Filed by:
Kri Pelletier, Property Specialist - SBA Communications
134 Flanders Rd., Suite 125, Westborough, MA 01581
508.251.0720 x 3804 - kpelletier@sbasite.com

February 26, 2018

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

Application for Tower Share
382 Colebrook River Rd., Colebrook, CT 06021
41 59 31.5 N
-73 2 23.3 W
T-Mobile #: CTNH549B_NSD

Dear Ms. Bachman:

Please accept this letter as notification pursuant to Connecticut General Statutes § 16-50aa and R.C.S.A § 16-50j-88 of T-Mobile's Application for Tower Sharing at the existing 150-foot Monopole Tower at 382 Colebrook River Rd., in Colebrook, CT.

Per the requirements under R.C.S.A §16-50j-89 please find the following statements in support of T-Mobile's Application:

1. **Facility and Proposed Modifications**

   A. **Existing Facility and Appurtenances**
   - Initial approval was given for this facility on February 2, 2005 by the Council under Docket 296 with the following conditions:
     - Monopole no taller than 150' above ground for public and private entities
     - The location would maintain a minimum distance of 150' to the property line of the adjacent property to the south
     - A D&M Plan was to be produced
     - The Certificate Holder was to provide a worst-case modeling of EMF report and ensure recalculated reports were produced when changes were made to the tower configuration
     - Upon the establishment of any new pertinent State or Federal radio frequency standards, the facility was to be brought into compliance
     - The Certificate Holder was to permit public or private entities to share space for fair consideration or provide reasons for precluding
     - The Certificate Holder was to provide space on the tower for municipal antennas for no compensation
     - The facility was to provide service within one year of completion of construction
     - Obsolete equipment was to be removed within 60 days of becoming obsolete
     - The facility was to be operational within one year of the date of the Decision or within one year after any appeals to the Decision were resolved

- The Certificate Holder was to provide Council with written notice two weeks prior to commencement of construction and written notice of completion of construction

- Latitude / Longitude: 41 59 31.5 N / -73 2 23.3 W
- Height of Tower: 150'
- Owned/operated by: SBA Towers II LLC
- Property Owner: 382 Colebrook LLC
- Size/Components of existing equipment compound:
  - 58' x 58' fenced compound with access double gate containing:
    - Monopole [center of compound]
    - Nextel Equipment Shelter [Northeast of monopole w/in compound]
    - AT&T Equipment Shelter [Southeast of monopole w/in compound]
    - Verizon Equipment Shelter [West of monopole w/in compound]
    - Meter Center [South of monopole w/in compound - T-Mobile to connect at leased area w/in compound]
    - Underground Telco [West of monopole w/in compound]
    - Transformer [Southwest of monopole outside of compound]
  - Components of existing tower:
    - Nextel:
      - 150'
        - (12) Decibel-DB846G90A-XY-Panel Antennas
        - (1) Low Profile Platform
        - (12) 1-5/8" lines
    - AT&T:
      - 139'
        - (6) Powerwave 7770 Panel Antennas
        - (1) Katrein 800 10764 Panel Antennas
        - (2) KMW AM-X-CD-16-65-00T-RET – Panel Antennas
        - (6) Powerwave - LGP 21401 – TMAs
        - (6) Powerwave - LGP 13519 – Diplexers
        - (6) Ericsson - RRUS 11 – RRUs
        - (1) Raycap - DC6-48-60-18-8F – SPs
        - (1) Commscope - ABT-DFDM-ADBH - Bias Ts
        - (1) Low Profile Platform
        - (12) 1-5/8" lines
        - (1) ¾" DC
        - (1) 7/16" Fiber
    - Verizon:
      - 128'
        - (3) Antel BXA-70080-6CF-EDIN – Panel Antennas
        - (3) Antel - BXA-171085-8BF-EDIN – Panel Antennas
        - (6) RFS - FD9R6004/2C-3L - Diplexers
      - 127'
        - (12) Antel - LPA-80080/6CF – Panel Antennas
        - (1) Low Profile Platform
        - (12) 1-5/8" lines
      - 65'
        - (2) Motorola - RRA4905A – GPS
        - (2) ½" lines

B. Nature and Extent of Proposed Modifications

T-Mobile proposes to install (12) panel antennas at the 117-foot level of the existing 150'-foot Monopole Tower and occupy a ground lease area of 10'x20' within the existing fenced compound. T-Mobile's full proposed scope of work is as follows:

Remove: None
Remove and Replace: None
Install:

Tower:

At 117'

(4) Ericsson - Air 32 KRD901146-1_B66A_B2A – Panel Antennas
(4) RFS - APXVAA24_43-U-A20 – Panel Antennas
(4) RFS - APXV18-206517S-A20 – Panel Antennas
(4) Ericsson - S11B12 – RRUs
(4) Ericsson - RRU 2217 B2 – RRUs
(1) Low profile platform with handrail (SitePro F4P-10W w/FRP-HRK10)
(4) 1-5/8" fiber

Ground:

(1) 9'x13' concrete pad
(1) GPS Antenna (Ground Mount to Ice Bridge Post)
(1) Ice Bridge
(1) AAV Purcell Cabinet (on H-Frame)
(1) PPC (on H-Frame)
(1) RBS 6102 cabinet
(1) 120 Gallon Stationary Vertical ASME Propane (LP) Storage Tank on 3'x3' pre-cast concrete pad and associated gas line
(1) 7.5 KW APU on 4'x4' pre-cast concrete pad
(1) H-Frame

Existing Equipment to Remain: N/A

C. This Proposal is technically, legally, environmentally, and economically feasible and meets public safety concerns per Connecticut General Statute Section 16-50aa.

T-Mobile proposes to collocate at the above-referenced existing telecommunication facility rather than to require additional tower construction. The 382 Colebrook River Road site sits in a heavily trafficked area serving the Route 8 corridor. Since the site was built, wireless technology has flourished, resulting in greatly increased consumer usage and data transfer. Three carriers currently share space on the tower.

The proposed collocation meets with all legal and technical requirements. This Application contains all required information and statements per R.C.S.A §16-50j-89 and the proposed installation has been drafted per current code, and studied with regard to structural feasibility and RF emissions output. Drawings and Reports are attached. T-Mobile's proposed collocation presents no known material changes to environmental conditions from those as documented in the Council's original Findings of Fact and presents no known public safety concerns.

2. Engineering Drawings per the requirements under R.C.S.A. §16-50j-89 are enclosed herewith.

3. An Engineering / Structural Analysis per the requirements under R.C.S.A. §16-50j-89 is enclosed herewith.

4. A Letter from SBA, as Owner of the Facility, agreeing to the proposed shared use of the facility, is enclosed herewith.

5. **Description of any potential environmental impact associated with the proposed shared use, including, but not limited to, visibility, wetlands and water resources, air quality and noise. Sources of noise shall be identified and in compliance with state and local noise control regulations**.

    A. T-Mobile's collocation will not have any significant adverse visual impact on the surrounding areas. The antennas should result in only marginal additional equipment visibility from areas that already have views of the existing tower. The proposed work would not require any Federal Aviation Administration obstruction marking or lighting.
    B. The proposed collocation does not affect alter the existing site with regard to wetlands, water resources or air quality.
    C. T-Mobile's collocation proposes the installation of an emergency backup generator within the leased area of the compound. The generator requires to be exercised only twice a year for 20 minutes each cycle, or 40 minutes yearly. There is zero fuel consumption in standby. The proposed 120 gallon stationary vertical ASME propane storage tank adheres to all required safety zones and clearances. While small in footprint (40"H x 42"W x 27"D), the generator would provide backup time of 80 hours in case of emergency. The Town of Colebrook does not have any defined ordinance for decibel levels.

The proposed work is not thought to have any substantial adverse environmental impact. Public Need for the additional coverage outweighs any minor environmental effects that would result from the construction, operation, and maintenance of the proposed collocation.

6. A Power Density / RF Report per the requirements under R.C.S.A. §16-50j-89 is enclosed herewith.
    A. The operation of T-Mobile's new antennas will not increase the total radio frequency electromagnetic power density at the site to a level at or above the applicable standards. The anticipated Maximum Composite contributions from the T-Mobile facility are only 4.42% of the allowable FCC established general public limit. The anticipated composite MPE value for this site assuming all carriers present is 8.82% of the allowable FCC established general public limit sampled at the ground level.

7. An original and fifteen copies of this Tower Share Application are being submitted along with a $625 filing fee per Conn. Gen. Stat. §4-189j; Regs., Conn. State Agencies §16-50v-1a.
    A. A copy of this Application and all attachments is being sent to:
        i. The Town of Colebrook's First Selectman, Thomas McKeon
        ii. The Town of Colebrook's Land Use Administrator and Zoning Enforcement Officer, Michael Halloran
        iii. The Property Owner, 382 Colebrook LLC
        iv. (Separate notice is not being sent to tower owner, as it belongs to SBA)

Please note, additionally: the planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. §16.50j-72(b)(2).

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

T-Mobile respectfully submits for the Council's review and approval this Application for Tower Share.

Sincerely,

Kri Pelletier
Property Specialist
SBA COMMUNICATIONS CORPORATION
134 Flanders Rd., Suite 125
Westborough, MA 01581
508.251.0720 x3804 + T
508.366.2610 + F
203.446.7700 + C
kpelletier@sbasite.com

Attachments

cc: Thomas McKeon, First Selectman / with attachments
562 Colebrook Road – P.O. Box 5 Colebrook, CT 06021
Michael Halloran, Land Use Administrator and Zoning Enforcement Officer / with attachments
562 Colebrook Road – P.O. Box 5 Colebrook, CT 06021
382 Colebrook LLC / with attachments
202 Hang Dog Lane, Wethersfield, CT 06109

POWER DENSITY

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C	Sector:	D
Antenna #:	1	Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR32 B66A/B2P	Make / Model:	Ericsson AIR32 B66A/B2P	Make / Model:	Ericsson AIR32 B66A/B2P	Make / Model:	Ericsson AIR32 B66A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	117	Height (AGL):	117	Height (AGL):	117	Height (AGL):	117
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08
Antenna A1 MPE%	2.72	Antenna B1 MPE%	2.72	Antenna C1 MPE%	2.72	Antenna D1 MPE%	2.72
Antenna #:	2	Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	RFS APXV18-206517S-C-A20	Make / Model:	RFS APXV18-206517S-C-A20	Make / Model:	RFS APXV18-206517S-C-A20	Make / Model:	RFS APXV18-206517S-C-A20
Gain:	16.9 dBd	Gain:	16.9 dBd	Gain:	16.9 dBd	Gain:	16.9 dBd
Height (AGL):	117	Height (AGL):	117	Height (AGL):	117	Height (AGL):	117
Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)
Channel Count	2	Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	60	Total TX Power(W):	60	Total TX Power(W):	60	Total TX Power(W):	60
ERP (W):	2,806.41	ERP (W):	2,806.41	ERP (W):	2,806.41	ERP (W):	2,806.41
Antenna A2 MPE%	0.82	Antenna B2 MPE%	0.82	Antenna C2 MPE%	0.82	Antenna D2 MPE%	0.82
Antenna #:	3	Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	RFS APXVAA24-43-U-A20	Make / Model:	RFS APXVAA24-43-U-A20	Make / Model:	RFS APXVAA24-43-U-A20	Make / Model:	RFS APXVAA24-43-U-A20
Gain:	13.15 / 13.55 dBd	Gain:	13.15 / 13.55 dBd	Gain:	13.15 / 13.55 dBd	Gain:	13.15 / 13.55 dBd
Height (AGL):	117	Height (AGL):	117	Height (AGL):	117	Height (AGL):	117
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
Channel Count	2	Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	60	Total TX Power(W):	60	Total TX Power(W):	60	Total TX Power(W):	60
ERP (W):	1,299.01	ERP (W):	1,299.01	ERP (W):	1,299.01	ERP (W):	1,299.01
Antenna A3 MPE%	0.88	Antenna B3 MPE%	0.88	Antenna C3 MPE%	0.88	Antenna D3 MPE%	0.88

T-Mobile Sector A Total:	4.42 %
T-Mobile Sector B Total:	4.42 %
T-Mobile Sector C Total:	4.42 %
T-Mobile Sector D Total:	4.42 %
Site Total:	8.82 %

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**4.42 %**
Nextel	0.38 %
AT&T	1.82 %
Verizon Wireless	2.20 %
Site Total MPE %:	**8.82 %**

ORIGIN ID:BBFA (508) 614-0389
RICK WOODS
SBA NETWORK SERVICES INC
134 FLANDERS ROAD
SUITE 125
WESTBOROUGH, MA 01581
UNITED STATES US

SHIP DATE: 26FEB18
ACTWGT: 1.00 LB
CAD: 105843304/INET3980

BILL SENDER

TO THOMAS MCKEON, FIRST SELECTMAN
TOWN OF COLEBROOK
562 COLEBROOK ROAD
COLEBROOK CT 06021
(508) 251-0720 X 3804

REF: 10-56-92009-6089
INV:
PO:
DEPT:

552J1/07F5/DCA5

J181118012601uv

FedEx Express

TRK# 0201 7715 7412 4497

TUE - 27 FEB 10:30A
PRIORITY OVERNIGHT

EB HFDA

06021
CT-US BDL

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382 COLEBROOK RIVER ROAD

Location	382 COLEBROOK RIVER ROAD	**Mblu**	23/ / 13/ /
		Acct#	
Owner	382 COLEBROOK LLC	**Assessment**	$549,000
Appraisal	$784,300	**PID**	698
Building Count	1		

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$599,400	$184,900	$784,300
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$419,600	$129,400	$549,000

Owner of Record

Owner	382 COLEBROOK LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	202 HANG DOG LANE WETHERSFIELD, CT 06109	**Book & Page**	87/ 269
		Sale Date	11/16/2015
		Instrument	03

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
382 COLEBROOK LLC	$0		87/ 269	03	11/16/2015
OLIVERI JOHN	$275,000		87/ 266	14	11/16/2015
US BANK TRUST NA TRUSTEE FOR	$0		87/ 205	14	10/26/2015
US BANK TRUST NA TRUSTEE	$0		87/ 161	14	09/30/2015
JOHNSON LEONARD D ESTATE OF &	$0		84/ 667	08	04/18/2013

Building Information

Building 1 : Section 1

Year Built:	1975
Replacement Cost:	$316,840
Building Percent Good:	77

Building Photo

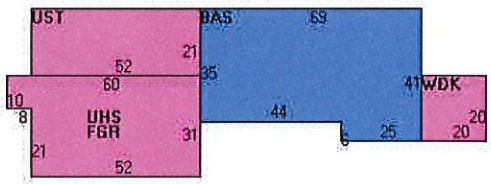
Replacement Cost
Less Depreciation: $244,000

Building Attributes	
Field	**Description**
Style	Ranch
Model	Residential
Grade:	Average +10
Stories:	1 Story
Occupancy	1
Exterior Wall 1	Clapboard
Exterior Wall 2	
Roof Structure:	Gable/Hip
Roof Cover	Standing Seam
Interior Wall 1	Drywall/Sheet
Interior Wall 2	
Interior Flr 1	Concr-Finished
Interior Flr 2	
Heat Fuel	Oil
Heat Type:	Forced Air-Duc
AC Type:	None
Total Bedrooms:	2 Bedrooms
Total Bthrms:	1
Total Half Baths:	0
Total Xtra Fixtrs:	
Total Rooms:	5 Rooms
Bath Style:	Average
Kitchen Style:	Avg

Building Photo

(http://images.vgsi.com/photos/ColebrookCTPhotos//\00\00\05/67.jpg)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	2,565	2,565
FGR	Garage	1,692	0
UHS	Unfinished Half Story	1,692	0
UST	Unfinished Storage	1,092	0
WDK	Wood Deck	400	0
		7,441	2,565

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	1-3
Description	1 Family
Zone	GB
Neighborhood	R04

Land Line Valuation

Size (Acres)	18.9
Frontage	0
Depth	0
Assessed Value	$129,400

Alt Land Appr No
Category

Appraised Value $184,900

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
CTW	CELL TOWER			1 UNITS	$300,000	1
MAS	MASONRY OUTB			240 S.F.	$16,800	1
MAS	MASONRY OUTB			360 S.F.	$25,200	1
MAS	MASONRY OUTB			192 S.F.	$13,400	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$599,400	$184,900	$784,300
2013	$435,600	$131,000	$566,600
2012	$435,600	$131,000	$566,600

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$419,600	$129,400	$549,000
2013	$305,000	$91,700	$396,700
2012	$305,000	$91,700	$396,700

February 22, 2018

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

RE: **Notice of Intent to Allow Shared Use of the Existing SBA Telecommunications Site**
Location: **382 Colebrook River Rd., Colebrook, CT 06021**
TMO Site No: CTNH549B_NSD
SBA Site No: CT13613

Dear Ms. Bachman:

Please let the following serve as Evidence of Intent to allow T-Mobile's shared use of the existing SBA telecommunications site at 382 Colebrook River Rd., Colebrook, CT.

SBA Towers II, LLC ("Owner") and T-Mobile Northeast LLC ("Tenant") are entering into a Site Lease Agreement. Tenant will be provided ground space within the existing site compound for its base station equipment and space at the height of 117' for antennas and associated equipment.

Thank you,

Rick Woods
Site Development Manager
SBA COMMUNICATIONS CORPORATION
134 Flanders Road, Suite 125
Westboro, MA 01581

508.251.0720 x3800 + T
508.366.2610 + F
508.614.0389 + C
rwoods@sbasite.com

Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
8445 Freeport Parkway, Suite 375, Irving, Texas 75063

Structural Analysis Report

Existing 150 ft PennSummit Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT13613-A

Customer Site Name: Johnson

Carrier Name: T-Mobile

Carrier Site ID / Name: CTNH549B / CTNH549B

Site Location: 382 Colebrook River Rd

Colebrook, Connecticut

Litchfield County

Latitude: 41.992083

Longitude: -73.039805

Analysis Result:

Max Structural Usage: 53.5% [Pass]

Max Foundation Usage: 32% [Pass]

Additional Usage Caused by New Mount: +6.0%

Report Prepared By: Vishnu Paidimarri

2/20/18

Introduction

The purpose of this report is to summarize the analysis results on the 150 ft PennSummit Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Paul J. Ford Job #29205-0113 (for PennSummit Tubular Design #24458), dated 05/24/05
Foundation Drawing	Paul J. Ford Job #29205-0113 (for PennSummit Tubular Design #24458), dated 05/24/05
Geotechnical Report	JGI Eastern, Inc. Project #05268G, dated 05/16/05
Modification Drawings	N/A

Analysis Criteria

The rigorous analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-G**.** In accordance with this standard, the structure was analyzed using **TESPoles,** a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

Wind Speed Used in the Analysis:	Ultimate Design Wind Speed V_{ult} = 115.0 mph (3-Sec. Gust)/ Nominal Design Wind Speed V_{asd} = 89.0 mph (3-Sec. Gust)
Wind Speed with Ice:	40 mph (3-Sec. Gust) with 1" radial ice concurrent
Operational Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-G / 2012 IBC / 2016 Connecticut State Building Code
Exposure Category:	B
Structure Class:	II
Topographic Category:	1
Crest Height:	0 ft
Seismic Parameters:	S_S = 0.174, S_1 = 0.065

This structural analysis is based upon the tower being classified as a Structure Class II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	150.0	12	Decibel - DB846G90A-XY - Panel	Low Profile Platform	(12) 1 5/8"	Nextel
2	139.0	6	Powerwave - 7770 - Panel	Low Profile Platform	(12) 1 5/8" (1) 3/4" DC (1) 7/16" Fiber	AT&T
3		1	Kathrein - 800 10764 - Panel			
4		2	KMW - AM-X-CD-16-65-00T-RET - Panel			
5		6	Powerwave - LGP 21401 - TMA			
6		6	Powerwave - LGP 13519 - Diplexer			
7		6	Ericsson - RRUS 11 - RRU			
8		1	Raycap - DC6-48-60-18-8F - SP			
9		1	Commscope - ABT-DFDM-ADBH - Bias T			
10	128.0	3	Antel - BXA-70080-6CF-EDIN - Panel	Low Profile Platform	(12) 1 5/8"	Verizon
11		3	Antel - BXA-171085-8BF-EDIN - Panel			
12		6	RFS - FD9R6004/2C-3L - Diplexer			
13	127.0	12	Antel - LPA-80080/6CF - Panel			
19	65.0	2	Motorola - RRA4905A - GPS	Direct	(2) 1/2"	

Proposed Carrier's Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier's final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
14	117.0	4	Ericsson - Air 32 KRD901146-1_B66A_B2A - Panel	Low Profile Platform w/ Handrail (SitePro - F4P-10W w/ F4P-HRK10)	(4) 1 5/8" Fiber	T-Mobile
15		4	RFS - APXVAA24_43-U-A20 - Panel			
16		4	RFS - APXV18-206517S-A20 - Panel			
17		4	Ericsson - S11B12 - RRU			
18		4	Ericsson - RRU 2217 B2 - RRU			

See the attached coax layout for the line placement considered in the analysis.

Analysis Results

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	**53.5%**	**40.1%**	**45.9%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Analysis Reactions	2723.3	24.8	86.8

The foundation has been analyzed using the supplied documents and was found adequate. Therefore, no modification to the foundation will be required. Geotechnical soil parameters were obtained from the original foundation calculations included with the referenced tower and foundation design drawings.

Operational Condition (Rigidity):

Operational characteristics of the tower are found to be within the limits prescribed by ANSI/TIA/EIA 222-G for the installed antennas. The maximum twist/sway at the elevation of the proposed equipment is 0.9106 degrees under the operational wind speed as specified in the Analysis Criteria.

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the ANSI/TIA/EIA 222-G Standard under the design basic wind speed as specified in the Analysis Criteria.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC.** Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.

2. The analysis is based on the presumption that the tower members and components along with any existing reinforcement items have been correctly and properly designed, manufactured, installed and maintained.

3. All the existing structural members were assumed to be in good condition with no physical damage or deterioration associated with corrosion.

4. An initial tension of 10% of the break strength on all the existing guy wires was assumed in all the structural analyses of guyed towers unless different values were provided by the client. **TES** cannot take responsibility for the deviations in the analysis results because of differences in the initial tension forces of the existing guy wires.

5. Secondary component or connection secondary components, welds and bolts are assumed to be able to carry their intended original design loads. **TES** cannot take responsibility for verification of the adequacy on the connections, bolts and welds present in the structure.

6. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the EIA/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.

7. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.

8. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.

9. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

Usage Diagram - Max Ratio 53.50% at 51.0ft

Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Gh:**	1.1	Page: 1	
Base Elev:	0.000 (ft)				

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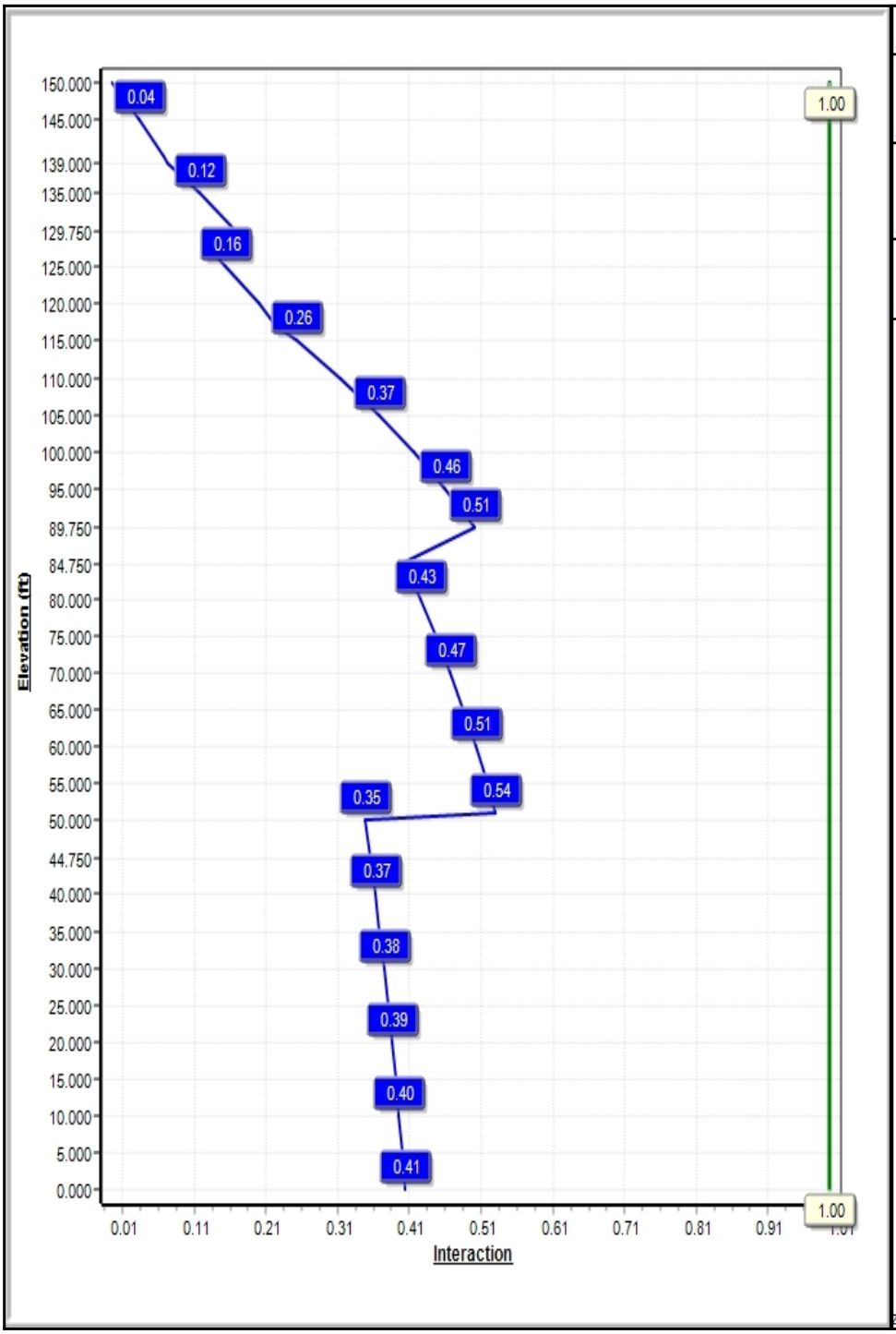
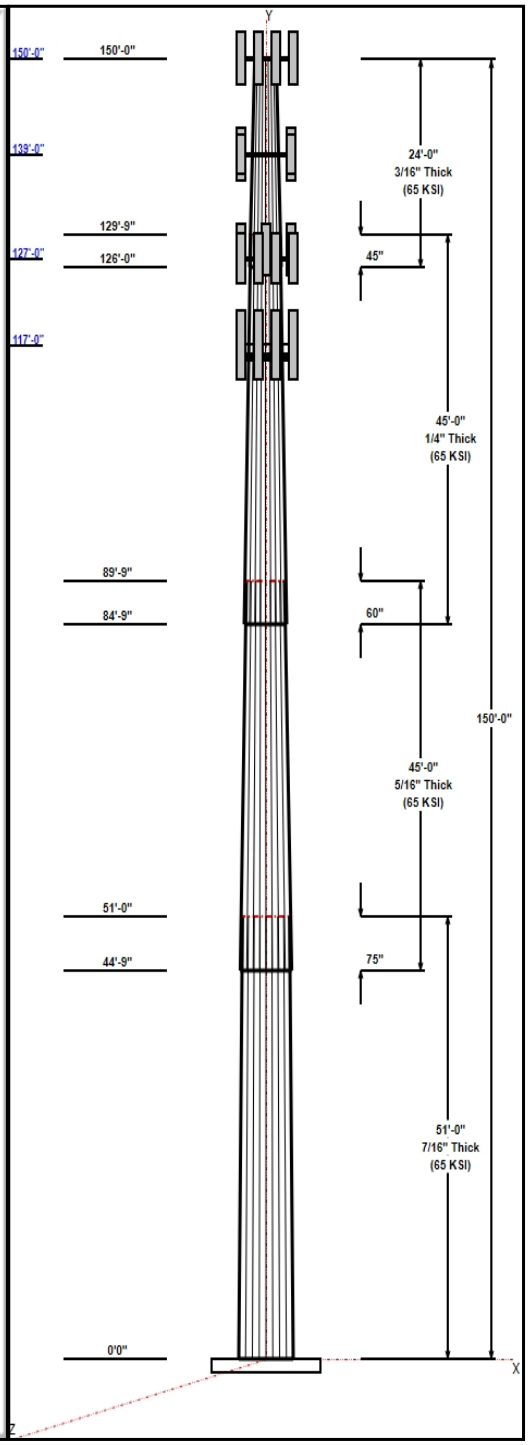
Dead Load Factor:	1.20	**Iterations:**	22
Wind Load Factor:	1.60		

Load Case : 1.2D + 1.6W 89 mph Wind





Structure: CT13613-A-SBA

Type: Tapered
Site Name: Johnson
Height: 150.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.26000

2/20/2018

Tower Engineering Solutions

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	51.00	46.74	60.00	0.438		0.26000	65
2	45.00	37.29	48.99	0.313	Slip	0.26000	65
3	45.00	27.39	39.09	0.250	Slip	0.26000	65
4	24.00	22.50	28.74	0.188	Slip	0.26000	65

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
150.00	150.00	1	Low Profile Platform	Nextel
150.00	150.00	12	Decibel - DB846G90A-XY	Nextel
139.00	139.00	1	Low Profile Platform	AT&T
139.00	139.00	6	Powerwave - 7770	AT&T
139.00	139.00	1	Kathrein - 800 10764	AT&T
139.00	139.00	2	KMW -	AT&T
139.00	139.00	6	Powerwave - LGP 21401 -	AT&T
139.00	139.00	6	Powerwave - LGP 13519 -	AT&T
139.00	139.00	6	Ericsson - RRUS 11 - RRU	AT&T
139.00	139.00	1	Raycap -	AT&T
139.00	139.00	1	Commscope -	AT&T
127.00	127.00	1	Low Profile Platform	Verizon
127.00	127.00	12	Antel - LPA-80080/6CF	Verizon
127.00	128.00	3	Antel -	Verizon
127.00	128.00	3	Antel -	Verizon
127.00	128.00	6	RFS - FD9R6004/2C-3L -	Verizon
117.00	117.00	1	Low-Profile Platform w/	T-Mobile
117.00	117.00	1	F4P-HRK10	T-Mobile
117.00	117.00	4	Ericsson - Air 32	T-Mobile
117.00	117.00	4	RFS -	T-Mobile
117.00	117.00	4	RFS -	T-Mobile
117.00	117.00	4	Ericsson - S11B12 - RRU	T-Mobile
117.00	117.00	4	Ericsson - RRU 2217 B2 -	T-Mobile
65.00	65.00	2	RRA4905A	Verizon

