



Crown Castle
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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: 876339
T-Mobile Site ID: CT11032D
Located at: 782 Old Clinton Road, Westbrook, CT 06498-1767

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. Noel Bishop, First Selectman of the Town of Westbrook.

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at **782 Old Clinton Road, Westbrook, CT 06498-1767**. 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

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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. Noel Bishop, First Selectman
Town of Westbrook
866 Boston Post Road
Westbrook, CT 06498

..T..Mobile..

NORTHEAST LLC.

SITE NAME: WESTBROOK/I-95/X64/CH1
 SITE ID NUMBER: CT11032D
 SITE ADDRESS: 782 OLD CLINTON ROAD
 WESTBROOK, CT 06498

PROJECT SUMMARY

SITE ID NUMBER: CT11032D
 SITE NAME: WESTBROOK/I-95/X64/CH1
 CROWN BU#: 876339
 SITE ADDRESS: 782 OLD CLINTON ROAD
 WESTBROOK, CT 06498
 COUNTY: MIDDLESEX
 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
 CONTACT: TAMMY NOSEK
 PHONE: (845) 567-6656 EXT. 2807

SITE ACQUISITION: CROWN CASTLE
 1200 MACARTHUR BLVD
 SUITE 200
 MAHWAH, NJ 07430
 CONTACT: PAUL HUGHES
 PHONE: (585) 259-7604

PARCEL INFO: 169/018
 LATITUDE: (NAD 83) 41.2905° N
 LONGITUDE: (NAD 83) 72.4689° 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 E/E WINTONBURY AVE. CONTINUE TO FOLLOW CT-178 E. TURN RIGHT TO MERGE ONTO I-91 S TOWARD HARTFORD. TAKE EXIT 22S ON THE LEFT TO MERGE ONTO CT-9 S TOWARD MIDDLETOWN/OLD SAYBROOK. CONTINUE ONTO CT-17 S/CT-9 S. CONTINUE ONTO CT-9 S. TAKE EXIT 3 FOR CONNECTICUT 154 TOWARD CONNECTICUT 153/ESSEX/WESTBROOK. MERGE ONTO STATE HWY 621. TURN RIGHT ONTO CT-153 S/PLAINS RD. CONTINUE TO FOLLOW CT-153 S. CONTINUE ONTO ESSEX RD. SLIGHT RIGHT ONTO BOSTON POST RD. TAKE THE 1ST RIGHT ONTO OLD CLINTON RD. DESTINATION WILL BE ON THE RIGHT.

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".



Know what's below.
 Call before you dig.

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

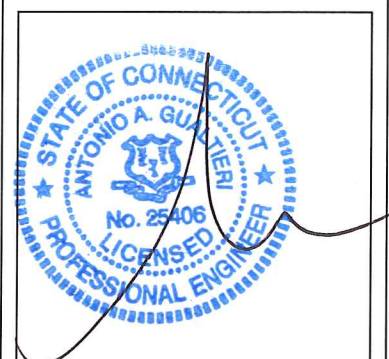


APPROVALS

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

PROJECT NUMBER	DESIGNED BY		
7061.CT11032D	JQ		
REV	DATE	REVISION	DRAWN BY
Δ	04/07/14	FOR COMMENT	SF
Δ	04/09/14	FOR CONSTRUCTION	MP

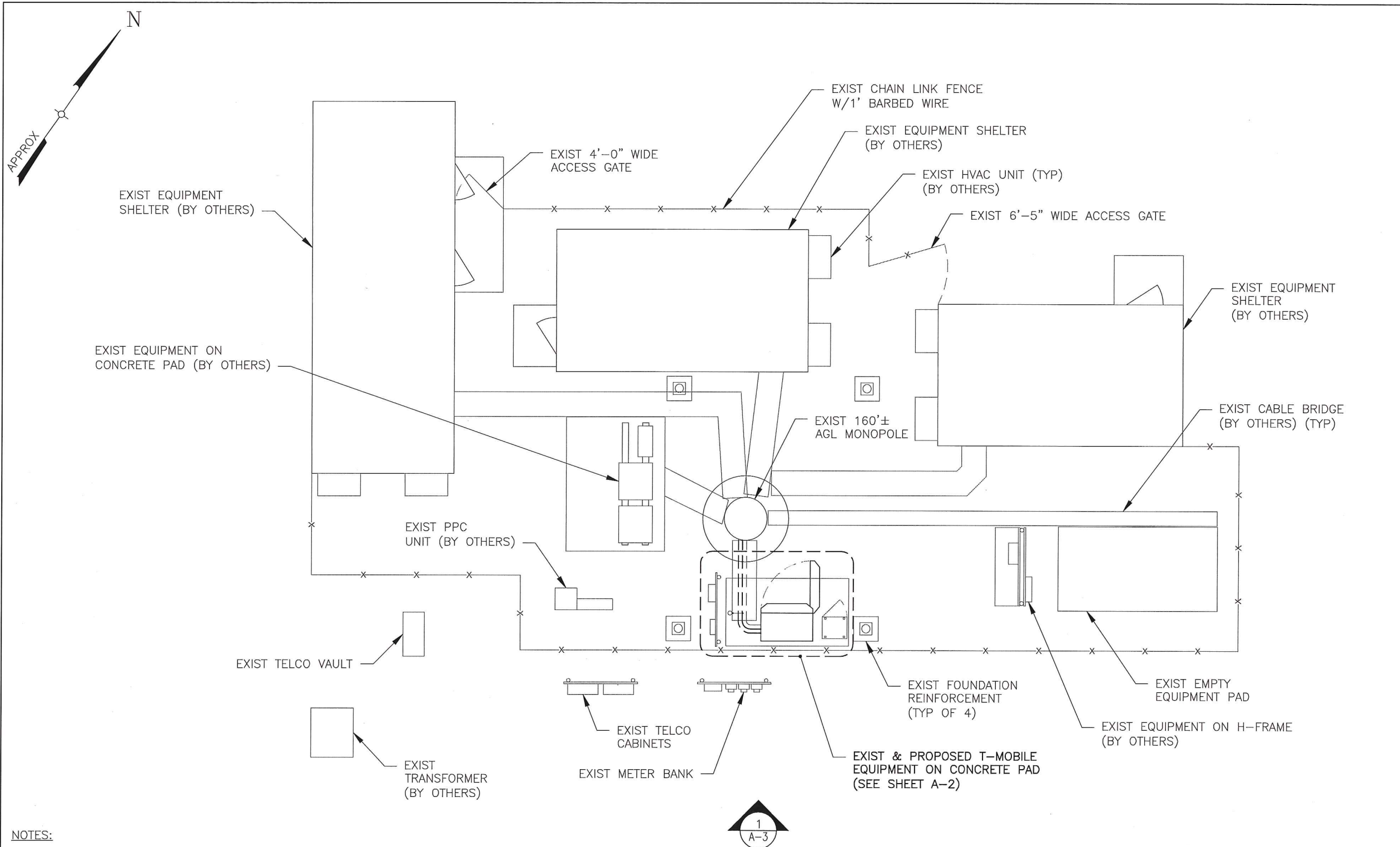
ISSUED BY _____ DATE _____



SITE INFORMATION
 CT11032D
 WESTBROOK/I-95/X64/CH1
 782 OLD CLINTON RD.
 WESTBROOK, CT 06498

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 INTERIOR 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.

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

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



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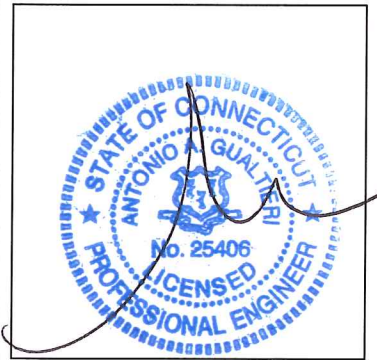


LANDLORD _____
 RF _____
 CONSTRUCTION _____
 OPERATIONS _____
 SITE ACQ. _____

PROJECT NUMBER: 7061.CT11032D DESIGNED BY: JQ

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CT11032D
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 782 OLD CLINTON RD.
 WESTBROOK, CT 06498

SHEET TITLE

SITE PLAN

SHEET NUMBER

A-1

HCS LENGTH			
FROM EQUIPMENT CABINET TO ANTENNA			
SECTOR	ALPHA	BETA	GAMMA
LENGTH	160'±	160'±	160'±
SIZE	1"		
HCS 9x18 MLE			

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CROWN CASTLE

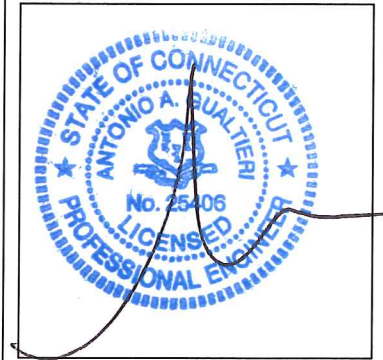
APPROVALS

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

PROJECT NUMBER: 7061.CT11032D DESIGNED BY: JQ

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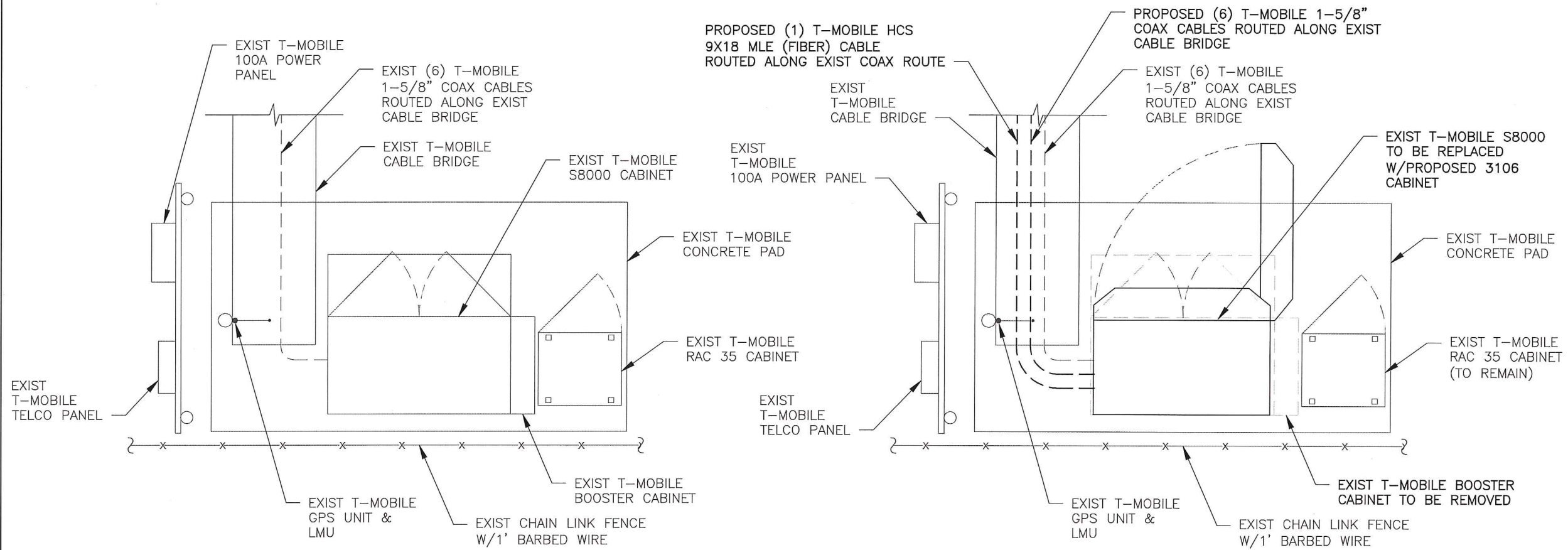
ISSUED BY _____ DATE _____



SITE INFORMATION
CT11032D
WESTBROOK/I-95/X64/CH1
782 OLD CLINTON RD.
WESTBROOK, CT 06498

SHEET TITLE
EQUIPMENT LAYOUT PLANS

SHEET NUMBER
A-2

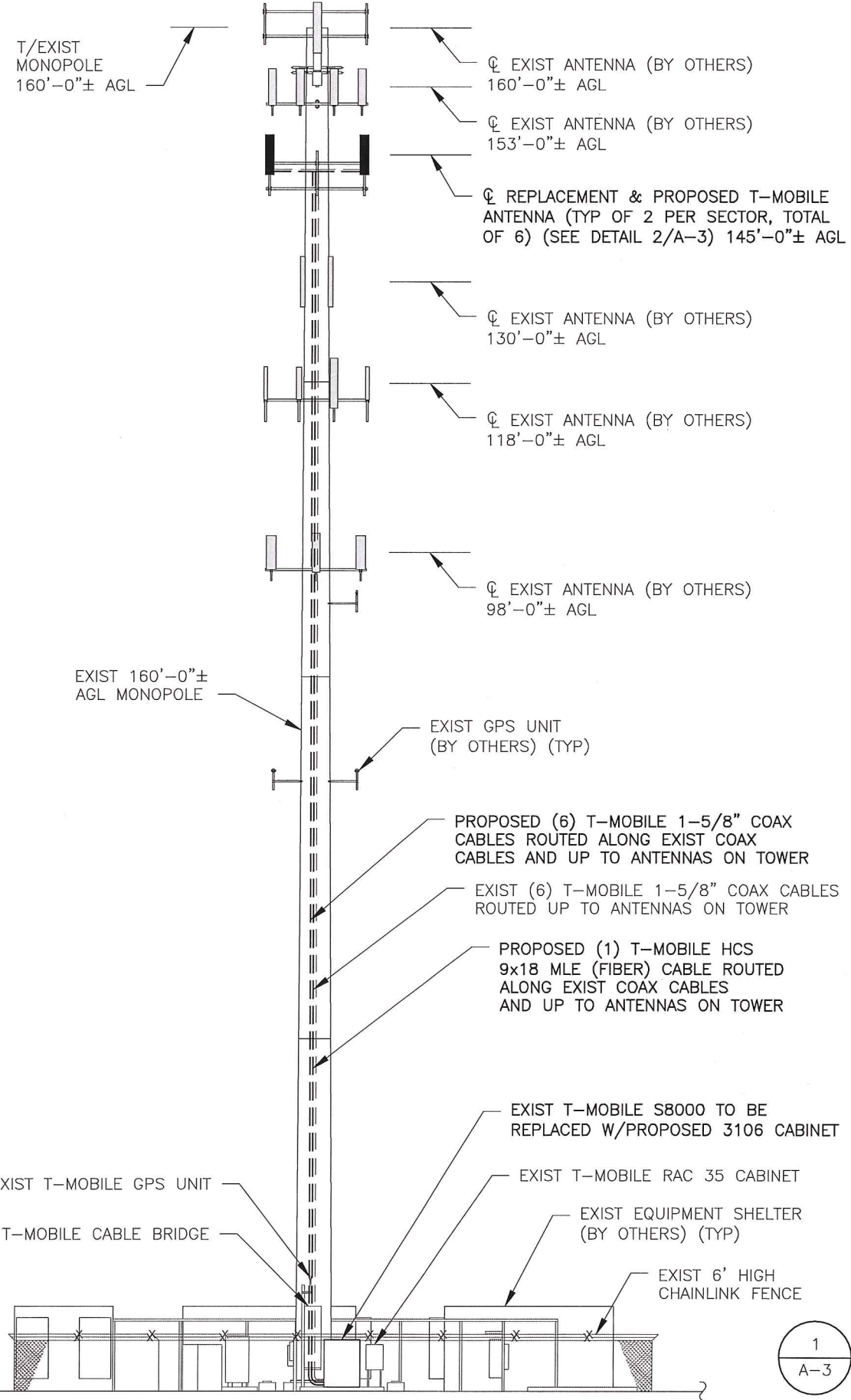


1
A-2
EXIST EQUIPMENT PLAN
SCALE: 3/8" = 1'-0'

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.



