Transcend Wireless

10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

July 19, 2018

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

Notice of Exempt Modification
5 Perryridge Road, Greenwich, CT 06830
Latitude- 41.039340000
Longitude- -73.6308290000

Dear Ms. Bachman,

T-Mobile currently maintains (6) existing antennas 144' level of the existing 164' monopole at 5 Perryridge Road in Greenwich, CT (Greenwich Hospital). The tower and property is owned by Greenwich Hospital. T-Mobile now intends to remove all (6) of the existing antennas and add (9) new 600/700/1900/2100 MHz antennas. These antennas would be installed at the same 144' level of the tower. T-Mobile also intends to swap (3) remote radio heads and add (3) hybrid cables.

This facility was approved by the Council on April 1, 1987 in Docket No. 73.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. 16-50j-72(b)(2). In accordance with R.C.S.A. 16-50j-73, a copy of this letter is being sent to Peter Tesei, First Selectmen of the Town of Greenwich, Katie Deluca, Director of Planning and Zoning for the Town of Greenwich, as well as the property owner/tower owner.

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 modification will not result in an increase in the height of the existing structure

2. The proposed modifications 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 change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitute an exempt modification under R.C.S.A. 16-50j-72(b)(2).

Sincerely,

Kyle Richers

Kyle Richers
Transcend Wireless
10 Industrial Ave., Suite 3
Mahwah, New Jersey 07430
908-447-4716
krichers@transcendwireless.com

cc: Peter J. Tesei- as elected official
Katie DeLuca- as zoning official
Greenwich Hospital- as tower and property owner

DOCKET NO. 73

AN APPLICATION OF METRO MOBILE CTS OF FAIRFIELD COUNTY, INC., FOR CERTIFICATES OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF THREE FACILITIES CONSISTING OF TELECOMMUNICATIONS TOWERS AND ASSOCIATED EQUIPMENT FOR THE PURPOSE OF PROVIDING DOMESTIC PUBLIC CELLULAR RADIO TELECOMMUNICATIONS SERVICE IN THE TOWN OF GREENWICH AND IN THE CITIES OF NORWALK AND STAMFORD, CONNECTICUT.	:	CONNECTICUT SITING COUNCIL
	:	April 1, 1987

D E C I S I O N A N D O R D E R

Pursuant to the foregoing opinion, the Connecticut Siting Council (Council) hereby directs that a Certificate of Environmental Compatibility and Public Need, as provided by Section 16-50k of the General Statutes of Connecticut (CGS), be issued to Metro Mobile CTS of Fairfield County, Inc., for the construction, operation, and maintenance of cellular mobile telecommunications equipment in the Town of Greenwich, and the Cities of Norwalk and Stamford, Connecticut.

The facilities shall be constructed, operated, and maintained as specified in the Council's record on this matter, and subject to the following conditions.

1. The Norwalk tower, including antennas, shall be no taller than necessary to provide the proposed service, and in no event shall exceed 193 feet.
2. A fence not lower than eight feet shall surround the Norwalk tower.
3. Unless necessary to comply with condition number four, below, no lights shall be installed on the Norwalk tower.
4. The facilities shall be constructed in accordance with all applicable federal, state, and municipal laws and regulations.

5. The certificate holder shall prepare a development and management (D&M) plan for the Norwalk site in compliance with sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies. The D&M plan shall provide for evergreen screening around the perimeter of the fence at this site, and for other landscaping to improve the appearance of the facility.
6. The receive antennas at the Greenwich and Stamford sites shall be mounted below the high points of the facades of their respective buildings to minimize their visibility.
7. No construction activities shall take place outside the hours of 7:00 A.M. to 7:00 P.M., Monday through Saturday.
8. The certificate holder or its successor shall notify the Council if and when directional antennas or any equipment other than that listed in this application is added to these facilities.
9. The certificate holder or its successor shall permit public or private entities to share space on the Norwalk tower, for due consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.
10. If these facilities do not provide or permanently cease to provide cellular service following completion of construction, this Decision and Order shall be void, and the tower and all associated equipment in this application shall be dismantled and removed or reapplication for any new use shall be made to the Council before any such new use is made.

11. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within three years of the issuance of this Decision and Order, or within three years of the completion of any appeal taken in this Decision.

12. The certificate holder shall comply with any future radio frequency (RF) standards promulgated by state or federal regulatory agencies. Upon the establishment of any new governmental RF standards, the facilities granted in this Decision shall continue to be in compliance with such standards.

Pursuant to CGS section 16-50p, we hereby direct that a copy of the Decision and Order be served on each person listed below. A notice of the issuance shall be published in the Stamford Advocate, the Greenwich Times, the Norwalk Hour, and the Bridgeport Post.

The parties to the proceeding are:

Mr. Armand Mascioli (Applicant)
General Manager
Metro Mobile CTS of Fairfield
County, Inc.
5 Eversley Avenue
Norwalk, Connecticut 06855

Howard L. Slater, Esquire (its attorney)
Byrne, Slater, Sandler,
Shulman & Rouse, P.C.
330 Main Street
P.O. Box 3216
Hartford, Connecticut 06103

Richard Rubin, Esquire (its attorney)
Fleischman and Walsh, P.C.
1725 N Street, N.W.
Washington, D.C. 20036

Southern New England
Telephone Company

(its attorney)

Mr. Peter J. Tyrrell
Senior Attorney
Southern New England
Telephone Company
227 Church Street
New Haven, Connecticut 06506

C E R T I F I C A T I O N

The undersigned members of the Connecticut Siting Council hereby certify that they have heard this case or read the record thereof, and that we voted as follows:

Dated at New Britain, Connecticut, this 1st day of April, 1987.

Council Members	Vote Cast
Gloria Dibble Pond Gloria Dibble Pond Chairperson	Yes
Commissioner John Downey Designee: Commissioner Peter G. Boucher	Yes
Acting Commissioner John Anderson Designee: Brian Emerick	Yes
Owen L. Clark	Yes
Fred J. Doocy	Yes
Mortimer A. Gelston	Yes
James G. Horsfall	Absent
William H. Smith	Absent
Colin C. Tait	Yes

STATE OF CONNECTICUT)
: ss. New Britain, April 1, 1987
COUNTY OF HARTFORD)

I hereby certify that the foregoing is a true and correct copy of the decision and order issued by the Connecticut Siting Council, State of Connecticut.

ATTEST:

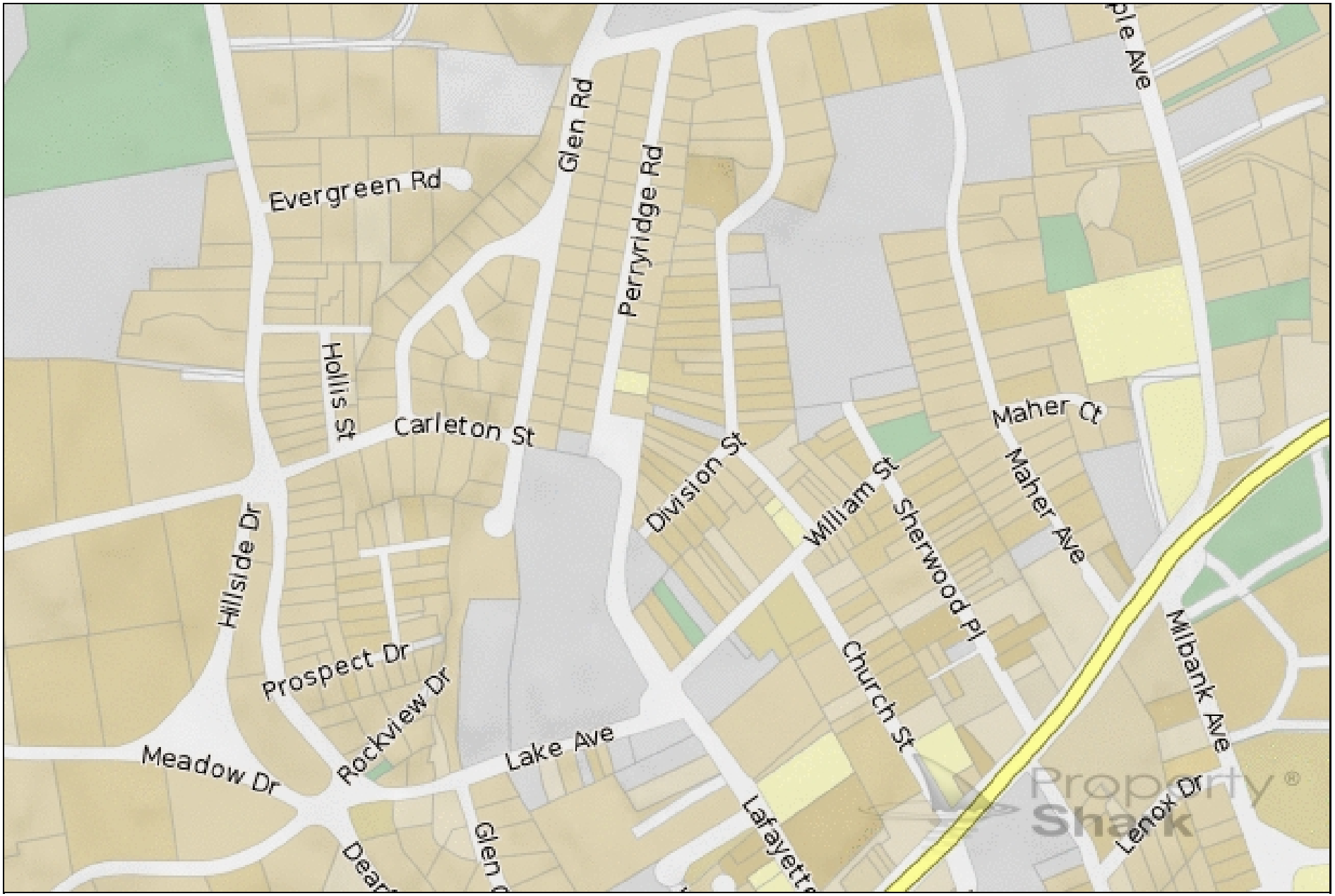
John C. Kelly
Executive Director
Connecticut Siting Council

I certify that a copy of the opinion and decision and order have been forwarded by mail to all parties of record on April 3, 1987.

ATTEST:

Robert K. Erling
Siting Analyst
Connecticut Siting Council

Place: **Ct - Fairfield** Map/Date rendered: **Parcel Outline (Default) //** Generated: **Wed Apr 18 09:49:04 2018**



Add notes 5 Perryridge Road Dup., Greenwich, CT 06930here ...

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CTFF001A

FF001/Greenwich_Hospital
5 Perryridge Road
Greenwich, CT 06830

July 11, 2018

EBI Project Number: 6218005045

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	33.84 %

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

EBI Consulting
environmental | engineering | due diligence

July 11, 2018

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

Emissions Analysis for Site: **CTFF001A – FF001/Greenwich_Hospital**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **5 Perryridge Road, Greenwich, 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 Band are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively. 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 **5 Perryridge Road, Greenwich, 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 for directional panel antennas, 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 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 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

5) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels has a transmit power of 30 Watts.

6) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels has a transmit power of 30 Watts.

7) 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.

8) 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 for directional panel antennas, 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.

9) The antennas used in this modeling are the **Ericsson AIR32 B66A/B2A** & **Ericsson AIR21 B2A/B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels, the **RFS APXVAARR24_43-U-NA20** for 600 MHz and 700 MHz channels. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, 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.

10) The antenna mounting height centerline of the proposed antennas (both panel antennas and microwave dish) is **144 feet** above ground level (AGL).

11) 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.

12) 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
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 B66A/B2A	Make / Model:	Ericsson AIR32 B66A/B2A	Make / Model:	Ericsson AIR32 B66A/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	144	Height (AGL):	144	Height (AGL):	144
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
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
Antenna A1 MPE%	**1.77**	Antenna B1 MPE%	**1.77**	Antenna C1 MPE%	**1.77**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	144	Height (AGL):	144	Height (AGL):	144
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
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A2 MPE%	**0.88**	Antenna B2 MPE%	**0.88**	Antenna C2 MPE%	**0.88**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	12.95/ 13.35 dBd	Gain:	12.95/ 13.35 dBd	Gain:	12.95/ 13.35 dBd
Height (AGL):	144	Height (AGL):	144	Height (AGL):	144
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,481.08	ERP (W):	2,481.08	ERP (W):	2,481.08
Antenna A3 MPE%	**1.08**	Antenna B3 MPE%	**1.08**	Antenna C3 MPE%	**1.08**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**3.73 %**
Eversource	20.44%
Verizon Wireless	2.78%
AT&T	3.59%
MW to Bruce	0.74%
MW to PD	0.02%
MW to Putnam	0.74%
Trunked Systems	0.22%
Mutual Aid	0.12%
CMED	0.08%
Fire Paging	0.13%
SP Hotline	0.17%
Sprint	0.34%
Clearwire	0.08%
Nextel	0.66%
Site Total MPE %:	**33.84 %**

T-Mobile Sector A Total:	3.73 %
T-Mobile Sector B Total:	3.73 %
T-Mobile Sector C Total:	3.73 %
Site Total:	33.84 %

T-Mobile Max Power Values (Per Sector)

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	144	8.81	AWS - 2100 MHz	1000	0.88%
T-Mobile PCS - 1900 MHz LTE	2	2,334.27	144	8.81	PCS - 1900 MHz	1000	0.88%
T-Mobile AWS - 2100 MHz UMTS	2	1,167.14	144	4.41	AWS - 2100 MHz	1000	0.44%
T-Mobile PCS - 1900 MHz UMTS	0	1,167.14	144	0.00	PCS - 1900 MHz	1000	0.00%
T-Mobile PCS - 1900 MHz GSM	2	1,167.14	144	4.41	PCS - 1900 MHz	1000	0.44%
T-Mobile 600 MHz LTE	2	591.73	144	2.23	600 MHz	400	0.56%
T-Mobile 700 MHz LTE	2	648.82	144	2.45	700 MHz	467	0.53%
						Total:	**3.73%**

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:	3.73 %
Sector B:	3.73 %
Sector C:	3.73 %
T-Mobile Per Sector Maximum (Per Sector):	3.73 %
Site Total:	33.84 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **33.84%** 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.

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

164-ft Existing EEI Monopole

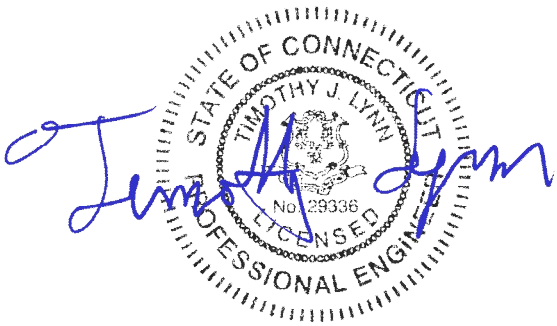
Proposed T-Mobile
Antenna Upgrade

Site Ref: CT11FF001A

5 Perryridge Road
Greenwich, CT

CENTEK Project No. 18058.64

Date: July 5, 2018



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

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Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by T-Mobile on the existing monopole (tower) owned and operated by Greenwich Hospital located in Greenwich, Connecticut.

The host tower is a 164-ft tall, five-section, eighteen sided, tapered monopole, originally designed and manufactured by Engineered Endeavors Incorporated (EEI); project no. 11030 dated August 21, 2002. The tower geometry, structure member sizes and foundation system information were obtained from the original manufacturers design documents.

Antenna and appurtenance information were obtained a previous structural analysis report prepared by Hudson dated June 28, 2018 and a T-Mobile RF sheet.

The tower is made up of five (5) tapered vertical sections consisting of A572-65 pole sections. The bottom four (4) vertical tower sections are slip joint connected while the top section is flange connected. The diameter of the pole (flat-flat) is 47.0-in at the top and 76.0-in at the base.

Antenna and Appurtenance Summary

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

- TOWN (EXISTING TO REMAIN):
  Antennas: Four (4) 12-ft Omni-directional whip antennas, one (1) Sinclair SC229-SFXLDF Omni-directional whip antenna, two (2) Sinclair SC479-HF1LDF Omni-directional whip antennas, one (1) Bird 432E-83I-01-T tower top amplifier and one (1) camera mounted on a PiROD 13-ft low profile platform with an elevation of 164-ft above grade level.
  Coax Cables: Two (2) 1/2"∅, two (2) 7/8"∅, six (6) 1-1/4" ∅ and one (1) 1-5/8" ∅ coax cables running on the inside of the existing tower.
- TOWN (EXISTING):
  Antennas: Two (2) 4-ft Dishes and one (1) 2-ft Dish mounted on three 4'x4" pipes with a RAD center elevation of 160-ft above grade level.
  Coax Cables: Three (3) 1-1/4" ∅ coax cables running on the inside of the existing tower.
- CLEARWIRE (EXISTING):
  Antennas: Three (3) Argus LLPX310R panel antennas, three (3) Samsung FDD-R6-RRH, two (2) Dragonwave Horizon ODU's and two (2) Dragonwave A-ANT-23-G-2-C dishes mounted on the Sprint 13-ft low profile platform with a RAD center elevation of 154-ft above the existing tower base plate.
  Coax Cables: Two (2) 2" ∅ conduits and two (2) 5/8" ∅ coax cables running on the inside of the existing tower.

- SPRINT (EXISTING):
  Antennas: Two (2) RFS APXVSPP18-C-A20 panel antennas, one (1) Powerwave P40-16-XLPP-RR-A panel antennas, three (3) RFS APXVTM14 panel antennas and one (1) GPS antenna mounted to a low profile platform with a RAD center elevation of 154-ft above the existing tower base plate. Three (3) ALU 1900 MHz RRH's, three (3) ALU 800 MHz RRH's and three (3) ALU TD-RRH-820 remote radio heads mounted on a universal tr-bracket below the existing low profile platform.
  Coax Cables: Six (6) 1-5/8" ∅ Hybriflex cables and one (1) 1/2" ∅ coax cable running on the inside of the existing tower.
- EVERSOURCE ENERGY (EXISTING):
  Antennas: Two (2) Decibel DB586-Y omni-directional whips (one upright and one inverted), one (1) Telewave ANT150F2 omni-directional whip, one (1) Comprod 531-70HD dipole and one (1) tower top amplifier mounted on a PiROD 13-ft low profile platform with an elevation of 114-ft above grade level.
  Coax Cables: Two (2) 1-5/8" ∅, two (2) 7/8" ∅ and one (1) 1/2" ∅ coax cables running on the inside of the existing tower on the inside of the existing tower.
- UNKNOWN (EXISTING):
  Antennas: Three GPS antennas mounted on three (3) standoffs with a RAD center elevation of 50-ft above grade level.
  Coax Cables: Three (3) 7/8" ∅ coax cables running on the exterior of the existing tower.
- AT&T (EXISTING):
  Antennas: Three (3) Powerwave 7770.00 panel antennas, three (3) Quintel QS66512 panel antennas, three (3) Kathrein 80010965 panel antennas, three (3) CCI HPA-65R-BUU-H6 panel antennas, six (6) LGP21401 TMA's, six (6) CCI TPX-070821 triplexers and three (3) Ericsson RRUS-32-B2 remote radio heads, three (3) Ericsson RRUS-32-B66 remote radio heads, three (3) Ericsson B14 4478 remote radio heads and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted on a 16-ft low profile platform with a RAD center elevation of 134-ft above grade level. Three (3) Ericsson RRUS-11 remote radio heads, three (3) Ericsson RRUS-32 remote radio heads and two (2) Raycap DC6-48-60-18-8F surge arrestor mounted to one (1) universal ring mount with a RAD center elevation of 138-ft above grade level.
  Cables: Twelve (12) 1-5/8" ∅ coax cables, two (2) fiber cable and six (6) dc control cables running on the inside of the existing tower.
- VERIZON (EXISTING):
  Antennas: Six (6) Decibel DB844G65ZAXY panel antennas, three (3) Antel QUAD656C000 panel antennas, six (6) Andrew SBNHH-1D65B panel antennas, three (3) Alcatel-Lucent RRH2x60-700 remote radio heads, three (3) Alcatel-Lucent RRH2x60-PCS remote radio heads, three (3) Alcatel-Lucent RRH4x45/2x90-AWS remote radio heads, three (3) RRH4x40-850 remote radio heads, six (6) RFS FD9R6004/2C-3L Diplexers and two (2) Raycap RC2DC-3315-PF-48 main distribution boxes mounted on a 13-ft low profile platform with a RAD center elevation of 124-ft above grade level.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables and two (2) 1-5/8" ∅ fiber cables running inside the monopole.

- T-MOBILE (EXISTING TO REMAIN):
  Antennas: Three (3) TMAs mounted on a low profile platform with a RAD center elevation of 144-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables inside the monopole and four (4) 1-5/8" ∅ cables on the exterior of the existing tower.
- **T-MOBILE (EXISTING TO REMOVE):**
  Antennas: Three (3) RFS APX16PV-16PVL panel antennas, three (3) Andrew LNX-6515DS panel antennas, six (6) TMAs and three (3) Bias Tees mounted on a low profile platform with a RAD center elevation of 144-ft above grade level.
  Coax Cables: Three (3) 1-5/8" ∅ cables on the exterior of the existing tower.
- **T-MOBILE (PROPOSED):**
  Antennas: Three (3) Ericsson AIR32 panel antennas, three (3) Ericsson AIR21 panel antennas, three (3) RFS APXVAARR24_43 panel antennas, and three (3) Ericsson 4449 B71 B12 remote radio units mounted on a low profile platform with a RAD center elevation of 144-ft above grade level.
  Coax Cables: Three (3) 6x12 fiber cables on the exterior of the existing tower.

Primary Assumptions Used in the Analysis

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

Analysis

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

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 0.75" radial ice on the tower structure and its components.

Basic Wind Speed:	Fairfield; v = 90-110 mph	*[Annex B of TIA-222-G-2005]*
	Greenwich; v = 93 mph	*[Appendix N of the 2016 CT Building Code]*
Load Cases:	Load Case 1; 93 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2016 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 0.75" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

[1] The 2012 International Building Code as amended by the 2016 Connecticut State Building Code (CSBC).

Tower Capacity

- Calculated stresses were found to be within allowable limits. This tower was found to be at **47.4%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L5)	1.50'-39.88'	47.4%	**PASS**

Foundation and Anchors

The existing foundation consists of a 9.0 ∅ x 28.0-ft long reinforced concrete caisson. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned EEI design report; project no. 11030 dated August 21, 2002. The base of the tower is connected to the foundation by means of (30) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 7-ft into the concrete foundation structure.

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

Location	Vector	Proposed Reactions
Base	Shear	57 kips
	Compression	103 kips
	Moment	6441 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	58.8%	**PASS**
	Lateral Deflection	0.23 in.(1)	**PASS**

(1) Lateral deflection limited to 0.75 in under service load combination per TIA-222-G section 9.5.

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

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Flange Bolts	Tension	50.5%	**PASS**
Flange Plate	Bending	42.3%	**PASS**

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

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Axial and Bending	48.9%	**PASS**
Base Plate	Bending	36.7%	**PASS**

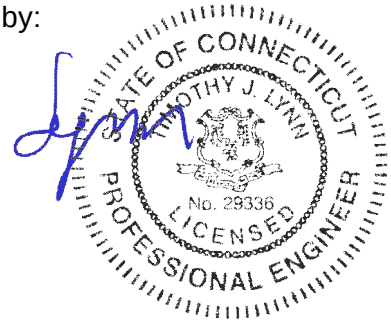
Conclusion

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

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

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

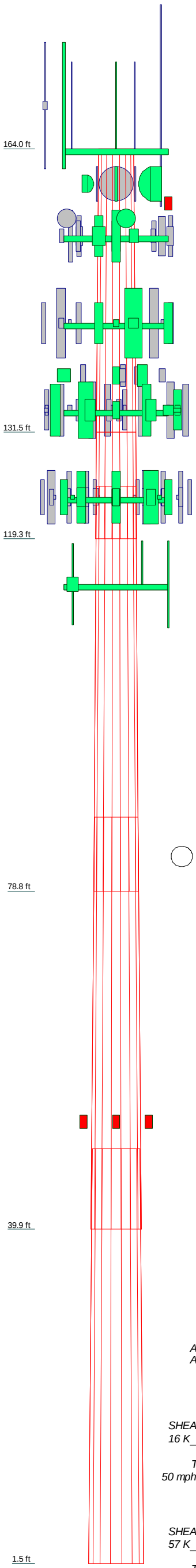
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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

tnxTower Features:

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

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	32.50	18	0.3125		47.0000	53.4200		5.5
2	12.21	18	0.3750	6.00	53.4200	56.1500		2.7
3	46.50	18	0.4375	8.42	54.0585	62.9700	A572-65	12.8
4	47.33	18	0.5625	9.25	60.4813	69.6600		18.5
5	47.63	18	0.5625		66.7412	76.0000		20.5
								60.0



