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 14, 2019

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

RE: Notice of Exempt Modification
LOT 5 (a.k.a. 350 Burr Mountain Road), Torrington, CT 06790
Latitude: 41.873255
Longitude: -73.088405
T-Mobile Site #: CTNH402A_L600

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 155-foot level of the existing 196-foot Monopole Tower at Lot 5, (a.k.a. 350 Burr Mountain Road), Torrington, CT. The 196-foot tower is owned by SBA 2012 TC Assets, LLC. The property is owned by O&G Industries, LLC. T-Mobile now intends to remove (3) L700/L600 MHz antennas and replace with (3) new L700/L600 MHz antennas. The new antennas would be installed at the 155-foot level of the tower.

Planned Modifications:

TOWER

Remove:
- N/A

Remove and Replace:
- (3) Commscope - LNX-6515DS-A1M – Panel (Remove) / (3) RFS APXVAARR24_43-U-NA20 600/700 MHz (Replace)
- (3) Ericsson - KRY 112 114 TMA (Remove) / (3) Ericsson KRY 112 144/1 (Replace)
- (3) 1-5/8" lines (Remove) - (3) 1-5/8" fiber (Replace)

Install New:
- (3) Ericsson Radio 4449 B71 + B12

Existing Equipment to Remain:
- (3) Ericsson - AIR 21 B2A/B4P – Panel 1900/2100 MHz
- (3) Ericsson - AIR 21 B4A/B2P – Panel 2100 MHz
- (3) T-Arms with handrail kit and v-brace kit
- (9) 1-5/8" lines
- (1) 1-5/8" hybrid

Entitlements:
- N/A

GROUND

Install New:

- Equipment inside existing 6131 cabinet

This facility was approved by the Council under docket 277 on April 26, 2004. The tower, including all appurtenances attached thereto, were not to exceed a height of 198 feet above ground level. The Certificate Holder was to ensure a recalculated report of electromagnetic radio frequency power density be submitted to the Council if and when circumstances in operation caused a change in power density above the levels calculated and provided pursuant to this Decision and Order. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility was to be brought into compliance with such standards. The Certificate Holder was to permit public or private entities to share space on the proposed tower for fair consideration, or provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing. The Certificate Holder was to provide reasonable space on the tower for no compensation for any municipal antennas, provided such antennas were compatible with the structural integrity of the tower. And any obsolete antenna was to be removed within 60 days. There were no further 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 City of Torrington's Mayor, Elinor Carbone, and Zoning Enforcement Officer, Rista Malanca, 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: The Honorable Elinor Carbone / with attachments
City of Torrington, 140 Main Street, Torrington, CT 06790
Rista Malanca, Zoning Enforcement Officer / with attachments
City of Torrington, 140 Main Street, Torrington, CT 06790
O&G Industries Inc / with attachments
112 Wall Street, Torrington CT 06790-5464

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	CSC Docket 277
Exhibit 6	Construction Drawings	Chappell dated 7/8/19
Exhibit 7	Structural Analysis	TESS dated 7/1/19
Exhibit 8	Mount Analysis	TESS dated 8/5/19
Exhibit 9	EME Report	Transcom dated 6/16/19

EXHIBIT 1

SBA Network Services, LLC

To: CONNECTICUT SITING COUNCIL 129986

Check Number: 2141945
Date: 07/08/2019

Invoice Number	Invoice Date	Description	Gross Amount	Taxes Withheld	Net Amount
PRSF07051922	07/08/2019	CSC FEE_CTNH402A_L600	$ 625.00	$ 0.00	$ 625.00
			$ 625.00	$ 0.00	$ 625.00

SBA Network Services, LLC
8051 Congress Avenue
Boca Raton, FL 33487

(800) 487-7483

Wells Fargo Bank

061209756

2141945

129986

DATE	AMOUNT
07/08/2019	$ 625.00

Void After 120 Days

Six Hundred Twenty Five Dollars And 00 Cents

Pay to the Order of:

CONNECTICUT SITING COUNCIL
ACCOUNTS RECEIVABLE
TEN FRANKLIN SQUARE

NEW BRITAIN, CT 06051

⑈ 2141945⑈ ⑆061209756⑆ 2079900424566⑈

EXHIBIT 2

ORIGIN ID:BBFA (508) 251-0720
KRI PELLETIER
SBA NETWORK SERVICES INC
134 FLANDERS RD.
SUITE 125
WESTBOROUGH, MA 01581
UNITED STATES US

SHIP DATE: 14AUG19
ACTWGT: 1.00 LB
CAD: 105843304/INET4160

BILL SENDER

TO MELANIE A. BACHMAN ACTING EXEC. DIR
CONNECTICUT SITING COUNCIL
TEN FRANKLIN SQUARE
NEW BRITAIN CT 06051
(508) 251-0720 X 302

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

567 J3/E9E7 05A2

J192019062401uv

FedEx Express

TRK# 0201 7759 8248 2058

THU - 15 AUG 10:30A
PRIORITY OVERNIGHT

EB BDLA

06051
CT-US BDL

After printing this label:
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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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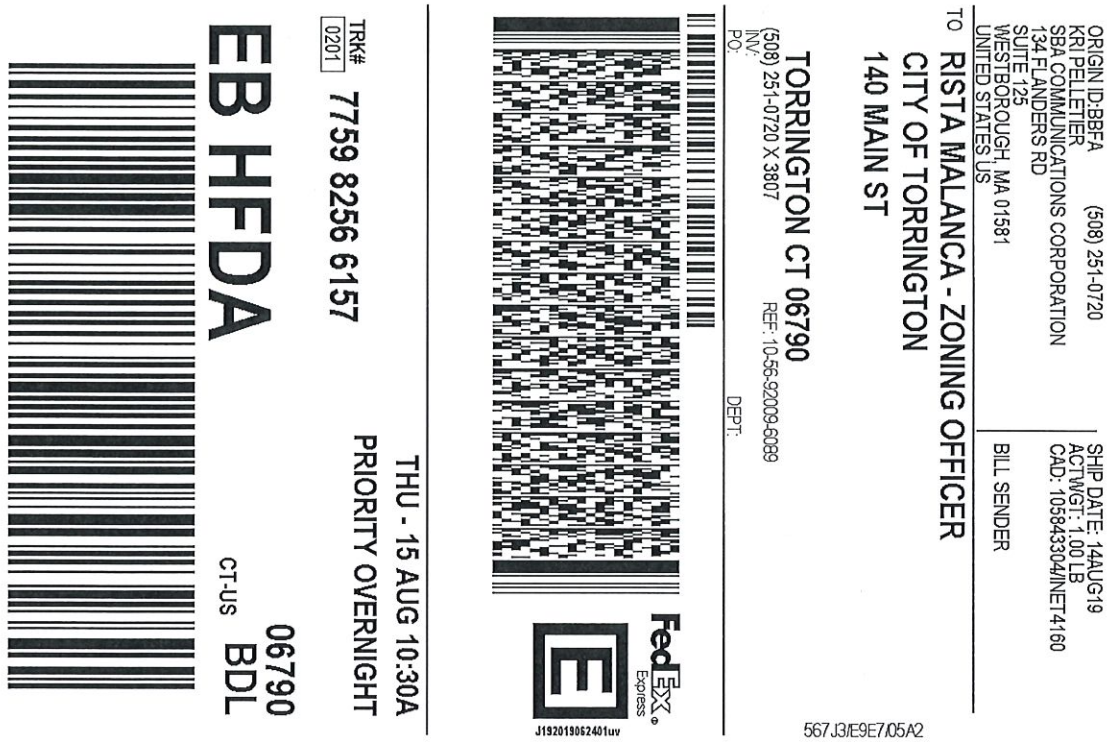

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EXHIBIT 3

s

The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2014.

Information on the Property Records for the Municipality of Torrington was last updated on 6/17/2019.

Parcel Information

Location:	BURR MTN RD	Property Use:	Residential	Primary Use:	Residential
Unique ID:	920	Map Block Lot:	242/001/015	Acres:	4.30
490 Acres:	0.00	Zone:	R60	Volume / Page:	0869/0389
Developers Map / Lot:		Census:	3107-0N		

Value Information

	Appraised Value	Assessed Value
Land	61,800	43,260
Buildings	0	0
Detached Outbuildings	0	0
Total	61,800	43,260

Owner's Information

Owner's Data
O & G INDUSTRIES INC 112 WALL ST TORRINGTON CT 06790

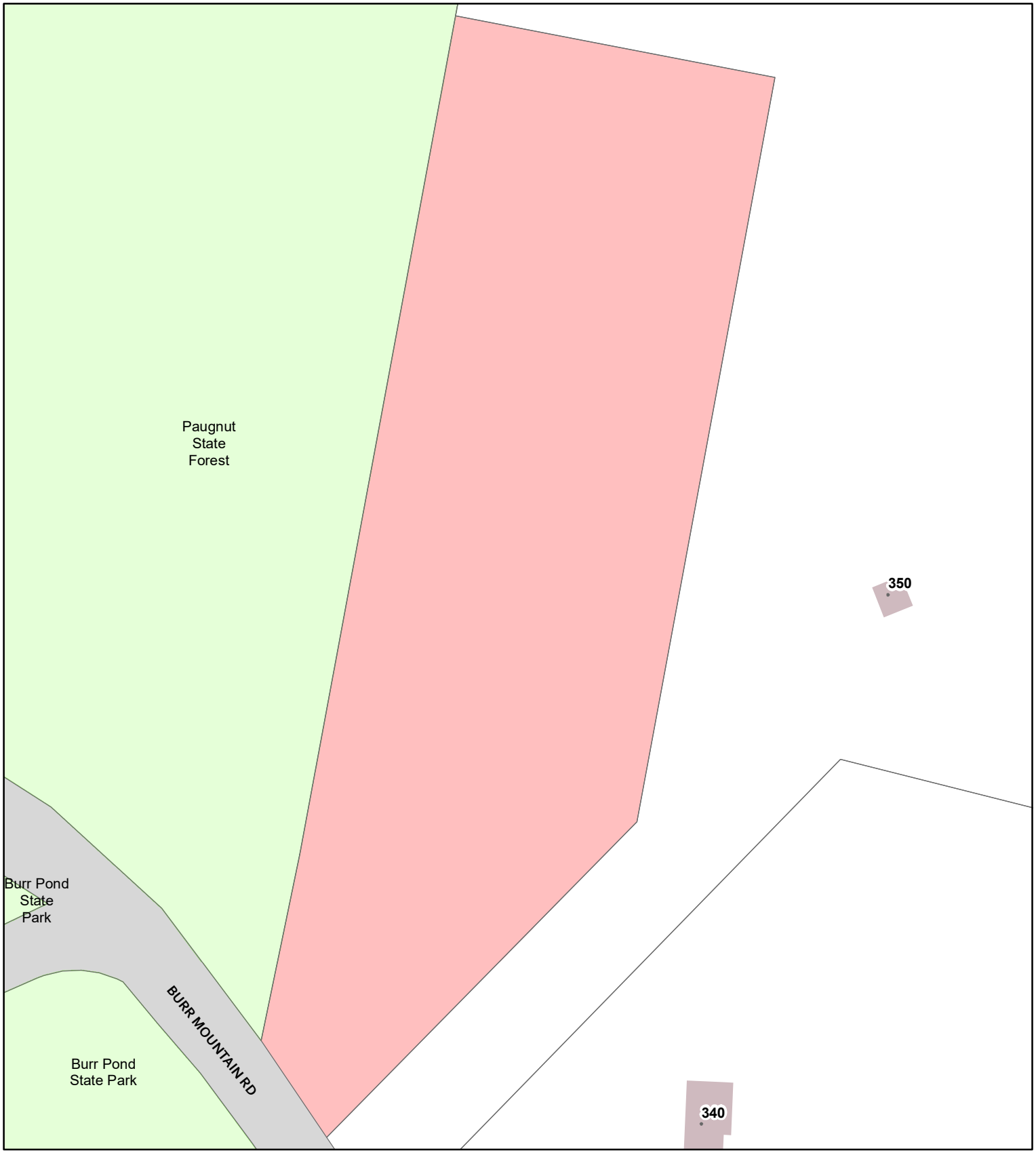
Owner History - Sales

Owner Name	Volume	Page	Sale Date	Deed Type	Valid Sale	Sale Price
O & G INDUSTRIES INC	0869	0389	03/10/2004		Yes	$61,000
BENJAMIN THOMAS G & PAMELA S	0316	0721	11/17/1977	Warranty Deed	No	$0

EXHIBIT 4

City of Torrington, Connecticut - Assessment Parcel Map

Map/Block/Lot 242-001-015 **Address:** BURR MTN RD



Map Produced Apr 2018

Approximate Scale: 1 inch = 100 feet

EXHIBIT 5

Connecticut Siting Council

Decisions

DOCKET NO. 277 – Sprint Spectrum, L.P. application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a telecommunications facility in Torrington, Connecticut.	}	Connecticut
	}	Siting
	}	Council
		April 26, 2004

Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a telecommunications facility including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to Sprint Spectrum, L.P. d/b/a Sprint PCS for the construction, maintenance and operation of a wireless telecommunications facility at Candidate A, located off Burr Mountain Road, Torrington, Connecticut. The Council denies certification of Candidate B located at Jordan Lane and Laurelton Drive, Torrington, Connecticut.

The facility shall be constructed, operated, and maintained substantially as specified in the Council's record in this matter, and subject to the following conditions:

1. The tower shall be constructed no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of Sprint and other entities, both public and private, but such tower, including all appurtenances attached thereto, shall not exceed a height of 198 feet above ground level and shall be designed with a yield point to reduce the area of the setback radius so that it shall be contained within the property of O&G Industries.

2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be submitted to and approved by the Council prior to the commencement of facility construction and shall include:

    a. a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment building, access road, utility line, and landscaping; and

    b. construction plans for site clearing, water drainage, and erosion and sedimentation control consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.

3. The Certificate Holder shall, prior to the commencement of operation, provide the Council

worst-case modeling of electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of electromagnetic radio frequency power density is submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

4. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.

5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.

6. The Certificate Holder shall provide reasonable space on the tower for no compensation for any municipal antennas, provided such antennas are compatible with the structural integrity of the tower.

7. If the facility does not initially provide wireless services within one year of completion of construction or ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.

8. Any antenna that becomes obsolete and ceases to function shall be removed within 60 days after such antennas become obsolete and cease to function.

9. Unless otherwise approved by the Council, this Decision and Order shall be void if the facility authorized herein is not operational within one year of the effective date of this Decision and Order or within one year after all appeals to this Decision and Order have been resolved.

Pursuant to General Statutes **§** 16-50p, we hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in the Waterbury Republican American and the Torrington Register Citizen.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of Connecticut State Agencies.

The parties and intervenors to this proceeding are:

Applicant	**Its Representative**
Sprint Spectrum, L.P. d/b/a Sprint PCS	Thomas J. Regan, Esq. Brown Rudnick Berlack Israels CityPlace 1 185 Asylum Street Hartford, CT 06103
Intervenor	**Its Representative**
Cellco Partnership	Kenneth C. Baldwin, Esq.

d/b/a Verizon Wireless	Robinson & Cole LLP 280 Trumbull Street Hartford, CT 06103-3597 (860) 275-8200

Content Last Modified on 4/29/2004 8:06:58 AM

EXHIBIT 6

LITCHFIELD SSUSA

350 BURR MOUNTAIN ROAD
TORRINGTON, CT 06790
LITCHFIELD COUNTY

SITE NO.: CTNH402A

SITE TYPE: 196'± MONOPOLE

RF DESIGN GUIDELINE: 67D02C

APPROVALS

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

T-MOBILE TECHNICIAN SITE SAFETY NOTES

LOCATION	SPECIAL RESTRICTIONS
SECTOR A:	ACCESS BY CERTIFIED CLIMBER
SECTOR B:	ACCESS BY CERTIFIED CLIMBER
SECTOR C:	ACCESS BY CERTIFIED CLIMBER
SECTOR D:	ACCESS BY CERTIFIED CLIMBER
GPS/LMU:	UNRESTRICTED
RADIO CABINETS:	UNRESTRICTED
PPC DISCONNECT:	UNRESTRICTED
MAIN CIRCUIT D/C:	UNRESTRICTED
NIU/T DEMARC:	UNRESTRICTED
OTHER/SPECIAL:	NONE

SITE NOTES

1. THIS IS AN UNMANNED AND RESTRICTED ACCESS TELECOMMUNICATION FACILITY, AND IS NOT FOR HUMAN HABITATION. IT WILL BE USED FOR THE TRANSMISSION OF RADIO SIGNAL FOR THE PURPOSE OF PROVIDING PUBLIC CELLULAR SERVICE.
   - ADA COMPLIANCE NOT REQUIRED.
   - POTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED.
   - NO OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES REQUIRED.
2. CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY THE ARCHITECT/ENGINEER PLACE THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.
3. NEW CONSTRUCTION WILL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES.
   - BUILDING CODE: 2018 CONNECTICUT STATE BUILDING CODE
   - ELECTRICAL CODE: 2017 NATIONAL ELECTRICAL CODE
   - STRUCTURAL CODE: TIA/EIA-222-G STRUCTURAL STANDARDS FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.

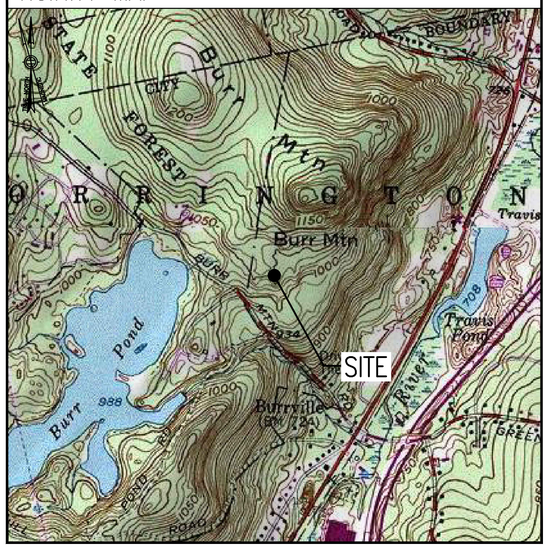
GENERAL NOTES

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.
2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.
3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE OMNIPOINT REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK. IN THE EVENT OF DISCREPANCIES THE CONTRACTOR SHALL PRICE THE MORE COSTLY OR EXTENSIVE WORK, UNLESS DIRECTED IN WRITING OTHERWISE.
4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.
5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
6. THE CONTRACTOR SHALL OBTAIN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWINGS/CONTRACT DOCUMENTS.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUMS OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.
9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
10. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY CONSTRUCTION CONTROL SURVEYS, ESTABLISHING AND MAINTAINING ALL LINES AND GRADES REQUIRED TO CONSTRUCT ALL IMPROVEMENTS AS SHOWN HEREIN.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY OR LOCAL GOVERNMENT AUTHORITY.
12. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.
13. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.
14. THE CONTRACTOR SHALL COMPLY WITH ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT.
15. THE CONTRACTOR SHALL NOTIFY THE PROJECT OWNER'S REPRESENTATIVE WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE LESSEE/LICENSEE REPRESENTATIVE.
16. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE JOB.
17. ALL UNDERGROUND UTILITY INFORMATION WAS DETERMINED FROM SURFACE INVESTIGATIONS AND EXISTING PLANS OF RECORD. THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES IN THE FIELD PRIOR TO ANY SITE WORK.

AT LEAST 72 HOURS PRIOR TO DIGGING, THE CONTRACTOR IS REQUIRED TO CALL DIG SAFE AT 811

VICINITY MAP

SCALE: 1" = 1000'-0"



DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE PROJECT OWNER'S REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

SHEET INDEX

SHEET NO.	DESCRIPTION	REV. NO.
T-1	TITLE SHEET	1
GN-1	GENERAL NOTES	1
A-1	COMPOUND & EQUIPMENT PLAN	1
A-2	TOWER ELEVATIONS & ANTENNA PLAN	1
A-3	SITE DETAILS	1
E-1	ELECTRIC & GROUNDING DETAILS	1

SPECIAL ZONING NOTE:
BASED ON INFORMATION PROVIDED BY T-MOBILE REGULATORY COMPLIANCE PROFESSIONALS AND LEGAL COUNSEL, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE MIDDLE CLASS TAX RELIEF AND JOB CREATION ACT OF 2012, 47 USC 1455(A), SECTION 6409(A), AND IS SUBJECT TO AN ELIGIBLE FACILITY REQUEST, EXPEDITED REVIEW, AND LIMITED/PARTIAL ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW, OR ADMINISTRATIVE REVIEW).

PROJECT SUMMARY

SITE NUMBER:	CTNH402A
SBA SITE NUMBER:	CT46138-A-04
SBA SITE NAME:	TORRINGTON/OANDG IND INC
SITE ADDRESS:	350 BURR MOUNTAIN ROAD TORRINGTON, CT 06790
PROPERTY OWNER:	O & G INDUSTRIES INC 112 WALL STREET TORRINGTON, CT 06790
TOWER OWNER:	SBA 2012 TC ASSETS, LLC 8501 CONGRESS AVENUE BOCA RATON, FL 33487 PHONE: 561-226-9523
COUNTY:	LITCHFIELD
ZONING DISTRICT:	R-60 (RESIDENTIAL ZONE)
STRUCTURE TYPE:	MONOPOLE
STRUCTURE HEIGHT:	196'±
APPLICANT:	T-MOBILE NORTHEAST LLC 15 COMMERCE WAY, SUITE B NORTON, MA 02766
SBA RSM:	STEPHEN ROTH PHONE: 860-539-4920 EMAIL: SRoth@sbasite.com
ARCHITECT:	CHAPPELL ENGINEERING ASSOCIATES, LLC. 201 BOSTON POST ROAD WEST, SUITE 101 MARLBOROUGH, MA 01752
STRUCTURAL ENGINEER:	CHAPPELL ENGINEERING ASSOCIATES, LLC. 201 BOSTON POST ROAD WEST, SUITE 101 MARLBOROUGH, MA 01752
SITE CONTROL POINT:	LATITUDE: N.41.873255° (41° 52' 23.72") LONGITUDE W.72.088405° (73° 05' 18.26")

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15 COMMERCE WAY, SUITE B
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STATE OF CONNECTICUT
CLEMENT J. SAMEK
No. 26876
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: JMT

APPROVED BY: JMT

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	07/08/19	ISSUED FOR CONSTRUCTION	CMC
0	06/26/19	ISSUED FOR REVIEW	MAM

SITE NUMBER:
CTNH402A

SITE ADDRESS:
350 BURR MOUNTAIN ROAD
TORRINGTON, CT 06790

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

1815.117

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:
   - CONTRACTOR – T–MOBILE
   - SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   - OWNER – T–MOBILE
   - OEM – ORIGINAL EQUIPMENT MANUFACTURER

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.

4. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL, STATE AND FEDERAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

5. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

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 FOR APPROVAL BY THE CONTRACTOR.

9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER, T1 CABLES AND 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 AND/OR LANDLORD PRIOR TO CONSTRUCTION.

10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, 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.

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION AND RETURN DISTURBED AREAS TO ORIGINAL CONDITIONS.

13. THE SUBCONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE SUBCONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.

14. SUBCONTRACTOR SHALL NOTIFY CHAPPELL ENGINEERING ASSOCIATES, LLC 48 HOURS IN ADVANCE OF POURING CONCRETE OR BACKFILLING TRENCHES, SEALING ROOF AND WALL PENETRATIONS AND POST DOWNS, FINISHING NEW WALLS OR FINAL ELECTRICAL CONNECTIONS FOR ENGINEERING REVIEW.

15. CONSTRUCTION SHALL COMPLY WITH ALL T–MOBILE STANDARDS AND SPECIFICATIONS.

16. 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.

17. THE EXISTING CELL SITES ARE 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.

18. IF THE EXISTING 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 TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

SITE WORK GENERAL NOTES:

1. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.

2. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY ENGINEERS. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. SUBCONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION.

3. ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.

4. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.

5. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS EQUIPMENT AND TOWER AREAS.

6. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

7. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.

8. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF ENGINEERING, OWNER AND/OR LOCAL UTILITIES.

9. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE AND STABILIZED TO PREVENT EROSION AS SPECIFIED IN THE PROJECT SPECIFICATIONS.

10. SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.

11. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE T–MOBILE SPECIFICATION FOR SITE SIGNAGE.

CONCRETE AND REINFORCING STEEL NOTES:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.

2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. A HIGHER STRENGTH (400PSI) MAY BE USED. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 381 CODE REQUIREMENTS

3. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.

4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
   - CONCRETE CAST AGAINST EARTH........3 IN.
   - CONCRETE EXPOSED TO EARTH OR WEATHER:
     - #6 AND LARGER ....2 IN.
     - #5 AND SMALLER & WWF ....1½ IN.
   - CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
     - SLAB AND WALL ....¾ IN.
     - BEAMS AND COLUMNS ....1½ IN.

5. A CHAMFER ¾" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

6. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHORS SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO THE MANUFACTURERS RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY SIMPSON OR APPROVED EQUAL.

7. CONCRETE CYLINDER TIES ARE NOT REQUIRED FOR SLAB ON GRADE WHEN CONCRETE IS LESS THAN 50 CUBIC YARDS (IBC1905.6.2.3) IN THAT EVENT THE FOLLOWING RECORDS SHALL BE PROVIDED BY THE CONCRETE SUPPLIER;
   (A) RESULTS OF CONCRETE CYLINDER TEST PERFORMED AT THE SUPPLIERS PLANT.
   (B) CERTIFICATION OF MINIMUM COMPRESSIVE STRENGTH FOR THE CONCRETE GRADE SUPPLIED.
   FOR GREATER THAN 50 CUBIC YARDS THE GC SHALL PERFORM THE CONCRETE CYLINDER TEST.

8. AS AN ALTERNATIVE TO ITEM 7. TEST CYLINDERS SHALL BE TAKEN INITIALLY AND THEREAFTER FOR EVERY 50 YARDS OF CONCRETE FROM EACH DIFFERENT BATCH PLANT.

9. EQUIPMENT SHALL NOT BE PLACED ON NEW PADS FOR SEVEN DAYS AFTER PAD IS POURED, UNLESS IT IS VERIFIED BY CYLINDER TESTS THAT COMPRESSIVE STRENGTH HAS BEEN ATTAINED.

STRUCTURAL STEEL NOTES:

1. ALL STEEL WORK SHALL BE PAINTED OR GALVANIZED IN ACCORDANCE WITH THE DRAWINGS AND T–MOBILE SPECIFICATIONS UNLESS OTHERWISE NOTED. STRUCTURAL STEEL SHALL BE ASTM–A–36 UNLESS OTHERWISE NOTED ON THE SITE SPECIFIC DRAWINGS. STEEL DESIGN, INSTALLATION AND BOLTING SHALL BE IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) "MANUAL OF STEEL CONSTRUCTION".

2. ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND AWS D1.1. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION", 9TH EDITION. PAINTED SURFACES SHALL BE TOUCHED UP.

3. BOLTED CONNECTIONS SHALL USE BEARING TYPE ASTM A325 BOLTS (¾"ø) AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE. ALL BOLTS SHALL BE GALVANIZED OR STAINLESS STEEL.

4. NON–STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE ⅝" DIA. ASTM A 307 BOLTS (GALV) UNLESS NOTED OTHERWISE.

5. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ENGINEER REVIEW & APPROVAL ON PROJECTS REQUIRING STRUCTURAL STEEL

6. ALL STRUCTURAL STEEL WORK SHALL BE DONE IN ACCORDANCE WITH AISC SPECIFICATIONS.

SOIL COMPACTION NOTES FOR SLAB ON GRADE:

1. EXCAVATE AS REQUIRED TO REMOVE VEGETATION AND TOPSOIL TO EXPOSE NATURAL SUBGRADE AND PLACE CRUSHED STONE AS REQUIRED.

2. COMPACTION CERTIFICATION: AN INSPECTION AND WRITTEN CERTIFICATION BY A QUALIFIED GEOTECHNICAL TECHNICIAN OR ENGINEER IS ACCEPTABLE.

3. AS AN ALTERNATE TO INSPECTION AND WRITTEN CERTIFICATION, THE "UNDISTURBED SOIL" BASE SHALL BE COMPACTED WITH "COMPACTION EQUIPMENT", LISTED BELOW, TO AT LEAST 90% MODIFIED PROCTOR MAXIMUM DENSITY PER ASTM D 1557 METHOD C.

4. COMPACTED SUBBASE SHALL BE UNIFORM AND LEVELED. PROVIDE 6" MINIMUM CRUSHED STONE OR GRAVEL COMPACTED IN 3" LIFTS ABOVE COMPACTED SOIL. GRAVEL SHALL BE NATURAL OR CRUSHED WITH 100% PASSING #1 SIEVE.

5. AS AN ALTERNATE TO ITEMS 2 AND 3, THE SUBGRADE SOILS WITH 5 PASSES OR A MEDIUM SIZED VIBRATORY PLATE COMPACTOR (SUCH AS BOMAG BPR 30/38) OR HAND–OPERATED SINGLE DRUM VIBRATORY ROLLER (SUCH AS BOMAG BW 55E). AND SOFT AREAS THAT ARE ENCOUNTERED SHOULD BE REMOVED AND REPLACED WITH A WELL–GRADED GRANULAR FILL AND COMPACTED AS STATED ABOVE.

COMPACTION EQUIPMENT:

1. HAND OPERATED DOUBLE DRUN, VIBRATORY ROLLER, VIBRATORY PLATE COMPACTOR OR JUMPING JACK COMPACTOR.

CONSTRUCTION NOTES:

1. FIELD VERIFICATION:
   SUBCONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, T–MOBILE ANTENNA PLATFORM LOCATION AND UTILITY TRENCHWORK.

2. COORDINATION OF WORK:
   SUBCONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH CONTRACTOR.

3. CABLE LADDER RACK:
   SUBCONTRACTOR SHALL FURNISH AND INSTALL CABLE LADDER RACK, CABLE TRAY AND/OR ICE BRIDGE, AND CONDUIT AS REQUIRED TO SUPPORT CABLES TO THE NEW BTS LOCATION.

ELECTRICAL INSTALLATION NOTES:

1. WIRING, RACEWAY, AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.

2. SUBCONTRACTOR SHALL MODIFY OR INSTALL CABLE TRAY SYSTEM AS REQUIRED TO SUPPORT RF AND TRANSPORT CABLING TO THE NEW BTS EQUIPMENT. SUBCONTRACTOR SHALL SUBMIT MODIFICATIONS TO CONTRACTOR FOR APPROVAL.

3. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND TELCORDIA.

4. CABLES SHALL NOT BE ROUTED THROUGH LADDER–STYLE CABLE TRAY RUNGS.

5. EACH END OF EVERY POWER, GROUNDING, AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA, AND MATCH INSTALLATION REQUIREMENTS.

6. POWER PHASE CONDUCTORS (I.E., HOTS) SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, ½ INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). PHASE CONDUCTOR COLOR CODES SHALL CONFORM WITH THE NEC AND OSHA.

7. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING, AND BRANCH CIRCUIT ID NUMBERS (I.E., PANELBOARD AND CIRCUIT ID'S).

8. PANELBOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS.

9. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.

10. POWER, CONTROL, AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (#34 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN–2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.

11. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (#6 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN–2 GREEN INSULATION, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.

12. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED OUTDOORS, OR BELOW GRADE, SHALL BE SINGLE CONDUCTOR #2 AWG SOLID TINNED COPPER CABLE, UNLESS OTHERWISE SPECIFIED.

13. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (#34 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN–2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; WITH OUTER JACKET; LISTED OR LABELED FOR THE LOCATION USED, UNLESS OTHERWISE SPECIFIED.

14. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRENUTS BY HARGER (OR EQUAL). LUGS AND WIRENUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75°C (90°C IF AVAILABLE).

15. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.

16. NEW RACEWAY OR CABLE TRAY WILL MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.

17. ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.

18. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT), OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.

19. GALVANIZED STEEL INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR OUTDOOR LOCATIONS ABOVE GRADE.

20. RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80) SHALL BE USED UNDERGROUND; DIRECT BURIED, IN AREAS OF OCCASIONAL LIGHT VEHICLE TRAFFIC OR ENCASED IN REINFORCED CONCRETE IN AREAS OF HEAVY VEHICLE TRAFFIC.

21. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.

22. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.

23. CABINETS, BOXES AND WIREWAYS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.

24. CABINETS, BOXES AND WIREWAYS TO MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.

25. WIREWAYS SHALL BE EPOXY–COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARD; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.

26. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES, AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL, SHALL MEET OR EXCEED UL 50, AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.

27. METAL RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED, OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.

28. NONMETALLIC RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.

29. THE SUBCONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CONTRACTOR BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.

30. THE SUBCONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.

31. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.

32. CONDUIT ROUTINGS ARE SCHEMATIC. SUBCONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED.

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TORRINGTON, CT 06790

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-1

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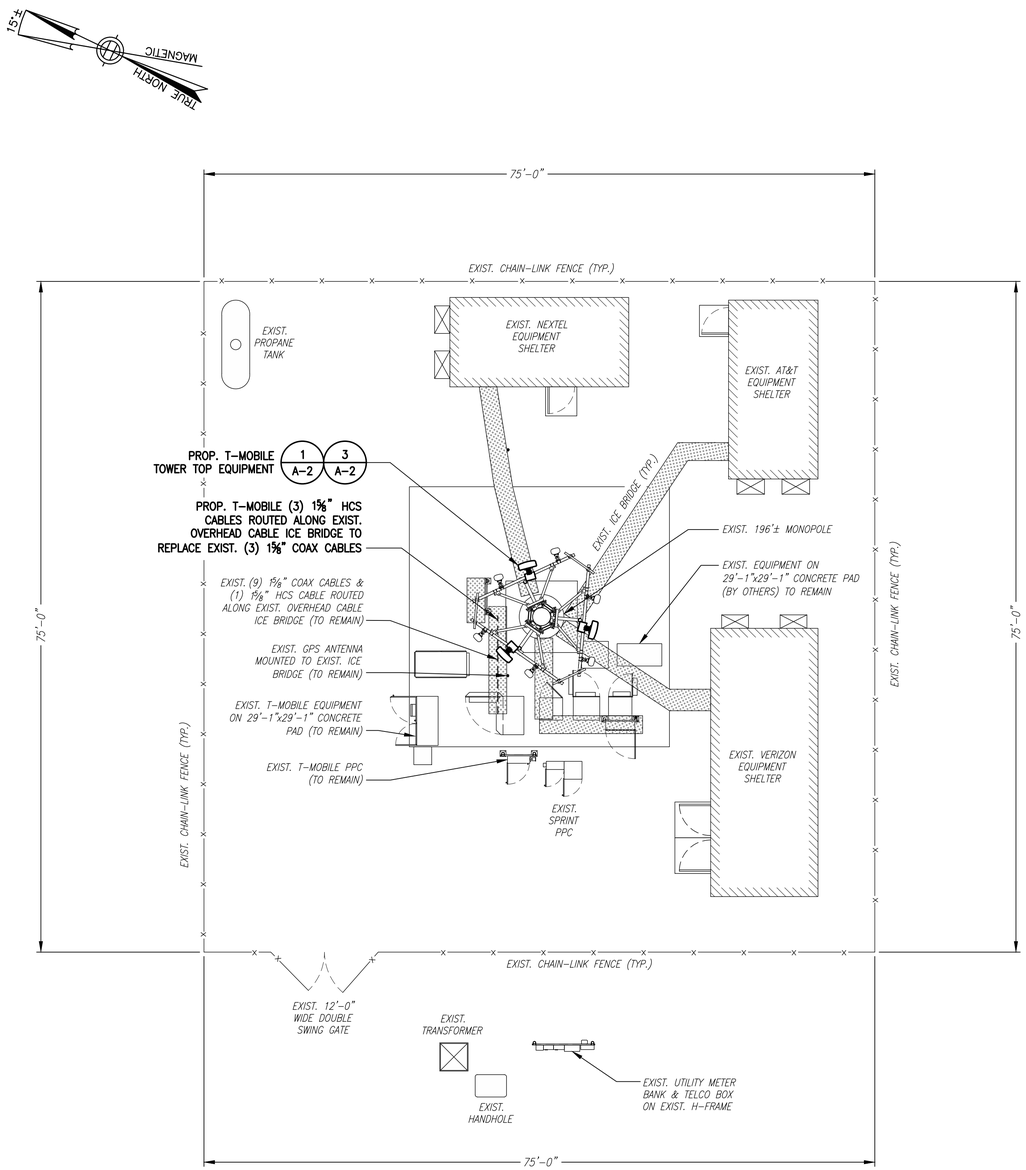
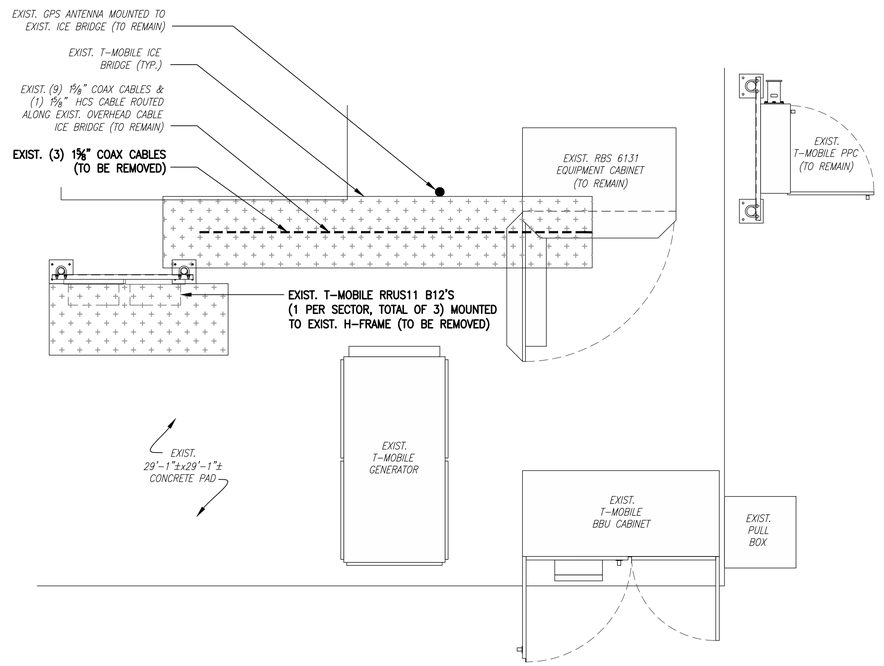
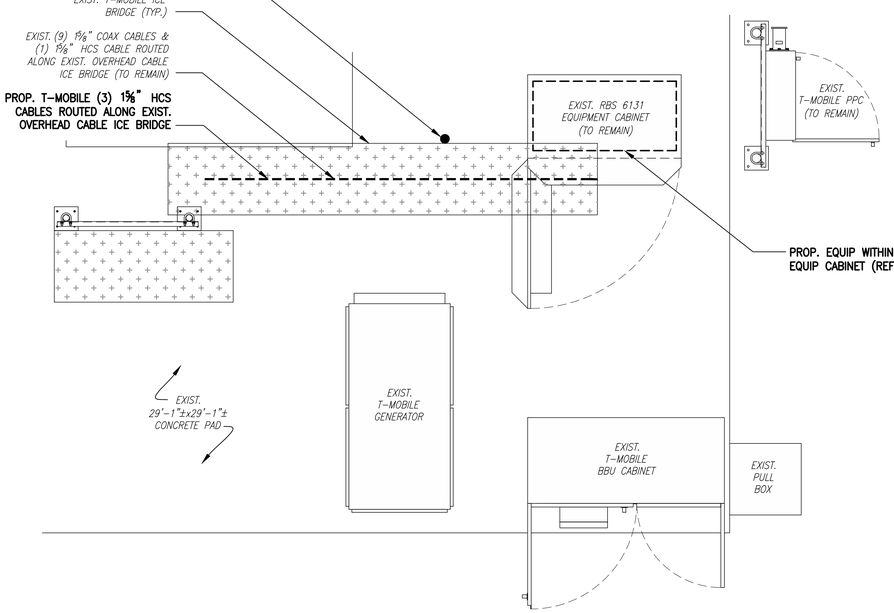
SPECIAL PRE-CONSTRUCTION WORK NOTE (SBA-PROVIDED TOWER STRUCTURAL ANALYSIS SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS):
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL SPECIAL OR SUPPLEMENTAL ADDITIONAL TOWER-MOUNTED EQUIPMENT PER RECOMMENDATIONS FROM SBA-PROVIDED TOWER STRUCTURAL ANALYSIS FOR ANY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



COMPOUND PLAN
1 / A-1
SCALE: 1/8" = 1'-0"
0 4' 8' 16' 24'



EXISTING EQUIPMENT PLAN
2 / A-1
SCALE: 1/2" = 1'-0"
0 2'-0" 4'-0" 6'-0"



PROPOSED EQUIPMENT PLAN
3 / A-1
SCALE: 1/2" = 1'-0"
0 2'-0" 4'-0" 6'-0"

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0	06/26/19	ISSUED FOR REVIEW	MAM

SITE NUMBER:
CTNH402A

SITE ADDRESS:
350 BURR MOUNTAIN ROAD
TORRINGTON, CT 06790

SHEET TITLE
COMPOUND & EQUIPMENT PLAN

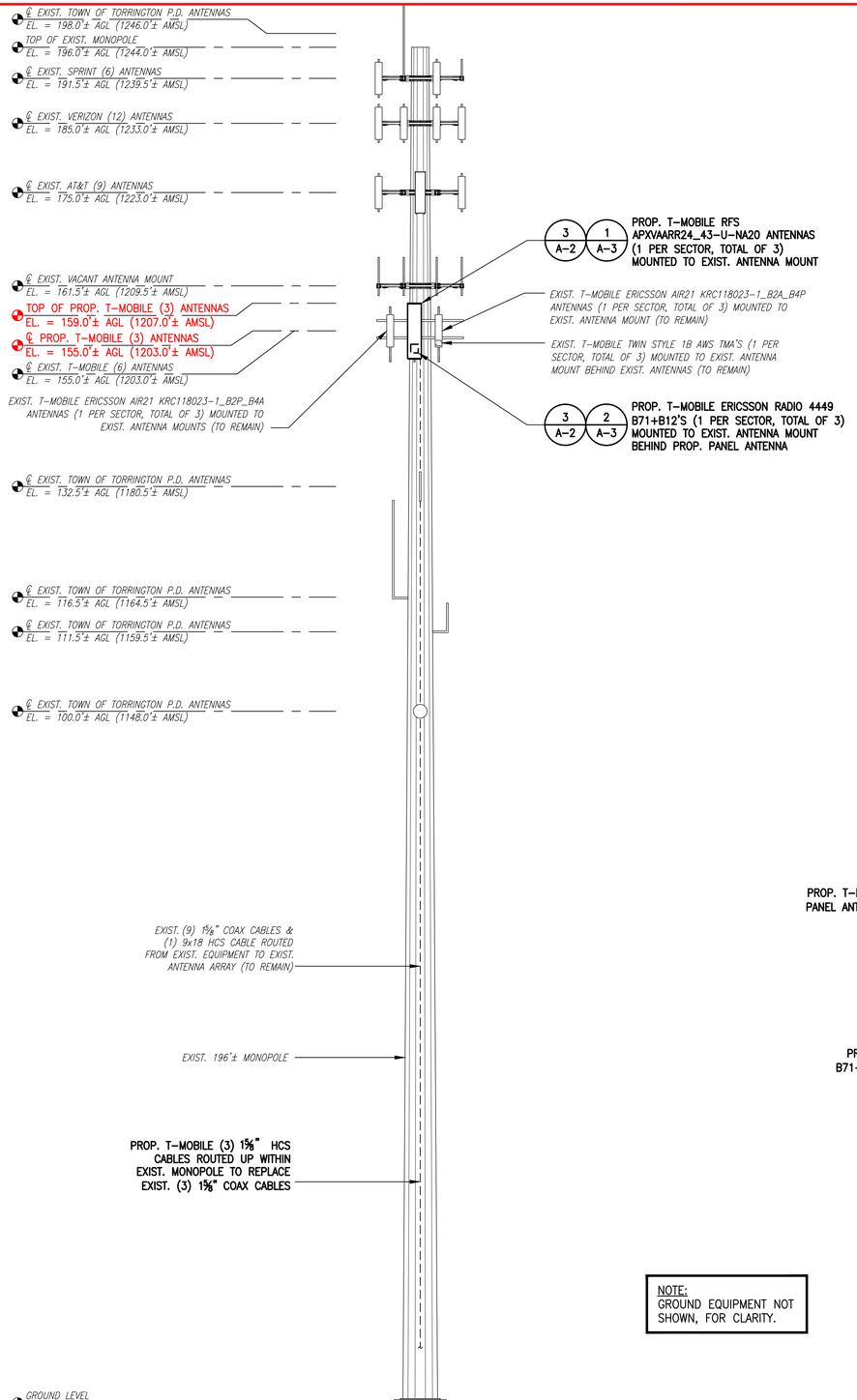
SHEET NUMBER
A-1

1815.117

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

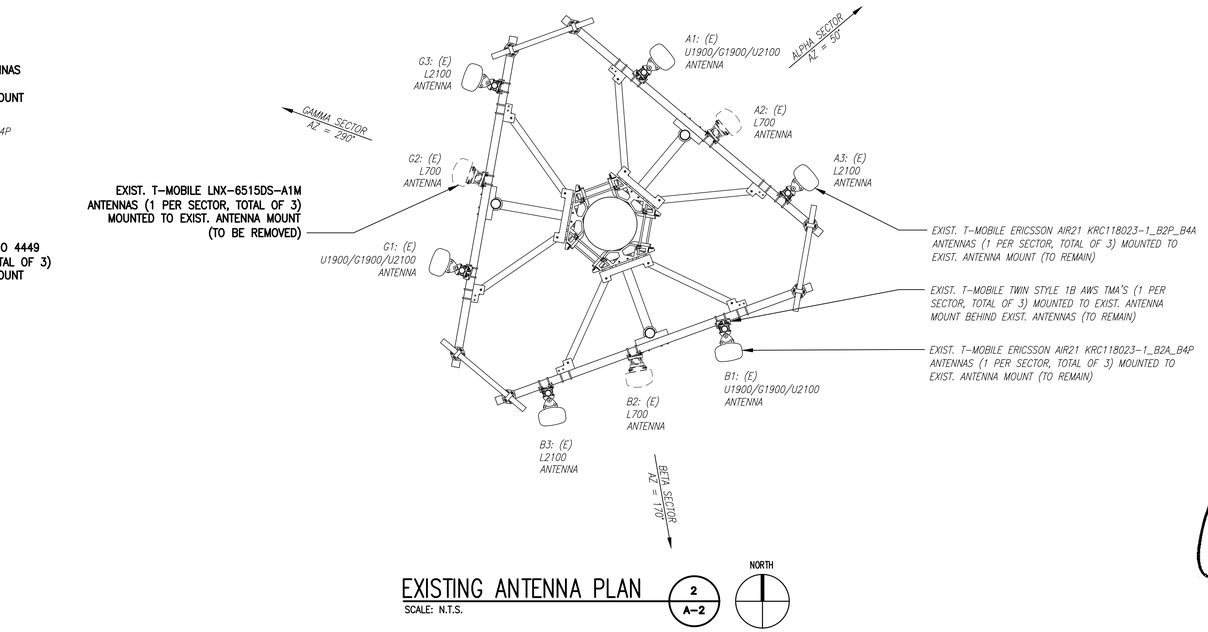
SPECIAL TOWER TOP EQUIPMENT INSTALLATION WORK NOTE (SAFETY-CLIMB ALIGNMENT REQUIREMENTS):
GENERAL CONTRACTOR SHALL ORIENT PROPOSED PLATFORM REINFORCEMENT KIT RING-MOUNTS SO THAT EXISTING SAFETY CLIMB CABLE IS NOT OBSTRUCTED/RE-ROUTED FROM VERTICAL ALIGNMENT AND IS NOT IN PHYSICAL CONTACT WITH EXISTING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

RAD CENTER NOTE:
T-MOBILE RAD CENTER SHOWN IN RED TEXT BASED ON SBA-PROVIDED CO-LOCATION APPLICATION, EQUIPMENT DATABASE, AND STRUCTURAL ANALYSIS. THE SBA-PROVIDED ANTENNA RAD CENTER SHALL SUPERSEDE ANY CONFLICTING INFORMATION DERIVED FROM THE T-MOBILE RFDS.

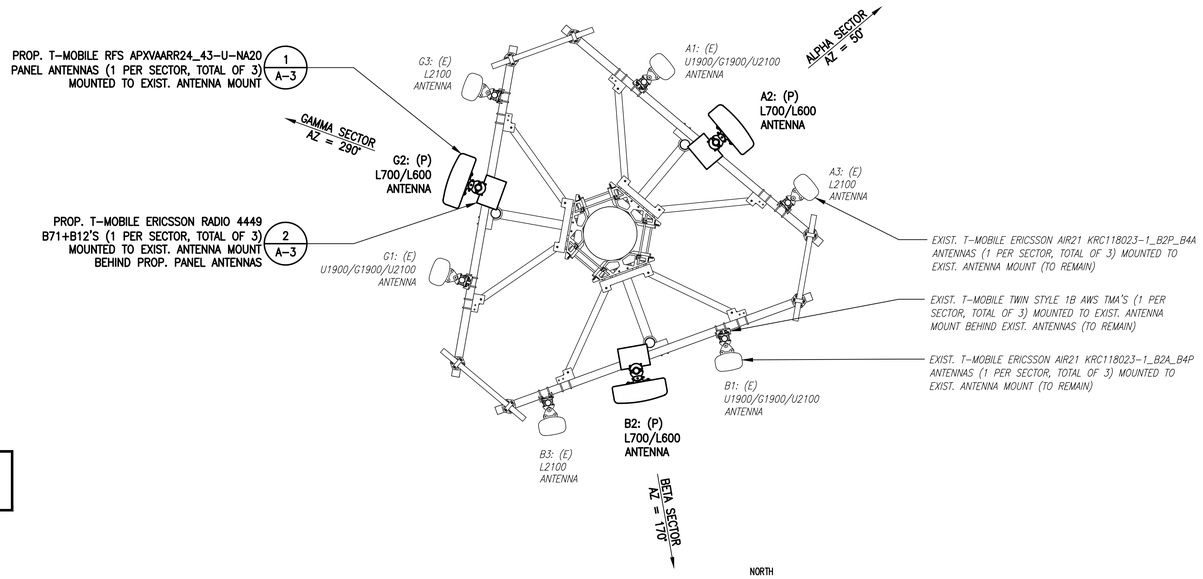


TOWER ELEVATION (1 / A-2)
SCALE: 1" = 20'
0 10' 20' 40' 60'

NOTE:
GROUND EQUIPMENT NOT SHOWN, FOR CLARITY.



EXISTING ANTENNA PLAN (2 / A-2)
SCALE: N.T.S.



PROPOSED ANTENNA PLAN (3 / A-2)
SCALE: N.T.S.

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(508) 481-7400
www.chappellengineering.com

STATE OF CONNECTICUT
CLEMENT J. SAMEK
No. 26876
LICENSED
PROFESSIONAL ENGINEER

CHECKED BY: JMT

APPROVED BY: JMT

SUBMITTALS

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SHEET TITLE
TOWER ELEVATIONS & ANTENNA PLAN

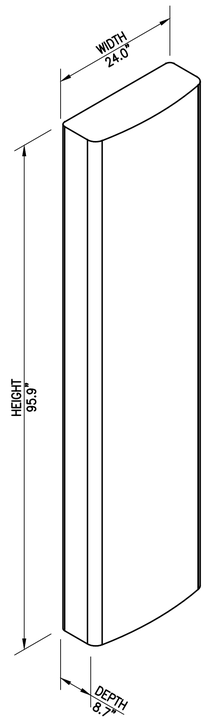
SHEET NUMBER
A-2

1815.117

FINAL ANTENNA CONFIGURATION

SECTOR	ANTENNA	RAD CENTER	AZIMUTH (TRUE NORTH)	MECHANICAL DOWNTILT	ELECTRICAL DOWNTILT	BAND	TMA/RADIOS	CABLES
ALPHA	*ERICSSON AIR21 KRC118023-1_B2A_B4P*	*155'± AGL*	*50°*	*0°*	*2°*	*U1900/G1900*	–	*(1) 1⅝" HCS CABLE (SHARED)*
						U2100	*TWIN STYLE 1B AWS TMA*	*(2) 1⅝" COAX CABLES*
	RFS APXVAARR24_43-U-NA20	155'± AGL	50°	0°	2°	L600/L700	RADIO 4449 B71+B12	(1) 1⅝" HCS CABLE
						–	SMART BIAS T	
	ERICSSON AIR21 KRC118023-1_B2P_B4A	*155'± AGL*	*50°*	*0°*	*2°*	*L2100*	–	*(1) 1⅝" HCS CABLE (SHARED)*
BETA	*ERICSSON AIR21 KRC118023-1_B2A_B4P*	*155'± AGL*	*170°*	*0°*	*2°*	*U1900/G1900*	–	*(1) 1⅝" HCS CABLE (SHARED)*
						U2100	*TWIN STYLE 1B AWS TMA*	*(2) 1⅝" COAX CABLES*
	RFS APXVAARR24_43-U-NA20	155'± AGL	170°	0°	2°	L600/L700	RADIO 4449 B71+B12	(1) 1⅝" HCS CABLE
						–	SMART BIAS T	
	ERICSSON AIR21 KRC118023-1_B2P_B4A	*155'± AGL*	*170°*	*0°*	*2°*	*L2100*	–	*(1) 1⅝" HCS CABLE (SHARED)*
GAMMA	*ERICSSON AIR21 KRC118023-1_B2A_B4P*	*155'± AGL*	*290°*	*0°*	*2°*	*U1900/G1900*	–	*(1) 1⅝" HCS CABLE (SHARED)*
						U2100	*TWIN STYLE 1B AWS TMA*	*(2) 1⅝" COAX CABLES*
	RFS APXVAARR24_43-U-NA20	155'± AGL	290°	0°	2°	L600/L700	RADIO 4449 B71+B12	(1) 1⅝" HCS CABLE
						–	SMART BIAS T	
	ERICSSON AIR21 KRC118023-1_B2P_B4A	*155'± AGL*	*290°*	*0°*	*2°*	*L2100*	–	*(1) 1⅝" HCS CABLE (SHARED)*

NOTE: EXISTING (3) 1⅝" COAX CABLES TO REMAIN DISCONNECTED



RFS APXVAARR24_43-U-NA20 PANEL ANTENNA
DIMENSIONS: 95.9"H x 24.0"W x 8.7"D
WEIGHT: 128.0 LBS
1 PER SECTOR, TOTAL OF 3

ANTENNA DETAILS (1 / A-3)
SCALE: N.T.S.

ERICSSON RADIO 4449 B12+B71
DIMENSIONS: 14.9"H x 13.2"W x 9.3"D
WEIGHT: 74.0 LBS
1 PER SECTOR, TOTAL OF 3

RRU DETAIL (2 / A-3)
SCALE: N.T.S.