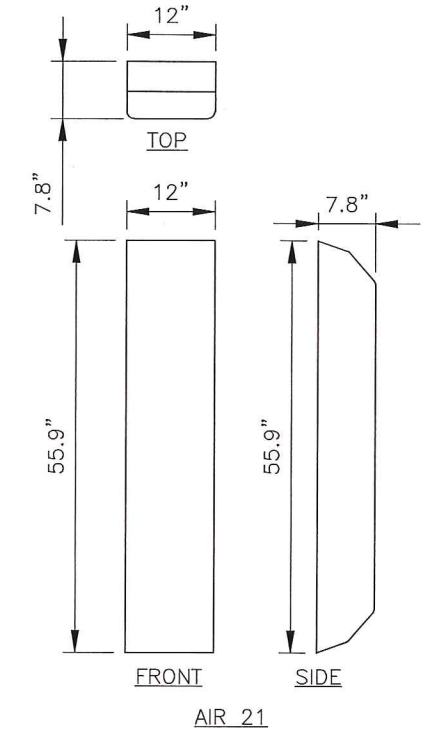


1
A-3

ELEVATION

SCALE: 1/16" = 1'-0"

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
A-3

DETAIL

SCALE: 1/2" = 1'-0"

ELEVATION NOTE:
ELEVATION OF EXIST MONOPOLE HAS BEEN ARBITRARILY ASSIGNED AS EL 264'-0"±. THIS IS APPROXIMATELY 160'-0"± ABOVE GRADE WHICH WAS ESTIMATED AS EL 104'-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

2C

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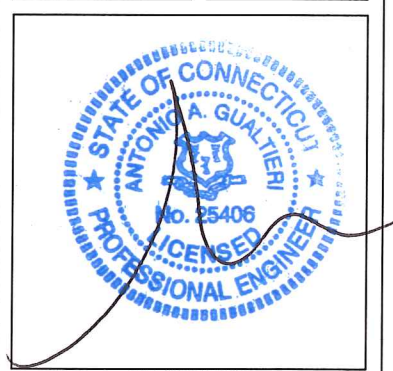
APPROVALS

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

PROJECT NUMBER 7061.CT11032D DESIGNED BY JQ

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

ISSUED BY _____ DATE _____



SITE INFORMATION

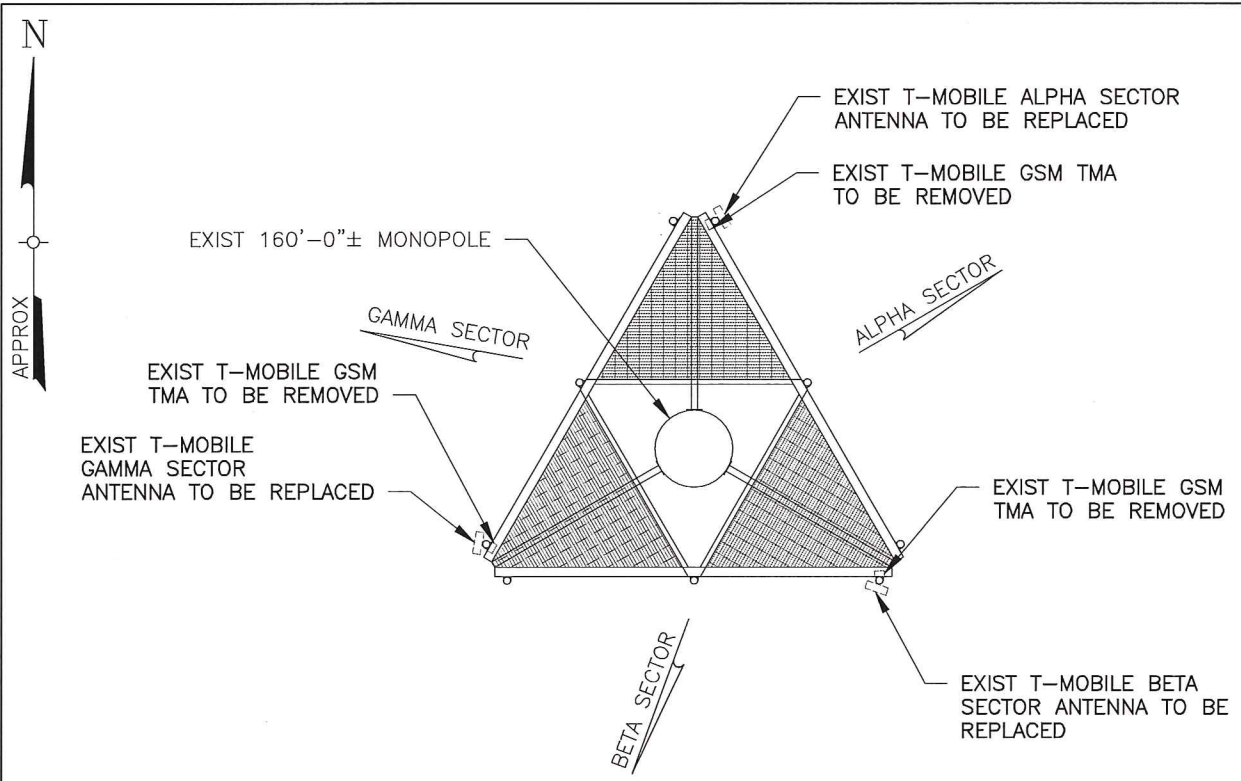
CT11032D
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782 OLD CLINTON RD.
WESTBROOK, CT 06498

SHEET TITLE

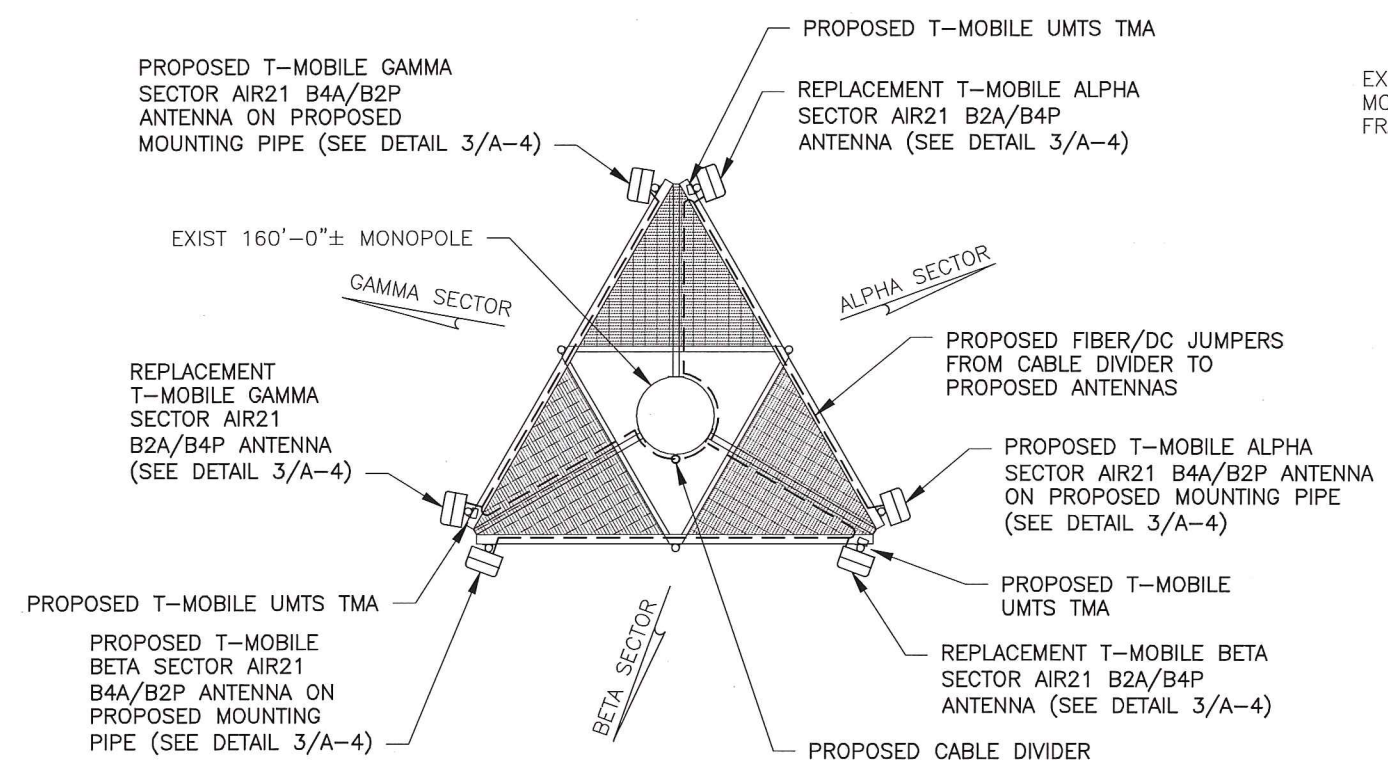
ELEVATION & DETAIL

SHEET NUMBER

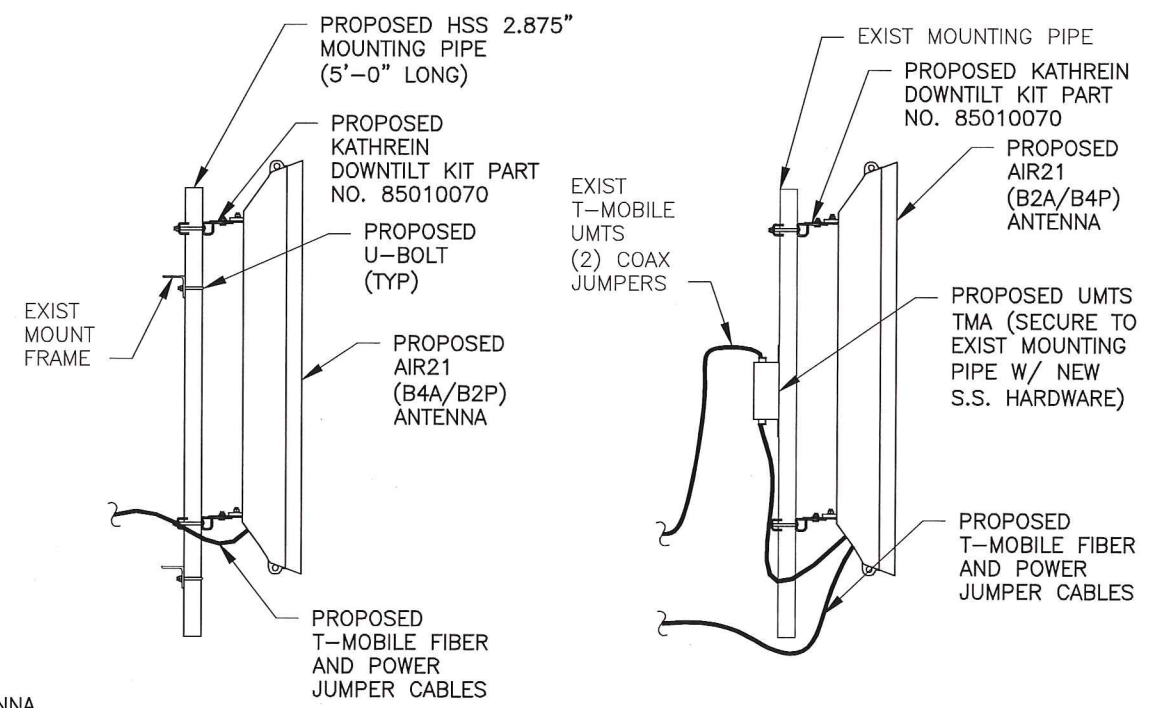
A-3



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



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



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

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).

EXIST ANTENNA SCHEDULE

SECTOR	MAKE	QUANTITY	MODEL#	SIZE
SECTOR A	EMS	1	RR65-18-02DP	56x8.0x2.8
SECTOR B	EMS	1	RR65-18-02DP	56x8.0x2.8
SECTOR B	EMS	1	RR65-18-02DP	56x8.0x2.8

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

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PHONE: (860) 692-7100

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APPROVALS

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

PROJECT NUMBER: 7061.CT11032D
DESIGNED BY: JQ

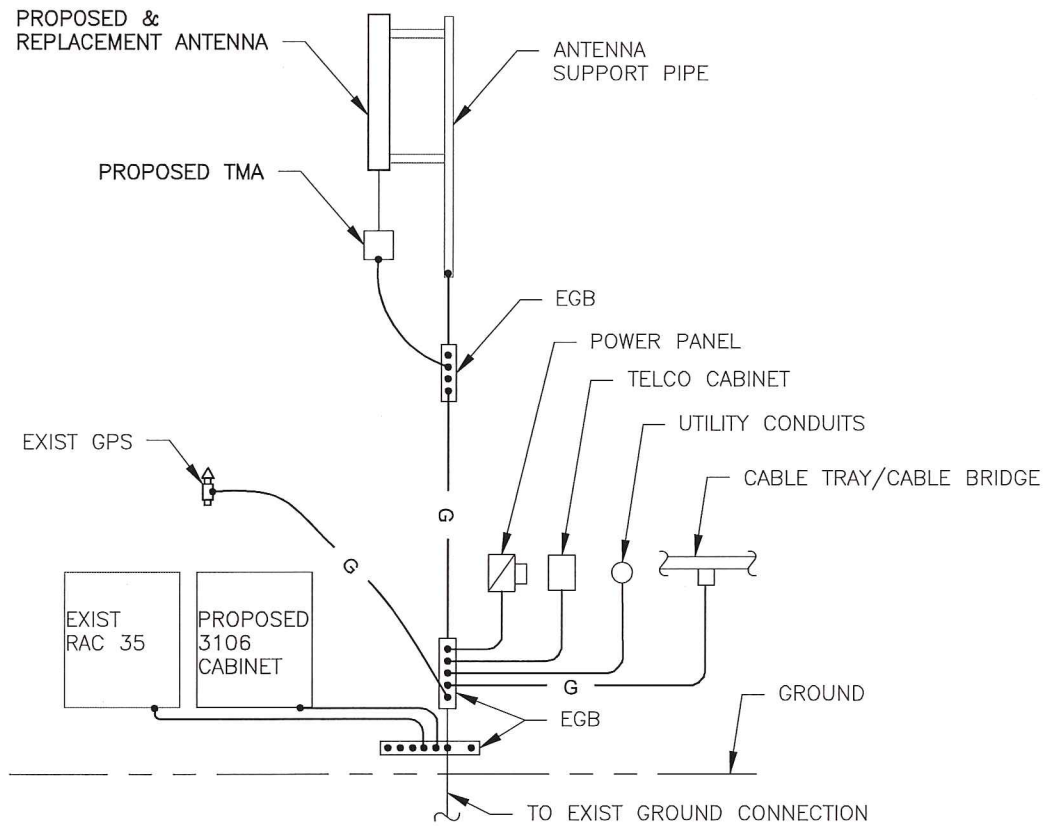
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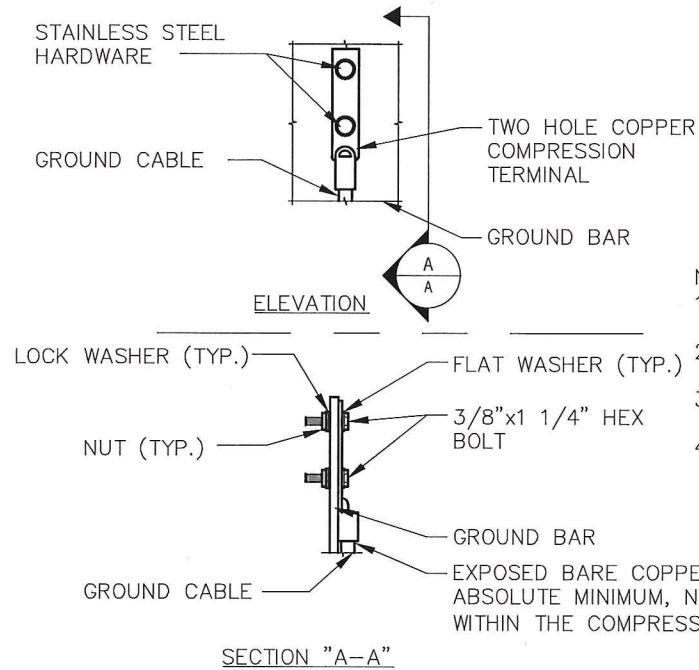
SITE INFORMATION
CT11032D
WESTBROOK/I-95/X64/CH1
782 OLD CLINTON RD.
WESTBROOK, CT 06498

SHEET TITLE
ANTENNA LAYOUT PLANS & DETAILS

SHEET NUMBER
A-4

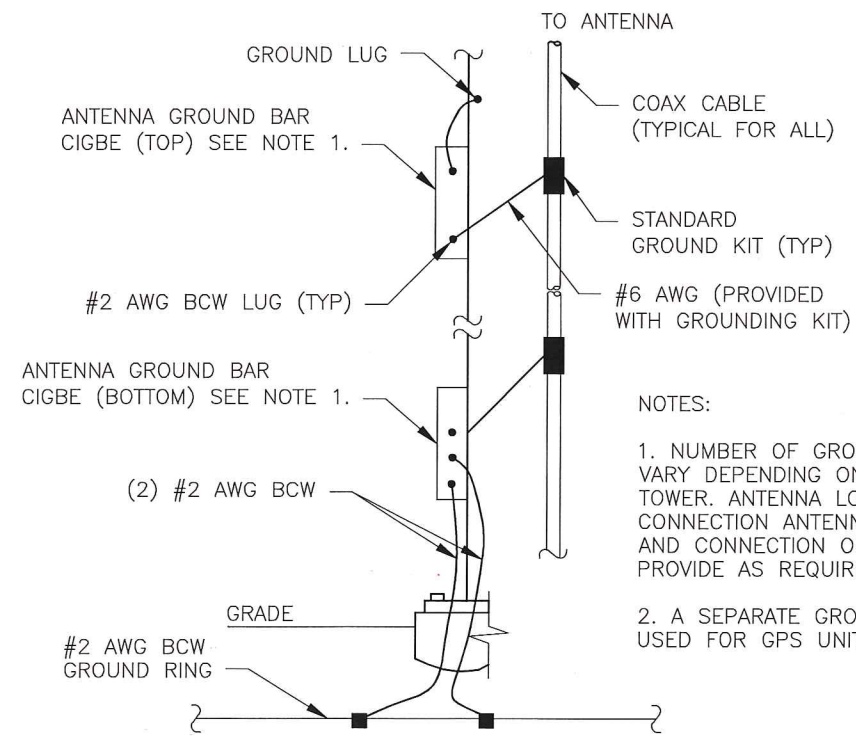


1 GROUNDING RISER DIAGRAM
A-5 SCALE: NTS



- 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.

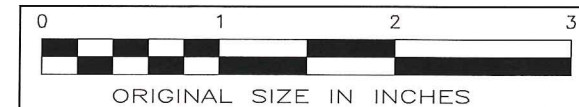
2 GROUNDING BAR CONN. DETAIL
A-5 SCALE: NTS



- NOTES:
1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER. ANTENNA LOCATION AND CONNECTION ANTENNA LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
 2. A SEPARATE GROUND BAR TO BE USED FOR GPS UNIT IF REQUIRED.

