

December 14, 2015

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

RE: Notice of Exempt Modification for T-Mobile / L700 Crown Site BU: 876399
T-Mobile Site ID: CT11542A
Located at: 60 South Main Street, East Granby, CT 06026
Latitude: 41° 56' 29.59" / Longitude: 72° 44' 19.248

Dear Ms. Bachman,

T-Mobile currently maintains three (3) antennas at the 92 foot level of the existing 98 foot monopole at 60 South Main Street, East Granby, CT. The tower is owned by Crown Castle. The property is owned by Crown Castle. T-Mobile now intends to remove and replace the three (3) antennas and install six (6) new antennas; six (6) lines of coaxial cable; and, one (1) new BBU cabinet. The antennas would be installed at the 92 foot level of the tower and the BBU cabinet would be installed at grade.

This facility was approved by the Town of East Granby Planning and Zoning Commission Number 00-20 on November 29, 2000. This approval included the condition(s) that:

1. A letter of approval be provided from the FAA that the proposed tower meets their requirements (ref. section IX, G3d of the Zoning Regulations).
2. A \$50,000 bond shall be posted prior to construction to be used to remove the tower if abandoned per section IX, G7 of the Zoning Regulations.

This modification complies with the aforementioned condition(s).

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to James M. Hayden, First Selectman for the Town of East Granby, as well as the property owner and the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.
2. The proposed modification will not require the extension of the site boundary.
3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Amanda Goodall.

Sincerely,



Amanda Goodall

Real Estate Specialist

12 Gill Street, Suite 5800, Woburn, MA 01801

339-205-7017

Amanda.Goodall@crowncastle.com

Melanie A. Bachman

December 14, 2015

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Attachments:

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

Tab 2: Exhibit-2: Structural Modification Report

Tab 4: Exhibit-3: General Power Density Table report (RF Emissions Analysis Report)

cc: James M. Hayden, First Selectman

Town of East Granby

9 Center Street

East Granby, Ct 06026

Crown Castle (Both Property Owner and Tower Owner)

12 Gill Street, Suite 5800

Woburn, Ma 01801

At the time of the original approval for the tower at 60 South Main Street in East Granby, CT, by State law, individual Towns had jurisdiction for approval. Applications were made to local Planning & Zoning Agencies. State law changed afterward, giving that jurisdiction to the CT Siting Council. Therefore, no Docket No. exists for the original tower. Please see attached approval from the local Planning & Zoning Commission.



R. Allen McKeown
12/10/15

Frey

Dec. 10. 2015 11:08AM
two years
1st-Class Mail or Pr
International Mail
with Certified M.
Postage provided by
Post Office
...to provide Post
...to provide a Post
...to provide a Post



**TOWN OF EAST GRANBY
PLANNING & ZONING COMMISSION
9 CENTER STREET
P.O. BOX 1858
EAST GRANBY, CT 06026
653-3444**

November 29, 2000

**Sprint Spectrum L.P. dba Sprint PCS
9 Barnes Industrial Road
Wallingford, CT 06492**

CERTIFIED MAIL

Dear Sirs,

At its meeting on November 28, 2000, the East Granby Planning & Zoning Commission voted to approve your Application #00-20 for a communication tower on the Galasso Holdings property subject to the following conditions:

1. A letter of approval be provided from the FAA that the proposed tower meets their requirements (ref. section IX, G3d of the Zoning Regulations).
2. A \$50,000 bond shall be posted prior to construction to be used to remove the tower if abandoned per section IX, G7 of the Zoning Regulations.

Sincerely,

Frederick O'Brien
(10/11/00)

Frederick O'Brien
Chairman

Cc: Town Clerk
Building Official
Town Engineer
Assessor
Attorney Thomas Regan

GENERAL NOTES:

1. 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
2. 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.
3. 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.
4. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
5. DRAWINGS PROVIDED HERE ARE NOT TO SCALE UNLESS OTHERWISE NOTED AND ARE INTENDED TO SHOW OUTLINE ONLY.
6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY PROJECT MANAGEMENT.
9. 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.
10. 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.
11. 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.
12. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. 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.
14. 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.
15. 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.
16. 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.
17. 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:

1. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
2. 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.
3. ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.
4. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, TOP SOIL AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
5. 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.
6. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION.
7. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE T-MOBILE SPECIFICATION FOR SITE SIGNAGE.
8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE TRANSMISSION EQUIPMENT AND TOWER AREAS.
9. 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.
10. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION, SEE SOIL COMPACTON NOTES.
11. 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.
12. 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:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.
2. CONTRACTOR SHALL MODIFY EXISTING CABLE TRAY SYSTEM AS REQUIRED TO SUPPORT RF AND TRANSPORT CABLING TO THE NEW BTS EQUIPMENT. CONTRACTOR SHALL SUBMIT MODIFICATIONS TO PROJECT MANAGEMENT FOR APPROVAL.
3. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED.
4. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.
5. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND TELCORDIA.
6. CABLES SHALL NOT BE ROUTED THROUGH LADDER-STYLE CABLE TRAY RUNGS.
7. 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.
8. 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).
9. PANELBOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS.
10. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
11. 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.
12. 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.
13. 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.
14. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED OUTDOORS, OR BELOW GRADE, SHALL BE SINGLE CONDUCTOR #2 AWG SOLID TINNED COPPER CABLE, UNLESS OTHERWISE SPECIFIED.
15. 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.
16. 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).
17. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANS/IEEE, AND NEC.
18. NEW RACEWAY OR CABLE TRAY WILL MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
19. 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.
20. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT), OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
21. GALVANIZED STEEL INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR OUTDOOR LOCATIONS ABOVE GRADE.
22. 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.
23. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
24. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.
25. CABINETS, BOXES, AND WIREWAYS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANS/IEEE, AND NEC.
26. CABINETS, BOXES, AND WIREWAYS TO MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
27. 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.
28. 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.
29. 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.
30. 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.
31. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM PROJECT MANAGEMENT BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
32. 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:

1. 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.
2. 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.
3. 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.
4. 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.
5. A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.
6. 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.
7. CONCRETE CYLINDER TEST IS NOT REQUIRED FOR SLAB ON GRADE WHEN CONCRETE IS LESS THAN 50 CUBIC YARDS (IBC 1905.6.2.3) 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.
8. 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.
9. 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:

1. 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".
2. 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.
3. BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4") CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
4. NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" DIA. ASTM A 307 BOLTS UNLESS NOTED OTHERWISE.
5. 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.
6. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ENGINEER REVIEW & APPROVAL ON PROJECTS REQUIRING STRUCTURAL STEEL.
7. ALL STRUCTURAL STEEL WORK SHALL BE DONE IN ACCORDANCE WITH AISC SPECIFICATIONS.

CONSTRUCTION NOTES:

1. FIELD VERIFICATION: CONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, T-MOBILE ANTENNA PLATFORM LOCATION AND ANTENNAS TO BE REPLACED.
2. COORDINATION OF WORK: CONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH PROJECT MANAGEMENT.
3. 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.
4. 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 GROUNDING IN ACCORDANCE WITH GOVERNING BUILDING CODE, MANUFACTURER RECOMMENDATIONS AND OWNER SPECIFICATIONS.



T-MOBILE NORTHEAST LLC
35 GRIFFIN RD SOUTH
BLOOMFIELD, CT 06002



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

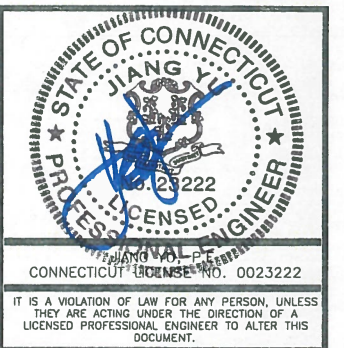
**CT11542A
(F) E. GRANBY
4Q2000/GALASSO**

CONSTRUCTION DRAWINGS

1	12/16/15	ISSUED AS FINAL
0	11/30/15	ISSUED AS FINAL
A	09/23/15	ISSUED FOR REVIEW



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



DRAWN BY: RA

REVIEWED BY: BSH

CHECKED BY: GHN

PROJECT NUMBER: 5006258

JOB NUMBER: 50072410

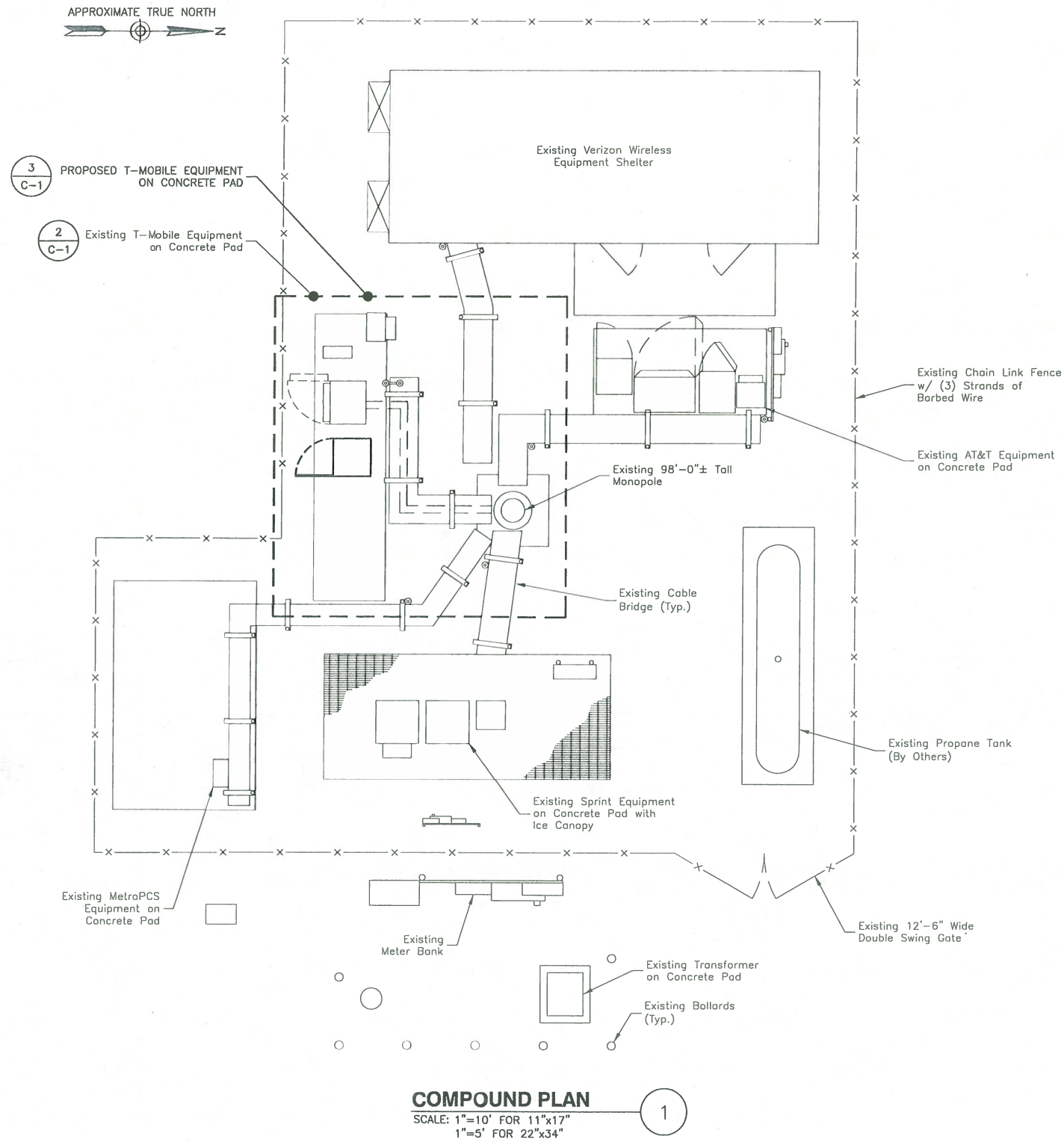
SITE ADDRESS:

60 SOUTH MAIN STREET
EAST GRANBY, CT 06026
HARTFORD COUNTY

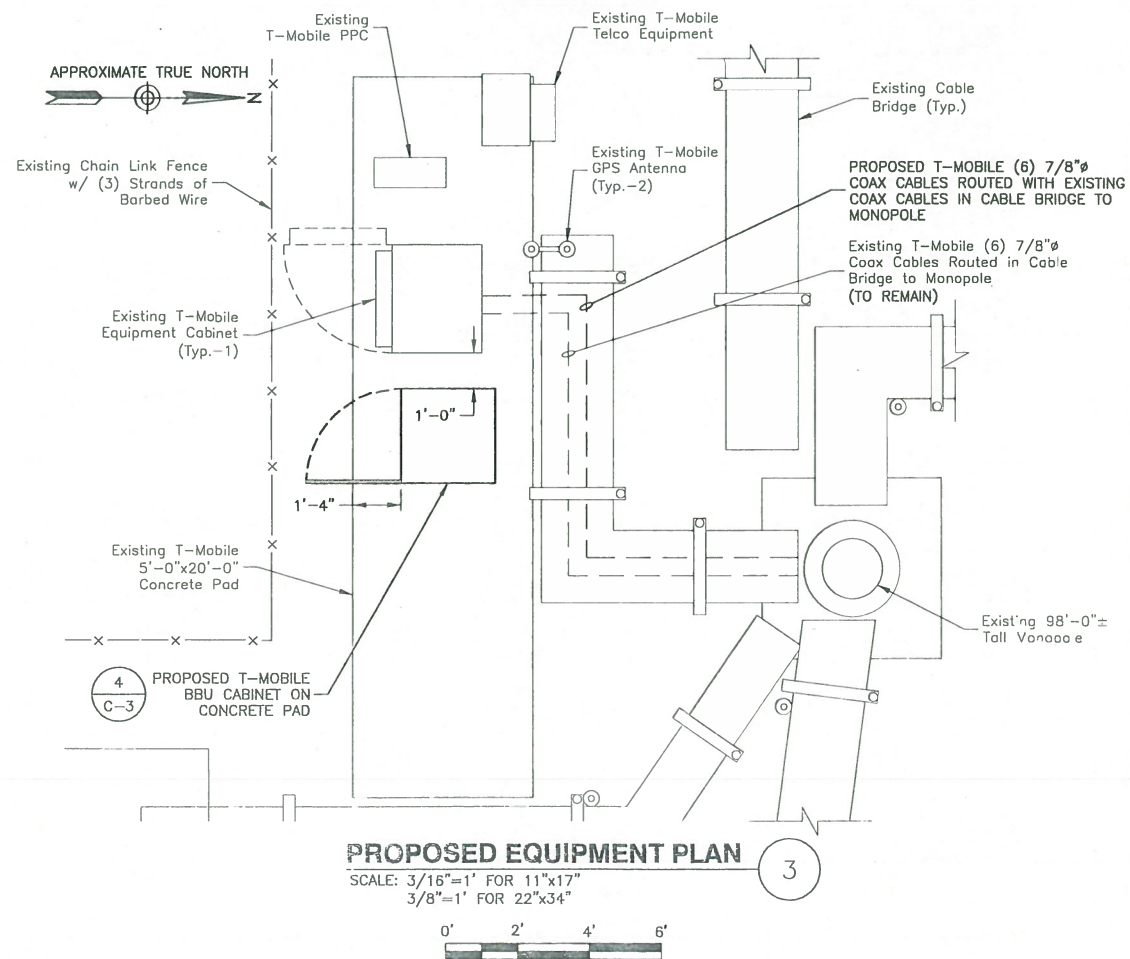
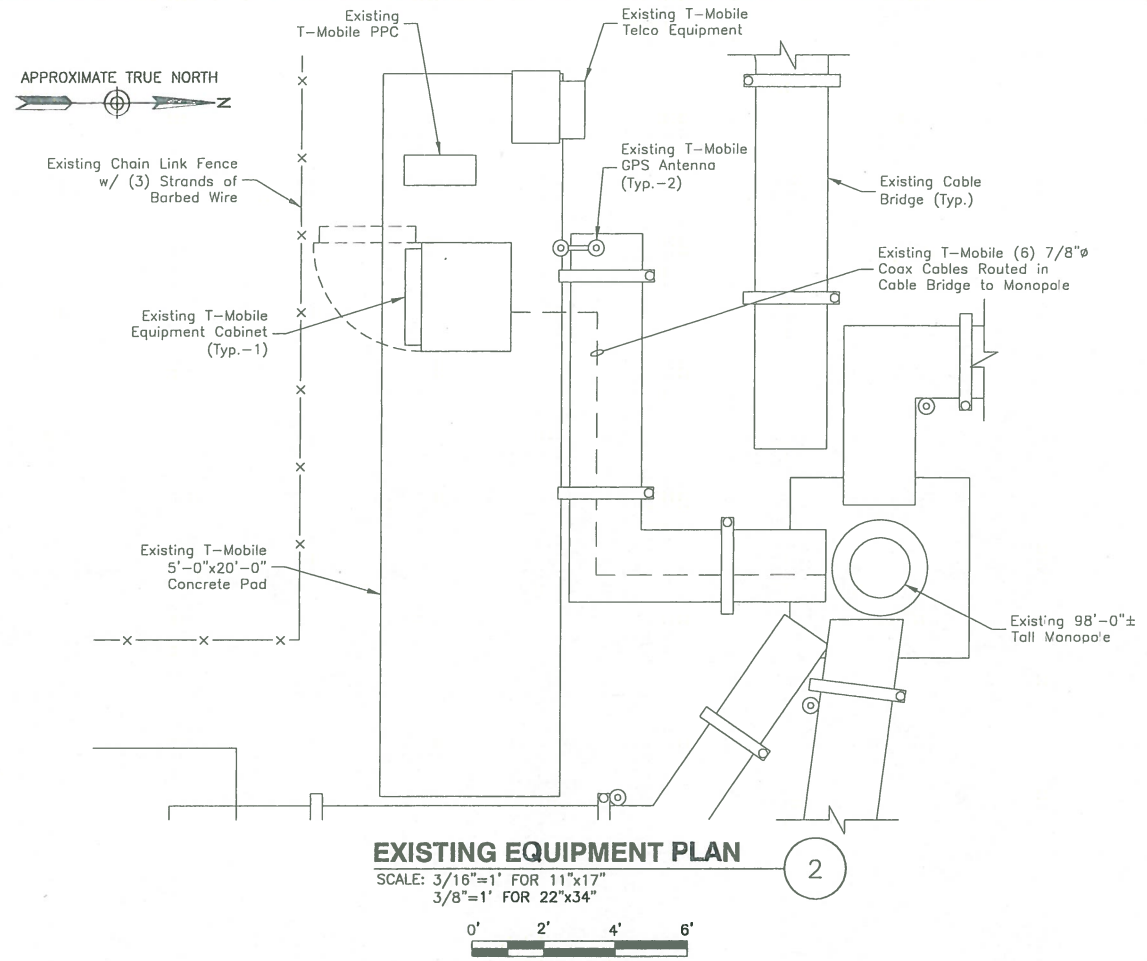
SHEET TITLE

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, BIAS TEES, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY GPD GROUP DATED JULY 29, 2015 & MONOPOLE REINFORCEMENT DRAWINGS BY GPD GROUP DATED JULY 29, 2015.



T-Mobile

T-MOBILE NORTHEAST LLC
35 GRIFFIN RD SOUTH
BLOOMFIELD, CT 06002

CROWN CASTLE

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

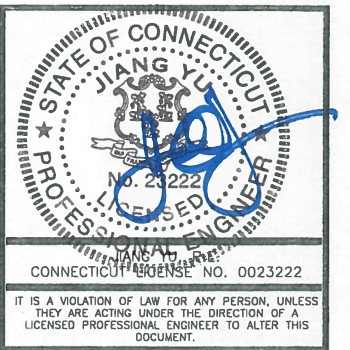
**CT11542A
(F) E. GRANBY
4Q2000/GALASSO**

CONSTRUCTION DRAWINGS

1	12/16/15	ISSUED AS FINAL
0	11/30/15	ISSUED AS FINAL
A	09/23/15	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:	RA
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50072410
SITE ADDRESS:	

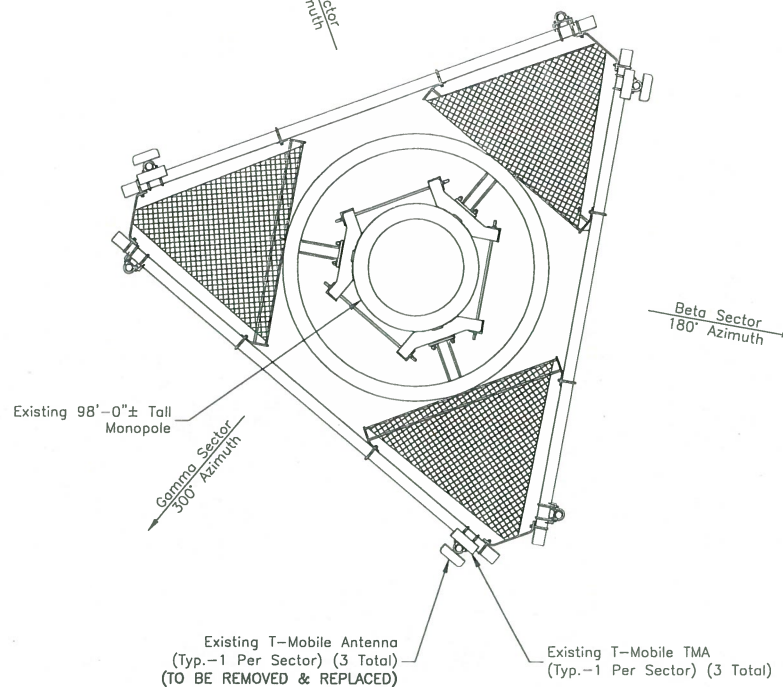
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EAST GRANBY, CT 06026
HARTFORD COUNTY

SHEET TITLE

COMPOUND PLAN &
EQUIPMENT PLANS

SHEET NUMBER

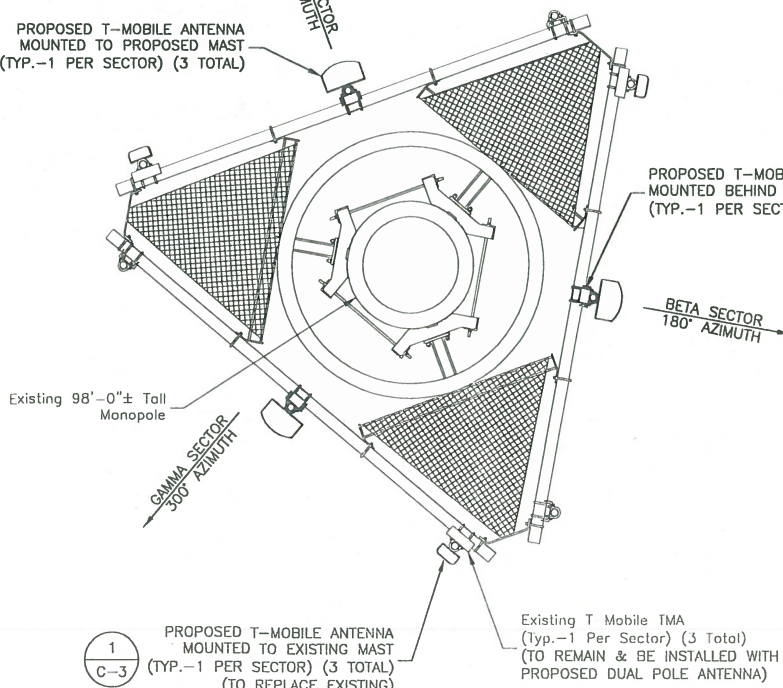
C-1



EXISTING ANTENNA LAYOUT

SCALE: N.T.S.

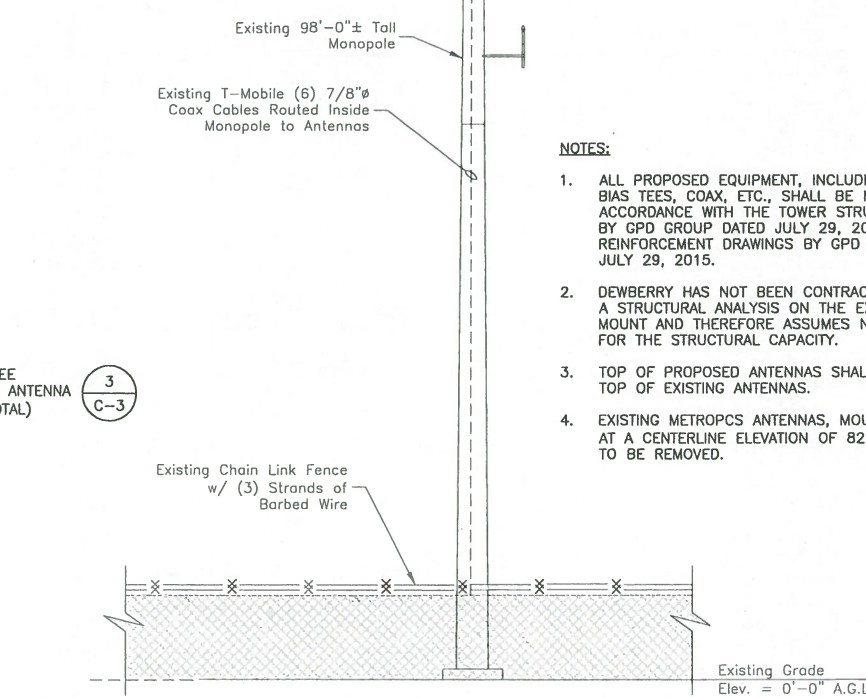
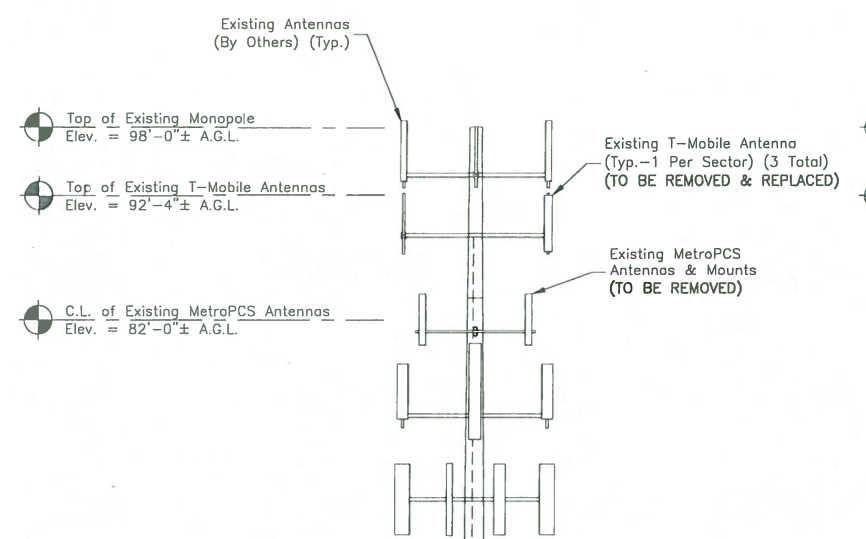
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PROPOSED ANTENNA LAYOUT

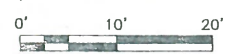
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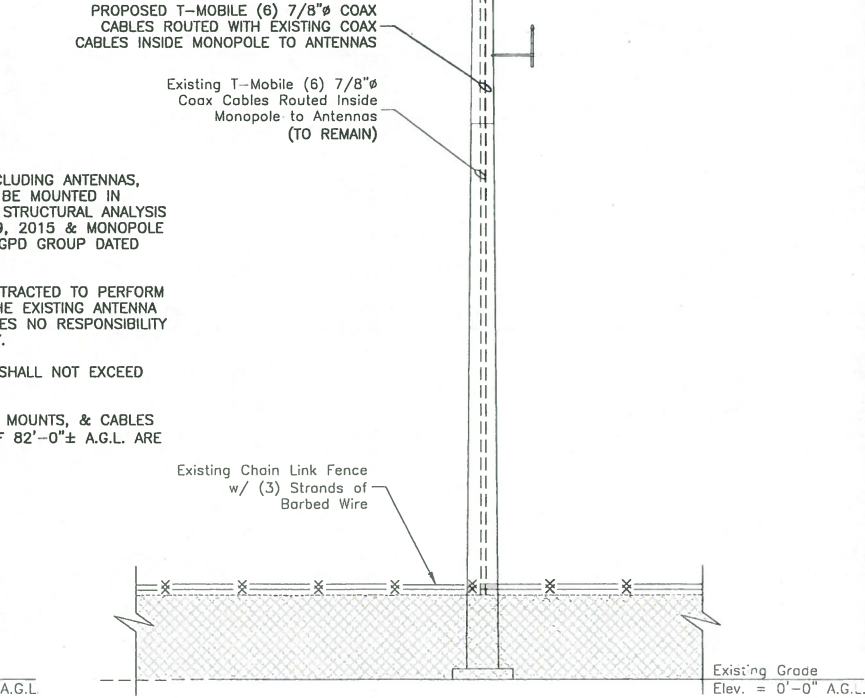
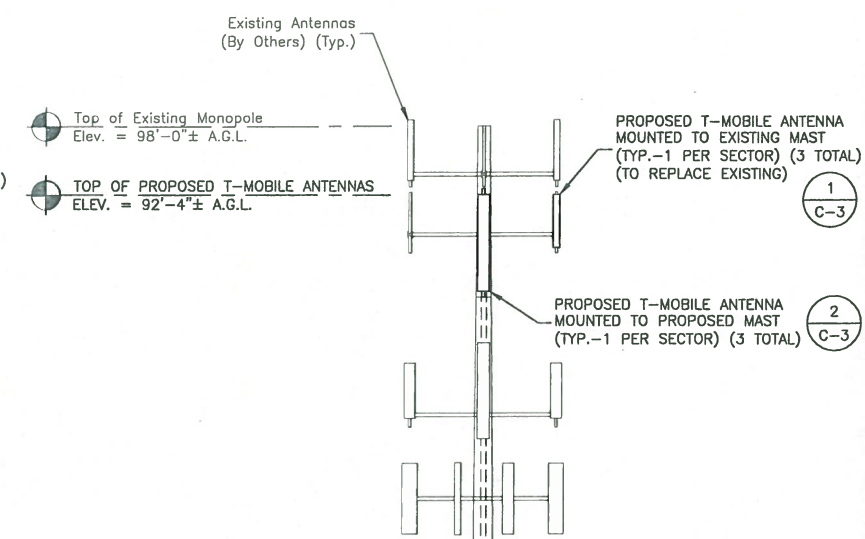


EXISTING ELEVATION

SCALE: 1/16"=1' FOR 11"x17"
1/8"=1' FOR 22"x34"



3



PROPOSED ELEVATION

SCALE: 1/16"=1' FOR 11"x17"
1/8"=1' FOR 22"x34"



4

NOTES:

1. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, BIAS TEES, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY GPD GROUP DATED JULY 29, 2015 & MONOPOLE REINFORCEMENT DRAWINGS BY GPD GROUP DATED JULY 29, 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.
3. TOP OF PROPOSED ANTENNAS SHALL NOT EXCEED TOP OF EXISTING ANTENNAS.
4. EXISTING METROPCS ANTENNAS, MOUNTS, & CABLES AT A CENTERLINE ELEVATION OF 82'-0"± A.G.L. ARE TO BE REMOVED.



