



Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

February 21, 2017

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

RE: Notice of Exempt Modification for AT&T/ LTE 3C Crown Site BU: 876391
AT&T Site ID: CT5861
14 Thompson Hill Road, Columbia, CT 06237
Latitude: 41° 43' 3.44" / Longitude: -72° 17' 59.09"

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 140-foot level of the existing 180-foot monopole at 14 Thompson Hill Road in Columbia, CT. The tower is owned by Crown Castle. The property is owned by Joshua Lanati and Crown Castle. AT&T now intends to install three (3) Bias-Ts and one (1) fiber line.

This facility was approved by the Columbia Planning and Zoning Commission on November 16, 1999. This approval included the conditions that:

1. The tower shall be structurally capable of supporting six users.
2. Prior to filing the final plan in the Land Record, a bond shall be posted to assure removal of the facility according to Section 52.7.15.5. The bond amount shall be proposed by the applicant and approved by the Town Engineer. Bond form all be cash or letter of credit.
3. The Town Planner shall be contacted on week prior to the start of any work associated with this approval, including site development and tree removal. At the Planner's request, a preconstruction meeting with the Planner, developer, and subcontractors shall be held prior to the start of work.
4. Any additional use of the site, including and not limited to additional antennas, cabinets, or other structures, and site work requires additional permitting by the Commission.
5. The location of the tower and associated compound and the proposed driveway shall be staked out by a licensed surveyor prior to excavation or construction. The tower and compound fence shall be shown on an as-built survey at the A2 level of accuracy prior to commencement use.
6. Clearcutting of timber shall be prohibited in a 100-foot ring around the lease area.
7. The text of this approval shall be placed on the final plan.

This modification complies with the aforementioned condition(s).

Melanie A. Bachman

February 21, 2017

Page 2

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

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

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

Sincerely,

Jeffrey Barbadora
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
781-729-0053
Jeff.Barbadora@crowncastle.com

Attachments:

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

Tab 2: Exhibit-2: Structural Modification Report

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

Melanie A. Bachman

February 21, 2017

Page 3

cc:

Mr. Carmen L. Vance
Columbia Town Hall
323 Route 87
Columbia, CT 06237

Joshua Lanati
4 Concorde Way A6
Windsor Locks, CT 06096

Department of Planning & Zoning
Columbia Town Hall
323 Route 87
Columbia, CT 06237



TOWN OF COLUMBIA

Planning & Zoning Commission
P.O. Box 165
Columbia, Connecticut 06237

Telephone: (860) 228-0440
Fax: (860) 228-1952

CERTIFIED #:
November 30, 1999

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

Dear Sirs,

At a meeting held on November 16, 1999, the Columbia Planning and Zoning Commission took the following action:

approved the application of Sprint Spectrum for a telecommunications facility at 14 Thompson Hill Road, property of Thomas R. Deojay, RA2 zone, based on the submitted application, including plans entitled: "Sprint PCS, Columbia, 14 Thompson Hill Road, Columbia, Connecticut CT33XC571" prepared by Goodkind & O'Dea, Inc., 59 Elm Street, Suite 101, New Haven, Connecticut 06510, consisting of 10 sheets labeled T1, S1, and Z1-Z8, with all sheets revised to 9/14/99 except sheet S1 revised 11/8/99, with the following conditions:

1. The tower shall be structurally capable of supporting six users.
2. Prior to filing the final plan in the Land Records, a bond shall be posted to assure removal of the facility according to Section 52.7.15.5. The bond amount shall be proposed by the applicant and approved by the Town Engineer. Bond form shall be cash or letter of credit.
3. The Town Planner shall be contacted one week prior to the start of any work associated with this approval, including site development and tree removal. At the Planner's request, a preconstruction meeting with the Planner, developer and subcontractors shall be held prior to the start of work.
4. Any additional use of the site, including and not limited to additional antennas, cabinets, or other structures, and site work, requires additional permitting by the Commission.
5. The location of the tower and associated compound and the proposed driveway shall be staked out by a licensed surveyor prior to excavation or construction. The tower and compound fence shall be shown on an as-built survey at the A2 level of accuracy prior to commencement of use.
6. Clearcutting of timber shall be prohibited in a 100-foot ring around the lease area.
7. The text of this approval shall be placed on the final plan.

Sprint
2 of 2

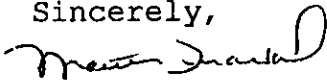
Technical Items

1. A signature block shall be placed on each sheet.
2. Plan sheets shall be numbered or otherwise indexed in the lower right corner.
3. Add to the sedimentation and erosion control notes on Z6:
 1. The Planner and Wetlands Agent may modify the erosion control requirements based on field conditions so as to minimize erosion and siltation on the site.
 2. Erosion controls shall be installed and inspected by the Planner prior to stump removal, grubbing, or other construction. The driveway shall be built per plan prior to development of the tower site.
 3. Prior to any work including tree removal, the Planner shall be provided with the name and phone number of a contact responsible for site work and erosion control who is on call 24 hours/day.

IN ORDER FOR THE APPROVAL TO BECOME FINAL, THE ABOVE CONDITIONS MUST BE FULFILLED.

Note that this action may be appealed for a fifteen day period following publication of notice of action in the Willimantic Chronicle. (Notice was published on or about November 22, 1999.) Do not hesitate to contact me at 228-0440 if you have any questions.

Sincerely,



Martha Fraenkel
Land Use Planner/Zoning Official

MF/ds

cc: Tom Regan

encl: procedures

CERTIFIED MAIL # Z 039 122 992

"SUMMARY RULING"
(APPROVAL WITH CONDITIONS)

As provided for in Connecticut General Statutes Section 22a-36 through 22a-45, as amended, and in Sections 5, 6.6b, 9.1 through 9.10 of the Inland Wetlands and Watercourse Regulations of the Town of Columbia, I move that the application No. AP9899-20 and described below be approved and a permit be granted with the conditions listed below in that the proposed activity does not have a significant impact on the wetlands or watercourses as defined in Section 2.20 in the Inland Wetlands Commission Regulations.

Applicant: Sprint PCS

Address: 9 Barnes Industrial
Rd. Wallingford, CT 06492

Address of Activity: 14 Thompson Hill Rd

Property owned by: Thomas R. &
Willie Jo Deojay

Maps Dated: 5/28/99

Application received on: 6/1/99

For the proposed activity: Upgrade existing gravel access drive by placing fill & 18" RCP - area of fill & disturbance in wetlands approximately 230 sq. ft.

Conditions:

1. The Inland Wetland Commission Agent is to be notified 48 hours before the commencement of any part of the activity approved above.
2. The granting of this permit does not relieve the applicant from obtaining additional permits and/or approvals required by other agencies, federal, state and local.
3. If an approval or permit is granted by another agency and contains conditions affecting the wetlands and/or watercourses and the area 75 feet from their flagged boundaries not addressed by this permit, the applicant must resubmit the application for further consideration by the Inland Wetlands Commission for a decision before work on the activity is to take place.

4. The duration of this permit is for five (5) years unless extended; by this Agency, and shall expire upon the completion of the activity approved herein or within one year of the start of the activity; whichever is sooner.
5. The applicant shall not assign or transfer this permit, or any part thereof, without the written permission of the Agency.
6. All activities for the prevention of soil erosion, such as silt fences and hay bales shall be under the direct supervision of the Inland Wetland Agent and if he deems it necessary, a certified engineer, who shall employ the best management practices, consistent with the terms and conditions of this permit, to control storm water discharges and to prevent erosion and sedimentation, to otherwise prevent pollution of wetlands or watercourses.
7. A copy of this motion and conditions listed, when approved by a majority vote of the IWC members present, shall constitute a permit for the activity described in the application and accompanying data when signed and dated by the Agent.
8. Diversion plan in place if work undertaken during streamflow. Plan to be approved by agent.
9. See additional conditions dated 7/6/99 attached.

Motion by: C. Robinson
Seconded by: C. Sanborn
Commission Action: Approved
Date: 7/6/99



John. Valente, Agent

July 6, 1999

Additional conditions for Sprint PCS

Driveway Crossing

1. Engineer to meet with agent and contractor.
2. Engineer to flag crossing and set elevations.
3. All silt fence to be in place prior to any work within 100' of wetlands.
4. Engineer to be present during initial stage of culvert installation and provide as-built certifying correct implementation of plan.

Driveway Design Outside of the Upland Review Area

1. Design of driveway is to prevent concentrated flows.
2. Any flow pattern greater than 200' to be broken up by acceptable erosion and soil measures, leak offs, grade changes or culverting.
3. All disturbed areas to be mulched and seeded.
4. All excess fill material to be deposited greater than 100' from wetlands - graded, seeded and mulched.

Mitigation

1. Mitigation to be done under the direction of the soil scientist.
2. Soil scientist to provide report to Commission on implementation of plan.
3. Soil scientist to verify success of planting at the beginning and end of the following growing season and provide report to Commission.

CERTIFIED MAIL # Z 039 122 992

"SUMMARY RULING"
(APPROVAL WITH CONDITIONS)

As provided for in Connecticut General Statutes Section 22a-36 through 22a-45, as amended, and in Sections 5, 6.6b, 9.1 through 9.10 of the Inland Wetlands and Watercourse Regulations of the Town of Columbia, I move that the application No. AP9899-20 and described below be approved and a permit be granted with the conditions listed below in that the proposed activity does not have a significant impact on the wetlands or watercourses as defined in Section 2.20 in the Inland Wetlands Commission Regulations.

Applicant: Sprint PCS

Address: 9 Barnes Industrial
Rd. Wallingford, CT 06492

Address of Activity: 14 Thompson Hill Rd

Property owned by: Thomas R. &
Willie Jo Deojay

Maps Dated: 5/28/99

Application received on: 6/1/99

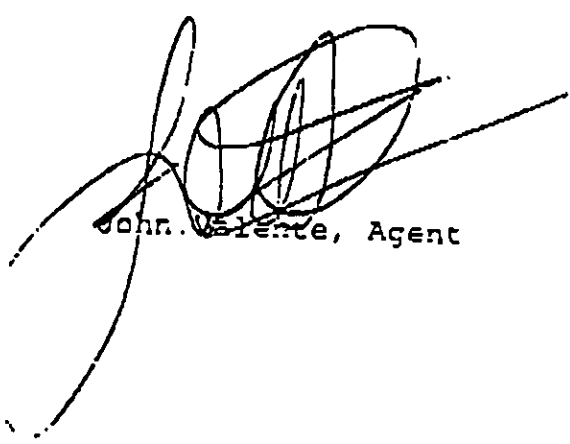
For the proposed activity: Upgrade existing gravel access drive by placing fill & 18" RCP - area of fill & disturbance in wetlands approximately 230 sq. ft.

Conditions:

1. The Inland Wetland Commission Agent is to be notified 48 hours before the commencement of any part of the activity approved above.
2. The granting of this permit does not relieve the applicant from obtaining additional permits and/or approvals required by other agencies, federal, state and local.
3. If an approval or permit is granted by another agency and contains conditions affecting the wetlands and/or watercourses and the area 75 feet from their flagged boundaries not addressed by this permit, the applicant must resubmit the application for further consideration by the Inland Wetlands Commission for a decision before work on the activity is to take place.

4. The duration of this permit is for five (5) years unless extended; by this Agency, and shall expire upon the completion of the activity approved herein or within one year of the start of the activity; whichever is sooner.
5. The applicant shall not assign or transfer this permit, or any part thereof, without the written permission of the Agency.
6. All activities for the prevention of soil erosion, such as silt fences and hay bales shall be under the direct supervision of the Inland Wetland Agent and if he deems it necessary, a certified engineer, who shall employ the best management practices, consistent with the terms and conditions of this permit, to control storm water discharges and to prevent erosion and sedimentation, to otherwise prevent pollution of wetlands or watercourses.
7. A copy of this motion and conditions listed, when approved by a majority vote of the IWC members present, shall constitute a permit for the activity described in the application and accompanying data when signed and dated by the Agent.
8. Diversion plan in place if work undertaken during streamflow. Plan to be approved by agent.
9. See additional conditions dated 7/6/99 attached.

Motion by: C. Robinson
Seconded by: C. Sanborn
Commission Action: Approved
Date: 7/6/99



John. Vicente, Agent

July 6, 1999

Additional conditions for Sprint PCS

Driveway Crossing

1. Engineer to meet with agent and contractor.
2. Engineer to flag crossing and set elevations.
3. All silt fence to be in place prior to any work within 100' of wetlands.
4. Engineer to be present during initial stage of culvert installation and provide as-built certifying correct implementation of plan.

Driveway Design Outside of the Upland Review Area

1. Design of driveway is to prevent concentrated flows.
2. Any flow pattern greater than 200' to be broken up by acceptable erosion and soil measures, leak offs, grade changes or culverting.
3. All disturbed areas to be mulched and seeded.
4. All excess fill material to be deposited greater than 100' from wetlands - graded, seeded and mulched.

Mitigation

1. Mitigation to be done under the direction of the soil scientist.
2. Soil scientist to provide report to Commission on implementation of plan.
3. Soil scientist to verify success of planting at the beginning and end of the following growing season and provide report to Commission.

14 THOMPSON HILL RD

Location 14 THOMPSON HILL RD

Mblu 011/ / 069/ CELL/

Acct# 011069CEL

Owner CROWN CABLE TOWERS 09 LLC

Assessment \$595,400

Appraisal \$850,600

PID 102279

Building Count 1

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2016	\$850,600	\$0	\$850,600

Assessment			
Valuation Year	Improvements	Land	Total
2016	\$595,400	\$0	\$595,400

Owner of Record

Owner	CROWN CABLE TOWERS 09 LLC	Sale Price	\$0
Co-Owner		Certificate	
Address	4017 WASHINGTON RD PNB 331 MCMURRAY, PA 15317	Book & Page	999
		Sale Date	09/30/2011

Ownership History

Ownership History				
Owner	Sale Price	Certificate	Book & Page	Sale Date
CROWN CABLE TOWERS 09 LLC	\$0		999	09/30/2011

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: \$0
Building Percent Good:
Replacement Cost Less Depreciation: \$0

Building Photo

Building Attributes	
Field	Description
Style	Outbuildings
Model	

Grade:	
Stories:	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Whirlpool	
Fireplace(s)	
Fndtn. Level	



(http://images.vgsi.com/photos2/ColumbiaCTPhotos//\00\00\83\48.jpg)

Building Layout

Building Layout

Building Sub-Areas (sq ft)	<u>Legend</u>
No Data for Building Sub-Areas	

Extra Features

Extra Features	<u>Legend</u>
No Data for Extra Features	

Land

Land Use

Use Code 3900
Description Dev Land
Zone
Neighborhood
Alt Land Appr No
Category

Land Line Valuation

Size (Acres) 0
Frontage
Depth
Assessed Value \$0
Appraised Value \$0

Outbuildings

Outbuildings						<u>Legend</u>
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
CELL	Cell Tower			4 UNITS	\$800,000	1

FN3	Fence-6' Chain			200 L.F.	\$2,000	1
CELS	Cell Shed			240 S.F.	\$27,000	1
CELS	Cell Shed			192 S.F.	\$21,600	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2015	\$705,000	\$0	\$705,000
2014	\$705,000	\$0	\$705,000
2013	\$705,000	\$0	\$705,000

Assessment			
Valuation Year	Improvements	Land	Total
2015	\$493,500	\$0	\$493,500
2014	\$493,500	\$0	\$493,500
2013	\$493,500	\$0	\$493,500

(c) 2016 Vision Government Solutions, Inc. All rights reserved.

