Filed by:
G. Scott Shepherd, Sr. Property Specialist - SBA Communications
134 Flanders Rd., Suite 125, Westborough, MA 01581
508.251.0720 x 3807 - GShepherd@sbasite.com

August 27, 2019

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

RE: Notice of Exempt Modification
11 Francis J. Clarke Circle, Bethel, CT 06801
Latitude: 41.360522
Longitude: -73.424474
T-Mobile Site #: CTFF752A_L600

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 117-foot level of the existing 155-foot Monopole Tower at 11 Francis J. Clarke Circle, Bethel, CT. The 155-foot tower is owned by SBA Towers, LLC. The property is owned by Costa Stergue. T-Mobile now intends to install three (3) new 600/700/2100 MHz antennas. The new antennas would be installed at the 117-foot level of the tower.

Planned Modifications:

TOWER

Remove:
- (3) 1-5/8" lines

Remove and Replace:
- (3) Ericsson - AIR 21 B2A/B4P – Panel (Remove) / (3) RFS - APXVAARR24_43-U-NA20 – Panel (Replace) 600/700 MHz
- (3) T-Arms (Valmont P/N RMV12-3xx) (Remove) / (1) SitePro RMQP-496 with HRK12 Handrails (Replace)

Install New:
- (3) Ericsson - AIR 21 B4A/B2P – Panel 2100 MHz
- (3) Ericsson Radio 4449 B71+B12
- (3) 1-5/8" fiber

Existing Equipment to Remain (including
- (6) Ericsson - AIR 21 B4A/B2P – Panel 2100 MHz
- (9) 1-5/8" lines

Entitlements:
- (1) 1-5/8" hybrid

GROUND

Install New:

- Equipment inside existing 6102 cabinet

This facility was approved by the Town of Bethel's Planning and Zoning Commission on April 16, 1999. Approval was given for special permit and site plan. On November 14, 2000, the PZC voted to approve the revised site plan application. On April 9, 2002, the PZC voted to approve reinstatement of the terms and conditions of the original Site Plan. There were no post construction stipulations set. Please see attached.

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 the Town of Bethel's First Selectman, Matt Knickerbocker, and Zoning Enforcement Officer, Fred Pollard, as well as to the property owner. (Separate notice is not being sent to tower owner, as it belongs to SBA.)

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

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modification will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.
5. The proposed modification will not cause a 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 telecommunication facility constitute an exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

G. Scott Shepherd

G. Scott Shepherd
Sr. Property Specialist
SBA COMMUNICATIONS CORPORATION
134 Flanders Rd., Suite 125
Westborough, MA 01581
508.251.0720 x3804 + T
508.366.2610 + F
508.868.6000 + C
GShepherd@sbasite.com
Attachments

cc: Matt Knickerbocker, First Selectman / with attachments
Town of Bethel, 1 School Street, Bethel, CT 06801
Fred Pollard, Zoning Enforcement Officer / with attachments
Town of Bethel, 1 School Street, Bethel, CT 06801
Costa Stergue / with attachments
562 Redding Road, Redding CT 06896-1903

Exhibit List

Exhibit 1	Check Copy	x
Exhibit 2	Notification Receipts	x
Exhibit 3	Property Card	x
Exhibit 4	Property Map	x
Exhibit 5	Original Zoning Approval	Town of Bethel P&Z Commission 4/13/99, 11/14/2000 and 4/9/2002
Exhibit 6	Construction Drawings	Infinigy dated 8/5/19
Exhibit 7	Structural Analysis	TES dated 6/26/19
Exhibit 8	Mount Analysis	GeoStructural dated 8/6/19
Exhibit 9	EME Report	Transcom dated 6/17/19

EXHIBIT 1

EXHIBIT 2

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

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EXHIBIT 3

Bethel, CT : Assessor Database

Property Search:

Parcel ID:	Alternate ID:	Owner 1 Name:	Street Number:	Street Name:
			11	FRANCIS J CLARKE CIRCLE

Search Reset

Property Detail:

Parcel ID:	Alternate ID/Map Block Lot:	Card:	Card:	Street Name:	Street Number:	Zoning:	LUC:	Acres:
09 23 150-05	R05677	1	1	FRANCIS J CLARKE CIRCLE	11	IP	WAREHOUSES	5.80

Owner Information:

Owner 1 Name:	STERGUE COSTA
Owner 2 Name:	
Street 1:	562 REDDING ROAD
Street 2:	
City:	WEST REDDING
State:	CT
Zip:	06896
Volume:	385
Page:	409
Deed Date:	1986-07-22

Building Information:

Building Number:	1
Units:	7
Structure Type:	MFG/PROCESSING
Grade:	C
Identical Units:	1
Year Built:	1992

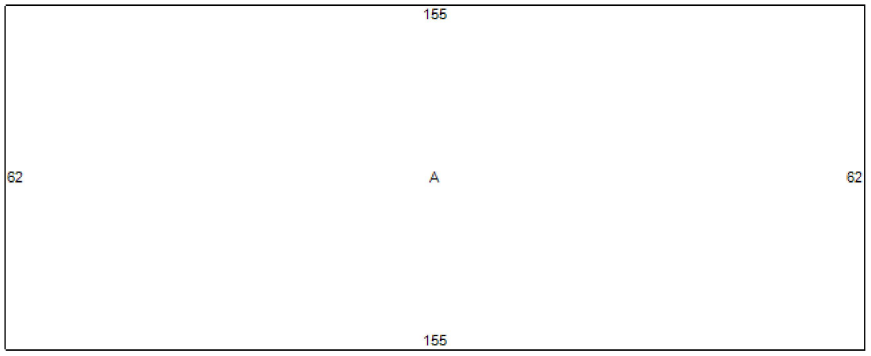
Valuation:

Appraised Land:	$392,800.00
Appraised Land PA490:	$0.00
Appraised Bldg:	$1,184,000.00
Appraised Total:	$1,576,800.00
Total Assessment:	$1,103,760.00

Property Images:

Picture:

Sketch:



ID	Code	Description
A	VS2	2S
B	044	LIGHT MANUFACTURING
C	044	LIGHT MANUFACTURING
D	082	MULTI-USE OFFICE
E	OD1	OVERHEAD DR-WOOD/MT
F	OD1	OVERHEAD DR-WOOD/MT
G	SS1	SPRINKLER SYS WET
H	OD1	OVERHEAD DR-WOOD/MT
I	PA1	PAVING ASPHALT PARKING

Out-Buildings:

Code:	Description:	Units:	Year Built:	Size1:	Size2:	Area:	Grade:	Condition:
PA1	PAVING ASPHALT PARKING	1	1992	0	0	20000	C	NORMAL (Comm)

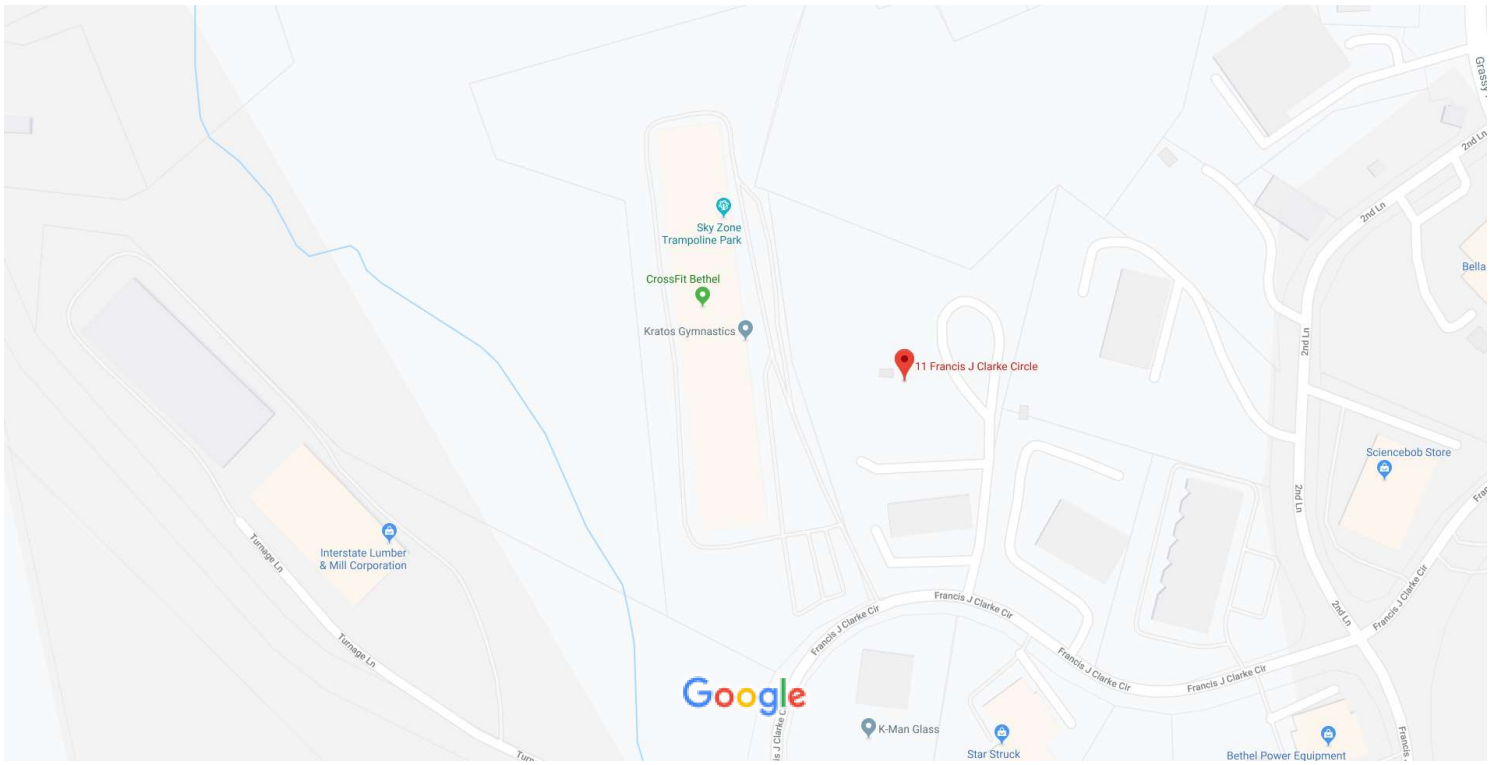
Building Interior/Exterior Information:

Floor From:	Floor To:	Area:	Use Type:	Exterior Walls:	Contruction Type:	Heating:	A/C:	Plumbing:	Functional Uti
01	01	9610	LIGHT MANUFACTURING	FRAME	WOOD FRAME/JOIST/BEAM	UNIT HEATERS	NONE	BELOW NORMAL	3
02	02	7378	LIGHT MANUFACTURING	FRAME	WOOD FRAME/JOIST/BEAM	UNIT HEATERS	NONE	BELOW NORMAL	3

02	02	2232	MULTI-USE OFFICE	FRAME	WOOD FRAME/JOIST/BEAM	HOT AIR	CENTRAL	NORMAL	3

EXHIBIT 4

Google Maps 11 Francis J Clarke Cir



Map data ©2019 100 ft

11 Francis J Clarke Cir

Bethel, CT 06801

Directions Save Nearby Send to your phone Share

9H6F+2X Bethel, CT

At this location

Capitol Electronics Inc
1.0 ★☆☆☆☆ (1)
Electronic parts supplier ·
11 Francis J Clarke Cir

East Coast Sign & Supply
3.0 ★★★☆☆ (1)
Sign shop · 11 Francis J Clarke Cir

Nisco Equipment Solutions
Equipment rental agency ·
11 Francis J Clarke Cir

EXHIBIT 5

PLANNING & ZONING COMMISSION
Bethel Municipal Center
1 School Street, Bethel, Connecticut 06801 *(203) 794-8519

April 16, 1999

Esther McNany
SBA, Inc/Nextel Communications/Sprint PCS
125 Shaw Street
New London, CT 06320

RE: SBA, Inc./Nextel Communications/Sprint PCS

Dear Ms. McNany:

At the April 13, 1999 meeting of the Planning & Zoning Commission it was voted to **APPROVE** your application for a special permit and site plan, 11 Francis J. Clarke Industrial Park, on maps dated C-1 dated 2/17/98 last revised 1/22/99, C-2 dated 2/17/98 last revised 1/22/99, C-3 dated 6/20/98 last revised 4/16/99, and C-4 dated 6/20/98 with the following stipulations:

1. Applicant will submit the approved site plan to the Economic Development Commission for their review prior to applying for a building permit.
2. Any changes to the plan or in the field will require a resubmission the Commission before making any changes.
3. Reason for approval is that it meets the Planning & Zoning regulations.

Work is to commence within (1) one year and completed in (5) five years.

If you have any questions please call. I have also attached a copy of the legal notice for you review.

Sincerely,

Denis J. Riordan
Chairman

DJR: cpc

PLANNING & ZONING COMMISSION
Bethel Municipal Center
1 School Street, Bethel, Connecticut 06801 *(203) 794-8519

November 15, 2000

Esther McNany
SBA, Inc./ Nextel Communications/Sprint PCS
125 Shaw Street
New London, CT 06320

RE: SBA, Inc. – 11 Francis J. Clarke Circle

Dear Ms. McNany,

At the November 14, 2000 meeting of the Planning & Zoning Commission it was voted to approve your revised site plan application for 11 Francis Clarke Circle on maps dated 2/17/98 last revised 11/5/00 with the following stipulations:

1) The resolution granting the original approval, dated 4/16/99, including all stipulations must be adhered to.
2) Any further changes in the site plan must be submitted to this Commission.

I have attached a copy of the legal notice for your review. Please be advised that work is not to commence until bonds are submitted and maps are signed and filed

Sincerely,

Denis J. Riordan

Denis J. Riordan BC
Chairman

SITE # 4276
FILE TYPE Construction
SECTION Permits

PLANNING & ZONING COMMISSION

Bethel Municipal Center
1 School Street, Bethel, Connecticut 06801 *(203) 794-8519

April 15, 2002

RTP
FINAL

Attorney Susan A. Hays
One State St
P.O. Box 231277
Hartford Ct 06123-1277

RE: SBA Telecommunications Tower
11 Francis J. Clarke Circle

Dear Ms. Hays,

At the April 9, 2002 meeting of the Planning & Zoning Commission it was voted to **APPROVE** your request for reinstatement of the terms and conditions of the original the Site Plan for the proposed SBA, Inc. telecommunications facility and antennas for Sprint and Nextel at 11 Francis J. Clarke Circle with the following stipulations:

1. Except as modified by this approval, improvements shall be constructed as shown on drawings prepared by Gesick & Associates, P.C., Robert J. Grabarek, P.E. (CT Lic # 13441), as follows:

   a) "SBA, Inc., #4276 Bethel (Costa Property II), 11 Francis J. Clarke Circle, Bethel, Connecticut," Sheet T-1, last revised 1/22/99;
   b) "Comprehensive Site Plan," Sheet C-1, last revised 1/22/99 (Note: the northerly setback is shown correctly at 212.5 feet, but the arrow is shown only to the 25-foot rear setback line and should be extended to the property line.);
   c) "Site Plan and Elevations," Sheet C-2, last revised 1/22/99 (added Sprint);
   d) "Site Details," Sheet C-3, last revised 4/6/99;
   e) "General Notes and Erosion Control Narrative," Sheet C-4, dated 6/20/98.

2. Applicant shall furnish the Economic Development Commission of the Town of Bethel with a copy of the plans, and shall furnish proof of transmittal to the Planning and Zoning Commission prior to the issuance of any zoning and building permits for the project.

3. Any changes in the approved plan shall require the approval of the Planning and Zoning Commission.

4. It is the applicant's responsibility to secure any and all permits and approvals required by the Connecticut Siting Council.

5. Pursuant to Sec. 118-22 of the Zoning Regulations, "The approval of any site plan shall be void and shall be of no effect unless construction of the proposed buildings or structures is commenced within one (1) year of the effective date of said approval and is substantially completed within (5) years of the effective date of said approval."

Reasons: The reinstated plan is in substantial compliance with Sec. 118-47.3, "Telecommunications towers and antennas," of the Zoning Regulations of the Town of Bethel and was previously approved by the Commission on 11/14/00, and further by Settlement Agreement dated 8/24/00-9/22/00. In granting the reinstatement of the Site Plan for this application, the Commission makes no decision regarding the property owner's right to apply for additional buildings or structures on the site, in accordance with Bethel zoning regulations in effect at the time of the application.

Sincerely,

Michael Mannion/mc

Michael J. Mannion
Chairman

MJM: cpc

EXHIBIT 6

SITE NAME: SBA BETHEL MONOPOLE

11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SITE NUMBER: CTFF752A
PROJECT: T-MOBILE L600

CONFIGURATION: 67D05A

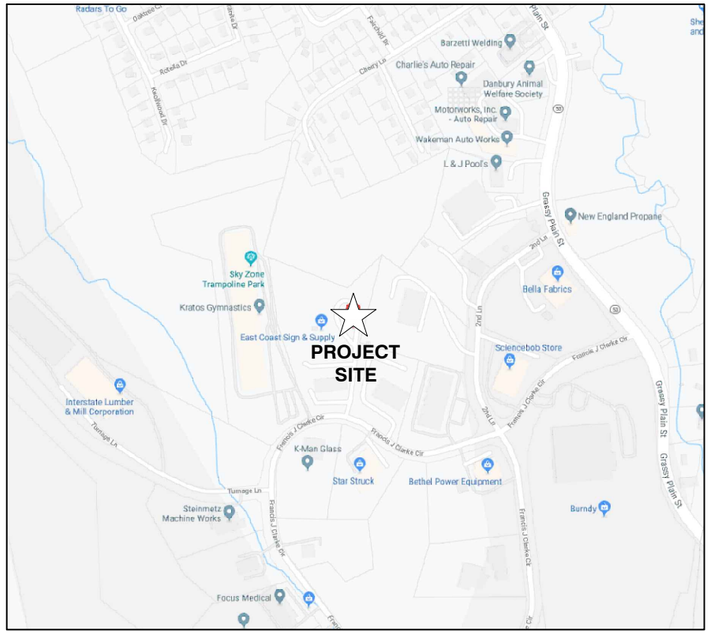
T-MOBILE TECHNICIAN SITE SAFETY NOTES	
LOCATION	SPECIAL RESTRICTIONS
ANTENNA/TMA/RRU	
SECTOR A:	ACCESS NOT PERMITTED
SECTOR B:	ACCESS NOT PERMITTED
SECTOR C:	ACCESS NOT PERMITTED
SECTOR D:	ACCESS NOT PERMITTED
GPS/LMU:	UNRESTRICTED* (*CAUTION: OSHA-APPROVED PORTABLE 8' STEP-LADDER REQUIRED)
RADIO CABINETS: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

GENERAL NOTES

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

SPECIAL CONSTRUCTION NOTES

1. TOWER OWNER SHALL PROVIDE GLOBAL STRUCTURAL STABILITY ANALYSIS OF EXISTING ANTENNA SUPPORT STRUCTURE. GENERAL CONTRACTOR SCOPE OF WORK SHALL INCLUDE ALL REQUIRED STRUCTURAL MODIFICATIONS, RE-BUNDLING OF COAXIAL CABLES OR OTHER SPECIAL MODIFICATIONS AS OUTLINED THEREIN.
2. TOWER IS ASSUMED TO BE PROPERLY CONSTRUCTED AND MAINTAINED. ALL STRUCTURAL MEMBERS AND THEIR CONNECTION ARE ASSUMED TO BE IN GOOD CONDITION AND ARE FREE FROM DEFECTS WITH NO DETERIORATION TO ITS MEMBER CAPACITIES.
3. T-MOBILE WORK IS CONTINGENT ON THE FOLLOWING:
   * COMPLETION OF A GLOBAL STRUCTURAL STABILITY ANALYSIS.
   * COMPLETION OF AN MOUNT STRUCTURAL ANALYSIS OR ASSESSMENT.
   * GC SHALL FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS AS INDICATED IN BEFORE-MENTIONED GLOBAL AND MOUNT ANALYSIS/ASSESSMENT.



PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY T-MOBILE COLLOCATION
SBA BUSINESS ADDRESS:	11 FRANCIS J. CLARKE CIRCLE BETHEL, CT 06801
LATITUDE:	41° 21' 37.88" N
LONGITUDE:	73° 25' 28.11" W
GROUND ELEVATION:	412' AMSL
ZONING JURISDICTION:	BASED ON INFORMATION PROVIDED BY T-MOBILE, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS AN ELIGIBLE FACILITY UNDER THE TAX RELIEF ACT OF 2012, 47 USC 1455(A), AND IS SUBJECT TO AN EXPEDITED ELIGIBLE FACILITIES REQUEST/REVIEW AND ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMITS, SITE PLAN REVIEW)
CODE COMPLIANCE:	1. BUILDING CODE IBC 2015 2. TIA-EIA-222-G 3. NFPA 70 2014 – NATIONAL ELECTRIC CODE
TOWER OWNER:	SBA TOWERS, LLC 8531 CONGRESS AVE BOCA RATON FL 33487
SBA SITE ID:	CT00248-S
SBA SITE NAME:	NORTH BETHEL
SBA REGIONAL SITE MANAGER:	STEPHEN ROTH (860) 539-4920 SROTH@SBASITE.COM.COM

APPROVALS

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

CALL CONNECTICUT ONE CALL
(888) 344-7233
CALL 3 WORKING DAYS
BEFORE YOU DIG!

811
Know what's **below.**
Call before you dig.
www.call811.com

DRAWING INDEX

SHEET NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
G-1	GENERAL NOTES	0
A-1	SITE PLAN	0
A-2	TOWER ELEVATION	0
A-3	ANTENNA LAYOUT & MOUNTING DETAILS	0
A-4	EQUIPMENT & MOUNTING DETAILS	0
A-5	ANTENNA SCHEDULE	0
A-6	RFDS	0
E-1	ELECTRICAL & GROUNDING DETAILS	0

PLANS PREPARED FOR:

T-Mobile

T-MOBILE NORTHEAST LLC
15 COMMERCE WAY, SUITE B
NORTON, MA 02766

PROJECT MANAGER:

SBA

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

PLANS PREPARED BY:

INFINIGY

INFINIGY ENGINEERING, PLLC
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793
JOB NUMBER 656-003

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JAIME S. STEVENS
24705
LICENSED PROFESSIONAL ENGINEER

08/06/2019

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	08/05/19	MAP	0

SITE NUMBER:
CTFF752A

SITE ADDRESS:
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET DESCRIPTION:
TITLE SHEET

SHEET NUMBER:
T-1

GROUNDING NOTES

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

GENERAL NOTES

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

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

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

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

    AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), STEEL CONSTRUCTION MANUAL, 13TH EDITION;

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

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

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

ABBREVIATIONS

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

PLANS PREPARED FOR:

T-MOBILE NORTHEAST LLC
15 COMMERCE WAY, SUITE B
NORTON, MA 02766

PROJECT MANAGER:

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

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Fax # (518) 690-0793
JOB NUMBER 656-003

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
24705
LICENSED PROFESSIONAL ENGINEER

08/06/2019

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	08/05/19	MAP	0

SITE NUMBER:

CTFF752A

SITE ADDRESS:

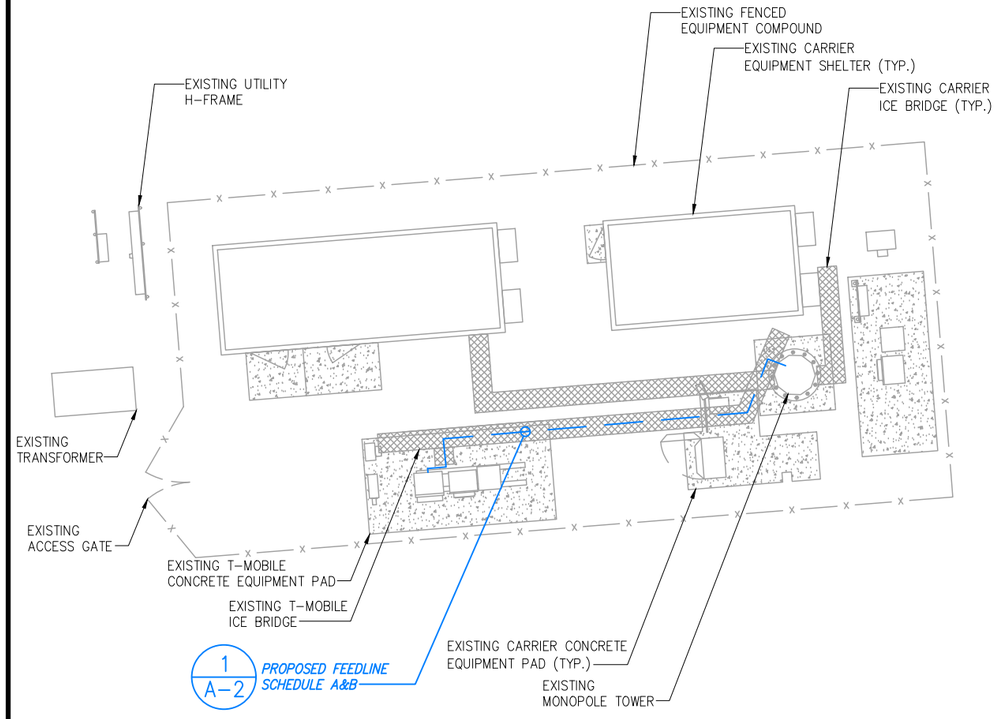
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

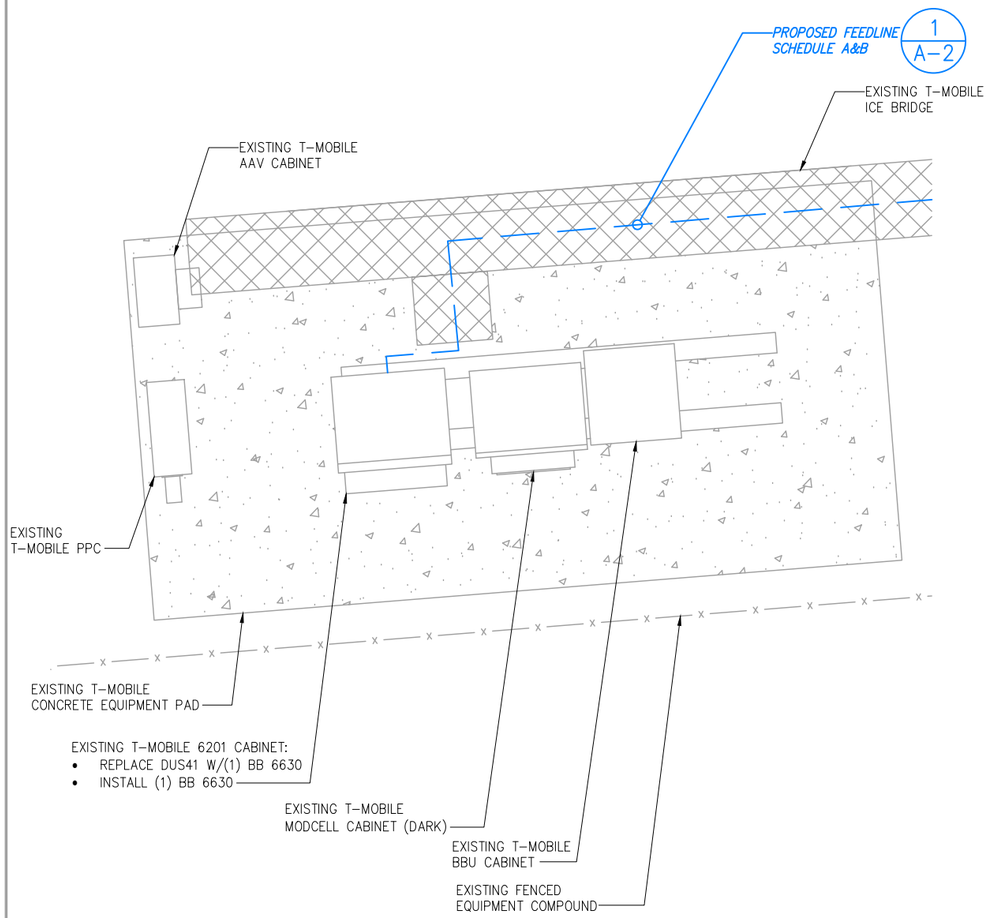
SHEET DESCRIPTION:

GENERAL NOTES

SHEET NUMBER:

G-1





N

GRAPHIC SCALE:

16' 8' 0 8' 16'

SCALE (11x17): 1" = 16'-0"
SCALE (22x34): 1" = 8'-0"

INFORMATION CONTAINED WITHIN DRAWINGS ARE BASED ON PROVIDED INFORMATION AND ARE NOT THE RESULT OF A FIELD SURVEY.

SITE PLAN | SCALE: AS NOTED | 1

N

GRAPHIC SCALE:

4' 2' 0 2' 4'

SCALE (11x17): 1" = 4'-0"
SCALE (22x34): 1" = 2'-0"

EQUIPMENT SITE PLAN | NO SCALE | 2

PLANS PREPARED FOR:

T-Mobile

T-MOBILE NORTHEAST LLC
15 COMMERCE WAY, SUITE B
NORTON, MA 02766

PROJECT MANAGER:

SBA

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08/06/2019

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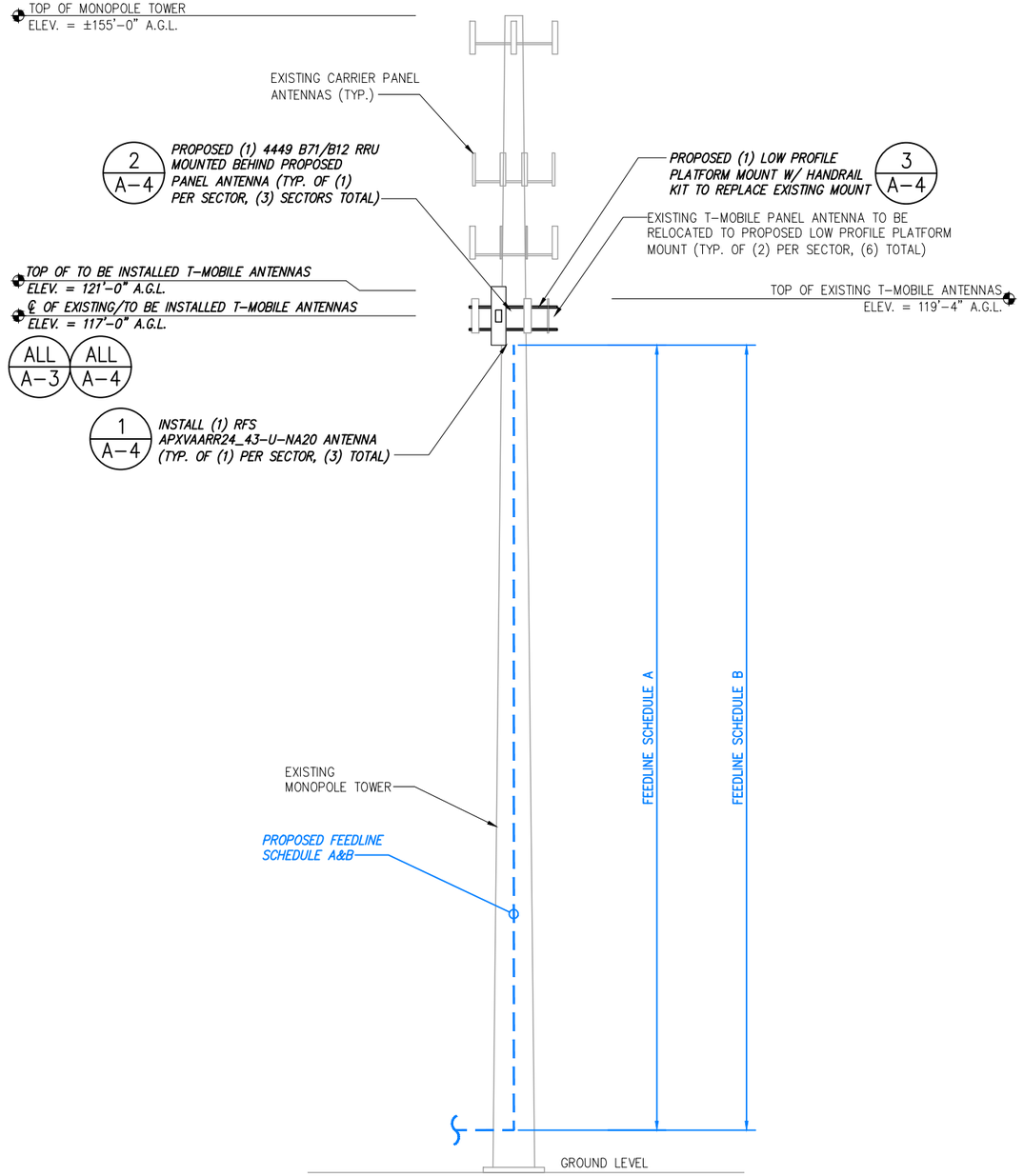
SHEET DESCRIPTION:

SITE PLAN

SHEET NUMBER:

A-1

THESE PLANS HAVE BEEN DEVELOPED FOR
THE MODIFICATION OF AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY OWNED OR LEASED BY T-MOBILE IN ACCORDANCE WITH THE SCOPE OF WORK PROVIDED BY T-MOBILE. INFINIGY HAS INCORPORATED THIS SCOPE OF WORK IN THE PLANS. THESE PLANS ARE NOT FOR CONSTRUCTION UNLESS ACCOMPANIED BY A PASSING STRUCTURAL STABILITY ANALYSIS PREPARED BY A LICENSED STRUCTURAL ENGINEER. STRUCTURAL ANALYSIS MUST INCLUDE BOTH TOWER AND MOUNT.



FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO REMAIN: (9) 1-5/8" COAX (1) 9X18 HYBRID CABLES TO 117' RAD EXISTING TO REMOVE: (3) 1-5/8" COAX	FROM CABINET TOP TO RAD
B	PROPOSED: (3) 6x12 HYBRID CABLES TO 117' RAD	FROM CABINET TOP TO RAD

NOTE:
EXISTING T-MOBILE EQUIPMENT FEEDLINE INVENTORY BASED ON COLOCATION APPLICATION AND SBA RECORD, NOT FIELD OBSERVATIONS. RFDS AND FEEDLINE LEASING ENTITLEMENTS MAY DIFFER.

NOTE:
VERIFY PROPOSED AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION

TOWER ELEVATION | NO SCALE | 1

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APPROVED BY:

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CTFF752A

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11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

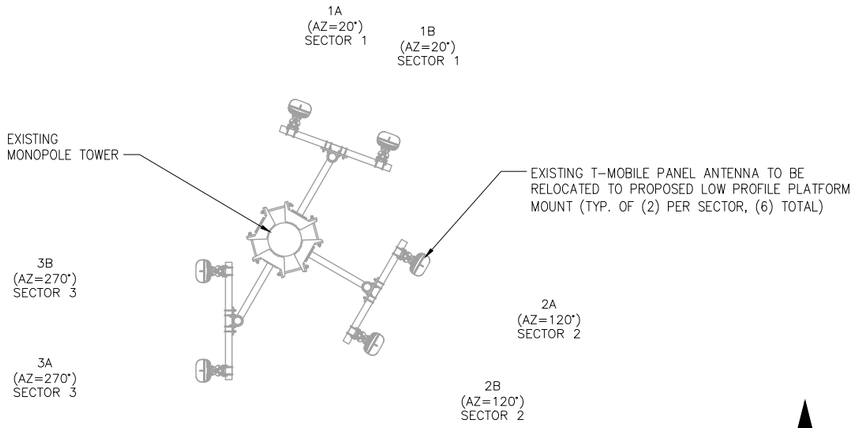
SHEET DESCRIPTION:

TOWER ELEVATION

SHEET NUMBER:

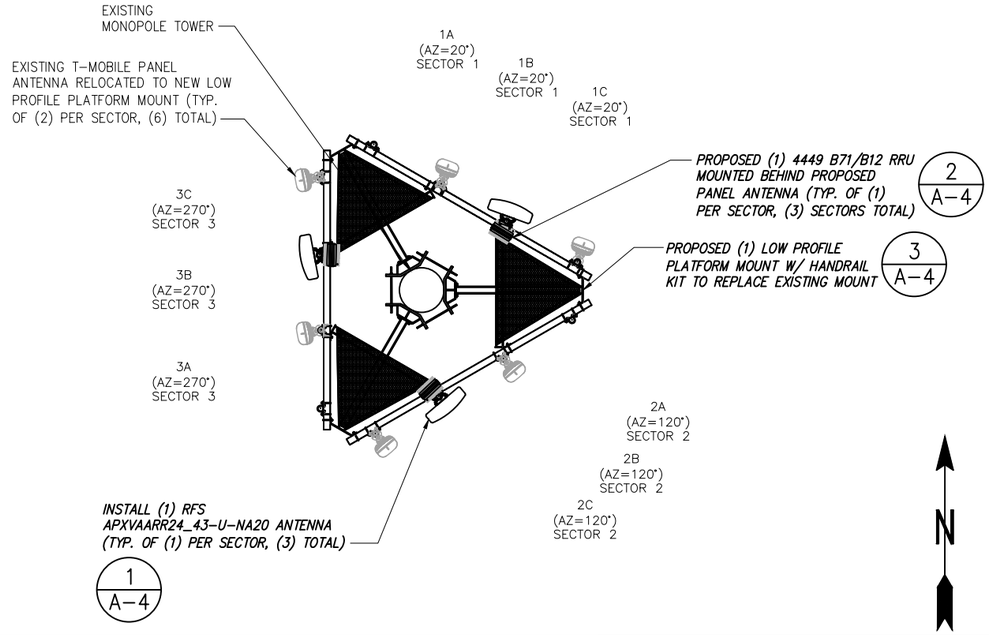
A-2

SPECIAL CONSTRUCTION NOTE:
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL ANTENNA MOUNT STRUCTURAL AUGMENTS (STRUCTURAL MODIFICATIONS) AT T-MOBILE'S RAD/VERTICAL EQUIPMENT SPACE PER RECOMMENDATIONS FROM SBA-PROVIDED ANTENNA MOUNT STRUCTURAL ANALYSIS AND ANY SUPPLEMENTAL CONSTRUCTION DRAWINGS (PROVIDED BY OTHERS).

