NORTHEAST SITE SOLUTIONS

Turnkey Wireless Development

Northeast Site Solutions
Denise Sabo
4 Angela's Way, Burlington CT 06013
860-209-4690
denise@northeastsitesolutions.com

October 15, 2018

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
785 Park Avenue, Bloomfield CT 06002
Latitude: 41.82879494
Longitude: -72.73446217
T-Mobile Site#: CTHA140A_L700 4x2

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 138-foot level of the existing 136-foot monopole tower at 785 Park Avenue, Bloomfield CT. The 136-foot tower and property are both owned by the Town of Bloomfield (Police Station). T-Mobile now intends to replace six (6) of its existing antennas with three (3) new 1900/2100 MHz antenna and three (3) new 600/700 MHz antenna. The new antennas would be installed at the 138-foot level of the tower.

Planned Modifications:

Remove:
(3) Twin TMA

Remove and Replace:
(3) LNX6515 Antenna **(Remove)** - AIR32 KRD901146-1 B66A_B2A **(Replace)**
(3) AIR21B2P B4A **(Remove)** – (3) APXVAARR24_43U-NA20 Antenna 600/700 MHz **(Replace)**
(3)RRUS11 B12 **(Remove)** - (3) RRU 4449 B12/B71 **(Replace)**

Install New:
(1) Fiber Hybrid Line

Existing to Remain:
(18) 1-5/8" Coax
(1) Fiber Hybrid Line
(3) Twin TMA
(3)AIR21 B2A/B4P 1900/2100 MHz

This facility was approved by the Bloomfield ZBA–on April 17, 2002 Town of Bloomfield was approved to erect two (2) tower shelters and a tower. Please see attached provided by the Town of Bloomfield Zoning Department.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to Mayor Suzette DeBeatham-Brown, Elected Official and Jose Giner, Zoning Director for the Town of Bloomfield, as well as the property owner and the tower owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S;A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site. ·

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

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

Sincerely,

Denise Sabo
Mobile: 860-209-4690
Fax: 413-521-0558
Office: 4 Angela's Way Burlington, CT 06013
Email: denise@northeastsitesolutions.com

Attachments
cc: Suzette DeBeatham-Brown- Mayor -Bloomfield elected official
Jose Giner – Director of Planning and Zoning
Town of Bloomfield - as property and tower owner

Exhibit A

TOWN OF BLOOMFIELD

800 Bloomfield Avenue - P.O. Box 337
Bloomfield, CT 06002
(860) 769-3516

BUILDING PERMIT APPLICATION

Job Location: 785 Park Ave, Bloomfield, CT	**Lot #:**	**Zone:**
Purpose of Permit: To construct a wireless communications facility consisting of a 140' monopole structure, it is designed to accomadate town Police + Fire wireless communications and four wireless carriers.		

Building Permit No: 21872	Use Group: U	Code:
Type of Construction:		

Property Owner - Name/Address	Contractor - Name/Address	Arch/Eng/Agent - Name/Address
Town of Bloomfield 800 Bloomfield Ave Bloomfield, CT, 06002 Phone:	Construction Services of Branford, Inc., 63-3 North Branford Rd, Branford, CT, 06405 Phone: (203) 488-0712	Vatcomm, Inc 63-2 North Branford Rd, Branford, CT, 06405 Phone: (203) 488-0580

USE:

☐ Residential Use	☐ Public Assembly	☐ Industrial
☐ Single Family	☐ Business	☐ Storage
☐ Multi Family	☐ Educational	☐ Utility

FEE INCLUDES:	ESTIMATED COST	FEE
☑ General Contractor	$ 110,000	$
☐ Plumbing Permit #:	$	$
☐ Heating Permit #:	$	$
☐ A/C Permit #:	$	$
☐ Electric Permit #:	$	$
☐ Sprinkler Permit #:	$	$
☐ _____ #:	$	$
	TOTAL $ 110,000	TOTAL $ 1,540.00

CERTIFICATION: I hereby certify that: ☐ I am the owner of record of the named property or ☑ that the proposed work is authorized by the owner of record and/or I have been authorized to make this application as an agent, and we agree to conform to all applicable laws, regulations and ordinances. All information contained within is true and accurate to the best of my knowledge and belief.

Signed: _____ ☐ Owner ☐ Contractor ☑ Agent	Date: 10/25/02	Contractor's License #: mco.900576

Exhibit B

Town of Bloomfield, CT

Property Listing Report | Map Block Lot 177-3-6 | Account R90068

Property Information

Property Location	785 PARK AVE
Owner	BLOOMFIELD TOWN OF
Co-Owner	POLICE STATION
Mailing Address	800 BLOOMFIELD AVE. BLOOMFIELD CT 06002
Land Use	922 Mun Bldg Com
Land Class	E
Zoning Code	BCD
Census Tract	
Sub Lot	

Neighborhood	
Acreage	2.25
Utilities	
Lot Setting/Desc	
Survey Map	
Foundation	POURED CONC.

Photo

Sketch

Primary Construction Details

Year Built	1991	Bedrooms		Exterior Walls	Concrete
Stories	1	Full Bathrooms		Interior Walls	Drywall
Building Style	City/Town Hall	Half Bathrooms		Heating Type	Forced Air
Building Use	Commercial	Bath Style		Heating Fuel	Gas
Building Condition	B	Kitchen Style		AC Type	
Floors	Carpet	Roof Style	Gable	Gross Bldg Area	20917
Total Rooms		Roof Cover	Asphalt Shingl	Total Living Area	20887

Report Created On 8/28/2018

Town of Bloomfield, CT

Property Listing Report | **Map Block Lot** 177-3-6 | **Account** R90068

Valuation Summary

(Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	2511900	1758330
Extras	0	0
Outbuildings	0	0
Land	560000	392000
Total	3071900	2150330

Outbuilding and Extra Items

Type	Description

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Finished Open Porch	30	0
First Floor	20887	20887
Total Area	20917	20887

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
BLOOMFIELD TOWN OF	33/ 70		0

Report Created On 8/28/2018

CL&P

Town of Bloomfield

State of Connecticut

House Nos. in Brown
Lot Nos. in Black

State Route
Town Road (Paved)
Town Road (Unpaved)
Private Road

TOWN OF BLOOMFIELD CONNECTICUT

Exhibit C

ANTENNA UPGRADES BY

T-Mobile

T-MOBILE NORTHEAST LLC

PROJECT: L700 4X2

SITE NUMBER: CTHA140A

SITE NAME: HA140/BLOOMFIELD POLICE_MP

SITE ADDRESS: 785 PARK AVENUE

BLOOMFIELD, CT 06002

(RF CONFIGURATION 67D92DB)

PROJECT SCOPE:

UPGRADE OF EXISTING WIRELESS FACILITY AS FOLLOWS:
REPLACE (6) EXISTING ANTENNAS,
REPLACE (3) REMOTE RADIO UNITS,
REMOVE (3) EXISTING TOWER MOUNTED AMPLIFIER UNITS (TMA),
ADD (1) 6X12 HYBRID CABLE.

PROJECT NOTES:

1. THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION:
   HANDICAPPED ACCESS IS NOT REQUIRED.
   POTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED.
   NO OUTDOOR STORAGE OR ANY
   SOLID WASTE RECEPTACLES REQUIRED.
2. CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON THE JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY THE ARCHITECT/ENGINEER PLACES THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.
3. DEVELOPMENT AND USE OF THE SITE WILL CONFORM TO ALL APPLICABLE CODES, ORDINANCES AND SPECIFICATIONS.
4. REFER TO STRUCTURAL ANALYSIS REPORT TITLED "STRUCTURAL ANALYSIS REPORT" SITE ID: CTHA140A, DATED AUGUST 07, 2018, PREPARED BY CENTEK ENGINEERING.

APPLICABLE STATE ADOPTION CODES:

2016 CONNECTICUT STATE BUILDING CODE (CSBC).

ANSI/TIA-222-G-2005 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.

2014 NATIONAL ELECTRICAL CODE (NFPA 70) FOR POWER AND GROUNDING REQUIREMENTS.

APPROVALS:

FSA CM	DATE
RF ENGINEER	DATE
FOPS	DATE
T-MOBILE ENGINEERING AND DEVELOPMENT	DATE
	DATE
	DATE

SITE IMAGE:

VICINITY MAP:

PROJECT INFORMATION:

ADDRESS:	785 PARK AVENUE BLOOMFIELD, CT 06002
STRUCTURE TYPE:	MONOPOLE
COORDINATES:	41.82879494 N -72.73446217 W

PROJECT TEAM:

APPLICANT:	T-MOBILE NORTHEAST, LLC. 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 860-692-7100
LANDLORD:	TOWN OF BLOOMFIELD 800 PARK AVE BLOOMFIELD, CT 06002 - HARTFORD COUNTY
PROJECT MANAGER:	NORTHEAST SITE SOLUTIONS 420 MAIN STREET, BLDG 4 STURBRIDGE, MA 01566 SHELDON FREINCLE SHELDON@NORTHEASTSITE SOLUTIONS.COM 201-776-8521
CONSULTANTS:	FORESITE LLC 462 WALNUT ST NEWTON, MA 02460 SAEED MOSSAVAT SMOSSAVAT@FORESITELLC.COM 617-212-3123

SHEET INDEX:

T-1:	TITLE SHEET
N-1:	GENERAL NOTES
A-1:	PLAN
A-2:	ELEVATION
A-3:	ANTENNA PLAN
A-4:	ANTENNA DETAILS
E-1:	GROUNDING DETAILS

APPLICANT:

T-Mobile

T-MOBILE NORTHEAST LLC

35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
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CONSULTANT:

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462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

PROFESSIONAL SEAL

REV	DESCRIPTION	DATE
A	PRELIMINARY	08/10/18
B	ADDED EQUIP CALLOUTS TO A-1	08/15/18
0	SIGNED AND SEALED	08/18/18

SITE NUMBER: CTHA140A
SITE NAME: HA140/BLOOMFIELD POLICE_MP
SITE ADDRESS: 785 PARK AVENUE
BLOOMFIELD, CT 06002

SHEET TITLE:

T-1: TITLE SHEET

GENERAL NOTES:

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.

2. THE ARCHITECT/ENGINEER HAS MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.

3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE CLIENT'S REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK.

5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS.

6. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S / VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.

7. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS DURING CONSTRUCTION.

8. THE CONTRACTOR SHALL COMPLY WITH ALL PERTINENT SECTIONS OF THE BASIC STATE BUILDING CODE, LATEST EDITION, AND ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJEC

9. THE CONTRACTOR SHALL NOTIFY THE CLIENT'S REPRESENTATIVE IN WRITING WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE CLIENT'S REPRESENTATIVE.

10. THE WORK SHALL CONFORM TO THE CODES AND STANDARDS OF THE FOLLOWING AGENCIES AS FURTHER CITED HEREIN:

A. ASTM: AMERICAN SOCIETY FOR TESTING AND MATERIALS, AS PUBLISHED IN "COMPILATION OF ASTM STANDARDS BUILDING CODES" OR LATEST EDITION.

B. AWS: AMERICAN WELDING SOCIETY INC. AS PUBLISHED IN "STANDARD D1.1–08, STRUCTURAL WELDING CODE" OR LATEST EDITION.

C. AISC: AMERICAN INSTITUTE FOR STEEL CONSTRUCTION AS PUBLISHED IN "CODE FOR STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"; "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" (LATEST EDITION).

11. BOLTING:

A. BOLTS SHALL BE CONFORMING TO ASTM A325 HIGH STRENGTH, HOT DIP GALVANIZED WITH ASTM A153 HEAVY HEX TYPE NUTS.

B. BOLTS SHALL BE 3/4"ø MINIMUM (UNLESS OTHERWISE NOTED)

C. ALL CONNECTIONS SHALL BE 2 BOLTS MINIMUM.

12. FABRICATION:

A. FABRICATION OF STEEL SHALL CONFORM TO THE AISC AND AWS STANDARDS AND CODES (LATEST EDITION).

B. ALL STRUCTURAL STEEL SHALL BE HOT–DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 (LATEST EDITION), UNLESS OTHERWISE NOTED.

13. ERECTION OF STEEL:

A. PROVIDE ALL ERECTION EQUIPMENT, BRACING, PLANKING, FIELD BOLTS, NUTS, WASHERS, DRIFT PINS, AND SIMILAR MATERIALS WHICH DO NOT FORM A PART OF THE COMPLETED CONSTRUCTION BUT ARE NECESSARY FOR ITS PROPER ERECTION.

B. ERECT AND ANCHOR ALL STRUCTURAL STEEL IN ACCORDANCE WITH AISC REFERENCE STANDARDS. ALL WORK SHALL BE ACCURATELY SET TO ESTABLISHED LINES AND ELEVATIONS AND RIGIDLY FASTENED IN PLACE WITH SUITABLE ATTACHMENTS TO THE CONSTRUCTION OF THE BUILDING.

C. TEMPORARY BRACING, GUYING AND SUPPORT SHALL BE PROVIDED TO KEEP THE STRUCTURE SAFE AND ALIGNED AT ALL TIMES DURING CONSTRUCTION, AND TO PREVENT DANGER TO PERSONS AND PROPERTY. CHECK ALL TEMPORARY LOADS AND STAY WITHIN SAFE CAPACITY OF ALL BUILDING COMPONENTS.

14. ANTENNA INSTALLATION:

A. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND CLIENT'S REPRESENTATIVE SPECIFICATIONS.

B. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.

C. INSTALL COAXIAL / FIBER CABLES AND TERMINATIONS BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTORS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS.

15. ANTENNA AND COAXIAL / FIBER CABLE GROUNDING:

A. ALL EXTERIOR #6 GREEN GROUND WIRE "DAISY CHAIN" CONNECTIONS ARE TO BE WEATHER SEALED WITH ANDREWS CONNECTOR/SPLICE WEATHERPROOFING KIT TYPE #221213 OR EQUAL.

B. ALL COAXIAL / FIBER CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF COAXIAL / FIBER CABLE (NOT WITHIN BENDS).

16. RELATED WORK, FURNISH THE FOLLOWING WORK AS SPECIFIED UNDER CONSTRUCTION DOCUMENTS, BUT COORDINATE WITH OTHER TRADES PRIOR TO BID:

A. FLASHING OF OPENING INTO OUTSIDE WALLS

B. SEALING AND CAULKING ALL OPENINGS

C. PAINTING

D. CUTTING AND PATCHING

17. REQUIREMENTS OF REGULATORY AGENCIES:

A. FURNISH U.L. LISTED EQUIPMENT WHERE SUCH LABEL IS AVAILABLE. INSTALL IN CONFORMANCE WITH U.L. STANDARDS WHERE APPLICABLE.

B. INSTALL ANTENNA, ANTENNA CABLES, GROUNDING SYSTEM IN ACCORDANCE WITH DRAWINGS AND SPECIFICATION IN EFFECT AT PROJECT LOCATION AND RECOMMENDATIONS OF STATE AND LOCAL BUILDING CODES, AND SPECIAL CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS OF WORK. THIS WORK INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:

C. TIA–EIA – 222 (LATEST EDITION). STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.

D. FAA – FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR AC 70/7460–IH, OBSTRUCTION MARKING AND LIGHTING.

E. FCC – FEDERAL COMMUNICATIONS COMMISSION RULES AND REGULATIONS FORM 715, OBSTRUCTION MARKING AND LIGHTING SPECIFICATION FOR ANTENNA STRUCTURES AND FORM 715A, HIGH INTENSITY OBSTRUCTION LIGHTING SPECIFICATIONS FOR ANTENNA STRUCTURES.

F. AISC – AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS (LATEST EDITION).

G. NEC – NATIONAL ELECTRICAL CODE – ON TOWER LIGHTING KITS.

H. UL – UNDERWRITER'S LABORATORIES APPROVED ELECTRICAL PRODUCTS.

I. IN ALL CASES, PART 77 OF THE FAA RULES AND PARTS 17 AND 22 OF THE FCC RULES ARE APPLICABLE AND IN THE EVENT OF CONFLICT, SUPERSEDE ANY OTHER STANDARDS OR SPECIFICATIONS.

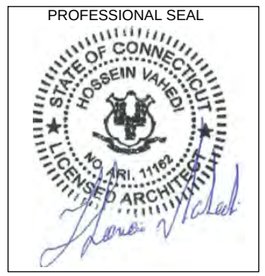
J. 2009 LIFE SAFETY CODE NFPA – 101.

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
420 MAIN STREET, BLDG 4
STURBRIDGE, MA 01566
203-275-6669

CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

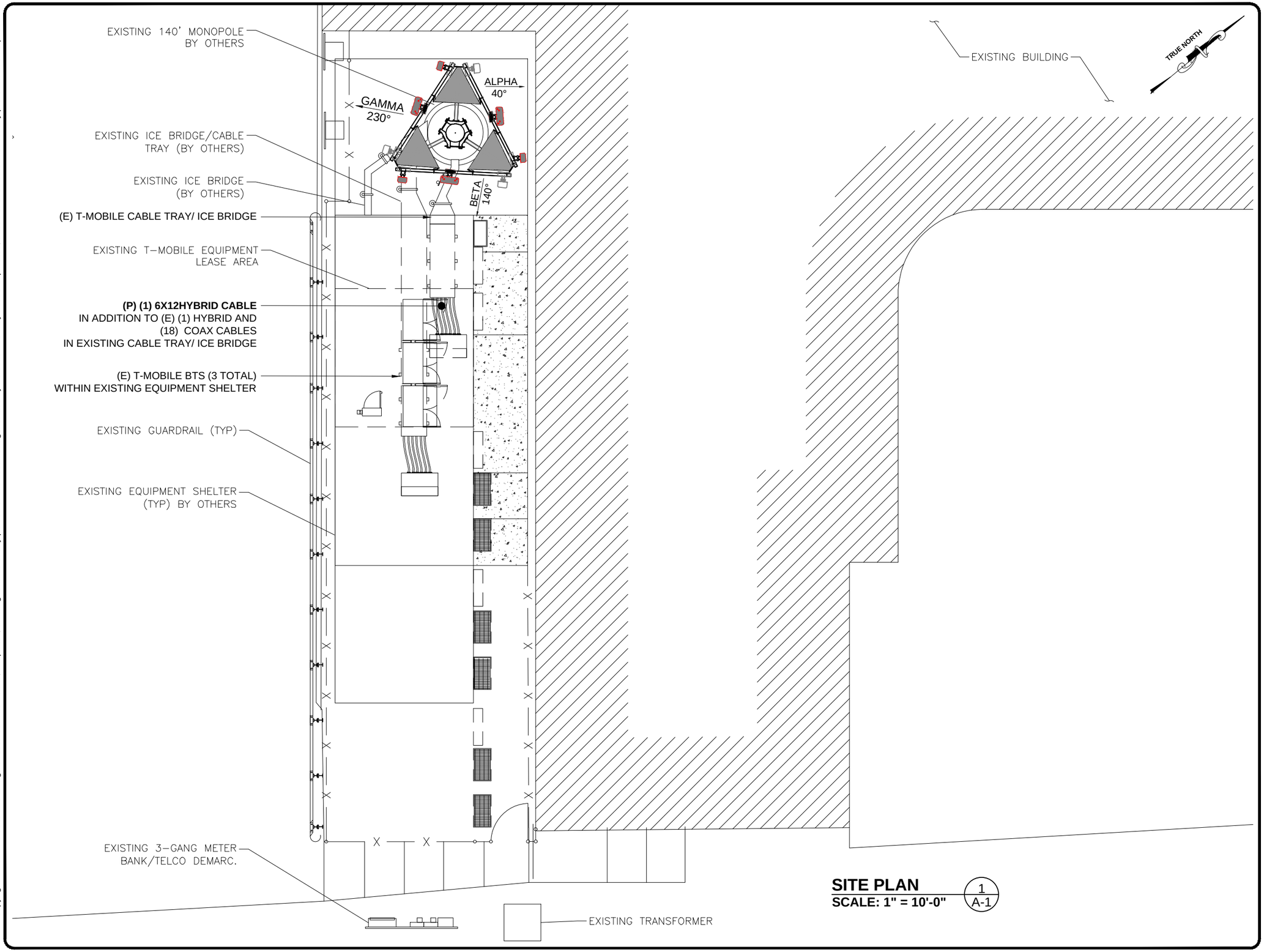
PROFESSIONAL SEAL



REV	DESCRIPTION	DATE
A	PRELIMINARY	08/10/18
B	ADDED EQUIP CALLOUTS TO A-1	08/15/18
0	SIGNED AND SEALED	08/18/18

SITE NUMBER: CTHA140A
SITE NAME: HA140/BLOOMFIELD POLICE_MP
SITE ADDRESS: 785 PARK AVENUE
BLOOMFIELD, CT 06002

SHEET TITLE:
N-1: NOTES AND DISCLAIMERS



SITE PLAN 1/A-1
SCALE: 1" = 10'-0"

APPLICANT:
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PROFESSIONAL SEAL
STATE OF CONNECTICUT
HOSSEIN VAHEDI
NO. ARI. 11162
LICENSED ARCHITECT

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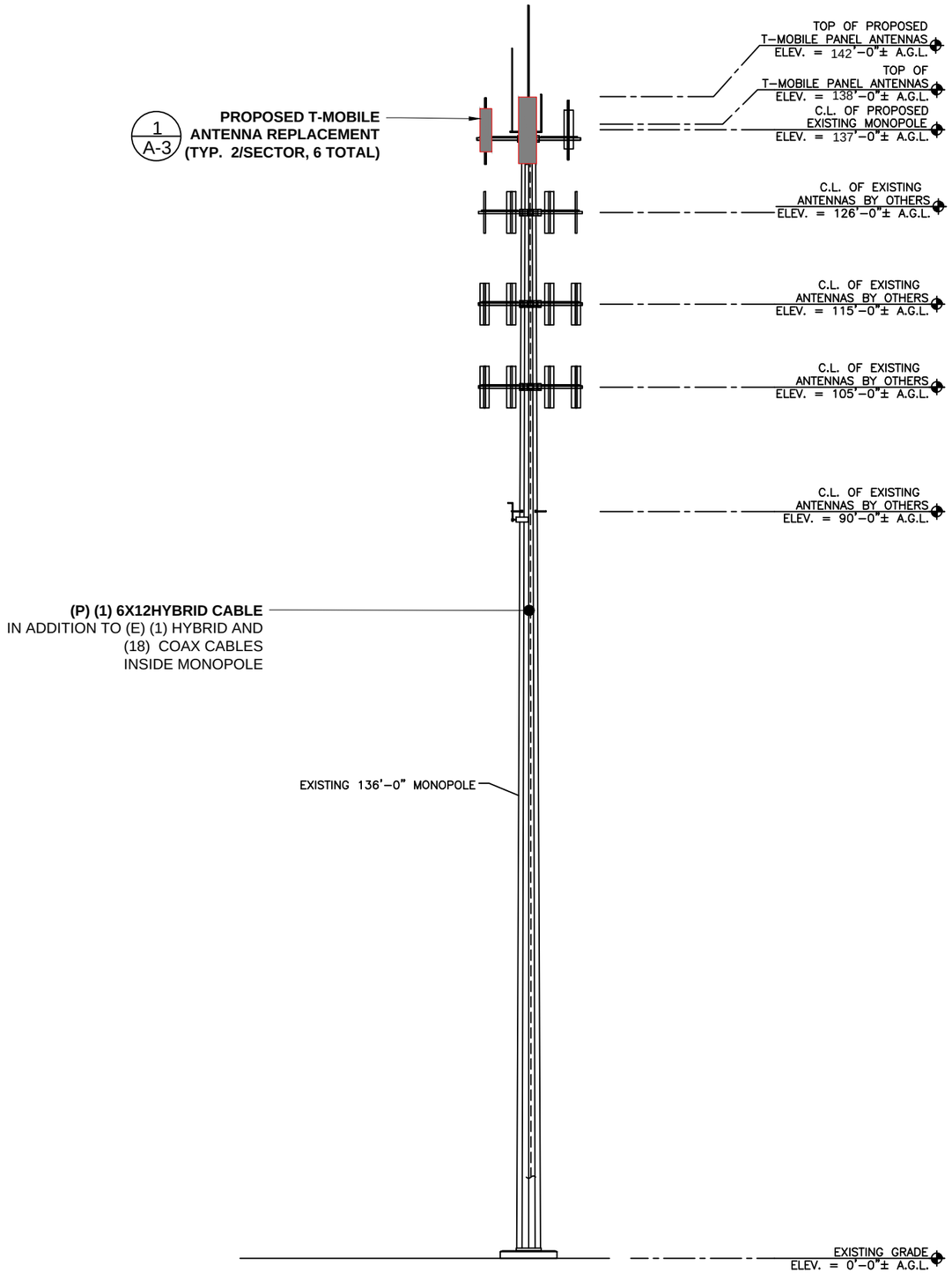
A-1: PLAN



ELEVATION
SCALE: 1/16" = 1'-0"

1
A-2

APPLICANT:

T-Mobile

T-MOBILE NORTHEAST LLC

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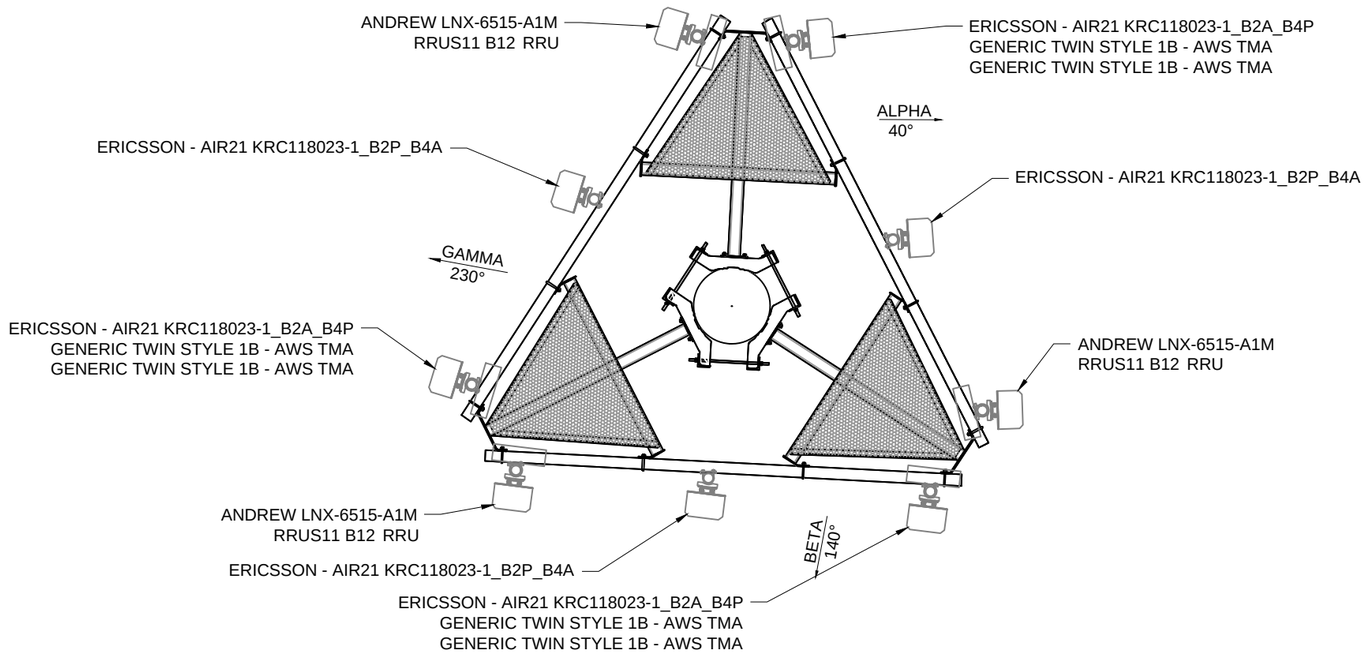
BLOOMFIELD, CT 06002