ALL REACTIONS ARE FACTORED

AXIAL 170 K
SHEAR 16 K
MOMENT 1774 kip-ft

TORQUE 1 kip-ft
50 mph WIND - 0.7500 in ICE

AXIAL 103 K
SHEAR 57 K
MOMENT 6441 kip-ft

TORQUE 4 kip-ft
REACTIONS - 93 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
12' x 3" Dia Omni (Town Existing)	164	QS66512-2 (AT⌶ Existing)	134
12' x 3" Dia Omni (Town Existing)	164	80010965 (AT⌶ Existing)	134
12' x 3" Dia Omni (Town Existing)	164	HPA-65R-BUU-H6 (AT⌶ Existing)	134
12' x 3" Dia Omni (Town Existing)	164	7770.00 (AT⌶ Existing)	134
Camera (Town Existing)	164	QS66512-2 (AT⌶ Existing)	134
SC479-HF1LDF (Town Existing)	164	80010965 (AT⌶ Existing)	134
TX/RX 432E-83I-01T (Town Existing)	164	HPA-65R-BUU-H6 (AT⌶ Existing)	134
SC229-SFXLDF (Town Existing)	164	(2) LGP21401 TMA (AT⌶ Existing)	134
SC479-HF1LDF (Town Existing)	164	(2) LGP21401 TMA (AT⌶ Existing)	134
Low Profile Platform (Town Existing)	164	(2) LGP21401 TMA (AT⌶ Existing)	134
4'x4" Pipe Mount (Town Existing)	160	(2) TPX-070821 (AT⌶ Existing)	134
4'x4" Pipe Mount (Town Existing)	160	(2) TPX-070821 (AT⌶ Existing)	134
4'x4" Pipe Mount (Town Existing)	160	(2) TPX-070821 (AT⌶ Existing)	134
4 FT DISH (Town Existing)	160	RRUS-32 (AT⌶ Existing)	134
4 FT DISH (Town Existing)	160	RRUS-32 (AT⌶ Existing)	134
2 FT DISH (Town Existing)	160	RRUS-32 (AT⌶ Existing)	134
Horizon ODU (Clearwire Existing)	154	RRUS-32 (AT⌶ Existing)	134
Horizon ODU (Clearwire Existing)	154	RRUS-32 (AT⌶ Existing)	134
APXVSPP18-C-A20 (Sprint Existing)	154	RRUS-32 (AT⌶ Existing)	134
P40-16-XLPP-RR-A (Sprint Existing)	154	B14 4478 (AT⌶ Existing)	134
APXVSPP18-C-A20 (Sprint Existing)	154	B14 4478 (AT⌶ Existing)	134
FD-RRH 4x45 1900 (Sprint Existing)	154	B14 4478 (AT⌶ Existing)	134
FD-RRH 4x45 1900 (Sprint Existing)	154	DC6-48-60-18-8F Surge Arrestor (AT⌶ Existing)	134
FD-RRH 4x45 1900 (Sprint Existing)	154	EEI 16-ft Low Profile Platform (AT⌶ Existing)	134
FD-RRH 2x50 800 (Sprint Existing)	154	7770.00 (AT⌶ Existing)	134
FD-RRH 2x50 800 (Sprint Existing)	154	QS66512-2 (AT⌶ Existing)	134
FD-RRH 2x50 800 (Sprint Existing)	154	80010965 (AT⌶ Existing)	134
GPS (Sprint Existing)	154	HPA-65R-BUU-H6 (AT⌶ Existing)	134
APXVTM14 (Sprint Existing)	154	7770.00 (AT⌶ Existing)	134
APXVTM14 (Sprint Existing)	154	DB844G65ZAXY (Verizon Existing)	124
APXVTM14 (Sprint Existing)	154	QUAD656C0000 (Verizon Existing)	124
TD-RRH8x20-25 (Sprint Existing)	154	SBNHH-1D65B (Verizon Existing)	124
TD-RRH8x20-25 (Sprint Existing)	154	SBNHH-1D65B (Verizon Existing)	124
TD-RRH8x20-25 (Sprint Existing)	154	DB844G65ZAXY (Verizon Existing)	124
Low Profile Platform (Sprint Existing)	154	DB844G65ZAXY (Verizon Existing)	124
LLPX310R (Clearwire Existing)	154	QUAD656C0000 (Verizon Existing)	124
LLPX310R (Clearwire Existing)	154	SBNHH-1D65B (Verizon Existing)	124
LLPX310R (Clearwire Existing)	154	SBNHH-1D65B (Verizon Existing)	124
A-Ant-23G-2-C (Clearwire Existing)	154	DB844G65ZAXY (Verizon Existing)	124
A-Ant-23G-2-C (Clearwire Existing)	154	(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	124
Remote Radio Head FD R6 RRH (Clearwire Existing)	151.5	(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	124
Remote Radio Head FD R6 RRH (Clearwire Existing)	151.5	(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	124
Valmont Uni-Tri Bracket (Sprint Existing)	151.5	RRH4x45/2x90-AWS (Verizon Existing)	124
Remote Radio Head FD R6 RRH (Clearwire Existing)	151.5	RRH4x45/2x90-AWS (Verizon Existing)	124
AIR32 (T-Mobile Proposed)	144	RRH4x45/2x90-AWS (Verizon Existing)	124
AIR21 B2A/B4P (T-Mobile Proposed)	144	RRH4x30-B13 (Verizon Existing)	124
APXVAARR24-43 (T-Mobile Proposed)	144	RRH4x30-B13 (Verizon Existing)	124
AIR32 (T-Mobile Proposed)	144	RRH4x30-B13 (Verizon Existing)	124
Radio 4449 B71 B12 (T-Mobile Proposed)	144	RRH2x60-PCS (Verizon Existing)	124
Radio 4449 B71 B12 (T-Mobile Proposed)	144	RRH2x60-PCS (Verizon Existing)	124
Radio 4449 B71 B12 (T-Mobile Proposed)	144	RRH2x60-PCS (Verizon Existing)	124
TMA 10"x8"x3" (T-Mobile Existing)	144	4x40 RRH 850 (Verizon Existing)	124
TMA 10"x8"x3" (T-Mobile Existing)	144	4x40 RRH 850 (Verizon Existing)	124
TMA 10"x8"x3" (T-Mobile Existing)	144	4x40 RRH 850 (Verizon Existing)	124
Low Profile Platform (T-Mobile Existing)	144	RC2DC-3315-PF-48 (Verizon Existing)	124
APXVAARR24-43 (T-Mobile Proposed)	144	RC2DC-3315-PF-48 (Verizon Existing)	124
AIR32 (T-Mobile Proposed)	144	Low Profile Platform (Verizon Existing)	124
AIR21 B2A/B4P (T-Mobile Proposed)	144	DB844G65ZAXY (Verizon Existing)	124
APXVAARR24-43 (T-Mobile Proposed)	144	QUAD656C0000 (Verizon Existing)	124
AIR21 B2A/B4P (T-Mobile Proposed)	144	SBNHH-1D65B (Verizon Existing)	124
RRUS-32 (AT⌶ Existing)	138	SBNHH-1D65B (Verizon Existing)	124
RRUS-32 (AT⌶ Existing)	138	DB844G65ZAXY (Verizon Existing)	124
RRUS-32 (AT⌶ Existing)	138	Low Profile Platform	114
Valmont Uni-Tri Bracket (AT⌶ Existing)	138	531-70HD (Eversource Existing)	114
DC6-48-60-18-8F Surge Arrestor (AT⌶ Existing)	138	DB586-Y (Eversource Existing)	114
DC6-48-60-18-8F Surge Arrestor (AT⌶ Existing)	138	DB586-Y (Eversource Existing)	114
RRUS-11 (AT⌶ Existing)	138	ANT150F2 (Eversource Existing)	114
RRUS-11 (AT⌶ Existing)	138	Tower Top Amplifier (Eversource Existing)	114
RRUS-11 (AT⌶ Existing)	138	GPS	51.5
		GPS	51.5
		GPS	51.5

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
8. Welds are fabricated with ER-70S-6 electrodes.
9. TOWER RATING: 47.4%

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

Job: **18058.64 - CTFF001A**			
Project: ***164' EEI Monopole - 5 Perryridge Rd., Greenwich, CT***			
Client: T-Mobile	Drawn by: TJL		App'd:
Code: TIA-222-G	Date: 07/05/18		Scale: NTS
Path: J:\Jobs\18058\00.WI\64_CTFF001A\05_Structural\Tower\Backup Documentation\ERI Files\164' EEI Monopole Greenwich, CT.eri			Dwg No. E-1

Tower Input Data

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

Basic wind speed of 93 mph.
Structure Class III.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	164.00-131.50	32.50	0.00	18	47.0000	53.4200	0.3125	1.2500	A572-65 (65 ksi)
L2	131.50-119.29	12.21	6.00	18	53.4200	56.1500	0.3750	1.5000	A572-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	119.29-78.79	46.50	8.42	18	54.0585	62.9700	0.4375	1.7500	(65 ksi) A572-65 (65 ksi)
L4	78.79-39.88	47.33	9.25	18	60.4813	69.6600	0.5625	2.2500	A572-65 (65 ksi)
L5	39.88-1.50	47.63		18	66.7412	76.0000	0.5625	2.2500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	47.7251	46.3082	12752.5270	16.5741	23.8760	534.1149	25521.8341	23.1585	7.7220	24.71
	54.2441	52.6760	18769.9004	18.8532	27.1374	691.6627	37564.4987	26.3430	8.8519	28.326
L2	54.2441	63.1368	22444.4518	18.8310	27.1374	827.0684	44918.4365	31.5744	8.7419	23.312
	57.0162	66.3862	26091.2194	19.8001	28.5242	914.7047	52216.7704	33.1994	9.2224	24.593
L3	56.0600	74.4594	27047.4669	19.0354	27.4617	984.9157	54130.5236	37.2368	8.7443	19.987
	63.9414	86.8342	42898.2727	22.1990	31.9888	1341.0421	85852.9920	43.4253	10.3127	23.572
L4	63.0724	106.9776	48524.0652	21.2712	30.7245	1579.3269	97111.9796	53.4990	9.6547	17.164
	70.7346	123.3649	74413.8720	24.5296	35.3873	2102.8424	148925.6597	61.6942	11.2702	20.036
L5	69.5966	118.1537	65376.3617	23.4934	33.9045	1928.2498	130838.7474	59.0881	10.7564	19.123
	77.1724	134.6842	96834.1984	26.7803	38.6080	2508.1382	193795.8137	67.3549	12.3860	22.02

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 164.00-131.50				1	1	1			
L2 131.50-119.29				1	1	1			
L3 119.29-78.79				1	1	1			
L4 78.79-39.88				1	1	1			
L5 39.88-1.50				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
7/8	B	Surface Ar (CaAa)	51.50 - 4.50	3	3	0.000 0.000	1.1100		0.54
1 5/8 (T-Mobile - Existing)	B	Surface Ar (CaAa)	144.00 - 7.50	6	6	0.000 0.000	1.9800		1.04

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1/2	A	No	Inside Pole	164.00 - 4.50	1	No Ice	0.00	0.25
(Town Existing)						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1 1/4	A	No	Inside Pole	164.00 - 4.50	6	No Ice	0.00	0.66
(Town Existing)						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
1/2	B	No	Inside Pole	154.00 - 7.50	1	No Ice	0.00	0.25
(Sprint Existing)						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
2" Rigid Conduit	B	No	Inside Pole	154.00 - 7.50	2	No Ice	0.00	2.80
(Clearwire Existing)						1/2" Ice	0.00	2.80
						1" Ice	0.00	2.80
LDF4.5-50 (5/8 FOAM)	B	No	Inside Pole	154.00 - 7.50	2	No Ice	0.00	0.15
(Clearwire Existing)						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
1 5/8	B	No	Inside Pole	144.00 - 4.50	12	No Ice	0.00	1.04
(T-Mobile Existing)						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
1 5/8	A	No	Inside Pole	134.00 - 11.50	12	No Ice	0.00	1.04
(AT&T Existing)						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
1 5/8	C	No	Inside Pole	124.00 - 7.50	6	No Ice	0.00	1.04
(Verizon Existing)						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
RG6-Fiber	A	No	Inside Pole	134.00 - 11.50	2	No Ice	0.00	0.00
(AT&T Existing)						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
#8 AWG Copper WIre	A	No	Inside Pole	134.00 - 11.50	4	No Ice	0.00	0.00
(AT&T Existing)						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
HYBRIFLEX 1-5/8"	B	No	Inside Pole	154.00 - 7.50	6	No Ice	0.00	1.90
(Sprint Existing)						1/2" Ice	0.00	1.90
						1" Ice	0.00	1.90
HYBRIFLEX 1-5/8"	C	No	Inside Pole	124.00 - 7.50	2	No Ice	0.00	1.90
(Verizon Existing)						1/2" Ice	0.00	1.90
						1" Ice	0.00	1.90
7/8	C	No	Inside Pole	114.00 - 1.50	2	No Ice	0.00	0.54
(Eversource Existing)						1/2" Ice	0.00	0.54
						1" Ice	0.00	0.54
1 5/8	C	No	Inside Pole	114.00 - 1.50	2	No Ice	0.00	1.04
(Eversource Existing)						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
1/2	C	No	Inside Pole	114.00 - 1.50	1	No Ice	0.00	0.25
(Eversource Existing)						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1 5/8	A	No	Inside Pole	164.00 - 4.50	1	No Ice	0.00	1.04
(Town Existing)						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
7/8	A	No	Inside Pole	164.00 - 4.50	2	No Ice	0.00	0.54
(Town Existing)						1/2" Ice	0.00	0.54
						1" Ice	0.00	0.54
1/2	A	No	Inside Pole	164.00 - 4.50	1	No Ice	0.00	0.25
(Town Existing)						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
#8 AWG Copper WIre	A	No	Inside Pole	134.00 - 11.50	2	No Ice	0.00	0.05
(AT&T Existing)						1/2" Ice	0.00	0.05
						1" Ice	0.00	0.05

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	164.00-131.50	A	0.000	0.000	0.000	0.000	0.25
		B	0.000	0.000	14.850	0.000	0.63
		C	0.000	0.000	0.000	0.000	0.00
L2	131.50-119.29	A	0.000	0.000	0.000	0.000	0.23
		B	0.000	0.000	14.505	0.000	0.44
		C	0.000	0.000	0.000	0.000	0.05
L3	119.29-78.79	A	0.000	0.000	0.000	0.000	0.78
		B	0.000	0.000	48.114	0.000	1.47
		C	0.000	0.000	0.000	0.000	0.53
L4	78.79-39.88	A	0.000	0.000	0.000	0.000	0.75
		B	0.000	0.000	50.095	0.000	1.43
		C	0.000	0.000	0.000	0.000	0.52
L5	39.88-1.50	A	0.000	0.000	0.000	0.000	0.59
		B	0.000	0.000	50.249	0.000	1.27
		C	0.000	0.000	0.000	0.000	0.46

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	164.00-131.50	A	2.178	0.000	0.000	0.000	0.000	0.25
		B		0.000	0.000	25.368	0.000	1.00
		C		0.000	0.000	0.000	0.000	0.00
L2	131.50-119.29	A	2.143	0.000	0.000	0.000	0.000	0.23
		B		0.000	0.000	24.672	0.000	0.80
		C		0.000	0.000	0.000	0.000	0.05
L3	119.29-78.79	A	2.092	0.000	0.000	0.000	0.000	0.78
		B		0.000	0.000	81.837	0.000	2.64
		C		0.000	0.000	0.000	0.000	0.53
L4	78.79-39.88	A	1.988	0.000	0.000	0.000	0.000	0.75
		B		0.000	0.000	89.050	0.000	2.67
		C		0.000	0.000	0.000	0.000	0.52
L5	39.88-1.50	A	1.793	0.000	0.000	0.000	0.000	0.59
		B		0.000	0.000	96.491	0.000	2.52
		C		0.000	0.000	0.000	0.000	0.46

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	164.00-131.50	0.5694	-0.3287	0.8034	-0.4638
L2	131.50-119.29	1.2535	-0.7237	1.5926	-0.9195
L3	119.29-78.79	1.2692	-0.7328	1.6369	-0.9450
L4	78.79-39.88	1.3810	-0.7973	1.8373	-1.0608
L5	39.88-1.50	1.4036	-0.8104	1.9652	-1.1346

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	17	1 5/8	131.50 - 144.00	1.0000	1.0000
L2	17	1 5/8	119.29 - 131.50	1.0000	1.0000
L3	11	7/8	78.79 - 51.50	1.0000	1.0000
L3	17	1 5/8	78.79 - 119.29	1.0000	1.0000
L4	11	7/8	39.88 - 51.50	1.0000	1.0000
L4	17	1 5/8	39.88 - 78.79	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
4'x4" Pipe Mount	A	From Face	0.50	0.0000	160.00	No Ice	1.10	1.10	0.04
(Town Existing)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00			1" Ice	1.84	1.84	0.07
4'x4" Pipe Mount	B	From Face	0.50	0.0000	160.00	No Ice	1.10	1.10	0.04
(Town Existing)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00			1" Ice	1.84	1.84	0.07
4'x4" Pipe Mount	C	From Face	0.50	0.0000	160.00	No Ice	1.10	1.10	0.04
(Town Existing)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00			1" Ice	1.84	1.84	0.07
12' x 3" Dia Omni	A	From Face	4.00	0.0000	164.00	No Ice	3.60	3.60	0.04
(Town Existing)			0.00			1/2" Ice	4.83	4.83	0.06
			5.00			1" Ice	6.08	6.08	0.09
12' x 3" Dia Omni	B	From Face	4.00	0.0000	164.00	No Ice	3.60	3.60	0.04
(Town Existing)			-6.00			1/2" Ice	4.83	4.83	0.06
			5.00			1" Ice	6.08	6.08	0.09
12' x 3" Dia Omni	C	From Face	4.00	0.0000	164.00	No Ice	3.60	3.60	0.04
(Town Existing)			6.00			1/2" Ice	4.83	4.83	0.06
			5.00			1" Ice	6.08	6.08	0.09
12' x 3" Dia Omni	C	From Face	4.00	0.0000	164.00	No Ice	3.60	3.60	0.04
(Town Existing)			0.00			1/2" Ice	4.83	4.83	0.06
			5.00			1" Ice	6.08	6.08	0.09
Camera	B	From Face	4.00	0.0000	164.00	No Ice	3.00	3.00	0.10
(Town Existing)			-6.00			1/2" Ice	4.00	4.00	0.15
			2.00			1" Ice	5.00	5.00	0.20
SC479-HF1LDF	A	From Face	4.00	0.0000	164.00	No Ice	4.70	4.70	0.03
(Town Existing)			-6.00			1/2" Ice	6.54	6.54	0.07
			5.00			1" Ice	8.04	8.04	0.11
TX/RX 432E-83I-01T	A	From Face	4.00	0.0000	164.00	No Ice	1.20	0.75	0.03
(Town Existing)			-6.00			1/2" Ice	1.34	0.86	0.04
			5.00			1" Ice	1.48	0.98	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
SC229-SFXLDF	B	From Face	4.00	0.0000	164.00	No Ice	6.67	6.67	0.03
(Town Existing)			0.00			1/2" Ice	9.02	9.02	0.08
			5.00			1" Ice	11.39	11.39	0.14
SC479-HF1LDF	C	From Face	4.00	0.0000	164.00	No Ice	4.70	4.70	0.03
(Town Existing)			6.00			1/2" Ice	6.54	6.54	0.07
			5.00			1" Ice	8.04	8.04	0.11
Low Profile Platform	C	None		0.0000	164.00	No Ice	15.70	15.70	1.30
(Town Existing)						1/2" Ice	20.10	20.10	1.76
						1" Ice	24.50	24.50	2.23
LLPX310R	A	From Face	3.00	0.0000	154.00	No Ice	4.30	1.95	0.03
(Clearwire Existing)			0.00			1/2" Ice	4.60	2.21	0.05
			0.00			1" Ice	4.90	2.49	0.08
LLPX310R	B	From Face	3.00	0.0000	154.00	No Ice	4.30	1.95	0.03
(Clearwire Existing)			0.00			1/2" Ice	4.60	2.21	0.05
			0.00			1" Ice	4.90	2.49	0.08
LLPX310R	C	From Face	3.00	0.0000	154.00	No Ice	4.30	1.95	0.03
(Clearwire Existing)			0.00			1/2" Ice	4.60	2.21	0.05
			0.00			1" Ice	4.90	2.49	0.08
Remote Radio Head FD R6	A	From Face	3.00	0.0000	151.50	No Ice	1.80	0.78	0.03
RRH			0.00			1/2" Ice	1.99	0.92	0.04
(Clearwire Existing)			0.00			1" Ice	2.18	1.07	0.06
Remote Radio Head FD R6	B	From Face	3.00	0.0000	151.50	No Ice	1.80	0.78	0.03
RRH			0.00			1/2" Ice	1.99	0.92	0.04
(Clearwire Existing)			0.00			1" Ice	2.18	1.07	0.06
Remote Radio Head FD R6	C	From Face	3.00	0.0000	151.50	No Ice	1.80	0.78	0.03
RRH			0.00			1/2" Ice	1.99	0.92	0.04
(Clearwire Existing)			0.00			1" Ice	2.18	1.07	0.06
Horizon ODU	A	None		0.0000	154.00	No Ice	0.68	0.16	0.00
(Clearwire Existing)						1/2" Ice	0.78	0.22	0.00
						1" Ice	0.89	0.29	0.01
Horizon ODU	C	None		0.0000	154.00	No Ice	0.68	0.16	0.00
(Clearwire Existing)						1/2" Ice	0.78	0.22	0.00
						1" Ice	0.89	0.29	0.01
APXVSPP18-C-A20	A	From Face	4.00	0.0000	154.00	No Ice	8.02	5.28	0.06
(Sprint Existing)			0.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16
P40-16-XLPP-RR-A	B	From Face	4.00	0.0000	154.00	No Ice	9.07	3.52	0.05
(Sprint Existing)			0.00			1/2" Ice	9.47	3.87	0.11
			0.00			1" Ice	9.87	4.22	0.16
APXVSPP18-C-A20	C	From Face	4.00	0.0000	154.00	No Ice	8.02	5.28	0.06
(Sprint Existing)			0.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16
FD-RRH 4x45 1900	A	From Face	4.00	0.0000	154.00	No Ice	2.32	2.38	0.06
(Sprint Existing)			2.00			1/2" Ice	2.52	2.59	0.08
			0.00			1" Ice	2.74	2.80	0.11
FD-RRH 4x45 1900	B	From Face	4.00	0.0000	154.00	No Ice	2.32	2.38	0.06
(Sprint Existing)			2.00			1/2" Ice	2.52	2.59	0.08
			0.00			1" Ice	2.74	2.80	0.11
FD-RRH 4x45 1900	C	From Face	4.00	0.0000	154.00	No Ice	2.32	2.38	0.06
(Sprint Existing)			2.00			1/2" Ice	2.52	2.59	0.08
			0.00			1" Ice	2.74	2.80	0.11
FD-RRH 2x50 800	A	From Face	4.00	0.0000	154.00	No Ice	2.06	1.93	0.06
(Sprint Existing)			-2.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
FD-RRH 2x50 800	B	From Face	4.00	0.0000	154.00	No Ice	2.06	1.93	0.06
(Sprint Existing)			-2.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
FD-RRH 2x50 800	C	From Face	4.00	0.0000	154.00	No Ice	2.06	1.93	0.06
(Sprint Existing)			-2.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
GPS	C	From Face	4.00	0.0000	154.00	No Ice	1.00	1.00	0.01
(Sprint Existing)			-6.00			1/2" Ice	1.50	1.50	0.01
			3.00			1" Ice	2.00	2.00	0.02
APXVTM14	A	From Face	4.00	0.0000	154.00	No Ice	6.34	3.61	0.06
(Sprint Existing)			2.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
APXVTM14	B	From Face	4.00	0.0000	154.00	No Ice	6.34	3.61	0.06
(Sprint Existing)			2.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
APXVTM14	C	From Face	4.00	0.0000	154.00	No Ice	6.34	3.61	0.06
(Sprint Existing)			2.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
TD-RRH8x20-25	A	From Face	4.00	0.0000	154.00	No Ice	4.05	1.53	0.07
(Sprint Existing)			2.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	B	From Face	4.00	0.0000	154.00	No Ice	4.05	1.53	0.07
(Sprint Existing)			2.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	C	From Face	4.00	0.0000	154.00	No Ice	4.05	1.53	0.07
(Sprint Existing)			2.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
Valmont Uni-Tri Bracket	A	None		0.0000	151.50	No Ice	1.75	1.75	0.29
(Sprint Existing)						1/2" Ice	1.94	1.94	0.31
						1" Ice	2.13	2.13	0.32
Low Profile Platform	C	None		0.0000	154.00	No Ice	15.70	15.70	1.30
(Sprint Existing)						1/2" Ice	20.10	20.10	1.76
						1" Ice	24.50	24.50	2.23
AIR21 B2A/B4P	A	From Face	4.00	0.0000	144.00	No Ice	6.05	4.36	0.08
(T-Mobile Proposed)			-6.00			1/2" Ice	6.42	4.70	0.12
			0.00			1" Ice	6.80	5.06	0.17
APXVAARR24-43	A	From Face	4.00	0.0000	144.00	No Ice	20.24	8.89	0.16
(T-Mobile Proposed)			-2.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
AIR32	A	From Face	4.00	0.0000	144.00	No Ice	6.51	4.71	0.13
(T-Mobile Proposed)			2.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR21 B2A/B4P	B	From Face	4.00	0.0000	144.00	No Ice	6.05	4.36	0.08
(T-Mobile Proposed)			-6.00			1/2" Ice	6.42	4.70	0.12
			0.00			1" Ice	6.80	5.06	0.17
APXVAARR24-43	B	From Face	4.00	0.0000	144.00	No Ice	20.24	8.89	0.16
(T-Mobile Proposed)			-2.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
AIR32	B	From Face	4.00	0.0000	144.00	No Ice	6.51	4.71	0.13
(T-Mobile Proposed)			2.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR21 B2A/B4P	C	From Face	4.00	0.0000	144.00	No Ice	6.05	4.36	0.08
(T-Mobile Proposed)			-6.00			1/2" Ice	6.42	4.70	0.12
			0.00			1" Ice	6.80	5.06	0.17
APXVAARR24-43	C	From Face	4.00	0.0000	144.00	No Ice	20.24	8.89	0.16
(T-Mobile Proposed)			-2.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
AIR32	C	From Face	4.00	0.0000	144.00	No Ice	6.51	4.71	0.13
(T-Mobile Proposed)			2.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Radio 4449 B71 B12	A	From Face	4.00	0.0000	144.00	No Ice	1.64	1.29	0.07
(T-Mobile Proposed)			-2.00			1/2" Ice	1.80	1.44	0.09
			0.00			1" Ice	1.97	1.59	0.11
Radio 4449 B71 B12	B	From Face	4.00	0.0000	144.00	No Ice	1.64	1.29	0.07
(T-Mobile Proposed)			-2.00			1/2" Ice	1.80	1.44	0.09
			0.00			1" Ice	1.97	1.59	0.11
Radio 4449 B71 B12	C	From Face	4.00	0.0000	144.00	No Ice	1.64	1.29	0.07
(T-Mobile Proposed)			-2.00			1/2" Ice	1.80	1.44	0.09
			0.00			1" Ice	1.97	1.59	0.11
TMA 10"x8"x3"	A	From Face	4.00	0.0000	144.00	No Ice	0.67	0.26	0.02
(T-Mobile Existing)			0.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
TMA 10"x8"x3"	B	From Face	4.00	0.0000	144.00	No Ice	0.67	0.26	0.02
(T-Mobile Existing)			0.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
TMA 10"x8"x3"	C	From Face	4.00	0.0000	144.00	No Ice	0.67	0.26	0.02
(T-Mobile Existing)			0.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
Low Profile Platform	C	None		0.0000	144.00	No Ice	15.70	15.70	1.30
(T-Mobile Existing)						1/2" Ice	20.10	20.10	1.76
						1" Ice	24.50	24.50	2.23
DC6-48-60-18-8F Surge	B	From Face	0.50	0.0000	138.00	No Ice	1.91	1.91	0.02
Arrestor			0.00			1/2" Ice	2.10	2.10	0.04
(AT&T Existing)			0.00			1" Ice	2.29	2.29	0.06
DC6-48-60-18-8F Surge	C	From Face	0.50	0.0000	138.00	No Ice	1.91	1.91	0.02
Arrestor			0.00			1/2" Ice	2.10	2.10	0.04
(AT&T Existing)			0.00			1" Ice	2.29	2.29	0.06
RRUS-11	A	From Face	0.50	0.0000	138.00	No Ice	2.57	1.07	0.05
(AT&T Existing)			6.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-11	B	From Face	0.50	0.0000	138.00	No Ice	2.57	1.07	0.05
(AT&T Existing)			6.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-11	C	From Face	0.50	0.0000	138.00	No Ice	2.57	1.07	0.05
(AT&T Existing)			6.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-32	A	From Face	0.50	0.0000	138.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			-3.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	B	From Face	0.50	0.0000	138.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			-3.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	C	From Face	0.50	0.0000	138.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			-3.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
Valmont Uni-Tri Bracket	C	None		0.0000	138.00	No Ice	1.75	1.75	0.29
(AT&T Existing)						1/2" Ice	1.94	1.94	0.31
						1" Ice	2.13	2.13	0.32
7770.00	A	From Face	3.00	0.0000	134.00	No Ice	5.51	2.93	0.04
(AT&T Existing)			-7.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
QS66512-2	A	From Face	3.00	0.0000	134.00	No Ice	8.13	6.80	0.11
(AT&T Existing)			-3.50			1/2" Ice	8.59	7.27	0.17
			0.00			1" Ice	9.05	7.72	0.23
80010965	A	From Face	3.00	0.0000	134.00	No Ice	13.81	5.83	0.11
(AT&T Existing)			3.50			1/2" Ice	14.35	6.32	0.19
			0.00			1" Ice	14.89	6.82	0.27