3 ANTENNA CABLE GROUNDING
A-5 SCALE: NTS

CONFIGURATION
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APPROVALS

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

PROJECT NUMBER 7061.CT11032D DESIGNED BY JQ

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SITE INFORMATION

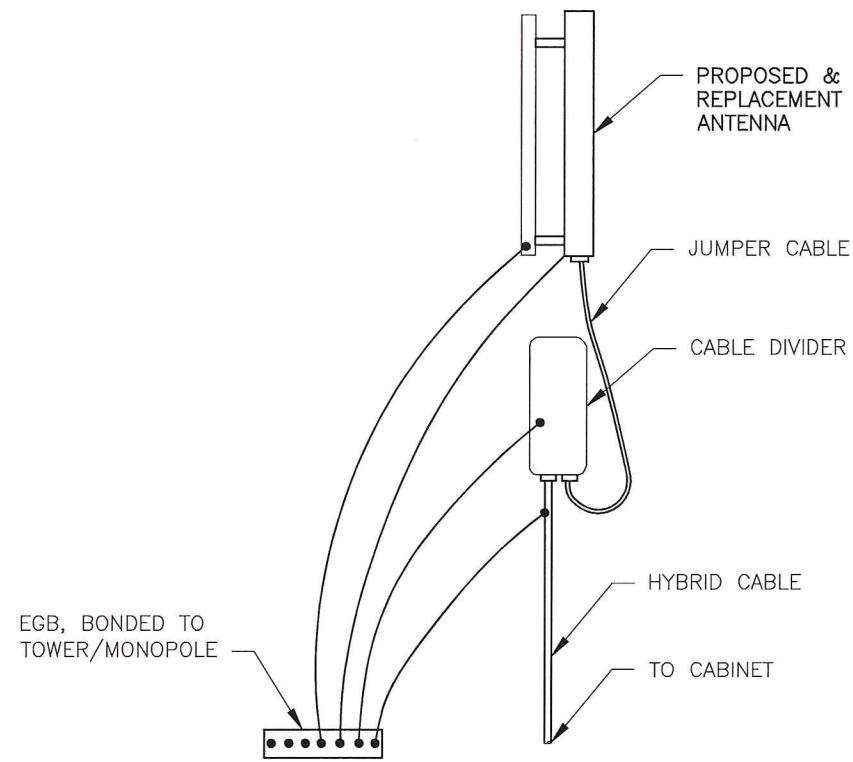
CT11032D
WESTBROOK/I-95/X64/CH1
782 OLD CLINTON RD.
WESTBROOK, CT 06498

SHEET TITLE

DETAILS

SHEET NUMBER

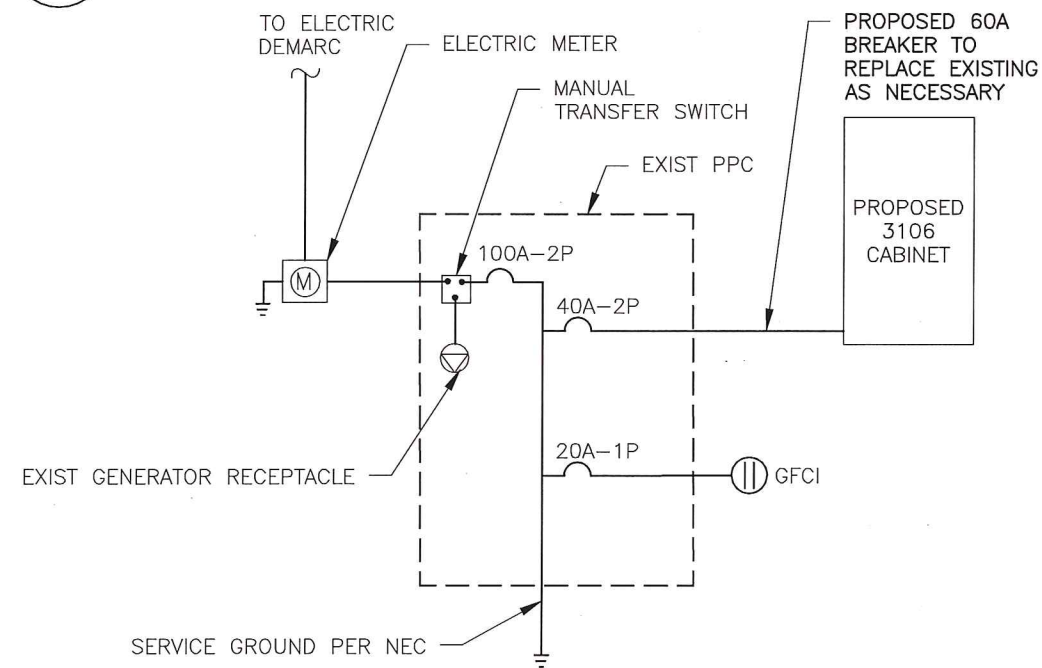
A-5



HYBRID CABLE CONNECTION AND GROUNDING DETAIL

1
A-6

SCALE: NTS

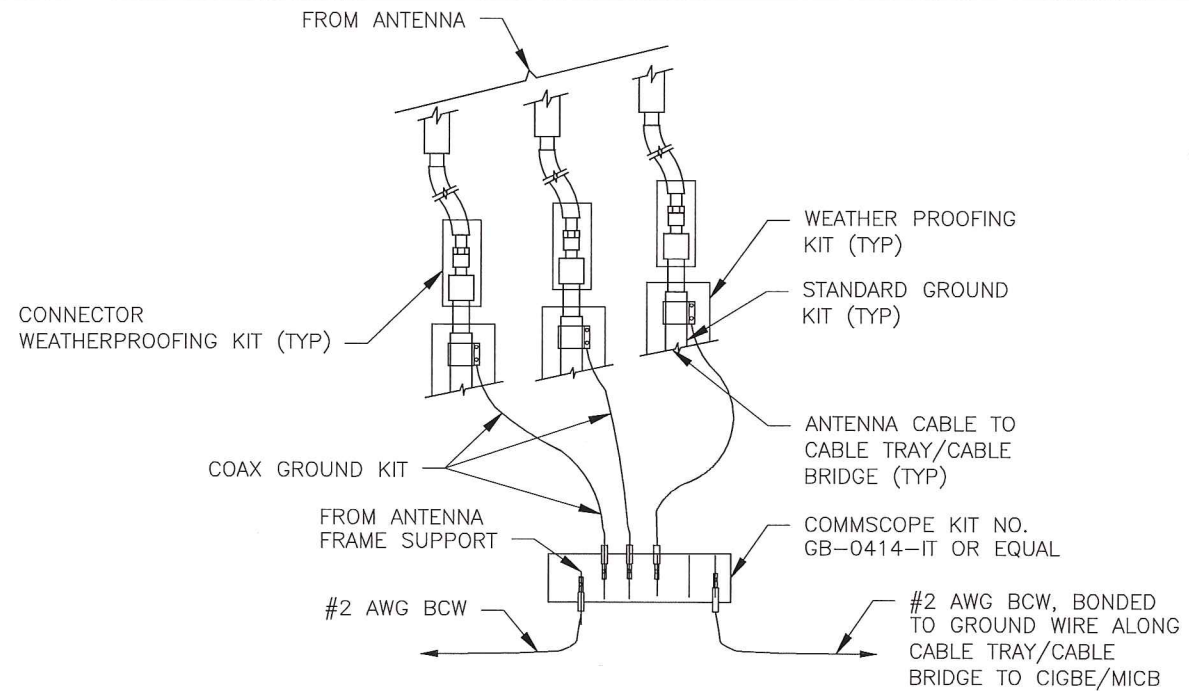


NOTE: CONTRACTOR TO VERIFY EXISTING CONDUCTORS ARE #6AWG OR LARGER FOR 60A CIRCUIT

ONE-LINE POWER DIAGRAM

3
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

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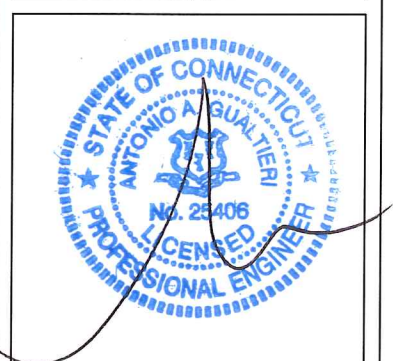
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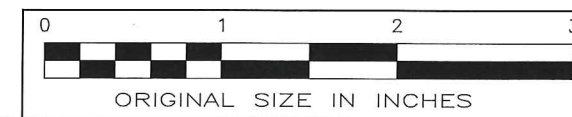
CROWN CASTLE
APPROVALS

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RF			
CONSTRUCTION			
OPERATIONS			
SITE ACC.			
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CONFIGURATION
2C
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SHEET TITLE
DETAILS

SHEET NUMBER
A-6

GENERAL NOTES

1. 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.
2. 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"
3. THIS PLAN IS SUBJECT TO ALL EASEMENTS AND RESTRICTIONS OF RECORD.
4. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE CODES, ORDINANCES, LAWS AND REGULATIONS OF ALL MUNICIPALITIES, UTILITIES OR OTHER PUBLIC AUTHORITIES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS THAT MAY BE REQUIRED BY ANY FEDERAL, STATE, COUNTY OR MUNICIPAL AUTHORITIES.
6. 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.
7. 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.
8. 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.
9. 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.
10. POWER TO THE FACILITY IS MONITORED BY AN EXISTING METER.
11. ALL STRUCTURAL ELEMENTS SHALL BE HOT DIPPED GALVANIZED STEEL.
12. CONTRACTOR SHALL MAKE A UTILITY "ONE CALL" TO LOCATE ALL UTILITIES PRIOR TO EXCAVATING.
13. IF ANY PIPING EXISTS BENEATH THE SITE AREA, CONTRACTOR MUST LOCATE IT AND CONTACT OWNER'S REPRESENTATIVE.
14. THE CONSTRUCTION CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ALL CONSTRUCTION MEANS AND METHODS. THE CONSTRUCTION CONTRACTOR IS ALSO RESPONSIBLE FOR ALL JOB SITE SAFETY.
15. 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.
16. 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.
17. 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.
18. 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.
19. THE MATERIALS INSTALLED SHALL MEET REQUIREMENTS OF CONTRACTORS DOCUMENTS. NO SUBSTITUTIONS ARE ALLOWED.
20. 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

21. 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.
22. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER OF ALL PRODUCTS OR ITEMS NOTED AS "EXISTING" WHICH ARE NOT FOUND TO BE IN THE FIELD.
23. 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.
24. 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.
25. 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.
26. 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.
27. THE CONTRACTOR SHALL REPAIR ALL EXISTING SURFACES DAMAGED DURING CONSTRUCTION SUCH THAT THEY MATCH AND BLEND WITH ADJACENT SURFACES.
28. 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.
29. BEFORE FINAL ACCEPTANCE OF THE WORK, THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT, TEMPORARY WORK, UNUSED AND USELESS MATERIALS, RUBBISH AND TEMPORARY STRUCTURES.
30. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE 2005 CONNECTICUT STATE BUILDING CODE (INCLUDING AMENDMENTS) AND ALL OTHER APPLICABLE CODES AND ORDINANCES.
31. 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.
32. 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.
33. 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.
34. 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

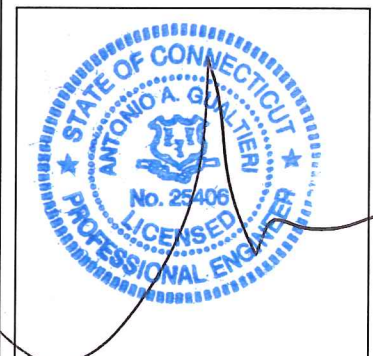
LANDLORD _____
RF _____
CONSTRUCTION _____
OPERATIONS _____
SITE ACC. _____

PROJECT NUMBER 7061.CT11032D DESIGNED BY JQ

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

--	--	--	--

ISSUED BY _____ DATE _____



SITE INFORMATION

CT11032D
WESTBROOK/I-95/X64/CH1
782 OLD CLINTON RD.
WESTBROOK, CT 06498

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

- PLANNING
- CONSTRUCTION
- ENGINEERING
- MANAGEMENT
- SURVEYING

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Consultants P.C.

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••T••Mobile••

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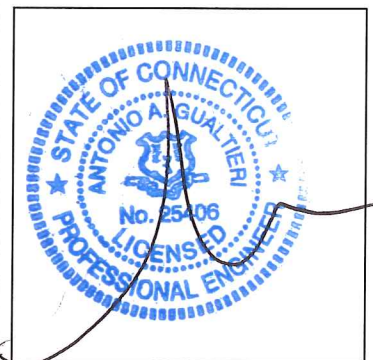
APPROVALS

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

PROJECT NUMBER: 7061.CT11032D DESIGNED BY: JQ

REV	DATE	REVISION	DRAWN BY
Δ	04/07/14	FOR COMMENT	SF
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SITE INFORMATION

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NOTES

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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 19, 2014**

Holly Haas
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Paul J. Ford and Company
250 East Broad Street, Suite 600
Columbus, Ohio 43215
614.221.6679

Subject: Structural Analysis Report

Carrier Designation: *T-Mobile Co-Locate*
Carrier Site Number: CT11032D
Carrier Site Name: Westbrook/
I-95/X64/Ch1

Crown Castle Designation:
Crown Castle BU Number: 876339
Crown Castle Site Name: POND MEADOW RD.
STABLE
Crown Castle JDE Job Number: 265592
Crown Castle Work Order Number: 726243
Crown Castle Application Number: 222740 Rev. 1

Engineering Firm Designation: **Paul J. Ford Project Number:** 37513-0634 R1

Site Data: 782 Old Clinton Road, WESTBROOK, Middlesex County, CT
Latitude 41° 17' 25.7", Longitude -72° 28' 7.9"
160 Foot - Monopole Tower

Dear Holly Haas,

Paul J. Ford 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 626870, in accordance with application 222740, revision 1.

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 of the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and the 2005 Connecticut Building Code 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.

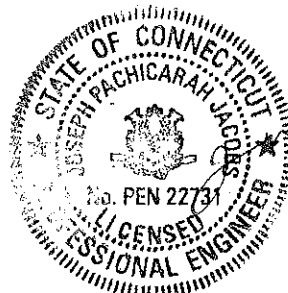
This analysis assumes all the coax going to the 141' elevation will be installed internally.

We at Paul J. Ford 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:

Kevin Mahlum, E.I.
Structural Designer

tnxTower Report - version 6.1.4.1



MAR 20 2014



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

Date: **March 19, 2014**

Holly Haas
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Paul J. Ford and Company
250 East Broad Street, Suite 600
Columbus, Ohio 43215
614.221.6679

Subject: Structural Analysis Report

Carrier Designation:

**T-Mobile Co-Locate
Carrier Site Number:
Carrier Site Name:**

CT11032D
Westbrook/
I-95/X64/Ch1

Crown Castle Designation:

**Crown Castle BU Number:
Crown Castle Site Name:

Crown Castle JDE Job Number:
Crown Castle Work Order Number:
Crown Castle Application Number:**

876339
POND MEADOW RD.
STABLE
265592
726243
222740 Rev. 1

Engineering Firm Designation:

Paul J. Ford Project Number:

37513-0634 R1

Site Data:

**782 Old Clinton Road, WESTBROOK, Middlesex County, CT
Latitude 41° 17' 25.7", Longitude -72° 28' 7.9"
160 Foot - Monopole Tower**

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The structural analysis was performed for this tower in accordance with the requirements of the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and the 2005 Connecticut Building Code 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.

This analysis assumes all the coax going to the 141' elevation will be installed internally.

We at Paul J. Ford 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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Kevin Mahlum, E.I.
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1) INTRODUCTION

This tower is a 160 ft Monopole tower designed by VALMONT in July of 1998. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and the 2005 Connecticut Building Code 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
141.0	145.0	3	ericsson	AIR 21 B2A B4P w/ Pipe	7	1-5/8	-
		3		AIR 21 B4A B2P w/ Pipe			
		3		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			
159.0	160.0	1	rfs celwave	APXV9ERR18-C-A20 w/ Pipe	3	1-1/4	1			
		2		APXVSP18-C-A20 w/ Pipe						
155.0	159.0	1	tower mounts	Platform Mount [LP 602-1]	-	-	1			
	156.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz						
	155.0	1	tower mounts	Side Arm Mount [SO 102-3]						
151.0	154.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	12	1-1/4	1			
	153.0	12	allgon	7130.16 w/ Pipe						
141.0	151.0	1	tower mounts	T-Arm Mount [TA 602-3]	-	-	3			
	145.0	3	ems wireless	RR65-18-02DP w/ Pipe						
130.0	141.0	1	tower mounts	Platform Mount [LP 602-1]	6	1-5/8	1			
		3	rfs celwave	APXV18-206517S-ACU w/ Pipe	6	1-5/8	1			
116.0	118.0	1	tower mounts	Pipe Mount [PM 601-3]				1	1-5/8	2
		3	alcatel lucent	RRH2X40-AWS						
		3	andrew	HBX-6517DS-VTM w/ Pipe						
		3		LNx-6514DS-VTM w/ Pipe						
		1	rfs celwave	DB-T1-6Z-8AB-0Z						
		4	antel	LPA-80063-4CF-EDIN-5 w/ Pipe	-	-	3			
		2		LPA-80080-4CF-EDIN-0 w/ Pipe						
		2		BXA-171063-8BF-EDIN-2 w/ Pipe	12	1-5/8	1			
		3		BXA-70063-6CF-EDIN-2 w/ Pipe						
1	swedcom	SPXW 8515 w/ Pipe								
116.0	116.0	6	rfs celwave	FD9R6004/2C-3L	-	-	-			
		1	tower mounts	Platform Mount [LP 303-1]						

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note	
96.0	103.0	1	gps	GPS_A	1	1/2	1	
		1	adc	DB 800/1900 FB MASTHEAD	-	-	3	
	6	DB 800/1900 FB MASTHEAD						
	6	css	DUO1417-8686 w/ Pipe	-	-	3		
	3	powerwave technologies	7770.00 w/ Pipe					
	6		LGP13519					
	6		7770.00 w/ Pipe					
	98.0	98.0	6	ericsson	7770.00 w/ Pipe	1 2	3/8 5/8	2
			6		TT19-08BP111-001			
			6		RRUS-11			
			3		AM-X-CD-14-65-00T-RET w/ Pipe			
	1	raycap	DC6-48-60-18-8F	12	1-5/8	1		
96.0	tower mounts	T-Arm Mount [TA 602-3]						
92.0	93.0	1	lucent	KS24019-L112A	1	1/2	1	
	92.0	1	tower mounts	Side Arm Mount [SO 701-1]				
71.0	72.0	2	gps	GPS_A	2	1/2	1	
	71.0	2	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	FDH, 10-12295E G1, 01/10/2011	1532966	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Semaan, 17818, 07/06/1998	1533020	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont, 17618-98, 07/14/1998	1531985	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 111347, 07/18/2011	2923975	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 131001.876339, 08/23/2013	4023333	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 was reinforced in conformance with the referenced modification drawings.
- 5) All coax going to the 141' elevation will be installed internally.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J. Ford 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	160 - 117.33	Pole	TP30.46x22.35x0.2188	1	-7.02	1015.10	72.4	Pass
L2	117.33 - 94	Pole	TP34.4549x29.1348x0.281	2	-14.30	1599.24	97.9	Pass
L3	94 - 82.5	Pole	TP36.64x34.4549x0.3817	3	-15.60	1970.09	89.7	Pass
L4	82.5 - 72.75	Pole	TP37.9427x34.8315x0.375	4	-19.63	2358.28	96.2	Pass
L5	72.75 - 56	Pole	TP41.1385x37.9427x0.4482	5	-24.11	2974.47	93.0	Pass
L6	56 - 40.583	Pole	TP44.08x41.1385x0.6042	6	-27.16	3331.82	91.3	Pass
L7	40.583 - 31.5	Pole	TP45.0389x41.6473x0.6915	7	-34.93	3778.19	93.8	Pass
L8	31.5 - 28.75	Pole	TP45.5593x45.0389x0.7353	8	-36.09	4065.20	89.1	Pass
L9	28.75 - 11	Pole	TP48.9184x45.5593x0.6172	9	-42.95	4203.64	96.8	Pass
L10	11 - 8.5	Pole	TP49.3915x48.9184x0.698	10	-44.05	4789.58	86.6	Pass
L11	8.5 - 0	Pole	TP51x49.3915x0.5706	11	-47.32	4349.94	99.7	Pass
							Summary	
						Pole (L11)	99.7	Pass
						Rating =	99.7	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1, 2	Anchor Rods	0	74.3	Pass
1	Base Plate	0	49.8	Pass
1	Base Foundation Steel Interaction	0	70.0	Pass
1	Base Foundation Soil Interaction	0	55.0	Pass

Structure Rating (max from all components) =	99.7%
---	--------------

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Worst case scenario between existing and post installed anchors.