14 THOMPSON HILL RD

Location 14 THOMPSON HILL RD

Mblu 011/ / 069/ /

Acct# 00054300

Owner LANATI JOSHUA & EILEEN

Assessment \$250,400

Appraisal \$502,300

PID 543

Building Count 1

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2016	\$127,400	\$374,900	\$502,300
Assessment			
Valuation Year	Improvements	Land	Total
2016	\$89,200	\$161,200	\$250,400

Owner of Record

Owner LANATI JOSHUA & EILEEN
Co-Owner
Address 14 THOMPSON HILL RD
 COLUMBIA, CT 06237

Sale Price \$155,000
Certificate
Book & Page 0197/0163
Sale Date 04/14/2011
Instrument 28

Ownership History

Ownership History					
Owner	Sale Price	Certificate	Book & Page	Instrument	Sale Date
LANATI JOSHUA & EILEEN	\$155,000		0197/0163	28	04/14/2011
DEOJAY THOMAS R ESTATE OF	\$0		0122/0722	25	09/23/2010
DEOJAY THOMAS R	\$0		0122/0722		10/25/1999
DEOJAY THOMAS R & WILLIE JO	\$0		0059/0018		05/18/1982

Building Information

Building 1 : Section 1

Year Built: 1955
Living Area: 1,677
Replacement Cost: \$190,432
Building Percent Good: 66
Replacement Cost Less Depreciation: \$125,700

Building Photo

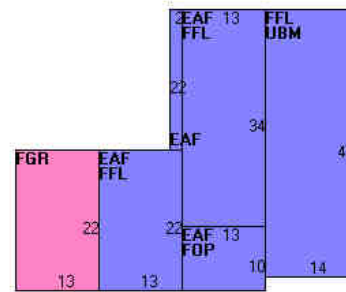
Building Attributes

Field	Description
Style	Conventional
Model	Residential
Grade:	Average +20
Stories:	1 1/2 Stories
Occupancy	1
Exterior Wall 1	Stucco/Masonry
Exterior Wall 2	Wood Shingle
Roof Structure:	Gable/Hip
Roof Cover	Asphalt
Interior Wall 1	Drywall/Sheet
Interior Wall 2	
Interior Flr 1	Pine/Soft Wood
Interior Flr 2	
Heat Fuel	Electric
Heat Type:	Electr Basebrd
AC Type:	None
Total Bedrooms:	3 Bedrooms
Total Bthrms:	2
Total Half Baths:	1
Total Xtra Fixtrs:	
Total Rooms:	8 Rooms
Bath Style:	Average
Kitchen Style:	Average
Whirlpool	
Fireplace(s)	1
Fndtn. Level	



(http://images.vgsi.com/photos2/ColumbiaCTPhotos//\00\00\75\76.jpg)

Building Layout



Building Sub-Areas (sq ft)		Legend	
Code	Description	Gross Area	Living Area
FFL	First Floor Living	1,316	1,316
EAF	Attic, Expansion, Finished	902	361
FGR	Garage, Framed	286	0
FOP	Porch, Open, Finished	130	0
UBM	Basement, Unfinished	588	0
		3,222	1,677

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	1010
Description	Single Fam
Zone	RA
Neighborhood	12

Land Line Valuation

Size (Acres)	29.4
Frontage	0
Depth	0
Assessed Value	\$161,200

Alt Land Appr No
Category

Appraised Value \$374,900

Outbuildings

Outbuildings						<u>Legend</u>
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
BRN3	Barn 1 St. w Loft			540 S.F.	\$1,300	1
SHD1	Shed Frame			64 S.F.	\$400	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2015	\$123,000	\$374,900	\$497,900
2014	\$123,000	\$374,900	\$497,900
2013	\$123,000	\$374,900	\$497,900

Assessment			
Valuation Year	Improvements	Land	Total
2015	\$86,100	\$160,330	\$246,430
2014	\$86,100	\$160,330	\$246,430
2013	\$86,100	\$160,330	\$246,430

(c) 2016 Vision Government Solutions, Inc. All rights reserved.





WIRELESS COMMUNICATIONS FACILITY CT5861 - LTE BWE COLUMBIA NORTH CROWN CASTLE SITE NO.: 876391 14 THOMPSON HILL ROAD COLUMBIA, CT 06237

GENERAL NOTES

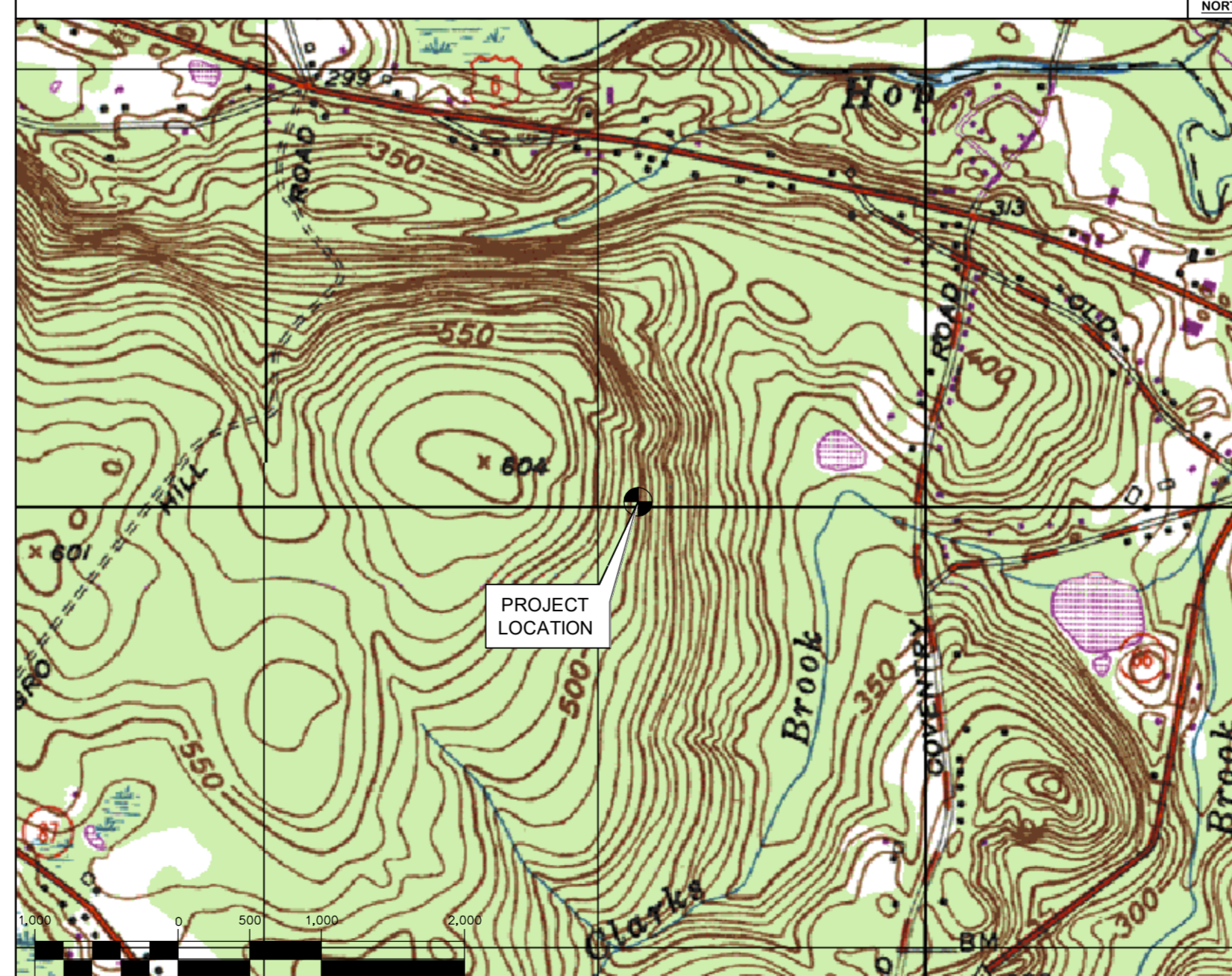
1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE, INCLUDING THE TIA-222 REVISION "G" STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES, 2016 CONNECTICUT FIRE SAFETY CODE AND, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. THE COMPOUND, TOWER, PRIMARY GROUND RING, ELECTRICAL SERVICE TO THE METER BANK AND TELEPHONE SERVICE TO THE DEMARCATION POINT ARE PROVIDED BY SITE OWNER. AS BUILT FIELD CONDITIONS REGARDING THESE ITEMS SHALL BE CONFIRMED BY THE CONTRACTOR. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
5. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
6. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
7. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
8. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING BUILDING'S/PROPERTY'S OPERATIONS, COORDINATE WORK WITH BUILDING/PROPERTY OWNER.
10. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
11. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
12. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
13. ANY AND ALL ERRORS, DISCREPANCIES, AND "MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
15. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
16. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
17. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
19. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
20. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED PRIOR TO ANY EXCAVATION WORK. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
21. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

FROM:	500 ENTERPRISE DRIVE ROCKY HILL, CONNECTICUT	TO:	14 THOMPSON HILL ROAD COLUMBIA, CONNECTICUT
<ol style="list-style-type: none"> 1. HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD 0.31 MI 2. TURN LEFT ONTO CAPITAL BLVD 0.27 MI 3. TURN LEFT ONTO WEST ST 0.16 MI 4. TURN LEFT TO MERGE ONTO I-91 N TOWARD HARTFORD 7.79 MI 5. MERGE ONTO CT-15 N/WILBUR CROSS HWY N EXIT 29 TOWARD I-84 E/E HARTFORD/BOSTON 2.14 MI 6. CT-15 N/WILBUR CROSS HWY N BECOMES I-84 E/US-6 E/WILBUR CROSS HWY N. 1.50 MI 7. KEEP RIGHT TO TAKE I-384 E EXIT 59 TOWARD PROVIDENCE 8.67 MI 8. I-384 E BECOMES US-6 E/US-44 E/BOSTON TURNPIKE 0.22 MI 9. TURN US-6 E TOWARD WILLIMANTIC/PROVIDENCE 10.12 MI 10. TURN RIGHT ONO EDGARTON RD. 0.15 MI 11. TAKE THE 1ST RIGHT ONTO THOMPSON HILL 0.18 MI 			

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
 - A. REMOVE AND REPLACE EXISTING RRUS-11's (1900 MHz) FOR PROPOSED RRUS-12's, TYPICAL OF (3)/(1) PER SECTOR.
 - B. RELOCATE EXISTING LTE HEXPORT ANTENNA FROM POSITION THREE (3) TO POSITION TWO (2).
 - C. INSTALL NEW XMU WITHIN EXISTING LTE PURCELL CABINET.

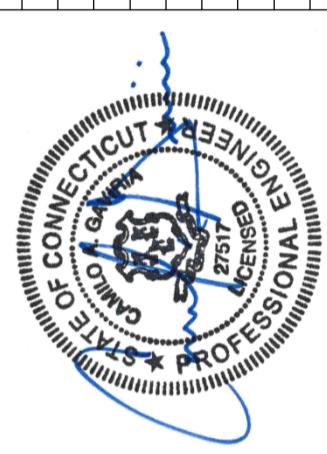
PROJECT INFORMATION

AT&T SITE NUMBER:	CT5861
AT&T SITE NAME:	COLUMBIA NORTH
SITE ADDRESS:	CROWN CASTLE SITE NO.: 876391 14 THOMPSON HILL ROAD COLUMBIA, CT 06237
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-43'-03.42" N LONGITUDE: 72°-17'-59.12" W GROUND ELEVATION: ±576' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM 1-A SURVEY PREPARED FOR AT&T MOBILITY BY EBI CONSULTING DATED SEPTEMBER 14, 2012.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	1
N-1	NOTES, SPECIFICATIONS AND DETAILS	1
C-1	PLANS AND ELEVATION	1
C-2	LTE BWE EQUIPMENT DETAILS	1
E-1	TYPICAL ELECTRICAL DETAILS AND NOTES	1

PROFESSIONAL ENGINEER SEAL



CENTEK engineering
Centered on Solutions™
(203) 488-0360
(203) 488-8387 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

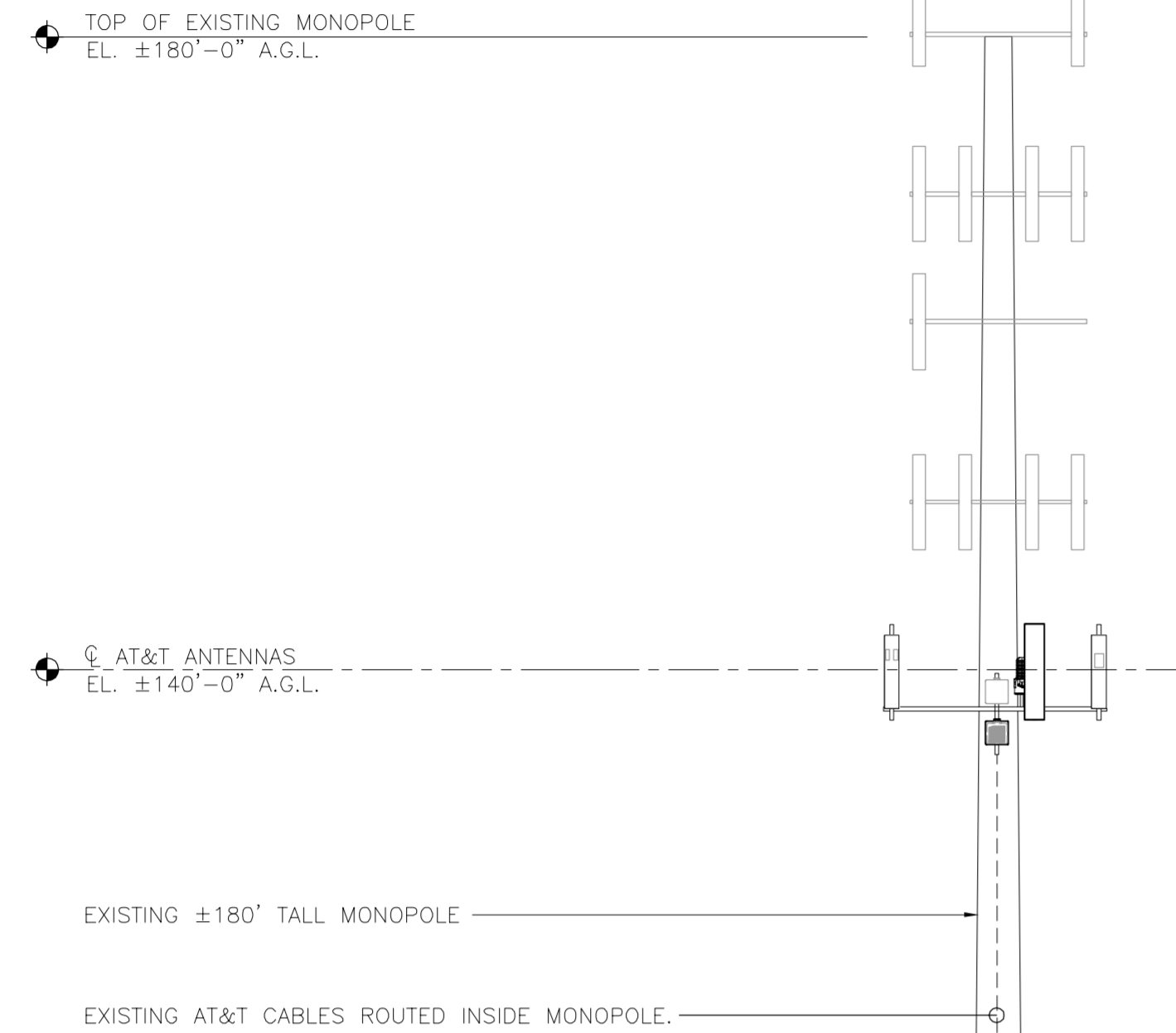
AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
COLUMBIA NORTH
CT5861 - LTE BWE
14 THOMPSON HILL ROAD
COLUMBIA, CT 06237

DATE: 11/23/16
SCALE: AS NOTED
JOB NO. 16071.62

TITLE SHEET

T-1

CONSTRUCTION DOCUMENTS - REVISED PER CLIENT	LVP	02/12/17
CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION	CAG	12/01/16
	KAWJR	
	DATE	
	REV.	
	0	
	1	
	DATE	
	12/01/16	
	02/12/17	
	CAG	
	LVP	
	CONSTRUCTION DOCUMENTS - REVISED PER CLIENT	
	CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION	

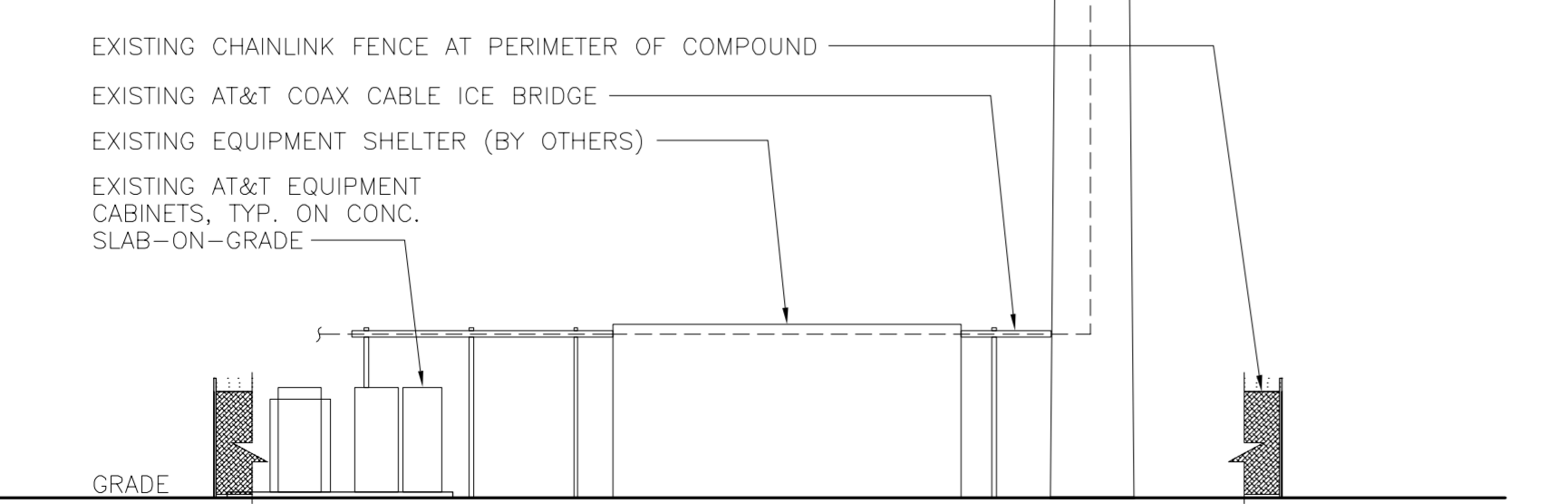


TOWER STRUCTURAL NOTES:

