City of Napoleon, Ohio

Zoning Department

255 West Riverview Avenue, P.O. Box 151
Napoleon, OH 43545
Kevin Schultheis Code Enforcement / Zoning Administrator
Telephone: (419) 592-4010 Fax: (419) 599-8393
www.napoleonohio.com

COMMERCIAL ZONING PERMIT

Issued Date:	May 30, 2023
Expiration Date:	May 30, 2024
Permit Number:	P-23-075
Job Location:	1815 Scott Street
Owner:	Maka Napoleon, LLC 478 Marshall Street Coldwater, MI 49036
Lessee:	American Tower Corporation C/O SMJ Int'l 49030 Pontiac Trail Suite 100 Wixom, MI 48393-2586
Contractor: Phone:	TBD 602-881-5824 (American Tower Corporation)
Zone:	C-4 Planned Commercial — Set Backs: Accessory Building Front: 60' Rear: 10' Side: 10'
Comments:	Remove nine (9) antennas and associated equipment. Add nine (9) antennas and associated equipment.
Permit Type:	Zoning

Fee: $50.00

Status: Paid

Amount Due: $0.00

Kevin Schultheis
Code Enforcement/Zoning Administrator

P-23-075
C-4

City of Napoleon, Ohio

Zoning Department

255 West Riverview Avenue, P.O. Box 151
Napoleon, OH 43545
Kevin Schultheis Code Enforcement / Interim Zoning Administrator
Telephone: (419) 592-4010 Fax: (419) 599-8393
www.napoleonohio.com

Commercial Zoning Permit Application

Date 05/22/23 **Job Location** 1515 N Scott Street Parcel 411192110040

Owner American Tower Coporation (Lessee) **Telephone #** 602-881-5824

Owner Address c/o SMJ Int'l. 49030 Pontiac Trail, Ste 100 Wixom, MI 48393-2586

Contractor TBD **Cell Phone #**

Description of Work to be Performed Remove 9 antennas and associated equipment. Add 9 antennas and associated equipment.

Estimated Completion Date 9/20/23 **Estimated Cost** $15,000

Demo Permit - $100.00 – See Separate Form	**(MDEMO 100.1700.46690)**	$
Zoning Permit - $50.00	**(MZON 100.1700.46690)**	$ 50.00
Fence - $25.00	**(MZON 100.1700.46690)**	$
Garage and Shed 120 SF or less (Detached) - $25.00	**(MZON 100.1700.46690)**	$
Driveway/Sidewalk/Curbing - $0.00	**(MZON 100.1700.46690)**	$
Drainage Permit/Outside Water/Sewer Repair - $0.00	**(MBLDG 510.0000.47300)**	$
1" Water Tap, 5/8" Meter, Copper Setter and Transmitter - $1,200.00(Outside City - $5,680)	**(MBLDG 510.0000.47300)**	$
1" Water Tap, 3/4"Meter, Copper Setter and Transmitter - $1,300.00(Outside City - $5,820)	**(MBLDG 510.0000.47300)**	$
1" Water Tap, 1" Meter, Copper Setter and Transmitter - $1,400.00 (Outside City - $5,960)	**(MBLDG 510.0000.47300)**	$
1 1/2" Water Tap and Larger - See Operations Superintendent		$
1" Meter, Copper Setter and Transmitter Without Tap - $525.00	**(MBLDG 510.0000.44730)**	
3/4" Meter, Copper Setter and Transmitter Without Tap - $440.87	**(MBLDG 510.0000.44730)**	
5/8" Meter, Copper Setter and Transmitter Without Tap - $350.00	**(MBLDG 510.0000.44730)**	
Sewer Tap for All Commercial and Industrial Uses - $600.00	**(MBLDG 510.0000.44730)**	$
Sewer Tap Inspection Fee, M.F., Comm., Indust. 50 L.F. or Less - $100.00	**(MBLDG 510.0000.44730)**	
Sewer Tap, M.F., Comm., Indust, 51 L.F. or More - $100.00 + $10.00 for each 50 L.F.	**(MBLDG 510.0000.44730)**	$
Manufactured Home Court - $87.00 Per Dwelling	**(MBLDG 510.0000.44730)**	
Sewer Main Extension in Right of Way Inspection – 2% of Construction Cost	**(MBLDG 510.0000.44730)**	$
Inspection Fee Outside the Corporation Limits – Increase 50%	**(MBLDG 510.0000.44730)**	
	TOTAL FEE:	$ 50.00

I FULLY UNDERSTAND THAT NO EXCAVATION, CONSTRUCTION OR STRUCTURAL ALTERATION, ELECTRICAL OR MECHANICAL INSTALLATION OR ALTERATION OF ANY BUILDING STRUCTURE, SIGN, OR PART THEREOF AND NO USE OF THE ABOVE SHALL BE UNDERTAKEN OR PERFORMED UNTIL THE PERMIT APPLIED FOR HEREIN HAS BEEN APPROVED AND ISSUED BY THE CITY OF NAPOLEON ZONING DEPARTMENT.

I hereby certify that I am the Owner of the named property, or that the proposed work is authorized by the Owner of record and that I have been authorized by the Owner to make this application as his/her authorized agent and I agree to conform to all applicable laws of the jurisdiction. In addition, if a permit for Work described in this application is issued, I certify that the code official or the code official's authorized representative shall have the authority to enter areas covered by such permit at any reasonable hour to enforce the provisions of the code(s) applicable to such permit.

I HEREBY ACKNOWLEDGE THAT I HAVE READ AND FULLY UNDERSTAND THE ABOVE LISTED INSTRUCTIONS.

SIGNATURE OF APPLICANT: DATE:

BATCH # **CHECK #** 5261 **DATE** 5/30/23

SMJ INTERNATIONAL
49030 Pontiac Trail, Suite 100
Wixom, MI 48393
www.smj-llc.com

May 24, 2023

City of Napoleon
Attn: Kevin Schultheis
255 West Riverview
Napoleon, OH 43545
(419) 592-4010

Re: ATC Site 99044 Verizon Equipment Modification BP Application located at:
1515 N Scott Street
Parcel 411192110040

Encl: (1) Cover Letter
(1) Check for $50.00 Zoning Fee
(1) FedEx Return Label/Envelope

Hi Kevin:

Enclosed please find the permit fee check and FedEx return envelope.

Please send the permit when approved.

Please contact me with any questions or comments.

Thanks,

Alan Waters
Zoning and Permitting Specialist
(p) 602-881-5824
(e) awaters@smj-llc.com

SMJ International

FINAL COAX/HYBRID CABLE:
COUNT (SIZE) TYPE

(10) 1-5/8" COAX CABLES
(2) 1-5/8" HYBRID CABLES

TOP OF EXISTING HIGHEST APPURTENANCE ELEV. 199.14'

TOP OF EXISTING TOWER ELEV. 180'

2 C-401 3 C-401 EXISTING AND PROPOSED VERIZON EQUIPMENT AND MOUNT MODIFICATIONS

EXISTING VERIZON RAD CENTER @ 180'

EXISTING CARRIER ANTENNAS RAD CENTER @ 175.1'

EXISTING CARRIER ANTENNAS RAD CENTER @ 168'

EXISTING CARRIER ANTENNAS RAD CENTER @ 159'

PROPOSED (1) 1-5/8" HYBRID CABLES

EXISTING (10) 1-5/8" COAX CABLES AND (1) 1-5/8" HYBRID CABLES TO REMAIN

(1) 1-5/8" COAX CABLES (TO BE REMOVED)

EXISTING TOWER BASE PLATE ELEV. 4.82' AMSL

1 TOWER ELEVATION
SCALE: 1" = 20'

SEQUENCE OF EVENTS:
1. REMOVE (2) TWO SC 9012 REV2 ANTENNAS,
   (4) FOUR APL866513 ANTENNAS,
   (3) THREE AHBCC AIRSCALE DUAL RRH 4T4R B5/B13 320W RRUS,
   (3) THREE AHFIC AIRSCALE DUAL RRH 4T4R B2/B66A 320W RRUS,
   (1) ONE RC3DC-3315-PF-48 OVP, AND
   (1) 1-5/8" COAX CABLES,
   AT 180' ELEVATION.
2. INSTALL (3) THREE MT6407-77A ANTENNAS,
   (3) THREE VVSSP-65S-R1BV2 ANTENNAS,
   (3) THREE RF4439D-25A RRUS,
   (3) THREE RF4440D-13A RRUS,
   (3) THREE RT4401-48A RRUS,
   (1) ONE RVZDC-6627-PF-48 OVP ON TOWER,
   (1) 1-5/8" HYBRID CABLES, AND
   MOUNT MODIFICATIONS,
   AT 180' ELEVATION.
3. INSTALL (1) ONE RVZDC-4520-RM-48 OVP IN SHELTER

GENERAL NOTES:
1. ALL WORK SHALL COMPLY WITH AMERICAN TOWER CONSTRUCTION SPECIFICATIONS.
2. NO ELECTRICAL WORK IS REQUIRED FOR THIS INSTALLATION. NO NEW VOLTAGE IS REQUIRED.

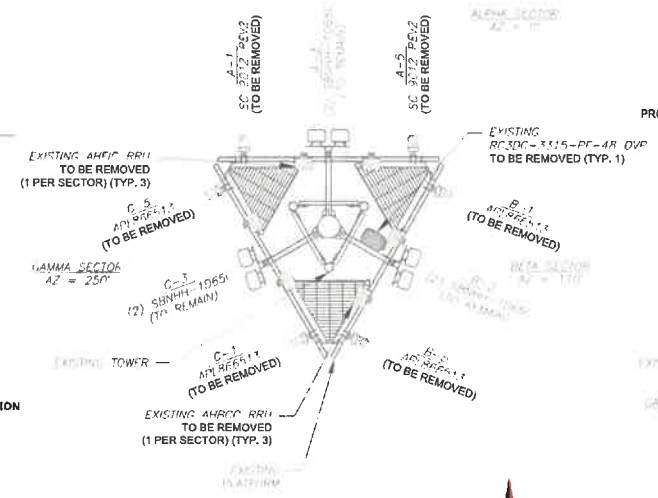
EQUIPMENT REPLACEMENT NOTES:
1. CONTRACTOR TO INSPECT THE CONDITION OF THE EXISTING MOUNTING PIPE. CONFIRM THE FOLLOWING:
   1.1. CORROSION - IF MOUNTS ARE FOUND TO BE CORRODED, CONTACT VERIZON WIRELESS REP FOR DIRECTION.
   1.2. CHECK CONDITION OF ATTACHMENT BOLTS. IF FOUND LOOSE, TIGHTEN TO ORIGINCAL SPECIFICATIONS (AISC; TURN OF THE NUT METHOD) IF BOLTS ARE MISSING, REPLACE TO SUIT.
   1.3. CONFIRM MOUNTING PIPE IS ADEQUATELY SIZED TO ACCOMMODATE PROPOSED INSTALLATION.
2. ALL WORK DEPICTED ON THIS DRAWING IS DESIGN IN ACCORDANCE TO THE LATEST STANDARDS.

NOTE TO GENERAL CONTRACTOR:
NO WORK IS TO BE PERFORMED ON THIS SITE WITHOUT REVIEW OF THE APPROVED STRUCTURAL ANALYSIS. IF ANY DISCREPANCIES ARE FOUND, THE GENERAL CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING. AT NO TIME WILL ANY ADDITIONAL ANTENNAS BE INSTALLED WITHOUT WRITTEN CONSENT FROM THE TOWER ENGINEER.

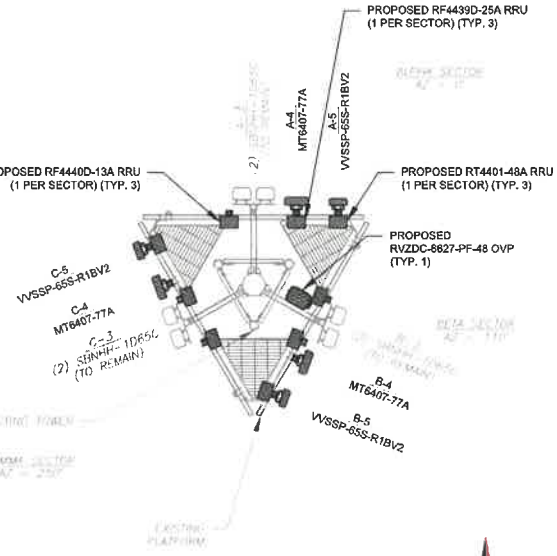
TOWER NOTES:
1. CONFIRM WITH VERIZON REP FOR APPLICABLE UPDATES/REVISIONS AND MOST RECENT RFDS FOR NSN CONFIGURATION (CONFIG). GC TO CAP ALL UNUSED PORTS.
2. CONFIRM SPACING OF PROPOSED EQUIP DOES NOT CAUSE TOWER CONFLICTS NOR IMPEDE TOWER CLIMBING PEGS.
3. ESTIMATED LENGTH OF PROPOSED CABLE IS **221'**. ESTIMATED LENGTH OF CABLE WAS PROVIDED BY CUSTOMER OR CALCULATED BY ADDING THE RAD CENTER AND THE DISTANCE FROM THE SHELTER ENTRY PLATE TO THE TOWER (ALONG THE ICE BRIDGE) AND A SAFETY FACTOR MEASUREMENT OF 15% (OF THE TWO PREVIOUS VALUES), CDS DEFER TO GREATEST CABLE LENGTH.

ANTENNA INSTALLATION NOTES:
1. ALL MOUNTING HARDWARE, FASTENERS, ETC., MUST COMPLY WITH ATC CONSTRUCTION SPECIFICATIONS SECTION 111000-2.3.

PER MOUNT ANALYSIS COMPLETED BY PAUL J. FORD AND COMPANY, DATED 01/17/23, THE EXISTING MOUNT MUST BE MODIFIED TO ADEQUATELY SUPPORT THE PROPOSED LOADING. THE MOUNT MODIFICATION PROPOSED IN THE MOUNT ANALYSIS, INCLUDED AT THE END OF THIS PLAN SET, MUST BE INSTALLED PRIOR TO THE INSTALLATION OF THE PROPOSED ANTENNAS AND OTHER EQUIPMENT.



2 EXISTING TOWER PLAN
SCALE: N.T.S.



3 FINAL TOWER PLAN
SCALE: N.T.S.

AMERICAN TOWER®
ATC TOWER SERVICES LLC
3500 REGENCY PARKWAY
SUITE 100
CARY, NC 27518
PHONE: (919) 468-0112
COA.02041

REV.	DESCRIPTION	BY	DATE
0	FOR CONSTRUCTION	JMP	05/12/23

ATC SITE NUMBER:
99044
ATC SITE NAME:
MAUMEE RIVER
VERIZON SITE NAME:
MAUMEE RIVER ALLTEL
SITE ADDRESS:
1515 N SCOTT STREET
NAPOLEON,OH 43545

SEAL:

STATE OF OHIO
SCOTT FLETCHER
E-85031
REGISTERED PROFESSIONAL ENGINEER

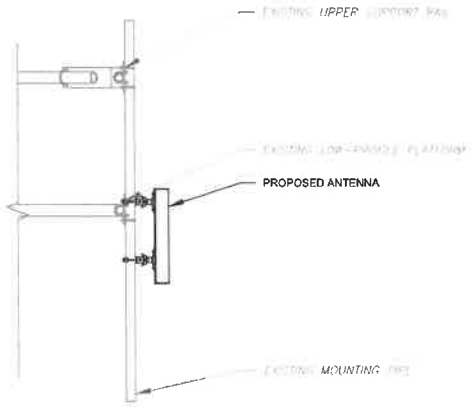
Authorized by "EOR"
16 May 2023 02:04:49 CDT

verizon

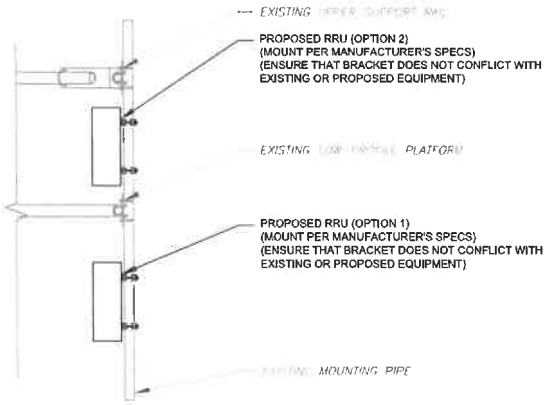
ATC JOB NO:	14423378_D1
CUSTOMER ID:	MAUMEE RIVER ALLTEL
CUSTOMER #:	5000012772

TOWER ELEVATION AND ANTENNA INSTALLATION

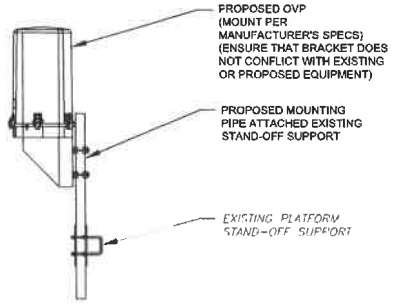
SHEET NUMBER:	REVISION:
C-101	0



1 PROPOSED 5G ANTENNA MOUNTING DETAIL - TYPICAL
SCALE: N.T.S.



2 PROPOSED RRU MOUNTING DETAIL - TYPICAL
SCALE: N.T.S.



3 PROPOSED OVP MOUNTING
SCALE: N.T.S.

Authorized by "EOR"
16 May 2023 02:04:49 cosign

AMERICAN TOWER®
ATC TOWER SERVICES LLC
3500 REGENCY PARKWAY
SUITE 100
CARY, NC 27518
PHONE: (919) 468-0112
COA.02041

REV.	DESCRIPTION	BY	DATE
0	FOR CONSTRUCTION	JMP	05/12/23

ATC SITE NUMBER:
99044
ATC SITE NAME:
MAUMEE RIVER
VERIZON SITE NAME:
MAUMEE RIVER ALLTEL
SITE ADDRESS:
1515 N SCOTT STREET
NAPOLEON,OH 43545

SEAL:

verizon

ATC JOB NO:	14423378_D1
CUSTOMER ID:	MAUMEE RIVER ALLTEL
CUSTOMER #:	5000012772

CONSTRUCTION DETAILS

SHEET NUMBER:	REVISION:
C-501	0

GENERAL CONSTRUCTION NOTES:

