



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

October 27, 2015

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

RE: T-Mobile - Exempt Modification - Crown Site BU: 806939
T-Mobile Site ID: CT11084B
Located at: 800 Ogg Meadow Road, Orange, CT 06477

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 700MHz 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 The Honorable James Zeoli, First Selectman, Town of Orange and South Central Connecticut Regional Water Authority as Property Owner.

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at **800 Ogg Meadow Road, Orange, CT**. 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 additional 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. A Structural Modification Report confirming that the tower and foundation can support T-Mobile's proposed modifications is included as Exhibit-2.
5. The operation of the additional 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.

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: Kimberly Myl.

Sincerely,



Kimberly Myl
Real Estate Specialist

Enclosures

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes

Tab 2: Exhibit-2: Structural Modification Report

Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: The Honorable James Zeoli, First Selectman
Town of Orange
Orange Town Hall
617 Orange Center Road
Orange, CT 06477

South Central Connecticut Regional Water Authority
Attn: Dianne L. Tompkins, Senior Land Use Manager
30 Sargent Drive
New Haven, CT 06511-5966

GENERAL NOTES:

- FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
PROJECT MANAGEMENT – CROWN CASTLE
CONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
OWNER – T-MOBILE
OEM – ORIGINAL EQUIPMENT MANUFACTURER
- PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF PROJECT MANAGEMENT.
- ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK.
- ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
- DRAWINGS PROVIDED HERE ARE NOT TO SCALE UNLESS OTHERWISE NOTED AND ARE INTENDED TO SHOW OUTLINE ONLY.
- UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
- THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY PROJECT MANAGEMENT.
- CONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. CONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. CONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH PROJECT MANAGEMENT.
- THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
- CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
- CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
- THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
- CONTRACTOR SHALL NOTIFY DEWBERRY 48 HOURS IN ADVANCE OF POURING CONCRETE, OR BACKFILLING TRENCHES, SEALING ROOF AND WALL PENETRATIONS & POST DOWNS, FINISHING NEW WALLS OR FINAL ELECTRICAL CONNECTIONS FOR ENGINEER REVIEW.
- CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. CONTRACTOR SHALL NOTIFY PROJECT MANAGEMENT OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
- THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY CONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
- SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

SITE WORK GENERAL NOTES:

- THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
- ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO:
A) FALL PROTECTION
B) CONFINED SPACE
C) ELECTRICAL SAFETY
D) TRENCHING & EXCAVATION.
- ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.
- IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, TOP SOIL AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
- ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
- CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION.
- THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE T-MOBILE SPECIFICATION FOR SITE SIGNAGE.
- THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE TRANSMISSION EQUIPMENT AND TOWER AREAS.
- NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
- THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION, SEE SOIL COMPACTION NOTES.
- THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
- EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL JURISDICTION'S GUIDELINES FOR EROSION AND SEDIMENT CONTROL.

ELECTRICAL INSTALLATION NOTES:

- ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.
- CONTRACTOR SHALL MODIFY EXISTING CABLE TRAY SYSTEM AS REQUIRED TO SUPPORT RF AND TRANSPORT CABLEING TO THE NEW BTS EQUIPMENT. CONTRACTOR SHALL SUBMIT MODIFICATIONS TO PROJECT MANAGEMENT FOR APPROVAL.
- CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED.
- WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.
- ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND TELCORDIA.
- CABLES SHALL NOT BE ROUTED THROUGH LADDER-STYLE CABLE TRAY RUNGS.
- EACH END OF EVERY POWER, POWER PHASE CONDUCTOR (I.E., HOTS), GROUNDING, AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC & OSHA, AND MATCH EXISTING INSTALLATION REQUIREMENTS.
- ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING, AND BRANCH CIRCUIT ID NUMBERS (I.E., PANELBOARD AND CIRCUIT ID'S).
- PANELBOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS.
- ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
- POWER, CONTROL, AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
- POWER PHASE CONDUCTORS (I.E., HOTS) SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL.) PHASE CONDUCTOR COLOR CODES SHALL CONFORM WITH THE NEC & OSHA AND MATCH EXISTING INSTALLATION REQUIREMENTS.
- SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (SIZE 6 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2 GREEN INSULATION, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
- SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED OUTDOORS, OR BELOW GRADE, SHALL BE SINGLE CONDUCTOR #2 AWG SOLID TINNED COPPER CABLE, UNLESS OTHERWISE SPECIFIED.
- POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; WITH OUTER JACKET; LISTED OR LABELED FOR THE LOCATION USED, UNLESS OTHERWISE SPECIFIED.
- ALL POWER AND POWER GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRENUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRENUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75°C (90°C IF AVAILABLE).
- RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
- NEW RACEWAY OR CABLE TRAY WILL MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
- ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40, OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
- ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT), OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
- GALVANIZED STEEL INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR OUTDOOR LOCATIONS ABOVE GRADE.
- RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80) SHALL BE USED UNDERGROUND; DIRECT BURIED, IN AREAS OF OCCASIONAL LIGHT VEHICLE TRAFFIC OR ENCASED IN REINFORCED CONCRETE IN AREAS OF HEAVY VEHICLE TRAFFIC.
- LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
- CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.
- CABINETS, BOXES, AND WIREWAYS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
- CABINETS, BOXES, AND WIREWAYS TO MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
- WIREWAYS SHALL BE EPOXY-COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARD; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
- EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES, AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL, SHALL MEET OR EXCEED UL 50, AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
- METAL RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED, OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
- NONMETALLIC RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
- THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM PROJECT MANAGEMENT BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
- THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.

CONCRETE AND REINFORCING STEEL NOTES:

- ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
- ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. A HIGHER STRENGTH (4000 PSI) MAY BE USED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
- REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE (UNO). SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.
- THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

CONCRETE CAST AGAINST EARTH.....3 IN.
CONCRETE EXPOSED TO EARTH OR WEATHER:
#6 AND LARGER2 IN.
#5 AND SMALLER & WWF.....1 1/2 IN.
CONCRETE NOT EXPOSED TO EARTH OR WEATHER
OR NOT CAST AGAINST THE GROUND:
SLAB AND WALL3/4 IN.
BEAMS AND COLUMNS.....1 1/2 IN.
- A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.
- INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD OR APPROVED EQUAL.
- CONCRETE CYLINDER TEST IS NOT REQUIRED FOR SLAB ON GRADE WHEN CONCRETE IS LESS THAN 50 CUBIC YARDS (IBC 1905.8.2.3) IN THAT EVENT THE FOLLOWING RECORDS SHALL BE PROVIDED BY THE CONCRETE SUPPLIER:
(A) RESULTS OF CONCRETE CYLINDER TESTS PERFORMED AT THE SUPPLIER'S PLANT,
(B) CERTIFICATION OF MINIMUM COMPRESSIVE STRENGTH FOR THE CONCRETE GRADE SUPPLIED.
FOR GREATER THAN 50 CUBIC YARDS THE GC SHALL PERFORM THE CONCRETE CYLINDER TEST.
- AS AN ALTERNATIVE TO ITEM 7, TEST CYLINDERS SHALL BE TAKEN INITIALLY AND THEREAFTER FOR EVERY 50 YARDS OF CONCRETE FROM EACH DIFFERENT BATCH PLANT.
- EQUIPMENT SHALL NOT BE PLACED ON NEW PADS FOR SEVEN DAYS AFTER PAD IS POURED, UNLESS IT IS VERIFIED BY CYLINDER TESTS THAT COMPRESSIVE STRENGTH HAS BEEN ATTAINED.

STRUCTURAL STEEL NOTES:

- ALL STEEL WORK SHALL BE PAINTED OR GALVANIZED IN ACCORDANCE WITH THE DRAWINGS UNLESS NOTED OTHERWISE. STRUCTURAL STEEL SHALL BE ASTM-A-36 UNLESS OTHERWISE NOTED ON THE SITE SPECIFIC DRAWINGS. STEEL DESIGN, INSTALLATION AND BOLTING SHALL BE PERFORMED IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) "MANUAL OF STEEL CONSTRUCTION".
- ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION". PAINTED SURFACES SHALL BE TOUCHED UP.
- BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4"Ø) CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
- NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" DIA. ASTM A 307 BOLTS UNLESS NOTED OTHERWISE.
- INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD OR APPROVED EQUAL.
- CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ENGINEER REVIEW & APPROVAL ON PROJECTS REQUIRING STRUCTURAL STEEL.
- ALL STRUCTURAL STEEL WORK SHALL BE DONE IN ACCORDANCE WITH AISC SPECIFICATIONS.

CONSTRUCTION NOTES:

- FIELD VERIFICATION:
CONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, T-MOBILE ANTENNA PLATFORM LOCATION AND ANTENNAS TO BE REPLACED.
- COORDINATION OF WORK:
CONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH PROJECT MANAGEMENT.
- CABLE LADDER RACK:
CONTRACTOR SHALL FURNISH AND INSTALL CABLE LADDER RACK, CABLE TRAY, AND CONDUIT AS REQUIRED TO SUPPORT CABLES TO THE NEW BTS LOCATION.
- GROUNDING OF ALL EQUIPMENT AND ANTENNAS IS NOT CONSIDERED PART OF THE SCOPE OF THIS PROJECT AND IS THE RESPONSIBILITY OF THE OWNER AND CONTRACTOR AT THE TIME OF CONSTRUCTION. ALL EQUIPMENT AND ANTENNAS TO BE INSTALLED AND GROUNDED IN ACCORDANCE WITH GOVERNING BUILDING CODE, MANUFACTURER RECOMMENDATIONS AND OWNER SPECIFICATIONS.

T-Mobile

T-MOBILE NORTHEAST LLC
4 SYLVAN WAY
PARSIPPANY, NJ 07054



CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

CT11084B
NHV 2071 143137

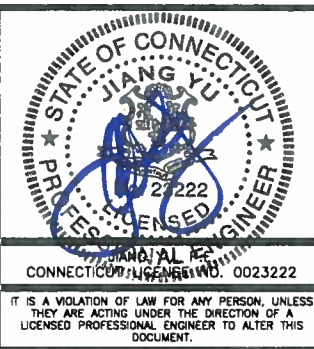
CONSTRUCTION DRAWINGS

0	10/26/15	ISSUED AS FINAL
A	10/20/15	ISSUED FOR REVIEW

Dewberry

Dewberry Engineers Inc.

600 PARSIPPANY ROAD
SUITE 301
PARSIPPANY, NJ 07054
PHONE: 973.739.9400
FAX: 973.739.9710



DRAWN BY: NRK

REVIEWED BY: BSH

CHECKED BY: GHN

PROJECT NUMBER: 50066258

JOB NUMBER: 50074818

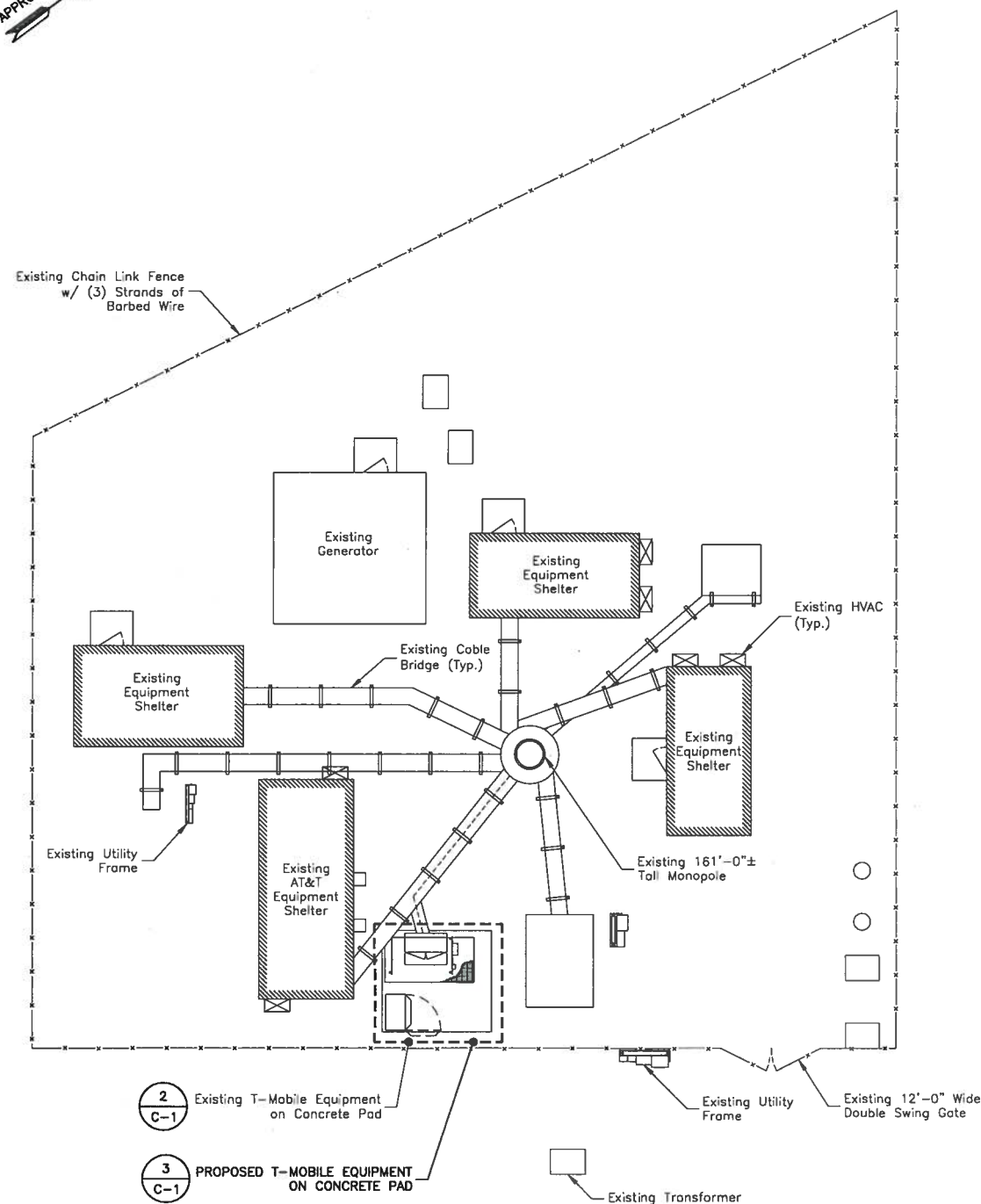
SITE ADDRESS:

800 OGG MEADOW ROAD
ORANGE, CT 06477
NEW HAVEN COUNTY

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

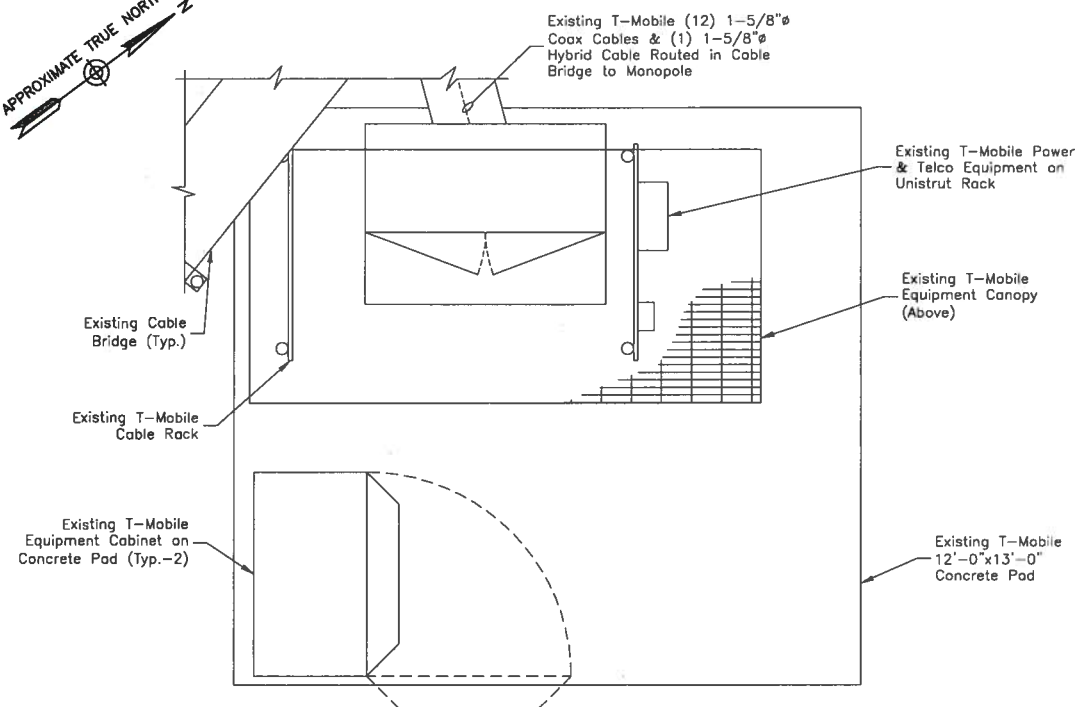


NOTES:

1. NORTH ARROW SHOWN AS APPROXIMATE.
2. NOT ALL INFORMATION IS SHOWN FOR CLARITY.
3. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, RRU'S, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY TOWER ENGINEERING PROFESSIONALS DATED OCTOBER 1, 2015.

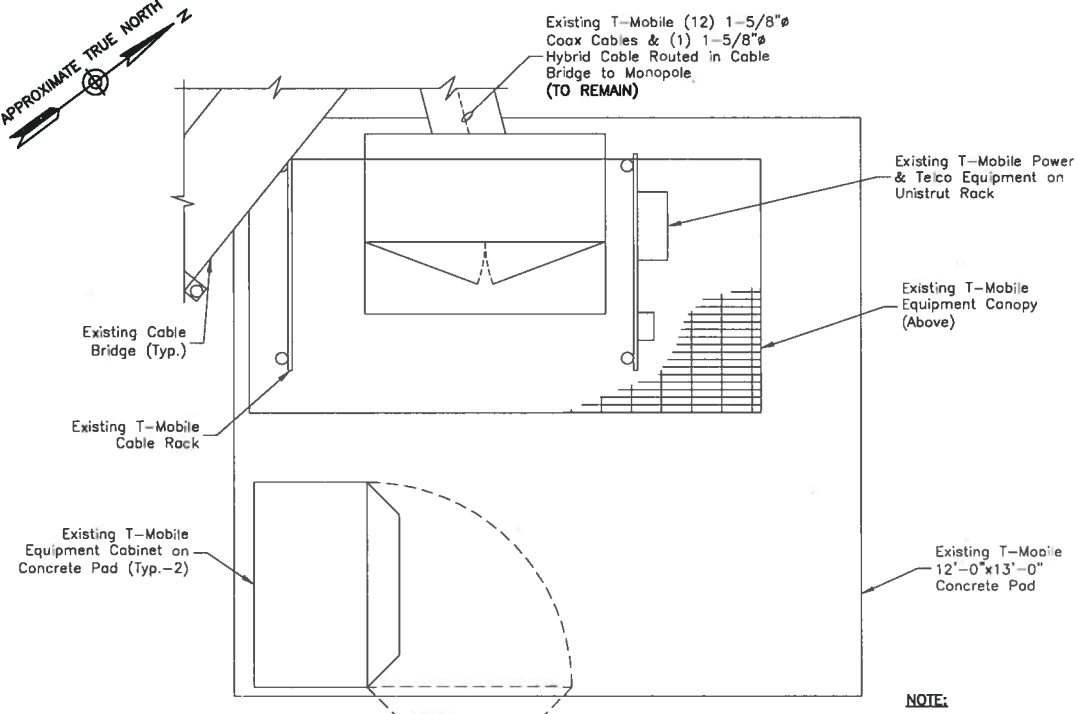
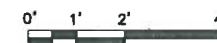
COMPOUND PLAN

SCALE: 1"=20' FOR 11"x17"
1"=10' FOR 22"x34"



EXISTING EQUIPMENT PLAN

SCALE: $1/4"=1'$ FOR $11"x17"$
 $1/2"=1'$ FOR $22"x34"$

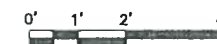


NOTE:

1. NO EQUIPMENT IS PROPOSED AT GRADE

PROPOSED EQUIPMENT PLAN

SCALE: $1/4"=1'$ FOR $11" \times 17"$
 $1/2"=1'$ FOR $22" \times 34"$



T-Mobile.

T-MOBILE NORTHEAST LLC
4 SYLVAN WAY
PARSIPPANY, NJ 07054



CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

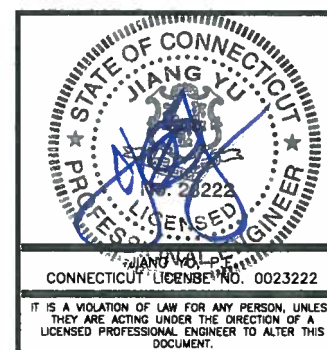
CT11084B
NHV 2071 143137

CONSTRUCTION DRAWINGS

D	10/26/15	ISSUED AS FINAL
A	10/20/15	ISSUED FOR REVIEW



Dewberry Engineers Inc.
600 PARSIPPANY ROAD
SUITE 301
PARSIPPANY, NJ 07054
PHONE: 973.739.9400
FAX: 973.739.9710



DRAWN BY: NRK

REVIEWED BY:	BSH
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CHECKED BY:	GHN
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PROJECT NUMBER:	50066258
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JOB NUMBER: 50074618

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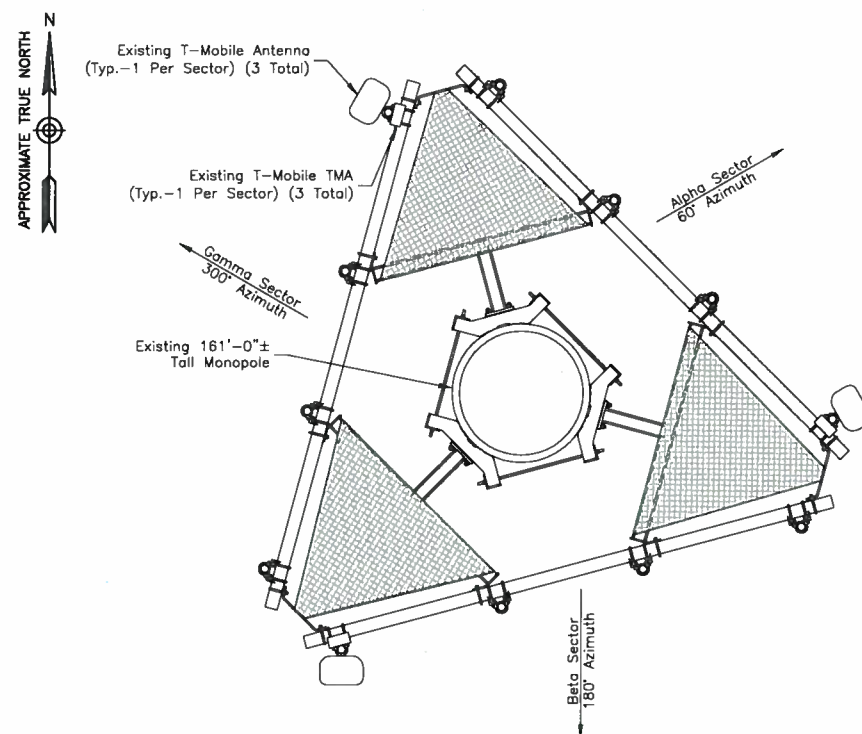
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ORANGE, CT 06477
NEW HAVEN COUNTY

SHEET TITLE

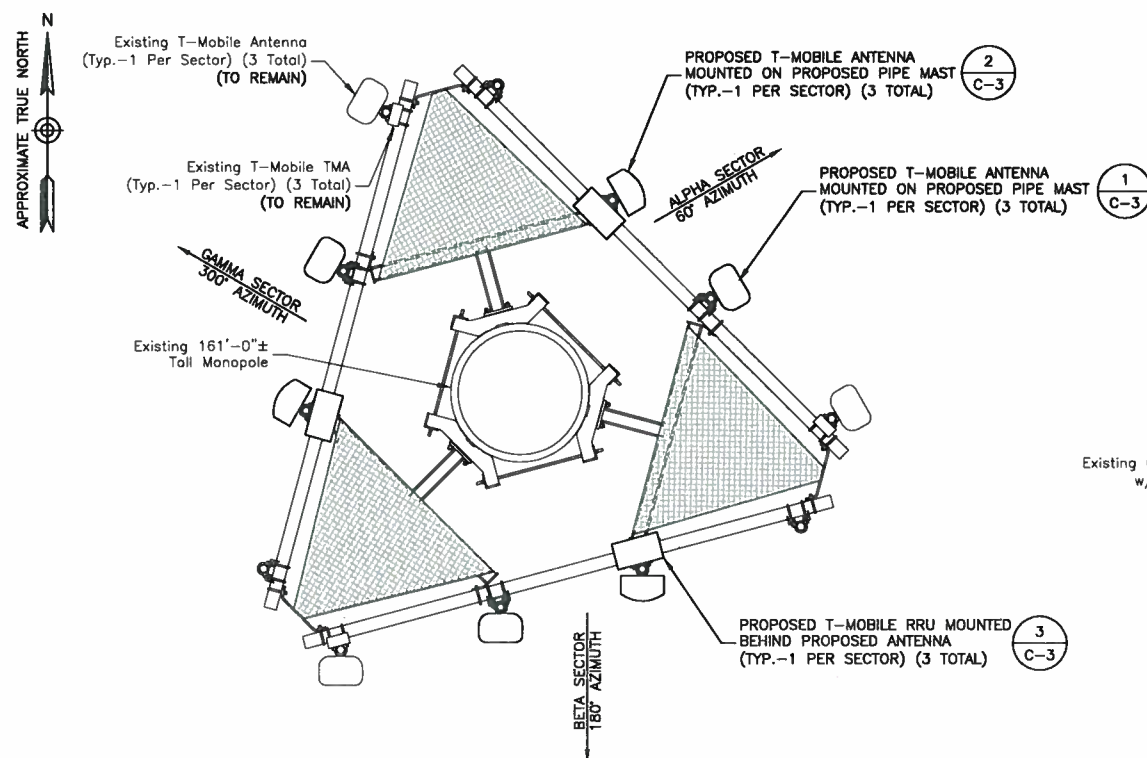
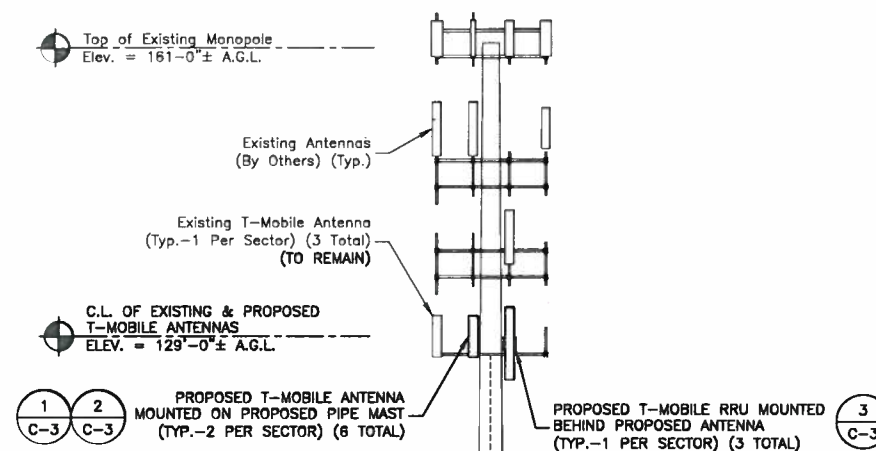
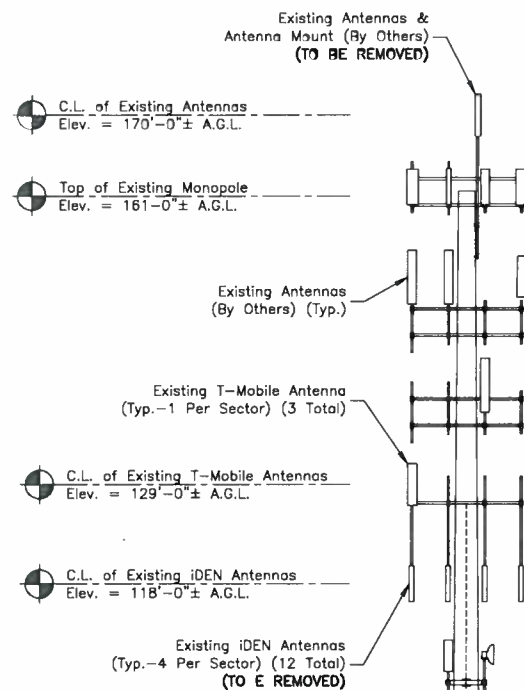
COMPOUND PLAN &
EQUIPMENT PLANS

SHEET NUMBER

C-1

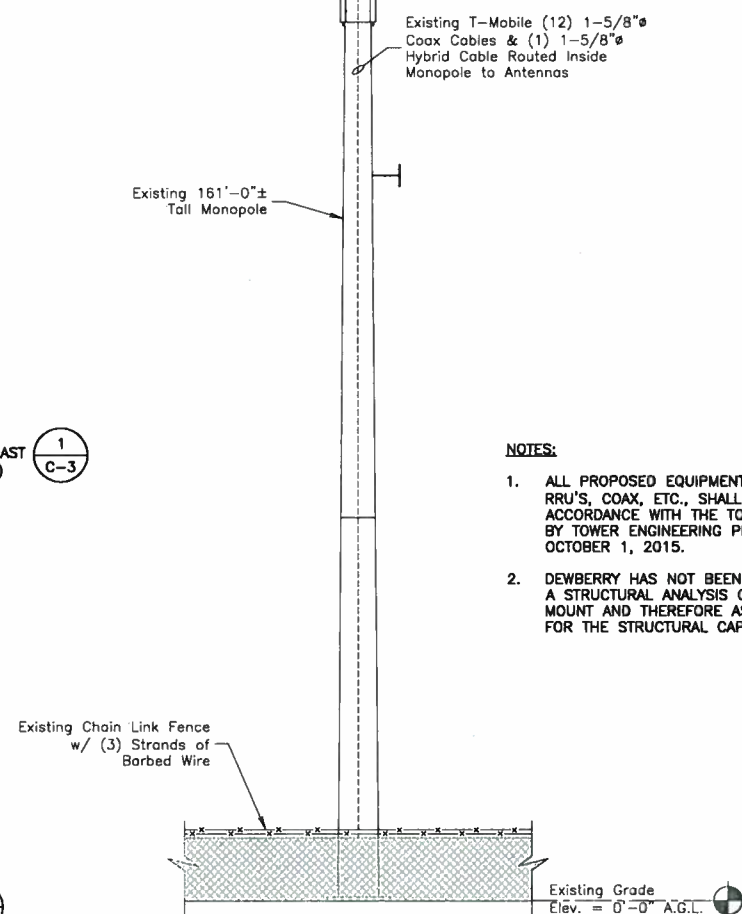


EXISTING ANTENNA LAYOUT
SCALE: N.T.S.