Linear Appurtenances

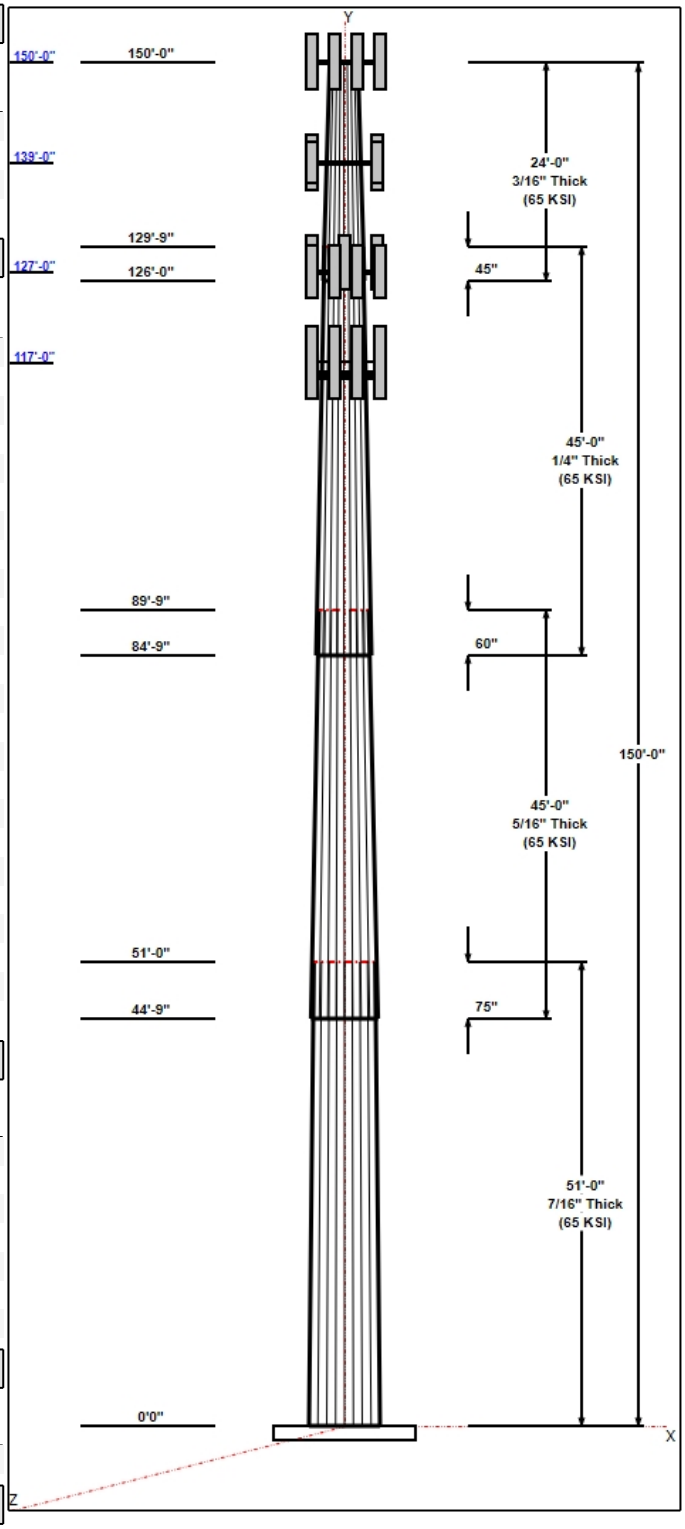
Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	150.00	Inside	1 5/8" Coax	Nextel
0.00	139.00	Inside	1 5/8" Coax	AT&T
0.00	139.00	Inside	3/4" DC	AT&T
0.00	139.00	Inside	7/16" Fiber	AT&T
0.00	127.00	Inside	1 5/8" Coax	Verizon
0.00	117.00	Inside	1 5/8" Fiber	T-Mobile
0.00	65.00	Outside	1/2" Coax	Verizon

Anchor Bolts

Qty	Specifications	Grade (ksi)	Arrangement
20	2.25" 18J	75.0	Cluster

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
2.7500	66.0	50.0	Clipped



Reactions

Load Case	Moment (FT-Kips)	Shear (Kips)	Axial (Kips)
1.2D + 1.6W 89 mph Wind	2723.3	24.8	48.4
0.9D + 1.6W 89 mph Wind	2701.7	24.7	36.3
1.2D + 1.0Di + 1.0Wi 40 mph Wind	631.9	5.7	86.8
1.2D + 1.0E	82.6	0.8	48.4
0.9D + 1.0E	81.7	0.8	36.3
1.0D + 1.0W 60 mph Wind	769.7	7.0	40.3

Structure: CT13613-A-SBA - Coax Line Placement

Type: Monopole
Site Name: Johnson
Height: 150.00 (ft)

2/20/2018

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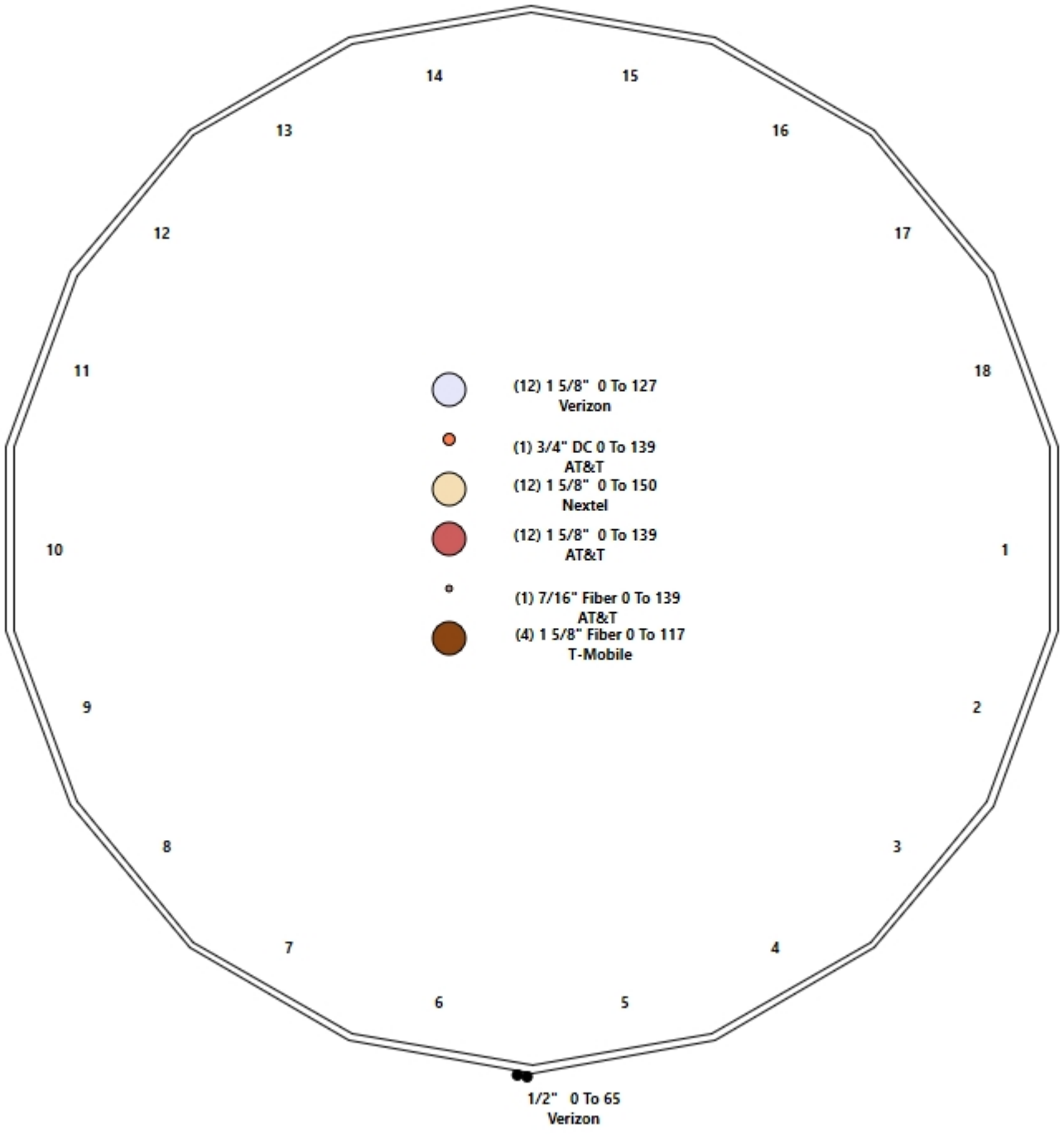

Shaft Properties

Structure:	CT13613-A-SBA		**Code:**	EIA/TIA-222-G	2/20/2018
Site Name:	Johnson		**Exposure:**	B	
Height:	150.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	A - Hard Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 5

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Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	51.000	0.4375	65		0.00	12,755
2	18	45.000	0.3125	65	Slip	75.00	6,504
3	18	45.000	0.2500	65	Slip	60.00	4,008
4	18	24.000	0.1875	65	Slip	45.00	1,236
					Total Shaft Weight:		**24,504**

	Bottom						Top						
Sec. No.	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Taper**
1	60.00	0.00	82.71	37071.59	22.77	137.14	46.74	51.00	64.29	17415.4	17.43	106.8	0.260000
2	48.99	44.75	48.28	14453.71	26.23	156.77	37.29	89.75	36.68	6335.88	19.63	119.3	0.260000
3	39.09	84.75	30.82	5873.84	26.16	156.36	27.39	129.75	21.53	2004.07	17.91	109.5	0.260000
4	28.74	126.0	16.99	1750.16	25.62	153.28	22.50	150.00	13.28	835.20	19.75	120.0	0.260000

Load Summary

Structure:	CT13613-A-SBA		**Code:**	EIA/TIA-222-G	2/20/2018
Site Name:	Johnson		**Exposure:**	B	
Height:	150.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	A - Hard Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 6

Tower Engineering Solutions

Discrete Appurtenances

				No Ice			Ice				
No.	**Elev (ft)**	**Description**	**Qty**	**Weight (lb)**	**CaAa (sf)**	**CaAa Factor**	**Weight (lb)**	**CaAa (sf)**	**CaAa Factor**	**Hor. Ecc. (ft)**	**Vert Ecc (ft)**
1	150.00	Low Profile Platform	1	1500.00	22.00	1.00	3245.22	45.549	1.00	0.00	0.00
2	150.00	Decibel - DB846G90A-XY	12	15.40	5.01	1.09	244.68	6.674	1.07	0.00	0.00
3	139.00	Low Profile Platform	1	1500.00	22.00	1.00	3231.97	45.370	1.00	0.00	0.00
4	139.00	Powerwave - 7770	6	35.00	5.50	0.77	221.12	6.928	0.81	0.00	0.00
5	139.00	Kathrein - 800 10764	1	40.80	5.88	0.79	209.53	8.715	0.82	0.00	0.00
6	139.00	KMW - AM-X-CD-16-65-00T-RET	2	48.50	8.02	0.79	263.23	11.717	0.82	0.00	0.00
7	139.00	Powerwave - LGP 21401 - TMA	6	17.50	0.00	0.50	49.83	0.000	0.50	0.00	0.00
8	139.00	Powerwave - LGP 13519 - TMA	6	5.30	0.34	0.50	17.87	0.941	0.50	0.00	0.00
9	139.00	Ericsson - RRUS 11 - RRU	6	50.70	2.52	0.67	144.37	3.684	0.67	0.00	0.00
10	139.00	Raycap - DC6-48-60-18-8F - SP	1	31.80	0.92	1.00	113.61	1.500	1.00	0.00	0.00
11	139.00	Commscope - ABT-DFDM-ADBH -	1	1.10	0.05	0.50	4.05	0.305	0.50	0.00	0.00
12	127.00	Low Profile Platform	1	1500.00	22.00	1.00	3216.41	45.160	1.00	0.00	0.00
13	127.00	Antel - LPA-80080/6CF	12	21.00	4.33	1.50	295.03	5.931	1.38	0.00	0.00
14	127.00	Antel - BXA-70080-6CF-EDIN	3	18.00	5.76	0.90	184.13	8.871	0.92	0.00	1.00
15	127.00	Antel - BXA-171085-8BF-EDIN	3	10.50	2.94	0.87	96.45	5.115	0.90	0.00	1.00
16	127.00	RFS - FD9R6004/2C-3L - Diplexer	6	3.10	0.37	0.50	13.63	0.968	0.50	0.00	1.00
17	117.00	Low-Profile Platform w/ Handrail	1	2396.00	58.98	1.00	5441.59	50.016	1.00	0.00	0.00
18	117.00	F4P-HRK10	1	478.27	9.00	1.00	1086.21	22.892	1.00	0.00	0.00
19	117.00	Ericsson - Air 32	4	105.80	6.51	0.86	340.86	7.994	0.88	0.00	0.00
20	117.00	RFS - APXVAA24_43-U-A20	4	99.00	20.24	0.72	711.39	22.739	0.74	0.00	0.00
21	117.00	RFS - APXV18-206517S-A20	4	26.40	5.17	0.79	147.16	8.259	0.83	0.00	0.00
22	117.00	Ericsson - S11B12 - RRU	4	51.00	2.83	0.67	141.53	3.704	0.67	0.00	0.00
23	117.00	Ericsson - RRU 2217 B2 - RRU	4	44.00	2.57	0.67	126.30	3.410	0.67	0.00	0.00
24	65.00	RRA4905A	2	1.00	0.14	1.00	12.56	0.616	1.00	0.00	0.00
		Totals:	**92**	**10,043.67**			**32,968.30**				

Linear Appurtenances

Bottom Elev. (ft)	**Top Elev. (ft)**	**Description**	**Exposed Width**	**Exposed**
0.00	150.00	(12) 1 5/8" Coax	0.00	Inside
0.00	139.00	(12) 1 5/8" Coax	0.00	Inside
0.00	139.00	(1) 3/4" DC	0.00	Inside
0.00	139.00	(1) 7/16" Fiber	0.00	Inside
0.00	127.00	(12) 1 5/8" Coax	0.00	Inside
0.00	117.00	(4) 1 5/8" Fiber	0.00	Inside
0.00	65.00	(2) 1/2" Coax	0.65	Outside

Shaft Section Properties

Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 7	

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Increment Length: **5 (ft)**

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in^3)	Weight (lb)
0.00		0.4375	60.000	82.707	37071.6	22.77	137.14	74.6	1216.	0.0
5.00		0.4375	58.700	80.902	34696.8	22.25	134.17	75.2	1164.	1391.8
10.00		0.4375	57.400	79.097	32425.7	21.72	131.20	75.8	1112.	1361.1
15.00		0.4375	56.100	77.292	30255.9	21.20	128.23	76.5	1062.	1330.4
20.00		0.4375	54.800	75.486	28185.2	20.68	125.26	77.1	1013.	1299.7
25.00		0.4375	53.500	73.681	26211.1	20.15	122.29	77.7	965.0	1269.0
30.00		0.4375	52.200	71.876	24331.5	19.63	119.31	78.3	918.1	1238.2
35.00		0.4375	50.900	70.071	22543.9	19.10	116.34	78.9	872.4	1207.5
40.00		0.4375	49.600	68.266	20846.1	18.58	113.37	79.5	827.8	1176.8
44.75	Bot - Section 2	0.4375	48.365	66.551	19314.2	18.08	110.55	80.1	786.6	1089.5
45.00		0.4375	48.300	66.461	19235.7	18.06	110.40	80.2	784.4	97.6
50.00		0.4375	47.000	64.656	17710.5	17.53	107.43	80.8	742.2	1924.8
51.00	Top - Section 1	0.3125	47.365	46.669	13054.0	25.31	151.57	0.0	0.0	378.6
55.00		0.3125	46.325	45.637	12207.4	24.73	148.24	72.3	519.0	628.2
60.00		0.3125	45.025	44.348	11201.6	23.99	144.08	73.2	490.0	765.5
65.00		0.3125	43.725	43.058	10252.7	23.26	139.92	74.0	461.8	743.6
70.00		0.3125	42.425	41.769	9359.0	22.53	135.76	74.9	434.5	721.6
75.00		0.3125	41.125	40.479	8518.7	21.79	131.60	75.8	408.0	699.7
80.00		0.3125	39.825	39.190	7730.3	21.06	127.44	76.6	382.3	677.7
84.75	Bot - Section 3	0.3125	38.590	37.965	7027.9	20.36	123.49	77.4	358.7	623.5
85.00		0.3125	38.525	37.901	6992.2	20.33	123.28	77.5	357.5	58.5
89.75	Top - Section 2	0.2500	37.790	29.787	5303.6	25.24	151.16	0.0	0.0	1092.1
90.00		0.2500	37.725	29.735	5276.1	25.20	150.90	71.8	275.5	25.3
95.00		0.2500	36.425	28.704	4745.8	24.28	145.70	72.8	256.6	497.1
100.00		0.2500	35.125	27.672	4252.3	23.36	140.50	73.9	238.4	479.6
105.00		0.2500	33.825	26.641	3794.3	22.45	135.30	75.0	220.9	462.0
110.00		0.2500	32.525	25.609	3370.4	21.53	130.10	76.1	204.1	444.5
115.00		0.2500	31.225	24.578	2979.3	20.61	124.90	77.2	187.9	426.9
117.00		0.2500	30.705	24.165	2831.8	20.25	122.82	77.6	181.6	165.9
120.00		0.2500	29.925	23.546	2619.7	19.70	119.70	78.2	172.4	243.5
125.00		0.2500	28.625	22.515	2290.3	18.78	114.50	79.3	157.6	391.8
126.00	Bot - Section 4	0.2500	28.365	22.308	2227.9	18.60	113.46	79.5	154.7	76.3
127.00		0.2500	28.105	22.102	2166.7	18.41	112.42	79.7	151.8	133.1
129.75	Top - Section 3	0.1875	27.765	16.411	1576.9	24.70	148.08	0.0	0.0	359.7
130.00		0.1875	27.700	16.373	1565.8	24.64	147.73	72.4	111.3	13.9
135.00		0.1875	26.400	15.599	1354.2	23.42	140.80	73.9	101.0	272.0
139.00		0.1875	25.360	14.980	1199.3	22.44	135.25	75.0	93.1	208.1
140.00		0.1875	25.100	14.826	1162.5	22.19	133.87	75.3	91.2	50.7
145.00		0.1875	23.800	14.052	989.9	20.97	126.93	76.7	81.9	245.7
150.00		0.1875	22.500	13.278	835.2	19.75	120.00	78.2	73.1	232.5
										24504.2

Wind Loading - Shaft

Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 8	

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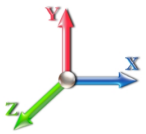
Load Case: 1.2D + 1.6W 89 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 22

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	13.485	14.83	378.06	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	13.485	14.83	369.87	0.650	0.000	5.00	25.111	16.32	387.4	0.0	1670.2
10.00		1.00	0.70	13.485	14.83	361.67	0.650	0.000	5.00	24.561	15.96	378.9	0.0	1633.3
15.00		1.00	0.70	13.485	14.83	353.48	0.650	0.000	5.00	24.011	15.61	370.4	0.0	1596.5
20.00		1.00	0.70	13.485	14.83	345.29	0.650	0.000	5.00	23.461	15.25	361.9	0.0	1559.6
25.00		1.00	0.70	13.485	14.83	337.10	0.650	0.000	5.00	22.911	14.89	353.4	0.0	1522.8
30.00		1.00	0.70	13.496	14.85	329.05	0.650	0.000	5.00	22.361	14.53	345.2	0.0	1485.9
35.00		1.00	0.73	14.104	15.51	328.00	0.650	0.000	5.00	21.811	14.18	351.9	0.0	1449.0
40.00		1.00	0.76	14.652	16.12	325.78	0.650	0.000	5.00	21.260	13.82	356.4	0.0	1412.2
44.75	Bot - Section 2	1.00	0.79	15.130	16.64	322.80	0.650	0.000	4.75	19.688	12.80	340.8	0.0	1307.4
45.00		1.00	0.79	15.154	16.67	322.62	0.650	0.000	0.25	1.036	0.67	18.0	0.0	117.1
50.00		1.00	0.81	15.617	17.18	318.70	0.650	0.000	5.00	20.425	13.28	364.9	0.0	2309.7
51.00	Top - Section 1	1.00	0.82	15.705	17.28	317.83	0.650	0.000	1.00	4.019	2.61	72.2	0.0	454.4
55.00		1.00	0.83	16.048	17.65	318.43	0.650	0.000	4.00	15.856	10.31	291.1	0.0	753.8
60.00		1.00	0.85	16.452	18.10	313.36	0.650	0.000	5.00	19.325	12.56	363.7	0.0	918.6
65.00	Appurtenance(s)	1.00	0.87	16.833	18.52	307.81	0.650	0.000	5.00	18.775	12.20	361.5	0.0	892.3
70.00		1.00	0.89	17.193	18.91	301.84	0.650	0.000	5.00	18.225	11.85	358.5	0.0	865.9
75.00		1.00	0.91	17.535	19.29	295.49	0.650	0.000	5.00	17.675	11.49	354.6	0.0	839.6
80.00		1.00	0.93	17.861	19.65	288.80	0.650	0.000	5.00	17.125	11.13	349.9	0.0	813.3
84.75	Bot - Section 3	1.00	0.94	18.158	19.97	282.16	0.650	0.000	4.75	15.759	10.24	327.4	0.0	748.2
85.00		1.00	0.94	18.173	19.99	281.80	0.650	0.000	0.25	0.826	0.54	17.2	0.0	70.2
89.75	Top - Section 2	1.00	0.96	18.458	20.30	274.90	0.650	0.000	4.75	15.437	10.03	326.0	0.0	1310.5
90.00		1.00	0.96	18.473	20.32	278.21	0.650	0.000	0.25	0.799	0.52	16.9	0.0	30.4
95.00		1.00	0.97	18.760	20.64	270.71	0.650	0.000	5.00	15.686	10.20	336.7	0.0	596.6
100.00		1.00	0.99	19.037	20.94	262.97	0.650	0.000	5.00	15.136	9.84	329.6	0.0	575.5
105.00		1.00	1.00	19.304	21.23	255.01	0.650	0.000	5.00	14.586	9.48	322.1	0.0	554.4
110.00		1.00	1.02	19.563	21.52	246.84	0.650	0.000	5.00	14.036	9.12	314.1	0.0	533.4
115.00		1.00	1.03	19.813	21.79	238.48	0.650	0.000	5.00	13.486	8.77	305.7	0.0	512.3
117.00	Appurtenance(s)	1.00	1.03	19.911	21.90	235.09	0.650	0.000	2.00	5.240	3.41	119.4	0.0	199.0
120.00		1.00	1.04	20.055	22.06	229.95	0.650	0.000	3.00	7.696	5.00	176.6	0.0	292.2
125.00		1.00	1.05	20.290	22.32	221.25	0.650	0.000	5.00	12.386	8.05	287.5	0.0	470.2
126.00	Bot - Section 4	1.00	1.06	20.337	22.37	219.49	0.650	0.000	1.00	2.411	1.57	56.1	0.0	91.5
127.00	Appurtenance(s)	1.00	1.06	20.383	22.42	217.72	0.650	0.000	1.00	2.421	1.57	56.5	0.0	159.7
129.75	Top - Section 3	1.00	1.06	20.508	22.56	212.83	0.650	0.000	2.75	6.544	4.25	153.5	0.0	431.7
130.00		1.00	1.07	20.519	22.57	215.30	0.650	0.000	0.25	0.587	0.38	13.8	0.0	16.7
135.00		1.00	1.08	20.742	22.82	206.30	0.650	0.000	5.00	11.445	7.44	271.6	0.0	326.4
139.00	Appurtenance(s)	1.00	1.09	20.915	23.01	199.01	0.650	0.000	4.00	8.760	5.69	209.6	0.0	249.7
140.00		1.00	1.09	20.958	23.05	197.17	0.650	0.000	1.00	2.135	1.39	51.2	0.0	60.9
145.00		1.00	1.10	21.169	23.29	187.90	0.650	0.000	5.00	10.345	6.72	250.5	0.0	294.8
150.00	Appurtenance(s)	1.00	1.11	21.375	23.51	178.49	0.650	0.000	5.00	9.795	6.37	239.5	0.0	279.0
								Totals:	**150.00**			**9,961.9**		**29,405.0**

Discrete Appurtenance Forces

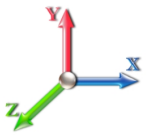
Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 9	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 89 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 22

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	150.00	Low Profile Platform	1	21.375	23.513	1.00	1.00	22.00	1800.00	0.000	0.000	827.65	0.00	0.00
2	150.00	Decibel - DB846G90A-XY	12	21.375	23.513	0.98	0.90	58.87	221.76	0.000	0.000	2214.71	0.00	0.00
3	139.00	KMW -	2	20.915	23.007	0.63	0.80	10.12	116.40	0.000	0.000	372.69	0.00	0.00
4	139.00	Low Profile Platform	1	20.915	23.007	1.00	1.00	22.00	1800.00	0.000	0.000	809.84	0.00	0.00
5	139.00	Powerwave - 7770	6	20.915	23.007	0.61	0.80	20.22	252.00	0.000	0.000	744.40	0.00	0.00
6	139.00	Kathrein - 800 10764	1	20.915	23.007	0.63	0.80	3.71	48.96	0.000	0.000	136.62	0.00	0.00
7	139.00	Powerwave - LGP 13519 -	6	20.915	23.007	0.40	0.80	0.82	38.16	0.000	0.000	30.04	0.00	0.00
8	139.00	Powerwave - LGP 21401 -	6	20.915	23.007	0.40	0.80	0.00	126.00	0.000	0.000	0.00	0.00	0.00
9	139.00	Ericsson - RRUS 11 -	6	20.915	23.007	0.54	0.80	8.10	365.04	0.000	0.000	298.33	0.00	0.00
10	139.00	Raycap -	1	20.915	23.007	0.80	0.80	0.74	38.16	0.000	0.000	27.09	0.00	0.00
11	139.00	Commscope -	1	20.915	23.007	0.40	0.80	0.02	1.32	0.000	0.000	0.74	0.00	0.00
12	127.00	RFS - FD9R6004/2C-3L -	6	20.428	22.471	0.40	0.80	0.89	22.32	0.000	1.000	31.93	0.00	31.93
13	127.00	Antel -	3	20.428	22.471	0.69	0.80	6.11	37.80	0.000	1.000	219.70	0.00	219.70
14	127.00	Antel - LPA-80080/6CF	12	20.383	22.421	1.20	0.80	62.27	302.40	0.000	0.000	2233.80	0.00	0.00
15	127.00	Low Profile Platform	1	20.383	22.421	1.00	1.00	22.00	1800.00	0.000	0.000	789.22	0.00	0.00
16	127.00	Antel -	3	20.428	22.471	0.72	0.80	12.37	64.80	0.000	1.000	444.84	0.00	444.84
17	117.00	Ericsson - Air 32	4	19.911	21.902	0.69	0.80	17.96	507.84	0.000	0.000	629.27	0.00	0.00
18	117.00	Low-Profile Platform w/	1	19.911	21.902	1.00	1.00	58.98	2875.20	0.000	0.000	2066.81	0.00	0.00
19	117.00	F4P-HRK10	1	19.911	21.902	1.00	1.00	9.00	573.92	0.000	0.000	315.38	0.00	0.00
20	117.00	RFS -	4	19.911	21.902	0.71	0.90	14.78	126.72	0.000	0.000	517.86	0.00	0.00
21	117.00	RFS -	4	19.911	21.902	0.57	0.80	46.37	475.20	0.000	0.000	1625.06	0.00	0.00
22	117.00	Ericsson - S11B12 - RRU	4	19.911	21.902	0.54	0.80	6.07	244.80	0.000	0.000	212.62	0.00	0.00
23	117.00	Ericsson - RRU 2217 B2 -	4	19.911	21.902	0.54	0.80	5.51	211.20	0.000	0.000	193.09	0.00	0.00
24	65.00	RRA4905A	2	16.833	18.516	1.00	1.00	0.28	2.40	0.000	0.000	8.30	0.00	0.00
							Totals:		**12,052.40**			**14,749.98**		

Total Applied Force Summary

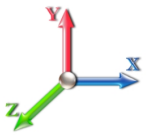
Structure:	CT13613-A-SBA		**Code:**	EIA/TIA-222-G	2/20/2018
Site Name:	Johnson		**Exposure:**	B	
Height:	150.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	A - Hard Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 10

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 89 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 22

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		387.37	1925.05	0.00	0.00
10.00		378.88	1888.20	0.00	0.00
15.00		370.40	1851.34	0.00	0.00
20.00		361.91	1814.49	0.00	0.00
25.00		353.43	1777.63	0.00	0.00
30.00		345.24	1740.78	0.00	0.00
35.00		351.91	1703.92	0.00	0.00
40.00		356.37	1667.07	0.00	0.00
44.75		340.77	1549.58	0.00	0.00
45.00		17.95	129.89	0.00	0.00
50.00		364.90	2564.60	0.00	0.00
51.00		72.21	505.34	0.00	0.00
55.00		291.10	957.73	0.00	0.00
60.00		363.71	1173.47	0.00	0.00
65.00	(2) attachments	369.83	1149.55	0.00	0.00
70.00		358.45	1118.90	0.00	0.00
75.00		354.56	1092.58	0.00	0.00
80.00		349.92	1066.25	0.00	0.00
84.75		327.36	988.56	0.00	0.00
85.00		17.18	82.81	0.00	0.00
89.75		325.98	1550.79	0.00	0.00
90.00		16.88	43.03	0.00	0.00
95.00		336.65	849.53	0.00	0.00
100.00		329.64	828.47	0.00	0.00
105.00		322.12	807.41	0.00	0.00
110.00		314.13	786.35	0.00	0.00
115.00		305.67	765.29	0.00	0.00
117.00	(22) attachments	5679.46	5315.10	0.00	0.00
120.00		176.56	429.03	0.00	0.00
125.00		287.51	698.21	0.00	0.00
126.00		56.10	137.11	0.00	0.00
127.00	(25) attachments	3775.93	2432.66	0.00	696.46
129.75		153.53	515.90	0.00	0.00
130.00		13.77	24.39	0.00	0.00
135.00		271.56	479.50	0.00	0.00
139.00	(30) attachments	2629.34	3158.27	0.00	0.00
140.00		51.19	75.83	0.00	0.00
145.00		250.52	369.67	0.00	0.00
150.00	(13) attachments	3281.88	2375.64	0.00	0.00
	Totals:	**24,711.88**	**48,389.90**	**0.00**	**696.46**

Linear Appurtenance Segment Forces (Factored)

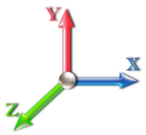
Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 11	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 89 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 22

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	13.485	0.00	1.92
10.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	13.485	0.00	1.92
15.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	13.485	0.00	1.92
20.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	13.485	0.00	1.92
25.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	13.485	0.00	1.92
30.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	13.496	0.00	1.92
35.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	14.104	0.00	1.92
40.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.013	0.000	14.652	0.00	1.92
44.75	1/2" Coax	Yes	4.75	0.000	0.65	0.26	0.00	0.013	0.000	15.130	0.00	1.82
45.00	1/2" Coax	Yes	0.25	0.000	0.65	0.01	0.00	0.013	0.000	15.154	0.00	0.10
50.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.013	0.000	15.617	0.00	1.92
51.00	1/2" Coax	Yes	1.00	0.000	0.65	0.05	0.00	0.014	0.000	15.705	0.00	0.38
55.00	1/2" Coax	Yes	4.00	0.000	0.65	0.22	0.00	0.014	0.000	16.048	0.00	1.54
60.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.014	0.000	16.452	0.00	1.92
65.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.014	0.000	16.833	0.00	1.92
									Totals:		**0.0**	**25.0**

Calculated Forces

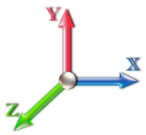
Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 12	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 89 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 22

