Crown Castle
3530 Toringdon Way
Suite 300
Charlotte, NC 28277

Tel: 704-405-6600

www.crowncastle.com

April 10, 2014

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

RE: **T-Mobile-Exempt Modification - Crown Site BU: 876381**
T-Mobile Site ID: CT11393B
Located at: 2381 Long Hill Road, Guilford, CT 06437

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. Joseph S. Mazza, First Selectman of the Town of Guilford.

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at **2381 Long Hill Road, Guilford, CT 06437**. 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.

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. Joseph S. Mazza, First Selectman
Town of Guilford
31 Park Street
Guilford, CT 06437

T-Mobile

NORTHEAST LLC.

SITE NAME: CT393/GLOBAL GUILFORD_MP2

SITE ID NUMBER: CT11393B

SITE ADDRESS: 2381 LONG HILL ROAD
GUILFORD, CT 06437

PROJECT SUMMARY

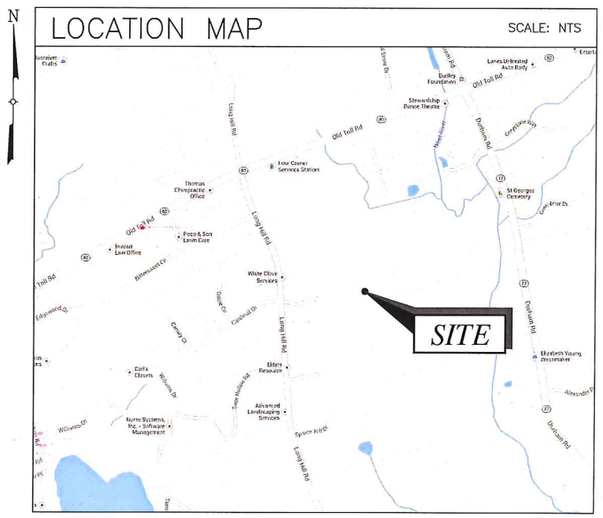
SITE ID NUMBER:	CT11393B
SITE NAME:	CT393/GLOBAL GUILFORD_MP2
CROWN BU#:	876381
SITE ADDRESS:	2381 LONG HILL ROAD GUILFORD, CT 06437
COUNTY:	NEW HAVEN
PROPERTY OWNER:	CROWN CASTLE USA
APPLICANT:	T-MOBILE NORTHEAST, LLC. 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 0602 PHONE: (800) 692-7100
ENGINEER/ SURVEYOR/ STRUCTURAL ENG:	TECTONIC ENGINEERING CONSULTANTS P.C. 1279 ROUTE 300 NEWBURGH, NY 12550
CONTACT: PHONE:	TAMMY NOSEK (845) 567-6656 EXT. 2807
SITE ACQUISITION:	CROWN CASTLE 1200 MACARTHUR BLVD SUITE 200 MAHWAH, NJ 07430
CONTACT: PHONE:	PAUL HUGHES (585) 259-7604
PARCEL INFO:	101023B
LATITUDE: (NAD 83)	41.34651° N
LONGITUDE: (NAD 83)	72.72304° W

SITE DIRECTIONS

HEAD NORTHEAST ON GRIFFIN RD S TOWARD W NEWBERRY RD. TAKE THE 1ST RIGHT ONTO W NEWBERRY RD. TURN LEFT ONTO WOODLAND AVE. TAKE THE 1ST RIGHT ONTO CT-187 S/BLUE HILLS AVE. TURN LEFT ONTO CT-178 E/E WINTONBURY AVE. CONTINUE TO FOLLOW CT-178 E. TURN RIGHT TO MERGE ONTO I-91 S TOWARD HARTFORD. TAKE EXIST 22S ON THE LEFT TO MERGE ONTO ST-9 S TOWARD MIDDLETOWN/OLD SAYBROOK. CONTINUE ONTO CT-17 S/CT-9 S. TAKE EXIT 13 FOR STATE ROUTE 17 S TOWARD NEW HAVEN. SLIGHT RIGHT ONTO CT-17 S. TURN LEFT ONTO CT-17 S/S MAIN ST. CONTINUE TO FOLLOW CT-17 S. SLIGHT LEFT ONTO CT-77 S/GUILFORD RD. CONTINUE TO FOLLOW CT-77 S. TURN RIGHT ONTO CT-80 W/OLD TOLL RD. TURN LEFT ONTO LONG HILL RD. DESTINATION WILL BE ON THE LEFT.

LOCATION MAP

SCALE: NTS



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.

0 1 2 3

ORIGINAL SIZE IN INCHES

TECTONIC
• PLANNING • CONSTRUCTION MANAGEMENT
• ENGINEERING
• SURVEYING

TECTONIC Engineering & Survey Consultants P.C.
1279 ROUTE 300
NEWBURGH, NY 12550
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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 ACQ. _____

PROJECT NUMBER	DESIGNED BY
7061.CT11393B	JQ

REV	DATE	REVISION	DRAWN BY
0	04/07/14	FOR COMMENT	SF
1	04/09/14	FOR CONSTRUCTION	MP

ISSUED BY _____ DATE _____

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

SITE INFORMATION

CT11393B
CT393/GLOBAL
GUILFORD_MP2
2381 LONG HILL ROAD
GUILFORD, CT 06437

SHEET TITLE

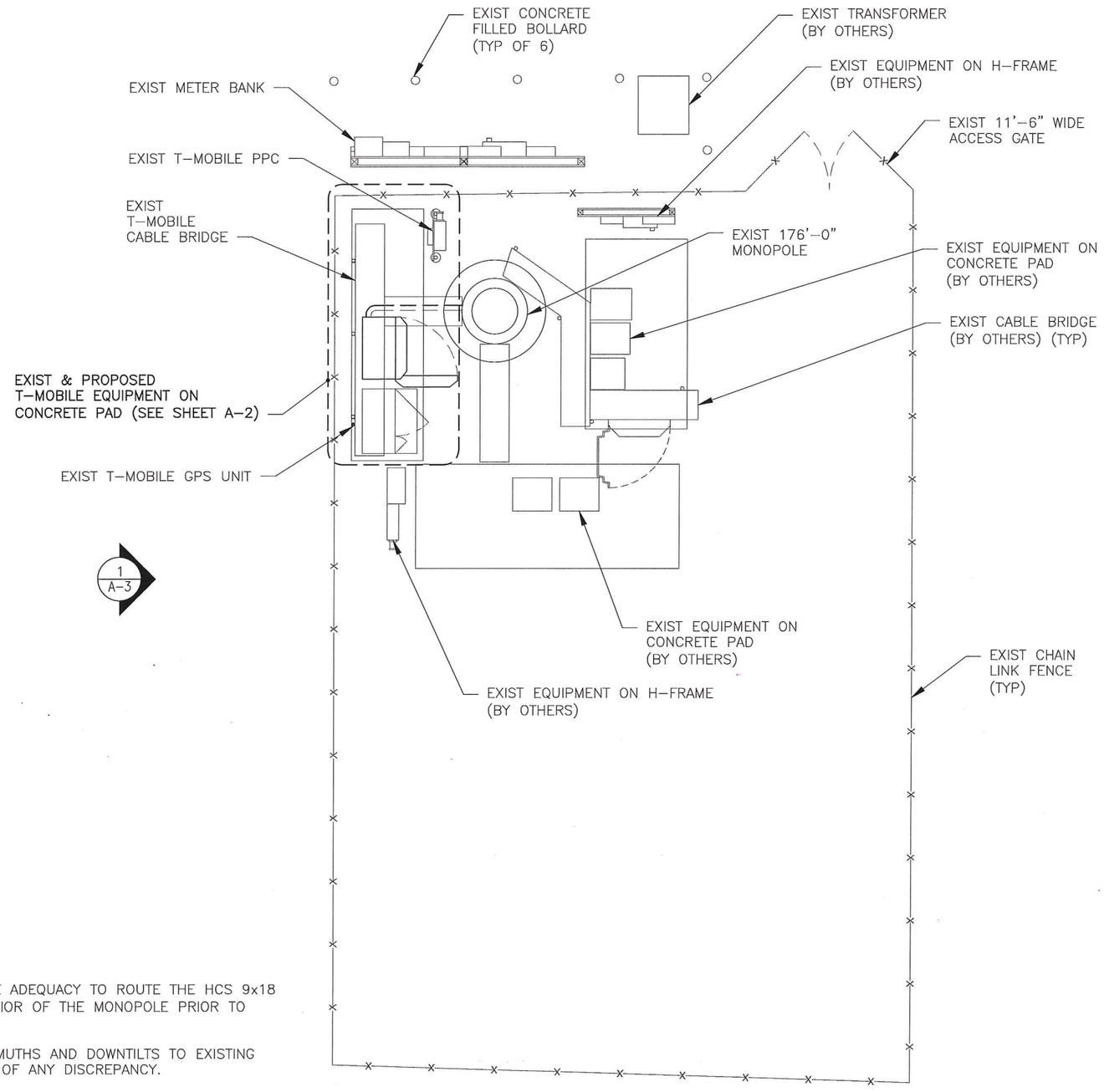
TITLE SHEET

SHEET NUMBER

T-1

N

APPROX



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

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SHEET TITLE

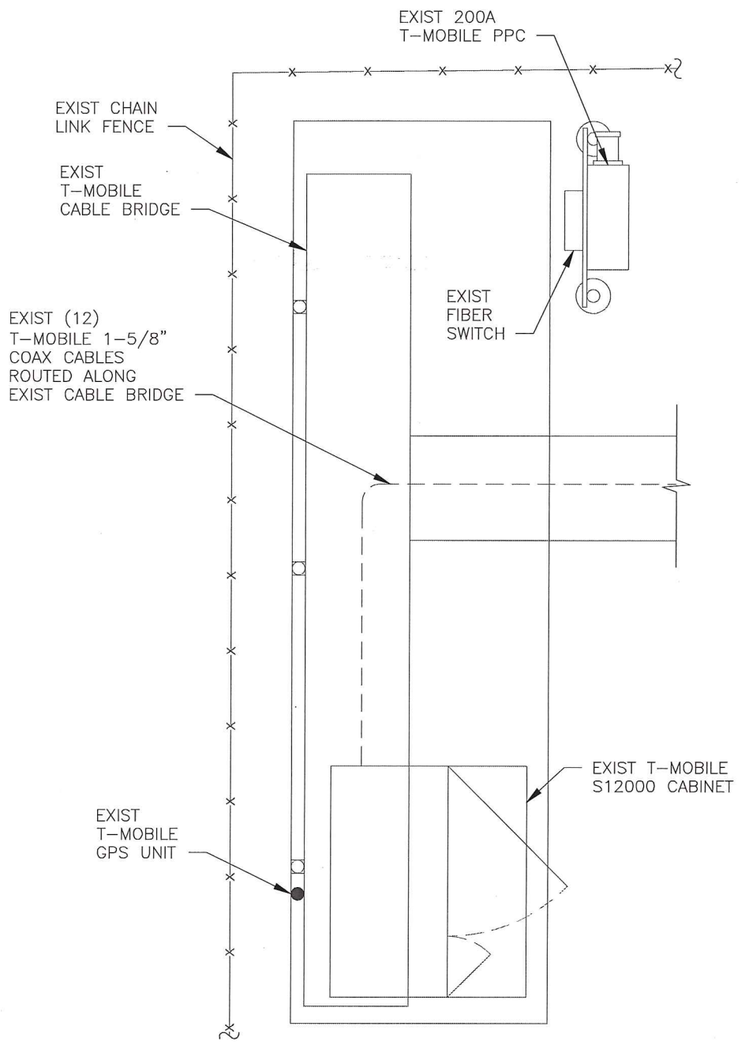
SITE PLAN

SHEET NUMBER

A-1

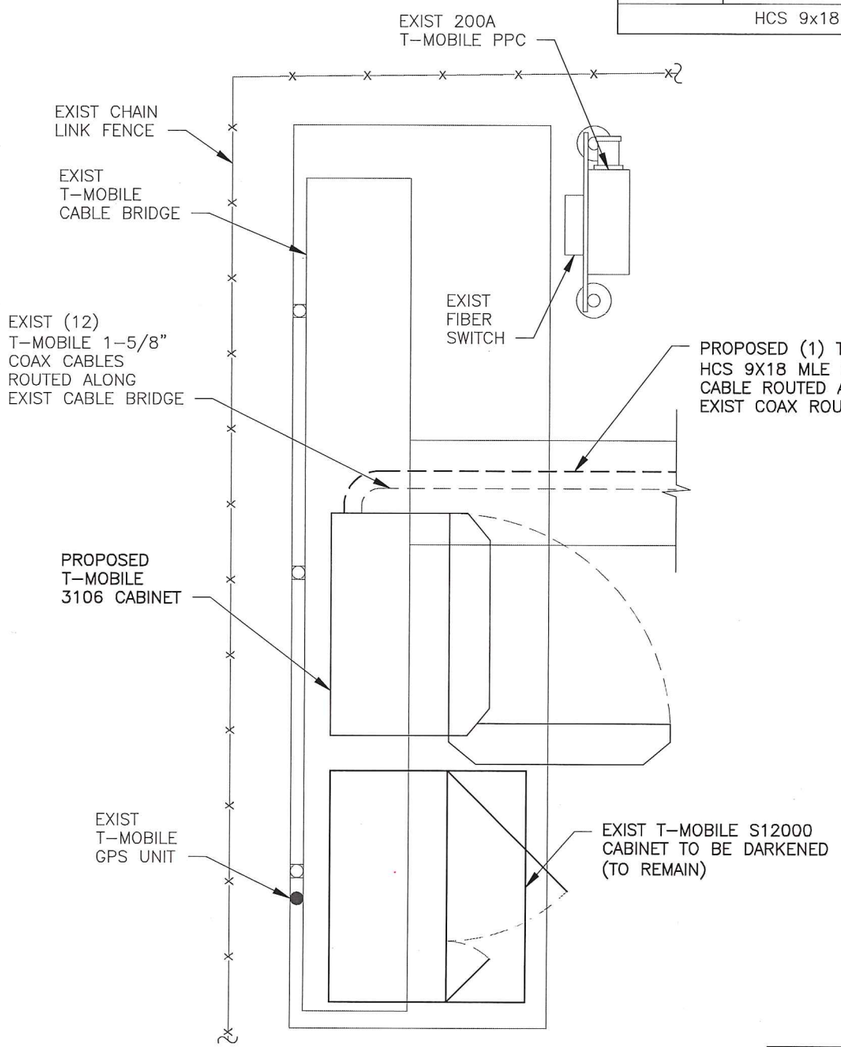
N

APPROX



1 / A–2 EXIST EQUIPMENT PLAN

SCALE: 3/8" = 1'–0'



2 / A–2 PROPOSED EQUIPMENT PLAN

SCALE: 3/8" = 1'–0'

HCS LENGTH			
FROM EQUIPMENT CABINET TO ANTENNA			
SECTOR	ALPHA	BETA	GAMMA
LENGTH	170'±	170'±	170'±
SIZE	1"		
HCS 9x18 MLE			

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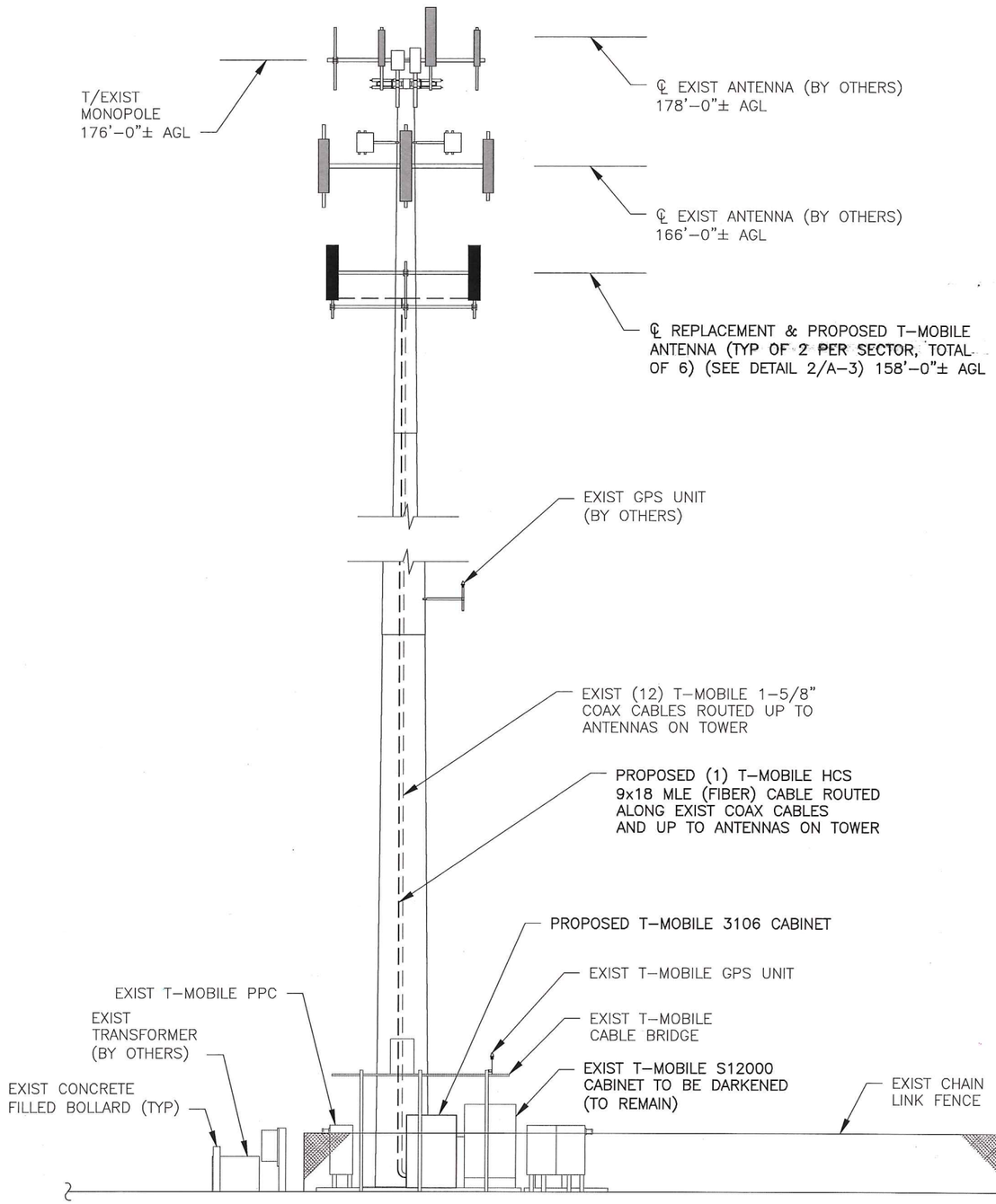
SHEET TITLE

EQUIPMENT LAYOUT PLANS

SHEET NUMBER

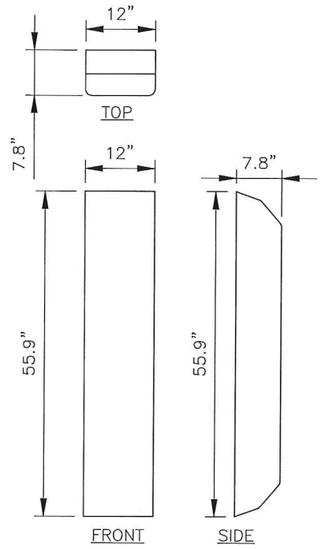
A–2



1 / A-3 ELEVATION

SCALE: 3/32" = 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).



