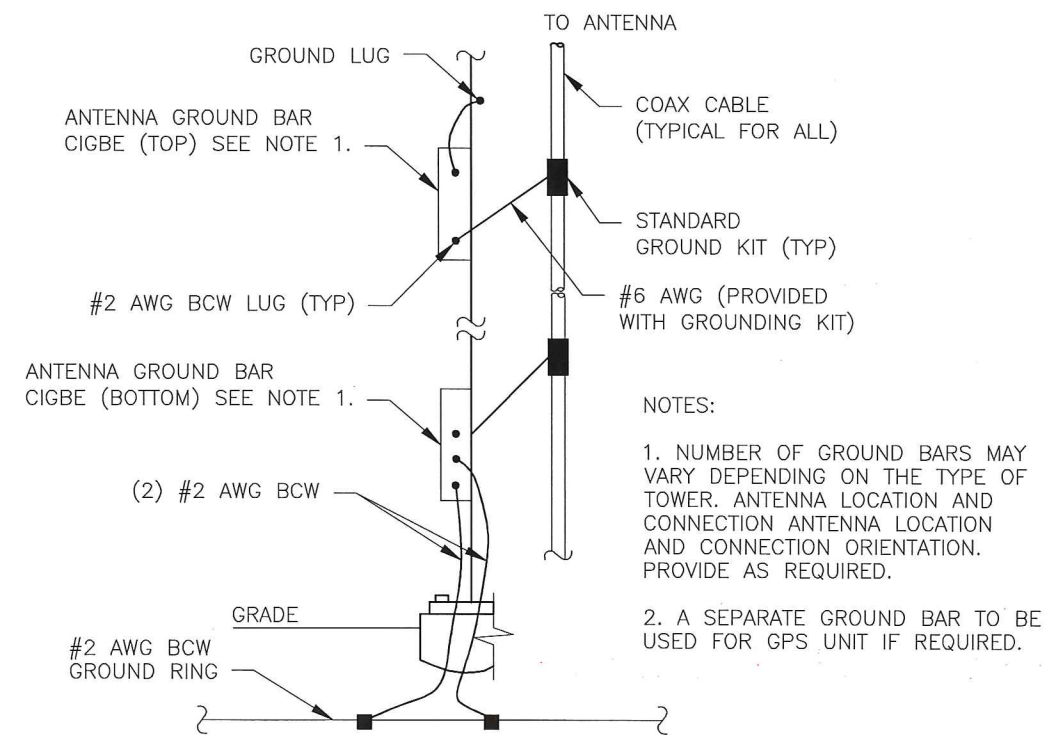


1
A-5
GROUNDING RISER DIAGRAM
SCALE: NTS



- NOTE:
1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
 2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
 3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB AND MGB.
 4. ALL GROUND LUGS MUST NE HEAT SHRUNK AT WIRE/LUG CONNECTION.

2
A-5
GROUNDING BAR CONN. DETAIL
SCALE: NTS



3
A-5
ANTENNA CABLE GROUNDING
SCALE: NTS

CONFIGURATION
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APPROVALS

LANDLORD _____

RF _____

CONSTRUCTION _____

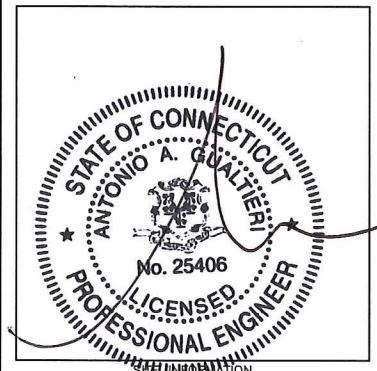
OPERATIONS _____

SITE ACQ. _____

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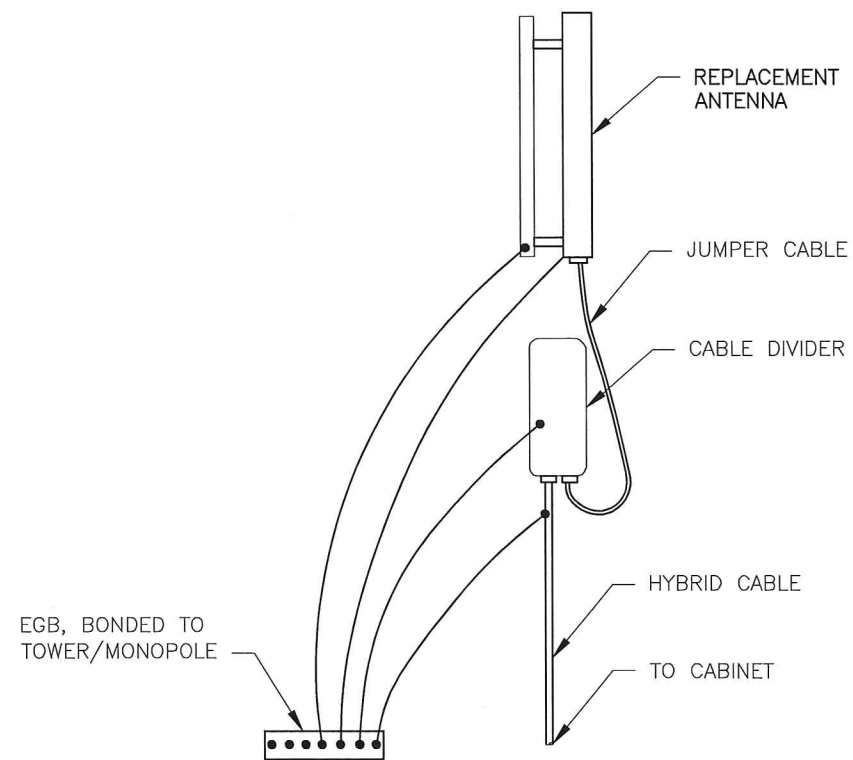
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SHEET TITLE

DETAILS

SHEET NUMBER

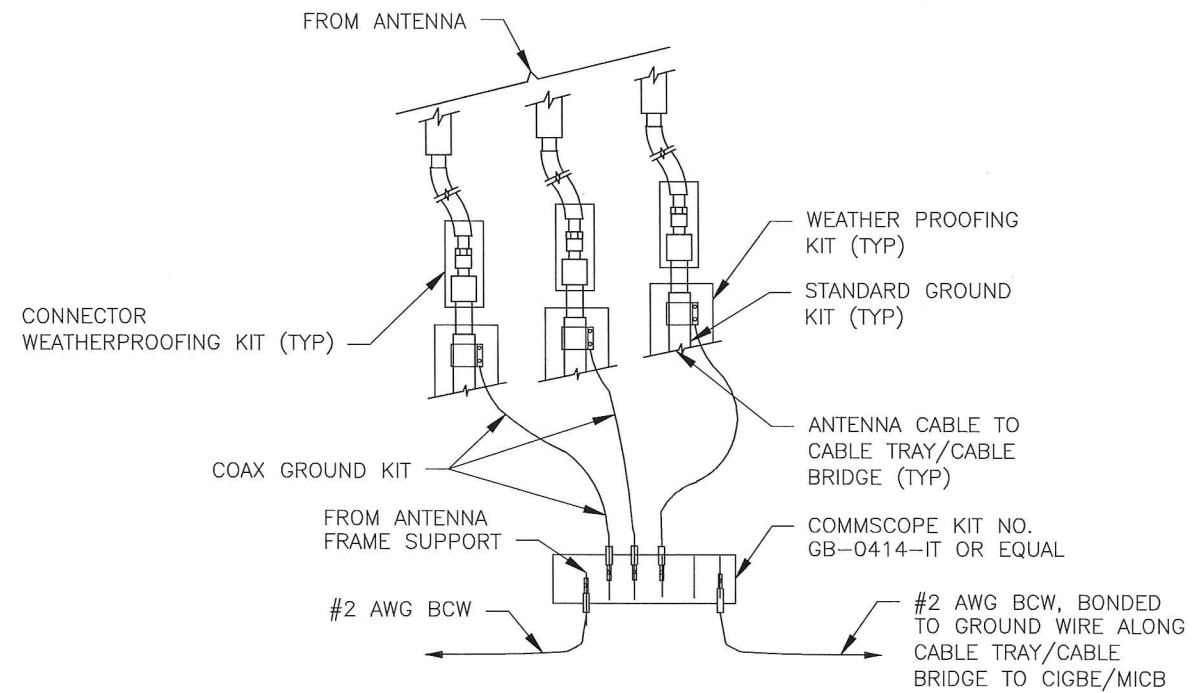
A-5



HYBRID CABLE CONNECTION AND GROUNDING DETAIL

1
A-6

SCALE: NTS

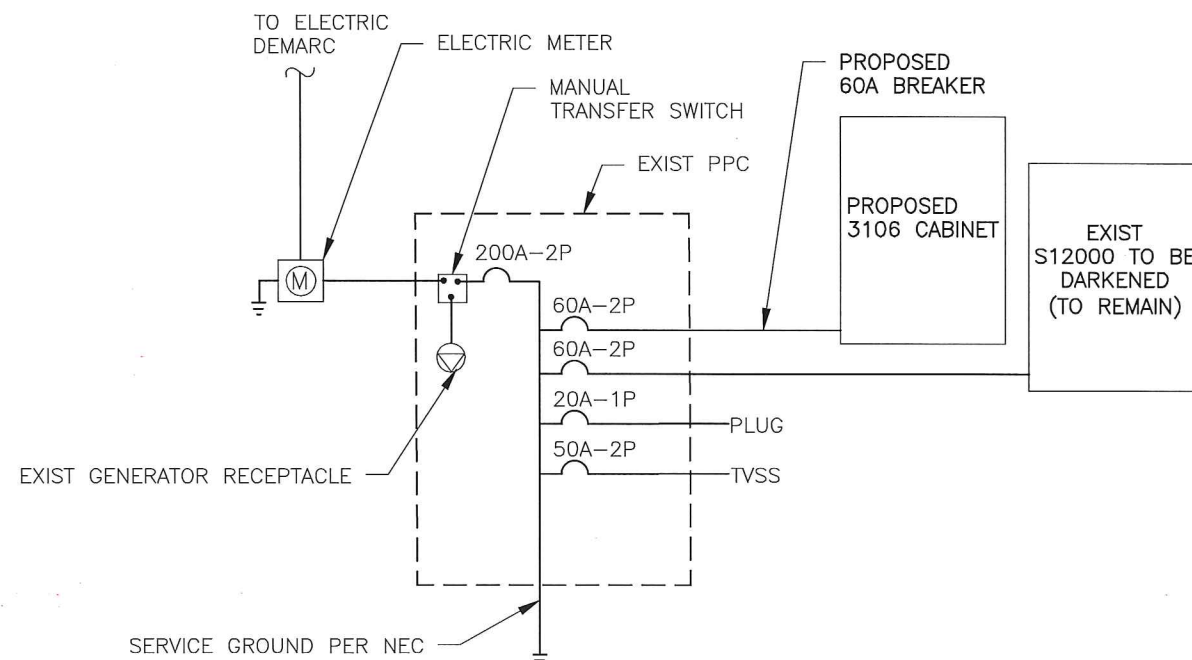


NOTE:
DO NOT INSTALL CABLE GROUND KIT AT A BEND
AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

GROUND WIRE TO GROUND BAR CONNECTION DETAIL

2
A-6

SCALE: NTS



ONE-LINE POWER DIAGRAM

3
A-6

SCALE: NTS



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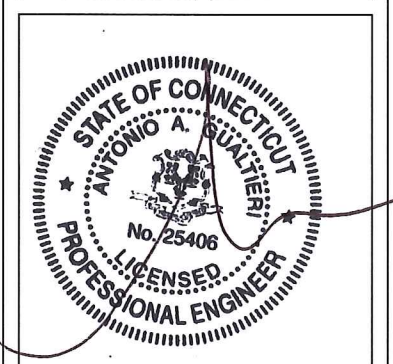
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SHEET TITLE
DETAILS

SHEET NUMBER
A-6

CONFIGURATION
2C
REFER TO LATEST T-MOBILE RF DATA SHEET FOR FINAL RF DESIGN & BOM.

GENERAL NOTES

- CONTRACTOR SHALL NOT COMMENCE ANY WORK UNTIL HE OBTAINS, AT HIS OWN EXPENSE, ALL INSURANCE REQUIRED BY T-MOBILE, THE PROPERTY OWNER AND/OR PROPERTY MANAGEMENT COMPANY.
- THIS SET OF PLANS HAS BEEN PREPARED FOR THE PURPOSES OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL CONDITIONS OF APPROVAL HAVE BEEN SATISFIED AND EACH OF THE DRAWINGS HAVE BEEN REVISED TO INDICATE "ISSUED FOR PERMIT"
- THIS PLAN IS SUBJECT TO ALL EASEMENTS AND RESTRICTIONS OF RECORD.
- THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE CODES, ORDINANCES, LAWS AND REGULATIONS OF ALL MUNICIPALITIES, UTILITIES OR OTHER PUBLIC AUTHORITIES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS THAT MAY BE REQUIRED BY ANY FEDERAL, STATE, COUNTY OR MUNICIPAL AUTHORITIES.
- THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER, IN WRITING, OF ANY CONFLICTS, ERRORS OR OMISSIONS PRIOR TO THE SUBMISSION OF BIDS OR PERFORMANCE OF WORK. MINOR OMISSIONS OR ERRORS IN THE BID DOCUMENTS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THIS PROJECT IN ACCORDANCE WITH THE OVERALL INTENT OF THESE DRAWINGS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING SITE IMPROVEMENTS PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED AS A RESULT OF CONSTRUCTION OF THIS FACILITY.
- THE SCOPE OF WORK FOR THIS PROJECT SHALL INCLUDE PROVIDING ALL MATERIALS, EQUIPMENT AND LABOR REQUIRED TO COMPLETE THIS PROJECT. ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
- THE CONTRACTOR SHALL VISIT THE PROJECT SITE PRIOR TO SUBMITTING A BID TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- POWER TO THE FACILITY IS MONITORED BY AN EXISTING METER.
- ALL STRUCTURAL ELEMENTS SHALL BE HOT DIPPED GALVANIZED STEEL.
- CONTRACTOR SHALL MAKE A UTILITY "ONE CALL" TO LOCATE ALL UTILITIES PRIOR TO EXCAVATING.
- IF ANY PIPING EXISTS BENEATH THE SITE AREA, CONTRACTOR MUST LOCATE IT AND CONTACT OWNER'S REPRESENTATIVE.
- THE CONSTRUCTION CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ALL CONSTRUCTION MEANS AND METHODS. THE CONSTRUCTION CONTRACTOR IS ALSO RESPONSIBLE FOR ALL JOB SITE SAFETY.
- CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.
- THE CONTRACTOR IS TO REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. THE CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUB-CONTRACTORS AND RELATED PARTIES. THE SUB-CONTRACTOR SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
- DETAILS ARE INTENDED TO SHOW END RESULT OF DESIGN. MINOR MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.
- ALL MATERIAL PROVIDED BY T-MOBILE IS TO BE REVIEWED BY THE CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS PRIOR TO INSTALLATION. ANY DEFICIENCIES TO PROVIDE MATERIALS SHALL BE BROUGHT TO THE CONSTRUCTION MANAGER'S ATTENTION IMMEDIATELY.
- THE MATERIALS INSTALLED SHALL MEET REQUIREMENTS OF CONTRACTORS DOCUMENTS. NO SUBSTITUTIONS ARE ALLOWED.
- INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR CONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE ENGINEER PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER APPROVAL.