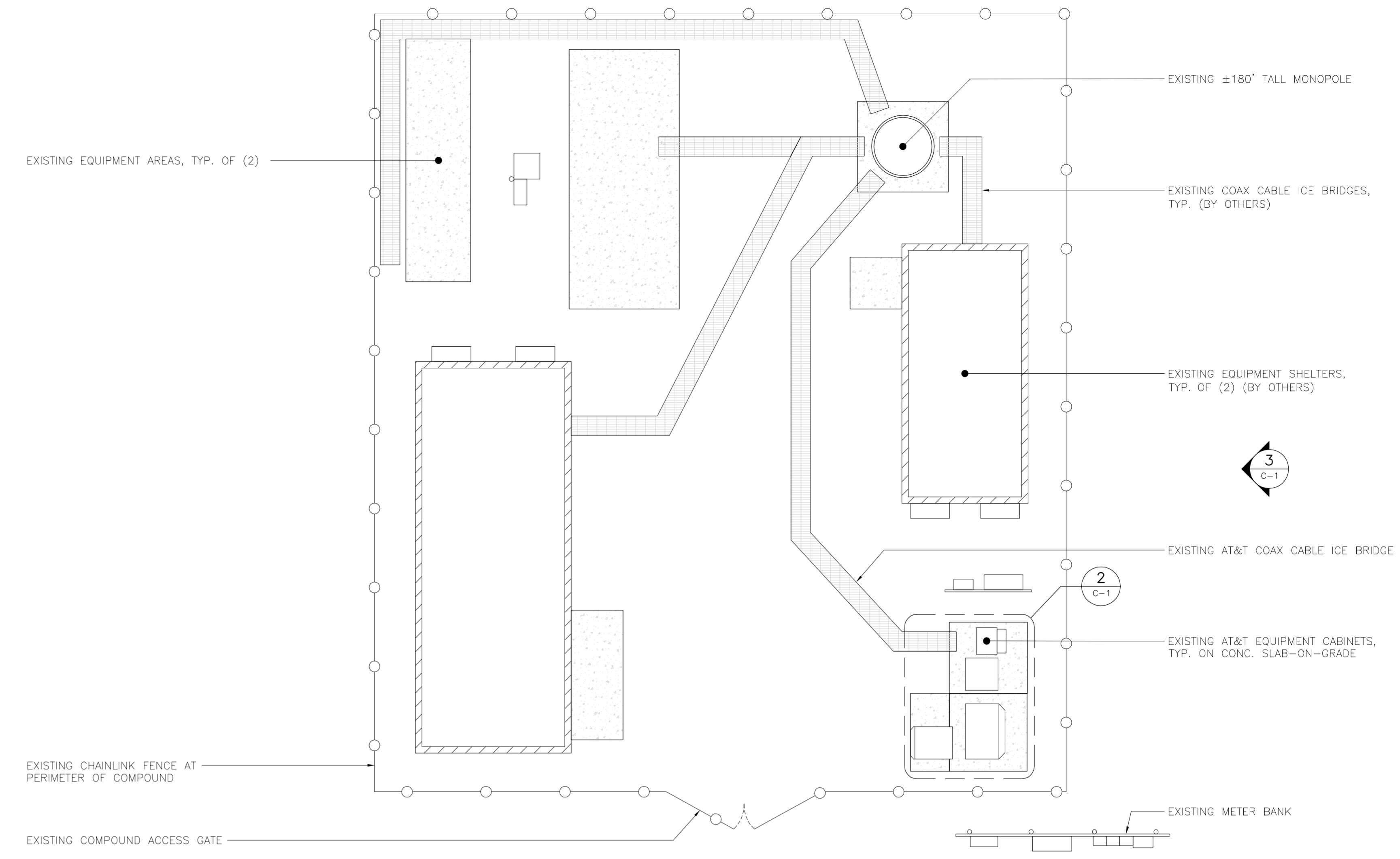
1. TOWER STRUCTURAL ANALYSIS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO BE PROVIDED PRIOR TO INSTALLATION OF THE ADDITIONAL TOWER LOADING DEPICTED HEREIN.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE, INC. AND FINAL AT&T RF DATA SHEET.

NOTES:

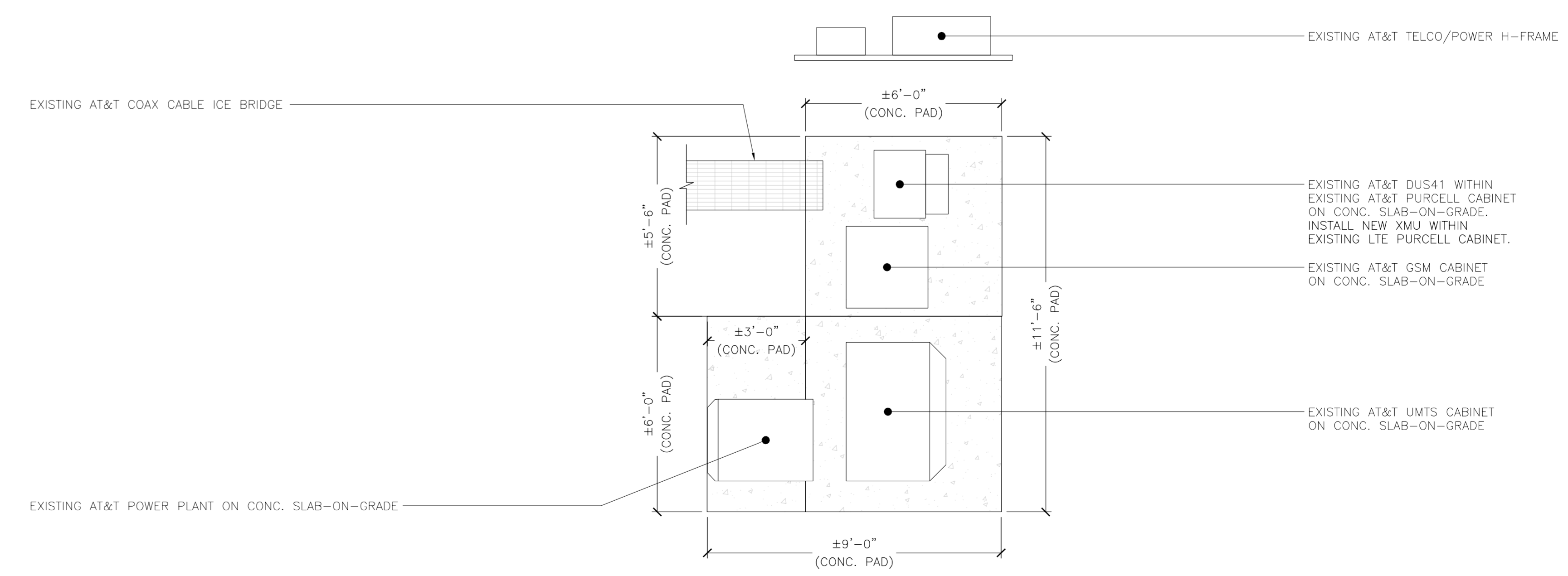
1. A.G.L. = ABOVE GRADE LEVEL



3 WEST TOWER ELEVATION
 SCALE: 1" = 10'
 GRAPHIC SCALE (IN FEET) 1 inch = 40 ft.

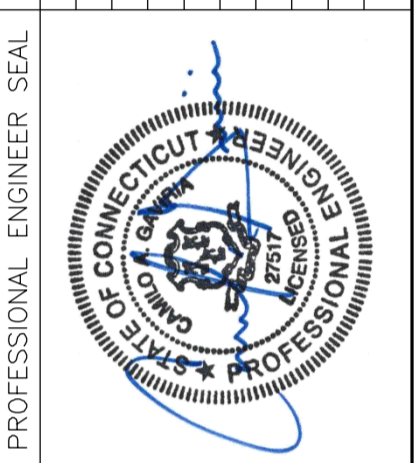


1 COMPOUND PLAN
 SCALE: 1" = 6'
 TRUE NORTH
 GRAPHIC SCALE (IN FEET) 1 inch = 6 ft.



2 EQUIPMENT LAYOUT PLAN
 SCALE: 3/8" = 1'-0"
 TRUE NORTH

REV.	DATE	BY	CHK'D	DESCRIPTION
1	02/12/17	CAG	LVP	CONSTRUCTION DOCUMENTS - REVISED PER CLIENT
0	12/01/16	KAWJR	CAG	CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION



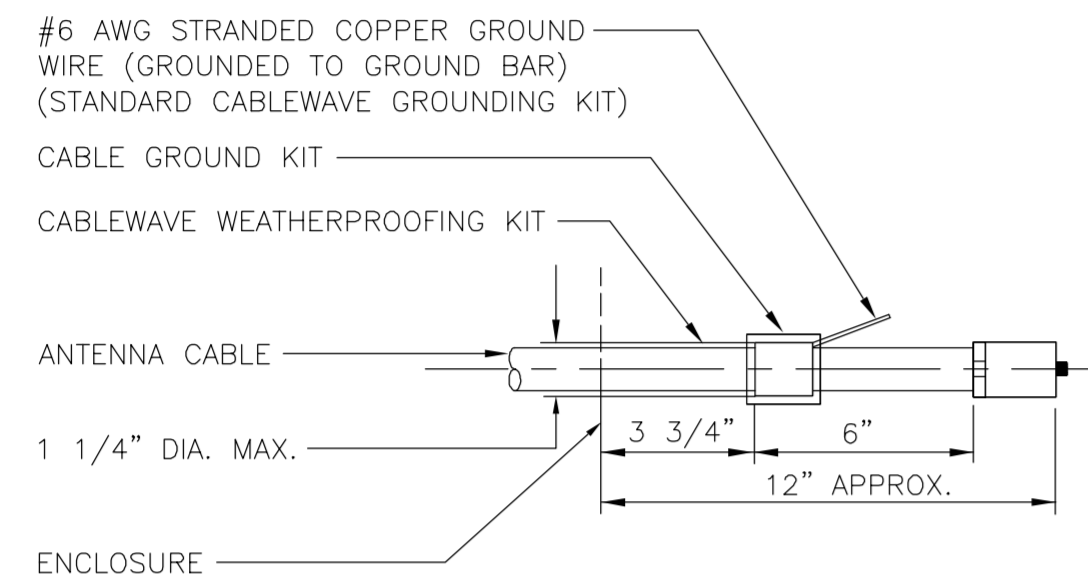
CENTEX engineering
 Centered on Solutions™
 (203) 488-0380
 (203) 488-8387 Fax
 63-2 North Branford Road
 Branford, CT 06405
 www.CentexEng.com

AT&T MOBILITY
 WIRELESS COMMUNICATIONS FACILITY
COLUMBIA NORTH
 CT5861 - LTE BWE
 14 THOMPSON HILL ROAD
 COLUMBIA, CT 06237

DATE: 11/23/16
 SCALE: AS NOTED
 JOB NO. 16071.62

PLANS AND ELEVATION

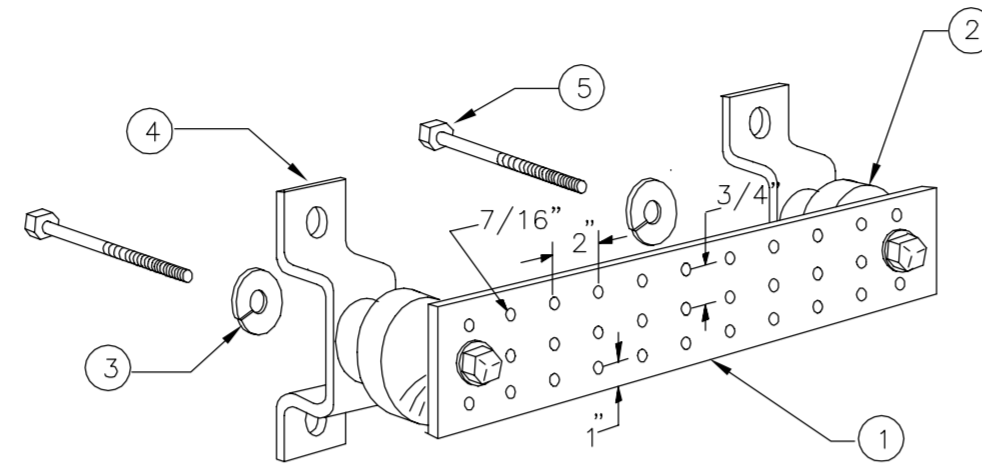
C-1
 Sheet No. 3 of 5



NOTE:

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

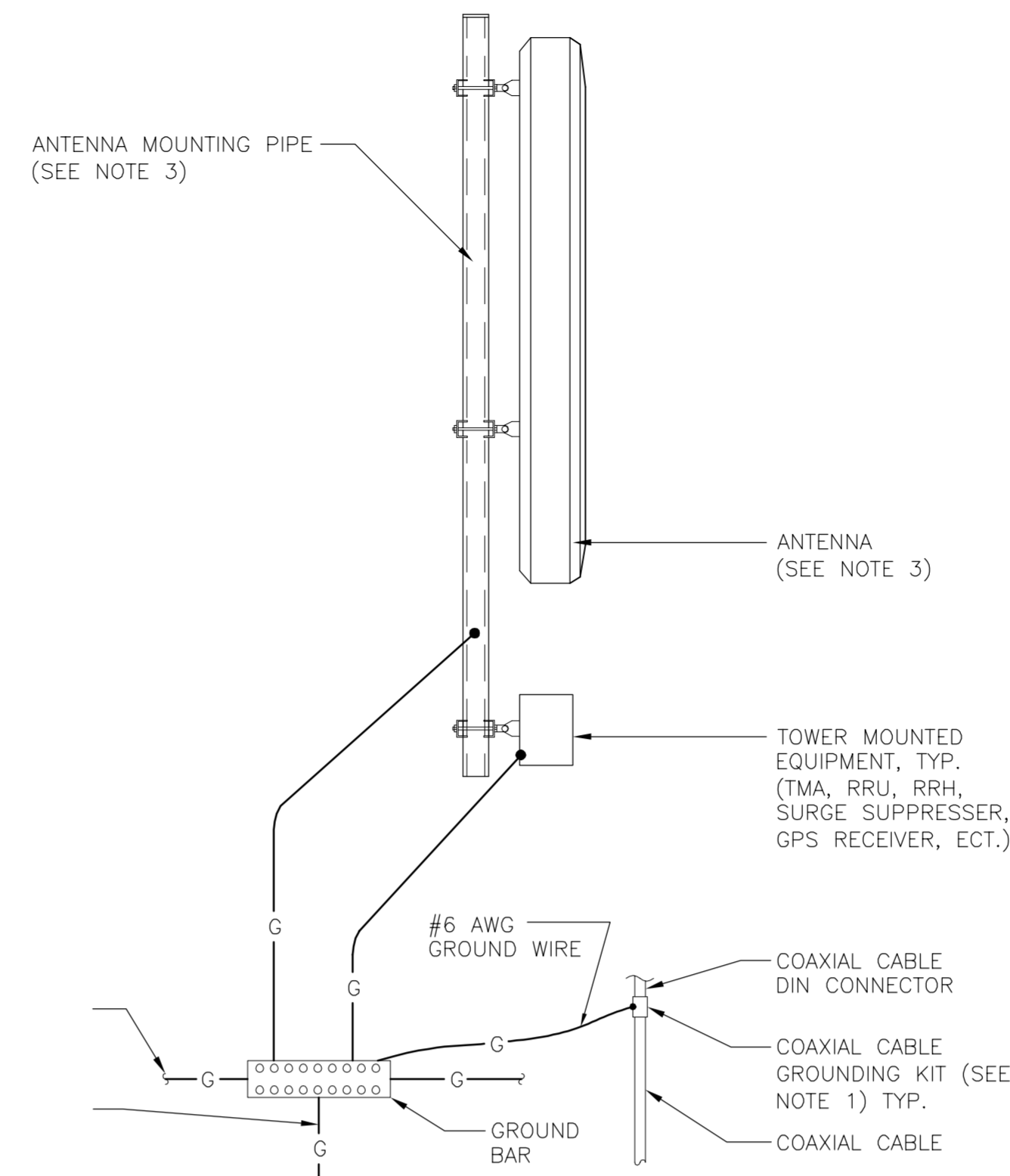
3 ANTENNA CABLE GROUNDING DETAIL
E-1 NOT TO SCALE



LEGEND

- TINNED COPPER GROUND BAR, 1/4"x 4"x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG.
- INSULATORS, NEWTON INSTRUMENT CAT. NO. 2. 3061-4.
- 3/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
- WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT. NO. A-6056.
- STAINLESS STEEL SECURITY SCREWS.