5) Recommendations

See base level for the layout of the proposed coax.

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:

Tower is located in Middlesex County, Connecticut.

Basic wind speed of 85 mph.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 38 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

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

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	160.00-117.33	42.67	4.67	12	22.3500	30.4600	0.2188	0.8752	A572-65 (65 ksi)
L2	117.33-94.00	28.00	0.00	12	29.1348	34.4549	0.2810	1.1240	A572-65 (65 ksi)
L3	94.00-82.50	11.50	5.50	12	34.4549	36.6400	0.3817	1.5269	Reinf 56.91 ksi (57 ksi)
L4	82.50-72.75	15.25	0.00	12	34.8315	37.9427	0.3750	1.5000	A572-65 (65 ksi)
L5	72.75-56.00	16.75	0.00	12	37.9427	41.1385	0.4482	1.7928	Reinf 63.33 ksi (63 ksi)
L6	56.00-40.58	15.42	6.42	12	41.1385	44.0800	0.6042	2.4167	Reinf 50.68 ksi (51 ksi)
L7	40.58-31.50	15.50	0.00	12	41.6473	45.0389	0.6915	2.7660	Reinf 47.84 ksi (48 ksi)
L8	31.50-28.75	2.75	0.00	12	45.0389	45.5593	0.7353	2.9414	Reinf 47.89 ksi (48 ksi)
L9	28.75-11.00	17.75	0.00	12	45.5593	48.9184	0.6172	2.4689	Reinf 54.75 ksi (55 ksi)
L10	11.00-8.50	2.50	0.00	12	48.9184	49.3915	0.6980	2.7919	Reinf 54.72 ksi (55 ksi)
L11	8.50-0.00	8.50		12	49.3915	51.0000	0.5706	2.2824	Reinf 58.70 ksi (59 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	It/Q in ²	w in	w/t
L1	23.1384	15.5922	974.7742	7.9230	11.5773	84.1970	1975.1568	7.6740	5.4034	24.696
	31.5345	21.3060	2487.0596	10.8263	15.7783	157.6255	5039.4571	10.4862	7.5769	34.629
L2	31.0812	26.1075	2774.3254	10.3297	15.0918	183.8296	5621.5354	12.8493	7.0550	25.107

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L3	35.6704	30.9213	4609.2822	12.2343	17.8477	258.2570	9339.6554	15.2185	8.4808	30.181
	35.6704	41.8818	6206.3643	12.1982	17.8477	347.7411	12575.776	20.6129	8.2109	21.51
L4	37.2219	41.6062	6305.0277	12.3354	18.0427	349.4499	12775.695	20.4773	8.3298	22.213
	39.2811	45.3629	8171.7520	13.4492	19.6543	415.7744	16558.185	22.3263	9.1636	24.436
L5	39.2811	54.1121	9709.8973	13.4230	19.6543	494.0344	19674.884	26.6323	8.9675	20.008
	42.5897	58.7244	12410.407	14.5671	21.3097	582.3820	25146.849	28.9024	9.8239	21.919
L6	42.5897	78.8579	16537.753	14.5113	21.3097	776.0656	33509.972	38.8114	9.4059	15.568
	45.6350	84.5805	20405.700	15.5643	22.8334	893.6761	41347.481	41.6279	10.1942	16.873
L7	44.5701	91.1921	19524.244	14.6622	21.5733	905.0189	39561.413	44.8820	9.3083	13.461
	46.6277	98.7439	24787.537	15.8764	23.3302	1062.4673	50226.271	48.5988	10.2172	14.776
L8	46.6277	104.9018	26281.295	15.8607	23.3302	1126.4942	53253.030	51.6295	10.0997	13.735
	47.1665	106.1340	27218.352	16.0470	23.5997	1153.3328	55151.762	52.2359	10.2392	13.924
L9	47.1665	89.3216	23027.629	16.0893	23.5997	975.7578	46660.219	43.9614	10.5557	17.102
	50.6440	95.9976	28586.482	17.2918	25.3397	1128.1298	57923.964	47.2471	11.4559	18.56
L10	50.6440	108.3751	32164.491	17.2629	25.3397	1269.3314	65173.979	53.3389	11.2395	16.103
	51.1338	109.4384	33120.527	17.4323	25.5848	1294.5404	67111.167	53.8622	11.3663	16.285
L11	51.1338	89.6986	27288.679	17.4779	25.5848	1066.5983	55294.263	44.1469	11.7077	20.519
	52.7991	92.6539	30075.831	18.0537	26.4180	1138.4598	60941.788	45.6015	12.1388	21.274

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1 160.00-117.33				1	1	1		
L2 117.33-94.00				1	1	1		
L3 94.00-82.50				1	1	1		
L4 82.50-72.75				1	1	1		
L5 72.75-56.00				1	1	1		
L6 56.00-40.58				1	1	1		
L7 40.58-31.50				1	1	1		
L8 31.50-28.75				1	1	1		
L9 28.75-11.00				1	1	1		
L10 11.00-8.50				1	1	1		
L11 8.50-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf

HB114-1-08U4-M5J(1 1/4")	C	No	Inside Pole	159.00 - 0.00	3	No Ice	0.00	1.08
						1/2" Ice	0.00	1.08
						1" Ice	0.00	1.08
						2" Ice	0.00	1.08
						4" Ice	0.00	1.08

LDF6-50A(1-1/4")	C	No	Inside Pole	151.00 - 0.00	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66

LDF7-50A(1-5/8")	C	No	Inside Pole	141.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
AL7-50(1 5/8)	C	No	Inside Pole	141.00 - 0.00	7	No Ice	0.00	0.52
						1/2" Ice	0.00	0.52
						1" Ice	0.00	0.52
						2" Ice	0.00	0.52
						4" Ice	0.00	0.52

AVA7-50(1-5/8")	C	No	Inside Pole	130.00 - 0.00	6	No Ice	0.00	0.72
						1/2" Ice	0.00	0.72
						1" Ice	0.00	0.72
						2" Ice	0.00	0.72
						4" Ice	0.00	0.72

LDF7-50A(1-5/8")	C	No	Inside Pole	116.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF7-50A(1-5/8")	C	No	Inside Pole	116.00 - 0.00	1	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82

LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	96.00 - 0.00	2	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
						2" Ice	0.60	10.54
						4" Ice	1.00	30.04
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	96.00 - 0.00	10	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
LDF4-50A(1/2")	C	No	CaAa (Out Of Face)	96.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.84
						1" Ice	0.00	2.14
						2" Ice	0.00	6.58
						4" Ice	0.00	22.78
FB-L98-002-XXX(3/8)	C	No	CaAa (Out Of	96.00 - 0.00	1	No Ice	0.00	0.06

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf
			Face)			1/2" Ice	0.00	0.61
						1" Ice	0.00	1.77
						2" Ice	0.00	5.91
						4" Ice	0.00	21.54
WR-VG82ST-BRDA(5/8")	C	No	CaAa (Out Of Face)	96.00 - 0.00	2	No Ice	0.00	0.31
						1/2" Ice	0.00	1.01
						1" Ice	0.00	2.32
						2" Ice	0.00	6.77
						4" Ice	0.00	23.01

LDF4-50A(1/2")	C	No	Inside Pole	92.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15

LDF4-50A(1/2")	C	No	CaAa (Out Of Face)	71.00 - 0.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.84
						1" Ice	0.00	2.14
						2" Ice	0.00	6.58
						4" Ice	0.00	22.78

1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	58.25 - 0.00	1	No Ice	0.21	0.00
						1/2" Ice	0.32	0.00
						1" Ice	0.43	0.00
						2" Ice	0.65	0.00
						4" Ice	1.10	0.00
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	74.00 - 44.00	1	No Ice	0.13	0.00
						1/2" Ice	0.24	0.00
						1" Ice	0.35	0.00
						2" Ice	0.57	0.00
						4" Ice	1.01	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	13.00 - 0.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
						2" Ice	0.61	0.00
						4" Ice	1.06	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	42.25 - 27.25	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
						2" Ice	0.61	0.00
						4" Ice	1.06	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	96.00 - 86.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
						2" Ice	0.61	0.00
						4" Ice	1.06	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	160.00-117.33	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.66
L2	117.33-94.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.125	0.82
L3	94.00-82.50	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	5.887	0.52
L4	82.50-72.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.017	0.44

Tower Section n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L5	72.75-56.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	9.196	0.77
L6	56.00-40.58	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	11.095	0.71
L7	40.58-31.50	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	7.003	0.42
L8	31.50-28.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.120	0.13
L9	28.75-11.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	11.310	0.81
L10	11.00-8.50	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	1.928	0.11
L11	8.50-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.553	0.39

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	160.00-117.33	A	0.890	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.66
L2	117.33-94.00	A	0.862	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.233	0.91
L3	94.00-82.50	A	0.844	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	11.270	1.00
L4	82.50-72.75	A	0.831	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	7.543	0.85
L5	72.75-56.00	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	18.069	1.48
L6	56.00-40.58	A	0.785	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	21.008	1.34
L7	40.58-31.50	A	0.758	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	13.023	0.79
L8	31.50-28.75	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	3.862	0.23
L9	28.75-11.00	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	20.177	1.50
L10	11.00-8.50	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	3.511	0.21
L11	8.50-0.00	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	11.937	0.72

Feed Line Center of Pressure

Section	Elevation	CP _x	CP _z	CP _x Ice	CP _z Ice
	ft	in	in	in	in
L1	160.00-117.33	0.0000	0.0000	0.0000	0.0000
L2	117.33-94.00	-0.0654	0.0378	-0.1212	0.0700
L3	94.00-82.50	-0.5658	0.3267	-0.9214	0.5320
L4	82.50-72.75	-0.4725	0.2728	-0.7758	0.4479
L5	72.75-56.00	-0.6124	0.3536	-1.0258	0.5922
L6	56.00-40.58	-0.7771	0.4487	-1.2455	0.7191
L7	40.58-31.50	-0.8277	0.4779	-1.3059	0.7540
L8	31.50-28.75	-0.8317	0.4802	-1.2983	0.7496
L9	28.75-11.00	-0.7126	0.4114	-1.1185	0.6458
L10	11.00-8.50	-0.8429	0.4867	-1.3283	0.7669
L11	8.50-0.00	-0.8457	0.4883	-1.3359	0.7713

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	

APXVSP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	159.00	No Ice	8.50	6.95	0.08
						1/2" Ice	9.15	8.13	0.15
						Ice	9.77	9.02	0.23
						1" Ice	11.03	10.84	0.41
						2" Ice	13.68	14.85	0.91
APXV9ERR18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	159.00	No Ice	8.50	7.47	0.09
						1/2" Ice	9.15	8.66	0.16
						Ice	9.77	9.56	0.24
						1" Ice	11.03	11.39	0.42
						2" Ice	13.68	15.53	0.94
APXVSP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	159.00	No Ice	8.50	6.95	0.08
						1/2" Ice	9.15	8.13	0.15
						Ice	9.77	9.02	0.23
						1" Ice	11.03	10.84	0.41
						2" Ice	13.68	14.85	0.91
Platform Mount [LP 602-1]	C	None		0.0000	159.00	No Ice	32.03	32.03	1.34
						1/2" Ice	38.71	38.71	1.80
						Ice	45.39	45.39	2.26
						1" Ice	58.75	58.75	3.17
						2" Ice	85.47	85.47	5.00
PCS 1900MHz 4x45W- 65MHz	A	From Leg	2.00 0.00 1.00	0.0000	155.00	No Ice	2.71	2.61	0.06
						1/2" Ice	2.95	2.85	0.08
						Ice	3.20	3.09	0.11
						1" Ice	3.72	3.61	0.17
						2" Ice	4.86	4.74	0.35
PCS 1900MHz 4x45W- 65MHz	B	From Leg	2.00 0.00 1.00	0.0000	155.00	No Ice	2.71	2.61	0.06
						1/2" Ice	2.95	2.85	0.08
						Ice	3.20	3.09	0.11
						1" Ice	3.72	3.61	0.17
						2" Ice	4.86	4.74	0.35
PCS 1900MHz 4x45W- 65MHz	C	From Leg	2.00 0.00 1.00	0.0000	155.00	No Ice	2.71	2.61	0.06
						1/2" Ice	2.95	2.85	0.08
						Ice	3.20	3.09	0.11
						1" Ice	3.72	3.61	0.17
						2" Ice	4.86	4.74	0.35

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA} _{Front}	C _{AA} _{Side}	Weight		
			Horz	Lateral	Vert						ft	ft
800MHz 2X50W RRH W/FILTER	A	From Leg	2.00	0.0000	155.00	4" Ice	2.40	2.25	0.06			
			0.00			No Ice						
			-1.00			1/2"				2.61	2.46	0.09
						Ice				2.83	2.68	0.11
						1" Ice				3.30	3.13	0.17
800MHz 2X50W RRH W/FILTER	B	From Leg	2.00	0.0000	155.00	4" Ice	2.40	2.25	0.06			
			0.00			No Ice						
			-1.00			1/2"				2.61	2.46	0.09
						Ice				2.83	2.68	0.11
						1" Ice				3.30	3.13	0.17
800MHz 2X50W RRH W/FILTER	C	From Leg	2.00	0.0000	155.00	4" Ice	2.40	2.25	0.06			
			0.00			No Ice						
			-1.00			1/2"				2.61	2.46	0.09
						Ice				2.83	2.68	0.11
						1" Ice				3.30	3.13	0.17
Side Arm Mount [SO 102-3]	C	None		0.0000	155.00	4" Ice	3.00	3.00	0.08			
						No Ice						
						1/2"				3.48	3.48	0.11
						Ice				3.96	3.96	0.14
						1" Ice				4.92	4.92	0.20
**** (4) 7130.16 w/ Mount Pipe	A	From Leg	4.00	0.0000	151.00	4" Ice	6.00	7.03	0.04			
			0.00			No Ice						
			2.00			1/2"				6.48	7.81	0.10
						Ice				6.97	8.57	0.16
						1" Ice				7.97	10.13	0.32
(4) 7130.16 w/ Mount Pipe	B	From Leg	4.00	0.0000	151.00	4" Ice	6.00	7.03	0.04			
			0.00			No Ice						
			2.00			1/2"				6.48	7.81	0.10
						Ice				6.97	8.57	0.16
						1" Ice				7.97	10.13	0.32
(4) 7130.16 w/ Mount Pipe	C	From Leg	4.00	0.0000	151.00	4" Ice	6.00	7.03	0.04			
			0.00			No Ice						
			2.00			1/2"				6.48	7.81	0.10
						Ice				6.97	8.57	0.16
						1" Ice				7.97	10.13	0.32
T-Arm Mount [TA 602-3]	C	None		0.0000	151.00	4" Ice	11.59	11.59	0.77			
						No Ice						
						1/2"				15.44	15.44	0.99
						Ice				19.29	19.29	1.21
						1" Ice				26.99	26.99	1.64
**** ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00	0.0000	141.00	4" Ice	6.83	5.64	0.11			
			0.00			No Ice						
			4.00			1/2"				7.35	6.48	0.17
						Ice				7.86	7.26	0.23
						1" Ice				8.93	8.86	0.38
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00	0.0000	141.00	4" Ice	6.83	5.64	0.11			
			0.00			No Ice						
			4.00			1/2"				7.35	6.48	0.17
						Ice				7.86	7.26	0.23
						1" Ice				8.93	8.86	0.38
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00	0.0000	141.00	4" Ice	6.83	5.64	0.11			
			0.00			No Ice						
					1/2"	7.35	6.48	0.17				

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA} _{Front}	C _{AA} _{Side}	Weight
			Horz	Lateral	Vert					
			ft	ft	ft	°	ft	ft ²	ft ²	K
			4.00				Ice	7.86	7.26	0.23
							1" Ice	8.93	8.86	0.38
							2" Ice	11.18	12.29	0.81
							4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00	0.0000	141.00		No Ice	6.82	5.63	0.11
			0.00				1/2"	7.34	6.47	0.17
			4.00				Ice	7.85	7.25	0.23
							1" Ice	8.92	8.85	0.38
							2" Ice	11.16	12.28	0.81
							4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00	0.0000	141.00		No Ice	6.82	5.63	0.11
			0.00				1/2"	7.34	6.47	0.17
			4.00				Ice	7.85	7.25	0.23
							1" Ice	8.92	8.85	0.38
							2" Ice	11.16	12.28	0.81
							4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00	0.0000	141.00		No Ice	6.82	5.63	0.11
			0.00				1/2"	7.34	6.47	0.17
			4.00				Ice	7.85	7.25	0.23
							1" Ice	8.92	8.85	0.38
							2" Ice	11.16	12.28	0.81
							4" Ice			
KRY 112 144/1	A	From Leg	4.00	0.0000	141.00		No Ice	0.41	0.20	0.01
			0.00				1/2"	0.50	0.27	0.01
			4.00				Ice	0.59	0.35	0.02
							1" Ice	0.81	0.53	0.03
							2" Ice	1.36	1.00	0.08
							4" Ice			
KRY 112 144/1	B	From Leg	4.00	0.0000	141.00		No Ice	0.41	0.20	0.01
			0.00				1/2"	0.50	0.27	0.01
			4.00				Ice	0.59	0.35	0.02
							1" Ice	0.81	0.53	0.03
							2" Ice	1.36	1.00	0.08
							4" Ice			
KRY 112 144/1	C	From Leg	4.00	0.0000	141.00		No Ice	0.41	0.20	0.01
			0.00				1/2"	0.50	0.27	0.01
			4.00				Ice	0.59	0.35	0.02
							1" Ice	0.81	0.53	0.03
							2" Ice	1.36	1.00	0.08
							4" Ice			
Platform Mount [LP 602-1]	C	None		0.0000	141.00		No Ice	32.03	32.03	1.34
							1/2"	38.71	38.71	1.80
							Ice	45.39	45.39	2.26
							1" Ice	58.75	58.75	3.17
							2" Ice	85.47	85.47	5.00
							4" Ice			