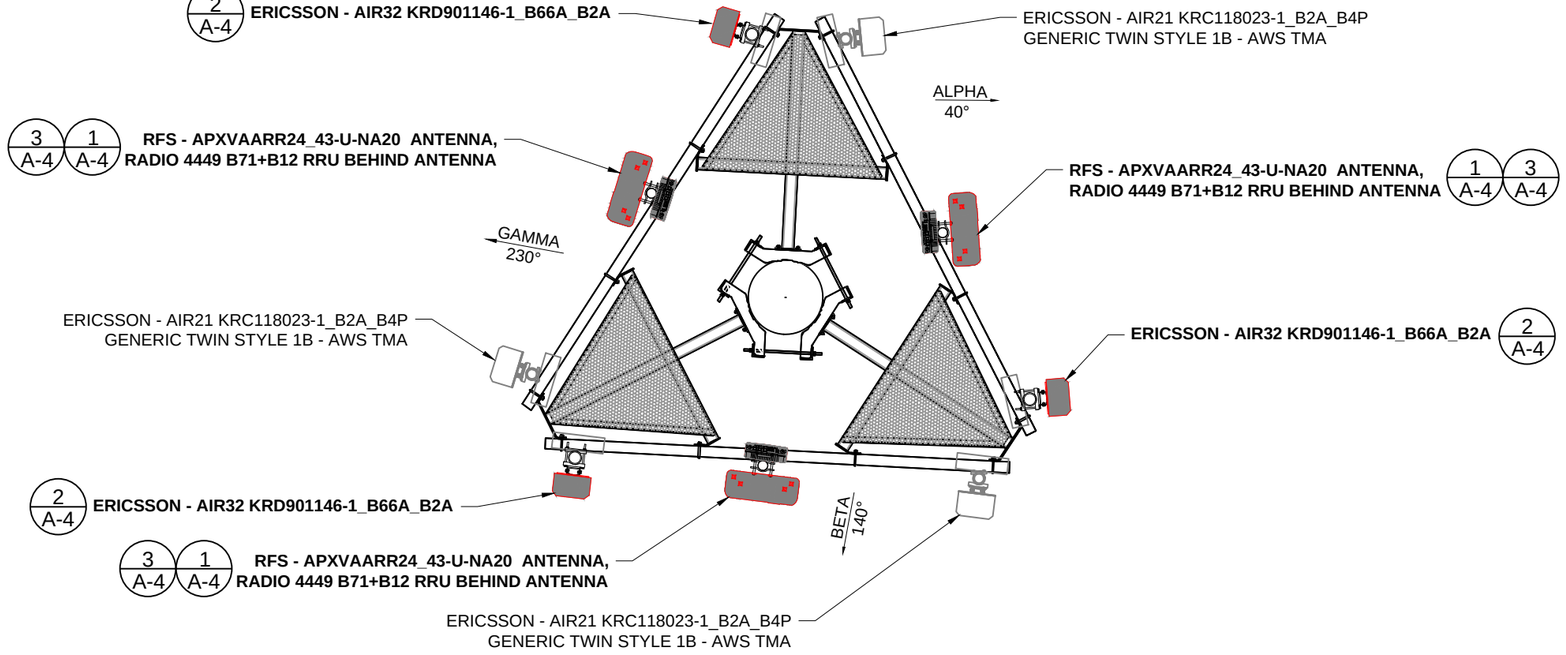
SHEET TITLE:

A-2: ELEVATION

EXISTING ANTENNA PLAN



FINAL ANTENNA PLAN



ANTENNA PLAN

SCALE: NTS 1 A-3

TRUE NORTH

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
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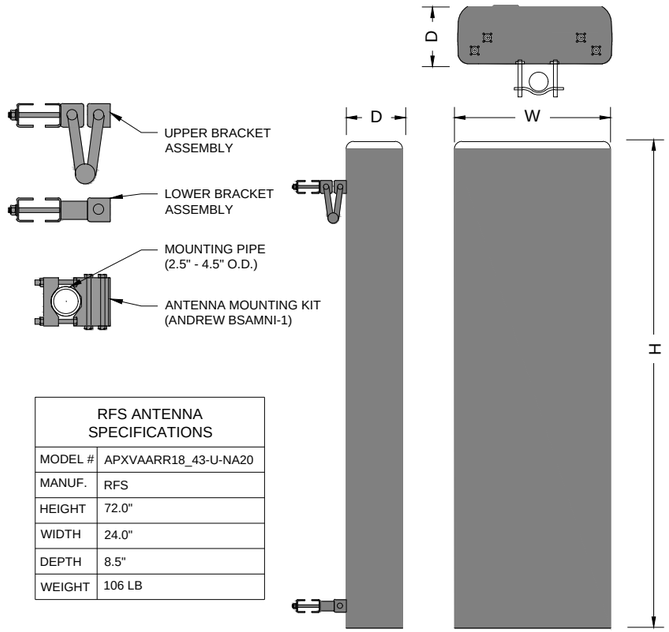
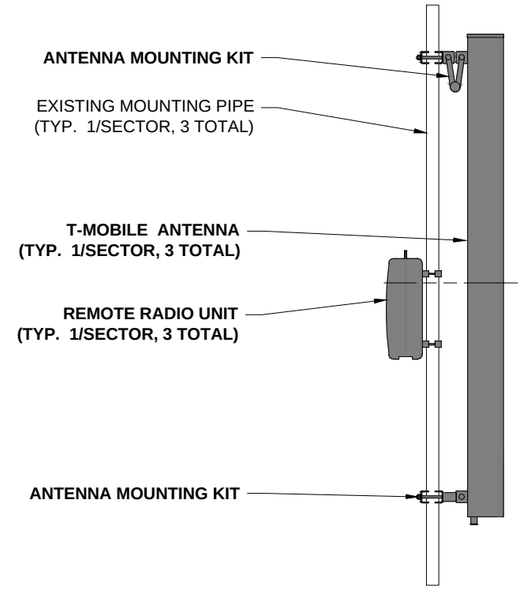
SHEET TITLE:
A-3: ANTENNA PLAN



RFS ANTENNA SPECIFICATIONS	
MODEL #	APXVAARR18_43-U-NA20
MANUF.	RFS
HEIGHT	72.0"
WIDTH	24.0"
DEPTH	8.5"
WEIGHT	106 LB

RFS ANTENNA
N.T.S
1 / A-4

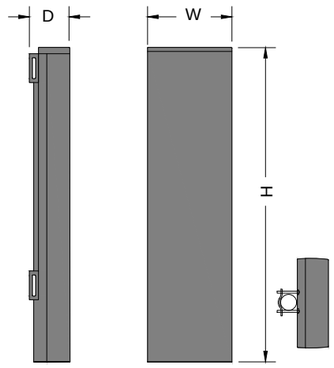


STRUCTURAL NOTES:

PRIOR TO COMMENCING CONSTRUCTION, GC SHALL REFER TO ROOFTOP STRUCTURAL ANALYSIS REPORT TO DETERMINE IF THERE IS ANY SUPPLEMENTAL OF SPECIAL INSTALLATION REQUIRED FOR ROOFTOP EQUIPMENT AND FOR CABLE BUNDLING, SHIELDING, MOUNTING, OR RELOCATION ARRANGEMENTS.

ANTENNA INSTALLATION SPECIAL WORK NOTE:
ANTENNA INSTALLATION WORKING POINT IS THE STRUCTURAL FACE FRAME VERTICAL CENTERLINE OF THE EXISTING ANTENNA SUPPORT ASSEMBLY. UNLESS NOTED OTHERWISE, VERTICALLY CENTERED PROPOSED PIPE MASTS AND ANTENNAS ON THIS WORKING POINT.

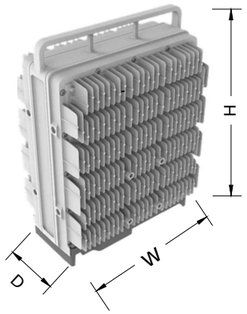
ANTENNA MOUNTING DETAIL
N.T.S
4 / A-4

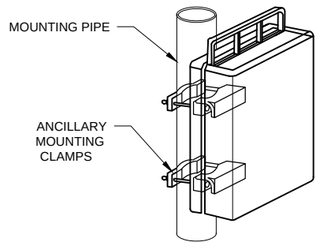


ERICSSON ANTENNA SPECIFICATIONS	
MODEL #	AIR32 KDR901146-1 B66A_B2A
MANUF.	ERICSSON
HEIGHT	58.1"
WIDTH	15.7"
DEPTH	9.4"
WEIGHT	180 LB

ERICSSON ANTENNA
N.T.S
2 / A-4

REMOTE RADIO UNIT SPECIFICATIONS	
MODEL #	RADIO 4449 B71+B12
MANUF.	ERICSSON
HEIGHT	14.9"
WIDTH	13.2"
DEPTH	10.4"
WEIGHT	74 LB





REMOTE RADIO UNIT MOUNTING DETAIL

REMOTE RADIO UNIT
N.T.S
3 / A-4

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
420 MAIN STREET, BLDG 4
STURBRIDGE, MA 01566
203-275-6669

CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

PROFESSIONAL SEAL

REV	DESCRIPTION	DATE
A	PRELIMINARY	08/10/18
B	ADDED EQUIP CALLOUTS TO A-1	08/15/18
0	SIGNED AND SEALED	08/18/18

SITE NUMBER: CTHA140A
SITE NAME: HA140/BLOOMFIELD POLICE_MP
SITE ADDRESS: 785 PARK AVENUE
BLOOMFIELD, CT 06002

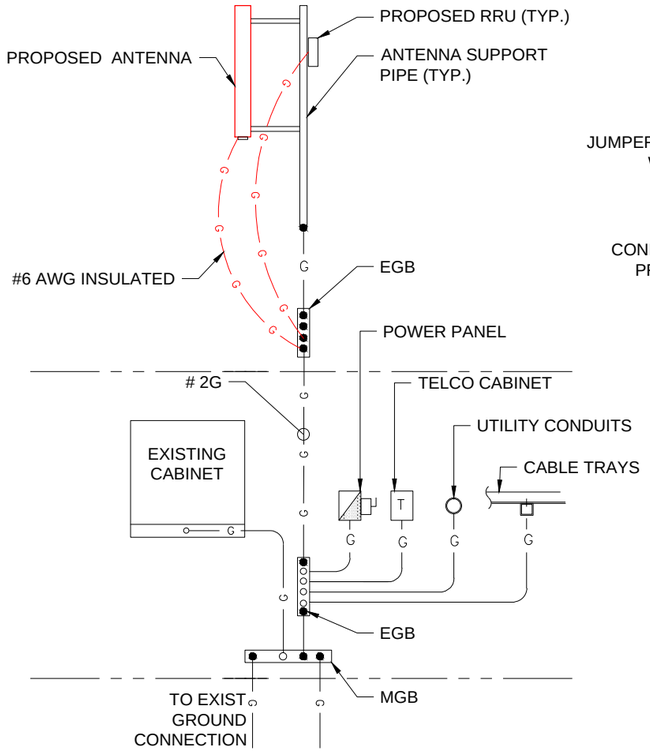
SHEET TITLE:
A-4: ANTENNA DETAILS

ELECTRICAL & GROUNDING NOTES

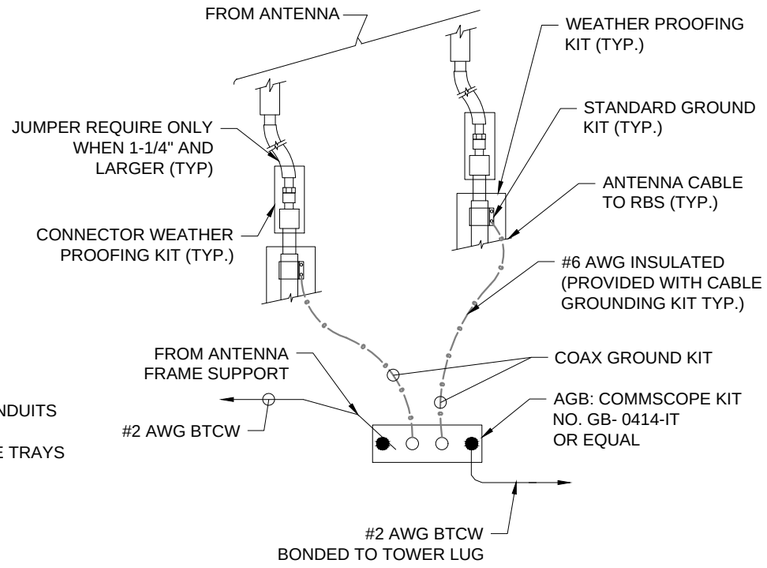
1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PRODUCED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED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

20 BOND ANTENNA EGB'S AND MGB TO WATER MAIN.

21. TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
22. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
23. VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.

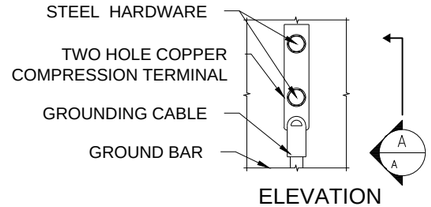


GROUNDING RISER DIAGRAM (1 / E-1)
SCALE: N.T.S

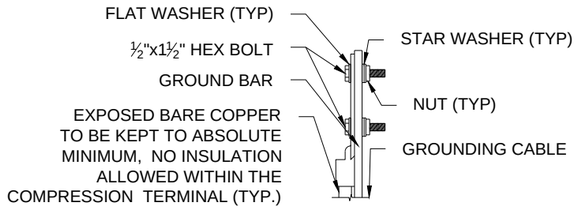


NOTES:
INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB

TOWER TOP CABLE GROUNDING DETAIL (2 / E-1)
SCALE: N.T.S



ELEVATION



SECTION A-A

NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

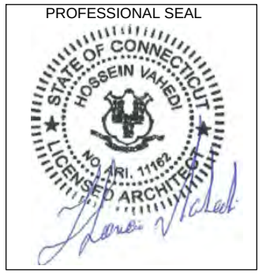
TYPICAL GROUND BAR CONNECTIONS DETAIL (3 / E-1)
SCALE: N.T.S

APPLICANT:
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
420 MAIN STREET, BLDG 4
STURBRIDGE, MA 01566
203-275-6669

CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

PROFESSIONAL SEAL



REV	DESCRIPTION	DATE
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0	SIGNED AND SEALED	08/18/18

SITE NUMBER: CTHA140A
SITE NAME: HA140/BLOOMFIELD POLICE_MP
SITE ADDRESS: 785 PARK AVENUE
BLOOMFIELD, CT 06002

SHEET TITLE:
E-1: GROUNDING AND ELECTRICAL DETAILS

Exhibit D

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

136-ft Existing Summit Monopole

Proposed T-Mobile
Antenna Upgrade

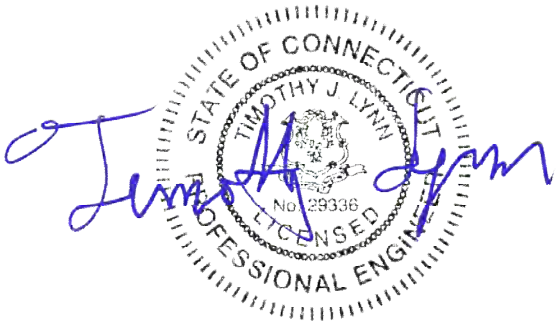
Site Ref: CTHA140A

785 Park Avenue
Bloomfield, CT

CENTEK Project No. 18098.03

~~Date: August 7, 2018~~

Rev 1: September 10, 2018



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

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- CONCLUSION

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Introduction

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

The host tower is a 136-ft, three-section, eighteen sided, tapered monopole, originally manufactured by PennSummit Tubular, LLC job no; 18633 dated February 6, 2003 and designed by Paul J. Ford and Company job no; 29202-0288, dated August 20, 2002. The tower geometry, structure member sizes and foundation system information were obtained from the aforementioned design documents.

Antenna and appurtenance information were obtained from a previous structural report prepared by Maser Consulting job no. 17924009A dated April 30, 2018 and a RF data sheet.

The tower is made up of three (3) tapered vertical sections consisting of A607-65 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 23.00-in at the top and 43.36-in at the base.

Antenna and Appurtenance Summary

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

- TOWN (EXISTING):
  Antennas: One (1) 20-ft 8-bay dipole antenna pipe mounted with an elevation of 143-ft above existing grade.
  Coax Cables: Three (3) 1-5/8" ∅ coax cables running on the inside of the existing tower.
- TOWN (EXISTING):
  Antennas: One (1) Motorola PTP400 microwave antenna pipe mounted with an elevation of 142-ft above existing grade.
  Coax Cables: One (1) Category 5e cable running on the inside of the existing tower.
- SPRINT (EXISTING):
  Antennas: Three (3) Commscope NNVV-65B panel antennas, and six (6) 800 MHz RRUs and three (3) 1900 MHz RRUs mounted on a universal tri-bracket assembly with three (3) dual standoff mounts with an elevation of 115-ft above existing grade.
  Coax Cables: Four (4) 1-5/8" fiber cables running on the exterior of the tower as specified in Section 3 of this report**.**
- VERIZON (EXISTING):
  Antennas: One (1) Antel BXA-70063-6CF panel antenna, three (3) Swedcom SLCP 2X6014 panel antennas, two (2) Antel BXA-80063-4BF panel antenna, six (6) Andrew SBNHH-1D65A panel antenna, three (3) RRH4x30-B13 remote radio heads, three (3) RRH2x60 remote radio heads and two (2) RFS DB-T1-6Z-8AB-0Z main distribution boxes mounted on a low profile platform with a RAD center elevation of 105-ft above existing grade.
  Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing tower and two (2) 1-5/8" ∅ fiber lines running on the exterior of the existing monopole.

- EMPTY MOUNT (EXISTING):
  Mount: One (1) 13-ft low profile platform with a RAD center elevation of 95-ft above the existing grade.
- TOWN (EXISTING):
  Antennas: Three (3) Motorola PTP400 microwave antennas on three (3) 4'-6" by 3" ∅ pipe mounts with an elevation of 83-ft above the existing grade.
  Coax Cables: Three (3) Category 5e (1 Wire) cables running on the inside of the existing tower.
- T-MOBILE (EXISTING TO REMAIN):
  Antennas: Three (3) Ericsson AIR 21 panel antennas and three (3) TMAs mounted on one (1) Site Pro 12-ft 6-in low profile platform with a RAD center elevation of 138-ft above existing grade.
  Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing tower, six (6) 1-5/8" ∅ coax cables running on the exterior of the tower and one (1) 1-5/8" ∅ fiber cable running on the exterior of the existing tower.
- T-MOBILE (EXISTING TO REMOVE):
  Antennas: Three (3) Ericsson AIR 21 panel antennas, three (3) Andrew LNX6515DS panel antennas, three (3) TMAs and three (3) Ericsson RRUS-11 remote radio heads mounted on one (1) Site Pro 12-ft 6-in low profile platform with a RAD center elevation of 138-ft above existing grade.
- **T-MOBILE (PROPOSED):**
  Misc. Equipment: Three (3) Ericsson AIR32 panel antennas, three (3) RFS APXVAARR24_43 panel antennas, three (3) Ericsson 4449 B71 B12 remote radio heads mounted on one (1) Site Pro 12-ft 6-in low profile platform with a RAD center elevation of 138-ft above existing grade.
  Coax Cables: One (1) 6x12 fiber lines running on the exterior of the monopole.

Primary Assumptions Used in the Analysis

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

Analysis

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

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

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

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 1.00" radial ice on the tower structure and its components.

Basic Wind Speed:	Hartford; v = 90-105 mph	*[Annex B of TIA-222-G-2005]*
	Bloomfield; v = 97 mph	*[Appendix N of the 2016 CT Building Code]*
Load Cases:	Load Case 1; 97 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2016 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 1.00" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

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

Tower Capacity

- Calculated stresses were found to be within allowable limits. In Load Case 1, per tnxTower "Section Capacity Table", the maximum tower steel usage was found to be at **77.4%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L1)	88.25'-137.00'	77.4%	**PASS**
Pole Shaft (L2)	47.25'-88.25'	62.7%	**PASS**
Pole Shaft (L3)	1.00'-47.25'	63.7%	**PASS**

Foundation and Anchors

The existing foundation consists of a 6.0-ft ∅ x 45.5-ft long reinforced concrete caisson. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned design documents. The base of the tower is connected to the foundation by means of (16) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 7-ft into the concrete foundation structure.

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

Location	Vector	Proposed Reactions
Base	Shear	28 kips
	Compression	39 kips
	Moment	2790 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	65.8%	**PASS**
	Lateral Deflection	0.2 in (1)	

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

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

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Axial and Shear	64.4%	**PASS**
Base Plate	Bending	60.1%	**PASS**

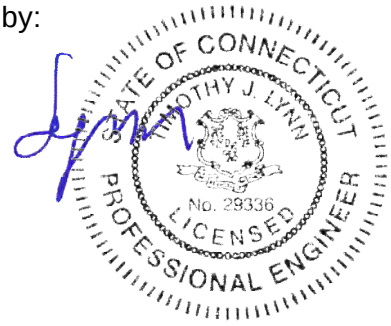
Conclusion

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

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

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

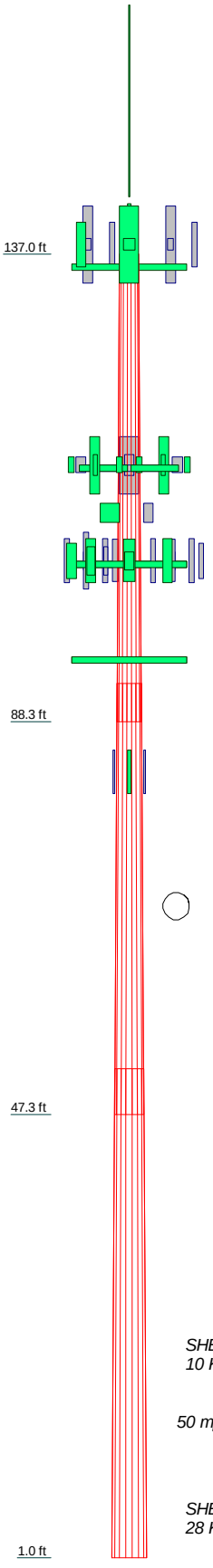
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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

tnxTower Features:

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

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	48.75	18	0.1875	4.00	23.0000	30.7000		2.6
2	45.00	18	0.3750	4.75	29.6932	36.8100	A607-65	6.0
3	51.00	18	0.5000		35.3088	43.3600		10.7
								19.3



ALL REACTIONS ARE FACTORED

AXIAL 85 K

SHEAR 10 K *MOMENT 1018 kip-ft*

TORQUE 1 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 39 K

SHEAR 28 K *MOMENT 2790 kip-ft*

TORQUE 2 kip-ft
REACTIONS - 97 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
20' 8 Bay Di-Pole (Town - Existing)	143	Dual Standoff Mount B1827 (Sprint - Existing)	115
PTP400 (Town - Existing)	142	Dual Standoff Mount B1827 (Sprint - Existing)	115
4'6"x3" Pipe Mount (Town - Existing)	140	DB-T1-6Z-8AB-0Z (Verizon - Existing)	110
AIR21 (T-Mobile - Existing)	138	DB-T1-6Z-8AB-0Z (Verizon - Existing)	110
AIR21 (T-Mobile - Existing)	138	Valmont Uni-Tri Bracket (Verizon - Existing)	110
AIR21 (T-Mobile - Existing)	138	RRH4x30-B13 (Verizon - Existing)	105
AIR32 (T-Mobile - Proposed)	138	RRH4x30-B13 (Verizon - Existing)	105
AIR32 (T-Mobile - Proposed)	138	13' Low Profile Platform (Verizon - Existing)	105
AIR32 (T-Mobile - Proposed)	138	SLCP 2x6014 (Verizon - Existing)	105
APXVAARR24-43 (T-Mobile - Proposed)	138	SBNHH-1D65A (Verizon - Existing)	105
APXVAARR24-43 (T-Mobile - Proposed)	138	SLCP 2x6014 (Verizon - Existing)	105
APXVAARR24-43 (T-Mobile - Proposed)	138	SBNHH-1D65A (Verizon - Existing)	105
KRY 112 TMA (T-Mobile - Existing)	138	BXA-80063-4BF (Verizon - Existing)	105
KRY 112 TMA (T-Mobile - Existing)	138	SBNHH-1D65A (Verizon - Existing)	105
KRY 112 TMA (T-Mobile - Existing)	138	SLCP 2x6014 (Verizon - Existing)	105
4449 B12,B71 (T-Mobile - Proposed)	138	SBNHH-1D65A (Verizon - Existing)	105
4449 B12,B71 (T-Mobile - Proposed)	138	BXA-80063-4BF (Verizon - Existing)	105
4449 B12,B71 (T-Mobile - Proposed)	138	RRH2x60-AWS (Verizon - Existing)	105
Valmont 13' Low Profile Platform (T-Mobile - Existing)	136	RRH2x60-AWS (Verizon - Existing)	105
NNVV-65B-R4 (Sprint - Existing)	115	RRH2x60-AWS (Verizon - Existing)	105
NNVV-65B-R4 (Sprint - Existing)	115	RRH4x30-B13 (Verizon - Existing)	105
NNVV-65B-R4 (Sprint - Existing)	115	SBNHH-1D65A (Verizon - Existing)	105
(2) FD-RRH 2x50 800 (Sprint - Existing)	115	BXA-70063/6CF (Verizon - Existing)	105
(2) FD-RRH 2x50 800 (Sprint - Existing)	115	SBNHH-1D65A (Verizon - Existing)	105
(2) FD-RRH 2x50 800 (Sprint - Existing)	115	13' Low Profile Platform (Empty)	95
FD-RRH 4x45 1900 (Sprint - Existing)	115	PTP400 (Town - Existing)	83
FD-RRH 4x45 1900 (Sprint - Existing)	115	4'6"x3" Pipe Mount (Town - Existing)	83
FD-RRH 4x45 1900 (Sprint - Existing)	115	4'6"x3" Pipe Mount (Town - Existing)	83
Valmont Uni-Tri Bracket (Sprint - Existing)	115	4'6"x3" Pipe Mount (Town - Existing)	83
Dual Standoff Mount B1827 (Sprint - Existing)	115	PTP400 (Town - Existing)	83
		PTP400 (Town - Existing)	83

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
8. Welds are fabricated with ER-70S-6 electrodes.
9. TOWER RATING: 77.4%

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

Job: **18098.03 - CTHA140A**			
Project: **136' Summit Monopole - 785 Park Ave., Bloomfield, CT**			
Client: T-Mobile	Drawn by: TJL	App'd:	
Code: TIA-222-G	Date: 08/07/18	Scale: NTS	
Path: J:\Jobs\18098\00 WI\03_CTHA140A\Structual\Backup Documentation\ER Files\136' Summit Monopole Bloomfield CT.eri		Dwg No. E-1	

Tower Input Data

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

Basic wind speed of 97 mph.
Structure Class III.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56.0 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	137.00-88.25	48.75	4.00	18	23.0000	30.7000	0.1875	0.7500	A607-65 (65 ksi)
L2	88.25-47.25	45.00	4.75	18	29.6932	36.8100	0.3750	1.5000	A607-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	47.25-1.00	51.00		18	35.3088	43.3600	0.5000	2.0000	(65 ksi) A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	23.3548	13.5763	892.6152	8.0984	11.6840	76.3964	1786.4050	6.7894	3.7180	19.829
	31.1736	18.1588	2135.8907	10.8319	15.5956	136.9547	4274.5918	9.0811	5.0732	27.057
L2	30.7936	34.8960	3789.5511	10.4080	15.0841	251.2274	7584.0887	17.4513	4.5660	12.176
	37.3779	43.3668	7273.3077	12.9344	18.6995	388.9578	14556.1858	21.6875	5.8186	15.516
L3	36.6149	55.2415	8456.3100	12.3571	17.9369	471.4487	16923.7470	27.6260	5.3343	10.669
	44.0289	68.0188	15785.9556	15.2153	22.0269	716.6678	31592.6828	34.0159	6.7514	13.503

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 137.00-88.25				1	1	1			
L2 88.25-47.25				1	1	1			
L3 47.25-1.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
HYBRIFLEX 1-5/8" (Verizon - Existing)	B	Surface Ar (CaAa)	106.00 - 4.00	2	2	0.000 0.000	0.0000		1.90
1 5/8 (T-Mobile - Existing)	A	Surface Ar (CaAa)	137.00 - 4.00	6	6	0.000 0.000	0.0000		1.04
HYBRIFLEX 1-5/8" (T-Mobile - Proposed)	A	Surface Ar (CaAa)	137.00 - 4.00	2	2	0.000 0.000	1.9800		1.90
HYBRIFLEX 1-1/4" (Sprint - Existing)	C	Surface Ar (CaAa)	1.00 - 1.00	4	4	0.000 0.000	1.5400		1.30

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1 5/8 (T-Mobile - Existing)	A	No	Inside Pole	137.00 - 4.00	12	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.04 1.04 1.04
1 5/8 (Verizon - Existing)	B	No	Inside Pole	106.00 - 4.00	12	No Ice 1/2" Ice	0.00 0.00	1.04 1.04

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.00	1.04
CATEGORY 5e (1 WIRE)	C	No	Inside Pole	137.00 - 4.00	1	No Ice	0.00	0.21
(Town - Existing)						1/2" Ice	0.00	0.21
						1" Ice	0.00	0.21
CATEGORY 5e (1 WIRE)	A	No	Inside Pole	86.00 - 4.00	3	No Ice	0.00	0.21
(Town - Existing)						1/2" Ice	0.00	0.21
						1" Ice	0.00	0.21
1 5/8	B	No	Inside Pole	137.00 - 4.00	3	No Ice	0.00	1.04
(Town - Existing)						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	137.00-88.25	A	0.000	0.000	19.305	0.000	1.10
		B	0.000	0.000	0.000	0.000	0.44
		C	0.000	0.000	0.000	0.000	0.01
L2	88.25-47.25	A	0.000	0.000	16.236	0.000	0.95
		B	0.000	0.000	0.000	0.000	0.80
		C	0.000	0.000	0.000	0.000	0.01
L3	47.25-1.00	A	0.000	0.000	17.127	0.000	1.00
		B	0.000	0.000	0.000	0.000	0.84
		C	0.000	0.000	0.000	0.000	0.01