AIR 21

2 / A-3 ANTENNA DETAIL

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

ELEVATION NOTE:

ELEVATION OF EXIST MONOPOLE HAS BEEN ARBITRARILY ASSIGNED AS EL 353'-0"±. THIS IS APPROXIMATELY 176'-0"± ABOVE GRADE WHICH WAS ESTIMATED AS EL 177'-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

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

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CROWN CASTLE

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RF _____
CONSTRUCTION _____
OPERATIONS _____
SITE ACQ. _____

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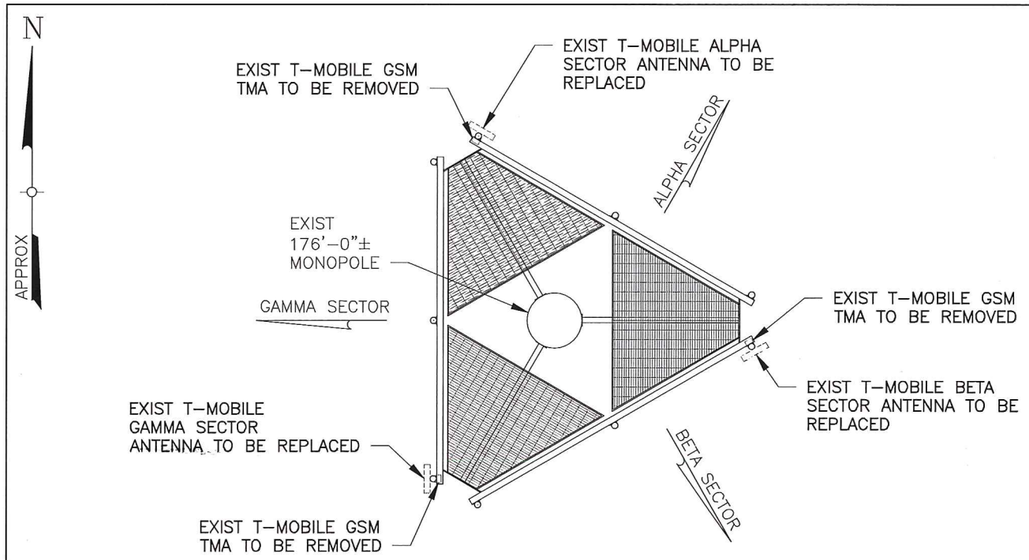
2381 LONG HILL ROAD
GUILFORD, CT 06437

SHEET TITLE

ELEVATION & DETAIL

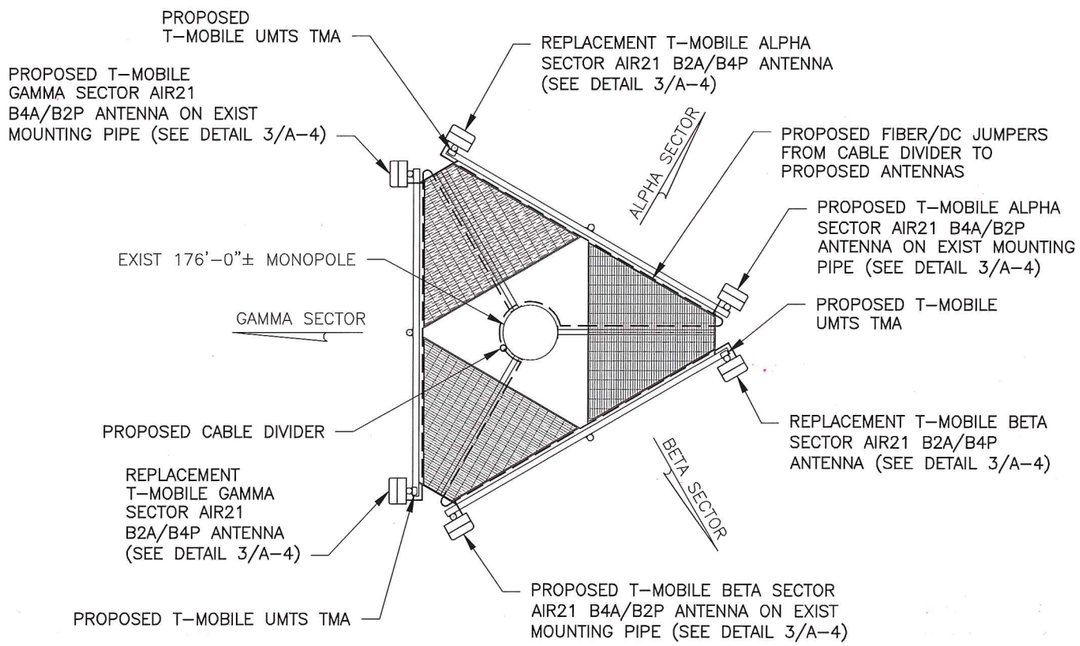
SHEET NUMBER

A-3



1 / A–4 EXIST ANTENNA PLAN

SCALE: 3/16" = 1'–0"



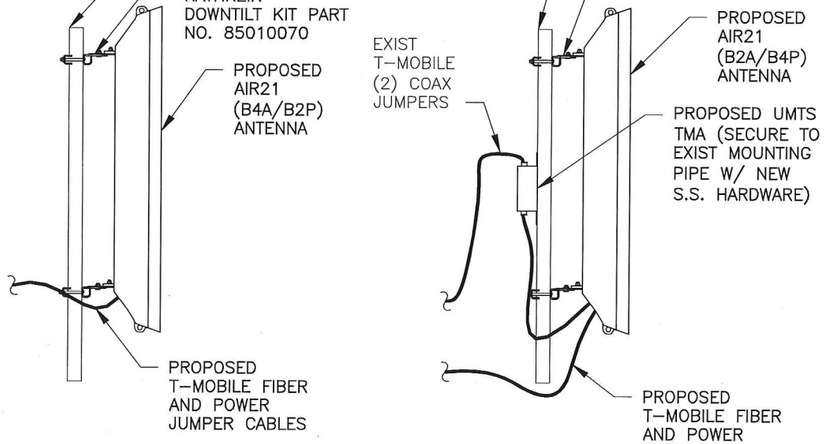
2 / A–4 PROPOSED ANTENNA PLAN

SCALE: 3/16" = 1'–0"

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
ALPHA	RFS	1	APX16DWV–16DWV	55.9x13.3x3.15
BETA	RFS	1	APX16DWV–16DWV	55.9x13.3x3.15
GAMMA	RFS	1	APX16DWV–16DWV	55.9x13.3x3.15

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



3 / A–4 ANTENNA DETAIL

SCALE: 1/2" = 1'–0"

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

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T–Mobile
T–MOBILE NORTHEAST LLC.
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CROWN CASTLE

APPROVALS

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ISSUED BY | DATE

STATE OF CONNECTICUT ★ ANTONIO A. GUALTIERI ★ No. 25406 LICENSED PROFESSIONAL ENGINEER

SITE INFORMATION

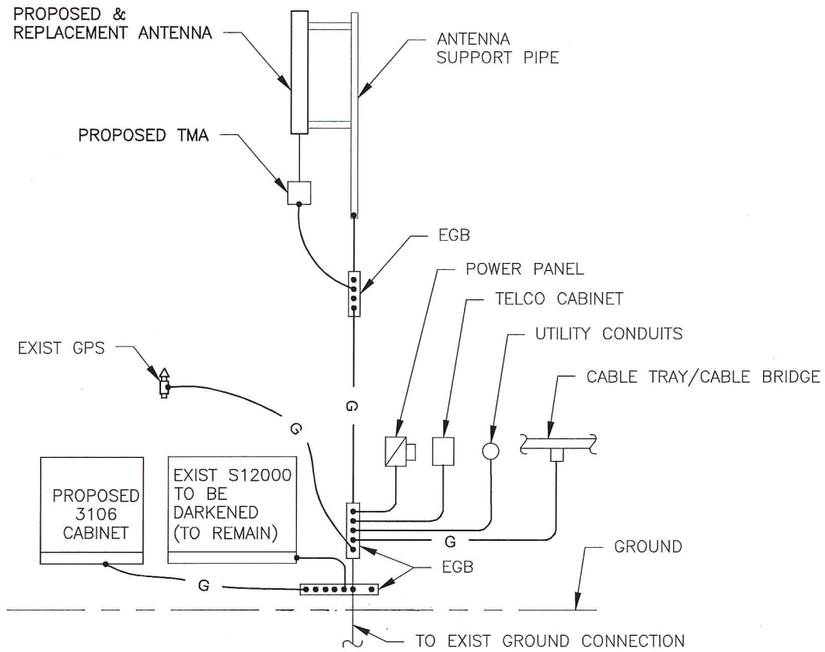
CT11393B
CT393/GLOBAL
GUILFORD_MP2
2381 LONG HILL ROAD
GUILFORD, CT 06437

SHEET TITLE

ANTENNA LAYOUT PLANS & DETAILS

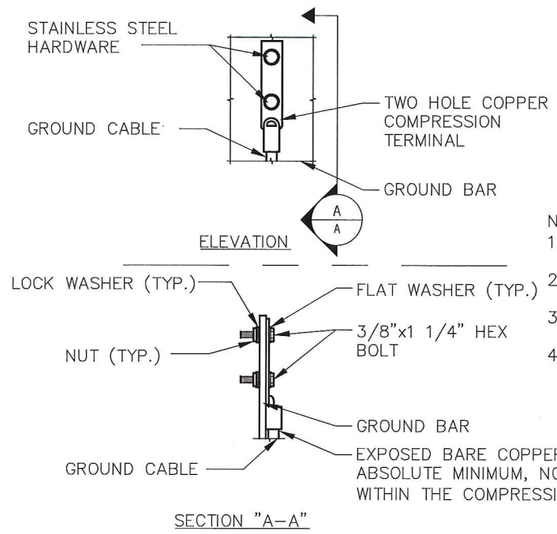
SHEET NUMBER

A–4



1 / A–5 GROUNDING RISER DIAGRAM

SCALE: NTS

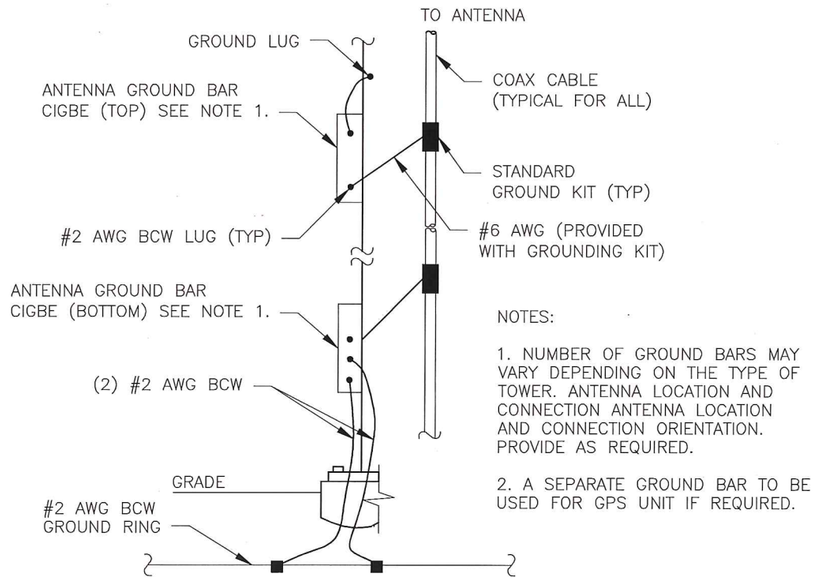


SECTION "A–A"

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

2 / A–5 GROUNDING BAR CONN. DETAIL

SCALE: NTS



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 / A–5 ANTENNA CABLE GROUNDING

SCALE: NTS

CONFIGURATION

2C

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

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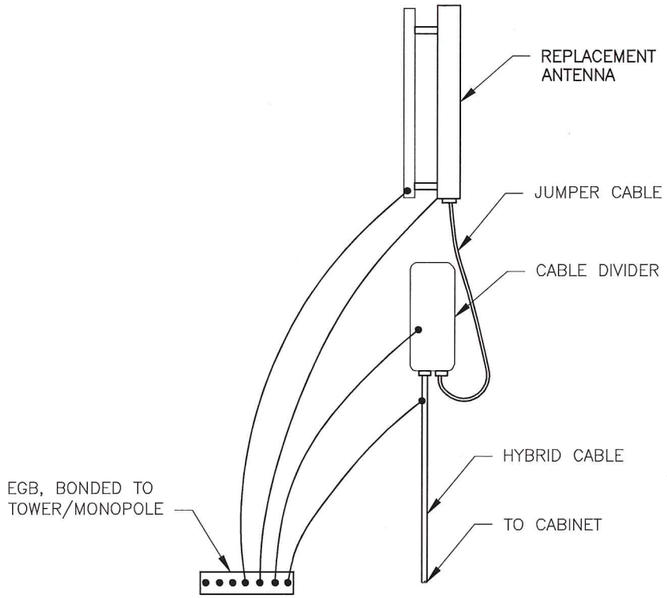
DETAILS

SHEET NUMBER

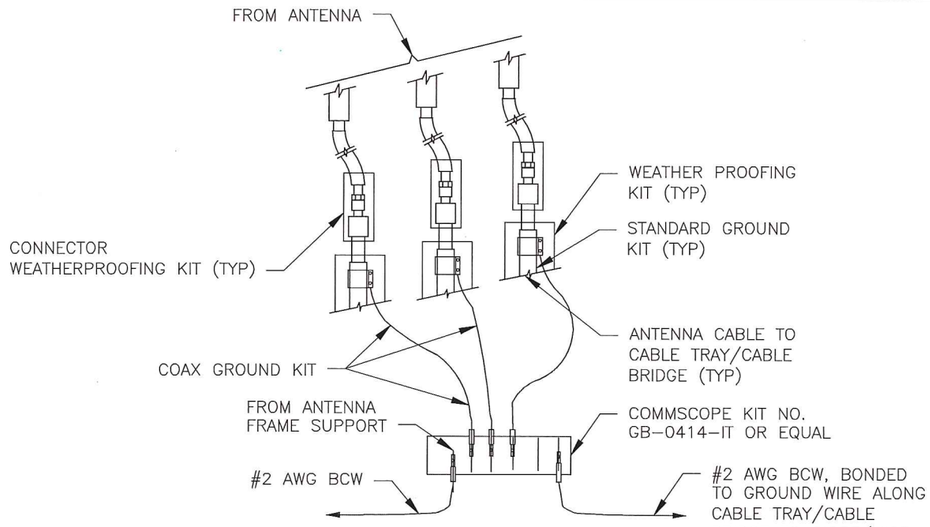
A–5



HYBRID CABLE CONNECTION AND GROUNDING DETAIL

1 / A-6

SCALE: NTS

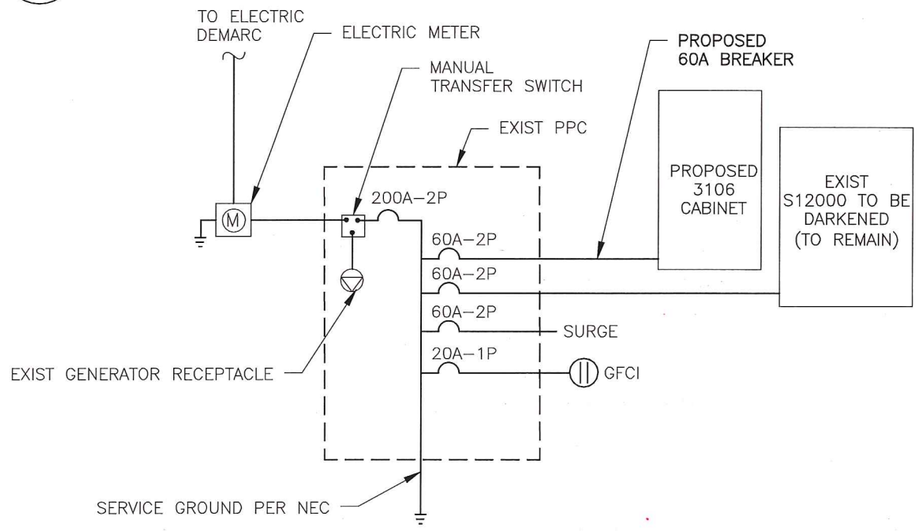


NOTE:
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

GROUND WIRE TO GROUND BAR CONNECTION DETAIL

2 / A-6

SCALE: NTS



ONE-LINE POWER DIAGRAM

3 / A-6

SCALE: NTS

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.