APXV18-206517S-ACU w/ Mount Pipe	A	From Leg	1.00	0.0000	130.00		No Ice	5.40	4.70	0.05
			0.00				1/2"	5.96	5.86	0.10
			0.00				Ice	6.48	6.73	0.15
							1" Ice	7.55	8.51	0.28
							2" Ice	9.92	12.28	0.68
							4" Ice			
APXV18-206517S-ACU w/ Mount Pipe	B	From Leg	1.00	0.0000	130.00		No Ice	5.40	4.70	0.05
			0.00				1/2"	5.96	5.86	0.10
			0.00				Ice	6.48	6.73	0.15
							1" Ice	7.55	8.51	0.28
							2" Ice	9.92	12.28	0.68
							4" Ice			
APXV18-206517S-ACU w/ Mount Pipe	C	From Leg	1.00	0.0000	130.00		No Ice	5.40	4.70	0.05
			0.00				1/2"	5.96	5.86	0.10
			0.00				Ice	6.48	6.73	0.15
							1" Ice	7.55	8.51	0.28
							2" Ice	9.92	12.28	0.68
							4" Ice			

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA} _{Front}	C _{AA} _{Side}	Weight	
			Horz	Lateral	Vert						ft
Pipe Mount [PM 601-3]	C	None				0.0000	130.00	No Ice	4.39	4.39	0.20
								1/2"	5.48	5.48	0.24
								Ice	6.57	6.57	0.28
								1" Ice	8.75	8.75	0.36
								2" Ice	13.11	13.11	0.53
								4" Ice			

BXA-70063-6CF-EDIN-2 w/ Mount Pipe	A	From Leg	4.00			0.0000	116.00	No Ice	7.97	5.80	0.04
			0.00					1/2"	8.61	6.95	0.10
			2.00					Ice	9.22	7.82	0.17
								1" Ice	10.46	9.60	0.34
								2" Ice	13.07	13.37	0.80
								4" Ice			
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	B	From Leg	4.00			0.0000	116.00	No Ice	7.97	5.80	0.04
			0.00					1/2"	8.61	6.95	0.10
			2.00					Ice	9.22	7.82	0.17
								1" Ice	10.46	9.60	0.34
								2" Ice	13.07	13.37	0.80
								4" Ice			
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	C	From Leg	4.00			0.0000	116.00	No Ice	7.97	5.80	0.04
			0.00					1/2"	8.61	6.95	0.10
			2.00					Ice	9.22	7.82	0.17
								1" Ice	10.46	9.60	0.34
								2" Ice	13.07	13.37	0.80
								4" Ice			
SPXW 8515 w/ Mount Pipe	A	From Leg	4.00			0.0000	116.00	No Ice	3.48	3.86	0.03
			0.00					1/2"	3.89	4.45	0.07
			2.00					Ice	4.31	5.11	0.11
								1" Ice	5.18	6.46	0.21
								2" Ice	7.07	9.46	0.52
								4" Ice			
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	B	From Leg	4.00			0.0000	116.00	No Ice	3.18	3.35	0.03
			0.00					1/2"	3.56	3.97	0.06
			2.00					Ice	3.96	4.60	0.10
								1" Ice	4.85	5.89	0.19
								2" Ice	6.77	8.89	0.49
								4" Ice			
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	C	From Leg	4.00			0.0000	116.00	No Ice	3.18	3.35	0.03
			0.00					1/2"	3.56	3.97	0.06
			2.00					Ice	3.96	4.60	0.10
								1" Ice	4.85	5.89	0.19
								2" Ice	6.77	8.89	0.49
								4" Ice			
(2) FD9R6004/2C-3L	A	From Leg	4.00			0.0000	116.00	No Ice	0.37	0.08	0.00
			0.00					1/2"	0.45	0.14	0.01
			0.00					Ice	0.54	0.20	0.01
								1" Ice	0.75	0.34	0.02
								2" Ice	1.28	0.74	0.06
								4" Ice			
(2) FD9R6004/2C-3L	B	From Leg	4.00			0.0000	116.00	No Ice	0.37	0.08	0.00
			0.00					1/2"	0.45	0.14	0.01
			0.00					Ice	0.54	0.20	0.01
								1" Ice	0.75	0.34	0.02
								2" Ice	1.28	0.74	0.06
								4" Ice			
(2) FD9R6004/2C-3L	C	From Leg	4.00			0.0000	116.00	No Ice	0.37	0.08	0.00
			0.00					1/2"	0.45	0.14	0.01
			0.00					Ice	0.54	0.20	0.01
								1" Ice	0.75	0.34	0.02
								2" Ice	1.28	0.74	0.06
								4" Ice			
LNx-6514DS-VTM w/ Mount Pipe	A	From Leg	4.00			0.0000	116.00	No Ice	8.63	7.07	0.06
			0.00					1/2"	9.29	8.25	0.13
			2.00					Ice	9.90	9.15	0.21
								1" Ice	11.17	10.98	0.39

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA} _{Front}	C _{AA} _{Side}	Weight	
			Horz	Lateral	Vert						ft
			ft	ft	ft	°	ft	ft ²	ft ²	K	
LNX-6514DS-VTM w/ Mount Pipe	B	From Leg	4.00	0.00	2.00	0.0000	116.00	2" Ice	13.82	15.01	0.90
								4" Ice			
								No Ice	8.63	7.07	0.06
								1/2" Ice	9.29	8.25	0.13
								1" Ice	9.90	9.15	0.21
LNX-6514DS-VTM w/ Mount Pipe	C	From Leg	4.00	0.00	2.00	0.0000	116.00	1" Ice	11.17	10.98	0.39
								2" Ice	13.82	15.01	0.90
								4" Ice			
								No Ice	8.63	7.07	0.06
								1/2" Ice	9.29	8.25	0.13
HBX-6517DS-VTM w/ Mount Pipe	A	From Leg	4.00	0.00	2.00	0.0000	116.00	Ice	9.90	9.15	0.21
								1" Ice	11.17	10.98	0.39
								2" Ice	13.82	15.01	0.90
								4" Ice			
								No Ice	5.54	5.02	0.05
HBX-6517DS-VTM w/ Mount Pipe	B	From Leg	4.00	0.00	2.00	0.0000	116.00	1/2" Ice	6.11	6.22	0.09
								Ice	6.65	7.17	0.15
								1" Ice	7.75	9.01	0.28
								2" Ice	10.11	12.90	0.69
								4" Ice			
HBX-6517DS-VTM w/ Mount Pipe	C	From Leg	4.00	0.00	2.00	0.0000	116.00	No Ice	5.54	5.02	0.05
								1/2" Ice	6.11	6.22	0.09
								Ice	6.65	7.17	0.15
								1" Ice	7.75	9.01	0.28
								2" Ice	10.11	12.90	0.69
DB-T1-6Z-8AB-0Z	A	From Leg	4.00	0.00	2.00	0.0000	116.00	4" Ice			
								No Ice	5.60	2.33	0.04
								1/2" Ice	5.92	2.56	0.08
								Ice	6.24	2.79	0.12
								1" Ice	6.91	3.28	0.21
RRH2X40-AWS	A	From Leg	4.00	0.00	2.00	0.0000	116.00	2" Ice	8.37	4.37	0.45
								4" Ice			
								No Ice	2.98	1.60	0.04
								1/2" Ice	3.24	1.82	0.06
								Ice	3.50	2.06	0.08
RRH2X40-AWS	B	From Leg	4.00	0.00	2.00	0.0000	116.00	1" Ice	4.07	2.56	0.14
								2" Ice	5.30	3.66	0.29
								4" Ice			
								No Ice	2.98	1.60	0.04
								1/2" Ice	3.24	1.82	0.06
RRH2X40-AWS	C	From Leg	4.00	0.00	2.00	0.0000	116.00	Ice	3.50	2.06	0.08
								1" Ice	4.07	2.56	0.14
								2" Ice	5.30	3.66	0.29
								4" Ice			
								No Ice	2.98	1.60	0.04
Platform Mount [LP 303-1]	C	None				0.0000	116.00	1/2" Ice	18.87	18.87	1.48
								Ice	23.08	23.08	1.71
								1" Ice	31.50	31.50	2.18
								2" Ice	48.34	48.34	3.10
								4" Ice			

GPS_A	C	From Leg	4.00	0.00		0.0000	96.00	No Ice	0.30	0.30	0.00
								1/2"	0.37	0.37	0.00

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA} _{Front}	C _{AA} _{Side}	Weight
			Horz	Lateral	Vert					
			ft	ft	ft	°	ft	ft ²	ft ²	K
					7.00		Ice	0.46	0.46	0.01
							1" Ice	0.65	0.65	0.02
							2" Ice	1.15	1.15	0.08
							4" Ice			
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00	0.0000	96.00		No Ice	6.12	4.25	0.06
			0.00				1/2"	6.63	5.01	0.10
			2.00				Ice	7.13	5.71	0.16
							1" Ice	8.16	7.16	0.29
							2" Ice	10.36	10.41	0.66
							4" Ice			
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00	0.0000	96.00		No Ice	6.12	4.25	0.06
			0.00				1/2"	6.63	5.01	0.10
			2.00				Ice	7.13	5.71	0.16
							1" Ice	8.16	7.16	0.29
							2" Ice	10.36	10.41	0.66
							4" Ice			
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00	0.0000	96.00		No Ice	6.12	4.25	0.06
			0.00				1/2"	6.63	5.01	0.10
			2.00				Ice	7.13	5.71	0.16
							1" Ice	8.16	7.16	0.29
							2" Ice	10.36	10.41	0.66
							4" Ice			
AM-X-CD-14-65-00T-RET w/ Mount Pipe	A	From Leg	4.00	0.0000	96.00		No Ice	5.74	4.02	0.05
			0.00				1/2"	6.20	4.63	0.10
			2.00				Ice	6.66	5.28	0.15
							1" Ice	7.62	6.68	0.27
							2" Ice	9.67	9.74	0.63
							4" Ice			
AM-X-CD-14-65-00T-RET w/ Mount Pipe	B	From Leg	4.00	0.0000	96.00		No Ice	5.74	4.02	0.05
			0.00				1/2"	6.20	4.63	0.10
			2.00				Ice	6.66	5.28	0.15
							1" Ice	7.62	6.68	0.27
							2" Ice	9.67	9.74	0.63
							4" Ice			
AM-X-CD-14-65-00T-RET w/ Mount Pipe	C	From Leg	4.00	0.0000	96.00		No Ice	5.74	4.02	0.05
			0.00				1/2"	6.20	4.63	0.10
			2.00				Ice	6.66	5.28	0.15
							1" Ice	7.62	6.68	0.27
							2" Ice	9.67	9.74	0.63
							4" Ice			
(2) RRUS-11	A	From Leg	4.00	0.0000	96.00		No Ice	3.25	1.37	0.05
			0.00				1/2"	3.49	1.55	0.07
			2.00				Ice	3.74	1.74	0.09
							1" Ice	4.27	2.14	0.15
							2" Ice	5.43	3.04	0.31
							4" Ice			
(2) RRUS-11	B	From Leg	4.00	0.0000	96.00		No Ice	3.25	1.37	0.05
			0.00				1/2"	3.49	1.55	0.07
			2.00				Ice	3.74	1.74	0.09
							1" Ice	4.27	2.14	0.15
							2" Ice	5.43	3.04	0.31
							4" Ice			
(2) RRUS-11	C	From Leg	4.00	0.0000	96.00		No Ice	3.25	1.37	0.05
			0.00				1/2"	3.49	1.55	0.07
			2.00				Ice	3.74	1.74	0.09
							1" Ice	4.27	2.14	0.15
							2" Ice	5.43	3.04	0.31
							4" Ice			
(2) TT19-08BP111-001	A	From Leg	4.00	0.0000	96.00		No Ice	0.64	0.52	0.02
			0.00				1/2"	0.75	0.62	0.02
			2.00				Ice	0.87	0.73	0.03
							1" Ice	1.13	0.98	0.05
							2" Ice	1.77	1.58	0.12
							4" Ice			
(2) TT19-08BP111-001	B	From Leg	4.00	0.0000	96.00		No Ice	0.64	0.52	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
			0.00			1/2"	0.75	0.62	0.02
			2.00			Ice	0.87	0.73	0.03
						1" Ice	1.13	0.98	0.05
						2" Ice	1.77	1.58	0.12
						4" Ice			
(2) TT19-08BP111-001	C	From Leg	4.00	0.0000	96.00	No Ice	0.64	0.52	0.02
			0.00			1/2"	0.75	0.62	0.02
			2.00			Ice	0.87	0.73	0.03
						1" Ice	1.13	0.98	0.05
						2" Ice	1.77	1.58	0.12
						4" Ice			
DC6-48-60-18-8F	A	From Leg	4.00	0.0000	96.00	No Ice	2.57	2.57	0.02
			0.00			1/2"	2.80	2.80	0.04
			2.00			Ice	3.04	3.04	0.07
						1" Ice	3.54	3.54	0.13
						2" Ice	4.66	4.66	0.30
						4" Ice			
T-Arm Mount [TA 602-3]	C	None		0.0000	96.00	No Ice	11.59	11.59	0.77
						1/2"	15.44	15.44	0.99
						Ice	19.29	19.29	1.21
						1" Ice	26.99	26.99	1.64
						2" Ice	42.39	42.39	2.50
						4" Ice			

KS24019-L112A	C	From Leg	4.00	0.0000	92.00	No Ice	0.16	0.16	0.01
			0.00			1/2"	0.22	0.22	0.01
			1.00			Ice	0.30	0.30	0.01
						1" Ice	0.48	0.48	0.02
						2" Ice	0.95	0.95	0.06
						4" Ice			
Side Arm Mount [SO 701-1]	C	None		0.0000	92.00	No Ice	0.85	1.67	0.07
						1/2"	1.14	2.34	0.08
						Ice	1.43	3.01	0.09
						1" Ice	2.01	4.35	0.12
						2" Ice	3.17	7.03	0.18
						4" Ice			

GPS_A	B	From Leg	4.00	0.0000	71.00	No Ice	0.30	0.30	0.00
			0.00			1/2"	0.37	0.37	0.00
			1.00			Ice	0.46	0.46	0.01
						1" Ice	0.65	0.65	0.02
						2" Ice	1.15	1.15	0.08
						4" Ice			
GPS_A	C	From Leg	4.00	0.0000	71.00	No Ice	0.30	0.30	0.00
			0.00			1/2"	0.37	0.37	0.00
			1.00			Ice	0.46	0.46	0.01
						1" Ice	0.65	0.65	0.02
						2" Ice	1.15	1.15	0.08
						4" Ice			
Side Arm Mount [SO 701-1]	B	None		0.0000	71.00	No Ice	0.85	1.67	0.07
						1/2"	1.14	2.34	0.08
						Ice	1.43	3.01	0.09
						1" Ice	2.01	4.35	0.12
						2" Ice	3.17	7.03	0.18
						4" Ice			
Side Arm Mount [SO 701-1]	C	None		0.0000	71.00	No Ice	0.85	1.67	0.07
						1/2"	1.14	2.34	0.08
						Ice	1.43	3.01	0.09
						1" Ice	2.01	4.35	0.12
						2" Ice	3.17	7.03	0.18
						4" Ice			

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_z	q_z psf	A_G ft ²	Face	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 160.00-117.33	137.81	1.504	28	93.892	A	0.000	93.892	93.892	100.00	0.000	0.000
					B	0.000	93.892	100.00	0.000	0.000	
					C	0.000	93.892	100.00	0.000	0.000	
L2 117.33-94.00	105.40	1.393	26	62.677	A	0.000	62.677	62.677	100.00	0.000	0.000
					B	0.000	62.677	100.00	0.000	0.000	
					C	0.000	62.677	100.00	0.000	1.125	
L3 94.00-82.50	88.19	1.324	24	34.066	A	0.000	34.066	34.066	100.00	0.000	0.000
					B	0.000	34.066	100.00	0.000	0.000	
					C	0.000	34.066	100.00	0.000	5.887	
L4 82.50-72.75	77.58	1.277	24	30.020	A	0.000	30.020	30.020	100.00	0.000	0.000
					B	0.000	30.020	100.00	0.000	0.000	
					C	0.000	30.020	100.00	0.000	4.017	
L5 72.75-56.00	64.26	1.21	22	55.192	A	0.000	55.192	55.192	100.00	0.000	0.000
					B	0.000	55.192	100.00	0.000	0.000	
					C	0.000	55.192	100.00	0.000	9.196	
L6 56.00-40.58	48.20	1.114	21	54.742	A	0.000	54.742	54.742	100.00	0.000	0.000
					B	0.000	54.742	100.00	0.000	0.000	
					C	0.000	54.742	100.00	0.000	11.095	
L7 40.58-31.50	36.01	1.025	19	33.339	A	0.000	33.339	33.339	100.00	0.000	0.000
					B	0.000	33.339	100.00	0.000	0.000	
					C	0.000	33.339	100.00	0.000	7.003	
L8 31.50-28.75	30.12	1	18	10.381	A	0.000	10.381	10.381	100.00	0.000	0.000
					B	0.000	10.381	100.00	0.000	0.000	
					C	0.000	10.381	100.00	0.000	2.120	
L9 28.75-11.00	19.77	1	18	69.874	A	0.000	69.874	69.874	100.00	0.000	0.000
					B	0.000	69.874	100.00	0.000	0.000	
					C	0.000	69.874	100.00	0.000	11.310	
L10 11.00-8.50	9.75	1	18	10.241	A	0.000	10.241	10.241	100.00	0.000	0.000
					B	0.000	10.241	100.00	0.000	0.000	
					C	0.000	10.241	100.00	0.000	1.928	
L11 8.50-0.00	4.23	1	18	35.555	A	0.000	35.555	35.555	100.00	0.000	0.000
					B	0.000	35.555	100.00	0.000	0.000	
					C	0.000	35.555	100.00	0.000	6.553	