GENERAL NOTES

- THE CONTRACTOR SHALL RECEIVE CLARIFICATION AND AUTHORIZATION IN WRITING TO PROCEED BEFORE STARTING WORK ON ANY ITEMS NOT CLEARLY DEFINED OR IDENTIFIED BY THE CONSTRUCTION DOCUMENTS.
- THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER OF ALL PRODUCTS OR ITEMS NOTED AS "EXISTING" WHICH ARE NOT FOUND TO BE IN THE FIELD.
- ERECTION SHALL BE DONE IN A WORKMANLIKE MANNER BY COMPETENT EXPERIENCED WORKMEN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST-ACCEPTED PRACTICE. ALL MEMBERS SHALL BE LAND PLUMB AND TRUE AS INDICATED ON THE DRAWINGS.
- THE CONTRACTOR SHALL COORDINATE HIS WORK AND SCHEDULE HIS ACTIVITIES AND WORKING HOURS IN ACCORDANCE WITH THE REQUIREMENTS OF THE PROPERTY OWNER AND/OR PROPERTY MANAGEMENT COMPANY.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING HIS WORK WITH THE WORK OF OTHERS AS IT MAY RELATE TO RADIO EQUIPMENT, ANTENNAS AND ANY OTHER PORTIONS OF THE WORK.
- THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY INDICATED OR WHERE LOCAL CODES OR REGULATIONS MAY TAKE PRECEDENCE.
- THE CONTRACTOR SHALL REPAIR ALL EXISTING SURFACES DAMAGED DURING CONSTRUCTION SUCH THAT THEY MATCH AND BLEND WITH ADJACENT SURFACES.
- THE CONTRACTOR SHALL KEEP CONTRACT AREA CLEAN, HAZARD FREE AND DISPOSE OF ALL DEBRIS AND RUBBISH. EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY OF THE OWNER SHALL BE REMOVED. LEAVE PREMISES IN CLEAN CONDITIONS AND FREE FROM PAINT SPOTS, DUST OR SMUDGES OF ANY NATURE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL ITEMS UNTIL COMPLETION OF CONSTRUCTION.
- BEFORE FINAL ACCEPTANCE OF THE WORK, THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT, TEMPORARY WORK, UNUSED AND USELESS MATERIALS, RUBBISH AND TEMPORARY STRUCTURES.
- ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE 2005 CONNECTICUT STATE BUILDING CODE (INCLUDING AMENDMENTS) AND ALL OTHER APPLICABLE CODES AND ORDINANCES.
- CONTRACTOR SHALL VISIT THE JOB SITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS AS TO THE COST THEREOF. CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
- PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY UNLESS OTHERWISE NOTED. THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT AND APPURTENANCES, AND LABOR NECESSARY TO EFFECT ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF THE WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFORM TO ALL OSHA REQUIREMENTS.
- CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK USING THE BEST CONSTRUCTION SKILLS AND ATTENTION. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER CONTRACT, UNLESS OTHERWISE NOTED.

CONFIGURATION

2C

REFER TO LATEST T-MOBILE RF DATA SHEET FOR FINAL RF DESIGN & BOM.



ORIGINAL SIZE IN INCHES

TECTONIC

- PLANNING
- ENGINEERING
- SURVEYING
- CONSTRUCTION MANAGEMENT

TECTONIC Engineering & Survey Consultants P.C.

1279 ROUTE 300
NEWBURGH, NY 12550
Phone: (845) 567-6656
Fax: (845) 567-8703

T-Mobile
T-MOBILE NORTHEAST LLC.
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
PHONE: (860) 692-7100

CROWN CASTLE
APPROVALS

LANDLORD _____
RF _____
CONSTRUCTION _____
OPERATIONS _____
SITE ACC. _____

PROJECT NUMBER 7081.CTNH107A DESIGNED BY JQ

REV	DATE	REVISION	DRAWN BY
Δ	04/07/14	FOR COMMENT	MP
Δ	04/09/14	FOR CONSTRUCTION	MP

ISSUED BY _____ DATE _____

STATE OF CONNECTICUT
ANTONIO A. GUXTERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

SITE INFORMATION

CTNH107A
NH107/GLOBAL/CHERRY HILL
150 NORTH MAIN STREET
BRANFORD, CT 06405

SHEET TITLE

NOTES

SHEET NUMBER

A-7

GROUNDING NOTES

1. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE GROUNDED AS REQUIRED BY ALL APPLICABLE CODES.
2. ALL GROUNDING WORK SHALL BE IN ACCORDANCE WITH T-MOBILE STANDARD PRACTICE.
3. ALL BUS CONNECTORS SHALL BE TWO-HOLE, LONG-BARREL TYPE COMPRESSION LUGS, T&B OR EQUAL, UNLESS OTHERWISE NOTED ON DRAWINGS. ALL LUGS SHALL BE ATTACHED TO BUSSES USING BOLTS, NUTS, AND LOCK WASHERS. NO WASHERS ARE ALLOWED BETWEEN THE ITEMS BEING GROUNDED.
4. ALL CONNECTORS SHALL BE CRIMPED USING HYDRAULIC CRIMPING TOOLS, T&B #TBM 8 OR EQUIVALENT.
5. ALL CONNECTIONS SHALL BE MADE TO BARE METAL. ALL PAINTED SURFACES SHALL BE FILED TO ENSURE PROPER CONTACT. NO WASHERS ARE ALLOWED BETWEEN THE ITEMS BEING GROUNDED. ALL CONNECTIONS ARE TO HAVE A NON-OXIDIZING AGENT APPLIED PRIOR TO INSTALLATION.
6. ALL COPPER BUSSES SHALL BE CLEANED, POLISHED, AND A NON-OXIDIZING AGENT APPLIED. NO FINGERPRINTS OR DISCOLORED COPPER WILL BE PERMITTED.
7. ALL BENDS SHALL BE AS SHALLOW AS POSSIBLE, WITH NO TURN SHORTER THAN AN 8-INCH NOMINAL RADIUS.
8. GROUNDING CONDUCTORS SHALL BE SOLID TINNED COPPER AND ANNEALED #2. ALL GROUNDING CONDUCTORS SHALL RUN THROUGH PVC SLEEVES WHEREVER CONDUCTORS RUN THROUGH WALLS, FLOORS, OR CEILINGS. IF CONDUCTORS MUST RUN THROUGH EMT, BOTH ENDS OF CONDUIT SHALL BE GROUNDED. SEAL BOTH ENDS OF CONDUIT WITH SILICONE CAULK.
9. GROUNDING SYSTEM RESISTANCE SHALL NOT EXCEED 10 OHMS. IF THE RESISTANCE VALUE IS EXCEEDED, NOTIFY THE PROJECT MANAGER FOR FURTHER INSTRUCTION ON METHODS FOR REDUCING THE RESISTANCE VALUE.
10. ALL ROOF TOP ANTENNA MOUNTS SHALL BE GROUNDED WITH A #2 GROUND WIRE CONNECTED TO THE NEAREST GROUND BUS. ALL CONNECTIONS ARE TO BE CAD-WELDED IF POSSIBLE.
11. UPON COMPLETION OF WORK, CONDUCT CONTINUITY, SHORT CIRCUIT, AND FALL OF POTENTIAL GROUNDING TESTS FOR APPROVAL. SUBMIT TEST REPORTS TO THE PROJECT MANAGER.
12. GROUNDING CONNECTION TO TRAVEL IN A DOWNWARD DIRECTION.
13. ALL EXPOSED #2 WIRE MUST BE TINN NOT BTW.
14. TECTONIC TAKES NO RESPONSIBILITY OR LIABILITY FOR THE GROUNDING SYSTEM AS SHOWN ON THIS SITE. THIS IS A STANDARD GROUNDING SYSTEM.

TECTONIC

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- SURVEYING

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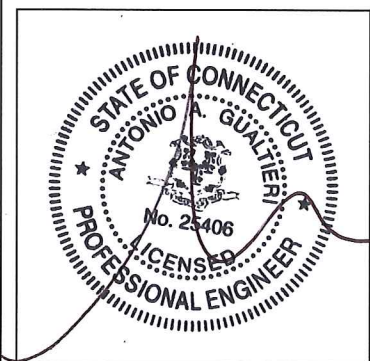
APPROVALS

LANDLORD _____
RF _____
CONSTRUCTION _____
OPERATIONS _____
SITE ACQ. _____

PROJECT NUMBER: 7061.CTNH107A DESIGNED BY: JQ

REV	DATE	REVISION	DRAWN BY
△	04/07/14	FOR COMMENT	MP
△	04/09/14	FOR CONSTRUCTION	MP

ISSUED BY _____ DATE _____



SITE INFORMATION

CTNH107A
NH107/GLOBAL/CHERRY HILL
150 NORTH MAIN STREET
BRANFORD, CT 06405

SHEET TITLE

NOTES

SHEET NUMBER

A-8

CONFIGURATION
2C
REFER TO LATEST T-MOBILE RF DATA SHEET FOR FINAL RF DESIGN & BOM.





PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
 250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **March 28, 2014**

Patrick Byrum
 Crown Castle
 3530 Toringdon Way Suite 300
 Charlotte, NC 28277

Paul J Ford and Company
 250 E. Broad Street, Suite 600
 Columbus, OH 43215
 614.221.6679
 jwoolley@pjfweb.com

Subject: Structural Analysis Report

Carrier Designation: *T-Mobile Co-Locate*
Carrier Site Number: CTNH107A
Carrier Site Name: N/A

Crown Castle Designation:
Crown Castle BU Number: 876321
Crown Castle Site Name: BRANFORD BANM TOWER
Crown Castle JDE Job Number: 268444
Crown Castle Work Order Number: 730498
Crown Castle Application Number: 223705 Rev. 0

Engineering Firm Designation: **Paul J Ford and Company Project Number:** 37513-2417 R2

Site Data: 150 North Main Street, BRANFORD, New Haven County, CT
 Latitude 41° 17' 19", Longitude -72° 48' 49.9"
 147 Foot - Monopole Tower

Dear Patrick Byrum,

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 630504, in accordance with application 223705, revision 0.

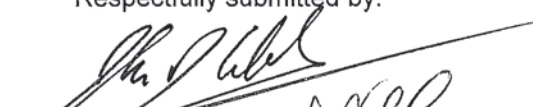
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

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

The structural analysis was performed for this tower in accordance with the requirements the 2005 Connecticut State Building Code of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:


 John J. Woolley, E.I.
 Structural Designer







PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **March 28, 2014**

Patrick Byrum
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3530 Toringdon Way Suite 300
Charlotte, NC 28277

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250 E. Broad Street, Suite 600
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Carrier Designation: *T-Mobile Co-Locate*
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We at *Paul J Ford and Company* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

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John J. Woolley, E.I.
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TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Antenna and Cable Information

Table 2 - Existing and Reserved Antenna and Cable Information

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 4 – Section Capacity (Summary)

Table 5 - Tower Component Stresses vs. Capacity

5) APPENDIX A

TNX Tower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 147 ft Monopole tower designed by SUMMIT in March of 2009. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements the 2005 Connecticut State Building Code of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

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
119.0	122.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1	1-5/8	-
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			

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
147.0	149.0	2	dragonwave	A-ANT-23G-2-C	6	5/16	1
	147.0	3	argus technologies	LLPX310R w/ Mount Pipe	4	1/2	
		1	powerwave technologies	P40-16-XLPP-RR-A w/ Mount Pipe	1 6	5/8 1-1/4	2
		9	rfs celwave	ACU-A20-N			
		3	alcatel lucent	TD-RRH8x20-25			
		2	rfs celwave	APXVSP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		3	samsung telecommunications	FDD_R6_RRH			
		1	tower mounts	Platform Mount [LP 712-1]			
145.0	146.0	3	alcatel lucent	1900MHz RRH (65MHz)	-	-	2
	145.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	800MHZ RRH			
		1	tower mounts	Side Arm Mount [SO 102-3]			
131.0	132.0	12	decibel	DB844H90E-XY w/ Mount Pipe	12	1-5/8	3
	131.0	1	tower mounts	Platform Mount [LP 601-1]			
119.0	122.0	6	remec	S20057A-1	1	5/16	3
		3	rfs celwave	APX16DWV-16DWVS-C w/ Mount Pipe			
	119.0	1	tower mounts	T-Arm Mount [TA 601-3]	12	1-5/8	1
110.0	112.0	6	ericsson	RRUS-11	1 2 12	1/4 7/8 1-1/4	1
		1	raycap	DC6-48-60-18-8F			
		3	kathrein	800 10764 w/ Mount Pipe			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		12	powerwave technologies	LGP2140X			
	110.0	1	tower mounts	Platform Mount [LP 712-1]			
100.0	100.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			
49.0	50.0	1	lucent	KS24019-L112A	1	1/2	1
	49.0	1	tower mounts	Side Arm Mount [SO 701-1]			

- 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, 10/8/96	2135657	CCISITES
4-POST-MODIFICATION INSPECTION	PJF, 41709-0058, 6/15/99	2448190	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF, 29299-111, 3/15/99	1613620	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PJF, 29299-111, 3/15/99	1614568	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 128359, 3/6/2013	3890848	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) Monopole has been reinforced in conformance with the referenced modification documents.