0 1 2 3

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

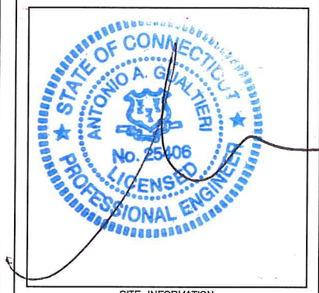
APPROVALS

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

PROJECT NUMBER	DESIGNED BY
7061.CT11393B	JQ

REV	DATE	REVISION	DRAWN BY
0	04/07/14	FOR COMMENT	SF
1	04/09/14	FOR CONSTRUCTION	MP

ISSUED BY	DATE



SITE INFORMATION

CT11393B
CT393/GLOBAL
GUILFORD_MP2
2381 LONG HILL ROAD
GUILFORD, CT 06437

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.

CONFIGURATION

2C

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

0 1 2 3

ORIGINAL SIZE IN INCHES

TECTONIC

- PLANNING
- ENGINEERING
- SURVEYING
- CONSTRUCTION MANAGEMENT

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Phone: (845) 567–6656
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CROWN CASTLE

APPROVALS

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

PROJECT NUMBER	DESIGNED BY
7061.CT11393B	JQ

REV	DATE	REVISION	DRAWN BY
0	04/07/14	FOR COMMENT	SF
1	04/09/14	FOR CONSTRUCTION	MP

ISSUED BY	DATE

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

SITE INFORMATION

CT11393B
CT393/GLOBAL
GUILFORD_MP2
2381 LONG HILL ROAD
GUILFORD, CT 06437

SHEET TITLE

NOTES

SHEET NUMBER

A–8

Date: **March 31, 2014**

Patrick Byrum
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6532

Tower Engineering Professionals
3703 Junction Blvd.
Raleigh, NC 27603
(919) 661-6351
crown@tepgroup.net

Subject: Structural Analysis Report

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11393B
	Carrier Site Name:	CT393/Global Gilford_MP2
Crown Castle Designation:	**Crown Castle BU Number:**	876381
	Crown Castle Site Name:	WARD
	Crown Castle JDE Job Number:	268433
	Crown Castle Work Order Number:	730910
	Crown Castle Application Number:	223702 Rev. 1
Engineering Firm Designation:	**TEP Project Number:**	51819.17074
Site Data:	**2365 Long Hill Rd, Guilford, New Haven County, CT 06437** **Latitude *41° 20' 47.34"*, Longitude *-72° 43' 23.15"*** **176 Foot - Monopole Tower**	

Dear Patrick Byrum,

Tower Engineering Professionals 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 629977, in accordance with application 223702, 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:

LC4.7: Existing + Reserved + Proposed Equipment with Proposed Modifications **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 Connecticut State Building Code (2003 International Building Code) with 2009 amendment based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the appurtenances listed in Tables 1 and 2 and the attached drawing for the determined available structural capacity to be effective.

We at *Tower Engineering Professionals* 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.

Structural analysis prepared by: Todd Lester, E.I. / RKE

Respectfully submitted by:

William H. Martin, P.E., S.E.

3/31/14

STATE OF CONNECTICUT
WILLIAM H. MARTIN
0029484
LICENSED
PROFESSIONAL ENGINEER

Electronic Copy

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1) INTRODUCTION

This tower is a 176-ft monopole tower designed by Engineered Endeavors, Inc. in July of 2003. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F for the appurtenances listed in Table 3. Modifications designed by Tower Engineering Professionals in January of 2014 were considered in this analysis. TEP did not visit the site. All information provided to TEP was assumed to be accurate and complete.

2) ANALYSIS CRITERIA

The analysis has been performed in accordance with the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and ASCE 7-05 Minimum Design Loads for Buildings and Other Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch escalating 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
155.0	155.0	3	Ericsson	Ericsson Air 21 B2A B4P	1	1-5/8	1
		3	Ericsson	Ericsson Air 21 B4A B2P			
		3	Ericsson	KRY 112 144/1			

Notes:
1) See “Appendix B – Base Level Drawing” for assumed feed line configuration.

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
176.0	178.0	3	Alcatel Lucent	800 External Notch Filter	3	1/2	1
		9	RFS Celwave	ACU-A20-N			
		3	RFS Celwave	APXVSPP18-C-A20 w/ Mount Pipe			
	176.0	1	Tower Mounts	Platform Mount [LP 712-1]	-	-	2
174.0	176.0	3	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz w/ Mount Pipe	-	-	1
		3	Alcatel Lucent	TME-800MHZ RRH			
	174.0	1	Tower Mounts	Side Arm Mount [SO 102-3]			
169.0	169.0	3	Ericsson	TME-RRUS-11 w/ Mount Pipe	-	-	2
		1	Tower Mounts	T-Arm Mount [TA 702-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
167.0	167.0	3	KMW Communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe	12 2 1	1-5/8 7/16 3/8	2
		6	Powerwave Technologies	7770.00 w/ Mount Pipe			
		6	Powerwave Technologies	LGP21401			
		6	Powerwave Technologies	LGP21901			
		1	Raycap	DC6-48-60-18-8F			
		1	Tower Mounts	Platform Mount [LP 303-1]			
155.0	155.0	3	Decibel	932QDG65T2EM	-	-	3
		6	Remec	S20057A1			
		1	Tower Mounts	Platform Mount [LP 301-1]	12	1-5/8	2
145.0	145.0	3	Alcatel Lucent	RRH2X40-07-U	14	1-5/8	1
		3	Alcatel Lucent	RRH2X40-AWS			
		6	Amphenol	BXA-171063-12CF-EDIN-X w/ Mount Pipe			
		6	Amphenol	BXA-70063-6CF-EDIN-X w/ Mount Pipe			
		1	RFS Celwave	DB-B1-6C-8AB-0Z			
		1	Tower Mounts	Platform Mount [LP 303-1]			
50.0	51.0	1	Lucent	KS24019-L112A	1	1/2	2
	50.0	1	Tower Mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Reserved equipment
2) Existing equipment
3) Existing equipment; to be removed

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
177.5	177.5	12	DAPA	48000	-	-
167.5	167.5	12	DAPA	48000	-	-
157.5	157.5	12	DAPA	48000	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Geotechnical Report	Jaworski Geotech, Inc.	1532993	CCISites
Manufacturer Drawings	Engineered Endeavors, Inc.	1613550	CCISites
Foundation Drawings	Engineered Endeavors, Inc.	1614617	CCISites
Reinforcement Drawings	Tower Engineering Professionals	4318894	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.

For analysis of monopole shaft reinforcements, the plates are modeled as linear appurtenances along the exterior of the pole. The loads calculated from tnxTower are then exported to a proprietary calculation sheet created by Tower Engineering Professionals, Inc. that analyzes each reinforcing element along each critical axis. The actual percent capacity of the tower structure including the reinforcing elements is reported in Table 5 – Section Capacity (Summary).

3.2) Assumptions

1) The tower and foundation were built in accordance with the manufacturer's specifications.
2) The tower and foundation 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 "Appendix B – Base Level Drawing".
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by the standard.
5) All tower components are in sufficient condition to carry their full design capacity.
6) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance.
7) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts. TEP did not perform a site visit to verify the size, condition or capacity of the antenna mounts and did not analyze antennas supporting mounts as part of this structural analysis report.
8) Based on recent photos showing the installed configuration the TMAs at 167-ft are installed directly behind the existing panel antennas such that they are shielded from the wind in the front, but not the side.

This analysis may be affected if any assumptions are not valid or have been made in error. Tower Engineering Professionals should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_{allow} (K)	% Capacity	Pass / Fail
L1	176.00-144.25	Pole	TP23.65x16.5x0.1875	1	-	-	73.2	Pass
L2	147.75-94.58	Pole	TP34.33x22.4868x0.3125	2	-	-	99.3	Pass
L3	99.41-46.95	Pole	TP44.3x32.6292x0.375	3	-	-	76.0	Pass
L4	53.03-0.00	Pole	TP54x42.1974x0.375	4	-	-	65.2	Pass
M1	35.00-0.00	Mod	CCI-WSFP-065125	5	-	-	66.7	Pass
M2	61.50-29.25	Mod	CCI-SFP-065125	6	-	-	83.5	Pass
M3	87.25-61.50	Mod	CCI-SFP-060100	7	-	-	94.8	Pass
M4	119.25-87.25	Mod	CCI-SFP-060100	8	-	-	86.6	Pass
							Summary	
						Pole (L2)	99.3	Pass
						Mod (M3)	94.8	Pass
						Rating =	**99.3**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	-	95.8	Pass
1	Base Plate	-	78.9	Pass
1	Base Foundation Soil Interaction	-	50.0	Pass
1	Base Foundation Structural	-	90.4	Pass

Structure Rating (max from all components) =	**99.3%**

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

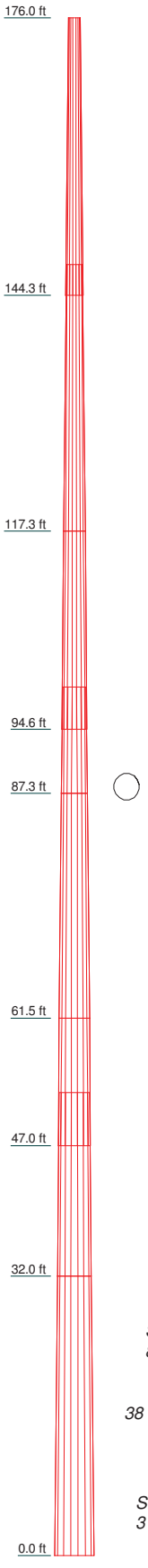
4.1) Recommendations

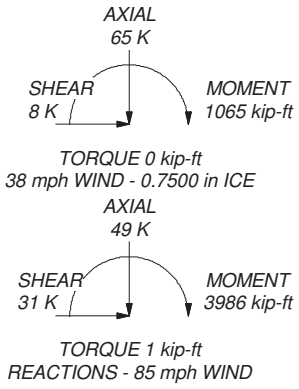
1) If the load differs from that described in Tables 1 and 2 of this report, “Appendix B – Base Level Drawing” or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
2) The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads once the proposed modifications (CCI Doc ID 3912596) are installed and a passing post modification inspection is completed. No additional modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4	5	6	7	8
Length (ft)	31.75	30.50	22.67	12.16	25.75	14.55	21.03	32.00
Number of Sides	18	18	18	18	18	18	18	18
Thickness (in)	0.1875	0.3125	0.5076	0.5587	0.5294	0.5770	0.5579	0.5702
Socket Length (ft)	3.50	4.83				6.08		
Top Dia (in)	16.5000	22.4868	29.2804	32.2391	35.3344	41.0631	41.7934	46.8779
Bot Dia (in)	23.6500	29.2804	34.3300	35.3344	41.0631	44.3000	46.8779	54.0000
Grade	A572-65			A572-65 (50% Density)		A572-65		A572-65 (50% Density)
Weight (K)	1.3	2.6	2.4	1.6	3.9	2.5	3.7	6.5





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
800 EXTERNAL NOTCH FILTER	176	(2) LGP21901	167
800 EXTERNAL NOTCH FILTER	176	(2) LGP21901	167
800 EXTERNAL NOTCH FILTER	176	(2) LGP21901	167
(3) ACU-A20-N	176	DC6-48-60-18-8F	167
(3) ACU-A20-N	176	Platform Mount [LP 303-1]	167
(3) ACU-A20-N	176	ERICSSON AIR 21 B2A B4P	155
APXVSPP18-C-A20 w/ Mount Pipe	176	ERICSSON AIR 21 B2A B4P	155
APXVSPP18-C-A20 w/ Mount Pipe	176	ERICSSON AIR 21 B2A B4P	155
APXVSPP18-C-A20 w/ Mount Pipe	176	ERICSSON AIR 21 B4A B2P	155
(3) 2.4" Dia. x 6' Mount Pipe	176	ERICSSON AIR 21 B4A B2P	155
(3) 2.4" Dia. x 6' Mount Pipe	176	ERICSSON AIR 21 B4A B2P	155
(3) 2.4" Dia. x 6' Mount Pipe	176	KRY 112 144/1	155
Platform Mount [LP 712-1]	176	KRY 112 144/1	155
PCS 1900MHz 4x45W-65MHz w/ Mount Pipe	174	KRY 112 144/1	155
		Platform Mount [LP 301-1]	155
PCS 1900MHz 4x45W-65MHz w/ Mount Pipe	174	RRH2X40-07-U	145
		RRH2X40-07-U	145
PCS 1900MHz 4x45W-65MHz w/ Mount Pipe	174	RRH2X40-07-U	145
		RRH2X40-AWS	145
TME-800MHZ RRH	174	RRH2X40-AWS	145
TME-800MHZ RRH	174	RRH2X40-AWS	145
TME-800MHZ RRH	174	(2) BXA-171063-12CF-EDIN-X w/ Mount Pipe	145
Side Arm Mount [SO 102-3]	174		
RRUS-11 w/ Mount Pipe	169	(2) BXA-171063-12CF-EDIN-X w/ Mount Pipe	145
RRUS-11 w/ Mount Pipe	169		
RRUS-11 w/ Mount Pipe	169	(2) BXA-171063-12CF-EDIN-X w/ Mount Pipe	145
T-Arm Mount [TA 702-3]	169		
AM-X-CD-16-65-00T-RET w/ Mount Pipe	167	(2) BXA-70063-6CF-EDIN-X w/ Mount Pipe	145
AM-X-CD-16-65-00T-RET w/ Mount Pipe	167	(2) BXA-70063-6CF-EDIN-X w/ Mount Pipe	145
AM-X-CD-16-65-00T-RET w/ Mount Pipe	167	(2) BXA-70063-6CF-EDIN-X w/ Mount Pipe	145
(2) 7770.00 w/ Mount Pipe	167	DB-B1-6C-8AB-0Z	145
(2) 7770.00 w/ Mount Pipe	167	Platform Mount [LP 303-1]	145
(2) 7770.00 w/ Mount Pipe	167	KS24019-L112A	50
(2) LGP21401	167	1.9" x 3' Pipe	50
(2) LGP21401	167	Side Arm Mount [SO 701-1]	50
(2) LGP21401	167		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	A572-65 (50% Density)	65 ksi	80 ksi

TOWER DESIGN NOTES

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

Tower Engineering Professionals, Inc.
3703 Junction Blvd.
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 661-6350

Job:	***WARD (BU 876381)***		
Project:	***TEP No. 51819.17074***		
Client: Crown Castle	Drawn by: KFO	App'd:	
Code: TIA/EIA-222-F	Date: 03/31/14	Scale: NTS	
Path: C:\Users\kolson\Desktop\Ward\876381_LC4.7.en		Dwg No. E-1	

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 New Haven 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.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Treat Feedline Bundles As Cylinder
	Consider Moments - Horizontals		Assume Legs Pinned		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Calculate Redundant Bracing Forces
	Use Moment Magnification	√	Use Clear Spans For Wind Area		Ignore Redundant Members in FEA
√	Use Code Stress Ratios		Use Clear Spans For KL/r		SR Leg Bolts Resist Compression
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		All Leg Panels Have Same Allowable
√	Escalate Ice	√	Bypass Mast Stability Checks		Offset Girt At Foundation
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Consider Feedline Torque
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Include Angle Block Shear Check
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Poles
	Leg Bolts Are At Top Of Section		SR Members Have Cut Ends	√	Include Shear-Torsion Interaction
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Always Use Sub-Critical Flow
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Use Top Mounted Sockets
	Add IBC .6D+W Combination		Use TIA-222-G Tension Splice Capacity Exemption		

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	176.00-144.25	31.75	3.50	18	16.5000	23.6500	0.1875	0.7500	A572-65 (65 ksi)
L2	144.25-117.25	30.50	0.00	18	22.4868	29.2804	0.3125	1.2500	A572-65 (65 ksi)
L3	117.25-94.58	22.67	4.83	18	29.2804	34.3300	0.5076	2.0302	A572-65 (50% Density) (65 ksi)
L4	94.58-87.25	12.16	0.00	18	32.2391	35.3344	0.5587	2.2349	A572-65 (50% Density)