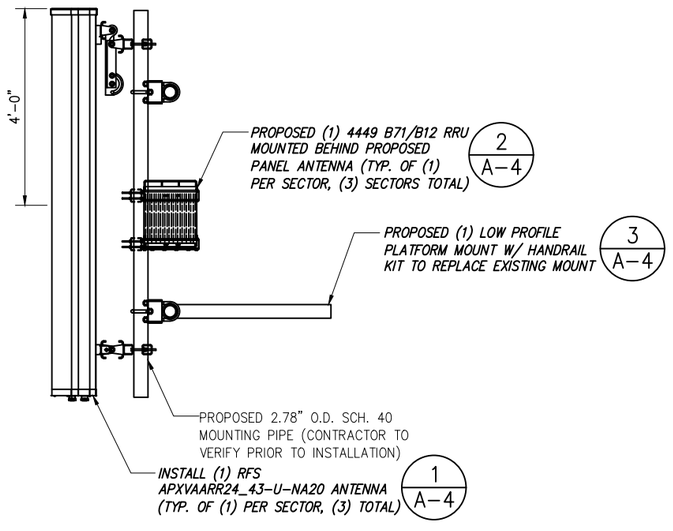


EXISTING ANTENNA & RRH LAYOUT | NO SCALE | 1

NOTE:
VERIFY PROPOSED AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION



FINAL ANTENNA & RRH LAYOUT | NO SCALE | 2



ANTENNA ATTACHMENT DETAIL | NO SCALE | 3

DETAIL NOT USED | NO SCALE | 4

PLANS PREPARED FOR:
T-Mobile
T-MOBILE NORTHEAST LLC
15 COMMERCE WAY, SUITE B
NORTON, MA 02766

PROJECT MANAGER:
SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
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TEL: (508) 251-0720

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ENGINEERING LICENSE:
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JOHN S. STEVENS
24705
LICENSED PROFESSIONAL ENGINEER
08/06/2019

CHECKED BY:

APPROVED BY:

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CTFF752A

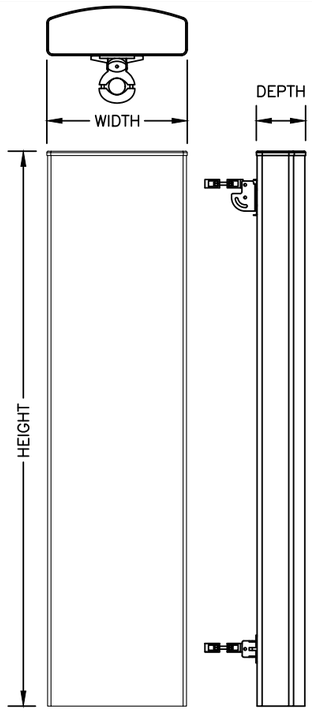
SITE ADDRESS:
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET DESCRIPTION:
ANTENNA LAYOUT
& MOUNTING DETAILS

SHEET NUMBER:
A-3

RFS ANTENNA SPECIFICATIONS

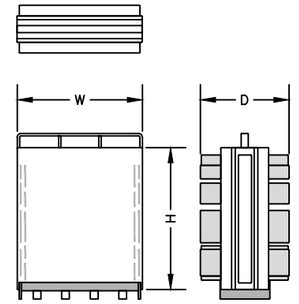
MANUF.	RFS
MODEL #	APXVAARR24_43-U-NA20
HEIGHT	95.9"
WIDTH	24.0"
DEPTH	8.7"
WEIGHT	128± LBS.



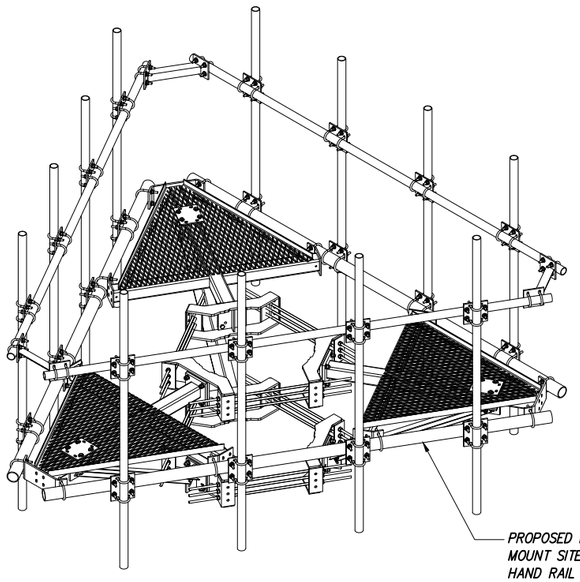
ANTENNA DETAIL | NO SCALE | 1

RRU SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	4449 B71+B12
HEIGHT	13.1"
WIDTH	14.9"
DEPTH	9.2"
WEIGHT	74± LBS.



RRU DETAIL | NO SCALE | 2



PROPOSED LOW PROFILE PLATFORM MOUNT SITEPRO 1 P/N: RMQP-496 W/ HAND RAIL KIT SITEPRO 1 P/N:HRK12

MOUNT DETAIL | NO SCALE | 3

DETAIL NOT USED | NO SCALE | 4

PLANS PREPARED FOR:

T-Mobile

T-MOBILE NORTHEAST LLC
15 COMMERCE WAY, SUITE B
NORTON, MA 02766

PROJECT MANAGER:

SBA

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
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JOHN S. STEVENS
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LICENSED PROFESSIONAL ENGINEER

08/06/2019

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	08/05/19	MAP	0

SITE NUMBER:

CTFF752A

SITE ADDRESS:

11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET DESCRIPTION:

EQUIPMENT & MOUNTING DETAILS

SHEET NUMBER:

A-4

FINAL ANTENNA CONFIGURATION

SECTOR	BAND	ANTENNA MODEL	ANTENNA RAD	AZIMUTH	ELECTRICAL TILT	MECHANICAL TILT	RADIOS	TMAS	CABLE FEED LINES	CABLE LENGTH
A	U2100	AIR21 KRC118023-1_B2P_B4A	117'-0"	20°	2°	0°	--	--	(E) (2) 1-5/8" COAX	±200'*
	L700/L600	APXVAARR24_43-U-NA20	117'-0"	20°	2°/2°	0°	RADIO 4449 B71+B12	--	(P) (1) SHARED 6x12 HYBRID CABLE TRUNK	±200'*
	L2100	AIR21 KRC118023-1_B2P_B4A	117'-0"	20°	2°	0°	--	--	(E) (1) SHARED 9x18 HYBRID CABLE TRUNK	±200'*
B	U2100	AIR21 KRC118023-1_B2P_B4A	117'-0"	120°	2°	0°	--	--	(E) (2) 1-5/8" COAX	±200'*
	L700/L600	APXVAARR24_43-U-NA20	117'-0"	120°	2°/2°	0°	RADIO 4449 B71+B12	--	(P) (1) SHARED 6x12 HYBRID CABLE TRUNK	±200'*
	L2100	AIR21 KRC118023-1_B2P_B4A	117'-0"	120°	2°	0°	--	--	(E) (1) SHARED 9x18 HYBRID CABLE TRUNK	±200'*
C	U2100	AIR21 KRC118023-1_B2P_B4A	117'-0"	270°	2°	0°	--	--	(E) (2) 1-5/8" COAX	±200'*
	L700/L600	APXVAARR24_43-U-NA20	117'-0"	270°	2°/2°	0°	RADIO 4449 B71+B12	--	(P) (1) SHARED 6x12 HYBRID CABLE TRUNK	±200'*
	L2100	AIR21 KRC118023-1_B2P_B4A	117'-0"	270°	2°	0°	--	--	(E) (1) SHARED 9x18 HYBRID CABLE TRUNK	±200'*

* PROPOSED CABLE LENGTH WAS DETERMINED USING THE SUM OF THE RAD CENTER OF ANTENNAS, AND DISTANCE FROM EXISTING EQUIPMENT AREA TO TOWER BASE WITH AN ADDITIONAL 20% BUFFER. LENGTH TO BE VERIFIED IN FIELD PRIOR TO ORDERING MATERIALS.

PLANS PREPARED FOR:
T-MOBILE NORTHEAST LLC
15 COMMERCE WAY, SUITE B
NORTON, MA 02766

PROJECT MANAGER:
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Fax # (518) 690-0793
JOB NUMBER 656-003

ENGINEERING LICENSE:
STATE OF CONNECTICUT JOHN STEVENS 24705 LICENSED PROFESSIONAL ENGINEER
08/06/2019

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	08/05/19	MAP	0

SITE NUMBER:
CTFF752A

SITE ADDRESS:
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET DESCRIPTION:
ANTENNA SCHEDULE

SHEET NUMBER:
A-5

Sector 1 (Proposed) view from behind								
Coverage Type	A - Outdoor Macro							
Antenna	1		2				3	
Antenna Model	Ericsson - AIR21 KRC118046-1_B2P_B4A (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)	
Azimuth	20		20				20	
M. Tilt	0		0				0	
Height	117		117				117	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	U2100		L700 L600	L700 L600			L2100	
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt	2		2	2			2	
Cables	Fiber Jumper		Fiber Jumper				Fiber Jumper	
TMAs								
Diplexers / Combiners								
Radio			Radio 4449 B71+B1 2 (At Antenna)	SHARED Radio 4449 B71+B1 2 (At Antenna)				
Sector Equipment								

SECTOR 1

Sector 2 (Proposed) view from behind								
Coverage Type	A - Outdoor Macro							
Antenna	1		2				3	
Antenna Model	Ericsson - AIR21 KRC118046-1_B2P_B4A (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)	
Azimuth	120		120				120	
M. Tilt	0		0				0	
Height	117		117				117	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	U2100		L700 L600	L700 L600			L2100	
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt	2		2	2			2	
Cables	Fiber Jumper		Fiber Jumper				Fiber Jumper	
TMAs								
Diplexers / Combiners								
Radio			Radio 4449 B71+B1 2 (At Antenna)	SHARED Radio 4449 B71+B1 2 (At Antenna)				
Sector Equipment								

SECTOR 2

Sector 3 (Proposed) view from behind								
Coverage Type	A - Outdoor Macro							
Antenna	1		2				3	
Antenna Model	Ericsson - AIR21 KRC118046-1_B2P_B4A (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)	
Azimuth	270		270				270	
M. Tilt	0		0				0	
Height	117		117				117	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	U2100		L700 L600	L700 L600			L2100	
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt	2		2	2			2	
Cables	Fiber Jumper		Fiber Jumper				Fiber Jumper	
TMAs								
Diplexers / Combiners								
Radio			Radio 4449 B71+B1 2 (At Antenna)	SHARED Radio 4449 B71+B1 2 (At Antenna)				
Sector Equipment								

SECTOR 3

RFDS

NO SCALE

1

PLANS PREPARED FOR:

T-Mobile

T-MOBILE NORTHEAST LLC
15 COMMERCE WAY, SUITE B
NORTON, MA 02766

PROJECT MANAGER:

SBA

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

PLANS PREPARED BY:

INFINIGY

INFINIGY ENGINEERING, PLLC
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793
JOB NUMBER 656-003

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
24705
LICENSED PROFESSIONAL ENGINEER

08/06/2019

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	08/05/19	MAP	0

SITE NUMBER:

CTFF752A

SITE ADDRESS:

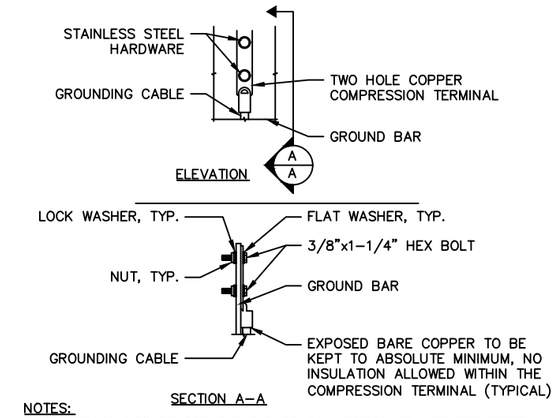
11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET DESCRIPTION:

RFDS

SHEET NUMBER:

A-6

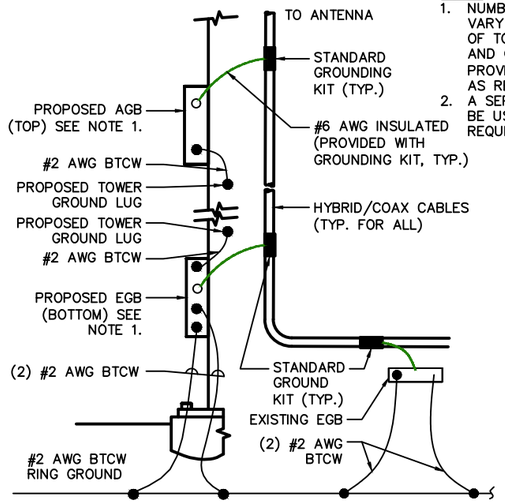


NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.

1 / E-1

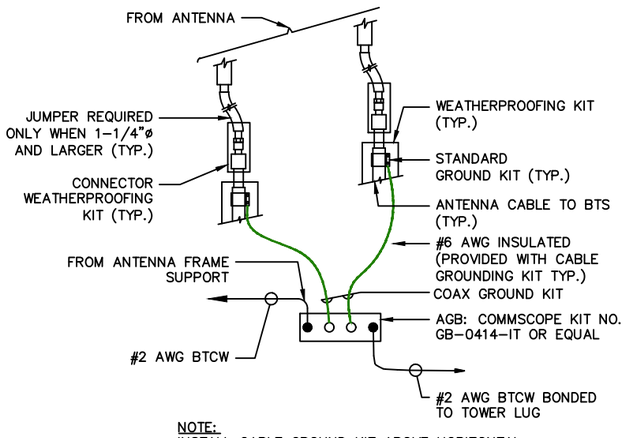


NOTE:
1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION, AND CONNECTION ORIENTATION. PROVIDE ADDITIONAL AGB/EGB AS REQUIRED.
2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED

TOWER BOTTOM CABLE GROUNDING DETAIL

SCALE: N.T.S.

2 / E-1

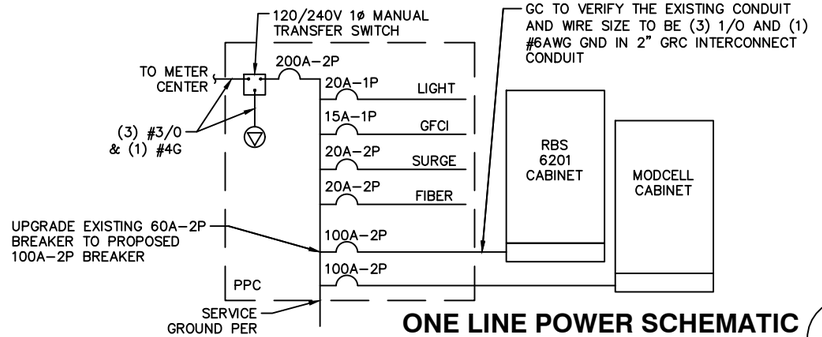


NOTE:
INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB.

TOWER TOP CABLE GROUNDING DETAIL

SCALE: N.T.S.

3 / E-1



GC TO VERIFY THE EXISTING CONDUIT AND WIRE SIZE TO BE (3) 1/0 AND (1) #6AWG GND IN 2" GRC INTERCONNECT CONDUIT

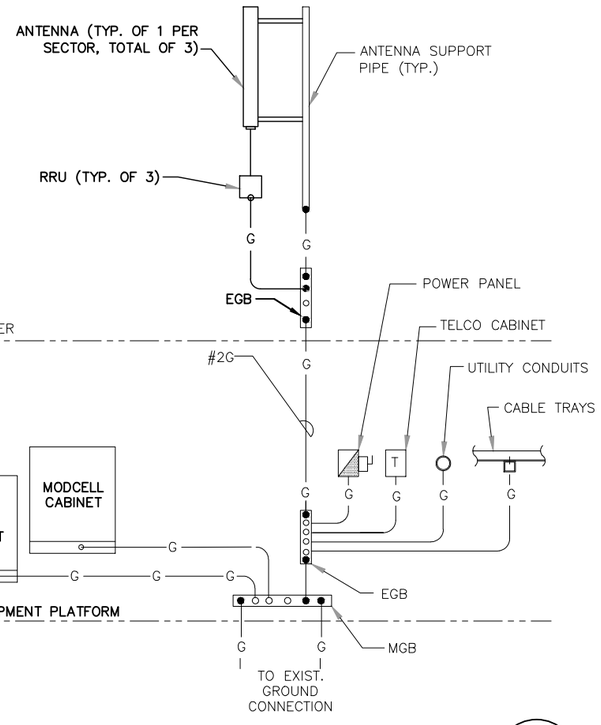
RBS 6201 CABINET

MODCELL CABINET

ONE LINE POWER SCHEMATIC

SCALE: N.T.S.

4 / E-1



GROUNDING RISER DIAGRAM

SCALE: NONE

5 / E-1

ELECTRICAL & GROUNDING NOTES:

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

SYMBOL LEGEND

- (X) SPECIAL WORK NOTE
- ■ EXOTHERMIC CONNECTION
- ● MECHANICAL CONNECTION
- □ CABLE GROUNDING KIT

PLANS PREPARED FOR:

T-Mobile

T-MOBILE NORTHEAST LLC
15 COMMERCE WAY, SUITE B
NORTON, MA 02766

PROJECT MANAGER:

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

PLANS PREPARED BY:

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JOB NUMBER 656-003

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
24705
LICENSED PROFESSIONAL ENGINEER

08/06/2019

CHECKED BY:

APPROVED BY:

REVISIONS:

DESCRIPTION	DATE	BY	REV.
ISSUED FOR CONSTRUCTION	08/05/19	MAP	0

SITE NUMBER:

CTFF752A

SITE ADDRESS:

11 FRANCIS J. CLARKE CIRCLE
BETHEL, CT 06801

SHEET DESCRIPTION:

ELECTRICAL & GROUNDING DETAILS

SHEET NUMBER:

E-1

EXHIBIT 7

Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
1320 Greenway Drive, Suite 600, Irving, Texas 75038

Structural Analysis Report

Existing 155 ft SUMMIT Monopole
Customer Name: SBA Communications Corp
Customer Site Number: CT00248-S
Customer Site Name: North Bethel
Carrier Name: T-Mobile (App#: 116927-1)
Carrier Site ID / Name: CTFF752A / North Bethel
Site Location: 11 Francis J. Clarke Circle
Bethel, Connecticut
Fairfield County
Latitude: 41.360522
Longitude: -73.424474

Analysis Result:
Max Structural Usage: 56.4% [Pass]
Max Foundation Usage: 54.0% [Pass]
Additional Usage Caused by New Mount: +3%

Report Prepared By : Tawfeeq Alajaj

Introduction

The purpose of this report is to summarize the analysis results on the 155 ft. SUMMIT Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Tower Drawings by Summit Manufacturing LLC., Job # 4071 Dated 10/22/1998
Foundation Drawing	Foundation Design by Paul J. Ford and Company, Job # 29200-1210 Dated 08/17/2000
Geotechnical Report	Geotechnical Report by Jaworski Geotech Inc., Project # C98342G Dated 08/06/1998
Modification Drawings	N/A

Analysis Criteria

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

Wind Speed Used in the Analysis:	Ultimate Design Wind Speed V_{ult} = 120 mph (3-Sec. Gust)/ Nominal Design Wind Speed V_{asd} = 93.0 mph (3-Sec. Gust)
Wind Speed with Ice:	50 mph (3-Sec. Gust) with 3/4" radial ice concurrent
Operational Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-G / 2015 IBC / 2018 Connecticut State Building Code
Exposure Category:	B
Structure Class:	II
Topographic Category:	1
Crest Height:	0 ft.
Seismic Parameters:	S_S = 0.215, S_1 = 0.066

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

Existing Antennas, Mounts and Transmission Lines

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

Items	Elevation (ft.)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	157.4	3	RFS - APXVSPP18-C-A20 - Panel	(1)Low Profile Platform (1)Collar Mount	(4) 1 1/4"	Sprint
2		3	RFS - APXVTM14-C-120 - Panel			
3		3	Alcatel - 1900MHz RRH - RRU			
4		3	Alcatel - 800 MHz RRH - RRU			
5		3	Alcatel - TD-RRH8x20-25 - RRH			
6		3	Alcatel - 800MHz External Notch Filter			
7		4	RFS - ACU-A20-N - RET			
8	137.0	6	Commscope - SBNHH-1D65B - Panel	(1)Low Profile Platform	(10) 1 5/8" (2) 1 5/8" Hybrid	Verizon
9		2	Antel - LPA-80080/4CF - Panel			
10		2	Antel - LPA-80080-6CF-EDIN - Panel			
11		2	Antel - LPA-80063/6CF - Panel			
12		3	Alcatel - 4X45 RRH AWS -RRU			
13		3	Alcatel - RRH2X60-PCS - RRU			
14		3	Alcatel - RRH2X60-700 - RRU			
15		6	RFS - FD9R6004/2C-3L - Diplexer			
16		2	RFS - DB-T1-6Z-8AB-0Z -Distribution Box			
17	127.0	3	Powerwave - 7770 - Panel	(1)Low Profile Platform	(9) 1 1/4" (2) 3/4" DC (1) 1/2" Fiber	AT&T
18		3	Powerwave - P65-16-XLH-RR - Panel			
19		6	Powerwave - LGP21401 - TMA			
20		3	Ericsson - RRU 11 - RRH			
21		3	Ericsson - RRUS 12 - RRH			
22		6	Kathrein - 860 10025 - RET			
23		1	Raycap - DC6-48-60-18-8F - SP			
-	117.0	3	Ericsson - AIR 21 B2A/B4P - Panel	(3) T-Arms (Valmont P/N RMV12-3xx)	[1](12) 1 5/8" [2](1) 1 5/8" Hybrid	T-Mobile
-		3	Ericsson - AIR 21 B4A/B2P - Panel			

1. The (12)1 5/8" Coax and are considered double stacked running outside of the pole shaft
2. The (1) 1 5/8" Hybrid is considered running outside of the pole shaft

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

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

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
24	117.0	6	Ericsson - Air 21 B4A/B2P - Panel	SitePro RMQP-496 with HRK12 Handrails	(9) 1 5/8" (4) 1 5/8" Fiber	T-Mobile
25		3	RFS - APXVAARR24_43-U-NA20 - Panel			
26		3	Ericsson Radio 4449 B71+B12			

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

Analysis Results

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

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	**56.4%**	**42.7%**	**51.8%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)
Original Design Reactions	3850.0	32.4
Analysis Reactions	2789.9	24.5
Factored Reactions*	5197.5	43.7
% of Design Reactions	53.7%	56.1%

* Per section 15.5.1 of the TIA-222-G standard, factored reactions were obtained by multiplying a 1.35 factor to the original design reactions.

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

Operational Condition (Rigidity):

Operational characteristics of the tower are found to be within the limits prescribed by ANSI/TIA/EIA 222-G for the installed antennas. The maximum twist/sway at the elevation of the proposed equipment is 1.1167 degrees under the operational wind speed as specified in the Analysis Criteria.

Conclusions

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

Standard Conditions

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

2. The structural analysis was performance based upon the evidence available at the time of this report. All information provided by the client is considered to be accurate.

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

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

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

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

Usage Diagram - Max Ratio 56.43% at 0.0ft

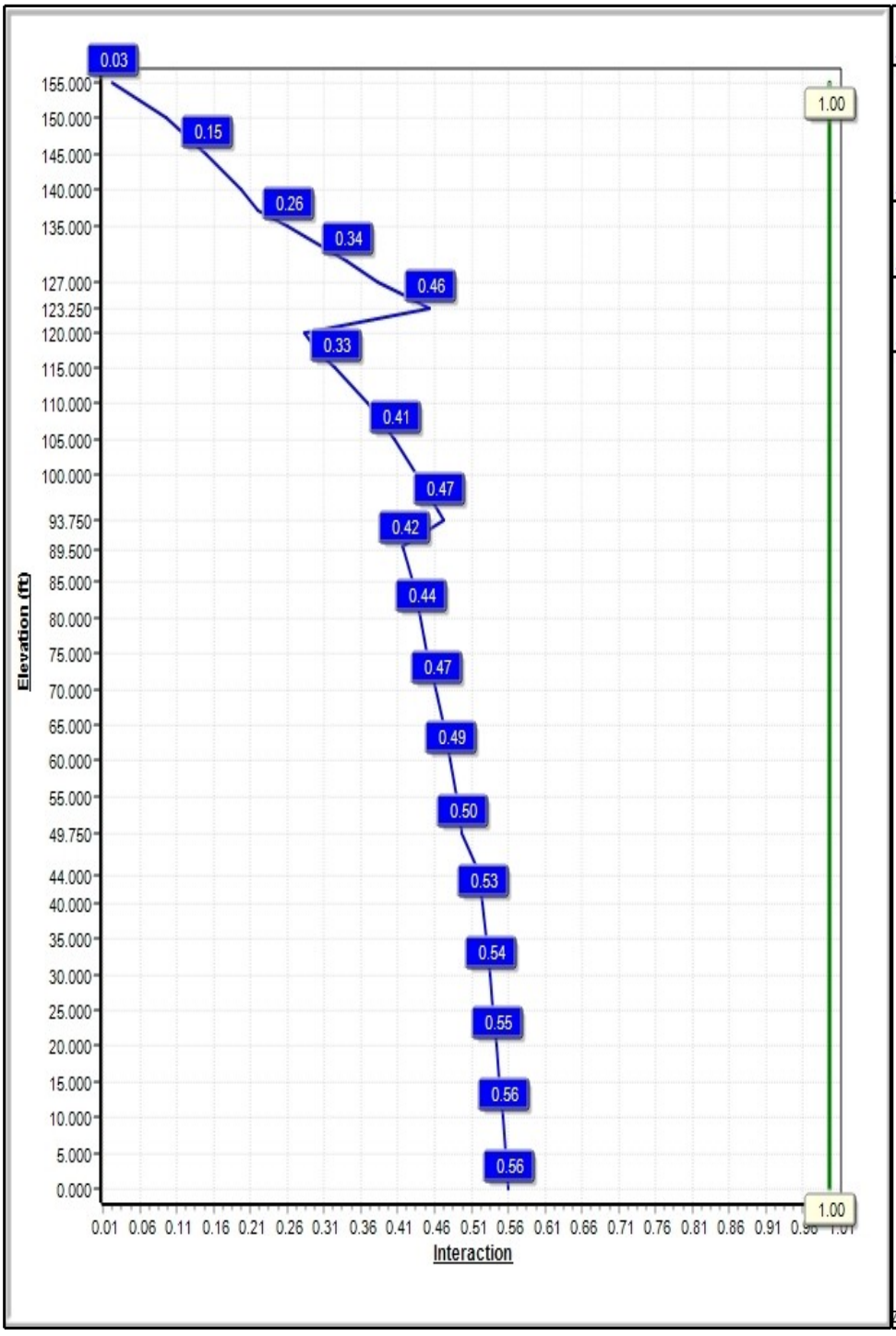
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019
Site Name:	North Bethel	**Exposure:**	B	
Height:	155.00 (ft)	**Gh:**	1.1	
Base Elev:	0.000 (ft)			Page: 1

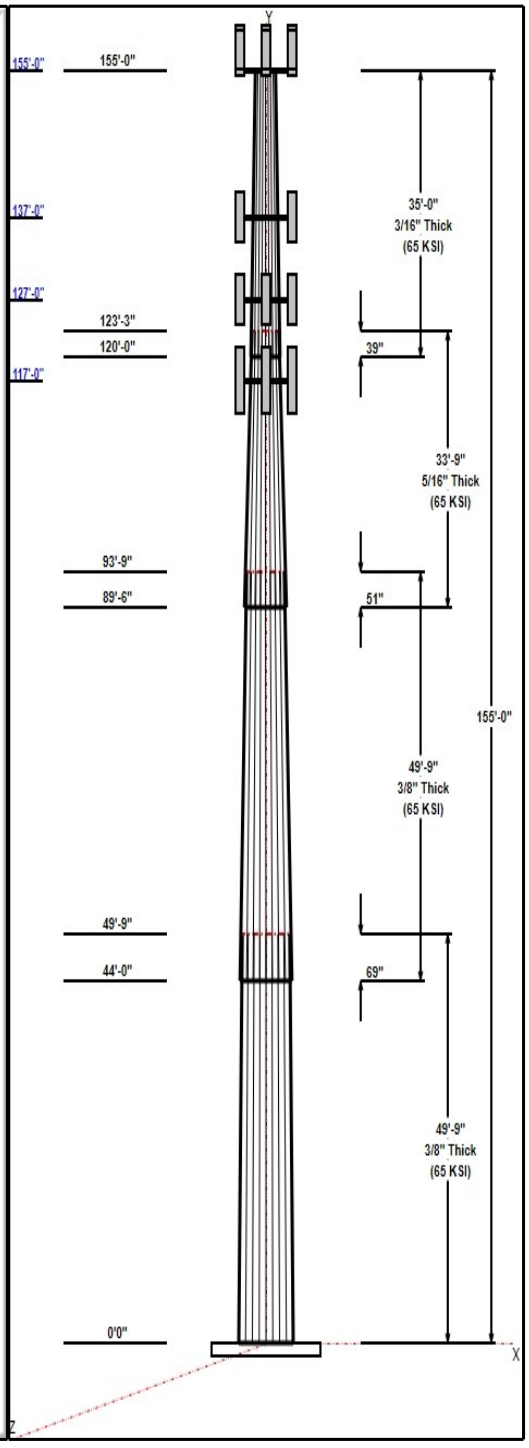
Tower Engineering Solutions

Dead Load Factor:	1.20
Wind Load Factor:	1.60

Load Case : 1.2D + 1.6W 93 mph Wind

Iterations: 24





Structure: CT00248-S-SBA

Type: Tapered
Site Name: North Bethel
Height: 155.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.27148

6/26/2019

Tower Engineering Solutions

Shaft Properties

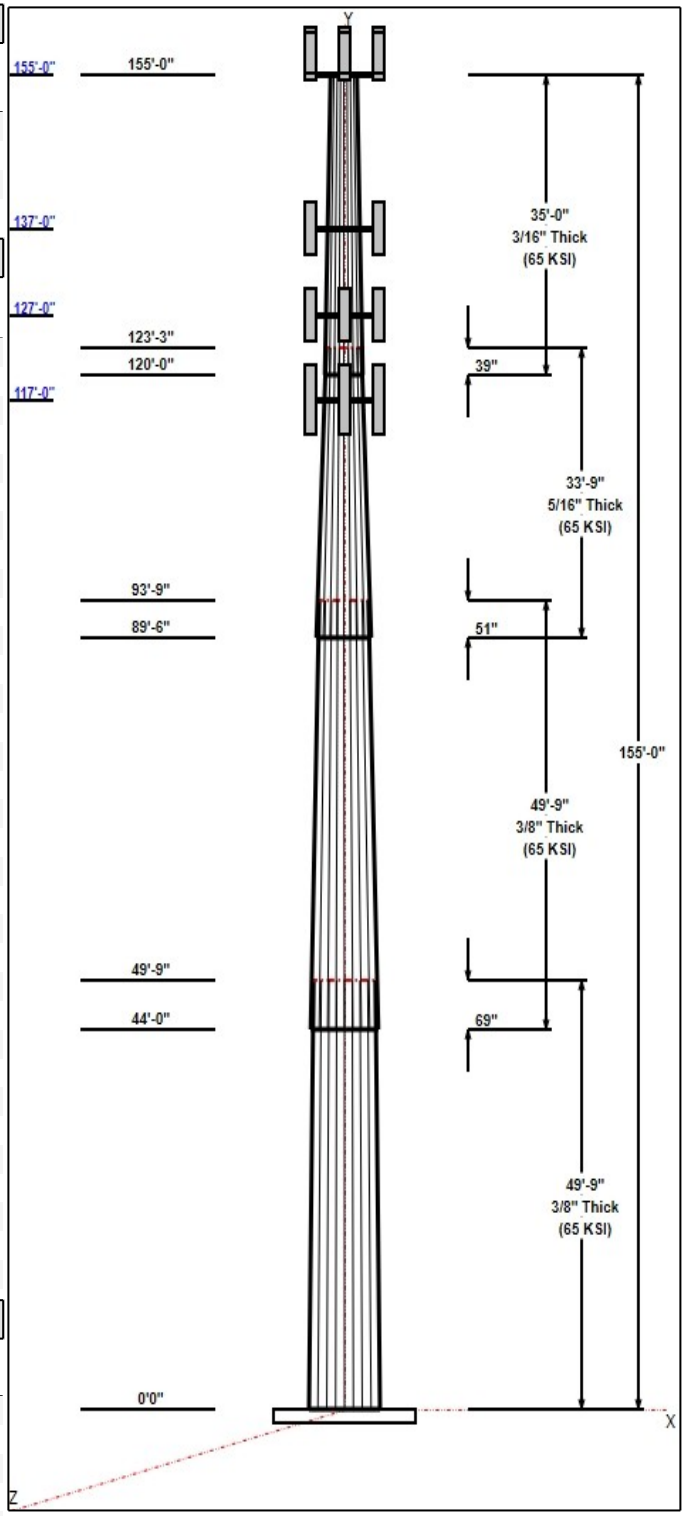
Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	49.75	43.32	56.83	0.375		0.27148	65
2	49.75	32.13	45.63	0.375	Slip	0.27148	65
3	33.75	24.74	33.91	0.313	Slip	0.27148	65
4	35.00	16.50	26.00	0.188	Slip	0.27148	65

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
155.00	155.00	1	6' Lightning rod	Verizon
155.00	157.40	3	APXVSPP18-C-A20	Sprint
155.00	157.40	4	ACU-A20-N	Sprint
155.00	157.40	3	APXVTM14-C-120	Sprint
155.00	157.40	3	TD-RRH8x20-25	Sprint
155.00	157.40	3	800 MHz RRH	Sprint
155.00	157.40	3	ALU 800MHz External	Sprint
155.00	157.40	3	1900MHz RRH	Sprint
155.00	155.00	1	Low Profile Platform	Sprint
155.00	155.00	1	Collar Mount	Sprint
137.00	137.00	6	SBNHH-1D65B	Verizon
137.00	137.00	2	LPA-80080/4CF ___	Verizon
137.00	137.00	2	LPA-80080-6CF-EDIN	Verizon
137.00	137.00	2	LPA-80063/6CF	Verizon
137.00	137.00	3	4X45 RRH AWS	Verizon
137.00	137.00	3	RRH2X60-PCS	Verizon
137.00	137.00	3	RRH2X60-700	Verizon
137.00	137.00	6	FD9R6004/2C-3L (3.1 lbs)	Verizon
137.00	137.00	2	DB-T1-6Z-8AB-0Z	Verizon
137.00	137.00	1	Low Profile Platform	Verizon
127.00	127.00	1	DC6-48-60-18-8F	AT&T
127.00	127.00	3	7770	AT&T
127.00	127.00	6	LGP21401	AT&T
127.00	127.00	1	Low Profile Platform	AT&T
127.00	127.00	3	RRU 11	AT&T
127.00	127.00	3	P65-16-XLH-RR	AT&T
127.00	127.00	3	RRUS 12	AT&T
127.00	127.00	6	860 10025	AT&T
117.00	117.00	6	Air 21 B4A/B2P	T-Mobile
117.00	117.00	3	APXVAARR24_43-U-NA20	T-Mobile
117.00	117.00	3	Ericsson Radio 4449	T-Mobile
117.00	117.00	1	RMQP-496	T-Mobile
117.00	117.00	1	HRK12 (Handrail Kit)	T-Mobile

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	155.00	Inside	1 1/4" Coax	Sprint
0.00	137.00	Inside	1 5/8" Coax	Verizon
0.00	137.00	Inside	1 5/8" Fiber	Verizon
0.00	127.00	Inside	1 1/4" Coax	AT&T
0.00	127.00	Inside	1/2" Fiber	AT&T
0.00	127.00	Inside	3/4" DC	AT&T
0.00	117.00	Outside	1 5/8" Coax	T-Mobile
0.00	117.00	Outside	1 5/8" Hybrid	T-Mobile



