smartlink

June 16, 2016

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

Re:	**Notice of Exempt Modification – Antenna Swap**
Property Address:	**14 Canton Springs Road, Canton, CT (the "Property")**
Applicant:	**New Cingular Wireless PCS, LLC ("AT&T")**

Dear Ms. Bachman:

On behalf of AT&T, please accept this application as notification pursuant to R.C.S.A. §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16-50j-72(b)(2).

AT&T currently maintains a wireless telecommunications facility consisting of nine (9) wireless telecommunication antennas at an antenna center line height of 130-feet on an existing 140 -foot monopole tower, owned by Cellco Partnership d/b/a Verizon Wireless, and located on the Property (the "Tower").. The Connecticut Siting Council (the "Council") approved AT&T's use of the Tower in the following prior decisions; EM-AT&T-023-020503, EM-CING-023-131-04, and EM-CING-023-121102.

AT&T now intends to replace two (2) KMW AM-X-CD-16-65-OOT-RET panel antennas, two (2) Powerwave P65-17-XLH-RR panel antennas and two (2) Andrew SBNH-1D6565C panel antennas with six (6) CCI HPA – 65R-BUU H-8 panel antennas and three (3) Andrew SBNHH-1D65A panel antennas, while retaining three (3) Kathrein 800-10121 panel antennas (for a total of twelve (12) panel antennas), at the 130-foot level. Please refer to Tab 1 for further specifications of the replacement antennas.

In accordance with R.C.S.A. §16-50j-73, a copy of this letter is being sent to Richard Barlow, First Selectman of the Town of Canton, Town Hall, P.O. Box 168, 4 Market Street, Collinsville, CT 06022. A copy of this letter is also being sent to the Canton Fire Dept., 14 Canton Springs Road, Canton, CT 06022; owner of the property where the tower is located; and

to the tower owner at Aleksey Tyurin, Verizon Wireless, 99 East River Drive, 9th Floor, East Hartford, CT 06108.

The planned modifications to AT&T's facility fall squarely within those activities explicitly provided for in R.C.S.A. §16-50j-72(b) (2).

1. The proposed modifications will not result in an increase in the height of the existing tower. AT&T's replacement antennas will be installed at the 130-foot level of the 140-foot monopole.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore, will not require and extension of the site boundary.
3. The proposed modifications will not increase the noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative worst-case RF emissions calculation for AT&T's modified facility is provided in the RF Emissions Compliance Report, included in Tab 2.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (See Structural Analysis Report included in Tab 3).

For the foregoing reasons, AT&T 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).

Sincerely,

Kristen Smith

Enclosures
CC w/enclosures:
Richard Barlow, First Selectman Town of Canton
Richard Hutchings, Fire Chief, Canton Fire Dept.

Tab 1

SITE NAME: CANTON-FIRE DEPARTMENT
SITE NUMBER: CT1022
14 CANTON SPRINGS ROAD,
CANTON, CT 06019

VICINITY MAP N.T.S.

DIRECTIONS FROM 500 ENTERPRISE DRIVE, ROCKY HILL, CT:

TAKE I–91 N. TAKE EXIT 32A–32B ON THE LEFT FOR TRUMBULL ST/I–84W TOWARD WATERBURY. TAKE EXIT 32B TO MERGE ONTO TRUMBULL ST. TURN RIGHT ONTO MAIN ST. CONTINUE ONTO US–44 W. TURN LEFT ONTO DOWD AVE. TAKE THE 1ST LEFT ONTO CANTON SPRINGS RD. DESTINATION WILL BE ON THE LEFT.

SITE COORDINATES:
LATITUDE: N 41° 49' 22.3"
LONGITUDE: W 72° 53' 42.6"
(PER EXISTING AT&T PLANS)

ELEVATION DATA
GRADE ELEVATION AT TOWER = 339'± A.M.S.L
(ELEVATION BASED UPON VELOROUTES.ORG)

ANTENNA ELEVATION (TO TOP OF ANTENNA)
ALPHA SECTOR: 132'–4"± A.G.L.
BETA SECTOR: 133'–10"± A.G.L.
GAMMA SECTOR: 133'–10"± A.G.L.

SITE INFORMATION

- REMOVE AND REPLACE ANTENNA MOUNT WITH A NEW MOUNT.
- REMOVE AND REPLACE (2) PANEL ANTENNAS PER SECTOR WITH (3) PANEL ANTENNAS PER SECTOR FOR A TOTAL OF (9) NEW ANTENNAS.
- ADD (5) NEW RRUS PER SECTOR ON A NEW MOUNT FOR A TOTAL OF (15) NEW RRUS.
- ADD (2) NEW SURGE ARRESTORS ON A NEW MOUNT.
- REMOVE AND REPLACE EXISTING DIPLEXERS WITH (6) NEW DIPLEXERS.
- ADD (1) NEW 23" EQUIPMENT RACK IN EXISTING SHELTER.

PROJECT DESCRIPTION

SITE NAME:
CANTON–FIRE DEPARTMENT

SITE NUMBER:
CT1022

LOCATION:
14 CANTON SPRINGS ROAD,
CANTON, CT 06019

APPLICANT/LESSEE:
AT&T MOBILITY
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CONNECTICUT 06067

PROJECT INFORMATION

THIS DOCUMENT WAS DEVELOPED TO REFLECT A SPECIFIC SITE AND ITS SITE CONDITIONS AND IS NOT TO BE USED FOR ANOTHER SITE OR WHEN OTHER CONDITIONS PERTAIN. REUSE OF THIS DOCUMENT IS AT THE SOLE RISK OF THE USER.

A.D.A. COMPLIANCE:
FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.

SHEET NUMBER	DESCRIPTION
T–1	TITLE SHEET
G–1	GENERAL NOTES
C–1	SITE PLAN & EQUIPMENT PLANS
C–2	ANTENNA LAYOUTS & ELEVATIONS
C–3	CONSTRUCTION DETAILS
C–4	ANTENNA SCHEDULE & CONSTRUCTION DETAILS
E–1	GROUNDING NOTES & DETAILS

SHEET INDEX

at&t
500 ENTERPRISE DRIVE SUITE 3A
ROCKY HILL, CT 06067

smartlink
1997 ANNAPOLIS EXCHANGE PARKWAY
SUITE 200
ANNAPOLIS, MD 21401

CT1022
CANTON-FIRE DEPARTMENT

CONSTRUCTION DRAWINGS

1	05/06/14	ISSUED AS FINAL
0	04/21/14	ISSUED AS FINAL
A	02/07/14	PRELIMINARY SUBMISSION

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

ROBERT J. FOLEY, P.E.
CT LICENSE No. PEN.0029056

DRAWN BY:	FG
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50063024
JOB NUMBER:	50063025
SITE ADDRESS:	

14 CANTON SPRINGS RD.
CANTON, CT 06019
HARTFORD COUNTY

SHEET TITLE

TITLE SHEET

SHEET NUMBER

T–1

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   PROJECT MANAGEMENT – SMARTLINK
   CONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T MOBILITY
   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 LAND LORD. 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 AT&T 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 COMPACTION 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.

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 LARGER .....2 IN.
   #5 AND SMALLER & WWF.....1 1/2 IN.
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
   SLAB AND WALL .....3/4 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"Ø) 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.

SOIL COMPACTION NOTES FOR SLAB ON GRADE:

1. EXCAVATE AS REQUIRED TO REMOVE VEGETATION & TOPSOIL EXPOSE UNDISTURBED NATURAL SUBGRADE AND PLACE CRUSHED STONE AS REQUIRED.
2. COMPACTION CERTIFICATION: AN INSPECTION AND WRITTEN CERTIFICATION BY A QUALIFIED GEOTECHNICAL TECHNICIAN OR ENGINEER IS ACCEPTABLE.
3. AS AN ALTERNATIVE TO INSPECTION AND WRITTEN CERTIFICATION, THE "UNDISTURBED SOIL" BASE SHALL BE COMPACTED WITH "COMPACTION EQUIPMENT", LISTED BELOW, TO AT LEAST 90% MODIFIED PROCTOR MAXIMUM DENSITY PER ASTM D 1557 METHOD C.
4. COMPACTED SUBBASE SHALL BE UNIFORM & LEVELED. PROVIDE 6" MINIMUM CRUSHED STONE OR GRAVEL COMPACTED IN 3" LIFTS ABOVE COMPACTED SOIL. GRAVEL SHALL BE NATURAL OR CRUSHED WITH 100% PASSING 1" SIEVE.
5. AS AN ALTERNATIVE TO ITEMS 2 AND 3 PROOFROLL THE SUBGRADE SOILS WITH 5 PASSES OF A MEDIUM SIZED VIBRATORY PLATE COMPACTOR (SUCH AS BOMAG BPR 30/38) OR HAND–OPERATED SINGLE DRUM VIBRATORY ROLLER (SUCH AS BOMAG BW 55E). ANY SOFT AREAS THAT ARE ENCOUNTERED SHOULD BE REMOVED AND REPLACED WITH A WELL–GRADED GRANULAR FILL, AND COMPACTED AS STATED ABOVE.

COMPACTION EQUIPMENT:

1. HAND OPERATED DOUBLE DRUM, VIBRATORY ROLLER, VIBRATORY PLATE COMPACTOR OR JUMPING JACK COMPACTOR.

CONSTRUCTION NOTES:

1. FIELD VERIFICATION:
   CONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, AT&T 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.

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.
5. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
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, ANSI/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, ANSI/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.

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CONSTRUCTION DRAWINGS		
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ROBERT J. FOLEY, P.E.
CT LICENSE No. PEN.0029056

DRAWN BY:	FG
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50063024
JOB NUMBER:	50063025
SITE ADDRESS:	

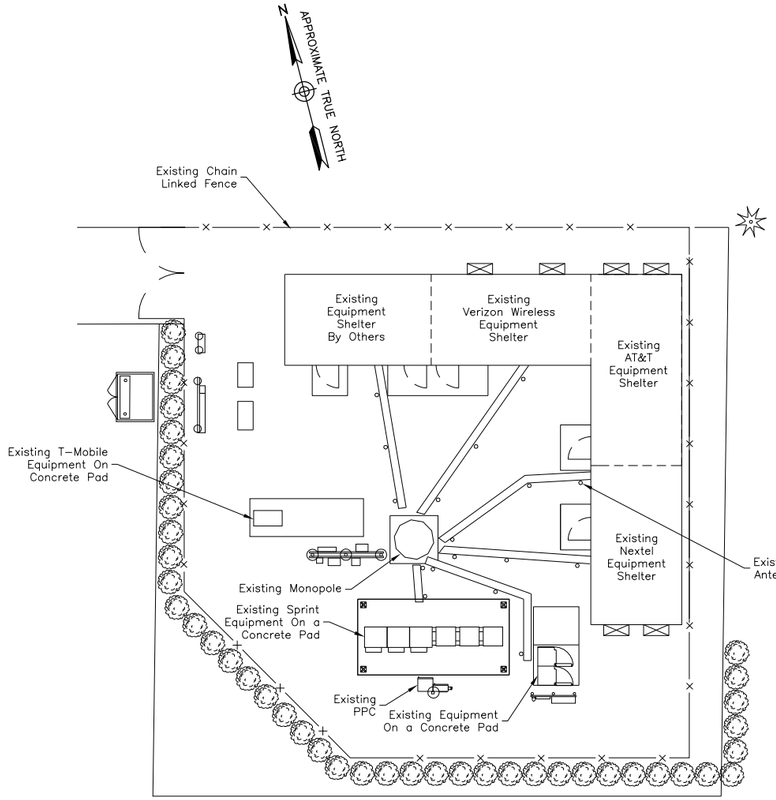
14 CANTON SPRINGS RD.
CANTON, CT 06019
HARTFORD COUNTY

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

G–1



SITE PLAN

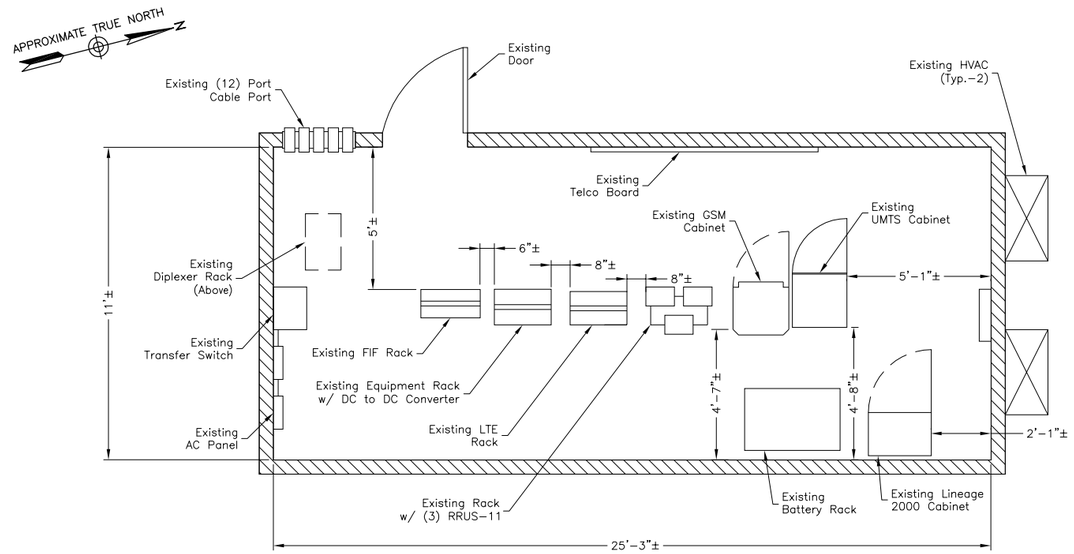
SCALE: 1"=20' FOR 11"x17"
1"=10' FOR 22"x34"

1

0' 10' 20'

NOTES:

1. NORTH SHOWN AS APPROXIMATE.
2. MOUNT ALL ANTENNAS, COAX, SURGE ARRESTORS, RRU'S ETC. IN ACCORDANCE WITH STRUCTURAL ANALYSIS BY OTHERS.
3. NOT ALL INFORMATION IS SHOWN FOR CLARITY.

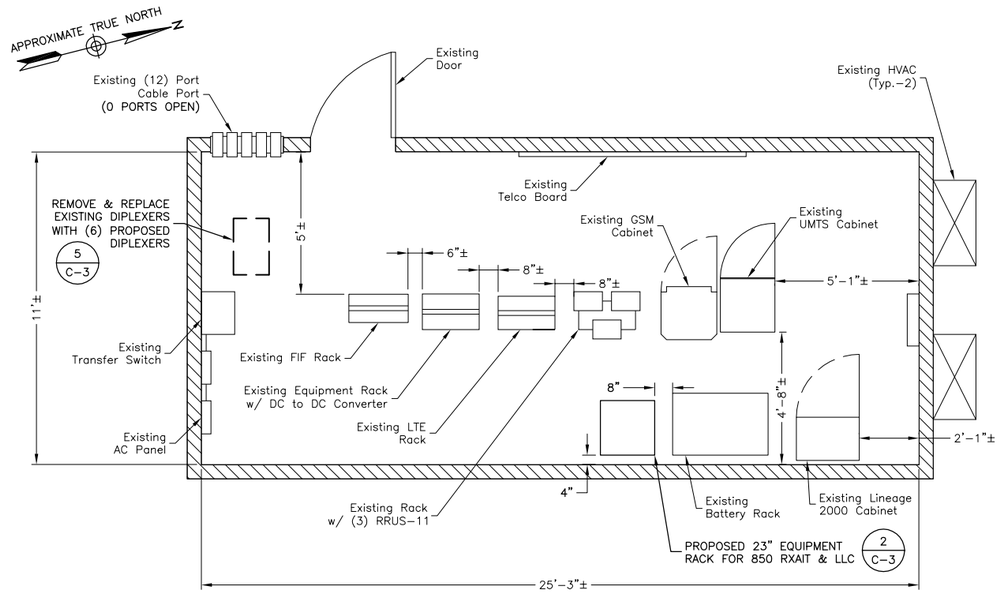


EXISTING EQUIPMENT PLAN

SCALE: 3/16"=1' FOR 11"x17"
3/8"=1' FOR 22"x34"

2

0' 2' 4' 6'



PROPOSED EQUIPMENT PLAN

SCALE: 3/16"=1' FOR 11"x17"
3/8"=1' FOR 22"x34"

3

0' 2' 4' 6'

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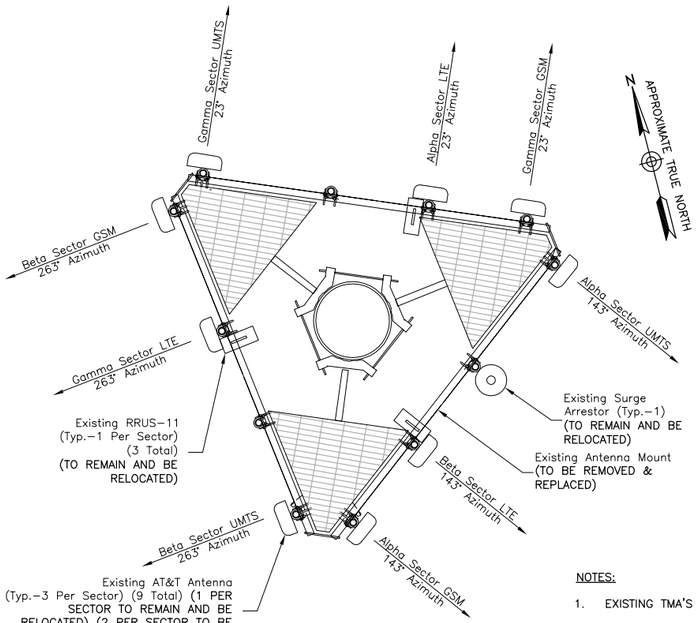
SHEET TITLE

SITE PLAN &
EQUIPMENT PLANS

SHEET NUMBER

C-1

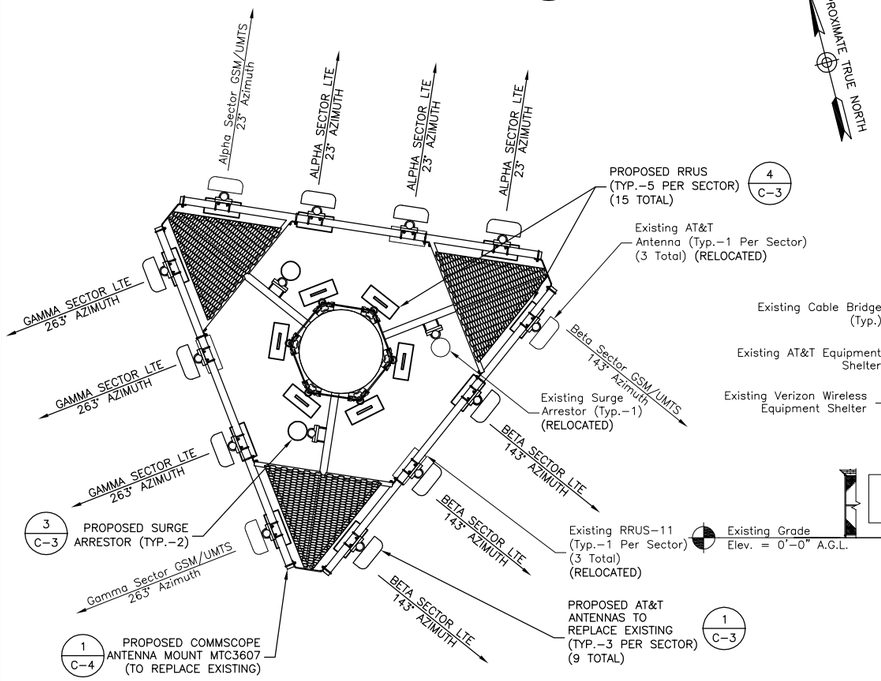


EXISTING ANTENNA LAYOUT (1)

SCALE: N.T.S.

NOTES:

1. EXISTING TMA'S NOT SHOWN FOR CLARITY.
2. ALL EXISTING TMA'S ARE TO REMAIN.

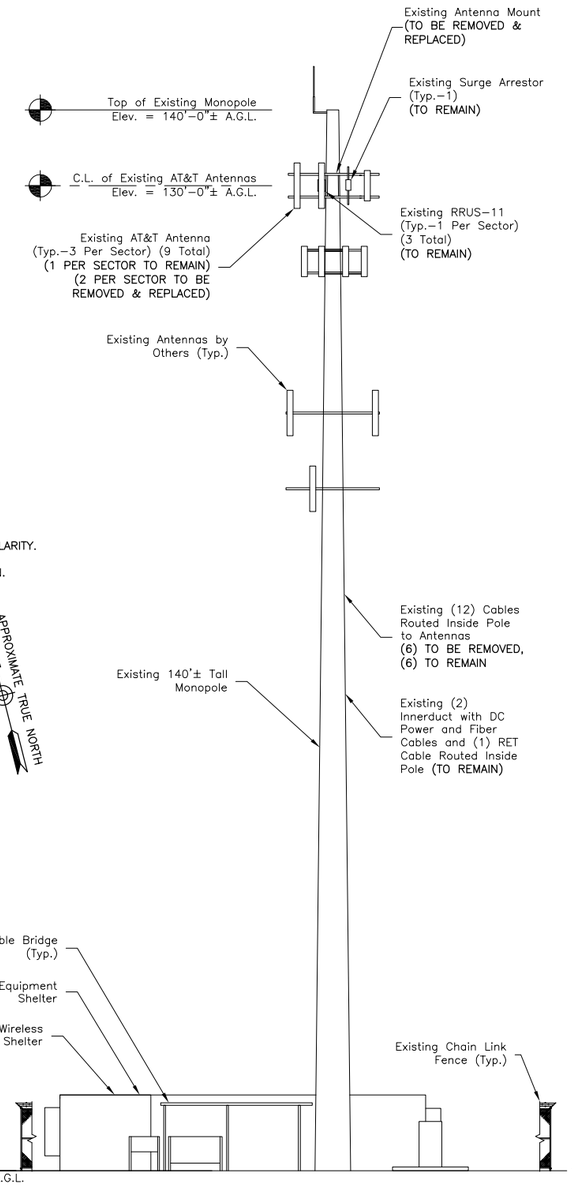


PROPOSED ANTENNA LAYOUT (2)

SCALE: N.T.S.

NOTES:

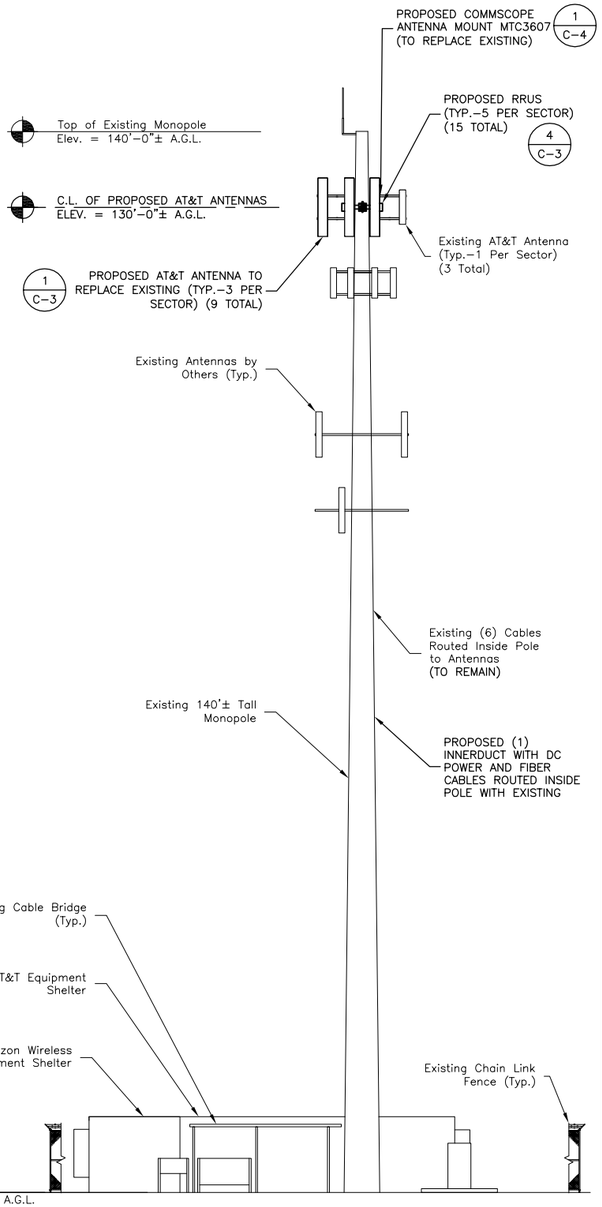
1. EXISTING TMA'S NOT SHOWN FOR CLARITY.
2. ALL EXISTING TMA'S ARE TO REMAIN AND BE RELOCATED TO NEW MOUNT.



EXISTING WEST ELEVATION (3)

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

0' 10' 20'



PROPOSED WEST ELEVATION (4)

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

0' 10' 20'

NOTES:

1. PRIOR TO START OF ANY WORK, A PASSING STRUCTURAL ANALYSIS SHALL BE PROVIDED BY A CONNECTICUT LICENSED P.E. CONTRACTOR TO OBTAIN A COPY BEFORE STARTING ANY WORK.
2. ALL ANTENNAS, COAX, SURGE ARRESTORS, RRUS, ETC. TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY OTHERS AND FINAL AT&T RF DATA SHEET.

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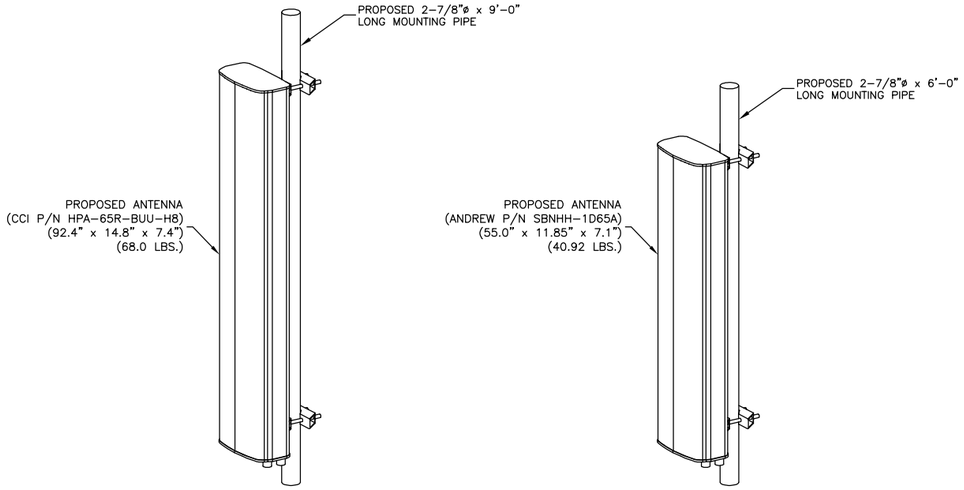
SHEET TITLE

ANTENNA LAYOUTS & ELEVATIONS

SHEET NUMBER

C-2

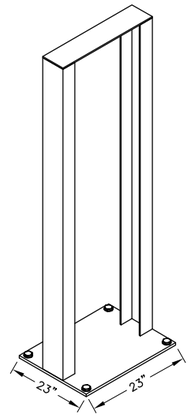


NOTE:

1. PLEASE SEE RFDS FOR SPECIFIC ANTENNA MODEL.

ISOMETRIC ANTENNA DETAILS 1

SCALE: N.T.S.



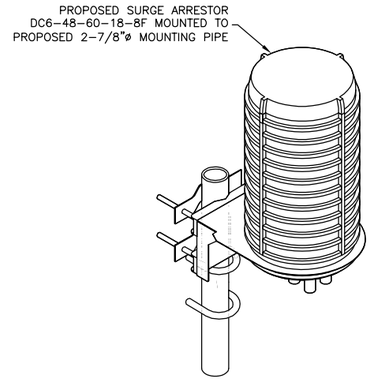
ISOMETRIC

NOTE:

1. CONTRACTOR SHALL SECURE RACK AS PER MANUFACTURER RECOMMENDATIONS.

23" x 23" INDOOR RACK 2

SCALE: N.T.S

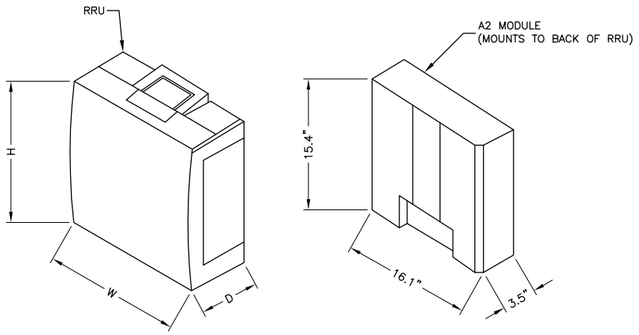


NOTE:

1. ALL ANTENNAS, COAX AND ANTENNA SUPPORT EQUIPMENT TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS AND FINAL RF DATA SHEET.

SURGE ARRESTOR MOUNTING DETAIL 3

SCALE: N.T.S.



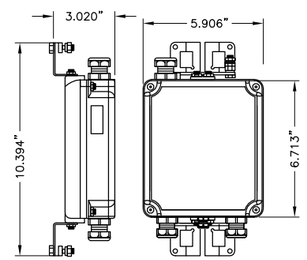
RRUS MODEL & DIMENSIONS	
ERICSSON MODEL #	DIMENSIONS (HxWxD)
RRUS–11	19.7"x17.0"x7.2"
RRUS–12	20.4"x18.8"x7.5"
RRUS–E2	20.4"x18.8"x7.5"
RRUS–32	29.9"x13.3"x9.5"

RRU NOTES:

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

RRUS & A2 MODULE 4

SCALE: N.T.S.



KAELUS DBC2055F1V1–1

NOTE:

1. ATTACH DIPLEXER TO RACK IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.

DIPLEXER DETAIL 5

SCALE: N.T.S.