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
L5	87.25-61.50	25.75	0.00	18	35.3344	41.0631	0.5294	2.1176	(65 ksi) A572-65 (65 ksi)
L6	61.50-46.95	14.55	6.08	18	41.0631	44.3000	0.5770	2.3079	A572-65 (50% Density) (65 ksi)
L7	46.95-32.00	21.03	0.00	18	41.7934	46.8779	0.5579	2.2317	A572-65 (50% Density) (65 ksi)
L8	32.00-0.00	32.00		18	46.8779	54.0000	0.5702	2.2808	A572-65 (50% Density) (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	16.7545	9.7080	326.3677	5.7909	8.3820	38.9367	653.1649	4.8549	2.5740	13.728
	24.0148	13.9631	971.1102	8.3292	12.0142	80.8302	1943.4981	6.9829	3.8324	20.439
L2	23.6253	21.9941	1366.2960	7.8719	11.4233	119.6061	2734.3898	10.9992	3.4077	10.905
	29.7321	28.7326	3046.1203	10.2836	14.8745	204.7886	6096.2488	14.3690	4.6034	14.731
L3	29.7321	46.3523	4848.1394	10.2144	14.8745	325.9371	9702.6581	23.1805	4.2601	8.393
	34.8596	54.4870	7874.8090	12.0070	17.4396	451.5465	15759.9799	27.2487	5.1488	10.144
L4	33.9849	56.1815	7123.7707	11.2465	16.3774	434.9747	14256.9151	28.0961	4.6907	8.395
	35.8795	61.6708	9422.5671	12.3454	17.9499	524.9371	18857.5326	30.8413	5.2355	9.37
L5	35.8795	58.4847	8950.8313	12.3558	17.9499	498.6564	17913.4403	29.2479	5.2871	9.987
	41.6965	68.1107	14137.8796	14.3894	20.8600	677.7497	28294.3623	34.0618	6.2953	11.891
L6	41.6965	74.1424	15353.7927	14.3726	20.8600	736.0388	30727.7883	37.0782	6.2116	10.766
	44.9834	80.0702	19338.7803	15.5217	22.5044	859.3333	38703.0071	40.0427	6.7813	11.753
L7	43.9308	73.0213	15686.6398	14.6386	21.2311	738.8531	31393.9204	36.5176	6.3737	11.424
	47.6011	82.0251	22234.2032	16.4436	23.8140	933.6614	44497.6627	41.0203	7.2686	13.028
L8	47.6011	83.8094	22705.8248	16.4392	23.8140	953.4658	45441.5265	41.9127	7.2470	12.709
	54.8330	96.6992	34876.0581	18.9676	27.4320	1271.3640	69798.0069	48.3588	8.5004	14.908

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 176.00-144.25				1	1	1		
L2 144.25-117.25				1	1	1		
L3 117.25-94.58				1	1	1.2385		
L4 94.58-87.25				1	1	1.34944		
L5 87.25-61.50				1	1	0.71103		
L6 61.50-46.95				1	1	1.3059		
L7 46.95-32.00				1	1	1.3496		
L8 32.00-0.00				1	1	1.32012		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
*** 176' ***								
HYBRIFLEX RRH 1-SECTOR(1/2")	C	No	CaAa (Out Of Face)	155.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.83
						1" Ice	0.00	2.13
						2" Ice	0.00	6.55
						4" Ice	0.00	22.73
HYBRIFLEX RRH 1-SECTOR(1/2")	C	No	CaAa (Out Of Face)	176.00 - 155.00	1	No Ice	0.06	0.15
						1/2" Ice	0.16	0.83
						1" Ice	0.26	2.13
						2" Ice	0.46	6.55
						4" Ice	0.86	22.73
HYBRIFLEX RRH 1-SECTOR(1/2")	C	No	CaAa (Out Of Face)	176.00 - 0.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.83
						1" Ice	0.00	2.13
						2" Ice	0.00	6.55
						4" Ice	0.00	22.73
*** 167' ***								
LDF7-50A(1-5/8")	B	No	Inside Pole	167.00 - 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
FB-L98B-002-75000(3/8")	B	No	Inside Pole	167.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
WR-VG122ST-BRDA(7/ 16)	B	No	Inside Pole	167.00 - 0.00	2	No Ice	0.00	0.14
						1/2" Ice	0.00	0.14
						1" Ice	0.00	0.14
						2" Ice	0.00	0.14
						4" Ice	0.00	0.14
2" Flexible Conduit	B	No	Inside Pole	167.00 - 0.00	1	No Ice	0.00	0.34
						1/2" Ice	0.00	0.34
						1" Ice	0.00	0.34
						2" Ice	0.00	0.34
						4" Ice	0.00	0.34
*** 155' ***								
LDF7-50A(1-5/8")	C	No	Inside Pole	155.00 - 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
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	C	No	CaAa (Out Of Face)	119.25 - 0.00	1	No Ice	0.00	1.07
						1/2" Ice	0.00	2.37
						1" Ice	0.00	4.28
						2" Ice	0.00	9.93
						4" Ice	0.00	28.56
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	C	No	CaAa (Out Of Face)	155.00 - 119.25	1	No Ice	0.16	1.07
						1/2" Ice	0.26	2.37
						1" Ice	0.36	4.28
						2" Ice	0.56	9.93
						4" Ice	0.96	28.56
*** 145' ***								
HB158-1-08U8-S8J18(1-5/8)	A	No	Inside Pole	145.00 - 0.00	2	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
						2" Ice	0.00	1.30
						4" Ice	0.00	1.30
LCF158-50JA(1 5/8")	A	No	Inside Pole	145.00 - 0.00	12	No Ice	0.00	0.92

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1/2" Ice	0.00	0.92
						1" Ice	0.00	0.92
						2" Ice	0.00	0.92
						4" Ice	0.00	0.92
*** 50' ***								
LDF4-50A(1/2")	C	No	Inside Pole	50.00 - 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
*** 10' ***								
*****								
Step Pegs (5/8" SR) 7-in. w/30" step	C	No	CaAa (Out Of Face)	176.00 - 0.00	1	No Ice	0.01	0.24
						1/2" Ice	0.11	0.64
						1" Ice	0.21	1.64
						2" Ice	0.41	5.49
						4" Ice	0.81	20.51
Safety Line 3/8	C	No	CaAa (Out Of Face)	176.00 - 0.00	1	No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28
						2" Ice	0.44	2.34
						4" Ice	0.84	4.46
*****								
CCI-65FP-065125	A	No	CaAa (Out Of Face)	35.00 - 0.00	1	No Ice	0.21	27.65
						1/2" Ice	0.32	28.73
						1" Ice	0.43	30.15
						2" Ice	0.65	34.04
						4" Ice	1.10	45.97
CCI-65FP-065125	B	No	CaAa (Out Of Face)	35.00 - 0.00	1	No Ice	0.00	27.65
						1/2" Ice	0.00	28.73
						1" Ice	0.00	30.15
						2" Ice	0.00	34.04
						4" Ice	0.00	45.97
CCI-65FP-065125	B	No	CaAa (Out Of Face)	35.00 - 0.00	1	No Ice	0.00	27.65
						1/2" Ice	0.00	28.73
						1" Ice	0.00	30.15
						2" Ice	0.00	34.04
						4" Ice	0.00	45.97
CCI-65FP-065125	C	No	CaAa (Out Of Face)	35.00 - 0.00	1	No Ice	0.21	27.65
						1/2" Ice	0.32	28.73
						1" Ice	0.43	30.15
						2" Ice	0.65	34.04
						4" Ice	1.10	45.97
*****								
CCI-65FP-065125	A	No	CaAa (Out Of Face)	64.25 - 35.00	1	No Ice	0.21	27.65
						1/2" Ice	0.32	28.73
						1" Ice	0.43	30.15
						2" Ice	0.65	34.04
						4" Ice	1.10	45.97
CCI-65FP-065125	A	No	CaAa (Out Of Face)	35.00 - 29.25	1	No Ice	0.00	27.65
						1/2" Ice	0.00	28.73
						1" Ice	0.00	30.15
						2" Ice	0.00	34.04
						4" Ice	0.00	45.97
CCI-65FP-065125	B	No	CaAa (Out Of Face)	64.25 - 29.25	1	No Ice	0.00	27.65
						1/2" Ice	0.00	28.73
						1" Ice	0.00	30.15
						2" Ice	0.00	34.04
						4" Ice	0.00	45.97
CCI-65FP-065125	C	No	CaAa (Out Of Face)	64.25 - 29.25	1	No Ice	0.00	27.65
						1/2" Ice	0.00	28.73

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.00	30.15
						2" Ice	0.00	34.04
						4" Ice	0.00	45.97
*****								
CCI-65FP-060100	A	No	CaAa (Out Of Face)	89.25 - 64.25	1	No Ice	0.17	20.42
						1/2" Ice	0.28	21.37
						1" Ice	0.39	22.66
						2" Ice	0.61	26.29
						4" Ice	1.06	37.70
CCI-65FP-060100	B	No	CaAa (Out Of Face)	89.25 - 64.25	1	No Ice	0.00	20.42
						1/2" Ice	0.00	21.37
						1" Ice	0.00	22.66
						2" Ice	0.00	26.29
						4" Ice	0.00	37.70
CCI-65FP-060100	C	No	CaAa (Out Of Face)	89.25 - 64.25	1	No Ice	0.00	20.42
						1/2" Ice	0.00	21.37
						1" Ice	0.00	22.66
						2" Ice	0.00	26.29
						4" Ice	0.00	37.70
*****								
CCI-65FP-060100	A	No	CaAa (Out Of Face)	119.25 - 89.25	1	No Ice	0.17	20.42
						1/2" Ice	0.28	21.37
						1" Ice	0.39	22.66
						2" Ice	0.61	26.29
						4" Ice	1.06	37.70
CCI-65FP-060100	B	No	CaAa (Out Of Face)	119.25 - 89.25	1	No Ice	0.00	20.42
						1/2" Ice	0.00	21.37
						1" Ice	0.00	22.66
						2" Ice	0.00	26.29
						4" Ice	0.00	37.70
CCI-65FP-060100	C	No	CaAa (Out Of Face)	119.25 - 89.25	1	No Ice	0.00	20.42
						1/2" Ice	0.00	21.37
						1" Ice	0.00	22.66
						2" Ice	0.00	26.29
						4" Ice	0.00	37.70

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	176.00-144.25	A	0.000	0.000	0.000	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.24
		C	0.000	0.000	0.000	4.703	0.15
L2	144.25-117.25	A	0.000	0.000	0.000	0.333	0.41
		B	0.000	0.000	0.000	0.000	0.32
		C	0.000	0.000	0.000	5.469	0.36
L3	117.25-94.58	A	0.000	0.000	0.000	3.778	0.77
		B	0.000	0.000	0.000	0.000	0.70
		C	0.000	0.000	0.000	1.181	0.73
L4	94.58-87.25	A	0.000	0.000	0.000	1.222	0.25
		B	0.000	0.000	0.000	0.000	0.23
		C	0.000	0.000	0.000	0.382	0.24
L5	87.25-61.50	A	0.000	0.000	0.000	4.406	0.90
		B	0.000	0.000	0.000	0.000	0.82
		C	0.000	0.000	0.000	1.342	0.85
L6	61.50-46.95	A	0.000	0.000	0.000	3.031	0.60
		B	0.000	0.000	0.000	0.000	0.56

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	0.758	0.57
L7	46.95-32.00	A	0.000	0.000	0.000	3.115	0.70
		B	0.000	0.000	0.000	0.000	0.74
		C	0.000	0.000	0.000	1.404	0.68
L8	32.00-0.00	A	0.000	0.000	0.000	6.667	1.40
		B	0.000	0.000	0.000	0.000	2.18
		C	0.000	0.000	0.000	8.334	1.34

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	176.00-144.25	A	0.906	0.000	0.000	0.000	0.000	0.01
		B		0.000	0.000	0.000	0.000	0.24
		C		0.000	0.000	0.000	21.961	0.41
L2	144.25-117.25	A	0.884	0.000	0.000	0.000	0.736	0.41
		B		0.000	0.000	0.000	0.000	0.33
		C		0.000	0.000	0.000	19.783	0.64
L3	117.25-94.58	A	0.862	0.000	0.000	0.000	8.123	0.81
		B		0.000	0.000	0.000	0.000	0.74
		C		0.000	0.000	0.000	9.001	0.99
L4	94.58-87.25	A	0.847	0.000	0.000	0.000	2.626	0.26
		B		0.000	0.000	0.000	0.000	0.24
		C		0.000	0.000	0.000	2.910	0.32
L5	87.25-61.50	A	0.826	0.000	0.000	0.000	9.135	0.94
		B		0.000	0.000	0.000	0.000	0.86
		C		0.000	0.000	0.000	9.853	1.13
L6	61.50-46.95	A	0.796	0.000	0.000	0.000	5.605	0.63
		B		0.000	0.000	0.000	0.000	0.58
		C		0.000	0.000	0.000	5.390	0.73
L7	46.95-32.00	A	0.766	0.000	0.000	0.000	5.759	0.73
		B		0.000	0.000	0.000	0.000	0.78
		C		0.000	0.000	0.000	6.694	0.84
L8	32.00-0.00	A	0.750	0.000	0.000	0.000	12.000	1.46
		B		0.000	0.000	0.000	0.000	2.30
		C		0.000	0.000	0.000	23.267	1.66

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	176.00-144.25	-0.1816	0.1048	-0.6010	0.3470
L2	144.25-117.25	-0.2381	0.1188	-0.6697	0.3547
L3	117.25-94.58	-0.0625	-0.1948	-0.3851	-0.1790
L4	94.58-87.25	-0.0629	-0.1960	-0.3926	-0.1824
L5	87.25-61.50	-0.0632	-0.2038	-0.3899	-0.1926
L6	61.50-46.95	-0.0631	-0.2548	-0.3851	-0.2400
L7	46.95-32.00	-0.1145	-0.2231	-0.4653	-0.1910
L8	32.00-0.00	-0.3044	-0.1054	-0.7311	-0.0133