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SITE ADDRESS:
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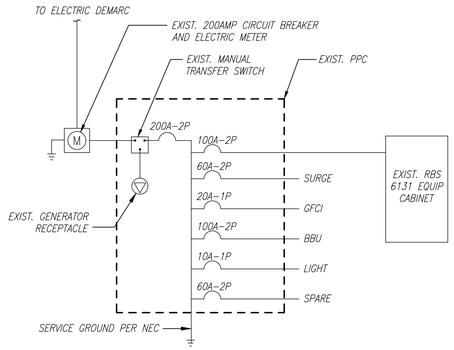
TORRINGTON, CT 06790

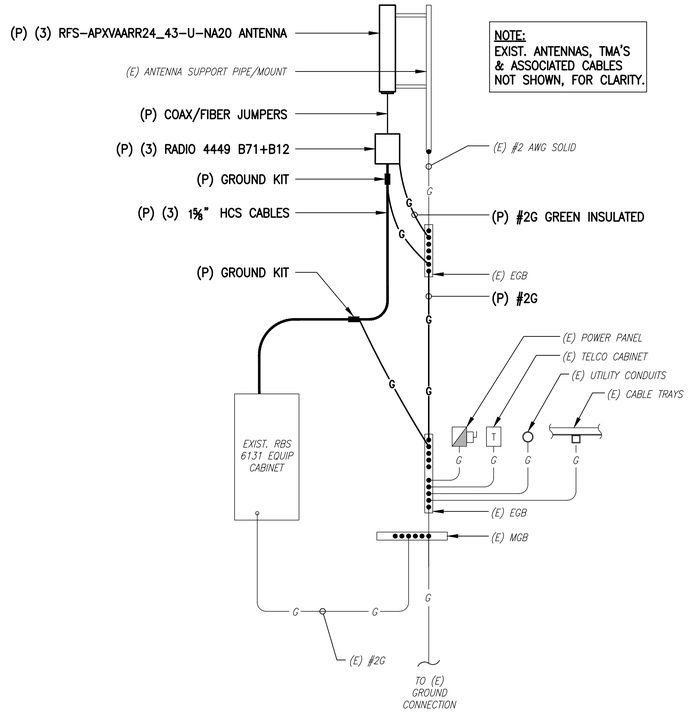
SHEET TITLE
SITE DETAILS

SHEET NUMBER
A-3

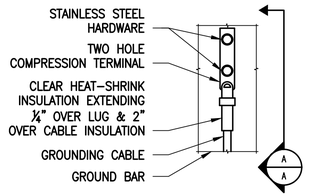
1815.117



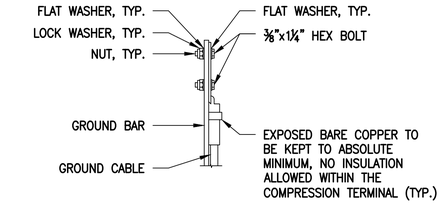
ONE LINE DIAGRAM (1 / E–1)
SCALE: NOT TO SCALE



GROUNDING RISER DIAGRAM (2 / E–1)
SCALE: NOT TO SCALE



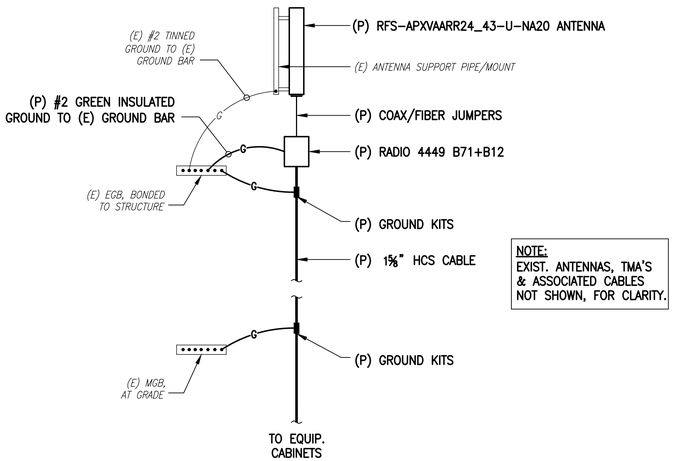
ELEVATION



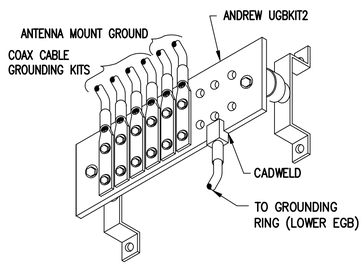
SECTION A–A

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

TYPICAL GROUND BAR CONNECTIONS DETAIL (3 / E–1)
SCALE: NOT TO SCALE



COAX CABLE CONNECTION AND GROUNDING DETAIL (4 / E–1)
SCALE: NOT TO SCALE



GROUND BAR (EGB) (5 / E–1)
SCALE: NOT TO SCALE

ELECTRICAL AND GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) 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 SPECIFICATION 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. BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THININSULATION.
8. RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE PPC 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 PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. WHERE CONDUIT BETWEEN BTS AND PROJECT OWNER CELL SITE PPC AND BETWEEN BTS AND PROJECT OWNER CELL SITE TELCO SERVICE CABINET ARE UNDERGROUND USE PVC, SCHEDULE 40 CONDUIT. ABOVE THE GROUND PORTION OF THESE CONDUITS SHALL BE PVC CONDUIT.
11. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
12. PPC SUPPLIED BY PROJECT OWNER.
13. GROUNDING SHALL COMPLY WITH NEC ART. 250. ADDITIONALLY, GROUNDING, BONDING AND LIGHTNING PROTECTION SHALL BE DONE IN ACCORDANCE WITH "T–MOBILE BTS SITE GROUNDING STANDARDS".
14. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
15. 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.
16. 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.
17. 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 6 FEET OF PROJECT OWNER EQUIPMENT OR CABINET TO MASTER GROUND BAR OR GROUNDING RING.
18. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
19. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
20. CONTRACTOR SHALL PROVIDE AND INSTALL OMNI DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALLS OVER EACH GROUND ROD AND BONDING POINT BETWEEN EXIST. TOWER/ MONOPOLE GROUNDING RING AND EQUIPMENT GROUNDING RING.
21. CONTRACTOR SHALL TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE–OUT DOCUMENTATION. 5 OHMNS MINIMUM RESISTANCE REQUIRED.
22. CONTRACTOR SHALL CONDUCT ANTENNA, COAX, AND LNA RETURN–LOSS AND DISTANCE– TO–FAULT MEASUREMENTS (SWEEP TESTS) AND RECORD RESULTS FOR PROJECT CLOSE OUT.

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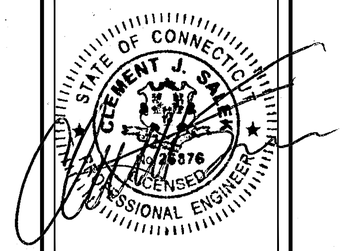

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SHEET TITLE
ELECTRIC & GROUNDING DETAILS

SHEET NUMBER
E-1

1815.117

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 196 ft Valmont Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT46138-A

Customer Site Name: Torrington/Oandg Ind Inc

Carrier Name: T-Mobile (App#: 117043, V1)

Carrier Site ID / Name: CTNH402A / Litchfield SSUSA

Site Location: LOT 5 Burr Mountain Road

Torrington, Connecticut

Litchfield County

Latitude: 41.873255

Longitude: -73.088405

Analysis Result:

Max Structural Usage: 71.8% [Pass]

Max Foundation Usage: 63.0% [Pass]

Additional Usage Caused by New Mount/Mount Modification: N/A

Report Prepared By: Sital Shrestha

Introduction

The purpose of this report is to summarize the analysis results on the 196 ft Valmont 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	Valmont, Order # 17566-64 Dated 08/03/2004
Foundation Drawing	Valmont, Eng File # A-402723 Dated 07/16/2004
Geotechnical Report	Geotechnical Report by Dr. Clarence Welti, P.E, P.C, Tower- CT33XC079 Dated 06/18/2004
Modification Drawings	Vertical Solutions, Project # 130499 Dated 06/28/2013

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} =116.0 mph (3-Sec. Gust)/ Nominal Design Wind Speed V_{asd} = 90.0 mph (3-Sec. Gust)
Wind Speed with Ice:	40 mph (3-Sec. Gust) with 1" radial ice concurrent
Operational Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-G / 2015 IBC / 2018 Connecticut State Building Code
Exposure Category:	C
Structure Class:	II
Topographic Category:	1
Crest Height:	0 ft
Seismic Parameters:	S_S = 0.179, S_1 = 0.065

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

Existing Antennas, Mounts and Transmission Lines

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

Items	Elevation (ft.)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	198.0	1	RFI - BA80-41-DIN - Omni	(1) Pipe mount	(1) 7/8"	Torrington P.D.
2	191.5	3	RFS - APXVTM14-C-120 - Panel	Low Profile Platform	(6) 1 5/8" (4) 1-1/4" Fiber	Sprint
3		3	RFS - APXVSPP18-C-A20 - Panel			
4		3	ALU - 800MHz - RRU			
5		3	ALU - 1900MHz - RRU			
6		3	ALU - RRH8x20-25 - RRU			
7		3	ALU - 800MHz Filter - RRU Filter			
8		4	RFS - ACU-A20-N - RET			
9	185.0	3	Antel - BXA-171063-8BF_2 - Panel	Low Profile Platform	(12) 1 5/8"	Verizon
10		6	Antel - LPA-80063/4CF - Panel			
11		3	Antel - BXA-70063 6CF_2 - Panel			
12		6	RFS - FD9R6004/2C-3L - Diplexer			
13	175.0	6	Kathrein 800-10965- Panel	Low Profile Platform SitePro1 HRK12 (Handrail Kit)	(12) 1 5/8" (2) 2" Conduit (Housing (4) 3/4" & (2) 7/16" Fiber lines) (1) 3" Conduit (Housing (2) 3/4" & (1) 7/16" Fiber lines)	AT&T
14		2	Raycap DC6-48-60-18-8C-EV			
15		3	Ericsson RRUS 32 B30			
16		3	Ericsson RRUS 4478 B14			
17		3	Ericsson RRUS 4449 B5/B12			
18		12	Powerwave LGP13519 Diplexer			
19		12	Powerwave LGP21401 TMA			
20		3	Powerwave 7770- Panel			
21		3	Ericsson RRUS 12			
22		1	Raycap DC6-48-60-18-8F			
-	155.0	3	Ericsson - AIR 21 B2A/B4P - Panel	(3) T-Arms w/ Handrail kit & v-brace kit	(12) 1 5/8" (1) 1 5/8" Hybrid	T-Mobile
-		3	Ericsson - AIR 21 B4A/B2P - Panel			
-		3	Commscope - LNX-6515DS-A1M - Panel			
-		3	Ericsson - KRY 112 114 TMA			
28	132.5	1	Telewave - ANT150F2 - Omni	(1) Standoff	(1) 7/8"	Torrington P.D.
29	116.5	5	14' Omni	(6) Standoff	(6) 1/2"	
30	111.5	1	4' Omni			
31	100.0	1	Maxrad - MPRD - Dish	(1) Standoff	(2) CAT5e	

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
23	155.0	3	RFS APXVAARR24_43-U-NA20	(3) T-Arms w/ Handrail kit & v-brace kit	(9) 1 5/8" Coax (4) 1 5/8" Fiber	T-Mobile
24		3	Ericsson AIR 21 B4A/B2P			
25		3	Ericsson AIR 21 B2A/B4P			
26		3	Ericsson KRY 112 144/1			
27		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	Reinforce Plate
Max. Usage:	**71.8%**	**59.1%**	**53.5%**	**80.6%**
Pass/Fail	**Pass**	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Analysis Reactions	5766.9	41.9	132.4

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 1.5614 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.

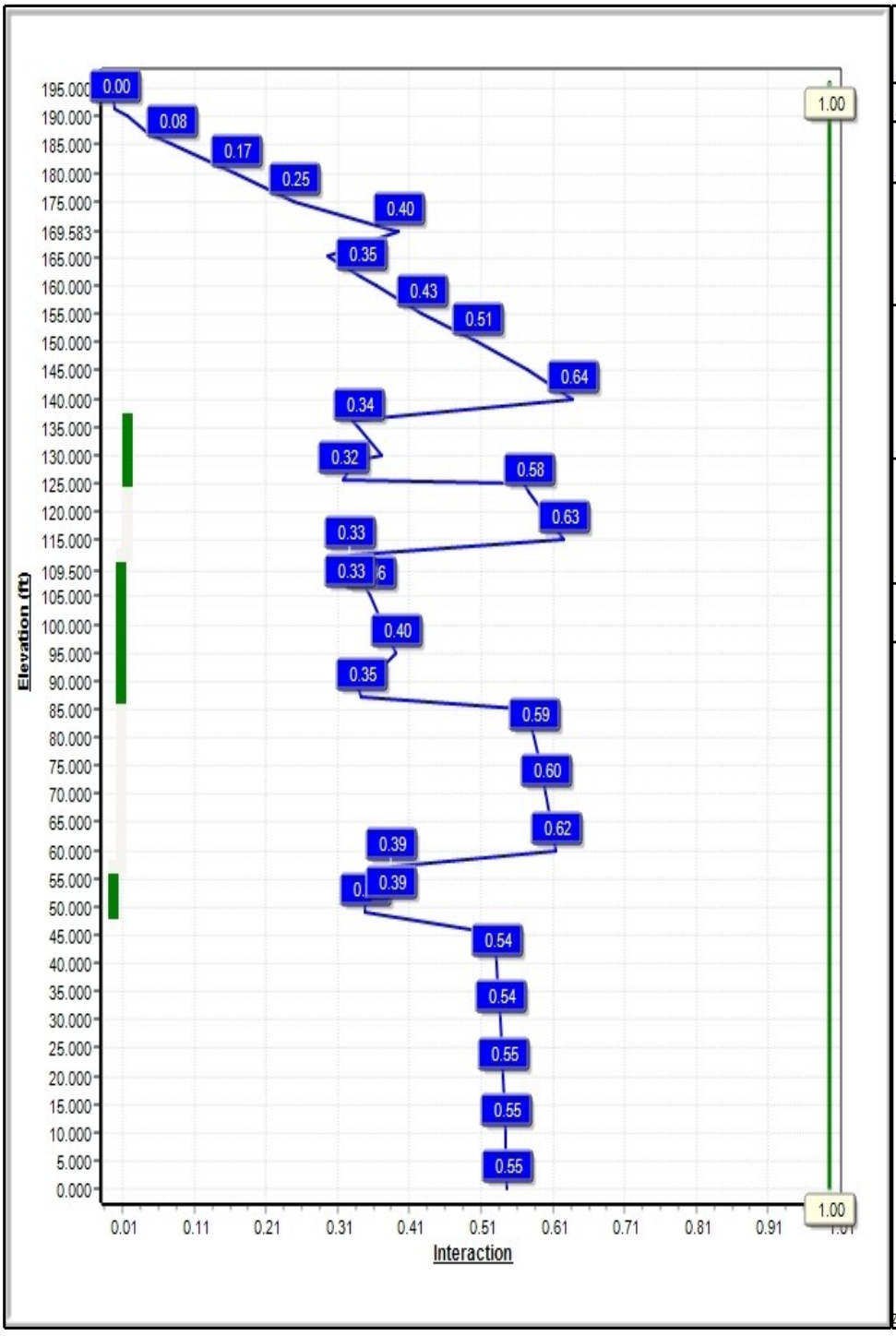
Usage Diagram - Max Ratio 64.19% at 140.0ft

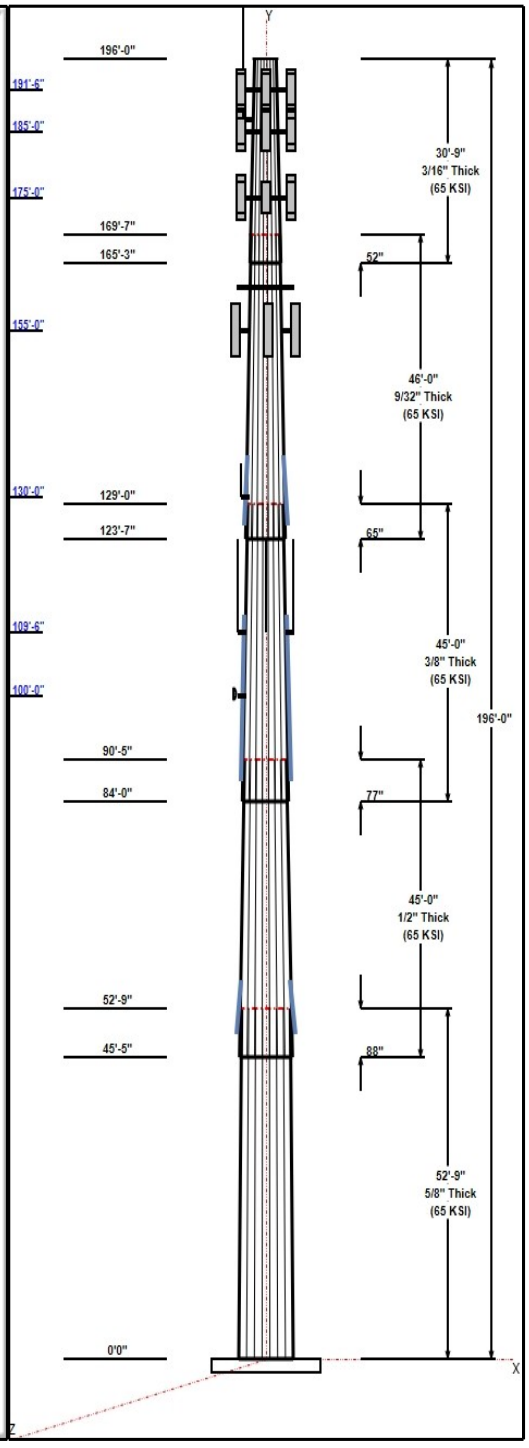
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C	
Height:	196.00 (ft)	**Gh:**	1.1	
Base Elev:	0.000 (ft)			Page: 1

Tower Engineering Solutions

Dead Load Factor:	1.20	**Iterations:**	27
Wind Load Factor:	1.60		

Load Case : 1.2D + 1.6W 90 mph Wind





Structure: CT46138-A-SBA

Type: Tapered
Site Name: Torrington/Oandg Ind Inc
Height: 196.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 16 Sided
Taper: 0.21000

7/1/2019

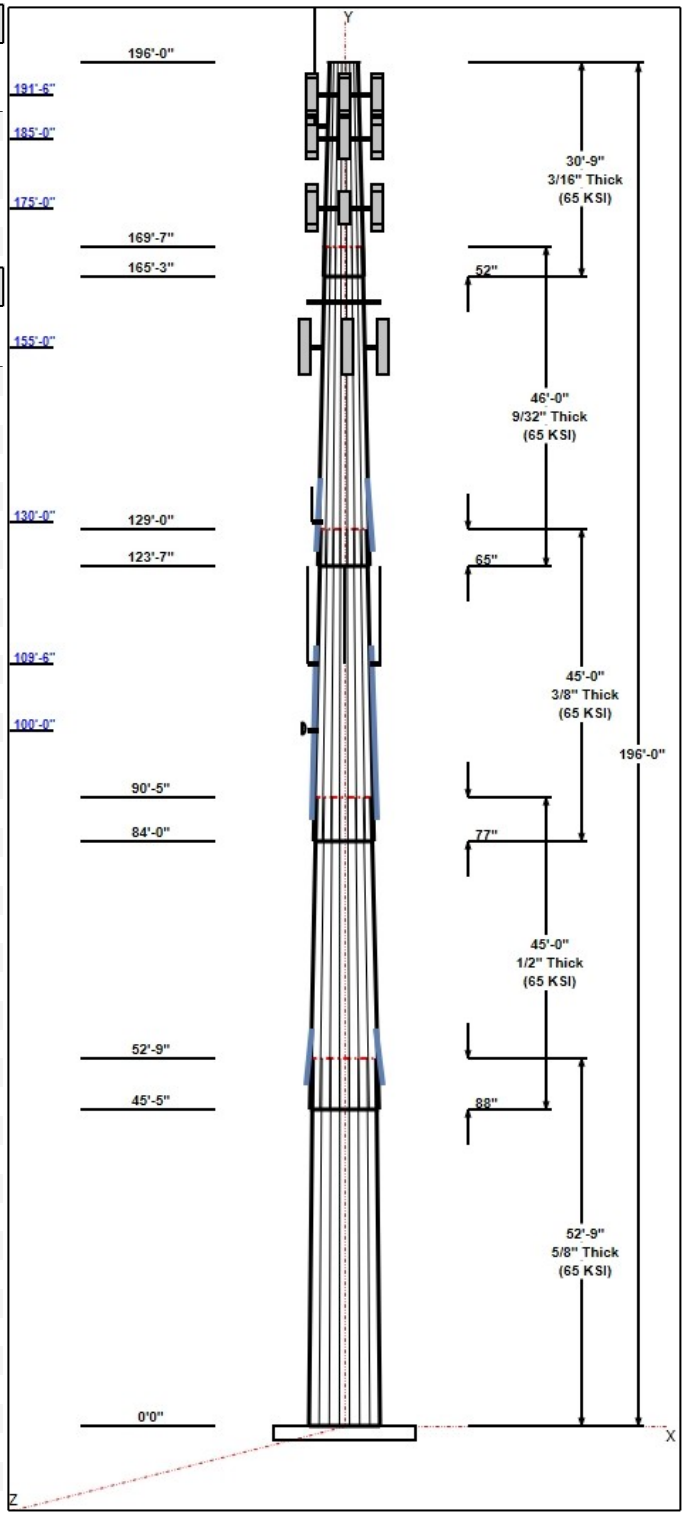
Tower Engineering Solutions

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	52.75	48.92	60.00	0.625		0.21000	65
2	45.00	42.01	51.46	0.500	Slip	0.21000	65
3	45.00	34.66	44.11	0.375	Slip	0.21000	65
4	46.00	26.70	36.36	0.281	Slip	0.21000	65
5	30.75	21.53	27.98	0.188	Slip	0.21000	65

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
196.00	196.00	1	6' Lightning rod	Torrington P.D.
191.50	191.50	3	APXVTM14-C-120	Sprint
191.50	191.50	3	APXVSPP18-C-A20	Sprint
191.50	191.50	3	800MHz - RRU	Sprint
191.50	191.50	3	1900MHz - RRU	Sprint
191.50	191.50	3	RRH8x20-25 - RRU	Sprint
191.50	191.50	3	800MHz Filter	Sprint
191.50	191.50	4	ACU-A20-N - RET	Sprint
191.50	191.50	1	Low Profile Platform	Sprint
187.00	197.33	1	BA80-41-DIN	Torrington P.D.
187.00	187.00	1	Pipe mount	Torrington P.D.
185.00	185.00	3	BXA-171063-8BF_2	Verizon
185.00	185.00	6	LPA-80063/4CF	Verizon
185.00	185.00	3	BXA-70063 6CF_2	Verizon
185.00	185.00	6	FD9R6004/2C-3L -	Verizon
185.00	185.00	1	Low Profile Platform	Verizon
175.00	175.00	6	Kathrein 800-10965	AT&T
175.00	175.00	1	HRK12 (Handrail Kit)	AT&T
175.00	175.00	2	Raycap	AT&T
175.00	175.00	3	Ericsson RRUS 32 B30	AT&T
175.00	175.00	3	Ericsson RRUS 4478 B14	AT&T
175.00	175.00	3	Ericsson RRUS 4449	AT&T
175.00	175.00	12	Powerwave LGP13519	AT&T
175.00	175.00	12	Powerwave LGP21401	AT&T
175.00	175.00	3	Powerwave 7770	AT&T
175.00	175.00	3	RRUS-12	AT&T
175.00	175.00	1	DC6-48-60-18-8F	AT&T
175.00	175.00	1	Low Profile Platform	AT&T
161.50	161.50	1	Low Profile Platform	Vacant
155.00	155.00	3	AIR 21 B4A/B2P	T-Mobile
155.00	155.00	3	AIR 21 B2A/B4P	T-Mobile
155.00	155.00	3	KRY 112 114 TMA	T-Mobile
155.00	155.00	3	T-Arms w/ Handrail kit &	T-Mobile
155.00	155.00	3	APXVAARR24_43-U-NA20	T-Mobile
155.00	155.00	3	Radio 4449 B71 + B12	T-Mobile
130.00	130.00	1	Standoff	Torrington P.D.
130.00	132.50	1	ANT150F2	Torrington P.D.
109.50	116.50	5	14' Omni	Torrington P.D.
109.50	111.50	1	4' Omni	Torrington P.D.
109.50	109.50	5	Standoff	Torrington P.D.
109.50	109.50	1	Standoff	Torrington P.D.
100.00	100.00	1	MPRD	Torrington P.D.
100.00	100.00	1	Standoff	Torrington P.D.



Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	191.50	Inside	1 5/8" Coax	Sprint
0.00	191.50	Inside	1-1/4" Fiber	Sprint
0.00	187.00	Inside	7/8" Coax	Torrington P.D.
0.00	185.00	Inside	1 5/8" Coax	Verizon
0.00	175.00	Inside	1 5/8" Coax	AT&T
0.00	175.00	Outside	2" Conduit	AT&T
0.00	175.00	Outside	3" Conduit	AT&T
0.00	175.00	Inside	3/4" DC	AT&T
0.00	175.00	Inside	7/16" Fiber	AT&T
0.00	155.00	Inside	1 5/8" Coax	T-Mobile
0.00	155.00	Inside	1 5/8" Fiber	T-Mobile
0.00	145.00	Inside	1 5/8" Coax	Metro PCS
0.00	130.00	Outside	7/8" Coax	Torrington P.D.
0.00	109.50	Inside	1/2" Coax	Torrington P.D.
0.00	100.00	Inside	CAT5e	Torrington P.D.

Anchor Bolts

Qty	Specifications	Grade (ksi)	Arrangement
28	2.25" 18J	75.0	Radial

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
3.0000	73.7	45.0	Polygon

Reactions

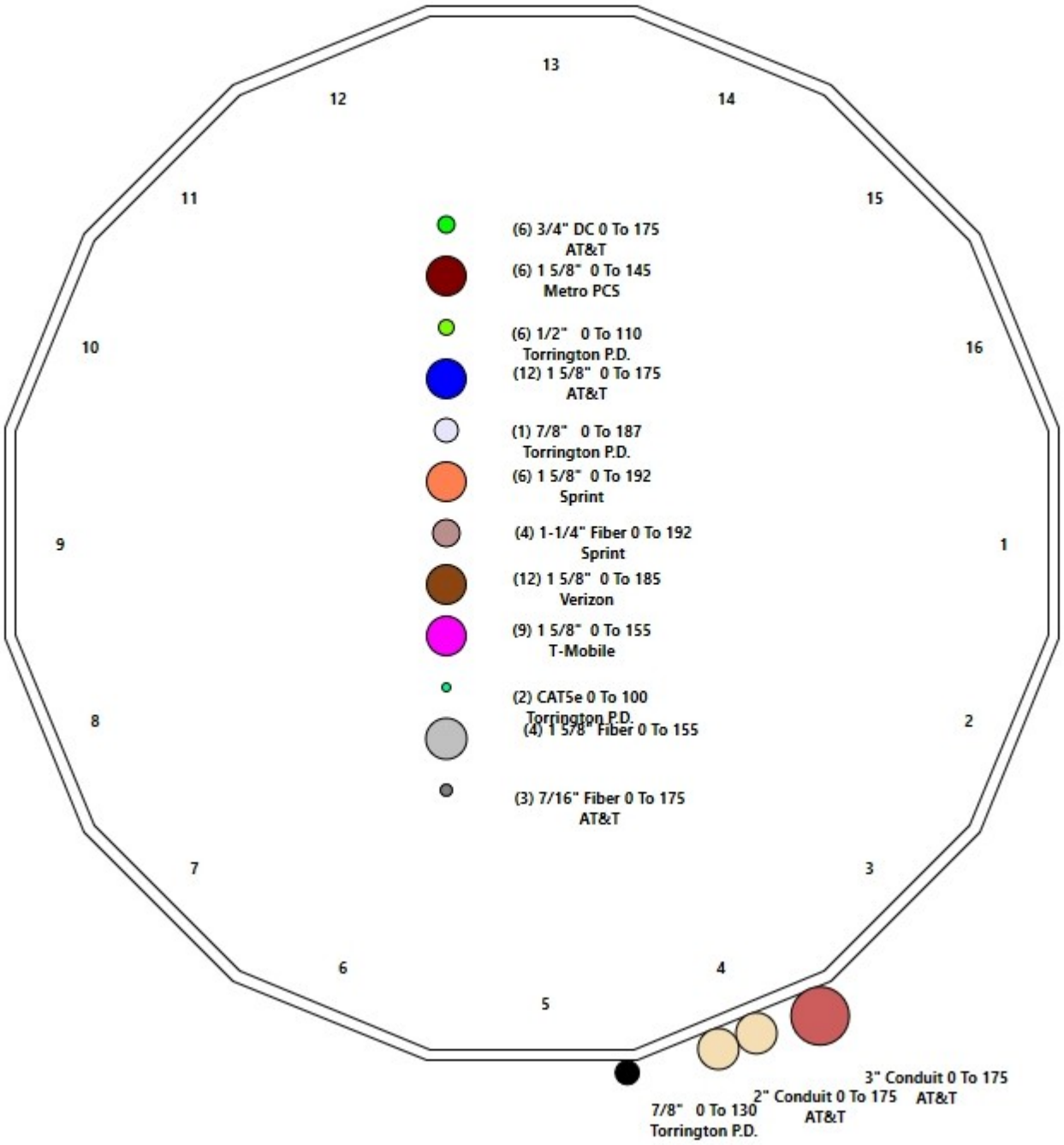
Load Case	Moment (FT-Kips)	Shear (Kips)	Axial (Kips)
1.2D + 1.6W 90 mph Wind	5766.9	41.9	80.5
0.9D + 1.6W 90 mph Wind	5693.1	41.8	60.4
1.2D + 1.0Di + 1.0Wi 40 mph Wind	1341.8	9.2	132.4
1.2D + 1.0E	325.1	2.5	80.6
0.9D + 1.0E	320.8	2.5	60.4
1.0D + 1.0W 60 mph Wind	1590.4	11.6	67.2

Structure: CT46138-A-SBA - Coax Line Placement

Type: Monopole
Site Name: Torrington/Oandg Ind Inc
Height: 196.00 (ft)

7/1/2019

Tower Engineering Solutions



Shaft Properties

Structure:	CT46138-A-SBA		**Code:**	EIA/TIA-222-G	7/1/2019
Site Name:	Torrington/Oandg Ind Inc		**Exposure:**	C	
Height:	196.00 (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	16	52.750	0.6250	65		0.00	19,266
2	16	45.000	0.5000	65	Slip	88.00	11,293
3	16	45.000	0.3750	65	Slip	77.00	7,146
4	16	46.000	0.2813	65	Slip	65.00	4,388
5	16	30.750	0.1875	65	Slip	52.00	1,538
					Total Shaft Weight:		**43,631**

	Bottom						Top						
Sec. No.	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Taper
1	60.00	0.00	118.3	52722.49	17.50	96.00	48.92	52.75	96.29	28376.2	13.98	78.28	0.210003
2	51.46	45.42	81.29	26670.08	18.88	102.92	42.01	90.42	66.21	14414.6	15.12	84.02	0.210003
3	44.11	84.00	52.32	12642.04	21.81	117.63	34.66	129.00	41.01	6090.27	16.79	92.43	0.210003
4	36.36	123.5	32.37	5322.81	24.12	129.28	26.70	169.58	23.70	2089.84	17.29	94.93	0.210003
5	27.98	165.2	16.63	1622.94	28.10	149.25	21.53	196.00	12.76	734.28	21.25	114.8	0.210003

Additional Steel

							Intermediate Connectors		Termination Connectors			
Elev From (ft)	Elev To (ft)	Qty	Description	Fy (ksi)	Fu (ksi)	Offset (in)	Description	Spacing (in)	Description	Spacing (in)	Lower Qty	Upper Qty
48.90	57.15	4	PLT 7.25x1.5(31mm Hole)	50	65	0.00	AJM20&sleeve	0.00	AJM20&sleeve	3.00	14	13
87.00	112.2	4	PLT 6.5x1.5(31mm Hole)	50	65	0.00	AJM20&sleeve	0.00	AJM20&sleeve	3.00	12	11
125.6	136.2	4	PLT 4.75x1.5(31mm Hole)	50	65	0.00	AJM20&sleeve	24.00	AJM20&sleeve	3.00	8	7

Discrete Appurtenances

				No Ice			Ice				
No.	Elev (ft)	Description	Qty	Weight (lb)	CaAa (sf)	CaAa Factor	Weight (lb)	CaAa (sf)	CaAa Factor	Hor. Ecc. (ft)	Vert Ecc (ft)
1	196.00	6' Lightning rod	1	6.50	0.38	1.00	56.21	1.869	1.00	0.00	0.00
2	191.50	APXVTM14-C-120	3	56.00	6.34	0.85	291.66	7.897	0.88	0.00	0.00
3	191.50	APXVSPP18-C-A20	3	57.00	8.02	0.83	293.17	11.837	0.85	0.00	0.00
4	191.50	800MHz - RRU	3	53.00	2.49	0.67	154.05	4.053	0.70	0.00	0.00
5	191.50	1900MHz - RRU	3	44.00	3.80	0.67	193.15	5.699	0.70	0.00	0.00
6	191.50	RRH8x20-25 - RRU	3	70.00	4.05	0.67	232.71	5.192	0.70	0.00	0.00
7	191.50	800MHz Filter	3	8.80	0.78	0.67	32.91	1.664	0.70	0.00	0.00
8	191.50	ACU-A20-N - RET	4	1.00	0.14	0.75	6.87	0.545	0.78	0.00	0.00
9	191.50	Low Profile Platform	1	1500.00	22.00	1.00	3288.37	46.131	1.00	0.00	0.00
10	187.00	BA80-41-DIN	1	68.00	9.40	1.00	423.55	34.963	1.00	0.00	10.33
11	187.00	Pipe mount	1	40.00	2.63	0.75	149.43	10.766	0.75	0.00	0.00
12	185.00	BXA-171063-8BF_2	3	10.50	2.94	0.87	99.74	5.198	0.90	0.00	0.00
13	185.00	LPA-80063/4CF	6	20.00	6.15	0.85	317.20	7.591	0.88	0.00	0.00
14	185.00	BXA-70063 6CF_2	3	17.00	7.57	0.82	218.92	11.333	0.85	0.00	0.00
15	185.00	FD9R6004/2C-3L - Diplexer	6	3.10	0.36	0.70	14.03	0.964	0.75	0.00	0.00
16	185.00	Low Profile Platform	1	1500.00	22.00	1.00	3282.20	46.048	1.00	0.00	0.00
17	175.00	Kathrein 800-10965	6	108.60	13.81	0.71	533.85	15.983	0.71	0.00	0.00
18	175.00	HRK12 (Handrail Kit)	1	261.72	6.75	1.00	682.28	15.682	1.00	0.00	0.00
19	175.00	Raycap DC6-48-60-18-8C-EV	2	16.00	4.78	1.00	183.54	5.977	1.00	0.00	0.00
20	175.00	Ericsson RRUS 32 B30	3	60.00	2.74	0.67	189.48	3.754	0.67	0.00	0.00
21	175.00	Ericsson RRUS 4478 B14	3	59.40	1.65	0.67	115.55	2.352	0.67	0.00	0.00
22	175.00	Ericsson RRUS 4449 B5/B12	3	71.00	1.97	0.67	143.28	2.711	0.67	0.00	0.00
23	175.00	Powerwave LGP13519 Diplexer	12	5.30	0.34	1.00	18.16	0.955	1.00	0.00	0.00
24	175.00	Powerwave LGP21401 TMA	12	14.10	1.29	1.00	47.95	2.422	1.00	0.00	0.00
25	175.00	Powerwave 7770	3	35.00	5.50	0.85	233.03	6.976	0.88	0.00	0.00
26	175.00	RRUS-12	3	50.00	2.70	0.67	133.84	4.157	0.70	0.00	0.00
27	175.00	DC6-48-60-18-8F	1	32.80	0.92	1.00	119.15	1.513	1.00	0.00	0.00
28	175.00	Low Profile Platform	1	1500.00	22.00	1.00	3272.33	45.915	1.00	0.00	0.00
29	161.50	Low Profile Platform	1	1500.00	22.00	1.00	3258.15	45.723	1.00	0.00	0.00
30	155.00	AIR 21 B4A/B2P	3	90.30	6.09	0.83	329.82	7.531	0.85	0.00	0.00
31	155.00	AIR 21 B2A/B4P	3	91.50	6.09	0.83	329.93	7.531	0.85	0.00	0.00
32	155.00	KRY 112 114 TMA	3	11.00	0.41	0.75	25.42	1.046	0.78	0.00	0.00
33	155.00	T-Arms w/ Handrail kit & v-brace kit	3	500.00	17.50	0.75	1433.84	36.130	0.75	0.00	0.00
34	155.00	APXVAARR24_43-U-NA20	3	128.00	20.24	0.70	711.31	22.814	0.70	0.00	0.00
35	155.00	Radio 4449 B71 + B12	3	71.00	1.97	0.67	142.41	2.702	0.67	0.00	0.00
36	130.00	Standoff	1	40.00	2.63	0.75	145.52	10.475	0.75	0.00	0.00
37	130.00	ANT150F2	1	13.00	1.23	1.00	56.47	2.623	1.00	0.00	2.50
38	109.50	14' Omni	5	40.00	4.20	1.00	176.81	10.663	1.00	0.00	7.00
39	109.50	4' Omni	1	10.00	1.00	1.00	50.41	2.117	1.00	0.00	2.00
40	109.50	Standoff	5	40.00	2.63	0.75	143.72	10.342	0.75	0.00	0.00
41	109.50	Standoff	1	40.00	2.63	0.75	143.72	10.342	0.75	0.00	0.00
42	100.00	MPRD	1	36.00	6.10	1.00	359.41	7.638	1.00	0.00	0.00
43	100.00	Standoff	1	40.00	2.63	0.75	142.79	10.272	0.75	0.00	0.00
		Totals:	**130**	**12,497.52**			**39,323.66**				

Linear Appurtenances

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)
Bottom Elev. (ft)	**Top Elev. (ft)**	**Description**		**Exposed Width**		**Exposed**					
0.00	191.50	(6) 1 5/8" Coax		0.00		Inside					
0.00	191.50	(4) 1-1/4" Fiber		0.00		Inside					
0.00	187.00	(1) 7/8" Coax		0.00		Inside					
0.00	185.00	(12) 1 5/8" Coax		0.00		Inside					
0.00	175.00	(12) 1 5/8" Coax		0.00		Inside					
0.00	175.00	(2) 2" Conduit		0.00		Outside					
0.00	175.00	(1) 3" Conduit		3.00		Outside					
0.00	175.00	(6) 3/4" DC		0.00		Inside					
0.00	175.00	(3) 7/16" Fiber		0.00		Inside					
0.00	155.00	(9) 1 5/8" Coax		0.00		Inside					
0.00	155.00	(4) 1 5/8" Fiber		0.00		Inside					
0.00	145.00	(6) 1 5/8" Coax		0.00		Inside					
0.00	130.00	(1) 7/8" Coax		0.52		Outside					
0.00	109.50	(6) 1/2" Coax		0.00		Inside					
0.00	100.00	(2) CAT5e		0.00		Inside					

Shaft Section Properties

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (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)**

											Additional Reinforcing			
Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fy (ksi)	Fb (ksi)	Weight (lb)	Area (in^2)	Ixp (in^4)	Iyp (in^4)	Weight (lb)
0.00		0.6250	60.000	118.379	52722.5	17.50	96.00	65	83	0.0				
5.00		0.6250	58.950	116.285	49974.6	17.17	94.32	65	83	1996.3				
10.00		0.6250	57.900	114.192	47323.8	16.84	92.64	65	83	1960.7				
15.00		0.6250	56.850	112.099	44768.5	16.50	90.96	65	83	1925.0				
20.00		0.6250	55.800	110.005	42306.9	16.17	89.28	65	83	1889.4				
25.00		0.6250	54.750	107.912	39937.2	15.83	87.60	65	83	1853.8				
30.00		0.6250	53.700	105.818	37657.6	15.50	85.92	65	83	1818.2				
35.00		0.6250	52.650	103.725	35466.6	15.17	84.24	65	83	1782.6				
40.00		0.6250	51.600	101.631	33362.2	14.83	82.56	65	83	1747.0				
45.00		0.6250	50.550	99.538	31342.7	14.50	80.88	65	83	1711.3				
45.42	Bot - Section 2	0.6250	50.462	99.363	31178.2	14.47	80.74	65	83	141.0				
48.90	RB1	0.6250	49.731	97.905	29825.3	14.24	79.57	65	83	2125.7	43.50	14933.2	14933.2	487.8
50.00		0.6250	49.500	97.444	29406.4	14.16	79.20	65	83	664.8	43.50	14802.3	14802.3	154.0
52.75	Top - Section 1	0.5000	49.922	78.829	24324.6	18.27	99.84	65	82	1648.4	43.50	14477.5	14477.5	385.1
55.00		0.5000	49.450	78.075	23633.6	18.08	98.90	65	82	600.6	43.50	14214.5	14214.5	315.1
57.15	RT1	0.5000	48.998	77.355	22985.6	17.90	98.00	65	82	568.6	43.50	13965.4	13965.4	301.1
60.00		0.5000	48.400	76.400	22145.1	17.66	96.80	65	83	745.6				
65.00		0.5000	47.350	74.725	20720.5	17.25	94.70	65	83	1285.6				
70.00		0.5000	46.300	73.051	19358.3	16.83	92.60	65	83	1257.1				
75.00		0.5000	45.250	71.376	18057.1	16.41	90.50	65	83	1228.6				
80.00		0.5000	44.200	69.701	16815.6	15.99	88.40	65	83	1200.1				
84.00	Bot - Section 3	0.5000	43.360	68.361	15864.5	15.66	86.72	65	83	939.6				
85.00		0.5000	43.150	68.026	15632.4	15.57	86.30	65	83	409.6				
87.00	RB2	0.5000	42.730	67.356	15175.1	15.41	85.46	65	83	813.3	39.00	9935.3	9935.3	265.4
90.00		0.5000	42.100	66.352	14506.0	15.16	84.20	65	83	1205.0	39.00	9661.0	9661.0	398.2
90.42	Top - Section 2	0.3750	42.762	50.706	11509.1	21.09	114.03	65	79	165.9	39.00	9623.2	9623.2	55.3
95.00		0.3750	41.800	49.554	10742.8	20.58	111.47	65	79	781.8	39.00	9212.3	9212.3	608.3
100.00		0.3750	40.750	48.298	9946.4	20.02	108.67	65	80	832.4	39.00	8774.4	8774.4	663.6
105.00		0.3750	39.700	47.042	9190.4	19.47	105.87	65	81	811.1	39.00	8347.2	8347.2	663.6
109.50		0.3750	38.755	45.912	8543.6	18.97	103.35	65	81	711.7	39.00	7972.0	7972.0	597.2
110.00		0.3750	38.650	45.786	8473.7	18.91	103.07	65	81	78.0	39.00	7930.8	7930.8	66.4
112.25	RT2	0.3750	38.177	45.221	8163.7	18.66	101.81	65	81	348.4	39.00	7746.9	7746.9	298.6
115.00		0.3750	37.600	44.530	7795.3	18.35	100.27	65	82	419.9				
120.00		0.3750	36.550	43.274	7154.0	17.80	97.47	65	82	746.9				
123.58	Bot - Section 4	0.3750	35.797	42.374	6716.8	17.40	95.46	65	83	522.2				
125.00		0.3750	35.500	42.018	6549.0	17.24	94.67	65	83	358.8				
125.60	RB3	0.3750	35.374	41.867	6478.8	17.17	94.33	65	83	151.1	28.50	5022.2	5022.2	58.2
129.00	Top - Section 3	0.2813	35.222	31.349	4835.0	23.32	125.23	65	76	845.8	28.50	4833.6	4833.6	329.7
130.00		0.2813	35.012	31.160	4748.4	23.17	124.49	65	76	106.4	28.50	4778.8	4778.8	97.0
135.00		0.2813	33.962	30.218	4330.6	22.43	120.75	65	77	522.1	28.50	4509.5	4509.5	484.9
136.26	RT3	0.2813	33.698	29.981	4229.3	22.24	119.81	65	77	129.1	28.50	4442.9	4442.9	122.2
140.00		0.2813	32.912	29.276	3938.1	21.69	117.02	65	78	377.1				
145.00		0.2813	31.862	28.334	3570.0	20.94	113.29	65	79	490.1				
150.00		0.2813	30.812	27.392	3225.6	20.20	109.55	65	80	474.1				
155.00		0.2813	29.762	26.450	2904.1	19.46	105.82	65	81	458.0				
160.00		0.2813	28.712	25.508	2604.8	18.72	102.09	65	81	442.0				
161.50		0.2813	28.397	25.225	2519.1	18.49	100.97	65	82	129.5				
165.00		0.2813	27.662	24.566	2326.7	17.97	98.35	65	82	296.5				
165.25	Bot - Section 5	0.2813	27.610	24.519	2313.3	17.94	98.17	65	82	20.9				
169.58	Top - Section 4	0.1875	27.075	16.082	1468.7	27.13	144.40	65	72	596.7				

Increment Length: **5 (ft)**

Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fy (ksi)	Fb (ksi)	Weight (lb)	Additional Reinforcing Area (in^2)	Additional Reinforcing Ixp (in^4)	Additional Reinforcing Iyp (in^4)	Additional Reinforcing Weight (lb)
170.00		0.1875	26.987	16.029	1454.4	27.04	143.93	65	72	22.8				
175.00		0.1875	25.937	15.401	1290.1	25.92	138.33	65	73	267.4				
180.00		0.1875	24.887	14.773	1138.6	24.81	132.73	65	74	256.7				
185.00		0.1875	23.837	14.145	999.5	23.70	127.13	65	76	246.0				
187.00		0.1875	23.417	13.894	947.2	23.25	124.89	65	76	95.4				
190.00		0.1875	22.787	13.517	872.2	22.58	121.53	65	77	139.9				
191.50		0.1875	22.472	13.329	836.2	22.25	119.85	65	77	68.5				
195.00		0.1875	21.737	12.889	756.2	21.47	115.93	65	78	156.1				
196.00		0.1875	21.527	12.764	734.3	21.25	114.81	65	79	43.6				
									Total Weight	**43630.8**				**6351.7**

Wind Loading - Shaft

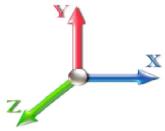
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 10	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 90 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 27

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	0.85	16.744	18.42	423.01	0.750	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	16.744	18.42	415.60	0.750	0.000	5.00	25.267	18.95	558.5	0.0	2395.5
10.00		1.00	0.85	16.744	18.42	408.20	0.750	0.000	5.00	24.821	18.62	548.6	0.0	2352.8
15.00		1.00	0.85	16.744	18.42	400.80	0.750	0.000	5.00	24.375	18.28	538.7	0.0	2310.0
20.00		1.00	0.90	17.766	19.54	405.23	0.750	0.000	5.00	23.929	17.95	561.2	0.0	2267.3
25.00		1.00	0.95	18.621	20.48	407.05	0.750	0.000	5.00	23.482	17.61	577.2	0.0	2224.6
30.00		1.00	0.98	19.350	21.28	406.98	0.750	0.000	5.00	23.036	17.28	588.4	0.0	2181.8
35.00		1.00	1.01	19.988	21.99	405.55	0.750	0.000	5.00	22.590	16.94	596.0	0.0	2139.1
40.00		1.00	1.04	20.558	22.61	403.09	0.750	0.000	5.00	22.144	16.61	600.9	0.0	2096.3
45.00		1.00	1.07	21.074	23.18	399.81	0.750	0.000	5.00	21.698	16.27	603.6	0.0	2053.6
45.42	Bot - Section 2	1.00	1.07	21.115	23.23	399.51	0.750	0.000	0.42	1.788	1.34	49.8	0.0	169.2
48.90	RB1	1.00	1.09	21.446	23.59	396.79	0.750	0.000	3.48	15.123	11.34	428.1	0.0	2550.8
50.00		1.00	1.09	21.547	23.70	395.87	0.750	0.000	1.10	4.731	3.55	134.5	0.0	797.8
52.75	Top - Section 1	1.00	1.11	21.791	23.97	393.47	0.750	0.000	2.75	11.732	8.80	337.5	0.0	1978.1
55.00		1.00	1.12	21.983	24.18	399.46	0.750	0.000	2.25	9.499	7.12	275.6	0.0	720.8
57.15	RT1	1.00	1.12	22.161	24.38	397.41	0.750	0.000	2.15	8.992	6.74	263.0	0.0	682.3
60.00		1.00	1.14	22.390	24.63	394.58	0.750	0.000	2.85	11.793	8.84	348.5	0.0	894.7
65.00		1.00	1.16	22.770	25.05	389.28	0.750	0.000	5.00	20.339	15.25	611.3	0.0	1542.7
70.00		1.00	1.17	23.128	25.44	383.63	0.750	0.000	5.00	19.893	14.92	607.3	0.0	1508.5
75.00		1.00	1.19	23.467	25.81	377.66	0.750	0.000	5.00	19.446	14.58	602.4	0.0	1474.4
80.00		1.00	1.21	23.788	26.17	371.41	0.750	0.000	5.00	19.000	14.25	596.6	0.0	1440.2
84.00	Bot - Section 3	1.00	1.22	24.033	26.44	366.23	0.750	0.000	4.00	14.879	11.16	472.0	0.0	1127.5
85.00		1.00	1.22	24.093	26.50	364.91	0.750	0.000	1.00	3.739	2.80	118.9	0.0	491.6
87.00	RB2	1.00	1.23	24.211	26.63	362.25	0.750	0.000	2.00	7.424	5.57	237.3	0.0	976.0
90.00		1.00	1.24	24.385	26.82	358.18	0.750	0.000	3.00	11.003	8.25	354.2	0.0	1446.0
90.42	Top - Section 2	1.00	1.24	24.408	26.85	357.61	0.750	0.000	0.42	1.515	1.14	48.8	0.0	199.1
95.00		1.00	1.25	24.664	27.13	357.66	0.750	0.000	4.58	16.465	12.35	536.1	0.0	938.2
100.00	Appurtenance(s)	1.00	1.27	24.932	27.42	350.56	0.750	0.000	5.00	17.535	13.15	577.1	0.0	998.9
105.00		1.00	1.28	25.189	27.71	343.29	0.750	0.000	5.00	17.089	12.82	568.2	0.0	973.3
109.50	Appurtenance(s)	1.00	1.29	25.413	27.95	336.60	0.750	0.000	4.50	14.998	11.25	503.1	0.0	854.0
110.00		1.00	1.29	25.437	27.98	335.85	0.750	0.000	0.50	1.644	1.23	55.2	0.0	93.6
112.25	RT2	1.00	1.30	25.546	28.10	332.45	0.750	0.000	2.25	7.344	5.51	247.6	0.0	418.1
115.00		1.00	1.30	25.676	28.24	328.26	0.750	0.000	2.75	8.853	6.64	300.0	0.0	503.9
120.00		1.00	1.32	25.907	28.50	320.52	0.750	0.000	5.00	15.750	11.81	538.6	0.0	896.3
123.58	Bot - Section 4	1.00	1.32	26.068	28.68	314.90	0.750	0.000	3.58	11.013	8.26	379.0	0.0	626.6
125.00		1.00	1.33	26.131	28.74	312.65	0.750	0.000	1.42	4.359	3.27	150.3	0.0	430.6
125.60	RB3	1.00	1.33	26.157	28.77	311.70	0.750	0.000	0.60	1.835	1.38	63.4	0.0	181.3
129.00	Top - Section 3	1.00	1.34	26.305	28.94	306.27	0.750	0.000	3.40	10.278	7.71	356.9	0.0	1015.0
130.00	Appurtenance(s)	1.00	1.34	26.348	28.98	309.64	0.750	0.000	1.00	2.984	2.24	103.8	0.0	127.6
135.00		1.00	1.35	26.558	29.21	301.55	0.750	0.000	5.00	14.651	10.99	513.6	0.0	626.6
136.26	RT3	1.00	1.35	26.610	29.27	299.49	0.750	0.000	1.26	3.622	2.72	127.2	0.0	154.9
140.00		1.00	1.36	26.762	29.44	293.34	0.750	0.000	3.74	10.583	7.94	373.9	0.0	452.5
145.00		1.00	1.37	26.960	29.66	285.04	0.750	0.000	5.00	13.759	10.32	489.6	0.0	588.1
150.00		1.00	1.38	27.153	29.87	276.63	0.750	0.000	5.00	13.313	9.98	477.2	0.0	568.9
155.00	Appurtenance(s)	1.00	1.39	27.341	30.08	268.13	0.750	0.000	5.00	12.867	9.65	464.4	0.0	549.6
160.00		1.00	1.40	27.525	30.28	259.53	0.751 *	0.000	5.00	12.421	9.33	452.1	0.0	530.4
161.50	Appurtenance(s)	1.00	1.40	27.579	30.34	256.94	0.757 *	0.000	1.50	3.639	2.75	133.7	0.0	155.4

Wind Loading - Shaft

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (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	

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165.00	1.00	1.41	27.704	30.47	250.85	0.761 *	0.000	3.50	8.335	6.34	309.4	0.0	355.8
165.25 Bot - Section 5	1.00	1.41	27.713	30.48	250.42	0.765 *	0.000	0.25	0.587	0.45	21.9	0.0	25.1
169.58 Top - Section 4	1.00	1.41	27.864	30.65	242.82	0.769 *	0.000	4.33	10.136	7.79	382.2	0.0	716.0
170.00	1.00	1.42	27.878	30.67	245.50	0.770 *	0.000	0.42	0.957	0.74	36.2	0.0	27.3
175.00 Appurtenance(s)	1.00	1.42	28.049	30.85	236.67	0.775 *	0.000	5.00	11.242	8.71	430.2	0.0	320.9
180.00	1.00	1.43	28.216	31.04	227.76	0.750	0.000	5.00	10.796	8.10	402.1	0.0	308.0
185.00 Appurtenance(s)	1.00	1.44	28.379	31.22	218.78	0.750	0.000	5.00	10.350	7.76	387.7	0.0	295.2
187.00 Appurtenance(s)	1.00	1.44	28.443	31.29	215.17	0.750	0.000	2.00	4.015	3.01	150.7	0.0	114.5
190.00	1.00	1.45	28.539	31.39	209.73	0.750	0.000	3.00	5.889	4.42	221.8	0.0	167.9
191.50 Appurtenance(s)	1.00	1.45	28.586	31.44	207.01	0.750	0.000	1.50	2.884	2.16	108.8	0.0	82.2
195.00	1.00	1.46	28.695	31.56	200.62	0.750	0.000	3.50	6.573	4.93	249.0	0.0	187.4
196.00 Appurtenance(s)	1.00	1.46	28.726	31.60	198.79	0.750	0.000	1.00	1.838	1.38	69.7	0.0	52.4
							Totals:	**196.00**			**20,839.6**		**52,356.9**

* Cf Adjusted by Linear Load Ra Effect

Discrete Appurtenance Forces

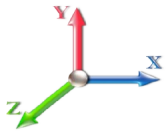
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 12	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 90 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 27