T-MOBILE NORTHEAST LLC
35 GRIFFIN RD SOUTH
BLOOMFIELD, CT 06002



CROWN CASTLE
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CLIFTON PARK, NY 12065

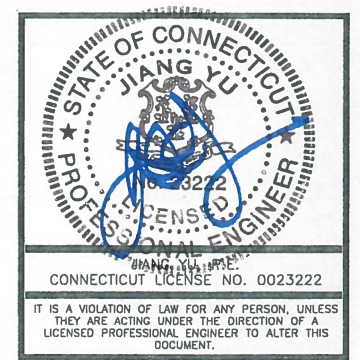
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(F) E. GRANBY
4Q2000/GALASSO

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DRAWN BY:	RA
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50072410
SITE ADDRESS:	

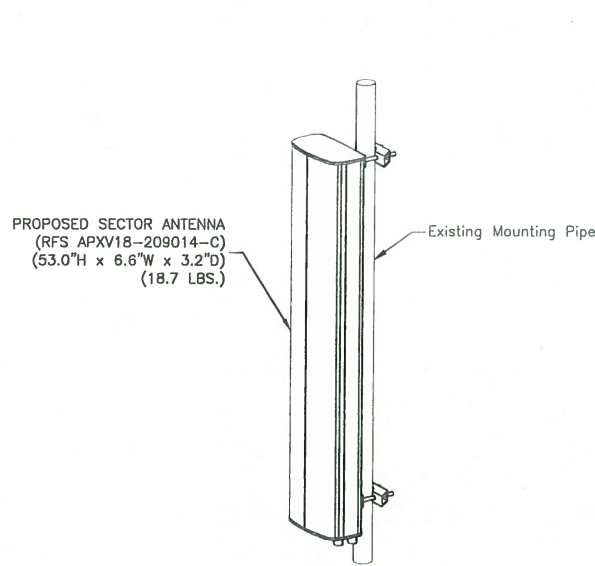
60 SOUTH MAIN STREET
EAST GRANBY, CT 06026
HARTFORD COUNTY

SHEET TITLE

ANTENNA LAYOUTS & ELEVATIONS

SHEET NUMBER

C-2



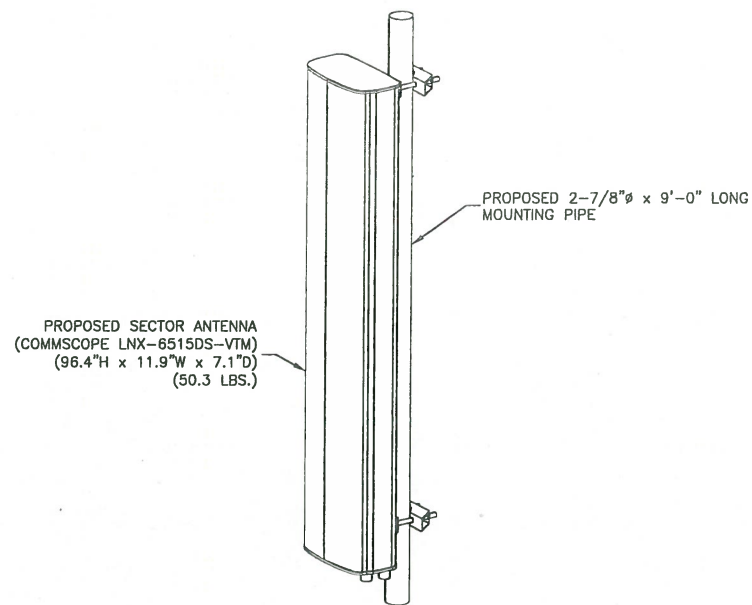
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2. GROUND ANTENNAS AND MOUNTS PER MANUFACTURER'S RECOMMENDATIONS AND T-MOBILE STANDARDS.
3. CONFIRM REQUIRED ANTENNAS WITH THE LATEST RFDS.

ISOMETRIC ANTENNA DETAIL

SCALE: N.T.S.

1



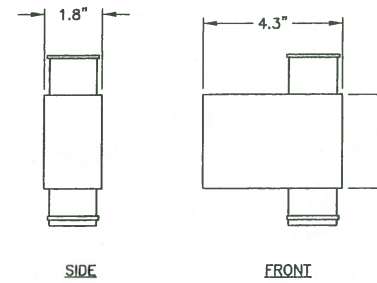
NOTES:

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.

ISOMETRIC ANTENNA DETAIL

SCALE: N.T.S.

2



ANDREW ATBT-BOTTOM-24V

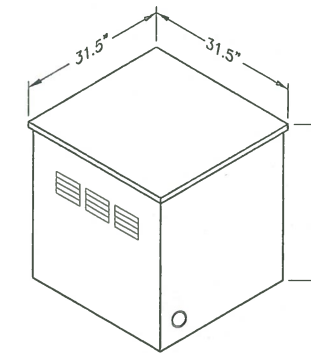
NOTES:

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

BIAS TEE DETAIL

SCALE: N.T.S.

3



ALCATEL-LUCENT EZBF0 BATTERY BACKUP SYSTEM

MATERIAL:	ANCHOR:
CONCRETE	3/8" HILTI KWIK BOLT 3 W/2-1/2" MIN. EMBED.
STRUCTURAL STEEL	1/2" STRUCTURAL BOLTS

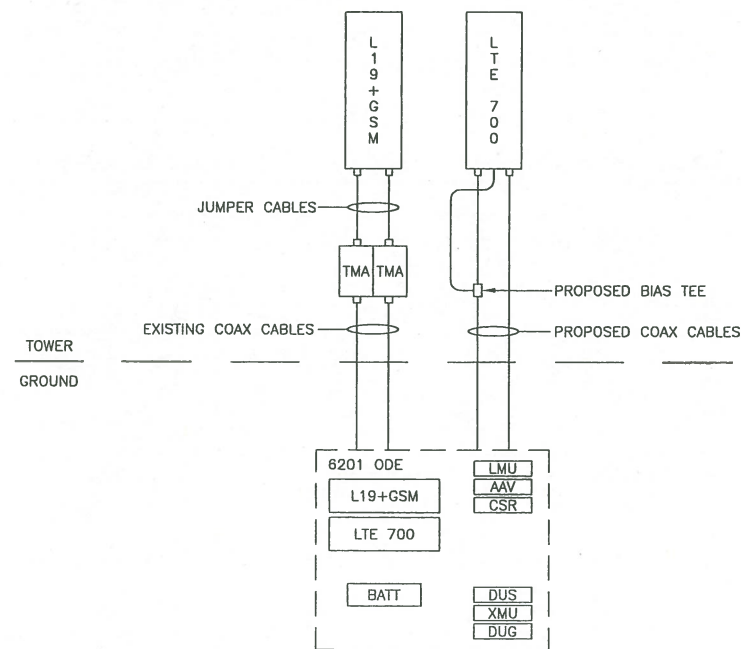
NOTE:

1. CONTRACTOR SHALL ANCHOR CABINET IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.

BBU CABINET DETAIL

SCALE: N.T.S.

4



SITE CONFIGURATION 704G

SCALE: N.T.S.

5

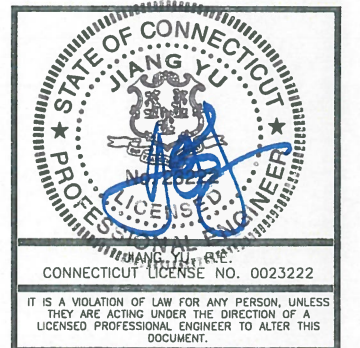
DESIGN CONFIGURATION					
ANTENNAS		COAX		COAX LENGTH	
EXISTING	PROPOSED	EXISTING	PROPOSED		
ALPHA	EMS RR90-17-02DP	RFS APXV18-209014-C			140'-0"
	-	COMMSCOPE LNX-6515DS-VTM	(2) 7/8"φ	(2) 7/8"φ	
	-	-			
BETA	EMS RR90-17-02DP	RFS APXV18-209014-C			140'-0"
	-	COMMSCOPE LNX-6515DS-VTM	(2) 7/8"φ	(2) 7/8"φ	
	-	-			
GAMMA	EMS RR90-17-02DP	RFS APXV18-209014-C			140'-0"
	-	COMMSCOPE LNX-6515DS-VTM	(2) 7/8"φ	(2) 7/8"φ	
	-	-			

CT11542A
(F) E. GRANBY
4Q2000/GALASSO

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



DRAWN BY: RA

REVIEWED BY: BSH

CHECKED BY: GHN

PROJECT NUMBER: 50066258

JOB NUMBER: 50072410

SITE ADDRESS:

60 SOUTH MAIN STREET
EAST GRANBY, CT 06026
HARTFORD COUNTY

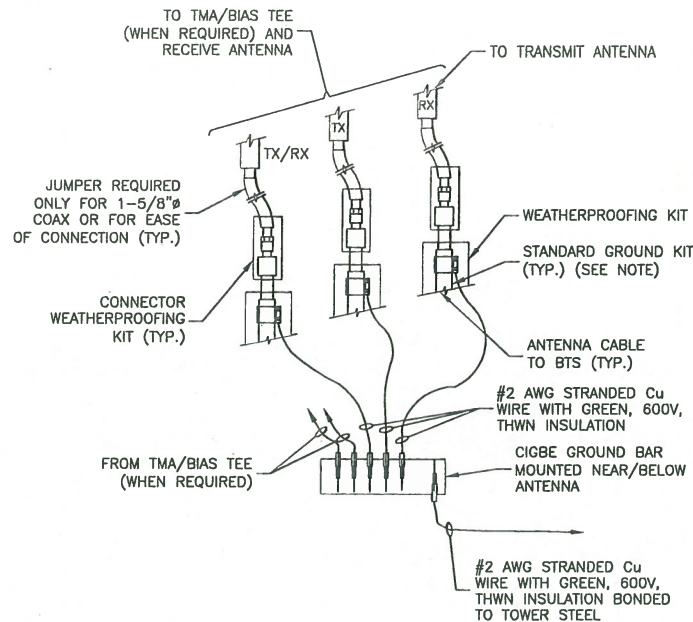
SHEET TITLE

CONSTRUCTION
DETAILS

SHEET NUMBER

GROUNDING NOTES:

- 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) LIGHTING 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.
- ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GESS'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.
- THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-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.
- 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.
- 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.
- METAL CONDUIT AND TRAY SHALL BE GROUNDING AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE AND UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
- 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.
- CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED. BACK-TO-BACK CONNECTIONS ON OPPOSITE SIDES OF THE GROUND BUS ARE PERMITTED.
- ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
- 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.
- 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.
- ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE 2 AWG SOLID TIN-PLATED COPPER UNLESS OTHERWISE INDICATED.
- 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.
- EXOTHERMIC WELDS SHALL BE PERMITTED ON TOWERS ONLY WITH THE EXPRESS APPROVAL OF THE TOWER MANUFACTURER OR THE CONTRACTORS STRUCTURAL ENGINEER.
- 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.
- 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.
- 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.
- APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
- ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
- MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
- 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.
- 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.



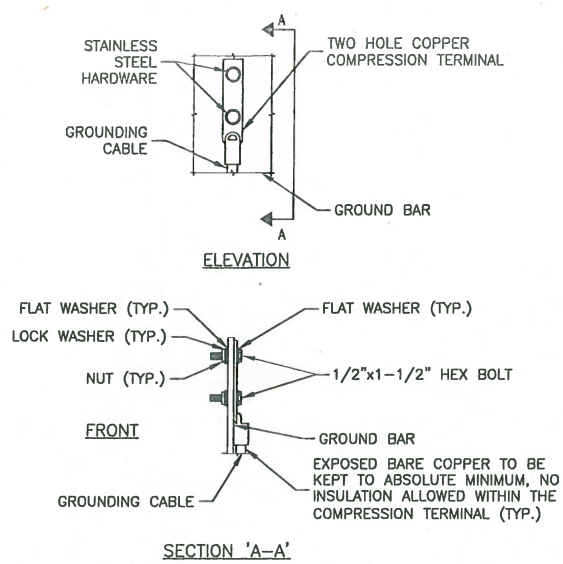
NOTE:

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

CONNECTION OF GROUND WIRES TO GROUNDING BAR (CIGBE)

SCALE: N.T.S.

1



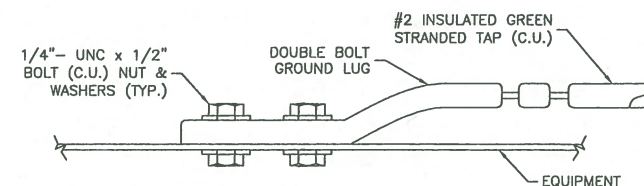
NOTES:

- DOUBLING UP OR STACKING OF CONNECTIONS IS NOT PERMITTED.
- OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL

SCALE: N.T.S.

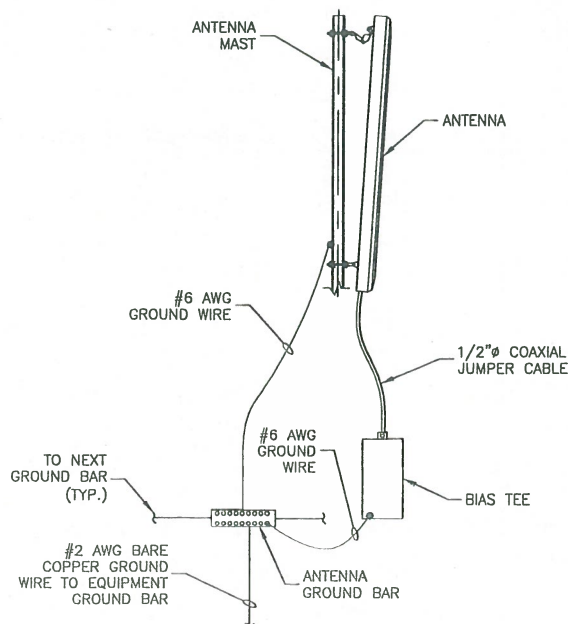
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CONNECTION TO EQUIPMENT DETAIL

SCALE: N.T.S.

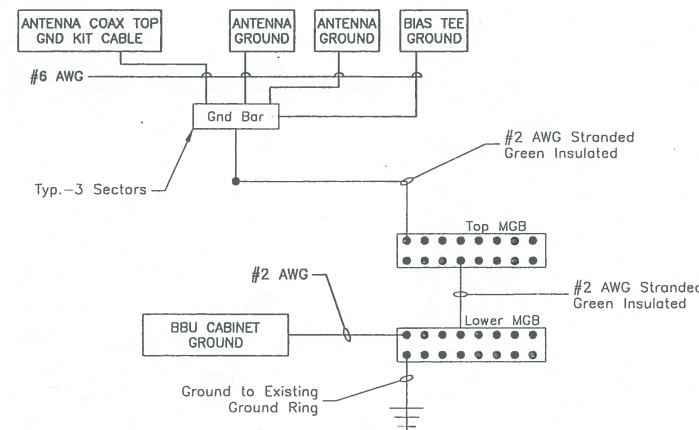
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TYPICAL ANTENNA GROUNDING DETAIL

SCALE: N.T.S.

4



NOTES:

- BOND ANTENNA GROUNDING KIT CABLE TO TOP CIGBE
- BOND ANTENNA GROUNDING KIT CABLE TO BOTTOM CIGBE.
- SCHEMATIC GROUNDING DIAGRAM IS TYPICAL FOR EACH SECTOR.
- VERIFY EXISTING GROUND SYSTEM IS INSTALLED PER T-MOBILE STANDARDS.

SCHEMATIC GROUNDING DIAGRAM

SCALE: N.T.S.

5



T-MOBILE NORTHEAST LLC
35 GRIFFIN RD SOUTH
BLOOMFIELD, CT 06002



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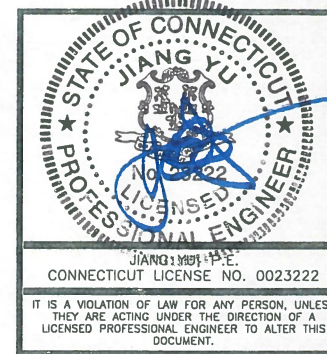
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HARTFORD COUNTY

SHEET TITLE

GROUNDING NOTES & DETAILS

SHEET NUMBER



GPD Engineering and Architecture
Professional Corporation

Date: **November 12, 2015**

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

520 South Main Street, Suite 2531
Akron, OH 44311
(216) 927-8663
dpalkovic@gpdgroup.com

Subject: Structural Analysis Report

Carrier Designation: T-Mobile Co-Locate
Carrier Site Number: CT11542A
Carrier Site Name: E. Granby - Sprint

Crown Castle Designation:
Crown Castle BU Number: 876399
Crown Castle Site Name: (F) E. GRANBY 4Q2000 / GALASSO
Crown Castle JDE Job Number: 324830
Crown Castle Work Order Number: 1147215
Crown Castle Application Number: 284769 Rev. 17

Engineering Firm Designation: GPD Project Number: 2016777.876399.02

Site Data: **60 South Main St., East Granby, Hartford County, CT 06026**
Latitude 41° 56' 29.59", Longitude -72° 44' 19.248"
98 Foot – Modified EEI Monopole Tower

Dear Sean Dempsey,

GPD 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 843649, in accordance with application 284769, revision 17.

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

LC4.7: Existing + Reserved + Proposed Equipment **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 standard and the 2005 CT State Building Code based upon a wind speed of 80 mph fastest mile.

All modifications designed by GPD (Project #: 2015777.876399.01, dated 7/29/2015, see Appendix D) and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at GPD 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: Benjamin Darkow

Respectfully submitted by:



Christopher J. Scheks
Connecticut #: 0030026

11/12/2015

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Table 6 - Tower Components vs. Capacity

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7) APPENDIX B

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8) APPENDIX C

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9) APPENDIX D

Modification Drawings

1) INTRODUCTION

This tower is a 98 ft Monopole tower designed by Engineered Endeavors, Inc. in September of 2000. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

The existing monopole has three major sections connected by slip joints. It has 18 sides and is evenly tapered from 32.0" (flat-flat) at the base to 12.0" (flat-flat) at the top. The structure is galvanized and has no tower lighting.

Modifications by IETS (Project #: 2009-70644, dated 11/4/2009) have been considered in this analysis. They consisted of installing base plate stiffeners.

Modifications by PJF (Project #: 32912-0138, dated 6/27/2012) have been considered in this analysis. They consisted of installing additional anchor rods and shaft reinforcement.

Proposed modifications designed by GPD (Project #: 2015777.876399.01 Rev. A, dated 8/3/2015) have been considered in this analysis. They consisted of installing steel plates on top of the foundation and removing the tower loading at the 81.0' elevation.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and the 2005 CT State Building Code using a fastest mile wind speed of 80 mph with no ice, 28 mph with 1 inch ice thickness (in accordance with ASCE 7-05 ice conditions) 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
89.0	90.0	3	Commscope	ATBT-BOTTOM-24V	6	7/8	1
		3	Commscope	LNx-6515DS-VTM			
		3	RFS Celwave	APXV18-209014-C			

Notes:

- 1) See Appendix B for the proposed feed line layout

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
94.0	96.0	1	Andrew	HBX-6516DS-VTM	2 6	7/8 1-1/4	
		1	Antel	BXA-80063/4CF			
		4	Decibel	DB980H65E-M			
	94.0	1		Platform Mount [LP 601-1]			
89.0	90.0	3	EMS Wireless	RR90-17-02DP	6	7/8	1
		3	RFS Celwave	ATMPP1412D-1CWA			
	89.0	1		Platform Mount [LP 305-1]			
81.0	82.0	3	Andrew	ATM200-A20	1 6	5/16 7/8	2
		3	Andrew	HBX-6516DS-VTM			
	81.0	1		T-Arm Mount [TA 601-3]			
74.0	76.0	3	Ericsson	RRUS-11	1 2 12	3/8 3/4 7/8	
		6	Powerwave	7770.00			
		6	Powerwave	LGP21401			
		6	Powerwave	LGP21903			
		3	Powerwave	P65-17-XLH-RR			
		1	Raycap	DC6-48-60-18-8F			
	74.0	1		Platform Mount [LP 303-1]			
67.0	67.0	2	Antel	BXA-70063/6CF	18	1-5/8	3
		1	Antel	BXA-70063/6CFx2			
		3	Antel	BXA-171063-12BF			
		6	Antel	LPA-80063/6CFx2			
		1		Platform Mount [LP 303-1]			
52.0	54.0	1	Lucent	KS24019-L112A	1	1/2	
	52.0	1		Side Arm Mount [SO 701-1]			

Notes:

- 1) Existing equipment to be removed; not considered in the analysis
- 2) Existing equipment to be removed per the proposed modification design; not considered in the analysis
- 3) Reserved equipment; considered in the 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)
96.5	96.5	12	Dapa	48000		
87.5	87.5	12	Dapa	48000		
77.5	77.5	12	Dapa	48000		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Geotechnical Report	Dr. Clarence Welti Associates, dated 7/25/2000	1531971	CCISITES
Tower Foundation Drawings	EEI Project #: 7832 Rev 1, dated 9/22/2000	2066334	CCISITES
Tower Manufacturer Drawings	EEI Project #: 9832 Rev 1, dated 9/22/2000	1613691	CCISITES
Tower Reinforcement Design	IETS Project #: 2009-70644, dated 11/4/2009	2529017	CCISITES
Post-Modification Inspection	IETS Project #: 2010-70158, dated 7/7/2010	2682749	CCISITES
Tower Reinforcement Design	PJF Project #: 32912-0138 , dated 6/27/2012	3713021	CCISITES
Post-Modification Inspection	PJF Project #: 32912-0138 MO, dated 3/13/2013	3713020	CCISITES
Tower Reinforcement Design	GPD Project #: 2015777.876399.01 Rev. A, dated 8/3/2015	D. Palkovic	GPD

3.1) Analysis Method

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

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	98 - 93	Pole	TP13.0782x12x0.1875	1	-1.31	*	4.6	Pass
L2	93 - 88	Pole	TP14.1563x13.0782x0.1875	2	-2.77	*	17.8	Pass
L3	88 - 82.7891	Pole	TP15.28x14.1563x0.1875	3	-2.88	*	27.0	Pass
L4	82.7891 - 80.2057	Pole	TP15.4455x14.3839x0.25	4	-3.19	*	32.3	Pass
L5	80.2057 - 75.2057	Pole	TP16.5072x15.4455x0.25	5	-3.46	*	40.5	Pass
L6	75.2057 - 70.2057	Pole	TP17.5689x16.5072x0.25	6	-5.69	*	54.4	Pass
L7	70.2057 - 65.2057	Pole	TP18.6305x17.5689x0.25	7	-7.63	*	67.3	Pass
L8	65.2057 - 60.2057	Pole	TP19.6922x18.6305x0.25	8	-8.11	*	81.2	Pass
L9	60.2057 - 59.16	Pole	TP19.9142x19.6922x0.25	9	-8.23	*	83.7	Pass
L10	59.16 - 58.9	Pole	TP19.9694x19.9142x0.5125	10	-8.28	*	60.5	Pass
L11	58.9 - 58.75	Pole	TP20.0013x19.9694x0.5125	11	-8.30	*	60.7	Pass
L12	58.75 - 53.75	Pole	TP21.0629x20.0013x0.5	12	-9.06	*	70.1	Pass
L13	53.75 - 52.916	Pole	TP21.24x21.0629x0.5	13	-9.19	*	71.5	Pass
L14	52.916 - 52.666	Pole	TP21.2931x21.24x0.5	14	-9.23	*	72.6	Pass
L15	52.666 - 52.16	Pole	TP21.4005x21.2931x0.5	15	-9.32	*	73.4	Pass
L16	52.16 - 51.91	Pole	TP21.4536x21.4005x0.4375	16	-9.43	*	76.1	Pass
L17	51.91 - 45.2865	Pole	TP22.86x21.4536x0.4375	17	-9.93	*	81.2	Pass
L18	45.2865 - 44.2865	Pole	TP22.5745x21.6345x0.5438	18	-11.04	*	77.4	Pass
L19	44.2865 - 39.2865	Pole	TP23.6387x22.5745x0.5313	19	-11.93	*	82.8	Pass
L20	39.2865 - 34.2865	Pole	TP24.7028x23.6387x0.5188	20	-12.84	*	87.4	Pass
L21	34.2865 - 33.5	Pole	TP24.8702x24.7028x0.5125	21	-12.99	*	88.0	Pass
L22	33.5 - 33.25	Pole	TP24.9234x24.8702x0.8125	22	-13.06	*	58.4	Pass
L23	33.25 - 32	Pole	TP25.1895x24.9234x0.8	23	-13.37	*	59.2	Pass
L24	32 - 31.75	Pole	TP25.2427x25.1895x0.5875	24	-13.43	*	71.8	Pass
L25	31.75 - 28.5	Pole	TP25.9344x25.2427x0.575	25	-14.10	*	73.9	Pass
L26	28.5 - 28.25	Pole	TP25.9876x25.9344x0.5875	26	-14.17	*	74.6	Pass
L27	28.25 - 28	Pole	TP26.0408x25.9876x0.5875	27	-14.22	*	74.8	Pass
L28	28 - 27.75	Pole	TP26.094x26.0408x0.8625	28	-14.29	*	52.2	Pass
L29	27.75 - 27.5	Pole	TP26.1472x26.094x0.85	29	-14.36	*	52.3	Pass
L30	27.5 - 27.25	Pole	TP26.2004x26.1472x0.575	30	-14.41	*	74.7	Pass
L31	27.25 - 22.25	Pole	TP27.2645x26.2004x0.5625	31	-15.47	*	77.5	Pass
L32	22.25 - 17.25	Pole	TP28.3287x27.2645x0.55	32	-16.56	*	80.0	Pass
L33	17.25 - 15.46	Pole	TP28.7097x28.3287x0.55	33	-16.95	*	80.8	Pass
L34	15.46 - 15.21	Pole	TP28.7629x28.7097x0.55	34	-17.02	*	81.6	Pass
L35	15.21 - 13.4167	Pole	TP29.1445x28.7629x0.55	35	-17.45	*	82.4	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L36	13.4167 - 13.1667	Pole	TP29.1977x29.1445x0.5	36	-17.52	*	84.3	Pass
L37	13.1667 - 8.1667	Pole	TP30.2619x29.1977x0.4875	37	-18.64	*	86.2	Pass
L38	8.1667 - 6.5	Pole	TP30.6166x30.2619x0.4875	38	-18.98	*	86.8	Pass
L39	6.5 - 6.25	Pole	TP30.6698x30.6166x0.5375	39	-19.04	*	85.1	Pass
L40	6.25 - 4.46	Pole	TP31.0508x30.6698x0.525	40	-19.43	*	85.7	Pass
L41	4.46 - 4.21	Pole	TP31.104x31.0508x0.525	41	-19.49	*	85.1	Pass
L42	4.21 - 0	Pole	TP32x31.104x0.5125	42	-20.35	*	87.1	Pass
							Summary	
						Pole	83.7	Pass
						Reinforcement	88.0	Pass
						Overall	88.0	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	85.3	Pass
1	Base Plate	0	93.1	Pass
1	Base Foundation Structural	0	37.2	Pass
1	Base Foundation Soil Interaction	0	79.5	Pass

Structure Rating (max from all components) =	93.1%
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Notes:

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

4.1) Recommendations

The modified tower and its foundation will be sufficient for the proposed loading once the GPD designed modifications (Project #: 2015777.876399.01 Rev. A, dated 8/3/2015) are installed.