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CANTON, CT 06019
HARTFORD COUNTY

SHEET TITLE

CONSTRUCTION DETAILS

SHEET NUMBER

C–3

EXISTING ANTENNA SCHEDULE

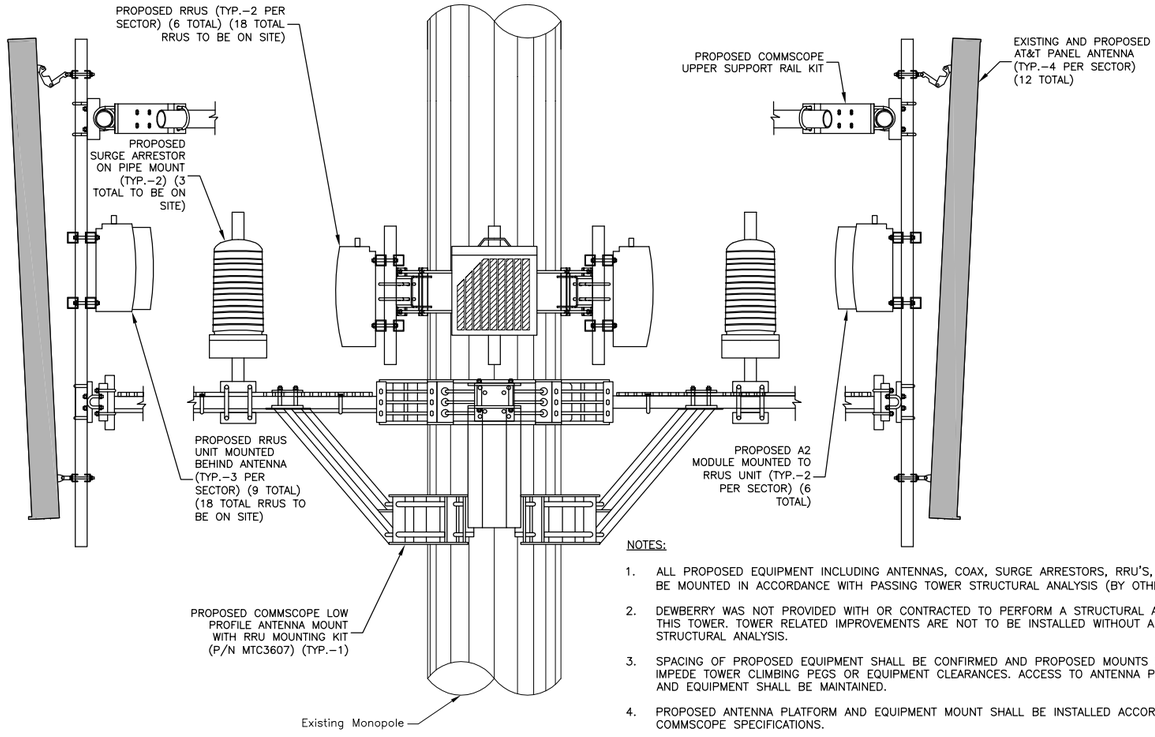
SECTOR	MAKE	MODEL#	SIZE (INCHES)
ALPHA:	KATHREIN	800-10121	54.5x10.3x5.9
	KMW	AM-X-CD-16-65-00T-RET	54.0x12.6x7.87
	KMW	AM-X-CD-16-65-00T-RET	54.0x12.6x7.87
BETA:	KATHREIN	800-10121	54.5x10.3x5.9
	POWERWAVE	P65-17-XLH-RR	96x12x6
	POWERWAVE	P65-17-XLH-RR	96x12x6
GAMMA:	KATHREIN	800-10121	54.5x10.3x5.9
	ANDREW	SBNH-1D6565C	96.4x11.9x7.1
	ANDREW	SBNH-1D6565C	96.4x11.9x7.1

PROPOSED ANTENNA SCHEDULE

SECTOR	MAKE	MODEL#	SIZE (INCHES)
ALPHA:	KATHREIN	800-10121	54.5x10.3x5.9
	ANDREW	SBNHH-1D65A	55.0x11.85x7.1
	ANDREW	SBNHH-1D65A	55.0x11.85x7.1
	ANDREW	SBNHH-1D65A	55.0x11.85x7.1
BETA:	KATHREIN	800-10121	54.5x10.3x5.9
	CCI	HPA-65R-BUU-H8	92.4x14.8x7.4
	CCI	HPA-65R-BUU-H8	92.4x14.8x7.4
	CCI	HPA-65R-BUU-H8	92.4x14.8x7.4
GAMMA:	KATHREIN	800-10121	54.5x10.3x5.9
	CCI	HPA-65R-BUU-H8	92.4x14.8x7.4
	CCI	HPA-65R-BUU-H8	92.4x14.8x7.4
	CCI	HPA-65R-BUU-H8	92.4x14.8x7.4

PROPOSED RRUS SCHEDULE

SECTOR	MAKE	MODEL#	SIZE (INCHES)
ALPHA:	ERICSSON	RRUS-11	19.7x17.0x7.2
	ERICSSON	RRUS-11	19.7x17.0x7.2
	ERICSSON	RRUS-12	20.4x18.5x7.5
	ERICSSON	RRUS-12	20.4x18.5x7.5
	ERICSSON	RRUS-A2	16.4x15.1x3.4
	ERICSSON	RRUS-A2	16.4x15.1x3.4
	ERICSSON	RRUS-E2	20.4x18.8x7.5
	ERICCSON	RRUS-32	29.9x13.3x9.5
BETA:	ERICSSON	RRUS-11	19.7x17.0x7.2
	ERICSSON	RRUS-11	19.7x17.0x7.2
	ERICSSON	RRUS-12	20.4x18.5x7.5
	ERICSSON	RRUS-12	20.4x18.5x7.5
	ERICSSON	RRUS-A2	16.4x15.1x3.4
	ERICSSON	RRUS-A2	16.4x15.1x3.4
	ERICSSON	RRUS-E2	20.4x18.8x7.5
	ERICSSON	RRUS-32	29.9x13.3x9.5
GAMMA:	ERICSSON	RRUS-11	19.7x17.0x7.2
	ERICSSON	RRUS-11	19.7x17.0x7.2
	ERICSSON	RRUS-12	20.4x18.5x7.5
	ERICSSON	RRUS-12	20.4x18.5x7.5
	ERICSSON	RRUS-A2	16.4x15.1x3.4
	ERICSSON	RRUS-A2	16.4x15.1x3.4
	ERICSSON	RRUS-E2	20.4x18.8x7.5
	ERICSSON	RRUS-32	29.9x13.3x9.5



NOTES:

1. ALL PROPOSED EQUIPMENT INCLUDING ANTENNAS, COAX, SURGE ARRESTORS, RRU'S, ETC. SHALL BE MOUNTED IN ACCORDANCE WITH PASSING TOWER STRUCTURAL ANALYSIS (BY OTHERS).
2. DEWBERRY WAS NOT PROVIDED WITH OR CONTRACTED TO PERFORM A STRUCTURAL ANALYSIS ON THIS TOWER. TOWER RELATED IMPROVEMENTS ARE NOT TO BE INSTALLED WITHOUT A PASSING STRUCTURAL ANALYSIS.
3. SPACING OF PROPOSED EQUIPMENT SHALL BE CONFIRMED AND PROPOSED MOUNTS SHALL NOT IMPEDE TOWER CLIMBING PEGS OR EQUIPMENT CLEARANCES. ACCESS TO ANTENNA PLATFORM AND EQUIPMENT SHALL BE MAINTAINED.
4. PROPOSED ANTENNA PLATFORM AND EQUIPMENT MOUNT SHALL BE INSTALLED ACCORDING TO COMMSCOPE SPECIFICATIONS.

PROPOSED ANTENNA MOUNTING DETAIL 1

SCALE: N.T.S.

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14 CANTON SPRINGS RD.
CANTON, CT 06019
HARTFORD COUNTY

SHEET TITLE

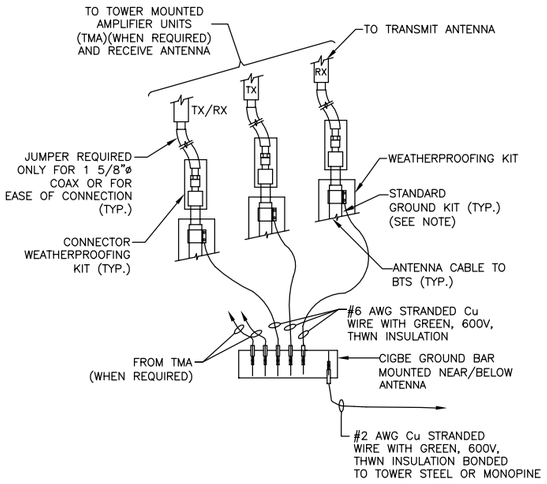
ANTENNA SCHEDULE & CONSTRUCTION DETAILS

SHEET NUMBER

C-4

GROUNDING NOTES:

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

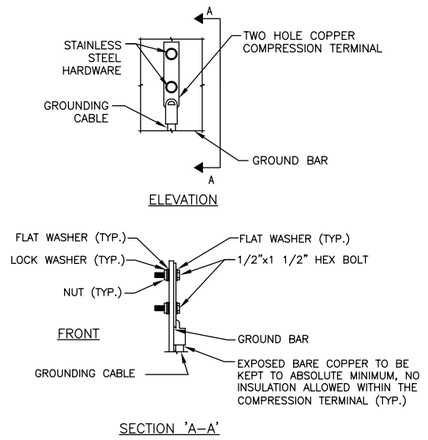


NOTE:

1. 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) — 1

SCALE: N.T.S.

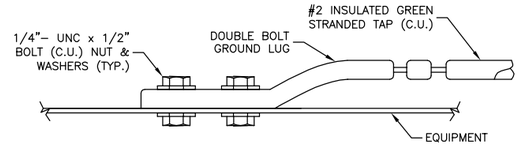


NOTES:

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

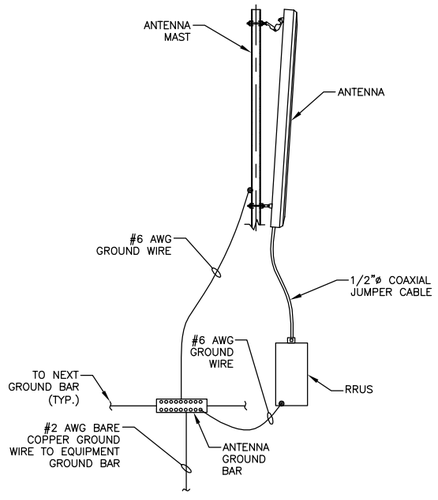
TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL — 2

SCALE: N.T.S.



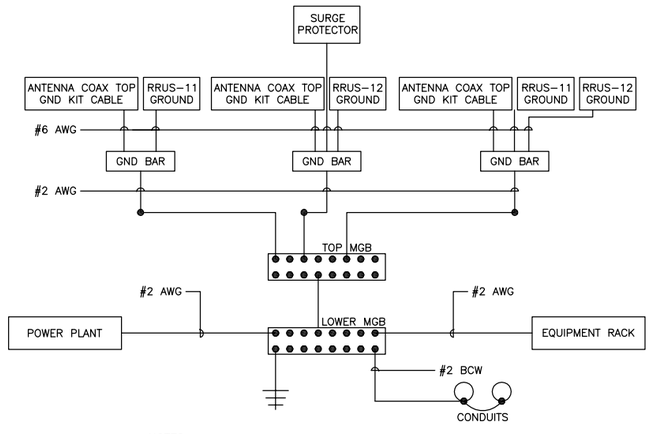
CONNECTION TO EQUIPMENT DETAIL — 3

SCALE: N.T.S.



TYPICAL ANTENNA GROUNDING DETAIL — 4

SCALE: N.T.S



NOTES:

1. BOND ANTENNA GROUNDING KIT CABLE TO TOP CIGBE
2. BOND ANTENNA GROUNDING KIT CABLE TO BOTTOM CIGBE.
3. SCHEMATIC GROUNDING DIAGRAM IS TYPICAL FOR EACH SECTOR.
4. GROUND ALL EQUIPMENT PER MANUFACTURER RECOMMENDATIONS.

SCHEMATIC GROUNDING DIAGRAM — 5

SCALE: N.T.S.

at&t

500 ENTERPRISE DRIVE SUITE 3A
ROCKY HILL, CT 06067

smartlink

1997 ANNAPOLIS EXCHANGE PARKWAY
SUITE 200
ANNAPOLIS, MD 21401

CT1022
CANTON-FIRE DEPARTMENT

CONSTRUCTION DRAWINGS		
1	05/06/14	ISSUED AS FINAL
0	04/21/14	ISSUED AS FINAL
A	02/07/14	PRELIMINARY SUBMISSION

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

ROBERT J. FOLEY, P.E.
CT LICENSE No. PEN.0029056

DRAWN BY:	FG
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50063024
JOB NUMBER:	50063025
SITE ADDRESS:	

14 CANTON SPRINGS RD.
CANTON, CT 06019
HARTFORD COUNTY

SHEET TITLE

GROUNDING NOTES & DETAILS

SHEET NUMBER

E–1

Tab 2

200 North Glebe Road, Suite 1000
Arlington, VA 22203-3728

Todd Oliver
Smartlink, LLC
Market Manager, NE
33 Boston Post Road, Suite 210
Marlborough, MA 01752

Reference: Smartlink LLC Site, Canton-Fire Department, 14 Canton Springs Road, Canton, CT

Date: 27 May 2014

1. This letter will address the additional RF impact that adding AT&T LTE antennas to the referenced site. Attached are two documents which cover the modeled RF emissions from the site.

2. The first report, "RF Emissions Compliance Report," for the site complied by Sitesafe, uses the antenna patterns for the antennas at the site to calculate the General Public Maximum Permissible Exposure (MPE) on the ground. The total MPE of all the carriers is 6.934% (based on the General Public MPE) based on this modeling, with AT&T antennas emitting a maximum of 1.491% of the General Public MPE on the ground.

3. The second attachment has the calculations, used by the Connecticut Siting Council, which assumes the maximum antenna gain transmits in a spherical pattern where the worst case results would be at the base of the tower. That calculation, based on the existing antennas, gives a result of 91.6**%** of the General Public MPE, with the AT&T antennas emitting 26.00**%** of the General Public MPE on the ground, using the modeling predictions used by Connecticut Siting Council.

4. In either case, the site is compliant with FCC guidelines. If you have any questions regarding this site, the compliance report, please contact me at 719-434-0700 or dcotton@sitesafe.com.

Director, RF Compliance

Attachment 1

RF EMISSIONS COMPLIANCE REPORT

Smartlink on behalf of AT&T Mobility, LLC

AT&T Mobility, LLC Site FA: 10035260
AT&T Mobility, LLC Site ID: CT1022
AT&T Mobility, LLC USID: 140506
AT&T Mobility, LLC Site Name: Canton-Fire Department
14 Canton Springs Road
Canton, CT
5/27/2014

Report Status:

AT&T Mobility, LLC Is Compliant

Prepared By:

Sitesafe, Inc.

200 North Glebe Road, Suite 1000 Arlington, VA 22203 Voice 703-276-1100
Fax 703-276-1169

Engineering Statement in Re:
Electromagnetic Energy Analysis
AT&T Mobility, LLC
Canton, CT

My signature on the cover of this document indicates:

That I am registered as a Professional Engineer in the jurisdiction indicated; and

That I have extensive professional experience in the wireless communications engineering industry; and

That I am an employee of Sitesafe, Inc. in Arlington, Virginia; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission ("the FCC" and "the FCC Rules") both in general and specifically as they apply to the FCC's Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; and

That the technical information serving as the basis for this report was supplied by AT&T Mobility, LLC (See attached Site Summary and Carrier documents), and that AT&T Mobility, LLC's installations involve communications equipment, antennas and associated technical equipment at a location referred to as the "Canton-Fire Department" ("the site"); and

That AT&T Mobility, LLC proposes to operate at the site with transmit antennas listed in the carrier summary and with a maximum effective radiated power as specified by AT&T Mobility, LLC and shown on the worksheet, and that worst-case 100% duty cycle have been assumed; and

That this analysis has been performed with the assumption that the ground immediately surrounding the tower is primarily flat or falling; and

That at this time, the FCC requires that certain licensees address specific levels of radio-frequency energy to which workers or members of the public might possibly be exposed (at §1.1307(b) of the FCC Rules); and

That such consideration of possible exposure of humans to radio-frequency radiation must utilize the standards set by the FCC, which is the Federal Agency having jurisdiction over communications facilities; and

That the FCC rules define two tiers of permissible exposure guidelines: 1) "uncontrolled environments," defined as situations in which persons may not be aware of (the "general public"), or may not be able to control their exposure to a transmission facility; and (2) "controlled environments," which defines situations in which persons are aware of their potential for exposure (industry personnel); and

That this statement specifically addresses the uncontrolled environment (which is more conservative than the controlled environment) and the limit set forth in the FCC rules for licensees of AT&T Mobility, LLC's operating frequency as shown on the attached antenna worksheet; and

That when applying the uncontrolled environment standards, the predicted Maximum Power Density at two meters above ground level from the proposed AT&T Mobility, LLC operation is no more than 1.491% of the maximum in any accessible area on the ground and

That it is understood per FCC Guidelines and OET65 Appendix A, that regardless of the existent radio-frequency environment, only those licenses whose contributions exceed five percent of the exposure limit pertinent to their operation(s) bear any responsibility for bringing any non-compliant area(s) into compliance; and

That when applying the uncontrolled environment standards, the cumulative predicted energy density from the proposed operation is no more than 6.934% of the maximum in any accessible area up to two meters above the ground per OET-65; and

That the calculations provided in this report are based on data provided by the client and antenna pattern data supplied by the antenna manufacturer, in accordance with FCC guidelines listed in OET-65. Horizontal and vertical antenna patterns are combined for modeling purposes to accurately reflect the energy two meters above ground level where on-axis energy refers to maximum energy two meters above the ground along the azimuth of the antenna and where area energy refers to the maximum energy anywhere two meters above the ground regardless of the antenna azimuth, accounting for cumulative energy from multiple antennas for the carrier and frequency range indicated; and

That the Occupational Safety and Health Administration has policies in place which address worker safety in and around communications sites, thus individual companies will be responsible for their employees' training regarding Radio Frequency Safety.

In summary, it is stated here that the proposed operation at the site would not result in exposure of the Public to excessive levels of radio-frequency energy as defined in the FCC Rules and Regulations, specifically 47 CFR 1.1307 and that AT&T Mobility, LLC's proposed operation is completely compliant.

Finally, it is stated that access to the tower should be restricted to communication industry professionals, and approved contractor personnel trained in radio-frequency safety; and that the instant analysis addresses exposure levels at two meters above ground level and does not address exposure levels on the tower, or in the immediate proximity of the antennas.

Note: Sitesafe has used data obtained from the "Connecticut Siting Council" to create this report. The manufacturer antenna patterns for AT&T Mobility, LLC were used to determine the RF emissions from the AT&T Mobility, LLC antennas. Generic antennas were used for the other carriers on the tower as this information was not available, or provided at the time the study was conducted. Sitesafe has also referenced the AT&T Mobility, LLC construction diagram for this site.

The following documents below were the primary sources of data used to create this report. The primary document was the "Connecticut Siting Council" document. The AT&T Mobility, LLC construction diagram was referenced when appropriate. Sitesafe has included modeling of the second carrier LTE in this analysis.

Note: Sprint-Nextel has decommissioned the existing iDEN network as of June 30, 2013. The modeling represented in this report follows the "Connecticut Siting Council" data.

Connecticut Siting Council: AlphaExMPowDens 4-16-14

AT&T Mobility, LLC Construction Diagram: 10035260.AE201.140506 (CT1022) Dewberry Rev 1 S&S

[1] This Power Density information was taken from the Connecticut Siting Council database dated April 16, 2014.
[2] This Power Density information is based on worse case assumptions from AT&T's radio frequency engineers.

AT&T Mobility, LLC (Proposed)
Canton-Fire Department
Site Summary

Carrier	Area Maximum Percentage MPE
AT&T Mobility, LLC	0.558 %
AT&T Mobility, LLC	0.304 %
AT&T Mobility, LLC (Proposed/Future)	0 %
AT&T Mobility, LLC (Proposed/Future)	0 %
AT&T Mobility, LLC (Proposed/Future)	0 %
AT&T Mobility, LLC (Proposed/Future)	0 %
AT&T Mobility, LLC (Proposed)	0.239 %
AT&T Mobility, LLC (Proposed)	0.39 %
Canton FD	0.134 %
Nextel (iDEN - Decommissioned)	0.347 %
Pocket (Now MetroPCS)	0.525 %
Sprint-Nextel	0.333 %
Sprint-Nextel	0.329 %
T-Mobile	0.141 %
Verizon Wireless	0.63 %
Verizon Wireless	0.299 %
Verizon Wireless	0.823 %
Verizon Wireless	1.882 %

Composite Site MPE: 6.934 %

Attachment 2

Canton - 14 Canton Springs Road

Power Density Calculations

Control Number	Site	Carrier	#Channels	ERP/Ch	Ant Ht	Power Density (mW/cm2)	MHz	S	%MPE	Site Total
EM-CING-023-121102	Canton - 14 Canton Springs Road	AT&T UMTS	2	565	130	0.0240	880	0.5867	4.10%	
EM-CING-023-121102	Canton - 14 Canton Springs Road	AT&T UMTS	2	1077	130	0.0458	1900	1.0000	4.58%	
EM-CING-023-121102	Canton - 14 Canton Springs Road	AT&T LTE	1	1615	130	0.0344	734	0.4893	7.02%	
EM-CING-023-121102	Canton - 14 Canton Springs Road	AT&T GSM	4	934	130	0.0795	1900	1.0000	7.95%	
EM-CING-023-121102	Canton - 14 Canton Springs Road	AT&T GSM	1	647	130	0.0138	880	0.5867	2.35%	
EM-VER-023-140221	**Canton - 14 Canton Springs Road**	**Verizon cellular**	**9**	**403**	**120**	**0.0906**	**869**	**0.5793**	**15.63%**	
EM-VER-023-140221	**Canton - 14 Canton Springs Road**	**Verizon PCS**	**11**	**438**	**120**	**0.1203**	**1970**	**1.0000**	**12.03%**	
EM-VER-023-140221	**Canton - 14 Canton Springs Road**	**Verizon AWS**	**1**	**1750**	**120**	**0.0437**	**2145**	**1.0000**	**4.37%**	
EM-VER-023-140221	**Canton - 14 Canton Springs Road**	**Verizon LTE**	**1**	**1050**	**120**	**0.0262**	**698**	**0.4653**	**5.63%**	
EM-Pocket-023-081117B	**Canton - 14 Canton Springs Road**	**Pocket (now MetroPCS)**	**3**	**631**	**83**	**0.0988**	**2130**	**1.0000**	**9.88%**	
EM-SPRINT-023-130405	**Canton - 14 Canton Springs Road**	**Sprint CDMA/LTE**	**2**	**693**	**90**	**0.0615**	**1900**	**1.0000**	**6.15%**	
EM-SPRINT-023-130405	**Canton - 14 Canton Springs Road**	**Sprint CDMA/LTE**	**1**	**390**	**90**	**0.0173**	**850**	**0.5667**	**3.06%**	
TS-SPRINT-023-020415	**Canton - 14 Canton Springs Road**	**Canton FD**	**1**	**71**	**140**	**0.0013**	**300**	**0.2000**	**0.65%**	
TS-SPRINT-023-020415	**Canton - 14 Canton Springs Road**	**Nextel**	**9**	**100**	**110**	**0.0267**	**851**	**0.5673**	**4.71%**	
EM-T-Mobile-023-031007	**Canton - 14 Canton Springs Road**	**T-Mobile**	**8**	**121**	**100**	**0.0348**	**1935**	**1.0000**	**3.48%**	**91.60%**

Tab 3

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

140-ft Existing EEI Monopole

Proposed AT&T Mobility
Antenna Upgrade

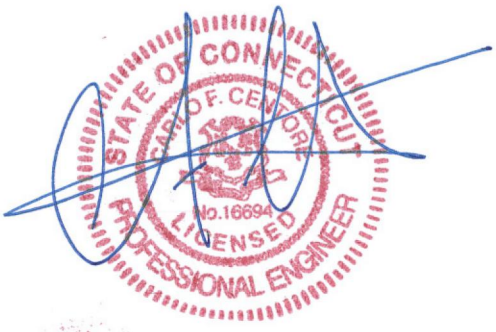
AT&T Site Ref: CT1022

Verizon Site Ref: Canton

14 Canton Springs Road
Canton, CT

Centek Project No. 14033.007

Date: May 27, 2014



Prepared for:

AT&T Mobility
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

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Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna installation proposed by AT&T Mobility on the existing monopole (tower) owned and operated by Verizon Wireless located in Canton, CT.

The host tower is a 140-ft, four-section, eighteen sided, tapered monopole, originally designed and manufactured by Engineered Endeavors Inc (EEI)—job no: 4960, dated May 13, 1999. The tower geometry, structure member sizes and foundation system information were obtained from a previous structural report prepared by Centek Engineering job no. 13001.107 dated January 6, 2014.

Antenna and appurtenance information were obtained from the aforementioned Centek structural report, a tower mapping report prepared by Eastern Communications Inc. dated April 25, 2014 and a AT&T RF data sheet.

The tower is made up of four (4) tapered vertical sections consisting of A572-65 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 18.00-in at the top and 51.00-in at the base.

AT&T proposes the removal of six (6) existing panel antennas and the installation of nine (9) panel antennas, fifteen (15) remote radio heads, six (6) A2 units and two (2) surge arrestors mounted on a proposed platform. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- TOWN (Existing):
  Antennas: One (1) 20-ft x 2” dia. Omni-directional whip antenna mounted on a 4-ft side arm with an elevation of 138-ft above exiting grade.
  Coax Cables: Two (2) 7/8” ∅ coax cables running on the inside of the existing monopole.
- VERIZON (Existing/Reserved):
  Antennas: Six (6) Antel LPA-80063-6CF panel antennas, six (6) Antel BXA-70063-6CF panel antennas, six (6) LPA-171063-12CF panel antennas, six (6) RFS FD9R6004/2C-3L Diplexers, six (6) RRH’s and two (2) main distribution boxes mounted on a 13-ft platform w/ handrails with a RAD center elevation of 120-ft above grade.
  Coax Cables: Twelve (12) 1-5/8” ∅ coax cables running on the inside of the existing tower and six (6) 1-5/8” ∅ coax cables and two (2) 1-5/8” ∅ fiber cable running on the exterior of the existing tower.

- T-MOBILE (Existing):
  Antennas: Four (4) EMS RR90-17-02DP panel antennas mounted on a 14-ft low profile platform with a RAD center elevation of 100-ft above exiting grade.
  Coax Cables: Eight (8) 1-5/8" ∅ coax cables running on the inside of the existing monopole.
- SPRINT (Existing):
  Antennas: Two (2) RFS APXVSPP18-C-A20 panel antennas, one (1) KMW ET-X-TU-42-15-37-iR-SP panel antenna, three (3) 1900MHz 4X40W RRH's and three (3) 800MHz 2X50W RRH's mounted on a 14-ft low profile platform with a RAD center elevation of 90-ft above exiting grade.
  Coax Cables: Three (3) 1-1/4"∅ Hybriflex cables running on the inside of the existing monopole.
- METROPCS (Existing):
  Antennas: Three (3) RFS APXV18-206517S panel antennas flush mounted with a RAD center elevation of 83-ft above exiting grade.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on the inside of the existing monopole.
- AT&T (Existing to Remain/Relocate):
  Antennas: Three (3) Kathrein 800-10121 panel antennas, three (3) Ericsson RRUS-11 remote radio heads, three (3) CCI DTMABP7819VG12A TMA's and one (1) Raycap DC6-48-60-18-8F surge arrestor to be relocated to the proposed platform with a RAD center elevation of 130-ft above exiting grade.
  Coax Cables: Six (6) 7/8" ∅ coax cables running on the inside of the existing monopole. One (1) fiber cable and two (2) dc control cables running within the interior of the existing monopole.
- AT&T (Existing to Remove):
  Antennas: One (1) KMW AM-X-CD-14-65-00T-RET panel antenna, two (2) KMW AM-X-CD-17-65-00T-RET panel antennas, three (3) Andrew SBNH-1D6565C panel antennas and three (3) CCI DTMABP7819VG12A TMA's mounted on a 13-ft platform w/ handrails with a RAD center elevation of 130-ft above exiting grade.
  Coax Cables: Six (6) 7/8" ∅ coax cables running on the inside of the existing monopole.
- **AT&T (PROPOSED):**
  Antennas: Three (3) Andrew SBNHH-1D65A panel antennas, six (6) CCI HPA-65R-BUU-H8 panel antennas, three (3) Ericsson RRUS-11 remote radio units, six (6) Ericsson RRUS-12 remote radio units, three (3) Ericsson RRUS-32 remote radio units, three (3) Ericsson RRUS-E2 remote radio units, six (6) Ericsson A2 units and two (2) Raycap DC6-48-60-18-8F surge arrestors mounted on steel platform Commscope p/n MTC3607R with a RAD center elevation of 130-ft above existing grade.
  Coax Cables: Four (4) dc control cables running on the exterior of the existing tower.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All existing coax cables to be installed as indicated in this report.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (fastest mile) with no ice and a 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix K of the CSBC[1] and the wind speed data available in the TIA/EIA-222-F-96 Standard. The higher of the two wind speeds is utilized in preparation on the tower analysis.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice on the tower structure and its components.

Basic Wind Speed:	Hartford; v = 80 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Canton; v = 95 mph (3 second gust) equivalent to v = 77.5 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	TIA/EIA-222-F wind speed controls.	
Load Cases:	Load Case 1; 80 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 69 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 69 mph wind speed velocity represents 75% of the wind pressure generated by the 80 mph wind speed.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

[1] The 2005 Connecticut State Building Code as amended by the 2009 CT State Supplement. (CSBC)

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

- Calculated stresses were found to be within allowable limits. In Load Case 1, per tnxTower "Section Capacity Table", this tower was found to be at **82.2%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L2)	79.83'-115.36'	82.2%	**PASS**

Foundation and Anchors

The existing foundation consists of a 6.5-ft square x 4.5-ft long reinforced concrete pier on a 24.0-ft square x 3.0-ft thick reinforced concrete pad. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned structural report. The base of the tower is connected to the foundation by means of (20) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 5-ft into the concrete foundation structure.

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	32 kips
	Compression	40 kips
	Moment	3299 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2 (FS)[1]	Proposed Loading (FS)[1]	Result
Reinforced Concrete Pad and Pier	OTM[2]	2.0	2.15	**PASS**

Note 1: FS denotes Factor of Safety.
Note 2: OTM denotes Overturning Moment

- The anchor bolts and base plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Compression and Bending	68.8%	**PASS**
Base Plate	Bending	81.3%	**PASS**

C o n c l u s i o n

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by AT&T Mobility. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Carlo F. Centore, PE
Principal ~ Structural Engineer

STATE OF CONNECTICUT
CARLO F. CENTORE
No. 16894
LICENSED
PROFESSIONAL ENGINEER

Prepared by:

Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of CENTEK engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provide to CENTEK engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. CENTEK engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

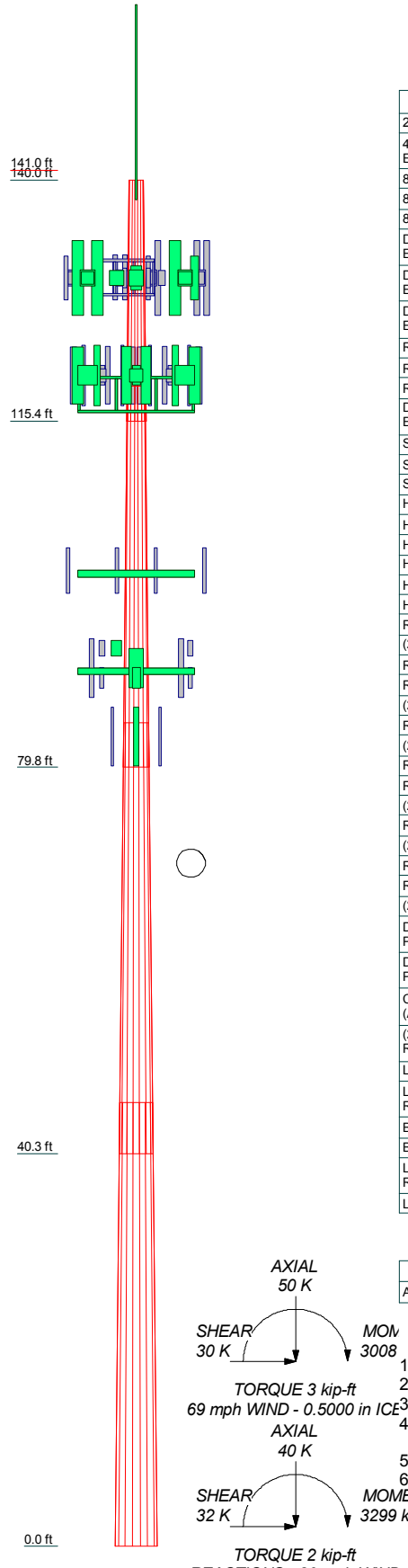
General Description of Structural Analysis Program

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	24.64	18	0.1875	3.53	18.0000	24.2521		1.0
2	39.06	18	0.3125	4.59	22.9814	32.7041		3.6
3	44.16	18	0.4375	5.28	30.9366	41.9334	A572-65	7.5
4	45.54	18	0.5000		39.7436	51.0000		11.0



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
20' x 2" Dia Omni (Town - Existing)	148	LPA-80063/6CF (Verizon - Reserved)	120
4' Side Mount Standoff (Town - Existing)	138	LPA-171063-12CF (Verizon - Reserved)	120
800 10121 (ATI - Existing)	130	BXA-70063/6CF (Verizon - Reserved)	120
800 10121 (ATI - Existing)	130	BXA-70063/6CF (Verizon - Reserved)	120
800 10121 (ATI - Existing)	130	LPA-171063-12CF (Verizon - Reserved)	120
DTMABP7819VG12A TMA (ATI - Existing)	130	LPA-80063/6CF (Verizon - Reserved)	120
DTMABP7819VG12A TMA (ATI - Existing)	130	LPA-80063/6CF (Verizon - Reserved)	120
DTMABP7819VG12A TMA (ATI - Existing)	130	LPA-171063-12CF (Verizon - Reserved)	120
RRUS-11 (ATI - Existing)	130	BXA-70063/6CF (Verizon - Reserved)	120
RRUS-11 (ATI - Existing)	130	BXA-70063/6CF (Verizon - Reserved)	120
RRUS-11 (ATI - Existing)	130	LPA-171063-12CF (Verizon - Reserved)	120
DC6-48-60-18-8F Surge Arrestor (ATI - Existing)	130	LPA-80063/6CF (Verizon - Reserved)	120
SBNHH-1D65A (ATI - Proposed)	130	(2) FD9R6004/2C-3L Diplexer (Verizon - Reserved)	120
SBNHH-1D65A (ATI - Proposed)	130	(2) FD9R6004/2C-3L Diplexer (Verizon - Reserved)	120
SBNHH-1D65A (ATI - Proposed)	130	(2) FD9R6004/2C-3L Diplexer (Verizon - Reserved)	120
HPA-65R-BUU-H8 (ATI - Proposed)	130	RRH2x40-AWS (Verizon - Reserved)	120
HPA-65R-BUU-H8 (ATI - Proposed)	130	RRH2x40-AWS (Verizon - Reserved)	120
HPA-65R-BUU-H8 (ATI - Proposed)	130	RRH2x40-AWS (Verizon - Reserved)	120
HPA-65R-BUU-H8 (ATI - Proposed)	130	RRH2x40-07-U (Verizon - Reserved)	120
HPA-65R-BUU-H8 (ATI - Proposed)	130	RRH2x40-07-U (Verizon - Reserved)	120
HPA-65R-BUU-H8 (ATI - Proposed)	130	RRH2x40-07-U (Verizon - Reserved)	120
RRUS-11 (ATI - Proposed)	130	13' Platform w/rails (Verizon - Existing)	118
(2) RRUS-12 (ATI - Proposed)	130	(2) RR90-17-02DP (T-Mobile - Existing)	100
RRUS-32 (ATI - Proposed)	130	(2) RR90-17-02DP (T-Mobile - Existing)	100
RRUS-E2 (ATI - Proposed)	130	14-ft Low Profile Platform (T-Mobile - Existing)	100
(2) A2 (ATI - Proposed)	130	14-ft Low Profile Platform (Sprint - Existing)	90
RRUS-11 (ATI - Proposed)	130	FD-RRH 2x50 800 w/ Mount (Sprint - Existing)	90
(2) RRUS-12 (ATI - Proposed)	130	FD-RRH 4x40 1900 (Sprint - Existing)	90
RRUS-32 (ATI - Proposed)	130	FD-RRH 2x50 800 w/ Mount (Sprint - Existing)	90
RRUS-E2 (ATI - Proposed)	130	FD-RRH 4x40 1900 (Sprint - Existing)	90
(2) A2 (ATI - Proposed)	130	APXVSPP18-C-A20 w/ Mount (Sprint - Existing)	90
RRUS-11 (ATI - Proposed)	130	APXVSPP18-C-A20 w/ Mount (Sprint - Existing)	90
(2) RRUS-12 (ATI - Proposed)	130	ET-X-TU-42-15-37-18-iR-SP (Sprint - Existing)	90
RRUS-32 (ATI - Proposed)	130	FD-RRH 2x50 800 w/ Mount (Sprint - Existing)	90
RRUS-E2 (ATI - Proposed)	130	FD-RRH 4x40 1900 (Sprint - Existing)	90
(2) A2 (ATI - Proposed)	130	APXV18-206517S (MetroPCS - Existing)	83
DC6-48-60-18-8F Surge Arrestor (ATI - Proposed)	130	APXV18-206517S (MetroPCS - Existing)	83
DC6-48-60-18-8F Surge Arrestor (ATI - Proposed)	130	Uni-Tri Bracket (MetroPCS - Existing)	83
Commscope MTC3607R Platform (ATI - Proposed)	130	APXV18-206517S (MetroPCS - Existing)	83
(2) DB-T1-6Z-8AB-0Z (Verizon - Reserved)	120		
LPA-80063/6CF (Verizon - Reserved)	120		
LPA-171063-12CF (Verizon - Reserved)	120		
BXA-70063/6CF (Verizon - Reserved)	120		
BXA-70063/6CF (Verizon - Reserved)	120		
LPA-171063-12CF (Verizon - Reserved)	120		
LPA-80063/6CF (Verizon - Reserved)	120		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
5. Welds are fabricated with ER-70S-6 electrodes.
6. TOWER RATING: 82.2%