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	196.00	6' Lightning rod	1	28.726	31.599	1.00	1.00	0.38	7.80	0.000	0.000	19.21	0.00	0.00
2	191.50	Low Profile Platform	1	28.586	31.445	1.00	1.00	22.00	1800.00	0.000	0.000	1106.86	0.00	0.00
3	191.50	ACU-A20-N - RET	4	28.586	31.445	0.60	0.80	0.34	4.80	0.000	0.000	16.90	0.00	0.00
4	191.50	800MHz Filter	3	28.586	31.445	0.54	0.80	1.25	31.68	0.000	0.000	63.10	0.00	0.00
5	191.50	RRH8x20-25 - RRU	3	28.586	31.445	0.54	0.80	6.51	252.00	0.000	0.000	327.65	0.00	0.00
6	191.50	1900MHz - RRU	3	28.586	31.445	0.54	0.80	6.11	158.40	0.000	0.000	307.42	0.00	0.00
7	191.50	800MHz - RRU	3	28.586	31.445	0.54	0.80	4.00	190.80	0.000	0.000	201.44	0.00	0.00
8	191.50	APXVSPP18-C-A20	3	28.586	31.445	0.66	0.80	15.98	205.20	0.000	0.000	803.77	0.00	0.00
9	191.50	APXVTM14-C-120	3	28.586	31.445	0.68	0.80	12.93	201.60	0.000	0.000	650.71	0.00	0.00
10	187.00	BA80-41-DIN	1	28.767	31.644	1.00	1.00	9.40	81.60	0.000	10.333	475.93	0.00	4917.90
11	187.00	Pipe mount	1	28.443	31.288	0.56	0.75	1.48	48.00	0.000	0.000	74.06	0.00	0.00
12	185.00	BXA-70063 6CF_2	3	28.379	31.217	0.66	0.80	14.90	61.20	0.000	0.000	744.10	0.00	0.00
13	185.00	LPA-80063/4CF	6	28.379	31.217	0.68	0.80	25.09	144.00	0.000	0.000	1253.27	0.00	0.00
14	185.00	BXA-171063-8BF_2	3	28.379	31.217	0.70	0.80	6.14	37.80	0.000	0.000	306.61	0.00	0.00
15	185.00	FD9R6004/2C-3L -	6	28.379	31.217	0.56	0.80	1.21	22.32	0.000	0.000	60.42	0.00	0.00
16	185.00	Low Profile Platform	1	28.379	31.217	1.00	1.00	22.00	1800.00	0.000	0.000	1098.84	0.00	0.00
17	175.00	Low Profile Platform	1	28.049	30.854	1.00	1.00	22.00	1800.00	0.000	0.000	1086.06	0.00	0.00
18	175.00	DC6-48-60-18-8F	1	28.049	30.854	0.80	0.80	0.74	39.36	0.000	0.000	36.33	0.00	0.00
19	175.00	RRUS-12	3	28.049	30.854	0.54	0.80	4.34	180.00	0.000	0.000	214.33	0.00	0.00
20	175.00	Powerwave 7770	3	28.049	30.854	0.68	0.80	11.22	126.00	0.000	0.000	553.89	0.00	0.00
21	175.00	Powerwave LGP21401	12	28.049	30.854	0.75	0.75	11.61	203.04	0.000	0.000	573.14	0.00	0.00
22	175.00	Powerwave LGP13519	12	28.049	30.854	0.75	0.75	3.06	76.32	0.000	0.000	151.06	0.00	0.00
23	175.00	Ericsson RRUS 4449	3	28.049	30.854	0.50	0.75	2.97	255.60	0.000	0.000	146.61	0.00	0.00
24	175.00	Ericsson RRUS 4478 B14	3	28.049	30.854	0.50	0.75	2.49	213.84	0.000	0.000	122.79	0.00	0.00
25	175.00	Ericsson RRUS 32 B30	3	28.049	30.854	0.50	0.75	4.13	216.00	0.000	0.000	203.91	0.00	0.00
26	175.00	Raycap	2	28.049	30.854	1.00	1.00	9.56	38.40	0.000	0.000	471.94	0.00	0.00
27	175.00	HRK12 (Handrail Kit)	1	28.049	30.854	1.00	1.00	6.75	314.06	0.000	0.000	333.22	0.00	0.00
28	175.00	Kathrein 800-10965	6	28.049	30.854	0.53	0.75	44.12	781.92	0.000	0.000	2178.18	0.00	0.00
29	161.50	Low Profile Platform	1	27.579	30.337	1.00	1.00	22.00	1800.00	0.000	0.000	1067.86	0.00	0.00
30	155.00	AIR 21 B4A/B2P	3	27.341	30.076	0.66	0.80	12.13	325.08	0.000	0.000	583.77	0.00	0.00
31	155.00	AIR 21 B2A/B4P	3	27.341	30.076	0.66	0.80	12.13	329.40	0.000	0.000	583.77	0.00	0.00
32	155.00	KRY 112 114 TMA	3	27.341	30.076	0.60	0.80	0.74	39.60	0.000	0.000	35.51	0.00	0.00
33	155.00	APXVAARR24_43-U-NA2	3	27.341	30.076	0.56	0.80	34.00	460.80	0.000	0.000	1636.27	0.00	0.00
34	155.00	Radio 4449 B71 + B12	3	27.341	30.076	0.54	0.80	3.17	255.60	0.000	0.000	152.44	0.00	0.00
35	155.00	T-Arms w/ Handrail kit &	3	27.341	30.076	0.56	0.75	29.53	1800.00	0.000	0.000	1421.07	0.00	0.00
36	130.00	ANT150F2	1	26.453	29.099	1.00	1.00	1.23	15.60	0.000	2.500	57.27	0.00	143.17
37	130.00	Standoff	1	26.348	28.982	0.56	0.75	1.48	48.00	0.000	0.000	68.60	0.00	0.00
38	109.50	4' Omni	1	25.510	28.061	1.00	1.00	1.00	12.00	0.000	2.000	44.90	0.00	89.79
39	109.50	14' Omni	5	25.746	28.321	1.00	1.00	21.00	240.00	0.000	7.000	951.58	0.00	6661.08
40	109.50	Standoff	1	25.413	27.954	0.56	0.75	1.48	48.00	0.000	0.000	66.17	0.00	0.00
41	109.50	Standoff	5	25.413	27.954	0.56	0.75	7.40	240.00	0.000	0.000	330.83	0.00	0.00
42	100.00	Standoff	1	24.932	27.425	0.56	0.75	1.48	48.00	0.000	0.000	64.91	0.00	0.00
43	100.00	MPRD	1	24.932	27.425	1.00	1.00	6.10	43.20	0.000	0.000	267.67	0.00	0.00
							Totals:		**14,997.02**			**20,914.37**		

Total Applied Force Summary

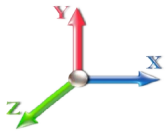
Structure:	CT46138-A-SBA		**Code:**	EIA/TIA-222-G	7/1/2019
Site Name:	Torrington/Oandg Ind Inc		**Exposure:**	C	
Height:	196.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 13

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 90 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 27

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		558.46	2782.69	0.00	0.00
10.00		548.60	2739.95	0.00	0.00
15.00		538.74	2697.20	0.00	0.00
20.00		561.16	2654.46	0.00	0.00
25.00		577.19	2611.72	0.00	0.00
30.00		588.38	2568.98	0.00	0.00
35.00		596.02	2526.24	0.00	0.00
40.00		600.91	2483.50	0.00	0.00
45.00		603.59	2440.76	0.00	0.00
45.42		49.84	201.47	0.00	0.00
48.90		428.10	2820.52	0.00	0.00
50.00		134.55	882.93	0.00	0.00
52.75		337.46	2191.04	0.00	0.00
55.00		275.63	895.00	0.00	0.00
57.15		263.05	848.75	0.00	0.00
60.00		348.52	1115.34	0.00	0.00
65.00		611.31	1929.90	0.00	0.00
70.00		607.30	1895.70	0.00	0.00
75.00		602.37	1861.51	0.00	0.00
80.00		596.60	1827.32	0.00	0.00
84.00		472.02	1437.24	0.00	0.00
85.00		118.91	569.01	0.00	0.00
87.00		237.27	1130.83	0.00	0.00
90.00		354.15	1678.30	0.00	0.00
90.42		48.83	231.39	0.00	0.00
95.00		536.05	1293.09	0.00	0.00
100.00	(2) attachments	909.65	1477.27	0.00	0.00
105.00		568.19	1360.18	0.00	0.00
109.50	(12) attachments	1896.60	1742.24	0.00	6750.88
110.00		55.21	131.72	0.00	0.00
112.25		247.63	589.58	0.00	0.00
115.00		300.05	713.55	0.00	0.00
120.00		538.63	1277.49	0.00	0.00
123.58		378.97	899.76	0.00	0.00
125.00		150.34	538.56	0.00	0.00
125.60		63.37	227.01	0.00	0.00
129.00		356.88	1274.18	0.00	0.00
130.00	(2) attachments	229.64	267.45	0.00	143.17
135.00		513.61	1004.61	0.00	0.00
136.26		127.21	250.13	0.00	0.00
140.00		373.86	735.25	0.00	0.00
145.00		489.65	966.14	0.00	0.00
150.00		477.17	909.46	0.00	0.00
155.00	(18) attachments	4877.20	4100.71	0.00	0.00
160.00		452.14	788.44	0.00	0.00
161.50	(1) attachments	1201.55	2032.78	0.00	0.00

Total Applied Force Summary

Structure:	CT46138-A-SBA		**Code:**	EIA/TIA-222-G	7/1/2019
Site Name:	Torrington/Oandg Ind Inc		**Exposure:**	C	
Height:	196.00 (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

165.00		309.37	536.42	0.00	0.00
165.25		21.89	37.96	0.00	0.00
169.58		382.15	939.63	0.00	0.00
170.00		36.15	48.82	0.00	0.00
175.00	(50) attachments	6501.67	4823.44	0.00	0.00
180.00		402.09	446.37	0.00	0.00
185.00	(19) attachments	3850.94	2498.87	0.00	0.00
187.00	(2) attachments	700.73	269.48	0.00	4917.90
190.00		221.83	204.10	0.00	0.00
191.50	(23) attachments	3586.69	2944.80	0.00	0.00
195.00		248.99	187.35	0.00	0.00
196.00	(1) attachments	88.91	60.17	0.00	0.00
	Totals:	**41,753.96**	**80,598.75**	**0.00**	**11,811.94**

Linear Appurtenance Segment Forces (Factored)

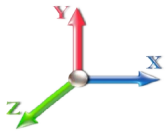
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 15	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 90 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 27

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	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.058	0.000	16.744	0.00	19.32
5.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.058	0.000	16.744	0.00	9.66
5.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.058	0.000	16.744	0.00	3.12
10.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.059	0.000	16.744	0.00	19.32
10.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.059	0.000	16.744	0.00	9.66
10.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.059	0.000	16.744	0.00	3.12
15.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.060	0.000	16.744	0.00	19.32
15.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.060	0.000	16.744	0.00	9.66
15.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.060	0.000	16.744	0.00	3.12
20.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.061	0.000	17.766	0.00	19.32
20.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.061	0.000	17.766	0.00	9.66
20.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.061	0.000	17.766	0.00	3.12
25.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.062	0.000	18.621	0.00	19.32
25.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.062	0.000	18.621	0.00	9.66
25.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.062	0.000	18.621	0.00	3.12
30.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.064	0.000	19.350	0.00	19.32
30.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.064	0.000	19.350	0.00	9.66
30.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.064	0.000	19.350	0.00	3.12
35.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.065	0.000	19.988	0.00	19.32
35.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.065	0.000	19.988	0.00	9.66
35.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.065	0.000	19.988	0.00	3.12
40.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.066	0.000	20.558	0.00	19.32
40.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.066	0.000	20.558	0.00	9.66
40.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.066	0.000	20.558	0.00	3.12
45.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.068	0.000	21.074	0.00	19.32
45.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.068	0.000	21.074	0.00	9.66
45.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.068	0.000	21.074	0.00	3.12
45.42	2" Conduit	Yes	0.42	0.000	0.00	0.00	0.00	0.068	0.000	21.115	0.00	1.61
45.42	3" Conduit	Yes	0.42	0.000	3.00	0.10	0.00	0.068	0.000	21.115	0.00	0.81
45.42	7/8" Coax	Yes	0.42	0.000	0.52	0.02	0.00	0.068	0.000	21.115	0.00	0.26
48.90	2" Conduit	Yes	3.48	0.000	0.00	0.00	0.00	0.069	0.000	21.446	0.00	13.46
48.90	3" Conduit	Yes	3.48	0.000	3.00	0.87	0.00	0.069	0.000	21.446	0.00	6.73
48.90	7/8" Coax	Yes	3.48	0.000	0.52	0.15	0.00	0.069	0.000	21.446	0.00	2.17
50.00	2" Conduit	Yes	1.10	0.000	0.00	0.00	0.00	0.070	0.000	21.547	0.00	4.25
50.00	3" Conduit	Yes	1.10	0.000	3.00	0.28	0.00	0.070	0.000	21.547	0.00	2.13
50.00	7/8" Coax	Yes	1.10	0.000	0.52	0.05	0.00	0.070	0.000	21.547	0.00	0.69
52.75	2" Conduit	Yes	2.75	0.000	0.00	0.00	0.00	0.070	0.000	21.791	0.00	10.63
52.75	3" Conduit	Yes	2.75	0.000	3.00	0.69	0.00	0.070	0.000	21.791	0.00	5.31
52.75	7/8" Coax	Yes	2.75	0.000	0.52	0.12	0.00	0.070	0.000	21.791	0.00	1.72
55.00	2" Conduit	Yes	2.25	0.000	0.00	0.00	0.00	0.069	0.000	21.983	0.00	8.69
55.00	3" Conduit	Yes	2.25	0.000	3.00	0.56	0.00	0.069	0.000	21.983	0.00	4.35
55.00	7/8" Coax	Yes	2.25	0.000	0.52	0.10	0.00	0.069	0.000	21.983	0.00	1.40
57.15	2" Conduit	Yes	2.15	0.000	0.00	0.00	0.00	0.070	0.000	22.161	0.00	8.31
57.15	3" Conduit	Yes	2.15	0.000	3.00	0.54	0.00	0.070	0.000	22.161	0.00	4.15
57.15	7/8" Coax	Yes	2.15	0.000	0.52	0.09	0.00	0.070	0.000	22.161	0.00	1.34
60.00	2" Conduit	Yes	2.85	0.000	0.00	0.00	0.00	0.071	0.000	22.390	0.00	11.01
60.00	3" Conduit	Yes	2.85	0.000	3.00	0.71	0.00	0.071	0.000	22.390	0.00	5.51

Linear Appurtenance Segment Forces (Factored)

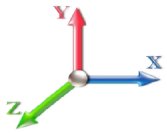
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 16	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 90 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 27

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)
60.00	7/8" Coax	Yes	2.85	0.000	0.52	0.12	0.00	0.071	0.000	22.390	0.00	1.78
65.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.072	0.000	22.770	0.00	19.32
65.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.072	0.000	22.770	0.00	9.66
65.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.072	0.000	22.770	0.00	3.12
70.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.074	0.000	23.128	0.00	19.32
70.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.074	0.000	23.128	0.00	9.66
70.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.074	0.000	23.128	0.00	3.12
75.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.075	0.000	23.467	0.00	19.32
75.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.075	0.000	23.467	0.00	9.66
75.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.075	0.000	23.467	0.00	3.12
80.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.077	0.000	23.788	0.00	19.32
80.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.077	0.000	23.788	0.00	9.66
80.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.077	0.000	23.788	0.00	3.12
84.00	2" Conduit	Yes	4.00	0.000	0.00	0.00	0.00	0.079	0.000	24.033	0.00	15.46
84.00	3" Conduit	Yes	4.00	0.000	3.00	1.00	0.00	0.079	0.000	24.033	0.00	7.73
84.00	7/8" Coax	Yes	4.00	0.000	0.52	0.17	0.00	0.079	0.000	24.033	0.00	2.50
85.00	2" Conduit	Yes	1.00	0.000	0.00	0.00	0.00	0.080	0.000	24.093	0.00	3.86
85.00	3" Conduit	Yes	1.00	0.000	3.00	0.25	0.00	0.080	0.000	24.093	0.00	1.93
85.00	7/8" Coax	Yes	1.00	0.000	0.52	0.04	0.00	0.080	0.000	24.093	0.00	0.62
87.00	2" Conduit	Yes	2.00	0.000	0.00	0.00	0.00	0.080	0.000	24.211	0.00	7.73
87.00	3" Conduit	Yes	2.00	0.000	3.00	0.50	0.00	0.080	0.000	24.211	0.00	3.86
87.00	7/8" Coax	Yes	2.00	0.000	0.52	0.09	0.00	0.080	0.000	24.211	0.00	1.25
90.00	2" Conduit	Yes	3.00	0.000	0.00	0.00	0.00	0.081	0.000	24.385	0.00	11.59
90.00	3" Conduit	Yes	3.00	0.000	3.00	0.75	0.00	0.081	0.000	24.385	0.00	5.80
90.00	7/8" Coax	Yes	3.00	0.000	0.52	0.13	0.00	0.081	0.000	24.385	0.00	1.87
90.42	2" Conduit	Yes	0.42	0.000	0.00	0.00	0.00	0.082	0.000	24.408	0.00	1.61
90.42	3" Conduit	Yes	0.42	0.000	3.00	0.10	0.00	0.082	0.000	24.408	0.00	0.81
90.42	7/8" Coax	Yes	0.42	0.000	0.52	0.02	0.00	0.082	0.000	24.408	0.00	0.26
95.00	2" Conduit	Yes	4.58	0.000	0.00	0.00	0.00	0.082	0.000	24.664	0.00	17.71
95.00	3" Conduit	Yes	4.58	0.000	3.00	1.15	0.00	0.082	0.000	24.664	0.00	8.85
95.00	7/8" Coax	Yes	4.58	0.000	0.52	0.20	0.00	0.082	0.000	24.664	0.00	2.86
100.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.084	0.000	24.932	0.00	19.32
100.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.084	0.000	24.932	0.00	9.66
100.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.084	0.000	24.932	0.00	3.12
105.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.086	0.000	25.189	0.00	19.32
105.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.086	0.000	25.189	0.00	9.66
105.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.086	0.000	25.189	0.00	3.12
109.50	2" Conduit	Yes	4.50	0.000	0.00	0.00	0.00	0.088	0.000	25.413	0.00	17.39
109.50	3" Conduit	Yes	4.50	0.000	3.00	1.13	0.00	0.088	0.000	25.413	0.00	8.69
109.50	7/8" Coax	Yes	4.50	0.000	0.52	0.20	0.00	0.088	0.000	25.413	0.00	2.81
110.00	2" Conduit	Yes	0.50	0.000	0.00	0.00	0.00	0.089	0.000	25.437	0.00	1.93
110.00	3" Conduit	Yes	0.50	0.000	3.00	0.13	0.00	0.089	0.000	25.437	0.00	0.97
110.00	7/8" Coax	Yes	0.50	0.000	0.52	0.02	0.00	0.089	0.000	25.437	0.00	0.31
112.25	2" Conduit	Yes	2.25	0.000	0.00	0.00	0.00	0.090	0.000	25.546	0.00	8.69
112.25	3" Conduit	Yes	2.25	0.000	3.00	0.56	0.00	0.090	0.000	25.546	0.00	4.35
112.25	7/8" Coax	Yes	2.25	0.000	0.52	0.10	0.00	0.090	0.000	25.546	0.00	1.40
115.00	2" Conduit	Yes	2.75	0.000	0.00	0.00	0.00	0.091	0.000	25.676	0.00	10.63

Linear Appurtenance Segment Forces (Factored)

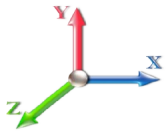
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 17	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 90 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 27

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)
115.00	3" Conduit	Yes	2.75	0.000	3.00	0.69	0.00	0.091	0.000	25.676	0.00	5.31
115.00	7/8" Coax	Yes	2.75	0.000	0.52	0.12	0.00	0.091	0.000	25.676	0.00	1.72
120.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.093	0.000	25.907	0.00	19.32
120.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.093	0.000	25.907	0.00	9.66
120.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.093	0.000	25.907	0.00	3.12
123.58	2" Conduit	Yes	3.58	0.000	0.00	0.00	0.00	0.095	0.000	26.068	0.00	13.85
123.58	3" Conduit	Yes	3.58	0.000	3.00	0.90	0.00	0.095	0.000	26.068	0.00	6.92
123.58	7/8" Coax	Yes	3.58	0.000	0.52	0.16	0.00	0.095	0.000	26.068	0.00	2.24
125.00	2" Conduit	Yes	1.42	0.000	0.00	0.00	0.00	0.097	0.000	26.131	0.00	5.47
125.00	3" Conduit	Yes	1.42	0.000	3.00	0.35	0.00	0.097	0.000	26.131	0.00	2.74
125.00	7/8" Coax	Yes	1.42	0.000	0.52	0.06	0.00	0.097	0.000	26.131	0.00	0.88
125.60	2" Conduit	Yes	0.60	0.000	0.00	0.00	0.00	0.097	0.000	26.157	0.00	2.32
125.60	3" Conduit	Yes	0.60	0.000	3.00	0.15	0.00	0.097	0.000	26.157	0.00	1.16
125.60	7/8" Coax	Yes	0.60	0.000	0.52	0.03	0.00	0.097	0.000	26.157	0.00	0.37
129.00	2" Conduit	Yes	3.40	0.000	0.00	0.00	0.00	0.099	0.000	26.305	0.00	13.14
129.00	3" Conduit	Yes	3.40	0.000	3.00	0.85	0.00	0.099	0.000	26.305	0.00	6.57
129.00	7/8" Coax	Yes	3.40	0.000	0.52	0.15	0.00	0.099	0.000	26.305	0.00	2.12
130.00	2" Conduit	Yes	1.00	0.000	0.00	0.00	0.00	0.098	0.000	26.348	0.00	3.86
130.00	3" Conduit	Yes	1.00	0.000	3.00	0.25	0.00	0.098	0.000	26.348	0.00	1.93
130.00	7/8" Coax	Yes	1.00	0.000	0.52	0.04	0.00	0.098	0.000	26.348	0.00	0.62
135.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.085	0.000	26.558	0.00	19.32
135.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.085	0.000	26.558	0.00	9.66
136.26	2" Conduit	Yes	1.26	0.000	0.00	0.00	0.00	0.087	0.000	26.610	0.00	4.87
136.26	3" Conduit	Yes	1.26	0.000	3.00	0.31	0.00	0.087	0.000	26.610	0.00	2.43
140.00	2" Conduit	Yes	3.74	0.000	0.00	0.00	0.00	0.088	0.000	26.762	0.00	14.45
140.00	3" Conduit	Yes	3.74	0.000	3.00	0.94	0.00	0.088	0.000	26.762	0.00	7.23
145.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.091	0.000	26.960	0.00	19.32
145.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.091	0.000	26.960	0.00	9.66
150.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.094	0.000	27.153	0.00	19.32
150.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.094	0.000	27.153	0.00	9.66
155.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.097	0.000	27.341	0.00	19.32
155.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.097	0.000	27.341	0.00	9.66
160.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.101	1.002	27.525	0.00	19.32
160.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.101	1.002	27.525	0.00	9.66
161.50	2" Conduit	Yes	1.50	0.000	0.00	0.00	0.00	0.103	1.009	27.579	0.00	5.80
161.50	3" Conduit	Yes	1.50	0.000	3.00	0.38	0.00	0.103	1.009	27.579	0.00	2.90
165.00	2" Conduit	Yes	3.50	0.000	0.00	0.00	0.00	0.105	1.015	27.704	0.00	13.52
165.00	3" Conduit	Yes	3.50	0.000	3.00	0.88	0.00	0.105	1.015	27.704	0.00	6.76
165.25	2" Conduit	Yes	0.25	0.000	0.00	0.00	0.00	0.106	1.019	27.713	0.00	0.97
165.25	3" Conduit	Yes	0.25	0.000	3.00	0.06	0.00	0.106	1.019	27.713	0.00	0.48
169.58	2" Conduit	Yes	4.33	0.000	0.00	0.00	0.00	0.108	1.025	27.864	0.00	16.74
169.58	3" Conduit	Yes	4.33	0.000	3.00	1.08	0.00	0.108	1.025	27.864	0.00	8.37
170.00	2" Conduit	Yes	0.42	0.000	0.00	0.00	0.00	0.109	1.027	27.878	0.00	1.61
170.00	3" Conduit	Yes	0.42	0.000	3.00	0.10	0.00	0.109	1.027	27.878	0.00	0.81
175.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.111	1.034	28.049	0.00	19.32
175.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.111	1.034	28.049	0.00	9.66

Linear Appurtenance Segment Forces (Factored)

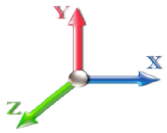
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 18	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 90 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 27

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)
										Totals:	**0.0**	**1,095.4**

Calculated Forces

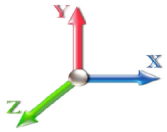
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 19	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 90 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 27

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	-80.54	-41.86	0.00	-5766.8	0.00	5766.87	8794.96	4397.48	21496.0	10671.5	0.00	0.000	0.000	0.550
5.00	-77.65	-41.51	0.00	-5557.5	0.00	5557.56	8639.43	4319.71	20738.5	10295.5	0.08	-0.153	0.000	0.549
10.00	-74.80	-41.15	0.00	-5350.0	0.00	5350.01	8483.89	4241.95	19994.7	9926.22	0.33	-0.308	0.000	0.548
15.00	-71.99	-40.80	0.00	-5144.2	0.00	5144.25	8328.36	4164.18	19264.4	9563.67	0.73	-0.466	0.000	0.547
20.00	-69.23	-40.41	0.00	-4940.2	0.00	4940.26	8172.83	4086.41	18547.7	9207.87	1.31	-0.626	0.000	0.545
25.00	-66.51	-39.99	0.00	-4738.2	0.00	4738.23	8017.29	4008.65	17844.6	8858.82	2.05	-0.789	0.000	0.543
30.00	-63.84	-39.55	0.00	-4538.3	0.00	4538.30	7861.76	3930.88	17155.1	8516.51	2.96	-0.954	0.000	0.541
35.00	-61.21	-39.08	0.00	-4340.5	0.00	4340.57	7706.22	3853.11	16479.1	8180.95	4.05	-1.122	0.000	0.539
40.00	-58.62	-38.61	0.00	-4145.1	0.00	4145.15	7550.69	3775.35	15816.8	7852.13	5.32	-1.292	0.000	0.536
45.00	-56.13	-38.04	0.00	-3952.1	0.00	3952.12	7395.16	3697.58	15168.0	7530.06	6.76	-1.464	0.000	0.533
45.42	-55.89	-38.05	0.00	-3936.2	0.00	3936.27	7382.20	3691.10	15114.6	7503.52	6.89	-1.479	0.000	0.532
48.90	-53.03	-37.61	0.00	-3803.7	0.00	3803.74	7273.84	3636.92	14671.4	7283.52	8.02	-1.602	0.000	0.353
50.00	-52.12	-37.50	0.00	-3762.3	0.00	3762.37	7239.62	3619.81	14532.8	7214.73	8.39	-1.629	0.000	0.352
52.75	-49.90	-37.15	0.00	-3659.2	0.00	3659.25	5810.43	2905.21	11825.7	5870.80	9.35	-1.694	0.000	0.359
55.00	-48.98	-36.89	0.00	-3575.6	0.00	3575.67	5769.82	2884.91	11629.7	5773.48	10.16	-1.748	0.000	0.392
57.15	-48.10	-36.66	0.00	-3496.3	0.00	3496.36	5730.75	2865.38	11443.3	5680.95	10.96	-1.806	0.000	0.388
57.15	-48.10	-36.66	0.00	-3496.3	0.00	3496.36	5730.75	2865.38	11443.3	5680.95	10.96	-1.806	0.000	0.388
60.00	-46.90	-36.39	0.00	-3391.8	0.00	3391.88	5678.55	2839.28	11197.7	5559.03	12.06	-1.881	0.000	0.619
65.00	-44.86	-35.88	0.00	-3209.9	0.00	3209.91	5551.73	2775.86	10705.1	5314.51	14.14	-2.093	0.000	0.612
70.00	-42.86	-35.36	0.00	-3030.5	0.00	3030.50	5427.30	2713.65	10228.2	5077.73	16.45	-2.307	0.000	0.605
75.00	-40.89	-34.84	0.00	-2853.6	0.00	2853.68	5302.88	2651.44	9762.15	4846.34	18.98	-2.524	0.000	0.597
80.00	-38.98	-34.29	0.00	-2679.4	0.00	2679.49	5178.45	2589.22	9306.93	4620.35	21.74	-2.742	0.000	0.588
84.00	-37.50	-33.82	0.00	-2542.3	0.00	2542.32	5078.91	2539.45	8950.59	4443.45	24.11	-2.918	0.000	0.580
85.00	-36.90	-33.72	0.00	-2508.4	0.00	2508.49	5054.02	2527.01	8862.59	4399.76	24.73	-2.964	0.000	0.578
87.00	-35.73	-33.48	0.00	-2441.0	0.00	2441.06	5004.25	2502.13	8687.89	4313.04	25.99	-3.054	0.000	0.347
90.00	-34.05	-33.06	0.00	-2340.6	0.00	2340.63	4929.59	2464.80	8429.11	4184.57	27.93	-3.135	0.000	0.340
90.42	-33.78	-33.04	0.00	-2326.8	0.00	2326.85	3591.78	1795.89	6277.53	3116.43	28.21	-3.146	0.000	0.362
95.00	-32.44	-32.51	0.00	-2175.4	0.00	2175.43	3535.98	1767.99	6038.44	2997.74	31.29	-3.268	0.000	0.396
100.00	-30.94	-31.59	0.00	-2012.9	0.00	2012.90	3473.75	1736.87	5780.45	2869.66	34.79	-3.418	0.000	0.378
105.00	-29.54	-31.01	0.00	-1854.9	0.00	1854.94	3410.09	1705.04	5525.58	2743.13	38.44	-3.565	0.000	0.359
109.50	-27.89	-29.05	0.00	-1708.6	0.00	1708.63	3351.58	1675.79	5299.03	2630.66	41.87	-3.695	0.000	0.341
110.00	-27.74	-29.00	0.00	-1694.1	0.00	1694.10	3345.00	1672.50	5274.03	2618.25	42.25	-3.710	0.000	0.339
112.25	-27.13	-28.75	0.00	-1628.8	0.00	1628.85	3315.25	1657.63	5161.96	2562.62	44.02	-3.775	0.000	0.331
112.25	-27.13	-28.75	0.00	-1628.8	0.00	1628.85	3315.25	1657.63	5161.96	2562.62	44.02	-3.775	0.000	0.331
115.00	-26.35	-28.48	0.00	-1549.7	0.00	1549.79	3278.49	1639.25	5025.98	2495.11	46.21	-3.853	0.000	0.629
120.00	-25.00	-27.96	0.00	-1407.3	0.00	1407.37	3210.56	1605.28	4781.62	2373.80	50.39	-4.122	0.000	0.601
123.58	-24.07	-27.57	0.00	-1307.1	0.00	1307.18	3148.16	1574.08	4590.15	2278.75	53.56	-4.316	0.000	0.582
125.00	-23.52	-27.40	0.00	-1268.1	0.00	1268.12	3121.72	1560.86	4512.97	2240.43	54.85	-4.393	0.000	0.574
125.60	-23.26	-27.35	0.00	-1251.6	0.00	1251.68	3110.52	1555.26	4480.48	2224.30	55.40	-4.426	0.000	0.322
129.00	-21.99	-26.92	0.00	-1158.6	0.00	1158.69	2149.47	1074.74	3099.22	1538.58	58.59	-4.527	0.000	0.339
130.00	-21.70	-26.71	0.00	-1131.6	0.00	1131.63	2141.27	1070.63	3068.69	1523.43	59.54	-4.557	0.000	0.376
135.00	-20.69	-26.15	0.00	-998.10	0.00	998.10	2099.38	1049.69	2916.97	1448.11	64.39	-4.716	0.000	0.343
136.26	-20.42	-26.03	0.00	-965.15	0.00	965.15	2088.60	1044.30	2879.00	1429.26	65.64	-4.756	0.000	0.335
136.26	-20.42	-26.03	0.00	-965.15	0.00	965.15	2088.60	1044.30	2879.00	1429.26	65.64	-4.756	0.000	0.335
140.00	-19.62	-25.66	0.00	-867.81	0.00	867.81	2056.07	1028.04	2766.99	1373.65	69.41	-4.868	0.000	0.642
145.00	-18.58	-25.18	0.00	-739.49	0.00	739.49	2011.34	1005.67	2618.95	1300.16	74.66	-5.159	0.000	0.579
150.00	-17.61	-24.70	0.00	-613.57	0.00	613.57	1965.18	982.59	2473.01	1227.71	80.20	-5.428	0.000	0.509
155.00	-13.92	-19.51	0.00	-490.06	0.00	490.06	1917.59	958.80	2329.38	1156.40	86.01	-5.672	0.000	0.431

Calculated Forces

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (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

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160.00	-13.14	-19.01	0.00	-392.52	0.00	392.52	1868.58	934.29	2188.24	1086.34	92.06	-5.888	0.000	0.369
161.50	-11.21	-17.62	0.00	-364.01	0.00	364.01	1853.60	926.80	2146.41	1065.57	93.92	-5.950	0.000	0.348
165.00	-10.69	-17.27	0.00	-302.32	0.00	302.32	1818.15	909.07	2049.77	1017.59	98.32	-6.081	0.000	0.303
165.25	-10.63	-17.26	0.00	-298.00	0.00	298.00	1815.59	907.79	2042.92	1014.19	98.64	-6.091	0.000	0.300
169.58	-9.72	-16.79	0.00	-223.21	0.00	223.21	1040.26	520.13	1155.41	573.59	104.23	-6.230	0.000	0.400
170.00	-9.64	-16.77	0.00	-216.21	0.00	216.21	1038.39	519.19	1149.55	570.68	104.77	-6.242	0.000	0.389
175.00	-5.54	-9.79	0.00	-132.37	0.00	132.37	1015.17	507.59	1079.51	535.91	111.40	-6.412	0.000	0.253
180.00	-5.13	-9.35	0.00	-83.43	0.00	83.43	990.53	495.27	1010.05	501.43	118.17	-6.531	0.000	0.172
185.00	-3.08	-5.24	0.00	-36.70	0.00	36.70	964.47	482.24	941.35	467.32	125.04	-6.606	0.000	0.082
187.00	-2.89	-4.51	0.00	-21.30	0.00	21.30	953.65	476.82	914.12	453.81	127.80	-6.624	0.000	0.050
190.00	-2.72	-4.27	0.00	-7.77	0.00	7.77	936.98	468.49	873.60	433.69	131.96	-6.638	0.000	0.021
191.50	-0.21	-0.36	0.00	-1.37	0.00	1.37	928.46	464.23	853.48	423.70	134.04	-6.640	0.000	0.003
195.00	-0.05	-0.10	0.00	-0.10	0.00	0.10	908.07	454.03	806.98	400.62	138.90	-6.641	0.000	0.000
196.00	0.00	-0.09	0.00	0.00	0.00	0.00	902.11	451.06	793.81	394.08	140.29	-6.641	0.000	0.000

Wind Loading - Shaft

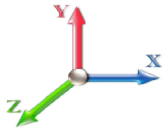
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 21	

TES Tower Engineering Solutions

Load Case: 0.9D + 1.6W 90 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 26

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	0.85	16.744	18.42	423.01	0.750	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	16.744	18.42	415.60	0.750	0.000	5.00	25.267	18.95	558.5	0.0	1796.6
10.00		1.00	0.85	16.744	18.42	408.20	0.750	0.000	5.00	24.821	18.62	548.6	0.0	1764.6
15.00		1.00	0.85	16.744	18.42	400.80	0.750	0.000	5.00	24.375	18.28	538.7	0.0	1732.5
20.00		1.00	0.90	17.766	19.54	405.23	0.750	0.000	5.00	23.929	17.95	561.2	0.0	1700.5
25.00		1.00	0.95	18.621	20.48	407.05	0.750	0.000	5.00	23.482	17.61	577.2	0.0	1668.4
30.00		1.00	0.98	19.350	21.28	406.98	0.750	0.000	5.00	23.036	17.28	588.4	0.0	1636.4
35.00		1.00	1.01	19.988	21.99	405.55	0.750	0.000	5.00	22.590	16.94	596.0	0.0	1604.3
40.00		1.00	1.04	20.558	22.61	403.09	0.750	0.000	5.00	22.144	16.61	600.9	0.0	1572.3
45.00		1.00	1.07	21.074	23.18	399.81	0.750	0.000	5.00	21.698	16.27	603.6	0.0	1540.2
45.42	Bot - Section 2	1.00	1.07	21.115	23.23	399.51	0.750	0.000	0.42	1.788	1.34	49.8	0.0	126.9
48.90	RB1	1.00	1.09	21.446	23.59	396.79	0.750	0.000	3.48	15.123	11.34	428.1	0.0	1913.1
50.00		1.00	1.09	21.547	23.70	395.87	0.750	0.000	1.10	4.731	3.55	134.5	0.0	598.3
52.75	Top - Section 1	1.00	1.11	21.791	23.97	393.47	0.750	0.000	2.75	11.732	8.80	337.5	0.0	1483.6
55.00		1.00	1.12	21.983	24.18	399.46	0.750	0.000	2.25	9.499	7.12	275.6	0.0	540.6
57.15	RT1	1.00	1.12	22.161	24.38	397.41	0.750	0.000	2.15	8.992	6.74	263.0	0.0	511.7
60.00		1.00	1.14	22.390	24.63	394.58	0.750	0.000	2.85	11.793	8.84	348.5	0.0	671.0
65.00		1.00	1.16	22.770	25.05	389.28	0.750	0.000	5.00	20.339	15.25	611.3	0.0	1157.1
70.00		1.00	1.17	23.128	25.44	383.63	0.750	0.000	5.00	19.893	14.92	607.3	0.0	1131.4
75.00		1.00	1.19	23.467	25.81	377.66	0.750	0.000	5.00	19.446	14.58	602.4	0.0	1105.8
80.00		1.00	1.21	23.788	26.17	371.41	0.750	0.000	5.00	19.000	14.25	596.6	0.0	1080.1
84.00	Bot - Section 3	1.00	1.22	24.033	26.44	366.23	0.750	0.000	4.00	14.879	11.16	472.0	0.0	845.6
85.00		1.00	1.22	24.093	26.50	364.91	0.750	0.000	1.00	3.739	2.80	118.9	0.0	368.7
87.00	RB2	1.00	1.23	24.211	26.63	362.25	0.750	0.000	2.00	7.424	5.57	237.3	0.0	732.0
90.00		1.00	1.24	24.385	26.82	358.18	0.750	0.000	3.00	11.003	8.25	354.2	0.0	1084.5
90.42	Top - Section 2	1.00	1.24	24.408	26.85	357.61	0.750	0.000	0.42	1.515	1.14	48.8	0.0	149.3
95.00		1.00	1.25	24.664	27.13	357.66	0.750	0.000	4.58	16.465	12.35	536.1	0.0	703.6
100.00	Appurtenance(s)	1.00	1.27	24.932	27.42	350.56	0.750	0.000	5.00	17.535	13.15	577.1	0.0	749.2
105.00		1.00	1.28	25.189	27.71	343.29	0.750	0.000	5.00	17.089	12.82	568.2	0.0	730.0
109.50	Appurtenance(s)	1.00	1.29	25.413	27.95	336.60	0.750	0.000	4.50	14.998	11.25	503.1	0.0	640.5
110.00		1.00	1.29	25.437	27.98	335.85	0.750	0.000	0.50	1.644	1.23	55.2	0.0	70.2
112.25	RT2	1.00	1.30	25.546	28.10	332.45	0.750	0.000	2.25	7.344	5.51	247.6	0.0	313.5
115.00		1.00	1.30	25.676	28.24	328.26	0.750	0.000	2.75	8.853	6.64	300.0	0.0	377.9
120.00		1.00	1.32	25.907	28.50	320.52	0.750	0.000	5.00	15.750	11.81	538.6	0.0	672.2
123.58	Bot - Section 4	1.00	1.32	26.068	28.68	314.90	0.750	0.000	3.58	11.013	8.26	379.0	0.0	469.9
125.00		1.00	1.33	26.131	28.74	312.65	0.750	0.000	1.42	4.359	3.27	150.3	0.0	322.9
125.60	RB3	1.00	1.33	26.157	28.77	311.70	0.750	0.000	0.60	1.835	1.38	63.4	0.0	136.0
129.00	Top - Section 3	1.00	1.34	26.305	28.94	306.27	0.750	0.000	3.40	10.278	7.71	356.9	0.0	761.2
130.00	Appurtenance(s)	1.00	1.34	26.348	28.98	309.64	0.750	0.000	1.00	2.984	2.24	103.8	0.0	95.7
135.00		1.00	1.35	26.558	29.21	301.55	0.750	0.000	5.00	14.651	10.99	513.6	0.0	469.9
136.26	RT3	1.00	1.35	26.610	29.27	299.49	0.750	0.000	1.26	3.622	2.72	127.2	0.0	116.1
140.00		1.00	1.36	26.762	29.44	293.34	0.750	0.000	3.74	10.583	7.94	373.9	0.0	339.4
145.00		1.00	1.37	26.960	29.66	285.04	0.750	0.000	5.00	13.759	10.32	489.6	0.0	441.1
150.00		1.00	1.38	27.153	29.87	276.63	0.750	0.000	5.00	13.313	9.98	477.2	0.0	426.7
155.00	Appurtenance(s)	1.00	1.39	27.341	30.08	268.13	0.750	0.000	5.00	12.867	9.65	464.4	0.0	412.2
160.00		1.00	1.40	27.525	30.28	259.53	0.751 *	0.000	5.00	12.421	9.33	452.1	0.0	397.8
161.50	Appurtenance(s)	1.00	1.40	27.579	30.34	256.94	0.757 *	0.000	1.50	3.639	2.75	133.7	0.0	116.5

Wind Loading - Shaft

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (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	

Tower Engineering Solutions

165.00	1.00	1.41	27.704	30.47	250.85	0.761 *	0.000	3.50	8.335	6.34	309.4	0.0	266.8
165.25 Bot - Section 5	1.00	1.41	27.713	30.48	250.42	0.765 *	0.000	0.25	0.587	0.45	21.9	0.0	18.8
169.58 Top - Section 4	1.00	1.41	27.864	30.65	242.82	0.769 *	0.000	4.33	10.136	7.79	382.2	0.0	537.0
170.00	1.00	1.42	27.878	30.67	245.50	0.770 *	0.000	0.42	0.957	0.74	36.2	0.0	20.5
175.00 Appurtenance(s)	1.00	1.42	28.049	30.85	236.67	0.775 *	0.000	5.00	11.242	8.71	430.2	0.0	240.6
180.00	1.00	1.43	28.216	31.04	227.76	0.750	0.000	5.00	10.796	8.10	402.1	0.0	231.0
185.00 Appurtenance(s)	1.00	1.44	28.379	31.22	218.78	0.750	0.000	5.00	10.350	7.76	387.7	0.0	221.4
187.00 Appurtenance(s)	1.00	1.44	28.443	31.29	215.17	0.750	0.000	2.00	4.015	3.01	150.7	0.0	85.9
190.00	1.00	1.45	28.539	31.39	209.73	0.750	0.000	3.00	5.889	4.42	221.8	0.0	125.9
191.50 Appurtenance(s)	1.00	1.45	28.586	31.44	207.01	0.750	0.000	1.50	2.884	2.16	108.8	0.0	61.7
195.00	1.00	1.46	28.695	31.56	200.62	0.750	0.000	3.50	6.573	4.93	249.0	0.0	140.5
196.00 Appurtenance(s)	1.00	1.46	28.726	31.60	198.79	0.750	0.000	1.00	1.838	1.38	69.7	0.0	39.3
							Totals:	**196.00**			**20,839.6**		**39,267.7**

* Cf Adjusted by Linear Load Ra Effect

Discrete Appurtenance Forces

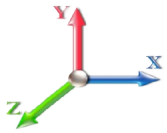
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 23	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 90 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 26

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	196.00	6' Lightning rod	1	28.726	31.599	1.00	1.00	0.38	5.85	0.000	0.000	19.21	0.00	0.00
2	191.50	Low Profile Platform	1	28.586	31.445	1.00	1.00	22.00	1350.00	0.000	0.000	1106.86	0.00	0.00
3	191.50	ACU-A20-N - RET	4	28.586	31.445	0.60	0.80	0.34	3.60	0.000	0.000	16.90	0.00	0.00
4	191.50	800MHz Filter	3	28.586	31.445	0.54	0.80	1.25	23.76	0.000	0.000	63.10	0.00	0.00
5	191.50	RRH8x20-25 - RRU	3	28.586	31.445	0.54	0.80	6.51	189.00	0.000	0.000	327.65	0.00	0.00
6	191.50	1900MHz - RRU	3	28.586	31.445	0.54	0.80	6.11	118.80	0.000	0.000	307.42	0.00	0.00
7	191.50	800MHz - RRU	3	28.586	31.445	0.54	0.80	4.00	143.10	0.000	0.000	201.44	0.00	0.00
8	191.50	APXVSPP18-C-A20	3	28.586	31.445	0.66	0.80	15.98	153.90	0.000	0.000	803.77	0.00	0.00
9	191.50	APXVTM14-C-120	3	28.586	31.445	0.68	0.80	12.93	151.20	0.000	0.000	650.71	0.00	0.00
10	187.00	BA80-41-DIN	1	28.767	31.644	1.00	1.00	9.40	61.20	0.000	10.333	475.93	0.00	4917.90
11	187.00	Pipe mount	1	28.443	31.288	0.56	0.75	1.48	36.00	0.000	0.000	74.06	0.00	0.00
12	185.00	BXA-70063 6CF_2	3	28.379	31.217	0.66	0.80	14.90	45.90	0.000	0.000	744.10	0.00	0.00
13	185.00	LPA-80063/4CF	6	28.379	31.217	0.68	0.80	25.09	108.00	0.000	0.000	1253.27	0.00	0.00
14	185.00	BXA-171063-8BF_2	3	28.379	31.217	0.70	0.80	6.14	28.35	0.000	0.000	306.61	0.00	0.00
15	185.00	FD9R6004/2C-3L -	6	28.379	31.217	0.56	0.80	1.21	16.74	0.000	0.000	60.42	0.00	0.00
16	185.00	Low Profile Platform	1	28.379	31.217	1.00	1.00	22.00	1350.00	0.000	0.000	1098.84	0.00	0.00
17	175.00	Low Profile Platform	1	28.049	30.854	1.00	1.00	22.00	1350.00	0.000	0.000	1086.06	0.00	0.00
18	175.00	DC6-48-60-18-8F	1	28.049	30.854	0.80	0.80	0.74	29.52	0.000	0.000	36.33	0.00	0.00
19	175.00	RRUS-12	3	28.049	30.854	0.54	0.80	4.34	135.00	0.000	0.000	214.33	0.00	0.00
20	175.00	Powerwave 7770	3	28.049	30.854	0.68	0.80	11.22	94.50	0.000	0.000	553.89	0.00	0.00
21	175.00	Powerwave LGP21401	12	28.049	30.854	0.75	0.75	11.61	152.28	0.000	0.000	573.14	0.00	0.00
22	175.00	Powerwave LGP13519	12	28.049	30.854	0.75	0.75	3.06	57.24	0.000	0.000	151.06	0.00	0.00
23	175.00	Ericsson RRUS 4449	3	28.049	30.854	0.50	0.75	2.97	191.70	0.000	0.000	146.61	0.00	0.00
24	175.00	Ericsson RRUS 4478 B14	3	28.049	30.854	0.50	0.75	2.49	160.38	0.000	0.000	122.79	0.00	0.00
25	175.00	Ericsson RRUS 32 B30	3	28.049	30.854	0.50	0.75	4.13	162.00	0.000	0.000	203.91	0.00	0.00
26	175.00	Raycap	2	28.049	30.854	1.00	1.00	9.56	28.80	0.000	0.000	471.94	0.00	0.00
27	175.00	HRK12 (Handrail Kit)	1	28.049	30.854	1.00	1.00	6.75	235.55	0.000	0.000	333.22	0.00	0.00
28	175.00	Kathrein 800-10965	6	28.049	30.854	0.53	0.75	44.12	586.44	0.000	0.000	2178.18	0.00	0.00
29	161.50	Low Profile Platform	1	27.579	30.337	1.00	1.00	22.00	1350.00	0.000	0.000	1067.86	0.00	0.00
30	155.00	AIR 21 B4A/B2P	3	27.341	30.076	0.66	0.80	12.13	243.81	0.000	0.000	583.77	0.00	0.00
31	155.00	AIR 21 B2A/B4P	3	27.341	30.076	0.66	0.80	12.13	247.05	0.000	0.000	583.77	0.00	0.00
32	155.00	KRY 112 114 TMA	3	27.341	30.076	0.60	0.80	0.74	29.70	0.000	0.000	35.51	0.00	0.00
33	155.00	APXVAARR24_43-U-NA2	3	27.341	30.076	0.56	0.80	34.00	345.60	0.000	0.000	1636.27	0.00	0.00
34	155.00	Radio 4449 B71 + B12	3	27.341	30.076	0.54	0.80	3.17	191.70	0.000	0.000	152.44	0.00	0.00
35	155.00	T-Arms w/ Handrail kit &	3	27.341	30.076	0.56	0.75	29.53	1350.00	0.000	0.000	1421.07	0.00	0.00
36	130.00	ANT150F2	1	26.453	29.099	1.00	1.00	1.23	11.70	0.000	2.500	57.27	0.00	143.17
37	130.00	Standoff	1	26.348	28.982	0.56	0.75	1.48	36.00	0.000	0.000	68.60	0.00	0.00
38	109.50	4' Omni	1	25.510	28.061	1.00	1.00	1.00	9.00	0.000	2.000	44.90	0.00	89.79
39	109.50	14' Omni	5	25.746	28.321	1.00	1.00	21.00	180.00	0.000	7.000	951.58	0.00	6661.08
40	109.50	Standoff	1	25.413	27.954	0.56	0.75	1.48	36.00	0.000	0.000	66.17	0.00	0.00
41	109.50	Standoff	5	25.413	27.954	0.56	0.75	7.40	180.00	0.000	0.000	330.83	0.00	0.00
42	100.00	Standoff	1	24.932	27.425	0.56	0.75	1.48	36.00	0.000	0.000	64.91	0.00	0.00
43	100.00	MPRD	1	24.932	27.425	1.00	1.00	6.10	32.40	0.000	0.000	267.67	0.00	0.00
							Totals:		**11,247.77**			**20,914.37**		

Total Applied Force Summary

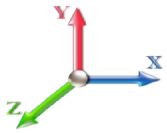
Structure:	CT46138-A-SBA		**Code:**	EIA/TIA-222-G	7/1/2019
Site Name:	Torrington/Oandg Ind Inc		**Exposure:**	C	
Height:	196.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 24

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 90 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 26

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		558.46	2087.02	0.00	0.00
10.00		548.60	2054.96	0.00	0.00
15.00		538.74	2022.90	0.00	0.00
20.00		561.16	1990.85	0.00	0.00
25.00		577.19	1958.79	0.00	0.00
30.00		588.38	1926.74	0.00	0.00
35.00		596.02	1894.68	0.00	0.00
40.00		600.91	1862.62	0.00	0.00
45.00		603.59	1830.57	0.00	0.00
45.42		49.84	151.10	0.00	0.00
48.90		428.10	2115.39	0.00	0.00
50.00		134.55	662.20	0.00	0.00
52.75		337.46	1643.28	0.00	0.00
55.00		275.63	671.25	0.00	0.00
57.15		263.05	636.56	0.00	0.00
60.00		348.52	836.51	0.00	0.00
65.00		611.31	1447.42	0.00	0.00
70.00		607.30	1421.78	0.00	0.00
75.00		602.37	1396.13	0.00	0.00
80.00		596.60	1370.49	0.00	0.00
84.00		472.02	1077.93	0.00	0.00
85.00		118.91	426.76	0.00	0.00
87.00		237.27	848.13	0.00	0.00
90.00		354.15	1258.72	0.00	0.00
90.42		48.83	173.55	0.00	0.00
95.00		536.05	969.82	0.00	0.00
100.00	(2) attachments	909.65	1107.95	0.00	0.00
105.00		568.19	1020.14	0.00	0.00
109.50	(12) attachments	1896.60	1306.68	0.00	6750.88
110.00		55.21	98.79	0.00	0.00
112.25		247.63	442.19	0.00	0.00
115.00		300.05	535.16	0.00	0.00
120.00		538.63	958.12	0.00	0.00
123.58		378.97	674.82	0.00	0.00
125.00		150.34	403.92	0.00	0.00
125.60		63.37	170.26	0.00	0.00
129.00		356.88	955.64	0.00	0.00
130.00	(2) attachments	229.64	200.59	0.00	143.17
135.00		513.61	753.45	0.00	0.00
136.26		127.21	187.59	0.00	0.00
140.00		373.86	551.43	0.00	0.00
145.00		489.65	724.60	0.00	0.00
150.00		477.17	682.10	0.00	0.00
155.00	(18) attachments	4877.20	3075.53	0.00	0.00
160.00		452.14	591.33	0.00	0.00
161.50	(1) attachments	1201.55	1524.59	0.00	0.00

Total Applied Force Summary

Structure:	CT46138-A-SBA		**Code:**	EIA/TIA-222-G	7/1/2019
Site Name:	Torrington/Oandg Ind Inc		**Exposure:**	C	
Height:	196.00 (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

165.00		309.37	402.32	0.00	0.00
165.25		21.89	28.47	0.00	0.00
169.58		382.15	704.72	0.00	0.00
170.00		36.15	36.61	0.00	0.00
175.00	(50) attachments	6501.67	3617.58	0.00	0.00
180.00		402.09	334.78	0.00	0.00
185.00	(19) attachments	3850.94	1874.15	0.00	0.00
187.00	(2) attachments	700.73	202.11	0.00	4917.90
190.00		221.83	153.07	0.00	0.00
191.50	(23) attachments	3586.69	2208.60	0.00	0.00
195.00		248.99	140.51	0.00	0.00
196.00	(1) attachments	88.91	45.13	0.00	0.00
	Totals:	**41,753.96**	**60,449.06**	**0.00**	**11,811.94**

Linear Appurtenance Segment Forces (Factored)

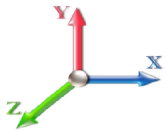
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 26	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 90 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 26

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	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.058	0.000	16.744	0.00	14.49
5.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.058	0.000	16.744	0.00	7.25
5.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.058	0.000	16.744	0.00	2.34
10.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.059	0.000	16.744	0.00	14.49
10.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.059	0.000	16.744	0.00	7.25
10.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.059	0.000	16.744	0.00	2.34
15.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.060	0.000	16.744	0.00	14.49
15.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.060	0.000	16.744	0.00	7.25
15.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.060	0.000	16.744	0.00	2.34
20.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.061	0.000	17.766	0.00	14.49
20.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.061	0.000	17.766	0.00	7.25
20.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.061	0.000	17.766	0.00	2.34
25.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.062	0.000	18.621	0.00	14.49
25.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.062	0.000	18.621	0.00	7.25
25.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.062	0.000	18.621	0.00	2.34
30.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.064	0.000	19.350	0.00	14.49
30.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.064	0.000	19.350	0.00	7.25
30.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.064	0.000	19.350	0.00	2.34
35.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.065	0.000	19.988	0.00	14.49
35.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.065	0.000	19.988	0.00	7.25
35.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.065	0.000	19.988	0.00	2.34
40.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.066	0.000	20.558	0.00	14.49
40.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.066	0.000	20.558	0.00	7.25
40.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.066	0.000	20.558	0.00	2.34
45.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.068	0.000	21.074	0.00	14.49
45.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.068	0.000	21.074	0.00	7.25
45.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.068	0.000	21.074	0.00	2.34
45.42	2" Conduit	Yes	0.42	0.000	0.00	0.00	0.00	0.068	0.000	21.115	0.00	1.21
45.42	3" Conduit	Yes	0.42	0.000	3.00	0.10	0.00	0.068	0.000	21.115	0.00	0.60
45.42	7/8" Coax	Yes	0.42	0.000	0.52	0.02	0.00	0.068	0.000	21.115	0.00	0.20
48.90	2" Conduit	Yes	3.48	0.000	0.00	0.00	0.00	0.069	0.000	21.446	0.00	10.09
48.90	3" Conduit	Yes	3.48	0.000	3.00	0.87	0.00	0.069	0.000	21.446	0.00	5.05
48.90	7/8" Coax	Yes	3.48	0.000	0.52	0.15	0.00	0.069	0.000	21.446	0.00	1.63
50.00	2" Conduit	Yes	1.10	0.000	0.00	0.00	0.00	0.070	0.000	21.547	0.00	3.19
50.00	3" Conduit	Yes	1.10	0.000	3.00	0.28	0.00	0.070	0.000	21.547	0.00	1.59
50.00	7/8" Coax	Yes	1.10	0.000	0.52	0.05	0.00	0.070	0.000	21.547	0.00	0.51
52.75	2" Conduit	Yes	2.75	0.000	0.00	0.00	0.00	0.070	0.000	21.791	0.00	7.97
52.75	3" Conduit	Yes	2.75	0.000	3.00	0.69	0.00	0.070	0.000	21.791	0.00	3.98
52.75	7/8" Coax	Yes	2.75	0.000	0.52	0.12	0.00	0.070	0.000	21.791	0.00	1.29
55.00	2" Conduit	Yes	2.25	0.000	0.00	0.00	0.00	0.069	0.000	21.983	0.00	6.52
55.00	3" Conduit	Yes	2.25	0.000	3.00	0.56	0.00	0.069	0.000	21.983	0.00	3.26
55.00	7/8" Coax	Yes	2.25	0.000	0.52	0.10	0.00	0.069	0.000	21.983	0.00	1.05
57.15	2" Conduit	Yes	2.15	0.000	0.00	0.00	0.00	0.070	0.000	22.161	0.00	6.23
57.15	3" Conduit	Yes	2.15	0.000	3.00	0.54	0.00	0.070	0.000	22.161	0.00	3.12
57.15	7/8" Coax	Yes	2.15	0.000	0.52	0.09	0.00	0.070	0.000	22.161	0.00	1.01
60.00	2" Conduit	Yes	2.85	0.000	0.00	0.00	0.00	0.071	0.000	22.390	0.00	8.26
60.00	3" Conduit	Yes	2.85	0.000	3.00	0.71	0.00	0.071	0.000	22.390	0.00	4.13

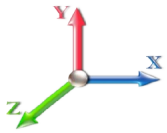
Linear Appurtenance Segment Forces (Factored)

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (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	

Load Case: 0.9D + 1.6W 90 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 26