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	137.00-88.25	A	2.824	0.000	0.000	92.973	0.000	2.61
		B		0.000	0.000	12.533	0.000	0.61
		C		0.000	0.000	0.000	0.000	0.01
L2	88.25-47.25	A	2.685	0.000	0.000	78.193	0.000	2.22
		B		0.000	0.000	28.949	0.000	1.19
		C		0.000	0.000	0.000	0.000	0.01
L3	47.25-1.00	A	2.426	0.000	0.000	79.475	0.000	2.24
		B		0.000	0.000	29.033	0.000	1.22
		C		0.000	0.000	0.000	0.000	0.01

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	137.00-88.25	-0.4632	-0.2674	-0.7306	-0.5598
L2	88.25-47.25	-0.4708	-0.2718	-0.5575	-0.6793
L3	47.25-1.00	-0.4454	-0.2572	-0.5919	-0.7163

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	3	HYBRIFLEX 1-5/8"	88.25 - 106.00	1.0000	1.0000
L1	7	1 5/8	88.25 - 137.00	1.0000	1.0000
L1	8	HYBRIFLEX 1-5/8"	88.25 - 137.00	1.0000	1.0000
L2	3	HYBRIFLEX 1-5/8"	47.25 - 88.25	1.0000	1.0000
L2	7	1 5/8	47.25 - 88.25	1.0000	1.0000
L2	8	HYBRIFLEX 1-5/8"	47.25 - 88.25	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
20' 8 Bay Di-Pole	C	From Face	1.00	0.0000	143.00	No Ice	4.00	4.00	0.06
(Town - Existing)			0.00			1/2" Ice	6.00	6.00	0.10
			10.00			1" Ice	8.00	8.00	0.14
PTP400	C	From Face	1.00	0.0000	142.00	No Ice	2.04	0.53	0.01
(Town - Existing)			0.00			1/2" Ice	2.24	0.65	0.02
			0.00			1" Ice	2.44	0.78	0.04
4'6"x3" Pipe Mount	C	From Face	1.00	0.0000	140.00	No Ice	1.20	1.20	0.03
(Town - Existing)			0.00			1/2" Ice	1.57	1.57	0.05
			0.00			1" Ice	1.86	1.86	0.06
NNVV-65B-R4	A	From Leg	3.00	0.0000	115.00	No Ice	14.61	9.17	0.11
(Sprint - Existing)			0.00			1/2" Ice	15.13	9.63	0.21
			0.00			1" Ice	15.65	10.11	0.32
NNVV-65B-R4	B	From Leg	3.00	0.0000	115.00	No Ice	14.61	9.17	0.11
(Sprint - Existing)			0.00			1/2" Ice	15.13	9.63	0.21
			0.00			1" Ice	15.65	10.11	0.32
NNVV-65B-R4	C	From Leg	3.00	0.0000	115.00	No Ice	14.61	9.17	0.11
(Sprint - Existing)			0.00			1/2" Ice	15.13	9.63	0.21
			0.00			1" Ice	15.65	10.11	0.32
(2) FD-RRH 2x50 800	A	From Leg	3.00	0.0000	115.00	No Ice	2.06	1.93	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
(2) FD-RRH 2x50 800	B	From Leg	3.00	0.0000	115.00	No Ice	2.06	1.93	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
(2) FD-RRH 2x50 800	C	From Leg	3.00	0.0000	115.00	No Ice	2.06	1.93	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
FD-RRH 4x45 1900	A	From Leg	3.00	0.0000	115.00	No Ice	2.32	2.38	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.52	2.59	0.08
			0.00			1" Ice	2.74	2.80	0.11
FD-RRH 4x45 1900	B	From Leg	3.00	0.0000	115.00	No Ice	2.32	2.38	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.52	2.59	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	2.74	2.80	0.11
FD-RRH 4x45 1900	C	From Leg	3.00	0.0000	115.00	No Ice	2.32	2.38	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.52	2.59	0.08
			0.00			1" Ice	2.74	2.80	0.11
Valmont Uni-Tri Bracket	C	From Leg	1.00	0.0000	115.00	No Ice	1.75	1.75	0.29
(Sprint - Existing)			0.00			1/2" Ice	1.94	1.94	0.31
			0.00			1" Ice	2.13	2.13	0.32
Dual Standoff Mount B1827	A	From Leg	2.00	0.0000	115.00	No Ice	1.40	1.40	0.10
(Sprint - Existing)			0.00			1/2" Ice	1.75	1.75	0.13
			0.00			1" Ice	2.10	2.10	0.16
Dual Standoff Mount B1827	B	From Leg	2.00	0.0000	115.00	No Ice	1.40	1.40	0.10
(Sprint - Existing)			0.00			1/2" Ice	1.75	1.75	0.13
			0.00			1" Ice	2.10	2.10	0.16
Dual Standoff Mount B1827	C	From Leg	2.00	0.0000	115.00	No Ice	1.40	1.40	0.10
(Sprint - Existing)			0.00			1/2" Ice	1.75	1.75	0.13
			0.00			1" Ice	2.10	2.10	0.16
SBNHH-1D65A	A	From Face	4.00	0.0000	105.00	No Ice	5.88	3.86	0.04
(Verizon - Existing)			-4.00			1/2" Ice	6.25	4.22	0.08
			0.00			1" Ice	6.62	4.57	0.12
BXA-70063/6CF	A	From Face	4.00	0.0000	105.00	No Ice	7.57	4.16	0.01
(Verizon - Existing)			0.00			1/2" Ice	8.02	4.60	0.05
			0.00			1" Ice	8.47	5.04	0.10
SBNHH-1D65A	A	From Face	4.00	0.0000	105.00	No Ice	5.88	3.86	0.04
(Verizon - Existing)			4.00			1/2" Ice	6.25	4.22	0.08
			0.00			1" Ice	6.62	4.57	0.12
SLCP 2x6014	A	From Face	4.00	0.0000	105.00	No Ice	6.48	5.28	0.02
(Verizon - Existing)			6.00			1/2" Ice	6.84	5.62	0.07
			0.00			1" Ice	7.21	5.98	0.13
SBNHH-1D65A	B	From Face	4.00	0.0000	105.00	No Ice	5.88	3.86	0.04
(Verizon - Existing)			-4.00			1/2" Ice	6.25	4.22	0.08
			0.00			1" Ice	6.62	4.57	0.12
SLCP 2x6014	B	From Face	4.00	0.0000	105.00	No Ice	6.48	5.28	0.02
(Verizon - Existing)			0.00			1/2" Ice	6.84	5.62	0.07
			0.00			1" Ice	7.21	5.98	0.13
SBNHH-1D65A	B	From Face	4.00	0.0000	105.00	No Ice	5.88	3.86	0.04
(Verizon - Existing)			4.00			1/2" Ice	6.25	4.22	0.08
			0.00			1" Ice	6.62	4.57	0.12
BXA-80063-4BF	B	From Face	4.00	0.0000	105.00	No Ice	4.39	2.38	0.01
(Verizon - Existing)			6.00			1/2" Ice	4.69	2.66	0.04
			0.00			1" Ice	5.00	2.96	0.07
SBNHH-1D65A	C	From Face	4.00	0.0000	105.00	No Ice	5.88	3.86	0.04
(Verizon - Existing)			-4.00			1/2" Ice	6.25	4.22	0.08
			0.00			1" Ice	6.62	4.57	0.12
SLCP 2x6014	C	From Face	4.00	0.0000	105.00	No Ice	6.48	5.28	0.02
(Verizon - Existing)			0.00			1/2" Ice	6.84	5.62	0.07
			0.00			1" Ice	7.21	5.98	0.13
SBNHH-1D65A	C	From Face	4.00	0.0000	105.00	No Ice	5.88	3.86	0.04
(Verizon - Existing)			4.00			1/2" Ice	6.25	4.22	0.08
			0.00			1" Ice	6.62	4.57	0.12
BXA-80063-4BF	C	From Face	4.00	0.0000	105.00	No Ice	4.39	2.38	0.01
(Verizon - Existing)			6.00			1/2" Ice	4.69	2.66	0.04
			0.00			1" Ice	5.00	2.96	0.07
RRH2x60-AWS	A	From Face	4.00	0.0000	105.00	No Ice	3.36	2.03	0.06
(Verizon - Existing)			4.00			1/2" Ice	3.61	2.26	0.08
			0.00			1" Ice	3.88	2.50	0.11
RRH2x60-AWS	B	From Face	4.00	0.0000	105.00	No Ice	3.36	2.03	0.06
(Verizon - Existing)			4.00			1/2" Ice	3.61	2.26	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	3.88	2.50	0.11
RRH2x60-AWS	C	From Face	4.00	0.0000	105.00	No Ice	3.36	2.03	0.06
(Verizon - Existing)			4.00			1/2" Ice	3.61	2.26	0.08
			0.00			1" Ice	3.88	2.50	0.11
RRH4x30-B13	A	From Face	4.00	0.0000	105.00	No Ice	2.16	1.62	0.06
(Verizon - Existing)			0.00			1/2" Ice	2.35	1.79	0.08
			0.00			1" Ice	2.55	1.97	0.10
RRH4x30-B13	B	From Face	4.00	0.0000	105.00	No Ice	2.16	1.62	0.06
(Verizon - Existing)			0.00			1/2" Ice	2.35	1.79	0.08
			0.00			1" Ice	2.55	1.97	0.10
RRH4x30-B13	C	From Face	4.00	0.0000	105.00	No Ice	2.16	1.62	0.06
(Verizon - Existing)			0.00			1/2" Ice	2.35	1.79	0.08
			0.00			1" Ice	2.55	1.97	0.10
DB-T1-6Z-8AB-0Z	C	From Face	0.00	0.0000	110.00	No Ice	4.80	2.00	0.04
(Verizon - Existing)			2.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12
DB-T1-6Z-8AB-0Z	B	From Face	0.00	0.0000	110.00	No Ice	4.80	2.00	0.04
(Verizon - Existing)			2.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12
Valmont Uni-Tri Bracket	C	From Face	0.00	0.0000	110.00	No Ice	1.75	1.75	0.29
(Verizon - Existing)			0.00			1/2" Ice	1.94	1.94	0.31
			0.00			1" Ice	2.13	2.13	0.32
13' Low Profile Platform	C	None		0.0000	105.00	No Ice	15.70	15.70	1.30
(Verizon - Existing)						1/2" Ice	20.10	20.10	1.76
						1" Ice	24.50	24.50	2.23
13' Low Profile Platform	C	None		0.0000	95.00	No Ice	15.70	15.70	1.30
(Empty)						1/2" Ice	20.10	20.10	1.76
						1" Ice	24.50	24.50	2.23
PTP400	A	From Face	1.00	0.0000	83.00	No Ice	2.04	0.53	0.01
(Town - Existing)			0.00			1/2" Ice	2.24	0.65	0.02
			0.00			1" Ice	2.44	0.78	0.04
PTP400	B	From Face	1.00	0.0000	83.00	No Ice	2.04	0.53	0.01
(Town - Existing)			0.00			1/2" Ice	2.24	0.65	0.02
			0.00			1" Ice	2.44	0.78	0.04
PTP400	C	From Face	1.00	0.0000	83.00	No Ice	2.04	0.53	0.01
(Town - Existing)			0.00			1/2" Ice	2.24	0.65	0.02
			0.00			1" Ice	2.44	0.78	0.04
4'6"x3" Pipe Mount	A	From Face	0.50	0.0000	83.00	No Ice	1.25	1.25	0.03
(Town - Existing)			0.00			1/2" Ice	1.57	1.57	0.05
			0.00			1" Ice	1.86	1.86	0.06
4'6"x3" Pipe Mount	B	From Face	0.50	0.0000	83.00	No Ice	1.25	1.25	0.03
(Town - Existing)			0.00			1/2" Ice	1.57	1.57	0.05
			0.00			1" Ice	1.86	1.86	0.06
4'6"x3" Pipe Mount	C	From Face	0.50	0.0000	83.00	No Ice	1.25	1.25	0.03
(Town - Existing)			0.00			1/2" Ice	1.57	1.57	0.05
			0.00			1" Ice	1.86	1.86	0.06
AIR21	A	From Face	4.00	0.0000	138.00	No Ice	6.53	4.36	0.08
(T-Mobile - Existing)			-5.00			1/2" Ice	6.98	4.77	0.12
			0.00			1" Ice	7.43	5.20	0.17
AIR21	B	From Face	4.00	0.0000	138.00	No Ice	6.53	4.36	0.08
(T-Mobile - Existing)			-5.00			1/2" Ice	6.98	4.77	0.12
			0.00			1" Ice	7.43	5.20	0.17
AIR21	C	From Face	4.00	0.0000	138.00	No Ice	6.53	4.36	0.08
(T-Mobile - Existing)			-5.00			1/2" Ice	6.98	4.77	0.12
			0.00			1" Ice	7.43	5.20	0.17
AIR32	A	From Face	4.00	0.0000	138.00	No Ice	6.51	4.71	0.13
(T-Mobile - Proposed)			5.00			1/2" Ice	6.89	5.07	0.18

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	7.27	5.43	0.23
AIR32	B	From Face	4.00	0.0000	138.00	No Ice	6.51	4.71	0.13
(T-Mobile - Proposed)			5.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR32	C	From Face	4.00	0.0000	138.00	No Ice	6.51	4.71	0.13
(T-Mobile - Proposed)			5.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
APXVAARR24-43	A	From Face	4.00	0.0000	138.00	No Ice	20.24	8.89	0.16
(T-Mobile - Proposed)			0.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
APXVAARR24-43	B	From Face	4.00	0.0000	138.00	No Ice	20.24	8.89	0.16
(T-Mobile - Proposed)			0.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
APXVAARR24-43	C	From Face	4.00	0.0000	138.00	No Ice	20.24	8.89	0.16
(T-Mobile - Proposed)			0.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
KRY 112 TMA	A	From Face	4.00	0.0000	138.00	No Ice	0.78	0.49	0.03
(T-Mobile - Existing)			0.00			1/2" Ice	0.90	0.59	0.03
			0.00			1" Ice	1.03	0.70	0.04
KRY 112 TMA	B	From Face	4.00	0.0000	138.00	No Ice	0.78	0.49	0.03
(T-Mobile - Existing)			0.00			1/2" Ice	0.90	0.59	0.03
			0.00			1" Ice	1.03	0.70	0.04
KRY 112 TMA	C	From Face	4.00	0.0000	138.00	No Ice	0.78	0.49	0.03
(T-Mobile - Existing)			0.00			1/2" Ice	0.90	0.59	0.03
			0.00			1" Ice	1.03	0.70	0.04
4449 B12,B71	A	From Face	4.00	0.0000	138.00	No Ice	1.65	1.16	0.08
(T-Mobile - Proposed)			0.00			1/2" Ice	1.81	1.29	0.10
			0.00			1" Ice	1.98	1.44	0.11
4449 B12,B71	B	From Face	4.00	0.0000	138.00	No Ice	1.65	1.16	0.08
(T-Mobile - Proposed)			0.00			1/2" Ice	1.81	1.29	0.10
			0.00			1" Ice	1.98	1.44	0.11
4449 B12,B71	C	From Face	4.00	0.0000	138.00	No Ice	1.65	1.16	0.08
(T-Mobile - Proposed)			0.00			1/2" Ice	1.81	1.29	0.10
			0.00			1" Ice	1.98	1.44	0.11
Valmont 13' Low Profile	A	From Face	1.00	0.0000	136.00	No Ice	15.70	15.70	1.30
Platform			0.00			1/2" Ice	20.10	20.10	1.76
(T-Mobile - Existing)			0.00			1" Ice	24.50	24.50	2.23

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	111.74	1.296	34.04	110.761	A	0.000	110.761	110.761	100.00	19.305	0.000
137.00-88.25					B	0.000	110.761		100.00	0.000	0.000
					C	0.000	110.761		100.00	0.000	0.000
L2 88.25-47.25	67.42	1.165	30.56	116.460	A	0.000	116.460	116.460	100.00	16.236	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					B	0.000	116.460		100.00	0.000	0.000
					C	0.000	116.460		100.00	0.000	0.000
L3 47.25-1.00	24.46	0.941	24.47	155.407	A	0.000	155.407	155.407	100.00	17.127	0.000
					B	0.000	155.407		100.00	0.000	0.000
					C	0.000	155.407		100.00	0.000	0.000

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 137.00-88.25	111.74	1.296	7.87	2.8243	133.708	A	0.000	133.708	133.708	100.00	92.973	0.000
						B	0.000	133.708		100.00	12.533	0.000
						C	0.000	133.708		100.00	0.000	0.000
L2 88.25-47.25	67.42	1.165	7.06	2.6851	135.759	A	0.000	135.759	135.759	100.00	78.193	0.000
						B	0.000	135.759		100.00	28.949	0.000
						C	0.000	135.759		100.00	0.000	0.000
L3 47.25-1.00	24.46	0.941	5.65	2.4262	176.105	A	0.000	176.105	176.105	100.00	79.475	0.000
						B	0.000	176.105		100.00	29.033	0.000
						C	0.000	176.105		100.00	0.000	0.000

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	111.74	1.296	10.13	110.761	A	0.000	110.761	110.761	100.00	19.305	0.000
137.00-88.25					B	0.000	110.761		100.00	0.000	0.000
					C	0.000	110.761		100.00	0.000	0.000
L2 88.25-47.25	67.42	1.165	9.10	116.460	A	0.000	116.460	116.460	100.00	16.236	0.000
					B	0.000	116.460		100.00	0.000	0.000
					C	0.000	116.460		100.00	0.000	0.000
L3 47.25-1.00	24.46	0.941	7.29	155.407	A	0.000	155.407	155.407	100.00	17.127	0.000
					B	0.000	155.407		100.00	0.000	0.000
					C	0.000	155.407		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	1.55	2.63	A	1	0.65	34.04	1	1	110.761	2.70	55.30	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
137.00-88.25			B	1	0.65		1	1	110.761			
			C	1	0.65		1	1	110.761			
L2	1.75	5.99	A	1	0.65	30.56	1	1	116.460	2.54	62.07	C
88.25-47.25			B	1	0.65		1	1	116.460			
			C	1	0.65		1	1	116.460			
L3 47.25-1.00	1.85	10.70	A	1	0.65	24.47	1	1	155.407	2.72	58.80	C
			B	1	0.65		1	1	155.407			
			C	1	0.65		1	1	155.407			
Sum Weight:	5.15	19.32						OTM	531.34 kip-ft	7.96		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	1.55	2.63	A	1	0.65	34.04	1	1	110.761	2.70	55.30	C
137.00-88.25			B	1	0.65		1	1	110.761			
			C	1	0.65		1	1	110.761			
L2	1.75	5.99	A	1	0.65	30.56	1	1	116.460	2.54	62.07	C
88.25-47.25			B	1	0.65		1	1	116.460			
			C	1	0.65		1	1	116.460			
L3 47.25-1.00	1.85	10.70	A	1	0.65	24.47	1	1	155.407	2.72	58.80	C
			B	1	0.65		1	1	155.407			
			C	1	0.65		1	1	155.407			
Sum Weight:	5.15	19.32						OTM	531.34 kip-ft	7.96		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	1.55	2.63	A	1	0.65	34.04	1	1	110.761	2.70	55.30	C
137.00-88.25			B	1	0.65		1	1	110.761			
			C	1	0.65		1	1	110.761			
L2	1.75	5.99	A	1	0.65	30.56	1	1	116.460	2.54	62.07	C
88.25-47.25			B	1	0.65		1	1	116.460			
			C	1	0.65		1	1	116.460			
L3 47.25-1.00	1.85	10.70	A	1	0.65	24.47	1	1	155.407	2.72	58.80	C
			B	1	0.65		1	1	155.407			
			C	1	0.65		1	1	155.407			
Sum Weight:	5.15	19.32						OTM	531.34 kip-ft	7.96		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	1.55	2.63	A	1	0.682	34.04	1	1	110.761	2.83	57.99	A
137.00-88.25			B	1	0.65		1	1	110.761			
			C	1	0.65		1	1	110.761			
L2	1.75	5.99	A	1	0.65	30.56	1	1	116.460	2.54	62.07	C
88.25-47.25			B	1	0.65		1	1	116.460			
			C	1	0.65		1	1	116.460			
L3 47.25-1.00	1.85	10.70	A	1	0.65	24.47	1	1	155.407	2.72	58.80	C
			B	1	0.65		1	1	155.407			
			C	1	0.65		1	1	155.407			
Sum Weight:	5.15	19.32						OTM	545.84 kip-ft	8.09		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	3.23	7.68	A	1	1.2	7.87	1	1	133.708	1.76	36.05	C
137.00-88.25			B	1	1.2		1	1	133.708			
			C	1	1.2		1	1	133.708			
L2	3.42	10.92	A	1	1.2	7.06	1	1	135.759	1.27	30.86	C
88.25-47.25			B	1	1.2		1	1	135.759			
			C	1	1.2		1	1	135.759			
L3 47.25-1.00	3.47	16.53	A	1	1.2	5.65	1	1	176.105	1.31	28.42	C
			B	1	1.2		1	1	176.105			
			C	1	1.2		1	1	176.105			
Sum Weight:	10.12	35.13						OTM	309.51 kip-ft	4.34		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	3.23	7.68	A	1	1.2	7.87	1	1	133.708	2.31	47.46	C
137.00-88.25			B	1	1.2		1	1	133.708			
			C	1	1.2		1	1	133.708			
L2	3.42	10.92	A	1	1.2	7.06	1	1	135.759	1.96	47.91	C
88.25-47.25			B	1	1.2		1	1	135.759			
			C	1	1.2		1	1	135.759			
L3 47.25-1.00	3.47	16.53	A	1	1.2	5.65	1	1	176.105	1.87	40.54	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			B	1	1.2		1	1	176.105			
			C	1	1.2		1	1	176.105			
Sum Weight:	10.12	35.13						OTM	430.68 kip-ft	6.15		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	3.23	7.68	A	1	1.2	7.87	1	1	133.708	1.76	36.05	A
137.00-88.25			B	1	1.2		1	1	133.708			
			C	1	1.2		1	1	133.708			
L2	3.42	10.92	A	1	1.2	7.06	1	1	135.759	1.27	30.86	C
88.25-47.25			B	1	1.2		1	1	135.759			
			C	1	1.2		1	1	135.759			
L3 47.25-1.00	3.47	16.53	A	1	1.2	5.65	1	1	176.105	1.31	28.42	C
			B	1	1.2		1	1	176.105			
			C	1	1.2		1	1	176.105			
Sum Weight:	10.12	35.13						OTM	309.51 kip-ft	4.34		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	3.23	7.68	A	1	1.2	7.87	1	1	133.708	2.51	51.45	A
137.00-88.25			B	1	1.2		1	1	133.708			
			C	1	1.2		1	1	133.708			
L2	3.42	10.92	A	1	1.2	7.06	1	1	135.759	2.11	51.49	A
88.25-47.25			B	1	1.2		1	1	135.759			
			C	1	1.2		1	1	135.759			
L3 47.25-1.00	3.47	16.53	A	1	1.2	5.65	1	1	176.105	2.00	43.22	A
			B	1	1.2		1	1	176.105			
			C	1	1.2		1	1	176.105			
Sum Weight:	10.12	35.13						OTM	464.83 kip-ft	6.62		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	1.55	2.63	A	1	0.65	10.13	1	1	110.761	0.80	16.46	C
137.00-88.25			B	1	0.65		1	1	110.761			
			C	1	0.65		1	1	110.761			
L2	1.75	5.99	A	1	0.65	9.10	1	1	116.460	0.76	18.48	C
88.25-47.25			B	1	0.65		1	1	116.460			
			C	1	0.65		1	1	116.460			
L3 47.25-1.00	1.85	10.70	A	1	0.65	7.29	1	1	155.407	0.81	17.50	C
			B	1	0.65		1	1	155.407			
			C	1	0.65		1	1	155.407			
Sum Weight:	5.15	19.32						OTM	158.17 kip-ft	2.37		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	1.55	2.63	A	1	0.65	10.13	1	1	110.761	0.80	16.46	C
137.00-88.25			B	1	0.65		1	1	110.761			
			C	1	0.65		1	1	110.761			
L2	1.75	5.99	A	1	0.65	9.10	1	1	116.460	0.76	18.48	C
88.25-47.25			B	1	0.65		1	1	116.460			
			C	1	0.65		1	1	116.460			
L3 47.25-1.00	1.85	10.70	A	1	0.65	7.29	1	1	155.407	0.81	17.50	C
			B	1	0.65		1	1	155.407			
			C	1	0.65		1	1	155.407			
Sum Weight:	5.15	19.32						OTM	158.17 kip-ft	2.37		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	1.55	2.63	A	1	0.65	10.13	1	1	110.761	0.80	16.46	C
137.00-88.25			B	1	0.65		1	1	110.761			
			C	1	0.65		1	1	110.761			
L2	1.75	5.99	A	1	0.65	9.10	1	1	116.460	0.76	18.48	C
88.25-47.25			B	1	0.65		1	1	116.460			
			C	1	0.65		1	1	116.460			
L3 47.25-1.00	1.85	10.70	A	1	0.65	7.29	1	1	155.407	0.81	17.50	C
			B	1	0.65		1	1	155.407			
			C	1	0.65		1	1	155.407			
Sum Weight:	5.15	19.32						OTM	158.17 kip-ft	2.37		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	1.55	2.63	A	1	0.682	10.13	1	1	110.761	0.84	17.26	A
137.00-88.25			B	1	0.65		1	1	110.761			
			C	1	0.65		1	1	110.761			
L2	1.75	5.99	A	1	0.65	9.10	1	1	116.460	0.76	18.48	C
88.25-47.25			B	1	0.65		1	1	116.460			
			C	1	0.65		1	1	116.460			
L3 47.25-1.00	1.85	10.70	A	1	0.65	7.29	1	1	155.407	0.81	17.50	C
			B	1	0.65		1	1	155.407			
			C	1	0.65		1	1	155.407			
Sum Weight:	5.15	19.32						OTM	162.49 kip-ft	2.41		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	19.32					
Bracing Weight	0.00					
Total Member Self-Weight	19.32			-1.64	3.84	
Total Weight	32.55			-1.64	3.84	
Wind 0 deg - No Ice		0.02	-17.61	-1666.04	1.75	-1.30
Wind 30 deg - No Ice		8.84	-15.37	-1456.66	-832.00	-1.23
Wind 45 deg - No Ice		12.40	-12.46	-1180.03	-1166.88	-1.06
Wind 60 deg - No Ice		15.19	-8.82	-835.65	-1429.23	-0.82
Wind 90 deg - No Ice		17.52	-0.02	-3.73	-1649.72	-0.20
Wind 120 deg - No Ice		15.17	8.79	828.76	-1427.14	0.48
Wind 135 deg - No Ice		12.38	12.44	1173.80	-1163.92	0.78
Wind 150 deg - No Ice		8.75	15.24	1438.74	-821.13	1.03
Wind 180 deg - No Ice		-0.02	17.61	1662.77	5.94	1.30
Wind 210 deg - No Ice		-8.84	15.37	1453.39	839.69	1.23
Wind 225 deg - No Ice		-12.40	12.46	1176.75	1174.57	1.06
Wind 240 deg - No Ice		-15.19	8.82	832.38	1436.92	0.82
Wind 270 deg - No Ice		-17.52	0.02	0.45	1657.41	0.20
Wind 300 deg - No Ice		-15.17	-8.79	-832.03	1434.83	-0.48
Wind 315 deg - No Ice		-12.38	-12.44	-1177.07	1171.61	-0.78
Wind 330 deg - No Ice		-8.75	-15.24	-1442.01	828.82	-1.03
Member Ice	15.81					
Total Weight Ice	77.11			-6.97	12.44	
Wind 0 deg - Ice		0.01	-8.12	-759.37	11.79	-0.73
Wind 30 deg - Ice		5.19	-9.01	-793.41	-440.37	-0.63
Wind 45 deg - Ice		7.01	-7.03	-625.14	-603.45	-0.52
Wind 60 deg - Ice		7.00	-4.06	-383.01	-635.43	-0.36
Wind 90 deg - Ice		7.73	-0.01	-7.62	-695.82	0.00
Wind 120 deg - Ice		6.69	3.87	348.20	-600.60	0.37
Wind 135 deg - Ice		5.46	5.48	495.66	-487.91	0.52
Wind 150 deg - Ice		3.86	6.71	608.86	-341.12	0.64

