



Crown Castle  
1220 Augusta Drive, Suite 600  
Houston, TX 77057

September 22, 2016

Karen Lahde  
City of Bryan  
300 S. Texas Avenue  
Bryan, TX 77805

Dear Ms. Lahde:

I received your copy of the Temporary Moratorium on the installation of above-ground wireless communication facilities. I understand that the City wants to review its existing provisions related to these facilities, and thus the applications that Crown Castle previously submitted are on hold.

We are asking for a waiver to the ordinance so that our pending applications can be processed. Our customers are at the end of the planning process for installation and are anxiously wanting to keep their schedule. We would like to emphasize that these applications are for minor upgrades to existing wireless towers that we have obtained permits for in the past. Our customers are replacing existing antennas with newer ones in order to provide excellent wireless service to the surrounding areas. There will be no change to ground space or tower height.

The applications submitted are for the tower located at 101 E. 31<sup>st</sup> Street.

If there are any other concerns or questions, please do not hesitate to contact me at (713) 570-3116, or on my cell at (310) 345-4574.

Thanking you in advance for your assistance in this urgent matter.

Best regards,

A handwritten signature in blue ink, appearing to read 'E. Divinity', written over a light blue rectangular background.

Elisha Divinity  
Real Estate Specialist  
(713) 570-3116 office  
(310) 345-4574 mobile

**CITY OF BRYAN APPLICATION FOR BUILDING PERMIT**

P.O. Box 1000 Bryan Texas 77805 \* Phone: 979-209-5010 \* Fax: 979-209-5035 \* www.bryantx.gov

Development Services

AUG 15 2016

RECEIVED

<b>1. ADDRESS / LOCATION OF WORK:</b> ADDRESS: 101 E. 31st St., Bryan, TX 77803 SUBDIVISION:  PHASE:                      LOT:                      BLOCK:		<b>2. DATE OF APPLICATION:</b> PERMIT # (by city): 16-2563 WTR / SWR # (by city): PROPERTY R-NUMBER:	
<b>3. PROPERTY OWNER INFORMATION</b> NAME: Crown Castle as agent for AT&T/ Elisha Divinity ADDRESS: 1220 Augusta Drive, Suite 500 CITY/STATE/ZIP: Houston, TX 77057 EMAIL: elisha.divinity@crowncastle.com PHONE: (713) 570-3116		<b>4. GENERAL CONTRACTOR INFORMATION</b> NAME: ADDRESS: CITY/STATE/ZIP: EMAIL: PHONE:	
5. ELECTRICIAN (Name & Phone #):		6. PLUMBER (Name & Phone #):	
7. HVAC (Name & Phone #):		8. ARCHITECT - If required by state or city ordinance (Name & Phone #): Kirk R. Hall / Trylon - (519) 572-9995 24 Queen St. E, Brampton, ON	
9. ENGINEER - If required by state or city ordinance (Name and Phone #): Christopher Scheks / GPD Group - (216) 927-8663 520 S. Main St., Ste 2531, Akron, OH 44311		10. CLASS OF WORK (Check the appropriate box):	
Commercial: <input checked="" type="checkbox"/> Residential: <input type="checkbox"/> Remodel: <input type="checkbox"/> Addition: <input type="checkbox"/> Repair: <input type="checkbox"/> New Construction: <input type="checkbox"/> Demolition: <input type="checkbox"/>		Are you painting the exterior of a commercial building? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<b>11. DESCRIPTION OF WORK:</b> Replacing existing antennas with new ones. There will be no change to ground space or tower height.		Present Use: Cell phone tower	
		Intended Use: Cell phone tower	
		Constructing Driveway in R.O.W? No	Constructing Sidewalk in R.O.W.? No
12. Square feet of heated area: N/A	13. # of Buildings: N/A	16. # of Dwelling Units: N/A	19. Water Tap Size: N/A
Square feet of unheated area: N/A	14. Foundation Type: N/A	# of bedrooms: N/A	20. Sewer Tap Size: N/A
Square feet total: 0	15. Number of floors: 0	17. Irrigation Tap Size: N/A	21. Official Use Only-Misc. Fees:
 CITY OF BRYAN The Good Life, Texas Style.		<b>22. Estimated Valuation</b> (Cost of Labor and Materials for project): \$30,000	
		<b>23. Total Permit Fee</b> (Valuation + Tap Fees + Any Misc. Fees): \$175 ✓	
		Long Tap Fee: D.& T. Fee: Work w/o Permit fee: REVISED 3	

Please continue to back side of application for additional items.  
 Applicant's signature required on back of application for permit approval.

**CITY OF BRYAN – COMMERCIAL PLAN REVIEW COMMENTS**

P.O. BOX 1000 BRYAN, TX 77805 ~ PHONE (979) 209-5010 ~ FAX (979) 209-5035 ~ [WWW.BRYANTX.GOV](http://WWW.BRYANTX.GOV)

EMAIL: [klahde@bryantx.gov](mailto:klahde@bryantx.gov)

Applicant Copy	<input type="checkbox"/>
City Copy	<input type="checkbox"/>



Project Address:	101 E. 31 <sup>st</sup> Street
Project Description:	Cell Tower Equipment
Plan Review Date:	August 16, 2016
City of Bryan Permit Number:	16-2563
Permit Applicant's Name:	Mastec Network Solution

Applicant to sign after reading plan review comments and statement below: (Do not sign this plan review unless you have read and understand all requirements, please direct any questions or concerns to Building Services prior to construction):

By signing this Building Plan Review, I acknowledge that I have read the entire plan review comments attached, and I understand and will conform to all requirements as stated in this Commercial Plan Review and City of Bryan Codes and Ordinances. I agree to use only the site plan and construction documents reviewed by the City of Bryan. I agree to resubmit revised construction plans for review for any changes made after City of Bryan building permit issuance. I agree to abide by the building inspection requirements and to keep a copy of the approved construction documents at the site during city inspections. Any errors or omissions not identified, as a result of the City of Bryan's review of the permit application and submitted documents does not relieve the applicant from complying with City of Bryan Codes and Ordinances.

Applicant's Printed Name:	
Applicant's Signature:	Date:

**\* Construction work times > 7:00 a.m. and 7:00 p.m. on weekdays and Saturdays \***

Plan Review Comments (Please read each item for your information to avoid delays or corrections during construction):

- City inspectors/staff cannot climb cell towers for inspections. An engineer's report is required for final city approval.**
- Separate electrical permits are required for electrical work and must be obtained by licensed electricians.** All work must conform to applicable sections of 2009 IBC and 2011 NEC.
- Towers shall be designed and constructed in accordance with the provisions of TIA-222, Revision G. See 2009 IBC, Section 3108.** The tower should be designed for a 90.0 mph basic wind.
- Call 209-5010 for inspections.** Inspections must be called in prior to covering work. A certificate of occupancy is required.
- Any changes to the plans during construction need to be approved by the architect and/or engineer of record and the City. The changes will need to be submitted as an amended set of construction documents. See Section 107.4 of 2009 IBC.**
- All construction debris removed during demolition or construction covered by this permit shall be disposed of properly per state and local laws. Roll off containers are recommended for all building construction debris removed during demolition or for materials not used and unwanted during construction. **Please contact City of Bryan Environmental Services Department at 979-209-5900 for a list of city approved/city licensed roll off container providers. The city will not pick up construction debris through the regular trash service or the "Brush and Bulky" collection service.**

## CITY OF BRYAN – COMMERCIAL PLAN REVIEW COMMENTS

P.O. BOX 1000 BRYAN, TX 77805 ~ PHONE (979) 209-5010 ~ FAX (979) 209-5035 ~ [WWW.BRYANTX.GOV](http://WWW.BRYANTX.GOV)

EMAIL: [klahde@bryantx.gov](mailto:klahde@bryantx.gov)

- The contractor shall be responsible for the containment and proper disposal of all liquid and solid waste associated with this project. The contractor shall use all means necessary to prevent the occurrence of wind blown litter from the project site.
- Site is required to provide containment for waste prior to and during demolition/construction. Solid waste roll off boxes and/or metal dumpsters shall be supplied by City or City permitted contractor(s) only.
- Port-a-Potties are required at all construction sites where an interior rest room is not available for construction workers. The Port-a-Potty is required to be located within the property lines of the construction site and maintained properly.
- City of Bryan inspections are required prior to covering any work – call 209-5010 for all inspections, including any steel inspections prior to placing concrete.

### Additional Comments:

0001. All construction, electrical, plumbing, mechanical, etc., shall comply with the following:

2009 International Building Code	2009 International Plumbing Code
2009 International Mechanical Code	2009 International Fire Code
2009 International Energy Conservation Code	2009 International Fuel Gas Code
2011 National Electrical Code	City of Bryan Ordinances
TAS (Texas Accessibility Standards)	TCEQ (Texas Commission on Environmental Quality – New Construction Storm Water Permit)

0002. Any revisions to building or site during or before construction require submittal of revised construction drawings/site plan/specifications to the City for approval. Verify that the "City Approved" site plan is used for construction.

0003. Section 106.1 of IBC (Submittal Documents) is amended to include the following at the end of this section and before exception: "The design professional shall be an architect or engineer legally registered under the laws of the state of Texas and shall affix his official seal to said drawings, specifications and accompanying data for the following:

1. All Group A, E, and I occupancies.
2. Buildings or structures three stories or more high.
3. Buildings or structures 5,000 square feet or more in area.

Exception: Group R-3 buildings, regardless of size.

0004. Texas Engineering Practice Act requires an engineer's seal for heights over two stories, square footage in excess of 5,000 square feet of foundation, and spans longer than 24 feet.

0005. An Asbestos Survey is required for public buildings if a person disturbs, removes, encapsulates, or installs, or maintains, or any other activity that may involve the disturbance or removal of asbestos containing material (ACM) whether intentional or unintentional.

0006. Construction sites are required to meet requirements of TECQ (Texas Commission on Environmental Quality). Refer to "New Construction Storm Water Permit" requirements. Construction sites of all sizes shall control erosion on the site during construction.

0007. All construction debris removed during demolition or construction covered by this permit shall be disposed of properly per state and local laws. Roll off containers are recommended for all building construction debris removed during demolition or for materials not used and unwanted during construction. Please contact City of Bryan Environmental Services Department at 979-209-5900 for a list of city approved/city licensed roll off container providers. The city will not pick up construction debris through the regular trash service or the "Brush and Bulky" collection service.

0008. Safeguards during construction required per \*\*IBC chapter 33. All contractors should have a copy of Safeguards during construction. Fire extinguishers are required per Section 3309 and 906 of the \*\*IBC during construction.

## CITY OF BRYAN – COMMERCIAL PLAN REVIEW COMMENTS

P.O. BOX 1000 BRYAN, TX 77805 ~ PHONE (979) 209-5010 ~ FAX (979) 209-5035 ~ [WWW.BRYANTX.GOV](http://WWW.BRYANTX.GOV)

EMAIL: [klahde@bryantx.gov](mailto:klahde@bryantx.gov)

- 1400. Masonry veneer wall anchorage is required to meet \*\*IBC, Chapter 14.
- 1401. Wall flashing shall meet \*\*IBC, Chapter 14.
- 1600. Anchor bolts are required to secure wood sole plates at exterior walls to slabs as per \*\*IBC, Section 1604.8.
- 1800. Foundations shall comply with City of Bryan Minimum Foundation Standards unless designed by a licensed Texas Architect or Engineer. Soil testing is recommended for areas likely to have expansive, compressible, or other unknown soil characteristics. Refer to \*\*IBC, Section 1802. Refer to \*\*IBC, Chapter 18 for items not covered by City of Bryan Minimum Foundation Standards. Refer to item # 0004 above for foundations over 5,000 square feet in area or supporting more than two stories.
- 2200. Port-a-Potties are required at all construction sites where an interior rest room is not available for construction workers. The Port-a-Potty is required to be located within the property lines of the construction site and maintained properly.
- 2300. Addresses are required on structures per City of Bryan Ordinance. An official address, assigned by the chief building official or his or her designee, shall be provided and placed pursuant to this section in such a position as to be clearly visible from the public street or roadway fronting the property. Addresses placed pursuant to this section shall be a minimum four inches in height and stroke of minimum one-half inch, composed of a durable material and of a color that provides a contrast to the background itself. The official address shall be placed a minimum of 36 inches and a maximum of 30 feet in height measured from the ground level. Buildings or structures located more than 50 feet from the street curb shall have an official address at least five inches in height. Durable materials used for the official address shall include, but not be limited to, wood, plastic, metal, weather resistant paint, weather resistant vinyl, or weather resistant material designed for outside use on a glass surface. For single-family residences with a U. S. mailbox located near the curb in front of the house, a minimum of two-inch high numbers on both sides of a U. S. mailbox and on the house are required.
- 2800. Exterior moisture barrier is required per \*\*IBC. Refer to Section 1404. Some exterior sheathing products are not moisture barriers. Approved moisture barriers are house wraps and felt paper. Vapor barriers (plastics) are not recommended in walls or ceilings assemblies in hot and humid climates.
- 3100. Construction sites are required to meet requirements of TECQ (Texas Commission on Environmental Quality). Refer to "New Construction Storm Water Permit" requirements. Construction sites of all sizes shall control erosion on the site during construction. Copy of NOI required.
- 3200. The concrete truck wash out area is required to be within the property lines of the property where construction is taking place.
- 3700. Separate electrical, mechanical, and plumbing permits are required.
- 3900. Do not divert, impound or alter the drainage flow from this property to any surrounding properties as required by Texas State Law. *(This includes impounding water, concentrating flow or changing runoff patterns beyond the property limits.)*
- 3100. If grading activities cause any off-site erosion or sedimentation, Please clean it up or otherwise correct the problem within 48 hours of notification by the City of Bryan.
- 3200. Business Signage is to be permitted separately – separate Sign Permit & Application is required.

### Electrical:

- E-1. 2002 \*NEC with the current City of Bryan Electrical Ordinance.
- E-2. Maintain clearances on all electrical equipment.
- E-3. An equipment grounding conductor, insulated, of adequate size shall be installed in all raceways, full size ground required in each parallel run to protect the over current device rated amperage.
- E-4. Color code of wires per City of Bryan Electrical Ordinance.
- E-5. Transformer's secondary must comply with tap rules, NEC 240.21(C).
- E-6. Note article NEC 240.4(C), for devices rated over 800 amps.
- E-7. All dedicated circuits for small appliances per NEC and the City of Bryan Electrical Ordinance to have a minimum rating of 20 amp rated device.
- E-8. The Grounding Electrode System to be per the City of Bryan Hand- out Requirements (attached).
- E-9. Per City of Bryan Ordinance, GFCI protection will be required for convenience outlets located outdoors and within six feet from outside edge of sinks and lavatories in other than dwellings units. GFCI protection is now also required on most commercial kitchen electrical outlets.
- E-10. Lighting System will need to meet \*\*\*IECC.
- E-11. Per City of Bryan a 125 volt single phase 20 amp-rated receptacle outlet shall be installed at an accessible location of the servicing of heating, air conditioning, and refrigeration equipment on rooftops, in attics, crawl

## CITY OF BRYAN – COMMERCIAL PLAN REVIEW COMMENTS

P.O. BOX 1000 BRYAN, TX 77805 ~ PHONE (979) 209-5010 ~ FAX (979) 209-5035 ~ [WWW.BRYANTX.GOV](http://WWW.BRYANTX.GOV)

EMAIL: klahde@bryantx.gov

spaces, and outside equipment locations. The receptacle outlet is required to be installed within ten feet of the equipment. The receptacle outlet shall not be connected to the load side of the equipment disconnecting means.

E12. Section 1006 Means of Egress Illumination from 2009 IBC. Exterior lighting required at all exits per IBC.

### Bryan Texas Utilities:

BTU has developed service entrance requirements manual to assist with securing electric service. The manual is located at <http://www.btutilities.com/Builders/pdfs/ServiceEntranceRequirements.pdf>.

Make sure all service and clearance requirements are met! Transformer placement and clearances need to comply with NEC, building codes, and BTU.

Call BTU at 979-821-5700 or visit them at 205 E 28<sup>th</sup> Street, Bryan TX 77803 if any questions.

### Dumpsters:

D-1 Dumpsters, trash enclosures, dumpster pads, and screening shall meet City of Bryan Ordinance requirements. If details are not on a City of Bryan approved site plan, please verify all requirements with City of Bryan Environmental Department at 209-5900.

**Call before you dig! (1-800-344-8377) OR DIAL 811 Free service!**

**All contractors and subcontractors to have a copy and knowledge of city amendments to the codes. Available upon request.**

### Attachments (Circle if attached):

Minimum Foundation Details  
Framing Span Tables  
Narrow wall bracing information

Copies of Specific Code Sections are available upon request.

Building Codes: \*NEC = 2011 National Electrical Code; \*\*IBC = 2009 International Building Code; \*\*\*IECC = 2009 International Energy Conservation Code, \*\*\*\*TAS=Texas Accessibility Standards. See #0001 Above.

Call 979-209-5010 for all inspections.

# CITY OF BRYAN APPLICATION FOR BUILDING PERMIT

P.O. Box 1000 Bryan Texas 77805 \* Phone: 979-209-5010 \* Fax: 979-209-5035 \* www.bryantx.gov

**Note:** Please initial in the box adjacent to each statement to affirm that you have read, understand, and each of these requirements. **Applicant to sign bottom of this page.**

### COMMERCIAL PERMIT CHECKLIST:

- TEXAS ACCESSIBILITY STANDARD (TAS) PROJECT REGISTRATION# EABPRJ \_\_\_\_\_  
(For Commercial/Public projects with a cost of \$50,000 or more)
- Existing Commercial/Public buildings: Attach copy of Asbestos Survey. TDH Inspector's Name and License No.: \_\_\_\_\_
- I have complied with the City of Bryan Ordinances and State Law for Architect and Engineer requirements.
- I have complied with the Texas Engineering Practice Act which requires (but not limited to) the following: an engineer's seal for heights over two stories, square footage in excess of 5,000 square feet of foundation, spans longer than 24 feet, and state requirements for engineered structural, mechanical, electrical, and plumbing systems.
- I understand that new commercial and some existing commercial site plans require separate review by City of Bryan Site Development Review Committee before a building permit can be issued.
- I have attached an electronic drawing file of all construction drawings and accompanying data to this application in Tiff format. Please submit all the pages within one TIFF file.
- I have attached two (2) complete sets of required scaled and dimensioned plans and accompanying data (requirements listed below) to this permit application. (Requirements are for new and existing buildings – please include existing floor plan(s) for additions and renovations.
- I have read and have attached to this permit application all of the COMMERCIAL PLAN REQUIREMENTS listed below.
- I will comply with TCEQ (Texas Commission on Environmental Quality) requirements for storm water permits. This includes submitting NOI/CSN per SWP3. Refer to <http://www.tceq.state.tx.us/> or call 512/239-1000.

### COMMERCIAL PLAN Requirements (2 copies + digital):

- Site Plan or Civil Plan and details
- Foundation Plan and Details
- Floor Plan and Details
- Structural plans and details ( framing, etc)
- Mechanical Plans and Details
- Electrical Plan and Details
- Plumbing Plan and details
- Exterior Building Elevations, Roof Plan
- Energy code compliance information; Rescheck, Comcheck, or compliance by default tables of Chapter 8 (Commercial) of International Energy Conservation Code. Include square footages of gross wall areas and gross glazing areas on plans. [www.energycodes.gov](http://www.energycodes.gov)

Note: Please allow two weeks for full plan reviews and building permit issuance.

**Call before you dig! (1-800-344-8377) Free Service!**

### RESIDENTIAL PERMIT CHECKLIST:

- Residential site plan requires submission of City of Bryan Residential Site Plan Application. Residential Site Plan shall be 8 1/2"X11" format. Locate and dimension driveways, building setbacks, property lines, label overall dimensions of all structures on the site.
  - I have read and have attached to this permit application all of the RESIDENTIAL PLAN REQUIREMENTS listed below.
- I will comply with TCEQ (Texas Commission on Environmental Quality) requirements for storm water permits. This includes submitting NOI/CSN per SWP3. Refer to <http://www.tceq.state.tx.us/> or CALL 512/239-1000.

### RESIDENTIAL PLAN Requirements (2 copies):

- Site Plan – 8-1/2"x11" format
- Foundation Plan and Details
- Floor Plan and Details
- Structural plans and details ( framing, etc)
- Narrow wall bracing and exterior sheathing notes
- Mechanical (HVAC) location of units noted
- Electrical switch and outlet plan
- Plumbing fixture locations noted
- Exterior Building Elevations, Roof Plan
- Energy code compliance information; Rescheck, Comcheck, or compliance by default tables of Chapter 5 (Residential) of International Energy Conservation Code. Include square footages of gross wall areas and gross glazing areas on plans. [www.energycodes.gov](http://www.energycodes.gov)
- Copy of NOI/CSN (Notice of Intent) for new home construction

### All Applicants – Please Read:

1. The Permit issued for this application becomes null and void if work or construction authorized is not commenced within six months, or if construction work is suspended or abandoned for a period of one year at any time after work is commenced.
2. Revised construction plans to be submitted for city review and approval is required for any changes made after City of Bryan building permit issuance.
3. The Permittee or Applicant is responsible for compliance with Deed and/or HOA restrictions.

Applicant Printed Name: Elisha Divinity

Applicant Signature Elisha Divinity

Digitally signed by Elisha Divinity  
DN: cn=Elisha Divinity, o=Cities of Bryan, email=Elisha.Divinity@bryantx.com, c=US  
Date: 2016.08.12 11:28:54 -0500

Date: 8/12/16

Official Use: (do not issue permit unless signed by plans examiner)  
Plans Examiner Signature: \_\_\_\_\_  
Development Coordinator approval: \_\_\_\_\_

Plan Review Attached: Yes No  
Plan Review Comments in H.T.E.: Yes No  
Approved Date: \_\_\_\_\_

**THANK YOU!**  
Revised 03-31-15

Submittal of the above information with a fully completed application is required to approve/issue the Permit in a 2  
timely manner. Omission of any information will cause the review to be delayed until the information is received.

**PROJECT INFORMATION**

**APPLICANT/LEASSEE:**  
**NAME:** AT&T MOBILITY  
**ADDRESS:** 1801 VALLEY VIEW LANE  
**CITY, STATE:** FARMERS BRANCH, TX  
**ZIP:** 75234  
**CONTACT:**  
**PHONE:**  
**SITE OWNER:**  
**NAME:** CROWN CASTLE  
**ADDRESS:** 1220 AUGUSTA DRIVE, SUITE 500  
**CITY, STATE:** HOUSTON, TX  
**ZIP:** 77057  
**CONTACT:**  
**PHONE:** 713-570-3092  
**PROPERTY OWNER:**  
**NAME:** CROWN CASTLE  
**ADDRESS:** 1220 AUGUSTA DRIVE, SUITE 500  
**CITY, STATE, ZIP:** HOUSTON, TX 77057  
**CONTACT:**  
**PHONE:** 713-570-3092  
**LATITUDE:** 30° 40' 7.19"  
**LONGITUDE:** -96° 22' 23.45"  
**JURISDICTION:** CITY OF BRYAN  
**TELEPHONE CO.:** N/A  
**POWER CO.:** N/A

**TOWER INFORMATION**

**TOWER OWNER** - CROWN CASTLE  
**SITE NAME** - OWNED PROP/BRYAN S. TABOR  
**SITE NO.** - 826461  
**TOWER TYPE** - MONOPOLE TOWER  
**TOWER HEIGHT** - 159'  
**ELEVATION OF WORK ON TOWER** - 107'

**DRIVING DIRECTIONS**

FROM: 1220 AUGUSTA DRIVE, SUITE 500, HOUSTON, TX 77057, GET ON I-10 W IN SPRING VALLEY FROM WOOD WAY DR. AND S VOSS RD., TAKE US-290 W AND TX-6 N TO TEXAS 6 FRONTAGE RD N IN BRYAN. TAKE THE EXIT FROM TX-6 N, CONTINUE ON TEXAS 6 FRONTAGE RD N. TAKE E WILLIAM J BRYAN PKWY TO S TABOR AVE.

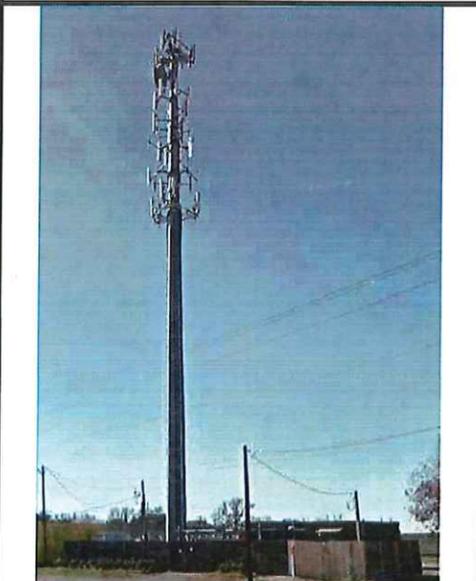
**VICINITY MAP**




1801 VALLEY VIEW LANE  
FARMERS BRANCH, TX 75234

**SITE NAME:**  
 OWNED PROP/BRYAN S. TABOR  
 5C LTE UPGRADE  
**FA NUMBER:**  
 10130592  
**CROWN CASTLE BU#:**  
 826461  
**PTN:**  
 3063A06IBW  
**SITE ADDRESS:**  
 101 E. 31ST STREET,  
 BRYAN, TX 77803

**SITE PHOTO**



**DESIGN TEAM**

**DESIGNER:**  
**NAME:** TRYLON TSF  
**ADDRESS:** 24 QUEEN ST E  
**CITY, STATE:** BRAMPTON, ON  
**ZIP:** L6V 1A2  
**CONTACT:** KATYA SERAVALLE  
**PHONE:** 519-465-4125



8-11-2016

**APPROVALS**

AT&T CONSTRUCTION MGR. \_\_\_\_\_ AT&T RF ENGINEER \_\_\_\_\_  
 LAND USE PLANNER \_\_\_\_\_ NETWORK OPERATION \_\_\_\_\_  
 PROPERTY OWNER \_\_\_\_\_ CONTRACTOR \_\_\_\_\_

**SHEET INDEX**

SHT #.	DESCRIPTION	REV. #.
T01	TITLE SHEET	0
C01	GENERAL NOTES	0
C02	OVERALL SITE PLAN	0
C03	TOWER ELEVATION AND ANTENNA ORIENTATION	0
C04	EQUIPMENT DETAILS	0
C05	EQUIPMENT DETAILS	0
C06	GROUNDING DETAILS	0
C07	BASE LEVEL DRAWING	0

**SCOPE OF WORK**

INSTALL LTE EQUIPMENT WITHIN AN EXISTING UNMANNED TELECOMMUNICATION FACILITY. INSTALL NEW AND / OR REPLACEMENT ANTENNAS AND LINES ON EXISTING TOWER. CONNECT POWER AND TELCO TO EXISTING AT&T UTILITY SERVICE.

**BUILDING CODES**

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL AUTHORITIES HAVING JURISDICTION.

- 2009 INTERNATIONAL BUILDING CODE
- UNIFORM BUILDING CODE
- 2011 NATIONAL ELECTRIC CODE
- ANSI/TIA/EIA-222
- CITY/COUNTY ORDINANCES

 IF YOU DIG IN ANY STATE DIAL 811 FOR THE LOCAL "ONE CALL CENTER" IT'S THE LAW

THE UTILITIES SHOWN HEREIN ARE FOR THE CONTRACTORS CONVENIENCE ONLY. THERE MAY BE OTHER UTILITIES NOT SHOWN ON THESE PLANS. THE ENGINEER/SURVEYOR ASSUMES NO RESPONSIBILITY FOR THE LOCATIONS SHOWN AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL THE UTILITIES WITHIN THE LIMITS OF THE WORK. ALL DAMAGE MADE TO THE EXISTING UTILITIES BY THE CONTRACTOR SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

**PREPARED BY:**



1220 AUGUSTA DRIVE, SUITE 500  
HOUSTON, TX 77057  
713-570-3092



24 QUEEN ST E  
BRAMPTON, ON  
1 (519) 572-9995

**CLIENT:**



1801 VALLEY VIEW LANE  
FARMERS BRANCH, TX 75234

THIS DOCUMENT IS THE DESIGN PROPERTY AND COPYRIGHT OF CROWN CASTLE AND FOR THE EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION OR USE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE CREATOR IS STRICTLY PROHIBITED.  
 DRAWING SCALES ARE INTENDED FOR 24"x36" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

**SUBMITTALS**

REV	DATE	DESCRIPTION	BY
0	08/09/16	ISSUE FOR CONSTRUCTION	RSN

**SITE INFO:**  
**SITE NAME:**  
 OWNED PROP/BRYAN S. TABOR  
**FA NUMBER:**  
 10130592  
**CROWN CASTLE BU#:**  
 826461  
**SITE ADDRESS:**  
 101 E. 31ST STREET  
 BRYAN, TX  
 77803

**SHEET TITLE:**  
 TITLE SHEET

**SHEET NUMBER:**  
 T01

**CHECKED BY:** \_\_\_\_\_  
**CHECKED BY DATE:** \_\_\_\_\_

1. GENERAL REQUIREMENTS

A. PURPOSE AND INTENT

1. THE DRAWING AND SPECIFICATION ARE INTENDED TO BE FULLY EXPLANATORY AND SUPPLEMENTARY, HOWEVER, SHOULD ANYTHING BE SHOWN, INDICATED, OR SPECIFIED ON ONE AND NOT THE OTHER, IT SHALL BE DONE THE SAME AS IF DISCREPANCIES BETWEEN REQUIREMENTS SHOWN IN BOTH, THE MORE STRINGENT REQUIREMENTS SHALL APPLY.  
2. THE INTENTION OF THE DOCUMENT IS TO INCLUDE ALL LABOR AND MATERIALS REASONABLY NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK AS STIPULATED IN THE CONTRACT.

B. CONFLICTS

1. VERIFY ALL MEASUREMENTS AT THE SITE BEFORE ORDERING MATERIAL OR DOING ANY WORK, NO EXTRA CHARGE OR COMPENSATION WILL BE ALLOWED DUE TO DIFFERENCES BETWEEN ACTUAL DIMENSIONS OR DIMENSIONS SHOWN ON PLANS SUBMIT NOTICE OF ANY DISCREPANCY IN DIMENSIONS OR OTHERWISE TO AT&T FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.  
2. NO PLEA OF IGNORANCE OF CONDITIONS THAT EXIST, OR OF DIFFICULTIES OR CONDITIONS THAT MAY BE ENCOUNTERED, OR OF ANY OTHER RELEVANT MATTER CONCERNING THE EXECUTION OF THE WORK WILL BE ACCEPTED AS AN EXCUSE FOR ANY FAILURE OR OMISSION ON THE PART OF THE CONTRACTOR TO FULFILL EVERY DETAIL OF ALL THE REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS GOVERNING THE WORK.

C. CLEANING

1. KEEP THE SITE FREE FROM ACCUMULATION OF WASTE AND RUBBISH CAUSED BY EMPLOYEES AT THE COMPLETION OF THE WORK, REMOVE ALL WASTE AND NON-CONSTRUCTION MATERIAL INCLUDING ALL CONTRACT TOOLS, SCAFFOLDING, AND SURPLUS MATERIAL AND LEAVE SITE CLEAN AND READY FOR USE.

D. CODES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR FOLLOWING ALL LAWS, REGULATIONS, AND RULES PROMULGATED BY FEDERAL STATE AND LOCAL AUTHORITIES WITH JURISDICTION OVER THE SALTIER. THIS RESPONSIBILITY IS IN EFFECT REGARDLESS OF WEATHER THE LAW, ORDINANCE, REGULATION OR RULE IS MENTIONED IN THESE SPECIFICATIONS.

E. LICENSING

1. CONTRACTOR SHALL HAVE AND MAINTAIN A VALID CONTRACTOR'S LICENSE FOR THE LOCATION IN WHICH THE WORK IS TO BE PERFORMED. FOR JURISDICTIONS THAT LICENSE INDIVIDUAL TRADES, THE TRADESMAN OR SUBCONTRACTOR PERFORMING THOSE SHALL BE LICENSED, RESEARCHED AND COMPLY WITH THE LICENSING LAWS, PAY LICENSE FEES, AND SELECT AND INFORM SUBCONTRACTORS REGARDING THESE LAWS.

F. OSHA

1. FOLLOW ALL APPLICABLE RULES AND REGULATIONS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATIONS AND STATE LAWS BASED IN THE FEDERAL OCCUPATION SAFETY AND HEALTH ACT. THESE REGULATIONS INCLUDE, BUT ARE NOT LIMITED TO, REGULATIONS DEALING WITH TOWER CONSTRUCTION AND SAFETY, EXCAVATION AND TRENCHING, AND WORK IN CONFINED SPACES. ENSURE THAT EMPLOYEES AND SUBCONTRACTORS WEAR HARD HATS AT ALL TIMES DURING CONSTRUCTION.

G. PHOTOS

1. PROVIDE PHOTOGRAPHIC EVIDENCE OF ALL FOUNDATION INSTALLATIONS, GROUNDING, AND TRENCHING AFTER PLACEMENT OF UTILITIES PRIOR TO BACKFILL.

H. BUILDING PERMITS

1. CONTRACTOR WILL SUBMIT CONSTRUCTION DOCUMENTS TO THE JURISDICTIONAL AUTHORITY FOR PLAN CHECK AND REVIEW. CONTRACTOR WILL SUBMIT LICENSING AND WORKMAN'S COMPENSATION INFORMATION TO THE JURISDICTION AS REQUIRED TO OBTAIN THE BUILDING PERMIT. CONTRACTOR SHALL COORDINATE AND SCHEDULE REQUIRED INSPECTIONS AND POST REQUIRED PERMITS AT THE JOB SITE COMPLY WITH SPECIFIC PROJECT RELATED REQUESTS AND SUGGESTIONS MADE BY BUILDING INSPECTOR, AND INFORM CONSTRUCTION MANAGER OF ANY SUCH WORK THAT MAY BE BEYOND THE SCOPE OF THE CONTRACT OR DEVIATE FROM THE CONSTRUCTION DOCUMENT. AT&T WILL REIMBURSE THE CONTRACTOR FEES FOR PLAN REVIEW, BUILDING PERMIT, CONNECTIONS, AND INSPECTIONS. (INCLUDED IN THE BASE PROPOSAL).

I. ZONING REGULATIONS AND CONDITIONAL USE PERMITS

1. CONTRACTOR WILL SUBMIT ALL ZONING AND CONDITIONAL USE PERMITS. SOME USE PERMITS MAY HAVE SPECIFIC REQUIREMENTS FOR THE SITE RELATED TO CONSTRUCTION, SUCH AS NOISE REGULATIONS, HOURS OF WORK, ACCESS LIMITATIONS, ETC. THE CONSTRUCTION MANAGER WILL INFORM THE CONTRACTOR OF THESE REQUIREMENTS AT THE PRE-BID MEETING OR AS SHOWN IN THE CONSTRUCTION DOCUMENTS.

J. FAA PERMIT AND TOWER LIGHTING

1. REFER TO CONSTRUCTION DOCUMENTS AND CONSTRUCTION MANAGER FOR FAA AND STATE LIGHTING REQUIREMENTS. CONTRACTOR SHALL PROVIDE TEMPORARY FM APPROVED LIGHTING UNTIL PERMANENT LIGHTING IS OPERATIONAL.

K. TOWER SECURITY

1. IF REQUIRED, TOWER MUST BE FENCED, TEMPORARILY OR PERMANENTLY WITHIN 24 HOURS OF ERECTION. DO NOT ALLOW THE GATE ACCESSING THE TOWER AREA TO REMAIN OPEN OR UNATTENDED ANY TIME FOR ANY REASON. KEEP THE GATE CLOSED AND LOCKED WHEN NOT IN USE.

L. SITE CONTROL

1. THE CONTRACTOR IS COMPLETELY RESPONSIBLE FOR CONTAINMENT OF SEDIMENT AND CONTROL OF EROSION AT THE SITE. ANY DAMAGE TO ADJACENT OR DOWNSTREAM PROPERTIES WILL BE CORRECTED BY THE CONTRACTOR AT NO EXPENSE TO AT&T.  
2. THE CONTRACTOR IS TO MAINTAIN ADEQUATE DRAINAGE AT ALL TIMES. DO NOT ALLOW WATER TO STAND OR POND. ANY DAMAGE TO STRUCTURES OR WORK ON THE SITE CAUSED BY INADEQUATE MAINTENANCE OF DRAINAGE PROVISIONS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND ANY COST ASSOCIATED WITH REPAIRS FOR SUCH DAMAGE WILL BE AT THE CONTRACTOR'S EXPENSE.  
3. ALL WASTE MATERIAL SHALL BE PROPERLY DISPOSED OF OFF-SITE OR AS DIRECTED BY CONSTRUCTION MANAGER AND IN ACCORDANCE WITH JURISDICTIONAL AUTHORITIES.

M. LIVESTOCK PROTECTION

1. PROTECT AND SECURE LIVESTOCK. MAINTAIN AND SECURE EXISTING PERIMETER FENCE AND/OR GATE ENCLOSURES.

N. SITE PREPARATION

A. SCOPE OF WORK INCLUDES  
1. PROTECTION OF EXISTING TREES, VEGETATION AND LANDSCAPING MATERIALS WHICH MIGHT BE DAMAGED BY CONSTRUCTION ACTIVITIES.  
2. TRIMMING OF EXISTING TREES AND VEGETATION AS REQUIRED FOR PROTECTION DURING CONSTRUCTION ACTIVITIES.  
3. CLEANING AND GRUBBING OF STUMPS, VEGETATION, DEBRIS, RUBBISH, DESIGNATED TREES AND SITE IMPROVEMENTS.  
4. TOPSOIL STRIPPING AND STOCKPILING.  
5. TEMPORARY EROSION CONTROL, SILTATION CONTROL, AND DUST CONTROL CONFORMING TO LOCAL REQUIREMENTS AS APPLICABLE.  
6. TEMPORARY PROTECTION OF ADJACENT PROPERTY, STRUCTURES, BENCHMARKS, AND MONUMENTS.  
7. PROTECTION AND TEMPORARY RELOCATION, STORAGE AND RE-INSTALLATION OF EXISTING FENCE AND OTHER SITE IMPROVEMENTS SCHEDULED FOR RE-USE.  
8. REMOVAL AND LEGDK DISPOSAL OF CLEARED MATERIALS.

B. PRODUCTS AND MATERIALS (AS APPROVED BY CONSTRUCTION MANAGER OR AS NOTED IN CONSTRUCTION DOCUMENTS)

1. MATERIALS USED FOR TREE PROTECTION, EROSION CONTROL, SILTATION CONTROL, AND DUST CONTROL.  
2. EARTHWORK  
A. SCOPE OF WORK INCLUDES  
1. EXCAVATION, TRENCHING, FILLING, COMPACTION, AND GRADING FOR STRUCTURES, SITE IMPROVEMENTS AND UTILITIES.  
2. MATERIALS FOR SUB-BASE, DRAINAGE, BACKFILL AND GRAVEL FOR SLABS, PAVEMENT AND IMPROVEMENTS.  
3. ROCK EXCAVATION WITHOUT BLASTING.  
4. SUPPLY OF ADDITIONAL MATERIALS FOR OFFSITE AS REQUIRED.  
5. REMOVAL AND LEGDK DISPOSAL OF EXCAVATED MATERIAL AS REQUIRED.

B. QUALITY ASSURANCE

1. COMPACTION  
A. UNDER STRUCTURES, BUILDING SLABS, PAVEMENTS AND WALKWAYS WILL OBTAIN A 95% COMPACTION AT A MINIMUM DRY DENSITY AS DETERMINED BY ASTM 0-1557 OR WITH PLUS OR MINUS 3% OF THE MOISTURE CONTENT.  
2. GRADING TOLERANCES OUTSIDE BUILDING LINES  
A. LAWNS, UNPAVED AREAS AND WALKS PLUS OR MINUS 1/4 INCH.  
B. UNDER PAVEMENTS PLUS OR MINUS 1/2 INCH.  
3. GRADING TOLERANCES FOR FILL UNDER CONCRETE APPLICATIONS  
A. PLUS OR MINUS 1/2 INCH MEASURED WITH 10 FOOT STRAIGHT EDGE.