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: **14033.007 - CT1022**		
Project: **140' EEI Monopole - 14 Canton Springs Rd, Canton, CT**		
Client: AT&T Mobility	Drawn by: TJL	App'd:
Code: TIA/EIA-222-F	Date: 05/27/14	Scale: NTS
Path: J:\Jobs\1403300 WI007 - CT1022\04 Structural\Backup Documentation\Calcs\ERI Files\140' EEI Monopole Canton.eri		Dwg No. E-1

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 80 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 69 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

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	140.00-115.36	24.64	3.53	18	18.0000	24.2521	0.1875	0.7500	A572-65 (65 ksi)
L2	115.36-79.83	39.06	4.59	18	22.9814	32.7041	0.3125	1.2500	A572-65 (65 ksi)
L3	79.83-40.26	44.16	5.28	18	30.9366	41.9334	0.4375	1.7500	A572-65 (65 ksi)
L4	40.26-0.00	45.54		18	39.7436	51.0000	0.5000	2.0000	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	18.2777	10.6007	424.9328	6.3234	9.1440	46.4712	850.4248	5.3013	2.8380	15.136
	24.6262	14.3214	1047.8077	8.5429	12.3201	85.0489	2096.9941	7.1621	3.9384	21.005
L2	24.2282	22.4847	1459.7753	8.0475	11.6746	125.0391	2921.4715	11.2445	3.4947	11.183
	33.2086	32.1284	4258.8427	11.4990	16.6137	256.3455	8523.2892	16.0673	5.2059	16.659
L3	32.5745	42.3518	4977.1676	10.8272	15.7158	316.6988	9960.8842	21.1799	4.6748	10.685
	42.5803	57.6222	12535.3942	14.7310	21.3022	588.4563	25087.2828	28.8166	6.6103	15.109
L4	41.6819	62.2795	12117.6844	13.9315	20.1897	600.1905	24251.3135	31.1457	6.1149	12.23
	51.7868	80.1435	25821.9188	17.9275	25.9080	996.6774	51677.8148	40.0794	8.0960	16.192

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 140.00-115.36				1	1	1		
L2 115.36-79.83				1	1	1		
L3 79.83-40.26				1	1	1		
L4 40.26-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
7/8	A	No	Inside Pole	140.00 - 3.00	2	No Ice	0.00	0.54
(Town - Existing)						1/2" Ice	0.00	0.54
RG6-Fiber	C	No	CaAa (Out Of	130.00 - 3.00	1	No Ice	0.05	1.00
(AT&T - Existing)			Face)			1/2" Ice	0.15	1.61
#8 AWG Copper WIre	C	No	CaAa (Out Of	130.00 - 3.00	2	No Ice	0.01	0.05
(AT&T - Existing)			Face)			1/2" Ice	0.11	0.43
1 5/8	B	No	Inside Pole	120.00 - 3.00	12	No Ice	0.00	1.04
(Verizon - Existing)						1/2" Ice	0.00	1.04
1/2	B	No	Inside Pole	120.00 - 3.00	1	No Ice	0.00	0.25
(Verizon - Existing)						1/2" Ice	0.00	0.25
1 5/8	B	No	CaAa (Out Of	120.00 - 3.00	1	No Ice	0.20	1.04
(Verizon - Existing)			Face)			1/2" Ice	0.30	2.55
1 5/8	B	No	CaAa (Out Of	120.00 - 3.00	5	No Ice	0.00	1.04
(Verizon - Existing)			Face)			1/2" Ice	0.00	2.55
HYBRIFLEX 1-5/8"	C	No	CaAa (Out Of	120.00 - 3.00	1	No Ice	0.20	1.90
(Verizon - Existing)			Face)			1/2" Ice	0.30	3.41
1 5/8	A	No	Inside Pole	100.00 - 3.00	8	No Ice	0.00	1.04
(T-Mobile - Existing)						1/2" Ice	0.00	1.04
HYBRIFLEX 1-5/8"	C	No	Inside Pole	90.00 - 3.00	3	No Ice	0.00	1.90
(Sprint - Existing)						1/2" Ice	0.00	1.90
1 5/8	C	No	Inside Pole	83.00 - 3.00	6	No Ice	0.00	1.04
(MetroPCS - Existing)						1/2" Ice	0.00	1.04
HYBRIFLEX 1-5/8"	B	No	CaAa (Out Of	120.00 - 3.00	2	No Ice	0.20	1.90
(Verizon - Reserved)			Face)			1/2" Ice	0.30	3.41
#8 AWG Copper WIre	C	No	CaAa (Out Of	130.00 - 3.00	4	No Ice	0.01	0.05
(AT&T - Proposed)			Face)			1/2" Ice	0.11	0.43

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
7/8	A	No	Inside Pole	130.00 - 3.00	6	No Ice	0.00	0.54
(AT&T - Existing)						1/2" Ice	0.00	0.54

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	140.00-115.36	A	0.000	0.000	0.000	0.000	0.07
		B	0.000	0.000	0.000	2.756	0.11
		C	0.000	0.000	0.000	2.779	0.03
L2	115.36-79.83	A	0.000	0.000	0.000	0.000	0.32
		B	0.000	0.000	0.000	21.105	0.81
		C	0.000	0.000	0.000	11.551	0.19
L3	79.83-40.26	A	0.000	0.000	0.000	0.000	0.50
		B	0.000	0.000	0.000	23.505	0.90
		C	0.000	0.000	0.000	12.864	0.60
L4	40.26-0.00	A	0.000	0.000	0.000	0.000	0.47
		B	0.000	0.000	0.000	22.132	0.85
		C	0.000	0.000	0.000	12.113	0.56

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	140.00-115.36	A	0.500	0.000	0.000	0.000	0.000	0.07
		B		0.000	0.000	0.000	4.148	0.16
		C		0.000	0.000	0.000	13.491	0.08
L2	115.36-79.83	A	0.500	0.000	0.000	0.000	0.000	0.32
		B		0.000	0.000	0.000	31.763	1.24
		C		0.000	0.000	0.000	39.975	0.35
L3	79.83-40.26	A	0.500	0.000	0.000	0.000	0.000	0.50
		B		0.000	0.000	0.000	35.375	1.38
		C		0.000	0.000	0.000	44.520	0.77
L4	40.26-0.00	A	0.500	0.000	0.000	0.000	0.000	0.47
		B		0.000	0.000	0.000	33.310	1.30
		C		0.000	0.000	0.000	41.921	0.73

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	140.00-115.36	0.0040	0.1644	-0.3531	0.3984
L2	115.36-79.83	0.2513	0.4959	-0.1587	0.8004
L3	79.83-40.26	0.2691	0.5311	-0.1785	0.9004
L4	40.26-0.00	0.2625	0.5179	-0.1827	0.9213

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
20' x 2" Dia Omni	C	From Face	4.00	0.0000	148.00	No Ice	4.00	4.00	0.02
(Town - Existing)			0.00			1/2" Ice	6.03	6.03	0.05
			0.00						
4' Side Mount Standoff	C	From Face	2.00	0.0000	138.00	No Ice	2.72	2.72	0.05
(Town - Existing)			0.00			1/2" Ice	4.91	4.91	0.09
			0.00						
800 10121	A	From Face	4.00	0.0000	130.00	No Ice	5.46	3.29	0.05
(AT&T - Existing)			-6.00			1/2" Ice	5.88	3.64	0.08
			0.00						
800 10121	B	From Face	4.00	0.0000	130.00	No Ice	5.46	3.29	0.05
(AT&T - Existing)			-6.00			1/2" Ice	5.88	3.64	0.08
			0.00						
800 10121	C	From Face	4.00	0.0000	130.00	No Ice	5.46	3.29	0.05
(AT&T - Existing)			-6.00			1/2" Ice	5.88	3.64	0.08
			0.00						
DTMABP7819VG12A TMA	A	From Face	4.00	0.0000	130.00	No Ice	1.59	0.58	0.02
(AT&T - Existing)			0.00			1/2" Ice	1.76	0.70	0.03
			0.00						
DTMABP7819VG12A TMA	B	From Face	4.00	0.0000	130.00	No Ice	1.59	0.58	0.02
(AT&T - Existing)			0.00			1/2" Ice	1.76	0.70	0.03
			0.00						
DTMABP7819VG12A TMA	C	From Face	4.00	0.0000	130.00	No Ice	1.59	0.58	0.02
(AT&T - Existing)			0.00			1/2" Ice	1.76	0.70	0.03
			0.00						
RRUS-11	A	From Face	1.00	0.0000	130.00	No Ice	2.99	1.25	0.05
(AT&T - Existing)			2.00			1/2" Ice	3.23	1.41	0.07
			0.00						
RRUS-11	B	From Face	1.00	0.0000	130.00	No Ice	2.99	1.25	0.05
(AT&T - Existing)			2.00			1/2" Ice	3.23	1.41	0.07
			0.00						
RRUS-11	C	From Face	1.00	0.0000	130.00	No Ice	2.99	1.25	0.05
(AT&T - Existing)			2.00			1/2" Ice	3.23	1.41	0.07
			0.00						
DC6-48-60-18-8F Surge	C	From Face	0.50	0.0000	130.00	No Ice	2.23	2.23	0.02
Arrestor			0.00			1/2" Ice	2.45	2.45	0.04
(AT&T - Existing)			0.00						
LPA-80063/6CF	A	From Face	3.00	0.0000	120.00	No Ice	10.31	9.01	0.03
(Verizon - Reserved)			6.00			1/2" Ice	10.87	9.55	0.10
			0.00						
LPA-171063-12CF	A	From Face	3.00	0.0000	120.00	No Ice	5.99	6.05	0.01
(Verizon - Reserved)			4.00			1/2" Ice	6.46	6.52	0.06
			0.00						
BXA-70063/6CF	A	From Face	3.00	0.0000	120.00	No Ice	7.73	4.16	0.02
(Verizon - Reserved)			1.00			1/2" Ice	8.27	4.60	0.06
			0.00						
BXA-70063/6CF	A	From Face	3.00	0.0000	120.00	No Ice	7.73	4.16	0.02
(Verizon - Reserved)			-1.00			1/2" Ice	8.27	4.60	0.06
			0.00						
LPA-171063-12CF	A	From Face	3.00	0.0000	120.00	No Ice	5.99	6.05	0.01
(Verizon - Reserved)			-4.00			1/2" Ice	6.46	6.52	0.06
			0.00						
LPA-80063/6CF	A	From Face	3.00	0.0000	120.00	No Ice	10.31	9.01	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(Verizon - Reserved)			-6.00 0.00			1/2" Ice	10.87	9.55	0.10
LPA-80063/6CF	B	From Face	3.00	0.0000	120.00	No Ice	10.31	9.01	0.03
(Verizon - Reserved)			6.00 0.00			1/2" Ice	10.87	9.55	0.10
LPA-171063-12CF	B	From Face	3.00	0.0000	120.00	No Ice	5.99	6.05	0.01
(Verizon - Reserved)			4.00 0.00			1/2" Ice	6.46	6.52	0.06
BXA-70063/6CF	B	From Face	3.00	0.0000	120.00	No Ice	7.73	4.16	0.02
(Verizon - Reserved)			1.00 0.00			1/2" Ice	8.27	4.60	0.06
BXA-70063/6CF	B	From Face	3.00	0.0000	120.00	No Ice	7.73	4.16	0.02
(Verizon - Reserved)			-1.00 0.00			1/2" Ice	8.27	4.60	0.06
LPA-171063-12CF	B	From Face	3.00	0.0000	120.00	No Ice	5.99	6.05	0.01
(Verizon - Reserved)			-4.00 0.00			1/2" Ice	6.46	6.52	0.06
LPA-80063/6CF	B	From Face	3.00	0.0000	120.00	No Ice	10.31	9.01	0.03
(Verizon - Reserved)			-6.00 0.00			1/2" Ice	10.87	9.55	0.10
LPA-80063/6CF	C	From Face	3.00	0.0000	120.00	No Ice	10.31	9.01	0.03
(Verizon - Reserved)			6.00 0.00			1/2" Ice	10.87	9.55	0.10
LPA-171063-12CF	C	From Face	3.00	0.0000	120.00	No Ice	5.99	6.05	0.01
(Verizon - Reserved)			4.00 0.00			1/2" Ice	6.46	6.52	0.06
BXA-70063/6CF	C	From Face	3.00	0.0000	120.00	No Ice	7.73	4.16	0.02
(Verizon - Reserved)			1.00 0.00			1/2" Ice	8.27	4.60	0.06
BXA-70063/6CF	C	From Face	3.00	0.0000	120.00	No Ice	7.73	4.16	0.02
(Verizon - Reserved)			-1.00 0.00			1/2" Ice	8.27	4.60	0.06
LPA-171063-12CF	C	From Face	3.00	0.0000	120.00	No Ice	5.99	6.05	0.01
(Verizon - Reserved)			-4.00 0.00			1/2" Ice	6.46	6.52	0.06
LPA-80063/6CF	C	From Face	3.00	0.0000	120.00	No Ice	10.31	9.01	0.03
(Verizon - Reserved)			-6.00 0.00			1/2" Ice	10.87	9.55	0.10
(2) FD9R6004/2C-3L	A	From Face	3.00	0.0000	120.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon - Reserved)			0.00						
(2) FD9R6004/2C-3L	B	From Face	3.00	0.0000	120.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon - Reserved)			0.00						
(2) FD9R6004/2C-3L	C	From Face	3.00	0.0000	120.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon - Reserved)			0.00						
RRH2x40-AWS	A	From Face	3.00	0.0000	120.00	No Ice	2.52	1.59	0.04
(Verizon - Reserved)			0.00 0.00			1/2" Ice	2.75	1.80	0.06
RRH2x40-AWS	B	From Face	3.00	0.0000	120.00	No Ice	2.52	1.59	0.04
(Verizon - Reserved)			0.00 0.00			1/2" Ice	2.75	1.80	0.06
RRH2x40-AWS	C	From Face	3.00	0.0000	120.00	No Ice	2.52	1.59	0.04
(Verizon - Reserved)			0.00 0.00			1/2" Ice	2.75	1.80	0.06
RRH2x40-07-U	A	From Face	3.00	0.0000	120.00	No Ice	2.25	1.23	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(Verizon - Reserved)			0.00 0.00			1/2" Ice	2.45	1.39	0.07
RRH2x40-07-U	B	From Face	3.00	0.0000	120.00	No Ice	2.25	1.23	0.05
(Verizon - Reserved)			0.00 0.00			1/2" Ice	2.45	1.39	0.07
RRH2x40-07-U	C	From Face	3.00	0.0000	120.00	No Ice	2.25	1.23	0.05
(Verizon - Reserved)			0.00 0.00			1/2" Ice	2.45	1.39	0.07
(2) DB-T1-6Z-8AB-0Z	C	From Face	3.00	0.0000	120.00	No Ice	5.60	2.33	0.04
(Verizon - Reserved)			0.00 0.00			1/2" Ice	5.92	2.56	0.08
13' Platform w/rails	C	None		0.0000	118.00	No Ice	31.30	31.30	1.82
(Verizon - Existing)						1/2" Ice	40.20	40.20	2.45
(2) RR90-17-02DP	A	From Face	4.00	0.0000	100.00	No Ice	4.36	1.97	0.02
(T-Mobile - Existing)			0.00 0.00			1/2" Ice	4.77	2.31	0.04
(2) RR90-17-02DP	B	From Face	4.00	0.0000	100.00	No Ice	4.36	1.97	0.02
(T-Mobile - Existing)			0.00 0.00			1/2" Ice	4.77	2.31	0.04
14-ft Low Profile Platform	C	None		0.0000	100.00	No Ice	16.50	16.50	1.55
(T-Mobile - Existing)						1/2" Ice	20.00	20.00	1.80
APXVSPP18-C-A20 w/	A	From Face	4.00	0.0000	90.00	No Ice	8.96	8.08	0.12
Mount			0.00			1/2" Ice	9.66	9.14	0.20
(Sprint - Existing)			0.00						
APXVSPP18-C-A20 w/	B	From Face	4.00	0.0000	90.00	No Ice	8.96	8.08	0.12
Mount			0.00			1/2" Ice	9.66	9.14	0.20
(Sprint - Existing)			0.00						
ET-X-TU-42-15-37-18-iR-SP	C	From Face	4.00	0.0000	90.00	No Ice	8.45	3.31	0.06
(Sprint - Existing)			0.00 0.00			1/2" Ice	8.88	3.67	0.11
FD-RRH 2x50 800 w/ Mount	A	From Face	4.00	0.0000	90.00	No Ice	4.92	5.39	0.14
(Sprint - Existing)			2.00 2.00			1/2" Ice	5.52	6.08	0.20
FD-RRH 4x40 1900	A	From Face	4.00	0.0000	90.00	No Ice	2.61	2.71	0.06
(Sprint - Existing)			2.00 -1.00			1/2" Ice	2.84	2.95	0.08
FD-RRH 2x50 800 w/ Mount	B	From Face	4.00	0.0000	90.00	No Ice	4.92	5.39	0.14
(Sprint - Existing)			2.00 2.00			1/2" Ice	5.52	6.08	0.20
FD-RRH 4x40 1900	B	From Face	4.00	0.0000	90.00	No Ice	2.61	2.71	0.06
(Sprint - Existing)			2.00 -1.00			1/2" Ice	2.84	2.95	0.08
FD-RRH 2x50 800 w/ Mount	C	From Face	4.00	0.0000	90.00	No Ice	4.92	5.39	0.14
(Sprint - Existing)			2.00 2.00			1/2" Ice	5.52	6.08	0.20
FD-RRH 4x40 1900	C	From Face	4.00	0.0000	90.00	No Ice	2.61	2.71	0.06
(Sprint - Existing)			0.00 -1.00			1/2" Ice	2.84	2.95	0.08
14-ft Low Profile Platform	C	None		0.0000	90.00	No Ice	16.50	16.50	1.55
(Sprint - Existing)						1/2" Ice	20.00	20.00	1.80
APXV18-206517S	A	From Face	1.50	0.0000	83.00	No Ice	5.17	3.04	0.03
(MetroPCS - Existing)			0.00 0.00			1/2" Ice	5.62	3.47	0.05
APXV18-206517S	B	From Face	1.50	0.0000	83.00	No Ice	5.17	3.04	0.03
(MetroPCS - Existing)			0.00 0.00			1/2" Ice	5.62	3.47	0.05
APXV18-206517S	C	From Face	1.50	0.0000	83.00	No Ice	5.17	3.04	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(MetroPCS - Existing)			0.00 0.00			1/2" Ice	5.62	3.47	0.05
Uni-Tri Bracket	C	None		0.0000	83.00	No Ice	1.75	1.75	0.00
(MetroPCS - Existing)						1/2" Ice	1.94	1.94	0.00
SBNHH-1D65A	A	From Face	4.00	0.0000	130.00	No Ice	6.36	3.86	0.04
(AT&T - Proposed)			6.00 0.00			1/2" Ice	6.80	4.22	0.08
SBNHH-1D65A	A	From Face	4.00	0.0000	130.00	No Ice	6.36	3.86	0.04
(AT&T - Proposed)			4.00 0.00			1/2" Ice	6.80	4.22	0.08
SBNHH-1D65A	A	From Face	4.00	0.0000	130.00	No Ice	6.36	3.86	0.04
(AT&T - Proposed)			-4.00 0.00			1/2" Ice	6.80	4.22	0.08
HPA-65R-BUU-H8	B	From Face	4.00	0.0000	130.00	No Ice	13.30	7.52	0.07
(AT&T - Proposed)			6.00 0.00			1/2" Ice	13.99	8.09	0.14
HPA-65R-BUU-H8	B	From Face	4.00	0.0000	130.00	No Ice	13.30	7.52	0.07
(AT&T - Proposed)			4.00 0.00			1/2" Ice	13.99	8.09	0.14
HPA-65R-BUU-H8	B	From Face	4.00	0.0000	130.00	No Ice	13.30	7.52	0.07
(AT&T - Proposed)			-4.00 0.00			1/2" Ice	13.99	8.09	0.14
HPA-65R-BUU-H8	C	From Face	4.00	0.0000	130.00	No Ice	13.30	7.52	0.07
(AT&T - Proposed)			6.00 0.00			1/2" Ice	13.99	8.09	0.14
HPA-65R-BUU-H8	C	From Face	4.00	0.0000	130.00	No Ice	13.30	7.52	0.07
(AT&T - Proposed)			4.00 0.00			1/2" Ice	13.99	8.09	0.14
HPA-65R-BUU-H8	C	From Face	4.00	0.0000	130.00	No Ice	13.30	7.52	0.07
(AT&T - Proposed)			-4.00 0.00			1/2" Ice	13.99	8.09	0.14
RRUS-11	A	From Face	4.00	0.0000	130.00	No Ice	2.99	1.25	0.05
(AT&T - Proposed)			0.00 0.00			1/2" Ice	3.23	1.41	0.07
(2) RRUS-12	A	From Face	4.00	0.0000	130.00	No Ice	3.67	1.49	0.06
(AT&T - Proposed)			0.00 0.00			1/2" Ice	3.93	1.67	0.08
RRUS-32	A	From Face	4.00	0.0000	130.00	No Ice	3.87	2.76	0.08
(AT&T - Proposed)			0.00 0.00			1/2" Ice	4.15	3.02	0.10
RRUS-E2	A	From Face	4.00	0.0000	130.00	No Ice	3.67	1.49	0.06
(AT&T - Proposed)			0.00 0.00			1/2" Ice	3.93	1.67	0.08
(2) A2	A	From Face	4.00	0.0000	130.00	No Ice	2.42	0.54	0.02
(AT&T - Proposed)			0.00 0.00			1/2" Ice	2.63	0.67	0.03
RRUS-11	B	From Face	4.00	0.0000	130.00	No Ice	2.99	1.25	0.05
(AT&T - Proposed)			0.00 0.00			1/2" Ice	3.23	1.41	0.07
(2) RRUS-12	B	From Face	4.00	0.0000	130.00	No Ice	3.67	1.49	0.06
(AT&T - Proposed)			0.00 0.00			1/2" Ice	3.93	1.67	0.08
RRUS-32	B	From Face	4.00	0.0000	130.00	No Ice	3.87	2.76	0.08
(AT&T - Proposed)			0.00 0.00			1/2" Ice	4.15	3.02	0.10
RRUS-E2	B	From Face	4.00	0.0000	130.00	No Ice	3.67	1.49	0.06
(AT&T - Proposed)			0.00			1/2" Ice	3.93	1.67	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
(2) A2	B	From Face	4.00	0.0000	130.00	No Ice	2.42	0.54	0.02
(AT&T - Proposed)			0.00			1/2" Ice	2.63	0.67	0.03
			0.00						
RRUS-11	C	From Face	4.00	0.0000	130.00	No Ice	2.99	1.25	0.05
(AT&T - Proposed)			0.00			1/2" Ice	3.23	1.41	0.07
			0.00						
(2) RRUS-12	C	From Face	4.00	0.0000	130.00	No Ice	3.67	1.49	0.06
(AT&T - Proposed)			0.00			1/2" Ice	3.93	1.67	0.08
			0.00						
RRUS-32	C	From Face	4.00	0.0000	130.00	No Ice	3.87	2.76	0.08
(AT&T - Proposed)			0.00			1/2" Ice	4.15	3.02	0.10
			0.00						
RRUS-E2	C	From Face	4.00	0.0000	130.00	No Ice	3.67	1.49	0.06
(AT&T - Proposed)			0.00			1/2" Ice	3.93	1.67	0.08
			0.00						
(2) A2	C	From Face	4.00	0.0000	130.00	No Ice	2.42	0.54	0.02
(AT&T - Proposed)			0.00			1/2" Ice	2.63	0.67	0.03
			0.00						
DC6-48-60-18-8F Surge	A	From Face	0.50	0.0000	130.00	No Ice	2.23	2.23	0.02
Arrestor			0.00			1/2" Ice	2.45	2.45	0.04
(AT&T - Proposed)			0.00						
DC6-48-60-18-8F Surge	B	From Face	0.50	0.0000	130.00	No Ice	2.23	2.23	0.02
Arrestor			0.00			1/2" Ice	2.45	2.45	0.04
(AT&T - Proposed)			0.00						
Commscope MTC3607R	A	From Face	0.50	0.0000	130.00	No Ice	53.00	53.00	2.52
Platform			0.00			1/2" Ice	68.00	68.00	3.20
(AT&T - Proposed)			0.00						

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	127.07	1.47	24	43.379	A	0.000	43.379	43.379	100.00	0.000	0.000
140.00-115.36					B	0.000	43.379		100.00	0.000	2.756
					C	0.000	43.379		100.00	0.000	2.779
L2	96.90	1.36	22	83.739	A	0.000	83.739	83.739	100.00	0.000	0.000
115.36-79.83					B	0.000	83.739		100.00	0.000	21.105
					C	0.000	83.739		100.00	0.000	11.551
L3 79.83-40.26	59.64	1.184	19	122.029	A	0.000	122.029	122.029	100.00	0.000	0.000
					B	0.000	122.029		100.00	0.000	23.505
					C	0.000	122.029		100.00	0.000	12.864
L4 40.26-0.00	19.40	1	16	154.412	A	0.000	154.412	154.412	100.00	0.000	0.000
					B	0.000	154.412		100.00	0.000	22.132
					C	0.000	154.412		100.00	0.000	12.113

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	127.07	1.47	18	0.5000	45.432	A	0.000	45.432	45.432	100.00	0.000	0.000
140.00-115.36						B	0.000	45.432		100.00	0.000	4.148
						C	0.000	45.432		100.00	0.000	13.491
L2 115.36-79.83	96.90	1.36	17	0.5000	86.699	A	0.000	86.699	86.699	100.00	0.000	0.000
						B	0.000	86.699		100.00	0.000	31.763
						C	0.000	86.699		100.00	0.000	39.975
L3 79.83-40.26	59.64	1.184	14	0.5000	125.326	A	0.000	125.326	125.326	100.00	0.000	0.000
						B	0.000	125.326		100.00	0.000	35.375
						C	0.000	125.326		100.00	0.000	44.520
L4 40.26-0.00	19.40	1	12	0.5000	157.767	A	0.000	157.767	157.767	100.00	0.000	0.000
						B	0.000	157.767		100.00	0.000	33.310
						C	0.000	157.767		100.00	0.000	41.921

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	127.07	1.47	9	43.379	A	0.000	43.379	43.379	100.00	0.000	0.000
140.00-115.36					B	0.000	43.379		100.00	0.000	2.756
					C	0.000	43.379		100.00	0.000	2.779
L2	96.90	1.36	9	83.739	A	0.000	83.739	83.739	100.00	0.000	0.000
115.36-79.83					B	0.000	83.739		100.00	0.000	21.105
					C	0.000	83.739		100.00	0.000	11.551
L3 79.83-40.26	59.64	1.184	8	122.029	A	0.000	122.029	122.029	100.00	0.000	0.000
					B	0.000	122.029		100.00	0.000	23.505
					C	0.000	122.029		100.00	0.000	12.864
L4 40.26-0.00	19.40	1	6	154.412	A	0.000	154.412	154.412	100.00	0.000	0.000
					B	0.000	154.412		100.00	0.000	22.132
					C	0.000	154.412		100.00	0.000	12.113