1. OWNER FURNISHED MATERIALS. VERIZON "THE COMPANY" WILL PROVIDE AND THE CONTRACTOR WILL INSTALL
   - A. BTS EQUIPMENT FRAME (PLATFORM) AND ICEBRIDGE SHELTER (GROUND BUILD/CO-LOCATE ONLY)
   - B. AC/TELCO INTERFACE BOX (PPC)
   - C. ICE BRIDGE (CABLE TRAY WITH COVER) (GROUND BUILD/CO-LOCATE ONLY, GC TO FURNISH AND INSTALL FOR ROOFTOP INSTALLATION)
   - D. TOWERS, MONOPOLES
   - E. TOWER LIGHTING
   - F. GENERATORS & LIQUID PROPANE TANK
   - G. ANTENNA STANDARD BRACKETS, FRAMES AND PIPES FOR MOUNTING
   - H. ANTENNAS (INSTALLED BY OTHERS)
   - I. TRANSMISSION LINE
   - J. TRANSMISSION LINE JUMPERS
   - K. TRANSMISSION LINE CONNECTORS WITH WEATHERPROOFING KITS
   - L. TRANSMISSION LINE GROUND KITS
   - M. HANGERS
   - N. HOISTING GRIPS
   - O. BTS EQUIPMENT
2. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL OTHER MATERIALS FOR THE COMPLETE INSTALLATION OF THE SITE INCLUDING, BUT NOT LIMITED TO, SUCH MATERIALS AS FENCING, STRUCTURAL STEEL SUPPORTING SUB-FRAME FOR PLATFORM, ROOFING LABOR AND MATERIALS, GROUNDING RINGS, GROUNDING WIRES, COPPER-CLAD OR XIT CHEMICAL GROUND ROD(S), BUSS BARS, TRANSFORMERS AND DISCONNECT SWITCHES WHERE APPLICABLE, TEMPORARY ELECTRICAL POWER, CONDUIT, LANDSCAPING COMPOUND STONE, CRANES, CORE DRILLING, SLEEPERS AND RUBBER MATTING, REBAR, CONCRETE CAISSONS, PADS AND/OR AUGER MOUNTS, MISCELLANEOUS FASTENERS, CABLE TRAYS, NON-STANDARD ANTENNA FRAMES AND ALL OTHER MATERIAL AND LABOR REQUIRED TO COMPLETE THE JOB ACCORDING TO THE DRAWINGS AND SPECIFICATIONS. IT IS THE POSITION OF VERIZON TO APPLY FOR PERMITTING AND CONTRACTOR RESPONSIBLE FOR PICKUP AND PAYMENT OF REQUIRED PERMITS.
3. ALL WORK SHALL CONFORM TO ALL CURRENT APPLICABLE FEDERAL, STATE, AND LOCAL CODES, INCLUDING ANSI/EIA/TIA-222, AND COMPLY WITH ATC CONSTRUCTION SPECIFICATIONS.
4. CONTRACTOR SHALL CONTACT LOCAL 811 FOR IDENTIFICATION OF UNDERGROUND UTILITIES PRIOR TO START OF CONSTRUCTION.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIRED INSPECTIONS.
6. ALL DIMENSIONS TO, OF, AND ON EXISTING BUILDINGS, DRAINAGE STRUCTURES, AND SITE IMPROVEMENTS SHALL BE VERIFIED IN FIELD BY CONTRACTOR WITH ALL DISCREPANCIES REPORTED TO THE ENGINEER.
7. DO NOT CHANGE SIZE OR SPACING OF STRUCTURAL ELEMENTS.
8. DETAILS SHOWN ARE TYPICAL; SIMILAR DETAILS APPLY TO SIMILAR CONDITIONS UNLESS OTHERWISE NOTED.
9. THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY WHICH SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
10. CONTRACTOR SHALL BRACE STRUCTURES UNTIL ALL STRUCTURAL ELEMENTS NEEDED FOR STABILITY ARE INSTALLED. THESE ELEMENTS ARE AS FOLLOWS: LATERAL BRACING, ANCHOR BOLTS, ETC.
11. CONTRACTOR SHALL DETERMINE EXACT LOCATION OF EXISTING UTILITIES, GROUNDS DRAINS, DRAIN PIPES, VENTS, ETC. BEFORE COMMENCING WORK.
12. INCORRECTLY FABRICATED, DAMAGED, OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE VERIZON REP PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH REMEDIAL ACTION SHALL REQUIRE WRITTEN APPROVAL BY THE VERIZON REP PRIOR TO PROCEEDING.
13. EACH CONTRACTOR SHALL COOPERATE WITH THE VERIZON REP, AND COORDINATE HIS WORK WITH THE WORK OF OTHERS.
14. CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED BY CONSTRUCTION OF THIS PROJECT TO MATCH EXISTING PRE-CONSTRUCTION CONDITIONS TO THE SATISFACTION OF THE VERIZON CONSTRUCTION MANAGER.
15. ALL CABLE/CONDUIT ENTRY/EXIT PORTS SHALL BE WEATHERPROOFED DURING INSTALLATION USING A SILICONE SEALANT.
16. WHERE EXISTING CONDITIONS DO NOT MATCH THOSE SHOWN IN THIS PLAN SET, CONTRACTOR SHALL NOTIFY THE VERIZON REP AND ENGINEER OF RECORD IMMEDIATELY.
17. CONTRACTOR SHALL ENSURE ALL SUBCONTRACTORS ARE PROVIDED WITH A COMPLETE AND CURRENT SET OF DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT.
18. CONTRACTOR SHALL REMOVE ALL RUBBISH AND DEBRIS FROM THE SITE AT THE END OF EACH DAY.
19. CONTRACTOR SHALL COORDINATE WORK SCHEDULE WITH AMERICAN TOWER CORPORATION (ATC) AND TAKE PRECAUTIONS TO MINIMIZE IMPACT AND DISRUPTION OF OTHER OCCUPANTS OF THE FACILITY.
20. CONTRACTOR SHALL FURNISH VERIZON AND AMERICAN TOWER CORPORATION (ATC) WITH A PDF MARKED UP AS-BUILT SET OF DRAWINGS UPON COMPLETION OF WORK.
21. PRIOR TO SUBMISSION OF BID, CONTRACTOR SHALL COORDINATE WITH VERIZON REP TO DETERMINE WHAT, IF ANY, ITEMS WILL BE PROVIDED. ALL ITEMS NOT PROVIDED SHALL BE PROVIDED AND INSTALLED BY THE CONTRACTOR. CONTRACTOR WILL INSTALL ALL ITEMS PROVIDED.
22. PRIOR TO SUBMISSION OF BID, CONTRACTOR SHALL COORDINATE WITH VERIZON REP TO DETERMINE IF ANY PERMITS WILL BE OBTAINED BY CONTRACTOR. ALL REQUIRED PERMITS NOT OBTAINED BY VERIZON MUST BE OBTAINED, AND PAID FOR, BY THE CONTRACTOR.
23. CONTRACTOR SHALL INSTALL ALL SITE SIGNAGE IN ACCORDANCE WITH VERIZON SPECIFICATIONS AND REQUIREMENTS.
24. CONTRACTOR SHALL SUBMIT ALL SHOP DRAWINGS TO VERIZON FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.
25. ALL EQUIPMENT SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS AND LOCATED ACCORDING TO VERIZON SPECIFICATIONS, AND AS SHOWN IN THESE PLANS.
26. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
27. CONTRACTOR SHALL NOTIFY VERIZON REP A MINIMUM OF 48 HOURS IN ADVANCE OF POURING CONCRETE OR BACKFILLING ANY UNDERGROUND UTILITIES, FOUNDATIONS OR SEALING ANY WALL, FLOOR OR ROOF PENETRATIONS FOR ENGINEERING REVIEW AND APPROVAL.
28. CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SAFETY INCLUDING COMPLIANCE WITH ALL APPLICABLE OSHA STANDARDS AND RECOMMENDATIONS AND SHALL PROVIDE ALL NECESSARY SAFETY DEVICES INCLUDING PPE AND PPM AND CONSTRUCTION DEVICES SUCH AS WELDING AND FIRE PREVENTION, TEMPORARY SHORING, SCAFFOLDING, TRENCH BOXES/SLOPING, BARRIERS, ETC.
29. THE CONTRACTOR SHALL PROTECT AT HIS OWN EXPENSE, ALL EXISTING FACILITIES AND SUCH OF HIS NEW WORK LIABLE TO INJURY DURING THE CONSTRUCTION PERIOD. ANY DAMAGE CAUSED BY NEGLECT ON THE PART OF THIS CONTRACTOR OR HIS REPRESENTATIVES, OR BY THE ELEMENTS DUE TO NEGLECT ON THE PART OF THIS CONTRACTOR OR HIS REPRESENTATIVES, EITHER TO THE EXISTING WORK, OR TO HIS WORK OR THE WORK OF ANY OTHER CONTRACTOR, SHALL BE REPAIRED AT HIS EXPENSE TO THE OWNER'S SATISFACTION.
30. ALL WORK SHALL BE INSTALLED IN A FIRST CLASS, NEAT AND WORKMANLIKE MANNER BY MECHANICS SKILLED IN THE TRADE INVOLVED. THE QUALITY OF WORKMANSHIP SHALL BE SUBJECT TO THE APPROVAL OF THE VERIZON REP. ANY WORK FOUND BY THE VERIZON REP TO BE OF INFERIOR QUALITY AND/OR WORKMANSHIP SHALL BE REPLACED AND/OR REWORKED AT CONTRACTOR EXPENSE UNTIL APPROVAL IS OBTAINED.
31. IN ORDER TO ESTABLISH STANDARDS OF QUALITY AND PERFORMANCE, ALL TYPES OF MATERIALS LISTED HEREINAFTER BY MANUFACTURER'S NAMES AND/OR MANUFACTURER'S CATALOG NUMBER SHALL BE PROVIDED BY THESE MANUFACTURERS AS SPECIFIED.
32. VERIZON FURNISHED EQUIPMENT SHALL BE PICKED-UP AT THE VERIZON WAREHOUSE, NO LATER THAN 48HR AFTER BEING NOTIFIED INSURED, STORED, UNCRATE, PROTECTED AND INSTALLED BY THE CONTRACTOR WITH ALL APPURTENANCES REQUIRED TO PLACE THE EQUIPMENT IN OPERATION, READY FOR USE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE EQUIPMENT AFTER PICKING IT UP.
33. VERIZON OR HIS ARCHITECT/ENGINEER RESERVES THE RIGHT TO REJECT ANY EQUIPMENT OR MATERIALS WHICH, IN HIS OWN OPINION ARE NOT IN COMPLIANCE WITH THE CONTRACT DOCUMENTS, EITHER BEFORE OR AFTER INSTALLATION AND THE EQUIPMENT SHALL BE REPLACED WITH EQUIPMENT CONFORMING TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS BY THE CONTRACTOR AT NO COST TO VERIZON OR THEIR ARCHITECT/ENGINEER.

SPECIAL CONSTRUCTION ANTENNA INSTALLATION NOTES:

1. WORK INCLUDED:
   - A. ANTENNA AND COAXIAL CABLES ARE FURNISHED BY VERIZON UNDER A SEPARATE CONTRACT. THE CONTRACTOR SHALL ASSIST ANTENNA INSTALLATION CONTRACTOR IN TERMS OF COORDINATION AND SITE ACCESS. ERECTION SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PERSONNEL.
   - B. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND VERIZON SPECIFICATIONS.
   - C. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.
   - D. INSTALL FURNISHED GALVANIZED STEEL OR ALUMINUM WAVEGUIDE.
   - E. CONTRACTOR SHALL PROVIDE FOUR (4) SETS OF SWEEP TESTS USING ANRITZU-PACKARD 8713B RF SCALAR NETWORK ANALYZER. SUBMIT FREQUENCY DOMAIN REFLECTOMETER(FDR) TESTS RESULTS TO THE PROJECT MANAGER. SWEEP TESTS SHALL BE AS PER ATTACHED RFS "MINIMUM FIELD TESTING RECOMMENDED FOR ANTENNA AND HELIAX COAXIAL CABLE SYSTEMS" DATED 10/5/93. TESTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING SERVICE AND BE BOUND AND SUBMITTED WITHIN ONE WEEK OF WORK COMPLETION.
   - F. INSTALL COAXIAL CABLES AND TERMINATING BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTIONS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS. TERMINATE ALL COAXIAL CABLE THREE (3) FEET IN EXCESS OF ENTRY PORT LOCATION UNLESS OTHERWISE STATED.
   - G. ANTENNA AND COAXIAL CABLE GROUNDING:
2. ALL EXTERIOR #6 GREEN GROUND WIRE "DAISY CHAIN" CONNECTIONS ARE TO BE WEATHER SEALED WITH RFS CONNECTORS/SPLICE WEATHERPROOFING KIT #221213 OR EQUAL.
3. ALL COAXIAL CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF COAXIAL CABLE (NOT WITHIN BENDS)

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNMENT AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

1. 2017 OHIO BUILDING CODE (OBC)
2. 2017 NATIONAL ELECTRIC CODE (NEC)
3. LOCAL BUILDING CODE
4. CITY/COUNTY ORDINANCES

ALL DISCREPANCIES FROM WHAT IS SHOWN ON THESE CONSTRUCTION DRAWINGS SHALL BE COMMUNICATED TO ATC ENGINEERING IMMEDIATELY FOR CORRECTION OR RE-DESIGN. FAILURE TO COMMUNICATE DIRECTLY WITH ATC ENGINEERING OR ANY CHANGES FROM THE DESIGN CONDUCTED WITHOUT PRIOR APPROVAL FROM ATC ENGINEERING SHALL BE THE SOLE RESPONSIBILITY OF THE GENERAL CONTRACTOR.

AMERICAN TOWER®
ATC TOWER SERVICES LLC
3500 REGENCY PARKWAY
SUITE 100
CARY, NC 27518
PHONE: (919) 468-0112
COA.02041

REV.	DESCRIPTION	BY	DATE
0	FOR CONSTRUCTION	JMP	05/12/23

ATC SITE NUMBER:
99044
ATC SITE NAME:
MAUMEE RIVER
VERIZON SITE NAME:
MAUMEE RIVER ALLTEL
SITE ADDRESS:
1515 N SCOTT STREET
NAPOLEON,OH 43545

SEAL:

STATE OF OHIO
SCOTT FLETCHER
E-85031
PROFESSIONAL ENGINEER

Authorized by "EOR"
16 May 2023 02:04:49 cosi

verizon

ATC JOB NO:	14423378_D1
CUSTOMER ID:	MAUMEE RIVER ALLTEL
CUSTOMER #:	5000012772

GENERAL NOTES

SHEET NUMBER:	REVISION:
G-001	0

verizon

PAUL J. FORD & COMPANY

Paul J. Ford and Company
250 East Broad Street Suite 600
Columbus, OH 43215
(614) 221-6679
pjfmount@pauljford.com

Antenna Mount Analysis Report with Hardware Upgrades and PMI Requirements

Mount Analysis

SMART Tool Project #: 10177362

Paul J. Ford Project #: 24322-2773.002.8190

January 16, 2023

Site Information	*Site ID:*	*228234-VZW / MAUMEE RIVER ALLTEL*
	Site Name:	*MAUMEE RIVER ALLTEL*
	Carrier Name:	*Verizon Wireless*
	Address:	*1515 NORTH SCOTT STREET*
		NAPOLEON, OHIO 43545, HENRY County
	Latitude:	*41.404263°*
	Longitude:	*-84.136125°*
Structure Information	*Tower Type:*	*180-Ft Self Support*
	Mount Type:	*16.50-Ft Platform w/ Support Rail*

FUZE ID # 16972767

Analysis Results

16.50-Ft Platform w/ Support Rail: **73.3% Pass w/ Hardware Upgrades***

*** Antennas and equipment to be installed in compliance with PMI Requirements of this mount analysis.**

Contractor PMI Requirements:
Included at the end of this MA report
Available & Submitted via portal at https://pmi.vzwsmart.com
For additional questions and support, please reach out to:
pmisupport@pauljford.com

Report Prepared By: Burak Gul

ADP

STATE OF OHIO
REBEKAH MARELLA DORRIS
E-84390
PROFESSIONAL ENGINEER

01/17/2023

Analysis Results:

Component	Utilization %*	Pass/Fail
Face Horizontals	44.6%	Pass
Bracing Members	30.9%	Pass
Support Rails	22.2%	Pass
Grating Support Members	27.9%	Pass
Standoff Members	57.8%	Pass
Corner Plates	5.3%	Pass
Mount Pipes	50.9%	Pass
Mount to Tower Connection	73.3%	Pass
Structure Rating – *(Controlling Utilization of all Components)*		**73.3%**

* Results valid after hardware upgrades noted in the PMI Requirements are Installed.

Mount Steel (EPA)a per ANSI/TIA-222-H Section 2.6.11.2:

Ice Thickness (In)	Mount Pipes Excluded		Mount Pipes Included	
	Front (EPA)a (Sq. Ft.)	Side (EPA)a (Sq. Ft.)	Front (EPA)a (Sq. Ft.)	Side (EPA)a (Sq. Ft.)
0	27.2	27.2	45.9	45.9
0.5	41.4	41.4	68.0	68.0
1	52.8	52.8	87.2	87.2

Notes:
- (EPA)a values listed above may be used in the absence of more precise information
- (EPA)a values in the table above include 3 sector(s).
- Ka factors included in (EPA)a calculations

Requirements:

The existing mount will be **SUFFICIENT** for the final loading configuration shown in attachment 2 upon the completion of the requirements listed below.

- Complete Mount Geometry Verification page. Contact EOR if these documents are not available to the general contractor.
- Provide information on final equipment configuration (manufacturer, model #, quantity, and locations) on the mount.
- Contractor shall relocate existing position 4 mount pipe on each sector. Top of pipe shall match existing top of pipe. Refer to Placement Diagrams.
- Provide VZWSMART MSK1 crossover plates to existing position 2 mount pipe to support rail connections.

ANSI/ASSP rigging plan review services compliant with the requirements of ANSI/TIA 322 are available for a Construction Class IV site or other, if required. Separate review fees will apply.

1 MOUNT ANALYSIS

NOTE: THIS SHEET WAS CREATED BY OTHERS AND PROVIDED AT THE REQUEST OF THE CUSTOMER WITHOUT EDIT. PLEASE REFERENCE THE MOUNT ANALYSIS REPORT FOR COMPLETE MOUNT ANALYSIS CALCULATIONS AND DETAILS. SUPPLEMENTAL PAGES INCLUDED IN THE CONSTRUCTION DRAWINGS ARE FOR REFERENCE ONLY. GENERAL CONTRACTOR IS TO VERYIFY THEY HAVE THE MOST RECENT MOUNT ANALYSIS PRIOR TO CONTRUCTION.

SUPPLEMENTAL

SHEET NUMBER:	REVISION:
R-601	0

AMERICAN TOWER®
CORPORATION

Structural Analysis Report

Structure	:	180 ft Self Support Tower
ATC Asset Name	:	MAUMEE RIVER
ATC Asset Number	:	99044
Engineering Number	:	14423378_C3_01
Proposed Carrier	:	ALLTEL COMMUNICATIONS, LLC
Carrier Site Name	:	MAUMEE RIVER ALLTEL
Carrier Site Number	:	5000012772
Site Location	:	1515 N Scott Street Napoleon, OH 43545-1061 41.4043, -84.1361
County	:	Henry
Date	:	April 26, 2023
Max Usage	:	97%
Analysis Result	:	Pass

Prepared By:

Lucas Tait
Structural Engineer II

L Tait

Reviewed By:

Authorized by "EOR"
27 Apr 2023 04:16:56 cosign

COA: COA.02041

Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 180 ft Self Support tower to reflect the change in loading by ALLTEL COMMUNICATIONS, LLC.

Supporting Documents

Tower Drawing:	Pirod Drawing #202284-B, dated August 18, 1997
Foundation Drawing:	Pirod Drawing #202284-B, dated August 18, 1997
Geotechnical Report:	CTL Project #97050223, dated August 13, 1997

Analysis

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

Basic Wind Speed:	108 mph (3-second gust)
Basic Wind Speed w/ Ice:	40 mph (3-second gust) w/ 2.00" radial ice concurrent
Code(s):	ANSI/TIA-222-H / 2015 IBC / 2017 Ohio Building Code
Exposure Category:	C
Risk Category:	II
Topographic Factor Procedure:	Method 1
Topographic Category:	1
Spectral Response:	Ss = 0.14, S_1 = 0.06
Site Class:	D - Stiff Soil - Default

Wind load and Ice thickness have been reduced by applicable existing structure load modification factors in accordance with TIA-222-H, ANNEX-S

Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact American Tower via email at **Engineering@americantower.com** Please include the American Tower site name, site number, and engineering number in the subject line for any questions.