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-48.37	-24.76	0.00	-2723.3	0.00	2723.35	5554.25	2777.13	13600.6	6810.41	0.00	0.000	0.000	0.409
5.00	-46.40	-24.45	0.00	-2599.5	0.00	2599.57	5477.89	2738.95	13118.7	6569.12	0.06	-0.102	0.000	0.404
10.00	-44.47	-24.15	0.00	-2477.3	0.00	2477.33	5399.54	2699.77	12640.4	6329.59	0.22	-0.206	0.000	0.400
15.00	-42.57	-23.85	0.00	-2356.5	0.00	2356.59	5319.17	2659.59	12165.9	6092.00	0.49	-0.312	0.000	0.395
20.00	-40.72	-23.55	0.00	-2237.3	0.00	2237.36	5236.81	2618.40	11695.6	5856.50	0.88	-0.420	0.000	0.390
25.00	-38.90	-23.26	0.00	-2119.6	0.00	2119.60	5152.44	2576.22	11229.8	5623.26	1.38	-0.530	0.000	0.385
30.00	-37.11	-22.97	0.00	-2003.3	0.00	2003.31	5066.07	2533.04	10768.8	5392.43	1.99	-0.642	0.000	0.379
35.00	-35.37	-22.67	0.00	-1888.4	0.00	1888.46	4977.70	2488.85	10313.0	5164.19	2.73	-0.756	0.000	0.373
40.00	-33.66	-22.35	0.00	-1775.1	0.00	1775.13	4887.33	2443.67	9862.71	4938.68	3.58	-0.871	0.000	0.366
44.75	-32.10	-22.02	0.00	-1668.9	0.00	1668.95	4799.62	2399.81	9440.25	4727.14	4.50	-0.983	0.000	0.360
45.00	-31.94	-22.04	0.00	-1663.4	0.00	1663.45	4794.96	2397.48	9418.17	4716.08	4.56	-0.989	0.000	0.359
50.00	-29.36	-21.66	0.00	-1553.2	0.00	1553.27	4700.58	2350.29	8979.75	4496.55	5.66	-1.108	0.000	0.352
51.00	-28.83	-21.61	0.00	-1531.6	0.00	1531.61	3008.41	1504.20	5823.48	2916.07	5.89	-1.133	0.000	0.535
55.00	-27.83	-21.36	0.00	-1445.1	0.00	1445.17	2970.26	1485.13	5621.72	2815.04	6.88	-1.230	0.000	0.523
60.00	-26.61	-21.05	0.00	-1338.3	0.00	1338.36	2920.78	1460.39	5370.82	2689.40	8.26	-1.392	0.000	0.507
65.00	-25.41	-20.72	0.00	-1233.1	0.00	1233.13	2869.29	1434.64	5121.68	2564.65	9.80	-1.556	0.000	0.490
70.00	-24.24	-20.40	0.00	-1129.5	0.00	1129.53	2815.80	1407.90	4874.61	2440.93	11.52	-1.720	0.000	0.472
75.00	-23.10	-20.08	0.00	-1027.5	0.00	1027.53	2760.31	1380.15	4629.95	2318.41	13.41	-1.883	0.000	0.452
80.00	-22.00	-19.75	0.00	-927.15	0.00	927.15	2702.81	1351.41	4388.01	2197.26	15.47	-2.047	0.000	0.430
84.75	-20.99	-19.42	0.00	-833.33	0.00	833.33	2646.34	1323.17	4160.98	2083.58	17.59	-2.201	0.000	0.408
85.00	-20.88	-19.43	0.00	-828.47	0.00	828.47	2643.31	1321.66	4149.11	2077.64	17.70	-2.209	0.000	0.407
89.75	-19.32	-19.07	0.00	-736.20	0.00	736.20	1922.43	961.22	2968.94	1486.68	19.98	-2.360	0.000	0.506
90.00	-19.25	-19.08	0.00	-731.43	0.00	731.43	1920.55	960.27	2960.86	1482.63	20.10	-2.368	0.000	0.504
95.00	-18.35	-18.77	0.00	-636.03	0.00	636.03	1881.78	940.89	2799.79	1401.97	22.68	-2.553	0.000	0.464
100.00	-17.48	-18.45	0.00	-542.21	0.00	542.21	1841.02	920.51	2640.02	1321.97	25.45	-2.729	0.000	0.420
105.00	-16.64	-18.14	0.00	-449.96	0.00	449.96	1798.25	899.12	2481.89	1242.79	28.40	-2.895	0.000	0.372
110.00	-15.83	-17.82	0.00	-359.29	0.00	359.29	1753.48	876.74	2325.70	1164.58	31.52	-3.047	0.000	0.318
115.00	-15.06	-17.50	0.00	-270.19	0.00	270.19	1706.70	853.35	2171.78	1087.50	34.78	-3.180	0.000	0.258
117.00	-10.06	-11.54	0.00	-235.20	0.00	235.20	1687.43	843.72	2110.92	1057.03	36.13	-3.228	0.000	0.229
120.00	-9.62	-11.35	0.00	-200.58	0.00	200.58	1657.93	828.96	2020.46	1011.73	38.18	-3.294	0.000	0.204
125.00	-8.93	-11.03	0.00	-143.83	0.00	143.83	1607.15	803.57	1872.06	937.42	41.68	-3.387	0.000	0.159
126.00	-8.79	-10.97	0.00	-132.80	0.00	132.80	1596.75	798.38	1842.76	922.75	42.39	-3.404	0.000	0.150
127.00	-6.59	-7.06	0.00	-121.13	0.00	121.13	1586.28	793.14	1813.59	908.14	43.10	-3.421	0.000	0.138
129.75	-6.08	-6.88	0.00	-101.72	0.00	101.72	1068.62	534.31	1212.20	607.00	45.08	-3.461	0.000	0.173
130.00	-6.05	-6.87	0.00	-100.00	0.00	100.00	1067.16	533.58	1207.67	604.73	45.26	-3.464	0.000	0.171
135.00	-5.58	-6.57	0.00	-65.66	0.00	65.66	1036.93	518.46	1117.63	559.65	48.93	-3.540	0.000	0.123
139.00	-2.59	-3.75	0.00	-39.37	0.00	39.37	1011.29	505.65	1046.45	524.00	51.92	-3.584	0.000	0.078
140.00	-2.52	-3.70	0.00	-35.62	0.00	35.62	1004.68	502.34	1028.80	515.16	52.67	-3.593	0.000	0.072
145.00	-2.16	-3.43	0.00	-17.13	0.00	17.13	970.44	485.22	941.49	471.44	56.45	-3.625	0.000	0.039
150.00	0.00	-3.28	0.00	0.00	0.00	0.00	934.20	467.10	856.03	428.65	60.25	-3.637	0.000	0.000

Wind Loading - Shaft

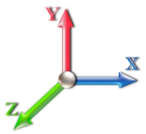
Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 13	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 89 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 22

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	13.485	14.83	378.06	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	13.485	14.83	369.87	0.650	0.000	5.00	25.111	16.32	387.4	0.0	1252.6
10.00		1.00	0.70	13.485	14.83	361.67	0.650	0.000	5.00	24.561	15.96	378.9	0.0	1225.0
15.00		1.00	0.70	13.485	14.83	353.48	0.650	0.000	5.00	24.011	15.61	370.4	0.0	1197.3
20.00		1.00	0.70	13.485	14.83	345.29	0.650	0.000	5.00	23.461	15.25	361.9	0.0	1169.7
25.00		1.00	0.70	13.485	14.83	337.10	0.650	0.000	5.00	22.911	14.89	353.4	0.0	1142.1
30.00		1.00	0.70	13.496	14.85	329.05	0.650	0.000	5.00	22.361	14.53	345.2	0.0	1114.4
35.00		1.00	0.73	14.104	15.51	328.00	0.650	0.000	5.00	21.811	14.18	351.9	0.0	1086.8
40.00		1.00	0.76	14.652	16.12	325.78	0.650	0.000	5.00	21.260	13.82	356.4	0.0	1059.1
44.75	Bot - Section 2	1.00	0.79	15.130	16.64	322.80	0.650	0.000	4.75	19.688	12.80	340.8	0.0	980.6
45.00		1.00	0.79	15.154	16.67	322.62	0.650	0.000	0.25	1.036	0.67	18.0	0.0	87.9
50.00		1.00	0.81	15.617	17.18	318.70	0.650	0.000	5.00	20.425	13.28	364.9	0.0	1732.3
51.00	Top - Section 1	1.00	0.82	15.705	17.28	317.83	0.650	0.000	1.00	4.019	2.61	72.2	0.0	340.8
55.00		1.00	0.83	16.048	17.65	318.43	0.650	0.000	4.00	15.856	10.31	291.1	0.0	565.4
60.00		1.00	0.85	16.452	18.10	313.36	0.650	0.000	5.00	19.325	12.56	363.7	0.0	688.9
65.00	Appurtenance(s)	1.00	0.87	16.833	18.52	307.81	0.650	0.000	5.00	18.775	12.20	361.5	0.0	669.2
70.00		1.00	0.89	17.193	18.91	301.84	0.650	0.000	5.00	18.225	11.85	358.5	0.0	649.5
75.00		1.00	0.91	17.535	19.29	295.49	0.650	0.000	5.00	17.675	11.49	354.6	0.0	629.7
80.00		1.00	0.93	17.861	19.65	288.80	0.650	0.000	5.00	17.125	11.13	349.9	0.0	610.0
84.75	Bot - Section 3	1.00	0.94	18.158	19.97	282.16	0.650	0.000	4.75	15.759	10.24	327.4	0.0	561.2
85.00		1.00	0.94	18.173	19.99	281.80	0.650	0.000	0.25	0.826	0.54	17.2	0.0	52.6
89.75	Top - Section 2	1.00	0.96	18.458	20.30	274.90	0.650	0.000	4.75	15.437	10.03	326.0	0.0	982.9
90.00		1.00	0.96	18.473	20.32	278.21	0.650	0.000	0.25	0.799	0.52	16.9	0.0	22.8
95.00		1.00	0.97	18.760	20.64	270.71	0.650	0.000	5.00	15.686	10.20	336.7	0.0	447.4
100.00		1.00	0.99	19.037	20.94	262.97	0.650	0.000	5.00	15.136	9.84	329.6	0.0	431.6
105.00		1.00	1.00	19.304	21.23	255.01	0.650	0.000	5.00	14.586	9.48	322.1	0.0	415.8
110.00		1.00	1.02	19.563	21.52	246.84	0.650	0.000	5.00	14.036	9.12	314.1	0.0	400.0
115.00		1.00	1.03	19.813	21.79	238.48	0.650	0.000	5.00	13.486	8.77	305.7	0.0	384.2
117.00	Appurtenance(s)	1.00	1.03	19.911	21.90	235.09	0.650	0.000	2.00	5.240	3.41	119.4	0.0	149.3
120.00		1.00	1.04	20.055	22.06	229.95	0.650	0.000	3.00	7.696	5.00	176.6	0.0	219.2
125.00		1.00	1.05	20.290	22.32	221.25	0.650	0.000	5.00	12.386	8.05	287.5	0.0	352.7
126.00	Bot - Section 4	1.00	1.06	20.337	22.37	219.49	0.650	0.000	1.00	2.411	1.57	56.1	0.0	68.6
127.00	Appurtenance(s)	1.00	1.06	20.383	22.42	217.72	0.650	0.000	1.00	2.421	1.57	56.5	0.0	119.8
129.75	Top - Section 3	1.00	1.06	20.508	22.56	212.83	0.650	0.000	2.75	6.544	4.25	153.5	0.0	323.8
130.00		1.00	1.07	20.519	22.57	215.30	0.650	0.000	0.25	0.587	0.38	13.8	0.0	12.6
135.00		1.00	1.08	20.742	22.82	206.30	0.650	0.000	5.00	11.445	7.44	271.6	0.0	244.8
139.00	Appurtenance(s)	1.00	1.09	20.915	23.01	199.01	0.650	0.000	4.00	8.760	5.69	209.6	0.0	187.3
140.00		1.00	1.09	20.958	23.05	197.17	0.650	0.000	1.00	2.135	1.39	51.2	0.0	45.6
145.00		1.00	1.10	21.169	23.29	187.90	0.650	0.000	5.00	10.345	6.72	250.5	0.0	221.1
150.00	Appurtenance(s)	1.00	1.11	21.375	23.51	178.49	0.650	0.000	5.00	9.795	6.37	239.5	0.0	209.2
								Totals:	**150.00**			**9,961.9**		**22,053.8**

Discrete Appurtenance Forces

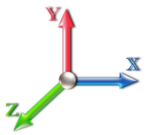
Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 14	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 89 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 22

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	150.00	Low Profile Platform	1	21.375	23.513	1.00	1.00	22.00	1350.00	0.000	0.000	827.65	0.00	0.00
2	150.00	Decibel - DB846G90A-XY	12	21.375	23.513	0.98	0.90	58.87	166.32	0.000	0.000	2214.71	0.00	0.00
3	139.00	KMW -	2	20.915	23.007	0.63	0.80	10.12	87.30	0.000	0.000	372.69	0.00	0.00
4	139.00	Low Profile Platform	1	20.915	23.007	1.00	1.00	22.00	1350.00	0.000	0.000	809.84	0.00	0.00
5	139.00	Powerwave - 7770	6	20.915	23.007	0.61	0.80	20.22	189.00	0.000	0.000	744.40	0.00	0.00
6	139.00	Kathrein - 800 10764	1	20.915	23.007	0.63	0.80	3.71	36.72	0.000	0.000	136.62	0.00	0.00
7	139.00	Powerwave - LGP 13519 -	6	20.915	23.007	0.40	0.80	0.82	28.62	0.000	0.000	30.04	0.00	0.00
8	139.00	Powerwave - LGP 21401 -	6	20.915	23.007	0.40	0.80	0.00	94.50	0.000	0.000	0.00	0.00	0.00
9	139.00	Ericsson - RRUS 11 -	6	20.915	23.007	0.54	0.80	8.10	273.78	0.000	0.000	298.33	0.00	0.00
10	139.00	Raycap -	1	20.915	23.007	0.80	0.80	0.74	28.62	0.000	0.000	27.09	0.00	0.00
11	139.00	Commscope -	1	20.915	23.007	0.40	0.80	0.02	0.99	0.000	0.000	0.74	0.00	0.00
12	127.00	RFS - FD9R6004/2C-3L -	6	20.428	22.471	0.40	0.80	0.89	16.74	0.000	1.000	31.93	0.00	31.93
13	127.00	Antel -	3	20.428	22.471	0.69	0.80	6.11	28.35	0.000	1.000	219.70	0.00	219.70
14	127.00	Antel - LPA-80080/6CF	12	20.383	22.421	1.20	0.80	62.27	226.80	0.000	0.000	2233.80	0.00	0.00
15	127.00	Low Profile Platform	1	20.383	22.421	1.00	1.00	22.00	1350.00	0.000	0.000	789.22	0.00	0.00
16	127.00	Antel -	3	20.428	22.471	0.72	0.80	12.37	48.60	0.000	1.000	444.84	0.00	444.84
17	117.00	Ericsson - Air 32	4	19.911	21.902	0.69	0.80	17.96	380.88	0.000	0.000	629.27	0.00	0.00
18	117.00	Low-Profile Platform w/	1	19.911	21.902	1.00	1.00	58.98	2156.40	0.000	0.000	2066.81	0.00	0.00
19	117.00	F4P-HRK10	1	19.911	21.902	1.00	1.00	9.00	430.44	0.000	0.000	315.38	0.00	0.00
20	117.00	RFS -	4	19.911	21.902	0.71	0.90	14.78	95.04	0.000	0.000	517.86	0.00	0.00
21	117.00	RFS -	4	19.911	21.902	0.57	0.80	46.37	356.40	0.000	0.000	1625.06	0.00	0.00
22	117.00	Ericsson - S11B12 - RRU	4	19.911	21.902	0.54	0.80	6.07	183.60	0.000	0.000	212.62	0.00	0.00
23	117.00	Ericsson - RRU 2217 B2 -	4	19.911	21.902	0.54	0.80	5.51	158.40	0.000	0.000	193.09	0.00	0.00
24	65.00	RRA4905A	2	16.833	18.516	1.00	1.00	0.28	1.80	0.000	0.000	8.30	0.00	0.00
							Totals:		**9,039.30**			**14,749.98**		

Total Applied Force Summary

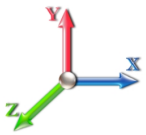
Structure:	CT13613-A-SBA		**Code:**	EIA/TIA-222-G	2/20/2018
Site Name:	Johnson		**Exposure:**	B	
Height:	150.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	A - Hard Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 15

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 89 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 22

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		387.37	1443.79	0.00	0.00
10.00		378.88	1416.15	0.00	0.00
15.00		370.40	1388.51	0.00	0.00
20.00		361.91	1360.87	0.00	0.00
25.00		353.43	1333.22	0.00	0.00
30.00		345.24	1305.58	0.00	0.00
35.00		351.91	1277.94	0.00	0.00
40.00		356.37	1250.30	0.00	0.00
44.75		340.77	1162.18	0.00	0.00
45.00		17.95	97.42	0.00	0.00
50.00		364.90	1923.45	0.00	0.00
51.00		72.21	379.00	0.00	0.00
55.00		291.10	718.30	0.00	0.00
60.00		363.71	880.10	0.00	0.00
65.00	(2) attachments	369.83	862.16	0.00	0.00
70.00		358.45	839.18	0.00	0.00
75.00		354.56	819.43	0.00	0.00
80.00		349.92	799.69	0.00	0.00
84.75		327.36	741.42	0.00	0.00
85.00		17.18	62.10	0.00	0.00
89.75		325.98	1163.09	0.00	0.00
90.00		16.88	32.27	0.00	0.00
95.00		336.65	637.14	0.00	0.00
100.00		329.64	621.35	0.00	0.00
105.00		322.12	605.55	0.00	0.00
110.00		314.13	589.76	0.00	0.00
115.00		305.67	573.96	0.00	0.00
117.00	(22) attachments	5679.46	3986.33	0.00	0.00
120.00		176.56	321.77	0.00	0.00
125.00		287.51	523.65	0.00	0.00
126.00		56.10	102.84	0.00	0.00
127.00	(25) attachments	3775.93	1824.49	0.00	696.46
129.75		153.53	386.92	0.00	0.00
130.00		13.77	18.29	0.00	0.00
135.00		271.56	359.63	0.00	0.00
139.00	(30) attachments	2629.34	2368.70	0.00	0.00
140.00		51.19	56.87	0.00	0.00
145.00		250.52	277.25	0.00	0.00
150.00	(13) attachments	3281.88	1781.73	0.00	0.00
	Totals:	**24,711.88**	**36,292.42**	**0.00**	**696.46**

Linear Appurtenance Segment Forces (Factored)

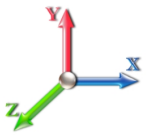
Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 16	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 89 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 22

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	13.485	0.00	1.44
10.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	13.485	0.00	1.44
15.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	13.485	0.00	1.44
20.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	13.485	0.00	1.44
25.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	13.485	0.00	1.44
30.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	13.496	0.00	1.44
35.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	14.104	0.00	1.44
40.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.013	0.000	14.652	0.00	1.44
44.75	1/2" Coax	Yes	4.75	0.000	0.65	0.26	0.00	0.013	0.000	15.130	0.00	1.37
45.00	1/2" Coax	Yes	0.25	0.000	0.65	0.01	0.00	0.013	0.000	15.154	0.00	0.07
50.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.013	0.000	15.617	0.00	1.44
51.00	1/2" Coax	Yes	1.00	0.000	0.65	0.05	0.00	0.014	0.000	15.705	0.00	0.29
55.00	1/2" Coax	Yes	4.00	0.000	0.65	0.22	0.00	0.014	0.000	16.048	0.00	1.15
60.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.014	0.000	16.452	0.00	1.44
65.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.014	0.000	16.833	0.00	1.44
									Totals:		**0.0**	**18.7**

Calculated Forces

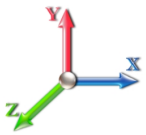
Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 17	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 89 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 22

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-36.27	-24.74	0.00	-2701.7	0.00	2701.70	5554.25	2777.13	13600.6	6810.41	0.00	0.000	0.000	0.403
5.00	-34.78	-24.42	0.00	-2577.9	0.00	2577.99	5477.89	2738.95	13118.7	6569.12	0.05	-0.101	0.000	0.399
10.00	-33.32	-24.10	0.00	-2455.9	0.00	2455.90	5399.54	2699.77	12640.4	6329.59	0.22	-0.204	0.000	0.394
15.00	-31.89	-23.78	0.00	-2335.4	0.00	2335.43	5319.17	2659.59	12165.9	6092.00	0.49	-0.310	0.000	0.389
20.00	-30.49	-23.46	0.00	-2216.5	0.00	2216.54	5236.81	2618.40	11695.6	5856.50	0.87	-0.417	0.000	0.384
25.00	-29.12	-23.16	0.00	-2099.2	0.00	2099.22	5152.44	2576.22	11229.8	5623.26	1.36	-0.526	0.000	0.379
30.00	-27.77	-22.85	0.00	-1983.4	0.00	1983.44	5066.07	2533.04	10768.8	5392.43	1.97	-0.636	0.000	0.373
35.00	-26.45	-22.54	0.00	-1869.1	0.00	1869.18	4977.70	2488.85	10313.0	5164.19	2.70	-0.749	0.000	0.367
40.00	-25.16	-22.21	0.00	-1756.5	0.00	1756.50	4887.33	2443.67	9862.71	4938.68	3.55	-0.863	0.000	0.361
44.75	-23.98	-21.88	0.00	-1650.9	0.00	1650.99	4799.62	2399.81	9440.25	4727.14	4.46	-0.974	0.000	0.354
45.00	-23.86	-21.88	0.00	-1645.5	0.00	1645.52	4794.96	2397.48	9418.17	4716.08	4.51	-0.980	0.000	0.354
50.00	-21.92	-21.51	0.00	-1536.1	0.00	1536.11	4700.58	2350.29	8979.75	4496.55	5.60	-1.097	0.000	0.346
51.00	-21.52	-21.45	0.00	-1514.6	0.00	1514.60	3008.41	1504.20	5823.48	2916.07	5.84	-1.122	0.000	0.527
55.00	-20.76	-21.20	0.00	-1428.7	0.00	1428.78	2970.26	1485.13	5621.72	2815.04	6.82	-1.218	0.000	0.515
60.00	-19.83	-20.87	0.00	-1322.8	0.00	1322.81	2920.78	1460.39	5370.82	2689.40	8.18	-1.378	0.000	0.499
65.00	-18.92	-20.53	0.00	-1218.4	0.00	1218.47	2869.29	1434.64	5121.68	2564.65	9.71	-1.540	0.000	0.482
70.00	-18.03	-20.20	0.00	-1115.8	0.00	1115.83	2815.80	1407.90	4874.61	2440.93	11.41	-1.702	0.000	0.464
75.00	-17.17	-19.87	0.00	-1014.8	0.00	1014.84	2760.31	1380.15	4629.95	2318.41	13.28	-1.864	0.000	0.444
80.00	-16.33	-19.53	0.00	-915.51	0.00	915.51	2702.81	1351.41	4388.01	2197.26	15.32	-2.025	0.000	0.423
84.75	-15.57	-19.20	0.00	-822.72	0.00	822.72	2646.34	1323.17	4160.98	2083.58	17.41	-2.177	0.000	0.401
85.00	-15.49	-19.20	0.00	-817.92	0.00	817.92	2643.31	1321.66	4149.11	2077.64	17.53	-2.185	0.000	0.400
89.75	-14.31	-18.85	0.00	-726.70	0.00	726.70	1922.43	961.22	2968.94	1486.68	19.78	-2.334	0.000	0.497
90.00	-14.25	-18.86	0.00	-721.99	0.00	721.99	1920.55	960.27	2960.86	1482.63	19.90	-2.342	0.000	0.495
95.00	-13.57	-18.54	0.00	-627.70	0.00	627.70	1881.78	940.89	2799.79	1401.97	22.45	-2.524	0.000	0.455
100.00	-12.91	-18.22	0.00	-535.02	0.00	535.02	1841.02	920.51	2640.02	1321.97	25.19	-2.699	0.000	0.412
105.00	-12.27	-17.90	0.00	-443.93	0.00	443.93	1798.25	899.12	2481.89	1242.79	28.11	-2.862	0.000	0.364
110.00	-11.65	-17.58	0.00	-354.44	0.00	354.44	1753.48	876.74	2325.70	1164.58	31.19	-3.012	0.000	0.311
115.00	-11.07	-17.27	0.00	-266.51	0.00	266.51	1706.70	853.35	2171.78	1087.50	34.42	-3.143	0.000	0.252
117.00	-7.39	-11.38	0.00	-231.98	0.00	231.98	1687.43	843.72	2110.92	1057.03	35.74	-3.191	0.000	0.224
120.00	-7.07	-11.20	0.00	-197.84	0.00	197.84	1657.93	828.96	2020.46	1011.73	37.77	-3.256	0.000	0.200
125.00	-6.55	-10.89	0.00	-141.86	0.00	141.86	1607.15	803.57	1872.06	937.42	41.23	-3.348	0.000	0.156
126.00	-6.45	-10.83	0.00	-130.97	0.00	130.97	1596.75	798.38	1842.76	922.75	41.93	-3.365	0.000	0.146
127.00	-4.85	-6.95	0.00	-119.45	0.00	119.45	1586.28	793.14	1813.59	908.14	42.64	-3.381	0.000	0.135
129.75	-4.47	-6.78	0.00	-100.33	0.00	100.33	1068.62	534.31	1212.20	607.00	44.60	-3.420	0.000	0.170
130.00	-4.44	-6.77	0.00	-98.64	0.00	98.64	1067.16	533.58	1207.67	604.73	44.78	-3.424	0.000	0.167
135.00	-4.09	-6.48	0.00	-64.82	0.00	64.82	1036.93	518.46	1117.63	559.65	48.40	-3.498	0.000	0.120
139.00	-1.89	-3.71	0.00	-38.91	0.00	38.91	1011.29	505.65	1046.45	524.00	51.35	-3.542	0.000	0.076
140.00	-1.84	-3.65	0.00	-35.20	0.00	35.20	1004.68	502.34	1028.80	515.16	52.10	-3.551	0.000	0.070
145.00	-1.57	-3.39	0.00	-16.93	0.00	16.93	970.44	485.22	941.49	471.44	55.83	-3.582	0.000	0.038
150.00	0.00	-3.28	0.00	0.00	0.00	0.00	934.20	467.10	856.03	428.65	59.59	-3.595	0.000	0.000

Wind Loading - Shaft

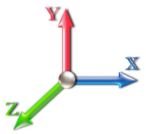
Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 18	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 40 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 22

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	2.724	3.00	0.00	1.200	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	2.724	3.00	0.00	1.200	1.656	5.00	26.491	31.79	95.2	626.1	2296.3
10.00		1.00	0.70	2.724	3.00	0.00	1.200	1.775	5.00	26.040	31.25	93.6	657.9	2291.2
15.00		1.00	0.70	2.724	3.00	0.00	1.200	1.848	5.00	25.551	30.66	91.9	670.9	2267.4
20.00		1.00	0.70	2.724	3.00	0.00	1.200	1.902	5.00	25.046	30.06	90.1	675.6	2235.2
25.00		1.00	0.70	2.724	3.00	0.00	1.200	1.945	5.00	24.532	29.44	88.2	675.5	2198.3
30.00		1.00	0.70	2.726	3.00	0.00	1.200	1.981	5.00	24.011	28.81	86.4	672.3	2158.2
35.00		1.00	0.73	2.849	3.13	0.00	1.200	2.012	5.00	23.487	28.18	88.3	666.7	2115.7
40.00		1.00	0.76	2.960	3.26	0.00	1.200	2.039	5.00	22.960	27.55	89.7	659.4	2071.6
44.75	Bot - Section 2	1.00	0.79	3.056	3.36	0.00	1.200	2.062	4.75	21.320	25.58	86.0	618.6	1926.0
45.00		1.00	0.79	3.061	3.37	0.00	1.200	2.063	0.25	1.122	1.35	4.5	32.9	150.1
50.00		1.00	0.81	3.155	3.47	0.00	1.200	2.085	5.00	22.162	26.59	92.3	649.0	2958.8
51.00	Top - Section 1	1.00	0.82	3.172	3.49	0.00	1.200	2.089	1.00	4.367	5.24	18.3	129.4	583.8
55.00		1.00	0.83	3.242	3.57	0.00	1.200	2.105	4.00	17.259	20.71	73.9	510.7	1264.5
60.00		1.00	0.85	3.323	3.66	0.00	1.200	2.123	5.00	21.094	25.31	92.5	626.9	1545.5
65.00	Appurtenance(s)	1.00	0.87	3.400	3.74	0.00	1.200	2.140	5.00	20.558	24.67	92.3	614.7	1507.0
70.00		1.00	0.89	3.473	3.82	0.00	1.200	2.156	5.00	20.022	24.03	91.8	601.9	1467.9
75.00		1.00	0.91	3.542	3.90	0.00	1.200	2.171	5.00	19.484	23.38	91.1	588.6	1428.2
80.00		1.00	0.93	3.608	3.97	0.00	1.200	2.185	5.00	18.946	22.73	90.2	574.8	1388.1
84.75	Bot - Section 3	1.00	0.94	3.668	4.03	0.00	1.200	2.198	4.75	17.499	21.00	84.7	533.2	1281.5
85.00		1.00	0.94	3.671	4.04	0.00	1.200	2.198	0.25	0.918	1.10	4.4	28.4	98.5
89.75	Top - Section 2	1.00	0.96	3.728	4.10	0.00	1.200	2.210	4.75	17.187	20.62	84.6	525.9	1836.4
90.00		1.00	0.96	3.731	4.10	0.00	1.200	2.211	0.25	0.891	1.07	4.4	27.6	58.0
95.00		1.00	0.97	3.789	4.17	0.00	1.200	2.223	5.00	17.539	21.05	87.7	537.9	1134.5
100.00		1.00	0.99	3.845	4.23	0.00	1.200	2.234	5.00	16.998	20.40	86.3	522.7	1098.2
105.00		1.00	1.00	3.899	4.29	0.00	1.200	2.245	5.00	16.457	19.75	84.7	507.1	1061.5
110.00		1.00	1.02	3.952	4.35	0.00	1.200	2.256	5.00	15.916	19.10	83.0	491.2	1024.6
115.00		1.00	1.03	4.002	4.40	0.00	1.200	2.266	5.00	15.374	18.45	81.2	475.1	987.4
117.00	Appurtenance(s)	1.00	1.03	4.022	4.42	0.00	1.200	2.270	2.00	5.997	7.20	31.8	187.4	386.5
120.00		1.00	1.04	4.051	4.46	0.00	1.200	2.276	3.00	8.833	10.60	47.2	275.2	567.5
125.00		1.00	1.05	4.099	4.51	0.00	1.200	2.285	5.00	14.290	17.15	77.3	442.1	912.3
126.00	Bot - Section 4	1.00	1.06	4.108	4.52	0.00	1.200	2.287	1.00	2.792	3.35	15.1	87.7	179.3
127.00	Appurtenance(s)	1.00	1.06	4.117	4.53	0.00	1.200	2.289	1.00	2.802	3.36	15.2	88.2	247.9
129.75	Top - Section 3	1.00	1.06	4.142	4.56	0.00	1.200	2.293	2.75	7.595	9.11	41.5	237.3	669.0
130.00		1.00	1.07	4.145	4.56	0.00	1.200	2.294	0.25	0.682	0.82	3.7	21.5	38.3
135.00		1.00	1.08	4.190	4.61	0.00	1.200	2.303	5.00	13.364	16.04	73.9	413.7	740.0
139.00	Appurtenance(s)	1.00	1.09	4.225	4.65	0.00	1.200	2.309	4.00	10.299	12.36	57.4	319.9	569.7
140.00		1.00	1.09	4.233	4.66	0.00	1.200	2.311	1.00	2.520	3.02	14.1	79.3	140.1
145.00		1.00	1.10	4.276	4.70	0.00	1.200	2.319	5.00	12.277	14.73	69.3	379.1	673.9
150.00	Appurtenance(s)	1.00	1.11	4.318	4.75	0.00	1.200	2.327	5.00	11.734	14.08	66.9	361.5	640.5
								Totals:	**150.00**			**2,571.0**		**46,199.2**

Discrete Appurtenance Forces

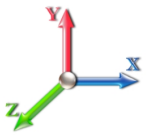
Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 19	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 40 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 22