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
*** 176' ***									
800 EXTERNAL NOTCH FILTER	A	From Centroid-Leg	4.00 -2.00 2.00	20.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	0.01 0.02 0.02 0.04 0.11
800 EXTERNAL NOTCH FILTER	B	From Centroid-Leg	4.00 -2.00 2.00	40.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	0.01 0.02 0.02 0.04 0.11
800 EXTERNAL NOTCH FILTER	C	From Centroid-Leg	4.00 -2.00 2.00	30.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	0.01 0.02 0.02 0.04 0.11
(3) ACU-A20-N	A	From Centroid-Leg	4.00 -2.00 2.00	20.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
(3) ACU-A20-N	B	From Centroid-Leg	4.00 -2.00 2.00	40.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
(3) ACU-A20-N	C	From Centroid-Leg	4.00 -2.00 2.00	30.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
APXVSPP18-C-A20 w/ Mount Pipe	A	From Centroid-Leg	4.00 -2.00 2.00	20.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Centroid-Leg	4.00 -2.00 2.00	40.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Centroid-Leg	4.00 -2.00 2.00	30.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
(3) 2.4" Dia. x 6' Mount Pipe	A	From Centroid-Leg	4.00 0.67 0.00	0.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.93 2.32 3.15 5.06	1.43 1.93 2.32 3.15 5.06	0.02 0.04 0.06 0.10 0.25
(3) 2.4" Dia. x 6' Mount Pipe	B	From	4.00	0.0000	176.00	No Ice	1.43	1.43	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		Centroid-Leg	0.67 0.00			1/2" Ice 1" Ice 2" Ice 4" Ice	1.93 2.32 3.15 5.06	1.93 2.32 3.15 5.06	0.04 0.06 0.10 0.25
(3) 2.4" Dia. x 6' Mount Pipe	C	From Centroid-Leg	4.00 0.67 0.00	0.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.93 2.32 3.15 5.06	1.43 1.93 2.32 3.15 5.06	0.02 0.04 0.06 0.10 0.25
Platform Mount [LP 712-1]	C	None		0.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.53 29.94 35.35 46.17 67.81	24.53 29.94 35.35 46.17 67.81	1.34 1.65 1.96 2.58 3.82
*** 174' ***									
PCS 1900MHz 4x45W-65MHz w/ Mount Pipe	A	From Leg	1.50 0.00 2.00	20.0000	174.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.90 3.21 3.52 4.19 5.70	3.22 3.65 4.09 5.06 7.34	0.07 0.10 0.14 0.23 0.48
PCS 1900MHz 4x45W-65MHz w/ Mount Pipe	B	From Leg	1.50 0.00 2.00	40.0000	174.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.90 3.21 3.52 4.19 5.70	3.22 3.65 4.09 5.06 7.34	0.07 0.10 0.14 0.23 0.48
PCS 1900MHz 4x45W-65MHz w/ Mount Pipe	C	From Leg	1.50 0.00 2.00	30.0000	174.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.90 3.21 3.52 4.19 5.70	3.22 3.65 4.09 5.06 7.34	0.07 0.10 0.14 0.23 0.48
TME-800MHZ RRH	A	From Leg	1.50 0.00 2.00	20.0000	174.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
TME-800MHZ RRH	B	From Leg	1.50 0.00 2.00	40.0000	174.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
TME-800MHZ RRH	C	From Leg	1.50 0.00 2.00	30.0000	174.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
Side Arm Mount [SO 102-3]	C	None		0.0000	174.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 3.48 3.96 4.92 6.84	3.00 3.48 3.96 4.92 6.84	0.08 0.11 0.14 0.20 0.32
*** 169' ***									
RRUS-11 w/ Mount Pipe	A	From Leg	3.00 -2.00 0.00	30.0000	169.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.49 3.87 4.27 5.11 7.05	2.11 2.52 2.95 3.86 6.05	0.05 0.08 0.12 0.20 0.45
RRUS-11 w/ Mount Pipe	B	From Leg	3.00	40.0000	169.00	No Ice	3.49	2.11	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			-2.00			1/2" Ice	3.87	2.52	0.08
			0.00			1" Ice	4.27	2.95	0.12
						2" Ice	5.11	3.86	0.20
						4" Ice	7.05	6.05	0.45
RRUS-11 w/ Mount Pipe	C	From Leg	3.00	40.0000	169.00	No Ice	3.49	2.11	0.05
			-2.00			1/2" Ice	3.87	2.52	0.08
			0.00			1" Ice	4.27	2.95	0.12
						2" Ice	5.11	3.86	0.20
						4" Ice	7.05	6.05	0.45
T-Arm Mount [TA 702-3]	C	None		0.0000	169.00	No Ice	5.64	5.64	0.34
						1/2" Ice	6.55	6.55	0.43
						1" Ice	7.46	7.46	0.52
						2" Ice	9.28	9.28	0.70
						4" Ice	12.92	12.92	1.06
*** 167' ***									
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Centroid-Leg	4.00	30.0000	167.00	No Ice	8.50	6.30	0.07
			0.00			1/2" Ice	9.15	7.48	0.14
			0.00			1" Ice	9.77	8.37	0.21
						2" Ice	11.03	10.18	0.38
						4" Ice	13.68	14.02	0.87
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Centroid-Leg	4.00	40.0000	167.00	No Ice	8.50	6.30	0.07
			0.00			1/2" Ice	9.15	7.48	0.14
			0.00			1" Ice	9.77	8.37	0.21
						2" Ice	11.03	10.18	0.38
						4" Ice	13.68	14.02	0.87
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Centroid-Leg	4.00	40.0000	167.00	No Ice	8.50	6.30	0.07
			0.00			1/2" Ice	9.15	7.48	0.14
			0.00			1" Ice	9.77	8.37	0.21
						2" Ice	11.03	10.18	0.38
						4" Ice	13.68	14.02	0.87
(2) 7770.00 w/ Mount Pipe	A	From Centroid-Leg	4.00	30.0000	167.00	No Ice	6.12	4.25	0.06
			0.00			1/2" Ice	6.63	5.01	0.10
			0.00			1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) 7770.00 w/ Mount Pipe	B	From Centroid-Leg	4.00	40.0000	167.00	No Ice	6.12	4.25	0.06
			0.00			1/2" Ice	6.63	5.01	0.10
			0.00			1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) 7770.00 w/ Mount Pipe	C	From Centroid-Leg	4.00	40.0000	167.00	No Ice	6.12	4.25	0.06
			0.00			1/2" Ice	6.63	5.01	0.10
			0.00			1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) LGP21401	A	From Centroid-Leg	4.00	30.0000	167.00	No Ice	0.00	0.23	0.01
			-3.00			1/2" Ice	0.00	0.31	0.02
			0.00			1" Ice	0.00	0.40	0.03
						2" Ice	0.00	0.61	0.05
						4" Ice	0.00	1.12	0.14
(2) LGP21401	B	From Centroid-Leg	4.00	40.0000	167.00	No Ice	0.00	0.23	0.01
			-3.00			1/2" Ice	0.00	0.31	0.02
			0.00			1" Ice	0.00	0.40	0.03
						2" Ice	0.00	0.61	0.05
						4" Ice	0.00	1.12	0.14
(2) LGP21401	C	From Centroid-Le	4.00	40.0000	167.00	No Ice	0.00	0.23	0.01
			-3.00			1/2" Ice	0.00	0.31	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		g	0.00			1" Ice	0.00	0.40	0.03
						2" Ice	0.00	0.61	0.05
						4" Ice	0.00	1.12	0.14
(2) LGP21901	A	From Centroid-Le g	4.00 3.00 0.00	30.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.18 0.25 0.32 0.49 0.94	0.01 0.01 0.01 0.02 0.07
(2) LGP21901	B	From Centroid-Le g	4.00 3.00 0.00	40.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.18 0.25 0.32 0.49 0.94	0.01 0.01 0.01 0.02 0.07
(2) LGP21901	C	From Centroid-Le g	4.00 3.00 0.00	40.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.18 0.25 0.32 0.49 0.94	0.01 0.01 0.01 0.02 0.07
DC6-48-60-18-8F	B	From Centroid-Le g	4.00 0.00 0.00	40.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.27 1.46 1.66 2.09 3.10	1.27 1.46 1.66 2.09 3.10	0.02 0.04 0.05 0.10 0.21
Platform Mount [LP 303-1]	C	None		0.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.66 18.87 23.08 31.50 48.34	14.66 18.87 23.08 31.50 48.34	1.25 1.48 1.71 2.18 3.10
*** 155' ***									
ERICSSON AIR 21 B2A B4P	A	From Centroid-Fa ce	4.00 -6.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.59 7.03 7.49 8.42 10.40	4.30 4.70 5.13 6.01 7.87	0.09 0.13 0.18 0.29 0.58
ERICSSON AIR 21 B2A B4P	B	From Centroid-Fa ce	4.00 -6.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.59 7.03 7.49 8.42 10.40	4.30 4.70 5.13 6.01 7.87	0.09 0.13 0.18 0.29 0.58
ERICSSON AIR 21 B2A B4P	C	From Centroid-Fa ce	4.00 -6.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.59 7.03 7.49 8.42 10.40	4.30 4.70 5.13 6.01 7.87	0.09 0.13 0.18 0.29 0.58
ERICSSON AIR 21 B4A B2P	A	From Centroid-Fa ce	4.00 6.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.59 7.03 7.49 8.42 10.40	4.30 4.70 5.13 6.01 7.87	0.09 0.13 0.18 0.29 0.58
ERICSSON AIR 21 B4A B2P	B	From Centroid-Fa ce	4.00 6.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.59 7.03 7.49 8.42 10.40	4.30 4.70 5.13 6.01 7.87	0.09 0.13 0.18 0.29 0.58
ERICSSON AIR 21 B4A B2P	C	From Centroid-Fa ce	4.00 6.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	6.59 7.03 7.49	4.30 4.70 5.13	0.09 0.13 0.18

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	8.42	6.01	0.29
						4" Ice	10.40	7.87	0.58
KRY 112 144/1	A	From Centroid-Face	4.00 -6.00 0.00	0.0000	155.00	No Ice	0.41	0.20	0.01
						1/2" Ice	0.50	0.27	0.01
						1" Ice	0.59	0.35	0.02
						2" Ice	0.81	0.53	0.03
						4" Ice	1.36	1.00	0.08
KRY 112 144/1	B	From Centroid-Face	4.00 -6.00 0.00	0.0000	155.00	No Ice	0.41	0.20	0.01
						1/2" Ice	0.50	0.27	0.01
						1" Ice	0.59	0.35	0.02
						2" Ice	0.81	0.53	0.03
						4" Ice	1.36	1.00	0.08
KRY 112 144/1	C	From Centroid-Face	4.00 -6.00 0.00	0.0000	155.00	No Ice	0.41	0.20	0.01
						1/2" Ice	0.50	0.27	0.01
						1" Ice	0.59	0.35	0.02
						2" Ice	0.81	0.53	0.03
						4" Ice	1.36	1.00	0.08
Platform Mount [LP 301-1]	C	None		0.0000	155.00	No Ice	30.10	30.10	1.59
						1/2" Ice	40.80	40.80	2.03
						1" Ice	51.50	51.50	2.47
						2" Ice	72.90	72.90	3.35
						4" Ice	115.70	115.70	5.11
*** 145' ***									
RRH2X40-07-U	A	From Centroid-Leg	4.00 -6.00 0.00	20.0000	145.00	No Ice	2.25	1.23	0.05
						1/2" Ice	2.45	1.39	0.07
						1" Ice	2.66	1.55	0.09
						2" Ice	3.10	1.91	0.13
						4" Ice	4.10	2.73	0.27
RRH2X40-07-U	B	From Centroid-Leg	4.00 -6.00 0.00	20.0000	145.00	No Ice	2.25	1.23	0.05
						1/2" Ice	2.45	1.39	0.07
						1" Ice	2.66	1.55	0.09
						2" Ice	3.10	1.91	0.13
						4" Ice	4.10	2.73	0.27
RRH2X40-07-U	C	From Centroid-Leg	4.00 -6.00 0.00	30.0000	145.00	No Ice	2.25	1.23	0.05
						1/2" Ice	2.45	1.39	0.07
						1" Ice	2.66	1.55	0.09
						2" Ice	3.10	1.91	0.13
						4" Ice	4.10	2.73	0.27
RRH2X40-AWS	A	From Centroid-Leg	4.00 2.00 0.00	20.0000	145.00	No Ice	2.52	1.59	0.04
						1/2" Ice	2.75	1.80	0.06
						1" Ice	2.99	2.01	0.08
						2" Ice	3.50	2.46	0.13
						4" Ice	4.61	3.48	0.28
RRH2X40-AWS	B	From Centroid-Leg	4.00 2.00 0.00	20.0000	145.00	No Ice	2.52	1.59	0.04
						1/2" Ice	2.75	1.80	0.06
						1" Ice	2.99	2.01	0.08
						2" Ice	3.50	2.46	0.13
						4" Ice	4.61	3.48	0.28
RRH2X40-AWS	C	From Centroid-Leg	4.00 2.00 0.00	30.0000	145.00	No Ice	2.52	1.59	0.04
						1/2" Ice	2.75	1.80	0.06
						1" Ice	2.99	2.01	0.08
						2" Ice	3.50	2.46	0.13
						4" Ice	4.61	3.48	0.28
(2) BXA-171063-12CF-EDIN-X w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	20.0000	145.00	No Ice	5.03	5.29	0.04
						1/2" Ice	5.58	6.46	0.09
						1" Ice	6.10	7.35	0.14
						2" Ice	7.17	9.15	0.27

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	9.44	12.95	0.68
(2)	B	From	4.00	20.0000	145.00	No Ice	5.03	5.29	0.04
BXA-171063-12CF-EDIN-X		Centroid-Le	0.00			1/2" Ice	5.58	6.46	0.09
w/ Mount Pipe		g	0.00			1" Ice	6.10	7.35	0.14
						2" Ice	7.17	9.15	0.27
						4" Ice	9.44	12.95	0.68
(2)	C	From	4.00	30.0000	145.00	No Ice	5.03	5.29	0.04
BXA-171063-12CF-EDIN-X		Centroid-Le	0.00			1/2" Ice	5.58	6.46	0.09
w/ Mount Pipe		g	0.00			1" Ice	6.10	7.35	0.14
						2" Ice	7.17	9.15	0.27
						4" Ice	9.44	12.95	0.68
(2)	A	From	4.00	20.0000	145.00	No Ice	7.97	5.80	0.04
BXA-70063-6CF-EDIN-X w/		Centroid-Le	0.00			1/2" Ice	8.61	6.95	0.10
Mount Pipe		g	0.00			1" Ice	9.22	7.82	0.17
						2" Ice	10.46	9.60	0.34
						4" Ice	13.07	13.37	0.80
(2)	B	From	4.00	20.0000	145.00	No Ice	7.97	5.80	0.04
BXA-70063-6CF-EDIN-X w/		Centroid-Le	0.00			1/2" Ice	8.61	6.95	0.10
Mount Pipe		g	0.00			1" Ice	9.22	7.82	0.17
						2" Ice	10.46	9.60	0.34
						4" Ice	13.07	13.37	0.80
(2)	C	From	4.00	30.0000	145.00	No Ice	7.97	5.80	0.04
BXA-70063-6CF-EDIN-X w/		Centroid-Le	0.00			1/2" Ice	8.61	6.95	0.10
Mount Pipe		g	0.00			1" Ice	9.22	7.82	0.17
						2" Ice	10.46	9.60	0.34
						4" Ice	13.07	13.37	0.80
DB-B1-6C-8AB-0Z	A	From	4.00	20.0000	145.00	No Ice	5.60	2.33	0.04
		Centroid-Le	-2.00			1/2" Ice	5.92	2.56	0.08
		g	0.00			1" Ice	6.24	2.79	0.12
						2" Ice	6.91	3.28	0.21
						4" Ice	8.37	4.37	0.45
Platform Mount [LP 303-1]	C	None		0.0000	145.00	No Ice	14.66	14.66	1.25
						1/2" Ice	18.87	18.87	1.48
						1" Ice	23.08	23.08	1.71
						2" Ice	31.50	31.50	2.18
						4" Ice	48.34	48.34	3.10
*** 50' ***									
KS24019-L112A	A	From Leg	3.00	0.0000	50.00	No Ice	0.09	0.09	0.01
			0.00			1/2" Ice	0.15	0.15	0.01
			1.00			1" Ice	0.22	0.22	0.01
						2" Ice	0.40	0.40	0.02
						4" Ice	0.89	0.89	0.04
1.9" x 3' Pipe	A	From Leg	3.00	0.0000	50.00	No Ice	0.51	0.51	0.01
			0.00			1/2" Ice	0.69	0.69	0.01
			0.00			1" Ice	0.89	0.89	0.02
						2" Ice	1.31	1.31	0.04
						4" Ice	2.42	2.42	0.11
Side Arm Mount [SO 701-1]	A	From Leg	1.50	0.0000	50.00	No Ice	0.85	1.67	0.07
			0.00			1/2" Ice	1.14	2.34	0.08
			0.00			1" Ice	1.43	3.01	0.09
						2" Ice	2.01	4.35	0.12
						4" Ice	3.17	7.03	0.18
*** 10' ***									
*****									

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	176 - 144.25	Pole	Max Tension	30	0.00	0.00	0.00
			Max. Compression	14	-14.05	0.03	-0.21
			Max. Mx	5	-6.65	-262.10	-0.39
			Max. My	8	-6.61	-0.38	-265.86
			Max. Vy	11	-13.95	262.02	0.39
			Max. Vx	8	14.12	-0.38	-265.86
			Max. Torque	3			0.60
L2	144.25 - 117.25	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	14	-23.26	0.59	0.04
			Max. Mx	11	-12.52	862.07	1.00
			Max. My	2	-12.48	1.00	873.75
			Max. Vy	11	-21.29	862.07	1.00
			Max. Vx	8	21.56	-0.85	-873.60
			Max. Torque	8			-0.51
L3	117.25 - 94.58	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.75	0.83	-0.10
			Max. Mx	11	-16.36	1255.09	1.29
			Max. My	2	-16.32	1.35	1271.54
			Max. Vy	11	-22.81	1255.09	1.29
			Max. Vx	8	23.08	-1.10	-1271.43
			Max. Torque	8			-0.51
L4	94.58 - 87.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.92	1.00	-0.20
			Max. Mx	11	-19.85	1539.54	1.48
			Max. My	2	-19.81	1.59	1559.24
			Max. Vy	11	-23.94	1539.54	1.48
			Max. Vx	8	24.21	-1.28	-1559.16
			Max. Torque	8			-0.52
L5	87.25 - 61.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-39.83	1.39	-0.42
			Max. Mx	11	-26.75	2183.14	1.87
			Max. My	8	-26.73	-1.64	-2209.71
			Max. Vy	5	26.09	-2182.67	-1.87
			Max. Vx	8	26.36	-1.64	-2209.71
			Max. Torque	8			-0.53
L6	61.5 - 46.95	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-42.75	1.53	-0.50
			Max. Mx	11	-29.32	2406.97	2.00
			Max. My	8	-29.30	-1.76	-2435.81
			Max. Vy	5	26.78	-2406.45	-2.02
			Max. Vx	8	27.05	-1.76	-2435.81
			Max. Torque	8			-0.53
L7	46.95 - 32	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-52.00	1.73	-0.39
			Max. Mx	11	-37.34	2990.29	2.50
			Max. My	2	-37.32	2.55	3024.45
			Max. Vy	5	28.57	-2989.92	-2.23
			Max. Vx	8	28.80	-2.18	-3024.17
			Max. Torque	3			0.67
L8	32 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-65.42	0.60	-1.71
			Max. Mx	5	-49.29	-3944.28	-3.75
			Max. My	8	-49.29	-4.20	-3985.50
			Max. Vy	5	31.05	-3944.28	-3.75
			Max. Vx	8	31.28	-4.20	-3985.50
			Max. Torque	3			0.76

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	21	65.42	0.00	-8.00
	Max. H_x	11	49.30	31.02	0.02
	Max. H_z	2	49.30	0.02	31.25

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. M_x	2	3983.80	0.02	31.25
	Max. M_z	5	3944.28	-31.02	-0.02
	Max. Torsion	3	0.76	-15.50	27.06
	Min. Vert	1	49.30	0.00	0.00
	Min. H_x	5	49.30	-31.02	-0.02
	Min. H_z	8	49.30	-0.02	-31.25
	Min. M_x	8	-3985.50	-0.02	-31.25
	Min. M_z	11	-3941.65	31.02	0.02
	Min. Torsion	9	-0.75	15.50	-27.06