Proposed Carrier Final Loading

Elev.*	Qty	Equipment	Lines	Carrier
180.0'	1	Platform with Handrails	(10) 1 5/8" Coax (2) 1 5/8" Hybriflex	ALLTEL COMMUNICATIONS, LLC
	1	Raycap RVZDC-6627-PF-48		
	3	Commscope VVSSP-65S-R1BV2		
	3	Samsung MT6407-77A		
	3	Samsung RF4439d-25A		
	3	Samsung RF4440d-13A		
	3	Samsung RT4401-48A		
	6	Andrew SBNHH-1D65C		

(If table breaks across pages, please see previous page for data in merged cells)

Contracted elevations are shown for appurtenances within contracted installation tolerances. Appurtenances outside of contract limits are shown at installed elevations.

Install proposed lines stacked on top of existing ALLTEL COMMUNICATIONS, LLC coax.

Other Existing/Reserved Loading

Elev.*	Qty	Equipment	Lines	Carrier
175.3'	1	Commscope VHLP4-11W	-	SPRINT NEXTEL
175.0'	-	-	(4) 0.36" (9.1mm) Cat 5e	SPRINT NEXTEL
173.6'	2	Commscope VHLP2-18	-	SPRINT NEXTEL
173.3'	6	DragonWave Horizon Compact Plus	-	SPRINT NEXTEL
173.0'	-	-	(4) 0.24" (6.1mm) Cat 5e	SPRINT NEXTEL
172.7'	3	KMW ET-X-WM-18-65-8P	-	SPRINT NEXTEL
172.3'	3	Samsung Medusa Box	-	SPRINT NEXTEL
170.0'	3	Light Sector Frame	-	SPRINT NEXTEL
168.0'	1	Andrew VHLP2-11W	(1) 0.38" (9.7mm) Cat 5e (3) 1.26" (32mm) Hybrid Fanout Cable (Type II)	SPRINT NEXTEL
	1	Andrew VHLP3-11W		
	3	KMW ET-X-TS-70-15-62-18-iR-RD		
	3	Samsung Fiber Junction Cylinder		
	3	Samsung Power Junction Cylinder..		
	3	Samsung RRH-C2A (w/ External Filter)		
	3	Samsung RRH-P4 (1.9 GHz)		
	3	Samsung RRH-V3 (2.5GHz w/ Finger Guard)		
159.0'	2	Commscope HELIAX FiberFeed 12 RRU Pendant Connect	(8) 0.40" (10mm) Coax (2) 1.46" (37.1mm) Hybrid	T-MOBILE
	2	Commscope VHLPX2-11W		
	2	Commscope VHLPX4-11W		
	3	Commscope FFVV-65C-R3-V1		
	3	Mount Reinforcement		
	3	Sector Frame		
	3	Nokia AEHC		
	3	Nokia AHFIG 70.55 lbs		
	3	Nokia AirScale Dual RRH 4T4R B12/71 240W AHLOA		
	8	Ericsson Mini-Link 6363		
148.0'	1	Raycap RDIDC-9181-PF-48	(1) 1.75" (44.5mm) Hybrid	DISH WIRELESS L.L.C.
	3	CellMax CMA-UBTULBULBHH/6516/16/21/21		
	3	Fujitsu TA08025-B604		
	3	Fujitsu TA08025-B605		
	3	Light Sector Frame		

Elev.*	Qty	Equipment	Lines	Carrier

(If table breaks across pages, please see previous page for data in merged cells)

Contracted elevations are shown for appurtenances within contracted installation tolerances. Appurtenances outside of contract limits are shown at installed elevations.

Structure Usages

Structural Component	Usage	Pass/Fail
Legs	97%	Pass
Diagonals	97%	Pass
Horizontals	63%	Pass
Anchor Rods	93%	Pass
Leg Bolts	56%	Pass

Foundation Reactions & Usages

Reaction Component	Original Design Reactions	Factored Design Reactions*	Analysis Reactions	Usage
Uplift (k)	218.0	294.3	193.3	66%
Compression (k)	235.2	317.5	223.1	70%
Shear (k)	35.6	48.1	28.1	58%

The design reactions are factored by 1.35 per ANSI/TIA-222-H, Sec. 15.6.2

The structure base reactions resulting from this analysis are acceptable when compared to those shown on the original structure drawings, therefore no modification or reinforcement of the foundation will be required.

Standard Conditions

All engineering services performed by ATC Tower Services LLC are prepared on the basis that the information used is current and correct. This information may consist of, but is not limited to the following:

- Information supplied by the client regarding antenna, mounts, and feed line loading
- Information from drawings, design and analysis documents, and field notes in the possession of ATC Tower Services LLC

It is the responsibility of the client to ensure that the information provided to ATC Tower Services LLC and used in the performance of our engineering services is correct and complete.

All assets of American Tower Corporation, its affiliates, and subsidiaries (collectively "American Tower") are inspected at regular intervals. Based upon these inspections and in the absence of information to the contrary, American Tower assumes that all structures were constructed in accordance with the drawings and specifications.

Unless explicitly agreed by both the client and ATC Tower Services LLC, all services will be performed in accordance with the current revision of ANSI/TIA-222.

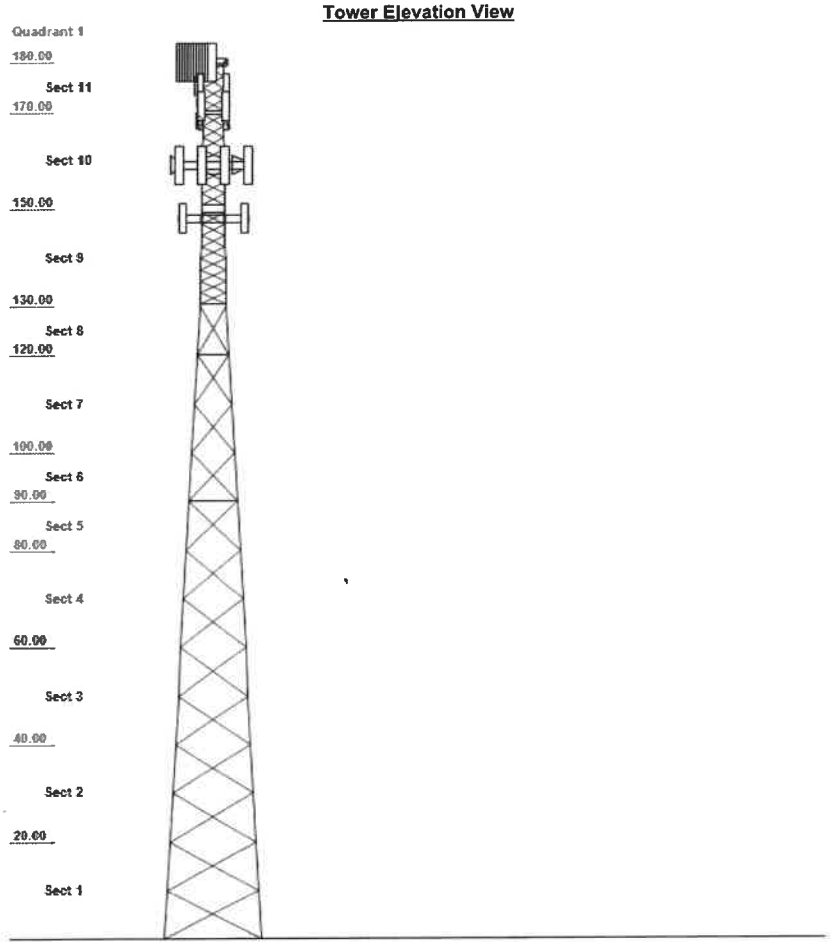
All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. ATC Tower Services LLC is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.

ASSET:	99044, MAUMEE RIVER	CODE:	ANSI/TIA-222-H
CUSTOMER:	ALLTEL COMMUNICATIONS, LLC	PROJECT:	14423378

ANALYSIS PARAMETERS

Nominal Wind:	105 mph	**Ice Wind:**	39 mph w/ 1.7" ice	**Service Wind:**	60 mph
Risk Category:	II	**Exposure:**	C	**S_s:** 0.139	**S_1:** 0.057
Topo Category:	1	**Topo Factor:**	Method 1	**Topo Feature:**	
Structure Height:	180 ft	**Base Elevation:**	0 ft	**Shape:**	Triangle
Base Width:	18 ft	**Top Width:**	4 ft		

Tower Elevation View



GLOBAL BASE REACTIONS

	DL+WL	DL+WL+IL
Moment (k-ft):	3262.39	987.39
Axial (k):	41.46	118.76
Shear (k):	28.06	8.71

INDIVIDUAL BASE REACTIONS

Comp (k):	223.10
Uplift (k):	193.34
Shear (k):	19.93

TOWER SECTION PROPERTIES

Section	Leg Members	Diagonal Members	Horizontal Members
1	12B 50 ksi 12"BD 1.75	SAE 36 ksi 3X3X0.3125	
2-3	12B 50 ksi 12"BD 1.75	SAE 36 ksi 3X3X0.1875	
4	12B 50 ksi 12"BD 1.5"	SAE 36 ksi 2.5X2.5X0.1875	
5	12B 50 ksi 12"BD 1.5"	SAE 36 ksi 2.5X2.5X0.1875	SAE 36 ksi 3X3X0.1875
6	12B 50 ksi 12"BD 1.5"	SAE 36 ksi 2.5X2.5X0.1875	
7	12B 50 ksi 12"BD 1.25	SAE 36 ksi 2.5X2.5X0.1875	SAE 36 ksi 3X3X0.1875
8	12B 50 ksi 12"BD 1.25	SAE 36 ksi 2.5X2.5X0.1875	
9	SOL 50 ksi 2" SOLID	SOL 50 ksi 7/8" SOLID	SOL 50 ksi 1" SOLID
10-11	SOL 50 ksi 1 1/2" SOL	SOL 50 ksi 3/4" SOLID	SOL 50 ksi 7/8" SOLID

SECONDARY BRACING MEMBERS

Section	Sub Diagonal 1	Sub Diagonal 2	Sub Diagonal 3
1 - 11	-	-	-

Section	Sub Horizontal 1	Sub Horizontal 2	Sub Horizontal 3
1 - 11	-	-	-

DISCRETE APPURTENANCE

Elev (ft)	Description
180.0	(6) Andrew SBNHH-1D65C
180.0	(3) Commscope VVSSP-65S-R1BV2
180.0	(3) Samsung RT4401-48A
180.0	(3) Samsung RF4440d-13A
180.0	(3) Samsung RF4439d-25A
180.0	(3) Samsung MT6407-77A
180.0	(1) Raycap RVZDC-6627-PF-48
180.0	(1) Generic Round Platform with Ha
175.3	(1) Commscope VHLP4-11W
173.6	(2) Commscope VHLP2-18
173.3	(6) DragonWave Horizon Compact Plu
172.7	(3) KMW ET-X-WM-18-65-8P
172.3	(3) Samsung Medusa Box
170.0	(3) Generic Flat Light Sector Fram
168.0	(3) Samsung RRH-C2A (w/ External F
168.0	(3) Samsung RRH-P4 (1.9 GHz)
168.0	(3) Samsung RRH-V3 (2.5GHz w/ Fing
168.0	(3) Samsung Fiber Junction Cylinde
168.0	(3) Samsung Power Junction Cylinde
168.0	(3) KMW ET-X-TS-70-15-62-18-iR-RD
168.0	(1) Andrew VHLP3-11W
168.0	(1) Andrew VHLP2-11W
159.0	(8) Ericsson Mini-Link 6363
159.0	(3) Nokia AEHC
159.0	(3) Generic Round Sector Frame
159.0	(3) Generic Mount Reinforcement
159.0	(3) Commscope FFVV-65C-R3-V1
159.0	(3) Nokia AirScale Dual RRH 4T4R B
159.0	(3) Nokia AHFIG 70.55 lbs
159.0	(2) Commscope VHLPX2-11W
159.0	(2) Commscope HELIAX FiberFeed 12
159.0	(2) Commscope VHLPX4-11W
148.0	(3) Generic Flat Light Sector Fram
148.0	(3) CellMax CMA-UBTULBULBHH/6516/1
148.0	(3) Fujitsu TA08025-B604
148.0	(3) Fujitsu TA08025-B605
148.0	(1) Raycap RDIDC-9181-PF-48

LINEAR APPURTENANCE

Elev To (ft)	Description
180.0	(10) 1 5/8" Coax
180.0	(2) 1 5/8" Hybriflex
175.0	(4) 0.36" (9.1mm) Cat 5e
173.0	(4) 0.24" (6.1mm) Cat 5e
168.0	(3) 1.26" (32mm) Hybrid Fanout Ca
168.0	(1) 0.38" (9.7mm) Cat 5e
159.0	(8) 0.40" (10mm) Coax
159.0	(2) 1.46" (37.1mm) Hybrid
148.0	(1) Waveguide
148.0	(1) 1.75" (44.5mm) Hybrid

ANALYSIS PARAMETERS

Location:	Henry County, OH	**Height:**	180 ft
Type and Shape:	Self Support, Triangle	**Base Elevation:**	0.00 ft
Manufacturer:	Pirod	**Bottom Face Width:**	18.00 ft
Kd	0.85	**Top Face Width:**	4.00 ft
Ke:	0.98	**Anchor Bolt Detail Type:**	c

ICE & WIND PARAMETERS

Exposure Category:	C	**Design Wind Speed Without Ice:**	105 mph
Risk Category:	II	**Design Wind Speed with Ice:**	39 mph
Topographic Factor Procedure:	Method 1	**Operational Windspeed:**	60 mph
Topographic Category:	Flat	**Design Ice Thickness:**	1.70 in
Crest Height:	0 ft	**HMSL:**	682 ft

SEISMIC PARAMETERS

Analysis Method:	Equivalent Lateral Force Method				
Site Class:	D - Stiff Soil			**Period Based on Rayleigh Method (sec):**	1.56
T_L (sec):	12	**P:**	1.3	**C_s:**	0.030
S_s:	0.139	**S_1:**	0.057	**C_s, Max:**	0.030
F_a:	1.600	**F_v:**	2.400	**C_s, Min:**	0.030
S_{ds}:	0.148	**S_{d1}:**	0.091		

LOAD CASES

1.2D + 1.0W Normal	1.2D + 1.0W Normal - 105.27 mph Wind with No Ice
1.2D + 1.0W 60°	1.2D + 1.0W 60° - 105.27 mph Wind with No Ice
1.2D + 1.0W 90°	1.2D + 1.0W 90° - 105.27 mph Wind with No Ice
0.9D + 1.0W Normal	0.9D + 1.0W Normal - 105.27 mph Wind with No Ice (Reduced DL)
0.9D + 1.0W 60°	0.9D + 1.0W 60° - 105.27 mph Wind with No Ice (Reduced DL)
0.9D + 1.0W 90°	0.9D + 1.0W 90° - 105.27 mph Wind with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi Normal	1.2D + 1.0Di + 1.0Wi Normal - 38.99 mph Wind with 1.7" Radial Ice
1.2D + 1.0Di + 1.0Wi 60°	1.2D + 1.0Di + 1.0Wi 60° - 38.99 mph Wind with 1.7" Radial Ice
1.2D + 1.0Di + 1.0Wi 90°	1.2D + 1.0Di + 1.0Wi 90° - 38.99 mph Wind with 1.7" Radial Ice
1.2D + 1.0Ev + 1.0Eh Normal	1.2D + 1.0Ev + 1.0Eh Normal - Seismic
1.2D + 1.0Ev + 1.0Eh 60°	1.2D + 1.0Ev + 1.0Eh 60° - Seismic
1.2D + 1.0Ev + 1.0Eh 90°	1.2D + 1.0Ev + 1.0Eh 90° - Seismic
0.9D - 1.0Ev + 1.0Eh Normal	0.9D - 1.0Ev + 1.0Eh Normal - Seismic (Reduced DL)
0.9D - 1.0Ev + 1.0Eh 60°	0.9D - 1.0Ev + 1.0Eh 60° - Seismic (Reduced DL)
0.9D - 1.0Ev + 1.0Eh 90°	0.9D - 1.0Ev + 1.0Eh 90° - Seismic (Reduced DL)
1.0D + 1.0W Service Normal	1.0D + 1.0W Service Normal - 60 mph Wind with No Ice
1.0D + 1.0W Service 60°	1.0D + 1.0W Service 60° - 60 mph Wind with No Ice
1.0D + 1.0W Service 90°	1.0D + 1.0W Service 90° - 60 mph Wind with No Ice

TOWER LOADING – DISCRETE APPURTENANCE

Discrete Appurtenance Properties for LC: **1.2D + 1.0W**

Elev (ft)	Description	Qty	Wt. (lb)	EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc. (ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
180.0	Samsung RT4401-48A	3	19	1.0	1.2	8.6	4.2	0.75	0.50	0.0	0.00	33.70	32	67
180.0	Samsung RF4440d-13A	3	70	1.9	1.3	15.0	9.1	0.75	0.50	0.0	0.00	33.70	60	253
180.0	Commscope VVSSP-65S-R1BV2	3	15	2.4	2.0	12.0	4.6	0.75	0.67	0.0	0.00	33.70	102	55
180.0	Samsung RF4439d-25A	3	75	2.5	1.7	15.0	10.4	0.75	0.67	0.0	0.00	33.70	108	269
180.0	Raycap RVZDC-6627-PF-48	1	32	3.8	2.4	15.7	10.3	0.75	1.00	0.0	0.00	33.70	81	38
180.0	Samsung MT6407-77A	3	82	4.7	2.9	16.1	5.5	0.75	0.61	0.0	0.00	33.70	185	294
180.0	Andrew SBNHH-1D65C	6	66	11.4	8.0	11.9	7.1	0.75	0.70	0.0	0.00	33.70	1024	476
180.0	Generic Round Platform with Ha	1	2500	27.2	0.0	0.0	0.0	1.00	1.00	0.0	0.00	33.70	779	3000
175.3	Commscope VHLP4-11W	1	88	16.7	4.1	49.3	27.4	0.80	1.00	0.0	0.00	33.51	381	106
173.6	Commscope VHLP2-18	2	31	4.7	2.2	26.1	12.3	0.80	1.00	0.0	0.00	33.44	213	74
173.3	DragonWave Horizon Compact Plu	6	8	0.7	0.8	8.7	4.0	0.80	0.50	-1.0	47.41	33.39	47	54
172.7	KMW ET-X-WM-18-65-8P	3	36	6.7	5.1	12.0	4.3	0.80	0.63	3.0	863.99	33.53	288	131
172.3	Samsung Medusa Box	3	4	0.4	0.7	5.5	5.5	0.80	0.50	4.0	53.38	33.55	13	14
170.0	Generic Flat Light Sector Fram	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.00	33.29	855	1440
168.0	Samsung Power Junction Cylinde	3	3	0.2	0.8	3.1	3.1	0.80	0.50	4.0	23.15	33.38	6	12
168.0	Samsung Fiber Junction Cylinde	3	3	0.2	0.9	3.1	3.1	0.80	0.50	1.0	6.11	33.25	6	12
168.0	Samsung RRH-V3 (2.5GHz w/ Fing	3	60	2.4	1.3	18.6	9.5	0.80	0.50	0.0	0.00	33.21	81	214
168.0	Samsung RRH-P4 (1.9 GHz)	3	63	2.7	2.0	13.8	9.0	0.80	0.50	3.0	279.19	33.34	93	226
168.0	Samsung RRH-C2A (w/ External F	3	57	3.1	2.0	15.7	6.7	0.80	0.50	0.0	0.00	33.21	105	206
168.0	Andrew VHLP2-11W	1	25	4.6	2.2	25.9	10.2	0.80	1.00	2.0	209.01	33.29	105	30
168.0	KMW ET-X-TS-70-15-62-18-iR-RD	3	42	8.3	6.2	11.8	5.9	0.80	0.67	3.0	1,129.85	33.34	377	151
168.0	Andrew VHLP3-11W	1	53	10.7	3.3	39.4	24.3	0.80	1.00	-3.0	720.84	33.09	240	64
159.0	Ericsson Mini-Link 6363	8	6	0.5	0.6	7.0	3.1	0.80	0.50	0.0	0.00	32.83	41	60
159.0	Commscope HELIAX FiberFeed 12	2	20	0.9	1.4	6.7	4.7	0.80	1.00	0.0	0.00	32.83	42	48
159.0	Nokia AirScale Dual RRH 4T4R B	3	84	2.2	1.8	12.1	7.4	0.80	0.50	0.0	0.00	32.83	74	302
159.0	Nokia AHFIG 70.55 lbs	3	71	2.8	2.3	12.1	5.2	0.80	0.50	0.0	0.00	32.83	93	254
159.0	Commscope VHLPX2-11W	2	25	4.6	2.2	25.9	10.2	0.80	1.00	0.0	0.00	32.83	206	60
159.0	Nokia AEHC	3	104	6.8	3.2	21.5	8.1	0.80	0.62	0.0	0.00	32.83	284	373
159.0	Generic Mount Reinforcement	3	200	7.5	0.0	0.0	0.0	1.00	1.00	0.0	0.00	32.83	628	720
159.0	Generic Round Sector Frame	3	300	14.4	0.0	0.0	0.0	0.75	0.75	0.0	0.00	32.83	678	1080
159.0	Commscope VHLPX4-11W	2	88	16.7	4.1	49.3	27.4	0.80	1.00	0.0	0.00	32.83	746	211
159.0	Commscope FFVV-65C-R3-V1	3	125	21.1	8.0	25.2	9.3	0.80	0.63	0.0	0.00	32.83	891	449
148.0	Fujitsu TA08025-B605	3	75	2.0	1.3	15.0	9.1	0.80	0.50	0.0	0.00	32.34	65	270
148.0	Fujitsu TA08025-B604	3	64	2.0	1.3	15.0	7.9	0.80	0.50	0.0	0.00	32.34	65	230
148.0	Raycap RDIDC-9181-PF-48	1	22	2.0	1.4	14.6	8.4	0.80	1.00	0.0	0.00	32.34	44	26
148.0	CellMax CMA-UBTULBULBHH/6516/1	3	105	16.2	6.0	26.7	7.7	0.80	0.60	0.0	0.00	32.34	643	378
148.0	Generic Flat Light Sector Fram	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.00	32.34	830	1440
	Totals	**106**	**10,905**	**636.4**									10,512	13,086