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)
60.00	7/8" Coax	Yes	2.85	0.000	0.52	0.12	0.00	0.071	0.000	22.390	0.00	1.33
65.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.072	0.000	22.770	0.00	14.49
65.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.072	0.000	22.770	0.00	7.25
65.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.072	0.000	22.770	0.00	2.34
70.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.074	0.000	23.128	0.00	14.49
70.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.074	0.000	23.128	0.00	7.25
70.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.074	0.000	23.128	0.00	2.34
75.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.075	0.000	23.467	0.00	14.49
75.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.075	0.000	23.467	0.00	7.25
75.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.075	0.000	23.467	0.00	2.34
80.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.077	0.000	23.788	0.00	14.49
80.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.077	0.000	23.788	0.00	7.25
80.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.077	0.000	23.788	0.00	2.34
84.00	2" Conduit	Yes	4.00	0.000	0.00	0.00	0.00	0.079	0.000	24.033	0.00	11.59
84.00	3" Conduit	Yes	4.00	0.000	3.00	1.00	0.00	0.079	0.000	24.033	0.00	5.80
84.00	7/8" Coax	Yes	4.00	0.000	0.52	0.17	0.00	0.079	0.000	24.033	0.00	1.87
85.00	2" Conduit	Yes	1.00	0.000	0.00	0.00	0.00	0.080	0.000	24.093	0.00	2.90
85.00	3" Conduit	Yes	1.00	0.000	3.00	0.25	0.00	0.080	0.000	24.093	0.00	1.45
85.00	7/8" Coax	Yes	1.00	0.000	0.52	0.04	0.00	0.080	0.000	24.093	0.00	0.47
87.00	2" Conduit	Yes	2.00	0.000	0.00	0.00	0.00	0.080	0.000	24.211	0.00	5.80
87.00	3" Conduit	Yes	2.00	0.000	3.00	0.50	0.00	0.080	0.000	24.211	0.00	2.90
87.00	7/8" Coax	Yes	2.00	0.000	0.52	0.09	0.00	0.080	0.000	24.211	0.00	0.94
90.00	2" Conduit	Yes	3.00	0.000	0.00	0.00	0.00	0.081	0.000	24.385	0.00	8.69
90.00	3" Conduit	Yes	3.00	0.000	3.00	0.75	0.00	0.081	0.000	24.385	0.00	4.35
90.00	7/8" Coax	Yes	3.00	0.000	0.52	0.13	0.00	0.081	0.000	24.385	0.00	1.40
90.42	2" Conduit	Yes	0.42	0.000	0.00	0.00	0.00	0.082	0.000	24.408	0.00	1.21
90.42	3" Conduit	Yes	0.42	0.000	3.00	0.10	0.00	0.082	0.000	24.408	0.00	0.60
90.42	7/8" Coax	Yes	0.42	0.000	0.52	0.02	0.00	0.082	0.000	24.408	0.00	0.20
95.00	2" Conduit	Yes	4.58	0.000	0.00	0.00	0.00	0.082	0.000	24.664	0.00	13.28
95.00	3" Conduit	Yes	4.58	0.000	3.00	1.15	0.00	0.082	0.000	24.664	0.00	6.64
95.00	7/8" Coax	Yes	4.58	0.000	0.52	0.20	0.00	0.082	0.000	24.664	0.00	2.14
100.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.084	0.000	24.932	0.00	14.49
100.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.084	0.000	24.932	0.00	7.25
100.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.084	0.000	24.932	0.00	2.34
105.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.086	0.000	25.189	0.00	14.49
105.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.086	0.000	25.189	0.00	7.25
105.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.086	0.000	25.189	0.00	2.34
109.50	2" Conduit	Yes	4.50	0.000	0.00	0.00	0.00	0.088	0.000	25.413	0.00	13.04
109.50	3" Conduit	Yes	4.50	0.000	3.00	1.13	0.00	0.088	0.000	25.413	0.00	6.52
109.50	7/8" Coax	Yes	4.50	0.000	0.52	0.20	0.00	0.088	0.000	25.413	0.00	2.11
110.00	2" Conduit	Yes	0.50	0.000	0.00	0.00	0.00	0.089	0.000	25.437	0.00	1.45
110.00	3" Conduit	Yes	0.50	0.000	3.00	0.13	0.00	0.089	0.000	25.437	0.00	0.72
110.00	7/8" Coax	Yes	0.50	0.000	0.52	0.02	0.00	0.089	0.000	25.437	0.00	0.23
112.25	2" Conduit	Yes	2.25	0.000	0.00	0.00	0.00	0.090	0.000	25.546	0.00	6.52
112.25	3" Conduit	Yes	2.25	0.000	3.00	0.56	0.00	0.090	0.000	25.546	0.00	3.26
112.25	7/8" Coax	Yes	2.25	0.000	0.52	0.10	0.00	0.090	0.000	25.546	0.00	1.05
115.00	2" Conduit	Yes	2.75	0.000	0.00	0.00	0.00	0.091	0.000	25.676	0.00	7.97

Linear Appurtenance Segment Forces (Factored)

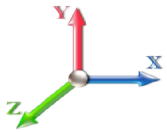
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 28	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 90 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 26

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)
115.00	3" Conduit	Yes	2.75	0.000	3.00	0.69	0.00	0.091	0.000	25.676	0.00	3.98
115.00	7/8" Coax	Yes	2.75	0.000	0.52	0.12	0.00	0.091	0.000	25.676	0.00	1.29
120.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.093	0.000	25.907	0.00	14.49
120.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.093	0.000	25.907	0.00	7.25
120.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.093	0.000	25.907	0.00	2.34
123.58	2" Conduit	Yes	3.58	0.000	0.00	0.00	0.00	0.095	0.000	26.068	0.00	10.38
123.58	3" Conduit	Yes	3.58	0.000	3.00	0.90	0.00	0.095	0.000	26.068	0.00	5.19
123.58	7/8" Coax	Yes	3.58	0.000	0.52	0.16	0.00	0.095	0.000	26.068	0.00	1.68
125.00	2" Conduit	Yes	1.42	0.000	0.00	0.00	0.00	0.097	0.000	26.131	0.00	4.11
125.00	3" Conduit	Yes	1.42	0.000	3.00	0.35	0.00	0.097	0.000	26.131	0.00	2.05
125.00	7/8" Coax	Yes	1.42	0.000	0.52	0.06	0.00	0.097	0.000	26.131	0.00	0.66
125.60	2" Conduit	Yes	0.60	0.000	0.00	0.00	0.00	0.097	0.000	26.157	0.00	1.74
125.60	3" Conduit	Yes	0.60	0.000	3.00	0.15	0.00	0.097	0.000	26.157	0.00	0.87
125.60	7/8" Coax	Yes	0.60	0.000	0.52	0.03	0.00	0.097	0.000	26.157	0.00	0.28
129.00	2" Conduit	Yes	3.40	0.000	0.00	0.00	0.00	0.099	0.000	26.305	0.00	9.85
129.00	3" Conduit	Yes	3.40	0.000	3.00	0.85	0.00	0.099	0.000	26.305	0.00	4.93
129.00	7/8" Coax	Yes	3.40	0.000	0.52	0.15	0.00	0.099	0.000	26.305	0.00	1.59
130.00	2" Conduit	Yes	1.00	0.000	0.00	0.00	0.00	0.098	0.000	26.348	0.00	2.90
130.00	3" Conduit	Yes	1.00	0.000	3.00	0.25	0.00	0.098	0.000	26.348	0.00	1.45
130.00	7/8" Coax	Yes	1.00	0.000	0.52	0.04	0.00	0.098	0.000	26.348	0.00	0.47
135.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.085	0.000	26.558	0.00	14.49
135.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.085	0.000	26.558	0.00	7.25
136.26	2" Conduit	Yes	1.26	0.000	0.00	0.00	0.00	0.087	0.000	26.610	0.00	3.65
136.26	3" Conduit	Yes	1.26	0.000	3.00	0.31	0.00	0.087	0.000	26.610	0.00	1.83
140.00	2" Conduit	Yes	3.74	0.000	0.00	0.00	0.00	0.088	0.000	26.762	0.00	10.84
140.00	3" Conduit	Yes	3.74	0.000	3.00	0.94	0.00	0.088	0.000	26.762	0.00	5.42
145.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.091	0.000	26.960	0.00	14.49
145.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.091	0.000	26.960	0.00	7.25
150.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.094	0.000	27.153	0.00	14.49
150.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.094	0.000	27.153	0.00	7.25
155.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.097	0.000	27.341	0.00	14.49
155.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.097	0.000	27.341	0.00	7.25
160.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.101	1.002	27.525	0.00	14.49
160.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.101	1.002	27.525	0.00	7.25
161.50	2" Conduit	Yes	1.50	0.000	0.00	0.00	0.00	0.103	1.009	27.579	0.00	4.35
161.50	3" Conduit	Yes	1.50	0.000	3.00	0.38	0.00	0.103	1.009	27.579	0.00	2.17
165.00	2" Conduit	Yes	3.50	0.000	0.00	0.00	0.00	0.105	1.015	27.704	0.00	10.14
165.00	3" Conduit	Yes	3.50	0.000	3.00	0.88	0.00	0.105	1.015	27.704	0.00	5.07
165.25	2" Conduit	Yes	0.25	0.000	0.00	0.00	0.00	0.106	1.019	27.713	0.00	0.72
165.25	3" Conduit	Yes	0.25	0.000	3.00	0.06	0.00	0.106	1.019	27.713	0.00	0.36
169.58	2" Conduit	Yes	4.33	0.000	0.00	0.00	0.00	0.108	1.025	27.864	0.00	12.56
169.58	3" Conduit	Yes	4.33	0.000	3.00	1.08	0.00	0.108	1.025	27.864	0.00	6.28
170.00	2" Conduit	Yes	0.42	0.000	0.00	0.00	0.00	0.109	1.027	27.878	0.00	1.21
170.00	3" Conduit	Yes	0.42	0.000	3.00	0.10	0.00	0.109	1.027	27.878	0.00	0.60
175.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.111	1.034	28.049	0.00	14.49
175.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.111	1.034	28.049	0.00	7.25

Linear Appurtenance Segment Forces (Factored)

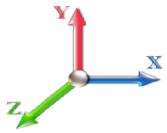
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 29	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 90 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 26

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)
										Totals:	**0.0**	**821.6**

Calculated Forces

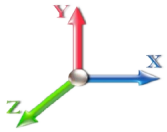
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 30	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 90 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 26

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	-60.39	-41.83	0.00	-5693.1	0.00	5693.13	8794.96	4397.48	21496.0	10671.5	0.00	0.000	0.000	0.540
5.00	-58.20	-41.43	0.00	-5483.9	0.00	5483.97	8639.43	4319.71	20738.5	10295.5	0.08	-0.151	0.000	0.539
10.00	-56.03	-41.02	0.00	-5276.8	0.00	5276.84	8483.89	4241.95	19994.7	9926.22	0.32	-0.304	0.000	0.538
15.00	-53.90	-40.62	0.00	-5071.7	0.00	5071.73	8328.36	4164.18	19264.4	9563.67	0.72	-0.459	0.000	0.537
20.00	-51.81	-40.18	0.00	-4868.6	0.00	4868.66	8172.83	4086.41	18547.7	9207.87	1.29	-0.617	0.000	0.535
25.00	-49.74	-39.72	0.00	-4667.7	0.00	4667.76	8017.29	4008.65	17844.6	8858.82	2.02	-0.778	0.000	0.533
30.00	-47.71	-39.24	0.00	-4469.1	0.00	4469.16	7861.76	3930.88	17155.1	8516.51	2.92	-0.940	0.000	0.531
35.00	-45.72	-38.74	0.00	-4272.9	0.00	4272.96	7706.22	3853.11	16479.1	8180.95	4.00	-1.106	0.000	0.528
40.00	-43.76	-38.23	0.00	-4079.2	0.00	4079.25	7550.69	3775.35	15816.8	7852.13	5.24	-1.273	0.000	0.525
45.00	-41.88	-37.65	0.00	-3888.1	0.00	3888.10	7395.16	3697.58	15168.0	7530.06	6.67	-1.443	0.000	0.522
45.42	-41.68	-37.65	0.00	-3872.4	0.00	3872.41	7382.20	3691.10	15114.6	7503.52	6.79	-1.458	0.000	0.522
48.90	-39.53	-37.21	0.00	-3741.2	0.00	3741.27	7273.84	3636.92	14671.4	7283.52	7.90	-1.579	0.000	0.346
50.00	-38.85	-37.09	0.00	-3700.3	0.00	3700.33	7239.62	3619.81	14532.8	7214.73	8.27	-1.605	0.000	0.345
52.75	-37.18	-36.75	0.00	-3598.3	0.00	3598.33	5810.43	2905.21	11825.7	5870.80	9.21	-1.669	0.000	0.352
55.00	-36.48	-36.49	0.00	-3515.6	0.00	3515.65	5769.82	2884.91	11629.7	5773.48	10.01	-1.722	0.000	0.384
57.15	-35.81	-36.24	0.00	-3437.2	0.00	3437.21	5730.75	2865.38	11443.3	5680.95	10.80	-1.779	0.000	0.381
57.15	-35.81	-36.24	0.00	-3437.2	0.00	3437.21	5730.75	2865.38	11443.3	5680.95	10.80	-1.779	0.000	0.381
60.00	-34.89	-35.96	0.00	-3333.9	0.00	3333.92	5678.55	2839.28	11197.7	5559.03	11.89	-1.853	0.000	0.606
65.00	-33.34	-35.42	0.00	-3154.1	0.00	3154.14	5551.73	2775.86	10705.1	5314.51	13.94	-2.061	0.000	0.600
70.00	-31.81	-34.88	0.00	-2977.0	0.00	2977.05	5427.30	2713.65	10228.2	5077.73	16.21	-2.272	0.000	0.592
75.00	-30.32	-34.33	0.00	-2802.6	0.00	2802.68	5302.88	2651.44	9762.15	4846.34	18.70	-2.484	0.000	0.584
80.00	-28.86	-33.77	0.00	-2631.0	0.00	2631.04	5178.45	2589.22	9306.93	4620.35	21.42	-2.698	0.000	0.575
84.00	-27.74	-33.30	0.00	-2495.9	0.00	2495.97	5078.91	2539.45	8950.59	4443.45	23.75	-2.872	0.000	0.567
85.00	-27.28	-33.19	0.00	-2462.6	0.00	2462.67	5054.02	2527.01	8862.59	4399.76	24.36	-2.916	0.000	0.565
87.00	-26.40	-32.95	0.00	-2396.3	0.00	2396.30	5004.25	2502.13	8687.89	4313.04	25.60	-3.004	0.000	0.339
90.00	-25.14	-32.55	0.00	-2297.4	0.00	2297.46	4929.59	2464.80	8429.11	4184.57	27.51	-3.084	0.000	0.333
90.42	-24.93	-32.52	0.00	-2283.9	0.00	2283.90	3591.78	1795.89	6277.53	3116.43	27.78	-3.095	0.000	0.355
95.00	-23.92	-31.98	0.00	-2134.8	0.00	2134.87	3535.98	1767.99	6038.44	2997.74	30.81	-3.215	0.000	0.388
100.00	-22.78	-31.07	0.00	-1974.9	0.00	1974.96	3473.75	1736.87	5780.45	2869.66	34.25	-3.362	0.000	0.370
105.00	-21.73	-30.49	0.00	-1819.6	0.00	1819.62	3410.09	1705.04	5525.58	2743.13	37.85	-3.506	0.000	0.351
109.50	-20.51	-28.54	0.00	-1675.6	0.00	1675.65	3351.58	1675.79	5299.03	2630.66	41.21	-3.634	0.000	0.333
110.00	-20.39	-28.50	0.00	-1661.3	0.00	1661.38	3345.00	1672.50	5274.03	2618.25	41.60	-3.648	0.000	0.331
112.25	-19.93	-28.24	0.00	-1597.2	0.00	1597.26	3315.25	1657.63	5161.96	2562.62	43.33	-3.712	0.000	0.323
112.25	-19.93	-28.24	0.00	-1597.2	0.00	1597.26	3315.25	1657.63	5161.96	2562.62	43.33	-3.712	0.000	0.323
115.00	-19.33	-27.97	0.00	-1519.5	0.00	1519.59	3278.49	1639.25	5025.98	2495.11	45.49	-3.788	0.000	0.615
120.00	-18.31	-27.44	0.00	-1379.7	0.00	1379.75	3210.56	1605.28	4781.62	2373.80	49.60	-4.053	0.000	0.587
123.58	-17.60	-27.05	0.00	-1281.4	0.00	1281.43	3148.16	1574.08	4590.15	2278.75	52.71	-4.243	0.000	0.568
125.00	-17.18	-26.89	0.00	-1243.1	0.00	1243.10	3121.72	1560.86	4512.97	2240.43	53.98	-4.318	0.000	0.561
125.60	-16.99	-26.83	0.00	-1226.9	0.00	1226.97	3110.52	1555.26	4480.48	2224.30	54.52	-4.350	0.000	0.314
129.00	-16.03	-26.42	0.00	-1135.7	0.00	1135.74	2149.47	1074.74	3099.22	1538.58	57.65	-4.450	0.000	0.331
130.00	-15.81	-26.20	0.00	-1109.1	0.00	1109.18	2141.27	1070.63	3068.69	1523.43	58.59	-4.479	0.000	0.367
135.00	-15.05	-25.66	0.00	-978.17	0.00	978.17	2099.38	1049.69	2916.97	1448.11	63.36	-4.635	0.000	0.335
136.26	-14.84	-25.53	0.00	-945.85	0.00	945.85	2088.60	1044.30	2879.00	1429.26	64.59	-4.674	0.000	0.327
136.26	-14.84	-25.53	0.00	-945.85	0.00	945.85	2088.60	1044.30	2879.00	1429.26	64.59	-4.674	0.000	0.327
140.00	-14.23	-25.17	0.00	-850.35	0.00	850.35	2056.07	1028.04	2766.99	1373.65	68.29	-4.784	0.000	0.627
145.00	-13.44	-24.68	0.00	-724.53	0.00	724.53	2011.34	1005.67	2618.95	1300.16	73.45	-5.069	0.000	0.565
150.00	-12.69	-24.20	0.00	-601.13	0.00	601.13	1965.18	982.59	2473.01	1227.71	78.89	-5.333	0.000	0.497
155.00	-10.02	-19.09	0.00	-480.14	0.00	480.14	1917.59	958.80	2329.38	1156.40	84.60	-5.571	0.000	0.421

Calculated Forces

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (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

160.00	-9.44	-18.60	0.00	-384.69	0.00	384.69	1868.58	934.29	2188.24	1086.34	90.55	-5.783	0.000	0.360
161.50	-8.01	-17.27	0.00	-356.78	0.00	356.78	1853.60	926.80	2146.41	1065.57	92.37	-5.844	0.000	0.339
165.00	-7.62	-16.93	0.00	-296.35	0.00	296.35	1818.15	909.07	2049.77	1017.59	96.70	-5.973	0.000	0.296
165.25	-7.58	-16.91	0.00	-292.11	0.00	292.11	1815.59	907.79	2042.92	1014.19	97.01	-5.982	0.000	0.293
169.58	-6.89	-16.47	0.00	-218.83	0.00	218.83	1040.26	520.13	1155.41	573.59	102.49	-6.118	0.000	0.389
170.00	-6.83	-16.44	0.00	-211.96	0.00	211.96	1038.39	519.19	1149.55	570.68	103.03	-6.130	0.000	0.379
175.00	-3.92	-9.59	0.00	-129.77	0.00	129.77	1015.17	507.59	1079.51	535.91	109.53	-6.297	0.000	0.246
180.00	-3.62	-9.16	0.00	-81.81	0.00	81.81	990.53	495.27	1010.05	501.43	116.18	-6.414	0.000	0.167
185.00	-2.18	-5.13	0.00	-35.99	0.00	35.99	964.47	482.24	941.35	467.32	122.93	-6.487	0.000	0.079
187.00	-2.06	-4.41	0.00	-20.82	0.00	20.82	953.65	476.82	914.12	453.81	125.65	-6.505	0.000	0.048
190.00	-1.93	-4.17	0.00	-7.60	0.00	7.60	936.98	468.49	873.60	433.69	129.73	-6.518	0.000	0.020
191.50	-0.15	-0.36	0.00	-1.34	0.00	1.34	928.46	464.23	853.48	423.70	131.77	-6.520	0.000	0.003
195.00	-0.03	-0.09	0.00	-0.09	0.00	0.09	908.07	454.03	806.98	400.62	136.54	-6.521	0.000	0.000
196.00	0.00	-0.09	0.00	0.00	0.00	0.00	902.11	451.06	793.81	394.08	137.91	-6.521	0.000	0.000

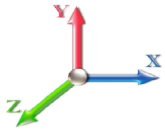
Wind Loading - Shaft

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (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	

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

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

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	0.85	3.308	3.64	0.00	1.200	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	3.308	3.64	0.00	1.200	1.656	5.00	26.647	31.98	116.3	634.4	3030.0
10.00		1.00	0.85	3.308	3.64	0.00	1.200	1.775	5.00	26.300	31.56	114.8	669.5	3022.3
15.00		1.00	0.85	3.308	3.64	0.00	1.200	1.848	5.00	25.915	31.10	113.1	685.7	2995.8
20.00		1.00	0.90	3.509	3.86	0.00	1.200	1.902	5.00	25.514	30.62	118.2	693.8	2961.1
25.00		1.00	0.95	3.678	4.05	0.00	1.200	1.945	5.00	25.103	30.12	121.9	697.0	2921.6
30.00		1.00	0.98	3.822	4.20	0.00	1.200	1.981	5.00	24.687	29.62	124.6	697.1	2879.0
35.00		1.00	1.01	3.948	4.34	0.00	1.200	2.012	5.00	24.267	29.12	126.5	695.0	2834.1
40.00		1.00	1.04	4.061	4.47	0.00	1.200	2.039	5.00	23.843	28.61	127.8	691.1	2787.5
45.00		1.00	1.07	4.163	4.58	0.00	1.200	2.063	5.00	23.417	28.10	128.7	685.9	2739.5
45.42	Bot - Section 2	1.00	1.07	4.171	4.59	0.00	1.200	2.065	0.42	1.931	2.32	10.6	57.1	226.3
48.90	RB1	1.00	1.09	4.236	4.66	0.00	1.200	2.080	3.48	16.330	19.60	91.3	483.7	3034.5
50.00		1.00	1.09	4.256	4.68	0.00	1.200	2.085	1.10	5.113	6.14	28.7	152.4	950.2
52.75	Top - Section 1	1.00	1.11	4.304	4.73	0.00	1.200	2.096	2.75	12.693	15.23	72.1	379.0	2357.1
55.00		1.00	1.12	4.342	4.78	0.00	1.200	2.105	2.25	10.288	12.35	59.0	308.6	1029.4
57.15	RT1	1.00	1.12	4.378	4.82	0.00	1.200	2.113	2.15	9.749	11.70	56.3	293.4	975.7
60.00		1.00	1.14	4.423	4.86	0.00	1.200	2.123	2.85	12.801	15.36	74.7	386.4	1281.0
65.00		1.00	1.16	4.498	4.95	0.00	1.200	2.140	5.00	22.122	26.55	131.3	669.3	2212.1
70.00		1.00	1.17	4.569	5.03	0.00	1.200	2.156	5.00	21.689	26.03	130.8	660.2	2168.8
75.00		1.00	1.19	4.635	5.10	0.00	1.200	2.171	5.00	21.256	25.51	130.1	650.6	2124.9
80.00		1.00	1.21	4.699	5.17	0.00	1.200	2.185	5.00	20.821	24.99	129.1	640.4	2080.6
84.00	Bot - Section 3	1.00	1.22	4.747	5.22	0.00	1.200	2.196	4.00	16.343	19.61	102.4	505.6	1633.2
85.00		1.00	1.22	4.759	5.24	0.00	1.200	2.198	1.00	4.105	4.93	25.8	128.1	619.6
87.00	RB2	1.00	1.23	4.782	5.26	0.00	1.200	2.204	2.00	8.159	9.79	51.5	254.4	1230.4
90.00		1.00	1.24	4.817	5.30	0.00	1.200	2.211	3.00	12.108	14.53	77.0	377.7	1823.7
90.42	Top - Section 2	1.00	1.24	4.821	5.30	0.00	1.200	2.212	0.42	1.669	2.00	10.6	52.4	251.5
95.00		1.00	1.25	4.872	5.36	0.00	1.200	2.223	4.58	18.164	21.80	116.8	566.8	1505.0
100.00	Appurtenance(s)	1.00	1.27	4.925	5.42	0.00	1.200	2.234	5.00	19.397	23.28	126.1	606.8	1605.7
105.00		1.00	1.28	4.976	5.47	0.00	1.200	2.245	5.00	18.960	22.75	124.5	595.0	1568.3
109.50	Appurtenance(s)	1.00	1.29	5.020	5.52	0.00	1.200	2.255	4.50	16.690	20.03	110.6	525.8	1379.8
110.00		1.00	1.29	5.025	5.53	0.00	1.200	2.256	0.50	1.832	2.20	12.2	58.3	151.9
112.25	RT2	1.00	1.30	5.046	5.55	0.00	1.200	2.260	2.25	8.191	9.83	54.6	259.9	677.9
115.00		1.00	1.30	5.072	5.58	0.00	1.200	2.266	2.75	9.891	11.87	66.2	313.9	817.8
120.00		1.00	1.32	5.117	5.63	0.00	1.200	2.276	5.00	17.647	21.18	119.2	558.1	1454.5
123.58	Bot - Section 4	1.00	1.32	5.149	5.66	0.00	1.200	2.282	3.58	12.376	14.85	84.1	393.5	1020.1
125.00		1.00	1.33	5.162	5.68	0.00	1.200	2.285	1.42	4.898	5.88	33.4	156.8	587.4
125.60	RB3	1.00	1.33	5.167	5.68	0.00	1.200	2.286	0.60	2.064	2.48	14.1	66.2	247.5
129.00	Top - Section 3	1.00	1.34	5.196	5.72	0.00	1.200	2.292	3.40	11.577	13.89	79.4	369.4	1384.4
130.00	Appurtenance(s)	1.00	1.34	5.204	5.72	0.00	1.200	2.294	1.00	3.366	4.04	23.1	108.1	235.7
135.00		1.00	1.35	5.246	5.77	0.00	1.200	2.303	5.00	16.570	19.88	114.7	527.4	1154.0
136.26	RT3	1.00	1.35	5.256	5.78	0.00	1.200	2.305	1.26	4.106	4.93	28.5	132.1	286.9
140.00		1.00	1.36	5.286	5.81	0.00	1.200	2.311	3.74	12.024	14.43	83.9	384.6	837.1
145.00		1.00	1.37	5.325	5.86	0.00	1.200	2.319	5.00	15.692	18.83	110.3	500.7	1088.8
150.00		1.00	1.38	5.364	5.90	0.00	1.200	2.327	5.00	15.252	18.30	108.0	487.0	1055.9
155.00	Appurtenance(s)	1.00	1.39	5.401	5.94	0.00	1.200	2.335	5.00	14.812	17.77	105.6	473.2	1022.9
160.00		1.00	1.40	5.437	5.98	0.00	1.202 *	2.342	5.00	14.372	17.28	103.3	459.3	989.7
161.50	Appurtenance(s)	1.00	1.40	5.448	5.99	0.00	1.211 *	2.344	1.50	4.225	5.12	30.7	136.5	291.9

Wind Loading - Shaft

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (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

165.00	1.00	1.41	5.472	6.02	0.00	1.218 *	2.349	3.50	9.706	11.82	71.2	311.7	667.4
165.25 Bot - Section 5	1.00	1.41	5.474	6.02	0.00	1.223 *	2.350	0.25	0.685	0.84	5.0	22.2	47.3
169.58 Top - Section 4	1.00	1.41	5.504	6.05	0.00	1.230 *	2.356	4.33	11.837	14.56	88.2	379.4	1095.4
170.00	1.00	1.42	5.507	6.06	0.00	1.232 *	2.356	0.42	1.121	1.38	8.4	36.4	63.7
175.00 Appurtenance(s)	1.00	1.42	5.541	6.09	0.00	1.240 *	2.363	5.00	13.211	16.39	99.9	422.3	743.1
180.00	1.00	1.43	5.574	6.13	0.00	1.200	2.370	5.00	12.771	15.32	94.0	407.8	715.9
185.00 Appurtenance(s)	1.00	1.44	5.606	6.17	0.00	1.200	2.376	5.00	12.330	14.80	91.2	393.3	688.5
187.00 Appurtenance(s)	1.00	1.44	5.618	6.18	0.00	1.200	2.379	2.00	4.808	5.77	35.7	155.0	269.5
190.00	1.00	1.45	5.637	6.20	0.00	1.200	2.383	3.00	7.080	8.50	52.7	227.1	395.0
191.50 Appurtenance(s)	1.00	1.45	5.647	6.21	0.00	1.200	2.384	1.50	3.480	4.18	25.9	112.2	194.5
195.00	1.00	1.46	5.668	6.24	0.00	1.200	2.389	3.50	7.967	9.56	59.6	254.7	442.0
196.00 Appurtenance(s)	1.00	1.46	5.674	6.24	0.00	1.200	2.390	1.00	2.236	2.68	16.8	72.2	124.5
							Totals:	**196.00**			**4,571.1**		**74,979.5**

* Cf Adjusted by Linear Load Ra Effect

Discrete Appurtenance Forces

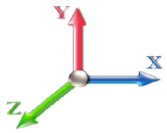
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 34	

Tower Engineering Solutions

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

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

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	196.00	6' Lightning rod	1	5.674	6.242	1.00	1.00	1.87	52.21	0.000	0.000	11.67	0.00	0.00
2	191.50	Low Profile Platform	1	5.647	6.211	1.00	1.00	46.13	3288.37	0.000	0.000	286.53	0.00	0.00
3	191.50	ACU-A20-N - RET	4	5.647	6.211	0.62	0.80	1.36	23.08	0.000	0.000	8.46	0.00	0.00
4	191.50	800MHz Filter	3	5.647	6.211	0.56	0.80	2.80	89.00	0.000	0.000	17.36	0.00	0.00
5	191.50	RRH8x20-25 - RRU	3	5.647	6.211	0.56	0.80	8.72	740.14	0.000	0.000	54.18	0.00	0.00
6	191.50	1900MHz - RRU	3	5.647	6.211	0.56	0.80	9.57	512.25	0.000	0.000	59.47	0.00	0.00
7	191.50	800MHz - RRU	3	5.647	6.211	0.56	0.80	6.81	430.66	0.000	0.000	42.29	0.00	0.00
8	191.50	APXVSPP18-C-A20	3	5.647	6.211	0.68	0.80	24.15	765.20	0.000	0.000	149.99	0.00	0.00
9	191.50	APXVTM14-C-120	3	5.647	6.211	0.70	0.80	16.68	908.58	0.000	0.000	103.59	0.00	0.00
10	187.00	BA80-41-DIN	1	5.682	6.251	1.00	1.00	34.96	362.45	0.000	10.333	218.54	0.00	2258.27
11	187.00	Pipe mount	1	5.618	6.180	0.56	0.75	6.06	134.43	0.000	0.000	37.43	0.00	0.00
12	185.00	BXA-70063 6CF_2	3	5.606	6.166	0.68	0.80	23.12	539.45	0.000	0.000	142.56	0.00	0.00
13	185.00	LPA-80063/4CF	6	5.606	6.166	0.70	0.80	32.06	1927.18	0.000	0.000	197.72	0.00	0.00
14	185.00	BXA-171063-8BF_2	3	5.606	6.166	0.72	0.80	11.23	249.13	0.000	0.000	69.23	0.00	0.00
15	185.00	FD9R6004/2C-3L -	6	5.606	6.166	0.60	0.80	3.47	74.09	0.000	0.000	21.39	0.00	0.00
16	185.00	Low Profile Platform	1	5.606	6.166	1.00	1.00	46.05	3282.20	0.000	0.000	283.95	0.00	0.00
17	175.00	Low Profile Platform	1	5.541	6.095	1.00	1.00	45.91	3272.33	0.000	0.000	279.83	0.00	0.00
18	175.00	DC6-48-60-18-8F	1	5.541	6.095	0.80	0.80	1.21	109.01	0.000	0.000	7.38	0.00	0.00
19	175.00	RRUS-12	3	5.541	6.095	0.56	0.80	6.98	337.93	0.000	0.000	42.57	0.00	0.00
20	175.00	Powerwave 7770	3	5.541	6.095	0.70	0.80	14.73	720.08	0.000	0.000	89.79	0.00	0.00
21	175.00	Powerwave LGP21401	12	5.541	6.095	0.75	0.75	21.79	524.07	0.000	0.000	132.83	0.00	0.00
22	175.00	Powerwave LGP13519	12	5.541	6.095	0.75	0.75	8.59	198.24	0.000	0.000	52.37	0.00	0.00
23	175.00	Ericsson RRUS 4449	3	5.541	6.095	0.50	0.75	4.09	431.64	0.000	0.000	24.91	0.00	0.00
24	175.00	Ericsson RRUS 4478 B14	3	5.541	6.095	0.50	0.75	3.55	354.08	0.000	0.000	21.61	0.00	0.00
25	175.00	Ericsson RRUS 32 B30	3	5.541	6.095	0.50	0.75	5.66	604.45	0.000	0.000	34.49	0.00	0.00
26	175.00	Raycap	2	5.541	6.095	1.00	1.00	11.95	313.88	0.000	0.000	72.86	0.00	0.00
27	175.00	HRK12 (Handrail Kit)	1	5.541	6.095	1.00	1.00	15.68	996.34	0.000	0.000	95.58	0.00	0.00
28	175.00	Kathrein 800-10965	6	5.541	6.095	0.53	0.75	51.07	3333.44	0.000	0.000	311.23	0.00	0.00
29	161.50	Low Profile Platform	1	5.448	5.992	1.00	1.00	45.72	3258.15	0.000	0.000	274.00	0.00	0.00
30	155.00	AIR 21 B4A/B2P	3	5.401	5.941	0.68	0.80	15.36	1043.65	0.000	0.000	91.27	0.00	0.00
31	155.00	AIR 21 B2A/B4P	3	5.401	5.941	0.68	0.80	15.36	1044.68	0.000	0.000	91.27	0.00	0.00
32	155.00	KRY 112 114 TMA	3	5.401	5.941	0.62	0.80	1.96	73.57	0.000	0.000	11.63	0.00	0.00
33	155.00	APXVAARR24_43-U-NA2	3	5.401	5.941	0.56	0.80	38.33	2210.72	0.000	0.000	227.70	0.00	0.00
34	155.00	Radio 4449 B71 + B12	3	5.401	5.941	0.54	0.80	4.35	429.02	0.000	0.000	25.81	0.00	0.00
35	155.00	T-Arms w/ Handrail kit &	3	5.401	5.941	0.56	0.75	60.97	4001.52	0.000	0.000	362.21	0.00	0.00
36	130.00	ANT150F2	1	5.225	5.748	1.00	1.00	2.62	49.57	0.000	2.500	15.07	0.00	37.69
37	130.00	Standoff	1	5.204	5.725	0.56	0.75	5.89	130.52	0.000	0.000	33.73	0.00	0.00
38	109.50	4' Omni	1	5.039	5.543	1.00	1.00	2.12	43.51	0.000	2.000	11.73	0.00	23.46
39	109.50	14' Omni	5	5.086	5.594	1.00	1.00	53.31	772.54	0.000	7.000	298.25	0.00	2087.73
40	109.50	Standoff	1	5.020	5.522	0.56	0.75	5.82	128.72	0.000	0.000	32.12	0.00	0.00
41	109.50	Standoff	5	5.020	5.522	0.56	0.75	29.09	643.62	0.000	0.000	160.60	0.00	0.00
42	100.00	Standoff	1	4.925	5.417	0.56	0.75	5.78	127.79	0.000	0.000	31.30	0.00	0.00
43	100.00	MPRD	1	4.925	5.417	1.00	1.00	7.64	324.41	0.000	0.000	41.37	0.00	0.00
							Totals:		**38,855.89**			**4,577.88**		

Total Applied Force Summary

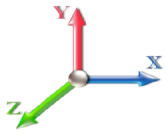
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 35	

Tower Engineering Solutions

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

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

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		116.34	3527.20	0.00	0.00
10.00		114.82	3530.74	0.00	0.00
15.00		113.14	3511.46	0.00	0.00
20.00		118.19	3482.15	0.00	0.00
25.00		121.88	3447.04	0.00	0.00
30.00		124.55	3408.12	0.00	0.00
35.00		126.47	3366.45	0.00	0.00
40.00		127.81	3322.71	0.00	0.00
45.00		128.67	3277.35	0.00	0.00
45.42		10.63	271.16	0.00	0.00
48.90		91.32	3410.44	0.00	0.00
50.00		28.72	1069.02	0.00	0.00
52.75		72.12	2654.83	0.00	0.00
55.00		58.97	1273.41	0.00	0.00
57.15		56.33	1209.30	0.00	0.00
60.00		74.73	1591.32	0.00	0.00
65.00		131.34	2758.28	0.00	0.00
70.00		130.80	2716.72	0.00	0.00
75.00		130.06	2674.54	0.00	0.00
80.00		129.14	2631.80	0.00	0.00
84.00		102.41	2075.07	0.00	0.00
85.00		25.79	730.18	0.00	0.00
87.00		51.51	1451.70	0.00	0.00
90.00		76.98	2156.17	0.00	0.00
90.42		10.62	297.70	0.00	0.00
95.00		116.81	2014.16	0.00	0.00
100.00	(2) attachments	198.77	2614.67	0.00	0.00
105.00		124.52	2126.05	0.00	0.00
109.50	(12) attachments	613.29	3471.11	0.00	2111.19
110.00		12.15	207.22	0.00	0.00
112.25		54.56	927.09	0.00	0.00
115.00		66.22	1122.66	0.00	0.00
120.00		119.21	2009.89	0.00	0.00
123.58		84.12	1418.66	0.00	0.00
125.00		33.37	745.07	0.00	0.00
125.60		14.08	314.30	0.00	0.00
129.00		79.40	1763.34	0.00	0.00
130.00	(2) attachments	71.93	527.33	0.00	37.69
135.00		114.74	1666.60	0.00	0.00
136.26		28.49	416.15	0.00	0.00
140.00		83.90	1220.99	0.00	0.00
145.00		110.31	1602.74	0.00	0.00
150.00		107.98	1533.08	0.00	0.00
155.00	(18) attachments	915.49	10303.86	0.00	0.00
160.00		103.35	1385.59	0.00	0.00
161.50	(1) attachments	304.66	3668.87	0.00	0.00

Total Applied Force Summary

Structure:	CT46138-A-SBA		**Code:**	EIA/TIA-222-G	7/1/2019
Site Name:	Torrington/Oandg Ind Inc		**Exposure:**	C	
Height:	196.00 (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

165.00		71.16	945.00	0.00	0.00
165.25		5.05	67.11	0.00	0.00
169.58		88.16	1439.52	0.00	0.00
170.00		8.36	96.79	0.00	0.00
175.00	(50) attachments	1265.31	12336.29	0.00	0.00
180.00		93.95	854.19	0.00	0.00
185.00	(19) attachments	806.09	6898.86	0.00	0.00
187.00	(2) attachments	291.63	791.71	0.00	2258.27
190.00		52.68	431.24	0.00	0.00
191.50	(23) attachments	747.82	6969.84	0.00	0.00
195.00		59.61	442.00	0.00	0.00
196.00	(1) attachments	28.42	176.75	0.00	0.00
	Totals:	**9,148.93**	**132,353.61**	**0.00**	**4,407.15**

Linear Appurtenance Segment Forces (Factored)

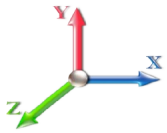
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 37	

Tower Engineering Solutions

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

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

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	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.058	0.000	3.308	0.00	65.17
5.00	3" Conduit	Yes	5.00	0.000	3.00	2.63	0.00	0.058	0.000	3.308	0.00	49.49
5.00	7/8" Coax	Yes	5.00	0.000	0.52	1.60	0.00	0.058	0.000	3.308	0.00	27.54
10.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.059	0.000	3.308	0.00	69.51
10.00	3" Conduit	Yes	5.00	0.000	3.00	2.73	0.00	0.059	0.000	3.308	0.00	53.37
10.00	7/8" Coax	Yes	5.00	0.000	0.52	1.70	0.00	0.059	0.000	3.308	0.00	30.54
15.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.060	0.000	3.308	0.00	72.28
15.00	3" Conduit	Yes	5.00	0.000	3.00	2.79	0.00	0.060	0.000	3.308	0.00	55.85
15.00	7/8" Coax	Yes	5.00	0.000	0.52	1.76	0.00	0.060	0.000	3.308	0.00	32.48
20.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.061	0.000	3.509	0.00	74.36
20.00	3" Conduit	Yes	5.00	0.000	3.00	2.84	0.00	0.061	0.000	3.509	0.00	57.72
20.00	7/8" Coax	Yes	5.00	0.000	0.52	1.80	0.00	0.061	0.000	3.509	0.00	33.95
25.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.062	0.000	3.678	0.00	76.03
25.00	3" Conduit	Yes	5.00	0.000	3.00	2.87	0.00	0.062	0.000	3.678	0.00	59.22
25.00	7/8" Coax	Yes	5.00	0.000	0.52	1.84	0.00	0.062	0.000	3.678	0.00	35.15
30.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.064	0.000	3.822	0.00	77.45
30.00	3" Conduit	Yes	5.00	0.000	3.00	2.90	0.00	0.064	0.000	3.822	0.00	60.50
30.00	7/8" Coax	Yes	5.00	0.000	0.52	1.87	0.00	0.064	0.000	3.822	0.00	36.16
35.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.065	0.000	3.948	0.00	78.68
35.00	3" Conduit	Yes	5.00	0.000	3.00	2.93	0.00	0.065	0.000	3.948	0.00	61.61
35.00	7/8" Coax	Yes	5.00	0.000	0.52	1.89	0.00	0.065	0.000	3.948	0.00	37.04
40.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.066	0.000	4.061	0.00	79.77
40.00	3" Conduit	Yes	5.00	0.000	3.00	2.95	0.00	0.066	0.000	4.061	0.00	62.60
40.00	7/8" Coax	Yes	5.00	0.000	0.52	1.92	0.00	0.066	0.000	4.061	0.00	37.83
45.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.068	0.000	4.163	0.00	80.75
45.00	3" Conduit	Yes	5.00	0.000	3.00	2.97	0.00	0.068	0.000	4.163	0.00	63.48
45.00	7/8" Coax	Yes	5.00	0.000	0.52	1.94	0.00	0.068	0.000	4.163	0.00	38.54
45.42	2" Conduit	Yes	0.42	0.000	0.00	0.00	0.00	0.068	0.000	4.171	0.00	6.74
45.42	3" Conduit	Yes	0.42	0.000	3.00	0.25	0.00	0.068	0.000	4.171	0.00	5.30
45.42	7/8" Coax	Yes	0.42	0.000	0.52	0.16	0.00	0.068	0.000	4.171	0.00	3.22
48.90	2" Conduit	Yes	3.48	0.000	0.00	0.00	0.00	0.069	0.000	4.236	0.00	56.74
48.90	3" Conduit	Yes	3.48	0.000	3.00	2.08	0.00	0.069	0.000	4.236	0.00	44.67
48.90	7/8" Coax	Yes	3.48	0.000	0.52	1.36	0.00	0.069	0.000	4.236	0.00	27.20
50.00	2" Conduit	Yes	1.10	0.000	0.00	0.00	0.00	0.070	0.000	4.256	0.00	17.96
50.00	3" Conduit	Yes	1.10	0.000	3.00	0.66	0.00	0.070	0.000	4.256	0.00	14.14
50.00	7/8" Coax	Yes	1.10	0.000	0.52	0.43	0.00	0.070	0.000	4.256	0.00	8.62
52.75	2" Conduit	Yes	2.75	0.000	0.00	0.00	0.00	0.070	0.000	4.304	0.00	45.16
52.75	3" Conduit	Yes	2.75	0.000	3.00	1.65	0.00	0.070	0.000	4.304	0.00	35.59
52.75	7/8" Coax	Yes	2.75	0.000	0.52	1.08	0.00	0.070	0.000	4.304	0.00	21.74
55.00	2" Conduit	Yes	2.25	0.000	0.00	0.00	0.00	0.069	0.000	4.342	0.00	37.11
55.00	3" Conduit	Yes	2.25	0.000	3.00	1.35	0.00	0.069	0.000	4.342	0.00	29.27
55.00	7/8" Coax	Yes	2.25	0.000	0.52	0.89	0.00	0.069	0.000	4.342	0.00	17.90
57.15	2" Conduit	Yes	2.15	0.000	0.00	0.00	0.00	0.070	0.000	4.378	0.00	35.60
57.15	3" Conduit	Yes	2.15	0.000	3.00	1.29	0.00	0.070	0.000	4.378	0.00	28.10
57.15	7/8" Coax	Yes	2.15	0.000	0.52	0.85	0.00	0.070	0.000	4.378	0.00	17.21
60.00	2" Conduit	Yes	2.85	0.000	0.00	0.00	0.00	0.071	0.000	4.423	0.00	47.44
60.00	3" Conduit	Yes	2.85	0.000	3.00	1.72	0.00	0.071	0.000	4.423	0.00	37.46

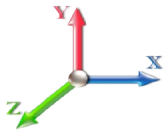
Linear Appurtenance Segment Forces (Factored)

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (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	

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

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

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)
60.00	7/8" Coax	Yes	2.85	0.000	0.52	1.13	0.00	0.071	0.000	4.423	0.00	22.99
65.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.072	0.000	4.498	0.00	83.93
65.00	3" Conduit	Yes	5.00	0.000	3.00	3.03	0.00	0.072	0.000	4.498	0.00	66.37
65.00	7/8" Coax	Yes	5.00	0.000	0.52	2.00	0.00	0.072	0.000	4.498	0.00	40.86
70.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.074	0.000	4.569	0.00	84.60
70.00	3" Conduit	Yes	5.00	0.000	3.00	3.05	0.00	0.074	0.000	4.569	0.00	66.97
70.00	7/8" Coax	Yes	5.00	0.000	0.52	2.01	0.00	0.074	0.000	4.569	0.00	41.34
75.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.075	0.000	4.635	0.00	85.23
75.00	3" Conduit	Yes	5.00	0.000	3.00	3.06	0.00	0.075	0.000	4.635	0.00	67.54
75.00	7/8" Coax	Yes	5.00	0.000	0.52	2.03	0.00	0.075	0.000	4.635	0.00	41.80
80.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.077	0.000	4.699	0.00	85.82
80.00	3" Conduit	Yes	5.00	0.000	3.00	3.07	0.00	0.077	0.000	4.699	0.00	68.08
80.00	7/8" Coax	Yes	5.00	0.000	0.52	2.04	0.00	0.077	0.000	4.699	0.00	42.24
84.00	2" Conduit	Yes	4.00	0.000	0.00	0.00	0.00	0.079	0.000	4.747	0.00	69.02
84.00	3" Conduit	Yes	4.00	0.000	3.00	2.46	0.00	0.079	0.000	4.747	0.00	54.79
84.00	7/8" Coax	Yes	4.00	0.000	0.52	1.64	0.00	0.079	0.000	4.747	0.00	34.05
85.00	2" Conduit	Yes	1.00	0.000	0.00	0.00	0.00	0.080	0.000	4.759	0.00	17.28
85.00	3" Conduit	Yes	1.00	0.000	3.00	0.62	0.00	0.080	0.000	4.759	0.00	13.72
85.00	7/8" Coax	Yes	1.00	0.000	0.52	0.41	0.00	0.080	0.000	4.759	0.00	8.53
87.00	2" Conduit	Yes	2.00	0.000	0.00	0.00	0.00	0.080	0.000	4.782	0.00	34.64
87.00	3" Conduit	Yes	2.00	0.000	3.00	1.23	0.00	0.080	0.000	4.782	0.00	27.51
87.00	7/8" Coax	Yes	2.00	0.000	0.52	0.82	0.00	0.080	0.000	4.782	0.00	17.12
90.00	2" Conduit	Yes	3.00	0.000	0.00	0.00	0.00	0.081	0.000	4.817	0.00	52.15
90.00	3" Conduit	Yes	3.00	0.000	3.00	1.86	0.00	0.081	0.000	4.817	0.00	41.45
90.00	7/8" Coax	Yes	3.00	0.000	0.52	1.24	0.00	0.081	0.000	4.817	0.00	25.83
90.42	2" Conduit	Yes	0.42	0.000	0.00	0.00	0.00	0.082	0.000	4.821	0.00	7.25
90.42	3" Conduit	Yes	0.42	0.000	3.00	0.26	0.00	0.082	0.000	4.821	0.00	5.76
90.42	7/8" Coax	Yes	0.42	0.000	0.52	0.17	0.00	0.082	0.000	4.821	0.00	3.59
95.00	2" Conduit	Yes	4.58	0.000	0.00	0.00	0.00	0.082	0.000	4.872	0.00	80.14
95.00	3" Conduit	Yes	4.58	0.000	3.00	2.84	0.00	0.082	0.000	4.872	0.00	63.75
95.00	7/8" Coax	Yes	4.58	0.000	0.52	1.90	0.00	0.082	0.000	4.872	0.00	39.80
100.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.084	0.000	4.925	0.00	87.92
100.00	3" Conduit	Yes	5.00	0.000	3.00	3.11	0.00	0.084	0.000	4.925	0.00	69.98
100.00	7/8" Coax	Yes	5.00	0.000	0.52	2.08	0.00	0.084	0.000	4.925	0.00	43.78
105.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.086	0.000	4.976	0.00	88.39
105.00	3" Conduit	Yes	5.00	0.000	3.00	3.12	0.00	0.086	0.000	4.976	0.00	70.41
105.00	7/8" Coax	Yes	5.00	0.000	0.52	2.09	0.00	0.086	0.000	4.976	0.00	44.13
109.50	2" Conduit	Yes	4.50	0.000	0.00	0.00	0.00	0.088	0.000	5.020	0.00	79.91
109.50	3" Conduit	Yes	4.50	0.000	3.00	2.82	0.00	0.088	0.000	5.020	0.00	63.70
109.50	7/8" Coax	Yes	4.50	0.000	0.52	1.89	0.00	0.088	0.000	5.020	0.00	39.98
110.00	2" Conduit	Yes	0.50	0.000	0.00	0.00	0.00	0.089	0.000	5.025	0.00	8.88
110.00	3" Conduit	Yes	0.50	0.000	3.00	0.31	0.00	0.089	0.000	5.025	0.00	7.08
110.00	7/8" Coax	Yes	0.50	0.000	0.52	0.21	0.00	0.089	0.000	5.025	0.00	4.45
112.25	2" Conduit	Yes	2.25	0.000	0.00	0.00	0.00	0.090	0.000	5.046	0.00	40.07
112.25	3" Conduit	Yes	2.25	0.000	3.00	1.41	0.00	0.090	0.000	5.046	0.00	31.95
112.25	7/8" Coax	Yes	2.25	0.000	0.52	0.95	0.00	0.090	0.000	5.046	0.00	20.07
115.00	2" Conduit	Yes	2.75	0.000	0.00	0.00	0.00	0.091	0.000	5.072	0.00	49.10

Linear Appurtenance Segment Forces (Factored)

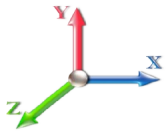
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 39	

Tower Engineering Solutions

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

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

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)
115.00	3" Conduit	Yes	2.75	0.000	3.00	1.73	0.00	0.091	0.000	5.072	0.00	39.17
115.00	7/8" Coax	Yes	2.75	0.000	0.52	1.16	0.00	0.091	0.000	5.072	0.00	24.63
120.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.093	0.000	5.117	0.00	89.69
120.00	3" Conduit	Yes	5.00	0.000	3.00	3.15	0.00	0.093	0.000	5.117	0.00	71.60
120.00	7/8" Coax	Yes	5.00	0.000	0.52	2.11	0.00	0.093	0.000	5.117	0.00	45.09
123.58	2" Conduit	Yes	3.58	0.000	0.00	0.00	0.00	0.095	0.000	5.149	0.00	64.49
123.58	3" Conduit	Yes	3.58	0.000	3.00	2.26	0.00	0.095	0.000	5.149	0.00	51.50
123.58	7/8" Coax	Yes	3.58	0.000	0.52	1.52	0.00	0.095	0.000	5.149	0.00	32.47
125.00	2" Conduit	Yes	1.42	0.000	0.00	0.00	0.00	0.097	0.000	5.162	0.00	25.53
125.00	3" Conduit	Yes	1.42	0.000	3.00	0.89	0.00	0.097	0.000	5.162	0.00	20.39
125.00	7/8" Coax	Yes	1.42	0.000	0.52	0.60	0.00	0.097	0.000	5.162	0.00	12.86
125.60	2" Conduit	Yes	0.60	0.000	0.00	0.00	0.00	0.097	0.000	5.167	0.00	10.82
125.60	3" Conduit	Yes	0.60	0.000	3.00	0.38	0.00	0.097	0.000	5.167	0.00	8.64
125.60	7/8" Coax	Yes	0.60	0.000	0.52	0.25	0.00	0.097	0.000	5.167	0.00	5.45
129.00	2" Conduit	Yes	3.40	0.000	0.00	0.00	0.00	0.099	0.000	5.196	0.00	61.48
129.00	3" Conduit	Yes	3.40	0.000	3.00	2.15	0.00	0.099	0.000	5.196	0.00	49.13
129.00	7/8" Coax	Yes	3.40	0.000	0.52	1.45	0.00	0.099	0.000	5.196	0.00	31.02
130.00	2" Conduit	Yes	1.00	0.000	0.00	0.00	0.00	0.098	0.000	5.204	0.00	18.10
130.00	3" Conduit	Yes	1.00	0.000	3.00	0.63	0.00	0.098	0.000	5.204	0.00	14.46
130.00	7/8" Coax	Yes	1.00	0.000	0.52	0.43	0.00	0.098	0.000	5.204	0.00	9.14
135.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.085	0.000	5.246	0.00	90.86
135.00	3" Conduit	Yes	5.00	0.000	3.00	3.17	0.00	0.085	0.000	5.246	0.00	72.67
136.26	2" Conduit	Yes	1.26	0.000	0.00	0.00	0.00	0.087	0.000	5.256	0.00	22.92
136.26	3" Conduit	Yes	1.26	0.000	3.00	0.80	0.00	0.087	0.000	5.256	0.00	18.33
140.00	2" Conduit	Yes	3.74	0.000	0.00	0.00	0.00	0.088	0.000	5.286	0.00	68.24
140.00	3" Conduit	Yes	3.74	0.000	3.00	2.38	0.00	0.088	0.000	5.286	0.00	54.60
145.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.091	0.000	5.325	0.00	91.59
145.00	3" Conduit	Yes	5.00	0.000	3.00	3.18	0.00	0.091	0.000	5.325	0.00	73.32
150.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.094	0.000	5.364	0.00	91.93
150.00	3" Conduit	Yes	5.00	0.000	3.00	3.19	0.00	0.094	0.000	5.364	0.00	73.64
155.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.097	0.000	5.401	0.00	92.27
155.00	3" Conduit	Yes	5.00	0.000	3.00	3.20	0.00	0.097	0.000	5.401	0.00	73.95
160.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.101	1.002	5.437	0.00	92.60
160.00	3" Conduit	Yes	5.00	0.000	3.00	3.20	0.00	0.101	1.002	5.437	0.00	74.25
161.50	2" Conduit	Yes	1.50	0.000	0.00	0.00	0.00	0.103	1.009	5.448	0.00	27.81
161.50	3" Conduit	Yes	1.50	0.000	3.00	0.96	0.00	0.103	1.009	5.448	0.00	22.30
165.00	2" Conduit	Yes	3.50	0.000	0.00	0.00	0.00	0.105	1.015	5.472	0.00	65.04
165.00	3" Conduit	Yes	3.50	0.000	3.00	2.25	0.00	0.105	1.015	5.472	0.00	52.18
165.25	2" Conduit	Yes	0.25	0.000	0.00	0.00	0.00	0.106	1.019	5.474	0.00	4.65
165.25	3" Conduit	Yes	0.25	0.000	3.00	0.16	0.00	0.106	1.019	5.474	0.00	3.73
169.58	2" Conduit	Yes	4.33	0.000	0.00	0.00	0.00	0.108	1.025	5.504	0.00	80.77
169.58	3" Conduit	Yes	4.33	0.000	3.00	2.78	0.00	0.108	1.025	5.504	0.00	64.82
170.00	2" Conduit	Yes	0.42	0.000	0.00	0.00	0.00	0.109	1.027	5.507	0.00	7.77
170.00	3" Conduit	Yes	0.42	0.000	3.00	0.27	0.00	0.109	1.027	5.507	0.00	6.24
175.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.111	1.034	5.541	0.00	93.53
175.00	3" Conduit	Yes	5.00	0.000	3.00	3.22	0.00	0.111	1.034	5.541	0.00	75.10

Linear Appurtenance Segment Forces (Factored)

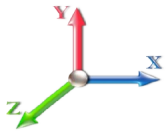
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 40	

Tower Engineering Solutions

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

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

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)
										Totals:	**0.0**	**6,368.9**

Calculated Forces

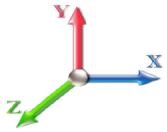
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 41	