Anchor Bolts

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

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
2.7500	64.0	50.0	Clipped

Reactions

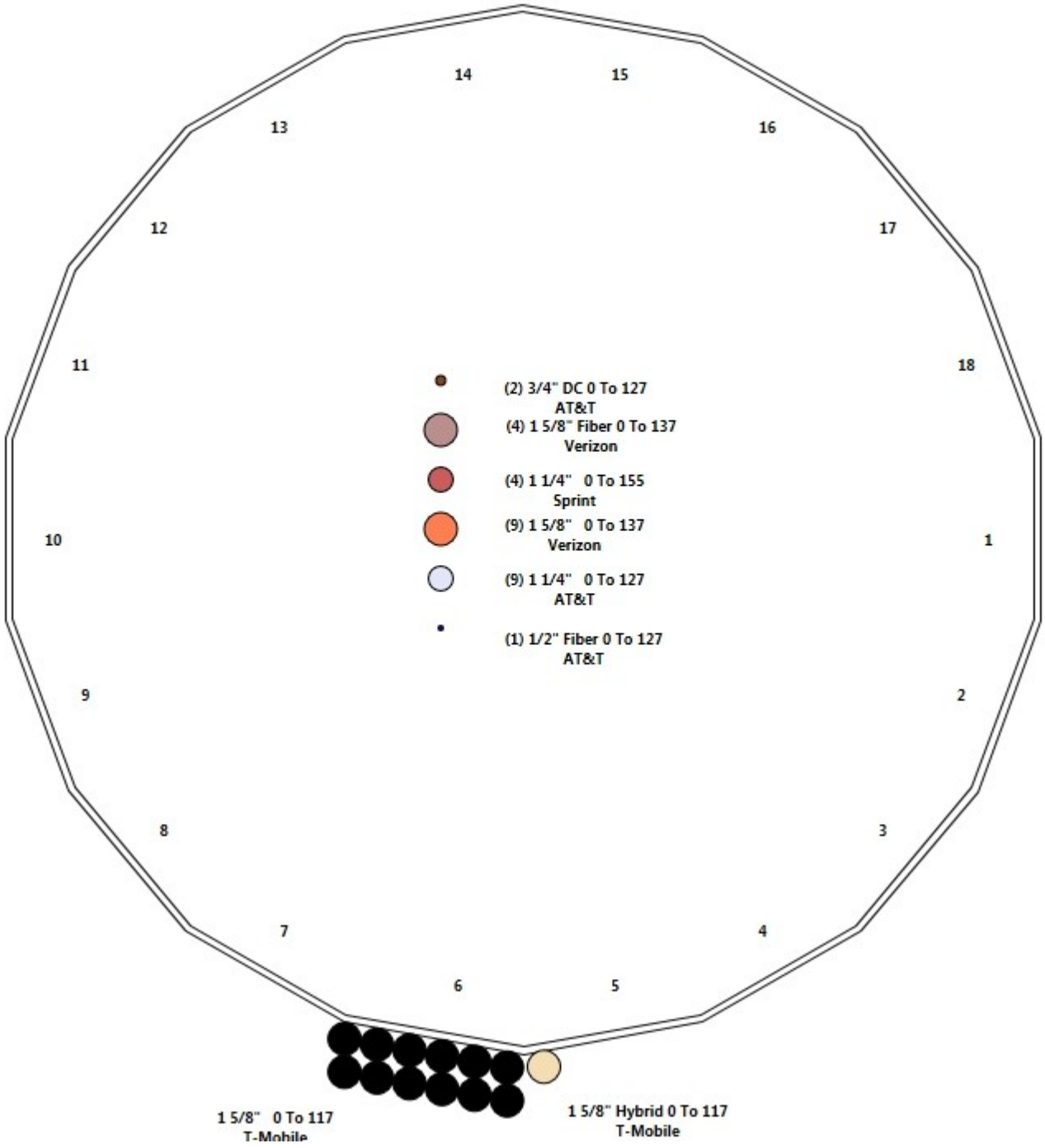
Load Case	Moment (FT-Kips)	Shear (Kips)	Axial (Kips)
1.2D + 1.6W 93 mph Wind	2789.9	24.5	45.0
0.9D + 1.6W 93 mph Wind	2759.2	24.5	33.8
1.2D + 1.0Di + 1.0Wi 50 mph Wind	839.3	7.4	77.3
1.2D + 1.0E	215.7	1.8	45.1
0.9D + 1.0E	213.1	1.8	33.8
1.0D + 1.0W 60 mph Wind	721.1	6.4	37.6

Structure: CT00248-S-SBA - Coax Line Placement

Type: Monopole
Site Name: North Bethel
Height: 155.00 (ft)

6/26/2019

Tower Engineering Solutions



Shaft Properties

Structure:	CT00248-S-SBA		**Code:**	EIA/TIA-222-G	6/26/2019
Site Name:	North Bethel		**Exposure:**	B	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 5

Tower Engineering Solutions

Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	49.750	0.3750	65		0.00	10,014
2	18	49.750	0.3750	65	Slip	69.00	7,759
3	18	33.750	0.3125	65	Slip	51.00	3,305
4	18	35.000	0.1875	65	Slip	39.00	1,493
					Total Shaft Weight:		**22,571**

	Bottom						Top						
Sec. No.	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Taper**
1	56.83	0.00	67.19	27057.20	25.31	151.55	43.32	49.75	51.12	11913.1	18.96	115.5	0.271484
2	45.63	44.00	53.87	13941.55	20.05	121.69	32.13	93.75	37.79	4814.44	13.70	85.68	0.271484
3	33.91	89.50	33.32	4751.23	17.72	108.50	24.74	123.25	24.23	1827.58	12.55	79.18	0.271484
4	26.00	120.0	15.36	1293.40	23.04	138.68	16.50	155.00	9.71	326.37	14.11	88.00	0.271484

Load Summary

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 6	

Tower Engineering Solutions

Discrete Appurtenances

No.	Elev (ft)	Description	Qty	No Ice Weight (lb)	No Ice CaAa (sf)	No Ice CaAa Factor	Ice Weight (lb)	Ice CaAa (sf)	Ice CaAa Factor	Hor. Ecc. (ft)	Vert Ecc (ft)
1	155.00	6' Lightning rod	1	6.50	0.38	1.00	42.92	1.471	1.00	0.00	0.00
2	155.00	APXVSPP18-C-A20	3	57.00	8.02	0.82	230.42	10.823	0.82	0.00	2.40
3	155.00	ACU-A20-N	4	1.00	0.14	1.00	5.31	0.438	1.00	0.00	2.40
4	155.00	APXVTM14-C-120	3	56.00	6.34	0.76	217.04	7.457	0.77	0.00	2.40
5	155.00	TD-RRH8x20-25	3	70.00	4.05	0.68	180.90	4.866	0.69	0.00	2.40
6	155.00	800 MHz RRH	3	53.00	2.49	0.92	127.20	3.638	0.92	0.00	2.40
7	155.00	ALU 800MHz External Notch Filt	3	8.80	0.78	0.69	26.50	1.429	0.72	0.00	2.40
8	155.00	1900MHz RRH	3	44.00	3.80	1.00	153.52	5.195	1.00	0.00	2.40
9	155.00	Low Profile Platform	1	1500.00	22.00	1.00	2813.21	39.720	1.00	0.00	0.00
10	155.00	Collar Mount	1	250.00	5.00	0.75	862.83	13.755	0.75	0.00	0.00
11	137.00	SBNHH-1D65B	6	50.71	8.08	0.82	250.15	9.360	0.82	0.00	0.00
12	137.00	LPA-80080/4CF ___	2	12.00	2.61	0.93	217.55	7.254	0.93	0.00	0.00
13	137.00	LPA-80080-6CF-EDIN	2	21.00	4.33	0.93	187.91	5.693	0.93	0.00	0.00
14	137.00	LPA-80063/6CF	2	27.00	9.60	0.94	312.08	10.940	0.94	0.00	0.00
15	137.00	4X45 RRH AWS	3	62.00	2.71	0.82	144.69	3.962	0.83	0.00	0.00
16	137.00	RRH2X60-PCS	3	55.00	2.20	0.89	138.59	2.830	0.90	0.00	0.00
17	137.00	RRH2X60-700	3	60.00	3.50	0.73	146.50	4.282	0.74	0.00	0.00
18	137.00	FD9R6004/2C-3L (3.1 lbs)	6	3.10	0.36	0.62	11.05	0.799	0.65	0.00	0.00
19	137.00	DB-T1-6Z-8AB-0Z	2	44.00	4.80	1.00	186.20	5.665	1.00	0.00	0.00
20	137.00	Low Profile Platform	1	1200.00	25.00	1.00	2237.68	45.754	1.00	0.00	0.00
21	127.00	DC6-48-60-18-8F	1	31.80	1.47	1.00	92.60	2.158	1.00	0.00	0.00
22	127.00	7770	3	35.00	5.50	0.75	167.44	6.546	0.75	0.00	0.00
23	127.00	LGP21401	6	14.10	1.29	0.64	38.69	2.112	0.66	0.00	0.00
24	127.00	Low Profile Platform	1	1500.00	22.00	1.00	2787.31	39.370	1.00	0.00	0.00
25	127.00	RRU 11	3	55.00	4.42	0.68	143.47	5.895	0.69	0.00	0.00
26	127.00	P65-16-XLH-RR	3	53.00	8.16	0.75	215.33	10.916	0.75	0.00	0.00
27	127.00	RRUS 12	3	60.00	2.70	0.67	125.91	3.349	0.69	0.00	0.00
28	127.00	860 10025	6	1.20	0.18	0.70	7.10	0.553	0.72	0.00	0.00
29	117.00	Air 21 B4A/B2P	6	90.40	6.09	0.86	254.36	7.159	0.86	0.00	0.00
30	117.00	APXVAARR24_43-U-NA20	3	128.00	20.24	0.70	534.40	22.092	0.70	0.00	0.00
31	117.00	Ericsson Radio 4449 B71+B12	3	70.00	1.65	0.67	136.15	2.173	0.67	0.00	0.00
32	117.00	RMQP-496	1	1718.00	37.00	1.00	3472.82	44.559	1.00	0.00	0.00
33	117.00	HRK12 (Handrail Kit)	1	261.72	6.75	1.00	564.69	13.185	1.00	0.00	0.00
		Totals:	**95**	**10,237.48**			**26,135.14**				

Linear Appurtenances

Bottom Elev. (ft)	Top Elev. (ft)	Description	Exposed Width	Exposed
0.00	155.00	(4) 1 1/4" Coax	0.00	Inside
0.00	137.00	(9) 1 5/8" Coax	0.00	Inside
0.00	137.00	(4) 1 5/8" Fiber	0.00	Inside
0.00	127.00	(9) 1 1/4" Coax	0.00	Inside
0.00	127.00	(1) 1/2" Fiber	0.00	Inside
0.00	127.00	(2) 3/4" DC	0.00	Inside
0.00	117.00	(12) 1 5/8" Coax	3.96	Outside
0.00	117.00	(1) 1 5/8" Hybrid	0.00	Outside

Discrete Appurtenances

No.	Elev (ft)	Description	Qty	No Ice Weight (lb)	No Ice CaAa (sf)	No Ice CaAa Factor	Ice Weight (lb)	Ice CaAa (sf)	Ice CaAa Factor	Hor. Ecc. (ft)	Vert Ecc (ft)

Shaft Section Properties

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 8	

Increment Length: **5 (ft)**

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in^3)	Weight (lb)
0.00		0.3750	56.830	67.193	27057.2	25.31	151.55	71.6	937.7	0.0
5.00		0.3750	55.473	65.578	25152.0	24.67	147.93	72.4	893.1	1129.5
10.00		0.3750	54.115	63.962	23338.5	24.03	144.31	73.1	849.4	1102.0
15.00		0.3750	52.758	62.346	21614.3	23.40	140.69	73.9	806.9	1074.5
20.00		0.3750	51.400	60.731	19977.1	22.76	137.07	74.6	765.5	1047.0
25.00		0.3750	50.043	59.115	18424.8	22.12	133.45	75.4	725.2	1019.5
30.00		0.3750	48.685	57.499	16955.1	21.48	129.83	76.1	685.9	992.0
35.00		0.3750	47.328	55.884	15565.7	20.84	126.21	76.9	647.8	964.5
40.00		0.3750	45.971	54.268	14254.3	20.21	122.59	77.6	610.7	937.1
44.00	Bot - Section 2	0.3750	44.885	52.976	13259.9	19.69	119.69	78.2	581.9	729.9
45.00		0.3750	44.613	52.653	13018.7	19.57	118.97	78.4	574.8	362.5
49.75	Top - Section 1	0.3750	44.074	52.010	12548.2	19.31	117.53	0.0	0.0	1691.7
50.00		0.3750	44.006	51.930	12489.8	19.28	117.35	78.7	559.0	44.2
55.00		0.3750	42.648	50.314	11360.0	18.64	113.73	79.5	524.6	869.8
60.00		0.3750	41.291	48.698	10300.4	18.00	110.11	80.2	491.3	842.3
65.00		0.3750	39.934	47.083	9308.9	17.37	106.49	81.0	459.1	814.8
70.00		0.3750	38.576	45.467	8383.1	16.73	102.87	81.7	428.0	787.3
75.00		0.3750	37.219	43.852	7520.8	16.09	99.25	82.5	398.0	759.8
80.00		0.3750	35.861	42.236	6719.8	15.45	95.63	82.5	369.1	732.3
85.00		0.3750	34.504	40.620	5977.8	14.81	92.01	82.5	341.2	704.9
89.50	Bot - Section 3	0.3750	33.282	39.166	5358.6	14.24	88.75	82.5	317.1	610.9
90.00		0.3750	33.146	39.005	5292.5	14.18	88.39	82.5	314.5	123.1
93.75	Top - Section 2	0.3125	32.753	32.176	4278.3	17.07	104.81	0.0	0.0	907.0
95.00		0.3125	32.414	31.840	4145.5	16.88	103.72	81.5	251.9	136.1
100.00		0.3125	31.057	30.493	3641.5	16.11	99.38	82.4	230.9	530.3
105.00		0.3125	29.699	29.147	3180.1	15.35	95.04	82.5	210.9	507.4
110.00		0.3125	28.342	27.801	2759.5	14.58	90.69	82.5	191.8	484.4
115.00		0.3125	26.984	26.454	2377.7	13.82	86.35	82.5	173.5	461.5
117.00		0.3125	26.441	25.916	2235.4	13.51	84.61	82.5	166.5	178.2
120.00	Bot - Section 4	0.3125	25.627	25.108	2032.8	13.05	82.01	82.5	156.2	260.4
123.25	Top - Section 3	0.1875	25.120	14.837	1165.3	22.21	133.97	0.0	0.0	439.8
125.00		0.1875	24.645	14.554	1099.9	21.77	131.44	75.8	87.9	87.5
127.00		0.1875	24.102	14.231	1028.3	21.25	128.54	76.4	84.0	98.0
130.00		0.1875	23.287	13.747	926.7	20.49	124.20	77.3	78.4	142.8
135.00		0.1875	21.930	12.939	772.8	19.21	116.96	78.8	69.4	227.0
137.00		0.1875	21.387	12.616	716.3	18.70	114.06	79.4	66.0	87.0
140.00		0.1875	20.572	12.131	636.9	17.94	109.72	80.3	61.0	126.3
145.00		0.1875	19.215	11.323	517.9	16.66	102.48	81.8	53.1	199.5
150.00		0.1875	17.857	10.515	414.8	15.38	95.24	82.5	45.8	185.8
155.00		0.1875	16.500	9.708	326.4	14.11	88.00	82.5	39.0	172.0
										22570.6

Wind Loading - Shaft

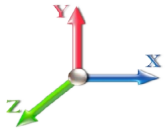
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 9	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 24

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	14.724	16.20	374.18	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	14.724	16.20	365.24	0.650	0.000	5.00	23.757	15.44	400.2	0.0	1355.4
10.00		1.00	0.70	14.724	16.20	356.30	0.650	0.000	5.00	23.183	15.07	390.5	0.0	1322.4
15.00		1.00	0.70	14.724	16.20	347.36	0.650	0.000	5.00	22.609	14.70	380.8	0.0	1289.4
20.00		1.00	0.70	14.724	16.20	338.43	0.650	0.000	5.00	22.034	14.32	371.2	0.0	1256.4
25.00		1.00	0.70	14.724	16.20	329.49	0.650	0.000	5.00	21.460	13.95	361.5	0.0	1223.4
30.00		1.00	0.70	14.736	16.21	320.69	0.650	0.000	5.00	20.886	13.58	352.1	0.0	1190.4
35.00		1.00	0.73	15.400	16.94	318.69	0.650	0.000	5.00	20.311	13.20	357.8	0.0	1157.5
40.00		1.00	0.76	15.999	17.60	315.51	0.650	0.000	5.00	19.737	12.83	361.2	0.0	1124.5
44.00	Bot - Section 2	1.00	0.78	16.441	18.08	312.28	0.650	0.000	4.00	15.376	9.99	289.2	0.0	875.8
45.00		1.00	0.79	16.546	18.20	311.39	0.650	0.000	1.00	3.850	2.50	72.9	0.0	435.0
49.75	Top - Section 1	1.00	0.81	17.028	18.73	306.75	0.650	0.000	4.75	17.974	11.68	350.1	0.0	2030.0
50.00		1.00	0.81	17.052	18.76	311.81	0.650	0.000	0.25	0.932	0.61	18.2	0.0	53.1
55.00		1.00	0.83	17.523	19.28	306.33	0.650	0.000	5.00	18.331	11.92	367.5	0.0	1043.7
60.00		1.00	0.85	17.964	19.76	300.29	0.650	0.000	5.00	17.757	11.54	364.9	0.0	1010.8
65.00		1.00	0.87	18.380	20.22	293.76	0.650	0.000	5.00	17.183	11.17	361.3	0.0	977.8
70.00		1.00	0.89	18.773	20.65	286.79	0.650	0.000	5.00	16.609	10.80	356.7	0.0	944.8
75.00		1.00	0.91	19.147	21.06	279.44	0.656 *	0.000	5.00	16.034	10.51	354.3	0.0	911.8
80.00		1.00	0.93	19.503	21.45	271.74	0.663 *	0.000	5.00	15.460	10.25	351.9	0.0	878.8
85.00		1.00	0.94	19.844	21.83	263.73	0.671 *	0.000	5.00	14.886	9.99	348.9	0.0	845.8
89.50	Bot - Section 3	1.00	0.96	20.138	22.15	256.28	0.679 *	0.000	4.50	12.906	8.77	310.8	0.0	733.0
90.00		1.00	0.96	20.170	22.19	255.43	0.684 *	0.000	0.50	1.432	0.98	34.8	0.0	147.7
93.75	Top - Section 2	1.00	0.97	20.407	22.45	249.04	0.688 *	0.000	3.75	10.555	7.26	260.8	0.0	1088.4
95.00		1.00	0.97	20.484	22.53	251.73	0.688 *	0.000	1.25	3.446	2.37	85.5	0.0	163.4
100.00		1.00	0.99	20.787	22.87	242.96	0.695 *	0.000	5.00	13.427	9.33	341.2	0.0	636.3
105.00		1.00	1.00	21.079	23.19	233.97	0.705 *	0.000	5.00	12.853	9.07	336.3	0.0	608.8
110.00		1.00	1.02	21.361	23.50	224.76	0.717 *	0.000	5.00	12.278	8.80	331.0	0.0	581.3
115.00		1.00	1.03	21.634	23.80	215.36	0.730 *	0.000	5.00	11.704	8.54	325.3	0.0	553.9
117.00	Appurtenance(s)	1.00	1.03	21.741	23.91	211.55	0.740 *	0.000	2.00	4.521	3.34	128.0	0.0	213.8
120.00	Bot - Section 4	1.00	1.04	21.898	24.09	205.77	0.650	0.000	3.00	6.609	4.30	165.6	0.0	312.5
123.25	Top - Section 3	1.00	1.05	22.066	24.27	199.45	0.650	0.000	3.25	7.030	4.57	177.5	0.0	527.8
125.00		1.00	1.05	22.155	24.37	199.04	0.650	0.000	1.75	3.685	2.39	93.4	0.0	105.0
127.00	Appurtenance(s)	1.00	1.06	22.256	24.48	195.10	0.650	0.000	2.00	4.125	2.68	105.0	0.0	117.5
130.00		1.00	1.07	22.405	24.65	189.14	0.650	0.000	3.00	6.015	3.91	154.2	0.0	171.4
135.00		1.00	1.08	22.648	24.91	179.07	0.650	0.000	5.00	9.565	6.22	247.8	0.0	272.4
137.00	Appurtenance(s)	1.00	1.08	22.743	25.02	175.01	0.650	0.000	2.00	3.665	2.38	95.4	0.0	104.3
140.00		1.00	1.09	22.884	25.17	168.86	0.650	0.000	3.00	5.326	3.46	139.4	0.0	151.6
145.00		1.00	1.10	23.115	25.43	158.51	0.650	0.000	5.00	8.417	5.47	222.6	0.0	239.4
150.00		1.00	1.11	23.340	25.67	148.03	0.650	0.000	5.00	7.843	5.10	209.4	0.0	222.9
155.00	Appurtenance(s)	1.00	1.12	23.560	25.92	137.42	0.650	0.000	5.00	7.268	4.72	195.9	0.0	206.4
								Totals:	**155.00**			**10,170.9**		**27,084.8**

* Cf Adjusted by Linear Load Ra Effect

Discrete Appurtenance Forces

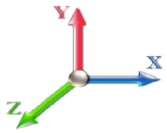
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 10	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 24

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	155.00	TD-RRH8x20-25	3	23.663	26.030	0.68	1.00	8.26	252.00	0.000	2.400	344.09	0.00	825.82
2	155.00	6' Lightning rod	1	23.560	25.916	1.00	1.00	0.38	7.80	0.000	0.000	15.76	0.00	0.00
3	155.00	APXVSPP18-C-A20	3	23.663	26.030	0.82	1.00	19.73	205.20	0.000	2.400	821.67	0.00	1972.01
4	155.00	ACU-A20-N	4	23.663	26.030	1.00	1.00	0.56	4.80	0.000	2.400	23.32	0.00	55.97
5	155.00	APXVTM14-C-120	3	23.663	26.030	0.76	1.00	14.46	201.60	0.000	2.400	602.02	0.00	1444.85
6	155.00	Collar Mount	1	23.560	25.916	0.56	0.75	2.81	300.00	0.000	0.000	116.62	0.00	0.00
7	155.00	800 MHz RRH	3	23.663	26.030	0.92	1.00	6.87	190.80	0.000	2.400	286.22	0.00	686.92
8	155.00	ALU 800MHz External	3	23.663	26.030	0.69	1.00	1.61	31.68	0.000	2.400	67.24	0.00	161.39
9	155.00	1900MHz RRH	3	23.663	26.030	1.00	1.00	11.40	158.40	0.000	2.400	474.78	0.00	1139.47
10	155.00	Low Profile Platform	1	23.560	25.916	1.00	1.00	22.00	1800.00	0.000	0.000	912.23	0.00	0.00
11	137.00	Low Profile Platform	1	22.743	25.017	1.00	1.00	25.00	1440.00	0.000	0.000	1000.70	0.00	0.00
12	137.00	DB-T1-6Z-8AB-0Z	2	22.743	25.017	0.80	0.80	7.68	105.60	0.000	0.000	307.41	0.00	0.00
13	137.00	FD9R6004/2C-3L (3.1 lbs)	6	22.743	25.017	0.50	0.80	1.07	22.32	0.000	0.000	42.88	0.00	0.00
14	137.00	RRH2X60-700	3	22.743	25.017	0.58	0.80	6.13	216.00	0.000	0.000	245.45	0.00	0.00
15	137.00	RRH2X60-PCS	3	22.743	25.017	0.71	0.80	4.70	198.00	0.000	0.000	188.10	0.00	0.00
16	137.00	4X45 RRH AWS	3	22.743	25.017	0.66	0.80	5.33	223.20	0.000	0.000	213.48	0.00	0.00
17	137.00	LPA-80063/6CF	2	22.743	25.017	0.75	0.80	14.44	64.80	0.000	0.000	577.94	0.00	0.00
18	137.00	LPA-80080-6CF-EDIN	2	22.743	25.017	0.74	0.80	6.44	50.40	0.000	0.000	257.90	0.00	0.00
19	137.00	LPA-80080/4CF ___	2	22.743	25.017	0.74	0.80	3.88	28.80	0.000	0.000	155.46	0.00	0.00
20	137.00	SBNHH-1D65B	6	22.743	25.017	0.66	0.80	31.80	365.11	0.000	0.000	1273.01	0.00	0.00
21	127.00	DC6-48-60-18-8F	1	22.256	24.482	0.80	0.80	1.18	38.16	0.000	0.000	46.06	0.00	0.00
22	127.00	7770	3	22.256	24.482	0.60	0.80	9.90	126.00	0.000	0.000	387.79	0.00	0.00
23	127.00	LGP21401	6	22.256	24.482	0.51	0.80	3.96	101.52	0.000	0.000	155.23	0.00	0.00
24	127.00	Low Profile Platform	1	22.256	24.482	1.00	1.00	22.00	1800.00	0.000	0.000	861.75	0.00	0.00
25	127.00	RRU 11	3	22.256	24.482	0.54	0.80	7.21	198.00	0.000	0.000	282.55	0.00	0.00
26	127.00	P65-16-XLH-RR	3	22.256	24.482	0.60	0.80	14.69	190.80	0.000	0.000	575.34	0.00	0.00
27	127.00	RRUS 12	3	22.256	24.482	0.54	0.80	4.34	216.00	0.000	0.000	170.06	0.00	0.00
28	127.00	860 10025	6	22.256	24.482	0.56	0.80	0.60	8.64	0.000	0.000	23.69	0.00	0.00
29	117.00	HRK12 (Handrail Kit)	1	21.741	23.915	1.00	1.00	6.75	314.06	0.000	0.000	258.28	0.00	0.00
30	117.00	RMQP-496	1	21.741	23.915	1.00	1.00	37.00	2061.60	0.000	0.000	1415.74	0.00	0.00
31	117.00	Ericsson Radio 4449	3	21.741	23.915	0.50	0.75	2.49	252.00	0.000	0.000	95.18	0.00	0.00
32	117.00	APXVAARR24_43-U-NA2	3	21.741	23.915	0.52	0.75	31.88	460.80	0.000	0.000	1219.76	0.00	0.00
33	117.00	Air 21 B4A/B2P	6	21.741	23.915	0.65	0.75	23.57	650.88	0.000	0.000	901.80	0.00	0.00
							Totals:		**12,284.98**			**14,319.51**		

Total Applied Force Summary

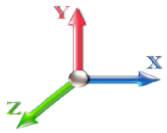
Structure:	CT00248-S-SBA		**Code:**	EIA/TIA-222-G	6/26/2019
Site Name:	North Bethel		**Exposure:**	B	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 11

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 24

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		400.18	1576.05	0.00	0.00
10.00		390.50	1543.06	0.00	0.00
15.00		380.83	1510.08	0.00	0.00
20.00		371.15	1477.09	0.00	0.00
25.00		361.48	1444.11	0.00	0.00
30.00		352.10	1411.12	0.00	0.00
35.00		357.84	1378.14	0.00	0.00
40.00		361.24	1345.15	0.00	0.00
44.00		289.20	1052.37	0.00	0.00
45.00		72.88	479.10	0.00	0.00
49.75		350.13	2239.67	0.00	0.00
50.00		18.17	64.09	0.00	0.00
55.00		367.48	1264.42	0.00	0.00
60.00		364.92	1231.43	0.00	0.00
65.00		361.29	1198.45	0.00	0.00
70.00		356.69	1165.46	0.00	0.00
75.00		354.27	1132.48	0.00	0.00
80.00		351.89	1099.49	0.00	0.00
85.00		348.91	1066.51	0.00	0.00
89.50		310.77	931.65	0.00	0.00
90.00		34.76	169.76	0.00	0.00
93.75		260.82	1253.92	0.00	0.00
95.00		85.54	218.54	0.00	0.00
100.00		341.22	856.99	0.00	0.00
105.00		336.31	829.51	0.00	0.00
110.00		330.99	802.02	0.00	0.00
115.00		325.27	774.53	0.00	0.00
117.00	(14) attachments	4018.70	4041.46	0.00	0.00
120.00		165.57	396.04	0.00	0.00
123.25		177.45	618.26	0.00	0.00
125.00		93.39	153.73	0.00	0.00
127.00	(26) attachments	2607.50	2852.34	0.00	0.00
130.00		154.17	230.41	0.00	0.00
135.00		247.83	370.81	0.00	0.00
137.00	(30) attachments	4357.70	2857.94	0.00	0.00
140.00		139.43	161.08	0.00	0.00
145.00		222.57	255.27	0.00	0.00
150.00		209.40	238.78	0.00	0.00
155.00	(25) attachments	3859.85	3374.56	0.00	6286.43
	Totals:	**24,490.39**	**45,065.86**	**0.00**	**6,286.43**

Linear Appurtenance Segment Forces (Factored)

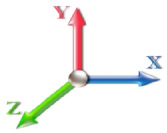
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 12	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 24

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.069	0.000	14.724	0.00	74.88
5.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.069	0.000	14.724	0.00	6.60
10.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.071	0.000	14.724	0.00	74.88
10.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.071	0.000	14.724	0.00	6.60
15.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.073	0.000	14.724	0.00	74.88
15.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.073	0.000	14.724	0.00	6.60
20.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.075	0.000	14.724	0.00	74.88
20.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.075	0.000	14.724	0.00	6.60
25.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.077	0.000	14.724	0.00	74.88
25.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.077	0.000	14.724	0.00	6.60
30.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.079	0.000	14.736	0.00	74.88
30.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.079	0.000	14.736	0.00	6.60
35.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.081	0.000	15.400	0.00	74.88
35.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.081	0.000	15.400	0.00	6.60
40.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.084	0.000	15.999	0.00	74.88
40.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.084	0.000	15.999	0.00	6.60
44.00	1 5/8" Coax	Yes	4.00	0.000	3.96	1.32	0.00	0.086	0.000	16.441	0.00	59.90
44.00	1 5/8" Hybrid	Yes	4.00	0.000	0.00	0.00	0.00	0.086	0.000	16.441	0.00	5.28
45.00	1 5/8" Coax	Yes	1.00	0.000	3.96	0.33	0.00	0.087	0.000	16.546	0.00	14.98
45.00	1 5/8" Hybrid	Yes	1.00	0.000	0.00	0.00	0.00	0.087	0.000	16.546	0.00	1.32
49.75	1 5/8" Coax	Yes	4.75	0.000	3.96	1.57	0.00	0.089	0.000	17.028	0.00	71.14
49.75	1 5/8" Hybrid	Yes	4.75	0.000	0.00	0.00	0.00	0.089	0.000	17.028	0.00	6.27
50.00	1 5/8" Coax	Yes	0.25	0.000	3.96	0.08	0.00	0.089	0.000	17.052	0.00	3.74
50.00	1 5/8" Hybrid	Yes	0.25	0.000	0.00	0.00	0.00	0.089	0.000	17.052	0.00	0.33
55.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.090	0.000	17.523	0.00	74.88
55.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.090	0.000	17.523	0.00	6.60
60.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.093	0.000	17.964	0.00	74.88
60.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.093	0.000	17.964	0.00	6.60
65.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.096	0.000	18.380	0.00	74.88
65.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.096	0.000	18.380	0.00	6.60
70.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.099	0.000	18.773	0.00	74.88
70.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.099	0.000	18.773	0.00	6.60
75.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.103	1.009	19.147	0.00	74.88
75.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.103	1.009	19.147	0.00	6.60
80.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.107	1.020	19.503	0.00	74.88
80.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.107	1.020	19.503	0.00	6.60
85.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.111	1.033	19.844	0.00	74.88
85.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.111	1.033	19.844	0.00	6.60
89.50	1 5/8" Coax	Yes	4.50	0.000	3.96	1.48	0.00	0.115	1.045	20.138	0.00	67.39
89.50	1 5/8" Hybrid	Yes	4.50	0.000	0.00	0.00	0.00	0.115	1.045	20.138	0.00	5.94
90.00	1 5/8" Coax	Yes	0.50	0.000	3.96	0.17	0.00	0.117	1.052	20.170	0.00	7.49
90.00	1 5/8" Hybrid	Yes	0.50	0.000	0.00	0.00	0.00	0.117	1.052	20.170	0.00	0.66
93.75	1 5/8" Coax	Yes	3.75	0.000	3.96	1.24	0.00	0.119	1.058	20.407	0.00	56.16
93.75	1 5/8" Hybrid	Yes	3.75	0.000	0.00	0.00	0.00	0.119	1.058	20.407	0.00	4.95
95.00	1 5/8" Coax	Yes	1.25	0.000	3.96	0.41	0.00	0.120	1.059	20.484	0.00	18.72
95.00	1 5/8" Hybrid	Yes	1.25	0.000	0.00	0.00	0.00	0.120	1.059	20.484	0.00	1.65
100.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.123	1.069	20.787	0.00	74.88

Linear Appurtenance Segment Forces (Factored)

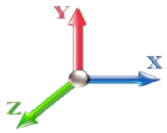
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 13	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 24

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
100.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.123	1.069	20.787	0.00	6.60
105.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.128	1.085	21.079	0.00	74.88
105.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.128	1.085	21.079	0.00	6.60
110.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.134	1.103	21.361	0.00	74.88
110.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.134	1.103	21.361	0.00	6.60
115.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.141	1.123	21.634	0.00	74.88
115.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.141	1.123	21.634	0.00	6.60
117.00	1 5/8" Coax	Yes	2.00	0.000	3.96	0.66	0.00	0.146	1.138	21.741	0.00	29.95
117.00	1 5/8" Hybrid	Yes	2.00	0.000	0.00	0.00	0.00	0.146	1.138	21.741	0.00	2.64
										Totals:	**0.0**	**1,906.6**

Calculated Forces

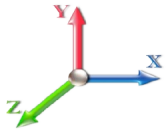
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 14	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 24

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-45.03	-24.55	0.00	-2789.9	0.00	2789.90	4331.76	2165.88	10060.7	5037.85	0.00	0.000	0.000	0.564
5.00	-43.40	-24.26	0.00	-2667.1	0.00	2667.17	4271.91	2135.96	9681.61	4848.00	0.08	-0.143	0.000	0.560
10.00	-41.79	-23.97	0.00	-2545.8	0.00	2545.89	4209.88	2104.94	9304.37	4659.10	0.31	-0.291	0.000	0.556
15.00	-40.22	-23.69	0.00	-2426.0	0.00	2426.05	4145.67	2072.83	8929.41	4471.34	0.69	-0.442	0.000	0.552
20.00	-38.68	-23.41	0.00	-2307.6	0.00	2307.63	4079.27	2039.64	8557.10	4284.91	1.24	-0.598	0.000	0.548
25.00	-37.18	-23.13	0.00	-2190.5	0.00	2190.59	4010.69	2005.34	8187.79	4099.98	1.95	-0.758	0.000	0.544
30.00	-35.71	-22.87	0.00	-2074.9	0.00	2074.92	3939.93	1969.96	7821.85	3916.74	2.84	-0.923	0.000	0.539
35.00	-34.27	-22.59	0.00	-1960.5	0.00	1960.59	3866.98	1933.49	7459.66	3735.38	3.89	-1.092	0.000	0.534
40.00	-32.87	-22.29	0.00	-1847.6	0.00	1847.66	3791.85	1895.92	7101.59	3556.07	5.13	-1.266	0.000	0.528
44.00	-31.79	-22.03	0.00	-1758.5	0.00	1758.50	3730.17	1865.09	6818.34	3414.24	6.25	-1.410	0.000	0.524
45.00	-31.27	-22.00	0.00	-1736.4	0.00	1736.48	3714.54	1857.27	6747.99	3379.01	6.55	-1.448	0.000	0.522
49.75	-29.01	-21.64	0.00	-1631.9	0.00	1631.98	3683.20	1841.60	6608.77	3309.30	8.08	-1.623	0.000	0.501
50.00	-28.91	-21.66	0.00	-1626.5	0.00	1626.57	3679.23	1839.62	6591.31	3300.56	8.17	-1.632	0.000	0.501
55.00	-27.59	-21.35	0.00	-1518.2	0.00	1518.26	3598.76	1799.38	6244.86	3127.07	9.97	-1.811	0.000	0.493
60.00	-26.30	-21.03	0.00	-1411.5	0.00	1411.53	3516.10	1758.05	5903.79	2956.28	11.97	-1.995	0.000	0.485
65.00	-25.05	-20.70	0.00	-1306.4	0.00	1306.41	3431.27	1715.63	5568.46	2788.37	14.16	-2.182	0.000	0.476
70.00	-23.83	-20.38	0.00	-1202.8	0.00	1202.89	3344.24	1672.12	5239.26	2623.52	16.55	-2.374	0.000	0.466
75.00	-22.64	-20.06	0.00	-1100.9	0.00	1100.98	3255.04	1627.52	4916.54	2461.92	19.14	-2.570	0.000	0.454
80.00	-21.49	-19.73	0.00	-1000.7	0.00	1000.70	3137.93	1568.96	4563.27	2285.03	21.94	-2.768	0.000	0.445
85.00	-20.38	-19.40	0.00	-902.06	0.00	902.06	3017.89	1508.95	4219.09	2112.68	24.94	-2.970	0.000	0.434
89.50	-19.43	-19.07	0.00	-814.77	0.00	814.77	2909.87	1454.93	3920.86	1963.34	27.83	-3.154	0.000	0.422
90.00	-19.23	-19.06	0.00	-805.24	0.00	805.24	2897.86	1448.93	3888.39	1947.09	28.16	-3.175	0.000	0.420
93.75	-17.96	-18.76	0.00	-733.78	0.00	733.78	2354.99	1177.49	3133.69	1569.17	30.72	-3.330	0.000	0.476
95.00	-17.70	-18.70	0.00	-710.33	0.00	710.33	2336.81	1168.40	3076.66	1540.62	31.60	-3.384	0.000	0.469
100.00	-16.80	-18.38	0.00	-616.82	0.00	616.82	2262.72	1131.36	2851.92	1428.08	35.26	-3.611	0.000	0.440
105.00	-15.92	-18.05	0.00	-524.94	0.00	524.94	2165.47	1082.73	2607.63	1305.76	39.16	-3.834	0.000	0.410
110.00	-15.08	-17.72	0.00	-434.70	0.00	434.70	2065.44	1032.72	2371.09	1187.31	43.29	-4.049	0.000	0.374
115.00	-14.29	-17.37	0.00	-346.11	0.00	346.11	1965.41	982.71	2145.79	1074.49	47.64	-4.250	0.000	0.330
117.00	-10.54	-13.08	0.00	-311.37	0.00	311.37	1925.40	962.70	2058.82	1030.94	49.44	-4.329	0.000	0.308
120.00	-10.13	-12.90	0.00	-272.13	0.00	272.13	1865.39	932.69	1931.73	967.30	52.19	-4.440	0.000	0.287
123.25	-9.51	-12.69	0.00	-230.20	0.00	230.20	1005.19	502.59	1030.12	515.83	55.25	-4.555	0.000	0.456
125.00	-9.35	-12.60	0.00	-207.99	0.00	207.99	992.91	496.46	998.01	499.75	56.93	-4.614	0.000	0.426
127.00	-6.70	-9.78	0.00	-182.78	0.00	182.78	978.56	489.28	961.59	481.51	58.89	-4.715	0.000	0.387
130.00	-6.45	-9.63	0.00	-153.43	0.00	153.43	956.38	478.19	907.53	454.44	61.89	-4.855	0.000	0.345
135.00	-6.08	-9.37	0.00	-105.28	0.00	105.28	917.66	458.83	819.21	410.21	67.08	-5.053	0.000	0.264
137.00	-3.61	-4.78	0.00	-86.55	0.00	86.55	901.57	450.78	784.57	392.87	69.21	-5.124	0.000	0.224
140.00	-3.46	-4.63	0.00	-72.22	0.00	72.22	876.76	438.38	733.42	367.25	72.46	-5.219	0.000	0.201
145.00	-3.21	-4.39	0.00	-49.07	0.00	49.07	833.68	416.84	650.52	325.74	77.99	-5.354	0.000	0.155
150.00	-2.99	-4.17	0.00	-27.11	0.00	27.11	781.24	390.62	565.69	283.26	83.65	-5.459	0.000	0.100
155.00	0.00	-3.86	0.00	-6.29	0.00	6.29	721.23	360.61	481.69	241.20	89.40	-5.516	0.000	0.026