Discrete Appurtenance Properties for LC: **0.9D + 1.0W**

Elev (ft)	Description	Qty	Wt. (lb)	EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc. (ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
180.0	Samsung RT4401-48A	3	19	1.0	1.2	8.6	4.2	0.75	0.50	0.0	0.00	33.70	32	50
180.0	Samsung RF4440d-13A	3	70	1.9	1.3	15.0	9.1	0.75	0.50	0.0	0.00	33.70	60	190
180.0	Commscope VVSSP-65S-R1BV2	3	15	2.4	2.0	12.0	4.6	0.75	0.67	0.0	0.00	33.70	102	41
180.0	Samsung RF4439d-25A	3	75	2.5	1.7	15.0	10.4	0.75	0.67	0.0	0.00	33.70	108	202
180.0	Raycap RVZDC-6627-PF-48	1	32	3.8	2.4	15.7	10.3	0.75	1.00	0.0	0.00	33.70	81	29
180.0	Samsung MT6407-77A	3	82	4.7	2.9	16.1	5.5	0.75	0.61	0.0	0.00	33.70	185	220
180.0	Andrew SBNHH-1D65C	6	66	11.4	8.0	11.9	7.1	0.75	0.70	0.0	0.00	33.70	1024	357
180.0	Generic Round Platform with Ha	1	2500	27.2	0.0	0.0	0.0	1.00	1.00	0.0	0.00	33.70	779	2250
175.3	Commscope VHLP4-11W	1	88	16.7	4.1	49.3	27.4	0.80	1.00	0.0	0.00	33.51	381	79
173.6	Commscope VHLP2-18	2	31	4.7	2.2	26.1	12.3	0.80	1.00	0.0	0.00	33.44	213	56
173.3	DragonWave Horizon Compact Plu	6	8	0.7	0.8	8.7	4.0	0.80	0.50	-1.0	47.41	33.39	47	40
172.7	KMW ET-X-WM-18-65-8P	3	36	6.7	5.1	12.0	4.3	0.80	0.63	3.0	863.99	33.53	288	98
172.3	Samsung Medusa Box	3	4	0.4	0.7	5.5	5.5	0.80	0.50	4.0	53.38	33.55	13	11
170.0	Generic Flat Light Sector Fram	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.00	33.29	855	1080
168.0	Samsung Power Junction Cylinde	3	3	0.2	0.8	3.1	3.1	0.80	0.50	4.0	23.15	33.38	6	9
168.0	Samsung Fiber Junction Cylinde	3	3	0.2	0.9	3.1	3.1	0.80	0.50	1.0	6.11	33.25	6	9
168.0	Samsung RRH-V3 (2.5GHz w/ Fing	3	60	2.4	1.3	18.6	9.5	0.80	0.50	0.0	0.00	33.21	81	161
168.0	Samsung RRH-P4 (1.9 GHz)	3	63	2.7	2.0	13.8	9.0	0.80	0.50	3.0	279.19	33.34	93	170
168.0	Samsung RRH-C2A (w/ External F	3	57	3.1	2.0	15.7	6.7	0.80	0.50	0.0	0.00	33.21	105	155
168.0	Andrew VHLP2-11W	1	25	4.6	2.2	25.9	10.2	0.80	1.00	2.0	209.01	33.29	105	22
168.0	KMW ET-X-TS-70-15-62-18-iR-RD	3	42	8.3	6.2	11.8	5.9	0.80	0.67	3.0	1,129.85	33.34	377	113
168.0	Andrew VHLP3-11W	1	53	10.7	3.3	39.4	24.3	0.80	1.00	-3.0	720.84	33.09	240	48
159.0	Ericsson Mini-Link 6363	8	6	0.5	0.6	7.0	3.1	0.80	0.50	0.0	0.00	32.83	41	45
159.0	Commscope HELIAX FiberFeed 12	2	20	0.9	1.4	6.7	4.7	0.80	1.00	0.0	0.00	32.83	42	36
159.0	Nokia AirScale Dual RRH 4T4R B	3	84	2.2	1.8	12.1	7.4	0.80	0.50	0.0	0.00	32.83	74	226
159.0	Nokia AHFIG 70.55 lbs	3	71	2.8	2.3	12.1	5.2	0.80	0.50	0.0	0.00	32.83	93	191
159.0	Commscope VHLPX2-11W	2	25	4.6	2.2	25.9	10.2	0.80	1.00	0.0	0.00	32.83	206	45
159.0	Nokia AEHC	3	104	6.8	3.2	21.5	8.1	0.80	0.62	0.0	0.00	32.83	284	280
159.0	Generic Mount Reinforcement	3	200	7.5	0.0	0.0	0.0	1.00	1.00	0.0	0.00	32.83	628	540
159.0	Generic Round Sector Frame	3	300	14.4	0.0	0.0	0.0	0.75	0.75	0.0	0.00	32.83	678	810
159.0	Commscope VHLPX4-11W	2	88	16.7	4.1	49.3	27.4	0.80	1.00	0.0	0.00	32.83	746	158
159.0	Commscope FFVV-65C-R3-V1	3	125	21.1	8.0	25.2	9.3	0.80	0.63	0.0	0.00	32.83	891	336
148.0	Fujitsu TA08025-B605	3	75	2.0	1.3	15.0	9.1	0.80	0.50	0.0	0.00	32.34	65	202

Elev (ft)	Description	Qty	Wt. (lb)	EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc. (ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
148.0	Fujitsu TA08025-B604	3	64	2.0	1.3	15.0	7.9	0.80	0.50	0.0	0.00	32.34	65	173
148.0	Raycap RDIDC-9181-PF-48	1	22	2.0	1.4	14.6	8.4	0.80	1.00	0.0	0.00	32.34	44	20
148.0	CellMax CMA-UBTULBULBHH/6516/1	3	105	16.2	6.0	26.7	7.7	0.80	0.60	0.0	0.00	32.34	643	284
148.0	Generic Flat Light Sector Fram	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.00	32.34	830	1080
	Totals	**106**	**10,905**	**636.4**									10,512	9,815

Discrete Appurtenance Properties for LC: **1.2D + 1.0Di + 1.0Wi**

Elev (ft)	Description	Qty	Ice Wt (lb)	Ice EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc. (ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
180.0	Samsung RT4401-48A	3	50	1.8	1.2	8.6	4.2	0.75	0.50	0.0	0.00	4.62	8	160
180.0	Samsung RF4440d-13A	3	140	2.9	1.3	15.0	9.1	0.75	0.50	0.0	0.00	4.62	13	462
180.0	Commscope VVSSP-65S-R1BV2	3	79	3.6	2.0	12.0	4.6	0.75	0.67	0.0	0.00	4.62	21	245
180.0	Samsung RF4439d-25A	3	167	3.7	1.7	15.0	10.4	0.75	0.67	0.0	0.00	4.62	22	545
180.0	Raycap RVZDC-6627-PF-48	1	158	5.3	2.4	15.7	10.3	0.75	1.00	0.0	0.00	4.62	16	165
180.0	Samsung MT6407-77A	3	199	6.5	2.9	16.1	5.5	0.75	0.61	0.0	0.00	4.62	35	646
180.0	Andrew SBNHH-1D65C	6	329	15.1	8.0	11.9	7.1	0.75	0.70	0.0	0.00	4.62	187	2052
180.0	Generic Round Platform with Ha	1	4368	55.4	0.0	0.0	0.0	1.00	1.00	0.0	0.00	4.62	218	4868
175.3	Commscope VHLP4-11W	1	476	19.5	4.1	49.3	27.4	0.80	1.00	0.0	0.00	4.60	61	494
173.6	Commscope VHLP2-18	2	144	6.1	2.2	26.1	12.3	0.80	1.00	0.0	0.00	4.59	38	300
173.3	DragonWave Horizon Compact Plu	6	31	1.3	0.8	8.7	4.0	0.80	0.50	-1.0	12.54	4.58	13	195
172.7	KMW ET-X-WM-18-65-8P	3	183	9.4	5.1	12.0	4.3	0.80	0.63	3.0	166.61	4.60	56	570
172.3	Samsung Medusa Box	3	23	0.9	0.7	5.5	5.5	0.80	0.50	4.0	16.76	4.60	4	71
170.0	Generic Flat Light Sector Fram	3	744	35.1	0.0	0.0	0.0	0.75	0.75	0.0	0.00	4.57	230	2472
168.0	Samsung Power Junction Cylinde	3	12	0.5	0.8	3.1	3.1	0.80	0.50	4.0	8.88	4.58	2	39
168.0	Samsung Fiber Junction Cylinde	3	13	0.5	0.9	3.1	3.1	0.80	0.50	1.0	2.33	4.56	2	40
168.0	Samsung RRH-V3 (2.5GHz w/ Fing	3	144	3.6	1.3	18.6	9.5	0.80	0.50	0.0	0.00	4.56	17	468
168.0	Samsung RRH-P4 (1.9 GHz)	3	155	4.0	2.0	13.8	9.0	0.80	0.50	3.0	56.23	4.57	19	502
168.0	Samsung RRH-C2A (w/ External F	3	149	4.4	2.0	15.7	6.7	0.80	0.50	0.0	0.00	4.56	21	482
168.0	Andrew VHLP2-11W	1	135	6.1	2.2	25.9	10.2	0.80	1.00	2.0	37.67	4.57	19	140
168.0	KMW ET-X-TS-70-15-62-18-iR-RD	3	231	11.5	6.2	11.8	5.9	0.80	0.67	3.0	216.34	4.57	72	719
168.0	Andrew VHLP3-11W	1	301	12.9	3.3	39.4	24.3	0.80	1.00	-3.0	119.12	4.54	40	312
159.0	Ericsson Mini-Link 6363	8	22	1.0	0.6	7.0	3.1	0.80	0.50	0.0	0.00	4.50	12	183
159.0	Commscope HELIAX FiberFeed 12	2	53	1.8	1.4	6.7	4.7	0.80	1.00	0.0	0.00	4.50	11	113
159.0	Nokia AirScale Dual RRH 4T4R B	3	157	3.4	1.8	12.1	7.4	0.80	0.50	0.0	0.00	4.50	16	520
159.0	Nokia AHFIG 70.55 lbs	3	146	4.1	2.3	12.1	5.2	0.80	0.50	0.0	0.00	4.50	19	479
159.0	Commscope VHLPX2-11W	2	135	6.1	2.2	25.9	10.2	0.80	1.00	0.0	0.00	4.50	37	280
159.0	Nokia AEHC	3	280	8.9	3.2	21.5	8.1	0.80	0.62	0.0	0.00	4.50	50	903
159.0	Generic Mount Reinforcement	3	421	16.1	0.0	0.0	0.0	1.00	1.00	0.0	0.00	4.50	184	1384
159.0	Generic Round Sector Frame	3	720	33.3	0.0	0.0	0.0	0.75	0.75	0.0	0.00	4.50	215	2341
159.0	Commscope VHLPX4-11W	2	473	19.4	4.1	49.3	27.4	0.80	1.00	0.0	0.00	4.50	119	980
159.0	Commscope FFVV-65C-R3-V1	3	597	25.4	8.0	25.2	9.3	0.80	0.63	0.0	0.00	4.50	147	1866
148.0	Fujitsu TA08025-B605	3	146	3.0	1.3	15.0	9.1	0.80	0.50	0.0	0.00	4.44	14	482
148.0	Fujitsu TA08025-B604	3	130	3.0	1.3	15.0	7.9	0.80	0.50	0.0	0.00	4.44	14	427
148.0	Raycap RDIDC-9181-PF-48	1	91	3.1	1.4	14.6	8.4	0.80	1.00	0.0	0.00	4.44	9	96
148.0	CellMax CMA-UBTULBULBHH/6516/1	3	462	19.5	6.0	26.7	7.7	0.80	0.60	0.0	0.00	4.44	106	1449
148.0	Generic Flat Light Sector Fram	3	739	34.9	0.0	0.0	0.0	0.75	0.75	0.0	0.00	4.44	222	2458
	Totals	**106**	**27,728**	**995.2**									2287	29,909

Discrete Appurtenance Properties for LC: **1.0D + 1.0W Service**

Elev (ft)	Description	Qty	Wt. (lb)	EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc. (ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
180.0	Samsung RT4401-48A	3	19	1.0	1.2	8.6	4.2	0.75	0.50	0.0	0.00	10.95	10	56
180.0	Samsung RF4440d-13A	3	70	1.9	1.3	15.0	9.1	0.75	0.50	0.0	0.00	10.95	20	211
180.0	Commscope VVSSP-65S-R1BV2	3	15	2.4	2.0	12.0	4.6	0.75	0.67	0.0	0.00	10.95	33	46
180.0	Samsung RF4439d-25A	3	75	2.5	1.7	15.0	10.4	0.75	0.67	0.0	0.00	10.95	35	224
180.0	Raycap RVZDC-6627-PF-48	1	32	3.8	2.4	15.7	10.3	0.75	1.00	0.0	0.00	10.95	26	32
180.0	Samsung MT6407-77A	3	82	4.7	2.9	16.1	5.5	0.75	0.61	0.0	0.00	10.95	60	245
180.0	Andrew SBNHH-1D65C	6	66	11.4	8.0	11.9	7.1	0.75	0.70	0.0	0.00	10.95	333	397
180.0	Generic Round Platform with Ha	1	2500	27.2	0.0	0.0	0.0	1.00	1.00	0.0	0.00	10.95	253	2500
175.3	Commscope VHLP4-11W	1	88	16.7	4.1	49.3	27.4	0.80	1.00	0.0	0.00	10.89	124	88
173.6	Commscope VHLP2-18	2	31	4.7	2.2	26.1	12.3	0.80	1.00	0.0	0.00	10.86	69	62
173.3	DragonWave Horizon Compact Plu	6	8	0.7	0.8	8.7	4.0	0.80	0.50	-1.0	15.40	10.85	15	45
172.7	KMW ET-X-WM-18-65-8P	3	36	6.7	5.1	12.0	4.3	0.80	0.63	3.0	280.67	10.89	94	109
172.3	Samsung Medusa Box	3	4	0.4	0.7	5.5	5.5	0.80	0.50	4.0	17.34	10.90	4	12
170.0	Generic Flat Light Sector Fram	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.00	10.82	278	1200
168.0	Samsung Power Junction Cylinde	3	3	0.2	0.8	3.1	3.1	0.80	0.50	4.0	7.52	10.84	2	10
168.0	Samsung Fiber Junction Cylinde	3	3	0.2	0.9	3.1	3.1	0.80	0.50	1.0	1.98	10.80	2	10
168.0	Samsung RRH-V3 (2.5GHz w/ Fing	3	60	2.4	1.3	18.6	9.5	0.80	0.50	0.0	0.00	10.79	26	178
168.0	Samsung RRH-P4 (1.9 GHz)	3	63	2.7	2.0	13.8	9.0	0.80	0.50	3.0	90.70	10.83	30	188
168.0	Samsung RRH-C2A (w/ External F	3	57	3.1	2.0	15.7	6.7	0.80	0.50	0.0	0.00	10.79	34	172
168.0	Andrew VHLP2-11W	1	25	4.6	2.2	25.9	10.2	0.80	1.00	2.0	67.90	10.82	34	25
168.0	KMW ET-X-TS-70-15-62-18-iR-RD	3	42	8.3	6.2	11.8	5.9	0.80	0.67	3.0	367.04	10.83	122	126
168.0	Andrew VHLP3-11W	1	53	10.7	3.3	39.4	24.3	0.80	1.00	-3.0	234.17	10.75	78	53
159.0	Ericsson Mini-Link 6363	8	6	0.5	0.6	7.0	3.1	0.80	0.50	0.0	0.00	10.66	13	50
159.0	Commscope HELIAX FiberFeed 12	2	20	0.9	1.4	6.7	4.7	0.80	1.00	0.0	0.00	10.66	14	40
159.0	Nokia AirScale Dual RRH 4T4R B	3	84	2.2	1.8	12.1	7.4	0.80	0.50	0.0	0.00	10.66	24	251