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 180 deg - Ice		-0.01	8.12	745.43	13.10	0.73
Wind 210 deg - Ice		-5.19	9.01	779.47	465.26	0.63
Wind 225 deg - Ice		-7.01	7.03	611.20	628.34	0.52
Wind 240 deg - Ice		-7.00	4.06	369.07	660.32	0.36
Wind 270 deg - Ice		-7.73	0.01	-6.32	720.71	-0.00
Wind 300 deg - Ice		-6.69	-3.87	-362.14	625.49	-0.37
Wind 315 deg - Ice		-5.46	-5.48	-509.60	512.80	-0.52
Wind 330 deg - Ice		-3.86	-6.71	-622.80	366.01	-0.64
Total Weight	32.55			-1.64	3.84	
Wind 0 deg - Service		0.01	-5.24	-495.88	2.09	-0.39
Wind 30 deg - Service		2.63	-4.58	-433.55	-246.11	-0.37
Wind 45 deg - Service		3.69	-3.71	-351.20	-345.80	-0.32
Wind 60 deg - Service		4.52	-2.63	-248.69	-423.89	-0.25
Wind 90 deg - Service		5.22	-0.01	-1.04	-489.53	-0.06
Wind 120 deg - Service		4.52	2.62	246.78	-423.27	0.14
Wind 135 deg - Service		3.69	3.70	349.50	-344.92	0.23
Wind 150 deg - Service		2.60	4.54	428.36	-242.87	0.31
Wind 180 deg - Service		-0.01	5.24	495.06	3.33	0.39
Wind 210 deg - Service		-2.63	4.58	432.73	251.53	0.37
Wind 225 deg - Service		-3.69	3.71	350.38	351.22	0.32
Wind 240 deg - Service		-4.52	2.63	247.86	429.32	0.25
Wind 270 deg - Service		-5.22	0.01	0.21	494.95	0.06
Wind 300 deg - Service		-4.52	-2.62	-247.61	428.69	-0.14
Wind 315 deg - Service		-3.69	-3.70	-350.32	350.34	-0.23
Wind 330 deg - Service		-2.60	-4.54	-429.19	248.29	-0.31

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice

Comb. No.	Description
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	137 - 88.25	Pole	Max Tension	39	0.00	0.00	0.00
			Max. Compression	34	-43.42	11.16	4.08
			Max. Mx	26	-12.60	520.13	0.17
			Max. My	2	-12.58	3.05	522.94
			Max. Vy	26	-19.85	520.13	0.17
			Max. Vx	2	-19.98	3.05	522.94
			Max. Torque	3			1.95
L2	88.25 - 47.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	34	-59.75	13.74	6.20
			Max. Mx	26	-21.91	1412.42	-0.56
			Max. My	2	-21.90	2.36	1420.75
			Max. Vy	26	-24.17	1412.42	-0.56
			Max. Vx	2	-24.30	2.36	1420.75

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	3			1.95
L3	47.25 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	34	-84.70	16.13	8.59
			Max. Mx	26	-39.03	2753.75	-1.42
			Max. My	2	-39.03	1.42	2769.00
			Max. Vy	26	-28.08	2753.75	-1.42
			Max. Vx	2	-28.21	1.42	2769.00
			Max. Torque	3			1.94

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	36	84.70	-5.19	9.01
	Max. H_x	26	39.06	28.04	-0.03
	Max. H_z	3	29.30	-0.03	28.17
	Max. M_x	2	2769.00	-0.03	28.17
	Max. M_z	10	2743.98	-28.04	0.03
	Max. Torsion	3	1.94	-0.03	28.17
	Min. Vert	31	29.30	19.81	19.90
	Min. H_x	10	39.06	-28.04	0.03
	Min. H_z	19	29.30	0.03	-28.17
	Min. M_x	18	-2764.90	0.03	-28.17
	Min. M_z	26	-2753.75	28.04	-0.03
	Min. Torsion	19	-1.94	0.03	-28.17

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	32.55	-0.00	0.00	-1.69	4.02	-0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	39.06	0.03	-28.17	-2769.00	1.42	-1.90
0.9 Dead+1.6 Wind 0 deg - No Ice	29.30	0.03	-28.17	-2740.55	0.16	-1.94
1.2 Dead+1.6 Wind 30 deg - No Ice	39.06	14.15	-24.59	-2420.90	-1384.55	-1.79
0.9 Dead+1.6 Wind 30 deg - No Ice	29.30	14.15	-24.59	-2395.95	-1371.83	-1.83
1.2 Dead+1.6 Wind 45 deg - No Ice	39.06	19.85	-19.94	-1961.08	-1941.28	-1.54
0.9 Dead+1.6 Wind 45 deg - No Ice	29.30	19.85	-19.94	-1940.77	-1922.95	-1.58
1.2 Dead+1.6 Wind 60 deg - No Ice	39.06	24.30	-14.11	-1388.58	-2377.42	-1.18
0.9 Dead+1.6 Wind 60 deg - No Ice	29.30	24.30	-14.11	-1374.05	-2354.69	-1.22
1.2 Dead+1.6 Wind 90 deg - No Ice	39.06	28.04	-0.03	-5.55	-2743.98	-0.25
0.9 Dead+1.6 Wind 90 deg - No Ice	29.30	28.04	-0.03	-4.97	-2717.56	-0.27

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
1.2 Dead+1.6 Wind 120 deg - No Ice	39.06	24.27	14.06	1378.44	-2373.96	0.75
0.9 Dead+1.6 Wind 120 deg - No Ice	29.30	24.27	14.06	1365.04	-2351.27	0.75
1.2 Dead+1.6 Wind 135 deg - No Ice	39.06	19.81	19.90	1952.05	-1936.38	1.18
0.9 Dead+1.6 Wind 135 deg - No Ice	29.30	19.81	19.90	1932.86	-1918.10	1.20
1.2 Dead+1.6 Wind 150 deg - No Ice	39.06	13.99	24.38	2392.48	-1366.51	1.53
0.9 Dead+1.6 Wind 150 deg - No Ice	29.30	13.99	24.38	2368.85	-1353.97	1.56
1.2 Dead+1.6 Wind 180 deg - No Ice	39.06	-0.03	28.17	2764.90	8.38	1.89
0.9 Dead+1.6 Wind 180 deg - No Ice	29.30	-0.03	28.17	2737.51	7.05	1.94
1.2 Dead+1.6 Wind 210 deg - No Ice	39.06	-14.15	24.59	2416.77	1394.35	1.75
0.9 Dead+1.6 Wind 210 deg - No Ice	29.30	-14.15	24.59	2392.89	1379.05	1.79
1.2 Dead+1.6 Wind 225 deg - No Ice	39.06	-19.85	19.94	1956.94	1951.07	1.50
0.9 Dead+1.6 Wind 225 deg - No Ice	29.30	-19.85	19.94	1937.71	1930.16	1.54
1.2 Dead+1.6 Wind 240 deg - No Ice	39.06	-24.30	14.11	1384.45	2387.20	1.15
0.9 Dead+1.6 Wind 240 deg - No Ice	29.30	-24.30	14.11	1370.99	2361.90	1.18
1.2 Dead+1.6 Wind 270 deg - No Ice	39.06	-28.04	0.03	1.42	2753.75	0.25
0.9 Dead+1.6 Wind 270 deg - No Ice	29.30	-28.04	0.03	1.92	2724.76	0.27
1.2 Dead+1.6 Wind 300 deg - No Ice	39.06	-24.27	-14.06	-1382.55	2383.73	-0.71
0.9 Dead+1.6 Wind 300 deg - No Ice	29.30	-24.27	-14.06	-1368.08	2358.47	-0.72
1.2 Dead+1.6 Wind 315 deg - No Ice	39.06	-19.81	-19.90	-1956.15	1946.15	-1.14
0.9 Dead+1.6 Wind 315 deg - No Ice	29.30	-19.81	-19.90	-1935.90	1925.30	-1.16
1.2 Dead+1.6 Wind 330 deg - No Ice	39.06	-13.99	-24.38	-2396.58	1376.29	-1.50
0.9 Dead+1.6 Wind 330 deg - No Ice	29.30	-13.99	-24.38	-2371.89	1361.18	-1.53
1.2 Dead+1.0 Ice+1.0 Temp	84.70	-0.00	-0.00	-8.59	16.13	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	84.70	0.01	-8.12	-854.56	15.45	-0.61
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	84.70	5.19	-9.01	-889.78	-491.13	-0.46
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	84.70	7.01	-7.03	-701.61	-674.17	-0.34
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	84.70	7.00	-4.06	-431.41	-712.15	-0.22
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	84.70	7.73	-0.01	-9.37	-779.85	0.09
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	84.70	6.69	3.87	390.61	-672.83	0.38
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	84.70	5.46	5.48	556.36	-546.17	0.50
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	84.70	3.86	6.71	683.60	-381.19	0.57

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	84.70	-0.01	8.12	837.32	16.93	0.60
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	84.70	-5.19	9.01	872.58	523.52	0.45
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	84.70	-7.01	7.03	684.36	706.55	0.33
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	84.70	-7.00	4.06	414.16	744.52	0.21
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	84.70	-7.73	0.01	-7.89	812.21	-0.10
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	84.70	-6.69	-3.87	-407.85	705.20	-0.39
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	84.70	-5.46	-5.48	-573.60	578.54	-0.50
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	84.70	-3.86	-6.71	-700.84	413.56	-0.58
Dead+Wind 0 deg - Service	32.55	0.01	-5.24	-513.81	3.43	-0.36
Dead+Wind 30 deg - Service	32.55	2.63	-4.58	-449.40	-253.09	-0.34
Dead+Wind 45 deg - Service	32.55	3.69	-3.71	-364.28	-356.12	-0.29
Dead+Wind 60 deg - Service	32.55	4.52	-2.63	-258.32	-436.83	-0.22
Dead+Wind 90 deg - Service	32.55	5.22	-0.01	-2.36	-504.67	-0.05
Dead+Wind 120 deg - Service	32.55	4.52	2.62	253.78	-436.19	0.14
Dead+Wind 135 deg - Service	32.55	3.69	3.70	359.94	-355.21	0.22
Dead+Wind 150 deg - Service	32.55	2.60	4.54	441.46	-249.74	0.29
Dead+Wind 180 deg - Service	32.55	-0.01	5.24	510.39	4.72	0.36
Dead+Wind 210 deg - Service	32.55	-2.63	4.58	445.97	261.24	0.34
Dead+Wind 225 deg - Service	32.55	-3.69	3.71	360.85	364.27	0.29
Dead+Wind 240 deg - Service	32.55	-4.52	2.63	254.90	444.98	0.22
Dead+Wind 270 deg - Service	32.55	-5.22	0.01	-1.07	512.82	0.05
Dead+Wind 300 deg - Service	32.55	-4.52	-2.62	-257.21	444.34	-0.14
Dead+Wind 315 deg - Service	32.55	-3.69	-3.70	-363.37	363.35	-0.22
Dead+Wind 330 deg - Service	32.55	-2.60	-4.54	-444.88	257.89	-0.29

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-32.55	0.00	0.00	32.55	0.00	0.000%
2	0.03	-39.06	-28.17	-0.03	39.06	28.17	0.000%
3	0.03	-29.30	-28.17	-0.03	29.30	28.17	0.000%
4	14.15	-39.06	-24.59	-14.15	39.06	24.59	0.000%
5	14.15	-29.30	-24.59	-14.15	29.30	24.59	0.000%
6	19.85	-39.06	-19.94	-19.85	39.06	19.94	0.000%
7	19.85	-29.30	-19.94	-19.85	29.30	19.94	0.000%
8	24.30	-39.06	-14.11	-24.30	39.06	14.11	0.000%
9	24.30	-29.30	-14.11	-24.30	29.30	14.11	0.000%
10	28.04	-39.06	-0.03	-28.04	39.06	0.03	0.000%
11	28.04	-29.30	-0.03	-28.04	29.30	0.03	0.000%
12	24.27	-39.06	14.06	-24.27	39.06	-14.06	0.000%
13	24.27	-29.30	14.06	-24.27	29.30	-14.06	0.000%
14	19.81	-39.06	19.90	-19.81	39.06	-19.90	0.000%
15	19.81	-29.30	19.90	-19.81	29.30	-19.90	0.000%
16	13.99	-39.06	24.38	-13.99	39.06	-24.38	0.000%
17	13.99	-29.30	24.38	-13.99	29.30	-24.38	0.000%
18	-0.03	-39.06	28.17	0.03	39.06	-28.17	0.000%
19	-0.03	-29.30	28.17	0.03	29.30	-28.17	0.000%
20	-14.15	-39.06	24.59	14.15	39.06	-24.59	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
21	-14.15	-29.30	24.59	14.15	29.30	-24.59	0.000%
22	-19.85	-39.06	19.94	19.85	39.06	-19.94	0.000%
23	-19.85	-29.30	19.94	19.85	29.30	-19.94	0.000%
24	-24.30	-39.06	14.11	24.30	39.06	-14.11	0.000%
25	-24.30	-29.30	14.11	24.30	29.30	-14.11	0.000%
26	-28.04	-39.06	0.03	28.04	39.06	-0.03	0.000%
27	-28.04	-29.30	0.03	28.04	29.30	-0.03	0.000%
28	-24.27	-39.06	-14.06	24.27	39.06	14.06	0.000%
29	-24.27	-29.30	-14.06	24.27	29.30	14.06	0.000%
30	-19.81	-39.06	-19.90	19.81	39.06	19.90	0.000%
31	-19.81	-29.30	-19.90	19.81	29.30	19.90	0.000%
32	-13.99	-39.06	-24.38	13.99	39.06	24.38	0.000%
33	-13.99	-29.30	-24.38	13.99	29.30	24.38	0.000%
34	0.00	-84.70	0.00	0.00	84.70	0.00	0.000%
35	0.01	-84.70	-8.12	-0.01	84.70	8.12	0.000%
36	5.19	-84.70	-9.01	-5.19	84.70	9.01	0.000%
37	7.01	-84.70	-7.03	-7.01	84.70	7.03	0.000%
38	7.00	-84.70	-4.06	-7.00	84.70	4.06	0.000%
39	7.73	-84.70	-0.01	-7.73	84.70	0.01	0.000%
40	6.69	-84.70	3.87	-6.69	84.70	-3.87	0.000%
41	5.46	-84.70	5.48	-5.46	84.70	-5.48	0.000%
42	3.86	-84.70	6.71	-3.86	84.70	-6.71	0.000%
43	-0.01	-84.70	8.12	0.01	84.70	-8.12	0.000%
44	-5.19	-84.70	9.01	5.19	84.70	-9.01	0.000%
45	-7.01	-84.70	7.03	7.01	84.70	-7.03	0.000%
46	-7.00	-84.70	4.06	7.00	84.70	-4.06	0.000%
47	-7.73	-84.70	0.01	7.73	84.70	-0.01	0.000%
48	-6.69	-84.70	-3.87	6.69	84.70	3.87	0.000%
49	-5.46	-84.70	-5.48	5.46	84.70	5.48	0.000%
50	-3.86	-84.70	-6.71	3.86	84.70	6.71	0.000%
51	0.01	-32.55	-5.24	-0.01	32.55	5.24	0.000%
52	2.63	-32.55	-4.58	-2.63	32.55	4.58	0.000%
53	3.69	-32.55	-3.71	-3.69	32.55	3.71	0.000%
54	4.52	-32.55	-2.63	-4.52	32.55	2.63	0.000%
55	5.22	-32.55	-0.01	-5.22	32.55	0.01	0.000%
56	4.52	-32.55	2.62	-4.52	32.55	-2.62	0.000%
57	3.69	-32.55	3.70	-3.69	32.55	-3.70	0.000%
58	2.60	-32.55	4.54	-2.60	32.55	-4.54	0.000%
59	-0.01	-32.55	5.24	0.01	32.55	-5.24	0.000%
60	-2.63	-32.55	4.58	2.63	32.55	-4.58	0.000%
61	-3.69	-32.55	3.71	3.69	32.55	-3.71	0.000%
62	-4.52	-32.55	2.63	4.52	32.55	-2.63	0.000%
63	-5.22	-32.55	0.01	5.22	32.55	-0.01	0.000%
64	-4.52	-32.55	-2.62	4.52	32.55	2.62	0.000%
65	-3.69	-32.55	-3.70	3.69	32.55	3.70	0.000%
66	-2.60	-32.55	-4.54	2.60	32.55	4.54	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00004638
3	Yes	4	0.00000001	0.00064077
4	Yes	5	0.00000001	0.00060610
5	Yes	5	0.00000001	0.00025574

6	Yes	5	0.00000001	0.00068560
7	Yes	5	0.00000001	0.00028694
8	Yes	5	0.00000001	0.00063106
9	Yes	5	0.00000001	0.00026962
10	Yes	4	0.00000001	0.00029243
11	Yes	4	0.00000001	0.00013207
12	Yes	5	0.00000001	0.00062108
13	Yes	5	0.00000001	0.00026553
14	Yes	5	0.00000001	0.00068050
15	Yes	5	0.00000001	0.00028543
16	Yes	5	0.00000001	0.00059338
17	Yes	5	0.00000001	0.00025202
18	Yes	5	0.00000001	0.00005039
19	Yes	4	0.00000001	0.00069429
20	Yes	5	0.00000001	0.00065524
21	Yes	5	0.00000001	0.00027854
22	Yes	5	0.00000001	0.00069024
23	Yes	5	0.00000001	0.00028813
24	Yes	5	0.00000001	0.00060651
25	Yes	5	0.00000001	0.00025663
26	Yes	4	0.00000001	0.00024739
27	Yes	4	0.00000001	0.00008896
28	Yes	5	0.00000001	0.00060953
29	Yes	5	0.00000001	0.00025818
30	Yes	5	0.00000001	0.00068853
31	Yes	5	0.00000001	0.00028728
32	Yes	5	0.00000001	0.00064048
33	Yes	5	0.00000001	0.00027284
34	Yes	4	0.00000001	0.00014651
35	Yes	5	0.00000001	0.00056177
36	Yes	5	0.00000001	0.00097129
37	Yes	6	0.00000001	0.00015113
38	Yes	5	0.00000001	0.00076563
39	Yes	5	0.00000001	0.00049318
40	Yes	5	0.00000001	0.00067216
41	Yes	5	0.00000001	0.00071718
42	Yes	5	0.00000001	0.00065855
43	Yes	5	0.00000001	0.00054491
44	Yes	6	0.00000001	0.00015608
45	Yes	6	0.00000001	0.00015832
46	Yes	5	0.00000001	0.00079054
47	Yes	5	0.00000001	0.00053247
48	Yes	5	0.00000001	0.00074822
49	Yes	5	0.00000001	0.00081482
50	Yes	5	0.00000001	0.00076898
51	Yes	4	0.00000001	0.00004999
52	Yes	4	0.00000001	0.00011670
53	Yes	4	0.00000001	0.00014973
54	Yes	4	0.00000001	0.00014052
55	Yes	4	0.00000001	0.00001782
56	Yes	4	0.00000001	0.00013222
57	Yes	4	0.00000001	0.00014498
58	Yes	4	0.00000001	0.00011186
59	Yes	4	0.00000001	0.00005007
60	Yes	4	0.00000001	0.00015928
61	Yes	4	0.00000001	0.00015689
62	Yes	4	0.00000001	0.00012317
63	Yes	4	0.00000001	0.00001819
64	Yes	4	0.00000001	0.00012837
65	Yes	4	0.00000001	0.00015819
66	Yes	4	0.00000001	0.00015497

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	137 - 88.25	17.781	60	1.1533	0.0050
L2	92.25 - 47.25	8.092	60	0.8302	0.0015
L3	52 - 1	2.535	60	0.4543	0.0006

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
143.00	20' 8 Bay Di-Pole	60	17.781	1.1533	0.0050	47837
142.00	PTP400	60	17.781	1.1533	0.0050	47837
140.00	4'6"x3" Pipe Mount	60	17.781	1.1533	0.0050	47837
138.00	AIR21	60	17.781	1.1533	0.0050	47837
136.00	Valmont 13' Low Profile Platform	60	17.548	1.1466	0.0049	47837
115.00	NNVV-65B-R4	60	12.744	1.0027	0.0031	10871
110.00	DB-T1-6Z-8AB-0Z	60	11.654	0.9666	0.0027	8858
105.00	SBNHH-1D65A	60	10.596	0.9294	0.0023	7474
95.00	13' Low Profile Platform	60	8.605	0.8527	0.0017	5703
83.00	PTP400	60	6.487	0.7496	0.0012	5263

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	137 - 88.25	95.676	20	6.1347	0.0271
L2	92.25 - 47.25	43.641	20	4.4782	0.0082
L3	52 - 1	13.686	20	2.4533	0.0030

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
143.00	20' 8 Bay Di-Pole	20	95.676	6.1347	0.0271	9346
142.00	PTP400	20	95.676	6.1347	0.0271	9346
140.00	4'6"x3" Pipe Mount	20	95.676	6.1347	0.0271	9346
138.00	AIR21	20	95.676	6.1347	0.0271	9346
136.00	Valmont 13' Low Profile Platform	20	94.426	6.1016	0.0266	9346
115.00	NNVV-65B-R4	20	68.642	5.3842	0.0165	2121
110.00	DB-T1-6Z-8AB-0Z	20	62.785	5.2010	0.0144	1727
105.00	SBNHH-1D65A	20	57.105	5.0100	0.0124	1456
95.00	13' Low Profile Platform	20	46.403	4.5991	0.0090	1108
83.00	PTP400	20	35.001	4.0453	0.0062	1008

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	137 - 88.25 (1)	TP30.7x23x0.1875	48.75	0.00	0.0	17.7828	-12.55	1124.71	0.011
L2	88.25 - 47.25 (2)	TP36.81x29.6932x0.375	45.00	0.00	0.0	42.4726	-21.88	3155.50	0.007
L3	47.25 - 1 (3)	TP43.36x35.3088x0.5	51.00	0.00	0.0	68.0188	-39.03	5053.46	0.008

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	137 - 88.25 (1)	TP30.7x23x0.1875	526.72	692.16	0.761	0.00	692.16	0.000
L2	88.25 - 47.25 (2)	TP36.81x29.6932x0.375	1432.29	2309.36	0.620	0.00	2309.36	0.000
L3	47.25 - 1 (3)	TP43.36x35.3088x0.5	2790.16	4437.07	0.629	0.00	4437.07	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	137 - 88.25 (1)	TP30.7x23x0.1875	20.18	562.35	0.036	1.76	1386.01	0.001
L2	88.25 - 47.25 (2)	TP36.81x29.6932x0.375	24.51	1577.75	0.016	1.75	4624.38	0.000
L3	47.25 - 1 (3)	TP43.36x35.3088x0.5	28.41	2526.73	0.011	1.75	8885.00	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	137 - 88.25 (1)	0.011	0.761	0.000	0.036	0.001	0.774 ✔	1.000	4.8.2 ✔
L2	88.25 - 47.25 (2)	0.007	0.620	0.000	0.016	0.000	0.627 ✔	1.000	4.8.2 ✔

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L3	47.25 - 1 (3)	0.008	0.629	0.000	0.011	0.000	0.637 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	137 - 88.25	Pole	TP30.7x23x0.1875	1	-12.55	1124.71	77.4	Pass
L2	88.25 - 47.25	Pole	TP36.81x29.6932x0.375	2	-21.88	3155.50	62.7	Pass
L3	47.25 - 1	Pole	TP43.36x35.3088x0.5	3	-39.03	5053.46	63.7	Pass
							Summary	
						Pole (L1)	77.4	Pass
						RATING =	**77.4**	**Pass**

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Subject:	Anchor Bolt and Baseplate Analysis
Location:	136-ft Summit Monopole Bloomfield, CT
Rev. 0: 8/7/18	Prepared by: T.J.L. Checked by: C.F.C. Job No. 18098.03

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 2790·ft·kips	(Input From tnxTower)
Shear Force =	Shear := 28·kips	(Input From tnxTower)
Axial Force =	Axial := 39·kips	(Input From tnxTower)

Anchor Bolt Data:

Use AST MA615 Grade 75

Number of Anchor Bolts =	N := 16	(User Input)
Bolt "Column" Distance =	l := 3.0·in	(User Input)
Bolt Ultimate Strength =	F_u := 100·ksi	(User Input)
Bolt Yield Strength =	F_y := 75·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	D := 2.25·in	(User Input)
Threads per Inch =	n := 4.5	(User Input)
Top of Concrete to Bot Leveling Nut =	l_{ar} := 2·in	(User Input)

Base Plate Data:

Use AST MA572 Gr. 55

Plate Yield Strength =	Fy_{bp} := 55·ksi	(User Input)
Base Plate Thickness =	t_{bp} := 3.0·in	(User Input)
η := 0.5	For Ungrouted Base Plate per TIA-222-G Section 4.9.9	

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

$d_1 := 24.875in$ (User Input)

$d_2 := 23.375in$ (User Input)

$d_3 := 8.875in$ (User Input)

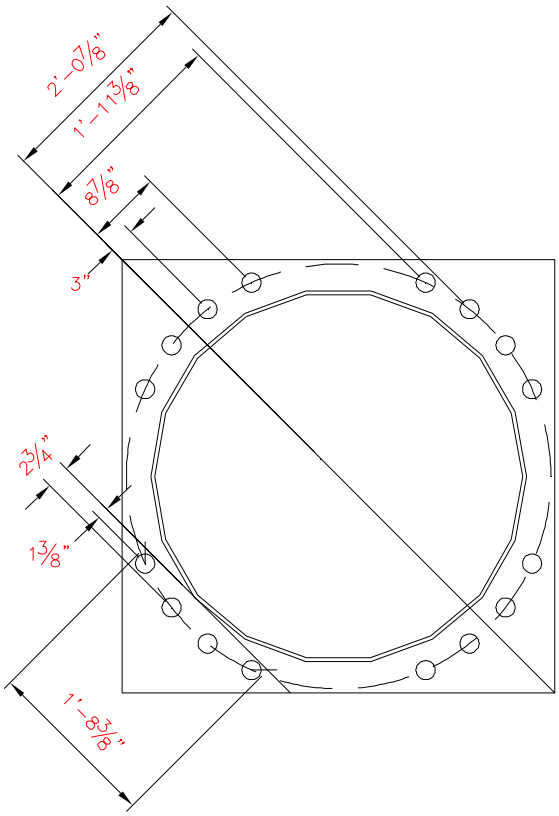
$d_4 := 3.0in$ (User Input)

Critical Distances For Bending in Plate:

$ma_1 := 2.75in$ (User Input)

$ma_2 := 1.375in$ (User Input)

Effective Width of Baseplate for Bending = $B_{eff} := 20.375in$ (User Input)



ANCHOR BOLT AND PLATE GEOMETRY

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \left[\left(d_1\right)^2 \cdot 4 + \left(d_2\right)^2 \cdot 4 + \left(d_3\right)^2 \cdot 4 + \left(d_4\right)^2 \cdot 4\right] = 5012 \cdot in^2$

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

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

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

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

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

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

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

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $P_u := OM \cdot \frac{d_1}{I_p} - \frac{Axial}{N} = 163.7 \cdot kips$

Maximum Shear Force = $V_u := \frac{Shear}{N} = 1.8 \cdot kips$

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

Bolt % of Capacity = $\frac{\left(P_u + \frac{V_u}{\eta}\right)}{\Phi R_{nt}} \cdot 100 = 64.4$

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

Condition1 = "OK"

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

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

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

Bolt % of Capacity = $\left[\left(\frac{V_u}{\Phi R_{nv}}\right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}}\right)^2\right] \cdot 100 = 39.7$

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

Condition2 = "OK"

Base Plate Analysis:

Force from Bolts = $C_1 := \frac{OM \cdot d_1}{I_p} + \frac{Axial}{N} = 168.612 \cdot kips$

$C_2 := \frac{OM \cdot d_2}{I_p} + \frac{Axial}{N} = 158.591 \cdot kips$

Applied Bending Stress in Plate = $f_{bp} := \frac{4 \cdot \left(2C_1 \cdot ma_1 + 2C_2 \cdot ma_2\right)}{B_{eff} \, t_{bp}^2} = 29.74 \cdot ksi$

Design Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 49.5 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 60.1 \cdot \%$

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

Condition3 = "Ok"

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Subject:	CAISSON FOUNDATION
Location:	136-ft Summit Monopole Bloomfield, CT
Rev. 0: 8/7/18	Prepared by: T.J.L.. Checked by: C.F.C. Job No. 18098.03

Caisson Foundation:

Input Data:

Shear Force =	$S := 28k$	*USER INPUT-FROM tnxTower*
Overturning Moment =	$M := 2790ft \cdot k$	*USER INPUT-FROM tnxTower*
Applied Axial Load =	$A1 := 39k$	*USER INPUT-FROM tnxTower*
Bending Moment =	$Mu := 3044ft \cdot k$	*USER INPUT--FROM LPILE*
Moment Capacity =	$Mn := 4619ft \cdot k$	*USER INPUT--FROM LPILE*
Foundation Diameter =	$d := 6.0ft$	*USER INPUT*
Overall Length of Caisson =	$L_c := 45.5ft$	*USER INPUT*
Depth From Top of Caisson to Grade =	$L_{pag} := 0.5ft$	*USER INPUT*
Number of Rebar =	$n := 20$	*USER INPUT*
Area of Rebar =	$Ar := 1.560in^2$	*USER INPUT*
Rebar Yield Strength =	$fy := 60ksi$	*USER INPUT*
Concrete Comp Strength =	$f'c := 3ksi$	*USER INPUT*

Check Moment Capacity:

Factor of Safety = $FS := \frac{Mn}{Mu} = 1.52$

Factor of Safety Required = $FS_{reqd} := 1.0$

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

FOSCheck = "OK"

LPILE Plus for Windows, Version 5.0 (5.0.47)

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

This program is licensed to:

TJL
Centek Engineering

Files Used for Analysis

Path to file locations: J:\Jobs\1809800.WI\03_CTHA140A\Structural\Backup Documentation\MathCad\Foundation\
Name of input data file: Bloomfield Caisson Analysis.lpd
Name of output file: Bloomfield Caisson Analysis.lpo
Name of plot output file: Bloomfield Caisson Analysis.lpp
Name of runtime file: Bloomfield Caisson Analysis.lpr

Time and Date of Analysis

Date: August 7, 2018 Time: 14:54:47

Problem Title

18098.03 - CTNH140A

Program Options

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

Basic Program Options:

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

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

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

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

Pile Structural Properties and Geometry

Pile Length = 546.00 in

Depth of ground surface below top of pile = 66.00 in

Slope angle of ground surface = 0.00 deg.