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	49.30	0.00	0.00	0.86	-1.31	0.00
Dead+Wind 0 deg - No Ice	49.30	-0.02	-31.25	-3983.80	1.57	-0.63
Dead+Wind 30 deg - No Ice	49.30	15.50	-27.06	-3448.57	-1970.23	-0.76
Dead+Wind 60 deg - No Ice	49.30	26.86	-15.61	-1989.05	-3414.56	-0.68
Dead+Wind 90 deg - No Ice	49.30	31.02	0.02	3.75	-3944.28	-0.41
Dead+Wind 120 deg - No Ice	49.30	26.88	15.64	1995.76	-3417.42	-0.04
Dead+Wind 150 deg - No Ice	49.30	15.53	27.07	3453.16	-1975.22	0.34
Dead+Wind 180 deg - No Ice	49.30	0.02	31.25	3985.50	-4.20	0.63
Dead+Wind 210 deg - No Ice	49.30	-15.50	27.06	3450.30	1967.60	0.75
Dead+Wind 240 deg - No Ice	49.30	-26.86	15.61	1990.78	3411.93	0.67
Dead+Wind 270 deg - No Ice	49.30	-31.02	-0.02	-2.03	3941.65	0.41
Dead+Wind 300 deg - No Ice	49.30	-26.88	-15.64	-1994.05	3414.80	0.05
Dead+Wind 330 deg - No Ice	49.30	-15.53	-27.07	-3451.43	1972.59	-0.33
Dead+Ice+Temp	65.42	0.00	0.00	1.71	0.60	0.00
Dead+Wind 0 deg+Ice+Temp	65.42	0.00	-8.00	-1061.03	0.25	-0.26
Dead+Wind 30 deg+Ice+Temp	65.42	3.99	-6.93	-918.90	-527.85	-0.29
Dead+Wind 60 deg+Ice+Temp	65.42	6.91	-4.01	-530.06	-914.32	-0.25
Dead+Wind 90 deg+Ice+Temp	65.42	7.97	-0.00	1.27	-1055.60	-0.14
Dead+Wind 120 deg+Ice+Temp	65.42	6.90	4.00	532.74	-913.83	0.01
Dead+Wind 150 deg+Ice+Temp	65.42	3.98	6.93	921.93	-527.00	0.15
Dead+Wind 180 deg+Ice+Temp	65.42	-0.00	8.00	1064.56	1.23	0.26
Dead+Wind 210 deg+Ice+Temp	65.42	-3.99	6.93	922.42	529.34	0.29
Dead+Wind 240 deg+Ice+Temp	65.42	-6.91	4.01	533.59	915.81	0.25
Dead+Wind 270 deg+Ice+Temp	65.42	-7.97	0.00	2.25	1057.08	0.14
Dead+Wind 300 deg+Ice+Temp	65.42	-6.90	-4.00	-529.21	915.31	-0.01
Dead+Wind 330 deg+Ice+Temp	65.42	-3.98	-6.93	-918.40	528.49	-0.15
Dead+Wind 0 deg - Service	49.30	-0.01	-10.81	-1380.60	-0.31	-0.22
Dead+Wind 30 deg - Service	49.30	5.36	-9.36	-1195.03	-683.92	-0.26
Dead+Wind 60 deg - Service	49.30	9.29	-5.40	-689.01	-1184.63	-0.23
Dead+Wind 90 deg - Service	49.30	10.74	0.01	1.86	-1368.26	-0.14
Dead+Wind 120 deg - Service	49.30	9.30	5.41	692.47	-1185.63	-0.01
Dead+Wind 150 deg - Service	49.30	5.37	9.37	1197.76	-685.65	0.12
Dead+Wind 180 deg - Service	49.30	0.01	10.81	1382.33	-2.31	0.22
Dead+Wind 210 deg - Service	49.30	-5.36	9.36	1196.76	681.30	0.26
Dead+Wind 240 deg - Service	49.30	-9.29	5.40	690.74	1182.00	0.23
Dead+Wind 270 deg - Service	49.30	-10.74	-0.01	-0.14	1365.64	0.14
Dead+Wind 300 deg - Service	49.30	-9.30	-5.41	-690.75	1183.01	0.01
Dead+Wind 330 deg - Service	49.30	-5.37	-9.37	-1196.03	683.03	-0.12

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-49.30	0.00	0.00	49.30	0.00	0.000%
2	-0.02	-49.30	-31.25	0.02	49.30	31.25	0.000%
3	15.50	-49.30	-27.06	-15.50	49.30	27.06	0.000%
4	26.86	-49.30	-15.61	-26.86	49.30	15.61	0.000%
5	31.02	-49.30	0.02	-31.02	49.30	-0.02	0.000%
6	26.88	-49.30	15.64	-26.88	49.30	-15.64	0.000%
7	15.53	-49.30	27.07	-15.53	49.30	-27.07	0.000%
8	0.02	-49.30	31.25	-0.02	49.30	-31.25	0.000%
9	-15.50	-49.30	27.06	15.50	49.30	-27.06	0.000%
10	-26.86	-49.30	15.61	26.86	49.30	-15.61	0.000%
11	-31.02	-49.30	-0.02	31.02	49.30	0.02	0.000%
12	-26.88	-49.30	-15.64	26.88	49.30	15.64	0.000%
13	-15.53	-49.30	-27.07	15.53	49.30	27.07	0.000%
14	0.00	-65.42	0.00	0.00	65.42	0.00	0.000%
15	0.00	-65.42	-8.00	-0.00	65.42	8.00	0.000%
16	3.99	-65.42	-6.93	-3.99	65.42	6.93	0.000%
17	6.91	-65.42	-4.01	-6.91	65.42	4.01	0.000%
18	7.97	-65.42	-0.00	-7.97	65.42	0.00	0.000%
19	6.90	-65.42	4.00	-6.90	65.42	-4.00	0.000%
20	3.98	-65.42	6.93	-3.98	65.42	-6.93	0.000%
21	-0.00	-65.42	8.00	0.00	65.42	-8.00	0.000%
22	-3.99	-65.42	6.93	3.99	65.42	-6.93	0.000%
23	-6.91	-65.42	4.01	6.91	65.42	-4.01	0.000%
24	-7.97	-65.42	0.00	7.97	65.42	-0.00	0.000%
25	-6.90	-65.42	-4.00	6.90	65.42	4.00	0.000%
26	-3.98	-65.42	-6.93	3.98	65.42	6.93	0.000%
27	-0.01	-49.30	-10.81	0.01	49.30	10.81	0.000%
28	5.36	-49.30	-9.36	-5.36	49.30	9.36	0.000%
29	9.29	-49.30	-5.40	-9.29	49.30	5.40	0.000%
30	10.74	-49.30	0.01	-10.74	49.30	-0.01	0.000%
31	9.30	-49.30	5.41	-9.30	49.30	-5.41	0.000%
32	5.37	-49.30	9.37	-5.37	49.30	-9.37	0.000%
33	0.01	-49.30	10.81	-0.01	49.30	-10.81	0.000%
34	-5.36	-49.30	9.36	5.36	49.30	-9.36	0.000%
35	-9.29	-49.30	5.40	9.29	49.30	-5.40	0.000%
36	-10.74	-49.30	-0.01	10.74	49.30	0.01	0.000%
37	-9.30	-49.30	-5.41	9.30	49.30	5.41	0.000%
38	-5.37	-49.30	-9.37	5.37	49.30	9.37	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00005437
3	Yes	6	0.00000001	0.00015518
4	Yes	6	0.00000001	0.00015693
5	Yes	4	0.00000001	0.00070976
6	Yes	6	0.00000001	0.00015693
7	Yes	6	0.00000001	0.00015572
8	Yes	4	0.00000001	0.00097858
9	Yes	6	0.00000001	0.00015749
10	Yes	6	0.00000001	0.00015543

11	Yes	4	0.00000001	0.00076743
12	Yes	6	0.00000001	0.00015608
13	Yes	6	0.00000001	0.00015759
14	Yes	4	0.00000001	0.00000001
15	Yes	5	0.00000001	0.00099671
16	Yes	6	0.00000001	0.00011725
17	Yes	6	0.00000001	0.00011745
18	Yes	5	0.00000001	0.00098826
19	Yes	6	0.00000001	0.00011735
20	Yes	6	0.00000001	0.00011734
21	Yes	5	0.00000001	0.00099787
22	Yes	6	0.00000001	0.00011850
23	Yes	6	0.00000001	0.00011777
24	Yes	5	0.00000001	0.00099259
25	Yes	6	0.00000001	0.00011760
26	Yes	6	0.00000001	0.00011814
27	Yes	4	0.00000001	0.00033047
28	Yes	5	0.00000001	0.00027381
29	Yes	5	0.00000001	0.00027866
30	Yes	4	0.00000001	0.00028846
31	Yes	5	0.00000001	0.00027889
32	Yes	5	0.00000001	0.00027589
33	Yes	4	0.00000001	0.00032207
34	Yes	5	0.00000001	0.00028164
35	Yes	5	0.00000001	0.00027372
36	Yes	4	0.00000001	0.00028998
37	Yes	5	0.00000001	0.00027624
38	Yes	5	0.00000001	0.00028234

Compression Checks

Pole Design Data

Section No.	Elevation (ft)	Size	L (ft)	L_u (ft)	Kl/r	F_a (ksi)	A (in^2)	Actual P (K)	Allow. P_a (K)	Ratio $\frac{P}{P_a}$
L1	176 - 144.25 (1)	TP23.65x16.5x0.1875	31.75	0.00	0.0	39.000	13.4940	-6.61	526.27	0.013
L2	144.25 - 117.25 (2)	TP29.2804x22.4868x0.3125	30.50	0.00	0.0	39.000	28.7326	-12.48	1120.57	0.011
L3	117.25 - 94.58 (3)	TP34.33x29.2804x0.5076	22.67	0.00	0.0	39.000	52.7538	-16.32	2057.40	0.008
L4	94.58 - 87.25 (4)	TP35.3344x32.2391x0.5587	12.16	0.00	0.0	39.000	61.6708	-19.81	2405.16	0.008
L5	87.25 - 61.5 (5)	TP41.0631x35.3344x0.5294	25.75	0.00	0.0	39.000	68.1107	-26.73	2656.32	0.010
L6	61.5 - 46.95 (6)	TP44.3x41.0631x0.577	14.55	0.00	0.0	39.000	77.5932	-29.30	3026.13	0.010
L7	46.95 - 32 (7)	TP46.8779x41.7934x0.5579	21.03	0.00	0.0	39.000	75.6244	-32.26	2949.35	0.011
L8	32 - 0 (8)	TP54x46.8779x0.5702	32.00	0.00	0.0	39.000	83.8094	-37.62	3268.57	0.012

Pole Bending Design Data

Section No.	Elevation (ft)	Size	Actual M_x (kip-ft)	Actual f_{bx} (ksi)	Allow. F_{bx} (ksi)	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y (kip-ft)	Actual f_{by} (ksi)	Allow. F_{by} (ksi)	Ratio $\frac{f_{by}}{F_{by}}$
L1	176 - 144.25	TP23.65x16.5x0.1875	265.86	42.273	39.000	1.084	0.00	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L2	144.25 - 117.25 (1)	TP29.2804x22.4868x0.3125	873.75	51.199	39.000	1.313	0.00	0.000	39.000	0.000
L3	117.25 - 94.58 (2)	TP34.33x29.2804x0.5076	1271.53	36.066	39.000	0.925	0.00	0.000	39.000	0.000
L4	94.58 - 87.25 (3)	TP35.3344x32.2391x0.5587	1559.24	35.644	39.000	0.914	0.00	0.000	39.000	0.000
L5	87.25 - 61.5 (4)	TP41.0631x35.3344x0.5294	2209.71	39.124	39.000	1.003	0.00	0.000	39.000	0.000
L6	61.5 - 46.95 (5)	TP44.3x41.0631x0.577	2435.82	36.236	39.000	0.929	0.00	0.000	39.000	0.000
L7	46.95 - 32 (6)	TP46.8779x41.7934x0.5579	2602.43	39.389	39.000	1.010	0.00	0.000	39.000	0.000
L8	32 - 0 (7)	TP54x46.8779x0.5702	3024.45	38.065	39.000	0.976	0.00	0.000	39.000	0.000

Pole Shear Design Data

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 $\frac{f_{vt}}{F_{vt}}$
L1	176 - 144.25 (1)	TP23.65x16.5x0.1875	14.12	1.046	26.000	0.080	0.33	0.025	26.000	0.001
L2	144.25 - 117.25 (2)	TP29.2804x22.4868x0.3125	21.56	0.750	26.000	0.058	0.51	0.014	26.000	0.001
L3	117.25 - 94.58 (3)	TP34.33x29.2804x0.5076	23.07	0.437	26.000	0.034	0.51	0.007	26.000	0.000
L4	94.58 - 87.25 (4)	TP35.3344x32.2391x0.5587	24.21	0.393	26.000	0.030	0.52	0.006	26.000	0.000
L5	87.25 - 61.5 (5)	TP41.0631x35.3344x0.5294	26.36	0.387	26.000	0.030	0.53	0.005	26.000	0.000
L6	61.5 - 46.95 (6)	TP44.3x41.0631x0.577	27.05	0.349	26.000	0.027	0.53	0.004	26.000	0.000
L7	46.95 - 32 (7)	TP46.8779x41.7934x0.5579	27.78	0.367	26.000	0.028	0.54	0.004	26.000	0.000
L8	32 - 0 (8)	TP54x46.8779x0.5702	28.93	0.345	26.000	0.026	0.55	0.003	26.000	0.000

Pole Interaction Design Data

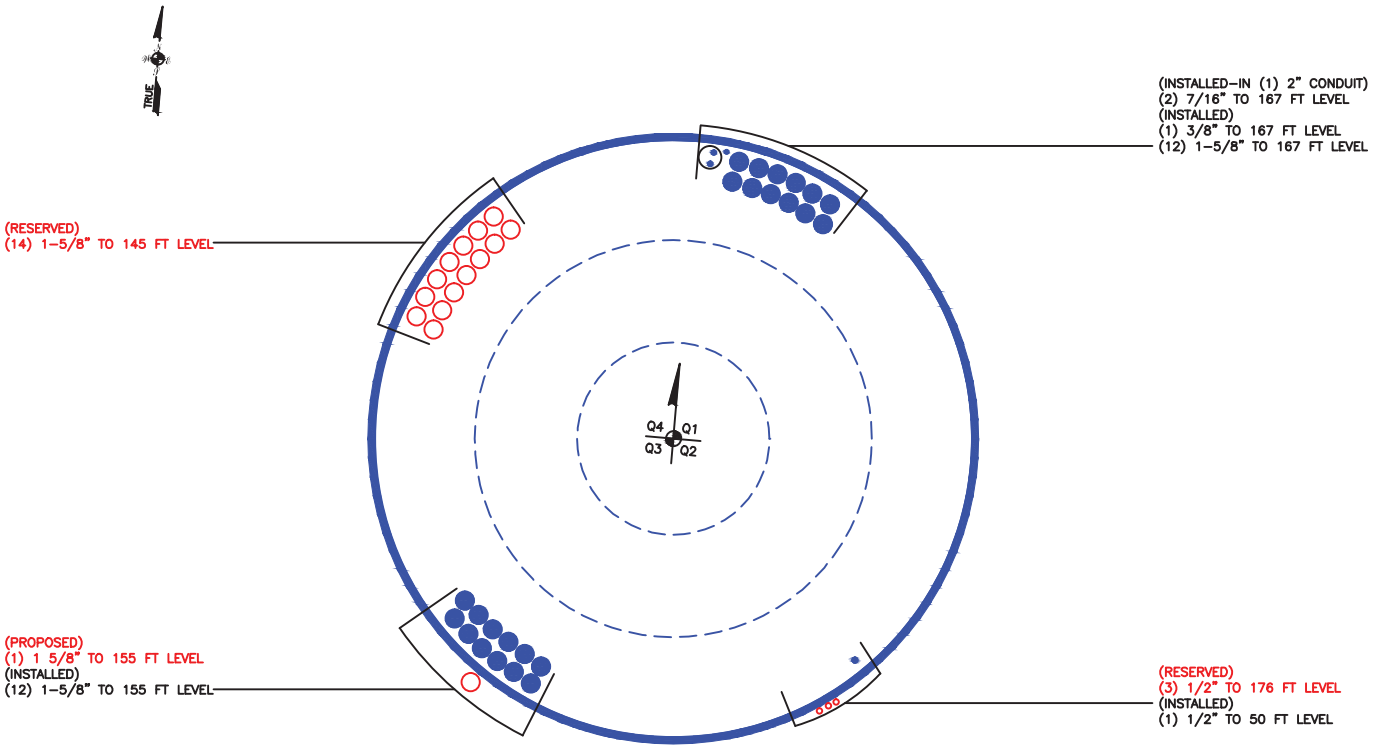
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	176 - 144.25 (1)	0.013	1.084	0.000	0.080	0.001	1.098	1.333	H1-3+VT
L2	144.25 - 117.25 (2)	0.011	1.313	0.000	0.058	0.001	1.325	1.333	H1-3+VT
L3	117.25 - 94.58 (3)	0.008	0.925	0.000	0.034	0.000	0.933	1.333	H1-3+VT
L4	94.58 - 87.25 (4)	0.008	0.914	0.000	0.030	0.000	0.922	1.333	H1-3+VT
L5	87.25 - 61.5 (5)	0.010	1.003	0.000	0.030	0.000	1.013	1.333	H1-3+VT
L6	61.5 - 46.95 (6)	0.010	0.929	0.000	0.027	0.000	0.939	1.333	H1-3+VT
L7	46.95 - 32 (7)	0.011	1.010	0.000	0.028	0.000	1.021	1.333	H1-3+VT
L8	32 - 0 (8)	0.012	0.976	0.000	0.026	0.000	0.988	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	176.00-144.25	Pole	TP23.65x16.5x0.1875	1	-	-	73.2	Pass
L2	147.75-94.58	Pole	TP34.33x22.4868x0.3125	2	-	-	99.3	Pass
L3	99.41-46.95	Pole	TP44.3x32.6292x0.375	3	-	-	76.0	Pass
L4	53.03-0.00	Pole	TP54x42.1974x0.375	4	-	-	65.2	Pass
M1	35.00-0.00	Mod	CCI-WSFP-065125	5	-	-	66.7	Pass
M2	61.50-29.25	Mod	CCI-SFP-065125	6	-	-	83.5	Pass
M3	87.25-61.50	Mod	CCI-SFP-060100	7	-	-	94.8	Pass
M4	119.25-87.25	Mod	CCI-SFP-060100	8	-	-	86.6	Pass
							Summary	
						Pole (L2)	99.3	Pass
						Mod (M3)	94.8	Pass
						RATING =	**99.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876381 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Pole (L2)	99.3%
Mod (M3)	94.8%