Tower Engineering Solutions

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

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

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	-132.3	-9.19	0.00	-1341.7	0.00	1341.78	8794.96	4397.48	21496.0	10671.5	0.00	0.000	0.000	0.141
5.00	-128.8	-9.15	0.00	-1295.8	0.00	1295.83	8639.43	4319.71	20738.5	10295.5	0.02	-0.036	0.000	0.141
10.00	-125.2	-9.12	0.00	-1250.0	0.00	1250.07	8483.89	4241.95	19994.7	9926.22	0.08	-0.072	0.000	0.141
15.00	-121.7	-9.08	0.00	-1204.4	0.00	1204.49	8328.36	4164.18	19264.4	9563.67	0.17	-0.109	0.000	0.141
20.00	-118.2	-9.03	0.00	-1159.1	0.00	1159.11	8172.83	4086.41	18547.7	9207.87	0.30	-0.146	0.000	0.140
25.00	-114.8	-8.97	0.00	-1113.9	0.00	1113.98	8017.29	4008.65	17844.6	8858.82	0.48	-0.184	0.000	0.140
30.00	-111.4	-8.91	0.00	-1069.1	0.00	1069.11	7861.76	3930.88	17155.1	8516.51	0.69	-0.223	0.000	0.140
35.00	-108.0	-8.85	0.00	-1024.5	0.00	1024.55	7706.22	3853.11	16479.1	8180.95	0.95	-0.263	0.000	0.139
40.00	-104.7	-8.78	0.00	-980.31	0.00	980.31	7550.69	3775.35	15816.8	7852.13	1.24	-0.303	0.000	0.139
45.00	-101.4	-8.67	0.00	-936.43	0.00	936.43	7395.16	3697.58	15168.0	7530.06	1.58	-0.344	0.000	0.138
45.42	-101.1	-8.69	0.00	-932.81	0.00	932.81	7382.20	3691.10	15114.6	7503.52	1.61	-0.348	0.000	0.138
48.90	-97.74	-8.60	0.00	-902.56	0.00	902.56	7273.84	3636.92	14671.4	7283.52	1.88	-0.377	0.000	0.092
50.00	-96.67	-8.59	0.00	-893.10	0.00	893.10	7239.62	3619.81	14532.8	7214.73	1.97	-0.383	0.000	0.092
52.75	-94.02	-8.52	0.00	-869.49	0.00	869.49	5810.43	2905.21	11825.7	5870.80	2.19	-0.399	0.000	0.093
55.00	-92.74	-8.47	0.00	-850.32	0.00	850.32	5769.82	2884.91	11629.7	5773.48	2.38	-0.411	0.000	0.102
57.15	-91.53	-8.43	0.00	-832.11	0.00	832.11	5730.75	2865.38	11443.3	5680.95	2.57	-0.425	0.000	0.101
57.15	-91.53	-8.43	0.00	-832.11	0.00	832.11	5730.75	2865.38	11443.3	5680.95	2.57	-0.425	0.000	0.101
60.00	-89.94	-8.40	0.00	-808.08	0.00	808.08	5678.55	2839.28	11197.7	5559.03	2.83	-0.443	0.000	0.161
65.00	-87.17	-8.32	0.00	-766.08	0.00	766.08	5551.73	2775.86	10705.1	5314.51	3.32	-0.494	0.000	0.160
70.00	-84.45	-8.24	0.00	-724.46	0.00	724.46	5427.30	2713.65	10228.2	5077.73	3.86	-0.545	0.000	0.158
75.00	-81.77	-8.16	0.00	-683.25	0.00	683.25	5302.88	2651.44	9762.15	4846.34	4.46	-0.596	0.000	0.156
80.00	-79.13	-8.07	0.00	-642.44	0.00	642.44	5178.45	2589.22	9306.93	4620.35	5.12	-0.649	0.000	0.154
84.00	-77.05	-7.98	0.00	-610.17	0.00	610.17	5078.91	2539.45	8950.59	4443.45	5.68	-0.691	0.000	0.152
85.00	-76.32	-7.96	0.00	-602.19	0.00	602.19	5054.02	2527.01	8862.59	4399.76	5.82	-0.702	0.000	0.152
87.00	-74.87	-7.92	0.00	-586.26	0.00	586.26	5004.25	2502.13	8687.89	4313.04	6.12	-0.724	0.000	0.092
90.00	-72.71	-7.83	0.00	-562.50	0.00	562.50	4929.59	2464.80	8429.11	4184.57	6.58	-0.743	0.000	0.090
90.42	-72.41	-7.84	0.00	-559.23	0.00	559.23	3591.78	1795.89	6277.53	3116.43	6.65	-0.746	0.000	0.096
95.00	-70.39	-7.73	0.00	-523.31	0.00	523.31	3535.98	1767.99	6038.44	2997.74	7.38	-0.775	0.000	0.105
100.00	-67.78	-7.54	0.00	-484.65	0.00	484.65	3473.75	1736.87	5780.45	2869.66	8.21	-0.811	0.000	0.101
105.00	-65.65	-7.42	0.00	-446.94	0.00	446.94	3410.09	1705.04	5525.58	2743.13	9.08	-0.846	0.000	0.096
109.50	-62.19	-6.78	0.00	-411.42	0.00	411.42	3351.58	1675.79	5299.03	2630.66	9.89	-0.878	0.000	0.091
110.00	-61.98	-6.77	0.00	-408.03	0.00	408.03	3345.00	1672.50	5274.03	2618.25	9.98	-0.881	0.000	0.091
112.25	-61.05	-6.72	0.00	-392.80	0.00	392.80	3315.25	1657.63	5161.96	2562.62	10.40	-0.897	0.000	0.089
112.25	-61.05	-6.72	0.00	-392.80	0.00	392.80	3315.25	1657.63	5161.96	2562.62	10.40	-0.897	0.000	0.089
115.00	-59.92	-6.68	0.00	-374.31	0.00	374.31	3278.49	1639.25	5025.98	2495.11	10.92	-0.916	0.000	0.168
120.00	-57.91	-6.59	0.00	-340.90	0.00	340.90	3210.56	1605.28	4781.62	2373.80	11.92	-0.981	0.000	0.162
123.58	-56.49	-6.51	0.00	-317.30	0.00	317.30	3148.16	1574.08	4590.15	2278.75	12.67	-1.028	0.000	0.157
125.00	-55.74	-6.48	0.00	-308.08	0.00	308.08	3121.72	1560.86	4512.97	2240.43	12.98	-1.047	0.000	0.155
125.60	-55.43	-6.47	0.00	-304.19	0.00	304.19	3110.52	1555.26	4480.48	2224.30	13.11	-1.055	0.000	0.088
129.00	-53.66	-6.37	0.00	-282.19	0.00	282.19	2149.47	1074.74	3099.22	1538.58	13.87	-1.079	0.000	0.092
130.00	-53.14	-6.31	0.00	-275.77	0.00	275.77	2141.27	1070.63	3068.69	1523.43	14.10	-1.087	0.000	0.103
135.00	-51.47	-6.19	0.00	-244.20	0.00	244.20	2099.38	1049.69	2916.97	1448.11	15.26	-1.126	0.000	0.095
136.26	-51.05	-6.17	0.00	-236.41	0.00	236.41	2088.60	1044.30	2879.00	1429.26	15.56	-1.135	0.000	0.093
136.26	-51.05	-6.17	0.00	-236.41	0.00	236.41	2088.60	1044.30	2879.00	1429.26	15.56	-1.135	0.000	0.093
140.00	-49.83	-6.10	0.00	-213.33	0.00	213.33	2056.07	1028.04	2766.99	1373.65	16.46	-1.163	0.000	0.180
145.00	-48.22	-6.02	0.00	-182.81	0.00	182.81	2011.34	1005.67	2618.95	1300.16	17.72	-1.234	0.000	0.165
150.00	-46.68	-5.93	0.00	-152.72	0.00	152.72	1965.18	982.59	2473.01	1227.71	19.05	-1.301	0.000	0.148
155.00	-36.40	-4.81	0.00	-123.07	0.00	123.07	1917.59	958.80	2329.38	1156.40	20.44	-1.362	0.000	0.125

Calculated Forces

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 42

Tower Engineering Solutions

160.00	-35.01	-4.69	0.00	-99.02	0.00	99.02	1868.58	934.29	2188.24	1086.34	21.90	-1.416	0.000	0.110
161.50	-31.35	-4.31	0.00	-91.98	0.00	91.98	1853.60	926.80	2146.41	1065.57	22.35	-1.432	0.000	0.103
165.00	-30.41	-4.23	0.00	-76.89	0.00	76.89	1818.15	909.07	2049.77	1017.59	23.41	-1.466	0.000	0.092
165.25	-30.34	-4.23	0.00	-75.83	0.00	75.83	1815.59	907.79	2042.92	1014.19	23.49	-1.468	0.000	0.091
169.58	-28.90	-4.11	0.00	-57.50	0.00	57.50	1040.26	520.13	1155.41	573.59	24.83	-1.503	0.000	0.128
170.00	-28.80	-4.12	0.00	-55.78	0.00	55.78	1038.39	519.19	1149.55	570.68	24.97	-1.507	0.000	0.126
175.00	-16.50	-2.53	0.00	-35.20	0.00	35.20	1015.17	507.59	1079.51	535.91	26.57	-1.551	0.000	0.082
180.00	-15.65	-2.42	0.00	-22.54	0.00	22.54	990.53	495.27	1010.05	501.43	28.21	-1.583	0.000	0.061
185.00	-8.77	-1.43	0.00	-10.43	0.00	10.43	964.47	482.24	941.35	467.32	29.88	-1.604	0.000	0.031
187.00	-7.99	-1.11	0.00	-5.32	0.00	5.32	953.65	476.82	914.12	453.81	30.56	-1.609	0.000	0.020
190.00	-7.56	-1.05	0.00	-1.98	0.00	1.98	936.98	468.49	873.60	433.69	31.57	-1.612	0.000	0.013
191.50	-0.62	-0.11	0.00	-0.40	0.00	0.40	928.46	464.23	853.48	423.70	32.07	-1.613	0.000	0.002
195.00	-0.18	-0.03	0.00	-0.03	0.00	0.03	908.07	454.03	806.98	400.62	33.26	-1.613	0.000	0.000
196.00	0.00	-0.03	0.00	0.00	0.00	0.00	902.11	451.06	793.81	394.08	33.59	-1.613	0.000	0.000

Seismic Segment Forces (Factored)

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 43	

Tower Engineering Solutions

Load Case:	1.2D + 1.0E							**Iterations**	24
Gust Response Factor	1.10				**Sds**	0.19		**Ss**	0.18
Dead Load Factor	1.20	**Seismic Load Factor**	1.00		**Sd1**	0.10		**S1**	0.07
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.28		**SA**	0.03	**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		1996.2	0.00	0.03	0.01	34.53	
10.00		1960.6	0.00	0.04	0.03	50.58	
15.00		1925.0	0.01	0.06	0.03	58.72	
20.00		1889.4	0.02	0.06	0.04	62.74	
25.00		1853.8	0.03	0.07	0.04	64.53	
30.00		1818.1	0.04	0.07	0.04	65.16	
35.00		1782.5	0.06	0.07	0.04	65.25	
40.00		1746.9	0.08	0.07	0.04	65.14	
45.00		1711.3	0.10	0.07	0.04	65.01	
45.42	Bot - Section 2	141.00	0.10	0.07	0.04	5.36	
48.90	RB1	2125.6	0.12	0.07	0.03	81.93	
50.00		664.80	0.12	0.07	0.03	25.73	
52.75	Top - Section 1	1648.4	0.14	0.07	0.03	64.41	
55.00		600.65	0.15	0.07	0.03	23.64	
57.15	RT1	568.56	0.16	0.07	0.03	22.51	
60.00		745.55	0.18	0.07	0.03	29.68	
65.00		1285.6	0.21	0.06	0.02	51.21	
70.00		1257.1	0.24	0.06	0.02	49.18	
75.00		1228.6	0.28	0.05	0.01	45.79	
80.00		1200.1	0.31	0.04	0.01	40.61	
84.00	Bot - Section 3	939.59	0.35	0.03	0.01	27.84	
85.00		409.65	0.36	0.03	0.01	11.62	
87.00	RB2	813.31	0.37	0.03	0.01	20.75	
90.00		1205.0	0.40	0.02	0.01	24.73	
90.42	Top - Section 2	165.94	0.40	0.02	0.01	3.28	
95.00		781.83	0.44	0.00	0.01	8.13	
100.00	Appurtenance(s)	908.43	0.49	-0.01	0.01	-1.25	
105.00		811.06	0.54	-0.03	0.01	-11.02	
109.50	Appurtenance(s)	1161.6	0.59	-0.05	0.01	-27.59	
110.00		78.01	0.60	-0.05	0.01	-1.93	
112.25	RT2	348.39	0.62	-0.06	0.02	-10.16	
115.00		419.93	0.65	-0.07	0.02	-14.18	
120.00		746.94	0.71	-0.09	0.03	-29.74	
123.58	Bot - Section 4	522.16	0.75	-0.10	0.04	-22.03	
125.00		358.80	0.77	-0.11	0.05	-15.31	
125.60	RB3	151.06	0.78	-0.11	0.05	-6.47	
129.00	Top - Section 3	845.83	0.82	-0.12	0.06	-36.09	
130.00	Appurtenance(s)	159.35	0.83	-0.12	0.06	-6.75	
135.00		522.14	0.90	-0.12	0.09	-20.33	
136.26	RT3	129.05	0.91	-0.12	0.09	-4.85	
140.00		377.06	0.96	-0.12	0.11	-12.27	
145.00		490.09	1.03	-0.10	0.15	-11.39	
150.00		474.06	1.11	-0.07	0.19	-5.26	
155.00	Appurtenance(s)	3133.4	1.18	-0.01	0.24	12.17	
160.00		442.00	1.26	0.07	0.30	9.61	

Seismic Segment Forces (Factored)

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 44	

Tower Engineering Solutions

161.50	Appurtenance(s)	1629.4	1.28	0.10	0.32	45.06		
165.00		296.50	1.34	0.18	0.37	12.60		
165.25	Bot - Section 5	20.88	1.34	0.19	0.38	0.91		
169.58	Top - Section 4	596.66	1.41	0.31	0.45	38.23		
170.00		22.76	1.42	0.33	0.45	1.51		
175.00	Appurtenance(s)	3804.5	1.51	0.52	0.55	353.19		
180.00		256.70	1.59	0.76	0.66	31.46		
185.00	Appurtenance(s)	1967.1	1.68	1.06	0.79	305.66		
187.00	Appurtenance(s)	203.41	1.72	1.20	0.85	34.46		
190.00		139.91	1.78	1.43	0.94	26.78		
191.50	Appurtenance(s)	2438.9	1.80	1.56	0.98	494.63		
195.00		156.13	1.87	1.88	1.10	36.00		
196.00	Appurtenance(s)	50.15	1.89	1.98	1.14	11.98		
	Totals:	**56,128.3**				**2,245.7**	**Total Wind:**	**41,754.0**

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

Calculated Forces

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 45	

Tower Engineering Solutions

Load Case:	1.2D + 1.0E							**Iterations**	24
Gust Response Factor	1.10			**Sds**	0.19			**Ss**	0.18
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.10			**S1**	0.07
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.28	**SA**	0.03	**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	-80.60	-2.49	0.00	-325.13	0.00	325.13	8794.96	4397.48	21496.0	10671.5		0.00	0.00	0.040
5.00	-77.82	-2.46	0.00	-312.70	0.00	312.70	8639.43	4319.71	20738.5	10295.5		0.00	-0.01	0.039
10.00	-75.08	-2.42	0.00	-300.37	0.00	300.37	8483.89	4241.95	19994.7	9926.22		0.02	-0.02	0.039
15.00	-72.38	-2.38	0.00	-288.25	0.00	288.25	8328.36	4164.18	19264.4	9563.67		0.04	-0.03	0.039
20.00	-69.72	-2.32	0.00	-276.37	0.00	276.37	8172.83	4086.41	18547.7	9207.87		0.07	-0.04	0.039
25.00	-67.11	-2.27	0.00	-264.75	0.00	264.75	8017.29	4008.65	17844.6	8858.82		0.12	-0.04	0.038
30.00	-64.54	-2.21	0.00	-253.42	0.00	253.42	7861.76	3930.88	17155.1	8516.51		0.17	-0.05	0.038
35.00	-62.01	-2.15	0.00	-242.36	0.00	242.36	7706.22	3853.11	16479.1	8180.95		0.23	-0.06	0.038
40.00	-59.53	-2.09	0.00	-231.60	0.00	231.60	7550.69	3775.35	15816.8	7852.13		0.30	-0.07	0.037
45.00	-57.09	-2.03	0.00	-221.12	0.00	221.12	7395.16	3697.58	15168.0	7530.06		0.38	-0.08	0.037
45.42	-56.89	-2.03	0.00	-220.28	0.00	220.28	7382.20	3691.10	15114.6	7503.52		0.39	-0.08	0.037
48.90	-54.07	-1.95	0.00	-213.21	0.00	213.21	7273.84	3636.92	14671.4	7283.52		0.45	-0.09	0.025
50.00	-53.19	-1.92	0.00	-211.07	0.00	211.07	7239.62	3619.81	14532.8	7214.73		0.47	-0.09	0.025
52.75	-50.99	-1.86	0.00	-205.78	0.00	205.78	5810.43	2905.21	11825.7	5870.80		0.52	-0.09	0.025
55.00	-50.10	-1.84	0.00	-201.60	0.00	201.60	5769.82	2884.91	11629.7	5773.48		0.57	-0.10	0.027
57.15	-49.25	-1.81	0.00	-197.65	0.00	197.65	5730.75	2865.38	11443.3	5680.95		0.61	-0.10	0.027
57.15	-49.25	-1.81	0.00	-197.65	0.00	197.65	5730.75	2865.38	11443.3	5680.95		0.61	-0.10	0.027
60.00	-48.13	-1.79	0.00	-192.48	0.00	192.48	5678.55	2839.28	11197.7	5559.03		0.68	-0.11	0.043
65.00	-46.20	-1.74	0.00	-183.53	0.00	183.53	5551.73	2775.86	10705.1	5314.51		0.79	-0.12	0.043
70.00	-44.31	-1.70	0.00	-174.80	0.00	174.80	5427.30	2713.65	10228.2	5077.73		0.92	-0.13	0.043
75.00	-42.45	-1.66	0.00	-166.30	0.00	166.30	5302.88	2651.44	9762.15	4846.34		1.07	-0.14	0.042
80.00	-40.62	-1.62	0.00	-157.99	0.00	157.99	5178.45	2589.22	9306.93	4620.35		1.22	-0.16	0.042
84.00	-39.18	-1.60	0.00	-151.50	0.00	151.50	5078.91	2539.45	8950.59	4443.45		1.36	-0.17	0.042
85.00	-38.61	-1.59	0.00	-149.91	0.00	149.91	5054.02	2527.01	8862.59	4399.76		1.39	-0.17	0.042
87.00	-37.48	-1.56	0.00	-146.73	0.00	146.73	5004.25	2502.13	8687.89	4313.04		1.46	-0.17	0.025
90.00	-35.80	-1.54	0.00	-142.04	0.00	142.04	4929.59	2464.80	8429.11	4184.57		1.57	-0.18	0.025
90.42	-35.57	-1.54	0.00	-141.40	0.00	141.40	3591.78	1795.89	6277.53	3116.43		1.59	-0.18	0.026
95.00	-34.28	-1.53	0.00	-134.36	0.00	134.36	3535.98	1767.99	6038.44	2997.74		1.76	-0.19	0.030
100.00	-32.80	-1.53	0.00	-126.73	0.00	126.73	3473.75	1736.87	5780.45	2869.66		1.96	-0.20	0.029
105.00	-31.44	-1.53	0.00	-119.08	0.00	119.08	3410.09	1705.04	5525.58	2743.13		2.18	-0.21	0.028
109.50	-29.70	-1.52	0.00	-112.21	0.00	112.21	3351.58	1675.79	5299.03	2630.66		2.37	-0.21	0.027
110.00	-29.57	-1.53	0.00	-111.44	0.00	111.44	3345.00	1672.50	5274.03	2618.25		2.40	-0.21	0.027
112.25	-28.98	-1.53	0.00	-108.01	0.00	108.01	3315.25	1657.63	5161.96	2562.62		2.50	-0.22	0.026
112.25	-28.98	-1.53	0.00	-108.01	0.00	108.01	3315.25	1657.63	5161.96	2562.62		2.50	-0.22	0.026
115.00	-28.26	-1.53	0.00	-103.82	0.00	103.82	3278.49	1639.25	5025.98	2495.11		2.63	-0.22	0.050
120.00	-26.99	-1.53	0.00	-96.17	0.00	96.17	3210.56	1605.28	4781.62	2373.80		2.87	-0.24	0.049
123.58	-26.09	-1.53	0.00	-90.69	0.00	90.69	3148.16	1574.08	4590.15	2278.75		3.06	-0.26	0.048
125.00	-25.55	-1.53	0.00	-88.52	0.00	88.52	3121.72	1560.86	4512.97	2240.43		3.13	-0.26	0.048
125.60	-25.32	-1.53	0.00	-87.60	0.00	87.60	3110.52	1555.26	4480.48	2224.30		3.17	-0.26	0.027
129.00	-24.05	-1.53	0.00	-82.39	0.00	82.39	2149.47	1074.74	3099.22	1538.58		3.36	-0.27	0.029
130.00	-23.78	-1.53	0.00	-80.87	0.00	80.87	2141.27	1070.63	3068.69	1523.43		3.41	-0.27	0.032
135.00	-22.77	-1.53	0.00	-73.22	0.00	73.22	2099.38	1049.69	2916.97	1448.11		3.71	-0.28	0.030
136.26	-22.52	-1.53	0.00	-71.30	0.00	71.30	2088.60	1044.30	2879.00	1429.26		3.78	-0.29	0.030
136.26	-22.52	-1.53	0.00	-71.30	0.00	71.30	2088.60	1044.30	2879.00	1429.26		3.78	-0.29	0.030
140.00	-21.79	-1.53	0.00	-65.58	0.00	65.58	2056.07	1028.04	2766.99	1373.65		4.01	-0.30	0.058
145.00	-20.82	-1.53	0.00	-57.93	0.00	57.93	2011.34	1005.67	2618.95	1300.16		4.33	-0.32	0.055
150.00	-19.91	-1.54	0.00	-50.26	0.00	50.26	1965.18	982.59	2473.01	1227.71		4.68	-0.34	0.051

Calculated Forces

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 46

Tower Engineering Solutions

155.00	-15.81	-1.50	0.00	-42.59	0.00	42.59	1917.59	958.80	2329.38	1156.40	5.04	-0.36	0.045
160.00	-15.02	-1.49	0.00	-35.07	0.00	35.07	1868.58	934.29	2188.24	1086.34	5.43	-0.38	0.040
161.50	-12.99	-1.44	0.00	-32.83	0.00	32.83	1853.60	926.80	2146.41	1065.57	5.55	-0.38	0.038
165.00	-12.45	-1.42	0.00	-27.81	0.00	27.81	1818.15	909.07	2049.77	1017.59	5.84	-0.40	0.034
165.25	-12.41	-1.42	0.00	-27.45	0.00	27.45	1815.59	907.79	2042.92	1014.19	5.86	-0.40	0.034
169.58	-11.47	-1.38	0.00	-21.29	0.00	21.29	1040.26	520.13	1155.41	573.59	6.23	-0.41	0.048
170.00	-11.42	-1.38	0.00	-20.72	0.00	20.72	1038.39	519.19	1149.55	570.68	6.26	-0.41	0.047
175.00	-6.60	-0.99	0.00	-13.83	0.00	13.83	1015.17	507.59	1079.51	535.91	6.70	-0.43	0.032
180.00	-6.16	-0.96	0.00	-8.88	0.00	8.88	990.53	495.27	1010.05	501.43	7.16	-0.44	0.024
185.00	-3.66	-0.63	0.00	-4.09	0.00	4.09	964.47	482.24	941.35	467.32	7.62	-0.45	0.013
187.00	-3.39	-0.60	0.00	-2.83	0.00	2.83	953.65	476.82	914.12	453.81	7.81	-0.45	0.010
190.00	-3.19	-0.57	0.00	-1.04	0.00	1.04	936.98	468.49	873.60	433.69	8.10	-0.45	0.006
191.50	-0.25	-0.05	0.00	-0.19	0.00	0.19	928.46	464.23	853.48	423.70	8.24	-0.45	0.001
195.00	-0.06	-0.01	0.00	-0.01	0.00	0.01	908.07	454.03	806.98	400.62	8.57	-0.45	0.000
196.00	0.00	-0.01	0.00	0.00	0.00	0.00	902.11	451.06	793.81	394.08	8.67	-0.45	0.000

Seismic Segment Forces (Factored)

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 47	

Tower Engineering Solutions

Load Case:	0.9D + 1.0E							**Iterations**	24
Gust Response Factor	1.10				**Sds**	0.19		**Ss**	0.18
Dead Load Factor	0.90	**Seismic Load Factor**	1.00		**Sd1**	0.10		**S1**	0.07
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.28		**SA**	0.03	**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		1996.2	0.00	0.03	0.01	34.53	
10.00		1960.6	0.00	0.04	0.03	50.58	
15.00		1925.0	0.01	0.06	0.03	58.72	
20.00		1889.4	0.02	0.06	0.04	62.74	
25.00		1853.8	0.03	0.07	0.04	64.53	
30.00		1818.1	0.04	0.07	0.04	65.16	
35.00		1782.5	0.06	0.07	0.04	65.25	
40.00		1746.9	0.08	0.07	0.04	65.14	
45.00		1711.3	0.10	0.07	0.04	65.01	
45.42	Bot - Section 2	141.00	0.10	0.07	0.04	5.36	
48.90	RB1	2125.6	0.12	0.07	0.03	81.93	
50.00		664.80	0.12	0.07	0.03	25.73	
52.75	Top - Section 1	1648.4	0.14	0.07	0.03	64.41	
55.00		600.65	0.15	0.07	0.03	23.64	
57.15	RT1	568.56	0.16	0.07	0.03	22.51	
60.00		745.55	0.18	0.07	0.03	29.68	
65.00		1285.6	0.21	0.06	0.02	51.21	
70.00		1257.1	0.24	0.06	0.02	49.18	
75.00		1228.6	0.28	0.05	0.01	45.79	
80.00		1200.1	0.31	0.04	0.01	40.61	
84.00	Bot - Section 3	939.59	0.35	0.03	0.01	27.84	
85.00		409.65	0.36	0.03	0.01	11.62	
87.00	RB2	813.31	0.37	0.03	0.01	20.75	
90.00		1205.0	0.40	0.02	0.01	24.73	
90.42	Top - Section 2	165.94	0.40	0.02	0.01	3.28	
95.00		781.83	0.44	0.00	0.01	8.13	
100.00	Appurtenance(s)	908.43	0.49	-0.01	0.01	-1.25	
105.00		811.06	0.54	-0.03	0.01	-11.02	
109.50	Appurtenance(s)	1161.6	0.59	-0.05	0.01	-27.59	
110.00		78.01	0.60	-0.05	0.01	-1.93	
112.25	RT2	348.39	0.62	-0.06	0.02	-10.16	
115.00		419.93	0.65	-0.07	0.02	-14.18	
120.00		746.94	0.71	-0.09	0.03	-29.74	
123.58	Bot - Section 4	522.16	0.75	-0.10	0.04	-22.03	
125.00		358.80	0.77	-0.11	0.05	-15.31	
125.60	RB3	151.06	0.78	-0.11	0.05	-6.47	
129.00	Top - Section 3	845.83	0.82	-0.12	0.06	-36.09	
130.00	Appurtenance(s)	159.35	0.83	-0.12	0.06	-6.75	
135.00		522.14	0.90	-0.12	0.09	-20.33	
136.26	RT3	129.05	0.91	-0.12	0.09	-4.85	
140.00		377.06	0.96	-0.12	0.11	-12.27	
145.00		490.09	1.03	-0.10	0.15	-11.39	
150.00		474.06	1.11	-0.07	0.19	-5.26	
155.00	Appurtenance(s)	3133.4	1.18	-0.01	0.24	12.17	
160.00		442.00	1.26	0.07	0.30	9.61	

Seismic Segment Forces (Factored)

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 48	

Tower Engineering Solutions

161.50	Appurtenance(s)	1629.4	1.28	0.10	0.32	45.06			
165.00		296.50	1.34	0.18	0.37	12.60			
165.25	Bot - Section 5	20.88	1.34	0.19	0.38	0.91			
169.58	Top - Section 4	596.66	1.41	0.31	0.45	38.23			
170.00		22.76	1.42	0.33	0.45	1.51			
175.00	Appurtenance(s)	3804.5	1.51	0.52	0.55	353.19			
180.00		256.70	1.59	0.76	0.66	31.46			
185.00	Appurtenance(s)	1967.1	1.68	1.06	0.79	305.66			
187.00	Appurtenance(s)	203.41	1.72	1.20	0.85	34.46			
190.00		139.91	1.78	1.43	0.94	26.78			
191.50	Appurtenance(s)	2438.9	1.80	1.56	0.98	494.63			
195.00		156.13	1.87	1.88	1.10	36.00			
196.00	Appurtenance(s)	50.15	1.89	1.98	1.14	11.98			
	Totals:	**56,128.3**				**2,245.7**	**Total Wind:**	**41,754.0**	

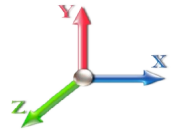
Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 49	

Tower Engineering Solutions

Load Case:	0.9D + 1.0E							**Iterations**	24
Gust Response Factor	1.10			**Sds**	0.19			**Ss**	0.18
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.10			**S1**	0.07
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.28	**SA**	0.03	**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	-60.45	-2.49	0.00	-320.79	0.00	320.79	8794.96	4397.48	21496.0	10671.5		0.00	0.00	0.037
5.00	-58.36	-2.46	0.00	-308.36	0.00	308.36	8639.43	4319.71	20738.5	10295.5		0.00	-0.01	0.037
10.00	-56.31	-2.42	0.00	-296.06	0.00	296.06	8483.89	4241.95	19994.7	9926.22		0.02	-0.02	0.036
15.00	-54.28	-2.37	0.00	-283.97	0.00	283.97	8328.36	4164.18	19264.4	9563.67		0.04	-0.03	0.036
20.00	-52.29	-2.31	0.00	-272.14	0.00	272.14	8172.83	4086.41	18547.7	9207.87		0.07	-0.03	0.036
25.00	-50.33	-2.25	0.00	-260.59	0.00	260.59	8017.29	4008.65	17844.6	8858.82		0.11	-0.04	0.036
30.00	-48.41	-2.19	0.00	-249.33	0.00	249.33	7861.76	3930.88	17155.1	8516.51		0.16	-0.05	0.035
35.00	-46.51	-2.13	0.00	-238.36	0.00	238.36	7706.22	3853.11	16479.1	8180.95		0.22	-0.06	0.035
40.00	-44.65	-2.07	0.00	-227.69	0.00	227.69	7550.69	3775.35	15816.8	7852.13		0.29	-0.07	0.035
45.00	-42.82	-2.01	0.00	-217.32	0.00	217.32	7395.16	3697.58	15168.0	7530.06		0.37	-0.08	0.035
45.42	-42.67	-2.01	0.00	-216.48	0.00	216.48	7382.20	3691.10	15114.6	7503.52		0.38	-0.08	0.035
48.90	-40.55	-1.93	0.00	-209.49	0.00	209.49	7273.84	3636.92	14671.4	7283.52		0.44	-0.09	0.023
50.00	-39.89	-1.90	0.00	-207.37	0.00	207.37	7239.62	3619.81	14532.8	7214.73		0.46	-0.09	0.023
52.75	-38.24	-1.84	0.00	-202.14	0.00	202.14	5810.43	2905.21	11825.7	5870.80		0.52	-0.09	0.023
55.00	-37.57	-1.81	0.00	-198.01	0.00	198.01	5769.82	2884.91	11629.7	5773.48		0.56	-0.10	0.026
57.15	-36.94	-1.79	0.00	-194.12	0.00	194.12	5730.75	2865.38	11443.3	5680.95		0.60	-0.10	0.025
57.15	-36.94	-1.79	0.00	-194.12	0.00	194.12	5730.75	2865.38	11443.3	5680.95		0.60	-0.10	0.025
60.00	-36.10	-1.77	0.00	-189.01	0.00	189.01	5678.55	2839.28	11197.7	5559.03		0.67	-0.10	0.040
65.00	-34.65	-1.72	0.00	-180.18	0.00	180.18	5551.73	2775.86	10705.1	5314.51		0.78	-0.12	0.040
70.00	-33.23	-1.67	0.00	-171.59	0.00	171.59	5427.30	2713.65	10228.2	5077.73		0.91	-0.13	0.040
75.00	-31.83	-1.63	0.00	-163.22	0.00	163.22	5302.88	2651.44	9762.15	4846.34		1.05	-0.14	0.040
80.00	-30.46	-1.59	0.00	-155.06	0.00	155.06	5178.45	2589.22	9306.93	4620.35		1.20	-0.15	0.039
84.00	-29.39	-1.57	0.00	-148.69	0.00	148.69	5078.91	2539.45	8950.59	4443.45		1.33	-0.16	0.039
85.00	-28.96	-1.56	0.00	-147.12	0.00	147.12	5054.02	2527.01	8862.59	4399.76		1.37	-0.17	0.039
87.00	-28.11	-1.53	0.00	-144.01	0.00	144.01	5004.25	2502.13	8687.89	4313.04		1.44	-0.17	0.024
90.00	-26.85	-1.51	0.00	-139.41	0.00	139.41	4929.59	2464.80	8429.11	4184.57		1.55	-0.18	0.023
90.42	-26.68	-1.51	0.00	-138.78	0.00	138.78	3591.78	1795.89	6277.53	3116.43		1.56	-0.18	0.025
95.00	-25.71	-1.50	0.00	-131.88	0.00	131.88	3535.98	1767.99	6038.44	2997.74		1.74	-0.18	0.028
100.00	-24.60	-1.50	0.00	-124.39	0.00	124.39	3473.75	1736.87	5780.45	2869.66		1.93	-0.19	0.027
105.00	-23.58	-1.50	0.00	-116.90	0.00	116.90	3410.09	1705.04	5525.58	2743.13		2.14	-0.20	0.026
109.50	-22.27	-1.50	0.00	-110.16	0.00	110.16	3351.58	1675.79	5299.03	2630.66		2.33	-0.21	0.025
110.00	-22.17	-1.50	0.00	-109.41	0.00	109.41	3345.00	1672.50	5274.03	2618.25		2.36	-0.21	0.025
112.25	-21.73	-1.50	0.00	-106.04	0.00	106.04	3315.25	1657.63	5161.96	2562.62		2.46	-0.22	0.025
112.25	-21.73	-1.50	0.00	-106.04	0.00	106.04	3315.25	1657.63	5161.96	2562.62		2.46	-0.22	0.025
115.00	-21.20	-1.50	0.00	-101.93	0.00	101.93	3278.49	1639.25	5025.98	2495.11		2.58	-0.22	0.047
120.00	-20.24	-1.50	0.00	-94.44	0.00	94.44	3210.56	1605.28	4781.62	2373.80		2.82	-0.24	0.046
123.58	-19.56	-1.50	0.00	-89.06	0.00	89.06	3148.16	1574.08	4590.15	2278.75		3.01	-0.25	0.045
125.00	-19.16	-1.50	0.00	-86.94	0.00	86.94	3121.72	1560.86	4512.97	2240.43		3.08	-0.26	0.045
125.60	-18.99	-1.50	0.00	-86.04	0.00	86.04	3110.52	1555.26	4480.48	2224.30		3.11	-0.26	0.025
129.00	-18.03	-1.50	0.00	-80.94	0.00	80.94	2149.47	1074.74	3099.22	1538.58		3.30	-0.27	0.027
130.00	-17.83	-1.50	0.00	-79.44	0.00	79.44	2141.27	1070.63	3068.69	1523.43		3.36	-0.27	0.030
135.00	-17.08	-1.50	0.00	-71.94	0.00	71.94	2099.38	1049.69	2916.97	1448.11		3.64	-0.28	0.029
136.26	-16.89	-1.50	0.00	-70.06	0.00	70.06	2088.60	1044.30	2879.00	1429.26		3.72	-0.28	0.028
136.26	-16.89	-1.50	0.00	-70.06	0.00	70.06	2088.60	1044.30	2879.00	1429.26		3.72	-0.28	0.028
140.00	-16.34	-1.50	0.00	-64.46	0.00	64.46	2056.07	1028.04	2766.99	1373.65		3.94	-0.29	0.055
145.00	-15.61	-1.50	0.00	-56.96	0.00	56.96	2011.34	1005.67	2618.95	1300.16		4.26	-0.31	0.052
150.00	-14.93	-1.50	0.00	-49.45	0.00	49.45	1965.18	982.59	2473.01	1227.71		4.60	-0.33	0.048

Calculated Forces

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 50	

Tower Engineering Solutions

155.00	-11.85	-1.48	0.00	-41.93	0.00	41.93	1917.59	958.80	2329.38	1156.40	4.96	-0.35	0.042
160.00	-11.26	-1.47	0.00	-34.55	0.00	34.55	1868.58	934.29	2188.24	1086.34	5.34	-0.37	0.038
161.50	-9.74	-1.41	0.00	-32.35	0.00	32.35	1853.60	926.80	2146.41	1065.57	5.46	-0.38	0.036
165.00	-9.34	-1.40	0.00	-27.41	0.00	27.41	1818.15	909.07	2049.77	1017.59	5.74	-0.39	0.032
165.25	-9.31	-1.40	0.00	-27.06	0.00	27.06	1815.59	907.79	2042.92	1014.19	5.76	-0.39	0.032
169.58	-8.60	-1.36	0.00	-21.00	0.00	21.00	1040.26	520.13	1155.41	573.59	6.12	-0.40	0.045
170.00	-8.57	-1.36	0.00	-20.43	0.00	20.43	1038.39	519.19	1149.55	570.68	6.16	-0.40	0.044
175.00	-4.95	-0.98	0.00	-13.65	0.00	13.65	1015.17	507.59	1079.51	535.91	6.59	-0.42	0.030
180.00	-4.62	-0.94	0.00	-8.77	0.00	8.77	990.53	495.27	1010.05	501.43	7.04	-0.43	0.022
185.00	-2.74	-0.62	0.00	-4.04	0.00	4.04	964.47	482.24	941.35	467.32	7.50	-0.44	0.011
187.00	-2.54	-0.59	0.00	-2.79	0.00	2.79	953.65	476.82	914.12	453.81	7.68	-0.44	0.009
190.00	-2.39	-0.56	0.00	-1.03	0.00	1.03	936.98	468.49	873.60	433.69	7.96	-0.45	0.005
191.50	-0.19	-0.05	0.00	-0.18	0.00	0.18	928.46	464.23	853.48	423.70	8.10	-0.45	0.001
195.00	-0.05	-0.01	0.00	-0.01	0.00	0.01	908.07	454.03	806.98	400.62	8.43	-0.45	0.000
196.00	0.00	-0.01	0.00	0.00	0.00	0.00	902.11	451.06	793.81	394.08	8.52	-0.45	0.000

Wind Loading - Shaft

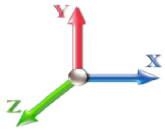
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 51	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 25

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	0.85	7.442	8.19	282.00	0.750	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	7.442	8.19	277.07	0.750	0.000	5.00	25.267	18.95	155.1	0.0	1996.3
10.00		1.00	0.85	7.442	8.19	272.13	0.750	0.000	5.00	24.821	18.62	152.4	0.0	1960.7
15.00		1.00	0.85	7.442	8.19	267.20	0.750	0.000	5.00	24.375	18.28	149.6	0.0	1925.0
20.00		1.00	0.90	7.896	8.69	270.15	0.750	0.000	5.00	23.929	17.95	155.9	0.0	1889.4
25.00		1.00	0.95	8.276	9.10	271.37	0.750	0.000	5.00	23.482	17.61	160.3	0.0	1853.8
30.00		1.00	0.98	8.600	9.46	271.32	0.750	0.000	5.00	23.036	17.28	163.4	0.0	1818.2
35.00		1.00	1.01	8.883	9.77	270.37	0.750	0.000	5.00	22.590	16.94	165.6	0.0	1782.6
40.00		1.00	1.04	9.137	10.05	268.72	0.750	0.000	5.00	22.144	16.61	166.9	0.0	1747.0
45.00		1.00	1.07	9.366	10.30	266.54	0.750	0.000	5.00	21.698	16.27	167.7	0.0	1711.3
45.42	Bot - Section 2	1.00	1.07	9.384	10.32	266.34	0.750	0.000	0.42	1.788	1.34	13.8	0.0	141.0
48.90	RB1	1.00	1.09	9.531	10.48	264.53	0.750	0.000	3.48	15.123	11.34	118.9	0.0	2125.7
50.00		1.00	1.09	9.576	10.53	263.92	0.750	0.000	1.10	4.731	3.55	37.4	0.0	664.8
52.75	Top - Section 1	1.00	1.11	9.685	10.65	262.31	0.750	0.000	2.75	11.732	8.80	93.7	0.0	1648.4
55.00		1.00	1.12	9.770	10.75	266.31	0.750	0.000	2.25	9.499	7.12	76.6	0.0	600.6
57.15	RT1	1.00	1.12	9.850	10.83	264.94	0.750	0.000	2.15	8.992	6.74	73.1	0.0	568.6
60.00		1.00	1.14	9.951	10.95	263.05	0.750	0.000	2.85	11.793	8.84	96.8	0.0	745.6
65.00		1.00	1.16	10.120	11.13	259.52	0.750	0.000	5.00	20.339	15.25	169.8	0.0	1285.6
70.00		1.00	1.17	10.279	11.31	255.75	0.750	0.000	5.00	19.893	14.92	168.7	0.0	1257.1
75.00		1.00	1.19	10.430	11.47	251.78	0.750	0.000	5.00	19.446	14.58	167.3	0.0	1228.6
80.00		1.00	1.21	10.572	11.63	247.61	0.750	0.000	5.00	19.000	14.25	165.7	0.0	1200.1
84.00	Bot - Section 3	1.00	1.22	10.681	11.75	244.15	0.750	0.000	4.00	14.879	11.16	131.1	0.0	939.6
85.00		1.00	1.22	10.708	11.78	243.27	0.750	0.000	1.00	3.739	2.80	33.0	0.0	409.6
87.00	RB2	1.00	1.23	10.761	11.84	241.50	0.750	0.000	2.00	7.424	5.57	65.9	0.0	813.3
90.00		1.00	1.24	10.838	11.92	238.79	0.750	0.000	3.00	11.003	8.25	98.4	0.0	1205.0
90.42	Top - Section 2	1.00	1.24	10.848	11.93	238.41	0.750	0.000	0.42	1.515	1.14	13.6	0.0	165.9
95.00		1.00	1.25	10.962	12.06	238.44	0.750	0.000	4.58	16.465	12.35	148.9	0.0	781.8
100.00	Appurtenance(s)	1.00	1.27	11.081	12.19	233.71	0.750	0.000	5.00	17.535	13.15	160.3	0.0	832.4
105.00		1.00	1.28	11.195	12.31	228.86	0.750	0.000	5.00	17.089	12.82	157.8	0.0	811.1
109.50	Appurtenance(s)	1.00	1.29	11.294	12.42	224.40	0.750	0.000	4.50	14.998	11.25	139.8	0.0	711.7
110.00		1.00	1.29	11.305	12.44	223.90	0.750	0.000	0.50	1.644	1.23	15.3	0.0	78.0
112.25	RT2	1.00	1.30	11.354	12.49	221.63	0.750	0.000	2.25	7.344	5.51	68.8	0.0	348.4
115.00		1.00	1.30	11.412	12.55	218.84	0.750	0.000	2.75	8.853	6.64	83.3	0.0	419.9
120.00		1.00	1.32	11.514	12.67	213.68	0.750	0.000	5.00	15.750	11.81	149.6	0.0	746.9
123.58	Bot - Section 4	1.00	1.32	11.586	12.74	209.93	0.750	0.000	3.58	11.013	8.26	105.3	0.0	522.2
125.00		1.00	1.33	11.614	12.78	208.44	0.750	0.000	1.42	4.359	3.27	41.8	0.0	358.8
125.60	RB3	1.00	1.33	11.625	12.79	207.80	0.750	0.000	0.60	1.835	1.38	17.6	0.0	151.1
129.00	Top - Section 3	1.00	1.34	11.691	12.86	204.18	0.750	0.000	3.40	10.278	7.71	99.1	0.0	845.8
130.00	Appurtenance(s)	1.00	1.34	11.710	12.88	206.42	0.750	0.000	1.00	2.984	2.24	28.8	0.0	106.4
135.00		1.00	1.35	11.803	12.98	201.03	0.750	0.000	5.00	14.651	10.99	142.7	0.0	522.1
136.26	RT3	1.00	1.35	11.827	13.01	199.66	0.750	0.000	1.26	3.622	2.72	35.3	0.0	129.1
140.00		1.00	1.36	11.894	13.08	195.56	0.750	0.000	3.74	10.583	7.94	103.9	0.0	377.1
145.00		1.00	1.37	11.982	13.18	190.02	0.750	0.000	5.00	13.759	10.32	136.0	0.0	490.1
150.00		1.00	1.38	12.068	13.27	184.42	0.750	0.000	5.00	13.313	9.98	132.5	0.0	474.1
155.00	Appurtenance(s)	1.00	1.39	12.152	13.37	178.75	0.750	0.000	5.00	12.867	9.65	129.0	0.0	458.0
160.00		1.00	1.40	12.233	13.46	173.02	0.751 *	0.000	5.00	12.421	9.33	125.6	0.0	442.0
161.50	Appurtenance(s)	1.00	1.40	12.257	13.48	171.29	0.757 *	0.000	1.50	3.639	2.75	37.1	0.0	129.5

Wind Loading - Shaft

Structure: CT46138-A-SBA
Site Name: Torrington/Oandg Ind Inc
Height: 196.00 (ft)
Base Elev: 0.000 (ft)
Gh: 1.1
Topography: 1

Code: EIA/TIA-222-G
Exposure: C
Crest Height: 0.00
Site Class: D - Stiff Soil
Struct Class: II

7/1/2019

Tower Engineering Solutions

165.00		1.00	1.41	12.313	13.54	167.23	0.761 *	0.000	3.50	8.335	6.34	85.9	0.0	296.5
165.25	Bot - Section 5	1.00	1.41	12.317	13.55	166.94	0.765 *	0.000	0.25	0.587	0.45	6.1	0.0	20.9
169.58	Top - Section 4	1.00	1.41	12.384	13.62	161.88	0.769 *	0.000	4.33	10.136	7.79	106.2	0.0	596.7
170.00		1.00	1.42	12.390	13.63	163.67	0.770 *	0.000	0.42	0.957	0.74	10.0	0.0	22.8
175.00	Appurtenance(s)	1.00	1.42	12.466	13.71	157.78	0.775 *	0.000	5.00	11.242	8.71	119.5	0.0	267.4
180.00		1.00	1.43	12.540	13.79	151.84	0.750	0.000	5.00	10.796	8.10	111.7	0.0	256.7
185.00	Appurtenance(s)	1.00	1.44	12.613	13.87	145.86	0.750	0.000	5.00	10.350	7.76	107.7	0.0	246.0
187.00	Appurtenance(s)	1.00	1.44	12.642	13.91	143.45	0.750	0.000	2.00	4.015	3.01	41.9	0.0	95.4
190.00		1.00	1.45	12.684	13.95	139.82	0.750	0.000	3.00	5.889	4.42	61.6	0.0	139.9
191.50	Appurtenance(s)	1.00	1.45	12.705	13.98	138.00	0.750	0.000	1.50	2.884	2.16	30.2	0.0	68.5
195.00		1.00	1.46	12.753	14.03	133.74	0.750	0.000	3.50	6.573	4.93	69.2	0.0	156.1
196.00	Appurtenance(s)	1.00	1.46	12.767	14.04	132.52	0.750	0.000	1.00	1.838	1.38	19.4	0.0	43.6
								Totals:	**196.00**			**5,788.8**		**43,630.8**

* Cf Adjusted by Linear Load Ra Effect

Discrete Appurtenance Forces

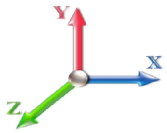
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 53	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 25

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	196.00	6' Lightning rod	1	12.767	14.044	1.00	1.00	0.38	6.50	0.000	0.000	5.34	0.00	0.00
2	191.50	Low Profile Platform	1	12.705	13.975	1.00	1.00	22.00	1500.00	0.000	0.000	307.46	0.00	0.00
3	191.50	ACU-A20-N - RET	4	12.705	13.975	0.60	0.80	0.34	4.00	0.000	0.000	4.70	0.00	0.00
4	191.50	800MHz Filter	3	12.705	13.975	0.54	0.80	1.25	26.40	0.000	0.000	17.53	0.00	0.00
5	191.50	RRH8x20-25 - RRU	3	12.705	13.975	0.54	0.80	6.51	210.00	0.000	0.000	91.01	0.00	0.00
6	191.50	1900MHz - RRU	3	12.705	13.975	0.54	0.80	6.11	132.00	0.000	0.000	85.40	0.00	0.00
7	191.50	800MHz - RRU	3	12.705	13.975	0.54	0.80	4.00	159.00	0.000	0.000	55.96	0.00	0.00
8	191.50	APXVSPP18-C-A20	3	12.705	13.975	0.66	0.80	15.98	171.00	0.000	0.000	223.27	0.00	0.00
9	191.50	APXVTM14-C-120	3	12.705	13.975	0.68	0.80	12.93	168.00	0.000	0.000	180.75	0.00	0.00
10	187.00	BA80-41-DIN	1	12.785	14.064	1.00	1.00	9.40	68.00	0.000	10.333	132.20	0.00	1366.08
11	187.00	Pipe mount	1	12.642	13.906	0.56	0.75	1.48	40.00	0.000	0.000	20.57	0.00	0.00
12	185.00	BXA-70063 6CF_2	3	12.613	13.874	0.66	0.80	14.90	51.00	0.000	0.000	206.69	0.00	0.00
13	185.00	LPA-80063/4CF	6	12.613	13.874	0.68	0.80	25.09	120.00	0.000	0.000	348.13	0.00	0.00
14	185.00	BXA-171063-8BF_2	3	12.613	13.874	0.70	0.80	6.14	31.50	0.000	0.000	85.17	0.00	0.00
15	185.00	FD9R6004/2C-3L -	6	12.613	13.874	0.56	0.80	1.21	18.60	0.000	0.000	16.78	0.00	0.00
16	185.00	Low Profile Platform	1	12.613	13.874	1.00	1.00	22.00	1500.00	0.000	0.000	305.23	0.00	0.00
17	175.00	Low Profile Platform	1	12.466	13.713	1.00	1.00	22.00	1500.00	0.000	0.000	301.68	0.00	0.00
18	175.00	DC6-48-60-18-8F	1	12.466	13.713	0.80	0.80	0.74	32.80	0.000	0.000	10.09	0.00	0.00
19	175.00	RRUS-12	3	12.466	13.713	0.54	0.80	4.34	150.00	0.000	0.000	59.54	0.00	0.00
20	175.00	Powerwave 7770	3	12.466	13.713	0.68	0.80	11.22	105.00	0.000	0.000	153.86	0.00	0.00
21	175.00	Powerwave LGP21401	12	12.466	13.713	0.75	0.75	11.61	169.20	0.000	0.000	159.21	0.00	0.00
22	175.00	Powerwave LGP13519	12	12.466	13.713	0.75	0.75	3.06	63.60	0.000	0.000	41.96	0.00	0.00
23	175.00	Ericsson RRUS 4449	3	12.466	13.713	0.50	0.75	2.97	213.00	0.000	0.000	40.72	0.00	0.00
24	175.00	Ericsson RRUS 4478 B14	3	12.466	13.713	0.50	0.75	2.49	178.20	0.000	0.000	34.11	0.00	0.00
25	175.00	Ericsson RRUS 32 B30	3	12.466	13.713	0.50	0.75	4.13	180.00	0.000	0.000	56.64	0.00	0.00
26	175.00	Raycap	2	12.466	13.713	1.00	1.00	9.56	32.00	0.000	0.000	131.09	0.00	0.00
27	175.00	HRK12 (Handrail Kit)	1	12.466	13.713	1.00	1.00	6.75	261.72	0.000	0.000	92.56	0.00	0.00
28	175.00	Kathrein 800-10965	6	12.466	13.713	0.53	0.75	44.12	651.60	0.000	0.000	605.05	0.00	0.00
29	161.50	Low Profile Platform	1	12.257	13.483	1.00	1.00	22.00	1500.00	0.000	0.000	296.63	0.00	0.00
30	155.00	AIR 21 B4A/B2P	3	12.152	13.367	0.66	0.80	12.13	270.90	0.000	0.000	162.16	0.00	0.00
31	155.00	AIR 21 B2A/B4P	3	12.152	13.367	0.66	0.80	12.13	274.50	0.000	0.000	162.16	0.00	0.00
32	155.00	KRY 112 114 TMA	3	12.152	13.367	0.60	0.80	0.74	33.00	0.000	0.000	9.86	0.00	0.00
33	155.00	APXVAARR24_43-U-NA2	3	12.152	13.367	0.56	0.80	34.00	384.00	0.000	0.000	454.52	0.00	0.00
34	155.00	Radio 4449 B71 + B12	3	12.152	13.367	0.54	0.80	3.17	213.00	0.000	0.000	42.34	0.00	0.00
35	155.00	T-Arms w/ Handrail kit &	3	12.152	13.367	0.56	0.75	29.53	1500.00	0.000	0.000	394.74	0.00	0.00
36	130.00	ANT150F2	1	11.757	12.933	1.00	1.00	1.23	13.00	0.000	2.500	15.91	0.00	39.77
37	130.00	Standoff	1	11.710	12.881	0.56	0.75	1.48	40.00	0.000	0.000	19.06	0.00	0.00
38	109.50	4' Omni	1	11.338	12.471	1.00	1.00	1.00	10.00	0.000	2.000	12.47	0.00	24.94
39	109.50	14' Omni	5	11.443	12.587	1.00	1.00	21.00	200.00	0.000	7.000	264.33	0.00	1850.30
40	109.50	Standoff	1	11.294	12.424	0.56	0.75	1.48	40.00	0.000	0.000	18.38	0.00	0.00
41	109.50	Standoff	5	11.294	12.424	0.56	0.75	7.40	200.00	0.000	0.000	91.90	0.00	0.00
42	100.00	Standoff	1	11.081	12.189	0.56	0.75	1.48	40.00	0.000	0.000	18.03	0.00	0.00
43	100.00	MPRD	1	11.081	12.189	1.00	1.00	6.10	36.00	0.000	0.000	74.35	0.00	0.00
							Totals:		**12,497.52**			**5,809.55**		

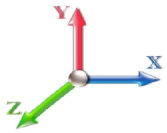
Total Applied Force Summary

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 54	

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 25

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		155.13	2318.91	0.00	0.00
10.00		152.39	2283.29	0.00	0.00
15.00		149.65	2247.67	0.00	0.00
20.00		155.88	2212.05	0.00	0.00
25.00		160.33	2176.43	0.00	0.00
30.00		163.44	2140.82	0.00	0.00
35.00		165.56	2105.20	0.00	0.00
40.00		166.92	2069.58	0.00	0.00
45.00		167.66	2033.96	0.00	0.00
45.42		13.84	167.89	0.00	0.00
48.90		118.92	2350.43	0.00	0.00
50.00		37.37	735.78	0.00	0.00
52.75		93.74	1825.87	0.00	0.00
55.00		76.56	745.83	0.00	0.00
57.15		73.07	707.29	0.00	0.00
60.00		96.81	929.45	0.00	0.00
65.00		169.81	1608.25	0.00	0.00
70.00		168.70	1579.75	0.00	0.00
75.00		167.33	1551.26	0.00	0.00
80.00		165.72	1522.77	0.00	0.00
84.00		131.12	1197.70	0.00	0.00
85.00		33.03	474.17	0.00	0.00
87.00		65.91	942.36	0.00	0.00
90.00		98.38	1398.58	0.00	0.00
90.42		13.56	192.83	0.00	0.00
95.00		148.90	1077.58	0.00	0.00
100.00	(2) attachments	252.68	1231.06	0.00	0.00
105.00		157.83	1133.49	0.00	0.00
109.50	(12) attachments	526.83	1451.87	0.00	1875.24
110.00		15.34	109.77	0.00	0.00
112.25		68.79	491.32	0.00	0.00
115.00		83.35	594.63	0.00	0.00
120.00		149.62	1064.57	0.00	0.00
123.58		105.27	749.80	0.00	0.00
125.00		41.76	448.80	0.00	0.00
125.60		17.60	189.17	0.00	0.00
129.00		99.13	1061.82	0.00	0.00
130.00	(2) attachments	63.79	222.88	0.00	39.77
135.00		142.67	837.17	0.00	0.00
136.26		35.34	208.44	0.00	0.00
140.00		103.85	612.70	0.00	0.00
145.00		136.01	805.12	0.00	0.00
150.00		132.55	757.89	0.00	0.00
155.00	(18) attachments	1354.78	3417.26	0.00	0.00
160.00		125.60	657.03	0.00	0.00
161.50	(1) attachments	333.76	1693.98	0.00	0.00