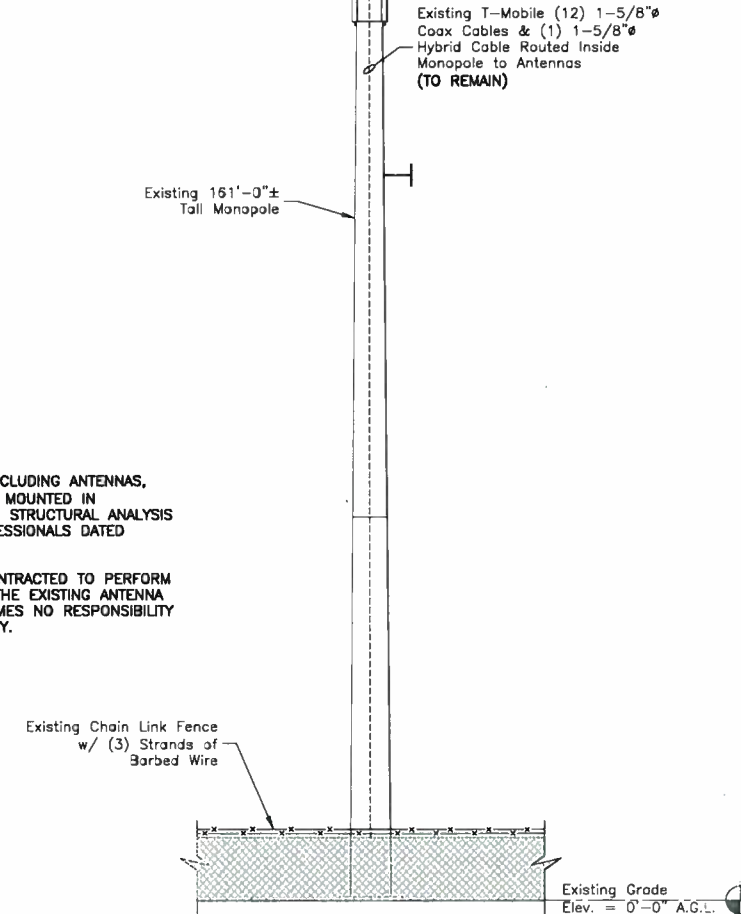


PROPOSED ANTENNA LAYOUT

SCALE: N.T.S.



EXISTING ELEVATION

**PROPOSED ELEVATION**

- NOTES:**

1. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, RRU'S, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY TOWER ENGINEERING PROFESSIONALS DATED OCTOBER 1, 2015.
2. DEWBERRY HAS NOT BEEN CONTRACTED TO PERFORM A STRUCTURAL ANALYSIS ON THE EXISTING ANTENNA MOUNT AND THEREFORE ASSUMES NO RESPONSIBILITY FOR THE STRUCTURAL CAPACITY.



T-MOBILE NORTHEAST LLC
4 SYLVAN WAY
PARSIPPANY, NJ 07054



CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

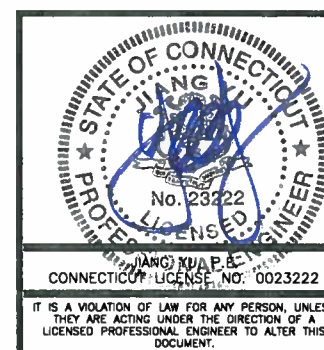
CT11084B
NHV 2071 143137

CONSTRUCTION DRAWINGS

O	10/26/15	ISSUED AS FINAL
A	10/20/15	ISSUED FOR REVIEW



Dewberry Engineers Inc.
600 PARSIPPANY ROAD
SUITE 301
PARSIPPANY, NJ 07054
PHONE: 973.739.9400
FAX: 973.739.9710



DRAWN BY: NRK

REVIEWED BY: BSH

CHECKED BY:	GHN
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PROJECT NUMBER:	50066258
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JOB NUMBER:	50074618
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SITE ADDRESS:

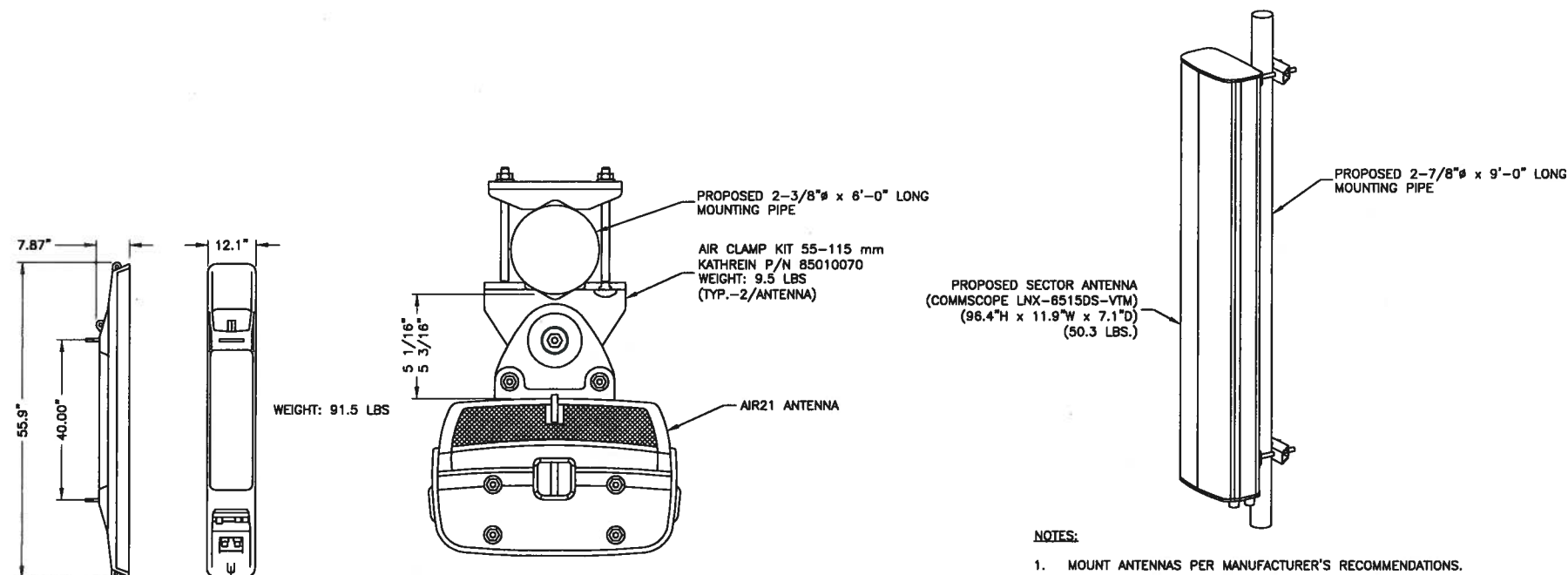
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ORANGE, CT 06477
NEW HAVEN COUNTY

SHEET TITLE

ANTENNA LAYOUTS & ELEVATIONS

SHEET NUMBER

C-2

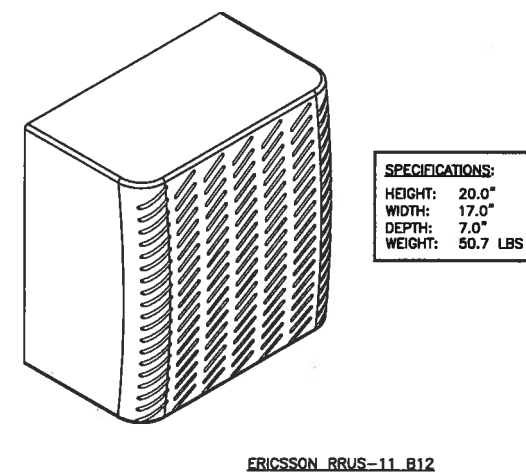


AIR21 ANTENNA DETAIL

SCALE: N.T.S.

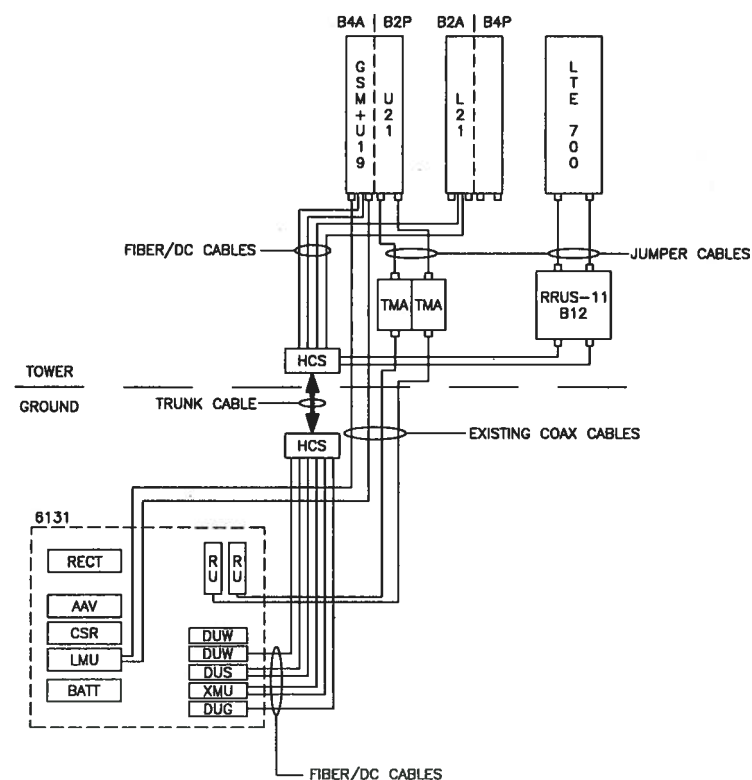


1. MOUNT ANTENNAS PER MANUFACTURER'S RECOMMENDATIONS.
2. GROUND ANTENNAS AND MOUNTS PER MANUFACTURER'S RECOMMENDATIONS AND T-MOBILE STANDARDS.
3. CONFIRM REQUIRED ANTENNAS WITH THE LATEST RFDS.



RRU NOTES:

1. MOUNT EQUIPMENT WITH MANUFACTURER PROVIDED MOUNTING BRACKETS.
2. GROUND EQUIPMENT AND MOUNTS PER MANUFACTURER'S RECOMMENDATIONS AND T-MOBILE STANDARDS.
3. CONFIRM REQUIRED EQUIPMENT WITH THE LATEST RFDS.



SITE CONFIGURATION 702Cu
SCALE: N.T.S.

DESIGN CONFIGURATION								
ANTENNAS		COAX		HYBRID	COAX LENGTH	TMA	RRU	
EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING		EXISTING	PROPOSED	
ALPHA	—	COMMSCOPE LNX—6515DS—VTM	(4) 1—5/8"ø	—	(1) 1—5/8"ø	179'—0"	—	(1) RRUS—11 B12
	—	ERICSSON AIR 21 B4A B2P					—	—
	ERICSSON AIR 21 B2A B4P	EXISTING TO REMAIN					(1) KRY 112 144/1	—
BETA	—	COMMSCOPE LNX—6515DS—VTM	(4) 1—5/8"ø	—	(1) 1—5/8"ø	179'—0"	—	(1) RRUS—11 B12
	—	ERICSSON AIR 21 B4A B4P					—	—
	ERICSSON AIR 21 B2A B2P	EXISTING TO REMAIN					(1) KRY 112 144/1	—
GAMMA	—	COMMSCOPE LNX—6515DS—VTM	(4) 1—5/8"ø	—	(1) 1—5/8"ø	179'—0"	—	(1) RRUS—11 B12
	—	ERICSSON AIR 21 B4A B4P					—	—
	ERICSSON AIR 21 B2A B2P	EXISTING TO REMAIN					(1) KRY 112 144/1	—

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

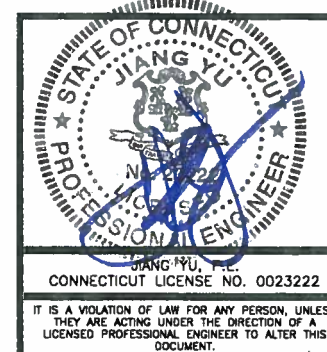
CT11084B
NHV 2071 143137

CONSTRUCTION DRAWINGS

O	10/26/15	ISSUED AS FINAL
A	10/20/15	ISSUED FOR REVIEW

Dewberry®

Dewberry Engineers Inc.
600 PARSIPPANY ROAD
SUITE 301
PARSIPPANY, NJ 07054
PHONE: 973.739.9400
FAX: 973.739.9710



DRAWN BY: NRK

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PROJECT NUMBER:	50066258
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SITE ADDRESS:

800 OGG MEADOW ROAD
ORANGE, CT 06477
NEW HAVEN COUNTY

SHEET TITLE

CONSTRUCTION DETAILS

SHEET NUMBER

1. THE CONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTNING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE CONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE ENGINEER FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS. ALL AVAILABLE GROUNDING ELECTRODES SHALL BE CONNECTED TOGETHER IN ACCORDANCE WITH THE NEC.
3. THE CONTRACTOR SHALL PERFORM IEEE FALL-OFF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS. USE OF OTHER METHODS MUST BE PRE-APPROVED BY THE ENGINEER IN WRITING.
4. THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS ON TOWER SITES AND 10 OHMS OR LESS ON ROOFTOP SITES. WHEN ADDING ELECTRODES, CONTRACTOR SHALL MAINTAIN A MINIMUM DISTANCE BETWEEN THE ADDED ELECTRODE AND ANY OTHER EXISTING ELECTRODE EQUAL TO THE BURIED LENGTH OF THE ROD. IDEALLY, CONTRACTOR SHALL STRIVE TO KEEP THE SEPARATION DISTANCE EQUAL TO TWICE THE BURIED LENGTH OF THE RODS.
5. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT.
6. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 8 AWG COPPER WIRE AND UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
7. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO TRANSMISSION EQUIPMENT.
8. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR SACKED. BACK-TO-BACK CONNECTIONS ON OPPOSITE SIDES OF THE GROUND BUS ARE PERMITTED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED. IN ALL CASES, BENDS SHALL BE MADE WITH A MINIMUM BEND RADIUS OF 8 INCHES.
11. EACH INTERIOR TRANSMISSION CABINET FRAME/PLINTH SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH 6 AWG STRANDED, GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRE UNLESS NOTED OTHERWISE IN THE DETAILS. EACH OUTDOOR CABINET FRAME/PLINTH SHALL BE DIRECTLY CONNECTED TO THE BURIED GROUND RING WITH 2 AWG SOLID TIN-PLATED COPPER WIRE UNLESS NOTED OTHERWISE IN THE DETAILS.
12. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE 2 AWG SOLID TIN-PLATED COPPER UNLESS OTHERWISE INDICATED.
13. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE. CONNECTIONS TO ABOVE GRADE UNITS SHALL BE MADE WITH EXOTHERMIC WELDS WHERE PRACTICAL OR WITH 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS. HIGH PRESSURE CRIMP CONNECTORS MAY ONLY BE USED WITH WRITTEN PERMISSION FROM T-MOBILE MARKET REPRESENTATIVE.
14. EXOTHERMIC WELDS SHALL BE PERMITTED ON TOWERS ONLY WITH THE EXPRESS APPROVAL OF THE TOWER MANUFACTURER OR THE CONTRACTOR'S STRUCTURAL ENGINEER.
15. ALL WIRE TO WIRE GROUND CONNECTIONS TO THE INTERIOR GROUND RING SHALL BE FORMED USING HIGH PRESS CRIMPS OR SPLIT BOLT CONNECTORS WHERE INDICATED IN THE DETAILS.
16. ON ROOFTOP SITES WHERE EXOTHERMIC WELDS ARE A FIRE HAZARD COPPER COMPRESSION CAP CONNECTORS MAY BE USED FOR WIRE TO WIRE CONNECTORS. 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS SHALL BE USED FOR CONNECTION TO ALL ROOFTOP TRANSMISSION EQUIPMENT AND STRUCTURAL STEEL.
17. COAX BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR USING TWO-HOLE MECHANICAL TYPE BRASS CONNECTORS AND STAINLESS STEEL HARDWARE.
18. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
19. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
20. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
21. BOND ALL METALLIC OBJECTS WITHIN 6 FT OF THE BURIED GROUND RING WITH 2 AWG SOLID TIN-PLATED COPPER GROUND CONDUCTOR. DURING EXCAVATION FOR NEW GROUND CONDUCTORS, IF EXISTING GROUND CONDUCTORS ARE ENCOUNTERED, BOND EXISTING GROUND CONDUCTORS TO NEW CONDUCTORS.
22. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT WITH LISTED BONDING FITTINGS.



E-1

Date: **October 1, 2015**

Sean Dempsey
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6565



Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351
crown@tepgroup.net

Subject: Structural Analysis Report

Carrier Designation:	T-Mobile Co-Locate	
	Carrier Site Number:	CT11084B
	Carrier Site Name:	Orange/ MP X56-57
Crown Castle Designation:	Crown Castle BU Number:	806939
	Crown Castle Site Name:	NHV 2071 143137
	Crown Castle JDE Job Number:	347080
	Crown Castle Work Order Number:	1127569
	Crown Castle Application Number:	309709 Rev. 2
Engineering Firm Designation:	TEP Project Number:	51192.38096
Site Data:	800 Ogg Meadow Road, Orange, New Haven County, CT 06477 Latitude 41° 18' 28.36", Longitude -73° 01' 56.22" 160 Foot - Monopole Tower	

Dear Sean Dempsey,

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 830433, in accordance with application 309709, revision 2.

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

LC7: Existing + Reserved + Proposed Equipment

Sufficient Capacity

Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, ASCE 7-05 Minimum Design Loads for Buildings and Other Structures and the 2005 Connecticut Building Code with 2009 amendments, 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: Kelly E. Hoiness, E.I. / TLI

Respectfully submitted by:

Graham M. Andres, P.E.

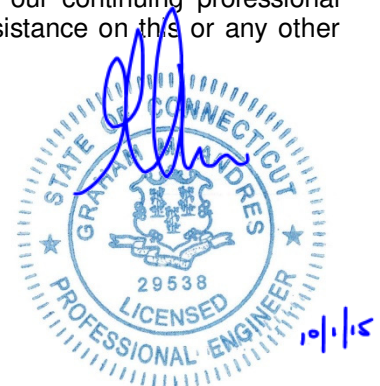


TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Antenna and Cable Information

Table 2 - Existing and Reserved Antenna and Cable Information

Table 3 - Design Antenna and Cable Information

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Table 6 - Tower Component Stresses vs. Capacity

4.1) Recommendations

5) APPENDIX A

tnxTower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 160-ft monopole tower designed by Valmont Industries, Inc. in June of 1998. The tower was originally designed for a wind speed of 90 mph per EIA/TIA-222-F for the appurtenances listed in Table 3. The tower has been modified per reinforcement drawings prepared by Paul J. Ford and Company in October of 2013. 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
127.0	129.0	3	Ericsson	AIR 21 B4A B2P w/ Mount Pipe	-	-	-
		3	Commscope	LNx-6515DS-VTM w/ Mount Pipe			
		3	Ericsson	RRUS 11 B12			

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
158.0	165.0	1	GPS	GPS_A	1	1/2	1
	162.0	6	RFS Celwave	FD9R6004/2C-3L	12	1-5/8	
		3	Alcatel Lucent	RRH2X60-AWS	1	1-5/8	2
		3	Alcatel Lucent	RRH2X60-PCS			
		2	Amphenol	BXA-80063-6BF-EDIN-X w/ Mount Pipe			
		3	Antel	BXA-70040/6CF w/ Mount Pipe			
		1	Antel	BXA-80063/4CF w/ Mount Pipe			
		2	Commscope	HBXX-6516DS-A2M w/ Mount Pipe			
		4	Commscope	HBXX-6517DS-A2M w/ Mount Pipe			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
	158.0	1	Tower Mounts	Platform Mount [LP 602-1]	-	-	1
156.0	170.0	3	EMS Wireless	RR90-17-00DP	-	-	3
		4	Nokia	CS72993.07			
	156.0	1	Tower Mounts	Pipe Mount [PM 601-3]			
147.0	152.0	6	Ericsson	RRUS-11	1 2 12	3/8 5/8 1-1/4	1
		3	Kathrein	800 10121 w/ Mount Pipe			
		6	Powerwave Technologies	P65-16-XLH-RR w/ Mount Pipe			
		6	Powerwave Technologies	TTAW-07BP111-001			
		1	Raycap	DC6-48-60-18-8F			
	147.0	1	Tower Mounts	Platform Mount [LP 602-1]			
137.0	140.0	1	Andrew	VHLP2-11	1 3	5/8 1-1/4	1
		1	Dragonwave	Horizon DUO			
		3	RFS Celwave	APXVSP18-C-A20 w/ Mount Pipe			
		3	Alcatel Lucent	800MHZ RRH			
		3	Alcatel Lucent	800 External Notch Filter			
		9	RFS Celwave	ACU-A20-N			
		3	Alcatel Lucent	1900MHz RRH (65MHz)			
		1	Tower Mounts	Platform Mount [LP 602-1]			
127.0	129.0	3	Ericsson	Air 21 B2A B4P w/ Mount Pipe	13	1-5/8	1
		3	Ericsson	KRY 112 144/1			
	127.0	1	Tower Mounts	Platform Mount [LP 713-1]			
		1	Tower Mounts	Miscellaneous [NA 507-1]			
	118.0	12	Decibel	DB844H90-XY w/ Mount Pipe	-	-	3

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
107.0	110.0	1	Andrew	PX2F-52	3	1/2 5/8	1
		1	Andrew	VHLP2-11			
		3	Argus Technologies	LLPX310R w/ Mount Pipe			
		2	Dragonwave	Horizon Compact			
		3	Samsung Telecomm.	Wimax Dap Head			
	107.0	1	Tower Mounts	Side Arm Mount [SO 101-3]			
100.0	100.0	3	RFS Celwave	APXV18-206517S-C	6	7/8	1
		1	Tower Mounts	Pipe Mount [PM 601-3]			
80.0	81.0	1	Kathrein	OG-860/1920/GPS-A	1	1/2	1
	80.0	2	Tower Mounts	Side Arm Mount [SO 701-1]			

Notes:

- 1) Existing equipment
- 2) Reserved equipment
- 3) Abandoned equipment to be removed; not considered in this analysis

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)
157.0	157.0	12	Swedcom	ALP 9011	-	-
147.0	147.0	12	Swedcom	ALP 110 11-N	-	-
137.0	137.0	12	Decibel	DB980H	-	-
127.0	127.0	12	Swedcom	ALP 9011	-	-
117.0	117.0	12	Swedcom	ALP 9011	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Geotechnical Report	FDH Engineering, Inc.	1257473	CCISites
Supplemental Geotechnical Report	FDH Engineering, Inc.	5475208	CCISites
Tower Foundation Mapping	FDH Engineering, Inc.	1060127	CCISites
Tower Foundation Drawings	Valmont Industries, Inc.	1060127	CCISites
Tower Manufacturer Drawings	Valmont Industries, Inc.	822032	CCISites
Tower Reinforcement Drawings	Paul J. Ford and Company	4025748	CCISites
Post-Modification Inspection	Sinnott Gering and Schmitt Towers, Inc.	4489413	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 and presents percent capacities for each element and the pole shaft 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.