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	147 - 99.5	Pole	TP30.313x22x0.25	1	-9.37	1135.99	69.0	Pass
L2	99.5 - 69.5	Pole	TP35.0626x29.1567x0.3125	2	-15.59	1817.84	94.1	Pass
L3	69.5 - 59	Pole	TP36.9x35.0626x0.4301	3	-16.92	2267.58	82.5	Pass
L4	59 - 58	Pole	TP36.45x35.2086x0.375	4	-18.94	2264.58	90.4	Pass
L5	58 - 50.5	Pole	TP37.7624x36.45x0.4272	5	-20.74	2494.67	90.0	Pass
L6	50.5 - 50	Pole	TP37.8499x37.7624x0.5406	6	-20.89	2941.81	77.2	Pass
L7	50 - 29.25	Pole	TP41.481x37.8499x0.479	7	-25.17	2851.53	92.9	Pass
L8	29.25 - 24	Pole	TP41.6499x39.6043x0.5047	8	-29.31	3263.40	90.8	Pass
L9	24 - 0	Pole	TP45.85x41.6499x0.5901	9	-37.74	3978.72	89.0	Pass
							Summary	
						Pole (L2)	94.1	Pass
						Rating =	94.1	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	90.3	Pass
1	Base Plate	0	73.5	Pass
1	Base Foundation Structural Steel	0	90.9	Pass
1	Base Foundation Soil Interaction	0	96.0	Pass

Structure Rating (max from all components) =	96.0%
-----------------------------------------------------	--------------

Notes:

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

APPENDIX A
TNXTOWER OUTPUT

Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

- 1) Tower is located in New Haven County, Connecticut.
- 2) Basic wind speed of 85 mph.
- 3) Nominal ice thickness of 0.7500 in.
- 4) Ice thickness is considered to increase with height.
- 5) Ice density of 56.00 pcf.
- 6) A wind speed of 38 mph is used in combination with ice.
- 7) Temperature drop of 50 °F.
- 8) Deflections calculated using a wind speed of 50 mph.
- 9) A non-linear (P-delta) analysis was used.
- 10) Pressures are calculated at each section.
- 11) Stress ratio used in pole design is 1.333.
- 12) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

- | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys √ Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. √ Autocalc Torque Arm Areas SR Members Have Cut Ends Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Use TIA-222-G Tension Splice Capacity Exemption | <ul style="list-style-type: none"> √ Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feedline Torque Include Angle Block Shear Check Poles √ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	147.0000- 99.5000	47.5000	3.75	12	22.0000	30.3130	0.2500	1.0000	A607-60 (60 ksi)
L2	99.5000- 69.5000	33.7500	0.00	12	29.1567	35.0626	0.3125	1.2500	A607-65 (65 ksi)
L3	69.5000- 59.0000	10.5000	4.75	12	35.0626	36.9000	0.4301	1.7205	Reinf 57.44 ksi (57 ksi)
L4	59.0000- 58.0000	5.7500	0.00	12	35.2086	36.4500	0.3750	1.5000	A607-65 (65 ksi)
L5	58.0000- 50.5000	7.5000	0.00	12	36.4500	37.7624	0.4271	1.7086	Reinf 60.74 ksi (61 ksi)
L6	50.5000- 50.0000	0.5000	0.00	12	37.7624	37.8499	0.5405	2.1622	Reinf 56.64 ksi (57 ksi)
L7	50.0000- 29.2500	20.7500	5.25	12	37.8499	41.4810	0.4790	1.9160	Reinf 57.67 ksi (58 ksi)
L8	29.2500- 24.0000	10.5000	0.00	12	39.6043	41.6499	0.5047	2.0188	Reinf 61.02 ksi (61 ksi)
L9	24.0000- 24.0000	24.0000		12	41.6499	45.8500	0.5900	2.3602	Reinf 57.85 ksi

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 (58 ksi)
	0.0000								

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	22.7761	17.5087	1057.2060	7.7865	11.3960	92.7699	2142.1860	8.6173	5.2260	20.904
	31.3823	24.2007	2791.7645	10.7626	15.7021	177.7952	5656.8718	11.9109	7.4539	29.816
L2	30.8646	29.0245	3082.2498	10.3262	15.1032	204.0796	6245.4738	14.2850	6.9765	22.325
	36.2995	34.9673	5389.6479	12.4405	18.1624	296.7470	10920.8879	17.2098	8.5593	27.39
L3	36.2995	47.9655	7343.1536	12.3984	18.1624	404.3045	14879.2200	23.6072	8.2441	19.167
	38.2017	50.5103	8575.0066	13.0562	19.1142	448.6197	17375.2881	24.8596	8.7365	20.312
L4	37.5123	42.0615	6514.2838	12.4704	18.2380	357.1812	13199.7051	20.7014	8.4309	22.482
	37.7358	43.5606	7235.8925	12.9148	18.8811	383.2347	14661.8800	21.4392	8.7636	23.37
L5	37.7358	49.5467	8206.4710	12.8962	18.8811	434.6395	16628.5352	24.3854	8.6238	20.189
	39.0945	51.3518	9136.5129	13.3660	19.5609	467.0795	18513.0521	25.2738	8.9756	21.013
L6	39.0945	64.7873	11457.0447	13.3254	19.5609	585.7104	23215.0787	31.8864	8.6717	16.042
	39.1851	64.9396	11538.0333	13.3568	19.6063	588.4871	23379.1837	31.9613	8.6951	16.086
L7	39.1851	57.6390	10274.7280	13.3788	19.6063	524.0533	20819.3846	28.3682	8.8601	18.497
	42.9443	63.2394	13570.1207	14.6787	21.4872	631.5456	27496.7436	31.1245	9.8332	20.529
L8	42.0603	63.5434	12399.4058	13.9977	20.5150	604.4058	25124.5579	31.2741	9.2613	18.35
	43.1191	66.8677	14449.0629	14.7300	21.5746	669.7248	29277.7188	32.9103	9.8095	19.436
L9	43.1191	78.0120	16787.3228	14.6994	21.5746	778.1049	34015.6674	38.3952	9.5808	16.237
	47.4674	85.9921	22483.9622	16.2031	23.7503	946.6812	45558.6031	42.3227	10.7065	18.145

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 147.0000-99.5000				1	1	1		
L2 99.5000-69.5000				1	1	1		
L3 69.5000-59.0000				1	1	1		
L4 59.0000-58.0000				1	1	1		
L5 58.0000-50.5000				1	1	1		
L6 50.5000-50.0000				1	1	1		
L7 50.0000-29.2500				1	1	1		
L8 29.2500-24.0000				1	1	1		
L9 24.0000-0.0000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A		Weight
						ft ² /ft	plf	
7983A(1/2")	C	No	CaAa (Out Of Face)	147.0000 - 0.0000	4	No Ice	0.0000	0.08
						1/2" Ice	0.0000	0.74
						1" Ice	0.0000	2.01
						2" Ice	0.0000	6.39
						4" Ice	0.0000	22.47
9207(5/16")	C	No	CaAa (Out Of Face)	147.0000 - 0.0000	6	No Ice	0.0000	0.60
						1/2" Ice	0.0000	1.11
						1" Ice	0.0000	2.22
						2" Ice	0.0000	6.29
						4" Ice	0.0000	21.76
HB114-1-0813U4-M5J(1 1/4")	C	No	CaAa (Out Of Face)	147.0000 - 0.0000	2	No Ice	0.1540	1.20
						1/2" Ice	0.2540	2.45
						1" Ice	0.3540	4.30
						2" Ice	0.5540	9.85
						4" Ice	0.9540	28.27
HB114-1-0813U4-M5J(1 1/4")	C	No	CaAa (Out Of Face)	147.0000 - 0.0000	4	No Ice	0.0000	1.20
						1/2" Ice	0.0000	2.45
						1" Ice	0.0000	4.30
						2" Ice	0.0000	9.85
						4" Ice	0.0000	28.27
2.5" Conduit (2 1/2" Thick-Wall Conduit)	C	No	CaAa (Out Of Face)	147.0000 - 0.0000	2	No Ice	0.0000	2.80
						1/2" Ice	0.0000	4.33
						1" Ice	0.0000	6.47
						2" Ice	0.0000	12.57
						4" Ice	0.0000	32.12

LDF7-50A(1-5/8")	C	No	Inside Pole	131.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82

LDF7-50A(1-5/8")	C	No	Inside Pole	119.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
860-10025(5/16)	C	No	Inside Pole	119.0000 - 0.0000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
						2" Ice	0.0000	0.00
						4" Ice	0.0000	0.00

LDF6-50A(1-1/4")	C	No	Inside Pole	110.0000 - 0.0000	12	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
						2" Ice	0.0000	0.66
						4" Ice	0.0000	0.66
6-8AWG 3 PAIR(7/8")	C	No	Inside Pole	110.0000 - 0.0000	2	No Ice	0.0000	0.68
						1/2" Ice	0.0000	0.68
						1" Ice	0.0000	0.68
						2" Ice	0.0000	0.68
						4" Ice	0.0000	0.68
A-DQZNB2Yn1750 N(1/4")	C	No	Inside Pole	110.0000 - 0.0000	1	No Ice	0.0000	0.03
						1/2" Ice	0.0000	0.03
						1" Ice	0.0000	0.03
						2" Ice	0.0000	0.03
						4" Ice	0.0000	0.03

CR 50 1873(1-5/8")	C	No	CaAa (Out Of Face)	100.0000 - 0.0000	1	No Ice	0.1980	0.83
						1/2" Ice	0.2980	2.34
						1" Ice	0.3980	4.47
						2" Ice	0.5980	10.55
						4" Ice	0.9980	30.05

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A		Weight
						ft ² /ft	plf	
CR 50 1873(1-5/8")	C	No	CaAa (Out Of Face)	100.0000 - 0.0000	4	No Ice	0.0000	0.83
						1/2" Ice	0.0000	2.34
						1" Ice	0.0000	4.47
						2" Ice	0.0000	10.55
						4" Ice	0.0000	30.05

LDF4-50A(1/2")	C	No	Inside Pole	49.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15

Aero MP3-04	C	No	CaAa (Out Of Face)	25.5000 - 0.5000	1	No Ice	0.2690	0.00
						1/2" Ice	0.3801	0.00
						1" Ice	0.4913	0.00
						2" Ice	0.7135	0.00
						4" Ice	1.1579	0.00
Aero MP3-04	C	No	CaAa (Out Of Face)	52.0000 - 32.0000	1	No Ice	0.2690	0.00
						1/2" Ice	0.3801	0.00
						1" Ice	0.4913	0.00
						2" Ice	0.7135	0.00
						4" Ice	1.1579	0.00
Aero MP3-04	C	No	CaAa (Out Of Face)	71.0000 - 61.0000	1	No Ice	0.2690	0.00
						1/2" Ice	0.3801	0.00
						1" Ice	0.4913	0.00
						2" Ice	0.7135	0.00
						4" Ice	1.1579	0.00
HB058-M12- XXXF(5/8")	C	No	CaAa (Out Of Face)	147.0000 - 0.0000	1	No Ice	0.0840	0.24
						1/2" Ice	0.1840	1.06
						1" Ice	0.2840	2.49
						2" Ice	0.4840	7.18
						4" Ice	0.8840	23.89

Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A _R	A _F	C _A A _A In Face	C _A A _A Out Face	Weight
			ft ²	ft ²	ft ²	ft ²	K
L1	147.0000- 99.5000	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	18.719	1.41
L2	99.5000-69.5000	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	18.103	1.50
L3	69.5000-59.0000	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	8.482	0.53
L4	59.0000-58.0000	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	0.590	0.05
L5	58.0000-50.5000	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	4.828	0.38
L6	50.5000-50.0000	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	0.430	0.03
L7	50.0000-29.2500	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	17.085	1.04
L8	29.2500-24.0000	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	3.501	0.26
L9	24.0000-0.0000	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	20.482	1.21

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_{dA_A} In Face ft ²	C_{dA_A} Out Face ft ²	Weight K
L1	147.0000- 99.5000	A	0.878	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	43.821	3.25
L2	99.5000-69.5000	A	0.839	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	39.461	3.13
L3	69.5000-59.0000	A	0.812	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	16.840	1.04
L4	59.0000-58.0000	A	0.803	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	1.240	0.10
L5	58.0000-50.5000	A	0.796	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	9.870	0.73
L6	50.5000-50.0000	A	0.789	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	0.833	0.05
L7	50.0000-29.2500	A	0.766	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	32.871	1.99
L8	29.2500-24.0000	A	0.750	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	6.975	0.50
L9	24.0000-0.0000	A	0.750	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	38.799	2.27

Feed Line Center of Pressure

Section	Elevation ft	CP_x in	CP_z in	CP_x Ice in	CP_z Ice in
L1	147.0000-99.5000	-0.4339	0.2505	-0.8047	0.4646
L2	99.5000-69.5000	-0.6419	0.3706	-1.1105	0.6412
L3	69.5000-59.0000	-0.8256	0.4766	-1.3171	0.7604
L4	59.0000-58.0000	-0.6415	0.3703	-1.1077	0.6395
L5	58.0000-50.5000	-0.6930	0.4001	-1.1653	0.6728
L6	50.5000-50.0000	-0.8768	0.5062	-1.3777	0.7954
L7	50.0000-29.2500	-0.8548	0.4935	-1.3538	0.7816
L8	29.2500-24.0000	-0.7259	0.4191	-1.2123	0.6999
L9	24.0000-0.0000	-0.8981	0.5185	-1.4208	0.8203

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C_{dA_A} Front ft ²	C_{dA_A} Side ft ²	Weight K	
LLPX310R w/ Mount Pipe	A	From Leg	4.0000	0.00	147.0000	No Ice	4.9623	2.8484	0.04
			0.00			1/2"	5.3512	3.3668	0.08
			0.00			Ice	5.7501	3.9019	0.12
						1" Ice	6.5777	5.0799	0.23