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
HPA-65R-BUU-H6	A	From Face	3.00	0.0000	134.00	No Ice	9.66	6.45	0.05
(AT&T Existing)			7.00			1/2" Ice	10.13	6.91	0.11
			0.00			1" Ice	10.61	7.38	0.18
7770.00	B	From Face	3.00	0.0000	134.00	No Ice	5.51	2.93	0.04
(AT&T Existing)			-7.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
QS66512-2	B	From Face	3.00	0.0000	134.00	No Ice	8.13	6.80	0.11
(AT&T Existing)			-3.50			1/2" Ice	8.59	7.27	0.17
			0.00			1" Ice	9.05	7.72	0.23
80010965	B	From Face	3.00	0.0000	134.00	No Ice	13.81	5.83	0.11
(AT&T Existing)			3.50			1/2" Ice	14.35	6.32	0.19
			0.00			1" Ice	14.89	6.82	0.27
HPA-65R-BUU-H6	B	From Face	3.00	0.0000	134.00	No Ice	9.66	6.45	0.05
(AT&T Existing)			7.00			1/2" Ice	10.13	6.91	0.11
			0.00			1" Ice	10.61	7.38	0.18
7770.00	C	From Face	3.00	0.0000	134.00	No Ice	5.51	2.93	0.04
(AT&T Existing)			-7.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
QS66512-2	C	From Face	3.00	0.0000	134.00	No Ice	8.13	6.80	0.11
(AT&T Existing)			-3.50			1/2" Ice	8.59	7.27	0.17
			0.00			1" Ice	9.05	7.72	0.23
80010965	C	From Face	3.00	0.0000	134.00	No Ice	13.81	5.83	0.11
(AT&T Existing)			3.50			1/2" Ice	14.35	6.32	0.19
			0.00			1" Ice	14.89	6.82	0.27
HPA-65R-BUU-H6	C	From Face	3.00	0.0000	134.00	No Ice	9.66	6.45	0.05
(AT&T Existing)			7.00			1/2" Ice	10.13	6.91	0.11
			0.00			1" Ice	10.61	7.38	0.18
(2) LGP21401 TMA	A	From Face	3.00	0.0000	134.00	No Ice	0.82	0.35	0.02
(AT&T Existing)			-2.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
(2) LGP21401 TMA	B	From Face	3.00	0.0000	134.00	No Ice	0.82	0.35	0.02
(AT&T Existing)			-2.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
(2) LGP21401 TMA	C	From Face	3.00	0.0000	134.00	No Ice	0.82	0.35	0.02
(AT&T Existing)			-2.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
(2) TPX-070821	A	From Face	3.00	0.0000	134.00	No Ice	0.47	0.10	0.01
(AT&T Existing)			-2.00			1/2" Ice	0.56	0.15	0.01
			0.00			1" Ice	0.66	0.20	0.02
(2) TPX-070821	B	From Face	3.00	0.0000	134.00	No Ice	0.47	0.10	0.01
(AT&T Existing)			-2.00			1/2" Ice	0.56	0.15	0.01
			0.00			1" Ice	0.66	0.20	0.02
(2) TPX-070821	C	From Face	3.00	0.0000	134.00	No Ice	0.47	0.10	0.01
(AT&T Existing)			-2.00			1/2" Ice	0.56	0.15	0.01
			0.00			1" Ice	0.66	0.20	0.02
RRUS-32	A	From Face	0.50	0.0000	134.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			3.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	B	From Face	0.50	0.0000	134.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			3.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	C	From Face	0.50	0.0000	134.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			3.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	A	From Face	0.50	0.0000	134.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			-4.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRUS-32	B	From Face	0.50	0.0000	134.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			-4.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	C	From Face	0.50	0.0000	134.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			-4.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
B14 4478	A	From Face	0.50	0.0000	134.00	No Ice	1.63	0.91	0.06
(AT&T Existing)			-6.00			1/2" Ice	1.79	1.03	0.07
			0.00			1" Ice	1.95	1.17	0.09
B14 4478	B	From Face	0.50	0.0000	134.00	No Ice	1.63	0.91	0.06
(AT&T Existing)			-6.00			1/2" Ice	1.79	1.03	0.07
			0.00			1" Ice	1.95	1.17	0.09
B14 4478	C	From Face	0.50	0.0000	134.00	No Ice	1.63	0.91	0.06
(AT&T Existing)			-6.00			1/2" Ice	1.79	1.03	0.07
			0.00			1" Ice	1.95	1.17	0.09
DC6-48-60-18-8F Surge	C	From Face	0.50	0.0000	134.00	No Ice	1.91	1.91	0.02
Arrestor			0.00			1/2" Ice	2.10	2.10	0.04
(AT&T Existing)			0.00			1" Ice	2.29	2.29	0.06
EEI 16-ft Low Profile	C	None		0.0000	134.00	No Ice	21.00	21.00	2.00
Platform						1/2" Ice	26.00	26.00	2.40
(AT&T Existing)						1" Ice	31.00	31.00	2.80
DB844G65ZAXY	A	From Face	4.00	0.0000	124.00	No Ice	4.34	3.61	0.02
(Verizon Existing)			-6.00			1/2" Ice	4.66	3.92	0.05
			0.00			1" Ice	4.98	4.23	0.09
QUAD656C0000	A	From Face	4.00	0.0000	124.00	No Ice	13.24	5.62	0.06
(Verizon Existing)			-4.00			1/2" Ice	13.75	6.09	0.13
			0.00			1" Ice	14.27	6.56	0.21
SBNHH-1D65B	A	From Face	4.00	0.0000	124.00	No Ice	8.08	5.34	0.04
(Verizon Existing)			0.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
SBNHH-1D65B	A	From Face	4.00	0.0000	124.00	No Ice	8.08	5.34	0.04
(Verizon Existing)			4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
DB844G65ZAXY	A	From Face	4.00	0.0000	124.00	No Ice	4.34	3.61	0.02
(Verizon Existing)			6.00			1/2" Ice	4.66	3.92	0.05
			0.00			1" Ice	4.98	4.23	0.09
DB844G65ZAXY	B	From Face	4.00	0.0000	124.00	No Ice	4.34	3.61	0.02
(Verizon Existing)			-6.00			1/2" Ice	4.66	3.92	0.05
			0.00			1" Ice	4.98	4.23	0.09
QUAD656C0000	B	From Face	4.00	0.0000	124.00	No Ice	13.24	5.62	0.06
(Verizon Existing)			-4.00			1/2" Ice	13.75	6.09	0.13
			0.00			1" Ice	14.27	6.56	0.21
SBNHH-1D65B	B	From Face	4.00	0.0000	124.00	No Ice	8.08	5.34	0.04
(Verizon Existing)			0.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
SBNHH-1D65B	B	From Face	4.00	0.0000	124.00	No Ice	8.08	5.34	0.04
(Verizon Existing)			4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
DB844G65ZAXY	B	From Face	4.00	0.0000	124.00	No Ice	4.34	3.61	0.02
(Verizon Existing)			6.00			1/2" Ice	4.66	3.92	0.05
			0.00			1" Ice	4.98	4.23	0.09
DB844G65ZAXY	C	From Face	4.00	0.0000	124.00	No Ice	4.34	3.61	0.02
(Verizon Existing)			-6.00			1/2" Ice	4.66	3.92	0.05
			0.00			1" Ice	4.98	4.23	0.09
QUAD656C0000	C	From Face	4.00	0.0000	124.00	No Ice	13.24	5.62	0.06
(Verizon Existing)			-4.00			1/2" Ice	13.75	6.09	0.13
			0.00			1" Ice	14.27	6.56	0.21

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
SBNHH-1D65B	C	From Face	4.00		0.0000	124.00	No Ice	8.08	5.34	0.04
(Verizon Existing)			0.00				1/2" Ice	8.53	5.79	0.09
			0.00				1" Ice	9.00	6.26	0.15
SBNHH-1D65B	C	From Face	4.00		0.0000	124.00	No Ice	8.08	5.34	0.04
(Verizon Existing)			4.00				1/2" Ice	8.53	5.79	0.09
			0.00				1" Ice	9.00	6.26	0.15
DB844G65ZAXY	C	From Face	4.00		0.0000	124.00	No Ice	4.34	3.61	0.02
(Verizon Existing)			6.00				1/2" Ice	4.66	3.92	0.05
			0.00				1" Ice	4.98	4.23	0.09
(2) FD9R6004/2C-3L	B	From Face	3.00		0.0000	124.00	No Ice	0.31	0.08	0.00
Diplexer			0.00				1/2" Ice	0.39	0.12	0.01
(Verizon Existing)			0.00				1" Ice	0.47	0.17	0.01
(2) FD9R6004/2C-3L	C	From Face	3.00		0.0000	124.00	No Ice	0.31	0.08	0.00
Diplexer			0.00				1/2" Ice	0.39	0.12	0.01
(Verizon Existing)			0.00				1" Ice	0.47	0.17	0.01
(2) FD9R6004/2C-3L	A	From Face	3.00		0.0000	124.00	No Ice	0.31	0.08	0.00
Diplexer			0.00				1/2" Ice	0.39	0.12	0.01
(Verizon Existing)			0.00				1" Ice	0.47	0.17	0.01
RRH4x45/2x90-AWS	A	From Face	4.00		0.0000	124.00	No Ice	2.58	1.69	0.08
(Verizon Existing)			4.00				1/2" Ice	2.79	1.87	0.10
			0.00				1" Ice	3.01	2.06	0.12
RRH4x45/2x90-AWS	B	From Face	4.00		0.0000	124.00	No Ice	2.58	1.69	0.08
(Verizon Existing)			4.00				1/2" Ice	2.79	1.87	0.10
			0.00				1" Ice	3.01	2.06	0.12
RRH4x45/2x90-AWS	C	From Face	4.00		0.0000	124.00	No Ice	2.58	1.69	0.08
(Verizon Existing)			4.00				1/2" Ice	2.79	1.87	0.10
			0.00				1" Ice	3.01	2.06	0.12
RRH4x30-B13	A	From Face	4.00		0.0000	124.00	No Ice	2.16	1.62	0.06
(Verizon Existing)			0.00				1/2" Ice	2.35	1.79	0.08
			0.00				1" Ice	2.55	1.97	0.10
RRH4x30-B13	B	From Face	4.00		0.0000	124.00	No Ice	2.16	1.62	0.06
(Verizon Existing)			0.00				1/2" Ice	2.35	1.79	0.08
			0.00				1" Ice	2.55	1.97	0.10
RRH4x30-B13	C	From Face	4.00		0.0000	124.00	No Ice	2.16	1.62	0.06
(Verizon Existing)			0.00				1/2" Ice	2.35	1.79	0.08
			0.00				1" Ice	2.55	1.97	0.10
RRH2x60-PCS	A	From Face	4.00		0.0000	124.00	No Ice	2.15	1.35	0.06
(Verizon Existing)			-4.00				1/2" Ice	2.34	1.50	0.07
			0.00				1" Ice	2.54	1.67	0.09
RRH2x60-PCS	B	From Face	4.00		0.0000	124.00	No Ice	2.15	1.35	0.06
(Verizon Existing)			-4.00				1/2" Ice	2.34	1.50	0.07
			0.00				1" Ice	2.54	1.67	0.09
RRH2x60-PCS	C	From Face	4.00		0.0000	124.00	No Ice	2.15	1.35	0.06
(Verizon Existing)			-4.00				1/2" Ice	2.34	1.50	0.07
			0.00				1" Ice	2.54	1.67	0.09
4x40 RRH 850	A	From Face	4.00		0.0000	124.00	No Ice	2.00	2.00	0.06
(Verizon Existing)			0.00				1/2" Ice	2.19	2.19	0.08
			0.00				1" Ice	2.39	2.39	0.10
4x40 RRH 850	B	From Face	4.00		0.0000	124.00	No Ice	2.00	2.00	0.06
(Verizon Existing)			0.00				1/2" Ice	2.19	2.19	0.08
			0.00				1" Ice	2.39	2.39	0.10
4x40 RRH 850	C	From Face	4.00		0.0000	124.00	No Ice	2.00	2.00	0.06
(Verizon Existing)			0.00				1/2" Ice	2.19	2.19	0.08
			0.00				1" Ice	2.39	2.39	0.10
RC2DC-3315-PF-48	A	From Face	1.00		0.0000	124.00	No Ice	3.01	1.96	0.03
(Verizon Existing)			1.00				1/2" Ice	3.23	2.15	0.05
			0.00				1" Ice	3.46	2.35	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RC2DC-3315-PF-48	B	From Face	1.00	0.0000	124.00	No Ice	3.01	1.96	0.03
(Verizon Existing)			1.00			1/2" Ice	3.23	2.15	0.05
			0.00			1" Ice	3.46	2.35	0.08
Low Profile Platform	C	None		0.0000	124.00	No Ice	15.70	15.70	1.30
(Verizon Existing)						1/2" Ice	20.10	20.10	1.76
						1" Ice	24.50	24.50	2.23
531-70HD	C	From Face	3.00	0.0000	114.00	No Ice	6.00	6.00	0.04
(Eversource Existing)			-6.00			1/2" Ice	6.90	6.90	0.05
			0.00			1" Ice	7.80	7.80	0.06
DB586-Y	C	From Face	3.00	0.0000	114.00	No Ice	1.01	1.01	0.01
(Eversource Existing)			5.00			1/2" Ice	1.28	1.28	0.02
			2.50			1" Ice	1.56	1.56	0.03
DB586-Y	C	From Face	3.00	0.0000	114.00	No Ice	1.01	1.01	0.01
(Eversource Existing)			5.00			1/2" Ice	1.28	1.28	0.02
			-2.50			1" Ice	1.56	1.56	0.03
ANT150F2	C	From Face	3.00	0.0000	114.00	No Ice	1.29	1.29	0.02
(Eversource Existing)			-3.00			1/2" Ice	1.60	1.60	0.03
			2.50			1" Ice	1.91	1.91	0.04
Tower Top Amplifier	C	From Face	3.00	0.0000	114.00	No Ice	2.67	1.03	0.04
(Eversource Existing)			5.00			1/2" Ice	2.87	1.17	0.06
			0.00			1" Ice	3.08	1.32	0.08
Low Profile Platform	C	None		0.0000	114.00	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76
						1" Ice	24.50	24.50	2.23
GPS	A	From Face	1.50	0.0000	51.50	No Ice	1.00	1.00	0.01
			0.00			1/2" Ice	1.50	1.50	0.01
			0.00			1" Ice	2.00	2.00	0.02
GPS	B	From Face	1.50	0.0000	51.50	No Ice	1.00	1.00	0.01
			0.00			1/2" Ice	1.50	1.50	0.01
			0.00			1" Ice	2.00	2.00	0.02
GPS	C	From Face	1.50	0.0000	51.50	No Ice	1.00	1.00	0.01
			0.00			1/2" Ice	1.50	1.50	0.01
			0.00			1" Ice	2.00	2.00	0.02

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
4 FT DISH	A	Paraboloid	From	1.00	Worst		160.00	4.00	No Ice	12.56	0.17
(Town Existing)		w/Shroud (HP)	Leg	0.00					1/2" Ice	13.09	0.24
				0.00					1" Ice	13.62	0.30
4 FT DISH	B	Paraboloid	From	1.00	Worst		160.00	4.00	No Ice	12.56	0.17
(Town Existing)		w/Shroud (HP)	Leg	0.00					1/2" Ice	13.09	0.24
				0.00					1" Ice	13.62	0.30
2 FT DISH	C	Paraboloid	From	1.00	Worst		160.00	2.00	No Ice	3.14	0.03
(Town Existing)		w/Shroud (HP)	Leg	0.00					1/2" Ice	3.41	0.04
				0.00					1" Ice	3.67	0.06
A-Ant-23G-2-C	A	Paraboloid	From	3.10	Worst		154.00	2.17	No Ice	3.72	0.03

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
(Clearwire Existing)		w/Radome	Face	-2.52					1/2" Ice	4.01	0.05
				2.00					1" Ice	4.30	0.07
A-Ant-23G-2-C	C	Paraboloid	From	3.80	Worst		154.00	2.17	No Ice	3.72	0.03
(Clearwire Existing)		w/Radome	Face	-1.24					1/2" Ice	4.01	0.05
				2.00					1" Ice	4.30	0.07

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	147.50	1.374	33	138.083	A	0.000	138.083	138.083	100.00	0.000	0.000
164.00-131.50					B	0.000	138.083		100.00	14.850	0.000
					C	0.000	138.083		100.00	0.000	0.000
L2	125.34	1.327	32	56.604	A	0.000	56.604	56.604	100.00	0.000	0.000
131.50-119.29					B	0.000	56.604		100.00	14.505	0.000
					C	0.000	56.604		100.00	0.000	0.000
L3	98.82	1.262	30	202.502	A	0.000	202.502	202.502	100.00	0.000	0.000
119.29-78.79					B	0.000	202.502		100.00	48.114	0.000
					C	0.000	202.502		100.00	0.000	0.000
L4 78.79-39.88	59.30	1.134	27	216.935	A	0.000	216.935	216.935	100.00	0.000	0.000
					B	0.000	216.935		100.00	50.095	0.000
					C	0.000	216.935		100.00	0.000	0.000
L5 39.88-1.50	21.06	0.912	22	234.708	A	0.000	234.708	234.708	100.00	0.000	0.000
					B	0.000	234.708		100.00	50.249	0.000
					C	0.000	234.708		100.00	0.000	0.000

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	147.50	1.374	8	2.1779	149.880	A	0.000	149.880	149.880	100.00	0.000	0.000
164.00-131.50						B	0.000	149.880		100.00	25.368	0.000
						C	0.000	149.880		100.00	0.000	0.000
L2	125.34	1.327	8	2.1427	60.964	A	0.000	60.964	60.964	100.00	0.000	0.000
131.50-119.29						B	0.000	60.964		100.00	24.672	0.000
						C	0.000	60.964		100.00	0.000	0.000
L3 119.29-78.79	98.82	1.262	8	2.0923	216.966	A	0.000	216.966	216.966	100.00	0.000	0.000
						B	0.000	216.966		100.00	81.837	0.000
						C	0.000	216.966		100.00	0.000	0.000
L4 78.79-39.88	59.30	1.134	7	1.9882	230.504	A	0.000	230.504	230.504	100.00	0.000	0.000
						B	0.000	230.504		100.00	89.050	0.000
						C	0.000	230.504		100.00	0.000	0.000
L5 39.88-1.50	21.06	0.912	6	1.7926	247.426	A	0.000	247.426	247.426	100.00	0.000	0.000
						B	0.000	247.426		100.00	96.491	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						C	0.000	247.426		100.00	0.000	0.000

Tower Pressure - Service

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	147.50	1.374	11	138.083	A	0.000	138.083	138.083	100.00	0.000	0.000
164.00-131.50					B	0.000	138.083		100.00	14.850	0.000
					C	0.000	138.083		100.00	0.000	0.000
L2	125.34	1.327	10	56.604	A	0.000	56.604	56.604	100.00	0.000	0.000
131.50-119.29					B	0.000	56.604		100.00	14.505	0.000
					C	0.000	56.604		100.00	0.000	0.000
L3	98.82	1.262	10	202.502	A	0.000	202.502	202.502	100.00	0.000	0.000
119.29-78.79					B	0.000	202.502		100.00	48.114	0.000
					C	0.000	202.502		100.00	0.000	0.000
L4 78.79-39.88	59.30	1.134	9	216.935	A	0.000	216.935	216.935	100.00	0.000	0.000
					B	0.000	216.935		100.00	50.095	0.000
					C	0.000	216.935		100.00	0.000	0.000
L5 39.88-1.50	21.06	0.912	7	234.708	A	0.000	234.708	234.708	100.00	0.000	0.000
					B	0.000	234.708		100.00	50.249	0.000
					C	0.000	234.708		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.87	5.47	A	1	0.65	33	1	1	138.083	3.28	100.89	C
164.00-131.50			B	1	0.65		1	1	138.083			
			C	1	0.65		1	1	138.083			
L2	0.72	2.69	A	1	0.65	32	1	1	56.604	1.30	106.42	C
131.50-119.29			B	1	0.65		1	1	56.604			
			C	1	0.65		1	1	56.604			
L3	2.77	12.76	A	1	0.65	30	1	1	202.502	4.42	109.03	C
119.29-78.79			B	1	0.65		1	1	202.502			
			C	1	0.65		1	1	202.502			
L4	2.70	18.55	A	1	0.65	27	1	1	216.935	4.24	108.95	C
78.79-39.88			B	1	0.65		1	1	216.935			
			C	1	0.65		1	1	216.935			
L5 39.88-1.50	2.32	20.49	A	1	0.65	22	1	1	234.708	3.71	96.79	C
			B	1	0.65		1	1	234.708			
			C	1	0.65		1	1	234.708			
Sum Weight:	9.38	59.96						OTM	1387.05 kip-ft	16.95		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.87	5.47	A	1	0.65	33	1	1	138.083	3.28	100.89	C
164.00-131.50			B	1	0.65		1	1	138.083			
			C	1	0.65		1	1	138.083			
L2	0.72	2.69	A	1	0.65	32	1	1	56.604	1.30	106.42	C
131.50-119.29			B	1	0.65		1	1	56.604			
			C	1	0.65		1	1	56.604			
L3	2.77	12.76	A	1	0.65	30	1	1	202.502	4.42	109.03	C
119.29-78.79			B	1	0.65		1	1	202.502			
			C	1	0.65		1	1	202.502			
L4	2.70	18.55	A	1	0.65	27	1	1	216.935	4.24	108.95	C
78.79-39.88			B	1	0.65		1	1	216.935			
			C	1	0.65		1	1	216.935			
L5 39.88-1.50	2.32	20.49	A	1	0.65	22	1	1	234.708	3.71	96.79	C
			B	1	0.65		1	1	234.708			
			C	1	0.65		1	1	234.708			
Sum Weight:	9.38	59.96						OTM	1387.05 kip-ft	16.95		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.87	5.47	A	1	0.65	33	1	1	138.083	3.28	100.89	C
164.00-131.50			B	1	0.65		1	1	138.083			
			C	1	0.65		1	1	138.083			
L2	0.72	2.69	A	1	0.65	32	1	1	56.604	1.30	106.42	C
131.50-119.29			B	1	0.65		1	1	56.604			
			C	1	0.65		1	1	56.604			
L3	2.77	12.76	A	1	0.65	30	1	1	202.502	4.42	109.03	C
119.29-78.79			B	1	0.65		1	1	202.502			
			C	1	0.65		1	1	202.502			
L4	2.70	18.55	A	1	0.65	27	1	1	216.935	4.24	108.95	C
78.79-39.88			B	1	0.65		1	1	216.935			
			C	1	0.65		1	1	216.935			
L5 39.88-1.50	2.32	20.49	A	1	0.65	22	1	1	234.708	3.71	96.79	C
			B	1	0.65		1	1	234.708			
			C	1	0.65		1	1	234.708			
Sum Weight:	9.38	59.96						OTM	1387.05 kip-ft	16.95		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	1.24	10.05	A	1	1.2	8	1	1	149.880	1.65	50.82	C
164.00-131.50			B	1	1.2		1	1	149.880			
			C	1	1.2		1	1	149.880			
L2	1.08	4.53	A	1	1.2	8	1	1	60.964	0.65	53.19	C
131.50-119.29			B	1	1.2		1	1	60.964			
			C	1	1.2		1	1	60.964			
L3	3.94	19.16	A	1	1.2	8	1	1	216.966	2.20	54.21	C
119.29-78.79			B	1	1.2		1	1	216.966			
			C	1	1.2		1	1	216.966			
L4	3.93	25.03	A	1	1.2	7	1	1	230.504	2.09	53.72	C
78.79-39.88			B	1	1.2		1	1	230.504			
			C	1	1.2		1	1	230.504			
L5 39.88-1.50	3.57	26.78	A	1	1.2	6	1	1	247.426	1.82	47.35	C
			B	1	1.2		1	1	247.426			
			C	1	1.2		1	1	247.426			
Sum Weight:	13.77	85.55						OTM	691.54 kip-ft	8.40		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	1.24	10.05	A	1	1.2	8	1	1	149.880	1.65	50.82	C
164.00-131.50			B	1	1.2		1	1	149.880			
			C	1	1.2		1	1	149.880			
L2	1.08	4.53	A	1	1.2	8	1	1	60.964	0.65	53.19	C
131.50-119.29			B	1	1.2		1	1	60.964			
			C	1	1.2		1	1	60.964			
L3	3.94	19.16	A	1	1.2	8	1	1	216.966	2.20	54.21	C
119.29-78.79			B	1	1.2		1	1	216.966			
			C	1	1.2		1	1	216.966			
L4	3.93	25.03	A	1	1.2	7	1	1	230.504	2.09	53.72	C
78.79-39.88			B	1	1.2		1	1	230.504			
			C	1	1.2		1	1	230.504			
L5 39.88-1.50	3.57	26.78	A	1	1.2	6	1	1	247.426	1.82	47.35	C
			B	1	1.2		1	1	247.426			
			C	1	1.2		1	1	247.426			
Sum Weight:	13.77	85.55						OTM	691.54 kip-ft	8.40		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	1.24	10.05	A	1	1.2	8	1	1	149.880	1.65	50.82	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
164.00-131.50			B	1	1.2		1	1	149.880			
			C	1	1.2		1	1	149.880			
L2	1.08	4.53	A	1	1.2	8	1	1	60.964	0.65	53.19	C
131.50-119.29			B	1	1.2		1	1	60.964			
			C	1	1.2		1	1	60.964			
L3	3.94	19.16	A	1	1.2	8	1	1	216.966	2.20	54.21	C
119.29-78.79			B	1	1.2		1	1	216.966			
			C	1	1.2		1	1	216.966			
L4	3.93	25.03	A	1	1.2	7	1	1	230.504	2.09	53.72	C
78.79-39.88			B	1	1.2		1	1	230.504			
			C	1	1.2		1	1	230.504			
L5 39.88-1.50	3.57	26.78	A	1	1.2	6	1	1	247.426	1.82	47.35	C
			B	1	1.2		1	1	247.426			
			C	1	1.2		1	1	247.426			
Sum Weight:	13.77	85.55						OTM	691.54 kip-ft	8.40		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.87	5.47	A	1	0.65	11	1	1	138.083	1.06	32.67	C
164.00-131.50			B	1	0.65		1	1	138.083			
			C	1	0.65		1	1	138.083			
L2	0.72	2.69	A	1	0.65	10	1	1	56.604	0.42	34.46	C
131.50-119.29			B	1	0.65		1	1	56.604			
			C	1	0.65		1	1	56.604			
L3	2.77	12.76	A	1	0.65	10	1	1	202.502	1.43	35.31	C
119.29-78.79			B	1	0.65		1	1	202.502			
			C	1	0.65		1	1	202.502			
L4	2.70	18.55	A	1	0.65	9	1	1	216.935	1.37	35.28	C
78.79-39.88			B	1	0.65		1	1	216.935			
			C	1	0.65		1	1	216.935			
L5 39.88-1.50	2.32	20.49	A	1	0.65	7	1	1	234.708	1.20	31.34	C
			B	1	0.65		1	1	234.708			
			C	1	0.65		1	1	234.708			
Sum Weight:	9.38	59.96						OTM	449.19 kip-ft	5.49		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.87	5.47	A	1	0.65	11	1	1	138.083	1.06	32.67	C
164.00-131.50			B	1	0.65		1	1	138.083			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	1	0.65		1	1	138.083			
L2	0.72	2.69	A	1	0.65	10	1	1	56.604	0.42	34.46	C
131.50-119.29			B	1	0.65		1	1	56.604			
			C	1	0.65		1	1	56.604			
L3	2.77	12.76	A	1	0.65	10	1	1	202.502	1.43	35.31	C
119.29-78.79			B	1	0.65		1	1	202.502			
			C	1	0.65		1	1	202.502			
L4	2.70	18.55	A	1	0.65	9	1	1	216.935	1.37	35.28	C
78.79-39.88			B	1	0.65		1	1	216.935			
			C	1	0.65		1	1	216.935			
L5 39.88-1.50	2.32	20.49	A	1	0.65	7	1	1	234.708	1.20	31.34	C
			B	1	0.65		1	1	234.708			
			C	1	0.65		1	1	234.708			
Sum Weight:	9.38	59.96						OTM	449.19 kip-ft	5.49		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.87	5.47	A	1	0.65	11	1	1	138.083	1.06	32.67	C
164.00-131.50			B	1	0.65		1	1	138.083			
			C	1	0.65		1	1	138.083			
L2	0.72	2.69	A	1	0.65	10	1	1	56.604	0.42	34.46	C
131.50-119.29			B	1	0.65		1	1	56.604			
			C	1	0.65		1	1	56.604			
L3	2.77	12.76	A	1	0.65	10	1	1	202.502	1.43	35.31	C
119.29-78.79			B	1	0.65		1	1	202.502			
			C	1	0.65		1	1	202.502			
L4	2.70	18.55	A	1	0.65	9	1	1	216.935	1.37	35.28	C
78.79-39.88			B	1	0.65		1	1	216.935			
			C	1	0.65		1	1	216.935			
L5 39.88-1.50	2.32	20.49	A	1	0.65	7	1	1	234.708	1.20	31.34	C
			B	1	0.65		1	1	234.708			
			C	1	0.65		1	1	234.708			
Sum Weight:	9.38	59.96						OTM	449.19 kip-ft	5.49		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	59.96					
Bracing Weight	0.00					
Total Member Self-Weight	59.96			-1.19	-1.88	