C. PRODUCTS AND MATERIALS (AS APPROVED BY CONSTRUCTION MANAGER OR AS NOTED IN CONSTRUCTION DOCUMENTS)

1. SUB-BASE MATERIAL: GRADED MIXTURE OF NATURAL OR CRUSHED GRAVEL, CRUSHED STONE OR SLAG, AND NATURAL SAND.  
2. WASHED MATERIAL, EVENLY GRADED MIXTURE OF CRUSHED STONE OR GRAVEL WITH 95% PASSING A 1-1/2 INCH SIEVE.  
3. GRADING MATERIAL WILL CONSIST OF SATISFACTORY NATIVE OR IMPORTED SOIL MATERIALS FREE OF CLAY, ROCK OR GRAVEL NOT LARGER THAN 2 INCHES IN ANY DIMENSION, DEBRIS, WASTE, FROZEN MATERIALS AND OTHER UNSUITABLE MATERIALS WILL NOT BE ALLOWED FOR USE. IMPORTED MATERIALS SHALL HAVE A CLAY CONTENT OF NO MORE THAN 5%.  
4. GRAVEL MATERIAL: EVENLY GRADED MIXTURE OF CRUSHED STONE OR GRAVEL WITH 95% PASSING A 1-1/2 INCH SIEVE.  
5. GEOTEXTILE FABRIC: AS PER CONSTRUCTION DOCUMENTS.

D. CLEARING AND GRUBBING

1. REMOVE ALL VEGETATION AND MATERIALS AS REQUIRED. REMOVE STUMPS COMPLETELY UNDER FOUNDATIONS AND ROADWAYS. DISPOSE OF CLEARING AND GRUBBING OFF-SITE OR IN AN ON-SITE LOCATION APPROVED BY CONSTRUCTION MANAGER.

E. STRIPPING

1. STRIP NOT LESS 3 INCHES OF SOD AND TOPSOIL FROM AREAS THAT WILL UNDERLAY GRAVEL, PAVEMENT, NEW STRUCTURES OR EMBANKMENTS. STOCKPILE STRIPPING ON-SITE FOR RE-USE AND FINAL LANDSCAPING.  
2. TEMPORARILY STOCKPILE ON-SITE EXCAVATION AT AN APPROVED LOCATION WITHIN THE WORK AREA UNTIL SITE GRADING IS COMPLETE. STOCKPILE SHALL NOT EXCEED 15 FEET IN HEIGHT.  
3. LEGALLY DISPOSE OF EXCESS COMMON EXCAVATION OFF-SITE.

F. COMMON EXCAVATION

1. EXCAVATE TO DEPTH, LINES AND GRADE SHOWN ON THE PLANS, OR AS OTHERWISE SPECIFIED.  
2. TEMPORARILY STOCKPILE ON-SITE EXCAVATION AT AN APPROVED LOCATION WITHIN THE WORK AREA UNTIL SITE GRADING IS COMPLETE. STOCKPILE SHALL NOT EXCEED 15 FEET IN HEIGHT.  
3. LEGALLY DISPOSE OF EXCESS COMMON EXCAVATION OFF-SITE.

G. EMBANKMENT

1. CONSTRUCT EMBANKMENT TO THE LINES AND GRADES SHOWN ON THE DRAWING.  
2. CONSTRUCT EMBANKMENT FROM ON-SITE EXCAVATION MATERIAL WHEN SUITABLE. USE IMPORTED BACKFILL ONLY AFTER AVAILABLE ON-SITE EXCAVATION MATERIAL HAS BEEN USED.  
3. CONSTRUCT IN LIFTS OF NOT MORE THAN 12 INCHES IN LOOSE DEPTH. THE FULL WIDTH OF THE CROSS SECTION SHALL BE BROUGHT UP UNIFORMLY.  
4. MATERIAL SHALL BE PLACED IN LAYERS AND SHALL BE NEAR OPTIMUM MOISTURE CONTENT BEFORE ROLLING TO OBTAIN THE PRESCRIBED COMPACTION. WETTING OR DRYING OF THE MATERIAL AND MANIPULATION TO SECURE A UNIFORM MOISTURE CONTENT THROUGHOUT THE LAYERS MAY BE REQUIRED. SUCH OPERATIONS SHALL BE INCLUDED IN THE APPROPRIATE BID ITEM. SHOULD THE MATERIAL BE TOO WET TO PERMIT PROPER COMPACTION, IT IS THE CONTRACTOR'S RESPONSIBILITY TO UTILIZE MATERIAL WITH AN ACCEPTABLE MOISTURE CONTENT.  
5. DO NOT PLACE FROZEN MATERIAL IN THE EMBANKMENT AND DO NOT PLACE EMBANKMENT MATERIAL UPON FROZEN MATERIAL.  
6. CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF EMBANKMENTS AND THE REPLACEMENT OF ANY PORTION WHICH HAS BECOME DISPLACED DUE TO CONTRACTOR'S OPERATIONS.  
7. START LAYERS IN THE DEEPEST PORTION OF THE FILL AND AS PLACEMENT PROGRESSES, CONSTRUCT LAYERS APPROXIMATELY PARALLEL TO THE FINISH GRADE LINE.  
8. ROUTE EQUIPMENT BOTH LOADED AND EMPTY, OVER THE FULL WIDTH OF THE EMBANKMENT TO ENSURE UNIFORMITY OF MATERIAL PLACEMENT.  
9. COMPACT EMBANKMENT UNDERLYING NEW GRAVEL PAVING, FLOOR SLABS AND STRUCTURES TO BE 95% COMPACTION AT A MINIMUM DRY DENSITY AS DETERMINED BY ASTM 0-1557 OR WITHIN PLUS OR MINUS 3% OF OPTIMUM MOISTURE CONTENT. COMPACT NON-STRUCTURAL AREA EMBANKMENTS TO A MINIMUM OF 90% OF ASTM 0-1557.

H. SITE GRADING

1. USING ON-SITE EXCAVATION MATERIAL, SHAPE, TRIM, FINISH AND COMPACT SURFACE AREAS TO CONFORM TO THE LINES, GRADES AND CROSS SECTIONS SHOWN ON THE DRAWING OR AS DESIGNATED BY THE CONSTRUCTION MANAGER.  
2. GRADE SURFACES TO DRAIN AND ELIMINATE ANY PONDING OR EROSION.  
3. ELIMINATE WHEEL RUTS BY REGRADING.  
4. COMPACT AREAS OF UNDERLYING NEW GRAVEL, PAVING, FLOOR SLABS AND STRUCTURES TO BE AT 95% COMPACTION AT A MAXIMUM DRY DENSITY AS DETERMINED BY THE ASTM 0-1557 OR WITHIN PLUS OR MINUS 3% OF OPTIMUM MOISTURE CONTENT.  
5. CONSTRUCT FINISH SURFACE OF SITE GRADING AREAS WITHIN 1 INCH FROM SPECIFIED GRADE.

I. SUBGRADE PREPARATION

1. SHAPE TOP OF SUBGRADE TO THE LINES AND GRADES SHOWN ON THE DRAWINGS.  
2. MAINTAIN TOP OF SUBGRADE IN A FREE-DRAINING CONDITION.  
3. DO NOT STOCK PILE MATERIAL ON TOP OF SUBGRADE UNLESS AUTHORIZED BY CONSTRUCTION MANAGER.  
4. COMPACT THE TOP 12 INCHES OF SUBGRADE TO A 95% COMPACTION AT A MAXIMUM DRY DENSITY AS DETERMINED BY ASTM 0-1557 OR WITHIN PLUS OR MINUS 3% OF THE OPTIMUM MOISTURE CONTENT.  
5. CONSTRUCT TOP OF SUBGRADE WITHIN 1 INCH OF ESTABLISHED GRADE AND CROSS SECTION.

J. GEOTEXTILE FABRIC

1. LAY GEOTEXTILE FABRIC OVER COMPACTED SUBGRADE IN THE COMPOUND AREA AND UNDER LENGTH OF ROAD (WHEN REQUIRED). LAP ALL JOINTS TO A MINIMUM OF 36 INCHES.

K. GRAVEL SURFACING

1. CONSTRUCT GRAVEL SURFACING AREAS USING CRUSHED AGGREGATE BASE AND FINISH COURSES AS SPECIFIED BY CONSTRUCTION MANAGER. SPREAD GRAVEL AND RAKE TO OBTAIN A UNIFORM SURFACE AREA.

L. LANDSCAPING

1. FURNISH, INSTALL AND MAINTAIN LANDSCAPE WORK AS SHOWN AND/OR REQUIRED WITHIN THE CONSTRUCTION DOCUMENTS OR AS SPECIFIED IN THE CONSTRUCTION SPECIFICATIONS.

M. CONCRETE FORM WORK

1. FORMS: SMOOTH AND FREE OF SURFACE IRREGULARITIES. UTILIZE FORM RELEASE AGENTS.  
2. CHAMFER EXPOSED EDGES OF ALL TOWER FOUNDATION SHALL RECEIVE A 1/2 INCH BY 1/2 INCH 45 DEGREE CHAMFER. OTHER EXPOSED EDGES SHALL RECEIVE A TOOLED RADIUS FINISH.  
3. UPON COMPLETION, REMOVE ALL FORMS INCLUDING THOSE CONCEALED OR BURIED.  
4. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL REQUIREMENTS.

5. GENERAL NOTES

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE ALL PLAN SHEETS AND SPECIFICATIONS AND COORDINATE HIS WORK WITH THE WORK OF ALL OTHER CONTRACTORS TO ENSURE THAT WORK PROGRESSION IS NOT INTERRUPTED.  
2. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING A NEAT AND ORDERLY SITE, YARD AND GROUNDS. CONTRACTOR SHALL REMOVE AND DISPOSE OFF SITE ALL RUBBISH, WASTE MATERIAL, LITTER AND ALL FOREIGN SUBSTANCES. REMOVE PETROCHEMICAL SPILLS, STAINS AND OTHER FOREIGN DEPOSITS. RAKE GROUND TO A SMOOTH EVEN-TEXTURED SURFACE.  
3. THE PLANS SHOW SOME KNOWN SUBSURFACE STRUCTURE ABOVE GROUND STRUCTURES AND/OR UTILITIES BELIEVED TO EXIST IN THE WORKING AREA, EXACT LOCATION OF WHICH MAY VARY FROM THE LOCATION INDICATED. IN PARTICULAR THE CONTRACTOR IS WARNED THAT THE EXACT OR EVEN APPROXIMATE LOCATION OF SUCH PIPELINES, SUBSURFACE STRUCTURES AND/OR UTILITIES IN THE AREA MAY BE SHOWN OR MAY NOT BE SHOWN AND IT SHALL BE HIS RESPONSIBILITY TO PROCEED WITH GREAT CARE IN 48 HOURS BEFORE YOU DIG, DRILL OR BLAST CALL LOCAL UTILITIES LOCATOR COMPANY.  
4. THE OWNER OR OWNER'S REPRESENTATIVE SHALL BE NOTIFIED IN WRITING OF ANY CONDITIONS THAT VARY FROM THOSE SHOWN ON THE PLANS. THE CONTRACTOR'S WORK SHALL NOT VARY FROM THE PLANS WITHOUT THE EXPRESSED APPROVAL OF THE OWNER OR THE OWNER'S REPRESENTATIVE.  
5. THE CONTRACTOR IS INSTRUCTED TO COOPERATE WITH ANY AND ALL OTHER CONTRACTORS PERFORMING WORK ON THE SITE DURING THE PERFORMANCE OF THIS CONTRACT.  
6. THE CONTRACTOR SHALL RESTORE ALL DAMAGED, PUBLIC OR PRIVATE PROPERTY TO AT LEAST AS GOOD OF CONDITION AS BEFORE DISTURBED AS DETERMINED BY THE OWNER OR OWNER'S REPRESENTATIVE.  
7. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIRED PERMITS.  
8. THE CONTRACTOR SHALL PROTECT EXISTING PROPERTY LINE MONUMENTATION. ANY MONUMENTATION DISTURBED OR DESTROYED, AS JUDGED BY THE OWNER OR OWNER'S REPRESENTATIVE, SHALL BE REPLACED.  
9. ALL TRENCH EXCAVATION AND ANY REQUIRED SHEETING AND SHORING SHALL BE DONE IN ACCORDANCE WITH OSHA REGULATIONS FOR CONSTRUCTION.  
10. CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING AND THE MAINTENANCE OF SURFACE DRAINAGE DURING THE COURSE OF WORK.  
11. ALL UTILITY WORK INVOLVING CONNECTIONS TO EXISTING SYSTEMS SHALL BE COORDINATED WITH THE OWNER OR OWNER'S REPRESENTATIVE BEFORE EACH AND EVERY CONNECTION TO EXISTING SYSTEMS IS MADE.  
12. MAINTAIN FLOW FOR ALL EXISTING UTILITIES  
13. ALL SITE FILL SHALL MEET SELECTED FILL STANDARDS AS DEFINED BY THE OWNER OF OWNER'S REPRESENTATIVE ON THE DRAWINGS OR GEOTECHNICAL REPORT RECOMMENDATIONS.  
14. CONTRACTOR TO GRADE ALL AREAS OF THE SITE TO PROVIDE POSITIVE DRAINAGE AWAY FROM THE BUILDING OR EQUIPMENT PAD AND THE TOWER.  
15. IF NECESSARY, THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING AND REGRADING ROADWAY AND ANY DISTURBED AREAS FOLLOWING INSTALLATION OF UTILITIES.  
16. NO COMMERCIAL MESSAGES TO BE DISPLAYED ON TOWER  
17. WATER AND SEWER SERVICES ARE NOT REQUIRED FOR THE DEVELOPMENT  
18. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIAL UNLESS OTHERWISE NOTED.  
19. ELECTRICAL DRAWINGS HAVE BEEN REVIEWED AND SEALED FOR STRUCTURAL PURPOSES ONLY.

PREPARED BY:



1220 AUGUSTA DRIVE, SUITE 500  
HOUSTON, TX 77057  
713-570-3092



24 QUEEN ST E  
BRAMPTON, ON  
1 (519) 572-9995

CLIENT:



1801 VALLEY VIEW LANE  
FARMERS BRANCH, TX 75234

THIS DOCUMENT IS THE DESIGN PROPERTY AND COPYRIGHT OF CROWN CASTLE AND FOR THE EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION OR USE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE CREATOR IS STRICTLY PROHIBITED.  
DRAWING SCALES ARE INTENDED FOR 24"x36" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

SUBMITTALS			
REV	DATE	DESCRIPTION	BY
0	08/09/16	ISSUE FOR CONSTRUCTION	RSN

SITE INFO:

SITE NAME:  
OWNED PROP/BRYAN S. TABOR  
FA NUMBER:  
10130592  
CROWN CASTLE BU#:  
826461  
SITE ADDRESS:  
101 E. 31ST STREET  
BRYAN, TX  
77803

SHEET TITLE:  
GENERAL NOTES

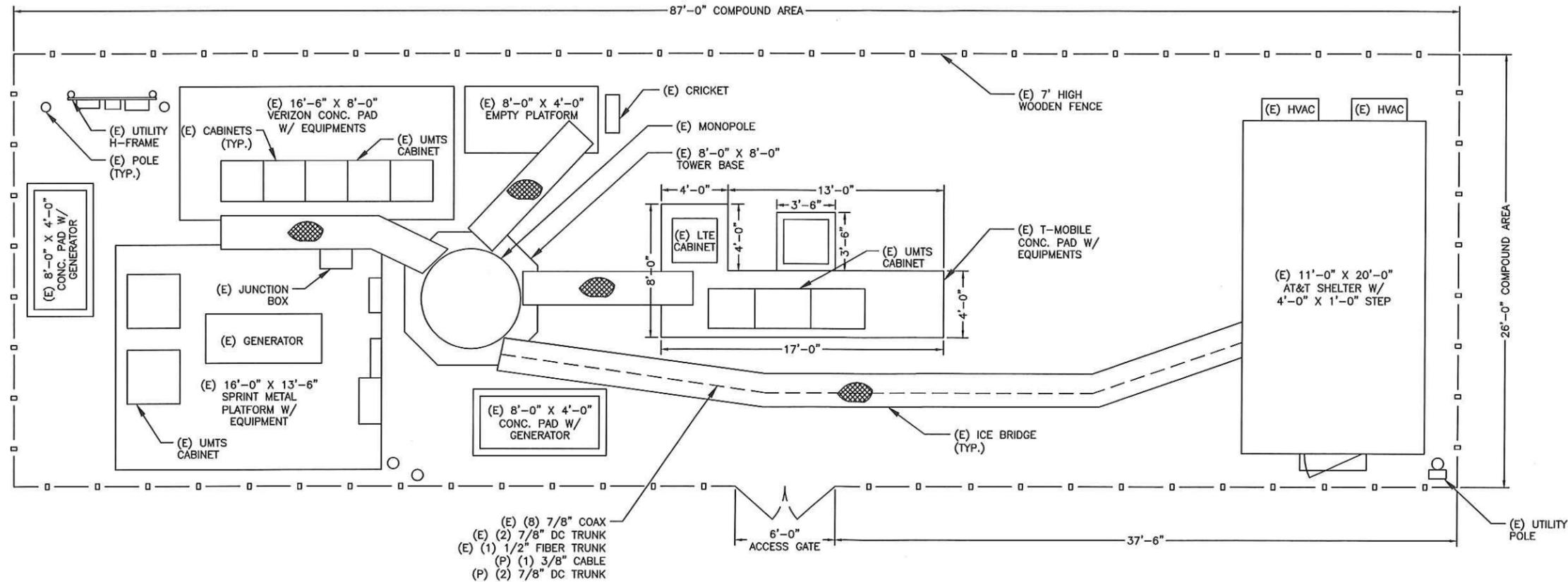
CHECKED BY:

CHECKED BY DATE:

SHEET NUMBER:  
C01



8-11-2016



PREPARED BY:



1220 AUGUSTA DRIVE, SUITE 500  
HOUSTON, TX 77057  
713-570-3092



24 QUEEN ST E  
BRAMPTON, ON  
1 (519) 572-9995

CLIENT:



1801 VALLEY VIEW LANE  
FARMERS BRANCH, TX 75234

THIS DOCUMENT IS THE DESIGN PROPERTY AND COPYRIGHT OF CROWN CASTLE AND FOR THE EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION OR USE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE CREATOR IS STRICTLY PROHIBITED.  
DRAWING SCALES ARE INTENDED FOR 24"x36" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

SUBMITTALS

REV	DATE	DESCRIPTION	BY
0	08/09/16	ISSUE FOR CONSTRUCTION	RSN

SITE INFO:

SITE NAME:  
OWNED PROP/BRYAN S. TABOR  
FA NUMBER:  
10130592  
CROWN CASTLE BU#:  
826461  
SITE ADDRESS:  
101 E. 31ST STREET  
BRYAN, TX  
77803

SHEET TITLE:

OVERALL SITE PLAN

SHEET NUMBER:

CHECKED BY:

C02

CHECKED BY DATE:

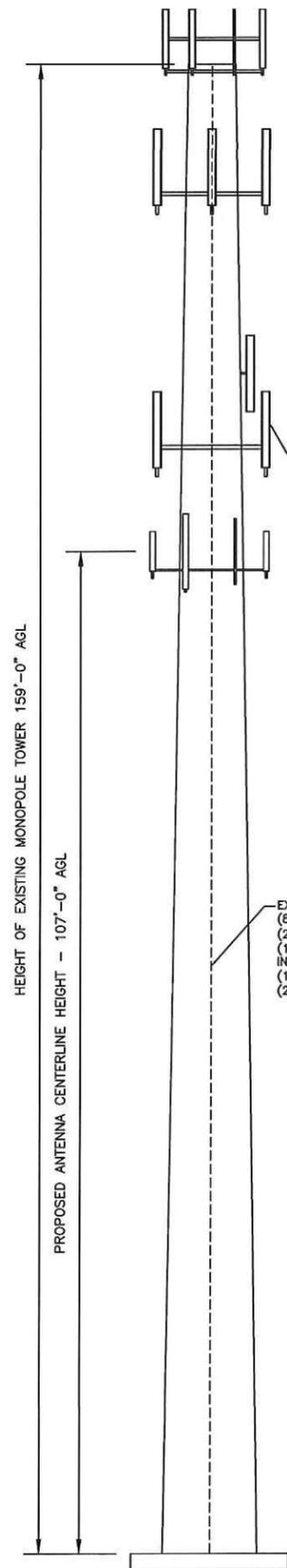


8-11-2016

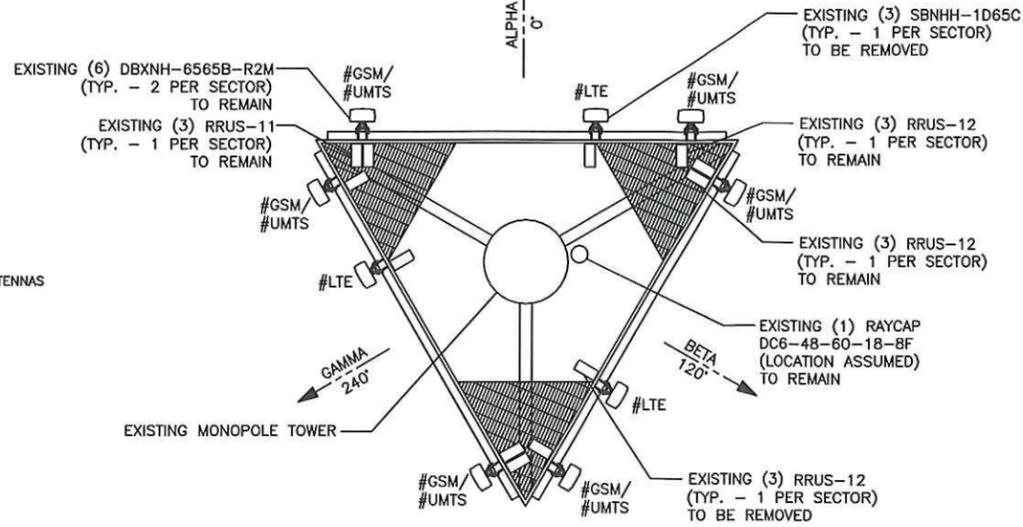
1 OVERALL SITE PLAN  
SCALE: N.T.S.

ANALYSIS AND DESIGN OF STRUCTURE AND FOUNDATION BY OTHERS. REFER TO SEPARATE SHEETS FOR MORE INFORMATION. NO MODIFICATION OF STRUCTURE AND FOUNDATION SHALL BE MADE WITHOUT APPROVAL OF STRUCTURAL ENGINEER

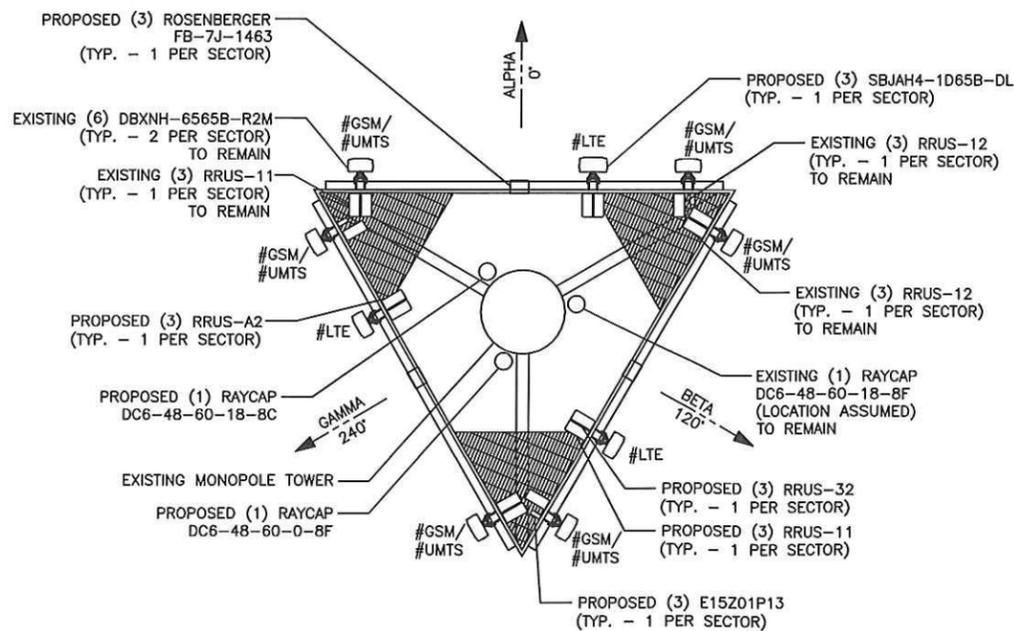
STRUCTURAL ANALYSIS PREPARED BY GPD GROUP PROFESSIONAL CORPORATION  
DATED: 07/25/16.  
WORK ORDER: 2016777.826461.02



1 ELEVATION  
SCALE: N.T.S.



2 EXISTING ANTENNA ORIENTATION DETAIL  
SCALE: N.T.S.



3 PROPOSED ANTENNA ORIENTATION DETAIL  
SCALE: N.T.S.



EXISTING ANTENNA SECTOR



EXISTING GROUND EQUIPMENT

SCOPE OF WORK:

AT&T 5C: REMOVE (3) EXISTING SBNHH-1D65C ANTENNAS, INSTALL (3) NEW SBJAH4-1D65B-DL ANTENNAS, REMOVE (3) RRUS-12 1600MHZ, INSTALL (3) RRUS 32 (3) RRUS-11 (3) RRUS-A2 (3) E15Z01P13 (1) DC6-48-60-0-8F (1) DC6-48-60-18-8C (3) FB-7J-1463, (1) 3/8" CABLE (2) 7/8" DC TRUNK. NO CHANGES TO GROUND SPACE.

FINAL CONFIGURATION:

(6) DBXNH-6565B-R2M (3) SBJAH4-1D65B-DL, (3) RRUS 32 (6) RRUS 11 (3) RRUS-A2 (6) RRUS-12 (3) E15Z01P13, (1) DC6-48-60-0-8F, (1) DC6-48-60-18-8F (1) DC6-48-60-18-8C, (3) FB-7J-1463, (8) 7/8" COAX, (4) 7/8" DC TRUNKS, (1) 1/2" FIBER TRUNK, (1) 3/8" CABLE FROM SHELTER TO RAD.



8-11-2016

PREPARED BY:



1220 AUGUSTA DRIVE, SUITE 500  
HOUSTON, TX 77057  
713-570-3092



24 QUEEN ST E  
BRAMPTON, ON  
1 (519) 572-9995

CLIENT:



1801 VALLEY VIEW LANE  
FARMERS BRANCH, TX 75234

THIS DOCUMENT IS THE DESIGN PROPERTY AND COPYRIGHT OF CROWN CASTLE AND FOR THE EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION OR USE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE CREATOR IS STRICTLY PROHIBITED.

DRAWING SCALES ARE INTENDED FOR 24"x36" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

SUBMITTALS

REV	DATE	DESCRIPTION	BY
0	08/09/16	ISSUE FOR CONSTRUCTION	RSN

SITE INFO:

SITE NAME:  
OWNED PROP/BRYAN S. TABOR  
FA NUMBER:  
10130592  
CROWN CASTLE BU#:  
826461  
SITE ADDRESS:  
101 E. 31ST STREET  
BRYAN, TX  
77803

SHEET TITLE:

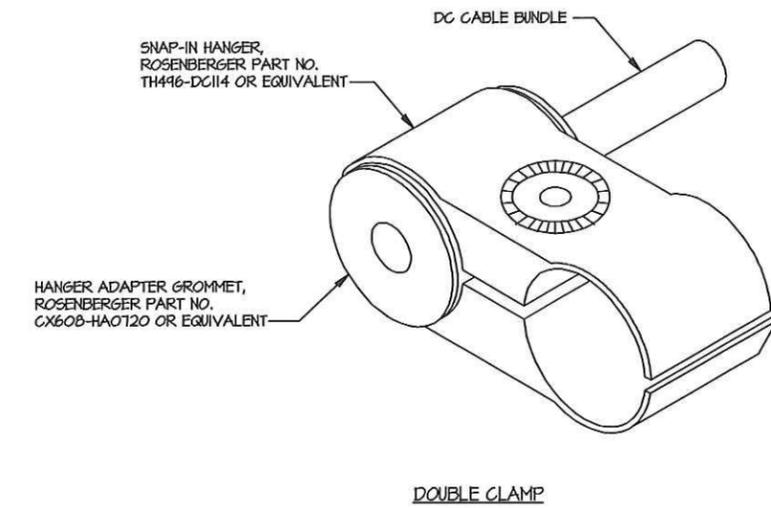
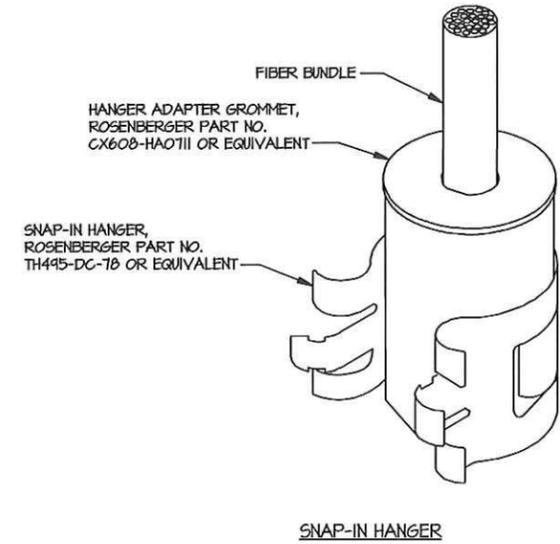
TOWER ELEVATION AND  
ANTENNA ORIENTATION

SHEET NUMBER:

CHECKED BY:

C03

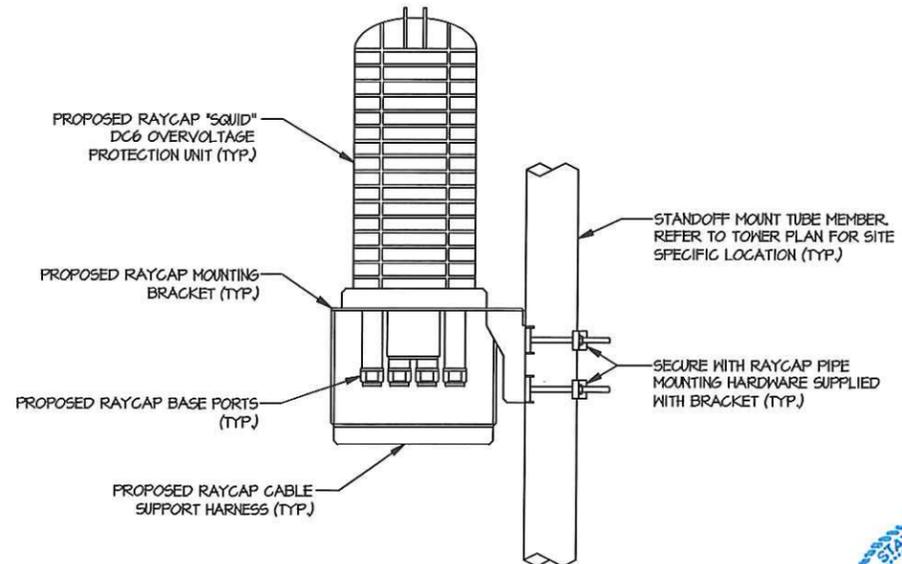
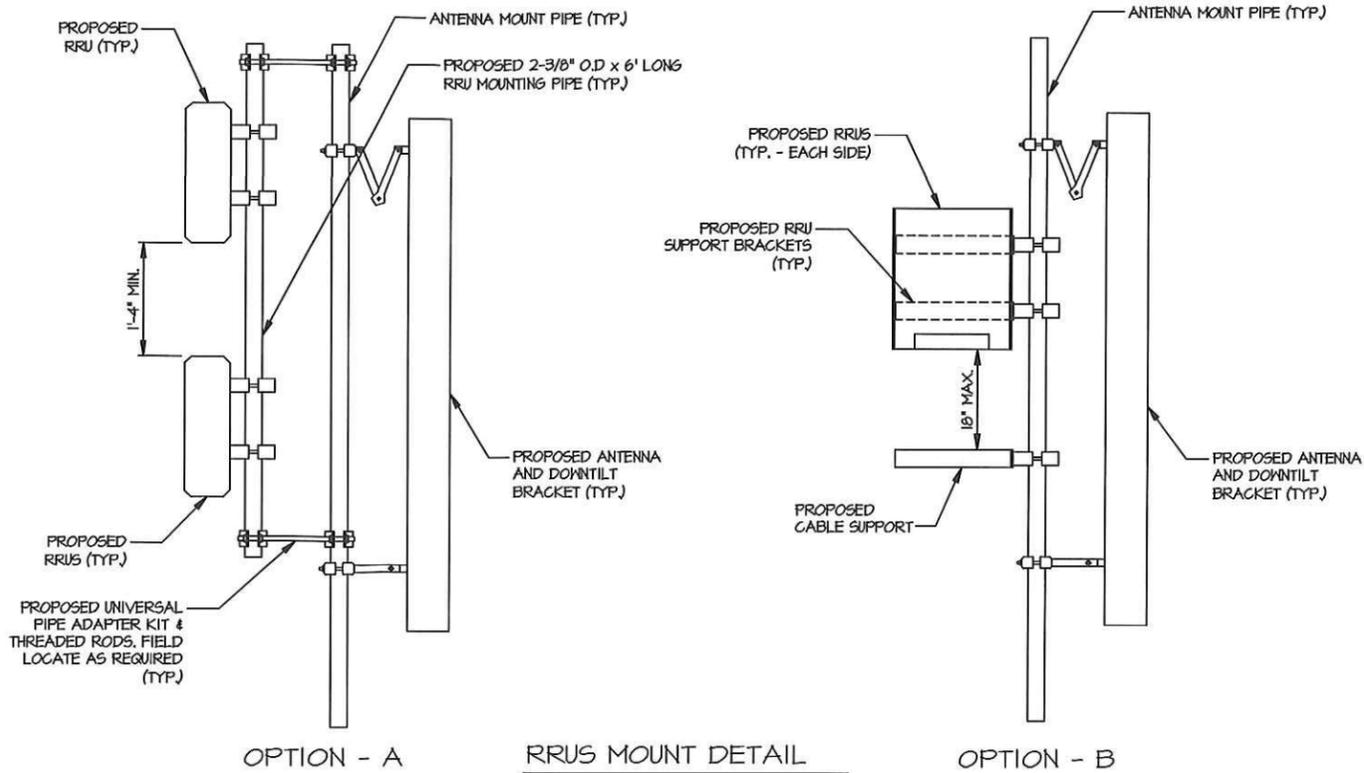
CHECKED BY DATE:



**NOTES:**

1. REFER TO JSA DOCUMENTS FOR EXACT CABLE NUMBER AND MANUFACTURER SPECIFICATIONS FOR PROPER GROMMETS AND HANGERS TO SUPPORT THE FIBER AND DC CABLE BUNDLES.
2. REFER TO STRUCTURAL ANALYSIS FOR EXACT CABLE ROUTING AND MOUNTING CONFIGURATION.

HANGER ADAPTER GROMMET DETAILS  
NOT TO SCALE



RAYCAP SQUID MOUNT DETAIL  
NOT TO SCALE



8-11-2016

PREPARED BY:



1220 AUGUSTA DRIVE, SUITE 500  
HOUSTON, TX 77057  
713-570-3092



24 QUEEN ST E  
BRAMPTON, ON  
1 (519) 572-9995

CLIENT:



1801 VALLEY VIEW LANE  
FARMERS BRANCH, TX 75234

THIS DOCUMENT IS THE DESIGN PROPERTY AND COPYRIGHT OF CROWN CASTLE AND FOR THE EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION OR USE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE CREATOR IS STRICTLY PROHIBITED.

DRAWING SCALES ARE INTENDED FOR 24"x36" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

SUBMITTALS

REV	DATE	DESCRIPTION	BY
0	08/09/16	ISSUE FOR CONSTRUCTION	RSN

SITE INFO:

SITE NAME:  
OWNED PROP/BRYAN S. TABOR  
FA NUMBER:  
10130592  
CROWN CASTLE BU#:  
826461  
SITE ADDRESS:  
101 E. 31ST STREET  
BRYAN, TX  
77803

SHEET TITLE:

EQUIPMENT DETAILS

CHECKED BY:

CHECKED BY DATE:

SHEET NUMBER:

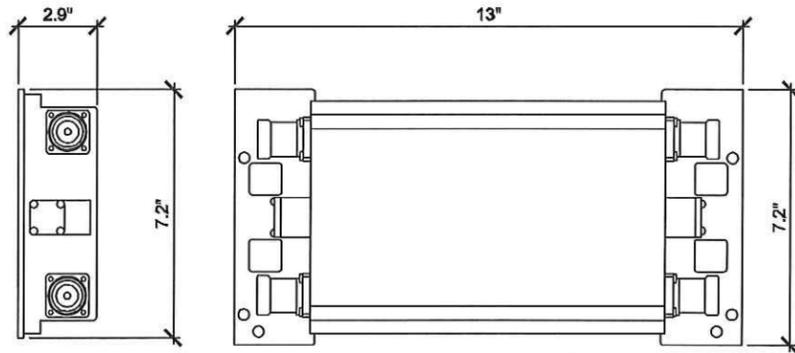
C04

ANDREW E15Z01P13

BANDWIDTH: 60.00 MHz

WEIGHT: 5.0 kg (11.0 lbs)

RF CONNECTORS: 7/16 DIN FEMALE



\\FIBER BOX.JPG

FB-7J-1463 DETAIL  
NTS



8-11-2016

PREPARED BY:



1220 AUGUSTA DRIVE, SUITE 500  
HOUSTON, TX 77057  
713-570-3092



24 QUEEN ST E  
BRAMPTON, ON  
1 (519) 572-9995

CLIENT:



1801 VALLEY VIEW LANE  
FARMERS BRANCH, TX 75234

THIS DOCUMENT IS THE DESIGN PROPERTY AND  
COPYRIGHT OF CROWN CASTLE AND FOR THE  
EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION  
OR USE WITHOUT THE EXPRESS WRITTEN CONSENT  
OF THE CREATOR IS STRICTLY PROHIBITED.  
DRAWING SCALES ARE INTENDED FOR 24"x36" SIZE  
PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES  
ARE DEEMED "NOT TO SCALE".