WARD (BU 876381)

TEP #: 51819.17074

Analysis: TML 3/31/2014

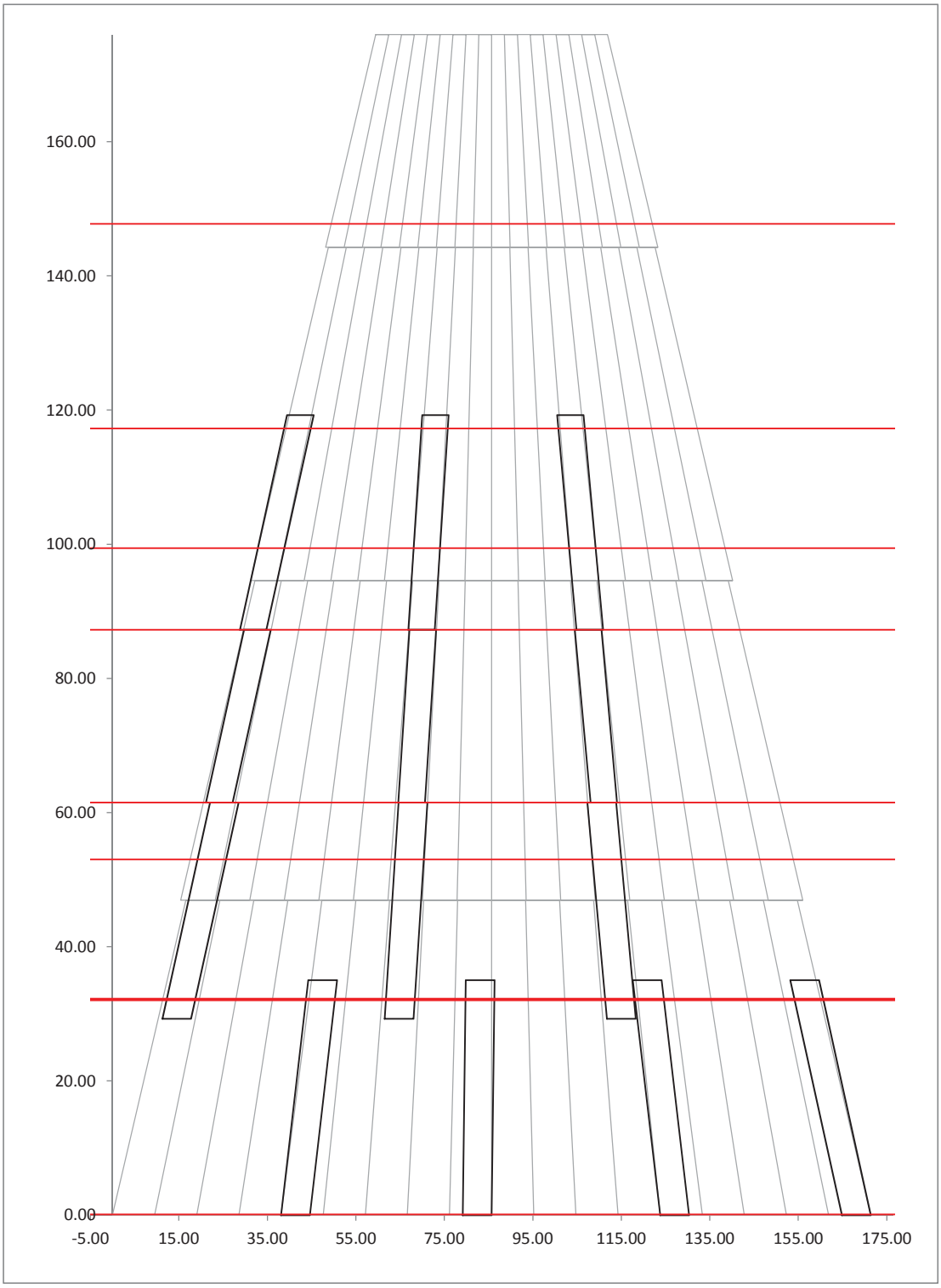
Check: RKE 3/31/2014

Monopole Shaft Reinforcement

Modification	Type	Effective	From (ft)	To (ft)	Effective	Location (° or flat/point #)	Flats/Points	Lateral Offset (in)
1	CCI-WSFP-065125	x	0.00	35.00		5 14	Flats	-1.50
2	CCI-WSFP-065125	x	0.00	35.00		9 18	Flats	1.50
3	CCI-SFP-065125		29.25	61.50	x	1 7 13	Flats	0.00
4	CCI-SFP-060100	x	61.50	87.25	x	1 7 13	Flats	0.00
5	CCI-SFP-060100	x	87.25	119.25		1 7 13	Flats	0.00

Modification Properties									
Modification	Unbraced Length (in)	Bolt Cap (k)	Ixx (in^4)	Iyy (in^4)	k	Drill Hole (in)	A,gross (in^2)	A,net (in^2)	Termination Length (ft)
CCI-WSFP-065125	19.000	30	1.058	28.607	0.8	1.19	8.125	6.563	2.750
CCI-SFP-065125	19.000	30	1.058	28.607	0.8	1.19	8.125	6.563	2.750
CCI-SFP-060100	16.000	30	0.500	18.000	0.8	1.19	6.000	4.750	2.000

Reinforcement Layout



Elevation: 0.00-ft

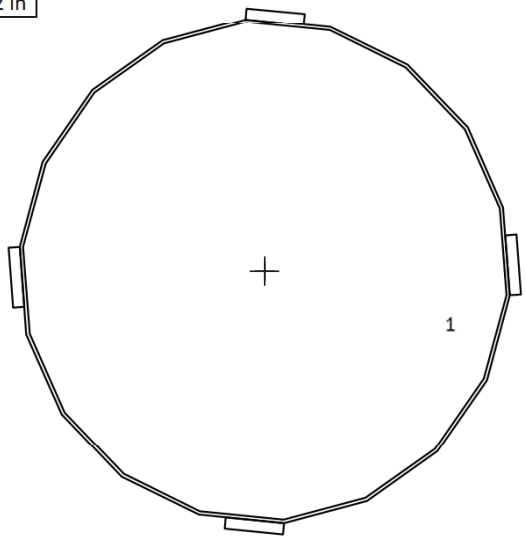
Loads		
Axial:	37.6	k
Moment:	3,024.5	k-ft
Shear:	28.9	k
Torsion:	0.6	k-ft

Equivalent Loads to Pole		
Axial:	24.9	k
Moment:	2,010.8	k-ft
Shear:	19.2	k
Torsion:	0.6	k-ft

Shear Flow		
Controlling Mod:	2	
q:	0.182	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	164.67	in
Capacity:	11.5%	

	(in^4)	Angle
$I_{comp,min}$:	34866.7	150.0°
$I_{comp,cont}$:	35663.8	105.5°

OD:	54.00 in
t:	0.3750 in
t_{eff}:	0.5702 in



	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	Axial	Bending	Axial	Bending	Angle	Capacity
4	0.391	28.537	52.000	52.000	149.5°	55.6%

	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	Axial	Bending	Comp.	Tension	Angle	Capacity
1	0.391	28.130	42.735	43.077	105.5°	66.7%
2	0.391	28.130	42.735	43.077	14.5°	66.7%

Elevation: 32.00-ft

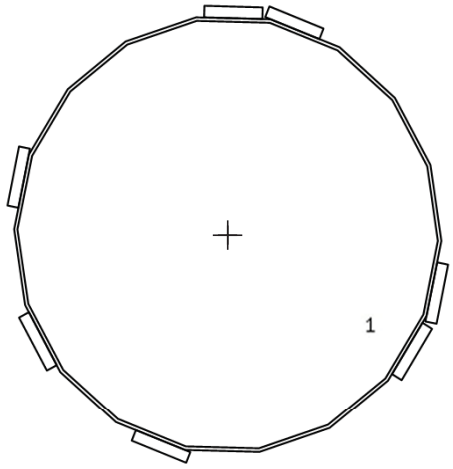
Loads		
Axial:	32.3	k
Moment:	2,602.4	k-ft
Shear:	27.8	k
Torsion:	0.5	k-ft

Equivalent Loads to Pole		
Axial:	15.9	k
Moment:	1,258.4	k-ft
Shear:	13.7	k
Torsion:	0.5	k-ft

Shear Flow		
Controlling Mod:	3	
q:	0.173	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	173.90	in
Capacity:	10.9%	

	(in^4)	Angle
$I_{comp,min}$:	31262.5	150.0°
$I_{comp,cont}$:	31473.2	121.5°

OD:	46.88 in
t:	0.3750 in
t_{eff}:	0.7968 in



	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	**Axial**	**Bending**	**Axial**	**Bending**	**Angle**	**Capacity**
4	0.287	23.774	52.000	52.000	149.5°	46.3%

	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	**Axial**	**Bending**	**Comp.**	**Tension**	**Angle**	**Capacity**
1	0.287	23.726	42.735	43.077	105.0°	56.2%
2	0.287	23.726	42.735	43.077	15.0°	56.2%
3	0.287	23.869	42.735	43.077	121.5°	56.5%

Elevation: 32.25-ft

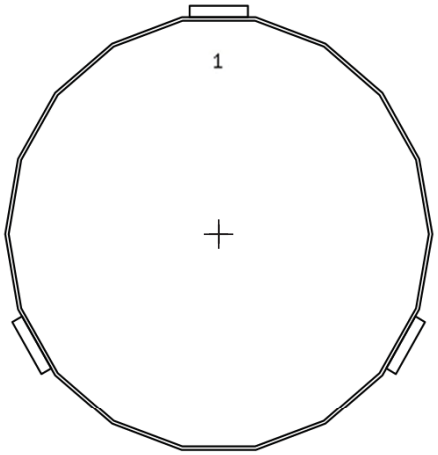
Loads		
Axial:	32.2	k
Moment:	2,599.7	k-ft
Shear:	27.8	k
Torsion:	0.5	k-ft

Equivalent Loads to Pole		
Axial:	22.4	k
Moment:	1,768.0	k-ft
Shear:	19.3	k
Torsion:	0.5	k-ft

Shear Flow		
Controlling Mod:	3	
q:	0.245	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	122.53	in
Capacity:	15.5%	

	(in^4)	Angle
$I_{comp,min}$:	22148.9	170.0°
$I_{comp,cont}$:	22148.9	0.0°

OD:	46.82 in
t:	0.3750 in
t_{eff}:	0.5579 in



	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	**Axial**	**Bending**	**Axial**	**Bending**	**Angle**	**Capacity**
4	0.404	33.481	52.000	52.000	39.5°	65.2%

	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	**Axial**	**Bending**	**Comp.**	**Tension**	**Angle**	**Capacity**
3	0.404	33.854	42.735	43.077	0.0°	80.2%

Elevation: 53.03-ft

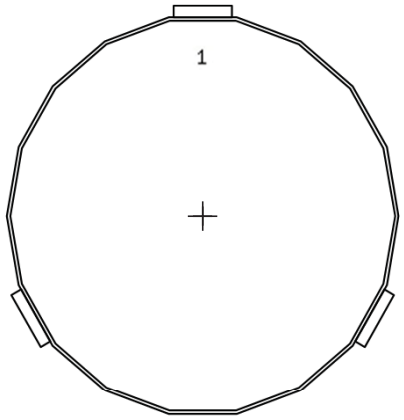
Loads		
Axial:	28.2	k
Moment:	2,342.6	k-ft
Shear:	26.8	k
Torsion:	0.5	k-ft

Equivalent Loads to Pole		
Axial:	19.1	k
Moment:	1,544.3	k-ft
Shear:	18.1	k
Torsion:	0.5	k-ft

Shear Flow		
Controlling Mod:	3	
q:	0.273	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	109.84	in
Capacity:	17.3%	

	(in^4)	Angle
$I_{comp,min}$:	17595.5	147.5°
$I_{comp,cont}$:	17595.5	0.0°

OD:	42.95 in
t:	0.3750 in
t_{eff}:	0.5770 in



	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	**Axial**	**Bending**	**Axial**	**Bending**	**Angle**	**Capacity**
3	0.376	34.835	52.000	52.000	89.5°	67.7%

	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	**Axial**	**Bending**	**Comp.**	**Tension**	**Angle**	**Capacity**
3	0.376	35.306	42.735	43.077	0.0°	83.5%

Elevation: 61.50-ft

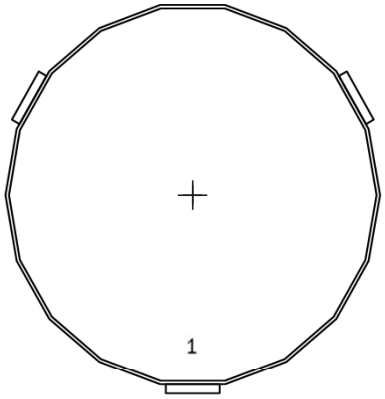
Loads		
Axial:	26.7	k
Moment:	2,209.7	k-ft
Shear:	26.4	k
Torsion:	0.5	k-ft

OD:	41.06 in
t:	0.3750 in
t_{eff}:	0.5294 in

Equivalent Loads to Pole		
Axial:	19.5	k
Moment:	1,583.0	k-ft
Shear:	19.2	k
Torsion:	0.5	k-ft

Shear Flow		
Controlling Mod:	4	
q:	0.235	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	127.48	in
Capacity:	12.6%	

	(in^4)	Angle
$I_{comp,min}$:	14134.9	117.0°
$I_{comp,cont}$:	14134.9	180.0°



	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	**Axial**	**Bending**	**Axial**	**Bending**	**Angle**	**Capacity**
3	0.402	39.109	52.000	52.000	9.5°	76.0%

	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	**Axial**	**Bending**	**Comp.**	**Tension**	**Angle**	**Capacity**
4	0.402	39.454	42.057	42.222	180.0°	94.8%

Elevation: 87.25-ft

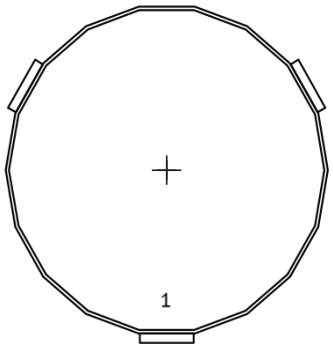
Loads		
Axial:	19.8	k
Moment:	1,559.2	k-ft
Shear:	24.2	k
Torsion:	0.5	k-ft

OD:	35.33 in
t:	0.3750 in
t_{eff}:	0.5587 in

Equivalent Loads to Pole		
Axial:	13.8	k
Moment:	1,063.0	k-ft
Shear:	16.9	k
Torsion:	0.5	k-ft

Shear Flow		
Controlling Mod:	5	
q:	0.280	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	107.10	in
Capacity:	14.9%	

	(in^4)	Angle
$I_{comp,min}$:	9421.4	1.0°
$I_{comp,cont}$:	9421.4	180.0°



	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	**Axial**	**Bending**	**Axial**	**Bending**	**Angle**	**Capacity**
3	0.332	35.627	52.000	52.000	149.5°	69.2%

	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	**Axial**	**Bending**	**Comp.**	**Tension**	**Angle**	**Capacity**
5	0.332	36.080	42.057	42.222	180.0°	86.6%

Elevation: 99.41-ft

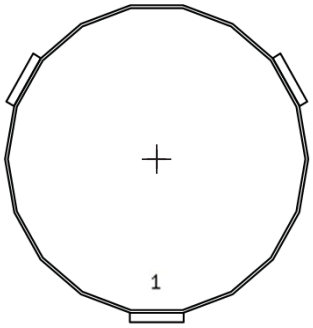
Loads		
Axial:	15.5	k
Moment:	1,187.5	k-ft
Shear:	22.8	k
Torsion:	0.5	k-ft

OD:	33.25 in
t:	0.3125 in
t_{eff}:	0.5076 in

Equivalent Loads to Pole		
Axial:	10.0	k
Moment:	744.2	k-ft
Shear:	14.7	k
Torsion:	0.5	k-ft

Shear Flow		
Controlling Mod:	5	
q:	0.327	k/in
Bolt Capacity:	30.0	k/bolt
Max Spacing:	91.70	in
Capacity:	17.4%	

	(in^4)	Angle
$I_{comp,min}$:	7146.0	3.5°
$I_{comp,cont}$:	7146.0	180.0°



	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	**Axial**	**Bending**	**Axial**	**Bending**	**Angle**	**Capacity**
2	0.306	33.667	52.000	52.000	159.5°	65.3%

	Applied Stress (ksi)		Allowable Stress (ksi)			
Mod	**Axial**	**Bending**	**Comp.**	**Tension**	**Angle**	**Capacity**
5	0.306	34.154	42.057	42.222	180.0°	81.9%

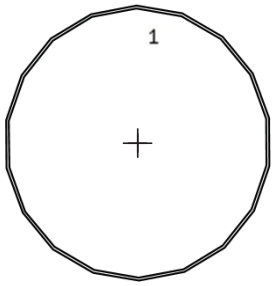
Elevation: 117.25-ft

Loads		
Axial:	12.5	k
Moment:	873.8	k-ft
Shear:	21.6	k
Torsion:	0.5	k-ft

OD:	29.28 in
t:	0.3125 in
t_{eff}:	0.3125 in

Equivalent Loads to Pole		
Axial:	12.5	k
Moment:	873.8	k-ft
Shear:	21.6	k
Torsion:	0.5	k-ft