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
						2" Ice 8.3714	7.8368	0.53
FDD_R6_RRH	A	From Leg	4.0000 0.00 0.00	0.00	147.0000	4" Ice 1.7889 No Ice 1.9715 1/2" 2.1627 Ice 2.5710 1" Ice 3.4914 2" Ice 4.7140 4" Ice	0.7778 0.9182 1.0673 1.3914 2.1432	0.03 0.04 0.06 0.09 0.20
1900MHz RRH (65MHz)	A	From Leg	4.0000 0.00 1.00	0.00	145.0000	No Ice 2.7087 1/2" 2.9477 Ice 3.1953 1" Ice 3.7164 2" Ice 4.8623 4" Ice	2.6087 2.8450 3.0899 3.6057 4.7410	0.06 0.08 0.11 0.17 0.35
800 EXTERNAL NOTCH FILTER	A	From Leg	4.0000 0.00 0.00	0.00	145.0000	No Ice 0.7701 1/2" 0.8898 Ice 1.0181 1" Ice 1.3007 2" Ice 1.9696 4" Ice	0.3747 0.4647 0.5634 0.7868 1.3372	0.01 0.02 0.02 0.04 0.11
800MHZ RRH	A	From Leg	4.0000 0.00 0.00	0.00	145.0000	No Ice 2.4899 1/2" 2.7061 Ice 2.9310 1" Ice 3.4068 2" Ice 4.4620 4" Ice	2.0685 2.2705 2.4812 2.9284 3.9265	0.05 0.07 0.10 0.16 0.32
(3) ACU-A20-N	A	From Leg	4.0000 0.00 0.00	0.00	147.0000	No Ice 0.0778 1/2" 0.1210 Ice 0.1728 1" Ice 0.3025 2" Ice 0.6654 4" Ice	0.1361 0.1890 0.2506 0.3997 0.8015	0.00 0.00 0.00 0.01 0.04
APXVSP18-C-A20 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	147.0000	No Ice 8.4975 1/2" 9.1490 Ice 9.7672 1" Ice 11.0311 2" Ice 13.6786 4" Ice	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.23 0.41 0.91
LLPX310R w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	147.0000	No Ice 4.9623 1/2" 5.3512 Ice 5.7501 1" Ice 6.5777 2" Ice 8.3714 4" Ice	2.8484 3.3668 3.9019 5.0799 7.8368	0.04 0.08 0.12 0.23 0.53
FDD_R6_RRH	B	From Leg	4.0000 0.00 0.00	0.00	147.0000	No Ice 1.7889 1/2" 1.9715 Ice 2.1627 1" Ice 2.5710 2" Ice 3.4914 4" Ice	0.7778 0.9182 1.0673 1.3914 2.1432	0.03 0.04 0.06 0.09 0.20
1900MHz RRH (65MHz)	B	From Leg	4.0000 0.00 1.00	0.00	145.0000	No Ice 2.7087 1/2" 2.9477 Ice 3.1953 1" Ice 3.7164 2" Ice 4.8623 4" Ice	2.6087 2.8450 3.0899 3.6057 4.7410	0.06 0.08 0.11 0.17 0.35
800 EXTERNAL NOTCH FILTER	B	From Leg	4.0000 0.00 0.00	0.00	145.0000	No Ice 0.7701 1/2" 0.8898 Ice 1.0181 1" Ice 1.3007 2" Ice 1.9696 4" Ice	0.3747 0.4647 0.5634 0.7868 1.3372	0.01 0.02 0.02 0.04 0.11
800MHZ RRH	B	From Leg	4.0000 0.00 0.00	0.00	145.0000	No Ice 2.4899 1/2" 2.7061 Ice 2.9310	2.0685 2.2705 2.4812	0.05 0.07 0.10

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
			Horz Lateral ft	Vert ft					
P40-16-XLPP-RR-A w/ Mount Pipe	B	From Leg	4.0000	0.00	0.00	147.0000	1" Ice	3.4068	0.16
							2" Ice	4.4620	0.32
							4" Ice		
							No Ice	9.3725	4.8250
							1/2" Ice	9.9120	5.5706
							Ice	10.4497	6.2654
(3) ACU-A20-N	B	From Leg	4.0000	0.00	0.00	147.0000	1" Ice	11.5558	0.37
							2" Ice	13.8921	0.82
							4" Ice		
							No Ice	0.0778	0.1361
							1/2" Ice	0.1210	0.1890
							Ice	0.1728	0.2506
LLPX310R w/ Mount Pipe	C	From Leg	4.0000	0.00	0.00	147.0000	1" Ice	0.3025	0.01
							2" Ice	0.6654	0.04
							4" Ice		
							No Ice	4.9623	2.8484
							1/2" Ice	5.3512	3.3668
							Ice	5.7501	3.9019
FDD_R6_RRH	C	From Leg	4.0000	0.00	0.00	147.0000	1" Ice	6.5777	0.23
							2" Ice	8.3714	0.53
							4" Ice		
							No Ice	1.7889	0.7778
							1/2" Ice	1.9715	0.9182
							Ice	2.1627	1.0673
1900MHz RRH (65MHz)	C	From Leg	4.0000	0.00	1.00	145.0000	1" Ice	2.5710	0.09
							2" Ice	3.4914	0.20
							4" Ice		
							No Ice	2.7087	2.6087
							1/2" Ice	2.9477	2.8450
							Ice	3.1953	3.0899
800 EXTERNAL NOTCH FILTER	C	From Leg	4.0000	0.00	0.00	145.0000	1" Ice	3.7164	0.17
							2" Ice	4.8623	0.35
							4" Ice		
							No Ice	0.7701	0.3747
							1/2" Ice	0.8898	0.4647
							Ice	1.0181	0.5634
800MHZ RRH	C	From Leg	4.0000	0.00	0.00	145.0000	1" Ice	1.3007	0.04
							2" Ice	1.9696	0.11
							4" Ice		
							No Ice	2.4899	2.0685
							1/2" Ice	2.7061	2.2705
							Ice	2.9310	2.4812
(3) ACU-A20-N	C	From Leg	4.0000	0.00	0.00	147.0000	1" Ice	3.4068	0.16
							2" Ice	4.4620	0.32
							4" Ice		
							No Ice	0.0778	0.1361
							1/2" Ice	0.1210	0.1890
							Ice	0.1728	0.2506
APXVSP18-C-A20 w/ Mount Pipe	C	From Leg	4.0000	0.00	0.00	147.0000	1" Ice	0.3025	0.01
							2" Ice	0.6654	0.04
							4" Ice		
							No Ice	8.4975	6.9458
							1/2" Ice	9.1490	8.1266
							Ice	9.7672	9.0212
*** Side Arm Mount [SO 102- 3]	C	None				145.0000	1" Ice	11.0311	0.41
							2" Ice	13.6786	0.91
							4" Ice		
							No Ice	3.0000	3.0000
							1/2" Ice	3.4800	3.4800
							Ice	3.9600	3.9600
Platform Mount [LP 712-1]	C	None				147.0000	1" Ice	4.9200	0.20
							2" Ice	6.8400	0.32
							4" Ice		
							No Ice	24.5300	24.5300
							1" Ice	4.9200	4.9200
							2" Ice	6.8400	6.8400

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
						1/2"	29.9400	29.9400	1.65
						Ice	35.3500	35.3500	1.96
						1" Ice	46.1700	46.1700	2.58
						2" Ice	67.8100	67.8100	3.82
						4" Ice			

T-Arm Mount [TA 601-3]	C	None		0.00	119.0000	No Ice	10.9000	10.9000	0.73
						1/2"	14.6500	14.6500	0.93
						Ice	18.4000	18.4000	1.13
						1" Ice	25.9000	25.9000	1.52
						2" Ice	40.9000	40.9000	2.32
						4" Ice			
(2) 6' x 2" Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	119.0000	No Ice	1.4250	1.4250	0.02
						1/2"	1.9250	1.9250	0.03
						Ice	2.2939	2.2939	0.05
						1" Ice	3.0596	3.0596	0.09
						2" Ice	4.7022	4.7022	0.23
						4" Ice			
(2) 6' x 2" Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	119.0000	No Ice	1.4250	1.4250	0.02
						1/2"	1.9250	1.9250	0.03
						Ice	2.2939	2.2939	0.05
						1" Ice	3.0596	3.0596	0.09
						2" Ice	4.7022	4.7022	0.23
						4" Ice			
(2) 6' x 2" Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	119.0000	No Ice	1.4250	1.4250	0.02
						1/2"	1.9250	1.9250	0.03
						Ice	2.2939	2.2939	0.05
						1" Ice	3.0596	3.0596	0.09
						2" Ice	4.7022	4.7022	0.23
						4" Ice			

(2) 7770.00 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.00	110.0000	No Ice	6.1194	4.2543	0.06
						1/2"	6.6258	5.0137	0.10
						Ice	7.1283	5.7109	0.16
						1" Ice	8.1643	7.1553	0.29
						2" Ice	10.3599	10.4117	0.66
						4" Ice			
(4) LGP2140X	A	From Leg	4.0000 0.00 2.00	0.00	110.0000	No Ice	1.2600	0.3780	0.01
						1/2"	1.4160	0.4932	0.02
						Ice	1.5806	0.6170	0.03
						1" Ice	1.9358	0.8905	0.05
						2" Ice	2.7499	1.5412	0.13
						4" Ice			
(2) RRUS-11	A	From Leg	4.0000 0.00 2.00	0.00	110.0000	No Ice	3.2486	1.3726	0.05
						1/2"	3.4905	1.5510	0.07
						Ice	3.7411	1.7380	0.09
						1" Ice	4.2682	2.1381	0.15
						2" Ice	5.4260	3.0418	0.31
						4" Ice			
800 10764 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.00	110.0000	No Ice	6.2031	4.2940	0.06
						1/2"	6.6897	4.9925	0.11
						Ice	7.1782	5.6620	0.17
						1" Ice	8.1863	7.1004	0.30
						2" Ice	10.3284	10.3001	0.67
						4" Ice			
DC6-48-60-18-8F	A	From Leg	4.0000 0.00 2.00	0.00	110.0000	No Ice	2.5667	2.5667	0.02
						1/2"	2.7978	2.7978	0.04
						Ice	3.0377	3.0377	0.07
						1" Ice	3.5432	3.5432	0.13
						2" Ice	4.6580	4.6580	0.30
						4" Ice			
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.0000	0.00	110.0000	No Ice	6.1194	4.2543	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
			0.00			1/2"	6.6258	5.0137	0.10
			2.00			Ice	7.1283	5.7109	0.16
						1" Ice	8.1643	7.1553	0.29
						2" Ice	10.3599	10.4117	0.66
						4" Ice			
(4) LGP2140X	B	From Leg	4.0000	0.00	110.0000	No Ice	1.2600	0.3780	0.01
			0.00			1/2"	1.4160	0.4932	0.02
			2.00			Ice	1.5806	0.6170	0.03
						1" Ice	1.9358	0.8905	0.05
						2" Ice	2.7499	1.5412	0.13
						4" Ice			
(2) RRUS-11	B	From Leg	4.0000	0.00	110.0000	No Ice	3.2486	1.3726	0.05
			0.00			1/2"	3.4905	1.5510	0.07
			2.00			Ice	3.7411	1.7380	0.09
						1" Ice	4.2682	2.1381	0.15
						2" Ice	5.4260	3.0418	0.31
						4" Ice			
800 10764 w/ Mount Pipe	B	From Leg	4.0000	0.00	110.0000	No Ice	6.2031	4.2940	0.06
			0.00			1/2"	6.6897	4.9925	0.11
			2.00			Ice	7.1782	5.6620	0.17
						1" Ice	8.1863	7.1004	0.30
						2" Ice	10.3284	10.3001	0.67
						4" Ice			
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.0000	0.00	110.0000	No Ice	6.1194	4.2543	0.06
			0.00			1/2"	6.6258	5.0137	0.10
			2.00			Ice	7.1283	5.7109	0.16
						1" Ice	8.1643	7.1553	0.29
						2" Ice	10.3599	10.4117	0.66
						4" Ice			
(4) LGP2140X	C	From Leg	4.0000	0.00	110.0000	No Ice	1.2600	0.3780	0.01
			0.00			1/2"	1.4160	0.4932	0.02
			2.00			Ice	1.5806	0.6170	0.03
						1" Ice	1.9358	0.8905	0.05
						2" Ice	2.7499	1.5412	0.13
						4" Ice			
(2) RRUS-11	C	From Leg	4.0000	0.00	110.0000	No Ice	3.2486	1.3726	0.05
			0.00			1/2"	3.4905	1.5510	0.07
			2.00			Ice	3.7411	1.7380	0.09
						1" Ice	4.2682	2.1381	0.15
						2" Ice	5.4260	3.0418	0.31
						4" Ice			
800 10764 w/ Mount Pipe	C	From Leg	4.0000	0.00	110.0000	No Ice	6.2031	4.2940	0.06
			0.00			1/2"	6.6897	4.9925	0.11
			2.00			Ice	7.1782	5.6620	0.17
						1" Ice	8.1863	7.1004	0.30
						2" Ice	10.3284	10.3001	0.67
						4" Ice			

Platform Mount [LP 712-1]	C	None		0.00	110.0000	No Ice	24.5300	24.5300	1.34
						1/2"	29.9400	29.9400	1.65
						Ice	35.3500	35.3500	1.96
						1" Ice	46.1700	46.1700	2.58
						2" Ice	67.8100	67.8100	3.82
						4" Ice			

APXV18-206517S-C w/ Mount Pipe	A	From Leg	4.0000	0.00	100.0000	No Ice	5.4042	4.7000	0.05
			0.00			1/2"	5.9597	5.8600	0.10
			0.00			Ice	6.4808	6.7338	0.15
						1" Ice	7.5467	8.5150	0.28
						2" Ice	9.9193	12.2774	0.68
						4" Ice			
APXV18-206517S-C w/ Mount Pipe	B	From Leg	4.0000	0.00	100.0000	No Ice	5.4042	4.7000	0.05
			0.00			1/2"	5.9597	5.8600	0.10
			0.00			Ice	6.4808	6.7338	0.15
						1" Ice	7.5467	8.5150	0.28