SUBMITTALS

REV	DATE	DESCRIPTION	BY
0	08/09/16	ISSUE FOR CONSTRUCTION	RSN

SITE INFO:

SITE NAME:  
OWNED PROP/BRYAN S. TABOR  
FA NUMBER:  
10130592  
CROWN CASTLE BU#:  
826461  
SITE ADDRESS:  
101 E. 31ST STREET  
BRYAN, TX  
77803

SHEET TITLE:

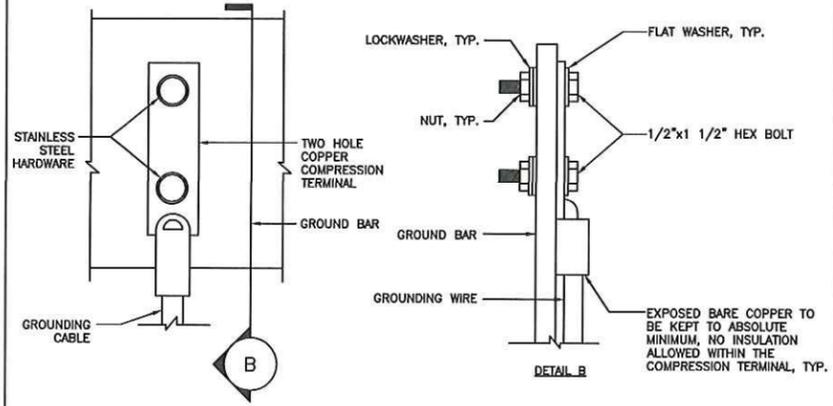
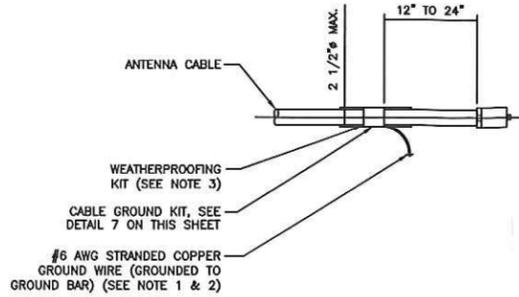
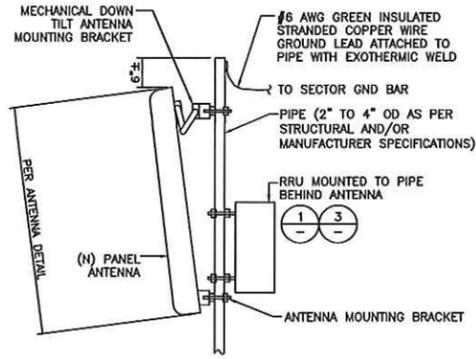
EQUIPMENT DETAILS

SHEET NUMBER:

CHECKED BY:

C05

CHECKED BY DATE:



- NOTES:**
- DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR
  - GROUNDING KIT SHALL BE ANDREW SUREGROUND TYPE KIT WITH TWO-HOLE LUG
  - WEATHER PROOFING SHALL BE ANDREW TWO-PART TAPE SUPPLIED WITH KIT. COLD SHRINK SHALL NOT BE USED

- NOTES:**
- "DOUBLING UP" OR "STACKING" OF CONNECTIONS IS NOT PERMITTED.
  - OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS AND TO BE APPLIED PRIOR TO ADDING HARDWARE.

ANTENNA PIPE MOUNT GROUNDING DETAIL

N.T.S.

9

CABLE GROUND KIT DETAIL

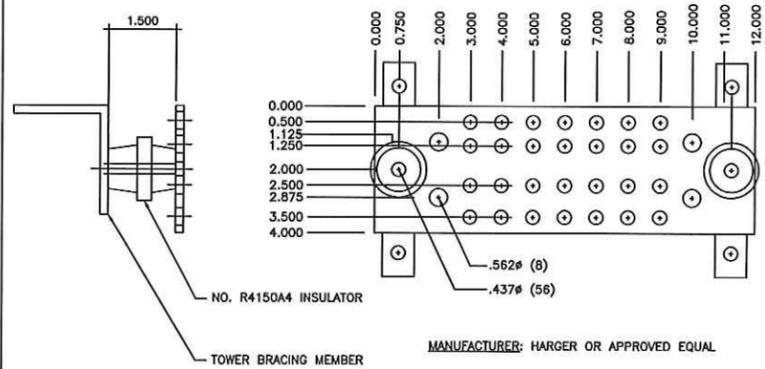
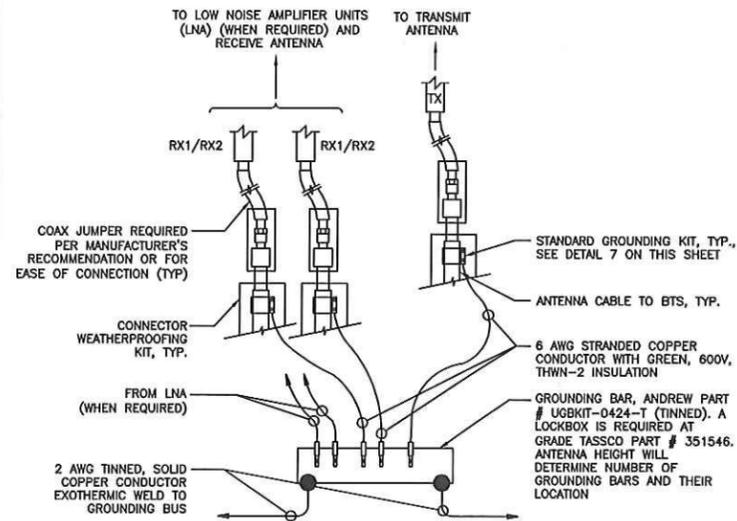
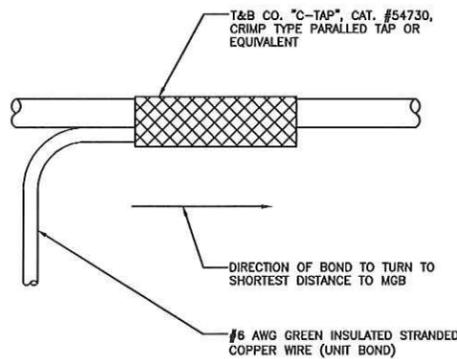
N.T.S.

6

TYPICAL GROUND LUG CONNECTION DETAIL

N.T.S.

3



GROUNDING WIRE CONNECTION

N.T.S.

8

ANTENNA GROUNDING BAR CONNECTION DETAIL

N.T.S.

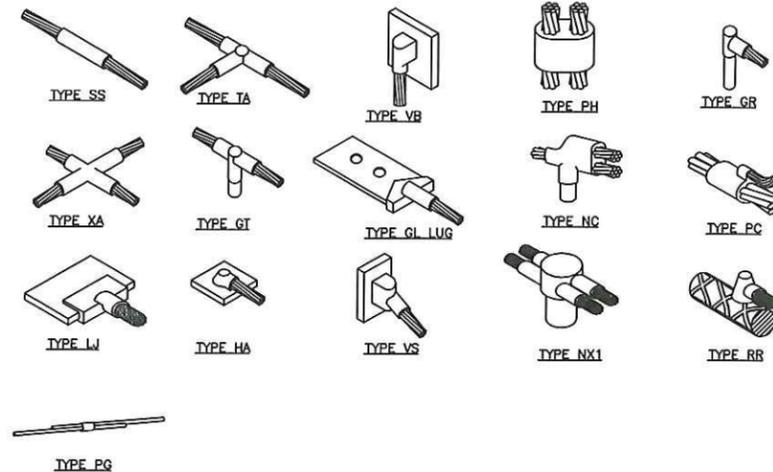
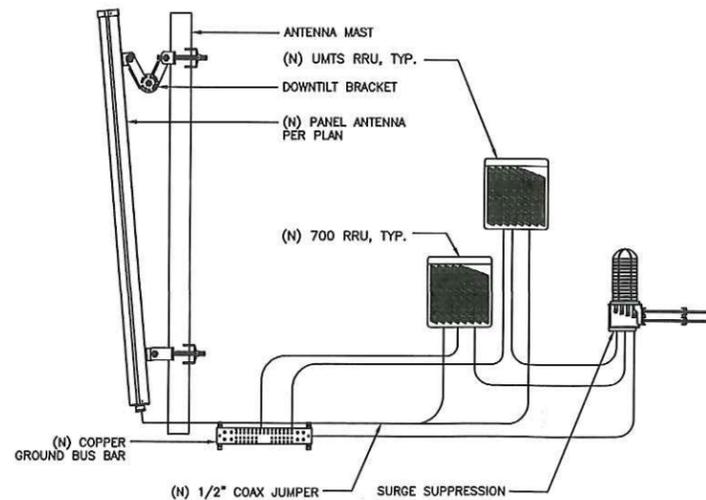
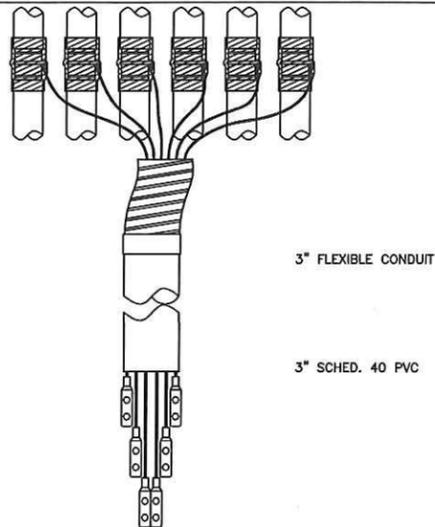
5

ANTENNA (12") GROUND BAR DETAIL

N.T.S.

2

COAX GROUNDING KITS  
TYPICAL (6)  
MTC 976715 - 15'  
MTC 976720 - 20'



COAX GROUND KIT

N.T.S.

7

RRU / RRU GROUNDING DETAIL

N.T.S.

4

TYPICAL CADWELD TYPES

N.T.S.

1



8-11-2016

PREPARED BY:



1220 AUGUSTA DRIVE, SUITE 500  
HOUSTON, TX 77057  
713-570-3092



24 QUEEN ST E  
BRAMPTON, ON  
1 (519) 572-9995

CLIENT:



1801 VALLEY VIEW LANE  
FARMERS BRANCH, TX 75234

THIS DOCUMENT IS THE DESIGN PROPERTY AND COPYRIGHT OF CROWN CASTLE AND FOR THE EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION OR USE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE CREATOR IS STRICTLY PROHIBITED.  
DRAWING SCALES ARE INTENDED FOR 24"x36" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

SUBMITTALS

REV	DATE	DESCRIPTION	BY
0	08/09/16	ISSUE FOR CONSTRUCTION	RSN

SITE INFO:

SITE NAME:  
OWNED PROP/BRYAN S. TABOR  
FA NUMBER:  
10130592  
CROWN CASTLE BU#:  
826461  
SITE ADDRESS:  
101 E. 31ST STREET  
BRYAN, TX  
77803

SHEET TITLE:

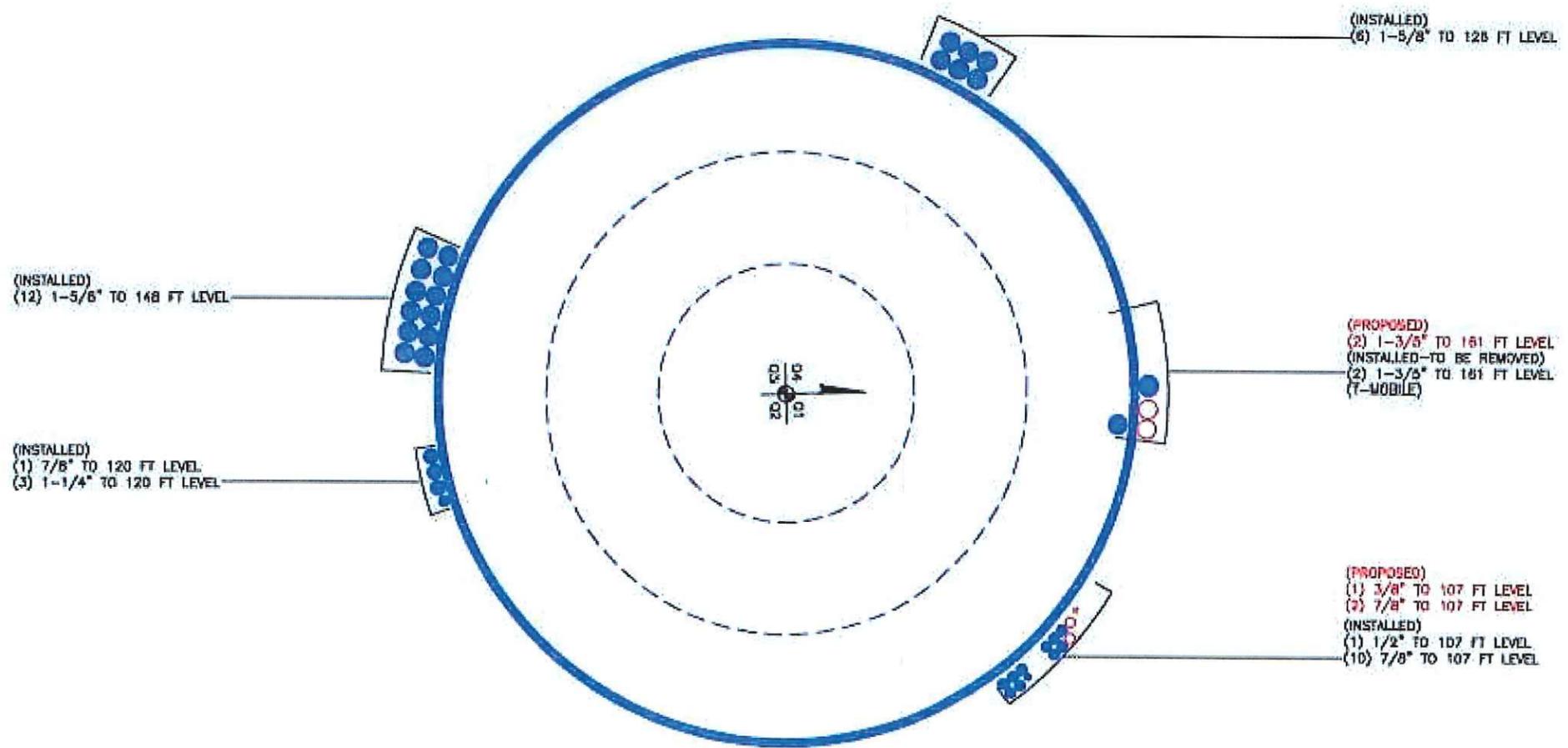
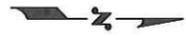
GROUNDING DETAILS

SHEET NUMBER:

C06

CHECKED BY:

CHECKED BY DATE:



8-11-2016

① BASE LEVEL DRAWING  
SCALE: NTS

PREPARED BY:  
**CROWN CASTLE**  
1220 AUGUSTA DRIVE, SUITE 500  
HOUSTON, TX 77057  
713-570-3092

**Trylon**  
24 QUEEN ST E  
BRAMPTON, ON  
1 (519) 572-9995

CLIENT:  
**at&t**  
Mobility  
1801 VALLEY VIEW LANE  
FARMERS BRANCH, TX 75234

THIS DOCUMENT IS THE DESIGN PROPERTY AND COPYRIGHT OF CROWN CASTLE AND FOR THE EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION OR USE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE CREATOR IS STRICTLY PROHIBITED.  
DRAWING SCALES ARE INTENDED FOR 24"x36" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

SUBMITTALS			
REV	DATE	DESCRIPTION	BY
0	08/09/16	ISSUE FOR CONSTRUCTION	RSN

SITE INFO:  
SITE NAME:  
OWNED PROP/BRYAN S. TABOR  
FA NUMBER:  
10130592  
CROWN CASTLE BU#:  
826461  
SITE ADDRESS:  
101 E. 31ST STREET  
BRYAN, TX  
77803

SHEET TITLE:  
BASE LEVEL DRAWING

CHECKED BY:  
CHECKED BY DATE:  
SHEET NUMBER:  
C07



Date: July 25, 2016

Melissa Khawaja  
Crown Castle  
1220 Augusta Drive Suite 500  
Houston, TX 77057  
(724) 416-2439

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

**Subject:** Structural Analysis Report

**Carrier Designation:** AT&T Mobility Co-Locate  
Carrier Site Number: HX3819  
Carrier Site Name: Washington

**Crown Castle Designation:** Crown Castle BU Number: 826461  
Crown Castle Site Name: Owned Prop/Bryan S. Tabor  
Crown Castle JDE Job Number: 389036  
Crown Castle Work Order Number: 1273286  
Crown Castle Application Number: 356847 Rev. 1

**Engineering Firm Designation:** GPD Project Number: 2016777.826461.02

**Site Data:** 101 E. 31st Street, Bryan, Brazos County, TX 77803  
Latitude 30° 40' 7.19", Longitude -96° 22' 23.45"  
159 Foot – LeBlanc Monopole Tower

Dear Melissa Khawaja,

GPD is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 928169, in accordance with application 356847, 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:

LC7: Existing + Reserved Equipment + Proposed **Sufficient Capacity**  
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

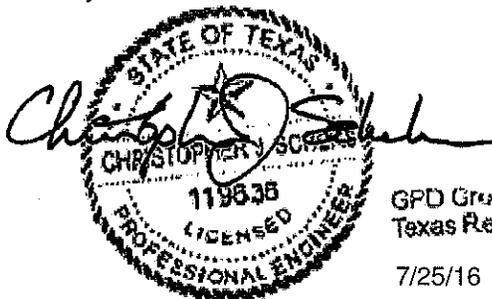
The analysis has been performed in accordance with the TIA-222-G standard and section 3108 of the 2009 IBC based upon a wind speed of 90 mph 3-second gust, exposure category C with topographic category 1 and crest height of 0 feet.

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

Structural analysis prepared by: Brian Christy

Respectfully submitted by:

Christopher J. Schecks, P.E.  
Texas #: 119636



GPD Group, Professional Corporation  
Texas Registration No. 18477

7/25/16

## TABLE OF CONTENTS

### 1) INTRODUCTION

### 2) ANALYSIS CRITERIA

Table 1 - Proposed Antenna and Cable Information

Table 2 - Existing and Reserved Antenna and Cable Information

Table 3 - Design Antenna and Cable Information

### 3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

### 4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Table 6 - Tower Components vs. Capacity

4.1) Recommendations

### 5) DISCLAIMER OF WARRANTIES

### 6) APPENDIX A

tnxTower Output

### 7) APPENDIX B

Base Level Drawing

### 8) APPENDIX C

Additional Calculations

## 1) INTRODUCTION

The existing 159 ft tower consists of 5 major sections connected by slip joints. It has a 12-sided cross section with a diameter of 60.36 inches (flat to flat) at the base and 22 inches (flat to flat) at the top. The structure is galvanized and does not contain tower lighting

This tower is a 159 ft Monopole tower designed by LeBlanc Communications, Inc. in October of 1997. The tower was originally designed for a wind speed of 110 mph per TIA/EIA-222-E.

## 2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of section 3108 of the 2009 IBC and TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 90 mph with no ice, 30 mph with 0.5 inch ice thickness and 60 mph under service loads, exposure category C with topographic category 1 and crest height of 0 feet.

**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
107.0	107.0	3	Commscope	SBJAH4-1D65B-DL	1	3/8 7/8	1
		3	Ericsson	RRUS A2			
		3	Ericsson	RRUS-11	2		
		3	Ericsson	RRUS 32			
		3	Andrew	E15Z01P13			
		1	Raycap	DC6-48-60-0-8F			
		1	Raycap	DC6-48-60-18-8C			
		3	Rosenberger Leoni	FB-7J-1463			

Notes:

- 1) See appendix B for proposed coax layout

**Table 2 - Existing and Reserved Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
161.0	163.0	12	Commscope	CBC1921x-DS-2X	2	1-3/5	2
		6	Commscope	HBXX-3319DS-A2M			
		3	Commscope	SBNH-1D65C-SR			
		6	Nokia	FHFB			
		3	Nokia	FRIG			
		1	Nokia	FXFC			
		1	Raycap	RNSNDC-7771-PF-48			
		3	Nokia	FRIG			
		3	Nokia	FRLB			
		161.0	1		13.5' Platform w/ Handrails		
148.0	148.0	3	Andrew	LNx-6514DS-VTM	12	1-5/8	
		3	Andrew	TBXLHA-6565B-VTM			
		3	Commscope	E15S09P49			
		3	Commscope	E15S09P73			
		1		T-Arm Mount [TA 702-3]			
126.0	126.0	3	Cellmax Technologies	CMA-B/6521/E0-6	6	1-5/8	
		1		T-Arm Mount [TA 601-3]			
120.0	120.0	3	RFS Celwave	APXVERR18-C	3 1	1-1/4 7/8	
		3	Commscope	TTTT65AP-1XR			
		3	Ericsson	800 MHZ SMR FILTER			
		3	Ericsson	RRUS 31 B25			
		3	Ericsson	RRUS-11 1900MHz			
		3	Nokia	FZHJ-RRH			
		9	RFS Celwave	ACU-A20-N			
	1		T-Arm Mount [TA 702-3]				
	117.0	1		T-Arm Mount [TA 601-3]			
107.0	107.0	3	Commscope	SBNHH-1D65C	1 10	1/2 7/8	1
		3	Ericsson	RRUS-12 1600MHz			
		6	Andrew	DBXNH-6565B-R2M			
		3	Ericsson	RRUS-11			
		6	Ericsson	RRUS-12 1600MHz			
		1	Raycap	DC6-48-60-18-8F			
	1		Platform Mount [LP 301-1]				
	105.0	1		Miscellaneous [NA 509-3]			

- Notes:  
 1) Equipment To Be Removed; Not Considered in this Analysis  
 2) Reserved Equipment

**Table 3 - Design Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
159.0	159.0	1		Amps Platform		
		9		Std Tri-Sector (76.7"x6.1"x1.4" & 16 lbs)		
147.6	147.6	1		Amps Platform		
		9		Std Tri-Sector (76.7"x6.1"x1.4" & 16 lbs)		

### 3) ANALYSIS PROCEDURE

**Table 4 - Documents Provided**

Document	Remarks	Reference	Source
Geotechnical Reports	LAW Project #: 60120-7-6024 Phase 04, dated 08/20/97	3470109	CCISITES
Tower Foundation Drawings	LCI Drawing #: 4471052-E2, dated 10/31/97	3929940	CCISITES
Tower Manufacturer Drawings	LCI File #: 4471052, dated 10/31/97	3470128	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) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.

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

#### 4) ANALYSIS RESULTS

**Table 5 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	159 - 134	Pole	TP28.63x22x0.375	1	-7.2568	2418.4500	17.8	Pass
L2	134 - 99	Pole	TP37.02x26.7971x0.375	2	-20.7792	3062.1300	38.9	Pass
L3	99 - 66	Pole	TP44.88x34.9186x0.375	3	-29.1394	3446.4200	61.7	Pass
L4	66 - 32.5	Pole	TP52.88x42.5423x0.5	4	-41.7778	5696.8200	52.1	Pass
L5	32.5 - 0	Pole	TP60.36x50.0301x0.5	5	-60.1139	6275.6000	61.7	Pass
						Summary	ELC:	LC7
						Pole (L5)	61.7	Pass
						Rating =	61.7	Pass

**Table 6 - Tower Component Stresses vs. Capacity – LC7**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	55.7	Pass
1	Base Plate	0	64.2	Pass
1	Base Foundation	0	51.7	Pass
1	Base Foundation Soil Interaction	0	39.9	Pass

<b>Structure Rating (max from all components) =</b>	<b>64.2%</b>
---	--------------

Notes:

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

#### 4.1) Recommendations

The existing tower and its foundation are sufficient for the proposed loading and do not require modifications.

## 5) DISCLAIMER OF WARRANTIES

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

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

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

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

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

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

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

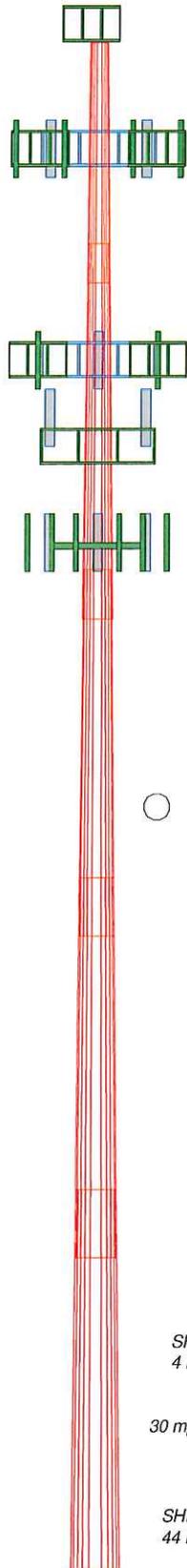
Towers are designed to carry gravity, wind, and ice loads. All members, legs, diagonals, struts, and redundant members provide structural stability to the tower with little redundancy. Absence or removal of a member can trigger catastrophic failure unless a substitute is provided before any removal.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

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

**APPENDIX A**  
**TNXTOWER OUTPUT**

Section	1	2	3	4	5
Length (ft)	25.00	39.08	38.17	39.58	39.58
Number of Sides	12	12	12	12	12
Thickness (in)	0.3750	0.3750	0.3750	0.5000	0.5000
Socket Length (ft)	4.08	5.17	6.08	7.08	7.08
Top Dia (in)	22.0000	26.7971	34.9186	42.5423	50.0301
Bot Dia (in)	28.6300	37.0200	44.8800	52.8900	60.3600
Grade			A572-65		
Weight (K)	2.6	5.1	6.2	10.2	11.9

159.0 ft  
134.0 ft  
99.0 ft  
66.0 ft  
32.5 ft  
0.0 ft



### DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
13.5' Platform w/ Handrails	161	FZHJ-RRH	120
SBNH-1D65C-SR w/ Mount Pipe	161	FZHJ-RRH	120
SBNH-1D65C-SR w/ Mount Pipe	161	FZHJ-RRH	120
SBNH-1D65C-SR w/ Mount Pipe	161	RRUS 31 B25	120
(2) HBXX-3319DS-A2M w/ Mount Pipe	161	RRUS 31 B25	120
(2) HBXX-3319DS-A2M w/ Mount Pipe	161	RRUS 31 B25	120
(2) HBXX-3319DS-A2M w/ Mount Pipe	161	RRUS-11 1900MHz	120
FRIG	161	RRUS-11 1900MHz	120
(2) FRIG	161	RRUS-11 1900MHz	120
(2) FRIG	161	800 MHZ SMR FILTER	120
FRIG	161	800 MHZ SMR FILTER	120
FRLB	161	800 MHZ SMR FILTER	120
FRLB	161	(3) ACU-A20-N	120
FRLB	161	(3) ACU-A20-N	120
RNSNDC-7771-PF-48	161	(3) ACU-A20-N	120
RNSNDC-7771-PF-48	161	T-Arm Mount [TA 601-3]	117
(3) FHFB	161	Platform Mount [LP 301-1]	107
(2) FHFB	161	(2) DBXNH-6565B-R2M	107
FHFB	161	(2) DBXNH-6565B-R2M	107
(3) CBC1921x-DS-2X	161	(2) DBXNH-6565B-R2M	107
(3) CBC1921x-DS-2X	161	RRUS-11	107
(6) CBC1921x-DS-2X	161	RRUS-11	107
FXFC	161	RRUS-11	107
T-Arm Mount [TA 702-3]	148	(2) RRUS-12 1600MHZ	107
TBXLHA-6565B-VTM w/ Mount Pipe	148	(2) RRUS-12 1600MHZ	107
TBXLHA-6565B-VTM w/ Mount Pipe	148	(2) RRUS-12 1600MHZ	107
TBXLHA-6565B-VTM w/ Mount Pipe	148	DC6-48-60-18-8F Surge Suppression Unit	107
LNx-6514DS-VTM w/ Mount Pipe	148	E15201P13	107
LNx-6514DS-VTM w/ Mount Pipe	148	SBJAH4-1D65B-DL w/ Mount Pipe	107
E15S09P73	148	RRUS 32	107
E15S09P73	148	RRUS A2	107
E15S09P73	148	RRUS-11	107
E15S09P49	148	DC6-48-60-0-8F	107
E15S09P49	148	DC6-48-60-18-8C	107
E15S09P49	148	FB-7J-1463	107
T-Arm Mount [TA 601-3]	126	E15201P13	107
(2) Pipe Mount 6"x2.375"	126	SBJAH4-1D65B-DL w/ Mount Pipe	107
(2) Pipe Mount 6"x2.375"	126	RRUS 32	107
(2) Pipe Mount 6"x2.375"	126	RRUS A2	107
CMA-B/6521/E0-6 w/ Mount Pipe	126	RRUS-11	107
CMA-B/6521/E0-6 w/ Mount Pipe	126	FB-7J-1463	107
CMA-B/6521/E0-6 w/ Mount Pipe	126	E15201P13	107
T-Arm Mount [TA 702-3]	120	SBJAH4-1D65B-DL w/ Mount Pipe	107
TTTT65AP-1XR w/ Mount Pipe	120	RRUS 32	107
TTTT65AP-1XR w/ Mount Pipe	120	RRUS A2	107
TTTT65AP-1XR w/ Mount Pipe	120	RRUS-11	107
APXVERR18-C w/ Mount Pipe	120	FB-7J-1463	107
APXVERR18-C w/ Mount Pipe	120	Miscellaneous [NA 509-3]	105
APXVERR18-C w/ Mount Pipe	120		

### MATERIAL STRENGTH

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

ALL REACTION ARE FACTORE

### TOWER DESIGN NOTES

- Tower is located in Brazos County, Texas.
  - Tower designed for Exposure C to the TIA-222-G Standard.
  - Tower designed for a 90 mph basic wind in accordance with the TIA-222-G Standard.
  - Tower is also designed for a 30 mph basic wind with 0.50 in ice. Ice is considered to increase in thickness with height.
  - Deflections are based upon a 60 mph wind.
  - Tower Structure Class II.
  - Topographic Category 1 with Crest Height of 0.00 ft
  - TOWER RATING: 61.7%
- AXIAL 87 K  
 SHEAR 4 K  
 TORQUE 0 kip-ft  
 30 mph WIND - 0.500 ft  
 AXIAL 60 K  
 SHEAR 44 K  
 MOMENT 4643 kip-ft  
 TORQUE 1 kip-ft  
 REACTIONS - 90 mph WIND

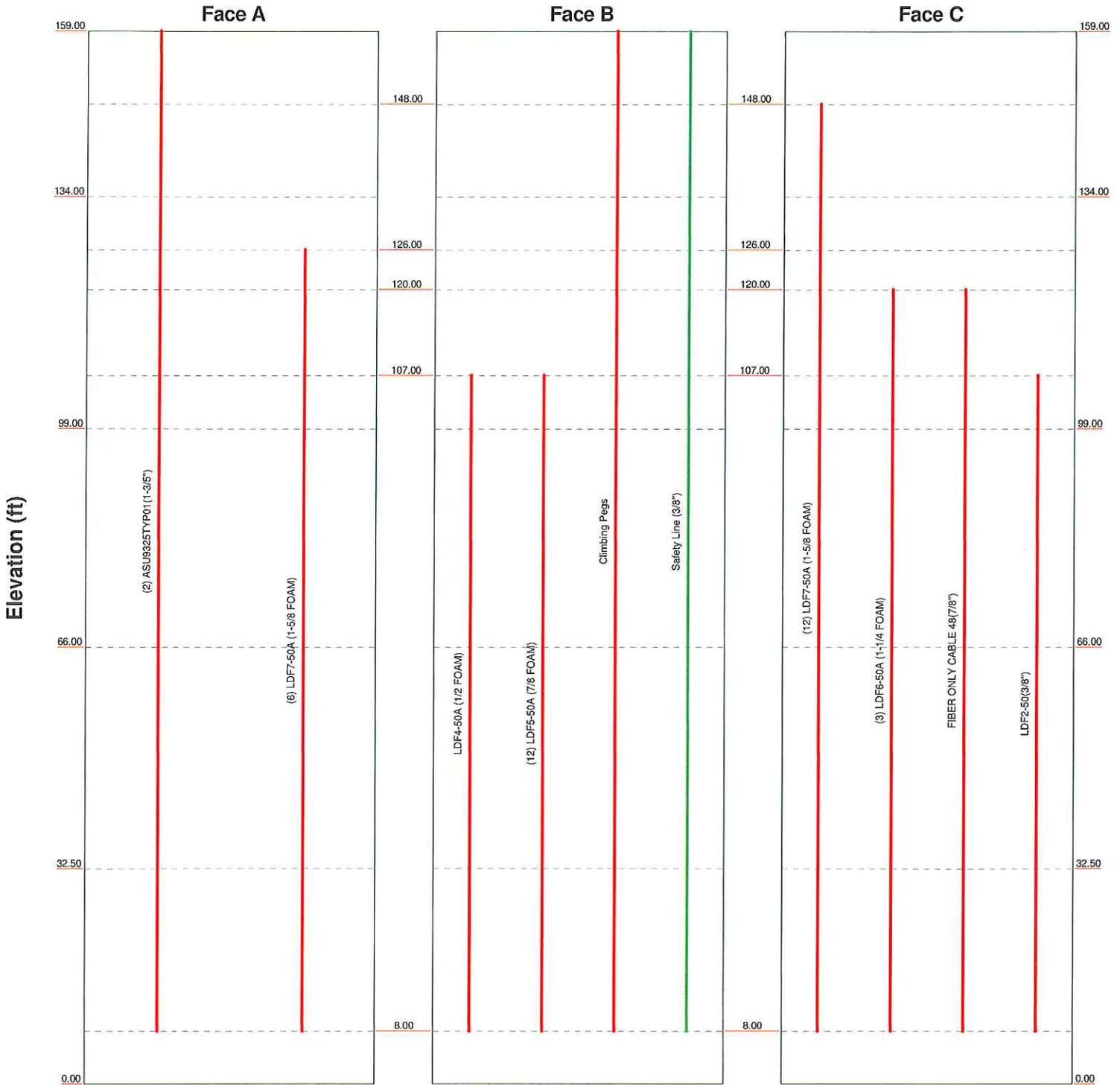
**GPD**  
520 South Main Street Suite 2531  
Akron, Ohio 44311  
Phone: (555) 555-1234  
FAX: (555) 555-1235

Job: **Owned Prop/Bryan S. Tabor - BU #: 826461**  
Project: **2016777.826461.02**  
Client: **Crown Castle USA, Inc.** Drawn by: **bchristy** App'd:  
Code: **TIA-222-G** Date: **07/25/16** Scale: **NTS**  
Path: **\\AKRN05.gpdco.com\TELECOM\Crown\826461\01\TNX\826461.er** Dwg No. **E-1**

# Feed Line Distribution Chart

## 0' - 159'

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



<p><b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235</p>	<b>Job:</b> <i>Owned Prop/Bryan S. Tabor - BU #: 826461</i>		
	<b>Project:</b> 2016777.826461.02		
	<b>Client:</b> Crown Castle USA, Inc.	<b>Drawn by:</b> bchristy	<b>App'd:</b>
	<b>Code:</b> TIA-222-G	<b>Date:</b> 07/25/16	<b>Scale:</b> NTS
	<b>Path:</b> \\AKRN05.gpdco.com\TELECOM\Crown\826461\01\TNX\826461.erl		
		<b>Dwg No.</b> E-7	

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 1 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

## Tower Input Data

There is a pole section.

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

The following design criteria apply:

Tower is located in Brazos County, Texas.

Basic wind speed of 90 mph.

Structure Class II.

Exposure Category C.

Topographic Category 1.

Crest Height 0.00 ft.