Total Applied Force Summary

Structure:	CT46138-A-SBA		**Code:**	EIA/TIA-222-G	7/1/2019
Site Name:	Torrington/Oandg Ind Inc		**Exposure:**	C	
Height:	196.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 55

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165.00		85.94	447.02	0.00	0.00
165.25		6.08	31.63	0.00	0.00
169.58		106.15	783.02	0.00	0.00
170.00		10.04	40.68	0.00	0.00
175.00	(50) attachments	1806.02	4019.53	0.00	0.00
180.00		111.69	371.98	0.00	0.00
185.00	(19) attachments	1069.71	2082.39	0.00	0.00
187.00	(2) attachments	194.65	224.56	0.00	1366.08
190.00		61.62	170.08	0.00	0.00
191.50	(23) attachments	996.30	2454.00	0.00	0.00
195.00		69.16	156.13	0.00	0.00
196.00	(1) attachments	24.70	50.15	0.00	0.00
	Totals:	**11,598.32**	**67,165.62**	**0.00**	**3,281.10**

Linear Appurtenance Segment Forces (Factored)

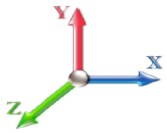
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 56	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 25

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	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.058	0.000	7.442	0.00	16.10
5.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.058	0.000	7.442	0.00	8.05
5.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.058	0.000	7.442	0.00	2.60
10.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.059	0.000	7.442	0.00	16.10
10.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.059	0.000	7.442	0.00	8.05
10.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.059	0.000	7.442	0.00	2.60
15.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.060	0.000	7.442	0.00	16.10
15.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.060	0.000	7.442	0.00	8.05
15.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.060	0.000	7.442	0.00	2.60
20.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.061	0.000	7.896	0.00	16.10
20.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.061	0.000	7.896	0.00	8.05
20.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.061	0.000	7.896	0.00	2.60
25.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.062	0.000	8.276	0.00	16.10
25.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.062	0.000	8.276	0.00	8.05
25.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.062	0.000	8.276	0.00	2.60
30.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.064	0.000	8.600	0.00	16.10
30.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.064	0.000	8.600	0.00	8.05
30.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.064	0.000	8.600	0.00	2.60
35.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.065	0.000	8.883	0.00	16.10
35.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.065	0.000	8.883	0.00	8.05
35.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.065	0.000	8.883	0.00	2.60
40.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.066	0.000	9.137	0.00	16.10
40.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.066	0.000	9.137	0.00	8.05
40.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.066	0.000	9.137	0.00	2.60
45.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.068	0.000	9.366	0.00	16.10
45.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.068	0.000	9.366	0.00	8.05
45.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.068	0.000	9.366	0.00	2.60
45.42	2" Conduit	Yes	0.42	0.000	0.00	0.00	0.00	0.068	0.000	9.384	0.00	1.34
45.42	3" Conduit	Yes	0.42	0.000	3.00	0.10	0.00	0.068	0.000	9.384	0.00	0.67
45.42	7/8" Coax	Yes	0.42	0.000	0.52	0.02	0.00	0.068	0.000	9.384	0.00	0.22
48.90	2" Conduit	Yes	3.48	0.000	0.00	0.00	0.00	0.069	0.000	9.531	0.00	11.22
48.90	3" Conduit	Yes	3.48	0.000	3.00	0.87	0.00	0.069	0.000	9.531	0.00	5.61
48.90	7/8" Coax	Yes	3.48	0.000	0.52	0.15	0.00	0.069	0.000	9.531	0.00	1.81
50.00	2" Conduit	Yes	1.10	0.000	0.00	0.00	0.00	0.070	0.000	9.576	0.00	3.54
50.00	3" Conduit	Yes	1.10	0.000	3.00	0.28	0.00	0.070	0.000	9.576	0.00	1.77
50.00	7/8" Coax	Yes	1.10	0.000	0.52	0.05	0.00	0.070	0.000	9.576	0.00	0.57
52.75	2" Conduit	Yes	2.75	0.000	0.00	0.00	0.00	0.070	0.000	9.685	0.00	8.86
52.75	3" Conduit	Yes	2.75	0.000	3.00	0.69	0.00	0.070	0.000	9.685	0.00	4.43
52.75	7/8" Coax	Yes	2.75	0.000	0.52	0.12	0.00	0.070	0.000	9.685	0.00	1.43
55.00	2" Conduit	Yes	2.25	0.000	0.00	0.00	0.00	0.069	0.000	9.770	0.00	7.25
55.00	3" Conduit	Yes	2.25	0.000	3.00	0.56	0.00	0.069	0.000	9.770	0.00	3.62
55.00	7/8" Coax	Yes	2.25	0.000	0.52	0.10	0.00	0.069	0.000	9.770	0.00	1.17
57.15	2" Conduit	Yes	2.15	0.000	0.00	0.00	0.00	0.070	0.000	9.850	0.00	6.92
57.15	3" Conduit	Yes	2.15	0.000	3.00	0.54	0.00	0.070	0.000	9.850	0.00	3.46
57.15	7/8" Coax	Yes	2.15	0.000	0.52	0.09	0.00	0.070	0.000	9.850	0.00	1.12
60.00	2" Conduit	Yes	2.85	0.000	0.00	0.00	0.00	0.071	0.000	9.951	0.00	9.18
60.00	3" Conduit	Yes	2.85	0.000	3.00	0.71	0.00	0.071	0.000	9.951	0.00	4.59

Linear Appurtenance Segment Forces (Factored)

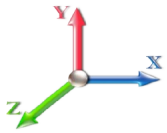
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 57	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 25

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)
60.00	7/8" Coax	Yes	2.85	0.000	0.52	0.12	0.00	0.071	0.000	9.951	0.00	1.48
65.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.072	0.000	10.120	0.00	16.10
65.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.072	0.000	10.120	0.00	8.05
65.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.072	0.000	10.120	0.00	2.60
70.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.074	0.000	10.279	0.00	16.10
70.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.074	0.000	10.279	0.00	8.05
70.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.074	0.000	10.279	0.00	2.60
75.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.075	0.000	10.430	0.00	16.10
75.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.075	0.000	10.430	0.00	8.05
75.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.075	0.000	10.430	0.00	2.60
80.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.077	0.000	10.572	0.00	16.10
80.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.077	0.000	10.572	0.00	8.05
80.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.077	0.000	10.572	0.00	2.60
84.00	2" Conduit	Yes	4.00	0.000	0.00	0.00	0.00	0.079	0.000	10.681	0.00	12.88
84.00	3" Conduit	Yes	4.00	0.000	3.00	1.00	0.00	0.079	0.000	10.681	0.00	6.44
84.00	7/8" Coax	Yes	4.00	0.000	0.52	0.17	0.00	0.079	0.000	10.681	0.00	2.08
85.00	2" Conduit	Yes	1.00	0.000	0.00	0.00	0.00	0.080	0.000	10.708	0.00	3.22
85.00	3" Conduit	Yes	1.00	0.000	3.00	0.25	0.00	0.080	0.000	10.708	0.00	1.61
85.00	7/8" Coax	Yes	1.00	0.000	0.52	0.04	0.00	0.080	0.000	10.708	0.00	0.52
87.00	2" Conduit	Yes	2.00	0.000	0.00	0.00	0.00	0.080	0.000	10.761	0.00	6.44
87.00	3" Conduit	Yes	2.00	0.000	3.00	0.50	0.00	0.080	0.000	10.761	0.00	3.22
87.00	7/8" Coax	Yes	2.00	0.000	0.52	0.09	0.00	0.080	0.000	10.761	0.00	1.04
90.00	2" Conduit	Yes	3.00	0.000	0.00	0.00	0.00	0.081	0.000	10.838	0.00	9.66
90.00	3" Conduit	Yes	3.00	0.000	3.00	0.75	0.00	0.081	0.000	10.838	0.00	4.83
90.00	7/8" Coax	Yes	3.00	0.000	0.52	0.13	0.00	0.081	0.000	10.838	0.00	1.56
90.42	2" Conduit	Yes	0.42	0.000	0.00	0.00	0.00	0.082	0.000	10.848	0.00	1.34
90.42	3" Conduit	Yes	0.42	0.000	3.00	0.10	0.00	0.082	0.000	10.848	0.00	0.67
90.42	7/8" Coax	Yes	0.42	0.000	0.52	0.02	0.00	0.082	0.000	10.848	0.00	0.22
95.00	2" Conduit	Yes	4.58	0.000	0.00	0.00	0.00	0.082	0.000	10.962	0.00	14.76
95.00	3" Conduit	Yes	4.58	0.000	3.00	1.15	0.00	0.082	0.000	10.962	0.00	7.38
95.00	7/8" Coax	Yes	4.58	0.000	0.52	0.20	0.00	0.082	0.000	10.962	0.00	2.38
100.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.084	0.000	11.081	0.00	16.10
100.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.084	0.000	11.081	0.00	8.05
100.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.084	0.000	11.081	0.00	2.60
105.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.086	0.000	11.195	0.00	16.10
105.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.086	0.000	11.195	0.00	8.05
105.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.086	0.000	11.195	0.00	2.60
109.50	2" Conduit	Yes	4.50	0.000	0.00	0.00	0.00	0.088	0.000	11.294	0.00	14.49
109.50	3" Conduit	Yes	4.50	0.000	3.00	1.13	0.00	0.088	0.000	11.294	0.00	7.25
109.50	7/8" Coax	Yes	4.50	0.000	0.52	0.20	0.00	0.088	0.000	11.294	0.00	2.34
110.00	2" Conduit	Yes	0.50	0.000	0.00	0.00	0.00	0.089	0.000	11.305	0.00	1.61
110.00	3" Conduit	Yes	0.50	0.000	3.00	0.13	0.00	0.089	0.000	11.305	0.00	0.81
110.00	7/8" Coax	Yes	0.50	0.000	0.52	0.02	0.00	0.089	0.000	11.305	0.00	0.26
112.25	2" Conduit	Yes	2.25	0.000	0.00	0.00	0.00	0.090	0.000	11.354	0.00	7.25
112.25	3" Conduit	Yes	2.25	0.000	3.00	0.56	0.00	0.090	0.000	11.354	0.00	3.62
112.25	7/8" Coax	Yes	2.25	0.000	0.52	0.10	0.00	0.090	0.000	11.354	0.00	1.17
115.00	2" Conduit	Yes	2.75	0.000	0.00	0.00	0.00	0.091	0.000	11.412	0.00	8.86

Linear Appurtenance Segment Forces (Factored)

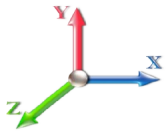
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 58	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 25

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)
115.00	3" Conduit	Yes	2.75	0.000	3.00	0.69	0.00	0.091	0.000	11.412	0.00	4.43
115.00	7/8" Coax	Yes	2.75	0.000	0.52	0.12	0.00	0.091	0.000	11.412	0.00	1.43
120.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.093	0.000	11.514	0.00	16.10
120.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.093	0.000	11.514	0.00	8.05
120.00	7/8" Coax	Yes	5.00	0.000	0.52	0.22	0.00	0.093	0.000	11.514	0.00	2.60
123.58	2" Conduit	Yes	3.58	0.000	0.00	0.00	0.00	0.095	0.000	11.586	0.00	11.54
123.58	3" Conduit	Yes	3.58	0.000	3.00	0.90	0.00	0.095	0.000	11.586	0.00	5.77
123.58	7/8" Coax	Yes	3.58	0.000	0.52	0.16	0.00	0.095	0.000	11.586	0.00	1.86
125.00	2" Conduit	Yes	1.42	0.000	0.00	0.00	0.00	0.097	0.000	11.614	0.00	4.56
125.00	3" Conduit	Yes	1.42	0.000	3.00	0.35	0.00	0.097	0.000	11.614	0.00	2.28
125.00	7/8" Coax	Yes	1.42	0.000	0.52	0.06	0.00	0.097	0.000	11.614	0.00	0.74
125.60	2" Conduit	Yes	0.60	0.000	0.00	0.00	0.00	0.097	0.000	11.625	0.00	1.93
125.60	3" Conduit	Yes	0.60	0.000	3.00	0.15	0.00	0.097	0.000	11.625	0.00	0.97
125.60	7/8" Coax	Yes	0.60	0.000	0.52	0.03	0.00	0.097	0.000	11.625	0.00	0.31
129.00	2" Conduit	Yes	3.40	0.000	0.00	0.00	0.00	0.099	0.000	11.691	0.00	10.95
129.00	3" Conduit	Yes	3.40	0.000	3.00	0.85	0.00	0.099	0.000	11.691	0.00	5.47
129.00	7/8" Coax	Yes	3.40	0.000	0.52	0.15	0.00	0.099	0.000	11.691	0.00	1.77
130.00	2" Conduit	Yes	1.00	0.000	0.00	0.00	0.00	0.098	0.000	11.710	0.00	3.22
130.00	3" Conduit	Yes	1.00	0.000	3.00	0.25	0.00	0.098	0.000	11.710	0.00	1.61
130.00	7/8" Coax	Yes	1.00	0.000	0.52	0.04	0.00	0.098	0.000	11.710	0.00	0.52
135.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.085	0.000	11.803	0.00	16.10
135.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.085	0.000	11.803	0.00	8.05
136.26	2" Conduit	Yes	1.26	0.000	0.00	0.00	0.00	0.087	0.000	11.827	0.00	4.06
136.26	3" Conduit	Yes	1.26	0.000	3.00	0.31	0.00	0.087	0.000	11.827	0.00	2.03
140.00	2" Conduit	Yes	3.74	0.000	0.00	0.00	0.00	0.088	0.000	11.894	0.00	12.04
140.00	3" Conduit	Yes	3.74	0.000	3.00	0.94	0.00	0.088	0.000	11.894	0.00	6.02
145.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.091	0.000	11.982	0.00	16.10
145.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.091	0.000	11.982	0.00	8.05
150.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.094	0.000	12.068	0.00	16.10
150.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.094	0.000	12.068	0.00	8.05
155.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.097	0.000	12.152	0.00	16.10
155.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.097	0.000	12.152	0.00	8.05
160.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.101	1.002	12.233	0.00	16.10
160.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.101	1.002	12.233	0.00	8.05
161.50	2" Conduit	Yes	1.50	0.000	0.00	0.00	0.00	0.103	1.009	12.257	0.00	4.83
161.50	3" Conduit	Yes	1.50	0.000	3.00	0.38	0.00	0.103	1.009	12.257	0.00	2.42
165.00	2" Conduit	Yes	3.50	0.000	0.00	0.00	0.00	0.105	1.015	12.313	0.00	11.27
165.00	3" Conduit	Yes	3.50	0.000	3.00	0.88	0.00	0.105	1.015	12.313	0.00	5.64
165.25	2" Conduit	Yes	0.25	0.000	0.00	0.00	0.00	0.106	1.019	12.317	0.00	0.81
165.25	3" Conduit	Yes	0.25	0.000	3.00	0.06	0.00	0.106	1.019	12.317	0.00	0.40
169.58	2" Conduit	Yes	4.33	0.000	0.00	0.00	0.00	0.108	1.025	12.384	0.00	13.95
169.58	3" Conduit	Yes	4.33	0.000	3.00	1.08	0.00	0.108	1.025	12.384	0.00	6.98
170.00	2" Conduit	Yes	0.42	0.000	0.00	0.00	0.00	0.109	1.027	12.390	0.00	1.34
170.00	3" Conduit	Yes	0.42	0.000	3.00	0.10	0.00	0.109	1.027	12.390	0.00	0.67
175.00	2" Conduit	Yes	5.00	0.000	0.00	0.00	0.00	0.111	1.034	12.466	0.00	16.10
175.00	3" Conduit	Yes	5.00	0.000	3.00	1.25	0.00	0.111	1.034	12.466	0.00	8.05

Linear Appurtenance Segment Forces (Factored)

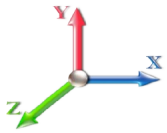
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 59	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 25

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)
										Totals:	**0.0**	**912.9**

Calculated Forces

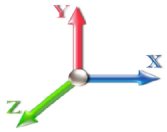
Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 60	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 25

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	-67.16	-11.62	0.00	-1590.3	0.00	1590.38	8794.96	4397.48	21496.0	10671.5	0.00	0.000	0.000	0.157
5.00	-64.83	-11.51	0.00	-1532.2	0.00	1532.28	8639.43	4319.71	20738.5	10295.5	0.02	-0.042	0.000	0.156
10.00	-62.54	-11.41	0.00	-1474.7	0.00	1474.71	8483.89	4241.95	19994.7	9926.22	0.09	-0.085	0.000	0.156
15.00	-60.29	-11.30	0.00	-1417.6	0.00	1417.68	8328.36	4164.18	19264.4	9563.67	0.20	-0.128	0.000	0.155
20.00	-58.07	-11.18	0.00	-1361.1	0.00	1361.19	8172.83	4086.41	18547.7	9207.87	0.36	-0.173	0.000	0.155
25.00	-55.88	-11.06	0.00	-1305.2	0.00	1305.28	8017.29	4008.65	17844.6	8858.82	0.56	-0.217	0.000	0.154
30.00	-53.73	-10.93	0.00	-1249.9	0.00	1249.99	7861.76	3930.88	17155.1	8516.51	0.82	-0.263	0.000	0.154
35.00	-51.62	-10.79	0.00	-1195.3	0.00	1195.34	7706.22	3853.11	16479.1	8180.95	1.12	-0.309	0.000	0.153
40.00	-49.54	-10.66	0.00	-1141.3	0.00	1141.37	7550.69	3775.35	15816.8	7852.13	1.47	-0.356	0.000	0.152
45.00	-47.50	-10.50	0.00	-1088.0	0.00	1088.09	7395.16	3697.58	15168.0	7530.06	1.86	-0.403	0.000	0.151
45.42	-47.33	-10.50	0.00	-1083.7	0.00	1083.72	7382.20	3691.10	15114.6	7503.52	1.90	-0.408	0.000	0.151
48.90	-44.98	-10.38	0.00	-1047.1	0.00	1047.15	7273.84	3636.92	14671.4	7283.52	2.21	-0.441	0.000	0.100
50.00	-44.24	-10.34	0.00	-1035.7	0.00	1035.74	7239.62	3619.81	14532.8	7214.73	2.31	-0.449	0.000	0.100
52.75	-42.41	-10.25	0.00	-1007.2	0.00	1007.29	5810.43	2905.21	11825.7	5870.80	2.58	-0.467	0.000	0.102
55.00	-41.67	-10.18	0.00	-984.24	0.00	984.24	5769.82	2884.91	11629.7	5773.48	2.80	-0.482	0.000	0.111
57.15	-40.96	-10.11	0.00	-962.36	0.00	962.36	5730.75	2865.38	11443.3	5680.95	3.02	-0.497	0.000	0.110
57.15	-40.96	-10.11	0.00	-962.36	0.00	962.36	5730.75	2865.38	11443.3	5680.95	3.02	-0.497	0.000	0.110
60.00	-40.02	-10.03	0.00	-933.55	0.00	933.55	5678.55	2839.28	11197.7	5559.03	3.32	-0.518	0.000	0.175
65.00	-38.40	-9.89	0.00	-883.38	0.00	883.38	5551.73	2775.86	10705.1	5314.51	3.90	-0.577	0.000	0.173
70.00	-36.82	-9.74	0.00	-833.95	0.00	833.95	5427.30	2713.65	10228.2	5077.73	4.53	-0.636	0.000	0.171
75.00	-35.26	-9.59	0.00	-785.25	0.00	785.25	5302.88	2651.44	9762.15	4846.34	5.23	-0.695	0.000	0.169
80.00	-33.73	-9.44	0.00	-737.30	0.00	737.30	5178.45	2589.22	9306.93	4620.35	5.99	-0.755	0.000	0.166
84.00	-32.53	-9.31	0.00	-699.55	0.00	699.55	5078.91	2539.45	8950.59	4443.45	6.64	-0.804	0.000	0.164
85.00	-32.05	-9.28	0.00	-690.24	0.00	690.24	5054.02	2527.01	8862.59	4399.76	6.81	-0.816	0.000	0.163
87.00	-31.11	-9.21	0.00	-671.68	0.00	671.68	5004.25	2502.13	8687.89	4313.04	7.16	-0.841	0.000	0.098
90.00	-29.71	-9.10	0.00	-644.05	0.00	644.05	4929.59	2464.80	8429.11	4184.57	7.70	-0.863	0.000	0.096
90.42	-29.51	-9.09	0.00	-640.26	0.00	640.26	3591.78	1795.89	6277.53	3116.43	7.77	-0.866	0.000	0.102
95.00	-28.43	-8.95	0.00	-598.58	0.00	598.58	3535.98	1767.99	6038.44	2997.74	8.62	-0.900	0.000	0.112
100.00	-27.20	-8.69	0.00	-553.86	0.00	553.86	3473.75	1736.87	5780.45	2869.66	9.58	-0.941	0.000	0.107
105.00	-26.06	-8.53	0.00	-510.40	0.00	510.40	3410.09	1705.04	5525.58	2743.13	10.59	-0.981	0.000	0.102
109.50	-24.62	-7.99	0.00	-470.12	0.00	470.12	3351.58	1675.79	5299.03	2630.66	11.53	-1.017	0.000	0.096
110.00	-24.50	-7.98	0.00	-466.13	0.00	466.13	3345.00	1672.50	5274.03	2618.25	11.64	-1.021	0.000	0.096
112.25	-24.01	-7.91	0.00	-448.18	0.00	448.18	3315.25	1657.63	5161.96	2562.62	12.13	-1.039	0.000	0.094
112.25	-24.01	-7.91	0.00	-448.18	0.00	448.18	3315.25	1657.63	5161.96	2562.62	12.13	-1.039	0.000	0.094
115.00	-23.41	-7.83	0.00	-426.44	0.00	426.44	3278.49	1639.25	5025.98	2495.11	12.73	-1.061	0.000	0.178
120.00	-22.34	-7.69	0.00	-387.27	0.00	387.27	3210.56	1605.28	4781.62	2373.80	13.88	-1.135	0.000	0.170
123.58	-21.59	-7.58	0.00	-359.73	0.00	359.73	3148.16	1574.08	4590.15	2278.75	14.76	-1.188	0.000	0.165
125.00	-21.14	-7.54	0.00	-348.99	0.00	348.99	3121.72	1560.86	4512.97	2240.43	15.11	-1.209	0.000	0.163
125.60	-20.95	-7.52	0.00	-344.46	0.00	344.46	3110.52	1555.26	4480.48	2224.30	15.26	-1.218	0.000	0.091
129.00	-19.89	-7.41	0.00	-318.89	0.00	318.89	2149.47	1074.74	3099.22	1538.58	16.14	-1.246	0.000	0.096
130.00	-19.66	-7.35	0.00	-311.45	0.00	311.45	2141.27	1070.63	3068.69	1523.43	16.40	-1.255	0.000	0.107
135.00	-18.82	-7.19	0.00	-274.72	0.00	274.72	2099.38	1049.69	2916.97	1448.11	17.74	-1.298	0.000	0.098
136.26	-18.61	-7.16	0.00	-265.66	0.00	265.66	2088.60	1044.30	2879.00	1429.26	18.09	-1.309	0.000	0.095
136.26	-18.61	-7.16	0.00	-265.66	0.00	265.66	2088.60	1044.30	2879.00	1429.26	18.09	-1.309	0.000	0.095
140.00	-18.00	-7.06	0.00	-238.88	0.00	238.88	2056.07	1028.04	2766.99	1373.65	19.12	-1.340	0.000	0.183
145.00	-17.19	-6.93	0.00	-203.58	0.00	203.58	2011.34	1005.67	2618.95	1300.16	20.57	-1.420	0.000	0.165
150.00	-16.42	-6.80	0.00	-168.94	0.00	168.94	1965.18	982.59	2473.01	1227.71	22.10	-1.494	0.000	0.146
155.00	-13.04	-5.37	0.00	-134.96	0.00	134.96	1917.59	958.80	2329.38	1156.40	23.70	-1.561	0.000	0.124

Calculated Forces

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 61

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160.00	-12.38	-5.23	0.00	-108.14	0.00	108.14	1868.58	934.29	2188.24	1086.34	25.37	-1.621	0.000	0.106
161.50	-10.70	-4.85	0.00	-100.29	0.00	100.29	1853.60	926.80	2146.41	1065.57	25.88	-1.638	0.000	0.100
165.00	-10.25	-4.76	0.00	-83.31	0.00	83.31	1818.15	909.07	2049.77	1017.59	27.10	-1.674	0.000	0.088
165.25	-10.22	-4.75	0.00	-82.12	0.00	82.12	1815.59	907.79	2042.92	1014.19	27.18	-1.677	0.000	0.087
169.58	-9.44	-4.63	0.00	-61.52	0.00	61.52	1040.26	520.13	1155.41	573.59	28.72	-1.715	0.000	0.116
170.00	-9.39	-4.62	0.00	-59.59	0.00	59.59	1038.39	519.19	1149.55	570.68	28.87	-1.719	0.000	0.114
175.00	-5.43	-2.70	0.00	-36.48	0.00	36.48	1015.17	507.59	1079.51	535.91	30.70	-1.766	0.000	0.073
180.00	-5.06	-2.58	0.00	-23.00	0.00	23.00	990.53	495.27	1010.05	501.43	32.57	-1.798	0.000	0.051
185.00	-3.01	-1.44	0.00	-10.11	0.00	10.11	964.47	482.24	941.35	467.32	34.46	-1.819	0.000	0.025
187.00	-2.79	-1.24	0.00	-5.86	0.00	5.86	953.65	476.82	914.12	453.81	35.23	-1.824	0.000	0.016
190.00	-2.62	-1.17	0.00	-2.14	0.00	2.14	936.98	468.49	873.60	433.69	36.37	-1.828	0.000	0.008
191.50	-0.20	-0.10	0.00	-0.38	0.00	0.38	928.46	464.23	853.48	423.70	36.95	-1.828	0.000	0.001
195.00	-0.05	-0.03	0.00	-0.03	0.00	0.03	908.07	454.03	806.98	400.62	38.29	-1.828	0.000	0.000
196.00	0.00	-0.02	0.00	0.00	0.00	0.00	902.11	451.06	793.81	394.08	38.67	-1.828	0.000	0.000

Final Analysis Summary

Structure:	CT46138-A-SBA	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 62	

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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 90 mph Wind	41.9	0.00	80.54	0.00	0.00	5766.87
0.9D + 1.6W 90 mph Wind	41.8	0.00	60.39	0.00	0.00	5693.13
1.2D + 1.0Di + 1.0Wi 40 mph Wind	9.2	0.00	132.35	0.00	0.00	1341.78
1.2D + 1.0E	2.5	0.00	80.60	0.00	0.00	325.13
0.9D + 1.0E	2.5	0.00	60.45	0.00	0.00	320.79
1.0D + 1.0W 60 mph Wind	11.6	0.00	67.16	0.00	0.00	1590.38

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 90 mph Wind	-19.62	-25.66	0.00	-867.81	0.00	-867.81	2056.07	1028.0	2766.99	1373.65	140.00	0.642
0.9D + 1.6W 90 mph Wind	-14.23	-25.17	0.00	-850.35	0.00	-850.35	2056.07	1028.0	2766.99	1373.65	140.00	0.627
1.2D + 1.0Di + 1.0Wi 40 mph Wind	-49.83	-6.10	0.00	-213.33	0.00	-213.33	2056.07	1028.0	2766.99	1373.65	140.00	0.180
1.2D + 1.0E	-21.79	-1.53	0.00	-65.58	0.00	-65.58	2056.07	1028.0	2766.99	1373.65	140.00	0.058
0.9D + 1.0E	-16.34	-1.50	0.00	-64.46	0.00	-64.46	2056.07	1028.0	2766.99	1373.65	140.00	0.055
1.0D + 1.0W 60 mph Wind	-18.00	-7.06	0.00	-238.88	0.00	-238.88	2056.07	1028.0	2766.99	1373.65	140.00	0.183

Additional Steel Summary

			Intermediate Connectors			Lower Termination				Upper Termination				Max Member			
Elev From (ft)	Elev To (ft)	Member	VQ/I (lb/in)	Vu (kips)	phi Vn (kips)	MQ/I (kips)	phi Vn (kips)	Num Reqd	Num Actual	MQ/I (kips)	phi Vn (kips)	Num Reqd	Num Actual	Pu (kips)	phi Pn (kips)	phi Tn (kips)	Ratio
48.9	57.1	(4) PLT-7.25x1.5(31mm Hole)	272.4	0.00	37.1	289.6	37.1	8	14	311.8	37.1	9	13	314.08	489.4	440.94	0.712
87.0	112.3	(4) PLT-6.5x1.5(31mm Hole)	355.2	0.00	37.1	255.8	37.1	7	12	237.6	37.1	7	11	276.14	438.8	386.10	0.715
125.6	136.3	(4) PLT-4.75x1.5(31mm Hole)	376.3	9.03	37.1	174.2	37.1	5	8	167.5	37.1	5	7	185.40	303.1	258.13	0.718

Base Plate Summary

Structure:	CT46138-A-SB	**Code:**	EIA/TIA-222-G	7/1/2019	
Site Name:	Torrington/Oandg Ind Inc	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 63	

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Reactions		Base Plate		Anchor Bolts	
Original Design		**Yield (ksi):**	45.00	**Bolt Circle:**	67.68
Moment (kip-ft):	5499.00	**Width (in):**	73.67	**Number Bolts:**	28.00
Axial (kip):	55.74	**Style:**	Polygon	**Bolt Type:**	2.25" 18J
Shear (kip):	40.77	**Polygon Sides:**	16.00	**Bolt Diameter (in):**	2.25
		Clip Length (in):	0.00	**Yield (ksi):**	75.00
Analysis				**Ultimate (ksi):**	100.00
Moment (kip-ft):	5766.87	**Effective Len (in):**	11.88	**Arrangement:**	Radial
Axial (kip):	132.35	**Moment (kip-in):**	579.06	**Cluster Dist (in):**	0.00
Shear (kip):	41.86	**Allow Stress (ksi):**	60.75	**Start Angle (deg):**	0.00
		Applied Stress (ksi):	0.00	Compression	
Moment Design %:	104.87	**Stress Ratio:**	0.53	**Force (kip):**	150.80
				Allowable (kip):	260.00
				Ratio:	0.59
				Tension	
				Force (kip):	141.34
				Allowable (kip):	260.00
				Ratio:	0.56

Monopole Mat Foundation Design

			Date: 7/14/1900
Customer Name:	SBA Communcations Corp	**EIA/TIA Standard:**	EIA-222-G
Site Name:	CT46138-A-SBA	**Structure Height (Ft.):**	196
Site Number:	78524	**Engineer Name:**	J. Chen
Engr. Number:		**Engineer Login ID:**	

Foundation Info Obtained from: Mapping Operation

Structure Type: Monopole

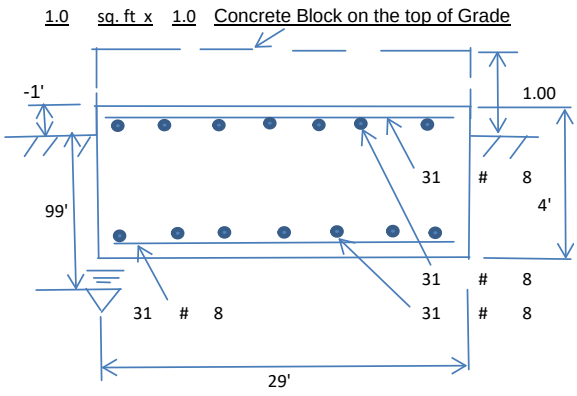
Analysis or Design? Analysis

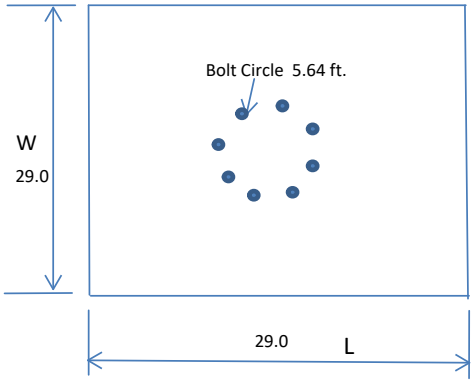
Base Reactions (Factored):

Axial Load (Kips):	132.4	Shear Force (Kips):	41.9
Uplift Force (Kips):	0.0	Moment (Kips-ft):	5766.9
Allowable overstress %:	5.0%		

Foundation Geometries:

		Mods required -Yes/No ?:	Yes
Anchor Bolt Circle (ft.):	5.64	Depth of Base BG (ft.):	5.00
Thickness of Pad (ft):	4.00		
Length of Pad (ft.):	29	Width of Pad (ft.):	29
Add Concrete Width & Length (ft.)	1	Add Concrete Thick. (ft)	1
Final Length of pad (ft)	29.0	Final width of pad (ft):	29.0





Material Properties and Reabr Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Pad Rebar Yield (Ksi):	60	Tie Spacing (in):	12.0	
Pad Steel Rebar Size (#):	8			
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf

Rebar at the bottom of the concrete pad:

Qty. of Rebar in Pad (L):	31	Qty. of Rebar in Pad (W):	31

Rebar at the top of the concrete pad:

Qty. of Rebar in Pad (L):	31	Qty. of Rebar in Pad (W):	31
Apply 1.35 factor for e/w Per G:	1.35		

Soil Design Parameters:

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):	12000	Ultimate Skin Friction:	0	Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad:	25
Consider soil hor. resist. for OTM.:	No	Reduction factor on the maximum soil bearing pressure:	1.00			

Foundation Analysis and Design:

Uplift Strength Reduction Factor:	0.75	Compression Strength Reduction Factor:	0.75
Total Dry Soil Volume (cu. Ft.):	811.39	Total Dry Soil Weight (Kips):	81.14
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	81.14	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	3340.02	Total Dry Concrete Weight (Kips):	501.00
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	501.00	Total Vertical Load on Base (Kips):	714.49

Check Soil Capacities:

				Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	2906	<	Allowable Factored Soil Bearing (psf): 9000	0.32	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	9563.0	>	Design Factored Momont (kips-ft): 5978	0.63	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	1.60	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

Concrete Pad:

One-Way Design Shear Capacity (L-Direction, Kips):	1272.3	>	One-Way Factored Shear (L-D. Kips):	357.1	0.28	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	1272.3	>	One-Way Factored Shear (W-D., Kips)	357.1	0.28	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	1529.9	>	One-Way Factored Shear (C-C, Kips):	633.8	0.41	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0016	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0016		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	4812.9	>	Moment at Bottom (L-Direct. K-Ft):	1378.6	0.29	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	4812.9	>	Moment at Bottom (W-Direct. K-Ft):	1378.6	0.29	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	6783.7	>	Moment at Bottom (C-C Dir. K-Ft):	1949.6	0.29	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0016	OK!	Upper Steel Reinf. Ratio (W-Direct.):	0.0016		
Upper Steel Pad Moment Capacity (L-Direction. Kips-ft):	4812.9	>	Moment at the top (L-Dir Kips-Ft):	428.2	0.09	OK!
Upper Steel Pad Moment Capacity (W-Direction. Kips-ft):	4812.9	>	Moment at the top (W-Dir Kips-Ft):	428.2	0.09	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	6783.7	>	Moment at the top (C-C Direc. K-Ft):	773.3	0.11	OK!

EXHIBIT 8

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

Antenna Mount Analysis Report

Existing 196-Ft Monopole Tower

Customer Name: SBA Communications Corp

Customer Site Number: CT46138-A

Customer Site Name: Torrington/Oandg Ind Inc

Carrier Name: T-Mobile (App#: 117043, V1)

Carrier Site ID / Name: CTNH402A / Litchfield SSUSA

Site Location: 350 Burr Mountain Road

Torrington, Connecticut

Litchfield County

Latitude: 41.873255

Longitude: -73.088405

8/15/19

Analysis Result:

Max Structural Usage: 78.8% [Pass]

Report Prepared By: Cameron Pescatello

Introduction

The purpose of this report is to summarize the analysis results on the (3) T-arms w/handrail kit & v-brace kit at 155.00' elevation to support the proposed antenna configuration. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Mount Drawings	Mount mapping provided by Full Metal Tower Services, dated 04/27/2019
Antenna Loading	SBA, Application #: 117043, v1, dated 06/06/2019
Modification Drawings	N/A

Analysis Criteria

Basic Wind Speed Used in the Analysis: V_{ULT} = 120 mph (3-Sec. Gust) / Equivalent to
V_{ASD} = 93 mph (3-Sec. Gust)
Basic Wind Speed with Ice: 40 mph (3-Sec. Gust) with 1" radial ice concurrent
Operational Wind Speed: 60 mph +0" Radial ice
Standard/Codes: ANSI/TIA/EIA 222-G/ 2-15 IBC / 2018 CSBC
Exposure Category: C
Structure Class: II
Topographic Category: 1
Crest Height (Ft): 0

The site is a Risk Category II structure per IBC Table 1604.5. This site does not support emergency communication equipment for first responders such as fire departments, police, hospitals, ambulance services or any of the facilities listed for Risk Categories III and IV. The scope of work detailed in this structural analysis does not include items that are a part of emergency service as the 911 or essential facility service of an emergency response system.

Mount Information

(3) T-arms w/handrail kit & v-brace kit at 155.00' elevation

Proposed Modifications

N/A

Final Antenna Configuration

3	RFS APXVAARR24_43-U-NA20
3	Ericsson AIR 21 B4A/B2P
3	Ericsson AIR 21 B2A/B4P
3	Ericsson KRY 112 144/1
3	Ericsson 4449 B71 + B12

Any proposed antennas not currently installed should be mounted such that the centers of the antennas do not exceed 0.5 ft vertically from the center of the T-arms w/handrail kit & v-brace kit.

In addition to the proposed equipment loading, a 500 lb serviceability load was also considered in this analysis in accordance with TIA requirements.

Analysis Results

Our calculations have determined that under design wind load the existing mounts will be structurally adequate to support the proposed antenna configuration. The maximum structural usage is 78.80%, which occurs in the mount pipe. The proposed equipment must be installed as stipulated in the Final Antenna Configuration section of this report. The analysis results are void if the proposed equipment is not installed in accordance with this report.

Attachments

1. Mount Photos
2. Antenna Placement Diagram
3. Mount Mapping Information
4. Analysis Calculations

Standard Conditions

1. The loading configuration as analyzed in this report is as provided from the customer. Any deviation from this design shall be communicated to TES to verify deviation will not adversely impact the analysis.

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

3. All the existing structural members were assumed to be in good condition with no physical damage or deterioration associated with corrosion. The mount analysis is not a condition assessment of the mount.

4. The mount analysis was performed in accordance with the loading provided, and if applicable the modification required to support the additional loading.

5. If the mount is modified, installation must adhere to the configuration communicated in the modification drawings.

6. The modification drawings are not intended to convey means or methods. These are the responsibility of the installing contractor.

7. Rigging plan review is available if the contractor requires for a construction class IV or other if required. Review fee would apply.

8. The mount modification package was created based upon information provided for the mount loading. The underlying tower is assumed to provide support and sufficient rigidity to support the mount loads as a tower analysis was not part of the mount analysis.

9. TES is not responsible for modifications to climbing facilities unless communicated to TES in writing.

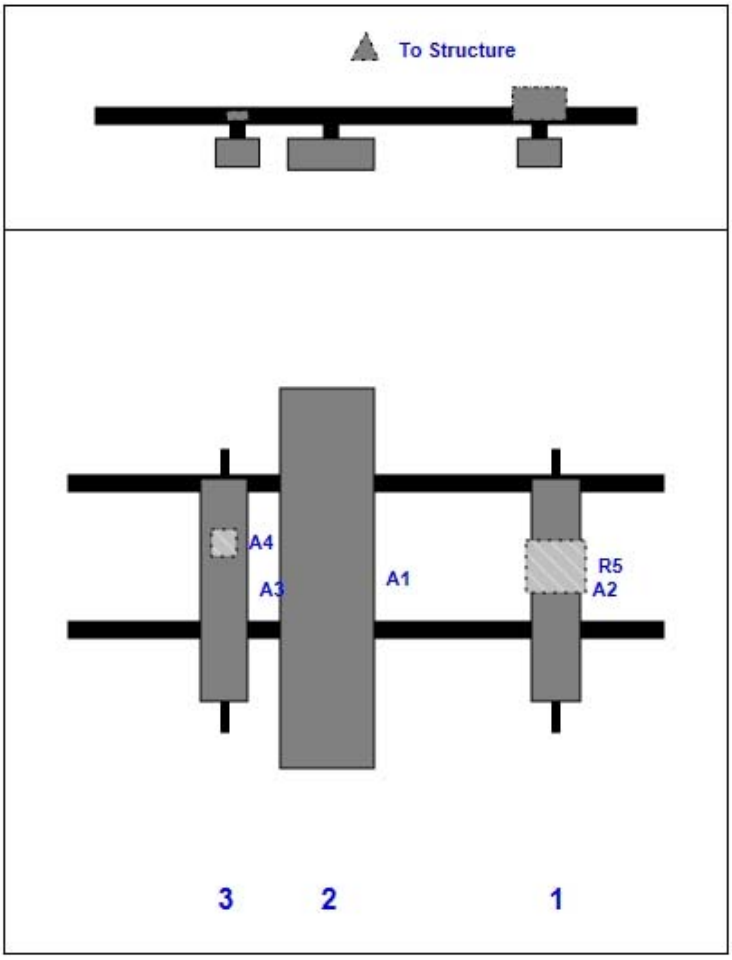
Structure: CT46138-A-SBA - Torrington/Oandg Ind Inc

Sector: A
Structure Type: Monopole
Mount Elev: 155.00

6/17/2019

Tower Engineering Solutions

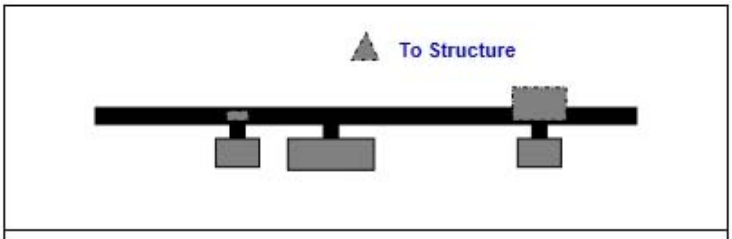
Plan View



Front View
Looking Toward Structure

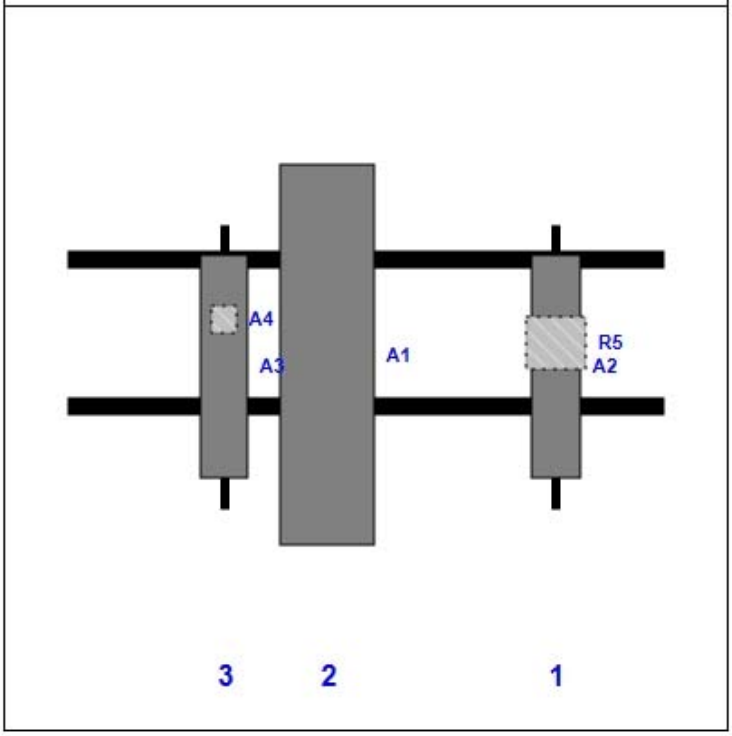
Ref #	Model	Height (in)	Width (in)	H Dist From Left	Pipe #	Pipe Pos V	Antenna Pos	Center Ant From Top	Antenna H Offset
A2	AIR 21 B4A/B2P	56.00	12.10	124.00	1	a	Front	36.00	0.00
R5	4449 B71 + B12	13.10	14.90	124.00	1	a	Behind	30.00	0.00
A1	APXVAARR24_43-U-NA20	95.90	24.00	66.00	2	a	Front	33.00	0.00
A3	AIR 21 B2A/B4P	56.00	12.10	40.00	3	a	Front	36.00	0.00
A4	KRY 112 144/1	6.90	6.10	40.00	3	a	Behind	24.00	0.00

Plan View



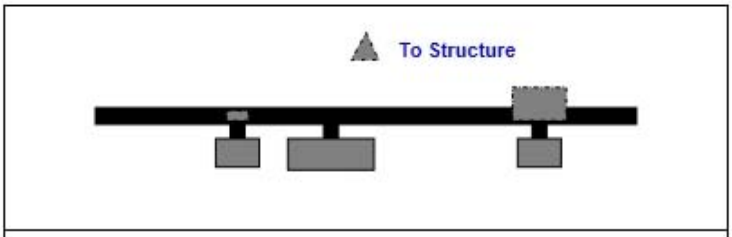
Front View

Looking Toward Structure



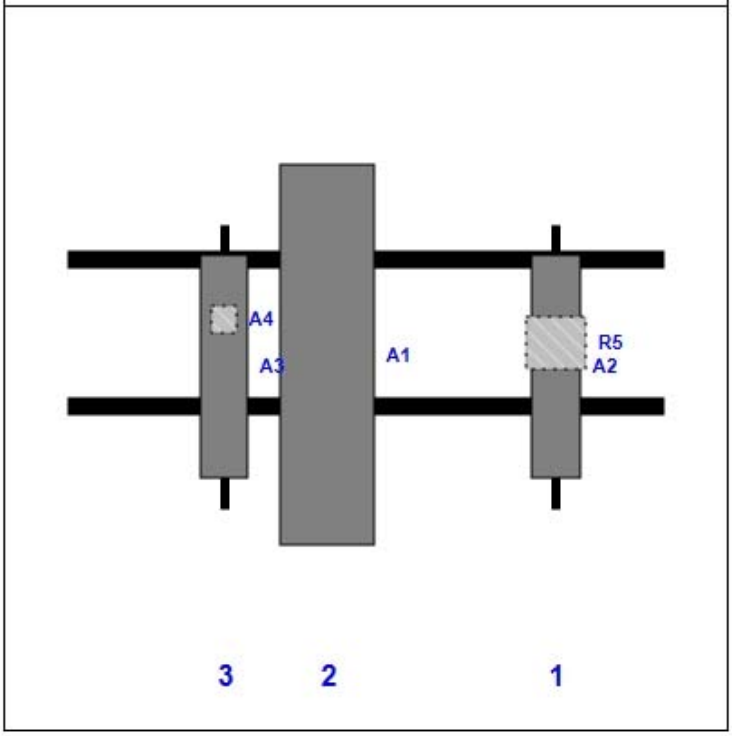
Ref #	Model	Height (in)	Width (in)	H Dist From Left	Pipe #	Pipe Pos V	Antenna Pos	Center Ant From Top	Antenna H Offset
A2	AIR 21 B4A/B2P	56.00	12.10	124.00	1	a	Front	36.00	0.00
R5	4449 B71 + B12	13.10	14.90	124.00	1	a	Behind	30.00	0.00
A1	APXVAARR24_43-U-NA20	95.90	24.00	66.00	2	a	Front	33.00	0.00
A3	AIR 21 B2A/B4P	56.00	12.10	40.00	3	a	Front	36.00	0.00
A4	KRY 112 144/1	6.90	6.10	40.00	3	a	Behind	24.00	0.00

Plan View



Front View

Looking Toward Structure

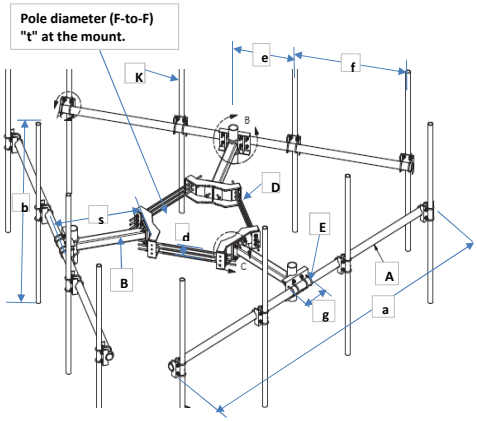


Ref #	Model	Height (in)	Width (in)	H Dist From Left	Pipe #	Pipe Pos V	Antenna Pos	Center Ant From Top	Antenna H Offset
A2	AIR 21 B4A/B2P	56.00	12.10	124.00	1	a	Front	36.00	0.00
R5	4449 B71 + B12	13.10	14.90	124.00	1	a	Behind	30.00	0.00
A1	APXVAARR24_43-U-NA20	95.90	24.00	66.00	2	a	Front	33.00	0.00
A3	AIR 21 B2A/B4P	56.00	12.10	40.00	3	a	Front	36.00	0.00
A4	KRY 112 144/1	6.90	6.10	40.00	3	a	Behind	24.00	0.00

Antenna Mount Type "MT-Z" Mapping Form (PATENT PENDING)

FCC # 1270235

Tower Owner:	SBA Communications	**Mapping Date:**	4/27/19
Site Name:	Torrington/Oandg Ind. Inc	**Structure Type:**	Monopole
Site Number or ID:	CT46138-A-SBA	**Structure Height (Ft.):**	195
Mapping Contractor:	Full Metal Tower Services	**Mount Height (Ft.):**	152.4



Geometries (Unit: inches)

a	151	**e**	7	**j**		**o**		**s**	48
b	72	**f**	39	**k**		**p**		**t**	25
c		**g**	9.5	**m**		**q**		**u ***	46
d	6	**h**		**n**		**r**		**v ***	72

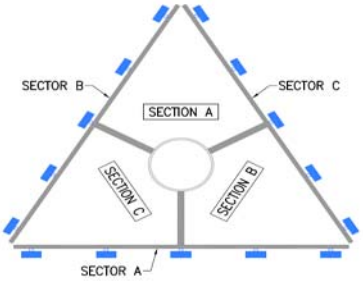
Members/Bolts (Unit: inches) — *** - See Ant. Layout for "u", "v" and member "K" (pipe)**

Items	Member	Lx (O.D.)	Ly (I.D.)	T	Items	Member	Lx (O.D.)	Ly (I.D.)	T
A	3.5 OD x 0.216 Pipe	3.5	3.068	0.216	**F**				
B	Tubing 4x4x1/4	4	4	0.25	**G**				
C					**H**				
D	3/4" Bolt	24			**J**				
E	1/2" Bolt	U-Bolt			**K* (pipe)**	2.375 OD x 0.154 Pipe	2.375	2.067	0.154

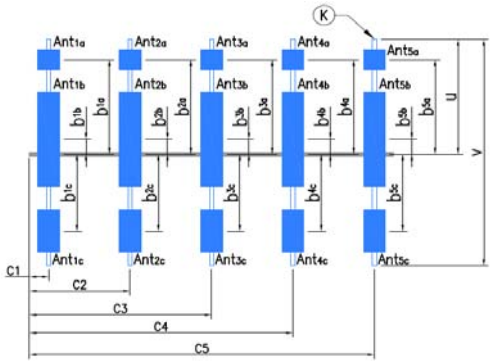
Distance from top of main platform member to lowest tip of ant./eqpt. of Carrier above. (N/A if > 10 ft.)	N/A
Distance from top of main platform member to highest tip of ant./eqpt. of Carrier below. (N/A if > 10 ft.)	N/A

Please enter the infomation below if members can't be found from the drop down lists

Mount has additional reinforcement modification installed above original mount.