Elev (ft)	Description	Qty	Wt. (lb)	EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc. (ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
159.0	Nokia AHFIG 70.55 lbs	3	71	2.8	2.3	12.1	5.2	0.80	0.50	0.0	0.00	10.66	30	212
159.0	Commscope VHLPX2-11W	2	25	4.6	2.2	25.9	10.2	0.80	1.00	0.0	0.00	10.66	67	50
159.0	Nokia AEHC	3	104	6.8	3.2	21.5	8.1	0.80	0.62	0.0	0.00	10.66	92	311
159.0	Generic Mount Reinforcement	3	200	7.5	0.0	0.0	0.0	1.00	1.00	0.0	0.00	10.66	204	600
159.0	Generic Round Sector Frame	3	300	14.4	0.0	0.0	0.0	0.75	0.75	0.0	0.00	10.66	220	900
159.0	Commscope VHLPX4-11W	2	88	16.7	4.1	49.3	27.4	0.80	1.00	0.0	0.00	10.66	243	176
159.0	Commscope FFVV-65C-R3-V1	3	125	21.1	8.0	25.2	9.3	0.80	0.63	0.0	0.00	10.66	289	374
148.0	Fujitsu TA08025-B605	3	75	2.0	1.3	15.0	9.1	0.80	0.50	0.0	0.00	10.50	21	225
148.0	Fujitsu TA08025-B604	3	64	2.0	1.3	15.0	7.9	0.80	0.50	0.0	0.00	10.50	21	192
148.0	Raycap RDIDC-9181-PF-48	1	22	2.0	1.4	14.6	8.4	0.80	1.00	0.0	0.00	10.50	14	22
148.0	CellMax CMA-UBTULBULBHH/6516/1	3	105	16.2	6.0	26.7	7.7	0.80	0.60	0.0	0.00	10.50	209	315
148.0	Generic Flat Light Sector Fram	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.00	10.50	270	1200
	Totals	**106**	**10,905**	**636.4**									3,415	10,905

TOWER LOADING – LINEAR APPURTENANCE

Linear Appurtenance Properties

Elev From (ft)	Elev To (ft)	Description	Qty	Width (in)	Weight (lb/ft)	% In Wind	Spread On Faces	Bundling	Cluster Dia (in)	Out of Zone	Spacing (in)	Orient. Factor	K_a Override
5.0	173.0	0.24" (6.1mm) Cat 5e	4	0.24	0.03	50	3	Block	0.00	N	1.00	1.00	0.01
5.0	168.0	0.38" (9.7mm) Cat 5e	1	0.38	0.09	100	3	Individual	0.00	N	1.00	1.00	0.01
5.0	168.0	1.26" (32mm) Hybrid Fanout Cab	3	1.26	1.01	66	3	Block	0.00	N	1.00	1.00	0.00
0.0	180.0	1 5/8" Hybriflex	1	1.98	1.30	100	2	Individual	0.00	N	1.00	1.00	0.00
0.0	180.0	1 5/8" Hybriflex	1	1.98	1.30	100	2	Individual	0.00	N	1.00	1.00	0.01
0.0	180.0	1 5/8" Coax	5	1.98	0.82	100	2	Individual	0.00	N	1.00	1.00	0.01
0.0	180.0	1 5/8" Coax	5	1.98	0.82	100	2	Individual	0.00	N	1.00	1.00	0.00
0.0	175.0	0.36" (9.1mm) Cat 5e	3	0.36	0.06	66	3	Block	0.00	N	1.00	1.00	0.00
0.0	175.0	0.36" (9.1mm) Cat 5e	1	0.36	0.06	100	3	Individual	0.00	N	1.00	1.00	0.00
0.0	159.0	1.46" (37.1mm) Hybrid	2	1.46	1.70	100	1	Individual	0.00	N	1.00	1.00	0.00
0.0	159.0	0.40" (10mm) Coax	8	0.40	0.10	100	1	Individual	0.00	N	1.00	1.00	0.00
0.0	148.0	1.75" (44.5mm) Hybrid	1	1.75	2.72	100	1	Individual	0.00	N	1.00	1.00	0.00
0.0	148.0	Waveguide	1	2.00	6.00	100	1	Individual	0.00	N	1.00	1.00	0.00

SECTION FORCES

1.2D + 1.0W Normal — Gust Response Factor (Gh): 0.85
105.27 mph Wind with No Ice — Wind Importance Factor (Iw): 1.00

Section #	Elev (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt (lb)	Ice Wt (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
11	175	33.50	0.000	5.329	0.00	0.129	2.85	1.00	1.00	0.0	3.06	8.72	0.00	608	0	248	219	467
10	160	32.87	0.000	10.322	0.00	0.118	2.89	1.00	1.00	0.0	5.91	17.11	0.00	1296	0	478	660	1138
9	140	31.96	0.000	13.414	0.00	0.136	2.82	1.00	1.00	0.0	7.72	21.79	0.00	2117	0	592	913	1505
8	125	31.21	4.594	7.813	0.00	0.211	2.56	1.00	1.00	0.0	8.91	22.81	0.00	1408	0	605	454	1059
7	110	30.38	11.250	15.626	0.00	0.182	2.66	1.00	1.00	0.0	19.80	52.63	0.00	2932	0	1359	884	2243
6	95	29.46	5.291	8.614	0.00	0.156	2.75	1.00	1.00	0.0	9.83	27.03	0.00	1662	0	677	428	1105
5	85	28.77	7.712	8.614	0.00	0.164	2.72	1.00	1.00	0.0	12.30	33.44	0.00	1797	0	818	419	1236
4	70	27.62	12.027	17.229	0.00	0.128	2.85	1.00	1.00	0.0	21.19	60.48	0.00	3402	0	1420	804	2224
3	50	25.73	15.937	18.831	0.00	0.129	2.85	1.00	1.00	0.0	25.83	73.61	0.00	4075	0	1610	749	2359
2	30	23.11	17.562	18.831	0.00	0.118	2.89	1.00	1.00	0.0	27.68	80.13	0.00	4162	0	1574	672	2246
1	10	20.00	19.257	18.831	0.00	0.109	2.93	1.00	1.00	0.0	28.27	82.79	0.00	4912	0	1407	562	1970
													Totals	**28,371**	**0**			**17,552**

1.2D + 1.0W 60° — Gust Response Factor (Gh): 0.85
105.27 mph Wind with No Ice — Wind Importance Factor (Iw): 1.00

Section #	Elev (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt (lb)	Ice Wt (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
11	175	33.50	0.000	5.329	0.00	0.129	2.85	0.80	1.00	0.0	3.06	8.72	0.00	608	0	248	219	467
10	160	32.87	0.000	10.322	0.00	0.118	2.89	0.80	1.00	0.0	5.91	17.11	0.00	1296	0	478	660	1138
9	140	31.96	0.000	13.414	0.00	0.136	2.82	0.80	1.00	0.0	7.72	21.79	0.00	2117	0	592	913	1505
8	125	31.21	4.594	7.813	0.00	0.211	2.56	0.80	1.00	0.0	7.99	20.46	0.00	1408	0	543	454	997
7	110	30.38	11.250	15.626	0.00	0.182	2.66	0.80	1.00	0.0	17.55	46.65	0.00	2932	0	1205	884	2088
6	95	29.46	5.291	8.614	0.00	0.156	2.75	0.80	1.00	0.0	8.77	24.12	0.00	1662	0	604	428	1032
5	85	28.77	7.712	8.614	0.00	0.164	2.72	0.80	1.00	0.0	10.76	29.24	0.00	1797	0	715	419	1134
4	70	27.62	12.027	17.229	0.00	0.128	2.85	0.80	1.00	0.0	18.79	53.62	0.00	3402	0	1259	804	2062
3	50	25.73	15.937	18.831	0.00	0.129	2.85	0.80	1.00	0.0	22.64	64.53	0.00	4075	0	1411	749	2160
2	30	23.11	17.562	18.831	0.00	0.118	2.89	0.80	1.00	0.0	24.17	69.96	0.00	4162	0	1374	672	2046
1	10	20.00	19.257	18.831	0.00	0.109	2.93	0.80	1.00	0.0	24.52	71.79	0.00	4912	0	1220	562	1783
													Totals	**28,371**	**0**			**16,414**

1.2D + 1.0W 90° — Gust Response Factor (Gh): 0.85
105.27 mph Wind with No Ice — Wind Importance Factor (Iw): 1.00

Section #	Elev (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt (lb)	Ice Wt (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
11	175	33.50	0.000	5.329	0.00	0.129	2.85	0.85	1.00	0.0	3.06	8.72	0.00	608	0	248	219	467
10	160	32.87	0.000	10.322	0.00	0.118	2.89	0.85	1.00	0.0	5.91	17.11	0.00	1296	0	478	660	1138
9	140	31.96	0.000	13.414	0.00	0.136	2.82	0.85	1.00	0.0	7.72	21.79	0.00	2117	0	592	913	1505
8	125	31.21	4.594	7.813	0.00	0.211	2.56	0.85	1.00	0.0	8.22	21.04	0.00	1408	0	558	454	1012
7	110	30.38	11.250	15.626	0.00	0.182	2.66	0.85	1.00	0.0	18.12	48.15	0.00	2932	0	1243	884	2127
6	95	29.46	5.291	8.614	0.00	0.156	2.75	0.85	1.00	0.0	9.03	24.85	0.00	1662	0	622	428	1051
5	85	28.77	7.712	8.614	0.00	0.164	2.72	0.85	1.00	0.0	11.14	30.29	0.00	1797	0	741	419	1159
4	70	27.62	12.027	17.229	0.00	0.128	2.85	0.85	1.00	0.0	19.39	55.34	0.00	3402	0	1299	804	2103
3	50	25.73	15.937	18.831	0.00	0.129	2.85	0.85	1.00	0.0	23.44	66.80	0.00	4075	0	1461	749	2210
2	30	23.11	17.562	18.831	0.00	0.118	2.89	0.85	1.00	0.0	25.05	72.50	0.00	4162	0	1424	672	2096
1	10	20.00	19.257	18.831	0.00	0.109	2.93	0.85	1.00	0.0	25.48	74.61	0.00	4912	0	1268	562	1831
													Totals	**28,371**	**0**			**16,699**

0.9D + 1.0W Normal — Gust Response Factor (Gh): 0.85
105.27 mph Wind with No Ice (Reduced DL) — Wind Importance Factor (Iw): 1.00

Section #	Elev (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt (lb)	Ice Wt (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
11	175	33.50	0.000	5.329	0.00	0.129	2.85	1.00	1.00	0.0	3.06	8.72	0.00	456	0	248	219	467
10	160	32.87	0.000	10.322	0.00	0.118	2.89	1.00	1.00	0.0	5.91	17.11	0.00	972	0	478	660	1138
9	140	31.96	0.000	13.414	0.00	0.136	2.82	1.00	1.00	0.0	7.72	21.79	0.00	1588	0	592	913	1505
8	125	31.21	4.594	7.813	0.00	0.211	2.56	1.00	1.00	0.0	8.91	22.81	0.00	1056	0	605	454	1059
7	110	30.38	11.250	15.626	0.00	0.182	2.66	1.00	1.00	0.0	19.80	52.63	0.00	2199	0	1359	884	2243
6	95	29.46	5.291	8.614	0.00	0.156	2.75	1.00	1.00	0.0	9.83	27.03	0.00	1247	0	677	428	1105
5	85	28.77	7.712	8.614	0.00	0.164	2.72	1.00	1.00	0.0	12.30	33.44	0.00	1348	0	818	419	1236
4	70	27.62	12.027	17.229	0.00	0.128	2.85	1.00	1.00	0.0	21.19	60.48	0.00	2551	0	1420	804	2224
3	50	25.73	15.937	18.831	0.00	0.129	2.85	1.00	1.00	0.0	25.83	73.61	0.00	3056	0	1610	749	2359
2	30	23.11	17.562	18.831	0.00	0.118	2.89	1.00	1.00	0.0	27.68	80.13	0.00	3121	0	1574	672	2246
1	10	20.00	19.257	18.831	0.00	0.109	2.93	1.00	1.00	0.0	28.37	83.07	0.00	3684	0	1412	562	1974
													Totals	**21,278**	**0**			**17,557**

0.9D + 1.0W 60° — Gust Response Factor (Gh): 0.85
105.27 mph Wind with No Ice (Reduced DL) — Wind Importance Factor (Iw): 1.00

Section #	Elev (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt (lb)	Ice Wt (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
11	175	33.50	0.000	5.329	0.00	0.129	2.85	0.80	1.00	0.0	3.06	8.72	0.00	456	0	248	219	467
10	160	32.87	0.000	10.322	0.00	0.118	2.89	0.80	1.00	0.0	5.91	17.11	0.00	972	0	478	660	1138
9	140	31.96	0.000	13.414	0.00	0.136	2.82	0.80	1.00	0.0	7.72	21.79	0.00	1588	0	592	913	1505
8	125	31.21	4.594	7.813	0.00	0.211	2.56	0.80	1.00	0.0	7.99	20.46	0.00	1056	0	543	454	997
7	110	30.38	11.250	15.626	0.00	0.182	2.66	0.80	1.00	0.0	17.55	46.65	0.00	2199	0	1205	884	2088

SECTION FORCES

0.9D + 1.0W 60° Gust Response Factor (Gh): 0.85
105.27 mph Wind with No Ice (Reduced DL) Wind Importance Factor (Iw): 1.00

Section #	Elev (ft)	Q_Z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt (lb)	Ice Wt (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
6	95	29.46	5.291	8.614	0.00	0.156	2.75	0.80	1.00	0.0	8.77	24.12	0.00	1247	0	604	428	1032
5	85	28.77	7.712	8.614	0.00	0.164	2.72	0.80	1.00	0.0	10.76	29.24	0.00	1348	0	715	419	1134
4	70	27.62	12.027	17.229	0.00	0.128	2.85	0.80	1.00	0.0	18.79	53.62	0.00	2551	0	1259	804	2062
3	50	25.73	15.937	18.831	0.00	0.129	2.85	0.80	1.00	0.0	22.64	64.53	0.00	3056	0	1411	749	2160
2	30	23.11	17.562	18.831	0.00	0.118	2.89	0.80	1.00	0.0	24.17	69.96	0.00	3121	0	1374	672	2046
1	10	20.00	19.257	18.831	0.00	0.109	2.93	0.80	1.00	0.0	24.52	71.79	0.00	3684	0	1220	562	1783
													Totals	**21,278**	**0**			**16,414**

0.9D + 1.0W 90° Gust Response Factor (Gh): 0.85
105.27 mph Wind with No Ice (Reduced DL) Wind Importance Factor (Iw): 1.00

Section #	Elev (ft)	Q_Z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt (lb)	Ice Wt (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
11	175	33.50	0.000	5.329	0.00	0.129	2.85	0.85	1.00	0.0	3.06	8.72	0.00	456	0	248	219	467
10	160	32.87	0.000	10.322	0.00	0.118	2.89	0.85	1.00	0.0	5.91	17.11	0.00	972	0	478	660	1138
9	140	31.96	0.000	13.414	0.00	0.136	2.82	0.85	1.00	0.0	7.72	21.79	0.00	1588	0	592	913	1505
8	125	31.21	4.594	7.813	0.00	0.211	2.56	0.85	1.00	0.0	8.22	21.04	0.00	1056	0	558	454	1012
7	110	30.38	11.250	15.626	0.00	0.182	2.66	0.85	1.00	0.0	18.12	48.15	0.00	2199	0	1243	884	2127
6	95	29.46	5.291	8.614	0.00	0.156	2.75	0.85	1.00	0.0	9.03	24.85	0.00	1247	0	622	428	1051
5	85	28.77	7.712	8.614	0.00	0.164	2.72	0.85	1.00	0.0	11.14	30.29	0.00	1348	0	741	419	1159
4	70	27.62	12.027	17.229	0.00	0.128	2.85	0.85	1.00	0.0	19.39	55.34	0.00	2551	0	1299	804	2103
3	50	25.73	15.937	18.831	0.00	0.129	2.85	0.85	1.00	0.0	23.44	66.80	0.00	3056	0	1461	749	2210
2	30	23.11	17.562	18.831	0.00	0.118	2.89	0.85	1.00	0.0	25.05	72.50	0.00	3121	0	1424	672	2096
1	10	20.00	19.257	18.831	0.00	0.109	2.93	0.85	1.00	0.0	25.48	74.61	0.00	3684	0	1268	562	1831
													Totals	**21,278**	**0**			**16,699**

1.2D + 1.0Di + 1.0Wi Normal Gust Response Factor (Gh): 0.85 Ice Importance Factor: 1.00
38.99 mph Wind with 1.7" Radial Ice Wind Importance Factor (Iw): 1.00 Ice Dead Load Factor: 1.00

Section #	Elev (ft)	Q_Z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt (lb)	Ice Wt (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
11	175	4.60	0.000	27.161	21.83	0.609	1.80	1.00	1.00	2.0	20.42	36.72	21.83	3073	2464	143	65	209
10	160	4.51	0.000	52.133	41.81	0.554	1.84	1.00	1.00	2.0	37.40	68.82	41.81	7266	5970	264	265	528
9	140	4.38	0.000	57.355	43.94	0.547	1.85	1.00	1.00	2.0	40.96	75.63	43.94	9328	7211	282	394	676
8	125	4.28	4.594	21.689	13.88	0.423	2.02	1.00	1.00	1.9	18.62	37.61	13.88	4928	3519	137	245	382
7	110	4.17	11.250	45.965	30.34	0.371	2.12	1.00	1.00	1.9	39.94	84.84	30.34	10150	7218	301	510	811
6	95	4.04	5.291	23.192	14.58	0.308	2.27	1.00	1.00	1.9	19.24	43.77	14.58	5179	3516	150	264	414
5	85	3.95	7.712	26.250	17.64	0.332	2.22	1.00	1.00	1.9	23.71	52.52	17.64	5606	3808	176	249	425
4	70	3.79	12.027	47.640	30.41	0.254	2.42	1.00	1.00	1.8	39.95	96.87	30.41	10331	6929	312	514	826
3	50	3.53	15.937	50.048	31.22	0.240	2.47	1.00	1.00	1.8	45.09	111.32	31.22	11180	7105	334	474	808
2	30	3.17	17.562	50.318	31.49	0.216	2.55	1.00	1.00	1.7	46.61	118.64	31.49	10968	6806	320	421	741
1	10	2.74	19.257	48.747	29.92	0.192	2.62	1.00	1.00	1.5	47.19	123.81	29.92	10839	5927	289	339	628
													Totals	**88,848**	**60,477**			**6,447**

1.2D + 1.0Di + 1.0Wi 60° Gust Response Factor (Gh): 0.85 Ice Importance Factor: 1.00
38.99 mph Wind with 1.7" Radial Ice Wind Importance Factor (Iw): 1.00 Ice Dead Load Factor: 1.00

Section #	Elev (ft)	Q_Z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt (lb)	Ice Wt (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
11	175	4.60	0.000	27.161	21.83	0.609	1.80	0.80	1.00	2.0	20.42	36.72	21.83	3073	2464	143	65	209
10	160	4.51	0.000	52.133	41.81	0.554	1.84	0.80	1.00	2.0	37.40	68.82	41.81	7266	5970	264	265	528
9	140	4.38	0.000	57.355	43.94	0.547	1.85	0.80	1.00	2.0	40.96	75.63	43.94	9328	7211	282	394	676
8	125	4.28	4.594	21.689	13.88	0.423	2.02	0.80	1.00	1.9	17.70	35.75	13.88	4928	3519	130	245	376
7	110	4.17	11.250	45.965	30.34	0.371	2.12	0.80	1.00	1.9	37.69	80.06	30.34	10150	7218	284	510	794
6	95	4.04	5.291	23.192	14.58	0.308	2.27	0.80	1.00	1.9	18.18	41.36	14.58	5179	3516	142	264	406
5	85	3.95	7.712	26.250	17.64	0.332	2.22	0.80	1.00	1.9	22.17	49.10	17.64	5606	3808	165	249	413
4	70	3.79	12.027	47.640	30.41	0.254	2.42	0.80	1.00	1.8	37.54	91.03	30.41	10331	6929	293	514	807
3	50	3.53	15.937	50.048	31.22	0.240	2.47	0.80	1.00	1.8	41.90	103.46	31.22	11180	7105	310	474	785
2	30	3.17	17.562	50.318	31.49	0.216	2.55	0.80	1.00	1.7	43.10	109.70	31.49	10968	6806	296	421	716
1	10	2.74	19.257	48.747	29.92	0.192	2.62	0.80	1.00	1.5	43.34	113.70	29.92	10839	5927	265	339	604
													Totals	**88,848**	**60,477**			**6,314**