Structural properties of pile defined using 2 points

Point No.	Point Depth in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	72.00000000	1319167.	4071.0000	3122019.
2	546.0000	72.00000000	1319167.	4071.0000	3122019.

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

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

Soil and Rock Layering Information

The soil profile is modelled using 2 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 66.000 in
Distance from top of pile to bottom of layer = 126.000 in
p-y subgrade modulus k for top of soil layer = 60.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 60.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 126.000 in
Distance from top of pile to bottom of layer = 900.000 in
p-y subgrade modulus k for top of soil layer = 60.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 60.000 lbs/in**3

(Depth of lowest layer extends 354.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 4 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	66.00	0.03300
2	126.00	0.03300
3	126.00	0.03900
4	900.00	0.03900

Shear Strength of Soils

Shear strength parameters with depth defined using 4 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	66.000	0.00000	30.00	------	------
2	126.000	0.00000	30.00	------	------
3	126.000	0.00000	22.00	------	------
4	900.000	0.00000	22.00	------	------

Notes:

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

Loading Type

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

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 28000.000 lbs
Bending moment at pile head = 33480000.000 in-lbs
Axial load at pile head = 39000.000 lbs

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

Load Case Number 2

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 11000.000 lbs
Bending moment at pile head = 12840000.000 in-lbs
Axial load at pile head = 39000.000 lbs

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

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

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Number of sections = 1

Pile Section No. 1

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

Outside Diameter	= 72.0000	in

Material Properties:

Compressive Strength of Concrete	= 3.000	kip/in**2
Yield Stress of Reinforcement	= 60.	kip/in**2
Modulus of Elasticity of Reinforcement	= 29000.	kip/in**2
Number of Reinforcing Bars	= 20	
Area of Single Bar	= 1.56000	in**2
Number of Rows of Reinforcing Bars	= 11	
Area of Steel	= 31.200	in**2
Area of Shaft	= 4071.504	in**2
Percentage of Steel Reinforcement	= 0.766	percent
Cover Thickness (edge to bar center)	= 4.000	in

Unfactored Axial Squash Load Capacity = 12174.78 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	1.560	32.000
2	3.120	30.434
3	3.120	25.889
4	3.120	18.809
5	3.120	9.889
6	3.120	0.000
7	3.120	-9.889

8	3.120	-18.809
9	3.120	-25.889
10	3.120	-30.434
11	1.560	-32.000

Axial Thrust Force = 39000.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
3835255.	4.602306E+12	8.333333E-07	0.00003299	39.58407176	101.28756	859.94840
7626544.	4.575926E+12	0.00000167	0.00006311	37.86387455	191.84751	1636.75394
11373777.	4.549511E+12	0.00000250	0.00009321	37.28211629	280.63910	2412.95343
15078800.	4.523640E+12	0.00000333	0.00012339	37.01613772	367.96864	3191.55998
15078800.	3.618912E+12	0.00000417	0.00008473	20.33478034	252.39499	5759.54738
15078800.	3.015760E+12	0.00000500	0.00009957	19.91327655	295.05868	6972.57490
15078800.	2.584937E+12	0.00000583	0.00011443	19.61580026	337.38411	8184.99379
15078800.	2.261820E+12	0.00000667	0.00012931	19.39586556	379.36999	9396.79933
15078800.	2.010507E+12	0.00000750	0.00014421	19.22764599	421.01501	10607.98700
15078800.	1.809456E+12	0.00000833	0.00015943	19.13180959	463.17651	11809.81268
15078800.	1.644960E+12	0.00000917	0.00017434	19.01854742	504.01523	13020.90281
15078800.	1.507880E+12	0.00001000	0.00018926	18.92648113	544.51515	14231.32047
15078800.	1.391889E+12	0.00001083	0.00020422	18.85073340	584.67475	15441.06126
15078800.	1.292469E+12	0.00001167	0.00021919	18.78782809	624.49271	16650.11816
15078800.	1.206304E+12	0.00001250	0.00023419	18.73520958	663.96748	17858.48653
15078800.	1.130910E+12	0.00001333	0.00024921	18.69096601	703.09766	19066.15981
15078800.	1.064386E+12	0.00001417	0.00026426	18.65363395	741.88175	

20273.13205					
15078800.	1.005253E+12	0.00001500	0.00027933	18.62207401	780.31821
21479.39781					
15805549.	9.982452E+11	0.00001583	0.00029443	18.59539139	818.40563
22684.94945					
16587761.	9.952657E+11	0.00001667	0.00030955	18.57286298	856.14230
23889.78289					
17368843.	9.925053E+11	0.00001750	0.00032469	18.55391157	893.52681
25093.88988					
18148784.	9.899337E+11	0.00001833	0.00033986	18.53806078	930.55754
26297.26435					
18927575.	9.875257E+11	0.00001917	0.00035506	18.52491581	967.23281
27499.90096					
19705211.	9.852606E+11	0.00002000	0.00037028	18.51415265	1003.55111
28701.79147					
20481680.	9.831206E+11	0.00002083	0.00038553	18.50549448	1039.51071
29902.93042					
21256976.	9.810912E+11	0.00002167	0.00040081	18.49871171	1075.11004
31103.30948					
22031089.	9.791595E+11	0.00002250	0.00041611	18.49360478	1110.34734
32302.92288					
22804012.	9.773148E+11	0.00002333	0.00043143	18.49000633	1145.22097
33501.76238					
23575732.	9.755475E+11	0.00002417	0.00044679	18.48776829	1179.72908
34699.82239					
24346243.	9.738497E+11	0.00002500	0.00046217	18.48676622	1213.87000
35897.09449					
25115536.	9.722143E+11	0.00002583	0.00047758	18.48689067	1247.64197
37093.57107					
25883603.	9.706351E+11	0.00002667	0.00049301	18.48804724	1281.04325
38289.24347					
26650428.	9.691065E+11	0.00002750	0.00050848	18.49014795	1314.07179
39484.10701					
27416008.	9.676238E+11	0.00002833	0.00052397	18.49312198	1346.72591
40678.15144					
28180329.	9.661827E+11	0.00002917	0.00053949	18.49690282	1379.00367
41871.36970					
28943386.	9.647795E+11	0.00003000	0.00055504	18.50143468	1410.90329
43063.75183					
29705161.	9.634106E+11	0.00003083	0.00057062	18.50666177	1442.42256
44255.29326					
30465652.	9.620732E+11	0.00003167	0.00058623	18.51254332	1473.55985
45445.98105					
31224842.	9.607644E+11	0.00003250	0.00060187	18.51903427	1504.31291
46635.81020					
32739287.	9.582230E+11	0.00003417	0.00063323	18.53370702	1564.65862
49012.85196					
34248409.	9.557695E+11	0.00003583	0.00066472	18.55042899	1623.44322
51386.34588					

35752114.	9.533897E+11	0.00003750	0.00069634	18.56899416	1680.64958
53756.21885					
37250313.	9.510718E+11	0.00003917	0.00072808	18.58923733	1736.26028
56122.39126					
38742903.	9.488058E+11	0.00004083	0.00075995	18.61101902	1790.25706
58484.78498					
40164185.	9.450396E+11	0.00004250	0.00079149	18.62323272	1841.84603
60000.00000					
41269126.	9.343953E+11	0.00004417	0.00082088	18.58589208	1888.17956
60000.00000					
42203507.	9.208038E+11	0.00004583	0.00084913	18.52643287	1931.18094
60000.00000					
43134413.	9.080929E+11	0.00004750	0.00087747	18.47309768	1972.87690
60000.00000					
43774625.	8.903314E+11	0.00004917	0.00090352	18.37665617	2009.79393
60000.00000					
44383960.	8.731271E+11	0.00005083	0.00092940	18.28329813	2045.26008
60000.00000					
44990849.	8.569686E+11	0.00005250	0.00095535	18.19723141	2079.61900
60000.00000					
45595274.	8.417589E+11	0.00005417	0.00098138	18.11780584	2112.86187
60000.00000					
46197208.	8.274127E+11	0.00005583	0.00100748	18.04444635	2144.97944
60000.00000					
46637039.	8.110789E+11	0.00005750	0.00103500	17.99999893	2177.58022
60000.00000					
46995343.	7.942875E+11	0.00005917	0.00105840	17.88840187	2204.04920
60000.00000					
47345883.	7.782885E+11	0.00006083	0.00108173	17.78180659	2229.46696
60000.00000					
47694802.	7.631168E+11	0.00006250	0.00110511	17.68183529	2253.97799
60000.00000					
48042077.	7.487077E+11	0.00006417	0.00112856	17.58798158	2277.57525
60000.00000					
48387698.	7.350030E+11	0.00006583	0.00115207	17.49979484	2300.25190
60000.00000					
48731642.	7.219502E+11	0.00006750	0.00117564	17.41686523	2322.00064
60000.00000					
49073889.	7.095020E+11	0.00006917	0.00119927	17.33882368	2342.81415
60000.00000					
49414423.	6.976154E+11	0.00007083	0.00122296	17.26533759	2362.68503
60000.00000					
49719419.	6.857851E+11	0.00007250	0.00124621	17.18916070	2381.19802
60000.00000					
49898253.	6.727854E+11	0.00007417	0.00126766	17.09209049	2397.36144
60000.00000					
50075920.	6.603418E+11	0.00007583	0.00128916	16.99993408	2412.74743
60000.00000					
50252409.	6.484182E+11	0.00007750	0.00131071	16.91238034	2427.35044

60000.00000
50427704. 6.369815E+11 0.00007917 0.00133231 16.82914388 2441.16480
60000.00000
50787691. 6.283013E+11 0.00008083 0.00135800 16.80000007 2456.63808
60000.00000
50807516. 6.158487E+11 0.00008250 0.00138066 16.73529017 2469.23541
60000.00000
50974463. 6.056372E+11 0.00008417 0.00140177 16.65463722 2480.11043
60000.00000
51140297. 5.958093E+11 0.00008583 0.00142292 16.57771575 2490.22422
60000.00000
51305002. 5.863429E+11 0.00008750 0.00144413 16.50431764 2499.57093
60000.00000
51468564. 5.772175E+11 0.00008917 0.00146539 16.43425190 2508.14466
60000.00000
51630973. 5.684144E+11 0.00009083 0.00148670 16.36734259 2515.93948
60000.00000
51792211. 5.599158E+11 0.00009250 0.00150807 16.30342448 2522.94923
60000.00000
51952279. 5.517056E+11 0.00009417 0.00152949 16.24234951 2529.16784
60000.00000
52111147. 5.437685E+11 0.00009583 0.00155096 16.18397176 2534.58884
60000.00000
52268819. 5.360905E+11 0.00009750 0.00157250 16.12816465 2539.20591
60000.00000
52425274. 5.286582E+11 0.00009917 0.00159408 16.07480371 2543.01243
60000.00000
52734469. 5.144826E+11 0.00010250 0.00163743 15.97496974 2548.16682
60000.00000
52907117. 4.999098E+11 0.00010583 0.00167755 15.85085428 2549.97271
60000.00000
53037713. 4.858416E+11 0.00010917 0.00171691 15.72738683 2544.37789
60000.00000
53165797. 4.725849E+11 0.00011250 0.00175645 15.61290586 2545.84062
60000.00000
53335865. 4.604535E+11 0.00011583 0.00180585 15.59008777 2549.52934
60000.00000
53451310. 4.485425E+11 0.00011917 0.00184426 15.47627413 2548.17551
60000.00000
53564343. 4.372599E+11 0.00012250 0.00188291 15.37065732 2542.44857
60000.00000
53676078. 4.265649E+11 0.00012583 0.00192171 15.27190053 2544.50980
60000.00000
53786487. 4.164115E+11 0.00012917 0.00196069 15.17949951 2547.92733
60000.00000
53895532. 4.067587E+11 0.00013250 0.00199982 15.09299934 2549.71801
60000.00000
54002579. 3.975650E+11 0.00013583 0.00203919 15.01240647 2547.83712
60000.00000

54107679.	3.887977E+11	0.00013917	0.00207877	14.93724668	2542.64830
60000.00000					
54211843.	3.804340E+11	0.00014250	0.00211848	14.86653078	2540.39736
60000.00000					
54315040.	3.724460E+11	0.00014583	0.00215833	14.79996908	2544.74323
60000.00000					
54417244.	3.648083E+11	0.00014917	0.00219831	14.73729980	2547.80236
60000.00000					
54518447.	3.574980E+11	0.00015250	0.00223844	14.67828906	2549.55413
60000.00000					
54618343.	3.504920E+11	0.00015583	0.00227873	14.62289822	2549.14394
60000.00000					
54716254.	3.437670E+11	0.00015917	0.00231928	14.57136548	2544.48852
60000.00000					
54813520.	3.373140E+11	0.00016250	0.00235992	14.52258790	2539.81483
60000.00000					
54910122.	3.311163E+11	0.00016583	0.00240067	14.47640884	2537.32191
60000.00000					
55006054.	3.251589E+11	0.00016917	0.00244153	14.43268669	2541.88993
60000.00000					
55142332.	3.196657E+11	0.00017250	0.00248400	14.40000021	2545.65390
60000.00000					
55423428.	3.152043E+11	0.00017583	0.00253200	14.40000021	2548.67933
60000.00000					
55722995.	3.110121E+11	0.00017917	0.00258000	14.40000021	2549.95439
60000.00000					
55722995.	3.053315E+11	0.00018250	0.00261823	14.34648693	2547.65318
60000.00000					
55722995.	2.998547E+11	0.00018583	0.00265380	14.28054106	2544.57186
60000.00000					
55722995.	2.945709E+11	0.00018917	0.00268941	14.21715724	2541.48265
60000.00000					
55722995.	2.894701E+11	0.00019250	0.00272507	14.15620458	2538.38547
60000.00000					
55722995.	2.845430E+11	0.00019583	0.00276077	14.09756076	2535.28026
60000.00000					
55722995.	2.797807E+11	0.00019917	0.00279652	14.04111207	2532.16693
60000.00000					
55722995.	2.751753E+11	0.00020250	0.00283232	13.98675120	2535.15959
60000.00000					
55722995.	2.707190E+11	0.00020583	0.00286816	13.93437946	2538.29910
60000.00000					
55722995.	2.664048E+11	0.00020917	0.00290405	13.88390458	2541.07481
60000.00000					
55722995.	2.622259E+11	0.00021250	0.00294124	13.84111154	2543.68010
60000.00000					
55722995.	2.581760E+11	0.00021583	0.00297858	13.80035484	2545.85646
60000.00000					
55722995.	2.542494E+11	0.00021917	0.00301598	13.76111948	2547.58114

```
  60000.00000
     55722995.  2.504404E+11    0.00022250    0.00305344   13.72333896    2548.84862
  60000.00000
     55722995.  2.467439E+11    0.00022583    0.00309097   13.68695319    2549.65332
  60000.00000
     55722995.  2.431549E+11    0.00022917    0.00312856   13.65190423    2549.98953
  60000.00000
     55722995.  2.396688E+11    0.00023250    0.00316635   13.61872852    2547.80744
  60000.00000
     55722995.  2.329881E+11    0.00023917    0.00324212   13.55592191    2542.23472
  60000.00000
     55722995.  2.266698E+11    0.00024583    0.00331804   13.49709570    2536.63725
  60000.00000
     55722995.  2.206851E+11    0.00025250    0.00339409   13.44194520    2531.01457
  60000.00000
     55748541.  2.151069E+11    0.00025917    0.00347029   13.39019573    2525.36626
  60000.00000
     55777832.  2.098226E+11    0.00026583    0.00354664   13.34160054    2529.21172
  60000.00000
     55783282.  2.047093E+11    0.00027250    0.00362863   13.31608951    2536.86558
  60000.00000
     55786774.  1.998332E+11    0.00027917    0.00371122   13.29390657    2542.86841
  60000.00000
     55789516.  1.951820E+11    0.00028583    0.00379411   13.27383721    2547.08532
  60000.00000
     55791494.  1.907401E+11    0.00029250    0.00387732   13.25578487    2549.46137
  60000.00000
```

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 55722.99491 in-kip

Axial Thrust Force = 39000.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
3835255.	4.602306E+12	8.333333E-07	0.00003299	39.58407176	101.28756	859.94840
7626544.	4.575926E+12	0.00000167	0.00006311	37.86387455	191.84751	1636.75394
11373777.	4.549511E+12	0.00000250	0.00009321	37.28211629	280.63910	

2412.95343					
15078800.	4.523640E+12	0.00000333	0.00012339	37.01613772	367.96864
3191.55998					
15078800.	3.618912E+12	0.00000417	0.00008473	20.33478034	252.39499
5759.54738					
15078800.	3.015760E+12	0.00000500	0.00009957	19.91327655	295.05868
6972.57490					
15078800.	2.584937E+12	0.00000583	0.00011443	19.61580026	337.38411
8184.99379					
15078800.	2.261820E+12	0.00000667	0.00012931	19.39586556	379.36999
9396.79933					
15078800.	2.010507E+12	0.00000750	0.00014421	19.22764599	421.01501
10607.98700					
15078800.	1.809456E+12	0.00000833	0.00015943	19.13180959	463.17651
11809.81268					
15078800.	1.644960E+12	0.00000917	0.00017434	19.01854742	504.01523
13020.90281					
15078800.	1.507880E+12	0.00001000	0.00018926	18.92648113	544.51515
14231.32047					
15078800.	1.391889E+12	0.00001083	0.00020422	18.85073340	584.67475
15441.06126					
15078800.	1.292469E+12	0.00001167	0.00021919	18.78782809	624.49271
16650.11816					
15078800.	1.206304E+12	0.00001250	0.00023419	18.73520958	663.96748
17858.48653					
15078800.	1.130910E+12	0.00001333	0.00024921	18.69096601	703.09766
19066.15981					
15078800.	1.064386E+12	0.00001417	0.00026426	18.65363395	741.88175
20273.13205					
15078800.	1.005253E+12	0.00001500	0.00027933	18.62207401	780.31821
21479.39781					
15805549.	9.982452E+11	0.00001583	0.00029443	18.59539139	818.40563
22684.94945					
16587761.	9.952657E+11	0.00001667	0.00030955	18.57286298	856.14230
23889.78289					
17368843.	9.925053E+11	0.00001750	0.00032469	18.55391157	893.52681
25093.88988					
18148784.	9.899337E+11	0.00001833	0.00033986	18.53806078	930.55754
26297.26435					
18927575.	9.875257E+11	0.00001917	0.00035506	18.52491581	967.23281
27499.90096					
19705211.	9.852606E+11	0.00002000	0.00037028	18.51415265	1003.55111
28701.79147					
20481680.	9.831206E+11	0.00002083	0.00038553	18.50549448	1039.51071
29902.93042					
21256976.	9.810912E+11	0.00002167	0.00040081	18.49871171	1075.11004
31103.30948					
22031089.	9.791595E+11	0.00002250	0.00041611	18.49360478	1110.34734
32302.92288					

22804012.	9.773148E+11	0.00002333	0.00043143	18.49000633	1145.22097
33501.76238					
23575732.	9.755475E+11	0.00002417	0.00044679	18.48776829	1179.72908
34699.82239					
24346243.	9.738497E+11	0.00002500	0.00046217	18.48676622	1213.87000
35897.09449					
25115536.	9.722143E+11	0.00002583	0.00047758	18.48689067	1247.64197
37093.57107					
25883603.	9.706351E+11	0.00002667	0.00049301	18.48804724	1281.04325
38289.24347					
26650428.	9.691065E+11	0.00002750	0.00050848	18.49014795	1314.07179
39484.10701					
27416008.	9.676238E+11	0.00002833	0.00052397	18.49312198	1346.72591
40678.15144					
28180329.	9.661827E+11	0.00002917	0.00053949	18.49690282	1379.00367
41871.36970					
28943386.	9.647795E+11	0.00003000	0.00055504	18.50143468	1410.90329
43063.75183					
29705161.	9.634106E+11	0.00003083	0.00057062	18.50666177	1442.42256
44255.29326					
30465652.	9.620732E+11	0.00003167	0.00058623	18.51254332	1473.55985
45445.98105					
31224842.	9.607644E+11	0.00003250	0.00060187	18.51903427	1504.31291
46635.81020					
32739287.	9.582230E+11	0.00003417	0.00063323	18.53370702	1564.65862
49012.85196					
34248409.	9.557695E+11	0.00003583	0.00066472	18.55042899	1623.44322
51386.34588					
35752114.	9.533897E+11	0.00003750	0.00069634	18.56899416	1680.64958
53756.21885					
37250313.	9.510718E+11	0.00003917	0.00072808	18.58923733	1736.26028
56122.39126					
38742903.	9.488058E+11	0.00004083	0.00075995	18.61101902	1790.25706
58484.78498					
40164185.	9.450396E+11	0.00004250	0.00079149	18.62323272	1841.84603
60000.00000					
41269126.	9.343953E+11	0.00004417	0.00082088	18.58589208	1888.17956
60000.00000					
42203507.	9.208038E+11	0.00004583	0.00084913	18.52643287	1931.18094
60000.00000					
43134413.	9.080929E+11	0.00004750	0.00087747	18.47309768	1972.87690
60000.00000					
43774625.	8.903314E+11	0.00004917	0.00090352	18.37665617	2009.79393
60000.00000					
44383960.	8.731271E+11	0.00005083	0.00092940	18.28329813	2045.26008
60000.00000					
44990849.	8.569686E+11	0.00005250	0.00095535	18.19723141	2079.61900
60000.00000					
45595274.	8.417589E+11	0.00005417	0.00098138	18.11780584	2112.86187

60000.00000
46197208. 8.274127E+11 0.00005583 0.00100748 18.04444635 2144.97944
60000.00000
46637039. 8.110789E+11 0.00005750 0.00103500 17.99999893 2177.58022
60000.00000
46995343. 7.942875E+11 0.00005917 0.00105840 17.88840187 2204.04920
60000.00000
47345883. 7.782885E+11 0.00006083 0.00108173 17.78180659 2229.46696
60000.00000
47694802. 7.631168E+11 0.00006250 0.00110511 17.68183529 2253.97799
60000.00000
48042077. 7.487077E+11 0.00006417 0.00112856 17.58798158 2277.57525
60000.00000
48387698. 7.350030E+11 0.00006583 0.00115207 17.49979484 2300.25190
60000.00000
48731642. 7.219502E+11 0.00006750 0.00117564 17.41686523 2322.00064
60000.00000
49073889. 7.095020E+11 0.00006917 0.00119927 17.33882368 2342.81415
60000.00000
49414423. 6.976154E+11 0.00007083 0.00122296 17.26533759 2362.68503
60000.00000
49719419. 6.857851E+11 0.00007250 0.00124621 17.18916070 2381.19802
60000.00000
49898253. 6.727854E+11 0.00007417 0.00126766 17.09209049 2397.36144
60000.00000
50075920. 6.603418E+11 0.00007583 0.00128916 16.99993408 2412.74743
60000.00000
50252409. 6.484182E+11 0.00007750 0.00131071 16.91238034 2427.35044
60000.00000
50427704. 6.369815E+11 0.00007917 0.00133231 16.82914388 2441.16480
60000.00000
50787691. 6.283013E+11 0.00008083 0.00135800 16.80000007 2456.63808
60000.00000
50807516. 6.158487E+11 0.00008250 0.00138066 16.73529017 2469.23541
60000.00000
50974463. 6.056372E+11 0.00008417 0.00140177 16.65463722 2480.11043
60000.00000
51140297. 5.958093E+11 0.00008583 0.00142292 16.57771575 2490.22422
60000.00000
51305002. 5.863429E+11 0.00008750 0.00144413 16.50431764 2499.57093
60000.00000
51468564. 5.772175E+11 0.00008917 0.00146539 16.43425190 2508.14466
60000.00000
51630973. 5.684144E+11 0.00009083 0.00148670 16.36734259 2515.93948
60000.00000
51792211. 5.599158E+11 0.00009250 0.00150807 16.30342448 2522.94923
60000.00000
51952279. 5.517056E+11 0.00009417 0.00152949 16.24234951 2529.16784
60000.00000

52111147.	5.437685E+11	0.00009583	0.00155096	16.18397176	2534.58884
60000.00000					
52268819.	5.360905E+11	0.00009750	0.00157250	16.12816465	2539.20591
60000.00000					
52425274.	5.286582E+11	0.00009917	0.00159408	16.07480371	2543.01243
60000.00000					
52734469.	5.144826E+11	0.00010250	0.00163743	15.97496974	2548.16682
60000.00000					
52907117.	4.999098E+11	0.00010583	0.00167755	15.85085428	2549.97271
60000.00000					
53037713.	4.858416E+11	0.00010917	0.00171691	15.72738683	2544.37789
60000.00000					
53165797.	4.725849E+11	0.00011250	0.00175645	15.61290586	2545.84062
60000.00000					
53335865.	4.604535E+11	0.00011583	0.00180585	15.59008777	2549.52934
60000.00000					
53451310.	4.485425E+11	0.00011917	0.00184426	15.47627413	2548.17551
60000.00000					
53564343.	4.372599E+11	0.00012250	0.00188291	15.37065732	2542.44857
60000.00000					
53676078.	4.265649E+11	0.00012583	0.00192171	15.27190053	2544.50980
60000.00000					
53786487.	4.164115E+11	0.00012917	0.00196069	15.17949951	2547.92733
60000.00000					
53895532.	4.067587E+11	0.00013250	0.00199982	15.09299934	2549.71801
60000.00000					
54002579.	3.975650E+11	0.00013583	0.00203919	15.01240647	2547.83712
60000.00000					
54107679.	3.887977E+11	0.00013917	0.00207877	14.93724668	2542.64830
60000.00000					
54211843.	3.804340E+11	0.00014250	0.00211848	14.86653078	2540.39736
60000.00000					
54315040.	3.724460E+11	0.00014583	0.00215833	14.79996908	2544.74323
60000.00000					
54417244.	3.648083E+11	0.00014917	0.00219831	14.73729980	2547.80236
60000.00000					
54518447.	3.574980E+11	0.00015250	0.00223844	14.67828906	2549.55413
60000.00000					
54618343.	3.504920E+11	0.00015583	0.00227873	14.62289822	2549.14394
60000.00000					
54716254.	3.437670E+11	0.00015917	0.00231928	14.57136548	2544.48852
60000.00000					
54813520.	3.373140E+11	0.00016250	0.00235992	14.52258790	2539.81483
60000.00000					
54910122.	3.311163E+11	0.00016583	0.00240067	14.47640884	2537.32191
60000.00000					
55006054.	3.251589E+11	0.00016917	0.00244153	14.43268669	2541.88993
60000.00000					
55142332.	3.196657E+11	0.00017250	0.00248400	14.40000021	2545.65390