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	150.00	Low Profile Platform	1	4.318	4.749	1.00	1.00	45.55	3245.22	0.000	0.000	216.33	0.00	0.00
2	150.00	Decibel - DB846G90A-XY	12	4.318	4.749	0.96	0.90	76.91	2973.14	0.000	0.000	365.27	0.00	0.00
3	139.00	KMW -	2	4.225	4.647	0.66	0.80	15.41	452.86	0.000	0.000	71.61	0.00	0.00
4	139.00	Low Profile Platform	1	4.225	4.647	1.00	1.00	45.37	3231.97	0.000	0.000	210.85	0.00	0.00
5	139.00	Powerwave - 7770	6	4.225	4.647	0.64	0.80	26.77	1578.75	0.000	0.000	124.40	0.00	0.00
6	139.00	Kathrein - 800 10764	1	4.225	4.647	0.66	0.80	5.72	181.19	0.000	0.000	26.60	0.00	0.00
7	139.00	Powerwave - LGP 13519 -	6	4.225	4.647	0.40	0.80	2.26	97.36	0.000	0.000	10.49	0.00	0.00
8	139.00	Powerwave - LGP 21401 -	6	4.225	4.647	0.40	0.80	0.00	424.98	0.000	0.000	0.00	0.00	0.00
9	139.00	Ericsson - RRUS 11 -	6	4.225	4.647	0.54	0.80	11.85	835.23	0.000	0.000	55.06	0.00	0.00
10	139.00	Raycap -	1	4.225	4.647	0.80	0.80	1.20	102.27	0.000	0.000	5.58	0.00	0.00
11	139.00	Commscope -	1	4.225	4.647	0.40	0.80	0.12	3.57	0.000	0.000	0.57	0.00	0.00
12	127.00	RFS - FD9R6004/2C-3L -	6	4.126	4.539	0.40	0.80	2.32	71.67	0.000	1.000	10.54	0.00	10.54
13	127.00	Antel -	3	4.126	4.539	0.72	0.80	11.06	239.55	0.000	1.000	50.20	0.00	50.20
14	127.00	Antel - LPA-80080/6CF	12	4.117	4.529	1.10	0.80	78.41	3842.82	0.000	0.000	355.10	0.00	0.00
15	127.00	Low Profile Platform	1	4.117	4.529	1.00	1.00	45.16	3216.41	0.000	0.000	204.53	0.00	0.00
16	127.00	Antel -	3	4.126	4.539	0.73	0.80	19.52	454.28	0.000	1.000	88.62	0.00	88.62
17	117.00	Ericsson - Air 32	4	4.022	4.424	0.70	0.80	22.51	1283.68	0.000	0.000	99.58	0.00	0.00
18	117.00	Low-Profile Platform w/	1	4.022	4.424	1.00	1.00	150.02	5229.79	0.000	0.000	663.67	0.00	0.00
19	117.00	F4P-HRK10	1	4.022	4.424	1.00	1.00	22.89	1660.13	0.000	0.000	101.27	0.00	0.00
20	117.00	RFS -	4	4.022	4.424	0.75	0.90	24.80	503.36	0.000	0.000	109.70	0.00	0.00
21	117.00	RFS -	4	4.022	4.424	0.59	0.80	53.77	2510.78	0.000	0.000	237.90	0.00	0.00
22	117.00	Ericsson - S11B12 - RRU	4	4.022	4.424	0.54	0.80	7.94	542.50	0.000	0.000	35.13	0.00	0.00
23	117.00	Ericsson - RRU 2217 B2 -	4	4.022	4.424	0.54	0.80	7.31	481.98	0.000	0.000	32.34	0.00	0.00
24	65.00	RRA4905A	2	3.400	3.740	1.00	1.00	1.23	20.13	0.000	0.000	4.61	0.00	0.00
							Totals:		**33,183.60**			**3,079.94**		

Total Applied Force Summary

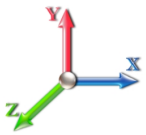
Structure:	CT13613-A-SBA		**Code:**	EIA/TIA-222-G	2/20/2018
Site Name:	Johnson		**Exposure:**	B	
Height:	150.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	A - Hard Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 20

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 40 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 22

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		95.25	2576.64	0.00	0.00
10.00		93.63	2574.66	0.00	0.00
15.00		91.87	2552.80	0.00	0.00
20.00		90.05	2522.17	0.00	0.00
25.00		88.20	2486.46	0.00	0.00
30.00		86.41	2447.37	0.00	0.00
35.00		88.32	2405.86	0.00	0.00
40.00		89.70	2362.50	0.00	0.00
44.75		86.01	2203.08	0.00	0.00
45.00		4.53	164.67	0.00	0.00
50.00		92.28	3251.09	0.00	0.00
51.00		18.29	642.25	0.00	0.00
55.00		73.85	1498.88	0.00	0.00
60.00		92.53	1839.00	0.00	0.00
65.00	(2) attachments	96.88	1821.16	0.00	0.00
70.00		91.78	1720.85	0.00	0.00
75.00		91.10	1681.20	0.00	0.00
80.00		90.23	1641.08	0.00	0.00
84.75		84.72	1521.80	0.00	0.00
85.00		4.45	111.18	0.00	0.00
89.75		84.59	2076.74	0.00	0.00
90.00		4.39	70.67	0.00	0.00
95.00		87.73	1387.47	0.00	0.00
100.00		86.28	1351.13	0.00	0.00
105.00		84.71	1314.48	0.00	0.00
110.00		83.02	1277.55	0.00	0.00
115.00		81.22	1240.36	0.00	0.00
117.00	(22) attachments	1311.43	12699.86	0.00	0.00
120.00		47.24	704.25	0.00	0.00
125.00		77.31	1140.30	0.00	0.00
126.00		15.14	224.86	0.00	0.00
127.00	(25) attachments	724.21	8118.21	0.00	149.36
129.75		41.53	753.22	0.00	0.00
130.00		3.73	45.92	0.00	0.00
135.00		73.91	893.16	0.00	0.00
139.00	(30) attachments	562.59	7600.34	0.00	0.00
140.00		14.08	155.12	0.00	0.00
145.00		69.30	748.74	0.00	0.00
150.00	(13) attachments	648.48	6933.74	0.00	0.00
	Totals:	**5,650.95**	**86,760.84**	**0.00**	**149.36**

Linear Appurtenance Segment Forces (Factored)

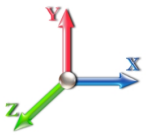
Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 21	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 40 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 22

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1/2" Coax	Yes	5.00	0.000	0.65	1.65	0.00	0.011	0.000	2.724	0.00	27.40
10.00	1/2" Coax	Yes	5.00	0.000	0.65	1.75	0.00	0.011	0.000	2.724	0.00	30.49
15.00	1/2" Coax	Yes	5.00	0.000	0.65	1.81	0.00	0.011	0.000	2.724	0.00	32.49
20.00	1/2" Coax	Yes	5.00	0.000	0.65	1.86	0.00	0.012	0.000	2.724	0.00	34.00
25.00	1/2" Coax	Yes	5.00	0.000	0.65	1.89	0.00	0.012	0.000	2.724	0.00	35.22
30.00	1/2" Coax	Yes	5.00	0.000	0.65	1.92	0.00	0.012	0.000	2.726	0.00	36.26
35.00	1/2" Coax	Yes	5.00	0.000	0.65	1.95	0.00	0.012	0.000	2.849	0.00	37.17
40.00	1/2" Coax	Yes	5.00	0.000	0.65	1.97	0.00	0.013	0.000	2.960	0.00	37.97
44.75	1/2" Coax	Yes	4.75	0.000	0.65	1.89	0.00	0.013	0.000	3.056	0.00	36.73
45.00	1/2" Coax	Yes	0.25	0.000	0.65	0.10	0.00	0.013	0.000	3.061	0.00	1.94
50.00	1/2" Coax	Yes	5.00	0.000	0.65	2.01	0.00	0.013	0.000	3.155	0.00	39.36
51.00	1/2" Coax	Yes	1.00	0.000	0.65	0.40	0.00	0.014	0.000	3.172	0.00	7.90
55.00	1/2" Coax	Yes	4.00	0.000	0.65	1.62	0.00	0.014	0.000	3.242	0.00	31.98
60.00	1/2" Coax	Yes	5.00	0.000	0.65	2.04	0.00	0.014	0.000	3.323	0.00	40.54
65.00	1/2" Coax	Yes	5.00	0.000	0.65	2.05	0.00	0.014	0.000	3.400	0.00	41.08
									Totals:		**0.0**	**470.5**

Calculated Forces

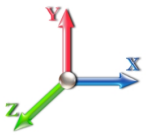
Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 22	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 40 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 22

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-86.76	-5.67	0.00	-631.92	0.00	631.92	5554.25	2777.13	13600.6	6810.41	0.00	0.000	0.000	0.108
5.00	-84.18	-5.61	0.00	-603.58	0.00	603.58	5477.89	2738.95	13118.7	6569.12	0.01	-0.024	0.000	0.107
10.00	-81.60	-5.55	0.00	-575.54	0.00	575.54	5399.54	2699.77	12640.4	6329.59	0.05	-0.048	0.000	0.106
15.00	-79.05	-5.49	0.00	-547.80	0.00	547.80	5319.17	2659.59	12165.9	6092.00	0.11	-0.073	0.000	0.105
20.00	-76.52	-5.43	0.00	-520.36	0.00	520.36	5236.81	2618.40	11695.6	5856.50	0.20	-0.098	0.000	0.103
25.00	-74.04	-5.37	0.00	-493.22	0.00	493.22	5152.44	2576.22	11229.8	5623.26	0.32	-0.123	0.000	0.102
30.00	-71.59	-5.31	0.00	-466.38	0.00	466.38	5066.07	2533.04	10768.8	5392.43	0.46	-0.149	0.000	0.101
35.00	-69.18	-5.25	0.00	-439.84	0.00	439.84	4977.70	2488.85	10313.0	5164.19	0.63	-0.176	0.000	0.099
40.00	-66.81	-5.18	0.00	-413.61	0.00	413.61	4887.33	2443.67	9862.71	4938.68	0.83	-0.203	0.000	0.097
44.75	-64.61	-5.10	0.00	-389.01	0.00	389.01	4799.62	2399.81	9440.25	4727.14	1.05	-0.229	0.000	0.096
45.00	-64.44	-5.11	0.00	-387.74	0.00	387.74	4794.96	2397.48	9418.17	4716.08	1.06	-0.230	0.000	0.096
50.00	-61.19	-5.02	0.00	-362.18	0.00	362.18	4700.58	2350.29	8979.75	4496.55	1.31	-0.258	0.000	0.094
51.00	-60.55	-5.02	0.00	-357.16	0.00	357.16	3008.41	1504.20	5823.48	2916.07	1.37	-0.264	0.000	0.143
55.00	-59.05	-4.97	0.00	-337.09	0.00	337.09	2970.26	1485.13	5621.72	2815.04	1.60	-0.286	0.000	0.140
60.00	-57.20	-4.90	0.00	-312.25	0.00	312.25	2920.78	1460.39	5370.82	2689.40	1.92	-0.324	0.000	0.136
65.00	-55.38	-4.83	0.00	-287.74	0.00	287.74	2869.29	1434.64	5121.68	2564.65	2.28	-0.362	0.000	0.132
70.00	-53.66	-4.76	0.00	-263.58	0.00	263.58	2815.80	1407.90	4874.61	2440.93	2.68	-0.400	0.000	0.127
75.00	-51.97	-4.70	0.00	-239.76	0.00	239.76	2760.31	1380.15	4629.95	2318.41	3.12	-0.439	0.000	0.122
80.00	-50.33	-4.63	0.00	-216.28	0.00	216.28	2702.81	1351.41	4388.01	2197.26	3.60	-0.477	0.000	0.117
84.75	-48.81	-4.54	0.00	-194.31	0.00	194.31	2646.34	1323.17	4160.98	2083.58	4.09	-0.513	0.000	0.112
85.00	-48.70	-4.55	0.00	-193.17	0.00	193.17	2643.31	1321.66	4149.11	2077.64	4.12	-0.515	0.000	0.111
89.75	-46.62	-4.46	0.00	-171.54	0.00	171.54	1922.43	961.22	2968.94	1486.68	4.65	-0.550	0.000	0.140
90.00	-46.55	-4.48	0.00	-170.43	0.00	170.43	1920.55	960.27	2960.86	1482.63	4.68	-0.552	0.000	0.139
95.00	-45.16	-4.41	0.00	-148.04	0.00	148.04	1881.78	940.89	2799.79	1401.97	5.28	-0.595	0.000	0.130
100.00	-43.80	-4.34	0.00	-125.99	0.00	125.99	1841.02	920.51	2640.02	1321.97	5.93	-0.636	0.000	0.119
105.00	-42.49	-4.27	0.00	-104.29	0.00	104.29	1798.25	899.12	2481.89	1242.79	6.61	-0.674	0.000	0.108
110.00	-41.21	-4.19	0.00	-82.96	0.00	82.96	1753.48	876.74	2325.70	1164.58	7.34	-0.709	0.000	0.095
115.00	-39.97	-4.11	0.00	-61.99	0.00	61.99	1706.70	853.35	2171.78	1087.50	8.10	-0.740	0.000	0.080
117.00	-27.29	-2.64	0.00	-53.78	0.00	53.78	1687.43	843.72	2110.92	1057.03	8.41	-0.751	0.000	0.067
120.00	-26.58	-2.59	0.00	-45.86	0.00	45.86	1657.93	828.96	2020.46	1011.73	8.89	-0.766	0.000	0.061
125.00	-25.44	-2.50	0.00	-32.90	0.00	32.90	1607.15	803.57	1872.06	937.42	9.70	-0.787	0.000	0.051
126.00	-25.22	-2.49	0.00	-30.40	0.00	30.40	1596.75	798.38	1842.76	922.75	9.87	-0.791	0.000	0.049
127.00	-17.11	-1.65	0.00	-27.76	0.00	27.76	1586.28	793.14	1813.59	908.14	10.04	-0.795	0.000	0.041
129.75	-16.36	-1.60	0.00	-23.22	0.00	23.22	1068.62	534.31	1212.20	607.00	10.50	-0.804	0.000	0.054
130.00	-16.31	-1.60	0.00	-22.82	0.00	22.82	1067.16	533.58	1207.67	604.73	10.54	-0.805	0.000	0.053
135.00	-15.42	-1.52	0.00	-14.82	0.00	14.82	1036.93	518.46	1117.63	559.65	11.39	-0.822	0.000	0.041
139.00	-7.83	-0.85	0.00	-8.75	0.00	8.75	1011.29	505.65	1046.45	524.00	12.09	-0.832	0.000	0.024
140.00	-7.67	-0.83	0.00	-7.90	0.00	7.90	1004.68	502.34	1028.80	515.16	12.26	-0.834	0.000	0.023
145.00	-6.92	-0.75	0.00	-3.75	0.00	3.75	970.44	485.22	941.49	471.44	13.14	-0.841	0.000	0.015
150.00	0.00	-0.65	0.00	0.00	0.00	0.00	934.20	467.10	856.03	428.65	14.02	-0.844	0.000	0.000

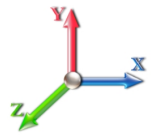
Seismic Segment Forces (Factored)

Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 23	

Tower Engineering Solutions

Load Case: 1.2D + 1.0E

Gust Response Factor	1.10			**Sds**	0.09	**Iterations**	20
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.03	**Ss**	0.17
Wind Load Factor	0.00	**Structure Frequency**	0.42	**SA**	0.01	**S1**	0.07
						Seismic Importance Factor	1.00



Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		1391.8	0.00	0.03	0.02	13.67	
10.00		1361.1	0.01	0.05	0.03	18.97	
15.00		1330.3	0.02	0.06	0.04	21.17	
20.00		1299.6	0.03	0.07	0.04	21.97	
25.00		1268.9	0.05	0.07	0.04	22.18	
30.00		1238.2	0.08	0.07	0.04	22.20	
35.00		1207.5	0.10	0.07	0.04	22.18	
40.00		1176.8	0.13	0.07	0.03	22.13	
44.75	Bot - Section 2	1089.5	0.17	0.07	0.03	20.84	
45.00		97.62	0.17	0.07	0.03	1.87	
50.00		1924.7	0.21	0.06	0.02	36.90	
51.00	Top - Section 1	378.64	0.22	0.06	0.02	7.24	
55.00		628.19	0.25	0.05	0.02	11.67	
60.00		765.49	0.30	0.04	0.01	12.95	
65.00	Appurtenance(s)	745.56	0.35	0.03	0.01	10.23	
70.00		721.62	0.41	0.01	0.01	6.24	
75.00		699.68	0.47	-0.01	0.01	1.29	
80.00		677.74	0.54	-0.03	0.01	-3.89	
84.75	Bot - Section 3	623.54	0.60	-0.05	0.01	-7.70	
85.00		58.46	0.61	-0.06	0.02	-0.74	
89.75	Top - Section 2	1092.0	0.68	-0.08	0.03	-19.11	
90.00		25.32	0.68	-0.08	0.03	-0.45	
95.00		497.14	0.76	-0.10	0.04	-10.05	
100.00		479.59	0.84	-0.12	0.07	-9.64	
105.00		462.04	0.93	-0.12	0.10	-8.06	
110.00		444.49	1.02	-0.11	0.14	-5.49	
115.00		426.94	1.11	-0.06	0.19	-2.07	
117.00	Appurtenance(s)	4344.9	1.15	-0.04	0.22	-5.20	
120.00		243.53	1.21	0.01	0.26	1.22	
125.00		391.84	1.31	0.14	0.35	6.76	
126.00	Bot - Section 4	76.26	1.33	0.17	0.37	1.53	
127.00	Appurtenance(s)	1989.2	1.35	0.20	0.39	45.43	
129.75	Top - Section 3	359.73	1.41	0.31	0.45	11.21	
130.00		13.94	1.42	0.32	0.45	0.45	
135.00		271.98	1.53	0.58	0.58	13.36	
139.00	Appurtenance(s)	2529.8	1.62	0.85	0.70	163.62	
140.00		50.71	1.65	0.93	0.73	3.49	
145.00		245.66	1.77	1.39	0.92	22.39	
150.00	Appurtenance(s)	1917.3	1.89	1.98	1.14	222.70	
	Totals:	**34,547.9**				**693.4**	**Total Wind:** **24,711.9**

Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 24	

Tower Engineering Solutions

Load Case: 1.2D + 1.0E

Gust Response Factor	1.10			**Sds**	0.09			**Iterations**	20
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.03			**Ss**	0.17
Wind Load Factor	0.00	**Structure Frequency**	0.42	**SA**	0.01			**S1**	0.07
								Seismic Importance Factor	1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-48.39	-0.77	0.00	-82.56	0.00	82.56	5554.25	2777.13	13600.6	6810.41		0.00	0.00	0.021
5.00	-46.46	-0.76	0.00	-78.73	0.00	78.73	5477.89	2738.95	13118.7	6569.12		0.00	0.00	0.020
10.00	-44.58	-0.74	0.00	-74.95	0.00	74.95	5399.54	2699.77	12640.4	6329.59		0.01	-0.01	0.020
15.00	-42.73	-0.72	0.00	-71.26	0.00	71.26	5319.17	2659.59	12165.9	6092.00		0.01	-0.01	0.020
20.00	-40.91	-0.70	0.00	-67.66	0.00	67.66	5236.81	2618.40	11695.6	5856.50		0.03	-0.01	0.019
25.00	-39.13	-0.68	0.00	-64.16	0.00	64.16	5152.44	2576.22	11229.8	5623.26		0.04	-0.02	0.019
30.00	-37.39	-0.66	0.00	-60.76	0.00	60.76	5066.07	2533.04	10768.8	5392.43		0.06	-0.02	0.019
35.00	-35.69	-0.64	0.00	-57.47	0.00	57.47	4977.70	2488.85	10313.0	5164.19		0.08	-0.02	0.018
40.00	-34.02	-0.62	0.00	-54.27	0.00	54.27	4887.33	2443.67	9862.71	4938.68		0.11	-0.03	0.018
44.75	-32.47	-0.60	0.00	-51.34	0.00	51.34	4799.62	2399.81	9440.25	4727.14		0.14	-0.03	0.018
45.00	-32.34	-0.60	0.00	-51.19	0.00	51.19	4794.96	2397.48	9418.17	4716.08		0.14	-0.03	0.018
50.00	-29.78	-0.56	0.00	-48.21	0.00	48.21	4700.58	2350.29	8979.75	4496.55		0.17	-0.03	0.017
51.00	-29.27	-0.55	0.00	-47.65	0.00	47.65	3008.41	1504.20	5823.48	2916.07		0.18	-0.03	0.026
55.00	-28.31	-0.54	0.00	-45.44	0.00	45.44	2970.26	1485.13	5621.72	2815.04		0.21	-0.04	0.026
60.00	-27.14	-0.53	0.00	-42.73	0.00	42.73	2920.78	1460.39	5370.82	2689.40		0.25	-0.04	0.025
65.00	-25.99	-0.52	0.00	-40.08	0.00	40.08	2869.29	1434.64	5121.68	2564.65		0.30	-0.05	0.025
70.00	-24.87	-0.52	0.00	-37.46	0.00	37.46	2815.80	1407.90	4874.61	2440.93		0.35	-0.05	0.024
75.00	-23.78	-0.52	0.00	-34.88	0.00	34.88	2760.31	1380.15	4629.95	2318.41		0.41	-0.06	0.024
80.00	-22.71	-0.52	0.00	-32.29	0.00	32.29	2702.81	1351.41	4388.01	2197.26		0.47	-0.06	0.023
84.75	-21.72	-0.52	0.00	-29.83	0.00	29.83	2646.34	1323.17	4160.98	2083.58		0.54	-0.07	0.023
85.00	-21.64	-0.52	0.00	-29.70	0.00	29.70	2643.31	1321.66	4149.11	2077.64		0.55	-0.07	0.022
89.75	-20.09	-0.52	0.00	-27.23	0.00	27.23	1922.43	961.22	2968.94	1486.68		0.62	-0.08	0.029
90.00	-20.05	-0.52	0.00	-27.10	0.00	27.10	1920.55	960.27	2960.86	1482.63		0.62	-0.08	0.029
95.00	-19.20	-0.52	0.00	-24.51	0.00	24.51	1881.78	940.89	2799.79	1401.97		0.71	-0.08	0.028
100.00	-18.37	-0.52	0.00	-21.90	0.00	21.90	1841.02	920.51	2640.02	1321.97		0.80	-0.09	0.027
105.00	-17.56	-0.52	0.00	-19.29	0.00	19.29	1798.25	899.12	2481.89	1242.79		0.89	-0.10	0.025
110.00	-16.78	-0.52	0.00	-16.68	0.00	16.68	1753.48	876.74	2325.70	1164.58		1.00	-0.10	0.024
115.00	-16.01	-0.52	0.00	-14.07	0.00	14.07	1706.70	853.35	2171.78	1087.50		1.11	-0.11	0.022
117.00	-10.70	-0.51	0.00	-13.02	0.00	13.02	1687.43	843.72	2110.92	1057.03		1.16	-0.11	0.019
120.00	-10.27	-0.51	0.00	-11.48	0.00	11.48	1657.93	828.96	2020.46	1011.73		1.23	-0.12	0.018
125.00	-9.57	-0.50	0.00	-8.92	0.00	8.92	1607.15	803.57	1872.06	937.42		1.35	-0.12	0.015
126.00	-9.43	-0.50	0.00	-8.42	0.00	8.42	1596.75	798.38	1842.76	922.75		1.38	-0.12	0.015
127.00	-7.00	-0.45	0.00	-7.91	0.00	7.91	1586.28	793.14	1813.59	908.14		1.41	-0.12	0.013
129.75	-6.48	-0.44	0.00	-6.67	0.00	6.67	1068.62	534.31	1212.20	607.00		1.48	-0.13	0.017
130.00	-6.46	-0.44	0.00	-6.56	0.00	6.56	1067.16	533.58	1207.67	604.73		1.48	-0.13	0.017
135.00	-5.98	-0.43	0.00	-4.36	0.00	4.36	1036.93	518.46	1117.63	559.65		1.62	-0.13	0.014
139.00	-2.82	-0.26	0.00	-2.65	0.00	2.65	1011.29	505.65	1046.45	524.00		1.73	-0.13	0.008
140.00	-2.74	-0.25	0.00	-2.40	0.00	2.40	1004.68	502.34	1028.80	515.16		1.76	-0.14	0.007
145.00	-2.38	-0.23	0.00	-1.14	0.00	1.14	970.44	485.22	941.49	471.44		1.90	-0.14	0.005
150.00	0.00	-0.22	0.00	0.00	0.00	0.00	934.20	467.10	856.03	428.65		2.05	-0.14	0.000

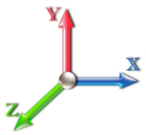
Seismic Segment Forces (Factored)

Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 25	

Tower Engineering Solutions

Load Case: 0.9D + 1.0E

Gust Response Factor	1.10			**Sds**	0.09	**Iterations**	19
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.03	**Ss**	0.17
Wind Load Factor	0.00	**Structure Frequency**	0.42	**SA**	0.01	**S1**	0.07
						Seismic Importance Factor	1.00



Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		1391.8	0.00	0.03	0.02	13.67	
10.00		1361.1	0.01	0.05	0.03	18.97	
15.00		1330.3	0.02	0.06	0.04	21.17	
20.00		1299.6	0.03	0.07	0.04	21.97	
25.00		1268.9	0.05	0.07	0.04	22.18	
30.00		1238.2	0.08	0.07	0.04	22.20	
35.00		1207.5	0.10	0.07	0.04	22.18	
40.00		1176.8	0.13	0.07	0.03	22.13	
44.75	Bot - Section 2	1089.5	0.17	0.07	0.03	20.84	
45.00		97.62	0.17	0.07	0.03	1.87	
50.00		1924.7	0.21	0.06	0.02	36.90	
51.00	Top - Section 1	378.64	0.22	0.06	0.02	7.24	
55.00		628.19	0.25	0.05	0.02	11.67	
60.00		765.49	0.30	0.04	0.01	12.95	
65.00	Appurtenance(s)	745.56	0.35	0.03	0.01	10.23	
70.00		721.62	0.41	0.01	0.01	6.24	
75.00		699.68	0.47	-0.01	0.01	1.29	
80.00		677.74	0.54	-0.03	0.01	-3.89	
84.75	Bot - Section 3	623.54	0.60	-0.05	0.01	-7.70	
85.00		58.46	0.61	-0.06	0.02	-0.74	
89.75	Top - Section 2	1092.0	0.68	-0.08	0.03	-19.11	
90.00		25.32	0.68	-0.08	0.03	-0.45	
95.00		497.14	0.76	-0.10	0.04	-10.05	
100.00		479.59	0.84	-0.12	0.07	-9.64	
105.00		462.04	0.93	-0.12	0.10	-8.06	
110.00		444.49	1.02	-0.11	0.14	-5.49	
115.00		426.94	1.11	-0.06	0.19	-2.07	
117.00	Appurtenance(s)	4344.9	1.15	-0.04	0.22	-5.20	
120.00		243.53	1.21	0.01	0.26	1.22	
125.00		391.84	1.31	0.14	0.35	6.76	
126.00	Bot - Section 4	76.26	1.33	0.17	0.37	1.53	
127.00	Appurtenance(s)	1989.2	1.35	0.20	0.39	45.43	
129.75	Top - Section 3	359.73	1.41	0.31	0.45	11.21	
130.00		13.94	1.42	0.32	0.45	0.45	
135.00		271.98	1.53	0.58	0.58	13.36	
139.00	Appurtenance(s)	2529.8	1.62	0.85	0.70	163.62	
140.00		50.71	1.65	0.93	0.73	3.49	
145.00		245.66	1.77	1.39	0.92	22.39	
150.00	Appurtenance(s)	1917.3	1.89	1.98	1.14	222.70	
	Totals:	**34,547.9**				**693.4**	**Total Wind:** **24,711.9**

Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 26	

Tower Engineering Solutions

Load Case: 0.9D + 1.0E

Gust Response Factor	1.10			**Sds**	0.09			**Iterations**	19
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.03			**Ss**	0.17
Wind Load Factor	0.00	**Structure Frequency**	0.42	**SA**	0.01			**S1**	0.07
								Seismic Importance Factor	1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-36.29	-0.77	0.00	-81.74	0.00	81.74	5554.25	2777.13	13600.6	6810.41		0.00	0.00	0.019
5.00	-34.85	-0.75	0.00	-77.92	0.00	77.92	5477.89	2738.95	13118.7	6569.12		0.00	0.00	0.018
10.00	-33.43	-0.74	0.00	-74.15	0.00	74.15	5399.54	2699.77	12640.4	6329.59		0.01	-0.01	0.018
15.00	-32.04	-0.72	0.00	-70.47	0.00	70.47	5319.17	2659.59	12165.9	6092.00		0.01	-0.01	0.018
20.00	-30.68	-0.70	0.00	-66.88	0.00	66.88	5236.81	2618.40	11695.6	5856.50		0.03	-0.01	0.017
25.00	-29.35	-0.68	0.00	-63.40	0.00	63.40	5152.44	2576.22	11229.8	5623.26		0.04	-0.02	0.017
30.00	-28.04	-0.65	0.00	-60.03	0.00	60.03	5066.07	2533.04	10768.8	5392.43		0.06	-0.02	0.017
35.00	-26.77	-0.63	0.00	-56.75	0.00	56.75	4977.70	2488.85	10313.0	5164.19		0.08	-0.02	0.016
40.00	-25.52	-0.61	0.00	-53.59	0.00	53.59	4887.33	2443.67	9862.71	4938.68		0.11	-0.03	0.016
44.75	-24.35	-0.59	0.00	-50.68	0.00	50.68	4799.62	2399.81	9440.25	4727.14		0.13	-0.03	0.016
45.00	-24.26	-0.59	0.00	-50.53	0.00	50.53	4794.96	2397.48	9418.17	4716.08		0.14	-0.03	0.016
50.00	-22.33	-0.55	0.00	-47.58	0.00	47.58	4700.58	2350.29	8979.75	4496.55		0.17	-0.03	0.015
51.00	-21.95	-0.55	0.00	-47.02	0.00	47.02	3008.41	1504.20	5823.48	2916.07		0.18	-0.03	0.023
55.00	-21.24	-0.54	0.00	-44.84	0.00	44.84	2970.26	1485.13	5621.72	2815.04		0.21	-0.04	0.023
60.00	-20.36	-0.52	0.00	-42.16	0.00	42.16	2920.78	1460.39	5370.82	2689.40		0.25	-0.04	0.023
65.00	-19.49	-0.52	0.00	-39.53	0.00	39.53	2869.29	1434.64	5121.68	2564.65		0.29	-0.05	0.022
70.00	-18.65	-0.51	0.00	-36.96	0.00	36.96	2815.80	1407.90	4874.61	2440.93		0.35	-0.05	0.022
75.00	-17.83	-0.51	0.00	-34.41	0.00	34.41	2760.31	1380.15	4629.95	2318.41		0.41	-0.06	0.021
80.00	-17.03	-0.51	0.00	-31.86	0.00	31.86	2702.81	1351.41	4388.01	2197.26		0.47	-0.06	0.021
84.75	-16.29	-0.51	0.00	-29.43	0.00	29.43	2646.34	1323.17	4160.98	2083.58		0.54	-0.07	0.020
85.00	-16.23	-0.51	0.00	-29.30	0.00	29.30	2643.31	1321.66	4149.11	2077.64		0.54	-0.07	0.020
89.75	-15.07	-0.51	0.00	-26.88	0.00	26.88	1922.43	961.22	2968.94	1486.68		0.61	-0.07	0.026
90.00	-15.04	-0.51	0.00	-26.75	0.00	26.75	1920.55	960.27	2960.86	1482.63		0.61	-0.07	0.026
95.00	-14.40	-0.51	0.00	-24.19	0.00	24.19	1881.78	940.89	2799.79	1401.97		0.70	-0.08	0.025
100.00	-13.78	-0.51	0.00	-21.63	0.00	21.63	1841.02	920.51	2640.02	1321.97		0.79	-0.09	0.024
105.00	-13.17	-0.51	0.00	-19.06	0.00	19.06	1798.25	899.12	2481.89	1242.79		0.88	-0.10	0.023
110.00	-12.58	-0.51	0.00	-16.49	0.00	16.49	1753.48	876.74	2325.70	1164.58		0.99	-0.10	0.021
115.00	-12.01	-0.51	0.00	-13.92	0.00	13.92	1706.70	853.35	2171.78	1087.50		1.10	-0.11	0.020
117.00	-8.02	-0.51	0.00	-12.89	0.00	12.89	1687.43	843.72	2110.92	1057.03		1.14	-0.11	0.017
120.00	-7.70	-0.51	0.00	-11.37	0.00	11.37	1657.93	828.96	2020.46	1011.73		1.21	-0.11	0.016
125.00	-7.18	-0.50	0.00	-8.84	0.00	8.84	1607.15	803.57	1872.06	937.42		1.34	-0.12	0.014
126.00	-7.07	-0.50	0.00	-8.34	0.00	8.34	1596.75	798.38	1842.76	922.75		1.36	-0.12	0.013
127.00	-5.25	-0.45	0.00	-7.85	0.00	7.85	1586.28	793.14	1813.59	908.14		1.39	-0.12	0.012
129.75	-4.86	-0.44	0.00	-6.61	0.00	6.61	1068.62	534.31	1212.20	607.00		1.46	-0.13	0.015
130.00	-4.84	-0.44	0.00	-6.50	0.00	6.50	1067.16	533.58	1207.67	604.73		1.47	-0.13	0.015
135.00	-4.48	-0.42	0.00	-4.32	0.00	4.32	1036.93	518.46	1117.63	559.65		1.60	-0.13	0.012
139.00	-2.12	-0.25	0.00	-2.64	0.00	2.64	1011.29	505.65	1046.45	524.00		1.71	-0.13	0.007
140.00	-2.06	-0.25	0.00	-2.38	0.00	2.38	1004.68	502.34	1028.80	515.16		1.74	-0.13	0.007
145.00	-1.78	-0.23	0.00	-1.13	0.00	1.13	970.44	485.22	941.49	471.44		1.88	-0.14	0.004
150.00	0.00	-0.22	0.00	0.00	0.00	0.00	934.20	467.10	856.03	428.65		2.02	-0.14	0.000