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.21	1.04	A	1	0.65	1	1	1	43.379	1.37	55.72	C
140.00-115.36			B	1	0.65	1	1	1	43.379			
			C	1	0.65	1	1	1	43.379			
L2	1.32	3.63	A	1	0.65	1	1	1	83.739	3.28	92.18	C
115.36-79.83			B	1	0.65	1	1	1	83.739			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	1	0.65	1	1	1	83.739			
L3	2.00	7.51	A	1	0.65	1	1	1	122.029	3.77	95.38	C
79.83-40.26			B	1	0.65	1	1	1	122.029			
			C	1	0.65	1	1	1	122.029			
L4 40.26-0.00	1.88	11.04	A	1	0.65	1	1	1	154.412	3.73	92.58	C
			B	1	0.65	1	1	1	154.412			
			C	1	0.65	1	1	1	154.412			
Sum Weight:	5.41	23.22						OTM	789.23 kip-ft	12.15		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.21	1.04	A	1	0.65	1	1	1	43.379	1.37	55.72	C
140.00-115.36			B	1	0.65	1	1	1	43.379			
			C	1	0.65	1	1	1	43.379			
L2	1.32	3.63	A	1	0.65	1	1	1	83.739	3.28	92.18	C
115.36-79.83			B	1	0.65	1	1	1	83.739			
			C	1	0.65	1	1	1	83.739			
L3	2.00	7.51	A	1	0.65	1	1	1	122.029	3.77	95.38	C
79.83-40.26			B	1	0.65	1	1	1	122.029			
			C	1	0.65	1	1	1	122.029			
L4 40.26-0.00	1.88	11.04	A	1	0.65	1	1	1	154.412	3.73	92.58	C
			B	1	0.65	1	1	1	154.412			
			C	1	0.65	1	1	1	154.412			
Sum Weight:	5.41	23.22						OTM	789.23 kip-ft	12.15		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.21	1.04	A	1	0.65	1	1	1	43.379	1.37	55.72	C
140.00-115.36			B	1	0.65	1	1	1	43.379			
			C	1	0.65	1	1	1	43.379			
L2	1.32	3.63	A	1	0.65	1	1	1	83.739	3.28	92.18	C
115.36-79.83			B	1	0.65	1	1	1	83.739			
			C	1	0.65	1	1	1	83.739			
L3	2.00	7.51	A	1	0.65	1	1	1	122.029	3.77	95.38	C
79.83-40.26			B	1	0.65	1	1	1	122.029			
			C	1	0.65	1	1	1	122.029			
L4 40.26-0.00	1.88	11.04	A	1	0.65	1	1	1	154.412	3.73	92.58	C
			B	1	0.65	1	1	1	154.412			
			C	1	0.65	1	1	1	154.412			
Sum Weight:	5.41	23.22						OTM	789.23 kip-ft	12.15		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.21	1.04	A	1	0.65	1	1	1	43.379	1.37	55.72	C
140.00-115.36			B	1	0.65	1	1	1	43.379			
			C	1	0.65	1	1	1	43.379			
L2	1.32	3.63	A	1	0.65	1	1	1	83.739	3.28	92.18	C
115.36-79.83			B	1	0.65	1	1	1	83.739			
			C	1	0.65	1	1	1	83.739			
L3	2.00	7.51	A	1	0.65	1	1	1	122.029	3.77	95.38	C
79.83-40.26			B	1	0.65	1	1	1	122.029			
			C	1	0.65	1	1	1	122.029			
L4 40.26-0.00	1.88	11.04	A	1	0.65	1	1	1	154.412	3.73	92.58	C
			B	1	0.65	1	1	1	154.412			
			C	1	0.65	1	1	1	154.412			
Sum Weight:	5.41	23.22						OTM	789.23 kip-ft	12.15		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.31	1.37	A	1	0.65	1	1	1	45.432	1.44	58.44	C
140.00-115.36			B	1	0.65	1	1	1	45.432			
			C	1	0.65	1	1	1	45.432			
L2	1.91	4.26	A	1	0.65	1	1	1	86.699	3.61	101.69	C
115.36-79.83			B	1	0.65	1	1	1	86.699			
			C	1	0.65	1	1	1	86.699			
L3	2.65	8.43	A	1	0.65	1	1	1	125.326	3.95	99.77	C
79.83-40.26			B	1	0.65	1	1	1	125.326			
			C	1	0.65	1	1	1	125.326			
L4 40.26-0.00	2.50	12.19	A	1	0.65	1	1	1	157.767	3.69	91.70	C
			B	1	0.65	1	1	1	157.767			
			C	1	0.65	1	1	1	157.767			
Sum Weight:	7.37	26.25						OTM	840.17 kip-ft	12.69		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.31	1.37	A	1	0.65	1	1	1	45.432	1.44	58.44	C
140.00-115.36			B	1	0.65	1	1	1	45.432			
			C	1	0.65	1	1	1	45.432			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L2	1.91	4.26	A	1	0.65	1	1	1	86.699	3.61	101.69	C
115.36-79.83			B	1	0.65	1	1	1	86.699			
			C	1	0.65	1	1	1	86.699			
L3	2.65	8.43	A	1	0.65	1	1	1	125.326	3.95	99.77	C
79.83-40.26			B	1	0.65	1	1	1	125.326			
			C	1	0.65	1	1	1	125.326			
L4 40.26-0.00	2.50	12.19	A	1	0.65	1	1	1	157.767	3.69	91.70	C
			B	1	0.65	1	1	1	157.767			
			C	1	0.65	1	1	1	157.767			
Sum Weight:	7.37	26.25						OTM	840.17 kip-ft	12.69		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.31	1.37	A	1	0.65	1	1	1	45.432	1.44	58.44	C
140.00-115.36			B	1	0.65	1	1	1	45.432			
			C	1	0.65	1	1	1	45.432			
L2	1.91	4.26	A	1	0.65	1	1	1	86.699	3.61	101.69	C
115.36-79.83			B	1	0.65	1	1	1	86.699			
			C	1	0.65	1	1	1	86.699			
L3	2.65	8.43	A	1	0.65	1	1	1	125.326	3.95	99.77	C
79.83-40.26			B	1	0.65	1	1	1	125.326			
			C	1	0.65	1	1	1	125.326			
L4 40.26-0.00	2.50	12.19	A	1	0.65	1	1	1	157.767	3.69	91.70	C
			B	1	0.65	1	1	1	157.767			
			C	1	0.65	1	1	1	157.767			
Sum Weight:	7.37	26.25						OTM	840.17 kip-ft	12.69		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.31	1.37	A	1	0.65	1	1	1	45.432	1.44	58.44	C
140.00-115.36			B	1	0.65	1	1	1	45.432			
			C	1	0.65	1	1	1	45.432			
L2	1.91	4.26	A	1	0.65	1	1	1	86.699	3.61	101.69	C
115.36-79.83			B	1	0.65	1	1	1	86.699			
			C	1	0.65	1	1	1	86.699			
L3	2.65	8.43	A	1	0.65	1	1	1	125.326	3.95	99.77	C
79.83-40.26			B	1	0.65	1	1	1	125.326			
			C	1	0.65	1	1	1	125.326			
L4 40.26-0.00	2.50	12.19	A	1	0.65	1	1	1	157.767	3.69	91.70	C
			B	1	0.65	1	1	1	157.767			
			C	1	0.65	1	1	1	157.767			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
Sum Weight:	7.37	26.25						OTM	840.17 kip-ft	12.69		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.21	1.04	A	1	0.65	1	1	1	43.379	0.54	21.77	C
140.00-115.36			B	1	0.65	1	1	1	43.379			
			C	1	0.65	1	1	1	43.379			
L2	1.32	3.63	A	1	0.65	1	1	1	83.739	1.28	36.01	C
115.36-79.83			B	1	0.65	1	1	1	83.739			
			C	1	0.65	1	1	1	83.739			
L3	2.00	7.51	A	1	0.65	1	1	1	122.029	1.47	37.26	C
79.83-40.26			B	1	0.65	1	1	1	122.029			
			C	1	0.65	1	1	1	122.029			
L4 40.26-0.00	1.88	11.04	A	1	0.65	1	1	1	154.412	1.46	36.16	C
			B	1	0.65	1	1	1	154.412			
			C	1	0.65	1	1	1	154.412			
Sum Weight:	5.41	23.22						OTM	308.29 kip-ft	4.75		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.21	1.04	A	1	0.65	1	1	1	43.379	0.54	21.77	C
140.00-115.36			B	1	0.65	1	1	1	43.379			
			C	1	0.65	1	1	1	43.379			
L2	1.32	3.63	A	1	0.65	1	1	1	83.739	1.28	36.01	C
115.36-79.83			B	1	0.65	1	1	1	83.739			
			C	1	0.65	1	1	1	83.739			
L3	2.00	7.51	A	1	0.65	1	1	1	122.029	1.47	37.26	C
79.83-40.26			B	1	0.65	1	1	1	122.029			
			C	1	0.65	1	1	1	122.029			
L4 40.26-0.00	1.88	11.04	A	1	0.65	1	1	1	154.412	1.46	36.16	C
			B	1	0.65	1	1	1	154.412			
			C	1	0.65	1	1	1	154.412			
Sum Weight:	5.41	23.22						OTM	308.29 kip-ft	4.75		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.21	1.04	A	1	0.65	1	1	1	43.379	0.54	21.77	C
140.00-115.36			B	1	0.65	1	1	1	43.379			
			C	1	0.65	1	1	1	43.379			
L2	1.32	3.63	A	1	0.65	1	1	1	83.739	1.28	36.01	C
115.36-79.83			B	1	0.65	1	1	1	83.739			
			C	1	0.65	1	1	1	83.739			
L3	2.00	7.51	A	1	0.65	1	1	1	122.029	1.47	37.26	C
79.83-40.26			B	1	0.65	1	1	1	122.029			
			C	1	0.65	1	1	1	122.029			
L4 40.26-0.00	1.88	11.04	A	1	0.65	1	1	1	154.412	1.46	36.16	C
			B	1	0.65	1	1	1	154.412			
			C	1	0.65	1	1	1	154.412			
Sum Weight:	5.41	23.22						OTM	308.29 kip-ft	4.75		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.21	1.04	A	1	0.65	1	1	1	43.379	0.54	21.77	C
140.00-115.36			B	1	0.65	1	1	1	43.379			
			C	1	0.65	1	1	1	43.379			
L2	1.32	3.63	A	1	0.65	1	1	1	83.739	1.28	36.01	C
115.36-79.83			B	1	0.65	1	1	1	83.739			
			C	1	0.65	1	1	1	83.739			
L3	2.00	7.51	A	1	0.65	1	1	1	122.029	1.47	37.26	C
79.83-40.26			B	1	0.65	1	1	1	122.029			
			C	1	0.65	1	1	1	122.029			
L4 40.26-0.00	1.88	11.04	A	1	0.65	1	1	1	154.412	1.46	36.16	C
			B	1	0.65	1	1	1	154.412			
			C	1	0.65	1	1	1	154.412			
Sum Weight:	5.41	23.22						OTM	308.29 kip-ft	4.75		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	23.22					
Bracing Weight	0.00					
Total Member Self-Weight	23.22			-0.12	1.50	
Total Weight	39.95			-0.12	1.50	
Wind 0 deg - No Ice		0.17	-32.40	-3200.41	-21.19	-1.09
Wind 30 deg - No Ice		16.13	-28.15	-2783.00	-1591.49	-0.07
Wind 45 deg - No Ice		22.73	-23.04	-2279.11	-2239.59	0.46
Wind 60 deg - No Ice		27.77	-16.35	-1619.92	-2734.95	0.96
Wind 90 deg - No Ice		31.96	-0.17	-22.81	-3145.18	1.74

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 120 deg - No Ice		27.60	16.05	1580.38	-2712.26	2.05
Wind 135 deg - No Ice		22.48	22.79	2246.79	-2207.49	2.00
Wind 150 deg - No Ice		15.83	27.98	2760.08	-1552.19	1.81
Wind 180 deg - No Ice		-0.17	32.40	3200.18	24.19	1.09
Wind 210 deg - No Ice		-16.13	28.15	2782.77	1594.49	0.07
Wind 225 deg - No Ice		-22.73	23.04	2278.88	2242.58	-0.46
Wind 240 deg - No Ice		-27.77	16.35	1619.69	2737.95	-0.96
Wind 270 deg - No Ice		-31.96	0.17	22.58	3148.18	-1.74
Wind 300 deg - No Ice		-27.60	-16.05	-1580.61	2715.26	-2.05
Wind 315 deg - No Ice		-22.48	-22.79	-2247.02	2210.49	-2.00
Wind 330 deg - No Ice		-15.83	-27.98	-2760.31	1555.19	-1.81
Member Ice	3.03					
Total Weight Ice	49.76			1.51	0.78	
Wind 0 deg - Ice		0.13	-29.88	-2885.92	-16.48	-1.67
Wind 30 deg - Ice		14.88	-25.94	-2507.71	-1437.00	-0.47
Wind 45 deg - Ice		20.98	-21.22	-2052.42	-2023.62	0.19
Wind 60 deg - Ice		25.64	-15.05	-1457.15	-2472.27	0.85
Wind 90 deg - Ice		29.53	-0.13	-15.75	-2844.89	1.94
Wind 120 deg - Ice		25.51	14.82	1430.28	-2455.02	2.51
Wind 135 deg - Ice		20.79	21.03	2031.03	-1999.21	2.55
Wind 150 deg - Ice		14.65	25.81	2493.47	-1407.11	2.41
Wind 180 deg - Ice		-0.13	29.88	2888.94	18.04	1.67
Wind 210 deg - Ice		-14.88	25.94	2510.73	1438.57	0.47
Wind 225 deg - Ice		-20.98	21.22	2055.43	2025.18	-0.19
Wind 240 deg - Ice		-25.64	15.05	1460.17	2473.84	-0.85
Wind 270 deg - Ice		-29.53	0.13	18.77	2846.46	-1.94
Wind 300 deg - Ice		-25.51	-14.82	-1427.26	2456.58	-2.51
Wind 315 deg - Ice		-20.79	-21.03	-2028.01	2000.78	-2.55
Wind 330 deg - Ice		-14.65	-25.81	-2490.45	1408.67	-2.41
Total Weight	39.95			-0.12	1.50	
Wind 0 deg - Service		0.07	-12.66	-1251.42	-6.32	-0.42
Wind 30 deg - Service		6.30	-11.00	-1088.37	-619.72	-0.03
Wind 45 deg - Service		8.88	-9.00	-891.53	-872.88	0.18
Wind 60 deg - Service		10.85	-6.39	-634.04	-1066.38	0.38
Wind 90 deg - Service		12.49	-0.07	-10.17	-1226.63	0.68
Wind 120 deg - Service		10.78	6.27	616.08	-1057.52	0.80
Wind 135 deg - Service		8.78	8.90	876.40	-860.34	0.78
Wind 150 deg - Service		6.18	10.93	1076.90	-604.36	0.71
Wind 180 deg - Service		-0.07	12.66	1248.81	11.41	0.42
Wind 210 deg - Service		-6.30	11.00	1085.76	624.81	0.03
Wind 225 deg - Service		-8.88	9.00	888.93	877.97	-0.18
Wind 240 deg - Service		-10.85	6.39	631.43	1071.47	-0.38
Wind 270 deg - Service		-12.49	0.07	7.56	1231.72	-0.68
Wind 300 deg - Service		-10.78	-6.27	-618.68	1062.61	-0.80
Wind 315 deg - Service		-8.78	-8.90	-879.00	865.43	-0.78
Wind 330 deg - Service		-6.18	-10.93	-1079.50	609.45	-0.71

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 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice

Comb. No.	Description
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	140 - 115.36	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-9.83	3.17	0.19
			Max. Mx	14	-4.94	127.06	-1.01
			Max. My	2	-4.87	0.56	127.75
			Max. Vy	14	-16.28	127.06	-1.01
			Max. Vx	2	-16.75	0.56	127.75
			Max. Torque	15			3.37
L2	115.36 - 79.83	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	18	-22.99	2.61	0.54
			Max. Mx	14	-15.29	821.11	-7.16
			Max. My	2	-15.24	-5.90	836.86
			Max. Vy	14	-24.48	821.11	-7.16
			Max. Vx	2	-24.93	-5.90	836.86
			Max. Torque	15			3.39
L3	79.83 - 40.26	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-33.56	1.88	-0.33
			Max. Mx	14	-24.89	1860.71	-14.64
			Max. My	2	-24.86	-13.25	1894.09
			Max. Vy	14	-28.48	1860.71	-14.64
			Max. Vx	2	-28.93	-13.25	1894.09
			Max. Torque	33			2.40
L4	40.26 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-49.76	0.89	-1.51
			Max. Mx	14	-39.93	3238.13	-23.26
			Max. My	2	-39.93	-21.81	3291.80
			Max. Vy	14	-31.99	3238.13	-23.26
			Max. Vx	2	-32.43	-21.81	3291.80
			Max. Torque	33			2.67

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	49.76	0.13	-29.88
	Max. H_x	14	39.95	31.96	-0.17
	Max. H_z	2	39.95	-0.17	32.40
	Max. M_x	2	3291.80	-0.17	32.40
	Max. M_z	6	3234.90	-31.96	0.17
	Max. Torsion	33	2.67	20.79	21.03
	Min. Vert	1	39.95	0.00	0.00
	Min. H_x	6	39.95	-31.96	0.17
	Min. H_z	10	39.95	0.17	-32.40
	Min. M_x	10	-3291.50	0.17	-32.40
	Min. M_z	14	-3238.13	31.96	-0.17
	Min. Torsion	25	-2.67	-20.79	-21.03

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	39.95	0.00	0.00	-0.14	1.57	0.00
Dead+Wind 0 deg - No Ice	39.95	0.17	-32.40	-3291.80	-21.81	-1.32
Dead+Wind 30 deg - No Ice	39.95	16.13	-28.15	-2862.51	-1636.84	-0.33
Dead+Wind 45 deg - No Ice	39.95	22.73	-23.04	-2344.29	-2303.40	0.21
Dead+Wind 60 deg - No Ice	39.95	27.77	-16.35	-1666.31	-2812.92	0.74
Dead+Wind 90 deg - No Ice	39.95	31.96	-0.17	-23.60	-3234.90	1.62
Dead+Wind 120 deg - No Ice	39.95	27.60	16.05	1625.46	-2789.60	2.07
Dead+Wind 135 deg - No Ice	39.95	22.48	22.79	2310.93	-2270.38	2.08
Dead+Wind 150 deg - No Ice	39.95	15.83	27.98	2838.87	-1596.33	1.96

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 180 deg - No Ice	39.95	-0.17	32.40	3291.50	25.05	1.32
Dead+Wind 210 deg - No Ice	39.95	-16.13	28.15	2862.19	1640.09	0.34
Dead+Wind 225 deg - No Ice	39.95	-22.73	23.04	2343.96	2306.65	-0.21
Dead+Wind 240 deg - No Ice	39.95	-27.77	16.35	1665.98	2816.16	-0.74
Dead+Wind 270 deg - No Ice	39.95	-31.96	0.17	23.26	3238.13	-1.62
Dead+Wind 300 deg - No Ice	39.95	-27.60	-16.05	-1625.79	2792.82	-2.07
Dead+Wind 315 deg - No Ice	39.95	-22.48	-22.79	-2311.25	2273.60	-2.08
Dead+Wind 330 deg - No Ice	39.95	-15.83	-27.98	-2839.18	1599.55	-1.96
Dead+Ice+Temp	49.76	-0.00	0.00	1.51	0.89	0.00
Dead+Wind 0 deg+Ice+Temp	49.76	0.13	-29.88	-3000.13	-17.10	-1.92
Dead+Wind 30 deg+Ice+Temp	49.76	14.88	-25.94	-2607.00	-1493.71	-0.73
Dead+Wind 45 deg+Ice+Temp	49.76	20.98	-21.22	-2133.74	-2103.49	-0.04
Dead+Wind 60 deg+Ice+Temp	49.76	25.64	-15.05	-1514.96	-2569.88	0.65
Dead+Wind 90 deg+Ice+Temp	49.76	29.53	-0.13	-16.54	-2957.23	1.86
Dead+Wind 120 deg+Ice+Temp	49.76	25.51	14.82	1486.77	-2551.91	2.57
Dead+Wind 135 deg+Ice+Temp	49.76	20.79	21.03	2111.31	-2078.04	2.67
Dead+Wind 150 deg+Ice+Temp	49.76	14.65	25.81	2592.06	-1462.50	2.59
Dead+Wind 180 deg+Ice+Temp	49.76	-0.13	29.88	3003.18	18.99	1.92
Dead+Wind 210 deg+Ice+Temp	49.76	-14.88	25.94	2610.05	1495.62	0.73
Dead+Wind 225 deg+Ice+Temp	49.76	-20.98	21.22	2136.78	2105.40	0.04
Dead+Wind 240 deg+Ice+Temp	49.76	-25.64	15.05	1517.99	2571.79	-0.65
Dead+Wind 270 deg+Ice+Temp	49.76	-29.53	0.13	19.56	2959.13	-1.86
Dead+Wind 300 deg+Ice+Temp	49.76	-25.51	-14.82	-1483.74	2553.79	-2.57
Dead+Wind 315 deg+Ice+Temp	49.76	-20.79	-21.03	-2108.28	2079.92	-2.67
Dead+Wind 330 deg+Ice+Temp	49.76	-14.65	-25.81	-2589.02	1464.38	-2.59
Dead+Wind 0 deg - Service	39.95	0.07	-12.66	-1287.34	-7.54	-0.52
Dead+Wind 30 deg - Service	39.95	6.30	-11.00	-1119.47	-639.09	-0.13
Dead+Wind 45 deg - Service	39.95	8.88	-9.00	-916.81	-899.74	0.08
Dead+Wind 60 deg - Service	39.95	10.85	-6.39	-651.69	-1098.97	0.29
Dead+Wind 90 deg - Service	39.95	12.49	-0.07	-9.32	-1263.94	0.64
Dead+Wind 120 deg - Service	39.95	10.78	6.27	635.50	-1089.81	0.82
Dead+Wind 135 deg - Service	39.95	8.78	8.90	903.55	-886.79	0.82
Dead+Wind 150 deg - Service	39.95	6.18	10.93	1110.00	-623.22	0.77
Dead+Wind 180 deg - Service	39.95	-0.07	12.66	1287.03	10.79	0.52
Dead+Wind 210 deg - Service	39.95	-6.30	11.00	1119.16	642.34	0.13
Dead+Wind 225 deg - Service	39.95	-8.88	9.00	916.50	902.99	-0.08
Dead+Wind 240 deg - Service	39.95	-10.85	6.39	651.37	1102.22	-0.29
Dead+Wind 270 deg - Service	39.95	-12.49	0.07	9.01	1267.19	-0.64
Dead+Wind 300 deg - Service	39.95	-10.78	-6.27	-635.82	1093.06	-0.82
Dead+Wind 315 deg - Service	39.95	-8.78	-8.90	-903.86	890.04	-0.82
Dead+Wind 330 deg - Service	39.95	-6.18	-10.93	-1110.31	626.47	-0.77

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-39.95	0.00	0.00	39.95	0.00	0.000%
2	0.17	-39.95	-32.40	-0.17	39.95	32.40	0.000%
3	16.13	-39.95	-28.15	-16.13	39.95	28.15	0.000%
4	22.73	-39.95	-23.04	-22.73	39.95	23.04	0.000%
5	27.77	-39.95	-16.35	-27.77	39.95	16.35	0.000%
6	31.96	-39.95	-0.17	-31.96	39.95	0.17	0.000%
7	27.60	-39.95	16.05	-27.60	39.95	-16.05	0.000%
8	22.48	-39.95	22.79	-22.48	39.95	-22.79	0.000%
9	15.83	-39.95	27.98	-15.83	39.95	-27.98	0.000%
10	-0.17	-39.95	32.40	0.17	39.95	-32.40	0.000%
11	-16.13	-39.95	28.15	16.13	39.95	-28.15	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
12	-22.73	-39.95	23.04	22.73	39.95	-23.04	0.000%
13	-27.77	-39.95	16.35	27.77	39.95	-16.35	0.000%
14	-31.96	-39.95	0.17	31.96	39.95	-0.17	0.000%
15	-27.60	-39.95	-16.05	27.60	39.95	16.05	0.000%
16	-22.48	-39.95	-22.79	22.48	39.95	22.79	0.000%
17	-15.83	-39.95	-27.98	15.83	39.95	27.98	0.000%
18	0.00	-49.76	0.00	0.00	49.76	0.00	0.000%
19	0.13	-49.76	-29.88	-0.13	49.76	29.88	0.000%
20	14.88	-49.76	-25.94	-14.88	49.76	25.94	0.000%
21	20.98	-49.76	-21.22	-20.98	49.76	21.22	0.000%
22	25.64	-49.76	-15.05	-25.64	49.76	15.05	0.000%
23	29.53	-49.76	-0.13	-29.53	49.76	0.13	0.000%
24	25.51	-49.76	14.82	-25.51	49.76	-14.82	0.000%
25	20.79	-49.76	21.03	-20.79	49.76	-21.03	0.000%
26	14.65	-49.76	25.81	-14.65	49.76	-25.81	0.000%
27	-0.13	-49.76	29.88	0.13	49.76	-29.88	0.000%
28	-14.88	-49.76	25.94	14.88	49.76	-25.94	0.000%
29	-20.98	-49.76	21.22	20.98	49.76	-21.22	0.000%
30	-25.64	-49.76	15.05	25.64	49.76	-15.05	0.000%
31	-29.53	-49.76	0.13	29.53	49.76	-0.13	0.000%
32	-25.51	-49.76	-14.82	25.51	49.76	14.82	0.000%
33	-20.79	-49.76	-21.03	20.79	49.76	21.03	0.000%
34	-14.65	-49.76	-25.81	14.65	49.76	25.81	0.000%
35	0.07	-39.95	-12.66	-0.07	39.95	12.66	0.000%
36	6.30	-39.95	-11.00	-6.30	39.95	11.00	0.000%
37	8.88	-39.95	-9.00	-8.88	39.95	9.00	0.000%
38	10.85	-39.95	-6.39	-10.85	39.95	6.39	0.000%
39	12.49	-39.95	-0.07	-12.49	39.95	0.07	0.000%
40	10.78	-39.95	6.27	-10.78	39.95	-6.27	0.000%
41	8.78	-39.95	8.90	-8.78	39.95	-8.90	0.000%
42	6.18	-39.95	10.93	-6.18	39.95	-10.93	0.000%
43	-0.07	-39.95	12.66	0.07	39.95	-12.66	0.000%
44	-6.30	-39.95	11.00	6.30	39.95	-11.00	0.000%
45	-8.88	-39.95	9.00	8.88	39.95	-9.00	0.000%
46	-10.85	-39.95	6.39	10.85	39.95	-6.39	0.000%
47	-12.49	-39.95	0.07	12.49	39.95	-0.07	0.000%
48	-10.78	-39.95	-6.27	10.78	39.95	6.27	0.000%
49	-8.78	-39.95	-8.90	8.78	39.95	8.90	0.000%
50	-6.18	-39.95	-10.93	6.18	39.95	10.93	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00070235
3	Yes	5	0.00000001	0.00036679
4	Yes	5	0.00000001	0.00040267
5	Yes	5	0.00000001	0.00035913
6	Yes	4	0.00000001	0.00094193
7	Yes	5	0.00000001	0.00038439
8	Yes	5	0.00000001	0.00039304
9	Yes	5	0.00000001	0.00033459
10	Yes	5	0.00000001	0.00003858
11	Yes	5	0.00000001	0.00037536
12	Yes	5	0.00000001	0.00040447

13	Yes	5	0.00000001	0.00038125
14	Yes	5	0.00000001	0.00004608
15	Yes	5	0.00000001	0.00033767
16	Yes	5	0.00000001	0.00039970
17	Yes	5	0.00000001	0.00038928
18	Yes	4	0.00000001	0.00000727
19	Yes	5	0.00000001	0.00017772
20	Yes	5	0.00000001	0.00086109
21	Yes	5	0.00000001	0.00097944
22	Yes	5	0.00000001	0.00085689
23	Yes	5	0.00000001	0.00017805
24	Yes	5	0.00000001	0.00089964
25	Yes	5	0.00000001	0.00095756
26	Yes	5	0.00000001	0.00079987
27	Yes	5	0.00000001	0.00018956
28	Yes	5	0.00000001	0.00089457
29	Yes	5	0.00000001	0.00098860
30	Yes	5	0.00000001	0.00089495
31	Yes	5	0.00000001	0.00019012
32	Yes	5	0.00000001	0.00080949
33	Yes	5	0.00000001	0.00097147
34	Yes	5	0.00000001	0.00091329
35	Yes	4	0.00000001	0.00020050
36	Yes	5	0.00000001	0.00004229
37	Yes	5	0.00000001	0.00004924
38	Yes	5	0.00000001	0.00004086
39	Yes	4	0.00000001	0.00025032
40	Yes	5	0.00000001	0.00004727
41	Yes	5	0.00000001	0.00004781
42	Yes	4	0.00000001	0.00097656
43	Yes	4	0.00000001	0.00024104
44	Yes	5	0.00000001	0.00004466
45	Yes	5	0.00000001	0.00005005
46	Yes	5	0.00000001	0.00004599
47	Yes	4	0.00000001	0.00029130
48	Yes	5	0.00000001	0.00003765
49	Yes	5	0.00000001	0.00004992
50	Yes	5	0.00000001	0.00004888

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 115.36	33.923	44	2.1502	0.0163
L2	118.89 - 79.83	24.532	44	2.0436	0.0081
L3	84.42 - 40.26	11.826	44	1.3861	0.0021
L4	45.54 - 0	3.300	44	0.6774	0.0007

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.00	20' x 2" Dia Omni	44	33.923	2.1502	0.0163	18043
138.00	4' Side Mount Standoff	44	33.014	2.1458	0.0154	18043

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	800 10121	44	29.398	2.1221	0.0121	9021
120.00	LPA-80063/6CF	44	25.005	2.0551	0.0084	4570
118.00	13' Platform w/rails	44	24.154	2.0336	0.0078	4278
100.00	(2) RR90-17-02DP	44	17.042	1.7259	0.0039	3307
90.00	APXVSPP18-C-A20 w/ Mount	44	13.583	1.5079	0.0026	2943
83.00	APXV18-206517S	44	11.401	1.3559	0.0020	2783

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 115.36	86.490	11	5.4821	0.0418
L2	118.89 - 79.83	62.591	11	5.2145	0.0207
L3	84.42 - 40.26	30.205	11	3.5407	0.0062
L4	45.54 - 0	8.433	11	1.7313	0.0022

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.00	20' x 2" Dia Omni	11	86.490	5.4821	0.0418	7357
138.00	4' Side Mount Standoff	11	84.177	5.4714	0.0396	7357
130.00	800 10121	11	74.979	5.4127	0.0310	3677
120.00	LPA-80063/6CF	11	63.797	5.2437	0.0220	1860
118.00	13' Platform w/rails	11	61.630	5.1892	0.0205	1739
100.00	(2) RR90-17-02DP	11	43.509	4.4068	0.0106	1317
90.00	APXVSPP18-C-A20 w/ Mount	11	34.685	3.8512	0.0075	1165
83.00	APXV18-206517S	11	29.119	3.4638	0.0060	1099

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	140 - 115.36 (1)	TP24.2521x18x0.1875	24.64	0.00	0.0	39.000	13.7884	-4.88	537.75	0.009
L2	115.36 - 79.83 (2)	TP32.7041x22.9814x0.3125	39.06	0.00	0.0	39.000	30.9952	-15.23	1208.81	0.013
L3	79.83 - 40.26 (3)	TP41.9334x30.9366x0.4375	44.16	0.00	0.0	39.000	55.7964	-24.86	2176.06	0.011
L4	40.26 - 0 (4)	TP51x39.7436x0.5	45.54	0.00	0.0	39.000	80.1435	-39.93	3125.60	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	140 - 115.36 (1)	TP24.2521x18x0.1875	129.03	19.646	39.000	0.504	0.00	0.000	39.000	0.000
L2	115.36 - 79.83 (2)	TP32.7041x22.9814x0.3125	838.92	42.211	39.000	1.082	0.00	0.000	39.000	0.000
L3	79.83 - 40.26 (3)	TP41.9334x30.9366x0.4375	1898.40	41.302	39.000	1.059	0.00	0.000	39.000	0.000
L4	40.26 - 0 (4)	TP51x39.7436x0.5	3298.79	39.718	39.000	1.018	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	140 - 115.36 (1)	TP24.2521x18x0.1875	16.69	1.211	26.000	0.093	0.78	0.058	26.000	0.002
L2	115.36 - 79.83 (2)	TP32.7041x22.9814x0.3125	24.98	0.806	26.000	0.062	0.67	0.016	26.000	0.001
L3	79.83 - 40.26 (3)	TP41.9334x30.9366x0.4375	28.97	0.519	26.000	0.040	0.52	0.005	26.000	0.000
L4	40.26 - 0 (4)	TP51x39.7436x0.5	32.47	0.405	26.000	0.031	0.34	0.002	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	140 - 115.36 (1)	0.009	0.504	0.000	0.093	0.002	0.515 ✔	1.333	H1-3+VT ✔
L2	115.36 - 79.83 (2)	0.013	1.082	0.000	0.062	0.001	1.096 ✔	1.333	H1-3+VT ✔
L3	79.83 - 40.26 (3)	0.011	1.059	0.000	0.040	0.000	1.071 ✔	1.333	H1-3+VT ✔
L4	40.26 - 0 (4)	0.013	1.018	0.000	0.031	0.000	1.031 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	140 - 115.36	Pole	TP24.2521x18x0.1875	1	-4.88	716.82	38.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P_{allow} K	% Capacity	Pass Fail
L2	115.36 - 79.83	Pole	TP32.7041x22.9814x0.3125	2	-15.23	1611.34	82.2	Pass
L3	79.83 - 40.26	Pole	TP41.9334x30.9366x0.4375	3	-24.86	2900.69	80.3	Pass
L4	40.26 - 0	Pole	TP51x39.7436x0.5	4	-39.93	4166.42	77.4	Pass
							Summary	
						Pole (L2)	82.2	Pass
						RATING =	**82.2**	**Pass**

CENTEK engineering
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Subject:	Anchor Bolt and Base Plate Anlaysis
Location:	140-ft EEI Monopole Canton, CT
Rev. 0: 5/27/14	Prepared by: T.J.L. Checked by: C.F.C. Job No. 14033.007

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 3299 \cdot ft \cdot kips$	(Input From tnxTower)
Shear Force =	$Shear := 32 \cdot kips$	(Input From tnxTower)
Axial Force =	$Axial := 40 \cdot kips$	(Input From tnxTower)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts =	$N := 20$	(User Input)
Diameter of Bolt Circle =	$D_{bc} := 60 \cdot in$	(User Input)
Bolt "Column" Distance =	$l := 3.0 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 100 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 75 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D := 2.25 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)

Base Plate Data:

Use ASTM A572 Grade 60

Plate Yield Strength =	$Fy_{bp} := 60 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{bp} := 2.25 \cdot in$	(User Input)
Base Plate Diameter =	$D_{bp} := 66.0 \cdot in$	(User Input)
Outer Pole Diameter =	$D_{pole} := 51.0 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 30 \cdot in$

Distance to Bolts = $i := 1 .. N$

$$d_i := \left| \begin{array}{l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N} \right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array} \right.$$

$d_1 = 9.27 \cdot in$ $d_7 = 24.27 \cdot in$

$d_2 = 17.63 \cdot in$ $d_8 = 17.63 \cdot in$

$d_3 = 24.27 \cdot in$ $d_9 = 9.27 \cdot in$

$d_4 = 28.53 \cdot in$ $d_{10} = 0.00 \cdot in$

$d_5 = 30.00 \cdot in$ $d_{11} = -9.27 \cdot in$

$d_6 = 28.53 \cdot in$ etc.