Wind Loading - Shaft

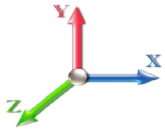
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 15	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 24

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	14.724	16.20	374.18	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	14.724	16.20	365.24	0.650	0.000	5.00	23.757	15.44	400.2	0.0	1016.5
10.00		1.00	0.70	14.724	16.20	356.30	0.650	0.000	5.00	23.183	15.07	390.5	0.0	991.8
15.00		1.00	0.70	14.724	16.20	347.36	0.650	0.000	5.00	22.609	14.70	380.8	0.0	967.0
20.00		1.00	0.70	14.724	16.20	338.43	0.650	0.000	5.00	22.034	14.32	371.2	0.0	942.3
25.00		1.00	0.70	14.724	16.20	329.49	0.650	0.000	5.00	21.460	13.95	361.5	0.0	917.6
30.00		1.00	0.70	14.736	16.21	320.69	0.650	0.000	5.00	20.886	13.58	352.1	0.0	892.8
35.00		1.00	0.73	15.400	16.94	318.69	0.650	0.000	5.00	20.311	13.20	357.8	0.0	868.1
40.00		1.00	0.76	15.999	17.60	315.51	0.650	0.000	5.00	19.737	12.83	361.2	0.0	843.4
44.00	Bot - Section 2	1.00	0.78	16.441	18.08	312.28	0.650	0.000	4.00	15.376	9.99	289.2	0.0	656.9
45.00		1.00	0.79	16.546	18.20	311.39	0.650	0.000	1.00	3.850	2.50	72.9	0.0	326.2
49.75	Top - Section 1	1.00	0.81	17.028	18.73	306.75	0.650	0.000	4.75	17.974	11.68	350.1	0.0	1522.5
50.00		1.00	0.81	17.052	18.76	311.81	0.650	0.000	0.25	0.932	0.61	18.2	0.0	39.8
55.00		1.00	0.83	17.523	19.28	306.33	0.650	0.000	5.00	18.331	11.92	367.5	0.0	782.8
60.00		1.00	0.85	17.964	19.76	300.29	0.650	0.000	5.00	17.757	11.54	364.9	0.0	758.1
65.00		1.00	0.87	18.380	20.22	293.76	0.650	0.000	5.00	17.183	11.17	361.3	0.0	733.3
70.00		1.00	0.89	18.773	20.65	286.79	0.650	0.000	5.00	16.609	10.80	356.7	0.0	708.6
75.00		1.00	0.91	19.147	21.06	279.44	0.656 *	0.000	5.00	16.034	10.51	354.3	0.0	683.8
80.00		1.00	0.93	19.503	21.45	271.74	0.663 *	0.000	5.00	15.460	10.25	351.9	0.0	659.1
85.00		1.00	0.94	19.844	21.83	263.73	0.671 *	0.000	5.00	14.886	9.99	348.9	0.0	634.4
89.50	Bot - Section 3	1.00	0.96	20.138	22.15	256.28	0.679 *	0.000	4.50	12.906	8.77	310.8	0.0	549.8
90.00		1.00	0.96	20.170	22.19	255.43	0.684 *	0.000	0.50	1.432	0.98	34.8	0.0	110.8
93.75	Top - Section 2	1.00	0.97	20.407	22.45	249.04	0.688 *	0.000	3.75	10.555	7.26	260.8	0.0	816.3
95.00		1.00	0.97	20.484	22.53	251.73	0.688 *	0.000	1.25	3.446	2.37	85.5	0.0	122.5
100.00		1.00	0.99	20.787	22.87	242.96	0.695 *	0.000	5.00	13.427	9.33	341.2	0.0	477.2
105.00		1.00	1.00	21.079	23.19	233.97	0.705 *	0.000	5.00	12.853	9.07	336.3	0.0	456.6
110.00		1.00	1.02	21.361	23.50	224.76	0.717 *	0.000	5.00	12.278	8.80	331.0	0.0	436.0
115.00		1.00	1.03	21.634	23.80	215.36	0.730 *	0.000	5.00	11.704	8.54	325.3	0.0	415.4
117.00	Appurtenance(s)	1.00	1.03	21.741	23.91	211.55	0.740 *	0.000	2.00	4.521	3.34	128.0	0.0	160.4
120.00	Bot - Section 4	1.00	1.04	21.898	24.09	205.77	0.650	0.000	3.00	6.609	4.30	165.6	0.0	234.4
123.25	Top - Section 3	1.00	1.05	22.066	24.27	199.45	0.650	0.000	3.25	7.030	4.57	177.5	0.0	395.8
125.00		1.00	1.05	22.155	24.37	199.04	0.650	0.000	1.75	3.685	2.39	93.4	0.0	78.8
127.00	Appurtenance(s)	1.00	1.06	22.256	24.48	195.10	0.650	0.000	2.00	4.125	2.68	105.0	0.0	88.2
130.00		1.00	1.07	22.405	24.65	189.14	0.650	0.000	3.00	6.015	3.91	154.2	0.0	128.5
135.00		1.00	1.08	22.648	24.91	179.07	0.650	0.000	5.00	9.565	6.22	247.8	0.0	204.3
137.00	Appurtenance(s)	1.00	1.08	22.743	25.02	175.01	0.650	0.000	2.00	3.665	2.38	95.4	0.0	78.3
140.00		1.00	1.09	22.884	25.17	168.86	0.650	0.000	3.00	5.326	3.46	139.4	0.0	113.7
145.00		1.00	1.10	23.115	25.43	158.51	0.650	0.000	5.00	8.417	5.47	222.6	0.0	179.6
150.00		1.00	1.11	23.340	25.67	148.03	0.650	0.000	5.00	7.843	5.10	209.4	0.0	167.2
155.00	Appurtenance(s)	1.00	1.12	23.560	25.92	137.42	0.650	0.000	5.00	7.268	4.72	195.9	0.0	154.8
								Totals:	**155.00**			**10,170.9**		**20,313.6**

* Cf Adjusted by Linear Load Ra Effect

Discrete Appurtenance Forces

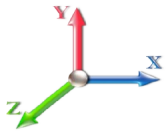
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 16	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 24

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	155.00	TD-RRH8x20-25	3	23.663	26.030	0.68	1.00	8.26	189.00	0.000	2.400	344.09	0.00	825.82
2	155.00	6' Lightning rod	1	23.560	25.916	1.00	1.00	0.38	5.85	0.000	0.000	15.76	0.00	0.00
3	155.00	APXVSPP18-C-A20	3	23.663	26.030	0.82	1.00	19.73	153.90	0.000	2.400	821.67	0.00	1972.01
4	155.00	ACU-A20-N	4	23.663	26.030	1.00	1.00	0.56	3.60	0.000	2.400	23.32	0.00	55.97
5	155.00	APXVTM14-C-120	3	23.663	26.030	0.76	1.00	14.46	151.20	0.000	2.400	602.02	0.00	1444.85
6	155.00	Collar Mount	1	23.560	25.916	0.56	0.75	2.81	225.00	0.000	0.000	116.62	0.00	0.00
7	155.00	800 MHz RRH	3	23.663	26.030	0.92	1.00	6.87	143.10	0.000	2.400	286.22	0.00	686.92
8	155.00	ALU 800MHz External	3	23.663	26.030	0.69	1.00	1.61	23.76	0.000	2.400	67.24	0.00	161.39
9	155.00	1900MHz RRH	3	23.663	26.030	1.00	1.00	11.40	118.80	0.000	2.400	474.78	0.00	1139.47
10	155.00	Low Profile Platform	1	23.560	25.916	1.00	1.00	22.00	1350.00	0.000	0.000	912.23	0.00	0.00
11	137.00	Low Profile Platform	1	22.743	25.017	1.00	1.00	25.00	1080.00	0.000	0.000	1000.70	0.00	0.00
12	137.00	DB-T1-6Z-8AB-0Z	2	22.743	25.017	0.80	0.80	7.68	79.20	0.000	0.000	307.41	0.00	0.00
13	137.00	FD9R6004/2C-3L (3.1 lbs)	6	22.743	25.017	0.50	0.80	1.07	16.74	0.000	0.000	42.88	0.00	0.00
14	137.00	RRH2X60-700	3	22.743	25.017	0.58	0.80	6.13	162.00	0.000	0.000	245.45	0.00	0.00
15	137.00	RRH2X60-PCS	3	22.743	25.017	0.71	0.80	4.70	148.50	0.000	0.000	188.10	0.00	0.00
16	137.00	4X45 RRH AWS	3	22.743	25.017	0.66	0.80	5.33	167.40	0.000	0.000	213.48	0.00	0.00
17	137.00	LPA-80063/6CF	2	22.743	25.017	0.75	0.80	14.44	48.60	0.000	0.000	577.94	0.00	0.00
18	137.00	LPA-80080-6CF-EDIN	2	22.743	25.017	0.74	0.80	6.44	37.80	0.000	0.000	257.90	0.00	0.00
19	137.00	LPA-80080/4CF ___	2	22.743	25.017	0.74	0.80	3.88	21.60	0.000	0.000	155.46	0.00	0.00
20	137.00	SBNHH-1D65B	6	22.743	25.017	0.66	0.80	31.80	273.83	0.000	0.000	1273.01	0.00	0.00
21	127.00	DC6-48-60-18-8F	1	22.256	24.482	0.80	0.80	1.18	28.62	0.000	0.000	46.06	0.00	0.00
22	127.00	7770	3	22.256	24.482	0.60	0.80	9.90	94.50	0.000	0.000	387.79	0.00	0.00
23	127.00	LGP21401	6	22.256	24.482	0.51	0.80	3.96	76.14	0.000	0.000	155.23	0.00	0.00
24	127.00	Low Profile Platform	1	22.256	24.482	1.00	1.00	22.00	1350.00	0.000	0.000	861.75	0.00	0.00
25	127.00	RRU 11	3	22.256	24.482	0.54	0.80	7.21	148.50	0.000	0.000	282.55	0.00	0.00
26	127.00	P65-16-XLH-RR	3	22.256	24.482	0.60	0.80	14.69	143.10	0.000	0.000	575.34	0.00	0.00
27	127.00	RRUS 12	3	22.256	24.482	0.54	0.80	4.34	162.00	0.000	0.000	170.06	0.00	0.00
28	127.00	860 10025	6	22.256	24.482	0.56	0.80	0.60	6.48	0.000	0.000	23.69	0.00	0.00
29	117.00	HRK12 (Handrail Kit)	1	21.741	23.915	1.00	1.00	6.75	235.55	0.000	0.000	258.28	0.00	0.00
30	117.00	RMQP-496	1	21.741	23.915	1.00	1.00	37.00	1546.20	0.000	0.000	1415.74	0.00	0.00
31	117.00	Ericsson Radio 4449	3	21.741	23.915	0.50	0.75	2.49	189.00	0.000	0.000	95.18	0.00	0.00
32	117.00	APXVAARR24_43-U-NA2	3	21.741	23.915	0.52	0.75	31.88	345.60	0.000	0.000	1219.76	0.00	0.00
33	117.00	Air 21 B4A/B2P	6	21.741	23.915	0.65	0.75	23.57	488.16	0.000	0.000	901.80	0.00	0.00
							Totals:		**9,213.73**			**14,319.51**		

Total Applied Force Summary

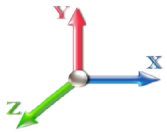
Structure:	CT00248-S-SBA		**Code:**	EIA/TIA-222-G	6/26/2019
Site Name:	North Bethel		**Exposure:**	B	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 17

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 24

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		400.18	1182.04	0.00	0.00
10.00		390.50	1157.30	0.00	0.00
15.00		380.83	1132.56	0.00	0.00
20.00		371.15	1107.82	0.00	0.00
25.00		361.48	1083.08	0.00	0.00
30.00		352.10	1058.34	0.00	0.00
35.00		357.84	1033.60	0.00	0.00
40.00		361.24	1008.86	0.00	0.00
44.00		289.20	789.28	0.00	0.00
45.00		72.88	359.32	0.00	0.00
49.75		350.13	1679.76	0.00	0.00
50.00		18.17	48.07	0.00	0.00
55.00		367.48	948.31	0.00	0.00
60.00		364.92	923.57	0.00	0.00
65.00		361.29	898.84	0.00	0.00
70.00		356.69	874.10	0.00	0.00
75.00		354.27	849.36	0.00	0.00
80.00		351.89	824.62	0.00	0.00
85.00		348.91	799.88	0.00	0.00
89.50		310.77	698.74	0.00	0.00
90.00		34.76	127.32	0.00	0.00
93.75		260.82	940.44	0.00	0.00
95.00		85.54	163.91	0.00	0.00
100.00		341.22	642.75	0.00	0.00
105.00		336.31	622.13	0.00	0.00
110.00		330.99	601.51	0.00	0.00
115.00		325.27	580.90	0.00	0.00
117.00	(14) attachments	4018.70	3031.09	0.00	0.00
120.00		165.57	297.03	0.00	0.00
123.25		177.45	463.70	0.00	0.00
125.00		93.39	115.30	0.00	0.00
127.00	(26) attachments	2607.50	2139.26	0.00	0.00
130.00		154.17	172.80	0.00	0.00
135.00		247.83	278.11	0.00	0.00
137.00	(30) attachments	4357.70	2143.45	0.00	0.00
140.00		139.43	120.81	0.00	0.00
145.00		222.57	191.45	0.00	0.00
150.00		209.40	179.08	0.00	0.00
155.00	(25) attachments	3859.85	2530.92	0.00	6286.43
	Totals:	**24,490.39**	**33,799.40**	**0.00**	**6,286.43**

Linear Appurtenance Segment Forces (Factored)

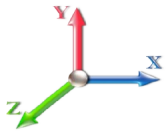
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 18	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 24

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.069	0.000	14.724	0.00	56.16
5.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.069	0.000	14.724	0.00	4.95
10.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.071	0.000	14.724	0.00	56.16
10.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.071	0.000	14.724	0.00	4.95
15.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.073	0.000	14.724	0.00	56.16
15.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.073	0.000	14.724	0.00	4.95
20.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.075	0.000	14.724	0.00	56.16
20.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.075	0.000	14.724	0.00	4.95
25.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.077	0.000	14.724	0.00	56.16
25.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.077	0.000	14.724	0.00	4.95
30.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.079	0.000	14.736	0.00	56.16
30.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.079	0.000	14.736	0.00	4.95
35.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.081	0.000	15.400	0.00	56.16
35.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.081	0.000	15.400	0.00	4.95
40.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.084	0.000	15.999	0.00	56.16
40.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.084	0.000	15.999	0.00	4.95
44.00	1 5/8" Coax	Yes	4.00	0.000	3.96	1.32	0.00	0.086	0.000	16.441	0.00	44.93
44.00	1 5/8" Hybrid	Yes	4.00	0.000	0.00	0.00	0.00	0.086	0.000	16.441	0.00	3.96
45.00	1 5/8" Coax	Yes	1.00	0.000	3.96	0.33	0.00	0.087	0.000	16.546	0.00	11.23
45.00	1 5/8" Hybrid	Yes	1.00	0.000	0.00	0.00	0.00	0.087	0.000	16.546	0.00	0.99
49.75	1 5/8" Coax	Yes	4.75	0.000	3.96	1.57	0.00	0.089	0.000	17.028	0.00	53.35
49.75	1 5/8" Hybrid	Yes	4.75	0.000	0.00	0.00	0.00	0.089	0.000	17.028	0.00	4.70
50.00	1 5/8" Coax	Yes	0.25	0.000	3.96	0.08	0.00	0.089	0.000	17.052	0.00	2.81
50.00	1 5/8" Hybrid	Yes	0.25	0.000	0.00	0.00	0.00	0.089	0.000	17.052	0.00	0.25
55.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.090	0.000	17.523	0.00	56.16
55.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.090	0.000	17.523	0.00	4.95
60.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.093	0.000	17.964	0.00	56.16
60.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.093	0.000	17.964	0.00	4.95
65.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.096	0.000	18.380	0.00	56.16
65.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.096	0.000	18.380	0.00	4.95
70.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.099	0.000	18.773	0.00	56.16
70.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.099	0.000	18.773	0.00	4.95
75.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.103	1.009	19.147	0.00	56.16
75.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.103	1.009	19.147	0.00	4.95
80.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.107	1.020	19.503	0.00	56.16
80.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.107	1.020	19.503	0.00	4.95
85.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.111	1.033	19.844	0.00	56.16
85.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.111	1.033	19.844	0.00	4.95
89.50	1 5/8" Coax	Yes	4.50	0.000	3.96	1.48	0.00	0.115	1.045	20.138	0.00	50.54
89.50	1 5/8" Hybrid	Yes	4.50	0.000	0.00	0.00	0.00	0.115	1.045	20.138	0.00	4.46
90.00	1 5/8" Coax	Yes	0.50	0.000	3.96	0.17	0.00	0.117	1.052	20.170	0.00	5.62
90.00	1 5/8" Hybrid	Yes	0.50	0.000	0.00	0.00	0.00	0.117	1.052	20.170	0.00	0.50
93.75	1 5/8" Coax	Yes	3.75	0.000	3.96	1.24	0.00	0.119	1.058	20.407	0.00	42.12
93.75	1 5/8" Hybrid	Yes	3.75	0.000	0.00	0.00	0.00	0.119	1.058	20.407	0.00	3.71
95.00	1 5/8" Coax	Yes	1.25	0.000	3.96	0.41	0.00	0.120	1.059	20.484	0.00	14.04
95.00	1 5/8" Hybrid	Yes	1.25	0.000	0.00	0.00	0.00	0.120	1.059	20.484	0.00	1.24
100.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.123	1.069	20.787	0.00	56.16

Linear Appurtenance Segment Forces (Factored)

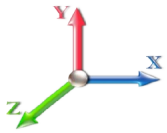
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 19	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 24

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
100.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.123	1.069	20.787	0.00	4.95
105.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.128	1.085	21.079	0.00	56.16
105.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.128	1.085	21.079	0.00	4.95
110.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.134	1.103	21.361	0.00	56.16
110.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.134	1.103	21.361	0.00	4.95
115.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.141	1.123	21.634	0.00	56.16
115.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.141	1.123	21.634	0.00	4.95
117.00	1 5/8" Coax	Yes	2.00	0.000	3.96	0.66	0.00	0.146	1.138	21.741	0.00	22.46
117.00	1 5/8" Hybrid	Yes	2.00	0.000	0.00	0.00	0.00	0.146	1.138	21.741	0.00	1.98
										Totals:	**0.0**	**1,430.0**

Calculated Forces

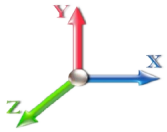
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 20	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 24

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-33.77	-24.53	0.00	-2759.1	0.00	2759.19	4331.76	2165.88	10060.7	5037.85	0.00	0.000	0.000	0.556
5.00	-32.53	-24.21	0.00	-2636.5	0.00	2636.53	4271.91	2135.96	9681.61	4848.00	0.08	-0.142	0.000	0.552
10.00	-31.31	-23.90	0.00	-2515.4	0.00	2515.47	4209.88	2104.94	9304.37	4659.10	0.30	-0.288	0.000	0.547
15.00	-30.12	-23.59	0.00	-2395.9	0.00	2395.97	4145.67	2072.83	8929.41	4471.34	0.68	-0.437	0.000	0.543
20.00	-28.95	-23.29	0.00	-2278.0	0.00	2278.02	4079.27	2039.64	8557.10	4284.91	1.23	-0.591	0.000	0.539
25.00	-27.81	-22.99	0.00	-2161.5	0.00	2161.58	4010.69	2005.34	8187.79	4099.98	1.93	-0.749	0.000	0.534
30.00	-26.69	-22.70	0.00	-2046.6	0.00	2046.63	3939.93	1969.96	7821.85	3916.74	2.80	-0.912	0.000	0.529
35.00	-25.59	-22.40	0.00	-1933.1	0.00	1933.12	3866.98	1933.49	7459.66	3735.38	3.85	-1.078	0.000	0.524
40.00	-24.53	-22.09	0.00	-1821.1	0.00	1821.12	3791.85	1895.92	7101.59	3556.07	5.07	-1.250	0.000	0.519
44.00	-23.72	-21.82	0.00	-1732.7	0.00	1732.77	3730.17	1865.09	6818.34	3414.24	6.18	-1.392	0.000	0.514
45.00	-23.32	-21.78	0.00	-1710.9	0.00	1710.96	3714.54	1857.27	6747.99	3379.01	6.47	-1.429	0.000	0.513
49.75	-21.62	-21.42	0.00	-1607.5	0.00	1607.51	3683.20	1841.60	6608.77	3309.30	7.98	-1.601	0.000	0.492
50.00	-21.53	-21.43	0.00	-1602.1	0.00	1602.16	3679.23	1839.62	6591.31	3300.56	8.07	-1.611	0.000	0.491
55.00	-20.53	-21.10	0.00	-1495.0	0.00	1495.00	3598.76	1799.38	6244.86	3127.07	9.85	-1.787	0.000	0.484
60.00	-19.55	-20.77	0.00	-1389.4	0.00	1389.49	3516.10	1758.05	5903.79	2956.28	11.81	-1.968	0.000	0.476
65.00	-18.60	-20.44	0.00	-1285.6	0.00	1285.65	3431.27	1715.63	5568.46	2788.37	13.97	-2.152	0.000	0.467
70.00	-17.67	-20.10	0.00	-1183.4	0.00	1183.47	3344.24	1672.12	5239.26	2623.52	16.33	-2.341	0.000	0.457
75.00	-16.77	-19.77	0.00	-1082.9	0.00	1082.95	3255.04	1627.52	4916.54	2461.92	18.88	-2.533	0.000	0.445
80.00	-15.90	-19.44	0.00	-984.09	0.00	984.09	3137.93	1568.96	4563.27	2285.03	21.64	-2.729	0.000	0.436
85.00	-15.06	-19.10	0.00	-886.91	0.00	886.91	3017.89	1508.95	4219.09	2112.68	24.61	-2.927	0.000	0.425
89.50	-14.34	-18.78	0.00	-800.97	0.00	800.97	2909.87	1454.93	3920.86	1963.34	27.45	-3.108	0.000	0.413
90.00	-14.19	-18.76	0.00	-791.58	0.00	791.58	2897.86	1448.93	3888.39	1947.09	27.78	-3.129	0.000	0.412
93.75	-13.23	-18.47	0.00	-721.25	0.00	721.25	2354.99	1177.49	3133.69	1569.17	30.30	-3.281	0.000	0.465
95.00	-13.03	-18.40	0.00	-698.16	0.00	698.16	2336.81	1168.40	3076.66	1540.62	31.16	-3.334	0.000	0.459
100.00	-12.34	-18.07	0.00	-606.15	0.00	606.15	2262.72	1131.36	2851.92	1428.08	34.77	-3.557	0.000	0.430
105.00	-11.67	-17.74	0.00	-515.78	0.00	515.78	2165.47	1082.73	2607.63	1305.76	38.62	-3.777	0.000	0.401
110.00	-11.03	-17.41	0.00	-427.08	0.00	427.08	2065.44	1032.72	2371.09	1187.31	42.68	-3.987	0.000	0.365
115.00	-10.43	-17.07	0.00	-340.03	0.00	340.03	1965.41	982.71	2145.79	1074.49	46.97	-4.185	0.000	0.322
117.00	-7.69	-12.85	0.00	-305.89	0.00	305.89	1925.40	962.70	2058.82	1030.94	48.74	-4.262	0.000	0.301
120.00	-7.38	-12.68	0.00	-267.34	0.00	267.34	1865.39	932.69	1931.73	967.30	51.45	-4.372	0.000	0.281
123.25	-6.91	-12.47	0.00	-226.14	0.00	226.14	1005.19	502.59	1030.12	515.83	54.46	-4.484	0.000	0.446
125.00	-6.79	-12.38	0.00	-204.31	0.00	204.31	992.91	496.46	998.01	499.75	56.11	-4.543	0.000	0.416
127.00	-4.84	-9.62	0.00	-179.55	0.00	179.55	978.56	489.28	961.59	481.51	58.04	-4.642	0.000	0.378
130.00	-4.65	-9.47	0.00	-150.69	0.00	150.69	956.38	478.19	907.53	454.44	61.00	-4.779	0.000	0.337
135.00	-4.38	-9.21	0.00	-103.35	0.00	103.35	917.66	458.83	819.21	410.21	66.11	-4.974	0.000	0.257
137.00	-2.62	-4.68	0.00	-84.94	0.00	84.94	901.57	450.78	784.57	392.87	68.20	-5.043	0.000	0.219
140.00	-2.50	-4.54	0.00	-70.89	0.00	70.89	876.76	438.38	733.42	367.25	71.40	-5.136	0.000	0.196
145.00	-2.32	-4.30	0.00	-48.21	0.00	48.21	833.68	416.84	650.52	325.74	76.85	-5.269	0.000	0.151
150.00	-2.16	-4.08	0.00	-26.69	0.00	26.69	781.24	390.62	565.69	283.26	82.42	-5.372	0.000	0.097
155.00	0.00	-3.86	0.00	-6.29	0.00	6.29	721.23	360.61	481.69	241.20	88.07	-5.429	0.000	0.026

Wind Loading - Shaft

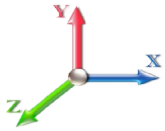
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 21	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	4.256	4.68	0.00	1.200	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	4.256	4.68	0.00	1.200	1.242	5.00	24.792	29.75	139.3	441.3	1796.7
10.00		1.00	0.70	4.256	4.68	0.00	1.200	1.331	5.00	24.292	29.15	136.5	462.4	1784.8
15.00		1.00	0.70	4.256	4.68	0.00	1.200	1.386	5.00	23.764	28.52	133.5	470.2	1759.6
20.00		1.00	0.70	4.256	4.68	0.00	1.200	1.427	5.00	23.223	27.87	130.5	472.1	1728.5
25.00		1.00	0.70	4.256	4.68	0.00	1.200	1.459	5.00	22.676	27.21	127.4	470.7	1694.1
30.00		1.00	0.70	4.260	4.69	0.00	1.200	1.486	5.00	22.124	26.55	124.4	466.9	1657.4
35.00		1.00	0.73	4.451	4.90	0.00	1.200	1.509	5.00	21.569	25.88	126.7	461.6	1619.0
40.00		1.00	0.76	4.625	5.09	0.00	1.200	1.529	5.00	21.011	25.21	128.3	454.9	1579.4
44.00	Bot - Section 2	1.00	0.78	4.752	5.23	0.00	1.200	1.544	4.00	16.405	19.69	102.9	359.1	1235.0
45.00		1.00	0.79	4.783	5.26	0.00	1.200	1.547	1.00	4.108	4.93	25.9	90.9	525.9
49.75	Top - Section 1	1.00	0.81	4.922	5.41	0.00	1.200	1.563	4.75	19.211	23.05	124.8	424.4	2454.4
50.00		1.00	0.81	4.929	5.42	0.00	1.200	1.564	0.25	0.997	1.20	6.5	22.3	75.4
55.00		1.00	0.83	5.065	5.57	0.00	1.200	1.579	5.00	19.647	23.58	131.4	437.3	1481.0
60.00		1.00	0.85	5.193	5.71	0.00	1.200	1.592	5.00	19.084	22.90	130.8	427.7	1438.4
65.00		1.00	0.87	5.313	5.84	0.00	1.200	1.605	5.00	18.520	22.22	129.9	417.6	1395.4
70.00		1.00	0.89	5.426	5.97	0.00	1.200	1.617	5.00	17.956	21.55	128.6	407.1	1351.9
75.00		1.00	0.91	5.534	6.09	0.00	1.210 *	1.628	5.00	17.391	21.05	128.2	396.2	1307.9
80.00		1.00	0.93	5.637	6.20	0.00	1.224 *	1.639	5.00	16.826	20.60	127.7	384.9	1263.7
85.00		1.00	0.94	5.736	6.31	0.00	1.239 *	1.649	5.00	16.260	20.15	127.1	373.3	1219.1
89.50	Bot - Section 3	1.00	0.96	5.821	6.40	0.00	1.254 *	1.657	4.50	14.149	17.75	113.6	326.4	1059.4
90.00		1.00	0.96	5.830	6.41	0.00	1.263 *	1.658	0.50	1.570	1.98	12.7	36.8	184.5
93.75	Top - Section 2	1.00	0.97	5.899	6.49	0.00	1.270 *	1.665	3.75	11.596	14.73	95.6	269.2	1357.6
95.00		1.00	0.97	5.921	6.51	0.00	1.271 *	1.667	1.25	3.794	4.82	31.4	89.0	252.3
100.00		1.00	0.99	6.008	6.61	0.00	1.282 *	1.676	5.00	14.824	19.01	125.6	343.5	979.8
105.00		1.00	1.00	6.093	6.70	0.00	1.302 *	1.684	5.00	14.256	18.56	124.4	330.9	939.8
110.00		1.00	1.02	6.174	6.79	0.00	1.324 *	1.692	5.00	13.688	18.12	123.1	318.2	899.5
115.00		1.00	1.03	6.253	6.88	0.00	1.348 *	1.699	5.00	13.120	17.68	121.6	305.2	859.1
117.00	Appurtenance(s)	1.00	1.03	6.284	6.91	0.00	1.366 *	1.702	2.00	5.088	6.95	48.0	120.0	333.8
120.00	Bot - Section 4	1.00	1.04	6.330	6.96	0.00	1.200	1.707	3.00	7.462	8.95	62.3	175.2	487.8
123.25	Top - Section 3	1.00	1.05	6.378	7.02	0.00	1.200	1.711	3.25	7.956	9.55	67.0	186.8	714.6
125.00		1.00	1.05	6.404	7.04	0.00	1.200	1.714	1.75	4.184	5.02	35.4	99.0	204.0
127.00	Appurtenance(s)	1.00	1.06	6.433	7.08	0.00	1.200	1.716	2.00	4.697	5.64	39.9	111.0	228.5
130.00		1.00	1.07	6.476	7.12	0.00	1.200	1.720	3.00	6.875	8.25	58.8	161.6	333.0
135.00		1.00	1.08	6.546	7.20	0.00	1.200	1.727	5.00	11.005	13.21	95.1	255.7	528.1
137.00	Appurtenance(s)	1.00	1.08	6.574	7.23	0.00	1.200	1.729	2.00	4.242	5.09	36.8	100.1	204.4
140.00		1.00	1.09	6.615	7.28	0.00	1.200	1.733	3.00	6.192	7.43	54.1	145.2	296.8
145.00		1.00	1.10	6.681	7.35	0.00	1.200	1.739	5.00	9.866	11.84	87.0	228.1	467.5
150.00		1.00	1.11	6.746	7.42	0.00	1.200	1.745	5.00	9.297	11.16	82.8	214.1	437.0
155.00	Appurtenance(s)	1.00	1.12	6.810	7.49	0.00	1.200	1.751	5.00	8.727	10.47	78.5	200.0	406.4
								Totals:	**155.00**			**3,704.0**		**38,541.4**

* Cf Adjusted by Linear Load Ra Effect

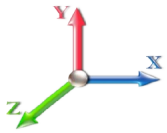
Discrete Appurtenance Forces

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 22	

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	155.00	TD-RRH8x20-25	3	6.840	7.524	0.69	1.00	10.07	584.70	0.000	2.400	75.79	0.00	181.89
2	155.00	6' Lightning rod	1	6.810	7.491	1.00	1.00	1.47	38.92	0.000	0.000	11.02	0.00	0.00
3	155.00	APXVSPP18-C-A20	3	6.840	7.524	0.82	1.00	26.62	576.96	0.000	2.400	200.32	0.00	480.76
4	155.00	ACU-A20-N	4	6.840	7.524	1.00	1.00	1.75	16.84	0.000	2.400	13.17	0.00	31.61
5	155.00	APXVTM14-C-120	3	6.840	7.524	0.77	1.00	17.23	684.73	0.000	2.400	129.61	0.00	311.06
6	155.00	Collar Mount	1	6.810	7.491	0.56	0.75	7.74	737.83	0.000	0.000	57.96	0.00	0.00
7	155.00	800 MHz RRH	3	6.840	7.524	0.92	1.00	10.04	350.11	0.000	2.400	75.54	0.00	181.29
8	155.00	ALU 800MHz External	3	6.840	7.524	0.72	1.00	3.09	69.78	0.000	2.400	23.22	0.00	55.74
9	155.00	1900MHz RRH	3	6.840	7.524	1.00	1.00	15.58	393.37	0.000	2.400	117.25	0.00	281.40
10	155.00	Low Profile Platform	1	6.810	7.491	1.00	1.00	39.72	2813.21	0.000	0.000	297.54	0.00	0.00
11	137.00	Low Profile Platform	1	6.574	7.231	1.00	1.00	45.75	2177.68	0.000	0.000	330.86	0.00	0.00
12	137.00	DB-T1-6Z-8AB-0Z	2	6.574	7.231	0.80	0.80	9.06	390.00	0.000	0.000	65.55	0.00	0.00
13	137.00	FD9R6004/2C-3L (3.1 lbs)	6	6.574	7.231	0.52	0.80	2.49	56.24	0.000	0.000	18.03	0.00	0.00
14	137.00	RRH2X60-700	3	6.574	7.231	0.59	0.80	7.60	415.20	0.000	0.000	54.99	0.00	0.00
15	137.00	RRH2X60-PCS	3	6.574	7.231	0.72	0.80	6.11	448.76	0.000	0.000	44.20	0.00	0.00
16	137.00	4X45 RRH AWS	3	6.574	7.231	0.66	0.80	7.89	407.98	0.000	0.000	57.08	0.00	0.00
17	137.00	LPA-80063/6CF	2	6.574	7.231	0.75	0.80	16.45	634.96	0.000	0.000	118.98	0.00	0.00
18	137.00	LPA-80080-6CF-EDIN	2	6.574	7.231	0.74	0.80	8.47	287.61	0.000	0.000	61.26	0.00	0.00
19	137.00	LPA-80080/4CF ___	2	6.574	7.231	0.74	0.80	10.79	439.91	0.000	0.000	78.05	0.00	0.00
20	137.00	SBNHH-1D65B	6	6.574	7.231	0.66	0.80	36.84	1561.76	0.000	0.000	266.39	0.00	0.00
21	127.00	DC6-48-60-18-8F	1	6.433	7.076	0.80	0.80	1.73	81.26	0.000	0.000	12.22	0.00	0.00
22	127.00	7770	3	6.433	7.076	0.60	0.80	11.78	523.33	0.000	0.000	83.39	0.00	0.00
23	127.00	LGP21401	6	6.433	7.076	0.53	0.80	6.69	206.45	0.000	0.000	47.34	0.00	0.00
24	127.00	Low Profile Platform	1	6.433	7.076	1.00	1.00	39.37	2787.31	0.000	0.000	278.60	0.00	0.00
25	127.00	RRU 11	3	6.433	7.076	0.55	0.80	9.76	386.32	0.000	0.000	69.08	0.00	0.00
26	127.00	P65-16-XLH-RR	3	6.433	7.076	0.60	0.80	19.65	536.18	0.000	0.000	139.05	0.00	0.00
27	127.00	RRUS 12	3	6.433	7.076	0.55	0.80	5.55	366.63	0.000	0.000	39.24	0.00	0.00
28	127.00	860 10025	6	6.433	7.076	0.58	0.80	1.91	34.42	0.000	0.000	13.51	0.00	0.00
29	117.00	HRK12 (Handrail Kit)	1	6.284	6.913	1.00	1.00	13.19	878.76	0.000	0.000	91.14	0.00	0.00
30	117.00	RMQP-496	1	6.284	6.913	1.00	1.00	44.56	5534.42	0.000	0.000	308.01	0.00	0.00
31	117.00	Ericsson Radio 4449	3	6.284	6.913	0.50	0.75	3.28	450.46	0.000	0.000	22.64	0.00	0.00
32	117.00	APXVAARR24_43-U-NA2	3	6.284	6.913	0.52	0.75	34.79	1680.01	0.000	0.000	240.52	0.00	0.00
33	117.00	Air 21 B4A/B2P	6	6.284	6.913	0.65	0.75	27.70	1634.63	0.000	0.000	191.50	0.00	0.00
							Totals:		**28,186.75**			**3,633.06**		

Total Applied Force Summary

Structure:	CT00248-S-SBA		**Code:**	EIA/TIA-222-G	6/26/2019
Site Name:	North Bethel		**Exposure:**	B	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 23