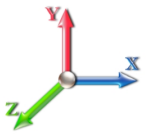
Wind Loading - Shaft

Structure: CT13613-A-SBA
Site Name: Johnson
Height: 150.00 (ft)
Base Elev: 0.000 (ft)
Gh: 1.1 **Topography:** 1

Code: EIA/TIA-222-G 2/20/2018
Exposure: B
Crest Height: 0.00
Site Class: A - Hard Rock
Struct Class: II

IES Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind
Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations 21

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	6.129	6.74	254.87	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	6.129	6.74	249.35	0.650	0.000	5.00	25.111	16.32	110.0	0.0	1391.8
10.00		1.00	0.70	6.129	6.74	243.83	0.650	0.000	5.00	24.561	15.96	107.6	0.0	1361.1
15.00		1.00	0.70	6.129	6.74	238.30	0.650	0.000	5.00	24.011	15.61	105.2	0.0	1330.4
20.00		1.00	0.70	6.129	6.74	232.78	0.650	0.000	5.00	23.461	15.25	102.8	0.0	1299.7
25.00		1.00	0.70	6.129	6.74	227.26	0.650	0.000	5.00	22.911	14.89	100.4	0.0	1269.0
30.00		1.00	0.70	6.134	6.75	221.83	0.650	0.000	5.00	22.361	14.53	98.1	0.0	1238.2
35.00		1.00	0.73	6.410	7.05	221.12	0.650	0.000	5.00	21.811	14.18	100.0	0.0	1207.5
40.00		1.00	0.76	6.659	7.33	219.62	0.650	0.000	5.00	21.260	13.82	101.2	0.0	1176.8
44.75	Bot - Section 2	1.00	0.79	6.876	7.56	217.62	0.650	0.000	4.75	19.688	12.80	96.8	0.0	1089.5
45.00		1.00	0.79	6.887	7.58	217.50	0.650	0.000	0.25	1.036	0.67	5.1	0.0	97.6
50.00		1.00	0.81	7.098	7.81	214.85	0.650	0.000	5.00	20.425	13.28	103.7	0.0	1924.8
51.00	Top - Section 1	1.00	0.82	7.138	7.85	214.27	0.650	0.000	1.00	4.019	2.61	20.5	0.0	378.6
55.00		1.00	0.83	7.294	8.02	214.67	0.650	0.000	4.00	15.856	10.31	82.7	0.0	628.2
60.00		1.00	0.85	7.477	8.22	211.26	0.650	0.000	5.00	19.325	12.56	103.3	0.0	765.5
65.00	Appurtenance(s)	1.00	0.87	7.650	8.42	207.52	0.650	0.000	5.00	18.775	12.20	102.7	0.0	743.6
70.00		1.00	0.89	7.814	8.60	203.49	0.650	0.000	5.00	18.225	11.85	101.8	0.0	721.6
75.00		1.00	0.91	7.969	8.77	199.21	0.650	0.000	5.00	17.675	11.49	100.7	0.0	699.7
80.00		1.00	0.93	8.118	8.93	194.70	0.650	0.000	5.00	17.125	11.13	99.4	0.0	677.7
84.75	Bot - Section 3	1.00	0.94	8.253	9.08	190.22	0.650	0.000	4.75	15.759	10.24	93.0	0.0	623.5
85.00		1.00	0.94	8.260	9.09	189.98	0.650	0.000	0.25	0.826	0.54	4.9	0.0	58.5
89.75	Top - Section 2	1.00	0.96	8.389	9.23	185.32	0.650	0.000	4.75	15.437	10.03	92.6	0.0	1092.1
90.00		1.00	0.96	8.396	9.24	187.56	0.650	0.000	0.25	0.799	0.52	4.8	0.0	25.3
95.00		1.00	0.97	8.526	9.38	182.50	0.650	0.000	5.00	15.686	10.20	95.6	0.0	497.1
100.00		1.00	0.99	8.652	9.52	177.28	0.650	0.000	5.00	15.136	9.84	93.6	0.0	479.6
105.00		1.00	1.00	8.774	9.65	171.91	0.650	0.000	5.00	14.586	9.48	91.5	0.0	462.0
110.00		1.00	1.02	8.891	9.78	166.41	0.650	0.000	5.00	14.036	9.12	89.2	0.0	444.5
115.00		1.00	1.03	9.005	9.91	160.78	0.650	0.000	5.00	13.486	8.77	86.8	0.0	426.9
117.00	Appurtenance(s)	1.00	1.03	9.049	9.95	158.49	0.650	0.000	2.00	5.240	3.41	33.9	0.0	165.9
120.00		1.00	1.04	9.115	10.03	155.02	0.650	0.000	3.00	7.696	5.00	50.2	0.0	243.5
125.00		1.00	1.05	9.222	10.14	149.15	0.650	0.000	5.00	12.386	8.05	81.7	0.0	391.8
126.00	Bot - Section 4	1.00	1.06	9.243	10.17	147.97	0.650	0.000	1.00	2.411	1.57	15.9	0.0	76.3
127.00	Appurtenance(s)	1.00	1.06	9.264	10.19	146.78	0.650	0.000	1.00	2.421	1.57	16.0	0.0	133.1
129.75	Top - Section 3	1.00	1.06	9.321	10.25	143.48	0.650	0.000	2.75	6.544	4.25	43.6	0.0	359.7
130.00		1.00	1.07	9.326	10.26	145.15	0.650	0.000	0.25	0.587	0.38	3.9	0.0	13.9
135.00		1.00	1.08	9.427	10.37	139.08	0.650	0.000	5.00	11.445	7.44	77.1	0.0	272.0
139.00	Appurtenance(s)	1.00	1.09	9.506	10.46	134.16	0.650	0.000	4.00	8.760	5.69	59.5	0.0	208.1
140.00		1.00	1.09	9.525	10.48	132.92	0.650	0.000	1.00	2.135	1.39	14.5	0.0	50.7
145.00		1.00	1.10	9.621	10.58	126.67	0.650	0.000	5.00	10.345	6.72	71.2	0.0	245.7
150.00	Appurtenance(s)	1.00	1.11	9.715	10.69	120.33	0.650	0.000	5.00	9.795	6.37	68.0	0.0	232.5
								Totals:	**150.00**			**2,829.7**		**24,504.2**

Discrete Appurtenance Forces

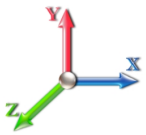
Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 28	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 21

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	150.00	Low Profile Platform	1	9.715	10.686	1.00	1.00	22.00	1500.00	0.000	0.000	235.10	0.00	0.00
2	150.00	Decibel - DB846G90A-XY	12	9.715	10.686	0.98	0.90	58.87	184.80	0.000	0.000	629.10	0.00	0.00
3	139.00	KMW -	2	9.506	10.456	0.63	0.80	10.12	97.00	0.000	0.000	105.86	0.00	0.00
4	139.00	Low Profile Platform	1	9.506	10.456	1.00	1.00	22.00	1500.00	0.000	0.000	230.04	0.00	0.00
5	139.00	Powerwave - 7770	6	9.506	10.456	0.61	0.80	20.22	210.00	0.000	0.000	211.45	0.00	0.00
6	139.00	Kathrein - 800 10764	1	9.506	10.456	0.63	0.80	3.71	40.80	0.000	0.000	38.81	0.00	0.00
7	139.00	Powerwave - LGP 13519 -	6	9.506	10.456	0.40	0.80	0.82	31.80	0.000	0.000	8.53	0.00	0.00
8	139.00	Powerwave - LGP 21401 -	6	9.506	10.456	0.40	0.80	0.00	105.00	0.000	0.000	0.00	0.00	0.00
9	139.00	Ericsson - RRUS 11 -	6	9.506	10.456	0.54	0.80	8.10	304.20	0.000	0.000	84.74	0.00	0.00
10	139.00	Raycap -	1	9.506	10.456	0.80	0.80	0.74	31.80	0.000	0.000	7.70	0.00	0.00
11	139.00	Commscope -	1	9.506	10.456	0.40	0.80	0.02	1.10	0.000	0.000	0.21	0.00	0.00
12	127.00	RFS - FD9R6004/2C-3L -	6	9.284	10.213	0.40	0.80	0.89	18.60	0.000	1.000	9.07	0.00	9.07
13	127.00	Antel -	3	9.284	10.213	0.69	0.80	6.11	31.50	0.000	1.000	62.41	0.00	62.41
14	127.00	Antel - LPA-80080/6CF	12	9.264	10.190	1.20	0.80	62.27	252.00	0.000	0.000	634.52	0.00	0.00
15	127.00	Low Profile Platform	1	9.264	10.190	1.00	1.00	22.00	1500.00	0.000	0.000	224.18	0.00	0.00
16	127.00	Antel -	3	9.284	10.213	0.72	0.80	12.37	54.00	0.000	1.000	126.36	0.00	126.36
17	117.00	Ericsson - Air 32	4	9.049	9.954	0.69	0.80	17.96	423.20	0.000	0.000	178.75	0.00	0.00
18	117.00	Low-Profile Platform w/	1	9.049	9.954	1.00	1.00	58.98	2396.00	0.000	0.000	587.09	0.00	0.00
19	117.00	F4P-HRK10	1	9.049	9.954	1.00	1.00	9.00	478.27	0.000	0.000	89.59	0.00	0.00
20	117.00	RFS -	4	9.049	9.954	0.71	0.90	14.78	105.60	0.000	0.000	147.10	0.00	0.00
21	117.00	RFS -	4	9.049	9.954	0.57	0.80	46.37	396.00	0.000	0.000	461.61	0.00	0.00
22	117.00	Ericsson - S11B12 - RRU	4	9.049	9.954	0.54	0.80	6.07	204.00	0.000	0.000	60.40	0.00	0.00
23	117.00	Ericsson - RRU 2217 B2 -	4	9.049	9.954	0.54	0.80	5.51	176.00	0.000	0.000	54.85	0.00	0.00
24	65.00	RRA4905A	2	7.650	8.415	1.00	1.00	0.28	2.00	0.000	0.000	2.36	0.00	0.00
							Totals:		**10,043.67**			**4,189.81**		

Total Applied Force Summary

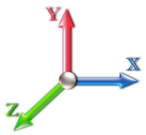
Structure:	CT13613-A-SBA		**Code:**	EIA/TIA-222-G	2/20/2018
Site Name:	Johnson		**Exposure:**	B	
Height:	150.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	A - Hard Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 29

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 21

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		110.03	1604.21	0.00	0.00
10.00		107.62	1573.50	0.00	0.00
15.00		105.21	1542.79	0.00	0.00
20.00		102.80	1512.07	0.00	0.00
25.00		100.39	1481.36	0.00	0.00
30.00		98.07	1450.65	0.00	0.00
35.00		99.96	1419.94	0.00	0.00
40.00		101.23	1389.22	0.00	0.00
44.75		96.80	1291.31	0.00	0.00
45.00		5.10	108.24	0.00	0.00
50.00		103.65	2137.17	0.00	0.00
51.00		20.51	421.12	0.00	0.00
55.00		82.69	798.11	0.00	0.00
60.00		103.31	977.89	0.00	0.00
65.00	(2) attachments	105.05	957.96	0.00	0.00
70.00		101.82	932.42	0.00	0.00
75.00		100.71	910.48	0.00	0.00
80.00		99.40	888.54	0.00	0.00
84.75		92.99	823.80	0.00	0.00
85.00		4.88	69.00	0.00	0.00
89.75		92.60	1292.33	0.00	0.00
90.00		4.79	35.86	0.00	0.00
95.00		95.63	707.94	0.00	0.00
100.00		93.64	690.39	0.00	0.00
105.00		91.50	672.84	0.00	0.00
110.00		89.23	655.29	0.00	0.00
115.00		86.83	637.74	0.00	0.00
117.00	(22) attachments	1613.28	4429.25	0.00	0.00
120.00		50.15	357.53	0.00	0.00
125.00		81.67	581.84	0.00	0.00
126.00		15.93	114.26	0.00	0.00
127.00	(25) attachments	1072.57	2027.22	0.00	197.83
129.75		43.61	429.91	0.00	0.00
130.00		3.91	20.32	0.00	0.00
135.00		77.14	399.58	0.00	0.00
139.00	(30) attachments	746.88	2631.89	0.00	0.00
140.00		14.54	63.19	0.00	0.00
145.00		71.16	308.06	0.00	0.00
150.00	(13) attachments	932.23	1979.70	0.00	0.00
	Totals:	**7,019.54**	**40,324.91**	**0.00**	**197.83**

Linear Appurtenance Segment Forces (Factored)

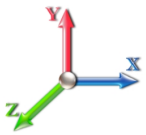
Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 30	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 21

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	6.129	0.00	1.60
10.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	6.129	0.00	1.60
15.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.011	0.000	6.129	0.00	1.60
20.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	6.129	0.00	1.60
25.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	6.129	0.00	1.60
30.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	6.134	0.00	1.60
35.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.012	0.000	6.410	0.00	1.60
40.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.013	0.000	6.659	0.00	1.60
44.75	1/2" Coax	Yes	4.75	0.000	0.65	0.26	0.00	0.013	0.000	6.876	0.00	1.52
45.00	1/2" Coax	Yes	0.25	0.000	0.65	0.01	0.00	0.013	0.000	6.887	0.00	0.08
50.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.013	0.000	7.098	0.00	1.60
51.00	1/2" Coax	Yes	1.00	0.000	0.65	0.05	0.00	0.014	0.000	7.138	0.00	0.32
55.00	1/2" Coax	Yes	4.00	0.000	0.65	0.22	0.00	0.014	0.000	7.294	0.00	1.28
60.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.014	0.000	7.477	0.00	1.60
65.00	1/2" Coax	Yes	5.00	0.000	0.65	0.27	0.00	0.014	0.000	7.650	0.00	1.60
									Totals:		**0.0**	**20.8**

Calculated Forces

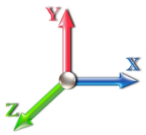
Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 31	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 21

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-40.32	-7.03	0.00	-769.74	0.00	769.74	5554.25	2777.13	13600.6	6810.41	0.00	0.000	0.000	0.120
5.00	-38.72	-6.94	0.00	-734.60	0.00	734.60	5477.89	2738.95	13118.7	6569.12	0.02	-0.029	0.000	0.119
10.00	-37.14	-6.85	0.00	-699.91	0.00	699.91	5399.54	2699.77	12640.4	6329.59	0.06	-0.058	0.000	0.117
15.00	-35.59	-6.76	0.00	-665.67	0.00	665.67	5319.17	2659.59	12165.9	6092.00	0.14	-0.088	0.000	0.116
20.00	-34.08	-6.67	0.00	-631.87	0.00	631.87	5236.81	2618.40	11695.6	5856.50	0.25	-0.119	0.000	0.114
25.00	-32.59	-6.59	0.00	-598.51	0.00	598.51	5152.44	2576.22	11229.8	5623.26	0.39	-0.150	0.000	0.113
30.00	-31.14	-6.50	0.00	-565.57	0.00	565.57	5066.07	2533.04	10768.8	5392.43	0.56	-0.181	0.000	0.111
35.00	-29.71	-6.41	0.00	-533.06	0.00	533.06	4977.70	2488.85	10313.0	5164.19	0.77	-0.213	0.000	0.109
40.00	-28.32	-6.32	0.00	-501.00	0.00	501.00	4887.33	2443.67	9862.71	4938.68	1.01	-0.246	0.000	0.107
44.75	-27.03	-6.23	0.00	-470.96	0.00	470.96	4799.62	2399.81	9440.25	4727.14	1.27	-0.278	0.000	0.105
45.00	-26.92	-6.23	0.00	-469.41	0.00	469.41	4794.96	2397.48	9418.17	4716.08	1.29	-0.279	0.000	0.105
50.00	-24.78	-6.12	0.00	-438.25	0.00	438.25	4700.58	2350.29	8979.75	4496.55	1.60	-0.313	0.000	0.103
51.00	-24.36	-6.11	0.00	-432.13	0.00	432.13	3008.41	1504.20	5823.48	2916.07	1.66	-0.320	0.000	0.156
55.00	-23.56	-6.04	0.00	-407.69	0.00	407.69	2970.26	1485.13	5621.72	2815.04	1.94	-0.347	0.000	0.153
60.00	-22.57	-5.95	0.00	-377.51	0.00	377.51	2920.78	1460.39	5370.82	2689.40	2.33	-0.393	0.000	0.148
65.00	-21.61	-5.85	0.00	-347.78	0.00	347.78	2869.29	1434.64	5121.68	2564.65	2.77	-0.439	0.000	0.143
70.00	-20.68	-5.76	0.00	-318.53	0.00	318.53	2815.80	1407.90	4874.61	2440.93	3.25	-0.485	0.000	0.138
75.00	-19.76	-5.67	0.00	-289.74	0.00	289.74	2760.31	1380.15	4629.95	2318.41	3.79	-0.532	0.000	0.132
80.00	-18.87	-5.57	0.00	-261.41	0.00	261.41	2702.81	1351.41	4388.01	2197.26	4.37	-0.578	0.000	0.126
84.75	-18.05	-5.48	0.00	-234.95	0.00	234.95	2646.34	1323.17	4160.98	2083.58	4.97	-0.621	0.000	0.120
85.00	-17.97	-5.48	0.00	-233.58	0.00	233.58	2643.31	1321.66	4149.11	2077.64	5.00	-0.623	0.000	0.119
89.75	-16.68	-5.38	0.00	-207.55	0.00	207.55	1922.43	961.22	2968.94	1486.68	5.64	-0.666	0.000	0.148
90.00	-16.64	-5.38	0.00	-206.21	0.00	206.21	1920.55	960.27	2960.86	1482.63	5.68	-0.668	0.000	0.148
95.00	-15.93	-5.29	0.00	-179.30	0.00	179.30	1881.78	940.89	2799.79	1401.97	6.40	-0.720	0.000	0.136
100.00	-15.24	-5.20	0.00	-152.84	0.00	152.84	1841.02	920.51	2640.02	1321.97	7.19	-0.770	0.000	0.124
105.00	-14.56	-5.11	0.00	-126.84	0.00	126.84	1798.25	899.12	2481.89	1242.79	8.02	-0.817	0.000	0.110
110.00	-13.90	-5.02	0.00	-101.28	0.00	101.28	1753.48	876.74	2325.70	1164.58	8.90	-0.860	0.000	0.095
115.00	-13.27	-4.93	0.00	-76.16	0.00	76.16	1706.70	853.35	2171.78	1087.50	9.82	-0.897	0.000	0.078
117.00	-8.86	-3.25	0.00	-66.30	0.00	66.30	1687.43	843.72	2110.92	1057.03	10.20	-0.911	0.000	0.068
120.00	-8.50	-3.20	0.00	-56.54	0.00	56.54	1657.93	828.96	2020.46	1011.73	10.78	-0.929	0.000	0.061
125.00	-7.92	-3.11	0.00	-40.54	0.00	40.54	1607.15	803.57	1872.06	937.42	11.76	-0.956	0.000	0.048
126.00	-7.81	-3.09	0.00	-37.43	0.00	37.43	1596.75	798.38	1842.76	922.75	11.97	-0.960	0.000	0.045
127.00	-5.80	-1.99	0.00	-34.14	0.00	34.14	1586.28	793.14	1813.59	908.14	12.17	-0.965	0.000	0.041
129.75	-5.37	-1.94	0.00	-28.68	0.00	28.68	1068.62	534.31	1212.20	607.00	12.73	-0.976	0.000	0.052
130.00	-5.35	-1.93	0.00	-28.19	0.00	28.19	1067.16	533.58	1207.67	604.73	12.78	-0.977	0.000	0.052
135.00	-4.95	-1.85	0.00	-18.52	0.00	18.52	1036.93	518.46	1117.63	559.65	13.81	-0.999	0.000	0.038
139.00	-2.33	-1.06	0.00	-11.11	0.00	11.11	1011.29	505.65	1046.45	524.00	14.66	-1.011	0.000	0.024
140.00	-2.27	-1.04	0.00	-10.06	0.00	10.06	1004.68	502.34	1028.80	515.16	14.87	-1.013	0.000	0.022
145.00	-1.96	-0.97	0.00	-4.84	0.00	4.84	970.44	485.22	941.49	471.44	15.93	-1.023	0.000	0.012
150.00	0.00	-0.93	0.00	0.00	0.00	0.00	934.20	467.10	856.03	428.65	17.01	-1.026	0.000	0.000

Final Analysis Summary

Structure:	CT13613-A-SBA	**Code:**	EIA/TIA-222-G	2/20/2018	
Site Name:	Johnson	**Exposure:**	B		
Height:	150.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	A - Hard Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 32	

Tower Engineering Solutions

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
1.2D + 1.6W 89 mph Wind	24.8	0.00	48.37	0.00	0.00	2723.35
0.9D + 1.6W 89 mph Wind	24.7	0.00	36.27	0.00	0.00	2701.70
1.2D + 1.0Di + 1.0Wi 40 mph Wind	5.7	0.00	86.76	0.00	0.00	631.92
1.2D + 1.0E	0.8	0.00	48.39	0.00	0.00	82.56
0.9D + 1.0E	0.8	0.00	36.29	0.00	0.00	81.74
1.0D + 1.0W 60 mph Wind	7.0	0.00	40.32	0.00	0.00	769.74

Max Stresses

Load Case	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Elev (ft)	Stress Ratio
1.2D + 1.6W 89 mph Wind	-28.83	-21.61	0.00	-1531.6	0.00	-1531.6	3008.41	1504.2	5823.48	2916.07	51.00	0.535
0.9D + 1.6W 89 mph Wind	-21.52	-21.45	0.00	-1514.6	0.00	-1514.6	3008.41	1504.2	5823.48	2916.07	51.00	0.527
1.2D + 1.0Di + 1.0Wi 40 mph Wind	-60.55	-5.02	0.00	-357.16	0.00	-357.16	3008.41	1504.2	5823.48	2916.07	51.00	0.143
1.2D + 1.0E	-20.09	-0.52	0.00	-27.23	0.00	-27.23	1922.43	961.22	2968.94	1486.68	89.75	0.029
0.9D + 1.0E	-15.07	-0.51	0.00	-26.88	0.00	-26.88	1922.43	961.22	2968.94	1486.68	89.75	0.026
1.0D + 1.0W 60 mph Wind	-24.36	-6.11	0.00	-432.13	0.00	-432.13	3008.41	1504.2	5823.48	2916.07	51.00	0.156

Base Plate Summary

Structure:	CT13613-A-SB		**Code:**	EIA/TIA-222-G	2/20/2018
Site Name:	Johnson		**Exposure:**	B	
Height:	150.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	A - Hard Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 33

TES Tower Engineering Solutions

Reactions	
Original Design	
Moment (kip-ft):	4200.00
Axial (kip):	36.00
Shear (kip):	39.00
Analysis	
Moment (kip-ft):	2723.35
Axial (kip):	86.76
Shear (kip):	24.76
Moment Design %:	64.84

Base Plate	
Yield (ksi):	50.00
Width (in):	66.00
Style:	Clipped
Polygon Sides:	4.00
Clip Length (in):	14.00
Effective Len (in):	9.14
Moment (kip-in):	356.62
Allow Stress (ksi):	67.50
Applied Stress (ksi):	0.00
Stress Ratio:	0.46

Anchor Bolts	
Bolt Circle:	67.00
Number Bolts:	20.00
Bolt Type:	2.25" 18J
Bolt Diameter (in):	2.25
Yield (ksi):	75.00
Ultimate (ksi):	100.00
Arrangement:	Clustered
Cluster Dist (in):	6.00
Start Angle (deg):	45.00
Compression	
Force (kip):	101.89
Allowable (kip):	260.00
Ratio:	0.40
Tension	
Force (kip):	93.21
Allowable (kip):	260.00
Ratio:	0.37

Last revised on 11/28/2017

Monopole Mat Foundation Design

			Date: 2/20/2018
Customer Name:	T-Mobile	**EIA/TIA Standard:**	EIA-222-G
Site Name:		**Structure Height (Ft.):**	150
Site Number:	CT13613-A-SBA	**Engineer Name:**	J. Chen
Engr. Number:	47720	**Engineer Login ID:**	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

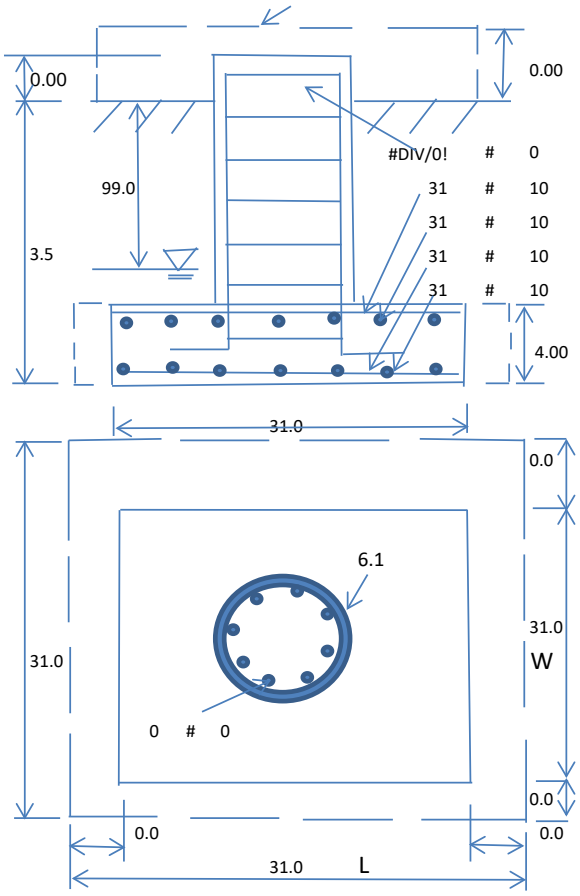
Analysis or Design? Analysis

Base Reactions (Factored):

Axial Load (Kips):	48.4	Shear Force (Kips):	24.8
Uplift Force (Kips):	0.0	Moment (Kips-ft):	2723.3
Allowable overstress %:	5.0%		

Foundation Geometries:

		Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	6.1	Depth of Base BG (ft.):	3.5
Pier Height A. G. (ft.):	0.00	Thickness of Pad (ft):	4.00
Length of Pad (ft.):	31	Width of Pad (ft.):	31
Final Length of pad (ft)	31.0	Final width of pad (ft):	31.0
Control Value for Cell D18:	0	Control Value for Cell F18:	0



Material Properties and Reabr Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)		Tie steel yield (ksi):		
Vertical Rebar Size #:		Tie / Stirrup Size #:		
Qty. of Vertical Rebars:		Tie Spacing (in):		
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	10	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf
Rebar at the bottom of the concrete pad:				
Qty. of Rebar in Pad (L):	31	Qty. of Rebar in Pad (W):	31	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	31	Qty. of Rebar in Pad (W):	31	
Apply 1.35 factor for e/w Per G:	1.35			

Soil Design Parameters:

Soil Unit Weight (pcf):	120.0	Soil Buoyant Weight:	50.0	Pcf		
Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Ultimate Bearing Pressure (psf):	20000	Ultimate Skin Friction:	0	Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad:	25
Consider soil hor. resist. for OTM.:	No	Reduction factor on the maximum soil bearing pressure:	1.00			

Foundation Analysis and Design: Uplift Strength Reduction Factor: 0.75 — Compression Strength Reduction Factor: 0.75

Total Dry Soil Volume (cu. Ft.):	1.86	Total Dry Soil Weight (Kips):	0.22
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	0.22	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	3844.20	Total Dry Concrete Weight (Kips):	576.63
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	576.63	Total Vertical Load on Base (Kips):	625.22

Check Soil Capacities:

					Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	1189	<	Allowable Factored Soil Bearing (psf):	15000	0.08	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	8796.9	>	Design Factored Momont (kips-ft):	2823	0.32	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	3.12	OK!				

Check the capacities of Reinforceing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75		
Strength reduction factor (Axial compresion):	0.65	Wind Load Factor on Concrete Design:	1.00		

(2).Concrete Pad:

One-Way Design Shear Capacity (L-Direction, Kips):	1356.2	>	One-Way Factored Shear (L-D. Kips):	197.9	0.15	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	1356.2	>	One-Way Factored Shear (W-D., Kips)	197.9	0.15	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	1328.3	>	One-Way Factored Shear (C-C, Kips):	185.1	0.14	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0024	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0024		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	7641.1	>	Moment at Bottom (L-Dir. K-Ft):	1527.4	0.20	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	7641.1	>	Moment at Bottom (W-Dir. K-Ft):	1527.4	0.20	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	10755.9	>	Moment at Bottom (C-C Dir. K-Ft):	2160.1	0.20	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0024	OK!	Upper Steel Reinf. Ratio (W-Dir.):	0.0024		
Upper Steel Pad Moment Capacity (L-Direc. Kips-ft):	7641.1	>	Moment at the top (L-Dir K-Ft):	556.0	0.07	OK!
Upper Steel Pad Moment Capacity (W-Direc. Kips-ft):	7641.1	>	Moment at the top (W-Dir K-Ft):	556.0	0.07	OK!

(3).Check Punching Shear Capacity due to Moment in the Pier:

Moment transferred by punching shear:	1089.3	k-ft.	Max. factored shear stress v_{u_CD}:	3.0	Psi
Max. factored shear stress v_{u_AB}:	7.3	Psi	Factored shear Strength ϕv_n:	164.3	Psi
Max. factored shear stress v_u:	7.3	Psi	Check Usage of Punching Shear Capacity:	0.04	OK!

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

T-Mobile Existing Facility

Site ID: CTNH549B

SBA Colebrook
382 Colebrook River Road
Colebrook, CT 06021

February 15, 2018

EBI Project Number: 6218001026

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	8.82 %

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
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February 15, 2018

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

Emissions Analysis for Site: **CTNH549B – SBA Colebrook**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **382 Colebrook River Road, Colebrook, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz Bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively, and the general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **382 Colebrook River Road, Colebrook, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 2 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel

4) 1 LTE channel (600 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

5) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

6) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

7) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antennas used in this modeling are the **Ericsson AIR32 B66A/B2P** & **RFS APXV18-206517S-C-A20** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **RFS APXVAA24-43-U-A20** for 600 MHz & 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR32 B66A/B2P** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **RFS APXV18-206517S-C-A20** has a maximum gain of **16.99 dBd** at its main lobe at 1900 MHz. The **RFS APXVAA24-43-U-A20** has a maximum gain of **13.55 dBd** at its main lobe at 700 MHz and a maximum gain of **13.15 dBd** at its main lobe at 600 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerline of the proposed antennas is **117 feet** above ground level (AGL).

10) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

11) All calculations were done with respect to uncontrolled / general population threshold limits.