Climbing ladder is Located at Section B, at 150° Degree Azimuth



Antenna Layout

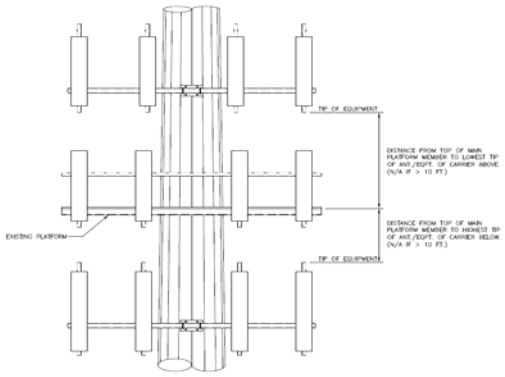
Ants. Items	Enter antenna model. If not labled, enter "Unknown". If no antenna at specified location, enter "N/A". If antennas and the locations are the same on all three sectors, only enter one sector.					Mounting Locations (Unit: inches)			Photos of antennas
	Antenna Models if Known	Width (in.)	Depth (in.)	Height (in.)	Coax Size and Qty	Vertical Distances"b_{1a}, b_{2a}, b_{3a}, b_{1b}...." (In.)	Horiz. offset (Use "-" if Ant. is inside)	Horiz. offset "C_1, C_2, C_3, C_4, C_5" (in.)	Photo Numbers
Sector A									
Ant_{1a}								124	
Ant_{1b}	Antenna A	13	9	56	1/2" (2)	22	8		
Ant_{1c}	TMA A	6	3	8	1/2" (2)	12			
Ant_{2a}								66	
Ant_{2b}	Antenna B	12	7.5	96.5	1/2" (2)	9	7		
Ant_{2c}									
Ant_{3a}								40	
Ant_{3b}	Antenna C	12	8	56	1/2" (1)	22	7		
Ant_{3c}									
Ant_{4a}									
Ant_{4b}									
Ant_{4c}									
Ant_{5a}									
Ant_{5b}									
Ant_{5c}									

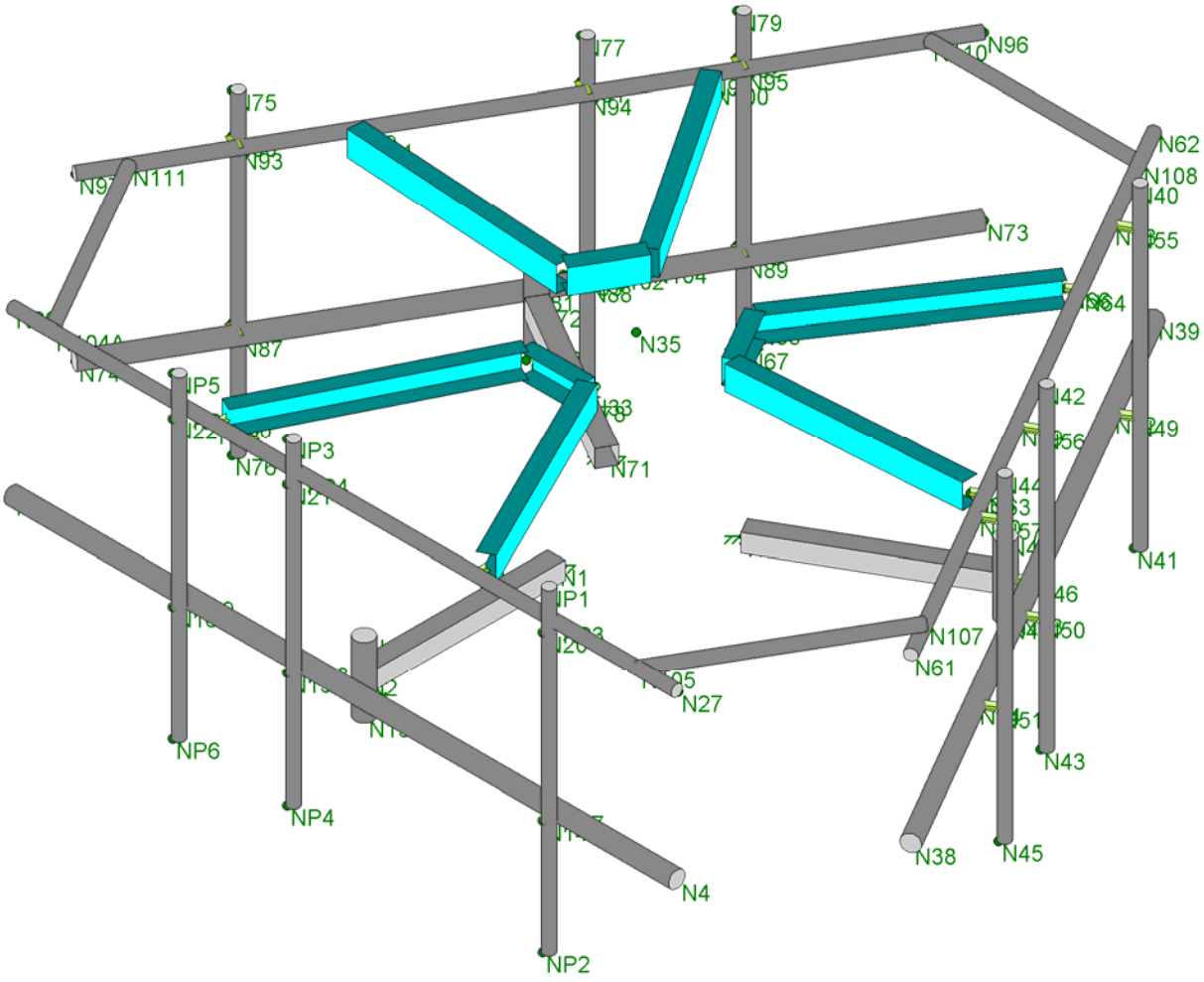
Are Ant same as sector A? Yes — **Antennas on Sector B are the same as Sector A**

Azimuth (Degree) of Each Sector and Climbing Information

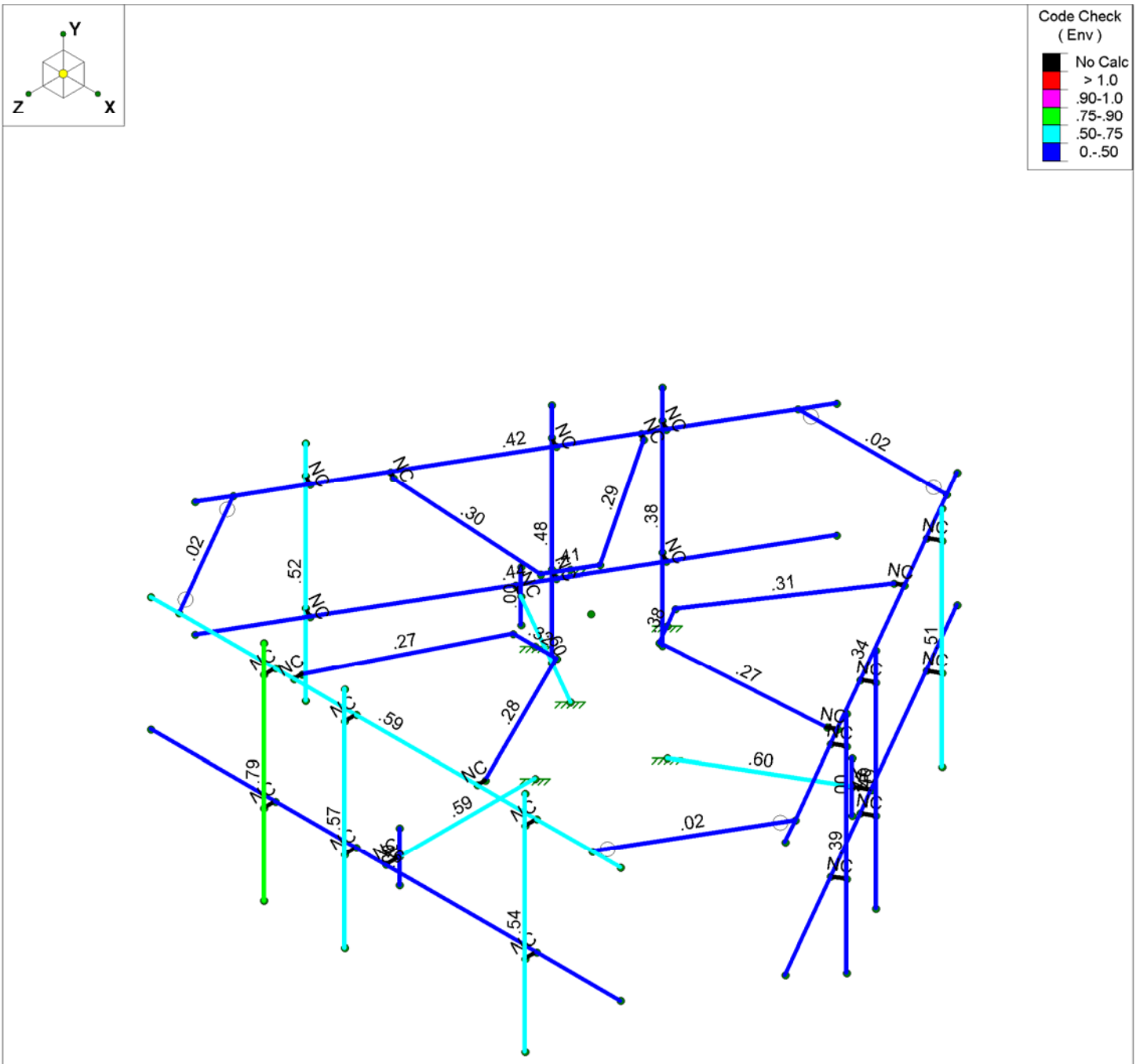
Sector A:	60°	Deg	
Sector B:	180°	Deg	
Sector C:	300°	Deg	
Climbing	150°	Deg	Located at Section B
Climbing Facility	Corrosion Type:		Severe corrosion observed
	Access:		Climbing path was unobstructed.
	Condition:		N/A

Are Ant same as sector A/B? Same As A — **Antennas on Sector C are the same as Sector A**



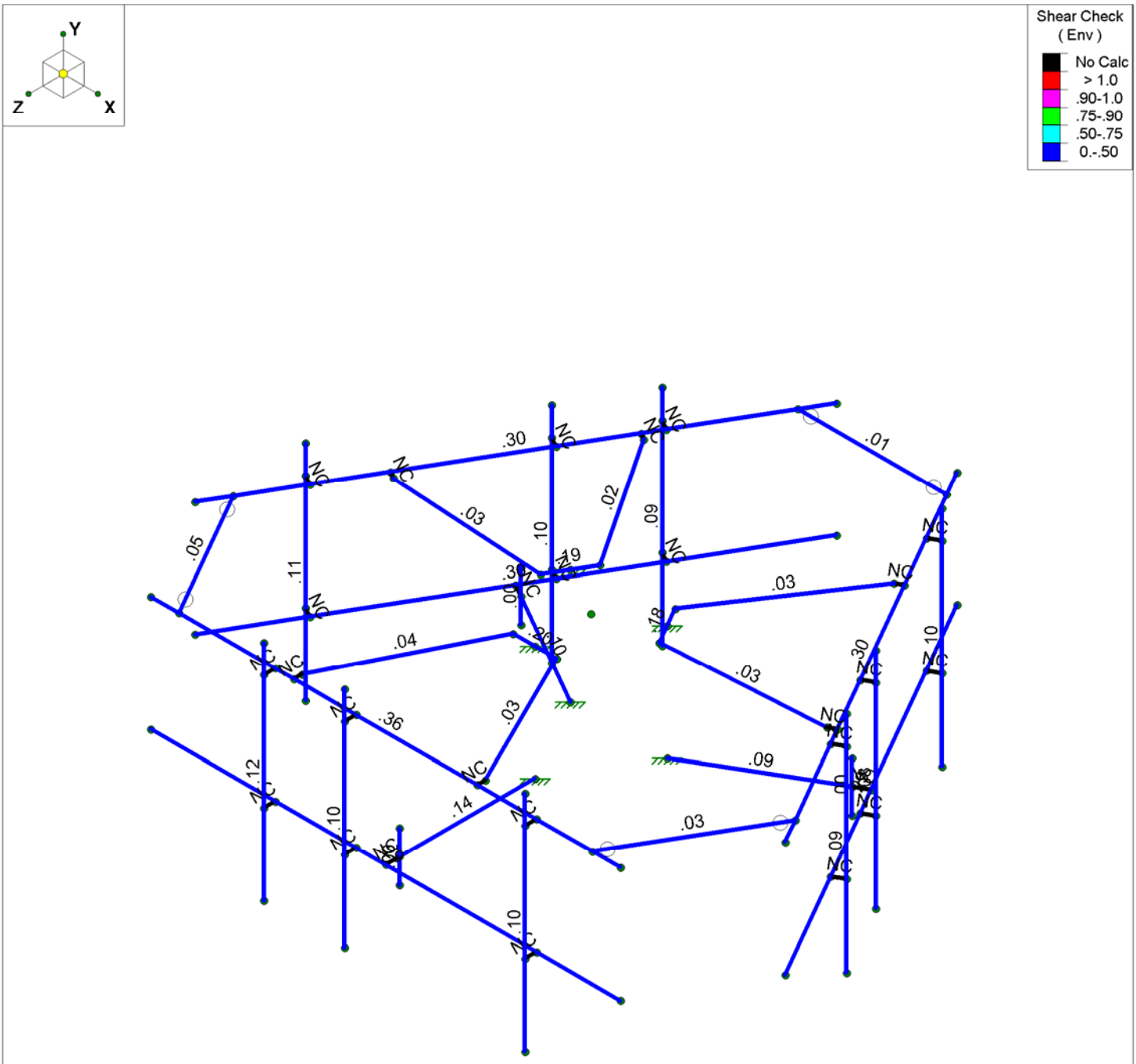


Tower Engineering Solutio...	CT46138-A-SBA_MT_LO_Loads Only_G	SK - 1
		June 17, 2019 at 3:43 PM
TES Project No. 78339		CT46138-A-SBA_78339_G_RISA_L...



Member Code Checks Displayed (Enveloped)
Results for LC 1, 1.2D+1.6W (Front)

Tower Engineering Solutio...	CT46138-A-SBA_MT_LO_Loads Only_G	SK - 4
		June 17, 2019 at 3:52 PM
TES Project No. 78339		CT46138-A-SBA_78339_G_RISA_L...



Member Shear Checks Displayed (Enveloped)
Results for LC 1, 1.2D+1.6W (Front)

Tower Engineering Solutio...	CT46138-A-SBA_MT_LO_Loads Only_G	SK - 5
		June 17, 2019 at 3:52 PM
TES Project No. 78339		CT46138-A-SBA_78339_G_RISA_L...

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Antenna D	None					27			
2	Antenna Di	None					27			
3	Antenna W Front	None					27			
4	Antenna Wi Front	None					27			
5	Antenna W Side	None					27			
6	Antenna Wi Side	None					27			
7	Service Lm1	None					1			
8	Service Lm2	None					1			
9	Structure D	None		-1						
10	Structure Di	None						33		
11	Structure W Front	None						33		
12	Structure Wi Front	None						33		
13	Structure W Side	None						33		
14	Structure Wi Side	None						33		

Load Combinations

	Description	Sol..	PD..	SR..	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
1	1.2D+1.6...	Yes	Y		1	1.2	9	1.2	3	1.6	11	1.6												
2	1.2D+1.6...	Yes	Y		1	1.2	9	1.2	3	-1.6	11	-1.6												
3	1.2D+1.6...	Yes	Y		1	1.2	9	1.2	5	1.6	13	1.6												
4	1.2D+1.6...	Yes	Y		1	1.2	9	1.2	5	-1.6	13	-1.6												
5	1.2D+1.0...	Yes	Y		1	1.2	9	1.2	2	1	10	1	4	1	12	1								
6	1.2D+1.0...	Yes	Y		1	1.2	9	1.2	2	1	10	1	4	-1	12	-1								
7	1.2D+1.0...	Yes	Y		1	1.2	9	1.2	2	1	10	1	6	1	14	1								
8	1.2D+1.0...	Yes	Y		1	1.2	9	1.2	2	1	10	1	6	-1	14	-1								
9	1.2D+1.5L..	Yes	Y		1	1.2	9	1.2	7	1.5	3	.16	11	.16										
10	1.2D+1.5L..	Yes	Y		1	1.2	9	1.2	8	1.5	3	.16	11	.16										
11	1.4D	Yes	Y		1	1.4	9	1.4																

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	0	0	0	0	
2	N2	0	0	3.625	0	
3	N3	-6.291667	0	4	0	
4	N4	6.291667	0	4	0	
5	NP1	4.041667	3.833333	4.308	0	
6	NP2	4.041667	-2.166667	4.308	0	
7	NP3	-0.791667	3.833333	4.308	0	
8	NP4	-0.791667	-2.166667	4.308	0	
9	NP5	-2.958333	3.833333	4.308	0	
10	NP6	-2.958333	-2.166667	4.308	0	
11	N11	0	0	4	0	
12	N12	0	0.666667	3.625	0	
13	N13	0	-0.666667	3.625	0	
14	N14	4.041667	0	4.308	0	
15	N15	-0.791667	0	4.308	0	
16	N16	-2.958333	0	4.308	0	
17	N17	4.04167	0	4	0	
18	N18	-0.791667	0	4	0	
19	N19	-2.95833	0	4	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
20	N20	4.041667	3.083333	4.308	0	
21	N21	-0.791667	3.083333	4.308	0	
22	N22	-2.958333	3.083333	4.308	0	
23	N23	4.04167	3.083333	4	0	
24	N24	-0.791667	3.083333	4	0	
25	N25	-2.95833	3.083333	4	0	
26	N26	-6.291667	3.083333	4	0	
27	N27	6.291667	3.083333	4	0	
28	N28	-2.45833	3.083333	4	0	
29	N29	2.45833	3.083333	4	0	
30	N30	-2.45833	3.083333	3.791333	0	
31	N31	2.45833	3.083333	3.791333	0	
32	N32	0	3.083333	0	0	
33	N33	0.583333	3.083333	0	0	
34	N34	-0.583333	3.083333	0	0	
35	N35	0	3.083333	-1.5	0	
36	N36	1.299038	0	-2.25	0	
37	N37	4.43838	0	-4.0625	0	
38	N38	7.908973	0	1.198743	0	
39	N39	1.617306	0	-9.698743	0	
40	N40	3.009042	3.833333	-7.904186	0	
41	N41	3.009042	-2.166667	-7.904186	0	
42	N42	5.425709	3.833333	-3.718397	0	
43	N43	5.425709	-2.166667	-3.718397	0	
44	N44	6.509042	3.833333	-1.842008	0	
45	N45	6.509042	-2.166667	-1.842008	0	
46	N46	4.76314	0	-4.25	0	
47	N47	4.43838	0.666667	-4.0625	0	
48	N48	4.43838	-0.666667	-4.0625	0	
49	N49	3.009042	0	-7.904186	0	
50	N50	5.425709	0	-3.718397	0	
51	N51	6.509042	0	-1.842008	0	
52	N52	2.742305	0	-7.750189	0	
53	N53	5.158973	0	-3.564396	0	
54	N54	6.242305	0	-1.688011	0	
55	N55	3.009042	3.083333	-7.904186	0	
56	N56	5.425709	3.083333	-3.718397	0	
57	N57	6.509042	3.083333	-1.842008	0	
58	N58	2.742305	3.083333	-7.750189	0	
59	N59	5.158973	3.083333	-3.564396	0	
60	N60	6.242305	3.083333	-1.688011	0	
61	N61	7.908973	3.083333	1.198743	0	
62	N62	1.617306	3.083333	-9.698743	0	
63	N63	5.992305	3.083333	-2.121024	0	
64	N64	3.533975	3.083333	-6.378976	0	
65	N65	5.811594	3.083333	-2.01669	0	
66	N66	3.353264	3.083333	-6.274643	0	
67	N67	1.299038	3.083333	-2.25	0	
68	N68	1.007371	3.083333	-2.755181	0	
69	N69	1.590705	3.083333	-1.744819	0	
70	N71	-1.299038	0	-2.25	0	
71	N72	-4.43838	0	-4.0625	0	
72	N73	-1.617306	0	-9.698743	0	
73	N74	-7.908973	0	1.198743	0	
74	N75	-7.050709	3.833333	-0.903814	0	
75	N76	-7.050709	-2.166667	-0.903814	0	
76	N77	-4.634042	3.833333	-5.089603	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
77	N78	-4.634042	-2.166667	-5.089603	0	
78	N79	-3.550709	3.833333	-6.965992	0	
79	N80	-3.550709	-2.166667	-6.965992	0	
80	N81	-4.76314	0	-4.25	0	
81	N82	-4.43838	0.666667	-4.0625	0	
82	N83	-4.43838	-0.666667	-4.0625	0	
83	N84	-7.050709	0	-0.903814	0	
84	N85	-4.634042	0	-5.089603	0	
85	N86	-3.550709	0	-6.965992	0	
86	N87	-6.783975	0	-0.749811	0	
87	N88	-4.367306	0	-4.935604	0	
88	N89	-3.283975	0	-6.811989	0	
89	N90	-7.050709	3.083333	-0.903814	0	
90	N91	-4.634042	3.083333	-5.089603	0	
91	N92	-3.550709	3.083333	-6.965992	0	
92	N93	-6.783975	3.083333	-0.749811	0	
93	N94	-4.367306	3.083333	-4.935604	0	
94	N95	-3.283975	3.083333	-6.811989	0	
95	N96	-1.617306	3.083333	-9.698743	0	
96	N97	-7.908973	3.083333	1.198743	0	
97	N98	-3.533975	3.083333	-6.378976	0	
98	N99	-5.992305	3.083333	-2.121024	0	
99	N100	-3.353264	3.083333	-6.274643	0	
100	N101	-5.811594	3.083333	-2.01669	0	
101	N102	-1.299038	3.083333	-2.25	0	
102	N103	-1.590705	3.083333	-1.744819	0	
103	N104	-1.007371	3.083333	-2.755181	0	
104	N104A	-5.541667	3.083333	4	0	
105	N105	5.541667	3.083333	4	0	
106	N107	7.533973	3.083333	0.549224	0	
107	N108	1.992306	3.083333	-9.049224	0	
108	N110	-1.992306	3.083333	-9.049224	0	
109	N111	-7.533973	3.083333	0.549224	0	

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	xxxxx	HSS16x0.438	Beam	None	A572 Gr.50	Typical	19.9	606	606	1210
2	HR2	C5x6.7	Beam	Channel	A36 Gr.36	Typical	1.97	.47	7.48	.055

Cold Formed Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	CF	4CU5.25X03...	Beam	CU	A570 Gr.33	Typical	4.854	13.238	12.817	.228
2	V-Arm	5.5CU3.5X0...	Beam	CU	A570 Gr.33	Typical	2.138	2.693	10.303	.025

Aluminum Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	AL1A	AACS14X13.9	Beam	AA Channel	3003-H14	Typical	11.8	44.7	401	1.19

Hot Rolled Steel Properties

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

Cold Formed Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[k/ft^3]	Yield[ksi]	Fu[ksi]
1	A570 Gr.33	29500	11346	.3	.65	.49	33	52
2	A607 C1 Gr.55	29500	11346	.3	.65	.49	55	70

Aluminum Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (...	Density[...	Table B.4	kt	Ftu[ksi]	Fty[ksi]	Fcy[ksi]	Fsu[ksi]	Ct
1	3003-H14	10100	3787.5	.33	1.3	.173	Table B....	1	19	16	13	12	141
2	6061-T6	10100	3787.5	.33	1.3	.173	Table B....	1	38	35	35	24	141
3	6063-T5	10100	3787.5	.33	1.3	.173	Table B....	1	22	16	16	13	141
4	6063-T6	10100	3787.5	.33	1.3	.173	Table B....	1	30	25	25	19	141
5	5052-H34	10200	3787.5	.33	1.3	.173	Table B....	1	34	26	24	20	141
6	6061-T6 W	10100	3787.5	.33	1.3	.173	Table B....	1	24	15	15	15	141

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N3	N4			PIPE_3.0	Beam	Pipe	A53 Gr.B	DR1
2	M2	N1	N2			HSS4x4x4	Beam	None	A500 Gr.B...	DR1
3	MP1A	NP1	NP2			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1
4	MP2A	NP3	NP4			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1
5	MP3A	NP5	NP6			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1
6	M6	N13	N12			PIPE_3.5	Beam	Pipe	A53 Gr.B	Typical
7	M7	N2	N11			RIGID	Beam	None	RIGID	DR1
8	M8	N19	N16			RIGID	Beam	None	RIGID	DR1
9	M9	N18	N15			RIGID	Beam	None	RIGID	DR1
10	M10	N17	N14			RIGID	Beam	None	RIGID	DR1
11	M11	N25	N22			RIGID	Beam	None	RIGID	DR1
12	M12	N24	N21			RIGID	Beam	None	RIGID	DR1
13	M13	N23	N20			RIGID	Beam	None	RIGID	DR1
14	M14	N26	N27			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1
15	M15	N28	N30			RIGID	Beam	None	RIGID	DR1
16	M16	N29	N31			RIGID	Beam	None	RIGID	DR1
17	M17	N34	N33			V-Arm	Beam	CU	A570 Gr.33	Typical
18	M18	N31	N33		180	V-Arm	Beam	CU	A570 Gr.33	Typical
19	M19	N34	N30		180	V-Arm	Beam	CU	A570 Gr.33	Typical
20	M20	N38	N39			PIPE_3.0	Beam	Pipe	A53 Gr.B	DR1
21	M21	N36	N37			HSS4x4x4	Beam	None	A500 Gr.B...	DR1
22	MP1B	N40	N41			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1
23	MP2B	N42	N43			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1
24	MP3B	N44	N45			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1
25	M25	N48	N47			PIPE_3.5	Beam	Pipe	A53 Gr.B	Typical
26	M26	N37	N46			RIGID	Beam	None	RIGID	DR1
27	M27	N54	N51			RIGID	Beam	None	RIGID	DR1

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
28	M28	N53	N50			RIGID	Beam	None	RIGID	DR1
29	M29	N52	N49			RIGID	Beam	None	RIGID	DR1
30	M30	N60	N57			RIGID	Beam	None	RIGID	DR1
31	M31	N59	N56			RIGID	Beam	None	RIGID	DR1
32	M32	N58	N55			RIGID	Beam	None	RIGID	DR1
33	M33	N61	N62			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1
34	M34	N63	N65			RIGID	Beam	None	RIGID	DR1
35	M35	N64	N66			RIGID	Beam	None	RIGID	DR1
36	M36	N69	N68			V-Arm	Beam	CU	A570 Gr.33	Typical
37	M37	N66	N68		180	V-Arm	Beam	CU	A570 Gr.33	Typical
38	M38	N69	N65		180	V-Arm	Beam	CU	A570 Gr.33	Typical
39	M39	N73	N74			PIPE_3.0	Beam	Pipe	A53 Gr.B	DR1
40	M40	N71	N72			HSS4x4x4	Beam	None	A500 Gr.B...	DR1
41	MP1C	N75	N76			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1
42	MP2C	N77	N78			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1
43	MP3C	N79	N80			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1
44	M44	N83	N82			PIPE_3.5	Beam	Pipe	A53 Gr.B	Typical
45	M45	N72	N81			RIGID	Beam	None	RIGID	DR1
46	M46	N89	N86			RIGID	Beam	None	RIGID	DR1
47	M47	N88	N85			RIGID	Beam	None	RIGID	DR1
48	M48	N87	N84			RIGID	Beam	None	RIGID	DR1
49	M49	N95	N92			RIGID	Beam	None	RIGID	DR1
50	M50	N94	N91			RIGID	Beam	None	RIGID	DR1
51	M51	N93	N90			RIGID	Beam	None	RIGID	DR1
52	M52	N96	N97			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1
53	M53	N98	N100			RIGID	Beam	None	RIGID	DR1
54	M54	N99	N101			RIGID	Beam	None	RIGID	DR1
55	M55	N104	N103			V-Arm	Beam	CU	A570 Gr.33	Typical
56	M56	N101	N103		180	V-Arm	Beam	CU	A570 Gr.33	Typical
57	M57	N104	N100		180	V-Arm	Beam	CU	A570 Gr.33	Typical
58	M58	N111	N104A			PIPE_2.0	Beam	Pipe	A36 Gr.36	Typical
59	M59	N110	N108			PIPE_2.0	Beam	Pipe	A36 Gr.36	Typical
60	M60	N105	N107			PIPE_2.0	Beam	Pipe	A36 Gr.36	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
1	M1						Yes			None
2	M2						Yes			None
3	MP1A						Yes	-z		None
4	MP2A						Yes	-z		None
5	MP3A						Yes	-z		None
6	M6						Yes			None
7	M7						Yes			None
8	M8						Yes			None
9	M9						Yes			None
10	M10						Yes			None
11	M11						Yes			None
12	M12						Yes			None
13	M13						Yes			None
14	M14						Yes			None
15	M15						Yes			None
16	M16						Yes			None
17	M17						Yes			None
18	M18						Yes			None
19	M19						Yes			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
20	M20						Yes			None
21	M21						Yes			None
22	MP1B						Yes	-z		None
23	MP2B						Yes	-z		None
24	MP3B						Yes	-z		None
25	M25						Yes			None
26	M26						Yes			None
27	M27						Yes			None
28	M28						Yes			None
29	M29						Yes			None
30	M30						Yes			None
31	M31						Yes			None
32	M32						Yes			None
33	M33						Yes			None
34	M34						Yes			None
35	M35						Yes			None
36	M36						Yes			None
37	M37						Yes			None
38	M38						Yes			None
39	M39						Yes			None
40	M40						Yes			None
41	MP1C						Yes	-z		None
42	MP2C						Yes	-z		None
43	MP3C						Yes	-z		None
44	M44						Yes			None
45	M45						Yes			None
46	M46						Yes			None
47	M47						Yes			None
48	M48						Yes			None
49	M49						Yes			None
50	M50						Yes			None
51	M51						Yes			None
52	M52						Yes			None
53	M53						Yes			None
54	M54						Yes			None
55	M55						Yes			None
56	M56						Yes			None
57	M57						Yes			None
58	M58	BenPIN	BenPIN				Yes			None
59	M59	BenPIN	BenPIN				Yes			None
60	M60	BenPIN	BenPIN				Yes			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torq...	Kyy	Kzz	Cb	Function
1	M1	PIPE_3.0	12.583			Lbyy						Gravity
2	M2	HSS4x4x4	3.625			Lbyy						Gravity
3	MP1A	PIPE_2.0	6			Lbyy						Lateral
4	MP2A	PIPE_2.0	6			Lbyy						Gravity
5	MP3A	PIPE_2.0	6			Lbyy						Gravity
6	M6	PIPE_3.5	1.333			Lbyy						Lateral
7	M14	PIPE_2.0	12.583			Lbyy						Gravity
8	M20	PIPE_3.0	12.583			Lbyy						Gravity
9	M21	HSS4x4x4	3.625			Lbyy						Gravity
10	MP1B	PIPE_2.0	6			Lbyy						Lateral
11	MP2B	PIPE_2.0	6			Lbyy						Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torq...	Kyy	Kzz	Cb	Function
12	MP3B	PIPE_2.0	6			Lbyy						Lateral
13	M25	PIPE_3.5	1.333			Lbyy						Lateral
14	M33	PIPE_2.0	12.583			Lbyy						Gravity
15	M39	PIPE_3.0	12.583			Lbyy						Gravity
16	M40	HSS4x4x4	3.625			Lbyy						Gravity
17	MP1C	PIPE_2.0	6			Lbyy						Lateral
18	MP2C	PIPE_2.0	6			Lbyy						Lateral
19	MP3C	PIPE_2.0	6			Lbyy						Lateral
20	M44	PIPE_3.5	1.333			Lbyy						Lateral
21	M52	PIPE_2.0	12.583			Lbyy						Gravity
22	M58	PIPE_2.0	3.985			Lbyy						Lateral
23	M59	PIPE_2.0	3.985			Lbyy						Lateral
24	M60	PIPE_2.0	3.985			Lbyy						Lateral

Cold Formed Steel Design Parameters

	Label	Shape	Lengt...	Lbyy[ft]	Lbzz[ft]	Lcomp t...	Lcomp ...	L-torque...	Kyy	Kzz	Cm-...	Cm-...	Cb	R	a[ft]	y sw...	z sw...
1	M17	V-Arm	1.167			Lbyy											
2	M18	V-Arm	4.23			Lbyy											
3	M19	V-Arm	4.23			Lbyy											
4	M36	V-Arm	1.167			Lbyy											
5	M37	V-Arm	4.23			Lbyy											
6	M38	V-Arm	4.23			Lbyy											
7	M55	V-Arm	1.167			Lbyy											
8	M56	V-Arm	4.23			Lbyy											
9	M57	V-Arm	4.23			Lbyy											

Aluminum Design Parameters

Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torq...	Kyy	Kzz	Cb	Function
No Data to Print ...											

Joint Loads and Enforced Displacements

Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
No Data to Print ...			

Member Point Loads (BLC 1 : Antenna D)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP2A	Y	-64	.5
2	MP2A	Y	-64	5
3	MP2B	Y	-64	.5
4	MP2B	Y	-64	5
5	MP2C	Y	-64	.5
6	MP2C	Y	-64	5
7	MP1A	Y	-45.2	1
8	MP1A	Y	-45.2	5
9	MP1B	Y	-45.2	1
10	MP1B	Y	-45.2	5
11	MP1C	Y	-45.2	1
12	MP1C	Y	-45.2	5
13	MP3A	Y	-45.75	1
14	MP3A	Y	-45.75	5
15	MP3B	Y	-45.75	1

Member Point Loads (BLC 1 : Antenna D) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
16	MP3B	Y	-45.75	5
17	MP3C	Y	-45.75	1
18	MP3C	Y	-45.75	5
19	MP3A	Y	-11	2
20	MP3B	Y	-11	2
21	MP3C	Y	-11	2
22	MP1A	Y	-37	2
23	MP1A	Y	-37	3
24	MP1B	Y	-37	2
25	MP1B	Y	-37	3
26	MP1C	Y	-37	2
27	MP1C	Y	-37	3

Member Point Loads (BLC 2 : Antenna Di)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP2A	Y	-300.135	.5
2	MP2A	Y	-300.135	5
3	MP2B	Y	-300.135	.5
4	MP2B	Y	-300.135	5
5	MP2C	Y	-300.135	.5
6	MP2C	Y	-300.135	5
7	MP1A	Y	-120.467	1
8	MP1A	Y	-120.467	5
9	MP1B	Y	-120.467	1
10	MP1B	Y	-120.467	5
11	MP1C	Y	-120.467	1
12	MP1C	Y	-120.467	5
13	MP3A	Y	-120.467	1
14	MP3A	Y	-120.467	5
15	MP3B	Y	-120.467	1
16	MP3B	Y	-120.467	5
17	MP3C	Y	-120.467	1
18	MP3C	Y	-120.467	5
19	MP3A	Y	-26.071	2
20	MP3B	Y	-26.071	2
21	MP3C	Y	-26.071	2
22	MP1A	Y	-49.048	2
23	MP1A	Y	-49.048	3
24	MP1B	Y	-49.048	2
25	MP1B	Y	-49.048	3
26	MP1C	Y	-49.048	2
27	MP1C	Y	-49.048	3

Member Point Loads (BLC 3 : Antenna W Front)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP2A	Z	-324.994	.5
2	MP2A	Z	-324.994	5
3	MP2B	Z	-188.291	.5
4	MP2B	Z	-188.291	5
5	MP2C	Z	-188.291	.5
6	MP2C	Z	-188.291	5
7	MP1A	Z	-97.787	1
8	MP1A	Z	-97.787	5
9	MP1B	Z	-76.353	1
10	MP1B	Z	-76.353	5
11	MP1C	Z	-76.353	1

Member Point Loads (BLC 3 : Antenna W Front) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
12	MP1C	Z	-76.353	5
13	MP3A	Z	-97.787	1
14	MP3A	Z	-97.787	5
15	MP3B	Z	-76.353	1
16	MP3B	Z	-76.353	5
17	MP3C	Z	-76.353	1
18	MP3C	Z	-76.353	5
19	MP3A	Z	-9.875	2
20	MP3B	Z	-5.279	2
21	MP3C	Z	-5.279	2
22	MP1A	Z	-23.724	2
23	MP1A	Z	-23.724	3
24	MP1B	Z	-15.002	2
25	MP1B	Z	-15.002	3
26	MP1C	Z	-15.002	2
27	MP1C	Z	-15.002	3

Member Point Loads (BLC 4 : Antenna Wi Front)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP2A	Z	-67.767	.5
2	MP2A	Z	-67.767	5
3	MP2B	Z	-41.644	.5
4	MP2B	Z	-41.644	5
5	MP2C	Z	-41.644	.5
6	MP2C	Z	-41.644	5
7	MP1A	Z	-22.548	1
8	MP1A	Z	-22.548	5
9	MP1B	Z	-18.281	1
10	MP1B	Z	-18.281	5
11	MP1C	Z	-18.281	1
12	MP1C	Z	-18.281	5
13	MP3A	Z	-22.548	1
14	MP3A	Z	-22.548	5
15	MP3B	Z	-18.281	1
16	MP3B	Z	-18.281	5
17	MP3C	Z	-18.281	1
18	MP3C	Z	-18.281	5
19	MP3A	Z	-3.35	2
20	MP3B	Z	-2.439	2
21	MP3C	Z	-2.439	2
22	MP1A	Z	-5.276	2
23	MP1A	Z	-5.276	3
24	MP1B	Z	-4.02	2
25	MP1B	Z	-4.02	3
26	MP1C	Z	-4.02	2
27	MP1C	Z	-4.02	3

Member Point Loads (BLC 5 : Antenna W Side)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP2A	X	142.723	.5
2	MP2A	X	142.723	5
3	MP2B	X	279.426	.5
4	MP2B	X	279.426	5
5	MP2C	X	279.426	.5
6	MP2C	X	279.426	5
7	MP1A	X	69.209	1

Member Point Loads (BLC 5 : Antenna W Side) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
8	MP1A	X	69.209	5
9	MP1B	X	90.643	1
10	MP1B	X	90.643	5
11	MP1C	X	90.643	1
12	MP1C	X	90.643	5
13	MP3A	X	69.209	1
14	MP3A	X	69.209	5
15	MP3B	X	90.643	1
16	MP3B	X	90.643	5
17	MP3C	X	90.643	1
18	MP3C	X	90.643	5
19	MP3A	X	4.996	2
20	MP3B	X	11.124	2
21	MP3C	X	11.124	2
22	MP1A	X	16.127	2
23	MP1A	X	16.127	3
24	MP1B	X	27.756	2
25	MP1B	X	27.756	3
26	MP1C	X	27.756	2
27	MP1C	X	27.756	3

Member Point Loads (BLC 6 : Antenna Wi Side)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP2A	X	32.936	.5
2	MP2A	X	32.936	5
3	MP2B	X	59.059	.5
4	MP2B	X	59.059	5
5	MP2C	X	59.059	.5
6	MP2C	X	59.059	5
7	MP1A	X	16.859	1
8	MP1A	X	16.859	5
9	MP1B	X	21.126	1
10	MP1B	X	21.126	5
11	MP1C	X	21.126	1
12	MP1C	X	21.126	5
13	MP3A	X	16.859	1
14	MP3A	X	16.859	5
15	MP3B	X	21.126	1
16	MP3B	X	21.126	5
17	MP3C	X	21.126	1
18	MP3C	X	21.126	5
19	MP3A	X	2.846	2
20	MP3B	X	4.061	2
21	MP3C	X	4.061	2
22	MP1A	X	4.802	2
23	MP1A	X	4.802	3
24	MP1B	X	6.476	2
25	MP1B	X	6.476	3
26	MP1C	X	6.476	2
27	MP1C	X	6.476	3

Member Point Loads (BLC 7 : Service Lm1)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	M1	Y	-500	0

Member Point Loads (BLC 8 : Service Lm2)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	M1	Y	-500	%50

Member Distributed Loads (BLC 10 : Structure Di)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-16.642	-16.642	0	%100
2	M2	Y	-23.005	-23.005	0	%100
3	MP1A	Y	-13.433	-13.433	0	%100
4	MP2A	Y	-13.433	-13.433	0	%100
5	MP3A	Y	-13.433	-13.433	0	%100
6	M6	Y	-18.068	-18.068	0	%100
7	M14	Y	-13.433	-13.433	0	%100
8	M17	Y	-19.68	-19.68	0	%100
9	M18	Y	-19.68	-19.68	0	%100
10	M19	Y	-19.68	-19.68	0	%100
11	M20	Y	-16.642	-16.642	0	%100
12	M21	Y	-23.005	-23.005	0	%100
13	MP1B	Y	-13.433	-13.433	0	%100
14	MP2B	Y	-13.433	-13.433	0	%100
15	MP3B	Y	-13.433	-13.433	0	%100
16	M25	Y	-18.068	-18.068	0	%100
17	M33	Y	-13.433	-13.433	0	%100
18	M36	Y	-19.68	-19.68	0	%100
19	M37	Y	-19.68	-19.68	0	%100
20	M38	Y	-19.68	-19.68	0	%100
21	M39	Y	-16.642	-16.642	0	%100
22	M40	Y	-23.005	-23.005	0	%100
23	MP1C	Y	-13.433	-13.433	0	%100
24	MP2C	Y	-13.433	-13.433	0	%100
25	MP3C	Y	-13.433	-13.433	0	%100
26	M44	Y	-18.068	-18.068	0	%100
27	M52	Y	-13.433	-13.433	0	%100
28	M55	Y	-19.68	-19.68	0	%100
29	M56	Y	-19.68	-19.68	0	%100
30	M57	Y	-19.68	-19.68	0	%100
31	M58	Y	-13.433	-13.433	0	%100
32	M59	Y	-13.433	-13.433	0	%100
33	M60	Y	-13.433	-13.433	0	%100

Member Distributed Loads (BLC 11 : Structure W Front)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	PZ	-11.24	-11.24	0	%100
2	M2	PZ	-21.409	-21.409	0	%100
3	MP1A	PZ	-7.627	-7.627	0	%100
4	MP2A	PZ	-7.627	-7.627	0	%100
5	MP3A	PZ	-7.627	-7.627	0	%100
6	M6	PZ	-12.846	-12.846	0	%100
7	M14	PZ	-7.627	-7.627	0	%100
8	M17	PZ	-26.762	-26.762	0	%100
9	M18	PZ	-26.762	-26.762	0	%100
10	M19	PZ	-26.762	-26.762	0	%100
11	M20	PZ	-11.24	-11.24	0	%100
12	M21	PZ	-21.409	-21.409	0	%100
13	MP1B	PZ	-7.627	-7.627	0	%100
14	MP2B	PZ	-7.627	-7.627	0	%100
15	MP3B	PZ	-7.627	-7.627	0	%100

Member Distributed Loads (BLC 11 : Structure W Front) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[ft,%]	End Location[ft,%]
16	M25	PZ	-12.846	-12.846	0	%100
17	M33	PZ	-7.627	-7.627	0	%100
18	M36	PZ	-26.762	-26.762	0	%100
19	M37	PZ	-26.762	-26.762	0	%100
20	M38	PZ	-26.762	-26.762	0	%100
21	M39	PZ	-11.24	-11.24	0	%100
22	M40	PZ	-21.409	-21.409	0	%100
23	MP1C	PZ	-7.627	-7.627	0	%100
24	MP2C	PZ	-7.627	-7.627	0	%100
25	MP3C	PZ	-7.627	-7.627	0	%100
26	M44	PZ	-12.846	-12.846	0	%100
27	M52	PZ	-7.627	-7.627	0	%100
28	M55	PZ	-26.762	-26.762	0	%100
29	M56	PZ	-26.762	-26.762	0	%100
30	M57	PZ	-26.762	-26.762	0	%100
31	M58	PZ	-7.627	-7.627	0	%100
32	M59	PZ	-7.627	-7.627	0	%100
33	M60	PZ	-7.627	-7.627	0	%100

Member Distributed Loads (BLC 12 : Structure Wi Front)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	PZ	-4.853	-4.853	0	%100
2	M2	PZ	-6.734	-6.734	0	%100
3	MP1A	PZ	-4.185	-4.185	0	%100
4	MP2A	PZ	-4.185	-4.185	0	%100
5	MP3A	PZ	-4.185	-4.185	0	%100
6	M6	PZ	-5.15	-5.15	0	%100
7	M14	PZ	-4.185	-4.185	0	%100
8	M17	PZ	-7.725	-7.725	0	%100
9	M18	PZ	-7.725	-7.725	0	%100
10	M19	PZ	-7.725	-7.725	0	%100
11	M20	PZ	-4.853	-4.853	0	%100
12	M21	PZ	-6.734	-6.734	0	%100
13	MP1B	PZ	-4.185	-4.185	0	%100
14	MP2B	PZ	-4.185	-4.185	0	%100
15	MP3B	PZ	-4.185	-4.185	0	%100
16	M25	PZ	-5.15	-5.15	0	%100
17	M33	PZ	-4.185	-4.185	0	%100
18	M36	PZ	-7.725	-7.725	0	%100
19	M37	PZ	-7.725	-7.725	0	%100
20	M38	PZ	-7.725	-7.725	0	%100
21	M39	PZ	-4.853	-4.853	0	%100
22	M40	PZ	-6.734	-6.734	0	%100
23	MP1C	PZ	-4.185	-4.185	0	%100
24	MP2C	PZ	-4.185	-4.185	0	%100
25	MP3C	PZ	-4.185	-4.185	0	%100
26	M44	PZ	-5.15	-5.15	0	%100
27	M52	PZ	-4.185	-4.185	0	%100
28	M55	PZ	-7.725	-7.725	0	%100
29	M56	PZ	-7.725	-7.725	0	%100
30	M57	PZ	-7.725	-7.725	0	%100
31	M58	PZ	-4.185	-4.185	0	%100
32	M59	PZ	-4.185	-4.185	0	%100
33	M60	PZ	-4.185	-4.185	0	%100

Member Distributed Loads (BLC 13 : Structure W Side)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	PX	11.24	11.24	0	%100
2	M2	PX	21.409	21.409	0	%100
3	MP1A	PX	7.627	7.627	0	%100
4	MP2A	PX	7.627	7.627	0	%100
5	MP3A	PX	7.627	7.627	0	%100
6	M6	PX	12.846	12.846	0	%100
7	M14	PX	7.627	7.627	0	%100
8	M17	PX	26.762	26.762	0	%100
9	M18	PX	26.762	26.762	0	%100
10	M19	PX	26.762	26.762	0	%100
11	M20	PX	11.24	11.24	0	%100
12	M21	PX	21.409	21.409	0	%100
13	MP1B	PX	7.627	7.627	0	%100
14	MP2B	PX	7.627	7.627	0	%100
15	MP3B	PX	7.627	7.627	0	%100
16	M25	PX	12.846	12.846	0	%100
17	M33	PX	7.627	7.627	0	%100
18	M36	PX	26.762	26.762	0	%100
19	M37	PX	26.762	26.762	0	%100
20	M38	PX	26.762	26.762	0	%100
21	M39	PX	11.24	11.24	0	%100
22	M40	PX	21.409	21.409	0	%100
23	MP1C	PX	7.627	7.627	0	%100
24	MP2C	PX	7.627	7.627	0	%100
25	MP3C	PX	7.627	7.627	0	%100
26	M44	PX	12.846	12.846	0	%100
27	M52	PX	7.627	7.627	0	%100
28	M55	PX	26.762	26.762	0	%100
29	M56	PX	26.762	26.762	0	%100
30	M57	PX	26.762	26.762	0	%100
31	M58	PX	7.627	7.627	0	%100
32	M59	PX	7.627	7.627	0	%100
33	M60	PX	7.627	7.627	0	%100

Member Distributed Loads (BLC 14 : Structure Wi Side)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	PX	4.853	4.853	0	%100
2	M2	PX	6.734	6.734	0	%100
3	MP1A	PX	4.185	4.185	0	%100
4	MP2A	PX	4.185	4.185	0	%100
5	MP3A	PX	4.185	4.185	0	%100
6	M6	PX	5.15	5.15	0	%100
7	M14	PX	4.185	4.185	0	%100
8	M17	PX	7.725	7.725	0	%100
9	M18	PX	7.725	7.725	0	%100
10	M19	PX	7.725	7.725	0	%100
11	M20	PX	4.853	4.853	0	%100
12	M21	PX	6.734	6.734	0	%100
13	MP1B	PX	4.185	4.185	0	%100
14	MP2B	PX	4.185	4.185	0	%100
15	MP3B	PX	4.185	4.185	0	%100
16	M25	PX	5.15	5.15	0	%100
17	M33	PX	4.185	4.185	0	%100
18	M36	PX	7.725	7.725	0	%100
19	M37	PX	7.725	7.725	0	%100
20	M38	PX	7.725	7.725	0	%100

Member Distributed Loads (BLC 14 : Structure Wi Side) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[ft,%]	End Location[ft,%]
21	M39	PX	4.853	4.853	0	%100
22	M40	PX	6.734	6.734	0	%100
23	MP1C	PX	4.185	4.185	0	%100
24	MP2C	PX	4.185	4.185	0	%100
25	MP3C	PX	4.185	4.185	0	%100
26	M44	PX	5.15	5.15	0	%100
27	M52	PX	4.185	4.185	0	%100
28	M55	PX	7.725	7.725	0	%100
29	M56	PX	7.725	7.725	0	%100
30	M57	PX	7.725	7.725	0	%100
31	M58	PX	4.185	4.185	0	%100
32	M59	PX	4.185	4.185	0	%100
33	M60	PX	4.185	4.185	0	%100

Member Area Loads

Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[ksf]
No Data to Print ...						

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	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N32	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N33						
4	N34						
5	N35						
6	N36	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
7	N67	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
8	N68						
9	N69						
10	N71	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
11	N102	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
12	N103						
13	N104						

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	920.355	4	2549.262	5	1732.372	1	-1.884	2	2.974	4	.423	4
2		min	-886.624	9	719.713	3	-1107.251	2	-8.675	5	-2.622	3	-1.433	9
3	N32	max	792.125	9	508.506	7	1052.773	1	-.013	2	1.161	9	.034	4
4		min	-695.386	3	129.491	4	-1684.275	2	-.066	5	-1.352	3	-.13	9
5	N36	max	1586.825	4	2574.445	6	904.853	1	4.581	6	3.285	2	7.436	8
6		min	-1139.959	3	726.826	4	-1248.459	2	1.033	1	-2.987	1	1.606	3
7	N67	max	924.82	4	485.433	5	1063.208	1	.035	2	1.346	2	.068	8
8		min	-1372.839	3	123.203	3	-716.332	2	-.016	1	-1.67	1	-.003	3
9	N71	max	1079.903	4	2576.124	7	999.509	1	4.066	6	3.287	1	-1.726	4
10		min	-1619.855	3	726.815	2	-1178.176	2	.789	1	-2.899	2	-7.746	7
11	N102	max	1470.923	4	483.536	8	936.201	1	.052	6	1.266	3	0	2
12		min	-930.15	3	123.11	1	-754.425	2	-.024	1	-1.624	4	-.05	5
13	Totals:	max	6588.594	4	9157.405	5	6688.916	1						
14		min	-6588.596	3	2626.479	2	-6688.917	2						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
1	M1	1	max	0	1	0	1	0	1	0	1	0	1	0	1
2			min	0	1	-750	9	0	1	0	1	0	1	0	1
3		2	max	0	1	-26.59	10	56.574	2	0	1	.089	2	2.401	9
4			min	0	1	-776.59	9	-56.574	1	0	1	-.089	1	.042	4
5		3	max	1017.757	9	-340.498	10	808.2	2	.227	4	1.192	2	2.173	8
6			min	-407.911	4	-1613.682	8	-1246.315	1	-1.055	6	-1.802	1	.679	2
7		4	max	464.471	8	686.849	5	402.689	1	.37	6	.318	2	.027	4
8			min	-85.758	3	212.976	9	-215.511	2	-.054	1	-.346	1	-.126	7
9		5	max	0	1	0	1	0	1	0	1	0	1	0	1
10			min	0	1	0	1	0	1	0	1	0	1	0	1
11	M2	1	max	1732.372	1	2558.332	5	887.86	9	.423	4	2.974	4	8.675	5
12			min	-1107.251	2	720.306	3	-921.006	4	-1.433	9	-2.622	3	1.884	2
13		2	max	1732.372	1	2524.072	5	887.86	9	.423	4	2.154	4	6.372	5
14			min	-1107.251	2	706.894	3	-889.962	4	-1.433	9	-1.883	3	1.219	2
15		3	max	1732.372	1	2489.811	5	887.86	9	.423	4	1.361	4	4.1	5
16			min	-1107.251	2	693.481	3	-858.919	4	-1.433	9	-1.172	3	.566	2
17		4	max	1732.372	1	2455.551	5	887.86	9	.423	4	.597	4	1.86	5
18			min	-1107.251	2	680.069	3	-827.875	4	-1.433	9	-.49	3	-.075	2
19		5	max	1732.372	1	2421.29	5	887.86	9	.423	4	.777	9	.442	1
20			min	-1107.251	2	666.656	3	-796.831	4	-1.433	9	-.139	4	-.704	2
21	MP1A	1	max	0	1	.007	9	.002	2	0	8	0	1	0	1
22			min	0	1	-.014	8	-.019	5	0	9	0	1	0	1
23		2	max	164.865	7	420.081	6	315.67	8	.099	3	.025	9	.204	8
24			min	24.919	4	131.37	9	11.073	9	-.071	4	-.128	8	.03	3
25		3	max	289.761	7	430.366	8	315.67	8	.099	3	.346	8	-.124	9
26			min	77.967	4	86.036	3	16.905	9	-.071	4	.036	3	-.434	8
27		4	max	-60.487	9	129.043	3	174.701	2	0	9	.092	1	.069	3
28			min	-201.104	8	-128.904	4	-174.592	1	0	8	-.092	2	-.069	4
29		5	max	0	9	.682	8	.726	5	0	9	0	9	0	4
30			min	0	8	-.115	9	-.064	2	0	8	0	8	0	3
31	MP2A	1	max	0	1	.279	9	.043	9	0	8	0	1	0	1
32			min	0	1	-.365	8	-.191	6	0	9	0	1	0	1
33		2	max	680.703	9	1.139	4	473.37	5	.082	9	.005	1	.044	5
34			min	56.614	10	-286.873	9	18.858	2	-.073	1	-.094	6	-.202	9
35		3	max	686.95	9	19.444	4	479.647	5	.082	9	.627	5	.229	9
36			min	62.861	10	-286.873	9	.553	2	-.073	1	-.036	2	.002	4
37		4	max	-83.047	9	246.568	3	538.192	2	0	9	.273	1	.128	3
38			min	-403.331	6	-246.555	4	-538.011	1	0	4	-.274	2	-.128	4
39		5	max	0	5	.106	4	1.693	5	0	9	0	5	0	4
40			min	0	2	-.325	9	-.104	2	0	4	0	2	0	3
41	MP3A	1	max	0	1	.011	9	0	2	0	4	0	1	0	1
42			min	0	1	-.002	4	-.027	5	0	9	0	1	0	1
43		2	max	114.775	8	-50.411	4	396.887	9	.064	9	.016	4	-.018	4
44			min	-613.892	9	-730.559	9	14.014	4	-.087	4	-.397	9	-.331	9
45		3	max	180.443	8	-24.112	4	400.297	9	.064	9	.32	7	.765	9
46			min	-594.445	9	-730.559	9	14.014	4	-.087	4	.013	2	.036	4
47		4	max	-61.146	9	128.975	3	174.704	2	0	9	.092	1	.069	3
48			min	-201.763	6	-128.982	4	-174.605	1	0	4	-.092	2	-.069	4
49		5	max	.001	9	.057	4	.631	5	0	9	0	9	0	4
50			min	0	2	-.417	9	-.06	2	0	4	0	4	0	3
51	M6	1	max	0	1	.018	9	.09	5	0	1	0	1	0	1
52			min	0	1	-.013	8	.005	2	0	1	0	1	0	1
53		2	max	-3.403	4	6.846	4	6.855	2	0	1	.001	2	.001	3
54			min	-9.425	5	-6.85	3	-6.838	1	0	1	-.001	1	-.001	4
55		3	max	18.851	5	13.701	3	13.689	1	0	1	.005	2	.005	3
56			min	6.806	4	-13.697	4	-13.707	2	0	1	-.005	1	-.005	4

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
57		4	max	9.425	5	6.85	3	6.838	1	0	1	.001	2	.001	3
58			min	3.403	4	-6.846	4	-6.856	2	0	1	-.001	1	-.001	4
59		5	max	0	1	.013	8	-.005	2	0	1	0	1	0	1
60			min	0	1	-.018	9	-.09	5	0	1	0	1	0	1
61	M7	1	max	1704.968	1	2387.461	5	888.076	9	.423	4	.777	9	.442	1
62			min	-1079.847	2	653.29	3	-769.702	4	-1.433	9	-.139	4	-.704	2
63		2	max	1704.968	1	2387.461	5	888.076	9	.423	4	.86	9	.379	1
64			min	-1079.847	2	653.29	3	-769.702	4	-1.433	9	-.212	4	-.767	2
65		3	max	1704.968	1	2387.461	5	888.076	9	.423	4	.944	9	.317	1
66			min	-1079.847	2	653.29	3	-769.702	4	-1.433	9	-.284	4	-.98	6
67		4	max	1704.968	1	2387.461	5	888.076	9	.423	4	1.027	9	.255	1
68			min	-1079.847	2	653.29	3	-769.702	4	-1.433	9	-.356	4	-1.203	6
69		5	max	1704.968	1	2387.461	5	888.076	9	.423	4	1.11	9	.193	1
70			min	-1079.847	2	653.29	3	-769.702	4	-1.433	9	-.428	4	-1.425	6
71	M8	1	max	420.826	9	410.465	8	727.044	9	1.375	9	-.029	2	.014	4
72			min	-139.038	2	-527.195	9	-123.356	4	.069	3	-.233	9	-.729	9
73		2	max	420.826	9	410.465	8	727.044	9	1.375	9	-.022	2	.002	4
74			min	-139.038	2	-527.195	9	-123.356	4	.069	3	-.177	9	-.688	9
75		3	max	420.826	9	410.465	8	727.044	9	1.375	9	-.015	2	-.01	4
76			min	-139.038	2	-527.195	9	-123.356	4	.069	3	-.142	5	-.647	9
77		4	max	420.826	9	410.465	8	727.044	9	1.375	9	-.005	3	-.022	4
78			min	-139.038	2	-527.195	9	-123.356	4	.069	3	-.119	8	-.607	9
79		5	max	420.826	9	410.465	8	727.044	9	1.375	9	.018	3	-.033	4
80			min	-139.038	2	-527.195	9	-123.356	4	.069	3	-.099	8	-.588	7
81	M9	1	max	807.447	1	1054.632	7	300.093	3	.468	9	.066	4	.141	1
82			min	-555.941	2	153.379	10	-284.974	4	-.202	3	-.098	3	-.591	6
83		2	max	807.447	1	1054.632	7	300.093	3	.468	9	.045	2	.124	1
84			min	-555.941	2	153.379	10	-284.974	4	-.202	3	-.076	1	-.672	6
85		3	max	807.447	1	1054.632	7	300.093	3	.468	9	.045	2	.108	1
86			min	-555.941	2	153.379	10	-284.974	4	-.202	3	-.075	1	-.753	6
87		4	max	807.447	1	1054.632	7	300.093	3	.468	9	.046	2	.091	1
88			min	-555.941	2	153.379	10	-284.974	4	-.202	3	-.075	1	-.835	6
89		5	max	807.447	1	1054.632	7	300.093	3	.468	9	.053	9	.074	1
90			min	-555.941	2	153.379	10	-284.974	4	-.202	3	-.074	1	-.916	6
91	M10	1	max	345.676	5	607.94	5	85.817	3	-.183	4	.237	6	.054	1
92			min	-158.573	2	186.804	4	-463.965	8	-.795	7	.053	1	-.37	6
93		2	max	345.676	5	607.94	5	85.817	3	-.183	4	.204	6	.038	1
94			min	-158.573	2	186.804	4	-463.965	8	-.795	7	.043	1	-.417	6
95		3	max	345.676	5	607.94	5	85.817	3	-.183	4	.172	6	.022	1
96			min	-158.573	2	186.804	4	-463.965	8	-.795	7	.021	4	-.463	6
97		4	max	345.676	5	607.94	5	85.817	3	-.183	4	.141	7	.007	1
98			min	-158.573	2	186.804	4	-463.965	8	-.795	7	-.007	4	-.51	6
99		5	max	345.676	5	607.94	5	85.817	3	-.183	4	.113	7	-.009	1
100			min	-158.573	2	186.804	4	-463.965	8	-.795	7	-.035	4	-.556	6
101	M11	1	max	76.356	1	674.421	9	9.323	3	.879	9	.232	9	.003	4
102			min	-385.55	6	-6.252	4	-726.28	9	.083	4	-.051	3	-.467	7
103		2	max	76.356	1	674.421	9	9.323	3	.879	9	.18	8	.003	4
104			min	-385.55	6	-6.252	4	-726.28	9	.083	4	-.05	3	-.474	7
105		3	max	76.356	1	674.421	9	9.323	3	.879	9	.155	8	.004	4
106			min	-385.55	6	-6.252	4	-726.28	9	.083	4	-.049	3	-.52	9
107		4	max	76.356	1	674.421	9	9.323	3	.879	9	.13	8	.004	4
108			min	-385.55	6	-6.252	4	-726.28	9	.083	4	-.049	3	-.572	9
109		5	max	76.356	1	674.421	9	9.323	3	.879	9	.105	8	.005	4
110			min	-385.55	6	-6.252	4	-726.28	9	.083	4	-.048	3	-.624	9
111	M12	1	max	305.754	1	26.308	10	229.946	3	.417	9	.15	4	.021	2
112			min	-557.261	2	-597.487	9	-290.266	9	-.075	4	-.118	3	-.536	5
113		2	max	305.754	1	26.308	10	229.946	3	.417	9	.131	4	.029	2