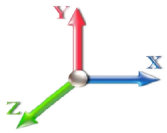
Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Iterations 24

Dead Load Factor 1.20

Wind Load Factor 1.00



Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		139.28	2181.91	0.00	0.00
10.00		136.47	2181.74	0.00	0.00
15.00		133.50	2163.91	0.00	0.00
20.00		130.47	2138.31	0.00	0.00
25.00		127.39	2108.22	0.00	0.00
30.00		124.40	2075.16	0.00	0.00
35.00		126.73	2039.96	0.00	0.00
40.00		128.26	2003.15	0.00	0.00
44.00		102.91	1575.58	0.00	0.00
45.00		25.93	611.13	0.00	0.00
49.75		124.81	2861.38	0.00	0.00
50.00		6.49	96.79	0.00	0.00
55.00		131.36	1911.59	0.00	0.00
60.00		130.80	1870.93	0.00	0.00
65.00		129.88	1829.64	0.00	0.00
70.00		128.61	1787.79	0.00	0.00
75.00		128.16	1745.45	0.00	0.00
80.00		127.73	1702.67	0.00	0.00
85.00		127.11	1659.50	0.00	0.00
89.50		113.63	1456.82	0.00	0.00
90.00		12.71	228.65	0.00	0.00
93.75		95.56	1689.56	0.00	0.00
95.00		31.40	363.07	0.00	0.00
100.00		125.64	1423.98	0.00	0.00
105.00		124.42	1385.09	0.00	0.00
110.00		123.07	1345.95	0.00	0.00
115.00		121.61	1306.57	0.00	0.00
117.00	(14) attachments	901.85	10691.29	0.00	0.00
120.00		62.35	571.28	0.00	0.00
123.25		66.99	805.11	0.00	0.00
125.00		35.37	252.71	0.00	0.00
127.00	(26) attachments	722.32	5206.09	0.00	0.00
130.00		58.77	392.00	0.00	0.00
135.00		95.09	626.54	0.00	0.00
137.00	(30) attachments	1132.21	7063.91	0.00	0.00
140.00		54.07	306.27	0.00	0.00
145.00		87.02	483.37	0.00	0.00
150.00		82.79	452.87	0.00	0.00
155.00	(25) attachments	1079.86	6688.71	0.00	1523.75
	Totals:	**7,337.03**	**77,284.66**	**0.00**	**1,523.75**

Linear Appurtenance Segment Forces (Factored)

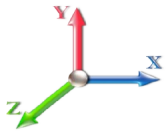
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 24	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.69	0.00	0.069	0.000	4.256	0.00	218.70
5.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.069	0.000	4.256	0.00	27.35
10.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.76	0.00	0.071	0.000	4.256	0.00	228.34
10.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.071	0.000	4.256	0.00	29.45
15.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.81	0.00	0.073	0.000	4.256	0.00	234.34
15.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.073	0.000	4.256	0.00	30.79
20.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.84	0.00	0.075	0.000	4.256	0.00	238.78
20.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.075	0.000	4.256	0.00	31.80
25.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.87	0.00	0.077	0.000	4.256	0.00	242.32
25.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.077	0.000	4.256	0.00	32.62
30.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.89	0.00	0.079	0.000	4.260	0.00	245.28
30.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.079	0.000	4.260	0.00	33.31
35.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.91	0.00	0.081	0.000	4.451	0.00	247.84
35.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.081	0.000	4.451	0.00	33.91
40.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.92	0.00	0.084	0.000	4.625	0.00	250.09
40.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.084	0.000	4.625	0.00	34.45
44.00	1 5/8" Coax	Yes	4.00	0.000	3.96	2.35	0.00	0.086	0.000	4.752	0.00	201.37
44.00	1 5/8" Hybrid	Yes	4.00	0.000	0.00	0.00	0.00	0.086	0.000	4.752	0.00	27.87
45.00	1 5/8" Coax	Yes	1.00	0.000	3.96	0.59	0.00	0.087	0.000	4.783	0.00	50.42
45.00	1 5/8" Hybrid	Yes	1.00	0.000	0.00	0.00	0.00	0.087	0.000	4.783	0.00	6.99
49.75	1 5/8" Coax	Yes	4.75	0.000	3.96	2.80	0.00	0.089	0.000	4.922	0.00	241.15
49.75	1 5/8" Hybrid	Yes	4.75	0.000	0.00	0.00	0.00	0.089	0.000	4.922	0.00	33.58
50.00	1 5/8" Coax	Yes	0.25	0.000	3.96	0.15	0.00	0.089	0.000	4.929	0.00	12.70
50.00	1 5/8" Hybrid	Yes	0.25	0.000	0.00	0.00	0.00	0.089	0.000	4.929	0.00	1.77
55.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.97	0.00	0.090	0.000	5.065	0.00	255.60
55.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.090	0.000	5.065	0.00	35.77
60.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.98	0.00	0.093	0.000	5.193	0.00	257.14
60.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.093	0.000	5.193	0.00	36.14
65.00	1 5/8" Coax	Yes	5.00	0.000	3.96	2.99	0.00	0.096	0.000	5.313	0.00	258.57
65.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.096	0.000	5.313	0.00	36.49
70.00	1 5/8" Coax	Yes	5.00	0.000	3.96	3.00	0.00	0.099	0.000	5.426	0.00	259.91
70.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.099	0.000	5.426	0.00	36.82
75.00	1 5/8" Coax	Yes	5.00	0.000	3.96	3.01	0.00	0.103	1.009	5.534	0.00	261.17
75.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.103	1.009	5.534	0.00	37.13
80.00	1 5/8" Coax	Yes	5.00	0.000	3.96	3.02	0.00	0.107	1.020	5.637	0.00	262.35
80.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.107	1.020	5.637	0.00	37.42
85.00	1 5/8" Coax	Yes	5.00	0.000	3.96	3.02	0.00	0.111	1.033	5.736	0.00	263.47
85.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.111	1.033	5.736	0.00	37.70
89.50	1 5/8" Coax	Yes	4.50	0.000	3.96	2.73	0.00	0.115	1.045	5.821	0.00	237.99
89.50	1 5/8" Hybrid	Yes	4.50	0.000	0.00	0.00	0.00	0.115	1.045	5.821	0.00	34.15
90.00	1 5/8" Coax	Yes	0.50	0.000	3.96	0.30	0.00	0.117	1.052	5.830	0.00	26.45
90.00	1 5/8" Hybrid	Yes	0.50	0.000	0.00	0.00	0.00	0.117	1.052	5.830	0.00	3.80
93.75	1 5/8" Coax	Yes	3.75	0.000	3.96	2.28	0.00	0.119	1.058	5.899	0.00	198.98
93.75	1 5/8" Hybrid	Yes	3.75	0.000	0.00	0.00	0.00	0.119	1.058	5.899	0.00	28.62
95.00	1 5/8" Coax	Yes	1.25	0.000	3.96	0.76	0.00	0.120	1.059	5.921	0.00	66.39
95.00	1 5/8" Hybrid	Yes	1.25	0.000	0.00	0.00	0.00	0.120	1.059	5.921	0.00	9.55
100.00	1 5/8" Coax	Yes	5.00	0.000	3.96	3.05	0.00	0.123	1.069	6.008	0.00	266.52

Linear Appurtenance Segment Forces (Factored)

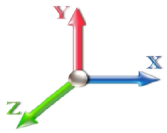
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 25	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
100.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.123	1.069	6.008	0.00	38.46
105.00	1 5/8" Coax	Yes	5.00	0.000	3.96	3.05	0.00	0.128	1.085	6.093	0.00	267.44
105.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.128	1.085	6.093	0.00	38.69
110.00	1 5/8" Coax	Yes	5.00	0.000	3.96	3.06	0.00	0.134	1.103	6.174	0.00	268.33
110.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.134	1.103	6.174	0.00	38.92
115.00	1 5/8" Coax	Yes	5.00	0.000	3.96	3.07	0.00	0.141	1.123	6.253	0.00	269.18
115.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.141	1.123	6.253	0.00	39.13
117.00	1 5/8" Coax	Yes	2.00	0.000	3.96	1.23	0.00	0.146	1.138	6.284	0.00	107.81
117.00	1 5/8" Hybrid	Yes	2.00	0.000	0.00	0.00	0.00	0.146	1.138	6.284	0.00	15.69
										Totals:	**0.0**	**6,767.0**

Calculated Forces

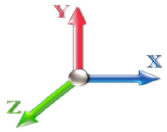
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 26	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-77.28	-7.37	0.00	-839.34	0.00	839.34	4331.76	2165.88	10060.7	5037.85	0.00	0.000	0.000	0.184
5.00	-75.09	-7.28	0.00	-802.51	0.00	802.51	4271.91	2135.96	9681.61	4848.00	0.02	-0.043	0.000	0.183
10.00	-72.91	-7.20	0.00	-766.09	0.00	766.09	4209.88	2104.94	9304.37	4659.10	0.09	-0.088	0.000	0.182
15.00	-70.74	-7.12	0.00	-730.09	0.00	730.09	4145.67	2072.83	8929.41	4471.34	0.21	-0.133	0.000	0.180
20.00	-68.59	-7.04	0.00	-694.48	0.00	694.48	4079.27	2039.64	8557.10	4284.91	0.37	-0.180	0.000	0.179
25.00	-66.48	-6.96	0.00	-659.27	0.00	659.27	4010.69	2005.34	8187.79	4099.98	0.59	-0.228	0.000	0.177
30.00	-64.40	-6.89	0.00	-624.45	0.00	624.45	3939.93	1969.96	7821.85	3916.74	0.85	-0.278	0.000	0.176
35.00	-62.35	-6.81	0.00	-590.02	0.00	590.02	3866.98	1933.49	7459.66	3735.38	1.17	-0.329	0.000	0.174
40.00	-60.35	-6.72	0.00	-555.99	0.00	555.99	3791.85	1895.92	7101.59	3556.07	1.54	-0.381	0.000	0.172
44.00	-58.77	-6.63	0.00	-529.13	0.00	529.13	3730.17	1865.09	6818.34	3414.24	1.88	-0.424	0.000	0.171
45.00	-58.15	-6.63	0.00	-522.50	0.00	522.50	3714.54	1857.27	6747.99	3379.01	1.97	-0.436	0.000	0.170
49.75	-55.29	-6.51	0.00	-491.01	0.00	491.01	3683.20	1841.60	6608.77	3309.30	2.43	-0.488	0.000	0.163
50.00	-55.19	-6.53	0.00	-489.38	0.00	489.38	3679.23	1839.62	6591.31	3300.56	2.46	-0.491	0.000	0.163
55.00	-53.27	-6.43	0.00	-456.73	0.00	456.73	3598.76	1799.38	6244.86	3127.07	3.00	-0.545	0.000	0.161
60.00	-51.40	-6.33	0.00	-424.57	0.00	424.57	3516.10	1758.05	5903.79	2956.28	3.60	-0.600	0.000	0.158
65.00	-49.56	-6.23	0.00	-392.91	0.00	392.91	3431.27	1715.63	5568.46	2788.37	4.26	-0.657	0.000	0.155
70.00	-47.77	-6.13	0.00	-361.75	0.00	361.75	3344.24	1672.12	5239.26	2623.52	4.98	-0.714	0.000	0.152
75.00	-46.02	-6.03	0.00	-331.09	0.00	331.09	3255.04	1627.52	4916.54	2461.92	5.76	-0.773	0.000	0.149
80.00	-44.32	-5.92	0.00	-300.96	0.00	300.96	3137.93	1568.96	4563.27	2285.03	6.60	-0.833	0.000	0.146
85.00	-42.65	-5.81	0.00	-271.34	0.00	271.34	3017.89	1508.95	4219.09	2112.68	7.51	-0.893	0.000	0.143
89.50	-41.19	-5.70	0.00	-245.18	0.00	245.18	2909.87	1454.93	3920.86	1963.34	8.38	-0.949	0.000	0.139
90.00	-40.96	-5.70	0.00	-242.33	0.00	242.33	2897.86	1448.93	3888.39	1947.09	8.48	-0.955	0.000	0.139
93.75	-39.27	-5.60	0.00	-220.96	0.00	220.96	2354.99	1177.49	3133.69	1569.17	9.24	-1.002	0.000	0.158
95.00	-38.91	-5.59	0.00	-213.96	0.00	213.96	2336.81	1168.40	3076.66	1540.62	9.51	-1.018	0.000	0.156
100.00	-37.48	-5.48	0.00	-186.01	0.00	186.01	2262.72	1131.36	2851.92	1428.08	10.61	-1.087	0.000	0.147
105.00	-36.09	-5.37	0.00	-158.60	0.00	158.60	2165.47	1082.73	2607.63	1305.76	11.79	-1.154	0.000	0.138
110.00	-34.74	-5.26	0.00	-131.74	0.00	131.74	2065.44	1032.72	2371.09	1187.31	13.03	-1.219	0.000	0.128
115.00	-33.43	-5.13	0.00	-105.44	0.00	105.44	1965.41	982.71	2145.79	1074.49	14.34	-1.280	0.000	0.115
117.00	-22.76	-4.00	0.00	-95.17	0.00	95.17	1925.40	962.70	2058.82	1030.94	14.88	-1.304	0.000	0.104
120.00	-22.19	-3.94	0.00	-83.16	0.00	83.16	1865.39	932.69	1931.73	967.30	15.71	-1.338	0.000	0.098
123.25	-21.39	-3.86	0.00	-70.36	0.00	70.36	1005.19	502.59	1030.12	515.83	16.64	-1.373	0.000	0.158
125.00	-21.13	-3.83	0.00	-63.59	0.00	63.59	992.91	496.46	998.01	499.75	17.14	-1.391	0.000	0.149
127.00	-15.94	-2.99	0.00	-55.93	0.00	55.93	978.56	489.28	961.59	481.51	17.73	-1.422	0.000	0.132
130.00	-15.55	-2.94	0.00	-46.95	0.00	46.95	956.38	478.19	907.53	454.44	18.64	-1.465	0.000	0.120
135.00	-14.92	-2.84	0.00	-32.26	0.00	32.26	917.66	458.83	819.21	410.21	20.21	-1.526	0.000	0.095
137.00	-7.89	-1.52	0.00	-26.59	0.00	26.59	901.57	450.78	784.57	392.87	20.85	-1.547	0.000	0.076
140.00	-7.59	-1.46	0.00	-22.03	0.00	22.03	876.76	438.38	733.42	367.25	21.84	-1.576	0.000	0.069
145.00	-7.11	-1.37	0.00	-14.72	0.00	14.72	833.68	416.84	650.52	325.74	23.51	-1.617	0.000	0.054
150.00	-6.65	-1.27	0.00	-7.89	0.00	7.89	781.24	390.62	565.69	283.26	25.22	-1.648	0.000	0.036
155.00	0.00	-1.08	0.00	-1.52	0.00	1.52	721.23	360.61	481.69	241.20	26.96	-1.664	0.000	0.006

Seismic Segment Forces (Factored)

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 27	

Tower Engineering Solutions

Load Case:	1.2D + 1.0E					**Iterations**	22
Gust Response Factor	1.10			**Sds**	0.23	**Ss**	0.21
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.11	**S1**	0.07
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.34	**SA**	0.04	**Seismic Importance Factor**	1.00

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		1129.4	0.00	0.03	0.02	26.78	
10.00		1101.9	0.01	0.05	0.03	37.37	
15.00		1074.5	0.02	0.06	0.04	41.79	
20.00		1047.0	0.03	0.07	0.04	43.41	
25.00		1019.5	0.05	0.07	0.04	43.76	
30.00		992.03	0.07	0.07	0.04	43.66	
35.00		964.55	0.10	0.07	0.04	43.45	
40.00		937.06	0.13	0.07	0.03	43.21	
44.00	Bot - Section 2	729.86	0.15	0.07	0.03	34.21	
45.00		362.47	0.16	0.07	0.03	17.04	
49.75	Top - Section 1	1691.6	0.19	0.06	0.02	80.17	
50.00		44.21	0.20	0.06	0.02	2.09	
55.00		869.78	0.24	0.06	0.02	40.50	
60.00		842.29	0.28	0.05	0.01	36.79	
65.00		814.81	0.33	0.04	0.01	30.69	
70.00		787.32	0.39	0.02	0.01	21.71	
75.00		759.83	0.44	0.00	0.01	10.00	
80.00		732.34	0.50	-0.02	0.01	-3.17	
85.00		704.86	0.57	-0.04	0.01	-15.59	
89.50	Bot - Section 3	610.87	0.63	-0.06	0.02	-21.79	
90.00		123.08	0.64	-0.07	0.02	-4.55	
93.75	Top - Section 2	907.01	0.69	-0.08	0.03	-40.62	
95.00		136.14	0.71	-0.09	0.03	-6.35	
100.00		530.26	0.79	-0.11	0.05	-26.72	
105.00		507.35	0.87	-0.12	0.08	-24.39	
110.00		484.45	0.95	-0.12	0.11	-19.34	
115.00		461.54	1.04	-0.10	0.15	-12.08	
117.00	Appurtenance(s)	3294.3	1.08	-0.08	0.17	-63.01	
120.00	Bot - Section 4	260.43	1.13	-0.05	0.21	-1.80	
123.25	Top - Section 3	439.82	1.20	0.00	0.25	3.76	
125.00		87.51	1.23	0.03	0.28	1.56	
127.00	Appurtenance(s)	2330.5	1.27	0.08	0.31	68.30	
130.00		142.80	1.33	0.16	0.36	6.88	
135.00		227.01	1.43	0.35	0.47	19.10	
137.00	Appurtenance(s)	2348.8	1.48	0.44	0.52	235.16	
140.00		126.31	1.54	0.61	0.59	15.90	
145.00		199.52	1.65	0.96	0.75	34.62	
150.00		185.78	1.77	1.41	0.93	42.21	
155.00	Appurtenance(s)	2798.9	1.89	1.98	1.14	803.55	
	Totals:	**32,808.1**				**1,588.3**	**Total Wind:** **24,490.4**

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

Calculated Forces

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 28	

Tower Engineering Solutions

Load Case: 1.2D + 1.0E

Iterations 22

Gust Response Factor	1.10			**Sds**	0.23			**Ss**	0.21
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.11			**S1**	0.07
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.34	**SA**	0.04	**Seismic Importance Factor**			1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-45.07	-1.83	0.00	-215.72	0.00	215.72	4331.76	2165.88	10060.7	5037.85		0.00	0.00	0.053
5.00	-43.49	-1.81	0.00	-206.56	0.00	206.56	4271.91	2135.96	9681.61	4848.00		0.01	-0.01	0.053
10.00	-41.95	-1.78	0.00	-197.50	0.00	197.50	4209.88	2104.94	9304.37	4659.10		0.02	-0.02	0.052
15.00	-40.44	-1.75	0.00	-188.58	0.00	188.58	4145.67	2072.83	8929.41	4471.34		0.05	-0.03	0.052
20.00	-38.96	-1.71	0.00	-179.83	0.00	179.83	4079.27	2039.64	8557.10	4284.91		0.10	-0.05	0.052
25.00	-37.51	-1.68	0.00	-171.27	0.00	171.27	4010.69	2005.34	8187.79	4099.98		0.15	-0.06	0.051
30.00	-36.10	-1.64	0.00	-162.88	0.00	162.88	3939.93	1969.96	7821.85	3916.74		0.22	-0.07	0.051
35.00	-34.72	-1.60	0.00	-154.68	0.00	154.68	3866.98	1933.49	7459.66	3735.38		0.30	-0.09	0.050
40.00	-33.38	-1.56	0.00	-146.67	0.00	146.67	3791.85	1895.92	7101.59	3556.07		0.40	-0.10	0.050
44.00	-32.33	-1.53	0.00	-140.41	0.00	140.41	3730.17	1865.09	6818.34	3414.24		0.49	-0.11	0.050
45.00	-31.85	-1.52	0.00	-138.88	0.00	138.88	3714.54	1857.27	6747.99	3379.01		0.51	-0.11	0.050
49.75	-29.61	-1.44	0.00	-131.67	0.00	131.67	3683.20	1841.60	6608.77	3309.30		0.63	-0.13	0.048
50.00	-29.54	-1.44	0.00	-131.31	0.00	131.31	3679.23	1839.62	6591.31	3300.56		0.64	-0.13	0.048
55.00	-28.28	-1.40	0.00	-124.11	0.00	124.11	3598.76	1799.38	6244.86	3127.07		0.78	-0.14	0.048
60.00	-27.05	-1.37	0.00	-117.09	0.00	117.09	3516.10	1758.05	5903.79	2956.28		0.94	-0.16	0.047
65.00	-25.85	-1.34	0.00	-110.23	0.00	110.23	3431.27	1715.63	5568.46	2788.37		1.11	-0.17	0.047
70.00	-24.68	-1.33	0.00	-103.51	0.00	103.51	3344.24	1672.12	5239.26	2623.52		1.30	-0.19	0.047
75.00	-23.55	-1.32	0.00	-96.88	0.00	96.88	3255.04	1627.52	4916.54	2461.92		1.51	-0.21	0.047
80.00	-22.45	-1.32	0.00	-90.29	0.00	90.29	3137.93	1568.96	4563.27	2285.03		1.73	-0.22	0.047
85.00	-21.38	-1.32	0.00	-83.68	0.00	83.68	3017.89	1508.95	4219.09	2112.68		1.98	-0.24	0.047
89.50	-20.45	-1.32	0.00	-77.72	0.00	77.72	2909.87	1454.93	3920.86	1963.34		2.22	-0.26	0.047
90.00	-20.28	-1.33	0.00	-77.06	0.00	77.06	2897.86	1448.93	3888.39	1947.09		2.24	-0.26	0.047
93.75	-19.03	-1.32	0.00	-72.08	0.00	72.08	2354.99	1177.49	3133.69	1569.17		2.46	-0.28	0.054
95.00	-18.81	-1.33	0.00	-70.43	0.00	70.43	2336.81	1168.40	3076.66	1540.62		2.53	-0.28	0.054
100.00	-17.95	-1.33	0.00	-63.80	0.00	63.80	2262.72	1131.36	2851.92	1428.08		2.84	-0.31	0.053
105.00	-17.12	-1.33	0.00	-57.14	0.00	57.14	2165.47	1082.73	2607.63	1305.76		3.17	-0.33	0.052
110.00	-16.32	-1.33	0.00	-50.48	0.00	50.48	2065.44	1032.72	2371.09	1187.31		3.53	-0.35	0.050
115.00	-15.54	-1.33	0.00	-43.81	0.00	43.81	1965.41	982.71	2145.79	1074.49		3.91	-0.38	0.049
117.00	-11.50	-1.31	0.00	-41.14	0.00	41.14	1925.40	962.70	2058.82	1030.94		4.07	-0.39	0.046
120.00	-11.10	-1.31	0.00	-37.21	0.00	37.21	1865.39	932.69	1931.73	967.30		4.32	-0.40	0.044
123.25	-10.49	-1.30	0.00	-32.95	0.00	32.95	1005.19	502.59	1030.12	515.83		4.60	-0.42	0.074
125.00	-10.33	-1.30	0.00	-30.67	0.00	30.67	992.91	496.46	998.01	499.75		4.76	-0.43	0.072
127.00	-7.48	-1.22	0.00	-28.06	0.00	28.06	978.56	489.28	961.59	481.51		4.94	-0.44	0.066
130.00	-7.25	-1.21	0.00	-24.41	0.00	24.41	956.38	478.19	907.53	454.44		5.22	-0.46	0.061
135.00	-6.88	-1.19	0.00	-18.36	0.00	18.36	917.66	458.83	819.21	410.21		5.73	-0.50	0.052
137.00	-4.02	-0.93	0.00	-15.97	0.00	15.97	901.57	450.78	784.57	392.87		5.94	-0.51	0.045
140.00	-3.86	-0.92	0.00	-13.17	0.00	13.17	876.76	438.38	733.42	367.25		6.27	-0.53	0.040
145.00	-3.60	-0.88	0.00	-8.59	0.00	8.59	833.68	416.84	650.52	325.74		6.83	-0.55	0.031
150.00	-3.37	-0.84	0.00	-4.19	0.00	4.19	781.24	390.62	565.69	283.26		7.42	-0.57	0.019
155.00	0.00	-0.80	0.00	0.00	0.00	0.00	721.23	360.61	481.69	241.20		8.02	-0.58	0.000

Seismic Segment Forces (Factored)

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 29	

Tower Engineering Solutions

Load Case:	0.9D + 1.0E					**Iterations**	22
Gust Response Factor	1.10			**Sds**	0.23	**Ss**	0.21
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.11	**S1**	0.07
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.34	**SA**	0.04	**Seismic Importance Factor**	1.00

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		1129.4	0.00	0.03	0.02	26.78	
10.00		1101.9	0.01	0.05	0.03	37.37	
15.00		1074.5	0.02	0.06	0.04	41.79	
20.00		1047.0	0.03	0.07	0.04	43.41	
25.00		1019.5	0.05	0.07	0.04	43.76	
30.00		992.03	0.07	0.07	0.04	43.66	
35.00		964.55	0.10	0.07	0.04	43.45	
40.00		937.06	0.13	0.07	0.03	43.21	
44.00	Bot - Section 2	729.86	0.15	0.07	0.03	34.21	
45.00		362.47	0.16	0.07	0.03	17.04	
49.75	Top - Section 1	1691.6	0.19	0.06	0.02	80.17	
50.00		44.21	0.20	0.06	0.02	2.09	
55.00		869.78	0.24	0.06	0.02	40.50	
60.00		842.29	0.28	0.05	0.01	36.79	
65.00		814.81	0.33	0.04	0.01	30.69	
70.00		787.32	0.39	0.02	0.01	21.71	
75.00		759.83	0.44	0.00	0.01	10.00	
80.00		732.34	0.50	-0.02	0.01	-3.17	
85.00		704.86	0.57	-0.04	0.01	-15.59	
89.50	Bot - Section 3	610.87	0.63	-0.06	0.02	-21.79	
90.00		123.08	0.64	-0.07	0.02	-4.55	
93.75	Top - Section 2	907.01	0.69	-0.08	0.03	-40.62	
95.00		136.14	0.71	-0.09	0.03	-6.35	
100.00		530.26	0.79	-0.11	0.05	-26.72	
105.00		507.35	0.87	-0.12	0.08	-24.39	
110.00		484.45	0.95	-0.12	0.11	-19.34	
115.00		461.54	1.04	-0.10	0.15	-12.08	
117.00	Appurtenance(s)	3294.3	1.08	-0.08	0.17	-63.01	
120.00	Bot - Section 4	260.43	1.13	-0.05	0.21	-1.80	
123.25	Top - Section 3	439.82	1.20	0.00	0.25	3.76	
125.00		87.51	1.23	0.03	0.28	1.56	
127.00	Appurtenance(s)	2330.5	1.27	0.08	0.31	68.30	
130.00		142.80	1.33	0.16	0.36	6.88	
135.00		227.01	1.43	0.35	0.47	19.10	
137.00	Appurtenance(s)	2348.8	1.48	0.44	0.52	235.16	
140.00		126.31	1.54	0.61	0.59	15.90	
145.00		199.52	1.65	0.96	0.75	34.62	
150.00		185.78	1.77	1.41	0.93	42.21	
155.00	Appurtenance(s)	2798.9	1.89	1.98	1.14	803.55	
	Totals:	**32,808.1**				**1,588.3**	**Total Wind:** **24,490.4**

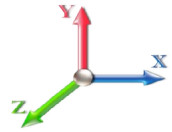
Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 30	

Tower Engineering Solutions

Load Case: 0.9D + 1.0E



Gust Response Factor	1.10			**Sds**	0.23	**Iterations**	22		
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.11	**Ss**	0.21		
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.34	**SA**	0.04	**S1**	0.07	**Seismic Importance Factor**	1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-33.80	-1.83	0.00	-213.13	0.00	213.13	4331.76	2165.88	10060.7	5037.85		0.00	0.00	0.050
5.00	-32.62	-1.81	0.00	-203.98	0.00	203.98	4271.91	2135.96	9681.61	4848.00		0.01	-0.01	0.050
10.00	-31.46	-1.78	0.00	-194.93	0.00	194.93	4209.88	2104.94	9304.37	4659.10		0.02	-0.02	0.049
15.00	-30.33	-1.74	0.00	-186.04	0.00	186.04	4145.67	2072.83	8929.41	4471.34		0.05	-0.03	0.049
20.00	-29.22	-1.70	0.00	-177.33	0.00	177.33	4079.27	2039.64	8557.10	4284.91		0.09	-0.05	0.049
25.00	-28.13	-1.67	0.00	-168.81	0.00	168.81	4010.69	2005.34	8187.79	4099.98		0.15	-0.06	0.048
30.00	-27.08	-1.63	0.00	-160.48	0.00	160.48	3939.93	1969.96	7821.85	3916.74		0.22	-0.07	0.048
35.00	-26.04	-1.59	0.00	-152.35	0.00	152.35	3866.98	1933.49	7459.66	3735.38		0.30	-0.08	0.048
40.00	-25.03	-1.55	0.00	-144.41	0.00	144.41	3791.85	1895.92	7101.59	3556.07		0.39	-0.10	0.047
44.00	-24.24	-1.52	0.00	-138.21	0.00	138.21	3730.17	1865.09	6818.34	3414.24		0.48	-0.11	0.047
45.00	-23.88	-1.50	0.00	-136.70	0.00	136.70	3714.54	1857.27	6747.99	3379.01		0.50	-0.11	0.047
49.75	-22.20	-1.42	0.00	-129.56	0.00	129.56	3683.20	1841.60	6608.77	3309.30		0.62	-0.13	0.045
50.00	-22.16	-1.42	0.00	-129.21	0.00	129.21	3679.23	1839.62	6591.31	3300.56		0.63	-0.13	0.045
55.00	-21.21	-1.38	0.00	-122.10	0.00	122.10	3598.76	1799.38	6244.86	3127.07		0.77	-0.14	0.045
60.00	-20.28	-1.35	0.00	-115.18	0.00	115.18	3516.10	1758.05	5903.79	2956.28		0.92	-0.16	0.045
65.00	-19.38	-1.32	0.00	-108.42	0.00	108.42	3431.27	1715.63	5568.46	2788.37		1.09	-0.17	0.045
70.00	-18.51	-1.30	0.00	-101.81	0.00	101.81	3344.24	1672.12	5239.26	2623.52		1.28	-0.19	0.044
75.00	-17.66	-1.30	0.00	-95.29	0.00	95.29	3255.04	1627.52	4916.54	2461.92		1.49	-0.20	0.044
80.00	-16.84	-1.30	0.00	-88.81	0.00	88.81	3137.93	1568.96	4563.27	2285.03		1.71	-0.22	0.044
85.00	-16.04	-1.30	0.00	-82.32	0.00	82.32	3017.89	1508.95	4219.09	2112.68		1.95	-0.24	0.044
89.50	-15.34	-1.30	0.00	-76.47	0.00	76.47	2909.87	1454.93	3920.86	1963.34		2.18	-0.26	0.044
90.00	-15.21	-1.30	0.00	-75.82	0.00	75.82	2897.86	1448.93	3888.39	1947.09		2.21	-0.26	0.044
93.75	-14.27	-1.30	0.00	-70.95	0.00	70.95	2354.99	1177.49	3133.69	1569.17		2.42	-0.27	0.051
95.00	-14.10	-1.30	0.00	-69.32	0.00	69.32	2336.81	1168.40	3076.66	1540.62		2.49	-0.28	0.051
100.00	-13.46	-1.30	0.00	-62.81	0.00	62.81	2262.72	1131.36	2851.92	1428.08		2.80	-0.30	0.050
105.00	-12.84	-1.31	0.00	-56.29	0.00	56.29	2165.47	1082.73	2607.63	1305.76		3.12	-0.32	0.049
110.00	-12.24	-1.31	0.00	-49.76	0.00	49.76	2065.44	1032.72	2371.09	1187.31		3.48	-0.35	0.048
115.00	-11.65	-1.31	0.00	-43.22	0.00	43.22	1965.41	982.71	2145.79	1074.49		3.85	-0.37	0.046
117.00	-8.62	-1.29	0.00	-40.61	0.00	40.61	1925.40	962.70	2058.82	1030.94		4.01	-0.38	0.044
120.00	-8.33	-1.29	0.00	-36.74	0.00	36.74	1865.39	932.69	1931.73	967.30		4.26	-0.40	0.042
123.25	-7.86	-1.28	0.00	-32.55	0.00	32.55	1005.19	502.59	1030.12	515.83		4.53	-0.41	0.071
125.00	-7.75	-1.28	0.00	-30.30	0.00	30.30	992.91	496.46	998.01	499.75		4.69	-0.42	0.068
127.00	-5.61	-1.20	0.00	-27.74	0.00	27.74	978.56	489.28	961.59	481.51		4.86	-0.44	0.063
130.00	-5.43	-1.20	0.00	-24.13	0.00	24.13	956.38	478.19	907.53	454.44		5.15	-0.46	0.059
135.00	-5.16	-1.18	0.00	-18.16	0.00	18.16	917.66	458.83	819.21	410.21		5.64	-0.49	0.050
137.00	-3.01	-0.92	0.00	-15.81	0.00	15.81	901.57	450.78	784.57	392.87		5.85	-0.50	0.044
140.00	-2.89	-0.91	0.00	-13.04	0.00	13.04	876.76	438.38	733.42	367.25		6.17	-0.52	0.039
145.00	-2.70	-0.87	0.00	-8.50	0.00	8.50	833.68	416.84	650.52	325.74		6.73	-0.54	0.029
150.00	-2.52	-0.83	0.00	-4.14	0.00	4.14	781.24	390.62	565.69	283.26		7.31	-0.56	0.018
155.00	0.00	-0.80	0.00	0.00	0.00	0.00	721.23	360.61	481.69	241.20		7.90	-0.57	0.000

Wind Loading - Shaft

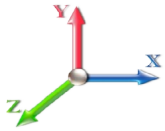
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 31	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 23

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	6.129	6.74	241.40	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	6.129	6.74	235.64	0.650	0.000	5.00	23.757	15.44	104.1	0.0	1129.5
10.00		1.00	0.70	6.129	6.74	229.87	0.650	0.000	5.00	23.183	15.07	101.6	0.0	1102.0
15.00		1.00	0.70	6.129	6.74	224.11	0.650	0.000	5.00	22.609	14.70	99.1	0.0	1074.5
20.00		1.00	0.70	6.129	6.74	218.34	0.650	0.000	5.00	22.034	14.32	96.6	0.0	1047.0
25.00		1.00	0.70	6.129	6.74	212.57	0.650	0.000	5.00	21.460	13.95	94.0	0.0	1019.5
30.00		1.00	0.70	6.134	6.75	206.90	0.650	0.000	5.00	20.886	13.58	91.6	0.0	992.0
35.00		1.00	0.73	6.410	7.05	205.60	0.650	0.000	5.00	20.311	13.20	93.1	0.0	964.5
40.00		1.00	0.76	6.659	7.33	203.55	0.650	0.000	5.00	19.737	12.83	94.0	0.0	937.1
44.00	Bot - Section 2	1.00	0.78	6.843	7.53	201.47	0.650	0.000	4.00	15.376	9.99	75.2	0.0	729.9
45.00		1.00	0.79	6.887	7.58	200.90	0.650	0.000	1.00	3.850	2.50	19.0	0.0	362.5
49.75	Top - Section 1	1.00	0.81	7.088	7.80	197.91	0.650	0.000	4.75	17.974	11.68	91.1	0.0	1691.7
50.00		1.00	0.81	7.098	7.81	201.17	0.650	0.000	0.25	0.932	0.61	4.7	0.0	44.2
55.00		1.00	0.83	7.294	8.02	197.63	0.650	0.000	5.00	18.331	11.92	95.6	0.0	869.8
60.00		1.00	0.85	7.477	8.22	193.74	0.650	0.000	5.00	17.757	11.54	94.9	0.0	842.3
65.00		1.00	0.87	7.650	8.42	189.52	0.650	0.000	5.00	17.183	11.17	94.0	0.0	814.8
70.00		1.00	0.89	7.814	8.60	185.03	0.650	0.000	5.00	16.609	10.80	92.8	0.0	787.3
75.00		1.00	0.91	7.969	8.77	180.29	0.656 *	0.000	5.00	16.034	10.51	92.2	0.0	759.8
80.00		1.00	0.93	8.118	8.93	175.32	0.663 *	0.000	5.00	15.460	10.25	91.5	0.0	732.3
85.00		1.00	0.94	8.260	9.09	170.15	0.671 *	0.000	5.00	14.886	9.99	90.8	0.0	704.9
89.50	Bot - Section 3	1.00	0.96	8.382	9.22	165.34	0.679 *	0.000	4.50	12.906	8.77	80.8	0.0	610.9
90.00		1.00	0.96	8.396	9.24	164.80	0.684 *	0.000	0.50	1.432	0.98	9.0	0.0	123.1
93.75	Top - Section 2	1.00	0.97	8.494	9.34	160.67	0.688 *	0.000	3.75	10.555	7.26	67.9	0.0	907.0
95.00		1.00	0.97	8.526	9.38	162.40	0.688 *	0.000	1.25	3.446	2.37	22.3	0.0	136.1
100.00		1.00	0.99	8.652	9.52	156.75	0.695 *	0.000	5.00	13.427	9.33	88.8	0.0	530.3
105.00		1.00	1.00	8.774	9.65	150.95	0.705 *	0.000	5.00	12.853	9.07	87.5	0.0	507.4
110.00		1.00	1.02	8.891	9.78	145.01	0.717 *	0.000	5.00	12.278	8.80	86.1	0.0	484.4
115.00		1.00	1.03	9.005	9.91	138.94	0.730 *	0.000	5.00	11.704	8.54	84.6	0.0	461.5
117.00	Appurtenance(s)	1.00	1.03	9.049	9.95	136.48	0.740 *	0.000	2.00	4.521	3.34	33.3	0.0	178.2
120.00	Bot - Section 4	1.00	1.04	9.115	10.03	132.76	0.650	0.000	3.00	6.609	4.30	43.1	0.0	260.4
123.25	Top - Section 3	1.00	1.05	9.185	10.10	128.68	0.650	0.000	3.25	7.030	4.57	46.2	0.0	439.8
125.00		1.00	1.05	9.222	10.14	128.41	0.650	0.000	1.75	3.685	2.39	24.3	0.0	87.5
127.00	Appurtenance(s)	1.00	1.06	9.264	10.19	125.87	0.650	0.000	2.00	4.125	2.68	27.3	0.0	98.0
130.00		1.00	1.07	9.326	10.26	122.02	0.650	0.000	3.00	6.015	3.91	40.1	0.0	142.8
135.00		1.00	1.08	9.427	10.37	115.53	0.650	0.000	5.00	9.565	6.22	64.5	0.0	227.0
137.00	Appurtenance(s)	1.00	1.08	9.466	10.41	112.91	0.650	0.000	2.00	3.665	2.38	24.8	0.0	87.0
140.00		1.00	1.09	9.525	10.48	108.94	0.650	0.000	3.00	5.326	3.46	36.3	0.0	126.3
145.00		1.00	1.10	9.621	10.58	102.27	0.650	0.000	5.00	8.417	5.47	57.9	0.0	199.5
150.00		1.00	1.11	9.715	10.69	95.50	0.650	0.000	5.00	7.843	5.10	54.5	0.0	185.8
155.00	Appurtenance(s)	1.00	1.12	9.806	10.79	88.66	0.650	0.000	5.00	7.268	4.72	51.0	0.0	172.0
								Totals:	**155.00**			**2,645.9**		**22,570.6**