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Total Weight	85.59			-1.19	-1.88	
Wind 0 deg - No Ice		0.03	-35.29	-3941.27	-6.12	-1.12
Wind 30 deg - No Ice		17.68	-30.58	-3415.52	-1978.09	0.21
Wind 60 deg - No Ice		30.60	-17.67	-1974.91	-3420.53	1.48
Wind 90 deg - No Ice		35.31	-0.03	-5.43	-3946.95	2.35
Wind 120 deg - No Ice		30.57	17.62	1965.18	-3416.29	2.60
Wind 150 deg - No Ice		17.63	30.55	3408.90	-1970.74	2.15
Wind 180 deg - No Ice		-0.03	35.29	3938.89	2.36	1.12
Wind 210 deg - No Ice		-17.68	30.58	3413.14	1974.33	-0.21
Wind 240 deg - No Ice		-30.60	17.67	1972.52	3416.77	-1.48
Wind 270 deg - No Ice		-35.31	0.03	3.05	3943.19	-2.35
Wind 300 deg - No Ice		-30.57	-17.62	-1967.56	3412.53	-2.60
Wind 330 deg - No Ice		-17.63	-30.55	-3411.28	1966.98	-2.15
Member Ice	25.59					
Total Weight Ice	149.08			-5.75	-9.02	
Wind 0 deg - Ice		0.01	-15.57	-1699.68	-10.14	-0.79
Wind 30 deg - Ice		7.80	-13.49	-1473.29	-857.62	-0.15
Wind 60 deg - Ice		13.50	-7.79	-853.68	-1477.73	0.52
Wind 90 deg - Ice		15.58	-0.01	-6.87	-1704.29	1.06
Wind 120 deg - Ice		13.49	7.78	840.24	-1476.61	1.31
Wind 150 deg - Ice		7.78	13.48	1460.67	-855.69	1.21
Wind 180 deg - Ice		-0.01	15.57	1688.17	-7.91	0.79
Wind 210 deg - Ice		-7.80	13.49	1461.79	839.58	0.15
Wind 240 deg - Ice		-13.50	7.79	842.18	1459.68	-0.52
Wind 270 deg - Ice		-15.58	0.01	-4.64	1686.25	-1.06
Wind 300 deg - Ice		-13.49	-7.78	-851.75	1458.57	-1.31
Wind 330 deg - Ice		-7.78	-13.48	-1472.18	837.65	-1.21
Total Weight	85.59			-1.19	-1.88	
Wind 0 deg - Service		0.01	-11.43	-1275.89	-1.06	-0.36
Wind 30 deg - Service		5.73	-9.90	-1105.63	-639.67	0.07
Wind 60 deg - Service		9.91	-5.72	-639.10	-1106.79	0.48
Wind 90 deg - Service		11.44	-0.01	-1.30	-1277.27	0.76
Wind 120 deg - Service		9.90	5.71	636.87	-1105.42	0.84
Wind 150 deg - Service		5.71	9.89	1104.41	-637.29	0.69
Wind 180 deg - Service		-0.01	11.43	1276.04	1.69	0.36
Wind 210 deg - Service		-5.73	9.90	1105.78	640.30	-0.07
Wind 240 deg - Service		-9.91	5.72	639.25	1107.42	-0.48
Wind 270 deg - Service		-11.44	0.01	1.45	1277.90	-0.76
Wind 300 deg - Service		-9.90	-5.71	-636.72	1106.05	-0.84
Wind 330 deg - Service		-5.71	-9.89	-1104.26	637.92	-0.69

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	164 - 131.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-50.88	2.26	0.94
			Max. Mx	20	-21.32	449.92	-0.21
			Max. My	2	-21.32	-0.69	448.29
			Max. Vy	8	27.52	-449.42	1.52
			Max. Vx	2	-27.44	-0.69	448.29
			Max. Torque	2			3.97
L2	131.5 - 119.29	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.06	1.80	1.20
			Max. Mx	20	-23.37	624.08	-0.45
			Max. My	2	-23.37	-1.07	622.10
			Max. Vy	8	28.61	-623.77	1.85
			Max. Vx	2	-28.53	-1.07	622.10
			Max. Torque	24			2.97

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L3	119.29 - 78.79	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-93.71	-0.76	1.01
			Max. Mx	8	-45.21	-2115.20	3.41
			Max. My	2	-45.21	-3.49	2110.17
			Max. Vy	8	43.16	-2115.20	3.41
			Max. Vx	2	-43.12	-3.49	2110.17
			Max. Torque	10			-4.17
L4	78.79 - 39.88	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-126.43	-4.34	3.07
			Max. Mx	8	-69.29	-3888.71	5.60
			Max. My	2	-69.30	-6.00	3881.91
			Max. Vy	8	49.90	-3888.71	5.60
			Max. Vx	2	-49.87	-6.00	3881.91
			Max. Torque	10			-4.17
L5	39.88 - 1.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-170.06	-9.40	5.99
			Max. Mx	8	-102.69	-6436.28	8.39
			Max. My	2	-102.69	-9.23	6427.26
			Max. Vy	8	56.54	-6436.28	8.39
			Max. Vx	2	-56.50	-9.23	6427.26
			Max. Torque	10			-4.17

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	170.06	0.00	0.00
	Max. H_x	20	102.71	56.50	-0.05
	Max. H_z	2	102.71	-0.05	56.46
	Max. M_x	2	6427.26	-0.05	56.46
	Max. M_z	8	6436.28	-56.50	0.05
	Max. Torsion	22	4.17	48.91	28.19
	Min. Vert	25	77.04	28.21	48.88
	Min. H_x	8	102.71	-56.50	0.05
	Min. H_z	14	102.71	0.05	-56.46
	Min. M_x	14	-6424.35	0.05	-56.46
	Min. M_z	20	-6431.69	56.50	-0.05
	Min. Torsion	10	-4.17	-48.91	-28.19

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	85.59	0.00	0.00	-1.19	-1.88	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	102.71	0.05	-56.46	-6427.26	-9.23	-1.82
0.9 Dead+1.6 Wind 0 deg - No Ice	77.04	0.05	-56.46	-6395.67	-8.61	-1.81
1.2 Dead+1.6 Wind 30 deg - No Ice	102.71	28.29	-48.92	-5569.83	-3225.29	0.31
0.9 Dead+1.6 Wind 30 deg - No	77.04	28.29	-48.92	-5542.40	-3209.04	0.31

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Ice						
1.2 Dead+1.6 Wind 60 deg - No Ice	102.71	48.95	-28.27	-3220.36	-5577.75	2.35
0.9 Dead+1.6 Wind 60 deg - No Ice	77.04	48.95	-28.27	-3204.35	-5550.06	2.36
1.2 Dead+1.6 Wind 90 deg - No Ice	102.71	56.50	-0.05	-8.39	-6436.28	3.77
0.9 Dead+1.6 Wind 90 deg - No Ice	77.04	56.50	-0.05	-7.98	-6404.42	3.77
1.2 Dead+1.6 Wind 120 deg - No Ice	102.71	48.91	28.19	3205.44	-5570.83	4.17
0.9 Dead+1.6 Wind 120 deg - No Ice	77.04	48.91	28.19	3190.23	-5543.18	4.17
1.2 Dead+1.6 Wind 150 deg - No Ice	102.71	28.21	48.88	5559.99	-3213.29	3.46
0.9 Dead+1.6 Wind 150 deg - No Ice	77.04	28.21	48.88	5533.34	-3197.10	3.45
1.2 Dead+1.6 Wind 180 deg - No Ice	102.71	-0.05	56.46	6424.35	4.63	1.82
0.9 Dead+1.6 Wind 180 deg - No Ice	77.04	-0.05	56.46	6393.50	5.18	1.81
1.2 Dead+1.6 Wind 210 deg - No Ice	102.71	-28.29	48.92	5566.92	3220.70	-0.31
0.9 Dead+1.6 Wind 210 deg - No Ice	77.04	-28.29	48.92	5540.23	3205.61	-0.31
1.2 Dead+1.6 Wind 240 deg - No Ice	102.71	-48.95	28.27	3217.44	5573.16	-2.35
0.9 Dead+1.6 Wind 240 deg - No Ice	77.04	-48.95	28.27	3202.17	5546.64	-2.35
1.2 Dead+1.6 Wind 270 deg - No Ice	102.71	-56.50	0.05	5.47	6431.69	-3.76
0.9 Dead+1.6 Wind 270 deg - No Ice	77.04	-56.50	0.05	5.80	6400.99	-3.76
1.2 Dead+1.6 Wind 300 deg - No Ice	102.71	-48.91	-28.19	-3208.36	5566.23	-4.17
0.9 Dead+1.6 Wind 300 deg - No Ice	77.04	-48.91	-28.19	-3192.41	5539.75	-4.16
1.2 Dead+1.6 Wind 330 deg - No Ice	102.71	-28.21	-48.88	-5562.91	3208.69	-3.46
0.9 Dead+1.6 Wind 330 deg - No Ice	77.04	-28.21	-48.88	-5535.52	3193.67	-3.45
1.2 Dead+1.0 Ice+1.0 Temp	170.06	0.00	0.00	-5.99	-9.40	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	170.06	0.01	-15.57	-1766.70	-10.84	-0.83
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	170.06	7.80	-13.49	-1531.42	-891.63	-0.18
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	170.06	13.50	-7.79	-887.46	-1536.11	0.51
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	170.06	15.58	-0.01	-7.37	-1771.58	1.07
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	170.06	13.49	7.78	873.04	-1534.95	1.34
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	170.06	7.78	13.48	1517.85	-889.62	1.25
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	170.06	-0.01	15.57	1754.29	-8.51	0.83
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	170.06	-7.80	13.49	1519.01	872.29	0.18
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	170.06	-13.50	7.79	875.05	1516.77	-0.51
1.2 Dead+1.0 Wind 270	170.06	-15.58	0.01	-5.04	1752.24	-1.07

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300	170.06	-13.49	-7.78	-885.44	1515.60	-1.34
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 330	170.06	-7.78	-13.48	-1530.25	870.27	-1.25
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	85.59	0.01	-11.43	-1297.81	-3.31	-0.37
Dead+Wind 30 deg - Service	85.59	5.73	-9.90	-1124.79	-652.24	0.06
Dead+Wind 60 deg - Service	85.59	9.91	-5.72	-650.72	-1126.92	0.48
Dead+Wind 90 deg - Service	85.59	11.44	-0.01	-2.61	-1300.15	0.76
Dead+Wind 120 deg - Service	85.59	9.90	5.71	645.88	-1125.52	0.84
Dead+Wind 150 deg - Service	85.59	5.71	9.89	1120.97	-649.82	0.70
Dead+Wind 180 deg - Service	85.59	-0.01	11.43	1295.38	-0.51	0.37
Dead+Wind 210 deg - Service	85.59	-5.73	9.90	1122.37	648.43	-0.06
Dead+Wind 240 deg - Service	85.59	-9.91	5.72	648.30	1123.10	-0.48
Dead+Wind 270 deg - Service	85.59	-11.44	0.01	0.19	1296.34	-0.76
Dead+Wind 300 deg - Service	85.59	-9.90	-5.71	-648.30	1121.71	-0.84
Dead+Wind 330 deg - Service	85.59	-5.71	-9.89	-1123.40	646.00	-0.70

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-85.59	0.00	0.00	85.59	0.00	0.000%
2	0.05	-102.71	-56.46	-0.05	102.71	56.46	0.000%
3	0.05	-77.04	-56.46	-0.05	77.04	56.46	0.000%
4	28.29	-102.71	-48.92	-28.29	102.71	48.92	0.000%
5	28.29	-77.04	-48.92	-28.29	77.04	48.92	0.000%
6	48.95	-102.71	-28.27	-48.95	102.71	28.27	0.000%
7	48.95	-77.04	-28.27	-48.95	77.04	28.27	0.000%
8	56.50	-102.71	-0.05	-56.50	102.71	0.05	0.000%
9	56.50	-77.04	-0.05	-56.50	77.04	0.05	0.000%
10	48.91	-102.71	28.19	-48.91	102.71	-28.19	0.000%
11	48.91	-77.04	28.19	-48.91	77.04	-28.19	0.000%
12	28.21	-102.71	48.88	-28.21	102.71	-48.88	0.000%
13	28.21	-77.04	48.88	-28.21	77.04	-48.88	0.000%
14	-0.05	-102.71	56.46	0.05	102.71	-56.46	0.000%
15	-0.05	-77.04	56.46	0.05	77.04	-56.46	0.000%
16	-28.29	-102.71	48.92	28.29	102.71	-48.92	0.000%
17	-28.29	-77.04	48.92	28.29	77.04	-48.92	0.000%
18	-48.95	-102.71	28.27	48.95	102.71	-28.27	0.000%
19	-48.95	-77.04	28.27	48.95	77.04	-28.27	0.000%
20	-56.50	-102.71	0.05	56.50	102.71	-0.05	0.000%
21	-56.50	-77.04	0.05	56.50	77.04	-0.05	0.000%
22	-48.91	-102.71	-28.19	48.91	102.71	28.19	0.000%
23	-48.91	-77.04	-28.19	48.91	77.04	28.19	0.000%
24	-28.21	-102.71	-48.88	28.21	102.71	48.88	0.000%
25	-28.21	-77.04	-48.88	28.21	77.04	48.88	0.000%
26	0.00	-170.06	0.00	0.00	170.06	0.00	0.000%
27	0.01	-170.06	-15.57	-0.01	170.06	15.57	0.000%
28	7.80	-170.06	-13.49	-7.80	170.06	13.49	0.000%
29	13.50	-170.06	-7.79	-13.50	170.06	7.79	0.000%
30	15.58	-170.06	-0.01	-15.58	170.06	0.01	0.000%
31	13.49	-170.06	7.78	-13.49	170.06	-7.78	0.000%
32	7.78	-170.06	13.48	-7.78	170.06	-13.48	0.000%
33	-0.01	-170.06	15.57	0.01	170.06	-15.57	0.000%
34	-7.80	-170.06	13.49	7.80	170.06	-13.49	0.000%
35	-13.50	-170.06	7.79	13.50	170.06	-7.79	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
36	-15.58	-170.06	0.01	15.58	170.06	-0.01	0.000%
37	-13.49	-170.06	-7.78	13.49	170.06	7.78	0.000%
38	-7.78	-170.06	-13.48	7.78	170.06	13.48	0.000%
39	0.01	-85.59	-11.43	-0.01	85.59	11.43	0.000%
40	5.73	-85.59	-9.90	-5.73	85.59	9.90	0.000%
41	9.91	-85.59	-5.72	-9.91	85.59	5.72	0.000%
42	11.44	-85.59	-0.01	-11.44	85.59	0.01	0.000%
43	9.90	-85.59	5.71	-9.90	85.59	-5.71	0.000%
44	5.71	-85.59	9.89	-5.71	85.59	-9.89	0.000%
45	-0.01	-85.59	11.43	0.01	85.59	-11.43	0.000%
46	-5.73	-85.59	9.90	5.73	85.59	-9.90	0.000%
47	-9.91	-85.59	5.72	9.91	85.59	-5.72	0.000%
48	-11.44	-85.59	0.01	11.44	85.59	-0.01	0.000%
49	-9.90	-85.59	-5.71	9.90	85.59	5.71	0.000%
50	-5.71	-85.59	-9.89	5.71	85.59	9.89	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00014418
3	Yes	4	0.00000001	0.00009015
4	Yes	5	0.00000001	0.00003467
5	Yes	5	0.00000001	0.00001668
6	Yes	5	0.00000001	0.00003371
7	Yes	4	0.00000001	0.00099309
8	Yes	4	0.00000001	0.00020378
9	Yes	4	0.00000001	0.00013184
10	Yes	5	0.00000001	0.00003739
11	Yes	5	0.00000001	0.00001807
12	Yes	5	0.00000001	0.00003253
13	Yes	4	0.00000001	0.00095839
14	Yes	4	0.00000001	0.00015091
15	Yes	4	0.00000001	0.00009486
16	Yes	5	0.00000001	0.00003483
17	Yes	5	0.00000001	0.00001677
18	Yes	5	0.00000001	0.00003598
19	Yes	5	0.00000001	0.00001735
20	Yes	4	0.00000001	0.00021126
21	Yes	4	0.00000001	0.00013694
22	Yes	5	0.00000001	0.00003233
23	Yes	4	0.00000001	0.00095223
24	Yes	5	0.00000001	0.00003701
25	Yes	5	0.00000001	0.00001787
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00006536
28	Yes	5	0.00000001	0.00006885
29	Yes	5	0.00000001	0.00006889
30	Yes	5	0.00000001	0.00006547
31	Yes	5	0.00000001	0.00006867
32	Yes	5	0.00000001	0.00006836
33	Yes	5	0.00000001	0.00006496
34	Yes	5	0.00000001	0.00006820
35	Yes	5	0.00000001	0.00006822
36	Yes	5	0.00000001	0.00006499

37	Yes	5	0.00000001	0.00006834
38	Yes	5	0.00000001	0.00006859
39	Yes	4	0.00000001	0.00001425
40	Yes	4	0.00000001	0.00002428
41	Yes	4	0.00000001	0.00002356
42	Yes	4	0.00000001	0.00001556
43	Yes	4	0.00000001	0.00002848
44	Yes	4	0.00000001	0.00002341
45	Yes	4	0.00000001	0.00001424
46	Yes	4	0.00000001	0.00002435
47	Yes	4	0.00000001	0.00002582
48	Yes	4	0.00000001	0.00001556
49	Yes	4	0.00000001	0.00002350
50	Yes	4	0.00000001	0.00002783

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	164 - 131.5	7.950	41	0.3680	0.0010
L2	131.5 - 119.29	5.483	41	0.3495	0.0007
L3	125.29 - 78.79	5.034	41	0.3413	0.0006
L4	87.21 - 39.88	2.581	41	0.2591	0.0003
L5	49.13 - 1.5	0.869	41	0.1578	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
164.00	12' x 3" Dia Omni	41	7.950	0.3680	0.0010	311669
160.00	4 FT DISH	41	7.641	0.3669	0.0010	311669
156.00	A-Ant-23G-2-C	41	7.333	0.3656	0.0009	194793
154.00	LLPX310R	41	7.179	0.3649	0.0009	155834
151.50	Remote Radio Head FD R6 RRH	41	6.987	0.3640	0.0009	124667
144.00	AIR21 B2A/B4P	41	6.415	0.3602	0.0008	77917
138.00	DC6-48-60-18-8F Surge Arrestor	41	5.964	0.3559	0.0007	59936
134.00	7770.00	41	5.667	0.3522	0.0007	51882
124.00	DB844G65ZAXY	41	4.942	0.3393	0.0006	37627
114.00	531-70HD	41	4.248	0.3215	0.0005	32935
51.50	GPS	41	0.946	0.1647	0.0002	14941

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	164 - 131.5	39.367	6	1.8228	0.0051
L2	131.5 - 119.29	27.152	6	1.7309	0.0033
L3	125.29 - 78.79	24.927	6	1.6904	0.0031

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L4	87.21 - 39.88	12.782	6	1.2832	0.0017
L5	49.13 - 1.5	4.304	6	0.7814	0.0008

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
164.00	12' x 3" Dia Omni	6	39.367	1.8228	0.0051	63430
160.00	4 FT DISH	6	37.837	1.8172	0.0048	63430
156.00	A-Ant-23G-2-C	6	36.310	1.8110	0.0046	39644
154.00	LLPX310R	6	35.548	1.8076	0.0044	31715
151.50	Remote Radio Head FD R6 RRH	6	34.598	1.8028	0.0042	25372
144.00	AIR21 B2A/B4P	6	31.767	1.7842	0.0038	15857
138.00	DC6-48-60-18-8F Surge Arrestor	6	29.533	1.7628	0.0036	12197
134.00	7770.00	6	28.062	1.7444	0.0034	10556
124.00	DB844G65ZAXY	6	24.471	1.6807	0.0031	7612
114.00	531-70HD	6	21.036	1.5924	0.0027	6660
51.50	GPS	6	4.684	0.8158	0.0009	3018

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	164 - 131.5 (1)	TP53.42x47x0.3125	32.50	162.50	103.4	52.6760	-21.32	1112.38	0.019
L2	131.5 - 119.29 (2)	TP56.15x53.42x0.375	12.21	162.50	100.9	64.7894	-23.37	1437.35	0.016
L3	119.29 - 78.79 (3)	TP62.97x54.0585x0.4375	46.50	162.50	90.2	84.5934	-45.21	2338.92	0.019
L4	78.79 - 39.88 (4)	TP69.66x60.4813x0.5625	47.33	162.50	81.6	120.1620	-69.29	3951.81	0.018
L5	39.88 - 1.5 (5)	TP76x66.7412x0.5625	47.63	162.50	72.8	134.6840	-102.69	5096.65	0.020

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	164 - 131.5 (1)	TP53.42x47x0.3125	450.02	3531.85	0.127	0.00	3531.85	0.000
L2	131.5 - 119.29 (2)	TP56.15x53.42x0.375	624.51	4783.28	0.131	0.00	4783.28	0.000
L3	119.29 - 78.79	TP62.97x54.0585x0.4375	2116.66	7104.26	0.298	0.00	7104.26	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L4	78.79 - 39.88 (3)	TP69.66x60.4813x0.5625	3891.47	11742.75	0.331	0.00	11742.75	0.000
L5	39.88 - 1.5 (4)	TP76x66.7412x0.5625	6440.65	14202.67	0.453	0.00	14202.67	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	164 - 131.5 (1)	TP53.42x47x0.3125	27.54	1613.88	0.017	0.58	7072.34	0.000
L2	131.5 - 119.29 (2)	TP56.15x53.42x0.375	28.63	2134.62	0.013	0.58	9578.25	0.000
L3	119.29 - 78.79 (3)	TP62.97x54.0585x0.4375	43.19	2833.69	0.015	2.35	14225.92	0.000
L4	78.79 - 39.88 (4)	TP69.66x60.4813x0.5625	49.94	4244.46	0.012	2.35	23514.17	0.000
L5	39.88 - 1.5 (5)	TP76x66.7412x0.5625	56.57	4576.00	0.012	2.35	28440.08	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	164 - 131.5 (1)	0.019	0.127	0.000	0.017	0.000	0.147 ✔	1.000	4.8.2 ✔
L2	131.5 - 119.29 (2)	0.016	0.131	0.000	0.013	0.000	0.147 ✔	1.000	4.8.2 ✔
L3	119.29 - 78.79 (3)	0.019	0.298	0.000	0.015	0.000	0.318 ✔	1.000	4.8.2 ✔
L4	78.79 - 39.88 (4)	0.018	0.331	0.000	0.012	0.000	0.349 ✔	1.000	4.8.2 ✔
L5	39.88 - 1.5 (5)	0.020	0.453	0.000	0.012	0.000	0.474 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	164 - 131.5	Pole	TP53.42x47x0.3125	1	-21.32	1112.38	14.7	Pass
L2	131.5 - 119.29	Pole	TP56.15x53.42x0.375	2	-23.37	1437.35	14.7	Pass
L3	119.29 - 78.79	Pole	TP62.97x54.0585x0.4375	3	-45.21	2338.92	31.8	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L4	78.79 - 39.88	Pole	TP69.66x60.4813x0.5625	4	-69.29	3951.81	34.9	Pass
L5	39.88 - 1.5	Pole	TP76x66.7412x0.5625	5	-102.69	5096.65	47.4	Pass
							Summary	
						Pole (L5)	47.4	Pass
						RATING =	**47.4**	**Pass**