60000.00000
55423428. 3.152043E+11 0.00017583 0.00253200 14.40000021 2548.67933
60000.00000
55722995. 3.110121E+11 0.00017917 0.00258000 14.40000021 2549.95439
60000.00000
55722995. 3.053315E+11 0.00018250 0.00261823 14.34648693 2547.65318
60000.00000
55722995. 2.998547E+11 0.00018583 0.00265380 14.28054106 2544.57186
60000.00000
55722995. 2.945709E+11 0.00018917 0.00268941 14.21715724 2541.48265
60000.00000
55722995. 2.894701E+11 0.00019250 0.00272507 14.15620458 2538.38547
60000.00000
55722995. 2.845430E+11 0.00019583 0.00276077 14.09756076 2535.28026
60000.00000
55722995. 2.797807E+11 0.00019917 0.00279652 14.04111207 2532.16693
60000.00000
55722995. 2.751753E+11 0.00020250 0.00283232 13.98675120 2535.15959
60000.00000
55722995. 2.707190E+11 0.00020583 0.00286816 13.93437946 2538.29910
60000.00000
55722995. 2.664048E+11 0.00020917 0.00290405 13.88390458 2541.07481
60000.00000
55722995. 2.622259E+11 0.00021250 0.00294124 13.84111154 2543.68010
60000.00000
55722995. 2.581760E+11 0.00021583 0.00297858 13.80035484 2545.85646
60000.00000
55722995. 2.542494E+11 0.00021917 0.00301598 13.76111948 2547.58114
60000.00000
55722995. 2.504404E+11 0.00022250 0.00305344 13.72333896 2548.84862
60000.00000
55722995. 2.467439E+11 0.00022583 0.00309097 13.68695319 2549.65332
60000.00000
55722995. 2.431549E+11 0.00022917 0.00312856 13.65190423 2549.98953
60000.00000
55722995. 2.396688E+11 0.00023250 0.00316635 13.61872852 2547.80744
60000.00000
55722995. 2.329881E+11 0.00023917 0.00324212 13.55592191 2542.23472
60000.00000
55722995. 2.266698E+11 0.00024583 0.00331804 13.49709570 2536.63725
60000.00000
55722995. 2.206851E+11 0.00025250 0.00339409 13.44194520 2531.01457
60000.00000
55748541. 2.151069E+11 0.00025917 0.00347029 13.39019573 2525.36626
60000.00000
55777832. 2.098226E+11 0.00026583 0.00354664 13.34160054 2529.21172
60000.00000
55783282. 2.047093E+11 0.00027250 0.00362863 13.31608951 2536.86558
60000.00000

```
     55786774.  1.998332E+11    0.00027917    0.00371122   13.29390657    2542.86841
  60000.00000
     55789516.  1.951820E+11    0.00028583    0.00379411   13.27383721    2547.08532
  60000.00000
     55791494.  1.907401E+11    0.00029250    0.00387732   13.25578487    2549.46137
  60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 =   55722.99491
in-kip




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

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
Specified shear force at pile head  =       28000.000 lbs
Specified moment at pile head       =    33480000.000 in-lbs
Specified axial load at pile head   =       39000.000 lbs

  Depth   Deflect.  Moment     Shear     Slope     Total   Flx. Rig. Soil Res.
Es*h
    X        y        M          V         S       Stress      EI        p
F/L
    in       in      lbs-in      lbs       Rad.  lbs/in**2 lbs-in**2  lbs/in
-------- --------- --------- --------- --------- --------- --------- ---------
---------
   0.000     2.052  3.35E+07    28000. -0.012221   923.247  9.57E+11     0.000
0.000
  43.680     1.552  3.47E+07    28000. -0.010663   957.156  9.55E+11     0.000
0.000
  87.360     1.121  3.59E+07    24665. -0.009045   990.385  9.53E+11  -315.166
1534.630
 131.040  0.762523  3.65E+07 -2641.005 -0.007379  1006.339  9.52E+11  -697.146
4991.873
 174.720  0.476662  3.57E+07   -38936. -0.005717   982.904  9.54E+11  -931.816
10674.
 218.400  0.261862  3.31E+07   -80792. -0.004139   911.867  9.58E+11  -952.182
19854.
 262.080  0.112626  2.87E+07 -1.19E+05 -0.002730   792.239  9.65E+11  -732.793
35525.
 305.760  0.019849  2.29E+07 -1.42E+05 -0.001565   635.100  9.77E+11  -303.476
83479.
 349.440 -0.028241  1.67E+07 -1.39E+05 -0.000687   465.174  9.95E+11   284.817
55066.
 393.120 -0.050788  1.10E+07 -1.23E+05 -0.000445   308.749  4.55E+12   441.610
```

```
47475.
 436.800 -0.068270  6.07E+06   -99849. -0.000364   175.352  4.58E+12   619.112
49514.
 480.480 -0.083181  2.37E+06   -67998. -0.000325    74.323  4.60E+12   844.081
55406.
 524.160 -0.097053  2.86E+05   -25623. -0.000314    17.384  4.60E+12  1102.194
62007.
```

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

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

```
Pile-head deflection             =     2.05195934 in
Computed slope at pile head      =    -0.01222091
Maximum bending moment           =      36527206. lbs-in
Maximum shear force              =  -144150.12865 lbs
Depth of maximum bending moment  =      125.58000 in
Depth of maximum shear force     =      322.14000 in
Number of iterations             =             34
Number of zero deflection points =              1
```

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

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)

```
Specified shear force at pile head  =       11000.000 lbs
Specified moment at pile head       =    12840000.000 in-lbs
Specified axial load at pile head   =       39000.000 lbs
```

Depth X	Deflect. y	Moment M	Shear V	Slope S	Total Stress	Flx. Rig. EI	Soil Res. Es*h p
in	in	lbs-in	lbs	Rad.	lbs/in**2	lbs-in**2	lbs/in F/L

```
---------
   0.000  0.195770  1.28E+07    11000. -0.001076   359.983  4.54E+12     0.000
0.000
  43.680  0.151511  1.33E+07    11000. -0.000950   373.142  4.53E+12     0.000
0.000
  87.360  0.112858  1.38E+07  9369.868 -0.000819   385.988  4.53E+12  -144.638
6997.536
 131.040  0.080003  1.40E+07 -1288.149 -0.000685   391.657  4.53E+12  -355.463
24259.
 174.720  0.053023  1.36E+07   -18583. -0.000551   379.989  4.53E+12  -396.712
40851.
 218.400  0.031729  1.24E+07   -34475. -0.000426   348.044  4.54E+12  -320.554
55161.
 262.080  0.015626  1.06E+07   -45923. -0.000315   299.597  4.55E+12  -198.819
69471.
 305.760  0.003963  8.47E+06   -51611. -0.000223   240.859  4.57E+12   -60.811
83780.
 349.440 -0.004164  6.21E+06   -51275. -0.000153   178.939  4.58E+12    74.801
98090.
 393.120 -0.009701  4.07E+06   -45655. -0.000104   120.775  4.60E+12   164.877
92794.
 436.800 -0.013537  2.26E+06   -37151. -7.44E-05    71.121  4.60E+12   231.731
93467.
 480.480 -0.016423  8.79E+05   -25235. -6.00E-05    33.569  4.60E+12   315.123
1.05E+05
 524.160 -0.018923  1.06E+05 -9476.674 -5.58E-05    12.466  4.60E+12   408.392
1.18E+05
```

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

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 2:

```
Pile-head deflection             =     0.19576992 in
Computed slope at pile head      =    -0.00107584
Maximum bending moment           =      14002228. lbs-in
Maximum shear force              =   -52184.26119 lbs
Depth of maximum bending moment  =      125.58000 in
Depth of maximum shear force     =      327.60000 in
Number of iterations             =              7
Number of zero deflection points =              1
```

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

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

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 28000.	M= 3.35E+07	39000.0000	2.0520	3.6527E+07	-144150.
1	V= 11000.	M= 1.28E+07	39000.0000	0.1957699	1.4002E+07	-52184.2612

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

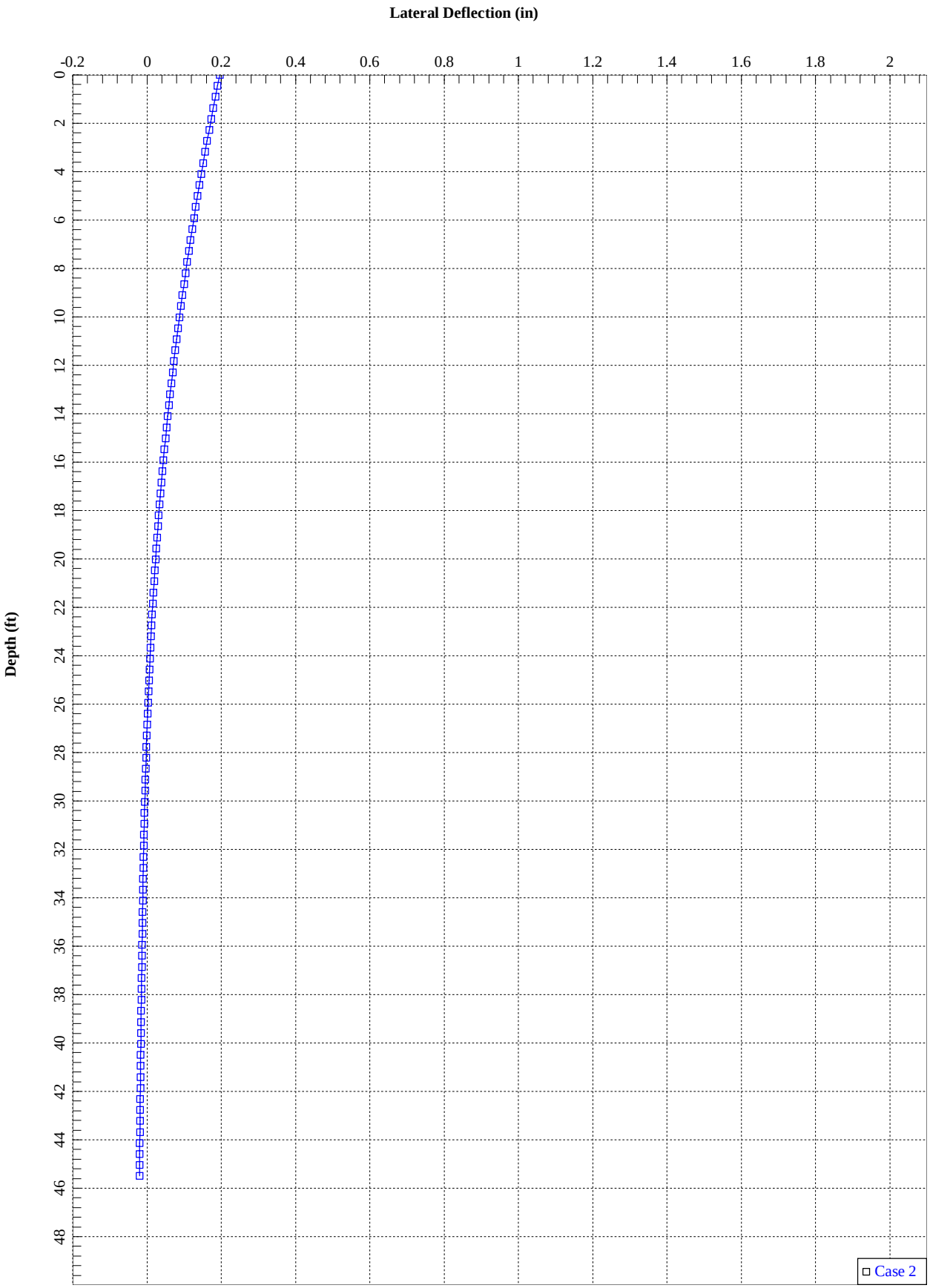
Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
0.00291128	2800.00004	477911.12418	961775.49338	1.641583E+08
0.00876383	8428.83988	1438656.	961775.49338	1.641583E+08
0.01389035	13359.39513	2280216.	961775.49338	1.641583E+08
0.01752767	16857.67976	2877312.	961775.49338	1.641583E+08
0.02034899	19571.16012	3340455.	961775.49338	1.641583E+08
0.02265418	21788.23501	3718871.	961775.49338	1.641583E+08
0.02460361	23662.74512	4038782.	961759.18931	1.641541E+08
0.02629356	25286.51964	4315791.	961700.04820	1.641387E+08
0.02778484	26718.79026	4560071.	961631.92745	1.641208E+08
0.02911937	28000.00000	4778536.	961559.30225	1.641016E+08

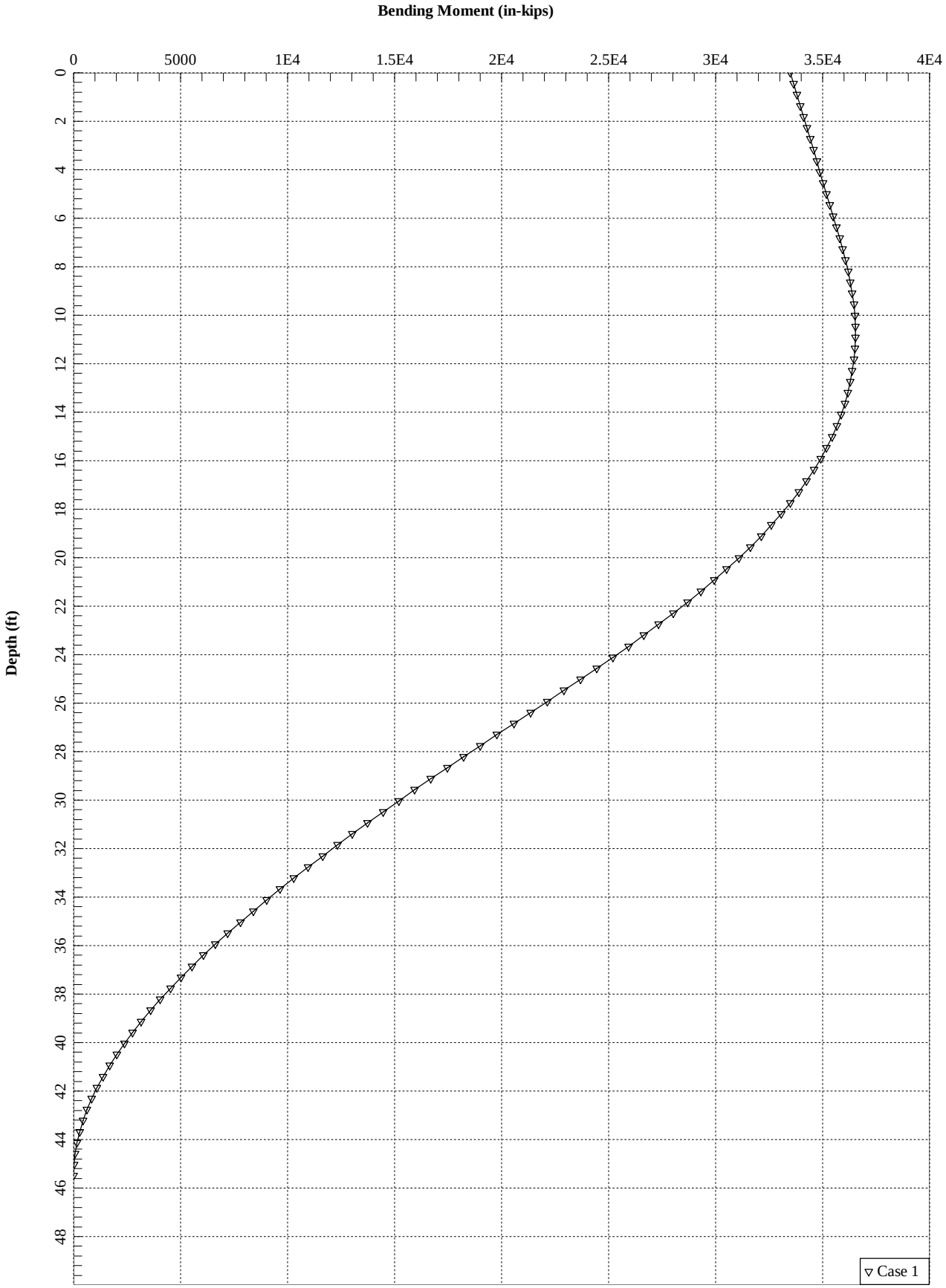
Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
0.00007966	13077.28856	3348000.	1.641583E+08	4.202721E+10
0.00024102	39387.39887	10078484.	1.634225E+08	4.181669E+10

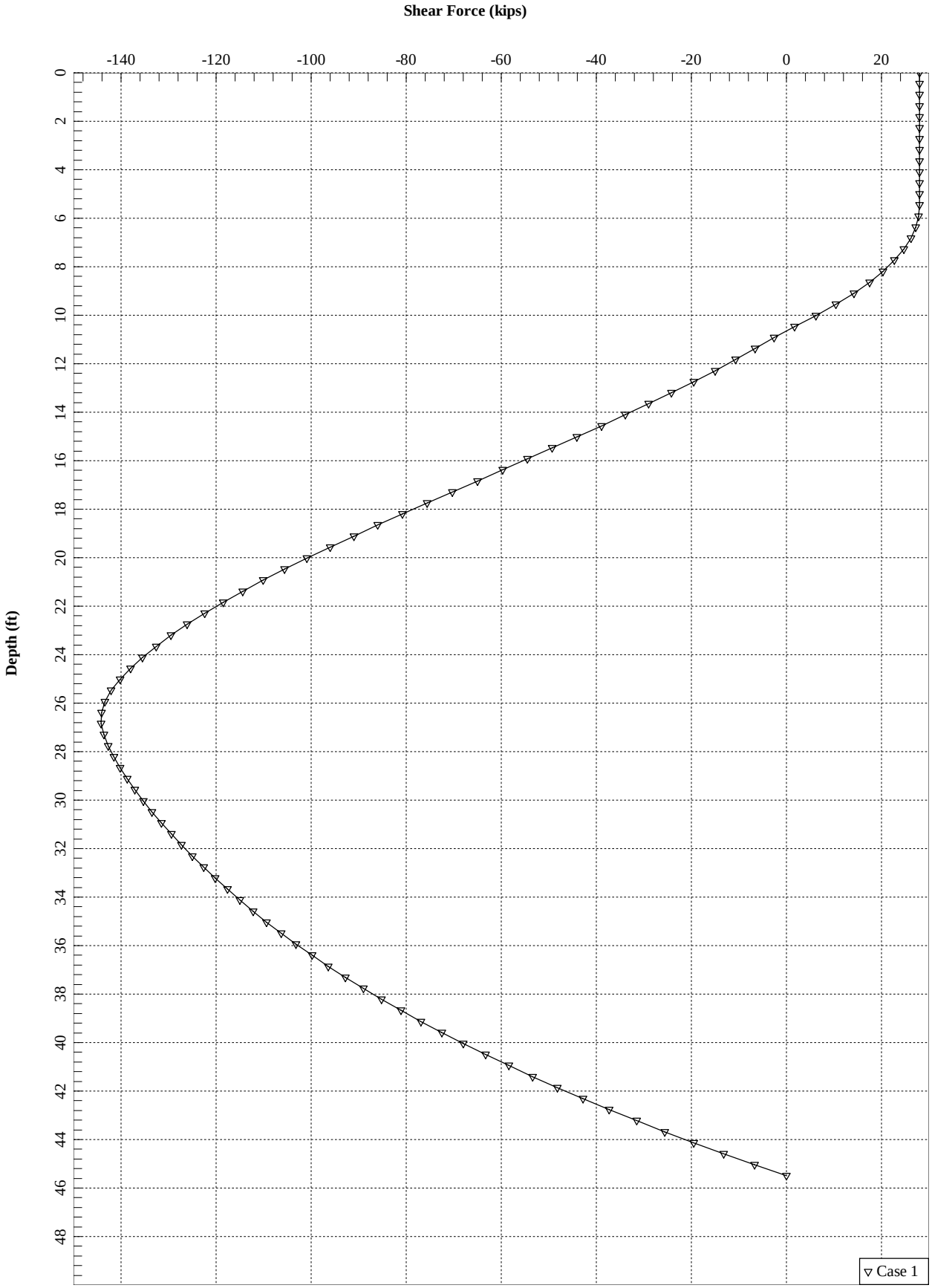
0.00039142	62414.72856	15974020.	1.594558E+08	4.081007E+10
0.00117747	84943.69778	20156969.	72141022.	1.711892E+10
0.00158574	104089.30103	23401516.	65641019.	1.475751E+10
0.00190354	119352.17580	26052504.	62700085.	1.368634E+10
0.00217855	129832.08284	28293882.	59595669.	1.298749E+10
0.00240361	138488.09827	30235453.	57616824.	1.257921E+10
0.00260595	146111.24168	31948039.	56068416.	1.225967E+10
0.00279045	152972.76634	33480000.	54820086.	1.199806E+10

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

The analysis ended normally.


Lateral Deflection (in)
-0.2
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
Case 2


Bending Moment (in-kips)
0
5000
1E4
1.5E4
2E4
2.5E4
3E4
3.5E4
4E4
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
Case 1


Shear Force (kips)
-140
-120
-100
-80
-60
-40
-20
0
20
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
▽ Case 1

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

CTHA140A_L600_2.2_draft

Section 1 - Site Information

Site ID: CTHA140A
Status: Draft
Version: 2.2
Project Type: L600
Approved: Not Approved
Approved By: Not Approved
Last Modified: 5/8/2018 11:43:00 AM
Last Modified By: GSM1900\VJaini

Site Name: HA140/BloomfieldPolice_MP
Site Class: Monopole
Site Type: Structure Non Building
Solution Type:
Plan Year:
Market: CONNECTICUT
Vendor: Ericsson
Landlord: Town of Bloomfield

Latitude: 41.8287949400
Longitude: -72.7344621700
Address: 785 Park Avenue
City, State: Bloomfield, CT
Region: NORTHEAST

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

Section 2 - Existing Template Images

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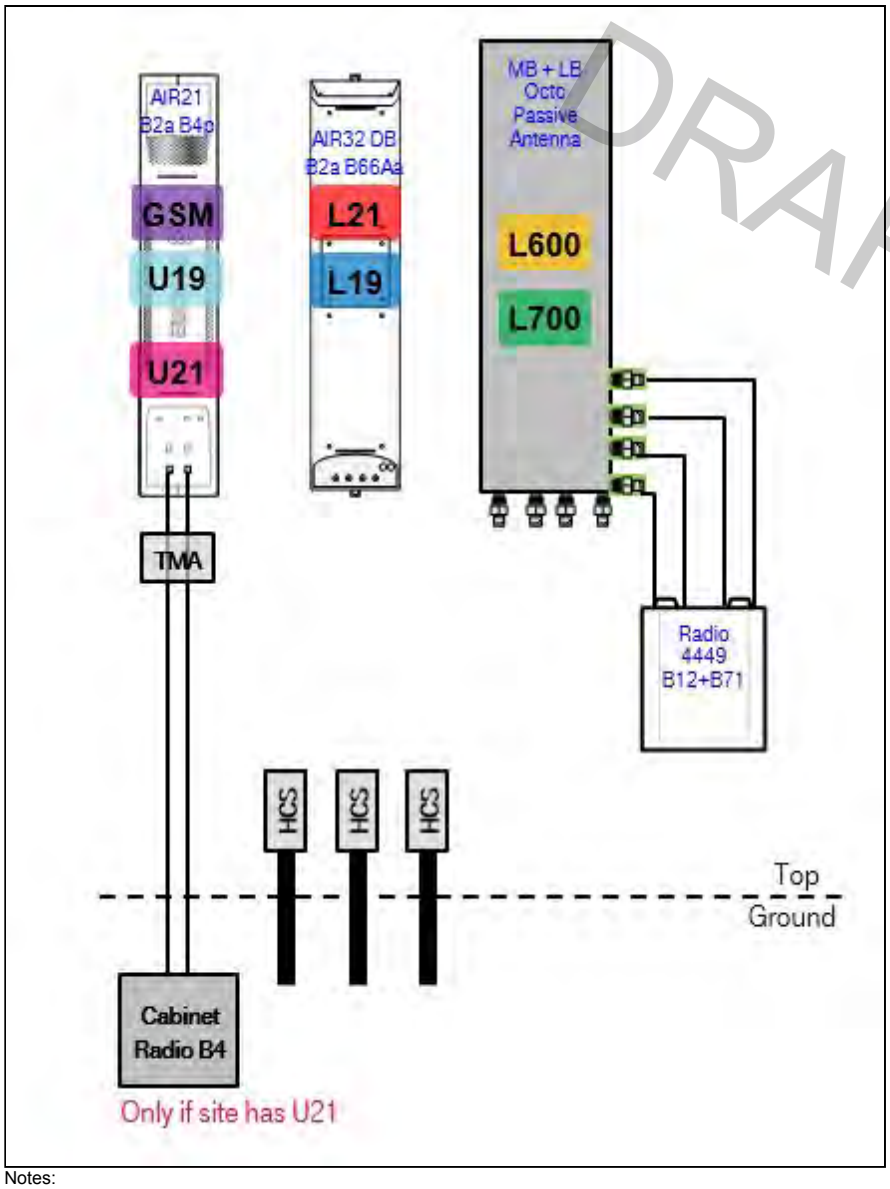
Section 3 - Proposed Template Images

67D92DB_2xAIR+1OP.JPG



Notes:

Section 4 - Siteplan Images

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

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 702Cu

Enclosure	1	2
Enclosure Type	RBS 3206	S12000 Outdoor
Baseband	RBS6601 (x2) · DUG20 · DUW30 (x2) · DUS41	
Radio	RU22 (x6)	

Proposed RAN Equipment

Template: 67D92DB Outdoor

Enclosure	1	2
Enclosure Type	RBS 6131	Ancillary Equipment
Baseband	DUW30 (U1900 (DECOMMISSIONED)) · DUW30 (U2100) · DUG20 (G1900) · BB 5216 (L2100, L1900, L700, L600)	
Hybrid Cable System		Ericsson 9x18 HCS *Select Length* · Ericsson 6x12 HCS *Select Length & AWG*
Multiplexer	XMU	
Radio	RU22 (x6) (U2100)	

RAN Scope of Work:

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

Section 6 - A&L Equipment

Existing Template: 702Cu
Proposed Template: 67D92DB_2xAIR+1OP

Sector 1 (Existing) view from behind

Coverage Type	A - Outdoor Macro				
Antenna	1		2		3
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)		Andrew - LNX-6515DS-A1M (Dual)
Azimuth	40		40		40
M. Tilt	0		0		0
Height	140		140		140
Ports	P2	P1	P3	P4	P5
Active Tech.	U2100	G1900	L2100		L700
Dark Tech.					
Restricted Tech.					
Decomm. Tech.		U1900			
E. Tilt	6	6	6		2
Cables	1-5/8" Coax - 180 ft. **(x6)**	1-5/8" Coax - 180 ft. **(x4)** Fiber Jumper - 15 ft. **(x2)**	Fiber Jumper - 15 ft. **(x2)**		Fiber Jumper - 15 ft. **(x2)**
TMAs	Generic Twin Style 1B - AWS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)			
Diplexers / Combiners					
Radio					RRUS11 B12 (At Antenna)
Sector Equipment					

Unconnected Equipment:

Scope of Work:

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

CTHA140A_L600_2.2_draft

Sector 1 (Proposed) view from behind										
Coverage Type	A - Outdoor Macro									
Antenna	1		2				3			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	40		40				40			
M. Tilt	0		0				0			
Height	140		140				140			
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	G1900	U2100			L700 L600	L700 L600	L2100	L2100	L1900	L1900
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt										
Cables		Generic Feeder Coax **(x2)** Coax Jumper **(x2)**			Coax Jumper **(x2)**	Coax Jumper **(x2)**				
TMAs		Generic Twin Style 1B - AWS (AtAntenna)								
Diplexers / Combiners										
Radio					Radio 4449 B71+B12 (At Antenna)					
Sector Equipment										

Unconnected Equipment:

Scope of Work:

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

CTHA140A_L600_2.2_draft

Sector 2 (Existing) view from behind					
Coverage Type	A - Outdoor Macro				
Antenna	1		2		3
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)		Andrew - LNX-6515DS-A1M (Dual)
Azimuth	140		140		140
M. Tilt	0		0		0
Height	140		140		140
Ports	P2	P1	P4	P3	P5
Active Tech.	U2100	G1900		L2100	L700
Dark Tech.					
Restricted Tech.					
Decomm. Tech.		U1900			
E. Tilt	6	6		6	2
Cables	1-5/8" Coax - 180 ft. **(x6)**	1-5/8" Coax - 180 ft. **(x4)** Fiber Jumper - 15 ft. **(x2)**	Fiber Jumper - 15 ft. **(x2)**	Fiber Jumper - 15 ft. **(x2)**	Fiber Jumper - 15 ft. **(x2)**
TMAs	Generic Twin Style 1B - AWS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)			
Diplexers / Combiners					
Radio					RRUS11 B12 (At Antenna)
Sector Equipment					

Unconnected Equipment:

Scope of Work:

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

CTHA140A_L600_2.2_draft

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

Unconnected Equipment:

Scope of Work:

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

CTHA140A_L600_2.2_draft

Sector 3 (Existing) view from behind					
Coverage Type	A - Outdoor Macro				
Antenna	1		2		3
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)		Andrew - LNX-6515DS-A1M (Dual)
Azimuth	230		230		230
M. Tilt	0		0		0
Height	140		140		140
Ports	P2	P1	P3	P4	P5
Active Tech.	U2100	G1900	L2100		L700
Dark Tech.					
Restricted Tech.					
Decomm. Tech.		U1900			
E. Tilt	5	5	5		2
Cables	1-5/8" Coax - 180 ft. **(x6)**	1-5/8" Coax - 180 ft. **(x4)** Fiber Jumper - 15 ft. **(x2)**	Fiber Jumper - 15 ft. **(x2)**		Fiber Jumper - 15 ft. **(x2)**
TMAs	Generic Twin Style 1B - AWS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)			
Diplexers / Combiners					
Radio					RRUS11 B12 (At Antenna)
Sector Equipment					

Unconnected Equipment:

Scope of Work:

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

CTHA140A_L600_2.2_draft

Sector 3 (Proposed) view from behind										
Coverage Type	A - Outdoor Macro									
Antenna	1		2				3			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	230		230				230			
M. Tilt	0		0				0			
Height	140		140				140			
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	G1900	U2100			L700 L600	L700 L600	L2100	L2100	L1900	L1900
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt										
Cables		Generic Feeder Coax **(x2)** Coax Jumper **(x2)**			Coax Jumper **(x2)**	Coax Jumper **(x2)**				
TMAs		Generic Twin Style 1B - AWS (AtAntenna)								
Diplexers / Combiners										
Radio					Radio 4449 B71+B12 (At Antenna)					
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Section 7 - Power Systems Equipment

Existing Power Systems Equipment

----- This section is intentionally blank. -----

Proposed Power Systems Equipment

RADIO FREQUENCY SYSTEMS
The Clear Choice®

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

FEATURES / BENEFITS

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

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

Technical Features

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

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

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

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

RADIO FREQUENCY SYSTEMS
The Clear Choice®

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

ELECTRICAL SPECIFICATIONS

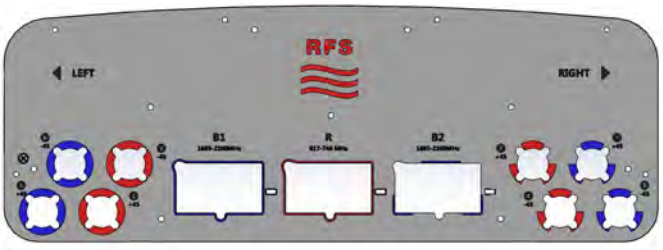
Impedance	Ohm	50.0
Polarization	Deg	±45°

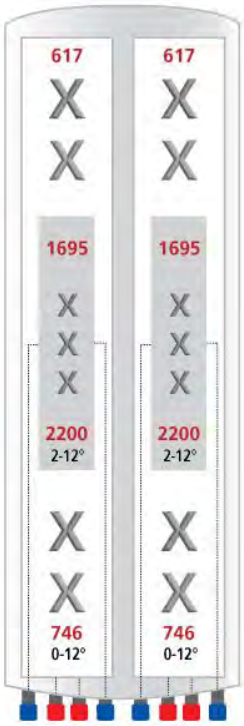
MECHANICAL SPECIFICATIONS

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

TESTING AND ENVIRONMENTAL

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





ORDERING INFORMATION

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

Exhibit E

CENTEK engineering

Centered on Solutions℠

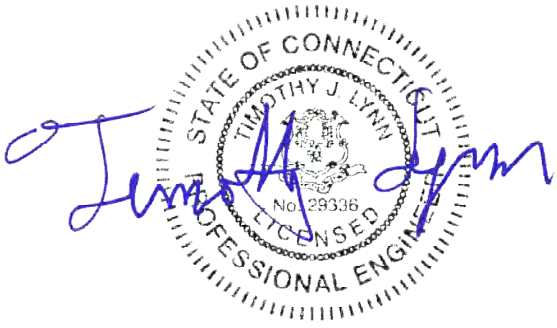
Structural Analysis Report

Antenna Mount Analysis

T-Mobile Site #: CTHA140A

785 Park Ave
Bloomfield, CT

Centek Project No. 18098.03



Date: August 7, 2018

Max Stress Ratio = 89.5%

Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

SECTION 1 – REPORT

- ANTENNA AND APPURTENANCE SUMMARY
- STRUCTURE LOADING
- CONCLUSION

SECTION 2 – CALCULATIONS

- WIND LOAD ON APPURTENANCES
- RISA3D OUTPUT REPORT

SECTION 3 – REFERENCE MATERIALS (NOT INCLUDED WITHIN REPORT)

- RF DATA SHEET, DATED 5/8/2018

CENTEK engineering

Centered on Solutions℠

August 7, 2018

Mr. Sheldon Freincle
Northeast Site Solutions
420 Main Street
Sturbridge, MA 01566

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CTHA140A
785 Park Avenue
Bloomfield, CT 06002

Centek Project No. 18098.03

Dear Mr. Freincle,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the existing mount, consisting of one (1) low profile platform to support the equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2012 International Building Code as modified by the 2016 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

- T-Mobile:
  Platform: Three (3) Ericsson AIR32 panel antennas, three (3) Ericsson AIR21 panel antennas, three (3) RFS APXVAARR24-43-NA20 panel antennas, three (3) KRY112 TMAs and three (3) Ericsson 4449 B71_B12 remote radio units mounted on one (1) low profile platform with a RAD center elevation of 138-ft +/- AGL.