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_z	q_z psf	t_z in	A_G ft ²	Face	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 160.00-117.33	137.81	1.504	5	0.8903	100.224	A	0.000	100.224	100.224	100.00	0.000	0.000
						B	0.000	100.224	100.00	0.000	0.000	
						C	0.000	100.224	100.00	0.000	0.000	
L2 117.33-94.00	105.40	1.393	5	0.8621	66.139	A	0.000	66.139	66.139	100.00	0.000	0.000
						B	0.000	66.139	100.00	0.000	0.000	
						C	0.000	66.139	100.00	0.000	2.233	
L3 94.00-82.50	88.19	1.324	5	0.8439	35.684	A	0.000	35.684	35.684	100.00	0.000	0.000
						B	0.000	35.684	100.00	0.000	0.000	
						C	0.000	35.684	100.00	0.000	11.270	
L4 82.50-72.75	77.58	1.277	5	0.8310	31.392	A	0.000	31.392	31.392	100.00	0.000	0.000
						B	0.000	31.392	100.00	0.000	0.000	
						C	0.000	31.392	100.00	0.000	7.543	
L5 72.75-56.00	64.26	1.21	4	0.8124	57.460	A	0.000	57.460	57.460	100.00	0.000	0.000
						B	0.000	57.460	100.00	0.000	0.000	
						C	0.000	57.460	100.00	0.000	18.069	

Section Elevation ft	z ft	K _z	q _z psf	t _z in	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
L6 56.00-40.58	48.20	1.114	4	0.7849	56.759	A	0.000	56.759	56.759	100.00	0.000	0.000
						B	0.000	56.759		100.00	0.000	0.000
						C	0.000	56.759		100.00	0.000	21.008
L7 40.58-31.50	36.01	1.025	4	0.7579	34.527	A	0.000	34.527	34.527	100.00	0.000	0.000
						B	0.000	34.527		100.00	0.000	0.000
						C	0.000	34.527		100.00	0.000	13.023
L8 31.50-28.75	30.12	1	4	0.7500	10.725	A	0.000	10.725	10.725	100.00	0.000	0.000
						B	0.000	10.725		100.00	0.000	0.000
						C	0.000	10.725		100.00	0.000	3.862
L9 28.75-11.00	19.77	1	4	0.7500	72.093	A	0.000	72.093	72.093	100.00	0.000	0.000
						B	0.000	72.093		100.00	0.000	0.000
						C	0.000	72.093		100.00	0.000	20.177
L10 11.00-8.50	9.75	1	4	0.7500	10.553	A	0.000	10.553	10.553	100.00	0.000	0.000
						B	0.000	10.553		100.00	0.000	0.000
						C	0.000	10.553		100.00	0.000	3.511
L11 8.50-0.00	4.23	1	4	0.7500	36.618	A	0.000	36.618	36.618	100.00	0.000	0.000
						B	0.000	36.618		100.00	0.000	0.000
						C	0.000	36.618		100.00	0.000	11.937

Tower Pressure - Service

$G_H = 1.690$

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 160.00-117.33	137.81	1.504	10	93.892	A	0.000	93.892	93.892	100.00	0.000	0.000
					B	0.000	93.892		100.00	0.000	0.000
					C	0.000	93.892		100.00	0.000	0.000
L2 117.33-94.00	105.40	1.393	9	62.677	A	0.000	62.677	62.677	100.00	0.000	0.000
					B	0.000	62.677		100.00	0.000	0.000
					C	0.000	62.677		100.00	0.000	1.125
L3 94.00-82.50	88.19	1.324	8	34.066	A	0.000	34.066	34.066	100.00	0.000	0.000
					B	0.000	34.066		100.00	0.000	0.000
					C	0.000	34.066		100.00	0.000	5.887
L4 82.50-72.75	77.58	1.277	8	30.020	A	0.000	30.020	30.020	100.00	0.000	0.000
					B	0.000	30.020		100.00	0.000	0.000
					C	0.000	30.020		100.00	0.000	4.017
L5 72.75-56.00	64.26	1.21	8	55.192	A	0.000	55.192	55.192	100.00	0.000	0.000
					B	0.000	55.192		100.00	0.000	0.000
					C	0.000	55.192		100.00	0.000	9.196
L6 56.00-40.58	48.20	1.114	7	54.742	A	0.000	54.742	54.742	100.00	0.000	0.000
					B	0.000	54.742		100.00	0.000	0.000
					C	0.000	54.742		100.00	0.000	11.095
L7 40.58-31.50	36.01	1.025	7	33.339	A	0.000	33.339	33.339	100.00	0.000	0.000
					B	0.000	33.339		100.00	0.000	0.000
					C	0.000	33.339		100.00	0.000	7.003
L8 31.50-28.75	30.12	1	6	10.381	A	0.000	10.381	10.381	100.00	0.000	0.000
					B	0.000	10.381		100.00	0.000	0.000
					C	0.000	10.381		100.00	0.000	2.120
L9 28.75-11.00	19.77	1	6	69.874	A	0.000	69.874	69.874	100.00	0.000	0.000
					B	0.000	69.874		100.00	0.000	0.000
					C	0.000	69.874		100.00	0.000	11.310
L10 11.00-8.50	9.75	1	6	10.241	A	0.000	10.241	10.241	100.00	0.000	0.000
					B	0.000	10.241		100.00	0.000	0.000
					C	0.000	10.241		100.00	0.000	1.928
L11 8.50-0.00	4.23	1	6	35.555	A	0.000	35.555	35.555	100.00	0.000	0.000
					B	0.000	35.555		100.00	0.000	0.000
					C	0.000	35.555		100.00	0.000	6.553

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	160 - 117.33	Pole	Max Tension	11	0.00	-0.00	-0.00
			Max. Compression	14	-14.83	-0.04	-0.02
			Max. Mx	5	-7.02	-434.19	0.44
			Max. My	8	-7.02	0.41	-434.69
			Max. Vy	5	16.92	-434.19	0.44
			Max. Vx	2	-16.93	-0.46	434.64
			Max. Torque	9			0.12
L2	117.33 - 94	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-26.89	0.14	0.82
			Max. Mx	5	-14.32	-1073.70	1.00
			Max. My	2	-14.30	-0.75	1078.18
			Max. Vy	5	28.24	-1073.70	1.00
			Max. Vx	8	28.39	0.77	-1077.62
			Max. Torque	11			-1.16
L3	94 - 82.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-28.61	0.58	0.56
			Max. Mx	11	-15.62	1245.98	-0.65
			Max. My	2	-15.60	-0.72	1251.32
			Max. Vy	5	29.18	-1245.89	1.02
			Max. Vx	8	29.34	0.95	-1250.89

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L4	82.5 - 72.75	Pole	Max. Torque	11			-1.16
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-33.83	1.63	-0.05
			Max. Mx	11	-19.64	1708.62	-0.94
			Max. My	2	-19.63	-0.68	1715.98
			Max. Vy	5	31.39	-1708.14	1.08
			Max. Vx	8	31.55	1.34	-1715.80
L5	72.75 - 56	Pole	Max. Torque	11			-1.10
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-39.41	2.91	-0.83
			Max. Mx	11	-24.13	2256.38	-1.28
			Max. My	8	-24.11	1.80	-2266.03
			Max. Vy	5	33.89	-2255.41	1.13
			Max. Vx	8	34.05	1.80	-2266.03
L6	56 - 40.583	Pole	Max. Torque	11			-1.06
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-43.04	3.63	-1.25
			Max. Mx	11	-27.17	2567.21	-1.47
			Max. My	8	-27.16	2.06	-2578.17
			Max. Vy	5	35.18	-2565.96	1.15
			Max. Vx	8	35.33	2.06	-2578.17
L7	40.583 - 31.5	Pole	Max. Torque	4			0.94
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-52.15	4.90	-1.98
			Max. Mx	11	-34.94	3130.98	-1.80
			Max. My	8	-34.93	2.51	-3144.22
			Max. Vy	5	37.45	-3129.24	1.17
			Max. Vx	8	37.60	2.51	-3144.22
L8	31.5 - 28.75	Pole	Max. Torque	4			0.94
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-53.49	5.12	-2.11
			Max. Mx	11	-36.10	3234.48	-1.86
			Max. My	8	-36.09	2.59	-3248.12
			Max. Vy	5	37.82	-3232.65	1.18
			Max. Vx	8	37.97	2.59	-3248.12
L9	28.75 - 11	Pole	Max. Torque	4			0.94
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-61.39	6.63	-2.98
			Max. Mx	11	-42.95	3925.30	-2.26
			Max. My	8	-42.95	3.12	-3941.50
			Max. Vy	5	40.03	-3922.85	1.19
			Max. Vx	8	40.18	3.12	-3941.50
L10	11 - 8.5	Pole	Max. Torque	3			0.94
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-62.65	6.85	-3.11
			Max. Mx	11	-44.05	4025.78	-2.31
			Max. My	8	-44.05	3.20	-4042.34
			Max. Vy	5	40.36	-4023.25	1.19
			Max. Vx	8	40.51	3.20	-4042.34
L11	8.5 - 0	Pole	Max. Torque	3			0.96
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-66.41	7.62	-3.55
			Max. Mx	11	-47.32	4373.40	-2.51
			Max. My	8	-47.32	3.46	-4391.17
			Max. Vy	5	41.44	-4370.55	1.19
			Max. Vx	8	41.58	3.46	-4391.17
			Max. Torque	3			1.01

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	66.41	0.00	-0.00

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. H _x	11	47.34	41.42	-0.01
	Max. H _z	2	47.34	-0.01	41.57
	Max. M _x	2	4389.86	-0.01	41.57
	Max. M _z	5	4370.55	-41.42	0.01
	Max. Torsion	3	1.01	-20.72	36.01
	Min. Vert	8	47.34	0.01	-41.57
	Min. H _x	5	47.34	-41.42	0.01
	Min. H _z	8	47.34	0.01	-41.57
	Min. M _x	8	-4391.17	0.01	-41.57
	Min. M _z	11	-4373.40	41.42	-0.01
	Min. Torsion	9	-1.00	20.72	-36.01

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	47.34	-0.00	0.00	0.65	1.59	0.00
Dead+Wind 0 deg - No Ice	47.34	0.01	-41.57	-4389.86	-0.23	-0.81
Dead+Wind 30 deg - No Ice	47.34	20.72	-36.01	-3803.12	-2186.17	-1.01
Dead+Wind 60 deg - No Ice	47.34	35.88	-20.80	-2196.53	-3785.92	-0.94
Dead+Wind 90 deg - No Ice	47.34	41.42	-0.01	-1.18	-4370.55	-0.61
Dead+Wind 120 deg - No Ice	47.34	35.87	20.78	2194.66	-3784.08	-0.11
Dead+Wind 150 deg - No Ice	47.34	20.70	36.00	3802.60	-2182.97	0.40
Dead+Wind 180 deg - No Ice	47.34	-0.01	41.57	4391.17	3.46	0.81
Dead+Wind 210 deg - No Ice	47.34	-20.72	36.01	3804.44	2189.40	1.00
Dead+Wind 240 deg - No Ice	47.34	-35.88	20.80	2197.85	3789.14	0.92
Dead+Wind 270 deg - No Ice	47.34	-41.42	0.01	2.51	4373.40	0.61
Dead+Wind 300 deg - No Ice	47.34	-35.87	-20.78	-2193.34	3787.31	0.13
Dead+Wind 330 deg - No Ice	47.34	-20.70	-36.00	-3801.29	2186.21	-0.39
Dead+Ice+Temp	66.41	-0.00	0.00	3.55	7.62	0.00
Dead+Wind 0 deg+Ice+Temp	66.41	0.00	-9.71	-1052.61	7.51	-0.31
Dead+Wind 30 deg+Ice+Temp	66.41	4.84	-8.41	-911.29	-518.57	-0.30
Dead+Wind 60 deg+Ice+Temp	66.41	8.39	-4.86	-524.82	-903.59	-0.21
Dead+Wind 90 deg+Ice+Temp	66.41	9.68	-0.00	3.25	-1044.38	-0.07
Dead+Wind 120 deg+Ice+Temp	66.41	8.38	4.85	531.42	-903.21	0.10
Dead+Wind 150 deg+Ice+Temp	66.41	4.84	8.41	918.17	-517.92	0.23
Dead+Wind 180 deg+Ice+Temp	66.41	-0.00	9.71	1059.87	8.26	0.31
Dead+Wind 210 deg+Ice+Temp	66.41	-4.84	8.41	918.55	534.34	0.30
Dead+Wind 240 deg+Ice+Temp	66.41	-8.39	4.86	532.08	919.36	0.21
Dead+Wind 270 deg+Ice+Temp	66.41	-9.68	0.00	4.01	1060.14	0.07
Dead+Wind 300 deg+Ice+Temp	66.41	-8.38	-4.85	-524.17	918.98	-0.09
Dead+Wind 330 deg+Ice+Temp	66.41	-4.84	-8.41	-910.92	533.69	-0.23
Dead+Wind 0 deg - Service	47.34	0.00	-14.38	-1520.65	0.98	-0.28
Dead+Wind 30 deg - Service	47.34	7.17	-12.46	-1317.33	-756.43	-0.35
Dead+Wind 60 deg - Service	47.34	12.41	-7.20	-760.65	-1310.73	-0.33
Dead+Wind 90 deg - Service	47.34	14.33	-0.00	0.02	-1513.18	-0.21
Dead+Wind 120 deg - Service	47.34	12.41	7.19	760.86	-1310.09	-0.04
Dead+Wind 150 deg - Service	47.34	7.16	12.46	1318.00	-755.33	0.14
Dead+Wind 180 deg - Service	47.34	-0.00	14.38	1521.96	2.26	0.28

Load Combination	Vertical	Shear _x	Shear _z	Overturning Moment, M _x	Overturning Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 210 deg - Service	47.34	-7.17	12.46	1318.64	759.67	0.35
Dead+Wind 240 deg - Service	47.34	-12.41	7.20	761.97	1313.96	0.32
Dead+Wind 270 deg - Service	47.34	-14.33	0.00	1.30	1516.42	0.21
Dead+Wind 300 deg - Service	47.34	-12.41	-7.19	-759.54	1313.32	0.04
Dead+Wind 330 deg - Service	47.34	-7.16	-12.46	-1316.69	758.56	-0.14

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	-47.34	0.00	0.00	47.34	0.00	0.000%
2	0.01	-47.34	-41.57	-0.01	47.34	41.57	0.008%
3	20.72	-47.34	-36.01	-20.72	47.34	36.01	0.000%
4	35.88	-47.34	-20.80	-35.88	47.34	20.80	0.000%
5	41.42	-47.34	-0.01	-41.42	47.34	0.01	0.003%
6	35.87	-47.34	20.78	-35.87	47.34	-20.78	0.000%
7	20.70	-47.34	36.00	-20.70	47.34	-36.00	0.000%
8	-0.01	-47.34	41.57	0.01	47.34	-41.57	0.008%
9	-20.72	-47.34	36.01	20.72	47.34	-36.01	0.000%
10	-35.88	-47.34	20.80	35.88	47.34	-20.80	0.000%
11	-41.42	-47.34	0.01	41.42	47.34	-0.01	0.008%
12	-35.87	-47.34	-20.78	35.87	47.34	20.78	0.000%
13	-20.70	-47.34	-36.00	20.70	47.34	36.00	0.000%
14	0.00	-66.41	0.00	0.00	66.41	-0.00	0.000%
15	0.00	-66.41	-9.71	-0.00	66.41	9.71	0.000%
16	4.84	-66.41	-8.41	-4.84	66.41	8.41	0.000%
17	8.39	-66.41	-4.86	-8.39	66.41	4.86	0.000%
18	9.68	-66.41	-0.00	-9.68	66.41	0.00	0.000%
19	8.38	-66.41	4.85	-8.38	66.41	-4.85	0.000%
20	4.84	-66.41	8.41	-4.84	66.41	-8.41	0.000%
21	-0.00	-66.41	9.71	0.00	66.41	-9.71	0.000%
22	-4.84	-66.41	8.41	4.84	66.41	-8.41	0.000%
23	-8.39	-66.41	4.86	8.39	66.41	-4.86	0.000%
24	-9.68	-66.41	0.00	9.68	66.41	-0.00	0.000%
25	-8.38	-66.41	-4.85	8.38	66.41	4.85	0.000%
26	-4.84	-66.41	-8.41	4.84	66.41	8.41	0.000%
27	0.00	-47.34	-14.38	-0.00	47.34	14.38	0.004%
28	7.17	-47.34	-12.46	-7.17	47.34	12.46	0.001%
29	12.41	-47.34	-7.20	-12.41	47.34	7.20	0.001%
30	14.33	-47.34	-0.00	-14.33	47.34	0.00	0.004%
31	12.41	-47.34	7.19	-12.41	47.34	-7.19	0.001%
32	7.16	-47.34	12.46	-7.16	47.34	-12.46	0.001%
33	-0.00	-47.34	14.38	0.00	47.34	-14.38	0.004%
34	-7.17	-47.34	12.46	7.17	47.34	-12.46	0.001%
35	-12.41	-47.34	7.20	12.41	47.34	-7.20	0.001%
36	-14.33	-47.34	0.00	-14.33	47.34	-0.00	0.004%
37	-12.41	-47.34	-7.19	12.41	47.34	7.19	0.001%
38	-7.16	-47.34	-12.46	7.16	47.34	12.46	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	13	0.00008925	0.00010561
3	Yes	18	0.00000001	0.00007007