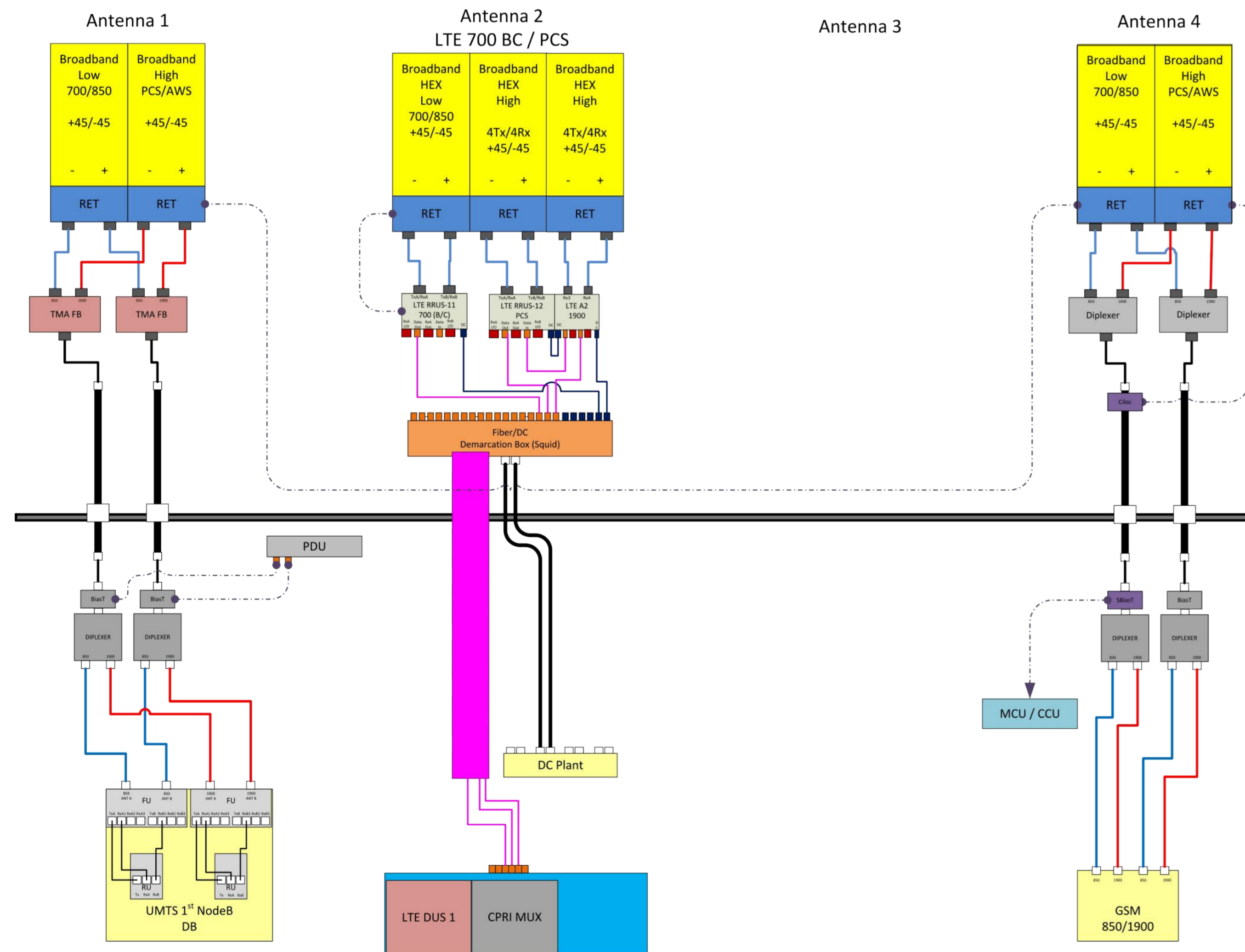
2 GROUND BAR DETAIL
E-1 NOT TO SCALE



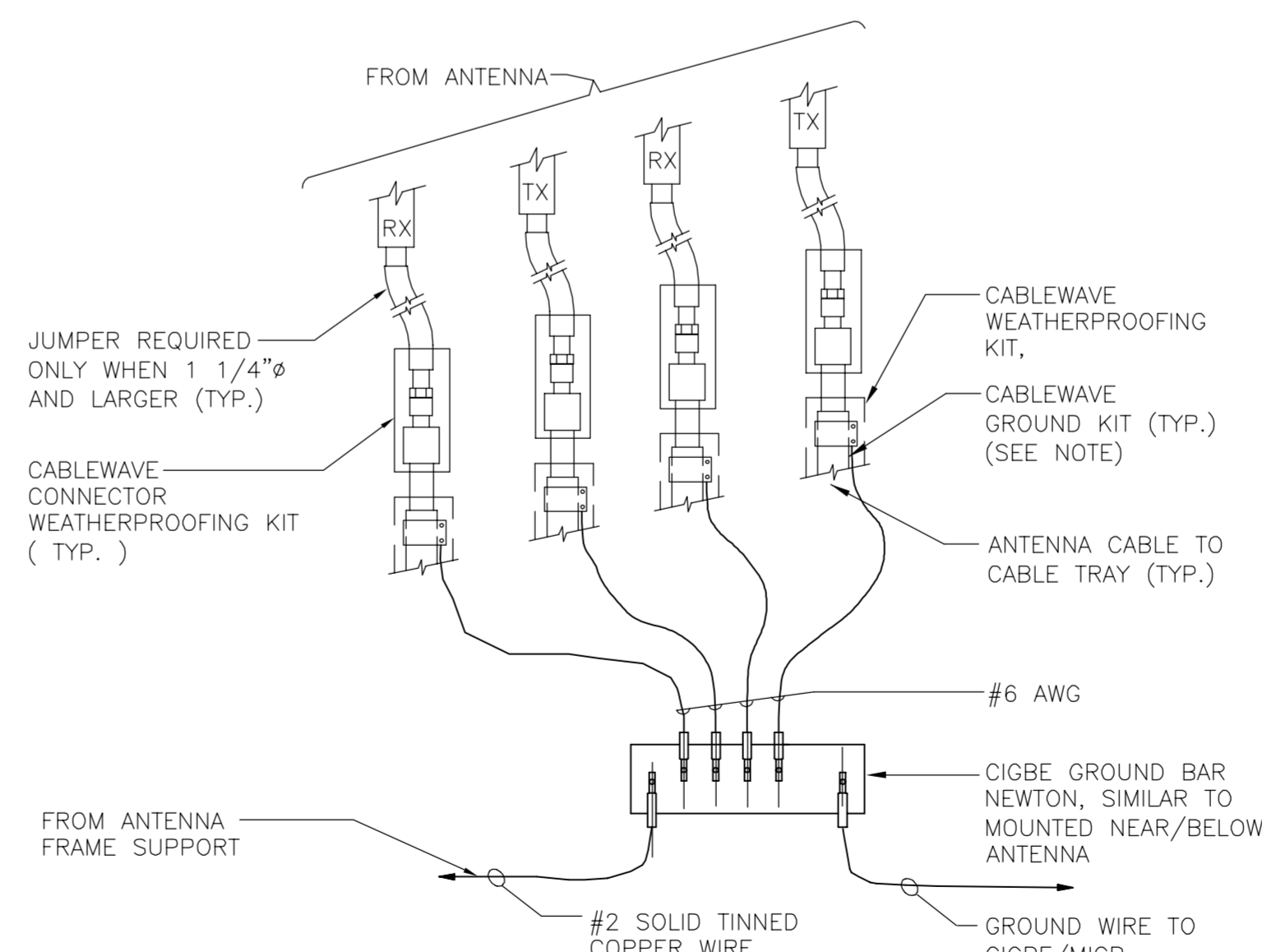
NOTES:

- BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
- BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURER'S SPECIFICATIONS.
- DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

1 TYPICAL ANTENNA GROUNDING DETAIL
E-1 NOT TO SCALE



5 RF PLUMBING DIAGRAM
E-1 NOT TO SCALE



NOTE:

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

4 CONNECTION OF GROUND WIRES TO GROUND BAR
E-1 NOT TO SCALE

ELECTRICAL NOTES

- PRIOR TO START OF CONSTRUCTION CONTRACTOR SHALL COORDINATE WITH OWNER FOR ALL CONSTRUCTION STANDARDS AND SPECIFICATIONS, AND ALL MANUFACTURER DOCUMENTATION FOR ALL EQUIPMENT TO BE INSTALLED.
- INSTALL ALL EQUIPMENT IN ACCORDANCE WITH LOCAL BUILDING CODE, NATIONAL ELECTRIC CODE, OWNER AND MANUFACTURER'S SPECIFICATIONS.
- CONNECT ALL NEW EQUIPMENT TO EXISTING TELCO AS REQUIRED BY MANUFACTURER.
- MAINTAIN ALL CLEARANCES REQUIRED BY NEC AND EQUIPMENT MANUFACTURER.
- PRIOR TO INSTALLATION CONTRACTOR SHALL MEASURE EXISTING ELECTRICAL LOAD AND VERIFY EXISTING AVAILABLE CAPACITY FOR PROPOSED INSTALLATION. IF INADEQUATE CAPACITY IS AVAILABLE, CONTRACTOR SHALL COORDINATE WITH LOCAL ELECTRIC UTILITY COMPANY TO UPGRADE EXISTING ELECTRIC SERVICE.
- CONTRACTOR SHALL INSPECT EXISTING GROUNDING AND LIGHTNING PROTECTION SYSTEM AND ENSURE THAT IT IS IN COMPLIANCE WITH NEC, AND SITE OWNER'S SPECIFICATIONS. THE RESULTS OF THIS INSPECTION SHALL BE PRESENTED TO OWNERS REPRESENTATIVE, AND ANY DEFICIENCIES SHALL BE CORRECTED.
- ALL TRANSMISSION TOWER SITES CONTAIN AN EXTENSIVE BURIED GROUNDING SYSTEM. ALL GROUNDING WORK MUST BE COORDINATED WITH, AND APPROVED BY, THE TOWER OWNER'S SITE REPRESENTATIVE. ALL OF THE TOWER OWNER'S SPECIFICATIONS MUST BE STRICTLY FOLLOWED.
- PROVIDE AND INSTALL GROUND KITS FOR ALL NEW COAXIAL CABLES AND BOND TO EXISTING OWNERS GROUNDING SYSTEM PER OWNERS SPECIFICATIONS AND NEC.
- ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS. #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION.
- MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.
- THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.
- THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNER'S REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES AS MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS AS MAY BE REQUIRED BY THE LOCAL AUTHORITY.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE SITE AND/OR BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.
- THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.
- DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.
- ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.
- GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.
- EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122. (MIN. #12 AWG).
- CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 5 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

- CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:
 - TEST 1: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM. THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:
 - TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
 - CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
 - GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.
- TESTING SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNERS CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.
- THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.
- CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.



CENTEX engineering
Centex on Solutions®
(203) 488-0360
(203) 488-8387 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentexEng.com

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
COLUMBIA NORTH
CT5861 - LTE BWE
14 THOMPSON HILL ROAD
COLUMBIA, CT 06237

DATE: 11/23/16
SCALE: AS NOTED
JOB NO. 16071.62

TYPICAL ELECTRICAL DETAILS & NOTES

Date: December 27, 2016

Sean Dempsey
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6565

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
rkoors@pjfweb.com

Subject: Structural Analysis Report

Carrier Designation: AT&T Mobility Co-Locate
Carrier Site Number: CT5861
Carrier Site Name: Columbia North

Crown Castle Designation: Crown Castle BU Number: 876391
Crown Castle Site Name: COLUMBIA / DEOJAY
Crown Castle JDE Job Number: 409605
Crown Castle Work Order Number: 1337817
Crown Castle Application Number: 369276 Rev. 1

Engineering Firm Designation: Paul J Ford and Company Project Number: 37516-0222.003.7805

Site Data: 14 Thompson Hill Rd, COLUMBIA, Tolland County, CT
Latitude 41° 43' 3.44", Longitude -72° 17' 59.09"
180 Foot - Monopole Tower

Dear Sean Dempsey,

Paul J Ford and Company is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 983949, in accordance with application 369276, revision 1.

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

LC5: Existing + Proposed Equipment

Sufficient Capacity

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

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 130 mph converted to a nominal 3-second gust wind speed of 101 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C and Risk Category II were used in this analysis.

We at Paul J Ford and Company appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:



Bob Koors, E.I.
Structural Designer



12-28-16

Date: **December 27, 2016**

Sean Dempsey
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6565

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
rkoors@pjfweb.com

Subject: Structural Analysis Report

Carrier Designation: **AT&T Mobility Co-Locate**
Carrier Site Number: CT5861
Carrier Site Name: Columbia North

Crown Castle Designation: **Crown Castle BU Number:** 876391
Crown Castle Site Name: COLUMBIA / DEOJAY
Crown Castle JDE Job Number: 409605
Crown Castle Work Order Number: 1337817
Crown Castle Application Number: 369276 Rev. 1

Engineering Firm Designation: **Paul J Ford and Company Project Number:** 37516-0222.003.7805

Site Data: **14 Thompson Hill Rd, COLUMBIA, Tolland County, CT**
Latitude 41° 43' 3.44", Longitude -72° 17' 59.09"
180 Foot - Monopole Tower

Dear Sean Dempsey,

Paul J Ford and Company is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 983949, in accordance with application 369276, revision 1.

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

LC5: Existing + Proposed Equipment

Sufficient Capacity

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

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 130 mph converted to a nominal 3-second gust wind speed of 101 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C and Risk Category II were used in this analysis.

We at *Paul J Ford and Company* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Bob Koors, E.I.
Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Antenna and Cable Information

Table 2 - Existing Antenna and Cable Information

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Table 5 – Tower Components vs. Capacity

5) APPENDIX A

tnxTower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 180 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in November of 1999. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 130 mph converted to a nominal 3-second gust wind speed of 101 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C and Risk Category II were used in this analysis.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
140.0	140.0	3	powerwave technologies	1001940	1	3/8	-

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
180.0	181.0	2	decibel	950F65T2ZE-M w/ Mount Pipe	6	1-5/8	1
		4	decibel	DB980H90E-M w/ Mount Pipe			
	180.0	1	tower mounts	Platform Mount [LP 601-1]			
161.0	162.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1	1-5/8	1
		3	ericsson	Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe			
		3	ericsson	RRUS 11 B12			
	161.0	1	tower mounts	Platform Mount [LP 305-1]			
147.0	150.0	3	alcatel lucent	RRH2X60-AWS	14	1/2 1-5/8	1
		3	alcatel lucent	RRH2X60-PCS			
		6	andrew	HBXX-6517DS-A2M w/ Mount Pipe			
		6	andrew	LNx-6514DS-A1M w/ Mount Pipe			
		1	lucent	KS24019-L112A			
		2	rfs celwave	DB-T1-6Z-8AB-0Z			
		6	rfs celwave	FD9R6004/1C-3L			
	147.0	1	tower mounts	Platform Mount [LP 712-1]			
141.0	141.0	1	tower mounts	Pipe Mount [PM 601-3]	-	-	1
	138.0	3	ericsson	TME-RRUS 11 BAND 12	-	-	-

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
140.0	140.0	3	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe	2 12 1	7/16 1-5/8 2	1
		3	ericsson	RRUS 12			
		3	ericsson	RRUS A2			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP 17201			
		6	powerwave technologies	LGP21901			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 303-1]			
		3	powerwave technologies	LGP13519			
83.0	84.0	2	kathrein	OG-860/1920/GPS-A	2	1-1/4	1
	83.0	2	tower mounts	Side Arm Mount [SO 701-1]			
78.0	79.0	1	kathrein	OG-860/1920/GPS-A	1	1/2	1
	78.0	1	tower mounts	Side Arm Mount [SO 701-1]			

- Notes:
 1) Existing Equipment
 2) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Goodkind & O'Dea, Inc., CT33XC519, 06/08/99	1613526	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI, 6151, 12/20/99	1613632	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI, 6151, 12/20/1999	1614546	CCISITES
4-TOWER MANUFACTURER DESIGN CALCULATIONS	EEI, 99-1429, 11/22/1999	1440653	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

- 1) Monopole was fabricated and installed in accordance with the manufacturer's specifications.
- 2) Monopole has been properly maintained in accordance with manufacturer's specifications.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	180 - 131.75	Pole	TP31.39x21x0.25	1	-12.42	1686.69	48.0	Pass
L2	131.75 - 86.71	Pole	TP40.46x29.921x0.375	2	-22.16	3408.11	63.6	Pass
L3	86.71 - 43.16	Pole	TP48.96x38.5229x0.4375	3	-36.12	4767.07	68.7	Pass
L4	43.16 - 0	Pole	TP57.25x46.668x0.5	4	-57.62	6465.70	68.3	Pass
							Summary	
						Pole (L3)	68.7	Pass
						Rating =	68.7	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	73.8	Pass
1	Base Plate	0	80.5	Pass
1	Base Foundation Steel	0	76.3	Pass
1	Base Foundation Soil Interaction	0	43.6	Pass

Structure Rating (max from all components) =	80.5%
---	--------------

Notes:

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

APPENDIX A
TNXTOWER OUTPUT

Tower Input Data

There is a pole section.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

- 3) Tower is located in Tolland County, Connecticut.
- 4) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
- 5) Basic wind speed of 101 mph.
- 6) Structure Class II.
- 7) Exposure Category C.
- 8) Topographic Category 1.
- 9) Crest Height 0.0000 ft.
- 10) Nominal ice thickness of 1.0000 in.
- 11) Ice thickness is considered to increase with height.
- 12) Ice density of 56.00 pcf.
- 13) A wind speed of 50 mph is used in combination with ice.
- 14) Temperature drop of 50 °F.
- 15) Deflections calculated using a wind speed of 60 mph.
- 16) A non-linear (P-delta) analysis was used.
- 17) Pressures are calculated at each section.
- 18) Stress ratio used in pole design is 1.
- 19) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. ✓ Autocalc Torque Arm Areas Add IBC .6D+W Combination Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-G Bracing Resist. Exemption Use TIA-222-G Tension Splice Exemption <div style="text-align: center; border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">Poles</div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
--	--	--