* Cf Adjusted by Linear Load Ra Effect

Discrete Appurtenance Forces

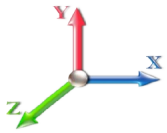
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 32	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 23

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	155.00	TD-RRH8x20-25	3	9.849	10.834	0.68	1.00	8.26	210.00	0.000	2.400	89.51	0.00	214.83
2	155.00	6' Lightning rod	1	9.806	10.787	1.00	1.00	0.38	6.50	0.000	0.000	4.10	0.00	0.00
3	155.00	APXVSPP18-C-A20	3	9.849	10.834	0.82	1.00	19.73	171.00	0.000	2.400	213.75	0.00	513.01
4	155.00	ACU-A20-N	4	9.849	10.834	1.00	1.00	0.56	4.00	0.000	2.400	6.07	0.00	14.56
5	155.00	APXVTM14-C-120	3	9.849	10.834	0.76	1.00	14.46	168.00	0.000	2.400	156.61	0.00	375.87
6	155.00	Collar Mount	1	9.806	10.787	0.56	0.75	2.81	250.00	0.000	0.000	30.34	0.00	0.00
7	155.00	800 MHz RRH	3	9.849	10.834	0.92	1.00	6.87	159.00	0.000	2.400	74.46	0.00	178.70
8	155.00	ALU 800MHz External	3	9.849	10.834	0.69	1.00	1.61	26.40	0.000	2.400	17.49	0.00	41.98
9	155.00	1900MHz RRH	3	9.849	10.834	1.00	1.00	11.40	132.00	0.000	2.400	123.51	0.00	296.43
10	155.00	Low Profile Platform	1	9.806	10.787	1.00	1.00	22.00	1500.00	0.000	0.000	237.31	0.00	0.00
11	137.00	Low Profile Platform	1	9.466	10.413	1.00	1.00	25.00	1200.00	0.000	0.000	260.33	0.00	0.00
12	137.00	DB-T1-6Z-8AB-0Z	2	9.466	10.413	0.80	0.80	7.68	88.00	0.000	0.000	79.97	0.00	0.00
13	137.00	FD9R6004/2C-3L (3.1 lbs)	6	9.466	10.413	0.50	0.80	1.07	18.60	0.000	0.000	11.16	0.00	0.00
14	137.00	RRH2X60-700	3	9.466	10.413	0.58	0.80	6.13	180.00	0.000	0.000	63.85	0.00	0.00
15	137.00	RRH2X60-PCS	3	9.466	10.413	0.71	0.80	4.70	165.00	0.000	0.000	48.93	0.00	0.00
16	137.00	4X45 RRH AWS	3	9.466	10.413	0.66	0.80	5.33	186.00	0.000	0.000	55.54	0.00	0.00
17	137.00	LPA-80063/6CF	2	9.466	10.413	0.75	0.80	14.44	54.00	0.000	0.000	150.35	0.00	0.00
18	137.00	LPA-80080-6CF-EDIN	2	9.466	10.413	0.74	0.80	6.44	42.00	0.000	0.000	67.09	0.00	0.00
19	137.00	LPA-80080/4CF ___	2	9.466	10.413	0.74	0.80	3.88	24.00	0.000	0.000	40.44	0.00	0.00
20	137.00	SBNHH-1D65B	6	9.466	10.413	0.66	0.80	31.80	304.26	0.000	0.000	331.17	0.00	0.00
21	127.00	DC6-48-60-18-8F	1	9.264	10.190	0.80	0.80	1.18	31.80	0.000	0.000	11.98	0.00	0.00
22	127.00	7770	3	9.264	10.190	0.60	0.80	9.90	105.00	0.000	0.000	100.88	0.00	0.00
23	127.00	LGP21401	6	9.264	10.190	0.51	0.80	3.96	84.60	0.000	0.000	40.38	0.00	0.00
24	127.00	Low Profile Platform	1	9.264	10.190	1.00	1.00	22.00	1500.00	0.000	0.000	224.18	0.00	0.00
25	127.00	RRU 11	3	9.264	10.190	0.54	0.80	7.21	165.00	0.000	0.000	73.51	0.00	0.00
26	127.00	P65-16-XLH-RR	3	9.264	10.190	0.60	0.80	14.69	159.00	0.000	0.000	149.67	0.00	0.00
27	127.00	RRUS 12	3	9.264	10.190	0.54	0.80	4.34	180.00	0.000	0.000	44.24	0.00	0.00
28	127.00	860 10025	6	9.264	10.190	0.56	0.80	0.60	7.20	0.000	0.000	6.16	0.00	0.00
29	117.00	HRK12 (Handrail Kit)	1	9.049	9.954	1.00	1.00	6.75	261.72	0.000	0.000	67.19	0.00	0.00
30	117.00	RMQP-496	1	9.049	9.954	1.00	1.00	37.00	1718.00	0.000	0.000	368.30	0.00	0.00
31	117.00	Ericsson Radio 4449	3	9.049	9.954	0.50	0.75	2.49	210.00	0.000	0.000	24.76	0.00	0.00
32	117.00	APXVAARR24_43-U-NA2	3	9.049	9.954	0.52	0.75	31.88	384.00	0.000	0.000	317.31	0.00	0.00
33	117.00	Air 21 B4A/B2P	6	9.049	9.954	0.65	0.75	23.57	542.40	0.000	0.000	234.60	0.00	0.00
							Totals:		**10,237.48**			**3,725.16**		

Total Applied Force Summary

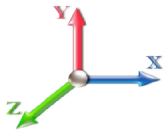
Structure:	CT00248-S-SBA		**Code:**	EIA/TIA-222-G	6/26/2019
Site Name:	North Bethel		**Exposure:**	B	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 33

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 23

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		104.10	1313.37	0.00	0.00
10.00		101.59	1285.88	0.00	0.00
15.00		99.07	1258.40	0.00	0.00
20.00		96.55	1230.91	0.00	0.00
25.00		94.04	1203.42	0.00	0.00
30.00		91.60	1175.93	0.00	0.00
35.00		93.09	1148.45	0.00	0.00
40.00		93.98	1120.96	0.00	0.00
44.00		75.23	876.98	0.00	0.00
45.00		18.96	399.25	0.00	0.00
49.75		91.09	1866.40	0.00	0.00
50.00		4.73	53.41	0.00	0.00
55.00		95.60	1053.68	0.00	0.00
60.00		94.93	1026.19	0.00	0.00
65.00		93.99	998.71	0.00	0.00
70.00		92.79	971.22	0.00	0.00
75.00		92.16	943.73	0.00	0.00
80.00		91.54	916.24	0.00	0.00
85.00		90.77	888.76	0.00	0.00
89.50		80.84	776.38	0.00	0.00
90.00		9.04	141.47	0.00	0.00
93.75		67.85	1044.94	0.00	0.00
95.00		22.25	182.12	0.00	0.00
100.00		88.77	714.16	0.00	0.00
105.00		87.49	691.25	0.00	0.00
110.00		86.11	668.35	0.00	0.00
115.00		84.62	645.44	0.00	0.00
117.00	(14) attachments	1045.45	3367.88	0.00	0.00
120.00		43.07	330.03	0.00	0.00
123.25		46.16	515.22	0.00	0.00
125.00		24.29	128.11	0.00	0.00
127.00	(26) attachments	678.33	2376.95	0.00	0.00
130.00		40.11	192.00	0.00	0.00
135.00		64.47	309.01	0.00	0.00
137.00	(30) attachments	1133.64	2381.62	0.00	0.00
140.00		36.27	134.23	0.00	0.00
145.00		57.90	212.72	0.00	0.00
150.00		54.48	198.98	0.00	0.00
155.00	(25) attachments	1004.12	2812.14	0.00	1635.39
	Totals:	**6,371.07**	**37,554.89**	**0.00**	**1,635.39**

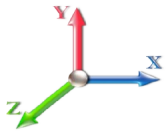
Linear Appurtenance Segment Forces (Factored)

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 34	

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 23

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.069	0.000	6.129	0.00	62.40
5.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.069	0.000	6.129	0.00	5.50
10.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.071	0.000	6.129	0.00	62.40
10.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.071	0.000	6.129	0.00	5.50
15.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.073	0.000	6.129	0.00	62.40
15.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.073	0.000	6.129	0.00	5.50
20.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.075	0.000	6.129	0.00	62.40
20.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.075	0.000	6.129	0.00	5.50
25.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.077	0.000	6.129	0.00	62.40
25.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.077	0.000	6.129	0.00	5.50
30.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.079	0.000	6.134	0.00	62.40
30.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.079	0.000	6.134	0.00	5.50
35.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.081	0.000	6.410	0.00	62.40
35.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.081	0.000	6.410	0.00	5.50
40.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.084	0.000	6.659	0.00	62.40
40.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.084	0.000	6.659	0.00	5.50
44.00	1 5/8" Coax	Yes	4.00	0.000	3.96	1.32	0.00	0.086	0.000	6.843	0.00	49.92
44.00	1 5/8" Hybrid	Yes	4.00	0.000	0.00	0.00	0.00	0.086	0.000	6.843	0.00	4.40
45.00	1 5/8" Coax	Yes	1.00	0.000	3.96	0.33	0.00	0.087	0.000	6.887	0.00	12.48
45.00	1 5/8" Hybrid	Yes	1.00	0.000	0.00	0.00	0.00	0.087	0.000	6.887	0.00	1.10
49.75	1 5/8" Coax	Yes	4.75	0.000	3.96	1.57	0.00	0.089	0.000	7.088	0.00	59.28
49.75	1 5/8" Hybrid	Yes	4.75	0.000	0.00	0.00	0.00	0.089	0.000	7.088	0.00	5.23
50.00	1 5/8" Coax	Yes	0.25	0.000	3.96	0.08	0.00	0.089	0.000	7.098	0.00	3.12
50.00	1 5/8" Hybrid	Yes	0.25	0.000	0.00	0.00	0.00	0.089	0.000	7.098	0.00	0.28
55.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.090	0.000	7.294	0.00	62.40
55.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.090	0.000	7.294	0.00	5.50
60.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.093	0.000	7.477	0.00	62.40
60.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.093	0.000	7.477	0.00	5.50
65.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.096	0.000	7.650	0.00	62.40
65.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.096	0.000	7.650	0.00	5.50
70.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.099	0.000	7.814	0.00	62.40
70.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.099	0.000	7.814	0.00	5.50
75.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.103	1.009	7.969	0.00	62.40
75.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.103	1.009	7.969	0.00	5.50
80.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.107	1.020	8.118	0.00	62.40
80.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.107	1.020	8.118	0.00	5.50
85.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.111	1.033	8.260	0.00	62.40
85.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.111	1.033	8.260	0.00	5.50
89.50	1 5/8" Coax	Yes	4.50	0.000	3.96	1.48	0.00	0.115	1.045	8.382	0.00	56.16
89.50	1 5/8" Hybrid	Yes	4.50	0.000	0.00	0.00	0.00	0.115	1.045	8.382	0.00	4.95
90.00	1 5/8" Coax	Yes	0.50	0.000	3.96	0.17	0.00	0.117	1.052	8.396	0.00	6.24
90.00	1 5/8" Hybrid	Yes	0.50	0.000	0.00	0.00	0.00	0.117	1.052	8.396	0.00	0.55
93.75	1 5/8" Coax	Yes	3.75	0.000	3.96	1.24	0.00	0.119	1.058	8.494	0.00	46.80
93.75	1 5/8" Hybrid	Yes	3.75	0.000	0.00	0.00	0.00	0.119	1.058	8.494	0.00	4.13
95.00	1 5/8" Coax	Yes	1.25	0.000	3.96	0.41	0.00	0.120	1.059	8.526	0.00	15.60
95.00	1 5/8" Hybrid	Yes	1.25	0.000	0.00	0.00	0.00	0.120	1.059	8.526	0.00	1.38
100.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.123	1.069	8.652	0.00	62.40

Linear Appurtenance Segment Forces (Factored)

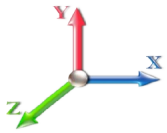
Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 35	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 23

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
100.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.123	1.069	8.652	0.00	5.50
105.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.128	1.085	8.774	0.00	62.40
105.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.128	1.085	8.774	0.00	5.50
110.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.134	1.103	8.891	0.00	62.40
110.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.134	1.103	8.891	0.00	5.50
115.00	1 5/8" Coax	Yes	5.00	0.000	3.96	1.65	0.00	0.141	1.123	9.005	0.00	62.40
115.00	1 5/8" Hybrid	Yes	5.00	0.000	0.00	0.00	0.00	0.141	1.123	9.005	0.00	5.50
117.00	1 5/8" Coax	Yes	2.00	0.000	3.96	0.66	0.00	0.146	1.138	9.049	0.00	24.96
117.00	1 5/8" Hybrid	Yes	2.00	0.000	0.00	0.00	0.00	0.146	1.138	9.049	0.00	2.20
										Totals:	**0.0**	**1,588.9**

Calculated Forces

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 36	

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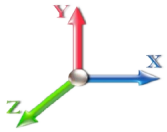
Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 23

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-37.55	-6.38	0.00	-721.10	0.00	721.10	4331.76	2165.88	10060.7	5037.85	0.00	0.000	0.000	0.152
5.00	-36.24	-6.30	0.00	-689.19	0.00	689.19	4271.91	2135.96	9681.61	4848.00	0.02	-0.037	0.000	0.151
10.00	-34.95	-6.22	0.00	-657.68	0.00	657.68	4209.88	2104.94	9304.37	4659.10	0.08	-0.075	0.000	0.149
15.00	-33.68	-6.14	0.00	-626.56	0.00	626.56	4145.67	2072.83	8929.41	4471.34	0.18	-0.114	0.000	0.148
20.00	-32.45	-6.07	0.00	-595.84	0.00	595.84	4079.27	2039.64	8557.10	4284.91	0.32	-0.155	0.000	0.147
25.00	-31.24	-5.99	0.00	-565.50	0.00	565.50	4010.69	2005.34	8187.79	4099.98	0.50	-0.196	0.000	0.146
30.00	-30.06	-5.92	0.00	-535.53	0.00	535.53	3939.93	1969.96	7821.85	3916.74	0.73	-0.238	0.000	0.144
35.00	-28.91	-5.84	0.00	-505.93	0.00	505.93	3866.98	1933.49	7459.66	3735.38	1.01	-0.282	0.000	0.143
40.00	-27.78	-5.76	0.00	-476.71	0.00	476.71	3791.85	1895.92	7101.59	3556.07	1.33	-0.327	0.000	0.141
44.00	-26.90	-5.69	0.00	-453.65	0.00	453.65	3730.17	1865.09	6818.34	3414.24	1.62	-0.364	0.000	0.140
45.00	-26.50	-5.69	0.00	-447.96	0.00	447.96	3714.54	1857.27	6747.99	3379.01	1.69	-0.374	0.000	0.140
49.75	-24.63	-5.59	0.00	-420.95	0.00	420.95	3683.20	1841.60	6608.77	3309.30	2.09	-0.419	0.000	0.134
50.00	-24.58	-5.60	0.00	-419.55	0.00	419.55	3679.23	1839.62	6591.31	3300.56	2.11	-0.421	0.000	0.134
55.00	-23.52	-5.51	0.00	-391.56	0.00	391.56	3598.76	1799.38	6244.86	3127.07	2.58	-0.468	0.000	0.132
60.00	-22.49	-5.43	0.00	-364.00	0.00	364.00	3516.10	1758.05	5903.79	2956.28	3.09	-0.515	0.000	0.130
65.00	-21.49	-5.34	0.00	-336.86	0.00	336.86	3431.27	1715.63	5568.46	2788.37	3.66	-0.563	0.000	0.127
70.00	-20.51	-5.26	0.00	-310.14	0.00	310.14	3344.24	1672.12	5239.26	2623.52	4.27	-0.613	0.000	0.124
75.00	-19.57	-5.17	0.00	-283.85	0.00	283.85	3255.04	1627.52	4916.54	2461.92	4.94	-0.663	0.000	0.121
80.00	-18.65	-5.09	0.00	-257.99	0.00	257.99	3137.93	1568.96	4563.27	2285.03	5.66	-0.714	0.000	0.119
85.00	-17.76	-5.00	0.00	-232.56	0.00	232.56	3017.89	1508.95	4219.09	2112.68	6.44	-0.766	0.000	0.116
89.50	-16.98	-4.92	0.00	-210.06	0.00	210.06	2909.87	1454.93	3920.86	1963.34	7.19	-0.814	0.000	0.113
90.00	-16.83	-4.91	0.00	-207.60	0.00	207.60	2897.86	1448.93	3888.39	1947.09	7.27	-0.819	0.000	0.112
93.75	-15.79	-4.84	0.00	-189.18	0.00	189.18	2354.99	1177.49	3133.69	1569.17	7.93	-0.859	0.000	0.127
95.00	-15.60	-4.82	0.00	-183.13	0.00	183.13	2336.81	1168.40	3076.66	1540.62	8.16	-0.873	0.000	0.126
100.00	-14.89	-4.74	0.00	-159.03	0.00	159.03	2262.72	1131.36	2851.92	1428.08	9.10	-0.932	0.000	0.118
105.00	-14.19	-4.65	0.00	-135.34	0.00	135.34	2165.47	1082.73	2607.63	1305.76	10.11	-0.989	0.000	0.110
110.00	-13.52	-4.57	0.00	-112.09	0.00	112.09	2065.44	1032.72	2371.09	1187.31	11.18	-1.044	0.000	0.101
115.00	-12.87	-4.48	0.00	-89.26	0.00	89.26	1965.41	982.71	2145.79	1074.49	12.30	-1.096	0.000	0.090
117.00	-9.53	-3.37	0.00	-80.30	0.00	80.30	1925.40	962.70	2058.82	1030.94	12.76	-1.117	0.000	0.083
120.00	-9.20	-3.33	0.00	-70.19	0.00	70.19	1865.39	932.69	1931.73	967.30	13.47	-1.145	0.000	0.078
123.25	-8.68	-3.27	0.00	-59.38	0.00	59.38	1005.19	502.59	1030.12	515.83	14.26	-1.175	0.000	0.124
125.00	-8.55	-3.25	0.00	-53.65	0.00	53.65	992.91	496.46	998.01	499.75	14.70	-1.190	0.000	0.116
127.00	-6.19	-2.52	0.00	-47.15	0.00	47.15	978.56	489.28	961.59	481.51	15.20	-1.216	0.000	0.104
130.00	-5.99	-2.49	0.00	-39.58	0.00	39.58	956.38	478.19	907.53	454.44	15.98	-1.252	0.000	0.093
135.00	-5.69	-2.42	0.00	-27.15	0.00	27.15	917.66	458.83	819.21	410.21	17.32	-1.304	0.000	0.072
137.00	-3.33	-1.23	0.00	-22.32	0.00	22.32	901.57	450.78	784.57	392.87	17.87	-1.322	0.000	0.061
140.00	-3.20	-1.19	0.00	-18.62	0.00	18.62	876.76	438.38	733.42	367.25	18.71	-1.346	0.000	0.054
145.00	-2.98	-1.13	0.00	-12.66	0.00	12.66	833.68	416.84	650.52	325.74	20.14	-1.381	0.000	0.042
150.00	-2.79	-1.07	0.00	-7.00	0.00	7.00	781.24	390.62	565.69	283.26	21.60	-1.408	0.000	0.028
155.00	0.00	-1.00	0.00	-1.64	0.00	1.64	721.23	360.61	481.69	241.20	23.08	-1.423	0.000	0.007

Final Analysis Summary

Structure:	CT00248-S-SBA	**Code:**	EIA/TIA-222-G	6/26/2019	
Site Name:	North Bethel	**Exposure:**	B		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 37	

Tower Engineering Solutions

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
1.2D + 1.6W 93 mph Wind	24.5	0.00	45.03	0.00	0.00	2789.90
0.9D + 1.6W 93 mph Wind	24.5	0.00	33.77	0.00	0.00	2759.19
1.2D + 1.0Di + 1.0Wi 50 mph Wind	7.4	0.00	77.28	0.00	0.00	839.34
1.2D + 1.0E	1.8	0.00	45.07	0.00	0.00	215.72
0.9D + 1.0E	1.8	0.00	33.80	0.00	0.00	213.13
1.0D + 1.0W 60 mph Wind	6.4	0.00	37.55	0.00	0.00	721.10

Max Stresses

Load Case	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Elev (ft)	Stress Ratio
1.2D + 1.6W 93 mph Wind	-45.03	-24.55	0.00	-2789.9	0.00	-2789.9	4331.76	2165.8	10060.7	5037.85	0.00	0.564
0.9D + 1.6W 93 mph Wind	-33.77	-24.53	0.00	-2759.1	0.00	-2759.1	4331.76	2165.8	10060.7	5037.85	0.00	0.556
1.2D + 1.0Di + 1.0Wi 50 mph Wind	-77.28	-7.37	0.00	-839.34	0.00	-839.34	4331.76	2165.8	10060.7	5037.85	0.00	0.184
1.2D + 1.0E	-10.49	-1.30	0.00	-32.95	0.00	-32.95	1005.19	502.59	1030.12	515.83	123.25	0.074
0.9D + 1.0E	-7.86	-1.28	0.00	-32.55	0.00	-32.55	1005.19	502.59	1030.12	515.83	123.25	0.071
1.0D + 1.0W 60 mph Wind	-37.55	-6.38	0.00	-721.10	0.00	-721.10	4331.76	2165.8	10060.7	5037.85	0.00	0.152

Base Plate Summary

Structure:	CT00248-S-SB		**Code:**	EIA/TIA-222-G	6/26/2019
Site Name:	North Bethel		**Exposure:**	B	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 38

Tower Engineering Solutions

Reactions		Base Plate		Anchor Bolts	
Original Design		**Yield (ksi):**	50.00	**Bolt Circle:**	64.00
Moment (kip-ft):	3850.00	**Width (in):**	64.00	**Number Bolts:**	20.00
Axial (kip):	38.70	**Style:**	Clipped	**Bolt Type:**	2.25" 18J
Shear (kip):	32.40	**Polygon Sides:**	0.00	**Bolt Diameter (in):**	2.25
Analysis		**Clip Length (in):**	15.00	**Yield (ksi):**	75.00
Moment (kip-ft):	2789.90	**Effective Len (in):**	8.82	**Ultimate (ksi):**	100.00
Axial (kip):	77.28	**Moment (kip-in):**	388.92	**Arrangement:**	Clustered
Shear (kip):	24.55	**Allow Stress (ksi):**	67.50	**Cluster Dist (in):**	6.00
		Applied Stress (ksi):	0.00	**Start Angle (deg):**	45.00
Moment Design %:	72.46	**Stress Ratio:**	0.52	Compression	
				Force (kip):	108.49
				Allowable (kip):	260.00
				Ratio:	0.43
				Tension	
				Force (kip):	100.76
				Allowable (kip):	260.00
				Ratio:	0.40

Monopole Mat Foundation Design

				Date
				6/26/2019
	Customer Name:	T-Mobile	**EIA/TIA Standard:**	EIA-222-G
	Site Name:		**Structure Height (Ft.):**	155
	Site Number:	CT00248-S-SBA	**Engineer Name:**	T. Alajaj
	Engr. Number:	79535	**Engineer Login ID:**	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

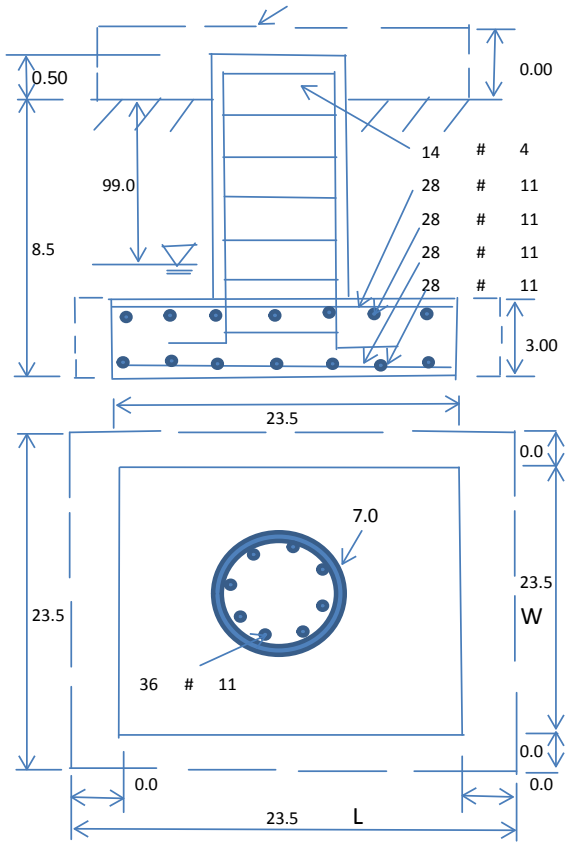
Analysis or Design? Analysis

Base Reactions (Factored):

Axial Load (Kips):	77.3	Shear Force (Kips):	24.5
Uplift Force (Kips):	0.0	Moment (Kips-ft):	2789.9
Allowable overstress %:	5.0%		

Foundation Geometries:

		Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	7.0	Depth of Base BG (ft.):	8.5
Pier Height A. G. (ft.):	0.50	Thickness of Pad (ft):	3.00
Length of Pad (ft.):	23.5	Width of Pad (ft.):	23.5
Final Length of pad (ft)	23.5	Final width of pad (ft):	23.5



Material Properties and Reabr Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	40	
Vertical Rebar Size #:	11	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	36	Tie Spacing (in):	8.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	11	
Concrete Cover (in.):	4	Unit Weight of Concrete:	150.0	pcf
Rebar at the bottom of the concrete pad:				
Qty. of Rebar in Pad (L):	28	Qty. of Rebar in Pad (W):	28	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	28	Qty. of Rebar in Pad (W):	28	
Apply 1.35 factor for e/w Per G:	1.35			

Soil Design Parameters:

Soil Unit Weight (pcf):	125.0	Soil Buoyant Weight:	50.0	Pcf		
Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Ultimate Bearing Pressure (psf):	5000	Ultimate Skin Friction:	425	Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	Yes		Angle from Bottm of Pad:	25
Consider soil hor. resist. for OTM.:	Yes	Reduction factor on the maximum soil bearing pressure:			1.00	

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

Total Dry Soil Volume (cu. Ft.):	2825.71	Total Dry Soil Weight (Kips):	353.21
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	353.21	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	1887.66	Total Dry Concrete Weight (Kips):	283.15
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	283.15	Total Vertical Load on Base (Kips):	713.66

Check Soil Capacities:

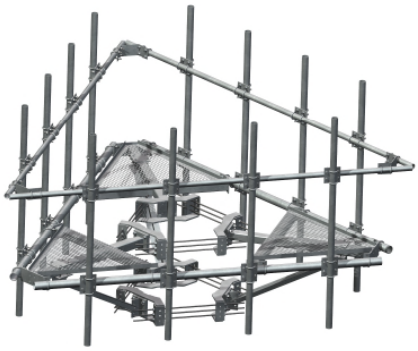
					Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	2043	<	Allowable Factored Soil Bearing (psf):	3750	0.54	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	7637.8	>	Design Factored Momont (kips-ft):	2678	0.35	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	2.85	OK!				

Check the capacities of Reinforceing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90		Strength reduction factor (Shear):	0.75		
Strength reduction factor (Axial compresion):	0.65		Wind Load Factor on Concrete Design:	1.00		
					Load/ Capacity Ratio	
(1) Concrete Pier:						
Vertical Steel Rebar Area (sq. in./each):	1.56		Tie / Stirrup Area (sq. in./each):	0.20		
Calculated Moment Capacity (Mn,Kips-Ft):	8832.5	>	Design Factored Moment (Mu, Kips-F	2936.9	0.33	OK!
Calculated Shear Capacity (Kips):	589.7	>	Design Factored Shear (Kips):	24.5	0.04	OK!
Calculated Tension Capacity (Tn, Kips):	3032.6	>	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	7273.9	>	Design Factored Axial Load (Pu Kips):	77.3	0.01	OK!
Moment & Axial Strength Combination:	0.33	OK!	Check Tie Spacing (Design/Required):		0.6667	OK!
Pier Reinforcement Ratio:	0.010		Reinforcement Ratio is satisfied per ACI			
(2).Concrete Pad:						
One-Way Design Shear Capacity (L-Direction, Kips):	725.5	>	One-Way Factored Shear (L-D. Kips):	196.5	0.27	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	725.5	>	One-Way Factored Shear (W-D., Kips)	196.5	0.27	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	648.8	>	One-Way Factored Shear (C-C, Kips):	181.0	0.28	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0049	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0049		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	5796.6	>	Moment at Bottom (L-Dir. K-Ft):	1036.0	0.18	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	5796.6	>	Moment at Bottom (W-Dir. K-Ft):	1036.0	0.18	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	8062.5	>	Moment at Bottom (C-C Dir. K-Ft):	1465.2	0.18	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0049	OK!	Upper Steel Reinf. Ratio (W-Dir.):	0.0049		
Upper Steel Pad Moment Capacity (L-Direc. Kips-ft):	5796.6	>	Moment at the top (L-Dir K-Ft):	382.8	0.07	OK!
Upper Steel Pad Moment Capacity (W-Direc. Kips-ft):	5796.6	>	Moment at the top (W-Dir K-Ft):	382.8	0.07	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	8062.5	>	Moment at the top (C-C Dir. K-Ft):	360.1	0.04	OK!
(3).Check Punching Shear Capacity due to Moment in the Pier:						
Moment transferred by punching shear:	1116.0	k-ft.	Max. factored shear stress v_{u_CD}:		0.2	Psi
Max. factored shear stress v_{u_AB}:	10.9	Psi	Factored shear Strength ϕv_n:		164.3	Psi
Max. factored shear stress v_u:	10.9	Psi	Check Usage of Punching Shear Capacity:		0.07	OK!

EXHIBIT 8

Antenna Mount Structural Analysis



Source: Sitepro1 Date: 08.01.2019

SBA Site:	CT00248-S North Bethel
T-Mobile Site Number:	CTFF752A
Project:	L600 Project
Prepared For:	T-Mobile
Mount Description:	(1) Platform w/ Handrail and Kicker Sitepro1 RMQP-4096-HK
Site Location:	11 Francis J Clarke Circle, Bethel, CT Fairfield County 41.3601°, -73.4245°
Design Codes:	ANSI/TIA-222-G IBC 2015 w/ 2018 CT Building Code
Analysis Load Case:	T-Mobile Final Configuration
Analysis Result:	**Adequate @ 79%** - Once Replaced See Conclusion

Revision 0
August 6, 2019

GeoStructural ▪ P.O. Box 2621, Boise, ID 83701 ▪ Office: (530) 539-4787
Professional Engineers | Tower Technicians | Climbers | sUAS Mapping

1.0 Introduction

An antenna mount structural analysis has been performed on T-Mobile's replacement mount assembly located at the CT00248-S North Bethel communications site in Fairfield County, CT considering the final equipment loading configuration listed in Section 3.0.

2.0 Analysis Criteria

An elastic three-dimensional model of the mount structure has been analyzed pursuant to the following criteria considering wind forces in 30° increments:

- 2018 Connecticut State Building Code.
- IBC 2015 – International Building Code.
- ANSI/TIA-222-G – Structural Standard for Antenna Supporting Structures and Antennas.
- AISC – Steel Construction Manual.
- ANSI/AWS D1.1 – Structural Welding Code.

Wind w/o ice = 120 mph (3-sec gust Ultimate Wind Speed) Wind w/o ice = 93 mph (3-sec gust Basic Wind Speed) Wind w/ ice = 50 mph (3-sec gust Basic) with 3/4" Design Ice, Escalated with Height
Topographic Category 1; Exposure Category C; Structure Class (Risk Category) II Gust Effect Factor = 1.0; Directionality Factor = 0.95 Site Class D "Stiff Soil"; F_a = 1.6; F_v = 2.4; S_{DS} = 0.232
Maintenance Loads**: Lm = 500 lb @ Worst Case Mount Pipe (Concurrent with 30 mph Wind Speed) Lv = 250 lb @ Worst Case Member Location (Center Span or Cantilever) ** *The mount face horizontal boom rails of T-Arm mount assemblies are not rated for rigging, hoisting or maintenance loading.*

The following documents were provided:

- Colo Application
  SBA 600 MHz, App # 116927 v1.
- RFDS
  T-Mobile L600 Project, V4.1, CTFF752A, 5/9/19.

The results of the analysis are illustrated in Section 4.0. If any of the existing or proposed conditions reported in this analysis are not properly represented, please contact our office immediately to request an amended report.

3.0 Appurtenance Information

Table 3.1 – T-Mobile Final Configuration[1,2,3]

COR	(Quantity) Appurtenance Make/Model	Mount Description
117.0'±	(3) ERICSSON AIR21 B2P B4A	*(1) Platform w/ Handrail and Kicker* • *Sitepro1 RMQP-4096-HK*
	(3) RFS APXVAARR24_43-U-NA20	
	(3) ERICSSON AIR21 B2P B4A	
	(3) ERICSSON 4449 B71+B12 RRH	

1. *Refer to antenna installation Construction Drawings (by others, when applicable) for additional information regarding final antenna and equipment orientations.*
2. *Panel antennas to be installed as follows:*
   2.1. *AIR21 panels to be installed on mount pipes in Positions 1 and 3.*
   2.2. *AARR panels to be installed on mount pipe in Position 2.*
3. *RRH/TMA units to be installed as follows:*
   3.1. *4449 RRHs to be installed on mount pipe behind panels in Position 2.*

4.0 Analysis Results

Table 4.1 – Replacement Mount Capacity

Load Case	Governing Mount Component[1]	% Capacity[2]	Result
Final T-Mobile Configuration	Standoff	25%	**Adequate Once Replaced[3]**
	Bottom Rail	16%	
	Bracing	34%	
	Pipe2.5STD Mount Pipe	40%	
	PRK Double Angles	42%	
	Handrail	79%	
	Connection Plates	66%	

1. *Refer to the Calculations & Software Output portion of this report for mount component and structural information.*
2. *Listed results are expressed as a percentage of available mount member capacity based upon the assumed material strengths listed in Table 4.2. 105% is an acceptable allowable stress percentage for mount components.*
3. *Refer to Conclusion & Recommendations Section for more information regarding mount replacement.*

Table 4.2 – Structural Component Material Strengths

Structural Component	Nominal Strength/Material[1]
Pipe	F_y = 35 ksi (A53, Gr. B)
Tube	F_y = 46 ksi (A500, Gr. B)
Structural Shapes (L, C, W, etc.), Plate / Bar	F_y = 36 ksi (A36)
Uni-Strut	F_y = 33 ksi (A570, Gr. 33)
Connection Bolts	A325
Stainless Steel Bolts	18-8 Stainless, Grade 316/304 F_y = 74 ksi (Yield) & F_u = 29 ksi (Tension)
U-Bolts / Threaded Rod	SAE J429 Grade 2 (Substitution: ASTM A449) F_y = 57 ksi (Yield) & F_u = 74 ksi (Tension)
Welds	E70XX Electrodes

1. *Strengths listed were assumed for this analysis and are based upon ASTM, AISC, RCSC, AWS and ACI preferred specification values. Values and materials are consistent with industry standards. Material strengths were taken from original design documents when available.*

5.0 Conclusion & Recommendations

Based on T-Mobile's final equipment loading configuration, the replacement mount assembly has sufficient capacity to support the loading considered in this analysis pursuant to the listed standards.

- Install Replacement Platform Assembly; attach to monopole shaft per manufacturer's specifications.
  - Sitepro1 RMQP-4096-HK, (1) total.
    - Sitepro1 RMQP + PRK1245 + HRK12.
    - 12'-6" Low Pro-Platform with Twelve 2-7/8" Antenna Mounting Pipes and Handrail.
    - Replacement mount to be installed in accordance with manufacturer's specifications and applicable Construction Drawings.