Nominal ice thickness of 0.5000 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 30 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

<ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>Include Bolts In Member Capacity</li> <li>Leg Bolts Are At Top Of Section</li> <li>Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>SR Members Have Cut Ends</li> <li>SR Members Are Concentric</li> </ul>	<ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>√ Use Clear Spans For KL/r</li> <li>Retension Guys To Initial Tension</li> <li>√ Bypass Mast Stability Checks</li> <li>√ Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <li>Autocalc Torque Arm Areas</li> <li>Add IBC .6D+W Combination</li> <li>√ Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> <li>Treat Feed Line Bundles As Cylinder</li> </ul>	<ul style="list-style-type: none"> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>SR Leg Bolts Resist Compression</li> <li>All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feed Line Torque</li> <li>Include Angle Block Shear Check</li> <li>Use TIA-222-G Bracing Resist. Exemption</li> <li>Use TIA-222-G Tension Splice Exemption</li> <li style="text-align: center;">Poles</li> <li>√ Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> </ul>
--	--	---

## Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	159.00-134.00	25.00	4.08	12	22.0000	28.6300	0.3750	1.5000	A572-65 (65 ksi)
L2	134.00-99.00	39.08	5.17	12	26.7971	37.0200	0.3750	1.5000	A572-65 (65 ksi)
L3	99.00-66.00	38.17	6.08	12	34.9186	44.8800	0.3750	1.5000	A572-65

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 2 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L4	66.00-32.50	39.58	7.08	12	42.5423	52.8800	0.5000	2.0000	(65 ksi) A572-65
L5	32.50-0.00	39.58		12	50.0301	60.3600	0.5000	2.0000	(65 ksi) A572-65

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L1	22.7761	26.1122	1558.6243	7.7417	11.3960	136.7694	3158.1954	12.8516	4.8910	13.043
	29.6400	34.1179	3476.6344	10.1153	14.8303	234.4272	7044.6039	16.7918	6.6678	17.781
L2	28.8481	31.9047	2842.9884	9.4591	13.8809	204.8130	5760.6652	15.7025	6.1766	16.471
	38.3259	44.2488	7584.3308	13.1189	19.1764	395.5042	15367.9104	21.7779	8.9164	23.777
L3	37.5464	41.7114	6352.9410	12.3666	18.0878	351.2276	12872.7808	20.5291	8.3532	22.275
	46.4632	53.7398	13586.2470	15.9328	23.2478	584.4090	27529.4198	26.4491	11.0228	29.394
L4	45.6878	67.6880	15271.0904	15.0511	22.0369	692.9784	30943.3694	33.3140	10.0613	20.123
	54.7454	84.3318	29533.0505	18.7520	27.3918	1078.1696	59841.9672	41.5055	12.8318	25.664
L5	53.7087	79.7434	24970.0350	17.7318	25.9156	963.5142	50596.0606	39.2473	12.0681	24.136
	62.4893	96.3746	44078.0084	21.4299	31.2665	1409.7528	89313.9952	47.4326	14.8365	29.673

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 159.00-134.00				1	1	1			
L2 134.00-99.00				1	1	1			
L3 99.00-66.00				1	1	1			
L4 66.00-32.50				1	1	1			
L5 32.50-0.00				1	1	1			

### Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
ASU9325TYP01(1-3/5")	A	Surface Ar (CaAa)	159.00 - 8.00	2	2	0.450 0.500	1.5840		1.61
LDF7-50A (1-5/8 FOAM)	C	Surface Ar (CaAa)	148.00 - 8.00	12	6	0.000 0.250	1.9800		0.82
LDF7-50A (1-5/8 FOAM)	A	Surface Ar (CaAa)	126.00 - 8.00	6	3	0.100 0.250	0.0000		0.82
LDF6-50A (1-1/4 FOAM)	C	Surface Ar (CaAa)	120.00 - 8.00	3	3	-0.150 -0.050	0.0000		0.66
FIBER ONLY CABLE 48(7/8")	C	Surface Ar (CaAa)	120.00 - 8.00	1	1	0.000 0.000	0.0000		0.25
LDF4-50A (1/2 FOAM)	B	Surface Ar (CaAa)	107.00 - 8.00	1	1	0.100 0.100	0.0000		0.15
LDF5-50A (7/8 FOAM)	B	Surface Ar (CaAa)	107.00 - 8.00	12	6	0.050 0.150	0.0000		0.33
LDF2-50(3/8")	C	Surface Ar	107.00 - 8.00	1	1	0.050	0.0000		0.08

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 3 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
Climbing Pegs	B	(CaAa) Surface Ar (CaAa)	159.00 - 8.00	1	1	0.150 0.000 0.500	0.1500		0.31

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>AA</sub>	Weight	
						ft <sup>2</sup> /ft	plf	
Safety Line (3/8")	B	No	CaAa (Out Of Face)	159.00 - 8.00	1	No Ice 1/2" Ice	0.04 0.14	0.22 0.75

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	159.00-134.00	A	0.000	0.000	7.920	0.000	0.0807
		B	0.000	0.000	0.375	0.938	0.0133
		C	0.000	0.000	16.632	0.000	0.1378
L2	134.00-99.00	A	0.000	0.000	11.088	0.000	0.2458
		B	0.000	0.000	0.525	1.313	0.0514
		C	0.000	0.000	41.580	0.000	0.3919
L3	99.00-66.00	A	0.000	0.000	10.454	0.000	0.2689
		B	0.000	0.000	0.495	1.238	0.1531
		C	0.000	0.000	39.204	0.000	0.4009
L4	66.00-32.50	A	0.000	0.000	10.613	0.000	0.2730
		B	0.000	0.000	0.502	1.256	0.1554
		C	0.000	0.000	39.798	0.000	0.4070
L5	32.50-0.00	A	0.000	0.000	7.762	0.000	0.1996
		B	0.000	0.000	0.367	0.919	0.1137
		C	0.000	0.000	29.106	0.000	0.2977

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	159.00-134.00	A	1.160	0.000	0.000	17.152	0.000	0.2189
		B		0.000	0.000	6.177	6.739	0.0904
		C		0.000	0.000	24.851	0.000	0.4006
L2	134.00-99.00	A	1.134	0.000	0.000	31.845	0.000	0.4837
		B		0.000	0.000	12.824	9.435	0.1858
		C		0.000	0.000	74.949	0.000	1.1311
L3	99.00-66.00	A	1.095	0.000	0.000	31.775	0.000	0.4979
		B		0.000	0.000	24.814	8.720	0.3551
		C		0.000	0.000	82.678	0.000	1.1632
L4	66.00-32.50	A	1.040	0.000	0.000	31.614	0.000	0.4944
		B		0.000	0.000	24.355	8.596	0.3484
		C		0.000	0.000	82.774	0.000	1.1519
L5	32.50-0.00	A	0.932	0.000	0.000	22.447	0.000	0.3503
		B		0.000	0.000	16.936	6.017	0.2426

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 4 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Tower Section	Tower Elevation ft	Face or Leg C	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
		C		0.000	0.000	59.324	0.000	0.8127

### Feed Line Center of Pressure

Section	Elevation ft	CP <sub>x</sub> in	CP <sub>z</sub> in	CP <sub>x</sub> Ice in	CP <sub>z</sub> Ice in
L1	159.00-134.00	-0.1761	0.4550	0.0776	0.3378
L2	134.00-99.00	-0.2931	0.9072	-0.0323	0.7467
L3	99.00-66.00	-0.3080	0.9522	0.1267	0.8337
L4	66.00-32.50	-0.3191	0.9855	0.1354	0.9233
L5	32.50-0.00	-0.2581	0.7966	0.1137	0.8555

### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
L1	2	ASU9325TYP01(1-3/5")	134.00 - 159.00	1.0000	1.0000
L1	3	LDF7-50A (1-5/8 FOAM)	134.00 - 148.00	1.0000	1.0000
L1	12	Climbing Pegs	134.00 - 159.00	1.0000	1.0000
L1	4	LDF7-50A (1-5/8 FOAM)	134.00 - 126.00	1.0000	1.0000
L1	5	LDF6-50A (1-1/4 FOAM)	134.00 - 120.00	1.0000	1.0000
L1	6	FIBER ONLY CABLE 48(7/8")	134.00 - 120.00	1.0000	1.0000
L1	7	LDF4-50A (1/2 FOAM)	134.00 - 107.00	1.0000	1.0000
L1	8	LDF5-50A (7/8 FOAM)	134.00 - 107.00	1.0000	1.0000
L1	10	LDF2-50(3/8")	134.00 - 107.00	1.0000	1.0000
L2	2	ASU9325TYP01(1-3/5")	99.00 - 134.00	1.0000	1.0000
L2	3	LDF7-50A (1-5/8 FOAM)	99.00 - 134.00	1.0000	1.0000
L2	4	LDF7-50A (1-5/8 FOAM)	99.00 - 126.00	1.0000	1.0000
L2	5	LDF6-50A (1-1/4 FOAM)	99.00 - 120.00	1.0000	1.0000
L2	6	FIBER ONLY CABLE 48(7/8")	99.00 - 120.00	1.0000	1.0000
L2	7	LDF4-50A (1/2 FOAM)	99.00 - 107.00	1.0000	1.0000
L2	8	LDF5-50A (7/8 FOAM)	99.00 - 107.00	1.0000	1.0000
L2	10	LDF2-50(3/8")	99.00 - 107.00	1.0000	1.0000
L2	12	Climbing Pegs	99.00 - 134.00	1.0000	1.0000
L3	2	ASU9325TYP01(1-3/5")	66.00 - 99.00	1.0000	1.0000
L3	3	LDF7-50A (1-5/8 FOAM)	66.00 - 99.00	1.0000	1.0000
L3	4	LDF7-50A (1-5/8 FOAM)	66.00 - 99.00	1.0000	1.0000
L3	5	LDF6-50A (1-1/4 FOAM)	66.00 - 99.00	1.0000	1.0000
L3	6	FIBER ONLY CABLE 48(7/8")	66.00 - 99.00	1.0000	1.0000
L3	7	LDF4-50A (1/2 FOAM)	66.00 - 99.00	1.0000	1.0000
L3	8	LDF5-50A (7/8 FOAM)	66.00 - 99.00	1.0000	1.0000
L3	10	LDF2-50(3/8")	66.00 - 99.00	1.0000	1.0000

<p><b>tnxTower</b></p> <p><b>GPD</b></p> <p>520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235</p>	<p><b>Job</b></p> <p>Owned Prop/Bryan S. Tabor - BU #: 826461</p>	<p><b>Page</b></p> <p>5 of 13</p>
	<p><b>Project</b></p> <p>2016777.826461.02</p>	<p><b>Date</b></p> <p>17:04:52 07/25/16</p>
	<p><b>Client</b></p> <p>Crown Castle USA, Inc.</p>	<p><b>Designed by</b></p> <p>bchristy</p>

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
L3	12	Climbing Pegs	66.00 - 99.00	1.0000	1.0000
L4	2	ASU9325TYP01(1-3/5")	32.50 - 66.00	1.0000	1.0000
L4	3	LDF7-50A (1-5/8 FOAM)	32.50 - 66.00	1.0000	1.0000
L4	4	LDF7-50A (1-5/8 FOAM)	32.50 - 66.00	1.0000	1.0000
L4	5	LDF6-50A (1-1/4 FOAM)	32.50 - 66.00	1.0000	1.0000
L4	6	FIBER ONLY CABLE 48(7/8")	32.50 - 66.00	1.0000	1.0000
L4	7	LDF4-50A (1/2 FOAM)	32.50 - 66.00	1.0000	1.0000
L4	8	LDF5-50A (7/8 FOAM)	32.50 - 66.00	1.0000	1.0000
L4	10	LDF2-50(3/8")	32.50 - 66.00	1.0000	1.0000
L4	12	Climbing Pegs	32.50 - 66.00	1.0000	1.0000

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
13.5' Platform w/ Handrails	C	From Leg	0.00	0.0000	161.00	No Ice	34.73	34.73	1.9845
			0.00			1/2" Ice	44.92	44.92	2.4950
			0.00						
SBNH-1D65C-SR w/ Mount Pipe	A	From Leg	4.00	0.0000	161.00	No Ice	11.68	9.84	0.0826
			0.00			1/2" Ice	12.40	11.37	0.1722
			2.00						
SBNH-1D65C-SR w/ Mount Pipe	B	From Leg	4.00	0.0000	161.00	No Ice	11.68	9.84	0.0826
			0.00			1/2" Ice	12.40	11.37	0.1722
			2.00						
SBNH-1D65C-SR w/ Mount Pipe	C	From Leg	4.00	0.0000	161.00	No Ice	11.68	9.84	0.0826
			0.00			1/2" Ice	12.40	11.37	0.1722
			2.00						
(2) HBXX-3319DS-A2M w/ Mount Pipe	A	From Leg	4.00	0.0000	161.00	No Ice	10.81	4.38	0.0591
			0.00			1/2" Ice	11.31	5.18	0.1307
			2.00						
(2) HBXX-3319DS-A2M w/ Mount Pipe	B	From Leg	4.00	0.0000	161.00	No Ice	10.81	4.38	0.0591
			0.00			1/2" Ice	11.31	5.18	0.1307
			2.00						
(2) HBXX-3319DS-A2M w/ Mount Pipe	C	From Leg	4.00	0.0000	161.00	No Ice	10.81	4.38	0.0591
			0.00			1/2" Ice	11.31	5.18	0.1307
			2.00						
FRIG	A	From Leg	4.00	0.0000	161.00	No Ice	2.39	0.97	0.0573
			0.00			1/2" Ice	2.59	1.10	0.0746
			2.00						
(2) FRIG	B	From Leg	4.00	0.0000	161.00	No Ice	2.39	0.97	0.0573
			0.00			1/2" Ice	2.59	1.10	0.0746
			2.00						
(2) FRIG	A	From Leg	4.00	0.0000	161.00	No Ice	2.39	0.97	0.0573
			0.00			1/2" Ice	2.59	1.10	0.0746
			2.00						
FRIG	C	From Leg	4.00	0.0000	161.00	No Ice	2.39	0.97	0.0573
			0.00			1/2" Ice	2.59	1.10	0.0746
			2.00						
FRLB	A	From Leg	4.00	0.0000	161.00	No Ice	2.07	0.78	0.0595
			0.00			1/2" Ice	2.25	0.90	0.0748
			2.00						
FRLB	B	From Leg	4.00	0.0000	161.00	No Ice	2.07	0.78	0.0595
			0.00			1/2" Ice	2.25	0.90	0.0748
			2.00						

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 6 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>Front</sub>	C <sub>A</sub> A <sub>Side</sub>	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
FRLB	C	From Leg	2.00		0.0000	161.00	No Ice	2.07	0.78	0.0595
			4.00				1/2" Ice	2.25	0.90	0.0748
			0.00							
RNSNDC-7771-PF-48	A	From Leg	2.00		0.0000	161.00	No Ice	3.20	1.03	0.0149
			4.00				1/2" Ice	3.42	1.17	0.0362
			0.00							
RNSNDC-7771-PF-48	B	From Leg	2.00		0.0000	161.00	No Ice	3.20	1.03	0.0149
			4.00				1/2" Ice	3.42	1.17	0.0362
			0.00							
(3) FHF B	A	From Leg	2.00		0.0000	161.00	No Ice	2.42	1.52	0.0485
			4.00				1/2" Ice	2.62	1.69	0.0683
			0.00							
(2) FHF B	B	From Leg	2.00		0.0000	161.00	No Ice	2.42	1.52	0.0485
			4.00				1/2" Ice	2.62	1.69	0.0683
			0.00							
FHF B	C	From Leg	2.00		0.0000	161.00	No Ice	2.42	1.52	0.0485
			4.00				1/2" Ice	2.62	1.69	0.0683
			0.00							
(3) CBC1921x-DS-2X	A	From Leg	2.00		0.0000	161.00	No Ice	0.48	0.35	0.0163
			4.00				1/2" Ice	0.57	0.42	0.0216
			0.00							
(3) CBC1921x-DS-2X	B	From Leg	2.00		0.0000	161.00	No Ice	0.48	0.35	0.0163
			4.00				1/2" Ice	0.57	0.42	0.0216
			0.00							
(6) CBC1921x-DS-2X	C	From Leg	2.00		0.0000	161.00	No Ice	0.48	0.35	0.0163
			4.00				1/2" Ice	0.57	0.42	0.0216
			0.00							
FXFC	C	From Leg	2.00		0.0000	161.00	No Ice	0.84	0.96	0.0551
			4.00				1/2" Ice	0.98	1.11	0.0775
			0.00							
T-Arm Mount [TA 702-3]	C	From Leg	2.00		0.0000	148.00	No Ice	5.64	5.64	0.3390
			4.00				1/2" Ice	6.55	6.55	0.4290
			0.00							
TBXLHA-6565B-VTM w/ Mount Pipe	A	From Leg	2.00		0.0000	148.00	No Ice	9.43	6.74	0.0661
			4.00				1/2" Ice	9.99	7.58	0.1299
			0.00							
TBXLHA-6565B-VTM w/ Mount Pipe	B	From Leg	2.00		0.0000	148.00	No Ice	9.43	6.74	0.0661
			4.00				1/2" Ice	9.99	7.58	0.1299
			0.00							
TBXLHA-6565B-VTM w/ Mount Pipe	C	From Leg	2.00		0.0000	148.00	No Ice	9.43	6.74	0.0661
			4.00				1/2" Ice	9.99	7.58	0.1299
			0.00							
LNX-6514DS-VTM w/ Mount Pipe	A	From Leg	2.00		0.0000	148.00	No Ice	8.17	6.83	0.0607
			4.00				1/2" Ice	8.63	7.79	0.1271
			0.00							
LNX-6514DS-VTM w/ Mount Pipe	B	From Leg	2.00		0.0000	148.00	No Ice	8.17	6.83	0.0607
			4.00				1/2" Ice	8.63	7.79	0.1271
			0.00							
LNX-6514DS-VTM w/ Mount Pipe	C	From Leg	2.00		0.0000	148.00	No Ice	8.17	6.83	0.0607
			4.00				1/2" Ice	8.63	7.79	0.1271
			0.00							
E15S09P73	A	From Leg	2.00		0.0000	148.00	No Ice	0.46	0.36	0.0066
			4.00				1/2" Ice	0.55	0.44	0.0119
			0.00							
E15S09P73	B	From Leg	2.00		0.0000	148.00	No Ice	0.46	0.36	0.0066
			4.00				1/2" Ice	0.55	0.44	0.0119
			0.00							

<p><b>tnxTower</b></p> <p><b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235</p>	<b>Job</b>		Owned Prop/Bryan S. Tabor - BU #: 826461		<b>Page</b>		7 of 13	
	<b>Project</b>		2016777.826461.02		<b>Date</b>		17:04:52 07/25/16	
	<b>Client</b>		Crown Castle USA, Inc.		<b>Designed by</b>		bchristy	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>Front</sub>	C <sub>A</sub> A <sub>Side</sub>	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
E15S09P73	C	From Leg	0.00		0.0000	148.00	No Ice	0.46	0.36	0.0066
			4.00				1/2" Ice	0.55	0.44	0.0119
			0.00							
E15S09P49	A	From Leg	4.00		0.0000	148.00	No Ice	0.78	0.40	0.0225
			0.00				1/2" Ice	0.89	0.49	0.0293
			0.00							
E15S09P49	B	From Leg	4.00		0.0000	148.00	No Ice	0.78	0.40	0.0225
			0.00				1/2" Ice	0.89	0.49	0.0293
			0.00							
E15S09P49	C	From Leg	4.00		0.0000	148.00	No Ice	0.78	0.40	0.0225
			0.00				1/2" Ice	0.89	0.49	0.0293
			0.00							
T-Arm Mount [TA 601-3]	C	None			0.0000	126.00	No Ice	10.90	10.90	0.7260
(2) Pipe Mount 6'x2.375"	A	From Leg	4.00		0.0000	126.00	No Ice	14.65	14.65	0.9256
			0.00				1/2" Ice	1.43	1.43	0.0261
(2) Pipe Mount 6'x2.375"	B	From Leg	4.00		0.0000	126.00	No Ice	1.92	1.92	0.0369
			0.00				1/2" Ice	1.43	1.43	0.0261
(2) Pipe Mount 6'x2.375"	C	From Leg	4.00		0.0000	126.00	No Ice	1.92	1.92	0.0369
			0.00				1/2" Ice	1.43	1.43	0.0261
CMA-B/6521/E0-6 w/ Mount Pipe	A	From Leg	4.00		0.0000	126.00	No Ice	6.63	6.33	0.0566
			0.00				1/2" Ice	7.17	7.55	0.1121
CMA-B/6521/E0-6 w/ Mount Pipe	B	From Leg	4.00		0.0000	126.00	No Ice	6.63	6.33	0.0566
			0.00				1/2" Ice	7.17	7.55	0.1121
CMA-B/6521/E0-6 w/ Mount Pipe	C	From Leg	4.00		0.0000	126.00	No Ice	6.63	6.33	0.0566
			0.00				1/2" Ice	7.17	7.55	0.1121
T-Arm Mount [TA 702-3]	C	None			0.0000	120.00	No Ice	5.64	5.64	0.3390
T-Arm Mount [TA 601-3]	C	None			0.0000	117.00	1/2" Ice	6.55	6.55	0.4290
							No Ice	10.90	10.90	0.7260
TTTT65AP-1XR w/ Mount Pipe	A	From Leg	4.00		0.0000	120.00	No Ice	14.65	14.65	0.9256
			0.00				1/2" Ice	6.98	4.47	0.0513
TTTT65AP-1XR w/ Mount Pipe	B	From Leg	4.00		0.0000	120.00	No Ice	7.39	5.17	0.1030
			0.00				1/2" Ice	6.98	4.47	0.0513
TTTT65AP-1XR w/ Mount Pipe	C	From Leg	4.00		0.0000	120.00	No Ice	7.39	5.17	0.1030
			0.00				1/2" Ice	6.98	4.47	0.0513
APXVERR18-C w/ Mount Pipe	A	From Leg	4.00		0.0000	120.00	No Ice	8.02	6.71	0.0789
			0.00				1/2" Ice	8.48	7.66	0.1443
APXVERR18-C w/ Mount Pipe	B	From Leg	4.00		0.0000	120.00	No Ice	8.02	6.71	0.0789
			0.00				1/2" Ice	8.48	7.66	0.1443
APXVERR18-C w/ Mount Pipe	C	From Leg	4.00		0.0000	120.00	No Ice	8.02	6.71	0.0789
			0.00				1/2" Ice	8.48	7.66	0.1443
FZHJ-RRH	A	From Leg	4.00		0.0000	120.00	No Ice	1.26	1.01	0.0552
			0.00				1/2" Ice	1.41	1.14	0.0733

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 8 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>1</sub> Front	C <sub>A</sub> A <sub>1</sub> Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
FZHJ-RRH	B	From Leg	0.00		0.0000	120.00	No Ice	1.26	1.01	0.0552
			4.00				1/2" Ice	1.41	1.14	0.0733
			0.00							
FZHJ-RRH	C	From Leg	4.00		0.0000	120.00	No Ice	1.26	1.01	0.0552
			0.00				1/2" Ice	1.41	1.14	0.0733
			0.00							
RRUS 31 B25	A	From Leg	4.00		0.0000	120.00	No Ice	1.62	1.28	0.0561
			0.00				1/2" Ice	1.78	1.43	0.0722
			0.00							
RRUS 31 B25	B	From Leg	4.00		0.0000	120.00	No Ice	1.62	1.28	0.0561
			0.00				1/2" Ice	1.78	1.43	0.0722
			0.00							
RRUS 31 B25	C	From Leg	4.00		0.0000	120.00	No Ice	1.62	1.28	0.0561
			0.00				1/2" Ice	1.78	1.43	0.0722
			0.00							
RRUS-11 1900MHz	A	From Leg	4.00		0.0000	120.00	No Ice	2.52	1.02	0.0440
			0.00				1/2" Ice	2.72	1.16	0.0633
			0.00							
RRUS-11 1900MHz	B	From Leg	4.00		0.0000	120.00	No Ice	2.52	1.02	0.0440
			0.00				1/2" Ice	2.72	1.16	0.0633
			0.00							
RRUS-11 1900MHz	C	From Leg	4.00		0.0000	120.00	No Ice	2.52	1.02	0.0440
			0.00				1/2" Ice	2.72	1.16	0.0633
			0.00							
800 MHZ SMR FILTER	A	From Leg	4.00		0.0000	120.00	No Ice	0.22	0.22	0.0088
			0.00				1/2" Ice	0.29	0.29	0.0137
			0.00							
800 MHZ SMR FILTER	B	From Leg	4.00		0.0000	120.00	No Ice	0.22	0.22	0.0088
			0.00				1/2" Ice	0.29	0.29	0.0137
			0.00							
800 MHZ SMR FILTER	C	From Leg	4.00		0.0000	120.00	No Ice	0.22	0.22	0.0088
			0.00				1/2" Ice	0.29	0.29	0.0137
			0.00							
(3) ACU-A20-N	A	From Leg	4.00		0.0000	120.00	No Ice	0.07	0.12	0.0010
			0.00				1/2" Ice	0.10	0.16	0.0023
			0.00							
(3) ACU-A20-N	B	From Leg	4.00		0.0000	120.00	No Ice	0.07	0.12	0.0010
			0.00				1/2" Ice	0.10	0.16	0.0023
			0.00							
(3) ACU-A20-N	C	From Leg	4.00		0.0000	120.00	No Ice	0.07	0.12	0.0010
			0.00				1/2" Ice	0.10	0.16	0.0023
			0.00							
Platform Mount [LP 301-1]	C	None			0.0000	107.00	No Ice	30.10	30.10	1.5885
Miscellaneous [NA 509-3]	C	None			0.0000	105.00	1/2" Ice	40.80	40.80	2.0292
							No Ice	11.84	11.84	0.2750
(2) DBXNH-6565B-R2M	A	From Leg	4.00		0.0000	107.00	1/2" Ice	16.96	16.96	0.2962
			0.00				No Ice	8.27	5.47	0.0540
			0.00				1/2" Ice	8.73	5.93	0.1050
(2) DBXNH-6565B-R2M	B	From Leg	4.00		0.0000	107.00	No Ice	8.27	5.47	0.0540
			0.00				1/2" Ice	8.73	5.93	0.1050
			0.00							
(2) DBXNH-6565B-R2M	C	From Leg	4.00		0.0000	107.00	No Ice	8.27	5.47	0.0540
			0.00				1/2" Ice	8.73	5.93	0.1050
			0.00							
RRUS-11	A	From Leg	4.00		0.0000	107.00	No Ice	2.78	1.19	0.0476

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b>		Owned Prop/Bryan S. Tabor - BU #: 826461		<b>Page</b>		9 of 13	
	<b>Project</b>		2016777.826461.02		<b>Date</b>		17:04:52 07/25/16	
	<b>Client</b>		Crown Castle USA, Inc.		<b>Designed by</b>		bchristy	

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K
			0.00		1/2" Ice	2.99	1.33	0.0684
RRUS-11	B	From Leg	0.00 4.00	0.0000	107.00	No Ice 2.78	1.19	0.0476
			0.00		1/2" Ice	2.99	1.33	0.0684
RRUS-11	C	From Leg	0.00 4.00	0.0000	107.00	No Ice 2.78	1.19	0.0476
			0.00		1/2" Ice	2.99	1.33	0.0684
(2) RRUS-12 1600MHZ	A	From Leg	0.00 4.00	0.0000	107.00	No Ice 2.70	1.21	0.0600
			0.00		1/2" Ice	2.90	1.36	0.0813
(2) RRUS-12 1600MHZ	B	From Leg	0.00 4.00	0.0000	107.00	No Ice 2.70	1.21	0.0600
			0.00		1/2" Ice	2.90	1.36	0.0813
(2) RRUS-12 1600MHZ	C	From Leg	0.00 4.00	0.0000	107.00	No Ice 2.70	1.21	0.0600
			0.00		1/2" Ice	2.90	1.36	0.0813
DC6-48-60-18-8F Surge Suppression Unit	A	From Leg	0.00 4.00	0.0000	107.00	No Ice 0.92	0.92	0.0189
			0.00		1/2" Ice	1.46	1.46	0.0366
E15Z01P13	A	From Leg	0.00 4.00	0.0000	107.00	No Ice 0.82	0.62	0.0240
			0.00		1/2" Ice	0.94	0.73	0.0318
SBJAH4-1D65B-DL w/ Mount Pipe	A	From Leg	0.00 4.00	0.0000	107.00	No Ice 9.47	7.74	0.0838
			0.00		1/2" Ice	10.04	8.94	0.1611
RRUS 32	A	From Leg	0.00 4.00	0.0000	107.00	No Ice 3.31	2.42	0.0770
			0.00		1/2" Ice	3.56	2.64	0.1049
RRUS A2	A	From Leg	0.00 4.00	0.0000	107.00	No Ice 1.60	0.39	0.0150
			0.00		1/2" Ice	1.76	0.48	0.0254
RRUS-11	A	From Leg	0.00 4.00	0.0000	107.00	No Ice 2.78	1.19	0.0476
			0.00		1/2" Ice	2.99	1.33	0.0684
DC6-48-60-0-8F	A	From Leg	0.00 4.00	0.0000	107.00	No Ice 2.20	2.20	0.0189
			0.00		1/2" Ice	2.40	2.40	0.0415
DC6-48-60-18-8C	A	From Leg	0.00 4.00	0.0000	107.00	No Ice 3.05	0.98	0.0160
			0.00		1/2" Ice	3.26	1.12	0.0373
FB-7J-1463	A	From Leg	0.00 4.00	0.0000	107.00	No Ice 0.73	0.38	0.0050
			0.00		1/2" Ice	0.85	0.47	0.0106
E15Z01P13	B	From Leg	0.00 4.00	0.0000	107.00	No Ice 0.82	0.62	0.0240
			0.00		1/2" Ice	0.94	0.73	0.0318
SBJAH4-1D65B-DL w/ Mount Pipe	B	From Leg	0.00 4.00	0.0000	107.00	No Ice 9.47	7.74	0.0838
			0.00		1/2" Ice	10.04	8.94	0.1611
RRUS 32	B	From Leg	0.00 4.00	0.0000	107.00	No Ice 3.31	2.42	0.0770
			0.00		1/2" Ice	3.56	2.64	0.1049
RRUS A2	B	From Leg	0.00 4.00	0.0000	107.00	No Ice 1.60	0.39	0.0150
			0.00		1/2" Ice	1.76	0.48	0.0254
RRUS-11	B	From Leg	0.00 4.00	0.0000	107.00	No Ice 2.78	1.19	0.0476

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b>	Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b>	10 of 13
	<b>Project</b>	2016777.826461.02	<b>Date</b>	17:04:52 07/25/16
	<b>Client</b>	Crown Castle USA, Inc.	<b>Designed by</b>	bchristy

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>Front</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>Side</sub> ft <sup>2</sup>	Weight K
			0.00		1/2" Ice	2.99	1.33	0.0684
FB-7J-1463	B	From Leg	0.00	0.0000	107.00	No Ice	0.73	0.0050
			0.00		1/2" Ice	0.85	0.47	0.0106
E15Z01P13	C	From Leg	0.00	0.0000	107.00	No Ice	0.82	0.0240
			0.00		1/2" Ice	0.94	0.73	0.0318
SBJAH4-1D65B-DL w/ Mount Pipe	C	From Leg	0.00	0.0000	107.00	No Ice	9.47	0.0838
			0.00		1/2" Ice	10.04	8.94	0.1611
RRUS 32	C	From Leg	0.00	0.0000	107.00	No Ice	3.31	0.0770
			0.00		1/2" Ice	3.56	2.64	0.1049
RRUS A2	C	From Leg	0.00	0.0000	107.00	No Ice	1.60	0.0150
			0.00		1/2" Ice	1.76	0.48	0.0254
RRUS-11	C	From Leg	0.00	0.0000	107.00	No Ice	2.78	0.0476
			0.00		1/2" Ice	2.99	1.33	0.0684
FB-7J-1463	C	From Leg	0.00	0.0000	107.00	No Ice	0.73	0.0050
			0.00		1/2" Ice	0.85	0.47	0.0106

## 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
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

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 11 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Comb. No.	Description
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 Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	159 - 134	20.503	48	1.1474	0.0026
L2	138.083 - 99	15.613	48	1.0715	0.0016
L3	104.167 - 66	8.754	48	0.8328	0.0008
L4	72.0833 - 32.5	4.081	48	0.5301	0.0003
L5	39.5833 - 0	1.255	48	0.2844	0.0001

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
161.00	13.5' Platform w/ Handrails	48	20.503	1.1474	0.0026	43379
148.00	T-Arm Mount [TA 702-3]	48	17.899	1.1118	0.0020	19717
126.00	T-Arm Mount [TA 601-3]	48	12.976	1.0035	0.0012	8570
120.00	T-Arm Mount [TA 702-3]	48	11.740	0.9622	0.0011	7890
117.00	T-Arm Mount [TA 601-3]	48	11.142	0.9399	0.0010	7589
107.00	Platform Mount [LP 301-1]	48	9.256	0.8580	0.0008	6738
105.00	Miscellaneous [NA 509-3]	48	8.900	0.8403	0.0008	6622

### Maximum Tower Deflections - Design Wind

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 12 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	159 - 134	82.598	20	4.6089	0.0101
L2	138.083 - 99	62.948	20	4.3146	0.0060
L3	104.167 - 66	35.321	20	3.3599	0.0028
L4	72.0833 - 32.5	16.473	20	2.1400	0.0011
L5	39.5833 - 0	5.064	20	1.1479	0.0005

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
161.00	13.5' Platform w/ Handrails	20	82.598	4.6089	0.0101	11117
148.00	T-Arm Mount [TA 702-3]	20	72.138	4.4721	0.0078	5052
126.00	T-Arm Mount [TA 601-3]	20	52.335	4.0448	0.0044	2174
120.00	T-Arm Mount [TA 702-3]	20	47.358	3.8798	0.0038	1992
117.00	T-Arm Mount [TA 601-3]	20	44.951	3.7902	0.0036	1911
107.00	Platform Mount [LP 301-1]	20	37.348	3.4610	0.0030	1686
105.00	Miscellaneous [NA 509-3]	20	35.911	3.3900	0.0029	1656

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
L1	159 - 134 (1)	TP28.63x22x0.375	25.00	0.00	0.0	32.8103	-7.2568	2418.4500	0.003
L2	134 - 99 (2)	TP37.02x26.7971x0.375	39.08	0.00	0.0	42.6170	-20.7792	3062.1300	0.007
L3	99 - 66 (3)	TP44.88x34.9186x0.375	38.17	0.00	0.0	51.8226	-29.1394	3446.4200	0.008
L4	66 - 32.5 (4)	TP52.88x42.5423x0.5	39.58	0.00	0.0	81.3534	-41.7778	5696.8200	0.007
L5	32.5 - 0 (5)	TP60.36x50.0301x0.5	39.58	0.00	0.0	96.3746	-60.1139	6275.6000	0.010

### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>ux</sub> kip-ft	φM <sub>ux</sub> kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M <sub>uy</sub> kip-ft	φM <sub>uy</sub> kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
L1	159 - 134 (1)	TP28.63x22x0.375	233.13	1331.02	0.175	0.00	1331.02	0.000
L2	134 - 99 (2)	TP37.02x26.7971x0.375	838.77	2195.85	0.382	0.00	2195.85	0.000
L3	99 - 66 (3)	TP44.88x34.9186x0.375	1829.92	3010.90	0.608	0.00	3010.90	0.000
L4	66 - 32.5 (4)	TP52.88x42.5423x0.5	3003.26	5853.03	0.513	0.00	5853.03	0.000
L5	32.5 - 0 (5)	TP60.36x50.0301x0.5	4642.94	7649.87	0.607	0.00	7649.87	0.000

### Pole Shear Design Data

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 13 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Section No.	Elevation ft	Size	Actual $V_u$ K	$\phi V_u$ K	Ratio $\frac{V_u}{\phi V_u}$	Actual $T_u$ kip-ft	$\phi T_u$ kip-ft	Ratio $\frac{T_u}{\phi T_u}$
L1	159 - 134 (1)	TP28.63x22x0.375	12.2570	1209.2200	0.010	1.30	2698.88	0.000
L2	134 - 99 (2)	TP37.02x26.7971x0.375	28.2908	1531.0600	0.018	0.57	4452.51	0.000
L3	99 - 66 (3)	TP44.88x34.9186x0.375	33.4424	1723.2100	0.019	0.53	6105.17	0.000
L4	66 - 32.5 (4)	TP52.88x42.5423x0.5	38.6389	2848.4100	0.014	0.48	11868.08	0.000
L5	32.5 - 0 (5)	TP60.36x50.0301x0.5	43.9221	3137.8000	0.014	0.44	15511.58	0.000

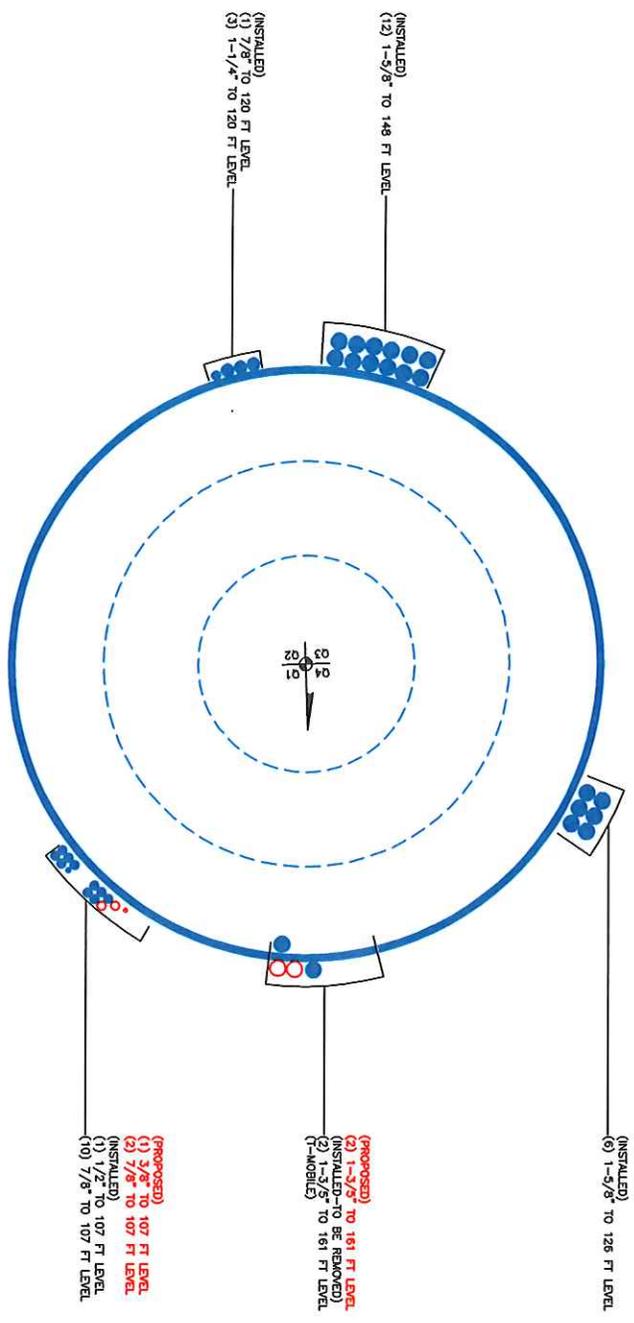
### Pole Interaction Design Data

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	159 - 134 (1)	0.003	0.175	0.000	0.010	0.000	0.178	1.000	4.8.2 ✓
L2	134 - 99 (2)	0.007	0.382	0.000	0.018	0.000	0.389	1.000	4.8.2 ✓
L3	99 - 66 (3)	0.008	0.608	0.000	0.019	0.000	0.617	1.000	4.8.2 ✓
L4	66 - 32.5 (4)	0.007	0.513	0.000	0.014	0.000	0.521	1.000	4.8.2 ✓
L5	32.5 - 0 (5)	0.010	0.607	0.000	0.014	0.000	0.617	1.000	4.8.2 ✓

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
L1	159 - 134	Pole	TP28.63x22x0.375	1	-7.2568	2418.4500	17.8	Pass
L2	134 - 99	Pole	TP37.02x26.7971x0.375	2	-20.7792	3062.1300	38.9	Pass
L3	99 - 66	Pole	TP44.88x34.9186x0.375	3	-29.1394	3446.4200	61.7	Pass
L4	66 - 32.5	Pole	TP52.88x42.5423x0.5	4	-41.7778	5696.8200	52.1	Pass
L5	32.5 - 0	Pole	TP60.36x50.0301x0.5	5	-60.1139	6275.6000	61.7	Pass
Summary							ELC:	LC7
Pole (L5)							61.7	Pass
Rating =							61.7	Pass

**APPENDIX B**  
**BASE LEVEL DRAWING**



BUSINESS UNIT: 826461 TOWER ID: C\_BASLLEVEL

BASE LEVEL DRAWING

PROJECT: 18272013 FILENAME: 826461\_BASLLEVEL.dwg  
 NEW FOUNDATION: 18272013 FILENAME: 826461\_BASLLEVEL.dwg

1'-1"=1" 1

CROWN REGION ADDRESS  
 USA

#	DATE	DESCRIPTION
1	06/24/14	UPLOADED PER WORK ORDER # 741331
2	07/15/14	APPLICATION ACCIED PER WORK ORDER # 843073
3	10/11/14	UPLOADED PER WORK ORDER # 848133
4	10/24/14	UPLOADED PER WORK ORDER # 1037287
5	10/24/14	UPLOADED PER WORK ORDER 1058132
6	04/07/16	UPLOADED PER WORK ORDER 1178631
7	04/07/16	UPLOADED PER WORK ORDER 1245288
8	07/27/16	UPLOADED PER WORK ORDER 1245564
9	06/06/16	UPLOADED PER WORK ORDER 1273286

DRAWN BY: CAR  
 CHECKED BY: SAC  
 DRAWING DATE: 18/2/2013

SITE NUMBER: \_\_\_\_\_  
 SITE NAME: \_\_\_\_\_  
 OWNED PROPRIETARY S. TABOR  
 BUSINESS UNIT NUMBER: 826461  
 SITE ADDRESS: 101 E. 31ST STREET  
 BRACKEN COUNTY  
 USA  
 SHEET TITLE: BASE LEVEL  
 SHEET NUMBER: A1-0

**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

## 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#:	826461
Site Name:	Owned Prop/Bryan S. Tabc
App #:	356847 Rev. 1
Pole Manufacturer:	Other

**Anchor Rod Data**

Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	67	in

**Plate Data**

Diam:	73	in
Thick:	2.25	in
Grade:	50	ksi
Single-Rod B-eff:	8.09	in

**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

**Pole Data**

Diam:	60.36	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Reactions		
Mu:	4643	ft-kips
Axial, Pu:	60	kips
Shear, Vu:	44	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

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

**Anchor Rod Results**

Max Rod (Cu+ Vu/η): 144.8 Kips  
 Allowable Axial, Φ\*Fu\*Anet: 260.0 Kips  
 Anchor Rod Stress Ratio: 55.7% **Pass**

Rigid
AISC LRFD
φ*Tn

**Base Plate Results**

Base Plate Stress: 28.9 ksi  
 Allowable Plate Stress: 45.0 ksi  
 Base Plate Stress Ratio: 64.2% **Pass**

Flexural Check

Rigid
AISC LRFD
φ*Fy
Y.L. Length: 29.08

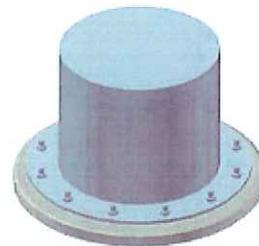
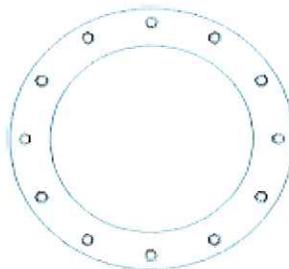
**n/a**

**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



\* 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

Site Number	826461
Site Name	wned Prop/ Bryan S. Tabor

# Caisson Analysis

Pier Properties		Analysis Properties	
Moment	4643 kip-ft	TIA Code	G
Shear	44 kip	Soil Safety Factor	1.33
Pier Diameter	7.0 ft	Water Table Depth	13.0 ft
Height Above Grade	0.50 ft	Ignored Soil Depth	4.0 ft
Depth Below Grade	30.00 ft	Cohesion Based on	PLS Caisson
Donut Diameter	ft	Max Soil Capacity	110%
Donut Depth	ft		

Soil Properties						
Layer	Top of Soil Layer (ft)	Layer Thickness (ft)	Bottom of Soil Layer (ft)	Soil Unit Weight (pcf)	Cohesion (psf)	Friction Angle (degrees)
<i>Soil.Layer</i>	<i>Soil.Top</i>	<i>Soil.Thick</i>	<i>Soil.Bottom</i>	<i>Soil.Weight</i>	<i>Soil.Cohesion</i>	<i>Soil.Phi</i>
1	0.00	4	4.00	100	0	
2	4.00	3	7.00	120	1500	
3	7.00	6	13.00	125		32
4	13.00	17	30.00	117	2500	
5	30.00	18	48.00	117	2500	
6	48.00	17	65.00	120	2500	
7						
8						
9						
10						

Critical Depths Below Grade		Results	
Rotation Axis	19.46 ft	Soil Capacity	39.9% <b>OK</b>
Zero Shear	5.75 ft	Max Pier Moment	4880 kip-ft

Moment At User Defined Depths Below Grade	
Moment @ 6.0'	4879 kip-ft
	kip-ft

## Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

**Note:** Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data		
BU#:	826461	
Site Name:	Owned Prop/Bryan S. Tabor	
App #:	349255 Rev. 1	

Loads Already Factored		
For M (WL)	1.3	<----Disregard
For P (DL)	1.3	<----Disregard

Pier Properties		
<b>Concrete:</b>		
Pier Diameter =	7.0	ft
Concrete Area =	5541.8	in <sup>2</sup>
<b>Reinforcement:</b>		
Clear Cover to Tie=	1.80	in
Horiz. Tie Bar Size=	4	
Vert. Cage Diameter =	6.50	ft
Vert. Cage Diameter =	78.00	in
<b>Vertical Bar Size =</b>	<b>11</b>	
Bar Diameter =	1.41	in
Bar Area =	1.56	in <sup>2</sup>
Number of Bars =	40	
As Total=	62.4	in <sup>2</sup>
A s/ Aconc, Rho:	0.0113	1.13%

ACI 10.5, ACI 21.10.4, and IBC 1810.  
 Min As for Flexural, Tension Controlled, Shafts:  
 $(3) * (\text{sqrt}(f'c) / Fy) = 0.0027$   
 $200 / Fy = 0.0033$

Minimum Rho Check:		
Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	1.13%	OK

Ref. Shaft Max Axial Capacities, $\phi$ Max(Pn or Tn):		
Max Pu = ( $\phi=0.65$ ) Pn.		
Pn per ACI 318 (10-2)	9212.52	kips
at Mu=( $\phi=0.65$ ) Mn=	5655.36	ft-kips
Max Tu, ( $\phi=0.9$ ) Tn =	3369.6	kips
at Mu= $\phi=(0.90)$ Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces		
TIA Revision:	G	
Max. Factored Shaft Mu:	4879.537	ft-kips (* Note)
Max. Factored Shaft Pu:	60.00	kips
Max Axial Force Type:	Comp.	