1.2D + 1.0Di + 1.0Wi 90° Gust Response Factor (Gh): 0.85 Ice Importance Factor: 1.00
38.99 mph Wind with 1.7" Radial Ice Wind Importance Factor (Iw): 1.00 Ice Dead Load Factor: 1.00

Section #	Elev (ft)	Q_Z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt (lb)	Ice Wt (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
11	175	4.60	0.000	27.161	21.83	0.609	1.80	0.85	1.00	2.0	20.42	36.72	21.83	3073	2464	143	65	209
10	160	4.51	0.000	52.133	41.81	0.554	1.84	0.85	1.00	2.0	37.40	68.82	41.81	7266	5970	264	265	528
9	140	4.38	0.000	57.355	43.94	0.547	1.85	0.85	1.00	2.0	40.96	75.63	43.94	9328	7211	282	394	676
8	125	4.28	4.594	21.689	13.88	0.423	2.02	0.85	1.00	1.9	17.93	36.22	13.88	4928	3519	132	245	377
7	110	4.17	11.250	45.965	30.34	0.371	2.12	0.85	1.00	1.9	38.25	81.26	30.34	10150	7218	288	510	798
6	95	4.04	5.291	23.192	14.58	0.308	2.27	0.85	1.00	1.9	18.45	41.96	14.58	5179	3516	144	264	408
5	85	3.95	7.712	26.250	17.64	0.332	2.22	0.85	1.00	1.9	22.55	49.96	17.64	5606	3808	168	249	416
4	70	3.79	12.027	47.640	30.41	0.254	2.42	0.85	1.00	1.8	38.14	92.49	30.41	10331	6929	298	514	812
3	50	3.53	15.937	50.048	31.22	0.240	2.47	0.85	1.00	1.8	42.70	105.42	31.22	11180	7105	316	474	791
2	30	3.17	17.562	50.318	31.49	0.216	2.55	0.85	1.00	1.7	43.98	111.93	31.49	10968	6806	302	421	723

SECTION FORCES

1.2D + 1.0Di + 1.0Wi 90° — Gust Response Factor (Gh): 0.85 — Ice Importance Factor: 1.00
38.99 mph Wind with 1.7" Radial Ice — Wind Importance Factor (Iw): 1.00 — Ice Dead Load Factor: 1.00

Section #	Elev (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt (lb)	Ice Wt (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
1	10	2.74	19.257	48.747	29.92	0.192	2.62	0.85	1.00	1.5	44.31	116.23	29.92	10839	5927	271	339	610
													Totals	**88,848**	**60,477**			**6,347**

1.0D + 1.0W Service Normal — Gust Response Factor (Gh): 0.85
60 mph Wind with No Ice — Wind Importance Factor (Iw): 1.00

Section #	Elev (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt (lb)	Ice Wt (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
11	175	10.88	0.000	5.329	0.00	0.129	2.85	1.00	1.00	0.0	3.06	8.72	0.00	507	0	81	71	152
10	160	10.68	0.000	10.322	0.00	0.118	2.89	1.00	1.00	0.0	5.91	17.11	0.00	1080	0	155	215	370
9	140	10.38	0.000	13.414	0.00	0.136	2.82	1.00	1.00	0.0	7.72	21.79	0.00	1764	0	192	297	489
8	125	10.14	4.594	7.813	0.00	0.211	2.56	1.00	1.00	0.0	9.10	23.30	0.00	1173	0	201	147	348
7	110	9.87	11.250	15.626	0.00	0.182	2.66	1.00	1.00	0.0	20.18	53.64	0.00	2443	0	450	287	737
6	95	9.57	5.291	8.614	0.00	0.156	2.75	1.00	1.00	0.0	10.18	28.01	0.00	1385	0	228	139	367
5	85	9.35	7.712	8.614	0.00	0.164	2.72	1.00	1.00	0.0	12.61	34.30	0.00	1498	0	273	136	409
4	70	8.97	12.027	17.229	0.00	0.128	2.85	1.00	1.00	0.0	21.77	62.14	0.00	2835	0	474	261	735
3	50	8.36	15.937	18.831	0.00	0.129	2.85	1.00	1.00	0.0	26.59	75.78	0.00	3396	0	538	243	782
2	30	7.51	17.562	18.831	0.00	0.118	2.89	1.00	1.00	0.0	28.20	81.62	0.00	3468	0	521	218	739
1	10	6.50	19.257	18.831	0.00	0.109	2.93	1.00	1.00	0.0	29.89	87.52	0.00	4093	0	483	183	666
													Totals	**23,643**	**0**			**5,793**

1.0D + 1.0W Service 60° — Gust Response Factor (Gh): 0.85
60 mph Wind with No Ice — Wind Importance Factor (Iw): 1.00

Section #	Elev (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt (lb)	Ice Wt (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
11	175	10.88	0.000	5.329	0.00	0.129	2.85	0.80	1.00	0.0	3.06	8.72	0.00	507	0	81	71	152
10	160	10.68	0.000	10.322	0.00	0.118	2.89	0.80	1.00	0.0	5.91	17.11	0.00	1080	0	155	215	370
9	140	10.38	0.000	13.414	0.00	0.136	2.82	0.80	1.00	0.0	7.72	21.79	0.00	1764	0	192	297	489
8	125	10.14	4.594	7.813	0.00	0.211	2.56	0.80	1.00	0.0	8.18	20.95	0.00	1173	0	180	147	328
7	110	9.87	11.250	15.626	0.00	0.182	2.66	0.80	1.00	0.0	17.93	47.66	0.00	2443	0	400	287	687
6	95	9.57	5.291	8.614	0.00	0.156	2.75	0.80	1.00	0.0	9.13	25.10	0.00	1385	0	204	139	343
5	85	9.35	7.712	8.614	0.00	0.164	2.72	0.80	1.00	0.0	11.07	30.11	0.00	1498	0	239	136	375
4	70	8.97	12.027	17.229	0.00	0.128	2.85	0.80	1.00	0.0	19.37	55.28	0.00	2835	0	422	261	683
3	50	8.36	15.937	18.831	0.00	0.129	2.85	0.80	1.00	0.0	23.40	66.70	0.00	3396	0	474	243	717
2	30	7.51	17.562	18.831	0.00	0.118	2.89	0.80	1.00	0.0	24.69	71.46	0.00	3468	0	456	218	674
1	10	6.50	19.257	18.831	0.00	0.109	2.93	0.80	1.00	0.0	26.04	76.24	0.00	4093	0	421	183	604
													Totals	**23,643**	**0**			**5,422**

1.0D + 1.0W Service 90° — Gust Response Factor (Gh): 0.85
60 mph Wind with No Ice — Wind Importance Factor (Iw): 1.00

Section #	Elev (ft)	Q_z (psf)	A_f (sf)	A_r (sf)	Ice A_r (sf)	e	C_f	D_f	D_r	T_{iz} (in)	A_e (sf)	EPA_a (sf)	EPA_{ai} (sf)	Wt (lb)	Ice Wt (lb)	F_{st} (lb)	F_a (lb)	Force (lb)
11	175	10.88	0.000	5.329	0.00	0.129	2.85	0.85	1.00	0.0	3.06	8.72	0.00	507	0	81	71	152
10	160	10.68	0.000	10.322	0.00	0.118	2.89	0.85	1.00	0.0	5.91	17.11	0.00	1080	0	155	215	370
9	140	10.38	0.000	13.414	0.00	0.136	2.82	0.85	1.00	0.0	7.72	21.79	0.00	1764	0	192	297	489
8	125	10.14	4.594	7.813	0.00	0.211	2.56	0.85	1.00	0.0	8.41	21.53	0.00	1173	0	186	147	333
7	110	9.87	11.250	15.626	0.00	0.182	2.66	0.85	1.00	0.0	18.49	49.15	0.00	2443	0	412	287	699
6	95	9.57	5.291	8.614	0.00	0.156	2.75	0.85	1.00	0.0	9.39	25.83	0.00	1385	0	210	139	349
5	85	9.35	7.712	8.614	0.00	0.164	2.72	0.85	1.00	0.0	11.46	31.16	0.00	1498	0	248	136	384
4	70	8.97	12.027	17.229	0.00	0.128	2.85	0.85	1.00	0.0	19.97	56.99	0.00	2835	0	435	261	696
3	50	8.36	15.937	18.831	0.00	0.129	2.85	0.85	1.00	0.0	24.20	68.97	0.00	3396	0	490	243	733
2	30	7.51	17.562	18.831	0.00	0.118	2.89	0.85	1.00	0.0	25.57	74.00	0.00	3468	0	472	218	691
1	10	6.50	19.257	18.831	0.00	0.109	2.93	0.85	1.00	0.0	27.00	79.06	0.00	4093	0	437	183	619
													Totals	**23,643**	**0**			**5,515**

EQUIVALENT LATERAL FORCE METHOD

Spectral Response Acceleration for Short Period (S_S):	0.14
Spectral Response Acceleration at 1.0 Second Period (S_1):	0.06
Long-Period Transition Period (T_L – Seconds):	12
Importance Factor (I_e):	1.00
Site Coefficient F_a:	1.60
Site Coefficient F_v:	2.40
Response Modification Coefficient (R):	3.00
Design Spectral Response Acceleration at Short Period (S_{ds}):	0.15
Design Spectral Response Acceleration at 1.0 Second Period (S_{d1}):	0.09
Seismic Response Coefficient (C_s):	0.03
Upper Limit C_S:	0.03
Lower Limit C_S:	0.03
Period based on Rayleigh Method (sec):	1.56
Redundancy Factor (p):	1.30
Seismic Force Distribution Exponent (k):	1.53
Total Unfactored Dead Load:	34.55 k
Seismic Base Shear (E):	1.35 k

SEISMIC FORCES

0.9D - 1.0Ev + 1.0Eh

Section/Appurtenance	Height Above Base (ft)	Weight (lb)	W_z (lb-ft)	Cvx	Horizontal Force (lb)	Vertical Force (lb)
11	175.00	507	1,386,463	0.029	40	441
10	160.00	1,080	2,574,371	0.055	74	940
9	140.00	1,764	3,428,241	0.073	98	1,535
8	125.00	1,173	1,916,764	0.041	55	1,021
7	110.00	2,443	3,280,865	0.070	94	2,126
6	95.00	1,385	1,485,967	0.032	42	1,206
5	85.00	1,498	1,354,872	0.029	39	1,304
4	70.00	2,835	1,904,490	0.040	54	2,467
3	50.00	3,396	1,362,397	0.029	39	2,956
2	30.00	3,468	636,094	0.014	18	3,019
1	10.00	4,093	139,439	0.003	4	3,563
Samsung RT4401-48A	180.00	56	159,368	0.003	5	49
Samsung RF4440d-13A	180.00	211	602,344	0.013	17	184
Commscope VVSSP-65S-R1BV2	180.00	46	130,237	0.003	4	40
Samsung RF4439d-25A	180.00	224	640,044	0.014	18	195
Raycap RVZDC-6627-PF-48	180.00	32	91,394	0.002	3	28
Samsung MT6407-77A	180.00	245	699,165	0.015	20	213
Andrew SBNHH-1D65C	180.00	397	1,132,716	0.024	32	345
Generic Round Platform with Handrails	180.00	2,500	7,140,163	0.151	204	2,176
Commscope VHLP4-11W	175.30	88	241,348	0.005	7	77
Commscope VHLP2-18	173.60	62	167,520	0.004	5	54
DragonWave Horizon Compact Plus	173.30	45	121,266	0.003	3	39
KMW ET-X-WM-18-65-8P	172.70	109	292,711	0.006	8	95
Samsung Medusa Box	172.30	12	32,052	0.001	1	10
Generic Flat Light Sector Frame	170.00	1,200	3,139,873	0.067	90	1,044
Samsung Power Junction Cylinder..	168.00	10	25,438	0.000	1	9
Samsung Fiber Junction Cylinder	168.00	10	25,438	0.000	1	9
Samsung RRH-V3 (2.5GHz w/ Finger Guard)	168.00	178	458,663	0.010	13	155
Samsung RRH-P4 (1.9 GHz)	168.00	188	484,101	0.010	14	164
Samsung RRH-C2A (w/ External Filter)	168.00	172	441,704	0.009	13	150
Andrew VHLP2-11W	168.00	25	64,238	0.001	2	22
KMW ET-X-TS-70-15-62-18-iR-RD	168.00	126	322,991	0.007	9	109
Andrew VHLP3-11W	168.00	53	136,186	0.003	4	46
Ericsson Mini-Link 6363	159.00	50	117,138	0.002	3	43
Commscope HELIAX FiberFeed 12 RRU Pendant Connect	159.00	40	94,466	0.002	3	35
Nokia AirScale Dual RRH 4T4R B12/71 240W AHLOA	159.00	251	593,717	0.013	17	219
Nokia AHFIG 70.55 lbs	159.00	212	500,196	0.011	14	184
Commscope VHLPX2-11W	159.00	50	118,082	0.002	3	44
Nokia AEHC	159.00	311	733,999	0.016	21	271
Generic Mount Reinforcement	159.00	600	1,416,987	0.030	40	522
Generic Round Sector Frame	159.00	900	2,125,480	0.045	61	783
Commscope VHLPX4-11W	159.00	176	415,649	0.009	12	153

Commscope FFVV-65C-R3-V1	159.00	374	882,783	0.019	25	325
Fujitsu TA08025-B605	148.00	225	476,089	0.010	14	196
Fujitsu TA08025-B604	148.00	192	405,628	0.009	12	167
Raycap RDIDC-9181-PF-48	148.00	22	46,339	0.001	1	19
CellMax CMA-UBTULBULBHH/6516/16/21/21	148.00	315	666,525	0.014	19	274
Generic Flat Light Sector Frame	148.00	1,200	2,539,141	0.054	73	1,044
Totals		**34,548**	**47,151,146**	**1.000**	**1,347**	**30,069**

1.2D + 1.0Ev + 1.0Eh

Section/Appurtenance	Height Above Base (ft)	Weight (lb)	W_z (lb-ft)	Cvx	Horizontal Force (lb)	Vertical Force (lb)
11	175.00	507	1,386,463	0.029	40	623
10	160.00	1,080	2,574,371	0.055	74	1,328
9	140.00	1,764	3,428,241	0.073	98	2,169
8	125.00	1,173	1,916,764	0.041	55	1,443
7	110.00	2,443	3,280,865	0.070	94	3,004
6	95.00	1,385	1,485,967	0.032	42	1,703
5	85.00	1,498	1,354,872	0.029	39	1,842
4	70.00	2,835	1,904,490	0.040	54	3,486
3	50.00	3,396	1,362,397	0.029	39	4,176
2	30.00	3,468	636,094	0.014	18	4,265
1	10.00	4,093	139,439	0.003	4	5,033
Samsung RT4401-48A	180.00	56	159,368	0.003	5	69
Samsung RF4440d-13A	180.00	211	602,344	0.013	17	259
Commscope VVSSP-65S-R1BV2	180.00	46	130,237	0.003	4	56
Samsung RF4439d-25A	180.00	224	640,044	0.014	18	276
Raycap RVZDC-6627-PF-48	180.00	32	91,394	0.002	3	39
Samsung MT6407-77A	180.00	245	699,165	0.015	20	301
Andrew SBNHH-1D65C	180.00	397	1,132,716	0.024	32	488
Generic Round Platform with Handrails	180.00	2,500	7,140,163	0.151	204	3,074
Commscope VHLP4-11W	175.30	88	241,348	0.005	7	108
Commscope VHLP2-18	173.60	62	167,520	0.004	5	76
DragonWave Horizon Compact Plus	173.30	45	121,266	0.003	3	55
KMW ET-X-WM-18-65-8P	172.70	109	292,711	0.006	8	134
Samsung Medusa Box	172.30	12	32,052	0.001	1	15
Generic Flat Light Sector Frame	170.00	1,200	3,139,873	0.067	90	1,476
Samsung Power Junction Cylinder..	168.00	10	25,438	0.000	1	12
Samsung Fiber Junction Cylinder	168.00	10	25,438	0.000	1	12
Samsung RRH-V3 (2.5GHz w/ Finger Guard)	168.00	178	458,663	0.010	13	219
Samsung RRH-P4 (1.9 GHz)	168.00	188	484,101	0.010	14	232
Samsung RRH-C2A (w/ External Filter)	168.00	172	441,704	0.009	13	211
Andrew VHLP2-11W	168.00	25	64,238	0.001	2	31
KMW ET-X-TS-70-15-62-18-iR-RD	168.00	126	322,991	0.007	9	155
Andrew VHLP3-11W	168.00	53	136,186	0.003	4	65
Ericsson Mini-Link 6363	159.00	50	117,138	0.002	3	61
Commscope HELIAX FiberFeed 12 RRU Pendant Connect	159.00	40	94,466	0.002	3	49
Nokia AirScale Dual RRH 4T4R B12/71 240W AHLOA	159.00	251	593,717	0.013	17	309
Nokia AHFIG 70.55 lbs	159.00	212	500,196	0.011	14	260
Commscope VHLPX2-11W	159.00	50	118,082	0.002	3	61
Nokia AEHC	159.00	311	733,999	0.016	21	382
Generic Mount Reinforcement	159.00	600	1,416,987	0.030	40	738
Generic Round Sector Frame	159.00	900	2,125,480	0.045	61	1,107
Commscope VHLPX4-11W	159.00	176	415,649	0.009	12	216
Commscope FFVV-65C-R3-V1	159.00	374	882,783	0.019	25	460
Fujitsu TA08025-B605	148.00	225	476,089	0.010	14	277
Fujitsu TA08025-B604	148.00	192	405,628	0.009	12	236
Raycap RDIDC-9181-PF-48	148.00	22	46,339	0.001	1	27
CellMax CMA-UBTULBULBHH/6516/16/21/21	148.00	315	666,525	0.014	19	387
Generic Flat Light Sector Frame	148.00	1,200	2,539,141	0.054	73	1,476
Totals		**34,548**	**47,151,146**	**1.000**	**1,347**	**42,482**

FORCE/STRESS SUMMARY

Section 1 – 0.0' to 20.00'

Member Compression	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'_y (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	# Bolt	# Hole	Use %	Controls
L 12B - 12"BD 1.75"	-218.51	1.2D + 1.0W N	10.017	100	100	100	0.00	0.00	300.70	0.00	0.00	0	0	72	User Input
D SAE - 3X3X0.3125	-4.50	1.2D + 1.0W N	20.158	50	50	50	205.34	205.34	12.08	35.34	34.80	1	1	37	Member Z

Member Tension	Pu (kip)	Load Case	F_y (ksi)	F_u (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	Blk Shear $\Phi_t P_n$ (kip)	# Bolt	# Hole	Use %	Controls
L 12B - 12"BD 1.75"	190.32	0.9D + 1.0W 60°	50.0	65	324.70	0.00	0.00		0	0	58	User Input
D SAE - 3X3X0.3125	3.76	1.2D + 1.0W 60°	36.0	58	47.24	35.34	21.21	16.94	1	1	22	Blk Shear

Max Splice Forces	Pu (kip)	Load Case	ΦR_{nt} (kip)	Use %	Num Bolts	Bolt Type
Bot Tension	194.43	0.9D + 1.0W 60°	408.88	48	6	1 A687

Section 2 – 20.0' to 40.00'