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 (lb)	SF*P _{allow} (lb)	% Capacity	Pass / Fail
L1	160.00-121.33	Pole	TP29.77×21.65×0.2500	1	Note 1	Note 1	46.2	Pass
L2	126.00-81.33	Pole	TP37.67×28.29×0.3750	2	Note 1	Note 1	90.9	Pass
L3	87.00-41.42	Pole	TP45.30×35.73×0.5000	3	Note 1	Note 1	95.8	Pass
L4	48.00-0.00	Pole	TP53.00×42.92×0.5625	4	Note 1	Note 1	86.0	Pass
M1b	30.50-0.00	Mod (Ex)	CCI-65FP-085125	1	Note 1	Note 1	90.7	Pass
M2	50.50-23.50	Mod (Ex)	CCI-65FP-065125	2	Note 1	Note 1	93.0	Pass
M3	50.50-30.50	Mod (Ex)	CCI-65FP-065125	3	Note 1	Note 1	93.0	Pass
M4	70.50-50.50	Mod (Ex)	CCI-65FP-065125	4	Note 1	Note 1	90.6	Pass
M5	104.75-84.75	Mod (Ex)	CCI-65FP-060100	5	Note 1	Note 1	91.5	Pass
							Summary	
						Pole (L3)	95.8	Pass
						Mod (M2)	93.0	Pass
						RATING =	95.8	Pass

Table 6 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	-	88.8	Pass
1	Base Plate	-	71.6	Pass
1	Base Foundation Soil Interaction	-	49.3	Pass
1	Base Foundation Structural	-	84.8	Pass
Structure Rating (max from all components) =				95.8%

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. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4	5	6	7	
Length (ft)	38.667	23.5000	21.1667	19.5000	26.0833	21.5000	26.5000	
Number of Sides	12	12	12	12	12	12	12	
Thickness (in)	0.2500	0.3750	0.5476	0.5000	0.6955	0.7427	0.7006	
Socket Length (ft)	4.6667		5.6667		6.5833			
Top Dia (in)	21.6500	28.2800	33.2250	35.3847	39.8239	42.5269	47.4338	
Bot Dia (in)	29.7700	33.2250	37.6700	39.8239	45.3000	47.4338	53.0000	
Grade	MPRF-Fy=65ksi, Density=100%							
Weight (lb)	2696.7	2933.7	3049.9	3963.9	6009.6	5884.6	8108.7	32647.0

160.0 ft.

121.3 ft.

102.5 ft.

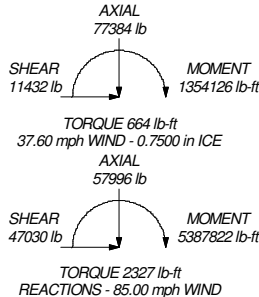
81.3 ft.

67.5 ft.

41.4 ft.

26.5 ft.

0.0 ft.



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
GPS_A	158	800MHZ RFRH	137
(2) FD9P6004/2C-3L	158	800MHZ RFRH	137
(2) FD9P6004/2C-3L	158	Horizon Duo	137
(2) FD9P6004/2C-3L	158	(3) 2.4" Dia. x 6" Mount Pipe	137
BXA-80063/4CF w/ Mount Pipe	158	(3) 2.4" Dia. x 6" Mount Pipe	137
BXA-80063-6BF-EDIN-X w/ Mount Pipe	158	(3) 2.4" Dia. x 6" Mount Pipe	137
BXA-80063-6BF-EDIN-X w/ Mount Pipe	158	Platform Mount [LP 602-1]	137
BXA-70040/6CF w/ Mount Pipe	158	VHLP2-11	137
BXA-70040/6CF w/ Mount Pipe	158	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	127
BXA-70040/6CF w/ Mount Pipe	158	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	127
(2) HBXX-6516DS-A2M w/ Mount Pipe	158	KRY 112 144/1	127
(2) HBXX-6517DS-A2M w/ Mount Pipe	158	KRY 112 144/1	127
(2) HBXX-6517DS-A2M w/ Mount Pipe	158	KRY 112 144/1	127
RFRH2X60-AWS	158	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	127
RFRH2X60-AWS	158	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	127
RFRH2X60-AWS	158	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	127
RFRH2X60-PCS	158	LNK-6515DS-VTM w/ Mount Pipe	127
RFRH2X60-PCS	158	LNK-6515DS-VTM w/ Mount Pipe	127
RFRH2X60-PCS	158	LNK-6515DS-VTM w/ Mount Pipe	127
DB-T1-62-8AB-0Z	158	RRLUS 11 B12	127
Platform Mount [LP 602-1]	158	RRLUS 11 B12	127
800 10121 w/ Mount Pipe	147	RRLUS 11 B12	127
800 10121 w/ Mount Pipe	147	2.4" Dia. x 6" Mount Pipe	127
800 10121 w/ Mount Pipe	147	2.4" Dia. x 6" Mount Pipe	127
P65-16-XLH-RR w/ Mount Pipe	147	2.4" Dia. x 6" Mount Pipe	127
P65-16-XLH-RR w/ Mount Pipe	147	Platform Mount [LP 713-1]	127
P65-16-XLH-RR w/ Mount Pipe	147	Miscellaneous [NA 507-1]	127
P65-16-XLH-RR w/ Mount Pipe	147	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	127
P65-16-XLH-RR w/ Mount Pipe	147	LLPX310R w/ Mount Pipe	107
P65-16-XLH-RR w/ Mount Pipe	147	LLPX310R w/ Mount Pipe	107
(2) TIAW-07BP111-001	147	WIMAX DAP HEAD	107
(2) TIAW-07BP111-001	147	WIMAX DAP HEAD	107
(2) TIAW-07BP111-001	147	WIMAX DAP HEAD	107
(2) RRLUS-11	147	HORIZON COMPACT	107
(2) RRLUS-11	147	HORIZON COMPACT	107
(2) RRLUS-11	147	2.4" Dia. x 6" Mount Pipe	107
DC6-48-60-18-8F	147	2.4" Dia. x 6" Mount Pipe	107
2.4" Dia. x 6" Mount Pipe	147	2.4" Dia. x 6" Mount Pipe	107
2.4" Dia. x 6" Mount Pipe	147	2.4" Dia. x 6" Mount Pipe	107
2.4" Dia. x 6" Mount Pipe	147	2.4" Dia. x 6" Mount Pipe	107
Platform Mount [LP 602-1]	147	2.4" Dia. x 6" Mount Pipe	107
APXVSP18-C-A20 w/ Mount Pipe	137	Side Arm Mount [SO 101-3]	107
APXVSP18-C-A20 w/ Mount Pipe	137	LLPX310R w/ Mount Pipe	107
APXVSP18-C-A20 w/ Mount Pipe	137	VHLP2-11	107
800 EXTERNAL NOTCH FILTER	137	PX2F-52	107
800 EXTERNAL NOTCH FILTER	137	Pipe Mount [PM 601-3]	100
(3) ACU-A20-N	137	APXV18-206517S-C	100
(3) ACU-A20-N	137	APXV18-206517S-C	100
(3) ACU-A20-N	137	APXV18-206517S-C	100
(3) ACU-A20-N	137	Side Arm Mount [SO 701-1]	80
1900MHz RFRH (65MHz)	137	Side Arm Mount [SO 701-1]	80
1900MHz RFRH (65MHz)	137	OG-860/1920/GPS-A	80
1900MHz RFRH (65MHz)	137	2.4" x 2-ft pipe	80
800MHZ RFRH	137	2.4" x 2-ft pipe	80

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
MPRF-Fy=65ksi, Density=100%	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85.00 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 37.60 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50.00 mph wind.

 Tower Engineering Professionals	Tower Engineering Professionals, Inc. 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350		Job: NHV 2071 143137 (BU 806939)	
	Project: TEP No. 51192.38096		Client: Crown Castle	
	Drawn by: Kelly E. Hoiness		App'd:	
	Code: TIA/EIA-222-F		Date: 10/01/15	
	Path: C:\Users\kboog\Desktop\NHV 2071 143137\806939 LC7.eri		Scale: NTS Dwg No: E-1	

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	Project TEP No. 51192.38096	Date 11:55:56 10/01/15
	Client Crown Castle	Designed by Kelly E. Hoiness

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 85.00 mph.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56.00 pcf.

A wind speed of 37.60 mph is used in combination with ice.

Deflections calculated using a wind speed of 50.00 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	160.0000-121.333	38.6667	4.67	12	21.6500	29.7700	0.2500	1.0000	MPRF-Fy=65ksi, Density=100% (65 ksi)
L2	121.3333-102.5000	23.5000	0.00	12	28.2900	33.2250	0.3750	1.5000	MPRF-Fy=65ksi, Density=100% (65 ksi)
L3	102.5000-81.333	21.1667	5.67	12	33.2250	37.6700	0.5476	2.1906	MPRF-Fy=65ksi, Density=100% (65 ksi)

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	Project TEP No. 51192.38096	Date 11:55:56 10/01/15
	Client Crown Castle	Designed by Kelly E. Hoiness

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
L4	81.3333-67.5000	19.5000	0.00	12	35.3847	39.8239	0.5000	2.0000	Density=100% (65 ksi) MPRF-Fy=65ksi, Density=100% (65 ksi)
L5	67.5000-41.4167	26.0833	6.58	12	39.8239	45.3000	0.6955	2.7818	MPRF-Fy=65ksi, Density=100% (65 ksi)
L6	41.4167-26.5000	21.5000	0.00	12	42.5269	47.4338	0.7427	2.9709	MPRF-Fy=65ksi, Density=100% (65 ksi)
L7	26.5000-0.0000	26.5000		12	47.4338	53.0000	0.7006	2.8025	MPRF-Fy=65ksi, Density=100% (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	<i>I</i> in ⁴	<i>r</i> in	<i>C</i> in	<i>I/C</i> in ³	<i>J</i> in ⁴	<i>It/Q</i> in ²	<i>w</i> in	<i>w/t</i>
L1	22.4137	17.2270	1006.9853	7.6612	11.2147	89.7916	2040.4253	8.4786	5.1322	20.529
	30.8202	23.7636	2643.2053	10.5682	15.4209	171.4045	5355.8505	11.6957	7.3084	29.233
L2	30.3025	33.7074	3352.6328	9.9936	14.6542	228.7828	6793.3429	16.5897	6.5767	17.538
	34.3971	39.6664	5463.6040	11.7603	17.2106	317.4567	11070.7429	19.5226	7.8993	21.065
L3	34.3971	57.6241	7853.8734	11.6985	17.2106	456.3406	15914.0768	28.3608	7.4366	13.579
	38.9989	65.4625	11514.6245	13.2898	19.5131	590.0984	23331.7511	32.2187	8.6279	15.754
L4	37.9685	56.1644	8724.0260	12.4887	18.3293	475.9613	17677.2420	27.6424	8.1431	16.286
	41.2288	63.3115	12496.3334	14.0780	20.6288	605.7713	25320.9593	31.1600	9.3328	18.666
L5	41.2288	87.6233	17123.4562	14.0080	20.6288	830.0754	34696.7648	43.1255	8.8090	12.666
	46.8980	99.8863	25365.8828	15.9684	23.4654	1080.9909	51398.1557	49.1610	10.2766	14.777
L6	45.5826	99.9291	22269.1114	14.9588	22.0290	1010.9017	45123.2572	49.1821	9.4067	12.665
	49.1071	111.6642	31071.9219	16.7154	24.5707	1264.5915	62960.1377	54.9577	10.7218	14.436
L7	49.1071	105.4305	29390.2481	16.7305	24.5707	1196.1493	59552.6107	51.8897	10.8346	15.464
	54.8696	117.9879	41192.3296	18.7232	27.4540	1500.4127	83466.8275	58.0700	12.3263	17.593

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor <i>A_f</i>	Adjust. Factor <i>A_r</i>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1 160.0000-121.3333				1	1	1		
L2 121.3333-102.5000				1	1	1		
L3 102.5000-81.3333				1	1	0.688037		
L4 81.3333-67.5000				1	1	1		

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	Project TEP No. 51192.38096	Date 11:55:56 10/01/15
	Client Crown Castle	Designed by Kelly E. Hoiness

<i>Tower Elevation</i>	<i>Gusset Area (per face)</i>	<i>Gusset Thickness</i>	<i>Gusset Grade</i>	<i>Adjust. Factor A_f</i>	<i>Adjust. Factor A_r</i>	<i>Weight Mult.</i>	<i>Double Angle Stitch Bolt Spacing Diagonals in</i>	<i>Double Angle Stitch Bolt Spacing Horizontals in</i>
<i>ft</i>	<i>ft²</i>	<i>in</i>						
L5 67.5000-41.41				1	1	0.722202		
L6 41.4167-26.50				1	1	0.760277		
L7 26.5000-0.0000				1	1	0.804976		

Feed Line/Linear Appurtenances - Entered As Area

<i>Description</i>	<i>Face or Leg</i>	<i>Allow Shield</i>	<i>Component Type</i>	<i>Placement</i>	<i>Total Number</i>	<i>C_AA_A</i>	<i>Weight</i>
				<i>ft</i>		<i>ft²/ft</i>	<i>plf</i>
HJ7-50A(1-5/8")	A	No	Inside Pole	158.0000 - 0.0000	12	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0000 0.0000 0.0000 0.0000 0.0000
LDF4-50A(1/2")	A	No	Inside Pole	158.0000 - 0.0000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0000 0.0000 0.0000 0.0000 0.0000
HB158-1-08U8-S8J18(1-5/8)	A	No	CaAa (Out Of Face)	84.7500 - 0.0000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0000 0.0000 0.0000 0.0000 0.0000
HB158-1-08U8-S8J18(1-5/8)	A	No	CaAa (Out Of Face)	158.0000 - 84.7500	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.1980 0.2980 0.3980 0.5980 0.9980

2" Flexible Conduit	A	No	Inside Pole	147.0000 - 0.0000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0000 0.0000 0.0000 0.0000 0.0000
LDF6-50A(1-1/4")	B	No	Inside Pole	147.0000 - 0.0000	12	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0000 0.0000 0.0000 0.0000 0.0000
FB-L98B-002-75000(3/8")	B	No	Inside Pole	147.0000 - 0.0000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0000 0.0000 0.0000 0.0000 0.0000
WR-VG82ST-BRDA(5/8")	B	No	Inside Pole	147.0000 - 0.0000	2	No Ice 1/2" Ice 1" Ice 2" Ice	0.0000 0.0000 0.0000 0.0000

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	Project TEP No. 51192.38096	Date 11:55:56 10/01/15
	Client Crown Castle	Designed by Kelly E. Hoiness

<i>Description</i>	<i>Face or Leg</i>	<i>Allow Shield</i>	<i>Component Type</i>	<i>Placement ft</i>	<i>Total Number</i>		<i>C_{AA}</i> <i>ft²/ft</i>	<i>Weight plf</i>
***						4" Ice	0.0000	0.31
HB114-1-0813U4-M5J(1 1/4")	B	No	Inside Pole	137.0000 - 0.0000	3	No Ice	0.0000	1.20
						1/2" Ice	0.0000	1.20
						1" Ice	0.0000	1.20
						2" Ice	0.0000	1.20
						4" Ice	0.0000	1.20
LDF4-75A(5/8")	B	No	Inside Pole	137.0000 - 0.0000	1	No Ice	0.0000	0.14
						1/2" Ice	0.0000	0.14
						1" Ice	0.0000	0.14
						2" Ice	0.0000	0.14
						4" Ice	0.0000	0.14

FLC 158-50J(1-5/8")	B	No	Inside Pole	127.0000 - 0.0000	13	No Ice	0.0000	0.92
						1/2" Ice	0.0000	0.92
						1" Ice	0.0000	0.92
						2" Ice	0.0000	0.92
						4" Ice	0.0000	0.92

HJ4.5-50(5/8")	A	No	CaAa (Out Of Face)	107.0000 - 0.0000	3	No Ice	0.0000	0.40
						1/2" Ice	0.0000	1.24
						1" Ice	0.0000	2.69
						2" Ice	0.0000	7.42
						4" Ice	0.0000	24.22
EC4-50(1/2")	A	No	Inside Pole	107.0000 - 0.0000	3	No Ice	0.0000	0.16
						1/2" Ice	0.0000	0.16
						1" Ice	0.0000	0.16
						2" Ice	0.0000	0.16
						4" Ice	0.0000	0.16
2" Flexible Conduit	A	No	CaAa (Out Of Face)	84.7500 - 0.0000	1	No Ice	0.0000	0.34
						1/2" Ice	0.0000	1.87
						1" Ice	0.0000	4.01
						2" Ice	0.0000	10.11
						4" Ice	0.0000	29.66
2" Flexible Conduit	A	No	CaAa (Out Of Face)	107.0000 - 84.7500	1	No Ice	0.2000	0.34
						1/2" Ice	0.3000	1.87
						1" Ice	0.4000	4.01
						2" Ice	0.6000	10.11
						4" Ice	1.0000	29.66
2" Flexible Conduit	A	No	CaAa (Out Of Face)	107.0000 - 0.0000	1	No Ice	0.0000	0.34
						1/2" Ice	0.0000	1.87
						1" Ice	0.0000	4.01
						2" Ice	0.0000	10.11
						4" Ice	0.0000	29.66

CR 50 1070PE(7/8")	B	No	Inside Pole	100.0000 - 0.0000	6	No Ice	0.0000	0.28
						1/2" Ice	0.0000	0.28
						1" Ice	0.0000	0.28
						2" Ice	0.0000	0.28
						4" Ice	0.0000	0.28

LDF4-50A(1/2")	C	No	Inside Pole	80.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15

Safety Line 3/8	C	No	CaAa (Out Of Face)	160.0000 - 10.0000	1	No Ice	0.0375	0.22
						1/2" Ice	0.1375	0.75
						1" Ice	0.2375	1.28
						2" Ice	0.4375	2.34

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job NHV 2071 143137 (BU 806939)	Page 5 of 34
	Project TEP No. 51192.38096	Date 11:55:56 10/01/15
	Client Crown Castle	Designed by Kelly E. Hoiness

<i>Description</i>	<i>Face or Leg</i>	<i>Allow Shield</i>	<i>Component Type</i>	<i>Placement ft</i>	<i>Total Number</i>		<i>C_{AA} ft²/ft</i>	<i>Weight plf</i>
Step Pegs (5/8" SR) 7-in. w/30" step	C	No	CaAa (Out Of Face)	160.0000 - 10.0000	1	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.8375 0.0350 0.1350 0.2350 0.4350 0.8350	4.46 0.49 1.01 2.07 6.09 21.46

CCI-65FP-085125	C	No	CaAa (Out Of Face)	30.5000 - 0.0000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2083 0.3194 0.4306 0.6528 1.0972	36.15 37.36 38.92 43.07 55.51
CCI-65FP-085125	A	No	CaAa (Out Of Face)	30.5000 - 0.0000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0000 0.0000 0.0000 0.0000 0.0000	36.15 37.36 38.92 43.07 55.51
CCI-65FP-085125	B	No	CaAa (Out Of Face)	30.5000 - 0.0000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2083 0.3194 0.4306 0.6528 1.0972	36.15 37.36 38.92 43.07 55.51

CCI-65FP-065125	C	No	CaAa (Out Of Face)	50.5000 - 30.5000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2083 0.3194 0.4306 0.6528 1.0972	27.65 28.73 30.15 34.04 45.97
CCI-65FP-065125	A	No	CaAa (Out Of Face)	50.5000 - 30.5000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0000 0.0000 0.0000 0.0000 0.0000	27.65 28.73 30.15 34.04 45.97
CCI-65FP-065125	B	No	CaAa (Out Of Face)	30.5000 - 23.5000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0000 0.0000 0.0000 0.0000 0.0000	27.65 28.73 30.15 34.04 45.97
CCI-65FP-065125	B	No	CaAa (Out Of Face)	50.5000 - 30.5000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2083 0.3194 0.4306 0.6528 1.0972	27.65 28.73 30.15 34.04 45.97

CCI-65FP-065125	C	No	CaAa (Out Of Face)	70.5000 - 50.5000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2083 0.3194 0.4306 0.6528 1.0972	27.65 28.73 30.15 34.04 45.97
CCI-65FP-065125	A	No	CaAa (Out Of Face)	70.5000 - 50.5000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0000 0.0000 0.0000 0.0000 0.0000	27.65 28.73 30.15 34.04 45.97
CCI-65FP-065125	B	No	CaAa (Out Of Face)	70.5000 - 50.5000	1	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2083 0.3194 0.4306 0.6528 1.0972	27.65 28.73 30.15 34.04 45.97

CCI-65FP-060100	C	No	CaAa (Out Of Face)	104.7500 - 84.7500	1	No Ice	0.0000	20.42

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	6 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A ft ² /ft	Weight plf
			Face)				
						1/2" Ice	0.0000
						1" Ice	0.0000
						2" Ice	0.0000
						4" Ice	0.0000
CCI-65FP-060100	A	No	CaAa (Out Of Face)	104.7500 - 84.7500	1	No Ice	0.0000
						1/2" Ice	0.0000
						1" Ice	0.0000
						2" Ice	0.0000
						4" Ice	0.0000
CCI-65FP-060100	B	No	CaAa (Out Of Face)	104.7500 - 84.7500	1	No Ice	0.0000
						1/2" Ice	0.0000
						1" Ice	0.0000
						2" Ice	0.0000
						4" Ice	0.0000

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight lb
L1	160.0000-121.3333	A	0.000	0.000	0.000	7.260	519.49
	3	B	0.000	0.000	0.000	0.000	346.91
		C	0.000	0.000	0.000	2.803	27.34
L2	121.3333-102.5000	A	0.000	0.000	0.000	4.629	325.31
	0	B	0.000	0.000	0.000	0.000	503.45
		C	0.000	0.000	0.000	1.365	59.25
L3	102.5000-81.3333	A	0.000	0.000	0.000	7.065	714.40
		B	0.000	0.000	0.000	0.000	907.95
		C	0.000	0.000	0.000	1.535	377.36
L4	81.3333-67.5000	A	0.000	0.000	0.000	0.000	312.99
		B	0.000	0.000	0.000	0.625	442.23
		C	0.000	0.000	0.000	1.628	94.60
L5	67.5000-41.4167	A	0.000	0.000	0.000	0.000	1154.91
		B	0.000	0.000	0.000	5.434	1398.59
		C	0.000	0.000	0.000	7.325	743.49
L6	41.4167-26.5000	A	0.000	0.000	0.000	0.000	694.50
		B	0.000	0.000	0.000	3.108	944.45
		C	0.000	0.000	0.000	4.189	459.22
L7	26.5000-0.0000	A	0.000	0.000	0.000	0.000	1398.79
		B	0.000	0.000	0.000	5.521	1729.31
		C	0.000	0.000	0.000	6.717	973.73

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 _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight lb
L1	160.0000-121.3333	A	0.892	0.000	0.000	0.000	13.801	636.14
	3	B		0.000	0.000	0.000	0.000	346.91
		C		0.000	0.000	0.000	16.598	116.07
L2	121.3333-102.5000	A	0.868	0.000	0.000	0.000	8.791	445.16
	0	B		0.000	0.000	0.000	0.000	507.87
		C		0.000	0.000	0.000	8.084	106.90
L3	102.5000-81.3333	A	0.848	0.000	0.000	0.000	13.084	1055.70
		B		0.000	0.000	0.000	0.000	940.83

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job NHV 2071 143137 (BU 806939)	Page 7 of 34
	Project TEP No. 51192.38096	Date 11:55:56 10/01/15
	Client Crown Castle	Designed by Kelly E. Hoiness

<i>Tower Section</i>	<i>Tower Elevation ft</i>	<i>Face or Leg</i>	<i>Ice Thickness in</i>	<i>A_R ft²</i>	<i>A_F ft²</i>	<i>C_{AA} In Face ft²</i>	<i>C_{AA} Out Face ft²</i>	<i>Weight lb</i>
L4	81.3333-67.5000	C		0.000	0.000	0.000	8.713	455.85
		A	0.827	0.000	0.000	0.000	0.000	520.77
		B		0.000	0.000	0.000	1.190	448.45
L5	67.5000-41.4167	C		0.000	0.000	0.000	6.885	130.62
		A	0.796	0.000	0.000	0.000	0.000	1556.05
		B		0.000	0.000	0.000	10.048	1448.79
L6	41.4167-26.5000	C		0.000	0.000	0.000	20.243	845.59
		A	0.752	0.000	0.000	0.000	0.000	924.74
		B		0.000	0.000	0.000	5.746	981.68
L7	26.5000-0.0000	C		0.000	0.000	0.000	11.577	518.43
		A	0.750	0.000	0.000	0.000	0.000	1781.82
		B		0.000	0.000	0.000	9.937	1787.36
		C		0.000	0.000	0.000	16.084	1056.83

Feed Line Center of Pressure

<i>Section</i>	<i>Elevation ft</i>	<i>CP_X in</i>	<i>CP_Z in</i>	<i>CP_X Ice in</i>	<i>CP_Z Ice in</i>
L1	160.0000-121.3333	-0.0840	-0.2047	-0.3882	-0.1516
L2	121.3333-102.5000	-0.0839	-0.2832	-0.3980	-0.2746
L3	102.5000-81.3333	-0.0828	-0.3879	-0.3829	-0.4362
L4	81.3333-67.5000	-0.0896	0.1183	-0.4356	0.3601
L5	67.5000-41.4167	-0.0828	0.3224	-0.3720	0.6382
L6	41.4167-26.5000	-0.0835	0.3251	-0.3791	0.6502
L7	26.5000-0.0000	-0.0517	0.3113	-0.2333	0.5795

Discrete Tower Loads

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horiz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>	<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight lb</i>
GPS_A	B	From Centroid-Left	4.0000	60.0000	158.0000	No Ice	0.2975	0.87
			-6.00			1/2" Ice	0.3739	4.66
			7.00			1" Ice	0.4589	9.76
						2" Ice	0.6549	24.67
						4" Ice	1.1506	78.80
(2) FD9R6004/2C-3L	A	From Centroid-Left	4.0000	20.0000	158.0000	No Ice	0.3665	3.10
			-6.00			1/2" Ice	0.4506	5.40
			4.00			1" Ice	0.5433	8.79
						2" Ice	0.7546	19.61
						4" Ice	1.2808	62.87
(2) FD9R6004/2C-3L	B	From Centroid-Left	4.0000	20.0000	158.0000	No Ice	0.3665	3.10
			-6.00			1/2" Ice	0.4506	5.40
			4.00			1" Ice	0.5433	8.79
						2" Ice	0.7546	19.61
						4" Ice	1.2808	62.87
(2) FD9R6004/2C-3L	C	From	4.0000	30.0000	158.0000	No Ice	0.3665	3.10