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C	Sector:	D
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 B66A/B2P	Make / Model:	Ericsson AIR32 B66A/B2P	Make / Model:	Ericsson AIR32 B66A/B2P	Make / Model:	Ericsson AIR32 B66A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	117	Height (AGL):	117	Height (AGL):	117	Height (AGL):	117
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08
Antenna A1 MPE%	2.72	Antenna B1 MPE%	2.72	Antenna C1 MPE%	2.72	Antenna D1 MPE%	2.72
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXV18-206517S-C-A20	Make / Model:	RFS APXV18-206517S-C-A20	Make / Model:	RFS APXV18-206517S-C-A20	Make / Model:	RFS APXV18-206517S-C-A20
Gain:	16.9 dBd	Gain:	16.9 dBd	Gain:	16.9 dBd	Gain:	16.9 dBd
Height (AGL):	117	Height (AGL):	117	Height (AGL):	117	Height (AGL):	117
Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)
Channel Count	2	Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	60	Total TX Power(W):	60	Total TX Power(W):	60	Total TX Power(W):	60
ERP (W):	2,806.41	ERP (W):	2,806.41	ERP (W):	2,806.41	ERP (W):	2,806.41
Antenna A2 MPE%	0.82	Antenna B2 MPE%	0.82	Antenna C2 MPE%	0.82	Antenna D2 MPE%	0.82
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAA24-43-U-A20	Make / Model:	RFS APXVAA24-43-U-A20	Make / Model:	RFS APXVAA24-43-U-A20	Make / Model:	RFS APXVAA24-43-U-A20
Gain:	13.15 / 13.55 dBd	Gain:	13.15 / 13.55 dBd	Gain:	13.15 / 13.55 dBd	Gain:	13.15 / 13.55 dBd
Height (AGL):	117	Height (AGL):	117	Height (AGL):	117	Height (AGL):	117
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
Channel Count	2	Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	60	Total TX Power(W):	60	Total TX Power(W):	60	Total TX Power(W):	60
ERP (W):	1,299.01	ERP (W):	1,299.01	ERP (W):	1,299.01	ERP (W):	1,299.01
Antenna A3 MPE%	0.88	Antenna B3 MPE%	0.88	Antenna C3 MPE%	0.88	Antenna D3 MPE%	0.88

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**4.42 %**
Nextel	0.38 %
AT&T	1.82 %
Verizon Wireless	2.20 %
Site Total MPE %:	**8.82 %**

T-Mobile Sector A Total:	4.42 %
T-Mobile Sector B Total:	4.42 %
T-Mobile Sector C Total:	4.42 %
T-Mobile Sector D Total:	4.42 %
Site Total:	8.82 %

T-Mobile Max Power Values

T-Mobile _Max Power Values per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	117	13.62	AWS - 2100 MHz	1000	1.36%
T-Mobile PCS - 1900 MHz LTE	2	2,334.27	117	13.62	PCS - 1900 MHz	1000	1.36%
T-Mobile PCS - 1900 MHz UMTS	2	1,403.21	117	8.19	PCS - 1900 MHz	1000	0.82%
T-Mobile 600 MHz LTE	1	619.61	117	1.81	600 MHz	467	0.45%
T-Mobile 700 MHz LTE	1	679.39	117	1.98	700 MHz	467	0.43%
						Total:	**4.42%**

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	4.42 %
Sector B:	4.42 %
Sector C:	4.42 %
Sector D:	4.42 %
T-Mobile Per Sector Maximum:	4.42 %
Site Total:	8.82 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **8.82%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

SITE NAME: CTNH549B

382 COLEBROOK RIVER ROAD
COLEBROOK, CT 06021

SITE NUMBER: CTNH549B

PROJECT: T-MOBILE L700

CONFIGURATION: 4SEC-6797DB3_1xAIR+1QP+1DP

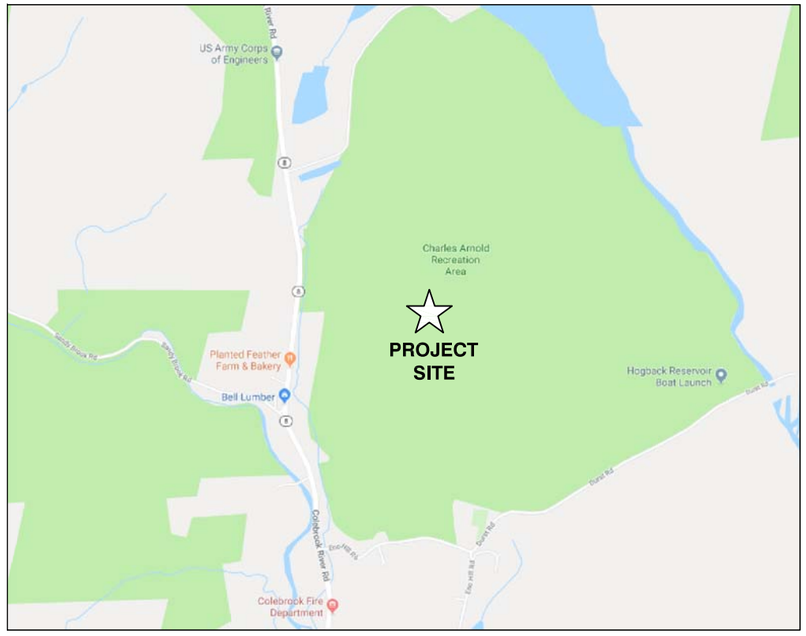
T-MOBILE TECHNICIAN SITE SAFETY NOTES	
LOCATION	SPECIAL RESTRICTIONS
ANTENNA/TMA/RRU	
SECTOR A:	ACCESS NOT PERMITTED
SECTOR B:	ACCESS NOT PERMITTED
SECTOR C:	ACCESS NOT PERMITTED
SECTOR D:	ACCESS NOT PERMITTED
GPS/LMU:	UNRESTRICTED* (*CAUTION: OSHA-APPROVED PORTABLE 8' STEP-LADDER REQUIRED)
RADIO CABINETS:	UNRESTRICTED
PPC DISCONNECT:	UNRESTRICTED
MAIN CIRCUIT D/C:	UNRESTRICTED
NIU/T DEMARC:	UNRESTRICTED
OTHER/SPECIAL:	NONE

GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF T-MOBILE NORTHEAST, LLC. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE T-MOBILE NORTHEAST. LLC REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

SPECIAL CONSTRUCTION NOTES

1. TOWER OWNER SHALL PROVIDE GLOBAL STRUCTURAL STABILITY ANALYSIS OF EXISTING ANTENNA SUPPORT STRUCTURE. GENERAL CONTRACTOR SCOPE OF WORK SHALL INCLUDE ALL REQUIRED STRUCTURAL MODIFICATIONS, RE-BUNDLING OF COAXIAL CABLES OR OTHER SPECIAL MODIFICATIONS AS OUTLINED THEREIN.
2. PROTERRA DESIGN GROUP ASSUMES THAT THE TOWER IS PROPERLY CONSTRUCTED AND MAINTAINED. ALL STRUCTURAL MEMBERS AND THEIR CONNECTION ARE ASSUMED TO BE IN GOOD CONDITION AND ARE FREE FROM DEFECTS WITH NO DETERIORATION TO ITS MEMBER CAPACITIES



PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY T-MOBILE COLLOCATION
ZONING JURISDICTION:	TOWN OF EAST COLEBROOK, CT SITING COUNCIL
T-MOBILE E911 ADDRESS:	39 NICHOLS ROAD MOODUS, CT 06469
SBA BUSINESS ADDRESS:	382 COLEBROOK RIVER ROAD COLEBROOK, CT 06021
LATITUDE:	41° 59' 31.50" N (FROM SBA RECORD)
LONGITUDE:	73° 02' 23.30" W (FROM SBA RECORD)
GROUND ELEVATION:	1150'± AMSL (FROM SBA RECORD)
JURISDICTION:	TOWN OF EAST COLEBROOK, CT SITING COUNCIL
BUILDING CODE:	2016 CONNECTICUT STATE BUILDING CODE WITH AMENDMENTS
ELECTRICAL CODE:	2014 NATIONAL ELECTRICAL CODE AND AMENDMENTS
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
PROPERTY OWNER:	N/F 382 COLEBROOK, LLC, 202 HANG DOG LANE WETHERSFIELD, CT 06109
TOWER OWNER:	SBA TOWERS II, LLC
SBA SITE ID:	CT13613-A
SBA SITE NAME:	JOHNSTON
SBA REGIONAL SITE MANAGER:	STEPHEN ROTH (860) 539-4920

APPROVALS

PROJECT MANAGER	DATE
CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING / SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE

DIG SAFE SYSTEM
(MA, ME, NH, RI, VT):
1-888-344-7233

CALL BEFORE YOU DIG
(CT): 1-800-922-4455

UNDERGROUND SERVICE ALERT

DRAWING INDEX

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A-2	ELEVATIONS & PROPOSED ANTENNA PLAN	2
A-3	ANTENNA MOUNTING DETAILS	2
A-4 TO A-6	DETAILS	2
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E-1 TO E-2	ELECTRICAL & GROUNDING DETAILS	2

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
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ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: 2-22-18 JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

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1	02/15/18	ISSUED FOR CONSTRUCTION	PN
0	02/06/18	ISSUED FOR CONSTRUCTION	PN

SITE NUMBER:
CTNH549B
SITE NAME:
CTNH549B
SITE ADDRESS:
382 COLEBROOK RIVER ROAD
COLEBROOK, CT 06021

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTNING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER SURCUITS TO BTS EQUIPMENT.
5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

   CONTRACTOR – SBA COMMUNICATIONS CORP.
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – T-MOBILE

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CUR\BS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
14. ANY NEW CONCRETE NEEDED FOR CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (FY = 36 KSI) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (FY = 35 KSI). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
16. CONSTRUCTION SHALL COMPLY WITH UMTS SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF T-MOBILE SITES."
17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
20. APPLICABLE BUILDING CODES:
    SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

    SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

    AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

    AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), STEEL CONSTRUCTION MANUAL, 14TH EDITION;

    TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-G, STRUCTURAL STANDARDS FOR STEEL

    ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	EQ	EQUAL	REQ	REQUIRED
AWG	AMERICAN WIRE GAUGE	G.C.	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
BTCW	BARE TINNED SOLID COPPER WIRE	GRC	GALVANIZED RIGID CONDUIT	TBD	TO BE DETERMINED
		MGB	MASTER GROUND BAR	TBR	TO BE REMOVED
BGR	BURIED GROUND RING	MIN	MINIMUM	TBRR	TO BE REMOVED AND REPLACED
BTS	BASE TRANSCEIVER STATION	PROPOSED	NEW OR (P)	TYP	TYPICAL
EXISTING	EXISTING OR (E)	N.T.S.	NOT TO SCALE	VIF	VERIFY IN FIELD
EGB	EQUIPMENT GROUND BAR	RAD	RADIATION CENTERLINE (ANTENNA)		
EGR	EQUIPMENT GROUND RING	REF	REFERENCE		

T-MOBILE NORTHEAST LLC
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ProTerra DESIGN GROUP, LLC
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STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: 2-22-18 JMM/TEJ

APPROVED BY: JMM/TEJ

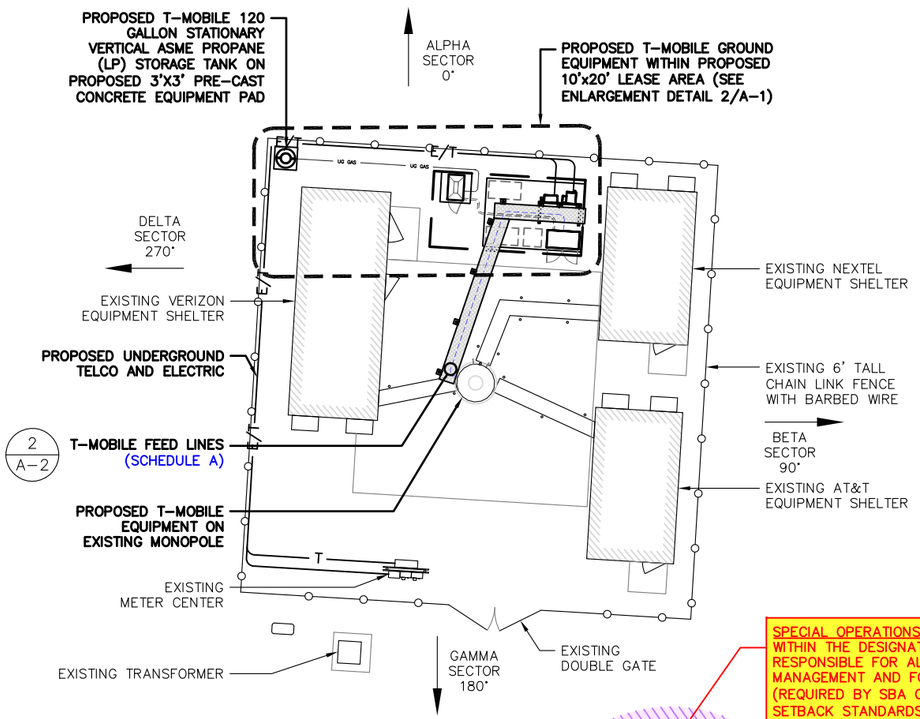
SUBMITTALS

REV.	DATE	DESCRIPTION	BY
2	02/22/18	ISSUED FOR CONSTRUCTION	PN
1	02/15/18	ISSUED FOR CONSTRUCTION	PN
0	02/06/18	ISSUED FOR CONSTRUCTION	PN

SITE NUMBER:
CTNH549B
SITE NAME:
CTNH549B
SITE ADDRESS:
382 COLEBROOK RIVER ROAD
COLEBROOK, CT 06021

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-1



COMPOUND PLAN

1 / A-1

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

20 10 0 20

13°41' MAGNETIC NORTH TRUE NORTH

PROPOSED T-MOBILE EQUIPMENT AND 9'x13' CONCRETE PAD WITHIN PROPOSED 10'x20' LEASE AREA (SEE GROUND EQUIPMENT LAYOUT PLAN BELOW)

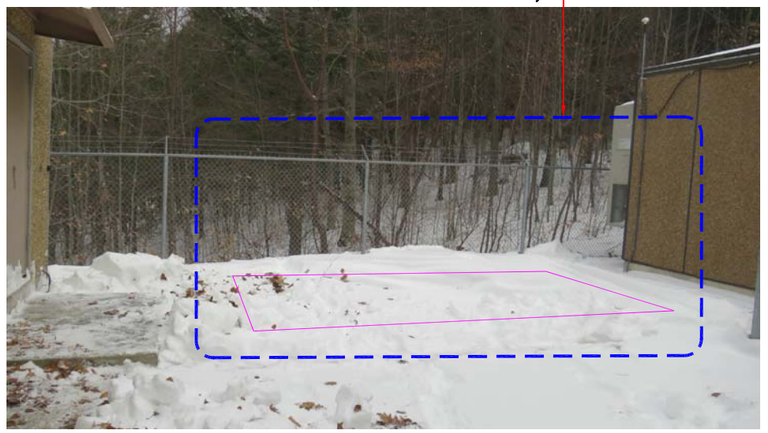


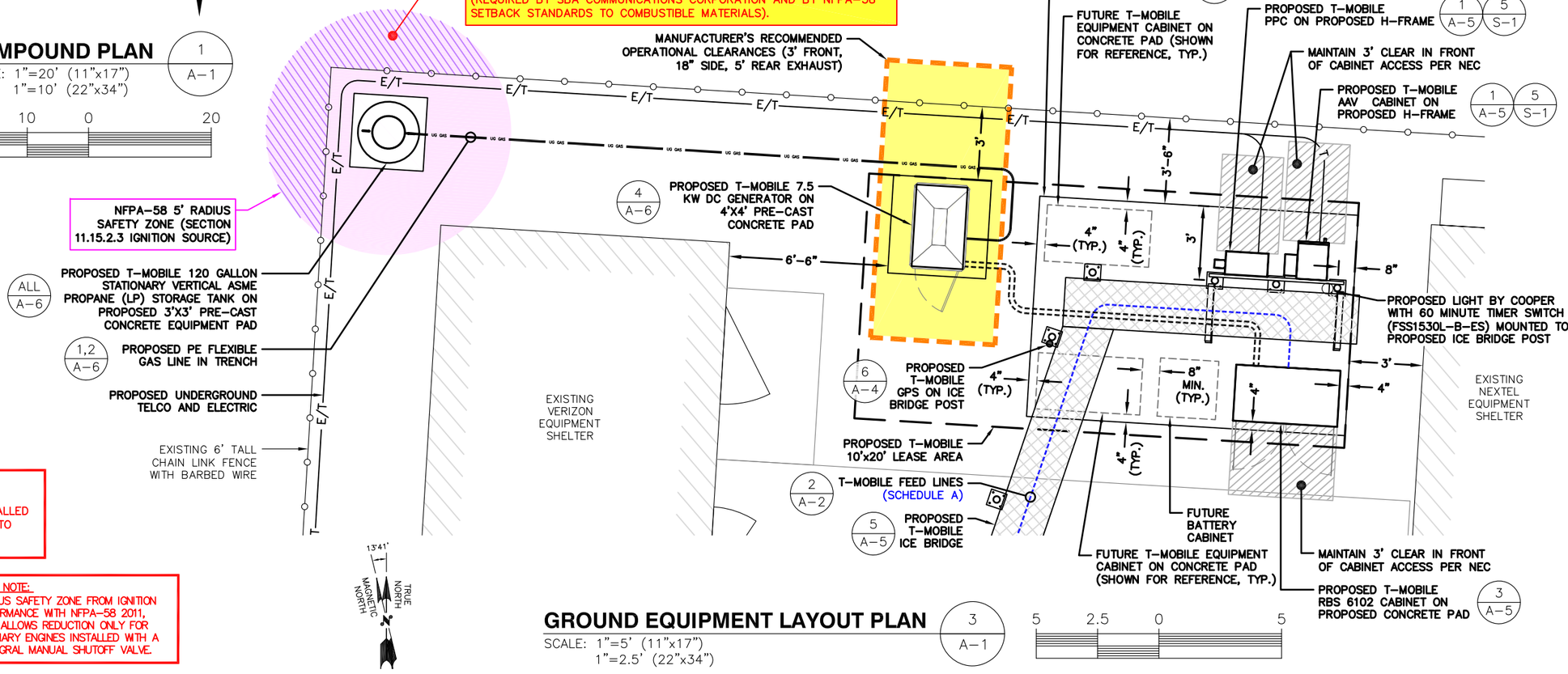
IMAGE SOURCE: PROTERRA 01/09/2018

PROPOSED EQUIPMENT AREA PHOTO DETAIL

2 / A-1

SCALE: N.T.S.

SPECIAL OPERATIONS & MAINTENANCE NOTE (VEGETATION MANAGEMENT): WITHIN THE DESIGNATED PROPANE SAFETY ZONE, T-MOBILE SHALL BE RESPONSIBLE FOR ALL LABOR AND MATERIALS FOR INITIAL VEGETATION MANAGEMENT AND FOR ROUTINE VEGETATION MAINTENANCE THEREAFTER (REQUIRED BY SBA COMMUNICATIONS CORPORATION AND BY NFPA-58 SETBACK STANDARDS TO COMBUSTIBLE MATERIALS).



NOTE:
REGULATOR AND FILL VALVE MUST BE INSTALLED NO CLOSER THAN 5' TO AN IGNITION SOURCE.

SAFETY ZONE REDUCTION NOTE:
REDUCTION TO A 5' RADIUS SAFETY ZONE FROM IGNITION SOURCE REQUIRES CONFORMANCE WITH NFPA-58 2011, SECTION 11.15.2.3 WHICH ALLOWS REDUCTION ONLY FOR CONTAINERS FOR STATIONARY ENGINES INSTALLED WITH A FILL VALVE WITH AN INTEGRAL MANUAL SHUTOFF VALVE.

13°41' MAGNETIC NORTH TRUE NORTH

GROUND EQUIPMENT LAYOUT PLAN

3 / A-1

SCALE: 1"=5' (11"x17")
1"=2.5' (22"x34")

5 2.5 0 5

T-MOBILE NORTHEAST LLC
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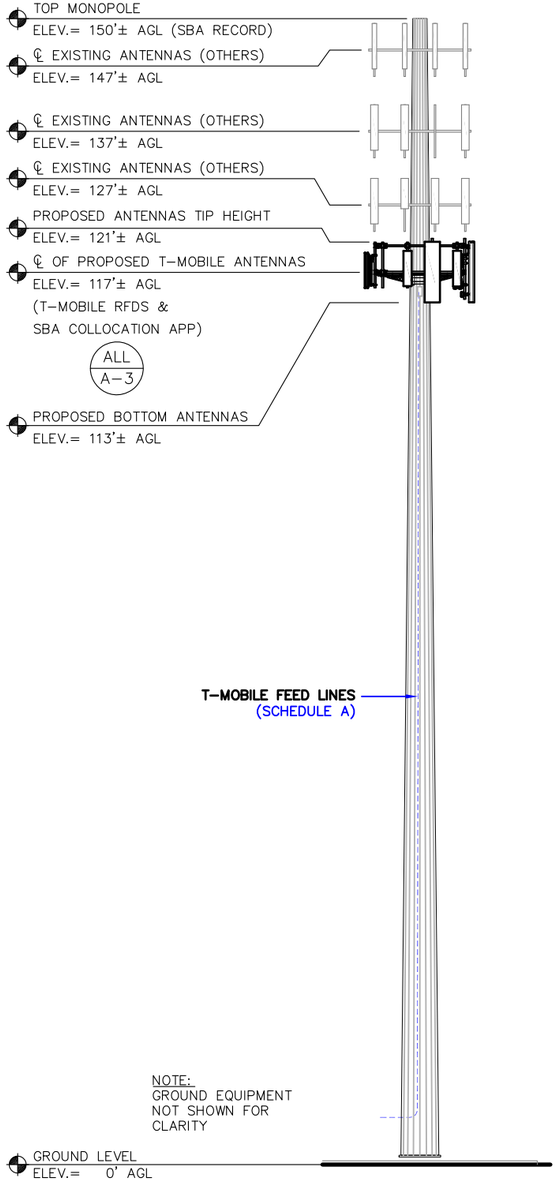
CTNH549B
SITE NAME:
CTNH549B
SITE ADDRESS:
382 COLEBROOK RIVER ROAD
COLEBROOK, CT 06021

SHEET TITLE
COMPOUND & ELEVATION PLAN

SHEET NUMBER
A-1



ELEVATION DETAIL

1 / A-2

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

20 10 0 20

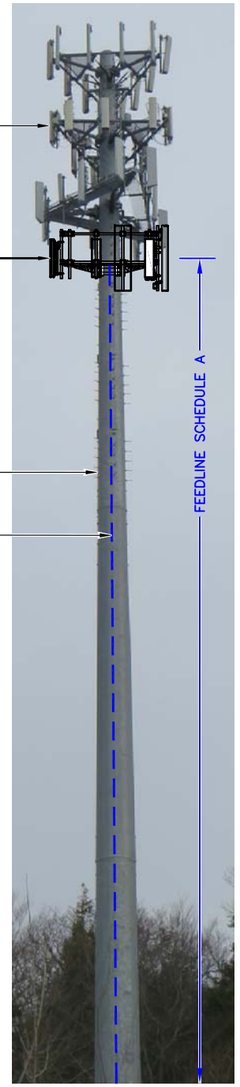


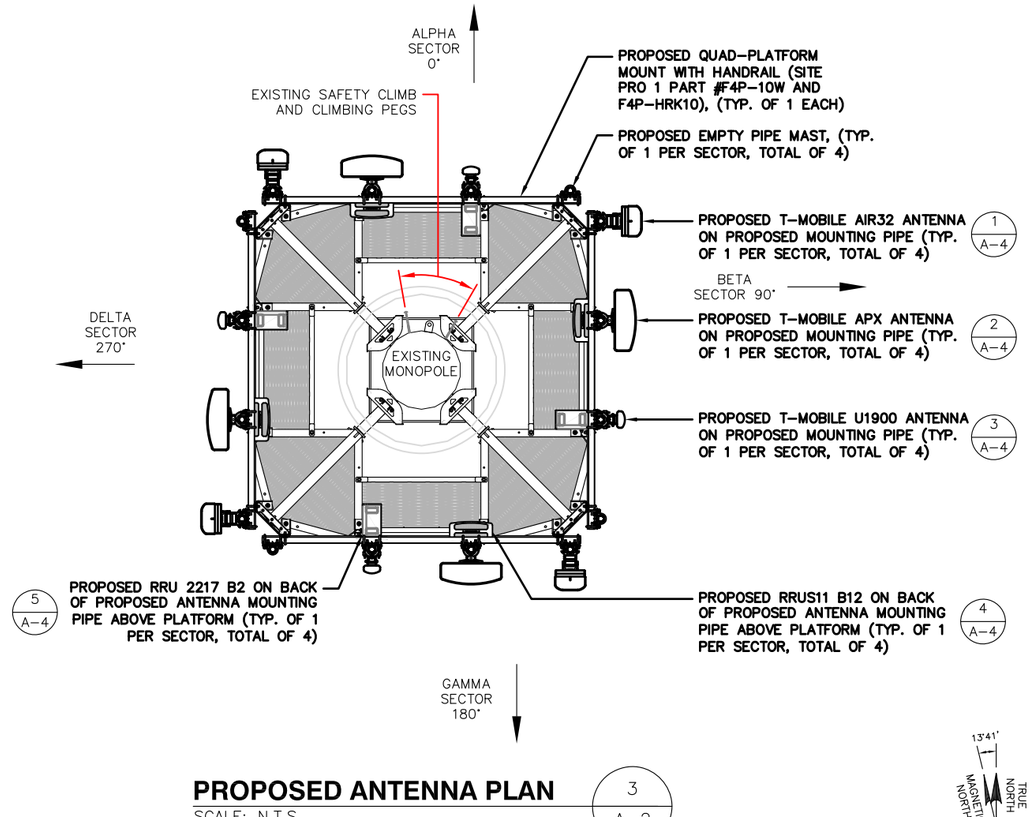
IMAGE SOURCE:
PROTERRA 01/09/2018

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	PROPOSED: (4) HYBRID TO 117' RAD;	UP MONOPOLE TOWER TO RAD
NOTE: PROPOSED T-MOBILE EQUIPMENT FEEDLINE INVENTORY BASED ON COLOCATION APPLICATION. RFDS AND FEEDLINE LEASING ENTITLEMENTS MAY DIFFER.		

TOWER ELEVATION PHOTO DETAIL

2 / A-2

SCALE: N.T.S.



PROPOSED ANTENNA PLAN

3 / A-2

SCALE: N.T.S.

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

SPECIAL PRE-CONSTRUCTION WORK NOTE (SBA-PROVIDED TOWER STRUCTURAL ANALYSIS SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS):
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL SPECIAL OR SUPPLEMENTAL ADDITIONAL TOWER-MOUNTED EQUIPMENT PER RECOMMENDATIONS FROM SBA-PROVIDED TOWER STRUCTURAL ANALYSIS FOR ANY SPECIAL SHIELDING OF TOWER TOP EQUIPMENT AND FOR ANY SPECIAL FEEDLINE BUNDLING OR RELOCATION.

13°41'
MAGNETIC NORTH
TRUE NORTH

T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 648-1116

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra
DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED
PROFESSIONAL ENGINEER

CHECKED BY: 2-22-18 JMM/TEJ

APPROVED BY: JMM/TEJ

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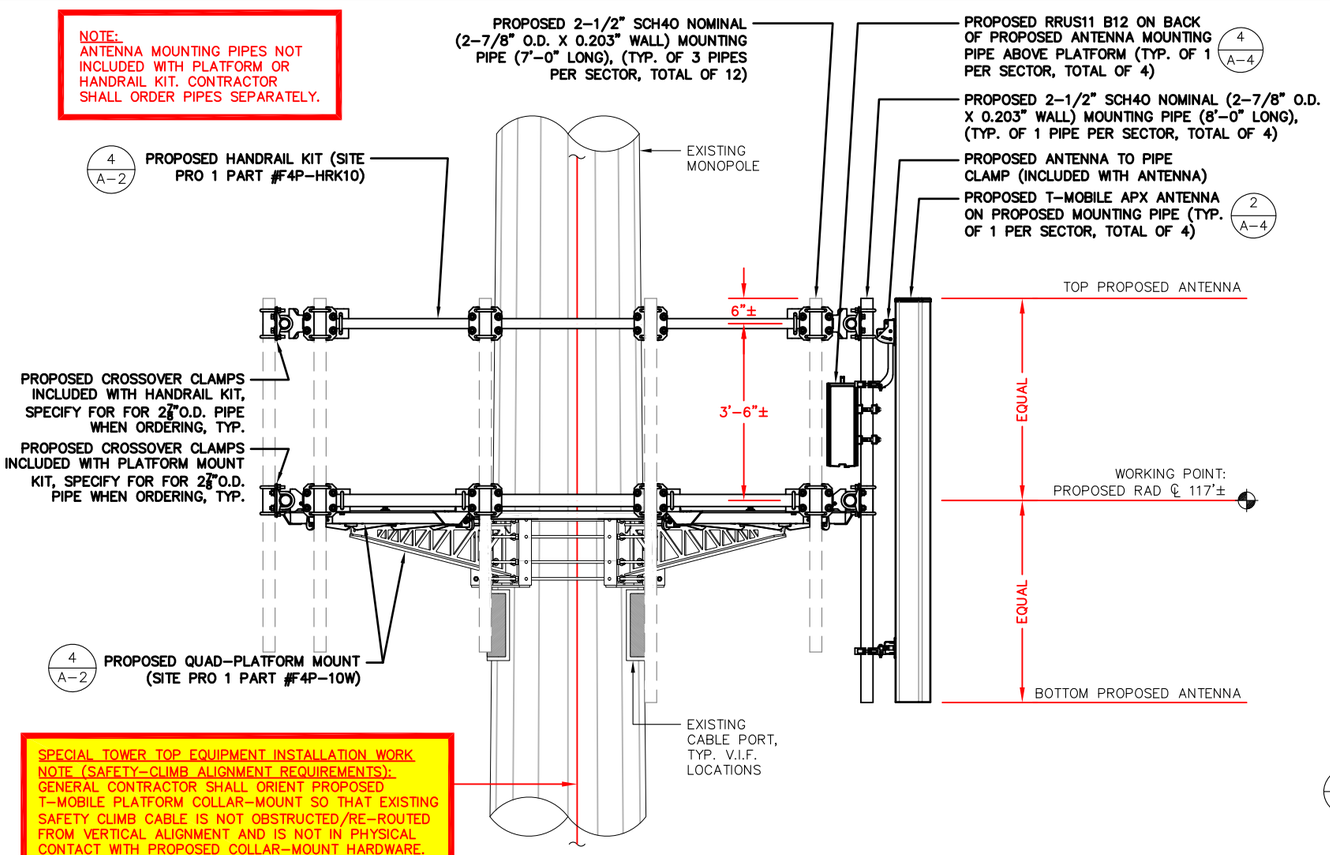
SITE NUMBER:
CTNH549B
SITE NAME:
CTNH549B

SITE ADDRESS:
382 COLEBROOK RIVER ROAD
COLEBROOK, CT 06021

SHEET TITLE
ELEVATIONS AND PROPOSED ANTENNA PLAN

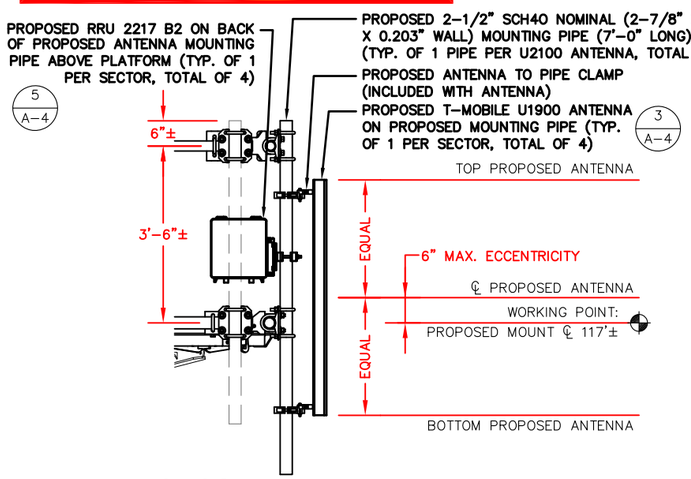
SHEET NUMBER
A-2

NOTE:
ANTENNA MOUNTING PIPES NOT INCLUDED WITH PLATFORM OR HANDRAIL KIT. CONTRACTOR SHALL ORDER PIPES SEPARATELY.