Installation Requirements:

- Antennas and equipment shall be installed centered vertically between the mount front face rails (limit vertical installation eccentricity) with a maximum vertical eccentricity of 12" for panels and 20" for RRHs. If this assumption is incorrect, the results of this analysis will be inaccurate and not valid. This analysis accounts for vertical eccentricities necessary to install all panel antennas at the same relative top tip elevation.
- Panel antennas to be installed as follows:
  - AIR21 panels to be installed on mount pipes in Positions 1 and 3.
  - AARR panels to be installed on mount pipe in Position 2.
- RRH/TMA units to be installed as follows:
  - 4449 RRHs to be installed on mount pipe behind panels in Position 2.

All data required to complete our structural analysis was furnished by our client and provided record data. GeoStructural has not conducted a site visit or independent study, nor have they been provided a mount mapping to verify existing conditions and the results of this analysis are based solely on the information provided.

This analysis only encompasses the antenna mount assembly. The tower, overall mount support structure, foundation, etc. are beyond the scope of this analysis. If any of the existing or proposed conditions (appurtenance loading, member sizes, etc.) reported in this analysis are not properly represented, please contact our office immediately to request an amended report.

Prepared by:

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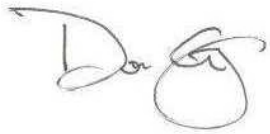
Reviewed and Approved by:



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6.0 Standard Conditions

- All data required to complete our structural analysis was furnished by our client and provided record data. GeoStructural has not conducted a site visit or independent study to verify existing conditions and the results of this analysis are based solely on the information provided. It has been assumed that the tower, antenna support structure and foundation have been constructed according to the provided existing drawings, previous structural analysis reports, mapping documents, etc.

- The default Structure Classification is Class II in accordance with ANSI/TIA-222-G §A.2.2 & §A.15.3 and has been assumed for this analysis. The owner shall verify this classification conforms with original or desired reliability criteria.

- This analysis assumes that the structure has been properly installed and maintained in accordance with ANSI/TIA-222-G §15.5 and that no physical deterioration has occurred in any of the components of the structure. Damaged, missing, or rusted members were not considered.

- This analysis verifies the adequacy of the main components of the structure. Not all connections, welds, bolts, plates, etc. were individually detailed and analyzed. Where not specifically analyzed, the existing connection plates, welds, bolts, etc. were assumed adequate to develop the full capacity of the main structural members.

- No consideration has been made for unusual or extreme wind events, rime/in-cloud ice loadings, harmonic or nodal vibration, vortex shedding or other similar conditions.

- It is the owner's responsibility to determine the appropriate design wind speed and amount of ice accumulation beyond code minimum values that should be considered in the analysis.

- This analysis report does not constitute a maintenance and condition assessment. No certifications regarding maintenance and condition are expressed or implied. If desired, GeoStructural can provide these services under a subsequent contract.

- This analysis only encompasses the antenna mount assembly. The tower, overall mount support structure, foundation, etc. are beyond the scope of this analysis. If desired, GeoStructural can provide these services under a subsequent contract.

7.0 Calculations & Software Output

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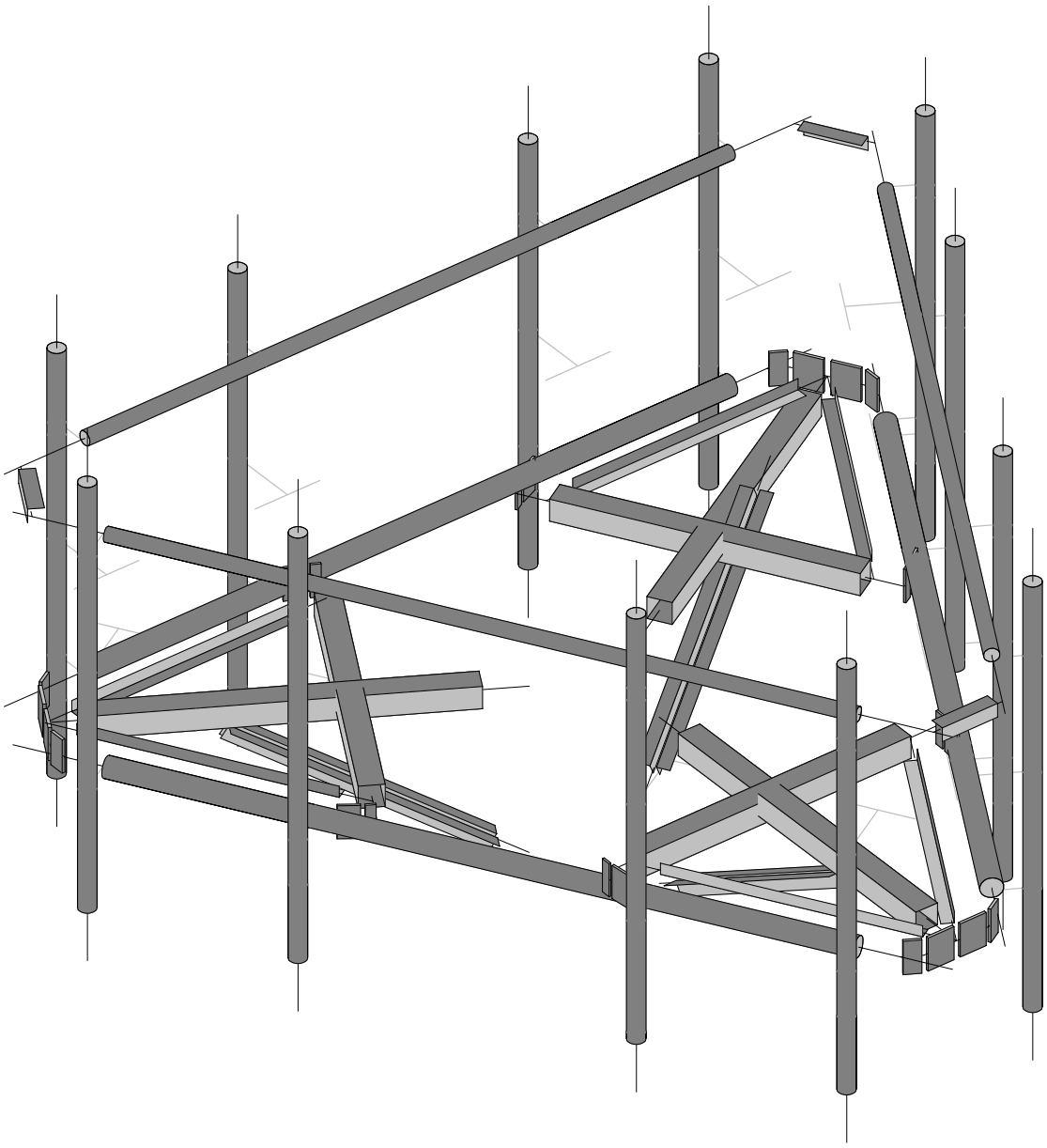

Envelope Only Solution

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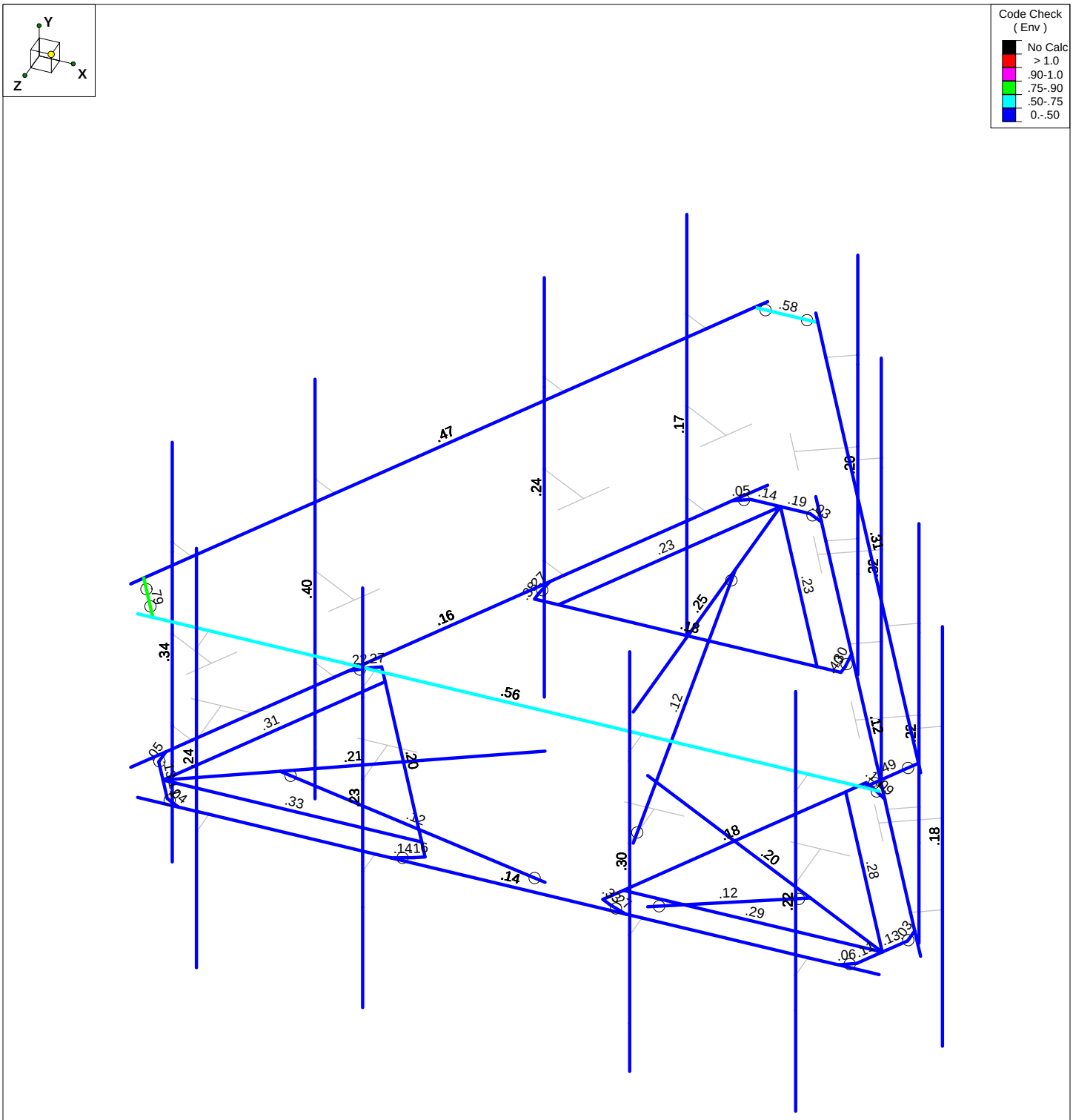

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Envelope Only Solution

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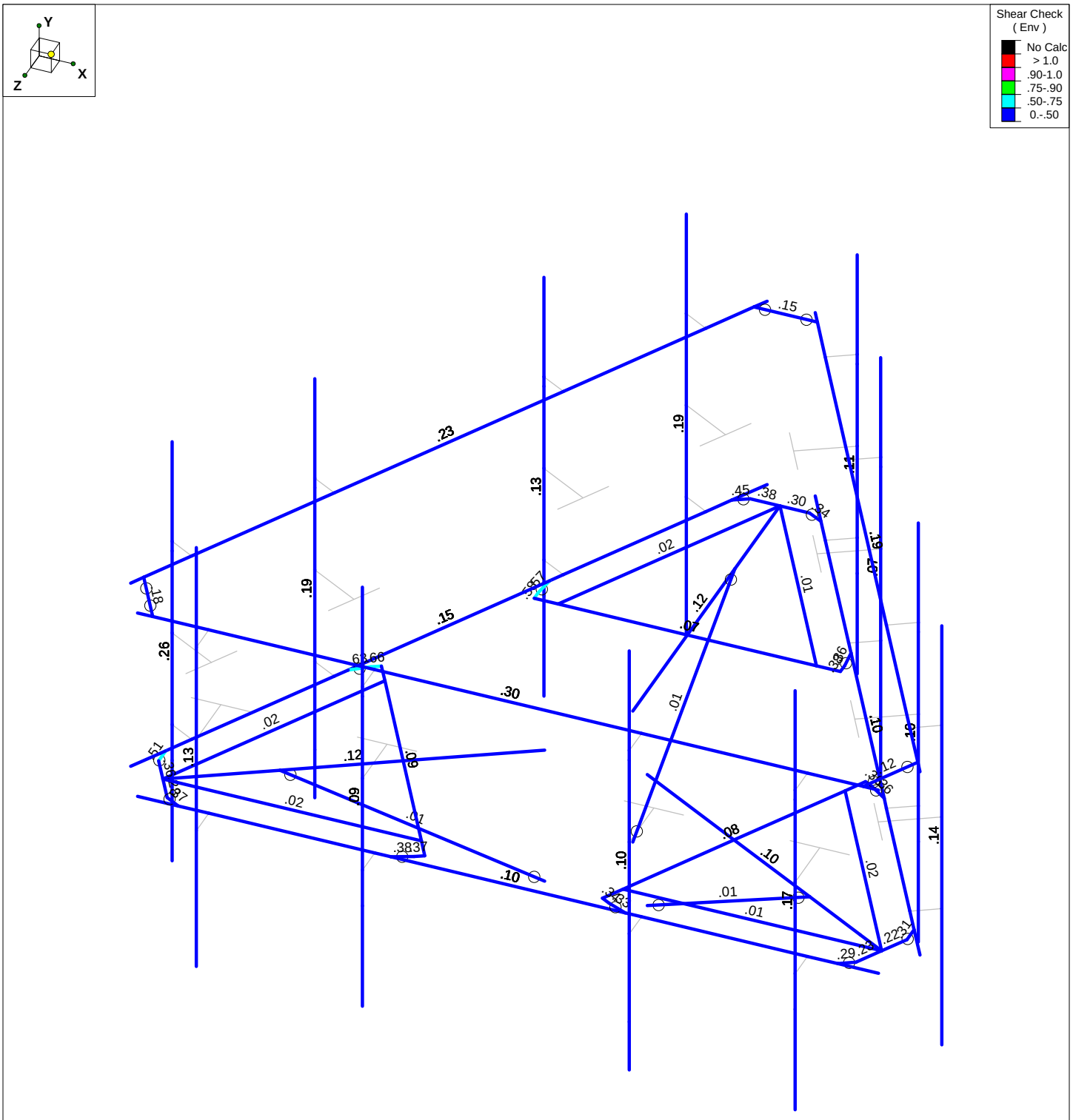

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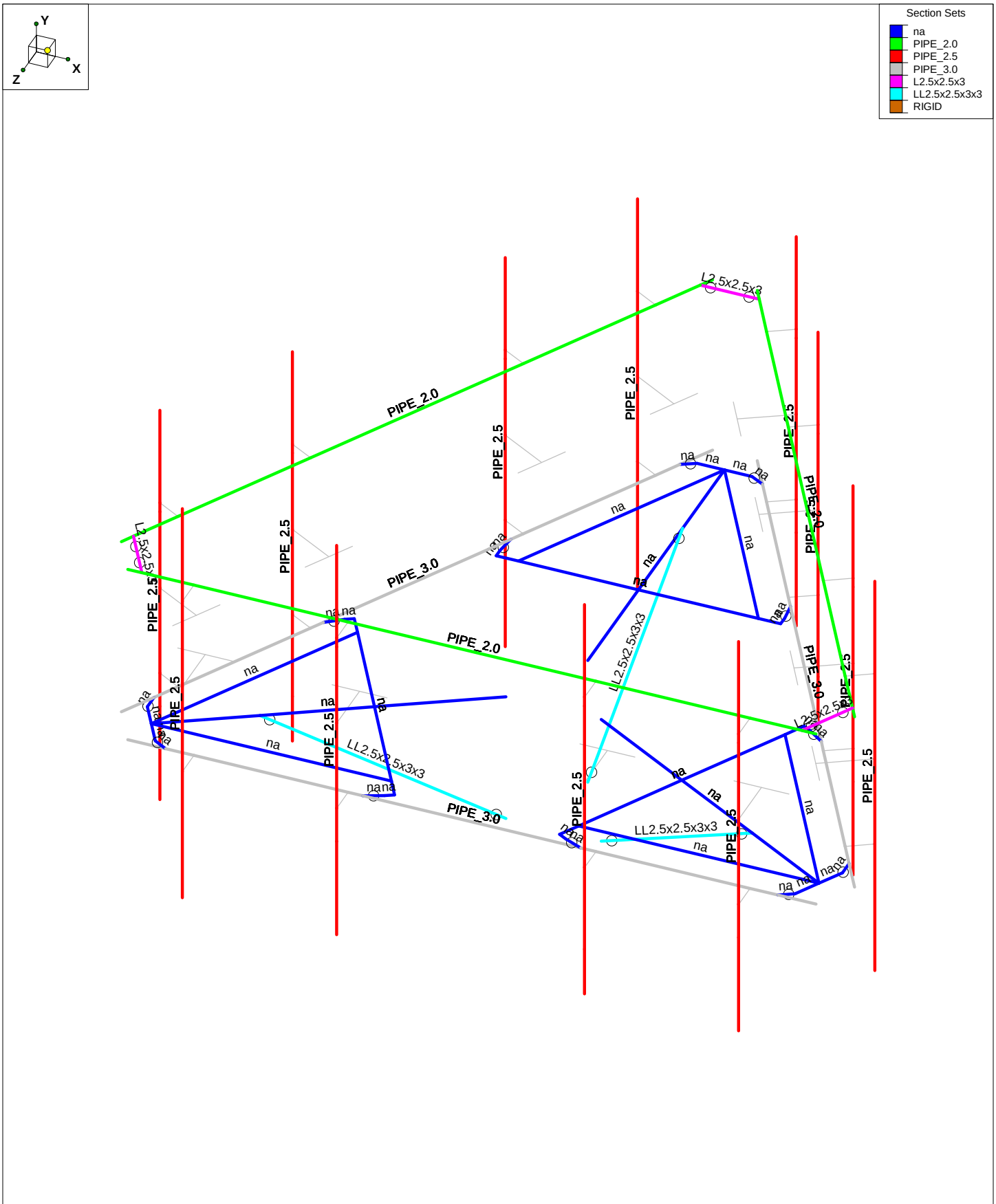

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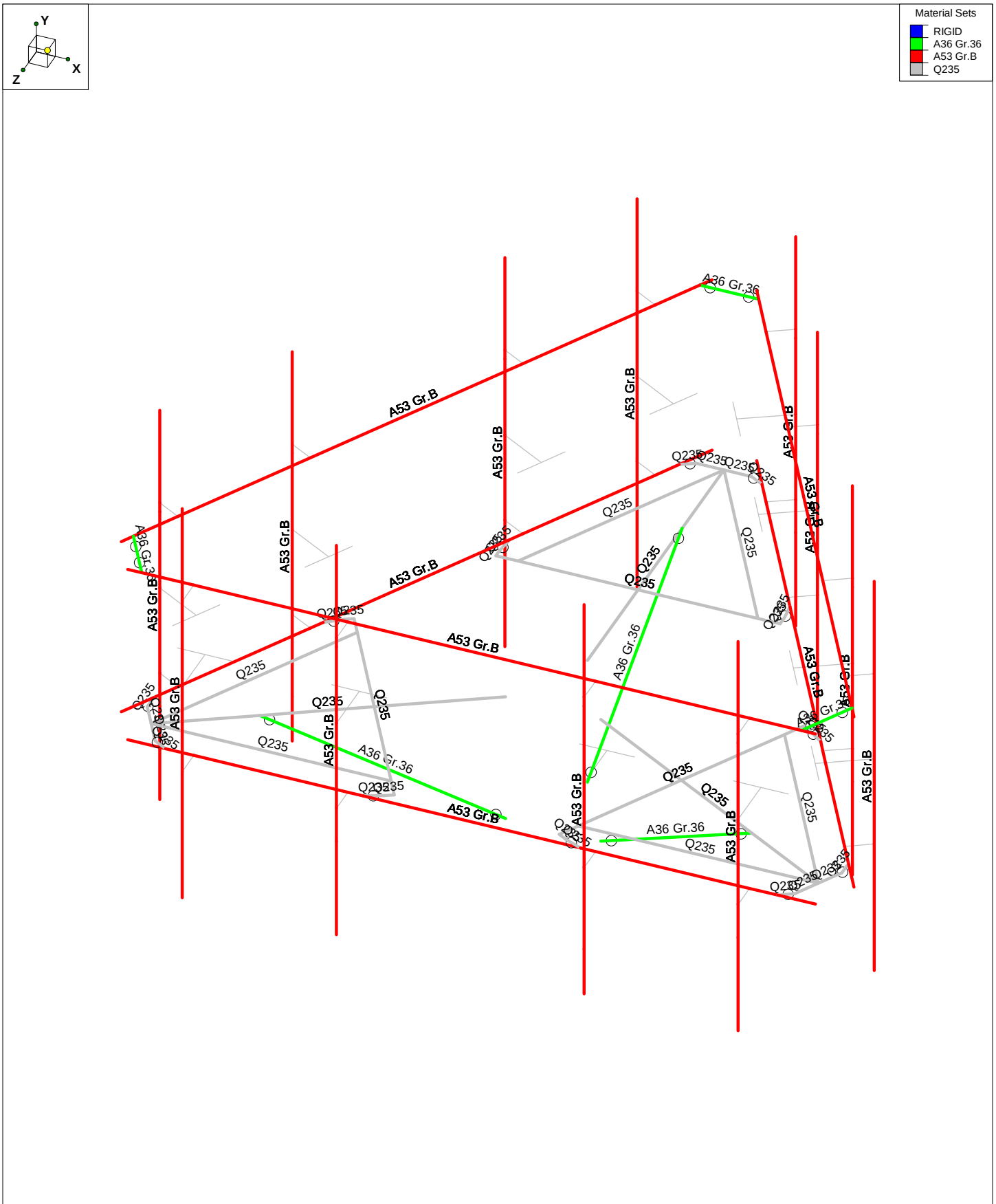

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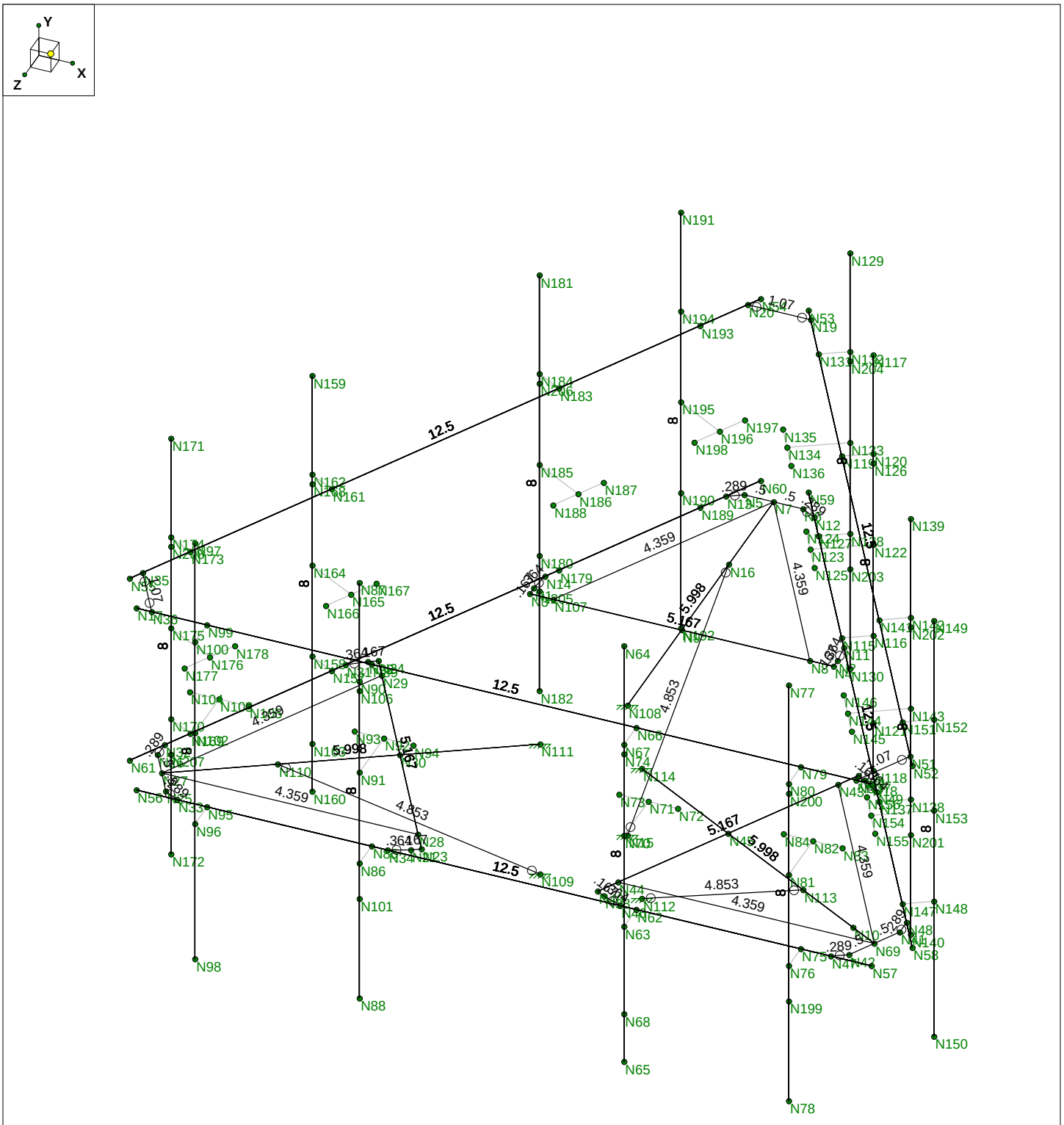

Member Length (ft) Displayed
Envelope Only Solution

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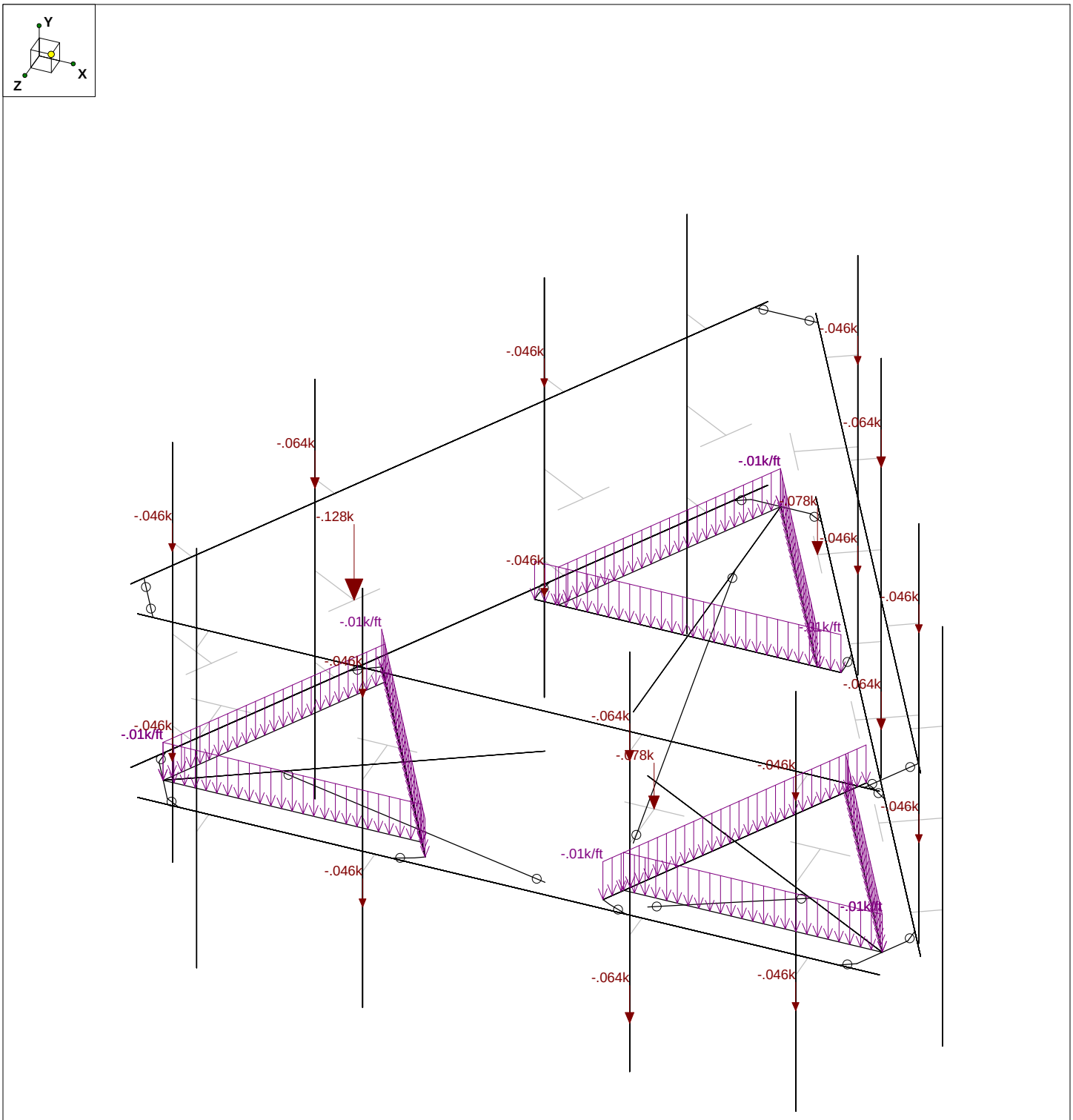

Loads: BLC 1, D
Envelope Only Solution

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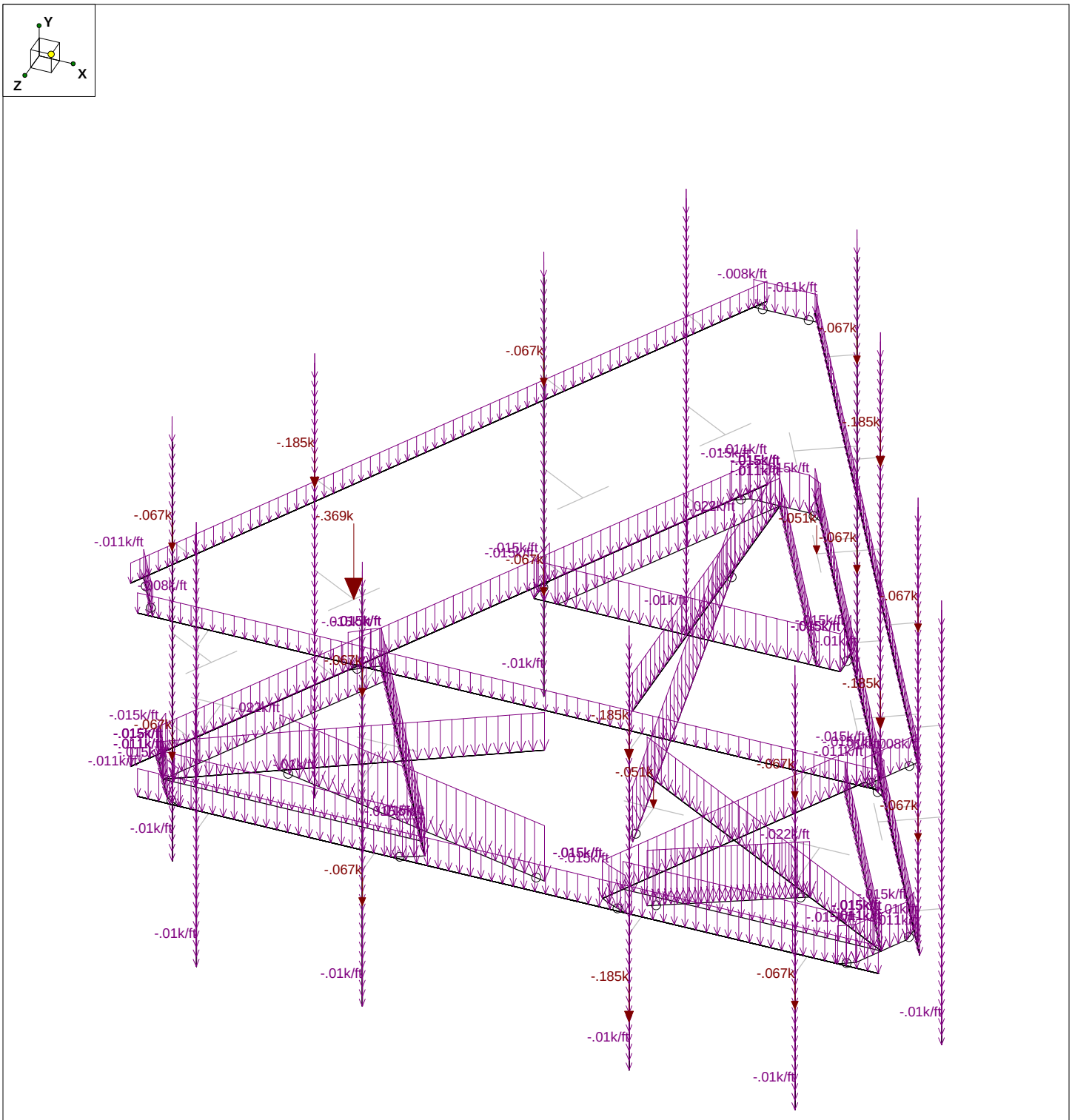

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Envelope Only Solution

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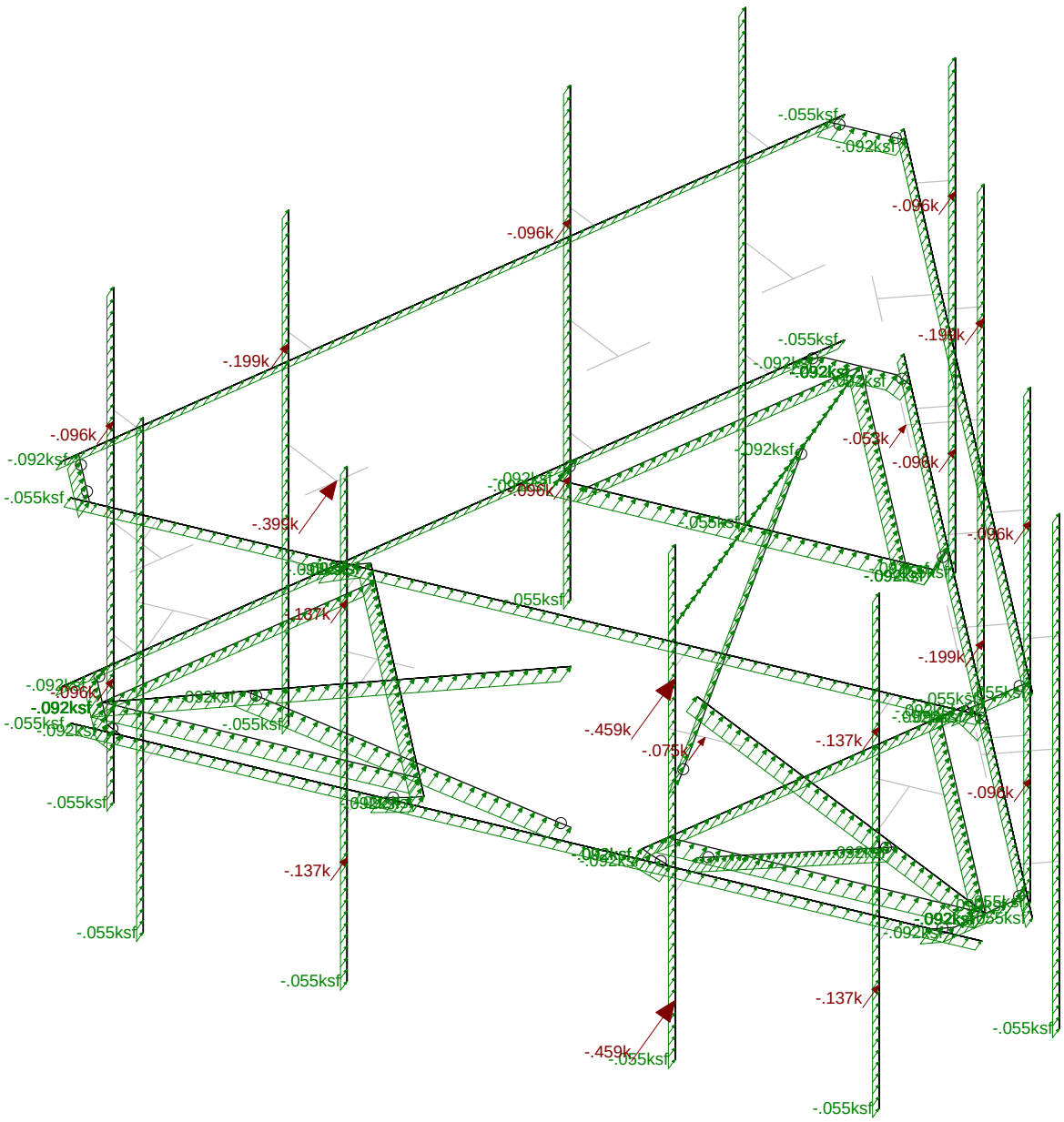