5) DISCLAIMER OF WARRANTIES

GPD has not performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD in connection with this Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

This analysis is limited to the designated maximum wind and seismic conditions per the governing tower standards and code. Wind forces resulting in tower vibrations near the structure's resonant frequencies were not considered in this analysis and are outside the scope of this analysis. Lateral loading from any dynamic response was not evaluated under a time-domain based fatigue analysis.

GPD does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the capability of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation in excess of the code specified amount, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD, but are beyond the scope of this report.

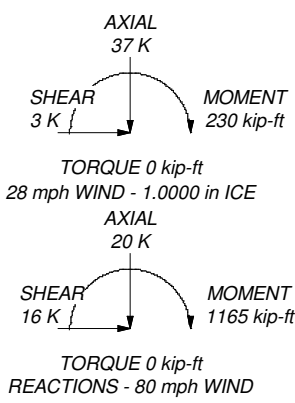
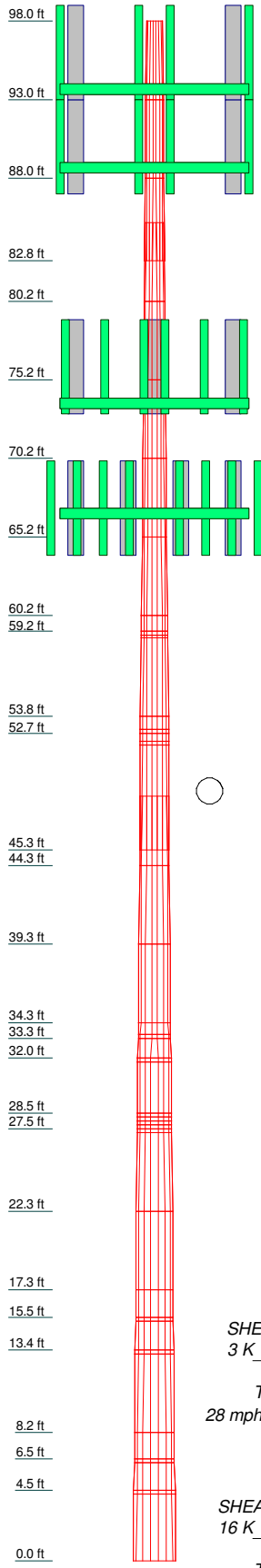
Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

Towers are designed to carry gravity, wind, and ice loads. All members, legs, diagonals, struts, and redundant members provide structural stability to the tower with little redundancy. Absence or removal of a member can trigger catastrophic failure unless a substitute is provided before any removal. Legs carry axial loads and derive their strength from shorter unbraced lengths by the presence of redundant members and their connection to the diagonals with bolts or welds. If the bolts or welds are removed without providing any substitute to the frame, the leg is subjected to a higher unbraced length that immediately reduces its load carrying capacity. If a diagonal is also removed in addition to the connection, the unbraced length of the leg is greatly increased, jeopardizing its load carrying capacity. Failure of one leg can result in a tower collapse because there is no redundancy. Redundant members and diagonals are critical to the stability of the tower.

GPD makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A
TNXTOWER OUTPUT

Section	1	2	3	4	5	6	7	8	12	17	18	19	20	25	31	32	37	42
Length (ft)	5.00	5.00	5.21	5.00	5.00	5.00	5.00	5.00	5.00	6.62	5.00	5.00	5.00	3.25	5.00	5.00	5.00	4.21
Number of Sides	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.1875	0.1875	0.1875	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.4375	0.5437	0.5313	0.5188	0.5625	0.5500	0.5500	0.5500	0.5125
Socket Length (ft)	2.42																	
Top Dia (in)	12.0000	13.0782	14.1563	14.3839	15.4455	16.5072	17.5689	18.6305	21.8.6305	22.823.6387	22.823.6387	22.823.6387	22.823.6387	22.823.6387	22.823.6387	22.823.6387	22.823.6387	22.823.6387
Bot Dia (in)	13.0782	14.1563	15.2800	15.4455	16.5072	17.5689	18.6305	21.8.6305	22.823.6387	22.823.6387	22.823.6387	22.823.6387	22.823.6387	22.823.6387	22.823.6387	22.823.6387	22.823.6387	22.823.6387
Grade	A572-65																	
Weight (K)	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.5	0.7	0.5	0.6	0.6	0.5	0.7	0.8	0.8	0.7



DESIGNED APPURTENANCE LOADING


TYPE	ELEVATION	TYPE	ELEVATION
(2) DB980H65E-M w/ Mount Pipe	94	P65-17-XLH-RR w/ Mount Pipe	74
BXA-80063/4CF w/ Mount Pipe	94	(2) LGP21401	74
HBX-6516DS-VTM w/ Mount Pipe	94	(2) LGP21401	74
(2) DB980H65E-M w/ Mount Pipe	94	(2) LGP21401	74
Pipe Mount 8"x2.375"	94	(2) LGP21903	74
Pipe Mount 8"x2.375"	94	(2) LGP21903	74
Pipe Mount 8"x2.375"	94	(2) LGP21903	74
Platform Mount [LP 601-1]	94	RRUS-11	74
APXV18-209014-C w/ Mount Pipe	89	RRUS-11	74
APXV18-209014-C w/ Mount Pipe	89	RRUS-11	74
APXV18-209014-C w/ Mount Pipe	89	DC6-48-60-18-8F Surge Suppression Unit	74
LNx-6515DS-VTM w/ Mount Pipe	89	Platform Mount [LP 303-1]	74
LNx-6515DS-VTM w/ Mount Pipe	89	(2) LPA-80063/6CFx2 w/ Mount Pipe	67
LNx-6515DS-VTM w/ Mount Pipe	89	(2) LPA-80063/6CFx2 w/ Mount Pipe	67
ATBT-BOTTOM-24V	89	(2) LPA-80063/6CFx2 w/ Mount Pipe	67
ATBT-BOTTOM-24V	89	BXA-70063/6CFx2 w/ Mount Pipe	67
ATBT-BOTTOM-24V	89	BXA-70063/6CF w/ Mount Pipe	67
ATMPP1412D-1CWA	89	BXA-70063/6CF w/ Mount Pipe	67
ATMPP1412D-1CWA	89	BXA-70063/6CF w/ Mount Pipe	67
ATMPP1412D-1CWA	89	BXA-171063-12BF w/ Mount Pipe	67
Platform Mount [LP 305-1]	89	BXA-171063-12BF w/ Mount Pipe	67
(2) 7770.00 w/ Mount Pipe	74	BXA-171063-12BF w/ Mount Pipe	67
(2) 7770.00 w/ Mount Pipe	74	Platform Mount [LP 303-1]	67
(2) 7770.00 w/ Mount Pipe	74	KS24019-L112A	52
P65-17-XLH-RR w/ Mount Pipe	74	Side Arm Mount [SO 701-1]	52
P65-17-XLH-RR w/ Mount Pipe	74		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.

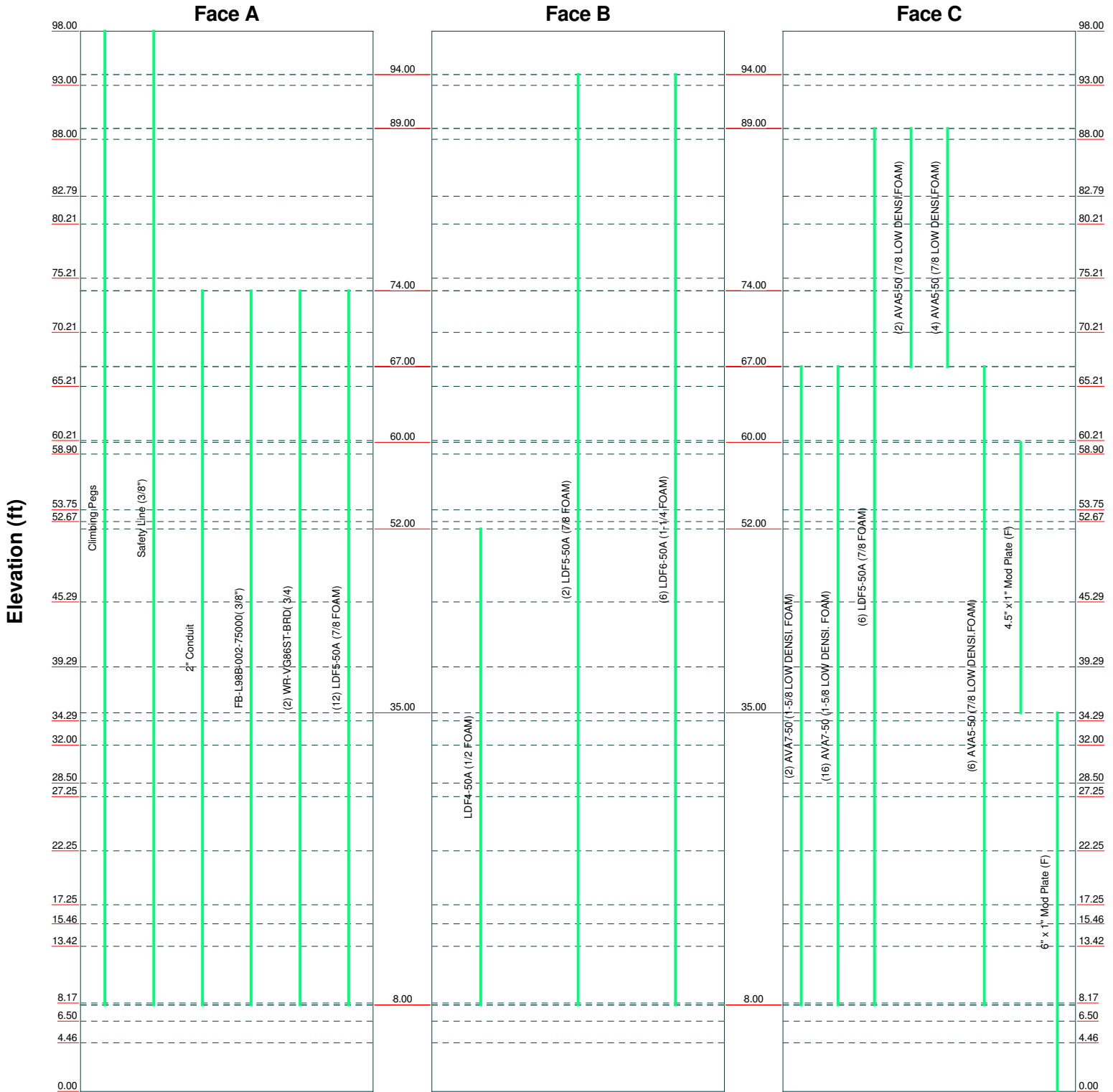

GPD
 520 South Main Street, Suite 2531
 Akron, OH 44311
 Phone: (330) 572-2100
 FAX: (330) 572-2101


Job: **BU #: 876399, (F) E. GRANBY 4Q2000 / GALASSO**
 Project: **2016777.876399.02**
 Client: Crown Castle USA, Inc. Drawn by: B Darkow App'd:
 Code: TIA/EIA-222-F Date: 11/12/15 Scale: NTS
 Path: \\AKRN05.gpdco.com\TELECOM\Crown\876399\02\lrx\876399.eri Dwg No. E-1

Feed Line Distribution Chart

0' - 98'

— Round
 — Flat
 — App In Face
 — App Out Face
 — Truss Leg



 GPD	GPD	Job: BU #: 876399, (F) E. GRANBY 4Q2000 / GALASSO			
	520 South Main Street, Suite 2531 Akron, OH 44311		Project: 2016777.876399.02		
	Phone: (330) 572-2100 FAX: (330) 572-2101		Client: Crown Castle USA, Inc.	Drawn by: B Darkow	App'd:
			Code: TIA/EIA-222-F	Date: 11/12/15	Scale: NTS
			Path: \\AKRN05.gpdco.com\TELECOM\Crown\876399\02\Inx\876399.eri		
		Dwg No. E-7			

Tower Input Data

There is a pole section.

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

The following design criteria apply:

- 1) Tower is located in Hartford County, Connecticut.
- 2) Basic wind speed of 80 mph.
- 3) Nominal ice thickness of 1.0000 in.
- 4) Ice thickness is considered to increase with height.
- 5) Ice density of 56 pcf.
- 6) A wind speed of 28 mph is used in combination with ice.
- 7) Temperature drop of 50 °F.
- 8) Deflections calculated using a wind speed of 50 mph.
- 9) A non-linear (P-delta) analysis was used.
- 10) Pressures are calculated at each section.
- 11) Stress ratio used in pole design is 1.333.
- 12) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys ✓ Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area ✓ Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas SR Members Have Cut Ends ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Use TIA-222-G Tension Splice Capacity Exemption	Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feedline Torque Include Angle Block Shear Check <div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
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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	98.00-93.00	5.00	0.00	18	12.0000	13.0782	0.1875	0.7500	A572-65 (65 ksi)
L2	93.00-88.00	5.00	0.00	18	13.0782	14.1563	0.1875	0.7500	A572-65 (65 ksi)
L3	88.00-82.79	5.21	2.42	18	14.1563	15.2800	0.1875	0.7500	A572-65 (65 ksi)
L4	82.79-80.21	5.00	0.00	18	14.3839	15.4455	0.2500	1.0000	A572-65 (65 ksi)
L5	80.21-75.21	5.00	0.00	18	15.4455	16.5072	0.2500	1.0000	A572-65 (65 ksi)
L6	75.21-70.21	5.00	0.00	18	16.5072	17.5689	0.2500	1.0000	A572-65 (65 ksi)
L7	70.21-65.21	5.00	0.00	18	17.5689	18.6305	0.2500	1.0000	A572-65 (65 ksi)
L8	65.21-60.21	5.00	0.00	18	18.6305	19.6922	0.2500	1.0000	A572-65 (65 ksi)
L9	60.21-59.16	1.05	0.00	18	19.6922	19.9142	0.2500	1.0000	A572-65 (65 ksi)
L10	59.16-58.90	0.26	0.00	18	19.9142	19.9694	0.5125	2.0500	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L11	58.90-58.75	0.15	0.00	18	19.9694	20.0013	0.5125	2.0500	A572-65 (65 ksi)
L12	58.75-53.75	5.00	0.00	18	20.0013	21.0629	0.5000	2.0000	A572-65 (65 ksi)
L13	53.75-52.92	0.83	0.00	18	21.0629	21.2400	0.5000	2.0000	A572-65 (65 ksi)
L14	52.92-52.67	0.25	0.00	18	21.2400	21.2931	0.5000	2.0000	A572-65 (65 ksi)
L15	52.67-52.16	0.51	0.00	18	21.2931	21.4005	0.5000	2.0000	A572-65 (65 ksi)
L16	52.16-51.91	0.25	0.00	18	21.4005	21.4536	0.4375	1.7500	A572-65 (65 ksi)
L17	51.91-45.29	6.62	3.42	18	21.4536	22.8600	0.4375	1.7500	A572-65 (65 ksi)
L18	45.29-44.29	4.42	0.00	18	21.6345	22.5745	0.5437	2.1750	A572-65 (65 ksi)
L19	44.29-39.29	5.00	0.00	18	22.5745	23.6387	0.5313	2.1250	A572-65 (65 ksi)
L20	39.29-34.29	5.00	0.00	18	23.6387	24.7028	0.5188	2.0750	A572-65 (65 ksi)
L21	34.29-33.50	0.79	0.00	18	24.7028	24.8702	0.5125	2.0500	A572-65 (65 ksi)
L22	33.50-33.25	0.25	0.00	18	24.8702	24.9234	0.8125	3.2500	A572-65 (65 ksi)
L23	33.25-32.00	1.25	0.00	18	24.9234	25.1895	0.8000	3.2000	A572-65 (65 ksi)
L24	32.00-31.75	0.25	0.00	18	25.1895	25.2427	0.5875	2.3500	A572-65 (65 ksi)
L25	31.75-28.50	3.25	0.00	18	25.2427	25.9344	0.5750	2.3000	A572-65 (65 ksi)
L26	28.50-28.25	0.25	0.00	18	25.9344	25.9876	0.5875	2.3500	A572-65 (65 ksi)
L27	28.25-28.00	0.25	0.00	18	25.9876	26.0408	0.5875	2.3500	A572-65 (65 ksi)
L28	28.00-27.75	0.25	0.00	18	26.0408	26.0940	0.8625	3.4500	A572-65 (65 ksi)
L29	27.75-27.50	0.25	0.00	18	26.0940	26.1472	0.8500	3.4000	A572-65 (65 ksi)
L30	27.50-27.25	0.25	0.00	18	26.1472	26.2004	0.5750	2.3000	A572-65 (65 ksi)
L31	27.25-22.25	5.00	0.00	18	26.2004	27.2645	0.5625	2.2500	A572-65 (65 ksi)
L32	22.25-17.25	5.00	0.00	18	27.2645	28.3287	0.5500	2.2000	A572-65 (65 ksi)
L33	17.25-15.46	1.79	0.00	18	28.3287	28.7097	0.5500	2.2000	A572-65 (65 ksi)
L34	15.46-15.21	0.25	0.00	18	28.7097	28.7629	0.5500	2.2000	A572-65 (65 ksi)
L35	15.21-13.42	1.79	0.00	18	28.7629	29.1445	0.5500	2.2000	A572-65 (65 ksi)
L36	13.42-13.17	0.25	0.00	18	29.1445	29.1977	0.5000	2.0000	A572-65 (65 ksi)
L37	13.17-8.17	5.00	0.00	18	29.1977	30.2619	0.4875	1.9500	A572-65 (65 ksi)
L38	8.17-6.50	1.67	0.00	18	30.2619	30.6166	0.4875	1.9500	A572-65 (65 ksi)
L39	6.50-6.25	0.25	0.00	18	30.6166	30.6698	0.5375	2.1500	A572-65 (65 ksi)
L40	6.25-4.46	1.79	0.00	18	30.6698	31.0508	0.5250	2.1000	A572-65 (65 ksi)
L41	4.46-4.21	0.25	0.00	18	31.0508	31.1040	0.5250	2.1000	A572-65 (65 ksi)
L42	4.21-0.00	4.21		18	31.1040	32.0000	0.5125	2.0500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	It/Q in ²	w in	w/t
L1	12.1851	7.0299	123.9285	4.1934	6.0960	20.3295	248.0200	3.5156	1.7820	9.504
	13.2799	7.6716	161.0543	4.5762	6.6437	24.2416	322.3205	3.8365	1.9718	10.516
L2	13.2799	7.6716	161.0543	4.5762	6.6437	24.2416	322.3205	3.8365	1.9718	10.516
	14.3747	8.3132	204.9401	4.9589	7.1914	28.4979	410.1499	4.1574	2.1615	11.528
L3	14.3747	8.3132	204.9401	4.9589	7.1914	28.4979	410.1499	4.1574	2.1615	11.528
	15.5157	8.9819	258.4813	5.3578	7.7622	33.2998	517.3028	4.4918	2.3593	12.583
L4	15.1268	11.2152	283.0538	5.0175	7.3070	38.7373	566.4800	5.6087	2.0916	8.366
	15.6838	12.0577	351.7490	5.3944	7.8463	44.8297	703.9608	6.0300	2.2784	9.114
L5	15.6838	12.0577	351.7490	5.3944	7.8463	44.8297	703.9608	6.0300	2.2784	9.114
	16.7618	12.9001	430.7462	5.7713	8.3857	51.3670	862.0592	6.4513	2.4653	9.861
L6	16.7618	12.9001	430.7462	5.7713	8.3857	51.3670	862.0592	6.4513	2.4653	9.861
	17.8399	13.7425	520.7652	6.1482	8.9250	58.3492	1042.2156	6.8726	2.6521	10.608
L7	17.8399	13.7425	520.7652	6.1482	8.9250	58.3492	1042.2156	6.8726	2.6521	10.608
	18.9179	14.5849	622.5256	6.5251	9.4643	65.7762	1245.8704	7.2939	2.8390	11.356
L8	18.9179	14.5849	622.5256	6.5251	9.4643	65.7762	1245.8704	7.2939	2.8390	11.356
	19.9960	15.4274	736.7473	6.9020	10.0036	73.6481	1474.4641	7.7151	3.0258	12.103
L9	19.9960	15.4274	736.7473	6.9020	10.0036	73.6481	1474.4641	7.7151	3.0258	12.103
	20.2214	15.6036	762.2790	6.9808	10.1164	75.3507	1525.5610	7.8033	3.0649	12.26
L10	20.2214	31.5603	1500.9227	6.8876	10.1164	148.3650	3003.8204	15.7831	6.2029	5.079
	20.2775	31.6501	1513.7715	6.9072	10.1445	149.2214	3029.5348	15.8280	2.6126	5.098
L11	20.2775	31.6501	1513.7715	6.9072	10.1445	149.2214	3029.5348	15.8280	2.6126	5.098
	20.3098	31.7019	1521.2175	6.9185	10.1606	149.7167	3044.4367	15.8540	2.6182	5.109
L12	20.3098	30.9485	1486.9722	6.9229	10.1606	146.3463	2975.9010	15.4772	2.6402	5.28
	21.3879	32.6334	1743.2874	7.2998	10.7000	162.9246	3488.8686	16.3198	2.8271	5.654
L13	21.3879	32.6334	1743.2874	7.2998	10.7000	162.9246	3488.8686	16.3198	2.8271	5.654
	21.5677	32.9144	1788.7150	7.3627	10.7899	165.7764	3579.7837	16.4603	2.8582	5.716
L14	21.5677	32.9144	1788.7150	7.3627	10.7899	165.7764	3579.7837	16.4603	2.8582	5.716
	21.6216	32.9986	1802.4846	7.3815	10.8169	166.6361	3607.3409	16.5025	2.8676	5.735
L15	21.6216	32.9986	1802.4846	7.3815	10.8169	166.6361	3607.3409	16.5025	2.8676	5.735
	21.7307	33.1691	1830.5700	7.4197	10.8715	168.3829	3663.5486	16.5877	2.8865	5.773
L16	21.7307	29.1098	1616.1611	7.4419	10.8715	148.6608	3234.4488	14.5577	2.9965	6.849
	21.7846	29.1835	1628.4696	7.4607	10.8984	149.4223	3259.0820	14.5945	3.0058	6.87
L17	21.7846	29.1835	1628.4696	7.4607	10.8984	149.4223	3259.0820	14.5945	3.0058	6.87
	23.2127	31.1364	1977.7643	7.9600	11.6129	170.3078	3958.1309	15.5712	3.2534	7.436
L18	22.7067	36.3998	2045.6052	7.4872	10.9903	186.1275	4093.9021	18.2034	2.8507	5.243
	22.9228	38.0221	2331.4889	7.8209	11.4679	203.3063	4666.0457	19.0147	3.0161	5.547
L19	22.9228	37.1691	2281.7710	7.8254	11.4679	198.9709	4566.5445	18.5881	3.0381	5.719
	24.0033	38.9635	2628.4410	8.2031	12.0084	218.8826	5260.3405	19.4854	3.2254	6.071
L20	24.0033	38.0673	2570.7627	8.2076	12.0084	214.0795	5144.9082	19.0372	3.2474	6.26
	25.0839	39.8194	2942.3278	8.5853	12.5490	234.4664	5888.5272	19.9135	3.4347	6.621
L21	25.0839	39.3498	2909.1324	8.5876	12.5490	231.8212	5822.0926	19.6786	3.4457	6.723
	25.2539	39.6221	2969.9392	8.6470	12.6341	235.0739	5943.7862	19.8148	3.4752	6.781
L22	25.2539	62.0418	4536.6006	8.5405	12.6341	359.0768	9079.1705	31.0268	2.9472	3.627
	25.3079	62.1790	4566.7674	8.5594	12.6611	360.6929	9139.5438	31.0954	2.9565	3.639
L23	25.3079	61.2542	4503.5065	8.5638	12.6611	355.6964	9012.9389	30.6329	2.9785	3.723
	25.5780	61.9297	4654.1519	8.6583	12.7962	363.7124	9314.4279	30.9707	3.0253	3.782
L24	25.5780	45.8759	3508.0115	8.7337	12.7962	274.1439	7020.6390	22.9423	3.3993	5.786
	25.6321	45.9751	3530.8215	8.7526	12.8233	275.3448	7066.2889	22.9919	3.4087	5.802
L25	25.6321	45.0197	3460.9563	8.7570	12.8233	269.8965	6926.4666	22.5141	3.4307	5.966
	26.3344	46.2821	3760.3383	9.0026	13.1747	285.4222	7525.6246	23.1454	3.5524	6.178
L26	26.3344	47.2649	3836.4062	8.9981	13.1747	291.1960	7677.8604	23.6369	3.5304	6.009
	26.3885	47.3641	3860.6167	9.0170	13.2017	292.4337	7726.3134	23.6866	3.5398	6.025
L27	26.3885	47.3641	3860.6167	9.0170	13.2017	292.4337	7726.3134	23.6866	3.5398	6.025
	26.4425	47.4634	3884.9290	9.0359	13.2287	293.6740	7774.9698	23.7362	3.5492	6.041
L28	26.4425	68.9274	5520.5357	8.9383	13.2287	417.3147	11048.335	34.4703	3.0652	3.554
	26.4965	69.0731	5555.6081	8.9572	13.2557	419.1096	11118.526	34.5431	3.0745	3.565
L29	26.4965	68.1057	5483.2334	8.9616	13.2557	413.6497	10973.681	34.0593	3.0965	3.643
	26.5505	68.2493	5517.9780	8.9805	13.2828	415.4237	11043.216	34.1311	3.1059	3.654
L30	26.5505	46.6705	3855.8116	9.0781	13.2828	290.2867	7716.6967	23.3397	3.5899	6.243
	26.6046	46.7676	3879.9298	9.0970	13.3098	291.5092	7764.9648	23.3883	3.5993	6.26
L31	26.6046	45.7733	3801.1406	9.1015	13.3098	285.5896	7607.2828	22.8910	3.6213	6.438
	27.6851	47.6732	4294.3784	9.4792	13.8504	310.0548	8594.4075	23.8411	3.8086	6.771
L32	27.6851	46.6356	4204.8475	9.4837	13.8504	303.5906	8415.2278	23.3222	3.8306	6.965
	28.7657	48.4933	4727.6175	9.8614	14.3910	328.5127	9461.4557	24.2512	4.0178	7.305