(\* Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

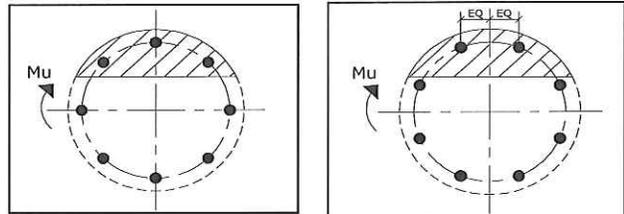
Load Factor	Shaft Factored Loads	
1.00	Mu:	4879.537 ft-kips
1.00	Pu:	60 kips

Material Properties		
Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	
ACI 318 Code		
Select Analysis ACI Code=	2008	
Seismic Properties		
Seismic Design Category =	B	
Seismic Risk =	Low	

Solve (Run)	<-- Press Upon Completing All Input
-------------	-------------------------------------

### Results:

Governing Orientation Case: 2



Case 1                      Case 2

Dist. From Edge to Neutral Axis: **17.93** in

Extreme Steel Strain,  $\epsilon_t$ : **0.0105**

**$\epsilon_t > 0.0050$ , Tension Controlled**

Reduction Factor,  $\phi$ : **0.900**

**Output Note:** Negative Pu=Tension  
 For Axial Compression,  $\phi$  Pn = Pu: **60.00** kips  
 Drilled Shaft Moment Capacity,  $\phi$ Mn: **9436.28** ft-kips  
 Drilled Shaft Superimposed Mu: **4879.54** ft-kips

<b>(Mu/<math>\phi</math>Mn, Drilled Shaft Flexure CSR:</b>	<b>51.7%</b>
--	--------------



Development Services

**CITY OF BRYAN APPLICATION FOR BUILDING PERMIT**

P.O. Box 1000 Bryan Texas 77805 \* Phone: 979-209-5010 \* Fax: 979-209-5035 \* www.bryantx.gov

SEP 14 2016

RECEIVED

<p>1. ADDRESS / LOCATION OF WORK:</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="3">ADDRESS: 101 E. 31st Street Bryan, TX 77803</td> </tr> <tr> <td colspan="3">SUBDIVISION: City of Bryan Townsite</td> </tr> <tr> <td style="width:33%;">PHASE:</td> <td style="width:33%;">LOT:</td> <td style="width:33%;">BLOCK: 271</td> </tr> </table>		ADDRESS: 101 E. 31st Street Bryan, TX 77803			SUBDIVISION: City of Bryan Townsite			PHASE:	LOT:	BLOCK: 271	<p>2. DATE OF APPLICATION: 9/14/16</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>PERMIT # (by city): 16-3023</td> </tr> <tr> <td>WTR / SWR # (by city):</td> </tr> <tr> <td>PROPERTY R-NUMBER:</td> </tr> </table>		PERMIT # (by city): 16-3023	WTR / SWR # (by city):	PROPERTY R-NUMBER:												
ADDRESS: 101 E. 31st Street Bryan, TX 77803																											
SUBDIVISION: City of Bryan Townsite																											
PHASE:	LOT:	BLOCK: 271																									
PERMIT # (by city): 16-3023																											
WTR / SWR # (by city):																											
PROPERTY R-NUMBER:																											
<p>3. PROPERTY OWNER INFORMATION</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="2">NAME: Crown Castle as agent for AT&amp;T</td> </tr> <tr> <td colspan="2">ADDRESS: 1220 Augusta Drive, Suite 500</td> </tr> <tr> <td colspan="2">CITY/STATE/ZIP: Houston, TX 77057</td> </tr> <tr> <td colspan="2">EMAIL: elisha.divinity@crowncastle.com</td> </tr> <tr> <td colspan="2">FAX:</td> </tr> <tr> <td colspan="2">PHONE: (713) 570-3116</td> </tr> </table>		NAME: Crown Castle as agent for AT&T		ADDRESS: 1220 Augusta Drive, Suite 500		CITY/STATE/ZIP: Houston, TX 77057		EMAIL: elisha.divinity@crowncastle.com		FAX:		PHONE: (713) 570-3116		<p>4. GENERAL CONTRACTOR INFORMATION</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="2">NAME: SAC Wireless</td> </tr> <tr> <td colspan="2">ADDRESS: 20203 Carriage Point Drive</td> </tr> <tr> <td colspan="2">CITY/STATE/ZIP: Houston, TX 77073</td> </tr> <tr> <td colspan="2">EMAIL: shawn.mccown@mastec.com</td> </tr> <tr> <td colspan="2">FAX:</td> </tr> <tr> <td colspan="2">PHONE: (281) 982-9846</td> </tr> </table>		NAME: SAC Wireless		ADDRESS: 20203 Carriage Point Drive		CITY/STATE/ZIP: Houston, TX 77073		EMAIL: shawn.mccown@mastec.com		FAX:		PHONE: (281) 982-9846	
NAME: Crown Castle as agent for AT&T																											
ADDRESS: 1220 Augusta Drive, Suite 500																											
CITY/STATE/ZIP: Houston, TX 77057																											
EMAIL: elisha.divinity@crowncastle.com																											
FAX:																											
PHONE: (713) 570-3116																											
NAME: SAC Wireless																											
ADDRESS: 20203 Carriage Point Drive																											
CITY/STATE/ZIP: Houston, TX 77073																											
EMAIL: shawn.mccown@mastec.com																											
FAX:																											
PHONE: (281) 982-9846																											
5. ELECTRICIAN (Name & Phone #): N/A		6. PLUMBER (Name & Phone #): N/A		7. HVAC (Name & Phone #): N/A																							
8. ARCHITECT – If required by state or city ordinance (Name & Phone #): Kirk R. Hall / Trylon (519) 572-9995			9. ENGINEER – If required by state or city ordinance (Name and Phone #): Christopher J. Scheks / GPD Group (216) 927-8663																								
10. CLASS OF WORK (Check the appropriate box):		Are you painting the exterior of a commercial building? ___ Yes ___ No																									
Commercial: <input checked="" type="checkbox"/>	Residential: <input type="checkbox"/>	Remodel: <input type="checkbox"/>	Addition: <input type="checkbox"/>	Repair: <input type="checkbox"/>	New Construction: <input type="checkbox"/>																						
11. DESCRIPTION OF WORK: Replacing existing antennas. There will be no change to ground space or tower height.		Present Use: Wireless tower		Intended Use: Wireless tower																							
		Constructing Driveway in R.O.W.?		Constructing Sidewalk in R.O.W.?																							
		12. Square feet of heated area: N/A		13. # of Buildings: N/A		16. # of Dwelling Units: N/A																					
Square feet of unheated area: N/A		14. Foundation Type: N/A		17. Irrigation Tap Size: N/A																							
Square feet total: 0		15. Number of floors: N/A		18. Fire Line Tap Size:																							
		22. Estimated Valuation (Cost of Labor and Materials for project): \$ 30,000		19. Water Tap Size: N/A																							
		23. Total Permit Fee (Valuation + Tap Fees + Any Misc. Fees): \$ 175.00		20. Sewer Tap Size: N/A																							
				21. Official Use Only-Misc. Fees:																							
				Long Tap Fee:																							
				D.&T. Fee:																							
				Work w/o Permit fee:																							
				REVISED 3																							

Please continue to back side of application for additional items.  
Applicant's signature required on back of application for permit approval.

# CITY OF BRYAN APPLICATION FOR BUILDING PERMIT

P.O. Box 1000 Bryan Texas 77805 \* Phone: 979-209-5010 \* Fax: 979-209-5035 \* www.bryantx.gov

**Note:** Please initial in the box adjacent to each statement to affirm that you have read, understand, and each of these requirements. **Applicant to sign bottom of this page.**

## COMMERCIAL PERMIT CHECKLIST:

- TEXAS ACCESSIBILITY STANDARD (TAS) PROJECT REGISTRATION# EABPRJ \_\_\_\_\_  
(For Commercial/Public projects with a cost of \$50,000 or more)
- Existing Commercial/Public buildings: Attach copy of Asbestos Survey. TDH Inspector's Name and License No.: \_\_\_\_\_
- I have complied with the City of Bryan Ordinances and State Law for Architect and Engineer requirements.
- I have complied with the Texas Engineering Practice Act which requires (but not limited to) the following: an engineer's seal for heights over two stories, square footage in excess of 5,000 square feet of foundation, spans longer than 24 feet, and state requirements for engineered structural, mechanical, electrical, and plumbing systems.
- I understand that new commercial and some existing commercial site plans require separate review by City of Bryan Site Development Review Committee before a building permit can be issued.
- I have attached an electronic drawing file of all construction drawings and accompanying data to this application in Tiff format. Please submit all the pages within one TIFF file.
- I have attached two (2) complete sets of required scaled and dimensioned plans and accompanying data (requirements listed below) to this permit application. (Requirements are for new and existing buildings – please include existing floor plan(s) for additions and renovations.
- I have read and have attached to this permit application all of the COMMERCIAL PLAN REQUIREMENTS listed below.
- I will comply with TCEQ (Texas Commission on Environmental Quality) requirements for storm water permits. This includes submitting NOI/CSN per SWP3. Refer to <http://www.tceq.state.tx.us/> or call 512/239-1000.

## COMMERCIAL PLAN Requirements (2 copies + digital):

- Site Plan or Civil Plan and details
- Foundation Plan and Details
- Floor Plan and Details
- Structural plans and details ( framing, etc)
- Mechanical Plans and Details
- Electrical Plan and Details
- Plumbing Plan and details
- Exterior Building Elevations, Roof Plan
- Energy code compliance information; Rescheck, Comcheck, or compliance by default tables of Chapter 8 (Commercial) of International Energy Conservation Code. Include square footages of gross wall areas and gross glazing areas on plans. [www.energycodes.gov](http://www.energycodes.gov)

Note: Please allow two weeks for full plan reviews and building permit issuance.

**Call before you dig! (1-800-344-8377) Free Service!**

## RESIDENTIAL PERMIT CHECKLIST:

- Residential site plan requires submission of City of Bryan Residential Site Plan Application. Residential Site Plan shall be 8 1/2"X11" format. Locate and dimension driveways, building setbacks, property lines, label overall dimensions of all structures on the site.
  - I have read and have attached to this permit application all of the RESIDENTIAL PLAN REQUIREMENTS listed below.
- I will comply with TCEQ (Texas Commission on Environmental Quality) requirements for storm water permits. This includes submitting NOI/CSN per SWP3. Refer to <http://www.tceq.state.tx.us/> or CALL 512/239-1000.

## RESIDENTIAL PLAN Requirements (2 copies):

- Site Plan – 8-1/2"x11" format
- Foundation Plan and Details
- Floor Plan and Details
- Structural plans and details ( framing, etc)
- Narrow wall bracing and exterior sheathing notes
- Mechanical (HVAC) location of units noted
- Electrical switch and outlet plan
- Plumbing fixture locations noted
- Exterior Building Elevations, Roof Plan
- Energy code compliance information; Rescheck, Comcheck, or compliance by default tables of Chapter 5 (Residential) of International Energy Conservation Code. Include square footages of gross wall areas and gross glazing areas on plans. [www.energycodes.gov](http://www.energycodes.gov)
- Copy of NOI/CSN (Notice of Intent) for new home construction

## All Applicants – Please Read:

1. The Permit issued for this application becomes null and void if work or construction authorized is not commenced within six months, or if construction work is suspended or abandoned for a period of one year at any time after work is commenced.
2. Revised construction plans to be submitted for city review and approval is required for any changes made after City of Bryan building permit issuance.
3. The Permittee or Applicant is responsible for compliance with Deed and/or HOA restrictions.

**Applicant Printed Name:** Elisha Divinity

**Applicant Signature:** Elisha Divinity Digitally signed by Elisha Divinity  
DN: cn=Elisha Divinity, o=Crown Castle, ou=Real  
State Services,  
email=Elisha.Divinity@CrownCastle.com, c=US  
Date: 2016.09.14 14:44:58 -0500 **Date:** 9/14/16

Official Use: (do not issue permit unless signed by plans examiner) **Plans Examiner Signature:** \_\_\_\_\_ **Plan Review Attached:** Yes No  
**Development Coordinator approval:** \_\_\_\_\_ **Plan Review Comments in H.T.E.:** Yes No  
**Approved Date:** \_\_\_\_\_

**THANK YOU!**  
Revised 03-31-15

Submittal of the above information with a fully completed application is required to approve/issue the Permit in a timely manner. Omission of any information will cause the review to be delayed until the information is received. 2

**PROJECT INFORMATION**

**APPLICANT/LEASSEE:**

**NAME:** AT&T MOBILITY  
**ADDRESS:** 1801 VALLEY VIEW LANE  
**CITY, STATE:** FARMERS BRANCH, TX  
**ZIP:** 75234  
**CONTACT:**  
**PHONE:**  
**SITE OWNER:**  
**NAME:** CROWN CASTLE  
**ADDRESS:** 1220 AUGUSTA DRIVE, SUITE 500  
**CITY, STATE:** HOUSTON, TX  
**ZIP:** 77057  
**CONTACT:**  
**PHONE:** 713-570-3092  
**PROPERTY OWNER:**  
**NAME:** CROWN CASTLE  
**ADDRESS:** 1220 AUGUSTA DRIVE, SUITE 500  
**CITY, STATE, ZIP:** HOUSTON, TX 77057  
**CONTACT:**  
**PHONE:** 713-570-3092  
**LATITUDE:** 30° 40' 7.19"  
**LONGITUDE:** -96° 22' 23.45"  
**JURISDICTION:** BRAZOS COUNTY  
**TELEPHONE CO.:** N/A  
**POWER CO.:** N/A

**TOWER INFORMATION**

**TOWER OWNER** - CROWN CASTLE  
**SITE NAME** - OWNED PROP/BRYAN S. TABOR  
**SITE NO.** - 826461  
**TOWER TYPE** - MONOPOLE TOWER  
**TOWER HEIGHT** - 159'  
**ELEVATION OF WORK ON TOWER** - 107'

**DRIVING DIRECTIONS**

FROM: 1220 AUGUSTA DRIVE, SUITE 500, HOUSTON, TX 77057, GET ON I-10 W IN SPRING VALLEY FROM WOOD WAY DR. AND S VOSS RD., TAKE US-290 W AND TX-6 N TO TEXAS 6 FRONTAGE RD N IN BRYAN. TAKE THE EXIT FROM TX-6 N, CONTINUE ON TEXAS 6 FRONTAGE RD N. TAKE E WILLIAM J BRYAN PKWY TO S TABOR AVE.

**VICINITY MAP**



**at&t**  
 Mobility

1801 VALLEY VIEW LANE  
 FARMERS BRANCH, TX 75234

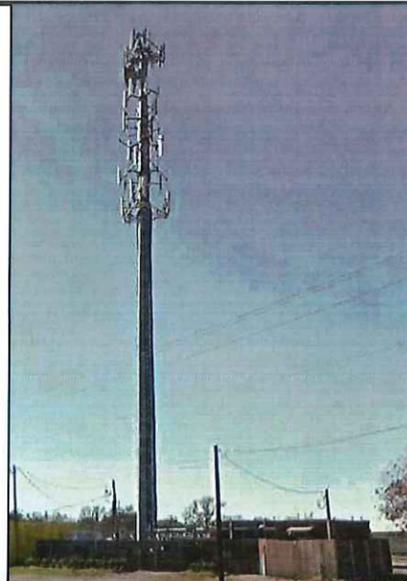
**SITE NAME:**  
 OWNED PROP/BRYAN S. TABOR  
 4TR LTE UPGRADE

**FA NUMBER:**  
 10130592  
**CROWN CASTLE BU#:**  
 826461

**PTN:**  
 3063A06WZ5

**SITE ADDRESS:**  
 101 E. 31ST STREET,  
 BRYAN, TX 77803

**SITE PHOTO**



**DESIGN TEAM**

**DESIGNER:**  
**NAME:** TRYLON TSF  
**ADDRESS:** 24 QUEEN ST E  
**CITY, STATE, ZIP:** BRAMPTON, ON L6V 1A2  
**CONTACT:** KATYA SERAVALLE  
**PHONE:** 519-465-4125



9-7-2016

**APPROVALS**

AT&T CONSTRUCTION MGR. \_\_\_\_\_ AT&T RF ENGINEER \_\_\_\_\_  
 LAND USE PLANNER \_\_\_\_\_ NETWORK OPERATION \_\_\_\_\_  
 PROPERTY OWNER \_\_\_\_\_ CONTRACTOR \_\_\_\_\_

**SHEET INDEX**

SHT #.	DESCRIPTION	REV. #.
T01	TITLE SHEET	0
C01	GENERAL NOTES	0
C02	OVERALL SITE PLAN	0
C03	TOWER ELEVATION AND ANTENNA ORIENTATION	0
C04	EQUIPMENT DETAILS	0
C05	EQUIPMENT DETAILS	0
C06	GROUNDING DETAILS	0
C07	BASE LEVEL DRAWING	0

**SCOPE OF WORK**

INSTALL LTE EQUIPMENT WITHIN AN EXISTING UNMANNED TELECOMMUNICATION FACILITY. INSTALL NEW AND / OR REPLACEMENT ANTENNAS AND LINES ON EXISTING TOWER. CONNECT POWER AND TELCO TO EXISTING AT&T UTILITY SERVICE.

**BUILDING CODES**

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL AUTHORITIES HAVING JURISDICTION.

- 2009 INTERNATIONAL BUILDING CODE
- UNIFORM BUILDING CODE
- 2011 NATIONAL ELECTRIC CODE
- ANSI/TIA/EIA-222
- CITY/COUNTY ORDINANCES



IF YOU DIG IN ANY STATE DIAL 811 FOR THE LOCAL "ONE CALL CENTER" IT'S THE LAW

THE UTILITIES SHOWN HEREIN ARE FOR THE CONTRACTORS CONVENIENCE ONLY. THERE MAY BE OTHER UTILITIES NOT SHOWN ON THESE PLANS. THE ENGINEER/SURVEYOR ASSUMES NO RESPONSIBILITY FOR THE LOCATIONS SHOWN AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL THE UTILITIES WITHIN THE LIMITS OF THE WORK. ALL DAMAGE MADE TO THE EXISTING UTILITIES BY THE CONTRACTOR SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

PREPARED BY:



1220 AUGUSTA DRIVE, SUITE 500  
 HOUSTON, TX 77057  
 713-570-3092



24 QUEEN ST E  
 BRAMPTON, ON  
 1 (519) 572-9995

CLIENT:



1801 VALLEY VIEW LANE  
 FARMERS BRANCH, TX 75234

THIS DOCUMENT IS THE DESIGN PROPERTY AND COPYRIGHT OF CROWN CASTLE AND FOR THE EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION OR USE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE CREATOR IS STRICTLY PROHIBITED.

DRAWING SCALES ARE INTENDED FOR 24"x36" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

**SUBMITTALS**

REV	DATE	DESCRIPTION	BY
0	09/02/16	ISSUE FOR CONSTRUCTION	RSN

SITE INFO:

**SITE NAME:**  
 OWNED PROP/BRYAN S. TABOR  
**FA NUMBER:**  
 10130592  
**CROWN CASTLE BU#:**  
 826461  
**SITE ADDRESS:**  
 101 E. 31ST STREET  
 BRYAN, TX  
 77803

SHEET TITLE:

TITLE SHEET

SHEET NUMBER:

T01

CHECKED BY:

CHECKED BY DATE:

1. GENERAL REQUIREMENTS

A. PURPOSE AND INTENT

1. THE DRAWING AND SPECIFICATION ARE INTENDED TO BE FULLY EXPLANATORY AND SUPPLEMENTARY, HOWEVER, SHOULD ANYTHING BE SHOWN, INDICATED, OR SPECIFIED ON ONE AND NOT THE OTHER, IT SHALL BE DONE THE SAME AS IF DISCREPANCIES BETWEEN REQUIREMENTS SHOWN IN BOTH, THE MORE STRINGENT REQUIREMENTS SHALL APPLY.  
2. THE INTENTION OF THE DOCUMENT IS TO INCLUDE ALL LABOR AND MATERIALS REASONABLY NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK AS STIPULATED IN THE CONTRACT.

B. CONFLICTS

1. VERIFY ALL MEASUREMENTS AT THE SITE BEFORE ORDERING MATERIAL OR DOING ANY WORK, NO EXTRA CHARGE OR COMPENSATION WILL BE ALLOWED DUE TO DIFFERENCES BETWEEN ACTUAL DIMENSIONS OR DIMENSIONS SHOWN ON PLANS. NOTICE OF ANY DISCREPANCY IN DIMENSIONS OR OTHERWISE TO AT&T FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.  
2. NO PLEA OF IGNORANCE OF CONDITIONS THAT EXIST, OR OF DIFFICULTIES OR CONDITIONS THAT MAY BE ENCOUNTERED, OR OF ANY OTHER RELEVANT MATTER CONCERNING THE EXECUTION OF THE WORK WILL BE ACCEPTED AS AN EXCUSE FOR ANY FAILURE OR OMISSION ON THE PART OF THE CONTRACTOR TO FULFILL EVERY DETAIL OF ALL THE REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS GOVERNING THE WORK.

C. CLEANING

1. KEEP THE SITE FREE FROM ACCUMULATION OF WASTE AND RUBBISH CAUSED BY EMPLOYEES AT THE COMPLETION OF THE WORK, REMOVE ALL WASTE AND NON-CONSTRUCTION MATERIAL INCLUDING ALL CONTRACT TOOLS, SCAFFOLDING, AND SURPLUS MATERIAL AND LEAVE SITE CLEAN AND READY FOR USE.

D. CODES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR FOLLOWING ALL LAWS, REGULATIONS, AND RULES PROMULGATED BY FEDERAL STATE AND LOCAL AUTHORITIES WITH JURISDICTION OVER THE SALTIER. THIS RESPONSIBILITY IS IN EFFECT REGARDLESS OF WEATHER THE LAW, ORDINANCE, REGULATION OR RULE IS MENTIONED IN THESE SPECIFICATIONS.

E. LICENSING

1. CONTRACTOR SHALL HAVE AND MAINTAIN A VALID CONTRACTOR'S LICENSE FOR THE LOCATION IN WHICH THE WORK IS TO BE PERFORMED. FOR JURISDICTIONS THAT LICENSE INDIVIDUAL TRADES, THE TRADESMAN OR SUBCONTRACTOR PERFORMING THOSE SHALL BE LICENSED, RESEARCHED AND COMPLY WITH THE LICENSING LAWS, PAY LICENSE FEES, AND SELECT AND INFORM SUBCONTRACTORS REGARDING THESE LAWS.

F. OSHA

1. FOLLOW ALL APPLICABLE RULES AND REGULATIONS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATIONS AND STATE LAWS BASED IN THE FEDERAL OCCUPATION SAFETY AND HEALTH ACT. THESE REGULATIONS INCLUDE, BUT ARE NOT LIMITED TO, REGULATIONS DEALING WITH TOWER CONSTRUCTION AND SAFETY, EXCAVATION AND TRENCHING, AND WORK IN CONFINED SPACES. ENSURE THAT EMPLOYEES AND SUBCONTRACTORS WEAR HARD HATS AT ALL TIMES DURING CONSTRUCTION.

G. PHOTOS

1. PROVIDE PHOTOGRAPHIC EVIDENCE OF ALL FOUNDATION INSTALLATIONS, GROUNDING, AND TRENCHING AFTER PLACEMENT OF UTILITIES PRIOR TO BACKFILL.

H. BUILDING PERMITS

1. CONTRACTOR WILL SUBMIT CONSTRUCTION DOCUMENTS TO THE JURISDICTIONAL AUTHORITY FOR PLAN CHECK AND REVIEW. CONTRACTOR WILL SUBMIT LICENSING AND WORKMAN'S COMPENSATION INFORMATION TO THE JURISDICTION AS REQUIRED TO OBTAIN THE BUILDING PERMIT, CONTRACTOR SHALL COORDINATE AND SCHEDULE REQUIRED INSPECTIONS AND POST REQUIRED PERMITS AT THE JOB SITE COMPLY WITH SPECIFIC PROJECT RELATED REQUESTS AND SUGGESTIONS MADE BY BUILDING INSPECTOR, AND INFORM CONSTRUCTION MANAGER OF ANY SUCH WORK THAT MAY BE BEYOND THE SCOPE OF THE CONTRACT OR DEVIATE FROM THE CONSTRUCTION DOCUMENT. AT&T WILL REIMBURSE THE CONTRACTOR FEES FOR PLAN REVIEW, BUILDING PERMIT, CONNECTIONS, AND INSPECTIONS. (INCLUDED IN THE BASE PROPOSAL).

I. ZONING REGULATIONS AND CONDITIONAL USE PERMITS

1. CONTRACTOR WILL SUBMIT ALL ZONING AND CONDITIONAL USE PERMITS. SOME USE PERMITS MAY HAVE SPECIFIC REQUIREMENTS FOR THE SITE RELATED TO CONSTRUCTION, SUCH AS NOISE REGULATIONS, HOURS OF WORK, ACCESS LIMITATIONS, ETC. THE CONSTRUCTION MANAGER WILL INFORM THE CONTRACTOR OF THESE REQUIREMENTS AT THE PRE-BID MEETING OR AS SHOWN IN THE CONSTRUCTION DOCUMENTS.

J. FAA PERMIT AND TOWER LIGHTING

1. REFER TO CONSTRUCTION DOCUMENTS AND CONSTRUCTION MANAGER FOR FAA AND STATE LIGHTING REQUIREMENTS. CONTRACTOR SHALL PROVIDE TEMPORARY FM APPROVED LIGHTING UNTIL PERMANENT LIGHTING IS OPERATIONAL.

K. TOWER SECURITY

1. IF REQUIRED, TOWER MUST BE FENCED, TEMPORARILY OR PERMANENTLY WITHIN 24 HOURS OF ERECTION. DO NOT ALLOW THE GATE ACCESSING THE TOWER AREA TO REMAIN OPEN OR UNATTENDED ANY TIME FOR ANY REASON. KEEP THE GATE CLOSED AND LOCKED WHEN NOT IN USE.

L. SITE CONTROL

1. THE CONTRACTOR IS COMPLETELY RESPONSIBLE FOR CONTAINMENT OF SEDIMENT AND CONTROL OF EROSION AT THE SITE. ANY DAMAGE TO ADJACENT OR DOWNSTREAM PROPERTIES WILL BE CORRECTED BY THE CONTRACTOR AT NO EXPENSE TO AT&T.

2. THE CONTRACTOR IS TO MAINTAIN ADEQUATE DRAINAGE AT ALL TIMES. DO NOT ALLOW WATER TO STAND OR POND. ANY DAMAGE TO STRUCTURES OR WORK ON THE SITE CAUSED BY INADEQUATE MAINTENANCE OF DRAINAGE PROVISIONS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND ANY COST ASSOCIATED WITH REPAIRS FOR SUCH DAMAGE WILL BE AT THE CONTRACTOR'S EXPENSE.

3. ALL WASTE MATERIAL SHALL BE PROPERLY DISPOSED OF OFF-SITE OR AS DIRECTED BY CONSTRUCTION MANAGER AND IN ACCORDANCE WITH JURISDICTIONAL AUTHORITIES.

M. LIVESTOCK PROTECTION

1. PROTECT AND SECURE LIVESTOCK. MAINTAIN AND SECURE EXISTING PERIMETER FENCE AND/OR GATE ENCLOSURES.

2. SITE PREPARATION

A. SCOPE OF WORK INCLUDES

1. PROTECTION OF EXISTING TREES, VEGETATION AND LANDSCAPING MATERIALS WHICH MIGHT BE DAMAGED BY CONSTRUCTION ACTIVITIES.

2. TRIMMING OF EXISTING TREES AND VEGETATION AS REQUIRED FOR PROTECTION DURING CONSTRUCTION ACTIVITIES.

3. CLEANING AND GRUBBING OF STUMPS, VEGETATION, DEBRIS, RUBBISH, DESIGNATED TREES AND SITE IMPROVEMENTS.

4. TOPSOIL STRIPPING AND STOCKPILING.

5. TEMPORARY EROSION CONTROL, SILTATION CONTROL, AND DUST CONTROL CONFORMING TO LOCAL REQUIREMENTS AS APPLICABLE.

6. TEMPORARY PROTECTION OF ADJACENT PROPERTY, STRUCTURES, BENCHMARKS, AND MONUMENTS.

7. PROTECTION AND TEMPORARY RELOCATION, STORAGE AND RE-INSTALLATION OF EXISTING FENCE AND OTHER SITE IMPROVEMENTS SCHEDULED FOR RE-USE.

8. REMOVAL AND LEGDK DISPOSAL OF CLEARED MATERIALS.

B. PRODUCTS AND MATERIALS (AS APPROVED BY CONSTRUCTION MANAGER OR AS NOTED IN CONSTRUCTION DOCUMENTS)

1. MATERIALS USED FOR TREE PROTECTION, EROSION CONTROL, SILTATION CONTROL, AND DUST CONTROL.

3. EARTHWORK

A. SCOPE OF WORK INCLUDES

1. EXCAVATION, TRENCHING, FILLING, COMPACTION, AND GRADING FOR STRUCTURES, SITE IMPROVEMENTS AND UTILITIES.

2. MATERIALS FOR SUB-BASE, DRAINAGE, BACKFILL AND GRAVEL FOR SLABS, PAVEMENT AND IMPROVEMENTS.

3. ROCK EXCAVATION WITHOUT BLASTING.

4. SUPPLY OF ADDITIONAL MATERIALS FOR OFFSITE AS REQUIRED.

5. REMOVAL AND LEGDK DISPOSAL OF EXCAVATED MATERIAL AS REQUIRED.

B. QUALITY ASSURANCE

1. COMPACTION

A. UNDER STRUCTURES, BUILDING SLABS, PAVEMENTS AND WALKWAYS WILL OBTAIN A 95% COMPACTION AT A MINIMUM DRY DENSITY AS DETERMINED BY ASTM 0-1557 OR WITH PLUS OR MINUS 3% OF THE MOISTURE CONTENT.

2. GRADING TOLERANCES OUTSIDE BUILDING LINES  
A. LAWNS, UNPAVED AREAS AND WALKS PLUS OR MINUS 1 INCH.

B. UNDER PAVEMENTS PLUS OR MINUS 1/2 INCH.

3. GRADING TOLERANCES FOR FILL UNDER CONCRETE APPLICATIONS  
A. PLUS OR MINUS 1/2 INCH MEASURED WITH 10 FOOT STRAIGHT EDGE.

C. PRODUCTS AND MATERIALS (AS APPROVED BY CONSTRUCTION MANAGER OR AS NOTED IN CONSTRUCTION DOCUMENTS)

1. SUB-BASE MATERIAL: GRADED MIXTURE OF NATURAL OR CRUSHED GRAVEL, CRUSHED STONE OR SLAG, AND NATURAL SAND.

2. WASHED MATERIAL, EVENLY GRADED MIXTURE OF CRUSHED STONE OR GRAVEL WITH 95% PASSING A 1-1/2 INCH SIEVE.

3. GRADING MATERIAL WILL CONSIST OF SATISFACTORY NATIVE OR IMPORTED SOIL MATERIALS FREE OF CLAY, ROCK OR GRAVEL NOT LARGER THAN 2 INCHES IN ANY DIMENSION, DEBRIS, WASTE, FROZEN MATERIALS AND OTHER UNSUITABLE MATERIALS WILL NOT BE ALLOWED FOR USE. IMPORTED MATERIALS SHALL HAVE A CLAY CONTENT OF NO MORE THAN 5%.

4. GRAVEL MATERIAL: EVENLY GRADED MIXTURE OF CRUSHED STONE OR GRAVEL WITH 95% PASSING A 1-1/2 INCH SIEVE.

5. GEOTEXTILE FABRIC: AS PER CONSTRUCTION DOCUMENTS.

D. CLEARING AND GRUBBING

1. REMOVE ALL VEGETATION AND MATERIALS AS REQUIRED. REMOVE STUMPS COMPLETELY UNDER FOUNDATIONS AND ROADWAYS. DISPOSE OF CLEARING AND GRUBBING OFF-SITE OR IN AN ON-SITE LOCATION APPROVED BY CONSTRUCTION MANAGER.

E. STRIPPING

1. STRIP NOT LESS 3 INCHES OF SOD AND TOPSOIL FROM AREAS THAT WILL UNDERLAY GRAVEL, PAVEMENT, NEW STRUCTURES OR EMBANKMENTS. STOCKPILE STRIPPING ON-SITE FOR RE-USE AND FINAL LANDSCAPING.

F. COMMON EXCAVATION

1. EXCAVATE TO DEPTH, LINES AND GRADE SHOWN ON THE PLANS, OR AS OTHERWISE SPECIFIED.

2. TEMPORARILY STOCKPILE ON-SITE EXCAVATION AT AN APPROVED LOCATION WITHIN THE WORK AREA UNTIL SITE GRADING IS COMPLETE. STOCKPILE SHALL NOT EXCEED 15 FEET IN HEIGHT.

3. LEGALLY DISPOSE OF EXCESS COMMON EXCAVATION OFF-SITE.

G. EMBANKMENT

1. CONSTRUCT EMBANKMENT TO THE LINES AND GRADES SHOWN ON THE DRAWING.

2. CONSTRUCT EMBANKMENT FROM ON-SITE EXCAVATION MATERIAL WHEN SUITABLE. USE IMPORTED BACKFILL ONLY AFTER AVAILABLE ON-SITE EXCAVATION MATERIAL HAS BEEN USED.

3. CONSTRUCT IN LIFTS OF NOT MORE THAN 12 INCHES IN LOOSE DEPTH. THE FULL WIDTH OF THE CROSS SECTION SHALL BE BROUGHT UP UNIFORMLY.

4. MATERIAL SHALL BE PLACED IN LAYERS AND SHALL BE NEAR OPTIMUM MOISTURE CONTENT BEFORE ROLLING TO OBTAIN THE PRESCRIBED COMPACTION, WETTING OR DRYING OF THE MATERIAL AND MANIPULATION TO SECURE A UNIFORM MOISTURE CONTENT THROUGHOUT THE LAYERS MAY BE REQUIRED. SUCH OPERATIONS SHALL BE INCLUDED IN THE APPROPRIATE BID ITEM. SHOULD THE MATERIAL BE TOO WET TO PERMIT PROPER COMPACTION, IT IS THE CONTRACTOR'S RESPONSIBILITY TO UTILIZE MATERIAL WITH AN ACCEPTABLE MOISTURE CONTENT.

5. DO NOT PLACE FROZEN MATERIAL IN THE EMBANKMENT AND DO NOT PLACE EMBANKMENT MATERIAL UPON FROZEN MATERIAL.

6. CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF EMBANKMENTS AND THE REPLACEMENT OF ANY PORTION WHICH HAS BECOME DISPLACED DUE TO CONTRACTOR'S OPERATIONS.

7. START LAYERS IN THE DEEPEST PORTION OF THE FILL AND AS PLACEMENT PROGRESSES, CONSTRUCT LAYERS APPROXIMATELY PARALLEL TO THE FINISH GRADE LINE.

8. ROUTE EQUIPMENT BOTH LOADED AND EMPTY, OVER THE FULL WIDTH OF THE EMBANKMENT TO ENSURE UNIFORMITY OF MATERIAL PLACEMENT.

9. COMPACT EMBANKMENT UNDERLYING NEW GRAVEL PAVING, FLOOR SLABS AND STRUCTURES TO BE 95% COMPACTION AT A MINIMUM DRY DENSITY AS DETERMINED BY ASTM 0-1557 OR WITHIN PLUS OR MINUS 3% OF OPTIMUM MOISTURE CONTENT. COMPACT NON-STRUCTURAL AREA EMBANKMENTS TO A MINIMUM OF 90% OF ASTM 0-1557.

H. SITE GRADING

1. USING ON-SITE EXCAVATION MATERIAL, SHAPE, TRIM, FINISH AND COMPACT SURFACE AREAS TO CONFORM TO THE LINES, GRADES AND CROSS SECTIONS SHOWN ON THE DRAWING OR AS DESIGNATED BY THE CONSTRUCTION MANAGER.

2. GRADE SURFACES TO DRAIN AND ELIMINATE ANY PONDING OR EROSION.

3. ELIMINATE WHEEL RUTS BY REGRADING.

4. COMPACT AREAS OF UNDERLYING NEW GRAVEL, PAVING, FLOOR SLABS AND STRUCTURES TO BE AT 95% COMPACTION AT A MAXIMUM DRY DENSITY AS DETERMINED BY THE ASTM 0-1557 OR WITHIN PLUS OR MINUS 3% OF OPTIMUM MOISTURE CONTENT.

5. CONSTRUCT FINISH SURFACE OF SITE GRADING AREAS WITHIN 1 INCH FROM SPECIFIED GRADE.

I. SUBGRADE PREPARATION

1. SHAPE TOP OF SUBGRADE TO THE LINES AND GRADES SHOWN ON THE DRAWINGS.

2. MAINTAIN TOP OF SUBGRADE IN A FREE-DRAINING CONDITION.

3. DO NOT STOCK PILE MATERIAL ON TOP OF SUBGRADE UNLESS AUTHORIZED BY CONSTRUCTION MANAGER.

4. COMPACT THE TOP 12 INCHES OF SUBGRADE TO A 95% COMPACTION AT A MAXIMUM DRY DENSITY AS DETERMINED BY ASTM 0-1557 OR WITHIN PLUS OR MINUS 3% OF THE OPTIMUM MOISTURE CONTENT.

5. CONSTRUCT TOP OF SUBGRADE WITHIN 1 INCH OF ESTABLISHED GRADE AND CROSS SECTION.

J. GEOTEXTILE FABRIC

1. LAY GEOTEXTILE FABRIC OVER COMPACTED SUBGRADE IN THE COMPOUND AREA AND UNDER LENGTH OF ROAD (WHEN REQUIRED). LAP ALL JOINTS TO A MINIMUM OF 36 INCHES.

K. GRAVEL SURFACING

1. CONSTRUCT GRAVEL SURFACING AREAS USING CRUSHED AGGREGATE BASE AND FINISH COURSES AS SPECIFIED BY CONSTRUCTION MANAGER. SPREAD GRAVEL AND RAKE TO OBTAIN A UNIFORM SURFACE AREA.

L. LANDSCAPING

1. FURNISH, INSTALL AND MAINTAIN LANDSCAPE WORK AS SHOWN AND/OR REQUIRED WITHIN THE CONSTRUCTION DOCUMENTS OR AS SPECIFIED IN THE CONSTRUCTION SPECIFICATIONS.