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	8 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>	<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight lb</i>
		Centroid-Le g	-6.00 4.00			1/2" Ice 0.4506 1" Ice 0.5433 2" Ice 0.7546 4" Ice 1.2808 No Ice 5.3988	0.1362 0.1965 0.3430 0.7396 3.4238	5.40 8.79 19.61 62.87 27.97
BXA-80063/4CF w/ Mount Pipe	A	From Centroid-Le g	4.0000 -6.00 4.00	20.0000	158.0000	1/2" Ice 5.8435 1" Ice 6.2986 2" Ice 7.2405 4" Ice 9.2612 No Ice 7.7073	4.0221 4.6369 5.9176 8.9263 5.6302	68.95 115.68 229.27 564.03 40.00
BXA-80063-6BF-EDIN-X w/ Mount Pipe	B	From Centroid-Le g	4.0000 -6.00 4.00	20.0000	158.0000	1/2" Ice 8.3278 1" Ice 8.9191 2" Ice 10.1316 4" Ice 12.6769 No Ice 7.7073	6.7191 7.5606 9.2937 12.9684 5.6302	102.87 169.55 329.04 785.59 40.00
BXA-80063-6BF-EDIN-X w/ Mount Pipe	C	From Centroid-Le g	4.0000 -6.00 4.00	30.0000	158.0000	1/2" Ice 8.3278 1" Ice 8.9191 2" Ice 10.1316 4" Ice 12.6769 No Ice 7.7073	6.7191 7.5606 9.2937 12.9684 5.6302	102.87 169.55 329.04 785.59 40.00
BXA-70040/6CF w/ Mount Pipe	A	From Centroid-Le g	4.0000 -2.00 4.00	0.0000	158.0000	1/2" Ice 17.5081 1" Ice 18.2035 2" Ice 19.6221 4" Ice 22.5799 No Ice 16.7762	8.5639 9.4582 11.2839 15.4116 7.3834	164.80 274.80 524.65 1177.83 63.55
BXA-70040/6CF w/ Mount Pipe	B	From Centroid-Le g	4.0000 -2.00 4.00	0.0000	158.0000	1/2" Ice 17.5081 1" Ice 18.2035 2" Ice 19.6221 4" Ice 22.5799 No Ice 16.7762	8.5639 9.4582 11.2839 15.4116 7.3834	164.80 274.80 524.65 1177.83 63.55
BXA-70040/6CF w/ Mount Pipe	C	From Centroid-Le g	4.0000 -2.00 4.00	0.0000	158.0000	1/2" Ice 17.5081 1" Ice 18.2035 2" Ice 19.6221 4" Ice 22.5799 No Ice 16.7762	8.5639 9.4582 11.2839 15.4116 7.3834	164.80 274.80 524.65 1177.83 63.55
(2) HBXX-6516DS-A2M w/ Mount Pipe	A	From Centroid-Le g	4.0000 4.00 4.00	20.0000	158.0000	1/2" Ice 6.6547 1" Ice 7.1374 2" Ice 8.1341 4" Ice 10.2560 No Ice 6.1758	5.2049 5.8987 7.3732 10.5560 4.5251	98.97 154.42 286.98 666.68 49.73
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Centroid-Le g	4.0000 4.00 4.00	20.0000	158.0000	1/2" Ice 9.6473 1" Ice 10.2909 2" Ice 11.5946 4" Ice 14.3212 No Ice 8.9758	8.1817 9.1436 11.0219 15.0267 6.9629	136.85 214.64 398.47 913.98 67.23
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Centroid-Le g	4.0000 4.00 4.00	0.0000	158.0000	1/2" Ice 9.6473 1" Ice 10.2909 2" Ice 11.5946 4" Ice 14.3212 No Ice 8.9758	8.1817 9.1436 11.0219 15.0267 6.9629	136.85 214.64 398.47 913.98 67.23
RRH2X60-AWS	A	From Centroid-Le g	4.0000 6.00 4.00	20.0000	158.0000	1/2" Ice 4.2724 1" Ice 4.5965 2" Ice 5.2705 4" Ice 6.7224 No Ice 3.9569	2.0752 2.3603 2.9566 4.2529 1.8157	82.72 109.06 173.43 354.26 60.00
RRH2X60-AWS	B	From Centroid-Le g	4.0000 6.00 4.00	20.0000	158.0000	1/2" Ice 4.2724 1" Ice 4.5965	2.0752 2.3603	82.72 109.06

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	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight lb
RRH2X60-AWS	C	From Centroid-Le g	4.0000 6.00 4.00	0.0000	158.0000	2" Ice	5.2705	2.9566	173.43
						4" Ice	6.7224	4.2529	354.26
						No Ice	3.9569	1.8157	60.00
						1/2" Ice	4.2724	2.0752	82.72
						1" Ice	4.5965	2.3603	109.06
RRH2X60-PCS	A	From Centroid-Le g	4.0000 2.00 4.00	20.0000	158.0000	2" Ice	5.2705	2.9566	173.43
						4" Ice	6.7224	4.2529	354.26
						No Ice	2.5667	2.0106	55.00
						1/2" Ice	2.7914	2.2184	75.35
						1" Ice	3.0247	2.4349	98.71
RRH2X60-PCS	B	From Centroid-Le g	4.0000 2.00 4.00	20.0000	158.0000	2" Ice	3.5173	2.8938	155.23
						4" Ice	4.6062	3.9152	312.91
						No Ice	2.5667	2.0106	55.00
						1/2" Ice	2.7914	2.2184	75.35
						1" Ice	3.0247	2.4349	98.71
RRH2X60-PCS	C	From Centroid-Le g	4.0000 2.00 4.00	0.0000	158.0000	2" Ice	3.5173	2.8938	155.23
						4" Ice	4.6062	3.9152	312.91
						No Ice	2.5667	2.0106	55.00
						1/2" Ice	2.7914	2.2184	75.35
						1" Ice	3.0247	2.4349	98.71
DB-T1-6Z-8AB-0Z	B	From Centroid-Le g	4.0000 -2.00 4.00	0.0000	158.0000	2" Ice	3.5173	2.8938	155.23
						4" Ice	4.6062	3.9152	312.91
						No Ice	5.6000	2.3333	44.00
						1/2" Ice	5.9154	2.5580	80.13
						1" Ice	6.2395	2.7914	120.22
Platform Mount [LP 602-1]	B	None		0.0000	158.0000	2" Ice	6.9136	3.2840	213.04
						4" Ice	8.3654	4.3728	454.67
						No Ice	32.0300	32.0300	1343.30
						1/2" Ice	38.7100	38.7100	1800.09
						1" Ice	45.3900	45.3900	2256.88
						2" Ice	58.7500	58.7500	3170.46
						4" Ice	85.4700	85.4700	4997.62
**									
**									
800 10121 w/ Mount Pipe	A	From Centroid-Le g	4.0000 -6.00 5.00	20.0000	147.0000	No Ice	5.6851	4.5996	66.50
						1/2" Ice	6.1819	5.3507	114.02
						1" Ice	6.6761	6.0464	167.89
						2" Ice	7.6953	7.5263	297.81
						4" Ice	9.8576	10.8324	675.28
800 10121 w/ Mount Pipe	B	From Centroid-Le g	4.0000 -6.00 5.00	21.0000	147.0000	No Ice	5.6851	4.5996	66.50
						1/2" Ice	6.1819	5.3507	114.02
						1" Ice	6.6761	6.0464	167.89
						2" Ice	7.6953	7.5263	297.81
						4" Ice	9.8576	10.8324	675.28
800 10121 w/ Mount Pipe	C	From Centroid-Le g	4.0000 -6.00 5.00	20.0000	147.0000	No Ice	5.6851	4.5996	66.50
						1/2" Ice	6.1819	5.3507	114.02
						1" Ice	6.6761	6.0464	167.89
						2" Ice	7.6953	7.5263	297.81
						4" Ice	9.8576	10.8324	675.28
P65-16-XLH-RR w/ Mount Pipe	A	From Centroid-Le g	4.0000 2.00 5.00	20.0000	147.0000	No Ice	8.6375	6.3625	78.55
						1/2" Ice	9.2903	7.5378	144.33
						1" Ice	9.9098	8.4270	218.01
						2" Ice	11.1763	10.2390	392.73
						4" Ice	13.8289	14.0988	885.61
P65-16-XLH-RR w/ Mount Pipe	B	From Centroid-Le g	4.0000 2.00 5.00	21.0000	147.0000	No Ice	8.6375	6.3625	78.55
						1/2" Ice	9.2903	7.5378	144.33
						1" Ice	9.9098	8.4270	218.01

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	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight lb
P65-16-XLH-RR w/ Mount Pipe	C	From Centroid-Le g	4.0000 2.00 5.00	20.0000	147.0000	2" Ice	11.1763	10.2390	392.73
						4" Ice	13.8289	14.0988	885.61
						No Ice	8.6375	6.3625	78.55
						1/2" Ice	9.2903	7.5378	144.33
						1" Ice	9.9098	8.4270	218.01
P65-16-XLH-RR w/ Mount Pipe	A	From Centroid-Le g	4.0000 6.00 5.00	30.0000	147.0000	2" Ice	11.1763	10.2390	392.73
						4" Ice	13.8289	14.0988	885.61
						No Ice	8.6375	6.3625	78.55
						1/2" Ice	9.2903	7.5378	144.33
						1" Ice	9.9098	8.4270	218.01
P65-16-XLH-RR w/ Mount Pipe	B	From Centroid-Le g	4.0000 6.00 5.00	30.0000	147.0000	2" Ice	11.1763	10.2390	392.73
						4" Ice	13.8289	14.0988	885.61
						No Ice	8.6375	6.3625	78.55
						1/2" Ice	9.2903	7.5378	144.33
						1" Ice	9.9098	8.4270	218.01
P65-16-XLH-RR w/ Mount Pipe	C	From Centroid-Le g	4.0000 6.00 5.00	30.0000	147.0000	2" Ice	11.1763	10.2390	392.73
						4" Ice	13.8289	14.0988	885.61
						No Ice	8.6375	6.3625	78.55
						1/2" Ice	9.2903	7.5378	144.33
						1" Ice	9.9098	8.4270	218.01
(2) TTAW-07BP111-001	A	From Centroid-Le g	4.0000 -2.00 5.00	20.0000	147.0000	2" Ice	11.1763	10.2390	392.73
						4" Ice	13.8289	14.0988	885.61
						No Ice	0.6449	0.5198	17.60
						1/2" Ice	0.7568	0.6232	23.40
						1" Ice	0.8773	0.7354	30.82
(2) TTAW-07BP111-001	B	From Centroid-Le g	4.0000 -2.00 5.00	21.0000	147.0000	2" Ice	1.1444	0.9856	51.30
						4" Ice	1.7822	1.5896	120.26
						No Ice	0.6449	0.5198	17.60
						1/2" Ice	0.7568	0.6232	23.40
						1" Ice	0.8773	0.7354	30.82
(2) TTAW-07BP111-001	C	From Centroid-Le g	4.0000 -2.00 5.00	20.0000	147.0000	2" Ice	1.1444	0.9856	51.30
						4" Ice	1.7822	1.5896	120.26
						No Ice	0.6449	0.5198	17.60
						1/2" Ice	0.7568	0.6232	23.40
						1" Ice	0.8773	0.7354	30.82
(2) RRUS-11	A	From Centroid-Le g	4.0000 6.00 5.00	30.0000	147.0000	2" Ice	1.1444	0.9856	51.30
						4" Ice	1.7822	1.5896	120.26
						No Ice	2.9419	1.2460	55.00
						1/2" Ice	3.1718	1.4124	74.32
						1" Ice	3.4103	1.5874	96.56
(2) RRUS-11	B	From Centroid-Le g	4.0000 6.00 5.00	30.0000	147.0000	2" Ice	3.9133	1.9633	150.56
						4" Ice	5.0229	2.8188	302.12
						No Ice	2.9419	1.2460	55.00
						1/2" Ice	3.1718	1.4124	74.32
						1" Ice	3.4103	1.5874	96.56
(2) RRUS-11	C	From Centroid-Le g	4.0000 6.00 5.00	30.0000	147.0000	2" Ice	3.9133	1.9633	150.56
						4" Ice	5.0229	2.8188	302.12
						No Ice	2.9419	1.2460	55.00
						1/2" Ice	3.1718	1.4124	74.32
						1" Ice	3.4103	1.5874	96.56
DC6-48-60-18-8F	C	From Centroid-Le g	4.0000 6.00 5.00	30.0000	147.0000	2" Ice	3.9133	1.9633	150.56
						4" Ice	5.0229	2.8188	302.12
						No Ice	1.2664	1.2664	20.00
						1/2" Ice	1.4564	1.4564	35.12
						1" Ice	1.6575	1.6575	52.57
						2" Ice	2.0931	2.0931	95.09
						4" Ice	3.0975	3.0975	214.90

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	11 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>		<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight lb</i>
2.4" Dia. x 6' Mount Pipe	A	From Centroid-Le g	4.0000 -2.00 0.00	0.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9305 2.3162 3.1485 5.0577	1.4250 1.9305 2.3162 3.1485 5.0577	21.90 37.81 55.56 99.64 251.60
2.4" Dia. x 6' Mount Pipe	B	From Centroid-Le g	4.0000 -2.00 0.00	0.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9305 2.3162 3.1485 5.0577	1.4250 1.9305 2.3162 3.1485 5.0577	21.90 37.81 55.56 99.64 251.60
2.4" Dia. x 6' Mount Pipe	C	From Centroid-Le g	4.0000 -2.00 0.00	0.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9305 2.3162 3.1485 5.0577	1.4250 1.9305 2.3162 3.1485 5.0577	21.90 37.81 55.56 99.64 251.60
Platform Mount [LP 602-1]	B	None		0.0000	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	32.0300 38.7100 45.3900 58.7500 85.4700	32.0300 38.7100 45.3900 58.7500 85.4700	1343.30 1800.09 2256.88 3170.46 4997.62
**									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Centroid-Fa ce	4.0000 -2.00 3.00	20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	82.55 150.56 226.53 405.98 908.95
APXVSPP18-C-A20 w/ Mount Pipe	B	From Centroid-Fa ce	4.0000 -2.00 3.00	-20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	82.55 150.56 226.53 405.98 908.95
APXVSPP18-C-A20 w/ Mount Pipe	C	From Centroid-Fa ce	4.0000 -2.00 3.00	-20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	82.55 150.56 226.53 405.98 908.95
800 EXTERNAL NOTCH FILTER	A	From Centroid-Fa ce	4.0000 -2.00 3.00	20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7701 0.8898 1.0181 1.3007 1.9696	0.3747 0.4647 0.5634 0.7868 1.3372	11.00 16.81 24.26 44.81 114.01
800 EXTERNAL NOTCH FILTER	B	From Centroid-Fa ce	4.0000 -2.00 3.00	-20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7701 0.8898 1.0181 1.3007 1.9696	0.3747 0.4647 0.5634 0.7868 1.3372	11.00 16.81 24.26 44.81 114.01
800 EXTERNAL NOTCH FILTER	C	From Centroid-Fa ce	4.0000 -2.00 3.00	-20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7701 0.8898 1.0181 1.3007 1.9696	0.3747 0.4647 0.5634 0.7868 1.3372	11.00 16.81 24.26 44.81 114.01
(3) ACU-A20-N	A	From Centroid-Fa ce	4.0000 -2.00 3.00	20.0000	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0778 0.1210 0.1728 0.3025 0.6654	0.1361 0.1890 0.2506 0.3997 0.8015	1.04 2.32 4.41 11.80 44.85
(3) ACU-A20-N	B	From	4.0000	-20.0000	137.0000	No Ice	0.0778	0.1361	1.04

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job NHV 2071 143137 (BU 806939)	Page 12 of 34
	Project TEP No. 51192.38096	Date 11:55:56 10/01/15
	Client Crown Castle	Designed by Kelly E. Hoiness

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>	<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight lb</i>
(3) ACU-A20-N	C	Centroid-Face	-2.00 3.00	-20.0000	137.0000	1/2" Ice	0.1210	2.32
						1" Ice	0.1728	4.41
						2" Ice	0.3025	11.80
						4" Ice	0.6654	44.85
						No Ice	0.0778	1.04
1900MHz RRH (65MHz)	A	From Centroid-Face	4.0000 -2.00 3.00	20.0000	137.0000	1/2" Ice	0.1210	2.32
						1" Ice	0.1728	4.41
						2" Ice	0.3025	11.80
						4" Ice	0.6654	44.85
						No Ice	2.6979	60.00
1900MHz RRH (65MHz)	B	From Centroid-Face	4.0000 -2.00 3.00	-20.0000	137.0000	1/2" Ice	2.9362	83.90
						1" Ice	3.1832	111.08
						2" Ice	3.7030	176.02
						4" Ice	4.8463	353.75
						No Ice	2.6979	60.00
1900MHz RRH (65MHz)	C	From Centroid-Face	4.0000 -2.00 3.00	-20.0000	137.0000	1/2" Ice	2.9362	83.90
						1" Ice	3.1832	111.08
						2" Ice	3.7030	176.02
						4" Ice	4.8463	353.75
						No Ice	2.6979	60.00
800MHZ RRH	A	From Centroid-Face	4.0000 -2.00 3.00	20.0000	137.0000	1/2" Ice	2.9362	83.90
						1" Ice	3.1832	111.08
						2" Ice	3.7030	176.02
						4" Ice	4.8463	353.75
						No Ice	2.4899	53.00
800MHZ RRH	B	From Centroid-Face	4.0000 -2.00 3.00	-20.0000	137.0000	1/2" Ice	2.7061	74.19
						1" Ice	2.9310	98.39
						2" Ice	3.4068	156.61
						4" Ice	4.4620	317.77
						No Ice	2.4899	53.00
800MHZ RRH	C	From Centroid-Face	4.0000 -2.00 3.00	-20.0000	137.0000	1/2" Ice	2.7061	74.19
						1" Ice	2.9310	98.39
						2" Ice	3.4068	156.61
						4" Ice	4.4620	317.77
						No Ice	2.4899	53.00
Horizon Duo	C	From Centroid-Face	4.0000 2.00 3.00	-17.0000	137.0000	1/2" Ice	0.5469	7.00
						1" Ice	0.6484	11.78
						2" Ice	0.7586	18.03
						4" Ice	1.0049	35.72
						No Ice	1.6012	97.31
(3) 2.4" Dia. x 6' Mount Pipe	A	From Centroid-Face	4.0000 2.00 0.00	0.0000	137.0000	1/2" Ice	1.4250	21.90
						1" Ice	1.9305	37.81
						2" Ice	2.3162	55.56
						4" Ice	3.1485	99.64
						No Ice	5.0577	251.60
(3) 2.4" Dia. x 6' Mount Pipe	B	From Centroid-Face	4.0000 2.00 0.00	0.0000	137.0000	1/2" Ice	1.4250	21.90
						1" Ice	1.9305	37.81
						2" Ice	2.3162	55.56
						4" Ice	3.1485	99.64
						No Ice	5.0577	251.60
(3) 2.4" Dia. x 6' Mount Pipe	C	From Centroid-Face	4.0000 2.00 0.00	0.0000	137.0000	1/2" Ice	1.4250	21.90
						1" Ice	1.9305	37.81
						2" Ice	2.3162	55.56

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job NHV 2071 143137 (BU 806939)	Page 13 of 34
	Project TEP No. 51192.38096	Date 11:55:56 10/01/15
	Client Crown Castle	Designed by Kelly E. Hoiness

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>	<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight lb</i>
Platform Mount [LP 602-1]	B	None		0.0000	137.0000	2" Ice	3.1485	99.64
						4" Ice	5.0577	251.60
						No Ice	32.0300	1343.30
						1/2" Ice	38.7100	1800.09
						1" Ice	45.3900	2256.88
						2" Ice	58.7500	3170.46
** ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Centroid-Fa ce	4.0000 -6.00 2.00	0.0000	127.0000	4" Ice	85.4700	4997.62
						No Ice	6.8253	112.18
						1/2" Ice	7.3471	169.02
						1" Ice	7.8631	232.59
						2" Ice	8.9261	383.07
						4" Ice	11.1755	806.82
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Centroid-Fa ce	4.0000 -6.00 2.00	0.0000	127.0000	No Ice	6.8253	112.18
						1/2" Ice	7.3471	169.02
						1" Ice	7.8631	232.59
						2" Ice	8.9261	383.07
						4" Ice	11.1755	806.82
						No Ice	6.8253	112.18
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Centroid-Fa ce	4.0000 -6.00 2.00	0.0000	127.0000	1/2" Ice	7.3471	169.02
						1" Ice	7.8631	232.59
						2" Ice	8.9261	383.07
						4" Ice	11.1755	806.82
						No Ice	0.4110	11.02
						1/2" Ice	0.4998	14.12
KRY 112 144/1	B	From Centroid-Fa ce	4.0000 -2.00 2.00	0.0000	127.0000	1" Ice	0.5972	18.44
						2" Ice	0.8179	31.51
						4" Ice	1.3632	80.86
						No Ice	0.4110	11.02
						1/2" Ice	0.4998	14.12
						1" Ice	0.5972	18.44
KRY 112 144/1	C	From Centroid-Fa ce	4.0000 -6.00 2.00	0.0000	127.0000	2" Ice	0.8179	31.51
						4" Ice	1.3632	80.86
						No Ice	0.4110	11.02
						1/2" Ice	0.4998	14.12
						1" Ice	0.5972	18.44
						2" Ice	0.8179	31.51
KRY 112 144/1	C	From Centroid-Fa ce	4.0000 -2.00 2.00	0.0000	127.0000	4" Ice	1.3632	80.86
						No Ice	0.4110	11.02
						1/2" Ice	0.4998	14.12
						1" Ice	0.5972	18.44
						2" Ice	0.8179	31.51
						4" Ice	1.3632	80.86
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Centroid-Fa ce	4.0000 -2.00 2.00	0.0000	127.0000	No Ice	6.8253	112.18
						1/2" Ice	7.3471	169.02
						1" Ice	7.8631	232.59
						2" Ice	8.9261	383.07
						4" Ice	11.1755	806.82
						No Ice	6.8253	112.18
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Centroid-Fa ce	4.0000 -2.00 2.00	0.0000	127.0000	1/2" Ice	7.3471	169.02
						1" Ice	7.8631	232.59
						2" Ice	8.9261	383.07
						4" Ice	11.1755	806.82
						No Ice	6.8253	112.18
						1/2" Ice	7.3471	169.02
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Centroid-Fa ce	4.0000 -2.00 2.00	0.0000	127.0000	1" Ice	7.8631	232.59
						2" Ice	8.9261	383.07
						4" Ice	11.1755	806.82
						No Ice	6.8253	112.18
						1/2" Ice	7.3471	169.02
						1" Ice	7.8631	232.59
LNx-6515DS-VTM w/ Mount Pipe	A	From Centroid-Fa ce	4.0000 2.00 2.00	0.0000	127.0000	2" Ice	8.9261	383.07
						4" Ice	11.1755	806.82
						No Ice	11.6828	83.27
						1/2" Ice	12.4043	172.93
						1" Ice	13.1351	272.55
						2" Ice	14.6007	506.06

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	14 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight lb
LNX-6515DS-VTM w/ Mount Pipe	B	From Centroid-Fa ce	4.0000 2.00 2.00	0.0000	127.0000	4" Ice	17.8748	20.1392	1151.11
						No Ice	11.6828	9.8418	83.27
						1/2" Ice	12.4043	11.3657	172.93
						1" Ice	13.1351	12.9138	272.55
						2" Ice	14.6007	15.2672	506.06
LNX-6515DS-VTM w/ Mount Pipe	C	From Centroid-Fa ce	4.0000 2.00 2.00	0.0000	127.0000	4" Ice	17.8748	20.1392	1151.11
						No Ice	11.6828	9.8418	83.27
						1/2" Ice	12.4043	11.3657	172.93
						1" Ice	13.1351	12.9138	272.55
						2" Ice	14.6007	15.2672	506.06
RRUS 11 B12	A	From Centroid-Fa ce	4.0000 2.00 2.00	0.0000	127.0000	4" Ice	17.8748	20.1392	1151.11
						No Ice	3.3056	1.3611	50.70
						1/2" Ice	3.5497	1.5404	71.57
						1" Ice	3.8025	1.7284	95.49
						2" Ice	4.3340	2.1302	153.24
RRUS 11 B12	B	From Centroid-Fa ce	4.0000 2.00 2.00	0.0000	127.0000	4" Ice	5.5006	3.0377	313.85
						No Ice	3.3056	1.3611	50.70
						1/2" Ice	3.5497	1.5404	71.57
						1" Ice	3.8025	1.7284	95.49
						2" Ice	4.3340	2.1302	153.24
RRUS 11 B12	C	From Centroid-Fa ce	4.0000 2.00 2.00	0.0000	127.0000	4" Ice	5.5006	3.0377	313.85
						No Ice	3.3056	1.3611	50.70
						1/2" Ice	3.5497	1.5404	71.57
						1" Ice	3.8025	1.7284	95.49
						2" Ice	4.3340	2.1302	153.24
2.4" Dia. x 6' Mount Pipe	A	From Centroid-Fa ce	4.0000 6.00 0.00	0.0000	127.0000	4" Ice	5.5006	3.0377	313.85
						No Ice	1.4250	1.4250	21.90
						1/2" Ice	1.9305	1.9305	37.81
						1" Ice	2.3162	2.3162	55.56
						2" Ice	3.1485	3.1485	99.64
2.4" Dia. x 6' Mount Pipe	B	From Centroid-Fa ce	4.0000 6.00 0.00	0.0000	127.0000	4" Ice	5.0577	5.0577	251.60
						No Ice	1.4250	1.4250	21.90
						1/2" Ice	1.9305	1.9305	37.81
						1" Ice	2.3162	2.3162	55.56
						2" Ice	3.1485	3.1485	99.64
2.4" Dia. x 6' Mount Pipe	C	From Centroid-Fa ce	4.0000 6.00 0.00	0.0000	127.0000	4" Ice	5.0577	5.0577	251.60
						No Ice	1.4250	1.4250	21.90
						1/2" Ice	1.9305	1.9305	37.81
						1" Ice	2.3162	2.3162	55.56
						2" Ice	3.1485	3.1485	99.64
Platform Mount [LP 713-1]	B	None		0.0000	127.0000	4" Ice	5.0577	5.0577	251.60
						No Ice	31.2700	31.2700	1510.00
						1/2" Ice	39.6800	39.6800	1929.00
						1" Ice	48.0900	48.0900	2348.00
						2" Ice	64.9100	64.9100	3186.00
Miscellaneous [NA 507-1]	B	None		0.0000	127.0000	4" Ice	98.5500	98.5500	4862.00
						No Ice	4.8000	4.8000	245.00
						1/2" Ice	6.7000	6.7000	294.00
						1" Ice	8.6000	8.6000	343.00
						2" Ice	12.4000	12.4000	441.00
** LLPX310R w/ Mount Pipe	A	From Leg	1.0000 1.50 3.00	0.0000	107.0000	4" Ice	20.0000	20.0000	637.00
						No Ice	4.9817	2.8743	43.87
						1/2" Ice	5.3757	3.3975	80.95
						1" Ice	5.7798	3.9374	123.32
						2" Ice	6.6182	5.1249	226.55
						4" Ice	8.4370	7.8945	531.24