4	Yes	18	0.00000001	0.00007131
5	Yes	14	0.00003587	0.00006559
6	Yes	18	0.00000001	0.00006992
7	Yes	18	0.00000001	0.00007059
8	Yes	13	0.00008925	0.00011034
9	Yes	18	0.00000001	0.00007125
10	Yes	18	0.00000001	0.00006996
11	Yes	13	0.00008930	0.00014202
12	Yes	18	0.00000001	0.00007096
13	Yes	18	0.00000001	0.00007034
14	Yes	6	0.00000001	0.00000001
15	Yes	16	0.00000001	0.00007573
16	Yes	16	0.00000001	0.00008536
17	Yes	16	0.00000001	0.00008539
18	Yes	16	0.00000001	0.00007518
19	Yes	16	0.00000001	0.00008535
20	Yes	16	0.00000001	0.00008554
21	Yes	16	0.00000001	0.00007590
22	Yes	16	0.00000001	0.00008648
23	Yes	16	0.00000001	0.00008622
24	Yes	16	0.00000001	0.00007591
25	Yes	16	0.00000001	0.00008605
26	Yes	16	0.00000001	0.00008610
27	Yes	13	0.00009557	0.00004941
28	Yes	15	0.00000001	0.00006832
29	Yes	15	0.00000001	0.00007188
30	Yes	13	0.00009559	0.00005255
31	Yes	15	0.00000001	0.00006814
32	Yes	15	0.00000001	0.00007010
33	Yes	13	0.00009556	0.00004952
34	Yes	15	0.00000001	0.00007173
35	Yes	15	0.00000001	0.00006798
36	Yes	13	0.00009558	0.00005231
37	Yes	15	0.00000001	0.00007118
38	Yes	15	0.00000001	0.00006940

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 117.33	39.292	33	2.2302	0.0011
L2	122 - 94	22.411	33	1.8809	0.0012
L3	94 - 82.5	12.706	33	1.3655	0.0008
L4	88 - 72.75	11.056	33	1.2599	0.0007
L5	72.75 - 56	7.372	33	1.0079	0.0004
L6	56 - 40.583	4.356	33	0.7099	0.0003
L7	47 - 31.5	3.133	33	0.5879	0.0002
L8	31.5 - 28.75	1.443	33	0.4303	0.0001
L9	28.75 - 11	1.205	33	0.3979	0.0001
L10	11 - 8.5	0.182	33	0.1535	0.0000
L11	8.5 - 0	0.110	33	0.1233	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
159.00	APXVSP18-C-A20 w/ Mount Pipe	33	38.826	2.2240	0.0011	26522
155.00	PCS 1900MHz 4x45W-65MHz	33	36.964	2.1989	0.0011	26522
151.00	(4) 7130.16 w/ Mount Pipe	33	35.109	2.1728	0.0012	14734
141.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	33	30.541	2.0980	0.0012	6979

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	APXV18-206517S-ACU w/ Mount Pipe	33	25.718	1.9881	0.0013	4419
116.00	BXA-70063-6CF-EDIN-2 w/ Mount Pipe	33	20.071	1.7825	0.0012	3238
96.00	GPS_A	33	13.289	1.4026	0.0008	2655
92.00	KS24019-L112A	33	12.141	1.3294	0.0007	3082
71.00	GPS_A	33	7.005	0.9768	0.0004	2896

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 117.33	113.123	8	6.4237	0.0031
L2	122 - 94	64.573	8	5.4194	0.0036
L3	94 - 82.5	36.630	8	3.9367	0.0022
L4	88 - 72.75	31.876	8	3.6323	0.0019
L5	72.75 - 56	21.259	8	2.9062	0.0013
L6	56 - 40.583	12.564	8	2.0475	0.0008
L7	47 - 31.5	9.037	8	1.6956	0.0006
L8	31.5 - 28.75	4.164	8	1.2412	0.0004
L9	28.75 - 11	3.476	8	1.1477	0.0004
L10	11 - 8.5	0.525	8	0.4427	0.0001
L11	8.5 - 0	0.316	8	0.3557	0.0001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
159.00	APXVSP18-C-A20 w/ Mount Pipe	8	111.783	6.4058	0.0031	9422
155.00	PCS 1900MHz 4x45W-65MHz	8	106.428	6.3337	0.0032	9422
151.00	(4) 7130.16 w/ Mount Pipe	8	101.094	6.2587	0.0034	5233
141.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	8	87.958	6.0437	0.0036	2476
130.00	APXV18-206517S-ACU w/ Mount Pipe	8	74.088	5.7277	0.0037	1566
116.00	BXA-70063-6CF-EDIN-2 w/ Mount Pipe	8	57.839	5.1363	0.0034	1143
96.00	GPS_A	8	38.310	4.0435	0.0023	931
92.00	KS24019-L112A	8	35.003	3.8325	0.0021	1080
71.00	GPS_A	8	20.201	2.8167	0.0012	1010

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
L1	160 - 117.33 (1)	TP30.46x22.35x0.2188	42.67	0.00	0.0	36.823	20.6807	-7.02	761.52	0.009
L2	117.33 - 94 (2)	TP34.4549x29.1348x0.281	28.00	0.00	0.0	38.800	30.9213	-14.30	1199.73	0.012
L3	94 - 82.5 (3)	TP36.64x34.4549x0.3817	11.50	0.00	0.0	34.146	43.2831	-15.60	1477.94	0.011
L4	82.5 - 72.75 (4)	TP37.9427x34.8315x0.375	15.25	0.00	0.0	39.000	45.3629	-19.63	1769.15	0.011
L5	72.75 - 56 (5)	TP41.1385x37.9427x0.448	16.75	0.00	0.0	37.998	58.7244	-24.11	2231.41	0.011

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
L6	56 - 40.583 (6)	TP44.08x41.1385x0.6042	15.42	0.00	0.0	30.408	82.1985	-27.16	2499.49	0.011
L7	40.583 - 31.5 (7)	TP45.0389x41.6473x0.691 5	15.50	0.00	0.0	28.704	98.7439	-34.93	2834.35	0.012
L8	31.5 - 28.75 (8)	TP45.5593x45.0389x0.735 3	2.75	0.00	0.0	28.734	106.134 0	-36.09	3049.66	0.012
L9	28.75 - 11 (9)	TP48.9184x45.5593x0.617 2	17.75	0.00	0.0	32.850	95.9976	-42.95	3153.52	0.014
L10	11 - 8.5 (10)	TP49.3915x48.9184x0.698	2.50	0.00	0.0	32.832	109.438 0	-44.05	3593.08	0.012
L11	8.5 - 0 (11)	TP51x49.3915x0.5706	8.50	0.00	0.0	35.220	92.6539	-47.32	3263.27	0.015

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	160 - 117.33 (1)	TP30.46x22.35x0.2188	434.96	35.154	36.823	0.955	0.00	0.000	36.823	0.000
L2	117.33 - 94 (2)	TP34.4549x29.1348x0.28 1	1078.1 8	50.098	38.800	1.291	0.00	0.000	38.800	0.000
L3	94 - 82.5 (3)	TP36.64x34.4549x0.3817 2	1251.3 2	40.416	34.146	1.184	0.00	0.000	34.146	0.000
L4	82.5 - 72.75 (4)	TP37.9427x34.8315x0.37 5	1715.9 8	49.526	39.000	1.270	0.00	0.000	39.000	0.000
L5	72.75 - 56 (5)	TP41.1385x37.9427x0.44 82	2266.0 3	46.692	37.998	1.229	0.00	0.000	37.998	0.000
L6	56 - 40.583 (6)	TP44.08x41.1385x0.6042	2578.1 8	36.669	30.408	1.206	0.00	0.000	30.408	0.000
L7	40.583 - 31.5 (7)	TP45.0389x41.6473x0.69 15	3144.2 2	35.512	28.704	1.237	0.00	0.000	28.704	0.000
L8	31.5 - 28.75 (8)	TP45.5593x45.0389x0.73 53	3248.1 2	33.795	28.734	1.176	0.00	0.000	28.734	0.000
L9	28.75 - 11 (9)	TP48.9184x45.5593x0.61 72	3941.5 1	41.926	32.850	1.276	0.00	0.000	32.850	0.000
L10	11 - 8.5 (10)	TP49.3915x48.9184x0.69 8	4042.3 5	37.471	32.832	1.141	0.00	0.000	32.832	0.000
L11	8.5 - 0 (11)	TP51x49.3915x0.5706	4391.1 8	46.285	35.220	1.314	0.00	0.000	35.220	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	160 - 117.33 (1)	TP30.46x22.35x0.2188	16.94	0.819	26.000	0.064	0.12	0.005	26.000	0.000
L2	117.33 - 94 (2)	TP34.4549x29.1348x0.28 1	28.39	0.918	26.000	0.072	0.03	0.001	26.000	0.000
L3	94 - 82.5 (3)	TP36.64x34.4549x0.3817	29.34	0.678	22.764	0.060	0.04	0.001	22.764	0.000
L4	82.5 - 72.75 (4)	TP37.9427x34.8315x0.37 5	31.55	0.695	26.000	0.054	0.14	0.002	26.000	0.000
L5	72.75 - 56 (5)	TP41.1385x37.9427x0.44 82	34.05	0.580	25.332	0.047	0.26	0.003	25.332	0.000
L6	56 - 40.583 (6)	TP44.08x41.1385x0.6042	35.33	0.430	20.272	0.043	0.35	0.002	20.272	0.000
L7	40.583 - 31.5 (7)	TP45.0389x41.6473x0.69 15	37.60	0.381	19.136	0.040	0.51	0.003	19.136	0.000
L8	31.5 - 28.75 (8)	TP45.5593x45.0389x0.73 53	37.97	0.358	19.156	0.038	0.53	0.003	19.156	0.000
L9	28.75 - 11 (9)	TP48.9184x45.5593x0.61 72	40.18	0.419	21.900	0.039	0.69	0.003	21.900	0.000
L10	11 - 8.5 (10)	TP49.3915x48.9184x0.69 8	40.51	0.370	21.888	0.034	0.71	0.003	21.888	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 $\frac{f_{vt}}{F_{vt}}$
L11	8.5 - 0 (11)	TP51x49.3915x0.5706	41.58	0.449	23.480	0.039	0.81	0.004	23.480	0.000

Pole Interaction Design Data

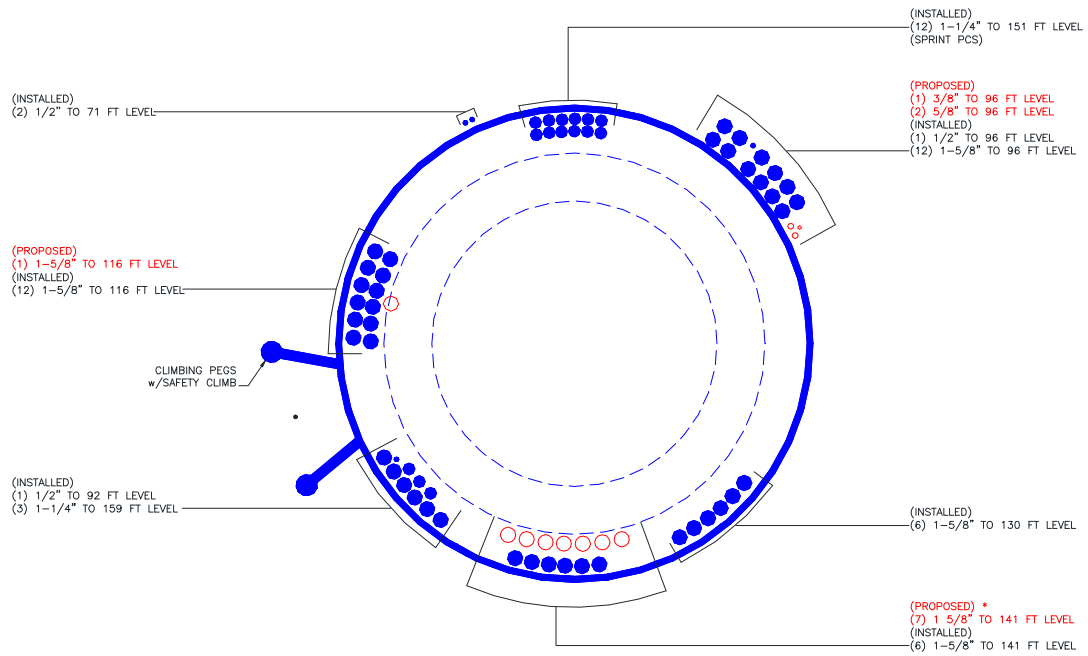
Section No.	Elevation ft	Ratio P	Ratio f_{bx}	Ratio f_{by}	Ratio f_v	Ratio f_{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 117.33 (1)	0.009	0.955	0.000	0.064	0.000	0.965	1.333	H1-3+VT ✓
L2	117.33 - 94 (2)	0.012	1.291	0.000	0.072	0.000	1.304	1.333	H1-3+VT ✓
L3	94 - 82.5 (3)	0.011	1.184	0.000	0.060	0.000	1.195	1.333	H1-3+VT ✓
L4	82.5 - 72.75 (4)	0.011	1.270	0.000	0.054	0.000	1.282	1.333	H1-3+VT ✓
L5	72.75 - 56 (5)	0.011	1.229	0.000	0.047	0.000	1.240	1.333	H1-3+VT ✓
L6	56 - 40.583 (6)	0.011	1.206	0.000	0.043	0.000	1.217	1.333	H1-3+VT ✓
L7	40.583 - 31.5 (7)	0.012	1.237	0.000	0.040	0.000	1.250	1.333	H1-3+VT ✓
L8	31.5 - 28.75 (8)	0.012	1.176	0.000	0.038	0.000	1.188	1.333	H1-3+VT ✓
L9	28.75 - 11 (9)	0.014	1.276	0.000	0.039	0.000	1.290	1.333	H1-3+VT ✓
L10	11 - 8.5 (10)	0.012	1.141	0.000	0.034	0.000	1.154	1.333	H1-3+VT ✓
L11	8.5 - 0 (11)	0.015	1.314	0.000	0.039	0.000	1.329	1.333	H1-3+VT ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF* P_{allow} K	% Capacity	Pass Fail	
L1	160 - 117.33	Pole	TP30.46x22.35x0.2188	1	-7.02	1015.10	72.4	Pass	
L2	117.33 - 94	Pole	TP34.4549x29.1348x0.281	2	-14.30	1599.24	97.9	Pass	
L3	94 - 82.5	Pole	TP36.64x34.4549x0.3817	3	-15.60	1970.09	89.7	Pass	
L4	82.5 - 72.75	Pole	TP37.9427x34.8315x0.375	4	-19.63	2358.28	96.2	Pass	
L5	72.75 - 56	Pole	TP41.1385x37.9427x0.4482	5	-24.11	2974.47	93.0	Pass	
L6	56 - 40.583	Pole	TP44.08x41.1385x0.6042	6	-27.16	3331.82	91.3	Pass	
L7	40.583 - 31.5	Pole	TP45.0389x41.6473x0.6915	7	-34.93	3778.19	93.8	Pass	
L8	31.5 - 28.75	Pole	TP45.5593x45.0389x0.7353	8	-36.09	4065.20	89.1	Pass	
L9	28.75 - 11	Pole	TP48.9184x45.5593x0.6172	9	-42.95	4203.64	96.8	Pass	
L10	11 - 8.5	Pole	TP49.3915x48.9184x0.698	10	-44.05	4789.58	86.6	Pass	
L11	8.5 - 0	Pole	TP51x49.3915x0.5706	11	-47.32	4349.94	99.7	Pass	
							Summary		
							Pole (L11)	99.7	Pass
							RATING =	99.7	Pass

APPENDIX B

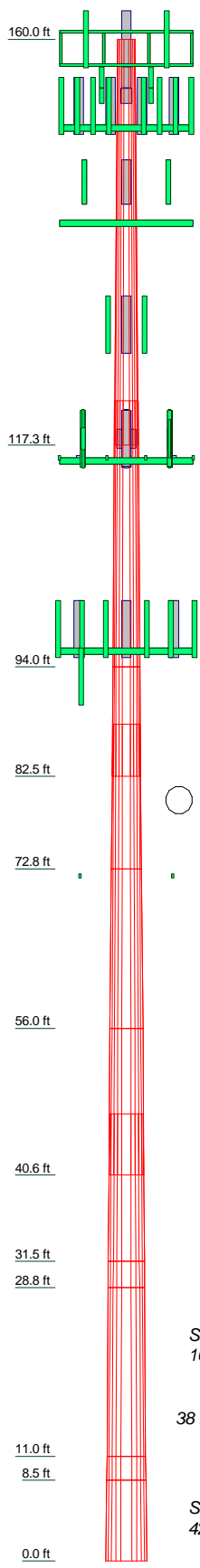
BASE LEVEL DRAWING



* To be installed internally

APPENDIX C
ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8	9	10	11
Length (ft)	42.67	28.00	11.50	15.25	16.75	15.42	15.50	2.75	17.75	2.50	8.50
Number of Sides	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.2188	0.2810	0.3817	0.3750	0.4482	0.6042	0.6915	0.7353	0.6172	0.5706	0.5706
Socket Length (ft)	4.67		5.50			6.42					
Top Dia (in)	22.3500	29.1348	34.4549	34.8315	37.9427	41.1385	44.0800	45.5593	45.5593	48.9184	49.3915
Bot Dia (in)	30.4600	34.4549	36.6400	37.9427	41.1385	44.0800	45.5593	45.5593	48.9184	49.3915	51.0000
Grade	A572-65	A572-65	Reinf 56.91 ksi	A572-65	Reinf 63.33 ksi	Reinf 50.68 ksi	Reinf 47.89 ksi	Reinf 54.75 ksi	Reinf 54.75 ksi	Reinf 54.75 ksi	Reinf 54.75 ksi
Weight (K)	2.7	2.7	1.7	2.3	3.2	4.3	5.0	1.0	5.6	0.9	2.6