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
			Horz ft	Vert ft						
APXV18-206517S-C w/ Mount Pipe	C	From Leg	4.0000	0.00	0.00	100.0000	2" Ice	9.9193	12.2774	0.68
							4" Ice			
							No Ice	5.4042	4.7000	0.05
							1/2" Ice	5.9597	5.8600	0.10
							Ice	6.4808	6.7338	0.15
							1" Ice	7.5467	8.5150	0.28
*** Pipe Mount [PM 601-3]	C	None			0.00	100.0000	2" Ice	9.9193	12.2774	0.68
							4" Ice			
							No Ice	4.3900	4.3900	0.20
							1/2" Ice	5.4800	5.4800	0.24
							Ice	6.5700	6.5700	0.28
							1" Ice	8.7500	8.7500	0.36
*** Pipe Mount [PM 501-1]	C	None			0.00	60.0000	2" Ice	13.1100	13.1100	0.53
							4" Ice			
							No Ice	3.4700	1.6700	0.05
							1/2" Ice	4.4500	2.1000	0.06
							Ice	5.4300	2.5300	0.07
							1" Ice	7.3900	3.3900	0.08
*** KS24019-L112A	A	From Leg	4.0000	0.00	0.00	49.0000	2" Ice	11.3100	5.1100	0.11
							4" Ice			
							No Ice	0.1556	0.1556	0.01
							1/2" Ice	0.2247	0.2247	0.01
							Ice	0.3025	0.3025	0.01
							1" Ice	0.4840	0.4840	0.02
*** Side Arm Mount [SO 701-1]	C	None			0.00	49.0000	2" Ice	0.9506	0.9506	0.06
							4" Ice			
							No Ice	0.8500	1.6700	0.07
							1/2" Ice	1.1400	2.3400	0.08
							Ice	1.4300	3.0100	0.09
							1" Ice	2.0100	4.3500	0.12
**** TD-RRH8x20-25	A	From Leg	4.0000	0.00	0.00	147.0000	2" Ice	3.1700	7.0300	0.18
							4" Ice			
							No Ice	4.7198	1.7027	0.07
							1/2" Ice	5.0138	1.9196	0.10
							Ice	5.3165	2.1453	0.13
							1" Ice	5.9478	2.6224	0.20
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.0000	0.00	0.00	147.0000	2" Ice	7.3141	3.6805	0.40
							4" Ice			
							No Ice	7.1342	4.9591	0.08
							1/2" Ice	7.6618	5.7544	0.13
							Ice	8.1830	6.4723	0.19
							1" Ice	9.2563	8.0099	0.34
TD-RRH8x20-25	B	From Leg	4.0000	0.00	0.00	147.0000	2" Ice	11.5262	11.4120	0.75
							4" Ice			
							No Ice	4.7198	1.7027	0.07
							1/2" Ice	5.0138	1.9196	0.10
							Ice	5.3165	2.1453	0.13
							1" Ice	5.9478	2.6224	0.20
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.0000	0.00	0.00	147.0000	2" Ice	7.3141	3.6805	0.40
							4" Ice			
							No Ice	7.1342	4.9591	0.08
							1/2" Ice	7.6618	5.7544	0.13
							Ice	8.1830	6.4723	0.19
							1" Ice	9.2563	8.0099	0.34
TD-RRH8x20-25	C	From Leg	4.0000	0.00	0.00	147.0000	2" Ice	11.5262	11.4120	0.75
							4" Ice			
							No Ice	4.7198	1.7027	0.07
							1/2" Ice	5.0138	1.9196	0.10
							Ice	5.3165	2.1453	0.13
							1" Ice	5.9478	2.6224	0.20

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment t °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
			Horz Lateral ft	Vert ft						
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	0.00	147.0000	2" Ice	7.3141	3.6805	0.40
							4" Ice			
							No Ice	7.1342	4.9591	0.08
							1/2" Ice	7.6618	5.7544	0.13
							Ice	8.1830	6.4723	0.19
							1" Ice	9.2563	8.0099	0.34
**** ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.0000 0.00 3.00	0.00	0.00	119.0000	2" Ice	11.5262	11.4120	0.75
							4" Ice			
							No Ice	6.8253	5.6424	0.11
							1/2" Ice	7.3471	6.4800	0.17
							Ice	7.8632	7.2567	0.23
							1" Ice	8.9261	8.8640	0.38
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.0000 0.00 3.00	0.00	0.00	119.0000	2" Ice	11.1755	12.2932	0.81
							4" Ice			
							No Ice	6.8155	5.6334	0.11
							1/2" Ice	7.3373	6.4717	0.17
							Ice	7.8532	7.2478	0.23
							1" Ice	8.9160	8.8537	0.38
KRY 112 144/1	A	From Leg	4.0000 0.00 3.00	0.00	0.00	119.0000	2" Ice	11.1650	12.2804	0.81
							4" Ice			
							No Ice	0.4083	0.2042	0.01
							1/2" Ice	0.4969	0.2733	0.01
							Ice	0.5941	0.3511	0.02
							1" Ice	0.8145	0.5326	0.03
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.0000 0.00 3.00	0.00	0.00	119.0000	2" Ice	1.3590	0.9992	0.08
							4" Ice			
							No Ice	6.8253	5.6424	0.11
							1/2" Ice	7.3471	6.4800	0.17
							Ice	7.8632	7.2567	0.23
							1" Ice	8.9261	8.8640	0.38
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.0000 0.00 3.00	0.00	0.00	119.0000	2" Ice	11.1755	12.2932	0.81
							4" Ice			
							No Ice	6.8155	5.6334	0.11
							1/2" Ice	7.3373	6.4717	0.17
							Ice	7.8532	7.2478	0.23
							1" Ice	8.9160	8.8537	0.38
KRY 112 144/1	B	From Leg	4.0000 0.00 3.00	0.00	0.00	119.0000	2" Ice	11.1650	12.2804	0.81
							4" Ice			
							No Ice	0.4083	0.2042	0.01
							1/2" Ice	0.4969	0.2733	0.01
							Ice	0.5941	0.3511	0.02
							1" Ice	0.8145	0.5326	0.03
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.0000 0.00 3.00	0.00	0.00	119.0000	2" Ice	1.3590	0.9992	0.08
							4" Ice			
							No Ice	6.8253	5.6424	0.11
							1/2" Ice	7.3471	6.4800	0.17
							Ice	7.8632	7.2567	0.23
							1" Ice	8.9261	8.8640	0.38
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.0000 0.00 3.00	0.00	0.00	119.0000	2" Ice	11.1755	12.2932	0.81
							4" Ice			
							No Ice	6.8155	5.6334	0.11
							1/2" Ice	7.3373	6.4717	0.17
							Ice	7.8532	7.2478	0.23
							1" Ice	8.9160	8.8537	0.38
KRY 112 144/1	C	From Leg	4.0000 0.00 3.00	0.00	0.00	119.0000	2" Ice	11.1650	12.2804	0.81
							4" Ice			
							No Ice	0.4083	0.2042	0.01
							1/2" Ice	0.4969	0.2733	0.01
							Ice	0.5941	0.3511	0.02
							1" Ice	0.8145	0.5326	0.03

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight K	
				Horz Lateral ft	Vert ft							
A-ANT-23G-2-C	A	Paraboloid w/o Radome	From Leg	1.0000	0.00	0.00		147.0000	2.1750	No Ice	3.7200	0.01
				0.00						1/2" Ice	4.0100	0.02
				2.00						1" Ice	4.3000	0.03
										2" Ice	4.8800	0.04
										4" Ice	6.0400	0.07
A-ANT-23G-2-C	C	Paraboloid w/o Radome	From Leg	1.0000	0.00	0.00		147.0000	2.1750	No Ice	3.7200	0.01
				0.00						1/2" Ice	4.0100	0.02
				2.00						1" Ice	4.3000	0.03
										2" Ice	4.8800	0.04
										4" Ice	6.0400	0.07

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 147.0000-99.5000	122.3179	1.454	26.85	103.536	A	0.000	103.536	103.536	100.00	0.000	0.000
					B	0.000	103.536	100.00	0.000	0.000	
					C	0.000	103.536	100.00	0.000	18.719	
L2 99.5000-69.5000	84.0954	1.306	24.16	81.094	A	0.000	81.094	81.094	100.00	0.000	0.000
					B	0.000	81.094	100.00	0.000	0.000	
					C	0.000	81.094	100.00	0.000	18.103	
L3 69.5000-59.0000	64.2053	1.209	22.37	31.484	A	0.000	31.484	31.484	100.00	0.000	0.000
					B	0.000	31.484	100.00	0.000	0.000	
					C	0.000	31.484	100.00	0.000	8.482	
L4 59.0000-58.0000	58.4995	1.178	21.78	3.029	A	0.000	3.029	3.029	100.00	0.000	0.000
					B	0.000	3.029	100.00	0.000	0.000	
					C	0.000	3.029	100.00	0.000	0.590	
L5 58.0000-50.5000	54.2279	1.152	21.32	23.191	A	0.000	23.191	23.191	100.00	0.000	0.000
					B	0.000	23.191	100.00	0.000	0.000	
					C	0.000	23.191	100.00	0.000	4.828	
L6 50.5000-50.0000	50.2499	1.128	20.86	1.575	A	0.000	1.575	1.575	100.00	0.000	0.000
					B	0.000	1.575	100.00	0.000	0.000	
					C	0.000	1.575	100.00	0.000	0.430	
L7 50.0000-29.2500	39.4667	1.052	19.47	68.588	A	0.000	68.588	68.588	100.00	0.000	0.000
					B	0.000	68.588	100.00	0.000	0.000	
					C	0.000	68.588	100.00	0.000	17.085	
L8 29.2500-24.0000	26.6141	1	18.50	17.998	A	0.000	17.998	17.998	100.00	0.000	0.000
					B	0.000	17.998	100.00	0.000	0.000	
					C	0.000	17.998	100.00	0.000	3.501	
L9 24.0000-0.0000	11.8080	1	18.50	87.500	A	0.000	87.500	87.500	100.00	0.000	0.000
					B	0.000	87.500	100.00	0.000	0.000	
					C	0.000	87.500	100.00	0.000	20.482	

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation	z	K _Z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
L1 147.0000-99.5000	122.3179	1.454	5.25	0.8777	110.484	A	0.000	110.484	110.484	100.00	0.000	0.000
						B	0.000	110.484		100.00	0.000	0.000
						C	0.000	110.484		100.00	0.000	43.821
L2 99.5000-69.5000	84.0954	1.306	4.73	0.8391	85.483	A	0.000	85.483	85.483	100.00	0.000	0.000
						B	0.000	85.483		100.00	0.000	0.000
						C	0.000	85.483		100.00	0.000	39.461
L3 69.5000-59.0000	64.2053	1.209	4.38	0.8124	32.905	A	0.000	32.905	32.905	100.00	0.000	0.000
						B	0.000	32.905		100.00	0.000	0.000
						C	0.000	32.905		100.00	0.000	16.840
L4 59.0000-58.0000	58.4995	1.178	4.26	0.8033	3.164	A	0.000	3.164	3.164	100.00	0.000	0.000
						B	0.000	3.164		100.00	0.000	0.000
						C	0.000	3.164		100.00	0.000	1.240
L5 58.0000-50.5000	54.2279	1.152	4.17	0.7961	24.186	A	0.000	24.186	24.186	100.00	0.000	0.000
						B	0.000	24.186		100.00	0.000	0.000
						C	0.000	24.186		100.00	0.000	9.870
L6 50.5000-50.0000	50.2499	1.128	4.08	0.7888	1.641	A	0.000	1.641	1.641	100.00	0.000	0.000
						B	0.000	1.641		100.00	0.000	0.000
						C	0.000	1.641		100.00	0.000	0.833
L7 50.0000-29.2500	39.4667	1.052	3.81	0.7663	71.238	A	0.000	71.238	71.238	100.00	0.000	0.000
						B	0.000	71.238		100.00	0.000	0.000
						C	0.000	71.238		100.00	0.000	32.871
L8 29.2500-24.0000	26.6141	1	3.62	0.7500	18.669	A	0.000	18.669	18.669	100.00	0.000	0.000
						B	0.000	18.669		100.00	0.000	0.000
						C	0.000	18.669		100.00	0.000	6.975
L9 24.0000-0.0000	11.8080	1	3.62	0.7500	90.500	A	0.000	90.500	90.500	100.00	0.000	0.000
						B	0.000	90.500		100.00	0.000	0.000
						C	0.000	90.500		100.00	0.000	38.799

Tower Pressure - Service

G_H = 1.690

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
L1 147.0000-99.5000	122.3179	1.454	9.29	103.53	A	0.000	103.536	103.536	100.00	0.000	0.000
				6	B	0.000	103.536		100.00	0.000	0.000
					C	0.000	103.536		100.00	0.000	18.719
L2 99.5000-69.5000	84.0954	1.306	8.36	81.094	A	0.000	81.094	81.094	100.00	0.000	0.000
					B	0.000	81.094		100.00	0.000	0.000
					C	0.000	81.094		100.00	0.000	18.103
L3 69.5000-59.0000	64.2053	1.209	7.74	31.484	A	0.000	31.484	31.484	100.00	0.000	0.000
					B	0.000	31.484		100.00	0.000	0.000
					C	0.000	31.484		100.00	0.000	8.482
L4 59.0000-58.0000	58.4995	1.178	7.54	3.029	A	0.000	3.029	3.029	100.00	0.000	0.000
					B	0.000	3.029		100.00	0.000	0.000
					C	0.000	3.029		100.00	0.000	0.590
L5 58.0000-50.5000	54.2279	1.152	7.38	23.191	A	0.000	23.191	23.191	100.00	0.000	0.000
					B	0.000	23.191		100.00	0.000	0.000
					C	0.000	23.191		100.00	0.000	4.828
L6 50.5000-50.0000	50.2499	1.128	7.22	1.575	A	0.000	1.575	1.575	100.00	0.000	0.000
					B	0.000	1.575		100.00	0.000	0.000
					C	0.000	1.575		100.00	0.000	0.430
L7 50.0000-29.2500	39.4667	1.052	6.74	68.588	A	0.000	68.588	68.588	100.00	0.000	0.000
					B	0.000	68.588		100.00	0.000	0.000
					C	0.000	68.588		100.00	0.000	17.085
L8 29.2500-24.0000	26.6141	1	6.40	17.998	A	0.000	17.998	17.998	100.00	0.000	0.000
					B	0.000	17.998		100.00	0.000	0.000
					C	0.000	17.998		100.00	0.000	3.501
L9 24.0000-0.0000	11.8080	1	6.40	87.500	A	0.000	87.500	87.500	100.00	0.000	0.000
					B	0.000	87.500		100.00	0.000	0.000
					C	0.000	87.500		100.00	0.000	20.482