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 25.5 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$ $MA_7 = 0.00 \cdot in$

$MA_2 = 0.00 \cdot in$ $MA_8 = 0.00 \cdot in$

$MA_3 = 0.00 \cdot in$ $MA_9 = 0.00 \cdot in$

$MA_4 = 3.03 \cdot in$ $MA_{10} = 0.00 \cdot in$

$MA_5 = 4.50 \cdot in$ $MA_{11} = 0.00 \cdot in$

$MA_6 = 3.03 \cdot in$ etc

Effective Width of Baseplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 33.5 \cdot in$

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 9 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 2.033 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.508 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.826 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 130 \cdot kips$

Allowable Tensile Force = $T_{ALL.Gross} := 1.333 \cdot \left(0.33 \cdot A_g \cdot F_u\right) = 174.9 \cdot kips$ (1.333 increase allowed per TIA/EIA)

$T_{ALL.Net} := 1.333 \cdot \left(0.60 \cdot A_n \cdot F_y\right) = 194.812 \cdot kips$ (1.333 increase allowed per TIA/EIA)

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Net}} \cdot 100 = 67$ Bolts are "upset bolts". Use net area per AISC

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Net}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Check Anchor Bolt Bending Stress:

Maximum Bending Moment = $M_x := \left(\frac{Shear}{N}\right) \cdot l = 0.4 \cdot ft \cdot kips$

Maximum Bending Stress = $f_{bx} := \frac{M_x}{S_x} = 5.8 \cdot ksi$

Allowable Bending Stress = $F_{bx} := 1.333 \cdot 0.6 \cdot F_y = 60 \cdot ksi$ (1.333 increase allowed per TIA/EIA)

Check Combined Stress Requirement:

Per ASCE Manual 72: "If the clearance between the base plate and concrete does not exceed two times the bolt diameter a bending stress analysis of the bolts is NOT normally required.

$$l := \begin{cases} l & \text{if } l > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 0 \cdot in$$

$$f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 0 \cdot ksi$$

Check Anchor Bolt Compression/Combined Stress:

Maximum Compressive Force =

$$C_{Max} := OM \cdot \frac{R_{bc}}{l_p} + \frac{Axial}{N} = 134 \cdot kips$$

Maximum Compressive Stress =

$$f_a := \frac{C_{Max}}{A_n} = 41.2 \cdot ksi$$

$$K := 0.65$$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{F_y}} = 87.364$$

$$F_a := \begin{cases} \dfrac{\left[1 - \dfrac{\left(\frac{K \cdot l}{r}\right)^2}{2 \cdot C_c^{\,2}}\right] \cdot F_y}{\dfrac{5}{3} + \dfrac{3 \cdot \left(\frac{K \cdot l}{r}\right)}{8 \cdot C_c} - \dfrac{\left(\frac{K \cdot l}{r}\right)^3}{8 \cdot C_c^{\,3}}} & \text{if } \dfrac{K \cdot l}{r} \le C_c \\ \dfrac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r}\right)^2} & \text{if } \dfrac{K \cdot l}{r} > C_c \end{cases} = 45 \cdot ksi$$

Allowable Compressive Stress =

$$F_a := 1.333 \cdot F_a = 60 \cdot ksi$$

(1.333 increase allowed per TIA/EIA)

Combined Stress % of Capacity =

$$\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}}\right) \cdot 100 = 68.8$$

Condition 2 =

$$Condition2 := if\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$$

Condition2 = "OK"

Base Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

$C_1 = 42.8 \cdot kips$ $C_7 = 108.8 \cdot kips$

$C_2 = 79.6 \cdot kips$ $C_8 = 79.6 \cdot kips$

$C_3 = 108.8 \cdot kips$ $C_9 = 42.8 \cdot kips$

$C_4 = 127.5 \cdot kips$ $C_{10} = 2.0 \cdot kips$

$C_5 = 134.0 \cdot kips$ $C_{11} = -38.8 \cdot kips$

$C_6 = 127.5 \cdot kips$ etc.

Maximum Bending Stress in Plate = $f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^2\right)} = 48.7 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 1.33 \cdot 0.75 \cdot Fy_{bp} = 59.9 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} \cdot 100 = 81.3$

Condition3 = $Condition3 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition3 = "Ok"

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Subject:	Foundation Analysis
Location:	140-ft Monopole Canton, CT
Rev. 0: 5/27/14	Prepared by: T.J.L. Checked by: C.F.C. Job No. 14033.007

Standard Monopole Foundation:

Input Data:

Tower Data

Overturning Moment =	$OM := 3299 \cdot ft \cdot kips$	(User Input from tnxTower)	
Shear Force =	$Shear := 32 \cdot kip$	(User Input from tnxTower)	
Axial Force =	$Axial := 40 \cdot kip$	(User Input from tnxTower)	
Tower Height =	$H_t := 140 \cdot ft$	(User Input)	

Footing Data:

Overall Depth of Footing =	$D_f := 6.5 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 4.5 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)	
Diameter of Pier =	$d_p := 6.5 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 3.0 \cdot ft$	(User Input)	
Width of Footing =	$W_f := 24.0 \cdot ft$	(User Input)	

Anchor Bolt Data:

Length of Anchor Bolts =	$L_{st} := 72 \cdot in$	(User Input)	
Projection of Anchor Bolts Above Pier =	$A_{BP} := 12.0 \cdot in$	(User Input)	
Anchor Bolt Diameter =	$d_{anchor} := 2.25 \cdot in$	(User Input)	
Base Plate Bolt Circle =	$MP := 60.0 \cdot in$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 4000 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Anchor Bolt Yield Strength =	$f_{ya} := 75000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Allowable Soil Bearing Capacity =	$q_s := 4000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 100 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Pier Reinforcement:

Bar Size =	$BS_{pier} := 8$	(User Input)	
Bar Diameter =	$d_{bpier} := 1.0 \cdot in$	(User Input)	
Number of Bars =	$NB_{pier} := 44$	(User Input)	
Clear Cover of Reinforcement =	$Cvr_{pier} := 3 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Diameter of Tie =	$d_{Tie} := 0.5 \cdot in$	(User Input)	

Pad Reinforcement:

Bar Size =	$BS_{top} := 8$	(User Input)	(Top of Pad)
Bar Diameter =	$d_{btop} := 1.0 \cdot in$	(User Input)	(Top of Pad)
Number of Bars =	$NB_{top} := 28$	(User Input)	(Top of Pad)
Bar Size =	$BS_{bot} := 8$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{bbot} := 1.0 \cdot in$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{bot} := 40$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{pad} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pier Reinforcement Bar Area =
$$A_{bpier} := \frac{\pi \cdot d_{bpier}^2}{4} = 0.785 \cdot in^2$$

Pad Top Reinforcement Bar Area =
$$A_{btop} := \frac{\pi \cdot d_{btop}^2}{4} = 0.785 \cdot in^2$$

Pad Bottom Reinforcement Bar Area =
$$A_{bbot} := \frac{\pi \cdot d_{bbot}^2}{4} = 0.785 \cdot in^2$$

Coefficient of Lateral Soil Pressure =
$$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$$

Load Factor =
$$LF := \begin{cases} 1.333 & \text{if } H_t \le 700 \cdot ft \\ 1.7 & \text{if } H_t \ge 1200 \cdot ft \\ 1.333 + \left(\frac{H_t - 700ft}{1200ft - 700ft}\right) \cdot 0.4 & \text{otherwise} \end{cases} = 1.333$$

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := if(Bouyancy = 1, \gamma_{conc} - 62.4pcf, \gamma_{conc}) = 150 \cdot pcf$

Adjusted Soil Unit Weight = $\gamma_s := if(Bouyancy = 1, \gamma_{soil} - 62.4pcf, \gamma_{soil}) = 100 \cdot pcf$

Passive Pressure = $P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0 \cdot ksf$

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = 1.05 \cdot ksf$

$P_{top} := if[n < (D_f - T_f), P_{pt}, P_{pn}] = 1.05 \cdot ksf$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 1.95 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 1.5 \cdot ksf$

$T_p := if[n < (D_f - T_f), T_f, (D_f - n)] = 3$

$A_p := W_f \cdot T_p = 72$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 108 \cdot kip$

Weight of Concrete Pad = $WT_c := \left[\left(W_f^2 \cdot T_f\right) + d_p^2 \cdot L_p\right] \cdot \gamma_c = 287.719 \cdot kip$

Weight of Soil Above Footing = $WT_{s1} := \left[\left(W_f^2 - d_p^2\right) \cdot \begin{cases} (L_p - L_{pag} - n) & \text{if } (L_p - L_{pag} - n) \geq 0 \\ 0 & \text{if } (L_p - L_{pag} - n) \leq 0 \end{cases}\right] \cdot \gamma_s = 213.5 \cdot kip$

Weight of Soil Wedge at Back Face = $WT_{s2} := \left(\frac{D_f^2 \cdot \tan(\Phi_s)}{2} \cdot W_f\right) \cdot \gamma_s = 29.272 \cdot kip$

Weight of Soil Wedge at back face Corners = $WT_{s3} := 2 \cdot \left[(D_f)^3 \cdot \frac{\tan(\Phi_s)}{3}\right] \cdot \gamma_s = 10.57 \cdot kips$

Total Weight = $WT_{tot} := WT_c + WT_{s1} + Axial = 541.219 \cdot kip$

Resisting Moment = $M_r := (WT_{tot}) \cdot \frac{W_f}{2} + S_u \cdot \frac{T_f}{3} + \left[(WT_{s2} + WT_{s3}) \cdot \left(W_f + \frac{D_f \cdot \tan(\Phi_s)}{3}\right)\right] = 7609 \cdot kip \cdot ft$

Overturning Moment = $M_{ot} := OM + Shear \cdot (L_p + T_f) = 3539 \cdot kip \cdot ft$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 2.15$

Factor of Safety Required = $FS_{req} := 2$

$OverTurning\_Moment\_Check := if(FS \geq FS_{req}, "Okay", "No Good")$

$OverTurning\_Moment\_Check = "Okay"$

Shear Capacity in Pier:

Shear Resistance of Pier = $S_p := \frac{\mu \cdot WT_{tot}}{FS_{req}} = 121.774 \cdot kips$

$Shear\_Check := if(S_p > Shear, "Okay", "No Good")$

$Shear\_Check = "Okay"$

Bearing Pressure Caused by Footing:

Area of the Mat = $A_{mat} := W_f^2 = 576$

Section Modulus of Mat = $S := \frac{W_f^3}{6} = 2304 \cdot ft^3$

Maximum Pressure in Mat = $P_{max} := \frac{WT_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 2.476 \cdot ksf$

$Max\_Pressure\_Check := if(P_{max} < q_s, "Okay", "No Good")$

$Max\_Pressure\_Check = "Okay"$

Minimum Pressure in Mat = $P_{min} := \frac{WT_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = -0.596 \cdot ksf$

$Min\_Pressure\_Check := if[(P_{min} \geq 0) \cdot (P_{min} < q_s), "Okay", "No Good"]$

$Min\_Pressure\_Check = "No Good"$

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 6.447$

Distance to Kern = $X_k := \frac{W_f}{6} = 4$ Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity = $e := \frac{M_{ot}}{WT_{tot}} = 6.539$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot WT_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)} = 2.753 \cdot ksf$

$q_{adj} := if(P_{min} < 0, P_a, P_{max}) = 2.753 \cdot ksf$

$Pressure\_Check := if(q_{adj} < q_s, "Okay", "No Good")$

$Pressure\_Check = "Okay"$

Concrete Bearing Capacity:

Strength Reduction Factor = $\Phi_c := 0.65$ (ACI-2008 9.3.2.2)

Bearing Strength Between Pier and Pad = $P_b := \Phi_c \cdot 0.85 \cdot f_c \cdot \frac{\pi \cdot d_p^2}{4} = 1.056 \times 10^4 \cdot kips$ (ACI-2008 10.14)

$Bearing\_Check := if\left(P_b > LF \cdot Axial, "Okay", "No Good"\right)$

Bearing_Check = "Okay"

Shear Strength of Concrete:

Beam Shear: (Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$\phi_c := 0.85$ (ACI 9.3.2.5)

$d := T_f - Cvr_{pad} - d_{bbot} = 32 \cdot in$

$d_1 := \frac{W_f}{2} - \frac{d_p}{2}$

$d_2 := d_1 - d$

$L := \left(\frac{W_f}{2} - e\right) \cdot 3$

$Slope := if\left(L > W_f, \frac{P_{max} - P_{min}}{W_f}, \frac{q_{adj}}{L}\right)$

$V_{req} := LF \cdot \left[\left(q_{adj} - Slope \cdot d_1\right) + \left(\frac{Slope \cdot d_1}{2}\right)\right] \cdot W_f \cdot d_1$

$V_{Avail} := \phi_c \cdot 2 \cdot \sqrt{f_c \cdot psi} \cdot W_f \cdot d$ (ACI-2008 11.2.1.1)

$Beam\_Shear\_Check := if\left(V_{req} < V_{Avail}, "Okay", "No Good"\right)$

Beam_Shear_Check = "Okay"

Punching Shear: (Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.11.1.2)

Critical Perimeter of Punching Shear = $b_o := \left(d_p + d\right) \cdot \pi = 28.8$

Area Included Inside Perimeter = $A_{bo} := \frac{\pi \cdot \left(d_p + d\right)^2}{4} = 66$

Area Outside of Perimeter = $A_{out} := A_{mat} - A_{bo} = 510$

Guess Value = $v_u := 1ksf$ (From "Foundation Analysis and design", By Joseph Bowles, Eq. 8-9)

Given $d^2 + d_p \cdot d = \frac{WT_{tot}}{\pi \cdot v_u}$

$v_u := Find(v_u) = 7 \cdot ksf$

$V_u := v_u \cdot d \cdot W_f = 451 \cdot kips$

Required Shear Strength = $V_{req} := LF \cdot V_u = 601.2 \cdot kips$

Available Shear Strength = $V_{Avail} := \phi_c \cdot 4 \cdot \sqrt{f_c \cdot psi} \cdot b_o \cdot d = 2377.9 \cdot kip$ (ACI-2008 11.11.2.1)

$Punching\_Shear\_Check := if(V_{req} < V_{Avail}, "Okay", "No Good")$

$Punching\_Shear\_Check = "Okay"$

Steel Reinforcement in Pad:

Required Reinforcement for Bending:

Strength Reduction Factor = $\phi_m := .90$ (ACI-2008 9.3.2.1)

$q_b := q_{adj} - d_1 \cdot Slope = 1.283 \cdot ksf$

Maximum Bending at Face of Pier = $M_u := LF \cdot \left[\left(q_{adj} - q_b \right) \cdot \frac{d_1^2}{3} + q_b \cdot \frac{d_1^2}{2} \right] \cdot W_f = 2771.3 \cdot kip \cdot ft$

$$\beta := \begin{cases} 0.85 & \text{if } 2500 \cdot psi \le f_c \le 4000 \cdot psi \\ 0.65 & \text{if } f_c > 8000 \cdot psi \\ \left[0.85 - \left[\frac{\left(\frac{f_c}{psi} - 4000 \right)}{1000} \right] \cdot 0.5 \right] & \text{otherwise} \end{cases} = 0.85$$

(ACI-200810.2.7.3)

$R_n := \frac{M_u}{\phi_m \cdot W_f \cdot d^2} = 125.3 \cdot psi$

$\rho := \frac{0.85 \cdot f_c}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot R_n}{0.85 \cdot f_c}} \right) = 0.0021$

$\rho_{min} := \rho = 0.00213$

Required Reinforcement for Temperature and Shrinkage:

$$\rho_{sh} := \begin{cases} .0018 & \text{if } f_y \geq 60000 \cdot psi \\ .0020 & \text{otherwise} \end{cases}$$ (ACI -2008 7.12.2.1)

Check Bottom Bars:

$$As := \begin{cases} \rho_{min} \cdot W_f \cdot d & \text{if } \rho_{min} > \frac{\rho_{sh}}{2} \\ \rho_{sh} \cdot W_f \cdot \frac{d}{2} & \text{otherwise} \end{cases} = 19.613 \cdot in^2$$

$$As_{prov} := A_{bbot} \cdot NB_{bot} = 31.4 \cdot in^2$$

$$Pad\_Reinforcement\_Bot := if\left(As_{prov} > As, "Okay", "No Good"\right)$$

Pad_Reinforcement_Bot = "Okay"

Check top Bars:

$$As := \rho_{sh} \cdot \left(W_f \cdot \frac{d}{2}\right) = 8.3 \cdot in^2$$

$$As_{prov} := A_{btop} \cdot NB_{top} = 22 \cdot in^2$$

$$Pad\_Reinforcement\_Top := if\left(As_{prov} > As, "Okay", "No Good"\right)$$

Pad_Reinforcement_Top = "Okay"

Developement Length Pad Reinforcement:

Bar Spacing =

$$B_{sPad} := \frac{W_f - 2 \cdot Cvr_{pad} - NB_{bot} \cdot d_{bbot}}{NB_{bot} - 1} = 6.21 \cdot in$$

Spacing or Cover Dimension =

$$c := if\left(Cvr_{pad} < \frac{B_{sPad}}{2}, Cvr_{pad}, \frac{B_{sPad}}{2}\right) = 3 \cdot in$$

Transverse Reinforcement Index =

$$k_{tr} := 0$$ (ACI-2008 12.2.3)

$$L_{dbt} := \frac{3 \cdot f_y \alpha_{pad} \cdot \beta_{pad} \cdot \gamma_{pad} \cdot \lambda_{pad}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \frac{c + k_{tr}}{d_{bbot}}} \cdot d_{bbot} = 23.7 \cdot in$$

Minimum Development Length =

$$L_{dbmin} := 12 \cdot in$$ (ACI-2008 12.2.1)

$$L_{dbtCheck} := if\left(L_{dbt} \geq L_{dbmin}, "Use L.dbt", "Use L.dbmin"\right)$$

Available Length in Pad =

$$L_{Pad} := \frac{W_f}{2} - \frac{d_p}{2} - Cvr_{pad} = 102 \cdot in$$

$$Lpad\_Check := if\left(L_{Pad} > L_{dbt}, "Okay", "No Good"\right)$$

Lpad_Check = "Okay"

Steel Reinforcement in Pier:

Area of Pier = $A_p := \frac{\pi \cdot d_p^2}{4} = 4778.36 \cdot in^2$

$A_{smin} := 0.01 \cdot 0.5 \cdot A_p = 23.89 \cdot in^2$ (ACI-2008 10.8.4 & 10.9.1)

$A_{sprov} := NB_{pier} \cdot A_{bpier} = 34.56 \cdot in^2$

$Steel\_Area\_Check := if(A_{sprov} > A_{smin}, "Okay", "No Good")$

Steel_Area_Check = "Okay"

Bar Spacing In Pier = $B_{sPier} := \frac{d_p \cdot \pi}{NB_{pier}} - d_{bpier} = 4.569 \cdot in$

Diameter of Reinforcement Cage = $Diam_{cage} := d_p - 2 \cdot Cvr_{pier} = 72 \cdot in$

Maximum Moment in Pier = $M_p := \left[OM + Shear \cdot \left(L_p + \frac{A_{BP}}{2} \right) \right] \cdot LF = 55330.2 \cdot in \cdot kips$

Pier Check evaluated from outside program and results are listed below;

$(D \ N \ n \ P_u \ M_{xu}) := \left(d_p \cdot 12 \ \ NB_{pier} \ \ BS_{pier} \ \ \frac{Axial \cdot 1.333}{kips} \ \ \frac{M_p}{in \cdot kips} \right)$

$(D \ N \ n \ P_u \ M_{xu}) = (78 \ \ 44 \ \ 8 \ \ 53.32 \ \ 5.533 \times 10^4)$

$(\phi P_n \ \ \phi M_{xn} \ \ f_{sp} \ \ \rho) := (0 \ \ 0 \ \ 0 \ \ 0)$

$(\phi P_n \ \ \phi M_{xn} \ \ f_{sp} \ \ \rho) := \phi P'_n(D, N, n, P_u, M_{xu})^T$

$(\phi P_n \ \ \phi M_{xn} \ \ f_{sp} \ \ \rho) = (58.759 \ \ 6.097 \times 10^4 \ \ -60 \ \ 7.274 \times 10^{-3})$

$Axial\_Load\_Check := if(\phi P_n \geq P_u, "Okay", "No Good")$

Axial_Load_Check = "Okay"

$Bending\_Check := if(\phi M_{xn} \geq M_{xu}, "Okay", "No Good")$

Bending_Check = "Okay"

Development Length Pier Reinforcement:

Available Length in Foundation:

$L_{pier} := L_p - Cvr_{pier} = 51 \cdot in$

$L_{pad} := T_f - Cvr_{pad} = 33 \cdot in$

Tension: (ACI-2008 12.2.3)

Spacing or Cover Dimension =

$c := if\left(Cvr_{pier} < \frac{B_{sPier}}{2}, Cvr_{pier}, \frac{B_{sPier}}{2}\right) = 2.285 \cdot in$

Transverse Reinforcement =

$k_{tr} := 0$ (ACI-2008 12.2.3)

$L_{dbt} := \frac{3 \cdot f_y \alpha_{pier} \cdot \beta_{pier} \cdot \gamma_{pier} \cdot \lambda_{pier}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \left(\frac{c + k_{tr}}{d_{bpier}}\right)} \cdot d_{bpier} = 31.14 \cdot in$

Minimum Development Length =

$L_{dh} := \frac{1200 \cdot d_{bpier}}{\sqrt{\frac{f_c}{psi}}} \cdot .7 = 13.282 \cdot in$ (ACI 12.2.1)

Pier reinforcement bars are standard 90 degree hooks and therefore developement in the pad is computed as follows:

$L_{db} := \max\left(L_{dbt}, L_{dbmin}\right)$

$L_{tension\_Check} := if\left(L_{pier} + L_{pad} > L_{dbt}, "Okay", "No Good"\right)$

$L_{tension\_Check} = "Okay"$

Compression: (ACI-2008 12.3.2)

$L_{dbc1} := \frac{.02 \cdot d_{bpier} \cdot f_y}{\sqrt{f_c \cdot psi}} = 18.974 \cdot in$

$L_{dbmin} := 0.0003 \cdot \frac{in^2}{lb} \cdot \left(d_{bpier} \cdot f_y\right) = 18 \cdot in$

$L_{dbc} := if\left(L_{dbc1} \geq L_{dbmin}, L_{dbc1}, L_{dbmin}\right) = 18.974 \cdot in$

$L_{compression\_Check} := if\left(L_{pier} + L_{pad} > L_{dbc}, "Okay", "No Good"\right)$

$L_{compression\_Check} = "Okay"$

Tie Size and Spacing in Column:

Minimum Tie Size =

$Tie_{min} := if(BS_{pier} \le 10, 3, 4) = 3$

Used #4 Ties

Seismic Factor =

$z := if(Z \le 2, 1, 0.5) = 1$ (ACI-2008 21.10.5)

$s_{lim1} := 16 \cdot d_{bpier} \cdot z = 16 \cdot in$

$s_{lim2} := 48 \cdot d_{Tie} \cdot z = 24 \cdot in$

$s_{lim3} := D_f \cdot z = 78 \cdot in$

$s_{lim4} := 18in$

Maximum Spacing =

$$s_{tie} := \min\left(\begin{pmatrix} s_{lim1} \\ s_{lim2} \\ s_{lim3} \\ s_{lim4} \end{pmatrix}\right) = 16 \cdot in$$

Number of Ties Required =

$$n_{tie} := \frac{L_{pier} - 3 \cdot in}{s_{tie}} + 1 = 4$$

Check Anchor Steel Embedment:

Depth Available =

$D_{ab} := L_{st} - A_{BP} = 5 \cdot ft$

Length of Anchor Bolt =

$$L_{anchor} := \frac{(0.11 \cdot f_{ya}) \cdot in}{\sqrt{f_c \cdot psi}} = 10.87 \cdot ft$$

$Depth\_Check := if(D_{ab} \ge L_{anchor}, "Okay", "No Good")$

Depth_Check = "No Good"

Note: Anchor plate is provided

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CTV1022	DATE:	04/20/2014	RF DESIGN ENG:	Younes Mekias	RF PERF ENG:		RFDS PROGRAM TYPE:	2014 LTE Next Carrier
ISSUE:	SFC_WCS and 700D/E	Approved? (Y/N):	Yes	RF DESIGN PHONE:	214.299.3228	RF PERF PHONE:		RFDS TECHNOLOGY:	LTE 2C
REVISION:	FINAL	RF MANAGER:		RF DESIGN EMAIL:	Younes.mekias@pramira.com	RF PERF EMAIL:		State:	Planned
INITIATIVE /PROJECT:	This RFDS requires SFC activity for LTE WCS and LTE 700D/E. The equipment ordering should be handled per the capital guidance. LTE 2C – Full configuration					TRIDENT:		Status:	In Progress
						GSM FREQUENCY:	850, 1900	RFDS ID:	240366
						UMTS FREQUENCY:	850, 1900	RFDS Version:	1.00
						LTE FREQUENCY:	700, 850, 1900, WCS	Created By:	fm4830
								Date Created:	12/27/2013 8:23:32 PM
								Date Updated:	4/22/2014 10:35:02 AM
								Updated By:	ym069x
						I-PLAN JOB # 1:	NER-RCTB-12-04123	IPLAN PRD GRP || SUB GRP #1:	LTE Next Carrier || LTE 2C
						I-PLAN JOB # 2:		IPLAN PRD GRP || SUB GRP #2:	
						I-PLAN JOB # 3:		IPLAN PRD GRP || SUB GRP #3:	
						I-PLAN JOB # 4:		IPLAN PRD GRP || SUB GRP #4:	

Section 2 - LOCATION INFORMATION

USID:	25969	FA LOCATION CODE:	10035260	LOCATION NAME:	CANTON SE	ORACLE PTN # 1:	2051585110	PACE JOB # 1:	MRCTB007543
REGION:	NORTHEAST	MARKET CLUSTER:	NEW ENGLAND	MARKET:	CONNECTICUT	ORACLE PTN # 2:		PACE JOB # 2:	
ADDRESS:	14 CANTON SPRINGS ROAD	CITY:	CANTON	STATE:	CT	ORACLE PTN # 3:		PACE JOB # 3:	
ZIP CODE:	06019	COUNTY:	HARTFORD	MSA / RSA:		ORACLE PTN # 4:		PACE JOB # 4:	
LATITUDE (D-M-S):	41d 49m 22.27116s	LONGITUDE (D-M-S):	-72d -53m -42.59796s	LAT (DEC. DEG.):	41.8228531	SEARCH RING NAME:			
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:	1022 CANTON FIREHOUSE I 84 TO RT 72 WEST CONTINUE FOR 1.7 MILES TO RT 177 WASHINGTON STREET TURN RIGHT AND FOLLOW FOR 10 MILES TO RT 44 TURN LEFT AND GO 3 MILES AND TURN LEFT ONTO DOWD AVE TAKE 1ST LEFT ONTO CANTON SPRINGS ROAD SITE IN REAR OF FIREHOUSE LOCK COMBO IS 4667. SMART CARDS LOCATED INSIDE SHELTER.T1 INFODHPV888413 (TDMA)DHPV888414 (TDMA)GSM T1#1: HCGS238784 (GSM)GSM T1#2: HCGS238785 (GSM)UMTS T1#1: HCGS 742214UMTS T1#2: HCGS 742215UMTS T1#3: HCGS 752859UMTS T1#4: HCGS 752860UMTS T1#5: HCGS 760938UMTS T1#6: HCGS 760939UMTS T1#7: HCGS 761342UMTS T1#8: HCGS 799272METER89 072 503 2					SEARCH RING ID:		CASPR INITIATIVE # 1:	
						BTA:		CASPR INITIATIVE # 2:	
						LONG (DEC. DEG.):	-72.8951661	CASPR INITIATIVE # 3:	
						BORDER CELL WITH CONTOUR COORD:		CASPR INITIATIVE # 4:	
						AM STUDY REQ'D (Y/N):	No		
						FREQ COORD:			

Section 3 - LICENSE COVERAGE/FILING INFORMATION

CGSA - NO FILING TRIGGERED (Yes/No):	No	CGSA LOSS:		PCS REDUCED - UPS ZIP:		CGSA CALL SIGNS:	
CGSA - MINOR FILING NEEDED (Yes/No)::	No	CGSA EXT AGMT NEEDED:		PCS POPS REDUCED:			
CGSA - MAJOR FILING NEEDED (Yes/No):	Yes	CGSA SCORECARD UPDATED:					

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:	Yes	GROUND ELEVATION (ft):		STRUCTURE TYPE:	MONOPOLE	MARKET LOCATION 700 MHz Band:			
ADDITIONAL REGULATORY?:	Yes	HEIGHT OVERALL (ft):	160.00	FCC ASR NUMBER:	NR	MARKET LOCATION 850 MHz Band:			
SUB-LEASE RIGHTS?:	Yes	STRUCTURE HEIGHT (ft):	160.00			MARKET LOCATION 1900 MHz Band:			
LIGHTING TYPE:	NOT REQUIRED					MARKET LOCATION AWS Band:			

Section 5 - E-911 INFORMATION - existing

		PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:
SECTOR A	E-911	CANTON POLICE DEPARTMENT	1310		INTRADO_MIAMI				
SECTOR B		CANTON POLICE DEPARTMENT	1310		INTRADO_MIAMI				
SECTOR C		CANTON POLICE DEPARTMENT	1310		INTRADO_MIAMI				
SECTOR D									
SECTOR E									
SECTOR F									
OMNI									

Section 5 - E-911 INFORMATION - final

		PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:
SECTOR A	E-911	CANTON POLICE DEPARTMENT	1310		INTRADO_MIAMI				
SECTOR B		CANTON POLICE DEPARTMENT	1310		INTRADO_MIAMI				
SECTOR C		CANTON POLICE DEPARTMENT	1310		INTRADO_MIAMI				
SECTOR D									
SECTOR E									
SECTOR F									
OMNI									

Section 6 - RBS GENERAL INFORMATION - existing

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	UMTS 3RD RBS	UMTS 4TH RBS	UMTS 5TH RBS	UMTS 6TH RBS	LTE 1ST RBS	LTE 2ND RBS
RBS ID:	130339	130340	208875	428439	250407				413942	
CTS COMMON ID:	032D1022	184D1022	CTV1022	CTU0022	CTU1022				CTL01022	
BTA/TID:	184G	184P	184U	184W	184V				184L	
4-DIGIT SITE ID:	1022	1022	1022	0022	1022				01022	
COW OR TOY?:	No	No	No	No	No				No	
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED				SECTORIZED	
SITE TYPE:	BTS-CONVENTIONAL	BTS-CONVENTIONAL	MACRO-CONVENTIONAL	BTS-CONVENTIONAL	MACRO-CONVENTIONAL				MACRO-CONVENTIONAL	
BTS LOCATION ID:				INTERNAL					INTERNAL	
ORIGINATING CO:	CINGULAR	CINGULAR	CINGULAR	CINGULAR	CINGULAR				CINGULAR	
CELLULAR NETWORK:	GOLD	GOLD	GOLD	GOLD	GOLD				GOLD	
OPS DISTRICT:	NORTH	CT-SOUTH	CT-NORTH	CT-South	CT-NORTH				CT-SOUTH	
RF DISTRICT:	NORTH	MIDDLETOWN	MIDDLETOWN	NPO Triage	MIDDLETOWN				NPO Triage	
OPS ZONE:	NE_CT_N_LCFD_S_CS	NE_CT_N_HRFR_SW__CS	NE_CT_N_HRFR_SW__CS	NE_CT_N_LCFD_S_CS	NE_CT_N_HRFR_SW__CS				NE_CT_N_LCFD_S_CS	
RF ZONE:	BCT04 - LITCHFIELD	BCT04	BCT10	Hotseat	BCT10				Hotseat	
BASE STATION TYPE:	BASE	BASE	BASE	OVERLAY	OVERLAY				BASE	
EQUIPMENT NAME:	CANTON SE	CANTON FD CANTON SPRINGS RD	CANTON SE	CANTON FD-CANTON SPRINGS RD 2ND NODE	CANTON FD-CANTON SPRINGS RD				CANTON SE LTE	
DISASTER PRIORITY:	0	1	1	1	0				0	

Section 6 - RBS GENERAL INFORMATION - final

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	UMTS 3RD RBS	UMTS 4TH RBS	UMTS 5TH RBS	UMTS 6TH RBS	LTE 1ST RBS	LTE 2ND RBS
RBS ID:	130339	130340	208875	428439	250407				413942	
CTS COMMON ID:	032D1022	184D1022	CTV1022	CTU0022	CTU1022				CTL01022	
BTA/TID:	184G	184P	184U	184W	184V				184L	
4-DIGIT SITE ID:	1022	1022	1022	0022	1022				01022	
COW OR TOY?:	No	No	No	No	No				No	
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED				SECTORIZED	
SITE TYPE:	BTS-CONVENTIONAL	BTS-CONVENTIONAL	MACRO-CONVENTIONAL	BTS-CONVENTIONAL	MACRO-CONVENTIONAL				MACRO-CONVENTIONAL	
BTS LOCATION ID:				INTERNAL					INTERNAL	
ORIGINATING CO:	CINGULAR	CINGULAR	CINGULAR	CINGULAR	CINGULAR				CINGULAR	
CELLULAR NETWORK:	GOLD	GOLD	GOLD	GOLD	GOLD				GOLD	
OPS DISTRICT:	NORTH	CT-South	CT-North	CT-South	CT-North				CT-South	
RF DISTRICT:	NORTH	Middletown	Middletown	NPO Triage	Middletown				NPO Triage	
OPS ZONE:	NE_CT_N_LCFD_S_CS	NE_CT_N_HRFR_SW__CS	NE_CT_N_HRFR_SW__CS	NE_CT_N_LCFD_S_CS	NE_CT_N_HRFR_SW__CS				NE_CT_N_LCFD_S_CS	
RF ZONE:	BCT04 - LITCHFIELD	BCT04	BCT10	Hotseat	BCT10				Hotseat	
BASE STATION TYPE:	BASE	BASE	BASE	OVERLAY	OVERLAY				BASE	
EQUIPMENT NAME:	CANTON SE	CANTON FD CANTON SPRINGS RD	CANTON SE	CANTON FD-CANTON SPRINGS RD 2ND NODE	CANTON FD-CANTON SPRINGS RD				CANTON SE LTE	
DISASTER PRIORITY:	0	1	1	1	0				0	