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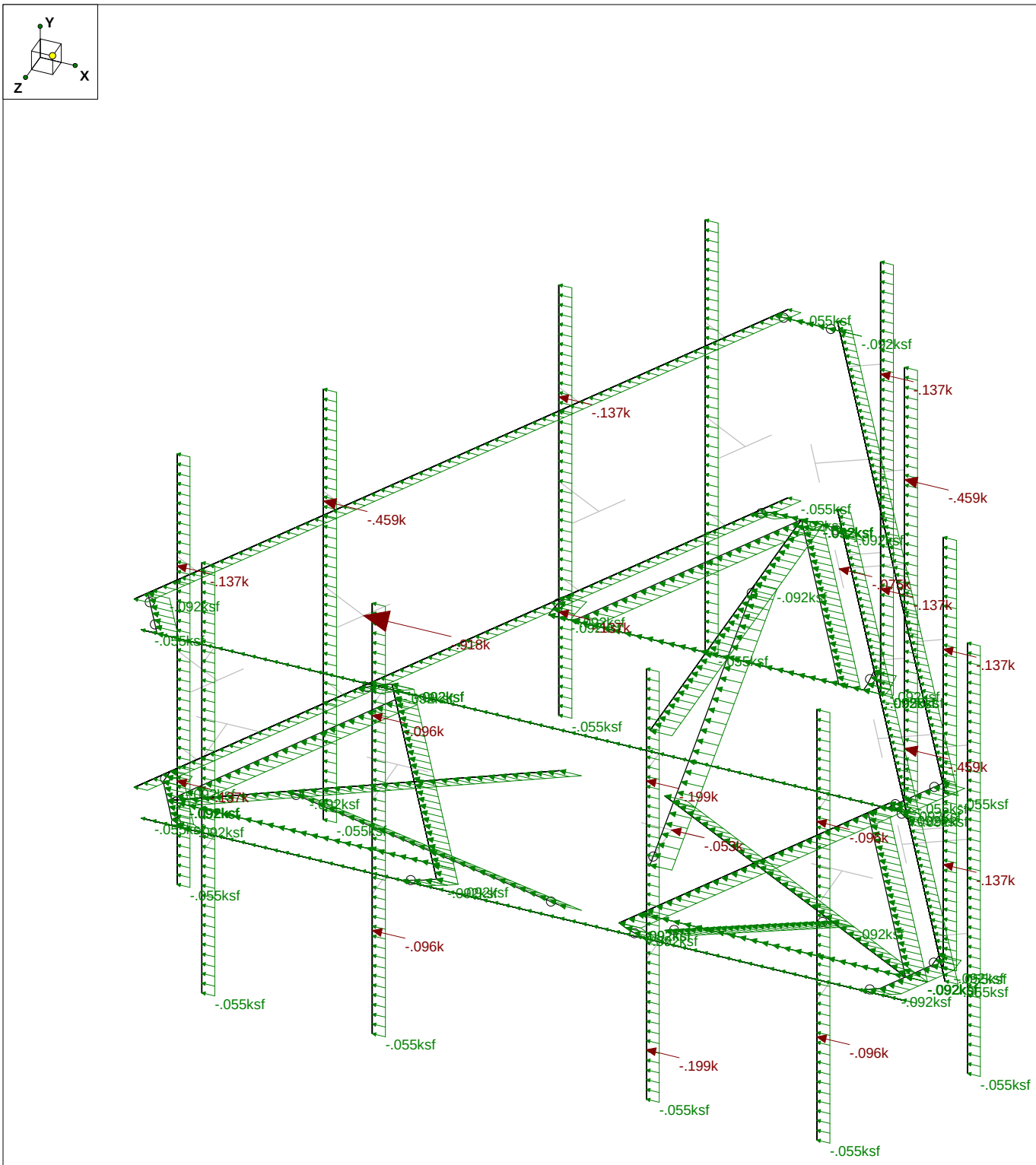

Loads: BLC 6, Wox
Envelope Only Solution

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Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	D	DL		-1		22		9		
2	Di	SL				22		63		
3	Lm [500]	LL				1				
4	Lv [250]	LL				2				
5	Woz	WL				22		60		
6	Wox	WL				22		60		
7	Wiz	WL				22		60		
8	Wix	WL				22		60		
9	Ez	EL				22				
10	Ex	EL				22				

Load Combination Design

	Description	ASIF	CD	Service	Hot Rol...	Cold Form...	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	1) 1.4D				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	2) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
19	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
21	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
22	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
23	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
24	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
25	3) 0.9D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
26	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
27	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
28	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
29	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
30	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
31	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
32	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
33	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
34	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
35	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
36	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
37	4) 1.2D+1.0...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
38	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
39	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
40	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
41	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Load Combination Design (Continued)

	Description	ASIF	CD	Service	Hot Rol...	Cold Form...	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
42	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
43	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
44	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
45	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
46	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
47	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
48	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
49	5) 1.2D+1.5L...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
50	6) 1.2D+1.5Lv				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
51	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
52	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
53	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
54	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
55	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
56	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
57	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
58	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
59	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
60	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
61	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
62	7) (1.2+0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
63	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
64	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
65	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
66	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
67	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
68	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
69	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
70	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
71	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
72	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
73	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
74	8) (0.9-0.2Sd...				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
75	Dead Only				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
3	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.49	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.49	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A500 Gr.B RND_1	29000	11154	.3	.65	.527	42	1.4	58	1.3
8	A500 Gr.B Rect_1	29000	11154	.3	.65	.527	46	1.4	58	1.3
9	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3
10	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
11	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
12	Q235	29000	11154	.3	.65	.49	34	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	PIPE_1.5	PIPE_1.5	Beam	None	A53 Gr.B	Typical	.749	.293	.293	.586
2	PIPE_2.0	PIPE_2.0	Beam	None	A53 Gr.B	Typical	1.02	.627	.627	1.25
3	PIPE_2.5	PIPE_2.5	Beam	None	A53 Gr.B	Typical	1.61	1.45	1.45	2.89
4	PIPE_3.0	PIPE_3.0	Beam	None	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
5	PIPE_3.5	PIPE_3.5	Beam	None	A53 Gr.B	Typical	2.5	4.52	4.52	9.04
6	PIPE_4.0	PIPE_4.0	Beam	None	A53 Gr.B	Typical	2.96	6.82	6.82	13.6
7	PIPE_2.0X	PIPE_2.0X	Beam	None	A53 Gr.B	Typical	1.4	.827	.827	1.65
8	HSS2x2x3	HSS2x2x3	Beam	None	A500 Gr.B Rect	Typical	1.19	.641	.641	1.09
9	HSS3x3x3	HSS3x3x3	Beam	None	A500 Gr.B Rect	Typical	1.89	2.46	2.46	4.03
10	HSS4x4x3	HSS4x4x3	Beam	None	A500 Gr.B Rect	Typical	2.58	6.21	6.21	10
11	HSS4x4x4	HSS4x4x4	Beam	None	A500 Gr.B Rect	Typical	3.37	7.8	7.8	12.8
12	HSS5x5x4	HSS5x5x4	Beam	None	A500 Gr.B Rect	Typical	4.3	16	16	25.8
13	C3x3.5	C3x3.5	Beam	None	A36 Gr.36	Typical	1.09	.169	1.57	.023
14	C4x4.5	C4X4.5_HRA	Beam	None	A36 Gr.36	Typical	1.38	.289	3.65	.032
15	C5x6.7	C5x6.7	Beam	None	A36 Gr.36	Typical	1.97	.47	7.48	.055
16	L2.5x2.5x3	L2.5x2.5x3	Beam	None	A36 Gr.36	Typical	.901	.535	.535	.011
17	L2.5x2.5x4	L2.5x2.5x4	Beam	None	A36 Gr.36	Typical	1.19	.692	.692	.026
18	L3x3x3	L3x3x3	Beam	None	A36 Gr.36	Typical	1.09	.948	.948	.014
19	L3x3x4	L3x3x4	Beam	None	A36 Gr.36	Typical	1.44	1.23	1.23	.031
20	L3x3x6	L3x3x6	Beam	None	A36 Gr.36	Typical	2.11	1.75	1.75	.101
21	L3.5x3.5x4	L3.5x3.5x4	Beam	None	A36 Gr.36	Typical	1.7	2	2	.039
22	L4x4x4	L4x4x4	Beam	None	A36 Gr.36	Typical	1.93	3	3	.044
23	LL2.5x2.5x3x3	LL2.5x2.5x3x3	Beam	None	A36 Gr.36	Typical	1.8	2.46	1.07	.023

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N15	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N16						
3	N108	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N109	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
5	N110						
6	N111	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
7	N112	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
8	N113						
9	N114	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N3	N1		90	3/8x6_HRA	Beam	None	Q235	Typical_APP
2	M2	N1	N14		90	3/8x6_HRA	Beam	None	Q235	Typical_APP
3	M3	N4	N2		90	3/8x6_HRA	Beam	None	Q235	Typical_APP
4	M4	N2	N11		90	3/8x6_HRA	Beam	None	Q235	Typical_APP
5	M5	N4	N3			HSS4x4x4	Beam	None	Q235	Typical_APP
6	M6	N16	N15			LL2.5x2.5x3x3	Beam	None	A36 Gr.36	Typical
7	M7	N17	N18			PIPE_2.0	Beam	None	A53 Gr.B	Typical
8	M8	N27	N25		90	1/2 x 6	Beam	None	Q235	Typical_APP
9	M9	N27	N26		90	1/2 x 6	Beam	None	Q235	Typical_APP
10	M10	N23	N21		90	3/8x6_HRA	Beam	None	Q235	Typical_APP
11	M11	N21	N34		90	3/8x6_HRA	Beam	None	Q235	Typical_APP
12	M12	N24	N22		90	3/8x6_HRA	Beam	None	Q235	Typical_APP
13	M13	N22	N31		90	3/8x6_HRA	Beam	None	Q235	Typical_APP
14	M14	N27	N29			L2x2x4	Beam	None	Q235	Typical_APP
15	M15	N27	N28		270	L2x2x4	Beam	None	Q235	Typical_APP
16	M16	N25	N33		90	1/2 x 6	Beam	None	Q235	Typical_APP

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
17	M17	N26	N32		90	1/2 x 6	Beam	None	Q235	Typical_APP
18	M18	N24	N23			HSS4x4x4	Beam	None	Q235	Typical_APP
19	M19	N39	N37		90	3/8x6_HRA	Beam	None	Q235	Typical_APP
20	M20	N37	N49		90	3/8x6_HRA	Beam	None	Q235	Typical_APP
21	M21	N40	N38		90	3/8x6_HRA	Beam	None	Q235	Typical_APP
22	M22	N38	N46		90	3/8x6_HRA	Beam	None	Q235	Typical_APP
23	M23	N40	N39			HSS4x4x4	Beam	None	Q235	Typical_APP
24	M24	N50	N51		180	L2.5x2.5x3	Beam	None	A36 Gr.36	Typical
25	M25	N52	N53			PIPE_2.0	Beam	None	A53 Gr.B	Typical
26	M26	N54	N55			PIPE_2.0	Beam	None	A53 Gr.B	Typical
27	M27	N56	N57			PIPE_3.0	Beam	None	A53 Gr.B	Typical
28	M28	N58	N59			PIPE_3.0	Beam	None	A53 Gr.B	Typical
29	M29	N60	N61			PIPE_3.0	Beam	None	A53 Gr.B	Typical
30	M30	N62	N63			RIGID	None	None	RIGID	Typical
31	M31	N65	N64			PIPE_2.5	Beam	None	A53 Gr.B	Typical
32	M32	N66	N67			RIGID	None	None	RIGID	Typical
33	M33	N69	N41		90	1/2 x 6	Beam	None	Q235	Typical_APP
34	M34	N69	N42		90	1/2 x 6	Beam	None	Q235	Typical_APP
35	M35	N41	N48		90	1/2 x 6	Beam	None	Q235	Typical_APP
36	M36	N42	N47		90	1/2 x 6	Beam	None	Q235	Typical_APP
37	M37	N7	N5		90	1/2 x 6	Beam	None	Q235	Typical_APP
38	M38	N7	N6		90	1/2 x 6	Beam	None	Q235	Typical_APP
39	M39	N5	N13		90	1/2 x 6	Beam	None	Q235	Typical_APP
40	M40	N6	N12		90	1/2 x 6	Beam	None	Q235	Typical_APP
41	M41	N69	N44			L2x2x4	Beam	None	Q235	Typical_APP
42	M42	N69	N43		270	L2x2x4	Beam	None	Q235	Typical_APP
43	M43	N7	N8			L2x2x4	Beam	None	Q235	Typical_APP
44	M44	N7	N108			HSS4x4x4	Beam	None	Q235	Typical_APP
45	M45	N19	N20		180	L2.5x2.5x3	Beam	None	A36 Gr.36	Typical
46	M46	N35	N36		180	L2.5x2.5x3	Beam	None	A36 Gr.36	Typical
47	M47	N70	N71			RIGID	None	None	RIGID	Typical
48	M48	N73	N72			RIGID	None	None	RIGID	Typical
49	M49	N75	N76			RIGID	None	None	RIGID	Typical
50	M50	N78	N77			PIPE_2.5	Beam	None	A53 Gr.B	Typical
51	M51	N79	N80			RIGID	None	None	RIGID	Typical
52	M52	N81	N82			RIGID	None	None	RIGID	Typical
53	M53	N84	N83			RIGID	None	None	RIGID	Typical
54	M54	N85	N86			RIGID	None	None	RIGID	Typical
55	M55	N88	N87			PIPE_2.5	Beam	None	A53 Gr.B	Typical
56	M56	N89	N90			RIGID	None	None	RIGID	Typical
57	M57	N91	N92			RIGID	None	None	RIGID	Typical
58	M58	N94	N93			RIGID	None	None	RIGID	Typical
59	M59	N95	N96			RIGID	None	None	RIGID	Typical
60	M60	N98	N97			PIPE_2.5	Beam	None	A53 Gr.B	Typical
61	M61	N99	N100			RIGID	None	None	RIGID	Typical
62	M62	N102	N103			RIGID	None	None	RIGID	Typical
63	M63	N105	N104			RIGID	None	None	RIGID	Typical
64	M64	N7	N107		270	L2x2x4	Beam	None	Q235	Typical_APP
65	M65	N110	N109			LL2.5x2.5x3x3	Beam	None	A36 Gr.36	Typical
66	M66	N27	N111			HSS4x4x4	Beam	None	Q235	Typical_APP
67	M67	N113	N112			LL2.5x2.5x3x3	Beam	None	A36 Gr.36	Typical
68	M68	N69	N114			HSS4x4x4	Beam	None	Q235	Typical_APP
69	M69	N115	N116			RIGID	None	None	RIGID	Typical
70	M70	N118	N117			PIPE_2.5	Beam	None	A53 Gr.B	Typical
71	M71	N119	N120			RIGID	None	None	RIGID	Typical
72	M72	N122	N123			RIGID	None	None	RIGID	Typical
73	M73	N125	N124			RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
74	M74	N127	N128			RIGID	None	None	RIGID	Typical
75	M75	N130	N129			PIPE_2.5	Beam	None	A53 Gr.B	Typical
76	M76	N131	N132			RIGID	None	None	RIGID	Typical
77	M77	N133	N134			RIGID	None	None	RIGID	Typical
78	M78	N136	N135			RIGID	None	None	RIGID	Typical
79	M79	N137	N138			RIGID	None	None	RIGID	Typical
80	M80	N140	N139			PIPE_2.5	Beam	None	A53 Gr.B	Typical
81	M81	N141	N142			RIGID	None	None	RIGID	Typical
82	M82	N143	N144			RIGID	None	None	RIGID	Typical
83	M83	N146	N145			RIGID	None	None	RIGID	Typical
84	M84	N147	N148			RIGID	None	None	RIGID	Typical
85	M85	N150	N149			PIPE_2.5	Beam	None	A53 Gr.B	Typical
86	M86	N151	N152			RIGID	None	None	RIGID	Typical
87	M87	N153	N154			RIGID	None	None	RIGID	Typical
88	M88	N156	N155			RIGID	None	None	RIGID	Typical
89	M89	N157	N158			RIGID	None	None	RIGID	Typical
90	M90	N160	N159			PIPE_2.5	Beam	None	A53 Gr.B	Typical
91	M91	N161	N162			RIGID	None	None	RIGID	Typical
92	M92	N164	N165			RIGID	None	None	RIGID	Typical
93	M93	N167	N166			RIGID	None	None	RIGID	Typical
94	M94	N169	N170			RIGID	None	None	RIGID	Typical
95	M95	N172	N171			PIPE_2.5	Beam	None	A53 Gr.B	Typical
96	M96	N173	N174			RIGID	None	None	RIGID	Typical
97	M97	N175	N176			RIGID	None	None	RIGID	Typical
98	M98	N178	N177			RIGID	None	None	RIGID	Typical
99	M99	N179	N180			RIGID	None	None	RIGID	Typical
100	M100	N182	N181			PIPE_2.5	Beam	None	A53 Gr.B	Typical
101	M101	N183	N184			RIGID	None	None	RIGID	Typical
102	M102	N185	N186			RIGID	None	None	RIGID	Typical
103	M103	N188	N187			RIGID	None	None	RIGID	Typical
104	M104	N189	N190			RIGID	None	None	RIGID	Typical
105	M105	N192	N191			PIPE_2.5	Beam	None	A53 Gr.B	Typical
106	M106	N193	N194			RIGID	None	None	RIGID	Typical
107	M107	N195	N196			RIGID	None	None	RIGID	Typical
108	M108	N198	N197			RIGID	None	None	RIGID	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1						Yes				None
2	M2		BenPIN				Yes				None
3	M3						Yes				None
4	M4		BenPIN				Yes				None
5	M5						Yes				None
6	M6	BenPIN	BenPIN				Yes				None
7	M7						Yes				None
8	M8						Yes				None
9	M9						Yes				None
10	M10						Yes				None
11	M11		BenPIN				Yes				None
12	M12						Yes				None
13	M13		BenPIN				Yes				None
14	M14						Yes				None
15	M15						Yes				None
16	M16		BenPIN				Yes				None
17	M17		BenPIN				Yes				None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
18	M18						Yes				None
19	M19						Yes				None
20	M20		BenPIN				Yes				None
21	M21						Yes				None
22	M22		BenPIN				Yes				None
23	M23						Yes				None
24	M24	BenPIN	OOOOXX				Yes	Default			None
25	M25						Yes				None
26	M26						Yes				None
27	M27						Yes				None
28	M28						Yes				None
29	M29						Yes				None
30	M30						Yes	** NA **			None
31	M31						Yes				None
32	M32						Yes	** NA **			None
33	M33						Yes				None
34	M34						Yes				None
35	M35		BenPIN				Yes				None
36	M36		BenPIN				Yes				None
37	M37						Yes				None
38	M38						Yes				None
39	M39		BenPIN				Yes				None
40	M40		BenPIN				Yes				None
41	M41						Yes				None
42	M42						Yes				None
43	M43						Yes				None
44	M44						Yes				None
45	M45	BenPIN	OOOOXX				Yes				None
46	M46	BenPIN	OOOOXX				Yes				None
47	M47						Yes	** NA **			None
48	M48						Yes	** NA **			None
49	M49						Yes	** NA **			None
50	M50						Yes				None
51	M51						Yes	** NA **			None
52	M52						Yes	** NA **			None
53	M53						Yes	** NA **			None
54	M54						Yes	** NA **			None
55	M55						Yes				None
56	M56						Yes	** NA **			None
57	M57						Yes	** NA **			None
58	M58						Yes	** NA **			None
59	M59						Yes	** NA **			None
60	M60						Yes				None
61	M61						Yes	** NA **			None
62	M62						Yes	** NA **			None
63	M63						Yes	** NA **			None
64	M64						Yes				None
65	M65	BenPIN	BenPIN				Yes				None
66	M66						Yes				None
67	M67	BenPIN	BenPIN				Yes				None
68	M68						Yes				None
69	M69						Yes	** NA **			None
70	M70						Yes				None
71	M71						Yes	** NA **			None
72	M72						Yes	** NA **			None
73	M73						Yes	** NA **			None
74	M74						Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
75	M75						Yes				None
76	M76						Yes	** NA **			None
77	M77						Yes	** NA **			None
78	M78						Yes	** NA **			None
79	M79						Yes	** NA **			None
80	M80						Yes				None
81	M81						Yes	** NA **			None
82	M82						Yes	** NA **			None
83	M83						Yes	** NA **			None
84	M84						Yes	** NA **			None
85	M85						Yes				None
86	M86						Yes	** NA **			None
87	M87						Yes	** NA **			None
88	M88						Yes	** NA **			None
89	M89						Yes	** NA **			None
90	M90						Yes				None
91	M91						Yes	** NA **			None
92	M92						Yes	** NA **			None
93	M93						Yes	** NA **			None
94	M94						Yes	** NA **			None
95	M95						Yes				None
96	M96						Yes	** NA **			None
97	M97						Yes	** NA **			None
98	M98						Yes	** NA **			None
99	M99						Yes	** NA **			None
100	M100						Yes				None
101	M101						Yes	** NA **			None
102	M102						Yes	** NA **			None
103	M103						Yes	** NA **			None
104	M104						Yes	** NA **			None
105	M105						Yes				None
106	M106						Yes	** NA **			None
107	M107						Yes	** NA **			None
108	M108						Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	3/8x6_HRA	.167			Lbyy						Lateral
2	M2	3/8x6_HRA	.364			Lbyy						Lateral
3	M3	3/8x6_HRA	.167			Lbyy						Lateral
4	M4	3/8x6_HRA	.364			Lbyy						Lateral
5	M5	HSS4x4x4	5.167			Lbyy						Lateral
6	M6	LL2.5x2.5x3...	4.853			Lbyy						Lateral
7	M7	PIPE_2.0	12.5			Lbyy						Lateral
8	M8	1/2 x 6	.5			Lbyy						Lateral
9	M9	1/2 x 6	.5			Lbyy						Lateral
10	M10	3/8x6_HRA	.167			Lbyy						Lateral
11	M11	3/8x6_HRA	.364			Lbyy						Lateral
12	M12	3/8x6_HRA	.167			Lbyy						Lateral
13	M13	3/8x6_HRA	.364			Lbyy						Lateral
14	M14	L2x2x4	4.359			Lbyy						Lateral
15	M15	L2x2x4	4.359			Lbyy						Lateral
16	M16	1/2 x 6	.289			Lbyy						Lateral
17	M17	1/2 x 6	.289			Lbyy						Lateral
18	M18	HSS4x4x4	5.167			Lbyy						Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
19	M19	3/8x6_HRA	.167			Lbyy						Lateral
20	M20	3/8x6_HRA	.364			Lbyy						Lateral
21	M21	3/8x6_HRA	.167			Lbyy						Lateral
22	M22	3/8x6_HRA	.364			Lbyy						Lateral
23	M23	HSS4x4x4	5.167			Lbyy						Lateral
24	M24	L2.5x2.5x3	1.07			Lbyy						Lateral
25	M25	PIPE_2.0	12.5			Lbyy						Lateral
26	M26	PIPE_2.0	12.5			Lbyy						Lateral
27	M27	PIPE_3.0	12.5	4	4	Lbyy						Lateral
28	M28	PIPE_3.0	12.5	4	4	Lbyy						Lateral
29	M29	PIPE_3.0	12.5	4	4	Lbyy						Lateral
30	M31	PIPE_2.5	8			Lbyy						Lateral
31	M33	1/2 x 6	.5			Lbyy						Lateral
32	M34	1/2 x 6	.5			Lbyy						Lateral
33	M35	1/2 x 6	.289			Lbyy						Lateral
34	M36	1/2 x 6	.289			Lbyy						Lateral
35	M37	1/2 x 6	.5			Lbyy						Lateral
36	M38	1/2 x 6	.5			Lbyy						Lateral
37	M39	1/2 x 6	.289			Lbyy						Lateral
38	M40	1/2 x 6	.289			Lbyy						Lateral
39	M41	L2x2x4	4.359			Lbyy						Lateral
40	M42	L2x2x4	4.359			Lbyy						Lateral
41	M43	L2x2x4	4.359			Lbyy						Lateral
42	M44	HSS4x4x4	5.998			Lbyy						Lateral
43	M45	L2.5x2.5x3	1.07			Lbyy						Lateral
44	M46	L2.5x2.5x3	1.07			Lbyy						Lateral
45	M50	PIPE_2.5	8			Lbyy						Lateral
46	M55	PIPE_2.5	8			Lbyy						Lateral
47	M60	PIPE_2.5	8			Lbyy						Lateral
48	M64	L2x2x4	4.359			Lbyy						Lateral
49	M65	LL2.5x2.5x3...	4.853			Lbyy						Lateral
50	M66	HSS4x4x4	5.998			Lbyy						Lateral
51	M67	LL2.5x2.5x3...	4.853			Lbyy						Lateral
52	M68	HSS4x4x4	5.998			Lbyy						Lateral
53	M70	PIPE_2.5	8			Lbyy						Lateral
54	M75	PIPE_2.5	8			Lbyy						Lateral
55	M80	PIPE_2.5	8			Lbyy						Lateral
56	M85	PIPE_2.5	8			Lbyy						Lateral
57	M90	PIPE_2.5	8			Lbyy						Lateral
58	M95	PIPE_2.5	8			Lbyy						Lateral
59	M100	PIPE_2.5	8			Lbyy						Lateral
60	M105	PIPE_2.5	8			Lbyy						Lateral

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N15	max	.045	17	2.69	26	.239	20	0	74	0	17	0	11
2		min	-.045	23	-.159	20	-4.352	26	0	1	0	11	0	17
3	N108	max	1.606	17	.515	32	6.003	2	.786	32	2.596	23	.637	11
4		min	-1.614	11	-.09	14	-3.124	20	.03	14	-2.586	5	-.448	17
5	N109	max	.592	24	2.795	30	2.263	30	.001	4	0	22	0	22
6		min	-3.918	30	-.436	24	-.341	24	0	22	0	4	0	4
7	N111	max	6.622	6	.606	12	2.223	25	.635	16	.896	2	.017	20
8		min	-4.152	24	-.24	18	-3.647	7	-.83	10	-.891	20	-.875	26
9	N112	max	3.838	34	2.74	34	2.217	34	0	25	0	25	0	25
10		min	-.383	16	-.291	16	-.221	16	0	43	0	43	0	43

Envelope Joint Reactions (Continued)

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
11	N114	max	3.25	16	.499	4	2.592	15	.155	25	1.623	21	.587	3
12		min	-5.757	10	-.127	22	-4.066	9	-.649	31	-1.618	3	-.173	21
13	Totals:	max	7.646	17	8.889	32	6.822	14						
14		min	-7.646	11	2.671	63	-6.822	8						

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code ...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y...	phi*Mn z...	Cb	Eqn
1	M46	L2.5x2.5x3	.789	1.07	10	.180	1.07	z	10	27.66	29.192	.873	1.972	1....	H2-1
2	M45	L2.5x2.5x3	.583	1.07	11	.153	0	y	11	27.66	29.192	.873	1.972	1....	H2-1
3	M7	PIPE_2.0	.560	1.172	10	.302	1.172		10	6.295	32.13	1.872	1.872	3....	H3-6
4	M24	L2.5x2.5x3	.491	1.07	7	.117	0	z	7	27.66	29.192	.873	1.972	1....	H2-1
5	M26	PIPE_2.0	.471	8.594	5	.227	11.198		5	6.295	32.13	1.872	1.872	3....	H1-1b
6	M90	PIPE_2.5	.404	2.667	11	.191	6.083		5	30.04	50.715	3.596	3.596	3....	H1-1b
7	M3	3/8x6_HRA	.404	0	11	.376	0	y	6	67.691	68.85	8.606	.538	1....	H1-1b
8	M1	3/8x6_HRA	.377	0	5	.583	0	y	10	67.691	68.85	8.606	.538	1....	H1-1b
9	M95	PIPE_2.5	.342	2.667	5	.257	6.083		5	30.04	50.715	3.596	3.596	1....	H3-6
10	M15	L2x2x4	.335	0	6	.017	0	z	28	11.646	28.886	.653	1.489	2....	H2-1
11	M21	3/8x6_HRA	.333	0	9	.344	0	y	2	67.691	68.85	8.606	.538	1....	H1-1b
12	M70	PIPE_2.5	.317	2.667	5	.074	4.416		2	30.04	50.715	3.596	3.596	1....	H1-1b
13	M14	L2x2x4	.305	4.359	5	.015	0	y	11	11.646	28.886	.653	1.415	1....	H2-1
14	M25	PIPE_2.0	.305	1.172	13	.189	1.172		13	6.295	32.13	1.872	1.872	4....	H1-1b
15	M31	PIPE_2.5	.304	2.667	3	.105	4.416		9	30.04	50.715	3.596	3.596	2....	H1-1b
16	M4	3/8x6_HRA	.296	0	11	.358	0	y	6	63.5	68.85	8.606	.538	1....	H1-1b
17	M41	L2x2x4	.288	4.359	9	.010	0	y	26	11.646	28.886	.653	1.489	1....	H2-1
18	M42	L2x2x4	.276	0	10	.016	0	z	31	11.646	28.886	.653	1.489	2....	H2-1
19	M22	3/8x6_HRA	.271	0	9	.327	0	y	2	63.5	68.85	8.606	.538	1....	H1-1b
20	M2	3/8x6_HRA	.271	0	5	.573	0	y	4	63.5	68.85	8.606	.538	1....	H1-1b
21	M12	3/8x6_HRA	.267	0	4	.656	0	y	10	67.691	68.85	8.606	.538	1....	H1-1b
22	M44	HSS4x4x4	.252	5.998	5	.120	5.998	z	11	92.262	103.122	11.96	11.96	2....	H1-1b
23	M100	PIPE_2.5	.243	2.667	12	.126	2.667		10	30.04	50.715	3.596	3.596	2....	H1-1b
24	M60	PIPE_2.5	.236	6.083	10	.128	2.667		8	30.04	50.715	3.596	3.596	2....	H1-1b
25	M64	L2x2x4	.230	0	2	.016	0	z	34	11.646	28.886	.653	1.489	2....	H2-1
26	M55	PIPE_2.5	.228	2.667	5	.090	2.667		7	30.04	50.715	3.596	3.596	2....	H1-1b
27	M43	L2x2x4	.228	4.359	13	.010	0	y	29	11.646	28.886	.653	1.489	2....	H2-1
28	M80	PIPE_2.5	.223	2.667	9	.102	2.667		11	30.04	50.715	3.596	3.596	2....	H1-1b
29	M13	3/8x6_HRA	.222	0	4	.632	0	y	10	63.5	68.85	8.606	.538	1....	H1-1b
30	M50	PIPE_2.5	.218	2.667	11	.167	6.083		9	30.04	50.715	3.596	3.596	2....	H1-1b
31	M66	HSS4x4x4	.212	1.874	6	.120	1.812	y	5	92.262	103.122	11.96	11.96	1....	H1-1b
32	M75	PIPE_2.5	.201	2.667	3	.115	6.083		13	30.04	50.715	3.596	3.596	2....	H1-1b
33	M68	HSS4x4x4	.198	5.998	3	.104	1.874	y	44	92.262	103.122	11.96	11.96	1....	H1-1b
34	M18	HSS4x4x4	.197	2.583	29	.091	.377	z	11	94.949	103.122	11.96	11.96	1....	H1-1b
35	M38	1/2 x 6	.194	0	10	.299	0	y	5	84.3	91.8	11.475	.956	1....	H1-1b
36	M23	HSS4x4x4	.184	2.583	36	.084	.377	z	9	94.949	103.122	11.96	11.96	1....	H1-1b
37	M5	HSS4x4x4	.183	2.583	28	.069	.377	z	13	94.949	103.122	11.96	11.96	1....	H1-1b
38	M85	PIPE_2.5	.179	2.667	10	.140	6.083		11	30.04	50.715	3.596	3.596	1....	H1-1b
39	M105	PIPE_2.5	.173	6.083	12	.189	6.083		4	30.04	50.715	3.596	3.596	2....	H1-1b
40	M29	PIPE_3.0	.162	8.464	12	.152	8.333		10	59.853	65.205	5.749	5.749	1	H1-1b
41	M10	3/8x6_HRA	.161	0	8	.374	0	y	3	67.691	68.85	8.606	.538	1....	H1-1b
42	M37	1/2 x 6	.145	0	6	.384	0	y	11	84.3	91.8	11.475	.956	1....	H1-1b
43	M11	3/8x6_HRA	.139	0	8	.378	0	y	9	63.5	68.85	8.606	.538	1....	H1-1b
44	M19	3/8x6_HRA	.138	0	3	.362	.167	y	6	67.691	68.85	8.606	.538	1....	H1-1b
45	M27	PIPE_3.0	.135	4.167	5	.099	4.167		10	59.853	65.205	5.749	5.749	2....	H1-1b
46	M33	1/2 x 6	.134	0	10	.223	.5	y	7	84.3	91.8	11.475	.956	1....	H1-1b
47	M9	1/2 x 6	.130	0	7	.363	.5	y	10	84.3	91.8	11.475	.956	1....	H1-1b
48	M65	LL2.5x2.5x3x3	.125	4.853	30	.010	0	z	4	42.67	58.32	3.954	2.55	1....	H1-1b*

Envelope AISC 14th(360-10): LRFD Steel Code Checks (Continued)

	Member	Shape	Code ...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y...	phi*Mn z...	Cb	Eqn
49	M28	PIPE_3.0	.124	4.297	10	.101	8.333		11	59.853	65.205	5.749	5.749	2....	H1-1b
50	M67	LL2.5x2.5x3x3	.122	4.853	34	.008	4.853	z	7	42.67	58.32	3.954	2.55	1....	H1-1b*
51	M6	LL2.5x2.5x3x3	.120	4.853	26	.005	0	y	36	42.67	58.32	3.954	2.55	1	H1-1b*
52	M8	1/2 x 6	.111	0	11	.275	0	y	3	84.3	91.8	11.475	.956	1....	H1-1b
53	M34	1/2 x 6	.109	0	8	.226	.5	y	2	84.3	91.8	11.475	.956	1....	H1-1b
54	M20	3/8x6_HRA	.091	0	13	.364	0	y	12	63.5	68.85	8.606	.538	1....	H1-1b
55	M36	1/2 x 6	.064	0	11	.293	.289	y	8	89.215	91.8	11.475	.956	1....	H1-1b
56	M39	1/2 x 6	.053	0	4	.452	.289	y	4	89.215	91.8	11.475	.956	1....	H1-1b
57	M17	1/2 x 6	.049	0	5	.510	.289	y	4	89.215	91.8	11.475	.956	1....	H1-1b
58	M16	1/2 x 6	.045	0	5	.367	0	y	9	89.215	91.8	11.475	.956	1....	H1-1b
59	M40	1/2 x 6	.034	0	3	.341	.289	y	12	89.215	91.8	11.475	.956	1....	H1-1b
60	M35	1/2 x 6	.030	0	10	.309	.289	y	12	89.215	91.8	11.475	.956	1....	H1-1b

Envelope Plate/Shell Principal Stresses

Plate	Surf...	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [ksi]	LC	Angle [rad]	LC	Von Mises [ksi]	LC
No Data to Print ...											

EXHIBIT 9

Transcom Engineering, Inc.

Wireless Network Design and Deployment

Radio Frequency Emissions Analysis Report

T-MOBILE Existing Facility

Site ID: CTFF752A

SBA Bethel Monopole
11 Francis J Clarke Circle
Bethel, CT 06801

June 17, 2019

Transcom Engineering Project Number: 737001-0169

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**9.82 %**

June 17, 2019

T-MOBILE
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 6009

Emissions Analysis for Site: **CTFF752A – SBA Bethel Monopole**

Transcom Engineering, Inc ("Transcom") was directed to analyze the proposed upgrades to the T-MOBILE facility located at **11 Francis J Clarke Circle, Bethel, 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.

Population 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 & 700 MHz bands 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 performed for the proposed upgrades to the T-MOBILE antenna facility located at **11 Francis J Clarke Circle, Bethel, 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.

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

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

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

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
LTE	2100 MHz (AWS)	2	60
UMTS	2100 MHz (AWS)	1	40
LTE / 5G NR	600 MHz	2	40
LTE	700 MHz	2	20

Table 1: Channel Data Table

The following antennas listed in *Table 2* were used in the modeling for transmission in the 600 MHz, 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB 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.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Ericsson AIR21 B4A/B2P	117
A	2	Ericsson AIR21 B4A/B2P	117
A	3	RFS APXVAARR24_43-U-NA20	117
B	1	Ericsson AIR21 B4A/B2P	117
B	2	Ericsson AIR21 B4A/B2P	117
B	3	RFS APXVAARR24_43-U-NA20	117
C	1	Ericsson AIR21 B4A/B2P	117
C	2	Ericsson AIR21 B4A/B2P	117
C	3	RFS APXVAARR24_43-U-NA20	117

Table 2: Antenna Data

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

RESULTS

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

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	1.36
Antenna A2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	1	40	1,556.18	0.45
Antenna A3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.69
						Sector A Composite MPE%	**3.50**
Antenna B1	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	1.36
Antenna B2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	1	40	1,556.18	0.45
Antenna B3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.69
						Sector B Composite MPE%	**3.50**
Antenna C1	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	1.36
Antenna C2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	1	40	1,556.18	0.45
Antenna C3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.69
						Sector C Composite MPE%	**3.50**

Table 3: T-MOBILE Emissions Levels

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

Site Composite MPE%	
Carrier	**MPE%**
T-MOBILE – Max Per Sector Value	**3.50 %**
AT&T	2.81 %
Verizon Wireless	2.37 %
Nextel iDEN	0.78 %
Clearwire	0.08 %
Sprint	0.28 %
Site Total MPE %:	**9.82 %**

Table 4: All Carrier MPE Contributions

T-MOBILE Sector A Total:	3.50 %
T-MOBILE Sector B Total:	3.50 %
T-MOBILE Sector C Total:	3.50 %
Site Total:	9.82 %

Table 5: Site MPE Summary

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

T-MOBILE _ Frequency Band / Technology 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 2100 MHz (AWS) LTE	2	2,334.27	117	13.62	2100 MHz (AWS)	1000	1.36%
T-Mobile 2100 MHz (AWS) UMTS	1	1,556.18	117	4.54	2100 MHz (AWS)	1000	0.45%
T-Mobile 600 MHz LTE / 5G NR	2	788.97	117	4.60	600 MHz	400	1.15%
T-Mobile 700 MHz LTE	2	432.54	117	2.52	700 MHz	467	0.54%
						Total:	**3.50%**

Table 6: T-MOBILE Maximum Sector MPE Power Values

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:	3.50 %
Sector B:	3.50 %
Sector C:	3.50 %
T-MOBILE Maximum Total (per sector):	3.50 %
Site Total:	9.82 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **9.82 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

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