DESIGNED APPURTENANCE LOADING

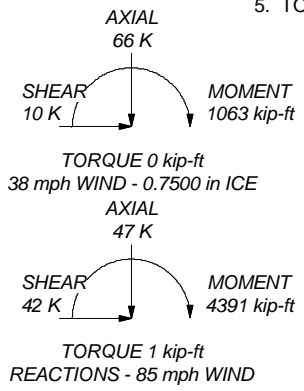
TYPE	ELEVATION	TYPE	ELEVATION
APXVSP18-C-A20 w/ Mount Pipe	159	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	116
APXV9ERR18-C-A20 w/ Mount Pipe	159	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	116
APXVSP18-C-A20 w/ Mount Pipe	159	(2) FD9R6004/2C-3L	116
Platform Mount [LP 602-1]	159	(2) FD9R6004/2C-3L	116
PCS 1900MHz 4x45W-65MHz	155	(2) FD9R6004/2C-3L	116
PCS 1900MHz 4x45W-65MHz	155	LNx-6514DS-VTM w/ Mount Pipe	116
PCS 1900MHz 4x45W-65MHz	155	LNx-6514DS-VTM w/ Mount Pipe	116
800MHz 2X50W RRH W/FILTER	155	LNx-6514DS-VTM w/ Mount Pipe	116
800MHz 2X50W RRH W/FILTER	155	LNx-6514DS-VTM w/ Mount Pipe	116
800MHz 2X50W RRH W/FILTER	155	HBX-6517DS-VTM w/ Mount Pipe	116
800MHz 2X50W RRH W/FILTER	155	HBX-6517DS-VTM w/ Mount Pipe	116
Side Arm Mount [SO 102-3]	155	HBX-6517DS-VTM w/ Mount Pipe	116
(4) 7130.16 w/ Mount Pipe	151	HBX-6517DS-VTM w/ Mount Pipe	116
(4) 7130.16 w/ Mount Pipe	151	DB-T1-6Z-8AB-OZ	116
(4) 7130.16 w/ Mount Pipe	151	RRH2X40-AWS	116
T-Arm Mount [TA 602-3]	151	RRH2X40-AWS	116
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	141	RRH2X40-AWS	116
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	141	Platform Mount [LP 303-1]	116
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	141	GPS_A	96
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	141	(2) 7770.00 w/ Mount Pipe	96
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	141	(2) 7770.00 w/ Mount Pipe	96
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	141	(2) 7770.00 w/ Mount Pipe	96
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	141	AM-X-CD-14-65-00T-RET w/ Mount Pipe	96
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	141	AM-X-CD-14-65-00T-RET w/ Mount Pipe	96
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	141	AM-X-CD-14-65-00T-RET w/ Mount Pipe	96
KRY 112 144/1	141	AM-X-CD-14-65-00T-RET w/ Mount Pipe	96
KRY 112 144/1	141	(2) RRU-11	96
KRY 112 144/1	141	(2) RRU-11	96
Platform Mount [LP 602-1]	141	(2) RRU-11	96
APXV18-206517S-ACU w/ Mount Pipe	130	(2) TT19-08BP111-001	96
APXV18-206517S-ACU w/ Mount Pipe	130	(2) TT19-08BP111-001	96
APXV18-206517S-ACU w/ Mount Pipe	130	(2) TT19-08BP111-001	96
Pipe Mount [PM 601-3]	130	DC6-48-60-18-8F	96
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	116	T-Arm Mount [TA 602-3]	96
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	116	KS24019-L112A	92
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	116	Side Arm Mount [SO 701-1]	92
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	116	GPS_A	71
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	116	GPS_A	71
SPXW 8515 w/ Mount Pipe	116	Side Arm Mount [SO 701-1]	71
		Side Arm Mount [SO 701-1]	71


MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	Reinf 47.89 ksi	48 ksi	60 ksi
Reinf 56.91 ksi	57 ksi	72 ksi	Reinf 54.75 ksi	55 ksi	65 ksi
Reinf 63.33 ksi	63 ksi	80 ksi	Reinf 54.72 ksi	55 ksi	69 ksi
Reinf 50.68 ksi	51 ksi	64 ksi	Reinf 58.70 ksi	59 ksi	74 ksi
Reinf 47.84 ksi	48 ksi	60 ksi			

TOWER DESIGN NOTES

1. Tower is located in Middlesex 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: 99.7%



 <p>Paul J. Ford 250 East Broad Street, Suite 600 Columbus, Ohio 43215 Phone: 614.221.6679 FAX: 614.448.4118</p>	Job: 160-Ft Monopole / Pond Meadow Project: 37511-0419 / BU# 876339		
	Client: Crown Castle Code: TIA/EIA-222-F Path:	Drawn by: Kevin Mahlum Date: 03/19/14	App'd: Scale: NTS Dwg No. E-1

v4.0 - Effective 1-12-12

Asymmetric Anchor Rod Analysis

Moment = 4391 k-ft
 Axial = 47.0 kips
 Shear = 42.0 kips
 Anchor Qty = 25

TIA Ref. = F
 ASIF = 1.3333
 Max Ratio = 100.0%

Location = Base Plate
 η = N/A for BP, Rev. G Sect. 4.9.9
 Threads = N/A for FP, Rev. G

**** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. ****

Item	Nominal Anchor Dia, in	Anchor Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in ²	Area, in ²	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	0.0	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
2	2.250	#18J A615 Gr 75	75	100	22.5	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
3	2.250	#18J A615 Gr 75	75	100	45.0	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
4	2.250	#18J A615 Gr 75	75	100	67.5	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
5	2.250	#18J A615 Gr 75	75	100	90.0	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
6	2.250	#18J A615 Gr 75	75	100	112.5	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
7	2.250	#18J A615 Gr 75	75	100	135.0	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
8	2.250	#18J A615 Gr 75	75	100	157.5	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
9	2.250	#18J A615 Gr 75	75	100	180.0	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
10	2.250	#18J A615 Gr 75	75	100	202.5	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
11	2.250	#18J A615 Gr 75	75	100	225.0	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
12	2.250	#18J A615 Gr 75	75	100	247.5	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
13	2.250	#18J A615 Gr 75	75	100	270.0	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
14	2.250	#18J A615 Gr 75	75	100	292.5	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
15	2.250	#18J A615 Gr 75	75	100	315.0	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
16	2.250	#18J A615 Gr 75	75	100	337.5	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
17	2.000	A193 Gr B7	105	125	15.0	65.80	0.00	3.14	130.28	126.99	126.99	0.00	172.79	73.5%
18	2.000	A193 Gr B7	105	125	45.0	65.80	0.00	3.14	130.28	126.99	126.99	0.00	172.79	73.5%
19	2.000	A193 Gr B7	105	125	135.0	65.80	0.00	3.14	130.28	126.99	126.99	0.00	172.79	73.5%
20	2.000	A193 Gr B7	105	125	165.0	65.80	0.00	3.14	130.28	126.99	126.99	0.00	172.79	73.5%
21	2.000	A193 Gr B7	105	125	255.0	65.80	0.00	3.14	130.28	126.99	126.99	0.00	172.79	73.5%
22	2.000	A193 Gr B7	105	125	285.0	65.80	0.00	3.14	130.28	126.99	126.99	0.00	172.79	73.5%
23	1.750	F1554 Gr 105	105	125	105.0	67.80	0.00	2.41	102.74	100.22	100.22	0.00	132.29	75.8%
24	1.750	F1554 Gr 105	105	125	225.0	67.80	0.00	2.41	102.74	100.22	100.22	0.00	132.29	75.8%
25	1.750	F1554 Gr 105	105	125	345.0	67.80	0.00	2.41	102.74	100.22	100.22	0.00	132.29	75.8%

89.75

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

TIA Rev F

Site Data	
BU#:	876339
Site Name:	
App #:	
Pole Manufacturer:	Other

Reactions		
Moment:	2903	ft-kips
Axial:	33.3	kips
Shear:	29.8	kips

Reactions adjusted to account for additional anchor rods.

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	59.3	in

If No stiffeners, Criteria: **AISC ASD** <-Only Applicable to Unstiffened Cases

Anchor Rod Results

Maximum Rod Tension: 144.8 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 74.3% **Pass**

Rigid
Service, ASD
Fty*ASIF

Plate Data		
Diam:	65.3	in
Thick:	2.75	in
Grade:	60	ksi
Single-Rod B-eff:	10.25	in

Base Plate Results

Base Plate Stress: 29.9 ksi
 Allowable Plate Stress: 60.0 ksi
 Base Plate Stress Ratio: 49.8% **Pass**

Flexural Check

Rigid
Service ASD
0.75*Fy*ASIF
Y.L. Length:
30.26

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

n/a

Stiffener Results

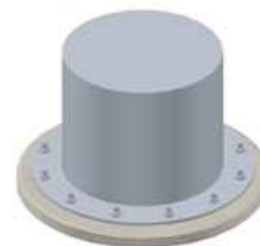
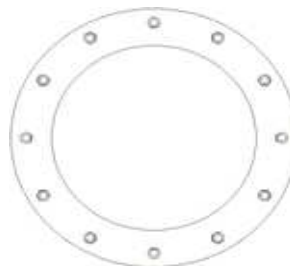
Horizontal Weld : n/a
 Vertical Weld: n/a
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: n/a
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Diam:	51	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor	
ASIF:	1.333



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

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



PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
 250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708
 Phone 614-221-6679 • Fax 614-448-4105 • www.PJFweb.com

Date: 3/20/2014
 PJF Project: 37513-0634
 Client Ref. # 876339
 Site Name: Pond Meadow Rd. Stable
 Description: 160' Pole
 Owner: CCI
 Engineer: KMM

v4.1 - Effective 7-3-12

Asymmetric Anchor Rod Analysis

Moment =	5562	k-ft	TIA Ref.	F	Location =	Base Plate
Axial =	0.0	kips	ASIF =	1.3333	η =	N/A
Shear =	0.0	kips	Max Ratio =	105.0%	Threads =	N/A
Anchor Qty =	4					

for BP, Rev. G Sect. 4.9.9
for FP, Rev. G

**** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. ****

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in ²	Area, in ²	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.750	Williams R71	127.7	150	45.0	322.44	0.00	2.66	207.00	207.00	207.00	207.00	207.00	100.0%
2	1.750	Williams R71	127.7	150	135.0	322.44	0.00	2.66	207.00	207.00	207.00	207.00	207.00	100.0%
3	1.750	Williams R71	127.7	150	225.0	322.44	0.00	2.66	207.00	207.00	207.00	207.00	207.00	100.0%
4	1.750	Williams R71	127.7	150	315.0	322.44	0.00	2.66	207.00	207.00	207.00	207.00	207.00	100.0%

10.65

Capacity of Rock Anchors to add to resisting overturning moment

Foundation Loads:

Pole weight or tower leg compression = 47 (kips)
 Horizontal load at top of pier = 42 (kips)
 Overturning moment at top of pier = 4391 (ft-kips)

Design criteria:

Safety factor against overturning = 1.5

Soil Properties:

Soil density = 110 (pcf)
 Allowable soil bearing = 15 (ksf)
 Depth to water table = 99 (ft)

Dimensions:

Pier shape (round or square) R ("R" or "S")
 Pier width = 7 (ft)
 Pier height above grade = 0.5 (ft)
 depth to bottom of footing = 7.5 (ft)
 Footing thickness = 3.5 (ft)
 Footing width = 23 (ft)
 Footing length = 23 (ft)

Concrete:

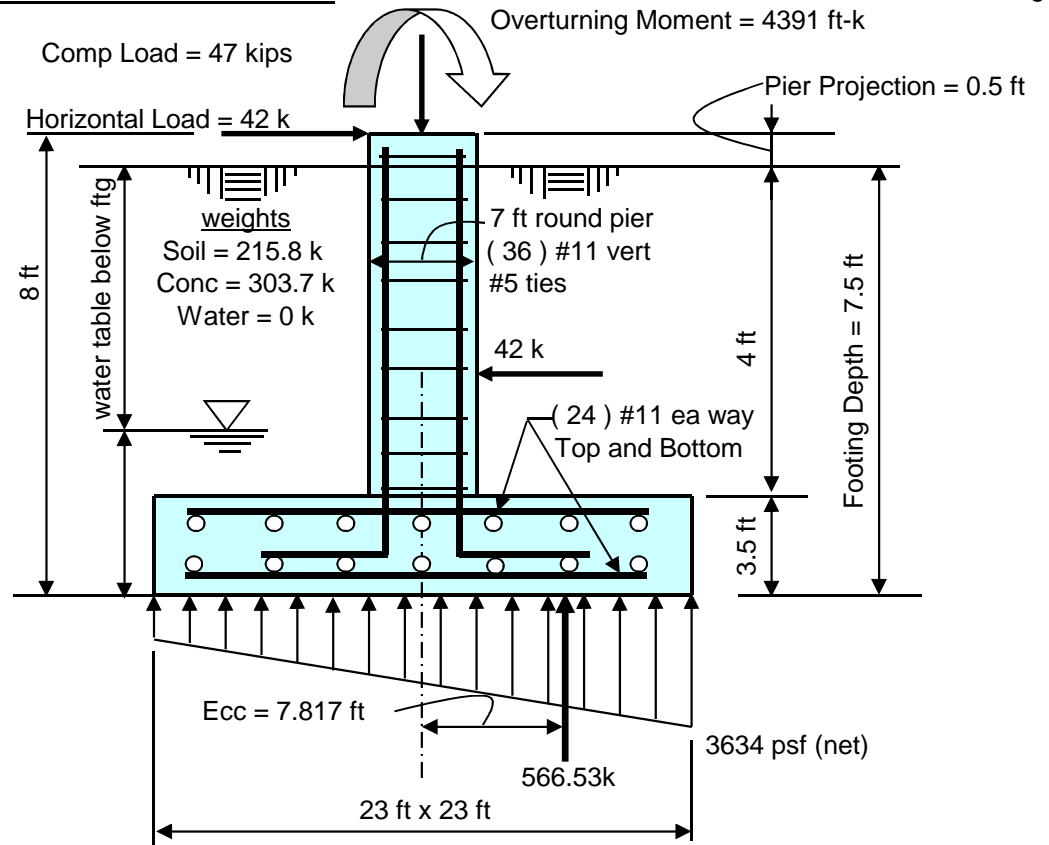
Concrete strength = 4 (ksi)
 Rebar strength = 60 (ksi)
 ultimate load factor = 1.3

Reinforcing Steel:

Pad
 minimum cover over rebar = 3 inches
 size of pad rebar = #11 bar
 quantity of pad rebar = 24 (ea direction)

Reinforcing Steel:

Pier
 size of vert rebar in pier = #11 bar
 vertical rebar quantity = 36
 size of pier ties = #5 bar
 minimum cover over rebar = 3 inches
 Total volume of concrete = 75.0 cu yd



Summary of analysis results	
Maximum Net Soil Bearing = 3.634 ksf Allowable Net Soil Bearing = 15 ksf Soil Bearing Stress Ratio = 0.24 Okay	Ult Bending Shear Capacity = 126 psi Ult Bending Shear Stress = 49 psi Bending Shear Stress Ratio = 0.39 Okay
Ftg Overturning Resistance ** = 12077 ft-kips Overturning Moment = 4429 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 2.727 Ratio = 0.55 Okay ** Includes Resistance from Rock Anchors	Pad Bending Moment Capacity = 6022 ft-k Pad Bending Moment = 2313 ft-k Bending Moment Stress Ratio = 0.38 OK

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General Information:

=====
 File Name: G:\TOWER\375_Crown_Castle\2013\37513-0634 BU 876339\WO 726148 BU 876339...\37513-0634.col
 Project:
 Column: Engineer:
 Code: ACI 318-11 Units: English
 Run Option: Investigation Slenderness: Not considered
 Run Axis: X-axis Column Type: Structural

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:

=====
 Circular: Diameter = 84 in
 Gross section area, Ag = 5541.77 in^2
 Ix = 2.44392e+006 in^4 Iy = 2.44392e+006 in^4
 rx = 21 in ry = 21 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; #3 ties with #10 bars, #4 with larger bars.
 phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

Layout: Circular
 Pattern: All Sides Equal (Cover to transverse reinforcement)
 Total steel area: As = 56.16 in^2 at rho = 1.01%
 Minimum clear spacing = 5.18 in

36 #11 Cover = 3 in

Factored Loads and Moments with Corresponding Capacities:

=====

No.	Pu kip	Mux k-ft	PhiMnx k-ft	PhiMn/Mu NA	depth in	Dt in	depth in	eps_t	Phi
1	47.00	5897.30	8428.59	1.429	17.44	79.79	0.01073	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: CT11032D

Westbrook/I95/X64/CH1

781 Old Clinton Road
Westbrook CT 06498

April 3, 2014

EBI Project Number: 62142255

April 3, 2014

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

Re: Emissions Values for Site: **CT11032D – Westbrook/I95/X64/CH1**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at 781 Old Clinton Road, Westbrook 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 (mW/cm^2). The number of mW/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 ($\mu W/cm^2$). The general population exposure limit for the cellular band is $567 \mu W/cm^2$, and the general population exposure limit for the PCS and AWS bands is $1000 \mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 781 Old Clinton Road, Westbrook 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) were considered for each sector of the proposed installation.
- 2) 2 UMTS channels (2110.000 MHz 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 MHz 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 **145 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 calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT11032D - Westbrook/195/X64/CH1
Site Address	781 Old Clinton Rd., Westbrook CT 06498
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	145	139	None	0	0	48.326044	0.899203	0.08992%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	145	139	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	145	139	1-5/8"	0	0	24.163022	0.449601	0.04496%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	145	139	1-5/8"	0	0	24.163022	0.449601	0.04496%
Sector total Power Density Value:																0.180%	

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	145	139	None	0	0	48.326044	0.899203	0.08992%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	145	139	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	145	139	1-5/8"	0	0	24.163022	0.449601	0.04496%
28	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	145	139	1-5/8"	0	0	24.163022	0.449601	0.04496%
Sector total Power Density Value:																0.180%	

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	145	139	None	0	0	48.326044	0.899203	0.08992%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	145	139	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	145	139	1-5/8"	0	0	24.163022	0.449601	0.04496%
28	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	145	139	1-5/8"	0	0	24.163022	0.449601	0.04496%
Sector total Power Density Value:																0.180%	

Site Composite MPE %	
Carrier	MPE %
T-Mobile	0.540%
Nextel	2.470%
Sprint	3.940%
Metro PCS	4.030%
Verizon	26.720%
AT&T	28.600%
Total Site MPE %	66.300%

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 **0.180% (0.540% 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 **66.300%** 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 well within the allowable 100% threshold standard per the federal government.



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