Section 7 - RBS SPECIFIC INFORMATION - existing

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	UMTS 3RD RBS	UMTS 4TH RBS	UMTS 5TH RBS	UMTS 6TH RBS	LTE 1ST RBS	LTE 2ND RBS
MSC										
BSC/RNC/MME POOL ID	MDTWCTBSC10	MDTWCTBSC10	MDTWCTNICR0R03	MDTWCTNICR0R03	MDTWCTNICR0R03				FF01	
LAC	05020	05020	05994	05994	05994					
RAC										
EQUIPMENT VENDOR	NOKIA	NOKIA	ERICSSON	ERICSSON	ERICSSON				ERICSSON	
EQUIPMENT TYPE	ULTRASITE	ULTRASITE	3206 INDOOR	6601 MAIN UNIT UMTS	3206 INDOOR				6601 INDOOR MU	
LOCATION										
CABINET LOCATION										
MARKET STATE CODE									CT	
AGPS	Yes	Yes	Yes	Yes	Yes				Yes	
NODE B NUMBER									1022	
PARENT NAME	MIDDLETOWN-GSM MTSO-BSC-10	MIDDLETOWN-GSM MTSO-BSC-10	MIDDLETOWN RNC03	MIDDLETOWN RNC03	MIDDLETOWN RNC03				FF01	

Section 7 - RBS SPECIFIC INFORMATION - final

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	UMTS 3RD RBS	UMTS 4TH RBS	UMTS 5TH RBS	UMTS 6TH RBS	LTE 1ST RBS	LTE 2ND RBS
MSC										
BSC/RNC/MME POOL ID	MDTWCTBSC10	MDTWCTBSC10	MDTWCTNICR0R03	MDTWCTNICR0R03	MDTWCTNICR0R03				FF01	
LAC	05020	05020	05994	05994	05994					
RAC										
EQUIPMENT VENDOR	NOKIA	NOKIA	ERICSSON	ERICSSON	ERICSSON				ERICSSON	
EQUIPMENT TYPE	ULTRASITE	ULTRASITE	3206 INDOOR	6601 MAIN UNIT UMTS	3206 INDOOR				6601 INDOOR MU	
LOCATION										
CABINET LOCATION										
MARKET STATE CODE									CT	
AGPS	Yes	Yes	Yes	Yes	Yes				Yes	
NODE B NUMBER									1022	
PARENT NAME	MIDDLETOWN-GSM MTSO-BSC-10	MIDDLETOWN-GSM MTSO-BSC-10	MIDDLETOWN RNC03	MIDDLETOWN RNC03	MIDDLETOWN RNC03					

Section 8 - RBS INDIVIDUAL INFORMATION - existing

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS
RBS ID:	130339	130340			208875	250407	428439										413942							
CELL ID/BCF:	032D1022	032D1022			CTV1022	CTV1022	CTU0022										CTL01022							
CTS COMMON ID:	032D1022	184D1022			CTV1022	CTU1022	CTU0022										CTL01022							

Section 8 - RBS INDIVIDUAL INFORMATION - final

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS
RBS ID:	130339	130340			208875	250407	428439										413942		413942					
CELL ID/BCF:	032D1022	032D1022			CTV1022	CTV1022	CTU0022										CTL01022		CTL01022					
CTS COMMON ID:	032D1022	184D1022			CTV1022	CTU1022	CTU0022										CTL01022		CTL01022					

Section 9 - SOFT SECTOR ID - existing

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS
USEID (excluding Hard Sector)	25969.850.25G.1	25969.1900.25G.2			25969.850.3G.1	25969.1900.3G.1	25969.850.3G.3										25969.700.4G.1							
SECTOR A SOFT SECTOR ID	184G10221	184P10221			CTV10221	CTU10227	CTV0022A										CTL01022_7A_1							
SECTOR B	184G10222	184P10222			CTV10222	CTU10228	CTV0022B										CTL01022_7B_1							
SECTOR C	184G10223	184P10223			CTV10223	CTU10229	CTV0022C										CTL01022_7C_1							
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								
SECTOR A IS MULTI CARRIER	No	No			No	No	Yes										No							
SECTOR B	No	No			No	No	Yes										No							
SECTOR C	No	No			No	No	Yes										No							
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								
SECTOR A CELL NUMBER																	15							
SECTOR B																	16							
SECTOR C																	17							
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 9 - SOFT SECTOR ID - final

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS
USEID (excluding Hard Sector)	25969.850.25G.1	25969.1900.25G.2			25969.850.3G.1	25969.1900.3G.1	25969.850.3G.3										25969.700.4G.1		25969.1900.4G.111					
SECTOR A SOFT SECTOR ID	184G10221	184P10221			CTV10221	CTU10227	CTV0022A										CTL01022_7A_1		CTL01022_9A_1					
SECTOR B	184G10222	184P10222			CTV10222	CTU10228	CTV0022B										CTL01022_7B_1		CTL01022_9B_1					
SECTOR C	184G10223	184P10223			CTV10223	CTU10229	CTV0022C										CTL01022_7C_1		CTL01022_9C_1					
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								
SECTOR A IS MULTI CARRIER	No	No			No	No	Yes										No		No					
SECTOR B	No	No			No	No	Yes										No		No					
SECTOR C	No	No			No	No	Yes										No		No					
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								
SECTOR A CELL NUMBER																	15		8					
SECTOR B																	16		9					
SECTOR C																	17		10					
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 10 - CID/SAC - existing

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS
SECTOR A CID/SAC	10221	10221			10221	10227	00221																	
SECTOR B	10222	10222			10222	10228	00222																	
SECTOR C	10223	10223			10223	10229	00223																	
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 10 - CID/SAC - final

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS
SECTOR A CID/SAC	10221	10221			10221	10227	00221																	
SECTOR B	10222	10222			10222	10228	00222																	
SECTOR C	10223	10223			10223	10229	00223																	
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 11 - CURRENT RADIO COUNTS existing

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS
SECTOR A RADIO COUNTS																								
SECTOR B																								
SECTOR C																								
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 12 - CURRENT T1 COUNTS existing

	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet	UMTS 2nd Cabinet	UMTS 3rd Cabinet	UMTS 4th Cabinet	UMTS 5th Cabinet	UMTS 6th Cabinet	LTE 1st Cabinet	LTE 2nd Cabinet
# T1s										
LINK PROFILE										
RF COMBINING										
FIBER or ETHERNET?										
Tx Board Model										
Tx Board QTY										
RAX/ECU Board Model										
RAX/ECU Board QTY										
BBU Board Model										
BBU Board QTY										
RRU - location										
FIBER JUMPER										
DC CABLE										
DC/Fiber Dem. Box										
Bundled Fiber Cable										
Bundled DC Cable										

Section 13 - NEW/PROPOSED RADIO COUNTS

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS
SECTOR A RADIO COUNTS																								
SECTOR B																								
SECTOR C																								
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 14 - NEW/PROPOSED T1 COUNTS

	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet	UMTS 2nd Cabinet	UMTS 3rd Cabinet	UMTS 4th Cabinet	UMTS 5th Cabinet	UMTS 6th Cabinet	LTE 1st Cabinet	LTE 2nd Cabinet
# T1s										
LINK PROFILE										
RF COMBINING										
FIBER or ETHERNET?										
Tx Board Model										
Tx Board QTY										
RAX/ECU Board Model										
RAX/ECU Board QTY										
BBU Board Model										
BBU Board QTY										
RRU - location										
FIBER JUMPER										
DC CABLE										
DC/Fiber Dem. Box										
Bundled Fiber Cable										
Bundled DC Cable										

Section 15A - CURRENT SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

ANTENNA COMMON FIELDS	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	800 10121 @850		AM-X-CD-14-65-00T-RET	800 10121 @850			
ANTENNA VENDOR	KATHREIN		KMW	KATHREIN			
ANTENNA SIZE (H x W x D)			48X11.8X5.9				
ANTENNA WEIGHT			36.4				
AZIMUTH	143		23	143			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	132.03		130.03	132.03			
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT	0		0	0			
FEEDER AMOUNT							
Antenna RET Motor (QTY/MODEL)							
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	Pwav LGP21401 Single 1900 w/ 850BP (850)			ADC CG1900W850BP Single 1900 w/ 850BP (850)			
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)							
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component1 (QTY/MODEL)							
Additional Component2 (QTY/MODEL)							
Additional Component3 (QTY/MODEL)							
Local Market Note1							
Local Market Note2							
Local Market Note3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	TX/RX?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	Feeder Length (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Cable Number	Cable ID
ANTENNA POSITION 1	PORT 1		25969.A.850.3G.1	CTV10221		UMTS 850	800 10121 @850_Xpol_8dt	13.41		8	0	RFS 7/8 (850)	160.04	0			NO				
	PORT 3		25969.A.1900.3G.1	CTU10227		UMTS 1900	800 10121 @1950_Xpol_0dt	17		0	0	RFS 7/8 (1900)	160.04	0			NO				
	PORT 4		25969.A.1900.3G.1	CTU10227		UMTS 1900	800 10121 @1950_Xpol_0dt	17		0	0	RFS 7/8 (1900)	160.04	0			NO				
ANTENNA POSITION 3	PORT 1		25969.A.700.4G.1	CTL01022_7A_1		LTE 700	AM-X-CD-14-65-00T-RET_725MHz_03DT	14.1		3	-1	FIBER	0.00	0							
ANTENNA POSITION 4	PORT 1		25969.A.850.25G.1	184G10221		GSM 850	800 10121 @850_Xpol_8dt	13.26		8	0	7/8 at 850 MHz	160.04	0			NO	17.78	183.23		
	PORT 3		25969.A.1900.25G.3	184P10224		GSM 1900	800 10121 @1950_Xpol_0dt	17.04		0	0	7/8 at 1900 MHz	160.04	0			NO	17.78	320.62		

Section 15B - CURRENT SECTOR/CELL INFORMATION - SECTOR B

ANTENNA COMMON FIELDS	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	800 10121 @850		P65-17-XLH-RR	800 10121 @850			
ANTENNA VENDOR	KATHREIN		Powerwave	KATHREIN			
ANTENNA SIZE (H x W x D)			96X12X6				
ANTENNA WEIGHT			70				
AZIMUTH	263		143	263			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	132.03		130.03	132.03			
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT	0		0	0			
FEEDER AMOUNT							
Antenna RET Motor (QTY/MODEL)							
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	Pwav LGP21401 Single 1900 w/ 850BP (850)			ADC CG1900W850BP Single 1900 w/ 850BP (850)			
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)							
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component1 (QTY/MODEL)							
Additional Component2 (QTY/MODEL)							
Additional Component3 (QTY/MODEL)							
Local Market Note1							
Local Market Note2							
Local Market Note3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	TX/RX?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	Feeder Length (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Cable Number	Cable ID
ANTENNA POSITION 1	PORT 1		25969.B.850.3G.1	CTV10222		UMTS 850	800 10121 @850_Xpol_8dt	13.41		8	0	RFS 7/8 (850)	160.04	0			NO				
	PORT 3		25969.B.1900.3G.1	CTU10228		UMTS 1900	800 10121 @1950_Xpol_0dt	17		0	0	RFS 7/8 (1900)	160.04	0			NO				
	PORT 4		25969.B.1900.3G.1	CTU10228		UMTS 1900	800 10121 @1950_Xpol_0dt	17		0	0	RFS 7/8 (1900)	160.04	0			NO				
ANTENNA POSITION 3	PORT 1		25969.B.700.4G.1	CTL01022_7B_1		LTE 700	P65-17-XLH-RR_716MHz_00DT	16.39		0	-1	FIBER	0.00	0							
ANTENNA POSITION 4	PORT 1		25969.B.850.25G.1	184G10222		GSM 850	800 10121 @850_Xpol_8dt	13.26		8	0	7/8 at 850 MHz	160.04	0			NO	28.18	290.4		
	PORT 3		25969.B.1900.25G.3	184P10225		GSM 1900	800 10121 @1950_Xpol_0dt	17.04		0	0	7/8 at 1900 MHz	160.04	0			NO	17.78	320.62		

Section 15C - CURRENT SECTOR/CELL INFORMATION - SECTOR C

ANTENNA COMMON FIELDS	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	800 10121 @850		SBNH-1D6565C	800 10121 @850			
ANTENNA VENDOR	KATHREIN		Andrew	KATHREIN			
ANTENNA SIZE (H x W x D)			96.4X11.9X7.1				
ANTENNA WEIGHT			66.1				
AZIMUTH	23		263	23			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	132.03		130.03	132.03			
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT	0		0	0			
FEEDER AMOUNT							
Antenna RET Motor (QTY/MODEL)							
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	Pwav LGP21401 Single 1900 w/ 850BP (850)			ADC CG1900W850BP Single 1900 w/ 850BP (850)			
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)							
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component1 (QTY/MODEL)							
Additional Component2 (QTY/MODEL)							
Additional Component3 (QTY/MODEL)							
Local Market Note1							
Local Market Note2							
Local Market Note3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	TX/RX?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	Feeder Length (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Cable Number	Cable ID
ANTENNA POSITION 1	PORT 1		25969.C.850.3G.1	CTV10223		UMTS 850	800 10121 @850_Xpol_6dt	13.42		6	0	RFS 7/8 (850)	160.04	0			NO				
	PORT 3		25969.C.1900.3G.1	CTU10229		UMTS 1900	800 10121 @1950_Xpol_6dt	16.6		6	0	RFS 7/8 (1900)	160.04	0			NO				
	PORT 4		25969.C.1900.3G.1	CTU10229		UMTS 1900	800 10121 @1950_Xpol_6dt	16.6		6	0	RFS 7/8 (1900)	160.04	0			NO				
ANTENNA POSITION 3	PORT 1		25969.C.700.4G.1	CTL01022_7C_1		LTE 700	SBNH-1D6565C_725MHz_03DT	15.6		3	-1	FIBER	0.00	0							
ANTENNA POSITION 4	PORT 1		25969.C.850.25G.1	184G10223		GSM 850	800 10121 @850_Xpol_6dt	13.26		6	0	7/8 at 850 MHz	160.04	0			NO	28.18	290.4		
	PORT 3		25969.C.1900.25G.3	184P10226		GSM 1900	800 10121 @1950_Xpol_6dt	16.63		6	0	7/8 at 1900 MHz	160.04	0			NO	17.78	291.74		

Section 16A - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	800-10121		SBNHH-1D65A		SBNHH-1D65A		SBNHH-1D65A							
ANTENNA VENDOR	KATHREIN		Andrew		Andrew		Andrew							
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9		55X11.9X7.1		55X11.9X7.1		55X11.9X7.1							
ANTENNA WEIGHT	44.1		33.5		33.5		33.5							
AZIMUTH	23		23		23		23							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	130		130		130		130							
ANTENNA TIP HEIGHT	132		132		132		132							
MECHANICAL DOWNTILT	0		0		0		0							
FEEDER AMOUNT	2													
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025												
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)	2	Pwav - CM1007-DBPXBC-003												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006												
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	1	CCI DTMABP7819VG12A (Twin 700/850 Bypass)												
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-E2			1	RRUS-11						
RRH - 850 band (QTY/MODEL)					1	RRUS-11								
RRH - 1900 band (QTY/MODEL)					1	RRUS-12+RRUS-A2	1	RRUS-12+RRUS-A2						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component1 (QTY/MODEL)	1	CCI RXAIT DUAL BAND												
Additional Component2 (QTY/MODEL)	2	CCI LLC 850												
Additional Component3 (QTY/MODEL)														
Local Market Note1	Antenna 1: UMTS - DB (UMTS) use existing antenna (coax/tma's) Combine GSM/UMTS. Antenna 2: HEX (WCS) + 2 x RRH (700DE (RRUS-E2) + WCS RRUS-32). Antenna 3: HEX(PCS) + A2 Module + PCS (RRUS-12) + 850 RRH (RRUS-11). Antenna 4: HEX(PCS) + A2 Module + PCS (RRUS-12) + 700 BC (RRUS-11). Add 850 RXAIT, 2 X 850 LLC and 1900 RXAIT.													
Local Market Note2	1 FIBER TRUNK, 6 DC TRUNKS, 1 Fiber/DC Squid + 2 DC Squid for the entire site													
Local Market Note3	RRUS(Install): 2xPCS (RRUS-12 + A2); 1x700BC (RRUS-11); 1x850 (RRUS-11)RRUS(Future):1x700DE (RRUS-E2); 1xWCS (RRUS-32)Remove Smart Bias-T and Bias-T.													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	TX/RX?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	Feeder Length (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Cable Number	Cable ID
ANTENNA POSITION 1	PORT 1		25969.C.850.25G.1	184G10223		GSM 850	800-10121_850MHz_06DT	13.42		6	NONE	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
	PORT 2		25969.C.850.3G.1	CTV10223		UMTS 850	800-10121_850MHz_06DT	13.42		6	NONE	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
	PORT 3		25969.C.1900.25G.1	184P10223		GSM 1900	800-10121_1900MHz_06DT	16.6		6	NONE	RFS 7/8	160.00	YES CCI RXAIT 1900		NO					
	PORT 4		25969.C.1900.3G.1	CTU10229		UMTS 1900	800-10121_1900MHz_06DT	16.6		6	NONE	RFS 7/8	160.00	YES CCI RXAIT 1900		NO					
	PORT 5		25969.C.850.3G.2	CTV1022C		UMTS 850	800-10121_850MHz_06DT	13.42		6	BOTTOM	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
ANTENNA POSITION 2	PORT 1		25969.A.700.4G.2	CTL01022_7A_2		LTE 700	HPA-65R-BUU-H4_719MHz_02DT	13.3		2	TOP	FIBER									
	PORT 3		25969.A.WCS.4G.1	CTL01022_3A_1		LTE WCS	HPA-65R-BUU-H4_2350MHz_02DT	16.29		2	TOP	FIBER									
ANTENNA POSITION 3	PORT 1		25969.A.850.4G.1	CTL01022_8A_1		LTE 850	SBNHH-1D65A_851MHz_03DT	13		3	TOP	FIBER									
	PORT 3		25969.A.1900.4G.2	CTL01022_9A_2		LTE 1900	SBNHH-1D65A_1930MHz_04DT	17.1		4	TOP	FIBER									
ANTENNA POSITION 4	PORT 1		25969.A.700.4G.1	CTL01022_7A_1_P		LTE 700	SBNHH-1D65A_722MHz_03DT	13.1		3	TOP	FIBER									
	PORT 3		25969.A.1900.4G.1	CTL01022_9A_1_P		LTE 1900	SBNHH-1D65A_1930MHz_04DT	17.1		4	TOP	FIBER									

Section 16B - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR B

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	800-10121		HPA-65R-BUU-H8		HPA-65R-BUU-H8		HPA-65R-BUU-H8							
ANTENNA VENDOR	KATHREIN		CCI Antennas		CCI Antennas		CCI Antennas							
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9		92.4X14.8X7.4		92.4X14.8X7.4		92.4X14.8X7.4							
ANTENNA WEIGHT	44.1		68		68		68							
AZIMUTH	143		143		143		143							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	130		130		130		130							
ANTENNA TIP HEIGHT	132		134		134		134							
MECHANICAL DOWNTILT	0		0		0		0							
FEEDER AMOUNT	2													
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025												
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)	2	Pwav - CM1007-DBPXBC-003												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006												
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	1	CCI DTMABP7819VG12A (Twin 700/850 Bypass)												
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-E2			1	RRUS-11						
RRH - 850 band (QTY/MODEL)					1	RRUS-11								
RRH - 1900 band (QTY/MODEL)					1	RRUS-12+RRUS-A2	1	RRUS-12+RRUS-A2						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component1 (QTY/MODEL)	1	CCI RXAIT DUAL BAND												
Additional Component2 (QTY/MODEL)	2	CCI LLC 850												
Additional Component3 (QTY/MODEL)														
Local Market Note1	Antenna 1: UMTS - DB (UMTS) use existing antenna (coax/tma's) Combine GSM/UMTS. Antenna 2: HEX (WCS) + 2 x RRH (700DE (RRUS-E2) + WCS RRUS-32). Antenna 3: HEX(PCS) + A2 Module + PCS (RRUS-12) + 850 RRH (RRUS-11). Antenna 4: HEX(PCS) + A2 Module + PCS (RRUS-12) + 700 BC (RRUS-11). Add 850 RXAIT, 2 X 850 LLC and 1900 RXAIT.													
Local Market Note2	1 FIBER TRUNK, 6 DC TRUNKS, 1 Fiber/DC Squid + 2 DC Squid for the entire site													
Local Market Note3	RRUS(Install): 2xPCS (RRUS-12 + A2); 1x700BC (RRUS-11); 1x850 (RRUS-11)RRUS(Future):1x700DE (RRUS-E2); 1xWCS (RRUS-32)Remove Smart Bias-T and Bias-T.													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	TX/RX?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	Feeder Length (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Cable Number	Cable ID
ANTENNA POSITION 1	PORT 1		25969.A.850.25G.1	184G10221		GSM 850	800-10121_850MHz_08DT	13.41		8	NONE	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
	PORT 2		25969.A.850.3G.1	CTV10221		UMTS 850	800-10121_850MHz_08DT	13.41		8	NONE	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
	PORT 3		25969.A.1900.25G.1	184P10221		GSM 1900	800-10121_1900MHz_00DT	17		0	NONE	RFS 7/8	160.00	YES CCI RXAIT 1900		NO					
	PORT 4		25969.A.1900.3G.1	CTU10227		UMTS 1900	800-10121_1900MHz_00DT	17		0	NONE	RFS 7/8	160.00	YES CCI RXAIT 1900		NO					
	PORT 5		25969.A.850.3G.2	CTV1022A		UMTS 850	800-10121_850MHz_08DT	13.41		8	BOTTOM	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
ANTENNA POSITION 2	PORT 1		25969.B.700.4G.2	CTL01022_7B_2		LTE 700	HPA-65R-BUU-H8_719MHz_03DT	15.3		3	TOP	FIBER									
	PORT 3		25969.B.WCS.4G.1	CTL01022_3B_1		LTE WCS	HPA-65R-BUU-H8_2310MHz_03DT	17.5		3	TOP	FIBER									
ANTENNA POSITION 3	PORT 1		25969.B.850.4G.1	CTL01022_8B_1		LTE 850	HPA-65R-BUU-H8_849MHz_02DT	16.2		2	TOP	FIBER									
	PORT 3		25969.B.1900.4G.2	CTL01022_9B_2		LTE 1900	HPA-65R-BUU-H8_1948MHz_03DT	17		3	TOP	FIBER									
ANTENNA POSITION 4	PORT 1		25969.B.700.4G.1	CTL01022_7B_1_P		LTE 700	HPA-65R-BUU-H8_719MHz_02DT	15.3		2	TOP	FIBER									
	PORT 3		25969.B.1900.4G.1	CTL01022_9B_1_P		LTE 1900	HPA-65R-BUU-H8_1948MHz_03DT	17		3	TOP	FIBER									

Section 16C - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR C

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	800-10121		HPA-65R-BUU-H8		HPA-65R-BUU-H8		HPA-65R-BUU-H8							
ANTENNA VENDOR	KATHREIN		CCI Antennas		CCI Antennas		CCI Antennas							
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9		92.4X14.8X7.4		92.4X14.8X7.4		92.4X14.8X7.4							
ANTENNA WEIGHT	44.1		68		68		68							
AZIMUTH	263		263		263		263							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	130		130		130		130							
ANTENNA TIP HEIGHT	132		134		134		134							
MECHANICAL DOWNTILT	0		0		0		0							
FEEDER AMOUNT	2													
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025												
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)	2	Pwav - CM1007-DBPXBC-003												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006												
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	1	CCI DTMABP7819VG12A (Twin 700/850 Bypass)												
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-E2			1	RRUS-11						
RRH - 850 band (QTY/MODEL)					1	RRUS-11								
RRH - 1900 band (QTY/MODEL)					1	RRUS-12+RRUS-A2	1	RRUS-12+RRUS-A2						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component1 (QTY/MODEL)	1	CCI RXAIT DUAL BAND												
Additional Component2 (QTY/MODEL)	2	CCI LLC 850												
Additional Component3 (QTY/MODEL)														
Local Market Note1	Antenna 1: UMTS - DB (UMTS) use existing antenna (coax/tma's) Combine GSM/UMTS. Antenna 2: HEX (WCS) + 2 x RRH (700DE (RRUS-E2) + WCS RRUS-32). Antenna 3: HEX(PCS) + A2 Module + PCS (RRUS-12) + 850 RRH (RRUS-11). Antenna 4: HEX(PCS) + A2 Module + PCS (RRUS-12) + 700 BC (RRUS-11). Add 850 RXAIT, 2 X 850 LLC and 1900 RXAIT.													
Local Market Note2	1 FIBER TRUNK, 6 DC TRUNKS, 1 Fiber/DC Squid + 2 DC Squid for the entire site													
Local Market Note3	RRUS(Install): 2xPCS (RRUS-12 + A2); 1x700BC (RRUS-11); 1x850 (RRUS-11)RRUS(Future):1x700DE (RRUS-E2); 1xWCS (RRUS-32)Remove Smart Bias-T and Bias-T.													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	TX/RX?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	Feeder Length (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Cable Number	Cable ID
ANTENNA POSITION 1	PORT 1		25969.B.850.25G.1	184G10222		GSM 850	800-10121_850MHz_08DT	13.41		8	NONE	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
	PORT 2		25969.B.850.3G.1	CTV10222		UMTS 850	800-10121_850MHz_08DT	13.41		8	NONE	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
	PORT 3		25969.B.1900.25G.1	184P10222		GSM 1900	800-10121_1900MHz_00DT	17		0	NONE	RFS 7/8	160.00	YES CCI RXAIT 1900		NO					
	PORT 4		25969.B.1900.3G.1	CTU10228		UMTS 1900	800-10121_1900MHz_00DT	17		0	NONE	RFS 7/8	160.00	YES CCI RXAIT 1900		NO					
	PORT 5		25969.B.850.3G.2	CTV1022B		UMTS 850	800-10121_850MHz_08DT	13.41		8	BOTTOM	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
ANTENNA POSITION 2	PORT 1		25969.C.700.4G.2	CTL01022_7C_2		LTE 700	HPA-65R-BUU-H8_719MHz_03DT	15.3		3	TOP	FIBER									
	PORT 3		25969.C.WCS.4G.1	CTL01022_3C_1		LTE WCS	HPA-65R-BUU-H8_2310MHz_03DT	17.5		3	TOP	FIBER									
ANTENNA POSITION 3	PORT 1		25969.C.850.4G.1	CTL01022_8C_1		LTE 850	HPA-65R-BUU-H8_849MHz_03DT	16.2		3	TOP	FIBER									
	PORT 3		25969.C.1900.4G.2	CTL01022_9C_2		LTE 1900	HPA-65R-BUU-H8_1948MHz_02DT	16.89		2	TOP	FIBER									
ANTENNA POSITION 4	PORT 1		25969.C.700.4G.1	CTL01022_7C_1_P		LTE 700	HPA-65R-BUU-H8_719MHz_03DT	15.3		3	TOP	FIBER									
	PORT 3		25969.C.1900.4G.1	CTL01022_9C_1_P		LTE 1900	HPA-65R-BUU-H8_1948MHz_02DT	16.89		2	TOP	FIBER									

Section 17A - FINAL SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	800-10121		SBNHH-1D65A		SBNHH-1D65A		SBNHH-1D65A							
ANTENNA VENDOR	KATHREIN		Andrew		Andrew		Andrew							
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9		55X11.9X7.1		55X11.9X7.1		55X11.9X7.1							
ANTENNA WEIGHT	44.1		33.5		33.5		33.5							
AZIMUTH	23		23		23		23							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	130		130		130		130							
ANTENNA TIP HEIGHT	132		132		132		132							
MECHANICAL DOWNTILT	0		0		0		0							
FEEDER AMOUNT	2													
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025												
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)	2	Pwav - CM1007-DBPXBC-003												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006												
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	1	CCI DTMABP7819VG12A (Twin 700/850 Bypass)												
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-E2			1	RRUS-11						
RRH - 850 band (QTY/MODEL)					1	RRUS-11								
RRH - 1900 band (QTY/MODEL)					1	RRUS-12+RRUS-A2	1	RRUS-12+RRUS-A2						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component1 (QTY/MODEL)	1	CCI RXAIT DUAL BAND												
Additional Component2 (QTY/MODEL)	2	CCI LLC 850												
Additional Component3 (QTY/MODEL)														
Local Market Note1	Antenna 1: UMTS - DB (UMTS) use existing antenna (coax/tma's) Combine GSM/UMTS. Antenna 2: HEX (WCS) + 2 x RRH (700DE (RRUS-E2) + WCS RRUS-32). Antenna 3: HEX(PCS) + A2 Module + PCS (RRUS-12) + 850 RRH (RRUS-11). Antenna 4: HEX(PCS) + A2 Module + PCS (RRUS-12) + 700 BC (RRUS-11). Add 850 RXAIT, 2 X 850 LLC and 1900 RXAIT.													
Local Market Note2	1 FIBER TRUNK, 6 DC TRUNKS, 1 Fiber/DC Squid + 2 DC Squid for the entire site													
Local Market Note3	RRUS(Install): 2xPCS (RRUS-12 + A2); 1x700BC (RRUS-11); 1x850 (RRUS-11)RRUS(Future):1x700DE (RRUS-E2); 1xWCS (RRUS-32)Remove Smart Bias-T and Bias-T.													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	TX/RX?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	Feeder Length (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Cable Number	Cable ID
ANTENNA POSITION 1	PORT 1		25969.C.850.25G.1	184G10223		GSM 850	800-10121_850MHz_06DT	13.42		6	NONE	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
	PORT 2		25969.C.850.3G.1	CTV10223		UMTS 850	800-10121_850MHz_06DT	13.42		6	NONE	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
	PORT 3		25969.C.1900.25G.1	184P10223		GSM 1900	800-10121_1900MHz_06DT	16.6		6	NONE	RFS 7/8	160.00	YES CCI RXAIT 1900		NO					
	PORT 4		25969.C.1900.3G.1	CTU10229		UMTS 1900	800-10121_1900MHz_06DT	16.6		6	NONE	RFS 7/8	160.00	YES CCI RXAIT 1900		NO					
	PORT 5		25969.C.850.3G.2	CTV1022C		UMTS 850	800-10121_850MHz_06DT	13.42		6	BOTTOM	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
ANTENNA POSITION 2	PORT 1		25969.A.700.4G.2	CTL01022_7A_2		LTE 700	HPA-65R-BUU-H4_719MHz_02DT	13.3		2	TOP	FIBER									
	PORT 3		25969.A.WCS.4G.1	CTL01022_3A_1		LTE WCS	HPA-65R-BUU-H4_2350MHz_02DT	16.29		2	TOP	FIBER									
ANTENNA POSITION 3	PORT 1		25969.A.850.4G.1	CTL01022_8A_1		LTE 850	SBNHH-1D65A_851MHz_03DT	13		3	TOP	FIBER									
	PORT 3		25969.A.1900.4G.2	CTL01022_9A_2		LTE 1900	SBNHH-1D65A_1930MHz_04DT	17.1		4	TOP	FIBER									
ANTENNA POSITION 4	PORT 1		25969.A.700.4G.1	CTL01022_7A_1_P		LTE 700	SBNHH-1D65A_722MHz_03DT	13.1		3	TOP	FIBER									
	PORT 3		25969.A.1900.4G.1	CTL01022_9A_1_P		LTE 1900	SBNHH-1D65A_1930MHz_04DT	17.1		4	TOP	FIBER									

Section 17B - FINAL SECTOR/CELL INFORMATION - SECTOR B

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	800-10121		HPA-65R-BUU-H8		HPA-65R-BUU-H8		HPA-65R-BUU-H8							
ANTENNA VENDOR	KATHREIN		CCI Antennas		CCI Antennas		CCI Antennas							
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9		92.4X14.8X7.4		92.4X14.8X7.4		92.4X14.8X7.4							
ANTENNA WEIGHT	44.1		68		68		68							
AZIMUTH	143		143		143		143							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	130		130		130		130							
ANTENNA TIP HEIGHT	132		134		134		134							
MECHANICAL DOWNTILT	0		0		0		0							
FEEDER AMOUNT	2													
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025												
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)	2	Pwav - CM1007-DBPXBC-003												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006												
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	1	CCI DTMABP7819VG12A (Twin 700/850 Bypass)												
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-E2			1	RRUS-11						
RRH - 850 band (QTY/MODEL)					1	RRUS-11								
RRH - 1900 band (QTY/MODEL)					1	RRUS-12+RRUS-A2	1	RRUS-12+RRUS-A2						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component1 (QTY/MODEL)	1	CCI RXAIT DUAL BAND												
Additional Component2 (QTY/MODEL)	2	CCI LLC 850												
Additional Component3 (QTY/MODEL)														
Local Market Note1	Antenna 1: UMTS - DB (UMTS) use existing antenna (coax/tma's) Combine GSM/UMTS. Antenna 2: HEX (WCS) + 2 x RRH (700DE (RRUS-E2) + WCS RRUS-32). Antenna 3: HEX(PCS) + A2 Module + PCS (RRUS-12) + 850 RRH (RRUS-11). Antenna 4: HEX(PCS) + A2 Module + PCS (RRUS-12) + 700 BC (RRUS-11). Add 850 RXAIT, 2 X 850 LLC and 1900 RXAIT.													
Local Market Note2	1 FIBER TRUNK, 6 DC TRUNKS, 1 Fiber/DC Squid + 2 DC Squid for the entire site													
Local Market Note3	RRUS(Install): 2xPCS (RRUS-12 + A2); 1x700BC (RRUS-11); 1x850 (RRUS-11)RRUS(Future):1x700DE (RRUS-E2); 1xWCS (RRUS-32)Remove Smart Bias-T and Bias-T.													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	TX/RX?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	Feeder Length (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Cable Number	Cable ID
ANTENNA POSITION 1	PORT 1		25969.A.850.25G.1	184G10221		GSM 850	800-10121_850MHz_08DT	13.41		8	NONE	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
	PORT 2		25969.A.850.3G.1	CTV10221		UMTS 850	800-10121_850MHz_08DT	13.41		8	NONE	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
	PORT 3		25969.A.1900.25G.1	184P10221		GSM 1900	800-10121_1900MHz_00DT	17		0	NONE	RFS 7/8	160.00	YES CCI RXAIT 1900		NO					
	PORT 4		25969.A.1900.3G.1	CTU10227		UMTS 1900	800-10121_1900MHz_00DT	17		0	NONE	RFS 7/8	160.00	YES CCI RXAIT 1900		NO					
	PORT 5		25969.A.850.3G.2	CTV1022A		UMTS 850	800-10121_850MHz_08DT	13.41		8	BOTTOM	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
ANTENNA POSITION 2	PORT 1		25969.B.700.4G.2	CTL01022_7B_2		LTE 700	HPA-65R-BUU-H8_719MHz_03DT	15.3		3	TOP	FIBER									
	PORT 3		25969.B.WCS.4G.1	CTL01022_3B_1		LTE WCS	HPA-65R-BUU-H8_2310MHz_03DT	17.5		3	TOP	FIBER									
ANTENNA POSITION 3	PORT 1		25969.B.850.4G.1	CTL01022_8B_1		LTE 850	HPA-65R-BUU-H8_849MHz_02DT	16.2		2	TOP	FIBER									
	PORT 3		25969.B.1900.4G.2	CTL01022_9B_2		LTE 1900	HPA-65R-BUU-H8_1948MHz_03DT	17		3	TOP	FIBER									
ANTENNA POSITION 4	PORT 1		25969.B.700.4G.1	CTL01022_7B_1_P		LTE 700	HPA-65R-BUU-H8_719MHz_02DT	15.3		2	TOP	FIBER									
	PORT 3		25969.B.1900.4G.1	CTL01022_9B_1_P		LTE 1900	HPA-65R-BUU-H8_1948MHz_03DT	17		3	TOP	FIBER									