The antenna mount was analyzed per the requirements of the 2012 International Building Code as modified by the 2016 Connecticut State Building Code considering a nominal design wind speed of 97 mph for Bloomfield as required in Appendix N of the 2016 Connecticut State Building Code.

A structural analysis of tower and foundation needs to be completed prior to any work.

Based on our review of the installation, it is our opinion that the existing antenna platform is structurally adequate to support the proposed antenna configuration. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STATE OF CONNECTICUT · TIMOTHY J. LYNN · No. 29336 · LICENSED PROFESSIONAL ENGINEER

Section 2 - Calculations

CENTEK engineering
Centered on Solutions
63-2 North Branford Road
Branford, CT 06405
www.centekeng.com
P: (203) 488-0580
F: (203) 488-8587

Subject:	TIA-222-G Loads
Location:	Bloomfield, CT
Rev. 0: 8/7/18	Prepared by: T.J.L. Checked by: C.F.C. Job No. 18098.03

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed: $V := 97$ mph (User Input - 2016 CSBC Appendix N)

Basic Wind Speed with Ice: $V_i := 50$ mph (User Input per Annex B of TIA-222-G)

Input

Structure Type = $Structure\_Type := Pole$ (User Input)

Structure Category = $SC := II$ (User Input)

Exposure Category = $Exp := C$ (User Input)

Structure Height = $h := 136$ ft (User Input)

Height to Center of Antennas = $z_{AT\&T} := 138$ ft (User Input)

Radial Ice Thickness = $t_i := 1.00$ in (User Input per Annex B of TIA-222-G)

Radial Ice Density = $Id := 56.00$ pcf (User Input)

Topograpic Factor = $K_{zt} := 1.0$ (User Input)

$K_a := 1.0$ (User Input)

Gust Response Factor = $G_H = 1.1$ (User Input)

Output

Wind Direction Probability Factor = (Per Table 2-2 of TIA-222-G)

$$K_d := \begin{cases} 0.95 & \text{if } Structure\_Type = Pole \\ 0.85 & \text{if } Structure\_Type = Lattice \end{cases} = 0.95$$

Importance Factors = (Per Table 2-3 of TIA-222-G)

$$I_{Wind} := \begin{cases} 0.87 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.15 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.00 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.25 & \text{if } SC = 3 \end{cases} = 1$$

$$K_{iz} := \left(\frac{z_{AT\&T}}{33}\right)^{0.1} = 1.154$$

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.308$$

Velocity Pressure Coefficient Antennas =

$$Kz_{AT\&T} := 2.01\left(\left(\frac{z_{AT\&T}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.354$$

Velocity Pressure w/o Ice Antennas =

$$qz_{AT\&T} := 0.00256 \cdot K_d \cdot Kz_{AT\&T} \cdot V^2 \cdot I_{Wind} = 30.993$$

Velocity Pressure with Ice Antennas =

$$qz_{ice.AT\&T} := 0.00256 \cdot K_d \cdot Kz_{AT\&T} \cdot V_i^2 \cdot I_{Wind} = 8.235$$

CENTEK engineering
Centered on Solutions
63-2 North Branford Road
Branford, CT 06405
www.centekeng.com
P: (203) 488-0580
F: (203) 488-8587

Subject:	TIA-222-G Loads
Location:	Bloomfield, CT
Rev. 0: 8/7/18	Prepared by: T.J.L. Checked by: C.F.C. Job No. 18098.03

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR32		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 56.6$	in	(User Input)
Antenna Width =	$W_{ant} := 12.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 133$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.4$		
Antenna Force Coefficient =	$Ca_{ant} = 1.28$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.1$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 222$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.4$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 150$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 7.4$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 87$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 5.7$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 66$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 133$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6352$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 7924$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 257$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 257$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR21		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 56$	in	(User Input)
Antenna Width =	$W_{ant} := 12.1$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.9$	in	(User Input)
Antenna Weight =	$WT_{ant} := 90$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.6$		
Antenna Force Coefficient =	$Ca_{ant} = 1.29$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.7$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 208$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.1$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 136$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 7$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 83$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 5.3$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 62$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 90$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5353$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 7327$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 237$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 237$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFSAPXVAARR24-43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 153$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.0$		
Antenna Force Coefficient =	$Ca_{ant} = 1.27$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 690$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 250$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 20$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 229$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 9.3$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 107$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 153$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 2 \times 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 592$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 592$	lbs

Development of Wind & Ice Load on TMA's

TMA Data:

TMA Model = Ericsson KRY112 TMA

TMA Shape = Flat (User Input)

TMA Height = $L_{TMA} := 7.7$ in (User Input)

TMA Width = $W_{TMA} := 7.5$ in (User Input)

TMA Thickness = $T_{TMA} := 3.4$ in (User Input)

TMA Weight = $WT_{TMA} := 11$ lbs (User Input)

Number of TMA's = $N_{TMA} := 1$ (User Input)

TMA Aspect Ratio = $Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 1$

TMA Force Coefficient = $Ca_{TMA} = 1.2$

Wind Load (without ice)

Surface Area for One TMA = $SA_{TMAF} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.4$ sf

Total TMA Wind Force = $F_{TMA} := qz_{AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAF} = 16$ lbs

Surface Area for One TMA = $SA_{TMAS} := \frac{L_{TMA} \cdot T_{TMA}}{144} = 0.2$ sf

Total TMA Wind Force = $F_{TMA} := qz_{AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAS} = 7$ lbs

Wind Load (with ice)

Surface Area for One TMA w/ Ice = $SA_{ICETMAF} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (W_{TMA} + 2 \cdot t_{iz})}{144} = 1$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAF} = 11$ lbs

Surface Area for One TMA w/ Ice = $SA_{ICETMAS} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz})}{144} = 0.7$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAS} = 7$ lbs

Gravity Load (without ice)

Weight of All TMAs = $WT_{TMA} \cdot N_{TMA} = 11$ lbs

Gravity Loads (ice only)

Volume of Each TMA = $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 196$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 2 \cdot t_{iz})(W_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz}) - V_{TMA} = 1000$ cu in

Weight of Ice on Each TMA = $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 32$ lbs

Weight of Ice on All TMAs = $W_{ICETMA} \cdot N_{TMA} = 32$ lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model = Ericsson 4449 B71B12

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 14.9$ in (User Input)

RRUS Width = $W_{RRUS} := 13.2$ in (User Input)

RRUS Thickness = $T_{RRUS} := 10.4$ in (User Input)

RRUS Weight = $WT_{RRUS} := 74$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$ (User Input)

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 56$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 44$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.4$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 26$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 2$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 22$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 74$ lbs

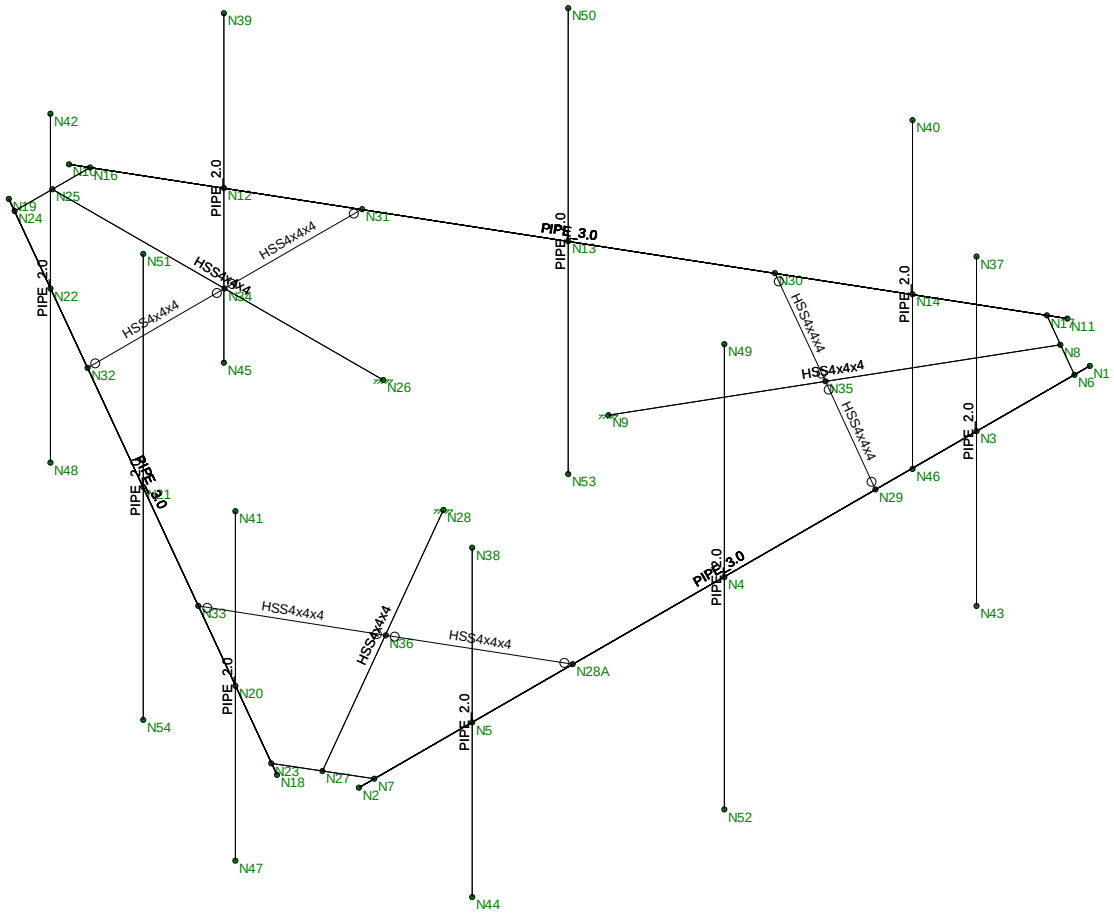
Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2045$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 3176$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 103$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 103$ lbs



Envelope Only Solution

Centek		
TJL	CTHA140A - Mount	Aug 7, 2018 at 3:54 PM
18098.03	Member Framing	Mount.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	No
RISAConnection Code	AISC 13th(360-05): ASD
Cold Formed Steel Code	AISI S100-10: ASD
Wood Code	AWC NDS-12: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - Building AISC 14th(360-10): ASD

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	150.001
Footing Concrete f'c (ksi)	4
Footing Concrete Ec (ksi)	3644
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	2
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Outrigger	HSS4x4x4	Beam	Pipe	A500 Gr.46	Typical	3.37	7.8	7.8	12.8
2	Horz Pipe	PIPE_3.0	Beam	Pipe	A53 Gr B	Typical	2.07	2.85	2.85	5.69
3	Antenna Pipe	PIPE_2.0	Beam	Pipe	A53 Gr B	Typical	1.02	.627	.627	1.25
4	Support	HSS4x4x4	Beam	Pipe	A500 Gr.46	Typical	3.37	7.8	7.8	12.8

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Outrigger	6.564			Lbyy						Lateral
2	M2	Outrigger	6.564			Lbyy						Lateral
3	M3	Outrigger	6.564			Lbyy						Lateral
4	M4	Horz Pipe	14.5			Lbyy						Lateral
5	M5	Horz Pipe	14.5			Lbyy						Lateral
6	M6	Horz Pipe	14.5			Lbyy						Lateral
7	M10	Support	2.721			Lbyy						Lateral
8	M11	Support	2.721			Lbyy						Lateral
9	M12	Support	2.721			Lbyy						Lateral
10	M13	Support	2.721			Lbyy						Lateral
11	M14	Support	2.721			Lbyy						Lateral
12	M15	Support	2.721			Lbyy						Lateral
13	M16	Antenna Pipe	6			Lbyy						Lateral
14	M17	Antenna Pipe	8			Lbyy						Lateral
15	M18	Antenna Pipe	6			Lbyy						Lateral
16	M19	Antenna Pipe	6			Lbyy						Lateral
17	M20	Antenna Pipe	8			Lbyy						Lateral
18	M21	Antenna Pipe	6			Lbyy						Lateral
19	M22	Antenna Pipe	6			Lbyy						Lateral
20	M23	Antenna Pipe	8			Lbyy						Lateral
21	M24	Antenna Pipe	6			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N26	N25			Outrigger	Beam	Pipe	A500 Gr....	Typical
2	M2	N28	N27			Outrigger	Beam	Pipe	A500 Gr....	Typical
3	M3	N9	N8			Outrigger	Beam	Pipe	A500 Gr....	Typical
4	M4	N19	N18			Horz Pipe	Beam	Pipe	A53 Gr B	Typical
5	M5	N2	N1			Horz Pipe	Beam	Pipe	A53 Gr B	Typical
6	M6	N11	N10			Horz Pipe	Beam	Pipe	A53 Gr B	Typical
7	M7	N24	N16			RIGID	None	None	RIGID	Typical
8	M8	N17	N6			RIGID	None	None	RIGID	Typical
9	M9	N23	N7			RIGID	None	None	RIGID	Typical
10	M10	N32	N34			Support	Beam	Pipe	A500 Gr....	Typical
11	M11	N30	N35			Support	Beam	Pipe	A500 Gr....	Typical
12	M12	N28A	N36			Support	Beam	Pipe	A500 Gr....	Typical
13	M13	N34	N31			Support	Beam	Pipe	A500 Gr....	Typical
14	M14	N35	N29			Support	Beam	Pipe	A500 Gr....	Typical
15	M15	N36	N33			Support	Beam	Pipe	A500 Gr....	Typical
16	M16	N48	N42			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
17	M17	N54	N51			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
18	M18	N47	N41			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
19	M19	N44	N38			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
20	M20	N52	N49			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
21	M21	N43	N37			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
22	M22	N46	N40			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
23	M23	N53	N50			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
24	M24	N45	N39			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	4.873916	0	-7.25	0	
2	N2	4.873916	0	7.25	0	
3	N3	4.873916	0	-5	0	
4	N4	4.873916	0	0	0	
5	N5	4.873916	0	5	0	
6	N6	4.873916	0	-6.944529	0	
7	N7	4.873916	0	6.944529	0	
8	N8	4.225548	0	-7.318864	0	
9	N9	0.943673	0	-1.634489	0	
10	N10	-8.715642	0	-0.595935	0	
11	N11	3.841726	0	-7.845935	0	
12	N12	-6.767085	0	-1.720935	0	
13	N13	-2.436958	0	-4.220935	0	
14	N14	1.893169	0	-6.720935	0	
15	N16	-8.451096	0	-0.748671	0	
16	N17	3.57718	0	-7.693199	0	
17	N18	3.841726	0	7.845935	0	
18	N19	-8.715642	0	0.595935	0	
19	N20	1.893169	0	6.720935	0	
20	N21	-2.436958	0	4.220935	0	
21	N22	-6.767085	0	1.720935	0	
22	N23	3.57718	0	7.693199	0	
23	N24	-8.451096	0	0.748671	0	
24	N25	-8.451096	0	0	0	
25	N26	-1.887346	0	0	0	
26	N27	4.225548	0	7.318864	0	
27	N28	0.943673	0	1.634489	0	
28	N28A	4.873916	0	3	0	
29	N29	4.873916	0	-3	0	
30	N30	0.161118	0	-5.720935	0	
31	N31	-5.035034	0	-2.720935	0	
32	N32	-5.035034	0	2.720935	0	
33	N33	0.161118	0	5.720935	0	
34	N34	-5.035034	0	0.	0	
35	N35	2.517517	0	-4.360467	0	
36	N36	2.517517	0	4.360467	0	
37	N37	4.873916	3	-5	0	
38	N38	4.873916	3	5	0	
39	N39	-6.767085	3	-1.720935	0	
40	N40	1.893169	3	-6.720935	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
41	N41	1.893169	3	6.720935	0	
42	N42	-6.767085	3	1.720935	0	
43	N43	4.873916	-3	-5	0	
44	N44	4.873916	-3	5	0	
45	N45	-6.767085	-3	-1.720935	0	
46	N46	1.893169	-3	-6.720935	0	
47	N47	1.893169	-3	6.720935	0	
48	N48	-6.767085	-3	1.720935	0	
49	N49	4.873916	4	0	0	
50	N50	-2.436958	4	-4.220935	0	
51	N51	-2.436958	4	4.220935	0	
52	N52	4.873916	-4	0	0	
53	N53	-2.436958	-4	-4.220935	0	
54	N54	-2.436958	-4	4.220935	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N9	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N26	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N28	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Point Loads (BLC 2 : Equipment Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M17	Y	-.077	1
2	M20	Y	-.077	1
3	M23	Y	-.077	1
4	M17	Y	-.077	7
5	M20	Y	-.077	7
6	M23	Y	-.077	7
7	M18	Y	-.045	1
8	M21	Y	-.045	1
9	M24	Y	-.045	1
10	M18	Y	-.045	5
11	M21	Y	-.045	5
12	M24	Y	-.045	5
13	M16	Y	-.067	1
14	M19	Y	-.067	1
15	M22	Y	-.067	1
16	M16	Y	-.067	5
17	M19	Y	-.067	5
18	M22	Y	-.067	5
19	M17	Y	-.074	5
20	M20	Y	-.074	5
21	M23	Y	-.074	5

Member Point Loads (BLC 3 : Ice Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M17	Y	-.296	1

Member Point Loads (BLC 3 : Ice Weight) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
2	M20	Y	-.296	1
3	M23	Y	-.296	1
4	M17	Y	-.296	7
5	M20	Y	-.296	7
6	M23	Y	-.296	7
7	M18	Y	-.119	1
8	M21	Y	-.119	1
9	M24	Y	-.119	1
10	M18	Y	-.119	5
11	M21	Y	-.119	5
12	M24	Y	-.119	5
13	M16	Y	-.129	1
14	M19	Y	-.129	1
15	M22	Y	-.129	1
16	M16	Y	-.129	5
17	M19	Y	-.129	5
18	M22	Y	-.129	5
19	M17	Y	-.103	5
20	M20	Y	-.103	5
21	M23	Y	-.103	5

Member Point Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M17	X	.054	1
2	M23	X	.054	1
3	M17	X	.054	7
4	M23	X	.054	7
5	M20	X	.115	1
6	M20	X	.115	7
7	M18	X	.031	1
8	M24	X	.031	1
9	M18	X	.031	5
10	M24	X	.031	5
11	M21	X	.042	1
12	M21	X	.042	5
13	M19	X	.044	1
14	M19	X	.044	5
15	M16	X	.033	1
16	M22	X	.033	1
17	M16	X	.033	5
18	M22	X	.033	5
19	M17	X	.022	5
20	M23	X	.022	5

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M17	X	.125	1
2	M23	X	.125	1
3	M17	X	.125	7
4	M23	X	.125	7
5	M20	X	.345	1

Member Point Loads (BLC 5 : Wind X) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
6	M20	X	.345	7
7	M18	X	.068	1
8	M24	X	.068	1
9	M18	X	.068	5
10	M24	X	.068	5
11	M21	X	.104	1
12	M21	X	.104	5
13	M19	X	.111	1
14	M19	X	.111	5
15	M16	X	.075	1
16	M22	X	.075	1
17	M16	X	.075	5
18	M22	X	.075	5
19	M17	X	.044	5
20	M23	X	.044	5

Member Point Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M17	Z	.115	1
2	M23	Z	.115	1
3	M17	Z	.115	7
4	M23	Z	.115	7
5	M20	Z	.054	1
6	M20	Z	.054	7
7	M18	Z	.042	1
8	M24	Z	.042	1
9	M18	Z	.042	5
10	M24	Z	.042	5
11	M21	Z	.031	1
12	M21	Z	.031	5
13	M19	Z	.033	1
14	M19	Z	.033	5
15	M16	Z	.044	1
16	M22	Z	.044	1
17	M16	Z	.044	5
18	M22	Z	.044	5
19	M20	Z	.022	5

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M17	Z	.345	1
2	M23	Z	.345	1
3	M17	Z	.345	7
4	M23	Z	.345	7
5	M20	Z	.125	1
6	M20	Z	.125	7
7	M18	Z	.104	1
8	M24	Z	.104	1
9	M18	Z	.104	5
10	M24	Z	.104	5
11	M21	Z	.068	1

Member Point Loads (BLC 7 : Wind Z) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
12	M21	Z	.068	5
13	M19	Z	.075	1
14	M19	Z	.075	5
15	M16	Z	.111	1
16	M22	Z	.111	1
17	M16	Z	.111	5
18	M22	Z	.111	5
19	M20	Z	.044	5

Member Distributed Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M24	X	.002	.002	0	0
2	M23	X	.002	.002	0	0
3	M22	X	.002	.002	0	0
4	M16	X	.002	.002	0	0
5	M17	X	.002	.002	0	0
6	M18	X	.002	.002	0	0
7	M4	X	.003	.003	0	0
8	M6	X	.003	.003	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M24	X	.006	.006	0	0
2	M23	X	.006	.006	0	0
3	M22	X	.006	.006	0	0
4	M16	X	.006	.006	0	0
5	M17	X	.006	.006	0	0
6	M18	X	.006	.006	0	0
7	M4	X	.009	.009	0	0
8	M6	X	.009	.009	0	0

Member Distributed Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M19	Z	.002	.002	0	0
2	M20	Z	.002	.002	0	0
3	M21	Z	.002	.002	0	0
4	M6	Z	.003	.003	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M19	Z	.006	.006	0	0
2	M20	Z	.006	.006	0	0
3	M21	Z	.006	.006	0	0
4	M6	Z	.009	.009	0	0

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Self Weight	DL		-1						
2	Equipment Weight	None					21			
3	Ice Weight	None					21			
4	Wind w/ Ice X	None					20	8		
5	Wind X	None					20	8		
6	Wind w/ Ice Z	None					19	4		
7	Wind Z	None					19	4		

Load Combinations

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.2D + 1.6W (X-d..	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W (X-d..	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D + 1.0Di + 1....	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.2D + 1.6W (X-d..	Yes	Y		1	1.2	2	1.2	7	1.6														
5	0.9D + 1.6W (X-d..	Yes	Y		1	.9	2	.9	7	1.6														
6	1.2D + 1.0Di + 1....	Yes	Y		1	1.2	2	1.2	3	1	6	1												

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N9	max	.441	5	2.107	3	.284	1	6.083	6	1.864	2	3.477	6
2		min	-1.318	2	.678	5	-1.7	4	1.998	5	.165	6	1.127	5
3	N26	max	.035	4	2.105	6	.007	1	-.007	5	.015	1	-2.248	2
4		min	-1.801	1	.67	2	-1.605	5	-.027	3	-3.316	5	-7.003	6
5	N28	max	-.111	6	2.107	6	-.084	3	-1.997	5	.395	5	3.527	6
6		min	-1.331	2	.692	5	-1.607	5	-6.052	3	-1.878	2	1.168	2
7	Totals:	max	0	4	6.313	6	0	3						
8		min	-4.45	2	2.055	2	-4.913	5						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	N1	max	.016	1	-.181	5	0	1	-1.997e-03	2	1.666e-03	5	-9.89e-04	5
2		min	-.038	5	-.546	6	-.034	5	-5.677e-03	6	2.107e-04	3	-3.043e-03	6
3	N2	max	.039	5	-.183	2	0	3	5.475e-03	3	1.574e-03	5	-1.186e-03	2
4		min	.004	3	-.547	6	-.034	5	1.874e-03	5	-9.029e-04	1	-3.382e-03	6
5	N3	max	.031	2	-.15	5	0	1	-4.942e-05	3	1.278e-03	5	-1.845e-03	5
6		min	.002	6	-.472	6	-.034	5	-4.792e-04	4	4.221e-05	3	-5.892e-03	6
7	N4	max	.084	2	-.154	2	0	1	2.254e-04	4	3.394e-06	1	-2.762e-03	5
8		min	0	6	-.525	6	-.034	5	6.821e-05	2	-9.475e-04	5	-8.887e-03	3
9	N5	max	.031	2	-.155	2	0	3	3.937e-04	1	1.252e-03	5	-1.971e-03	2
10		min	-.002	6	-.479	6	-.034	5	-7.934e-05	6	-1.735e-04	1	-6.098e-03	6
11	N6	max	.019	1	-.174	5	0	1	-1.997e-03	2	1.666e-03	5	-9.89e-04	5
12		min	-.032	5	-.525	6	-.034	5	-5.677e-03	6	2.107e-04	3	-3.043e-03	6
13	N7	max	.034	5	-.176	2	0	3	5.475e-03	3	1.574e-03	5	-1.186e-03	2
14		min	.005	3	-.527	6	-.034	5	1.874e-03	5	-9.029e-04	1	-3.382e-03	6
15	N8	max	.015	1	-.175	5	.008	1	-1.997e-03	2	1.666e-03	5	-9.89e-04	5
16		min	-.04	5	-.527	6	-.021	5	-5.677e-03	6	2.107e-04	3	-3.043e-03	6