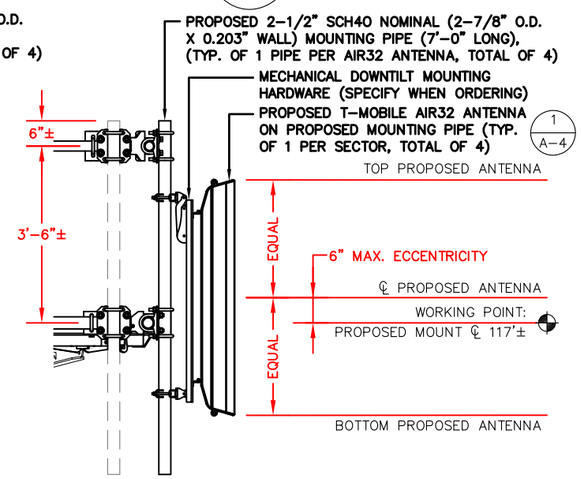


SPECIAL TOWER TOP EQUIPMENT INSTALLATION WORK NOTE (SAFETY-CLIMB ALIGNMENT REQUIREMENTS):
GENERAL CONTRACTOR SHALL ORIENT PROPOSED T-MOBILE PLATFORM COLLAR-MOUNT SO THAT EXISTING SAFETY CLIMB CABLE IS NOT OBSTRUCTED/RE-ROUTED FROM VERTICAL ALIGNMENT AND IS NOT IN PHYSICAL CONTACT WITH PROPOSED COLLAR-MOUNT HARDWARE. GENERAL CONTRACTOR SHALL INSTALL NEW OR ADDITIONAL SAFETY-CLIMB CABLE GUIDES IF ADDITIONAL CLEARANCE IS REQUIRED. ADDITIONAL CABLE GUIDES SHALL BE ATTACHED SECURELY TO THE POLE USING MECHANICAL FASTENERS OR FIELD WELDED BY A CERTIFIED WELDING TECHNICIAN.

PROPOSED APX ANTENNA AND PLATFORM MOUNTING DETAIL
1 A-3
SCALE: N.T.S.



PROPOSED U1900 ANTENNA MOUNTING DETAIL
2 A-3
SCALE: N.T.S.



PROPOSED AIR32 ANTENNA MOUNTING DETAIL
3 A-3
SCALE: N.T.S.

SPECIAL PRE-CONSTRUCTION WORK NOTE (SBA-PROVIDED TOWER STRUCTURAL ANALYSIS SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS):
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NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

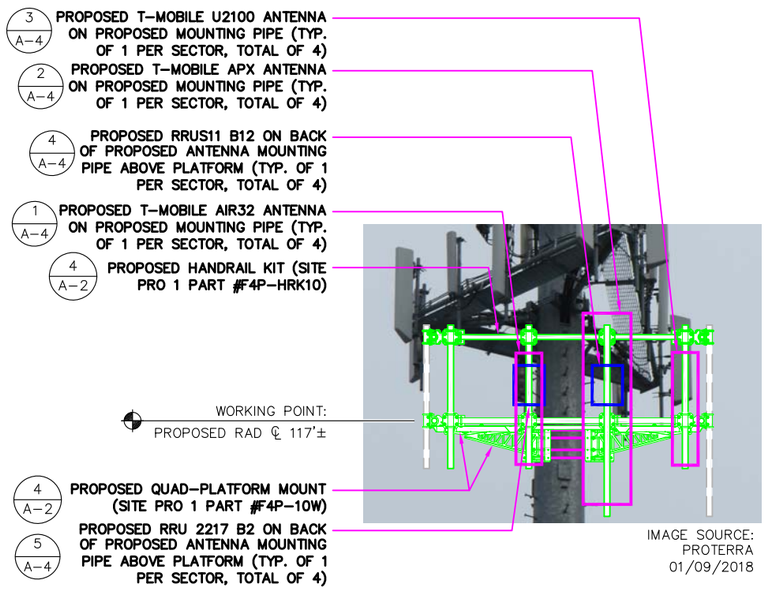

IMAGE SOURCE: PROTERRA 01/09/2018

NOTE: ONE SECTOR SHOWN FOR CLARITY

ANTENNA PHOTO DETAIL
4 A-3
SCALE: N.T.S.

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
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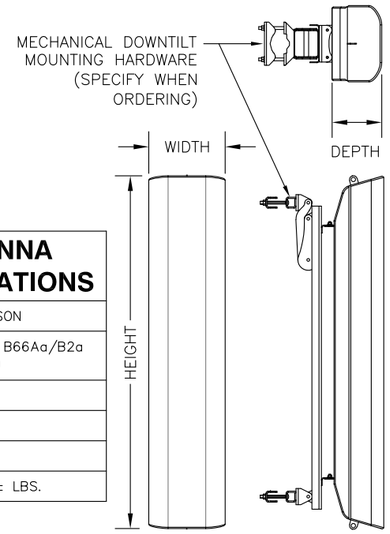
SHEET TITLE
ANTENNA MOUNTING DETAILS

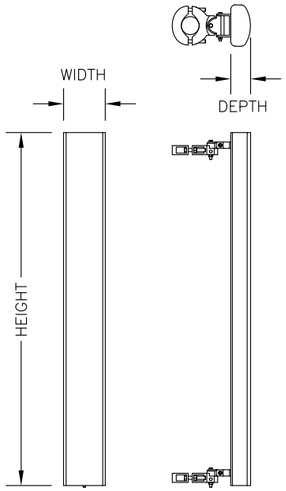
SHEET NUMBER
A-3



AIR ANTENNA SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	AIR32 B66Aa/B2a (Octa)
HEIGHT	56.6"
WIDTH	12.9"
DEPTH	8.7"
WEIGHT	132.2± LBS.

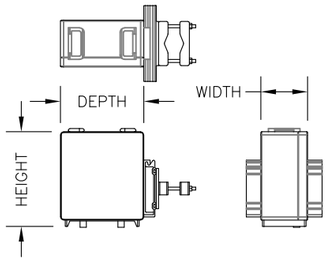
AIR32 ANTENNA DETAIL (1 / A-4)
SCALE: N.T.S.



U1900 ANTENNA SPECIFICATIONS

MANUF.	RFS
MODEL #	APXV18-206517S (Dual)
HEIGHT	76.0"
WIDTH	6.65"
DEPTH	3.15"
WEIGHT	12± LBS.

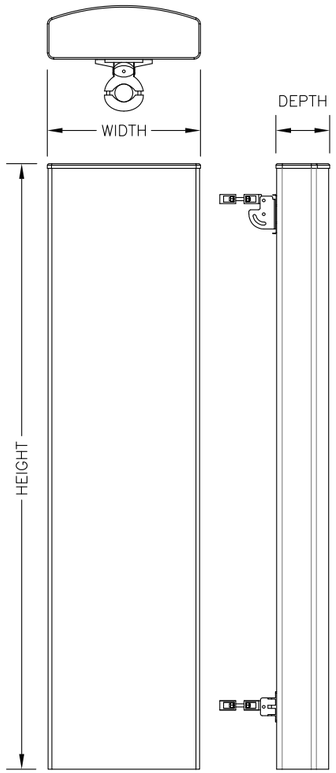
U1900 ANTENNA DETAIL (3 / A-4)
SCALE: N.T.S.



2217 B2 SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	2217 B2
HEIGHT	13.4"
WIDTH	11.5"
DEPTH	4.1"
WEIGHT	26.5± LBS.

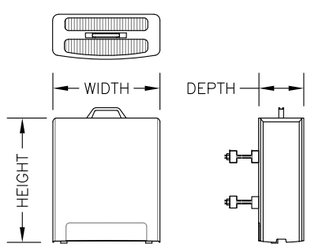
RRU DETAIL (5 / A-4)
SCALE: N.T.S.



APX ANTENNA SPECIFICATIONS

MANUF.	ANDREW
MODEL #	APXVAA24_43-U-A20
HEIGHT	95.9"
WIDTH	24.0"
DEPTH	8.5"
WEIGHT	124.3± LBS.

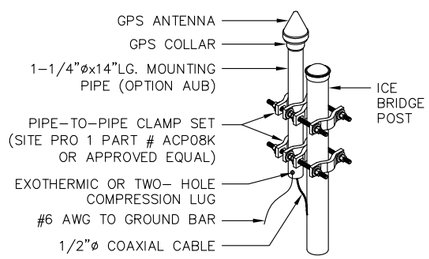
APX ANTENNA DETAIL (2 / A-4)
SCALE: N.T.S.



RRUS11 SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	RRUS11 B12
HEIGHT	20.7"
WIDTH	17"
DEPTH	7"
WEIGHT	50.7± LBS.

RRU DETAIL (4 / A-4)
SCALE: N.T.S.



GPS ANTENNA

MANUF.	NAIS
MODEL #	CCAH32ST03
HEIGHT	3.9"
WIDTH	3.5"

GPS DETAIL (6 / A-4)
SCALE: N.T.S.

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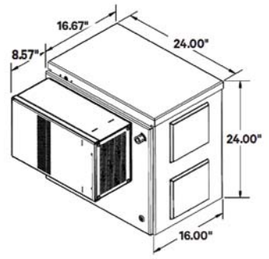
COLEBROOK, CT 06021

SHEET TITLE
DETAILS

SHEET NUMBER
A-4

SSC SPECIFICATIONS

MANUF.	EMERSON
MODEL #	NXC2416
HEIGHT	24.0"
WIDTH	24.0"
DEPTH	16.67" (25.24 WITH HEAT EXCHANGER)
WEIGHT	64± LBS. (EMPTY) 100± LBS. (WITH 4 BATTERIES)



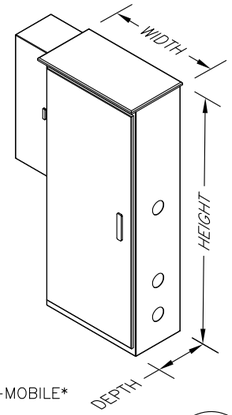
SITE SUPPORT CABINET (SSC)

SCALE: N.T.S.

1 / A-5

PPC SPECIFICATIONS

MANUF.	DELTA
MODEL #	3799340400
HEIGHT	40"
WIDTH	20"
DEPTH	10"
WEIGHT	75± LBS.



TO BE PROVIDED BY T-MOBILE

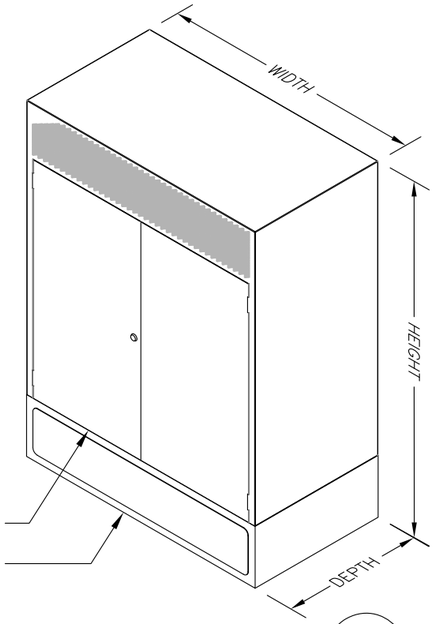
POWER PROTECTION CABINET (PPC)

SCALE: N.T.S.

2 / A-5

RBS SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	RBS 6102
HEIGHT	57.1"
WIDTH	51.2"
DEPTH	27.6"
WEIGHT	728± LBS. W/O BATTERIES
MAX WEIGHT	1850LBS



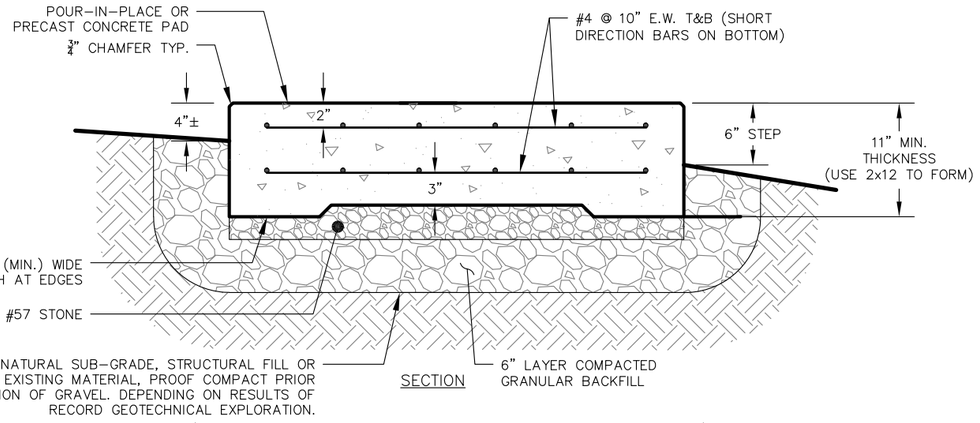
ATTACH RBS CABINET TO BASE FRAME PER MANUFACTURER'S GUIDELINES

RBS BASE FRAME (DIMENSIONS TBD). ANCHOR TO CONCRETE PAD WITH HILTI HDI ½" SS 303 DROP-IN ANCHORS (TYP. OF 8) OR EQUAL PER MANUFACTURER'S GUIDELINES

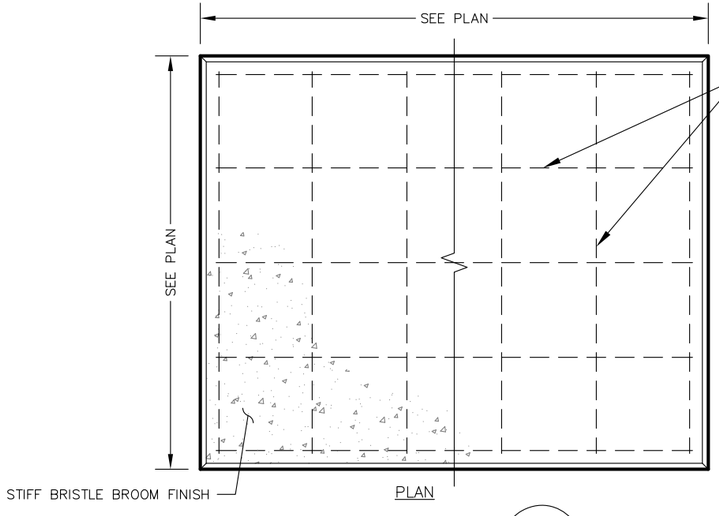
RBS 6102

SCALE: N.T.S.

3 / A-5



SECTION



PLAN

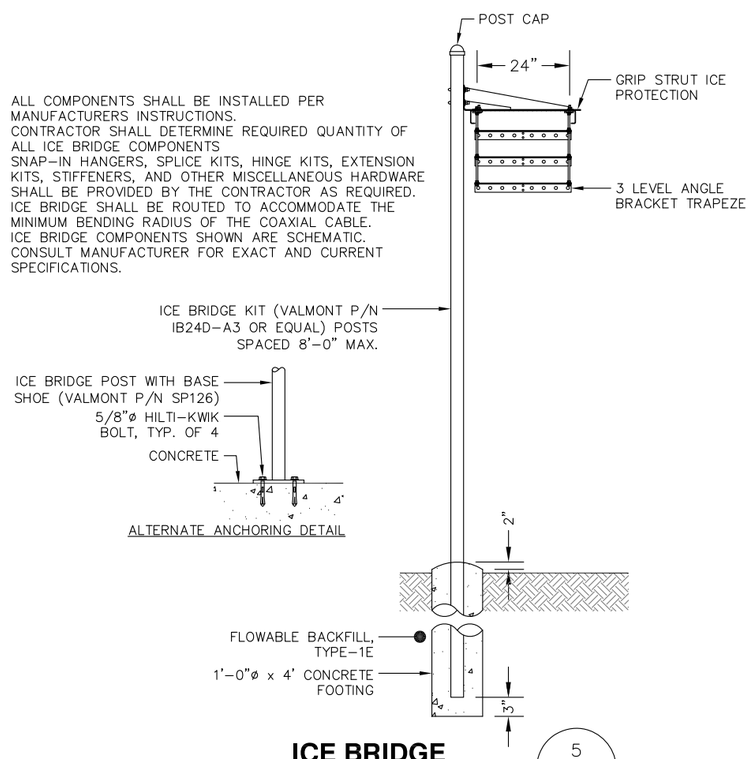
NOTES:
1. BEARING STRATA MEDIUM TO DENSE INSET GRANULAR MATERIAL OR COMPACTED FILL. 95% COMPACTION.
2. SUBGRADE AND FILL SHALL CONSIST OF CLEAN SOIL. NO DELETERIOUS MATERIALS OR ORGANICS TO BE USED.
3. CONCRETE FORM WORK SHALL BE CONSTRUCTED USING MINIMUM 2"X8" NOMINAL SIZE LUMBER. STRIP AND REMOVE UPON COMPLETION.
4. CONCRETE SHALL HAVE 4000PSI 28-DAY COMPRESSIVE STRENGTH WITH 5(±1)% AIR ENTRAINMENT, 4(±1)" SLUMP AND BRISTLE BROOM FINISH.
5. SEE CONCRETE NOTES ON GN-1.

CONCRETE PAD

SCALE: N.T.S.

4 / A-5

1. ALL COMPONENTS SHALL BE INSTALLED PER MANUFACTURERS INSTRUCTIONS.
2. CONTRACTOR SHALL DETERMINE REQUIRED QUANTITY OF ALL ICE BRIDGE COMPONENTS
3. SNAP-IN HANGERS, SPLICE KITS, HINGE KITS, EXTENSION KITS, STIFFENERS, AND OTHER MISCELLANEOUS HARDWARE SHALL BE PROVIDED BY THE CONTRACTOR AS REQUIRED.
4. ICE BRIDGE SHALL BE ROUTED TO ACCOMMODATE THE MINIMUM BENDING RADIUS OF THE COAXIAL CABLE.
5. ICE BRIDGE COMPONENTS SHOWN ARE SCHEMATIC. CONSULT MANUFACTURER FOR EXACT AND CURRENT SPECIFICATIONS.



ALTERNATE ANCHORING DETAIL

ICE BRIDGE

SCALE: N.T.S.

5 / A-5

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BLOOMFIELD, CT 06002
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SHEET TITLE
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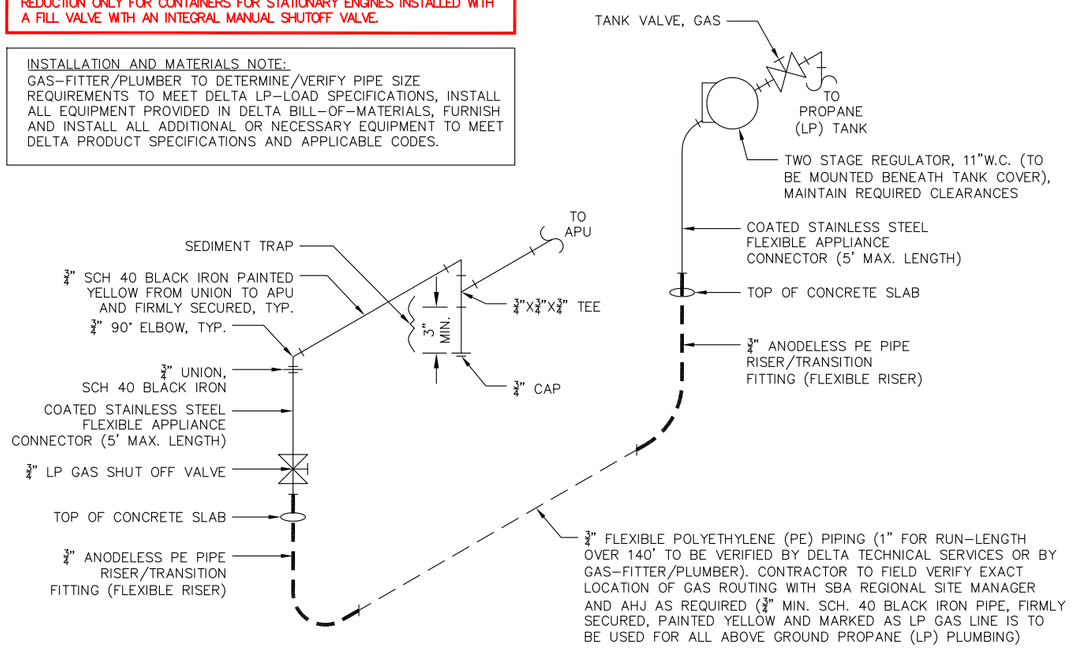
A-5

SAFETY ZONE REDUCTION NOTE:
REDUCTION TO A 5' RADIUS SAFETY ZONE FROM IGNITION SOURCE REQUIRES CONFORMANCE WITH NFPA-58 2011, SECTION 11.15.2.3 WHICH ALLOWS REDUCTION ONLY FOR CONTAINERS FOR STATIONARY ENGINES INSTALLED WITH A FILL VALVE WITH AN INTEGRAL MANUAL SHUTOFF VALVE.

INSTALLATION AND MATERIALS NOTE:
GAS-FITTER/PLUMBER TO DETERMINE/VERIFY PIPE SIZE REQUIREMENTS TO MEET DELTA LP-LOAD SPECIFICATIONS, INSTALL ALL EQUIPMENT PROVIDED IN DELTA BILL-OF-MATERIALS, FURNISH AND INSTALL ALL ADDITIONAL OR NECESSARY EQUIPMENT TO MEET DELTA PRODUCT SPECIFICATIONS AND APPLICABLE CODES.

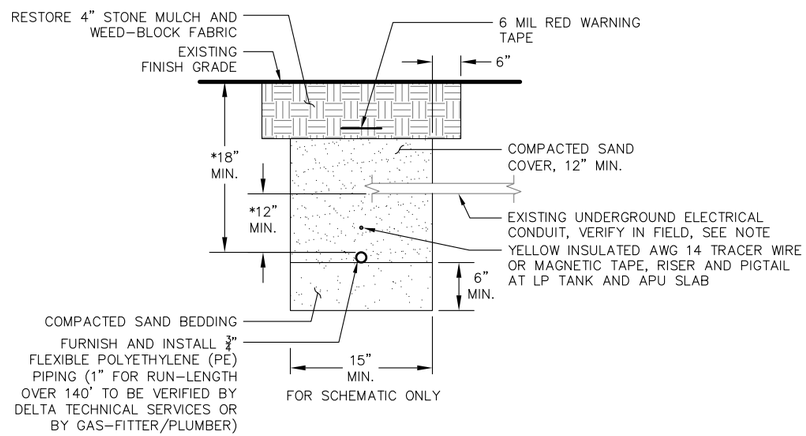


ISOMETRIC PIPING DIAGRAM
SCALE: N.T.S.

1 / A-6

SPECIAL CONSTRUCTION WORK NOTE
(HAND-DUG UTILITY TRENCH EXCAVATION REQUIRED):

EXISTING UNDERGROUND UTILITY LOCATIONS ARE UNKNOWN. GENERAL CONTRACTOR SHALL HAND-EXCAVATE TO REQUIRED SUB-GRADE DEPTH, SUFFICIENT TEST HOLES OR AS DIRECTED/REQUIRED BY SBA REGIONAL SITE MANAGER. ALL PROPOSED UNDERGROUND UTILITY TRENCHES SHALL BE HAND-EXCAVATE AS REQUIRED. GENERAL CONTRACTOR IS RESPONSIBLE FOR ANY REQUIRED SPECIAL TEMPORARY PROTECTION OF, PHYSICAL DAMAGE TO, OR REPAIR OF EXISTING UNDERGROUND CONDUIT INCLUDING RESTORATION OF SERVICE.

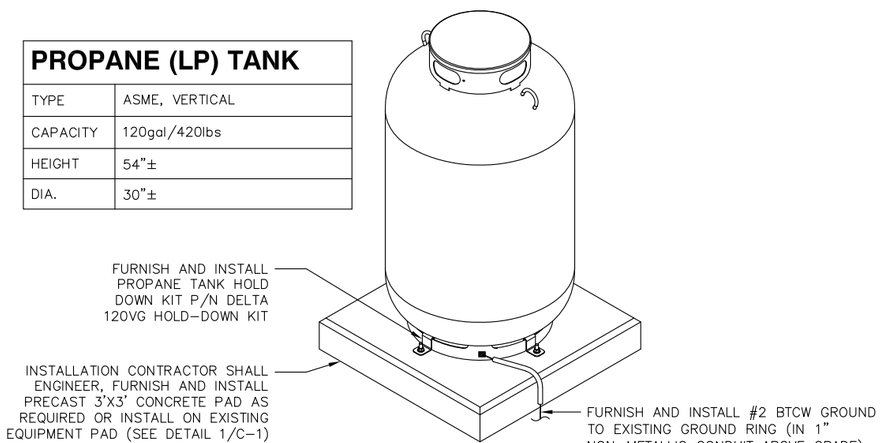


UNDERGROUND PLUMBING NOTES:
1. A SCH. 80 GALVANIZED PIPE SLEEVE IS TO BE USED TO PROTECT FLEXIBLE UNDERGROUND PIPE UNDER ALL AREAS SUBJECT TO VEHICLE TRAFFIC OR AS DIRECTED BY AHJ.
2. PROPANE (LP) PLUMBING IS NOT TO BE RUN WITHIN THE SAME TRENCH AS ELECTRICAL, ALARM OR CONTROL CONDUIT.
3. *A MINIMUM SEPARATION OF 12" VERTICALLY IS TO BE MAINTAINED WHENEVER CROSSING, TRANSITIONING NEAR, OR TRAVELING ALONG EXISTING ELECTRICAL CONDUIT. ADJUST DEPTH OF PROPANE (LP) PLUMBING SO AS TO MAINTAIN A MINIMUM OF 18" BELOW GRADE.
4. A MINIMUM SEPARATION OF 12" HORIZONTALLY IS TO BE MAINTAINED WHENEVER RUNNING PARALLEL TO OTHER BURIED UTILITIES AND CONDUITS.
5. ALL NOTED BURIAL DEPTHS ARE THE MINIMUM REQUIRED. LOCAL JURISDICTIONS MAY REQUIRE DEEPER BURIAL DEPTHS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY REQUIREMENTS WITH LOCAL AHJ.

PROPANE (LP) GAS PIPE TRENCH DETAIL
SCALE: N.T.S.

2 / A-6

PROPANE (LP) TANK	
TYPE	ASME, VERTICAL
CAPACITY	120gal/420lbs
HEIGHT	54"±
DIA.	30"±



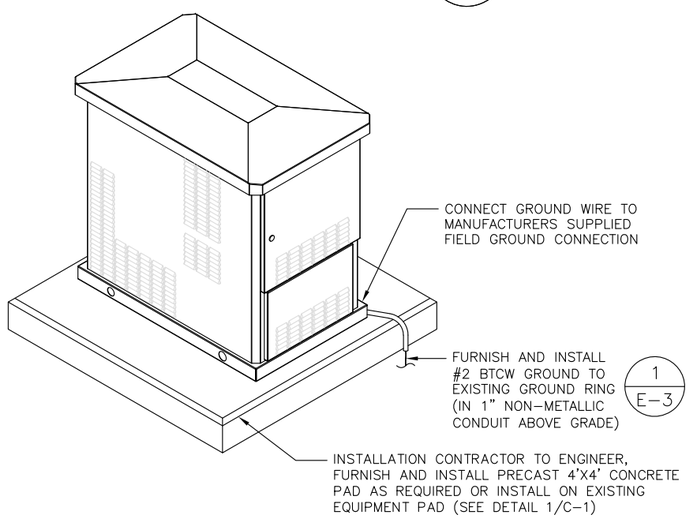
PROPANE (LP) TANK
SCALE: N.T.S.

3 / A-6

1,2 / G-1

GENERATOR SETBACKS REQUIRED:
1. 10' MIN. – DISTANCE FROM EXHAUST TO ANY OPERABLE OPENING IN A BUILDING (IMC-09).
2. 5' MINIMUM – DISTANCE FROM GENERATOR TO ANY STRUCTURE HAVING COMBUSTIBLE WALLS (LESS THAN 1HR RATED) OR ANY OPENINGS IN WALLS (NFPA-37).

APU, DC GENERATOR	
TYPE	7.5 KW, 48VDC
MANUFACTURER	DELTA ELECTRONICS, INC.
MODEL	ESOG150-PCA01
FUEL	PROPANE (LP) @ 11" W.C.
HEIGHT	40.1"
WIDTH	27"
DEPTH	42"
FRONT CLEARANCE	36"
SIDE CLEARANCE	18"
REAR CLEARANCE (EXHAUST)	60"



AUXILIARY POWER UNIT (APU)
SCALE: N.T.S.

4 / A-6

1 / E-3

T-Mobile
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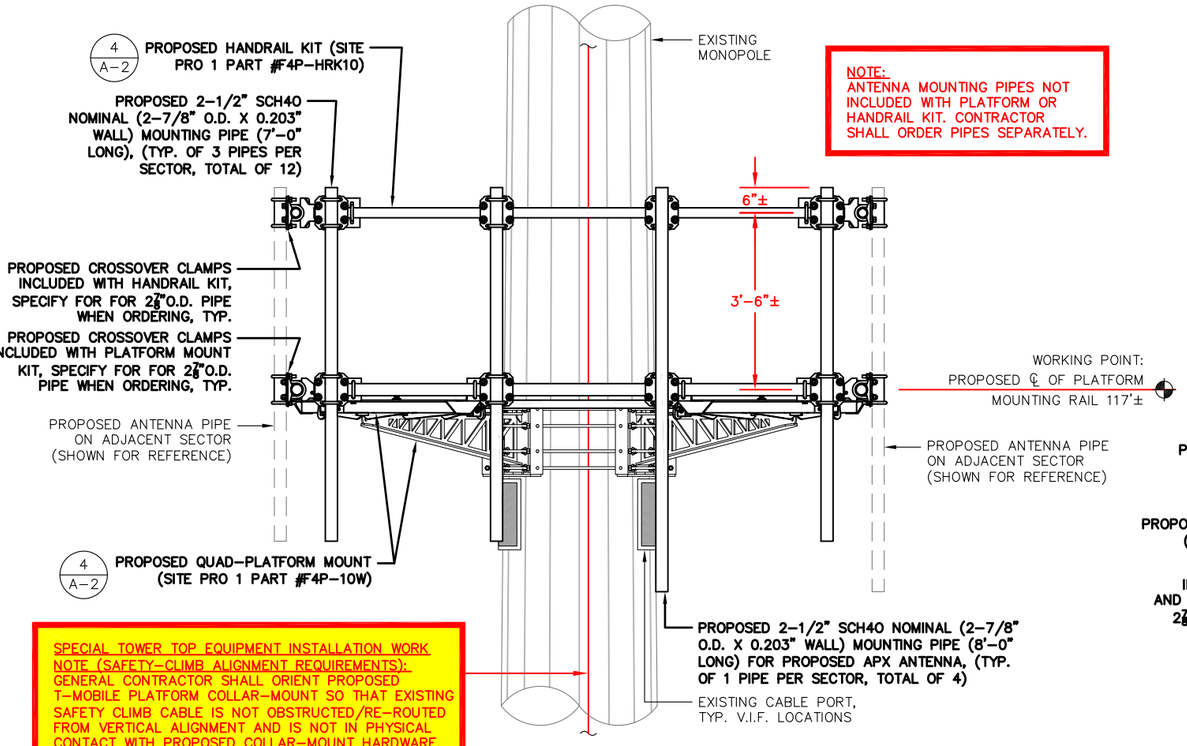
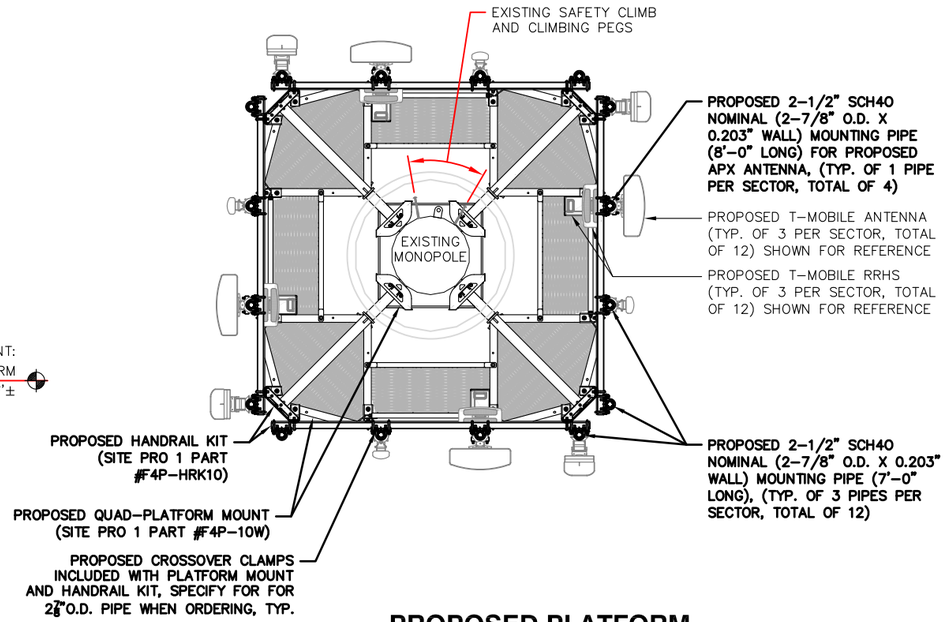


PROPOSED PLATFORM MOUNTING DETAIL

1 / S-1

SCALE: N.T.S.