Program Version 7.0.5.1 - 2/1/2016 File:J:/Jobs/1805800.WI/64_CTFF001A/05_Structural/Tower/Backup Documentation/ERI Files/164' EEI Monopole Greenwich, CT.eri

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Subject:	Flange Bolts and Flangeplate Analysis
Location:	164-ft EEI Monopole Greenwich, CT
Rev. 0: 7/5/18	Prepared by: T.J.L. Checked by: C.F.C. Job No. 18058.64

Flange Bolt and Flange Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 450·ft·kips	(Input From tnxTower)
Shear Force =	Shear := 28·kips	(Input From tnxTower)
Axial Force =	Axial := 51·kips	(Input From tnxTower)

Flange Bolt Data:

Use AST MA325

Number of Flange Bolts =	N := 12	(User Input)
Diameter of Bolt Circle =	D_{bc} := 58·in	(User Input)
Bolt Minimum Tensile Strength =	F_{ub} := 120·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Flange Bolts =	D := 1.00·in	(User Input)
Threads per Inch =	n := 8	(User Input)

Flange Plate Data:

Use AST MA36

Plate Yield Strength =	Fy_{bp} := 36·ksi	(User Input)
Flange Plate Thickness =	t_{bp} := 1.0·in	(User Input)
Flange Plate Diameter =	D_{bp} := 61.0·in	(User Input)
Outer Pole Diameter =	D_{pole} := 53.42·in	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 29 \cdot in$

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

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

$d_1 = 14.50 \cdot in$ $d_7 = -14.50 \cdot in$

$d_2 = 25.11 \cdot in$ $d_8 = -25.11 \cdot in$

$d_3 = 29.00 \cdot in$ $d_9 = -29.00 \cdot in$

$d_4 = 25.11 \cdot in$ $d_{10} = -25.11 \cdot in$

$d_5 = 14.50 \cdot in$ $d_{11} = -14.50 \cdot in$

$d_6 = 0.00 \cdot in$ $d_{12} = -0.00 \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 26.71 \cdot in$

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

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

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

$MA_3 = 2.29 \cdot in$ $MA_9 = 0.00 \cdot in$

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

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

$MA_6 = 0.00 \cdot in$ $MA_{12} = 0.00 \cdot in$

Effective Width of Flangeplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 23.6 \cdot in$

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 5.046 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.606 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 0.878 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.22 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.066 \cdot in^3$

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 26.8 \cdot kips$

Maximum Shear Force = $V_{Max} := \frac{Shear}{N} = 2.3 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := \left(0.75 \cdot F_{ub} \cdot 0.75 \cdot A_g\right) = 53 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{\Phi R_{nt}} = 50.52 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{\Phi R_{nt}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Design Shear Strength = $\Phi R_{nv} := \left(0.75 \cdot 0.45 \cdot F_{ub} \cdot A_g\right) = 31.8 \cdot kips$

Condition2 = $Condition2 := if\left[\left(\frac{V_{Max}}{\Phi R_{nv}}\right)^2 + \left(\frac{T_{Max}}{\Phi R_{nt}}\right)^2 \le 1.00, "OK", "Overstressed"\right]$

Condition2 = "OK"

Flange Plate Analysis:

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

$C_1 = 19.8 \cdot kips$ $C_7 = -11.3 \cdot kips$

$C_2 = 31.1 \cdot kips$ $C_8 = -22.6 \cdot kips$

$C_3 = 35.3 \cdot kips$ $C_9 = -26.8 \cdot kips$

$C_4 = 31.1 \cdot kips$ $C_{10} = -22.6 \cdot kips$

$C_5 = 19.8 \cdot kips$ $C_{11} = -11.3 \cdot kips$

$C_6 = 4.3 \cdot kips$ $C_{12} = 4.2 \cdot kips$

Maximum Bending Stress in Plate =

$$f_{bp} := \sum_i \frac{4 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^2\right)} = 13.7 \cdot ksi$$

Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 32.4 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 42.3 \cdot \%$

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

Condition3 = "Ok"

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Subject:	Anchor Bolt and Baseplate Analysis
Location:	164-FT EEI Monopole Greenwich, CT
Rev. 0: 7/5/18	Prepared by: T.J.L. Checked by: C.F.C. Job No. 18058.64

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 6441·ft·kips	(Input From tnxTower)
Shear Force =	Shear := 57·kips	(Input From tnxTower)
Axial Force =	Axial := 103·kips	(Input From tnxTower)

Anchor Bolt Data:

ASTMA615 Grade 75

Number of Anchor Bolts =	N := 30	(User Input)
Diameter of Bolt Circle =	D_{bc} := 86·in	(User Input)
Bolt Ultimate Strength =	F_u := 100·ksi	(User Input)
Bolt Yield Strength =	F_y := 75·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	D := 2.25·in	(User Input)
Threads per Inch =	n := 4.5	(User Input)
Top of Concrete to Bot Leveling Nut =	l_{ar} := 2·in	(User Input)

Base Plate Data:

Use AST MA572 Grade 60

Plate Yield Strength =	Fy_{bp} := 60·ksi	(User Input)
Base Plate Thickness =	t_{bp} := 3.0·in	(User Input)
Base Plate Diameter =	D_{bp} := 92.0·in	(User Input)
Outer Pole Diameter =	D_{pole} := 76.0·in	(User Input)
	η := 0.5	For Ungrouted Base Plate per TIA-222-G Section 4.9.9

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 43 \cdot in$

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

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

$d_1 = 8.94 \cdot in$

$d_2 = 17.49 \cdot in$

$d_3 = 25.27 \cdot in$

$d_4 = 31.96 \cdot in$

$d_5 = 37.24 \cdot in$

$d_6 = 40.90 \cdot in$

$d_7 = 42.76 \cdot in$

$d_8 = 42.76 \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 38 \cdot in$

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

$MA_1 = 0.00 \cdot in$

$MA_2 = 0.00 \cdot in$

$MA_3 = 0.00 \cdot in$

$MA_4 = 0.00 \cdot in$

$MA_5 = 0.00 \cdot in$

$MA_6 = 2.90 \cdot in$

$MA_7 = 4.76 \cdot in$

$MA_8 = 4.76 \cdot in$

Effective Width of Baseplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 41.5 \cdot in$

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 2.773 \times 10^4 \cdot in^2$

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

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

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

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

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

Tensile Root Diameter = $d_{rt} := D - \frac{0.9743 \cdot in}{n} = 2.033 \cdot in$

Plastic Section Modulus = $Z := \frac{d_{rt}^3}{6} = 1.401 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 116.4 \cdot kips$

Maximum Compressive Force = $P_u := OM \cdot \frac{R_{bc}}{I_p} + \frac{Axial}{N} = 123.3 \cdot kips$

Maximum Shear Force = $V_u := \frac{Shear}{N} = 1.9 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := 0.8 \cdot F_u \cdot A_n = 259.815 \cdot k$

Bolt % of Capacity = $\frac{\left(P_u + \frac{V_u}{\eta}\right)}{\Phi R_{nt}} \cdot 100 = 48.9$

Condition1 = $Condition1 := if\left[\frac{\left(P_u + \frac{V_u}{\eta}\right)}{\Phi R_{nt}} \le 1.00, "OK", "Overstressed"\right]$

Condition1 = "OK"

Design Shear Strength = $\Phi R_{nv} := 0.75 \cdot 0.45 \cdot F_u \cdot A_g = 134.193 \cdot k$

Design Flexural Strength = $\Phi R_{nm} := 0.9 \cdot F_y \cdot Z = 94.597 \cdot in \cdot k$

$$M_u := \begin{cases} 0 & \text{if } l_{ar} < D \\ 0.65 \cdot l_{ar} \cdot V_u & \text{otherwise} \end{cases} = 0 \cdot in \cdot k$$

Bolt % of Capacity = $\left[\left(\frac{V_u}{\Phi R_{nv}}\right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}}\right)^2\right] \cdot 100 = 22.5$

Condition2 = $Condition2 := if\left[\left(\frac{V_u}{\Phi R_{nv}}\right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}}\right)^2 \le 1.00, \text{"OK"}, \text{"Overstressed"}\right]$

Condition2 = "OK"

Base Plate Analysis:

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

$C_1 = 28.3 \cdot kips$

$C_2 = 52.2 \cdot kips$

$C_3 = 73.9 \cdot kips$

$C_4 = 92.5 \cdot kips$

$C_5 = 107.2 \cdot kips$

$C_6 = 117.4 \cdot kips$

$C_7 = 122.6 \cdot kips$

$C_8 = 122.6 \cdot kips$

Maximum Bending Stress in Plate = $f_{bp} := \sum_i \frac{4 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^2\right)} = 19.8 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 54 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 36.7 \cdot \%$

Condition2 = $Condition2 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition2 = "Ok"

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Subject:	CAISSON FOUNDATION
Location:	164-ft EEI Monopole Greenwich, CT
Rev. 0: 7/5/18	Prepared by: TJL Checked by: C.F.C. Job No. 18058.64

Caisson Foundation:

Input Data:

Shear Force =	$S := 57k$	*USER INPUT-FROM tnxTower*
Overturning Moment =	$M := 6441ft \cdot k$	*USER INPUT-FROM tnxTower*
Applied Axial Load =	$A1 := 103k$	*USER INPUT-FROM tnxTower*
Bending Moment =	$Mu := 6746ft \cdot k$	*USER INPUT--FROM LPILE*
Moment Capacity =	$Mn := 12372ft \cdot k$	*USER INPUT--FROM LPILE*
Foundation Diameter =	$d := 9.0ft$	*USER INPUT*
Overall Length of Caisson =	$L_c := 28.0ft$	*USER INPUT*
Depth From Top of Caisson to Grade =	$L_{pag} := 1.0ft$	*USER INPUT*
Number of Rebar =	$n := 33$	*USER INPUT*
Area of Rebar =	$Ar := 1.560in^2$	*USER INPUT*
Rebar Yield Strength =	$fy := 60ksi$	*USER INPUT*
Concrete Comp Strength =	$f'c := 3ksi$	*USER INPUT*

Check Moment Capacity:

Factor of Safety = $FS := \frac{0.9 \cdot Mn}{Mu} = 1.7$

Factor of Safety Required = $FS_{reqd} := 1$

$FOSCheck := if(FS \geq FS_{reqd}, "OK", "NO GOOD")$

FOSCheck = "OK"

LPILE Plus for Windows, Version 5.0 (5.0.47)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

This program is licensed to:

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Files Used for Analysis

Path to file locations:
J:\Jobs\1805800.WI\64_CTFF001A\05_Structural\Tower\Backup Documentation\Foundation\
Name of input data file: Greenwich Hospital Caisson Analysis.lpd
Name of output file: Greenwich Hospital Caisson Analysis.lpo
Name of plot output file: Greenwich Hospital Caisson Analysis.lpp
Name of runtime file: Greenwich Hospital Caisson Analysis.lpr

Time and Date of Analysis

Date: July 5, 2018 Time: 7:36:38

Problem Title

18058.64 - CTFF001A

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 3:
- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- Analysis includes computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 100
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-04 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 8

Pile Structural Properties and Geometry

Pile Length = 336.00 in

Depth of ground surface below top of pile = 12.00 in

Slope angle of ground surface = 0.00 deg.

Structural properties of pile defined using 2 points

Point No.	Point Depth in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	108.00000	6678285.	9160.9000	3600000.
2	336.0000	108.00000	6678285.	9160.9000	3600000.

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness

that the above values of moment of inertia and modulus of are not used
for any computations other than total stress due to combined axial
loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 12.000 in
Distance from top of pile to bottom of layer = 48.000 in
p-y subgrade modulus k for top of soil layer = 20.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 20.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 48.000 in
Distance from top of pile to bottom of layer = 72.000 in
p-y subgrade modulus k for top of soil layer = 90.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 90.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 72.000 in
Distance from top of pile to bottom of layer = 132.000 in
p-y subgrade modulus k for top of soil layer = 150.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 150.000 lbs/in**3

Layer 4 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 132.000 in
Distance from top of pile to bottom of layer = 360.000 in
p-y subgrade modulus k for top of soil layer = 250.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 250.000 lbs/in**3

(Depth of lowest layer extends 24.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 8 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	12.00	0.05800

2	48.00	0.05800
3	48.00	0.06900
4	72.00	0.06900
5	72.00	0.06900
6	132.00	0.06900
7	132.00	0.07500
8	360.00	0.07500

Shear Strength of Soils

Shear strength parameters with depth defined using 8 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	12.000	0.00000	20.00	------	------
2	48.000	0.00000	20.00	------	------
3	48.000	0.00000	30.00	------	------
4	72.000	0.00000	30.00	------	------
5	72.000	0.00000	35.00	------	------
6	132.000	0.00000	35.00	------	------
7	132.000	0.00000	42.00	------	------
8	360.000	0.00000	42.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 57000.000 lbs
Bending moment at pile head = 77292000.000 in-lbs
Axial load at pile head = 103000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Load Case Number 2

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 24000.000 lbs
Bending moment at pile head = 32232000.000 in-lbs
Axial load at pile head = 102000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

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Number of sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 108.0000 in

Material Properties:

Compressive Strength of Concrete = 3.000 kip/in**2
Yield Stress of Reinforcement = 60. kip/in**2
Modulus of Elasticity of Reinforcement = 29000. kip/in**2
Number of Reinforcing Bars = 33
Area of Single Bar = 1.56000 in**2
Number of Rows of Reinforcing Bars = 33

Area of Steel = 51.480 in**2
Area of Shaft = 9160.884 in**2
Percentage of Steel Reinforcement = 0.562 percent
Cover Thickness (edge to bar center) = 4.000 in

Unfactored Axial Squash Load Capacity = 26317.78 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	1.560	49.943
2	1.560	49.491
3	1.560	48.591
4	1.560	47.250
5	1.560	45.482
6	1.560	43.301
7	1.560	40.729
8	1.560	37.787
9	1.560	34.504
10	1.560	30.908
11	1.560	27.032
12	1.560	22.911
13	1.560	18.583
14	1.560	14.087
15	1.560	9.463
16	1.560	4.753
17	1.560	0.000
18	1.560	-4.753
19	1.560	-9.463
20	1.560	-14.087
21	1.560	-18.583
22	1.560	-22.911
23	1.560	-27.032
24	1.560	-30.908
25	1.560	-34.504
26	1.560	-37.787
27	1.560	-40.729
28	1.560	-43.301
29	1.560	-45.482
30	1.560	-47.250
31	1.560	-48.591
32	1.560	-49.491
33	1.560	-49.943

Axial Thrust Force = 102000.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
11415961.	2.283192E+13	5.000000E-07	0.00003050	60.99838811	93.75901675	825.65545
22709595.	2.270959E+13	0.00000100	0.00005760	57.60000139	175.44501	1552.75768
33889413.	2.259294E+13	0.00000150	0.00008473	56.48394710	255.82465	2280.58816
44945747.	2.247287E+13	0.00000200	0.00011182	55.91005200	334.72717	3007.49830
55888049.	2.235522E+13	0.00000250	0.00013901	55.60401946	412.52515	3737.18552
55888049.	1.862935E+13	0.00000300	0.00008737	29.12172657	259.67438	6509.48271
55888049.	1.596801E+13	0.00000350	0.00009988	28.53742880	295.54619	7653.70272
55888049.	1.397201E+13	0.00000400	0.00011213	28.03168219	330.34130	8805.75543
55888049.	1.241957E+13	0.00000450	0.00012439	27.64153665	364.90797	9957.38885
55888049.	1.117761E+13	0.00000500	0.00013666	27.33233052	399.24545	11108.60028
55888049.	1.016146E+13	0.00000550	0.00014895	27.08200318	433.35296	12259.38752
55888049.	9.314675E+12	0.00000600	0.00016164	26.94043082	468.33251	13398.51089
55888049.	8.598161E+12	0.00000650	0.00017390	26.75407416	501.79954	14550.18169
55888049.	7.984007E+12	0.00000700	0.00018618	26.59660810	535.03982	15701.39205
55888049.	7.451740E+12	0.00000750	0.00019847	26.46226805	568.05252	16852.13901
55888049.	6.986006E+12	0.00000800	0.00021077	26.34672815	600.83677	18002.42020
55888049.	6.575065E+12	0.00000850	0.00022310	26.24668926	633.39189	19152.23105
55888049.	6.209783E+12	0.00000900	0.00023544	26.15957648	665.71697	20301.56932
55888049.	5.882952E+12	0.00000950	0.00024779	26.08336204	697.81120	21450.43135
55888049.	5.588805E+12	0.00001000	0.00026016	26.01642698	729.67388	22598.81259

55888049.	5.322671E+12	0.00001050	0.00027255	25.95745164	761.30401
23746.71121					
55888049.	5.080732E+12	0.00001100	0.00028496	25.90536422	792.70082
24894.12288					
55888049.	4.859830E+12	0.00001150	0.00029738	25.85927635	823.86344
26041.04422					
55888049.	4.657337E+12	0.00001200	0.00030982	25.81845099	854.79109
27187.47076					
55888049.	4.471044E+12	0.00001250	0.00032228	25.78226048	885.48270
28333.40110					
55888049.	4.299081E+12	0.00001300	0.00033475	25.75018662	915.93762
29478.82899					
55888049.	4.139855E+12	0.00001350	0.00034724	25.72177881	946.15485
30623.75176					
57470698.	4.105050E+12	0.00001400	0.00035975	25.69665402	976.13351
31768.16545					
59380939.	4.095237E+12	0.00001450	0.00037228	25.67448074	1005.87265
32912.06666					
61288981.	4.085932E+12	0.00001500	0.00038482	25.65497249	1035.37135
34055.45159					
63194824.	4.077085E+12	0.00001550	0.00039739	25.63788468	1064.62884
35198.31429					
65098434.	4.068652E+12	0.00001600	0.00040997	25.62299198	1093.64392
36340.65399					
66999810.	4.060595E+12	0.00001650	0.00042257	25.61010772	1122.41580
37482.46455					
68898943.	4.052879E+12	0.00001700	0.00043518	25.59906453	1150.94359
38623.74110					
70795802.	4.045474E+12	0.00001750	0.00044782	25.58970791	1179.22610
39764.48197					
72690396.	4.038355E+12	0.00001800	0.00046047	25.58191234	1207.26266
40904.67931					
74582688.	4.031497E+12	0.00001850	0.00047315	25.57555228	1235.05195
42044.33257					
76472671.	4.024877E+12	0.00001900	0.00048584	25.57052475	1262.59309
43183.43606					
78360335.	4.018479E+12	0.00001950	0.00049855	25.56673640	1289.88512
44321.98458					
82128647.	4.006275E+12	0.00002050	0.00052403	25.56254572	1343.71774
46597.39823					
85887480.	3.994766E+12	0.00002150	0.00054959	25.56238800	1396.54116
48870.54038					
89636721.	3.983854E+12	0.00002250	0.00057523	25.56578690	1448.34698
51141.37099					
93376231.	3.973457E+12	0.00002350	0.00060095	25.57234329	1499.12629
53409.85263					
97105898.	3.963506E+12	0.00002450	0.00062675	25.58173209	1548.87035
55675.94157					
1.008256E+08	3.953944E+12	0.00002550	0.00065264	25.59367329	1597.56977

57939.59847
1.045103E+08 3.943785E+12 0.00002650 0.00067855 25.60582370 1645.11020
60000.00000
1.074500E+08 3.907272E+12 0.00002750 0.00070288 25.55911142 1688.51738
60000.00000
1.098930E+08 3.855894E+12 0.00002850 0.00072611 25.47759265 1728.91910
60000.00000
1.120249E+08 3.797453E+12 0.00002950 0.00074866 25.37819105 1767.14594
60000.00000
1.139123E+08 3.734829E+12 0.00003050 0.00077064 25.26702207 1803.51156
60000.00000
1.158936E+08 3.679162E+12 0.00003150 0.00079380 25.20000011 1840.95386
60000.00000
1.172451E+08 3.607541E+12 0.00003250 0.00081609 25.11050874 1876.03416
60000.00000
1.186263E+08 3.541084E+12 0.00003350 0.00083652 24.97069377 1907.27934
60000.00000
1.199664E+08 3.477287E+12 0.00003450 0.00085687 24.83680111 1937.66674
60000.00000
1.211211E+08 3.411861E+12 0.00003550 0.00087665 24.69443375 1966.46191
60000.00000
1.222723E+08 3.349925E+12 0.00003650 0.00089648 24.56100136 1994.62446
60000.00000
1.232692E+08 3.287180E+12 0.00003750 0.00091580 24.42124110 2021.36782
60000.00000
1.242411E+08 3.227042E+12 0.00003850 0.00093508 24.28767997 2047.39418
60000.00000
1.251709E+08 3.168883E+12 0.00003950 0.00095424 24.15801018 2072.60905
60000.00000
1.259836E+08 3.110706E+12 0.00004050 0.00097300 24.02463573 2096.63156
60000.00000
1.267934E+08 3.055262E+12 0.00004150 0.00099179 23.89855796 2120.08060
60000.00000
1.275874E+08 3.002057E+12 0.00004250 0.00101056 23.77797443 2142.88355
60000.00000
1.282582E+08 2.948465E+12 0.00004350 0.00102886 23.65191275 2164.47826
60000.00000
1.289265E+08 2.897224E+12 0.00004450 0.00104719 23.53228194 2185.52508
60000.00000
1.295921E+08 2.848177E+12 0.00004550 0.00106555 23.41867000 2206.02117
60000.00000
1.302336E+08 2.800722E+12 0.00004650 0.00108810 23.39999861 2230.60863
60000.00000
1.308647E+08 2.755046E+12 0.00004750 0.00110611 23.28662807 2249.40010
60000.00000
1.313953E+08 2.709181E+12 0.00004850 0.00112344 23.16379791 2266.90296
60000.00000
1.319238E+08 2.665127E+12 0.00004950 0.00114081 23.04658109 2283.91362
60000.00000

1.324501E+08	2.622774E+12	0.00005050	0.00115820	22.93464607	2300.42908
60000.00000					
1.329237E+08	2.581042E+12	0.00005150	0.00117533	22.82186776	2316.16059
60000.00000					
1.333477E+08	2.539956E+12	0.00005250	0.00119220	22.70860344	2331.14843
60000.00000					
1.337698E+08	2.500370E+12	0.00005350	0.00120911	22.60013813	2345.66685
60000.00000					
1.341900E+08	2.462201E+12	0.00005450	0.00122604	22.49621755	2359.71350
60000.00000					
1.346081E+08	2.425371E+12	0.00005550	0.00124301	22.39659387	2373.28539
60000.00000					
1.350243E+08	2.389810E+12	0.00005650	0.00126001	22.30104822	2386.38008
60000.00000					
1.353761E+08	2.354367E+12	0.00005750	0.00127662	22.20206827	2398.67279
60000.00000					
1.357079E+08	2.319793E+12	0.00005850	0.00129313	22.10487145	2410.41652
60000.00000					
1.360379E+08	2.286351E+12	0.00005950	0.00130968	22.01143724	2421.70680
60000.00000					
1.366924E+08	2.222641E+12	0.00006150	0.00134286	21.83513242	2442.91666
60000.00000					
1.373395E+08	2.162827E+12	0.00006350	0.00137616	21.67182130	2462.28143
60000.00000					
1.386452E+08	2.116721E+12	0.00006550	0.00141480	21.60000032	2482.48043
60000.00000					
1.386452E+08	2.054003E+12	0.00006750	0.00144863	21.46117669	2497.89714
60000.00000					
1.389698E+08	1.999565E+12	0.00006950	0.00147988	21.29330474	2510.31371
60000.00000					
1.394373E+08	1.950172E+12	0.00007150	0.00151125	21.13642126	2521.08122
60000.00000					
1.398863E+08	1.903215E+12	0.00007350	0.00154261	20.98788375	2530.14433
60000.00000					
1.402382E+08	1.857459E+12	0.00007550	0.00157311	20.83594412	2537.32028
60000.00000					
1.405844E+08	1.813993E+12	0.00007750	0.00160373	20.69326454	2542.91205
60000.00000					
1.409250E+08	1.772642E+12	0.00007950	0.00163445	20.55916589	2546.90133
60000.00000					
1.412598E+08	1.733250E+12	0.00008150	0.00166529	20.43303663	2549.26942
60000.00000					
1.415882E+08	1.695667E+12	0.00008350	0.00169625	20.31432635	2549.69449
60000.00000					
1.418878E+08	1.659507E+12	0.00008550	0.00172712	20.20019943	2544.59528
60000.00000					
1.421234E+08	1.624267E+12	0.00008750	0.00175731	20.08351690	2540.60439
60000.00000					
1.423563E+08	1.590573E+12	0.00008950	0.00178761	19.97329742	2544.76198

60000.00000
1.425867E+08 1.558325E+12 0.00009150 0.00181803 19.86914188 2547.72425
60000.00000
1.425867E+08 1.524992E+12 0.00009350 0.00185130 19.79999882 2549.59126
60000.00000
1.428175E+08 1.495471E+12 0.00009550 0.00189090 19.79999882 2547.59774
60000.00000
1.433815E+08 1.470580E+12 0.00009750 0.00192476 19.74108464 2542.60639
60000.00000
1.435856E+08 1.443071E+12 0.00009950 0.00195432 19.64141268 2538.36772
60000.00000
1.437881E+08 1.416632E+12 0.00010150 0.00198398 19.54656869 2541.74672
60000.00000
1.439335E+08 1.390662E+12 0.00010350 0.00201263 19.44570905 2544.89259
60000.00000
1.440758E+08 1.365647E+12 0.00010550 0.00204133 19.34910446 2547.29186
60000.00000
1.442167E+08 1.341551E+12 0.00010750 0.00207012 19.25689012 2548.94187
60000.00000
1.443564E+08 1.318323E+12 0.00010950 0.00209899 19.16884071 2549.83279
60000.00000
1.444938E+08 1.295909E+12 0.00011150 0.00212799 19.08515579 2548.79139
60000.00000
1.446286E+08 1.274261E+12 0.00011350 0.00215716 19.00581926 2545.25420
60000.00000
1.447627E+08 1.253357E+12 0.00011550 0.00218639 18.92975932 2541.70630
60000.00000
1.448960E+08 1.233157E+12 0.00011750 0.00221568 18.85681182 2538.14762
60000.00000
1.450285E+08 1.213627E+12 0.00011950 0.00224503 18.78683192 2534.57791
60000.00000
1.451602E+08 1.194734E+12 0.00012150 0.00227444 18.71967477 2538.15588
60000.00000
1.452901E+08 1.176438E+12 0.00012350 0.00230389 18.65499598 2541.49675
60000.00000
1.453811E+08 1.158415E+12 0.00012550 0.00233242 18.58503860 2544.14717
60000.00000
1.454715E+08 1.140953E+12 0.00012750 0.00236101 18.51773983 2546.31112
60000.00000
1.455613E+08 1.124025E+12 0.00012950 0.00238966 18.45298058 2547.98312
60000.00000
1.456503E+08 1.107607E+12 0.00013150 0.00241837 18.39065140 2549.15766
60000.00000
1.457388E+08 1.091676E+12 0.00013350 0.00244714 18.33064932 2549.82904
60000.00000
1.458261E+08 1.076208E+12 0.00013550 0.00247600 18.27306443 2549.47453
60000.00000
1.459113E+08 1.061173E+12 0.00013750 0.00250502 18.21835059 2546.59383
60000.00000