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	180.0000- 131.7500	48.2500	4.50	18	21.0000	31.3900	0.2500	1.0000	A572-65 (65 ksi)
L2	131.7500- 86.7100	49.5400	5.58	18	29.9210	40.4600	0.3750	1.5000	A572-65 (65 ksi)
L3	86.7100- 43.1600	49.1300	6.67	18	38.5229	48.9600	0.4375	1.7500	A572-65 (65 ksi)
L4	43.1600- 0.0000	49.8300		18	46.6680	57.2500	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	I/Q in ²	w in	w/t
L1	21.3240	16.4651	895.6507	7.3663	10.6680	83.9568	1792.4800	8.2341	3.2560	13.024
	31.8742	24.7096	3027.1937	11.0547	15.9461	189.8389	6058.3706	12.3571	5.0846	20.339
L2	31.3547	35.1671	3878.5647	10.4888	15.1999	255.1711	7762.2328	17.5869	4.6061	12.283
	41.0842	47.7112	9685.4835	14.2302	20.5537	471.2287	19383.711	23.8601	6.4610	17.229
L3	40.3209	52.8864	9691.6750	13.5203	19.5696	495.2402	19396.102	26.4482	6.0100	13.737
	49.7153	67.3796	20042.502	17.2255	24.8717	805.8363	40111.376	33.6962	7.8470	17.936
L4	48.8263	73.2687	19730.526	16.3897	23.7074	832.2531	39487.013	36.6413	7.3336	14.667
	58.1332	90.0622	36644.767	20.1462	29.0830	1260.0065	73337.753	45.0397	9.1960	18.392

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft ²	in					in	in	in
L1 180.0000-131.7500				1	1	1			
L2 131.7500-86.7100				1	1	1			
L3 86.7100-43.1600				1	1	1			
L4 43.1600-0.0000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	C _A A _A	Weight
				ft		ft ² /ft	plf
LDF7-50A(1-5/8)	C	No	Inside Pole	180.0000 - 0.0000	6	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.82
**							
MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	C	No	Inside Pole	161.0000 - 0.0000	1	No Ice 1/2" Ice 1" Ice	1.07 1.07 1.07
**							
LDF4-50A(1/2)	C	No	Inside Pole	147.0000 - 0.0000	1	No Ice 1/2" Ice 1" Ice	0.15 0.15 0.15
LDF7-50A(1-5/8)	C	No	CaAa (Out Of Face)	147.0000 - 0.0000	12	No Ice 1/2" Ice 1" Ice	0.82 2.33 4.46
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	147.0000 - 0.0000	1	No Ice 1/2" Ice 1" Ice	1.30 2.81 4.94
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	147.0000 - 0.0000	1	No Ice 1/2" Ice 1" Ice	1.30 2.81 4.94
**							
FB-L98B-034-XXX(3/8)	C	No	Inside Pole	140.0000 - 0.0000	1	No Ice 1/2" Ice 1" Ice	0.06 0.06 0.06
2" (Nominal) Conduit	C	No	Inside Pole	140.0000 - 0.0000	1	No Ice	0.72

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A		Weight
						ft ² /ft	plf	
WR-VG122ST-BRDA(7/16)	C	No	Inside Pole	140.0000 - 0.0000	2	1/2" Ice	0.0000	0.72
						1" Ice	0.0000	0.72
						No Ice	0.0000	0.14
LDF7-50A(1-5/8)	C	No	Inside Pole	140.0000 - 0.0000	12	1/2" Ice	0.0000	0.14
						1" Ice	0.0000	0.14
						No Ice	0.0000	0.82
ICE 200(2)	C	No	Inside Pole	140.0000 - 0.0000	1	1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						No Ice	0.0000	0.23
**						1/2" Ice	0.0000	0.23
LDF6-50A(1-1/4)	C	No	CaAa (Out Of Face)	83.0000 - 0.0000	1	No Ice	0.0000	0.60
						1/2" Ice	0.0000	1.85
						1" Ice	0.0000	3.72
LDF6-50A(1-1/4)	C	No	CaAa (Out Of Face)	83.0000 - 0.0000	1	No Ice	0.1550	0.60
						1/2" Ice	0.2550	1.85
						1" Ice	0.3550	3.72
**						No Ice	0.0000	0.15
LDF4-50A(1/2)	C	No	CaAa (Out Of Face)	78.0000 - 0.0000	1	1/2" Ice	0.0000	0.84
						1" Ice	0.0000	2.14
						No Ice	0.0000	0.15
**						1" Ice	0.0000	2.14

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	180.0000-131.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.019	0.55
L2	131.7500-86.7100	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	8.918	1.34
L3	86.7100-43.1600	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	14.798	1.35
L4	43.1600-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	15.235	1.34

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	180.0000-131.7500	A	2.334	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.138	3.32
L2	131.7500-86.7100	A	2.253	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	29.941	9.52
L3	86.7100-43.1600	A	2.139	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	52.369	9.95
L4	43.1600-0.0000	A	1.919	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	52.160	9.22

Feed Line Center of Pressure

Section	Elevation	CP _x	CP _z	CP _x Ice	CP _z Ice
	ft	in	in	in	in
L1	180.0000- 131.7500	-0.0884	0.0511	-0.2403	0.1387
L2	131.7500-86.7100	-0.2377	0.1372	-0.6304	0.3639
L3	86.7100-43.1600	-0.4001	0.2310	-1.0873	0.6278
L4	43.1600-0.0000	-0.4184	0.2416	-1.1443	0.6606

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
(2) 950F65T2ZE-M w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice	4.2306	4.2028	0.03
						1/2" Ice	4.6953	5.0707	0.07
						Ice	5.1456	5.8149	0.12
						1" Ice			
(2) DB980H90E-M w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice	4.0361	3.6194	0.03
						1/2" Ice	4.4987	4.4808	0.07
						Ice	4.9468	5.2186	0.11
						1" Ice			
(2) DB980H90E-M w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice	4.0361	3.6194	0.03
						1/2" Ice	4.4987	4.4808	0.07
						Ice	4.9468	5.2186	0.11
						1" Ice			
Platform Mount [LP 601-1]	C	None		0.00	180.0000	No Ice	28.4700	28.4700	1.12
						1/2" Ice	33.5900	33.5900	1.51
						Ice	38.7100	38.7100	1.91
						1" Ice			
8-ft Ladder	C	From Leg	2.0000 0.00 -2.00	0.00	180.0000	No Ice	7.0700	7.0700	0.04
						1/2" Ice	9.7300	9.7300	0.07
						Ice	11.1900	11.1900	0.08
						1" Ice			
(2) 2.375" OD x 6' Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice	1.4250	1.4250	0.03
						1/2" Ice	1.9250	1.9250	0.04
						Ice	2.2939	2.2939	0.05
						1" Ice			
(2) 2.375" OD x 6' Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice	1.4250	1.4250	0.03
						1/2" Ice	1.9250	1.9250	0.04
						Ice	2.2939	2.2939	0.05
						1" Ice			
(2) 2.375" OD x 6' Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	180.0000	No Ice	1.4250	1.4250	0.03
						1/2" Ice	1.9250	1.9250	0.04
						Ice	2.2939	2.2939	0.05
						1" Ice			

ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.00	161.0000	No Ice	6.3292	5.6424	0.11
						1/2" Ice	6.7751	6.4259	0.17
						Ice	7.2137	7.1313	0.23
						1" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	161.0000	No Ice	6.3292	5.6424	0.11
						1/2" Ice	6.7751	6.4259	0.17
						Ice	7.2137	7.1313	0.23
						1" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	161.0000	No Ice	6.3292	5.6424	0.11
						1/2" Ice	6.7751	6.4259	0.17
						Ice	7.2137	7.1313	0.23
						1" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Lateral Vert						ft
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	A	From Leg	4.0000	0.00	0.00	161.0000	No Ice	7.8625	6.8796	0.16
			0.00				1/2"	8.3076	7.5944	0.23
			1.00				Ice	8.7610	8.3255	0.31
							1" Ice			
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	B	From Leg	4.0000	0.00	0.00	161.0000	No Ice	7.8625	6.8796	0.16
			0.00				1/2"	8.3076	7.5944	0.23
			1.00				Ice	8.7610	8.3255	0.31
							1" Ice			
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	C	From Leg	4.0000	0.00	0.00	161.0000	No Ice	7.8625	6.8796	0.16
			0.00				1/2"	8.3076	7.5944	0.23
			1.00				Ice	8.7610	8.3255	0.31
							1" Ice			
RRUS 11 B12	A	From Leg	4.0000	0.00	0.00	161.0000	No Ice	2.8333	1.1821	0.05
			0.00				1/2"	3.0426	1.3299	0.07
			1.00				Ice	3.2593	1.4848	0.10
							1" Ice			
RRUS 11 B12	B	From Leg	4.0000	0.00	0.00	161.0000	No Ice	2.8333	1.1821	0.05
			0.00				1/2"	3.0426	1.3299	0.07
			1.00				Ice	3.2593	1.4848	0.10
							1" Ice			
RRUS 11 B12	C	From Leg	4.0000	0.00	0.00	161.0000	No Ice	2.8333	1.1821	0.05
			0.00				1/2"	3.0426	1.3299	0.07
			1.00				Ice	3.2593	1.4848	0.10
							1" Ice			
Platform Mount [LP 305-1]	C	None			0.00	161.0000	No Ice	18.0100	18.0100	1.12
							1/2"	23.3300	23.3300	1.35
							Ice	28.6500	28.6500	1.58
							1" Ice			
2.375" OD x 6' Mount Pipe	C	From Leg	4.0000	0.00	0.00	161.0000	No Ice	1.4250	1.4250	0.03
			0.00				1/2"	1.9250	1.9250	0.04
			0.00				Ice	2.2939	2.2939	0.05
							1" Ice			
(2) LNX-6514DS-A1M w/ Mount Pipe	A	From Leg	4.0000	0.00	0.00	147.0000	No Ice	8.4106	7.0817	0.06
			0.00				1/2"	8.9745	8.2729	0.13
			3.00				Ice	9.5048	9.1847	0.21
							1" Ice			
(2) LNX-6514DS-A1M w/ Mount Pipe	B	From Leg	4.0000	0.00	0.00	147.0000	No Ice	8.4106	7.0817	0.06
			0.00				1/2"	8.9745	8.2729	0.13
			3.00				Ice	9.5048	9.1847	0.21
							1" Ice			
(2) LNX-6514DS-A1M w/ Mount Pipe	C	From Leg	4.0000	0.00	0.00	147.0000	No Ice	8.4106	7.0817	0.06
			0.00				1/2"	8.9745	8.2729	0.13
			3.00				Ice	9.5048	9.1847	0.21
							1" Ice			
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.0000	0.00	0.00	147.0000	No Ice	8.7655	6.9629	0.07
			0.00				1/2"	9.3417	8.1817	0.14
			3.00				Ice	9.8885	9.1436	0.21
							1" Ice			
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.0000	0.00	0.00	147.0000	No Ice	8.7655	6.9629	0.07
			0.00				1/2"	9.3417	8.1817	0.14
			3.00				Ice	9.8885	9.1436	0.21
							1" Ice			
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.0000	0.00	0.00	147.0000	No Ice	8.7655	6.9629	0.07
			0.00				1/2"	9.3417	8.1817	0.14
			3.00				Ice	9.8885	9.1436	0.21
							1" Ice			
KS24019-L112A	B	From Leg	4.0000	0.00	0.00	147.0000	No Ice	0.1407	0.1407	0.01
			0.00				1/2"	0.1979	0.1979	0.01
			3.00				Ice	0.2621	0.2621	0.01
							1" Ice			
(2) FD9R6004/1C-3L	A	From Leg	4.0000	0.00	0.00	147.0000	No Ice	0.3142	0.0762	0.00
			0.00				1/2"	0.3862	0.1189	0.00
			3.00				Ice	0.4656	0.1685	0.01
							1" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Lateral						Vert
(2) FD9R6004/1C-3L	B	From Leg	4.0000	0.00	0.00	147.0000	No Ice	0.3142	0.0762	0.00
			0.00				1/2"	0.3862	0.1189	0.00
			3.00				Ice	0.4656	0.1685	0.01
(2) FD9R6004/1C-3L	C	From Leg	4.0000	0.00	0.00	147.0000	No Ice	0.3142	0.0762	0.00
			0.00				1/2"	0.3862	0.1189	0.00
			3.00				Ice	0.4656	0.1685	0.01
RRH2X60-AWS	A	From Leg	4.0000	0.00	0.00	147.0000	No Ice	1.8775	1.2359	0.04
			0.00				1/2"	2.0551	1.3858	0.06
			3.00				Ice	2.2401	1.5441	0.08
RRH2X60-AWS	B	From Leg	4.0000	0.00	0.00	147.0000	No Ice	1.8775	1.2359	0.04
			0.00				1/2"	2.0551	1.3858	0.06
			3.00				Ice	2.2401	1.5441	0.08
RRH2X60-AWS	C	From Leg	4.0000	0.00	0.00	147.0000	No Ice	1.8775	1.2359	0.04
			0.00				1/2"	2.0551	1.3858	0.06
			3.00				Ice	2.2401	1.5441	0.08
DB-T1-6Z-8AB-0Z	A	From Leg	4.0000	0.00	0.00	147.0000	No Ice	4.8000	2.0000	0.04
			0.00				1/2"	5.0704	2.1926	0.08
			3.00				Ice	5.3481	2.3926	0.12
DB-T1-6Z-8AB-0Z	B	From Leg	4.0000	0.00	0.00	147.0000	No Ice	4.8000	2.0000	0.04
			0.00				1/2"	5.0704	2.1926	0.08
			3.00				Ice	5.3481	2.3926	0.12
RRH2X60-PCS	A	From Leg	4.0000	0.00	0.00	147.0000	No Ice	2.2000	1.7233	0.06
			0.00				1/2"	2.3926	1.9015	0.08
			3.00				Ice	2.5926	2.0870	0.10
RRH2X60-PCS	B	From Leg	4.0000	0.00	0.00	147.0000	No Ice	2.2000	1.7233	0.06
			0.00				1/2"	2.3926	1.9015	0.08
			3.00				Ice	2.5926	2.0870	0.10
RRH2X60-PCS	C	From Leg	4.0000	0.00	0.00	147.0000	No Ice	2.2000	1.7233	0.06
			0.00				1/2"	2.3926	1.9015	0.08
			3.00				Ice	2.5926	2.0870	0.10
Platform Mount [LP 712-1]	C	None			0.00	147.0000	No Ice	24.5300	24.5300	1.34
							1/2"	29.9400	29.9400	1.65
							Ice	35.3500	35.3500	1.96
**	A	From Leg	1.0000	0.00	0.00	141.0000	No Ice	2.5662	1.0828	0.05
			0.00				1/2"	2.7649	1.2260	0.07
			-3.00				Ice	2.9710	1.3765	0.09
TME-RRUS 11 BAND 12	B	From Leg	1.0000	0.00	0.00	141.0000	No Ice	2.5662	1.0828	0.05
			0.00				1/2"	2.7649	1.2260	0.07
			-3.00				Ice	2.9710	1.3765	0.09
TME-RRUS 11 BAND 12	C	From Leg	1.0000	0.00	0.00	141.0000	No Ice	2.5662	1.0828	0.05
			0.00				1/2"	2.7649	1.2260	0.07
			-3.00				Ice	2.9710	1.3765	0.09
Pipe Mount [PM 601-3]	C	None			0.00	141.0000	No Ice	4.3900	4.3900	0.20
							1/2"	5.4800	5.4800	0.24
							Ice	6.5700	6.5700	0.28
***	A	From Leg	4.0000	0.00	0.00	140.0000	No Ice	5.7981	4.5454	0.09
			0.00				1/2"	6.2677	5.5082	0.14
			0.00				Ice	6.6966	6.2127	0.21