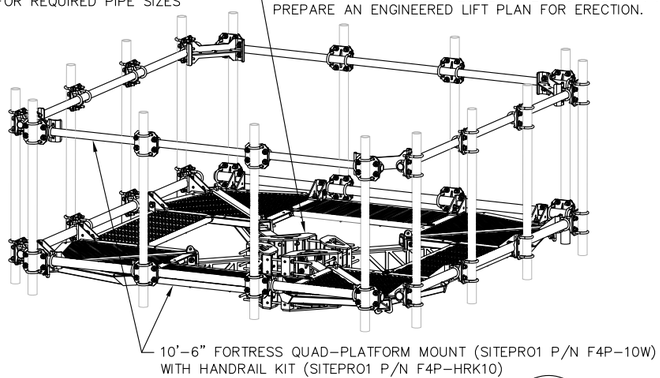


PROPOSED PLATFORM MOUNTING PLAN DETAIL

2 / S-1

SCALE: N.T.S.

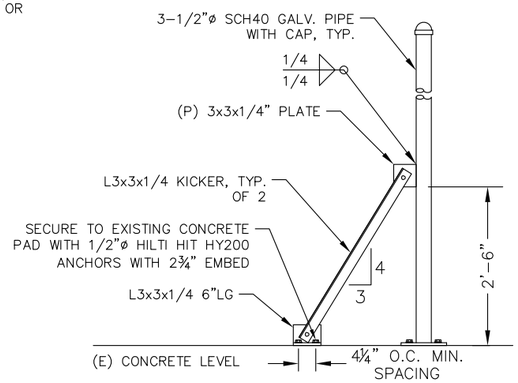
NOTE:
MOUNTING PIPES SHOWN FOR REFERENCE. REFER TO DETAILS S-1 FOR REQUIRED PIPE SIZES



SECTOR FRAME DETAIL

3 / S-1

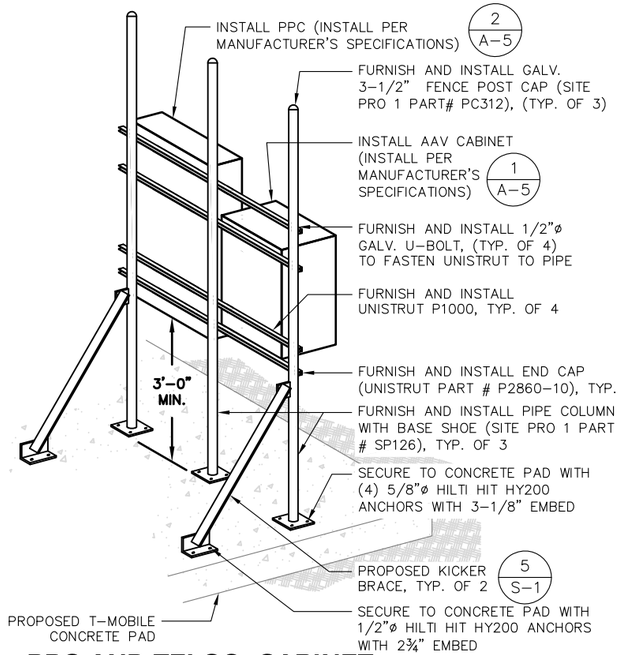
SCALE: N.T.S.



KICKER DETAIL

5 / S-1

SCALE: N.T.S.



PPC AND TELCO CABINET H-FRAME MOUNTING DETAIL

6 / S-1

SCALE: N.T.S.

T-MOBILE NORTHEAST LLC
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ProTerra DESIGN GROUP, LLC
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STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: 2-22-18 JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
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1	02/15/18	ISSUED FOR CONSTRUCTION	PN
0	02/06/18	ISSUED FOR CONSTRUCTION	PN

SITE NUMBER:
CTNH549B
SITE NAME:
CTNH549B

SITE ADDRESS:
382 COLEBROOK RIVER ROAD
COLEBROOK, CT 06021

SHEET TITLE
STRUCTURAL DETAILS

SHEET NUMBER
S-1

RAN Template:	A&L Template:	Power System Template:
4Sec-6797DB3	4Sec-6797DB3_1xAIR+1QP+1DP	Custom

CTNH549B_Infill/ROB/Greenfield_C0.1

Section 1 - Site Information

Site ID: CTNH549B
Status: Final
Version: C0.1
Project Type: Infill/ROB/Greenfield
Approved: 2/12/2018 6:23:19 AM -08:00
Approved By: GSM1900\BAlter
Last Modified: 2/12/2018 6:23:19 AM -08:00
Last Modified By: GSM1900\BAlter

Site Name: CTNH549B
Site Class: Monopole
Site Type: Structure Non Building
Solution Type:
Plan Year:
Market: CONNECTICUT
Vendor: Ericsson
Landlord: SBA TOWERS V, LLC

Latitude: 41.99233612
Longitude: -73.03959723
Address: 382 Colebrook River Rd
City, State: Winsted, CT
Region: NORTHEAST

RAN Template: 4Sec-6797DB3 | AL Template: 4Sec-6797DB3_1xAIR+1QP+1DP

Sector Count: 4	Antenna Count: 12	Coax Line Count: 0	TMA Count: 0	RRU Count: 8

RAN Template:	A&L Template:	Power System Template:
4Sec-6797DB3	4Sec-6797DB3_1xAIR+1QP+1DP	Custom

CTNH549B_Infill/ROB/Greenfield_C0.1

Section 5 - RAN Equipment

Existing RAN Equipment

— This section is intentionally blank. —

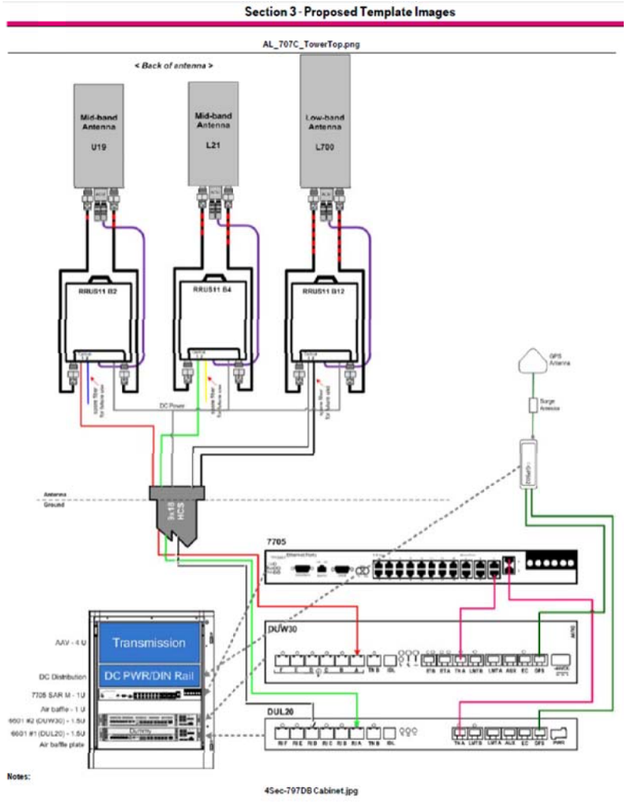
Proposed RAN Equipment

Template: 4Sec-6797DB3

Enclosure	1	2
Enclosure Type	RBS 6102 MU AC	Ancillary Equipment
Baseband	DUW30 U1900; BB 5216 L2100 L1900 L700	
Hybrid Cable System		Ericsson 6x12 HCS *Select Length & AWG* (x2); Ericsson 6x12 HCS *Select AWG & Length*
Multiplexer	XMU L2100 L1900 L700	

RAN Scope of Work:

Section 3 - Proposed Template Images



RAN Template:	A&L Template:	Power System Template:
4Sec-6797DB3	4Sec-6797DB3_1xAIR+1QP+1DP	Custom

CTNH549B_Infill/ROB/Greenfield_C0.1

Section 6 - A&L Equipment

Existing Template: Custom
Proposed Template: 4Sec-6797DB3_1xAIR+1QP+1DP

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro						
Antenna	1				2		3
Antenna Model	Ericsson-AIR32 KRD901146-1_B66A_B2A (Octa)				RFS - APXVAA24_43-U-A20 (Quad)		RFS - APXV18-206517S-A20 (Dual)
Azimuth	0				0		0
M. Tilt	0				0		0
Height	117				117		117
Ports	P1	P2	P3	P4	P5	P6	P7
Active Tech.	L2100	L2100	L1900	L1900	L700		U1900
Dark Tech.							
Restricted Tech.							
Decomm. Tech.							
E. Tilt	2		2		2		2
Cables	MLA Fiber Pair - 15 ft.		MLA Fiber Pair - 15 ft.		MLA Fiber Pair - 15 ft.		MLA Fiber Pair - 15 ft.
TMAs							
Diplexers / Combiners							
Radio					RRUS11 B12 (At Antenna)		Radio 2217 B2 (At Antenna)
Sector Equipment							

Unconnected Equipment:

Scope of Work:

L600 is not active yet.

RAN Template:	A&L Template:	Power System Template:
4Sec-6797DB3	4Sec-6797DB3_1xAIR+1QP+1DP	Custom

CTNH549B_Infill/ROB/Greenfield_C0.1

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro						
Antenna	1				2		3
Antenna Model	Ericsson-AIR32 KRD901146-1_B66A_B2A (Octa)				RFS - APXVAA24_43-U-A20 (Quad)		RFS - APXV18-206517S-A20 (Dual)
Azimuth	180				180		180
M. Tilt	0				0		0
Height	117				117		117
Ports	P1	P2	P3	P4	P5	P6	P7
Active Tech.	L2100	L2100	L1900	L1900	L700		U1900
Dark Tech.							
Restricted Tech.							
Decomm. Tech.							
E. Tilt	2		2		2		2
Cables	MLA Fiber Pair - 15 ft.		MLA Fiber Pair - 15 ft.		MLA Fiber Pair - 15 ft.		MLA Fiber Pair - 15 ft.
TMAs							
Diplexers / Combiners							
Radio					RRUS11 B12 (At Antenna)		Radio 2217 B2 (At Antenna)
Sector Equipment							

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
4Sec-6797DB3	4Sec-6797DB3_1xAIR+1QP+1DP	Custom

CTNH549B_Infill/ROB/Greenfield_C0.1

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro						
Antenna	1				2		3
Antenna Model	Ericsson-AIR32 KRD901146-1_B66A_B2A (Octa)				RFS - APXVAA24_43-U-A20 (Quad)		RFS - APXV18-206517S-A20 (Dual)
Azimuth	90				90		90
M. Tilt	0				0		0
Height	117				117		117
Ports	P1	P2	P3	P4	P5	P6	P7
Active Tech.	L2100	L2100	L1900	L1900	L700		U1900
Dark Tech.							
Restricted Tech.							
Decomm. Tech.							
E. Tilt	2		2		2		2
Cables	MLA Fiber Pair - 15 ft.		MLA Fiber Pair - 15 ft.		MLA Fiber Pair - 15 ft.		MLA Fiber Pair - 15 ft.
TMAs							
Diplexers / Combiners							
Radio					RRUS11 B12 (At Antenna)		Radio 2217 B2 (At Antenna)
Sector Equipment							

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
4Sec-6797DB3	4Sec-6797DB3_1xAIR+1QP+1DP	Custom

CTNH549B_Infill/ROB/Greenfield_C0.1

Sector 4 (Proposed) view from behind

Coverage Type	A - Outdoor Macro						
Antenna	1				2		3
Antenna Model	Ericsson-AIR32 KRD901146-1_B66A_B2A (Octa)				RFS - APXVAA24_43-U-A20 (Quad)		RFS - APXV18-206517S-A20 (Dual)
Azimuth	270				270		270
M. Tilt	0				0		0
Height	117				117		117
Ports	P1	P2	P3	P4	P5	P6	P7
Active Tech.	L2100	L2100	L1900	L1900	L700		U1900
Dark Tech.							
Restricted Tech.							
Decomm. Tech.							
E. Tilt	2		2		2		2
Cables	MLA Fiber Pair - 15 ft.		MLA Fiber Pair - 15 ft.		MLA Fiber Pair - 15 ft.		MLA Fiber Pair - 15 ft.
TMAs							
Diplexers / Combiners							
Radio					RRUS11 B12 (At Antenna)		Radio 2217 B2 (At Antenna)
Sector Equipment							

Unconnected Equipment:

Scope of Work:

RF DATA SHEET
SCALE: N.T.S.

1
RF – 1

NOTE: RFDS PROVIDED BY T–MOBILE DATED 02/12/2018.
EXCERPTS TAKEN DEPICT RELEVANT RF DESIGN INFORMATION.
A&E VENDOR SCOPE OF WORK LIMITED TO DESIGN OF MECHANICAL/STRUCUTRAL EQUIPMENT ATTACHMENTS.

NOTE:
VERIFY PROPOSED AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION

T-Mobile

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
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STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: 2-22-18 JMM/TEJ

APPROVED BY: JMM/TEJ

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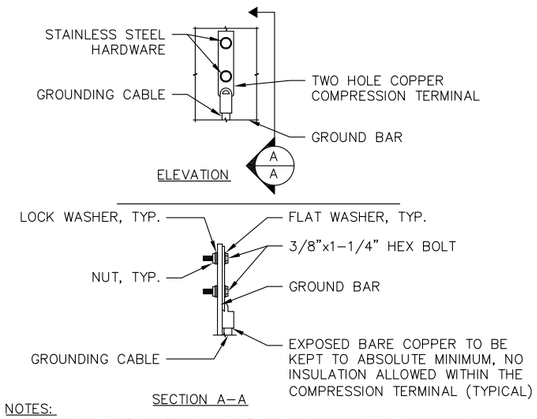
1	02/15/18	ISSUED FOR CONSTRUCTION	PN
0	02/06/18	ISSUED FOR CONSTRUCTION	PN

SITE NUMBER:
CTNH549B
SITE NAME:
CTNH549B

SITE ADDRESS:
382 COLEBROOK RIVER ROAD
COLEBROOK, CT 06021

SHEET TITLE
RF DATA SHEET

SHEET NUMBER
RF – 1

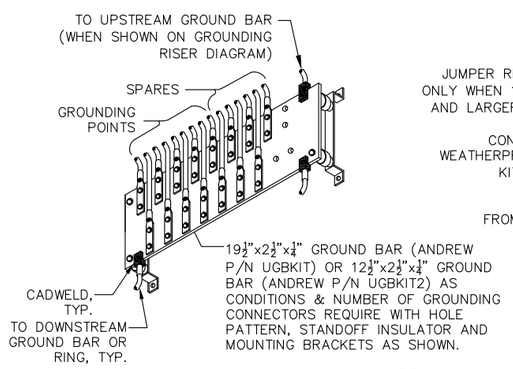


NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR CONNECTION DETAIL

1 / E-1

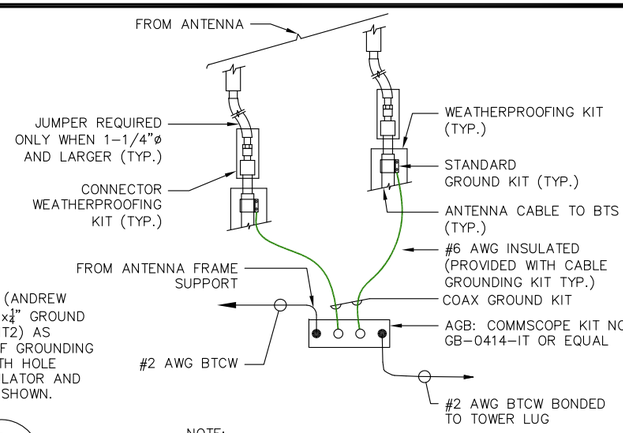
SCALE: N.T.S.



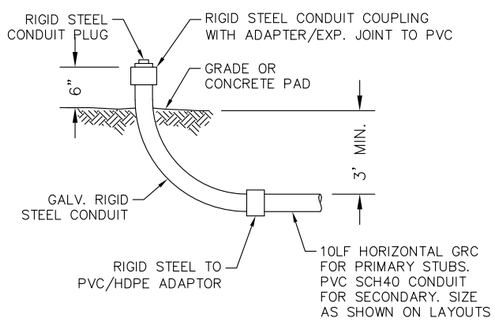
COAX GROUND BAR (MGB)

2 / E-1

SCALE: NONE



NOTE:
INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB.



CONDUIT STUB UP

4 / E-1

SCALE: NONE

TOWER TOP CABLE GROUNDING DETAIL

3 / E-1

SCALE: N.T.S.

GPS ANTENNA GROUNDING DETAIL

5 / E-1

SCALE: N.T.S.

NOTE:
1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION, AND CONNECTION ORIENTATION. PROVIDE ADDITIONAL AGB/EGB AS REQUIRED.
2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED

TOWER BOTTOM CABLE GROUNDING DETAIL

6 / E-1

SCALE: N.T.S.

SOIL ENHANCEMENT

7 / E-1

SCALE: NONE

MAKE ALL CONNECTIONS AS PER UTILITY COMPANY REQUIREMENTS

NOTES
1. MAKE ALL CONNECTIONS AS PER UTILITY COMPANY REQUIREMENTS.
2. VERIFY CONDUIT SIZE WITH UTILITY COMPANY.
3. CONTRACTOR SHALL FURNISH AND INSTALL AN APPROVED 2,500 POUND TEST TAPE IN EACH PRIMARY CONDUIT RUN OR PER UTILITY COMPANY REQUIREMENTS.

BURIED CONDUIT SECTION

8 / E-1

SCALE: NONE

ELECTRICAL LEGEND

A	AMPERE
V	VOLT
KWH	KILOWATT - HOUR
C	CONDUIT
GRC	GALVANIZED RIGID CONDUIT
BTCW	BARE TINNED (SOLID) COPPER WIRE (#2 AWG, UNLESS NOTES OTHERWISE)
G	GROUND
	GROUND
MGB	MASTER GROUND BAR — ○ MECHANICAL CONNECTION ● CADWELD CONNECTION
AGB/EGB	EQUIPMENT GROUND BAR/ANTENNA GROUND BAR
G	GROUND COPPER WIRE, SIZE AS NOTED
	EXPOSED WIRING
	INSULATED GROUNDING CONDUCTOR (#6 AWG STRANDED, UNLESS NOTED OTHERWISE)
	5/8"x10' COPPER CLAD STAINLESS STEEL GROUND ROD
	● EXOTHERMIC (CAD WELD) OR ○ MECHANICAL (COMPRESSION TYPE) CONNECTION
PPC	POWER PROTECTION CABINET
	OMNI-DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALL

ELECTRICAL & GROUNDING NOTES:

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) 2014 AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
6. RIGID STEEL CONDUITS SHALL BE GROUNDED AT BOTH ENDS.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THHN INSULATION AS REQUIRED BY NEC.
8. RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL ROOM AND PROPOSED CELL SITE POWER PEDESTAL AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROPOSED CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON DRAWING A-1. PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
11. GROUNDING SHALL COMPLY WITH NEC ART. 250.
12. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
13. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
14. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
15. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
16. CONNECTIONS TO MGB SHALL BE ARRANGED IN THREE MAIN GROUPS: SURGE PRODUCERS (COAXIAL CABLE GROUND KITS, TELCO AND POWER PANEL GROUND); (GROUNDING ELECTRODE RING OR BUILDING STEEL); NON-SURGING OBJECTS (EGB GROUND IN BTS UNIT).
17. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LYGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
18. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
19. BOMD ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
20. BOND ANTENNA EGB'S AND MGB TO WATER MAIN/GROUND RING.
21. TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
22. VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.

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STATE OF CONNECTICUT · THOMAS E. JOHNSON · No. 28192 · LICENSED PROFESSIONAL ENGINEER

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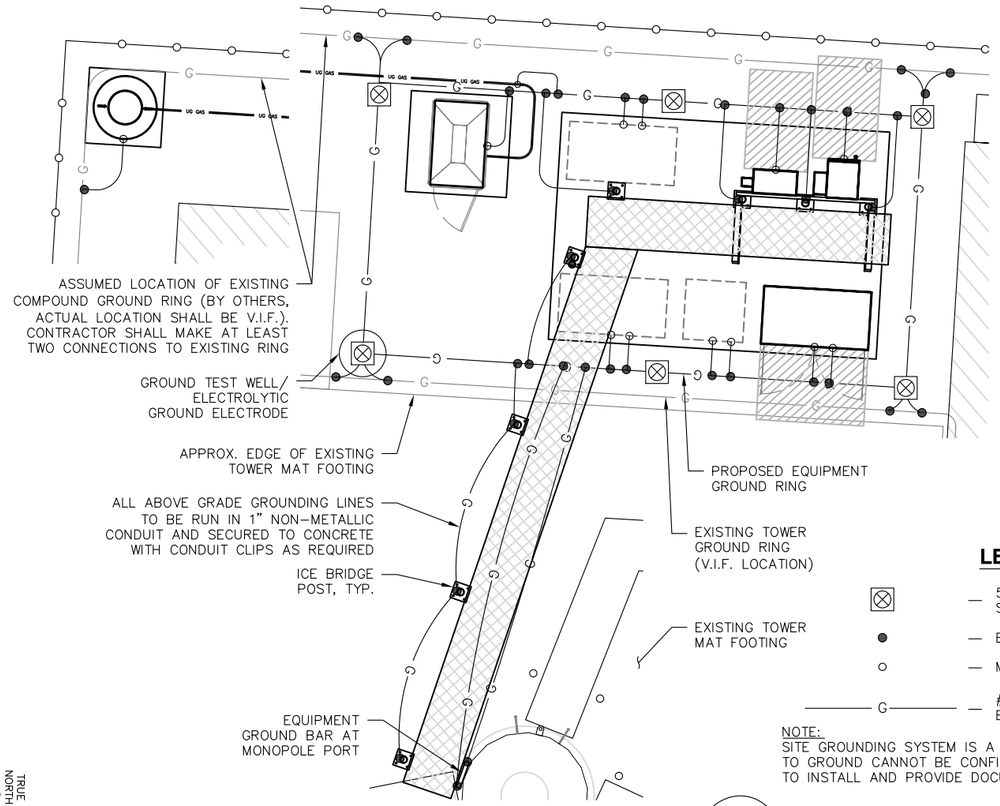
CTNH549B
SITE NAME:
CTNH549B
SITE ADDRESS:
382 COLEBROOK RIVER ROAD
COLEBROOK, CT 06021

SHEET TITLE
ELECTRICAL & GROUNDING DETAILS

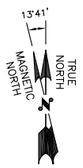
SHEET NUMBER
E-1

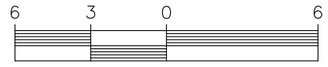


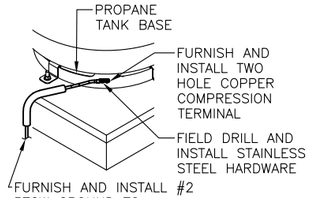
GROUND EQUIPMENT GROUNDING SCHEMATIC

1 / E-2

SCALE: 1"=6' (11"x17")
1"=3' (22"x34")





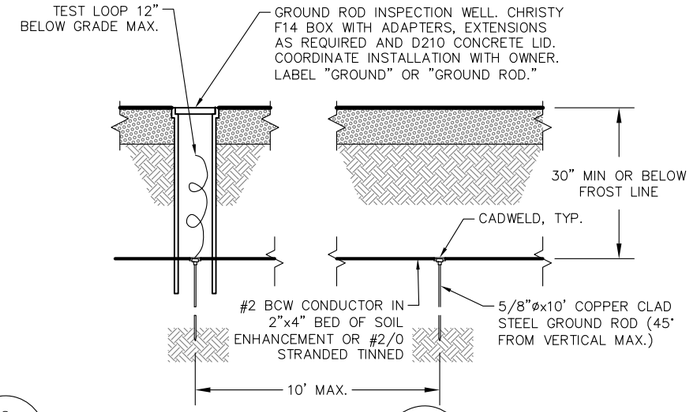


NOTE:
CONNECTION AREA IS TO HAVE PAINT REMOVED. AREA IS TO BE COLD GALV. COATED AFTER INSTALLATION OF MECHANICAL LUG.

PROPANE (LP) TANK GROUNDING DETAIL

2 / E-2

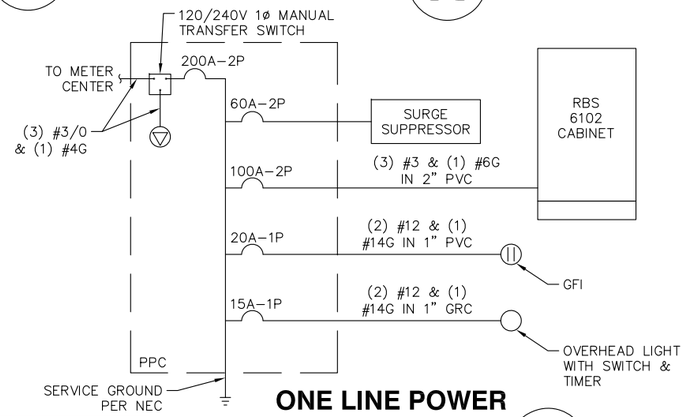
SCALE: N.T.S.



GROUND ROD

3 / E-2

SCALE: NONE

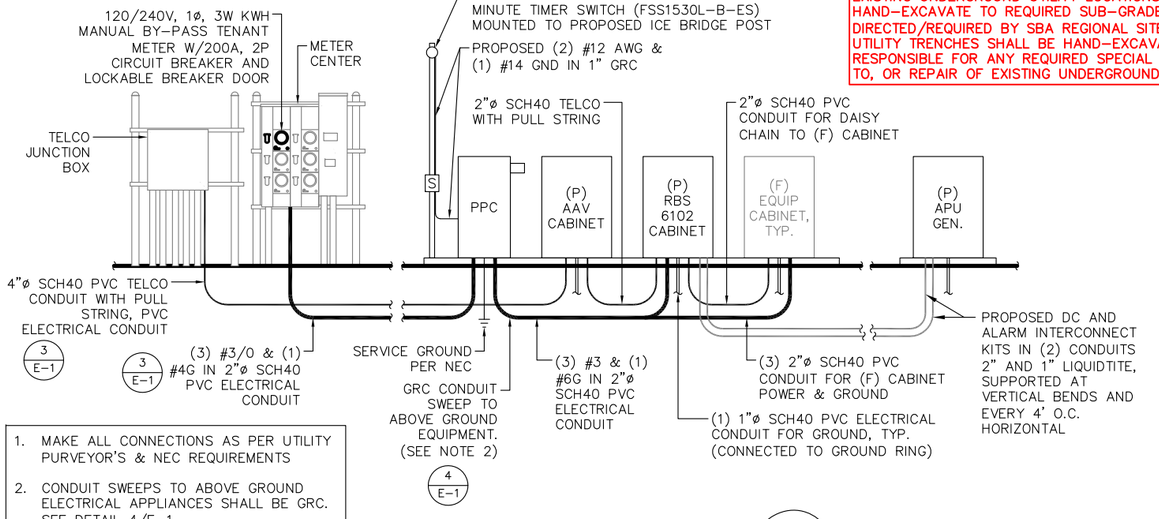


ONE LINE POWER SCHEMATIC

5 / E-2

SCALE: N.T.S.

CONTRACTOR TO VERIFY THE POWER FEED & PHASE OF METER BANK PRIOR TO ORDERING OF EQUIPMENT



1. MAKE ALL CONNECTIONS AS PER UTILITY PURVEYOR'S & NEC REQUIREMENTS
2. CONDUIT SWEEPS TO ABOVE GROUND ELECTRICAL APPLIANCES SHALL BE GRC. SEE DETAIL 4/E-1.

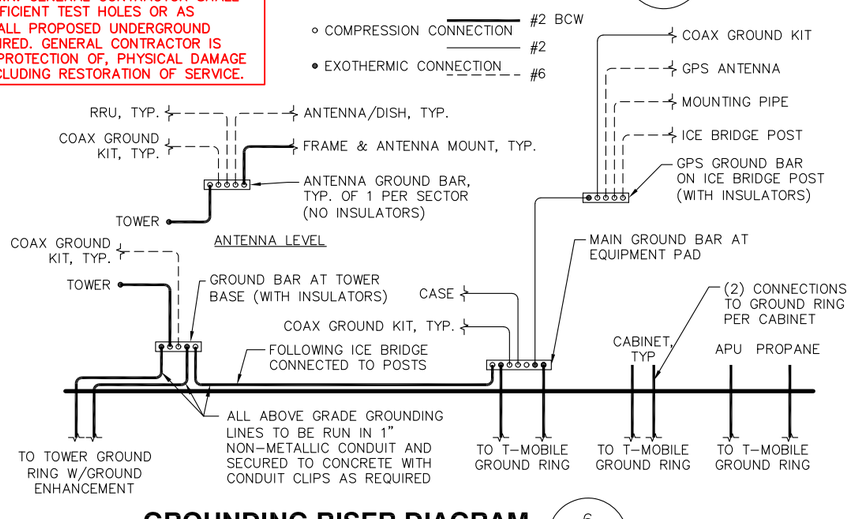
UTILITY RISER SCHEMATIC

4 / E-2

SCALE: NONE

SPECIAL CONSTRUCTION WORK NOTE (HAND-DUG UTILITY TRENCH EXCAVATION REQUIRED):

EXISTING UNDERGROUND UTILITY LOCATIONS ARE UNKNOWN. GENERAL CONTRACTOR SHALL HAND-EXCAVATE TO REQUIRED SUB-GRADE DEPTH, SUFFICIENT TEST HOLES OR AS DIRECTED/REQUIRED BY SBA REGIONAL SITE MANAGER. ALL PROPOSED UNDERGROUND UTILITY TRENCHES SHALL BE HAND-EXCAVATE AS REQUIRED. GENERAL CONTRACTOR IS RESPONSIBLE FOR ANY REQUIRED SPECIAL TEMPORARY PROTECTION OF, PHYSICAL DAMAGE TO, OR REPAIR OF EXISTING UNDERGROUND CONDUIT INCLUDING RESTORATION OF SERVICE.



GROUNDING RISER DIAGRAM

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SCALE: NONE

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 648-1116

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
FOR SCHEMATIC ONLY

CHECKED BY: 2-22-18 JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
2	02/22/18	ISSUED FOR CONSTRUCTION	PN
1	02/15/18	ISSUED FOR CONSTRUCTION	PN
0	02/06/18	ISSUED FOR CONSTRUCTION	PN

SITE NUMBER:
CTNH549B
SITE NAME:
CTNH549B

SITE ADDRESS:
382 COLEBROOK RIVER ROAD
COLEBROOK, CT 06021

SHEET TITLE
ELECTRICAL & GROUNDING DETAILS

SHEET NUMBER
E-2