M. CONCRETE FORM WORK

1. FORMS: SMOOTH AND FREE OF SURFACE IRREGULARITIES. UTILIZE FORM RELEASE AGENTS.

2. CHAMFER EXPOSED EDGES OF ALL TOWER FOUNDATION SHALL RECEIVE A 1/2 INCH BY 1/2 INCH 45 DEGREE CHAMFER. OTHER EXPOSED EDGES SHALL RECEIVE A TOOLED RADIUS FINISH.

3. UPON COMPLETION, REMOVE ALL FORMS INCLUDING THOSE CONCEALED OR BURIED.

4. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL REQUIREMENTS.

5. GENERAL NOTES

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE ALL PLAN SHEETS AND SPECIFICATIONS AND COORDINATE HIS WORK WITH THE WORK OF ALL OTHER CONTRACTORS TO ENSURE THAT WORK PROGRESSION IS NOT INTERRUPTED.

2. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING A NEAT AND ORDERLY SITE, YARD AND GROUNDS. CONTRACTOR SHALL REMOVE AND DISPOSE OFF SITE ALL RUBBISH, WASTE MATERIAL, LITTER AND ALL FOREIGN SUBSTANCES. REMOVE PETROCHEMICAL SPILLS, STAINS AND OTHER FOREIGN DEPOSITS. RAKE GROUND TO A SMOOTH EVEN-TEXTURED SURFACE.

3. THE PLANS SHOW SOME KNOWN SUBSURFACE STRUCTURE ABOVE GROUND STRUCTURES AND/OR UTILITIES BELIEVED TO EXIST IN THE WORKING AREA, EXACT LOCATION OF WHICH MAY VARY FROM THE LOCATION INDICATED. IN PARTICULAR THE CONTRACTOR IS WARNED THAT THE EXACT OR EVEN APPROXIMATE LOCATION OF SUCH PIPELINES, SUBSURFACE STRUCTURES AND/OR UTILITIES IN THE AREA MAY BE SHOWN OR MAY NOT BE SHOWN AND IT SHALL BE HIS RESPONSIBILITY TO PROCEED WITH GREAT CARE IN 48 HOURS BEFORE YOU DIG, DRILL OR BLAST CALL LOCAL UTILITIES LOCATOR COMPANY.

4. THE OWNER OR OWNER'S REPRESENTATIVE SHALL BE NOTIFIED IN WRITING OF ANY CONDITIONS THAT VARY FROM THOSE SHOWN ON THE PLANS. THE CONTRACTOR'S WORK SHALL NOT VARY FROM THE PLANS WITHOUT THE EXPRESSED APPROVAL OF THE OWNER OR THE OWNER'S REPRESENTATIVE.

5. THE CONTRACTOR IS INSTRUCTED TO COOPERATE WITH ANY AND ALL OTHER CONTRACTORS PERFORMING WORK ON THE SITE DURING THE PERFORMANCE OF THIS CONTRACT.

6. THE CONTRACTOR SHALL RESTORE ALL DAMAGED, PUBLIC OR PRIVATE PROPERTY TO AT LEAST AS GOOD OF CONDITION AS BEFORE DISTURBED AS DETERMINED BY THE OWNER OR OWNER'S REPRESENTATIVE.

7. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIRED PERMITS.

8. THE CONTRACTOR SHALL PROTECT EXISTING PROPERTY LINE MONUMENTATION. ANY MONUMENTATION DISTURBED OR DESTROYED, AS JUDGED BY THE OWNER OR OWNER'S REPRESENTATIVE, SHALL BE REPLACED.

9. ALL TRENCH EXCAVATION AND ANY REQUIRED SHEETING AND SHORING SHALL BE DONE IN ACCORDANCE WITH OSHA REGULATIONS FOR CONSTRUCTION.

10. CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING AND THE MAINTENANCE OF SURFACE DRAINAGE DURING THE COURSE OF WORK.

11. ALL UTILITY WORK INVOLVING CONNECTIONS TO EXISTING SYSTEMS SHALL BE COORDINATED WITH THE OWNER OR OWNER'S REPRESENTATIVE BEFORE EACH AND EVERY CONNECTION TO EXISTING SYSTEMS IS MADE.

12. MAINTAIN FLOW FOR ALL EXISTING UTILITIES

13. ALL SITE FILL SHALL MEET SELECTED FILL STANDARDS AS DEFINED BY THE OWNER OF OWNER'S REPRESENTATIVE ON THE DRAWINGS OR GEOTECHNICAL REPORT RECOMMENDATIONS.

14. CONTRACTOR TO GRADE ALL AREAS OF THE SITE TO PROVIDE POSITIVE DRAINAGE AWAY FROM THE BUILDING OR EQUIPMENT PAD AND THE TOWER.

15. IF NECESSARY, THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING AND REGRADING ROADWAY AND ANY DISTURBED AREAS FOLLOWING INSTALLATION OF UTILITIES.

16. NO COMMERCIAL MESSAGES TO BE DISPLAYED ON TOWER

17. WATER AND SEWER SERVICES ARE NOT REQUIRED FOR THE DEVELOPMENT

18. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIAL UNLESS OTHERWISE NOTED.

19. ELECTRICAL DRAWINGS HAVE BEEN REVIEWED AND SEALED FOR STRUCTURAL PURPOSES ONLY.

PREPARED BY:



1220 AUGUSTA DRIVE, SUITE 500  
HOUSTON, TX 77057  
713-570-3092



24 QUEEN ST E  
BRAMPTON, ON  
1 (519) 572-9995

CLIENT:



1801 VALLEY VIEW LANE  
FARMERS BRANCH, TX 75234

THIS DOCUMENT IS THE DESIGN PROPERTY AND COPYRIGHT OF CROWN CASTLE AND FOR THE EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION OR USE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE CREATOR IS STRICTLY PROHIBITED.

DRAWING SCALES ARE INTENDED FOR 24"x36" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

SUBMITTALS

REV	DATE	DESCRIPTION	BY
0	09/02/16	ISSUE FOR CONSTRUCTION	RSN

SITE INFO:

SITE NAME:  
OWNED PROP/BRYAN S. TABOR  
FA NUMBER:  
10130592  
CROWN CASTLE BU#:  
826461  
SITE ADDRESS:  
101 E. 31ST STREET  
BRYAN, TX  
77803

SHEET TITLE:

GENERAL NOTES

SHEET NUMBER:

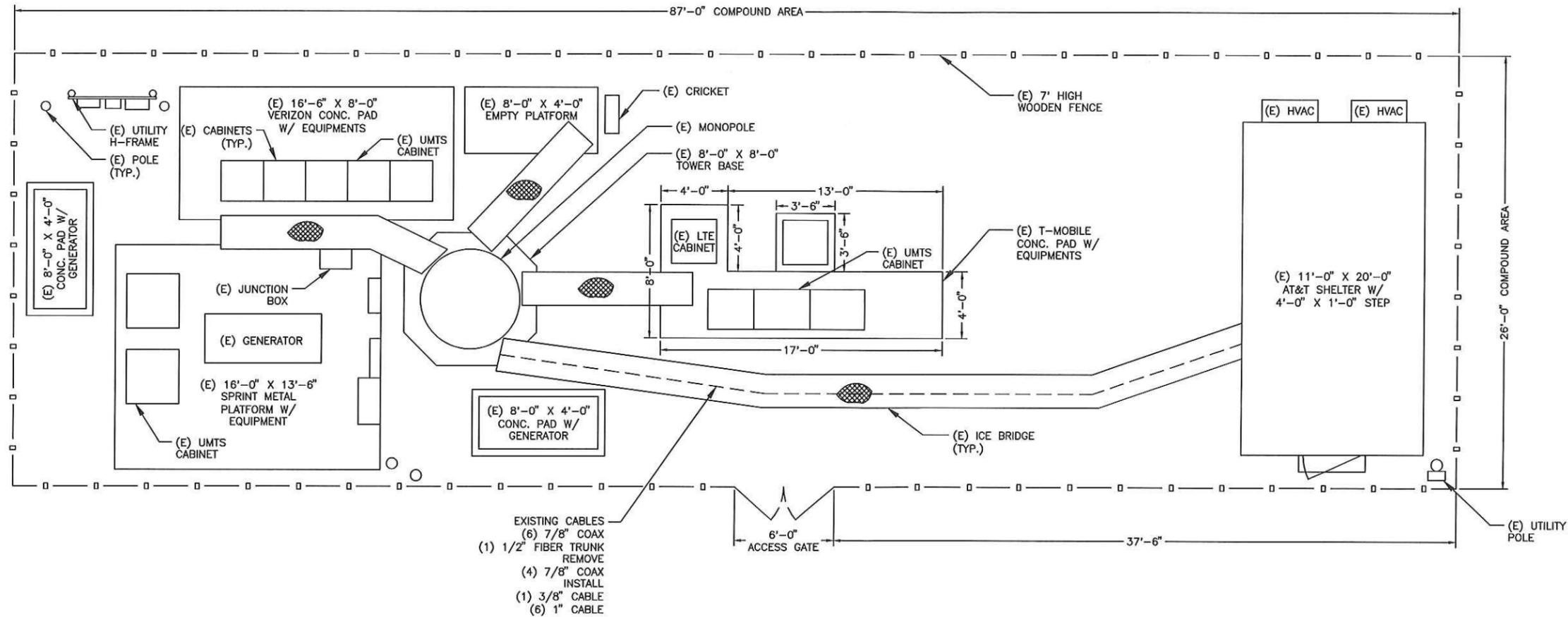
C01

CHECKED BY:

CHECKED BY DATE:



9-7-2016



1 OVERALL SITE PLAN  
 SCALE: N.T.S



9-7-2016

PREPARED BY:



1220 AUGUSTA DRIVE, SUITE 500  
 HOUSTON, TX 77057  
 713-570-3092



24 QUEEN ST E  
 BRAMPTON, ON  
 1 (519) 572-9995

CLIENT:



1801 VALLEY VIEW LANE  
 FARMERS BRANCH, TX 75234

THIS DOCUMENT IS THE DESIGN PROPERTY AND COPYRIGHT OF CROWN CASTLE AND FOR THE EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION OR USE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE CREATOR IS STRICTLY PROHIBITED.

DRAWING SCALES ARE INTENDED FOR 24"x36" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

SUBMITTALS

REV	DATE	DESCRIPTION	BY
0	09/02/16	ISSUE FOR CONSTRUCTION	RSN

SITE INFO:

SITE NAME:  
 OWNED PROP/BRYAN S. TABOR  
 FA NUMBER:  
 10130592  
 CROWN CASTLE BU#:  
 826461  
 SITE ADDRESS:  
 101 E. 31ST STREET  
 BRYAN, TX  
 77803

SHEET TITLE:

OVERALL SITE PLAN

SHEET NUMBER:

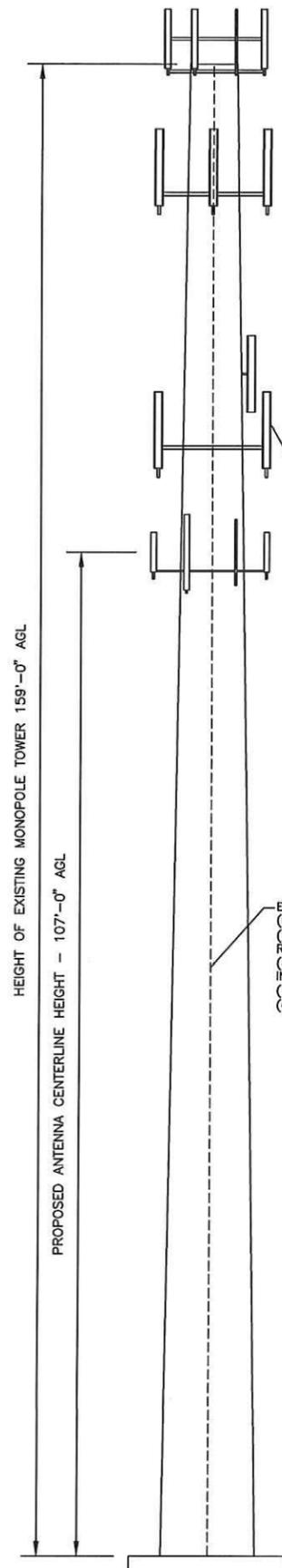
C02

CHECKED BY:

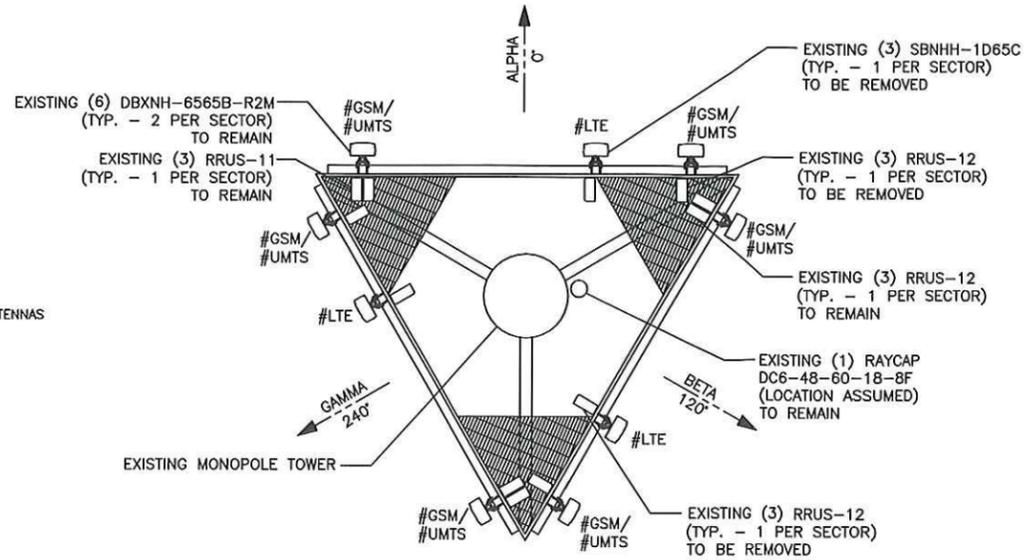
CHECKED BY DATE:

ANALYSIS AND DESIGN OF STRUCTURE AND FOUNDATION BY OTHERS. REFER TO SEPARATE SHEETS FOR MORE INFORMATION. NO MODIFICATION OF STRUCTURE AND FOUNDATION SHALL BE MADE WITHOUT APPROVAL OF STRUCTURAL ENGINEER

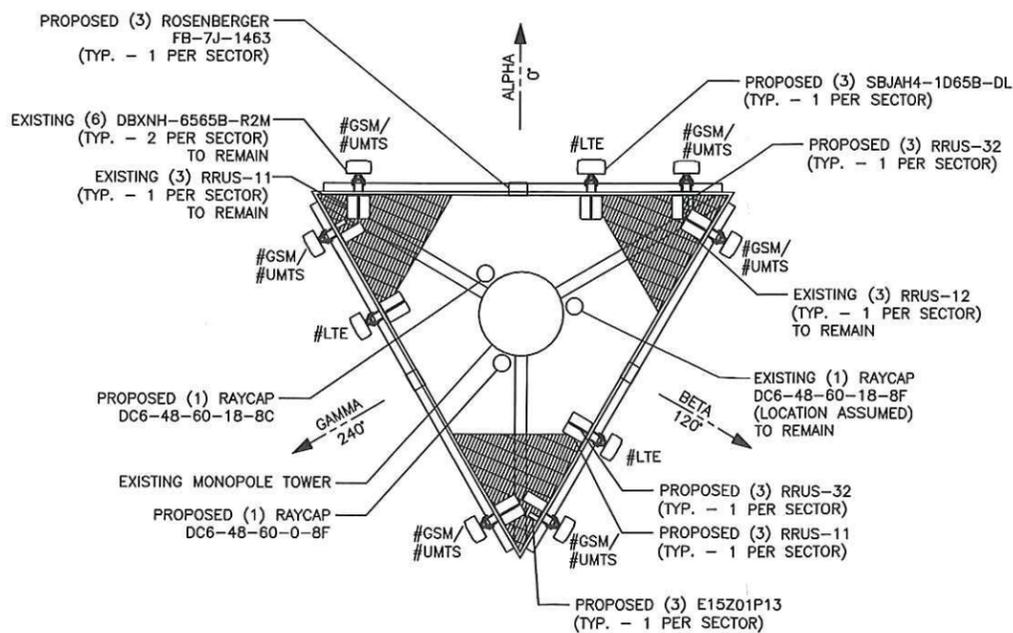
STRUCTURAL ANALYSIS PREPARED BY GPD GROUP PROFESSIONAL CORPORATION  
 DATED: 08/24/16.  
 WORK ORDER: 2016777.826461.03



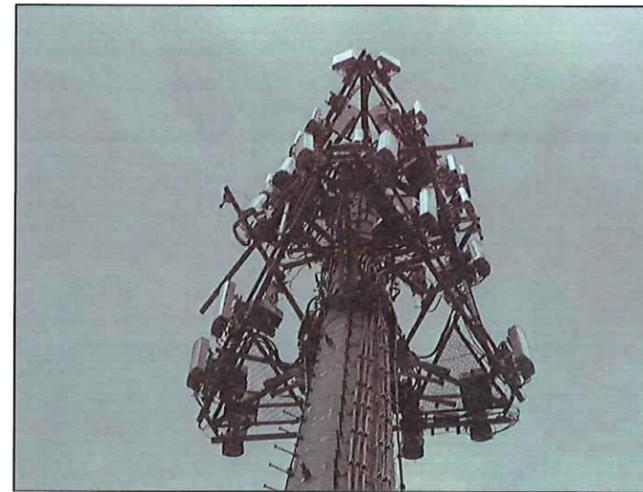
1 ELEVATION  
 SCALE: N.T.S



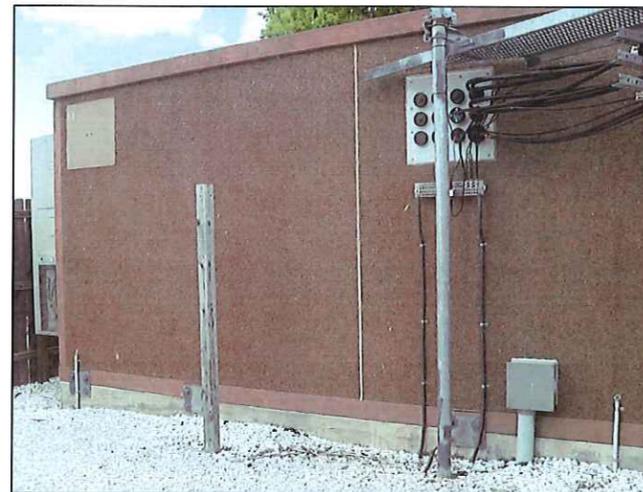
2 EXISTING ANTENNA ORIENTATION DETAIL  
 SCALE: N.T.S



3 PROPOSED ANTENNA ORIENTATION DETAIL  
 SCALE: N.T.S



EXISTING ANTENNA SECTOR



EXISTING GROUND EQUIPMENT

SCOPE OF WORK:

AT&T 4TR: REMOVE (3) EXISTING SBNHH-1D65C ANTENNAS, INSTALL (3) NEW SBJAH4-1D65B-DL ANTENNAS, REMOVE (6) RRUS-12 1600MHZ, INSTALL (6) RRUS 32 (3) RRUS-11 (3) E15Z01P13 (1) DC6-48-60-0-8F (1) DC6-48-60-18-8C (3) FB-7J-1463, REMOVE (4) 7/8" COAX, INSTALL (1) 3/8" CABLE (6) 1" CABLE. NO CHANGES TO GROUND SPACE.

FINAL CONFIGURATION:

(6) DBXNH-6565B-R2M (3) SBJAH4-1D65B-DL, (6) RRUS 32 (6) RRUS 11 (3) RRUS-12 (3) E15Z01P13, (1) DC6-48-60-0-8F (1) DC6-48-60-18-8F (1) DC6-48-60-18-8C, (3) FB-7J-1463, (6) 7/8" COAX, (1) 1/2" FIBER TRUNK, (1) 3/8" CABLE (6) 1" CABLE FROM SHELTER TO RAD.



9-7-2016

PREPARED BY:



1220 AUGUSTA DRIVE, SUITE 500  
 HOUSTON, TX 77057  
 713-570-3092



24 QUEEN ST E  
 BRAMPTON, ON  
 1 (519) 572-9995

CLIENT:



1801 VALLEY VIEW LANE  
 FARMERS BRANCH, TX 75234

THIS DOCUMENT IS THE DESIGN PROPERTY AND COPYRIGHT OF CROWN CASTLE AND FOR THE EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION OR USE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE CREATOR IS STRICTLY PROHIBITED.

DRAWING SCALES ARE INTENDED FOR 24"x36" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

SUBMITTALS

REV	DATE	DESCRIPTION	BY
0	09/02/16	ISSUE FOR CONSTRUCTION	RSN

SITE INFO:

SITE NAME:  
 OWNED PROP/BRYAN S. TABOR  
 FA NUMBER:  
 10130592  
 CROWN CASTLE BU#:  
 826461  
 SITE ADDRESS:  
 101 E. 31ST STREET  
 BRYAN, TX  
 77803

SHEET TITLE:

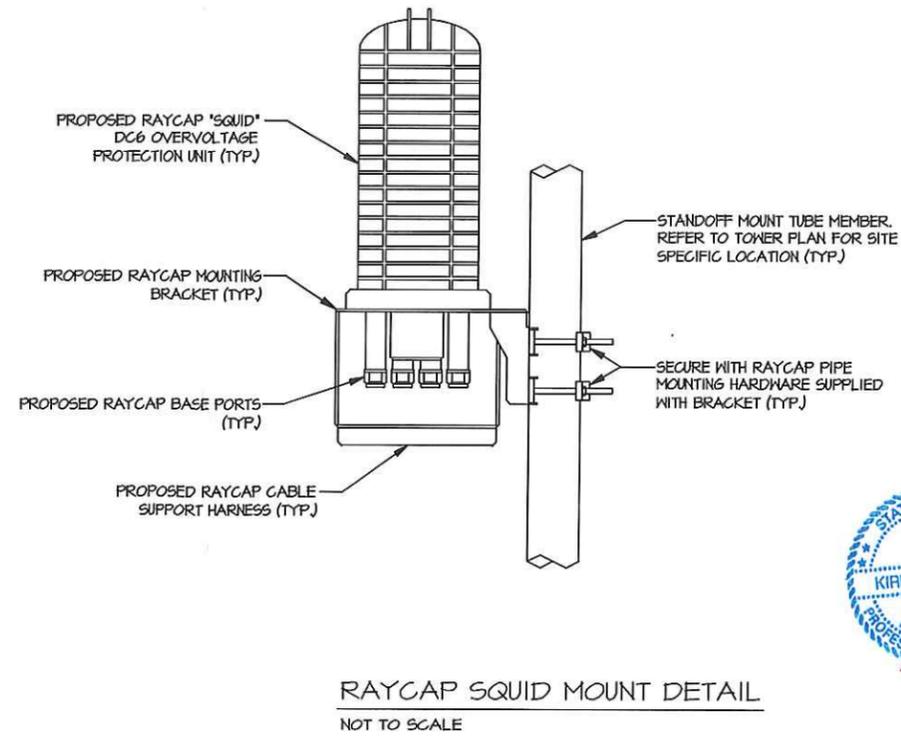
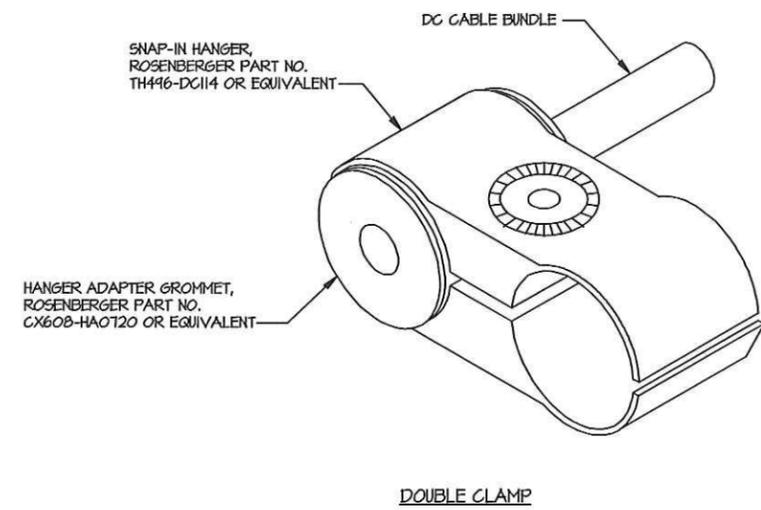
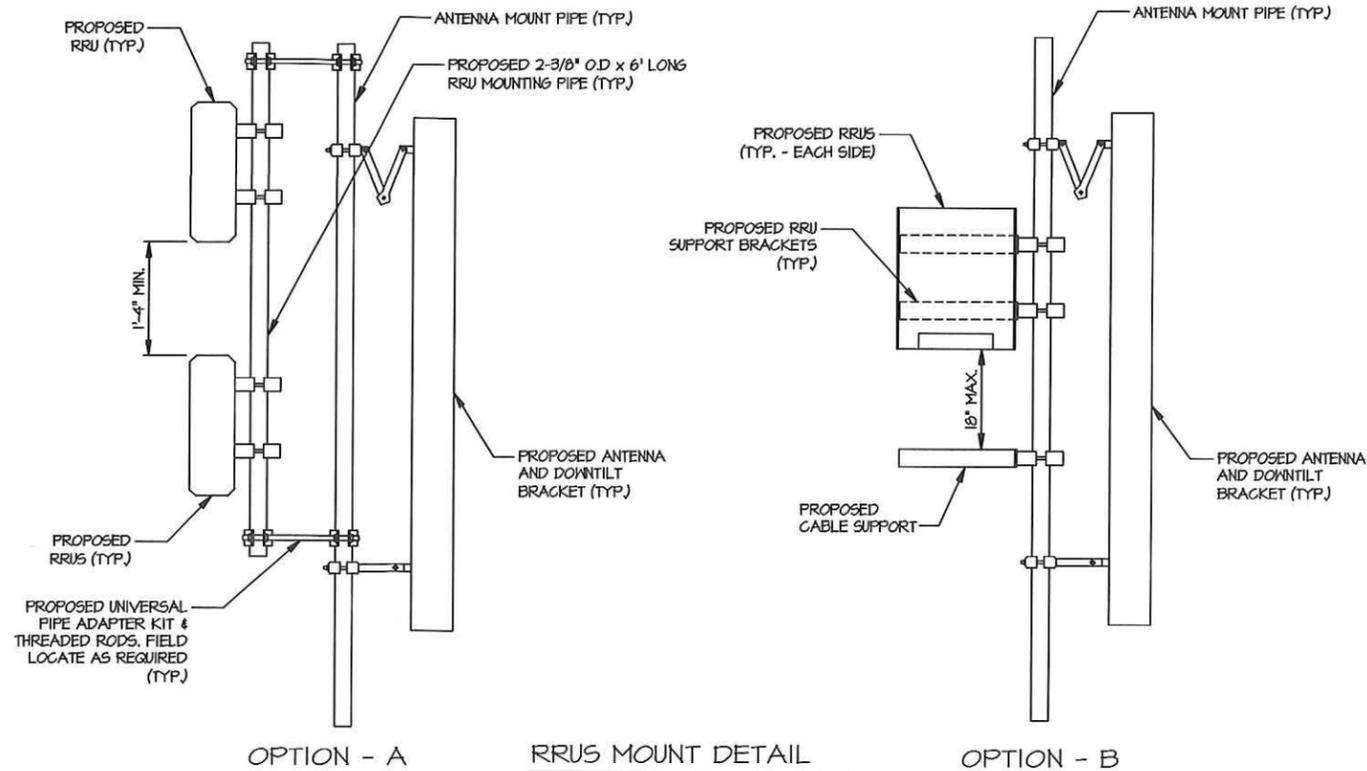
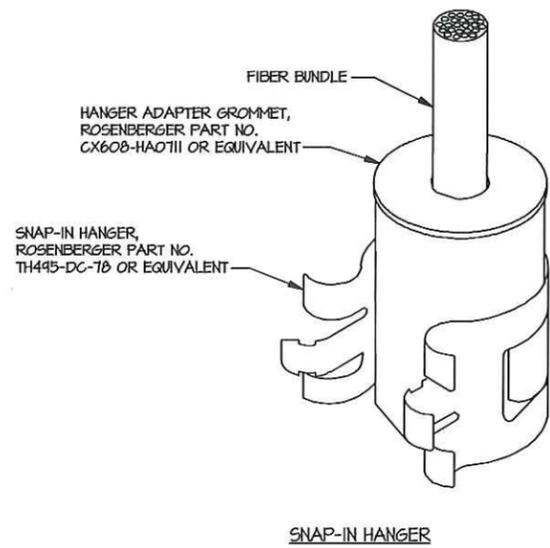
TOWER ELEVATION AND  
 ANTENNA ORIENTATION

SHEET NUMBER:

CHECKED BY:

C03

CHECKED BY DATE:



- NOTES:
- REFER TO JSA DOCUMENTS FOR EXACT CABLE NUMBER AND MANUFACTURER SPECIFICATIONS FOR PROPER GROMMETS AND HANGERS TO SUPPORT THE FIBER AND DC CABLE BUNDLES.
  - REFER TO STRUCTURAL ANALYSIS FOR EXACT CABLE ROUTING AND MOUNTING CONFIGURATION.

HANGER ADAPTER GROMMET DETAILS

NOT TO SCALE



9-7-2016

PREPARED BY:

**CROWN CASTLE**

1220 AUGUSTA DRIVE, SUITE 500  
HOUSTON, TX 77057  
713-570-3092

**Trylon**

24 QUEEN ST E  
BRAMPTON, ON  
1 (519) 572-9995

CLIENT:

**at&t**  
Mobility

1801 VALLEY VIEW LANE  
FARMERS BRANCH, TX 75234

THIS DOCUMENT IS THE DESIGN PROPERTY AND COPYRIGHT OF CROWN CASTLE AND FOR THE EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION OR USE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE CREATOR IS STRICTLY PROHIBITED.

DRAWING SCALES ARE INTENDED FOR 24"x36" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

SUBMITTALS

REV	DATE	DESCRIPTION	BY
0	09/02/16	ISSUE FOR CONSTRUCTION	RSN

SITE INFO:

SITE NAME:  
OWNED PROP/BRYAN S. TABOR

FA NUMBER:  
10130592

CROWN CASTLE BU#:  
826461

SITE ADDRESS:  
101 E. 31ST STREET  
BRYAN, TX  
77803

SHEET TITLE:  
EQUIPMENT DETAILS

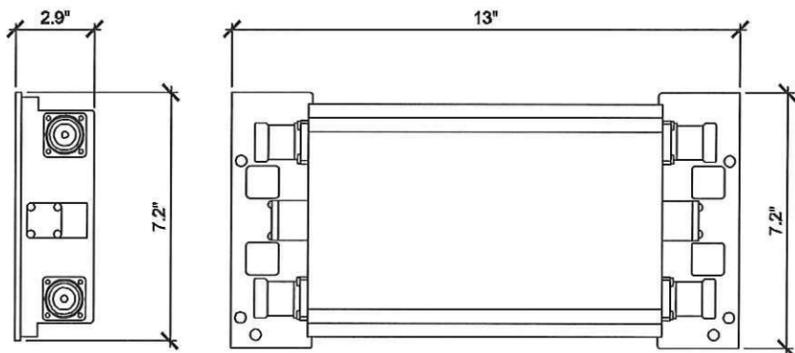
CHECKED BY:

CHECKED BY DATE:

SHEET NUMBER:  
C04

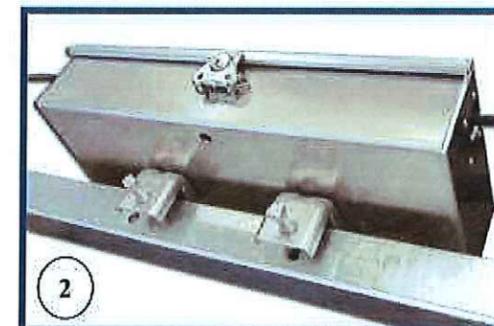
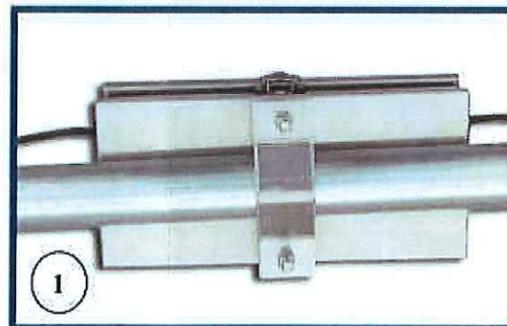
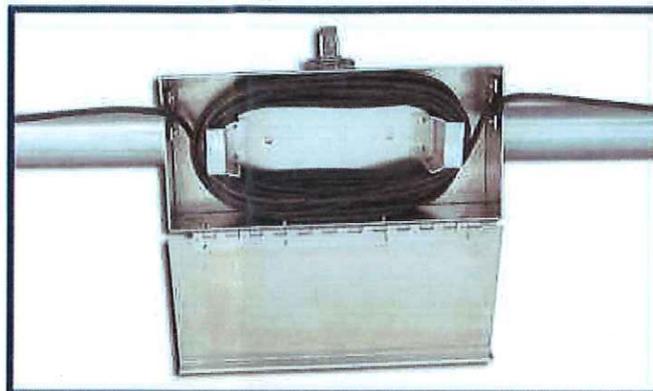
ANDREW E15Z01P13

BANDWIDTH: 60.00 MHz  
 WEIGHT: 5.0 kg (11.0 lbs)  
 RF CONNECTORS: 7/16 DIN FEMALE



**Description**

The RSS tower top excess fiber jumper storage is designed for outdoor on-site storage of excess fiber jumpers. This aluminum storage bracket can contain up to 20 meters of 7mm fiber cable. Hinged cover provides superior protection to the excess fiber. The storage can be H-bracket or pipe mounted. Pipe Mounting hardware included.



**Specifications**

- Size: 14" X 6.25" X 3" (plus mounting)
- Material: Aluminum, non-painted
- Hinged cover with twist-lock
- Capacity: Up to 20 meters of 7 mm fiber cable
- Mounting:
  1. Wall, H Bracket or Pipe up to 3.5" OD (Pipe Mounting Hardware Included)
  2. Optional Mounting with Angle Adapters (Sold Separately)

FB-7J-1463 DETAIL  
 NTS



9-7-2016

PREPARED BY:



1220 AUGUSTA DRIVE, SUITE 500  
 HOUSTON, TX 77057  
 713-570-3092



24 QUEEN ST E  
 BRAMPTON, ON  
 1 (519) 572-9995

CLIENT:



1801 VALLEY VIEW LANE  
 FARMERS BRANCH, TX 75234

THIS DOCUMENT IS THE DESIGN PROPERTY AND COPYRIGHT OF CROWN CASTLE AND FOR THE EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION OR USE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE CREATOR IS STRICTLY PROHIBITED.  
 DRAWING SCALES ARE INTENDED FOR 24"x36" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

SUBMITTALS

REV	DATE	DESCRIPTION	BY
0	09/02/16	ISSUE FOR CONSTRUCTION	RSN

SITE INFO:

SITE NAME:  
 OWNED PROP/BRYAN S. TABOR  
 FA NUMBER:  
 10130592  
 CROWN CASTLE BU#:  
 826461  
 SITE ADDRESS:  
 101 E. 31ST STREET  
 BRYAN, TX  
 77803

SHEET TITLE:

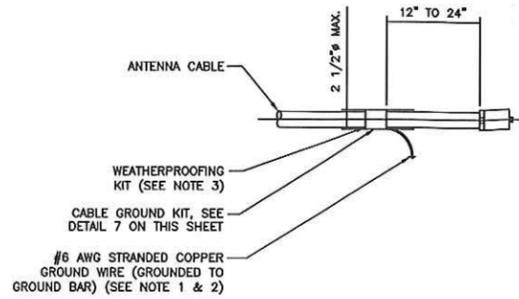
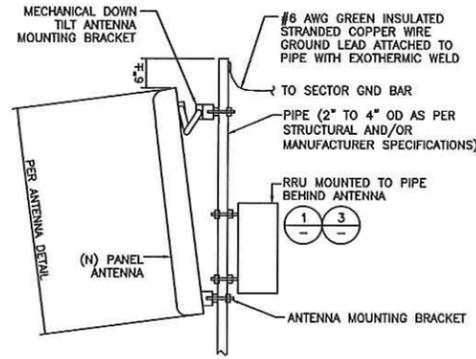
EQUIPMENT DETAILS

SHEET NUMBER:

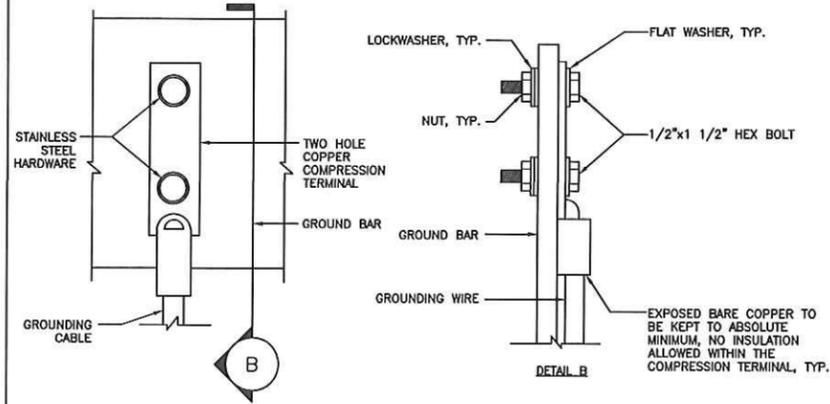
CHECKED BY:

CHECKED BY DATE:

C05



- NOTES:**
- DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR
  - GROUNDING KIT SHALL BE ANDREW SUREGROUND TYPE KIT WITH TWO-HOLE LUG
  - WEATHER PROOFING SHALL BE ANDREW TWO-PART TAPE SUPPLIED WITH KIT. COLD SHRINK SHALL NOT BE USED



- NOTES:**
- "DOUBLING UP" OR "STACKING" OF CONNECTIONS IS NOT PERMITTED.
  - OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS AND TO BE APPLIED PRIOR TO ADDING HARDWARE.

PREPARED BY:



1220 AUGUSTA DRIVE, SUITE 500  
HOUSTON, TX 77057  
713-570-3092



24 QUEEN ST E  
BRAMPTON, ON  
1 (519) 572-9995

CLIENT:



1801 VALLEY VIEW LANE  
FARMERS BRANCH, TX 75234

THIS DOCUMENT IS THE DESIGN PROPERTY AND COPYRIGHT OF CROWN CASTLE AND FOR THE EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION OR USE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE CREATOR IS STRICTLY PROHIBITED.

DRAWING SCALES ARE INTENDED FOR 24"x36" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

SUBMITTALS

REV	DATE	DESCRIPTION	BY
0	09/02/16	ISSUE FOR CONSTRUCTION	RSN

SITE INFO:

SITE NAME:  
OWNED PROP/BRYAN S. TABOR  
FA NUMBER:  
10130592  
CROWN CASTLE BU#:  
826461  
SITE ADDRESS:  
101 E. 31ST STREET  
BRYAN, TX  
77803

SHEET TITLE:

GROUNDING DETAILS

SHEET NUMBER:

CHECKED BY:

C06

CHECKED BY DATE:

ANTENNA PIPE MOUNT GROUNDING DETAIL

N.T.S.