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	15 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight lb
LLPX310R w/ Mount Pipe	B	From Leg	1.0000 1.50 3.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.9817 5.3757 5.7798 6.6182 8.4370	2.8743 3.3975 3.9374 5.1249 7.8945	43.87 80.95 123.32 226.55 531.24
LLPX310R w/ Mount Pipe	C	From Leg	1.0000 1.50 3.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.9817 5.3757 5.7798 6.6182 8.4370	2.8743 3.3975 3.9374 5.1249 7.8945	43.87 80.95 123.32 226.55 531.24
WIMAX DAP HEAD	A	From Leg	1.0000 1.50 3.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.8044 1.9877 2.1795 2.5891 3.5121	0.7778 0.9182 1.0673 1.3914 2.1432	33.00 44.58 58.46 93.93 201.10
WIMAX DAP HEAD	B	From Leg	1.0000 1.50 3.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.8044 1.9877 2.1795 2.5891 3.5121	0.7778 0.9182 1.0673 1.3914 2.1432	33.00 44.58 58.46 93.93 201.10
WIMAX DAP HEAD	C	From Leg	1.0000 1.50 3.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.8044 1.9877 2.1795 2.5891 3.5121	0.7778 0.9182 1.0673 1.3914 2.1432	33.00 44.58 58.46 93.93 201.10
HORIZON COMPACT	A	From Leg	1.0000 -1.50 3.00	-17.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.8409 0.9658 1.0993 1.3922 2.0819	0.4340 0.5297 0.6341 0.8687 1.4417	11.50 17.99 26.19 48.49 122.20
HORIZON COMPACT	C	From Leg	1.0000 -1.50 3.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.8409 0.9658 1.0993 1.3922 2.0819	0.4340 0.5297 0.6341 0.8687 1.4417	11.50 17.99 26.19 48.49 122.20
2.4" Dia. x 6' Mount Pipe	A	From Leg	1.0000 -1.50 0.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9305 2.3162 3.1485 5.0577	1.4250 1.9305 2.3162 3.1485 5.0577	21.90 37.81 55.56 99.64 251.60
2.4" Dia. x 6' Mount Pipe	B	From Leg	1.0000 -1.50 0.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9305 2.3162 3.1485 5.0577	1.4250 1.9305 2.3162 3.1485 5.0577	21.90 37.81 55.56 99.64 251.60
2.4" Dia. x 6' Mount Pipe	C	From Leg	1.0000 -1.50 0.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9305 2.3162 3.1485 5.0577	1.4250 1.9305 2.3162 3.1485 5.0577	21.90 37.81 55.56 99.64 251.60
2.4" Dia. x 8' Mount Pipe	A	From Leg	1.0000 0.00 0.00	0.0000	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.9000 2.7281 3.4009 4.3962 6.4980	1.9000 2.7281 3.4009 4.3962 6.4980	29.20 43.54 63.16 118.86 300.35
2.4" Dia. x 8' Mount Pipe	B	From Leg	1.0000 0.00	0.0000	107.0000	No Ice 1/2" Ice	1.9000 2.7281	1.9000 2.7281	29.20 43.54

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	16 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>	<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight lb</i>
			0.00			1" Ice 3.4009	3.4009	63.16
						2" Ice 4.3962	4.3962	118.86
						4" Ice 6.4980	6.4980	300.35
2.4" Dia. x 8' Mount Pipe	C	From Leg	1.0000	0.0000	107.0000	No Ice 1.9000	1.9000	29.20
			0.00			1/2" Ice 2.7281	2.7281	43.54
			0.00			1" Ice 3.4009	3.4009	63.16
						2" Ice 4.3962	4.3962	118.86
						4" Ice 6.4980	6.4980	300.35
Side Arm Mount [SO 101-3]	B	None		0.0000	107.0000	No Ice 7.5000	7.5000	252.00
						1/2" Ice 8.9000	8.9000	333.00
						1" Ice 10.3000	10.3000	414.00
						2" Ice 13.1000	13.1000	576.00
						4" Ice 18.7000	18.7000	900.00
**								
APXV18-206517S-C	A	From Leg	1.0000	30.0000	100.0000	No Ice 5.1667	3.0375	26.40
			0.00			1/2" Ice 5.6182	3.4693	53.00
			0.00			1" Ice 6.0772	3.9086	85.10
						2" Ice 7.0173	4.8093	166.61
						4" Ice 9.1225	6.6995	404.25
APXV18-206517S-C	B	From Leg	1.0000	30.0000	100.0000	No Ice 5.1667	3.0375	26.40
			0.00			1/2" Ice 5.6182	3.4693	53.00
			0.00			1" Ice 6.0772	3.9086	85.10
						2" Ice 7.0173	4.8093	166.61
						4" Ice 9.1225	6.6995	404.25
APXV18-206517S-C	C	From Leg	1.0000	30.0000	100.0000	No Ice 5.1667	3.0375	26.40
			0.00			1/2" Ice 5.6182	3.4693	53.00
			0.00			1" Ice 6.0772	3.9086	85.10
						2" Ice 7.0173	4.8093	166.61
						4" Ice 9.1225	6.6995	404.25
Pipe Mount [PM 601-3]	B	None		0.0000	100.0000	No Ice 4.3900	4.3900	195.00
						1/2" Ice 5.4800	5.4800	237.41
						1" Ice 6.5700	6.5700	279.82
						2" Ice 8.7500	8.7500	364.65
						4" Ice 13.1100	13.1100	534.30
**								
OG-860/1920/GPS-A	C	From Leg	3.0000	-30.0000	80.0000	No Ice 0.1444	0.1444	1.65
			0.00			1/2" Ice 0.2333	0.2333	3.53
			1.00			1" Ice 0.3333	0.3333	6.44
						2" Ice 0.5667	0.5667	15.90
						4" Ice 1.1667	1.1667	53.78
2.4" x 2-ft pipe	A	From Leg	3.0000	0.0000	80.0000	No Ice 0.3467	0.3467	7.32
			0.00			1/2" Ice 0.4769	0.4769	11.16
			0.00			1" Ice 0.6356	0.6356	16.61
						2" Ice 0.9956	0.9956	32.99
						4" Ice 1.8489	1.8489	91.90
2.4" x 2-ft pipe	C	From Leg	3.0000	0.0000	80.0000	No Ice 0.3467	0.3467	7.32
			0.00			1/2" Ice 0.4769	0.4769	11.16
			0.00			1" Ice 0.6356	0.6356	16.61
						2" Ice 0.9956	0.9956	32.99
						4" Ice 1.8489	1.8489	91.90
Side Arm Mount [SO 701-1]	C	From Leg	1.5000	0.0000	80.0000	No Ice 0.8500	1.6700	65.00
			0.00			1/2" Ice 1.1400	2.3400	79.00
			0.00			1" Ice 1.4300	3.0100	93.00
						2" Ice 2.0100	4.3500	121.00
						4" Ice 3.1700	7.0300	177.00
Side Arm Mount [SO 701-1]	A	From Leg	1.5000	0.0000	80.0000	No Ice 0.8500	1.6700	65.00
			0.00			1/2" Ice 1.1400	2.3400	79.00

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job NHV 2071 143137 (BU 806939)	Page 17 of 34
	Project TEP No. 51192.38096	Date 11:55:56 10/01/15
	Client Crown Castle	Designed by Kelly E. Hoiness

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>	<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight lb</i>
			0.00		1" Ice	1.4300	3.0100	93.00
					2" Ice	2.0100	4.3500	121.00
					4" Ice	3.1700	7.0300	177.00

Dishes

<i>Description</i>	<i>Face or Leg</i>	<i>Dish Type</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft</i>	<i>Azimuth Adjustment °</i>	<i>3 dB Beam Width °</i>	<i>Elevation ft</i>	<i>Outside Diameter ft</i>	<i>Aperture Area ft²</i>	<i>Weight lb</i>
VHLP2-11	C	Paraboloid w/Radome	From Centroid -Face	4.0000 2.00 3.00	-17.0000		137.0000	2.0000	No Ice 3.7200 1/2" Ice 4.0100 1" Ice 4.3000 2" Ice 4.8800 4" Ice 6.0400	31.00 47.56 68.12 109.25 191.50
VHLP2-11	A	Paraboloid w/Radome	From Leg	2.0000 -1.50 3.00	-17.0000		107.0000	2.0000	No Ice 3.7200 1/2" Ice 4.0100 1" Ice 4.3000 2" Ice 4.8800 4" Ice 6.0400	31.00 47.56 68.12 109.25 191.50
PX2F-52	C	Paraboloid w/Shroud (HP)	From Leg	2.0000 -1.50 3.00	0.0000		107.0000	2.0917	No Ice 3.4400 1/2" Ice 3.7200 1" Ice 3.9900 2" Ice 4.5500 4" Ice 5.6700	20.00 40.00 60.00 90.00 170.00
**										

Load Combinations

<i>Comb. No.</i>	<i>Description</i>
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
15	Dead+ Wind 0 deg+Ice

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	18 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

<i>Comb. No.</i>	<i>Description</i>
16	Dead+ Wind 30 deg+Ice
17	Dead+ Wind 60 deg+Ice
18	Dead+ Wind 90 deg+Ice
19	Dead+ Wind 120 deg+Ice
20	Dead+ Wind 150 deg+Ice
21	Dead+ Wind 180 deg+Ice
22	Dead+ Wind 210 deg+Ice
23	Dead+ Wind 240 deg+Ice
24	Dead+ Wind 270 deg+Ice
25	Dead+ Wind 300 deg+Ice
26	Dead+ Wind 330 deg+Ice
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

<i>Section No.</i>	<i>Elevation ft</i>	<i>Component Type</i>	<i>Condition</i>	<i>Gov. Load Comb.</i>	<i>Force lb</i>	<i>Major Axis Moment lb-ft</i>	<i>Minor Axis Moment lb-ft</i>
L1	160 - 121.333	Pole	Max Tension	21	0.01	-0.20	0.00
			Max. Compression	14	-23426.81	-22.49	-787.93
			Max. Mx	11	-10634.16	538726.46	1266.58
			Max. My	8	-10598.47	-1173.56	-542276.42
			Max. Vy	11	-27398.48	538726.46	1266.58
			Max. Vx	2	-27633.56	1042.67	542223.10
			Max. Torque	13			1787.63
			Max Tension	1	0.00	0.00	0.00
L2	121.333 - 102.5	Pole	Max. Compression	14	-30265.37	330.91	-570.51
			Max. Mx	11	-15874.48	1230782.80	2589.71
			Max. My	2	-15837.75	1593.48	1240011.20
			Max. Vy	5	32366.40	-1230049.0	-1667.24
			Max. Vx	2	-32599.40	1593.48	1240011.20
			Max. Torque	13			2011.71
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-35349.16	387.65	-196.90
L3	102.5 - 81.3333	Pole	Max. Mx	11	-20033.55	1758317.78	2793.47
			Max. My	2	-20001.99	806.18	1771773.20
			Max. Vy	5	35312.71	-1758117.6	-1542.61
			Max. Vx	2	-35546.07	806.18	1771773.20
			Max. Torque	13			2007.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-43142.99	775.43	455.01
			Max. Mx	5	-26816.71	-2475845.3	-1443.13
L4	81.3333 - 67.5	Pole	Max. My	2	-26795.81	174.95	2494271.84

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	19 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L5	67.5 - 41.4167	Pole	Max. Vy	5	38141.93	-2475845.37	-1443.13
			Max. Vx	2	-38358.56	174.95	2494271.84
			Max. Torque	13			2150.19
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-51282.98	856.20	983.65
			Max. Mx	5	-34140.36	-3245397.18	-1526.69
			Max. My	2	-34125.72	-555.23	3268155.69
			Max. Vy	5	40835.00	-3245397.18	-1526.69
L6	41.4167 - 26.5	Pole	Max. Vx	2	-41050.49	-555.23	3268155.69
			Max. Torque	13			2203.29
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-63381.26	749.34	1480.85
			Max. Mx	5	-44997.13	-4155940.22	-1717.43
			Max. My	2	-44988.26	-1551.87	4183163.58
			Max. Vy	5	43695.77	-4155940.22	-1717.43
			Max. Vx	2	-43909.68	-1551.87	4183163.58
L7	26.5 - 0	Pole	Max. Torque	13			2262.27
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-77384.43	671.83	2217.43
			Max. Mx	5	-57975.88	-5355034.81	-1866.07
			Max. My	2	-57975.66	-2705.81	5387821.28
			Max. Vy	5	46846.34	-5355034.81	-1866.07
			Max. Vx	2	-47055.24	-2705.81	5387821.28
			Max. Torque	13			2327.36

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	15	77384.43	-10.64	11432.07
	Max. H _x	11	57995.99	46785.35	22.76
	Max. H _z	2	57995.99	-38.57	47030.18
	Max. M _x	2	5387821.28	-38.57	47030.18
	Max. M _z	5	5355034.81	-46821.44	-8.67
	Max. Torsion	13	2327.36	23494.23	40729.05
	Min. Vert	1	57995.99	0.00	0.00
	Min. H _x	5	57995.99	-46821.44	-8.67
	Min. H _z	8	57995.99	2.63	-47019.08
	Min. M _x	8	-5384909.02	2.63	-47019.08
	Min. M _z	11	-5351987.65	46785.35	22.76
	Min. Torsion	7	-2231.58	-23464.55	-40743.39

Tower Mast Reaction Summary

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job NHV 2071 143137 (BU 806939)	Page 20 of 34
	Project TEP No. 51192.38096	Date 11:55:56 10/01/15
	Client Crown Castle	Designed by Kelly E. Hoiness

Load Combination	Vertical lb	Shear _x lb	Shear _z lb	Overturning Moment, M _x lb-ft	Overturning Moment, M _z lb-ft	Torque lb-ft
Dead Only	57995.99	0.00	0.00	-228.70	92.21	0.00
Dead+ Wind 0 deg - No Ice	57995.99	38.57	-47030.18	-5387821.28	-2706.03	-1757.47
Dead+ Wind 30 deg - No Ice	57995.99	23427.81	-40684.62	-4660008.69	-2678805.11	-842.01
Dead+ Wind 60 deg - No Ice	57995.99	40523.42	-23452.82	-2685385.84	-4634145.03	180.16
Dead+ Wind 90 deg - No Ice	57995.99	46821.42	8.67	1865.93	-5355034.81	1175.14
Dead+ Wind 120 deg - No Ice	57995.99	40627.19	23475.33	2689522.05	-4647644.02	1893.73
Dead+ Wind 150 deg - No Ice	57995.99	23464.55	40743.39	4666864.18	-2685744.93	2231.58
Dead+ Wind 180 deg - No Ice	57995.99	-2.63	47019.08	5384909.02	-1075.90	1745.02
Dead+ Wind 210 deg - No Ice	57995.99	-23397.50	40654.13	4654465.54	2674933.20	885.26
Dead+ Wind 240 deg - No Ice	57995.99	-40491.29	23431.11	2681039.84	4630837.69	-229.95
Dead+ Wind 270 deg - No Ice	57995.99	-46785.35	-22.76	-5125.95	5351987.65	-1248.45
Dead+ Wind 300 deg - No Ice	57995.99	-40604.75	-23504.52	-2694321.74	4646723.79	-2114.49
Dead+ Wind 330 deg - No Ice	57995.99	-23494.23	-40729.05	-4666779.92	2689714.23	-2327.36
Dead+Ice	77384.43	0.00	0.00	-2217.43	671.83	0.00
Dead+ Wind 0 deg+Ice	77384.43	10.64	-11432.07	-1354126.17	-333.54	-488.15
Dead+ Wind 30 deg+Ice	77384.43	5703.95	-9891.53	-1171865.29	-672923.26	-210.44
Dead+ Wind 60 deg+Ice	77384.43	9865.28	-5703.95	-676600.94	-1164321.06	95.65
Dead+ Wind 90 deg+Ice	77384.43	11396.73	-0.13	-2216.63	-1345191.25	380.66
Dead+ Wind 120 deg+Ice	77384.43	9886.32	5705.38	672379.30	-1166958.70	573.32
Dead+ Wind 150 deg+Ice	77384.43	5708.56	9902.53	1168571.15	-673758.14	641.83
Dead+ Wind 180 deg+Ice	77384.43	-2.63	11429.57	1349035.40	887.85	487.51
Dead+ Wind 210 deg+Ice	77384.43	-5697.18	9884.69	1166172.11	673447.19	222.95
Dead+ Wind 240 deg+Ice	77384.43	-9858.12	5699.07	671184.28	1164977.60	-106.35
Dead+ Wind 270 deg+Ice	77384.43	-11388.71	-3.04	-2949.03	1345914.43	-399.58
Dead+ Wind 300 deg+Ice	77384.43	-9881.35	-5711.91	-677892.61	1168172.87	-626.15
Dead+ Wind 330 deg+Ice	77384.43	-5715.19	-9899.36	-1172979.62	676071.90	-664.25
Dead+ Wind 0 deg - Service	57995.99	13.34	-16273.42	-1867186.51	-864.05	-613.80
Dead+ Wind 30 deg - Service	57995.99	8106.51	-14077.72	-1614966.03	-928204.81	-292.77
Dead+ Wind 60 deg - Service	57995.99	14021.94	-8115.16	-930694.83	-1605764.60	63.60
Dead+ Wind 90 deg - Service	57995.99	16201.19	3.00	500.74	-1855566.58	409.99
Dead+ Wind 120 deg - Service	57995.99	14057.85	8122.95	931843.15	-1610454.08	661.17
Dead+ Wind 150 deg - Service	57995.99	8119.22	14098.06	1617055.17	-930616.10	780.77
Dead+ Wind 180 deg - Service	57995.99	-0.91	16269.58	1865875.52	-303.58	612.18
Dead+ Wind 210 deg - Service	57995.99	-8096.02	14067.17	1612739.44	926998.67	311.45
Dead+ Wind 240 deg - Service	57995.99	-14010.83	8107.65	928889.04	1604752.30	-80.28
Dead+ Wind 270 deg - Service	57995.99	-16188.71	-7.88	-1925.07	1854648.38	-438.61
Dead+ Wind 300 deg - Service	57995.99	-14050.09	-8133.05	-933800.98	1610280.26	-742.28
Dead+ Wind 330 deg - Service	57995.99	-8129.49	-14093.10	-1617323.80	932135.52	-815.28

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	0.00	-57995.99	0.00	0.00	57995.99	0.00	0.000%
2	38.57	-57995.99	-47030.17	-38.57	57995.99	47030.18	0.000%
3	23427.81	-57995.99	-40684.62	-23427.81	57995.99	40684.62	0.000%
4	40523.42	-57995.99	-23452.82	-40523.42	57995.99	23452.82	0.000%
5	46821.42	-57995.99	8.67	-46821.44	57995.99	-8.67	0.000%
6	40627.19	-57995.99	23475.33	40627.19	57995.99	-23475.33	0.000%
7	23464.55	-57995.99	40743.39	-23464.55	57995.99	-40743.39	0.000%
8	-2.63	-57995.99	47019.07	2.63	57995.99	-47019.08	0.000%
9	-23397.50	-57995.99	40654.13	23397.50	57995.99	-40654.13	0.000%
10	-40491.29	-57995.99	23431.11	40491.29	57995.99	-23431.11	0.000%
11	-46785.34	-57995.99	-22.76	46785.35	57995.99	22.76	0.000%
12	-40604.75	-57995.99	-23504.52	40604.75	57995.99	23504.52	0.000%
13	-23494.23	-57995.99	-40729.05	23494.23	57995.99	40729.05	0.000%
14	0.00	-77384.43	0.00	0.00	77384.43	0.00	0.000%

tnxTower Tower Engineering Professionals, Inc. 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	21 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
15	10.64	-77384.43	-11432.05	-10.64	77384.43	11432.07	0.000%
16	5703.94	-77384.43	-9891.52	-5703.95	77384.43	9891.53	0.000%
17	9865.28	-77384.43	-5703.95	-9865.28	77384.43	5703.95	0.000%
18	11396.71	-77384.43	-0.13	-11396.73	77384.43	0.13	0.000%
19	9886.32	-77384.43	5705.38	-9886.32	77384.43	-5705.38	0.000%
20	5708.56	-77384.43	9902.53	-5708.56	77384.43	-9902.53	0.000%
21	-2.63	-77384.43	11429.55	2.63	77384.43	-11429.57	0.000%
22	-5697.17	-77384.43	9884.69	5697.18	77384.43	-9884.69	0.000%
23	-9858.12	-77384.43	5699.07	9858.12	77384.43	-5699.07	0.000%
24	-11388.69	-77384.43	-3.04	11388.71	77384.43	3.04	0.000%
25	-9881.35	-77384.43	-5711.91	9881.35	77384.43	5711.91	0.000%
26	-5715.19	-77384.43	-9899.36	5715.19	77384.43	9899.36	0.000%
27	13.34	-57995.99	-16273.42	-13.34	57995.99	16273.42	0.000%
28	8106.51	-57995.99	-14077.72	-8106.51	57995.99	14077.72	0.000%
29	14021.94	-57995.99	-8115.16	-14021.94	57995.99	8115.16	0.000%
30	16201.18	-57995.99	3.00	-16201.19	57995.99	-3.00	0.000%
31	14057.85	-57995.99	8122.95	-14057.85	57995.99	-8122.95	0.000%
32	8119.22	-57995.99	14098.06	-8119.22	57995.99	-14098.06	0.000%
33	-0.91	-57995.99	16269.57	0.91	57995.99	-16269.58	0.000%
34	-8096.02	-57995.99	14067.17	8096.02	57995.99	-14067.17	0.000%
35	-14010.83	-57995.99	8107.65	14010.83	57995.99	-8107.65	0.000%
36	-16188.70	-57995.99	-7.88	16188.71	57995.99	7.88	0.000%
37	-14050.09	-57995.99	-8133.05	14050.09	57995.99	8133.05	0.000%
38	-8129.49	-57995.99	-14093.10	8129.49	57995.99	14093.10	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	4	0.00000001	0.00096076
3	Yes	5	0.00000001	0.00098688
4	Yes	5	0.00000001	0.00099104
5	Yes	4	0.00000001	0.00069488
6	Yes	6	0.00000001	0.00003056
7	Yes	5	0.00000001	0.00097722
8	Yes	4	0.00000001	0.00094197
9	Yes	6	0.00000001	0.00003018
10	Yes	5	0.00000001	0.00099299
11	Yes	4	0.00000001	0.00061538
12	Yes	5	0.00000001	0.00097783
13	Yes	6	0.00000001	0.00003082
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00040080
16	Yes	5	0.00000001	0.00013266
17	Yes	5	0.00000001	0.00013332
18	Yes	4	0.00000001	0.00037739
19	Yes	5	0.00000001	0.00014101
20	Yes	5	0.00000001	0.00012895
21	Yes	4	0.00000001	0.00040116
22	Yes	5	0.00000001	0.00013719
23	Yes	5	0.00000001	0.00013515
24	Yes	4	0.00000001	0.00038043
25	Yes	5	0.00000001	0.00012964
26	Yes	5	0.00000001	0.00014404
27	Yes	4	0.00000001	0.00024524

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	22 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

28	Yes	5	0.00000001	0.00009059
29	Yes	5	0.00000001	0.00009133
30	Yes	4	0.00000001	0.00020035
31	Yes	5	0.00000001	0.00009590
32	Yes	5	0.00000001	0.00008892
33	Yes	4	0.00000001	0.00024359
34	Yes	5	0.00000001	0.00009368
35	Yes	5	0.00000001	0.00009180
36	Yes	4	0.00000001	0.00020091
37	Yes	5	0.00000001	0.00008899
38	Yes	5	0.00000001	0.00009773

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _a ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio $\frac{P}{P_a}$
L1	160 - 158.211	TP29.77x21.65x0.25	38.6667	0.0000	0.0	39.000	17.5295	-125.28	683651.00	0.000
	158.211 - 156.421					39.000	17.8320	-1806.93	695449.00	0.003
	156.421 - 154.632					39.000	18.1345	-1937.60	707247.00	0.003
	154.632 - 152.842					39.000	18.4370	-2070.75	719045.00	0.003
	152.842 - 151.053					39.000	18.7396	-2206.37	730843.00	0.003
	151.053 - 149.263					39.000	19.0421	-2344.47	742640.00	0.003
	149.263 - 147.474					39.000	19.3446	-2485.03	754438.00	0.003
	147.474 - 145.684					39.000	19.6471	-4533.24	766236.00	0.006
	145.684 - 143.895					39.000	19.9496	-4685.48	778034.00	0.006
	143.895 - 142.105					39.000	20.2521	-4841.47	789832.00	0.006
	142.105 - 140.316					39.000	20.5546	-5001.09	801630.00	0.006
	140.316 - 138.526					39.000	20.8571	-5182.62	813428.00	0.006
	138.526 - 136.737					39.000	21.1596	-7076.50	825226.00	0.009
	136.737 - 134.947					39.000	21.4621	-7253.55	837024.00	0.009
	134.947 - 133.158					39.000	21.7647	-7435.26	848822.00	0.009
	133.158 - 131.368					39.000	22.0672	-7621.37	860620.00	0.009
	131.368 - 129.579					39.000	22.3697	-7807.00	872418.00	0.009
	129.579 - 127.789					39.000	22.6722	-8001.71	884215.00	0.009
	127.789 - 126					39.000	22.9747	-10598.20	896013.00	0.012
	126 - 121.333					39.000	23.7636	-4721.36	926780.00	0.005
L2	126 - 121.333	TP33.225x28.29x0.375	23.5000	0.0000	0.0	39.000	34.8907	-6892.60	1360740.00	0.005

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	23 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

Section No.	Elevation ft	Size	L ft	L _a ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio $\frac{P}{P_a}$
	121.333 - 120.287					39.000	35.1560	-11822.60	1371090.00	0.009
	120.287 - 119.241					39.000	35.4213	-12012.10	1381430.00	0.009
	119.241 - 118.194					39.000	35.6867	-12203.20	1391780.00	0.009
	118.194 - 117.148					39.000	35.9520	-12396.00	1402130.00	0.009
	117.148 - 116.102					39.000	36.2173	-12590.40	1412470.00	0.009
	116.102 - 115.056					39.000	36.4826	-12786.40	1422820.00	0.009
	115.056 - 114.009					39.000	36.7479	-12983.90	1433170.00	0.009
	114.009 - 112.963					39.000	37.0132	-13183.10	1443520.00	0.009
	112.963 - 111.917					39.000	37.2785	-13383.80	1453860.00	0.009
	111.917 - 110.87					39.000	37.5439	-13586.10	1464210.00	0.009
	110.87 - 109.824					39.000	37.8092	-13824.00	1474560.00	0.009
	109.824 - 108.778					39.000	38.0745	-14029.50	1484910.00	0.009
	108.778 - 107.731					39.000	38.3398	-14236.60	1495250.00	0.010
	107.731 - 106.685					39.000	38.6051	-14983.10	1505600.00	0.010
	106.685 - 105.639					39.000	38.8704	-15195.00	1515950.00	0.010
	105.639 - 104.593					39.000	39.1357	-15408.50	1526290.00	0.010
	104.593 - 103.546					39.000	39.4011	-15623.60	1536640.00	0.010
L3	103.546 - 102.5	TP37.67x33.225x0.5476	21.1667	0.0000	0.0	39.000	39.6664	-15840.20	1546990.00	0.010
	102.5 - 101.467					39.000	58.0068	-16099.10	2262260.00	0.007
	101.467 - 100.433					39.000	58.3894	-16353.40	2277190.00	0.007
	100.433 - 99.4					39.000	58.7721	-16831.20	2292110.00	0.007
	99.4 - 98.3667					39.000	59.1548	-17088.60	2307040.00	0.007
	98.3667 - 97.3333					39.000	59.5374	-17347.30	2321960.00	0.007
	97.3333 - 96.3					39.000	59.9201	-17605.10	2336880.00	0.008
	96.3 - 95.2667					39.000	60.3028	-17866.30	2351810.00	0.008
	95.2667 - 94.2333					39.000	60.6854	-18128.90	2366730.00	0.008
	94.2333 - 93.2					39.000	61.0681	-18392.80	2381660.00	0.008
	93.2 - 92.1667					39.000	61.4507	-18657.80	2396580.00	0.008
	92.1667 - 91.1333					39.000	61.8334	-18924.20	2411500.00	0.008
	91.1333 - 90.1					39.000	62.2161	-19191.80	2426430.00	0.008
	90.1 - 89.0667					39.000	62.5987	-19460.60	2441350.00	0.008
	89.0667 - 88.0333					39.000	62.9814	-19730.70	2456270.00	0.008
	88.0333 - 87					39.000	63.3641	-20002.00	2471200.00	0.008
L4	87 - 81.3333	TP39.8239x35.3847x0.5	19.5000	0.0000	0.0	39.000	65.4625	-11939.30	2553040.00	0.005
	87 - 81.3333					39.000	58.2413	-10561.10	2271410.00	0.005
	81.3333 - 80.2692					39.000	58.6313	-22836.90	2286620.00	0.010
	80.2692 -					39.000	59.0214	-23285.00	2301830.00	0.010