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	It/Q in ²	w in	w/t
L33	28.7657	48.4933	4727.6175	9.8614	14.3910	328.5127	9461.4557	24.2512	4.0178	7.305
	29.1525	49.1583	4924.8049	9.9967	14.5845	337.6738	9856.0901	24.5838	4.0849	7.427
L34	29.1525	49.1583	4924.8049	9.9967	14.5845	337.6738	9856.0901	24.5838	4.0849	7.427
	29.2066	49.2512	4952.7738	10.0156	14.6115	338.9633	9912.0647	24.6303	4.0943	7.444
L35	29.2066	49.2512	4952.7738	10.0156	14.6115	338.9633	9912.0647	24.6303	4.0943	7.444
	29.5941	49.9175	5156.5106	10.1511	14.8054	348.2853	10319.8064	24.9635	4.1614	7.566
L36	29.5941	45.4589	4712.3707	10.1688	14.8054	318.2868	9430.9421	22.7338	4.2494	8.499
	29.6482	45.5433	4738.6793	10.1877	14.8325	319.4805	9483.5939	22.7760	4.2588	8.518
L37	29.6482	44.4241	4626.2523	10.1921	14.8325	311.9007	9258.5919	22.2163	4.2808	8.781
	30.7287	46.0706	5159.9724	10.5699	15.3730	335.6508	10326.7344	23.0397	4.4681	9.165
L38	30.7287	46.0706	5159.9724	10.5699	15.3730	335.6508	10326.7344	23.0397	4.4681	9.165
	31.0889	46.6195	5346.6013	10.6958	15.5532	343.7613	10700.2379	23.3142	4.5305	9.293
L39	31.0889	51.3157	5865.6708	10.6781	15.5532	377.1351	11739.0599	25.6627	4.4425	8.265
	31.1429	51.4065	5896.8536	10.6970	15.5803	378.4822	11801.4663	25.7081	4.4519	8.283
L40	31.1429	50.2318	5766.8884	10.7014	15.5803	370.1406	11541.3651	25.1207	4.4739	8.522
	31.5298	50.8666	5988.3061	10.8367	15.7738	379.6363	11984.4917	25.4382	4.5409	8.649
L41	31.5298	50.8666	5988.3061	10.8367	15.7738	379.6363	11984.4917	25.4382	4.5409	8.649
	31.5838	50.9553	6019.6741	10.8555	15.8008	380.9721	12047.2697	25.4825	4.5503	8.667
L42	31.5838	49.7624	5883.5578	10.8600	15.8008	372.3576	11774.8570	24.8859	4.5723	8.922
	32.4937	51.2199	6415.8291	11.1781	16.2560	394.6745	12840.1002	25.6148	4.7300	9.229

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1 98.00-93.00				1	1	1		
L2 93.00-88.00				1	1	1		
L3 88.00-82.79				1	1	1		
L4 82.79-80.21				1	1	1		
L5 80.21-75.21				1	1	1		
L6 75.21-70.21				1	1	1		
L7 70.21-65.21				1	1	1		
L8 65.21-60.21				1	1	1		
L9 60.21-59.16				1	1	1		
L10 59.16-58.90				1	1	0.920941		
L11 58.90-58.75				1	1	0.920233		
L12 58.75-53.75				1	1	0.919781		
L13 53.75-52.92				1	1	0.916197		
L14 52.92-52.67				1	1	1.05151		
L15 52.67-52.16				1	1	1.04867		
L16 52.16-51.91				1	1	1.03913		

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_r	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
ft	ft ²	in						
L17 51.91-45.29				1	1	1.02446		
L18 45.29-44.29				1	1	0.935815		
L19 44.29-39.29				1	1	0.940295		
L20 39.29-34.29				1	1	0.94659		
L21 34.29-33.50				1	1	0.955494		
L22 33.50-33.25				1	1	0.899211		
L23 33.25-32.00				1	1	0.907092		
L24 32.00-31.75				1	1	0.929378		
L25 31.75-28.50				1	1	0.938037		
L26 28.50-28.25				1	1	1.0444		
L27 28.25-28.00				1	1	1.04333		
L28 28.00-27.75				1	1	0.891423		
L29 27.75-27.50				1	1	0.902956		
L30 27.50-27.25				1	1	0.933941		
L31 27.25-22.25				1	1	0.938342		
L32 22.25-17.25				1	1	0.944239		
L33 17.25-15.46				1	1	0.939151		
L34 15.46-15.21				1	1	1.06028		
L35 15.21-13.42				1	1	1.05371		
L36 13.42-13.17				1	1	1.02433		
L37 13.17-8.17				1	1	1.03551		
L38 8.17-6.50				1	1	1.03087		
L39 6.50-6.25				1	1	1.05262		
L40 6.25-4.46				1	1	1.07122		
L41 4.46-4.21				1	1	0.952638		
L42 4.21-0.00				1	1	0.965067		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		$C_A A_A$ ft ² /ft	Weight plf
Climbing Pegs	A	No	CaAa (Out Of Face)	98.00 - 8.00	1	No Ice	0.01	0.31
						1/2" Ice	0.12	0.71
						1" Ice	0.22	1.71
						2" Ice	0.41	5.56
						4" Ice	0.82	20.59
Safety Line (3/8")	A	No	CaAa (Out Of Face)	98.00 - 8.00	1	No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28
						2" Ice	0.44	2.34
						4" Ice	0.84	4.46
2" Conduit	A	No	Inside Pole	74.00 - 8.00	1	No Ice	0.00	0.26
						1/2" Ice	0.00	0.26
						1" Ice	0.00	0.26

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A		Weight
						ft ² /ft	plf	
FB-L98B-002-75000(3/8")	A	No	Inside Pole	74.00 - 8.00	1	2" Ice	0.00	0.26
						4" Ice	0.00	0.26
						No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	A	No	Inside Pole	74.00 - 8.00	2	4" Ice	0.00	0.06
						No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
						2" Ice	0.00	0.58
						4" Ice	0.00	0.58
LDF5-50A (7/8 FOAM)	A	No	Inside Pole	74.00 - 8.00	12	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
						No Ice	0.00	0.15
LDF4-50A (1/2 FOAM)	B	No	Inside Pole	52.00 - 8.00	1	1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
						No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
LDF5-50A (7/8 FOAM)	B	No	Inside Pole	94.00 - 8.00	2	1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
						No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
LDF6-50A (1-1/4 FOAM)	B	No	Inside Pole	94.00 - 8.00	6	2" Ice	0.00	0.66
						4" Ice	0.00	0.66
						No Ice	0.20	0.72
						1/2" Ice	0.30	2.23
						1" Ice	0.40	4.36
						2" Ice	0.60	10.44
AVA7-50 (1-5/8 LOW DENS. FOAM)	C	No	CaAa (Out Of Face)	67.00 - 8.00	2	4" Ice	1.00	29.94
						No Ice	0.00	0.72
						1/2" Ice	0.00	2.23
						1" Ice	0.00	4.36
						2" Ice	0.00	10.44
						4" Ice	0.00	29.94
AVA7-50 (1-5/8 LOW DENS. FOAM)	C	No	CaAa (Out Of Face)	67.00 - 8.00	16	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
						No Ice	0.11	0.30
LDF5-50A (7/8 FOAM)	C	No	Inside Pole	89.00 - 8.00	6	1/2" Ice	0.21	1.28
						1" Ice	0.31	2.87
						2" Ice	0.51	7.87
						4" Ice	0.91	25.22
						No Ice	0.00	0.30
						1/2" Ice	0.00	1.28
AVA5-50 (7/8 LOW DENS. FOAM)	C	No	CaAa (Out Of Face)	89.00 - 67.00	4	1" Ice	0.00	2.87
						2" Ice	0.00	7.87
						4" Ice	0.00	25.22
						No Ice	0.00	0.30
						1/2" Ice	0.00	1.28
						1" Ice	0.00	2.87
AVA5-50 (7/8 LOW DENS. FOAM)	C	No	CaAa (Out Of Face)	67.00 - 8.00	6	2" Ice	0.00	7.87
						4" Ice	0.00	25.22
						No Ice	0.00	0.30
						1/2" Ice	0.00	1.28
						1" Ice	0.00	2.87
						2" Ice	0.00	7.87
4.5" x 1" Mod Plate (F)	C	No	CaAa (Out Of Face)	60.00 - 35.00	1	4" Ice	0.00	25.22
						No Ice	0.17	15.31
						1/2" Ice	0.28	16.46
						1" Ice	0.39	17.95
						2" Ice	0.61	21.97
						4" Ice	1.06	34.15
6" x 1" Mod Plate (F)	C	No	CaAa (Out Of Face)	35.00 - 0.00	1	No Ice	0.17	23.82
						1/2" Ice	0.28	25.29
						1" Ice	0.39	27.10
						2" Ice	0.61	21.97

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A ft ² /ft	Weight plf
						2" Ice	31.77
						4" Ice	45.25

Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	98.00-93.00	A	0.000	0.000	0.000	0.263	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	93.00-88.00	A	0.000	0.000	0.000	0.263	0.00
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.220	0.00
L3	88.00-82.79	A	0.000	0.000	0.000	0.274	0.00
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	1.146	0.02
L4	82.79-80.21	A	0.000	0.000	0.000	0.136	0.00
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.568	0.01
L5	80.21-75.21	A	0.000	0.000	0.000	0.263	0.00
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	1.100	0.02
L6	75.21-70.21	A	0.000	0.000	0.000	0.263	0.02
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	1.100	0.02
L7	70.21-65.21	A	0.000	0.000	0.000	0.263	0.03
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	1.416	0.04
L8	65.21-60.21	A	0.000	0.000	0.000	0.263	0.03
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	1.980	0.08
L9	60.21-59.16	A	0.000	0.000	0.000	0.055	0.01
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.554	0.03
L10	59.16-58.90	A	0.000	0.000	0.000	0.014	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.146	0.01
L11	58.90-58.75	A	0.000	0.000	0.000	0.008	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.084	0.00
L12	58.75-53.75	A	0.000	0.000	0.000	0.263	0.03
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	2.813	0.16
L13	53.75-52.92	A	0.000	0.000	0.000	0.044	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.469	0.03
L14	52.92-52.67	A	0.000	0.000	0.000	0.013	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.141	0.01
L15	52.67-52.16	A	0.000	0.000	0.000	0.027	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.285	0.02
L16	52.16-51.91	A	0.000	0.000	0.000	0.013	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.141	0.01
L17	51.91-45.29	A	0.000	0.000	0.000	0.348	0.04
		B	0.000	0.000	0.000	0.000	0.03
		C	0.000	0.000	0.000	3.727	0.21
L18	45.29-44.29	A	0.000	0.000	0.000	0.052	0.01
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.563	0.03
L19	44.29-39.29	A	0.000	0.000	0.000	0.263	0.03
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	2.813	0.16
L20	39.29-34.29	A	0.000	0.000	0.000	0.263	0.03
		B	0.000	0.000	0.000	0.000	0.02

Tower Section	Tower Elevation	Face	A _R	A _F	C _A A _A In Face	C _A A _A Out Face	Weight
n	ft		ft ²	ft ²	ft ²	ft ²	K
		C	0.000	0.000	0.000	2.813	0.17
L21	34.29-33.50	A	0.000	0.000	0.000	0.041	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.443	0.03
L22	33.50-33.25	A	0.000	0.000	0.000	0.013	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.141	0.01
L23	33.25-32.00	A	0.000	0.000	0.000	0.066	0.01
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.703	0.05
L24	32.00-31.75	A	0.000	0.000	0.000	0.013	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.141	0.01
L25	31.75-28.50	A	0.000	0.000	0.000	0.171	0.02
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	1.829	0.13
L26	28.50-28.25	A	0.000	0.000	0.000	0.013	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.141	0.01
L27	28.25-28.00	A	0.000	0.000	0.000	0.013	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.141	0.01
L28	28.00-27.75	A	0.000	0.000	0.000	0.013	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.141	0.01
L29	27.75-27.50	A	0.000	0.000	0.000	0.013	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.141	0.01
L30	27.50-27.25	A	0.000	0.000	0.000	0.013	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.141	0.01
L31	27.25-22.25	A	0.000	0.000	0.000	0.263	0.03
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	2.813	0.20
L32	22.25-17.25	A	0.000	0.000	0.000	0.263	0.03
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	2.813	0.20
L33	17.25-15.46	A	0.000	0.000	0.000	0.094	0.01
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	1.007	0.07
L34	15.46-15.21	A	0.000	0.000	0.000	0.013	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.141	0.01
L35	15.21-13.42	A	0.000	0.000	0.000	0.094	0.01
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	1.009	0.07
L36	13.42-13.17	A	0.000	0.000	0.000	0.013	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.141	0.01
L37	13.17-8.17	A	0.000	0.000	0.000	0.263	0.03
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	2.813	0.20
L38	8.17-6.50	A	0.000	0.000	0.000	0.009	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.344	0.04
L39	6.50-6.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.042	0.01
L40	6.25-4.46	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.298	0.04
L41	4.46-4.21	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.042	0.01
L42	4.21-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.702	0.10

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 K
L1	98.00-93.00	A	1.136	0.000	0.000	0.000	2.534	0.02
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	93.00-88.00	A	1.129	0.000	0.000	0.000	2.520	0.02
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.671	0.02
L3	88.00-82.79	A	1.121	0.000	0.000	0.000	2.610	0.02
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	3.483	0.12
L4	82.79-80.21	A	1.115	0.000	0.000	0.000	1.294	0.01
		B		0.000	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.000	1.726	0.06
L5	80.21-75.21	A	1.108	0.000	0.000	0.000	2.479	0.02
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	3.316	0.11
L6	75.21-70.21	A	1.099	0.000	0.000	0.000	2.461	0.04
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	3.299	0.11
L7	70.21-65.21	A	1.090	0.000	0.000	0.000	2.443	0.04
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	3.596	0.27
L8	65.21-60.21	A	1.080	0.000	0.000	0.000	2.423	0.04
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	4.140	0.54
L9	60.21-59.16	A	1.074	0.000	0.000	0.000	0.504	0.01
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.204	0.13
L10	59.16-58.90	A	1.072	0.000	0.000	0.000	0.125	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.320	0.03
L11	58.90-58.75	A	1.072	0.000	0.000	0.000	0.072	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.184	0.02
L12	58.75-53.75	A	1.066	0.000	0.000	0.000	2.395	0.04
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	6.130	0.63
L13	53.75-52.92	A	1.059	0.000	0.000	0.000	0.397	0.01
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.019	0.10
L14	52.92-52.67	A	1.058	0.000	0.000	0.000	0.119	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.305	0.03
L15	52.67-52.16	A	1.057	0.000	0.000	0.000	0.241	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.618	0.06
L16	52.16-51.91	A	1.056	0.000	0.000	0.000	0.119	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.305	0.03
L17	51.91-45.29	A	1.047	0.000	0.000	0.000	3.123	0.06
		B		0.000	0.000	0.000	0.000	0.03
		C		0.000	0.000	0.000	8.044	0.81
L18	45.29-44.29	A	1.037	0.000	0.000	0.000	0.471	0.01
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.214	0.12
L19	44.29-39.29	A	1.029	0.000	0.000	0.000	2.320	0.04
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	6.014	0.60
L20	39.29-34.29	A	1.013	0.000	0.000	0.000	2.289	0.04
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	5.965	0.59
L21	34.29-33.50	A	1.003	0.000	0.000	0.000	0.357	0.01
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.933	0.10
L22	33.50-33.25	A	1.001	0.000	0.000	0.000	0.113	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.296	0.03
L23	33.25-32.00	A	1.000	0.000	0.000	0.000	0.566	0.01

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
		B		0.000	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.000	1.481	0.16
L24	32.00-31.75	A	1.000	0.000	0.000	0.000	0.113	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.296	0.03
L25	31.75-28.50	A	1.000	0.000	0.000	0.000	1.471	0.03
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	3.851	0.41
L26	28.50-28.25	A	1.000	0.000	0.000	0.000	0.113	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.296	0.03
L27	28.25-28.00	A	1.000	0.000	0.000	0.000	0.113	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.296	0.03
L28	28.00-27.75	A	1.000	0.000	0.000	0.000	0.113	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.296	0.03
L29	27.75-27.50	A	1.000	0.000	0.000	0.000	0.113	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.296	0.03
L30	27.50-27.25	A	1.000	0.000	0.000	0.000	0.113	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.296	0.03
L31	27.25-22.25	A	1.000	0.000	0.000	0.000	2.263	0.04
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	5.924	0.62
L32	22.25-17.25	A	1.000	0.000	0.000	0.000	2.263	0.04
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	5.924	0.62
L33	17.25-15.46	A	1.000	0.000	0.000	0.000	0.810	0.02
		B		0.000	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.000	2.121	0.22
L34	15.46-15.21	A	1.000	0.000	0.000	0.000	0.113	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.296	0.03
L35	15.21-13.42	A	1.000	0.000	0.000	0.000	0.811	0.02
		B		0.000	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.000	2.125	0.22
L36	13.42-13.17	A	1.000	0.000	0.000	0.000	0.113	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.296	0.03
L37	13.17-8.17	A	1.000	0.000	0.000	0.000	2.263	0.04
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	5.924	0.62
L38	8.17-6.50	A	1.000	0.000	0.000	0.000	0.075	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.781	0.06
L39	6.50-6.25	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.097	0.01
L40	6.25-4.46	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.696	0.05
L41	4.46-4.21	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.097	0.01
L42	4.21-0.00	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.637	0.11

Feed Line Center of Pressure

Section	Elevation	CP_x	CP_z	CP_x	CP_z
	ft	in	in	Ice in	Ice in
L1	98.00-93.00	0.0000	-0.0750	0.0000	-0.4563
L2	93.00-88.00	-0.0543	-0.0412	-0.1041	-0.3773
L3	88.00-82.79	-0.2338	0.0706	-0.4123	-0.1187
L4	82.79-80.21	-0.2351	0.0710	-0.4189	-0.1206
L5	80.21-75.21	-0.2372	0.0716	-0.4288	-0.1225
L6	75.21-70.21	-0.2398	0.0724	-0.4417	-0.1255
L7	70.21-65.21	-0.3021	0.1100	-0.4871	-0.1002
L8	65.21-60.21	-0.4016	0.1704	-0.5560	-0.0547
L9	60.21-59.16	-0.5089	0.2356	-0.7129	0.0670
L10	59.16-58.90	-0.5335	0.2505	-0.7475	0.0937
L11	58.90-58.75	-0.5338	0.2507	-0.7483	0.0939
L12	58.75-53.75	-0.5376	0.2525	-0.7583	0.0958
L13	53.75-52.92	-0.5418	0.2544	-0.7692	0.0979
L14	52.92-52.67	-0.5426	0.2548	-0.7711	0.0983
L15	52.67-52.16	-0.5431	0.2551	-0.7725	0.0986
L16	52.16-51.91	-0.5436	0.2553	-0.7738	0.0988
L17	51.91-45.29	-0.5483	0.2575	-0.7858	0.1014
L18	45.29-44.29	-0.5502	0.2584	-0.7913	0.1021
L19	44.29-39.29	-0.5540	0.2601	-0.7993	0.1054
L20	39.29-34.29	-0.5599	0.2629	-0.8142	0.1094
L21	34.29-33.50	-0.5632	0.2645	-0.8222	0.1117
L22	33.50-33.25	-0.5638	0.2648	-0.8236	0.1121
L23	33.25-32.00	-0.5646	0.2651	-0.8258	0.1126
L24	32.00-31.75	-0.5654	0.2655	-0.8282	0.1129
L25	31.75-28.50	-0.5673	0.2664	-0.8338	0.1137
L26	28.50-28.25	-0.5691	0.2673	-0.8393	0.1145
L27	28.25-28.00	-0.5694	0.2674	-0.8401	0.1146
L28	28.00-27.75	-0.5696	0.2675	-0.8409	0.1147
L29	27.75-27.50	-0.5699	0.2676	-0.8417	0.1148
L30	27.50-27.25	-0.5701	0.2677	-0.8424	0.1149
L31	27.25-22.25	-0.5728	0.2690	-0.8505	0.1160
L32	22.25-17.25	-0.5775	0.2712	-0.8653	0.1180
L33	17.25-15.46	-0.5806	0.2727	-0.8750	0.1193
L34	15.46-15.21	-0.5815	0.2731	-0.8779	0.1197
L35	15.21-13.42	-0.5824	0.2735	-0.8807	0.1201
L36	13.42-13.17	-0.5833	0.2739	-0.8835	0.1205
L37	13.17-8.17	-0.5855	0.2750	-0.8907	0.1215
L38	8.17-6.50	-0.2471	0.1354	-0.4794	0.2236
L39	6.50-6.25	-0.2032	0.1173	-0.4149	0.2395
L40	6.25-4.46	-0.2033	0.1174	-0.4154	0.2398
L41	4.46-4.21	-0.2034	0.1174	-0.4159	0.2401
L42	4.21-0.00	-0.2036	0.1175	-0.4171	0.2408

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C _{AA} Front	C _{AA} Side	Weight K	
						ft ²	ft ²		
(2) DB980H65E-M w/ Mount Pipe	A	From Centroid- Leg	4.00 0.00 2.00	0.0000	94.00	No Ice	4.04	3.62	0.03
						1/2" Ice	4.50	4.48	0.07
						1" Ice	4.95	5.22	0.11
						2" Ice	5.87	6.74	0.22
						4" Ice	8.05	10.00	0.55
BXA-80063/4CF w/ Mount Pipe	B	From Centroid- Leg	4.00 0.00 2.00	0.0000	94.00	No Ice	5.40	3.42	0.03
						1/2" Ice	5.84	4.02	0.07
						1" Ice	6.30	4.64	0.12
						2" Ice	7.24	5.92	0.23
						4" Ice	9.26	8.93	0.56
HBX-6516DS-VTM w/ Mount Pipe	B	From Centroid- Leg	4.00 0.00 2.00	0.0000	94.00	No Ice	3.53	3.17	0.03
						1/2" Ice	3.91	3.80	0.06
						1" Ice	4.33	4.43	0.10
						2" Ice	5.22	5.75	0.19
						4" Ice	7.14	8.68	0.49
(2) DB980H65E-M w/ Mount Pipe	C	From Centroid- Leg	4.00 0.00 2.00	0.0000	94.00	No Ice	4.04	3.62	0.03
						1/2" Ice	4.50	4.48	0.07
						1" Ice	4.95	5.22	0.11
						2" Ice	5.87	6.74	0.22
						4" Ice	8.05	10.00	0.55
Pipe Mount 8'x2.375"	A	From Centroid- Leg	4.00 0.00 0.00	0.0000	94.00	No Ice	1.90	1.90	0.03
						1/2" Ice	2.73	2.73	0.05
						1" Ice	3.40	3.40	0.07
						2" Ice	4.40	4.40	0.12
						4" Ice	6.50	6.50	0.30
Pipe Mount 8'x2.375"	B	From Centroid- Leg	4.00 0.00 0.00	0.0000	94.00	No Ice	1.90	1.90	0.03
						1/2" Ice	2.73	2.73	0.05
						1" Ice	3.40	3.40	0.07
						2" Ice	4.40	4.40	0.12
						4" Ice	6.50	6.50	0.30
Pipe Mount 8'x2.375"	C	From Centroid- Leg	4.00 0.00 0.00	0.0000	94.00	No Ice	1.90	1.90	0.03
						1/2" Ice	2.73	2.73	0.05
						1" Ice	3.40	3.40	0.07
						2" Ice	4.40	4.40	0.12
						4" Ice	6.50	6.50	0.30
Platform Mount [LP 601-1]	B	None		0.0000	94.00	No Ice	28.47	28.47	1.12
						1/2" Ice	33.59	33.59	1.51
						1" Ice	38.71	38.71	1.91
						2" Ice	48.95	48.95	2.69
						4" Ice	69.43	69.43	4.26
APXV18-209014-C w/ Mount Pipe	A	From Centroid- Leg	4.00 0.00 1.00	0.0000	89.00	No Ice	3.62	3.21	0.04
						1/2" Ice	4.00	3.84	0.07
						1" Ice	4.40	4.49	0.11
						2" Ice	5.30	5.82	0.21
						4" Ice	7.23	8.76	0.51
APXV18-209014-C w/ Mount Pipe	B	From Centroid- Leg	4.00 0.00 1.00	0.0000	89.00	No Ice	3.62	3.21	0.04
						1/2" Ice	4.00	3.84	0.07
						1" Ice	4.40	4.49	0.11
						2" Ice	5.30	5.82	0.21
						4" Ice	7.23	8.76	0.51
APXV18-209014-C w/ Mount Pipe	C	From Centroid- Leg	4.00 0.00 1.00	0.0000	89.00	No Ice	3.62	3.21	0.04
						1/2" Ice	4.00	3.84	0.07
						1" Ice	4.40	4.49	0.11