9

CABLE GROUND KIT DETAIL

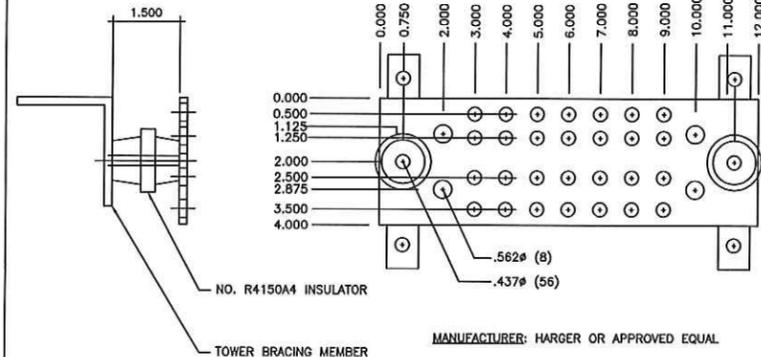
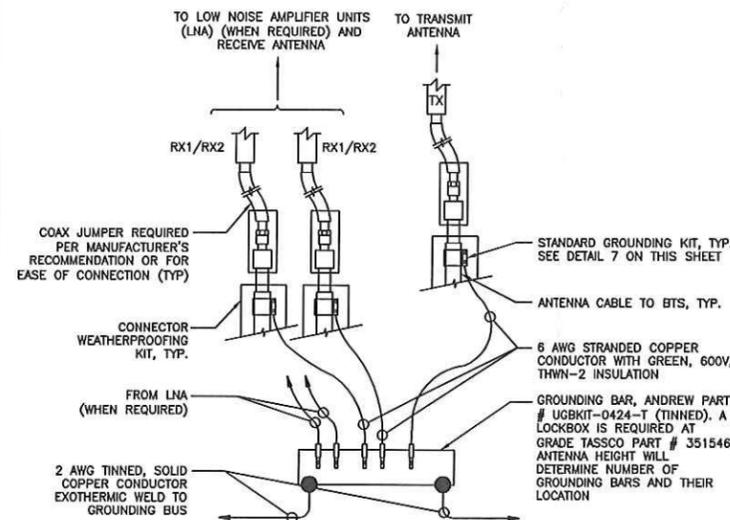
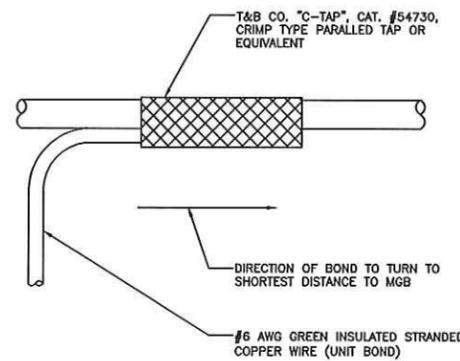
N.T.S.

6

TYPICAL GROUND LUG CONNECTION DETAIL

N.T.S.

3



GROUNDING WIRE CONNECTION

N.T.S.

8

ANTENNA GROUNDING BAR CONNECTION DETAIL

N.T.S.

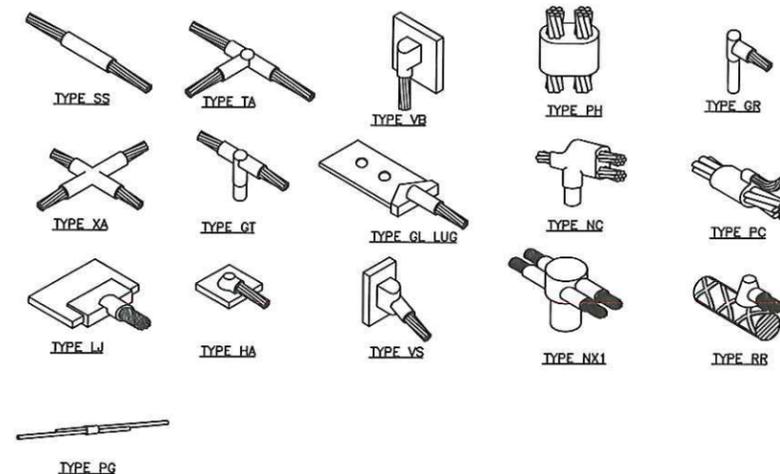
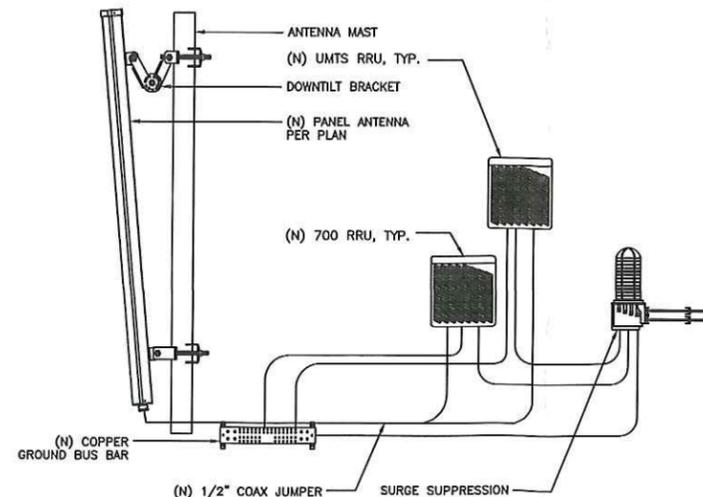
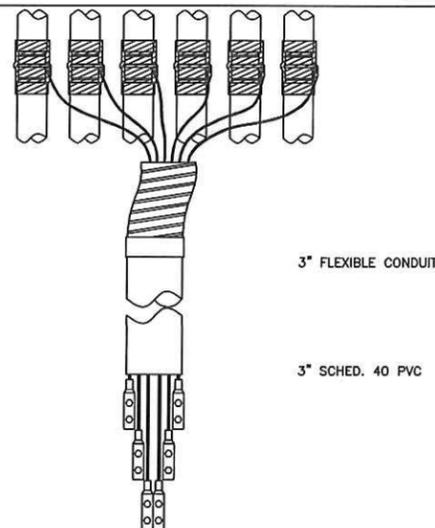
5

ANTENNA (12") GROUND BAR DETAIL

N.T.S.

2

COAX GROUNDING KITS  
TYPICAL (6)  
MTC 976715 - 15'  
MTC 976720 - 20'



COAX GROUND KIT

N.T.S.

7

RRU / RRU GROUNDING DETAIL

N.T.S.

4

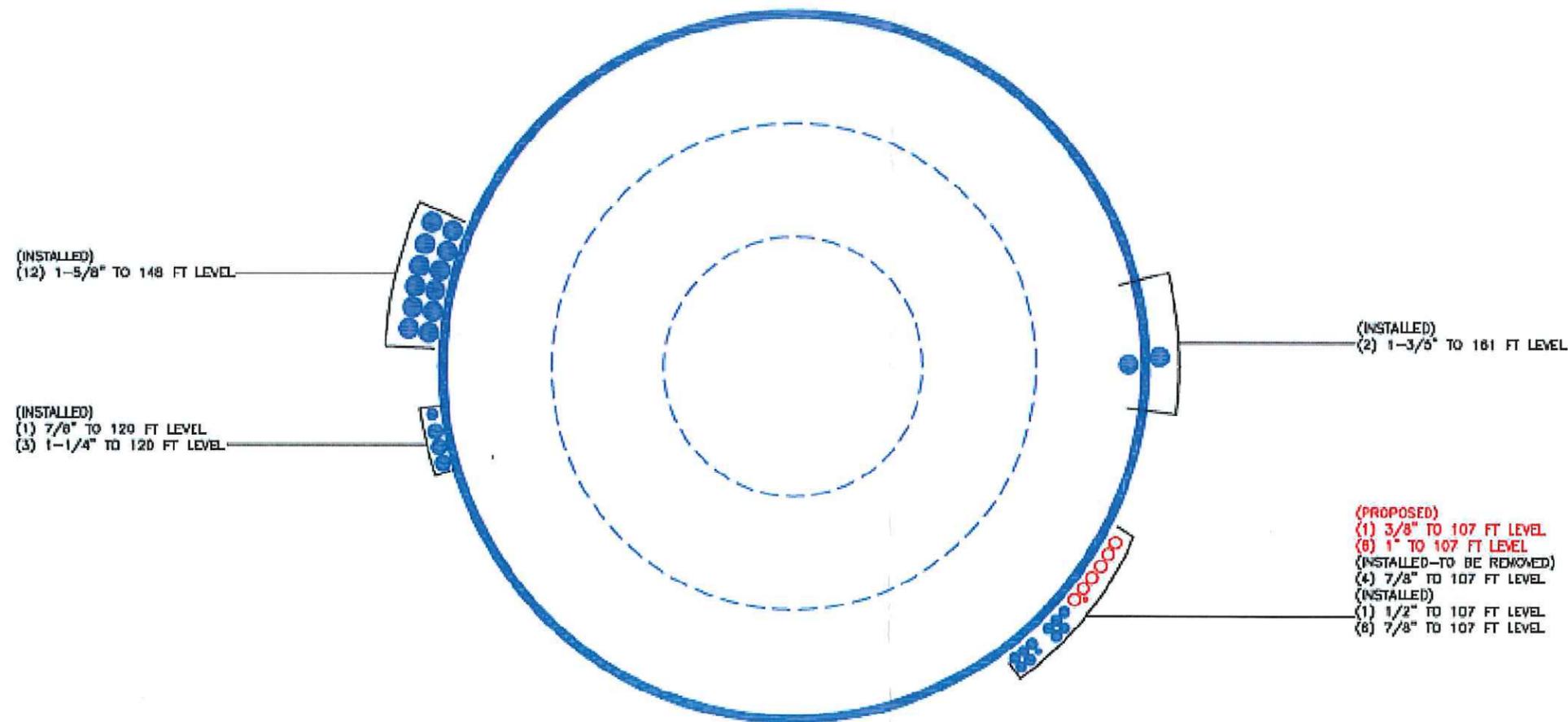
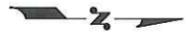
TYPICAL CADWELD TYPES

N.T.S.

1



9-7-2016



9-7-2016

1 BASE LEVEL DRAWING  
SCALE: NTS

PREPARED BY:  
**CROWN CASTLE**  
1220 AUGUSTA DRIVE, SUITE 500  
HOUSTON, TX 77057  
713-570-3092

**Trylon**  
24 QUEEN ST E  
BRAMPTON, ON  
1 (519) 572-9995

CLIENT:  
**at&t**  
Mobility  
1801 VALLEY VIEW LANE  
FARMERS BRANCH, TX 75234

THIS DOCUMENT IS THE DESIGN PROPERTY AND COPYRIGHT OF CROWN CASTLE AND FOR THE EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION OR USE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE CREATOR IS STRICTLY PROHIBITED.  
DRAWING SCALES ARE INTENDED FOR 24"x36" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

SUBMITTALS

REV	DATE	DESCRIPTION	BY
0	09/02/16	ISSUE FOR CONSTRUCTION	RSN

SITE INFO:  
SITE NAME:  
OWNED PROP/BRYAN S. TABOR  
FA NUMBER:  
10130592  
CROWN CASTLE BU#:  
826461  
SITE ADDRESS:  
101 E. 31ST STREET  
BRYAN, TX  
77803

SHEET TITLE:  
BASE LEVEL DRAWING

CHECKED BY:  
CHECKED BY DATE:  
SHEET NUMBER:  
C07



Date: July 25, 2016

Melissa Khawaja  
Crown Castle  
1220 Augusta Drive Suite 500  
Houston, TX 77057  
(724) 416-2439

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

**Subject:** Structural Analysis Report

**Carrier Designation:** AT&T Mobility Co-Locate  
Carrier Site Number: HX3819  
Carrier Site Name: Washington

**Crown Castle Designation:** Crown Castle BU Number: 826461  
Crown Castle Site Name: Owned Prop/Bryan S. Tabor  
Crown Castle JDE Job Number: 389036  
Crown Castle Work Order Number: 1273286  
Crown Castle Application Number: 356847 Rev. 1

**Engineering Firm Designation:** GPD Project Number: 2016777.826461.02

**Site Data:** 101 E. 31st Street, Bryan, Brazos County, TX 77803  
Latitude 30° 40' 7.19", Longitude -96° 22' 23.45"  
159 Foot – LeBlanc Monopole Tower

Dear Melissa Khawaja,

GPD is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 928169, in accordance with application 356847, 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:

LC7: Existing + Reserved Equipment + Proposed **Sufficient Capacity**  
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

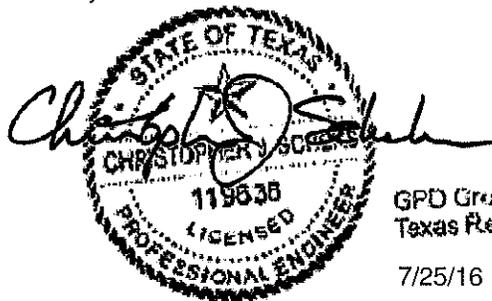
The analysis has been performed in accordance with the TIA-222-G standard and section 3108 of the 2009 IBC based upon a wind speed of 90 mph 3-second gust, exposure category C with topographic category 1 and crest height of 0 feet.

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

Structural analysis prepared by: Brian Christy

Respectfully submitted by:

Christopher J. Scheks, P.E.  
Texas #: 119636



GPD Group, Professional Corporation  
Texas Registration No. 16477

7/25/16

## TABLE OF CONTENTS

### 1) INTRODUCTION

### 2) ANALYSIS CRITERIA

Table 1 - Proposed Antenna and Cable Information

Table 2 - Existing and Reserved Antenna and Cable Information

Table 3 - Design Antenna and Cable Information

### 3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

### 4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Table 6 - Tower Components vs. Capacity

4.1) Recommendations

### 5) DISCLAIMER OF WARRANTIES

### 6) APPENDIX A

tnxTower Output

### 7) APPENDIX B

Base Level Drawing

### 8) APPENDIX C

Additional Calculations

## 1) INTRODUCTION

The existing 159 ft tower consists of 5 major sections connected by slip joints. It has a 12-sided cross section with a diameter of 60.36 inches (flat to flat) at the base and 22 inches (flat to flat) at the top. The structure is galvanized and does not contain tower lighting

This tower is a 159 ft Monopole tower designed by LeBlanc Communications, Inc. in October of 1997. The tower was originally designed for a wind speed of 110 mph per TIA/EIA-222-E.

## 2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of section 3108 of the 2009 IBC and TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 90 mph with no ice, 30 mph with 0.5 inch ice thickness and 60 mph under service loads, exposure category C with topographic category 1 and crest height of 0 feet.

**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
107.0	107.0	3	Commscope	SBJAH4-1D65B-DL	1 2	3/8 7/8	1
		3	Ericsson	RRUS A2			
		3	Ericsson	RRUS-11			
		3	Ericsson	RRUS 32			
		3	Andrew	E15Z01P13			
		1	Raycap	DC6-48-60-0-8F			
		1	Raycap	DC6-48-60-18-8C			
		3	Rosenberger Leoni	FB-7J-1463			

Notes:

- 1) See appendix B for proposed coax layout

**Table 2 - Existing and Reserved Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
161.0	163.0	12	Commscope	CBC1921x-DS-2X	2	1-3/5	2
		6	Commscope	HBXX-3319DS-A2M			
		3	Commscope	SBNH-1D65C-SR			
		6	Nokia	FHFB			
		3	Nokia	FRIG			
		1	Nokia	FXFC			
		1	Raycap	RNSNDC-7771-PF-48			
		3	Nokia	FRIG			
		3	Nokia	FRLB			
		161.0	1		13.5' Platform w/ Handrails		
148.0	148.0	3	Andrew	LNx-6514DS-VTM	12	1-5/8	
		3	Andrew	TBXLHA-6565B-VTM			
		3	Commscope	E15S09P49			
		3	Commscope	E15S09P73			
		1		T-Arm Mount [TA 702-3]			
126.0	126.0	3	Cellmax Technologies	CMA-B/6521/E0-6	6	1-5/8	
		1		T-Arm Mount [TA 601-3]			
120.0	120.0	3	RFS Celwave	APXVERR18-C	3 1	1-1/4 7/8	
		3	Commscope	TTTT65AP-1XR			
		3	Ericsson	800 MHZ SMR FILTER			
		3	Ericsson	RRUS 31 B25			
		3	Ericsson	RRUS-11 1900MHz			
		3	Nokia	FZHJ-RRH			
		9	RFS Celwave	ACU-A20-N			
	1		T-Arm Mount [TA 702-3]				
	117.0	1		T-Arm Mount [TA 601-3]			
107.0	107.0	3	Commscope	SBNHH-1D65C	1 10	1/2 7/8	
		3	Ericsson	RRUS-12 1600MHz			
		6	Andrew	DBXNH-6565B-R2M			
		3	Ericsson	RRUS-11			
		6	Ericsson	RRUS-12 1600MHz			
		1	Raycap	DC6-48-60-18-8F			
	1		Platform Mount [LP 301-1]				
	105.0	1		Miscellaneous [NA 509-3]			1

- Notes:  
 1) Equipment To Be Removed; Not Considered in this Analysis  
 2) Reserved Equipment

**Table 3 - Design Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
159.0	159.0	1		Amps Platform		
		9		Std Tri-Sector (76.7"x6.1"x1.4" & 16 lbs)		
147.6	147.6	1		Amps Platform		
		9		Std Tri-Sector (76.7"x6.1"x1.4" & 16 lbs)		

### 3) ANALYSIS PROCEDURE

**Table 4 - Documents Provided**

Document	Remarks	Reference	Source
Geotechnical Reports	LAW Project #: 60120-7-6024 Phase 04, dated 08/20/97	3470109	CCISITES
Tower Foundation Drawings	LCI Drawing #: 4471052-E2, dated 10/31/97	3929940	CCISITES
Tower Manufacturer Drawings	LCI File #: 4471052, dated 10/31/97	3470128	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) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.

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

**4) ANALYSIS RESULTS**

**Table 5 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	159 - 134	Pole	TP28.63x22x0.375	1	-7.2568	2418.4500	17.8	Pass
L2	134 - 99	Pole	TP37.02x26.7971x0.375	2	-20.7792	3062.1300	38.9	Pass
L3	99 - 66	Pole	TP44.88x34.9186x0.375	3	-29.1394	3446.4200	61.7	Pass
L4	66 - 32.5	Pole	TP52.88x42.5423x0.5	4	-41.7778	5696.8200	52.1	Pass
L5	32.5 - 0	Pole	TP60.36x50.0301x0.5	5	-60.1139	6275.6000	61.7	Pass
						Summary	ELC:	LC7
						Pole (L5)	61.7	Pass
						Rating =	61.7	Pass

**Table 6 - Tower Component Stresses vs. Capacity – LC7**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	55.7	Pass
1	Base Plate	0	64.2	Pass
1	Base Foundation	0	51.7	Pass
1	Base Foundation Soil Interaction	0	39.9	Pass

<b>Structure Rating (max from all components) =</b>	<b>64.2%</b>
---	--------------

Notes:

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

**4.1) Recommendations**

The existing tower and its foundation are sufficient for the proposed loading and do not require modifications.

## 5) DISCLAIMER OF WARRANTIES

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

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

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

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

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

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

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

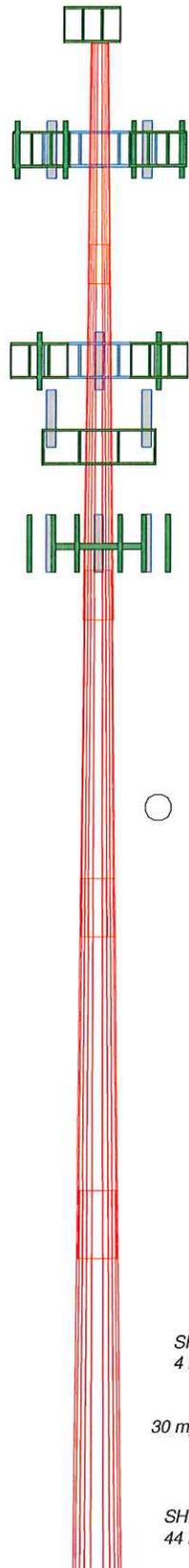
Towers are designed to carry gravity, wind, and ice loads. All members, legs, diagonals, struts, and redundant members provide structural stability to the tower with little redundancy. Absence or removal of a member can trigger catastrophic failure unless a substitute is provided before any removal.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

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

**APPENDIX A**  
**TNXTOWER OUTPUT**

Section	1	2	3	4	5
Length (ft)	25.00	39.08	38.17	39.58	39.58
Number of Sides	12	12	12	12	12
Thickness (in)	0.3750	0.3750	0.3750	0.5000	0.5000
Socket Length (ft)	4.08	5.17	6.08	7.08	7.08
Top Dia (in)	22.0000	26.7971	34.9196	42.5423	50.0301
Bot Dia (in)	28.6300	37.0200	44.9800	52.9800	60.9600
Grade			A572-65		
Weight (K)	2.6	5.1	6.2	10.2	11.9

159.0 ft  
134.0 ft  
99.0 ft  
66.0 ft  
32.5 ft  
0.0 ft



### DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
13.5' Platform w/ Handrails	161	FZHJ-RRH	120
SBNH-1D65C-SR w/ Mount Pipe	161	FZHJ-RRH	120
SBNH-1D65C-SR w/ Mount Pipe	161	FZHJ-RRH	120
SBNH-1D65C-SR w/ Mount Pipe	161	RRUS 31 B25	120
(2) HBXX-3319DS-A2M w/ Mount Pipe	161	RRUS 31 B25	120
(2) HBXX-3319DS-A2M w/ Mount Pipe	161	RRUS 31 B25	120
(2) HBXX-3319DS-A2M w/ Mount Pipe	161	RRUS-11 1900MHz	120
FRIG	161	RRUS-11 1900MHz	120
(2) FRIG	161	RRUS-11 1900MHz	120
(2) FRIG	161	800 MHZ SMR FILTER	120
FRIG	161	800 MHZ SMR FILTER	120
FRLB	161	800 MHZ SMR FILTER	120
FRLB	161	(3) ACU-A20-N	120
FRLB	161	(3) ACU-A20-N	120
RNSNDC-7771-PF-48	161	(3) ACU-A20-N	120
RNSNDC-7771-PF-48	161	T-Arm Mount [TA 601-3]	117
(3) FHFB	161	Platform Mount [LP 301-1]	107
(2) FHFB	161	(2) DBXNH-6565B-R2M	107
FHFB	161	(2) DBXNH-6565B-R2M	107
(3) CBC1921x-DS-2X	161	(2) DBXNH-6565B-R2M	107
(3) CBC1921x-DS-2X	161	RRUS-11	107
(6) CBC1921x-DS-2X	161	RRUS-11	107
FXFC	161	RRUS-11	107
T-Arm Mount [TA 702-3]	148	(2) RRUS-12 1600MHZ	107
TBXLHA-6565B-VTM w/ Mount Pipe	148	(2) RRUS-12 1600MHZ	107
TBXLHA-6565B-VTM w/ Mount Pipe	148	(2) RRUS-12 1600MHZ	107
TBXLHA-6565B-VTM w/ Mount Pipe	148	DC6-48-60-18-8F Surge Suppression Unit	107
LNx-6514DS-VTM w/ Mount Pipe	148		
LNx-6514DS-VTM w/ Mount Pipe	148	E15Z01P13	107
LNx-6514DS-VTM w/ Mount Pipe	148	SBJAH4-1D65B-DL w/ Mount Pipe	107
E15S09P73	148	RRUS 32	107
E15S09P73	148	RRUS A2	107
E15S09P73	148	RRUS-11	107
E15S09P49	148	DC6-48-60-0-8F	107
E15S09P49	148	DC6-48-60-18-8C	107
E15S09P49	148	FB-7J-1463	107
E15S09P49	148	E15Z01P13	107
T-Arm Mount [TA 601-3]	126	SBJAH4-1D65B-DL w/ Mount Pipe	107
(2) Pipe Mount 6x2.375"	126	RRUS 32	107
(2) Pipe Mount 6x2.375"	126	RRUS A2	107
(2) Pipe Mount 6x2.375"	126	RRUS-11	107
CMA-B/6521/E0-6 w/ Mount Pipe	126	FB-7J-1463	107
CMA-B/6521/E0-6 w/ Mount Pipe	126	E15Z01P13	107
CMA-B/6521/E0-6 w/ Mount Pipe	126	SBJAH4-1D65B-DL w/ Mount Pipe	107
T-Arm Mount [TA 702-3]	120	RRUS 32	107
TTTT65AP-1XR w/ Mount Pipe	120	RRUS A2	107
TTTT65AP-1XR w/ Mount Pipe	120	RRUS-11	107
TTTT65AP-1XR w/ Mount Pipe	120	FB-7J-1463	107
APXVERR18-C w/ Mount Pipe	120	Miscellaneous [NA 509-3]	105
APXVERR18-C w/ Mount Pipe	120		
APXVERR18-C w/ Mount Pipe	120		

### MATERIAL STRENGTH

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

ALL REACTION ARE FACTORE

### TOWER DESIGN NOTES

1. Tower is located in Brazos County, Texas.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 90 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 30 mph basic wind with 0.50 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 0.00 ft
8. TOWER RATING: 61.7%



TORQUE 1 kip-ft  
REACTIONS - 90 mph WIND

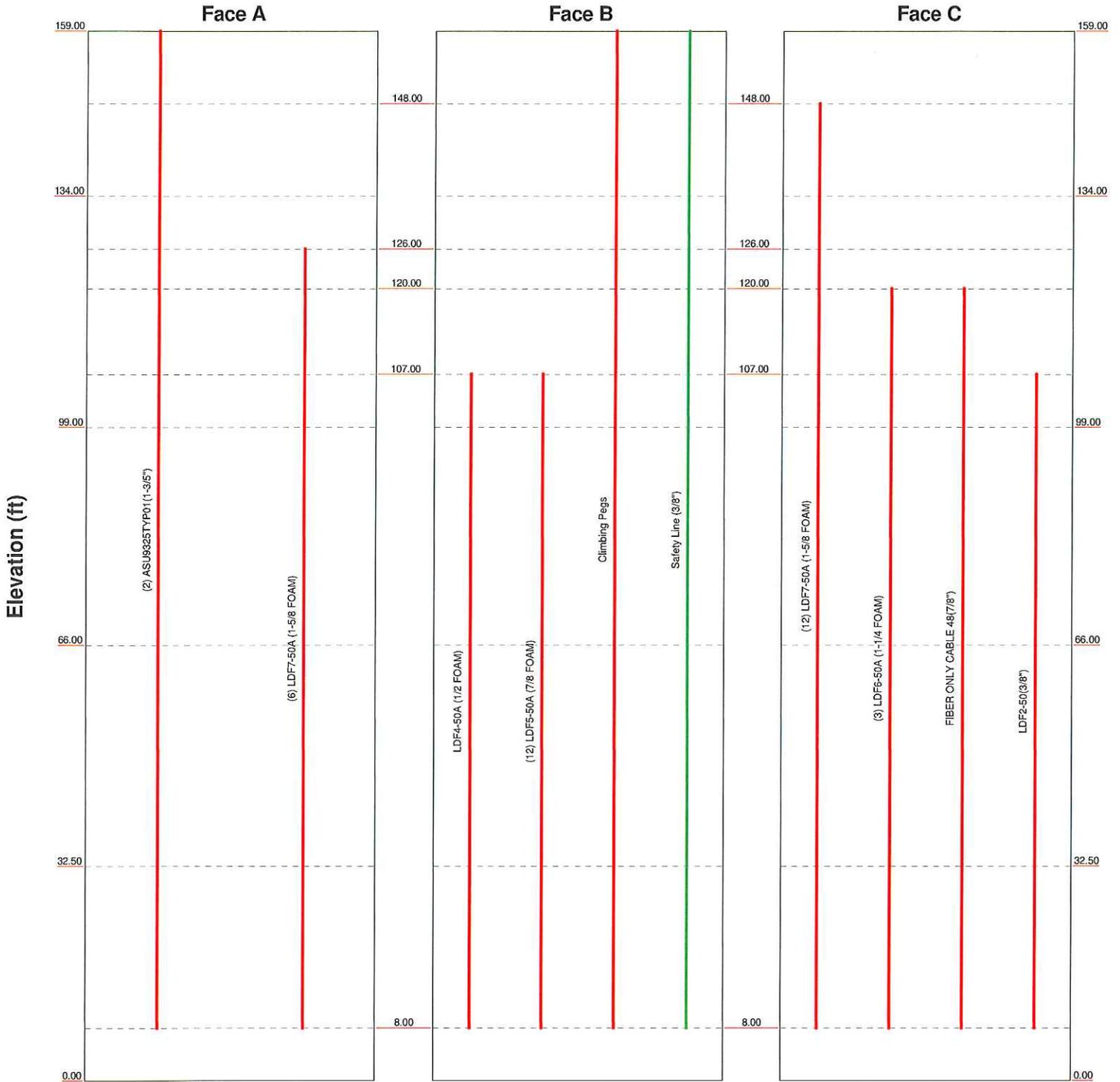
**GPD**  
520 South Main Street Suite 2531  
Akron, Ohio 44311  
Phone: (555) 555-1234  
FAX: (555) 555-1235

Job: **Owned Prop/Bryan S. Tabor - BU #: 826461**  
Project: **2016777.826461.02**  
Client: **Crown Castle USA, Inc.**  
Code: **TIA-222-G**  
Path: **WAKRN05.gpdco.com\TELECOM\Crown\826461\01\TNX\826461.ert**  
Drawn by: **bchristy**  
Date: **07/25/16**  
App'd:  
Scale: **NTS**  
Dwg No. **E-1**

# Feed Line Distribution Chart

0' - 159'

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



<p><b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235</p>	Job: <b>Owned Prop/Bryan S. Tabor - BU #: 826461</b>		
	Project: <b>2016777.826461.02</b>		
	Client: Crown Castle USA, Inc.	Drawn by: bchristy	App'd:
	Code: TIA-222-G	Date: 07/25/16	Scale: NTS
Path: \\AKRN05.gpdco.com\TELECOM\Crown\826461\01\TNX\826461.er			
		Dwg No. <b>E-7</b>	

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 1 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

## Tower Input Data

There is a pole section.

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

The following design criteria apply:

Tower is located in Brazos County, Texas.

Basic wind speed of 90 mph.

Structure Class II.

Exposure Category C.

Topographic Category I.

Crest Height 0.00 ft.

Nominal ice thickness of 0.5000 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 30 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

<ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>Include Bolts In Member Capacity</li> <li>Leg Bolts Are At Top Of Section</li> <li>Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>SR Members Have Cut Ends</li> <li>SR Members Are Concentric</li> </ul>	<ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>√ Use Clear Spans For KL/r</li> <li>Retension Guys To Initial Tension</li> <li>√ Bypass Mast Stability Checks</li> <li>√ Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <li>Autocalc Torque Arm Areas</li> <li>Add IBC .6D+W Combination</li> <li>√ Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> <li>Treat Feed Line Bundles As Cylinder</li> </ul>	<ul style="list-style-type: none"> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>SR Leg Bolts Resist Compression</li> <li>All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feed Line Torque</li> <li>Include Angle Block Shear Check</li> <li>Use TIA-222-G Bracing Resist. Exemption</li> <li>Use TIA-222-G Tension Splice Exemption Poles</li> <li>√ Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> </ul>
--	--	--

## 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	159.00-134.00	25.00	4.08	12	22.0000	28.6300	0.3750	1.5000	A572-65 (65 ksi)
L2	134.00-99.00	39.08	5.17	12	26.7971	37.0200	0.3750	1.5000	A572-65 (65 ksi)
L3	99.00-66.00	38.17	6.08	12	34.9186	44.8800	0.3750	1.5000	A572-65

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 2 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L4	66.00-32.50	39.58	7.08	12	42.5423	52.8800	0.5000	2.0000	(65 ksi) A572-65
L5	32.50-0.00	39.58		12	50.0301	60.3600	0.5000	2.0000	(65 ksi) A572-65

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I/Q in <sup>2</sup>	w in	w/t
L1	22.7761	26.1122	1558.6243	7.7417	11.3960	136.7694	3158.1954	12.8516	4.8910	13.043
	29.6400	34.1179	3476.6344	10.1153	14.8303	234.4272	7044.6039	16.7918	6.6678	17.781
L2	28.8481	31.9047	2842.9884	9.4591	13.8809	204.8130	5760.6652	15.7025	6.1766	16.471
	38.3259	44.2488	7584.3308	13.1189	19.1764	395.5042	15367.9104	21.7779	8.9164	23.777
L3	37.5464	41.7114	6352.9410	12.3666	18.0878	351.2276	12872.7808	20.5291	8.3532	22.275
	46.4632	53.7398	13586.2470	15.9328	23.2478	584.4090	27529.4198	26.4491	11.0228	29.394
L4	45.6878	67.6880	15271.0904	15.0511	22.0369	692.9784	30943.3694	33.3140	10.0613	20.123
	54.7454	84.3318	29533.0505	18.7520	27.3918	1078.1696	59841.9672	41.5055	12.8318	25.664
L5	53.7087	79.7434	24970.0350	17.7318	25.9156	963.5142	50596.0606	39.2473	12.0681	24.136
	62.4893	96.3746	44078.0084	21.4299	31.2665	1409.7528	89313.9952	47.4326	14.8365	29.673

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 159.00-134.00				1	1	1			
L2 134.00-99.00				1	1	1			
L3 99.00-66.00				1	1	1			
L4 66.00-32.50				1	1	1			
L5 32.50-0.00				1	1	1			

### Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
ASU9325TYP01(1-3/5")	A	Surface Ar (CaAa)	159.00 - 8.00	2	2	0.450 0.500	1.5840		1.61
LDF7-50A (1-5/8 FOAM)	C	Surface Ar (CaAa)	148.00 - 8.00	12	6	0.000 0.250	1.9800		0.82
LDF7-50A (1-5/8 FOAM)	A	Surface Ar (CaAa)	126.00 - 8.00	6	3	0.100 0.250	0.0000		0.82
LDF6-50A (1-1/4 FOAM)	C	Surface Ar (CaAa)	120.00 - 8.00	3	3	-0.150 -0.050	0.0000		0.66
FIBER ONLY CABLE 48(7/8")	C	Surface Ar (CaAa)	120.00 - 8.00	1	1	0.000 0.000	0.0000		0.25
LDF4-50A (1/2 FOAM)	B	Surface Ar (CaAa)	107.00 - 8.00	1	1	0.100 0.100	0.0000		0.15
LDF5-50A (7/8 FOAM)	B	Surface Ar (CaAa)	107.00 - 8.00	12	6	0.050 0.150	0.0000		0.33
LDF2-50(3/8")	C	Surface Ar	107.00 - 8.00	1	1	0.050	0.0000		0.08

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 3 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
Climbing Pegs	B	(CaAa) Surface Ar (CaAa)	159.00 - 8.00	1	1	0.150 0.000 0.500	0.1500		0.31

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight plf
Safety Line (3/8")	B	No	CaAa (Out Of Face)	159.00 - 8.00	1	No Ice 1/2" Ice	0.04 0.75

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L1	159.00-134.00	A	0.000	0.000	7.920	0.000	0.0807
		B	0.000	0.000	0.375	0.938	0.0133
		C	0.000	0.000	16.632	0.000	0.1378
L2	134.00-99.00	A	0.000	0.000	11.088	0.000	0.2458
		B	0.000	0.000	0.525	1.313	0.0514
		C	0.000	0.000	41.580	0.000	0.3919
L3	99.00-66.00	A	0.000	0.000	10.454	0.000	0.2689
		B	0.000	0.000	0.495	1.238	0.1531
		C	0.000	0.000	39.204	0.000	0.4009
L4	66.00-32.50	A	0.000	0.000	10.613	0.000	0.2730
		B	0.000	0.000	0.502	1.256	0.1554
		C	0.000	0.000	39.798	0.000	0.4070
L5	32.50-0.00	A	0.000	0.000	7.762	0.000	0.1996
		B	0.000	0.000	0.367	0.919	0.1137
		C	0.000	0.000	29.106	0.000	0.2977

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L1	159.00-134.00	A	1.160	0.000	0.000	17.152	0.000	0.2189
		B		0.000	0.000	6.177	6.739	0.0904
		C		0.000	0.000	24.851	0.000	0.4006
L2	134.00-99.00	A	1.134	0.000	0.000	31.845	0.000	0.4837
		B		0.000	0.000	12.824	9.435	0.1858
		C		0.000	0.000	74.949	0.000	1.1311
L3	99.00-66.00	A	1.095	0.000	0.000	31.775	0.000	0.4979
		B		0.000	0.000	24.814	8.720	0.3551
		C		0.000	0.000	82.678	0.000	1.1632
L4	66.00-32.50	A	1.040	0.000	0.000	31.614	0.000	0.4944
		B		0.000	0.000	24.355	8.596	0.3484
		C		0.000	0.000	82.774	0.000	1.1519
L5	32.50-0.00	A	0.932	0.000	0.000	22.447	0.000	0.3503
		B		0.000	0.000	16.936	6.017	0.2426

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 4 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Tower Section	Tower Elevation ft	Face or Leg C	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
		C		0.000	0.000	59.324	0.000	0.8127

### Feed Line Center of Pressure

Section	Elevation ft	CP <sub>x</sub> in	CP <sub>z</sub> in	CP <sub>x</sub> Ice in	CP <sub>z</sub> Ice in
L1	159.00-134.00	-0.1761	0.4550	0.0776	0.3378
L2	134.00-99.00	-0.2931	0.9072	-0.0323	0.7467
L3	99.00-66.00	-0.3080	0.9522	0.1267	0.8337
L4	66.00-32.50	-0.3191	0.9855	0.1354	0.9233
L5	32.50-0.00	-0.2581	0.7966	0.1137	0.8555

### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
L1	2	ASU9325TYP01(1-3/5")	134.00 - 159.00	1.0000	1.0000
L1	3	LDF7-50A (1-5/8 FOAM)	134.00 - 148.00	1.0000	1.0000
L1	12	Climbing Pegs	134.00 - 159.00	1.0000	1.0000
L1	4	LDF7-50A (1-5/8 FOAM)	134.00 - 126.00	1.0000	1.0000
L1	5	LDF6-50A (1-1/4 FOAM)	134.00 - 120.00	1.0000	1.0000
L1	6	FIBER ONLY CABLE 48(7/8")	134.00 - 120.00	1.0000	1.0000
L1	7	LDF4-50A (1/2 FOAM)	134.00 - 107.00	1.0000	1.0000
L1	8	LDF5-50A (7/8 FOAM)	134.00 - 107.00	1.0000	1.0000
L1	10	LDF2-50(3/8")	134.00 - 107.00	1.0000	1.0000
L2	2	ASU9325TYP01(1-3/5")	99.00 - 134.00	1.0000	1.0000
L2	3	LDF7-50A (1-5/8 FOAM)	99.00 - 134.00	1.0000	1.0000
L2	4	LDF7-50A (1-5/8 FOAM)	99.00 - 126.00	1.0000	1.0000
L2	5	LDF6-50A (1-1/4 FOAM)	99.00 - 120.00	1.0000	1.0000
L2	6	FIBER ONLY CABLE 48(7/8")	99.00 - 120.00	1.0000	1.0000
L2	7	LDF4-50A (1/2 FOAM)	99.00 - 107.00	1.0000	1.0000
L2	8	LDF5-50A (7/8 FOAM)	99.00 - 107.00	1.0000	1.0000
L2	10	LDF2-50(3/8")	99.00 - 107.00	1.0000	1.0000
L2	12	Climbing Pegs	99.00 - 134.00	1.0000	1.0000
L3	2	ASU9325TYP01(1-3/5")	66.00 - 99.00	1.0000	1.0000
L3	3	LDF7-50A (1-5/8 FOAM)	66.00 - 99.00	1.0000	1.0000
L3	4	LDF7-50A (1-5/8 FOAM)	66.00 - 99.00	1.0000	1.0000
L3	5	LDF6-50A (1-1/4 FOAM)	66.00 - 99.00	1.0000	1.0000
L3	6	FIBER ONLY CABLE 48(7/8")	66.00 - 99.00	1.0000	1.0000
L3	7	LDF4-50A (1/2 FOAM)	66.00 - 99.00	1.0000	1.0000
L3	8	LDF5-50A (7/8 FOAM)	66.00 - 99.00	1.0000	1.0000
L3	10	LDF2-50(3/8")	66.00 - 99.00	1.0000	1.0000

<p><b>tnxTower</b></p> <p><b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235</p>	<p><b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461</p>	<p><b>Page</b> 5 of 13</p>
	<p><b>Project</b> 2016777.826461.02</p>	<p><b>Date</b> 17:04:52 07/25/16</p>
	<p><b>Client</b> Crown Castle USA, Inc.</p>	<p><b>Designed by</b> bchristy</p>