Section 17C - FINAL SECTOR/CELL INFORMATION - SECTOR C

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	800-10121		HPA-65R-BUU-H8		HPA-65R-BUU-H8		HPA-65R-BUU-H8							
ANTENNA VENDOR	KATHREIN		CCI Antennas		CCI Antennas		CCI Antennas							
ANTENNA SIZE (H x W x D)	54.5X10.3X5.9		92.4X14.8X7.4		92.4X14.8X7.4		92.4X14.8X7.4							
ANTENNA WEIGHT	44.1		68		68		68							
AZIMUTH	263		263		263		263							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	130		130		130		130							
ANTENNA TIP HEIGHT	132		134		134		134							
MECHANICAL DOWNTILT	0		0		0		0							
FEEDER AMOUNT	2													
Antenna RET Motor (QTY/MODEL)	2	Kathrein / 860-10025												
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)	2	Pwav - CM1007-DBPXBC-003												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006												
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	1	CCI DTMABP7819VG12A (Twin 700/850 Bypass)												
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-E2			1	RRUS-11						
RRH - 850 band (QTY/MODEL)					1	RRUS-11								
RRH - 1900 band (QTY/MODEL)					1	RRUS-12+RRUS-A2	1	RRUS-12+RRUS-A2						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component1 (QTY/MODEL)	1	CCI RXAIT DUAL BAND												
Additional Component2 (QTY/MODEL)	2	CCI LLC 850												
Additional Component3 (QTY/MODEL)														
Local Market Note1	Antenna 1: UMTS - DB (UMTS) use existing antenna (coax/tma's) Combine GSM/UMTS. Antenna 2: HEX (WCS) + 2 x RRH (700DE (RRUS-E2) + WCS RRUS-32). Antenna 3: HEX(PCS) + A2 Module + PCS (RRUS-12) + 850 RRH (RRUS-11). Antenna 4: HEX(PCS) + A2 Module + PCS (RRUS-12) + 700 BC (RRUS-11). Add 850 RXAIT, 2 X 850 LLC and 1900 RXAIT.													
Local Market Note2	1 FIBER TRUNK, 6 DC TRUNKS, 1 Fiber/DC Squid + 2 DC Squid for the entire site													
Local Market Note3	RRUS(Install): 2xPCS (RRUS-12 + A2); 1x700BC (RRUS-11); 1x850 (RRUS-11)RRUS(Future):1x700DE (RRUS-E2); 1xWCS (RRUS-32)Remove Smart Bias-T and Bias-T.													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	TX/RX?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	Feeder Length (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Cable Number	Cable ID
ANTENNA POSITION 1	PORT 1		25969.B.850.25G.1	184G10222		GSM 850	800-10121_850MHz_08DT	13.41		8	NONE	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
	PORT 2		25969.B.850.3G.1	CTV10222		UMTS 850	800-10121_850MHz_08DT	13.41		8	NONE	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
	PORT 3		25969.B.1900.25G.1	184P10222		GSM 1900	800-10121_1900MHz_00DT	17		0	NONE	RFS 7/8	160.00	YES CCI RXAIT 1900		NO					
	PORT 4		25969.B.1900.3G.1	CTU10228		UMTS 1900	800-10121_1900MHz_00DT	17		0	NONE	RFS 7/8	160.00	YES CCI RXAIT 1900		NO					
	PORT 5		25969.B.850.3G.2	CTV1022B		UMTS 850	800-10121_850MHz_08DT	13.41		8	BOTTOM	RFS 7/8	160.00	YES CCI RXAIT 850	2	CCI LLC 850					
ANTENNA POSITION 2	PORT 1		25969.C.700.4G.2	CTL01022_7C_2		LTE 700	HPA-65R-BUU-H8_719MHz_03DT	15.3		3	TOP	FIBER									
	PORT 3		25969.C.WCS.4G.1	CTL01022_3C_1		LTE WCS	HPA-65R-BUU-H8_2310MHz_03DT	17.5		3	TOP	FIBER									
ANTENNA POSITION 3	PORT 1		25969.C.850.4G.1	CTL01022_8C_1		LTE 850	HPA-65R-BUU-H8_849MHz_03DT	16.2		3	TOP	FIBER									
	PORT 3		25969.C.1900.4G.2	CTL01022_9C_2		LTE 1900	HPA-65R-BUU-H8_1948MHz_02DT	16.89		2	TOP	FIBER									
ANTENNA POSITION 4	PORT 1		25969.C.700.4G.1	CTL01022_7C_1_P		LTE 700	HPA-65R-BUU-H8_719MHz_03DT	15.3		3	TOP	FIBER									
	PORT 3		25969.C.1900.4G.1	CTL01022_9C_1_P		LTE 1900	HPA-65R-BUU-H8_1948MHz_02DT	16.89		2	TOP	FIBER									

Diagram - Sector	A	Diagram File Name - CT1022_A.vsd					
Atoll Site Name -	CTV1022	Location Name -	CANTON SE	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:							

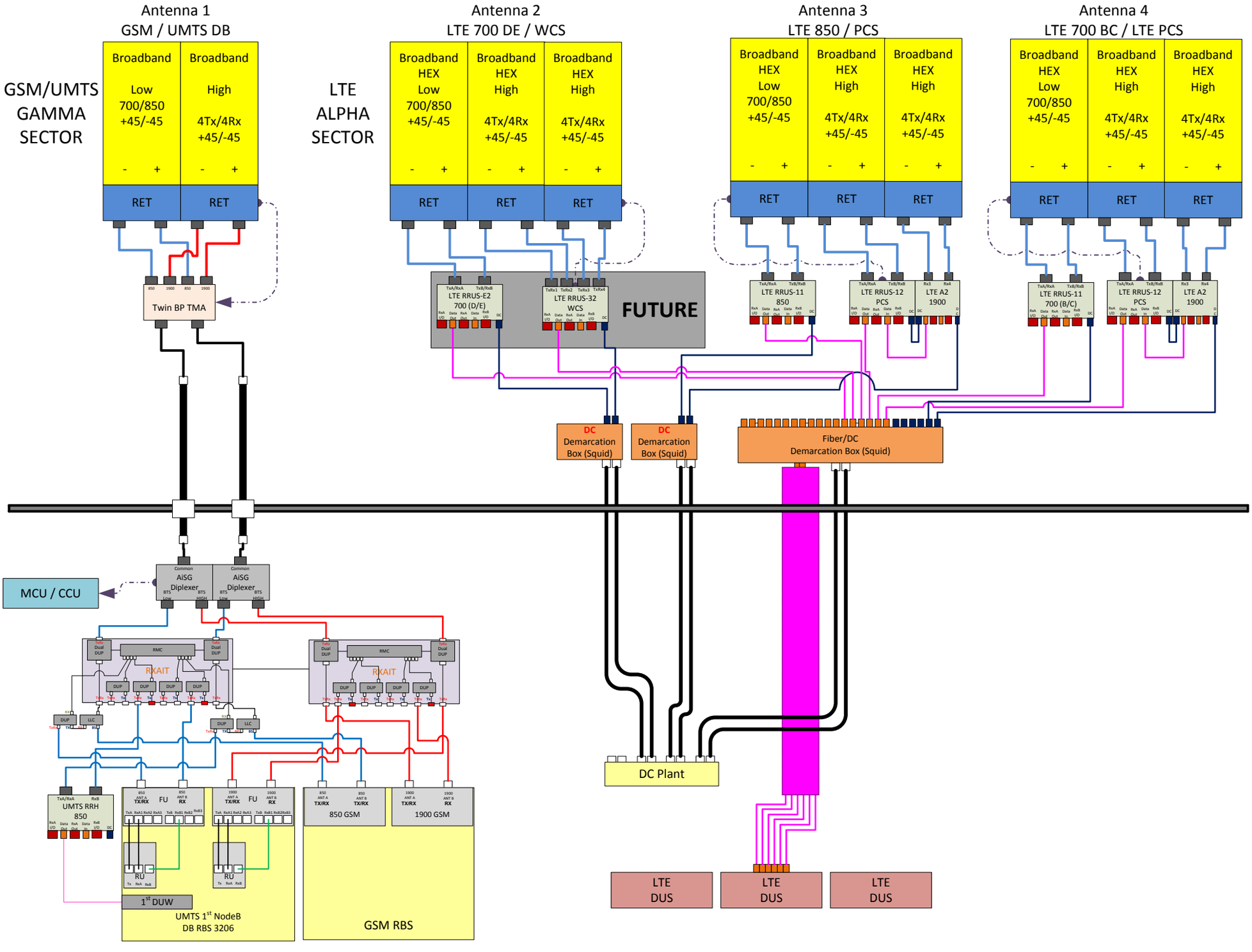


Diagram - Sector	B	Diagram File Name - CT1022_B.vsd					
Atoll Site Name -	CTV1022	Location Name -	CANTON SE	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:							

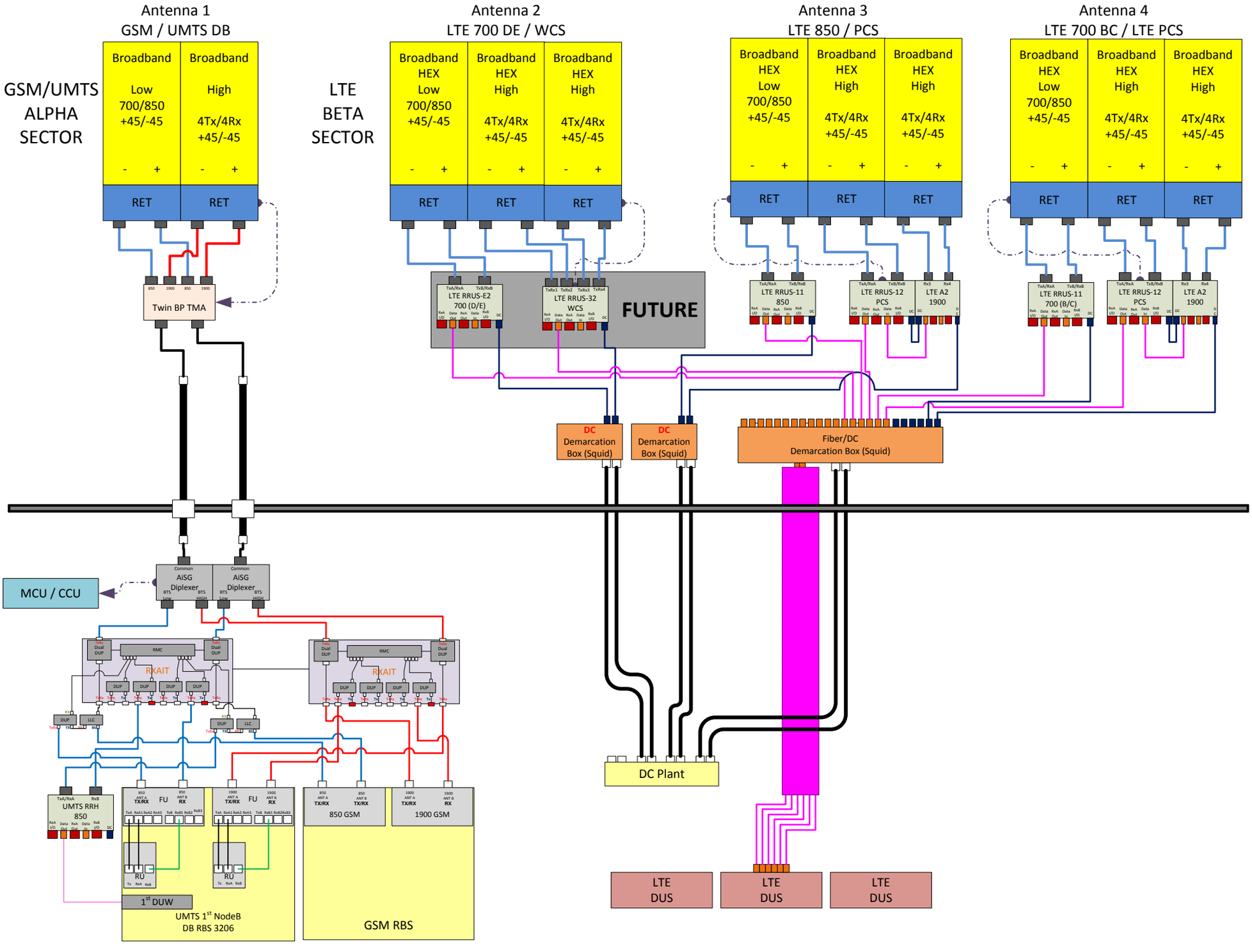
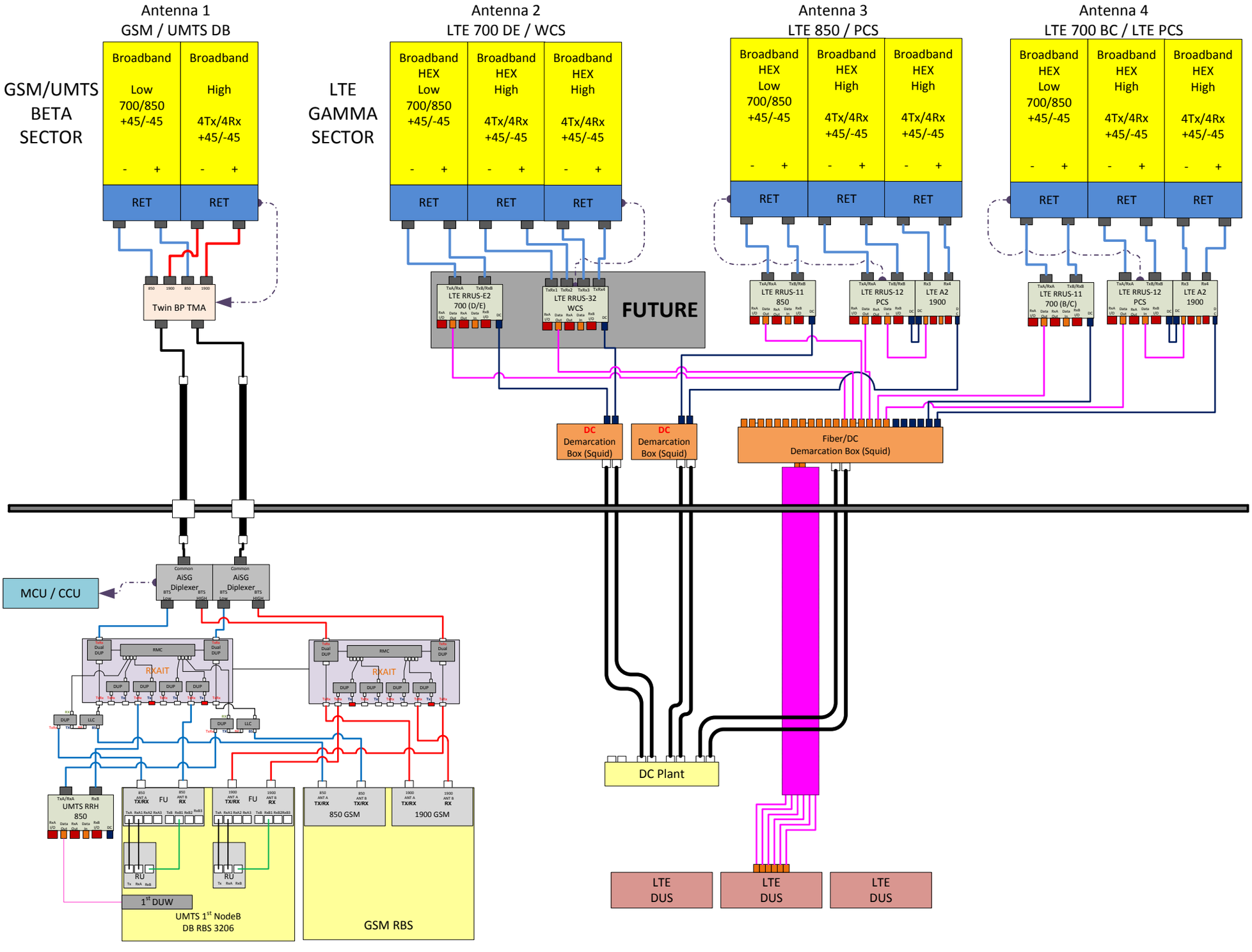


Diagram - Sector	C	Diagram File Name - CT1022_G.vsd					
Atoll Site Name -	CTV1022	Location Name -	CANTON SE	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:							



HexPort Multi-Band Antenna

Model HPA-65R-BUU-H8

Hexport Multi-Band Antenna Array

The CCI Hexport Multi-Band Antenna Array is an industry first 6-port antenna with full WCS Band Coverage. With four high band ports and two low band ports, our hexport antenna is ready for 4X4 high band MIMO.

Modern networks demand high performance, consequently CCI has incorporated several new and innovative design techniques to provide an antenna with excellent side-lobe performance, sharp elevation beams, and high front to back ratio.

Multiple networks can now be connected to a single antenna, reducing tower loading and leasing expense, while decreasing deployment time and installation cost.

Full band capability for 700 MHz , Cellular 850 MHz, PCS 1900 MHz, AWS 1710/2170 MHz and WCS 2300 MHz coverage in a single enclosure.

Benefits

- **Includes WCS Band**
- **Reduces tower loading**
- **Frees up space for tower mounted E-nodes**
- **Single radome with six ports**
- **All Band design simplifies radio assignments**
- **Sharp elevation beam eases network planning**

Features

- High Band Ports include WCS Band
- Four High Band ports with two Low Band ports in one antenna
- Sharp elevation beam
- Excellent elevation side-lobe performance
- Excellent MIMO performance due to array spacing
- Excellent PIM Performance
- A multi-network solution in one radome

Applications

- 4x4 MIMO on High Band and 2x2 MIMO on Low Band
- Adding additional capacity without adding additional antennas
- Adding WCS Band without increasing antenna count

ISO 9001:2008
Quality Management Systems
Système de Qualité
www.ca.sgs.com

HexPort Multi-Band Antenna

Model HPA-65R-BUU-H8

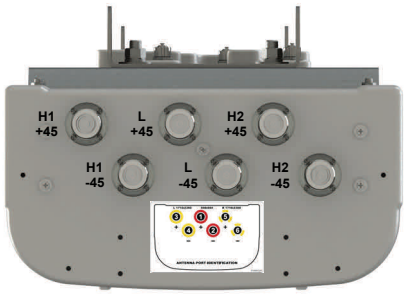
HPA-65R Multi-Band Antenna

Electrical Specifications

Frequency Range	2 X Low Band Ports which cover the full range from 698-894 MHz		4 X High Band Ports which cover the full range from 1710-2360 MHz			
	698-806 MHz	824-894 MHz	1850-1990 MHz	1710-1755/2110-2170 MHz	2305-2360 MHz	
Gain	15.3 dBi	16.2 dBi	17.1 dBi	16.3 dBi	17.4 dBi	17.7 dBi
Azimuth Beamwidth (-3dB)	65°	61°	62°	68°	64°	60°
Elevation Beamwidth (-3dB)	10.1°	8.4°	5.6°	6.2°	5.0°	4.5°
Electrical Downtilt	2° to 10°	2° to 10°	0° to 8°	0° to 8°	0° to 8°	0° to 8°
Elevation Sidelobes (1st Upper)	< -17 dB	< -17 dB	< -19 dB	< -18 dB	< -18 dB	< -17 dB
Front-to-Back Ratio @180°	> 29 dB	> 28 dB	> 35 dB	> 35 dB	> 35 dB	> 35 dB
Front-to-Back Ratio over ± 20°	> 28 dB	> 27 dB	> 28 dB	> 27 dB	> 28 dB	> 28 dB
Cross-Polar Discrimination (at Peak)	> 24 dB	> 20 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
Cross-Polar Discrimination (at ± 60°)	> 16 dB	> 14 dB	> 18 dB	> 18 dB	> 18 dB	> 18 dB
Cross-Polar Port-to-Port Isolation	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
VSWR	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1
Passive Intermodulation (2x20W)	≤ -150dBc	≤ -150dBc	≤ -150dBc	≤ -150dBc	≤ -150dBc	≤ -150dBc
Input Power	500 Watts CW	500 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW
Polarization	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°
Input Impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms
Lightning Protection	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground

Mechanical Specifications

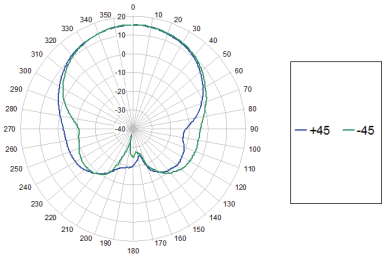
Dimensions (LxWxD)	92.4 x 14.8 x 7.4 inches (2348 x 376 x 189 mm)
Survival Wind Speed	> 150 mph
Front Wind Load	332 lbs (1479 N) @ 100 mph (161 kph)
Side Wind Load	193 lbs (860 N) @ 100 mph (161 kph)
Equivalent Flat Plate Area	13.0 ft^2 (1.2 m^2)
Weight (without Mounting)	68 lbs (31 kg)
RET System Weight	5.0 lbs (2.25 kg)
Connector	6; 7-16 DIN female long neck
Mounting Pole	2-5 inches (5-12 cm)



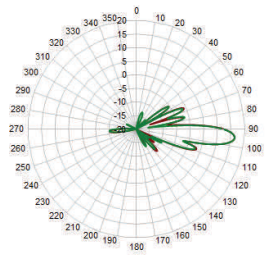
Bottom View

Rear View

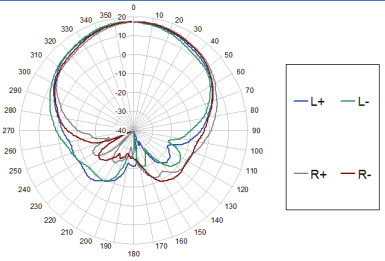
Antenna Patterns*



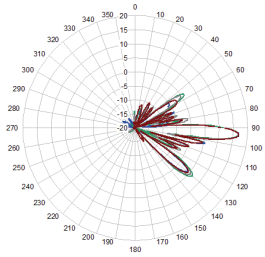
894 MHz Azimuth



Elevation 5°



1920 MHz Azimuth



Elevation 4°

*Typical antenna patterns. For detail information on antenna pattern, please contact us at info@cciproducts.com. All specifications are subject to change without notice.

Product Specifications

COMMSCOPE®

POWERED BY ANDREW®

SBNHH-1D65A

Andrew® Tri-band Antenna, 1 x 698–896 MHz and 2 x 1710–2360 MHz, 65° horizontal beamwidth, internal RET. Both high bands share the same electrical tilt.

- Interleaved dipole technology providing for attractive, low wind load mechanical package
- The values presented on this datasheet have been calculated based on N-P-BASTA White Paper version 9.6 by the NGMN Alliance

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1710–1880	1850–1990	1920–2180	2300–2360
Gain by all Beam Tilts, average, dBi	13.1	13.1	16.1	16.5	16.7	17.2
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.5	±0.5	±0.3	±0.5	±0.4
Gain by Beam Tilt, average, dBi	0 ° | 13.4 9 ° | 13.1 18 ° | 12.7	0 ° | 13.4 9 ° | 13.1 18 ° | 12.7	0 ° | 16.0 5 ° | 16.2 10 ° | 16.1	0 ° | 16.3 5 ° | 16.5 10 ° | 16.5	0 ° | 16.5 5 ° | 16.8 10 ° | 16.6	0 ° | 17.0 5 ° | 17.3 10 ° | 16.9
Beamwidth, Horizontal, degrees	66	61	70	65	62	61
Beamwidth, Horizontal Tolerance, degrees	±3.1	±5.4	±2.8	±4	±6.6	±4.6
Beamwidth, Vertical, degrees	17.6	15.9	7.1	6.6	6.2	5.5
Beamwidth, Vertical Tolerance, degrees	±1.8	±1.4	±0.3	±0.4	±0.5	±0.3
Beam Tilt, degrees	0–18	0–18	0–10	0–10	0–10	0–10
USLS, dB	15	14	15	15	15	14
Front-to-Back Total Power at 180° ± 30°, dB	22	21	26	26	24	25
CPR at Boresight, dB	22	16	22	25	21	22
CPR at Sector, dB	10	6	12	8	5	4
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® tri-band
Band	Multiband
Brand	DualPol® | Teletilt®
Operating Frequency Band	1710 – 2360 MHz | 698 – 896 MHz

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, maximum	445.0 N @ 150 km/h

Product Specifications

SBNHH-1D65A

	100.0 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h | 150.0 mph

Dimensions

Depth	180.0 mm | 7.1 in
Length	1398.0 mm | 55.0 in
Width	301.0 mm | 11.9 in
Net Weight	15.2 kg | 33.5 lb

Remote Electrical Tilt (RET) Information

Annual Failure Rate, maximum	0.01%
Input Voltage	10–30 Vdc
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	11.0 W
Protocol	3GPP/AISG 2.0 Multi-RET
RET Interface	RS-485 Female (daisy chain port ,1) | RS-485 Male (input port, 1)
RET Interface, quantity	1 female | 1 male
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

BSAMNT-1 — Wide Profile Antenna Downtilt Mounting Kit for 2.5 - 4.5 in (64 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

RRUS 11

Frequency (AT&T)
- ✓ Band 12 (Lower 700 MHz)
- ✓ Band 4 (AWS, 17/2100 MHz) — 2Q2011

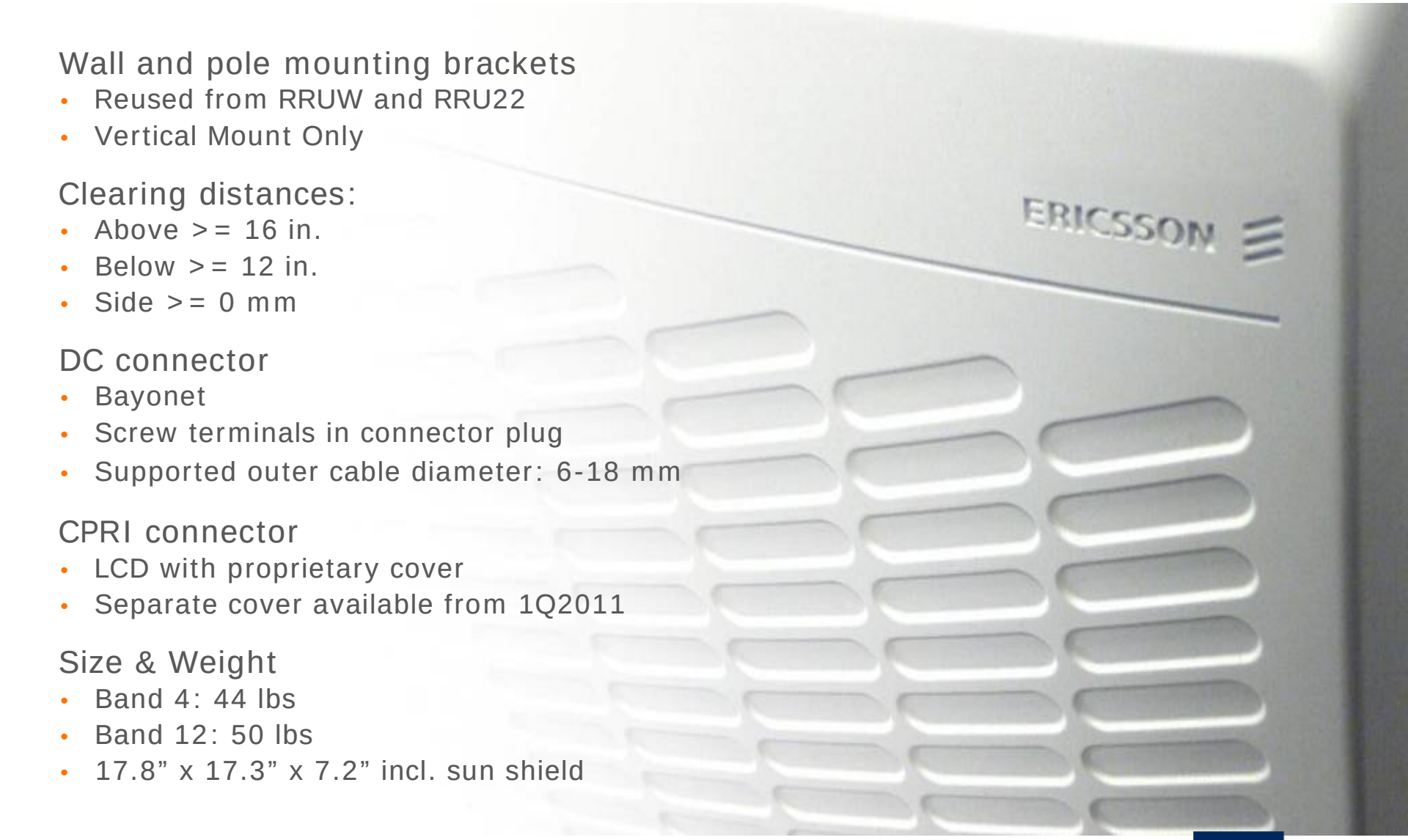
RF Characteristics
- ✓ Output power: 2x30 Watts
- ✓ 2x2 MIMO Capable
- ✓ IBW of 20 MHz
- ✓ Rx Sens.: Better than -105 dBm (5 MHz)

RET/TMA Support
- ✓ AISG 2.0 Compatible
- ✓ Via RET Port and Centre Conductor
- ✓ Cascading
- ✓ 30 VDC Bias

Environmental
- ✓ Self Convection
- ✓ Temperature -40 to 131 F

Power
- ✓ Input voltage: -48 VDC or AC (exemption)
- ✓ Fuse size: 13 – 32 A
  - Recommended: 25 A
- ✓ Power Consumption:
  - Typical 200 Watts
  - Max 310 Watts
  - Excl. RET and TMA load

RRUS 11 Mechanics



Wall and pole mounting brackets
- Reused from RRUW and RRU22
- Vertical Mount Only

Clearing distances:
- Above >= 16 in.
- Below >= 12 in.
- Side >= 0 mm

DC connector
- Bayonet
- Screw terminals in connector plug
- Supported outer cable diameter: 6-18 mm

CPRI connector
- LCD with proprietary cover
- Separate cover available from 1Q2011

Size & Weight
- Band 4: 44 lbs
- Band 12: 50 lbs
- 17.8” x 17.3” x 7.2” incl. sun shield

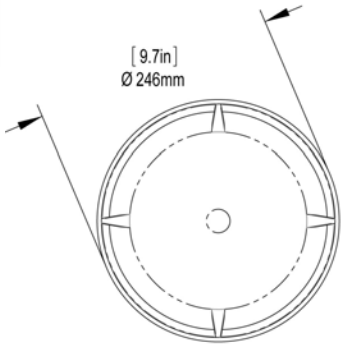
DC6-48-60-18-8F

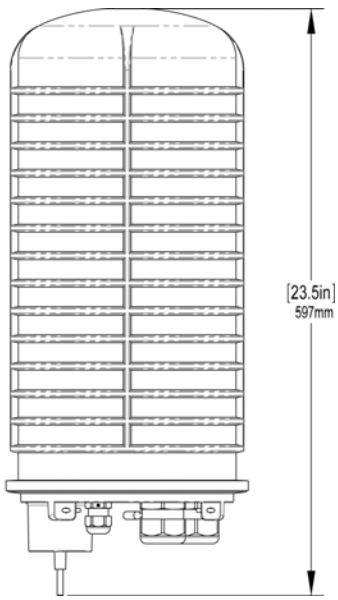
DC Surge Suppression Solution

The DC6-48-60-18 is a dual chambered, DC surge suppression system for use in multi-circuit, Distributed Antenna Systems. The system will protect up to 6 Remote Radio Heads from voltage surges and lightning, and connect up to 18 fiber pairs. The system is enclosed in a NEMA 4 rated, waterproof enclosure.