Member Compression	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'_y (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	# Bolt	# Hole	Use %	Controls
L 12B - 12"BD 1.75"	-204.89	1.2D + 1.0W N	10.017	100	100	100	0.00	0.00	300.70	0.00	0.00	0	0	68	User Input
D SAE - 3X3X0.1875	-3.67	1.2D + 1.0W 90°	18.448	50	50	50	185.72	185.72	9.04	35.34	20.88	1	1	40	Member Z

Member Tension	Pu (kip)	Load Case	F_y (ksi)	F_u (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	Blk Shear $\Phi_t P_n$ (kip)	# Bolt	# Hole	Use %	Controls
L 12B - 12"BD 1.75"	179.32	0.9D + 1.0W 60°	50.0	65	324.70	0.00	0.00		0	0	55	User Input
D SAE - 3X3X0.1875	3.39	1.2D + 1.0W 90°	36.0	58	29.06	35.34	12.72	10.16	1	1	33	Blk Shear

Max Splice Forces	Pu (kip)	Load Case	ΦR_{nt} (kip)	Use %	Num Bolts	Bolt Type
Bot Tension	181.95	0.9D + 1.0W 60°	327.10	56	6	1 A325

Section 3 – 40.0' to 60.00'

Member Compression	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'_y (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	# Bolt	# Hole	Use %	Controls
L 12B - 12"BD 1.75"	-189.06	1.2D + 1.0W N	10.017	100	100	100	0.00	0.00	300.70	0.00	0.00	0	0	62	User Input
D SAE - 3X3X0.1875	-3.48	1.2D + 1.0W 90°	16.803	50	50	50	169.16	169.16	10.90	35.34	20.88	1	1	31	Member Z

Member Tension	Pu (kip)	Load Case	F_y (ksi)	F_u (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	Blk Shear $\Phi_t P_n$ (kip)	# Bolt	# Hole	Use %	Controls
L 12B - 12"BD 1.75"	166.78	0.9D + 1.0W 60°	50.0	65	324.70	0.00	0.00		0	0	51	User Input
D SAE - 3X3X0.1875	3.23	1.2D + 1.0W 90°	36.0	58	29.06	35.34	12.72	10.16	1	1	31	Blk Shear

Max Splice Forces	Pu (kip)	Load Case	ΦR_{nt} (kip)	Use %	Num Bolts	Bolt Type
Bot Tension	169.50	0.9D + 1.0W 60°	327.10	52	6	1 A325

Section 4 – 60.0' to 80.00'

Member Compression	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'_y (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	# Bolt	# Hole	Use %	Controls
L 12B - 12"BD 1.5"	-172.67	1.2D + 1.0W N	10.017	100	100	100	0.00	0.00	214.90	0.00	0.00	0	0	80	User Input
D SAE - 2.5X2.5X0.1875	-3.29	1.2D + 1.0W N	15.243	50	50	50	184.76	184.76	7.56	35.34	20.88	1	1	43	Member Z

Member Tension	Pu (kip)	Load Case	F_y (ksi)	F_u (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	Blk Shear $\Phi_t P_n$ (kip)	# Bolt	# Hole	Use %	Controls
L 12B - 12"BD 1.5"	153.76	0.9D + 1.0W 60°	50.0	65	238.60	0.00	0.00		0	0	64	User Input
D SAE - 2.5X2.5X0.1875	3.36	1.2D + 1.0W N	36.0	58	22.93	35.34	12.72	9.14	1	1	36	Blk Shear

Max Splice Forces	Pu (kip)	Load Case	ΦR_{nt} (kip)	Use %	Num Bolts	Bolt Type
Bot Tension	156.67	0.9D + 1.0W 60°	327.10	48	6	1 A325

FORCE/STRESS SUMMARY

Section 5 – 80.0' to 90.00'

Member Compression	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'_y (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	# Bolt	# Hole	Use %	Controls
L 12B - 12"BD 1.5"	-154.28	1.2D + 1.0W N	10.017	100	100	100	0.00	0.00	214.90	0.00	0.00	0	0	71	User Input
H SAE - 3X3X0.1875	-2.85	1.2D + 1.0W N	9	100	100	100	181.21	181.21	9.50	35.34	20.88	1	1	30	Member Z
D SAE - 2.5X2.5X0.1875	-4.14	1.2D + 1.0W N	13.796	50	50	50	167.23	167.23	9.23	35.34	20.88	1	1	44	Member Z

Member Tension	Pu (kip)	Load Case	F_y (ksi)	F_u (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	Blk Shear $\Phi_t P_n$ (kip)	# Bolt	# Hole	Use %	Controls
L 12B - 12"BD 1.5"	137.32	1.2D + 1.0W 60°	50.0	65	238.60	0.00	0.00		0	0	57	User Input
H SAE - 3X3X0.1875	3.31	1.2D + 1.0W 60°	36.0	58	29.06	35.34	12.72	10.16	1	1	32	Blk Shear
D SAE - 2.5X2.5X0.1875	3.49	0.9D + 1.0W 60°	36.0	58	22.93	35.34	12.72	9.14	1	1	38	Blk Shear

Max Splice Forces	Pu (kip)	Load Case	ΦR_{nt} (kip)	Use %	Num Bolts	Bolt Type
Bot Tension	142.76	0.9D + 1.0W 60°	327.10	44	6	1 A325

Section 6 – 90.0' to 100.00'

Member Compression	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'_y (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	# Bolt	# Hole	Use %	Controls
L 12B - 12"BD 1.5"	-146.00	1.2D + 1.0W N	10.017	100	100	100	0.00	0.00	214.90	0.00	0.00	0	0	67	User Input
D SAE - 2.5X2.5X0.1875	-3.99	1.2D + 1.0W N	13.128	50	50	50	159.12	159.12	10.20	35.34	20.88	1	1	39	Member Z

Member Tension	Pu (kip)	Load Case	F_y (ksi)	F_u (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	Blk Shear $\Phi_t P_n$ (kip)	# Bolt	# Hole	Use %	Controls
L 12B - 12"BD 1.5"	131.44	0.9D + 1.0W 60°	50.0	65	238.60	0.00	0.00		0	0	55	User Input
D SAE - 2.5X2.5X0.1875	3.24	1.2D + 1.0W 60°	36.0	58	22.93	35.34	12.72	9.14	1	1	35	Blk Shear

Max Splice Forces	Pu (kip)	Load Case	ΦR_{nt} (kip)	Use %	Num Bolts	Bolt Type

Section 7 – 100.0' to 120.00'

Member Compression	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'_y (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	# Bolt	# Hole	Use %	Controls
L 12B - 12"BD 1.25"	-139.08	1.2D + 1.0W N	10.017	100	100	100	0.00	0.00	142.50	0.00	0.00	0	0	97	User Input
H SAE - 3X3X0.1875	-5.47	0.9D + 1.0W N	6	100	100	100	120.81	120.81	21.23	35.34	20.88	1	1	26	Bolt Bear
D SAE - 2.5X2.5X0.1875	-4.99	1.2D + 1.0W N	11.93	50	50	50	144.61	144.61	12.35	35.34	20.88	1	1	40	Member Z

Member Tension	Pu (kip)	Load Case	F_y (ksi)	F_u (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	Blk Shear $\Phi_t P_n$ (kip)	# Bolt	# Hole	Use %	Controls
L 12B - 12"BD 1.25"	124.58	1.2D + 1.0W 60°	50.0	65	165.70	0.00	0.00		0	0	75	User Input
H SAE - 3X3X0.1875	6.41	1.2D + 1.0W 60°	36.0	58	29.06	35.34	12.72	10.16	1	1	63	Blk Shear
D SAE - 2.5X2.5X0.1875	4.35	0.9D + 1.0W 90°	36.0	58	22.93	35.34	12.72	9.14	1	1	47	Blk Shear

Max Splice Forces	Pu (kip)	Load Case	ΦR_{nt} (kip)	Use %	Num Bolts	Bolt Type
Bot Tension	128.06	0.9D + 1.0W 60°	327.10	39	6	1 A325

Section 8 – 120.0' to 130.00'

Member Compression	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'_y (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	# Bolt	# Hole	Use %	Controls
L 12B - 12"BD 1.25"	-108.29	1.2D + 1.0W N	10.017	100	100	100	0.00	0.00	142.50	0.00	0.00	0	0	75	User Input
D SAE - 2.5X2.5X0.1875	-10.28	1.2D + 1.0W 90°	11.416	50	50	50	138.38	138.38	13.48	35.34	20.88	1	1	76	Member Z

Member Tension	Pu (kip)	Load Case	F_y (ksi)	F_u (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	Blk Shear $\Phi_t P_n$ (kip)	# Bolt	# Hole	Use %	Controls
L 12B - 12"BD 1.25"	98.41	1.2D + 1.0W 60°	50.0	65	165.70	0.00	0.00		0	0	59	User Input
D SAE - 2.5X2.5X0.1875	8.89	0.9D + 1.0W 90°	36.0	58	22.93	35.34	12.72	9.14	1	1	97	Blk Shear

Max Splice Forces	Pu (kip)	Load Case	ΦR_{nt} (kip)	Use %	Num Bolts	Bolt Type

FORCE/STRESS SUMMARY

Bot Tension	110.02	0.9D + 1.0W 60°	327.10	34	6	1 A325

Section 9 – 130.0' to 150.00'

Member Compression	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'_y (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	# Bolt	# Hole	Use %	Controls
L SOL - 2" SOLID	-107.48	1.2D + 1.0W N	2.334	100	100	100	56.01	56.01	112.40	0.00	0.00	0	0	95	Member X
H SOL - 1" SOLID	-2.87	0.9D + 1.0W N	4.985	100	100	100	155.54	155.54	7.33	0.00	0.00	0	0	39	Member X
D SOL - 7/8" SOLID	-5.89	1.2D + 1.0W 90°	5.112	50	50	50	126.21	126.21	8.53	0.00	0.00	0	0	69	Member X

Member Tension	Pu (kip)	Load Case	F_y (ksi)	F_u (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	Blk Shear $\Phi_t P_n$ (kip)	# Bolt	# Hole	Use %	Controls
L SOL - 2" SOLID	99.28	1.2D + 1.0W 60°	50.0	65	141.37	0.00	0.00		0	0	70	Member
H SOL - 1" SOLID	3.25	1.2D + 1.0W N	50.0	65	35.34	0.00	0.00	0.00	0	0	9	Member
D SOL - 7/8" SOLID	5.56	1.2D + 1.0W 90°	50.0	65	27.06	0.00	0.00	0.00	0	0	20	Member

Max Splice Forces	Pu (kip)	Load Case	ΦR_{nt} (kip)	Use %	Num Bolts	Bolt Type
Top Tension	46.33	0.9D + 1.0W 60°	87.50	53	0	
Bot Tension	99.48	0.9D + 1.0W 60°	327.10	30	6	1 A325

Section 10 – 150.0' to 170.00'

Member Compression	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'_y (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	# Bolt	# Hole	Use %	Controls
L SOL - 1 1/2" SOLID	-50.61	1.2D + 1.0W N	2.334	100	100	100	74.68	74.68	52.89	0.00	0.00	0	0	95	Member X
H SOL - 7/8" SOLID	-2.84	1.2D + 1.0W N	4.479	100	100	100	159.75	159.75	5.32	0.00	0.00	0	0	53	Member X
D SOL - 3/4" SOLID	-4.53	1.2D + 1.0W 90°	5.025	50	50	50	144.71	144.71	4.77	0.00	0.00	0	0	95	Member X

Member Tension	Pu (kip)	Load Case	F_y (ksi)	F_u (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	Blk Shear $\Phi_t P_n$ (kip)	# Bolt	# Hole	Use %	Controls
L SOL - 1 1/2" SOLID	46.41	0.9D + 1.0W 60°	50.0	65	79.52	0.00	0.00		0	0	58	Member
H SOL - 7/8" SOLID	2.24	1.2D + 1.0W 60°	50.0	65	27.06	0.00	0.00	0.00	0	0	8	Member
D SOL - 3/4" SOLID	4.55	1.2D + 1.0W 90°	50.0	65	19.88	0.00	0.00	0.00	0	0	22	Member

Max Splice Forces	Pu (kip)	Load Case	ΦR_{nt} (kip)	Use %	Num Bolts	Bolt Type
Top Tension	7.37	0.9D + 1.0W 60°	41.80	18	0	

Section 11 – 170.0' to 180.00'

Member Compression	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'_y (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	# Bolt	# Hole	Use %	Controls
L SOL - 1 1/2" SOLID	-9.52	1.2D + 1.0W N	2.375	100	100	100	76.00	76.00	52.13	0.00	0.00	0	0	18	Member X
H SOL - 7/8" SOLID	-0.89	1.2D + 1.0W N	4	100	100	100	142.66	142.66	6.67	0.00	0.00	0	0	13	Member X
D SOL - 3/4" SOLID	-1.74	1.2D + 1.0W 90°	4.652	50	50	50	133.97	133.97	5.56	0.00	0.00	0	0	31	Member X

Member Tension	Pu (kip)	Load Case	F_y (ksi)	F_u (ksi)	$\Phi_c P_n$ (kip)	Shear ΦR_{nv} (kip)	Bear ΦR_n (kip)	Blk Shear $\Phi_t P_n$ (kip)	# Bolt	# Hole	Use %	Controls
L SOL - 1 1/2" SOLID	7.39	1.2D + 1.0W 60°	50.0	65	79.52	0.00	0.00		0	0	9	Member
H SOL - 7/8" SOLID	0.85	1.2D + 1.0W 60°	50.0	65	27.06	0.00	0.00	0.00	0	0	3	Member
D SOL - 3/4" SOLID	1.59	1.2D + 1.0W N	50.0	65	19.88	0.00	0.00	0.00	0	0	8	Member

Max Splice Forces	Pu (kip)	Load Case	ΦR_{nt} (kip)	Use %	Num Bolts	Bolt Type

DEFLECTIONS AND ROTATIONS

Load Case	Elevation (ft)	Deflection (ft)	Twist (deg)	Sway (deg)	Resultant (deg)
1.0D + 1.0W Service 90° 60 mph Wind with No Ice	146.92	0.4951	-0.0253	0.4383	0.4385
1.0D + 1.0W Service 90° 60 mph Wind with No Ice	160.17	0.6365	-0.0678	0.5791	0.5802
1.0D + 1.0W Service 90° 60 mph Wind with No Ice	167.17	0.7074	-0.0924	0.5106	0.5159
1.0D + 1.0W Service 90° 60 mph Wind with No Ice	170.00	0.7387	-0.1009	0.7977	0.7995
1.0D + 1.0W Service 90° 60 mph Wind with No Ice	172.63	0.7669	-0.1008	0.5184	0.5281
1.0D + 1.0W Service 90° 60 mph Wind with No Ice	175.00	0.7915	-0.1007	0.6211	0.6277
1.0D + 1.0W Service 90° 60 mph Wind with No Ice	180.00	0.844	-0.1006	0.6718	0.6792
1.0D + 1.0W Service 60° 60 mph Wind with No Ice	146.92	0.4944	0.0265	0.4387	0.4395
1.0D + 1.0W Service 60° 60 mph Wind with No Ice	160.17	0.6349	0.0717	0.5809	0.5853
1.0D + 1.0W Service 60° 60 mph Wind with No Ice	167.17	0.706	0.1003	0.5340	0.5433
1.0D + 1.0W Service 60° 60 mph Wind with No Ice	170.00	0.7372	0.1049	0.7934	0.8002
1.0D + 1.0W Service 60° 60 mph Wind with No Ice	172.63	0.7654	0.1075	0.5414	0.5519
1.0D + 1.0W Service 60° 60 mph Wind with No Ice	175.00	0.79	0.1079	0.6180	0.6273
1.0D + 1.0W Service 60° 60 mph Wind with No Ice	180.00	0.8427	0.1076	0.6709	0.6745
1.0D + 1.0W Service Normal 60 mph Wind with No Ice	146.92	0.4976	-0.0029	0.4424	0.4424
1.0D + 1.0W Service Normal 60 mph Wind with No Ice	160.17	0.6391	-0.0019	0.5799	0.5799
1.0D + 1.0W Service Normal 60 mph Wind with No Ice	167.17	0.7104	-0.0055	0.5994	0.5994
1.0D + 1.0W Service Normal 60 mph Wind with No Ice	170.00	0.7415	-0.0003	0.7637	0.7637
1.0D + 1.0W Service Normal 60 mph Wind with No Ice	172.63	0.7696	-0.0004	0.6030	0.603
1.0D + 1.0W Service Normal 60 mph Wind with No Ice	175.00	0.7945	-0.0003	0.6048	0.6048
1.0D + 1.0W Service Normal 60 mph Wind with No Ice	180.00	0.8472	-0.0003	0.6688	0.6688
0.9D - 1.0Ev + 1.0Eh 90° Seismic (Reduced DL)	146.92	0.0982	-0.0011	0.0891	0.0891
0.9D - 1.0Ev + 1.0Eh 90° Seismic (Reduced DL)	160.17	0.1273	-0.0023	0.1203	0.1203
0.9D - 1.0Ev + 1.0Eh 90° Seismic (Reduced DL)	167.17	0.1422	-0.0029	0.1143	0.1143
0.9D - 1.0Ev + 1.0Eh 90° Seismic (Reduced DL)	170.00	0.1488	-0.0041	0.1725	0.1726
0.9D - 1.0Ev + 1.0Eh 90° Seismic (Reduced DL)	172.63	0.1547	-0.0037	0.1149	0.115
0.9D - 1.0Ev + 1.0Eh 90° Seismic (Reduced DL)	175.00	0.1598	-0.0035	0.1277	0.1277
0.9D - 1.0Ev + 1.0Eh 90° Seismic (Reduced DL)	180.00	0.1707	-0.0031	0.1299	0.1299
0.9D - 1.0Ev + 1.0Eh 60° Seismic (Reduced DL)	146.92	0.0982	0.0012	0.0890	0.089
0.9D - 1.0Ev + 1.0Eh 60° Seismic (Reduced DL)	160.17	0.1273	0.0021	0.1206	0.1206
0.9D - 1.0Ev + 1.0Eh 60° Seismic (Reduced DL)	167.17	0.1422	0.0026	0.1141	0.1141
0.9D - 1.0Ev + 1.0Eh 60° Seismic (Reduced DL)	170.00	0.1488	0.0036	0.1727	0.1727
0.9D - 1.0Ev + 1.0Eh 60° Seismic (Reduced DL)	172.63	0.1547	0.0033	0.1146	0.1147
0.9D - 1.0Ev + 1.0Eh 60° Seismic (Reduced DL)	175.00	0.1598	0.0030	0.1279	0.1279
0.9D - 1.0Ev + 1.0Eh 60° Seismic (Reduced DL)	180.00	0.1707	0.0027	0.1301	0.1301
0.9D - 1.0Ev + 1.0Eh Normal Seismic (Reduced DL)	146.92	0.0982	0.0011	0.0890	0.0891
0.9D - 1.0Ev + 1.0Eh Normal Seismic (Reduced DL)	160.17	0.1273	0.0020	0.1202	0.1202
0.9D - 1.0Ev + 1.0Eh Normal Seismic (Reduced DL)	167.17	0.1423	0.0025	0.1140	0.114
0.9D - 1.0Ev + 1.0Eh Normal Seismic (Reduced DL)	170.00	0.1488	0.0035	0.1735	0.1735
0.9D - 1.0Ev + 1.0Eh Normal Seismic (Reduced DL)	172.63	0.1547	0.0032	0.1148	0.1148
0.9D - 1.0Ev + 1.0Eh Normal Seismic (Reduced DL)	175.00	0.1598	0.0030	0.1273	0.1273
0.9D - 1.0Ev + 1.0Eh Normal Seismic (Reduced DL)	180.00	0.1707	0.0026	0.1293	0.1294
1.2D + 1.0Ev + 1.0Eh 90° Seismic	146.92	0.0988	-0.0011	0.0896	0.0896
1.2D + 1.0Ev + 1.0Eh 90° Seismic	160.17	0.1281	-0.0023	0.1213	0.1213
1.2D + 1.0Ev + 1.0Eh 90° Seismic	167.17	0.1432	-0.0030	0.1151	0.1151
1.2D + 1.0Ev + 1.0Eh 90° Seismic	170.00	0.1497	-0.0042	0.1742	0.1743
1.2D + 1.0Ev + 1.0Eh 90° Seismic	172.63	0.1557	-0.0038	0.1157	0.1158
1.2D + 1.0Ev + 1.0Eh 90° Seismic	175.00	0.1609	-0.0035	0.1288	0.1288
1.2D + 1.0Ev + 1.0Eh 90° Seismic	180.00	0.1719	-0.0031	0.1311	0.1311
1.2D + 1.0Ev + 1.0Eh 60° Seismic	146.92	0.0987	0.0012	0.0894	0.0894
1.2D + 1.0Ev + 1.0Eh 60° Seismic	160.17	0.1281	0.0021	0.1216	0.1216
1.2D + 1.0Ev + 1.0Eh 60° Seismic	167.17	0.1431	0.0026	0.1149	0.1149
1.2D + 1.0Ev + 1.0Eh 60° Seismic	170.00	0.1498	0.0037	0.1741	0.1741
1.2D + 1.0Ev + 1.0Eh 60° Seismic	172.63	0.1557	0.0033	0.1154	0.1154
1.2D + 1.0Ev + 1.0Eh 60° Seismic	175.00	0.1609	0.0031	0.1290	0.129
1.2D + 1.0Ev + 1.0Eh 60° Seismic	180.00	0.1719	0.0027	0.1314	0.1314
1.2D + 1.0Ev + 1.0Eh Normal Seismic	146.92	0.0988	0.0011	0.0895	0.0895
1.2D + 1.0Ev + 1.0Eh Normal Seismic	160.17	0.1281	0.0020	0.1210	0.121
1.2D + 1.0Ev + 1.0Eh Normal Seismic	167.17	0.1432	0.0025	0.1148	0.1148