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
17	N9	max	0	2	0	5	0	4	0	5	0	6	0	5
18		min	0	5	0	3	0	1	0	6	0	2	0	6
19	N10	max	.001	1	-.177	2	.079	5	1.806e-04	3	1.165e-05	2	6.426e-03	6
20		min	0	3	-.545	6	0	1	4.793e-05	5	-1.639e-04	4	2.174e-03	2
21	N11	max	.009	1	-.183	5	.012	1	-1.997e-03	2	1.666e-03	5	-9.891e-04	5
22		min	-.05	5	-.549	6	-.014	5	-5.677e-03	6	2.107e-04	3	-3.043e-03	6
23	N12	max	.001	6	-.148	2	.074	5	-1.393e-03	2	5.87e-04	5	2.975e-03	3
24		min	-.002	5	-.473	6	-.002	1	-5.116e-03	6	2.206e-05	3	1.16e-03	2
25	N13	max	.017	1	-.154	2	.089	5	-2.268e-03	2	3.09e-04	4	4.324e-03	6
26		min	.003	6	-.527	6	.006	3	-7.735e-03	6	-6.327e-04	2	1.082e-03	2
27	N14	max	.019	1	-.156	5	.028	2	-1.8e-03	2	1.013e-03	5	3.115e-03	6
28		min	-.032	5	-.48	6	.004	6	-5.254e-03	6	7.976e-05	3	7.473e-04	2
29	N16	max	.001	4	-.17	2	.079	5	1.805e-04	3	1.159e-05	2	6.426e-03	6
30		min	0	3	-.525	6	0	1	4.791e-05	5	-1.64e-04	4	2.174e-03	2
31	N17	max	.011	1	-.177	5	.015	2	-1.997e-03	2	1.666e-03	5	-9.89e-04	5
32		min	-.047	5	-.528	6	-.008	5	-5.677e-03	6	2.107e-04	3	-3.043e-03	6
33	N18	max	.051	5	-.182	2	-.002	6	5.475e-03	3	1.574e-03	5	-1.186e-03	2
34		min	.002	3	-.545	3	-.015	5	1.874e-03	5	-9.028e-04	1	-3.382e-03	6
35	N19	max	.002	2	-.178	2	.079	5	1.805e-04	3	1.153e-05	2	6.426e-03	6
36		min	-.001	4	-.547	6	0	1	4.788e-05	5	-1.64e-04	4	2.174e-03	2
37	N20	max	.033	5	-.151	5	.016	5	5.121e-03	6	9.837e-04	5	2.927e-03	3
38		min	.004	3	-.472	3	-.028	2	1.738e-03	2	-3.669e-04	1	6.051e-04	5
39	N21	max	.018	2	-.153	5	.087	5	7.628e-03	6	6.293e-04	2	4.545e-03	6
40		min	-.006	4	-.525	3	-.026	1	2.2e-03	2	8.406e-05	6	1.201e-03	2
41	N22	max	.001	2	-.152	2	.074	5	5.284e-03	3	5.743e-04	5	3.002e-03	6
42		min	-.001	6	-.479	3	0	3	1.509e-03	2	-8.664e-05	1	1.165e-03	2
43	N23	max	.048	5	-.175	5	0	6	5.475e-03	3	1.574e-03	5	-1.186e-03	2
44		min	.003	3	-.524	3	-.015	2	1.874e-03	5	-9.029e-04	1	-3.382e-03	6
45	N24	max	.002	2	-.172	2	.079	5	1.805e-04	3	1.159e-05	2	6.426e-03	6
46		min	-.002	4	-.527	6	0	1	4.791e-05	5	-1.64e-04	4	2.174e-03	2
47	N25	max	.001	1	-.171	2	.079	5	1.805e-04	3	1.159e-05	2	6.426e-03	6
48		min	0	4	-.526	6	0	1	4.791e-05	5	-1.64e-04	4	2.174e-03	2
49	N26	max	0	1	0	2	0	5	0	3	0	5	0	6
50		min	0	4	0	6	0	1	0	5	0	1	0	2
51	N27	max	.041	5	-.176	2	-.002	3	5.475e-03	3	1.574e-03	5	-1.186e-03	2
52		min	.004	3	-.526	3	-.022	5	1.874e-03	5	-9.029e-04	1	-3.382e-03	6
53	N28	max	0	2	0	5	0	5	0	3	0	2	0	2
54		min	0	6	0	6	0	3	0	5	0	5	0	6
55	N28A	max	.039	2	-.152	2	0	3	2.125e-04	1	1.592e-04	5	-2.775e-03	2
56		min	-.02	5	-.495	6	-.034	5	-4.707e-04	6	-9.932e-04	1	-8.892e-03	6
57	N29	max	.038	2	-.147	5	0	1	5.421e-04	3	1.008e-03	1	-2.725e-03	5
58		min	.005	6	-.487	6	-.034	5	-1.518e-04	1	7.488e-06	6	-8.822e-03	3
59	N30	max	.02	1	-.154	2	.041	5	-2.393e-03	2	1.499e-03	5	4.855e-03	6
60		min	-.02	5	-.495	6	.007	3	-7.472e-03	6	1.172e-05	3	1.185e-03	2
61	N31	max	.002	1	-.145	2	.066	5	-2.204e-03	2	-8.027e-05	6	3.933e-03	6
62		min	-.006	5	-.488	6	0	1	-7.932e-03	6	-4.766e-04	1	1.369e-03	2
63	N32	max	.006	5	-.149	2	.066	5	7.915e-03	6	4.676e-04	2	4.049e-03	6
64		min	0	6	-.494	3	0	1	2.21e-03	2	-2.957e-04	4	1.425e-03	2
65	N33	max	.021	5	-.148	5	.038	5	7.364e-03	6	1.5e-03	5	4.878e-03	6
66		min	.003	6	-.487	3	-.031	1	2.341e-03	2	-4.385e-05	1	1.208e-03	2
67	N34	max	0	1	-.06	2	.065	5	8.658e-05	3	1.583e-03	5	7.442e-03	6
68		min	0	4	-.186	6	0	1	2.297e-05	5	-6.148e-06	1	2.416e-03	2

Envelope Joint Displacements (Continued)

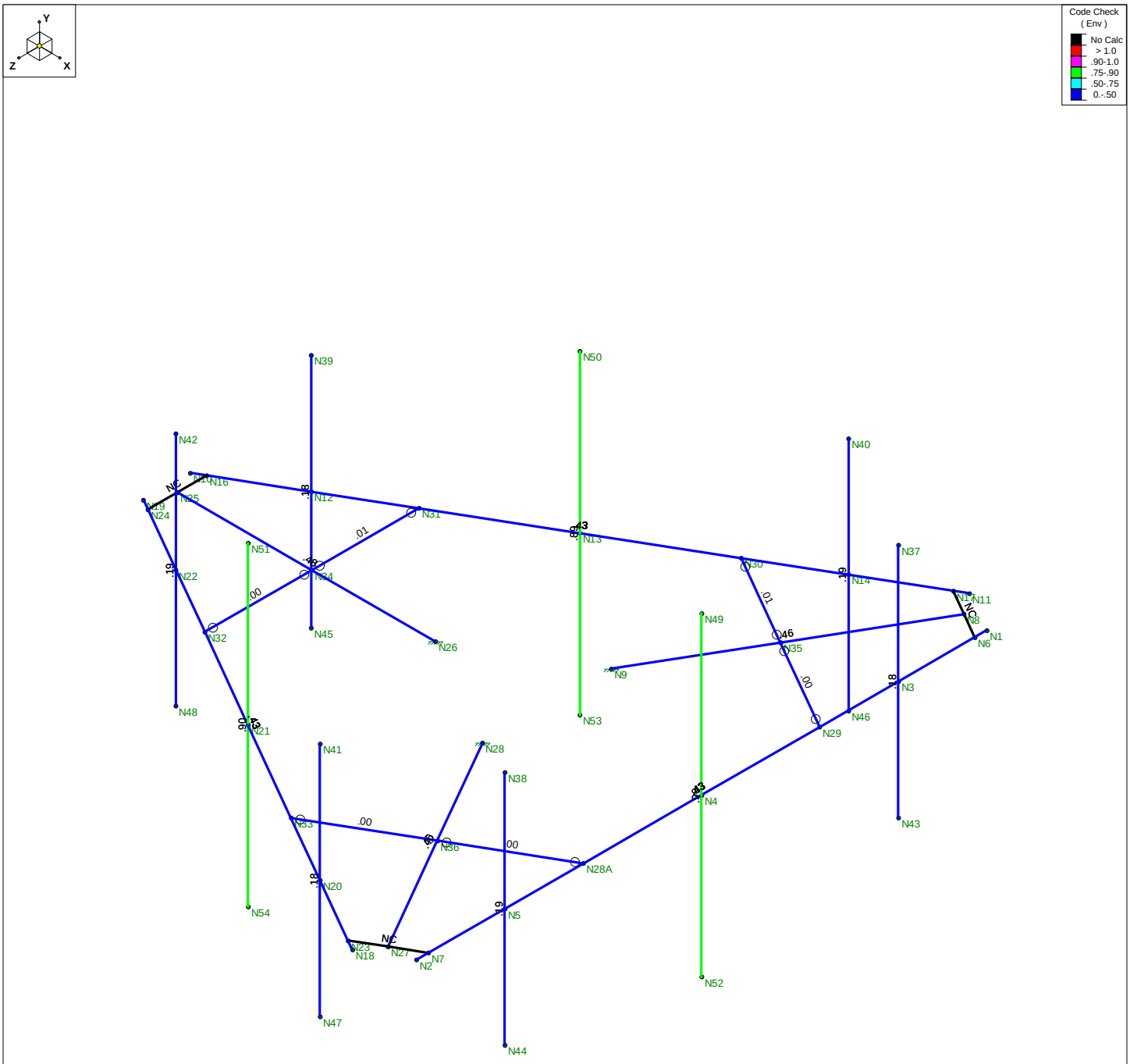
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
69	N35	max	.029	2	-.062	5	.016	2	-2.187e-03	5	3.917e-04	5	-1.179e-03	5
70		min	.002	6	-.186	6	.001	6	-6.501e-03	6	-5.857e-04	1	-3.641e-03	6
71	N36	max	.029	2	-.062	2	0	6	6.401e-03	3	5.919e-04	2	-1.279e-03	2
72		min	-.001	6	-.186	3	-.016	2	2.133e-03	5	4.73e-05	6	-3.801e-03	6
73	N37	max	.239	3	-.15	5	.011	5	1.705e-03	5	1.278e-03	5	-1.846e-03	5
74		min	.07	5	-.472	6	-.016	1	-4.665e-04	1	4.221e-05	3	-6.577e-03	3
75	N38	max	.247	3	-.155	2	.041	4	2.579e-03	4	1.252e-03	5	-2.018e-03	5
76		min	.072	5	-.479	6	-.002	3	-5.026e-05	3	-1.735e-04	1	-6.803e-03	3
77	N39	max	.017	2	-.148	2	.094	5	1.126e-03	5	5.87e-04	5	2.984e-03	6
78		min	-.106	6	-.473	6	-.183	3	-5.088e-03	3	2.206e-05	3	-9.054e-04	2
79	N40	max	.055	2	-.157	5	.031	5	9.501e-04	5	1.013e-03	5	3.127e-03	6
80		min	-.117	6	-.48	6	-.182	3	-5.245e-03	3	7.976e-05	3	-1.497e-03	2
81	N41	max	.054	2	-.151	5	.207	6	5.805e-03	6	9.837e-04	5	2.91e-03	6
82		min	-.1	6	-.472	3	.034	2	1.739e-03	2	-3.669e-04	1	-1.417e-03	2
83	N42	max	.023	2	-.152	2	.227	4	6.e-03	6	5.743e-04	5	3.013e-03	6
84		min	-.109	6	-.479	3	.055	2	1.51e-03	2	-8.664e-05	1	-1.079e-03	2
85	N43	max	.038	2	-.15	5	.041	4	-4.925e-05	3	1.278e-03	5	7.68e-04	2
86		min	-.21	6	-.472	6	.002	3	-2.542e-03	4	4.221e-05	3	-5.872e-03	6
87	N44	max	.04	2	-.155	2	.02	5	3.93e-04	1	1.252e-03	5	8.421e-04	2
88		min	-.22	6	-.479	6	-.015	1	-1.993e-03	5	-1.735e-04	1	-6.074e-03	6
89	N45	max	.123	3	-.148	2	.22	4	-1.391e-03	2	5.87e-04	5	3.638e-03	1
90		min	.042	5	-.473	6	.048	2	-5.763e-03	6	2.206e-05	3	1.21e-03	5
91	N46	max	.133	3	-.157	5	.213	6	-1.798e-03	2	1.013e-03	5	3.687e-03	3
92		min	-.003	5	-.48	6	.093	2	-5.928e-03	6	7.976e-05	3	8.012e-04	5
93	N47	max	.125	3	-.151	5	.026	5	5.093e-03	3	9.837e-04	5	3.478e-03	3
94		min	.055	5	-.472	3	-.19	3	-8.505e-04	5	-3.669e-04	1	6.046e-04	5
95	N48	max	.124	3	-.152	2	.098	5	5.263e-03	3	5.743e-04	5	3.82e-03	1
96		min	.046	5	-.479	3	-.189	3	-1.279e-03	5	-8.664e-05	1	1.241e-03	5
97	N49	max	.978	1	-.154	2	.278	4	8.483e-03	4	3.394e-06	1	-2.775e-03	5
98		min	.135	5	-.526	6	.003	2	6.853e-05	2	-9.475e-04	5	-2.35e-02	1
99	N50	max	.266	2	-.154	2	.686	5	1.73e-02	5	3.09e-04	4	4.407e-03	6
100		min	-.207	6	-.527	6	-.368	3	-7.84e-03	3	-6.327e-04	2	-7.16e-03	2
101	N51	max	.26	2	-.153	5	.953	4	2.293e-02	4	6.293e-04	2	4.632e-03	6
102		min	-.224	6	-.526	3	.08	2	2.21e-03	2	8.406e-05	6	-7.04e-03	2
103	N52	max	.661	2	-.154	2	.243	5	1.242e-04	3	3.394e-06	1	1.686e-02	2
104		min	-.422	6	-.526	6	-.006	3	-7.717e-03	5	-9.475e-04	5	-8.756e-03	6
105	N53	max	.377	1	-.154	2	.954	4	-2.263e-03	2	3.09e-04	4	9.44e-03	1
106		min	.071	5	-.527	6	.134	2	-2.285e-02	4	-6.327e-04	2	1.328e-03	5
107	N54	max	.385	1	-.153	5	.684	5	7.47e-03	3	6.293e-04	2	9.598e-03	1
108		min	.062	5	-.526	3	-.366	3	-1.728e-02	5	8.406e-05	6	1.428e-03	5

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

	Member	Shape	Code Check	Loc...	LC	Shea...	Loc.....	L...	phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
1	M1	HSS4x4x4	.475	0	6	.057	0	y 3	116.5	139.518	16.181	16.181	2..	H1-1b
2	M2	HSS4x4x4	.460	0	3	.057	0	y 6	116.5	139.518	16.181	16.181	2..	H1-1b
3	M3	HSS4x4x4	.460	0	3	.057	0	y 6	116.5	139.518	16.181	16.181	2..	H1-1b
4	M4	PIPE_3.0	.431	14....	6	.175	14....	6	21.266	65.205	5.749	5.749	3..	H1-1b
5	M5	PIPE_3.0	.433	.453	3	.175	14....	3	21.266	65.205	5.749	5.749	3..	H1-1b
6	M6	PIPE_3.0	.432	.453	6	.175	14....	6	21.266	65.205	5.749	5.749	3..	H1-1b
7	M10	HSS4x4x4	.005	1.36	4	.091	0	y 3	135.261	139.518	16.181	16.181	1..	H1-1b

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

	Member	Shape	Code Check	Loc...	LC	Shea..	Loc.....	L..	phi*Pn..	phi*Pn..	phi*M...	phi*M...	...	Eqn
8	M11	HSS4x4x4	.007	0	4	.091	0	y 3	135.261	139.518	16.181	16.181	1..	H1-1..
9	M12	HSS4x4x4	.005	1.36	1	.091	0	y 6	135.261	139.518	16.181	16.181	1..	H1-1b
10	M13	HSS4x4x4	.008	0	5	.094	2.7...	y 3	135.261	139.518	16.181	16.181	1..	H1-1..
11	M14	HSS4x4x4	.005	1.36	1	.094	2.7...	y 6	135.261	139.518	16.181	16.181	1..	H1-1b
12	M15	HSS4x4x4	.004	1.36	4	.094	0	y 3	135.261	139.518	16.181	16.181	1..	H1-1b
13	M16	PIPE_2.0	.192	3	4	.018	3	4	20.867	32.13	1.872	1.872	1..	H1-1b
14	M17	PIPE_2.0	.895	4	4	.057	4	4	14.916	32.13	1.872	1.872	1..	H1-1b
15	M18	PIPE_2.0	.179	3	4	.017	3	4	20.867	32.13	1.872	1.872	1..	H1-1b
16	M19	PIPE_2.0	.192	3	1	.018	3	1	20.867	32.13	1.872	1.872	1..	H1-1b
17	M20	PIPE_2.0	.895	4	1	.057	4	1	14.916	32.13	1.872	1.872	1..	H1-1b
18	M21	PIPE_2.0	.179	3	1	.017	3	1	20.867	32.13	1.872	1.872	1..	H1-1b
19	M22	PIPE_2.0	.191	3	4	.018	3	5	20.867	32.13	1.872	1.872	1..	H1-1b
20	M23	PIPE_2.0	.894	4	4	.057	4	4	14.916	32.13	1.872	1.872	1..	H1-1b
21	M24	PIPE_2.0	.179	3	4	.017	3	5	20.867	32.13	1.872	1.872	1..	H1-1b



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek		
TJL	CTHA140A - Mount	Aug 7, 2018 at 3:55 PM
18098.03	Unity Check	Mount.r3d

Exhibit F

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CTHA140A

HA140/BloomfieldPolice_MP
785 Park Avenue
Bloomfield, CT 06002

August 13, 2018

EBI Project Number: 6218005569

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	15.12 %

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

August 13, 2018

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

Emissions Analysis for Site: **CTHA140A – HA140/BloomfieldPolice_MP**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **785 Park Avenue, Bloomfield, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **785 Park Avenue, Bloomfield, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 1 GSM channel (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 15 Watts per Channel.

2) 1 UMTS channel (AWS Band – 2100 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

4) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

6) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

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

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

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

10) The antenna mounting height centerline of the proposed antennas is **138 feet** above ground level (AGL).

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

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 B66A/B2A	Make / Model:	Ericsson AIR32 B66A/B2A	Make / Model:	Ericsson AIR32 B66A/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	138 feet	Height (AGL):	138 feet	Height (AGL):	138 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	200	Total TX Power(W):	200	Total TX Power(W):	200
ERP (W):	7,780.90	ERP (W):	7,780.90	ERP (W):	7,780.90
Antenna A1 MPE%	**1.60**	Antenna B1 MPE%	**1.60**	Antenna C1 MPE%	**1.60**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	138 feet	Height (AGL):	138 feet	Height (AGL):	138 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	55	Total TX Power(W):	55	Total TX Power(W):	55
ERP (W):	2,139.75	ERP (W):	2,139.75	ERP (W):	2,139.75
Antenna A2 MPE%	**0.44**	Antenna B2 MPE%	**0.44**	Antenna C2 MPE%	**0.44**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd
Height (AGL):	138 feet	Height (AGL):	138 feet	Height (AGL):	138 feet
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,443.03	ERP (W):	2,443.03	ERP (W):	2,443.03
Antenna A3 MPE%	**1.20**	Antenna B3 MPE%	**1.20**	Antenna C3 MPE%	**1.20**

Site Summary Tables

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**3.24 %**
Police UHF	**0.07**
Police Back up repeater	**0.10**
Hartford Co. Fire	**0.08**
State Police	**0.36**
NPSAC	**0.01**
RAFS	**0.12**
Verizon Wireless	**5.42**
Sprint	**4.46**
Nextel	**1.10**
Clearwire	**0.16**
Site Total MPE %:	**15.12 %**

T-Mobile Sector A Total:	3.24 %
T-Mobile Sector B Total:	3.24 %
T-Mobile Sector C Total:	3.24 %
Site Total:	15.12 %

T-Mobile Max Power Values (Per Sector)

T-Mobile _Frequency Band / Technology (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile PCS - 1900 MHz LTE	2	1,556.18	138	6.42	PCS - 1900 MHz	1000.00	0.64%
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	138	9.63	AWS - 2100 MHz	1000.00	0.96%
T-Mobile PCS - 1900 MHz GSM	1	583.57	138	1.20	PCS - 1900 MHz	1000.00	0.12%
T-Mobile AWS - 2100 MHz UMTS	1	1,556.18	138	3.21	AWS - 2100 MHz	1000.00	0.32%
T-Mobile 600 MHz LTE	2	788.97	138	3.26	600 MHz	400.00	0.81%
T-Mobile 700 MHz LTE	2	432.54	138	1.78	700 MHz	467.00	0.39%
						Total:	**3.24%**

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	3.24 %
Sector B:	3.24 %
Sector C:	3.24 %
T-Mobile Maximum MPE % (Per Sector):	3.24 %
Site Total:	15.12 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **15.12%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Exhibit G

UNITED STATES POSTAL SERVICE®

Click-N-Ship®

9405 5036 9930 0310 0694 37 0067 0000 0010 6002

usps.com
$6.70
US POSTAGE
Flat Rate Env

P

10/16/2018 Mailed from 06002 062S0000001307

PRIORITY MAIL 1-DAY™

DEBORAH CHASE
T-MOBILE USA- NSS
35 GRIFFIN RD S
BLOOMFIELD CT 06002-1351

Expected Delivery Date: 10/17/18
Ref#: HA140L74X2

0024

Carrier -- Leave if No Response

C017

SHIP TO: SUZETTE DEBEATHAN-BROWN
MAYOR OF BLOOMFIELD CT
800 BLOOMFIELD AVE
BLOOMFIELD CT 06002-2460

USPS TRACKING #

9405 5036 9930 0310 0694 37

Electronic Rate Approved #038555749

Cut on dotted line.

Instructions

1. **Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.**
2. **Place your label so it does not wrap around the edge of the package.**
3. **Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.**
4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0310 0694 37

Trans. #:	446459749
Print Date:	10/16/2018
Ship Date:	10/16/2018
Expected Delivery Date:	10/17/2018

Priority Mail® Postage:	**$6.70**
Total	**$6.70**

From: DEBORAH CHASE
T-MOBILE USA- NSS
35 GRIFFIN RD S
BLOOMFIELD CT 06002-1351

Ref#: HA140L74X2

To: SUZETTE DEBEATHAN-BROWN
MAYOR OF BLOOMFIELD CT
800 BLOOMFIELD AVE
BLOOMFIELD CT 06002-2460

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

UNITED STATES POSTAL SERVICE®

Thank you for shipping with the United States Postal Service!
Check the status of your shipment on the USPS Tracking® page at usps.com

UNITED STATES POSTAL SERVICE®

Click-N-Ship®

9405 5036 9930 0310 0694 44 0067 0000 0010 6002

usps.com
$6.70
US POSTAGE
Flat Rate Env

P

10/16/2018 Mailed from 06002 062S0000001307

PRIORITY MAIL 1-DAY™

DEBORAH CHASE
T-MOBILE USA- NSS
35 GRIFFIN RD S
BLOOMFIELD CT 06002-1351

Expected Delivery Date: 10/17/18
Ref#: HA140L74X2

0024

Carrier -- Leave if No Response

C017

SHIP TO: JOSE GINER
DIRECTOR PLANNING & ZONING
800 BLOOMFIELD AVE
BLOOMFIELD CT 06002-2460

USPS TRACKING #

9405 5036 9930 0310 0694 44

Electronic Rate Approved #038555749

Cut on dotted line.

Instructions

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2. **Place your label so it does not wrap around the edge of the package.**
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4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0310 0694 44

Trans. #:	446459749
Print Date:	10/16/2018
Ship Date:	10/16/2018
Expected Delivery Date:	10/17/2018

Priority Mail® Postage:	**$6.70**
Total	**$6.70**

From: DEBORAH CHASE
T-MOBILE USA- NSS
35 GRIFFIN RD S
BLOOMFIELD CT 06002-1351

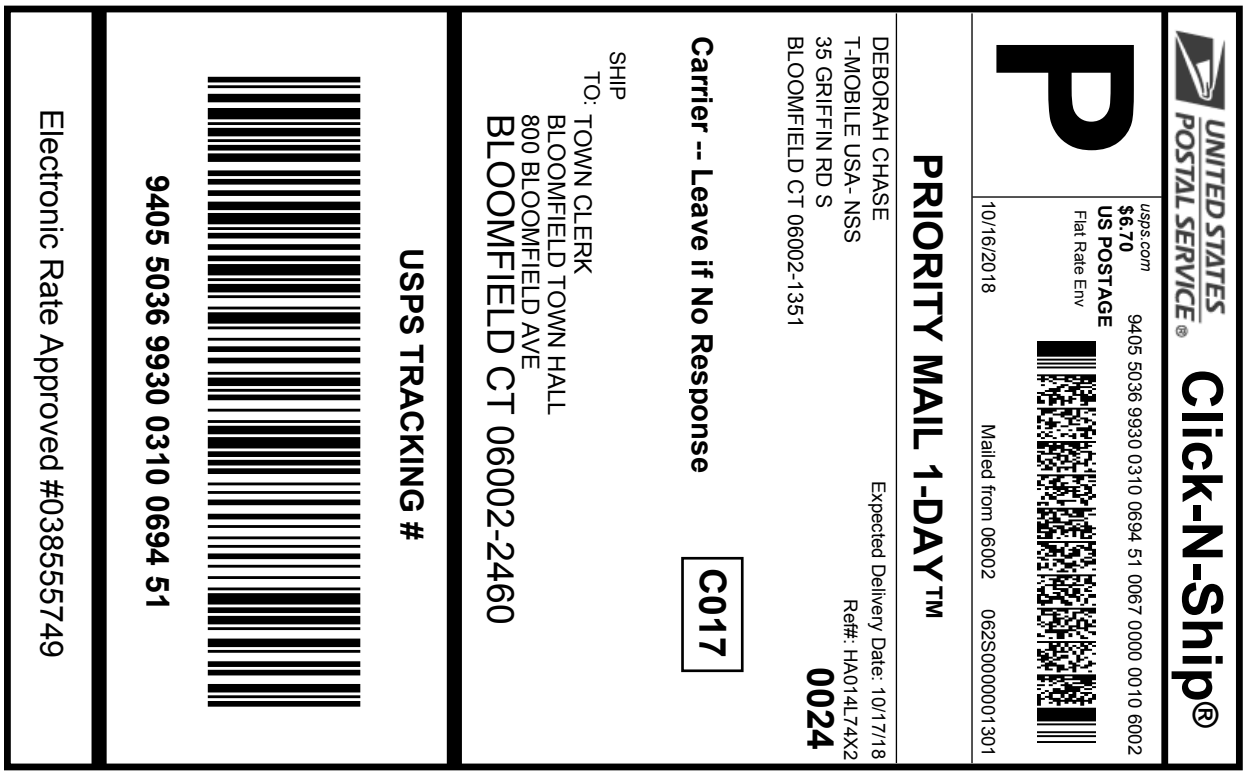
Ref#: HA140L74X2

To: JOSE GINER
DIRECTOR PLANNING & ZONING
800 BLOOMFIELD AVE
BLOOMFIELD CT 06002-2460

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

UNITED STATES POSTAL SERVICE®

Thank you for shipping with the United States Postal Service!
Check the status of your shipment on the USPS Tracking® page at usps.com



Cut on dotted line.

Instructions

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2. **Place your label so it does not wrap around the edge of the package.**
3. **Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.**
4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0310 0694 51

Trans. #:	446459749
Print Date:	10/16/2018
Ship Date:	10/16/2018
Expected Delivery Date:	10/17/2018

Priority Mail® Postage:	**$6.70**
Total	**$6.70**

From: DEBORAH CHASE
T-MOBILE USA- NSS
35 GRIFFIN RD S
BLOOMFIELD CT 06002-1351

Ref#: HA014L74X2

To: TOWN CLERK
BLOOMFIELD TOWN HALL
800 BLOOMFIELD AVE
BLOOMFIELD CT 06002-2460

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

Thank you for shipping with the United States Postal Service!
Check the status of your shipment on the USPS Tracking® page at usps.com

UNITED STATES POSTAL SERVICE®

Shipment Confirmation Acceptance Notice

A. Mailer Action

Note To Mailer: The labels and volume associated to this form online, **must** match the labeled packages being presented to the USPS® employee with this form.

Shipment Date: 10/16/18

Shipped From:

DEBORAH CHASE
T-MOBILE USA- NSS
35 GRIFFIN RD S
BLOOMFIELD CT 06002-1351

Type of Mail	Volume
Priority Mail®	3
Priority Mail Express™*	0
International Mail*	0
Other	0
Total Volume	3

*Start time for products with service guarantees will begin when mail arrives at the local Post Office™ and items receive individual processing and acceptance scans.

B. USPS Action

- USPS EMPLOYEE: Please scan upon pickup or receipt of mail. Leave form with customer or in customer's mail receptacle.
- Employee verifies the package volume count on the Package Pickup Carrier Manifest.
  - If the volume on the manifest matches the volume being collected from the customer, the employee should make the **1:YES** selection by pressing the number 1 on the keypad of the handheld scanner, or on the keyboard of the POS ONE terminal.
  - If the volume on the manifest does not match the volume being collected from the customer, the employee should make the **2:NO** selection**.** The mail should still be collected and dispatched as normal.

USPS SCAN

9475 7036 9930 0288 8075 84