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	140.0000	1" Ice			
						No Ice	5.7981	4.5454	0.09
						1/2" Ice	6.2677	5.5082	0.14
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	140.0000	1" Ice			
						No Ice	5.7981	4.5454	0.09
						1/2" Ice	6.2677	5.5082	0.14
HPA-65R-BUU-H6 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	140.0000	1" Ice			
						No Ice	9.8953	8.1125	0.08
						1/2" Ice	10.4700	9.3041	0.16
HPA-65R-BUU-H6 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	140.0000	1" Ice			
						No Ice	9.8953	8.1125	0.08
						1/2" Ice	10.4700	9.3041	0.16
HPA-65R-BUU-H6 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	140.0000	1" Ice			
						No Ice	9.8953	8.1125	0.08
						1/2" Ice	10.4700	9.3041	0.16
(2) LGP 17201	A	From Leg	4.0000 0.00 0.00	0.00	140.0000	1" Ice			
						No Ice	1.6680	0.4669	0.03
						1/2" Ice	1.8289	0.5676	0.04
(2) LGP 17201	B	From Leg	4.0000 0.00 0.00	0.00	140.0000	1" Ice			
						No Ice	1.6680	0.4669	0.03
						1/2" Ice	1.8289	0.5676	0.04
(2) LGP 17201	C	From Leg	4.0000 0.00 0.00	0.00	140.0000	1" Ice			
						No Ice	1.6680	0.4669	0.03
						1/2" Ice	1.8289	0.5676	0.04
(2) LGP21901	A	From Leg	4.0000 0.00 0.00	0.00	140.0000	1" Ice			
						No Ice	0.2310	0.1575	0.01
						1/2" Ice	0.2941	0.2129	0.01
(2) LGP21901	B	From Leg	4.0000 0.00 0.00	0.00	140.0000	1" Ice			
						No Ice	0.2310	0.1575	0.01
						1/2" Ice	0.2941	0.2129	0.01
(2) LGP21901	C	From Leg	4.0000 0.00 0.00	0.00	140.0000	1" Ice			
						No Ice	0.2310	0.1575	0.01
						1/2" Ice	0.2941	0.2129	0.01
RRUS 12	A	From Leg	4.0000 0.00 0.00	0.00	140.0000	1" Ice			
						No Ice	3.1450	1.2854	0.06
						1/2" Ice	3.3648	1.4379	0.08
RRUS 12	B	From Leg	4.0000 0.00 0.00	0.00	140.0000	1" Ice			
						No Ice	3.1450	1.2854	0.06
						1/2" Ice	3.3648	1.4379	0.08
RRUS 12	C	From Leg	4.0000 0.00 0.00	0.00	140.0000	1" Ice			
						No Ice	3.1450	1.2854	0.06
						1/2" Ice	3.3648	1.4379	0.08
RRUS A2	A	From Leg	4.0000 0.00 0.00	0.00	140.0000	1" Ice			
						No Ice	2.0663	0.4988	0.02
						1/2" Ice	2.2451	0.6087	0.03
RRUS A2	B	From Leg	4.0000 0.00 0.00	0.00	140.0000	1" Ice			
						No Ice	2.0663	0.4988	0.02
						1/2" Ice	2.2451	0.6087	0.03
						Ice	2.4313	0.7255	0.05
						1" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
RRUS A2	C	From Leg	4.0000	0.00	140.0000	No Ice	2.0663	0.4988	0.02
			0.00			1/2"	2.2451	0.6087	0.03
			0.00			Ice	2.4313	0.7255	0.05
DC6-48-60-18-8F	C	From Leg	4.0000	0.00	140.0000	1" Ice	0.9167	0.9167	0.02
			0.00			1/2"	1.4583	1.4583	0.04
			0.00			Ice	1.6431	1.6431	0.06
1001940	A	From Leg	4.0000	0.00	140.0000	1" Ice	0.1758	0.0833	0.00
			0.00			1/2"	0.2317	0.1264	0.00
			0.00			Ice	0.2950	0.1778	0.01
1001940	B	From Leg	4.0000	0.00	140.0000	No Ice	0.1758	0.0833	0.00
			0.00			1/2"	0.2317	0.1264	0.00
			0.00			Ice	0.2950	0.1778	0.01
1001940	C	From Leg	4.0000	0.00	140.0000	1" Ice	0.1758	0.0833	0.00
			0.00			1/2"	0.2317	0.1264	0.00
			0.00			Ice	0.2950	0.1778	0.01
Platform Mount [LP 303-1]	C	None		0.00	140.0000	No Ice	14.6600	14.6600	1.25
						1/2"	18.8700	18.8700	1.48
						Ice	23.0800	23.0800	1.71
**						1" Ice			
OG-860/1920/GPS-A	A	From Leg	4.0000	0.00	83.0000	No Ice	0.3077	0.3667	0.00
			0.00			1/2"	0.3952	0.4572	0.01
			1.00			Ice	0.4897	0.5548	0.01
OG-860/1920/GPS-A	B	From Leg	4.0000	0.00	83.0000	1" Ice	0.3077	0.3667	0.00
			0.00			1/2"	0.3952	0.4572	0.01
			1.00			Ice	0.4897	0.5548	0.01
Side Arm Mount [SO 701-1]	A	None		0.00	83.0000	No Ice	0.8500	1.6700	0.07
						1/2"	1.1400	2.3400	0.08
						Ice	1.4300	3.0100	0.09
Side Arm Mount [SO 701-1]	B	None		0.00	83.0000	1" Ice	0.8500	1.6700	0.07
						1/2"	1.1400	2.3400	0.08
						Ice	1.4300	3.0100	0.09
***						1" Ice			
OG-860/1920/GPS-A	B	From Leg	4.0000	0.00	78.0000	No Ice	0.3077	0.3667	0.00
			0.00			1/2"	0.3952	0.4572	0.01
			1.00			Ice	0.4897	0.5548	0.01
Side Arm Mount [SO 701-1]	B	None		0.00	78.0000	1" Ice	0.8500	1.6700	0.07
						1/2"	1.1400	2.3400	0.08
						Ice	1.4300	3.0100	0.09
**						1" Ice			

Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _{AA} In Face ft ²	C _{AA} Out Face ft ²
L1 180.0000- 131.7500	154.4747	1.387	34.38	106.95 1	A B C	0.000 0.000 0.000	106.951 106.951 106.951	106.951	100.00 100.00 100.00	0.000 0.000 0.000	0.000 0.000 3.019

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} In Face ft ²	C_{AA} Out Face ft ²
L2 131.7500-86.7100	108.4660	1.287	31.90	135.94	A	0.000	135.944	135.944	100.00	0.000	0.000
					B	0.000	135.944	100.00	0.000	0.000	
					C	0.000	135.944	100.00	0.000	8.918	
L3 86.7100-43.1600	64.5656	1.154	28.53	163.37	A	0.000	163.378	163.378	100.00	0.000	0.000
					B	0.000	163.378	100.00	0.000	0.000	
					C	0.000	163.378	100.00	0.000	14.798	
L4 43.1600-0.0000	21.8139	0.919	22.83	192.34	A	0.000	192.349	192.349	100.00	0.000	0.000
					B	0.000	192.349	100.00	0.000	0.000	
					C	0.000	192.349	100.00	0.000	15.235	

Tower Pressure - With Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_z	q_z psf	t_z in	A_G ft ²	Face	A_F ft ²	A_R ft ²	A_{leg} ft ²	Leg %	C_{AA} In Face ft ²	C_{AA} Out Face ft ²
L1 180.0000-131.7500	154.4747	1.387	8.43	2.3338	125.718	A	0.000	125.718	125.718	100.00	0.000	0.000
						B	0.000	125.718	100.00	0.000	0.000	
						C	0.000	125.718	100.00	0.000	10.138	
L2 131.7500-86.7100	108.4660	1.287	7.82	2.2527	153.463	A	0.000	153.463	153.463	100.00	0.000	0.000
						B	0.000	153.463	100.00	0.000	0.000	
						C	0.000	153.463	100.00	0.000	29.941	
L3 86.7100-43.1600	64.5656	1.154	6.99	2.1388	179.729	A	0.000	179.729	179.729	100.00	0.000	0.000
						B	0.000	179.729	100.00	0.000	0.000	
						C	0.000	179.729	100.00	0.000	52.369	
L4 43.1600-0.0000	21.8139	0.919	5.60	1.9189	207.734	A	0.000	207.734	207.734	100.00	0.000	0.000
						B	0.000	207.734	100.00	0.000	0.000	
						C	0.000	207.734	100.00	0.000	52.160	

Tower Pressure - Service

$G_H = 1.100$

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} In Face ft ²	C_{AA} Out Face ft ²
L1 180.0000-131.7500	154.4747	1.387	10.86	106.95	A	0.000	106.951	106.951	100.00	0.000	0.000
					B	0.000	106.951	100.00	0.000	0.000	
					C	0.000	106.951	100.00	0.000	3.019	
L2 131.7500-86.7100	108.4660	1.287	10.07	135.94	A	0.000	135.944	135.944	100.00	0.000	0.000
					B	0.000	135.944	100.00	0.000	0.000	
					C	0.000	135.944	100.00	0.000	8.918	
L3 86.7100-43.1600	64.5656	1.154	9.01	163.37	A	0.000	163.378	163.378	100.00	0.000	0.000
					B	0.000	163.378	100.00	0.000	0.000	
					C	0.000	163.378	100.00	0.000	14.798	
L4 43.1600-0.0000	21.8139	0.919	7.21	192.34	A	0.000	192.349	192.349	100.00	0.000	0.000
					B	0.000	192.349	100.00	0.000	0.000	
					C	0.000	192.349	100.00	0.000	15.235	

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice

Comb. No.	Description
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	180 - 131.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.04	3.95	-2.23
			Max. Mx	20	-12.43	493.41	0.63
			Max. My	14	-12.43	-0.55	-492.07
			Max. Vy	20	-24.99	493.41	0.63
			Max. Vx	14	25.01	-0.55	-492.07
			Max. Torque	24			1.67
L2	131.75 - 86.71	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-64.70	16.26	-9.33
			Max. Mx	20	-22.17	1709.44	2.82
			Max. My	14	-22.17	-2.36	-1708.67
			Max. Vy	20	-30.35	1709.44	2.82
			Max. Vx	14	30.37	-2.36	-1708.67
			Max. Torque	24			2.11
L3	86.71 - 43.16	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-92.20	31.74	-18.45

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L4	43.16 - 0	Pole	Max. Mx	20	-36.12	3128.30	4.69
			Max. My	14	-36.12	-3.77	-3128.01
			Max. Vy	20	-36.18	3128.30	4.69
			Max. Vx	14	36.20	-3.77	-3128.01
			Max. Torque	24			3.19
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-128.94	51.23	-29.70
			Max. Mx	20	-57.62	5075.80	6.65
			Max. My	14	-57.62	-5.07	-5075.94
			Max. Vy	20	-41.54	5075.80	6.65
			Max. Vx	14	41.56	-5.07	-5075.94
			Max. Torque	24			4.74

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	128.94	-0.00	0.00
	Max. H _x	21	43.24	41.50	0.06
	Max. H _z	2	57.65	0.06	41.52
	Max. M _x	2	5071.39	0.06	41.52
	Max. M _z	8	5068.07	-41.50	-0.06
	Max. Torsion	24	4.74	20.80	35.98
	Min. Vert	21	43.24	41.50	0.06
	Min. H _x	9	43.24	-41.50	-0.06
	Min. H _z	14	57.65	-0.06	-41.52
	Min. M _x	14	-5075.94	-0.06	-41.52
	Min. M _z	20	-5075.80	41.50	0.06
	Min. Torsion	12	-4.73	-20.80	-35.98

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturing Moment, M _x kip-ft	Overturing Moment, M _z kip-ft	Torque kip-ft
Dead Only	48.04	0.00	-0.00	1.83	3.10	-0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	57.65	-0.06	-41.52	-5071.39	12.77	-4.19
0.9 Dead+1.6 Wind 0 deg - No Ice	43.24	-0.06	-41.52	-5016.33	11.68	-4.18
1.2 Dead+1.6 Wind 30 deg - No Ice	57.65	20.70	-35.93	-4387.46	-2524.77	-2.51
0.9 Dead+1.6 Wind 30 deg - No Ice	43.24	20.70	-35.93	-4340.08	-2498.13	-2.51
1.2 Dead+1.6 Wind 60 deg - No Ice	57.65	35.91	-20.71	-2526.99	-4384.77	-0.17
0.9 Dead+1.6 Wind 60 deg - No Ice	43.24	35.91	-20.71	-2499.94	-4337.79	-0.17
1.2 Dead+1.6 Wind 90 deg - No Ice	57.65	41.50	0.06	11.19	-5068.07	2.21
0.9 Dead+1.6 Wind 90 deg - No Ice	43.24	41.50	0.06	10.50	-5013.86	2.21
1.2 Dead+1.6 Wind 120 deg - No Ice	57.65	35.97	20.81	2546.95	-4393.63	4.00
0.9 Dead+1.6 Wind 120 deg - No Ice	43.24	35.97	20.81	2518.55	-4346.55	4.00
1.2 Dead+1.6 Wind 150 deg - No Ice	57.65	20.80	35.98	4400.88	-2540.20	4.73
0.9 Dead+1.6 Wind 150 deg - No Ice	43.24	20.80	35.98	4352.21	-2513.37	4.73
1.2 Dead+1.6 Wind 180 deg - No Ice	57.65	0.06	41.52	5075.94	-5.07	4.20
0.9 Dead+1.6 Wind 180 deg	43.24	0.06	41.52	5019.71	-5.96	4.20

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
- No Ice						
1.2 Dead+1.6 Wind 210 deg	57.65	-20.70	35.93	4392.03	2532.48	2.53
- No Ice						
0.9 Dead+1.6 Wind 210 deg	43.24	-20.70	35.93	4343.46	2503.85	2.53
- No Ice						
1.2 Dead+1.6 Wind 240 deg	57.65	-35.91	20.71	2531.55	4392.49	0.18
- No Ice						
0.9 Dead+1.6 Wind 240 deg	43.24	-35.91	20.71	2503.32	4343.52	0.18
- No Ice						
1.2 Dead+1.6 Wind 270 deg	57.65	-41.50	-0.06	-6.65	5075.80	-2.22
- No Ice						
0.9 Dead+1.6 Wind 270 deg	43.24	-41.50	-0.06	-7.13	5019.60	-2.22
- No Ice						
1.2 Dead+1.6 Wind 300 deg	57.65	-35.97	-20.81	-2542.42	4401.35	-4.02
- No Ice						
0.9 Dead+1.6 Wind 300 deg	43.24	-35.97	-20.81	-2515.19	4352.28	-4.02
- No Ice						
1.2 Dead+1.6 Wind 330 deg	57.65	-20.80	-35.98	-4396.34	2547.90	-4.74
- No Ice						
0.9 Dead+1.6 Wind 330 deg	43.24	-20.80	-35.98	-4348.85	2519.09	-4.74
- No Ice						
1.2 Dead+1.0 Ice+1.0 Temp	128.94	0.00	-0.00	29.70	51.23	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	128.94	-0.01	-12.54	-1570.92	53.02	-2.09
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	128.94	6.26	-10.85	-1355.63	-747.40	-1.21
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	128.94	10.85	-6.26	-769.12	-1333.80	-0.01
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	128.94	12.53	0.01	31.45	-1549.04	1.20
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	128.94	10.86	6.28	831.57	-1335.47	2.08
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	128.94	6.28	10.86	1416.84	-750.30	2.41
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	128.94	0.01	12.54	1630.45	49.67	2.09
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	128.94	-6.26	10.85	1415.16	850.08	1.21
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	128.94	-10.85	6.26	828.65	1436.47	0.01
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	128.94	-12.53	-0.01	28.09	1651.71	-1.20
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	128.94	-10.86	-6.28	-772.02	1438.15	-2.08
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	128.94	-6.28	-10.86	-1357.30	852.99	-2.41
Dead+Wind 0 deg - Service	48.04	-0.01	-8.19	-993.97	4.96	-0.20
Dead+Wind 30 deg - Service	48.04	4.09	-7.09	-859.68	-493.08	-0.14
Dead+Wind 60 deg - Service	48.04	7.09	-4.09	-494.52	-858.14	-0.04
Dead+Wind 90 deg - Service	48.04	8.19	0.01	3.64	-992.40	0.08
Dead+Wind 120 deg - Service	48.04	7.10	4.11	501.34	-859.89	0.17
Dead+Wind 150 deg - Service	48.04	4.10	7.10	865.21	-496.11	0.21
Dead+Wind 180 deg - Service	48.04	0.01	8.19	997.76	1.46	0.20
Dead+Wind 210 deg - Service	48.04	-4.09	7.09	863.46	499.50	0.14
Dead+Wind 240 deg - Service	48.04	-7.09	4.09	498.31	864.57	0.04
Dead+Wind 270 deg - Service	48.04	-8.19	-0.01	0.14	998.83	-0.08
Dead+Wind 300 deg - Service	48.04	-7.10	-4.11	-497.56	866.32	-0.17
Dead+Wind 330 deg - Service	48.04	-4.10	-7.10	-861.43	502.54	-0.22