1.459961E+08	1.046567E+12	0.00013950	0.00253408	18.16547781	2543.70647
60000.00000					
1.461648E+08	1.018570E+12	0.00014350	0.00259232	18.06495291	2537.91163
60000.00000					
1.466286E+08	9.940921E+11	0.00014750	0.00265500	18.00000054	2531.33751
60000.00000					
1.476109E+08	9.743296E+11	0.00015150	0.00272700	18.00000054	2536.11274
60000.00000					
1.484654E+08	9.547614E+11	0.00015550	0.00279900	18.00000054	2543.79153
60000.00000					
1.484654E+08	9.308175E+11	0.00015950	0.00286745	17.97772425	2548.12970
60000.00000					
1.484654E+08	9.080452E+11	0.00016350	0.00292420	17.88500780	2549.63012
60000.00000					
1.484654E+08	8.863606E+11	0.00016750	0.00298149	17.79992920	2549.05568
60000.00000					
1.484654E+08	8.656874E+11	0.00017150	0.00304051	17.72893542	2544.38560
60000.00000					
1.484654E+08	8.459567E+11	0.00017550	0.00309966	17.66186839	2539.69426
60000.00000					
1.484654E+08	8.271053E+11	0.00017950	0.00315893	17.59847707	2534.98131
60000.00000					
1.484654E+08	8.090757E+11	0.00018350	0.00321832	17.53854257	2530.24604
60000.00000					
1.484654E+08	7.918154E+11	0.00018750	0.00327785	17.48185569	2525.48807
60000.00000					
1.484654E+08	7.752762E+11	0.00019150	0.00333751	17.42822653	2520.70693
60000.00000					
1.484654E+08	7.594138E+11	0.00019550	0.00339772	17.37962168	2526.00396
60000.00000					
1.484654E+08	7.441874E+11	0.00019950	0.00345924	17.33956236	2532.23530
60000.00000					
1.484654E+08	7.295597E+11	0.00020350	0.00352095	17.30197495	2537.57177
60000.00000					
1.484654E+08	7.154959E+11	0.00020750	0.00358285	17.26675326	2541.99117
60000.00000					
1.484654E+08	7.019640E+11	0.00021150	0.00364495	17.23379427	2545.46962
60000.00000					
1.484654E+08	6.889345E+11	0.00021550	0.00370536	17.19426280	2547.81157
60000.00000					
1.484654E+08	6.763799E+11	0.00021950	0.00376541	17.15448672	2549.29150
60000.00000					
1.484654E+08	6.642747E+11	0.00022350	0.00382563	17.11689287	2549.96051
60000.00000					

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 148465.39377 in-kip

Axial Thrust Force = 103000.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
11416043.	2.283209E+13	5.000000E-07	0.00003053	61.06633383	93.86402450	826.64066
22709630.	2.270963E+13	0.00000100	0.00005763	57.62801653	175.53015	1553.57012
33889418.	2.259295E+13	0.00000150	0.00008476	56.50691217	255.92755	2281.58714
44945750.	2.247287E+13	0.00000200	0.00011185	55.92739731	334.82900	3008.50433
55888010.	2.235520E+13	0.00000250	0.00013904	55.61799163	412.62586	3738.19850
55888010.	1.862934E+13	0.00000300	0.00008750	29.16657203	260.07591	6505.58116
55888010.	1.596800E+13	0.00000350	0.00010003	28.57893652	295.97637	7649.48969
55888010.	1.397200E+13	0.00000400	0.00011227	28.06807870	330.76906	8801.53344
55888010.	1.241956E+13	0.00000450	0.00012453	27.67395490	365.33324	9953.15827
55888010.	1.117760E+13	0.00000500	0.00013681	27.36156553	399.66822	11104.36121
55888010.	1.016146E+13	0.00000550	0.00014910	27.10863751	433.77327	12255.13935
55888010.	9.314668E+12	0.00000600	0.00016180	26.96693641	468.78502	13393.89892
55888010.	8.598155E+12	0.00000650	0.00017406	26.77860028	502.24949	14545.55852
55888010.	7.984001E+12	0.00000700	0.00018634	26.61943477	535.48713	15696.75823
55888010.	7.451735E+12	0.00000750	0.00019863	26.48362058	568.49714	16847.49484
55888010.	6.986001E+12	0.00000800	0.00021093	26.36679322	601.27874	17997.76511
55888010.	6.575060E+12	0.00000850	0.00022326	26.26561815	633.83118	19147.56508
55888010.	6.209779E+12	0.00000900	0.00023560	26.17749792	666.15361	20296.89182
55888010.	5.882948E+12	0.00000950	0.00024795	26.10038227	698.24518	

21445.74228					
55888010.	5.588801E+12	0.00001000	0.00026033	26.03263289	730.10508
22594.11288					
55888010.	5.322668E+12	0.00001050	0.00027272	25.97292370	761.73249
23741.99997					
55888010.	5.080728E+12	0.00001100	0.00028512	25.92016679	793.12650
24889.40085					
55888010.	4.859827E+12	0.00001150	0.00029754	25.87347060	824.28638
26036.31043					
55888010.	4.657334E+12	0.00001200	0.00030999	25.83208519	855.21119
27182.72605					
55888010.	4.471041E+12	0.00001250	0.00032244	25.79538614	885.90016
28328.64305					
55888010.	4.299078E+12	0.00001300	0.00033492	25.76283914	916.35227
29474.05899					
55888010.	4.139853E+12	0.00001350	0.00034741	25.73399037	946.56658
30618.97093					
57500428.	4.107173E+12	0.00001400	0.00035992	25.70846003	976.54243
31763.37221					
59410624.	4.097284E+12	0.00001450	0.00037245	25.68590695	1006.27866
32907.26194					
61318630.	4.087909E+12	0.00001500	0.00038499	25.66604787	1035.77456
34050.63380					
63224427.	4.078995E+12	0.00001550	0.00039755	25.64862853	1065.02910
35193.48492					
65128004.	4.070500E+12	0.00001600	0.00041013	25.63343006	1094.04139
36335.81072					
67029338.	4.062384E+12	0.00001650	0.00042273	25.62025613	1122.81036
37477.60853					
68928426.	4.054613E+12	0.00001700	0.00043535	25.60893935	1151.33517
38618.87281					
70825241.	4.047157E+12	0.00001750	0.00044799	25.59932524	1179.61470
39759.60117					
72719785.	4.039988E+12	0.00001800	0.00046064	25.59128505	1207.64819
40899.78676					
74612035.	4.033083E+12	0.00001850	0.00047332	25.58469647	1235.43451
42039.42672					
76501977.	4.026420E+12	0.00001900	0.00048601	25.57945329	1262.97268
43178.51643					
78389606.	4.019980E+12	0.00001950	0.00049872	25.57546216	1290.26180
44317.05016					
82157819.	4.007698E+12	0.00002050	0.00052420	25.57088846	1344.08818
46592.43847					
85916560.	3.996119E+12	0.00002150	0.00054976	25.57038635	1396.90538
48865.55341					
89665710.	3.985143E+12	0.00002250	0.00057540	25.57347304	1448.70494
51136.35578					
93405134.	3.974687E+12	0.00002350	0.00060112	25.57974619	1499.47799
53404.80756					

97134695.	3.964681E+12	0.00002450	0.00062693	25.58887106	1549.21547
55670.86934					
1.008543E+08	3.955069E+12	0.00002550	0.00065281	25.60057086	1597.90828
57934.49772					
1.045395E+08	3.944889E+12	0.00002650	0.00067873	25.61255711	1645.44493
60000.00000					
1.074811E+08	3.908402E+12	0.00002750	0.00070306	25.56579334	1688.85372
60000.00000					
1.099246E+08	3.857005E+12	0.00002850	0.00072630	25.48412651	1729.25185
60000.00000					
1.120571E+08	3.798546E+12	0.00002950	0.00074885	25.38458329	1767.47497
60000.00000					
1.139451E+08	3.735904E+12	0.00003050	0.00077084	25.27328235	1803.83688
60000.00000					
1.158936E+08	3.679162E+12	0.00003150	0.00079380	25.20000011	1840.95386
60000.00000					
1.172787E+08	3.608577E+12	0.00003250	0.00081631	25.11713916	1876.38302
60000.00000					
1.186606E+08	3.542108E+12	0.00003350	0.00083674	24.97721475	1907.62470
60000.00000					
1.200013E+08	3.478297E+12	0.00003450	0.00085709	24.84321910	1938.00841
60000.00000					
1.211559E+08	3.412842E+12	0.00003550	0.00087687	24.70069402	1966.79668
60000.00000					
1.223070E+08	3.350877E+12	0.00003650	0.00089670	24.56711036	1994.95214
60000.00000					
1.233046E+08	3.288122E+12	0.00003750	0.00091602	24.42726642	2021.69177
60000.00000					
1.242764E+08	3.227958E+12	0.00003850	0.00093530	24.29357010	2047.71120
60000.00000					
1.252067E+08	3.169791E+12	0.00003950	0.00095447	24.16382951	2072.92223
60000.00000					
1.260194E+08	3.111589E+12	0.00004050	0.00097323	24.03032631	2096.93756
60000.00000					
1.268291E+08	3.056124E+12	0.00004150	0.00099202	23.90412945	2120.37955
60000.00000					
1.276237E+08	3.002910E+12	0.00004250	0.00101080	23.78348798	2143.17837
60000.00000					
1.282945E+08	2.949298E+12	0.00004350	0.00102909	23.65731364	2164.76591
60000.00000					
1.289626E+08	2.898037E+12	0.00004450	0.00104742	23.53757983	2185.80573
60000.00000					
1.296282E+08	2.848972E+12	0.00004550	0.00106579	23.42386490	2206.29452
60000.00000					
1.302336E+08	2.800722E+12	0.00004650	0.00108810	23.39999861	2230.60863
60000.00000					
1.309019E+08	2.755830E+12	0.00004750	0.00110639	23.29237014	2249.69495
60000.00000					
1.314325E+08	2.709948E+12	0.00004850	0.00112372	23.16944021	2267.19005

60000.00000
1.319609E+08 2.665877E+12 0.00004950 0.00114108 23.05212361 2284.19266
60000.00000
1.324872E+08 2.623509E+12 0.00005050 0.00115847 22.94009525 2300.70014
60000.00000
1.329613E+08 2.581773E+12 0.00005150 0.00117561 22.82729441 2316.42705
60000.00000
1.333853E+08 2.540673E+12 0.00005250 0.00119248 22.71393996 2331.40685
60000.00000
1.338074E+08 2.501072E+12 0.00005350 0.00120939 22.60539097 2345.91732
60000.00000
1.342275E+08 2.462889E+12 0.00005450 0.00122633 22.50138670 2359.95579
60000.00000
1.346456E+08 2.426046E+12 0.00005550 0.00124329 22.40168256 2373.51947
60000.00000
1.350617E+08 2.390472E+12 0.00005650 0.00126029 22.30606288 2386.60603
60000.00000
1.354140E+08 2.355026E+12 0.00005750 0.00127691 22.20707005 2398.89336
60000.00000
1.357458E+08 2.320440E+12 0.00005850 0.00129342 22.10979921 2410.62885
60000.00000
1.360757E+08 2.286987E+12 0.00005950 0.00130997 22.01629418 2421.91087
60000.00000
1.367301E+08 2.223254E+12 0.00006150 0.00134315 21.83985418 2443.10399
60000.00000
1.373772E+08 2.163420E+12 0.00006350 0.00137645 21.67641753 2462.45183
60000.00000
1.386452E+08 2.116721E+12 0.00006550 0.00141480 21.60000032 2482.48043
60000.00000
1.386452E+08 2.054003E+12 0.00006750 0.00144898 21.46634907 2498.05419
60000.00000
1.390084E+08 2.000121E+12 0.00006950 0.00148024 21.29835802 2510.45158
60000.00000
1.394758E+08 1.950711E+12 0.00007150 0.00151161 21.14135867 2521.19950
60000.00000
1.399253E+08 1.903745E+12 0.00007350 0.00154297 20.99279219 2530.24446
60000.00000
1.402771E+08 1.857974E+12 0.00007550 0.00157348 20.84074956 2537.40072
60000.00000
1.406232E+08 1.814493E+12 0.00007750 0.00160409 20.69797021 2542.97247
60000.00000
1.409637E+08 1.773129E+12 0.00007950 0.00163482 20.56377822 2546.94146
60000.00000
1.412984E+08 1.733723E+12 0.00008150 0.00166566 20.43755883 2549.28893
60000.00000
1.416266E+08 1.696127E+12 0.00008350 0.00169662 20.31876487 2549.62948
60000.00000
1.419266E+08 1.659961E+12 0.00008550 0.00172750 20.20463151 2544.52881
60000.00000

1.421621E+08	1.624710E+12	0.00008750	0.00175769	20.08786851	2540.67704
60000.00000					
1.423950E+08	1.591006E+12	0.00008950	0.00178799	19.97757500	2544.81649
60000.00000					
1.426254E+08	1.558747E+12	0.00009150	0.00181841	19.87334865	2547.76032
60000.00000					
1.426254E+08	1.525405E+12	0.00009350	0.00185130	19.79999882	2549.59126
60000.00000					
1.428175E+08	1.495471E+12	0.00009550	0.00189090	19.79999882	2547.59774
60000.00000					
1.434206E+08	1.470981E+12	0.00009750	0.00192524	19.74602848	2542.52184
60000.00000					
1.436246E+08	1.443463E+12	0.00009950	0.00195481	19.64628249	2538.28273
60000.00000					
1.438271E+08	1.417016E+12	0.00010150	0.00198446	19.55136770	2541.83376
60000.00000					
1.439731E+08	1.391044E+12	0.00010350	0.00201313	19.45054668	2544.96292
60000.00000					
1.441152E+08	1.366021E+12	0.00010550	0.00204183	19.35387450	2547.34326
60000.00000					
1.442561E+08	1.341918E+12	0.00010750	0.00207062	19.26159579	2548.97407
60000.00000					
1.443958E+08	1.318683E+12	0.00010950	0.00209950	19.17348200	2549.84551
60000.00000					
1.445331E+08	1.296261E+12	0.00011150	0.00212851	19.08977133	2548.70112
60000.00000					
1.446679E+08	1.274607E+12	0.00011350	0.00215768	19.01037043	2545.16360
60000.00000					
1.448019E+08	1.253696E+12	0.00011550	0.00218691	18.93424612	2541.61540
60000.00000					
1.449351E+08	1.233490E+12	0.00011750	0.00221620	18.86124390	2538.05627
60000.00000					
1.450676E+08	1.213955E+12	0.00011950	0.00224555	18.79120606	2534.48622
60000.00000					
1.451993E+08	1.195056E+12	0.00012150	0.00227497	18.72399741	2538.26834
60000.00000					
1.453297E+08	1.176759E+12	0.00012350	0.00230443	18.65937012	2541.59471
60000.00000					
1.454207E+08	1.158731E+12	0.00012550	0.00233296	18.58935803	2544.22867
60000.00000					
1.455110E+08	1.141263E+12	0.00012750	0.00236156	18.52200776	2546.37601
60000.00000					
1.456008E+08	1.124330E+12	0.00012950	0.00239021	18.45720023	2548.03123
60000.00000					
1.456898E+08	1.107907E+12	0.00013150	0.00241892	18.39482278	2549.18876
60000.00000					
1.457782E+08	1.091972E+12	0.00013350	0.00244769	18.33477241	2549.84294
60000.00000					
1.458655E+08	1.076498E+12	0.00013550	0.00247656	18.27717787	2549.37677

60000.00000
1.459506E+08 1.061459E+12 0.00013750 0.00250558 18.22241253 2546.49587
60000.00000
1.460354E+08 1.046849E+12 0.00013950 0.00253464 18.16949147 2543.60826
60000.00000
1.462041E+08 1.018844E+12 0.00014350 0.00259288 18.06887645 2537.81288
60000.00000
1.466286E+08 9.940921E+11 0.00014750 0.00265500 18.00000054 2531.33751
60000.00000
1.476109E+08 9.743296E+11 0.00015150 0.00272700 18.00000054 2536.11274
60000.00000
1.484654E+08 9.547614E+11 0.00015550 0.00279900 18.00000054 2543.79153
60000.00000
1.484654E+08 9.308175E+11 0.00015950 0.00286833 17.98325711 2548.20421
60000.00000
1.484654E+08 9.080452E+11 0.00016350 0.00292509 17.89045376 2549.66313
60000.00000
1.484654E+08 8.863606E+11 0.00016750 0.00298244 17.80561656 2548.88858
60000.00000
1.484654E+08 8.656874E+11 0.00017150 0.00304147 17.73453265 2544.21722
60000.00000
1.484654E+08 8.459567E+11 0.00017550 0.00310062 17.66737872 2539.52464
60000.00000
1.484654E+08 8.271053E+11 0.00017950 0.00315990 17.60390693 2534.81035
60000.00000
1.484654E+08 8.090757E+11 0.00018350 0.00321930 17.54389518 2530.07376
60000.00000
1.484654E+08 7.918154E+11 0.00018750 0.00327884 17.48713750 2525.31436
60000.00000
1.484654E+08 7.752762E+11 0.00019150 0.00333850 17.43344396 2520.53167
60000.00000
1.484654E+08 7.594138E+11 0.00019550 0.00339877 17.38502258 2526.32546
60000.00000
1.484654E+08 7.441874E+11 0.00019950 0.00346031 17.34491175 2532.51473
60000.00000
1.484654E+08 7.295597E+11 0.00020350 0.00352203 17.30728251 2537.80812
60000.00000
1.484654E+08 7.154959E+11 0.00020750 0.00358394 17.27201897 2542.18286
60000.00000
1.484654E+08 7.019640E+11 0.00021150 0.00364605 17.23901814 2545.61510
60000.00000
1.484654E+08 6.889345E+11 0.00021550 0.00370654 17.19972163 2547.91876
60000.00000
1.484654E+08 6.763799E+11 0.00021950 0.00376660 17.15989727 2549.35247
60000.00000
1.484654E+08 6.642747E+11 0.00022350 0.00382683 17.12226480 2549.97400
60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 148465.39377

in-kip

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
Specified shear force at pile head = 57000.000 lbs
Specified moment at pile head = 77292000.000 in-lbs
Specified axial load at pile head = 103000.000 lbs

Depth X	Deflect. y	Moment M	Shear V	Slope S	Total Stress	Flx. Rig. EI	Soil Res. p	Es*h F/L
in	in	lbs-in	lbs	Rad.	lbs/in**2	lbs-in**2	lbs/in	
0.000	0.844737	7.73E+07	57000.	-0.005760	636.219	4.02E+12	0.000	0.000
26.880	0.696901	7.88E+07	55380.	-0.005238	648.667	4.02E+12	-207.398	999.936
53.760	0.563237	8.02E+07	43764.	-0.004706	659.887	4.01E+12	-965.249	5758.211
80.640	0.444003	8.09E+07	4230.625	-0.004165	665.783	4.01E+12	-2097.113	15870.
107.520	0.339325	8.02E+07	-67192.	-0.003624	659.582	4.01E+12	-3195.946	31646.
134.400	0.249043	7.71E+07	-1.67E+05	-0.003097	634.806	4.02E+12	-5162.745	69654.
161.280	0.172555	7.08E+07	-3.04E+05	-0.002602	583.467	4.05E+12	-4796.204	93392.
188.160	0.108647	6.10E+07	-4.20E+05	-0.002165	504.379	4.09E+12	-3749.973	1.16E+05
215.040	0.053770	4.85E+07	-5.01E+05	-0.001992	403.586	2.24E+13	-2217.224	1.39E+05
241.920	0.000920	3.45E+07	-5.33E+05	-0.001943	290.152	2.26E+13	-44.141	1.61E+05
268.800	-0.050825	2.05E+07	-4.98E+05	-0.001910	176.770	2.27E+13	2778.867	1.84E+05
295.680	-0.101914	8.50E+06	-3.78E+05	-0.001893	79.936	2.28E+13	6257.017	2.06E+05
322.560	-0.152722	1.08E+06	-1.55E+05	-0.001888	19.978	2.28E+13	10403.	2.29E+05

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection	=	0.84473678 in
Computed slope at pile head	=	-0.00575982
Maximum bending moment	=	80952005. lbs-in
Maximum shear force	=	-532995.55526 lbs
Depth of maximum bending moment	=	84.00000000 in
Depth of maximum shear force	=	241.92000 in
Number of iterations	=	45
Number of zero deflection points	=	1

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 2

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
Specified shear force at pile head = 24000.000 lbs
Specified moment at pile head = 32232000.000 in-lbs
Specified axial load at pile head = 102000.000 lbs

Depth X	Deflect. y	Moment M	Shear V	Slope S	Total Stress	Flx. Rig. EI	Soil Res. p	Es*h F/L
in	in	lbs-in	lbs	Rad.	lbs/in**2	lbs-in**2	lbs/in	
0.000	0.228910	3.22E+07	24000.	-0.001116	271.759	2.26E+13	0.000	0.000
26.880	0.199443	3.29E+07	23541.	-0.001077	276.982	2.26E+13	-59.354	999.936
53.760	0.171027	3.35E+07	19066.	-0.001037	281.832	2.26E+13	-500.970	9842.069
80.640	0.143681	3.38E+07	-862.396	-0.000997	284.166	2.26E+13	-1102.950	

```
25793.
 107.520  0.117412  3.33E+07   -34606. -0.000957   280.470  2.26E+13 -1374.708
39340.
 134.400  0.092206  3.19E+07   -73832. -0.000918   268.834  2.26E+13 -1943.263
70813.
 161.280  0.068015  2.92E+07 -1.26E+05 -0.000882   247.109  2.26E+13 -1890.497
93392.
 188.160  0.044752  2.51E+07 -1.73E+05 -0.000850   214.478  2.27E+13 -1544.640
1.16E+05
 215.040  0.022288  2.00E+07 -2.07E+05 -0.000823   172.956  2.27E+13  -919.053
1.39E+05
 241.920  0.000458  1.42E+07 -2.20E+05 -0.000803   126.194  2.28E+13   -21.977
1.61E+05
 268.800 -0.020920  8.45E+06 -2.05E+05 -0.000789    79.432  2.28E+13  1143.817
1.84E+05
 295.680 -0.042029  3.51E+06 -1.56E+05 -0.000782    39.482  2.28E+13  2580.394
2.06E+05
 322.560 -0.063022  4.46E+05   -64081. -0.000780    14.739  2.28E+13  4292.787
2.29E+05
```

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 2:

```
Pile-head deflection             =     0.22891000 in
Computed slope at pile head      =    -0.00111553
Maximum bending moment           =      33766394. lbs-in
Maximum shear force              =  -219777.67055 lbs
Depth of maximum bending moment  =    80.64000000 in
Depth of maximum shear force     =      241.92000 in
Number of iterations             =              5
Number of zero deflection points =              1
```

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacment in
Type 2 = Shear and Slope, M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment, S = Pile-head Slope, radians
Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 57000.	M= 7.73E+07	103000.	0.8447368	8.0952E+07	-532996.
1	V= 24000.	M= 3.22E+07	102000.	0.2289100	3.3766E+07	-219778.