FEATURES

- Protects up to 6 Remote Radio Heads, each with its own protection circuit.
- Flexible design allows for installation at the top of a tower for Remote Radio Head protection.
- Includes fiber connections for up to 18 pairs of fiber.
- LED indicators on individual circuits provide visual indication of suppressor status.
- Form 'C' relays allow for remote monitoring of the suppressor status.
- Patented Strikesorb technology provides over 60 kA of surge current capacity per circuit.
- Strikesorb suppression modules are fully recognized to UL 1449-3rd Edition Safety Standard, meeting all intermediate and high current fault requirements to facilitate use in OEM applications.
- Raycap recommends that DC protection system be installed within 2 meters or 6 feet of the radio.
- Dome design is lightweight and aerodynamic providing maximum flexibility for installation on top of towers.





Raycap

Phone 208.777.1166 Toll Free 800.890.2569 Fax 208.777.4466 www.raycapsurgeprotection.com

DC6-48-60-18-8F

DC Power Surge Protection

Electrical Specifications	
Model Number	DC6-48-60-18-8F
Nominal Operating Voltage	48 VDC
Nominal Discharge Current (I_n)	20 kA 8/20 µs
Maximum Discharge Current (I_{max}) per NEMA LS-1	60 kA 8/20 µs
Maximum Continuous Operating Voltage (U_c)	75 VDC
Voltage Protection Rating	400 V

Mechanical Specifications	
Suppression Connection Method	Compression lug, #2-#14 AWG Copper, #2-#12 Aluminum
Fiber Connection Method	LC-LC Single mode duplex
Environmental Rating	IP 68, 7m 72hrs
Operating Temperature	-40° C to + 80° C
Storage Temperature	-70° C to + 80° C
Cold Temperature Cycling	IEC 61300-2-22e -30° C to + 60° C 200 hrs @ 5 psi
Resistance to Aggressive Materials	CEI IEC 61073-2 including acids and bases
UV Protection	ISO 4892-2 Method A Xenon-Arc 2160 hrs
Weight	20 lbs without Mounting Bracket

STANDARDS

Strikesorb modules are compliant to the following Surge Protection Device (SPD) Standards:

- ANSI/UL 1449 – 3rd Edition
- IEEE C62.41
- NEMA LS-1, IEC 61643-1:2005 2nd Edition:2005
- IEC 61643-12
- EN 61643-11:2002 (including A11:2007)

GS-07F-0435V

Certified to ISO 9001:2000

TÜV Rheinland of North America

Raycap, Inc. 806 W. Clearwater Loop • Post Falls • Idaho • 83854 • USA
Phone 208.777.1166 • Toll Free 800.890.2569 • Fax 208.777.4466 • www.raycapsurgeprotection.com

Rosenberger
Rosenberger Site Solutions, LLC

AT&T LTE FIBER INSTALLATION MATERIALS

12 PAIR FIBER TRUNK

FTTA fiber trunks are fiber optical cable assemblies connecting base stations and remote radio heads in telecommunication applications. They can be used indoor and outdoor, are UV protected and riser rated. Connectors and fan-out are IP67 protected. This ensures easy handling in an outdoor environment. A pulling sock eases cable hoisting.

Part #	Diameter	Description	QTY
FB-L98B-002-15000 CEQ.32135	10mm	Preconnect Trunk with UL certified cable 12 channels, 24 fibers, single mode LC Duplex to LC Duplex, OD 10.0mm: 15 meter length.	Each
FB-L98B-002-30000 CEQ.32194	10mm	Preconnect Trunk with UL certified cable 12 channels, 24 fibers, single mode LC Duplex to LC Duplex, OD 10.0mm: 30 meter length.	Each
FB-L98B-002-50000 CEQ.32193	10mm	Preconnect Trunk with UL certified cable 12 channels, 24 fibers, single mode LC Duplex to LC Duplex, OD 10.0mm: 50 meter length.	Each
FB-L98B-002-75000 CEQ.32192	10mm	Preconnect Trunk with UL certified cable 12 channels, 24 fibers, single mode LC Duplex to LC Duplex, OD 10.0mm: 75 meter length.	Each
FB-L98B-002-100000 CEQ.32191	10mm	Preconnect Trunk with UL certified cable 12 channels, 24 fibers, single mode LC Duplex to LC Duplex, OD 10.0mm: 100 meter length.	Each
FB-L98B-002-125000 CEQ.32190	10mm	Preconnect Trunk with UL certified cable 12 channels, 24 fibers, single mode LC Duplex to LC Duplex, OD 10.0mm: 125 meter length.	Each

6 CONDUCTOR (3 PAIR) POWER CABLE

600 Volts Power Cable. UL Approved for direct burial or sunlight applications.

Part #	Diameter	Description	QTY
WR-VG86T CEQ.32182	19.2 mm	RSS 8-AWG 6 - Conductor Unshielded 600 Volts Power Cable -# 8 Tinned Copper (three traced red/black pairs) w/ #10 Bare Ground Wire.	Per FT
WR-VG86ST-BRD CEQ.32181	19.7 mm	RSS 8-AWG 6 - Conductor Shielded (Tinned Copper Braid and Aluminum Tape w/ Drain Wire) 600 Volts Power Cable -# 8 Tinned Copper (three traced red/black pairs) w/ #10 Bare Ground Wire.	Per FT

2 CONDUCTOR (SINGLE PAIR) SHIELDED POWER CABLE

600 Volts Power Cable. UL Approved for direct burial or sunlight applications.

Part #	Diameter	Description	QTY
WR-VG122ST-BRDA CEQ.10224	9.8mm	RSS 12-AWG 2 – Flexible Conductor Shielded (Tinned Copper Braid and Aluminum Tape w/ Drain Wire) 600 Volts Power Cable -# 12 AWG 65 Strands Tinned Copper (red and black) w/ #12 Bare Ground Wire.	Per FT
WR-VG102ST-BRDA CEQ.10225	11.6mm	RSS 10-AWG 2 – Flexible Conductor Shielded (Tinned Copper Braid and Aluminum Tape w/ Drain Wire) 600 Volts Power Cable -# 10 AWG 105 Strands Tinned Copper (red and black) w/ #10 Bare Ground Wire.	Per FT
WR-VG82ST-BRDA CEQ.10226	15.4mm	RSS 8-AWG 2 – Flexible Conductor Shielded (Tinned Copper Braid and Aluminum Tape w/ Drain Wire) 600 Volts Power Cable -# 8 AWG 168 Strands Tinned Copper (red and black) w/ #10 Bare Ground Wire.	Per FT

▪P.O. Box 8817 ▪ Lake Charles, LA 70606 ▪ Ph. 337.598.5250 ▪ Fax: 337.598.5290 ▪rlss@rlss.us ▪ www.RLSS.us

Rev. Date: 9/10/2010

Product Specifications

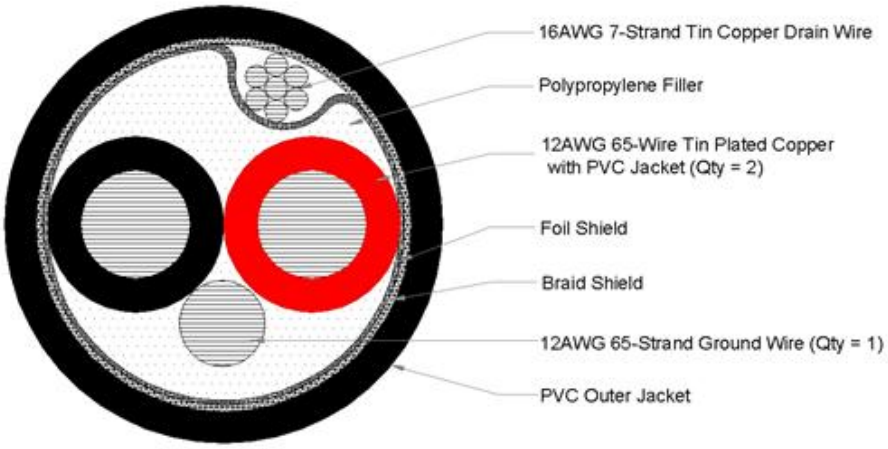
COMMSCOPE®

POWERED BY ANDREW®

PWRT-212-S

Remote Radio Head Power Cable, 2 conductor with shield, 12 AWG (3.31 mm2)

Cross Section Drawing



Construction Materials

Construction Type	Non-armored
Conductor Material	Tinned copper
Dielectric Material	PVC
Drain Wire Material	Tinned copper
Filler Material	Polypropylene
Ground Wire Material	Tinned copper
Insulation Material, singles	PVC
Jacket Material	PVC
Outer Shield (Braid) Coverage	65 %
Outer Shield (Braid) Gauge	36 AWG
Outer Shield (Braid) Material	Tinned copper
Outer Shield (Tape) Material	Aluminum/Poly, non-bonded

Dimensions

Cable Weight	0.16 kg/m | 0.11 lb/ft
Diameter Over Conductor, singles	2.5654 mm per 65 strand 0.1010 in per 65 strand
Diameter Over Dielectric	3.5814 mm | 0.1410 in
Diameter Over Drain Wire	1.5200 mm per 7 strand 0.0598 in per 7 strand
Diameter Over Ground Wire	2.565 mm | 0.101 in
Diameter Over Jacket	10.109 mm | 0.398 in

Product Specifications

PWRT-212-S

Diameter Over Shield (Braid)	7.823 mm | 0.308 in
Jacket Thickness	1.143 mm | 0.045 in

Electrical Specifications

Conductor dc Resistance	1.68 ohms/kft | 5.51 ohms/km
Conductor dc Resistance Note	Maximum value based on a standard condition of 20 °C (68 °F)
Safety Voltage Rating	600 V

Environmental Specifications

Environmental Space	UV resistant for outdoor and/or direct burial installations
Operating Temperature	-40 °C to +90 °C (-40 °F to +194 °F)
Safety Standard	NEC Article 336 (Type TC)

General Specifications

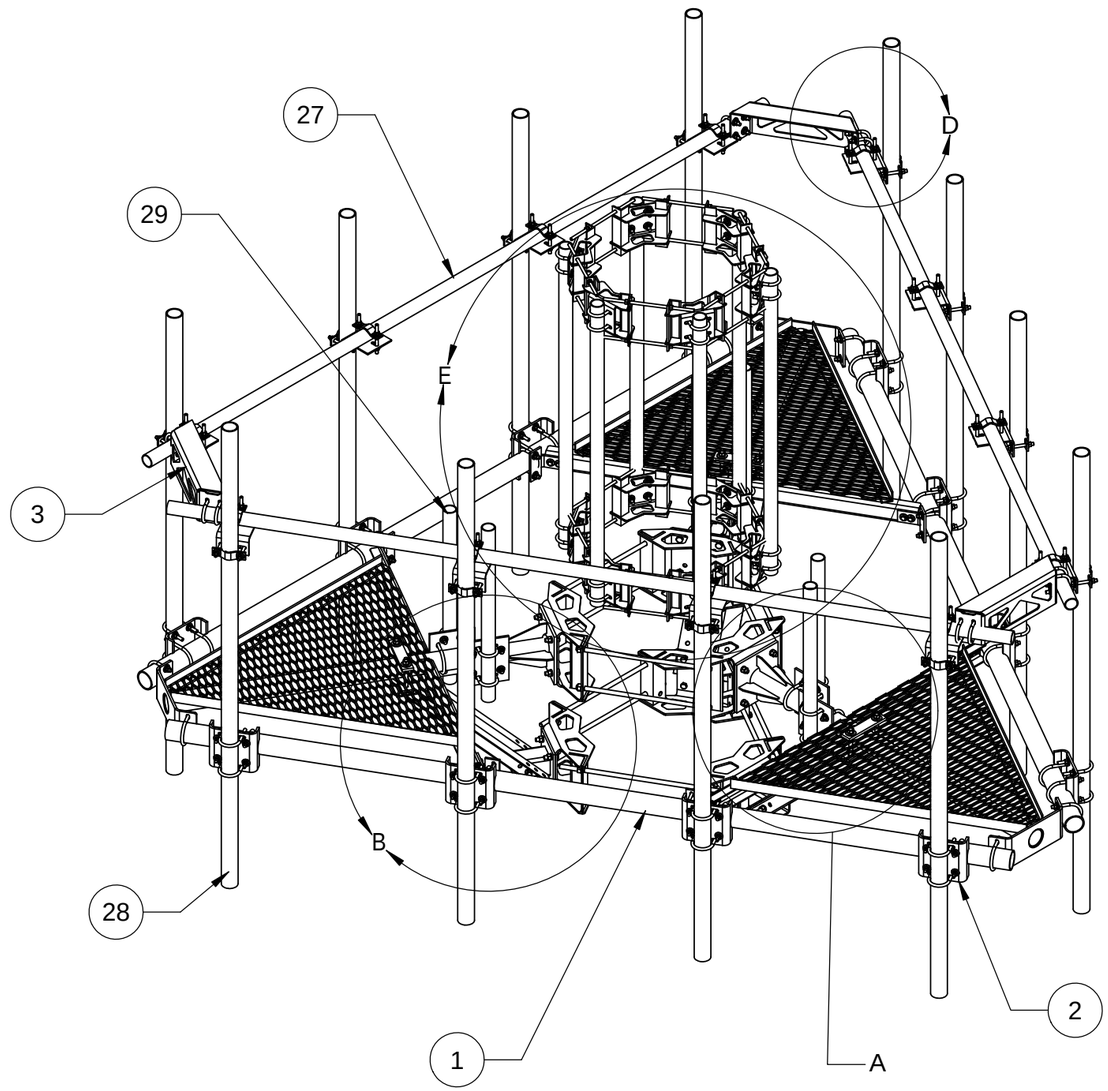
Application	Industrial
Cable Type	Power
Jacket Color	Black
Conductor Gauge, singles	12 AWG
Conductor Type, singles	Stranded
Conductors, quantity	2
Drain Wire Gauge	16 AWG
Ground Wire Gauge	12 AWG
Ground Wire Type	Stranded
Jacket Color, singles	Black | Red

Regulatory Compliance/Certifications

Agency	Classification
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

ITEM	PART NO.	DESCRIPTION	QTY.	WEIGHT
1	MC-PK12S-B	LOW PROFILE CO-LOCATION PLATFORM KIT	1	859.05 LBS
2	MT-219M-H	3.5" OD X 2-7/8" OD Clamp Bracket Assembly	12	12.78 LBS
3	MT19525	Corner Weldment	3	14.76 LBS
4	GUB-4240	1/2" X 2-1/2" X 4" GALV U-BOLT	48	0.56 LBS
5	XAU01	Angle BRK	12	3.59 LBS
6	MTC323704	Clamp Bar	6	2.37 LBS
7	ACP10	1.5" - 3.5" O.D. CLAMP HALF	24	0.61 LBS
8	DCP10	SMALL CLAMP HALF	6	2.21 LBS
9	MT-379-6	1/2" X 6" GALV THREADED ROD	48	0.33 LBS
10	GWF-04	1/2" GALV FLAT WASHER	96	0.03 LBS
11	GWL-04	1/2" GALV LOCK WASHER	144	0.01 LBS
12	GN-04	1/2" GALV HEX NUT	144	0.04 LBS
13	MTC306503	CW 1030 Ringmount Weldment	3	28.02 LBS
14	MT38430B7	3/4" X 30" GALV THREADED ROD GRADE B7	6	3.73 LBS
15	GWL-06	3/4" GALV LOCK WASHER	12	0.04 LBS
16	GN-06	3/4" GALV HEX NUT	12	0.14 LBS
17	MTC313802	Kicker Mount Standoff	3	13.08 LBS
18	MTC323701	Left Kicker	3	14.36 LBS
19	MTC323702	Right Kicker	3	14.36 LBS
20	MT-381-8	5/8" X 8" GALV THREADED ROD	9	0.69 LBS
21	GB-0520A	5/8" X 2" GALV BOLT KIT (A325)	12	0.27 LBS
22	GWF-05	5/8" GALV FLAT WASHER	12	0.06 LBS
23	GWL-05	5/8" GALV LOCK WASHER	18	0.03 LBS
24	GN-05	5/8" GALV HEX NUT	18	0.08 LBS
25	XP2030.01	CROSSOVER PLATE ∅2-3/8" O.D. TO ∅3-1/2" O.D.	6	7.30 LBS
26	GUB-4355	1/2" X 3-5/8" X 5" GALV U-BOLT	12	0.71 LBS
27	MT-651-150	∅2.375" OD x 150" PIPE	3	45.42 LBS
28	MT54696	∅2.875" O.D. X 96 PIPE	12	46.51 LBS
29	MT-649	2 3/8" x 36" Pipe	6	10.90 LBS
30	MTC320001	RRU Ringmount	12	10.52 LBS
31	MT37916	1/2" X 16" GALV THREADED ROD	24	0.88 LBS
32	MT-650-63	∅2.375" OD x 63" PIPE	6	19.08 LBS

REVISIONS				
REV.	ZONE	DESCRIPTION	BY	DATE
A		INITIAL RELEASE	DRR	10/18/13

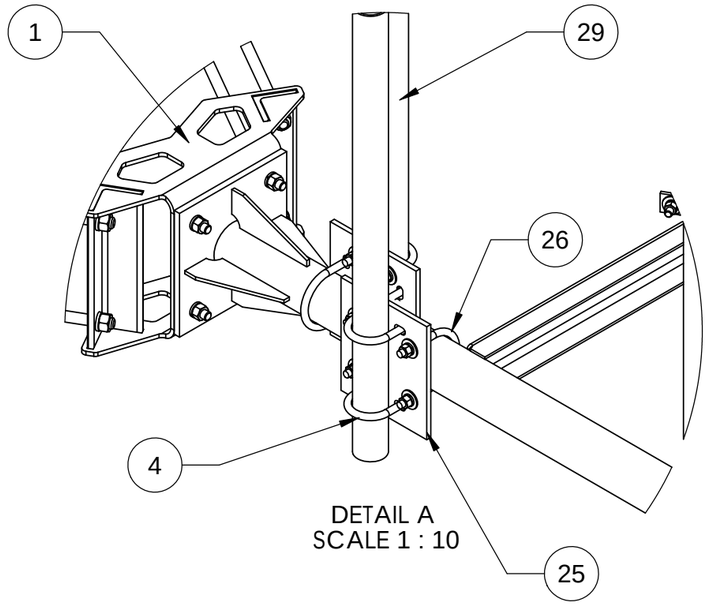


NOTES:
1. ALL METRIC DIMENSIONS ARE IN BRACKETS.
2. FITS MONOPOLES ∅10"–∅30".

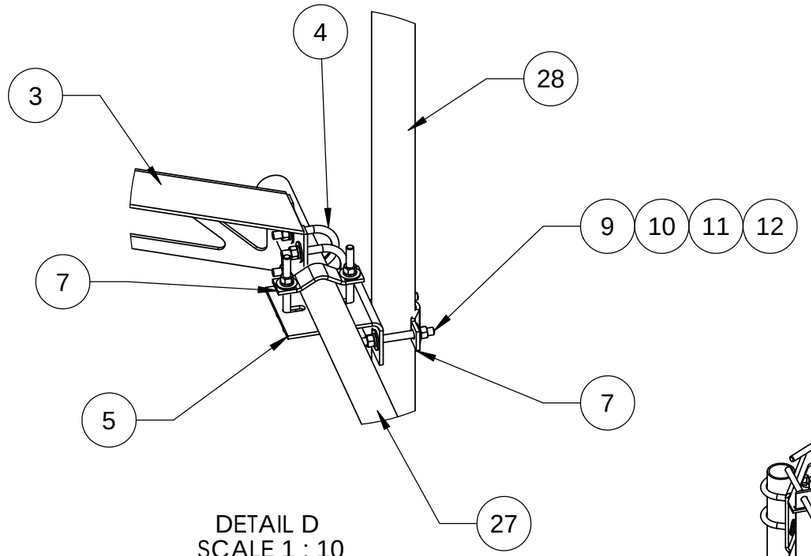
ALL DIMENSIONS ARE IN INCHES U.O.S.
TOLERANCES UNLESS OTHERWISE SPECIFIED:
.X = ± .12 ANGLES ±2°
.XX = ± .06 FRACTIONS ±1/32
.XXX= ± .031
REMOVE BURRS AND BREAK EDGES .005
DO NOT SCALE THIS PRINT

DRAWN BY: DRR	SHEET: 1 of 3	PART NUMBER: MTC3607R	
CHECKED BY: TP	SCALE: NTS	DESCRIPTION: Low Profile Co-Location Platform Kit	
DATE: 10/18/13	MATERIAL: A36, A500, A529	DRAWING TYPE: ASSEMBLY DRAWING	
REVISION: A	FINISH: Galv A123	COMMSCOPE® Hickory, NC 28602 U.S.A.	
	WEIGHT: 2528.27 LBS		

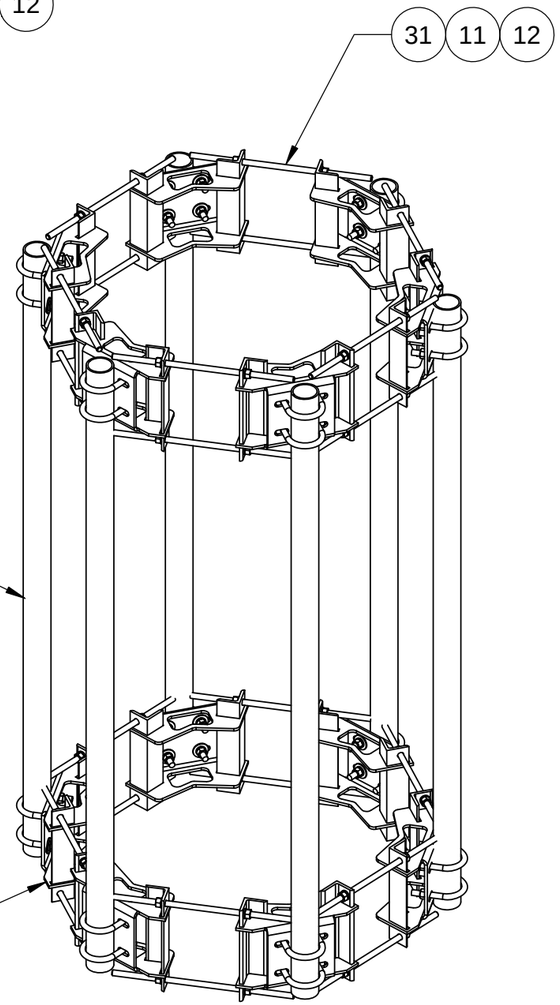
SOME ITEMS OMITED
FOR CLARITY



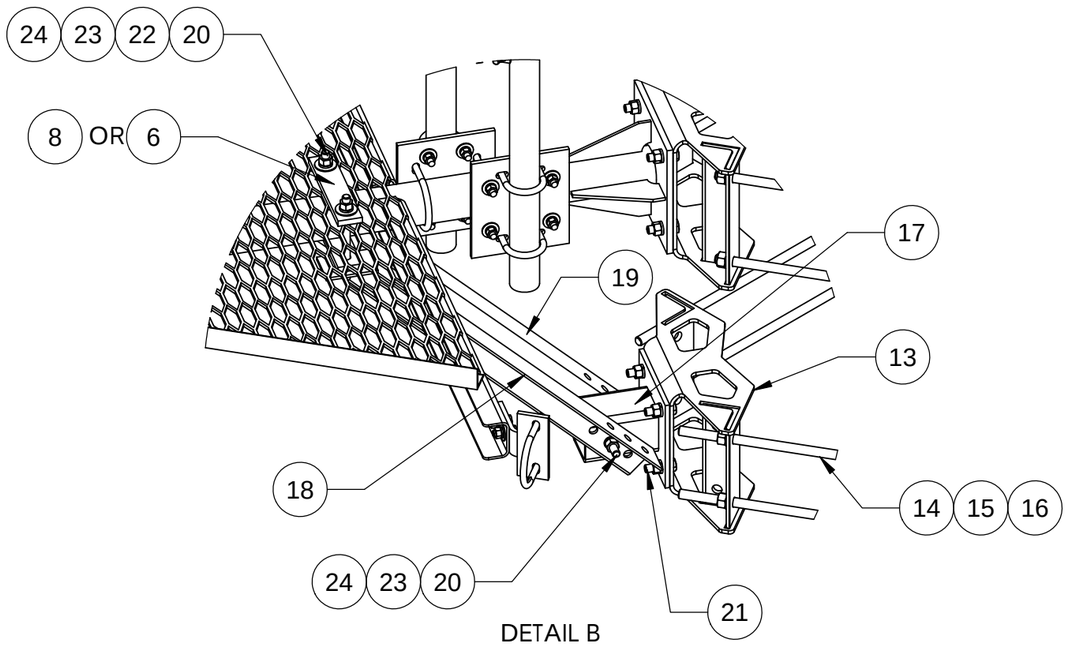
DETAIL A
SCALE 1 : 10



DETAIL D
SCALE 1 : 10



DETAIL E
SCALE 1 : 13



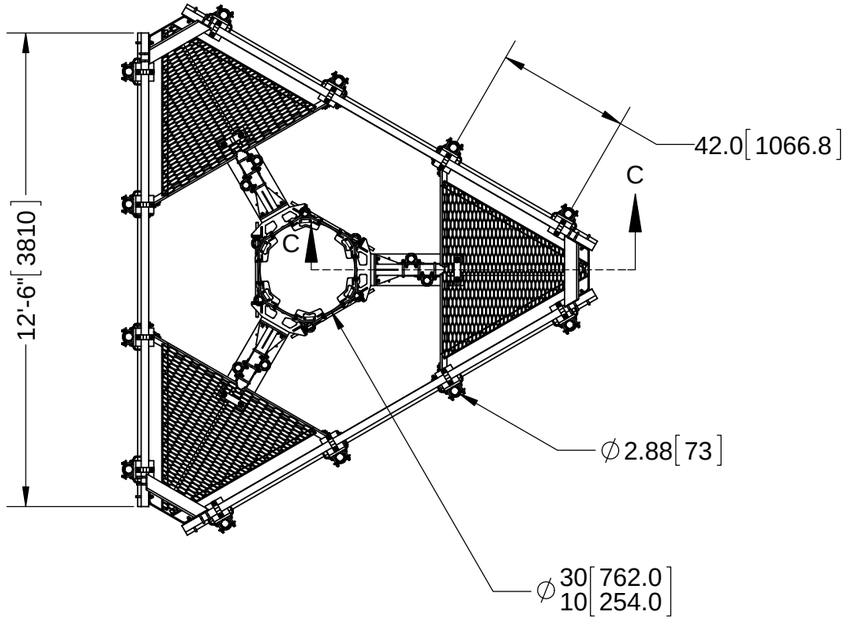
DETAIL B
SCALE 1 : 12

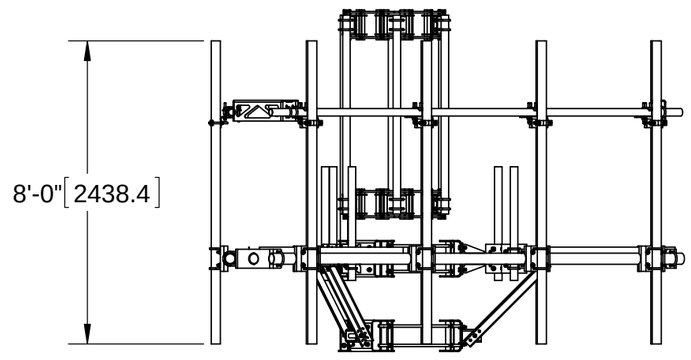
ALL DIMENSIONS ARE IN INCHES U.O.S.
TOLERANCES UNLESS OTHERWISE SPECIFIED:
.X = ± .12 ANGLES ±2°
.XX = ± .06 FRACTIONS ±1/32
.XXX= ± .031

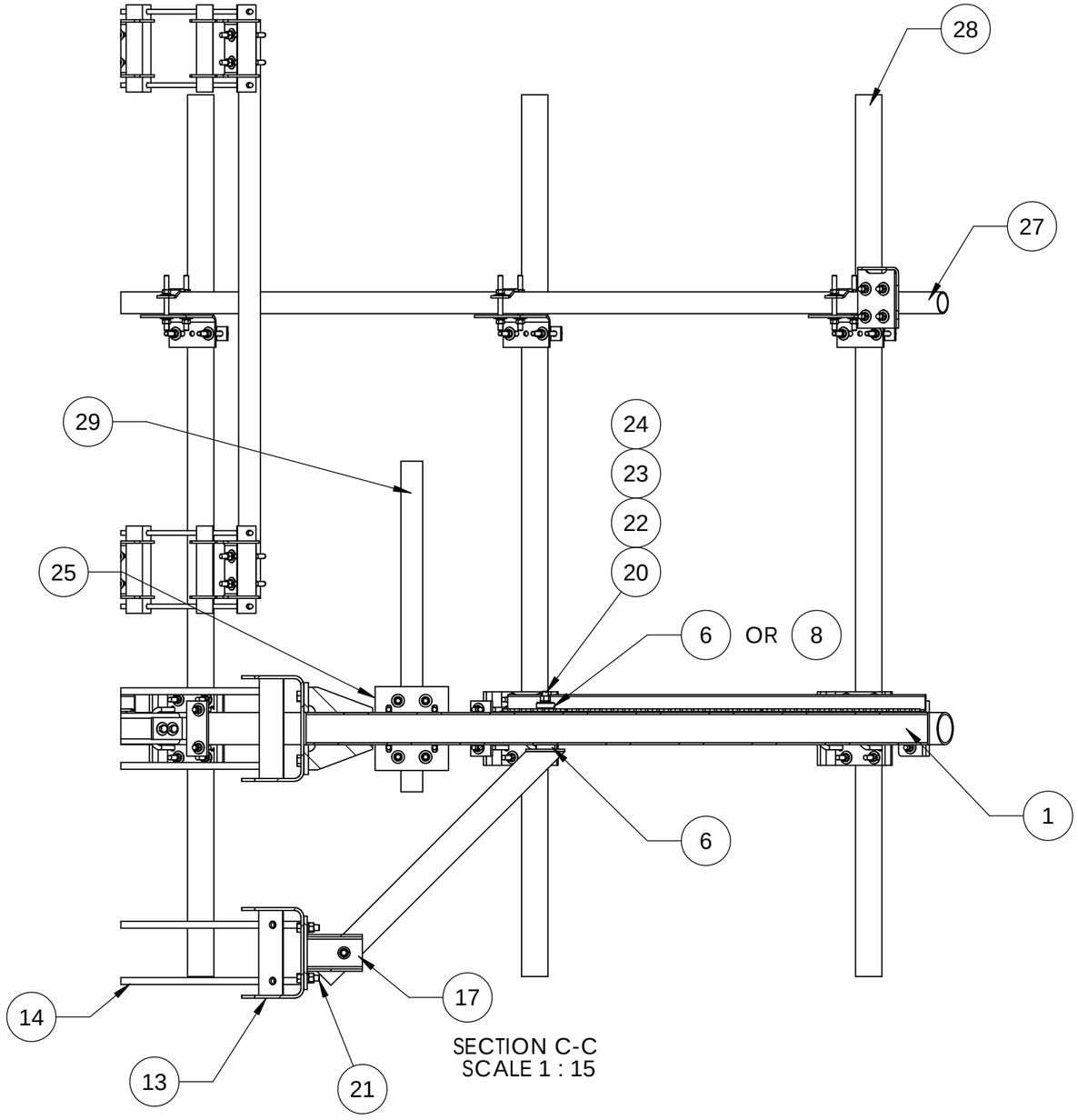
REMOVE BURRS AND BREAK EDGES .005

DO NOT SCALE THIS PRINT

DRAWN BY: DRR	SHEET: 2 of 3	PART NUMBER: MTC3607R	
CHECKED BY: TP	SCALE: NTS	DESCRIPTION: Low Profile Co-Location Platform Kit	
DATE: 10/18/13	MATERIAL: A36, A500, A529	DRAWING TYPE: ASSEMBLY DRAWING	
REVISION: A	FINISH: Galv A123	COMMSCOPE® Hickory, NC 28602 U.S.A.	
	WEIGHT: 2528.27 LBS		







SECTION C-C
SCALE 1 : 15

ALL DIMENSIONS ARE IN INCHES U.O.S.
TOLERANCES UNLESS OTHERWISE SPECIFIED:
.X = ± .12 ANGLES ±2°
.XX = ± .06 FRACTIONS ±1/32
.XXX= ± .031
REMOVE BURRS AND BREAK EDGES .005
DO NOT SCALE THIS PRINT

DRAWN BY: DRR	SHEET: 3 of 3	PART NUMBER: MTC3607R	
CHECKED BY: TP	SCALE: NTS	DESCRIPTION: Low Profile Co-Location Platform Kit	
DATE: 10/18/13	MATERIAL: A36, A500, A529	DRAWING TYPE: ASSEMBLY DRAWING	
REVISION: A	FINISH: Galv A123	COMMSCOPE® Hickory, NC 28602 U.S.A.	
	WEIGHT: 2528.27 LBS		