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
114			min	-557.261	2	-597.487	9	-290.266	9	-.075	4	-.1	3	-.522	5
115		3	max	305.754	1	26.308	10	229.946	3	.417	9	.112	4	.038	2
116			min	-557.261	2	-597.487	9	-290.266	9	-.075	4	-.082	3	-.508	5
117		4	max	305.754	1	26.308	10	229.946	3	.417	9	.093	4	.046	2
118			min	-557.261	2	-597.487	9	-290.266	9	-.075	4	-.065	3	-.493	5
119		5	max	305.754	1	26.308	10	229.946	3	.417	9	.075	4	.054	2
120			min	-557.261	2	-597.487	9	-290.266	9	-.075	4	-.053	9	-.479	5
121	M13	1	max	116.411	1	38.502	8	443.02	7	-.153	1	.065	4	.035	9
122			min	-340.504	6	17.773	3	14.431	4	-.515	6	-.256	7	-.349	8
123		2	max	116.411	1	38.502	8	443.02	7	-.153	1	.066	4	.032	9
124			min	-340.504	6	17.773	3	14.431	4	-.515	6	-.222	7	-.351	8
125		3	max	116.411	1	38.502	8	443.02	7	-.153	1	.067	4	.029	9
126			min	-340.504	6	17.773	3	14.431	4	-.515	6	-.188	7	-.354	8
127		4	max	116.411	1	38.502	8	443.02	7	-.153	1	.068	4	.027	9
128			min	-340.504	6	17.773	3	14.431	4	-.515	6	-.154	7	-.357	8
129		5	max	116.411	1	38.502	8	443.02	7	-.153	1	.069	4	.024	9
130			min	-340.504	6	17.773	3	14.431	4	-.515	6	-.125	3	-.36	8
131	M14	1	max	0	1	0	1	0	1	0	1	0	1	0	1
132			min	0	1	0	1	0	1	0	1	0	1	0	1
133		2	max	58.843	2	-20.917	4	152.942	2	.006	2	.335	2	.17	6
134			min	-57.402	1	-90.517	7	-149.375	1	-.04	9	-.326	1	-.025	9
135		3	max	401.915	2	94.894	7	166.088	6	-.002	2	.046	1	.223	6
136			min	-497.739	1	8.711	10	-67.595	1	-.215	5	-.18	6	.054	10
137		4	max	-84.784	4	127.957	6	233.119	1	.34	8	.442	2	-.06	9
138			min	-429.839	7	39.539	3	-423.816	2	-.056	9	-.407	1	-.295	7
139		5	max	0	1	0	1	0	1	0	1	0	1	0	1
140			min	0	1	0	1	0	1	0	1	0	1	0	1
141	M15	1	max	502.424	1	-.139	4	351.373	1	.368	7	.232	9	-.066	4
142			min	-865.761	2	-181.417	9	-480.803	9	.033	4	-.401	3	-.776	7
143		2	max	502.424	1	-.139	4	351.373	1	.368	7	.214	4	-.066	4
144			min	-865.761	2	-181.417	9	-480.803	9	.033	4	-.395	3	-.769	7
145		3	max	502.424	1	-.139	4	351.373	1	.368	7	.204	4	-.066	4
146			min	-865.761	2	-181.417	9	-480.803	9	.033	4	-.389	3	-.761	7
147		4	max	502.424	1	-.139	4	351.373	1	.368	7	.193	4	-.066	4
148			min	-865.761	2	-181.417	9	-480.803	9	.033	4	-.384	3	-.754	7
149		5	max	502.424	1	-.139	4	351.373	1	.368	7	.183	4	-.066	4
150			min	-865.761	2	-181.417	9	-480.803	9	.033	4	-.378	3	-.746	7
151	M16	1	max	339.823	1	.301	9	501.066	2	-.034	9	.484	9	-.065	9
152			min	-607.989	2	-90.048	8	-323.062	1	-.256	8	-.479	2	-.544	8
153		2	max	339.823	1	.301	9	501.066	2	-.034	9	.468	9	-.065	9
154			min	-607.989	2	-90.048	8	-323.062	1	-.256	8	-.453	2	-.539	8
155		3	max	339.823	1	.301	9	501.066	2	-.034	9	.451	9	-.065	9
156			min	-607.989	2	-90.048	8	-323.062	1	-.256	8	-.427	2	-.534	8
157		4	max	339.823	1	.301	9	501.066	2	-.034	9	.435	9	-.065	9
158			min	-607.989	2	-90.048	8	-323.062	1	-.256	8	-.401	2	-.529	8
159		5	max	339.823	1	.301	9	501.066	2	-.034	9	.419	9	-.065	9
160			min	-607.989	2	-90.048	8	-323.062	1	-.256	8	-.375	2	-.525	8
161	M17	1	max	351.611	1	-37.394	4	945.9	2	.033	9	.679	3	.022	9
162			min	-482.269	9	-268.468	7	-582.758	1	.004	2	-.704	9	.002	4
163		2	max	351.611	1	-39.94	4	958.389	2	.033	9	.731	3	.094	7
164			min	-482.269	9	-276.754	7	-595.247	1	.004	2	-.552	9	.013	4
165		3	max	351.611	1	-42.486	4	970.877	2	.033	9	.783	3	.176	7
166			min	-501.037	2	-285.04	7	-607.735	1	-.039	5	-.253	1	.046	2
167		4	max	323.247	1	222.035	8	432.612	1	-.004	9	.762	9	.086	8
168			min	-501.037	2	39.187	9	-700.734	2	-.039	5	-.621	3	.011	9
169		5	max	323.247	1	213.749	8	420.123	1	-.004	9	.762	9	.023	8
170			min	-501.037	2	36.641	9	-688.245	2	-.039	5	-.673	3	0	9

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
171	M18	1	max	447.904	1	88.533	8	281.069	9	.003	8	.375	2	.584	8
172			min	-767.095	2	-.133	9	-179.205	2	-.002	9	-.419	9	.074	9
173		2	max	465.895	1	118.573	8	280.18	9	.003	8	.19	2	.474	8
174			min	-785.086	2	9.096	9	-190.676	3	-.002	9	-.204	1	.069	9
175		3	max	483.887	1	148.613	8	279.29	9	.003	8	.173	9	.333	8
176			min	-803.078	2	18.326	9	-227.055	3	-.002	9	-.116	3	.055	9
177		4	max	501.878	1	178.652	8	278.4	9	.003	8	.468	9	.16	8
178			min	-821.069	2	27.556	9	-263.434	3	-.002	9	-.376	3	.029	3
179		5	max	519.869	1	208.692	8	277.51	9	.003	8	.762	9	-.004	9
180			min	-839.06	2	36.786	9	-299.814	3	-.002	9	-.673	3	-.045	5
181	M19	1	max	678.194	1	-37.063	4	240.526	4	0	4	.679	3	-.004	2
182			min	-1043.102	2	-263.907	7	-322.514	3	-.005	9	-.704	9	-.039	9
183		2	max	660.203	1	-27.833	4	204.146	4	0	4	.357	3	.233	7
184			min	-1025.111	2	-233.867	7	-286.134	3	-.005	9	-.493	9	.03	4
185		3	max	642.212	1	-18.603	4	197.56	9	0	4	.073	3	.464	7
186			min	-1007.12	2	-203.827	7	-249.755	3	-.005	9	-.284	9	.054	4
187		4	max	624.22	1	-9.373	4	196.67	9	0	4	.063	4	.664	7
188			min	-989.129	2	-186.915	9	-213.376	3	-.005	9	-.231	5	.069	4
189		5	max	606.229	1	-.143	4	195.78	9	0	4	.183	4	.832	7
190			min	-971.137	2	-177.685	9	-176.996	3	-.005	9	-.378	3	.074	4
191	M20	1	max	0	1	.006	7	.061	2	0	1	0	1	0	1
192			min	0	1	-.018	1	-.016	4	0	1	0	1	0	1
193		2	max	24.497	1	-26.591	10	42.432	3	0	1	.067	3	.124	5
194			min	-24.497	2	-78.949	5	-42.446	4	0	1	-.067	4	.042	10
195		3	max	669.764	1	-395.307	4	647.099	3	.176	2	1.06	3	2.178	6
196			min	-481.542	2	-1633.54	6	-1032.797	4	-1.036	5	-1.633	4	.673	9
197		4	max	446.056	6	692.996	8	320.516	8	.419	7	.19	3	.009	2
198			min	-102.897	1	210.975	3	-126.491	3	-.089	4	-.228	4	-.135	5
199		5	max	0	1	.028	2	.005	6	0	1	0	1	0	1
200			min	0	1	-.013	8	-.056	4	0	1	0	1	0	1
201	M21	1	max	1450.444	4	2581.635	6	913.568	1	.371	2	3.285	2	8.712	8
202			min	-891.476	3	726.694	1	-990.358	2	-.061	1	-2.987	1	2.029	3
203		2	max	1437.001	4	2547.375	6	890.285	1	.371	2	2.398	2	6.389	8
204			min	-878.033	3	713.282	1	-967.076	2	-.061	1	-2.17	1	1.355	3
205		3	max	1423.559	4	2513.115	6	867.002	1	.371	2	1.532	2	4.098	8
206			min	-864.591	3	699.869	1	-943.793	2	-.061	1	-1.374	1	.693	3
207		4	max	1410.117	4	2478.854	6	843.72	1	.371	2	.688	2	1.837	8
208			min	-851.149	3	686.457	1	-920.51	2	-.061	1	-.598	1	.043	3
209		5	max	1396.674	4	2444.594	6	820.437	1	.371	2	.204	5	.322	4
210			min	-837.707	3	673.044	1	-897.228	2	-.061	1	-.147	3	-.595	3
211	MP1B	1	max	0	1	.004	3	.019	8	0	8	0	1	0	1
212			min	0	1	-.012	8	0	3	0	3	0	1	0	1
213		2	max	171.465	8	74.185	3	-106.948	4	.113	1	.228	7	.017	2
214			min	21.821	3	-56.81	4	-494.645	7	-.081	2	.022	4	-.013	1
215		3	max	296.362	8	50.944	2	-71.518	1	.113	1	-.111	1	.038	1
216			min	74.869	3	-33.713	1	-501.293	6	-.081	2	-.518	6	-.067	6
217		4	max	-60.488	1	163.226	3	140.331	2	0	3	.075	1	.086	3
218			min	-201.104	6	-163.205	4	-140.497	1	0	8	-.075	2	-.086	4
219		5	max	0	1	.305	8	-.027	1	0	3	0	1	0	4
220			min	0	6	-.107	3	-.869	6	0	8	0	6	0	3
221	MP2B	1	max	0	1	.038	4	.35	7	0	7	0	1	0	1
222			min	0	1	-.079	7	0	4	0	4	0	1	0	1
223		2	max	648.303	8	399.497	8	-18.35	3	.047	1	.068	5	.092	5
224			min	140.377	2	25.675	3	-144.508	8	-.073	2	.017	2	.002	2
225		3	max	674.7	8	405.774	8	-10.324	1	.047	1	.002	1	.004	3
226			min	146.624	2	7.37	3	-146.891	6	-.073	2	-.149	8	-.515	8
227		4	max	-83.048	3	465.279	3	319.38	2	0	3	.164	1	.237	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
228			min	-403.332	8	-465.122	4	-319.475	1	0	8	-.164	2	-.237	4
229		5	max	0	3	1.581	8	.095	1	0	3	0	1	0	1
230			min	0	8	-.108	3	-.731	6	0	8	0	6	0	2
231	MP3B	1	max	0	1	0	3	.007	6	0	8	0	1	0	1
232			min	0	1	-.028	8	-.002	1	0	3	0	1	0	1
233		2	max	82.025	6	433.545	5	106.913	6	.037	1	-.014	9	.299	5
234			min	-33.311	1	30.489	2	12.369	9	-.081	2	-.101	8	-.013	2
235		3	max	147.693	6	434.107	8	110.847	5	.037	1	.061	5	-.009	3
236			min	-13.863	1	18.121	3	.941	2	-.081	2	-.003	2	-.356	8
237		4	max	-61.148	3	163.295	3	140.366	2	0	3	.075	1	.086	3
238			min	-201.764	8	-163.2	4	-140.403	1	0	8	-.075	2	-.086	4
239		5	max	0	3	.639	8	.068	1	0	3	0	3	0	2
240			min	0	8	-.038	3	-.185	6	0	8	0	8	0	1
241	M25	1	max	0	1	-.003	3	-.003	1	0	1	0	1	0	1
242			min	0	1	-.074	8	-.053	6	0	1	0	1	0	1
243		2	max	-3.403	1	6.84	4	6.842	2	0	1	.001	2	.001	3
244			min	-9.425	5	-6.854	3	-6.854	1	0	1	-.001	1	-.001	4
245		3	max	18.851	5	13.705	3	13.705	1	0	1	.005	2	.005	3
246			min	6.806	1	-13.691	4	-13.693	2	0	1	-.005	1	-.005	4
247		4	max	9.425	5	6.854	3	6.854	1	0	1	.001	2	.001	3
248			min	3.403	1	-6.84	4	-6.842	2	0	1	-.001	1	-.001	4
249		5	max	0	1	.074	8	.053	6	0	1	0	1	0	1
250			min	0	1	.003	3	.003	1	0	1	0	1	0	1
251	M26	1	max	1372.942	4	2409.876	6	796.649	1	.371	2	.204	5	.322	4
252			min	-813.976	3	659.418	1	-874.165	2	-.061	1	-.147	3	-.595	3
253		2	max	1372.942	4	2409.876	6	796.649	1	.371	2	.231	4	.259	4
254			min	-813.976	3	659.418	1	-874.165	2	-.061	1	-.218	2	-.766	7
255		3	max	1372.942	4	2409.876	6	796.649	1	.371	2	.305	1	.197	4
256			min	-813.976	3	659.418	1	-874.165	2	-.061	1	-.3	2	-.991	7
257		4	max	1372.942	4	2409.876	6	796.649	1	.371	2	.38	1	.135	4
258			min	-813.976	3	659.418	1	-874.165	2	-.061	1	-.382	2	-1.216	7
259		5	max	1372.942	4	2409.876	6	796.649	1	.371	2	.454	1	.073	4
260			min	-813.976	3	659.418	1	-874.165	2	-.061	1	-.464	2	-1.441	7
261	M27	1	max	353.067	8	377.67	6	338.951	5	.449	6	0	9	.049	2
262			min	-158.343	3	53.516	1	-121.991	2	.072	1	-.12	7	-.462	5
263		2	max	353.067	8	377.67	6	338.951	5	.449	6	.006	9	.037	2
264			min	-158.343	3	53.516	1	-121.991	2	.072	1	-.099	7	-.49	5
265		3	max	353.067	8	377.67	6	338.951	5	.449	6	.012	9	.025	2
266			min	-158.343	3	53.516	1	-121.991	2	.072	1	-.078	6	-.518	5
267		4	max	353.067	8	377.67	6	338.951	5	.449	6	.034	1	.013	2
268			min	-158.343	3	53.516	1	-121.991	2	.072	1	-.069	2	-.546	5
269		5	max	353.067	8	377.67	6	338.951	5	.449	6	.056	1	.001	2
270			min	-158.343	3	53.516	1	-121.991	2	.072	1	-.078	2	-.574	5
271	M28	1	max	627.368	4	1108.215	8	334.191	1	.288	2	.033	2	.087	4
272			min	-403.199	3	236.887	2	-312.304	2	-.256	1	-.046	1	-.586	7
273		2	max	627.368	4	1108.215	8	334.191	1	.288	2	.012	3	.066	4
274			min	-403.199	3	236.887	2	-312.304	2	-.256	1	-.023	4	-.671	7
275		3	max	627.368	4	1108.215	8	334.191	1	.288	2	.006	1	.045	4
276			min	-403.199	3	236.887	2	-312.304	2	-.256	1	-.015	2	-.756	7
277		4	max	627.368	4	1108.215	8	334.191	1	.288	2	.031	1	.024	4
278			min	-403.199	3	236.887	2	-312.304	2	-.256	1	-.039	2	-.841	7
279		5	max	627.368	4	1108.215	8	334.191	1	.288	2	.057	1	.004	4
280			min	-403.199	3	236.887	2	-312.304	2	-.256	1	-.063	2	-.925	7
281	M29	1	max	311.268	6	614.199	8	78.309	1	-.201	2	.2	5	.089	4
282			min	-84.093	1	183.705	3	-438.815	6	-.808	5	.029	2	-.419	7
283		2	max	311.268	6	614.199	8	78.309	1	-.201	2	.172	5	.072	4
284			min	-84.093	1	183.705	3	-438.815	6	-.808	5	.003	2	-.466	7

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
285		3	max	311.268	6	614.199	8	78.309	1	-.201	2	.144	5	.056	4
286			min	-84.093	1	183.705	3	-438.815	6	-.808	5	-.023	2	-.513	7
287		4	max	311.268	6	614.199	8	78.309	1	-.201	2	.117	5	.039	4
288			min	-84.093	1	183.705	3	-438.815	6	-.808	5	-.05	2	-.56	7
289		5	max	311.268	6	614.199	8	78.309	1	-.201	2	.11	1	.023	4
290			min	-84.093	1	183.705	3	-438.815	6	-.808	5	-.076	2	-.607	7
291	M30	1	max	57.537	2	132.664	5	-4.475	1	.449	5	.135	6	.027	2
292			min	-336.703	5	-6.638	2	-314.904	6	.07	2	-.055	1	-.421	5
293		2	max	57.537	2	132.664	5	-4.475	1	.449	5	.115	2	.028	2
294			min	-336.703	5	-6.638	2	-314.904	6	.07	2	-.055	1	-.431	5
295		3	max	57.537	2	132.664	5	-4.475	1	.449	5	.103	2	.028	2
296			min	-336.703	5	-6.638	2	-314.904	6	.07	2	-.056	1	-.441	5
297		4	max	57.537	2	132.664	5	-4.475	1	.449	5	.091	2	.029	2
298			min	-336.703	5	-6.638	2	-314.904	6	.07	2	-.056	1	-.452	5
299		5	max	57.537	2	132.664	5	-4.475	1	.449	5	.078	2	.029	2
300			min	-336.703	5	-6.638	2	-314.904	6	.07	2	-.056	1	-.462	5
301	M31	1	max	210.409	4	-57.311	2	250.319	1	.086	1	.147	2	.013	3
302			min	-451.593	7	-245.323	8	-274.244	2	-.076	2	-.134	1	-.5	8
303		2	max	210.409	4	-57.311	2	250.319	1	.086	1	.126	2	.02	3
304			min	-451.593	7	-245.323	8	-274.244	2	-.076	2	-.115	1	-.481	8
305		3	max	210.409	4	-57.311	2	250.319	1	.086	1	.105	2	.026	3
306			min	-451.593	7	-245.323	8	-274.244	2	-.076	2	-.096	1	-.462	8
307		4	max	210.409	4	-57.311	2	250.319	1	.086	1	.084	2	.032	3
308			min	-451.593	7	-245.323	8	-274.244	2	-.076	2	-.076	1	-.443	8
309		5	max	210.409	4	-57.311	2	250.319	1	.086	1	.063	2	.039	3
310			min	-451.593	7	-245.323	8	-274.244	2	-.076	2	-.057	1	-.425	8
311	M32	1	max	136.928	4	39.325	3	419.403	5	-.133	4	.068	2	.027	4
312			min	-319.836	7	11.427	4	24.288	2	-.494	7	-.218	5	-.338	7
313		2	max	136.928	4	39.325	3	419.403	5	-.133	4	.07	2	.026	4
314			min	-319.836	7	11.427	4	24.288	2	-.494	7	-.186	5	-.341	7
315		3	max	136.928	4	39.325	3	419.403	5	-.133	4	.072	2	.026	4
316			min	-319.836	7	11.427	4	24.288	2	-.494	7	-.154	5	-.343	7
317		4	max	136.928	4	39.325	3	419.403	5	-.133	4	.074	2	.025	4
318			min	-319.836	7	11.427	4	24.288	2	-.494	7	-.128	1	-.346	7
319		5	max	136.928	4	39.325	3	419.403	5	-.133	4	.076	2	.024	4
320			min	-319.836	7	11.427	4	24.288	2	-.494	7	-.11	1	-.348	7
321	M33	1	max	0	1	.002	7	.001	1	0	1	0	1	0	1
322			min	0	1	-.004	1	-.012	3	0	1	0	1	0	1
323		2	max	65.673	3	-20.998	9	208.45	3	.003	1	.476	3	.158	5
324			min	-64.512	4	-90.51	8	-205.033	4	-.021	9	-.468	4	.003	9
325		3	max	297.995	1	97.103	8	153.893	3	-.001	3	.049	4	.228	7
326			min	-399.583	2	30.224	2	-89.885	4	-.201	8	-.147	7	.054	4
327		4	max	-56.407	3	123.211	7	143.05	4	.33	7	.393	1	-.093	4
328			min	-415.303	8	32.288	4	-324.657	7	-.021	4	-.358	2	-.28	6
329		5	max	0	1	.004	2	.009	2	0	1	0	1	0	1
330			min	0	1	-.002	8	-.009	4	0	1	0	1	0	1
331	M34	1	max	363.8	4	1.653	3	459.982	4	.337	5	.378	3	-.06	3
332			min	-698.575	7	-128.409	5	-544.91	3	.03	3	-.515	4	-.711	5
333		2	max	363.8	4	1.653	3	459.982	4	.337	5	.349	3	-.06	3
334			min	-698.575	7	-128.409	5	-544.91	3	.03	3	-.491	4	-.704	5
335		3	max	363.8	4	1.653	3	459.982	4	.337	5	.321	3	-.06	3
336			min	-698.575	7	-128.409	5	-544.91	3	.03	3	-.467	4	-.698	5
337		4	max	363.8	4	1.653	3	459.982	4	.337	5	.292	3	-.06	3
338			min	-698.575	7	-128.409	5	-544.91	3	.03	3	-.443	4	-.691	5
339		5	max	363.8	4	1.653	3	459.982	4	.337	5	.264	3	-.061	3
340			min	-698.575	7	-128.409	5	-544.91	3	.03	3	-.419	4	-.684	5
341	M35	1	max	262.119	4	-7.769	1	483.075	1	-.043	1	.514	2	-.09	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
342			min	-497.895	3	-82.536	7	-321.722	2	-.243	7	-.583	1	-.515	7
343		2	max	262.119	4	-7.769	1	483.075	1	-.043	1	.497	2	-.09	1
344			min	-497.895	3	-82.536	7	-321.722	2	-.243	7	-.558	1	-.51	7
345		3	max	262.119	4	-7.769	1	483.075	1	-.043	1	.48	2	-.09	1
346			min	-497.895	3	-82.536	7	-321.722	2	-.243	7	-.533	1	-.506	7
347		4	max	262.119	4	-7.769	1	483.075	1	-.043	1	.464	2	-.089	1
348			min	-497.895	3	-82.536	7	-321.722	2	-.243	7	-.508	1	-.502	7
349		5	max	262.119	4	-7.769	1	483.075	1	-.043	1	.447	2	-.089	1
350			min	-497.895	3	-82.536	7	-321.722	2	-.243	7	-.483	1	-.497	7
351	M36	1	max	465.278	4	-35.988	3	700.327	7	.028	8	.742	1	.015	8
352			min	-551.604	3	-252.403	5	-373.781	4	.003	3	-.608	2	.001	3
353		2	max	470.686	4	-38.534	3	708.646	3	.028	8	.894	1	.09	5
354			min	-557.011	3	-260.689	5	-383.148	4	.003	3	-.664	2	.012	3
355		3	max	476.094	4	60.837	9	718.013	3	-.008	1	1.046	1	.167	5
356			min	-581.549	1	-268.975	5	-196.572	2	-.037	6	-.721	2	.045	10
357		4	max	413.967	2	214.507	7	402	4	-.008	1	.668	2	.083	7
358			min	-576.142	1	46.765	4	-637.702	3	-.037	6	-.736	1	.018	1
359		5	max	408.559	2	206.221	7	392.633	4	-.008	1	.712	2	.022	6
360			min	-570.734	1	44.219	4	-628.335	3	-.037	6	-.847	1	.005	1
361	M37	1	max	281.565	4	80.755	7	246.03	2	.003	6	.483	1	.553	7
362			min	-564.824	3	7.179	1	-286.637	1	0	1	-.447	2	.099	1
363		2	max	302.46	4	110.794	7	259.958	2	.003	6	.172	1	.452	7
364			min	-585.719	3	16.409	1	-300.565	1	0	1	-.179	2	.085	4
365		3	max	323.356	4	140.834	7	273.886	2	.003	6	.15	3	.319	7
366			min	-606.615	3	25.638	1	-314.493	1	0	1	-.2	4	.062	4
367		4	max	344.251	4	170.874	7	287.813	2	.003	6	.4	2	.154	7
368			min	-627.511	3	34.868	1	-328.421	1	0	1	-.493	1	.029	4
369		5	max	365.147	4	200.914	7	301.741	2	.003	6	.712	2	-.01	1
370			min	-648.406	3	44.098	1	-342.349	1	0	1	-.847	1	-.043	6
371	M38	1	max	541.399	4	-35.278	3	259.497	2	0	2	.742	1	-.004	3
372			min	-871.318	3	-247.733	5	-327.573	1	-.001	5	-.608	2	-.032	8
373		2	max	538.494	4	-26.049	3	214.407	2	0	2	.42	1	.215	5
374			min	-868.414	3	-217.693	5	-282.483	1	-.001	5	-.358	2	.029	3
375		3	max	535.59	4	-16.819	3	182.959	3	0	2	.145	1	.429	5
376			min	-865.51	3	-187.653	5	-251.862	4	-.001	5	-.155	2	.052	3
377		4	max	532.686	4	-7.589	3	182.772	3	0	2	.071	3	.612	5
378			min	-862.605	3	-157.613	5	-251.674	4	-.001	5	-.187	8	.064	3
379		5	max	529.781	4	1.641	3	182.585	3	0	2	.264	3	.763	5
380			min	-859.701	3	-127.573	5	-251.487	4	-.001	5	-.419	4	.068	3
381	M39	1	max	0	1	.004	7	.071	3	0	1	0	1	0	1
382			min	0	1	-.018	2	-.007	6	0	1	0	1	0	1
383		2	max	24.497	4	-26.59	9	42.485	4	0	1	.067	4	.124	6
384			min	-24.497	3	-78.948	6	-42.36	3	0	1	-.067	3	.042	9
385		3	max	647.119	2	-402.818	2	537.62	4	.294	1	1.048	4	2.161	5
386			min	-481.21	1	-1652.196	7	-922.001	3	-1.053	8	-1.637	3	.677	9
387		4	max	473.987	5	674.819	6	383.543	3	.414	5	.31	4	.02	1
388			min	-95.751	2	207.802	1	-213.448	4	-.07	2	-.364	3	-.093	6
389		5	max	0	1	.03	1	.025	3	0	1	0	1	0	1
390			min	0	1	-.015	4	-.042	2	0	1	0	1	0	1
391	M40	1	max	1426.595	3	2584.099	7	885.974	2	.418	1	3.287	1	8.732	7
392			min	-869.38	4	728.44	2	-998.706	1	-.053	2	-2.899	2	1.96	4
393		2	max	1413.153	3	2549.838	7	862.691	2	.418	1	2.392	1	6.406	7
394			min	-855.938	4	715.028	2	-975.423	1	-.053	2	-2.107	2	1.298	4
395		3	max	1399.711	3	2515.578	7	839.408	2	.418	1	1.519	1	4.111	7
396			min	-842.496	4	701.615	2	-952.14	1	-.053	2	-1.336	2	.649	4
397		4	max	1386.269	3	2481.317	7	816.126	2	.418	1	.666	1	1.846	7
398			min	-829.054	4	688.203	2	-928.858	1	-.053	2	-.585	2	.012	4

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
399		5	max	1372.826	3	2447.057	7	792.843	2	.418	1	.144	2	.341	3
400			min	-815.611	4	674.791	2	-905.575	1	-.053	2	-.165	1	-.613	4
401	MP1C	1	max	0	1	.024	6	.003	2	0	1	0	1	0	1
402			min	0	1	0	1	-.006	5	0	6	0	1	0	1
403		2	max	153.07	6	-66.241	2	237.795	6	.093	8	-.028	2	-.007	2
404			min	18.27	1	-466.898	5	53.798	1	-.038	3	-.123	5	-.21	5
405		3	max	277.966	6	-66.241	2	235.291	5	.093	8	.228	6	.49	5
406			min	71.318	1	-466.898	5	61	2	-.038	3	.069	1	.092	2
407		4	max	-60.488	4	163.173	3	140.417	2	0	7	.075	1	.086	3
408			min	-201.104	7	-163.332	4	-140.344	1	0	4	-.075	2	-.086	4
409		5	max	0	4	.001	4	.318	5	0	7	0	4	0	1
410			min	0	7	-.919	7	-.053	2	0	4	0	7	0	2
411	MP2C	1	max	0	1	.368	5	0	4	0	2	0	1	0	1
412			min	0	1	-.011	2	-.183	7	0	5	0	1	0	1
413		2	max	652.756	6	-28.563	4	-31.17	1	.065	4	.038	8	-.017	3
414			min	121.266	3	-330.949	7	-252.166	6	-.089	3	-.016	3	-.104	8
415		3	max	679.153	6	-10.258	4	-12.865	1	.065	4	-.031	1	.399	7
416			min	127.514	3	-337.227	7	-258.443	6	-.089	3	-.347	6	-.014	4
417		4	max	-83.048	4	465.106	3	319.4	2	0	7	.164	1	.237	3
418			min	-403.332	7	-465.272	4	-319.477	1	0	4	-.164	2	-.237	4
419		5	max	0	4	.115	4	.093	1	0	7	0	1	0	2
420			min	0	7	-1.466	7	-.941	6	0	4	0	6	0	1
421	MP3C	1	max	0	1	.02	7	.019	6	0	4	0	1	0	1
422			min	0	1	0	4	0	1	0	7	0	1	0	1
423		2	max	98.813	7	16.635	1	-38.235	1	.045	2	.293	8	.017	3
424			min	-34.687	4	-141.891	6	-403.49	8	-.084	1	.008	3	-.067	8
425		3	max	164.481	7	16.635	1	-11.483	1	.045	2	-.023	1	.147	6
426			min	-15.24	4	-141.891	6	-411.692	6	-.084	1	-.319	6	-.009	1
427		4	max	-61.148	1	163.178	3	140.381	2	0	7	.075	1	.086	3
428			min	-201.764	6	-163.262	4	-140.436	1	0	4	-.075	2	-.086	4
429		5	max	0	1	.071	4	.034	1	0	7	0	1	0	4
430			min	0	6	-.506	7	-.427	6	0	4	0	6	0	3
431	M44	1	max	0	1	.084	7	0	1	0	1	0	1	0	1
432			min	0	1	.005	4	-.035	6	0	1	0	1	0	1
433		2	max	-3.403	1	6.856	4	6.845	2	0	1	.001	2	.001	3
434			min	-9.425	5	-6.838	3	-6.85	1	0	1	-.001	1	-.001	4
435		3	max	18.851	5	13.689	3	13.701	1	0	1	.005	2	.005	3
436			min	6.806	1	-13.707	4	-13.696	2	0	1	-.005	1	-.005	4
437		4	max	9.425	5	6.838	3	6.85	1	0	1	.001	2	.001	3
438			min	3.403	1	-6.856	4	-6.845	2	0	1	-.001	1	-.001	4
439		5	max	0	1	-.005	4	.035	6	0	1	0	1	0	1
440			min	0	1	-.084	7	0	1	0	1	0	1	0	1
441	M45	1	max	1349.093	3	2412.687	7	769.724	2	.418	1	.144	2	.341	3
442			min	-791.876	4	661.839	2	-881.737	1	-.053	2	-.165	1	-.613	4
443		2	max	1349.093	3	2412.687	7	769.724	2	.418	1	.216	2	.278	3
444			min	-791.876	4	661.839	2	-881.737	1	-.053	2	-.248	1	-.766	8
445		3	max	1349.093	3	2412.687	7	769.724	2	.418	1	.288	2	.214	3
446			min	-791.876	4	661.839	2	-881.737	1	-.053	2	-.33	1	-.991	8
447		4	max	1349.093	3	2412.687	7	769.724	2	.418	1	.36	2	.15	3
448			min	-791.876	4	661.839	2	-881.737	1	-.053	2	-.413	1	-1.217	8
449		5	max	1349.093	3	2412.687	7	769.724	2	.418	1	.432	2	.086	3
450			min	-791.876	4	661.839	2	-881.737	1	-.053	2	-.496	1	-1.442	8
451	M46	1	max	344.209	6	394.626	7	311.578	6	.472	5	-.018	4	.05	3
452			min	-87.964	1	52.23	4	-119.108	1	.058	2	-.16	7	-.467	8
453		2	max	344.209	6	394.626	7	311.578	6	.472	5	0	4	.037	3
454			min	-87.964	1	52.23	4	-119.108	1	.058	2	-.141	7	-.496	8
455		3	max	344.209	6	394.626	7	311.578	6	.472	5	.016	4	.024	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
456			min	-87.964	1	52.23	4	-119.108	1	.058	2	-.122	7	-.525	8
457		4	max	344.209	6	394.626	7	311.578	6	.472	5	.033	4	.012	3
458			min	-87.964	1	52.23	4	-119.108	1	.058	2	-.103	7	-.554	8
459		5	max	344.209	6	394.626	7	311.578	6	.472	5	.05	4	0	3
460			min	-87.964	1	52.23	4	-119.108	1	.058	2	-.096	3	-.583	8
461	M47	1	max	608.758	3	1112.245	6	328.532	2	.324	1	.053	1	.105	3
462			min	-385.828	4	219.264	3	-312.568	1	-.218	2	-.101	2	-.586	8
463		2	max	608.758	3	1112.245	6	328.532	2	.324	1	.048	4	.088	3
464			min	-385.828	4	219.264	3	-312.568	1	-.218	2	-.093	3	-.672	8
465		3	max	608.758	3	1112.245	6	328.532	2	.324	1	.069	4	.071	3
466			min	-385.828	4	219.264	3	-312.568	1	-.218	2	-.114	3	-.758	8
467		4	max	608.758	3	1112.245	6	328.532	2	.324	1	.09	4	.054	3
468			min	-385.828	4	219.264	3	-312.568	1	-.218	2	-.134	3	-.843	8
469		5	max	608.758	3	1112.245	6	328.532	2	.324	1	.112	4	.038	3
470			min	-385.828	4	219.264	3	-312.568	1	-.218	2	-.155	3	-.929	8
471	M48	1	max	340.818	3	595.631	6	71.812	2	-.184	1	.176	8	.07	2
472			min	-171.023	4	180.029	1	-467.032	5	-.751	6	.008	3	-.414	5
473		2	max	340.818	3	595.631	6	71.812	2	-.184	1	.145	8	.054	2
474			min	-171.023	4	180.029	1	-467.032	5	-.751	6	-.014	3	-.459	5
475		3	max	340.818	3	595.631	6	71.812	2	-.184	1	.115	8	.038	2
476			min	-171.023	4	180.029	1	-467.032	5	-.751	6	-.037	3	-.505	5
477		4	max	340.818	3	595.631	6	71.812	2	-.184	1	.093	4	.022	2
478			min	-171.023	4	180.029	1	-467.032	5	-.751	6	-.059	3	-.55	5
479		5	max	340.818	3	595.631	6	71.812	2	-.184	1	.094	4	.007	2
480			min	-171.023	4	180.029	1	-467.032	5	-.751	6	-.082	3	-.596	5
481	M49	1	max	100.219	3	116.901	8	12.054	2	.438	8	.173	5	.007	3
482			min	-347.172	8	-15.872	3	-291.733	5	.062	3	-.04	2	-.421	8
483		2	max	100.219	3	116.901	8	12.054	2	.438	8	.15	5	.009	3
484			min	-347.172	8	-15.872	3	-291.733	5	.062	3	-.039	2	-.43	8
485		3	max	100.219	3	116.901	8	12.054	2	.438	8	.128	5	.01	3
486			min	-347.172	8	-15.872	3	-291.733	5	.062	3	-.039	2	-.439	8
487		4	max	100.219	3	116.901	8	12.054	2	.438	8	.105	5	.011	3
488			min	-347.172	8	-15.872	3	-291.733	5	.062	3	-.038	2	-.448	8
489		5	max	100.219	3	116.901	8	12.054	2	.438	8	.083	5	.012	3
490			min	-347.172	8	-15.872	3	-291.733	5	.062	3	-.037	2	-.457	8
491	M50	1	max	229.022	3	-38.256	3	257.406	2	.063	4	.127	1	-.024	4
492			min	-452.183	8	-249.806	6	-271.884	1	-.091	3	-.08	2	-.489	7
493		2	max	229.022	3	-38.256	3	257.406	2	.063	4	.11	3	-.014	4
494			min	-452.183	8	-249.806	6	-271.884	1	-.091	3	-.063	4	-.47	7
495		3	max	229.022	3	-38.256	3	257.406	2	.063	4	.093	3	-.003	4
496			min	-452.183	8	-249.806	6	-271.884	1	-.091	3	-.047	4	-.452	7
497		4	max	229.022	3	-38.256	3	257.406	2	.063	4	.079	7	.007	4
498			min	-452.183	8	-249.806	6	-271.884	1	-.091	3	-.032	4	-.433	7
499		5	max	229.022	3	-38.256	3	257.406	2	.063	4	.073	7	.018	4
500			min	-452.183	8	-249.806	6	-271.884	1	-.091	3	-.016	4	-.414	7
501	M51	1	max	64.977	2	51.443	5	445.757	6	-.146	2	.047	1	.024	2
502			min	-304.489	5	18.479	2	36.197	1	-.524	5	-.184	6	-.329	5
503		2	max	64.977	2	51.443	5	445.757	6	-.146	2	.05	1	.023	2
504			min	-304.489	5	18.479	2	36.197	1	-.524	5	-.149	6	-.333	5
505		3	max	64.977	2	51.443	5	445.757	6	-.146	2	.053	1	.021	2
506			min	-304.489	5	18.479	2	36.197	1	-.524	5	-.115	6	-.336	5
507		4	max	64.977	2	51.443	5	445.757	6	-.146	2	.056	1	.02	2
508			min	-304.489	5	18.479	2	36.197	1	-.524	5	-.089	2	-.34	5
509		5	max	64.977	2	51.443	5	445.757	6	-.146	2	.058	1	.019	2
510			min	-304.489	5	18.479	2	36.197	1	-.524	5	-.07	2	-.344	5
511	M52	1	max	0	1	.002	7	.008	3	0	1	0	1	0	1
512			min	0	1	-.003	2	-.011	2	0	1	0	1	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
513		2	max	69.058	1	-20.863	1	206.918	1	.006	4	.488	1	.162	8
514			min	-70.318	2	-90.565	6	-208.312	2	-.008	7	-.491	2	.034	3
515		3	max	431.369	4	115.486	6	155.575	5	-.021	4	.015	2	.258	5
516			min	-534.107	3	31.408	1	-46.561	2	-.199	7	-.165	5	.074	2
517		4	max	-65.626	1	140.601	5	233.369	3	.326	5	.503	4	-.094	9
518			min	-440.647	6	39.828	2	-405.426	4	-.018	2	-.443	3	-.304	7
519		5	max	0	1	.004	1	.011	4	0	1	0	1	0	1
520			min	0	1	-.002	8	-.003	1	0	1	0	1	0	1
521	M53	1	max	401.124	3	6.577	1	355.18	2	.335	6	.412	1	-.041	1
522			min	-716.147	4	-126.781	6	-419.282	1	.021	1	-.579	2	-.707	6
523		2	max	401.124	3	6.577	1	355.18	2	.335	6	.39	1	-.041	1
524			min	-716.147	4	-126.781	6	-419.282	1	.021	1	-.561	2	-.701	6
525		3	max	401.124	3	6.577	1	355.18	2	.335	6	.369	1	-.041	1
526			min	-716.147	4	-126.781	6	-419.282	1	.021	1	-.542	2	-.694	6
527		4	max	401.124	3	6.577	1	355.18	2	.335	6	.347	1	-.042	1
528			min	-716.147	4	-126.781	6	-419.282	1	.021	1	-.524	2	-.688	6
529		5	max	401.124	3	6.577	1	355.18	2	.335	6	.325	1	-.042	1
530			min	-716.147	4	-126.781	6	-419.282	1	.021	1	-.505	2	-.681	6
531	M54	1	max	270.543	3	-2.763	2	608.456	4	-.034	2	.57	3	-.07	2
532			min	-514.506	4	-83.124	5	-432.436	3	-.242	5	-.655	4	-.515	5
533		2	max	270.543	3	-2.763	2	608.456	4	-.034	2	.547	3	-.07	2
534			min	-514.506	4	-83.124	5	-432.436	3	-.242	5	-.623	4	-.511	5
535		3	max	270.543	3	-2.763	2	608.456	4	-.034	2	.525	3	-.07	2
536			min	-514.506	4	-83.124	5	-432.436	3	-.242	5	-.591	4	-.506	5
537		4	max	270.543	3	-2.763	2	608.456	4	-.034	2	.502	3	-.069	2
538			min	-514.506	4	-83.124	5	-432.436	3	-.242	5	-.559	4	-.502	5
539		5	max	270.543	3	-2.763	2	608.456	4	-.034	2	.48	3	-.069	2
540			min	-514.506	4	-83.124	5	-432.436	3	-.242	5	-.528	4	-.498	5
541	M55	1	max	442.013	2	-30.928	1	846.574	4	.026	6	.793	2	.014	6
542			min	-506.889	1	-250.03	6	-531.661	3	.003	1	-.629	1	.001	1
543		2	max	447.421	2	-33.474	1	855.941	4	.026	6	.871	4	.089	6
544			min	-512.297	1	-258.316	6	-541.028	3	.003	1	-.62	3	.01	1
545		3	max	452.829	2	58.247	9	865.307	4	-.009	4	1.123	4	.165	6
546			min	-626.007	4	-266.602	6	-550.395	3	-.039	7	-.779	3	.044	9
547		4	max	443.318	3	214.992	5	289.883	3	-.009	4	.623	1	.084	5
548			min	-620.599	4	42.131	2	-534.12	4	-.039	7	-.712	2	.018	2
549		5	max	437.91	3	206.706	5	280.517	3	-.009	4	.656	3	.023	7
550			min	-615.191	4	39.585	2	-524.753	4	-.039	7	-.813	4	.005	4
551	M56	1	max	434.057	3	81.303	5	268.125	3	.003	5	.528	4	.554	5
552			min	-731.326	4	2.659	2	-316.569	4	0	2	-.48	3	.077	2
553		2	max	436.962	3	111.342	5	268.313	3	.003	5	.193	4	.452	5
554			min	-734.23	4	11.888	2	-316.756	4	0	2	-.196	3	.069	2
555		3	max	439.866	3	141.382	5	268.5	3	.003	5	.129	1	.318	5
556			min	-737.135	4	21.118	2	-316.943	4	0	2	-.185	2	.052	2
557		4	max	442.77	3	171.422	5	268.687	3	.003	5	.372	3	.153	5
558			min	-740.039	4	30.348	2	-317.13	4	0	2	-.478	4	.025	2
559		5	max	445.675	3	201.462	5	268.874	3	.003	5	.656	3	-.01	4
560			min	-742.943	4	39.578	2	-317.317	4	0	2	-.813	4	-.045	7
561	M57	1	max	508.024	3	-30.419	1	253.268	1	0	1	.793	2	-.003	1
562			min	-818.731	4	-246.646	6	-334.738	2	-.001	6	-.629	1	-.03	6
563		2	max	487.129	3	-21.189	1	239.34	1	0	1	.446	2	.215	6
564			min	-797.836	4	-216.607	6	-320.81	2	-.001	6	-.368	1	.024	1
565		3	max	466.233	3	-11.96	1	225.412	1	0	1	.155	4	.428	6
566			min	-776.94	4	-186.567	6	-306.882	2	-.001	6	-.164	3	.041	1
567		4	max	445.338	3	-2.73	1	211.484	1	0	1	.109	1	.609	6
568			min	-756.044	4	-156.527	6	-292.954	2	-.001	6	-.211	6	.049	1
569		5	max	424.442	3	6.5	1	197.556	1	0	1	.325	1	.759	6

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
570			min	-735.149	4	-126.487	6	-279.026	2	-.001	6	-.505	2	.047	1
571	M58	1	max	169.989	4	35.06	5	18.235	3	.013	2	0	1	0	1
572			min	-167.448	3	8.298	9	-18.235	4	-.079	9	0	1	0	1
573		2	max	164.725	4	17.53	5	9.117	3	.013	2	.014	3	-.006	9
574			min	-162.184	3	4.149	9	-9.117	4	-.079	9	-.014	4	-.026	5
575		3	max	159.461	4	0	1	0	1	.013	2	.018	3	-.008	9
576			min	-156.92	3	0	1	0	1	-.079	9	-.018	4	-.035	5
577		4	max	154.198	4	-4.149	1	9.117	4	.013	2	.014	3	-.006	9
578			min	-151.657	3	-17.53	5	-9.117	3	-.079	9	-.014	4	-.026	5
579		5	max	148.934	4	-8.298	1	18.235	4	.013	2	0	1	0	1
580			min	-146.393	3	-35.06	5	-18.235	3	-.079	9	0	1	0	1
581	M59	1	max	213.472	1	35.06	5	24.313	1	.012	4	0	1	0	1
582			min	-215.823	2	8.298	3	-24.313	2	-.015	7	0	1	0	1
583		2	max	213.472	1	17.53	5	12.156	1	.012	4	.018	1	-.006	3
584			min	-215.823	2	4.149	3	-12.156	2	-.015	7	-.018	2	-.026	5
585		3	max	213.472	1	0	1	0	1	.012	4	.024	1	-.008	3
586			min	-215.823	2	0	1	0	1	-.015	7	-.024	2	-.035	5
587		4	max	213.472	1	-4.149	9	12.156	2	.012	4	.018	1	-.006	3
588			min	-215.823	2	-17.53	5	-12.156	1	-.015	7	-.018	2	-.026	5
589		5	max	213.472	1	-8.298	9	24.313	2	.012	4	0	1	0	1
590			min	-215.823	2	-35.06	5	-24.313	1	-.015	7	0	1	0	1
591	M60	1	max	175.406	3	35.06	5	18.235	4	.007	1	0	1	0	1
592			min	-172.402	4	8.298	9	-18.235	3	-.043	9	0	1	0	1
593		2	max	180.67	3	17.53	5	9.117	4	.007	1	.014	4	-.006	9
594			min	-177.666	4	4.149	9	-9.117	3	-.043	9	-.014	3	-.026	6
595		3	max	185.934	3	0	1	0	1	.007	1	.018	4	-.008	9
596			min	-182.93	4	0	1	0	1	-.043	9	-.018	3	-.035	5
597		4	max	191.198	3	-4.149	10	9.117	3	.007	1	.014	4	-.006	9
598			min	-188.194	4	-17.53	5	-9.117	4	-.043	9	-.014	3	-.026	5
599		5	max	196.462	3	-8.298	10	18.235	3	.007	1	0	1	0	1
600			min	-193.458	4	-35.06	5	-18.235	4	-.043	9	0	1	0	1

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc [...	phi*Pnt [lb]	phi*Mn y...	phi*Mn z...	Cb	Eqn
1	M1	PIPE_3.0	.461	6.292	5	.295	6.292		6	27936.207	65205	5.749	5.749	1....	H1-1b
2	M2	HSS4x4x4	.592	0	8	.140	0	y	9	132052....	139518	16.181	16.181	1....	H1-1b
3	MP1A	PIPE_2.0	.540	3.813	8	.100	.75		7	20866.733	32130	1.872	1.872	2....	H1-1b
4	MP2A	PIPE_2.0	.568	3.813	5	.098	.75		1	20866.733	32130	1.872	1.872	2....	H1-1b
5	MP3A	PIPE_2.0	.788	3.813	9	.125	3.813		9	20866.733	32130	1.872	1.872	2....	H1-1b
6	M6	PIPE_3.5	.001	.667	2	.001	.667		2	78181.359	78750	7.954	7.954	1	H1-1b
7	M14	PIPE_2.0	.593	3.408	9	.360	3.801		9	6212.315	32130	1.872	1.872	3....	H3-6
8	M20	PIPE_3.0	.454	6.292	8	.292	6.292		5	27936.207	65205	5.749	5.749	1....	H1-1b
9	M21	HSS4x4x4	.595	0	6	.088	0	y	6	132052....	139518	16.181	16.181	1....	H1-1b
10	MP1B	PIPE_2.0	.510	3.813	6	.103	.75		5	20866.733	32130	1.872	1.872	2....	H1-1b
11	MP2B	PIPE_2.0	.491	3.813	8	.076	.75		2	20866.733	32130	1.872	1.872	2....	H1-1b
12	MP3B	PIPE_2.0	.390	3.813	8	.091	.75		6	20866.733	32130	1.872	1.872	2....	H1-1b
13	M25	PIPE_3.5	.001	.667	3	.001	.667		3	78181.359	78750	7.954	7.954	1....	H1-1b
14	M33	PIPE_2.0	.342	3.801	3	.299	3.801		5	6212.315	32130	1.872	1.872	1....	H1-1b
15	M39	PIPE_3.0	.440	6.292	7	.295	6.292		8	27936.207	65205	5.749	5.749	1....	H1-1b
16	M40	HSS4x4x4	.601	0	5	.096	0	y	5	132052....	139518	16.181	16.181	1....	H1-1b
17	MP1C	PIPE_2.0	.525	3.813	5	.111	.75		8	20866.733	32130	1.872	1.872	2....	H1-1b
18	MP2C	PIPE_2.0	.481	3.813	7	.101	.75		3	20866.733	32130	1.872	1.872	2....	H1-1b
19	MP3C	PIPE_2.0	.381	3.813	6	.086	.75		5	20866.733	32130	1.872	1.872	2....	H1-1b
20	M44	PIPE_3.5	.001	.667	4	.001	.667		4	78181.359	78750	7.954	7.954	1....	H1-1b
21	M52	PIPE_2.0	.416	8.782	4	.299	3.801		8	6212.315	32130	1.872	1.872	1....	H1-1b

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc [...	phi*Pnt [lb]	phi*Mn y...	phi*Mn z...	Cb	Eqn
22	M58	PIPE_2.0	.019	1.992	8	.047	3.985		9	27171.207	33048	1.925	1.925	1....	H1-1b
23	M59	PIPE_2.0	.019	1.992	5	.012	3.985		7	27171.207	33048	1.925	1.925	1....	H1-1b
24	M60	PIPE_2.0	.019	1.992	7	.026	0		9	27171.207	33048	1.925	1.925	1....	H1-1b

Envelope AISI S100-10: LRFD Cold Formed Steel Code Checks

	Member	Shape	Code ...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pn[lb]	phi*Tn[lb]	phi*Mny...	phi*Mnz...	Cb	Cmyy	Cmzz	Eqn
1	M17	5.5CU3....	.315	.583	9	.195	.583	z	6	57854.9..	63487.7..	2.8	9.042	1.483	.85	.85	C3.3.2-1
2	M18	5.5CU3....	.275	4.23	9	.029	4.23	y	8	49212.9..	63487.7..	2.8	9.042	1.317	.85	.85	C5.2.2-3
3	M19	5.5CU3....	.266	0	9	.038	0	y	9	49212.9..	63487.7..	2.8	9.273	1.675	.85	.85	C5.1.2-1
4	M36	5.5CU3....	.380	.571	1	.185	.583	z	7	57854.9..	63487.7..	2.8	9.042	1.388	.85	.85	C5.2.2-3
5	M37	5.5CU3....	.313	4.23	1	.028	4.23	y	7	49212.9..	63487.7..	2.8	9.273	1.439	.85	.85	C5.1.2-1
6	M38	5.5CU3....	.266	0	1	.025	0	y	5	49212.9..	63487.7..	2.8	9.042	1.584	.85	.85	C3.3.2-1
7	M55	5.5CU3....	.409	.583	4	.188	.583	z	8	57854.9..	63487.7..	2.8	9.042	1.325	.85	.85	C3.3.2-1
8	M56	5.5CU3....	.303	4.23	4	.029	4.23	y	5	49212.9..	63487.7..	2.8	9.273	1.496	.85	.85	C5.1.2-1
9	M57	5.5CU3....	.291	0	2	.024	0	y	6	49212.9..	63487.7..	2.8	9.042	1.598	.85	.85	C5.2.2-3

Envelope AA ADM1-10: ASD - Building Aluminum Code Checks

Member	Shape	Code C...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	Pnc/O...	Pnt/Om...	Mny/O...	Mnz/O...	Vny/O...	Vnz/O...	Cb	Eqn
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: CTNH402A

Litchfield SSUSA
350 Burr Mountain Road
Torrington, CT 06790

June 16, 2019

Transcom Engineering Project Number: 737001-0141

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**7.37 %**

June 16, 2019

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

Emissions Analysis for Site: **CTNH402A – Litchfield SSUSA**

Transcom Engineering, Inc ("Transcom") was directed to analyze the proposed upgrades to the T-MOBILE facility located at **350 Burr Mountain Road, Torrington, 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 **350 Burr Mountain Road, Torrington, 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)
GSM	1900 MHz (PCS)	1	15
UMTS	1900 MHz (PCS)	1	40
UMTS	2100 MHz (AWS)	1	40
LTE	2100 MHz (AWS)	2	60
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 B2A/B4P	155
A	2	Ericsson AIR21 B4A/B2P	155
A	3	RFS APXVAARR24_43-U-NA20	155
B	1	Ericsson AIR21 B2A/B4P	155
B	2	Ericsson AIR21 B4A/B2P	155
B	3	RFS APXVAARR24_43-U-NA20	155
C	1	Ericsson AIR21 B2A/B4P	155
C	2	Ericsson AIR21 B4A/B2P	155
C	3	RFS APXVAARR24_43-U-NA20	155

Table 2: Antenna Data

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

Cable losses were factored in the calculations for this site. Since all **2100 MHz (AWS) UMTS** radios are ground mounted the following cable loss values were used. For each ground mounted **2100 MHz (AWS) UMTS** radio there was **1.27 dB** of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for **120 feet** of **1-5/8"** coax.

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 B2A/B4P	1900 MHz (PCS) / 2100 MHz (AWS)	15.9 / 15.9	3	95	3,301.36	0.53
Antenna A2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	0.76
Antenna A3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	0.94
						Sector A Composite MPE%	**2.23**
Antenna B1	Ericsson AIR21 B2A/B4P	1900 MHz (PCS) / 2100 MHz (AWS)	15.9 / 15.9	3	95	3,301.36	0.53
Antenna B2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	0.76
Antenna B3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	0.94
						Sector B Composite MPE%	**2.23**
Antenna C1	Ericsson AIR21 B2A/B4P	1900 MHz (PCS) / 2100 MHz (AWS)	15.9 / 15.9	3	95	3,301.36	0.53
Antenna C2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	0.76
Antenna C3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	0.94
						Sector C Composite MPE%	**2.23**

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	**2.23 %**
Sprint	0.18 %
MetroPCS	0.37 %
Verizon Wireless	1.10 %
AT&T	3.18 %
Nextel	0.31 %
Site Total MPE %:	**7.37 %**

Table 4: All Carrier MPE Contributions

T-MOBILE Sector A Total:	2.23 %
T-MOBILE Sector B Total:	2.23 %
T-MOBILE Sector C Total:	2.23 %
Site Total:	7.37 %

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 1900 MHz (PCS) GSM	1	583.57	155	0.94	1900 MHz (PCS)	1000	0.09%
T-Mobile 1900 MHz (PCS) UMTS	1	1,556.18	155	2.52	1900 MHz (PCS)	1000	0.25%
T-Mobile 2100 MHz (AWS) UMTS	1	1,161.61	155	1.88	2100 MHz (AWS)	1000	0.19%
T-Mobile 2100 MHz (AWS) LTE	2	2,334.27	155	7.56	2100 MHz (AWS)	1000	0.76%
T-Mobile 600 MHz LTE / 5G NR	2	788.97	155	2.56	600 MHz	400	0.64%
T-Mobile 700 MHz LTE	2	432.54	155	1.40	700 MHz	467	0.30%
						Total:	**2.23%**

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:	2.23 %
Sector B:	2.23 %
Sector C:	2.23 %
T-MOBILE Maximum Total (per sector):	2.23 %
Site Total:	7.37 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **7.37 %** 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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