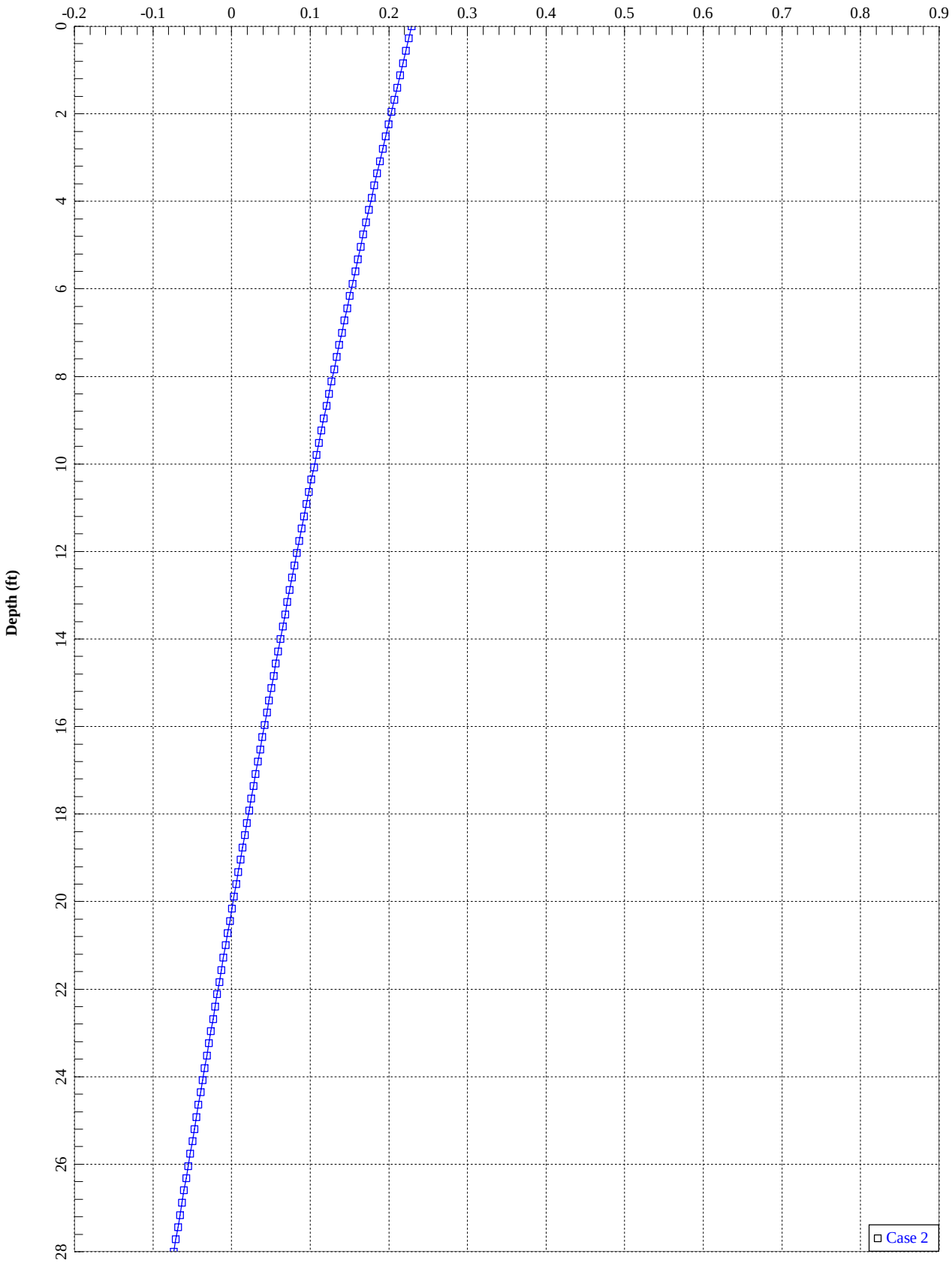
Computed Pile-head Stiffness Matrix Members
K22, K23, K32, K33 for Superstructure

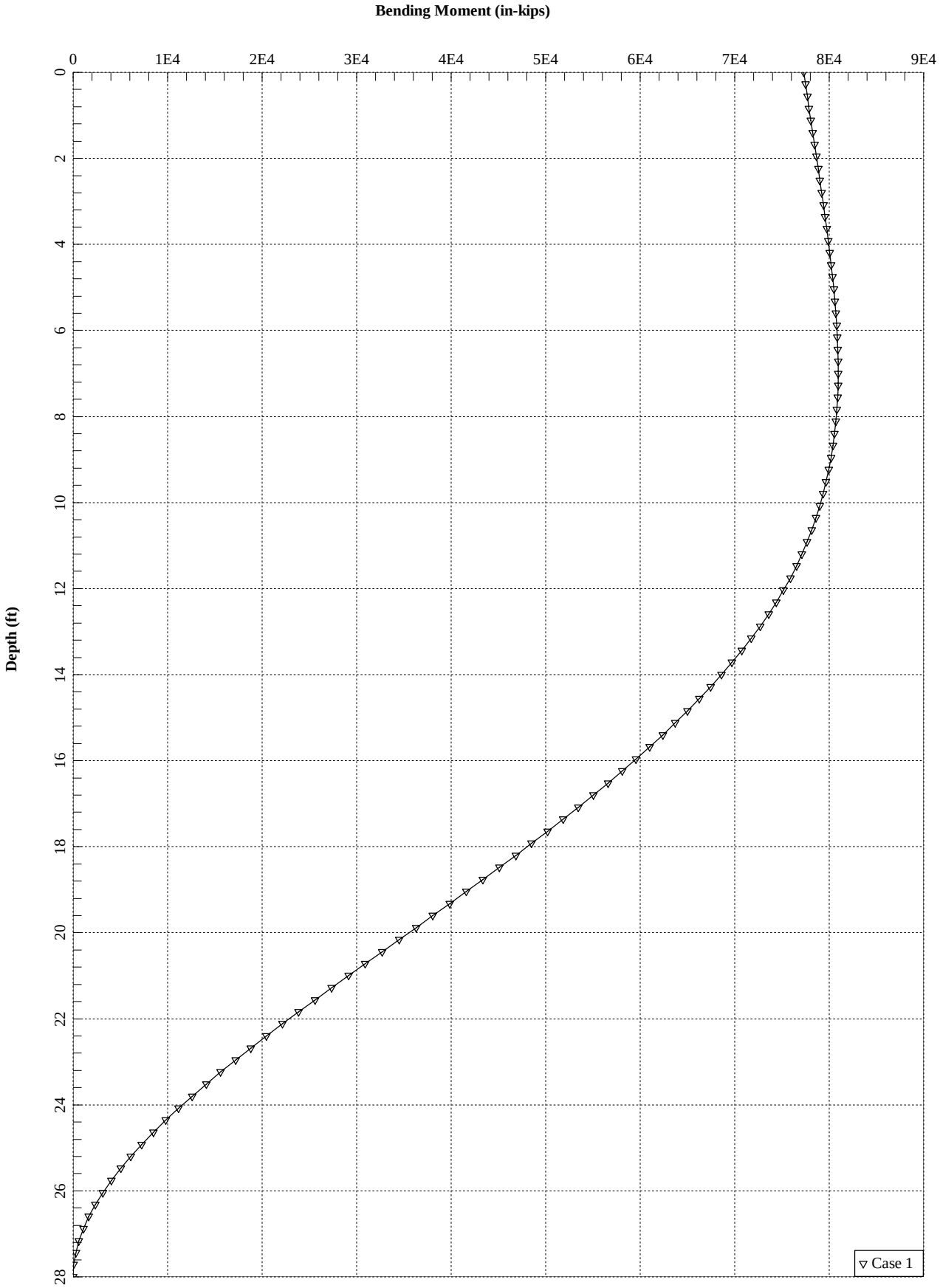
Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
0.00147273	5700.00008	1139539.	3870363.	7.737592E+08
0.00443336	17158.70975	3430353.	3870363.	7.737592E+08
0.00702671	27195.91152	5436980.	3870363.	7.737592E+08
0.00886672	34317.41951	6860705.	3870363.	7.737592E+08
0.01029394	39841.29025	7965032.	3870363.	7.737592E+08
0.01146007	44354.62127	8867333.	3870363.	7.737592E+08
0.01244601	48170.58828	9630217.	3870363.	7.737592E+08
0.01330008	51476.12926	10291058.	3870363.	7.737592E+08
0.01405342	54391.82304	10873961.	3870363.	7.737592E+08
0.01472730	57000.00000	11395385.	3870363.	7.737592E+08

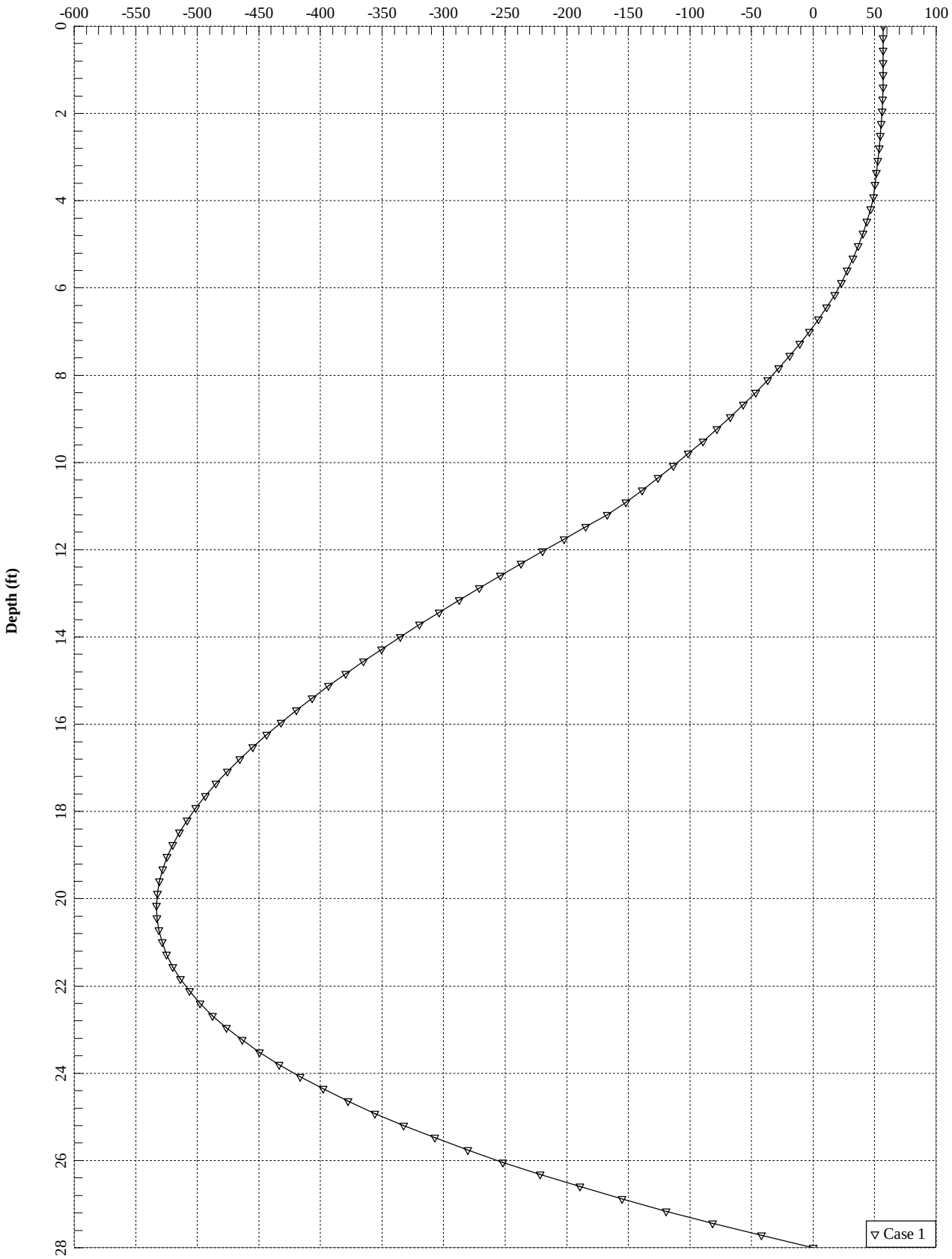
Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
0.00004112	31817.84304	7729200.	7.737592E+08	1.879618E+11
0.00012408	95790.92902	23267210.	7.720231E+08	1.875211E+11
0.00019726	151853.20186	36877656.	7.698137E+08	1.869498E+11
0.00024948	191644.65557	46534421.	7.681773E+08	1.865259E+11
0.00029016	222517.80220	54024790.	7.668834E+08	1.861906E+11
0.00032989	247773.04340	60144866.	7.510796E+08	1.823184E+11
0.00065388	271894.90809	65319318.	4.158184E+08	9.989512E+10
0.00084061	294161.13118	69801631.	3.499364E+08	8.303658E+10
0.00100466	315155.45861	73755312.	3.136945E+08	7.341340E+10
0.00112012	333455.74349	77292000.	2.976974E+08	6.900354E+10

K22 = abs(Shear Reaction/Top y)
K23 = abs(Shear Reaction/Top Rotation)
K32 = abs(Moment Reaction/Top y)
K33 = abs(Moment Reaction/Top Rotation)

The analysis ended normally.


Lateral Deflection (in)
-0.2
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 2


Bending Moment (in-kips)
0
1E4
2E4
3E4
4E4
5E4
6E4
7E4
8E4
9E4
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 1


Shear Force (kips)
-600
-550
-500
-450
-400
-350
-300
-250
-200
-150
-100
-50
0
50
100
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 1

RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CTFF001A_L600_1.1_draft

Section 1 - Site Information

Site ID: CTFF001A
Status: Draft
Version: 1.1
Project Type: L600
Approved: Not Approved
Approved By: Not Approved
Last Modified: 5/11/2018 11:46:38 AM
Last Modified By: GSM1900\AMurill9

Site Name: FF001/Greenwich_Hospital
Site Class: Monopole
Site Type: Structure Non Building
Solution Type:
Plan Year:
Market: CONNECTICUT
Vendor: Ericsson
Landlord: Greenwich Hospital

Latitude: 41.0339340000
Longitude: -73.6308290000
Address: 5 Perryridge Rd
City, State: Greenwich, CT
Region: NORTHEAST

RAN Template: 67D92DB Outdoor			AL Template: 67D92DB_2xAIR+1OP	
Sector Count: 3	**Antenna Count:** 9	**Coax Line Count:** 6	**TMA Count:** 3	**RRU Count:** 3

Section 2 - Existing Template Images

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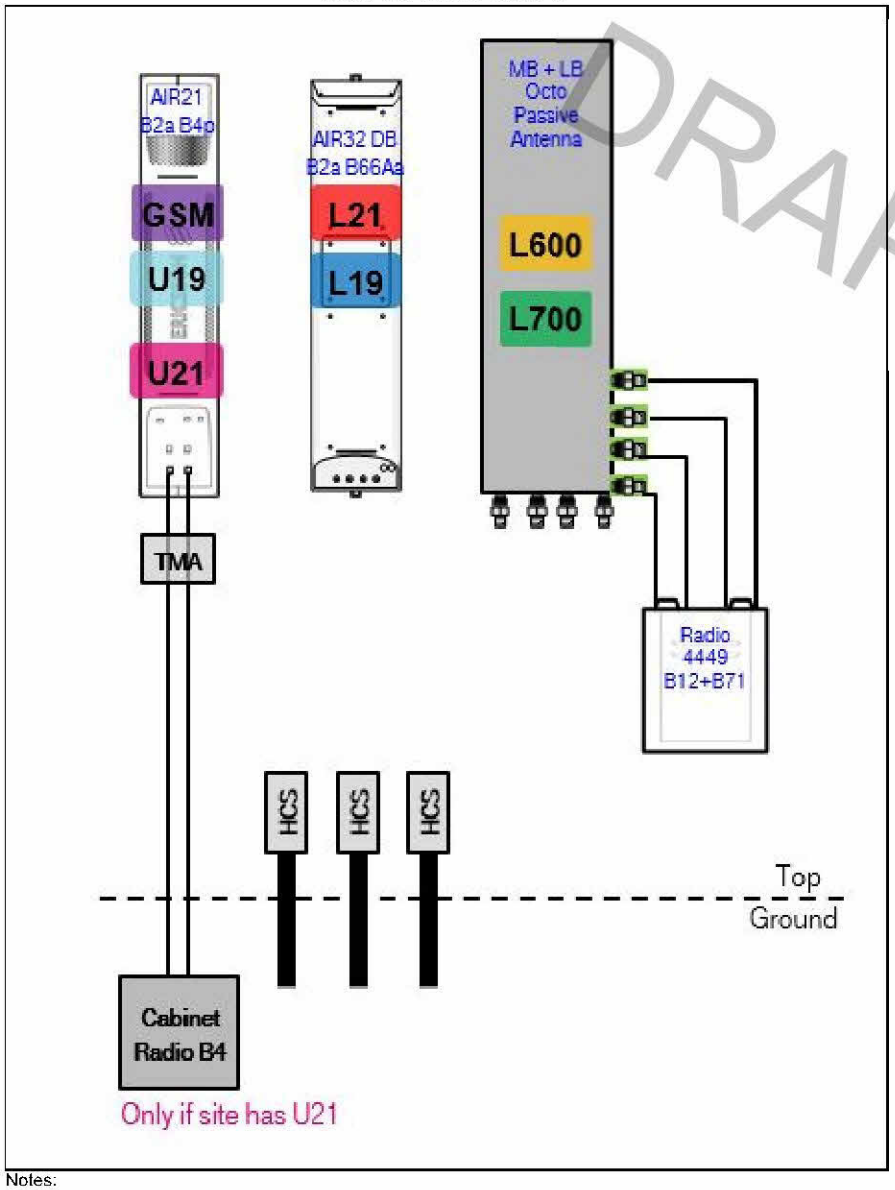
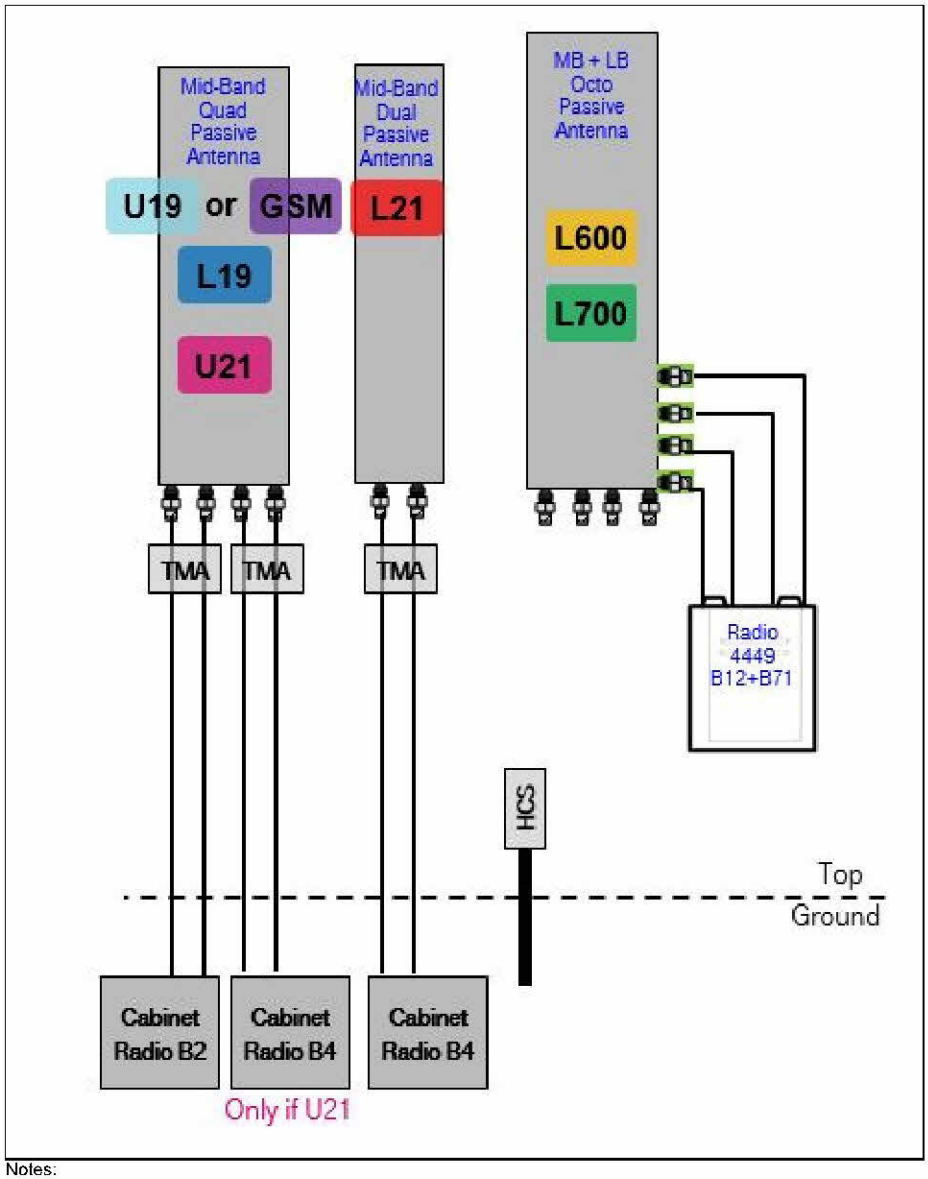
Section 3 - Proposed Template Images

67D92DB_2xAIR+1OP.JPG



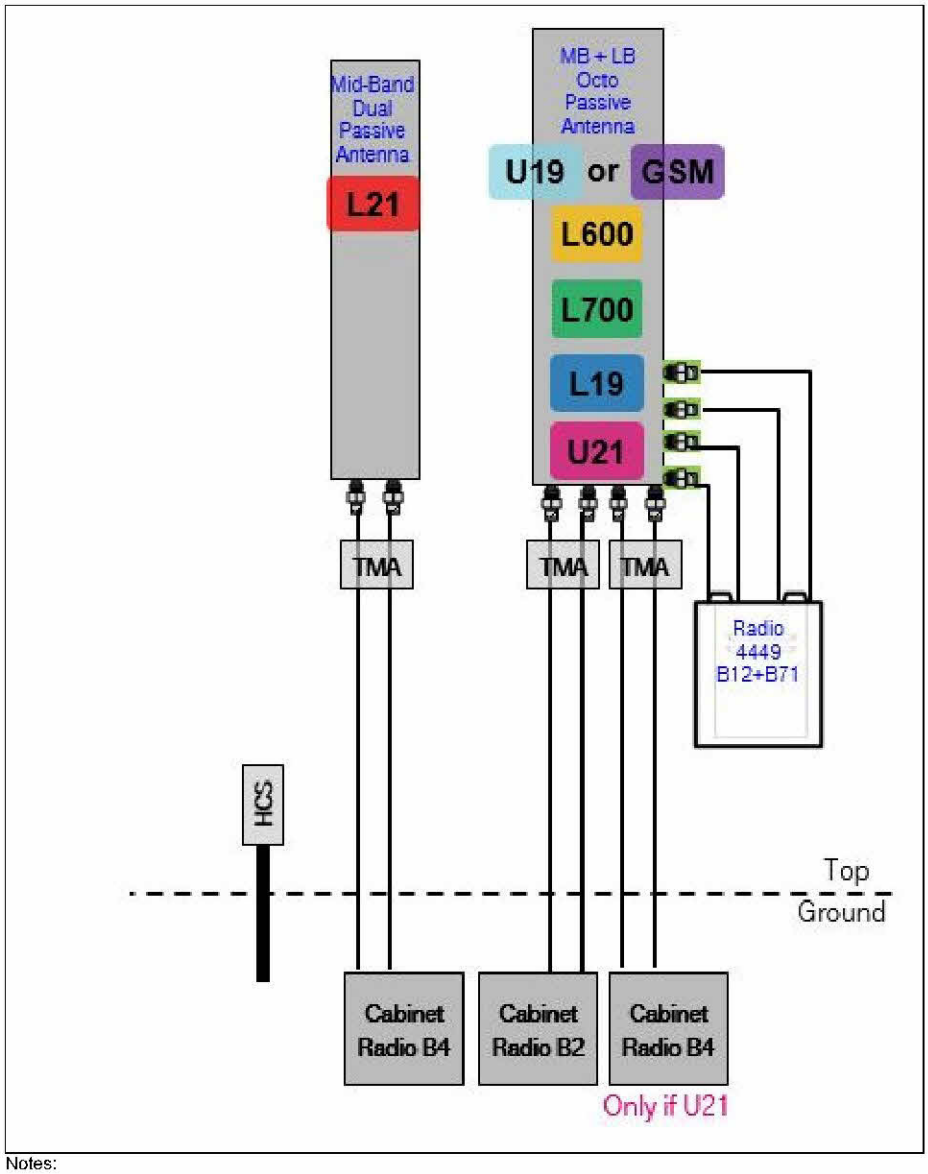
Notes:

67D94B_1DP+1QP+1OP.JPG



Notes:

67D94B_1DP+1OP.JPG


Mid-Band
Dual
Passive
Antenna
L21
MB + LB
Octo
Passive
Antenna
U19 or GSM
L600
L700
L19
U21
TMA
TMA
TMA
Radio
4449
B12+B71
HCS
Top
Ground
Cabinet
Radio B4
Cabinet
Radio B2
Cabinet
Radio B4
Only if U21

Notes:

Section 4 - Siteplan Images

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RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CTFF001A_L600_1.1_draft

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 704Bu

Enclosure	1	2	3
Enclosure Type	RBS 6102	S8000 Outdoor	S8000 Outdoor
Baseband	DUG20, DUW30 (x2), DUS41		
Radio	RUS01 B4 (x6), RUS01 B2 (x6)		

Proposed RAN Equipment

Template: 67D92DB Outdoor

Enclosure	1	2
Enclosure Type	RBS 6131	Ancillary Equipment
Baseband	DUW30 U1900 (DECOMMISSIONED); DUW30 U2100; DUG20 G1900; BB 5216 L2100, L1900, L700, L600	
Hybrid Cable System		Ericsson 6x12 HCS 4AWG 120m (x3)
Multiplexer	XMU	
Radio	RU22 (x6) U2100	

RAN Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CTFF001A_L600_1.1_draft

Section 6 - A&L Equipment

Existing Template: 704Bu
Proposed Template: 67D92DB_2xAIR+1OP

Sector 1 (Existing) view from behind

Address	**Address:** **City, State:** ,		**Latitude:** 41.0339340000 **Longitude:** -73.6308290000		
Coverage Type	A - Outdoor Macro				
Antenna	1	2	3	4	
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)	Empty Antenna Mount (Empty mount)	Empty Antenna Mount (Empty mount)	Andrew - LNX-6515DS-A1M (Dual)	
Azimuth	40			40	
M. Tilt	0			0	
Height	144			144	
Ports	P1	P2			P3
Active Tech.	G1900	U2100 L2100			L700
Dark Tech.	U1900				
Restricted Tech.					
Decomm. Tech.					
E. Tilt	6	6			2
Cables	1-5/8" Coax - 375 ft. **(x4)**	1-5/8" Coax - 375 ft. **(x4)**			1-5/8" Coax - 375 ft. **(x4)**
TMAs	Generic Twin Style 1A - PCS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)			Generic Twin Style 1C - 700 (AtAntenna)
Diplexers / Combiners					
Radio					RRUS11 B12 (At Antenna)
Sector Equipment					

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CTFF001A_L600_1.1_draft

Sector 1 (Proposed) view from behind										
Coverage Type	A - Outdoor Macro									
Antenna	1		2				3			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	40		40				40			
M. Tilt	0		0				0			
Height	144		144				144			
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	G1900	U2100			L700 L600	L700 L600	L2100	L2100	L1900	L1900
Dark Tech.										
Restricted Tech.										
Decomm. Tech.	U1900									
E. Tilt										
Cables		Generic Feeder Coax (x2) Coax Jumper (x2)			Coax Jumper (x2)	Coax Jumper (x2)				
TMAs		Generic Twin Style 1B - AWS (AtAntenna)								
Diplexers / Combiners										
Radio					Radio 4449 B71+B12 (At Antenna)					
Sector Equipment										

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CTFF001A_L600_1.1_draft

Sector 2 (Existing) view from behind

Address	**Address:** **City, State:** ,		**Latitude:** 41.0339340000 **Longitude:** -73.6308290000		
Coverage Type	A - Outdoor Macro				
Antenna	1		2	3	4
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		Empty Antenna Mount (Empty mount)	Empty Antenna Mount (Empty mount)	Andrew - LNX-6515DS-A1M (Dual)
Azimuth	140				140
M. Tilt	3				0
Height	144				144
Ports	P1	P2			P3
Active Tech.	G1900	U2100 L2100			L700
Dark Tech.	U1900				
Restricted Tech.					
Decomm. Tech.					
E. Tilt	7	7			2
Cables	1-5/8" Coax - 375 ft. **(x4)**	1-5/8" Coax - 375 ft. **(x4)**			1-5/8" Coax - 375 ft. **(x4)**
TMAs	Generic Twin Style 1A - PCS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)			Generic Twin Style 1C - 700 (AtAntenna)
Diplexers / Combiners					
Radio					RRUS11 B12 (At Antenna)
Sector Equipment					

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CTFF001A_L600_1.1_draft

Sector 2 (Proposed) view from behind										
Coverage Type	A - Outdoor Macro									
Antenna	1		2				3			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	140		140				140			
M. Tilt	0		0				0			
Height	144		144				144			
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	G1900	U2100			L700 L600	L700 L600	L2100	L2100	L1900	L1900
Dark Tech.										
Restricted Tech.										
Decomm. Tech.	U1900									
E. Tilt										
Cables		Generic Feeder Coax (x2) Coax Jumper (x2)			Coax Jumper (x2)	Coax Jumper (x2)				
TMAs		Generic Twin Style 1B - AWS (AtAntenna)								
Diplexers / Combiners										
Radio					Radio 4449 B71+B12 (At Antenna)					
Sector Equipment										

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CTFF001A_L600_1.1_draft

Sector 3 (Existing) view from behind					
Address	Address: City, State: ,		Latitude: 41.0339340000 Longitude: -73.6308290000		
Coverage Type	A - Outdoor Macro				
Antenna	1		2	3	4
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		Empty Antenna Mount (Empty mount)	Empty Antenna Mount (Empty mount)	Andrew - LNX-6515DS-A1M (Dual)
Azimuth	280				280
M. Tilt	0				0
Height	144				144
Ports	P1	P2			P3
Active Tech.	G1900	U2100 L2100			L700
Dark Tech.	U1900				
Restricted Tech.					
Decomm. Tech.					
E. Tilt	5	5			2
Cables	1-5/8" Coax - 375 ft. (x4)	1-5/8" Coax - 375 ft. (x4)			1-5/8" Coax - 375 ft. (x4)
TMAs	Generic Twin Style 1A - PCS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)			Generic Twin Style 1C - 700 (AtAntenna)
Diplexers / Combiners					
Radio					RRUS11 B12 (At Antenna)
Sector Equipment					

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CTFF001A_L600_1.1_draft

Sector 3 (Proposed) view from behind										
Coverage Type	A - Outdoor Macro									
Antenna	1		2				3			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	280		280				280			
M. Tilt	0		0				0			
Height	144		144				144			
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	G1900	U2100			L700 L600	L700 L600	L2100	L2100	L1900	L1900
Dark Tech.										
Restricted Tech.										
Decomm. Tech.	U1900									
E. Tilt										
Cables		Generic Feeder Coax (x2) Coax Jumper (x2)			Coax Jumper (x2)	Coax Jumper (x2)				
TMAs		Generic Twin Style 1B - AWS (AtAntenna)								
Diplexers / Combiners										
Radio					Radio 4449 B71+B12 (At Antenna)					
Sector Equipment										

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CTFF001A_L600_1.1_draft

Section 7 - Power Systems Equipment

Existing Power Systems Equipment

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Proposed Power Systems Equipment

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

FEATURES / BENEFITS

This antenna provides a 8 Port multi-band flexible platform for advanced use for flexible use in deployment scenarios for encompassing 600MHz, 700MHz, AWS & PCS applications.