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
L3	12	Climbing Pegs	66.00 - 99.00	1.0000	1.0000
L4	2	ASU9325TYP01(1-3/5")	32.50 - 66.00	1.0000	1.0000
L4	3	LDF7-50A (1-5/8 FOAM)	32.50 - 66.00	1.0000	1.0000
L4	4	LDF7-50A (1-5/8 FOAM)	32.50 - 66.00	1.0000	1.0000
L4	5	LDF6-50A (1-1/4 FOAM)	32.50 - 66.00	1.0000	1.0000
L4	6	FIBER ONLY CABLE 48(7/8")	32.50 - 66.00	1.0000	1.0000
L4	7	LDF4-50A (1/2 FOAM)	32.50 - 66.00	1.0000	1.0000
L4	8	LDF5-50A (7/8 FOAM)	32.50 - 66.00	1.0000	1.0000
L4	10	LDF2-50(3/8")	32.50 - 66.00	1.0000	1.0000
L4	12	Climbing Pegs	32.50 - 66.00	1.0000	1.0000

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>Front</sub> No Ice 1/2" Ice	C <sub>A</sub> A <sub>Side</sub> No Ice 1/2" Ice	Weight K	
13.5' Platform w/ Handrails	C	From Leg	0.00 0.00 0.00	0.0000	161.00	No Ice 1/2" Ice	34.73 44.92	34.73 44.92	1.9845 2.4950
SBNH-1D65C-SR w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	161.00	No Ice 1/2" Ice	11.68 12.40	9.84 11.37	0.0826 0.1722
SBNH-1D65C-SR w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	161.00	No Ice 1/2" Ice	11.68 12.40	9.84 11.37	0.0826 0.1722
SBNH-1D65C-SR w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	161.00	No Ice 1/2" Ice	11.68 12.40	9.84 11.37	0.0826 0.1722
(2) HBXX-3319DS-A2M w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	161.00	No Ice 1/2" Ice	10.81 11.31	4.38 5.18	0.0591 0.1307
(2) HBXX-3319DS-A2M w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	161.00	No Ice 1/2" Ice	10.81 11.31	4.38 5.18	0.0591 0.1307
(2) HBXX-3319DS-A2M w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	161.00	No Ice 1/2" Ice	10.81 11.31	4.38 5.18	0.0591 0.1307
FRIG	A	From Leg	4.00 0.00 2.00	0.0000	161.00	No Ice 1/2" Ice	2.39 2.59	0.97 1.10	0.0573 0.0746
(2) FRIG	B	From Leg	4.00 0.00 2.00	0.0000	161.00	No Ice 1/2" Ice	2.39 2.59	0.97 1.10	0.0573 0.0746
(2) FRIG	A	From Leg	4.00 0.00 2.00	0.0000	161.00	No Ice 1/2" Ice	2.39 2.59	0.97 1.10	0.0573 0.0746
FRIG	C	From Leg	4.00 0.00 2.00	0.0000	161.00	No Ice 1/2" Ice	2.39 2.59	0.97 1.10	0.0573 0.0746
FRLB	A	From Leg	4.00 0.00 2.00	0.0000	161.00	No Ice 1/2" Ice	2.07 2.25	0.78 0.90	0.0595 0.0748
FRLB	B	From Leg	4.00 0.00 2.00	0.0000	161.00	No Ice 1/2" Ice	2.07 2.25	0.78 0.90	0.0595 0.0748

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b>	Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b>	6 of 13
	<b>Project</b>	2016777.826461.02	<b>Date</b>	17:04:52 07/25/16
	<b>Client</b>	Crown Castle USA, Inc.	<b>Designed by</b>	bchristy

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight	
			Horz	Lateral						Vert
FRLB	C	From Leg	2.00		0.0000	161.00	No Ice	2.07	0.78	0.0595
			4.00				1/2" Ice	2.25	0.90	0.0748
			0.00							
RNSNDC-7771-PF-48	A	From Leg	2.00		0.0000	161.00	No Ice	3.20	1.03	0.0149
			4.00				1/2" Ice	3.42	1.17	0.0362
			0.00							
RNSNDC-7771-PF-48	B	From Leg	2.00		0.0000	161.00	No Ice	3.20	1.03	0.0149
			4.00				1/2" Ice	3.42	1.17	0.0362
			0.00							
(3) FHFBB	A	From Leg	2.00		0.0000	161.00	No Ice	2.42	1.52	0.0485
			4.00				1/2" Ice	2.62	1.69	0.0683
			0.00							
(2) FHFBB	B	From Leg	2.00		0.0000	161.00	No Ice	2.42	1.52	0.0485
			4.00				1/2" Ice	2.62	1.69	0.0683
			0.00							
FHFBB	C	From Leg	2.00		0.0000	161.00	No Ice	2.42	1.52	0.0485
			4.00				1/2" Ice	2.62	1.69	0.0683
			0.00							
(3) CBC1921x-DS-2X	A	From Leg	2.00		0.0000	161.00	No Ice	0.48	0.35	0.0163
			4.00				1/2" Ice	0.57	0.42	0.0216
			0.00							
(3) CBC1921x-DS-2X	B	From Leg	2.00		0.0000	161.00	No Ice	0.48	0.35	0.0163
			4.00				1/2" Ice	0.57	0.42	0.0216
			0.00							
(6) CBC1921x-DS-2X	C	From Leg	2.00		0.0000	161.00	No Ice	0.48	0.35	0.0163
			4.00				1/2" Ice	0.57	0.42	0.0216
			0.00							
FXFC	C	From Leg	2.00		0.0000	161.00	No Ice	0.84	0.96	0.0551
			4.00				1/2" Ice	0.98	1.11	0.0775
			0.00							
T-Arm Mount [TA 702-3]	C	From Leg	2.00		0.0000	148.00	No Ice	5.64	5.64	0.3390
			4.00				1/2" Ice	6.55	6.55	0.4290
			0.00							
TBXLHA-6565B-VTM w/ Mount Pipe	A	From Leg	2.00		0.0000	148.00	No Ice	9.43	6.74	0.0661
			4.00				1/2" Ice	9.99	7.58	0.1299
			0.00							
TBXLHA-6565B-VTM w/ Mount Pipe	B	From Leg	2.00		0.0000	148.00	No Ice	9.43	6.74	0.0661
			4.00				1/2" Ice	9.99	7.58	0.1299
			0.00							
TBXLHA-6565B-VTM w/ Mount Pipe	C	From Leg	2.00		0.0000	148.00	No Ice	9.43	6.74	0.0661
			4.00				1/2" Ice	9.99	7.58	0.1299
			0.00							
LNX-6514DS-VTM w/ Mount Pipe	A	From Leg	2.00		0.0000	148.00	No Ice	8.17	6.83	0.0607
			4.00				1/2" Ice	8.63	7.79	0.1271
			0.00							
LNX-6514DS-VTM w/ Mount Pipe	B	From Leg	2.00		0.0000	148.00	No Ice	8.17	6.83	0.0607
			4.00				1/2" Ice	8.63	7.79	0.1271
			0.00							
LNX-6514DS-VTM w/ Mount Pipe	C	From Leg	2.00		0.0000	148.00	No Ice	8.17	6.83	0.0607
			4.00				1/2" Ice	8.63	7.79	0.1271
			0.00							
E15S09P73	A	From Leg	2.00		0.0000	148.00	No Ice	0.46	0.36	0.0066
			4.00				1/2" Ice	0.55	0.44	0.0119
			0.00							
E15S09P73	B	From Leg	2.00		0.0000	148.00	No Ice	0.46	0.36	0.0066
			4.00				1/2" Ice	0.55	0.44	0.0119
			0.00							

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 7 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight						
			Horz	Lateral						Vert	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
			ft	ft											
			ft	ft											
			ft	ft											
E15S09P73	C	From Leg	0.00		4.00	0.0000	148.00	No Ice	0.46	0.36	0.0066				
			4.00									1/2" Ice	0.55	0.44	0.0119
			0.00												
E15S09P49	A	From Leg	0.00		4.00	0.0000	148.00	No Ice	0.78	0.40	0.0225				
			4.00									1/2" Ice	0.89	0.49	0.0293
			0.00												
E15S09P49	B	From Leg	0.00		4.00	0.0000	148.00	No Ice	0.78	0.40	0.0225				
			4.00									1/2" Ice	0.89	0.49	0.0293
			0.00												
E15S09P49	C	From Leg	0.00		4.00	0.0000	148.00	No Ice	0.78	0.40	0.0225				
			4.00									1/2" Ice	0.89	0.49	0.0293
			0.00												
T-Arm Mount [TA 601-3]	C	None			0.0000	126.00	No Ice	10.90	10.90	0.7260					
(2) Pipe Mount 6'x2.375"	A	From Leg	0.00		4.00	0.0000	126.00	No Ice	14.65	14.65	0.9256				
			4.00									1/2" Ice	1.43	1.43	0.0261
			0.00									1/2" Ice	1.92	1.92	0.0369
(2) Pipe Mount 6'x2.375"	B	From Leg	0.00		4.00	0.0000	126.00	No Ice	1.43	1.43	0.0261				
			4.00									1/2" Ice	1.92	1.92	0.0369
			0.00												
(2) Pipe Mount 6'x2.375"	C	From Leg	0.00		4.00	0.0000	126.00	No Ice	1.43	1.43	0.0261				
			4.00									1/2" Ice	1.92	1.92	0.0369
			0.00												
CMA-B/6521/E0-6 w/ Mount Pipe	A	From Leg	0.00		4.00	0.0000	126.00	No Ice	6.63	6.33	0.0566				
			4.00									1/2" Ice	7.17	7.55	0.1121
			0.00												
CMA-B/6521/E0-6 w/ Mount Pipe	B	From Leg	0.00		4.00	0.0000	126.00	No Ice	6.63	6.33	0.0566				
			4.00									1/2" Ice	7.17	7.55	0.1121
			0.00												
CMA-B/6521/E0-6 w/ Mount Pipe	C	From Leg	0.00		4.00	0.0000	126.00	No Ice	6.63	6.33	0.0566				
			4.00									1/2" Ice	7.17	7.55	0.1121
			0.00												
T-Arm Mount [TA 702-3]	C	None			0.0000	120.00	No Ice	5.64	5.64	0.3390					
T-Arm Mount [TA 601-3]	C	None			0.0000	117.00	No Ice	10.90	10.90	0.7260					
											1/2" Ice	14.65	14.65	0.9256	
											1/2" Ice	7.39	5.17	0.1030	
TTTT65AP-1XR w/ Mount Pipe	A	From Leg	0.00		4.00	0.0000	120.00	No Ice	6.98	4.47	0.0513				
			4.00									1/2" Ice	7.39	5.17	0.1030
			0.00												
TTTT65AP-1XR w/ Mount Pipe	B	From Leg	0.00		4.00	0.0000	120.00	No Ice	6.98	4.47	0.0513				
			4.00									1/2" Ice	7.39	5.17	0.1030
			0.00												
TTTT65AP-1XR w/ Mount Pipe	C	From Leg	0.00		4.00	0.0000	120.00	No Ice	6.98	4.47	0.0513				
			4.00									1/2" Ice	7.39	5.17	0.1030
			0.00												
APXVERR18-C w/ Mount Pipe	A	From Leg	0.00		4.00	0.0000	120.00	No Ice	8.02	6.71	0.0789				
			4.00									1/2" Ice	8.48	7.66	0.1443
			0.00												
APXVERR18-C w/ Mount Pipe	B	From Leg	0.00		4.00	0.0000	120.00	No Ice	8.02	6.71	0.0789				
			4.00									1/2" Ice	8.48	7.66	0.1443
			0.00												
APXVERR18-C w/ Mount Pipe	C	From Leg	0.00		4.00	0.0000	120.00	No Ice	8.02	6.71	0.0789				
			4.00									1/2" Ice	8.48	7.66	0.1443
			0.00												
FZHJ-RRH	A	From Leg	0.00		4.00	0.0000	120.00	No Ice	1.26	1.01	0.0552				
			4.00									1/2" Ice	1.41	1.14	0.0733
			0.00												

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 8 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>Front</sub>	C <sub>A</sub> A <sub>Side</sub>	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
FZHJ-RRH	B	From Leg	4.00	0.00	0.0000	120.00	No Ice	1.26	1.01	0.0552
			0.00	0.00			1/2" Ice	1.41	1.14	0.0733
			0.00	0.00						
FZHJ-RRH	C	From Leg	4.00	0.00	0.0000	120.00	No Ice	1.26	1.01	0.0552
			0.00	0.00			1/2" Ice	1.41	1.14	0.0733
			0.00	0.00						
RRUS 31 B25	A	From Leg	4.00	0.00	0.0000	120.00	No Ice	1.62	1.28	0.0561
			0.00	0.00			1/2" Ice	1.78	1.43	0.0722
			0.00	0.00						
RRUS 31 B25	B	From Leg	4.00	0.00	0.0000	120.00	No Ice	1.62	1.28	0.0561
			0.00	0.00			1/2" Ice	1.78	1.43	0.0722
			0.00	0.00						
RRUS 31 B25	C	From Leg	4.00	0.00	0.0000	120.00	No Ice	1.62	1.28	0.0561
			0.00	0.00			1/2" Ice	1.78	1.43	0.0722
			0.00	0.00						
RRUS-11 1900MHz	A	From Leg	4.00	0.00	0.0000	120.00	No Ice	2.52	1.02	0.0440
			0.00	0.00			1/2" Ice	2.72	1.16	0.0633
			0.00	0.00						
RRUS-11 1900MHz	B	From Leg	4.00	0.00	0.0000	120.00	No Ice	2.52	1.02	0.0440
			0.00	0.00			1/2" Ice	2.72	1.16	0.0633
			0.00	0.00						
RRUS-11 1900MHz	C	From Leg	4.00	0.00	0.0000	120.00	No Ice	2.52	1.02	0.0440
			0.00	0.00			1/2" Ice	2.72	1.16	0.0633
			0.00	0.00						
800 MHZ SMR FILTER	A	From Leg	4.00	0.00	0.0000	120.00	No Ice	0.22	0.22	0.0088
			0.00	0.00			1/2" Ice	0.29	0.29	0.0137
			0.00	0.00						
800 MHZ SMR FILTER	B	From Leg	4.00	0.00	0.0000	120.00	No Ice	0.22	0.22	0.0088
			0.00	0.00			1/2" Ice	0.29	0.29	0.0137
			0.00	0.00						
800 MHZ SMR FILTER	C	From Leg	4.00	0.00	0.0000	120.00	No Ice	0.22	0.22	0.0088
			0.00	0.00			1/2" Ice	0.29	0.29	0.0137
			0.00	0.00						
(3) ACU-A20-N	A	From Leg	4.00	0.00	0.0000	120.00	No Ice	0.07	0.12	0.0010
			0.00	0.00			1/2" Ice	0.10	0.16	0.0023
			0.00	0.00						
(3) ACU-A20-N	B	From Leg	4.00	0.00	0.0000	120.00	No Ice	0.07	0.12	0.0010
			0.00	0.00			1/2" Ice	0.10	0.16	0.0023
			0.00	0.00						
(3) ACU-A20-N	C	From Leg	4.00	0.00	0.0000	120.00	No Ice	0.07	0.12	0.0010
			0.00	0.00			1/2" Ice	0.10	0.16	0.0023
			0.00	0.00						
Platform Mount [LP 301-1]	C	None			0.0000	107.00	No Ice	30.10	30.10	1.5885
							1/2" Ice	40.80	40.80	2.0292
Miscellaneous [NA 509-3]	C	None			0.0000	105.00	No Ice	11.84	11.84	0.2750
							1/2" Ice	16.96	16.96	0.2962
(2) DBXNH-6565B-R2M	A	From Leg	4.00	0.00	0.0000	107.00	No Ice	8.27	5.47	0.0540
			0.00	0.00			1/2" Ice	8.73	5.93	0.1050
			0.00	0.00						
(2) DBXNH-6565B-R2M	B	From Leg	4.00	0.00	0.0000	107.00	No Ice	8.27	5.47	0.0540
			0.00	0.00			1/2" Ice	8.73	5.93	0.1050
			0.00	0.00						
(2) DBXNH-6565B-R2M	C	From Leg	4.00	0.00	0.0000	107.00	No Ice	8.27	5.47	0.0540
			0.00	0.00			1/2" Ice	8.73	5.93	0.1050
			0.00	0.00						
RRUS-11	A	From Leg	4.00	0.00	0.0000	107.00	No Ice	2.78	1.19	0.0476

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 9 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
			0.00			1/2" Ice	2.99	1.33	0.0684	
			0.00							
RRUS-11	B	From Leg	4.00		0.0000	107.00	No Ice	2.78	1.19	0.0476
			0.00				1/2" Ice	2.99	1.33	0.0684
			0.00							
RRUS-11	C	From Leg	4.00		0.0000	107.00	No Ice	2.78	1.19	0.0476
			0.00				1/2" Ice	2.99	1.33	0.0684
			0.00							
(2) RRUS-12 1600MHZ	A	From Leg	4.00		0.0000	107.00	No Ice	2.70	1.21	0.0600
			0.00				1/2" Ice	2.90	1.36	0.0813
			0.00							
(2) RRUS-12 1600MHZ	B	From Leg	4.00		0.0000	107.00	No Ice	2.70	1.21	0.0600
			0.00				1/2" Ice	2.90	1.36	0.0813
			0.00							
(2) RRUS-12 1600MHZ	C	From Leg	4.00		0.0000	107.00	No Ice	2.70	1.21	0.0600
			0.00				1/2" Ice	2.90	1.36	0.0813
			0.00							
DC6-48-60-18-8F Surge Suppression Unit	A	From Leg	4.00		0.0000	107.00	No Ice	0.92	0.92	0.0189
			0.00				1/2" Ice	1.46	1.46	0.0366
			0.00							
E15Z01P13	A	From Leg	4.00		0.0000	107.00	No Ice	0.82	0.62	0.0240
			0.00				1/2" Ice	0.94	0.73	0.0318
			0.00							
SBJAH4-1D65B-DL w/ Mount Pipe	A	From Leg	4.00		0.0000	107.00	No Ice	9.47	7.74	0.0838
			0.00				1/2" Ice	10.04	8.94	0.1611
			0.00							
RRUS 32	A	From Leg	4.00		0.0000	107.00	No Ice	3.31	2.42	0.0770
			0.00				1/2" Ice	3.56	2.64	0.1049
			0.00							
RRUS A2	A	From Leg	4.00		0.0000	107.00	No Ice	1.60	0.39	0.0150
			0.00				1/2" Ice	1.76	0.48	0.0254
			0.00							
RRUS-11	A	From Leg	4.00		0.0000	107.00	No Ice	2.78	1.19	0.0476
			0.00				1/2" Ice	2.99	1.33	0.0684
			0.00							
DC6-48-60-0-8F	A	From Leg	4.00		0.0000	107.00	No Ice	2.20	2.20	0.0189
			0.00				1/2" Ice	2.40	2.40	0.0415
			0.00							
DC6-48-60-18-8C	A	From Leg	4.00		0.0000	107.00	No Ice	3.05	0.98	0.0160
			0.00				1/2" Ice	3.26	1.12	0.0373
			0.00							
FB-7J-1463	A	From Leg	4.00		0.0000	107.00	No Ice	0.73	0.38	0.0050
			0.00				1/2" Ice	0.85	0.47	0.0106
			0.00							
E15Z01P13	B	From Leg	4.00		0.0000	107.00	No Ice	0.82	0.62	0.0240
			0.00				1/2" Ice	0.94	0.73	0.0318
			0.00							
SBJAH4-1D65B-DL w/ Mount Pipe	B	From Leg	4.00		0.0000	107.00	No Ice	9.47	7.74	0.0838
			0.00				1/2" Ice	10.04	8.94	0.1611
			0.00							
RRUS 32	B	From Leg	4.00		0.0000	107.00	No Ice	3.31	2.42	0.0770
			0.00				1/2" Ice	3.56	2.64	0.1049
			0.00							
RRUS A2	B	From Leg	4.00		0.0000	107.00	No Ice	1.60	0.39	0.0150
			0.00				1/2" Ice	1.76	0.48	0.0254
			0.00							
RRUS-11	B	From Leg	4.00		0.0000	107.00	No Ice	2.78	1.19	0.0476

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 10 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight
			Horz	Lateral					
			0.00						
			0.00			1/2" Ice	2.99	1.33	0.0684
FB-7J-1463	B	From Leg	4.00		0.0000	107.00	No Ice	0.73	0.0050
			0.00				1/2" Ice	0.85	0.0106
			0.00						
E15Z01P13	C	From Leg	4.00		0.0000	107.00	No Ice	0.82	0.0240
			0.00				1/2" Ice	0.94	0.0318
			0.00						
SBJAH4-1D65B-DL w/ Mount Pipe	C	From Leg	4.00		0.0000	107.00	No Ice	9.47	0.0838
			0.00				1/2" Ice	10.04	0.1611
			0.00						
RRUS 32	C	From Leg	4.00		0.0000	107.00	No Ice	3.31	0.0770
			0.00				1/2" Ice	3.56	0.1049
			0.00						
RRUS A2	C	From Leg	4.00		0.0000	107.00	No Ice	1.60	0.0150
			0.00				1/2" Ice	1.76	0.0254
			0.00						
RRUS-11	C	From Leg	4.00		0.0000	107.00	No Ice	2.78	0.0476
			0.00				1/2" Ice	2.99	0.0684
			0.00						
FB-7J-1463	C	From Leg	4.00		0.0000	107.00	No Ice	0.73	0.0050
			0.00				1/2" Ice	0.85	0.0106
			0.00						

## 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
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

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 11 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Comb. No.	Description
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 Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	159 - 134	20.503	48	1.1474	0.0026
L2	138.083 - 99	15.613	48	1.0715	0.0016
L3	104.167 - 66	8.754	48	0.8328	0.0008
L4	72.0833 - 32.5	4.081	48	0.5301	0.0003
L5	39.5833 - 0	1.255	48	0.2844	0.0001

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
161.00	13.5' Platform w/ Handrails	48	20.503	1.1474	0.0026	43379
148.00	T-Arm Mount [TA 702-3]	48	17.899	1.1118	0.0020	19717
126.00	T-Arm Mount [TA 601-3]	48	12.976	1.0035	0.0012	8570
120.00	T-Arm Mount [TA 702-3]	48	11.740	0.9622	0.0011	7890
117.00	T-Arm Mount [TA 601-3]	48	11.142	0.9399	0.0010	7589
107.00	Platform Mount [LP 301-1]	48	9.256	0.8580	0.0008	6738
105.00	Miscellaneous [NA 509-3]	48	8.900	0.8403	0.0008	6622

### Maximum Tower Deflections - Design Wind

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 12 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	159 - 134	82.598	20	4.6089	0.0101
L2	138.083 - 99	62.948	20	4.3146	0.0060
L3	104.167 - 66	35.321	20	3.3599	0.0028
L4	72.0833 - 32.5	16.473	20	2.1400	0.0011
L5	39.5833 - 0	5.064	20	1.1479	0.0005

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
161.00	13.5' Platform w/ Handrails	20	82.598	4.6089	0.0101	11117
148.00	T-Arm Mount [TA 702-3]	20	72.138	4.4721	0.0078	5052
126.00	T-Arm Mount [TA 601-3]	20	52.335	4.0448	0.0044	2174
120.00	T-Arm Mount [TA 702-3]	20	47.358	3.8798	0.0038	1992
117.00	T-Arm Mount [TA 601-3]	20	44.951	3.7902	0.0036	1911
107.00	Platform Mount [LP 301-1]	20	37.348	3.4610	0.0030	1686
105.00	Miscellaneous [NA 509-3]	20	35.911	3.3900	0.0029	1656

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
L1	159 - 134 (1)	TP28.63x22x0.375	25.00	0.00	0.0	32.8103	-7.2568	2418.4500	0.003
L2	134 - 99 (2)	TP37.02x26.7971x0.375	39.08	0.00	0.0	42.6170	-20.7792	3062.1300	0.007
L3	99 - 66 (3)	TP44.88x34.9186x0.375	38.17	0.00	0.0	51.8226	-29.1394	3446.4200	0.008
L4	66 - 32.5 (4)	TP52.88x42.5423x0.5	39.58	0.00	0.0	81.3534	-41.7778	5696.8200	0.007
L5	32.5 - 0 (5)	TP60.36x50.0301x0.5	39.58	0.00	0.0	96.3746	-60.1139	6275.6000	0.010

### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>xx</sub> kip-ft	φM <sub>xx</sub> kip-ft	Ratio $\frac{M_{xx}}{\phi M_{xx}}$	M <sub>yy</sub> kip-ft	φM <sub>yy</sub> kip-ft	Ratio $\frac{M_{yy}}{\phi M_{yy}}$
L1	159 - 134 (1)	TP28.63x22x0.375	233.13	1331.02	0.175	0.00	1331.02	0.000
L2	134 - 99 (2)	TP37.02x26.7971x0.375	838.77	2195.85	0.382	0.00	2195.85	0.000
L3	99 - 66 (3)	TP44.88x34.9186x0.375	1829.92	3010.90	0.608	0.00	3010.90	0.000
L4	66 - 32.5 (4)	TP52.88x42.5423x0.5	3003.26	5853.03	0.513	0.00	5853.03	0.000
L5	32.5 - 0 (5)	TP60.36x50.0301x0.5	4642.94	7649.87	0.607	0.00	7649.87	0.000

### Pole Shear Design Data

<b>tnxTower</b>  <b>GPD</b> 520 South Main Street Suite 2531 Akron, Ohio 44311 Phone: (555) 555-1234 FAX: (555) 555-1235	<b>Job</b> Owned Prop/Bryan S. Tabor - BU #: 826461	<b>Page</b> 13 of 13
	<b>Project</b> 2016777.826461.02	<b>Date</b> 17:04:52 07/25/16
	<b>Client</b> Crown Castle USA, Inc.	<b>Designed by</b> bchristy

Section No.	Elevation ft	Size	Actual $V_u$ K	$\phi V_n$ K	Ratio $V_u$ $\phi V_n$	Actual $T_u$ kip-ft	$\phi T_n$ kip-ft	Ratio $T_u$ $\phi T_n$
L1	159 - 134 (1)	TP28.63x22x0.375	12.2570	1209.2200	0.010	1.30	2698.88	0.000
L2	134 - 99 (2)	TP37.02x26.7971x0.375	28.2908	1531.0600	0.018	0.57	4452.51	0.000
L3	99 - 66 (3)	TP44.88x34.9186x0.375	33.4424	1723.2100	0.019	0.53	6105.17	0.000
L4	66 - 32.5 (4)	TP52.88x42.5423x0.5	38.6389	2848.4100	0.014	0.48	11868.08	0.000
L5	32.5 - 0 (5)	TP60.36x50.0301x0.5	43.9221	3137.8000	0.014	0.44	15511.58	0.000

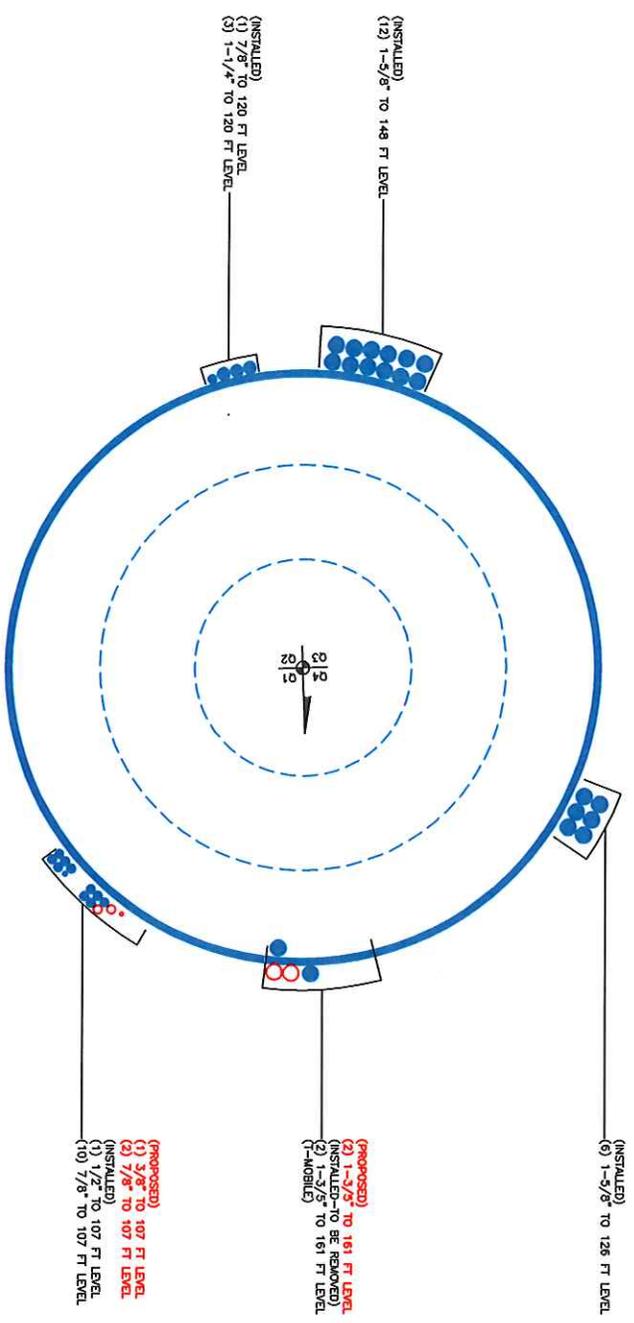
### Pole Interaction Design Data

Section No.	Elevation ft	Ratio $P_u$ $\phi P_n$	Ratio $M_{ux}$ $\phi M_{nx}$	Ratio $M_{uy}$ $\phi M_{ny}$	Ratio $V_u$ $\phi V_n$	Ratio $T_u$ $\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	159 - 134 (1)	0.003	0.175	0.000	0.010	0.000	0.178	1.000	4.8.2 ✓
L2	134 - 99 (2)	0.007	0.382	0.000	0.018	0.000	0.389	1.000	4.8.2 ✓
L3	99 - 66 (3)	0.008	0.608	0.000	0.019	0.000	0.617	1.000	4.8.2 ✓
L4	66 - 32.5 (4)	0.007	0.513	0.000	0.014	0.000	0.521	1.000	4.8.2 ✓
L5	32.5 - 0 (5)	0.010	0.607	0.000	0.014	0.000	0.617	1.000	4.8.2 ✓

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
L1	159 - 134	Pole	TP28.63x22x0.375	1	-7.2568	2418.4500	17.8	Pass
L2	134 - 99	Pole	TP37.02x26.7971x0.375	2	-20.7792	3062.1300	38.9	Pass
L3	99 - 66	Pole	TP44.88x34.9186x0.375	3	-29.1394	3446.4200	61.7	Pass
L4	66 - 32.5	Pole	TP52.88x42.5423x0.5	4	-41.7778	5696.8200	52.1	Pass
L5	32.5 - 0	Pole	TP60.36x50.0301x0.5	5	-60.1139	6275.6000	61.7	Pass
Summary							ELC:	LC7
Pole (L5)							61.7	Pass
Rating =							61.7	Pass

**APPENDIX B**  
**BASE LEVEL DRAWING**



BUSINESS UNIT: 826461 TOWER ID: C\_BASLEVEL

BASE LEVEL DRAWING

1

See Also: C:\Users\jmorris\Documents\Projects\826461\Tower\826461\_C\_BASLEVEL.dwg

CROWN REGION ADDRESS  
USA

- # 71 UPLOADED PER WORK ORDER # 741531
- # 72 APPLICATION ADDED PER WORK ORDER # 843073
- # 73 UPLOADED PER WORK ORDER # 865132
- # 74 UPLOADED PER WORK ORDER # 1037287
- # 75 UPLOADED PER WORK ORDER 1004132
- # 76 UPLOADED PER WORK ORDER 1178631
- # 77 UPLOADED PER WORK ORDER 1345586
- # 78 UPLOADED PER WORK ORDER 1348564
- # 79 UPLOADED PER WORK ORDER 1272365

DRAWN BY: CAR  
CHECKED BY: JAC  
DRAWING DATE: 18/02/2013

SITE NUMBER:  
SITE NAME:  
OWNED PROPRIETARY S. TABOR  
BUSINESS UNIT NUMBER  
826461  
SITE ADDRESS  
101 E. 31ST STREET  
BRYAN, TX 77803  
BRYAN, TX 77803  
BRYAN, TX 77803  
USA  
SHEET TITLE  
BASE LEVEL

A1-0

**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

## 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  $(1) \times (\text{Rod Diameter})$

### Site Data

BU#:	826461
Site Name:	Owned Prop/Bryan S. Tabc
App #:	356847 Rev. 1
Pole Manufacturer:	Other

### Anchor Rod Data

Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	67	in

### Plate Data

Diam:	73	in
Thick:	2.25	in
Grade:	50	ksi
Single-Rod B-eff:	8.09	in

### 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

### Pole Data

Diam:	60.36	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Reactions		
Mu:	4643	ft-kips
Axial, Pu:	60	kips
Shear, Vu:	44	kips
Eta Factor, $\eta$	0.5	TIA G (Fig. 4-4)

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

### Anchor Rod Results

Max Rod  $(C_u + V_u/\eta)$ : 144.8 Kips  
 Allowable Axial,  $\Phi \cdot F_u \cdot A_{net}$ : 260.0 Kips  
 Anchor Rod Stress Ratio: 55.7% **Pass**

Rigid
AISC LRFD
$\phi \cdot T_n$

### Base Plate Results

Base Plate Stress: 28.9 ksi  
 Allowable Plate Stress: 45.0 ksi  
 Base Plate Stress Ratio: 64.2% **Pass**

### Flexural Check

Rigid
AISC LRFD
$\phi \cdot F_y$
Y.L. Length:
29.08

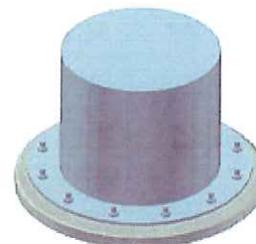
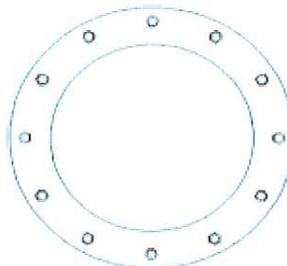
**n/a**

### Stiffener Results

Horizontal Weld : n/a  
 Vertical Weld: n/a  
 Plate Flex+Shear,  $f_b/F_b + (f_v/F_v)^2$ : n/a  
 Plate Tension+Shear,  $f_t/F_t + (f_v/F_v)^2$ : n/a  
 Plate Comp. (AISC Bracket): n/a

### Pole Results

Pole Punching Shear Check: n/a



\* 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

Site Number	826461
Site Name	wned Prop/ Bryan S. Tabor

## Caisson Analysis

Pier Properties		Analysis Properties	
Moment	4643 kip-ft	TIA Code	G
Shear	44 kip	Soil Safety Factor	1.33
Pier Diameter	7.0 ft	Water Table Depth	13.0 ft
Height Above Grade	0.50 ft	Ignored Soil Depth	4.0 ft
Depth Below Grade	30.00 ft	Cohesion Based on	PLS Caisson
Donut Diameter	ft	Max Soil Capacity	110%
Donut Depth	ft		

Soil Properties						
Layer	Top of Soil Layer (ft)	Layer Thickness (ft)	Bottom of Soil Layer (ft)	Soil Unit Weight (pcf)	Cohesion (psf)	Friction Angle (degrees)
<i>Soil.Layer</i>	<i>Soil.Top</i>	<i>Soil.Thick</i>	<i>Soil.Bottom</i>	<i>Soil.Weight</i>	<i>Soil.Cohesion</i>	<i>Soil.Phi</i>
1	0.00	4	4.00	100	0	
2	4.00	3	7.00	120	1500	
3	7.00	6	13.00	125		32
4	13.00	17	30.00	117	2500	
5	30.00	18	48.00	117	2500	
6	48.00	17	65.00	120	2500	
7						
8						
9						
10						

Critical Depths Below Grade		Results	
Rotation Axis	19.46 ft	Soil Capacity	39.9% <b>OK</b>
Zero Shear	5.75 ft	Max Pier Moment	4880 kip-ft

Moment At User Defined Depths Below Grade			
Moment @ 6.0'	4879 kip-ft		kip-ft
	kip-ft		kip-ft

V1.0

## Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

**Note:** Shaft assumed to have ties, not spiral, transverse reinforcing

### Site Data

BU#: 826461  
 Site Name: *Owned Prop/Bryan S. Tabor*  
 App #: 349255 Rev. 1

### Loads Already Factored

For M (WL)	1.3	<----Disregard
For P (DL)	1.3	<----Disregard

### Pier Properties

#### Concrete:

Pier Diameter = 7.0 ft  
 Concrete Area = 5541.8 in<sup>2</sup>

#### Reinforcement:

Clear Cover to Tie = 1.80 in  
 Horiz. Tie Bar Size = 4  
 Vert. Cage Diameter = 6.50 ft  
 Vert. Cage Diameter = 78.00 in  
**Vertical Bar Size = 11**  
 Bar Diameter = 1.41 in  
 Bar Area = 1.56 in<sup>2</sup>  
 Number of Bars = 40  
 As Total = 62.4 in<sup>2</sup>  
 A s/ Aconc, Rho: 0.0113 1.13%

ACI 10.5, ACI 21.10.4, and IBC 1810.

Min As for Flexural, Tension Controlled, Shafts:

$(3) * (\text{sqrt}(f'c) / F_y) = 0.0027$   
 $200 / F_y = 0.0033$

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	1.13%	<b>OK</b>

Ref. Shaft Max Axial Capacities, $\phi$ Max(Pn or Tn):		
Max Pu = ( $\phi=0.65$ ) Pn.		
Pn per ACI 318 (10-2)	9212.52	kips
at Mu=( $\phi=0.65$ )Mn=	5655.36	ft-kips
Max Tu, ( $\phi=0.9$ ) Tn =	3369.6	kips
at Mu= $\phi=(0.90)$ Mn=	0.00	ft-kips

### Maximum Shaft Superimposed Forces

TIA Revision:	G	
Max. Factored Shaft Mu:	4879.537	ft-kips (* Note)
Max. Factored Shaft Pu:	60.00	kips
Max Axial Force Type:	Comp.	

(\* Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	Shaft Factored Loads	
1.00	Mu:	4879.537 ft-kips
1.00	Pu:	60 kips

### Material Properties

Concrete Comp. strength, f'c = 3000 psi  
 Reinforcement yield strength, Fy = 60 ksi  
 Reinforcing Modulus of Elasticity, E = 29000 ksi  
 Reinforcement yield strain = 0.00207  
 Limiting compressive strain = 0.003

### ACI 318 Code

Select Analysis ACI Code = 2008

### Seismic Properties

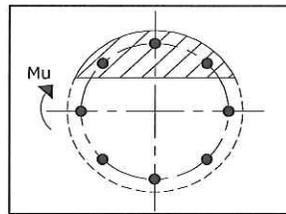
Seismic Design Category = B  
 Seismic Risk = Low

Solve  
(Run)

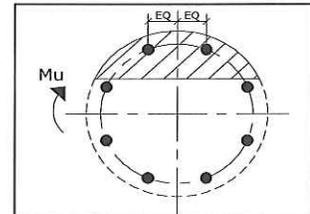
<-- Press Upon Completing All Input

### Results:

Governing Orientation Case: 2



Case 1



Case 2

Dist. From Edge to Neutral Axis: 17.93 in

Extreme Steel Strain,  $\epsilon_t$ : 0.0105

**$\epsilon_t > 0.0050$ , Tension Controlled**

Reduction Factor,  $\phi$ : 0.900

Output Note: Negative Pu=Tension

For Axial Compression,  $\phi$  Pn = Pu: 60.00 kips

Drilled Shaft Moment Capacity,  $\phi$ Mn: 9436.28 ft-kips

Drilled Shaft Superimposed Mu: 4879.54 ft-kips

**(Mu/ $\phi$ Mn, Drilled Shaft Flexure CSR): 51.7%**