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	24 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

Section No.	Elevation ft	Size	L ft	L _a ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio $\frac{P}{P_a}$
	79.2051									
	79.2051 - 78.141					39.000	59.4114	-23596.00	2317040.00	0.010
	78.141 - 77.0769					39.000	59.8014	-23908.70	2332250.00	0.010
	77.0769 - 76.0128					39.000	60.1914	-24223.00	2347460.00	0.010
	76.0128 - 74.9487					39.000	60.5814	-24539.00	2362680.00	0.010
	74.9487 - 73.8846					39.000	60.9714	-24856.50	2377890.00	0.010
	73.8846 - 72.8205					39.000	61.3615	-25175.70	2393100.00	0.011
	72.8205 - 71.7564					39.000	61.7515	-25496.50	2408310.00	0.011
	71.7564 - 70.6923					39.000	62.1415	-25818.90	2423520.00	0.011
	70.6923 - 69.6282					39.000	62.5315	-26142.90	2438730.00	0.011
	69.6282 - 68.5641					39.000	62.9215	-26468.60	2453940.00	0.011
	68.5641 - 67.5					39.000	63.3115	-26795.80	2469150.00	0.011
L5	67.5 - 66.4737	TP45.3x39.8239x0.6955	26.0833	0.0000	0.0	39.000	88.1058	-27174.90	3436130.00	0.008
	66.4737 - 65.4474					39.000	88.5883	-27549.40	3454950.00	0.008
	65.4474 - 64.421					39.000	89.0709	-27925.30	3473760.00	0.008
	64.421 - 63.3947					39.000	89.5534	-28302.60	3492580.00	0.008
	63.3947 - 62.3684					39.000	90.0359	-28681.20	3511400.00	0.008
	62.3684 - 61.3421					39.000	90.5184	-29061.20	3530220.00	0.008
	61.3421 - 60.3158					39.000	91.0009	-29442.60	3549040.00	0.008
	60.3158 - 59.2895					39.000	91.4835	-29825.30	3567860.00	0.008
	59.2895 - 58.2632					39.000	91.9660	-30209.50	3586670.00	0.008
	58.2632 - 57.2368					39.000	92.4485	-30594.90	3605490.00	0.008
	57.2368 - 56.2105					39.000	92.9310	-30981.80	3624310.00	0.009
	56.2105 - 55.1842					39.000	93.4135	-31370.00	3643130.00	0.009
	55.1842 - 54.1579					39.000	93.8960	-31759.60	3661950.00	0.009
	54.1579 - 53.1316					39.000	94.3786	-32150.50	3680760.00	0.009
	53.1316 - 52.1053					39.000	94.8611	-32542.90	3699580.00	0.009
	52.1053 - 51.0789					39.000	95.3436	-32936.50	3718400.00	0.009
	51.0789 - 50.0526					39.000	95.8261	-33331.60	3737220.00	0.009
	50.0526 - 49.0263					39.000	96.3086	-33728.00	3756040.00	0.009
	49.0263 - 48					39.000	96.7912	-34125.70	3774860.00	0.009
	48 - 41.4167					39.000	99.8863	-19013.40	3895570.00	0.005
L6	48 - 41.4167	TP47.4338x42.5269x0.7427	21.5000	0.0000	0.0	39.000	103.5220	-19297.90	4037380.00	0.005

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job NHV 2071 143137 (BU 806939)	Page 25 of 34
	Project TEP No. 51192.38096	Date 11:55:56 10/01/15
	Client Crown Castle	Designed by Kelly E. Hoiness

Section No.	Elevation ft	Size	L ft	L _a ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio $\frac{P}{P_a}$
L7	41.4167 - 40.3512	TP53x47.4338x0.7006	26.5000	0.0000	0.0	39.000	104.1040	-38808.80	4060060.00	0.010
	40.3512 - 39.2857					39.000	104.6860	-39274.20	4082740.00	0.010
	39.2857 - 38.2202					39.000	105.2670	-39741.30	4105420.00	0.010
	38.2202 - 37.1548					39.000	105.8490	-40210.00	4128100.00	0.010
	37.1548 - 36.0893					39.000	106.4300	-40680.30	4150780.00	0.010
	36.0893 - 35.0238					39.000	107.0120	-41152.40	4173460.00	0.010
	35.0238 - 33.9583					39.000	107.5930	-41626.00	4196140.00	0.010
	33.9583 - 32.8929					39.000	108.1750	-42101.40	4218820.00	0.010
	32.8929 - 31.8274					39.000	108.7560	-42578.40	4241500.00	0.010
	31.8274 - 30.7619					39.000	109.3380	-43057.00	4264180.00	0.010
	30.7619 - 29.6964					39.000	109.9200	-43537.40	4286860.00	0.010
	29.6964 - 28.6309					39.000	110.5010	-44019.30	4309540.00	0.010
	28.6309 - 27.5655					39.000	111.0830	-44503.00	4332220.00	0.010
	27.5655 - 26.5					39.000	111.6640	-44988.30	4354900.00	0.010
	26.5 - 25.175					39.000	106.0580	-45609.90	4136280.00	0.011
	25.175 - 23.85					39.000	106.6860	-46239.00	4160760.00	0.011
	23.85 - 22.525					39.000	107.3140	-46870.40	4185250.00	0.011
	22.525 - 21.2					39.000	107.9420	-47504.30	4209740.00	0.011
	21.2 - 19.875					39.000	108.5700	-48140.60	4234220.00	0.011
	19.875 - 18.55					39.000	109.1980	-48779.40	4258710.00	0.011
	18.55 - 17.225					39.000	109.8260	-49420.50	4283200.00	0.012
	17.225 - 15.9					39.000	110.4530	-50064.10	4307690.00	0.012
	15.9 - 14.575					39.000	111.0810	-50710.10	4332170.00	0.012
	14.575 - 13.25					39.000	111.7090	-51358.50	4356660.00	0.012
	13.25 - 11.925					39.000	112.3370	-52009.30	4381150.00	0.012
	11.925 - 10.6					39.000	112.9650	-52662.60	4405630.00	0.012
	10.6 - 9.275					39.000	113.5930	-53318.30	4430120.00	0.012
	9.275 - 7.95					39.000	114.2210	-53976.30	4454610.00	0.012
	7.95 - 6.625					39.000	114.8490	-54636.90	4479090.00	0.012
	6.625 - 5.3					39.000	115.4760	-55299.80	4503580.00	0.012
	5.3 - 3.975					39.000	116.1040	-55965.10	4528070.00	0.012
	3.975 - 2.65					39.000	116.7320	-56632.90	4552550.00	0.012
	2.65 - 1.325					39.000	117.3600	-57303.10	4577040.00	0.013
	1.325 - 0					39.000	117.9880	-57975.70	4601530.00	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x lb-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M _y lb-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	160 - 158.211	TP29.77x21.65x0.25	179.26	0.023	39.000	0.001	0.00	0.000	39.000	0.000
	158.211 - 156.421		36186.5	4.512	39.000	0.116	0.00	0.000	39.000	0.000

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	26 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	156.421 - 154.632		50706.25	6.112	39.000	0.157	0.00	0.000	39.000	0.000
	154.632 - 152.842		65591.58	7.647	39.000	0.196	0.00	0.000	39.000	0.000
	152.842 - 151.053		80846.75	9.122	39.000	0.234	0.00	0.000	39.000	0.000
	151.053 - 149.263		96475.83	10.541	39.000	0.270	0.00	0.000	39.000	0.000
	149.263 - 147.474		112483.33	11.907	39.000	0.305	0.00	0.000	39.000	0.000
	147.474 - 145.684		154980.83	15.901	39.000	0.408	0.00	0.000	39.000	0.000
	145.684 - 143.895		182040.83	18.113	39.000	0.464	0.00	0.000	39.000	0.000
	143.895 - 142.105		209486.67	20.222	39.000	0.519	0.00	0.000	39.000	0.000
	142.105 - 140.316		237321.67	22.237	39.000	0.570	0.00	0.000	39.000	0.000
	140.316 - 138.526		265800.83	24.185	39.000	0.620	0.00	0.000	39.000	0.000
	138.526 - 136.737		301809.17	26.678	39.000	0.684	0.00	0.000	39.000	0.000
	136.737 - 134.947		338780.83	29.104	39.000	0.746	0.00	0.000	39.000	0.000
	134.947 - 133.158		376149.17	31.418	39.000	0.806	0.00	0.000	39.000	0.000
	133.158 - 131.368		413917.50	33.627	39.000	0.862	0.00	0.000	39.000	0.000
	131.368 - 129.579		452117.50	35.739	39.000	0.916	0.00	0.000	39.000	0.000
	129.579 - 127.789		490760.83	37.761	39.000	0.968	0.00	0.000	39.000	0.000
	127.789 - 126		542540.00	40.648	39.000	1.042	0.00	0.000	39.000	0.000
	126 - 121.333		279940.00	19.599	39.000	0.503	0.00	0.000	39.000	0.000
L2	126 - 121.333	TP33.225x28.29x0.375	393051.67	19.233	39.000	0.493	0.00	0.000	39.000	0.000
	121.333 - 120.287		702670.00	33.863	39.000	0.868	0.00	0.000	39.000	0.000
	120.287 - 119.241		732489.17	34.770	39.000	0.892	0.00	0.000	39.000	0.000
	119.241 - 118.194		762450.83	35.652	39.000	0.914	0.00	0.000	39.000	0.000
	118.194 - 117.148		792555.00	36.512	39.000	0.936	0.00	0.000	39.000	0.000
	117.148 - 116.102		822801.67	37.348	39.000	0.958	0.00	0.000	39.000	0.000
	116.102 - 115.056		853191.67	38.163	39.000	0.979	0.00	0.000	39.000	0.000
	115.056 - 114.009		883725.00	38.957	39.000	0.999	0.00	0.000	39.000	0.000
	114.009 - 112.963		914408.33	39.730	39.000	1.019	0.00	0.000	39.000	0.000
	112.963 - 111.917		945233.33	40.483	39.000	1.038	0.00	0.000	39.000	0.000
	111.917 - 110.87		976200.00	41.218	39.000	1.057	0.00	0.000	39.000	0.000
	110.87 - 109.824		1007441.67	41.938	39.000	1.075	0.00	0.000	39.000	0.000

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	27 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L3	109.824 - 108.778	TP37.67x33.225x0.5476	1038916.67	42.644	39.000	1.093	0.00	0.000	39.000	0.000
	108.778 - 107.731		1070550.00	43.333	39.000	1.111	0.00	0.000	39.000	0.000
	107.731 - 106.685		1105058.33	44.113	39.000	1.131	0.00	0.000	39.000	0.000
	106.685 - 105.639		1138608.33	44.831	39.000	1.150	0.00	0.000	39.000	0.000
	105.639 - 104.593		1172308.33	45.531	39.000	1.167	0.00	0.000	39.000	0.000
	104.593 - 103.546		1206158.33	46.213	39.000	1.185	0.00	0.000	39.000	0.000
	103.546 - 102.5		1240150.00	46.878	39.000	1.202	0.00	0.000	39.000	0.000
	102.5 - 101.467		1273883.33	33.054	39.000	0.848	0.00	0.000	39.000	0.000
	101.467 - 100.433		1307758.33	33.486	39.000	0.859	0.00	0.000	39.000	0.000
	100.433 - 99.4		1342225.00	33.919	39.000	0.870	0.00	0.000	39.000	0.000
	99.4 - 98.3667		1377158.33	34.349	39.000	0.881	0.00	0.000	39.000	0.000
	98.3667 - 97.3333		1412241.67	34.770	39.000	0.892	0.00	0.000	39.000	0.000
	97.3333 - 96.3		1447508.33	35.181	39.000	0.902	0.00	0.000	39.000	0.000
	96.3 - 95.2667		1482925.00	35.582	39.000	0.912	0.00	0.000	39.000	0.000
	95.2667 - 94.2333		1518491.67	35.974	39.000	0.922	0.00	0.000	39.000	0.000
	94.2333 - 93.2		1554208.33	36.356	39.000	0.932	0.00	0.000	39.000	0.000
	93.2 - 92.1667		1590083.33	36.730	39.000	0.942	0.00	0.000	39.000	0.000
	92.1667 - 91.1333		1626116.67	37.095	39.000	0.951	0.00	0.000	39.000	0.000
	91.1333 - 90.1		1662300.00	37.452	39.000	0.960	0.00	0.000	39.000	0.000
	90.1 - 89.0667		1698633.33	37.801	39.000	0.969	0.00	0.000	39.000	0.000
	89.0667 - 88.0333		1735125.00	38.142	39.000	0.978	0.00	0.000	39.000	0.000
	88.0333 - 87		1771775.00	38.475	39.000	0.987	0.00	0.000	39.000	0.000
	87 - 81.3333		1073800.00	21.836	39.000	0.560	0.00	0.000	39.000	0.000
	87 - 81.3333		902050.00	21.139	39.000	0.542	0.00	0.000	39.000	0.000
L4	81.3333 - 80.2692	TP39.8239x35.3847x0.5	2014750.00	46.584	39.000	1.194	0.00	0.000	39.000	0.000
	80.2692 - 79.2051		2054008.33	46.862	39.000	1.202	0.00	0.000	39.000	0.000
	79.2051 - 78.141		2093333.33	47.130	39.000	1.208	0.00	0.000	39.000	0.000
	78.141 - 77.0769		2132791.67	47.390	39.000	1.215	0.00	0.000	39.000	0.000
	77.0769 - 76.0128		2172383.33	47.642	39.000	1.222	0.00	0.000	39.000	0.000
	76.0128 - 74.9487		2212125.00	47.887	39.000	1.228	0.00	0.000	39.000	0.000

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	28 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	74.9487 - 73.8846		2252008.33	48.124	39.000	1.234	0.00	0.000	39.000	0.000
	73.8846 - 72.8205		2292025.00	48.355	39.000	1.240	0.00	0.000	39.000	0.000
	72.8205 - 71.7564		2332191.67	48.579	39.000	1.246	0.00	0.000	39.000	0.000
	71.7564 - 70.6923		2372500.00	48.796	39.000	1.251	0.00	0.000	39.000	0.000
	70.6923 - 69.6282		2412950.00	49.007	39.000	1.257	0.00	0.000	39.000	0.000
	69.6282 - 68.5641		2453533.33	49.212	39.000	1.262	0.00	0.000	39.000	0.000
	68.5641 - 67.5		2494275.00	49.410	39.000	1.267	0.00	0.000	39.000	0.000
L5	67.5 - 66.4737	TP45.3x39.8239x0.6955	2533700.00	36.225	39.000	0.929	0.00	0.000	39.000	0.000
	66.4737 - 65.4474		2573275.00	36.388	39.000	0.933	0.00	0.000	39.000	0.000
	65.4474 - 64.421		2612991.67	36.547	39.000	0.937	0.00	0.000	39.000	0.000
	64.421 - 63.3947		2652850.00	36.702	39.000	0.941	0.00	0.000	39.000	0.000
	63.3947 - 62.3684		2692850.00	36.854	39.000	0.945	0.00	0.000	39.000	0.000
	62.3684 - 61.3421		2733000.00	37.002	39.000	0.949	0.00	0.000	39.000	0.000
	61.3421 - 60.3158		2773283.33	37.147	39.000	0.952	0.00	0.000	39.000	0.000
	60.3158 - 59.2895		2813725.00	37.289	39.000	0.956	0.00	0.000	39.000	0.000
	59.2895 - 58.2632		2854300.00	37.428	39.000	0.960	0.00	0.000	39.000	0.000
	58.2632 - 57.2368		2895025.00	37.563	39.000	0.963	0.00	0.000	39.000	0.000
	57.2368 - 56.2105		2935900.00	37.696	39.000	0.967	0.00	0.000	39.000	0.000
	56.2105 - 55.1842		2976916.67	37.825	39.000	0.970	0.00	0.000	39.000	0.000
	55.1842 - 54.1579		3018083.33	37.952	39.000	0.973	0.00	0.000	39.000	0.000
	54.1579 - 53.1316		3059391.67	38.076	39.000	0.976	0.00	0.000	39.000	0.000
	53.1316 - 52.1053		3100850.00	38.197	39.000	0.979	0.00	0.000	39.000	0.000
	52.1053 - 51.0789		3142458.33	38.316	39.000	0.982	0.00	0.000	39.000	0.000
	51.0789 - 50.0526		3184208.33	38.432	39.000	0.985	0.00	0.000	39.000	0.000
	50.0526 - 49.0263		3226108.33	38.545	39.000	0.988	0.00	0.000	39.000	0.000
	49.0263 - 48		3268158.33	38.656	39.000	0.991	0.00	0.000	39.000	0.000
	48 - 41.4167		1797516.67	19.954	39.000	0.512	0.00	0.000	39.000	0.000
L6	48 - 41.4167	TP47.4338x42.5269x0.7427	1744350.00	19.282	39.000	0.494	0.00	0.000	39.000	0.000
	41.4167 - 40.3512		3586791.67	39.203	39.000	1.005	0.00	0.000	39.000	0.000
	40.3512 - 39.2857		3631850.00	39.252	39.000	1.006	0.00	0.000	39.000	0.000

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	Project TEP No. 51192.38096	Date 11:55:56 10/01/15
	Client Crown Castle	Designed by Kelly E. Hoiness

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	39.2857 - 38.2202		3677041.67	39.299	39.000	1.008	0.00	0.000	39.000	0.000
	38.2202 - 37.1548		3722375.00	39.344	39.000	1.009	0.00	0.000	39.000	0.000
	37.1548 - 36.0893		3767841.67	39.387	39.000	1.010	0.00	0.000	39.000	0.000
	36.0893 - 35.0238		3813441.67	39.428	39.000	1.011	0.00	0.000	39.000	0.000
	35.0238 - 33.9583		3859175.00	39.468	39.000	1.012	0.00	0.000	39.000	0.000
	33.9583 - 32.8929		3905050.00	39.505	39.000	1.013	0.00	0.000	39.000	0.000
	32.8929 - 31.8274		3951058.33	39.541	39.000	1.014	0.00	0.000	39.000	0.000
	31.8274 - 30.7619		3997208.33	39.575	39.000	1.015	0.00	0.000	39.000	0.000
	30.7619 - 29.6964		4043491.67	39.607	39.000	1.016	0.00	0.000	39.000	0.000
	29.6964 - 28.6309		4089908.33	39.638	39.000	1.016	0.00	0.000	39.000	0.000
	28.6309 - 27.5655		4136466.67	39.667	39.000	1.017	0.00	0.000	39.000	0.000
	27.5655 - 26.5		4183166.67	39.695	39.000	1.018	0.00	0.000	39.000	0.000
L7	26.5 - 25.175	TP53x47.4338x0.7006	4241425.00	42.045	39.000	1.078	0.00	0.000	39.000	0.000
	25.175 - 23.85		4299900.00	42.121	39.000	1.080	0.00	0.000	39.000	0.000
	23.85 - 22.525		4358575.00	42.194	39.000	1.082	0.00	0.000	39.000	0.000
	22.525 - 21.2		4417458.33	42.264	39.000	1.084	0.00	0.000	39.000	0.000
	21.2 - 19.875		4476550.00	42.332	39.000	1.085	0.00	0.000	39.000	0.000
	19.875 - 18.55		4535850.00	42.397	39.000	1.087	0.00	0.000	39.000	0.000
	18.55 - 17.225		4595350.00	42.460	39.000	1.089	0.00	0.000	39.000	0.000
	17.225 - 15.9		4655058.33	42.521	39.000	1.090	0.00	0.000	39.000	0.000
	15.9 - 14.575		4714975.00	42.579	39.000	1.092	0.00	0.000	39.000	0.000
	14.575 - 13.25		4775100.00	42.636	39.000	1.093	0.00	0.000	39.000	0.000
	13.25 - 11.925		4835433.33	42.690	39.000	1.095	0.00	0.000	39.000	0.000
	11.925 - 10.6		4895975.00	42.742	39.000	1.096	0.00	0.000	39.000	0.000
	10.6 - 9.275		4956725.00	42.792	39.000	1.097	0.00	0.000	39.000	0.000
	9.275 - 7.95		5017683.33	42.840	39.000	1.098	0.00	0.000	39.000	0.000
	7.95 - 6.625		5078850.00	42.886	39.000	1.100	0.00	0.000	39.000	0.000
	6.625 - 5.3		5140225.00	42.931	39.000	1.101	0.00	0.000	39.000	0.000
	5.3 - 3.975		5201808.33	42.973	39.000	1.102	0.00	0.000	39.000	0.000
	3.975 - 2.65		5263600.00	43.014	39.000	1.103	0.00	0.000	39.000	0.000

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	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	2.65 - 1.325		5325608.33	43.053	39.000	1.104	0.00	0.000	39.000	0.000
	1.325 - 0		5387825.00	43.091	39.000	1.105	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V lb	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	160 - 158.211	TP29.77x21.65x0.25	198.71	0.011	26.000	0.001	2.05	0.000	26.000	0.000
	158.211 - 156.421		8014.30	0.449	26.000	0.035	653.88	0.038	26.000	0.001
	156.421 - 154.632		8217.54	0.453	26.000	0.035	653.86	0.037	26.000	0.001
	154.632 - 152.842		8423.17	0.457	26.000	0.036	653.38	0.036	26.000	0.001
	152.842 - 151.053		8631.18	0.461	26.000	0.036	652.88	0.035	26.000	0.001
	151.053 - 149.263		8841.54	0.464	26.000	0.036	652.36	0.034	26.000	0.001
	149.263 - 147.474		9054.24	0.468	26.000	0.037	651.83	0.033	26.000	0.001
	147.474 - 145.684		15018.10	0.764	26.000	0.060	881.48	0.043	26.000	0.002
	145.684 - 143.895		15233.20	0.764	26.000	0.060	881.38	0.041	26.000	0.002
	143.895 - 142.105		15450.20	0.763	26.000	0.060	880.76	0.040	26.000	0.002
	142.105 - 140.316		15669.00	0.762	26.000	0.060	880.11	0.039	26.000	0.001
	140.316 - 138.526		16008.60	0.768	26.000	0.060	1327.11	0.057	26.000	0.002
	138.526 - 136.737		20557.00	0.972	26.000	0.076	1704.70	0.071	26.000	0.003
	136.737 - 134.947		20778.50	0.968	26.000	0.076	1704.40	0.069	26.000	0.003
	134.947 - 133.158		21001.50	0.965	26.000	0.075	1703.57	0.067	26.000	0.003
	133.158 - 131.368		21225.80	0.962	26.000	0.075	1702.69	0.065	26.000	0.003
	131.368 - 129.579		21487.60	0.961	26.000	0.075	1784.78	0.067	26.000	0.003
	129.579 - 127.789		21714.70	0.958	26.000	0.075	1783.84	0.065	26.000	0.002
	127.789 - 126		27597.00	1.201	26.000	0.094	1699.92	0.060	26.000	0.002
	126 - 121.333		11948.40	0.503	26.000	0.039	688.54	0.023	26.000	0.001
L2	126 - 121.333	TP33.225x28.29x0.375	16360.70	0.469	26.000	0.037	966.49	0.022	26.000	0.001
	121.333 - 120.287		28435.90	0.809	26.000	0.063	1653.18	0.037	26.000	0.001
	120.287 - 119.241		28571.70	0.807	26.000	0.063	1652.22	0.037	26.000	0.001
	119.241 -		28708.00	0.804	26.000	0.063	1651.24	0.036	26.000	0.001

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	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

Section No.	Elevation ft	Size	Actual V lb	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	118.194		0							
	118.194 -		28844.7	0.802	26.000	0.063	1650.26	0.036	26.000	0.001
	117.148		0							
	117.148 -		28982.0	0.800	26.000	0.063	1649.26	0.035	26.000	0.001
	116.102		0							
	116.102 -		29119.8	0.798	26.000	0.062	1648.25	0.035	26.000	0.001
	115.056		0							
	115.056 -		29258.0	0.796	26.000	0.062	1647.23	0.034	26.000	0.001
	114.009		0							
	114.009 -		29396.8	0.794	26.000	0.062	1646.21	0.034	26.000	0.001
	112.963		0							
	112.963 -		29536.0	0.792	26.000	0.062	1645.17	0.033	26.000	0.001
	111.917		0							
	111.917 -		29675.7	0.790	26.000	0.062	1644.13	0.033	26.000	0.001
	110.87		0							
	110.87 -		30022.8	0.794	26.000	0.062	1955.19	0.038	26.000	0.001
	109.824		0							
	109.824 -		30163.4	0.792	26.000	0.062	1954.92	0.038	26.000	0.001
	108.778		0							
	108.778 -		30304.5	0.790	26.000	0.062	1953.83	0.037	26.000	0.001
	107.731		0							
	107.731 -		32003.4	0.829	26.000	0.065	2011.71	0.038	26.000	0.001
	106.685		0							
	106.685 -		32144.9	0.827	26.000	0.065	2011.42	0.037	26.000	0.001
	105.639		0							
	105.639 -		32286.7	0.825	26.000	0.064	2010.32	0.037	26.000	0.001
	104.593		0							
	104.593 -		32429.0	0.823	26.000	0.064	2009.20	0.036	26.000	0.001
	103.546		0							
	103.546 -		32571.7	0.821	26.000	0.064	2008.08	0.036	26.000	0.001
	102.5		0							
L3	102.5 -	TP37.67x33.225x0.5476	32713.2	0.564	26.000	0.044	2007.00	0.024	26.000	0.001
	101.467		0							
	101.467 -		32858.2	0.563	26.000	0.044	2005.38	0.024	26.000	0.001
	100.433		0							
	100.433 - 99.4		33737.8	0.574	26.000	0.045	2003.75	0.024	26.000	0.001
	99.4 - 98.3667		0							
			33883.5	0.573	26.000	0.045	2002.11	0.023	26.000	0.001
			0							
	98.3667 -		34029.7	0.572	26.000	0.045	2000.46	0.023	26.000	0.001
	97.3333		0							
	97.3333 - 96.3		34204.2	0.571	26.000	0.045	1424.83	0.016	26.000	0.001
			0							
	96.3 - 95.2667		34351.4	0.570	26.000	0.045	1425.69	0.016	26.000	0.001
			0							
	95.2667 -		34499.0	0.568	26.000	0.045	1426.56	0.016	26.000	0.001
	94.2333		0							
	94.2333 - 93.2		34647.2	0.567	26.000	0.045	1427.43	0.016	26.000	0.001
			0							
	93.2 - 92.1667		34795.8	0.566	26.000	0.045	1428.32	0.015	26.000	0.001
			0							
	92.1667 -		34944.9	0.565	26.000	0.044	1429.20	0.015	26.000	0.001
	91.1333		0							
	91.1333 - 90.1		35094.5	0.564	26.000	0.044	1430.09	0.015	26.000	0.001
			0							
	90.1 - 89.0667		35244.6	0.563	26.000	0.044	1430.99	0.015	26.000	0.001
			0							
	89.0667 -		35395.1	0.562	26.000	0.044	1431.90	0.015	26.000	0.001
	88.0333		0							
	88.0333 - 87		35546.1	0.561	26.000	0.044	1432.81	0.015	26.000	0.001