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	147 - 99.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-18.95	2.63	-1.03
			Max. Mx	5	-9.39	-457.85	3.76
			Max. My	8	-9.39	-0.63	-459.92
			Max. Vy	5	18.62	-457.85	3.76
			Max. Vx	8	18.64	-0.63	-459.92
			Max. Torque	4			1.17
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-28.28	5.70	-2.79
			L2	99.5 - 69.5	Pole	Max Tension	1
Max. Compression	14	-28.28				5.70	-2.79
Max. Mx	5	-15.61				-1189.18	6.30
Max. My	8	-15.60				-0.91	-1193.24
Max. Vy	5	24.11				-1189.18	6.30
Max. Vx	8	24.13				-0.91	-1193.24
Max. Torque	4						1.17
Max Tension	1	0.00				0.00	0.00
Max. Compression	14	-30.02				6.25	-3.11
L3	69.5 - 59	Pole				Max. Mx	5
			Max. My	8	-16.92	-0.94	-1334.36

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L4	59 - 58	Pole	Max. Vy	5	24.92	-1329.92	6.71
			Max. Vx	8	24.95	-0.94	-1334.36
			Max. Torque	3			1.20
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-32.69	6.81	-3.43
			Max. Mx	5	-18.95	-1475.87	7.13
			Max. My	8	-18.94	-0.97	-1480.69
			Max. Vy	5	25.93	-1475.87	7.13
L5	58 - 50.5	Pole	Max. Vx	8	25.95	-0.97	-1480.69
			Max. Torque	3			1.23
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-34.99	7.54	-3.85
			Max. Mx	5	-20.75	-1673.69	7.66
			Max. My	8	-20.74	-1.00	-1679.00
			Max. Vy	5	26.90	-1673.69	7.66
			Max. Vx	8	26.92	-1.00	-1679.00
L6	50.5 - 50	Pole	Max. Torque	3			1.26
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-35.17	7.60	-3.88
			Max. Mx	5	-20.90	-1687.14	7.70
			Max. My	8	-20.89	-1.00	-1692.48
			Max. Vy	5	26.97	-1687.14	7.70
			Max. Vx	8	26.99	-1.00	-1692.48
			Max. Torque	3			1.27
L7	50 - 29.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-40.50	9.13	-4.72
			Max. Mx	5	-25.18	-2120.55	8.80
			Max. My	8	-25.18	-1.04	-2126.94
			Max. Vy	5	28.99	-2120.55	8.80
			Max. Vx	8	29.01	-1.04	-2126.94
			Max. Torque	8			-1.40
			Max Tension	1	0.00	0.00	0.00
L8	29.25 - 24	Pole	Max. Compression	14	-45.57	10.16	-5.31
			Max. Mx	5	-29.32	-2431.98	9.51
			Max. My	8	-29.32	-1.05	-2439.10
			Max. Vy	5	30.34	-2431.98	9.51
			Max. Vx	8	30.36	-1.05	-2439.10
			Max. Torque	8			-1.50
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-55.54	12.62	-6.73
L9	24 - 0	Pole	Max. Mx	5	-37.74	-3194.17	11.09
			Max. My	8	-37.74	-1.03	-3203.04
			Max. Vy	5	33.29	-3194.17	11.09
			Max. Vx	8	33.31	-1.03	-3203.04
			Max. Torque	8			-1.76

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	55.54	-0.00	0.00
	Max. H _x	11	37.75	33.19	0.06
	Max. H _z	2	37.75	-0.17	33.27
	Max. M _x	2	3196.50	-0.17	33.27
	Max. M _z	5	3194.17	-33.27	0.08
	Max. Torsion	3	1.57	-16.75	28.74
	Min. Vert	2	37.75	-0.17	33.27
	Min. H _x	5	37.75	-33.27	0.08
	Min. H _z	8	37.75	-0.03	-33.29
	Min. M _x	8	-3203.04	-0.03	-33.29
	Min. M _z	11	-3188.97	33.19	0.06
	Min. Torsion	8	-1.76	-0.03	-33.29

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	37.75	0.00	-0.00	1.94	3.70	0.00
Dead+Wind 0 deg - No Ice	37.75	0.17	-33.27	-3196.50	-22.83	-1.55
Dead+Wind 30 deg - No Ice	37.75	16.75	-28.74	-2755.62	-1612.43	-1.57
Dead+Wind 60 deg - No Ice	37.75	28.85	-16.62	-1594.38	-2770.90	-1.19
Dead+Wind 90 deg - No Ice	37.75	33.27	-0.08	-11.09	-3194.17	-0.45
Dead+Wind 120 deg - No Ice	37.75	28.91	16.69	1609.27	-2780.06	0.57
Dead+Wind 150 deg - No Ice	37.75	16.56	28.86	2778.31	-1583.98	1.44
Dead+Wind 180 deg - No Ice	37.75	0.03	33.29	3203.04	-1.03	1.76
Dead+Wind 210 deg - No Ice	37.75	-16.51	28.87	2780.49	1583.85	1.57
Dead+Wind 240 deg - No Ice	37.75	-28.73	16.79	1624.45	2760.70	0.98
Dead+Wind 270 deg - No Ice	37.75	-33.19	-0.06	-6.46	3188.97	0.22
Dead+Wind 300 deg - No Ice	37.75	-28.78	-16.62	-1593.99	2768.15	-0.57
Dead+Wind 330 deg - No Ice	37.75	-16.64	-28.72	-2752.45	1603.86	-1.21
Dead+Ice+Temp	55.54	0.00	-0.00	6.73	12.62	0.00
Dead+Wind 0	55.54	0.04	-8.11	-796.05	6.64	-0.57
deg+Ice+Temp						
Dead+Wind 30	55.54	4.08	-7.01	-685.59	-392.54	-0.49
deg+Ice+Temp						
Dead+Wind 60	55.54	7.03	-4.05	-393.93	-683.56	-0.29
deg+Ice+Temp						
Dead+Wind 90	55.54	8.11	-0.02	3.80	-789.98	-0.00
deg+Ice+Temp						
Dead+Wind 120	55.54	7.04	4.07	410.05	-685.68	0.32
deg+Ice+Temp						
Dead+Wind 150	55.54	4.04	7.03	703.50	-386.00	0.55
deg+Ice+Temp						
Dead+Wind 180	55.54	0.01	8.11	810.21	11.65	0.61
deg+Ice+Temp						
Dead+Wind 210	55.54	-4.03	7.04	704.00	409.75	0.49
deg+Ice+Temp						
Dead+Wind 240	55.54	-7.00	4.09	413.54	704.99	0.25
deg+Ice+Temp						
Dead+Wind 270	55.54	-8.09	-0.01	4.87	812.54	-0.05
deg+Ice+Temp						
Dead+Wind 300	55.54	-7.02	-4.05	-393.84	706.70	-0.32
deg+Ice+Temp						
Dead+Wind 330	55.54	-4.06	-7.00	-684.85	414.33	-0.50
deg+Ice+Temp						
Dead+Wind 0 deg - Service	37.75	0.06	-11.51	-1106.14	-5.41	-0.55
Dead+Wind 30 deg - Service	37.75	5.79	-9.94	-953.36	-556.12	-0.55
Dead+Wind 60 deg - Service	37.75	9.98	-5.75	-551.06	-957.46	-0.41
Dead+Wind 90 deg - Service	37.75	11.51	-0.03	-2.54	-1104.13	-0.15
Dead+Wind 120 deg - Service	37.75	10.00	5.78	558.84	-960.65	0.20
Dead+Wind 150 deg - Service	37.75	5.73	9.99	963.84	-546.26	0.49
Dead+Wind 180 deg - Service	37.75	0.01	11.52	1110.96	2.14	0.61
Dead+Wind 210 deg - Service	37.75	-5.71	9.99	964.59	551.22	0.55
Dead+Wind 240 deg - Service	37.75	-9.94	5.81	564.09	958.93	0.35
Dead+Wind 270 deg - Service	37.75	-11.48	-0.02	-0.93	1107.32	0.08
Dead+Wind 300 deg - Service	37.75	-9.96	-5.75	-550.92	961.51	-0.20
Dead+Wind 330 deg - Service	37.75	-5.76	-9.94	-952.25	558.14	-0.42

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-37.75	0.00	-0.00	37.75	0.00	0.001%
2	0.17	-37.75	-33.28	-0.17	37.75	33.27	0.005%
3	16.75	-37.75	-28.74	-16.75	37.75	28.74	0.000%
4	28.85	-37.75	-16.62	-28.85	37.75	16.62	0.000%
5	33.28	-37.75	-0.08	-33.27	37.75	0.08	0.005%
6	28.91	-37.75	16.69	-28.91	37.75	-16.69	0.000%
7	16.56	-37.75	28.86	-16.56	37.75	-28.86	0.000%
8	0.03	-37.75	33.29	-0.03	37.75	-33.29	0.002%
9	-16.51	-37.75	28.87	16.51	37.75	-28.87	0.000%
10	-28.73	-37.75	16.79	28.73	37.75	-16.79	0.000%
11	-33.19	-37.75	-0.06	33.19	37.75	0.06	0.005%
12	-28.78	-37.75	-16.62	28.78	37.75	16.62	0.000%
13	-16.64	-37.75	-28.72	16.64	37.75	28.72	0.000%
14	0.00	-55.54	0.00	-0.00	55.54	0.00	0.001%
15	0.04	-55.54	-8.11	-0.04	55.54	8.11	0.000%
16	4.08	-55.54	-7.01	-4.08	55.54	7.01	0.000%
17	7.03	-55.54	-4.05	-7.03	55.54	4.05	0.000%
18	8.11	-55.54	-0.02	-8.11	55.54	0.02	0.000%
19	7.04	-55.54	4.07	-7.04	55.54	-4.07	0.000%
20	4.04	-55.54	7.03	-4.04	55.54	-7.03	0.000%
21	0.01	-55.54	8.11	-0.01	55.54	-8.11	0.000%
22	-4.03	-55.54	7.04	4.03	55.54	-7.04	0.000%
23	-7.00	-55.54	4.09	7.00	55.54	-4.09	0.000%
24	-8.09	-55.54	-0.01	8.09	55.54	0.01	0.000%
25	-7.02	-55.54	-4.05	7.02	55.54	4.05	0.000%
26	-4.06	-55.54	-7.00	4.06	55.54	7.00	0.000%
27	0.06	-37.75	-11.51	-0.06	37.75	11.51	0.002%
28	5.79	-37.75	-9.94	-5.79	37.75	9.94	0.001%
29	9.98	-37.75	-5.75	-9.98	37.75	5.75	0.001%
30	11.51	-37.75	-0.03	-11.51	37.75	0.03	0.002%
31	10.00	-37.75	5.78	-10.00	37.75	-5.78	0.001%
32	5.73	-37.75	9.99	-5.73	37.75	-9.99	0.001%
33	0.01	-37.75	11.52	-0.01	37.75	-11.52	0.002%
34	-5.71	-37.75	9.99	5.71	37.75	-9.99	0.001%
35	-9.94	-37.75	5.81	9.94	37.75	-5.81	0.001%
36	-11.49	-37.75	-0.02	11.48	37.75	0.02	0.002%
37	-9.96	-37.75	-5.75	9.96	37.75	5.75	0.001%
38	-5.76	-37.75	-9.94	5.76	37.75	9.94	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000738
2	Yes	13	0.00005790	0.00009790
3	Yes	17	0.00000001	0.00006618
4	Yes	17	0.00000001	0.00006871
5	Yes	13	0.00005791	0.00012195
6	Yes	17	0.00000001	0.00006864
7	Yes	17	0.00000001	0.00006591
8	Yes	14	0.00000001	0.00006270
9	Yes	17	0.00000001	0.00006877
10	Yes	17	0.00000001	0.00006741
11	Yes	13	0.00005793	0.00009752
12	Yes	17	0.00000001	0.00006695
13	Yes	17	0.00000001	0.00006788
14	Yes	9	0.00000001	0.00010267
15	Yes	15	0.00000001	0.00011835
16	Yes	15	0.00000001	0.00012891
17	Yes	15	0.00000001	0.00012907
18	Yes	15	0.00000001	0.00011717
19	Yes	15	0.00000001	0.00013164
20	Yes	15	0.00000001	0.00013089
21	Yes	15	0.00000001	0.00012064
22	Yes	15	0.00000001	0.00013479

23	Yes	15	0.00000001	0.00013522
24	Yes	15	0.00000001	0.00012091
25	Yes	15	0.00000001	0.00013273
26	Yes	15	0.00000001	0.00013217
27	Yes	13	0.00000001	0.00004235
28	Yes	14	0.00000001	0.00006970
29	Yes	14	0.00000001	0.00007868
30	Yes	13	0.00000001	0.00004018
31	Yes	14	0.00000001	0.00007649
32	Yes	14	0.00000001	0.00007042
33	Yes	13	0.00000001	0.00004561
34	Yes	14	0.00000001	0.00008059
35	Yes	14	0.00000001	0.00007307
36	Yes	13	0.00000001	0.00003916
37	Yes	14	0.00000001	0.00007374
38	Yes	14	0.00000001	0.00007710