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-48.04	0.00	-0.00	48.04	0.00	0.000%
2	-0.06	-57.65	-41.52	0.06	57.65	41.52	0.003%
3	-0.06	-43.24	-41.52	0.06	43.24	41.52	0.006%
4	20.70	-57.65	-35.93	-20.70	57.65	35.93	0.000%
5	20.70	-43.24	-35.93	-20.70	43.24	35.93	0.000%
6	35.91	-57.65	-20.71	-35.91	57.65	20.71	0.000%
7	35.91	-43.24	-20.71	-35.91	43.24	20.71	0.000%
8	41.50	-57.65	0.06	-41.50	57.65	-0.06	0.007%
9	41.50	-43.24	0.06	-41.50	43.24	-0.06	0.006%
10	35.97	-57.65	20.81	-35.97	57.65	-20.81	0.000%
11	35.97	-43.24	20.81	-35.97	43.24	-20.81	0.000%
12	20.80	-57.65	35.98	-20.80	57.65	-35.98	0.000%
13	20.80	-43.24	35.98	-20.80	43.24	-35.98	0.000%
14	0.06	-57.65	41.52	-0.06	57.65	-41.52	0.003%
15	0.06	-43.24	41.52	-0.06	43.24	-41.52	0.006%
16	-20.70	-57.65	35.93	20.70	57.65	-35.93	0.000%
17	-20.70	-43.24	35.93	20.70	43.24	-35.93	0.000%
18	-35.91	-57.65	20.71	35.91	57.65	-20.71	0.000%
19	-35.91	-43.24	20.71	35.91	43.24	-20.71	0.000%
20	-41.50	-57.65	-0.06	41.50	57.65	0.06	0.007%
21	-41.50	-43.24	-0.06	41.50	43.24	0.06	0.006%
22	-35.97	-57.65	-20.81	35.97	57.65	20.81	0.000%
23	-35.97	-43.24	-20.81	35.97	43.24	20.81	0.000%
24	-20.80	-57.65	-35.98	20.80	57.65	35.98	0.000%
25	-20.80	-43.24	-35.98	20.80	43.24	35.98	0.000%
26	0.00	-128.94	0.00	-0.00	128.94	0.00	0.000%
27	-0.01	-128.94	-12.54	0.01	128.94	12.54	0.001%
28	6.26	-128.94	-10.85	-6.26	128.94	10.85	0.001%
29	10.85	-128.94	-6.26	-10.85	128.94	6.26	0.001%
30	12.54	-128.94	0.01	-12.53	128.94	-0.01	0.001%
31	10.86	-128.94	6.28	-10.86	128.94	-6.28	0.001%
32	6.28	-128.94	10.86	-6.28	128.94	-10.86	0.001%
33	0.01	-128.94	12.54	-0.01	128.94	-12.54	0.001%
34	-6.26	-128.94	10.85	6.26	128.94	-10.85	0.001%
35	-10.85	-128.94	6.26	10.85	128.94	-6.26	0.001%
36	-12.54	-128.94	-0.01	12.53	128.94	0.01	0.001%
37	-10.86	-128.94	-6.28	10.86	128.94	6.28	0.001%
38	-6.28	-128.94	-10.86	6.28	128.94	10.86	0.001%
39	-0.01	-48.04	-8.19	0.01	48.04	8.19	0.002%
40	4.09	-48.04	-7.09	-4.09	48.04	7.09	0.002%
41	7.09	-48.04	-4.09	-7.09	48.04	4.09	0.002%
42	8.19	-48.04	0.01	-8.19	48.04	-0.01	0.002%
43	7.10	-48.04	4.11	-7.10	48.04	-4.11	0.002%
44	4.10	-48.04	7.10	-4.10	48.04	-7.10	0.002%
45	0.01	-48.04	8.19	-0.01	48.04	-8.19	0.002%
46	-4.09	-48.04	7.09	4.09	48.04	-7.09	0.002%
47	-7.09	-48.04	4.09	7.09	48.04	-4.09	0.002%
48	-8.19	-48.04	-0.01	8.19	48.04	0.01	0.002%
49	-7.10	-48.04	-4.11	7.10	48.04	4.11	0.002%
50	-4.10	-48.04	-7.10	4.10	48.04	7.10	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	15	0.00003837	0.00008448
3	Yes	14	0.00006048	0.00014841
4	Yes	18	0.00000001	0.00011555
5	Yes	18	0.00000001	0.00008207
6	Yes	18	0.00000001	0.00011744
7	Yes	18	0.00000001	0.00008346
8	Yes	14	0.00009029	0.00013711
9	Yes	14	0.00006047	0.00011053
10	Yes	18	0.00000001	0.00012089
11	Yes	18	0.00000001	0.00008590

12	Yes	18	0.00000001	0.00011581
13	Yes	18	0.00000001	0.00008214
14	Yes	15	0.00003836	0.00007435
15	Yes	14	0.00006047	0.00013236
16	Yes	18	0.00000001	0.00011937
17	Yes	18	0.00000001	0.00008477
18	Yes	18	0.00000001	0.00011748
19	Yes	18	0.00000001	0.00008338
20	Yes	14	0.00009027	0.00012399
21	Yes	14	0.00006046	0.00010069
22	Yes	18	0.00000001	0.00011645
23	Yes	18	0.00000001	0.00008258
24	Yes	18	0.00000001	0.00012154
25	Yes	18	0.00000001	0.00008634
26	Yes	13	0.00000001	0.00001821
27	Yes	16	0.00012026	0.00008047
28	Yes	16	0.00012001	0.00012104
29	Yes	16	0.00012001	0.00012303
30	Yes	16	0.00012029	0.00007820
31	Yes	16	0.00011993	0.00013334
32	Yes	16	0.00011992	0.00012585
33	Yes	16	0.00012017	0.00008330
34	Yes	16	0.00011979	0.00014284
35	Yes	16	0.00011980	0.00014043
36	Yes	16	0.00012015	0.00008311
37	Yes	16	0.00011987	0.00013092
38	Yes	16	0.00011987	0.00013882
39	Yes	14	0.00000001	0.00003086
40	Yes	14	0.00000001	0.00002691
41	Yes	14	0.00000001	0.00002859
42	Yes	14	0.00000001	0.00003062
43	Yes	14	0.00000001	0.00003010
44	Yes	14	0.00000001	0.00002673
45	Yes	14	0.00000001	0.00003094
46	Yes	14	0.00000001	0.00003003
47	Yes	14	0.00000001	0.00002824
48	Yes	14	0.00000001	0.00003080
49	Yes	14	0.00000001	0.00002725
50	Yes	14	0.00000001	0.00003073

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 131.75	28.69	49	1.39	0.00
L2	136.25 - 86.71	16.57	49	1.19	0.00
L3	92.29 - 43.16	7.36	49	0.78	0.00
L4	49.83 - 0	2.10	49	0.39	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.0000	(2) 950F65T2ZE-M w/ Mount Pipe	49	28.69	1.39	0.00	57655
161.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	49	23.22	1.32	0.00	15172
147.0000	(2) LNX-6514DS-A1M w/ Mount Pipe	49	19.36	1.25	0.00	8734
141.0000	TME-RRUS 11 BAND 12	49	17.78	1.22	0.00	7390
140.0000	(2) 7770.00 w/ Mount Pipe	49	17.52	1.21	0.00	7208
83.0000	OG-860/1920/GPS-A	49	5.89	0.69	0.00	5950
78.0000	OG-860/1920/GPS-A	49	5.17	0.64	0.00	5865

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 131.75	145.71	22	7.08	0.02
L2	136.25 - 86.71	84.24	22	6.04	0.01
L3	92.29 - 43.16	37.46	22	3.95	0.01
L4	49.83 - 0	10.68	22	1.97	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.0000	(2) 950F65T2ZE-M w/ Mount Pipe	22	145.71	7.08	0.02	11680
161.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	22	117.99	6.73	0.02	3070
147.0000	(2) LNX-6514DS-A1M w/ Mount Pipe	22	98.40	6.38	0.01	1764
141.0000	TME-RRUS 11 BAND 12	22	90.38	6.20	0.01	1491
140.0000	(2) 7770.00 w/ Mount Pipe	22	89.08	6.17	0.01	1454
83.0000	OG-860/1920/GPS-A	22	29.98	3.49	0.00	1178
78.0000	OG-860/1920/GPS-A	22	26.32	3.25	0.00	1160

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
L1	180 - 131.75 (1)	TP31.39x21x0.25	48.250	0.0000	0.0	23.940	-12.42	1686.69	0.007
L2	131.75 - 86.71 (2)	TP40.46x29.921x0.375	49.540	0.0000	0.0	46.298	-22.16	3408.11	0.007
L3	86.71 - 43.16 (3)	TP48.96x38.5229x0.4375	49.130	0.0000	0.0	65.411	-36.12	4767.07	0.008
L4	43.16 - 0 (4)	TP57.25x46.668x0.5	49.830	0.0000	0.0	90.062	-57.62	6465.70	0.009

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{nx} kip-ft	Ratio M _{ux} / φM _{nx}	M _{uy} kip-ft	φM _{ny} kip-ft	Ratio M _{uy} / φM _{ny}
L1	180 - 131.75 (1)	TP31.39x21x0.25	493.74	1046.01	0.472	0.00	1046.01	0.000
L2	131.75 - 86.71 (2)	TP40.46x29.921x0.375	1712.13	2721.23	0.629	0.00	2721.23	0.000
L3	86.71 - 43.16 (3)	TP48.96x38.5229x0.4375	3133.10	4611.06	0.679	0.00	4611.06	0.000
L4	43.16 - 0 (4)	TP57.25x46.668x0.5	5082.89	7538.14	0.674	0.00	7538.14	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V _u K	φV _n K	Ratio V _u / φV _n	Actual T _u kip-ft	φT _n kip-ft	Ratio T _u / φT _n
L1	180 - 131.75 (1)	TP31.39x21x0.25	25.05	843.35	0.030	1.13	2094.57	0.001

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L2	131.75 - 86.71 (2)	TP40.46x29.921x0.375	30.42	1704.05	0.018	1.69	5449.12	0.000
L3	86.71 - 43.16 (3)	TP48.96x38.5229x0.4375	36.24	2383.53	0.015	2.68	9233.42	0.000
L4	43.16 - 0 (4)	TP57.25x46.668x0.5	41.60	3232.85	0.013	4.02	15094.75	0.000

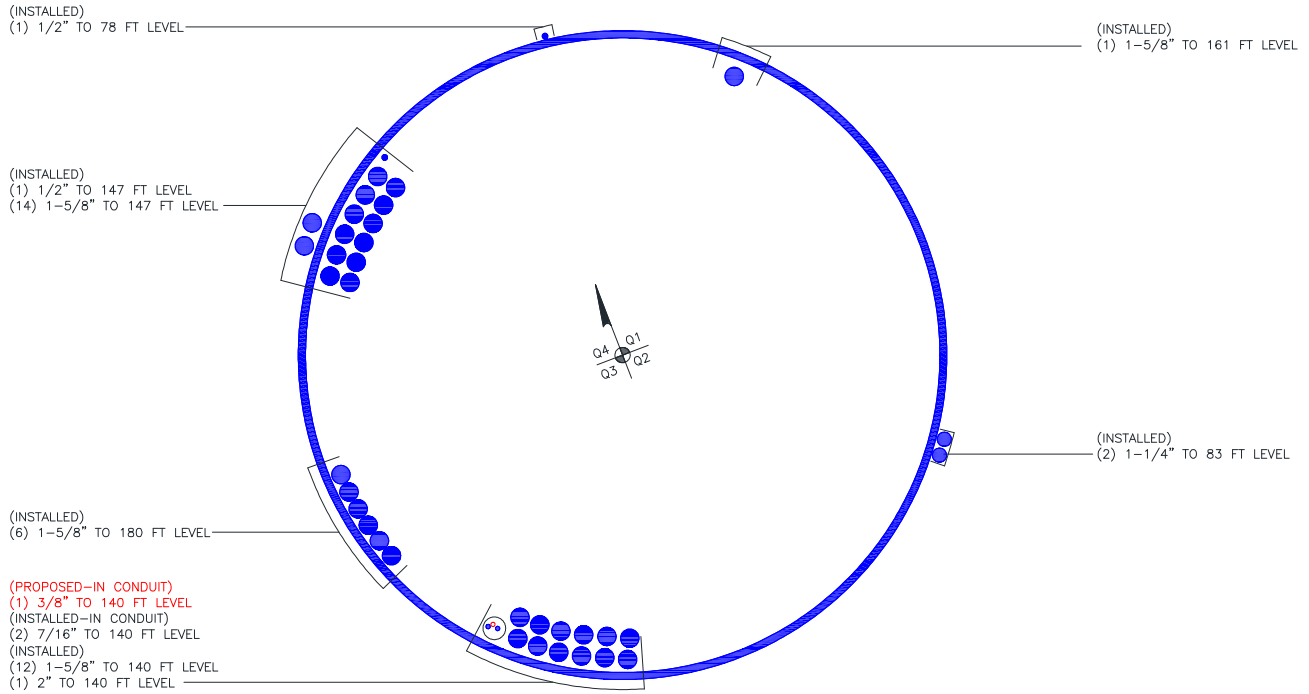
Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	180 - 131.75 (1)	0.007	0.472	0.000	0.030	0.001	0.480	1.000	4.8.2 ✓
L2	131.75 - 86.71 (2)	0.007	0.629	0.000	0.018	0.000	0.636	1.000	4.8.2 ✓
L3	86.71 - 43.16 (3)	0.008	0.679	0.000	0.015	0.000	0.687	1.000	4.8.2 ✓
L4	43.16 - 0 (4)	0.009	0.674	0.000	0.013	0.000	0.683	1.000	4.8.2 ✓

Section Capacity Table

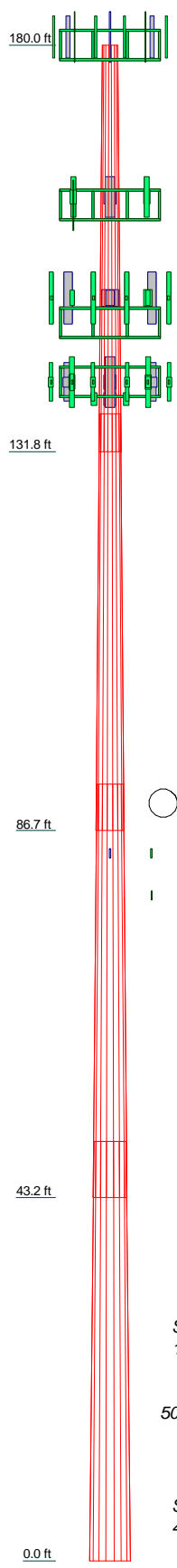
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail	
L1	180 - 131.75	Pole	TP31.39x21x0.25	1	-12.42	1686.69	48.0	Pass	
L2	131.75 - 86.71	Pole	TP40.46x29.921x0.375	2	-22.16	3408.11	63.6	Pass	
L3	86.71 - 43.16	Pole	TP48.96x38.5229x0.4375	3	-36.12	4767.07	68.7	Pass	
L4	43.16 - 0	Pole	TP57.25x46.668x0.5	4	-57.62	6465.70	68.3	Pass	
							Summary		
							Pole (L3)	68.7	Pass
							RATING =	68.7	Pass

APPENDIX B
BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS

Section	1	2	3	4	
Length (ft)	48.2500	49.5400	49.1300	49.8300	
Number of Sides	18	18	18	18	
Thickness (in)	0.2500	0.3750	0.4375	0.5000	
Socket Length (ft)	4.5000	5.5800	6.6700	6.6700	
Top Dia (in)	21.0000	29.9210	38.5229	46.6680	
Bot Dia (in)	31.3900	40.4600	48.9600	57.2500	
Grade		A572-65			
Weight (K)	3.4	7.0	10.1	13.8	34.3



DESIGNED APPURTENANCE LOADING

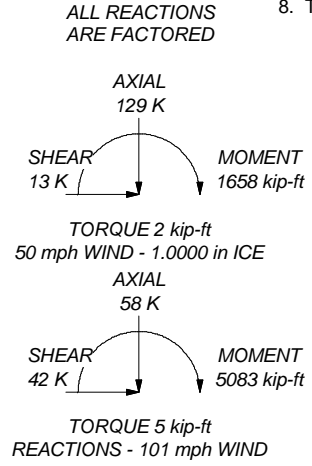
TYPE	ELEVATION	TYPE	ELEVATION
(2) 950F65T2ZE-M w/ Mount Pipe	180	DB-T1-6Z-8AB-0Z	147
(2) DB980H90E-M w/ Mount Pipe	180	RRH2X60-PCS	147
(2) DB980H90E-M w/ Mount Pipe	180	RRH2X60-PCS	147
Platform Mount [LP 601-1]	180	RRH2X60-PCS	147
8-ft Ladder	180	Platform Mount [LP 712-1]	147
(2) 2.375" OD x 6" Mount Pipe	180	TME-RRUS 11 BAND 12	141
(2) 2.375" OD x 6" Mount Pipe	180	TME-RRUS 11 BAND 12	141
(2) 2.375" OD x 6" Mount Pipe	180	TME-RRUS 11 BAND 12	141
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	161	Pipe Mount [PM 601-3]	141
(2) 7770.00 w/ Mount Pipe	161	(2) 7770.00 w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	161	(2) 7770.00 w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	161	HPA-65R-BUU-H6 w/ Mount Pipe	140
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	161	HPA-65R-BUU-H6 w/ Mount Pipe	140
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	161	HPA-65R-BUU-H6 w/ Mount Pipe	140
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	161	(2) LGP 17201	140
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	161	(2) LGP 17201	140
RRUS 11 B12	161	(2) LGP 17201	140
RRUS 11 B12	161	(2) LGP21901	140
RRUS 11 B12	161	(2) LGP21901	140
RRUS 11 B12	161	RRUS 12	140
Platform Mount [LP 305-1]	161	RRUS 12	140
2.375" OD x 6" Mount Pipe	161	RRUS 12	140
(2) LNX-6514DS-A1M w/ Mount Pipe	147	RRUS A2	140
(2) LNX-6514DS-A1M w/ Mount Pipe	147	RRUS A2	140
(2) LNX-6514DS-A1M w/ Mount Pipe	147	RRUS A2	140
(2) HBXX-6517DS-A2M w/ Mount Pipe	147	DC6-48-60-18-8F	140
(2) HBXX-6517DS-A2M w/ Mount Pipe	147	1001940	140
(2) HBXX-6517DS-A2M w/ Mount Pipe	147	1001940	140
KS24019-L112A	147	1001940	140
(2) FD9R6004/1C-3L	147	Platform Mount [LP 303-1]	140
(2) FD9R6004/1C-3L	147	OG-860/1920/GPS-A	83
(2) FD9R6004/1C-3L	147	OG-860/1920/GPS-A	83
RRH2X60-AWS	147	Side Arm Mount [SO 701-1]	83
RRH2X60-AWS	147	Side Arm Mount [SO 701-1]	83
RRH2X60-AWS	147	OG-860/1920/GPS-A	78
DB-T1-6Z-8AB-0Z	147	Side Arm Mount [SO 701-1]	78