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
			Horz Lateral ft	Vert ft					
							1" Ice 5.30	5.82	0.21
							2" Ice 7.23	8.76	0.51
							4" Ice		
LNx-6515DS-VTM w/ Mount Pipe	A	From Centroid-Leg	4.00	0.0000	89.00	No Ice	11.64	9.79	0.08
			0.00			1/2" Ice	12.34	11.30	0.17
			1.00			Ice	13.04	12.80	0.27
						1" Ice	14.48	15.12	0.50
						2" Ice	17.71	19.94	1.14
						4" Ice			
LNx-6515DS-VTM w/ Mount Pipe	B	From Centroid-Leg	4.00	0.0000	89.00	No Ice	11.64	9.79	0.08
			0.00			1/2" Ice	12.34	11.30	0.17
			1.00			Ice	13.04	12.80	0.27
						1" Ice	14.48	15.12	0.50
						2" Ice	17.71	19.94	1.14
						4" Ice			
LNx-6515DS-VTM w/ Mount Pipe	C	From Centroid-Leg	4.00	0.0000	89.00	No Ice	11.64	9.79	0.08
			0.00			1/2" Ice	12.34	11.30	0.17
			1.00			Ice	13.04	12.80	0.27
						1" Ice	14.48	15.12	0.50
						2" Ice	17.71	19.94	1.14
						4" Ice			
ATBT-BOTTOM-24V	A	From Centroid-Leg	4.00	0.0000	89.00	No Ice	0.12	0.08	0.00
			0.00			1/2" Ice	0.17	0.12	0.00
			1.00			Ice	0.23	0.17	0.01
						1" Ice	0.38	0.30	0.01
						2" Ice	0.77	0.67	0.04
						4" Ice			
ATBT-BOTTOM-24V	B	From Centroid-Leg	4.00	0.0000	89.00	No Ice	0.12	0.08	0.00
			0.00			1/2" Ice	0.17	0.12	0.00
			1.00			Ice	0.23	0.17	0.01
						1" Ice	0.38	0.30	0.01
						2" Ice	0.77	0.67	0.04
						4" Ice			
ATBT-BOTTOM-24V	C	From Centroid-Leg	4.00	0.0000	89.00	No Ice	0.12	0.08	0.00
			0.00			1/2" Ice	0.17	0.12	0.00
			1.00			Ice	0.23	0.17	0.01
						1" Ice	0.38	0.30	0.01
						2" Ice	0.77	0.67	0.04
						4" Ice			
ATMPP1412D-1CWA	A	From Centroid-Leg	4.00	0.0000	89.00	No Ice	1.17	0.42	0.01
			0.00			1/2" Ice	1.32	0.53	0.02
			1.00			Ice	1.48	0.65	0.03
						1" Ice	1.82	0.92	0.05
						2" Ice	2.61	1.57	0.13
						4" Ice			
ATMPP1412D-1CWA	B	From Centroid-Leg	4.00	0.0000	89.00	No Ice	1.17	0.42	0.01
			0.00			1/2" Ice	1.32	0.53	0.02
			1.00			Ice	1.48	0.65	0.03
						1" Ice	1.82	0.92	0.05
						2" Ice	2.61	1.57	0.13
						4" Ice			
ATMPP1412D-1CWA	C	From Centroid-Leg	4.00	0.0000	89.00	No Ice	1.17	0.42	0.01
			0.00			1/2" Ice	1.32	0.53	0.02
			1.00			Ice	1.48	0.65	0.03
						1" Ice	1.82	0.92	0.05
						2" Ice	2.61	1.57	0.13
						4" Ice			
Platform Mount [LP 305-1]	B	None		0.0000	89.00	No Ice	18.01	18.01	1.12
						1/2" Ice	23.33	23.33	1.35
						Ice	28.65	28.65	1.58
						1" Ice	39.29	39.29	2.05
						2" Ice	60.57	60.57	2.97
						4" Ice			
(2) 7770.00 w/ Mount Pipe	A	From Leg	3.00	0.0000	74.00	No Ice	6.22	4.35	0.06
			0.00			1/2" Ice	6.77	5.20	0.11
			2.00			Ice	7.30	5.92	0.16

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
						1" Ice	8.38	7.41	0.29
						2" Ice	10.69	10.76	0.68
						4" Ice			
(2) 7770.00 w/ Mount Pipe	B	From Leg	3.00 0.00 2.00	0.0000	74.00	No Ice	6.22	4.35	0.06
						1/2" Ice	6.77	5.20	0.11
						1" Ice	7.30	5.92	0.16
						2" Ice	8.38	7.41	0.29
						4" Ice	10.69	10.76	0.68
(2) 7770.00 w/ Mount Pipe	C	From Leg	3.00 0.00 2.00	0.0000	74.00	No Ice	6.22	4.35	0.06
						1/2" Ice	6.77	5.20	0.11
						1" Ice	7.30	5.92	0.16
						2" Ice	8.38	7.41	0.29
						4" Ice	10.69	10.76	0.68
P65-17-XLH-RR w/ Mount Pipe	A	From Leg	3.00 0.00 2.00	0.0000	74.00	No Ice	11.47	8.70	0.09
						1/2" Ice	12.08	10.11	0.17
						1" Ice	12.71	11.38	0.26
						2" Ice	14.07	13.58	0.48
						4" Ice	17.08	18.18	1.09
P65-17-XLH-RR w/ Mount Pipe	B	From Leg	3.00 0.00 2.00	0.0000	74.00	No Ice	11.47	8.70	0.09
						1/2" Ice	12.08	10.11	0.17
						1" Ice	12.71	11.38	0.26
						2" Ice	14.07	13.58	0.48
						4" Ice	17.08	18.18	1.09
P65-17-XLH-RR w/ Mount Pipe	C	From Leg	3.00 0.00 2.00	0.0000	74.00	No Ice	11.47	8.70	0.09
						1/2" Ice	12.08	10.11	0.17
						1" Ice	12.71	11.38	0.26
						2" Ice	14.07	13.58	0.48
						4" Ice	17.08	18.18	1.09
(2) LGP21401	A	From Leg	3.00 0.00 2.00	0.0000	74.00	No Ice	1.29	0.36	0.01
						1/2" Ice	1.45	0.48	0.02
						1" Ice	1.61	0.60	0.03
						2" Ice	1.97	0.87	0.05
						4" Ice	2.79	1.52	0.14
(2) LGP21401	B	From Leg	3.00 0.00 2.00	0.0000	74.00	No Ice	1.29	0.36	0.01
						1/2" Ice	1.45	0.48	0.02
						1" Ice	1.61	0.60	0.03
						2" Ice	1.97	0.87	0.05
						4" Ice	2.79	1.52	0.14
(2) LGP21401	C	From Leg	3.00 0.00 2.00	0.0000	74.00	No Ice	1.29	0.36	0.01
						1/2" Ice	1.45	0.48	0.02
						1" Ice	1.61	0.60	0.03
						2" Ice	1.97	0.87	0.05
						4" Ice	2.79	1.52	0.14
(2) LGP21903	A	From Leg	3.00 0.00 2.00	0.0000	74.00	No Ice	0.27	0.18	0.01
						1/2" Ice	0.34	0.25	0.01
						1" Ice	0.43	0.32	0.02
						2" Ice	0.62	0.49	0.03
						4" Ice	1.10	0.94	0.07
(2) LGP21903	B	From Leg	3.00 0.00 2.00	0.0000	74.00	No Ice	0.27	0.18	0.01
						1/2" Ice	0.34	0.25	0.01
						1" Ice	0.43	0.32	0.02
						2" Ice	0.62	0.49	0.03
						4" Ice	1.10	0.94	0.07
(2) LGP21903	C	From Leg	3.00 0.00 2.00	0.0000	74.00	No Ice	0.27	0.18	0.01
						1/2" Ice	0.34	0.25	0.01
						1" Ice	0.43	0.32	0.02

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
			Horz Lateral ft	Vert ft					
RRUS-11	A	From Leg	3.00 0.00 2.00	0.0000	74.00	1" Ice	0.62	0.49	0.03
						2" Ice	1.10	0.94	0.07
						4" Ice			
						No Ice	3.25	1.37	0.05
						1/2" Ice	3.49	1.55	0.07
						1" Ice	3.74	1.74	0.09
RRUS-11	B	From Leg	3.00 0.00 2.00	0.0000	74.00	2" Ice	5.43	3.04	0.31
						4" Ice			
						No Ice	3.25	1.37	0.05
						1/2" Ice	3.49	1.55	0.07
						Ice	3.74	1.74	0.09
						1" Ice	4.27	2.14	0.15
RRUS-11	C	From Leg	3.00 0.00 2.00	0.0000	74.00	2" Ice	5.43	3.04	0.31
						4" Ice			
						No Ice	3.25	1.37	0.05
						1/2" Ice	3.49	1.55	0.07
						Ice	3.74	1.74	0.09
						1" Ice	4.27	2.14	0.15
DC6-48-60-18-8F Surge Suppression Unit	A	From Leg	3.00 0.00 2.00	0.0000	74.00	2" Ice	5.43	3.04	0.31
						4" Ice			
						No Ice	1.47	1.47	0.02
						1/2" Ice	1.67	1.67	0.04
						Ice	1.88	1.88	0.06
						1" Ice	2.33	2.33	0.11
Platform Mount [LP 303-1]	B	None		0.0000	74.00	2" Ice	3.38	3.38	0.24
						4" Ice			
						No Ice	14.66	14.66	1.25
						1/2" Ice	18.87	18.87	1.48
						Ice	23.08	23.08	1.71
						1" Ice	31.50	31.50	2.18
(2) LPA-80063/6CFx2 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	67.00	2" Ice	48.34	48.34	3.10
						4" Ice			
						No Ice	10.36	10.45	0.05
						1/2" Ice	10.93	11.50	0.14
						Ice	11.51	12.43	0.24
						1" Ice	12.68	14.34	0.46
(2) LPA-80063/6CFx2 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	67.00	2" Ice	15.14	18.36	1.05
						4" Ice			
						No Ice	10.36	10.45	0.05
						1/2" Ice	10.93	11.50	0.14
						Ice	11.51	12.43	0.24
						1" Ice	12.68	14.34	0.46
(2) LPA-80063/6CFx2 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	67.00	2" Ice	15.14	18.36	1.05
						4" Ice			
						No Ice	10.36	10.45	0.05
						1/2" Ice	10.93	11.50	0.14
						Ice	11.51	12.43	0.24
						1" Ice	12.68	14.34	0.46
BXA-70063/6CFx2 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	67.00	2" Ice	13.14	13.02	0.79
						4" Ice			
						No Ice	8.00	5.42	0.04
						1/2" Ice	8.65	6.59	0.10
						Ice	9.26	7.46	0.17
						1" Ice	10.51	9.25	0.33
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	67.00	2" Ice	13.97	13.94	0.83
						4" Ice			
						No Ice	8.23	5.66	0.05
						1/2" Ice	8.99	6.92	0.11
						Ice	9.71	8.04	0.18
						1" Ice	11.09	9.94	0.34
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	67.00	2" Ice	13.97	13.94	0.83
						4" Ice			
						No Ice	8.23	5.66	0.05
						1/2" Ice	8.99	6.92	0.11
						Ice	9.71	8.04	0.18

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _{Front} ft ²	C _A A _{Side} ft ²	Weight K	
BXA-171063-12BF w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	67.00	1" Ice	11.09	9.94	0.34
						2" Ice	13.97	13.94	0.83
						4" Ice			
						No Ice	4.97	5.23	0.04
						1/2" Ice	5.52	6.39	0.09
						1" Ice	6.04	7.26	0.14
						2" Ice	7.09	9.05	0.27
BXA-171063-12BF w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	67.00	4" Ice	9.36	12.82	0.67
						No Ice	4.97	5.23	0.04
						1/2" Ice	5.52	6.39	0.09
						Ice	6.04	7.26	0.14
						1" Ice	7.09	9.05	0.27
						2" Ice	9.36	12.82	0.67
						4" Ice			
BXA-171063-12BF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	67.00	No Ice	4.97	5.23	0.04
						1/2" Ice	5.52	6.39	0.09
						Ice	6.04	7.26	0.14
						1" Ice	7.09	9.05	0.27
						2" Ice	9.36	12.82	0.67
						4" Ice			
						No Ice	14.66	14.66	1.25
Platform Mount [LP 303-1]	B	None		0.0000	67.00	1/2" Ice	18.87	18.87	1.48
						Ice	23.08	23.08	1.71
						1" Ice	31.50	31.50	2.18
						2" Ice	48.34	48.34	3.10
						4" Ice			
						No Ice	0.16	0.16	0.01
						1/2" Ice	0.22	0.22	0.01
KS24019-L112A	A	From Leg	3.00 0.00 2.00	0.0000	52.00	Ice	0.30	0.30	0.01
						1" Ice	0.48	0.48	0.02
						2" Ice	0.95	0.95	0.06
						4" Ice			
						No Ice	0.85	1.67	0.07
						1/2" Ice	1.14	2.34	0.08
						Ice	1.43	3.01	0.09
Side Arm Mount [SO 701-1]	A	From Leg	1.50 0.00 0.00	0.0000	52.00	1" Ice	2.01	4.35	0.12
						2" Ice	3.17	7.03	0.18
						4" Ice			
						No Ice			
						1" Ice			

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp

Comb. No.	Description
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	98 - 93	22.289	37	2.0310	0.0026
L2	93 - 88	20.163	37	2.0283	0.0026
L3	88 - 82.7891	18.054	37	1.9940	0.0022
L4	85.2057 - 80.2057	16.899	37	1.9532	0.0021
L5	80.2057 - 75.2057	14.883	37	1.8843	0.0019
L6	75.2057 - 70.2057	12.966	37	1.7756	0.0018
L7	70.2057 - 65.2057	11.173	37	1.6429	0.0015
L8	65.2057 - 60.2057	9.534	37	1.4855	0.0012
L9	60.2057 - 59.16	8.073	36	1.3018	0.0009
L10	59.16 - 58.9	7.792	36	1.2613	0.0009
L11	58.9 - 58.75	7.724	36	1.2560	0.0009
L12	58.75 - 53.75	7.684	36	1.2530	0.0009
L13	53.75 - 52.916	6.428	36	1.1453	0.0008
L14	52.916 - 52.666	6.230	36	1.1270	0.0007
L15	52.666 - 52.16	6.171	36	1.1214	0.0007
L16	52.16 - 51.91	6.053	36	1.1102	0.0007
L17	51.91 - 45.2865	5.995	36	1.1039	0.0007
L18	48.7031 - 44.2865	5.281	36	1.0213	0.0006
L19	44.2865 - 39.2865	4.362	36	0.9566	0.0006
L20	39.2865 - 34.2865	3.422	36	0.8391	0.0005
L21	34.2865 - 33.5	2.606	36	0.7195	0.0004
L22	33.5 - 33.25	2.489	36	0.7008	0.0004
L23	33.25 - 32	2.453	36	0.6969	0.0004
L24	32 - 31.75	2.273	36	0.6773	0.0003
L25	31.75 - 28.5	2.237	36	0.6721	0.0003
L26	28.5 - 28.25	1.804	36	0.6027	0.0003
L27	28.25 - 28	1.772	36	0.5975	0.0003
L28	28 - 27.75	1.741	36	0.5923	0.0003
L29	27.75 - 27.5	1.710	36	0.5887	0.0003
L30	27.5 - 27.25	1.679	36	0.5850	0.0003
L31	27.25 - 22.25	1.649	36	0.5798	0.0003
L32	22.25 - 17.25	1.098	36	0.4731	0.0002
L33	17.25 - 15.46	0.658	36	0.3668	0.0002
L34	15.46 - 15.21	0.528	36	0.3301	0.0001
L35	15.21 - 13.4167	0.510	36	0.3249	0.0001

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L36	13.4167 - 13.1667	0.395	36	0.2886	0.0001
L37	13.1667 - 8.1667	0.380	36	0.2830	0.0001
L38	8.1667 - 6.5	0.144	36	0.1694	0.0001
L39	6.5 - 6.25	0.091	36	0.1329	0.0001
L40	6.25 - 4.46	0.084	36	0.1279	0.0001
L41	4.46 - 4.21	0.043	36	0.0918	0.0000
L42	4.21 - 0	0.038	36	0.0867	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
94.00	(2) DB980H65E-M w/ Mount Pipe	37	20.588	2.0303	0.0027	17705
89.00	APXV18-209014-C w/ Mount Pipe	37	18.472	2.0053	0.0024	6176
74.00	(2) 7770.00 w/ Mount Pipe	37	12.521	1.7455	0.0017	2288
67.00	(2) LPA-80063/6CFx2 w/ Mount Pipe	37	10.103	1.5438	0.0013	1776
52.00	KS24019-L112A	36	6.016	1.1062	0.0007	2520

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	98 - 93	56.500	12	5.1468	0.0066
L2	93 - 88	51.124	12	5.1403	0.0064
L3	88 - 82.7891	45.790	12	5.0545	0.0055
L4	85.2057 - 80.2057	42.866	12	4.9521	0.0052
L5	80.2057 - 75.2057	37.764	12	4.7785	0.0048
L6	75.2057 - 70.2057	32.909	12	4.5046	0.0044
L7	70.2057 - 65.2057	28.367	12	4.1696	0.0037
L8	65.2057 - 60.2057	24.210	12	3.7716	0.0029
L9	60.2057 - 59.16	20.502	12	3.3061	0.0023
L10	59.16 - 58.9	19.790	12	3.2034	0.0022
L11	58.9 - 58.75	19.616	12	3.1901	0.0022
L12	58.75 - 53.75	19.516	12	3.1824	0.0022
L13	53.75 - 52.916	16.328	12	2.9093	0.0019
L14	52.916 - 52.666	15.824	12	2.8629	0.0019
L15	52.666 - 52.16	15.675	12	2.8487	0.0019
L16	52.16 - 51.91	15.374	12	2.8202	0.0019
L17	51.91 - 45.2865	15.227	12	2.8041	0.0019
L18	48.7031 - 44.2865	13.415	12	2.5946	0.0016
L19	44.2865 - 39.2865	11.082	12	2.4305	0.0015
L20	39.2865 - 34.2865	8.694	12	2.1319	0.0012
L21	34.2865 - 33.5	6.621	12	1.8281	0.0010
L22	33.5 - 33.25	6.324	12	1.7805	0.0009
L23	33.25 - 32	6.231	12	1.7706	0.0009
L24	32 - 31.75	5.774	12	1.7209	0.0009
L25	31.75 - 28.5	5.684	12	1.7076	0.0009
L26	28.5 - 28.25	4.582	12	1.5313	0.0008
L27	28.25 - 28	4.503	12	1.5182	0.0008
L28	28 - 27.75	4.423	12	1.5050	0.0008
L29	27.75 - 27.5	4.345	12	1.4958	0.0007

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L30	27.5 - 27.25	4.267	12	1.4864	0.0007
L31	27.25 - 22.25	4.189	12	1.4730	0.0007
L32	22.25 - 17.25	2.789	12	1.2022	0.0006
L33	17.25 - 15.46	1.672	12	0.9319	0.0004
L34	15.46 - 15.21	1.340	12	0.8387	0.0004
L35	15.21 - 13.4167	1.297	12	0.8256	0.0004
L36	13.4167 - 13.1667	1.004	12	0.7332	0.0003
L37	13.1667 - 8.1667	0.966	12	0.7190	0.0003
L38	8.1667 - 6.5	0.365	12	0.4304	0.0002
L39	6.5 - 6.25	0.231	12	0.3377	0.0001
L40	6.25 - 4.46	0.213	12	0.3249	0.0001
L41	4.46 - 4.21	0.109	12	0.2333	0.0001
L42	4.21 - 0	0.097	12	0.2203	0.0001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
94.00	(2) DB980H65E-M w/ Mount Pipe	12	52.198	5.1451	0.0069	7243
89.00	APXV18-209014-C w/ Mount Pipe	12	46.848	5.0828	0.0061	2505
74.00	(2) 7770.00 w/ Mount Pipe	12	31.782	4.4286	0.0044	917
67.00	(2) LPA-80063/6CFx2 w/ Mount Pipe	12	25.653	3.9190	0.0032	708
52.00	KS24019-L112A	12	15.280	2.8100	0.0019	998

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	98 - 93 (1)	TP13.0782x12x0.1875	5.00	0.00	0.0	39.000	7.6716	-1.31	299.19	0.004
L2	93 - 88 (2)	TP14.1563x13.0782x0.1875	5.00	0.00	0.0	39.000	8.3132	-2.77	324.21	0.009
L3	88 - 82.7891 (3)	TP15.28x14.1563x0.1875	5.21	0.00	0.0	39.000	8.6718	-2.88	338.20	0.009
L4	82.7891 - 80.2057 (4)	TP15.4455x14.3839x0.25	5.00	0.00	0.0	39.000	12.0577	-3.19	470.25	0.007
L5	80.2057 - 75.2057 (5)	TP16.5072x15.4455x0.25	5.00	0.00	0.0	39.000	12.9001	-3.46	503.10	0.007
L6	75.2057 - 70.2057 (6)	TP17.5689x16.5072x0.25	5.00	0.00	0.0	39.000	13.7425	-5.69	535.96	0.011
L7	70.2057 - 65.2057 (7)	TP18.6305x17.5689x0.25	5.00	0.00	0.0	39.000	14.5849	-7.63	568.81	0.013
L8	65.2057 - 60.2057 (8)	TP19.6922x18.6305x0.25	5.00	0.00	0.0	39.000	15.4274	-8.11	601.67	0.013
L9	60.2057 - 59.16 (9)	TP19.9142x19.6922x0.25	1.05	0.00	0.0	39.000	15.6036	-8.23	608.54	0.014
L10	59.16 - 58.9 (10)	TP19.9694x19.9142x0.5125	0.26	0.00	0.0	39.000	31.6501	-8.28	1234.35	0.007
L11	58.9 - 58.75 (11)	TP20.0013x19.9694x0.5125	0.15	0.00	0.0	39.000	31.7019	-8.30	1236.37	0.007
L12	58.75 - 53.75 (12)	TP21.0629x20.0013x0.5	5.00	0.00	0.0	39.000	32.6334	-9.06	1272.70	0.007
L13	53.75 - 52.916 (13)	TP21.24x21.0629x0.5	0.83	0.00	0.0	39.000	32.9144	-9.19	1283.66	0.007
L14	52.916 -	TP21.2931x21.24x0.5	0.25	0.00	0.0	39.000	32.9986	-9.23	1286.95	0.007