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147 - 99.5	34.41	35	2.04	0.00
L2	103.25 - 69.5	17.02	35	1.64	0.00
L3	69.5 - 59	7.35	35	1.03	0.00
L4	63.75 - 58	6.17	35	0.94	0.00
L5	58 - 50.5	5.07	35	0.87	0.00
L6	50.5 - 50	3.81	35	0.74	0.00
L7	50 - 29.25	3.73	35	0.73	0.00
L8	34.5 - 24	1.78	35	0.47	0.00
L9	24 - 0	0.86	35	0.34	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.0000	A-ANT-23G-2-C	35	34.41	2.04	0.00	31716
147.0000	LLPX310R w/ Mount Pipe	35	34.41	2.04	0.00	31716
145.0000	1900MHz RRH (65MHz)	35	33.57	2.02	0.00	31716
119.0000	T-Arm Mount [TA 601-3]	35	22.88	1.83	0.00	5662
110.0000	(2) 7770.00 w/ Mount Pipe	35	19.45	1.73	0.00	4284
100.0000	APXV18-206517S-C w/ Mount Pipe	35	15.90	1.59	0.00	3497
60.0000	Pipe Mount [PM 501-1]	35	5.44	0.90	0.00	4137
49.0000	KS24019-L112A	35	3.58	0.71	0.00	3202

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147 - 99.5	99.21	6	5.88	0.01
L2	103.25 - 69.5	49.08	6	4.75	0.01
L3	69.5 - 59	21.21	6	2.97	0.00
L4	63.75 - 58	17.79	6	2.70	0.00
L5	58 - 50.5	14.64	6	2.52	0.00
L6	50.5 - 50	10.99	6	2.13	0.00
L7	50 - 29.25	10.77	6	2.11	0.00
L8	34.5 - 24	5.13	6	1.37	0.00
L9	24 - 0	2.47	6	0.99	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.0000	A-ANT-23G-2-C	6	99.21	5.88	0.01	11207
147.0000	LLPX310R w/ Mount Pipe	6	99.21	5.88	0.01	11207
145.0000	1900MHz RRH (65MHz)	6	96.78	5.84	0.01	11207
119.0000	T-Arm Mount [TA 601-3]	6	65.98	5.29	0.01	1997
110.0000	(2) 7770.00 w/ Mount Pipe	6	56.09	5.01	0.01	1509
100.0000	APXV18-206517S-C w/ Mount Pipe	6	45.86	4.60	0.01	1229
60.0000	Pipe Mount [PM 501-1]	6	15.71	2.59	0.00	1439
49.0000	KS24019-L112A	6	10.34	2.06	0.00	1112

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
L1	147 - 99.5 (1)	TP30.313x22x0.25	47.5000	0.0000	0.0	36.00	23.6724	-9.37	852.21	0.011
L2	99.5 - 69.5 (2)	TP35.0626x29.1567x0.312 5	33.7500	0.0000	0.0	39.00	34.9673	-15.59	1363.72	0.011
L3	69.5 - 59 (3)	TP36.9x35.0626x0.4301	10.5000	0.0000	0.0	34.46	49.3591	-16.92	1701.11	0.010
L4	59 - 58 (4)	TP36.45x35.2086x0.375	5.7500	0.0000	0.0	39.00	43.5606	-18.94	1698.86	0.011
L5	58 - 50.5 (5)	TP37.7624x36.45x0.4272	7.5000	0.0000	0.0	36.44	51.3518	-20.74	1871.47	0.011
L6	50.5 - 50 (6)	TP37.8499x37.7624x0.540 6	0.5000	0.0000	0.0	33.98	64.9396	-20.89	2206.91	0.009
L7	50 - 29.25 (7)	TP41.481x37.8499x0.479	20.7500	0.0000	0.0	34.60	61.8224	-25.17	2139.18	0.012
L8	29.25 - 24 (8)	TP41.6499x39.6043x0.504 7	10.5000	0.0000	0.0	36.61	66.8677	-29.31	2448.16	0.012
L9	24 - 0 (9)	TP45.85x41.6499x0.5901	24.0000	0.0000	0.0	34.71	85.9921	-37.74	2984.79	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio f _{bx} F _{bx}	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} F _{by}
L1	147 - 99.5 (1)	TP30.313x22x0.25	463.05	32.67	36.00	0.907	0.00	0.00	36.00	0.000
L2	99.5 - 69.5 (2)	TP35.0626x29.1567x0.31 25	1198.5 6	48.47	39.00	1.243	0.00	0.00	39.00	0.000
L3	69.5 - 59 (3)	TP36.9x35.0626x0.4301	1340.0 2	37.55	34.46	1.089	0.00	0.00	34.46	0.000
L4	59 - 58 (4)	TP36.45x35.2086x0.375	1486.7 0	46.55	39.00	1.194	0.00	0.00	39.00	0.000
L5	58 - 50.5 (5)	TP37.7624x36.45x0.4272	1685.4 5	43.30	36.44	1.188	0.00	0.00	36.44	0.000
L6	50.5 - 50 (6)	TP37.8499x37.7624x0.54 06	1698.9 6	34.64	33.98	1.019	0.00	0.00	33.98	0.000
L7	50 - 29.25 (7)	TP41.481x37.8499x0.479	2134.3 2	42.45	34.60	1.227	0.00	0.00	34.60	0.000
L8	29.25 - 24 (8)	TP41.6499x39.6043x0.50 47	2447.0 5	43.85	36.61	1.198	0.00	0.00	36.61	0.000
L9	24 - 0 (9)	TP45.85x41.6499x0.5901	3212.2 3	40.72	34.71	1.173	0.00	0.00	34.71	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f _v ksi	Allow. F _v ksi	Ratio f _v F _v	Actual T kip-ft	Actual f _{vt} ksi	Allow. F _{vt} ksi	Ratio f _{vt} F _{vt}
L1	147 - 99.5 (1)	TP30.313x22x0.25	18.73	0.79	24.00	0.067	0.34	0.01	24.00	0.000
L2	99.5 - 69.5 (2)	TP35.0626x29.1567x0.31 25	24.22	0.69	26.00	0.054	0.10	0.00	26.00	0.000
L3	69.5 - 59 (3)	TP36.9x35.0626x0.4301	25.04	0.51	22.98	0.045	0.04	0.00	22.98	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L4	59 - 58 (4)	TP36.45x35.2086x0.375	26.05	0.60	26.00	0.047	0.03	0.00	26.00	0.000
L5	58 - 50.5 (5)	TP37.7624x36.45x0.4272	27.01	0.53	24.30	0.044	0.09	0.00	24.30	0.000
L6	50.5 - 50 (6)	TP37.8499x37.7624x0.5406	27.08	0.42	22.66	0.037	0.09	0.00	22.66	0.000
L7	50 - 29.25 (7)	TP41.481x37.8499x0.479	29.10	0.47	23.07	0.041	0.21	0.00	23.07	0.000
L8	29.25 - 24 (8)	TP41.6499x39.6043x0.5047	30.45	0.46	24.41	0.038	0.31	0.00	24.41	0.000
L9	24 - 0 (9)	TP45.85x41.6499x0.5901	33.40	0.39	23.14	0.034	0.57	0.00	23.14	0.000

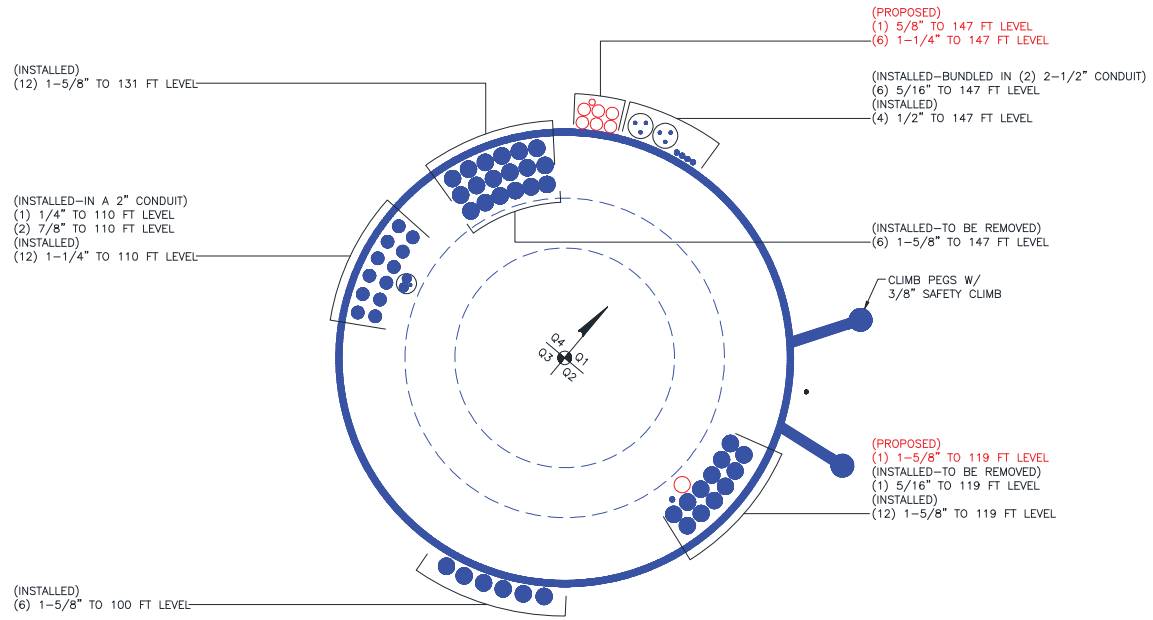
Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	147 - 99.5 (1)	0.011	0.907	0.000	0.067	0.000	0.920	1.333	H1-3+VT ✓
L2	99.5 - 69.5 (2)	0.011	1.243	0.000	0.054	0.000	1.255	1.333	H1-3+VT ✓
L3	69.5 - 59 (3)	0.010	1.089	0.000	0.045	0.000	1.100	1.333	H1-3+VT ✓
L4	59 - 58 (4)	0.011	1.194	0.000	0.047	0.000	1.205	1.333	H1-3+VT ✓
L5	58 - 50.5 (5)	0.011	1.188	0.000	0.044	0.000	1.200	1.333	H1-3+VT ✓
L6	50.5 - 50 (6)	0.009	1.019	0.000	0.037	0.000	1.029	1.333	H1-3+VT ✓
L7	50 - 29.25 (7)	0.012	1.227	0.000	0.041	0.000	1.239	1.333	H1-3+VT ✓
L8	29.25 - 24 (8)	0.012	1.198	0.000	0.038	0.000	1.210	1.333	H1-3+VT ✓
L9	24 - 0 (9)	0.013	1.173	0.000	0.034	0.000	1.186	1.333	H1-3+VT ✓

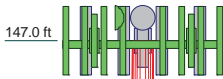
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF \cdot P_{allow}$ K	% Capacity	Pass Fail	
L1	147 - 99.5	Pole	TP30.313x22x0.25	1	-9.37	1135.99	69.0	Pass	
L2	99.5 - 69.5	Pole	TP35.0626x29.1567x0.3125	2	-15.59	1817.84	94.1	Pass	
L3	69.5 - 59	Pole	TP36.9x35.0626x0.4301	3	-16.92	2267.58	82.5	Pass	
L4	59 - 58	Pole	TP36.45x35.2086x0.375	4	-18.94	2264.58	90.4	Pass	
L5	58 - 50.5	Pole	TP37.7624x36.45x0.4272	5	-20.74	2494.67	90.0	Pass	
L6	50.5 - 50	Pole	TP37.8499x37.7624x0.5406	6	-20.89	2941.81	77.2	Pass	
L7	50 - 29.25	Pole	TP41.481x37.8499x0.479	7	-25.17	2851.53	92.9	Pass	
L8	29.25 - 24	Pole	TP41.6499x39.6043x0.5047	8	-29.31	3263.40	90.8	Pass	
L9	24 - 0	Pole	TP45.85x41.6499x0.5901	9	-37.74	3978.72	89.0	Pass	
							Summary		
							Pole (L2)	94.1	Pass
							RATING =	94.1	Pass

APPENDIX B
BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS



DESIGNED APPURTENANCE LOADING

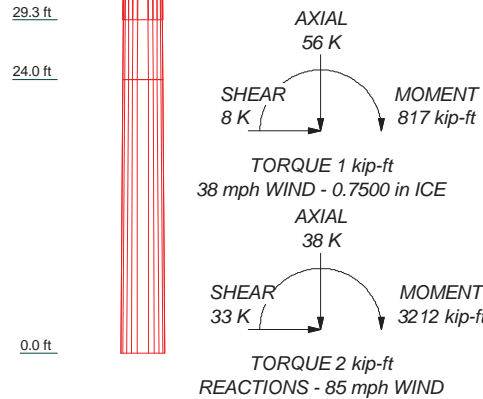
TYPE	ELEVATION	TYPE	ELEVATION
LLPX310R w/ Mount Pipe	147	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	119
FDD_R6_RRH	147		
(3) ACU-A20-N	147	KRY 112 144/1	119
APXVSP18-C-A20 w/ Mount Pipe	147	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	119
LLPX310R w/ Mount Pipe	147		
FDD_R6_RRH	147	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	119
P40-16-XLPP-RR-A w/ Mount Pipe	147	KRY 112 144/1	119
(3) ACU-A20-N	147		
LLPX310R w/ Mount Pipe	147	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	119
FDD_R6_RRH	147		
(3) ACU-A20-N	147	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	119
APXVSP18-C-A20 w/ Mount Pipe	147	KRY 112 144/1	119
Platform Mount [LP 712-1]	147	DC6-48-60-18-8F	110
TD-RRH8x20-25	147	(2) 7770.00 w/ Mount Pipe	110
APXVTM14-C-120 w/ Mount Pipe	147	(4) LGP2140X	110
TD-RRH8x20-25	147	(2) RRU-11	110
APXVTM14-C-120 w/ Mount Pipe	147	(2) 7770.00 w/ Mount Pipe	110
TD-RRH8x20-25	147	(4) LGP2140X	110
APXVTM14-C-120 w/ Mount Pipe	147	800 10764 w/ Mount Pipe	110
A-ANT-23G-2-C	147	(2) 7770.00 w/ Mount Pipe	110
A-ANT-23G-2-C	147	(4) LGP2140X	110
Side Arm Mount [SO 102-3]	145	(2) RRU-11	110
800 EXTERNAL NOTCH FILTER	145	800 10764 w/ Mount Pipe	110
800MHZ RRH	145	Platform Mount [LP 712-1]	110
1900MHZ RRH (65MHz)	145	(2) RRU-11	110
1900MHZ RRH (65MHz)	145	800 10764 w/ Mount Pipe	110
1900MHZ RRH (65MHz)	145	APXV18-206517S-C w/ Mount Pipe	100
800 EXTERNAL NOTCH FILTER	145	APXV18-206517S-C w/ Mount Pipe	100
800MHZ RRH	145	APXV18-206517S-C w/ Mount Pipe	100
800 EXTERNAL NOTCH FILTER	145	Pipe Mount [PM 601-3]	100
800MHZ RRH	145	Pipe Mount [PM 501-1]	60
T-Arm Mount [TA 601-3]	119	Side Arm Mount [SO 701-1]	49
(2) 6' x 2" Mount Pipe	119	KS24019-L112A	49
(2) 6' x 2" Mount Pipe	119		
(2) 6' x 2" Mount Pipe	119		
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	119		