Shear Flow N/A



	(in^4)	Angle
$I_{comp,min}$:	3045.3	0.0°
$I_{comp,cont}$:	3045.3	9.5°

	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	**Axial**	**Bending**	**Axial**	**Bending**	**Angle**	**Capacity**
2	0.434	51.182	52.000	52.000	9.5°	**99.3%**

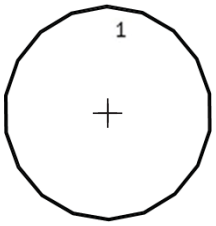
Elevation: 147.75-ft

Loads		
Axial:	5.9	k
Moment:	236.7	k-ft
Shear:	12.6	k
Torsion:	0.3	k-ft

OD:	22.86 in
t:	0.1875 in
t_{eff}:	0.1875 in

Equivalent Loads to Pole		
Axial:	5.9	k
Moment:	236.7	k-ft
Shear:	12.6	k
Torsion:	0.3	k-ft

Shear Flow N/A



	(in^4)	Angle
$I_{comp,min}$:	876.2	0.0°
$I_{comp,cont}$:	876.2	9.5°

	Applied Stress (ksi)		Allowable Stress (ksi)			
Pole Seg.	**Axial**	**Bending**	**Axial**	**Bending**	**Angle**	**Capacity**
1	0.436	37.631	52.000	52.000	9.5°	**73.2%**

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

TIA Rev F

Site Data

BU#: *876381*
Site Name: *WARD*
App #: *223702 Rev. 1*
Pole Manufacturer: *Other*

Reactions		
Moment:	3986	ft-kips
Axial:	49	kips
Shear:	31	kips

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

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	63	in

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	186.7 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	95.8% **Pass**	

Plate Data		
Diam:	69	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	10.71	in

Base Plate Results Flexural Check

		Stiffened
Base Plate Stress:	47.3 ksi	Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	78.9% **Pass**	Y.L. Length: N/A, Roark

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Groove	
Groove Depth:	0.375	in **
Groove Angle:	45	degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:	0.3125	in
Width:	6.5	in
Height:	15	in
Thick:	0.75	in
Notch:	0.75	in
Grade:	65	ksi
Weld str.:	80	ksi

Stiffener Results

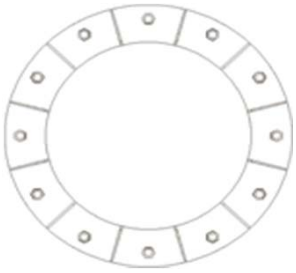
Horizontal Weld :	60.5% **Pass**
Vertical Weld:	69.4% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	23.9% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	59.1% **Pass**
Plate Comp. (AISC Bracket):	69.4% **Pass**

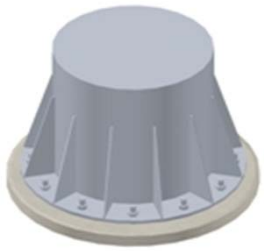
Pole Data		
Diam:	54	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Pole Results

Pole Punching Shear Check:	21.4% **Pass**

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

	PASS	PASS			
Results Summary:	LC1	LC2		WARD (BU 876381)	
Soil Interaction:	50.0%	13.3%	TEP #:	51819.17074	
Foundation Structural:	90.4%	23.9%	Analysis:	TML	3/31/2014
			Check:	RKE	3/31/2014

Drilled Caisson Tool - Input

Code Revisions: TIA-222-F ACI 318-05

Tower Type: Monopole

	LC1	LC2	
Moment:	3,986.00	1,065.00	kip-ft
Axial (download):	49.00	65.00	kip
Shear:	31.00	8.00	kip
Axial (uplift):	0.00	0.00	kip

Shaft Information

Diameter:	7.00	ft
Projection:	1.00	ft
Caisson Length:	30.00	ft
f'c:	4.000	ksi
Max εc:	0.003	in/in

Cage 1 Reinforcement

Tie Bar Size:	5	*(fy = 60.0 ksi)*
Clear Cover to Tie:	4.17	*in (Cage Ø = 73.00in)*
Tie Bar Spacing:	12.00	in
Vertical Bar Size:	11	
Vertical Bar Quantity:	24	*(ρ =0.676%)*
fy:	60.0	ksi
E:	29,000	ksi

Design Parameters

Soil Layer	Soil Type	Depth (ft) from	Depth (ft) to	Eff. Unit Weight (pcf)	Cohesion (psf)	Friction Angle ϕ (°)	All. Skin Friction (psf) Download	All. Skin Friction (psf) Uplift
1	Clay	0.00	3.50	130.0	0			
2	Sand	3.50	9.00	130.0		35.0		
3	Sand	9.00	30.00	67.6		35.0		

Notes: 1) Neglect lateral soil strength to a depth of:

i) ~~1/2 Pier Ø = 7.00ft / 2 = 3.50ft~~

ii) ~~Frost Depth = 40.0in / (12in/ft) = 3.33ft~~

iii) **Geotech Recommendation = 3.50ft**

2) Groundwater = 9.00ft

TOWER ENGINEERING PROFESSIONALS

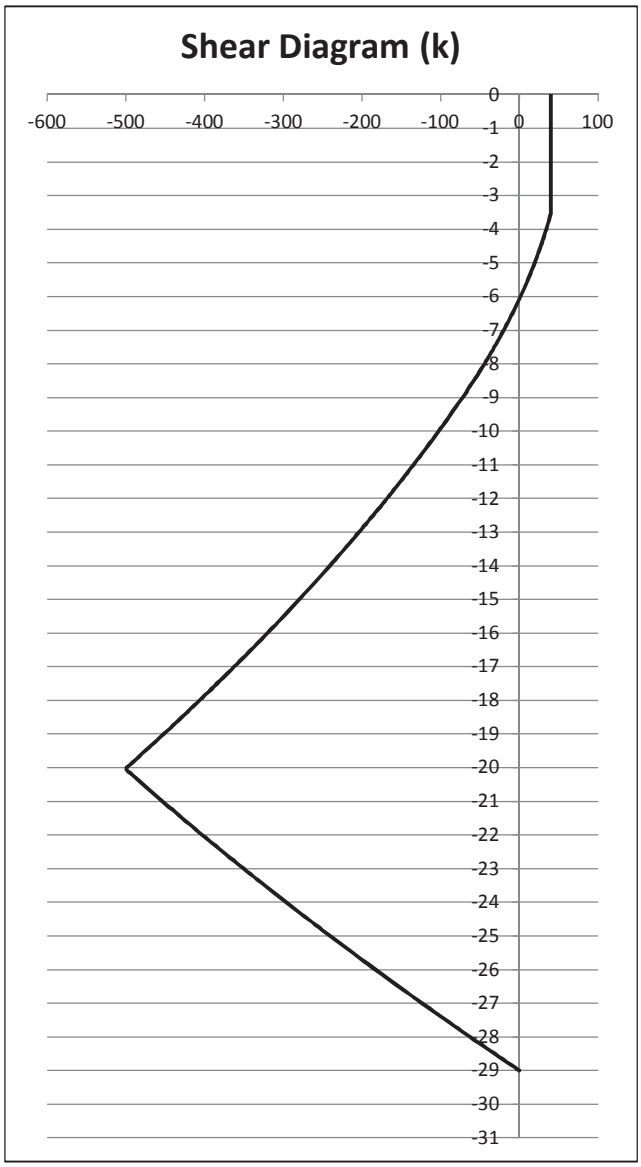
WARD (BU 876381)

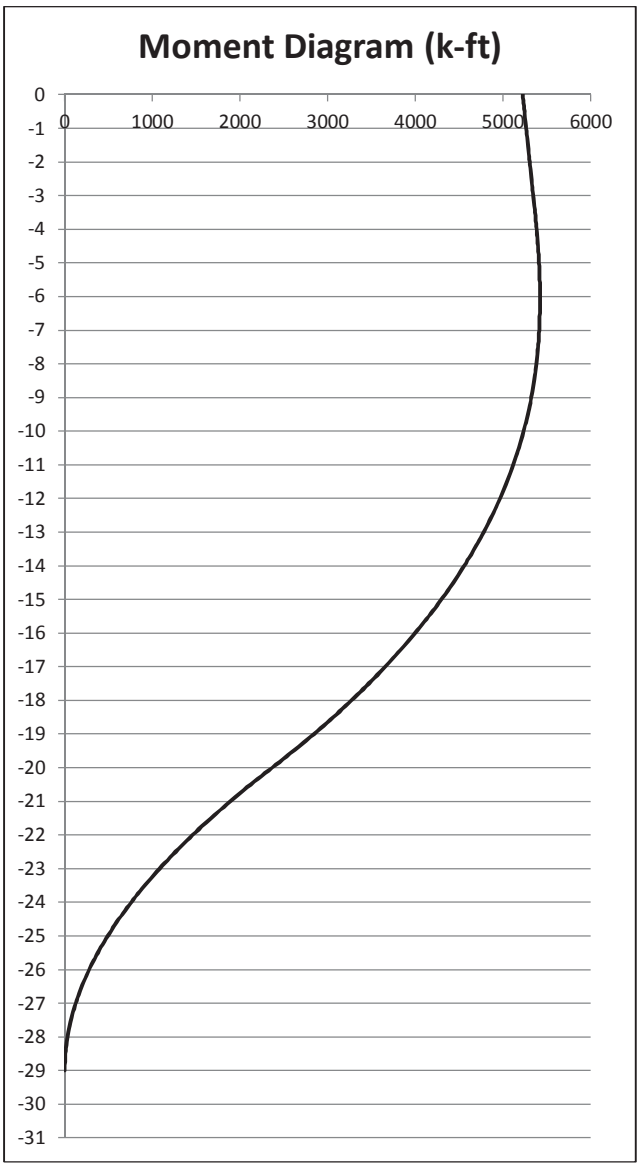
TEP #: 51819.17074

Analysis: TML 3/31/2014

Check: RKE 3/31/2014

Soil Interaction: LC1





Max Unfactored Moment: **5419.6** **kip-ft**

@ **6.07** **ft below grade**

Additional Factor of Safety: **4.00**

Capacity = **50.0%** **PASS**

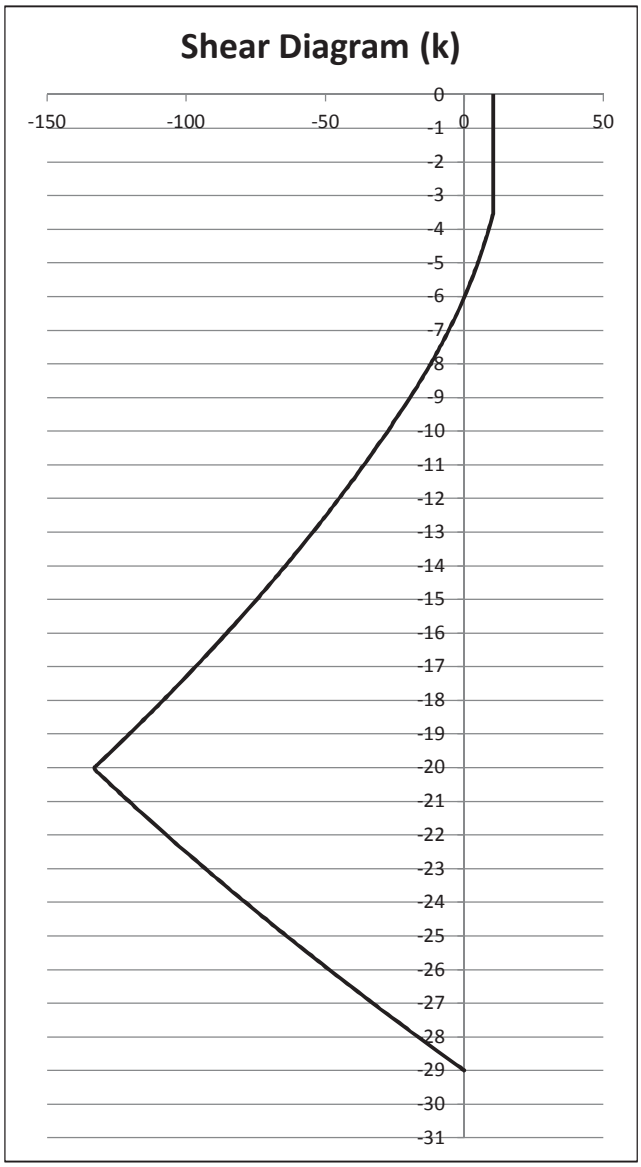
WARD (BU 876381)

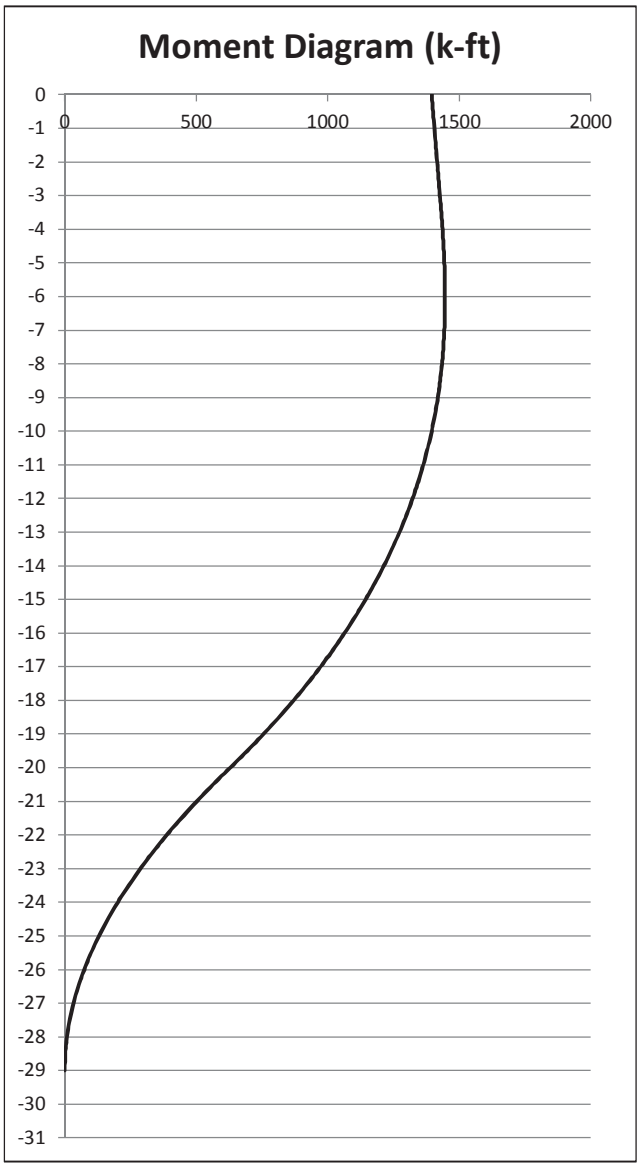
TEP #: 51819.17074

Analysis: TML 3/31/2014

Check: RKE 3/31/2014

Soil Interaction: LC2





Max Unfactored Moment: 1445.5 kip-ft

@ 6.01 ft below grade

Additional Factor of Safety: 15.04

Capacity = 13.3% PASS

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11393B
Global Guilford_MP2

2381 Long Hill Road
Guilford, CT 06437

April 9, 2014

EBI PROJECT NUMBER: 62142279

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

EBI Consulting
environmental | engineering | due diligence

April 9, 2014

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

Re: Emissions Values for Site: **CT11393B – Global Guilford_MP2**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at 2381 Long Hill Road, Guilford, CT, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of μW/cm2 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 (μW/cm2). The general population exposure limit for the cellular band is 567 μW/cm2, and the general population exposure limit for the PCS and AWS bands is 1000 μW/cm2. 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 2381 Long Hill Road, Guilford, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, the actual antenna pattern gain value in the direction of the sample area was used. For this report the sample point is a 6 foot person standing at the base of the tower.

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

1) 2 GSM channels (1935.000 MHz—to 1945.000 MHz / 1980.000 MHz—to 1985.000 MHz) were considered for each sector of the proposed installation.
2) 2 UMTS channels (2110.000 to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation.
3) 2 LTE channels (2110.000 to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation.
4) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
5) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
6) The antenna used in this modeling is the Ericsson AIR21 for LTE, UMTS and GSM. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.6 dBd 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 **155 feet** above ground level (AGL).
8) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

Site ID	CT11393B - Global Guilford_MP2
Site Addresss	2381 Long Hill Road, Guilford, CT 06437
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	155	149	None	0	0	48.326044	0.782555	0.07826%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	155	149	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	155	149	1-5/8"	0	0	24.163022	0.391277	0.03913%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	155	149	1-5/8"	0	0	24.163022	0.391277	0.03913%
														Sector total Power Density Value:		0.157%	

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	155	149	None	0	0	48.326044	0.782555	0.07826%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	155	149	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	155	149	1-5/8"	0	0	24.163022	0.391277	0.03913%
2b	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	155	149	1-5/8"	0	0	24.163022	0.391277	0.03913%
														Sector total Power Density Value:		0.157%	

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	155	149	None	0	0	48.326044	0.782555	0.07826%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	155	149	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	155	149	1-5/8"	0	0	24.163022	0.391277	0.03913%
2b	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	155	149	1-5/8"	0	0	24.163022	0.391277	0.03913%
														Sector total Power Density Value:		0.157%	

Site Composite MPE %

Carrier	MPE %
T-Mobile	0.470%
AT&T	2.640%
Metro PCS	11.530%
Total Site MPE %	**14.640%**

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 **0.470% (0.157% 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 **14.640%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803