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L15	52.666 (14) 52.666 - 52.16 (15)	TP21.4005x21.2931x0.5	0.51	0.00	0.0	39.000	33.1691	-9.32	1293.60	0.007
L16	52.16 - 51.91 (16)	TP21.4536x21.4005x0.4375	0.25	0.00	0.0	39.000	29.1835	-9.43	1138.16	0.008
L17	51.91 - 45.2865 (17)	TP22.86x21.4536x0.4375	6.62	0.00	0.0	39.000	30.1290	-9.93	1175.03	0.008
L18	45.2865 - 44.2865 (18)	TP22.5745x21.6345x0.5438	4.42	0.00	0.0	39.000	38.0221	-11.04	1482.86	0.007
L19	44.2865 - 39.2865 (19)	TP23.6387x22.5745x0.5313	5.00	0.00	0.0	39.000	38.9635	-11.93	1519.57	0.008
L20	39.2865 - 34.2865 (20)	TP24.7028x23.6387x0.5188	5.00	0.00	0.0	39.000	39.8194	-12.84	1552.96	0.008
L21	34.2865 - 33.5 (21)	TP24.8702x24.7028x0.5125	0.79	0.00	0.0	39.000	39.6221	-12.99	1545.26	0.008
L22	33.5 - 33.25 (22)	TP24.9234x24.8702x0.8125	0.25	0.00	0.0	39.000	62.1790	-13.06	2424.98	0.005
L23	33.25 - 32 (23)	TP25.1895x24.9234x0.8	1.25	0.00	0.0	39.000	61.9297	-13.37	2415.26	0.006
L24	32 - 31.75 (24)	TP25.2427x25.1895x0.5875	0.25	0.00	0.0	39.000	45.9751	-13.43	1793.03	0.007
L25	31.75 - 28.5 (25)	TP25.9344x25.2427x0.575	3.25	0.00	0.0	39.000	46.2821	-14.10	1805.00	0.008
L26	28.5 - 28.25 (26)	TP25.9876x25.9344x0.5875	0.25	0.00	0.0	39.000	47.3641	-14.17	1847.20	0.008
L27	28.25 - 28 (27)	TP26.0408x25.9876x0.5875	0.25	0.00	0.0	39.000	47.4634	-14.22	1851.07	0.008
L28	28 - 27.75 (28)	TP26.094x26.0408x0.8625	0.25	0.00	0.0	39.000	69.0731	-14.29	2693.85	0.005
L29	27.75 - 27.5 (29)	TP26.1472x26.094x0.85	0.25	0.00	0.0	39.000	68.2493	-14.36	2661.72	0.005
L30	27.5 - 27.25 (30)	TP26.2004x26.1472x0.575	0.25	0.00	0.0	39.000	46.7676	-14.41	1823.94	0.008
L31	27.25 - 22.25 (31)	TP27.2645x26.2004x0.5625	5.00	0.00	0.0	39.000	47.6732	-15.47	1859.25	0.008
L32	22.25 - 17.25 (32)	TP28.3287x27.2645x0.55	5.00	0.00	0.0	39.000	48.4933	-16.56	1891.24	0.009
L33	17.25 - 15.46 (33)	TP28.7097x28.3287x0.55	1.79	0.00	0.0	39.000	49.1583	-16.95	1917.17	0.009
L34	15.46 - 15.21 (34)	TP28.7629x28.7097x0.55	0.25	0.00	0.0	39.000	49.2512	-17.02	1920.80	0.009
L35	15.21 - 13.4167 (35)	TP29.1445x28.7629x0.55	1.79	0.00	0.0	39.000	49.9175	-17.45	1946.78	0.009
L36	13.4167 - 13.1667 (36)	TP29.1977x29.1445x0.5	0.25	0.00	0.0	39.000	45.5433	-17.52	1776.19	0.010
L37	13.1667 - 8.1667 (37)	TP30.2619x29.1977x0.4875	5.00	0.00	0.0	39.000	46.0706	-18.64	1796.76	0.010
L38	8.1667 - 6.5 (38)	TP30.6166x30.2619x0.4875	1.67	0.00	0.0	39.000	46.6195	-18.98	1818.16	0.010
L39	6.5 - 6.25 (39)	TP30.6698x30.6166x0.5375	0.25	0.00	0.0	39.000	51.4065	-19.04	2004.85	0.009
L40	6.25 - 4.46 (40)	TP31.0508x30.6698x0.525	1.79	0.00	0.0	39.000	50.8666	-19.43	1983.80	0.010
L41	4.46 - 4.21 (41)	TP31.104x31.0508x0.525	0.25	0.00	0.0	39.000	50.9553	-19.49	1987.26	0.010
L42	4.21 - 0 (42)	TP32x31.104x0.5125	4.21	0.00	0.0	39.000	51.2199	-20.35	1997.58	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	98 - 93 (1)	TP13.0782x12x0.1875	4.44	2.200	39.000	0.056	0.00	0.000	39.000	0.000
L2	93 - 88 (2)	TP14.1563x13.0782x0.1875	21.14	8.904	39.000	0.228	0.00	0.000	39.000	0.000
L3	88 - 82.7891 (3)	TP15.28x14.1563x0.1875	35.41	13.697	39.000	0.351	0.00	0.000	39.000	0.000
L4	82.7891 - 80.2057 (4)	TP15.4455x14.3839x0.25	61.77	16.534	39.000	0.424	0.00	0.000	39.000	0.000
L5	80.2057 - 75.2057 (5)	TP16.5072x15.4455x0.25	89.16	20.828	39.000	0.534	0.00	0.000	39.000	0.000
L6	75.2057 - 70.2057 (6)	TP17.5689x16.5072x0.25	135.74	27.916	39.000	0.716	0.00	0.000	39.000	0.000
L7	70.2057 - 65.2057 (7)	TP18.6305x17.5689x0.25	189.03	34.486	39.000	0.884	0.00	0.000	39.000	0.000
L8	65.2057 - 60.2057 (8)	TP19.6922x18.6305x0.25	256.03	41.717	39.000	1.070	0.00	0.000	39.000	0.000
L9	60.2057 - 59.16 (9)	TP19.9142x19.6922x0.25	270.19	43.028	39.000	1.103	0.00	0.000	39.000	0.000
L10	59.16 - 58.9 (10)	TP19.9694x19.9142x0.5125	273.71	22.011	39.000	0.564	0.00	0.000	39.000	0.000
L11	58.9 - 58.75 (11)	TP20.0013x19.9694x0.5125	275.75	22.102	39.000	0.567	0.00	0.000	39.000	0.000
L12	58.75 - 53.75 (12)	TP21.0629x20.0013x0.5	344.34	25.362	39.000	0.650	0.00	0.000	39.000	0.000
L13	53.75 - 52.916 (13)	TP21.24x21.0629x0.5	355.91	25.763	39.000	0.661	0.00	0.000	39.000	0.000
L14	52.916 - 52.666 (14)	TP21.2931x21.24x0.5	359.39	25.881	39.000	0.664	0.00	0.000	39.000	0.000
L15	52.666 - 52.16 (15)	TP21.4005x21.2931x0.5	366.44	26.115	39.000	0.670	0.00	0.000	39.000	0.000
L16	52.16 - 51.91 (16)	TP21.4536x21.4005x0.4375	370.03	29.717	39.000	0.762	0.00	0.000	39.000	0.000
L17	51.91 - 45.2865 (17)	TP22.86x21.4536x0.4375	415.22	31.266	39.000	0.802	0.00	0.000	39.000	0.000
L18	45.2865 - 44.2865 (18)	TP22.5745x21.6345x0.5438	478.43	28.239	39.000	0.724	0.00	0.000	39.000	0.000
L19	44.2865 - 39.2865 (19)	TP23.6387x22.5745x0.5313	551.26	30.222	39.000	0.775	0.00	0.000	39.000	0.000
L20	39.2865 - 34.2865 (20)	TP24.7028x23.6387x0.5188	625.32	32.004	39.000	0.821	0.00	0.000	39.000	0.000
L21	34.2865 - 33.5 (21)	TP24.8702x24.7028x0.5125	637.08	32.522	39.000	0.834	0.00	0.000	39.000	0.000
L22	33.5 - 33.25 (22)	TP24.9234x24.8702x0.8125	640.82	21.320	39.000	0.547	0.00	0.000	39.000	0.000
L23	33.25 - 32 (23)	TP25.1895x24.9234x0.8	659.60	21.762	39.000	0.558	0.00	0.000	39.000	0.000
L24	32 - 31.75 (24)	TP25.2427x25.1895x0.5875	663.36	28.910	39.000	0.741	0.00	0.000	39.000	0.000
L25	31.75 - 28.5 (25)	TP25.9344x25.2427x0.575	712.57	29.959	39.000	0.768	0.00	0.000	39.000	0.000
L26	28.5 - 28.25 (26)	TP25.9876x25.9344x0.5875	716.38	29.397	39.000	0.754	0.00	0.000	39.000	0.000
L27	28.25 - 28 (27)	TP26.0408x25.9876x0.5875	720.19	29.428	39.000	0.755	0.00	0.000	39.000	0.000
L28	28 - 27.75 (28)	TP26.094x26.0408x0.8625	724.00	20.730	39.000	0.532	0.00	0.000	39.000	0.000
L29	27.75 - 27.5 (29)	TP26.1472x26.094x0.85	727.81	21.024	39.000	0.539	0.00	0.000	39.000	0.000
L30	27.5 - 27.25 (30)	TP26.2004x26.1472x0.575	731.63	30.118	39.000	0.772	0.00	0.000	39.000	0.000
L31	27.25 - 22.25 (31)	TP27.2645x26.2004x0.5625	808.64	31.297	39.000	0.802	0.00	0.000	39.000	0.000
L32	22.25 - 17.25 (32)	TP28.3287x27.2645x0.55	886.85	32.395	39.000	0.831	0.00	0.000	39.000	0.000
L33	17.25 - 15.46 (33)	TP28.7097x28.3287x0.55	915.13	32.521	39.000	0.834	0.00	0.000	39.000	0.000
L34	15.46 - 15.21 (34)	TP28.7629x28.7097x0.55	919.10	32.538	39.000	0.834	0.00	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L35	15.21 - 13.4167 (35)	TP29.1445x28.7629x0.55	947.62	32.650	39.000	0.837	0.00	0.000	39.000	0.000
L36	13.4167 - 13.1667 (36)	TP29.1977x29.1445x0.5	951.60	35.743	39.000	0.916	0.00	0.000	39.000	0.000
L37	13.1667 - 8.1667 (37)	TP30.2619x29.1977x0.48 75	1031.9 5	36.894	39.000	0.946	0.00	0.000	39.000	0.000
L38	8.1667 - 6.5 (38)	TP30.6166x30.2619x0.48 75	1058.9 6	36.966	39.000	0.948	0.00	0.000	39.000	0.000
L39	6.5 - 6.25 (39)	TP30.6698x30.6166x0.53 75	1063.0 2	33.704	39.000	0.864	0.00	0.000	39.000	0.000
L40	6.25 - 4.46 (40)	TP31.0508x30.6698x0.52 5	1092.1 4	34.522	39.000	0.885	0.00	0.000	39.000	0.000
L41	4.46 - 4.21 (41)	TP31.104x31.0508x0.525	1096.2	34.529	39.000	0.885	0.00	0.000	39.000	0.000
L42	4.21 - 0 (42)	TP32x31.104x0.5125	1165.2 0	35.428	39.000	0.908	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	98 - 93 (1)	TP13.0782x12x0.1875	2.44	0.317	26.000	0.024	0.00	0.000	26.000	0.000
L2	93 - 88 (2)	TP14.1563x13.0782x0.18 75	5.05	0.608	26.000	0.047	0.00	0.000	26.000	0.000
L3	88 - 82.7891 (3)	TP15.28x14.1563x0.1875	5.16	0.595	26.000	0.046	0.00	0.000	26.000	0.000
L4	82.7891 - 80.2057 (4)	TP15.4455x14.3839x0.25	5.38	0.446	26.000	0.034	0.00	0.000	26.000	0.000
L5	80.2057 - 75.2057 (5)	TP16.5072x15.4455x0.25	5.58	0.433	26.000	0.033	0.01	0.001	26.000	0.000
L6	75.2057 - 70.2057 (6)	TP17.5689x16.5072x0.25	9.15	0.666	26.000	0.051	0.16	0.016	26.000	0.001
L7	70.2057 - 65.2057 (7)	TP18.6305x17.5689x0.25	13.30	0.912	26.000	0.070	0.12	0.010	26.000	0.000
L8	65.2057 - 60.2057 (8)	TP19.6922x18.6305x0.25	13.50	0.875	26.000	0.067	0.11	0.009	26.000	0.000
L9	60.2057 - 59.16 (9)	TP19.9142x19.6922x0.25	13.55	0.869	26.000	0.067	0.11	0.009	26.000	0.000
L10	59.16 - 58.9 (10)	TP19.9694x19.9142x0.51 25	13.56	0.429	26.000	0.033	0.11	0.004	26.000	0.000
L11	58.9 - 58.75 (11)	TP20.0013x19.9694x0.51 25	13.58	0.428	26.000	0.033	0.11	0.004	26.000	0.000
L12	58.75 - 53.75 (12)	TP21.0629x20.0013x0.5	13.85	0.424	26.000	0.033	0.10	0.003	26.000	0.000
L13	53.75 - 52.916 (13)	TP21.24x21.0629x0.5	13.89	0.422	26.000	0.032	0.10	0.003	26.000	0.000
L14	52.916 - 52.666 (14)	TP21.2931x21.24x0.5	13.91	0.421	26.000	0.032	0.09	0.003	26.000	0.000
L15	52.666 - 52.16 (15)	TP21.4005x21.2931x0.5	13.93	0.420	26.000	0.032	0.09	0.003	26.000	0.000
L16	52.16 - 51.91 (16)	TP21.4536x21.4005x0.43 75	14.00	0.480	26.000	0.037	0.21	0.008	26.000	0.000
L17	51.91 - 45.2865 (17)	TP22.86x21.4536x0.4375	14.17	0.470	26.000	0.036	0.21	0.008	26.000	0.000
L18	45.2865 - 44.2865 (18)	TP22.5745x21.6345x0.54 38	14.43	0.380	26.000	0.029	0.20	0.006	26.000	0.000
L19	44.2865 - 39.2865 (19)	TP23.6387x22.5745x0.53 13	14.68	0.377	26.000	0.029	0.19	0.005	26.000	0.000
L20	39.2865 - 34.2865 (20)	TP24.7028x23.6387x0.51 88	14.92	0.375	26.000	0.029	0.18	0.004	26.000	0.000
L21	34.2865 - 33.5 (21)	TP24.8702x24.7028x0.51 25	14.96	0.377	26.000	0.029	0.17	0.004	26.000	0.000
L22	33.5 - 33.25 (22)	TP24.9234x24.8702x0.81 25	14.97	0.241	26.000	0.019	0.17	0.003	26.000	0.000
L23	33.25 - 32	TP25.1895x24.9234x0.8	15.04	0.243	26.000	0.019	0.17	0.003	26.000	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L24	(23) 32 - 31.75	TP25.2427x25.1895x0.58	15.05	0.327	26.000	0.025	0.17	0.004	26.000	0.000
L25	(24) 31.75 - 28.5	TP25.9344x25.2427x0.57	15.21	0.329	26.000	0.025	0.16	0.003	26.000	0.000
L26	(25) 28.5 - 28.25	TP25.9876x25.9344x0.58	15.21	0.321	26.000	0.025	0.16	0.003	26.000	0.000
L27	(26) 28.25 - 28	TP26.0408x25.9876x0.58	15.23	0.321	26.000	0.025	0.16	0.003	26.000	0.000
L28	(27) 28 - 27.75	TP26.094x26.0408x0.862	15.24	0.221	26.000	0.017	0.16	0.002	26.000	0.000
L29	(28) 27.75 - 27.5	TP26.1472x26.094x0.85	15.25	0.223	26.000	0.017	0.16	0.002	26.000	0.000
L30	(29) 27.5 - 27.25	TP26.2004x26.1472x0.57	15.26	0.326	26.000	0.025	0.16	0.003	26.000	0.000
L31	(30) 27.25 - 22.25	TP27.2645x26.2004x0.56	15.51	0.325	26.000	0.025	0.15	0.003	26.000	0.000
L32	(31) 22.25 - 17.25	TP28.3287x27.2645x0.55	15.74	0.325	26.000	0.025	0.13	0.002	26.000	0.000
L33	(32) 17.25 - 15.46	TP28.7097x28.3287x0.55	15.84	0.322	26.000	0.025	0.13	0.002	26.000	0.000
L34	(33) 15.46 - 15.21	TP28.7629x28.7097x0.55	15.84	0.322	26.000	0.025	0.13	0.002	26.000	0.000
L35	(34) 15.21 - 13.4167	TP29.1445x28.7629x0.55	15.93	0.319	26.000	0.025	0.13	0.002	26.000	0.000
L36	(35) 13.4167 - 13.1667	TP29.1977x29.1445x0.5	15.93	0.350	26.000	0.027	0.12	0.002	26.000	0.000
L37	(36) 13.1667 - 8.1667	TP30.2619x29.1977x0.48	16.17	0.351	26.000	0.027	0.11	0.002	26.000	0.000
L38	(37) 8.1667 - 6.5	TP30.6166x30.2619x0.48	16.23	0.348	26.000	0.027	0.11	0.002	26.000	0.000
L39	(38) 6.5 - 6.25	TP30.6698x30.6166x0.53	16.23	0.316	26.000	0.024	0.10	0.002	26.000	0.000
L40	(39) 6.25 - 4.46	TP31.0508x30.6698x0.52	16.30	0.321	26.000	0.025	0.10	0.002	26.000	0.000
L41	(40) 4.46 - 4.21	TP31.104x31.0508x0.525	16.30	0.320	26.000	0.025	0.10	0.002	26.000	0.000
L42	(41) 4.21 - 0	TP32x31.104x0.5125	16.45	0.321	26.000	0.025	0.10	0.001	26.000	0.000

*See appendix C for additional capacity calculations

APPENDIX B
BASE LEVEL DRAWING

APPENDIX C
ADDITIONAL CALCULATIONS

TNX Section Forces

Increment (ft):		5	TNX Output		
	Section Height (ft)	P _u (K)	M _{ux} (kip-ft)	V _u (K)	
1	98 - 93	1.3113	4.4437	2.4356	
2	93 - 88	2.7741	21.145	5.0513	
3	88 - 85.20573	2.8778	35.413	5.1625	
4	85.20573 - 80.20573	3.1907	61.769	5.3768	
5	80.20573 - 75.20573	3.4569	89.157	5.5823	
6	75.20573 - 70.20573	5.6937	135.74	9.1471	
7	70.20573 - 65.20573	7.6278	189.03	13.297	
8	65.20573 - 60.20573	8.1109	256.03	13.505	
9	60.20573 - 59.16	8.2278	270.19	13.553	
10	59.16 - 58.9	8.2776	273.71	13.564	
11	58.9 - 58.75	8.3008	275.75	13.578	
12	58.75 - 53.75	9.0552	344.34	13.847	
13	53.75 - 52.916	9.1859	355.91	13.892	
14	52.916 - 52.666	9.2326	359.39	13.905	
15	52.666 - 52.16	9.3176	366.44	13.932	
16	52.16 - 51.91	9.4262	370.03	14.001	
17	51.91 - 48.70313	9.9308	415.22	14.166	
18	48.70313 - 44.28646	11.038	478.43	14.433	
19	44.28646 - 39.28646	11.925	551.26	14.683	
20	39.28646 - 34.28646	12.841	625.32	14.921	
21	34.28646 - 33.5	12.995	637.08	14.957	
22	33.5 - 33.25	13.062	640.82	14.967	
23	33.25 - 32	13.369	659.6	15.036	
24	32 - 31.75	13.426	663.36	15.045	
25	31.75 - 28.5	14.102	712.57	15.206	
26	28.5 - 28.25	14.166	716.38	15.213	
27	28.25 - 28	14.224	720.19	15.225	
28	28 - 27.75	14.292	724	15.239	
29	27.75 - 27.5	14.359	727.81	15.252	
30	27.5 - 27.25	14.411	731.63	15.264	
31	27.25 - 22.25	15.474	808.64	15.507	
32	22.25 - 17.25	16.563	886.85	15.745	
33	17.25 - 15.46	16.952	915.13	15.836	
34	15.46 - 15.21	17.024	919.1	15.836	
35	15.21 - 13.4167	17.448	947.61	15.935	
36	13.4167 - 13.1667	17.515	951.6	15.934	
37	13.1667 - 8.1667	18.64	1031.9	16.169	
38	8.1667 - 6.5	18.976	1059	16.232	
39	6.5 - 6.25	19.0	1063.0	16.2	
40	6.25 - 4.46	19.4	1092.1	16.3	
41	4.46 - 4.21	19.5	1096.2	16.3	
42	4.21 - 0	20.3	1165.2	16.4	

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
98 - 93	Pole	TP13.078x12x0.1875	Pole	4.6%	Pass
93 - 88	Pole	TP14.156x13.078x0.1875	Pole	17.8%	Pass
88 - 85.21	Pole	TP15.28x14.156x0.1875	Pole	27.0%	Pass
85.21 - 80.21	Pole	TP15.446x14.384x0.25	Pole	32.3%	Pass
80.21 - 75.21	Pole	TP16.507x15.446x0.25	Pole	40.5%	Pass
75.21 - 70.21	Pole	TP17.569x16.507x0.25	Pole	54.4%	Pass
70.21 - 65.21	Pole	TP18.631x17.569x0.25	Pole	67.3%	Pass
65.21 - 60.21	Pole	TP19.692x18.631x0.25	Pole	81.2%	Pass
60.21 - 59.16	Pole	TP19.914x19.692x0.25	Pole	83.7%	Pass
59.16 - 58.9	Pole + Reinf.	TP19.969x19.914x0.5125	Reinf. 4 Compression	60.5%	Pass
58.9 - 58.75	Pole + Reinf.	TP20.001x19.969x0.5125	Reinf. 4 Compression	60.7%	Pass
58.75 - 53.75	Pole + Reinf.	TP21.063x20.001x0.5	Reinf. 4 Compression	70.1%	Pass
53.75 - 52.92	Pole + Reinf.	TP21.24x21.063x0.5	Reinf. 4 Compression	71.5%	Pass
52.92 - 52.67	Pole + Reinf.	TP21.293x21.24x0.5	Reinf. 9 Compression	72.6%	Pass
52.67 - 52.16	Pole + Reinf.	TP21.401x21.293x0.5	Reinf. 9 Compression	73.4%	Pass
52.16 - 51.91	Pole + Reinf.	TP21.454x21.401x0.4375	Reinf. 9 Compression	76.1%	Pass
51.91 - 48.7	Pole + Reinf.	TP22.86x21.454x0.4375	Reinf. 9 Compression	81.2%	Pass
48.7 - 44.29	Pole + Reinf.	TP22.575x21.635x0.5438	Reinf. 3 Compression	77.4%	Pass
44.29 - 39.29	Pole + Reinf.	TP23.639x22.575x0.5313	Reinf. 3 Compression	82.8%	Pass
39.29 - 34.29	Pole + Reinf.	TP24.703x23.639x0.5188	Reinf. 3 Compression	87.4%	Pass
34.29 - 33.5	Pole + Reinf.	TP24.87x24.703x0.5125	Reinf. 3 Compression	88.0%	Pass
33.5 - 33.25	Pole + Reinf.	TP24.923x24.87x0.8125	Reinf. 3 Compression	58.4%	Pass
33.25 - 32	Pole + Reinf.	TP25.189x24.923x0.8	Reinf. 3 Compression	59.2%	Pass
32 - 31.75	Pole + Reinf.	TP25.243x25.189x0.5875	Reinf. 7 Compression	71.8%	Pass
31.75 - 28.5	Pole + Reinf.	TP25.934x25.243x0.575	Reinf. 7 Compression	73.9%	Pass
28.5 - 28.25	Pole + Reinf.	TP25.988x25.934x0.5875	Reinf. 7 Compression	74.6%	Pass
28.25 - 28	Pole + Reinf.	TP26.041x25.988x0.5875	Reinf. 7 Compression	74.8%	Pass
28 - 27.75	Pole + Reinf.	TP26.094x26.041x0.8625	Reinf. 8 Bolt Shear	52.2%	Pass
27.75 - 27.5	Pole + Reinf.	TP26.147x26.094x0.85	Reinf. 7 Bolt Shear	52.3%	Pass
27.5 - 27.25	Pole + Reinf.	TP26.2x26.147x0.575	Reinf. 2 Compression	74.7%	Pass
27.25 - 22.25	Pole + Reinf.	TP27.265x26.2x0.5625	Reinf. 2 Compression	77.5%	Pass
22.25 - 17.25	Pole + Reinf.	TP28.329x27.265x0.55	Reinf. 2 Compression	80.0%	Pass
17.25 - 15.46	Pole + Reinf.	TP28.71x28.329x0.55	Reinf. 2 Compression	80.8%	Pass
15.46 - 15.21	Pole + Reinf.	TP28.763x28.71x0.55	Reinf. 8 Compression	81.6%	Pass
15.21 - 13.42	Pole + Reinf.	TP29.145x28.763x0.55	Reinf. 8 Compression	82.4%	Pass
13.42 - 13.17	Pole + Reinf.	TP29.198x29.145x0.5	Reinf. 8 Compression	84.3%	Pass
13.17 - 8.17	Pole + Reinf.	TP30.262x29.198x0.4875	Reinf. 8 Compression	86.2%	Pass
8.17 - 6.5	Pole + Reinf.	TP30.617x30.262x0.4875	Reinf. 8 Compression	86.8%	Pass
6.5 - 6.25	Pole + Reinf.	TP30.67x30.617x0.5375	Reinf. 8 Compression	85.1%	Pass
6.25 - 4.46	Pole + Reinf.	TP31.051x30.67x0.525	Reinf. 8 Compression	85.7%	Pass
4.46 - 4.21	Pole + Reinf.	TP31.104x31.051x0.525	Reinf. 1 Compression	85.1%	Pass
4.21 - 0	Pole + Reinf.	TP32x31.104x0.5125	Reinf. 1 Bolt Shear	87.1%	Pass
				Summary	
			Pole	83.7%	Pass
			Reinforcement	88.0%	Pass
			Overall	88.0%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in ⁴)			Area (in ²)			% Capacity	Axial (kips)								
	Pole	Reinf.	Total	Pole	Reinf.	Total		Pole	R1	R2	R3	R4	R5	R6	R7	R8
98 - 93	161	n/a	161	7.67	n/a	7.67	4.6%									
93 - 88	205	n/a	205	8.31	n/a	8.31	17.8%									
88 - 85.21	233	n/a	233	8.67	n/a	8.67	27.0%									
85.21 - 80.21	352	n/a	352	12.06	n/a	12.06	32.3%									
80.21 - 75.21	431	n/a	431	12.90	n/a	12.90	40.5%									
75.21 - 70.21	521	n/a	521	13.74	n/a	13.74	54.4%									
70.21 - 65.21	622	n/a	622	14.58	n/a	14.58	67.3%									
65.21 - 60.21	737	n/a	737	15.43	n/a	15.43	81.2%									
60.21 - 59.16	762	n/a	762	15.60	n/a	15.60	83.7%									
59.16 - 58.9	768	754	1522	15.65	13.50	29.15	42.1%				103.1					103.1
58.9 - 58.75	772	756	1528	15.67	13.50	29.17	42.3%				103.6					103.6
58.75 - 53.75	904	833	1737	16.51	13.50	30.01	48.8%				119.5					119.5
53.75 - 52.92	927	847	1773	16.65	13.50	30.15	49.9%				121.9					121.9
52.92 - 52.67	935	872	1806	16.70	18.00	34.70	50.6%				89.2		84.1			123.6
52.67 - 52.16	949	880	1829	16.78	18.00	34.78	51.2%				90.3		85.1			125.1
52.16 - 51.91	960	685	1645	16.82	13.50	30.32	59.8%						123.4			129.6
51.91 - 48.7	1055	727	1781	17.36	13.50	30.86	63.9%						131.8			138.4
48.7 - 44.29	1382	950	2332	22.08	13.50	35.58	54.1%				132.0					132.0
44.29 - 39.29	1590	1036	2626	23.14	13.50	36.64	57.9%				141.1					141.1
39.29 - 34.29	1818	1127	2944	24.19	13.50	37.69	61.3%				148.9					148.9
34.29 - 33.5	1855	1141	2997	24.36	13.50	37.86	61.7%				150.0					150.0
33.5 - 33.25	1867	2686	4553	24.41	31.50	55.91	41.0%				99.6			132.7		99.6
33.25 - 32	1929	2740	4669	24.67	31.50	56.17	41.6%				101.0			134.6		101.0
32 - 31.75	1941	1577	3518	24.73	18.00	42.73	55.6%							180.0		
31.75 - 28.5	2107	1660	3767	25.41	18.00	43.41	57.3%							185.4		
28.5 - 28.25	2122	1711	3833	25.47	24.00	49.47	57.9%				130.5			187.1		
28.25 - 28	2136	1717	3853	25.52	24.00	49.52	58.0%				130.9			187.5		
28 - 27.75	2147	3359	5506	25.57	36.00	61.57	40.1%				129.7			129.7	129.7	
27.75 - 27.5	2160	3372	5532	25.62	36.00	61.62	40.2%				130.0			130.0	130.0	
27.5 - 27.25	2173	1692	3866	25.68	18.00	43.68	57.9%				187.3					187.3
27.25 - 22.25	2453	1825	4278	26.73	18.00	44.73	60.2%				194.4					194.4
22.25 - 17.25	2755	1963	4718	27.79	18.00	45.79	62.2%				200.6					200.6
17.25 - 15.46	2869	2014	4882	28.17	18.00	46.17	62.9%				202.7					202.7
15.46 - 15.21	2887	2071	4959	28.22	24.00	52.22	63.5%				152.5		145.3			204.5
15.21 - 13.42	3005	2124	5129	28.60	24.00	52.60	64.1%				154.3		147.0			206.5
13.42 - 13.17	3030	1698	4727	28.65	18.00	46.65	72.2%						202.2			211.4
13.17 - 8.17	3377	1818	5194	29.70	18.00	47.70	73.8%						206.9			216.2
8.17 - 6.5	3498	1858	5356	30.06	18.00	48.06	74.3%						208.3			217.7
6.5 - 6.25	3507	2339	5847	30.11	24.00	54.11	66.4%	160.6					153.3			213.4
6.25 - 4.46	3641	2395	6036	30.49	24.00	54.49	66.9%	162.0					154.7			214.9
4.46 - 4.21	3657	2347	6004	30.54	18.00	48.54	66.4%	213.4								213.4
4.21 - 0	3986	2478	6464	31.43	18.00	49.43	67.4%	216.6								216.6

Note: Section capacity checked in 5 degree increments.