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	32 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

Section No.	Elevation ft	Size	Actual V lb	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	87 - 81.3333		0 20035.9	0.306	26.000	0.025	782.87	0.007	26.000	0.000
L4	87 - 81.3333	TP39.8239x35.3847x0.5	0 16478.1	0.283	26.000	0.022	655.41	0.007	26.000	0.000
	81.3333 - 80.2692		0 36627.4	0.625	26.000	0.049	1439.15	0.016	26.000	0.001
	80.2692 - 79.2051		0 36893.5	0.625	26.000	0.049	1692.88	0.018	26.000	0.001
	79.2051 - 78.141		0 37024.7	0.623	26.000	0.049	1693.73	0.018	26.000	0.001
	78.141 - 77.0769		0 37156.4	0.621	26.000	0.049	1694.61	0.018	26.000	0.001
	77.0769 - 76.0128		0 37288.4	0.619	26.000	0.049	1695.49	0.017	26.000	0.001
	76.0128 - 74.9487		0 37420.8	0.618	26.000	0.049	1696.39	0.017	26.000	0.001
	74.9487 - 73.8846		0 37553.6	0.616	26.000	0.048	1697.29	0.017	26.000	0.001
	73.8846 - 72.8205		0 37686.8	0.614	26.000	0.048	1698.20	0.017	26.000	0.001
	72.8205 - 71.7564		0 37820.4	0.612	26.000	0.048	1699.13	0.017	26.000	0.001
	71.7564 - 70.6923		0 37954.4	0.611	26.000	0.048	1700.06	0.016	26.000	0.001
	70.6923 - 69.6282		0 38088.7	0.609	26.000	0.048	1701.00	0.016	26.000	0.001
	69.6282 - 68.5641		0 38223.4	0.607	26.000	0.048	1701.96	0.016	26.000	0.001
	68.5641 - 67.5		0 38358.6	0.606	26.000	0.048	1702.92	0.016	26.000	0.001
L5	67.5 - 66.4737	TP45.3x39.8239x0.6955	0 38493.5	0.437	26.000	0.034	1703.78	0.011	26.000	0.000
	66.4737 - 65.4474		0 38632.9	0.436	26.000	0.034	1704.67	0.011	26.000	0.000
	65.4474 - 64.421		0 38772.7	0.435	26.000	0.034	1705.57	0.011	26.000	0.000
	64.421 - 63.3947		0 38912.7	0.435	26.000	0.034	1706.47	0.011	26.000	0.000
	63.3947 - 62.3684		0 39053.1	0.434	26.000	0.034	1707.38	0.011	26.000	0.000
	62.3684 - 61.3421		0 39193.8	0.433	26.000	0.034	1708.29	0.011	26.000	0.000
	61.3421 - 60.3158		0 39334.7	0.432	26.000	0.034	1709.21	0.011	26.000	0.000
	60.3158 - 59.2895		0 39476.0	0.432	26.000	0.034	1710.14	0.011	26.000	0.000
	59.2895 - 58.2632		0 39617.6	0.431	26.000	0.034	1711.08	0.011	26.000	0.000
	58.2632 - 57.2368		0 39759.5	0.430	26.000	0.034	1712.02	0.010	26.000	0.000
	57.2368 - 56.2105		0 39901.7	0.429	26.000	0.034	1712.97	0.010	26.000	0.000
	56.2105 - 55.1842		0 40044.2	0.429	26.000	0.033	1713.92	0.010	26.000	0.000
	55.1842 - 54.1579		0 40187.1	0.428	26.000	0.033	1714.88	0.010	26.000	0.000
	54.1579 - 53.1316		0 40330.2	0.427	26.000	0.033	1715.86	0.010	26.000	0.000
	53.1316 -		0 40473.6	0.427	26.000	0.033	1716.83	0.010	26.000	0.000

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	33 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

Section No.	Elevation ft	Size	Actual V lb	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	52.1053		0							
	52.1053 -		40617.4	0.426	26.000	0.033	1717.82	0.010	26.000	0.000
	51.0789		0							
	51.0789 -		40761.5	0.425	26.000	0.033	1718.81	0.010	26.000	0.000
	50.0526		0							
	50.0526 -		40905.8	0.425	26.000	0.033	1719.81	0.010	26.000	0.000
	49.0263		0							
	49.0263 - 48		41050.5	0.424	26.000	0.033	1720.82	0.010	26.000	0.000
			0							
	48 - 41.4167		21644.9	0.217	26.000	0.017	878.42	0.005	26.000	0.000
			0							
L6	48 - 41.4167	TP47.4338x42.5269x0.7427	20504.6	0.198	26.000	0.015	849.25	0.004	26.000	0.000
			0							
	41.4167 -		42245.4	0.406	26.000	0.032	1728.57	0.009	26.000	0.000
	40.3512		0							
	40.3512 -		42371.8	0.405	26.000	0.032	1729.49	0.009	26.000	0.000
	39.2857		0							
	39.2857 -		42498.4	0.404	26.000	0.032	1730.42	0.009	26.000	0.000
	38.2202		0							
	38.2202 -		42625.3	0.403	26.000	0.031	1731.36	0.009	26.000	0.000
	37.1548		0							
	37.1548 -		42752.4	0.402	26.000	0.031	1732.30	0.008	26.000	0.000
	36.0893		0							
	36.0893 -		42879.9	0.401	26.000	0.031	1733.25	0.008	26.000	0.000
	35.0238		0							
	35.0238 -		43007.6	0.400	26.000	0.031	1734.21	0.008	26.000	0.000
	33.9583		0							
	33.9583 -		43135.6	0.399	26.000	0.031	1735.17	0.008	26.000	0.000
	32.8929		0							
	32.8929 -		43263.9	0.398	26.000	0.031	1736.15	0.008	26.000	0.000
	31.8274		0							
	31.8274 -		43392.5	0.397	26.000	0.031	1737.13	0.008	26.000	0.000
	30.7619		0							
	30.7619 -		43521.4	0.396	26.000	0.031	1738.12	0.008	26.000	0.000
	29.6964		0							
	29.6964 -		43650.5	0.395	26.000	0.031	1739.12	0.008	26.000	0.000
	28.6309		0							
	28.6309 -		43780.0	0.394	26.000	0.031	1740.13	0.008	26.000	0.000
	27.5655		0							
	27.5655 - 26.5		43909.7	0.393	26.000	0.031	1741.13	0.008	26.000	0.000
			0							
L7	26.5 - 25.175	TP53x47.4338x0.7006	44069.9	0.416	26.000	0.032	1741.88	0.008	26.000	0.000
			0							
	25.175 - 23.85		44225.5	0.415	26.000	0.032	1742.63	0.008	26.000	0.000
			0							
	23.85 - 22.525		44381.2	0.414	26.000	0.032	1743.38	0.008	26.000	0.000
			0							
	22.525 - 21.2		44537.1	0.413	26.000	0.032	1744.14	0.008	26.000	0.000
			0							
	21.2 - 19.875		44693.1	0.412	26.000	0.032	1744.92	0.008	26.000	0.000
			0							
	19.875 - 18.55		44849.3	0.411	26.000	0.032	1745.69	0.008	26.000	0.000
			0							
	18.55 - 17.225		45005.7	0.410	26.000	0.032	1746.48	0.008	26.000	0.000
			0							
	17.225 - 15.9		45162.3	0.409	26.000	0.032	1747.28	0.007	26.000	0.000
			0							
	15.9 - 14.575		45319.1	0.408	26.000	0.032	1748.08	0.007	26.000	0.000
			0							
	14.575 - 13.25		45476.0	0.407	26.000	0.032	1748.89	0.007	26.000	0.000

<i>tnxTower</i> <i>Tower Engineering Professionals, Inc.</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	NHV 2071 143137 (BU 806939)	Page	34 of 34
	Project	TEP No. 51192.38096	Date	11:55:56 10/01/15
	Client	Crown Castle	Designed by	Kelly E. Hoiness

Section No.	Elevation ft	Size	Actual V lb	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	13.25 - 11.925		0 45633.1	0.406	26.000	0.032	1749.72	0.007	26.000	0.000
	11.925 - 10.6		0 45790.4	0.405	26.000	0.032	1750.54	0.007	26.000	0.000
	10.6 - 9.275		0 45947.8	0.404	26.000	0.032	1751.38	0.007	26.000	0.000
	9.275 - 7.95		0 46105.5	0.404	26.000	0.032	1752.22	0.007	26.000	0.000
	7.95 - 6.625		0 46263.3	0.403	26.000	0.031	1753.08	0.007	26.000	0.000
	6.625 - 5.3		0 46421.3	0.402	26.000	0.031	1753.94	0.007	26.000	0.000
	5.3 - 3.975		0 46579.5	0.401	26.000	0.031	1754.81	0.007	26.000	0.000
	3.975 - 2.65		0 46737.9	0.400	26.000	0.031	1755.68	0.007	26.000	0.000
	2.65 - 1.325		0 46896.5	0.400	26.000	0.031	1756.57	0.007	26.000	0.000
	1.325 - 0		0 47055.3	0.399	26.000	0.031	1757.47	0.007	26.000	0.000

APPENDIX B
BASE LEVEL DRAWING



(RESERVED)

(1) 1-5/8" TO 158 FT LEVEL

(INSTALLED)

(1) 1/2" TO 158 FT LEVEL

(12) 1-5/8" TO 158 FT LEVEL

(INSTALLED—BUNDLED IN 2" CONDUIT)

(1) 3/8" TO 147 FT LEVEL

(2) 5/8" TO 147 FT LEVEL

(INSTALLED)

(12) 1-1/4" TO 147 FT LEVEL

(6) 7/8" TO 100 FT LEVEL

(INSTALLED—BUNDLED IN (2) 2" CONDUITS)

(3) 1/2" TO 107 FT LEVEL

(INSTALLED)

(3) 5/8" TO 107 FT LEVEL

(INSTALLED)

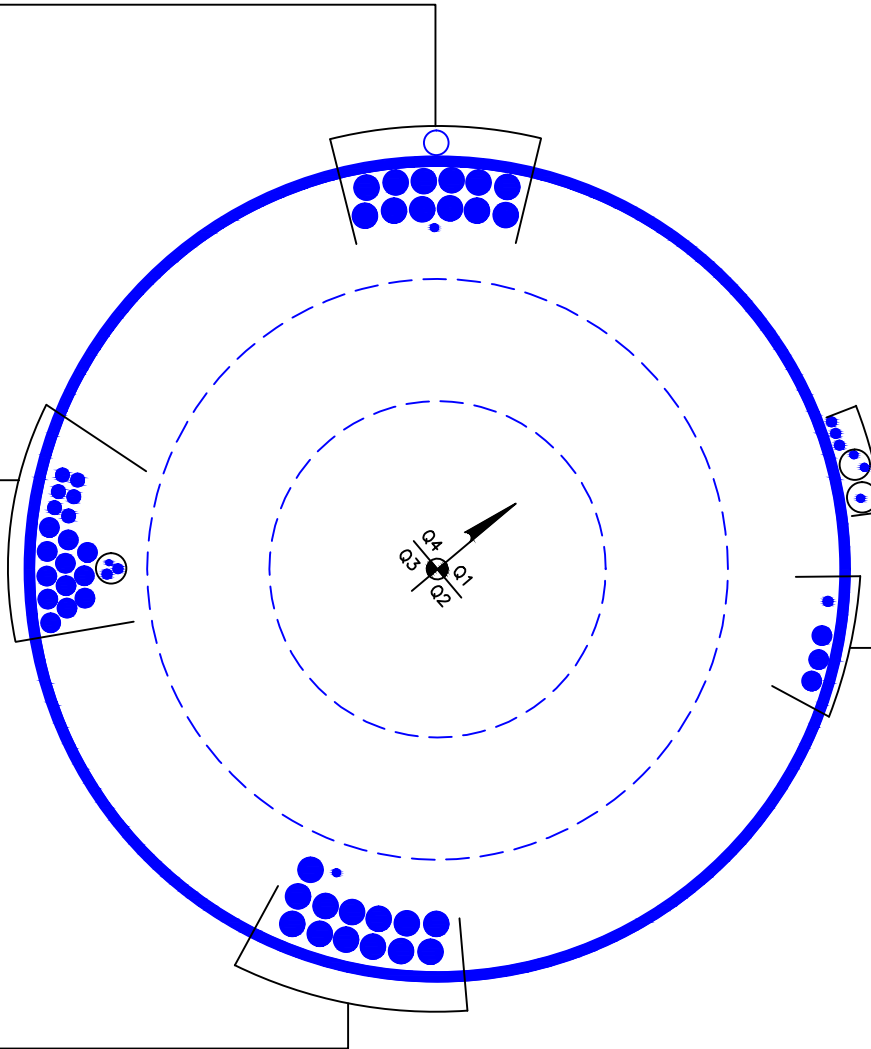
(3) 1-1/4" TO 137 FT LEVEL

(1) 5/8" TO 137 FT LEVEL

(INSTALLED)

(13) 1-5/8" TO 127 FT LEVEL

(1) 1/2" TO 80 FT LEVEL



APPENDIX C

ADDITIONAL CALCULATIONS



Pole (L3)	95.8%	Pass
Mod (M2)	93.0%	Pass

NHV 2071 143137 (BU 806939)

TEP #: 51192.38096

Analysis: KEH 10/1/2015

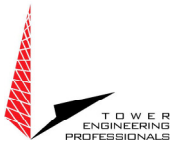
Check: TLI 10/1/2015

Monopole Reinforcement_v1.4.9 - TIA-222-F - Capacities

Section No.	Elevation (ft)	Type	Size	Critical Element	P (lb)	Pa (lb)	% Capacity	Pass/Fail
L1	160.00-121.33	Pole	TP29.77×21.65×0.2500	1	Note 1	Note 1	46.2	Pass
L2	126.00-81.33	Pole	TP37.67×28.29×0.3750	2	Note 1	Note 1	90.9	Pass
L3	87.00-41.42	Pole	TP45.30×35.73×0.5000	3	Note 1	Note 1	95.8	Pass
L4	48.00-0.00	Pole	TP53.00×42.92×0.5625	4	Note 1	Note 1	86.0	Pass
M1b	30.50-0.00	Mod (Ex)	CCI-65FP-085125	1	Note 1	Note 1	90.7	Pass
M2	50.50-23.50	Mod (Ex)	CCI-65FP-065125	2	Note 1	Note 1	93.0	Pass
M3	50.50-30.50	Mod (Ex)	CCI-65FP-065125	3	Note 1	Note 1	93.0	Pass
M4	70.50-50.50	Mod (Ex)	CCI-65FP-065125	4	Note 1	Note 1	90.6	Pass
M5	104.75-84.75	Mod (Ex)	CCI-65FP-060100	5	Note 1	Note 1	91.5	Pass

Summary	
Pole (L3)	95.8 Pass
Mod (M2)	93.0 Pass
RATING =	95.8 Pass

*Note 1: See additional documentation in following sheets for details.



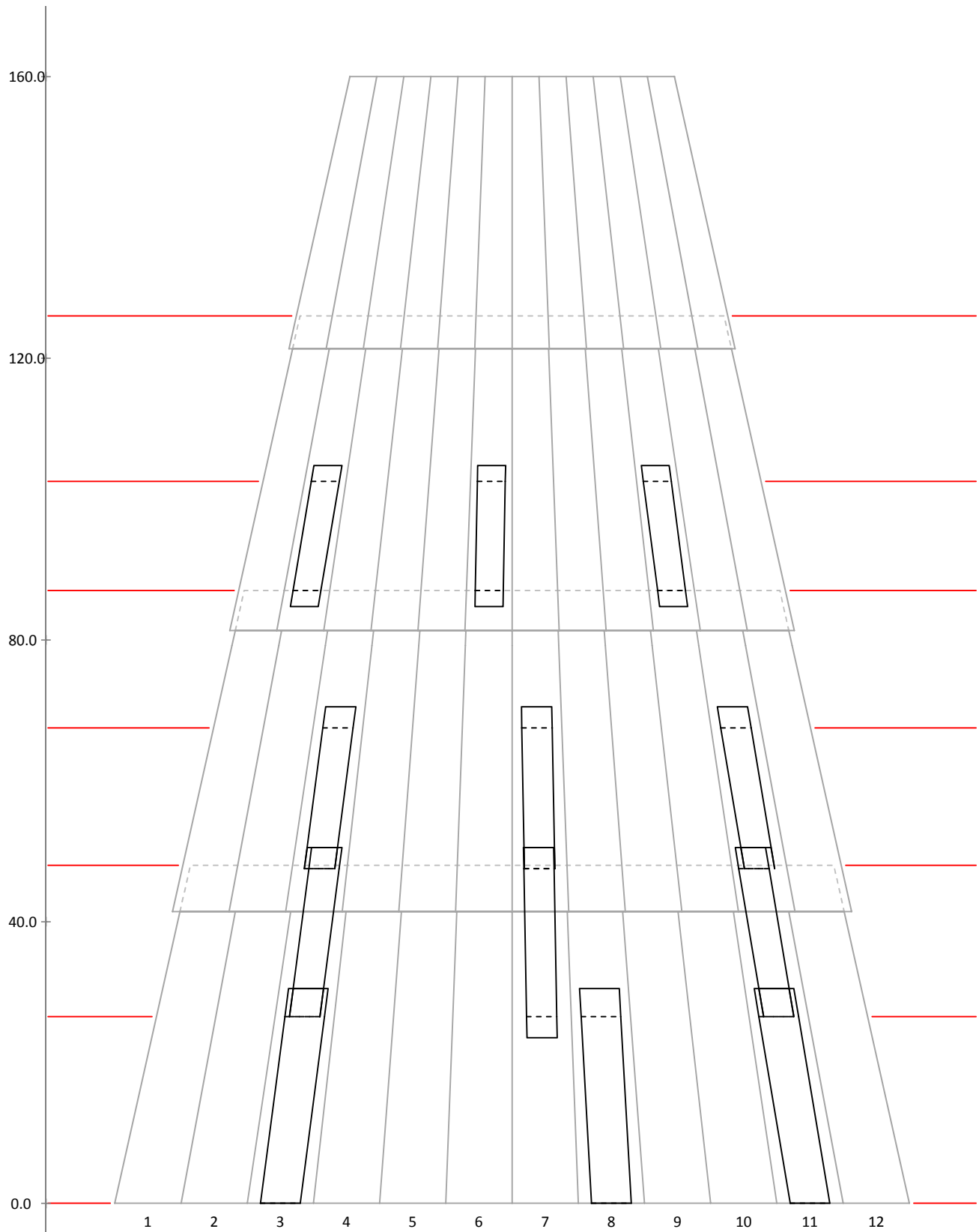
NHV 2071 143137 (BU 806939)

TEP #: 51192.38096

Analysis: KEH 10/1/2015

Check: TLI 10/1/2015

Reinforcement Layout





NHV 2071 143137 (BU 806939)

TEP #: 51192.38096

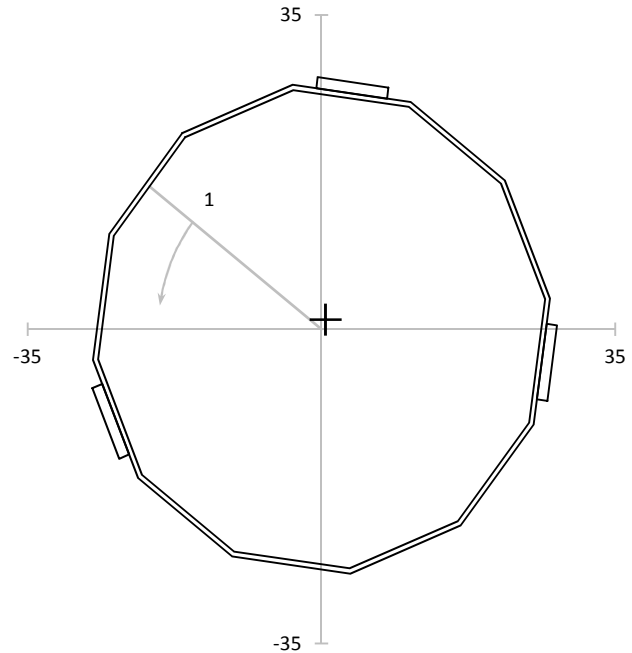
Analysis: KEH 10/1/2015

Check: TLI 10/1/2015

Elevation: 0.00-ft

Loads	
Axial:	58.0 k
Moment:	5,387.8 k-ft
Shear:	47.1 k
Torsion:	1.8 k-ft
Equivalent Loads to Pole	
Axial:	43.4 k
Moment:	4,329.3 k-ft
Shear:	35.2 k
Torsion:	1.8 k-ft
Shear Flow	
Controlling Mod:	2
q:	0.305 k/in
Bolt/Weld Cap:	30.0 k/bolt
Max Spacing:	98.28 in
Stitch:	17.00 in
Capacity:	17.3%

Pole Info	
OD:	53.00 in
t:	0.5625 in
Pole A_g :	94.98 in ²
Pole I_g :	33,334.2 in ⁴
Controlling	
Angle:	307.80°
I_{CONT} :	42,239.1 in ⁴
A_g :	126.85 in ²
Minimum	
Angle:	149.35°
I_{MIN} :	41,192.3 in ⁴
t_{EFF} :	0.7006 in



Pole Segment: L4, $F_y = 65$ ksi

POLE CAPACITY									
Angle (°)	y_{CONT} (in)	I (in ⁴)	σ_A (ksi)	σ_B (ksi)		F_A (ksi)	F_B (ksi)		Capacity
137.95	28.40	41495.5	0.457	44.257		52.000	52.000		86.0%

MODIFICATION CAPACITIES											
Mod Number	#	Angle (°)	y_{CONT} (in)	I (in ⁴)	σ_A (ksi)	σ_B (ksi)		F_T (ksi)	F_C (ksi)		Capacity
1a	1	198.00	26.47	45563.3	0.457	37.562		44.041	45.487		86.3%
1b	1	62.80	27.96	48921.2	0.457	36.957		44.041	45.487		85.0%
1b	2	307.80	25.79	42239.1	0.457	39.476		44.041	45.487		90.7%



NHV 2071 143137 (BU 806939)

TEP #: 51192.38096

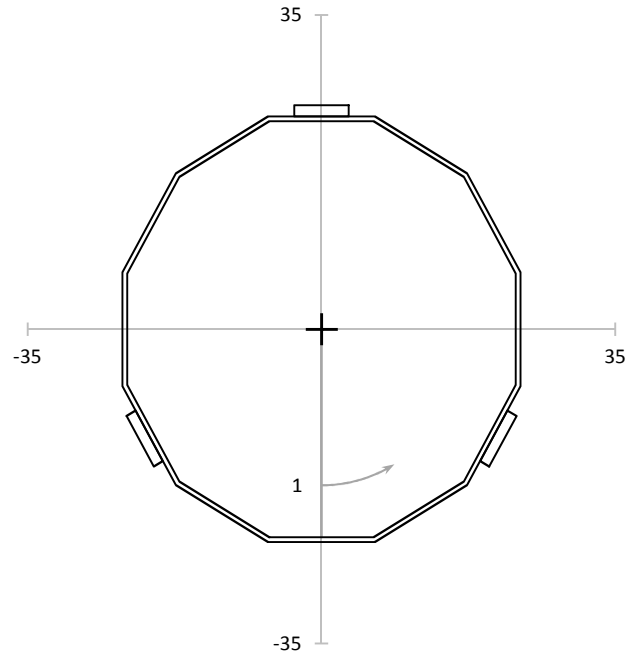
Analysis: KEH 10/1/2015

Check: TLI 10/1/2015

Elevation: 26.50-ft

Loads	
Axial:	45.0 k
Moment:	4,183.2 k-ft
Shear:	43.9 k
Torsion:	1.7 k-ft
Equivalent Loads to Pole	
Axial:	35.0 k
Moment:	3,205.0 k-ft
Shear:	34.1 k
Torsion:	1.7 k-ft
Shear Flow	
Controlling Mod:	3
q:	0.279 k/in
Bolt/Weld Cap:	30.0 k/bolt
Max Spacing:	107.34 in
Stitch:	19.00 in
Capacity:	17.7%

Pole Info	
OD:	47.43 in
t:	0.5625 in
Pole A_g :	84.90 in ²
Pole I_g :	23,806.0 in ⁴
Controlling	
Angle:	180.00°
I_g :	31,071.9 in ⁴
A_g :	109.27 in ²
Minimum	
Angle:	0.20°
I_{MIN} :	31,071.9 in ⁴
t_{EFF} :	0.7427 in



POLE CAPACITY									
Angle (°)	Y_{CONT} (in)	I (in ⁴)	σ_A (ksi)	σ_B (ksi)		F_A (ksi)	F_B (ksi)		Capacity
165.00	24.57	31071.9	0.412	39.695		52.000	52.000		77.1%

MODIFICATION CAPACITIES											
Mod Number	#	Angle (°)	Y_{CONT} (in)	I (in ⁴)	σ_A (ksi)	σ_B (ksi)		F_T (ksi)	F_C (ksi)		Capacity
2	1	180.00	24.34	31071.9	0.412	39.325		42.735	43.073		93.0%
3	1	60.00	24.34	31071.9	0.412	39.325		42.735	43.073		93.0%
3	2	300.00	24.34	31071.9	0.412	39.325		42.735	43.073		93.0%



NHV 2071 143137 (BU 806939)

TEP #: 51192.38096

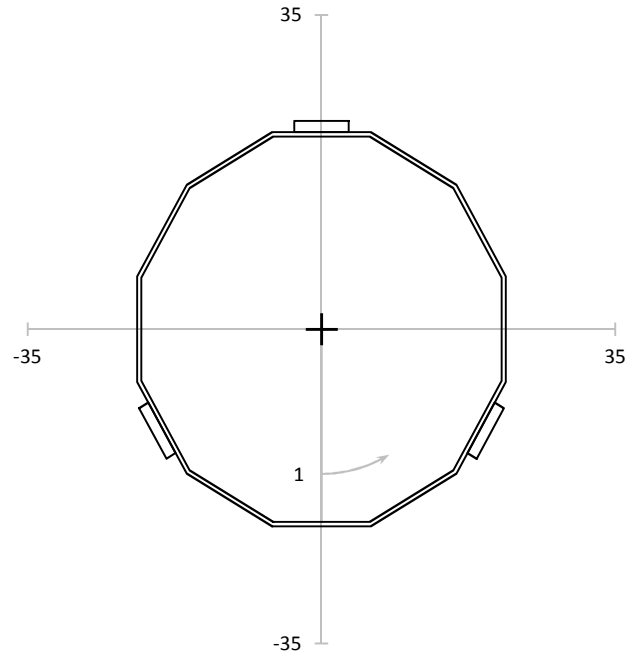
Analysis: KEH 10/1/2015

Check: TLI 10/1/2015

Elevation: 48.00-ft

Loads	
Axial:	34.1 k
Moment:	3,268.2 k-ft
Shear:	41.1 k
Torsion:	1.7 k-ft
Equivalent Loads to Pole	
Axial:	25.3 k
Moment:	2,381.7 k-ft
Shear:	30.4 k
Torsion:	1.7 k-ft
Shear Flow	
Controlling Mod:	5
q:	0.326 k/in
Bolt/Weld Cap:	30.0 k/bolt
Max Spacing:	91.92 in
Stitch:	19.00 in
Capacity:	20.7%