MATERIAL STRENGTH


GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	Reinf 56.64 ksi	57 ksi	71 ksi
A607-65	65 ksi	80 ksi	Reinf 57.67 ksi	58 ksi	73 ksi
Reinf 57.44 ksi	57 ksi	65 ksi	Reinf 61.02 ksi	61 ksi	77 ksi
Reinf 60.74 ksi	61 ksi	76 ksi	Reinf 57.85 ksi	58 ksi	73 ksi

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 94.1%



Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	47.5000	12	0.2500	3.7500	22.0000	30.3130	A607-60	3.4
2	33.7500	12	0.3125	29.1567	35.0626		A607-65	3.7
3	5.7500	12	0.4301	4.7500				1.8
4	5.7500	12	0.3750	35.0626	36.9000			0.8
5	20.7500	12	0.4790	37.8499	41.4810			1.3
6	10.5000	12	0.5047	39.6043	41.6499			0.1
7	24.0000	12	0.5900	41.6499	45.8500			4.3
8	24.0000	12	0.5900	41.6499	45.8500			2.3
9	24.0000	12	0.5900	41.6499	45.8500			6.7
								24.3



Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: **147' MP; Branford Banm Tower; Branford, CT**

Project: **PJF# 37512-1607 (BU# 876321)**

Client: CCI	Drawn by: John J Woolley	App'd:
Code: TIA/EIA-222-F	Date: 03/31/14	Scale: NTS
Path:		Dwg No. E-1

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
 2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
 3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#:	876321
Site Name:	Branford Banm
App #:	

Anchor Rod Data

Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	54	in
Anchor Spacing:	6	in

Plate Data

W=Side:	54	in
Thick:	3.5	in
Grade:	50	ksi
Clip Distance:	4	in

Stiffener Data (Welding at both sides)

Configuration:	Unstiffened
Weld Type:	**
Groove Depth:	in **
Groove Angle:	degrees
Fillet H. Weld:	<-- Disregard
Fillet V. Weld:	in
Width:	in
Height:	in
Thick:	in
Notch:	in
Grade:	ksi
Weld str.:	ksi

Pole Data

Diam:	45.85	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round

Stress Increase Factor

ASD ASIF:	1.333
-----------	-------

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

Base Reactions

TIA Revision:	F	
Unfactored Moment, M:	3212	ft-kips
Unfactored Axial, P:	38	kips
Unfactored Shear, V:	33	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	176.1 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	90.3% Pass

Base Plate Results

Base Plate Stress:	36.7 ksi	Flexural Check
Allowable PL Bending Stress:	50.0 ksi	
Base Plate Stress Ratio:	73.5% Pass	

PL Ref. Data

Yield Line (in):	30.52
Max PL Length:	30.52

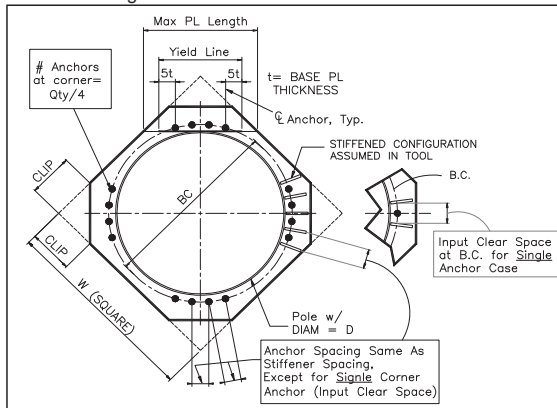
N/A - Unstiffened

Stiffener Results

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$:	N/A
Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check:	N/A
----------------------------	-----



Foundation Loads:

Pole weight or tower leg compression = **38** (kips)
 Horizontal load at top of pier = **33** (kips)
 Overturning moment at top of pier = **3212** (ft-kips)

Design criteria:

Safety factor against overturning = **1.5**

Soil Properties:

Soil density = **125** (pcf)
 Allowable soil bearing = **4** (ksf)
 Depth to water table = **4.5** (ft)

Dimensions:

Pier shape (round or square) = **S** ("R" or "S")
 Pier width = **7** (ft)
 Pier height above grade = **0.5** (ft)
 depth to bottom of footing = **11** (ft)
 Footing thickness = **3** (ft)
 Footing width = **20.5** (ft)
 Footing length = **20.5** (ft)

Concrete:

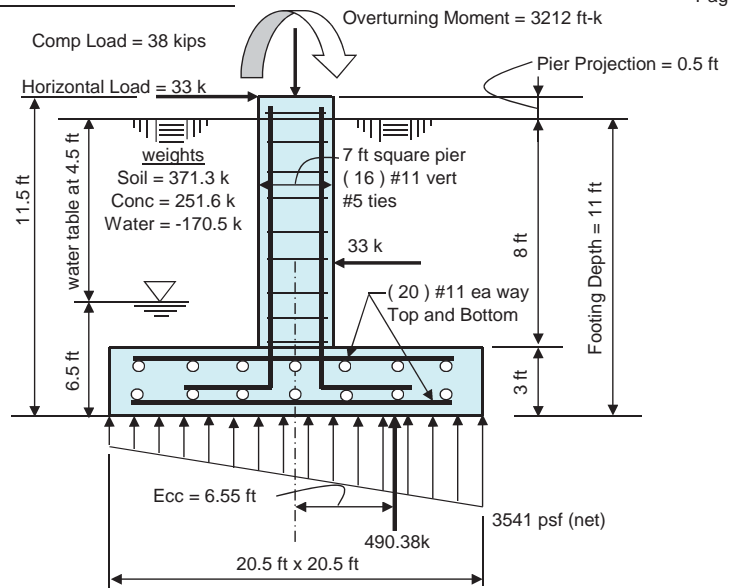
Concrete strength = **3** (ksi)
 Rebar strength = **60** (ksi)
 ultimate load factor = **1.3**

Reinforcing Steel:

Pad
 minimum cover over rebar = **3** inches
 size of pad rebar = **#11** bar
 quantity of pad rebar = **20** (ea direction)

Reinforcing Steel:

Pier
 size of vert rebar in pier = **#11** bar
 vertical rebar quantity = **16**
 size of pier ties = **#5** bar
 minimum cover over rebar = **3** inches
 Total volume of concrete = **62.1** cu yd



Summary of analysis results	
Maximum Net Soil Bearing = 3.541 ksf Allowable Net Soil Bearing = 4 ksf Soil Bearing Stress Ratio = 0.89 Okay	Ult Bending Shear Capacity = 110 psi Ult Bending Shear Stress = 50 psi Bending Shear Stress Ratio = 0.45 Okay
Ftg Overturning Resistance = 5026 ft-kips Overturning Moment = 3212 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 1.565 Ratio = 0.96 Okay	Pad Bending Moment Capacity = 4134 ft-k Pad Bending Moment = 1452 ft-k Bending Moment Stress Ratio = 0.35 OK

```

                oooooo          o
                oo   oo          oo
oo   oo   oooooo oo          oo   oo   o ooooooooooo   o ooooo
oo   o   oo   oo   oo          oo   oo   oo          oo   oo   oo   oo   oo
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                        spColumn v4.80 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections
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General Information:

=====
 File Name: g:\tower\375_crown_castle\2013\37513-2417 bu 876321\37513-2417 r2 wo...\37513-2417 r2.col
 Project: 37512-1607
 Column: Engineer:
 Code: ACI 318-02 Units: English
 Run Option: Investigation Slenderness: Not considered
 Run Axis: Biaxial Column Type: Architectural

Material Properties:

=====
 f'c = 3 ksi fy = 60 ksi
 Ec = 3122.02 ksi Es = 29000 ksi
 Ultimate strain = 0.003 in/in
 Beta1 = 0.85

Section:

=====
 Rectangular: Width = 84 in Depth = 84 in
 Gross section area, Ag = 7056 in^2
 Ix = 4.14893e+006 in^4 Iy = 4.14893e+006 in^4
 rx = 24.2487 in ry = 24.2487 in
 Xo = 0 in Yo = 0 in

Reinforcement:

=====
 Bar Set: ASTM A615

Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)
# 3	0.38	0.11	# 4	0.50	0.20	# 5	0.63	0.31
# 6	0.75	0.44	# 7	0.88	0.60	# 8	1.00	0.79
# 9	1.13	1.00	# 10	1.27	1.27	# 11	1.41	1.56
# 14	1.69	2.25	# 18	2.26	4.00			

Confinement: Tied; #5 ties with #11 bars, #5 with larger bars.
 phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

Pattern: Irregular
 Total steel area: As = 30.21 in^2 at rho = 0.43% (Note: rho < 0.50%)
 Minimum clear spacing = 10.31 in

Area in^2	X (in)	Y (in)	Area in^2	X (in)	Y (in)	Area in^2	X (in)	Y (in)
1.56	-37.7	37.7	1.75	16.5	26.1	1.56	-18.8	37.7
1.75	-21.9	21.9	1.56	0.0	37.7	1.75	9.5	-29.4
1.56	18.8	37.7	1.56	37.7	37.7	1.56	-37.7	-37.7
1.56	-18.8	-37.7	1.56	0.0	-37.7	1.56	18.8	-37.7
1.56	37.7	-37.7	1.56	-37.7	18.8	1.56	-37.7	0.0
1.56	-37.7	-18.8	1.56	37.7	18.8	1.56	37.7	0.0
1.56	37.7	-18.8						

Factored Loads and Moments with Corresponding Capacities:

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 =====

No.	Pu kip	Mux k-ft	Muy k-ft	PhiMnx k-ft	PhiMny k-ft	PhiMn/Mu	NA depth in	Dt depth in	eps_t	Phi
1	37.00	4540.25	0.00	5290.61	0.00	1.165	11.59	79.99	0.01785	0.900
2	37.00	-4540.25	0.00	-4995.29	-0.00	1.100	11.93	79.97	0.01722	0.900
3	37.00	0.00	-4540.25	0.00	-5175.49	1.140	13.06	80.97	0.01597	0.900
4	37.00	0.00	4540.25	-0.00	5112.07	1.126	13.22	81.09	0.01580	0.900

*** End of output ***

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

T-Mobile Existing Facility

Site ID: CTNH107A
Global/Cherry Hill

150 North Main Street
Branford, CT 06405

April 9, 2014

EBI PROJECT NUMBER: 62142282

April 9, 2014

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

Re: Emissions Values for Site: **CTNH107A - Global/Cherry Hill**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at 150 North Main Street, Branford, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ 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 public 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 public 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 ($\mu\text{W}/\text{cm}^2$). The general population exposure limit for the cellular band is $567 \mu\text{W}/\text{cm}^2$, and the general population exposure limit for the PCS and AWS bands is $1000 \mu\text{W}/\text{cm}^2$. 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 150 North Main Street, Branford, 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, the actual antenna pattern gain value in the direction of the sample area was used. For this report the sample point is a 6 foot person standing at the base of the tower.

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

- 1) 2 GSM channels (1935.000 MHz—to 1945.000 MHz / 1980.000 MHz—to 1985.000 MHz) were considered for each sector of the proposed installation.
- 2) 2 UMTS channels (2110.000 to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation.
- 3) 2 LTE channels (2110.000 to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation.
- 4) 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.
- 5) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
- 6) The antenna used in this modeling is the Ericsson AIR21 for LTE, UMTS and GSM. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.6 dBi gain value at its main lobe. Actual antenna gain values were used for all calculations as per the manufacturers specifications.

- 7) The antenna mounting height centerline of the proposed antennas is **122 feet** above ground level (AGL).
- 8) 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.

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

Site ID	CTNH107A - Global/Cherry Hill
Site Address	150 North Main Street, Branford 06405
Site Type	Monopole

Sector 1

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBD)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	122	116	None	0	0	48.326044	1.291134	0.12911%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-	-	-	0	-3.95	122	116	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	122	116	1-5/8"	0	0	24.163022	0.645567	0.06456%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	122	116	1-5/8"	0	0	24.163022	0.645567	0.06456%

Sector total Power Density Value: 0.258%

Sector 2

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBD)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	122	116	None	0	0	48.326044	1.291134	0.12911%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-	-	-	0	-3.95	122	116	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	122	116	1-5/8"	0	0	24.163022	0.645567	0.06456%
2b	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	122	116	1-5/8"	0	0	24.163022	0.645567	0.06456%

Sector total Power Density Value: 0.258%

Sector 3

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBD)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	122	116	None	0	0	48.326044	1.291134	0.12911%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-	-	-	0	-3.95	122	116	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	122	116	1-5/8"	0	0	24.163022	0.645567	0.06456%
2b	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	122	116	1-5/8"	0	0	24.163022	0.645567	0.06456%

Sector total Power Density Value: 0.258%

Site Composite MPE %	
Carrier	MPE %
T-Mobile	0.775%
AT&T	30.000%
Metro PCS	4.930%
Pagenet	1.000%
Cingular	1.490%
Nextel	4.170%
Clearwire	0.880%
Sprint	4.580%
Total Site MPE %	47.825%

Summary

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

The anticipated Maximum Composite contributions from the T-Mobile facility are **0.775% (0.258% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **47.825%** of the allowable FCC established general public 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 within the allowable 100% threshold standard per the federal government.



Scott Heffernan
RF Engineering Director

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