Anchor Rod Interaction, TIA/EIA-222-F
BU #: 876399, (F) E. GRANBY 4Q2000 / GALASSO
2016777.876399.02

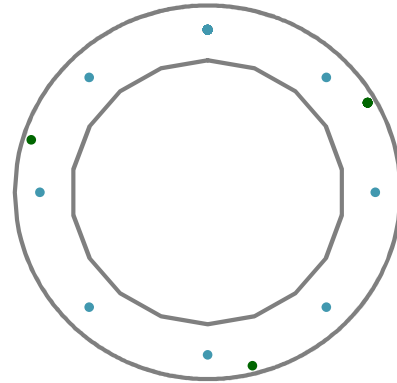
tnx Reactions		
Overturing Moment=	1165.00	k*ft
Axial Force =	20.00	k
Shear Force =	16.00	k

Existing Anchor Rods		
Number of Rods =	8	
Rod Circle =	40	in
Rod Diameter =	2.25	in
Est. Dist. b/w ea. Rod =	6	in
Plate Type =	Round	
Plate Diameter =	46	in

Pole		
Pole Diameter =	32	in
Number of Sides =	18	
Thickness =	0.3125	in

First Added Anchor Rods		
Number of Rods =	3	
Rod Circle =	44.00	in
Rod Diameter =	2.50	in
Anchor Rod Grade =	A687	

Rod Number	Initial Angle
1	60
2	166
3	287



- Existing Anchor Rods
- First Added Anchor Rods
- Second Added Anchor Rods

Second Added Anchor Rods		
Number of Rods =		
Rod Circle =		in
Rod Diameter =		in
Anchor Rod Grade =		

First Added Anchor Rods		
Max Rod Tension =	207.32	k
Rnt/Ω=	242.98	k
Anchor Rod Capacity =	85.32%	OK

Reactions in Existing Rods		
Overturing Moment=	664.73	k*ft
Axial Force =	20.00	k
Shear Force =	16.00	k
Centroid Offset =	0.55	in

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

TIA Rev F

Site Data

BU#: 876399
Site Name: (F) E. GRANBY 4Q2000 /
App #: 16
Pole Manufacturer: Other

Reactions		
Moment:	714.13333	ft-kips
Axial:	20	kips
Shear:	16	kips

Anchor Rod Data		
Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	40	in

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

Anchor Rod Results	
Maximum Rod Tension:	104.6 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	53.7% Pass

Non-Rigid
Service, ASD
Fty*ASIF

Plate Data		
Diam:	46	in
Thick:	1.5	in
Grade:	60	ksi
Single-Rod B-eff:	12.70	in

Base Plate Results	Flexural Check
Base Plate Stress:	55.9 ksi
Allowable Plate Stress:	60.0 ksi
Base Plate Stress Ratio:	93.1% Pass

Non-Rigid
Service ASD
0.75*Fy*ASIF
Y.L. Length:
24.00

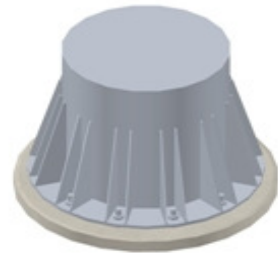
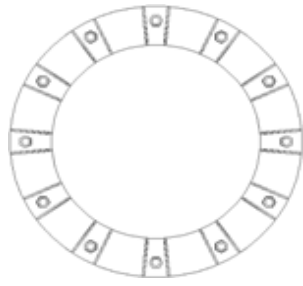
Stiffener Data (Welding at both sides)		
Config:		*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

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

Pole Results	
Pole Punching Shear Check:	n/a

Pole Data		
Diam:	32	in
Thick:	0.3125	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None



Stress Increase Factor	
ASIF:	1.333

* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
 ** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes



Mat Foundation Analysis
BU #: 876399, (F) E. GRANBY 4Q2000 / GALASSO
2016777.876399.02

General Info	
Code	TIA/EIA-222-F (LRFD)
Bearing On	Soil
Foundation Type	Mono Pad
Pier Type	Square
Reinforcing Known	Yes
Max Capacity	1.1

Tower Reactions	
Moment, M	1165 k-ft
Axial, P	55.04 k
Shear, V	16 k

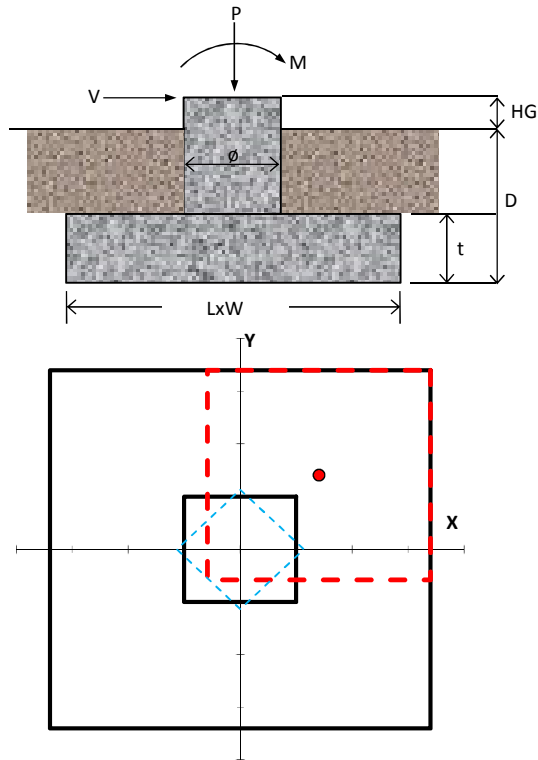
Pad & Pier Geometry	
Pier Width, ϕ	5 ft
Pad Length, L	17 ft
Pad Width, W	17 ft
Pad Thickness, t	3 ft
Depth, D	5 ft
Height Above Grade, HG	1 ft

Pad & Pier Reinforcing	
Rebar Fy	60 ksi
Concrete Fc'	4 ksi
Clear Cover	3 in
Reinforced Top & Bottom?	Yes
Pad Reinforcing Size	# 8
Pad Quantity Per Layer	16
Pier Rebar Size	# 8
Pier Quantity of Rebar	20

Soil Properties	
Soil Type	Granular
Soil Unit Weight	125 pcf
Angle of Friction, ϕ	34 °
Bearing Type	Gross
Ultimate Bearing	8 ksf
Water Table Depth	7 ft
Frost Depth	3.5 ft

Bearing Summary			Load Case
Qxmax	3.98	ksf	0.9D+1.6W
Qymax	3.98	ksf	0.9D+1.6W
Qmax @ 45°	4.07	ksf	0.9D+1.6W
Q _{(all) Gross}	6.00	ksf	
Controlling Capacity	67.8%	Pass	

Overturning Summary (Required FS=1.0)			Load Case
FS(ot)x	1.26	≥1.0	0.9D+1.6W
FS(ot)y	1.26	≥1.0	0.9D+1.6W
Controlling Capacity	79.5%	Pass	

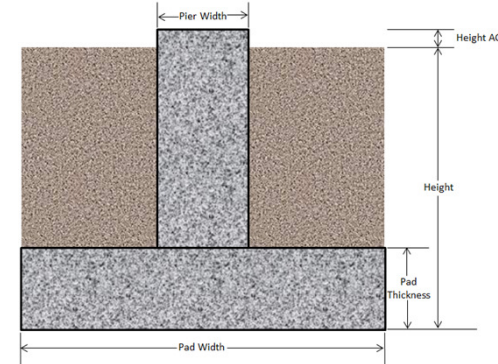




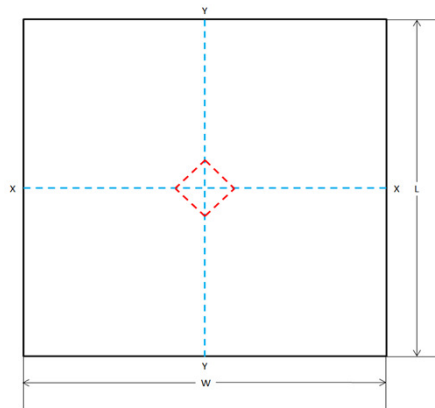
Tower Reactions	
Moment	1165 k-ft
Axial	55.04 k
Shear	16 k

Overall Capacities		
Reinforcement Capacity	37.2%	OK
As Min Met?	No	
Controlling Capacity	37.2%	OK

Pad & Pier Geometry	
Height	5 ft
Height above Grade	1 ft
Pad Length, L	17 ft
Pad Width, W	17 ft
Pad Thickness	3 ft
Pier Shape	Square
Square Pier Width	5 ft



Pad & Pier Reinforcing	
Reinforcing Known	Yes
f_c'	4 ksi
Clear Cover	3 in
Rebar F_y	60 ksi
Reinforced Top & Bottom?	Yes
Pad Rebar Size	# 8
Pad Rebar Quantity	16
Pier Rebar Size	# 8
Pier Rebar Quantity	20



Unit Weights	
Concrete Unit Weight	150 pcf
Soil Unit Weight	125 pcf

Orthogonal Bearing	
Q_{max}	4.04 ksf
Q_{min}	0.00 ksf
Bearing Length	8.17 ft

Pad Moment Capacity	
$M_u =$	38.51 k-ft
$\phi M_n =$	103.57 k-ft
Moment Capacity	37.2% OK
One-Way (Wide-Beam) Shear	
$V_u =$	131.60 kips
$\phi V_n =$	609.62 kips
Shear Capacity	21.6% OK
Two-Way (Punching) Shear	
$V_u =$	298.18 kips
$\phi V_n =$	2187.47 kips
Shear Capacity	13.6% OK
Pier Compression	
$P_u =$	71.55 kips
$\phi P_n =$	4750.33 kips
Compression Capacity	1.5% OK

<---As min not met, pier checked as plain concrete member

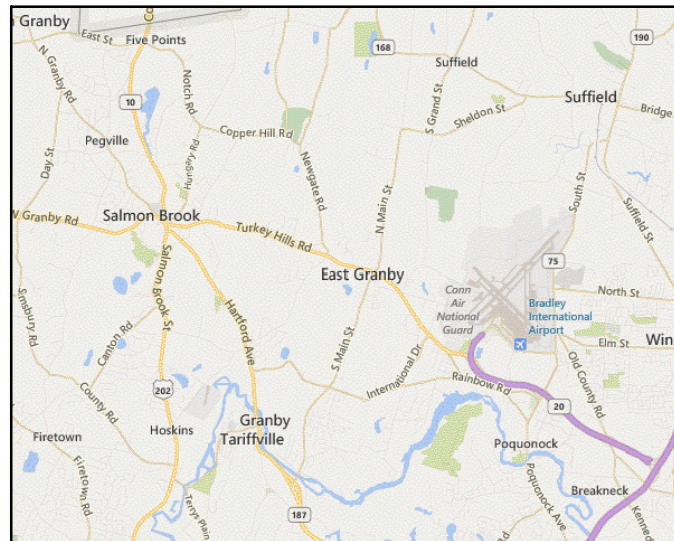
APPENDIX D
MODIFICATION DRAWINGS

MONOPOLE REINFORCEMENT DRAWINGS

PREPARED FOR CROWN CASTLE

SITE NAME: (F) E. GRANBY 4Q2000 / GALASSO
BU NUMBER: 876399

SITE ADDRESS:
60 SOUTH MAIN ST.
EAST GRANBY, CT 06026
HARTFORD COUNTY, USA



DIRECTIONS: 91 NORTH TO EXIT 40 (20 WEST). FOLLOW 20 WEST TO HILLCREST ON LEFT. ADDITIONAL INSTRUCTIONS FOR NIGHT ACCESS; THIS GATE IS NORMALLY OPEN... AND NOT LOCKED... DUE TO THE BLACKTOP PLANT IN OPERATION AND LARGE EQUIPMENT IN OPERATION THE SECURITY GUARD IS NOW LOCKING THE GATE AFTER 10:00PM... THE SECURITY GUARD IS ON DUTY 24/7 AND CAN OPEN THE GATE IF NEEDED. THE GUARD CONFIRMED THERE HAS BEEN NO ISSUE WITH ACCESS IN THE PAST AND ALSO SUGGESTED THE FRONT GATE IS WHERE THE GUARD SHACK IS AND TO DIRECT PERSONNEL TO CHECK WITH THE GUARD ON DUTY IF WORKING AFTER HOURS.

PROJECT CONTACTS:

1. CROWN PROJECT MANAGER

DAN VADNEY
(518) 373-3510
DAN.VADNEY@CROWNCastle.COM
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

2. CROWN CONSTRUCTION MANAGER

JASON D'AMICO
(860) 209-0104
JASON.D'AMICO.VENDOR@CROWNCastle.COM
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

3. ENGINEER OF RECORD

GPD
520 SOUTH MAIN STREET, SUITE 2531
AKRON, OH 44311
FOR QUESTIONS PLEASE EMAIL:
CROWNMODS@GPDGROUP.COM

DRAWINGS INCLUDED

SHEET NUMBER	DESCRIPTION
S-1	TITLE PAGE
S-2	MODIFICATION INSPECTION CHECKLIST
S-3	NOTES
S-4	ADDITIONAL PROJECT NOTES
S-5	TOWER ELEVATION
F-1	FOUNDATION DETAILS & PARTIAL SITE PLAN



TOWER INFORMATION

TOWER MANUFACTURER / JOB #: EEI / JOB #:7832
TOWER HEIGHT / TYPE: 98 FT MONOPOLE
TOWER LOCATION: LAT: 41° 56' 29.590"
DATUM: (NAD 1983) LONG: -72° 44' 19.248"
ELEV: 278 FT AMSL
STRUCTURAL DESIGN DRAWING: CCI / WO #: 1091056
STRUCTURAL ANALYSIS REPORT: P-SEC / WO #: 1069020
STRUCTURAL ANALYSIS DATE: 06/05/15
APPLICATION ID: 284769 REV #: 5
CCSITES DOCUMENT ID: 5739369

CODE COMPLIANCE

GOVERNING CODES: TIA/EIA-222-F & 2005 CT STATE BUILDING CODE
WIND SPEEDS: 80 MPH FASTEST MILE
28 MPH FASTEST MILE (W/ ICE)
ICE THICKNESS: 1"

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT 800-788-7011.

 <small>GPD Engineering and Architecture Professional Corporation 520 South Main Street, Suite 2531 Akron, OH 44311 330.572.2100 330.572.2101</small>		
GPD PROJECT NUMBER 2015777.876399.01		
SITE NAME: (F) E. GRANBY 4Q2000 / GALASSO BU NUMBER: 876399 WO NUMBER: 1091056 SITE ADDRESS: 60 SOUTH MAIN ST. EAST GRANBY, CT 06026 HARTFORD COUNTY, USA		
ENG/QA BY: MM	DATE: 7/29/2015	
DFT BY: AL	DATE: 7/29/2015	
DFT/QA BY: BPS	DATE: 7/29/2015	
APRVD BY: CJS	DATE: 7/29/2015	
SCALE: N.T.S.		
 7/29/2015		
TITLE PAGE		
S-1	REV	A

MODIFICATION INSPECTION NOTES

CORRECTION OF FAILING MI'S

IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION

MI VERIFICATION INSPECTIONS

CROWN RESERVES THE RIGHT TO CONDUCT AN MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH CROWN ENG-SOW-10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED **"PASSING MI"** OR **"PASS AS NOTED MI"** REPORT FOR THE ORIGINAL PROJECT.

REQUIRED PHOTOS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
 - RAW MATERIALS
 - PHOTOS OF ALL CRITICAL DETAILS
 - FOUNDATION MODIFICATIONS
 - WELD PREPARATION
 - BOLT INSTALLATION
 - FINAL INSTALLED CONDITION
 - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
 - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN ONLY FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO CROWN ENG-SOW-10007.

GENERAL

THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE CROWN ENG-BUL-10173, "APPROVED MI VENDORS".

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PURCHASE ORDER (PO) IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO CROWN ENG-SOW-10007, "MODIFICATION INSPECTION SOW", FOR FURTHER DETAILS AND REQUIREMENTS.

MI INSPECTOR

THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GC INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

GENERAL CONTRACTOR

THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE MI INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND CROWN ENG-SOW-10007.

RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT:



- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW THE FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

CANCELLATION OR DELAYS IN SCHEDULED MI

IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY, NOR FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

MI CHECKLIST	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWING
X	EOR REVIEW
X	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE PER ENG-SOW-10033
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
X	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
NA	CONTRACTOR'S CERTIFIED WELD INSPECTION AND NDE REPORTS
X	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
NA	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

NOTE: X DENOTES A DOCUMENT REQUIRED FOR THE MI REPORT
NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT

 520 South Main Street, Suite 2531 Albany, OH 44311 330.572.2100 330.572.2101		
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SCALE: N.T.S.		
 7/29/2015		
MODIFICATION INSPECTION CHECKLIST		
S-2	REV	A

GENERAL NOTES



- ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST BE EXPERIENCED IN THE PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED, THAT HE IS PROPERLY LICENSED, AND THAT HE IS PROPERLY REGISTERED TO DO THIS WORK IN THE STATE AND/OR COUNTY IN WHICH IT IS TO BE PERFORMED.
- THE GENERAL NOTES AND TYPICAL DETAILS ARE APPLICABLE TO ALL PARTS OF THE STRUCTURE AND SHALL BE READ IN CONJUNCTION WITH THE STRUCTURAL DRAWINGS AND PROJECT SPECIFICATIONS.
- THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING APPROVALS FROM ALL AUTHORITIES HAVING JURISDICTION FOR THIS PROJECT AND SHALL NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY, OR CITY) ENGINEER 24 HOURS PRIOR TO THE BEGINNING OF CONSTRUCTION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
- ERECT GUARDS AND BARRIERS PER APPLICABLE LABOR AND CONSTRUCTION SAFETY REGULATIONS.
- THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, POSSIBLE INTERFERENCES, AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO THE ENGINEER OF RECORD (EOR) AND FIELD PERSONNEL IMMEDIATELY. ANY AND ALL FIELD CHANGES SHALL BE APPROVED AND DOCUMENTED BY THE EOR PRIOR TO FIELD IMPLEMENTATION.
- ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR TWO (2) YEARS FROM THE DATE OF COMPLETED CONSTRUCTION.
- USE ONLY THE LATEST ISSUES OF ANY APPLICABLE CODES, STANDARDS, OR REGULATIONS MENTIONED IN THE FOLLOWING NOTES AND SPECIFICATIONS, UNO.
- ALL WORKMANSHIP SHALL BE IN ACCORDANCE WITH ANSI, ASTM, ACI, TIA, AND AISC STANDARDS AS REFERENCED IN THE APPLICABLE CODE.
- STRUCTURAL ELEMENTS SHOWN ON THESE DRAWINGS ARE DESIGNED IN ACCORDANCE WITH APPLICABLE BUILDING CODES/STANDARDS. ALL CONSTRUCTION, EXCEPT WHERE NOTED OTHERWISE, SHALL COMPLY WITH THOSE CODES/STANDARDS.
- ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS. AND IN CONFORMANCE WITH THE DRAWINGS. ANY AND ALL SUBSTITUTIONS MUST BE DULY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER OF RECORD PRIOR TO FABRICATION AND INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
- ALL MANUFACTURER'S HARDWARE ASSEMBLY INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERSEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS ALSO RESPONSIBLE FOR ENSURING THAT ALL CONSTRUCTION PROCEDURES MEET THE REQUIREMENTS OF OSHA, THE OWNER, AND ALL OTHER APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY REGULATIONS.
- ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSITIA 1019 (LATEST EDITION), OSHA, AND GENERAL INDUSTRY STANDARDS. ALL RIGGING PLANS SHALL ADHERE TO ANSITIA-1019 (LATEST EDITION) INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION.
- ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE CONTRACTOR SHALL COORDINATE INTENDED CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIAL ACCESS, WITH THE RESIDENT LEASING AGENT.
- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SAFEGUARD ALL EXISTING STRUCTURES OR BURIED SERVICES AFFECTED BY THIS CONSTRUCTION. CONTRACTOR IS ALSO RESPONSIBLE FOR TEMPORARILY RELOCATING ANY LINES OR STRUTS AS NECESSARY TO COMPLETE THE REQUIRED WORK.
- STRUCTURAL DESIGN IS FOR THE COMPLETE CONDITION ONLY. THE CONTRACTOR MUST BE COGNIZANT THAT THE REMOVAL OF ANY STRUCTURAL COMPONENT OF AN EXISTING TOWER HAS THE POTENTIAL TO CAUSE THE PARTIAL OR COMPLETE COLLAPSE OF THE STRUCTURE. ALL NECESSARY PRECAUTIONS MUST BE TAKEN TO ENSURE STRUCTURAL INTEGRITY, INCLUDING, BUT NOT LIMITED TO, ENGINEERING ASSESSMENT OF CONSTRUCTION STRESSES WITH INSTALLATION MAXIMUM WIND SPEED AND/OR TEMPORARY BRACING AND SHORING.
- DO NOT SCALE DRAWINGS.
- THE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN CASTLE. THEY MAY NOT BE REPRODUCED IN ANY FORM WITHOUT THE EXPRESSED WRITTEN CONSENT/PERMISSION OF CROWN CASTLE
- FOR THIS ANALYSIS AND MODIFICATION, THE TOWER HAS BEEN ASSUMED TO BE IN GOOD CONDITION WITHOUT ANY DEFECTS. IF THE CONTRACTOR DISCOVERS ANY INDICATION OF AN EXISTING STRUCTURAL DEFECT, CONTACT THE ENGINEER OF RECORD IMMEDIATELY.
- MODIFICATION WORK SHALL BE COMPLETED IN CALM WIND CONDITIONS / OR APPROPRIATE WIND SPEED FOR THE TYPE OF MODIFICATION WORK TO BE INSTALLED.
- THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE ENGINEER OF RECORD.

ANCHOR ROD NOTES

- CONTRACTOR SHALL INSTALL RODS AT LOCATIONS INDICATED ON DRAWINGS.
- CONTRACTOR SHALL VERIFY THAT TOWER IS PLUMB PRIOR TO THE INSTALLATION OF ANY TOWER MODIFICATIONS.
- CONTRACTOR SHALL PROVIDE TOP HEAVY HEX NUTS FOR PROPOSED ANCHOR RODS. TOP CONNECTION SHALL BE DOUBLE NUTTED.
- CARE SHALL BE TAKEN DURING INSTALLATION OF ANCHOR RODS SO THAT EXISTING REINFORCING STEEL AND OR ANCHOR BOLTS ARE NOT DAMAGED. CONTACT ENGINEER IMMEDIATELY IF REINFORCING ENCOUNTERED. CONTRACTOR SHALL NONDESTRUCTIVELY DETERMINE LOCATION AND SIZE OF EXISTING REINFORCING STEEL PRIOR TO INSTALLATION OF ANCHOR RODS. EXISTING REINFORCEMENT INDICATED ON DRAWINGS IS ILLUSTRATIVE. ACTUAL QUANTITY AND LOCATION OF REINFORCEMENT MIGHT DIFFER FROM THAT INDICATED ON THE DRAWINGS. ANCHOR TEMPLATES MAY BE ENCOUNTERED DURING DRILLING PROCESS, AND MAY BE DRILLED THROUGH.
- NEW ANCHOR RODS TO BE HOT DIPPED GALVANIZED TO A MINIMUM OF 3" BELOW THE CONCRETE SURFACE.
- THE ADHESIVE ANCHOR SYSTEM USED FOR POST-INSTALLED ANCHORAGE TO CONCRETE SHALL CONFORM TO THE MOST RECENTLY PUBLISHED ACI 355.4, ACCEPTANCE CRITERIA FOR QUALIFICATION OF POST-INSTALLED ADHESIVE ANCHORS IN CONCRETE AND COMMENTARY. THE ANCHOR SYSTEM SHALL BE ONE OF THE FOLLOWING:
 - HILTI HIT-RE 500-SD (ICC #: ESR-2322)
 - AN ENGINEER APPROVED EQUAL MEETING ACI 355.4 AND THE MINIMUM BOND STRESS VALUES BELOW. BULK MIXED ADHESIVES ARE NOT PERMITTED.
- THE ADHESIVE ANCHORS SELECTED FROM THE PARAGRAPH ABOVE SHALL BE SUPPLIED AS AN ENTIRE SYSTEM. THE SYSTEM SHALL INCLUDE, BUT NOT BE LIMITED TO, THE NEW ADHESIVE CARTRIDGE, A CLEAN MIXING NOZZLE, EXTENSION TUBE, A DISPENSING GUN, AND ALL MANUFACTURER RECOMMENDED SUPPLIES FOR PROPERLY CLEANING THE HOLE. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL EQUIPMENT REQUIRED FOR INSTALLATION OF THE ADHESIVE ANCHOR SYSTEM.
- ALL-THREADED ROD TO BE USED IN ADHESIVE ANCHOR ASSEMBLIES SHALL CONFORM TO THE ASTM SPECIFICATIONS REPRESENTED WITHIN THESE DRAWINGS. THREADS SHALL BE UNC COARSE THREADS, UNLESS NOTED OTHERWISE. COMPATIBLE NUTS AND WASHERS SHALL BE FURNISHED WITH ALL THE ALL-THREAD ROD CONSIDERED PART OF THE ASSEMBLY. THE COST OF HARDWARE SHALL BE CONSIDERED INCIDENTAL TO THE ADHESIVE ANCHOR ASSEMBLY.
- NUTS, WASHERS, AND OTHER HARDWARE USED WITH AN ALL-THREADED BAR ADHESIVE ANCHOR SYSTEM SHALL HAVE A MATERIAL OR AN ALLOY DESIGNATION THAT MATCHES THE ALL-THREAD MATERIAL/ALLOY. GALVANIZED ASSEMBLIES SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A153 CLASS C. ELECTROPLATE GALVANIZING IS NOT ACCEPTABLE. DISSIMILAR METAL ASSEMBLIES SHALL BE SEPARATED BY NYLON, EPDM, OR OTHER APPROVED NON-METALLIC WASHERS.
- REINFORCING BARS TO BE USED IN ADHESIVE ANCHOR ASSEMBLIES SHALL CONFORM TO ASTM A615, A706, OR A995.
- EMBEDMENT DEPTH AND ANCHOR PROJECTION (STICK-OUT) FROM CONCRETE SURFACE SHALL BE AS SHOWN ON THE DRAWING OR DETAIL FOR THE PARTICULAR ANCHOR OR ANCHOR GROUP BEING INSTALLED. ABSENT OF ANY INFORMATION THE MINIMUM STICK-OUT SHALL BE 12".
- ADHESIVES SHALL BE STORED AND INSTALLED AT THE SERVICE TEMPERATURE RANGES RECOMMENDED BY THE MANUFACTURER. ADHESIVE ANCHORS SHALL BE INSTALLED BY QUALIFIED PERSONNEL TRAINED TO INSTALL ADHESIVE ANCHORS IN ACCORDANCE WITH THE SPECIFICATIONS.
- POST-INSTALLED ADHESIVE ANCHORS SHALL BE INSTALLED AND CLEANED IN ACCORDANCE WITH THE MANUFACTURERS PRINTED INSTALLATION INSTRUCTIONS (MPII).
- INSTALLATION OF ADHESIVE ANCHORS HORIZONTALLY OR UPWARDLY INCLINED TO SUPPORT SUSTAINED TENSION LOADS SHALL BE PERFORMED BY PERSONNEL CERTIFIED BY THE ACI/CRSI ADHESIVE ANCHOR INSTALLER CERTIFICATION PROGRAM. THESE ANCHORS ARE DESIGNATED WITH A (CERT) AFTER THE ANCHOR CALL-OUT. THESE ANCHORS SHALL BE CONTINUOUSLY INSPECTED DURING INSTALLATION BY AN INSPECTOR SPECIALLY APPROVED FOR THAT PURPOSE BY THE BUILDING OFFICIAL.
- THE INSTALLERS QUALIFICATIONS SHALL BE SUBMITTED AND APPROVED IN ACCORDANCE WITH THE SPECIFICATIONS.
- INSTALLED ADHESIVE ANCHORS SHALL BE SECURELY FIXED IN-PLACE TO PREVENT DISPLACEMENT WHILE THE ADHESIVE CURES. UNLESS SHOWN OTHERWISE WITHIN THE DRAWINGS, ANCHORS SHALL BE INSTALLED PERPENDICULAR TO THE CONCRETE SURFACE. ANCHORS DISPLACED PRIOR TO ADHESIVE CURING SHALL BE CONSIDERED DAMAGED AND ARE THE RESPONSIBILITY OF THE CONTRACTOR.
- REINFORCING BARS OR ALL-THREADED BARS SHALL NOT BE BENT AFTER BEING ADHESIVELY EMBEDDED IN HARDENED, SOUND CONCRETE, UNLESS PERMITTED BY THE ENGINEER.


STRUCTURAL STEEL NOTES

- DESIGN, FABRICATION, ERECTION, ALTERATION AND MAINTENANCE SHALL CONFORM TO THE FOLLOWING, UNLESS NOTED OTHERWISE (UNO).
 - TIA-222-G: STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS
 - TIA-1019-A: INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS
 - AISC: MANUAL OF STEEL CONSTRUCTION
- ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS, UNO.
 - PLATES, ASTM A36 GRADE 36.
 - ANCHOR RODS, ASTM F1554, GRADE 55
 - ANCHOR ROD NUTS, ASTM A194, GRADE 2H.
 - WASHERS, ASTM F436 HARDENED STEEL WASHERS.
- HOLES SHALL NOT BE FLAME CUT THRU STEEL UNLESS APPROVED BY THE ENGINEER OF RECORD.
- ALL FASTENERS SHALL NOT BE REUSED.
- A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED ASTM A325 BOLTS.
- ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH SUCH THAT THE END OF THE BOLT BE AT LEAST FLUSH WITH THE FACE OF THE NUT. IT IS NOT PERMITTED FOR THE BOLT END TO BE BELOW THE FACE OF THE NUT AFTER TIGHTENING IS COMPLETED.
- HOT-DIP GALVANIZE ALL ITEMS, UNO. GALVANIZE PER ASTM A123, ASTM A153/A153M OR ASTM A653 G90, AS APPLICABLE.
- FOR A LIST OF CROWN APPROVED COLD GALVANIZING COMPOUNDS, REFER TO CROWN ENG-BUL-10149, "TOWER PROTECTIVE COATINGS BULLETIN".
- AFTER FINAL INSPECTION, ALL EXPOSED STRUCTURAL STEEL AS THE RESULT OF THIS SCOPE OF WORK INCLUDING WELDS, FIELD DRILLED HOLES, AND SHAFT INTERIORS (WHERE ACCESSIBLE), SHALL BE CLEANED AND COLD GALVANIZING APPLIED BY BRUSH IN ACCORDANCE WITH CROWN ENG-BUL-10149, "TOWER PROTECTIVE COATINGS BULLETIN". PHOTO DOCUMENTATION IS REQUIRED TO BE SUBMITTED TO THE MI INSPECTOR
- ALL NEW STEEL SHALL BE PAINTED TO MATCH EXISTING PAINTED STEEL. FOR A LIST OF CROWN APPROVED PAINT COATINGS, REFER TO CROWN ENG-BUL-10149, "TOWER PROTECTIVE COATINGS BULLETIN".