Pole Info	
OD:	43.92 in
t:	0.5000 in
Pole A_g :	69.90 in ²
Pole I_g :	16,819.7 in ⁴
Controlling	
Angle:	180.00°
I_g :	23,080.2 in ⁴
A_g :	94.28 in ²
Minimum	
Angle:	356.60°
I_{MIN} :	23,080.2 in ⁴
t_{EFF} :	0.6955 in



POLE CAPACITY									
Angle (°)	y_{CONT} (in)	I (in ⁴)	σ_A (ksi)	σ_B (ksi)		F_A (ksi)	F_B (ksi)		Capacity
195.00	22.75	23080.2	0.362	38.656		52.000	52.000		75.0%

MODIFICATION CAPACITIES											
Mod Number	#	Angle (°)	y_{CONT} (in)	I (in ⁴)	σ_A (ksi)	σ_B (ksi)		F_T (ksi)	F_C (ksi)		Capacity
4	1	60.00	22.58	23080.2	0.362	38.375		42.735	43.073		90.6%
4	2	180.00	22.58	23080.2	0.362	38.375		42.735	43.073		90.6%
4	3	300.00	22.58	23080.2	0.362	38.375		42.735	43.073		90.6%



NHV 2071 143137 (BU 806939)

TEP #: 51192.38096

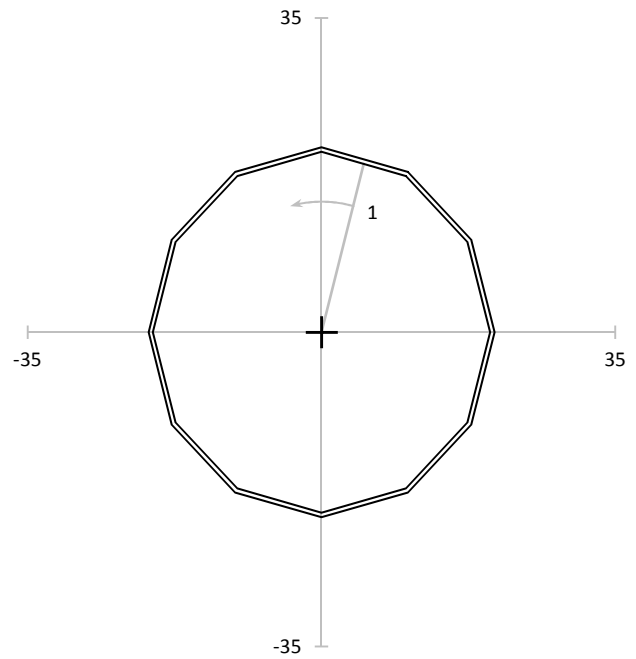
Analysis: KEH 10/1/2015

Check: TLI 10/1/2015

Elevation: 67.50-ft

Loads	
Axial:	26.8 k
Moment:	2,494.3 k-ft
Shear:	38.4 k
Torsion:	1.7 k-ft
Equivalent Loads to Pole	
Axial:	26.8 k
Moment:	2,494.3 k-ft
Shear:	38.4 k
Torsion:	1.7 k-ft
Shear Flow N/A	

Pole Info	
OD:	39.82 in
t:	0.5000 in
Pole A_g :	63.31 in ²
Pole I_g :	12,496.3 in ⁴
Controlling	
Angle:	15.00°
I_g :	12,496.3 in ⁴
A_g :	63.31 in ²
Minimum	
Angle:	0.00°
I_{MIN} :	12,496.3 in ⁴
t_{EFF} :	0.5000 in



Pole Segment: L3, $F_y = 65$ ksi

POLE CAPACITY									
Angle (°)	y_{CONT} (in)	I (in ⁴)	σ_A (ksi)	σ_B (ksi)		F_A (ksi)	F_B (ksi)		Capacity
15.00	20.63	12496.3	0.423	49.410		52.000	52.000		95.8%

MODIFICATION CAPACITIES										
Mod Number	#	Angle (°)	y_{CONT} (in)	I (in ⁴)	σ_A (ksi)	σ_B (ksi)		F_T (ksi)	F_C (ksi)	Capacity



NHV 2071 143137 (BU 806939)

TEP #: 51192.38096

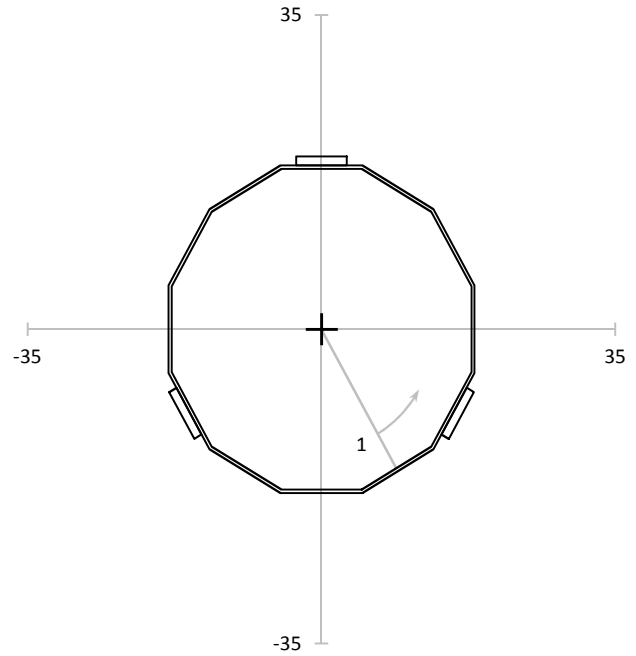
Analysis: KEH 10/1/2015

Check: TLI 10/1/2015

Elevation: 87.00-ft

Loads	
Axial:	20.0 k
Moment:	1,771.8 k-ft
Shear:	35.5 k
Torsion:	1.4 k-ft
Equivalent Loads to Pole	
Axial:	14.2 k
Moment:	1,230.8 k-ft
Shear:	25.2 k
Torsion:	1.4 k-ft
Shear Flow	
Controlling Mod:	6
q:	0.383 k/in
Bolt/Weld Cap:	30.0 k/bolt
Max Spacing:	78.38 in
Stitch:	16.00 in
Capacity:	20.4%

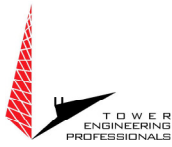
Pole Info	
OD:	36.48 in
t:	0.3750 in
Pole A_g :	43.60 in ²
Pole I_g :	7,254.0 in ⁴
Controlling	
Angle:	150.00°
I_g :	10,442.4 in ⁴
A_g :	61.60 in ²
Minimum	
Angle:	131.60°
I_{MIN} :	10,442.4 in ⁴
t_{EFF} :	0.5476 in



Pole Segment: L2, $F_y = 65$ ksi

POLE CAPACITY									
Angle (°)	y_{CONT} (in)	I (in ⁴)	σ_A (ksi)	σ_B (ksi)		F_A (ksi)	F_B (ksi)		Capacity
135.00	18.90	10442.4	0.325	38.475		52.000	52.000		74.6%

MODIFICATION CAPACITIES											
Mod Number	#	Angle (°)	y_{CONT} (in)	I (in ⁴)	σ_A (ksi)	σ_B (ksi)		F_T (ksi)	F_C (ksi)		Capacity
5	1	30.00	18.74	10442.4	0.325	38.156		42.057	42.218		91.5%
5	2	150.00	18.74	10442.4	0.325	38.156		42.057	42.218		91.5%
5	3	270.00	18.74	10442.4	0.325	38.156		42.057	42.218		91.5%



NHV 2071 143137 (BU 806939)

TEP #: 51192.38096

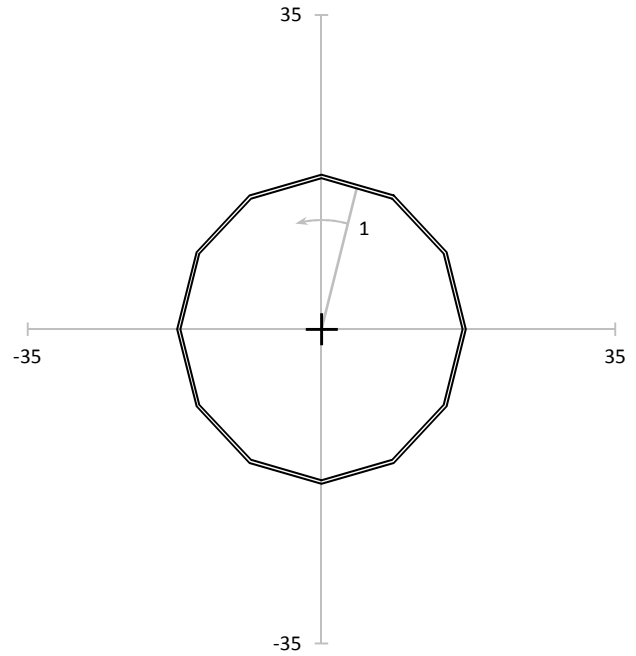
Analysis: KEH 10/1/2015

Check: TLI 10/1/2015

Elevation: 102.50-ft

Loads	
Axial:	15.8 k
Moment:	1,240.2 k·ft
Shear:	32.6 k
Torsion:	2.0 k·ft
Equivalent Loads to Pole	
Axial:	15.8 k
Moment:	1,240.2 k·ft
Shear:	32.6 k
Torsion:	2.0 k·ft
Shear Flow N/A	

Pole Info	
OD:	33.22 in
t:	0.3750 in
Pole A_g :	39.67 in ²
Pole I_g :	5,463.6 in ⁴
Controlling	
Angle:	15.00°
I_g :	5,463.6 in ⁴
A_g :	39.67 in ²
Minimum	
Angle:	0.00°
I_{MIN} :	5,463.6 in ⁴
t_{EFF} :	0.3750 in



Pole Segment: L2, $F_y = 65$ ksi

POLE CAPACITY									
Angle (°)	y_{CONT} (in)	I (in ⁴)	σ_A (ksi)	σ_B (ksi)		F_A (ksi)	F_B (ksi)		Capacity
15.00	17.21	5463.6	0.399	46.878		52.000	52.000		90.9%

MODIFICATION CAPACITIES										
Mod Number	#	Angle (°)	y_{CONT} (in)	I (in ⁴)	σ_A (ksi)	σ_B (ksi)		F_T (ksi)	F_C (ksi)	Capacity



NHV 2071 143137 (BU 806939)

TEP #: 51192.38096

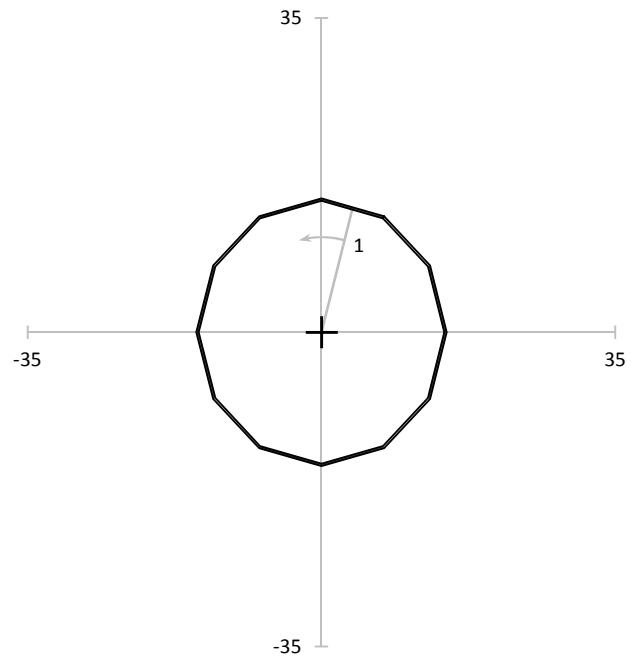
Analysis: KEH 10/1/2015

Check: TLI 10/1/2015

Elevation: 126.00-ft

Loads	
Axial:	6.4 k
Moment:	316.8 k-ft
Shear:	16.3 k
Torsion:	0.9 k-ft
Equivalent Loads to Pole	
Axial:	6.4 k
Moment:	316.8 k-ft
Shear:	16.3 k
Torsion:	0.9 k-ft
Shear Flow N/A	

Pole Info	
OD:	28.79 in
t:	0.2500 in
Pole A_G :	22.97 in ²
Pole I_G :	2,388.6 in ⁴
Controlling	
Angle:	15.00°
I_G :	2,388.6 in ⁴
A_G :	22.97 in ²
Minimum	
Angle:	0.00°
I_{MIN} :	2,388.6 in ⁴
t_{EFF} :	0.2500 in



Pole Segment: L1, $F_y = 65$ ksi

POLE CAPACITY									
Angle (°)	y_{CONT} (in)	I (in ⁴)	σ_A (ksi)	σ_B (ksi)		F_A (ksi)	F_B (ksi)		Capacity
15.00	14.91	2388.6	0.277	23.738		52.000	52.000		46.2%

MODIFICATION CAPACITIES										
Mod Number	#	Angle (°)	y_{CONT} (in)	I (in ⁴)	σ_A (ksi)	σ_B (ksi)		F_T (ksi)	F_C (ksi)	Capacity

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

TIA Rev F

Site Data

BU#:	806939
Site Name:	NHV 2071 143137
App #:	309709 Rev. 2
Pole Manufacturer:	Other

Anchor Rod Data

Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	61.37	in

Plate Data

Diam:	67.37	in
Thick:	3	in
Grade:	60	ksi
Single-Rod B-eff:	7.10	in

Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:		
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data

Diam:	53	in
Thick:	0.5625	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor

ASIF:	1.333	
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Reactions

Moment:	5388	ft-kips
Axial:	58	kips
Shear:	47	kips

If No stiffeners, Criteria:

AISC ASD

<-Only Applicable to Unstiffened Cases

Anchor Rod Results

Maximum Rod Tension:	173.2 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	88.8% Pass

Rigid

Service, ASD
Fty*ASIF

Base Plate Results

Base Plate Stress:	43.0 ksi
Allowable Plate Stress:	60.0 ksi
Base Plate Stress Ratio:	71.6% Pass

Flexural Check

Rigid

Service ASD
0.75*Fy*ASIF
Y.L. Length:
30.94

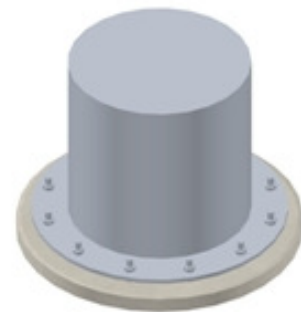
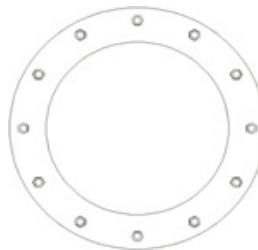
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check:	n/a
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* 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



JOB: NHV 2071 143137 (BU 806939) - TEP No. 51192.38096
 SHEET NUMBER: 1 OF 2
 CALCULATED BY: KEH DATE 10/1/2015
 CHECKED BY: TLI DATE 10/1/2015

Pad and Pier Foundation for Monopole - TIA-222-F

Q_a , ALLOWABLE SOIL PRESS. (ksf)	12.50
NET or GROSS	NET
SOIL DENSITY (pcf)	120

F'_c (ksi)	4
F'_y (ksi)	60

Base Reactions LC1: Maximum Wind

M , MOMENT (k-ft)	5387.8
P_t , TOTAL DOWNLOAD (k)	58.0
H , HORIZONTAL SHEAR (k)	47.0

Base Reaction LC 2: Ice Wind + Ice

M (k-ft)	1354.1
P_t (k)	77.4
H (k)	11.4

Try:	L (ft.)	B (ft.)	t (ft.)	Soil depth to TOP of mat (ft.)	Soil depth to BOT. of mat (ft.)	Pier dia./width (ft.)	Pier Height, h (cu.ft.)	Pier Shape
	30	30	3.5	6	9.5	7.00	6.50	Round

W_m , Weight of Mat (k) =	472.5	Concrete Vol. (cu yd)	125.93
W_p , Weight of Pier (k) =	37.5		
W_s , WEIGHT OF SOIL (k) =	620.3		

CHECK DESIGN CRITERIA

CHECK STABILITY:

	LC1	LC2
Mst = $P * (L/2) + (Vf+s * L/2) =$	17824.6 k-ft	18115.5 k-ft
Mot = $M+H*(t+h) =$	5858.1 k-ft	1468 k-ft
SF = $Mot/Mst =$	3.04 > 1.5	12.34 > 1.5

Capacity: 49.3%

CHECK BEARING PRESSURE

	LC1	LC2
P = $P_t + W_i + W_s =$	1188.3 k	1207.7 k
e = $M / P =$	4.93 ft	1.22 ft
L/6 =	5.00 ft	5.00 ft
Width of Wedge, L' =	30.00 ft	30.00 ft
0 Deg Wind: Q_{max} =	1.48 ksf	0.53 ksf
45 Deg Wind: Q_{max} =	2.06 ksf	0.66 ksf

Capacity: 16.5%



JOB: NHV 2071 143137 (BU 806939) - TEP No. 51192.38096

SHEET NUMBER: 2 OF 2

CALCULATED BY: KEH DATE 10/1/2015

CHECKED BY: TLI DATE 10/1/2015

CHECK ONE WAY SHEAR

$$V_u = 741.2 \text{ k}$$
$$V_c = 1285.0 \text{ k}$$

Capacity: 57.7%**CHECK TWO WAY SHEAR: PUNCHING + UNBALANCED MOMENT**

$$V_u = 45.6 \text{ psi}$$
$$\phi V_c = 189.7 \text{ psi}$$

Capacity: 24.0%**CALCULATE REINFORCING REQUIRED**

$$F'_c = 4.0 \text{ ksi}$$

$$F_y = 60.0 \text{ ksi}$$

$$\text{Temp \& Shrinkage reinforcing, } A_{s, \text{ temp}} = 0.40 \text{ in}^2/\text{ft} \quad (\text{ACI 318 Sec. 10.5.4})$$

BOTTOM REINFORCING

Bar Size = 11

Bar Spacing, c-c: 12.9

d = 36.9 in.

$$M_u = 1109.2 \text{ in-k/ft}$$

$$\phi M_n = 0.9 A_s F_y d (1 - 0.59 A_s F_y / (b d F'_c))$$

Solution: $A_{s, \text{ req}} = 0.56 \text{ in}^2/\text{ft}$

Check, $A_s = 1.45 \text{ in}^2/\text{ft}$

Capacity: 38.8%**TOP REINFORCING**

Bar Size = 11

Bar Spacing, c-c: 12.9

d = 36.9 in.

$$M_u = 890.2 \text{ in-k/ft}$$

$$\phi M_n = 0.9 A_s F_y d (1 - 0.59 A_s F_y / (b d F'_c))$$

Solution: $A_{s, \text{ req}} = 0.45 \text{ in}^2/\text{ft}$

 $A_{s, \text{ req}} > A_{s, \text{ t}}, \text{ use } A_{s, \text{ req}}$

Bar Spacing, c-c:

Check, $A_s = 1.45 \text{ in}^2/\text{ft}$

Top Reinforcing O.K.**Capacity:** 31.0%



PASS PASS

NHV 2071 143137 (BU 806939)

Results Summary: LC1 LC2

Soil Interaction: N/A N/A

TEP #: 51192.38096

Analysis: KEH 10/1/2015

Foundation Structural: 84.8% 21.1%

Check: TLI 10/1/2015

Drilled Caisson Tool - Input

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

Tower Type: Monopole

	LC1	LC2	
Moment:	5,693.52	1,428.43	kip-ft
Axial (download):	58.00	77.38	kip
Shear:	47.03	11.43	kip
Axial (uplift):			kip

Shaft Information		
Diameter:	7.00	ft
Projection:	0.50	ft
Caisson Length:	6.50	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:	3.00	in (Cage Ø = 75.34in)
Tie Bar Spacing:	12.00	in
Vertical Bar Size:	11	
Vertical Bar Quantity:	36	(ρ = 1.013%)
fy:	60.0	ksi
E:	29,000	ksi



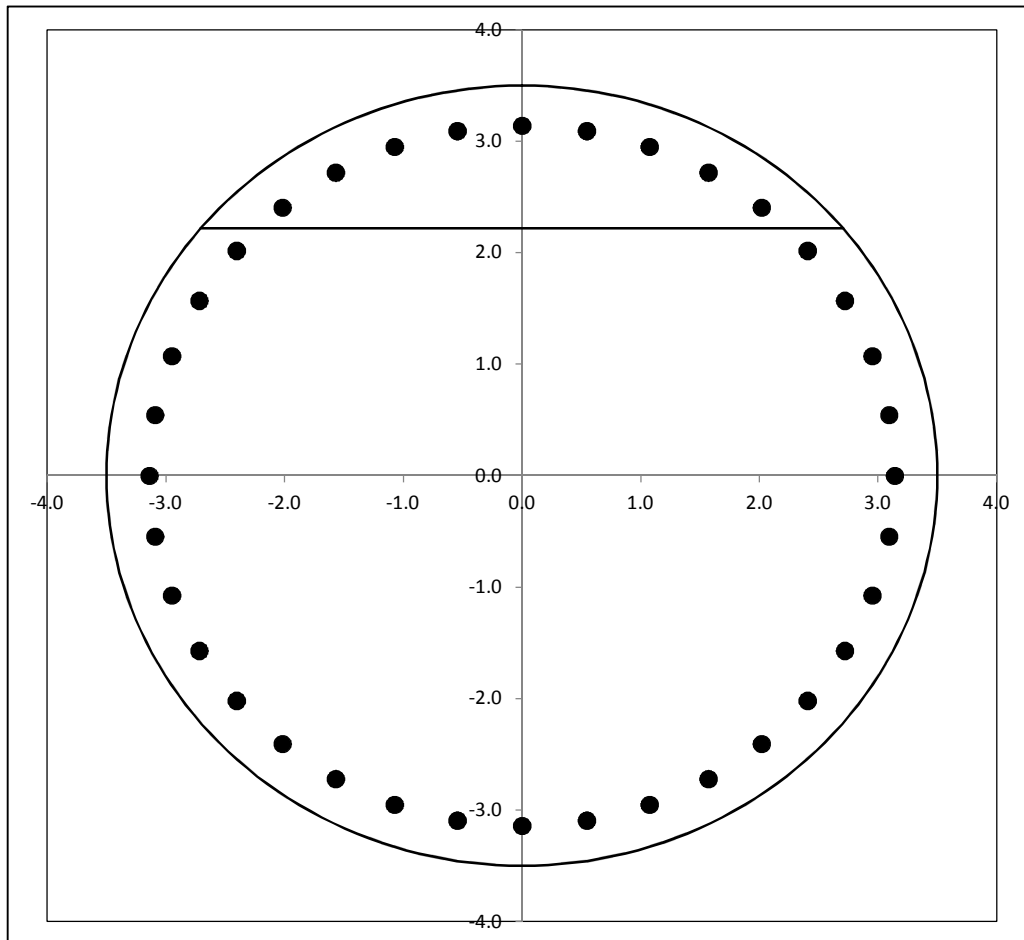
NHV 2071 143137 (BU 806939)

TEP #: 51192.38096

Analysis: KEH 10/1/2015

Check: TLI 10/1/2015

Reinforcement Capacity



	LC1	LC2
V_u =	61.1	61.1 kip
V_c =	704.7	705.9 kip
f_y, tie = 60.0 V_s =	246.5	246.5 kip
ϕV_n =	713.4	714.3 kip
Capacity =	8.6%	8.6%
	PASS	PASS

	LC1	LC2
M_u =	7401.6	1857.0 kip-ft
ϕM_n =	8725.8	8783.9 kip-ft
Capacity =	84.8%	21.1%
	PASS	PASS

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

T-Mobile Existing Facility

Site ID: CT11084B

Orange/ MP X56-57
800 Ogg Meadow Rd
Orange, CT 06477

October 9, 2015

EBI Project Number: 6215005057

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	8.54 %

October 9, 2015

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

Emissions Analysis for Site: **CT11084B – Orange/ MP X56-57**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **800 Ogg Meadow Rd, Orange, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **800 Ogg Meadow Rd, Orange, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

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

- 1) 2 GSM / UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel
- 2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.
- 5) 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.

- 6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 7) The antennas used in this modeling are the **Ericsson AIR21 (B4A/B2P & B2A/B4P)** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 (B4A/B2P & B2A/B4P)** have a maximum gain of **15.9 dBd** at their main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 8) The antenna mounting height centerline of the proposed antennas is **129 feet** above ground level (AGL).
- 9) 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.



T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	129	Height (AGL):	129	Height (AGL):	129
Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)
Channel Count	2	Channel Count	2	# PCS Channels:	2
Total TX Power:	120	Total TX Power:	120	# AWS Channels:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE%	1.11	Antenna B1 MPE%	1.11	Antenna C1 MPE%	1.11
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	129	Height (AGL):	129	Height (AGL):	129
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power:	120	Total TX Power:	120	Total TX Power:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A2 MPE%	1.11	Antenna B2 MPE%	1.11	Antenna C2 MPE%	1.11
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	129	Height (AGL):	129	Height (AGL):	129
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.44	Antenna B3 MPE%	0.44	Antenna C3 MPE%	0.44

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	2.66 %
AT&T	1.63 %
MetroPCS	0.68 %
Verizon Wireless	1.81 %
Clearwire	0.15 %
Nextel	0.42 %
Sprint	0.93 %
Metrcicom	0.06 %
XM Satellite Radio	0.20 %
Site Total MPE %:	8.54 %

T-Mobile Sector 1 Total:	2.66 %
T-Mobile Sector 2 Total:	2.66 %
T-Mobile Sector 3 Total:	2.66 %
Site Total:	8.54 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
T-Mobile 2100 MHz (AWS) LTE	2	2334.27	129	11.09	2100	1000	1.11 %
T-Mobile 700 MHz LTE	1	865.21	129	2.06	700	467	0.44 %
T-Mobile 1900 MHz (PCS) GSM/UMTS	2	1167.14	129	5.55	1900	1000	0.55 %
T-Mobile 2100 MHz (AWS) UMTS	2	1167.14	129	5.55	2100	1000	0.55 %
						Total:	2.66%

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector 1:	2.66 %
Sector 2:	2.66 %
Sector 3 :	2.66 %
T-Mobile Per Sector Maximum:	2.66 %
Site Total:	8.54 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **8.54%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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



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