DEFLECTIONS AND ROTATIONS

Load Case	Elevation (ft)	Deflection (ft)	Twist (deg)	Sway (deg)	Resultant (deg)
1.2D + 1.0Ev + 1.0Eh Normal Seismic	170.00	0.1497	0.0036	0.1752	0.1752
1.2D + 1.0Ev + 1.0Eh Normal Seismic	172.63	0.1557	0.0032	0.1156	0.1157
1.2D + 1.0Ev + 1.0Eh Normal Seismic	175.00	0.1609	0.0030	0.1283	0.1284
1.2D + 1.0Ev + 1.0Eh Normal Seismic	180.00	0.1718	0.0027	0.1305	0.1305
1.2D + 1.0Di + 1.0Wi 90° 38.99 mph Wind with 1.7" Radial Ice	146.92	0.4521	-0.0201	0.3889	0.389
1.2D + 1.0Di + 1.0Wi 90° 38.99 mph Wind with 1.7" Radial Ice	160.17	0.5772	-0.0524	0.5139	0.5146
1.2D + 1.0Di + 1.0Wi 90° 38.99 mph Wind with 1.7" Radial Ice	167.17	0.64	-0.0709	0.4611	0.465
1.2D + 1.0Di + 1.0Wi 90° 38.99 mph Wind with 1.7" Radial Ice	170.00	0.6675	-0.0779	0.6937	0.6949
1.2D + 1.0Di + 1.0Wi 90° 38.99 mph Wind with 1.7" Radial Ice	172.63	0.6923	-0.0778	0.4700	0.4764
1.2D + 1.0Di + 1.0Wi 90° 38.99 mph Wind with 1.7" Radial Ice	175.00	0.714	-0.0778	0.5448	0.5486
1.2D + 1.0Di + 1.0Wi 90° 38.99 mph Wind with 1.7" Radial Ice	180.00	0.7604	-0.0776	0.5838	0.5889
1.2D + 1.0Di + 1.0Wi 60° 38.99 mph Wind with 1.7" Radial Ice	146.92	0.453	0.0192	0.3899	0.3904
1.2D + 1.0Di + 1.0Wi 60° 38.99 mph Wind with 1.7" Radial Ice	160.17	0.5779	0.0484	0.5174	0.5192
1.2D + 1.0Di + 1.0Wi 60° 38.99 mph Wind with 1.7" Radial Ice	167.17	0.6412	0.0651	0.4785	0.4828
1.2D + 1.0Di + 1.0Wi 60° 38.99 mph Wind with 1.7" Radial Ice	170.00	0.6688	0.0726	0.6915	0.6944
1.2D + 1.0Di + 1.0Wi 60° 38.99 mph Wind with 1.7" Radial Ice	172.63	0.6935	0.0738	0.4855	0.4911
1.2D + 1.0Di + 1.0Wi 60° 38.99 mph Wind with 1.7" Radial Ice	175.00	0.7155	0.0740	0.5454	0.5492
1.2D + 1.0Di + 1.0Wi 60° 38.99 mph Wind with 1.7" Radial Ice	180.00	0.762	0.0738	0.5861	0.5896
1.2D + 1.0Di + 1.0Wi Normal 38.99 mph Wind with 1.7" Radial Ice	146.92	0.4523	-0.0035	0.3906	0.3907
1.2D + 1.0Di + 1.0Wi Normal 38.99 mph Wind with 1.7" Radial Ice	160.17	0.5777	0.0017	0.5115	0.5116
1.2D + 1.0Di + 1.0Wi Normal 38.99 mph Wind with 1.7" Radial Ice	167.17	0.6406	0.0002	0.5203	0.5203
1.2D + 1.0Di + 1.0Wi Normal 38.99 mph Wind with 1.7" Radial Ice	170.00	0.668	0.0046	0.6720	0.672
1.2D + 1.0Di + 1.0Wi Normal 38.99 mph Wind with 1.7" Radial Ice	172.63	0.6926	0.0045	0.5216	0.5216
1.2D + 1.0Di + 1.0Wi Normal 38.99 mph Wind with 1.7" Radial Ice	175.00	0.7146	0.0043	0.5342	0.5342
1.2D + 1.0Di + 1.0Wi Normal 38.99 mph Wind with 1.7" Radial Ice	180.00	0.761	0.0040	0.5829	0.5829
0.9D + 1.0W 90° 105.27 mph Wind with No Ice (Reduced DL)	146.92	1.5164	-0.0746	1.3434	1.344
0.9D + 1.0W 90° 105.27 mph Wind with No Ice (Reduced DL)	160.17	1.9494	-0.2040	1.7725	1.7761
0.9D + 1.0W 90° 105.27 mph Wind with No Ice (Reduced DL)	167.17	2.1665	-0.2794	1.5641	1.5789
0.9D + 1.0W 90° 105.27 mph Wind with No Ice (Reduced DL)	170.00	2.2623	-0.3052	2.4427	2.4484
0.9D + 1.0W 90° 105.27 mph Wind with No Ice (Reduced DL)	172.63	2.3486	-0.3055	1.5873	1.6165
0.9D + 1.0W 90° 105.27 mph Wind with No Ice (Reduced DL)	175.00	2.424	-0.3054	1.9020	1.9221
0.9D + 1.0W 90° 105.27 mph Wind with No Ice (Reduced DL)	180.00	2.5849	-0.3054	2.0573	2.0798
0.9D + 1.0W 60° 105.27 mph Wind with No Ice (Reduced DL)	146.92	1.516	0.1620	1.3454	1.3551
0.9D + 1.0W 60° 105.27 mph Wind with No Ice (Reduced DL)	160.17	1.9452	0.4697	1.7793	1.8403
0.9D + 1.0W 60° 105.27 mph Wind with No Ice (Reduced DL)	167.17	2.1643	0.6636	1.6418	1.7708
0.9D + 1.0W 60° 105.27 mph Wind with No Ice (Reduced DL)	170.00	2.2593	0.7050	2.4297	2.5287
0.9D + 1.0W 60° 105.27 mph Wind with No Ice (Reduced DL)	172.63	2.3454	0.7303	1.6614	1.8149
0.9D + 1.0W 60° 105.27 mph Wind with No Ice (Reduced DL)	175.00	2.4213	0.7354	1.8925	2.0292
0.9D + 1.0W 60° 105.27 mph Wind with No Ice (Reduced DL)	180.00	2.5821	0.7341	2.0566	2.1668
0.9D + 1.0W Normal 105.27 mph Wind with No Ice (Reduced DL)	146.92	1.5329	-0.0090	1.3626	1.3626
0.9D + 1.0W Normal 105.27 mph Wind with No Ice (Reduced DL)	160.17	1.9693	-0.0078	1.7894	1.7894
0.9D + 1.0W Normal 105.27 mph Wind with No Ice (Reduced DL)	167.17	2.1893	-0.0187	1.8474	1.8474
0.9D + 1.0W Normal 105.27 mph Wind with No Ice (Reduced DL)	170.00	2.2848	-0.0023	2.3553	2.3553
0.9D + 1.0W Normal 105.27 mph Wind with No Ice (Reduced DL)	172.63	2.3715	-0.0011	1.8577	1.8577
0.9D + 1.0W Normal 105.27 mph Wind with No Ice (Reduced DL)	175.00	2.4481	-0.0014	1.8642	1.8642
0.9D + 1.0W Normal 105.27 mph Wind with No Ice (Reduced DL)	180.00	2.6108	-0.0011	2.0642	2.0642
1.2D + 1.0W 90° 105.27 mph Wind with No Ice	146.92	1.5251	-0.0748	1.3512	1.3518
1.2D + 1.0W 90° 105.27 mph Wind with No Ice	160.17	1.9619	-0.2051	1.7863	1.7899
1.2D + 1.0W 90° 105.27 mph Wind with No Ice	167.17	2.1806	-0.2810	1.5767	1.5916
1.2D + 1.0W 90° 105.27 mph Wind with No Ice	170.00	2.2773	-0.3072	2.4661	2.4718
1.2D + 1.0W 90° 105.27 mph Wind with No Ice	172.63	2.3643	-0.3075	1.6003	1.6296
1.2D + 1.0W 90° 105.27 mph Wind with No Ice	175.00	2.4402	-0.3074	1.9174	1.9376
1.2D + 1.0W 90° 105.27 mph Wind with No Ice	180.00	2.6025	-0.3073	2.0756	2.0982
1.2D + 1.0W 60° 105.27 mph Wind with No Ice	146.92	1.5248	0.1631	1.3533	1.3631
1.2D + 1.0W 60° 105.27 mph Wind with No Ice	160.17	1.9577	0.4722	1.7937	1.8548
1.2D + 1.0W 60° 105.27 mph Wind with No Ice	167.17	2.1785	0.6672	1.6546	1.7841
1.2D + 1.0W 60° 105.27 mph Wind with No Ice	170.00	2.2743	0.7110	2.4530	2.5521
1.2D + 1.0W 60° 105.27 mph Wind with No Ice	172.63	2.3611	0.7365	1.6746	1.8294
1.2D + 1.0W 60° 105.27 mph Wind with No Ice	175.00	2.4376	0.7417	1.9082	2.0453

DEFLECTIONS AND ROTATIONS

Load Case	Elevation (ft)	Deflection (ft)	Twist (deg)	Sway (deg)	Resultant (deg)
1.2D + 1.0W 60° 105.27 mph Wind with No Ice	180.00	2.5998	0.7404	2.0748	2.1859
1.2D + 1.0W Normal 105.27 mph Wind with No Ice	146.92	1.5416	-0.0092	1.3705	1.3706
1.2D + 1.0W Normal 105.27 mph Wind with No Ice	160.17	1.9818	-0.0071	1.8034	1.8034
1.2D + 1.0W Normal 105.27 mph Wind with No Ice	167.17	2.2035	-0.0177	1.8602	1.8603
1.2D + 1.0W Normal 105.27 mph Wind with No Ice	170.00	2.2999	-0.0011	2.3787	2.3787
1.2D + 1.0W Normal 105.27 mph Wind with No Ice	172.63	2.3873	-0.0013	1.8709	1.8709
1.2D + 1.0W Normal 105.27 mph Wind with No Ice	175.00	2.4645	-0.0010	1.8798	1.8798
1.2D + 1.0W Normal 105.27 mph Wind with No Ice	180.00	2.6284	-0.0012	2.0821	2.0821

DETAILED REACTIONS

Load Case	Radius (ft)	Elevation (ft)	Azimuth (deg)	Node	FX* (kip)	FY* (kip)	FZ* (kip)
					(-) Uplift and (+) Down		
	10.39	0.00	0	1	0.03	223.10	-19.93
1.2D + 1.0W Normal	10.39	0.00	120	1a	7.31	-90.81	-4.09
	10.39	0.00	240	1b	-7.34	-90.84	-4.03
	10.39	0.00	0	1	0.23	116.12	-10.18
1.2D + 1.0W 60°	10.39	0.00	120	1a	-8.69	115.93	5.30
	10.39	0.00	240	1b	-14.86	-190.59	-8.59
	10.39	0.00	0	1	0.21	13.85	-1.08
1.2D + 1.0W 90°	10.39	0.00	120	1a	-14.62	191.80	8.63
	10.39	0.00	240	1b	-12.80	-164.19	-7.55
	10.39	0.00	0	1	0.03	218.94	-19.64
0.9D + 1.0W Normal	10.39	0.00	120	1a	7.53	-93.91	-4.24
	10.39	0.00	240	1b	-7.56	-93.94	-4.18
	10.39	0.00	0	1	0.21	112.31	-9.89
0.9D + 1.0W 60°	10.39	0.00	120	1a	-8.45	112.12	5.15
	10.39	0.00	240	1b	-15.08	-193.34	-8.72
	10.39	0.00	0	1	0.19	10.39	-0.80
0.9D + 1.0W 90°	10.39	0.00	120	1a	-14.38	187.74	8.47
	10.39	0.00	240	1b	-13.03	-167.03	-7.68
	10.39	0.00	0	1	0.01	102.93	-5.91
1.2D + 1.0Di + 1.0Wi Normal	10.39	0.00	120	1a	2.44	8.00	-1.40
	10.39	0.00	240	1b	-2.45	7.83	-1.39
	10.39	0.00	0	1	0.02	71.16	-2.98
1.2D + 1.0Di + 1.0Wi 60°	10.39	0.00	120	1a	-2.56	71.05	1.51
	10.39	0.00	240	1b	-4.91	-23.46	-2.84
	10.39	0.00	0	1	0.02	39.69	-0.10
1.2D + 1.0Di + 1.0Wi 90°	10.39	0.00	120	1a	-4.40	94.21	2.57
	10.39	0.00	240	1b	-4.25	-15.14	-2.47
	10.39	0.00	0	1	0.00	25.74	-2.08
1.2D + 1.0Ev + 1.0Eh Normal	10.39	0.00	120	1a	-0.55	7.53	0.39
	10.39	0.00	240	1b	0.55	7.53	0.39
	10.39	0.00	0	1	0.07	19.67	-1.61
1.2D + 1.0Ev + 1.0Eh 60°	10.39	0.00	120	1a	-1.36	19.67	0.86
	10.39	0.00	240	1b	0.18	1.47	0.10
	10.39	0.00	0	1	0.08	13.60	-1.14
1.2D + 1.0Ev + 1.0Eh 90°	10.39	0.00	120	1a	-1.67	24.11	1.01
	10.39	0.00	240	1b	0.30	3.09	0.13
	10.39	0.00	0	1	0.00	21.72	-1.74
0.9D - 1.0Ev + 1.0Eh Normal	10.39	0.00	120	1a	-0.26	3.58	0.23
	10.39	0.00	240	1b	0.26	3.58	0.23
	10.39	0.00	0	1	0.06	15.67	-1.28
0.9D - 1.0Ev + 1.0Eh 60°	10.39	0.00	120	1a	-1.07	15.67	0.69
	10.39	0.00	240	1b	-0.11	-2.47	-0.07
	10.39	0.00	0	1	0.07	9.63	-0.81
0.9D - 1.0Ev + 1.0Eh 90°	10.39	0.00	120	1a	-1.38	20.10	0.84
	10.39	0.00	240	1b	0.01	-0.85	-0.03
	10.39	0.00	0	1	0.01	79.33	-7.08
1.0D + 1.0W Service Normal	10.39	0.00	120	1a	1.88	-22.38	-1.06
	10.39	0.00	240	1b	-1.89	-22.40	-1.04
	10.39	0.00	0	1	0.06	44.86	-3.91
1.0D + 1.0W Service 60°	10.39	0.00	120	1a	-3.35	44.79	2.01
	10.39	0.00	240	1b	-4.37	-55.10	-2.52
	10.39	0.00	0	1	0.06	11.53	-0.92
1.0D + 1.0W Service 90°	10.39	0.00	120	1a	-5.29	69.51	3.11
	10.39	0.00	240	1b	-3.70	-46.49	-2.18

MAXIMUM REACTIONS SUMMARY

Individual		Global (DL+WL+IL)		Global (DL+WL)	
Max Uplift:	193.34 (kip)	Moment Ice:	987.39 (kip-ft)	Moment:	3262.39 (kip-ft)
Max Down:	223.1 (kip)	Total Down Ice:	118.76 (kip)	Total Down:	41.46 (kip)
Max Shear:	19.93 (kip)	Total Shear Ice:	8.71 (kip)	Total Shear:	28.06 (kip)

1.2D + 1.0W Normal

Site Number	**Maumee River, OH**
Site Name	**99044**
TIA Revision	**ANSI/TIA-222-H**
Date	**4/26/2023**

SST Anchor Rod Interaction Check

Reactions & Layout			
Uplift	Tu	193.3	k
Axial	Pu	223.1	k
Shear	Vu	19.9	k
Rod Quantity	n	6	
Rod Diameter	d	1	in
Rod Grade		A687	
Rod F_y	F_y	105	ksi
Rod F_u	F_u	150	ksi
Clear Distance		4.5	in
Grouted? (Type c)		Yes	

Rod Properties			
Threads per Inch	n^b	8.0	
Net Area	A_n	0.61	in^2
Gross Area	A_g	0.79	in^2

Tension				
Tension Reduction Factor	Φ_t	0.75		*[ANSI/TIA-222-H, 4.9.6.5]*
Nominal Tensile Strength	R_{nt}	90.86	k	

Shear				
Shear Reduction Factor	Φ_v	0.75		*[ANSI/TIA-222-H, 4.9.6.3]*
Nominal Shear Strength	R_{nv}	58.90	k	
Compression Reduction Factor	Φ_c	0.90		
Nominal Shear Yielding Strength	R_{nvc}	37.11	k	

Flexure				
Flexure Reduction Factor	Φ_f	0.90		*[ANSI/TIA-222-H, 4.7.1]*
Plastic Section Modulus	Z	0.17	in^3	
Nominal Flexural Strength	M_n	17.50	k-in	

Compression				
Radius of Gyration	r	0.25	ksi	*[ANSI/TIA-222-H, 4.5.4.2]*
Effective Yield Strss	F_y'	105.00	ksi	
λ_c		0.18	k-in	
Critical Compression Stress	F_{cr}	103.64	k	
Nominal Compression Yielding Strength	R_{nc}	82.47	k	
Nominal Buckling Strength	R_{nb}	81.40	k	
Anchor Rod Projection to Nut	lar	3.54	in	

Tensile Interaction Result	92.5%	Pass
Compressive Interaction Result	49.6%	Pass