			 520 South Main Street, Suite 2531 Albany, OH 44311 330.572.2100 330.572.2101	
			GPD PROJECT NUMBER 2015777.876399.01	
			SITE NAME: (F) E. GRANBY 4Q2000 / GALASSO	
			BU NUMBER: 8763999	
			WO NUMBER: 1091056	
			SITE ADDRESS: 60 SOUTH MAIN ST. EAST GRANBY, CT 06026 HARTFORD COUNTY, USA	
			ENG/QA BY: MM DATE: 7/29/2015	
			DFT BY: AL DATE: 7/29/2015	
			DFT/QA BY: BPS DATE: 7/29/2015	
			APRVD BY: CJS DATE: 7/29/2015	
			SCALE: N.T.S.	
			 7/29/2015	
			NOTES	
S-3		REV A		

FOUNDATION NOTES

1. **CONTRACTOR SHALL NOTIFY THE FOLLOWING INDIVIDUALS 5 BUSINESS DAYS PRIOR TO FOUNDATION CONSTRUCTION IN ORDER TO COORDINATE THE VISUAL INSPECTION BY GPD:**
 - DAN VADNEY (CROWN CASTLE) 518-373-3510
 - BRIAN SMITH (GPD GROUP) 216-927-8648
 - MATT MOELLER (GPD GROUP) 330-572-2232
 - DAN PALKOVIC (GPD GROUP) 614-859-1607
2. EXISTING FOUNDATION INFORMATION BASED UPON FOUNDATION DRAWINGS BY EEI (PROJECT #: 7832 REV. 1, DATED SEPTEMBER 22, 2000). CONTRACTOR SHALL OBTAIN AND BECOME FAMILIAR WITH THE REFERENCED FOUNDATION DOCUMENT. IF EXISTING FOUNDATION CONDITIONS DIFFER FROM THE REFERENCED DOCUMENT, CONTACT ENGINEER AND TOWER OWNER IMMEDIATELY.
3. WELDING IS PROHIBITED ON REINFORCING STEEL AND EMBEDMENTS.
4. ALL FOUNDATIONS SHALL REST ON AND AGAINST FIRM UNDISTURBED SOIL FREE FROM WATER, ORGANIC MATTER, AND FORM WORK. CONTRACTOR SHALL COMPACT SUBGRADE AS REQUIRED.
5. SOIL INFORMATION IS BASED ON A GEOTECHNICAL REPORT BY TECTONIC (PROJECT #: 1774B, DATED AUGUST 11, 1997), CONTRACTOR SHALL OBTAIN AND IMPLEMENT ALL RECOMMENDATIONS CONTAINED IN THE REFERENCED GEOTECHNICAL REPORT. IF SOIL CONDITIONS ENCOUNTERED ARE DIFFERENT FROM REFERENCED GEOTECHNICAL REPORT, NOTIFY ENGINEER IMMEDIATELY.
 - A. FRICTION ANGLE = 34°
 - B. UNIT WEIGHT OF SOIL = 120 PCF
 - C. GROUNDWATER = AT 7' BELOW GRADE
6. BACKFILL SHALL BE CLEAN, FREE OF DEBRIS, AND ORGANIC FREE. CONTRACTOR SHALL UTILIZE CLEAN FILL AS REQUIRED. (MIN. UNIT WEIGHT = 120 PCF). ALL BACKFILL SHALL BE CONTROLLED-COMPACTED, PLACED IN A MAXIMUM OF 8" LIFTS, MOISTURE CONDITIONED TO WITHIN THREE PERCENT OF OPTIMUM MOISTURE, AND COMPACTED TO 95% OF STANDARD PROCTOR MAXIMUM DRY DENSITY PER ASTM D698.
7. CONTRACTOR SHALL OBTAIN AND BECOME FAMILIAR WITH REFERENCED EPOXY AND BONDING AGENT INSTALLATION PROCEDURES AND RECOMMENDATIONS. PRIOR TO APPLICATION OF BONDING AGENT, CLEAN FACE OF EXISTING FOUNDATION SUCH THAT IT IS FREE FROM ALL DIRT, DEBRIS, AND FOREIGN MATTER.
8. CONTRACTOR SHALL SECURE SITE BACK TO EXISTING CONDITION UNDER SUPERVISION OF OWNER. ALL FENCE, STONE, GEOFABRIC, GROUNDING, AND SURROUNDING GRADE SHALL BE REPLACED AND REPAIRED AS REQUIRED TO ACHIEVE OWNER APPROVAL. POSITIVE DRAINAGE AWAY FROM TOWER SITE SHALL BE MAINTAINED.
9. EQUIPMENT PAD, SHELTER, AND ICE BRIDGE SUPPORT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COMMISSION. CONTRACTOR SHALL TAKE GREAT CARE AND ALL NECESSARY PROVISIONS WHEN SHORING IS REQUIRED.
10. ALL FOUNDATION UPGRADES REQUIRE A PRETEST ON THE EXISTING GROUNDING SYSTEM. IF THE RESULTS OF THE TESTING IS ABOVE 50 A CALL TO THE TOWER OWNER IS REQUIRED BEFORE FURTHER CONSTRUCTION CAN BE DONE.
11. THE ADHESIVE ANCHOR SYSTEM USED FOR POST-INSTALLED ANCHOR RODS TO CONCRETE SHALL CONFORM TO THE MOST RECENTLY PUBLISHED ACI 308.4R, ACCEPTANCE CRITERIA FOR QUALIFICATION OF POST-INSTALLED ADHESIVE ANCHORS IN CONCRETE AND COMMENTARY. THE ANCHOR SYSTEM SHALL BE ONE OF THE FOLLOWING:
 - A. SIMPSON HILTI HIT-RE 500-SD (ICC #: ESR-2322)
 - B. AN ENGINEER APPROVED EQUAL MEETING ACI 308.4R AND THE MINIMUM BOND STRESS VALUES BELOW. BULK MIXED ADHESIVES ARE NOT PERMITTED.

	 <small>520 South Main Street, Suite 2531 Albany, OH 43311 330.572.2100 330.572.2101</small>		
	GPD PROJECT NUMBER 2015777.876399.01		
	SITE NAME: (F) E. GRANBY 4Q2000 / GALASSO BU NUMBER: 876399 WO NUMBER: 1091056 SITE ADDRESS: 60 SOUTH MAIN ST. EAST GRANBY, CT 06026 HARTFORD COUNTY, USA		
	ENG/QA BY: MM DATE: 7/29/2015		
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	APRVD BY: CJS DATE: 7/29/2015		
	SCALE: N.T.S.		
	ADDITIONAL PROJECT NOTES		
	<div style="display: flex; justify-content: space-between;"> S-4 <table border="1" style="border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">REV</td> </tr> <tr> <td style="text-align: center;">A</td> </tr> </table> </div>	REV	A
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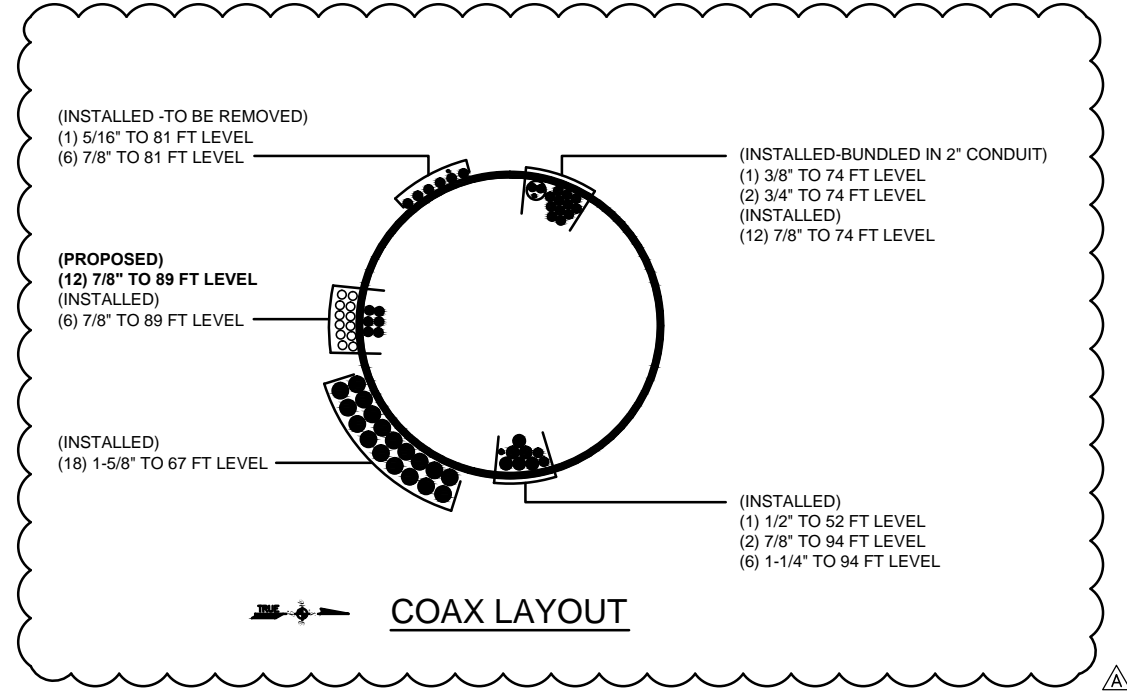
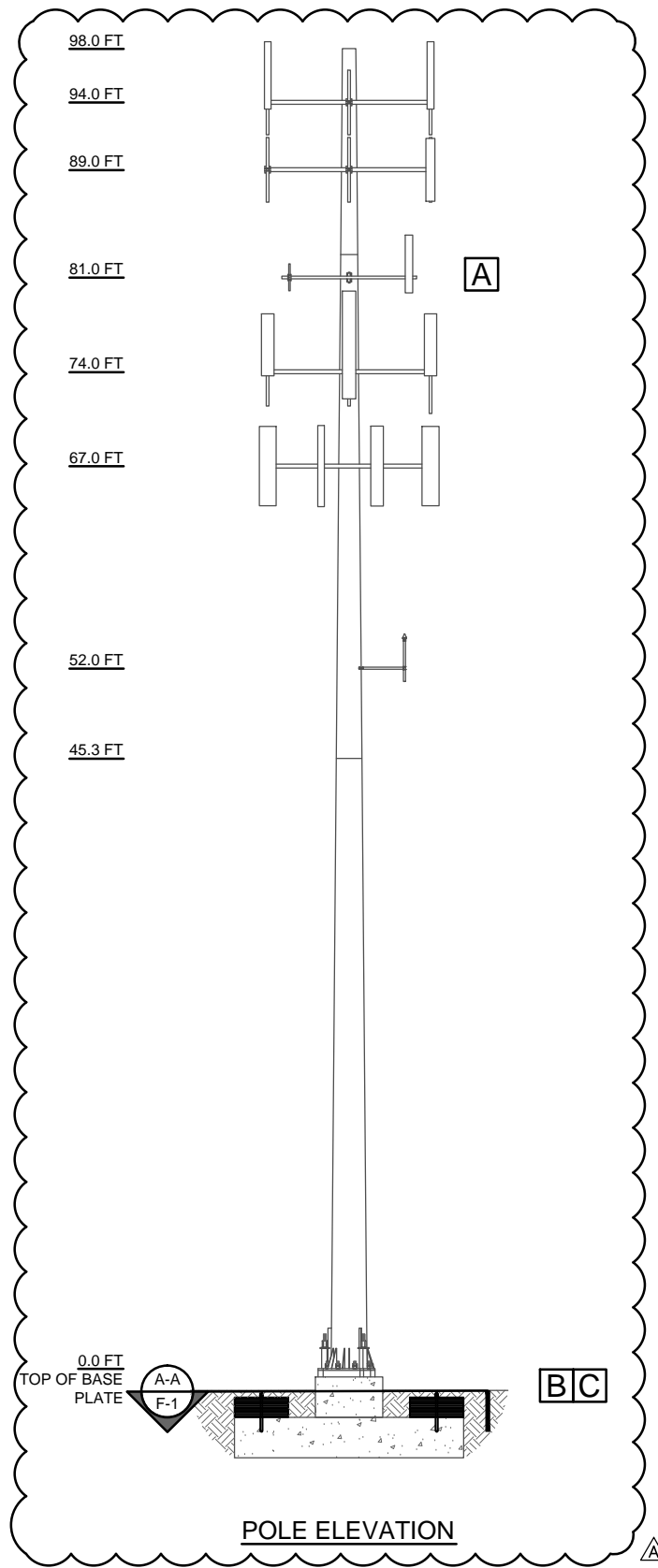



POLE SPECIFICATIONS	
POLE SHAPE TYPE:	18-SIDED POLYGON
TAPER:	0.2156 IN/FT
SHAFT STEEL:	ASTM A572 GRADE 65
BASE PL STEEL:	ASTM A871 GRADE 60
ANCHOR RODS:	2-1/4"Ø #18J ASTM A615 GR 75

SHAFT SECTION DATA					
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN)	
				@ TOP	@ BOTTOM
1	15.21	0.1875	29.00	12.00	15.28
2	39.92	0.2500		14.26	22.86
3	48.71	0.3125	41.00	21.50	32.00

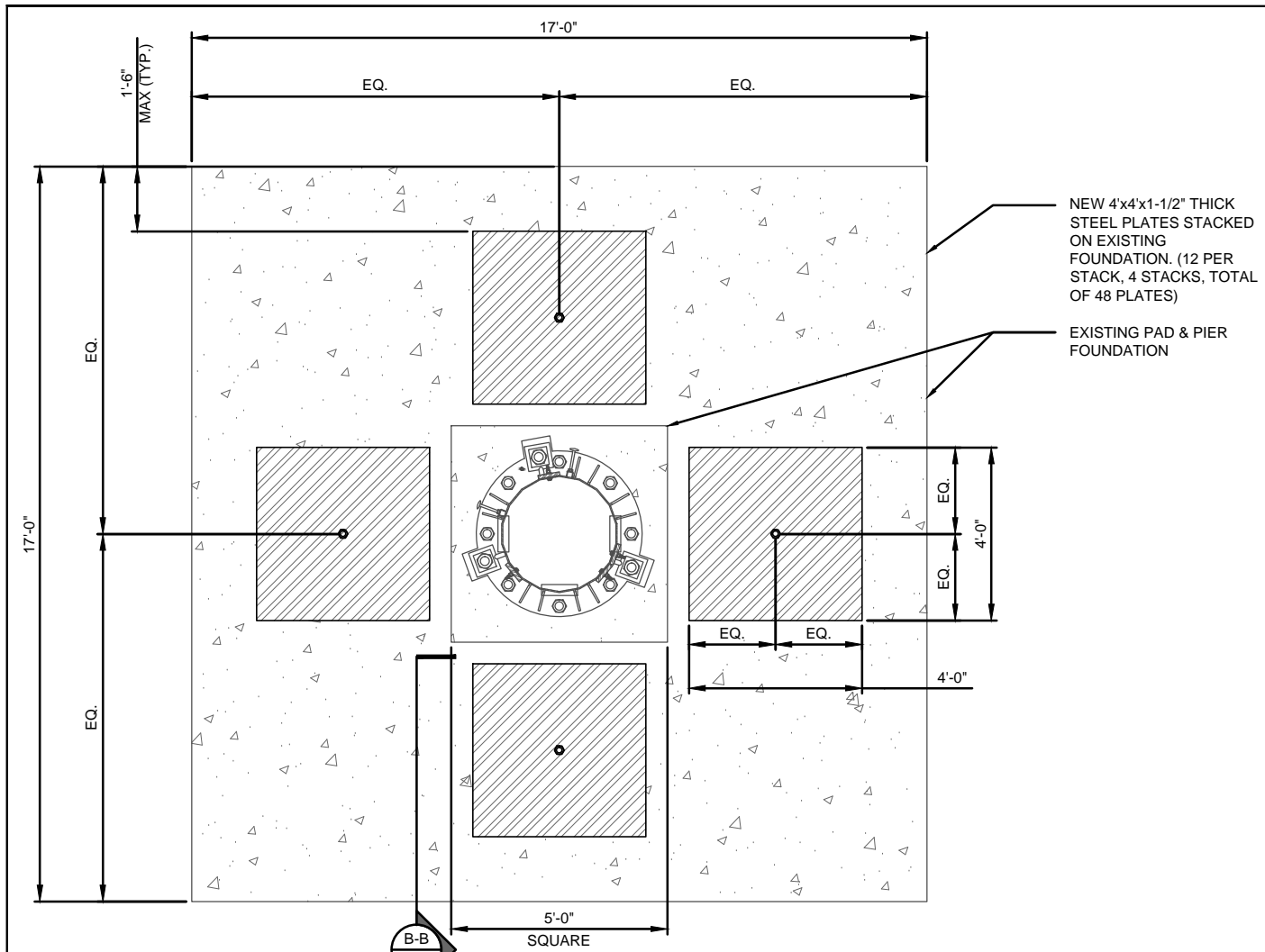
NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

POLE MODIFICATION SCHEDULE			
	ELEVATION (FT)	MODIFICATION	REFERENCE SHEET
A	81.0	REMOVE EQUIPMENT, MOUNTS, COAX, AND ALL ASSOCIATED HARDWARE FROM TOWER. ALL MATERIALS REMOVED FROM TOWER SHALL BE DISPOSED OF BY CONTRACTOR OFF SITE	-
B	GRADE	INSTALL NEW STEEL PLATES ON TOP OF THE EXISTING FOUNDATION PAD	F-1
C	GRADE	INSTALL NEW 1-1/2"Ø THREADED ANCHOR ROD THROUGH THE STEEL PLATES	F-1

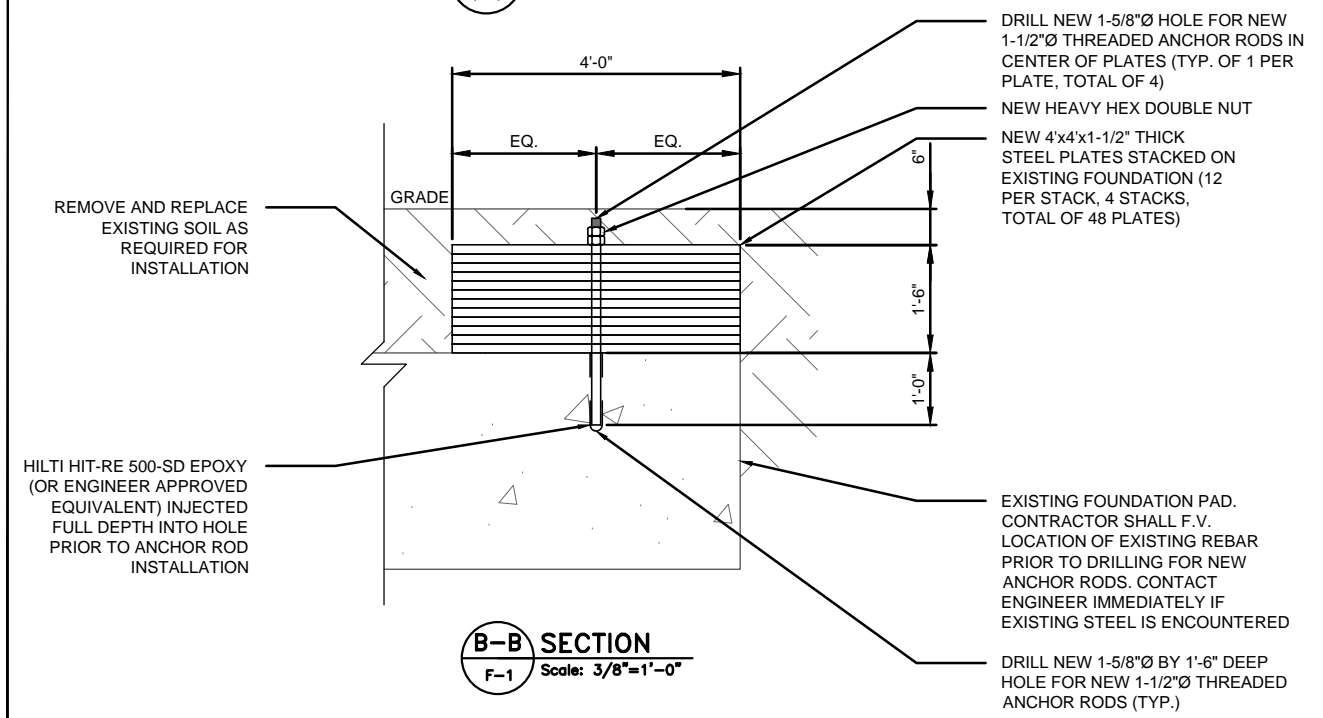


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<p>REVISIONS</p>			<p>SCALE: N.T.S.</p>						
<p>REVISIONS</p>			<p>TOWER ELEVATION</p>						
<p>REVISIONS</p>			<p>S-5 REV A</p>						

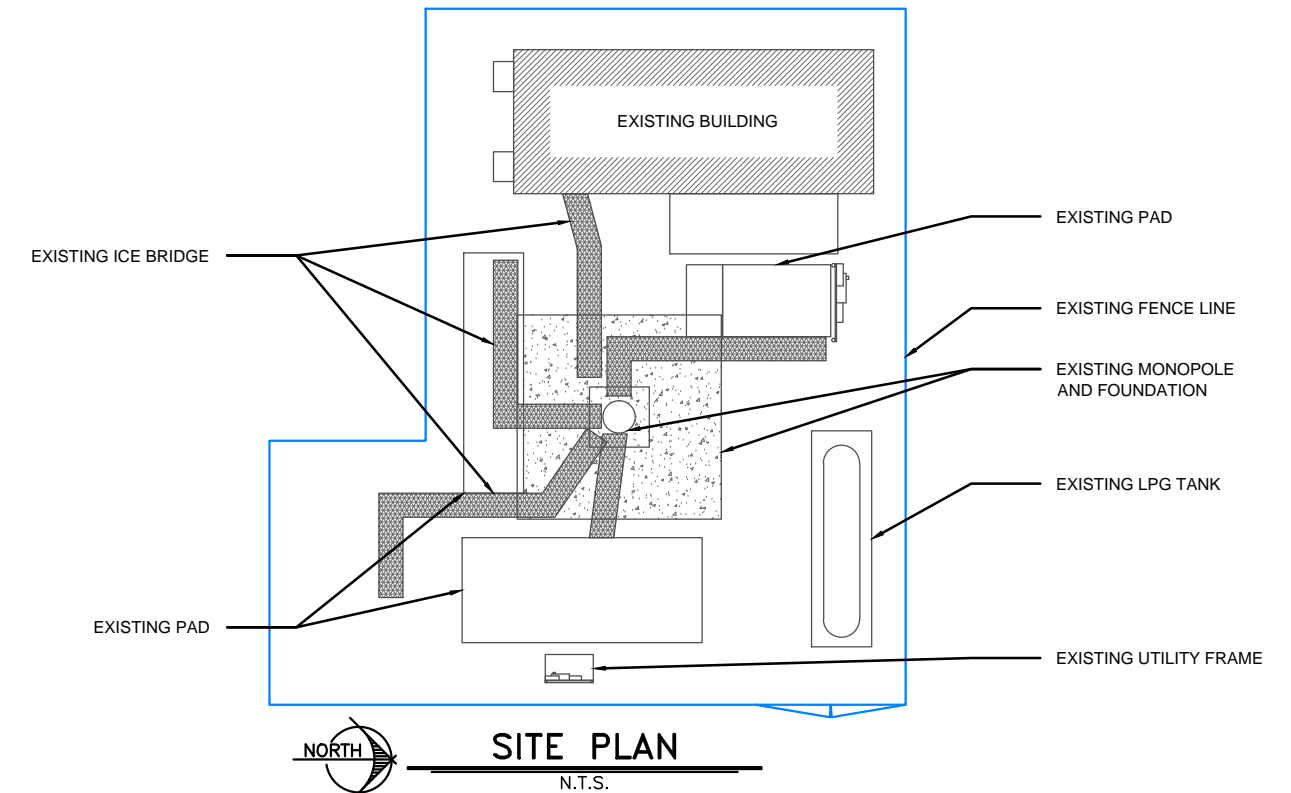




A-A FOUNDATION SECTION
 F-1 Scale: 1/4"=1'-0"



B-B SECTION
 F-1 Scale: 3/8"=1'-0"



SITE PLAN

N.T.S.

- NOTE:**
1. ALL SITE LAYOUT AND FOUNDATION ORIENTATION INFORMATION IS CONSIDERED APPROXIMATE. CONTRACTOR SHALL VERIFY ALL SITE DIMENSIONS, ORIENTATION, AND UTILITY LOCATIONS PRIOR TO MOBILIZING (SEE NOTES ON SHEET N-01)
 2. CONTRACTOR TO VERIFY LOCATION OF ALL EXISTING PUBLIC AND PRIVATE UTILITIES PRIOR TO EXCAVATION. IF NECESSARY UTILITIES SHALL BE RELOCATED PRIOR TO FOUNDATION MODIFICATION. UTILITIES SHALL NOT BE ENCASED IN CONCRETE.



NO.	DATE	DESCRIPTION
REVISIONS		

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7/29/2015

FOUNDATION DETAILS & PARTIAL SITE PLAN

F-1	REV A
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**RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL
TO NON-IONIZING EMISSIONS**

T-Mobile Existing Facility

Site ID: CT11542A

**E. Granby- Sprint
60 South Main Street
East Granby, CT 06026**

August 18, 2015

EBI Project Number: 6215004395

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	91.47 %

August 18, 2015

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

Emissions Analysis for Site: **CT11542A – E. Granby- Sprint**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **60 South Main Street, East Granby, 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 **60 South Main Street, East Granby, 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 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 **RFS APXV18-209014** 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 **RFS APXV18-209014 & B2A/B4P** have a maximum gain of **14.4 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 **90 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:	RFS APXV18-209014	Make / Model:	RFS APXV18-209014	Make / Model:	RFS APXV18-209014
Gain:	14.4 dBd	Gain:	14.4 dBd	Gain:	14.4 dBd
Height (AGL):	90	Height (AGL):	90	Height (AGL):	90
Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)
Channel Count	6	Channel Count	6	# PCS Channels:	6
Total TX Power:	240	Total TX Power:	240	# AWS Channels:	240
ERP (W):	6,610.15	ERP (W):	6,610.15	ERP (W):	6,610.15
Antenna A1 MPE%	3.37	Antenna B1 MPE%	3.37	Antenna C1 MPE%	3.37
Antenna #:	2	Antenna #:	2	Antenna #:	2
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):	90	Height (AGL):	90	Height (AGL):	90
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 A2 MPE%	0.94	Antenna B2 MPE%	0.94	Antenna C2 MPE%	0.94

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Maximum)	4.31
AT&T	5.95 %
MetroPCS	11.66 %
Verizon Wireless	61.83 %
Sprint	7.72 %
Site Total MPE %:	91.47 %

T-Mobile Sector 1 Total:	4.31 %
T-Mobile Sector 2 Total:	4.31 %
T-Mobile Sector 3 Total:	4.31 %
Site Total:	91.47 %

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	1652.54	90	16.84	2100	1000	1.68 %
T-Mobile 700 MHz LTE	1	865.21	90	4.41	700	467	0.94 %
T-Mobile 1900 MHz (PCS) UMTS	2	826.27	90	8.42	1900	1000	0.84 %
T-Mobile 2100 MHz (AWS) UMTS	2	826.27	90	8.42	2100	1000	0.84 %
						Total:	4.31%

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:	4.31 %
Sector 2:	4.31 %
Sector 3 :	4.31 %
T-Mobile Max (per sector):	4.31 %
Site Total:	91.47 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **91.47%** 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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