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Tolland County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 101 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 68.7%



Paul J Ford and Company 250 E. Broad Street Suite 600 Columbus, OH 43215 Phone: 614.221.6679 FAX: 614.448.4105	Job: 180' Monopole / Columbia/Deojay	
	Project: PJF 37516-0222 / BU 876391	
Client: Crown Castle	Drawn by: Robert Koors	App'd:
Code: TIA-222-G	Date: 12/27/16	Scale: NTS
Path:	Dwg No. E-1	

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

TIA Rev G

Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data	
BU#:	
Site Name:	
App #:	
Pole Manufacturer:	<i>Other</i>

Reactions		
Mu:	5083	ft-kips
Axial, Pu:	58	kips
Shear, Vu:	42	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	66	in

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

Anchor Rod Results
 Max Rod (Cu+ Vu/η): 191.9 Kips
 Allowable Axial, Φ*Fu*Anet: 260.0 Kips
 Anchor Rod Stress Ratio: 73.8% **Pass**

Rigid
AISC LRFD
φ*Tn

Plate Data		
Diam:	72	in
Thick:	2.25	in
Grade:	60	ksi
Single-Rod B-eff:	9.09	in

Base Plate Results
 Base Plate Stress: 43.5 ksi
 Allowable Plate Stress: 54.0 ksi
 Base Plate Stress Ratio: 80.5% **Pass**

Flexural Check
 43.5 ksi
 54.0 ksi
 80.5% **Pass**

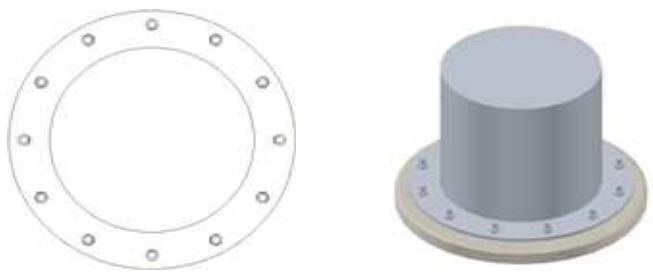
Rigid
AISC LRFD
φ*Fy
Y.L. Length: 32.84

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

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

Pole Results
 Pole Punching Shear Check: n/a

Pole Data		
Diam:	57.25	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None



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

Structure Type:

Type = **Pole**

Factored Foundation Loads:

Load Combo 1 = LC1 = 1.2D + 1.6Wo

Load Combo 2 = LC2 = 0.9D + 1.6Wo

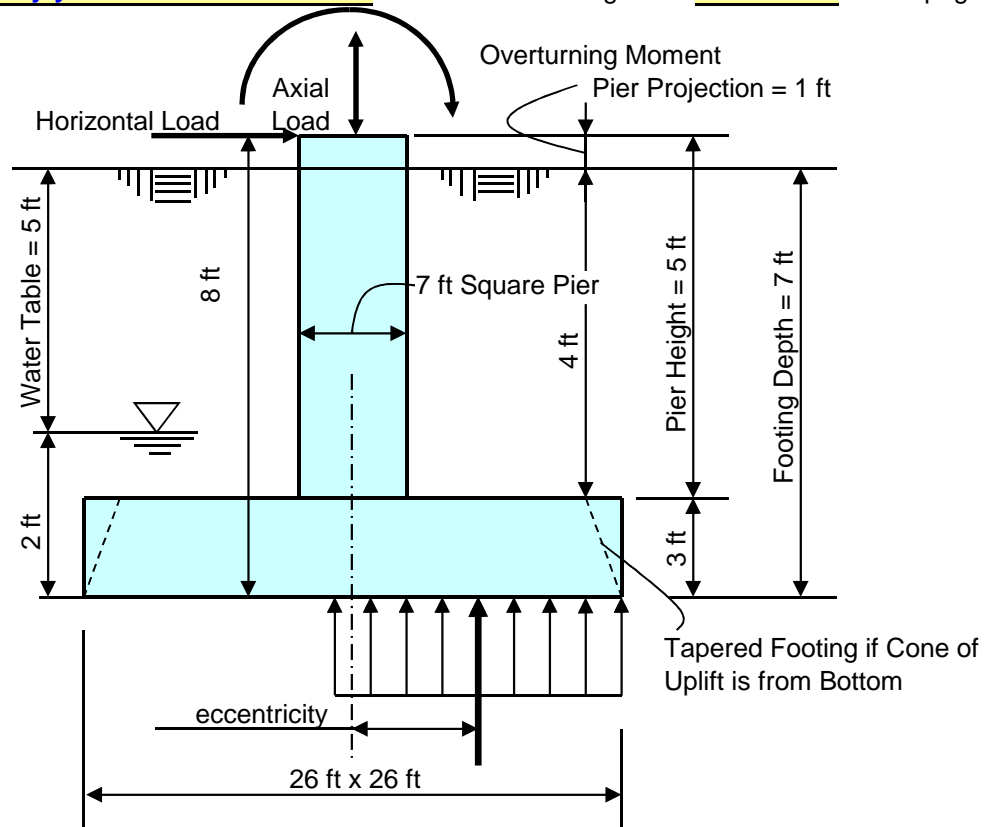
	LC1	LC2	
Factored Axial Load (+Comp, -Ten) =	58	43.5	kips
Factored Horiz. Load at Top of Pier =	42	42.0	kips
Factored OTM at Top of Pier =	5083	5083	k-ft

LRFD Resistance and Load Factors:

	Φ	Dead Load Factors	
Soil Bearing =	0.75		
Soil Weight =	0.75	1.2	0.9
Concrete Weight =	0.75	1.2	0.9

Soil Properties:

Depth to Water Table =	5	ft
Use? (Cohesion or Soil Cone)	S	
Soil Cone of Uplift =	30	degrees
Cohesion (for Uplift) =	0	ksf
Depth to Ignore for Uplift and PP?	3.5	ft
Include Side Friction? (Yes or No)	N	
Include Passive Pressure On?	N	(Not Included)
Include Soil Wedges? (Yes or No)	N	(For LC2 LC Only)
Treat Conc as Load or Resistance?	R	for Uplift Calc



Layer Thk	Soil Density	Cohesion ksf	Friction Angle degrees	Ult Bearing ksf	Depth ft
7	100	0	30	12	7.00

Dimensions:

Pier Shape (Round or Square)	S
Pier Width =	7 ft
Pier Height above Grade =	1 ft
Depth to Bottom of Footing =	7 ft
Footing Thickness =	3 ft
Footing Width, B =	26 ft
Footing Length, L =	26 ft

Concrete:

Concrete Strength = **4** ksi

Rebar Strength = **60** ksi

Reinforcing Steel:

Minimum Cover over Rebar = **3** inches

Size of Pad Rebar = # **9** bar

Quantity of Pad Rebar, Parallel to Width = **35** #9 bars @ 9" oc

Quantity of Pad Rebar, Parallel to Length = **35** #9 bars @ 9" oc

Pad rebar area exceeds minimum steel requirements.

Minimum Cover over Rebar = **3** inches

Size of Pier Rebar = # **9** bar

Rebar Qty (Multiples of 2 or 4 Only) = **39** (Min = 4, Max = 40)

Size Of Pier Ties = # **4** bar

Bar Layout (Round or Square) **R**

Column (Spiral or Tied) **T**

Pier rebar area exceeds minimum steel requirements.

Factored Foundation Loads:

	LC1	LC2	
Factored Axial Load (+Comp, -Ten) =	58	43.5	kips
Factored Horiz. Load at Top of Pier =	42	42	kips
Factored OTM at Top of Pier =	5083	5083	kips

LRFD Resistance and Load Factors:

	Φ	Dead Load Factors	
Soil Bearing =	0.75		
Soil Weight =	0.75	1.2	0.9
Concrete Weight =	0.75	1.2	0.9

Soil Properties:

Depth to Water Table =	5 ft
Uplift Cone from	Top of footing

Layer Thk ft	Soil Density pcf	Cohesion ksf	Friction Angle degrees	Ult Bearing ksf	Depth ft
7	100	0	30	12	7.00

Dimensions:

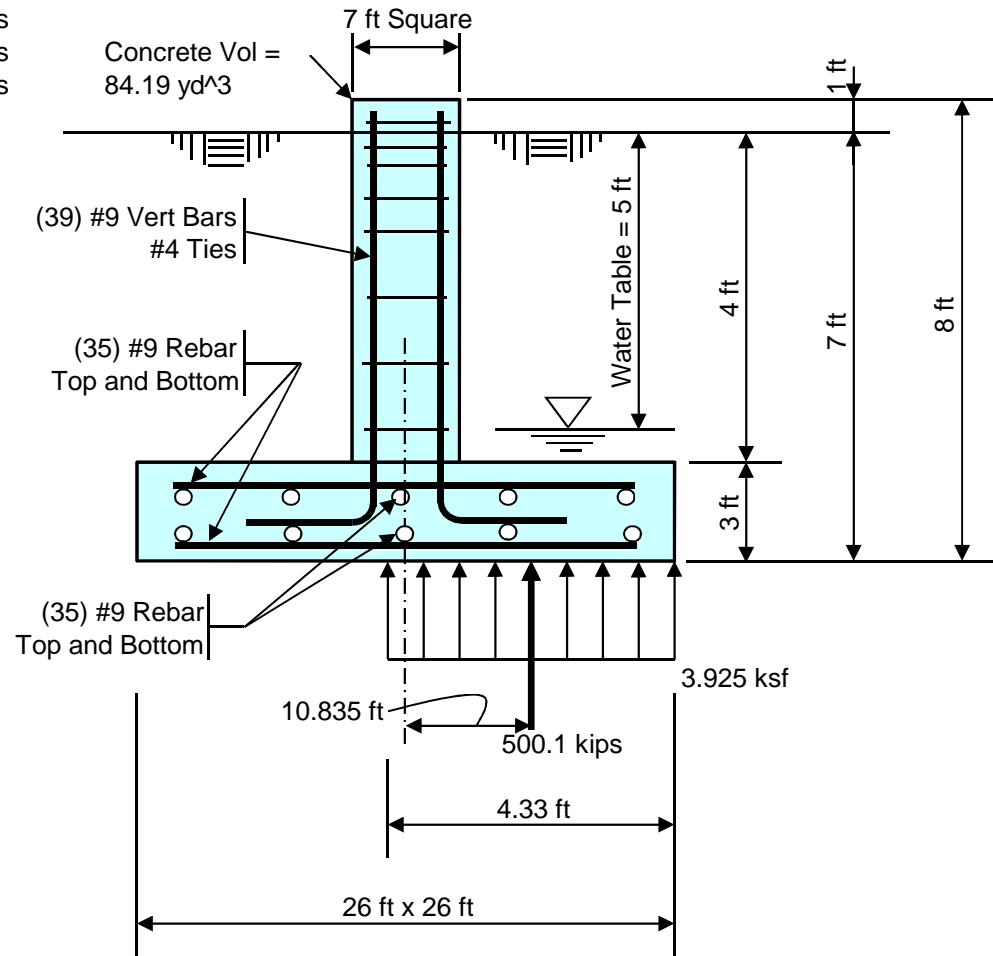
Pier Shape =	Square
Pier Width =	7 ft Square
Pier Height above Grade =	1 ft
Depth to Bottom of Footing =	7 ft
Footing Thickness =	3 ft
Footing Width, B =	26 ft
Footing Length, L =	26 ft

Concrete:

Concrete Strength =	4 ksi
Rebar Strength =	60 ksi

Summary Results:

	Required	Available
Maximum Net Soil Bearing =	3.925 ksf	9.000 ksf
Uplift =	0.0 kips	418.7 kips
Punching Shear Stress =	0.054 ksi	0.190 ksi
Bending Shear Stress =	389.9 kips	926.7 kips
Bending Moment =	2902.7 k-ft	4775.1 k-ft
Conc Pier Reinforcing Steel =	5293.0 k-ft	6933.3 k-ft



Total Pad Reinf Stl =	70.00 in ² >= 20.22 in ² = Min Stl, OK
Total Pier Reinf Stl =	39.00 in ² >= 35.28 in ² = Min Stl, OK
Footing Thickness =	3.00 ft >= 1.5 ft = Min Ftg Thk, OK

Stress Ratio =	43.6% in Soil Bearing
Stress Ratio =	0.0% in Uplift
Stress Ratio =	28.5% in Punching Shear
Stress Ratio =	42.1% in Bending Shear
Stress Ratio =	60.8% in Bending Moment
Stress Ratio =	76.3% in Pier Rebar



Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT5861

Columbia North
14 Thompson Hill Road
Columbia, CT 06237

December 28, 2016

Centerline Communications Project Number: 950006-008

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	6.70 %



December 28, 2016

AT&T Mobility – New England
Attn: John Benedetto, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT5861 – Columbia North**

Centerline Communications, LLC (“Centerline”) was directed to analyze the proposed AT&T facility located at **14 Thompson Hill Road, Columbia, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately $467 \mu\text{W}/\text{cm}^2$ and $567 \mu\text{W}/\text{cm}^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is $1000 \mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.



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

Additional details can be found in FCC OET 65.



CALCULATIONS

Calculations were performed for the proposed AT&T Wireless antenna facility located at **14 Thompson Hill Road, Columbia, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
UMTS	850 MHz	2	30
UMTS	1900 MHz (PCS)	2	30
LTE	700 MHz	2	60
LTE	1900 MHz (PCS)	2	60
GSM	850 MHz	2	30
GSM	1900 MHz (PCS)	2	30

Table 1: Channel Data Table



The following antennas listed in *Table 2* were used in the modeling for transmission in the 700 MHz, 850 MHz and 1900 MHz (PCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Powerwave 7770	140
A	2	CCI HPA-65R-BUU-H6	140
A	3	Powerwave 7770	140
B	1	Powerwave 7770	140
B	2	CCI HPA-65R-BUU-H6	140
B	3	Powerwave 7770	140
C	1	Powerwave 7770	140
C	2	CCI HPA-65R-BUU-H6	140
C	3	Powerwave 7770	140

Table 2: Antenna Data

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

RESULTS

Per the calculations completed for the proposed AT&T configurations *Table 3* shows resulting emissions power levels and percentages of the FCC’s allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.56
Antenna A2	CCI HPA-65R-BUU-H6	700 MHz / 1900 MHz (PCS)	11.95 / 14.75	4	240	5,462.56	1.52
Antenna A3	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.56
Sector A Composite MPE%							2.63
Antenna B1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.56
Antenna B2	CCI HPA-65R-BUU-H6	700 MHz / 1900 MHz (PCS)	11.95 / 14.75	4	240	5,462.56	1.52
Antenna B3	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.56
Sector B Composite MPE%							2.63
Antenna C1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.56
Antenna C2	CCI HPA-65R-BUU-H6	700 MHz / 1900 MHz (PCS)	11.95 / 14.75	4	240	5,462.56	1.52
Antenna C3	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.56
Sector C Composite MPE%							2.63

Table 3: AT&T Emissions Levels



The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum AT&T MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. *Table 5* below shows a summary for each AT&T Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	MPE%
AT&T – Max Sector Value	2.63 %
Sprint	0.12 %
Verizon	2.61 %
T-Mobile	1.34 %
Site Total MPE %:	6.70 %

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	2.63 %
AT&T Sector B Total:	2.63 %
AT&T Sector C Total:	2.63 %
Site Total:	6.70 %

Table 5: Site MPE Summary



Per FCC OET 65, carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated AT&T sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

AT&T _ Frequency Band / Technology	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	414.12	140	1.66	850 MHz	567	0.29%
AT&T 1900 MHz (PCS) UMTS	2	656.33	140	2.63	1900 MHz (PCS)	1000	0.26%
AT&T 700 MHz LTE	2	940.05	140	3.76	700 MHz	467	0.81%
AT&T 1900 MHz (PCS) LTE	2	1,791.23	140	7.17	1900 MHz (PCS)	1000	0.72%
AT&T 850 MHz GSM	2	414.12	140	1.66	850 MHz	567	0.29%
AT&T 1900 MHz (PCS) GSM	2	656.33	140	2.63	1900 MHz (PCS)	1000	0.26%
						Total:	2.63%

Table 6: AT&T Maximum Sector MPE Power Values



Summary

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

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

AT&T Sector	Power Density Value (%)
Sector A:	2.63 %
Sector B:	2.63 %
Sector C:	2.63 %
AT&T Maximum Total (per sector):	2.63 %
Site Total:	6.70 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **6.70 %** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

A handwritten signature in black ink, appearing to read 'Scott Heffernan', is positioned above the printed name.

Scott Heffernan
RF Engineering Director
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767