- **24 Inch Width For Easier Zoning**
- **Field Replaceable (Integrated) AISG RET platform for reduced environmental exposure and long lasting quality**
- **Superior elevation pattern performance across the entire electrical down tilt range**
- **Includes three AISG RET motors - Includes 0.5m AISG jumper for optional diasy chain of two high band RET motors for one single AISG point of high band tilt control.**
- **Low band arrays driven by a single RET motor**

Technical Features

LOW BAND LEFT ARRAY (617-746 MHZ) [R1]

Frequency Band	MHz	617-698	698-746
Gain	dBi	15.1	15.5
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.4
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	24
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

LOW BAND RIGHT ARRAY (617-746 MHZ) [R2]

Frequency Band	MHz	617-698	698-746
Gain	dBi	14.8	15.1
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.3
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	23
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

ELECTRICAL SPECIFICATIONS

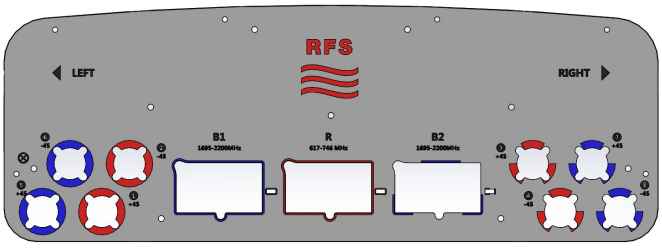
Impedance	Ohm	50.0
Polarization	Deg	±45°

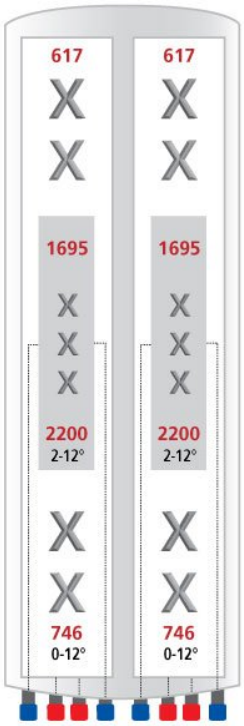
MECHANICAL SPECIFICATIONS

Dimensions - H x W x D	mm (in)	2436 x 609 x 222 (95.9 x 24 x 8.7)
Weight (Antenna Only)	kg (lb)	58 (128)
Weight (Mounting Hardware only)	kg (lb)	11.5 (25.3)
Shipping Weight	kg (lb)	80 (176)
Connector type		8 x 4.3-10 female at bottom + 6 AISG connectors (3 male, 3 female)
Adjustment mechanism		Integrated RET solution AISG compliant (Field Replaceable) + Manual Override + External Tilt Indicator
Mounting Hardware Material		Galvanized steel
Radome Material / Color		Fiber Glass / Light Grey RAL7035

TESTING AND ENVIRONMENTAL

Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Lightning protection		IEC 61000-4-5
Survival/Rated Wind Velocity	km/h	241 (150)
Environmental		ETSI 300-019-2-4 Class 4.1E





ORDERING INFORMATION

Order No.	Configuration	Mounting Hardware	Mounting pipe Diameter	Shipping Weight
APXVAARR24_43-U-NA20	Field Replace RET included (3)	APM40-5E Beam tilt kit (included)	60-120mm	80 Kg

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

FF001/GREENWICH HOSPITAL

SITE ID: CTFF001A

5 PERRYRIDGE RD

GREENWICH, CT 06830

GENERAL NOTES

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

SITE DIRECTIONS

FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

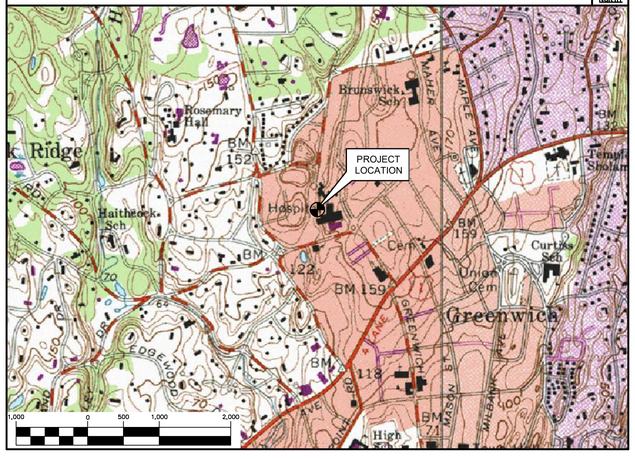
TO: 5 PERRYRIDGE RD
GREENWICH, CT 06830

1.	HEAD NORTH ON GRIFFIN ROAD S. TOWARD HARTMAN RD.	0.21 MI.
2.	TAKE THE 2ND RIGHT ONTO DAY HILL RD.	0.14 MI.
3.	TAKE THE 1ST RIGHT ONTO BLUE HILLS AVENUE EXT/CT–187	1.89 MI.
4.	TURN LEFT ONTO CT–305/OLD WINDSOR RD.	2.32 MI.
5.	STAY STRAIGHT TO GO ONTO BLOOMFIELD AVE/CT–305.	0.01 MI.
6.	MERGE ONTO I–91 S TOWARD HARTFORD	23.74 MI.
7.	MERGE ONTO CT–15 S VIA EXIT 17 TOWARD E MAIN ST.	59.25 MI.
8.	TAKE THE NORTH ST. EXIT, EXIT 31	0.09 MI.
9.	TURN RIGHT ONTO NORTH ST.	4.16 MI.
10.	TURN RIGHT ONTO N MAPLE AVE.	0.02 MI.
11.	TAKE THE 1ST LEFT ONTO PATTERSON AVE.	0.21 MI.
12.	PATTERSON AVE BECOMES DEER PARK DR.	0.06 MI.
13.	TURN LEFT ONTO PERRYRIDGE RD.	0.35 MI.

VICINITY MAP

SCALE: 1" = 1000'

NORTH



T-MOBILE RF CONFIGURATION

67D92DB_2xAIR+1OP

PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
   - A. REMOVE (6) EXISTING ANTENNAS, (2) PER SECTOR
   - B. INSTALL (9) PROPOSED ANTENNAS, (3) PER SECTOR
   - C. REMOVE (3) EXISTING RRUS11 B12, (1) PER SECTOR
   - D. INSTALL (3) NEW RADIO 4449 B71+B12'S, (1) PER SECTOR
   - E. REMOVE (6) EXISTING TMAs, (2) PER SECTOR.
   - F. THREE (3) TMAs TO REMAIN.
   - G. INSTALL (3) NEW HYBRID CABLES, (1) PER SECTOR

PROJECT INFORMATION

SITE NAME:	FF001/GREENWICH HOSPITAL
SITE ID:	CTFF001A
SITE ADDRESS:	5 PERRYRIDGE RD GREENWICH, CT 06830
APPLICANT:	T–MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	DAN REID (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (203) 592–8291
ENGINEER:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°–2'–3.19" N LONGITUDE: 73°–37'–50.30" W GROUND ELEVATION: 135'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T–1	TITLE SHEET	0
N–1	DESIGN BASIS AND SITE NOTES	0
C–1	SITE LOCATION PLAN	0
C–2	COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.	0
E–1	TYPICAL ELECTRICAL DETAILS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/06/18	ASC	TJL	ISSUED FOR CONSTRUCTION
A	07/05/18	ASC	TJL	PRELIMINARY CDs – ISSUED FOR CLIENT REVIEW

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T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
FF001/GREENWICH HOSPITAL
SITE ID: CTFF001A
5 PERRYRIDGE RD
GREENWICH, CT 06830

DATE: 07/03/18
SCALE: AS NOTED
JOB NO. 18058.64

TITLE SHEET

T-1

Sheet No. 1 of 5

DESIGN BASIS:

GOVERNING CODE: 2012 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2016 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G:
- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 93 MPH (Vasd) (EXPOSURE C/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10) PER 2012 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.
-

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON EVERSOURCE OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS---ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
A	07/05/18	ASC	TJL	PRELIMINARY CDs - ISSUED FOR CLIENT REVIEW
0	07/06/18	ASC	TJL	ISSUED FOR CONSTRUCTION

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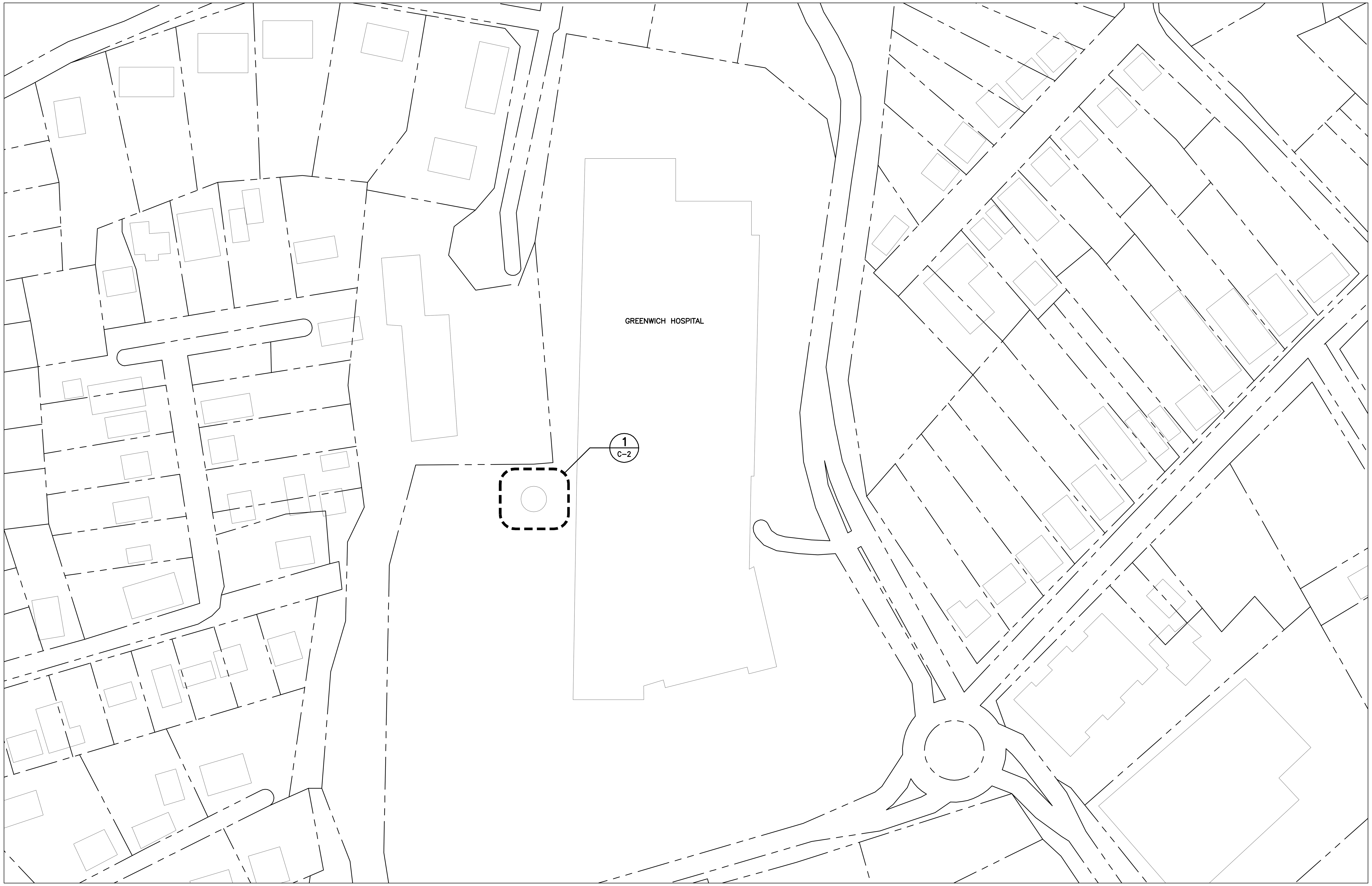
DATE: 07/03/18
SCALE: AS NOTED
JOB NO. 18058.64

DESIGN BASIS AND SITE NOTES

N-1



1 / C-1 **SITE LOCATION PLAN**
SCALE: 1" = 50'

APPROX. NORTH

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

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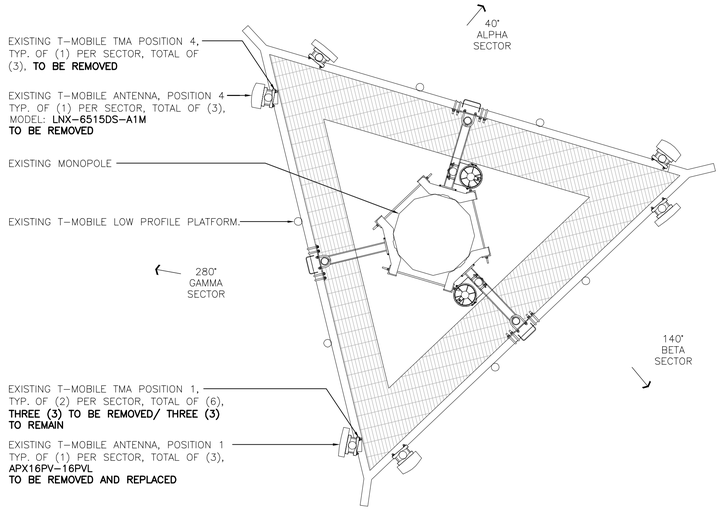
SITE LOCATION PLAN

C-1

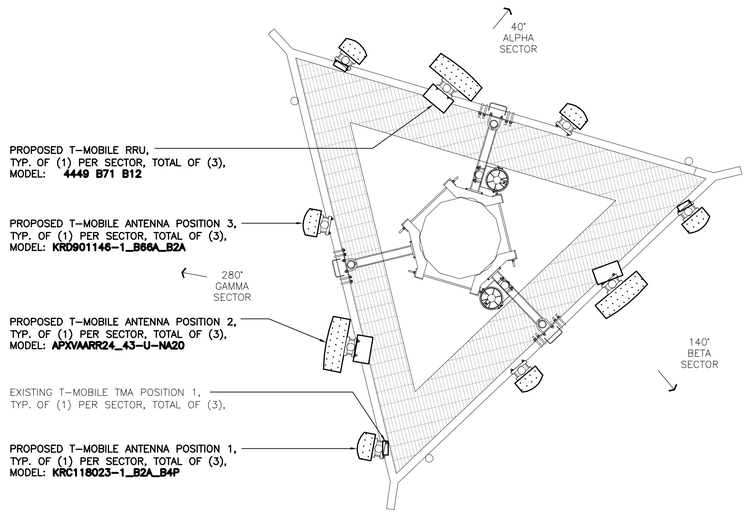
Sheet No. 3 of 5



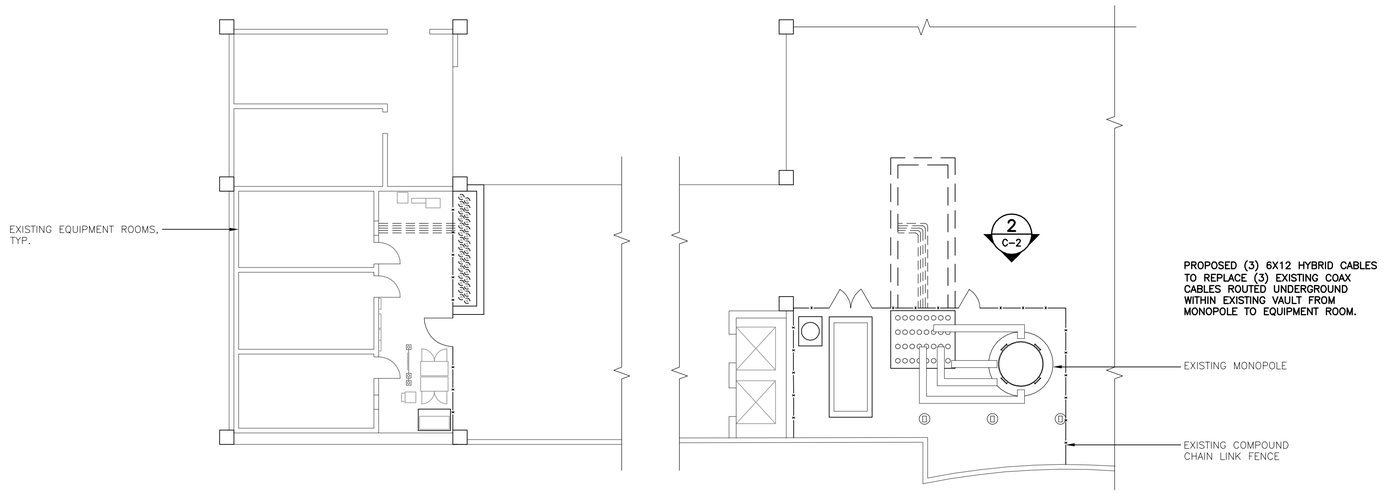
4 C-2 **EXISTING ANTENNA MOUNTING CONFIGURATION**
SCALE: 3/8" = 1' **144' ELEVATION** APPROXIMATE NORTH

STRUCTURAL NOTE:

REFER TO STRUCTURAL ANALYSIS REPORT OF TOWER AND FOUNDATION AS PREPARED BY CENTEK ENGINEERING INC., DATED: 07/05/18 PROJECT NUMBER: 18058.64

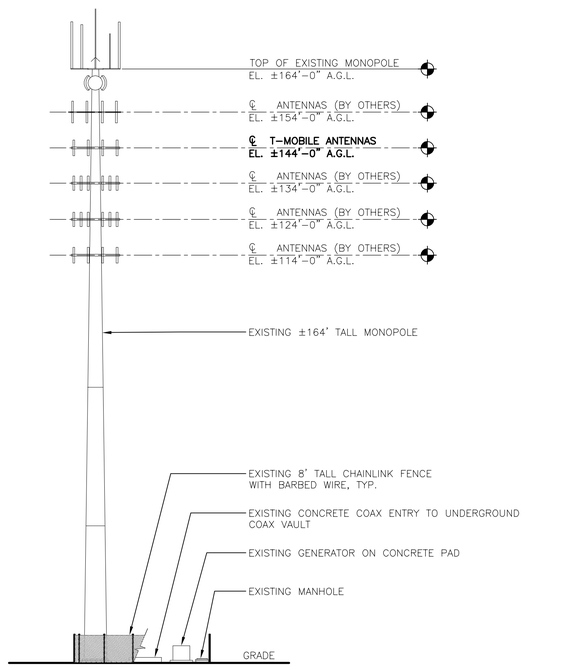


5 C-2 **PROPOSED ANTENNA MOUNTING CONFIGURATION**
SCALE: 3/8" = 1' **144' ELEVATION** APPROXIMATE NORTH



1 C-2 **COMPOUND PLAN**
SCALE: 1" = 10' TRUE NORTH

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.



2 C-2 **SOUTH TOWER ELEVATION**
SCALE: 1" = 10'

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.

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SCALE: AS NOTED
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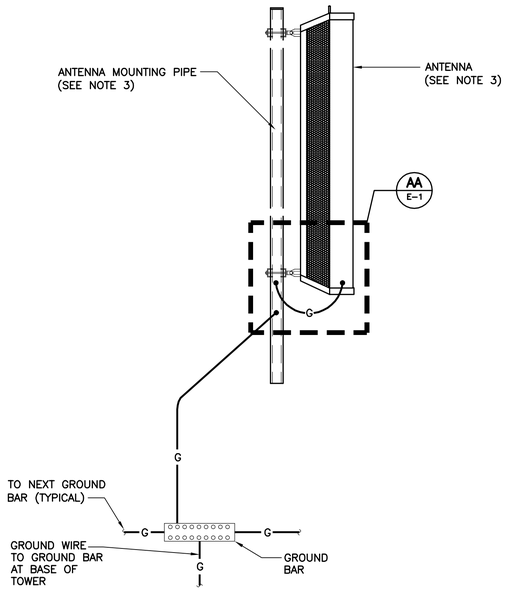
COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.

C-2

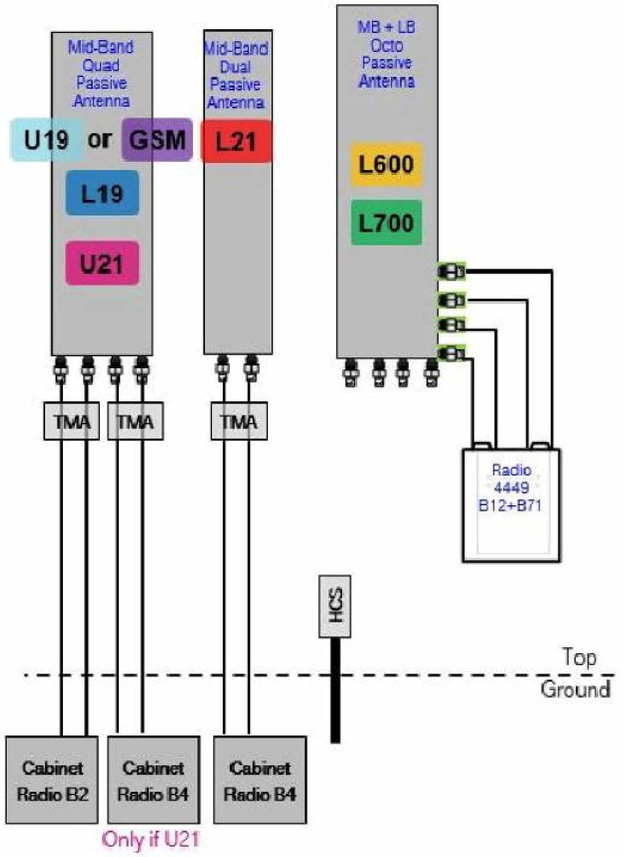
Sheet No. 4 of 5



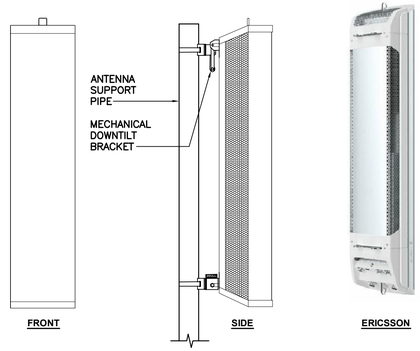
NOTES:

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

1 / E-1 **TYPICAL ANTENNA GROUNDING DETAIL**
SCALE: NONE

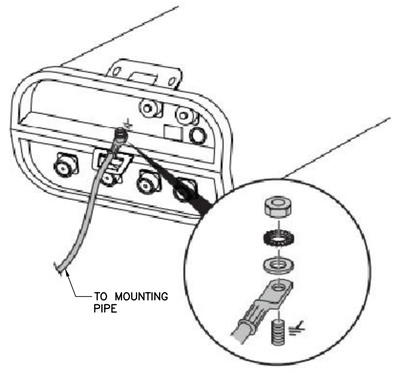


2 / E-1 **PROPOSED PLUMBING DIAGRAM**
SCALE: NONE

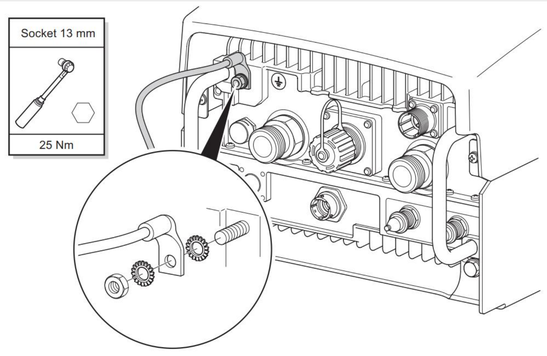


ALPHA/BETA/GAMMA ANTENNA			
EQUIPMENT		DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: KRD901146-1_B66A_B2A		56.65"L x 12.87"W x 8.66"D	132.2 LBS.
MAKE: ERICSSON MODEL: KRC118023-1_B2A_B4P		56.0"L x 12.1"W x 7.9"D	91.5 LBS.
MAKE: RFS MODEL: APXVAARR24_43-U-NA20		95.9"L x 24.0"W x 8.7"D	153 LBS.

3 / E-1 **PROPOSED ANTENNA DETAIL**
SCALE: NONE



AA / E-1 **TYPICAL ANTENNA GROUNDING DETAIL**
SCALE: NONE



4 / E-1 **TYPICAL RRU GROUNDING DETAIL**
NOT TO SCALE

ISOMETRIC VIEW

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4449 B71B12	14.9"L x 13.2"W x 10.4"D	74 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T-MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.

5 / E-1 **PROPOSED RRU DETAIL**
SCALE: NONE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/06/18	ASC	TJL	ISSUED FOR CONSTRUCTION
A	07/05/18	ASC	TJL	PRELIMINARY CDs - ISSUED FOR CLIENT REVIEW

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FF001/GREENWICH HOSPITAL
SITE ID: CTFF001A
5 PERRYRIDGE RD
GREENWICH, CT 06830

DATE: 07/03/18
SCALE: AS NOTED
JOB NO. 18058.64

TYPICAL ELECTRICAL DETAILS

E-1

Sheet No. 5 of 5